

Grid 797 Pipestone Creek Culvert Replacement

Tender Document

Invitation to Tender



January 16, 2025 | BAR Project No. 24MU-598400

RM of Frenchman Butte No. 501 | Box 180 Paradise Hill, SK S0M 2G0

INVITATION TO TENDER



Sealed Tenders marked: **RM of Frenchman Butte No. 501
Grid 797 Pipestone Creek Culvert Replacement
BAR Project No.: 24MU-598400**

Will be received until **2:00 PM**, local time (MST), **Wednesday, February 19, 2025**.

At the office of: **BAR Engineering Co. Ltd.
5237 – 70 Avenue
Lloydminster, AB
T9V 3N6**

The Work generally consists of:

road reconstruction of approximately 1.5 kilometres of Grid Road 797 in the Rural Municipality of Frenchman Butte No. 501 and the replacement of an existing 68m long 2400mm Ø CSP culvert with a 112m long 2400mm Ø CSP culvert. The Work includes clearing and grubbing, topsoil stripping, approximately 33,340 m³ of common excavation, 50,350 m³ of over-excavation, 70,000m³ of engineered fill to compacted embankment, culvert removal and replacement, subgrade construction, sub-base and granular base course placement, prime coat, tack coat, hot mix asphalt concrete pavement placement, pavement markings, topsoil placement, and seeding.

Tender Documents can be obtained electronically from **SaskTenders**, after **3:00 PM**, local time, **Thursday, January 16, 2025**.

A Pre-Tender Meeting will be held on **Wednesday, January 29, 2025, @ 2:00 PM (MST)** at the office of **BAR Engineering Co. Ltd., 5237 – 70th Avenue, Lloydminster, Alberta, T9V 3N6** and **virtually via Microsoft Teams**, to discuss the project parameters and to take questions from potential bidders. Attendance by bidders at this meeting is encouraged, but not mandatory. Request for the virtual Microsoft Teams meeting login information shall be made to Kelly Stovra at kelly.stovra@bareng.ca.

The Tender submission must be accompanied by a **ten percent (10%) Bid Bond and Consent of Surety** as well as an outline of the Bidder's safety program and policy, or a valid Certificate of Recognition. The successful Bidder shall furnish Performance and Labour and Materials Payment Bonds within fifteen (15) days following confirmation that the Bidder's Tender has been accepted.

The **RM of Frenchman Butte No. 501** reserves the right to reject any or all Tenders or to accept the Tender deemed to be most favourable to the **Owner**, as described in the "Instructions to Bidders". The lowest of any Tender will not necessarily be accepted. The Bidder is hereby advised that the award of a Contract will depend on the Owner receiving regulatory approvals and the Owner reserves the right to not award a Contract if approvals are not received.

For more information, please contact BAR Engineering Co. Ltd., Municipal Division, Kelly Stovra at kelly.stovra@bareng.ca.



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SCOPE OF WORK



1.0 SCOPE OF WORK

The Work generally consists of:

road reconstruction of approximately 1.5 kilometres of Grid Road 797 in the Rural Municipality of Frenchman Butte No. 501 and the replacement of an existing 68m long 2400mm Ø CSP culvert with a 112m long 2400mm Ø CSP culvert. The Work includes clearing and grubbing, topsoil stripping, approximately 33,340 m³ of common excavation, 50,350 m³ of over-excavation, 70,000m³ of engineered fill to compacted embankment, culvert removal and replacement, subgrade construction, sub-base and granular base course placement, prime coat, tack coat, hot mix asphalt concrete pavement placement, pavement markings, topsoil placement, and seeding.

The Contractor shall supply all necessary materials, equipment, tools, labour, supervision, expertise, and incidentals to undertake and complete the Work in accordance with the Plans, Special Provisions, Standard Specifications, and other terms and conditions outlined in this Contract.

This is a "**Unit Price**" Contract.



INSTRUCTIONS TO BIDDERS



2.0 INSTRUCTIONS TO BIDDERS

2.1 Preparation of Tenders

Tenders must be made on the standard Tender Forms provided. Each Bidder shall specify on the Tender Forms the unit price in figures for each of the separate items called for.

2.2 Delivery of Tenders

2.2.1 Hard Copy Submission

Each Tender must be submitted in a sealed envelope plainly marked **RM of Frenchman Butte No. 501; Grid 797 Pipestone Creek Culvert Replacement; BAR Project No.: 24MU-598400** and addressed to the Consultant. Tenders may be delivered by mail or in person to the office of **BAR Engineering Co. Ltd.** and will be received until **2:00 PM**, local time (MST), **Wednesday, February 19, 2025**. No Tender received after this time will be considered.

The following information is also to be clearly stipulated on the outside of the envelope:

- Tender closing date and time
- Bidder's Name and Address

Tenders submitted by facsimile (FAX) and/or by email will not be accepted.

The Bidder acknowledges that their submitted Tender becomes the property of the Owner and will be retained by the Owner after the date of closing of the Tenders.

2.3 Opening of Tenders

2.3.1 Public Opening of Tenders

All Tenders will be opened and read publicly immediately after closing at the office of BAR Engineering Co. Ltd., at **2:00PM**, local time (MST), **Wednesday, February 19, 2025**.

2.3.2 Award

No Contract will be awarded except to responsible Bidders capable of performing the class of work contemplated. The Bidder shall furnish a complete statement of their experience and of the amount of capital and equipment available for the proposed Work as requested in the Tender Forms.

The Owner reserves the right to reject any or all Tenders or to accept the Tender deemed to be most favourable to the Owner. The lowest Tender may not necessarily be accepted.

The Bidder is hereby advised that the award of a Contract will depend on the Owner receiving regulatory approvals and the Owner reserves the right to not award a Contract if approvals are not received.

The Tender submission shall be an **original copy** signed and sealed by the Bidder and shall include all pages contained within Section 3.0 Tender Forms of the Tender Document as well as other documentation identified as being required.

Following are some reasons for which Tenders may be rejected:

- Tenders not accompanied by a Bid Bond or Certified Cheque will be rejected.
- Tenders not accompanied by a Consent of Surety or a letter stipulating the provision of an alternate Form of Security (Guarantee) Bonding will be rejected.
- If the bid is not submitted on the Tender Forms furnished by the Consultant or if the Tender Forms are altered.
- If the Tender Forms are not properly signed.
- If the Tender Forms do not show a price for every Contract item where quantities are indicated.
- If there are any unauthorized additions or erasures or irregularities of any kind which tend to make the Tender incomplete, indefinite or ambiguous as to its meaning.
- If the list of equipment is not supplied or the list of equipment is not sufficient to perform the proposed class of work.
- If the Contractor Capability section is not completed or the earthmoving capability of the Contractor listed is not sufficient to perform the proposed work as a whole (i.e. in its entirety) by the required completion date.
- If any unit bid price is, in the opinion of the Consultant, unreasonably high or low.

Tender submission debriefs, if applicable, will be conducted by phone.

2.4 Tender Deposit

The Tender must be accompanied by a Bid Bond made payable in the name of the Owner in the amount of **ten percent (10%)** of the Tender Amount of the Work. A Certified Cheque in the amount of ten percent (10%) of the Tender Amount of the Work shall be deemed to be an acceptable alternative of Bid Bond.

Certified Cheques of unsuccessful Bidders will be returned as soon as possible after the award of the Contract, or if no Contract is awarded, after the Owner reaches such decision. The Certified Cheque of the successful Bidder will be returned following the receipt of the necessary Security (Guarantee) Bonding and Proof of Insurance coverage, and its execution of the Contract Agreement. This Certified Cheque or Bid Bond shall be retained by the Owner until the Security (Guarantee) Bonding has been furnished and the Contract signed by both parties.

The Contractor agrees that, should anything occur having the effect of a withdrawal or attempted withdrawal of this Tender, either during the time the same is required to be held firm, or if, after having been advised by the Owner of the acceptance of this Tender requiring the Bidder to furnish Security (Guarantee) Bonding within the time as fixed, the Owner shall have the right, in addition to any other legal remedy available to it, to treat any contractual relationship arising out of this Tender as being completely at an end and to retain as liquidated damages the money represented by such Certified Cheque or Bid Bond, and the same shall not be recoverable in any Court.

2.5 Consent of Surety

The Contractor shall, with its Tender submission, submit a “**Consent of Surety**” from a Surety Company licensed to do business in the Province of Saskatchewan stating that it is willing to supply **Security**

(Guarantee) Bonding required for the Contract in the amounts described in the General Conditions of the Contract.

2.6 Contractor's Insurance

The Contractor is advised that they will be required to provide and continuously maintain insurance coverage for the project consistent with the terms and conditions outlined in the General Conditions of the Contract.

2.7 Worker's Compensation Board

The Contractor shall be registered as a member in good standing with the Worker's Compensation Board in the Province of Saskatchewan.

2.8 Contractor's Safety Program

The Tender submission shall also include the Bidder's current valid Certificate of Recognition as issued by Heavy Construction Safety Association of Saskatchewan Inc., or copies of the Bidder's safety program and policy.

2.9 Commencement & Completion of the Work

The Contractor shall be expected to complete all the Work no later than the completion date specified in the Contract Agreement. The Contractor shall, however, state in the Tender Form their anticipated dates of commencement and completion of the Work, as these dates will be used by the Owner in evaluating the Tenders.

No Work shall be done until the Contract has been executed by both parties thereto and the Performance and Labour and Materials Payment Bonds have been filed by the Contractor and accepted by the Owner. The actual Work, excluding processing of aggregates, must be commenced by:

Not earlier than July 1, 2025 and no later than July 10, 2025 or when all approvals and permits are obtained by the Owner. The rate of progress must be such that the whole will be completed on or before October 1, 2025, or such later date as the Owner may for any reason determine.

2.10 Addenda

Addenda, when issued, form part of the Tender Document. The Bidder shall acknowledge receipt of each Addendum in the space provided in the Tender Forms. The individual items in the Addendum shall be added, deleted, or changed in accordance with the instructions contained in the Addendum letter. A copy of each Addendum will be inserted in the Contract Document.

2.11 Unit Prices to Include

The unit prices in the Tender Forms shall be full compensation to the Contractor for all work completed and for goods and services furnished by them to complete the project. Such items as overhead, profit and other miscellaneous expenses are to be included pro rata in the unit prices

2.12 Withdrawal of Tenders

At any time prior to the closing time for bidding, the Bidder may withdraw its Tender by delivering a written notice, signed by an authorized representative of the Bidder, to the Consultant at the delivery location specified in the Invitation to Tender and Instructions to Bidders.

The responsibility for ensuring that any request to withdraw a Tender rests fully with the Bidder, and the Consultant and Owner and their employees or agents shall not be liable nor responsible for such requests not being received or for not achieving the purpose intended, for any reason whatsoever.

2.13 Modifications of Tenders

A Bidder may modify their Tender (including modifications to the Unit Price Schedule) provided the modifications are made prior to 30 minutes before the time set for closing of Tenders. The modified Tender must be resubmitted in writing in accordance with the submission requirements.

For modification of the Unit Price Schedule to be accepted, the entire Unit Price Schedule being modified must be completely filled out and resubmitted for the Tender modification, must be signed by an authorized representative of the Bidder, and received no later than 30 minutes before the time set for closing of the Tenders. Partial modifications, or modifications to specific items in the Unit Price Schedule will not be accepted. The entire complete Unit Price Schedule must be resubmitted for it to be accepted.

The responsibility for any modification of a Tender rests fully with the Bidder, and the Consultant and Owner and their employees or agents shall not be liable nor responsible for such requests not being received or for not achieving the purpose intended, for any reason whatsoever.

2.14 Questions or Inquiries

Questions or inquiries regarding this Tender Document will be considered if received no later than **2:00 PM**, local time (MST), **Thursday, February 13, 2025**. All questions and inquiries must be in writing to Kelly Stovra at kelly.stovra@bareng.ca to be considered. Written Addenda, in response to Bidder questions and inquiries, if required, will be issued in accordance with Section 2.10.

2.15 Bid Evaluation

The Owner will evaluate the Bids based on the following evaluation criteria in awarding the Tender:

Criteria	Weighting
Cost	40%
Contractor's Experience	30%
Contractor's References	30%
Total	100%

2.15.1 Cost Evaluation

The lowest bid will receive the maximum scoring available. All other bids will be proportionately discounted by the percentage it exceeds the low bid price as follows:

- The following formula will be used to calculate the scoring for each bidder:

$$\frac{\text{Lowest Bidder's Tender Price}}{\text{Bid Price being assessed}} \times 40 = \text{Bidder's Score}$$

- Any rejected bids will not be used in the calculation of price weightings.

2.15.2 Experience Evaluation

Each bidder will be evaluated on the reference projects provided in their Tender Forms submission. The listed Project Owner(s) must express satisfaction with the quality of work, efficient use of time and professional conduct of the bidder.

2.15.3 Bidder Reference Evaluation

The Owner reserves the right to ask and judge a bidder's scoring based on any information relevant to the bidder's past projects and capacity of completing the tendered project from the references listed in their Tender Forms submission. In general, but not limited to, references will be asked for information pertaining to the bidder's past work in the following:

- Timelines of project delivery, clean-up, and efficiency in Contract completion.
- Level of project planning and organization.
- Adherence to Contract specifications.
- Control of Sub-contractors and Suppliers.
- Safety and Traffic Accommodation.



TENDER FORMS

The background features several light gray, three-dimensional geometric shapes, primarily triangles and polygons, arranged in a scattered pattern. These shapes have a slight shadow, giving them a sense of depth. The overall design is clean and modern, with a white background and a red vertical bar on the left side.The bottom of the page is decorated with a black and red geometric pattern, consisting of a black triangle on the left and a red triangle on the right, meeting at a diagonal line.

3.0 TENDER FORMS

FOR MUNICIPAL ROAD GRADING, CULVERT REPLACEMENT, AND ASPHALT CONCRETE PAVEMENT STRUCTURE OF:

1.5 KILOMETERS OF MUNICIPAL ROAD

LOCATED:

GRID ROAD 797 ADJACENT TO SE ¼ SECTION 4-54-26-W3 AND SW ¼ SECTION 3-54-26-W3

LOCATED IN:

RURAL MUNICIPALITY OF FRENCHMAN BUTTE NO. 501

3.1 Tender Agreement

THE UNDERSIGNED (the "Contractor"), having read over and examined the General Conditions, the Plans, Profiles (if any), Standard Specifications and Special Provisions furnished with this Tender for the above-mentioned work;

HEREBY TENDERS AND AGREES:

- 3.1.1** To furnish all labour, materials, and equipment required to be furnished and to complete the Work as outlined in the Tender, and in accordance with the Plans, Profiles (if any) forming part hereof, all in accordance with the terms and conditions as set forth herein, at and for the unit prices as set forth in Section 3.2 hereof.
- 3.1.2** That unless, in the meantime, the Consultant shall have advised the undersigned that this Tender has been rejected, the same shall remain firm and open to acceptance by the Owner during a period of **forty five (45)** days following the date fixed for the opening of Tenders in respect to such a Contract. By the act of submitting their Tender, the Contractor waives any right to contest in any legal proceedings or action the right of the Owner to award the Work to whomever it chooses and for whatever reason the Owner deems appropriate.
- No act of the Owner other than a "Notice of Award" in writing shall constitute the acceptance of a Tender. Such Notice of Award shall be signed by the Consultant on behalf of the Owner and forwarded to the selected Contractor at the address given in the Tender Forms and shall bind the Contractor to submit the required Security (Guarantee) Bonds and Proof of Insurance coverage and to execute the Contract within **fifteen (15) days** of the date of the Notice of Award.
- 3.1.3** That the quantities listed in Section 3.2 hereof are **estimates only** and that the actual quantities may vary considerably from such estimates. It is agreed that the quantities of Work to be done or materials to be furnished may be altered by the Consultant and such alterations shall not be considered as a waiver of any condition of the Contract, nor as invalidating any provisions thereof, nor shall any changes be made in the Contract unit prices on account of such alteration, but same unit prices shall apply as if no alterations had been made.

Payment to the Contractor will be made on the basis of the actual quantities of Work performed or materials furnished and used in satisfactorily completing the Work in accordance with the Plans, Standard Specifications and Special Provisions. The actual quantities of Work performed or material furnished and used shall be as determined by measurements made by the Consultant.

3.1.4 Quantity estimate for any portion of the project covered by the Contract on which the design has been altered subsequent to the preparation of the plans shall be recalculated.

3.1.5 The Council of the Rural Municipality of Frenchman Butte No. 501, hereby appoints the following person(s) who shall administer the Contract for the Owner.

The person(s) appointed shall be:

Kelly Stovra
Senior Technologist, Municipal Division
BAR Engineering Co. Ltd.
5237-70 Avenue
Lloydminster, AB T9V 3N6
T: 780-875-1683

3.1.6 We understand and agree that the Owner reserves the right to increase, decrease, delete, or vary any portion of the Work and we offer to do the Work whether the quantities are increased or decreased at the unit prices attached hereto.

We further agree that if our offer is accepted, we will submit the required Security (Guarantee) Bonds and Proof of Insurance coverage and will execute the Contract within **fifteen (15) days** of the issuance of the Notice of Award.

If our quotation is accepted, we agree to commence the Work by _____ and to complete the Work on or before _____, or such later date as the Owner may for any reason accept or approve.

Enclosed with our submission is the following documentation:

- Force Account Rates
- Bid Bond in the amount of ten percent (10%) of our Tender amount
- Consent of Surety
- Certificate of Recognition or copy of Corporate Safety Program/Policy

Name of Individual, Partnership or Corporation

Business Address

BY: _____
Name of Authorized Signing Officer

CORPORATE SEAL

Contractor's G.S.T Registration Number

Dated _____

3.2 Unit Prices

3.2.1 Unit Price Schedule "A"

Item #	Description	Est'd Quantity	Unit	Unit Price (\$)	Extension (\$)
Grid 797 Pipestone Creek Culvert Replacement					
PART A: Mobilization					
1.0	Mobilization				
.1	Mobilization	1	ls	_____	_____
PART A Tender Amount \$					
PART B: Earthworks					
1.0	Removals				
.1	Removal of Topsoil Including Hauling	6650	m ³	_____	_____
.2	Clearing and Grubbing	0.74	ha	_____	_____
2.0	Common Excavation Including Hauling				
.1	Common Excavation to Stockpile Including Hauling	3350	m ³	_____	_____
.2	Common Excavation to Compacted Embankment Including Hauling	30000	m ³	_____	_____
3.0	Waste Excavation Including Hauling				
.1	Waste Excavation to Stockpile Including Hauling (Provisional Item)	1000	m ³	_____	_____
.2	Spreading and Shaping Over-Exc. and Waste Excavation Stockpile(s) Including Hauling	14000	m ³	_____	_____
4.0	Over-Excavation Including Hauling				
.1	Over-Excavation to Compacted Embankment Including Hauling (Provisional Item)	1000	m ³	_____	_____
.2	Over-Excavation to Stockpile Including Hauling	37500	m ³	_____	_____
.3	Over-Excavation to Waste Stockpile	13000	m ³	_____	_____
5.0	Fill (Culvert Backfill, Embankment Fill) Including Hauling				
.1	Stockpile (Common Exc. And Over-Exc.) to Compacted Embankment Including Hauling	40850	m ³	_____	_____
6.0	Miscellaneous				
.1	Granular Fill for Over-Excavation Areas (Provisional Item)	500	m ³	_____	_____
.2	Supply and Install Woven Geotextile for Bottom of Over-Excavation Areas (Provisional Item)	1000	m ²	_____	_____
PART B Tender Amount \$					

Item #	Description	Est'd Quantity	Unit	Unit Price (\$)	Extension (\$)
PART C: Culverts					
1.0	Removing Culverts from Roadway and Disposing				
.1	=<750 mm diameter	20	m		
.2	2400mm diameter	68.5	m		
2.0	Supply 2400mm Diameter CSP Culvert Materials from RM Supplier (SP 6.15.1)	1	CA	\$ 238,370.60	\$ 238,370.60
3.0	Installing Culverts in Roadway as Directed				
.1	500mm diameter, Owner Supplied (Incl. Excavation and Backfill)	100	m		
.2	2400mm diameter	112	m		
.3	Culvert End Stiffener (2400mm dia. Inlet End)	1	ea.		
.4	Supply and Install Woven Geotextile (under granular backfill)	1000	m ²		
.5	Granular Backfill, Owner Supplied	4500	t		
4.0	Rip-Rap				
.1	Supply and Install Woven Geotextile (under rip-rap)	400	m ²		
.2	Type I (300-600mm) Rip-Rap, Owner Supplied	400	m ²		
PART C Tender Amount \$					
PART D: Pavement Structure					
1.0	Subgrade				
.1	Subgrade Construction	14000	m ²		
.2	Supply and Install Woven Geotextile (Provisional Item)	500	m ²		
.3	Supply and Install Non-Woven Geotextile (Provisional Item)	500	m ²		
.4	Supply and Install CombiGrid (Provisional Item)	2000	m ²		
2.0	Asphalt Concrete Pavement Structure				
.1	Sub-base Course (Type 8) - 250mm Compacted Depth, Owner Supplied	11300	tonnes		
.2	Granular Base Course (Type 33) - 150mm Compacted Depth, Owner Supplied	5800	tonnes		
.3	Prime Coat	14000	m ²		
.4	Tack Coat	25650	m ²		
.5	Hot-Mix Asphalt (Type 2) – 125mm Compacted Thickness, Aggregate Provided by Owner	4300	tonnes		
3.0	Pavement Markings	1	ls		
PART D Tender Amount \$					

Item #	Description	Est'd Quantity	Unit	Unit Price (\$)	Extension (\$)
PART E: Environmental, Landscaping, & Miscellaneous					
1.0	Environmental				
.1	Care of Water (SP 6.15.6)	1	ls	_____	_____
.2	Supply and Install Silt Fence	200	m	_____	_____
.3	Supply and Install Silt Curtain (Provisional Item)	30	m	_____	_____
.4	Supply and Install Erosion Control Blanket (Provisional Item)	400	m ²	_____	_____
.5	Supply and Install GeoRidge BIO (Provisional Item)	400	m	_____	_____
2.0	Landscaping				
.1	Replacing Topsoil including Hauling	6650	m ³	_____	_____
.2	Seeding	5.4	ha	_____	_____
3.0	Miscellaneous				
.1	Care of Utilities	1	ls	_____	_____
PART E Tender Amount \$					_____
PART F: Site Occupancy					
1.0	Site Occupancy	_____	days	\$ 6,000.00	_____
PART F Tender Amount \$					_____
SUMMARY OF ALL PARTS					
PART A Tender Amount \$					_____
PART B Tender Amount \$					_____
PART C Tender Amount \$					_____
PART D Tender Amount \$					_____
PART E Tender Amount \$					_____
SUBTOTAL BID AMOUNT \$					_____
PART F Tender Amount \$					_____
SUBTOTAL BID AMOUNT \$					_____
PST @ 6%					_____
GST @ 5%					_____
TOTAL BID AMOUNT \$					_____

Notes:

- (a) Goods and Services Tax shall be in addition to the Unit Prices and Extensions in Section 3.2.
- (b) Provincial Sales Tax shall be in addition to the Unit Prices and Extensions shown in Section 3.2.

3.2.2 Unit Price Schedule “B” – Alternate Work Quantities and Unit Prices

None Included

3.4 Contractor Capability

The following information is considered essential to the acceptance of any Tender and must be completed:

- a. Contractor's estimated seasonal earthmoving capacity for equipment listed.

Excavation _____ Haul _____

- b. Contractor's commitment to date for equipment listed.

Rural Municipality or Other Agency	Length	Excavation	Haul	Completion Date
1.				
2.				
3.				
4.				
5.				

- c. Contractor's experience in the construction of Municipal Road Grading, **Large Diameter Culvert Replacement**, and Asphalt Concrete Paving within the province of Saskatchewan in the past five (5) years.

Project 1	
Rural Municipality or Other Agency	
Owner Contact and Phone Number	
Length of Project	
Excavation	
Haul	
Completion Date	
Other Details	

Project 2	
Rural Municipality or Other Agency	
Owner Contact and Phone Number	
Length of Project	
Excavation	
Haul	
Completion Date	
Other Details	

Project 3	
Rural Municipality or Other Agency	
Owner Contact and Phone Number	
Length of Project	
Excavation	
Haul	
Completion Date	
Other Details	

Project 4	
Rural Municipality or Other Agency	
Owner Contact and Phone Number	
Length of Project	
Excavation	
Haul	
Completion Date	
Other Details	

Project 5	
Rural Municipality or Other Agency	
Owner Contact and Phone Number	
Length of Project	
Excavation	
Haul	
Completion Date	
Other Details	

d. Contractor's reference for three (3) separate projects occurring within the past five (5) years.

Reference Name	Title	Phone No.	Project Information

The Contractor will be required to provide a formal schedule in the form of a "Gantt" chart which may be updated with ease on a weekly basis for review and discussion at project meetings, and capable of being amended to provide an indication of percent completion of the scheduled tasks in context with the project milestones.

3.6 Acknowledgement of Addenda Received

We, the Bidder, acknowledge receipt of the following addendums:

#1 _____

#2 _____

#3 _____

#4 _____

(Contractor's Signature)

(Date)

(Name of Contractor)

3.7 List of Supervisory Personnel

List below the key personnel who would be associated with the project and what their duties would be, and attach resumes outlining qualifications and experience.

Name	Position	Experience
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

3.8 List of Materials Suppliers & Subcontractors

The following Materials Suppliers and Subcontractors will be employed in the performance of the Work under this Contract. No Subcontractors will be added, deleted, or changed without the approval of the Consultant to a request made in writing by the Contractor.

Subcontractor	Address	Type of Work/Materials Supplied

3.9 Force Account Rates

In the event that the Contractor may be requested to perform Work not covered by the unit prices contained in the Tender Forms, **the Contractor is requested, as part of their Tender submission, to submit their Force Account Rates.** These Force Account Rates shall include:

- Labour

All classification of labour and supervision along with their hourly rates and overtime rates and which shall also include an allowance for payroll costs, fringe benefits, accommodation and board allowance, and profit.

- Equipment

The rates for equipment, vehicles, and power tools shall include operator wages, all maintenance and operation costs, and the Contractor overhead and profit. All equipment will be paid for at the Contractor's established rates but such rates, however, shall not exceed the rates listed in the latest edition of the "Equipment Rental Rates and Membership Guide" published by the Road Builders and Heavy Construction Association of Saskatchewan.

- Subcontract Work

An allowance to the Contractor for profit, superintendence, and all other related expenses shall not exceed **ten percent (10%)** of the Subcontractor's bill for such work.

- Materials

Materials provided by the Contractor shall be paid for at the suppliers' invoice price plus an additional amount not exceeding **ten percent (10%)** of the cost to cover handling, storage, and indirect overhead costs.

It is expressly understood and agreed that only Work authorized by the Consultant in writing shall be undertaken and carried out under Force Account.

NOTES:

- The Contractor shall furnish original receipted bills to verify the cost of materials purchased by them and used on the Force Account work.
- The cost of labour and equipment rental charges shall be furnished by the Contractor.
- Accounts for Force Account work must be submitted to the Consultant.
- The Consultant, if it deems it necessary, shall provide and place a timekeeper or timekeepers on the Work for the purpose of keeping records of the costs of Force Account work.
- The Contractor shall not be entitled to anticipated profits which men, machinery, or equipment might have earned through not having been employed on Force Account work.



CONTRACT AGREEMENT



4.0 CONTRACT AGREEMENT

THIS AGREEMENT, dated this _____ day of _____, 2025.

by and between: _____

(hereinafter called the "Contractor") and the **Rural Municipality of Frenchman Butte No. 501** (hereinafter called the "Owner") of the Province of Saskatchewan.

WITNESSETH THAT:

The Contractor and the Owner undertake and agree that:

1. The Contractor will construct to the required Road Standards, the roads located at:

GRID 797 ADJACENT TO THE SE ¼ SECTION 4-54-26-W3 AND SW ¼ SECTION 3-54-26-W3

In accordance with the Tender Forms, General Conditions, Standard Specifications, Special Provisions and Plans furnished with and identified in the Tender;

2. The aforesaid Tender Forms, General Conditions, Standard Specifications, Special Provisions, Plans and addenda hereto attached, together with the Contractor's bond, are hereby made and shall be considered part of this Agreement the same as if herein fully set forth;
3. **IN CONSIDERATION WHEREOF**, and upon the Contractor constructing and fully completing **by October 1, 2025** the Works herein contracted for in accordance with the agreements herein set forth, the Owner agrees to pay unto the Contractor for the actual amount of work done and materials in place at the unit prices stated in the Contractor's attached Tender;
4. As a condition precedent to the complete execution of this Agreement, the Contractor will furnish to the satisfaction of the Owner good and sufficient Performance and Labour and Materials Payment Bonds each in the amount of \$_____dollars, **in the name of the Owner**, to be conditioned upon the faithful performance of the covenants and agreements as herein set forth by it to be performed;
5. Neither party of the Contract shall assign, transfer or sublet the Contract, or any part thereof, without the written consent of the other.
6. No implied contract of any kind whatsoever, by or on behalf of the Owner, shall arise or be implied from anything contained in this Contract or from any position or situation of the parties at any time, it being understood and agreed that the express contracts, covenants, and agreements contained herein and made by the parties hereto are and shall be the only contracts, covenants, and agreements on which any rights against the Owner may be found.
7. The Contractor shall furnish all labour, supervision, technical skills and knowledge, materials, tools and equipment, together with all necessary work incidental thereto, required to perform all Work and shall do and fulfill everything set out in this Contract Agreement and the Contract Documents so as to complete the project of undertaking for which Tenders were called.
8. The Owner shall, in the manner described in the General Conditions of the Contract Documents and upon being satisfied that the Contractor has satisfactorily completed the Work or portions

thereof, will make monthly payments to the Contractor for the Work completed with such payments calculated on the basis of the actual Work completed at the unit prices Tendered.

9. Nothing in this Agreement shall require the Owner to pay for goods, materials or services other than those actually supplied by the Contractor and incorporated into the Work, notwithstanding the estimated quantities set out in the Tender Forms.

This Contract shall ensure to the benefit of and be binding upon the parties hereto, and their successors, executors, administrators and assigns.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement on the date which is indicated first herein.

_____)

SIGNED, SEALED AND DELIVERED

_____)

_____)

Contractor

In the presence of

Contractor's G.S.T Registration Number

(Witness)

Rural Municipality of Frenchman Butte No. 501

Reeve

Rural Municipality Administrator

In the presence of

(Witness)



GENERAL CONDITIONS



5.0 GENERAL CONDITIONS

5.1 Definitions

a. Contractor:

The word "Contractor" shall, unless the content otherwise requires, include the authorized agents of the Contractor or the Foreman in charge of the work.

b. Rural Municipality:

The word "RM" or "Owner" shall mean the **Rural Municipality of Frenchman Butte No. 501** Council or its designated representative(s).

c. Interpretation:

Where there is any doubt as to the intention, or the correct interpretation of the specifications herein, the matter shall be referred to the Consultant.

d. Consultant:

The word "Consultant" shall mean **BAR Engineering Co. Ltd.**, acting through a delegate duly appointed to act on its behalf to administer the Contract.

5.2 Times and Manner of Payment

The Owner will well and truly pay or cause to be paid unto the Contractor for the said works at the price as shown in the Tender Forms. Payments will be made as follows:

5.2.1 Progress Payments

The monthly estimates and payments are approximate only but shall be as close to the actual value as is practicable and shall be subject to correction in the final estimate and payment. **If carry over work from one construction season to the next construction season is required, the final estimate for each construction season will be considered as the final estimate and payment for that applicable construction season. Adjustment to the previous construction season final estimate and payment will not be permitted in subsequent construction seasons.**

The Owner shall make monthly payments to the Contractor for the Work completed based on Progress Payment Certificates prepared by the Consultant. Payments will be calculated on the basis of the actual Work completed, as measured by the Consultant, at the unit prices Tendered for the Work together with any Force Account or Extra Work that may have been approved.

Such monthly payments shall be due and payable to the Contractor within **thirty (30) days** of the date that a Progress Payment Certificate is signed by the Consultant.

The Owner shall retain a Holdback in the amount of **ten percent (10%)** of the value of each progress estimate. Bonding in lieu of the **10%** Holdback will not be accepted by the Owner.

The Owner reserves the right to apply a Deficiency Holdback against the Contractor for Work that has not been satisfactorily completed and rectified. Such deficiency holdback shall be two (2) times the estimated value of the deficient Work.

If because of climatic or other conditions reasonably beyond the control of the Contractor, there are items of work that cannot be performed, payment in full for that portion of the Work which has been performed as certified by the Consultant shall not be withheld or delayed by the Owner on account thereof, but the Owner may withhold, until the remaining portion of the Work is finished, only such an amount that the Consultant determines is sufficient and reasonable to cover the cost of performing the remaining work.

After a minimum of **forty-five (45) days** has expired from the date of the construction completion, the Owner will release the full amount of the Holdback to the Contractor, provided that all of the following have occurred:

- All Work has been completed and accepted by the Consultant and the Owner and the Contractor has complied with all the terms of the Contract;
- There are no outstanding third party claims filed with the Owner or Consultant;
- The final payments have been calculated by the Consultant and accepted by the Owner and there is no recovery required from the Contractor on any account, including overpayment, liquidated damages, or penalty;
- The Consultant has received from the Contractor confirmation from the Saskatchewan Workers' Compensation Board that the Contractor is in good standing;
- The Consultant has received a Statutory Declaration executed by the Contractor stating that it has discharged every obligation under this Contract and that it has made full payment to all creditors for all labour, equipment, materials and services used in the performance of the Work under this Contract, including full payments to all Subcontractors and the Workers' Compensation Board;
- The Contractor has provided the Consultant with written confirmation that it is in full compliance with all environmental approvals, permits, licences, and/or written authorizations for the Work; and,
- The Contractor has submitted a certificate of payment from the Saskatchewan Ministry of Finance stating the Contractor has obtained Provincial Sales Tax (PST) Clearance (if applicable).

If the Contractor fails to meet its obligations with respect to any of the afore-mentioned items, the Owner may use the Holdback funds to rectify the deficiency, in accordance with the terms of this Contract and the Public Works Act.

5.2.2 Final Payment

The Contractor shall have thirty (30) days from receipt of the final quantity statement from the Consultant to advise the Consultant of its non- acceptance of the quantities, if applicable.

If carry over work from one construction season to the next construction season is required, the final quantity estimate for each construction season will be considered as the final quantity statement and payment for that applicable construction season. Adjustment to the previous construction season final estimate and payment will not be permitted in subsequent construction seasons.

5.3 Materials

No claim for damages shall be made against the Owner on account of delays on the part of the Owner in the delivery of materials for performance of the Work. Should there be unduly prolonged delays on the part of the Owner in the delivery of any materials or the performance of Work, the Contractor shall be entitled to a corresponding extension of time within which to complete the Work.

5.4 Supervision and Acceptance of Work

The person or persons appointed by the Owner in the Tender Forms shall have duties, authority and responsibilities as follows:

- a. To supervise the Works to appraise that the Work is being carried out according to the Contract documents, and give the Contractor written points of instruction.
- b. To act on behalf of the Owner to expedite removal or relocation of obstructions to the Work such as fences and utilities, and to ensure the prompt arrangement for purchase, lease or easement of right-of-way and borrow pits; and to expedite prompt delivery of materials and supplies to be supplied by the Owner.
- c. To arrange and conduct a pre-job meeting with the Owner, Consultant and Contractor to discuss scheduling of the Contractor's work, delivery of materials by the Owner, schedules of utility location, relocation or removal.
- d. To inspect the finished work of the Contractor and provide a written acceptance or a written list of deficiencies.
- a. To ensure that the Contractor's invoices or the Consultant's payment certificate for Work completed are dealt with by the RM Council in the times and manner prescribed elsewhere in the Contract documents.

5.5 Extension of Contract Time of Completion

If the satisfactory execution and completion of the Contract shall require work or material in substantially greater amounts or quantities than those set forth in the Contract, then Contract times shall be increased in the same proportion as the additional work bears to the original Work contracted for. No allowance shall be made for delay or suspension of the prosecution of the Work due to the fault of the Contractor. Provided, however, that upon receipt of written notice from the Contractor of the existence of causes over which it has no control and which must delay the completion of the Work, the Owner may at its discretion by resolution of its Council extend the date specified for the completion of the said Work. In such case the Contractor shall become liable for liquidated damages for failure to perform Work within the time as so extended in accordance with the provisions of the immediately preceding paragraph.

5.6 Cancellation or Default

If, in the opinion of the Owner, the rate of progress, at any time, is not such as to ensure the completion of the Work by the completion date as provided in the Contract or within such extended time as may have been granted under Section 5.5 hereof, or if the Contractor shall neglect or refuse or fail in any respect to comply with any other provisions of this Contract, the Owner reserves and may exercise the right to cancel or annul this Contract and make other provisions for the Work being completed. The Contractor shall not be entitled to claim damages on account of anticipated profits or for other reasons.

If the Owner exercises its right of cancellation as provided for in this clause, the Contractor shall not be entitled to receive any further payment under this Contract until the said Work has been wholly completed. At such time, if the unpaid balance of the amount to be paid under this Contract exceeds the expense incurred by the Owner in completing the Work; then such excess shall be paid to the Contractor by the Owner. If such expense exceeds such unpaid balance, the Contractor and its sureties shall be jointly and severally liable to pay such excess to the Owner.

The Owner, if it considers it advisable, may use all or any part of the Contractor's appliances, tools, materials, and means of construction as may be found in connection with said Work and which may be required for the completion of the Contract.

The cost of any such materials used in the Work shall be allowed for at prices shown by proper vouchers and receipts, and reimbursement for any plant or tools so used and for any additional plant required shall be made on the basis of depreciation for the time it is used on the work at a rate that will equal the actual cost of the plant in twelve (12) months' use, and ten (10) percent for organization, superintendence, etc.

5.7 Extra Work (Force Account)

If, during the performance of the Contract, it shall become necessary or desirable for the proper completion of the Work to order additional Work done or materials furnished, which are not susceptible to classification under the prices set out in this Contract, the Contractor shall, if ordered in writing by the Consultant, do and perform such work and furnish such materials. The extra work will be paid for at a unit price or lump sum to be agreed upon previously in writing by the Contractor, Owner and Consultant.

5.8 Labour

The Contractor agrees that all persons employed on the Work by the Contractor and any sub-contractor of the Contractor will, in respect of the construction to be carried out under this Contract, employ only residents of Canada. In employing persons, the Contractor will refrain from discriminating against any person by reason of their race, sex, religious or political affiliations.

The Contractor shall, at all times during its absence from the Work, have a competent superintendent or foreman as its representative on the job, and who shall receive instructions from the Consultant.

The Contractor shall, at all times, provide adequate supervision and sufficient labour and equipment for prosecuting the several classes of Work to full completion in the manner and within the time required by the Contract.

The Contractor shall only employ foremen and workmen who have sufficient skill and experience to perform properly the Work assigned to them. Any person employed on the Work who, in the opinion of the Owner, is careless, incompetent, obstructs the progress of work, acts contrary to instructions or conducts themselves improperly shall, on the requisition of the Consultant, be immediately discharged. Such person shall not again be employed on the job without the permission of the Consultant.

5.9 Payment by Contractor for Labour, Etc.

The Contractor shall promptly pay for all labour expended, services given, and materials and supplies used in, upon, in respect of, or about the construction of the Work, or any portion thereof, including any sum due for the labour or services of any sub-contractor foreman, workman, labourer or other person. The Contractor shall also pay any sum due for insurance premiums, whether such payments or insurance premiums are due by the Contractor, or any sub-contractor. The payments in respect of such labour, services, materials and supplies to include without prejudice to the foregoing generality all sums for:

- a. The services of any person or persons performing any work or labour in repairing machinery and equipment;
- b. The use, rent or hire of:
 1. Vehicles or other plant or machinery;
 2. Motor power equipment of any kind;
- c. The furnishing of any handtools;
- d. The materials or supplies for any camp maintained for the feeding or keeping of persons; and

- e. Supplies used for machinery or motor power equipment (except repair parts).

And the Contractor further agrees that the Contract bond shall be held to cover all such claims referred to in this clause. In case any such sum or sums remain unpaid which, in the opinion of the Owner should be paid, the Owner shall have the right to pay such sum or sums, whether due by the Contractor or sub-contractor, out of any monies that may then or thereafter be or become due to the Contractor from the Owner. It is agreed that so long as any such sum or sums remain unpaid, the payrolls, timebooks, account books, invoices and vouchers of the Contractor or any sub-contractor relating to any such unpaid sum or sums shall be open to inspection by the Owner for the purpose of ascertaining the true sum or sums remaining unpaid.

The Contractor shall supply to the Owner when and as often as requested, a statement showing all claims incurred by the Contractor, including all obligations incurred by each sub-contractor on the work covered by the Contract, remaining unpaid at the date of submission of such statement. The submission of each statement by the Contractor, when so requested, shall be a condition precedent to the payment by the Owner of any monies due or to accrue due to the Contractor under the Contract.

5.10 Accidents

The Contractor shall at all times, until the Work is completed and accepted by the Owner, take all necessary and sufficient precautions and steps to prevent and avoid accidents to workmen or other persons, or to the Work or other property. The Contractor shall provide and maintain at its own expense such fences, barriers, signs, lights and watchmen as may be necessary.

In the event of injury or damage being suffered by any workman or other person having the right of action thereafter against the Contractor or against the Owner, the Contractor shall and will indemnify and save harmless the Owner from any and all actions, causes of action, claims, demands and remedies whatsoever which the workman or other person may have or pretend to have against the Owner in respect of such damages or injury under the Workers' Compensation Act, or otherwise howsoever.

In the event of one or more actions, claims, or demands being made or commenced by any workman or workmen or other person or persons in respect of any injury or damages alleged to have been suffered as aforesaid, the Owner shall be entitled to retain out of any monies owing or accruing due to the Contractor, until such actions, claims or demands are satisfied, an amount equal to the total of the claim or claims.

5.11 Traffic and Detours

The Contractor shall at all times carry out the Work in a manner that will create the least interference with traffic, consistent with the faithful performance of the work. The Contractor shall not close any portion of the roadway, nor divert traffic outside the limits of the roadway, except by written approval of the Owner.

Warning signs, as outlined in the annexed specifications, are to be erected before the Work is commenced and are not to be removed until the Work has been completed. The Owner or the Consultant may instruct the Contractor to cease construction operations until such time as proper signing has been erected. Failure by the Contractor to erect signs to the required specifications will render the Contractor liable for any action that may result due to its negligence.

5.12 Security (Guarantee) Bonds

The successful Bidder shall deposit with the Owner, through the Consultant, prior to the time of signing the Contract Agreement, the following Security (Guarantee) Bonds:

- A **Performance Bond** in the amount of **fifty percent (50%)** of the Contract Tender Amount for due performance of the Contract;

- A **Labour and Materials Payment Bond** in the amount of **fifty percent (50%)** of the Contract Tender Amount for the payment in full of claims for the labour and material used or reasonably required for use in the performance of the Contract.

The same Surety Company providing the Consent of Surety shall issue the respective Security (Guarantee) Bonds.

The cost of securing and providing all Security (Guarantee) Bonds shall be borne by the Contractor and the Contractor shall continuously carry and maintain the Security (Guarantee) Bonding, at its entire cost, for the duration of the Contract until all the Work has been satisfactorily completed.

As an alternative to providing Security (Guarantee) Bonds, an Irrevocable Letter of Credit, Certified Cheque, Bank Draft, or Money Order may be used as a security (guarantee) in lieu of the Performance and Labour and Materials Payment Bonds. The value of these alternative security (guarantee) instruments shall be equivalent to the value required for the Bonds.

No Work under the Contract shall be commenced unless the Security (Guarantee) Bonds are in place.

5.13 Liability Insurance

The Bidder whose Tender has been accepted shall, prior to the execution of the Contract, file with the Owner a written declaration by its insurance company as evidence that it carries the following insurance, as well as any additional insurance or special coverage that is indicated in the Special Provisions.

Without limiting any of the Contractor's obligations or liabilities under the Contract Documents, the Contractor shall, and shall cause its Subcontractors to, obtain and continuously carry and maintain, while the Work is being performed including as may be required any remedial Work, at the Contractor's expense and cost, the following insurance coverage with minimum limits not less than those stated:

a. General Liability Insurance

General liability insurance in a Form acceptable to the Owner, with limits of not less than **five million dollars (\$5,000,000)** inclusive per occurrence for bodily injury, death, and damage to property including loss of use thereof. Such coverage shall be endorsed to include, but not necessarily limited to, Products and Completed Operations hazards, Contractual Liability (including liability assumed under this Contract), and Owner's and Contractors Protective Liability coverage, and shall cover liability arising out of this Contract and all operations necessary or incidental thereto.

The General liability insurance shall include the Owner and the Consultant as additional named insured under this policy for any and all claims arising out of the Contractor's operations and shall also cover as unnamed insureds all Subcontractors, materials suppliers, and anyone employed directly or indirectly by the Contractor or its Subcontractors to perform a part or parts of the Work.

b. Automobile Liability Insurance (Owned and Non-owned)

Automobile liability insurance with respect to licensed vehicles (in respect of vehicles that are required by law to be insured), with coverage limits of not less than **two million dollars (\$2,000,000)**, inclusive per occurrence for bodily injury, death, and damage to property, covering all licensed vehicles, owned, leased, rented or used by the Contractor.

All policies of insurance shall be in a form acceptable to the Owner and shall not allow subrogation claims by the insurer against the Owner or Consultant and must state so on the insurance certificate. A **Waiver of Subrogation** shall be identified on the Certificate of Insurance.

The specified limits of insurance and coverage in no way define or limit the obligation of the Contractor to indemnify the Owner in the event of loss.

All policies of insurance shall provide that at least thirty (30) days prior written notice be given to the Owner in the event of cancellation or amendment restricting coverage.

Certified copies of such insurance coverage shall be filed with the Owner, through the Consultant prior to the execution of the Contract Agreement. No Work under the Contract shall be commenced unless the required insurance is in place.

5.14 Assignment of Contract

The Contractor shall not, without the prior written consent of the Owner, make any assignment of this Contract or enter into any sub-contract for the execution of any of the Works hereby contracted for, and no assignment or sub-contract, even though duly consented to, shall exonerate the Contractor from liability under this Contract for the due performance of the Works hereby contracted for, or for the fulfilment of any other term or terms of the Contract. In such case, the Contractor shall be responsible for all acts, defaults, neglects and delays of any assignee or sub-contractor, or its servants, agents and employees, to the same extent as if no such assignment or sub-contract had been made or entered into.

5.15 Cancellation Without Fault of Contractor

The Owner shall have the right at any time to cancel this Contract upon giving thirty (30) days notice in writing to the Contractor, in which event the Contractor shall be entitled to the full amount of the estimate for the work done by them under the terms and conditions of this Contract up to the time of such cancellation.

The Contractor shall be reimbursed by the Owner for such expenditures as in the judgement of the Council of the RM are not otherwise compensated for.

The Owner shall have the right to make such reasonable alterations in the Plans as it may consider necessary and such alterations shall not be considered as a waiver of any condition of the Contract or as invalidating any provisions thereof, nor shall any change be made in the Contract unit prices on account of such alterations.

5.16 Removal of Surplus Material and Refuse

On the completion of the Work entailed by the Contract, or in the event of its cancellation, the Contractor shall promptly remove from the right-of-way of roads herein described, and from any adjoining road, all temporary structures, rubbish and waste materials resulting from its operations, and all equipment, supplies and surplus materials.

In the event of the Contractor failing to comply with this provision within a period of ten (10) days from the date of the completion or cancellation of this Contract, the Owner shall have the right to employ the necessary labour and do such Work at the expense of the Contractor.

5.17 Purchases

The Contractor agrees that all purchases of supplies, merchandise or equipment for use in connection with the work shall, when practicable, be purchased from residents of the Province of Saskatchewan.

5.18 Unacceptable and Unauthorized Work

All work and materials which do not conform to the requirements of the Contract shall be considered unacceptable.

Any unacceptable work found to exist prior to the issuance of the final acceptance certificate for the Work shall be remedied or removed and replaced in an acceptable manner by the Contractor at its own expense, except that it shall be the Owner's expense if the unacceptable work resulted from the use of defective material supplied by the Owner.

Any work done by the Contractor prior to the execution of the Contract by both parties, work done contrary to or regardless of the instructions of the Consultant, work done beyond the lines, grades and dimensions shown on the Plans, or any Extra Work done without authority, may be considered as unauthorized work and may not be paid under the provisions of the Contract.

If the Contractor fails to comply with an order for a corrective procedure, the Owner may deduct from the Contract price the difference in value between the unauthorized work as done and that called for by the Contract.

5.19 Errors or Omissions

The Contractor shall immediately report to the Consultant any omissions, inconsistencies or possible errors it may discover in the drawings, specifications or staking, and shall not proceed with any Work in uncertainty.

5.20 Appeal Procedure (Arbitration)

The parties agree that all disputes and differences between the parties bound by this Contract concerning its interpretation, application, operation or alleged violation shall be finally and conclusively settled in accordance with the procedure hereinafter outlined, or shall be submitted for legal action.

Either party to this Contract may provide to the other party notice in writing of a dispute or difference between the parties to this Contract concerning its interpretation, application, operation or alleged violation. Upon receipt of the notice, representatives of both the parties shall meet within three (3) working days of the receipt of such notice to discuss the dispute or difference as set out in such notice. Failing a satisfactory resolution of the dispute or difference within such period, or such longer time as the parties mutually agree in writing, then either of the parties may, after the expiration of such period, notify the other party in writing that it requires the matter to be submitted to arbitration.

The Board of Arbitration shall consist of three persons constituted as follows:

1. The party desiring arbitration shall appoint a member to the Arbitration Board and shall notify the other party of its appointee concurrently with providing the notice to submit the difference or dispute to arbitration;
2. The party receiving the notice shall within five (5) days thereafter, appoint a member for the Board and notify the other party of its appointment in writing;
3. The two arbitrators so appointed shall confer to select a third person to be Chairman and failing agreement, within a period of three (3) working days from the appointment of the second of them, either party may, upon the expiration of such period, apply to the Chief Justice of the Court of Queen's Bench for the Province of Saskatchewan who shall appoint such arbitrator to be Chairman of the Arbitration Board.

The Arbitration Board shall convene its hearing, hear the parties and counselacting on their behalf, and any and all evidence adduced relating to the difference or dispute between the parties under the provisions of the Contract, and shall make its award within fourteen (14) days after the hearing. The award of the Arbitration Board shall be final and binding upon the parties.

The Arbitration Board may, within the consent of the parties, enlarge the time for the presentation of its award, and shall have such powers and exercise such authority as is provided for by the Arbitration Act for the Province of Saskatchewan, and the award of the Arbitration Board shall be enforceable as provided for by the Arbitration Act.

Each party to the arbitration shall pay its own costs and expenses of arbitration, and one-half (1/2) of the costs and expenses of the Chairman and other expenses of the arbitration hearing.

In view of the provisions of this Article, the parties agree that there shall be no termination or interruption of the Work or the payments as provided for under the terms of this Contract unless otherwise mutually agreed upon between the parties.

5.21 Safety

As per the Occupational Health and Safety Act, Code, and Regulations of the Province of Saskatchewan, the Contractor who enters into a written agreement with the Owner of the worksite is to be the Prime Contractor and assumes all roles and responsibilities of the Prime Contractor. The Prime Contractor shall be required to, at all times, conduct its operations in compliance with the most current version of the Occupational Health and Safety Act, Code, and Regulations of the Province of Saskatchewan, with particular emphasis on safe working conditions and the prevention of accidents to employees and the public.

All personnel, including the personnel of its sub-contractors, shall be equipped with proper personal protective equipment related to, but not necessarily limited to, head, eye, limb, and hearing protection. Employees shall also be properly attired to minimize the potential of clothing being caught in the moving parts of equipment and tools.

The Contractor shall also be in compliance with all municipal safety requirements that may be in effect.

It shall be the responsibility of the Contractor, primarily through the site supervisor or foreman, to ensure that all personnel working within the Contract limits comply with all safety requirements.

The Contractor shall be responsible for scheduling safety meetings on a regular basis during the progress of the Work. The Consultant shall be given adequate advance notice as to the date, time and location of such safety meetings. Minutes of such meetings shall be submitted to the Consultant, if requested, in a timely manner. All safety inspection reports, incident/accident reports, and any reports, directives or orders received from regulatory agencies pertaining to health and safety shall also be provided to the Consultant.

The Consultant has the authority to suspend the Work, in whole or in part, if, in its opinion, the Contractor fails to adequately provide for the safety of its employees or those of its sub-contractors, or the public. Such suspension of the Work shall be issued in writing to the Contractor and shall remain in effect until the Contractor has adequately and satisfactorily addressed the safety concerns.

In the event that the Contractor fails or refuses to comply with an order issued by the Consultant or by a Safety Codes Officer under the Occupational Health and Safety Act or Regulations, such failure or refusal by the Contractor may be grounds for the Owner to terminate the Contract.

The Contractor shall provide to the Consultant a copy of the Contractor's Safety Management Program and Safety Policy in advance of commencing Work. A copy of such manual shall be available for review by the Contractor's Employee's and sub-contractors at all times. Submittal of a current valid Certificate of

Recognition as issued by Heavy Construction Safety Association of Saskatchewan Inc. will be considered an acceptable alternative.

5.22 Goods and Services/Duties and Taxes

The Bid Prices exclude the Goods and Services Tax (GST) and Provincial Sales Tax (PST) on all materials and services supplied and provided by the Contractor and incorporated into the Work. The Owner will include the applicable GST and PST payment on the monthly and final progress payments, showing such GST and PST amount as a separate line item.

Unless otherwise stated in the Contract Documents, the Contractor shall pay any other applicable Government taxes, customs, duties and excise taxes that may arise in the performance of the Work under the Contract. The Owner will not refund any other Government taxes, customs, duties and excise paid on material or equipment.

5.23 Warranty (Guarantee) Period

The Contractor shall promptly correct defects or deficiencies in the Work which appear within **one (1) year** from the date on which the Work is completed. The Consultant will give the Contractor written notice of defects and deficiencies.

If the Contractor fails to do the repairs promptly or to the satisfaction of the Consultant, the Consultant may arrange to have the repairs done by others, the cost of which shall be paid by the Contractor to the Owner.

5.24 Construction Completion and Acceptance

Upon notice from the Contractor of completion of the entire Work, the Consultant and Owner, accompanied by the Contractor's representative, will make an inspection of the Work.

- If the Work is found to be completed in accordance with terms and requirements of the Contract, that inspection shall constitute the construction completion inspection and the Consultant will issue a Construction Completion Certificate to the Contractor indicating the Owner's acceptance of the Work; or
- If the inspection discloses any unsatisfactory Work, the Consultant will give the Contractor a list of deficiencies and the Contractor shall immediately correct the deficiencies. Upon correction of the deficiencies, another inspection will be made and provided the Work has been satisfactorily corrected, the Consultant will issue a Construction Completion Certificate to the Contractor indicating the Owner's acceptance of the Work.

The date specified in the Construction Completion Certificate shall be the date of commencement of the warranty (guarantee) period.

5.25 Contractor's Warranty and Final Acceptance

During the warranty (guarantee) period, the Contractor shall warrant the Work to be free from any defect or failure and to withstand climatic, maintenance and normal operational conditions.

The Contractor shall repair at its own expense any defects or failures that occur in the Work prior to the expiry of the warranty (guarantee) period. The Owner, through the Consultant, will notify the Contractor in writing during the warranty (guarantee) period of repairs required and the Contractor shall promptly make these repairs. These repairs are a performance requirement of the Contract, and shall be assured by the security provided.

If the Contractor fails to do the repairs promptly or to the satisfaction of the Consultant and the Owner, the Owner may then make other arrangements to have the repair work done, the cost of which shall be a debt due and owing by the Contractor and the Surety to the Owner.

In the event that repairs must be made immediately to protect the health, safety and welfare of the public and the Contractor is not available, the Owner may make other arrangements to undertake such repairs and to assess the costs to the Contractor, except that the Owner shall withdraw from performing the repair work as soon as the Contractor is available to commence with the repair work.

Upon expiry of the warranty period, a Final Acceptance Certificate will be issued to the Contractor, provided, however, that the Contractor has corrected or repaired all identified defects or failures.



SPECIAL PROVISIONS



6.0 SPECIAL PROVISIONS

The Special Provisions contained herein are typically more project specific and are intended to provide additional and/or supplementary information to the Contractor for preparation of the Tender Document and for execution of the Work under the Contract. These Special Provisions form a part of the Contract Documents making up the Agreement to be executed by the Owner and the successful Bidder.

6.1 Completion Date and Liquidated Damages

In accordance with Specification 01 18 00 Completion Date and Liquidated Damages, the following shall apply:

- The Contract Completion Date is specified in Section 2.9 Commencement & Completion of the Work, and Section 4.0 Contract Completion.
- Daily Liquidated Damages will be **\$1,000.00**.
- The lump sum Liquidated Damages will be **\$20,000.00**.

In accordance with Specification 01 18 00 Completion Date and Liquidated Damages, all work must be completed to achieve Construction Completion.

6.2 Site Occupancy

In accordance with Specification 00 81 50 Site Occupancy, the following shall apply:

- Site Occupancy shall include All Work.

6.3 Diesel Fuel Adjustment

There will be no adjustments for diesel fuel cost changes in the Contract.

6.4 Traffic Accommodation

For the duration of construction, the Owner will permit Grid 797 to be closed and traffic to be detoured around the construction site on RM roads. All detour signage shall be installed and maintained by the **Owner** in accordance with Specification Section 01 55 26 Traffic Accommodation. The RM's proposed detour route will be Range Road 3261 to Township Road 542 to Range Road 3265 as shown in Figure # F-01.

The Contractor shall be responsible to maintain the worksite in a condition to permit vehicle traffic as needed for local traffic and as much as possible for inspections and testing by the Owner's representatives. Payment for Traffic Accommodation will not be provided to the Contractor and is considered a subsidiary obligation of the Contractor under this Contract.

6.5 Road Standards

Top Asphalt Width	=	8.2 m
Side Slopes	=	3:1 (H:V) Max. (4H:1V desirable)
Ditch Width	=	3.0 m Max.

Right of Way	=	Varies
Asphalt Concrete Pavement Structure	=	125mm thickness of Type 2 Hot Mix Asphalt, on; 150mm thickness Type 33 Granular Base Course, on; 250mm thickness Type 8 Sub-base Course.

6.6 Truck Haul and Haul Roads

The Contractor shall be responsible for Road Maintenance Agreements, Capital Road Loss Payments and dust control on all the commodity haul roads used in this Contract outside of the jurisdiction of the RM of Frenchman Butte No. 501. These items will not be paid for directly, but shall be considered a subsidiary obligation of the Contractor under the unit bid prices of this Contract.

The Owner shall be responsible for maintaining all haul roads within the jurisdiction of the RM of Frenchman Butte No. 501.

The Contractor shall obtain approvals for haul roads from all affected Municipalities for any municipal haul roads to be used under this Contract.

The Contractor will supply the Consultant with copies of all Road Maintenance Agreements from affected Municipalities prior to the commencement of haul.

The Contractor will supply the Consultant with copies of all haul road clearances from affected Municipalities upon completion of haul.

Trucks shall proceed ahead, after dumping, in the normal direction of traffic flow, to the nearest approach to turn around.

The Contractor will be responsible for all costs associated with the municipal roads to be used under this Contract including, but not limited to, the cost of the road maintenance, restoration, shortening of the lifetime (capital road loss) of the municipal roads, and the cost to provide dust control.

All mitigating measures required by the regulatory agencies will not be paid for directly, but will be considered as a subsidiary obligation of the Contractor under this Contract except where otherwise identified for separate payment under this Contract.

Primary weights **will be** allowed on roads within the jurisdiction of the Rural Municipality of Frenchman Butte No. 501 at a **reduced speed of 60km/hr.**

The Contractor shall provide a detailed list of haul trucks to the Consultant prior to commencement of hauling including unit number, truck configuration, unloaded weight, and maximum secondary highway weights.

All haul sources for aggregate shall be identified and provided to the Consultant (including binder) prior to any haul. Weigh scales at each haul source are required for determining road maintenance haul.

6.7 Final Inspection

The Contractor must make arrangements with the Consultant, minimum of 48 hours' notice, to have the final inspection of the entire work area (i.e. when all payable items under the Contract are deemed complete) before all their equipment is removed from the site. No extra payment will be made if equipment has to be returned to the site to complete outstanding items or address deficiencies of Work that become evident at the time of final inspection.

6.8 Quality Control and Quality Assurance

The Contractor shall be fully responsible, at all times, for the Quality of the Work and shall ensure compliance of the Work with the Standard Specifications and the Plans. Saskatchewan Ministry of Highways and Infrastructure Standard Test Procedures shall be followed (<https://publications.saskatchewan.ca/#/categories/5130>).

The Consultant shall, prior to commencement of the Work at the preconstruction meeting, review with the Contractor all testing requirements which are outlined in the specifications, including the applicable type of tests, and the frequency, location, depth, etc. of tests to be performed. Quality control (QC) testing shall be the responsibility of the Contractor. Quality assurance (QA) testing will be conducted by the Owner's representative. **QA testing shall in no way relieve the Contractor of its QC responsibility.**

The Contractor shall be fully responsible to provide a tandem axle dual wheeled truck, loaded to a minimum of 14,500kg on the rear axles with tires inflated to a minimum of 620 kPa at their entire cost for proof rolling surfaces as directed by the Consultant. Proof rolling will be given consideration by the Consultant as an indication of the level of compaction being achieved by the Contractor. Such proof rolling tests shall be considered as being supplemental and not in lieu of other testing procedures being carried out, however, where such proof rolling test identifies weak areas, the Contractor will be obligated to correct these weak areas. No extra payment will be made to the Contractor for conducting a proof roll test. **QA testing shall include proof roll testing.**

Testing conducted on the Work, even if the results are within the acceptable or passing requirements, in no way relieves the Contractor of their maintenance responsibilities with respect to the Work. All settlements, failures, and other defects in the Work shall be repaired by the Contractor to the satisfaction of the Consultant as soon as is practicable to do so.

The Contractor shall promptly inform and coordinate the scheduling of QA testing with the Consultant. Delays in the Work due to insufficient scheduling and coordination by the Contractor in advance of requiring QA testing will rest solely with the Contractor and no claim shall be made against the Owner or Consultant for such delays.

6.9 Survey & Layout

The Consultant will provide one (1) set of hub line stakes on property line, one (1) set of stripping limit stakes, one (1) set of subgrade stakes (slope stakes), one (1) set of subgrade stakes (shoulder stakes), one (1) set of culvert stakes, one (1) set of subbase stakes, one (1) set of granular base stakes, and one (1) set of trim stakes (top of granular base shoulder stakes). One (1) nail line on centerline will be provided for the bottom lift of asphalt and one (1) centerline marking layout for pavement markings will be provided on finished asphalt. Stakes will be provided in increments of 25m. Re-grade stakes that may be required to complete the grade to required road specifications as deemed necessary by the Consultant shall be replaced at the Contractor's expense. The Contractor will be responsible for any other intermediate staking required. If additional staking, other than the ten (10) sets above is required to be supplied by the Consultant, the Contractor will be back charged at the survey crew standard charge rates and those costs will be deducted from the Contract progress payments.

The Consultant will establish bench marks and control points for the Work and will be responsible for their accuracy. The Consultant shall, as may be required, provide a base line, temporary bench marks and construction stakes as outlined above for use by the Contractor in executing the Work.

The Contractor shall provide sufficient advance notice to the Consultant of their requirement for construction survey stakes. Such advance notice shall be a minimum of forty-eight (48) hours unless mutually agreed upon otherwise by the Contractor and the Consultant.

The Contractor shall, before commencing with the Work, satisfy itself as to the meaning and correctness of all stakes and the instructions provided by the Consultant. Should the Contractor find a discrepancy between the Plans and the construction survey stakes provided by the Consultant, it shall immediately notify the Consultant for interpretation and instruction as no claims shall be considered for any allowance based on alleged inaccuracies, failure to read reference points correctly, or failure to interpret instructions correctly.

The Contractor shall exercise due diligence in preserving and protecting all bench marks, control points and survey stakes established by the Consultant for its use in executing the Work. In the case of wilful or careless destruction of the bench marks, control points and survey stakes, the Contractor shall be fully responsible for the costs of re-establishing such survey control.

The Contractor shall, at all times, safeguard all survey control markers, statutory iron pins, and lot corner posts/pins and shall be fully responsible, at its entire cost, for re-establishing all survey control markers, statutory iron pins, and lot corner posts/pins removed without authorization from the Consultant.

6.10 Watering

The Work shall include loading, transporting and distributing water required to aid the compacting of embankments and subgrade preparation.

The Contractor shall furnish the source of water including obtaining all permits, approvals, etc.

The water shall be free from undesirable quantities of organic matter and mineral salts. The quality will be subject to the approval of the Owner.

Watering equipment shall consist of water-tight tanks mounted on adequately powered trucks. The water shall be applied through a spray bar of such design as to provide a uniform unbroken spread of water the full width of the spray bar. A suitable device for positive shut off of the spray shall be so located as to permit control from the cab.

Water shall be distributed only if equipment is available to mix the materials or when the compaction operation is in progress.

Payment for the supply, loading and placing water will be considered incidental to the Work and shall be a subsidiary obligation of the Contractor to the Contract.

6.11 Approvals

The awarding of this Contract is contingent upon the Owner receiving all necessary approvals from Saskatchewan Ministry of Environment (MoE), Water Security Agency (WSA), Department of Fisheries and Oceans (DFO), Saskatchewan Ministry of Highways and Infrastructure (MHI), and all other necessary regulatory agencies.

No claims for compensation will be considered for delays resulting from restrictions of regulatory agencies.

6.12 Regulatory Agency Requirements

The Contractor shall provide the Consultant with 10 calendar days notice prior to the commencement of any clearing or grubbing or removal of topsoil between April 10 and August 31 of any year to permit the Consultant to make arrangements for an environmental monitor to inspect the work area for migratory birds.

- Work performed without 10 calendar days notice or work performed within the 10 calendar day notice period will be considered unauthorized work in accordance with General Condition 5.18.

- The Consultant will provide the results of the migratory bird survey to the Contractor. The Consultant will give written authorization to proceed or make an alternate recommendation based on the results of the survey. The Contractor is required to comply with the Consultants' recommendation at no direct cost to the Owner. The Owner will not consider claims from the Contractor should the results of the migratory bird survey result in the Contractor moving within the Contract limits.
 - If the results of the migratory bird survey prohibit the Contractor from working on the Contract, the Owner will consider suspending Site Occupancy Charged Days, however, standby claims for these delays will not be considered.

The results of the migratory bird survey shall be valid for 7 days.

Construction may not take place in the streambed during the annual spring spawning period from **April 16th to June 30th** inclusive.

If construction takes place between **May 1st and November 1st** inclusive, an Environmental Monitor shall be onsite to identify Whooping Cranes in accordance with the Aquatic Habitat Protection Permit issued by Water Security Agency. Work shall halt if a Whooping Crane is observed within 1000m of the construction area.

The Contractor shall comply with the conditions contained in the Aquatic Habitat Protection Permit(s) (AHPP) issued by the Water Security Agency and/or Saskatchewan Ministry of Environment. A copy of the AHPP is provided in Section 10.0 Permits and Crossing Agreements.

The Contractor shall not disturb wetland areas or streambed(s) outside of the construction footprint(s), including riprap areas, for culvert Work. Any areas that are disturbed shall be restored to the satisfaction of the Ministry of Environment and/or Water Security Agency and/or Fisheries and Oceans Canada at no direct expense to the Owner.

The Contractor shall obtain a Fish Collection Permit from Saskatchewan Ministry of Environment prior to dewatering the work site. The permit is required to collect, transport and release any fish stranded during the dewatering process.

All mitigation measures required by regulatory agencies will not be paid for directly but will be considered as a subsidiary obligation of the Contractor under this Contract except where otherwise identified for separate payment under this Contract.

The Contractor shall comply with the environmental protection measures listed below in addition to the Aquatic Habitat Protection Permit(s) issued by Permits issued by Water Security Agency and/or Saskatchewan Ministry of Environment. If any environmental protection measures listed below contradict the permit, the terms and conditions of the permit will supersede.

- Machinery and heavy equipment must arrive at the project site clean and free of fluid leaks or accumulations of external contaminants that may include, but are not limited to: oil, fuel, grease, other lubricates, soil and mud or plant materials.
- Machinery and heavy equipment must be cleaned, fueled, serviced and stored in a manner that will not contaminate the bed, bank or boundary of any water body or watercourse.
- No machinery or heavy equipment is to enter water under any circumstances. The only exceptions are the use of necessary attached booms, buckets, other tools, or implements.
- Work shall be done under dry or frozen conditions. If the site is not dry or frozen, then work may occur, but only under isolated (de-watered) conditions. Heavy machinery and equipment may be used below the natural high water mark if the work site has been isolated appropriately. If there is

a potential for damage to the bed or banks to occur as a result of the operation of heavy equipment, then appropriate measures must be used to prevent rutting and compaction (e.g. swamp mats).

- The Contractor shall prepare and submit an Erosion and Sediment Control Plan to the Consultant a minimum of **one week** in advance of the Pre-construction meeting.
 - The Consultant will review the Erosion and Sediment Control Plan for conformity with the regulatory requirements for this Contract. Work shall not commence at any location until the Erosion and Sediment Control Plan has been reviewed and deemed acceptable by the Consultant.
 - Sediment control measures (i.e., silt or turbidity curtain) must be appropriate to site conditions including expected water depth, wind and wave action and must be installed around the perimeter of the work area before starting work to prevent re-suspended sediment from spreading to adjacent areas.
 - Sediment control measures shall be regularly inspected and maintained or repaired if any damage occurs, must be left in place following in-water activity until suspended sediment has settled, and must be removed in a way that prevents the escape or re-suspension of sediments.
 - Effective erosion control measures must be installed, monitored, maintained, and replaced or upgraded as necessary prior to, during and following project completion to ensure they remain effective until the project site stabilizes and re-vegetates.
- Acceptance of the Erosion Control and Sediment Control Plan by the Consultant shall not relieve the Contractor of any of their obligations under this Contract. The Contractor shall be responsible for ensuring that any requirements outlined in the Aquatic Habitat Protection Permit(s) or Letter of Advice are satisfied for the duration of construction.
- The Consultant may, in their sole discretion and at any time during construction, rescind acceptance of the Erosion and Sediment Control Plan submitted by the Contractor due to changes in site conditions, or due to failure by the Contractor to adhere to the plan.
 - The Contractor shall secure the site and immediately stop work until such time as any concerns raised by the Consultant have been rectified to the satisfaction of the Consultant.
- Cofferdams must be constructed of clean, non-erodible materials such as sand bags, Aquadam-type installations, steel or wood walls, concrete blocks, clean rip-rap, etc. and installed at either end of the construction to isolate it. **Earthen fill material shall not be used.** Once installed, cofferdams shall be appropriately sealed (i.e. lined with heavy gauge plastic, the bottom sealed with sand bags, etc.), as required, to prevent the cofferdam structures from leaking.
- Materials for coffer dams must be obtained from outside the high water mark or bed, bank or boundary of any watercourse or waterbody. Upon removal, coffer dam locations must be restored and stabilized to the approximate original width, depth, and substrate of the watercourse or waterbody.
- Downstream water flow must be maintained at the natural flow rate at all times for the duration of the project (i.e. water flows are not to be impeded).
- An energy dissipation area must be installed if water will be pumped downstream to prevent sediment transport and shall consist of armoured clean rock, geo-textile fabric or some other energy dissipating device.

- For any dewatering activities, water shall be released into a well-vegetated area or settling basin and not directly into the watercourse, provided the water is able to return to the watercourse after sediment has dropped from suspension. Water entering the watercourses will be of equal or better quality than the receiving water.
- Culvert must be appropriately sized to accommodate expected water flows and not result in the restriction of natural stream flow patterns.
- Culvert must be installed in a manner that will not result in it becoming perched or hanging.
- Measures must be taken (e.g., shrouding) to collect debris created during the demolition of wood box culverts.
- When removing and reclaiming a culvert crossing, the crossing site shall be restored to approximately the original width, depth, and substrate of the watercourse and stabilized to prevent short and long-term erosion. The channel shall be restored so as to follow the natural contours of the shoreline.
- Existing vegetation must be retained as much as possible.
- Rock rip rap, gravel and other excavated material shall be obtained from outside the bed, bank or boundary of any watercourse or water body, with the exception of materials that need to be relocated as part of the project. These materials must also be clean and free from oil, grease or other contaminants.
- Excavated and stockpiled materials must be located above the bank and stabilized so they will not erode into any water bodies or watercourses.
- Adequate precautions must be taken to prevent debris and sediment from entering the water. Any project debris entering the water must be removed as soon as practical and disposed of in approved sites.
- Hazardous substances such as fuel, oil, grease, paint and solvents must be stored where they will not contaminate any water body or watercourse and disposed of appropriately. No raw concrete, wash water or chemicals used for concrete treatment will be allowed to enter any water body.
- Appropriately sized spill basins and/or spill kits for clean ups must be on site and accessible at all times. All spills of harmful substances (e.g., petroleum products) must be cleaned up and disposed of properly at approved sites.
- All Contractors are to receive copies of all permits before they begin any work. A copy of the permit must be on site at all times and available for review by a Conservation Officer.
- The Contractor shall comply with the conditions as directed by the Consultant.

The Contractor shall provide the Consultant with 48 hours notice prior to the commencement of installation or removal of the cofferdams. The Consultant shall be onsite for the installation and removal of the cofferdams.

The Contractor shall comply with the conditions contained in the Letter of Advice/Authorization issued by Fisheries and Oceans Canada.

In the event that all regulatory approvals have not been issued prior to the execution of the Contract:

- The Contractor shall not start work without until the regulatory approvals have been issued.
- An extension to the completion date specified in Section 2.9 and Section 4.0 will be granted equivalent to the number of days lost due to the delay in obtaining regulatory approvals.

6.13 Order of Work

6.13.1 Permits and Agreements

The RM is currently in the process of obtaining:

- The required permits and approvals from Regulatory Authorities.
- Aquatic Habitat Protection Permit(s).
- Crossing agreements with Utility and Pipeline Companies.

No compensation will be paid for delays, staging of work or mobilization to or from the project due to any factors associated with such permits and their timing.

6.13.2 Construction Order

The Contractor shall provide a written plan to the Consultant for review at least 10 days prior to the preconstruction meeting describing their planned work order including, but not limited to:

- Care of Utilities – Locates/Daylighting
- Care of Water – Isolating the Work Area, Maintaining Creek Flow
- Erosion and Sediment Control Measures
- Topsoil Removal
- Over-Excavation of the Embankment
- Culvert Placement
- Culvert Removal
- Backfill
- Notching and Widening
- Granular Placement
- Asphalt Concrete Pavement

6.14 Owner Supplied Products and Work

6.14.1 Existing Fences

Prior to commencement of the Work, the Owner will remove all fencing which may be affected by the Work, and provide any temporary fencing which may be required. The Contractor shall provide a minimum 10-days advanced notice prior to requiring fence removal.

Removed fences will be replaced by the Owner.

6.14.2 Culverts

Culverts required for the project will be supplied by the Owner **excluding** the 2400mm diameter CSP culvert. The Owner will have the culverts delivered to a location along the road alignment as designated by the Owner. The Contractor will be responsible for hauling the culverts from the designated site to the culvert installation site.

Supply of the 2400mm diameter CSP culvert will be the responsibility of the Contractor as outlined in Section 6.15.

6.14.3 Seeding

Seed will be provided by the Owner to the Contractor for use under the Contract. Seeding of all ditch bottoms and back slopes shall be completed by the Contractor at the Contract unit price per hectare. The Contractor shall coordinate obtaining the seed with the Owner.

6.14.4 Erosion Control Blanket and GeoRidge

The Owner may elect to place Erosion Control Blanket and GeoRidge under a separate Contract. Provisional pricing shall be provided by the Contractor under the applicable items in the Tender Forms for use and consideration as may be required during construction and as designated by the Consultant.

6.14.5 Aggregate and Rip Rap

The Owner will supply all aggregate and rip rap required for the work as outlined in Section 6.17.

6.15 Culvert(s)

The work shall consist of:

- the installation of one (1) 2400mm diameter by 112m length corrugated steel pipe culvert through Grid 797 Subgrade to the lines, grades, and dimensions as shown on the plans and drawings. The installation shall be by open excavation of the Roadway.
- the installation of approach culverts as required and where indicated on the Plans or as directed by the Consultant.

6.15.1 2400mm Diameter Culvert Supply, Cash Allowance

The Owner has negotiated a price with their preferred culvert supplier, Prairie Steel Culverts, for the supply of the 2400mm diameter culvert. A cash allowance price has been included in the Tender Forms based on the Owner negotiated price and will be included in the Contractor's Total bid amount. The Prairie Steel Culverts Quotation, Terms and Conditions of Sale, and Culvert Tender Supply Assurance Agreement are attached in Section 10.0.

The Contractor shall:

- Obtain the 2400mm diameter culvert materials (pipe, couplers, end stiffeners, and all other components and appurtenances required to complete the installation) from the Owner's preferred supplier at the Owner negotiated rate, including delivery by the supplier to the construction site.
- Provide the quote from the Owner's preferred supplier with their Tender submission.
- Provide invoices to the Consultant for the purchased materials for payment purposes.

Markup on the supply of the 2400mm diameter culvert materials by the Contractor will not be permitted, as the cash allowance bid item is considered an at cost amount (i.e. cost + 0%). Payment will be at the supplier invoice amounts up to the Owner negotiated cash allowance included in the Tender Forms.

6.15.2 Order of Work

It is anticipated that the existing 2400mm diameter CSP culvert, or a portion thereof, will need to remain in place during and throughout the installation of the new 2400mm diameter CSP culvert to facilitate and

maintain creek flow. Therefore, it is expected that placement of the new 2400mm diameter CSP culvert will need to be completed in its entirety (to the point of conveying creek flow) prior to removal of the existing 2400mm diameter CSP culvert. This shall be addressed in the Contractor's Construction Order of Work submittal outlined in Section 6.13.2.

The Contractor shall complete all work at one culvert site before commencing work at another site unless written authorization is provided by the Consultant.

All culverts shall be installed during the earthworks operation prior to construction of the compacted embankment and prior to completion of the finished road subgrade at culvert crossing locations, unless otherwise directed by the Consultant. This will be strictly enforced for this Contract.

6.15.3 Removal and Disposal

The existing culvert(s) shall be removed in an environmentally responsible manner.

The earth materials as deemed suitable for salvage and use as engineered fill that are excavated during the removal of the existing culvert(s) shall be stockpiled at sites which will avoid erosion of the excavated material into the streambed.

It is anticipated that a portion of the earth material to be excavated during the removal of the existing culvert(s) may be wet. All work required to excavate this wet material will not be paid for directly but will be considered as a subsidiary obligation of the Contractor under this Contract.

Any unsuitable earth material and excess suitable earth material excavated during the removal of the existing culvert(s) shall be disposed of as directed by the Consultant and in accordance with the Aquatic Habitat Protection Permit issued by Ministry of Environment and/or Water Security Agency and the Letter of Advice/Authorization issued by Fisheries and Oceans Canada.

- All disposed material shall be shaped and trimmed to the satisfaction of the Consultant. All work associated with the disposal of unsuitable material and excess suitable material will not be paid for directly but will be considered as a subsidiary obligation of the Contractor under this Contract.

6.15.4 Materials

Granular backfill material and crushed aggregate will be made available to the Contractor in accordance with Section 6.17.

Only a corrugated steel pipe (CSP) culvert will be allowed.

The culvert(s) at the following location(s) will require a minimum wall thickness of 4.2 mm if a corrugated steel pipe culvert is used:

- Station 8+166

Contrary and in addition to Specification 33 42 13 Culverts, the following shall apply:

- Separate sections of CSP culvert shall be joined with semi-corrugated (hugger band style) CSP couplers complete with 2 elastomeric O-ring gaskets and a neoprene gasket. The couplers and gaskets shall comply with the following:
 - Minimum coupler thickness of 1.6mm.
 - Minimum coupler width of 480mm.
 - Minimum of three sets of bar and strap connectors on each coupler (one for each flat band section).
 - The corrugations shall be the same as the adjacent culvert sections.

- The O-ring gaskets shall comply with the requirements of the most recent edition of ASTM Specification C443M for Standard Gaskets.
- The culvert ends shall be separated as per the manufacturer's specifications at the joint to achieve a proper fit for the coupler.
- The neoprene gasket shall be placed under the coupler sheet laps.
 - The width of the gasket shall be 150 mm minimum.
- The couplers shall be wrapped with a non-woven geotextile fabric.
- The supplier shall provide the necessary tools, instruction and training for the proper installation of the coupler.

6.15.5 Culvert End Stiffener

A culvert end stiffener shall be installed on the inlet end of all CSP culverts with diameters greater than or equal to 1,800mm and less than 2,700mm in accordance with Standard Plan No. HM608-02.

The end stiffener shall comply with the following requirements:

General Requirements

Stiffeners shall be manufactured in three separate pieces of equal length.

The end stiffener channel shall be formed and the bolt holes drilled prior to galvanizing.

The end stiffener shall be supplied and installed by the culvert supplier prior to delivery.

Material

The end stiffener channel shall be composed of structural steel in accordance with the requirements of the most recent edition of Canadian Standards Association (CSA) Standard G40.21 350W.

The end stiffener channel shall be hot-dip zinc-coated in accordance with the requirements of the most recent ASTM Specification A123/123M.

The bolts shall be hot-dip zinc-coated Type 1 Hex Bolt in accordance with requirements of the most recent ASTM Specification A449 each supplied with one nut.

The nuts shall be double (top and bottom) chamfered (beveled) hot-dip zinc-coated Grade DH Heavy Hex with the threads tapped in accordance with the requirements of the most recent ASTM Specification A563.

Quality Assurance

- a. General Quality Assurance and Quality Control
 - Final inspection and acceptance or rejection will be made by the Owner's representative.
 - All materials shall be subject to the inspection, sampling and quality assurance testing by the Owner's representative. The manufacturer/Contractor shall provide safe, convenient access, acceptable to the representative of the Owner, for inspection and sampling of the materials, and shall cooperate in the inspection and sampling process when requested to do so.
 - The manufacturer/Contractor shall contact the Owner's representative at least 72 hours prior to shipping the materials to coordinate any inspection, sampling or testing at the manufacturing location and the delivery site, which the representative of the Owner deems necessary.
 - The corrugated steel pipe culvert with the end stiffener attached will be inspected at the time of unloading.
- b. Rejection
 - Any material found unacceptable by the representative of the Owner will be rejected and shall be promptly replaced with acceptable material at no expense to the Owner.

Installation

When the inlet end of the culvert is installed, the joints between the end stiffener sections shall be located at the 4 o'clock, 8 o'clock, and 12 o'clock positions.

Measurement and Payment

Payment for Install Culvert End Stiffener will be at the Contract unit price per culvert end stiffener. The Contract unit price will be full compensation for completing the work.

6.15.6 Control of Water

The Contractor shall be responsible for controlling water within the work area.

The bid item "Control of Water" shall include, but is not limited to, the installation and removal of cofferdams, maintaining creek flow, pumping, energy dissipation, etc.

Payment for "Control of Water" shall be at the Contract lump sum price bid by the Contractor, and shall be full compensation for installing and removing cofferdams, construction of diversion works, removing and controlling water, and fish salvage within the construction area during the culvert installation and embankment construction, in addition to any and all sediment control measures required that are not payable in a separate bid item.

6.15.7 Large Diameter Culverts

Contrary to Section 33 24 13 Culverts, payment for excavation and backfill of the 2400mm diameter culvert **only**, will be paid for separately under the applicable unit and shall not be included in the unit price bid per m for "Installing Culverts in Roadway as Directed, 2400mm diameter" The payment for installing the culverts will be at the contract unit price per linear metre. The Contractor's unit price shall be full compensation for installation of the 2400mm diameter culvert, including all necessary work to install the culverts according to the plans included with the Tender or as directed by the Consultant.

In addition to Section 33 24 13 Culverts, the following shall apply:

- Type 105 granular backfill shall be used and compacted to 98% of the maximum S.P.D.
- The Consultant shall be notified and approve the foundation prior to the placement of any bedding material. After the culvert and headwalls, if headwalls are used, have been assembled and placed, the Consultant shall be notified and approve the commencement of the installation of side fill and the continuance of the installation of the bedding.
- Lateral movement shall be guarded against by controlling the rate of filling on each side. It is not intended that the culvert(s) be strutted and the Contractor shall be responsible for the proper placing of the bedding and backfill. Improper placing of the bedding material and backfill will be evidenced by the deformation of the culvert(s) from their original shape.

6.16 Utilities

Properties of utility companies such as pole lines, conduits, gas pipes, oil pipes, water pipes, sewers, and tile lines which, in the opinion of the Consultant, may interfere with the completion of the Work, will, except as otherwise provided in the Contract, be moved by the Owner. The Contractor shall complete a Saskatchewan First Call prior to commencing work, and shall ensure that all utilities, whether shown on the Plans or not, that may interfere with construction are identified and marked.

- The Contractor shall be fully responsible for **locating and exposing** all existing underground utilities as may be required to complete the work, and prior to Work commencing.

- The Owner will make available to the Contractor whatever underground utility information that it may possess but such service will not relieve the Contractor of its responsibilities.
- The Contractor shall be fully responsible for notifying utility companies as required according to the conditions stated in applicable agreements.
- The Contractor shall ensure that all of its employees are made aware of the location of any underground utilities and the importance of avoiding damage to them. The Contractor shall ensure all instructions issued by the Consultant for the preservation of any utilities are carefully observed by the Contractor's employees.
- The Contractor shall preserve and protect all utilities. The Contractor shall assume full responsibility for reimbursing the Owner for any damage, caused by its operations, to such properties.
- The Contractor shall not hinder, or interfere with, any persons engaged in protecting or moving utility properties in the operation of the utility. No adjustment in unit prices shall be allowed because of delay or interference caused by such work.

6.16.1 Road Right-of-Way

The following list is of known utilities in proximity or crossing the work area and is provided for information only and should not be considered complete. The Contractor shall be fully responsible for locating and exposing all existing utilities as may be required to complete the Work. The Contractor shall be fully responsible for notifying utility and pipeline companies as required according to the conditions stated in the applicable crossing agreements.

SaskTel utilities are known at the following approximate locations:

- buried line crossing Grid 797 at STA. 9+044, SW 4-54-26-W3 / NW 33-53-26-W3
- buried line crossing Culvert between STA. 8+220 and 8+050, NE 33-53-26-W3 / NW 34-53-26-W3
- buried line running parallel along the south side of Grid 797 for the entire project extents from STA. 7+600 to 9+045
- Contact: Brent Degenstein 306-441-0507, David Jubin 306-227-2381

SaskPower utilities are known at the following approximate locations:

- buried line crossing Grid 797 at STA. 9+077, SW 4-54-26-W3 / NW 33-53-26-W3
- buried line crossing Culvert between STA. 8+175 and 8+110, NE 33-53-26-W3 / NW 34-53-26-W3
- buried line running parallel along the south side of Grid 797 for the entire project extents from STA. 7+600 to 9+045
- Overhead line crossing Embankment Construction between STA. 8+535 and 8+325 and between STA. 8+215 and 7+750
- Overhead line crossing Culvert between STA. 8+150 and 8+110
- Overhead line running parallel along the south side of Grid 797 for the entire project extents from STA. 7+600 to 9+045
- Contact: crossingrequests@saskpower.com, 1-306-848-7141 or Kevin Connell

SaskEnergy pipelines are known at the following approximate locations:

- buried line crossing at STA. 8+717, SE 4-54-26-W3 / NE 33-53-26-W3
- Contact: 1-888-700-0427

TransGas pipelines are known at the following approximate locations:

- buried line crossing at STA. 7+700, SW 3-54-26-W3 / NW 34-53-26-W3
- Contact 1-888-700-0427

Canadian Natural Resources Ltd. (CNRL) pipelines are known at the following approximate locations:

- buried line crossing at STA. 8+855, SW 4-54-26-W3 / NW 33-53-26-W3
- Contact: Marty Bogust 780-205-4779

6.17 Aggregate Sources

6.17.1 Owner Supplied Aggregate

Owner-owned aggregate source(s) will be made available to the Contractor for Sub-Base Course, Granular Base Course, Asphalt aggregate, Culvert Granular Backfill, and Rip Rap. The general areas from which aggregate is to be removed; the areas for placing waste material, and other conditions are as follows:

1. Sub-Base Course: NW 34-53-26-W3
2. Granular Base Course: NW 34-53-26-W3
3. Rip Rap: NW 34-53-26-W3
4. Asphalt Aggregate: NW 34-53-26-W3 – Approximate Quantity: 1,300 m³
5. Granular Backfill: NW 34-53-23-W3
6. Waste Material Disposal: SW 3-54-26-W3

The Owner provides no guarantee as to the quality of aggregate available from these source(s), however, the Owner has successfully utilized the material from the above sources for previous road construction. The Contractor will be responsible to load, haul, and all other tasks required to utilize the Owner-owned aggregate material at no direct cost to the Owner and shall be considered as a subsidiary obligation of the Contractor under this Contract.

Upon completion of the work at the stockpile site, the site shall be returned to its original condition and the stockpile from which the material was removed shall be reshaped to prevent cave-ins and to allow for proper drainage. This work will not be paid for directly but will be considered as a subsidiary obligation of the Contractor under this Contract.

Materials from the Owner-owned aggregate source(s) not required for the sub-base course, granular base course, asphalt aggregate, rip rap, or granular backfill will remain the property of the Owner and shall remain at the supply location.

The Contractor will only be compensated for material utilized for the completion of this Contract.

6.18 Improvements of Approaches

All approaches designated for culvert replacements or adjustments shall be improved to the following minimum standards:

- 7m top width (minimum)
- 5:1 side slope
- 12m radius
- Structure to match the proposed Road Structure for the first 1.5m from edge of the road (i.e. 250mm thickness Sub-base Course, 150mm thickness Granular Base Course, and 125mm thickness of hot mix asphalt for first 1.5m).

The following approaches are tentatively designated for improvements:

- Station 8+890
- Station 8+694
- Station 8+535
- Station 7+778
- Station 7+695

Existing approaches that exceed the above minimum standards must be reconstructed to the existing approach geometric configuration.

Approaches designated for improvements are illustrated on the Plans and Drawings. Additional approaches may be designated for improvement at the direction of the Consultant.

Payment for approach improvements will be in accordance with the measurement and payment terms and unit price bid for the commodities used in the improvements.

6.19 Signs

6.19.1 Existing Signs (Traffic Signs, Utility Signs, Etc.)

If during the course of construction, the Contractor must remove an existing sign, (i.e. stop sign, yield, utility, etc.) the Contractor shall be responsible for removing the sign, storing the sign, and re-installation of the traffic signs upon completion of the Work. The Contractor shall mark/locate the original sign locations to facilitate reinstallation of the signs. If the signs are to be reinstalled at an alternate location, the Consultant shall confirm the amended location for the Contractor. Reinstallation of the signs shall be done in accordance with the latest edition of Transportation Association of Canada Manual of Uniform Traffic Control Devices of Canada and Saskatchewan Traffic Control Device Manual. During the Work, the Contractor shall supply, install, and maintain all temporary traffic signage including but not limited to stop signs, yield signs, etc. which may be required. This Work has been deemed incidental to the Work and should be included in the unit prices. As such, no additional payment will be made due the Contractor.

6.19.2 New Traffic Signs by Owner

Supply and install of all NEW traffic signs will be completed by the Owner.

6.20 Required versus Alternate Work Quantities

Estimated quantities for Work which is required to be completed under this Contract are provided in Section 3.2.1 Unit Prices Schedule "A". Estimated quantities for alternate Work are provided in Section 3.2.2 Unit Prices Schedule "B" – Alternate Work Quantities and Unit Prices (if applicable). The alternate Work Quantities may be substituted for the similar unit price items in Schedule "A" at the discretion of the Owner and or Consultant, at which time the alternate Work unit rate will govern and be the basis upon which applicable work will be paid. The Consultant will notify the Contractor in writing of alternate Work which will be requested of the Contractor.

6.21 Embankment Protection During Contractor Scheduled Time Off

Prior to leaving site for scheduled time off, the Contractor shall protect the worksite from entry of water at no direct cost to the Owner. Upon returning to site, the Contractor shall be responsible to rectify any deficiencies at their entire cost to the satisfaction of the Owner and at no direct expense to the Owner.

For the purpose of this Contract, scheduled time off is considered any time the Contractor is away from the site for a 24-hour period or longer. At all times, the Contractor is responsible for protecting the road

embankment and worksite including during scheduled time off and is considered a subsidiary obligation of the Contractor under other Contract items.

6.22 Over-Excavation Quantity Measurement Scheduling

The Contractor, upon completion of over-excavating material below the finished design subgrade line, shall confirm the over-excavation area has been surveyed by the Consultant prior to placing any backfill.

6.23 Subgrade Construction and Over-Excavation

Where organic soil is present at or near the existing road surface, the organic soil shall be excavated to a maximum depth of 0.9m below the design subgrade line or to stable subsurface, whichever is less. The excavated organic soil will be treated as over-excavation in accordance with Section 31 24 13.01. The subsurface below the over-excavated material shall be shaped and finished by means of a blade grader and finished smooth, free of disturbed materials and covered with woven geotextile prior to placement of engineered fill as directed by the Consultant.

For areas in cut to the design subgrade line, the Contractor shall cut and shape the roadway to the design cross section subgrade line in accordance with the Plans and Drawings and Section 31 22 16. Prior to placing surfacing material and after compacting to a smooth surface with all loose soil properly compacted and true to grade, the Contractor shall proof roll all subgrade, in the presence of the Consultant, to identify weak areas. Weak areas identified during the proof roll shall be over-excavated and treated as directed by the Consultant.

6.24 Over-Excavation Extents

Based on the findings of the geotechnical investigation, over-excavation of the entire road embankment on the east side of the proposed 2400mm Ø CSP culvert is required between approximate stations 7+885 and 8+145. In addition, all embankment that is excavated to facilitate installation of the new 2400mm Ø CSP culvert and removal of the existing 2400mm Ø CSP culvert, below the design subgrade line, will be treated as over-excavation in accordance with Section 31 24 13.01 Over-Excavation. It is anticipated that most of the over-excavated material will be considered as suitable material and will be reused as engineered backfill in accordance with Section 31 24 13 Embankment. Excavated material that is considered unsuitable as outlined in Section 31 24 13.01 Over-Excavation will be disposed of in accordance with Section 31 24 13.01 Over-Excavation and at the waste material disposal location identified in Special Provision Section 6.17.

Additional Over-excavation extents, if any, will be identified by means of proof rolling prior to placement of fill material as directed by the Consultant. Areas in cut to design subgrade line shall be completed in accordance with Special Provision 6.23 and Standard Specification Section 31 22 16 Subgrade Construction.

6.25 Moisture Conditioning

Material requiring moisture conditioning to achieve the specifications outlined in Section 31 24 13 Embankment, whether by drying or addition of water, will be the responsibility of the Contractor and is considered a subsidiary obligation of the Contractor under this Contract. Claims for moisture conditioning will not be considered by the Owner.

6.26 Haul

Haul on any and all haul commodities will not be paid for directly, but is considered a subsidiary obligation of the Contractor under this Contract.

6.27 Over-Excavation Stockpile and Disposal

Material classified as “Over-Excavation to Stockpile for Dispose” shall be excavated and disposed of at a waste disposal designated at the waste material location designated in Special Provision Section 6.17. Over-excavated material may be stockpiled at the designated location until such time as the material can be placed in its final position. The finished landscaped surface shall be smooth and evenly trimmed and the side slopes shall not be steeper than four meters horizontal to one meter vertical.

6.28 Protection of the Road Surface

The Contractor shall be fully responsible to protect the road surface and road embankment throughout the duration of Construction. Use of loaded construction equipment on the road surface or embankment causing subgrade failures will not be permitted under this Contract. Measures to mitigate damage from Contractor operation must be taken where practical including, but not limited to, limiting the volume of loaded construction equipment on the road surface and embankment haul routes. Damage to the road surface and embankment that is deemed to be caused by Contractor operation shall be repaired at the Contractor's sole expense.

6.29 Equipment

All tools, machinery, plant and equipment used in handling materials and executing any part of the Work, shall be maintained in efficient working order and where any of the machinery, plant or equipment is found to be unsatisfactory, it shall be improved or replaced.

6.30 Embankment Protection

All embankments, fills, or roadway ditches and drainage structures which are subject to damage or erosion from wave action or water flow shall be protected from such damage or erosion in accordance with instruction to be obtained from the Consultant.

6.31 Existing Asphalt Structure and Tie-in

The existing asphalt concrete shall be cut at the limits of the excavation area using a saw or approved equivalent prior to removal.

The existing asphalt concrete and granular surfacing structure shall be used as follows:

- The existing asphalt structure from **station 7+680 to 7+700** and **station 9+020 to 9+040** shall be pulverized, mixed, and excavated to design subgrade line with the excavated material used as “Common Excavation to Compacted Embankment”. Pulverized material shall be broken down to a maximum dimension of 80mm when measured in any direction. Payment for pulverizing and mixing the existing asphalt structure, including providing all necessary equipment to do the work, will not be made separately, but will be considered a subsidiary obligation under “Common Excavation to Compacted Embankment”.

6.32 Hillside Benching/Notching

Benching required to achieve proper bond between the existing and newly placed materials on hillsides/existing large embankment fills, for embankment construction, will not be paid for separately, but will be considered a subsidiary obligation of the Contractor for embankment construction.

6.33 Pavement Markings

All pavement markings, including but not limited to yellow centerline and white shoulder lines, shall be placed by the Contractor at the completion of placing the asphalt concrete pavement. Payment for pavement markings will be at the Contract lump sum price for "Pavement Markings" included in the Tender Forms.

Contrary to Specification Section 32 17 23 Pavement Markings, pavement markings are not shown on the plans and shall be placed in compliance with the most recent edition of the Manual of Uniform Traffic Control Devices of Canada.

6.34 Scale House Operator and Checker

The Contractor shall be responsible for providing scale house operators and checkers for all aggregate haul commodities including spread rate and coordination. Payment for supply of scale house operators and checkers will not be made separately, but is considered a subsidiary obligation of the Contractor under this Contract.



STANDARD SPECIFICATIONS



7.0 STANDARD SPECIFICATIONS

List of standard specifications:

7.1 Division 00 - Contract

- Section 00 81 50 Site Occupancy
- Section 00 87 00 Mobilization

7.2 Division 01 – General

- Section 01 18 00 Completion Date and Liquidated Damages
- Section 01 50 13 Erosion and Sediment Control
- Section 01 55 26 Traffic Accommodation

7.3 Division 31 – Earthworks

- Section 31 05 16 Granular Backfill
- Section 31 11 00 Clearing and Grubbing
- Section 31 14 13 Removal and Replacement of Topsoil
- Section 31 22 13 Common Excavation
- Section 31 22 16 Subgrade Construction
- Section 31 23 16.26 Rock
- Section 31 24 13 Embankment
- Section 31 24 13.01 Over-Excavation
- Section 31 24 13.02 Ditches
- Section 31 24.04 Waste Excavation
- Section 31 32 19 Geosynthetics
- Section 31 37 00 Rip Rap

7.4 Division 32 – Surface Improvements

- Section 32 11 01 Processing Aggregate
- Section 32 11 16.01 Sub-base Course In Place
- Section 32 11 23 Granular Base Course In Place
- Section 32 12 13.16 Asphalt Prime, Tack, and Flush Coat
- Section 32 12 16 Asphalt Concrete In Place
- Section 32 17 23 Pavement Markings

7.5 Utilities

- Section 33 42 13 Culverts

1.0 GENERAL

1.1 Description

This Specification outlines how the measurement and payment for Site Occupancy will be applied.

1.2 Definitions

“Charged Days” are the unit of measure for Site Occupancy.

“Final Span” means the number of Charged Days allowed for each Stage for Site Occupancy as calculated pursuant to sub-section 4.1.

“Initial Span” means the number of Charged Days bid by the Contractor for each Stage for Site Occupancy on the Bid Form.

“Normal Working Day” means the average duration worked by the Contractor on the preceding 5 uninterrupted working days.

- If inclement weather occurs on the first planned day of work, a Normal Working Day will be considered as 12 hours.
- If inclement weather occurs within the first 5 days of work, a Normal Working Day shall be taken from the average duration of all uninterrupted days the Contractor has worked on the Stage to date.

“Twenty-Eight Day Period” means a period of 28 days as shown on a calendar including weekends and Holidays. The first period will commence on the first Charged Day assessed.

2.0 MATERIALS

N/A

3.0 EXECUTION

N/A

4.0 MEASUREMENT AND PAYMENT

4.1 Measurement

Charged Days will be measured in whole numbers. Portions of a Charged Day will be rounded up to the nearest whole number.

The assessment of Charged Days will begin when the Contractor first begins work or on the commencement date provided by the Contractor, whichever is earlier. When the Contractor first begins work, for the purposes of assessment of Charged Days, is described as when the first cubic metre of topsoil or earth

excavation occurs, or the Contractor first disturbs the surface of the roadway. Charged days will end when all Contract items payable under the Contract and finishing work (including borrow pit finishing) is completed.

- The Contractor shall provide the Consultant 48 hours notice to alter the commencement date.

A Charged Day will be assessed for every day except the following:

- days the Contractor is prohibited from working due to restrictions outside the Contractor's control that are imposed by Public Authorities that come into effect after the Owner accepts the Bid;
- days the Contractor schedules employee time off subject to the following conditions:
 - a. the Contractor will be granted a maximum of 8 non Charged Days per Twenty-Eight Day Period for the purpose of allowing employee time off, providing:
 - the Consultant is given at least 3 days notice;
 - there is no ongoing work that requires the presence of Owner personnel as determined by the Consultant;
 - b. any of the days allowed for employee time off not used in the specified Twenty-Eight Day Period may not be carried over to following Twenty-Eight Day Periods; and
 - c. the 8 days allowed for employee time off will be prorated for periods shorter than twenty-eight days.
- days the Contractor does not work during the period of December 18th to January 8th inclusive for the Holiday season shutdown;
 - a. a new Twenty-Eight Day Period will commence when the Contractor recommences work during this period or January 9th, whichever is earlier;
- days a Stage is delayed due to inclement weather subject to the following:
 - a. the Contractor is prevented from working for more than half a Normal Working Day; or
 - b. the Contractor works for more than half a Normal Working Day rectifying conditions resulting from inclement weather, with no other work occurring. Activities to rectify conditions resulting from inclement weather include:
 - towing services or blading the Travelled Way to accommodate traffic;
 - ripping, drying or re-laying material to restore the material to the condition it was prior to the occurrence of inclement weather; or
 - any other activities that rectify or restore the work site that the Consultant deems necessary before any work can continue.
- days on which the Consultant has suspended the Contractor's operations;
- days not worked because of strikes, embargoes, acts of God, acts of the public enemy, acts of any foreign state, fire, floods, epidemics, pandemics or quarantine restrictions;
- days that the Owner, in its sole discretion, agrees to suspend Site Occupancy following a written request from the Contractor;
- days not worked because of Road Bans within the Final Span;
- for Preparatory Work:
 - a. days after the completion of all Preparatory Work subject to any traffic accommodation related restrictions associated with the Preparatory Work being removed.
 - days after all work is complete;
 - days after Contract Completion is achieved.

Adjustments to the Initial Span will determine the Final Span and will be calculated, excluding Preparatory Work, as follows:

$$\textit{Final Span} = \frac{F \times I}{A}$$

Where:

Final Span = adjusted number of Charged Days allowed; a fraction of a day will be rounded up to a full day;

F = Final Amount (excluding Site Occupancy) plus Force Account;

I = Initial Span; and

A = At Award Amount (excluding Site Occupancy).

The Initial Span for Preparatory Work will not be adjusted, and the Final Span will be equal to the Initial Span.

4.2 Payment

Payment for Site Occupancy will be made as follows:

- a. if the number of Charged Days equals the Final Span; no payment will be made; or
- b. if the number of Charged Days is less than the Final Span;
 - a positive payment adjustment equal to the contract unit price per Charged Day multiplied by the difference between the Final Span and the actual number of Charged Days will be made; or
- c. if the number of Charged Days exceed the Final Span;
 - a negative payment adjustment equal to the contract unit price per Charged Day multiplied by the difference between the actual number of Charged Days and the Final Span will be made.

1.0 GENERAL

1.1 Description

This Specification describes the terms and conditions for the mobilization to the Project site.

2.0 MATERIALS

N/A

3.0 EXECUTION

The Contractor shall do the necessary preparatory work and operations, including but not limited to, those required for the movement of personnel, equipment, supplies, and incidentals to the Project site.

4.0 MEASUREMENT AND PAYMENT

Payment for Mobilization will be at the contract lump sum price. Partial payments for Mobilization will be made as follows:

- a. When 5.0% or more of the Total Amount of Bid (excluding Site Occupancy) is earned, 25.0% of the amount bid for Mobilization will be paid.
- b. When 25.0% or more of the Total Amount of Bid (excluding Site Occupancy) is earned, an additional 25.0% of the amount bid for Mobilization will be paid.
- c. When 50.0% or more of the Total Amount of Bid (excluding Site Occupancy) is earned, the remaining 50.0% of the amount bid for Mobilization will be paid.
- d. For the purpose of the above partial payments, the amount earned for lump sum Contract Items, including Mobilization, will be the amount paid for that item on the previous progressive estimate. The Contractor shall do the necessary preparatory work and operations, including but not limited to, those required for the movement of personnel, equipment, supplies, and incidentals to the project site. Payment for Mobilization will be at the contract lump sum price.

1.0 GENERAL

1.1 Description

The Contractor shall complete the Work in its entirety by the date stated in Section 2.9 Commencement & Completion of the Work, and Section 4.0 Contract Agreement.

1.2 Construction Completion

The Consultant will provide a Construction Completion Certificate once it is achieved. In order to achieve Construction Completion, the Work, except those items identified in the Special Provisions (if any), shall be fully available to be made open to the public, and all payable items under the Contract shall be completed.

Construction Completion will not be given if any defects or deficiencies are outstanding.

1.3 Final Completion

The Consultant will provide a Final Completion Certificate once it is achieved after expiry of the warranty period.

1.4 Liquidated Damages

If the Contractor fails to achieve Construction Completion by the Contract Completion Date, the Contractor acknowledges that the Owner will sustain damages. The Contractor shall pay to the Owner Liquidated Damages in the amount(s) specified in the Special Provisions for each day following the Contract Completion Date, up to and including the Contract Completion date.

The Contractor and the Owner agree that the Liquidated Damages are not a penalty.

In addition to daily Liquidated Damages, lump sum Liquidated Damages will be assessed if work is carried over past March 31 each year and the Contractor fails to achieve the following:

- a. Construction Completion by the Contract Completion Date, and/or;
- b. Completion by the date specified in a particular phase (if any).

The Owner may recover Liquidated Damages by deducting the amount thereof out of any monies which may be due or become due to the Contractor or by an action at law against the Contractor or its surety or by any other lawful means or by any combination of these methods.

Permitting the Contractor to continue and finish the Work, or any part of it, after the Contract Completion Date(s), will not operate as a waiver by the Owner of any of its rights under the Contract.

Neither by declaring the Contractor to be in default pursuant to the General Provisions of the Contract nor by taking over the Work shall the Owner forfeit the right to recover Liquidated Damages from the Contractor or its surety for failure to complete the Work within the Contract Completion Date(s).

Assessment of daily Liquidated Damages will be suspended between:

- the later of October 15 or the actual day the Contractor ceases operations during any year and,
- the earlier of May 16 or the actual day the Contractor recommences operations on the road during the following year.

2.0 MATERIALS

N/A

3.0 EXECUTION

N/A

4.0 MEASUREMENT AND PAYMENT

N/A

1.0 GENERAL

1.1 Description

The work shall consist of the supply and installation of silt fence and silt curtain (turbidity curtain) to prevent sediment, debris, and foreign material from entering and migrating into an open waterbody and erosion control blanket to prevent erosion.

2.0 MATERIALS

The Contractor shall supply the silt fence, silt curtain (turbidity curtain), erosion control blanket, etc. material.

Silt fence shall be a minimum height of 900 mm, with 31 mm x 31 mm wooden stakes at a maximum spacing of 2m, and shall meet the following specifications:

Property (Test Method)	Test Value
Elongation (ASTM D 4632)	<50%
Grab Strength Machine Direction (ASTM D 4632)	550 N
Grab Strength X-Machine Direction (ASTM D 4632)	450 N
Permittivity (ASTM D 4491)	0.05 s ⁻¹ minimum
Apparent Opening Size (ASTM D 4751)	0.60 mm maximum average roll value
Ultraviolet Stability (% retained strength) (ASTM D 4355)	70% after 500 hrs of exposure

Silt Curtain shall be 0.61 kg/m² PVC laminated polyester fabric with 152mm EPS foam blocks for buoyance with anchor chain and connectors included. Silt curtain must be appropriate to site conditions including expected water depth, wind and wave action and shall meet the following specifications:

Property (Test Method)	Test Value
Grab Tensile Strength (ASTM D 4632)	1400 N minimum
Apparent Opening Size (ASTM D 4751)	0.425 mm maximum
Puncture Strength (ASTM D 4833)	500 N minimum

The erosion control blanket must be SC150 or approved equivalent.

3.0 EXECUTION

3.1 Silt Fence

Silt fence shall be installed prior to any ground surface being disturbed unless otherwise directed by the Consultant.

Silt fence shall be installed in accordance with the manufacturer's recommendations or as directed by the Consultant.

The Contractor shall be responsible for monitoring, maintaining and repairing the silt fence until Final Acceptance of the Contract.

The Contractor shall ensure that loading on the silt fence does not exceed loading limits. Material removed from the silt fence shall be disposed of as directed by the Consultant.

The silt fence shall be free from trapped material at the time of Final Acceptance.

All work associated with monitoring, maintaining and repairing, including the removal and disposal of material trapped by the silt fence, will not be paid for directly but will be considered as a subsidiary obligation of the Contractor under this Contract.

The Contractor shall repair or replace, at no direct expense to the Owner, any silt fence material damaged by their operations.

Silt fence shall remain in place at the completion of the Contract unless otherwise directed by the Consultant.

3.2 Silt Curtain

Installation of the silt curtain shall be as per the manufacturer's specifications, and as approved by the Consultant.

The Contractor shall be responsible for monitoring, maintaining, and repairing the silt curtain until Final Acceptance of the Contract.

The silt curtain shall remain in place at the completion of the Contract unless otherwise directed by the Consultant.

3.3 Erosion Control Blanket

Prior to installation of the blanket, the installation area shall be true to grade and cross-section and free from irregularities.

Erosion control blanket shall not be placed prior to seeding being completed unless otherwise authorized by the Consultant.

Erosion control blanket shall be installed at locations indicated on the Plans or as directed by the Consultant.

Erosion control blanket shall be installed in accordance with the manufacturer's recommendations or as directed by the Consultant.

The Contractor shall repair or replace, at no direct expense to the Owner, any materials damaged by their operations.

4.0 MEASUREMENT AND PAYMENT

All work associated with monitoring, maintaining and repairing, will not be paid for directly but will be considered as a subsidiary obligation of the Contractor under this Contract.

"Supply and Install Silt Fence (Provisional Item)" will be measured in lineal metres. The unit price will be full compensation for completing the work.

Payment for installing silt curtain will be at the contract unit price per lineal meter for Bid Item "Supply and Install Silt Curtain (Provisional Item)". The unit price will be full compensation for completing the work.

“Supply and Install Erosion Control Blanket (Provisional Item)” will be measured in square metres of surface area covered. No allowance will be made for overlapping. The unit price will be full compensation for completing the work.

“Supply and Install NILEX GEORIDGE BIO (Provisional Item)” will be measured in lineal meters measured along the crest of the weir from end to end. No allowance will be made for overlapping. The unit price will be full compensation for completing the work.

1.0 GENERAL

1.1 Description

The work shall consist of all measures necessary to safely and expeditiously accommodate all traffic using the Roadway within the Project, and using all roads open to the public and affected by the Contractor's operation.

1.2 Definitions and Abbreviations

For the purpose of this Specification, the following definitions will apply:

- a. Work Area means any section of Roadway on which the Contractor has commenced operations including:
 - any portion of the Project which has not been accepted by the Consultant;
 - any Roadside Diversion;
 - any section where workers or equipment are working;
 - any section where materials are piled or loosely spread;
 - any section where fresh oil has been sprayed but not adequately blotted; and,
 - all roads open to public travel which are affected by the Contractor's operation.
- b. Work Zone means the section of Roadway between the first advance warning sign and the point beyond the Work Area where traffic is no longer affected. The Work Area is one component of the Work Zone as shown in TCDMWZ 304.
- c. TCDMWZ means the Saskatchewan Ministry of Highway's Traffic Control Devices Manual for Work Zones.
- d. Roadside Diversion means a local roadside temporary roadway which is built specifically for detouring traffic off of the original Travelled Way while construction is underway.
- e. Route Detour means alternate road(s) used where traffic is required to depart from the normal Project route.

2.0 MATERIALS

The Contractor shall supply all traffic accommodation materials, including the selection of dust abatement materials, including water.

3.0 EXECUTION

3.1 General

If Work occurs on or within 10 m of the Roadway, the Contractor shall provide the Consultant with a Traffic Accommodation Plan in accordance with TCDMWZ 309 at least one week prior to the Pre-construction Meeting.

- The Traffic Accommodation Plan shall ensure that disruption and inconvenience to motorists is minimized.

- Wait times for individual vehicles in a queue (or cumulatively in multiple queues) in the Work Zone shall be minimized, and shall not, under any circumstance, exceed 20 minutes.

Approval of more than one Work Area does not change the requirements noted above.

The Contractor shall be responsible for the safe and expeditious movement of traffic and for the protection of individuals performing the Work.

The Contractor shall provide for the guidance and control of traffic in the Project. In doing so, the Contractor shall be guided by the TCDMWZ. The TCDMWZ will be considered the minimum standards to be met and the Contractor shall exceed these standards where conditions warrant. The Contractor shall have access to the current TCDMWZ on-site at all times.

The Contractor shall designate for the purposes of this Specification and for the duration of the Contract a Traffic Accommodation Supervisor (TAS) who has successfully completed an approved course in traffic accommodation and holds a valid certificate. The TAS shall keep the certificate of training in their possession during construction and present it upon request by the Consultant.

The Contractor shall assign to the TAS primary responsibility for traffic accommodation in the Project including responsibility for:

- a. identifying potential danger areas and providing signing, traffic accommodation and dust control necessary to provide a safe and convenient travel path for motorists;
- b. erecting, moving, cleaning, removing and replacing all signs and other traffic control devices, used to control and accommodate traffic;
- c. maintaining a log of all regulatory speed signs installed and removed;
- d. directing and supervising the activities of:
 - flagpersons and operators of pilot vehicles used on the Contract; and,
 - all other employees of the Contractor in relation to matters of traffic accommodation;
- e. developing proper work methods and coordinating the Contractor's work so disruption and inconvenience to motorists is minimized;
- f. monitoring individual vehicle wait times in a queue or multiple queues and ensuring that all wait times remain less than 20 minutes;
- g. ensuring that flagpersons are trained in the proper procedures for flagging and maintain in their possession, a valid certificate indicating successful completion of an approved flagperson training course; and
- h. notifying the Consultant of the appropriate traffic accommodation restrictions before the Work commences, communicating updates as required during the Work and to remove the restrictions after the Work is completed.
 - Notification shall be given to the Consultant each time an update is completed.

The Contractor shall appoint a qualified alternate TAS when the TAS is absent. The Consultant shall be notified in writing when an alternate is appointed.

The Contractor shall be responsible for traffic accommodation on the Project and in the Work Zone 24 hours per day, 7 days per week.

- The Contractor shall obtain written approval from the Consultant that the traffic accommodation at the time of seasonal shutdown is acceptable prior to leaving the Project for the season.
- Upon receiving written approval from the Consultant indicating so, the Contractor will be relieved of traffic responsibilities between:
 - a. the later of:
 - November 1; or,
 - the date on which the Contractor ceases operations during any year; and,

- b. the earlier of:
 - May 15; or,
 - the date on which the Contractor commences operations of the subsequent year.

The Contractor shall be responsible for the supply, installation, maintenance and removal of all traffic control devices and shall designate person(s) responsible for inspection and maintenance of the traffic control devices.

- Such person(s) shall inspect the traffic control devices a minimum of 3 times (morning, evening and a minimum of one other inspection) every day.
- The Contractor shall provide a phone number for 24 hours per day, 7 days per week response to traffic control device maintenance.

One Work Zone will only be permitted in accordance with the guidelines set in the TCDMWZ.

- a. Requests for multiple Work Zones shall be made to the Consultant, and must be approved in writing prior to implementation.
 - Requests shall include consideration for the anticipated traffic impacts and proposed measures to mitigate and minimize them.
- b. If multiple Work Zones are approved, Electronic Variable Message Boards (EVMs) shall be used at the limits of construction to indicate that multiple Work Zones are present.
- c. The Owner, at its discretion, may reject any requests. The Owner will not accept or pay any claims as a result of the denial of the request for multiple Work Zones.
- d. The Owner may rescind approval of multiple Work Zones at any time by providing written notice to the Contractor. The Owner will not accept or pay any claims as a result of the withdrawal of approval.

Only one Work Area will be permitted unless approved by the Consultant in writing.

- If more than one Work Area is approved, each Work Area shall be signed separately.

The Consultant may inspect the Project at any time to ensure wait time requirements for individual vehicles are being met. The Consultant will provide the Contractor with a copy of the Wait Time Inspection Form(s), noting any deficiencies as soon as practical after the inspection. The Contractor shall countersign the form(s).

The Consultant may inspect the Project at any time to ensure that the traffic control devices in place meet Contract requirements. Inspections will generally be performed a minimum of three times per day at daily start-up and shutdown and when the traffic accommodation requirements change. The Consultant will provide the Contractor with a copy of the Traffic Accommodation Inspection Checklist(s), noting any deficiencies, as soon as practicable after the inspection. The Contractor shall countersign the checklist(s).

The Contractor will be penalized for each inspection where wait times for individual vehicles in a queue exceed 20 minutes, and for each inspection where one or more of the traffic control devices do not meet the minimum requirements under the Contract. The penalties will be as follows:

Notification Occurrence	Penalty (% of Subtotal Amount of Bid (Excluding Provincial Sales Tax))
First	0.1% (minimum \$500.00 / maximum \$5,000.00)
Second and Subsequent	0.2% (minimum \$1,000.00 / maximum \$10,000.00)

- a. The Contractor will not be penalized for non-compliance related to traffic control devices resulting from circumstances beyond the Contractor's control, including but not limited to extreme weather, theft or vandalism. The Contractor will be given 12 hours from the time of non-compliance to correct any traffic control device issues.
- b. Non-compliance issues related to individual wait times in a queue beyond 20 minutes shall be rectified immediately.
- c. In addition to the above, the Contractor may be penalized for any instances where the Traffic Accommodation Supervisor fails to perform duties outlined above.

Equipment shall not be parked on the Roadway except where it is impractical to do otherwise.

The Contractor shall provide dust abatement on the Project, Route Detours or other public roadways affected by the Contractor's operation to effectively control dust for the safety of motorists, workers and flagpersons and to prevent dust problems for private dwellings, businesses and properties.

- The Contractor shall provide a Dust Abatement Plan to the Owner for review prior to the Pre-construction meeting.

Approaches necessary to provide access to public or private establishments, including public road intersections, shall be maintained in a condition such that reasonable convenience and safety is afforded to the users. Approaches shall be graveled by the Contractor with suitable material acceptable to the Consultant at no direct cost to the Owner.

The Contractor shall ensure that all signs, including official signs erected by the Owner, are maintained erect, level and clean, and are clearly visible.

All Owner and Contractor signs that are not applicable at any given time shall be promptly removed or entirely covered until such time as they are needed again.

- Turning the signs parallel to the Travelled Way or knocking over within 10 m of the Travelled Way will be considered an occurrence resulting in a penalty.

Towing services shall be provided on the Project by the Contractor, including Route Diversions and Route Detours.

- In periods of inclement weather or as requested by the Consultant, the Consultant will approve the Contractor's equipment to be used and the number of operators and flagpersons to be on standby.

Class II Traffic Accommodation shall apply to this Contract with one lane of traffic to remain open at all times throughout the duration of the project for local access only. The Contractor shall:

- a. on roadway grading projects, ensure that the length of subgrade in the Work Zone not covered with gravel does not exceed 1.0 km;
- b. on passing lane projects where only one lane is open to traffic through any portion of the Project, ensure that the length of subgrade in the Work Zone not covered with sub-base (or Granular Base Course) does not exceed the length of two individual passing lanes (one set);
- c. on passing lane projects where two lanes are open to traffic throughout the entire Project, ensure that the length of subgrade in the Work Zone not covered with subbase does not exceed the length of four individual passing lanes (two sets); and,
- d. maintain the Travelled Way in a sufficiently smooth condition, free of rocks, so as to permit motorists to travel safely at a minimum of 50 km/h at all times.

For Class II Traffic Accommodation, the following shall apply:

- a. the minimum lane width for all roadways through the Project shall be 3.5 m;

- b. the minimum clearance shall be 1.0 m between the edge of the Travelled Way and hazards such as a drop off greater than or equal to 70 mm but less than 300 mm deep or slopes steeper than 3:1;
- c. the minimum clearance shall be 1.5 m between the edge of the Travelled Way and hazards such as a drop off greater than or equal to 300 mm deep or slopes steeper than 3:1;
- d. the Travelled Way and minimum clearance shall remain clear from construction equipment, materials, signs, barricades, delineation posts and other items at all times;
- e. if the above cannot be accommodated, traffic shall be restricted to one-way unless the following is implemented:
 - a continuous interlocking traffic barrier conforming to National Cooperative Highway Research Program (NCHRP) TL-4 or approved equivalent is in place on all High Priority Traffic Accommodation Corridors (HPTAC) shown in TCDMWZ section 105, with a minimum 0.5 m distance between the edge of the barrier and the edge of the 3.5 m lane; or,
 - a continuous interlocking traffic barrier conforming to NCHRP TL3 or approved equivalent is in place on highways not designated as HPTAC, with a minimum 0.5 m distance between the edge of the barrier and the edge of the 3.5 m lane;
 - the barrier shall be set back a minimum distance of 0.5 m from the edge of pavement to account for potential movement upon impact. The barrier and barrier placement shall be approved by the Consultant;
 - the barriers shall be supplied by the Contractor at no direct cost to the Owner.
- f. the length of Roadway which has a pavement drop-off at centreline greater than 20 mm does not exceed the length which could be covered by one day's plant production;
- g. for planned work stoppages longer than one day, construction of adjacent lanes is scheduled so there is no pavement drop-off greater than 20 mm along centreline;
- h. where traffic is present, the length of sub-base and base courses on the Roadway, in windrows or laid, that has not received a prime coat does not exceed:
 - 5 km before October 16 unless a greater length has been approved by the Consultant; or,
 - 3 km after October 15;
- i. reclaiming and paving operations are not conducted on two different lanes of the Roadway at the same time;
- j. adjoining driving lanes on a new surface are delineated as follows:
 - by placing temporary reflective pavement markers at the end of each shift in a work day:
 - i. on a primed surface or on a sealed surface; and,
 - ii. on the final lift of asphalt concrete;
 - by removing the protective covering of the markers after the seal or prime coat is applied or the markers have been placed on the asphalt concrete;
 - the markers shall be placed at approximately 15 m intervals both on the centreline and to delineate other lanes;
 - by placing pavement marking tape at the end of each shift in a work day, to delineate adjoining driving lanes of each lift of asphalt concrete below the final lift. Strips of tape 500 mm long shall be placed at approximately 25 m intervals both on the centreline and to delineate other lanes;
- k. any reduction in pavement width is marked with delineators.

The Contractor shall supply and operate pilot vehicles when required for traffic accommodation.

Should the Contractor temporarily shift the lanes from their original location, the Contractor shall be responsible for establishing appropriate lane lines using either roadway markings or barrels/cones on the roadway surface. All temporary lane markings shall be removed prior to Final Acceptance.

- Temporary covering or removal of existing pavement markings shall be approved by the Consultant.

Before the end of each day and between active construction periods, the Contractor shall ensure that at least one of the following considerations are provided:

- all notched areas shall be backfilled such that there is no vertical drop off within 1.0 m of the travelled lane, and such that any vertical drop off is not greater than 70 mm, and such that a minimum side slope of 3:1 exists. Delineation by barrels/cones shall also be required at the edge of the 3.5 m lane at a maximum spacing of 25 m; or,
- a minimum clearance of 0.5 m from the travelled lane to the notch is provided, the side slope of the notched area is graded to a minimum slope of 3:1 from the edge of asphalt (such that no vertical drop-off exists). Delineation by barrels/cones shall also be required at the edge of the 3.5 m lane at a maximum spacing of 25 m; or,
- a continuous interlocking TL-3 traffic barrier is in place between the travelled lane and the notch, with a minimum 0.5 m distance between the edge of the barrier and the 3.5 m lane. The barrier shall be set back the recommended distance, at a minimum 0.5 m from the edge of pavement, to account for potential movement upon impact. The barrier and barrier placement shall be approved by the Consultant.

For seasonal shutdowns:

- a vertical drop-off along the centreline will not be permitted;
- a vertical drop-off between the main lane and passing lane and along the outside edge of pavement will not be permitted; and,
- if the design shoulder width and finished side slope specified in the Plans are not implemented in accordance with the Contract requirements, a minimum shoulder of 1.0 m and a side slope of 3:1 or flatter shall be implemented in the area disturbed by the Work.

3.2 Diversions & Detours

Traffic accommodation which is implemented on the existing roadway surface is not considered to be a diversion or detour (e.g. single lane closure).

Roadside Diversions

Roadside Diversions shall not be used unless specifically authorized in the Special Provisions or by written authorization from the Consultant.

Diversions shall be subject to the following requirements:

- a. a minimum 30 km/hr design speed;
- b. a minimum 4.2 m surface width for one-way traffic, 8.0 m surface width for two-way traffic;
- c. a minimum radius of 300 m for curves within the detour;
- d. a minimum superelevation of 3.5% for curves within the detour;
- e. a maximum grade of 8% within the detour;
- f. 24 hours per day, 7 days per week directional traffic control shall be provided when accommodating both directions of traffic on a single lane detour;
- g. illuminated to equivalent standards of the existing roadway; and
- h. structurally adequate and utilize competent material to accommodate the existing traffic based on the highway classification (primary weight, secondary weight).

The Contractor shall be responsible for sourcing and obtaining materials used to construct the embankments for the Roadside Diversion. These materials shall be removed and the area shall be returned

to its original condition and design grade prior to the completion of the project. The Contractor shall not be compensated directly for the materials or effort required to construct, remove, or maintain Roadside Diversions.

Roadside Diversions shall be maintained with a gravel surface by the Contractor at no direct cost to the Owner.

- Gravel shall conform to the requirements of Specification 7.31.3 For Traffic Gravel.
- Type 105 to 109 Traffic Gravel will be allowed.

Route Detours

Route Detours will not be permitted unless otherwise specified in the Special Provisions. If permitted, the following shall apply:

- a. Consideration should be given to impacts to the public, impacts on schedule, complexity of work, and other factors.
- b. All risks and costs associated with Route Detours, including but not limited to permissions, approvals, fees, maintenance, reconstruction, upgrading, signage, and dust abatement, shall be implemented at no direct or extra cost to the Owner.
- c. Route Detours shall add up to a maximum of 15 minutes of travel time.
 - Detours that add greater than 15 minutes of travel time may be submitted by the Contractor to the Owner for review.
- d. The Contractor shall submit a detour plan prior to the Pre-construction Meeting, which includes the following:
 - length and layout of detour;
 - signing plan and traffic accommodation plan;
 - duration and hours of operation; and,
 - impact on travelling public.
- e. Should the Route Detour propose the use of roads under another jurisdiction, the Contractor shall obtain and provide written approval from that jurisdiction prior to use of the detour.
- f. The Contractor shall be responsible for ensuring flagpersons, detour signage, variable message boards, barriers, markings, lighting, safety devices, and other appurtenances are supplied, installed and maintained for the duration that the detour is in use.
- g. Before a route or a temporary detour is opened to the public, all traffic accommodation and signage pertinent to the condition must be installed in their proper positions. Construction ahead signs must be installed when work first commences and the detour signs must not be exposed to view until the detour is required.
- h. When a Route Detour is used, the Contractor shall accommodate local traffic which needs to use any portion of the Roadway closed during construction.
- i. Delay times during peak traffic volume periods will be monitored by the Contractor with the detour operating periods adjusted as required by the Contractor to improve traffic management.
- j. No Route Detours shall be permitted on designated holidays, including the Saturday and Sunday associated with the designated holiday, unless otherwise approved by the Consultant in writing.

Cross-overs

Any four to two lane cross-overs shall be constructed in accordance with the Traffic Control Devices Manual for Work Zones for Saskatchewan and the Saskatchewan Traffic Control Devices Manual. Cross-overs in place for more than one day shall be designed as a single lane ramp with a design speed of 80 km/h and shall only be permitted between May 1 and October 31.

Short-Term Detours

Short-term detours are not permitted unless otherwise specified in the Special Provisions. If short-term detours are permitted to reroute traffic at Crossroads or intersections to accommodate short-term construction operations, prior to the implementation of the short-term detours, the Contractor shall submit to the Owner for review, a detailed detour plan and an updated Traffic Accommodation Plan identifying the number of lanes, all horizontal and vertical detour geometry, anticipated traffic volumes relative to peak traffic volumes, traffic management and traffic control devices, and hours of operation.

3.3 Night Work

Night work is not permitted under this Contract unless otherwise specified in the Special Provisions.

4.0 MEASUREMENT AND PAYMENT

Payment for Traffic Accommodation shall be at the contract lump sum price, and shall include compensation for the performance of all activities of traffic accommodation, including night work (if applicable), except those for which specific provision for payment is made in this section. Partial payments for Traffic Accommodation shall be made as follows:

- a. when 5.0% or more of the Total Amount of Bid (excluding Site Occupancy) is earned, 25.0% of the amount bid for Traffic Accommodation will be paid;
- b. when 25.0% or more of the Total Amount of Bid (excluding Site Occupancy) is earned, another 25.0% of the amount bid for Traffic Accommodation will be paid;
- c. when 50.0% or more of the Total Amount of Bid (excluding Site Occupancy) is earned, another 25.0% of the amount bid for Traffic Accommodation will be paid;
- d. when 75.0% or more of the Total Amount of Bid (excluding Site Occupancy) is earned, another 15.0% of the amount bid for Traffic Accommodation will be paid; and
- e. when the Contract is completed; the balance of the Total Amount of Bid (excluding Site Occupancy) for Traffic Accommodation will be paid.

For the purpose of the above partial payments, the Total Amount of Bid earned for lump sum Contract Items, including Traffic Accommodation, will be the amount paid for that item on the previous progressive estimate.

Payment for dust abatement materials, including water, will not be paid for directly, but will be included in the Contract Unit Price for Traffic Accommodation.

Payment for towing services will be made as follows:

- a. During periods of inclement weather or when requested by the Consultant on an Extra work basis:
 - for operators and flagpersons, 12 hours per day standby or actual hours worked, whichever is greater. The standby rate will be the labour rate shown in the current Saskatchewan Heavy Construction Association (SHCA) Rental and Rates Guide;
 - for equipment, standby rate for the number of hours the equipment is ready and available on the Roadway but not to exceed the operator hours above. The standby rate for equipment will be 50% of the rates shown in the current SHCA Rental and Rates Guide, excluding the labour component; and,

- if vehicles are required by the flagpersons for transportation and shelter, payment for the vehicles will be made on the basis of one-half of the hours worked by the flagpersons at the Owner's rental rate for a half-ton truck.
- b. During Contractor days off or periods of non-inclement weather, payment will not be made directly, but will be included in the Contract Unit Price for Traffic Accommodation.

1.0 GENERAL

1.1 Description

The work shall consist of a compacted granular material placed as a foundation for culverts, subsurface drain pipes, curbs, curbs and gutters, sidewalks, driveways, storm sewers, and manholes, catch basins, and other structures. The work shall include backfills for culverts, drain pipes, and bridge abutments. The work shall be performed at the locations and in conformity with the lines, grades, and dimensions shown on the plans or as designated by the Consultant.

2.0 MATERIALS

Granular material shall be composed of sand or gravel free from undesirable quantities of soft or flaky particles, loam, and organic or other deleterious material. Granular material shall comply with the following requirements:

Sieve Designation	Percent by Weight Passing Canadian Metric Sieve Series			
	TYPE			
	105	115	116	10
50 mm		100	-	100
22.4 mm	100			
18.0 mm	63 - 92			
9.0 mm		-	100	-
5.0 mm	0 - 40			
2.0 mm	0 - 25			
900 µm		-	30 - 100	-
400 µm		-	15 - 75	-
160 µm		-	0 - 10	-
71 µm		0 - 15	-	0 - 20
Plasticity Index	0 - 6	0 - 6	0 - 6	0 - 6

The above materials will generally be used, as designated by the Consultant, for the following operations:

- a. For backfilling all types of culverts and bridge abutments, **TYPE 115** shall be used.
- b. For backfilling subsurface drain pipes, **TYPE 116** shall be used as a filter material.
- c. For backfilling curbs, curbs and gutters, sidewalks, driveways, storm sewers, and manholes, catch basins, and other ancillary structures, **TYPE 10** shall be used.

3.0 EXECUTION

3.1 Culverts

Material shall be placed in layers and compacted to not less than ninety-five (95) percent of the maximum density, as determined in accordance with STP 205-07 for Density-In-Place By Nuclear Guage. If pneumatic tire rollers are used, the depth of each layer shall not exceed fifteen centimetres (15 cm). If mechanical vibratory compactors are used, the thickness of each layer shall be such that the specified density is obtained.

If the moisture existing in the granular material is insufficient for compacting to the specified density, the Contractor may elect to add water.

If excess moisture exists in the granular material, it shall be dried to the optimum moisture content at no direct expense to the Owner.

Compacting by puddling or jetting will not be permitted.

4.0 MEASUREMENT AND PAYMENT

4.1 Measurement

Granular Backfill will be measured in tonnes.

4.2 Payment

Payment for "Granular Backfill" will be at the Contract unit price per tonnes as specified in the Tender form. The unit price will be full compensation for supply, loading, hauling, dumping, spreading, compacting, and tamping the material.

1.0 GENERAL

1.1 Description

Clearing consists of the removal and disposal of all timber, brush, stumps, rubbish, or other such perishable material from within the limits of the right-of-way, or adjacent to the right-of-way, from such areas as may be required for off-take ditches, channel changes, sight triangles, borrow pits, etc.

Grubbing consists of the excavation and removal of all roots, stumps, etc., from such portions of the right-of-way as are necessary for efficient construction operations, also from such areas as may be required for off-take ditches, channel changes, sight triangles, borrow pits, etc. In the case of areas to be covered by embankments of 2.0 metres or more in height, stumps will not be required to be removed if they are cut close to the ground.

2.0 MATERIALS

N/A

3.0 EXECUTION

The Consultant, in conjunction with the Contractor, will designate areas where Clearing and Grubbing is required.

3.1 Clearing

All timber and brush must be cut off close to the ground for the full width of the right-of-way and any other areas designated by the Consultant.

The clearing operation shall be completed at least three (3) kilometers ahead of the earthmoving operations.

All merchantable timber cut on the right-of-way and not required for construction purposes shall be trimmed and cut in suitable lengths, and neatly piled at convenient locations for removal as directed by the Consultant.

All timber, brush, etc., not required for construction or commercial purposes is to be piled at convenient points on the right-of-way and burned, the burning to be done at times and in a manner in conformity with the existing fire regulations applying in the district concerned. The Contractor shall be responsible for obtaining a permit to burn the material. The portion of the debris which cannot be burned may be buried in disposal pits. Where burning is not possible, disposal shall be carried out at the direction of the Owner. The bid price for clearing and grubbing shall include the cost of excavating the disposal pits whether the excavated material is used in the embankment or not.

3.2 Grubbing

All stumps, roots and other fibrous material required to be removed shall be piled at convenient points on the right-of-way and completely burned, the burning to be done at times and in a manner in conformity with

the existing fire regulations applying in the rural municipality concerned. The Contractor shall be responsible for obtaining a permit to burn the material.

4.0 MEASUREMENT AND PAYMENT

Payment for "Clearing and Grubbing" shall be at the Contract unit price per hectare as measured by the Consultant. If a bid item/price for clearing and grubbing is not included in the Unit Price Schedule, the Work will not be paid for directly, but will be considered as a subsidiary obligation of the Contractor under other Contract items.

1.0 GENERAL

1.1 Description

The Contractor shall be responsible for the removal of all topsoil to complete the Work, and replacement of topsoil within the road right-of-way and at borrow locations, within areas designated by the Consultant.

2.0 MATERIALS

N/A

3.0 EXECUTION

Topsoil shall be piled at locations generally adjacent to the right-of-way or borrow area for re-use.

The Contractor shall ensure that topsoil stockpiles/windrows do not interfere with construction operations, and will be responsible for all costs associated with maintaining topsoil stockpiles.

The excavated topsoil shall be distributed evenly on the designated areas to be reclaimed, which will include along the road side slopes, (excluding on the exposed Pavement Structure edge, i.e. sub-base, base, or asphalt), constructed ditch bottom, and backslope.

All loose rocks with a diameter greater than 80mm shall be removed from the reclaimed area following the replacement of the topsoil. Payment for removal and disposal of stones 80 mm or more in diameter from the topsoil replaced will be considered a subsidiary obligation of the Contract and no extra payment will be made.

If the Contractor stockpiles topsoil outside the Right-of-Way, the following shall apply:

- The Contractor shall provide the Consultant with a written copy of the agreement with the landowner that allows the use of their land as a temporary stockpile site.
- The Contractor shall provide the Consultant with a written copy of clearance for the temporary stockpile site, signed by the applicable landowner, prior to final acceptance.
- Any remaining topsoil after topsoil replacement shall be returned to the right-of-way if and as directed by the Consultant. Excess topsoil which cannot be returned to the construction footprint/road right-of-way will be disposed of or stockpiled by the Contractor at a location designated by the Owner.

4.0 MEASUREMENT AND PAYMENT

Payment for the removal and stockpiling of the topsoil will be made at the Contract unit price per cubic metre for "Removal of Topsoil Including Hauling". The volume of the topsoil removed will be measured in cubic metres in its original position. The volume will be measured by the cross-section method. Cross-sections will be taken before and after the topsoil is removed. The Contract unit price will be full compensation for all Work required including but not limited to excavating, loading, hauling, stockpiling, and trimming the stockpile if required.

Payment for the replacement of topsoil will be at the Contract unit price per cubic metre for “Replacing Topsoil Including Hauling” determined by the average cross-section method for topsoil in the final position. The Contract unit price will be full compensation for all Work required to place the topsoil uniformly over the designated area, including but not limited to loading, hauling, placing, shaping and trimming the slopes and surfaces.

1.0 GENERAL

1.1 Description

Common excavation shall include the removal of all earth, loose stones, gravel, rock and all other materials suitable for embankment construction, and the disposition of the same in accordance with the specifications, or as directed by the Consultant.

2.0 MATERIALS

Unsuitable material, for the purpose of this Contract, shall mean surface soil, organics or vegetation that is not suitable for embankment construction as determined by the Consultant. Material requiring moisture conditioning (i.e. either drying or addition of water) to achieve the requirements of the Embankment Construction specification will not be considered as unsuitable material. Moisture conditioning of the material will be considered as a subsidiary obligation of the Contractor under the Contract.

3.0 EXECUTION

The width of roadway and cross-section in cut shall be as shown on the standard cross-sections herewith, unless otherwise directed by the Consultant.

The road surface in excavation shall be shaped by means of a blade grader to secure a smooth and even roadway. Materials obtained from excavation and used in embankment will be paid for only as excavation, where the contract price is a unit price for excavation.

The Contractor will be required to shape and trim both excavation and embankment to a uniform, smooth surface by means of a motor grader or other suitable equipment to conform to the standard cross-section, or as staked by the Consultant.

4.0 MEASUREMENT AND PAYMENT

Payment for "Common Excavation to Compacted Embankment" and "Common Excavation to Stockpile" will be at the contract unit price per cubic metre measured in its original position determined by the average cross-section method.

1.0 GENERAL

1.1 Description

The work shall consist of shaping the subgrade and compacting, **when the roadway is in cut to the design subgrade line**, to the required grade and cross section. Subgrade, for the purpose of this Contract, shall mean the surface directly below the Pavement Structure (Sub-Base Course).

2.0 MATERIALS

N/A

3.0 EXECUTION

The Contractor shall cut and shape the roadway to the design cross section subgrade line in accordance with the Plans and Drawings. Prior to placing surfacing material and after compacting to a smooth surface with all loose soil properly compacted and true to grade, the Contractor shall proof roll all subgrade, in the presence of the Consultant, to identify weak areas.

4.0 MEASUREMENT AND PAYMENT

Payment for "Subgrade Construction", if included in the Unit Price Schedule, will be at the Contract unit price per square metre. The finished trimmed top surface of the subgrade in its original state prior to widening, as staked by the Consultant, and only **when the roadway is in cut to the design subgrade line**, will be the basis of measurement. The unit price will be full compensation for blading, shaping, trimming, final rolling, and finishing the subgrade to the required grade and cross section.

Watering on the road will not be paid for directly, but will be considered a subsidiary obligation of the Contractor under the Tendered unit price for "Subgrade Construction".

Excavation for "Subgrade Construction" is not required and will not be paid for under the Contract.

1.0 GENERAL

1.1 Definitions

Surplus rock is any rock, except that resulting from blasting operations, which:

- a. has a dimension of 80 mm or more when measured in any direction;
- b. has not been incorporated as part of the completed embankment;
- c. has been set aside, outside embankment areas, for measurement;
- d. rock piles which exist within or adjacent to the right-of-way prior to construction operations will be classified as surplus rock, if measured and buried in pits;
- e. during clearing operations, where it is impractical to separate the rock from the clearing piles, the rock shall be classified as surplus rock providing it is buried in pits.

Excessive rock (which is rock that cannot be removed by normal methods) encountered in borrow pits outside of the right-of-way shall not be classified as surplus rock. Payment for removal and disposal of such rock shall be considered under Force Account.

Solid rock material shall include solid masses of rock which cannot be excavated without drilling and blasting. It shall also include detached boulders having a volume of 0.8 cubic metres or more.

2.0 MATERIALS

N/A

3.0 EXECUTION

Surplus rock generally shall be buried in pits. A minimum of 0.3 metres of earth is required over buried rock.

Surplus Rock may be piled off the right-of-way or used for erosion protection, at the discretion of the Consultant, rather than buried, and must be placed at least 10 m from the edge of the right-of-way with the top of the rockpile being at least 0.6 metres lower than the shoulder elevation of the grade. Where surplus rock is piled off the right-of-way, the Contractor must provide the Owner with written permission from the landowner.

The Work shall consist of excavating solid rock materials from the roadway, borrow pits, side ditches, over-excavations, drainage ditches, channel improvements, dugouts and disposal pits.

The excavated rock materials may be placed in the embankment or otherwise disposed of in pits as directed by the Consultant. The material must be measured before being incorporated into the embankment or otherwise disposed of. Solid rock material that is not measured and is incorporated into the embankment will be considered as "Common Excavation to Compacted Embankment".

4.0 MEASUREMENT AND PAYMENT

The volume of rock materials in solid masses will be measured in cubic metres in its original position by the cross-section method. Payment for solid rock excavation will be at the contract unit price per cubic metre for "Disposal of Surplus Rock" only if included in the unit price schedule. The unit price will be full compensation for material, equipment and work required for drilling and blasting, excavating, loading, hauling, digging disposal pits, dumping and spreading rock material, forming embankments, and shaping and trimming slopes and surfaces. If a bid item/price for "Disposal of Surplus Rock" is not included in the Unit Price Schedule, the Work will not be paid for directly, but will be considered as a subsidiary obligation of the Contractor under other Contract items.

"Disposal of Surplus Rock" will be measured in cubic meters in piles or in disposal pits. Surplus rock that is buried prior to being measured by the Consultant shall not be paid for as surplus rock. If a bid item/price for "Disposal of Surplus Rock" is not included in the Unit Price Schedule, the Work will not be paid for directly, but will be considered as a subsidiary obligation of the Contractor under other Contract items.

The bid price for surplus rock will be full compensation for picking, loading, hauling, dumping, digging the disposal pits, piling, levelling the piles, placing in pits and restoring and levelling the ground surface over the buried rock except that any excavation from a rock disposal pit that is required and used in the embankment shall be paid for at "Common Excavation to Compacted Embankment Including Hauling" unit prices up to an amount equal to the amount of rock disposed of in the pit.

1.0 GENERAL

1.1 Description

This item shall consist of constructing embankments (fills) in accordance with these specifications and in conformity with the grades and cross-sections shown on the Plans herewith or as ordered by the Consultant in case of any changes in plans.

2.0 MATERIALS

- a. The embankment shall be constructed with soils acceptable for the purpose. The material shall be free from objectionable organic matter, frozen soil, stumps, trees or other objectionable material.
- b. Silt soils conducive to objectionable frost heaving shall not be used in the 1.25m depth of embankment immediately above the existing high water table.
- c. Stones having a dimension of 80mm or more when measured in any direction shall be excluded from the top 0.30m of the finished subgrade. If the Owner suspects that stones have been incorporated into the road top, they may request the Contractor to scarify and repack the top 0.30m of the embankment. If stones are encountered in this scarified material, the Work shall be carried out at no additional cost to the Owner. If no stones are encountered, this Work shall be carried out on a force account basis.
- d. Treatment of Soils Containing Organic Material
 - Soil containing objectionable organic matter shall be excavated and removed from those areas of a roadbed where the fill shall be less than 0.6 m in depth. Upon permission from the Owner, such soil may be used in the construction of slopes of the embankment, approaches or ditch blocks.

3.0 EXECUTION

3.1 Embankment Construction

- a. The embankment shall be formed of suitable material placed in successive layers, distributed uniformly over the full width of the cross-section. Each layer shall not exceed 150mm in depth when compacted, and shall be spread and bladed evenly by means of a suitable motor grader, except that the Consultant may approve the use of a bulldozer or other suitable equipment. This will be strictly enforced on this project. Each 150mm layer shall be compacted with a sheepsfoot or padfoot packer to 100% of S.P.D. within +/- 2% of the Optimum Moisture Content (OMC).
- b. The Contractor shall ensure that there be no intermixing of unsuitable and suitable materials. The slopes in the surface of the embankment shall be shaped and trimmed to a uniform, smooth slope conforming to the cross-sections shown on the Plans or as staked by the Consultant.
- c. If the material on the surface has insufficient moisture to produce a stable surface as determined by the Consultant, water shall be added by the Contractor as required to achieve the required compaction at no additional cost to the Owner.

- d. If excess moisture exists in the constructed embankment, the Contractor shall be responsible for sufficient drying and/or aeration of the wet material to produce a smooth, firm driving surface that will support normal traffic without rutting of the road surface. Drying and/or aeration shall be carried out at no direct expense to the Owner.
- e. If additional drying is desired by the Owner, it shall be carried out by the Contractor as directed by the Consultant at no direct expense to the Owner.
- f. The subgrade shall be proof-rolled to expose any soft spots in the subgrade.
- g. Soft spots and/or deflections detected by proof-rolling shall be repaired at the Contractor's expense.
- h. There will be no direct payment for proof-rolling and it will be considered a subsidiary obligation of the Contract prior to acceptance of any portion of the finished subgrade.
- i. The subgrade shall be constructed to within +/- 30mm of the design subgrade line.

3.2 Construction Through Sloughs and Marshes

The construction of embankments through water and/or wet depressions shall be carried out with suitable materials in a manner which will tend to displace existing unstable materials to the edges of the embankment. The center portion shall be carried well forward of the shoulders of the embankment. When necessary, a surcharge of embankment material shall be carried at the forward end of the embankment to assist in displacing unsuitable material.

4.0 MEASUREMENT AND PAYMENT

Construction of embankments will not be paid for directly, but will be considered a subsidiary obligation of the Contractor under the Tendered unit price for "Common Excavation to Compacted Embankment" or "Import Clay Fill to Compacted Embankment" or "Over-Excavation to Compacted Embankment" or "Stockpile to Embankment".

1.0 GENERAL

1.1 Description

For this specification, a subgrade failure is defined as a section of the design subgrade that is unable to support normal traffic because of a condition that requires repair below the designated design subgrade line.

2.0 MATERIALS

N/A

3.0 EXECUTION

If subgrade failure should occur, the following shall apply:

Over-excavation shall include the removal of all earth, loose stones, gravel, rock and all other materials **below the design subgrade line to a maximum depth of 0.9m**, unless otherwise directed by the Consultant, and the disposition of the same in accordance with the specifications, or as directed by the Consultant. Excavation to depths greater than 0.9m below the design subgrade line will not be paid for unless directed by the Consultant.

Over-excavated material deemed suitable for embankment construction, as determined by the Consultant, shall be placed on the roadway, moisture conditioned, and compacted in accordance with the Embankment specifications.

Over-excavated material deemed unsuitable for embankment construction, as determined by the Consultant, shall be hauled and disposed of in accordance with the Waste Excavation specifications. Unsuitable material, for the purpose of this Contract, shall mean surface soil, organics or vegetation that is not suitable for embankment construction, as determined by the Consultant. Material requiring moisture conditioning to achieve the requirements of the Embankment Construction specification will not be considered as unsuitable material, unless otherwise directed by the Consultant.

The subsurface below the over-excavated material shall be shaped and finished by means of a blade grader and finished smooth, free of disturbed materials and covered with woven geotextile prior to placement of engineered fill as directed by the Consultant.

4.0 MEASUREMENT AND PAYMENT

Payment for "Over-Excavation to Compacted Embankment" will be at the contract unit price per cubic metre measured in its original in-situ position determined by the average cross-section method and shall include all equipment, labour, supervision, materials, excavation, loading, hauling, placing, compaction, and all other related or incidental tasks. Moisture conditioning of the over-excavated material (adding water or drying) will not be paid for separately, but will be considered a subsidiary obligation of the Contractor under this Contract. Material that is over-excavated and either replaced in the same over-excavated area or

another over-excitation area will not be paid for separately, but will be considered a subsidiary obligation of the Contractor under "Over-Excavation to Compacted Embankment" (**i.e. the over-excavated material will not be paid for twice**).

Payment for "Over-Excavation to Stockpile for Dispose" will be at the Contract unit price per cubic metre measured in its original in-situ position determined by the average cross section method and shall include all equipment, labour, supervision, materials, excavation, loading, hauling, stockpiling, and all other tasks incidental or related to this operation.

Replacing over-excitation with engineered fill will be paid for at the Contract unit price for either "Import Fill to Compacted Embankment" or "Sub-Base Course Fill to Over-Excavation (Provisional Item)" as directed by the Consultant. If "Common Excavation to Compacted Embankment" is used, payment will only be made once under the unit for "Common Excavation to Compacted Embankment". Payment for "Import Fill to Compacted Embankment" will be in accordance with the Borrow Pits/Import Fill specification. Payment for "Granular Base Course to Over-Excavation" will be at the contract unit price per cubic metre measured in its final position by the average cross-section method and shall include all equipment, labour, supervision, materials, loading, hauling, placing, compacting, shaping, moisture conditioning, and all other related incidental tasks.

1.0 GENERAL

1.1 Description

N/A

2.0 MATERIALS

N/A

3.0 EXECUTION

Ditches shall be constructed along the side of the roadway or as directed by the Consultant. They shall be built with a uniform gradient to a point of outlet and shall have their sides at the slopes shown on the standard cross-sections.

Side borrow pits along the line of the ditch shall not be excavated below the elevation of gradeline or ditch.

Special care shall be taken to have the ditches turned away from the embankment to prevent erosion of the side slopes.

Drainage or off-take ditches either on or off the right-of-way shall be constructed as directed by the Consultant.

Where the grade of ditch is equal or greater than 3%, GeoRidge Bio check weirs shall be installed in strict accordance with the manufacturer's recommendations and as directed by the Consultant.

4.0 MEASUREMENT AND PAYMENT

N/A

1.0 GENERAL

1.1 Description

The work shall consist of excavating unsuitable materials from the roadway, side ditches, and approaches **above the design subgrade line.**

2.0 MATERIALS

Unsuitable material, for the purpose of this Contract, shall mean surface soil, organics or vegetation that is not suitable for embankment construction as determined by the Consultant. Material requiring moisture conditioning to achieve the requirements of the Embankment Construction specification, will not be considered as unsuitable material, unless otherwise directed by the Consultant.

3.0 EXECUTION

Stripping and disposal of unsuitable material from cuts and embankment areas shall be carried out at least 500m ahead of the main earthmoving operation.

Where the existing soil in a cut to the design subgrade line is such that it is not a suitable foundation for the roadway, the material shall be removed or be treated in accordance with instructions to be obtained from the Consultant.

4.0 MEASUREMENT AND PAYMENT

Payment for "Waste Excavation to Stockpile" will be at the Contract unit price per cubic metre by the average cross-section method for in-situ material removed. The unit price will be full compensation for excavating, loading, hauling, stockpiling or otherwise disposing of the material.

Payment for "Spreading and Shaping Waste Excavation Stockpile Including Hauling" or "Spreading and Shaping Over-Excavation Stockpile Including Hauling" will be at the Contract unit price per cubic metre by the average cross section method for in-situ material removed. The unit price will be full compensation for disposing of the stockpiled material by spreading, shaping, trimming, and if required, hauling and loading the material for placement in its final position. Compaction of the material shall be achieved by track packing with a bulldozer throughout the spreading and shaping process. The Contractor is hereby advised that "Spreading and Shaping Waste Excavation Stockpile Including Hauling" or "Spreading and Shaping Over-Excavation Stockpile Including Hauling" will only be paid for if the material is stockpiled and has to be moved from the stockpile to its final position. If the material is placed in its final position directly, and not required to be stockpiled, payment for "Spreading and Shaping Waste Excavation Stockpile Including Hauling" or "Spreading and Shaping Over-Excavation Stockpile Including Hauling" will not be made due to the Contractor.

1.0 GENERAL

1.1 Description

The Contractor shall install geotextile and/or geogrid beneath over-excavation areas, or geotextile beneath rock rip rap, as directed by the Consultant.

2.0 MATERIALS

The Contractor shall supply the geotextile or geogrid material. Non-woven geotextile must be Terrafix 360R, woven geotextile must be Terrafix 200W, and CombiGrid (geotextile and geogrid) must be Naue 40 x 40, or approved equivalent(s).

3.0 EXECUTION

Installation of the geotextile or geogrid material shall be as per the manufacturer's specifications.

4.0 MEASUREMENT AND PAYMENT

The quantity of geotextile or geogrid will be measured in square metres of surface covered. No allowance will be made for overlapping.

Payment for installing geotextile or geogrid materials will be at the contract unit price per square metre for - Bid Item "Supply and Install Non-Woven Geotextile", "Supply and Install Woven Geotextile", and/or "Supply and Install CombiGrid (Provisional Item)".

1.0 GENERAL

1.1 Description

The work shall consist of a protective covering of stone, with or without grout, constructed on an earth bed or granular filter blanket. Rip rap shall be constructed at the locations and in conformity with the lines, grades, and dimensions shown on the plans or designated by the Consultant.

2.0 MATERIALS

The Contractor shall supply all materials required for rip rap.

Rip rap materials, for culverts and other drainage works, shall consist of hard and durable field stones, boulders, or quarry rock. No stone shall be less than fifteen centimetres (15 cm) in its smallest dimension. For the purpose of this specification, dimension will be defined as being length, width, and depth.

Rip rap size and gradation will be in accordance with the following specification and as specified on the plans and drawings or as designated by the Consultant:

- **Type I** Rip Rap – stone size range is 300 mm to 600 mm.
- **Type II** Rip Rap – stone size range is 150 mm to 300 mm.
- **Type III** Rip Rap – stone size range is from 60 mm to 150 mm.

Within the size range, 50% of the rock has a weight greater than the median stone, and the remaining 50% has a weight equal to or less than the median stone weight.

The aspect ratio of the longest side of the rip rap to the shortest size should be 2:1 or less but shall not exceed 3:1.

3.0 EXECUTION

Culverts to be rip rapped are designated on the Plans and Drawings. Additional culverts may be designated to be rip rapped at the direction of the Consultant. Supply and installation of rock rip rap erosion protection at both ends of designated culverts as shown on the Plans and Drawings shall be the responsibility of the Contractor. Key-cut at the ends of culverts to support proper rip rap installation will be strictly enforced by the Consultant, including placement of non-woven geotextile filter layer.

All of the individual stones shall interact to produce a stable surface such that no individual rock will move when stepped on.

4.0 MEASUREMENT AND PAYMENT

Payment will be the Contract unit price per square metre for “Supply and Install Rock Rip Rap” as measured in final position by the Consultant for the specified depth and “Supply and Install Non-woven Geotextile” in

accordance with Section 31 32 19. Rip rap quantities for culverts shall not exceed the design quantities shown on the Plans, unless otherwise specified by the Consultant.

1.0 GENERAL

1.1 Description

The work shall consist of screening, crushing and stockpiling aggregates. The Final Product to be produced will be stated in the Special Provisions, Specifications, and/or Plans.

1.2 Definitions

The following definitions shall apply:

- a. Raw Aggregate is granular material excavated from the aggregate source prior to processing.
- b. Reject Aggregate is the screened aggregate removed from the Raw Aggregate prior to crushing to meet the requirements of the unsplit Final Product.
- c. Screened Aggregate is the aggregate passing through the appropriate screen when Raw Aggregate is fully screened prior to crushing for a four-way split.
- d. Natural Fines Aggregate is the aggregate passing through the appropriate screen when Raw Aggregate is fully screened prior to crushing for a two or three-way split, or when the Screened Aggregate is fully screened for a four-way split.
- e. Pea Aggregate is the aggregate passing the top size sieve of the Final Product being produced and retained on the 9.0 mm square opening sieve which is stockpiled separately for a four-way split.
- f. Crushed Aggregate is the aggregate retained on the appropriate screen during Natural Fines Aggregate production for a two or three-way split, or during Screened Aggregate production for a four-way split, following processing at the crusher.
- g. Crushed Coarse Aggregate is the aggregate retained on the appropriate screen after screening the Crushed Aggregate.
- h. Crushed Fines Aggregate is the aggregate passing the appropriate screen after screening the Crushed Aggregate.
- i. Commodity is any component produced from the Raw Aggregate as a result of the screening, crushing and splitting processes, excluding Reject Aggregate. The component may be Screened Aggregate, Natural Fines Aggregate, Pea Aggregate, Crushed Aggregate, Crushed Coarse Aggregate or Crushed Fines Aggregate.
- j. Final Product
 - For split aggregate is the individual Commodities when the aggregate is to be used by others, or the product produced by recombining Commodities and applicable additives to produce the final type of aggregate as stipulated in the Special Provisions and/or Plans.
 - For unsplit aggregate is the final aggregate type as stipulated in the Special Provisions and/or Plans after processing and the removal of Reject Aggregate if required.
- k. Mean is the arithmetic average of a set of 'n' test results constituting the sample.
- l. Moving Average is the arithmetic mean of 3 consecutive test results.
- m. Dry Aggregate is the Final Quantity of the asphalt concrete or base course less the weight of liquid asphalt if applicable.

2.0 MATERIALS

The aggregate shall be composed of sound, hard and durable particles of sand, gravel and rock free from injurious quantities of elongated, soft or flaky particles, shale, loam, clay balls and organic or other deleterious material, as specified for the Final Product to be produced.

3.0 EXECUTION

The Contractor must ensure the selected process used in producing any of the required aggregates meets all of the specified aggregate requirements.

3.1 Processing Using a Two-way Split

Base aggregate shall be processed using a two-way split as follows:

- a. Raw Aggregate shall be screened to produce Natural Fines Aggregate.
 - The Natural Fines Aggregate stockpile shall contain no less than 97% of the material passing the 9.0 mm square opening sieve.
- b. Aggregate retained on the screen following Natural Fines Aggregate production shall contain no more than 3% of the material passing the 9.0 mm square opening sieve.
 - Construction practices that result in incomplete screening of the aggregate including but not limited to the flooding of the screens will not be permitted.
 - If the Consultant determines that the Raw Aggregate has not been fully screened, the Crushed Aggregate will be considered as Defective Material in accordance with General Condition 5.18.
- c. Aggregate retained on the screen during Natural Fines Aggregate production shall be crushed to the specified top size of the Final Product being produced and stockpiled as Crushed Aggregate.
 - A tolerance of 3% in the percent by weight passing the maximum size sieve for the Commodities and Final Product being produced will be permitted providing 100% of the oversize passes the next highest sieve size. Sieve sizes include: 40.0 mm, 31.5 mm and 22.4 mm.

3.2 Processing Using a Three-way Split

The Contractor may elect to process asphalt concrete aggregate using a three-way split as follows:

- a. Raw Aggregate shall be screened to produce Natural Fines Aggregate.
 - The minimum percent of material contained in the Natural Fines Aggregate stockpile that passes the 9.0 mm square opening sieve shall be as shown in the Table below.

MINIMUM PERCENT OF NATURAL FINES AGGREGATE PASSING THE 9.0 mm SIEVE

Asphalt Mix Design Type	Minimum % By Weight Passing the 9.0 mm Sieve
Types 1 to 4	97.0%
Type 5	98.0%
Type 6	99.0%

- b. Aggregate retained on the screen during Natural Fines Aggregate production shall contain no more than 3% of the material passing the 9.0 mm square opening sieve.

- Construction practices that result in incomplete screening of the aggregate including but not limited to the flooding of the screens will not be permitted.
 - If the Consultant determines that the Raw Aggregate has not been fully screened, the Crushed Aggregate will be considered as Defective Material in accordance with General Condition 5.18.
- c. Aggregate retained on the screen following Natural Fines Aggregate production shall be crushed to the specified top size of the Final Product being produced.
- A tolerance of 3% in the percent by weight passing the maximum size sieve for the Commodities and Final Product being produced will be permitted providing 100% of the oversize passes the next highest sieve size. Sieve sizes include: 22.4 mm, 18.0 mm and 16.0 mm.
- d. Crushed Aggregate shall be screened and stockpiled separately as Crushed Coarse Aggregate and Crushed Fines Aggregate.
- The Crushed Coarse Aggregate stockpile shall contain no more than 10% of the material passing the 5.0 mm square opening sieve.
 - The Crushed Fines Aggregate stockpile shall contain no less than 90% of the material passing the 5.0 mm square opening sieve.

3.3 Processing Using a Four-way Split

The Contractor may elect to process asphalt concrete aggregate using a four-way split as follows:

- a. Raw Aggregate shall be screened to produce Screened Aggregate.
- No less than 99% of the material contained in the Screened Aggregate stockpile shall pass the top size square opening sieve of the Final Product being produced.
- b. A portion of the Screened Aggregate stockpile shall be re-screened to produce Pea Aggregate and Natural Fines Aggregate.
- The Contractor will only be required to screen enough of the Screened Aggregate stockpile to produce the quantities of Natural Fines Aggregate and Pea Aggregate designated in the Processed Aggregate Requisition Form.
 - The minimum percent of material contained in the Natural Fines Aggregate stockpile that passes the 9.0 mm square opening sieve shall be as shown in the Table above.
- c. The aggregate retained on the screen following Screened Aggregate production shall contain no more than 1% of the material passing the top size sieve of the Final Product being produced.
- Construction practices that result in incomplete screening of the aggregate including but not limited to the flooding of the screens will not be permitted.
 - If the Consultant determines that the Screened Aggregate has not been fully screened, the Crushed Aggregate will be considered as Defective Material in accordance with General Condition 5.18.
- d. Aggregate remaining following the removal of the Screened Aggregate shall be crushed to the specified top size of the Final Product being produced.
- A tolerance of 3% in the percent by weight passing the maximum size sieve for the Commodities and Final Product being produced will be permitted providing 100% of the oversize passes the next highest sieve size. Sieve sizes include: 22.4 mm, 18.0 mm and 16.0 mm.
- e. Crushed Aggregate shall be screened and stockpiled separately as Crushed Coarse Aggregate and Crushed Fines Aggregate.
- The Crushed Coarse Aggregate stockpile shall contain no more than 10% of the material passing the 5.0 mm square opening sieve.
 - The Crushed Fines Aggregate stockpile shall contain no less than 90% of the material passing the 5.0 mm square opening sieve.

3.4 Sampling and Testing

Frequency of testing will be at the discretion of the Contractor. The Contractor shall be responsible for all testing during processing aggregate including the frequency of testing.

4.0 MEASUREMENT AND PAYMENT

All work required for processing aggregate will not be measured or paid for separately, but will be considered a subsidiary obligation of the Contractor under this Contract.

Contractor Supply will include and be considered full compensation for the supply and processing of all aggregates for this Contract. The Contractor shall bear all costs associated with using material from the Contractor's source(s) and Owner's source(s), if applicable. The frequency of testing will be at the discretion of the Contractor, and all tests will be made by and at the expense of the Contractor.

The Contract unit price for "Granular Base Course in Place, Contractor Supply", "Sub-base Course in Place, Contractor Supply", "Asphalt Concrete in Place, Contractor Supply", "Gravel Incorporation, Contractor Supply", "Culvert Granular Bedding – Supply and Place", and "Traffic Gravel, Contractor Supply" will be itemized in the Bid Form and will include processing. The Contractor will only be compensated for material utilized for the completion of this Contract. All work required for the production of any of the commodities used in the production of the aggregate will not be paid for directly but will be considered as a subsidiary obligation of the Contractor under the applicable Contract unit prices for "Gravel Incorporation, Contractor Supply", "Culvert Granular Bedding – Supply and Place", and "Traffic Gravel, Contractor Supply". There will be no monthly payment for interim products and interim haul and no pre-payment for crushed aggregate prior to the aggregate being incorporated into the Work.

1.0 GENERAL

1.1 Description

The work shall consist of spreading and compacting screened or crushed aggregate on a prepared surface.

1.2 Definitions

The following definitions shall apply for this specification:

- a. Mean: The arithmetic average of a set of 'n' test results constituting the sample.
- b. Moving average: The arithmetic mean of 3 consecutive test results.
- c. Sub-base aggregate: The aggregate before mixing, when binder is to be added or the aggregate before spreading and compacting, when no binder is to be added.
- d. Sub-base mix: The sub-base aggregate after mixing with binder and water but before spreading and compacting.
- e. Sub-base course: The sub-base aggregate or sub-base mix in place on the road during and after spreading and compacting.

2.0 MATERIALS

2.1 Aggregate

Sub-base aggregate shall be composed of sound, hard, and durable particles of sand, gravel and rock free from injurious quantities of soft or flaky particles, shale, loam, clay balls and organic or other deleterious material.

Only Sub-base course Type 8 will be permitted for Contractor supplied Sub-base and shall comply with the requirements listed in Table 1:

TABLE 1

Sieve Designation	Percent By Weight Passing Canadian Metric Sieve Series
	TYPE 8
50.0 mm	100.0
2.0 mm	0 - 90.0
400 µm	0 - 60.0
160 µm	0 - 25.0
71 µm	0 - 15.0
Plasticity Index (all types)	0 - 6.0

A tolerance of 3% in the percent by weight passing the maximum size sieve shall be permitted providing 100% of the oversize passes the 63.0 mm sieve.

Binder, filler and blender sand shall be provided by the Contractor as required to create a stable sub-base surface.

The Contractor shall supply a scale house operator and road checker for the placement of Sub-Base Course.

The Contractor shall provide daily copies of the delivery/weigh slips to the Consultant.

3.0 EXECUTION

3.1 Spreading and Compacting

The subgrade surface, at the time of placement of the sub-base aggregate, shall be true to grade and cross-section, dried to at least the optimum moisture content, and compacted to not less than the specified density at no direct expense to the Owner.

All windrows of sub-base aggregate shall be placed on the road shoulder. Placement of sub-base aggregate windrows along the centerline of the roadway will not be permitted.

The thickness of a compacted lift of sub-base course shall not exceed 120 mm. The lift thickness may be increased if the Contractor can demonstrate that with the use of vibratory compaction equipment and construction procedures, the compaction requirements can be achieved for lifts greater than 120 mm.

Sub-base courses shall be compacted until no further settlement is apparent and the particles are well keyed into place. The sub-base course shall be free from any rutting or deformations before the placement of the next course.

If excess moisture originating from external causes including but not limited to precipitation and/or Contractor's operation is present in the sub-base course and/or underlying material prior to the acceptance of the completed surfacing structure; the Contractor shall dry the sub-base course and/or the underlying material to the optimum moisture content and compact the sub-base and/or the underlying material to not less than the specified density or the optimum density in accordance with the requirements for Moisture-Density Proctor (STP 205-5).

3.2 Stabilizing

If the sub-base course proves to be unstable, the Contractor shall be required to stabilize the sub-base aggregate by one or a combination of the following methods at no direct cost to the Owner:

- a. By the addition of binder or filler at the aggregate source or at the screening plant. The binder or filler shall be added and thoroughly distributed throughout the aggregate until a homogeneous mixture is obtained.
- b. By the addition of crushed aggregate on the road.
- c. Any other method proposed by the Contractor and accepted by the Consultant.

Stabilizing Sub-base course by any approved method shall not be paid for directly, but will be considered as a subsidiary obligation of the Contractor under the Contract.

3.3 Seasonal Shutdown

If work must be carried over from one construction season to the next, there shall be no exposed sub-base aggregate, mix or sub-base course remaining on the road unless covered by a lift of base course.

3.4 Sampling and Testing

Sub-base Course shall be spread and compacted in lifts. The compacted lift thickness shall not exceed 120mm. The section of Sub-base Course shall be considered acceptable if it contains no surface defects and if:

- The average density meets or exceeds 98% of S.P.D.
- All individual tests results are greater than 96% of S.P.D.
- The moisture content is less than or equal to the optimum moisture content.

The test procedures in effect on the closing date of the tenders shall apply.

The finished sub-base course surface shall be proof-rolled to expose any soft spots in the sub-base course and subgrade. Soft spots and/or deflections detected by proof-rolling shall be repaired at the Contractor's expense. There will be no direct payment for proof-rolling and it will be considered a subsidiary obligation of the Contractor prior to acceptance of any portion of the finished sub-base course.

4.0 MEASUREMENT AND PAYMENT

Payment for "Sub-base Course In-Place" shall be at the contract unit price per tonne. The "Sub-base Course In-Place" and will be measured in tonnes based on the Contractor supplied daily delivery/weight tickets up to the design spread (i.e. tonnes/km) using the specified compacted depth and cross section. Sub-base Course exceeding the design spread, which results from back sloping and grading activities or overbuild will not be paid for directly, but considered incidental to the Work. The unit price shall be full compensation for completing the work including supply, processing, placement, testing during aggregate production, supplying and incorporating water and binder, reject and surplus aggregate, compacting, applying water, drying, equipment, labor, and all other items incidental and required to complete the work.

All remedial work shall be performed at the Contractor's expense including the cost of materials.

1.0 GENERAL

1.1 Description

The work shall consist of spreading and compacting crushed and pugmilled aggregate on a prepared surface.

1.2 Definitions

The following definitions shall apply:

- a. Acceptance limit: The maximum or minimum value for a test result above or below which the section of roadway shall be rejected.
- b. Quality assurance testing: The testing performed to determine compliance with the specification regarding certain requirements, limits and tolerances for the quality of materials and workmanship to be supplied.
- c. Base aggregate: The aggregate before pugmilling.
- d. Base mix: The mix after pugmilling, but before spreading.
- e. Base course: The mix in place on the road during and after spreading and compacting.
- f. Mean: The arithmetic average of a set of 'n' test results constituting the sample.
- g. Moving average: The arithmetic mean of 3 consecutive test results.
- h. Surface defects: Surface defects that are due to the Contractor's operation shall include but shall not be limited to the following:
 - i. Potholing.
 - ii. Surface failures.
 - iii. Ravelling.
 - iv. Rutting.
 - v. Bumps or dips.
 - vi. Irregular cross slopes.
 - vii. Segregation.

2.0 MATERIALS

2.1 Aggregate

Base aggregate shall be composed of sound, hard and durable particles of sand, gravel and rock free from injurious quantities of elongated, soft or flaky particles, shale, loam, clay balls and organic or other deleterious material.

The Contractor shall supply all aggregate source(s) for this Contract.

Only base course Type 33 will be permitted. No payment will be made for Granular Base Course not meeting the Type 33 specification and the material will be rejected by the Consultant. The Contractor shall have no claim against the Owner for all or part of material rejected and shall remove and dispose of rejected material at his own expense.

- a. Base course shall comply with the requirements listed in the Table below.

TABLE 1

SIEVE DESIGNATION	PERCENT BY WEIGHT PASSING CANADIAN METRIC SIEVE SERIES
	TYPE 33
31.5 mm	
18.0 mm	100.0
12.5 mm	75.0 – 100.0
5.0 mm	50.0 – 75.0
2.0 mm	32.0 – 52.0
900 µm	20.0 – 35.0
400 µm	15.0 – 25.0
160 µm	8.0 – 15.0
71 µm	6.0 – 11.0
Plasticity Index	0 – 6.0
Fractured Face %	50.0 Minimum
Light Weight Pieces %	5.0 Maximum

- b. A tolerance of 3% in the percent by weight passing the maximum size sieve shall be permitted providing 100% of the oversize passes the 40.0 mm sieve for Type 31 base course and the 22.4 mm sieve for Types 33 and 35 base course.

Binder, filler and blender sand shall be added using a separate conveyor system.

Binder, filler and blender sand feeds shall be accurately controlled and coordinated.

The Contractor shall supply a scale house operator and road checker for the placement of granular base course in place.

The Contractor shall provide daily copies of the delivery/weigh slips to the Consultant.

2.2 Processing

Base mix production shall comply with the following requirements during the pugmilling stage:

- The Contractor shall cease operations if the moving average for any sieve does not comply with the specified requirements listed in Table 2.
- Operations shall not recommence until the specified requirements are met.
- Upon recommencement of operations, the specified requirements shall be met on each of the initial 2 tests.
- Failure to cease operations shall subject all subsequent materials to the requirements of General Conditions 5.18 (Unacceptable and Unauthorized Work).

Base aggregate shall be stockpiled after the crushing operation and prior to the pugmilling.

During pugmilling operations, the Contractor shall have sufficient base aggregate in stockpile for at least 24 h of pugmilling operation until crushing is completed.

Pugmilling shall be performed in a stationary mixing plant. The mixing unit shall be designed to ensure complete mixing of the materials.

The pugmill shall be equipped with spray bars for the addition of water.

The moisture content of the base mix shall not be greater than 5 % by weight when it leaves the pugmill.

The Contractor shall supply the Consultant with test results from processing of the Granular Base Course mix that is within the tolerances of the Specification prior to hauling any Granular Base Course for use on the road.

3.0 EXECUTION

3.1 Spreading and Compacting

The Granular Base Course shall be spread and compacted in lifts. The compacted lift thickness shall not exceed 150 mm. Granular Base Mix will be sampled in place on the road in accordance with Standard Test Procedure STP 105 for Sampling Fine and Coarse Aggregates. The Contractor shall be required to compact the base course to 100% of S.P.D.

All windrows of base course aggregate shall be placed on the road shoulder. Placement of base course aggregate windrows along the centerline of the roadway will not be permitted.

Base mix shall be spread on dry and unfrozen surfaces.

Base mix shall not be compacted if the atmospheric temperature is less than 2°C.

Base course spilled on new asphalt concrete shall be removed immediately.

The finished surface of the base course shall be true to grade and cross section and free of any surface defects.

If specified in the Special Provisions or shown on the plans, a prime coat shall be placed on the finished final lift of base course in accordance with Section 32 12 13.16 For Asphalt Prime, Tack, And Flush Coat. Prime coat shall be placed within 24 h, weather permitting, after receiving written authorization from the Consultant.

If a seal coat is specified for shoulder base course, the surface of the final lift of shoulder base course shall be constructed 10 mm below the surface of the final lift of the wearing course.

If excess moisture originating from external causes including but not limited to precipitation and/or Contractor's operation is present in the subgrade and/or sub-base course and/or base course prior to the acceptance of the completed surfacing structure; the Contractor shall dry the subgrade and/or sub-base course and/or base course to the optimum moisture content and compact the subgrade and/or sub-base course and/or base course to not less than the specified density or the optimum density in accordance with the requirements for Moisture-Density Proctor (STP 205-5).

3.2 Seasonal Shutdown

If work must be carried over from one construction season to the next and the number of working days/completion date have not expired, the following shall apply:

- a. For accepted final lift of base course on which a wearing course has not been placed, the following shall apply:
 - i. At the time seasonal operations cease, a seal coat, or asphalt concrete shall be placed on the full width of base course as directed by the Consultant.
 - ii. The Contractor shall bear all the costs including materials for placing the seal coat, and asphalt concrete on the full width of base course.

- iii. When work resumes, the Contractor shall bear the cost of removing the seal coat, and asphalt concrete if required and remedying unacceptable base course including replacing the prime and prime materials.
- b. For unaccepted base course and accepted lower lifts of base course, the following shall apply:
 - i. At the time seasonal operations cease, a seal coat, or asphalt concrete shall be placed on the full width of base course as directed by the Consultant.
 - ii. The Contractor shall bear all the costs including materials for placing the seal coat, and asphalt concrete on the full width of base course.
 - iii. When work resumes, the Contractor shall bear the cost of removing the seal coat, and asphalt concrete if required and remedying unacceptable base course including replacing the prime and prime materials.

If work must be carried over from one construction season to the next and the number of working days/completion date have expired, the following shall apply:

- a. For accepted final lift of base course on which a wearing course has not been placed, the following shall apply:
 - i. At the time seasonal operations cease a seal coat, or asphalt concrete shall be placed on the full width of base course as directed by the Consultant.
 - ii. The Contractor shall bear all the costs including materials for placing the seal coat, and asphalt concrete on the full width of base course.
 - iii. When work resumes, the Contractor shall bear the costs of removing the seal coat, and asphalt concrete if required and remedying unacceptable base course including replacing the prime and prime materials on all sections of base course.
- b. For unaccepted base course and accepted lower lifts of base course, the following shall apply:
 - i. At the time seasonal operations cease, a seal coat, or asphalt concrete shall be placed on the full width of base course as directed by the Consultant.
 - ii. The Contractor shall bear all the costs including materials for placing the seal coat, and asphalt concrete on the full width of base course.
 - iii. When work resumes, the Contractor shall bear the costs of removing the seal coat, and asphalt concrete if required and remedying unacceptable base course including replacing the prime and prime materials on all sections of base course.

The Contractor shall bear the cost of maintenance, except snow and ice removal, on sections of roadway where the road surface has been disturbed by the construction operations.

3.3 Sampling and Testing

3.3.1 General

Unless otherwise specified, test procedures shall be in accordance with Saskatchewan Highways and Transportation's Standard Test Procedures Manual.

The test procedures in effect on the closing date of the tenders shall apply.

3.3.2 Quality Assurance Testing

Upon notification from the Contractor that a section of the roadway has been inspected and is ready for quality assurance testing, the Consultant shall carry out the required tests for density and surface defects.

3.3.3 Quality Assurance Testing for Density

The maximum density value and the corresponding optimum moisture content shall be determined in accordance with the requirements for Moisture-Density Proctor (STP 205-5).

Densities shall not be taken at locations within 0.5 m of an unsupported edge and 0.1 m of a supported edge.

Acceptance testing for density of the base course on the road shall be determined in accordance with the requirements for Density-In-Place By Nuclear Gauge (STP 205-7).

Frequency and locations of testing on any section shall be at the discretion of the Consultant.

The finished Granular Base Course surface shall be proof-rolled to expose any soft spots in the Granular Base Course, Sub-base Course, and subgrade. Soft spots and/or deflections detected by proof-rolling shall be repaired at the Contractor's expense. There will be no direct payment for proof-rolling and it will be considered a subsidiary obligation of the Contract prior to acceptance of any portion of the finished Granular Base Course.

3.4 Acceptance or Rejection

The section of base course shall be considered acceptable if it contains no surface defects and if:

- a. The average density meets or exceeds 100 % of maximum density.
- b. All individual test results are greater than 98 % of maximum density.
- c. The moisture content is less than or equal to the optimum moisture content.

3.4.1 Product Rejection

If the densities for any section of the roadway are outside the acceptance limits outlined above, the section shall be rejected as unacceptable work and the following shall apply:

- a. The Contractor shall have the opportunity to remedy existing base course by rerolling or by any other method suggested by the Contractor and approved by the Consultant. The Contractor may request that the section of the roadway be retested during or after the completion of the remedial attempts.
- b. The section shall be tested a total of 2 times free of cost to the Contractor. The Contractor shall pay the cost of any additional testing. Cost for retesting, if applicable, will be deducted from monies due to the Contractor for the work as required.
- c. If the base course in the section remains outside the acceptance limits after the remedial attempts, the Contractor shall remove and replace all the base course in that section at the Contractor's expense.

Any section with surface defects shall be rejected as unacceptable work.

Excessive pumping of fine aggregate to the surface during watering and compaction will be considered a surface defect.

3.4.2 Repairs

Surface defects shall be repaired in a manner acceptable to the Consultant at the Contractor's expense.

4.0 MEASUREMENT AND PAYMENT

Payment for “Granular Base Course In Place” shall be at the contract unit price per tonne. The “Granular Base Course In Place” will be measured in tonne based on the Contractor supplied daily delivery/weigh tickets up to the design spread (i.e. tonnes/km) using the specified compacted depth and cross section. Granular Base Course exceeding the design spread, which resulted from back sloping and other grading activities or overbuild will not be paid for directly, but considered incidental to the Work. The unit price shall be full compensation for completing the work including supply, processing, placement, testing during aggregate production, supplying and incorporating water and binder, reject and surplus aggregate, compacting, applying water, drying, equipment, labour, and all other items incidental and required to complete the work.

All remedial work shall be performed at the Contractor’s expense including the cost of materials.

1.0 GENERAL

1.1 Description

The work shall consist of liquid asphalt placed on a prepared surface.

2.0 MATERIALS

The Contractor shall supply the prime and tack coat materials at no direct expense to the Owner.

For Asphalt Prime, MC-30 or EAP-2 shall be used as a prime coat.

For Asphalt Tack or Flush, SS-1 emulsified asphalt shall be used as a tack coat.

3.0 EXECUTION

3.1 Distributor

The Contractor shall supply a self-powered pressure asphalt distributor in accordance with the following requirements:

- a. Equipped with a device that measures the truck speed in metres per minute and distance travelled in metres.
- b. The distributor is capable of maintaining a uniform speed.
- c. The capacity of the distributor shall not be less than 4 500 L.
- d. A heating system capable of applying even heat to the asphalt.
- e. A device capable of measuring the asphalt temperature in the tank.
- f. A positive displacement asphalt pump with separate power unit or hydrostatic drive.
- g. Equipped with a gauge that measures spray bar pressure.
- h. The spray bar is capable of being maintained at a constant height throughout the entire operation.
- i. An adjustable length spray bar on which the nozzles on any portion may be closed off.
- j. The spray bar has been provided with a positive shutoff to prevent leaking.
- k. Spray bar nozzles are of the same manufacture, type and size.
- l. Spray bar nozzles are in good working condition.
- m. A device capable of measuring spray nozzle angle.
- n. Nozzles have been set in the spray bar so that the nozzle slots make the same angle, 15 to 30 degrees, with the longitudinal axis of the spray bar.

3.2 Inspection and Calibration of Distributor

Prior to commencing seasonal operations, all distributors shall be calibrated in accordance with STP 203-20 For Distributor Application Rate.

- The Contractor shall provide the Consultant with the approved calibration form. The Contractor shall verify that the distributor's settings and attachments, including but not limited to pumps and spray bars, are in accordance with the approved calibration.

- The Contractor shall recalibrate the distributor if deemed necessary by the Consultant.

3.3 Preparation of Surface

Before applying the asphalt, the surface shall be swept clean of loose aggregate and other objectionable material.

Prime coat shall only be applied to a slightly damp surface with no water ponding.

Tack and flush coat shall only be applied to dry surfaces.

3.4 Application of Asphalt

Asphalt prime, tack and flush coat shall be applied only after a written authorization has been received from the Consultant.

The asphalt shall be applied in a single application at the rate per square metre specified below.

The prime coat shall be applied at a rate of 1.50 litres per m². The tack coat shall be applied in accordance with the application rates outlined in the following table:

Surface Type	Application Rate (L/m ²)		
	Residual	Undiluted	Diluted (one part water to one part emulsified asphalt)
Oxidized Asphalt Concrete	0.18 – 0.27	0.32 – 0.45	0.60 – 0.90
Milled Asphalt Concrete	0.27 – 0.36	0.45 – 0.60	0.90 – 1.20
New Asphalt Concrete	0.14 – 0.18	0.23 – 0.32	0.45 – 0.60

The asphalt shall be applied in accordance with the temperature limits specified in Table below.

APPLICATION TEMPERATURE LIMITS

Type of Asphalt	Temperature (Degrees Celsius)	
Emulsified Asphalts	Emulsified Primers	25 - 55
	SS - 1	25 - 55
	PE - 90	40 - 55
	Inverted Emulsified Prime 1	40 - 55
Cutback Asphalts	RC - 30, MC - 30	30 - 55
	RC - 70, MC - 70	60 - 80
	RC - 250, MC - 250	75 - 95

The Contractor shall be responsible for accidents or damage resulting from the use of excessive temperatures and shall replace any material destroyed.

Potable water shall be used to dilute the emulsified asphalt.

The prime/tack coat shall be uniformly applied across the entire prepared surface.

Asphalt for the adjacent lane shall be applied such that half the spray fan from the end nozzle overlaps the joint.

Structures, wheel guards, curbs, guardrail, and other roadway appurtenances shall not be splattered by the asphalt. The Contractor shall remove any splattering caused by his operation.

Skipped areas or deficiencies shall be corrected by hand spraying or pouring pot.

3.5 Weather Limitations

The use of emulsified asphalt for prime coat, excluding emulsified primers, will be allowed only up to September 15.

Asphalt for prime coat and tack coat shall not be applied to a prepared surface when:

- a. The surface temperature is less than 2°C.
- b. The weather is misty, rainy, or if rain is impending.

Asphalt for flush coat shall not be applied to a prepared surface when:

- a. The surface temperature is less than 10°C.
- b. The weather is misty, rainy, or if rain is impending.

3.6 Traffic Control

Traffic using the Roadway shall be accommodated in accordance with Section 01 55 26 For Traffic Accommodation and Safety.

Traffic will not be permitted to travel on prime coat until 6 hours after application unless otherwise authorized by the Consultant. After 6 hours, excess asphalt remaining on the surface shall be blotted by sand before traffic is permitted to travel on the surface.

- The Contractor will supply the source for the blotter sand.
- Excess blotter sand shall be removed when the blotter sand is no longer required.

Traffic shall not be permitted to travel on tack coat or flush coat until it has cured.

3.7 Additional Asphalt Wearing Course

When the Contractor is required to place an additional asphalt wearing course on the completed prime coat, the following shall apply:

- a. Prime coat shall be maintained by the Contractor at its own expense, including but not limited to the cost of materials, until the wearing course is accepted.
- b. If work must be carried over from one construction season to the next, the responsibility for maintaining or repairing the prime coat and the supply of materials shall be in accordance with the Specification for the type of material to be primed.

When the Contractor is not required to place an additional asphalt wearing course on the completed prime coat, the following shall apply:

- a. The Contractor shall be responsible for repairing any deficiencies which are identified in the underlying structure or the prime coat during the 72 hour period immediately following the priming of the complete width of any section of road surface.

4.0 MEASUREMENT AND PAYMENT

The unit of measurement for the application of the "Prime or Tack Coat" shall be the square meter. The unit price shall include the supply of the prime or tack coat material, equipment and tools, labour, supervision, and all other tasks and incidentals necessary to perform the Work, including where required blotter sand.

1.0 GENERAL

1.1 Description

The work shall consist of mixing crushed aggregates, or a combination of crushed aggregates, blender sand material as required, additives as required, and asphalt in a hot mix plant; and spreading and compacting the mixture on a prepared surface.

1.2 Definitions

The following definitions shall apply for this specification:

- a. Acceptance Limit is the maximum or minimum value for a test result above or below which the block and/or lot will be rejected.
- b. Quality Assurance Testing is the testing performed by the Consultant to appraise compliance with the specifications regarding specified requirements, limits and tolerances for the quality of materials and workmanship supplied. Quality assurance testing completed by the Consultant does not relieve the Contractor of their responsibility regarding quality of materials and workmanship supplied and responsibility for the quality of materials and workmanship rests fully and solely with the Contractor.
- c. Quality Control Testing is the testing performed by the Contractor to determine and confirm compliance with the specifications regarding specified requirements, limits and tolerances for the quality of materials and workmanship supplied.
- d. Adjusted P_{rl} is the adjusted profile results for smoothness in a block in which individual bumps and dips greater than 12 mm have been removed. The adjusted P_{rl} in a block will be recalculated by removing the individual P_{rl} results corresponding to the location of individual bumps and dips that are greater than 12 mm.
- e. Asphalt is the asphalt material being added as bituminous binder.
- f. Asphalt Concrete is the asphalt mix in place on the road including levelling and surface courses during and after spreading and compacting.
- g. Asphalt Mix is the mix after the asphalt mix aggregate and asphalt have been blended together.
- h. Asphalt Mix Aggregate is the aggregate after combining all virgin aggregates, additives and reclaimed asphalt concrete aggregate.
- i. Asphalt Mix Design is the laboratory determination of the precise proportions of asphalt, reclaimed asphalt concrete, additives, and all virgin aggregates to be blended together to meet the specified properties for the asphalt mix.
- j. Asphalt Mix Formula is the field determination during the plant calibration process of the precise proportions of asphalt, reclaimed asphalt concrete, additives, and all virgin aggregates to be blended together to meet the specified properties for the asphalt mix as produced at the plant.
- k. Block is the unit of measurement for assessing smoothness and individual bumps and dips. A block is a portion of the final lift of asphalt concrete that is one paver width wide and 100 m long. The first and last block on a construction section may be less than 100 m long.
- l. Density
 - Asphalt Mix Design Density is the Marshall density for the compacted Asphalt Mix Design specimen (see 1.2.i above).
 - Asphalt Mix Formula Density is the Marshall density for the compacted Asphalt Mix Formula specimen (see 1.2.j above).

- Field Density is the density of the Asphalt Concrete as determined by STP 204 – 6, Density-In-Place By Nuclear Gauge.
 - Job Mix Formula Density is the Marshall density for the compacted Job Mix Formula specimen (see 1.2.n below).
 - Specified Marshall Density is 97% of the Marshall Density established for the Asphalt Mix Formula or the Job Mix Formula, whichever is in use.
- m. Individual Bump and/or Dip is a bump or dip measured in the vertical direction that exceeds 12 mm.
- n. Job Mix Formula is the field determination of the precise proportions of asphalt, reclaimed asphalt concrete, additives, and all virgin aggregates to be blended together to meet the specified properties for the asphalt mix as produced at the plant.
- o. Lot is approximately 200 tonnes of asphalt concrete which is assessed as a unit for the purpose of payment and selected to represent work produced by essentially the same process and materials. The final lot on a project may vary in mass from 101 t to 300 t.
- p. Mean is the arithmetic average of the test results within a lot.
- q. Profile Index (PrI) is the sum of the vertical deviations, in millimetres, outside the 5 mm null band that a roadway deviates from a perfectly flat surface over a horizontal distance of 100 m. The PrI categories are as follows:
- Category I PrI applies to all blocks not identified below as Category II PrI.
 - Category II PrI applies to the following circumstances:
 - i. Curves with radius less than 600 m;
 - ii. Blocks within 50 m of a bridge or railway crossing;
 - iii. Single lift rehabilitation projects where the total thickness of asphalt concrete being placed is 50 mm or less, with the exception of profiled-milled sections;
 - iv. Areas where there is curb and gutter; and
 - v. The block at each construction limit.
- r. Reclaimed Asphalt Concrete is asphalt concrete reclaimed from the roadway.
- s. Reclaimed Asphalt Concrete Aggregate is the aggregate remaining after the asphalt has been extracted from the Reclaimed Asphalt Concrete.
- t. Repair
- Class I Repair is a corrective improvement that removes and replaces, or overlays the defective or damaged block(s) or lot(s) and restores the block(s) or lot(s) to the specified standard.
 - Class II Repair is a surface treatment that mends or corrects a structural defect to restore the surface to an acceptable standard (e.g. slurry seal).
 - Class III Repair is a surface treatment that mends or corrects a surface defect but does not restore the surface to an acceptable standard (e.g. flush coat).
 - Class IV Repair is a corrective improvement to the ride by reducing bump(s) and/or dip(s). An acceptable Class IV repair is one which removes or reduces the bump(s) and/or dip(s) through a smooth transition to the surrounding asphalt concrete without impairing the functionality and/or structural characteristics in the area of the bump(s) and/or dip(s).
- u. Segregated Area is an area 0.1 m² or greater where the surface texture is either too stony or lacking in continuous matrix of asphalt, fine aggregate and coarse aggregate in relation to the surrounding acceptable asphalt concrete.
- v. Segregation Severity
- None means a completely uniform surface texture. The matrix of asphalt and fine aggregate is in place between the coarse aggregate.
 - Minor means significantly more stone is visible than in the surrounding acceptable asphalt concrete, usually with a lack of continuous contact with the surrounding matrix.
 - Severe means areas that usually appear as very stony mix, with stone against stone, and may be missing matrix.

- w. Smoothness means the surface profile of the asphalt concrete with the Profile Index (PrI) as the measured output. Individual bumps and/or dips of 12 mm or less are considered a part of smoothness.
- x. Surface Defects that are due to the Contractor's operation shall include, but shall not be limited to the following:
- Areas of segregation less than 0.1 m²;
 - Areas containing excess or insufficient asphalt;
 - Areas of open texture;
 - Improper matching of longitudinal and transverse joints on final lift of asphalt concrete;
 - Roller marks on final lift of asphalt concrete;
 - Cracking or tearing;
 - Contamination by diesel, hydraulic fluids, detergent or other harmful products;
 - Foreign objects or materials that are detrimental to the asphalt concrete; and
 - Clay balls or oversized materials.

2.0 MATERIALS

2.1 Asphalt

Only Asphalt Mix **Type 2** will be permitted.

The Contractor shall supply the asphalt and anti-stripping agent. Type 150 – 200A asphalt shall be used as bituminous binder. This material shall meet the requirements of SMM 101 For Asphalt Cements. Supply and incorporation of the asphalt and an anti-stripping agent will not be paid for directly, but will be considered as a subsidiary obligation of the Contractor under this Contract.

2.2 Aggregate

Virgin aggregate shall be composed of sound, hard and durable particles of sand, gravel and rock, free from injurious quantities of elongated, soft or flaky particles, shale, clay, loam, ironstone, coal and organic or other deleterious material.

2.3 Anti-Stripping Agents

Only liquid anti-stripping agent will be permitted. The Contractor shall submit the type and proportion used in the mix design for review by the Consultant. Evotherm™ will not be permitted for this contract.

3.0 EXECUTION

The Contractor shall supply a scale house operator and road checker for the placement of Asphalt Concrete In Place.

The Contractor shall provide daily copies of the delivery/weigh slips to the Consultant.

The Contractor shall furnish a platform scale meeting Measurement Canada's requirements.

- The platform scale shall be of sufficient length and capacity to accommodate any truck used on the Contract in a single weighing.

- At the time of use, the scales shall have been certified and sealed within one year. The Contractor shall arrange for scale certification by an accredited scale inspector. Proof of certification shall be provided to the Consultant.
- The Contractor shall furnish two tonnes of approved test weights and shall have them available on site at all times for checking of the scale(s) at the discretion of the Consultant.

The Contractor may use other types of scales and/or weigh ticket printers provided these devices are approved or under permit for use by Measurement Canada, and are approved for use by the Owner.

Trucks used to haul material purchased by weight shall be weighed empty at such times as the Consultant directs.

Payment will not be made to the Contractor for furnishing and certifying scales.

3.1 Binder, Filler, and Blender Sand

Filler and blender shall be provided by the Contractor at no direct cost to the Owner.

3.2 Anti-Stripping Agents

Liquid Anti-Stripping Agent:

- a. When a liquid anti-stripping agent is used, the following shall apply:
 - The Contractor shall supply the equipment necessary to add a liquid antistripping agent.
 - The addition of liquid anti-stripping agent shall be accomplished through the use of a liquid anti-strip injection system containing a positive displacement pump with a variable speed motor, a totalizing flow meter, a sampling valve, a system check valve, a system isolation valve and an inline check valve. The injector pump motor shall be regulated by a signal from the asphalt flow meter.
 - Liquid anti-stripping agent will be injected into the plant asphalt line just prior to entry into the drum mixer.
 - The system shall be capable of regulating the flow rate resulting in consistent flow rate of liquid anti-stripping agent.
 - The system shall be capable of re-circulating the liquid anti-stripping agent to the storage tank until the asphalt plant bypass valve is actuated.
 - Liquid anti-stripping agent shall be added at a rate of approximately 1.0% of the weight of liquid asphalt added for the Job Mix Formula.

3.3 Aggregate

- a. The Contractor shall split the aggregate into 3 separate stockpiles in accordance with the following:
 - The natural fines stockpile shall be produced by screening the raw aggregate over a maximum 9.0 mm square opening screen or 5.0 mm slotted screen prior to crushing.
 - The aggregate retained on the screen shall be crushed and split into crushed coarse and crushed fine stockpiles.
 - The crushed coarse stockpile shall contain no more than 10% of the material passing the 5.0 mm square opening sieve.
 - The crushed fine stockpile shall contain no less than 90% of the material passing the 5.0 mm square opening sieve.
- b. The crushed coarse, crushed fines, and natural fines stockpiles shall be mathematically recombined at the percentages provided by the Contractor. If the resulting aggregate does not

meet the requirements specified in the Table below, the Contractor shall be required to reject a fraction of the material in the natural fines stockpile in accordance with General Conditions 5.18.

3.4 Asphalt Mix Design

The Contractor shall supply the Consultant with the mix design a minimum of five (5) days prior to the commencement of the paving operation. The Consultant will not accept any asphalt mix produced prior to the Contractor receiving written approval of the mix design.

Preparation of the asphalt mix design will not be paid for directly but will be considered as a subsidiary obligation of the Contractor under this Contract.

Only asphalt mix design Type 6 will be permitted for this contract. The asphalt mix characteristics shall meet the requirements in the Table below.

ASPHALT CONCRETE MIX DESIGN TYPES AND CHARACTERISTICS

Mix Design Type/ Design Factors -Mix Characteristics	1	2	3	4	5	6
Asphalt Type	150-200 A or 200-300 A			150-200 A or 200-300 A		
Marshall Blows	50 blows			75 blows		
Aggregate Type/Sieve Designation*	70 or 70 R	71 or 71 R	72 or 72 R	70 or 70 R	71 or 71 R	72 or 72 R
18.0 mm	100.0			100.0		
16.0 mm	78.0 – 98.0	100.0		78.0-98.0	100.0	
12.5 mm	68.0 – 92.0	78.0 – 98.0	100.0	68.0 – 92.0	78.0 – 98.0	100.0
9.0 mm	54.0 – 80.0	66.0 – 90.0	66.0 – 90.0	54.0 – 80.0	66.0 – 90.0	66.0 – 90.0
5.0 mm	38.0 – 65.0	46.0 – 72.0	46.0 – 72.0	38.0 – 65.0	46.0 – 72.0	46.0 – 72.0
2.0 mm	18.0 – 46.0	23.0 – 51.0	23.0 – 51.0	18.0 – 46.0	23.0 – 51.0	23.0 – 51.0
900 um	10.0 – 33.0	15.0 – 37.0	15.0 – 37.0	10.0 – 33.0	15.0 – 37.0	15.0 – 37.0
400 um	5.0 – 25.0	10.0 -- 27.0	10.0 -- 27.0	5.0 – 25.0	10.0 – 27.0	10.0 – 27.0
160 um	3.0 – 13.0	3.0 – 14.0	3.0 – 14.0	3.0 – 13.0	3.0 – 14.0	3.0 – 14.0
71 um	2.0 – 9.0	2.0 – 9.0	2.0 – 9.0	2.0 – 9.0	2.0 – 9.0	2.0 – 9.0
Air Voids, %	3.0 – 5.0					
Air Voids (Field), %	4.0 – 9.0					
Deleterious Material, Maximum % **	2.0					
Film Thickness, Minimum um	7.5					
Flow, mm	1.5 – 3.5					
Fracture, Minimum % ***	60.0	70.0	80.0	75.0	85.0	95.0
Lightweight Aggregate, Maximum %	1.0					
Retained Stability, Minimum %	70.0					
Sand Equivalent, Minimum	45					
Stability, Minimum N	5500			7000		
Voids Filled, %	65.0 - 78.0					
V. M. A., %	13.5 – 15.5	14.0 – 16.0	14.0 – 16.0	13.5 – 15.5	14.0 – 16.0	14.0 – 16.0

*A tolerance of 3% in the percent by weight retained on the maximum size sieve will be permitted providing 100% of the oversize passes the 22.4 mm sieve for Type 70 and Type 70 R aggregate, the 18.0 mm sieve for Type 71 and 71 R aggregate and the 16 mm sieve for Type 72 and 72 R aggregate.

**Deleterious material includes all other injurious material other than lightweight pieces.

***The Fractured Face percentage will be calculated on the aggregate after combining all virgin aggregates and additives, excluding reclaim.

ASPHALT CONCRETE MIX DESIGN TYPES AND CHARACTERISTICS, CONT'D

Mix Design Type/ Design Factors - Mix Characteristics	7	8	9	10	11	12
Asphalt Type	300-400A			300-400A		
Marshall Blows	50 blows			75 blows		
Aggregate Type/Sieve Designation*	70 or 70 R	71 or 71 R	72 or 72 R	70 or 70 R	71 or 71 R	72 or 72 R
18.0 mm	100.0			100.0		
16.0 mm	78.0 – 98.0	100.0		78.0-98.0	100.0	
12.5 mm	68.0 – 92.0	78.0 – 98.0	100.0	68.0 – 92.0	78.0 – 98.0	100.0
9.0 mm	54.0 – 80.0	66.0 – 90.0	66.0 – 90.0	54.0 – 80.0	66.0 – 90.0	66.0 – 90.0
5.0 mm	38.0 – 65.0	46.0 – 72.0	46.0 – 72.0	38.0 – 65.0	46.0 – 72.0	46.0 – 72.0
2.0 mm	18.0 – 46.0	23.0 – 51.0	23.0 – 51.0	18.0 – 46.0	23.0 – 51.0	23.0 – 51.0
900 um	10.0 – 33.0	15.0 – 37.0	15.0 – 37.0	10.0 – 33.0	15.0 – 37.0	15.0 – 37.0
400 um	5.0 – 25.0	10.0 – 27.0	10.0 – 27.0	5.0 – 25.0	10.0 – 27.0	10.0 – 27.0
160 um	3.0 – 13.0	3.0 – 14.0	3.0 – 14.0	3.0 – 13.0	3.0 – 14.0	3.0 – 14.0
75 um	2.0 – 9.0	2.0 – 9.0	2.0 – 9.0	2.0 – 9.0	2.0 – 9.0	2.0 – 9.0
Air Voids, %	3.0 – 5.0					
Air Voids (Field), %	4.0 – 9.0					
Deleterious Material, Maximum % **	2.0					
Film Thickness, Minimum um	7.5					
Flow, mm	1.5 – 3.5					
Fracture, Minimum % ***	50.0	60.0	70.0	75.0	85.0	95.0
Lightweight Aggregate, Maximum %	1.0					
Retained Stability, Minimum %	70.0					
Sand Equivalent, Minimum	45.0					
Stability, Minimum N	5500			7000		
Voids Filled, %	65.0 - 78.0					

*A tolerance of 3% in the percent by weight retained on the maximum size sieve will be permitted providing 100% of the oversize passes the 22.4 mm sieve for Type 70 and Type 70 R aggregate, the 18.0 mm sieve for Type 71 and 71 R aggregate and the 16 mm sieve for Type 72 and 72 R aggregate.

**Deleterious material includes all other injurious material other than lightweight pieces.

***The Fractured Face percentage will be calculated on the aggregate after combining all virgin aggregates and additives, excluding reclaim.

The Asphalt Mix characteristics shall also meet the following additional requirements:

Minimum Percent Manufactured-Fines:

- 70% for Mix Design Types 1, 4 and 5
- 60% for Mix Design Types 2 and 6
- 50% for Mix Design Type 3

Percent Manufactured Fines is defined as the proportion of material passing the 5.0 mm sieve in the combined asphalt concrete aggregate blend that has been crusher-processed. The formula used to calculate the Percent Manufactured Fines (% MF) is as follows:

$$\% \text{ MF} = [(\% \text{ CC}_{\text{mix}} * \% \text{ Fines CC}) + (\% \text{ CF}_{\text{mix}} * \% \text{ Fines CF}) + ((\% \text{ RAC}_{\text{mix}} * \% \text{ Fines RAC}) * \% \text{ MF RAC})] / (\% \text{ Fines}_{\text{mix}})$$

Where:

% CC_{mix} = % Crushed Coarse aggregate in the total combined aggregate blend

% Fines CC = % passing the 5 mm sieve in the Crushed Coarse aggregate stockpile

% CF_{mix} = % Crushed Fines aggregate in the total combined aggregate blend

% Fines CF = % passing the 5 mm sieve in the Crushed Fines aggregate stockpile

% Fines_{mix} = % passing the 5 mm sieve in the total combined aggregate blend

% RAC_{mix} = % Reclaimed Asphalt Concrete in the total combined aggregate blend

% Fines RAC = % passing the 5 mm sieve in the RAC stockpile

% MF RAC = % Manufactured Fines passing the 5 mm sieve in the Reclaimed Asphalt Concrete

- when the % MF in the original asphalt mix is known, increase by 7% and use for % MF RAC.
- when the % MF in the original asphalt mix is unknown, use 45% for % MF RAC for 16 mm or larger top size reclaimed asphalt concrete and 55% for 12.5 mm top size reclaimed asphalt concrete.

Minimum Percent Manufactured Fine Aggregate Angularity as determined by ASTM C1252-06, Method A:

- 42 for Mix Design Types 1, 2, 3, 4 and 5
- 43 for Mix Design Type 6

3.5 Plant Requirements

A uniform mixture shall be produced in which all particles are thoroughly coated. Aggregate particles shall not be coated with residue from fuel combustion. The asphalt mix shall contain no more than 0.5% moisture by weight.

Plant Calibration and Operation

- a. Plant Calibration:
 - The Contractor shall be responsible for Plant Calibration including all required testing.
- b. Plant Operation:

- For the initial 24 hours of plant production at each plant set-up, the asphalt added shall not vary by more than 0.5% from the design asphalt content. Full-scale plant production shall not commence until the percentage of asphalt added to trial batches of asphalt mix complies with the foregoing requirement.
- After the initial 24 hours of production, the Contractor shall cease operations if the of asphalt added varies by more than 0.3% from the Job Mix Formula.
- After the Job Mix Formula aggregate gradation has been established, the following shall apply:
 - i. The Contractor shall cease operations if any sieve does not comply with the specified requirements listed below:

MAXIMUM PERMISSIBLE SIEVE VARIATION

Maximum Permissible Variation from the Job Mix Formula	
Sieve Designation	Percent By Weight Passing Canadian Metric Sieve Series
16.0 mm	± 5.0
12.5 mm	± 5.0
9.0 mm	± 5.0
5.0 mm	± 5.0
2.0 mm	± 4.0
900 um	± 3.0
400 um	± 3.0
160 um	± 2.0
71 um	± 1.5

- ii. Road operations shall not recommence until the specified requirements are met.
 - iii. Upon re-commencement of operations, the specified requirements shall be met on each of the initial 2 tests.
 - iv. Failure to cease operations shall subject all subsequent materials to the requirements of General Conditions 5.18 (Unacceptable and Unauthorized Work).
 - v. The Contractor may not request more than Four revisions to the Job Mix Formula without the provision of a new Mix Design.
- The Contractor shall immediately shut down the plant when:
 - i. The stack emissions temperature exceeds the asphalt mix temperature at the mixer discharge by more than 20°C or;
 - ii. The temperatures exceed the limits outlined in the following table:

TEMPERATURE LIMITS

Grade of Asphalt	Degrees Celsius		
	Maximum Temperature of Dry Aggregate	Asphalt Storage Temperature	Asphalt Mix Temperature at Mixer Discharge
150-200A	160	120-175	135-155
200-300A	160	120-175	130-150
300-400A	150	114-175	120-140
400-500A	140	110-175	110-130

- All material produced subsequent to the occurrence of an event specified above will be deemed to be unacceptable material for the purposes of General Conditions 5.18 (Unacceptable And Unauthorized Work).
- Plant operations shall not recommence until the temperature limits above are met.
- The Contractor shall dispose of any rejected asphalt mix or asphalt concrete in a manner that is acceptable by the Consultant.

3.6 Delivering to the Road

Truck boxes shall be clean and free from accumulations of asphalt mix and foreign materials. Excess truck box lubricants such as light oil, detergent, lime solutions, gasoline, kerosene, diesel or other similar products shall not be allowed to contaminate the asphalt mix, and shall be disposed of in an environmentally acceptable manner.

Every truck used to transport the asphalt mix shall be equipped with a tarpaulin which is waterproof and can be securely fastened, when required, to protect the asphalt mix from precipitation and excessive heat loss.

Prior to unloading into the paver, the temperature at a depth of 40 mm below the surface of the asphalt mix in the truck box shall not be less than 110°C.

Trucks shall be turned around only at approaches.

3.7 Pavers

Pavers shall be self-propelled units capable of spreading and finishing the asphalt concrete to the specified typical cross section and thickness shown on the plans. For traffic lanes, pavers shall be operated using the following:

- Automatic screed controls, for the control of longitudinal and transverse slope and joint matching. The automatic control device shall be capable of being operated from either side of the paver.
- Vibrating screed.

Spreading

A tack coat shall be applied in accordance with Section 32 12 13.16 For Asphalt Prime, Tack and Flush Coat between all asphalt lifts.

Asphalt mix shall be spread on dry, clean, and unfrozen surfaces.

Asphalt concrete shall be placed in accordance with the following temperature limitations:

- a. Paving may begin, for other than the final lift, when the temperature is 0°C provided the temperature is forecast, by Environment Canada, for the closest location to the project, to reach at least 5°C that day.
- b. The final lift of asphalt concrete shall not be placed if:
 - The atmospheric temperature is less than 5°C; or
 - The surface temperature is less than 7°C.

The minimum and maximum thickness of a compacted lift of asphalt concrete shall meet the following requirements:

MINIMUM AND MAXIMUM LIFT THICKNESS

Lift	Type 70 or 70 R Aggregate		Type 71 or 71 R Aggregate		Type 72 or 72 R Aggregate	
	Minimum Thickness	Maximum Thickness	Minimum Thickness	Maximum Thickness	Minimum Thickness	Maximum Thickness
Top	40 mm	60 mm	35 mm	50 mm	30 mm	50 mm
Lower	30 mm	60 mm	30 mm	50 mm	25 mm	50 mm

The following clause shall apply only when shimming and levelling are specified in the Special Provisions as being applicable to the Contract.

- a. The Contractor shall shim and level any pavement depressions designated by the Consultant. The use of a motor grader and hand raking will be permitted.
- b. All work involved with shimming and levelling will be paid for at the contract unit bid price(s) where applicable.
- c. The Contractor shall complete all shimming and levelling operations such that the material has cooled sufficiently before the placement of asphalt concrete.

Longitudinal joints shall not be permitted in the lane. Longitudinal joints shall be vertical butt type, well bonded and sealed, and finished to provide a continuous, smooth profile across the joint.

The asphalt mix temperature in the paver shall not be less than 110°C.

Contact faces of curbs, gutters, manholes, and sidewalks shall be coated with asphalt using a hand applicator before placing the asphalt mix.

When paving is discontinued on the roadway, the asphalt concrete shall be temporarily feathered to a slope of 10 horizontal to 1 vertical. When paving is resumed, the transverse joint shall be straight and have a vertical face when the taper is removed.

Asphalt mix shall not be placed or allowed to fall on previously laid top lift asphalt concrete or the existing asphalt concrete.

Transverse construction joints from one lift to the next shall be separated by at least 2 m.

Road intersections and approaches shall be paved in accordance with the plans, special provisions, or as directed by the Consultant.

If designated by the Consultant, a flush coat shall be applied in accordance with Section 32 12 13.16 For Asphalt Prime, Tack and Flush Coat.

3.8 Compacting

At the beginning of the work, the Contractor shall establish a rolling pattern for achieving the Specified Marshall Density. The Contractor shall be fully responsible for establishing their rolling pattern at no direct cost to the Owner. The rolling pattern strip shall comply with the following:

- a. The rolling pattern strip shall have a length of at least 250 m and shall be of the same thickness as the lift it represents.
- b. The material used shall conform to the requirements of the asphalt concrete stated in the contract.
- c. The Consultant and/or the Contractor at any time may order the construction of a new rolling pattern strip if there are reasons to indicate that the paving operation, the mix design or lift thickness have been altered.
- d. Compaction shall commence immediately and shall be completed before the temperature of the asphalt concrete falls below 55°C for 150-200 A and 200-300A asphalt concrete mixes, and 40°C for 300-400 A and 400-500 A asphalt concrete mixes.
- e. Compaction shall continue until the Specified Marshall Density is achieved using a fully ballasted pneumatic tired roller with a minimum tire pressure of 620 kPa and having the tire size and wheel load indicated in the table below.

ROLLER TIRE SIZE AND MINIMUM LOAD

Tire Size (mm)	Minimum Load Per Tire (kg)
190.5 x 381.0	950
228.5 x 508.0	1 300
279.4 x 508.0	1 900

- f. The speed of steel rollers shall not exceed 5 km/h and the speed of pneumatic rollers shall not exceed 8 km/h.
- g. The rolling pattern strip shall remain in place and shall become part of the completed work.

Each lift of asphalt concrete shall be compacted to the Specified Marshall Density established for the lot.

Longitudinal joints shall be rolled directly behind the paver.

All asphalt mix shall be thoroughly compacted, and after final rolling, the finished surface of the mat shall be free from segregation, waves, hairline cracks, and other obvious defects.

Traffic shall not be allowed to travel on the finished surface until the surface has cooled to a temperature as to ensure that no deformation or other defects to the surface will occur.

3.9 Sampling and Testing

3.9.1 General

Unless otherwise specified, test procedures will be in accordance with the Saskatchewan Ministry of Highway's Standard Test Procedures Manual.

The test procedures in effect on the closing date of the Bids will apply.

The failure of the Consultant to provide test results within the time provided in this specification shall not relieve the Contractor of their obligation to remedy any defect, and the Quality of the product remains the full and sole responsibility of the Contractor.

3.9.2 Quality Control

Quality control testing and inspection is the responsibility of the Contractor throughout every stage of the Work from aggregate production to inspection of the final product. A Quality Control Plan prepared in accordance with the requirements for Quality Control Plans (STP 400) shall be submitted at least 2 days prior to the Pre-Construction Meeting. As part of the Quality Control Plan, the Contractor shall indicate the effort they have placed on quality control testing, such as exchange testing with the Canadian Asphalt Materials Exchange Program (CAMEP) and/or the Canadian Council of Independent Laboratories (CCIL) and/or the AASHTO Materials Reference Laboratory (AMRL) Proficiency Sample Program.

The Contractor shall provide equipment and qualified personnel to perform all field testing and inspection necessary to determine and monitor the properties of the materials produced and incorporated into the Work, and the workmanship of the final product.

The cost of quality control testing and inspection will be considered incidental to the cost of the material sampled, and no separate payment will be made.

Quality Control Testing

- For each day of production a minimum of 1 asphalt mix sample representing each 3 hours of production, or portion thereof, shall be obtained and tested for the purpose of Quality Control.
- The results from quality control testing shall be available to the Owner during the progress of the Work, within 24 hours of sampling.
- Test results shall be reported on forms and charts provided by the Saskatchewan Ministry of Highways, or in a format acceptable to the Consultant.
- The Contractor shall provide the following to the Owner prior to final acceptance of the Work:
 - A summary of all aggregate Quality Control tests;
 - Originals of all test results for Quality Control of mix properties; and
 - Originals of the quality control charts.
- For each sample, information on Marshall Density, asphalt content, aggregate gradation, air voids, maximum theoretical density, voids filled and voids in mineral aggregate shall be reported and plotted on charts.
- For each Lot, Marshall stability information shall be reported and plotted on charts.
- For each day's production, information on coarse aggregate fracture shall be reported and plotted on charts.
- Additional properties contained in the Mix Design and Asphalt Properties Table, do not have to be reported by the Contractor, but may be tested by the Owner.

3.9.3 Quality Assurance Testing

General

- a. Quality assurance testing completed by the Consultant will not be considered as quality control testing.
- b. Within this specification, certain requirements, limits and tolerances are specified regarding the quality of materials and workmanship to be supplied. Compliance with these requirements, where

so specified, will be judged by testing as described in this section. These tests cannot be disputed on the grounds of statistical theory or a specified or implied Contractor's risk.

- c. The results of quality assurance testing for Field Density, smoothness, individual bumps and dips, segregation and surface defects will be used for acceptance, rejection and pay adjustments for the block or lot.
- d. If the remedial work by the Contractor on a rejected block or lot involves a repair of the asphalt concrete in the block or lot, all test results from quality assurance testing performed on the rejected block or lot prior to the remedial work will be discarded and new sampling and quality assurance testing will be performed in accordance with the following Section.

Sampling and quality assurance testing will be in accordance with the following:

- a. For **Field Density**:
 - The Consultant will develop a correlation between the results of the nuclear gauge and the results of the asphalt concrete cores obtained from the compacted lift of asphalt concrete. The density results obtained from the cores will be used to correct the Field Density results obtained from the nuclear gauge.
 - Testing will be conducted prior to the placement of the next lift of asphalt concrete.
 - Upon notification from the Contractor that a lot has been inspected and is ready for quality assurance testing, the Consultant will locate 3 test sites in the lot.
 - The Consultant will measure the Field Density at 3 test sites for each lot in accordance with the requirements for Density-In-Place By Nuclear Gauge (STP 204-6).
 - The Consultant will provide the Contractor with a copy of the results of acceptance tests within 5 calendar days of receiving notification from the Contractor that the lot is ready for quality assurance testing.
 - If the quality assurance test results on a lot indicate a penalty for Field Density, the Contractor will be allowed one opportunity to re-roll the lot. The sampling procedure for re-testing will exclude areas falling within traffic wheel paths.
- b. For **smoothness and individual bumps and dips**:
 - The surface of the blocks will be profiled by the Consultant in accordance with the standard test procedures.
 - If a block is located within a rejected lot, the surface of the block will not be profiled until the lot has been remedied.
 - The Consultant will provide the Contractor with a copy of the results of acceptance tests for smoothness and individual bumps and dips within 12 calendar days of the placement of the asphalt concrete.
 - When all the quality assurance tests for a block are completed, the Consultant will advise the Contractor as to the acceptability of the block with respect to smoothness and individual bumps and dips.
- c. For **segregation**:
 - Each lane-km, including the shoulder, will be inspected for areas of segregation.
 - After receiving notification from the Contractor that the asphalt concrete is ready for quality assurance testing, the Consultant will provide the Contractor with the locations of the visually identified segregation in accordance with the following:
 - i. Within 12 calendar days during the course of the construction; and
 - ii. Within 4 calendar days after the completion of all the asphalt concrete.
 - A segregated area will be categorized by the worst condition prevalent for 50% or more of the length of the segregated area.
 - If the worst condition in a segregated area is not prevalent for at least 50% of the length of the area, then the area will be measured in relation to the length of minor and severe segregation.
- d. For **surface defects**:

- Each lane-km, including the shoulder, will be inspected for surface defects.
- After receiving notification from the Contractor that the asphalt concrete is ready for quality assurance testing, the Consultant will provide the Contractor with the locations of the visually identified surface defects in accordance with the following:
 - i. Within 12 calendar days during the course of the construction; and
 - ii. Within 4 calendar days after the completion of all the asphalt concrete.

3.9.4 Exclusions to Random Sampling

Random sampling methods will not apply to the following:

- a. Smoothness;
- b. Small areas such as approaches, tapers, areas of handwork and gores;
- c. Areas of visually identified segregation; and
- d. Areas of surface defect repair.

3.9.5 Appeal of Quality Assurance Test Results and Appeal Testing

General

- a. The Contractor cannot appeal test results that are within the full or bonus payment range.
- b. The Consultant will provide the Contractor with a copy of the results of appeal tests within 6 calendar days of delivery of the samples.
- c. Appeal testing will be performed by the Owner, and the new results shall be binding on the Contractor and the Owner.
- d. If the appeal testing does not result in a decrease of the pay adjustments, all testing costs incurred during the appeal procedures shall be paid by the Contractor.
- e. If the Consultant determines that certain test results are faulty due to testing equipment malfunction, improper testing procedures or calculations, re-testing will be performed at the expense of the Owner.
- f. In the case of an appeal, the Owner will not be responsible for any delays including but not limited to Contractor's downtime, or other costs as a result of awaiting the receipt of the appeal test results, or due to the nature and values of the appeal test results.

Appeal of the acceptance test results shall be in accordance with the following:

- a. For **Field Density**:
 - Within 2 calendar days of receipt of the quality assurance test results for a lot, the Contractor may appeal the quality assurance test results by requesting appeal tests. The following procedures shall apply:
 - i. The Consultant will locate 2 appeal test sites in the lot.
 - ii. The Consultant will measure the Field Density at each appeal test site and in the vicinity of the original 3 quality assurance test sites in accordance with the requirements for Density-In-Place By Nuclear Gauge (STP 204-6).
 - iii. The mean of the test results from the 5 referee sites will be used for the purpose of acceptance, rejection and determination of pay adjustments.
- b. For **smoothness and individual bumps and dips**:
 - Within 2 calendar days of receipt of the quality assurance test results for a block, the Contractor may appeal the test results by requesting appeal tests.

- The Consultant will re-test the entire block for smoothness and individual bumps and dips, if either is under appeal.
- c. For **segregation**:
 - Within 6 calendar days of receipt of the locations of the visually identified segregation, the Contractor may appeal the quality assurance test results by requesting appeal tests.
 - The Consultant will obtain a core sample at a location that is representative of the area being considered. The core sample will be obtained in accordance with the requirements for Asphalt Concrete Samples Obtained By Coring (STP 204-5).
 - The Consultant will determine the Field Density, asphalt content and the aggregate gradation of the sample.
 - The area will be considered non-segregated if the aggregate gradation complies with requirements specified.
 - If the aggregate gradation does not comply with the requirements specified:
 - i. The area will be considered minor segregation if the test results indicate the Field Density of the asphalt concrete meets or exceeds 94% of the Marshall Density established for the Job Mix Formula or Asphalt Mix Formula, and the asphalt content deviates by not more than 0.6% from the asphalt content approved for the Job Mix Formula or Asphalt Mix Formula.
 - ii. The area will be considered severe segregation if the conditions noted above are not met.

3.10 Acceptance, Rejection, and Repairs

3.10.1 General

The Contractor shall provide a finished product conforming in quality and accuracy of detail to the dimensional and tolerance requirements of the specifications and drawings. Where no tolerances are specified, the standard of workmanship shall be in accordance with normally accepted good practice.

3.10.2 Rejection

The block or lot will be rejected as unacceptable work if:

- a. The Field Density for the lot is outside the acceptance limits.
- b. The PrI for the Block is outside the acceptance limits.
- c. Any individual bumps and/or dips exceed 12 mm.

Areas of segregation and surface defects will be considered unacceptable work until the areas are repaired and accepted by the Consultant.

3.10.3 Repairs

General

- a. The Contractor shall not undertake any repair on any defective work prior to notifying the Consultant. Any areas repaired prior to obtaining the Consultant approval will not be considered for payment.
- b. Work on any block or lot which has been rejected shall be remedied within 30 calendar days of receipt of the quality assurance test results.
- c. All remedial work shall be performed at the Contractor's expense, including the cost of materials.
- d. The Contractor shall pay the cost of all re-testing performed following the remedying of work in any block or lot that has been rejected.

- e. Repairs shall be subject to the acceptance of the Consultant.
- f. Alternate repair methods proposed by the Contractor shall be subject to approval of the Consultant. The nature of the deficiencies shall be taken into account in the consideration of the method of repair.
- g. Acceptable remedial measures to a rejected block or lot, or areas within a block or lot are as follows:
 - A **Class I** repair either overlays or removes and replaces the asphalt concrete.
 - i. If an overlay is used as the remedial measure, the following shall apply:
 - A tack coat shall be applied in accordance with Section 32 12 13.16 For Asphalt Prime, Tack and Flush Coat unless otherwise directed by the Consultant.
 - The minimum overlay thickness shall be as specified in Minimum And Maximum Lift Thickness Table for top lift.
 - Adjacent lanes and shoulders shall be overlaid to the same thickness and length.
 - On all lifts of asphalt concrete below the final lift, the overlay shall be completed prior to the next lift being placed.
 - ii. If a removal and replace operation is used as the remedial measure, the following shall apply:
 - The asphalt concrete shall be removed by cold milling to a minimum depth as specified in the Minimum and Maximum Lift Thickness Table for the lift being removed.
 - A tack coat in accordance with Section 32 12 13.16 For Asphalt Prime, Tack and Flush Coat, unless otherwise directed by the Consultant, shall be applied to the milled surface.
 - The asphalt concrete material removed by the milling operation shall be the property of the Contractor.
 - The asphalt concrete used for back-filling the milled area shall be subject to the same specifications as the original pavement.
 - A **Class II** repair is typically either the placing of a slurry seal on the entire block or lot, or the placing of a spot slurry seal patch or patches within the block or lot.
 - i. For slurry seals or slurry seal patches, the following shall apply:
 - The seal shall be a mixture of a dry, non-plastic sand, an emulsified asphalt SS-1 (slurry), potable water, and, if needed, acceptable additives such as Portland Cement, and Carbon Black, for colour.
 - The gradation of the sand shall be as follows:

SLURRY SEAL SAND GRADATION

Sieve Designation	Percent by Weight Passing Canadian Metric Sieve Series
900 um	100.0
400 um	70.0 – 95.0
160 um	60.0 – 80.0
71 um	20.0 – 42.0
Plasticity Index	Non Plastic

- The Contractor shall perform all Class II repairs. The slurry seal mixture for a Class II repair shall meet the requirements for a Type II mix under Section 4 of the International Slurry Surfacing Associations Recommended Performance Guidelines For Emulsified Asphalt Slurry Seal (A105 (Revised), May 2005).
- The mix proportions for a 1 000 litre batch of seal shall be as follows:
 1. 360 litres of SS-1 (slurry);

2. 270 litres of potable water; and
 3. 850 kg of dry, non-plastic sand.
- The Contractor shall add the water to the emulsified asphalt followed by the addition of the sand.
 - The Contractor shall thoroughly mix the seal. If a mineral filler is used, it shall be blended into the mixture. A minimum amount of additional water may be added to obtain a fluid, homogeneous mixture.
 - If a tack coat is required, the same asphalt chosen for the seal binder shall be used. The tack coat shall be applied in accordance with Section 32 12 13.16 For Asphalt Prime, Tack And Flush Coat, unless otherwise directed by the Consultant.
 - The seal shall be neat and square; and uniform and homogeneous with no uncovered areas, ridges or loose aggregate.
 - Hand or mechanical squeegees may be used to spread the seal.
 - The completed seal shall be kept free of all traffic until it has cured sufficiently to prevent pickup of aggregate particles.
 - Any tests performed by the Consultant on the seal will be quality assurance tests and will not be considered as quality control tests.
- A **Class III** repair is typically a flush coat on the entire block or lot, or the placing of a spot flush coat(s) within the block or lot.
 - i. A flush coat or spot flush coat shall be applied in accordance with Section 32 12 13.16 For Asphalt Prime, Tack and Flush Coat, unless otherwise directed by the Consultant.
 - A **Class IV** repair is typically either a re-rolling operation to remove or reduce the bump(s) or a shim operation to remove or reduce dip(s). Other methods of Class IV repairs proposed by the Contractor shall be subject to the approval of the Consultant.
 - i. For repairs to a bump(s), the following shall apply:
 - The repair procedure shall not cause damage to the asphalt concrete such as, but not limited to, excessive crushing, pulverizing or displacing the asphalt concrete or its surface.
 - The area repaired shall have a smooth transition to the surrounding pavement without impairing the functionality and/or structural characteristics of the service life of the area.
 - ii. For repairs to a dip(s), the following shall apply:
 - If shimming is used, the area shimmed shall have a smooth transition to the surrounding pavement. The shim shall have sufficient thickness and be thoroughly compacted to prevent ravel of the shimmed area.
 - If a tack coat is required, the tack coat shall be applied in accordance with Section 32 12 13.16 For Asphalt Prime, Tack and Flush Coat, unless otherwise directed by the Consultant.

Repairs shall be in accordance with the following:

- a. For **Field Density**:
 - If after re-rolling, the Field Density of a lot remains outside the acceptance limit, the Contractor shall perform a Class I repair.
 - If the area(s) requiring repairs appears to be isolated:
 - a. The Consultant may identify the area(s) through additional testing.
 - b. The Contractor shall perform a Class I repair for only the portion of the lot requiring repairs.

- c. If the isolated repair area continues into an adjacent lot, which is deemed acceptable through quality assurance testing, that portion of the adjacent lot shall be repaired along with the portion of the unacceptable lot.
- b. For **smoothness**:
- If the quality assurance test results on a block indicate a pay adjustment for smoothness, additional work to improve the smoothness will not be allowed except the Contractor will be allowed to perform a Class I or Class IV repair on individual bumps and dips that exceed 12 mm.
 - If the smoothness of the final lift of asphalt concrete of a block is outside the acceptance limit, the block shall be repaired by a Class I repair.
- c. For **individual bumps and dips**:
- Individual bumps and dips that exceed 12 mm in the vertical direction shall be repaired by a Class I or Class IV repair.
 - Work to repair individual bumps and dips ≤ 12 mm will not be permitted.
- d. For **segregation**:
- The Contractor shall repair all segregated areas, except for minor segregation on lower lifts, but including segregated areas with nil pay adjustment. These repairs will not affect the initial pay adjustments assessed in accordance with the Pay Adjustments For Field Density Table with the exception of a Class I repair.
 - Severe segregation on lower lifts of asphalt concrete shall be repaired by a Class I repair.
 - Segregated areas on the final lift of asphalt concrete shall be repaired in accordance with the following:
 - i. Minor segregation on the lane or shoulder shall be repaired by a Class II repair. If the minor segregation is more than one half the lane width or is across the centre of the lane, the full width shall be repaired.
 - ii. Severe segregation:
 - Individual areas less than 100 m in length shall be repaired with a Class II repair slurry seal patch over the full lane or shoulder width.
 - Individual areas 100 m or greater in length shall be repaired over the full lane or shoulder by a Class II repair slurry seal or by a remove and replace Class I repair.
- e. For **surface defects**:
- On all lifts of asphalt concrete, surface defects shall be repaired with a Class I to Class IV repair, in a manner that is acceptable to the Consultant.

Payment options in lieu of repairs:

- a. For smoothness and individual bumps and/or dips, the following shall apply, at the discretion of the Consultant, for the final lift of asphalt concrete in a block:
- If the Category I PrI is ≤ 23 or the Category II PrI is ≤ 28 , and individual bumps and/or dips exceed 12 mm, a \$2,000 penalty per bump and/or dip plus the adjusted PrI pay adjustment may apply, to a maximum of \$6,000.
 - If the Category I PrI is > 23 or the Category II PrI is > 28 , and no individual bumps and/or dips exceed 12 mm, a \$6,000 penalty may apply.
 - If the Category I PrI is > 23 or the Category II PrI is > 28 , and individual bumps and/or dips exceed 12 mm:
 - i. A \$6,000 penalty may apply if the adjusted PrI for the Category I PrI is > 23 or the Category II PrI is > 28 .
 - ii. A \$2,000 penalty per bump and/or dip plus the adjusted PrI pay adjustment may apply, if the adjusted PrI for the Category I PrI is ≤ 23 or the Category II PrI is ≤ 28 .

- b. For segregation and surface defects requiring a Class II repair, the slurry seal mixture for a Class II repair shall meet the requirements for a Type II mix under Section 4 of the International Slurry Surfacing Associations Recommended Performance Guidelines For Emulsified Asphalt Slurry Seal (A105 (Revised), May 2005).

4.0 MEASUREMENT AND PAYMENT

4.1 Measurement

Asphalt concrete will be measured in tonnes.

4.2 Payment

Payment for Asphalt Concrete will be at the contract unit price per tonne with pay adjustments for Field Density, smoothness, severity of segregation, segregation frequency and final surface condition.

The contract unit price will be full compensation for completing the work except for those activities for which specific provision for payment is made in this section.

Addition of liquid anti-stripping agent shall be a subsidiary obligation of the Contractor.

If the shoulder is laid separately from the main lane, the pay adjustments for Field Density for asphalt concrete on the shoulder will be at 50% of the regular rates specified in the Pay Adjustments For Field Density Table.

Segregation and surface defects on the shoulder will be excluded from pay adjustments for segregation severity, segregation frequency and final surface condition. The Contractor shall repair segregation and surface defects on the shoulder in accordance with the Section 32 12 16, Sub-Section 3.10.3.

When defects in rejected blocks or lots have been remedied, the pay adjustments for Field Density, smoothness, severity of segregation, segregation frequency and final surface condition will be based on testing of the repaired sections where applicable.

The pay adjustments determined through testing of the remedial work will be applied to that quantity of material in the block or lot which was originally rejected.

If any lot or block has been rejected, payment will not be made for the asphalt concrete in the lot or block until the rejected work has been remedied.

4.2.1 Pay Adjustments

The dollar value of the pay adjustment will be as follows:

- a. For **Field Density**:
 - The pay adjustment for each lot will be determined from the Pay Adjustments For Field Density Table.

PAY ADJUSTMENTS FOR FIELD DENSITY

% of Marshall Density of Job Mix Formula	Pay Adjustment Dollars Per Tonne
> 99.0	+1.00
98.9	+0.90
98.8	+0.80
98.7	+0.70
98.6	+0.60
98.5	+0.50
98.4	+0.40
98.3	+0.30
98.2	+0.20
98.1	+0.10
98.0	0.00
97.9	0.00
97.8	0.00
97.7	0.00
97.6	0.00
97.5	0.00
97.4	0.00
97.3	0.00
97.2	0.00
97.1	0.00
97.0	0.00
96.9	-0.05
96.8	-0.10
96.7	-0.20
96.6	-0.30
96.5	-0.40
96.4	-0.50

Continued	
% of Marshall Density of Job Mix Formula	Pay Adjustment Dollars Per Tonne
96.3	-0.60
96.2	-0.70
96.1	-0.80
96.0	-0.90
95.9	-1.00
95.8	-1.50
95.7	-2.00
95.6	-2.50
95.5	-3.00
95.4	-3.50
95.3	-4.00
95.2	-4.50
95.1	-5.00
95.0	-5.50
94.9	-6.00
94.8	-7.00
94.7	-8.00
94.6	-9.00
94.5	-10.00
94.4	-11.00
94.3	-12.00
94.2	-13.00
94.1	-14.00
94.0	-15.00
92.5 - < 93.9	No Payment
< 92.5	Reject

b. For **Smoothness, and Segregation:**

- Pay adjustments for smoothness, individual bumps and dips, and segregation shall not apply. Should the test results show that the smoothness is outside of the acceptable limits, the Contractor shall be required to perform a Class I repair at no additional cost to the Owner

1.0 GENERAL

1.1 Description

This Section relates to the supply of materials and installation of painted, cold plastic, and inlaid thermoplastic pavement markings on asphalt concrete pavement surfaces.

1.2 Traffic Accommodation Plan

The Contractor shall, at its entire cost, prepare and submit a Traffic Accommodation Plan through the Consultant to the Roadway Authority for the movement and/or control of vehicular and pedestrian traffic during the installation of the pavement markings and including protection of the Work.

2.0 MATERIALS

2.1 Painted Markings

1. PAINT
 - i. To CGSB 1 – GP-74M, alkyd traffic paint
 - ii. To CGSB 1 – GP-149M, alkyd reflectorized traffic paint
 - iii. Colour: to CGSB 1-GP-12C yellow 505-308, white 513-301
2. THINNER
 - i. To CGSB 1-GP-5M
3. GLASS BEADS
 - i. To CGSB 1-GP-71 reflectorized glass beads, minimum 80% true spherical shape

2.2 Premarking Paint

As approved by the Consultant.

3.0 EXECUTION

3.1 Test Section

Prior to the commencement of paving, the Contractor shall demonstrate the effectiveness and ability of the lane markings. This shall be achieved by a test section of at least 50 metres length that demonstrates the Contractor's ability to meet the requirements of these project specifications. Lane markings previously constructed in a similar environment by the Contractor using the same equipment and techniques as proposed for this Tender, may be accepted by the Consultant.

3.2 General

The Contractor shall assume all costs resulting from the use of patented materials, equipment, devices, or processes used on or incorporated in the Work, and agrees to indemnify and save harmless the purchaser and his duly authorized representatives from all suits at law, or action of every nature for or on account of the use of any patented materials, equipment, devices, or processes.

It is the intent of this Contract that all markings shall be installed prior to the opening of the road traffic. If this cannot be achieved for whatever reason, the Contractor shall provide temporary markings at no additional cost to the Owner. These temporary markings shall be removed when permanent markings are installed.

3.3 Application of Markings

3.3.1 Painted Markings

The paint applicator shall be an approved pressure type distributor with a positive shut-off capable of applying the paint uniformly as a single continuous line and/or dashed line.

Provide adequate warning signs and traffic control or channelization devices to minimize vehicle paint tracking.

Provide forms for painting arrow, pedestrian crosswalks, handicap symbols, etc.

The Contractor shall be responsible for ensuring that the surface areas to be painted are free of any debris, surface water, frost, ice, dust, oil, grease and other foreign matter. Coordinating the cleaning of the street, including hand sweeping, as may be required, shall be the responsibility of the Contractor.

Unless otherwise approved by the Consultant, apply paint only when air temperature is above 10° C, wind speed is less than 20km/hr, and no rain is forecast.

Do not thin the paint unless approved by the Consultant.

The traffic paint shall be uniformly applied at a minimum rate of not less than 38 L/km of solid 100 mm wide line.

Glass beads shall be applied immediately following the paint application at a uniform application rate of not less than 600 g/L of paint.

The Contractor may heat the paint prior to application to the roadway surface to reduce the drying time but under no circumstances shall the paint be heated to a temperature in excess of 65° C.

Paint lines must be of uniform colour and density with sharp edges.

3.3.2 Premarking

The Contractor is responsible for premarking all work.

Premarking must be done on a clean, dry road surface with premarking paint.

Unless authorized by the Consultant, premarking shall be within 100 mm accuracy of plan dimensions; notwithstanding this, premarking shall indicate straight lines and smooth curves.

Premarkings shall be reviewed by the Consultant prior to the installation of the markings. Changes in the alignment of the markings that do not correspond to the plans may be made in the field only upon approval by the Consultant. Any changes made in the field must be recorded by the Contractor on plans issued by the Owner and returned to the Owner.

The markings shall not be installed over a longitudinal joint or seam except transverse markings such as stop lines and crosswalk lines.

3.3.3 Workmanship

Markings shall be within ± 5 mm of the dimension specified.

Faulty markings must be replaced within five working days at the Contractor's expense.

3.3.4 Types of Markings

The pavement markings shown on the plans were designed, where possible, in compliance with the Manual of Uniform Traffic Control Devices for Canada. If conflict arises as to the interpretation between the plans and the Manual of Uniform Traffic Control Devices for Canada, precedence shall be given to the plans.

Arrows shall be white and designed according to the Manual of Uniform Traffic Control Devices for Canada.

3.4 Protection of Completed Work

The Contractor shall protect the pavement markings until dry to prevent tracking using traffic control devices such as barricades, cones, etc., and including flashing lights and advance warning signs as required.

In the case of tire tracking, the accepted repair will be re-applying paint and beads to the damaged areas, all at the cost of the Contractor.

4.0 MEASUREMENT AND PAYMENT

4.1 Measurement

Measurements for pavement markings shall be as follows:

- i. Centre lines, lane lines, stop lines, crosswalk lines, parking stall lines and pavement edge lines shall be measured in lineal meters at the specified width. For dashed lines, the measurement will be continuous.
- ii. Pedestrian "zebra" crosswalks, arrows, symbols, etc. will be measured in the units completed.
- iii. or, lump sum, whichever is specified in the Schedule of Quantities and Unit Prices.

4.2 Payment

The unit or lump sum price shall include the supply of all materials, equipment, and labour required to prepare the surface, layout of premarking, grinding, disposal of grindings, painting/placing the lines, providing and setting forms, providing traffic control devices such as barricades, cones, etc., final cleanup and all other related or incidental tasks necessary to satisfactorily complete the Work.

1.0 GENERAL

1.1 Description

The Work shall consist of various types and sizes of helical corrugated steel pipe (CSP) culverts installed at locations and in conformity with the lines and grades shown on the Plans or designated by the Consultant.

This specification does not cover the installation of spiral rib steel pipe culverts, structural plate corrugated steel pipe culverts, smooth wall steel pipe culverts, steel liner plate and drain pipes for subsurface drainage.

2.0 MATERIALS

The Contractor shall supply the culvert material, including but not limited to the culvert, couplers (including all mounting hardware, geotextile fabric and gaskets as required) and applicable end sections.

The following requirements shall apply:

- For geotextile fabrics:
 - Comply with the requirements of Specification Section 31 32 19 Geosynthetics.

- For CSP culverts:
 - Comply with the requirements of the most recent edition of Canadian Standards Association (CSA) Standard G401.
 - 2.0 mm minimum thickness or as indicated in the Special Provisions.
 - 68 mm x 13 mm corrugations for culverts 1 200 mm or less in diameter.
 - 125 mm x 25 mm corrugations for culverts greater than 1 200 mm in diameter.
 - Minimum 6 m section lengths for new culvert installations.
 - Annular recorrugated ends.
 - Separate sections shall be joined with external corrugated band couplers. The couplers shall comply with the following:
 - Minimum thickness of 1.6 mm.
 - Corrugations same as ends of adjacent culvert sections.
 - Minimum of 5 standard coupler connecting bolts per coupler segment.
 - Minimum width of 600 mm.
 - Previously installed pipe shall not be used, unless stated otherwise in the Special Provisions.
 - Culvert materials shall have a hot-dip galvanized coating.
 - All corrugated steep pipe culverts shall be supplied from a manufacturing plant certified to CSA Standard G401.
 - Plant certification shall be performed by a 3rd party agency accredited by the Standards Council of Canada.
 - Plant certification documentation shall be made available to the Owner upon request.
 - Certified corrugated steel pipe culverts shall be marked in accordance with CSA Standard G401, along with the name of the pipe manufacturer and logo of the 3rd party certification body. Labels will not be permitted.
 - All materials shall be subject to inspection, sampling and quality assurance testing by the representative of the Owner. The manufacturer/Contractor shall provide safe, convenient

- access, acceptable to the Owner representative, for inspection and sampling of materials, and shall cooperate in the inspection and sampling process when requested to do so.
- Any material found unacceptable by the Owner representative will be rejected and shall be promptly replaced with acceptable material at no expense to the Owner.
 - Metallic coating that has sustained storage damage that appears as red or black stains will be rejected.

3.0 EXECUTION

3.1 Removal and Disposal of Existing Culverts

In general, explosives shall not be used for the removal of pipe culverts. The use of explosives may be permitted for the removal of other types of culverts, but only with the permission of the Owner. Such permission, where granted, shall in no way relieve the Contractor of any liability for damage to persons or property resulting from the use of explosives.

3.2 Installation of Pipe Culverts

All pipe culverts must be carefully installed in a workmanlike manner; all joints must be as watertight as possible, having regard to the type of culvert being installed, and shall be installed prior to, or at the time of constructing the compacted embankment across the culvert crossing location, and prior to finishing the subgrade construction.

Culverts must be true to grade and line in accordance with the Plans and Drawings, and as directed by the Consultant. When culverts are laid in hard ground, the bottom of the trench in which the culverts are to lie shall be rounded to fit the culvert as nearly as possible, that it may rest solidly on its bed. If the ground is soft or otherwise unsuitable for carrying the culverts, the unsound material shall be removed to the depth required by the Consultant and replaced with suitable material. The backfill material of the type specified by the Consultant when being replaced around the culvert shall be well tamped in place in layers not exceeding 150mm in thickness. Place backfill material to full width, alternately on each side of culvert, so as not to displace it laterally or vertically. Compact each layer to 95 percent of maximum Standard Proctor Density (S.P.D.) taking special care to obtain required density under haunches. Culvert installation approval from the Consultant, in writing, must be obtained by the Contractor prior to placing granular structure.

Culverts to be strutted will be designated by the Owner or its agents. Struts shall be left in place as long as practicable and shall be removed by the Contractor.

All corrugated metal culverts shall be laid so that the horizontal seams come at the sides of the culvert, and shall be placed so that the horizontal seams in alternate lengths are, so far as possible, on alternate sides of the culvert.

All CSP couplers installed through Roadway embankments shall be wrapped with a non woven geotextile fabric. The geotextile fabric wrapping shall comply with the following:

- The width of the wrap shall be a minimum of 2.3 m (one-half of a standard roll width).
- The wrap shall be overlapped a minimum of 0.3 m such that the end of the overlap is facing down at the side of the coupler/joint.
- The wrap shall be mechanically held in place until backfilled.

When granular material is used to construct the culvert bed or to backfill the culvert, an impervious and compacted clay seepage cut-off shall be constructed to the lines, grades and dimensions as shown on the Plans.

- The clay seepage cut-off shall extend to the full width of the excavation.
 - The width of the clay seepage cut-off shall be the same as the width of the prepared culvert bed in fill sections.
- The Contractor shall ensure that the clay seepage cut-off material does not become contaminated with granular materials.
- All the Work involved in the construction of the clay seepage cut-off will not be paid for directly, but will be considered as a subsidiary obligation of the Contractor under the Contract.

When crushed aggregate is required to be compacted, it shall be compacted to not less than 95% of the maximum dry density as determined in accordance with STP 205-5 for Moisture-Density Standard Proctor.

- If the moisture content in the crushed aggregate material is insufficient for compacting to the specified density, the Contractor may elect to add water.
- If excess moisture exists in the crushed aggregate material, it shall be dried to the optimum moisture content as determined in accordance with STP 205-5 for Moisture-Density Standard Proctor.

The embankment, within three diameters or three spans of the culvert barrel, shall be free from rocks having a dimension of 80 mm or greater when measured in any direction.

Each layer of earth embankment required to backfill the culvert and to backfill the excavation required to remove the existing culvert(s) shall be dried to at least the optimum moisture content and compacted to not less than 100% of the maximum dry density as determined in accordance with STP 205-5 for Moisture-Density Standard Proctor.

- For fill sections, the compaction zone shall extend to 10 m beyond the culvert barrel.

The density for the earth embankment, crushed aggregate and granular backfill material will be determined in accordance with STP 205-7 for Density-In-Place By Nuclear Gauge.

The diameter or the span and rise of CSP culverts shall not vary from the manufactured dimensions by more than 5% during cover and backfill placing operations.

- If the distortion is greater than 5% the culvert installation will be rejected.

Various culverts and culvert extensions may not have the minimum cover specified for the culvert. The Contractor shall take necessary precautions to prevent damage to these culverts.

The Contractor shall repair or replace, at no direct expense to the Ministry, any culvert damaged by their operations.

It is anticipated that a portion of the earth material to be excavated may be wet. All work required to excavate this wet material for the purpose of culvert installation will not be paid for directly but will be considered as a subsidiary obligation of the Contractor under the Contract. Any unsuitable earth material excavated for the installation of the replacement culvert(s) shall be disposed of at locations as designated by the Consultant at no direct cost to the Owner.

Vertical and horizontal deflections will not be permitted. If during the placement of the backfill or embankment around and above the culvert(s), the culvert(s) distort from their original shape, the work shall cease and the Consultant shall be notified. The Consultant may then order the removal and replacement of the backfill in its entirety or in part and may require, as a corrective measure, that the culvert(s) be strutted

either horizontally or vertically. The Contractor shall undertake the corrective Work so ordered entirely at its own expense if it deviates from the foregoing procedures.

The Contractor shall place all couplers required on pipe culverts, and the unit price for installing pipe culverts shall include the cost of installing such couplers.

The Contractor shall clean out the entire length of all new and existing culverts.

4.0 MEASUREMENT AND PAYMENT

The "removing" of corrugated metal, or concrete pipe shall include the cost of all necessary excavation and the removing and disposing of such culverts as instructed or directed by the Consultant. Payment for removal and disposal of culverts will be at the Contract unit price per lineal metre measured from invert to invert as measured by the Consultant for "Removing Old Culverts from Roadway and Disposing as Directed". If to be salvaged and reused, pipe culverts shall be removed in such a manner and by such methods that no damage shall be done to the culverts. Where, due to the carelessness on the part of the Contractor, pipe culverts to be salvaged and reused are damaged, such culverts shall be replaced at the Contractor's expense, by new culverts or a type approved by the Owner. Culverts will be disposed at a location determined by the Owner. The Contract unit price for "Removing Old Culverts from Roadway and Disposing as Directed" will also be full compensation for all costs associated with the preparation and final clean-up of the site utilized for the stockpiling of the suitable earth materials.

The unit price per metre set forth in the Contract for "Installing Culverts (Owner Supplied) in Roadway as directed, including Excavation and Backfill" shall include the cost of hauling pipes to the various culvert sites, excavation for culverts, installing culverts (including excavation of wet material), including extensions of existing culverts in their proper positions in the roadway, strutting where specified, including the supplying of struts and couplers, backfilling the trench, and bringing the roadway over the culvert to the required grade and cross-section. Costs shall also include any necessary dewatering prior to placing of bedding and construction, maintenance and removal of any temporary coffer dams and bypass roads. Payment for installation of culverts will be at the Contract unit price per lineal metre measured from invert to invert and as measured by the Consultant for "Installing Culverts (Owner Supplied) in Roadway as directed, including Excavation and Backfill". All pipe culverts are to be supplied by the Owner and delivered to within the limits of the project.

Culverts requiring granular bedding will be designated by the Consultant and shall consist of Type 8 Sub-base Course on non-woven geotextile, unless specified otherwise. Payment for "Culvert Granular Bedding – Supply and Place" will be at the contract unit price per tonne. The unit price shall include all equipment, labour, supervision, material supply, loading, hauling, placing, compacting, and all other related items incidental to the work and the Contractor will be responsible to provide haul tickets to the Consultant. Payment for "Supply and Place Non-woven Geotextile" will be at the contract unit price per square meter. The unit price shall include all equipment, labour, supervision, material supply, loading, hauling, placing, and all other related items incidental to the work. No allowance will be made for overlapping.



PLANS AND DRAWINGS



8.0 PLANS AND DRAWINGS

The plans herewith are incorporated as a part of the Standard Specifications.

8.1 Earthworks

- STANDARD PLAN NO. 22024 SUBGRADE CONSTRUCTION EMBANKMENT WIDENING NOTCH AND FILL METHOD HEIGHT < 2.0m
- STANDARD PLAN NO. 22025 SUBGRADE CONSTRUCTION EMBANKMENT WIDENING NOTCH AND FILL METHOD HEIGHT >= 2.0m

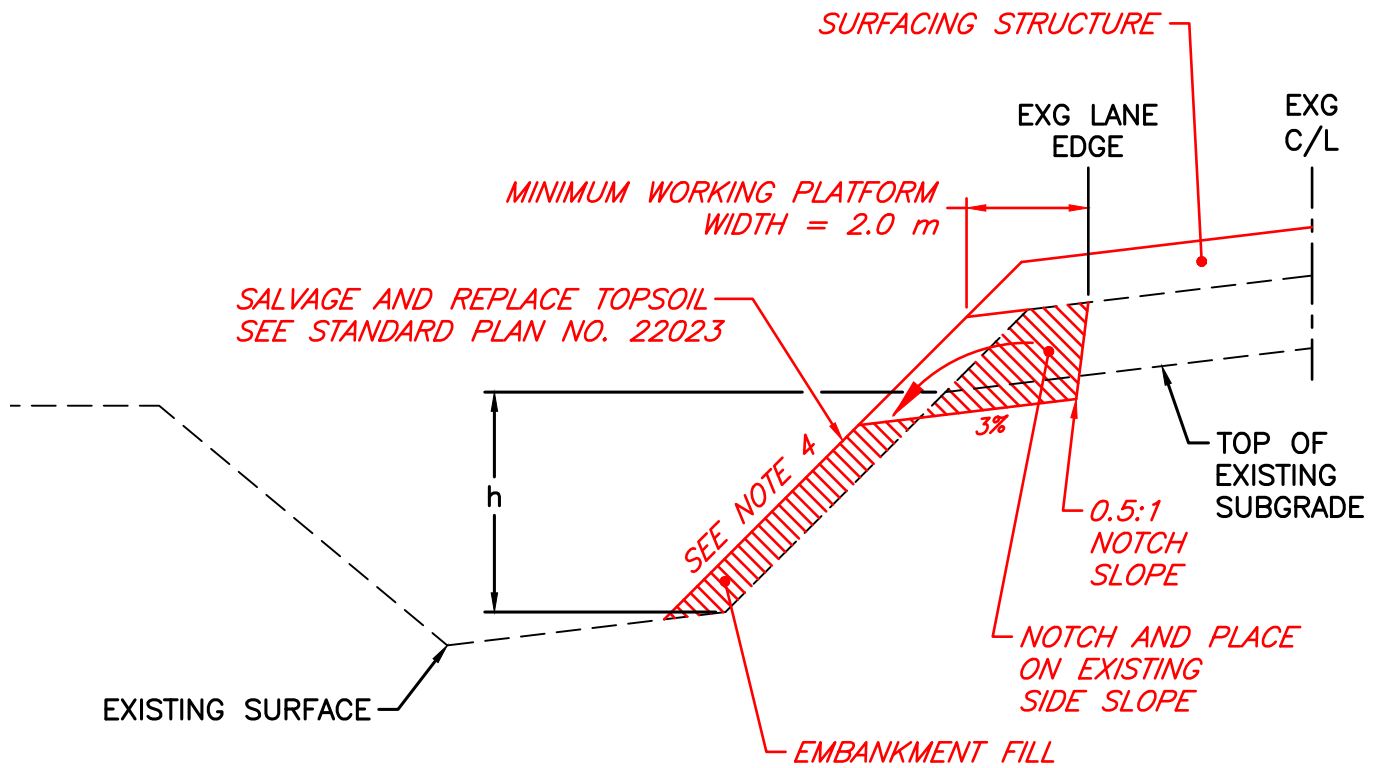
8.2 Utilities

- STANDARD PLAN NO. HM608-02 CSP CULVERT END STIFFENER
- STANDARD PLAN NO. HM705-02 BACKFILLING PIPE CULVERTS 1500 mm<= D < 3000 mm IN ROAD EMBANKMENT
- STANDARD PLAN NO. HM705-03 BACKFILLING PIPE CULVERTS D<= 600 mm IN UNPAVED APPROACH

8.3 Project Specific Plans and Drawings


- FIGURE # F-01 – PIPESTONE CREEK DETOUR PLAN
- COVER PAGE
- DWG #: RP-1 ROAD PLAN AND PROFILE STATION 7+680 TO 9+045
- DWG #: SV-1 SECTION VIEWS STATION 7+600 TO 7+975
- DWG #: SV-2 SECTION VIEWS STATION 8+000 TO 8+225
- DWG #: SV-3 SECTION VIEWS STATION 8+250 TO 8+625
- DWG #: SV-4 SECTION VIEWS STATION 8+650 TO 9+045
- DWG #: C-1 CULVERT RIP RAP DETAILS
- DWG #: SD-1 STANDARD DETAILS



Basemap Source: Information Services Corporation, Saskatchewan Surface Cadastral Dataset.
Reproduced with the Permission of Information Services Corporation.

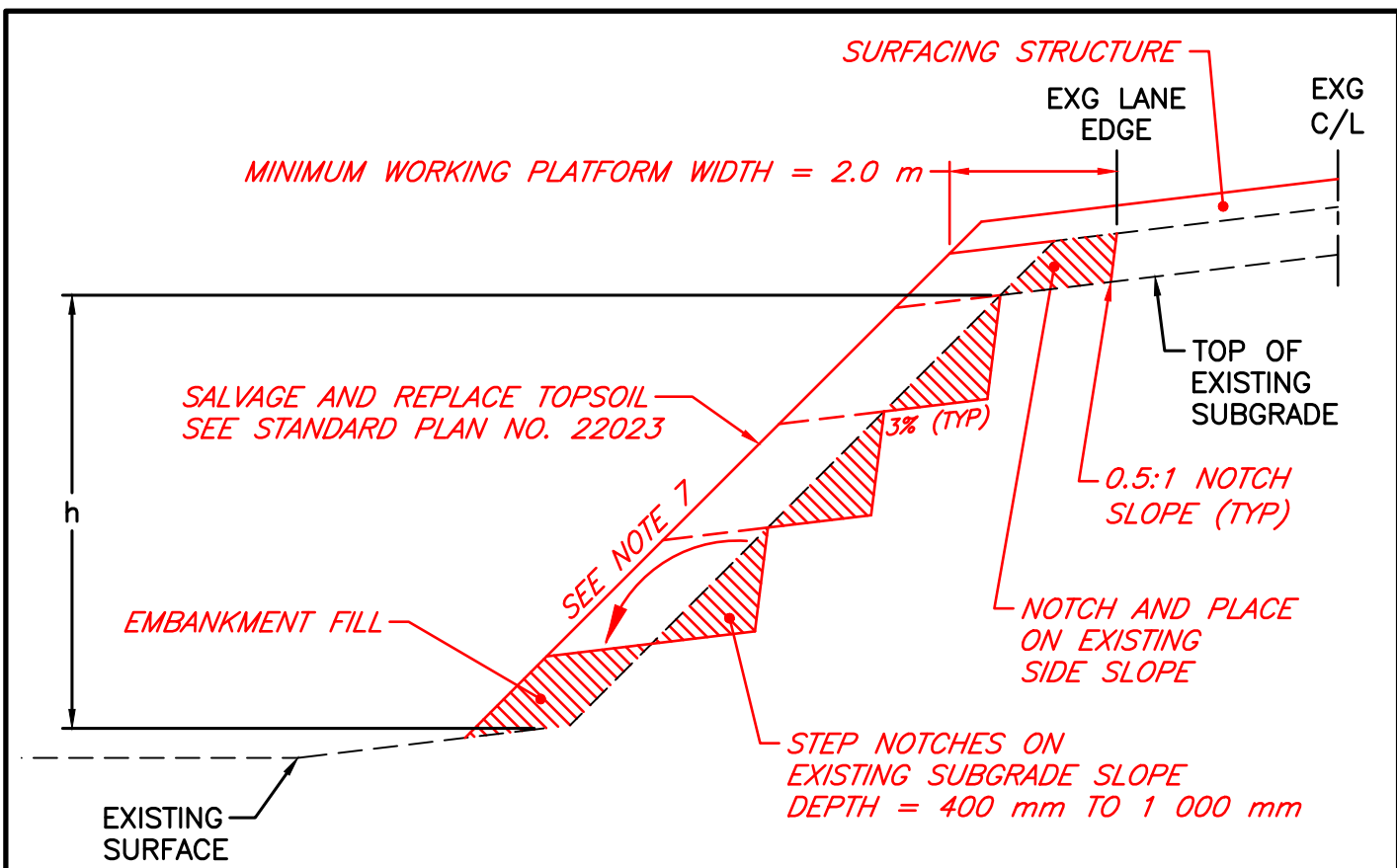


HALF SECTION OF EMBANKMENT AND SIDE DITCH

1. The notch should be excavated at the centreline of the road or lane, or at the edge of lane, whenever possible. The edge of notch should be located such that it does not align with a wheel path on the finished surface, and that a minimum working platform width of 2.0 m is maintained.
2. The minimum depth of the notch shall be the depth of the existing surfacing structure, or the depth required to balance the cut and fill, whichever is greater.
3. Consult with the Senior Surfacing Engineer if unsuitable material is identified in the grade.
4. Side slopes are to be constructed as per the applicable Ministry Standard Plan.
5. Embankment construction shall conform to Standard Specification 2300 for Earth Excavation or as described in the Special Provisions.
6. Embankment fill material shall include suitable excavated material and other material as described in the Special Provisions. The materials shall be compacted in lifts in accordance with the applicable Standard Specifications.


	<h2 style="margin: 0;">SUBGRADE CONSTRUCTION</h2> <h3 style="margin: 0;">EMBANKMENT WIDENING</h3> <h3 style="margin: 0;">NOTCH AND FILL METHOD</h3> <h3 style="margin: 0;">GRADE HEIGHT < 2.0 m</h3>
---	---



RECOMMENDED BY	 Rob Bushman	DIRECTOR DESIGN STANDARDS	DATE	June 6, 2023	STANDARD PLAN NO	22024
APPROVED BY		EXECUTIVE DIRECTOR DESIGN BRANCH	DATE	June 6, 2023	SHEET	1 OF 1



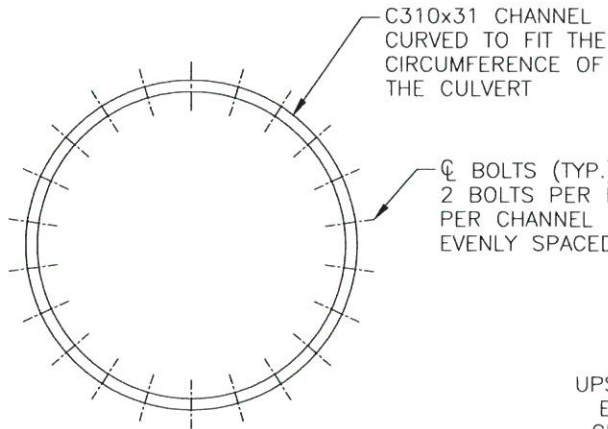
HALF SECTION OF EMBANKMENT

1. For the uppermost notch, the notch should be excavated at the centreline of the road or lane, or at the edge of lane, whenever possible. The edge of notch should be located such that it does not align with a wheel path on the finished surface, and that a minimum working platform width of 2.0 m is maintained.
2. The minimum depth of the uppermost notch shall be the depth of the existing surfacing structure or the depth of the design surfacing structure, whichever is greater.
3. A minimum working platform width of 2.0 m shall be maintained for each step notch.
4. Consult with the Senior Surfacing Engineer if unsuitable material is identified in the grade.
5. The minimum embankment height (h) for a stepped notch embankment, measured from the toe of the side slope to the height of the subgrade, is 2.0 m.
6. For embankment heights over 8.0 m, the embankment width shall be increased by 0.9 m.
7. Side slopes are to be constructed as per the applicable Ministry Standard Plan.
8. Embankment construction shall conform to Standard Specification 2300 for Earth Excavation or as described in the Special Provisions.
9. Embankment fill material shall include suitable excavated material and other material as described in the Special Provisions. The materials shall be compacted in lifts in accordance with the applicable Standard Specifications.

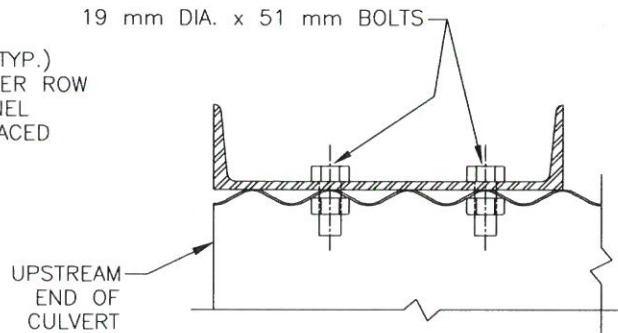
	<h2 style="margin: 0;">SUBGRADE CONSTRUCTION</h2> <h3 style="margin: 0;">EMBANKMENT WIDENING</h3> <h3 style="margin: 0;">NOTCH AND FILL METHOD</h3> <h3 style="margin: 0;">GRADE HEIGHT \geq 2.0 m</h3>
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RECOMMENDED BY	 Rob Bushman	DIRECTOR DESIGN STANDARDS	DATE	June 6, 2023	STANDARD PLAN NO	22025
APPROVED BY		EXECUTIVE DIRECTOR DESIGN BRANCH	DATE	June 6, 2023	SHEET	1 OF 1

ACAD DWG: Embankment Widening h over 2_4lines_23-May-2023.dwg
LAST REV DATE: 2023-05-23



END VIEW
N.T.S.



DETAIL A
N.T.S.

QUANTITIES		
CULVERT DIAMETER (mm)	NUMBER OF BOLT ROWS PER STIFFENER SECTION	TOTAL CHANNEL LENGTH (mm)
1 800	6	5 800
2 000	7	6 400
2 200	7	7 050
2 400	8	7 650

GENERAL NOTES:

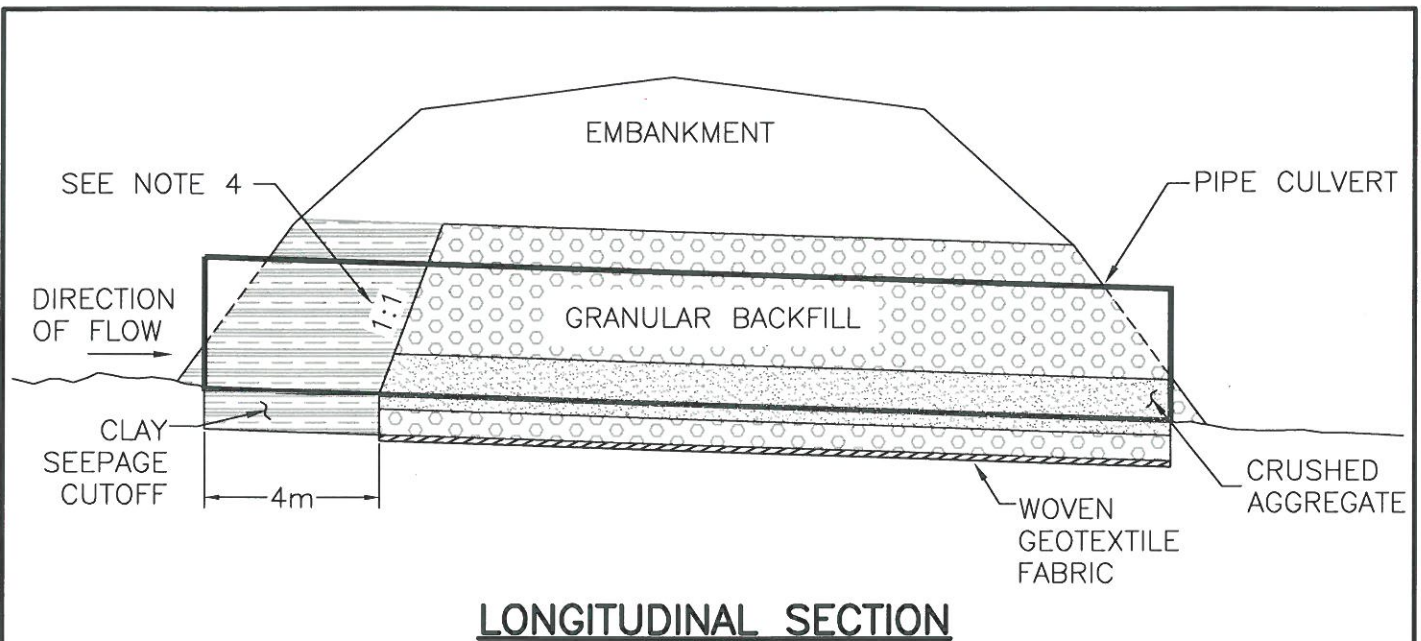
1. The end stiffeners are to be supplied in three equal lengths and installed by the culvert supplier prior to delivery.
2. Refer to SMM 707 in the Specifications for Manufactured Materials Manual for the material and fabrication requirements.
3. The bolts are to be installed through crests of corrugations as shown in DETAIL A.
4. The Ø of the bolt holes at the ends of each end stiffener section shall be located 40 mm from the end of the section.



CSP CULVERT END STIFFENER

RECOMMENDED BY		DIRECTOR DESIGN STANDARDS	DATE	May 24/18	STANDARD PLAN NO	HM608-02
APPROVED BY		EXECUTIVE DIRECTOR DESIGN BRANCH	DATE	May 24/18	SHEET	1 OF 1

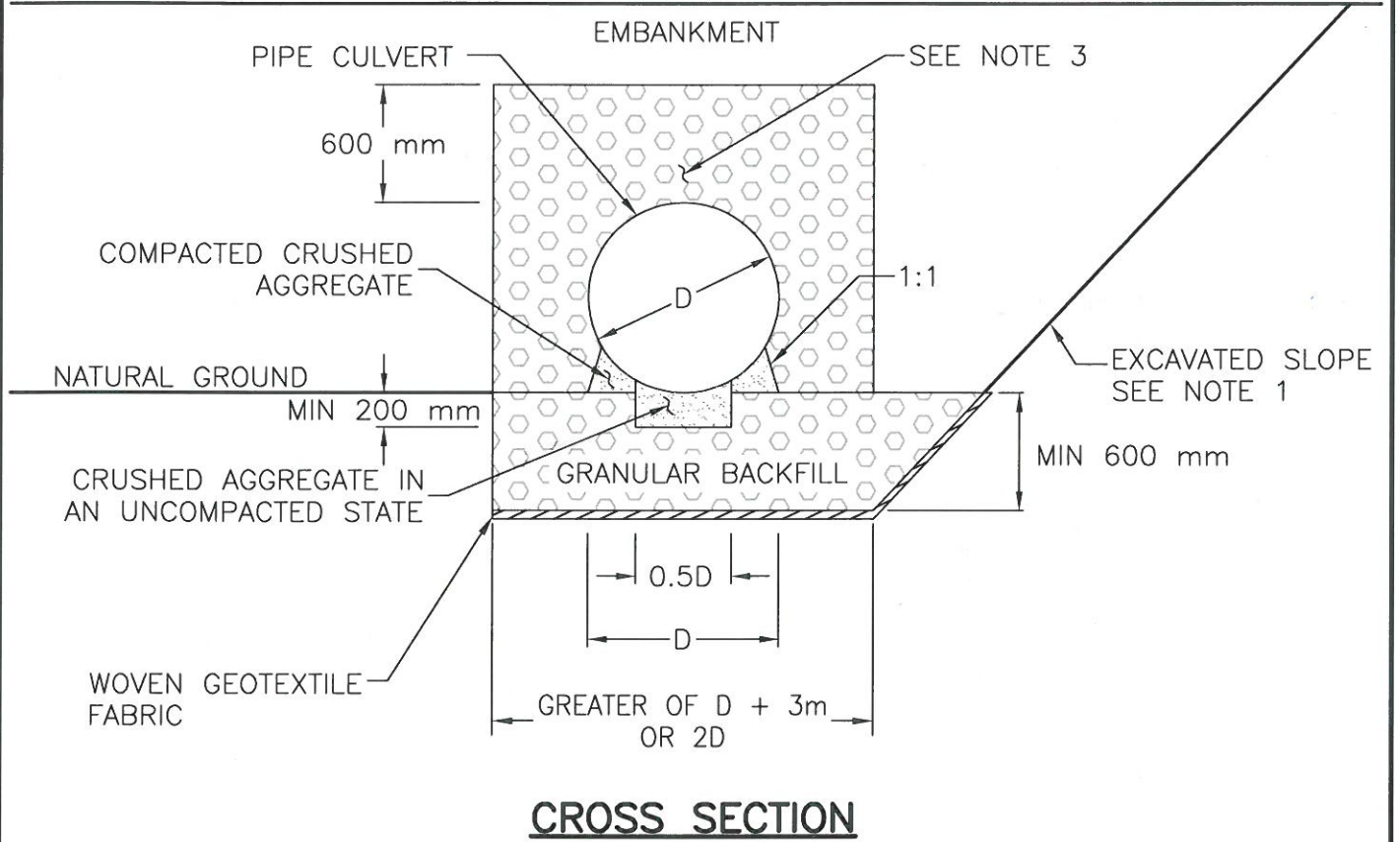
ACAD DWG: HM608-02.dwg
LAST REV DATE: 2018-05-23



LONGITUDINAL SECTION

EMBANKMENT SECTION EXCAVATION SECTION

TOP OF SUBGRADE



CROSS SECTION



BACKFILLING PIPE CULVERTS
 $1500 \text{ mm} \leq D < 3000 \text{ mm}$
IN ROAD EMBANKMENT

RECOMMENDED BY	<i>[Signature]</i>	DIRECTOR DESIGN & TRAFFIC ENG	DATE	04/17/14	STANDARD PLAN NO	HM705-02
APPROVED BY	<i>[Signature]</i>	EXECUTIVE DIRECTOR TECHNICAL STANDARDS BRANCH	DATE	02/31/14	SHEET	1 OF 2

ACAD DWG: HM705-02
 LAST REV DATE: 14/09/19

NOTES:

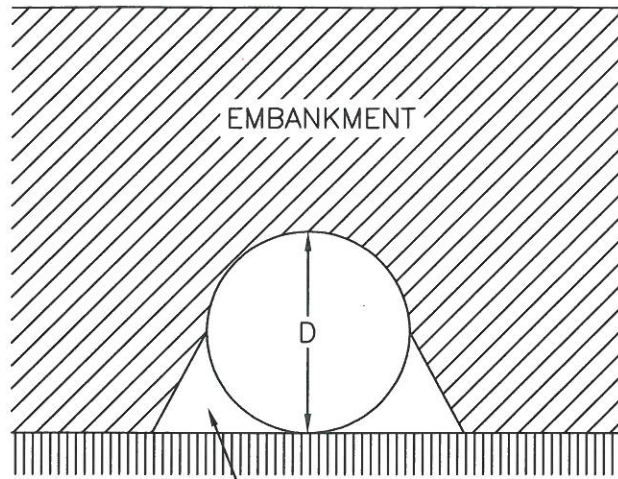
1. For embankments with a specified density the excavated slope shall be 8:1 for depths up to 2 m, the slope shall be steepened by holding the distance between the toe and top of slope at 16 m for depths from 2 m to 4 m, and the slope shall be 4:1 for depths greater than 4 m.
2. The clay seepage cutoff extends the full width of the excavation.
3. Compact the first 300 mm of granular backfill directly above the pipe without vibration.
4. Steeper slope should be provided to ensure clay seepage cutoff does not extend under driving lanes.
5. The crushed aggregate material shall meet the specifications for type 33 Base Aggregate or equivalent. The material shall be placed and compacted in thin layers filling all corrugations and ensuring firm contact with the pipe, where compaction is required.
6. Place backfill such that the difference in elevation of the compacted layers on opposite sides of the pipe is not more than 150 mm.
7. Heavy vibratory equipment shall not be allowed within 1 m of culvert walls.
8. The granular backfill material shall be placed and compacted in the longitudinal direction.



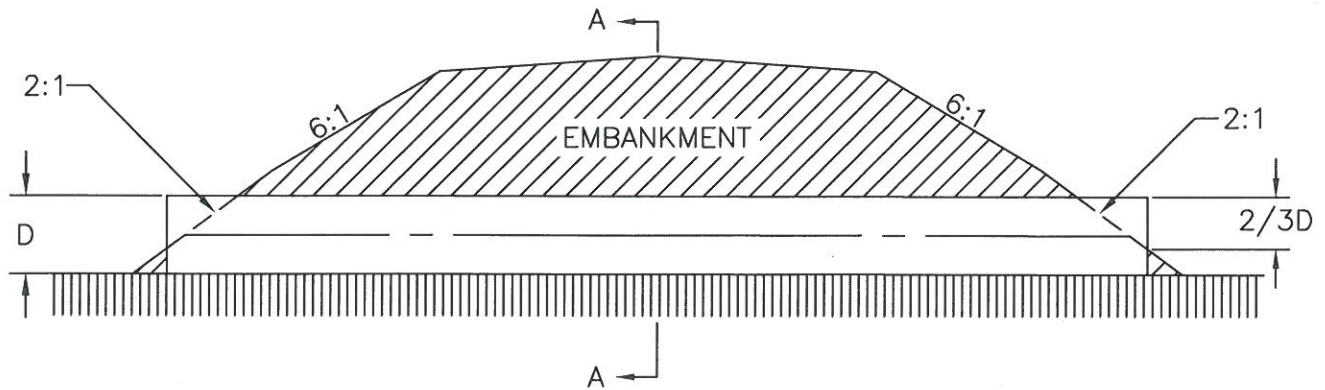
BACKFILLING PIPE CULVERTS
 1500 mm ≤ D < 3000 mm
 IN ROAD EMBANKMENT

RECOMMENDED BY		DIRECTOR DESIGN & TRAFFIC ENG	DATE	Oct 17/14	STANDARD PLAN NO	HM705-02
APPROVED BY		EXECUTIVE DIRECTOR TECHNICAL STANDARDS BRANCH	DATE	Oct 31/14	SHEET	2 OF 2

ACAD DWG: HM705-02
LAST REV DATE: 14/09/19



SECTION A-A



ELEVATION

NOTES:

1. Refer to the Hydraulic Manual Section HM 606-00 for the determination of culvert length.
2. The minimum depth of cover is 300 mm.
3. Does not apply to culverts where the embankment is greater than 3.5 m high. Use Standard Plan HM705-04.
4. Does not apply to High Density Polyethylene (HDPE) pipe. HDPE pipe installations are to follow manufacturer specifications and require a project specific plan.

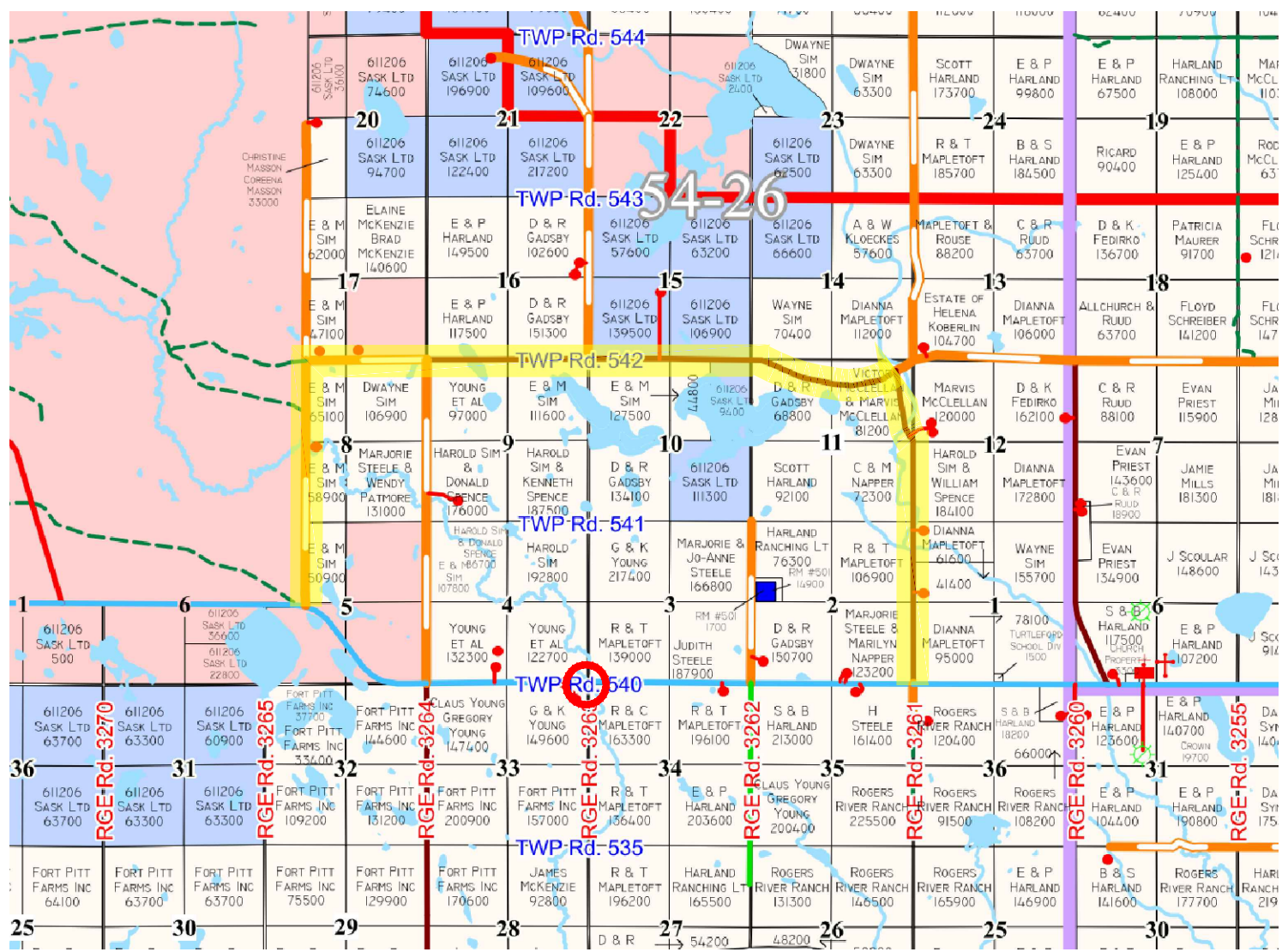
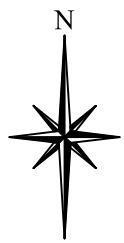
NOT TO SCALE



BACKFILLING PIPE CULVERTS
D ≤ 600 mm
IN UNPAVED APPROACH

RECOMMENDED BY		DIRECTOR DESIGN & TRAFFIC ENG	DATE	Oct 17/14	STANDARD PLAN NO	HM705-03
APPROVED BY		EXECUTIVE DIRECTOR TECHNICAL STANDARDS BRANCH	DATE	Oct. 31/14	SHEET	1 OF 1

ACAD DWG: HM705-03
LAST REV DATE: 14/11/07



NOTES:

1. DETOUR ROUTE HIGHLIGHTED IN YELLOW
2. PIPESTONE CREEK LOCATION CIRCLED IN RED



PIPESTONE CREEK DETOUR ROUTE

FIGURE #:	F-01
Scale:	NTS
Revision:	0

Drawn by:	DJB
Approved by:	SWS
Date:	01/07/2025

GRID ROAD 797



GEOTECHNICAL



9.0 GEOTECHNICAL

The Geotechnical information listed below forms an integral part of the Contract Documents:

- SolidEarth Geotechnical Inc., Geotechnical Investigation Road Surface Cracking and Culvert Replacement Along a Portion of Grid 797, Project File #: PG21-1596, RM of Frenchman Butte No. 501, 20 December 2021.
- SolidEarth Geotechnical Inc., Supplemental Geotechnical Investigation Road Surface Cracking Along a Portion of Grid 797, Project File #: PG21-1596.3000, RM of Frenchman Butte No. 501, 18 October 2023.

GEOTECHNICAL INVESTIGATION

**Road Surface Cracking and Culvert Replacement
Along a Portion of Grid Road 797
RM of Frenchman Butte No. 501, Saskatchewan**

Prepared for:

BAR Engineering Co. Ltd.

Date:

20 December 2021

Project File #: PG21-1596

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Site Photographs Taken During the Field Investigation

Appendix B:

Borehole Logs
Explanation of Terms and Symbols

Appendix C:

C1 and C2 SPT vs Elevation Charts

Appendix D:

D1 to D7 Results of Slope Stability Analyses

1.0 INTRODUCTION

This report presents the results of the geotechnical investigation conducted for the road surface cracking and culvert replacement along a portion of Grid Road 797, between Range Roads (RR) 3262 and 3264, in the RM of Frenchman Butte No. 501, Saskatchewan. The investigation was carried out by SolidEarth Geotechnical Inc. (SolidEarth) at the authorization of Mr. Kelly Stovra of BAR Engineering Co. Ltd. (BAR Engineering).

2.0 PROJECT DESCRIPTION

Based on information provided to SolidEarth, it was understood that the roadway is undergoing a complete rebuild. Failures in the road surface have been observed along a stretch of approximately 1.1 km in length (between approximate stations 7+600 and 8+700). The portion of the alignment showing failures consisted of a valley including the downhill slope towards a water course. The failure was present along the eastern slope of the valley and was described as slumping/depressions along the roadway alignment, manifesting as surface cracking/depressions across the road surface at three distinct locations. The roadway failures were anticipated to have been caused by slope instability within the road embankment.

Additionally, a culvert will be replaced at the base of the valley approximately 10 m below the roadway surface. Open trench and/or trenchless installation methods are being considered for this task.

The design drawings for the project were completed by WSP Global Inc. (WSP). The construction management is being completed by BAR Engineering.

3.0 SCOPE OF WORK

The scope of work for this project included the following:

- Site visit to observe the roadway failures and field condition.
- Drilling boreholes at selected locations along the roadway.
- Reviewing recovered soil samples and completing laboratory soil testing.
- Performing slope stability assessment to determine; (i) the likely failure mechanism along the road sections, and (ii) stability of the excavation during culvert installation with open trench method.
- Preparation of this report summarizing the findings and providing the discussion and recommendations.

4.0 SITE DESCRIPTION

The portion of the alignment showing the failures consisted of a valley including a downhill slope towards a water course. Based on visual observations, it appeared that the eastern portion of the alignment (east of the first road crack) was in cut, transitioning into fill, and then back into cut near the western limit of the subject alignment. The height of the fill near the water course (thickest portion) appeared to be approximately 10 m.

Selected photographs taken during the field investigation are provided in Appendix B.

5.0 FIELD AND LABORATORY INVESTIGATION

5.1 GROUND DISTURBANCE AND SAFETY PERFORMANCE

Prior to field drilling, a SolidEarth representative completed internal ground disturbance procedures, which included placing a Saskatchewan First Call. Before starting onsite work, a daily field level hazard assessment was conducted and was communicated with all workers involved during the tailgate meeting. The field work was completed without any near misses or incidents.

5.2 FIELD DRILLING, SAMPLING, AND TESTING

The borehole locations were selected and marked in the field by SolidEarth based the failure areas and traffic considerations. The borehole location plan is presented as Figure 1.

The field investigation was undertaken on 5 and 6 November 2021 and included drilling seven (7) boreholes (BH21-1 to -7). The boreholes were generally drilled to approximate depths ranging between 9 and 15 m below the roadway surface.

SolidEarth subcontracted Drilling Solutions Inc., of Sherwood Park, Alberta to drill the boreholes. Drilling was completed using a truck-mounted auger drill rig utilizing 150 mm solid stem continuous flight augers.

During drilling, soil samples were generally collected at approximately 0.75 m intervals along the depth of the boreholes. Pocket penetrometer testing was conducted on selected cohesive soil samples to obtain an indication of the unconfined compressive strength of disturbed soil samples from the auger. Standard Penetration Tests (SPT) were conducted at selected depths (typically every 1.5 m) within the boreholes to assess the in-situ strength of the soils encountered. The soil sampling and testing sequences are shown on the borehole logs, Appendix B.

A SolidEarth geotechnical technologist monitored the drilling operations and logged the recovered soil samples from the auger cuttings and the SPT samples. The soils were logged according to the Modified Unified Soil Classification System, which is described in the Explanation of Terms and Symbols in Appendix B. Due to the method by which the soil cuttings

were returned to surface, the depths noted on the borehole and test pit logs may vary by \pm 0.3 m from those recorded.

Groundwater seepage conditions were monitored during and immediately following completion of drilling. Slotted standpipe piezometers were installed at selected borehole locations at completion of drilling to monitor short-term groundwater levels.

The lateral and vertical coordinates (northing, easting, and ground elevation) of the borehole locations were provided to SolidEarth by BAR Engineering. These coordinates are shown on the borehole logs.

5.3 LABORATORY INVESTIGATION

All collected samples were submitted to the laboratory for further examination and testing. Laboratory testing included visual examination and determination of the natural moisture content on all collected samples; and Atterberg limits and grain size distribution analysis on selected samples. The results of the laboratory testing are presented on the borehole logs, Appendix B.

6.0 SUBSURFACE CONDITIONS

The subsurface conditions encountered at the borehole locations consisted of roadway surfacing material at the ground surface, followed by embankment fill, followed by sand and/or clay till, and underlain by clay shale.

A brief summary of the subsurface soil conditions encountered is presented below. A detailed description of the subsurface conditions encountered at each borehole location is provided on the borehole logs. A cross-section of the subsurface conditions encountered at the borehole locations is shown in Figure 2.

Roadway Surfacing Material

Cold mix asphalt underlain by gravel was generally encountered at the ground surface of all borehole locations. The best estimate of the thickness of the cold mix asphalt and the gravel at each borehole location is shown on the borehole logs.

The approximate thickness of the cold mix asphalt ranged between 50 and 75 mm. The approximate thickness of the gravel ranged between 125 and 225 mm. Due to the drilling method used in the investigation (auger drilling), the exact thickness of the cold mix asphalt and the gravel layer could not be accurately determined as the soils were ground and mixed by the auger during drilling. Additionally, the quality of the gravel base material was variable and included high contents of sands and fines (silt and clay sizes), making it difficult to identify the interface between this material and the clayey soil below it.

Embankment Fill

Embankment fill consisting of intermixed layers of clay and sand was encountered below the roadway surfacing material at all of the borehole locations. The fill extended to approximate depths ranging between approximately 0.6 and 10 m below the road surface. The thickest fill (in the order of 8 to 9.5 m) was recorded at the locations of BH21-4 and -5, near the culvert location.

The thickness and quality of the various soil layers encountered within the embankment fill varied across the borehole locations. The majority of the encountered fill was mineral in composition; however, buried layers of topsoil/organics were encountered within the fill at various depths at the location of BH12-4.

The clay fill was classified as “clay, and silt, sandy”, was medium plastic, brown, contained trace to some organics, and moist. The moisture contents of the clay fill samples generally ranged between 12 and 25 percent, with an average of 20 percent. Liquid and plastic limits of two selected clay fill samples tested were in the order of 40 to 42 and 12 to 14 percent, respectively. Based on comparison with the plastic limit of the soil, it was expected that the average moisture content of the clay fill was generally higher than the optimum moisture content of the soil. The consistency of the clay fill was assessed based on the SPT “N” values and pocket penetrometer values to be generally stiff.

The sand fill was classified as “sand, trace to and clay, trace to and silt”, was poorly graded, fine grained, brown and damp to moist. The density of the sand fill was assessed based on the SPT “N” values to be generally compact.

A plot of SPT “N” values versus elevation for the embankment fill is shown as Figures C1, Appendix C.

Buried Topsoil

Buried topsoil was encountered below the fill all borehole locations within the fill zone of the road alignment. The approximate thickness of the buried topsoil ranged between 0.1 and 0.6 m. The topsoil was generally very moist to wet.

Sand

Sand was encountered below the buried topsoil and/or interbedded within the clay till at a few borehole locations. The approximate thickness of sand layers ranged between 1.4 and 1.7 m.

The sand was fine grained, poorly graded, and was generally classified as “sand, trace clay, trace silt”, was grey brown, very moist to wet, and exhibited seepage and sloughing conditions. The density of the sand was assessed based on the SPT “N” values to be generally very loose to loose.

Clay Till

Clay till was encountered below the fill/buried topsoil/sand at all of the borehole locations and extended to the top of the bedrock. The clay till was generally classified as “clay, and silt, some to trace sand, trace gravel”, was medium plastic, grey, brown, and very moist (locally wet). Layers of high plastic clay till were encountered at one borehole location.

The moisture contents of the medium plastic clay till samples generally ranged between 15 and 34 percent, with an average of 22 percent. Liquid and plastic limits of medium plastic clay till samples tested were in the order of 32 to 40 and 14 to 15 percent, respectively. Liquid and plastic limits of a sample of the high plastic clay till were in the order of 52 and 17 percent, respectively. Based on comparison with the plastic limit of the soil, it was expected that the average moisture content of the clay till was generally higher than the optimum moisture content of the soil.

The consistency of the clay till was assessed based on the SPT “N” and pocket penetrometer values to be generally firm to stiff.

A plot of SPT “N” values versus elevation for the clay till and sand units is shown as Figures C2, Appendix C.

Clay Shale (Bedrock)

Clay shale bedrock was encountered at all boreholes except BH21-1, and extended to beyond the borehole exploration depths.

The natural moisture content of samples of the clay shale typically ranged between 10 and 28 percent, with an average of 20 percent. Liquid and plastic limits of one clay shale sample tested were in the order of 41 and 14 percent, respectively.

The clay shale was generally described as “highly weathered, weak, silty, trace sand”, was medium to high plastic, grey, and moist. The shale was classified as a very weak rock in terms of rock classification, and comparable to a very stiff to hard soil.

Groundwater Level

The measured groundwater levels in the boreholes are shown in Table 1. Seepage and sloughing conditions were observed in the majority of the borehole locations.

The groundwater table generally takes time to recover and stabilize following the completion of drilling. The length of time required depends on the hydraulic conductivity of the soil and the presence of fissures and seams in the soil matrix. The depth of the groundwater table also fluctuates seasonally depending upon several factors that include the local geology, hydrogeology, and surface infiltration.

Table 1: Measured Groundwater Levels

Borehole ID	Depth of Borehole (mbgs) ^{Note 1}	Depth of Installed Standpipe (mbgs)	Ground Elevation (m) ^{Note 2}	Groundwater Levels			
				At Drilling Completion (5 and 6 November, 2021)		15 November, 2021	
				Depth (mbgs)	Elevation (m)	Depth (mbgs)	Elevation (m)
BH21-1	8.4	3.0	582.7	Dry	-	Dry	-
		8.5				5.9	576.8
BH21-2	11.9	11.9	572.8	Dry	-	3.8	569.0
BH21-3	11.9	5.6	567.1	7.2	559.9	Dry	-
		9.8				6.5	560.6
BH21-4	14.9	N/A	560.9	11.3	549.6	N/A	N/A
BH21-5	14.9	14.9	561.7	Dry	-	11.2	550.5
BH21-6	11.9	11.6	573.0	9.3	563.7	3.0	570.0
BH21-7	13.4	12.2	563.0	8.4	554.6	7.6	555.4

Note 1: mbgs – metres below the existing ground surface

Note 2: Based on Information provided by BAR Engineering

7.0 EVALUATION OF ROAD SURFACE CRACKING

7.1 FOREWORD

Slope stability analyses were conducted to confirm that the observed road cracking was due to slope instability in the road embankment, and to determine the likely failure mechanism at all three locations.

Slope stability analyses were conducted using SLOPE/W® software, assuming two-dimensional plane strain conditions. Generally, a calculated factor of safety against slope instability of near unity would indicate failure and/or marginally stable conditions. Industry practice for road embankments design is to achieve a minimum factor of safety of 1.25 to 1.3 against slope instability.

7.2 LOCATION AND CONFIGURATION OF SECTIONS ANALYZED

The three locations within the roadway where cracking was noted were analyzed. In establishing the configuration of the surface and subsurface soil units at each cross-section, the following were considered and/or assumed:

- The head scarp is generally perpendicular to the direction of slope movement.
- The existing ground surface (embankment) configuration was obtained from the survey contours provided by BAR Engineering.

- The top of the original ground surface (prior to embankment construction) was estimated by redeveloping the possible original ground contours, as described below.
- The elevations of the various subsurface soil units were interpolated from the findings at the borehole locations.

The original ground surface contours were redeveloped by simply connecting the existing ground contours on the north and south sides of the road right-of-way and using the findings at the borehole locations (particularly the thickness of the embankment fill) as a mid-span data point. It is to be noted that this reconstruction method may not be fully accurate; however, it was considered to be the best approach available to re-establish original grades.

The location and alignment of the analyzed cross sections are shown on Figure 1. As outlined above, the alignment of the cross sections were taken as perpendicular to the head scarp. Incidentally, the alignment of the cross sections appeared to be generally perpendicular to the reconstructed existing ground contours. This observation generally validates the configuration of the reconstructed existing ground contours, as a potential slide will likely flow downhill along the original valley slope (i.e., perpendicular to the original contours).

The configurations of the cross sections analyzed are shown on Figures D1 to D3, Appendix D.

7.3 SUB-SURFACE CONDITIONS AND SOIL PARAMETERS

The subsurface conditions encountered at the boreholes locations generally consisted of embankment fill followed by buried topsoil, followed by interbedded layers of sand and clay till, and underlain by clay shale. The following was noted and assumed for modeling purposes:

- The embankment fill varied from predominantly clayey, to predominantly sandy, to a heterogeneous mix of clay, sand, and buried topsoil at the various borehole locations. To simplify the model, the embankment fill was assumed as clayey in nature.
- The presence of buried topsoil was generally consistent at all borehole locations located within the cut zone of the road alignment. This generally indicated that the topsoil was not removed prior to embankment construction.
- The order and thickness of the clay and sand units below the buried topsoil and above the shale varied significantly at the various borehole locations. To simplify the model, the soil below the buried topsoil and above the shale was conservatively assumed as clayey in nature.

The soil properties assumed in the analyses are presented in Table 2. The soil parameters were derived from the subsurface conditions encountered at the borehole locations, results of the laboratory testing, from published correlations with soil index parameters, and assumptions discussed above. The analyses were conducted using effective stress (drained) analysis. This analysis is generally used to assess long-term performance of natural and man-made slopes.

**Table 2: Soil Parameters used in the Embankment Slope Stability Analyses
(Effective Stress Analysis)**

Soil Parameter	Soil Unit			
	Clay Fill	Buried Topsoil	Clay Till	Clay Shale
Effective Unit Weight (kN/m ³)	20	18	20	20
Effective Angle of Internal Friction (degrees)	23	11	25	23
Effective Cohesion (kPa)	0	0	0	0

The water table was assumed as a piezometric line slightly below the interface between the fill and native soil. The configurations of the cross sections analyzed are shown on Figures D1 to D3, Appendix D.

7.4 RESULTS OF THE ANALYSES

Experience indicates that buried topsoil below roadway embankments generally act as a weak layer, and slippage along such a layer is a likely failure mechanism. As such, the analyses considered translational slip planes through the weak buried topsoil layer.

The results of the stability analysis are presented in Figures D1 to D3, Appendix D, for Sections 1 to 3, respectively. The results indicated that calculated factor of safety against translational block-failure through the buried topsoil layer affecting the road embankment was near unity for all three cross sections analyzed.

7.5 DISCUSSIONS AND RECOMMENDATIONS

The analyses identified a marginally stable embankment in its current condition and configuration. Additionally,

- The stability was expected to be very sensitive to variation in configuration, loading, and change in moisture conditions and height of water table. A rise in the water table (for example, during a wet season) could significantly reduce the factor of safety and lead to instability.
- The embankment may also be experiencing creep-like movement along the buried topsoil layer. The creep-like movement will eventually manifest with the creation of a scarp (cracks) within the roadway surface. The frequency of such an occurrence will depend of several factors and is very hard to predict.

Stabilization of the road embankment is recommended to achieve a stable condition on the long run. The design of the stabilization measure should target factor of safety against all potential modes on instability of over 1.25 to 1.3.

Several stabilisation options are available for roadway embankment, including: toe buttressing, shear key, pile wall retaining structure, excavation of all or part of the embankment and proper re-construction and/or mechanical stabilization. The efficiency, requirement, and cost of each potential measure may vary significantly.

It is the recommendations of SolidEarth that additional analysis should be conducted to:

- Further delineate the soil conditions within the lower portions of the embankment by advancing additional boreholes within the embankment.
- Confirm the quality and strength parameter of the soil by advanced geotechnical laboratory testing.
- Confirm the mode and elevation of potential movement by the installation and monitoring of slope Inclinometers (SI) within the embankment.
- Confirm the configuration of the existing ground by a site-specific survey.
- Refine the slope stability modeling based on the additional findings.
- Confirm the need of slope stabilization and determine the requirements of the most efficient option.

8.0 CONSIDERATIONS FOR CULVERT REPLACEMENT

It was understood that the culvert below the embankment along the water course is planned for replacement. The depth of the culvert was approximately 10 to 12 m below the road surface. It was understood that both open cut and trenchless installation methods are being considered. Considerations and challenges for both installation methods are discussed below.

8.1 OPEN CUT INSTALLATION METHOD

8.1.1 Anticipated Soil and Groundwater Condition

Embankment Fill

The embankment as encountered at the borehole locations varied from predominantly clayey, to predominantly sandy, to a heterogeneous mix of clay, sand, and buried topsoil at the various borehole locations. As such, any and all of these soils may be intercepted by an open excavation.

Based on the findings at the two nearest boreholes to the culvert locations (i.e., BH21-4 and -5), it would be expected that the embankment soils to be intercepted by an open cut excavation would consist mainly of clayey soils with interbedded sand layers at various elevations and of various thicknesses.

Native Soil below the Embankment

An open cut excavation for culvert replacement is anticipated to expose and potentially slightly extend into the near surface native soils. Based on the findings at the borehole locations, interbedded layers of sand and clay till should be anticipated below the embankment fill (and buried topsoil). It is anticipated that the uppermost layer will likely consist of a relatively weak and saturated sand unit.

Groundwater Conditions

The water table should be anticipated to be near the ground surface near the water course. Groundwater seepage conditions should also be anticipated from the lower portions of the embankment excavation, particularly where sand units are intercepted.

8.1.2 Anticipated Challenges with Open Cut Method

The two main challenges anticipated with an open cut are (i) groundwater management during construction, and (ii) slope instability.

Groundwater Management

Groundwater control measures will likely be necessary during excavation to maintain dry conditions during culvert replacement. Depending on the time of the year the project is conducted, diversion/pumping of the water course as well as drawdown wells/sumps at the base of the excavation will likely be required. Seepage from the walls of the excavation may be managed by drainage sumps equipped with pumps.

Slope Stability of the Excavation

As outlined above, the embankment fill as encountered at the borehole locations varied from predominantly clayey, to predominantly sandy, to a heterogeneous mix of clay, sand, and buried topsoil at the various borehole locations. Additionally, relatively weak foundation soils were encountered below the embankment. These conditions may lead to the following concerns:

- Instability and sloughing of the embankment walls particularly where wet sand, poor fill, and/or buried organics are encountered.
- Instability in the foundation soil leading to global failure of the excavation.

8.1.3 Preliminary Stability Analysis of an Open Cut

Foreword

To quantify the concerns with excavation instability, slope stability modeling was conducted. The analyses were conducted using SLOPE/W® software, assuming two-dimensional plane strain conditions. Generally, a minimum calculated factor of safety against slope instability of 1.3 is required for temporary excavation where workers will be present at the base of the excavation.

Subsurface Conditions and Soil Parameters

Given the variability of the soil conditions encountered, generalization and simplification of the soil conditions for modeling proposes was required. Generally, the soil conditions encountered at the location of BH21-4 was assumed in the models.

The soil properties assumed in the analyses are presented in Table 3. The soil parameters were derived from the subsurface conditions encountered at the locations, results of the laboratory testing, and from published correlations with soil index parameters. The water table was assumed as a piezometric at the native soil surface.

**Table 3: Soil Parameters used in the Open Cut Stability Analysis
(Total Stress Analysis)**

Soil Parameter	Soil Unit				
	Clay Fill	Buried Topsoil	Clay Till	Sand	Clay Shale
Total Unit Weight (kN/m ³)	20	18	20	19	20
Angle of Internal Friction (degrees)	1	1	1	30	1
Cohesion (kPa)	40	30	30 to 35 ^{Note 1}	0	75

Note 1: Given the variability in the strength of the native foundation soils, a range of possible values were considered in the model. This was intended to provide a sensitivity analysis, and to assess the need of establishing refined soil parameters through advanced geotechnical laboratory testing.

Configuration of the Sections Analyzed

For the purpose of modeling, the excavation was assumed as 10 m deep. Two side slope inclinations were considered, 2 horizontal to 1 vertical (2H:1V) and 3H:1V.

The configurations of the cross sections analyzed are shown on Figures D4 and D6, Appendix D.

Results of the Analyses

The analyses considered a rotational slip failure extending into the foundation soils. The results of the stability analysis are presented in Figures D4 to D7, Appendix D. The results indicated that the calculated factor of safety against instability for a cut:

- With a 2H:1V side slope ranged between 1.02 and (Figure D4) and 1.1 (Figure D5), for the anticipated range in the strength of the foundation soils.
- With a 3H:1V side slope ranged between 1.3 and (Figure D6) and 1.4 (Figure D7), for the anticipated range in the strength of the foundation soils.

Limitation of the Analyses

The analyses were conducted using total stress (undrained) analysis. This analysis is generally used to assess short-term performance of man-made excavations. Short-term excavations are generally defined as excavations that will be open for 2 months or less.

If the excavation will be open for a longer time, then the stability should be also assessed using effective stress (drained) analysis. The more stringent requirement (generally the excavation side slope inclination) from both analyses should then be adopted. It is to be noted that the effective stress (drained) analysis was not conducted at this stage.

Once the final excavation depth and timeline are better defined, additional analysis may be conducted. As such, the analysis and results presented in this section should be treated as preliminary and to be confirmed once the final design details are available.

Discussions and Recommendations

The analyses identified that the minimum acceptable slope inclination for an open cut excavation is 3H:1V. As outlined above, the analysis and results presented in this section should be treated as preliminary.

It is the recommendation of SolidEarth that additional analysis should be conducted if the open cut installation method is selected. The additional analysis should consider the following:

- Applicability and requirement of effective stress (drained) analysis, as discussed above, based on the anticipated construction timeline.
- Confirm the quality and strength parameter of the foundation soils by advanced geotechnical laboratory testing.

- Refined slope stability modeling with the updated configuration of the excavation (once the final depth is established) and soil updated parameters (based on additional findings).
- Additional analysis with various failure modes and location of weak layers to capture potential variability in the embankment soils.
- Additional analysis based on the contractors proposed execution plan, access, and staging requirements.

8.1.4 Excavation Backfill

The majority of soils excavated from the excavation may be re-used for backfill. Moisture conditioning of these soils will likely be required and will depend on weather conditions at the time of construction.

Layers of organics and overly wet soils (that cannot be practically moisture conditioned), should be wasted and not mixed with the material for trench backfill. Frequent sampling and testing should be implemented during construction to verify the suitability of the encountered soils.

Trench backfill should be uniformly compacted to a minimum of 98 percent of standard Proctor maximum dry density (SPMDD) to minimize the potential of future settlement. Generally, total settlement of 1 to 1.5 percent of backfill thickness should be expected for cohesive soils compacted to 98 percent of SPMDD. It is expected that the majority of the settlement under self-weight will occur within two to three years following construction.

The fill should be placed at moisture contents within three percent of optimum moisture content. The lift thicknesses should be governed by the ability of the selected compaction equipment to uniformly achieve the recommended density. It is recommended to use lifts with a maximum thickness of 300 mm loose. Fill placement procedures and quality of the fill soils should be monitored by geotechnical personnel on a full-time basis. Field monitoring should include compaction testing at regular frequencies.

8.2 TRENCHLESS INSTALLATION (HORIZONTAL BORE METHOD)

8.2.1 Construction Methodology

Horizontal-bores are typically constructed using a cased horizontal augering method. This method requires that access pits (entry and exit) be excavated on both sides of the crossing to provide an entry and exit for the bore and allow for the installation method.

The boring machine is situated in the entry pit and advances the casing with enclosed augers. A forward thrust is maintained on the casing while the augers remove the soil within the casing. Once the cased hole reaches the exit pit, the pipeline may be installed by connecting one

segment at a time inside the casing. The ends of the pipe are then connected to the remaining alignment on both sides of the crossing, and the pits are subsequently backfilled.

8.2.2 Consideration for Boring

It is expected that the bore path will be located at an approximate depth of 10 m below the existing roadway, at the interface between the native soils and embankment fill. Based on the findings at the two nearest boreholes to the culvert locations (i.e., BH21-4 and -5), it is anticipated that:

- The lower 2 m of the embankment soils (zone of anticipated bore path) are likely be clayey in nature. However, a heterogeneous mix of clay, sand, and buried topsoil should be anticipated along the bore path.
- The foundation soil expected to be intercepted within the lower portion of the bore will likely consist of a relatively weak and saturated sand unit.
- The water table should be assumed near or above the native ground surface.

Sloughing and Void Creation

The lower portion (underside) of the proposed bore trajectory will be likely intercept the native sand with high water table. The soils are anticipated to be erodible and prone to sloughing and flow conditions. Significant water seepage and sloughing conditions (potentially leading to void creations) should be anticipated during boring. The soil conditions encountered at the borehole locations should be carefully reviewed by the drilling contractor to determine suitable measures to be taken during boring and pipe installation.

Excessive sloughing during boring may result in the development of voids along the bore path, which would increase the risk of surficial settlements and potential instability. The volume of materials removed by the augers generally gives an indication of whether sloughing is occurring into the bore. If significant sloughing is encountered, the risk of void creation can usually be reduced by advancing the casing ahead of the augers, thus maintaining support of the soil units at the bore face.

An experienced engineer or technician should be on-site during horizontal bores to determine if the volume of material is appropriate for the advance rate of the horizontal bore, and to determine the susceptibility of the soil units in which the bore is advancing to slough and flow.

Water Seepage

Groundwater control measures will likely be necessary during boring. Depending on the time of the year the project is conducted, diversion/pumping of the water course as well as drawdown wells/sumps at the base of the embankment will likely be required to minimize the amount of water seepage into the bore space.

Ground Settlement Monitoring

Monitoring of soil settlement is highly recommended along the embankment and road alignment to provide an early warning system of potential movement and settlement. A monitoring program should be developed and implemented by an experienced engineer, and should include monitoring of ground-surface and subsurface movements along the bore alignment.

9.0 TESTING AND INSPECTION

Recommendations presented in this report may not be valid if adequate engineering inspection and testing programs are not implemented or if other building code requirements are not followed. Testing and inspection programs should consist of:

- Review and approval of the construction plan
- Periodic inspection and monitoring of an open cut excavation
- Full time monitoring and compaction testing during placement of fill
- Monitoring of the boring process for excessive seepage and soils collection, and for surface and subsurface settlement

10.0 CLOSURE

The recommendations presented in this report are based on the results of soil sampling and testing at seven (7) borehole locations advanced during this investigation and ground contour drawing provided to SolidEarth. Soil conditions by nature can vary across any given site. If different soil conditions are encountered at subsequent phases of this project, SolidEarth should be notified immediately and given the opportunity to evaluate the situation and provide additional recommendations as necessary.

The recommendations presented in this report should not be used for another site or for a different application at the same site. If the intended application of the site is changed or if the assumptions outlined in this report became invalid, SolidEarth should be notified and given the opportunity to assess if the recommendations presented should be modified.

This report has been prepared for the exclusive use of RM of Frenchman Butte No. 501, BAR Engineering and their authorized users for the specific application outlined in this report. No other warranties expressed or implied are provided. This report has been prepared within generally accepted geotechnical engineering practices.

Respectfully submitted,
SolidEarth Geotechnical Inc.

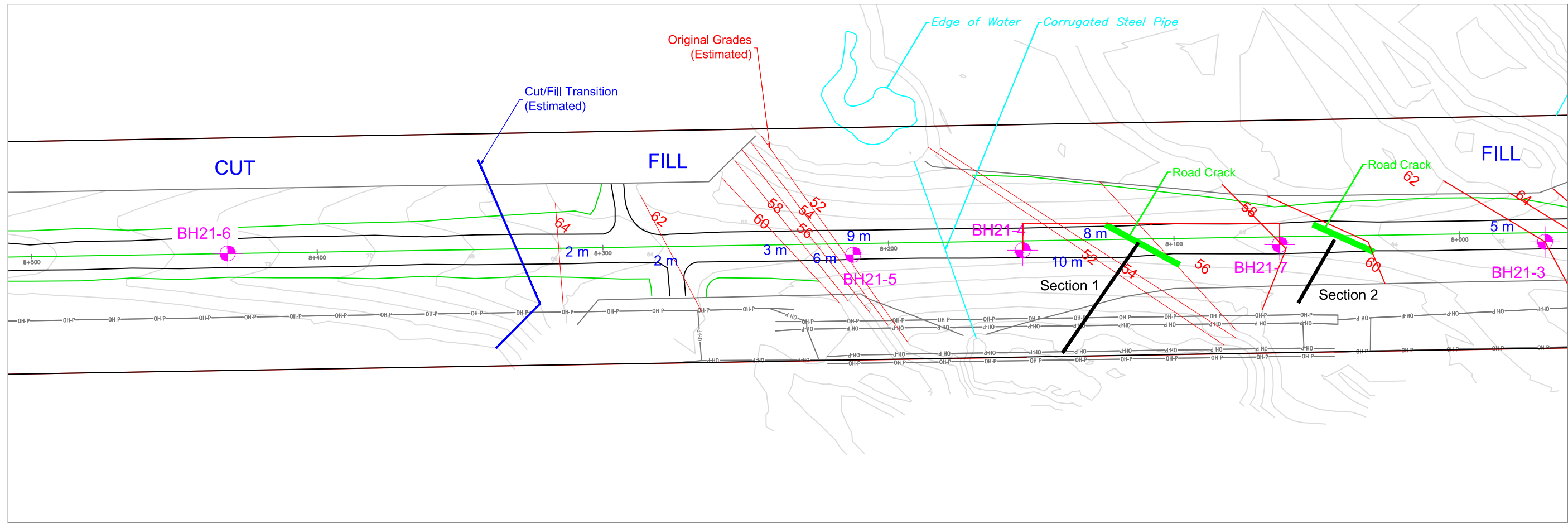
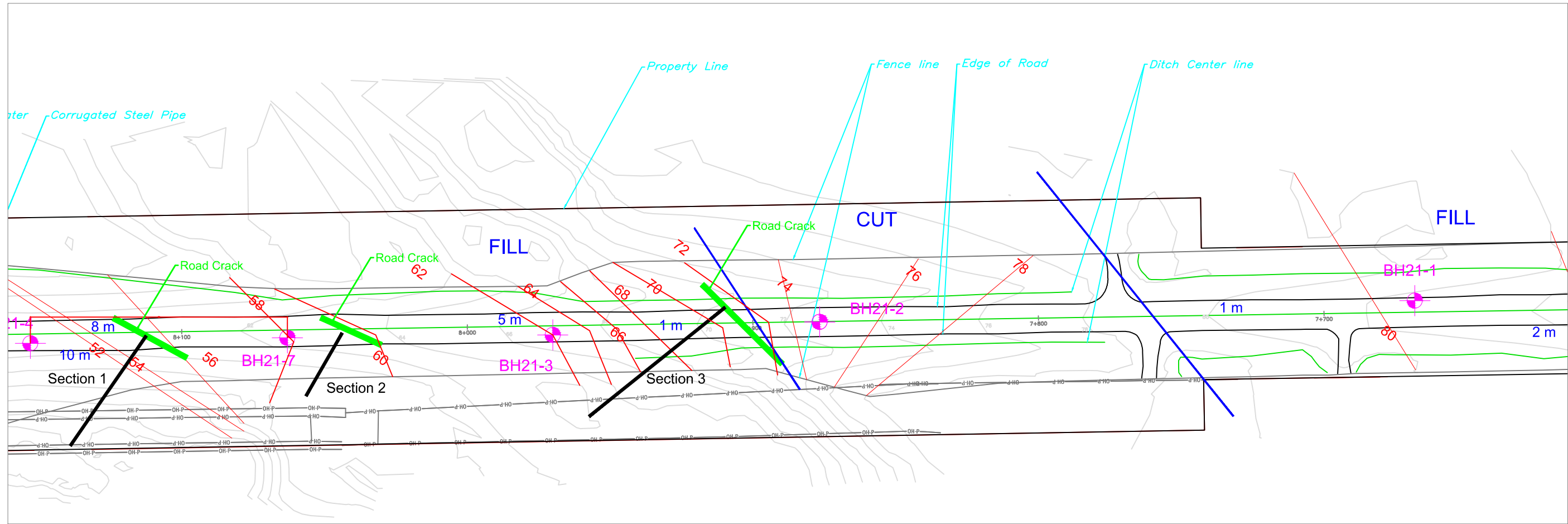
A handwritten signature in blue ink, appearing to read "Jay Jaber", is written over a horizontal line.

Indranil (Neel) Deysarkar, M.Sc., P.Eng (AB)
Geotechnical Engineer

Jay Jaber, M.Sc., P.Eng.
Senior Geotechnical Engineer
Managing Director

Figures

- Figure 1: Borehole Location Plan
Figure 2: Cross Section of Subsurface Conditions



CLIENT:



PROJECT NAME:
Grid Road 797 Geotechnical Assessment
Road Surface Cracking and Culver Replacement

FIGURE No.: 1
REVISION No.: 1
PROJECT No.: PG21-1596

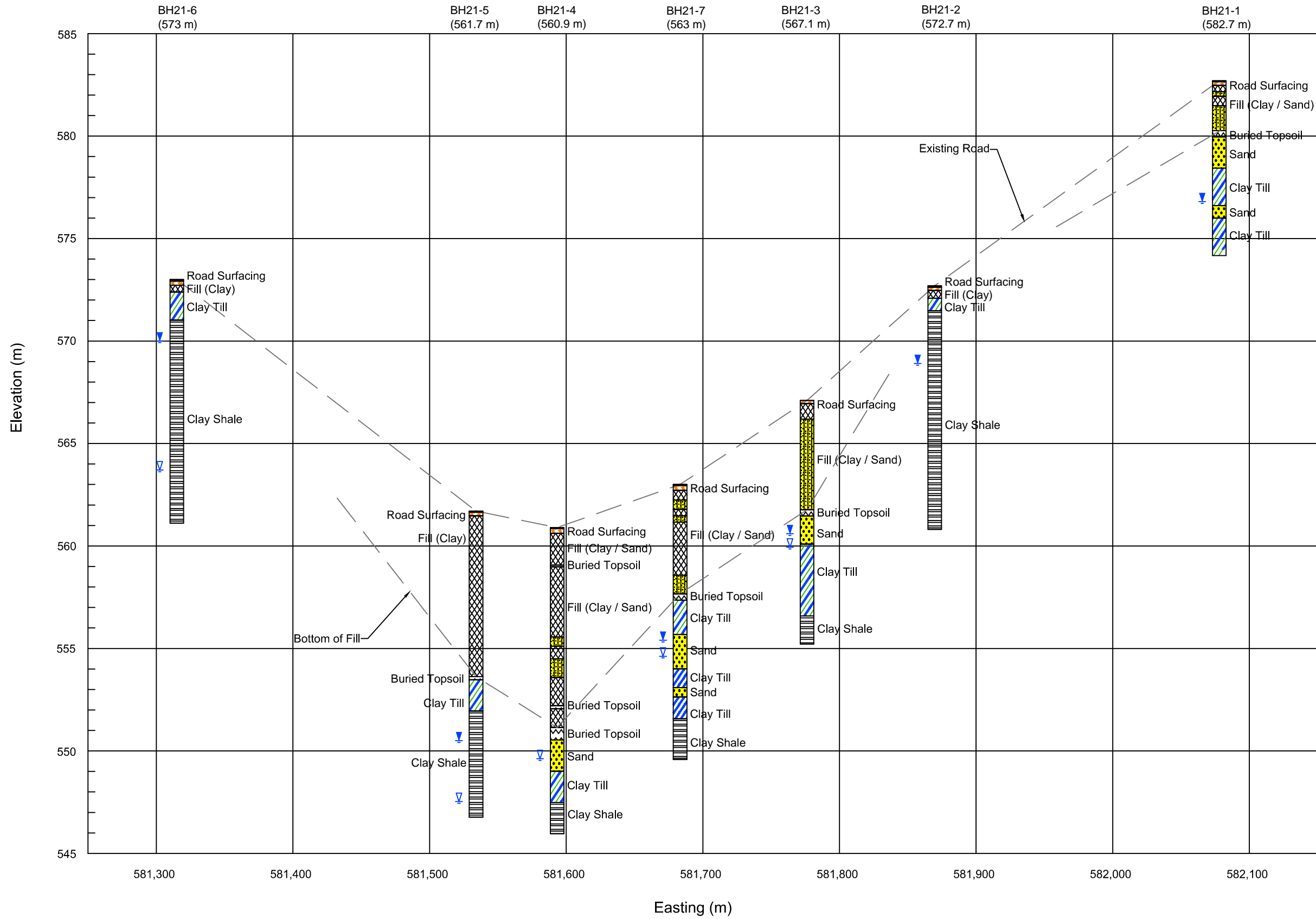
DRAWN BY: JU
DATE: November 2021

SCALE: NTS
DATUM: -

DRAWING TITLE:
BH Location Plan, Original Grades, and
Location of Selected Cross-sections



SolidEarth Geotechnical Inc.
4336 97 Street, Edmonton, AB, T6E 5R9



CLIENT:

PROJECT NAME: Grid Road 797 Geotechnical Assessment
Road Surface Cracking and Culver Replacement

DRAWING TITLE: Cross-section of Subsurface Conditions

FIGURE No.: 2
REVISION No.: 1
PROJECT No.: PG21-1596

SCALE: NTS
DRAWN BY: JU
DATE: November 2021

SolidEarth Geotechnical Inc.
4336 97 Street, Edmonton, AB, T6E 5R9

Appendix A

Site Photographs Taken During the Field Investigation



Photograph 1: Near the culvert location looking east



Photograph 2: East slope middle crack



Photograph 3: Looking west along the alignment



Photograph 4: Buried topsoil, BH21-3 at a depth between 5.4 and 6 m

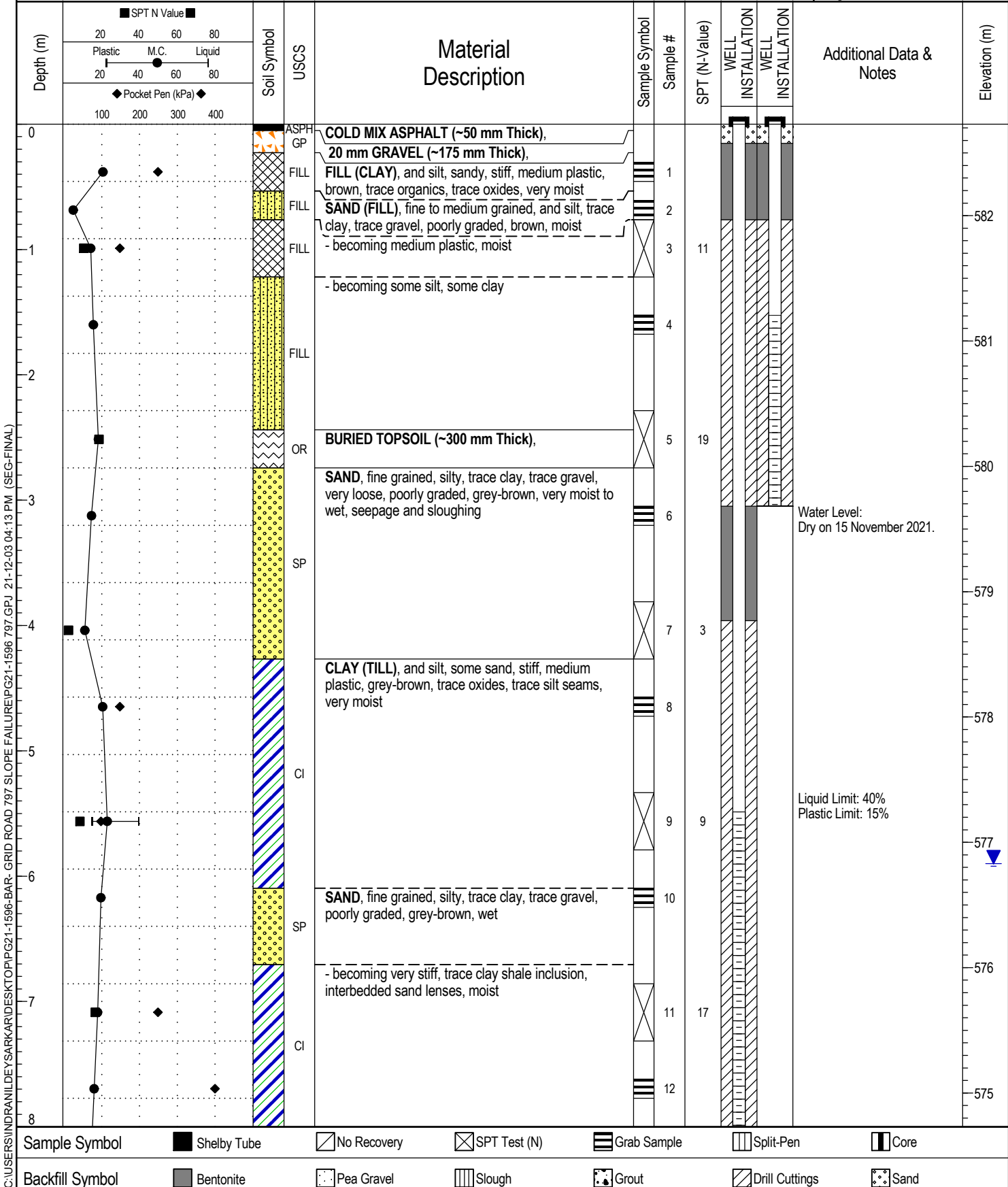


Photograph 5: Buried topsoil, BH21-4 at a depth between 8 and 10 m

Appendix B

Borehole Logs
Explanation of Terms and Symbols

Project Name: Grid Road 797 Surface Failure and Culvert Replacement Borehole #: **BH21-1**
 Client Name: Bar Engineering Co. Ltd. Project #: PG21-1596
 Site: RM of Frenchman Butte No.501, Saskatchewan Logged By: JS / Reviewed By: TF
 Northing: 5942876 Easting: 582078 Driller: Drilling Solutions
 Elevation: 582.7 m Drill Method: 150 mm Solid Stem Auger



Sample Symbol: Shelby Tube, No Recovery, SPT Test (N), Grab Sample, Split-Pen, Core
 Backfill Symbol: Bentonite, Pea Gravel, Slough, Grout, Drill Cuttings, Sand

Project Name: Grid Road 797 Surface Failure and Culvert Replacement Borehole #: BH21-1
 Client Name: Bar Engineering Co. Ltd. Project #: PG21-1596
 Site: RM of Frenchman Butte No.501, Saskatchewan Logged By: JS / Reviewed By: TF
 Northing: 5942876 Easting: 582078 Driller: Drilling Solutions
 Elevation: 582.7 m Drill Method: 150 mm Solid Stem Auger

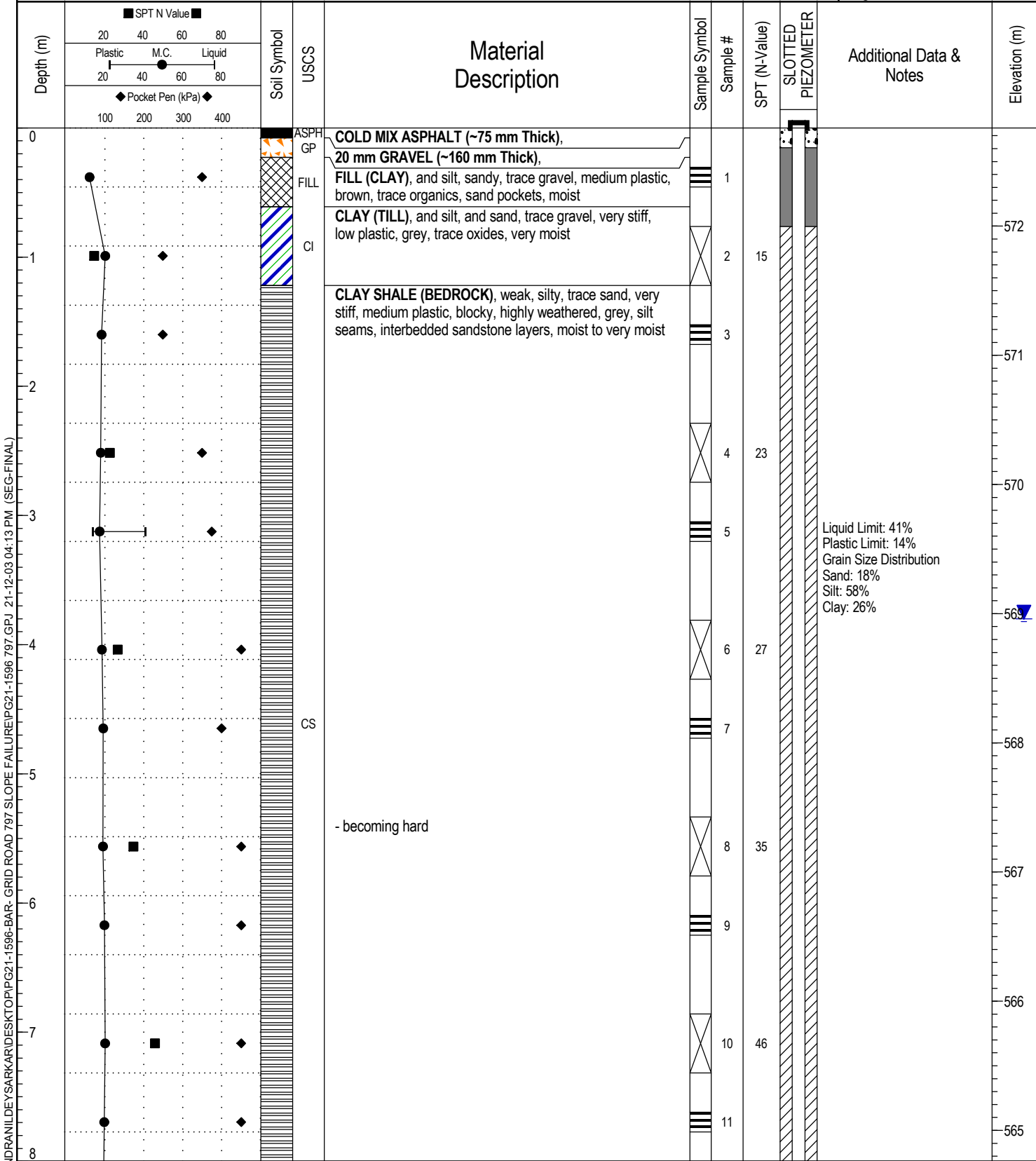
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Completion Date: 21-11-5
 Page 2 of 2

Depth (m)	SPT N Value		Soil Symbol	USCS	Material Description	Sample Symbol	Sample #	SPT (N-Value)	WELL INSTALLATION	WELL INSTALLATION	Additional Data & Notes	Elevation (m)
	20 40 60 80	20 40 60 80										
8	Plastic M.C. Liquid	100 200 300 400		CI	<p>COMPLETION DEPTH: 8.4 m below grade</p> <p>No accumulation of water or slough materials. Slotted Standpipe A - Installed to 8.5 m below grade. Slotted Standpipe B - Installed to 3.0 m below grade. Borehole backfilled with drill cuttings and a bentonite plug.</p>		13				<p>Water Level: 5.9 m below existing ground surface on 15 November 2021.</p>	574
9						573						
10					572							
11					571							
12					570							
13					569							
14					568							
15					567							
16												

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Sample Symbol Shelby Tube No Recovery SPT Test (N) Grab Sample Split-Pen Core
 Backfill Symbol Bentonite Pea Gravel Slough Grout Drill Cuttings Sand



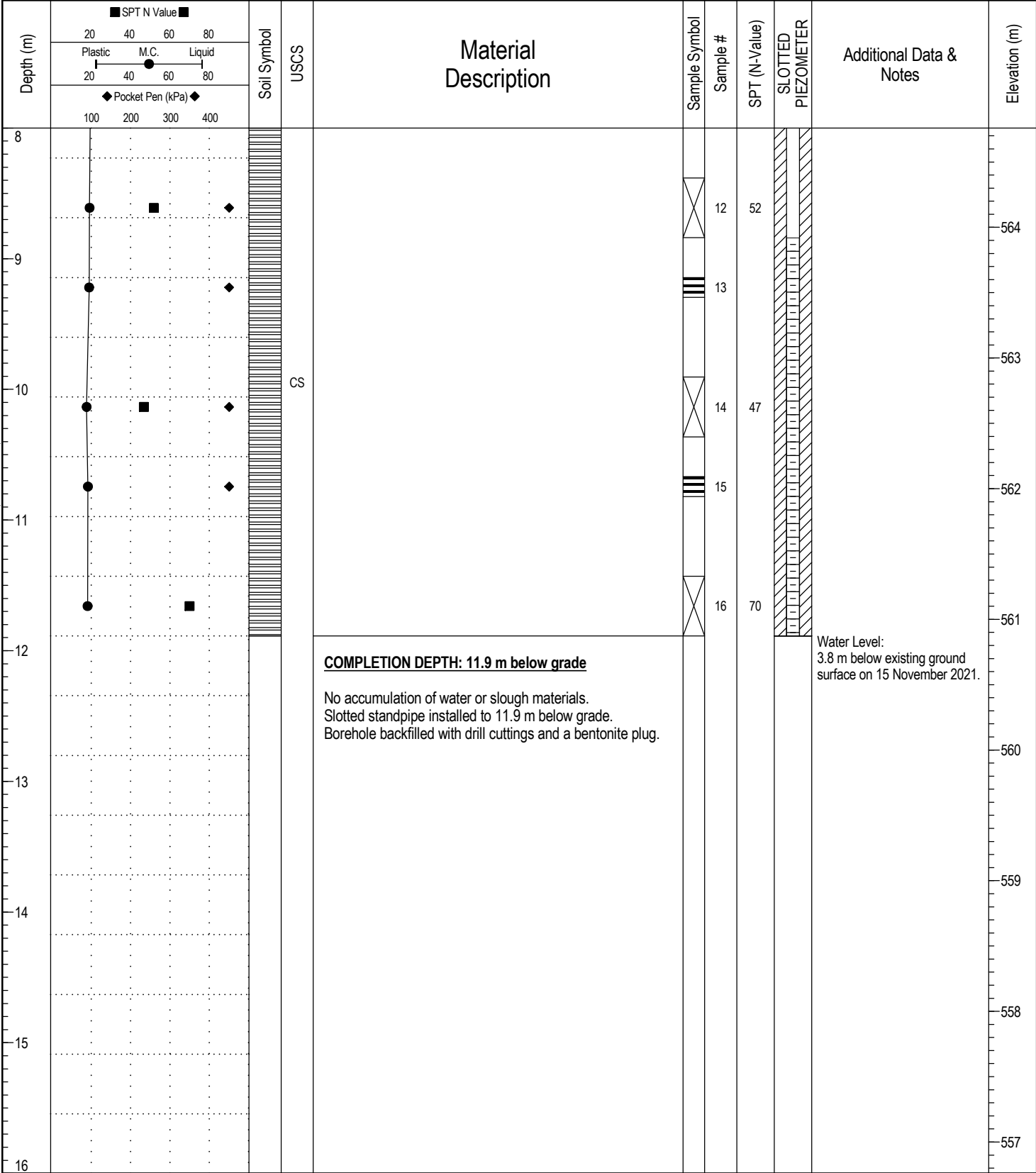
Sample Symbol	Shelby Tube	No Recovery	SPT Test (N)	Grab Sample	Split-Pen	Core
Backfill Symbol	Bentonite	Pea Gravel	Slough	Grout	Drill Cuttings	Sand

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Project Name: Grid Road 797 Surface Failure and Culvert Replacement Borehole #: BH21-2
 Client Name: Bar Engineering Co. Ltd. Project #: PG21-1596
 Site: RM of Frenchman Butte No.501, Saskatchewan Logged By: JS / Reviewed By: TF
 Northing: 5942873 Easting: 581870 Driller: Drilling Solutions
 Elevation: 572.8 m Drill Method: 150 mm Solid Stem Auger

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Completion Date: 21-11-5
 Page 2 of 2

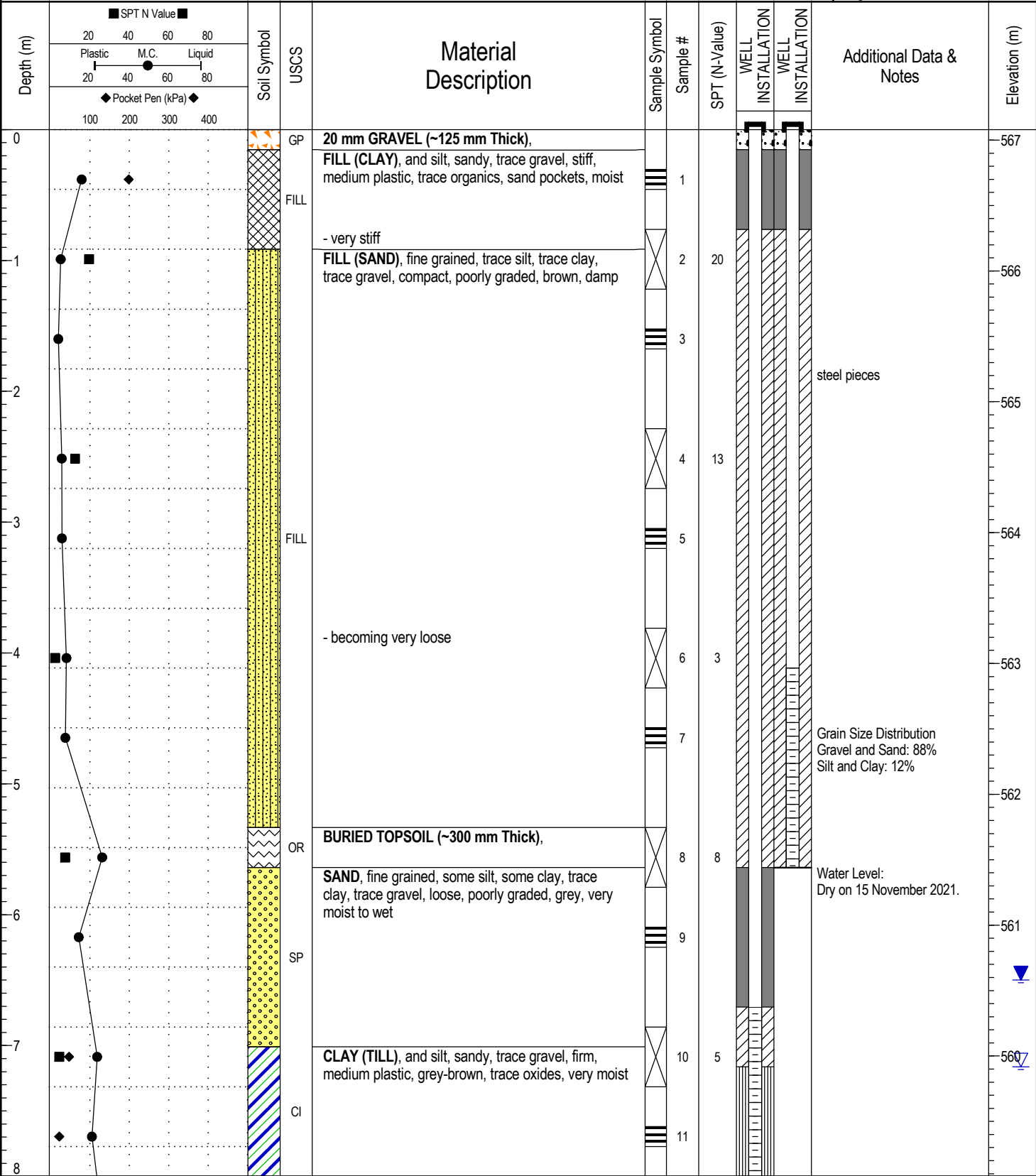


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Sample Symbol [Black Square] Shelby Tube [White Box with Diagonal Line] No Recovery [White Box with X] SPT Test (N) [White Box with Horizontal Lines] Grab Sample [White Box with Vertical Lines] Split-Pen [White Box with Dotted Pattern] Core

Backfill Symbol [Grey Box] Bentonite [White Box with Dotted Pattern] Pea Gravel [White Box with Vertical Lines] Slough [White Box with Dotted Pattern] Grout [White Box with Diagonal Line] Drill Cuttings [White Box with Dotted Pattern] Sand

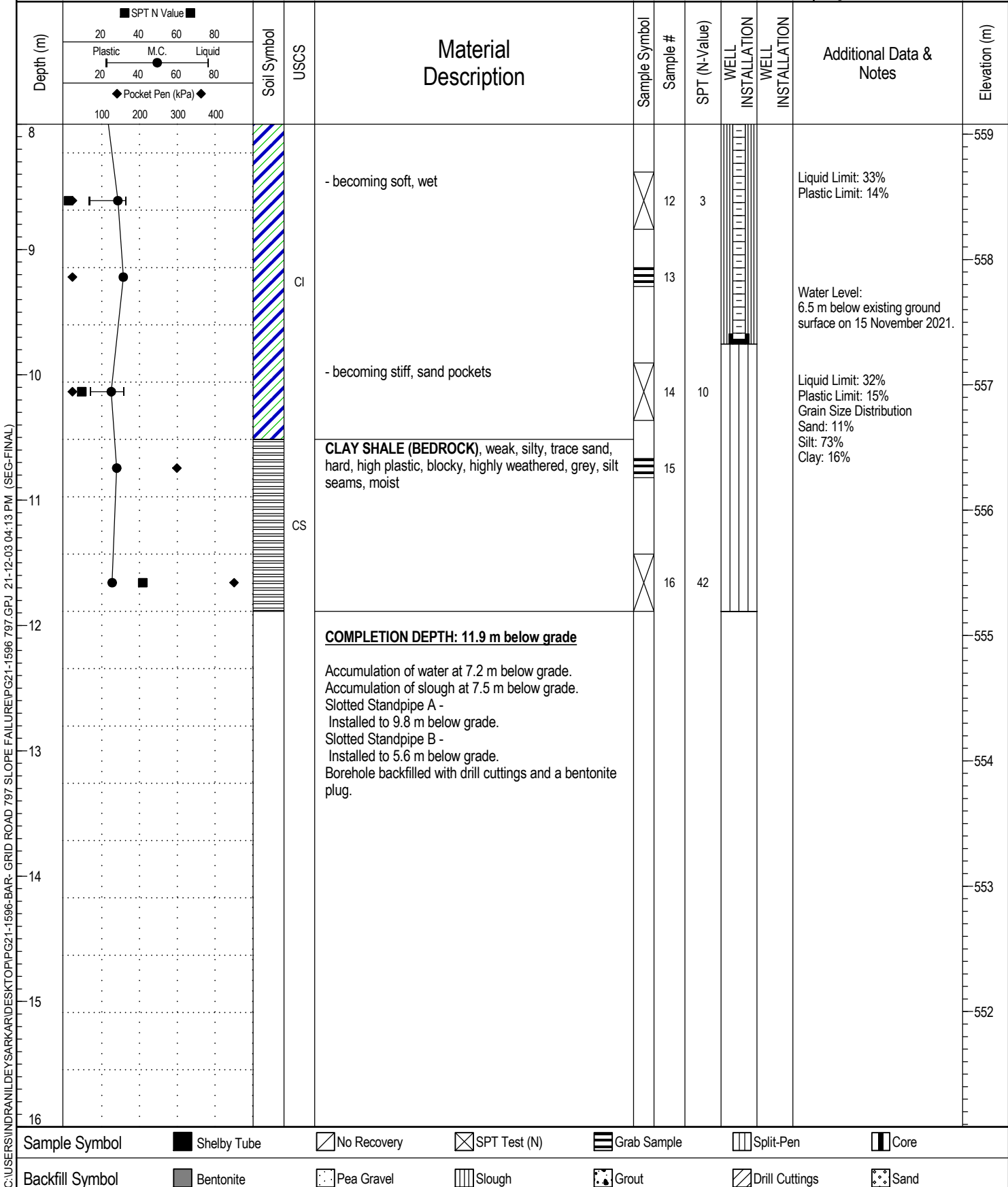
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 Client Name: Bar Engineering Co. Ltd. Project #: PG21-1596
 Site: RM of Frenchman Butte No.501, Saskatchewan Logged By: JS / Reviewed By: TF
 Northing: 5942871 Easting: 581777 Driller: Drilling Solutions
 Elevation: 567.1 m Drill Method: 150 mm Solid Stem Auger



Sample Symbol: Shelby Tube No Recovery SPT Test (N) Grab Sample Split-Pen Core
 Backfill Symbol: Bentonite Pea Gravel Slough Grout Drill Cuttings Sand

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Project Name: Grid Road 797 Surface Failure and Culvert Replacement Borehole #: BH21-3
 Client Name: Bar Engineering Co. Ltd. Project #: PG21-1596
 Site: RM of Frenchman Butte No.501, Saskatchewan Logged By: JS / Reviewed By: TF
 Northing: 5942871 Easting: 581777 Driller: Drilling Solutions
 Elevation: 567.1 m Drill Method: 150 mm Solid Stem Auger



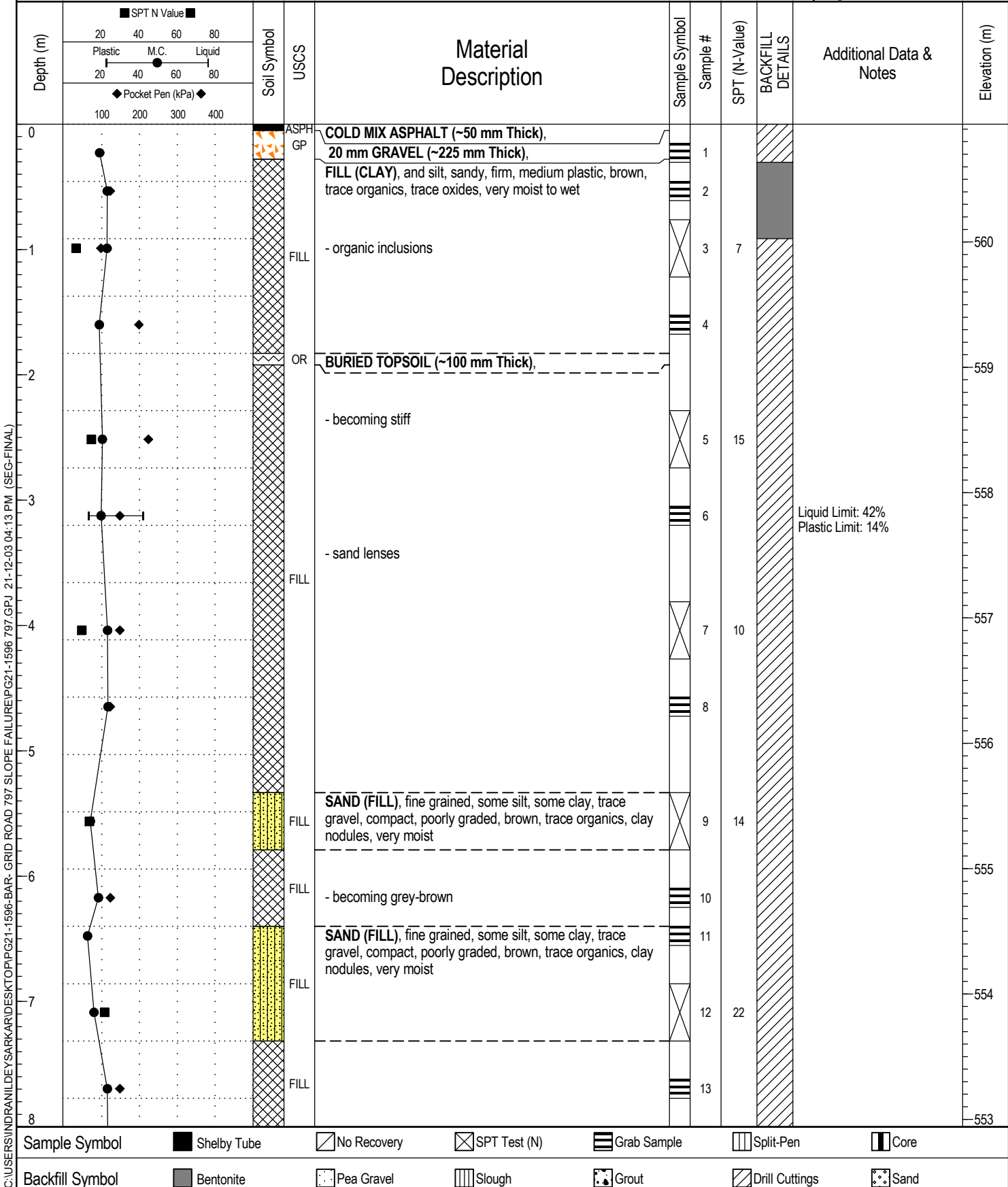
Legend:

Sample Symbol: ■ Shelby Tube, □ No Recovery, ⊗ SPT Test (N), ▬ Grab Sample, ▨ Split-Pen, ▩ Core

Backfill Symbol: ▒ Bentonite, □ Pea Gravel, ▨ Slough, ▨ Grout, ▨ Drill Cuttings, ▨ Sand

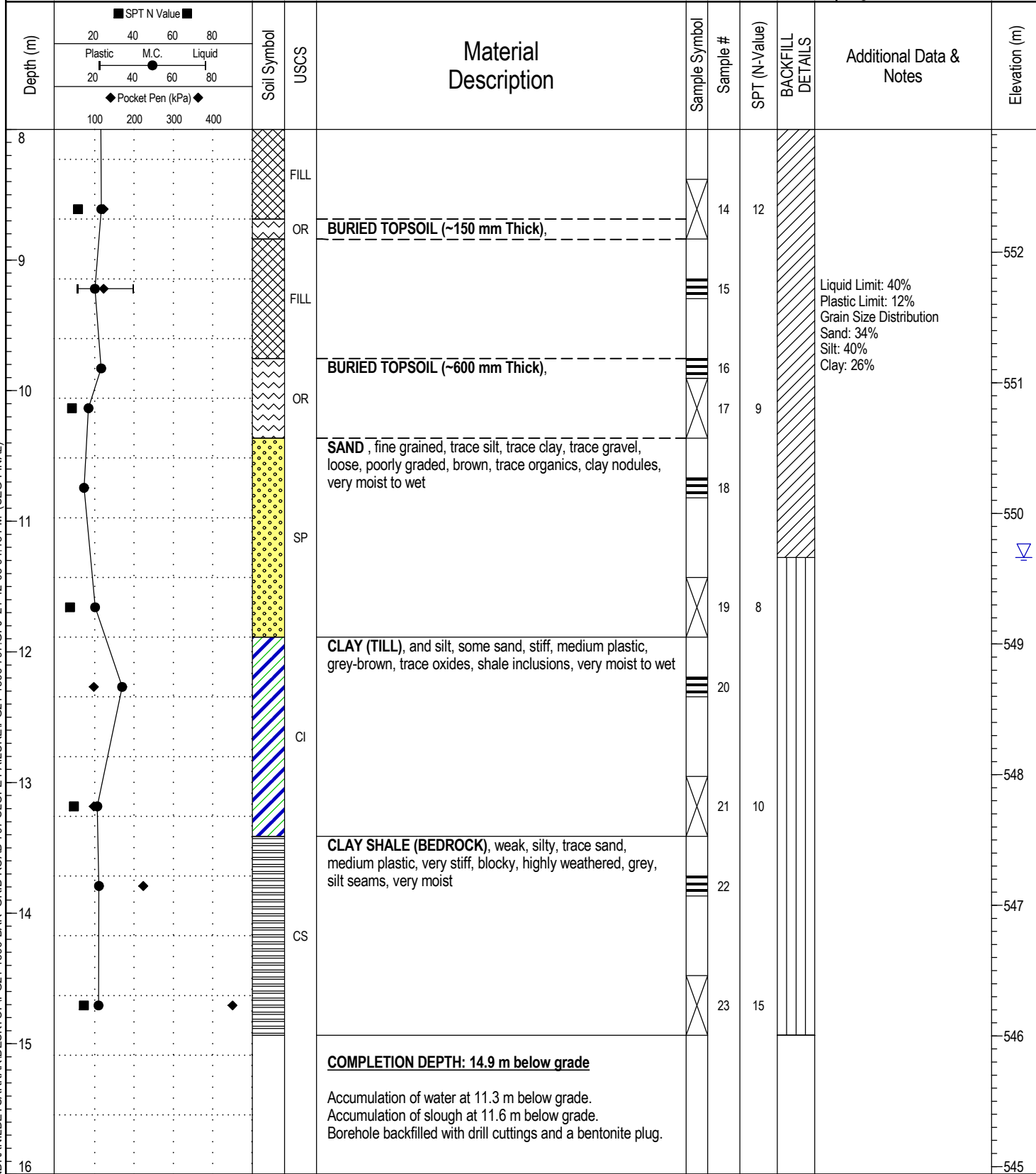
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Project Name: Grid Road 797 Surface Failure and Culvert Replacement Borehole #: **BH21-4**
 Client Name: Bar Engineering Co. Ltd. Project #: PG21-1596
 Site: RM of Frenchman Butte No.501, Saskatchewan Logged By: JS / Reviewed By: TF
 Northing: 5942871 Easting: 581593 Driller: Drilling Solutions
 Elevation: 560.9 m Drill Method: 150 mm Solid Stem Auger



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Project Name: Grid Road 797 Surface Failure and Culvert Replacement Borehole #: **BH21-4**
 Client Name: Bar Engineering Co. Ltd. Project #: PG21-1596
 Site: RM of Frenchman Butte No.501, Saskatchewan Logged By: JS / Reviewed By: TF
 Northing: 5942871 Easting: 581593 Driller: Drilling Solutions
 Elevation: 560.9 m Drill Method: 150 mm Solid Stem Auger

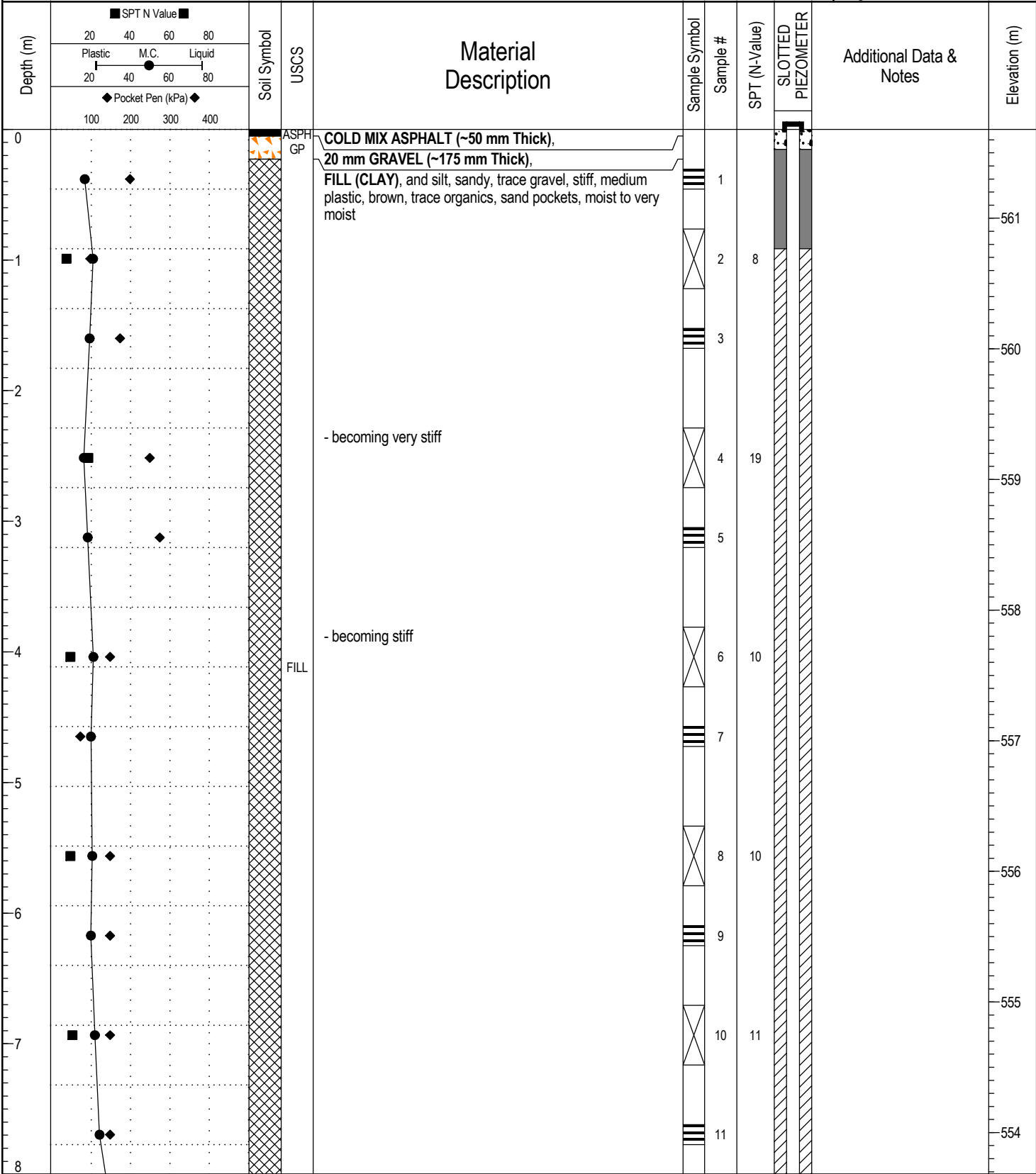


Accumulation of water at 11.3 m below grade.
 Accumulation of slough at 11.6 m below grade.
 Borehole backfilled with drill cuttings and a bentonite plug.

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Sample Symbol: ■ Shelby Tube, □ No Recovery, ⊗ SPT Test (N), ▬ Grab Sample, ▨ Split-Pen, ▩ Core
 Backfill Symbol: ■ Bentonite, □ Pea Gravel, ▨ Slough, ⊗ Grout, ▨ Drill Cuttings, □ Sand

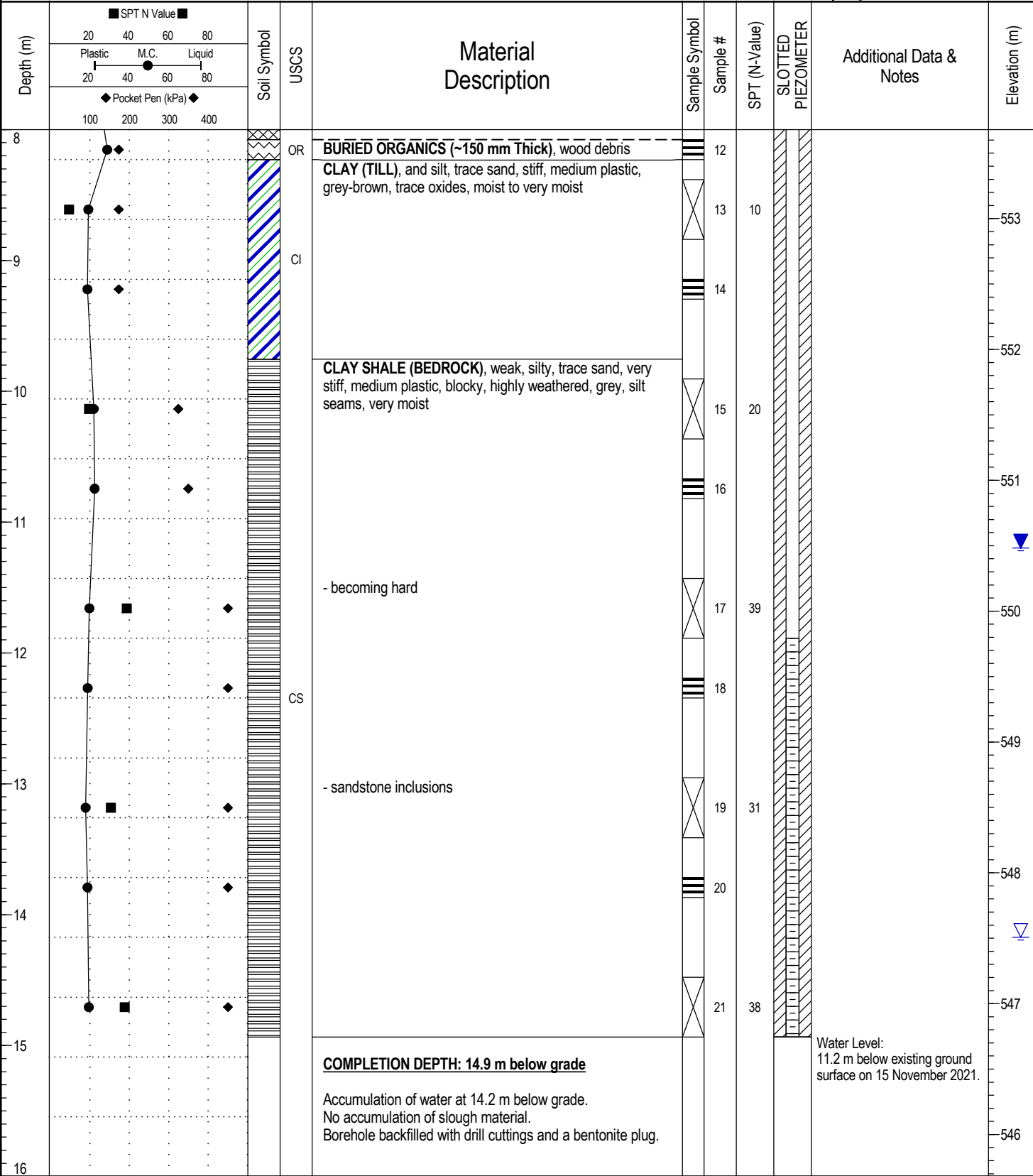
Project Name: Grid Road 797 Surface Failure and Culvert Replacement Borehole #: **BH21-5**
 Client Name: Bar Engineering Co. Ltd. Project #: PG21-1596
 Site: RM of Frenchman Butte No.501, Saskatchewan Logged By: JS / Reviewed By: TF
 Northing: 5942868 Easting: 581534 Driller: Drilling Solutions
 Elevation: 561.7 m Drill Method: 150 mm Solid Stem Auger



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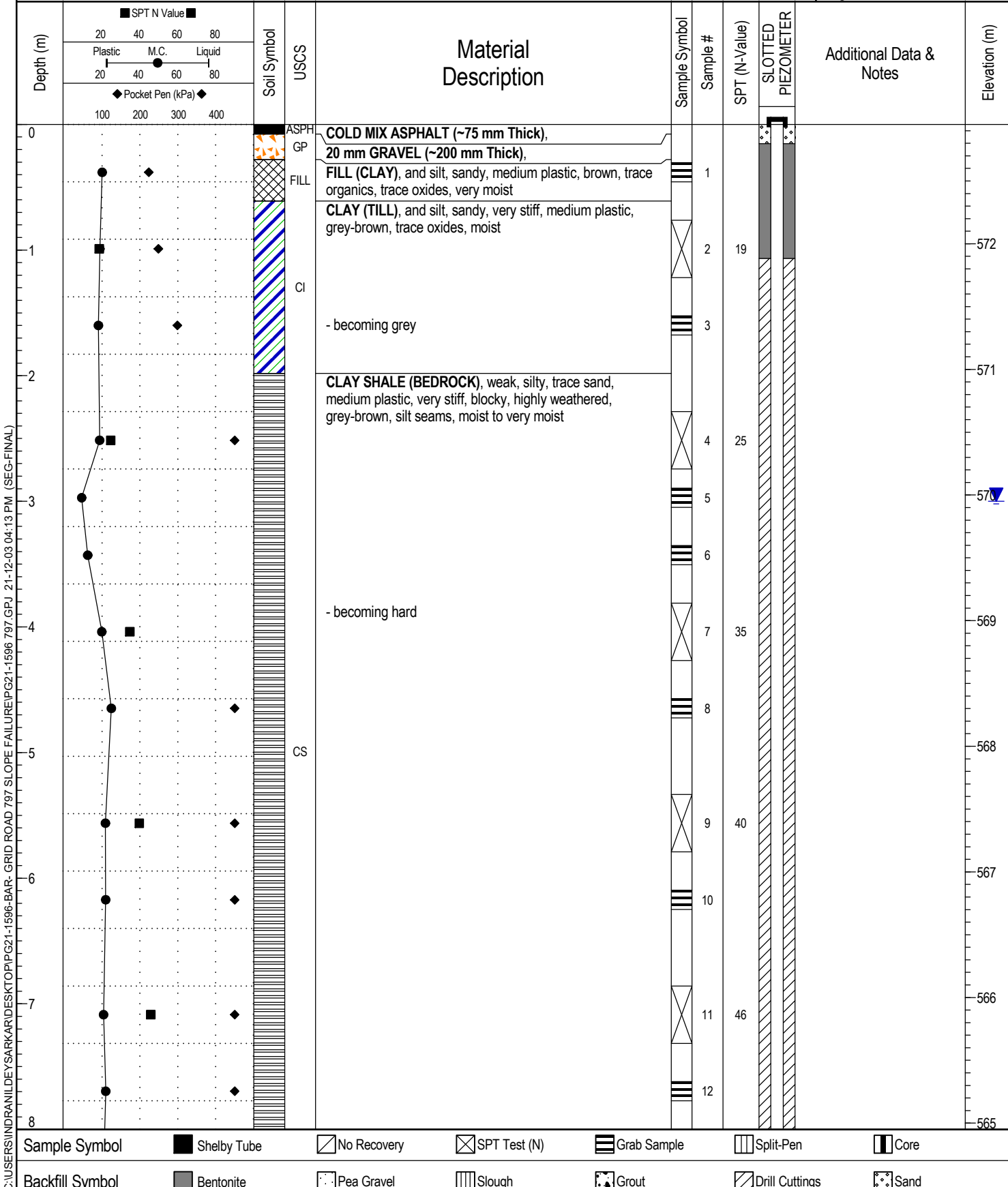
Sample Symbol ■ Shelby Tube □ No Recovery ⊗ SPT Test (N) ≡ Grab Sample ▨ Split-Pen ▩ Core
Backfill Symbol ■ Bentonite ▨ Pea Gravel ▨ Slough ⊗ Grout ▨ Drill Cuttings ▨ Sand

Project Name: Grid Road 797 Surface Failure and Culvert Replacement Borehole #: BH21-5
 Client Name: Bar Engineering Co. Ltd. Project #: PG21-1596
 Site: RM of Frenchman Butte No.501, Saskatchewan Logged By: JS / Reviewed By: TF
 Northing: 5942868 Easting: 581534 Driller: Drilling Solutions
 Elevation: 561.7 m Drill Method: 150 mm Solid Stem Auger



Sample Symbol: ■ Shelby Tube, □ No Recovery, ⊗ SPT Test (N), ≡ Grab Sample, ▨ Split-Pen, ▩ Core
 Backfill Symbol: ■ Bentonite, □ Pea Gravel, ▨ Slough, ⊗ Grout, ▨ Drill Cuttings, □ Sand

C:\USERS\INDRANIL\DESKTOP\BAR\GRID ROAD 797 SLOPE FAILURE\PG21-1596-BAR-GRID ROAD 797 SURFACE FAILURE\PG21-1596-BAR-GRID ROAD 797 SURFACE FAILURE (SEG-FINAL).JPG 21-12-03 04:13 PM (SEG-FINAL)



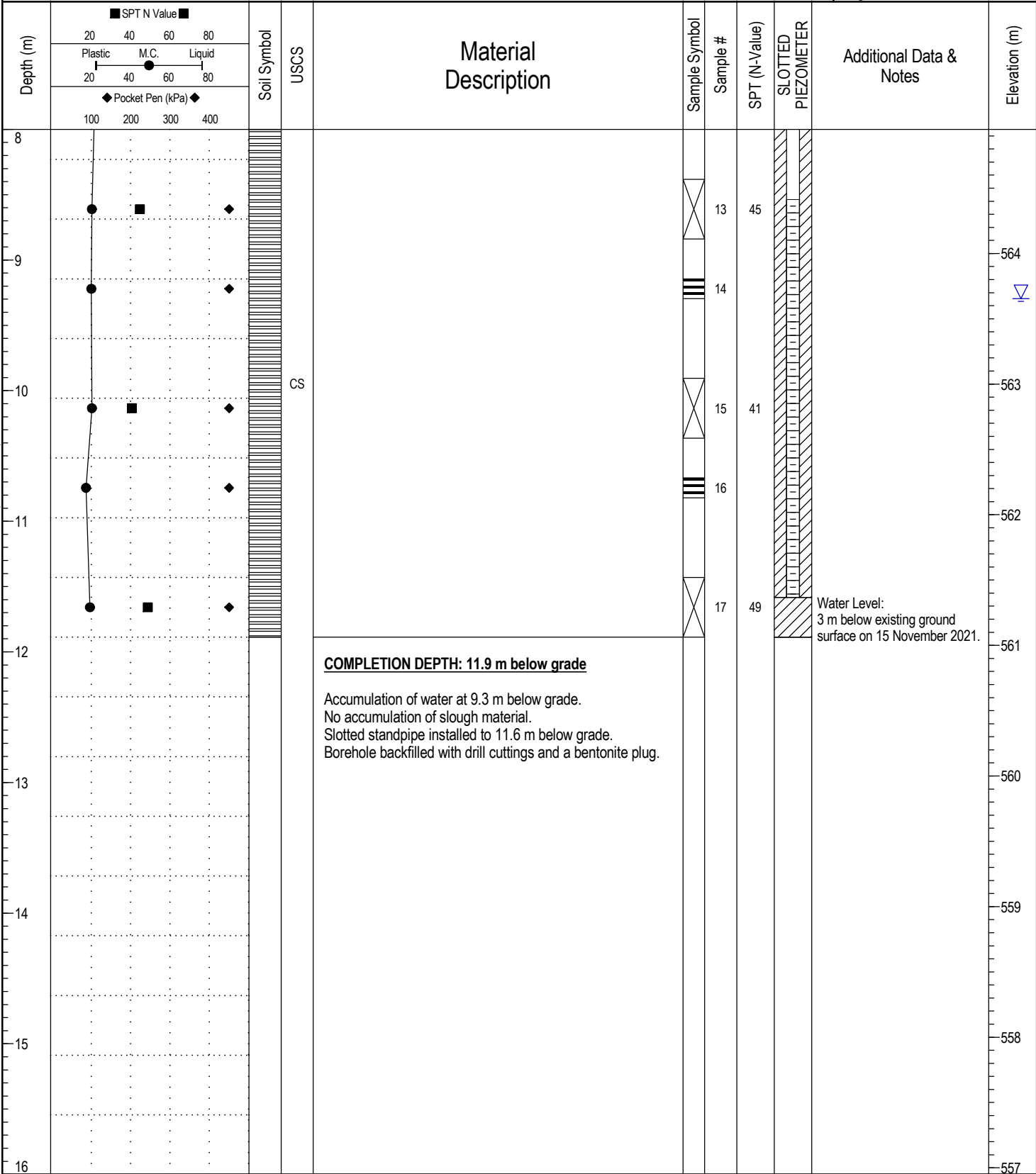
Sample Symbol: Shelby Tube, No Recovery, SPT Test (N), Grab Sample, Split-Pen, Core
 Backfill Symbol: Bentonite, Pea Gravel, Slough, Grout, Drill Cuttings, Sand

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Project Name: Grid Road 797 Surface Failure and Culvert Replacement Borehole #: BH21-6
 Client Name: Bar Engineering Co. Ltd. Project #: PG21-1596
 Site: RM of Frenchman Butte No.501, Saskatchewan Logged By: JS / Reviewed By: TF
 Northing: 5942864 Easting: 581315 Driller: Drilling Solutions
 Elevation: 573 m Drill Method: 150 mm Solid Stem Auger

SolidEarth
 GEOTECHNICAL

Completion Date: 21-11-6
 Page 2 of 2



Sample Symbol

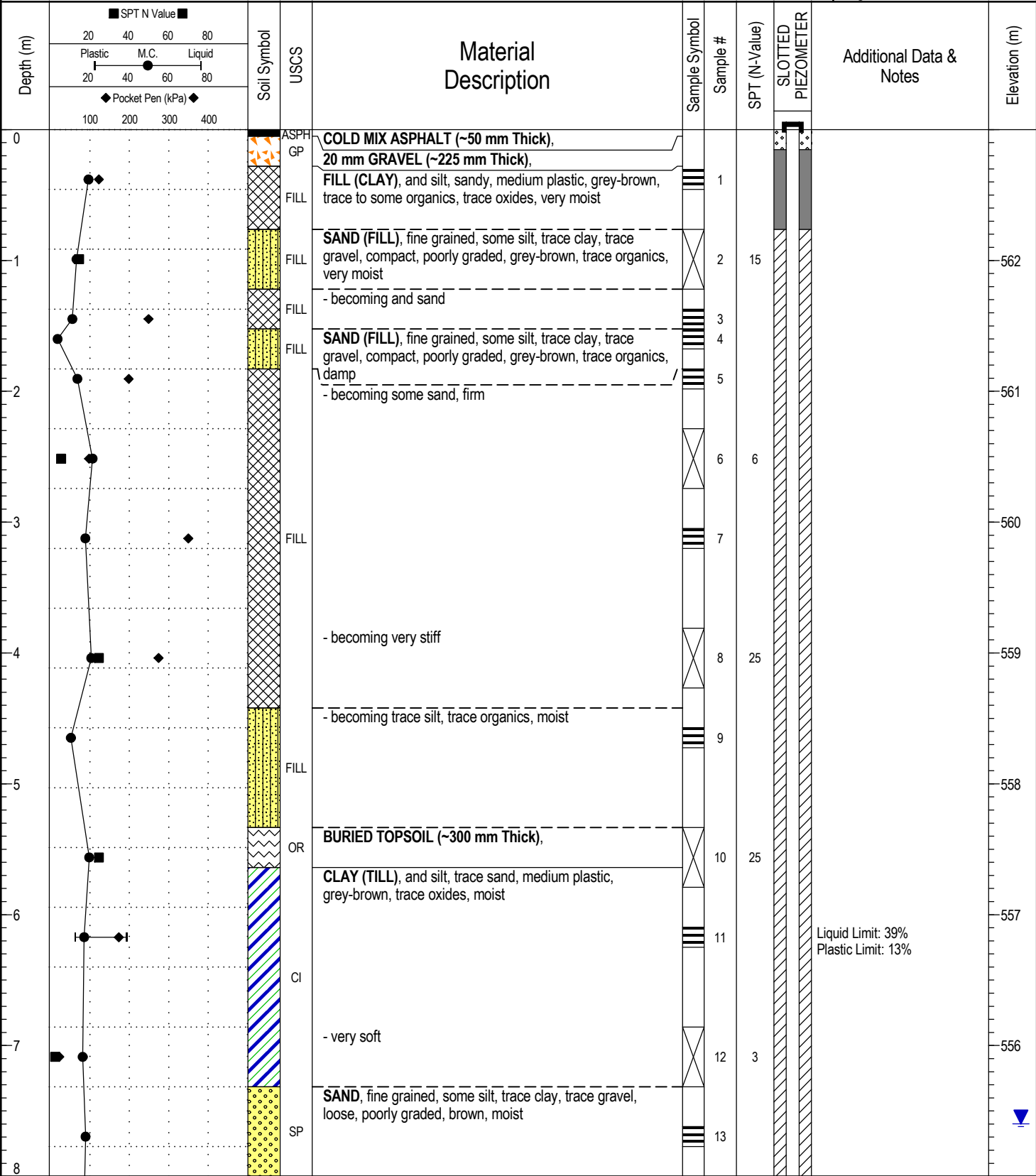
- Shelby Tube
- No Recovery
- SPT Test (N)
- Grab Sample
- Split-Pen
- Core

Backfill Symbol

- Bentonite
- Pea Gravel
- Slough
- Grout
- Drill Cuttings
- Sand

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Project Name: Grid Road 797 Surface Failure and Culvert Replacement Borehole #: **BH21-7**
 Client Name: Bar Engineering Co. Ltd. Project #: PG21-1596
 Site: RM of Frenchman Butte No.501, Saskatchewan Logged By: JS / Reviewed By: TF
 Northing: 5942867 Easting: 581688 Driller: Drilling Solutions
 Elevation: 563 m Drill Method: 150 mm Solid Stem Auger

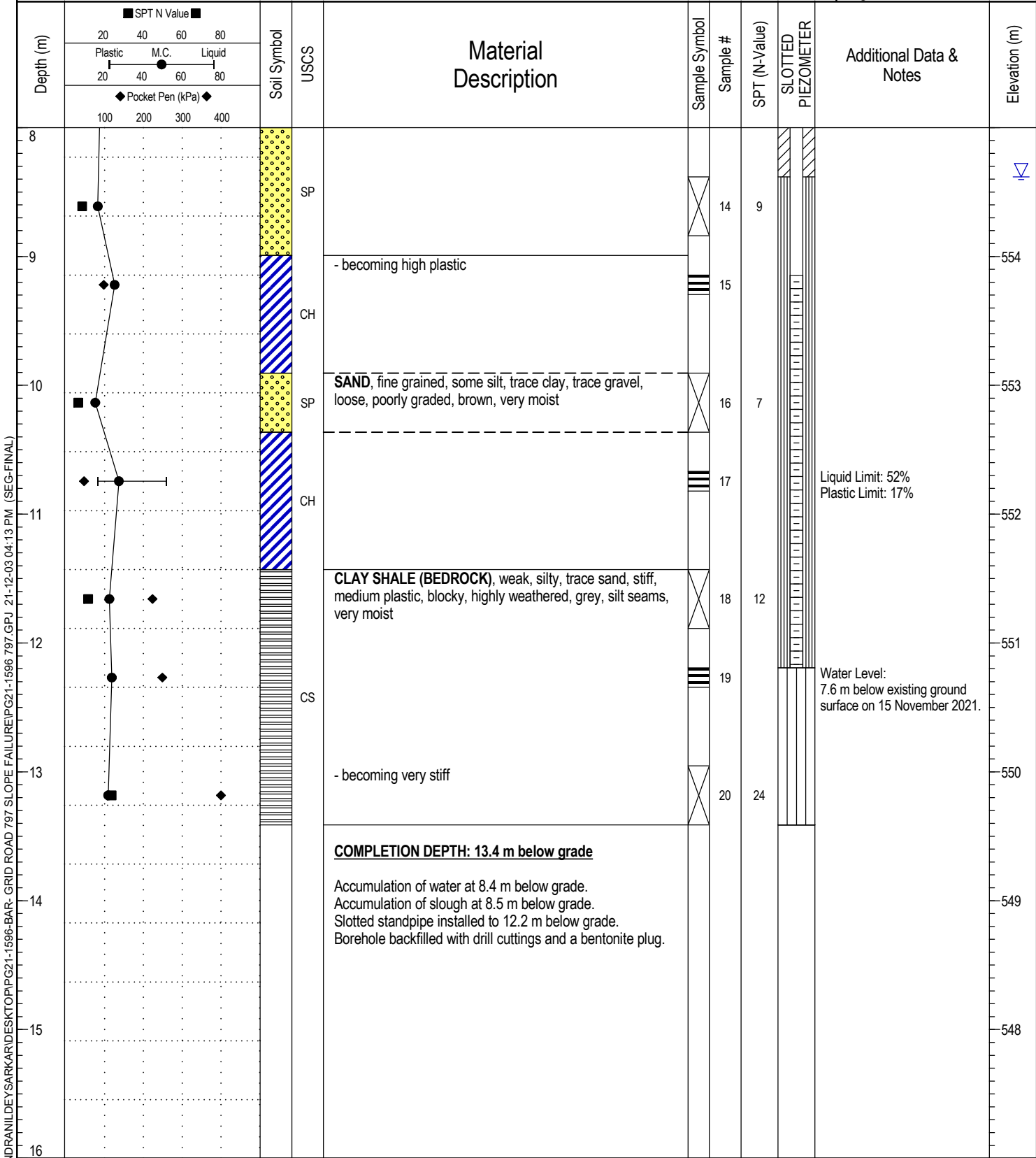


Sample Symbol: Shelby Tube, No Recovery, SPT Test (N), Grab Sample, Split-Pen, Core
 Backfill Symbol: Bentonite, Pea Gravel, Slough, Grout, Drill Cuttings, Sand

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Project Name: Grid Road 797 Surface Failure and Culvert Replacement Borehole #: **BH21-7**
 Client Name: Bar Engineering Co. Ltd. Project #: PG21-1596
 Site: RM of Frenchman Butte No.501, Saskatchewan Logged By: JS / Reviewed By: TF
 Northing: 5942867 Easting: 581688 Driller: Drilling Solutions
 Elevation: 563 m Drill Method: 150 mm Solid Stem Auger

SolidEarth
 GEOTECHNICAL
 Completion Date: 21-11-6
 Page 2 of 2



Sample Symbol: Shelby Tube, No Recovery, SPT Test (N), Grab Sample, Split-Pen, Core
 Backfill Symbol: Bentonite, Pea Gravel, Slough, Grout, Drill Cuttings, Sand

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EXPLANATION OF TERMS & SYMBOLS

The terms and symbols used on the borehole logs to summarize the results of the field investigation and laboratory testing are described on the following two pages.

1. VISUAL TEXTURAL CLASSIFICATION ON MINERAL SOILS

CLASSIFICATION	APPARENT PARTICLE SIZE	VISUAL IDENTIFICATION
Boulders	> 200 mm	> 200 mm
Cobbles	75 mm to 200 mm	75 mm to 200 mm
Gravel	4.75 mm to 75 mm	5 mm to 75 mm
Sand	0.075 mm to 4.75 mm	Visible particles to 5 mm
Silt	0.002 mm to 0.075 mm	Non-plastic particles, not visible to naked eye
Clay	< 0.002 mm	Plastic particles, not visible to naked eye

2. TERMS FOR CONSISTENCY & DENSITY OF SOILS

Cohesionless Soils

DESCRIPTIVE TERM	APPROXIMATE SPT "N" VALUE
Very Dense	> 50
Dense	30 to 50
Compact	10 to 30
Loose	4 to 10
Very Loose	< 4

Cohesive Soils

DESCRIPTIVE TERM	UNDRAINED SHEAR STRENGTH	APPROXIMATE SPT "N" VALUE
Hard	>200 kPa	> 30
Very Stiff	100 to 200 kPa	15 to 30
Stiff	50 to 100 kPa	8 to 15
Firm	25 to 50 kPa	4 to 8
Soft	10 to 25 kPa	2 to 4
Very Soft	< 10 kPa	< 2

* SPT "N" Values – Refers to the number of blows by a 63.5 kg hammer dropped 760 mm to drive a 50 mm diameter split spoon sampler for a distance of 300 mm after an initial penetration of 150 mm.

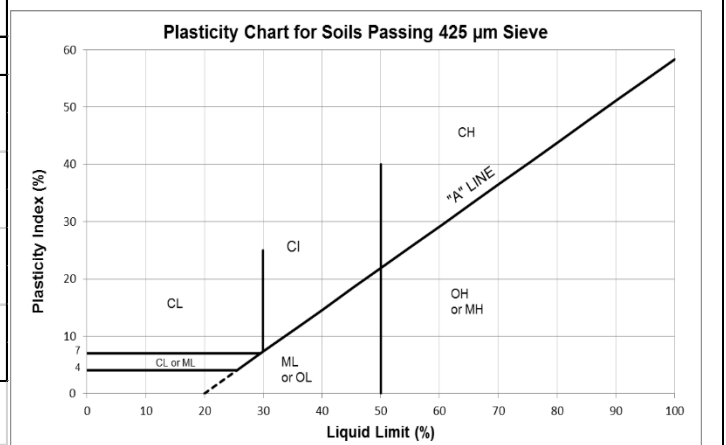
3. SYMBOLS USED ON BOREHOLE LOGS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
N(■)	Standard Penetration Test (CSA A119 1-60)	SO ₄	Concentration of Water-Soluble Sulphate
N _d	Dynamic Cone Penetration Test	C _u	Undrained Shear Strength
pp (◆)	Pocket Penetrometer Strength	γ	Unit Weight of Soil or Rock
q _u	Unconfined Compressive Strength	γ _d	Dry Unit Weight of Soil or Rock
w (●)	Natural Moisture Content (ASTM D2216)	ρ	Density of Soil or Rock
w _L	Liquid Limit (ASTM D 4318)	ρ _d	Dry Density of Soil or Rock
w _P	Plastic Limit (ASTM D 4318)	▽	Short-Term Water Level
I _P	Plastic Index	▼	Long-Term Water Level

MODIFIED UNIFIED CLASSIFICATION SYSTEM FOR SOILS

MAJOR DIVISION		GROUP SYMBOL	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA		
COARSE GRAINED SOILS (MORE THAN HALF BY WEIGHT LARGER THAN 75 µm)	GRAVELS (MORE THAN HALF COARSE GRAINS LARGER THAN 4.75mm)	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL GRADED GRAVELS AND GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	$C_u = D_{60}/D_{10} > 4$ $C_c = (D_{30})^2/(D_{10} \times D_{60}) = 1 \text{ to } 3$	
		GRAVELS (WITH SOME FINES)	GP	POORLY GRADED GRAVELS AND GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	NOT MEETING ABOVE REQUIREMENTS	
			GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	CONTENT OF FINES EXCEEDS 12%	ATTERBERG LIMITS BELOW 'A' LINE I_p LESS THAN 4
		GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES	ATTERBERG LIMITS ABOVE 'A' LINE I_p MORE THAN 7		
	SANDS (MORE THAN HALF COARSE GRAINS SMALLER THAN 4.75mm)	CLEAN SANDS (LITTLE OR NO FINES)	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	$C_u = D_{60}/D_{10} > 6$ $C_c = (D_{30})^2/(D_{10} \times D_{60}) = 1 \text{ to } 3$	
		SANDS (WITH SOME FINES)	SP	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	NOT MEETING ALL GRADATION REQUIREMENTS FOR SW	
			SM	SILTY SANDS, SAND-SILT MIXTURES	CONTENT OF FINES EXCEEDS 12%	ATTERBERG LIMITS BELOW 'A' LINE I_p LESS THAN 4
		SC	CLAYEY SANDS, SAND-CLAY MIXTURES	ATTERBERG LIMITS ABOVE 'A' LINE I_p MORE THAN 7		
FINE GRAINED SOILS (MORE THAN HALF BY WEIGHT SMALLER THAN 75 µm)	SILTS (BELOW 'A' LINE NEGLIGIBLE ORGANIC CONTENT)	$W_L < 50 \%$	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY SANDS OF SLIGHT PLASTICITY	CLASSIFICATION IS BASED UPON PLASTICITY CHART (SEE BELOW)	
		$W_L > 50 \%$	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS		
	CLAYS (ABOVE 'A' LINE NEGLIGIBLE ORGANIC CONTENT)	$W_L < 30 \%$	CL	INORGANIC CLAYS OF LOW PLASTICITY, GRAVELLY, SANDY, OR SILTY CLAYS, LEAN CLAYS		
		$30 \% < W_L < 50 \%$	CI	INORGANIC CLAYS OR MEDIUM PLASTICITY, SILTY CLAYS		
		$W_L > 50 \%$	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS		
		ORGANIC SILTS & CLAYS (BELOW 'A' LINE)	$W_L < 50 \%$	OL		
	$W_L > 50 \%$		OH	ORGANIC CLAYS OF HIGH PLASTICITY		
	HIGHLY ORGANIC SOILS			Pt		
BEDROCK			BR	SEE REPORT DESCRIPTION		

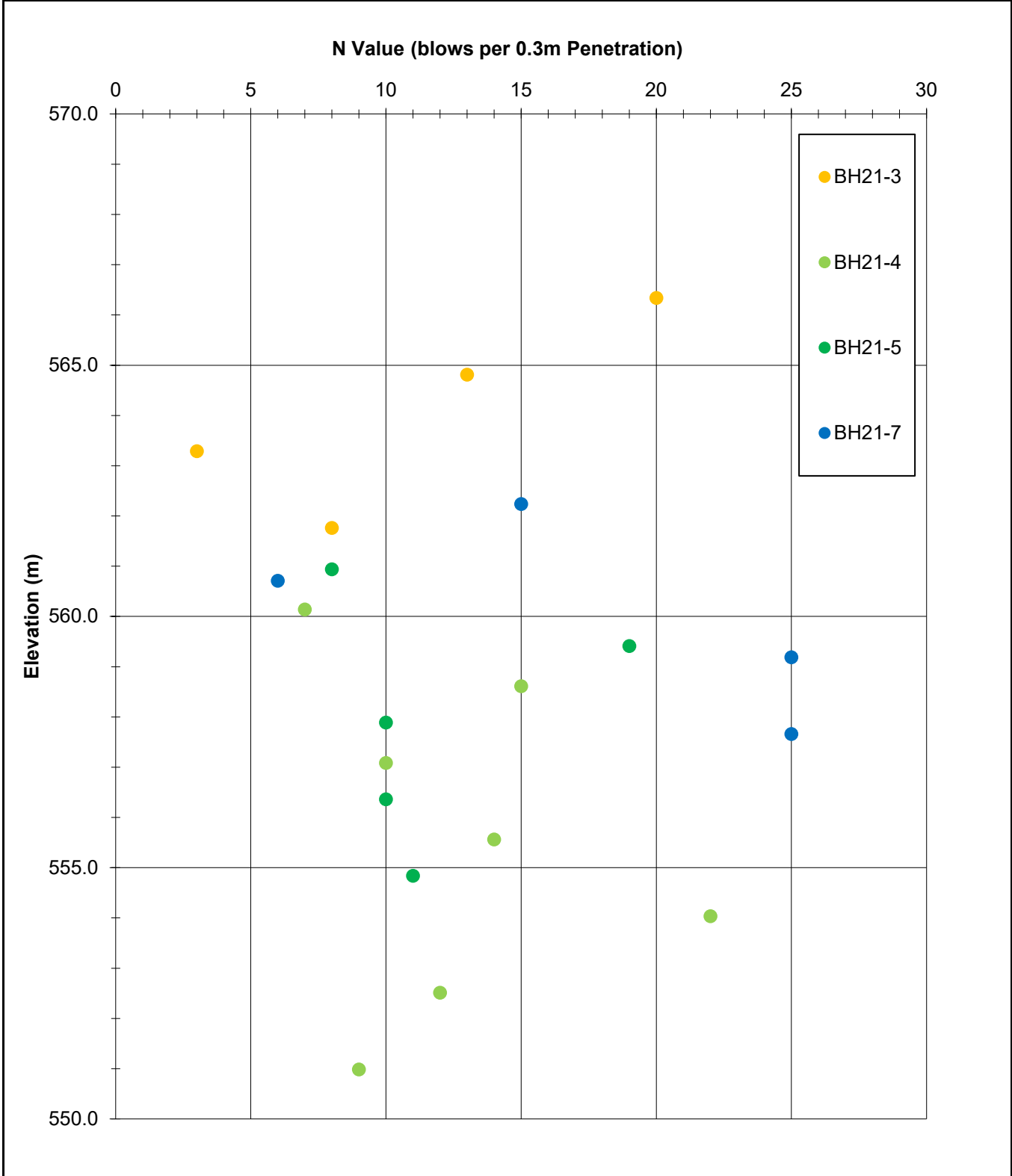
Soil Components			
Component	Size Range (mm)	Descriptor	% by Weight
Cobbles	> 76	and	> 35
Gravel	76 to 4.75		
Coarse	76 to 19	-y, -ey	35 to 20
Fine	19 to 4.75		
Sand	4.75 to 0.075	some	20 to 10
Coarse	4.75 to 2		
Medium	2 to 0.425		
Fine	0.425 to 0.075	trace	10 to 1
Fines (Silt or Clay)	< 0.075		




Appendix C

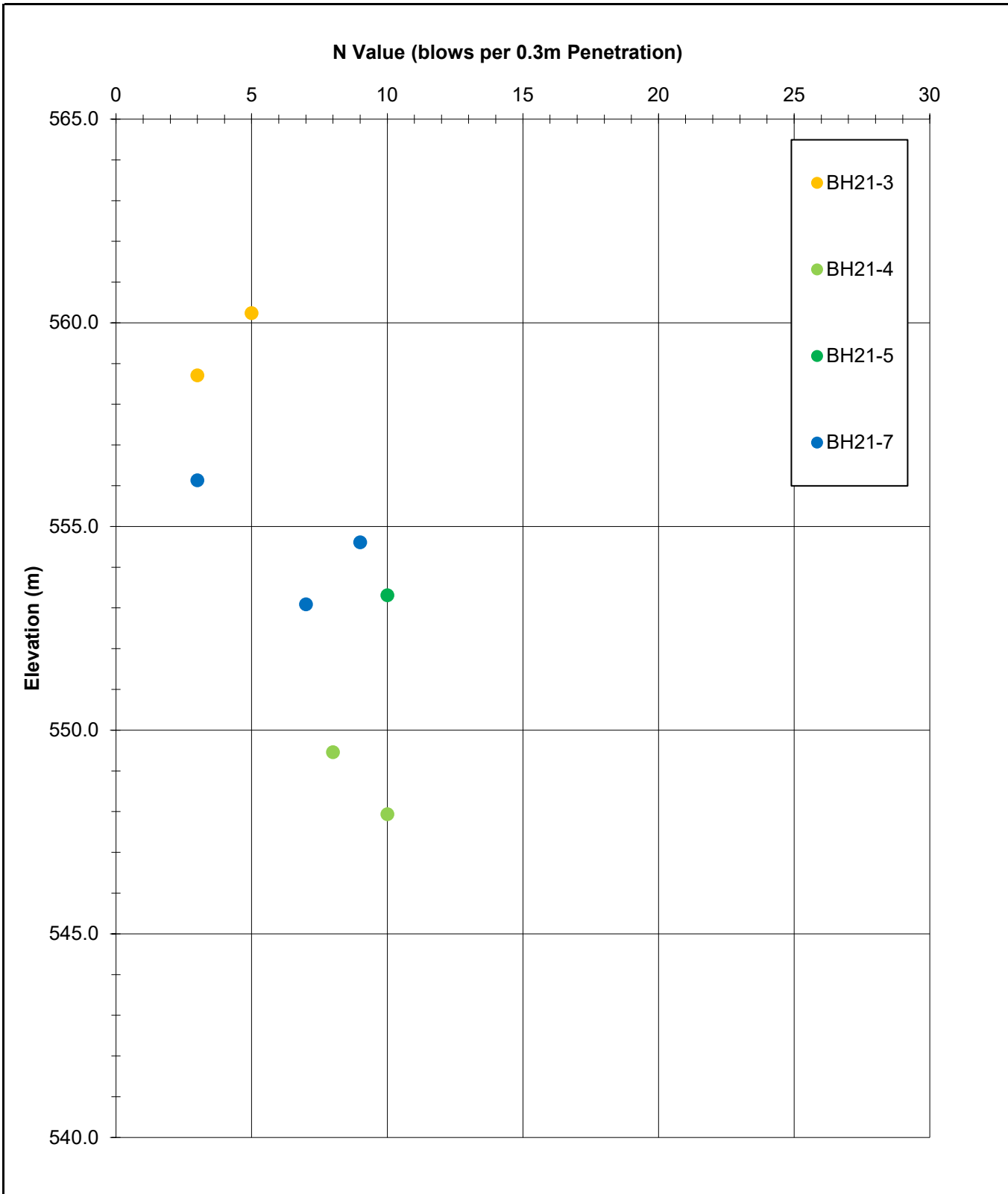
SPT vs Elevation Charts C1 and C2


**SPT vs Elevation
Embankment Fill Material**



	Location: Along a portion of Grid Rd 797 RM of Frenchman Butte No. 501	Date:	Nov-21
		Project #:	PG21-1596
		Prep/Rev by:	ND/JJ
		Figure #:	C1

SPT vs Elevation
Native Foundation Soils Below Embankment



	Location: Along a portion of Grid Rd 797 RM of Frenchman Butte No. 501	Date:	Nov-21
		Project #:	PG21-1596
		Prep/Rev by:	ND/JJ
		Figure #:	C2

Appendix D

D1 to D7 – Results of Slope Stability Analyses

Name	Unit Weight (kN/m ³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line
Clay Till	20	0	25	1
Buried Topsoil	18	0	11	1
Clay Fill	20	0	23	1
Clay Shale	20	0	23	1

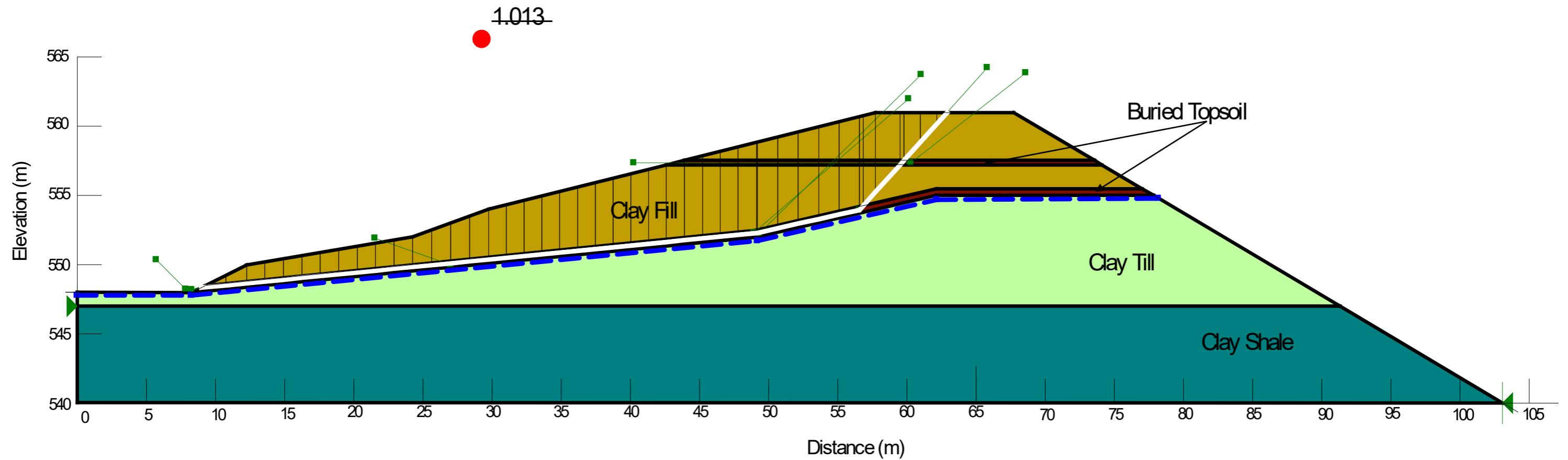




FIGURE NO.	1	DWN BY:	ND	PROJECT:	Slope Stability Assessment Along a portion of Grid Road 797 RM of Frenchman Butte No. 501, Saskatchewan	CLIENT:	
PROJECT NO.	PG21-1596	DATE:	November 2021	TITLE:		Factor of Safety for Road Surface Failure (Section 1)	
							

Name	Unit Weight (kN/m ³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line
Buried Topsoil	18	0	11	1
Clay Fill	20	0	23	1
Clay Shale	20	0	23	1
Clay Till	20	0	25	1

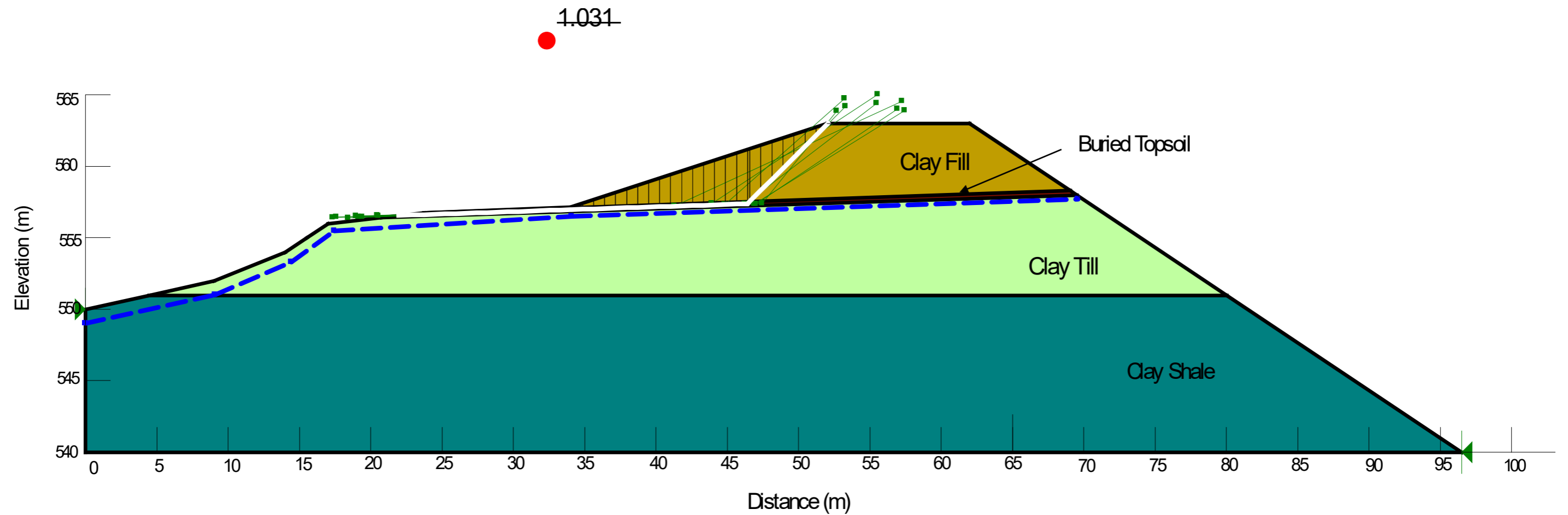




FIGURE NO.	2	DWN BY:	ND	PROJECT: Slope Stability Assessment Along a portion of Grid Road 797 RM of Frenchman Butte No. 501, Saskatchewan	CLIENT: 
PROJECT NO.	PG21-1596	DATE:	November 2021		
				TITLE: Factor of Safety for Road Surface Failure (Section 2)	

Name	Unit Weight (kN/m ³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line
Buried Topsoil	18	0	11	1
Clay Fill	20	0	23	1
Clay Till	20	0	25	1

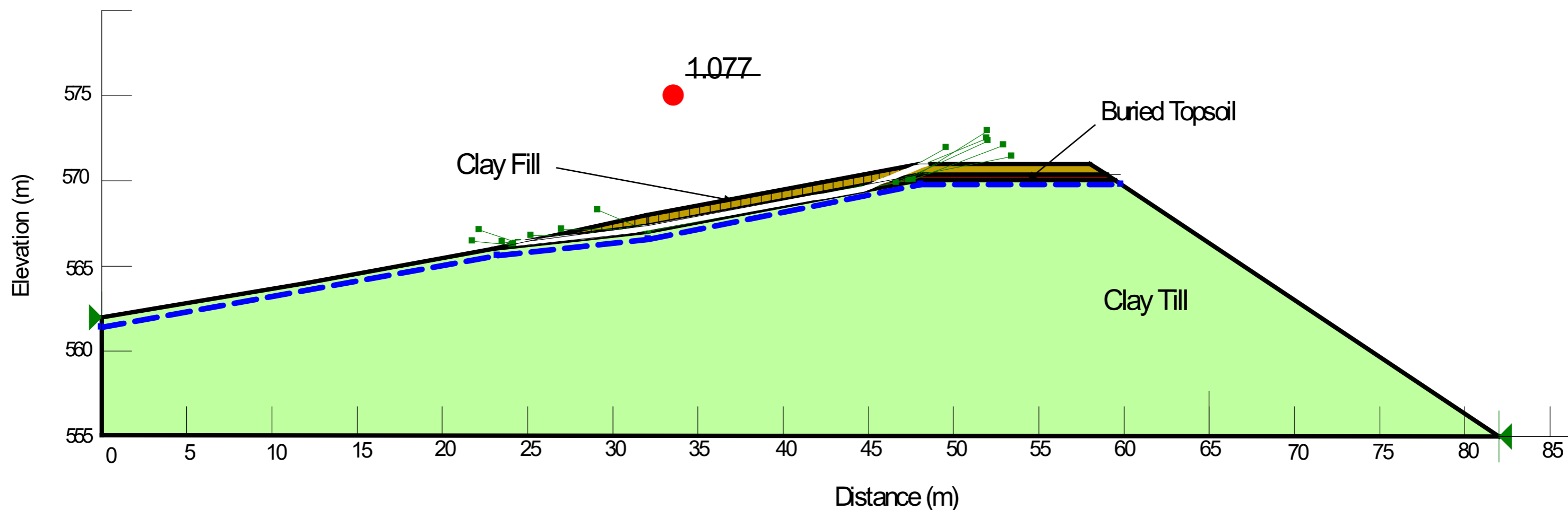




FIGURE NO. 3	DWN BY: ND	PROJECT: Slope Stability Assessment Along a portion of Grid Road 797 RM of Frenchman Butte No. 501, Saskatchewan	CLIENT: 
PROJECT NO. PG21-1596	DATE: November 2021		
		TITLE: Factor of Safety for Road Surface Failure (Section 3)	

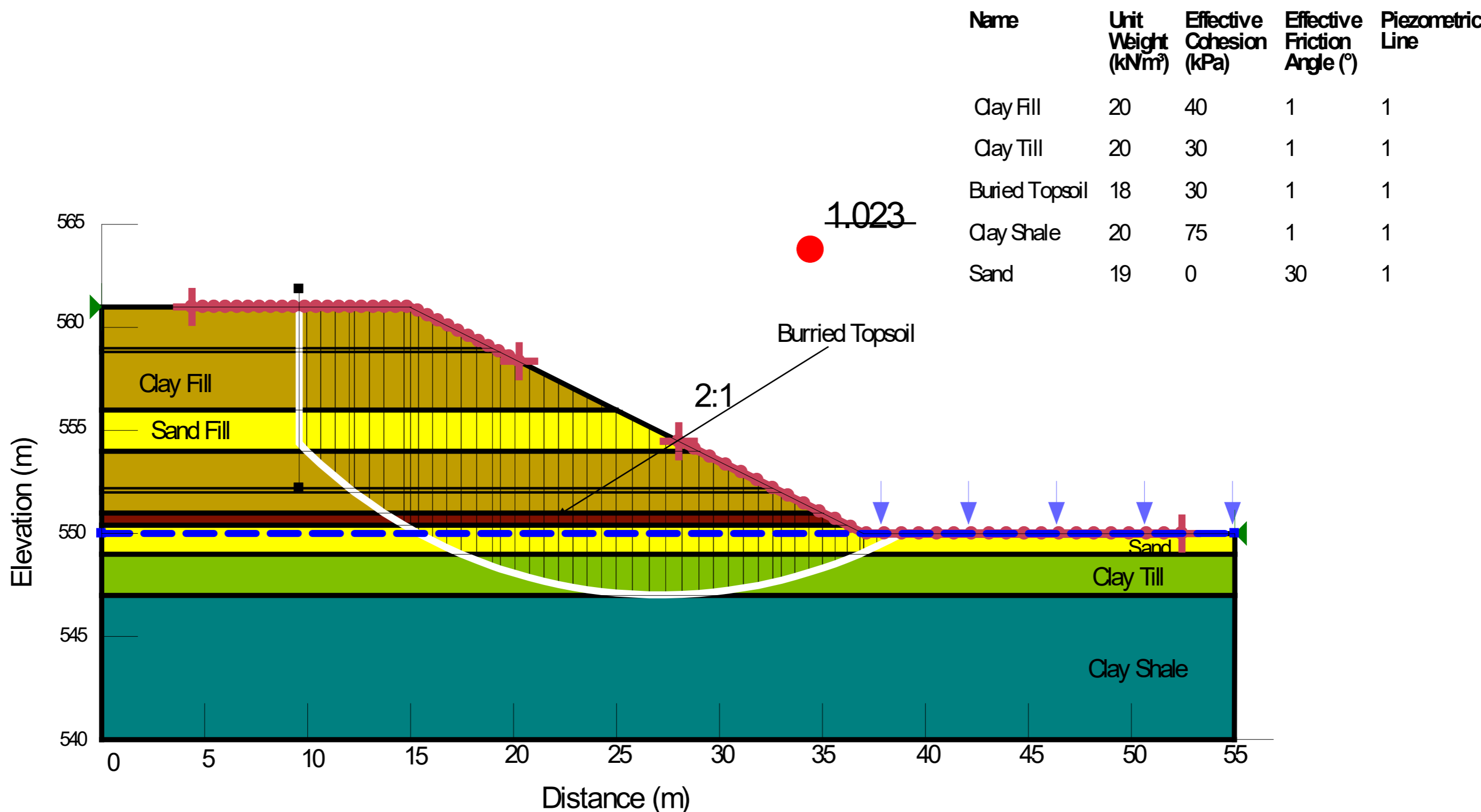
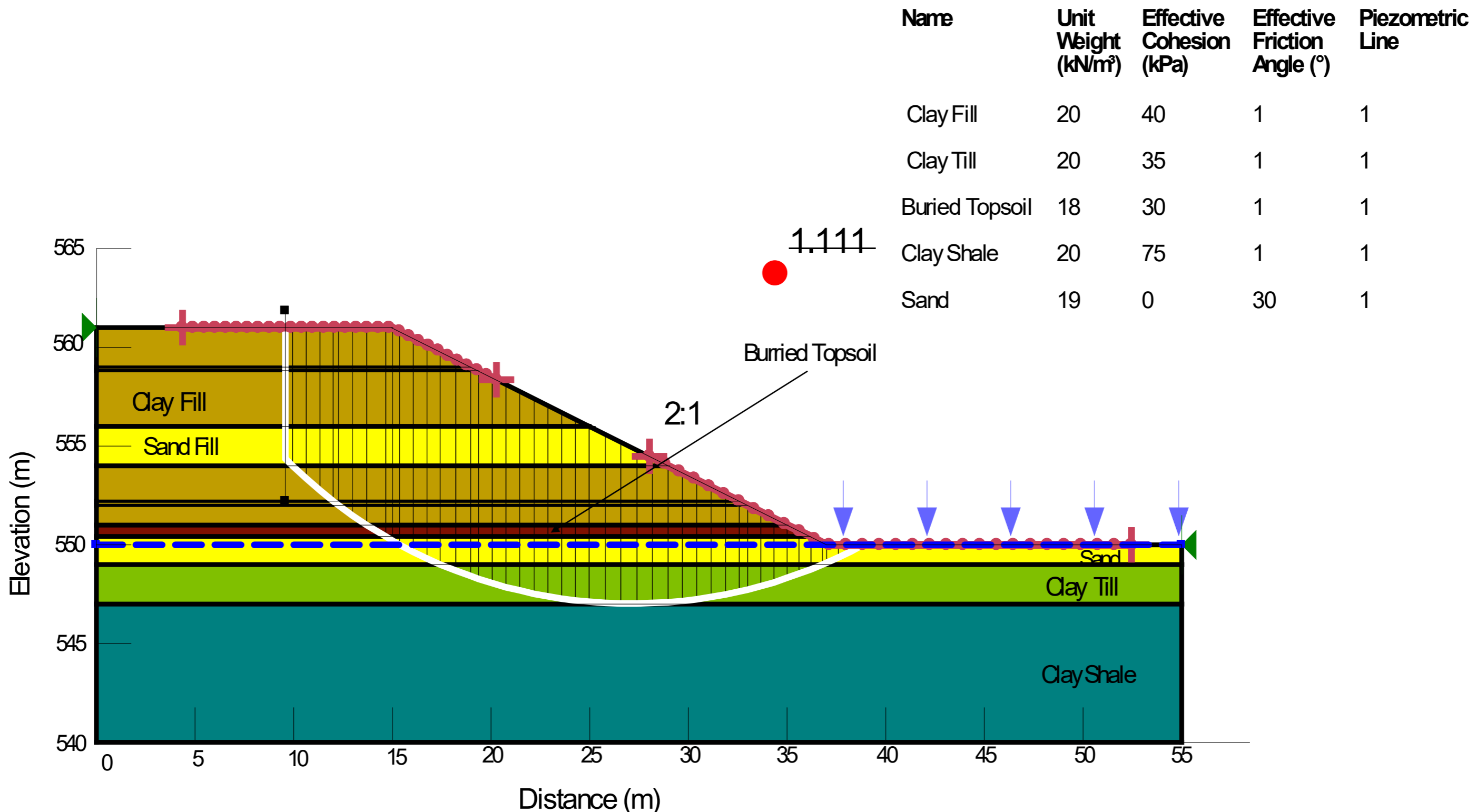




FIGURE NO.	4	DWN BY:	ND	PROJECT:	Slope Stability Assessment Along a portion of Grid Road 797 RM of Frenchman Butte No. 501, Saskatchewan	CLIENT:	
PROJECT NO.	PG21-1596	DATE:	November 2021	TITLE:	Factor of Safety Against Installing 2H:1V Open Cut (30 kPa cohesions for clay till)		



Name	Unit Weight (kN/m ³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line
Clay Fill	20	40	1	1
Clay Till	20	35	1	1
Buried Topsoil	18	30	1	1
Clay Shale	20	75	1	1
Sand	19	0	30	1

FIGURE NO.	5	DWN BY:	ND	PROJECT:	Slope Stability Assessment Along a portion of Grid Road 797 RM of Frenchman Butte No. 501, Saskatchewan	CLIENT:	
PROJECT NO.	PG21-1596	DATE:	November 2021	TITLE:		Factor of Safety Against Installing 2H:1V Open Cut (35 kPa cohesions for clay till)	
							

Name	Unit Weight (kN/m ³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line
Clay Fill	20	40	1	1
Clay Till	20	30	1	1
Buried Topsoil	18	30	1	1
Clay Shale	20	75	1	1
Sand	19	0	30	1

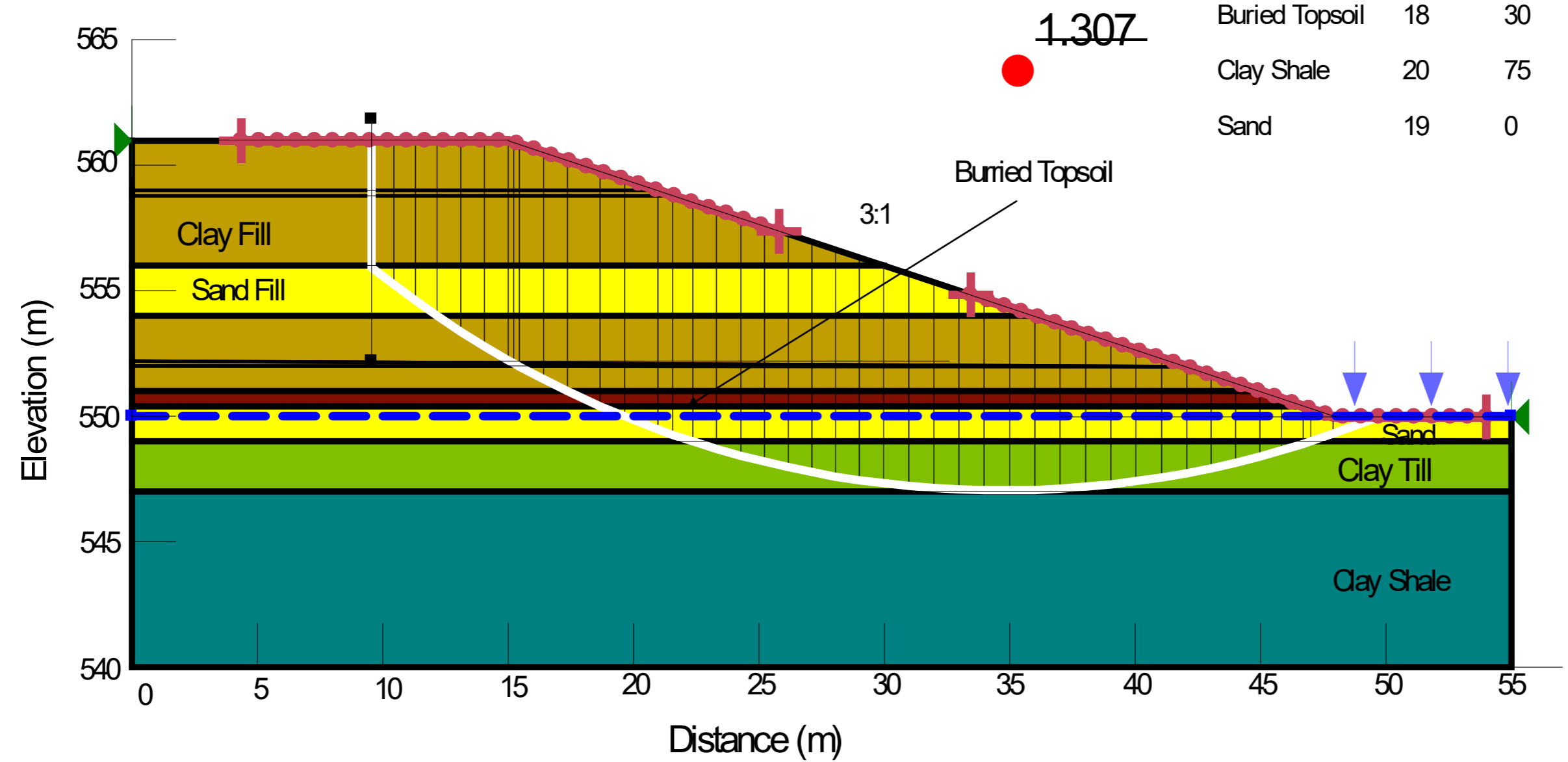




FIGURE NO. 6	DWN BY: ND	PROJECT: Slope Stability Assessment Along a portion of Grid Road 797 RM of Frenchman Butte No. 501, Saskatchewan	CLIENT: 
PROJECT NO. PG21-1596	DATE: November 2021		
		TITLE: Factor of Safety Against Installing 3H:1V Open Cut (30 kPa cohesions for clay till)	

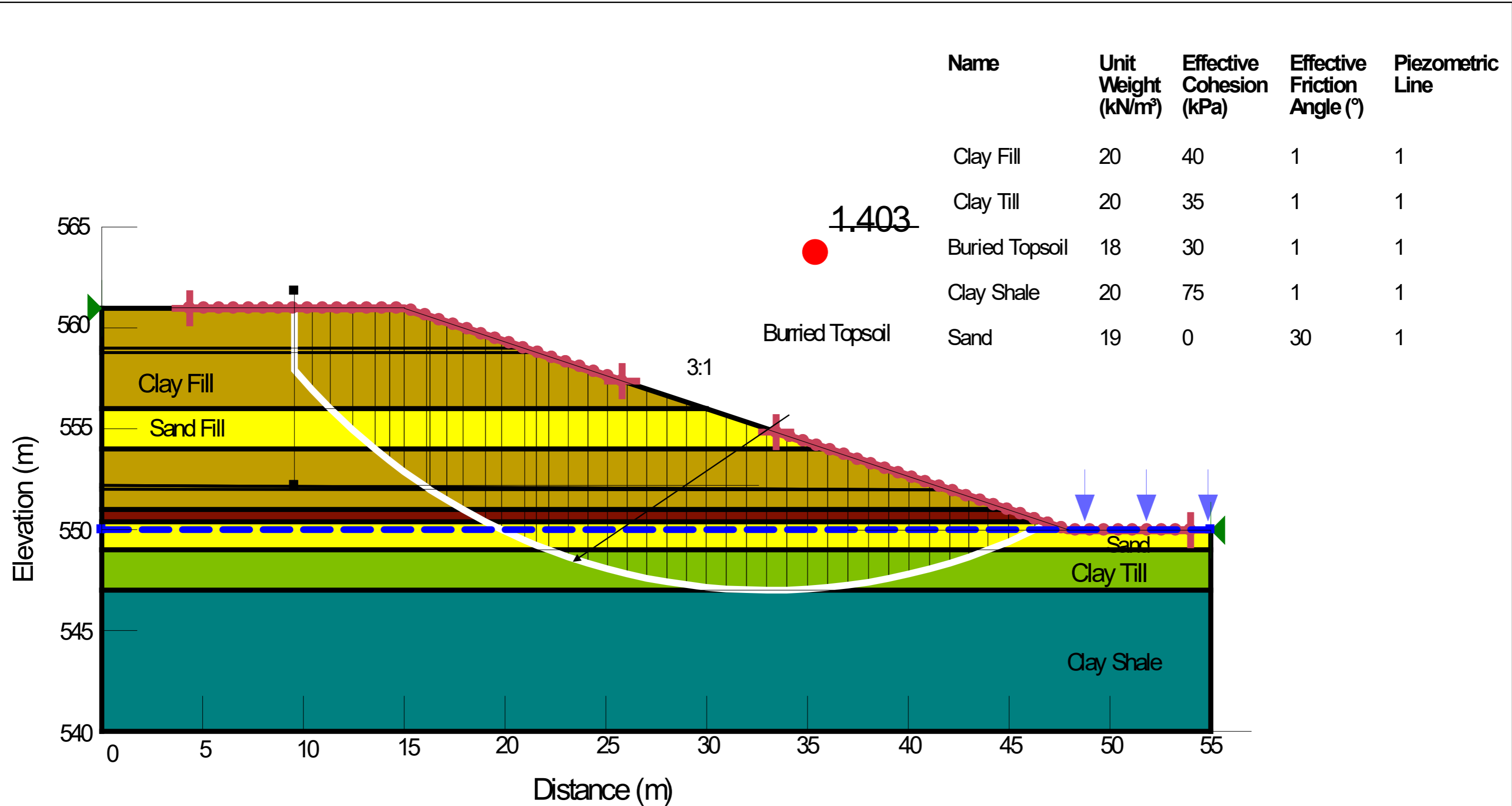




FIGURE NO.	7	DWN BY:	ND	PROJECT:	Slope Stability Assessment Along a portion of Grid Road 797 RM of Frenchman Butte No. 501, Saskatchewan	CLIENT:	
PROJECT NO.	PG21-1596	DATE:	November 2021	TITLE:	Factor of Safety Against Installing 3H:1V Open Cut (35 kPa cohesions for clay till)		
							

SUPPLEMENTAL GEOTECHNICAL INVESTIGATION

**Road Surface Cracking
Along a Portion of Grid Road 797
RM of Frenchman Butte No. 501, Saskatchewan**

Prepared for:

BAR Engineering Co. Ltd.

Date:

18 October 2023

Project File #: PG21-1596.3000

Edmonton : Tel.: 780.577.1115
Fax: 780.669.7094
4336 97 Street
Edmonton, AB, T6E 5R9

Cold Lake : Tel.: 780.545.3545
Fax: 780.669.7094
#105, 4604 50 Street
Cold Lake, AB, T9M 1S6

Lloydminster : Tel.: 780.875.2112
Fax: 780.669.7094
5406 52 Avenue
Lloydminster, AB, T9V 2T5

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Figures:

Figure 1: Borehole and Test Location Plan

Appendix A:

Photographs of Test Pits

Appendix B:

SI and Test Pit Logs
 Explanation of Terms and Symbols

Appendix C:

SI Monitoring Results

1.0 INTRODUCTION

This report presents the findings from the supplemental geotechnical investigation for the road surface cracking along a portion of Grid Road 797, between Range Roads (RR) 3262 and 3264, in the RM of Frenchman Butte No. 501, Saskatchewan. The investigation was carried out by SolidEarth Geotechnical Inc. (SolidEarth) at the authorization of Mr. Scott Simon, P.Eng. of BAR Engineering Co. Ltd. (BAR Engineering).

2.0 PROJECT BACKGROUND

Based on information provided to SolidEarth, it was understood that the roadway was undergoing a complete rebuild. Failures in the road surface have been observed along a stretch of approximately 1.1 km in length (between approximate stations 7+600 and 8+700). The portion of the alignment showing failures consisted of a valley including the downhill slope towards a water course. The failure was present along the eastern slope of the valley and was described as slumping/depressions along the roadway alignment, manifesting as surface cracking/depressions across the road surface at three distinct locations.

SolidEarth completed an initial geotechnical investigation and presented their findings in a geotechnical report (Report #: PG21-1596, dated 20 December 2021). The report presented the findings of the subsurface investigation and include slope stability analysis of the roadway embankment. The stability analysis suggested that the roadway embankment in its current condition at the time of preparation of the report was suspected to be marginally stable and suggested installing Slope Inclinator (SIs) to monitor for slope movements.

SolidEarth installed three SIs within the southern roadway embankment in May 2022. Four monitoring events of the SIs were conducted in September 2022, and in January, June, and August 2023 to monitor for any slope movements.

SolidEarth was notified in May 2023 that the cracks in the road surface re-appeared, and were indicated to have been at the same locations as previously noted in prior years. The timeline of the cracking was noted during/after the spring thaw. The roadway surface was graded for traffic safety without being surveyed or inspected by the geotechnical engineer. An inspection and a test pitting program were subsequently completed in August 2023.

3.0 ORGANIZATION OF THIS REPORT

This report summarizes the activities completed and findings noted since the completion of the initial geotechnical investigation in 2021. In particular, it summarizes:

- The installation of the SIs within the roadway embankment and outlines the subsurface conditions encountered
- The results of the SI monitoring program completed

- Observations made during the August 2023 field inspection and test pitting program
- Overall evaluation and recommendations

This report should be used in conjunction with the initial 2021 geotechnical report.

4.0 INSTALLATION OF SLOPE INCLINOMETERS

4.1 GROUND DISTURBANCE AND SAFETY PERFORMANCE

Prior to field drilling and test pitting, a SolidEarth representative completed internal ground disturbance procedures, which included placing a Saskatchewan First Call. Before starting onsite work, a daily field level hazard assessment was conducted and was communicated with all workers involved during the tailgate meeting. The field work was completed without any near misses or incidents.

4.2 FIELD INSTALLATION

The SI locations were selected by SolidEarth and marked in the field by BAR Engineering. The SI locations are shown on Figure 1. Also shown on Figure 1 are the seven (7) boreholes drilled during the initial 2021 investigation and the five (5) test pits excavated in August 2023.

In total, three (3) SIs (BH22-SI-1 to -3) were drilled on 12 and 13 May 2022 to approximate depths ranging between 10 and 12 m below the ground surface. An SI casing with 70 mm outside diameter, anchor, and top cap manufactured by RST Instruments were used. The SI was protected with a steel protective casing. A mixture of GU hydraulic cement and Grout-Well® DF bentonite (80% cement and 20% bentonite) was used as grout material. The grout was injected via a tube placed with the tip at the bottom of the borehole.

SolidEarth subcontracted Drilling Solutions Inc., of Sherwood Park, Alberta to drill the boreholes. Drilling was completed using a track-mounted auger drill rig utilizing 150 mm solid stem continuous flight augers.

During borehole drilling, soil samples were generally collected at approximately 0.75 m intervals along the depth of the boreholes. Pocket penetrometer testing was conducted on selected cohesive soil samples to obtain an indication of the unconfined compressive strength of disturbed soil samples from the auger. Standard Penetration Tests (SPT) were conducted at selected depths (typically every 1.5 m) within some boreholes to assess the in-situ strength of the soils encountered. Shelby tube samples were also collected at selected borehole locations to obtain low disturbance soil samples for further soil examination and testing. The soil sampling and testing sequences are shown on the borehole logs, Appendix B.

A SolidEarth geotechnical technologist monitored the drilling operations and logged the recovered soil samples from the auger cuttings, excavator, and the SPT samples. The soils

were logged according to the Modified Unified Soil Classification System, which is described in the Explanation of Terms and Symbols in Appendix B. Due to the method by which the soil cuttings were returned to surface, the depths noted on the borehole and test pit logs may vary by ± 0.3 m from those recorded.

Groundwater seepage conditions were monitored during and immediately following completion of drilling. Vibrating Wire (VW) piezometers were installed at the locations of BH23-S1-1 through -3. VW piezometers were installed at selected depths to measure the pore-water pressure heads and determine the groundwater levels. The SI and the VW piezometer installation details are shown on the borehole logs.

The lateral and vertical coordinates (northing, easting, and ground elevation) of the borehole locations were provided to SolidEarth by BAR Engineering. These coordinates are shown on the borehole logs.

4.3 LABORATORY INVESTIGATION

All collected samples were submitted to the laboratory for further examination and testing. Laboratory testing included visual examination and determination of the natural moisture content on all collected samples; and Atterberg limits, grain size distribution analysis, consolidated undrained tri-axial test on selected samples. The results of the laboratory testing are presented on the borehole logs, Appendix B.

4.4 SUBSURFACE CONDITIONS

The subsurface conditions encountered at the SI locations consisted of fill, followed by clay till and underlain by clay shale. Buried topsoil was encountered within or below the fill. A brief summary of subsurface conditions encountered is provided below. A detailed description of the subsurface conditions encountered at each SI location is provided on the SI borehole logs.

Fill

Fill was encountered at the borehole locations and extended to approximate elevations ranging between 550 and 556 m. Clay fill was generally encountered at the locations of BH23-SI-1 and 2. Sand fill was encountered interbedded within the clay fill. Sand fill was also predominant at the location of BH23-S1-3.

Buried Topsoil

Buried topsoil was encountered within and below the fill at the locations of BH23-S1-2 and -3 at an approximate elevation of 551.5 and 557.5 m, respectively. The approximate thickness of the buried topsoil was in the order of 0.3 m.

Clay Till and Clay Shale

Clay till was encountered below the fill/buried topsoil at all of the borehole locations and extended to approximate elevations ranging between 547 and 553 m. Clay shale bedrock was encountered below the clay till and extended to the borehole termination depths.

Groundwater Level

The groundwater level in the boreholes based on VW piezometer readings was estimated to be in the order of approximately 4 to 5 m below the ground surface along the embankment slope. Seepage and sloughing conditions were observed in the majority of the borehole locations.

The groundwater table generally takes time to recover and stabilize following the completion of drilling. The length of time required depends on the hydraulic conductivity of the soil and the presence of fissures and seams in the soil matrix. The depth of the groundwater table also fluctuates seasonally depending upon several factors that include the local geology, hydrogeology, and surface infiltration.

5.0 SI MONITORING RESULTS AND DATA INTERPRETATION

The SI's were initialized on 30 May 2022 and successive monitoring was conducted on 16 September 2022, and on 16 January, 30 June, and 3 August 2023. A MEMS digital inclinometer system with a metric probe manufactured by RST was used. Data analysis and graphical presentation was completed using GTILT® Plus computer software.

At each location, the relative displacement was measured along the depth of the borehole. The output from the instrument software was a set of charts showing the incremental and cumulative displacement with depth at each SI location.

The results of the monitoring program did not indicate any significant movement along the depth of the SI's at any of the locations tested. The incremental and cumulative plots from each SI instrument are presented in Appendix C.

6.0 INSPECTION AND TEST PITTING PROGRAM

6.1 AUGUST 2023 SITE VISIT

A site visit was conducted on 3 August 2023 by SolidEarth, BAR Engineering and RM staff. During the visit, the condition of the road embankment was observed along with soil and groundwater conditions in a couple of test pits excavated in the northern side ditch.

No bulging, cracking, or evidence of slope movement were noted within the embankment. No significant seepages were noted in the shallow test pits advanced within the northern ditch.

6.2 TEST PITTING WITHIN THE ROAD

Four (4) test pits (TP23-1 through-4) were excavated on 23 August 2023. The test pits were excavated to approximate depths ranging between 1.8 and 2.4 m below the existing ground surface using a rubber tire backhoe operated by the RM.

The location of the test pits are shown on Figure 1. In general, TP23-2 through-4 were advanced across the road surface where the cracks noted. Photographs of the test pits are shown in Appendix A.

The subsurface conditions encountered within the test pits generally consisted of gravel at the surface followed by clay fill and underlain by clay till.

A key observation noted at the location of test pit TP23-2, was that the east side of the test pit was predominantly clay (native) while the west side was predominantly sand (fill). This confirms the variability in the fill material placed within the roadway.

7.0 DISCUSSION AND RECOMMENDATION

As discussed above, no significant movement was noted in any of the SIs installed. This likely indicates that the road embankment has been stable and has not been experiencing any movement of significance. It is possible that the road cracks are being caused by a different mechanism than slope movement.

The road cracks were reported to have re-appeared during spring thaw of 2023, at generally the same locations as previously noted. This observation combined with the variability in the roadway fill material may be a result of frost induced differential movement within the roadway embankment at the crack locations.

Based on data available to date, the exact cause of the surface cracking can not be confirmed with certainty. As such, remediation of the surface (to potentially mitigate frost induced differential movement), combined with continued monitoring of the SIs (to eliminate potential embankment movement as a cause) is recommended. The following are recommended:

- Excavate the full width of the roadway along the cracks and backfill with gravel. The width and depth of the trench should be in the order of 2 by 1.5 m, respectively. It is important that the excavation be along the exact location of the cracks (understood to have previously been surveyed by BAR Engineering). Ideally, this should be conducted in October 2023 before the onset of winter.
- The gravel backfill should be properly drained with a pipe installed at the bottom of the excavation and daylighted into the side ditch.

- Settlement plates should be embedded in the gravel backfill (approximately 150 mm below surface) and surveyed. These plates should be re-surveyed the following spring to note any change in elevation.
- The SI should continue to be monitored for one more year to gain a longer record of embankment performance. The longer record will help eliminate the slope movement as the potential cause. At a minimum, monitoring should be conducted in November 2023 before the onset of winter and in May 2024 following spring thaw.
- If the cracks reappear in 2024, SolidEarth should be notified and given the opportunity to inspect the site prior to any grading of the roadway. The shape and magnitude of the cracking may lead to further indication on the root cause.

8.0 CLOSURE

The assessment conducted for this report is based on the results of monitoring or three (3) SI locations and observations at five (5) test pit locations advanced within the project site, as well as historical data collected.

The recommendations presented in this report should not be used for another site or for a different application at the same site. If the intended application of the site is changed or if the assumptions outlined in this report became invalid, SolidEarth should be notified and given the opportunity to assess if the recommendations presented should be modified.

This report has been prepared for the exclusive use of RM of Frenchman Butte No. 501, BAR Engineering and their authorized users for the specific application outlined in this report. No other warranties expressed or implied are provided. This report has been prepared within generally accepted geotechnical engineering practices.

Respectfully submitted,
SolidEarth Geotechnical Inc.

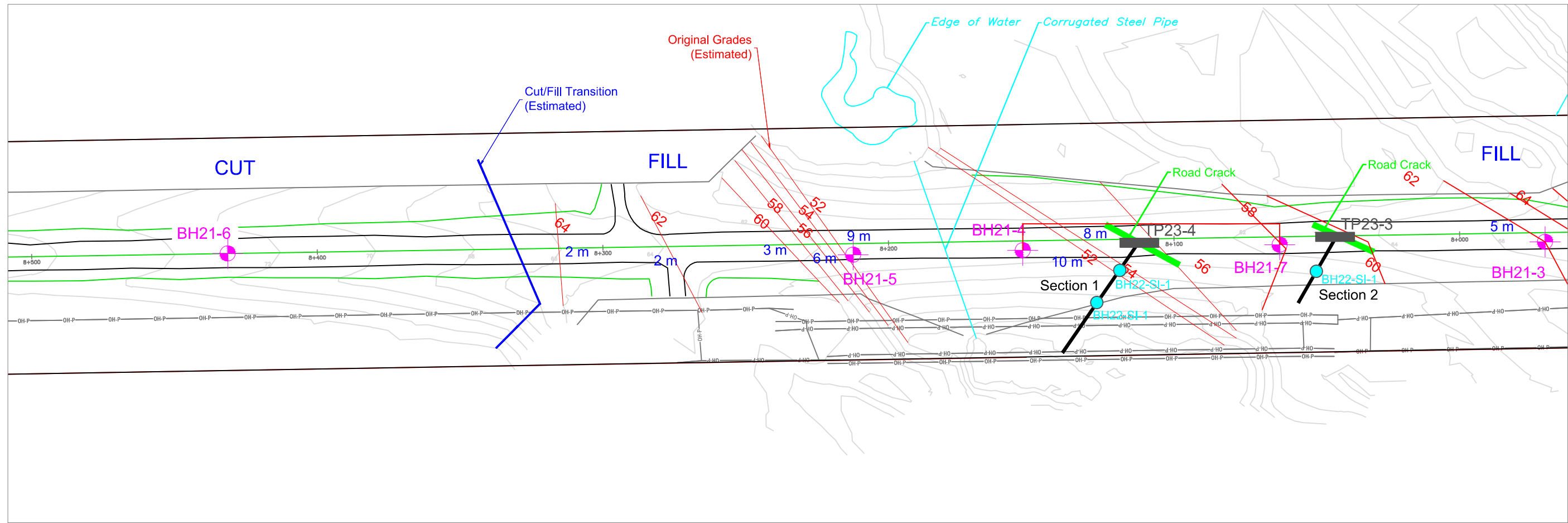
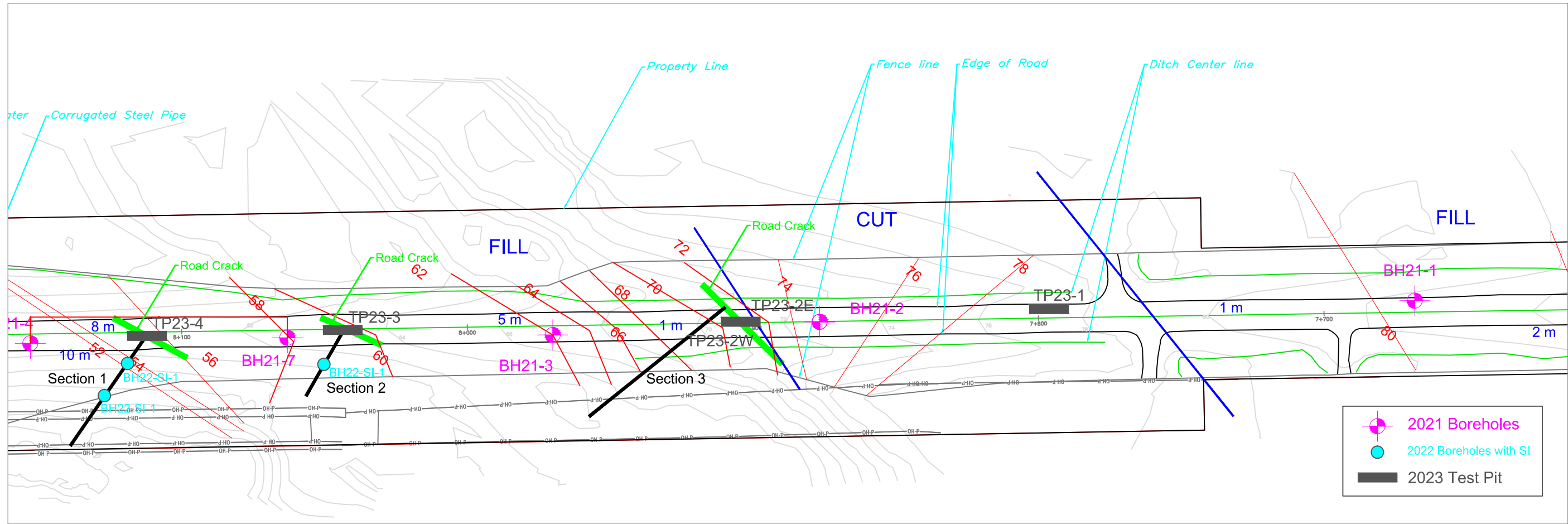


Indranil (Neel) Deysarkar, M.Sc., P.Eng (AB)
Senior Geotechnical Engineer

Jay Jaber, M.Sc., P.Eng.
Principal Geotechnical Engineer
President

Figures

Figure 1: Borehole and Test Pit Location Plan



CLIENT:



PROJECT NAME: Road Surface Cracking

Along a Portion of Grid Road 797

RM of Frenchman Butte No.501, Saskatchewan

Borehole and Test Pit Location Plan, Original Grades and Location of Selected Cross-sections

FIGURE No.: 1

REVISION No.: 1

PROJECT No.: PG21-1596.3000

DRAWN BY: JU

DATE: October 2023

SCALE: NTS

DATUM: -



SolidEarth Geotechnical Inc.
4336 97 Street, Edmonton, AB, T6E 5R9

Appendix A

Photographs of Test Pits



Photograph 1: Looking at TP23-1



Photograph 2: Looking at TP23-2 east wall



Photograph 3: Looking at TP23-2 west wall



Photograph 4: Looking east at TP23-4

Appendix B

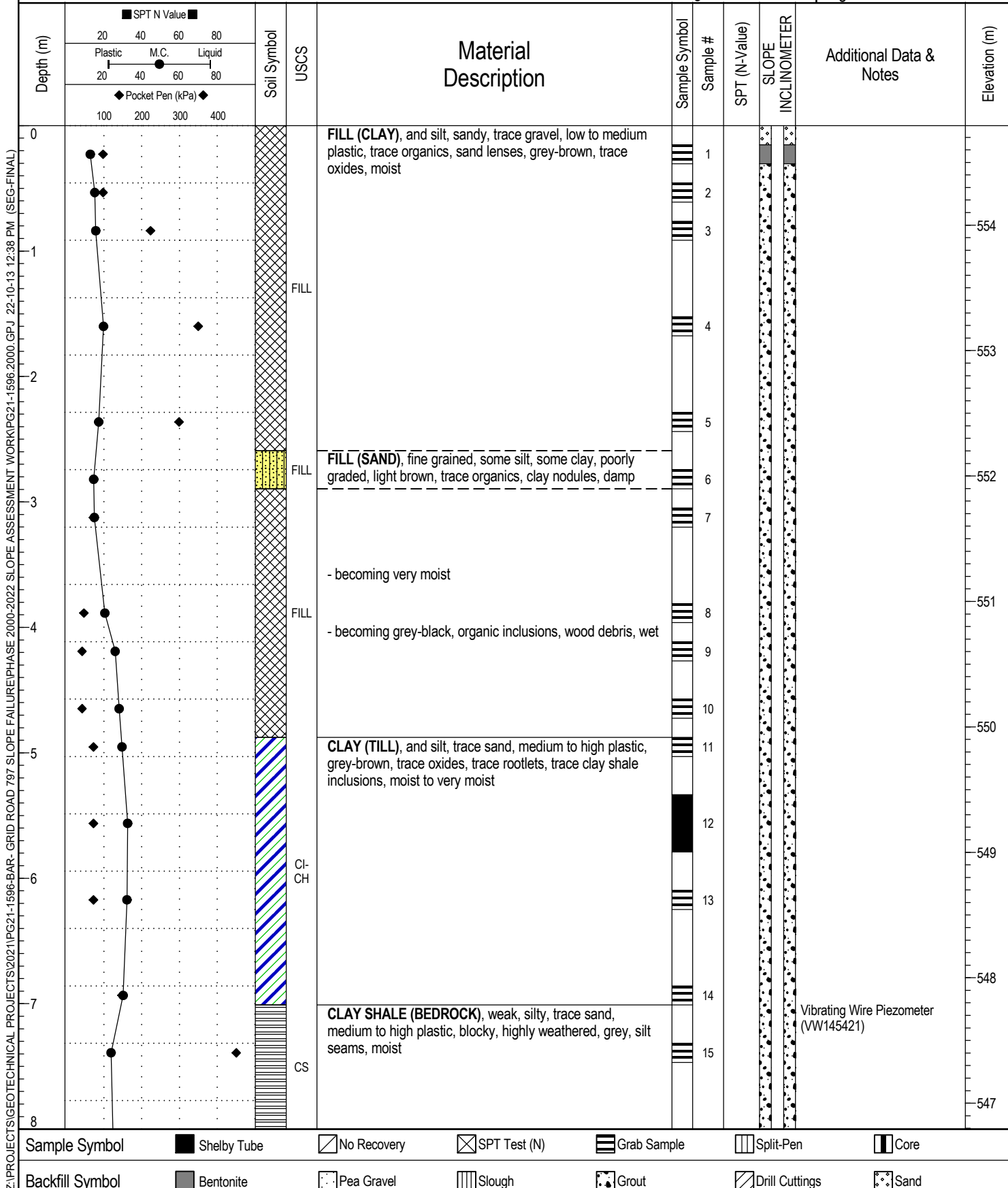
SI and Test Pit Logs
Explanation of Terms and Symbols

Project Name: Grid Road 797 Surface Failure and Culvert Replace
 Client Name: Bar Engineering Co. Ltd.
 Site: RM of Frenchman Butte No.501, Saskatchewan
 Northing: 5942845 Easting: 581617
 Elevation: 554.8 m

Borehole #: BH22-SI-1
 Project #: PG21-1596.2000
 Logged By: JS / Reviewed By: TF
 Driller: All Services Drilling Ltd.
 Drill Method: 150 mm Solid Stem Auger

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 GEOTECHNICAL

Completion Date: 22-5-12
 Page 1 of 2



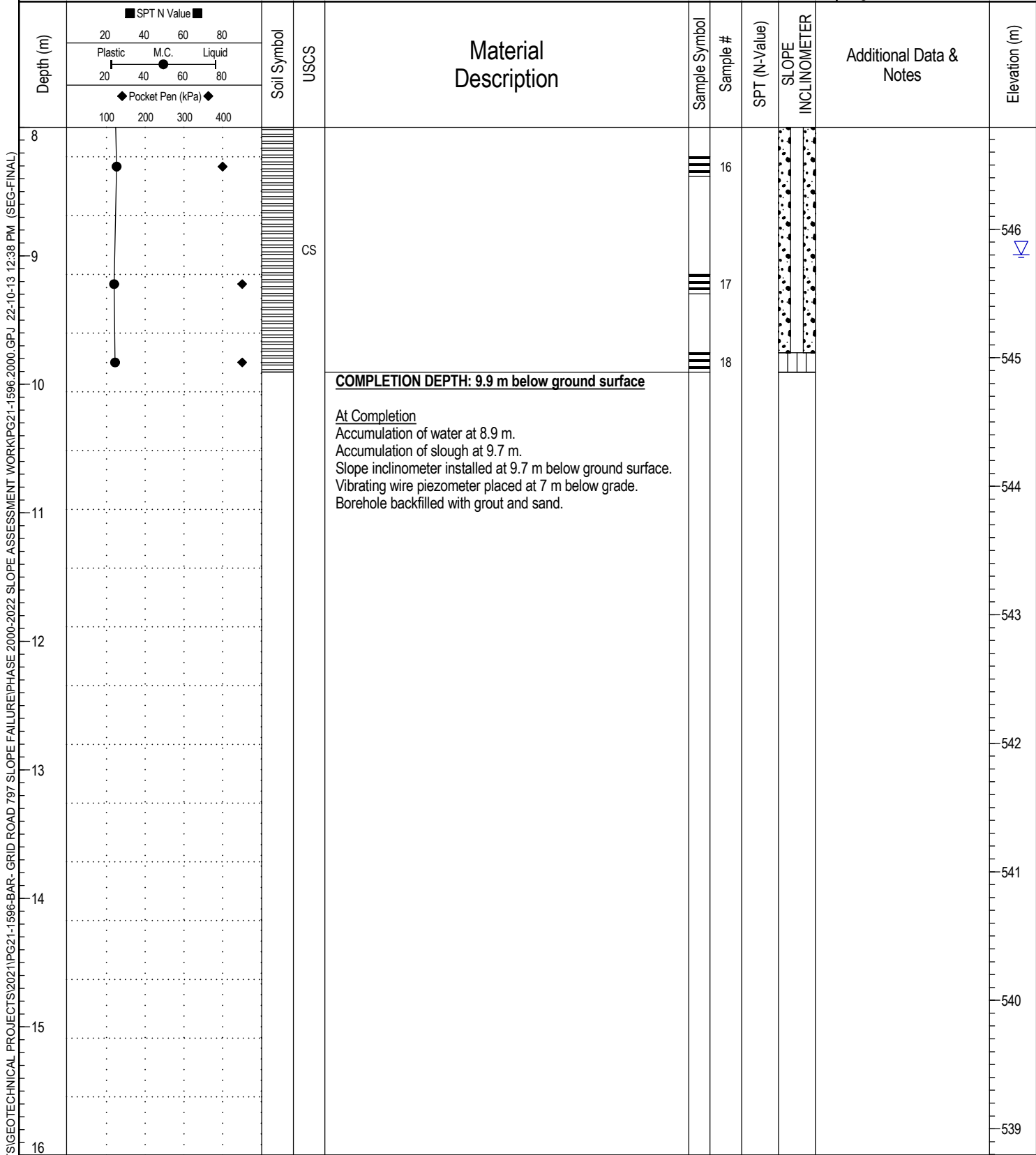
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Project Name: Grid Road 797 Surface Failure and Culvert Replace
 Client Name: Bar Engineering Co. Ltd.
 Site: RM of Frenchman Butte No.501, Saskatchewan
 Northing: 5942845 Easting: 581617
 Elevation: 554.8 m

Borehole #: BH22-SI-1
 Project #: PG21-1596.2000
 Logged By: JS / Reviewed By: TF
 Driller: All Services Drilling Ltd.
 Drill Method: 150 mm Solid Stem Auger

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Completion Date: 22-5-12
 Page 2 of 2



Sample Symbol

- Shelby Tube
- No Recovery
- SPT Test (N)
- Grab Sample
- Split-Pen
- Core

Backfill Symbol

- Bentonite
- Pea Gravel
- Slough
- Grout
- Drill Cuttings
- Sand

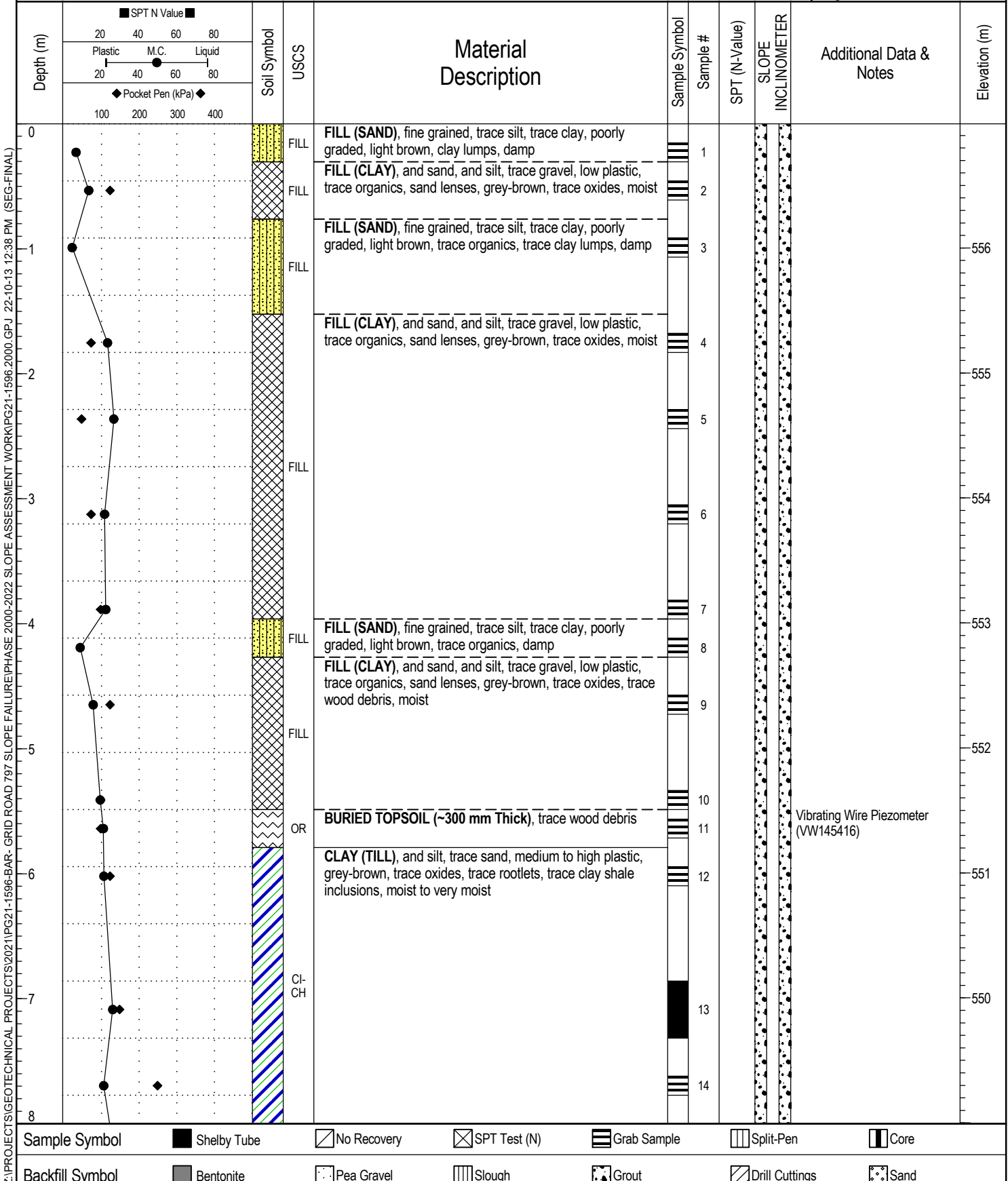
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Project Name: Grid Road 797 Surface Failure and Culvert Replace
 Client Name: Bar Engineering Co. Ltd.
 Site: RM of Frenchman Butte No.501, Saskatchewan
 Northing: 5942854 Easting: 581623
 Elevation: 557 m

Borehole #: BH22-SI-2
 Project #: PG21-1596.2000
 Logged By: JS / Reviewed By: TF
 Driller: All Services Drilling Ltd.
 Drill Method: 150 mm Solid Stem Auger

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 Page 1 of 2



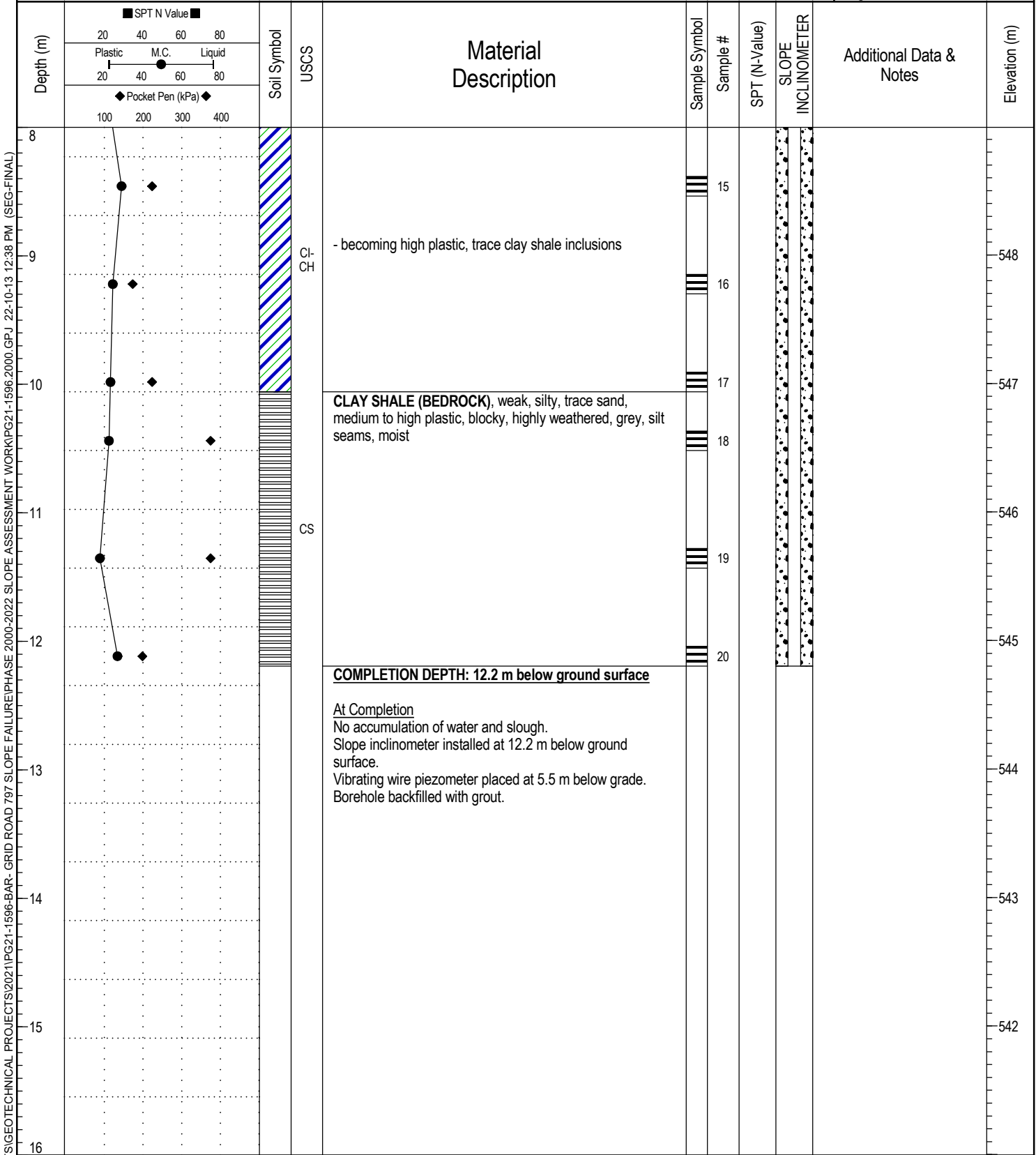
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Sample Symbol: [Symbol] Shelby Tube, [Symbol] No Recovery, [Symbol] SPT Test (N), [Symbol] Grab Sample, [Symbol] Split-Pen, [Symbol] Core
 Backfill Symbol: [Symbol] Bentonite, [Symbol] Pea Gravel, [Symbol] Slough, [Symbol] Grout, [Symbol] Drill Cuttings, [Symbol] Sand

Project Name: Grid Road 797 Surface Failure and Culvert Replace
 Client Name: Bar Engineering Co. Ltd.
 Site: RM of Frenchman Butte No.501, Saskatchewan
 Northing: 5942854 Easting: 581623
 Elevation: 557 m

Borehole #: BH22-SI-2
 Project #: PG21-1596.2000
 Logged By: JS / Reviewed By: TF
 Driller: All Services Drilling Ltd.
 Drill Method: 150 mm Solid Stem Auger

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 GEOTECHNICAL
 Completion Date: 22-5-12
 Page 2 of 2



Sample Symbol	■ Shelby Tube	☐ No Recovery	⊗ SPT Test (N)	▬ Grab Sample	▨ Split-Pen	▬ Core
Backfill Symbol	■ Bentonite	⊙ Pea Gravel	▨ Slough	⊙ Grout	▨ Drill Cuttings	⊙ Sand

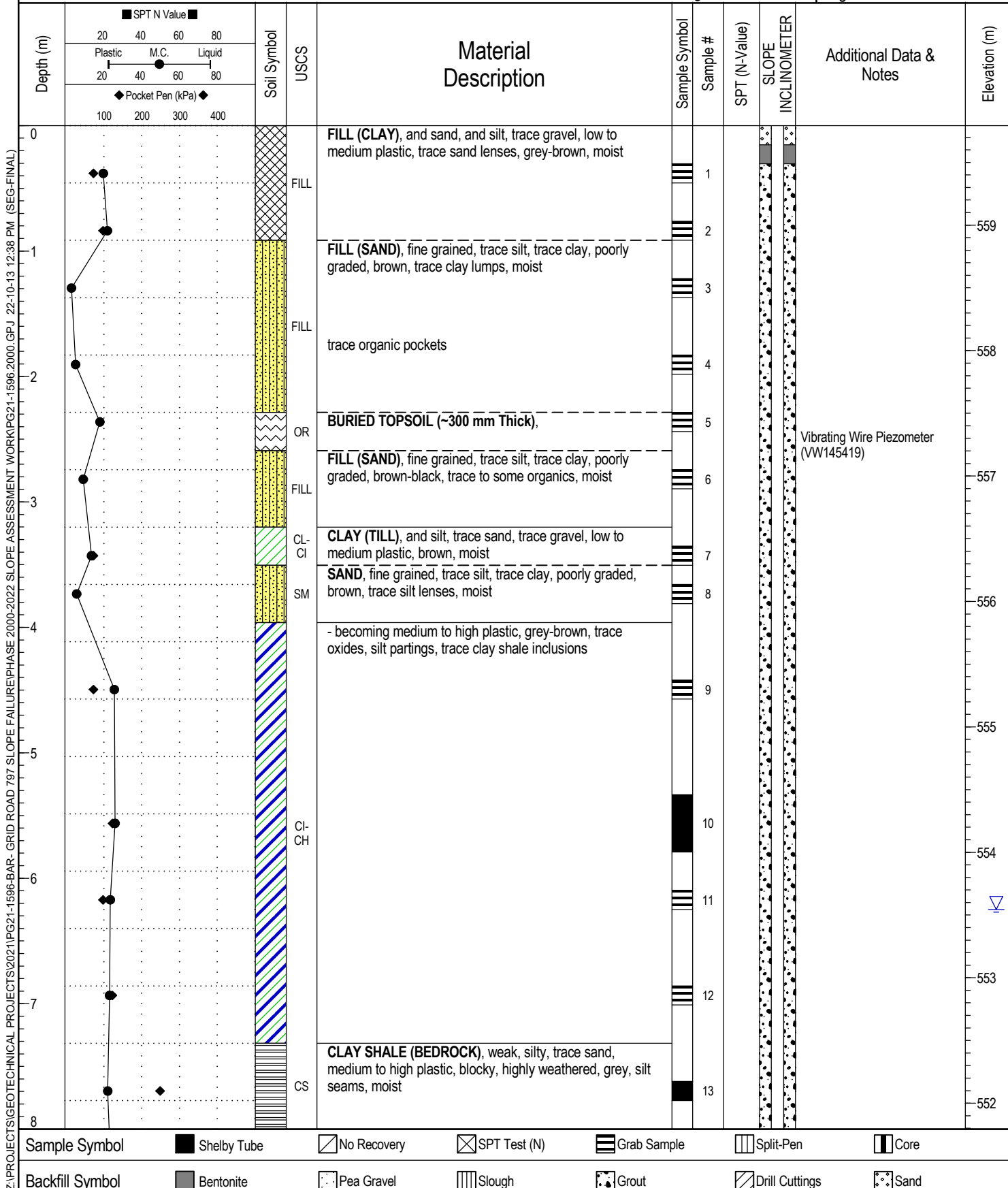
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Project Name: Grid Road 797 Surface Failure and Culvert Replace
 Client Name: Bar Engineering Co. Ltd.
 Site: RM of Frenchman Butte No.501, Saskatchewan
 Northing: 5942857 Easting: 581697
 Elevation: 559.8 m

Borehole #: BH22-SI-3
 Project #: PG21-1596.2000
 Logged By: JS / Reviewed By: TF
 Driller: All Services Drilling Ltd.
 Drill Method: 150 mm Solid Stem Auger

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Completion Date: 22-5-13
 Page 1 of 2

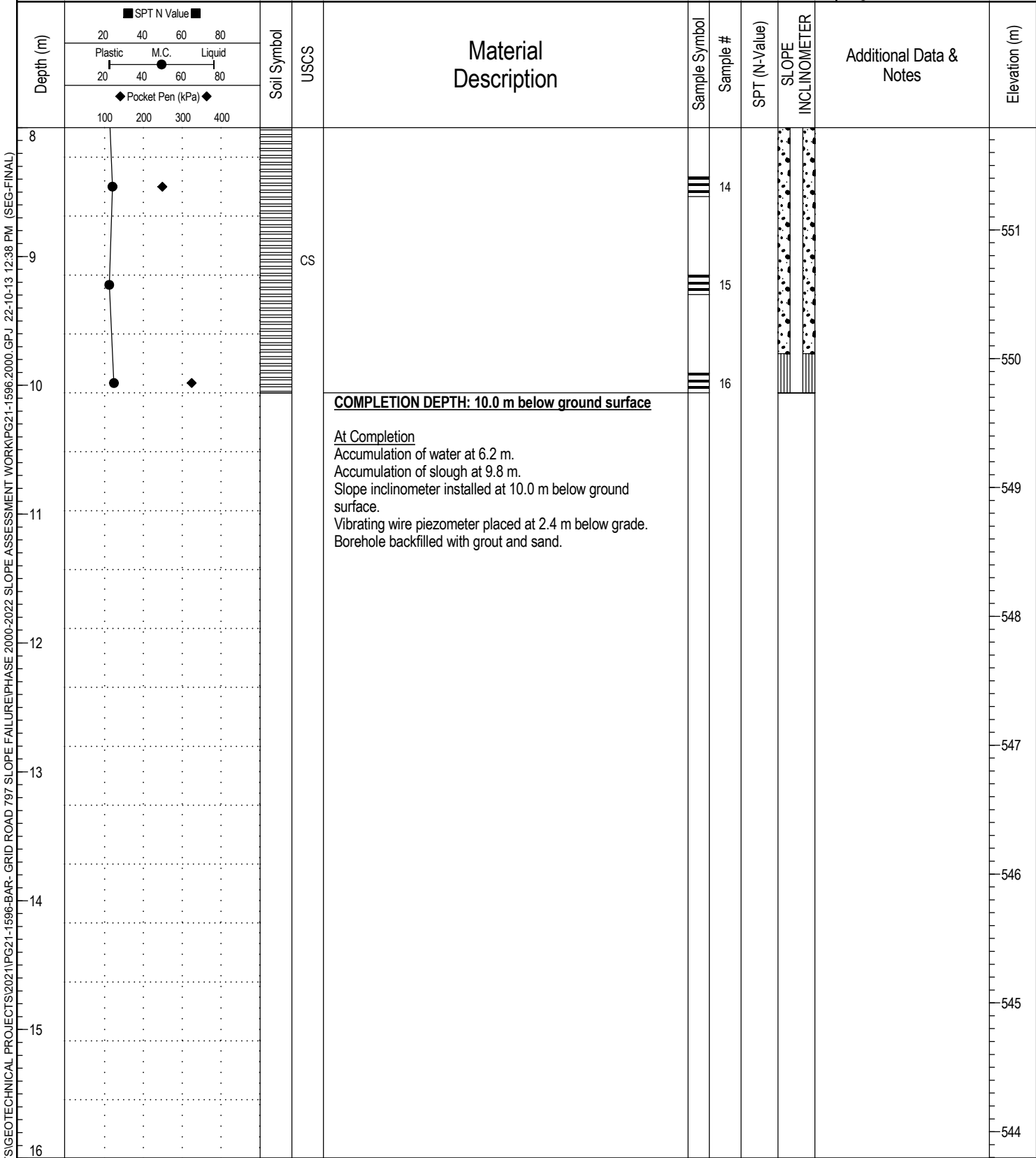


Project Name: Grid Road 797 Surface Failure and Culvert Replace
 Client Name: Bar Engineering Co. Ltd.
 Site: RM of Frenchman Butte No.501, Saskatchewan
 Northing: 5942857 Easting: 581697
 Elevation: 559.8 m

Borehole #: BH22-SI-3
 Project #: PG21-1596.2000
 Logged By: JS / Reviewed By: TF
 Driller: All Services Drilling Ltd.
 Drill Method: 150 mm Solid Stem Auger

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Completion Date: 22-5-13
 Page 2 of 2



Sample Symbol

- Shelby Tube
- No Recovery
- SPT Test (N)
- Grab Sample
- Split-Pen
- Core

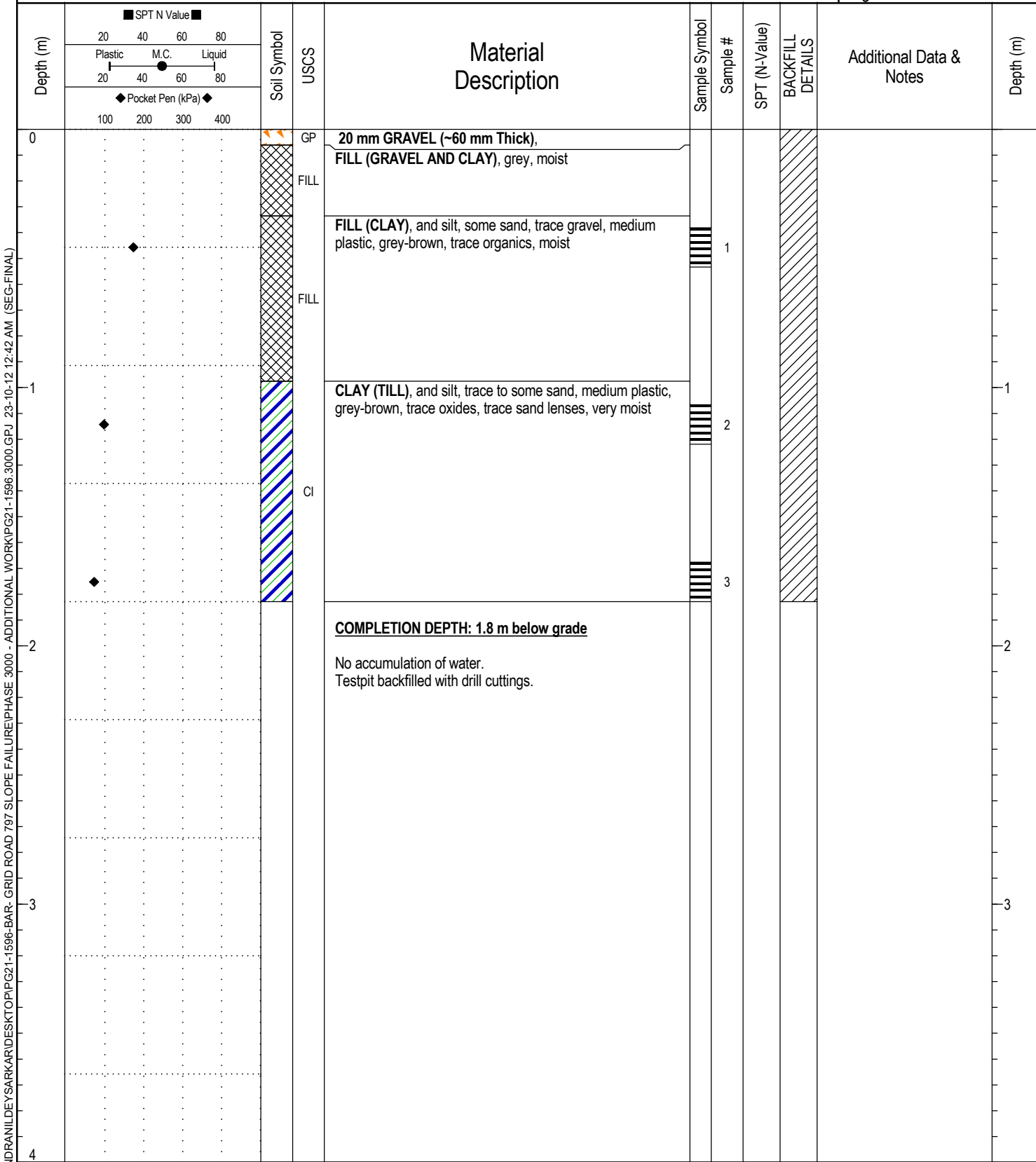
Backfill Symbol

- Bentonite
- Pea Gravel
- Slough
- Grout
- Drill Cuttings
- Sand

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Project Name: Grid Road 797 Surface Failure
 Client Name: Bar Engineering Co. Ltd.
 Site: RM of Frenchman Butte No.501, Saskatchewan
 Northing: 5942869 Easting: 581959
 Elevation: _____

Borehole #: TP23-1
 Project #: PG21-1596.3000
 Logged By: JS / Reviewed By: TF
 Driller: SolidEarth Geotechnical Inc.
 Drill Method: Backhoe




Sample Symbol: Shelby Tube No Recovery SPT Test (N) Grab Sample Split-Pen Core
 Backfill Symbol: Bentonite Pea Gravel Slough Grout Drill Cuttings Sand

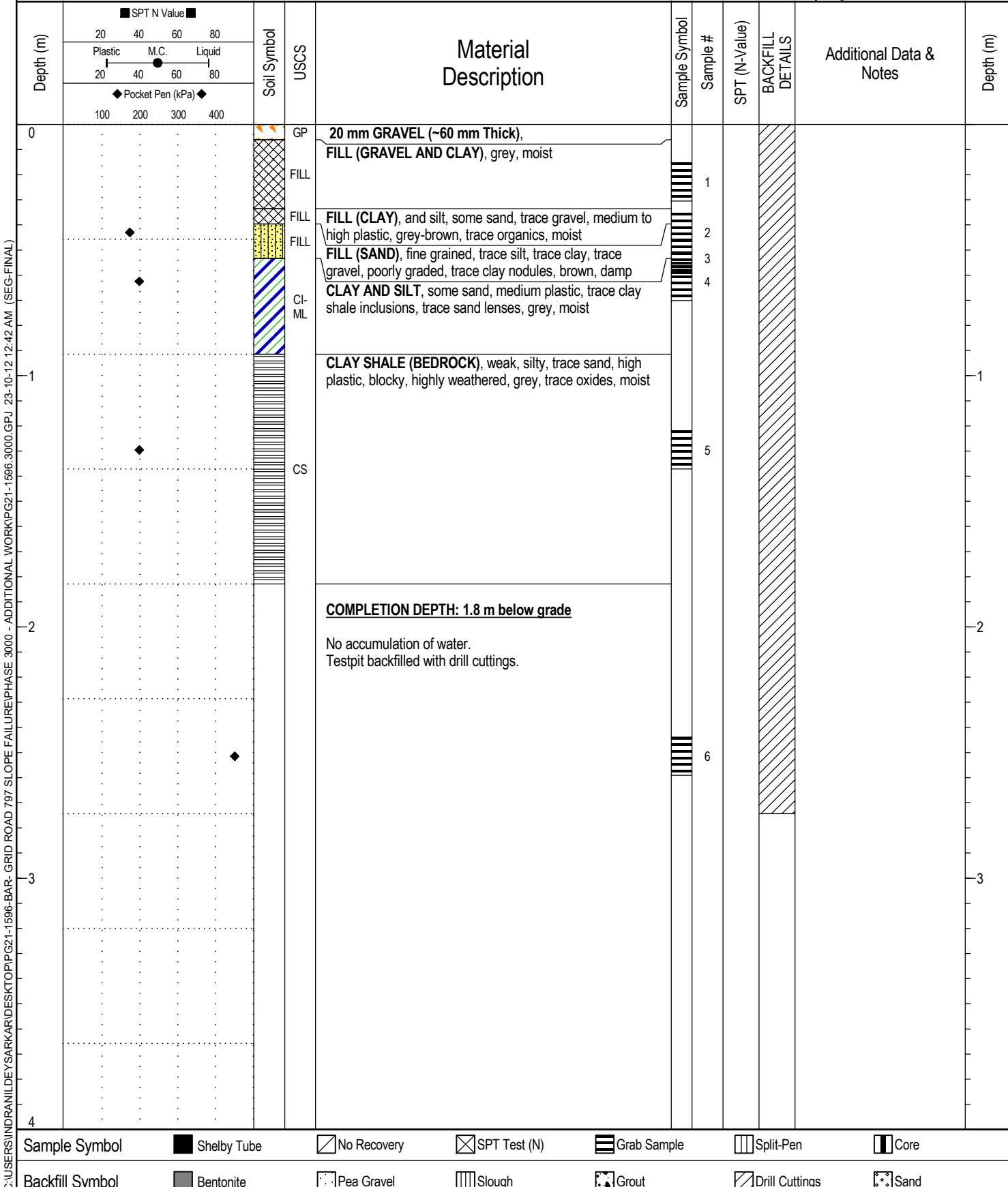
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Project Name: Grid Road 797 Surface Failure
 Client Name: Bar Engineering Co. Ltd.
 Site: RM of Frenchman Butte No.501, Saskatchewan
 Northing: 5942874 Easting: 581843
 Elevation: _____

Borehole #: TP23-2-E
 Project #: PG21-1596.3000
 Logged By: JS / Reviewed By: TF
 Driller: SolidEarth Geotechnical Inc.
 Drill Method: Backhoe



Completion Date: 21-8-23
 Page 1 of 1



Sample Symbol: Shelby Tube, No Recovery, SPT Test (N), Grab Sample, Split-Pen, Core

Backfill Symbol: Bentonite, Pea Gravel, Slough, Grout, Drill Cuttings, Sand

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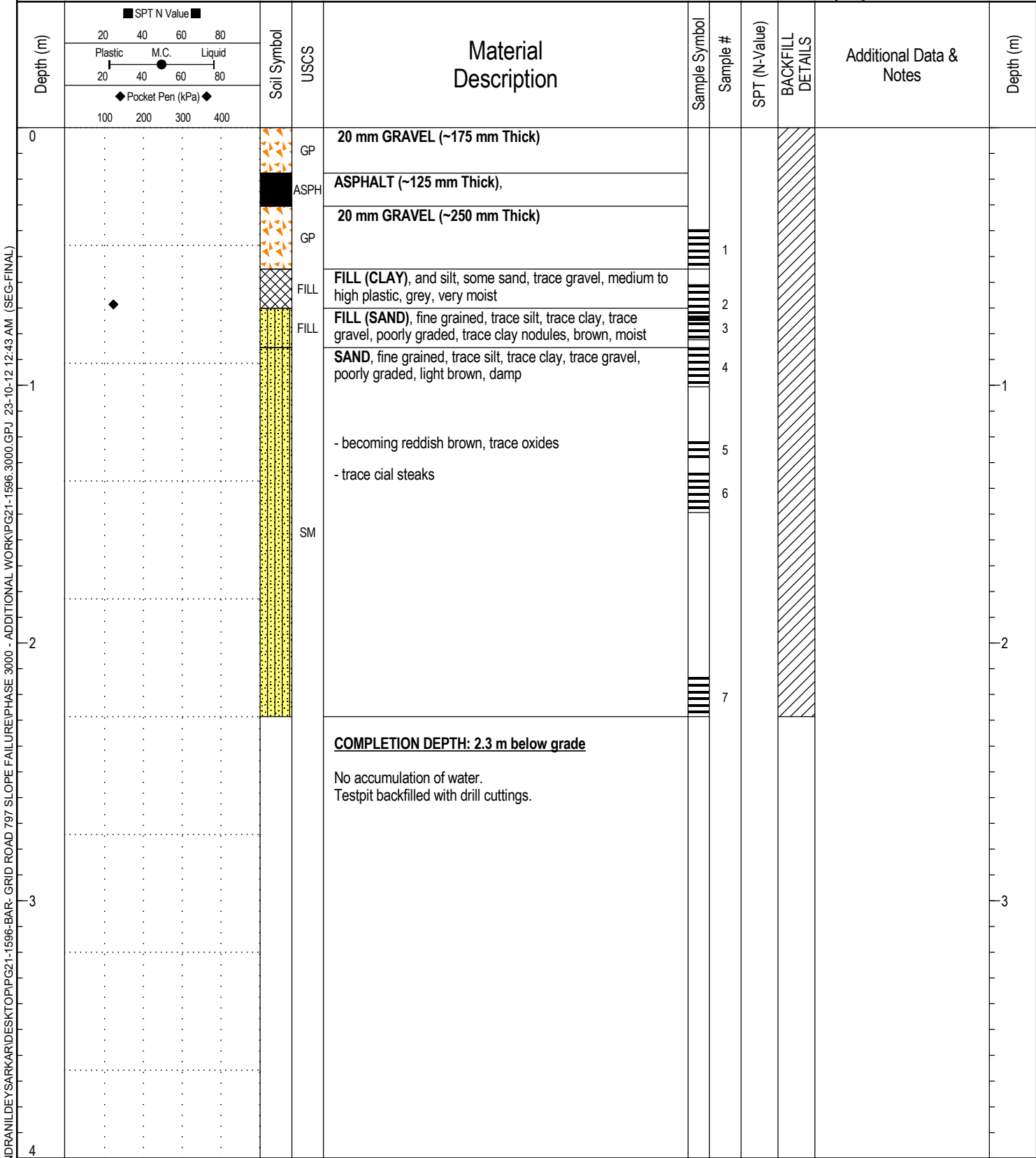
Project Name: Grid Road 797 Surface Failure
 Client Name: Bar Engineering Co. Ltd.
 Site: RM of Frenchman Butte No.501, Saskatchewan
 Northing: 5942872 Easting: 581840
 Elevation: _____

Borehole #: TP23-2-W
 Project #: PG21-1596.3000
 Logged By: JS / Reviewed By: TF
 Driller: SolidEarth Geotechnical Inc.
 Drill Method: Backhoe

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 GEOTECHNICAL

Completion Date: 21-8-23

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Sample Symbol: Shelby Tube No Recovery SPT Test (N) Grab Sample Split-Pen Core

Backfill Symbol: Bentonite Pea Gravel Slough Grout Drill Cuttings Sand

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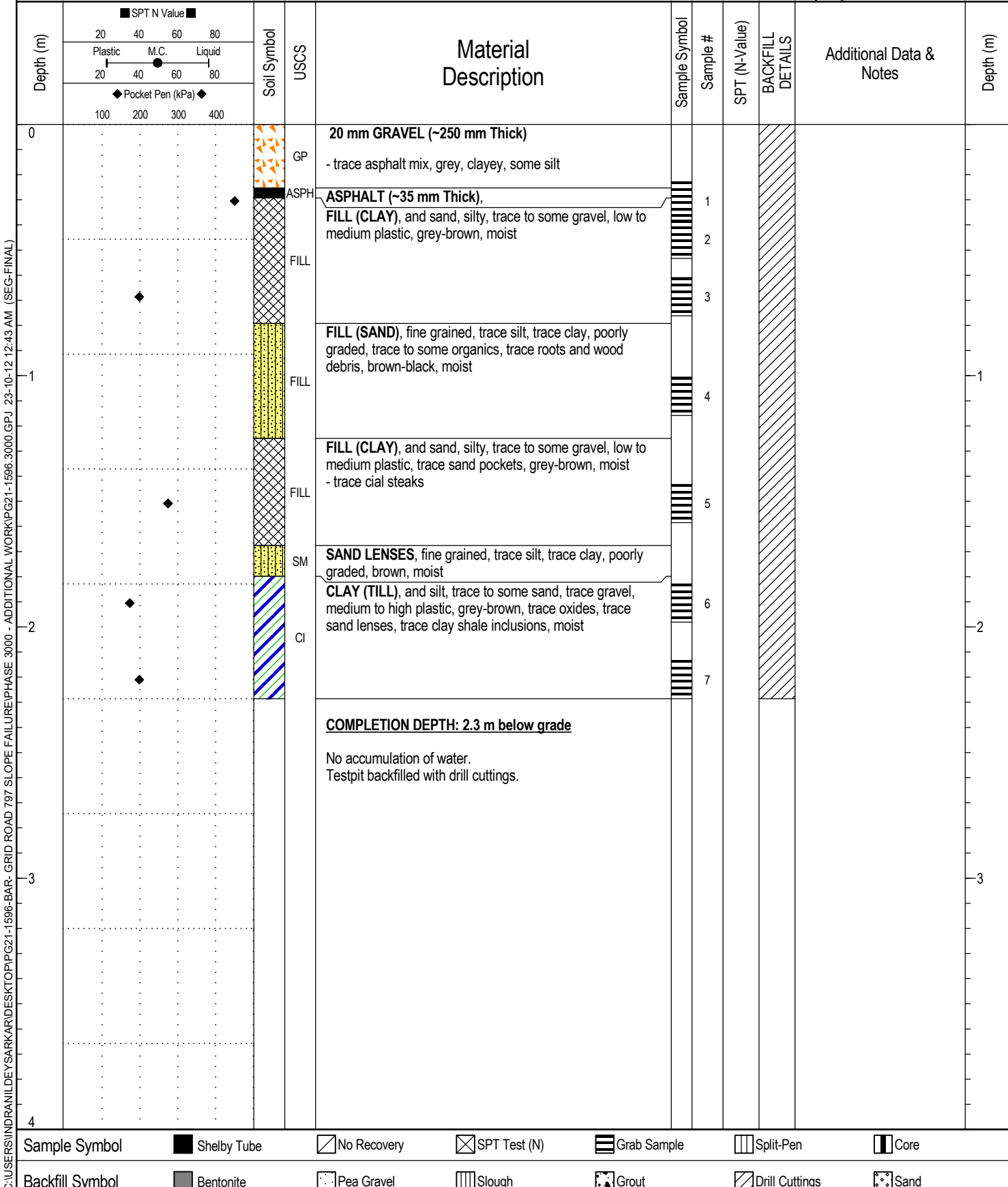
Project Name: Grid Road 797 Surface Failure
 Client Name: Bar Engineering Co. Ltd.
 Site: RM of Frenchman Butte No.501, Saskatchewan
 Northing: 5942869 Easting: 5818703
 Elevation: _____

Borehole #: TP23-3
 Project #: PG21-1596.3000
 Logged By: JS / Reviewed By: TF
 Driller: SolidEarth Geotechnical Inc.
 Drill Method: Backhoe

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- Backfill Symbol: Bentonite, Pea Gravel, Slough, Grout, Drill Cuttings, Sand

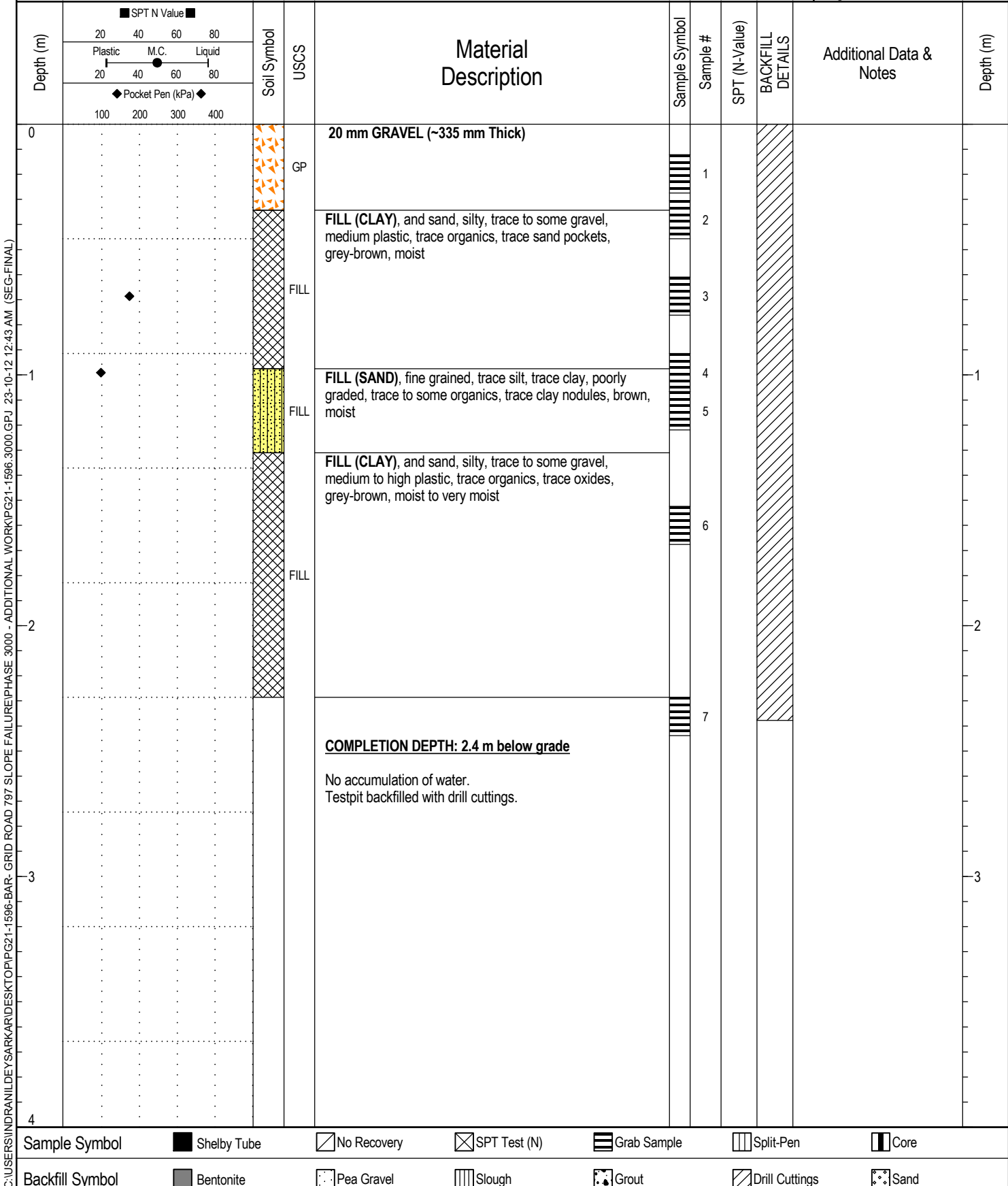
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 Client Name: Bar Engineering Co. Ltd.
 Site: RM of Frenchman Butte No.501, Saskatchewan
 Northing: 5942868 Easting: 581631
 Elevation: _____

Borehole #: TP23-4
 Project #: PG21-1596.3000
 Logged By: JS / Reviewed By: TF
 Driller: SolidEarth Geotechnical Inc.
 Drill Method: Backhoe

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Completion Date: 21-8-23

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EXPLANATION OF TERMS & SYMBOLS

The terms and symbols used on the borehole logs to summarize the results of the field investigation and laboratory testing are described on the following two pages.

1. VISUAL TEXTURAL CLASSIFICATION ON MINERAL SOILS

CLASSIFICATION	APPARENT PARTICLE SIZE	VISUAL IDENTIFICATION
Boulders	> 200 mm	> 200 mm
Cobbles	75 mm to 200 mm	75 mm to 200 mm
Gravel	4.75 mm to 75 mm	5 mm to 75 mm
Sand	0.075 mm to 4.75 mm	Visible particles to 5 mm
Silt	0.002 mm to 0.075 mm	Non-plastic particles, not visible to naked eye
Clay	< 0.002 mm	Plastic particles, not visible to naked eye

2. TERMS FOR CONSISTENCY & DENSITY OF SOILS

Cohesionless Soils

DESCRIPTIVE TERM	APPROXIMATE SPT "N" VALUE
Very Dense	> 50
Dense	30 to 50
Compact	10 to 30
Loose	4 to 10
Very Loose	< 4

Cohesive Soils

DESCRIPTIVE TERM	UNDRAINED SHEAR STRENGTH	APPROXIMATE SPT "N" VALUE
Hard	>200 kPa	> 30
Very Stiff	100 to 200 kPa	15 to 30
Stiff	50 to 100 kPa	8 to 15
Firm	25 to 50 kPa	4 to 8
Soft	10 to 25 kPa	2 to 4
Very Soft	< 10 kPa	< 2

* SPT "N" Values – Refers to the number of blows by a 63.5 kg hammer dropped 760 mm to drive a 50 mm diameter split spoon sampler for a distance of 300 mm after an initial penetration of 150 mm.

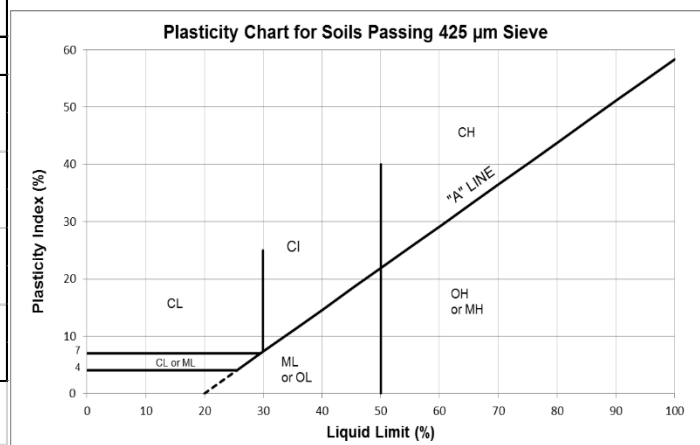
3. SYMBOLS USED ON BOREHOLE LOGS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
N(■)	Standard Penetration Test (CSA A119 1-60)	SO ₄	Concentration of Water-Soluble Sulphate
N _d	Dynamic Cone Penetration Test	C _u	Undrained Shear Strength
pp (◆)	Pocket Penetrometer Strength	γ	Unit Weight of Soil or Rock
q _u	Unconfined Compressive Strength	γ _d	Dry Unit Weight of Soil or Rock
w (●)	Natural Moisture Content (ASTM D2216)	ρ	Density of Soil or Rock
w _L	Liquid Limit (ASTM D 4318)	ρ _d	Dry Density of Soil or Rock
w _P	Plastic Limit (ASTM D 4318)	▽	Short-Term Water Level
I _P	Plastic Index	▼	Long-Term Water Level

MODIFIED UNIFIED CLASSIFICATION SYSTEM FOR SOILS

MAJOR DIVISION		GROUP SYMBOL	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA		
COARSE GRAINED SOILS (MORE THAN HALF BY WEIGHT LARGER THAN 75 µm)	GRAVELS (MORE THAN HALF COARSE GRAINS LARGER THAN 4.75mm)	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL GRADED GRAVELS AND GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	$C_u = D_{60}/D_{10} > 4$ $C_c = (D_{30})^2 / (D_{10} \times D_{60}) = 1 \text{ to } 3$	
			GP	POORLY GRADED GRAVELS AND GRAVEL-SAND MIXTURES, LITTLE OR NO FINES		NOT MEETING ABOVE REQUIREMENTS
		GRAVELS (WITH SOME FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	CONTENT OF FINES EXCEEDS 12%	ATTERBERG LIMITS BELOW 'A' LINE I_p LESS THAN 4
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES		ATTERBERG LIMITS ABOVE 'A' LINE I_p MORE THAN 7
	SANDS (MORE THAN HALF COARSE GRAINS SMALLER THAN 4.75mm)	CLEAN SANDS (LITTLE OR NO FINES)	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	$C_u = D_{60}/D_{10} > 6$ $C_c = (D_{30})^2 / (D_{10} \times D_{60}) = 1 \text{ to } 3$	
			SP	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES		NOT MEETING ALL GRADATION REQUIREMENTS FOR SW
		SANDS (WITH SOME FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES	CONTENT OF FINES EXCEEDS 12%	ATTERBERG LIMITS BELOW 'A' LINE I_p LESS THAN 4
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES		ATTERBERG LIMITS ABOVE 'A' LINE I_p MORE THAN 7
FINE GRAINED SOILS (MORE THAN HALF BY WEIGHT SMALLER THAN 75 µm)	SILTS (BELOW 'A' LINE NEGLIGIBLE ORGANIC CONTENT)	$W_L < 50\%$	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY SANDS OF SLIGHT PLASTICITY	CLASSIFICATION IS BASED UPON PLASTICITY CHART (SEE BELOW)	
		$W_L > 50\%$	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS		
	CLAYS (ABOVE 'A' LINE NEGLIGIBLE ORGANIC CONTENT)	$W_L < 30\%$	CL	INORGANIC CLAYS OF LOW PLASTICITY, GRAVELLY, SANDY, OR SILTY CLAYS, LEAN CLAYS		
		$30\% < W_L < 50\%$	CI	INORGANIC CLAYS OR MEDIUM PLASTICITY, SILTY CLAYS		
		$W_L > 50\%$	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS		
		ORGANIC SILTS & CLAYS (BELOW 'A' LINE)	$W_L < 50\%$	OL		ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	$W_L > 50\%$		OH	ORGANIC CLAYS OF HIGH PLASTICITY		
	HIGHLY ORGANIC SOILS			Pt		PEAT AND OTHER HIGHLY ORGANIC SOILS
BEDROCK			BR	SEE REPORT DESCRIPTION		

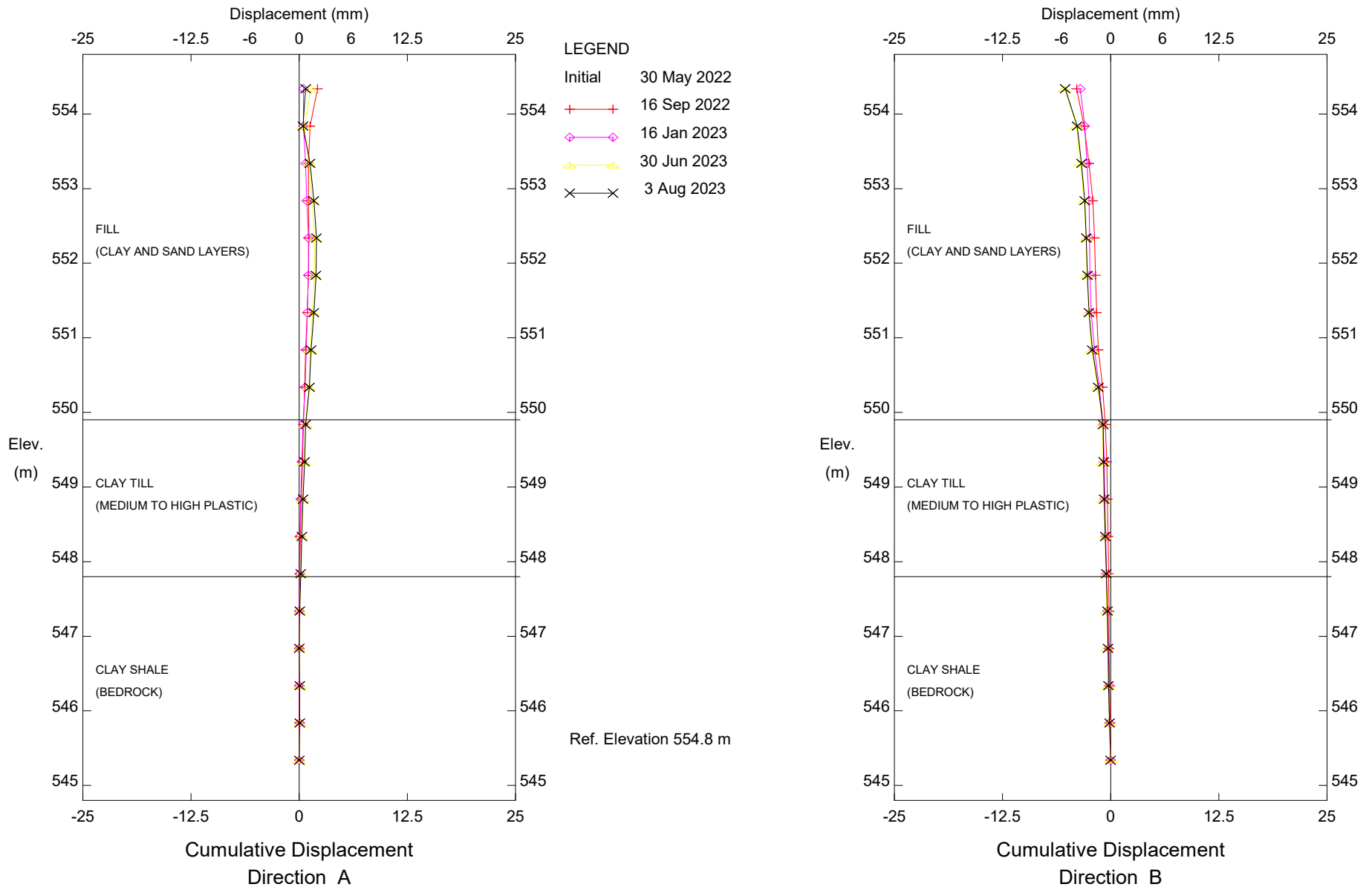
Soil Components			
Component	Size Range (mm)	Descriptor	% by Weight
Cobbles	> 76	and	> 35
Gravel	76 to 4.75		
Coarse	76 to 19	-y, -ey	35 to 20
Fine	19 to 4.75		
Sand	4.75 to 0.075	some	20 to 10
Coarse	4.75 to 2		
Medium	2 to 0.425		
Fine	0.425 to 0.075	trace	10 to 1
Fines (Silt or Clay)	< 0.075		



Appendix C

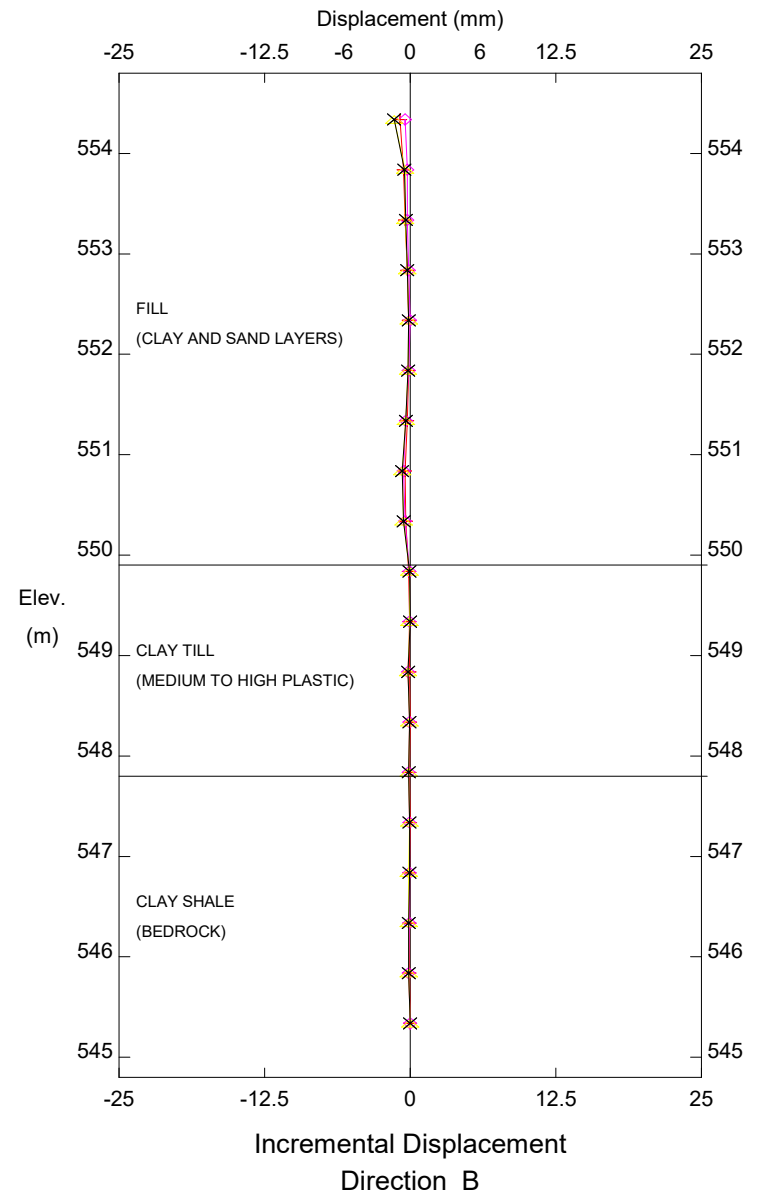
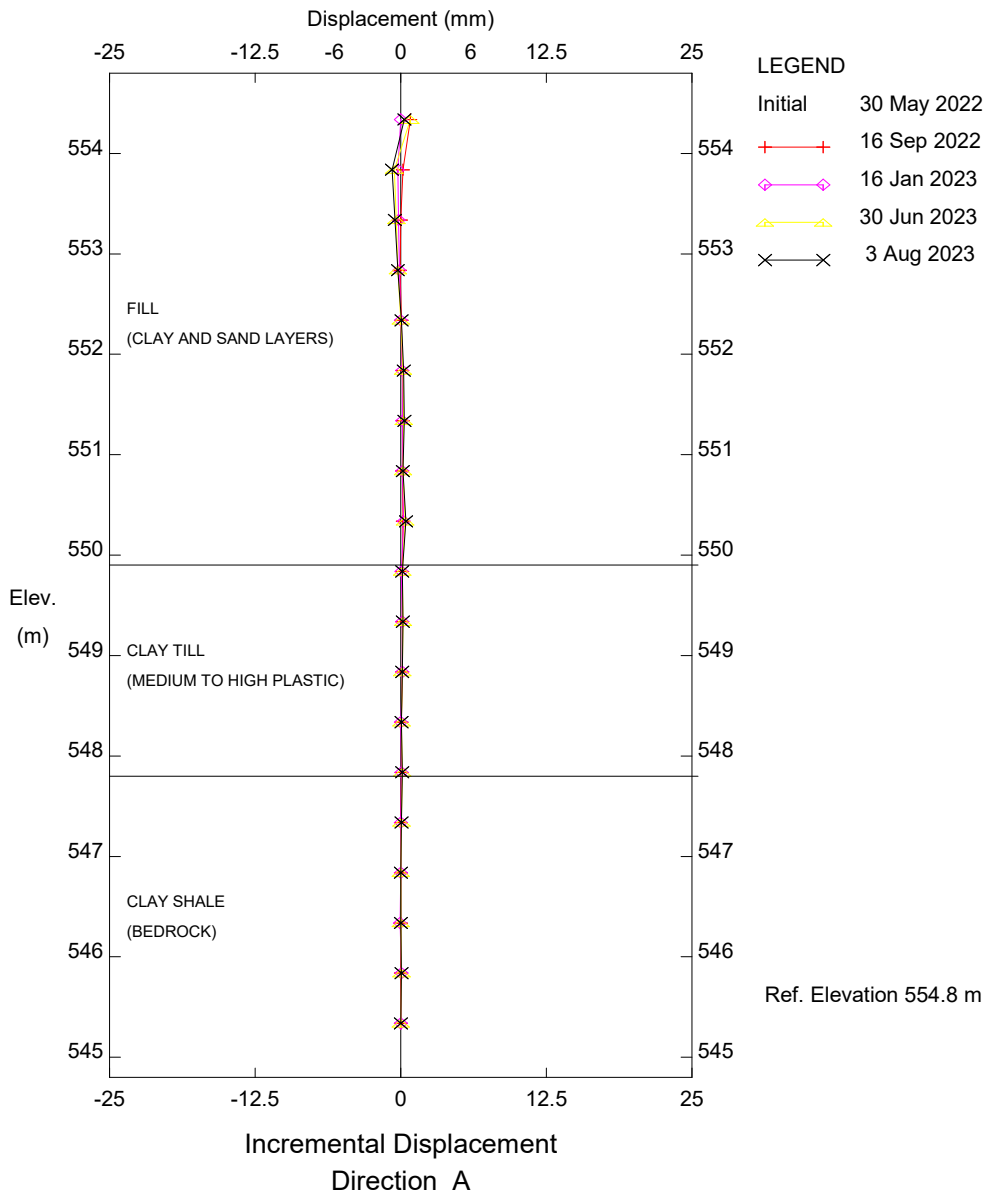
SI Monitoring Results

SolidEarth Geotechnical - Edmonton, AB



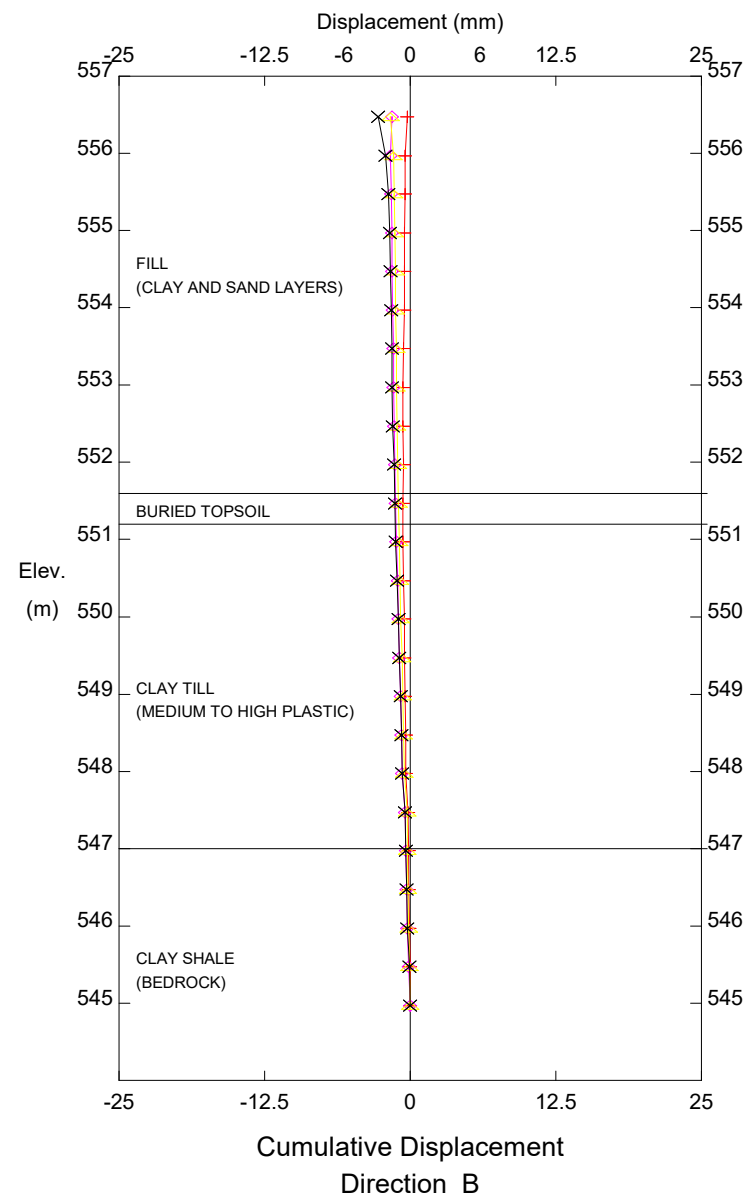
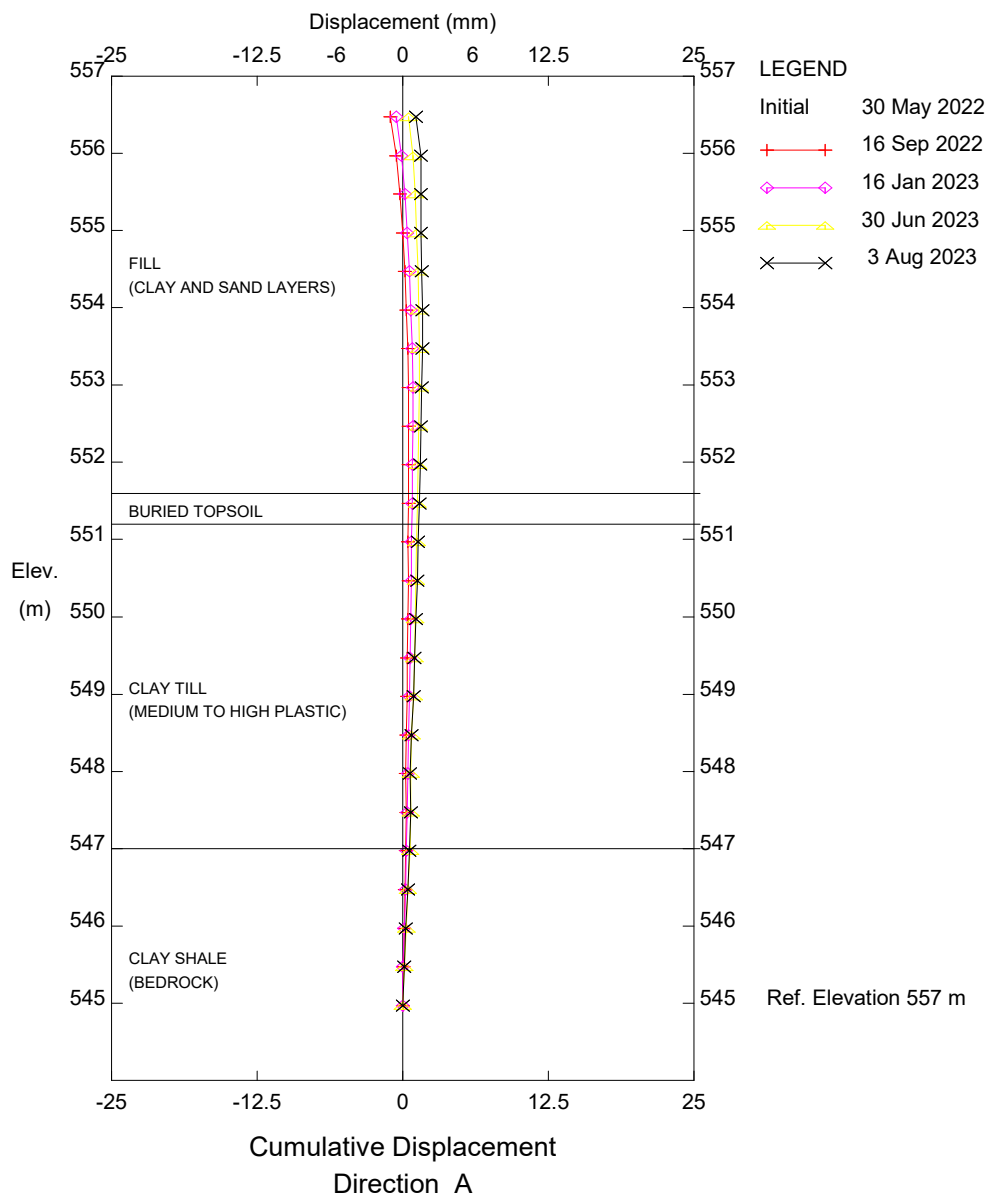
Grid Road 797 Surface Failure, Inclinator BH22-SI-1

SolidEarth Geotechnical - Edmonton, AB



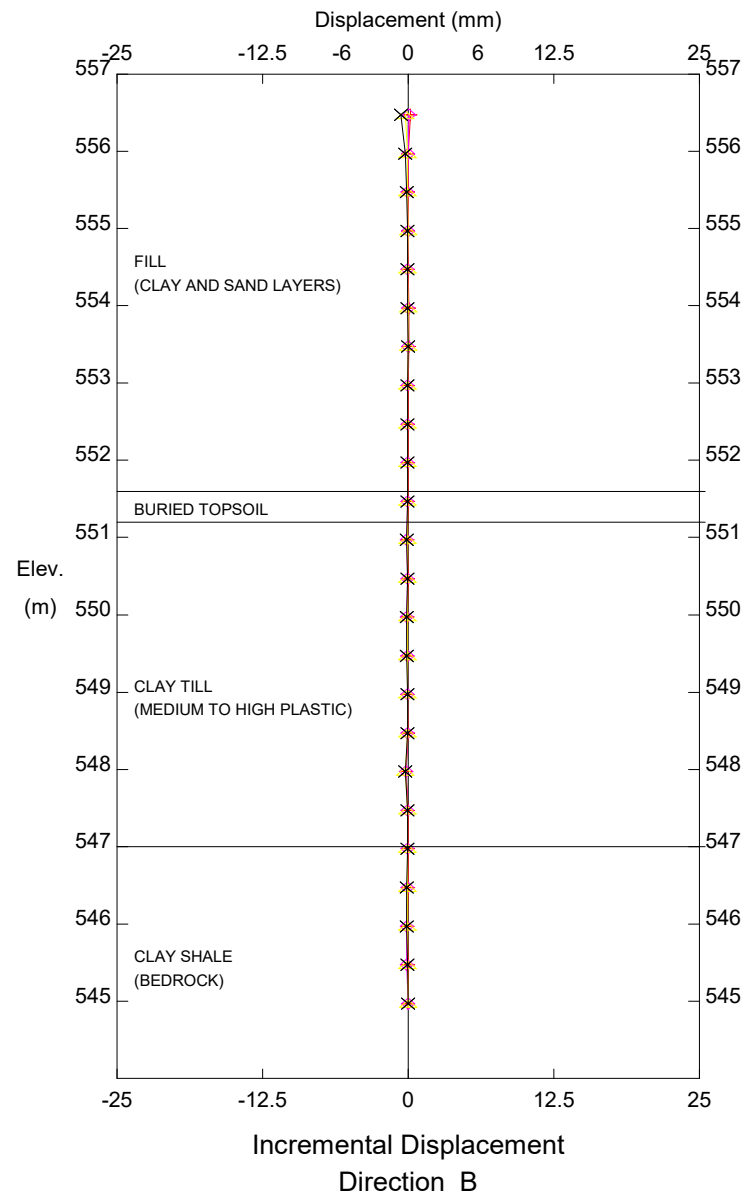
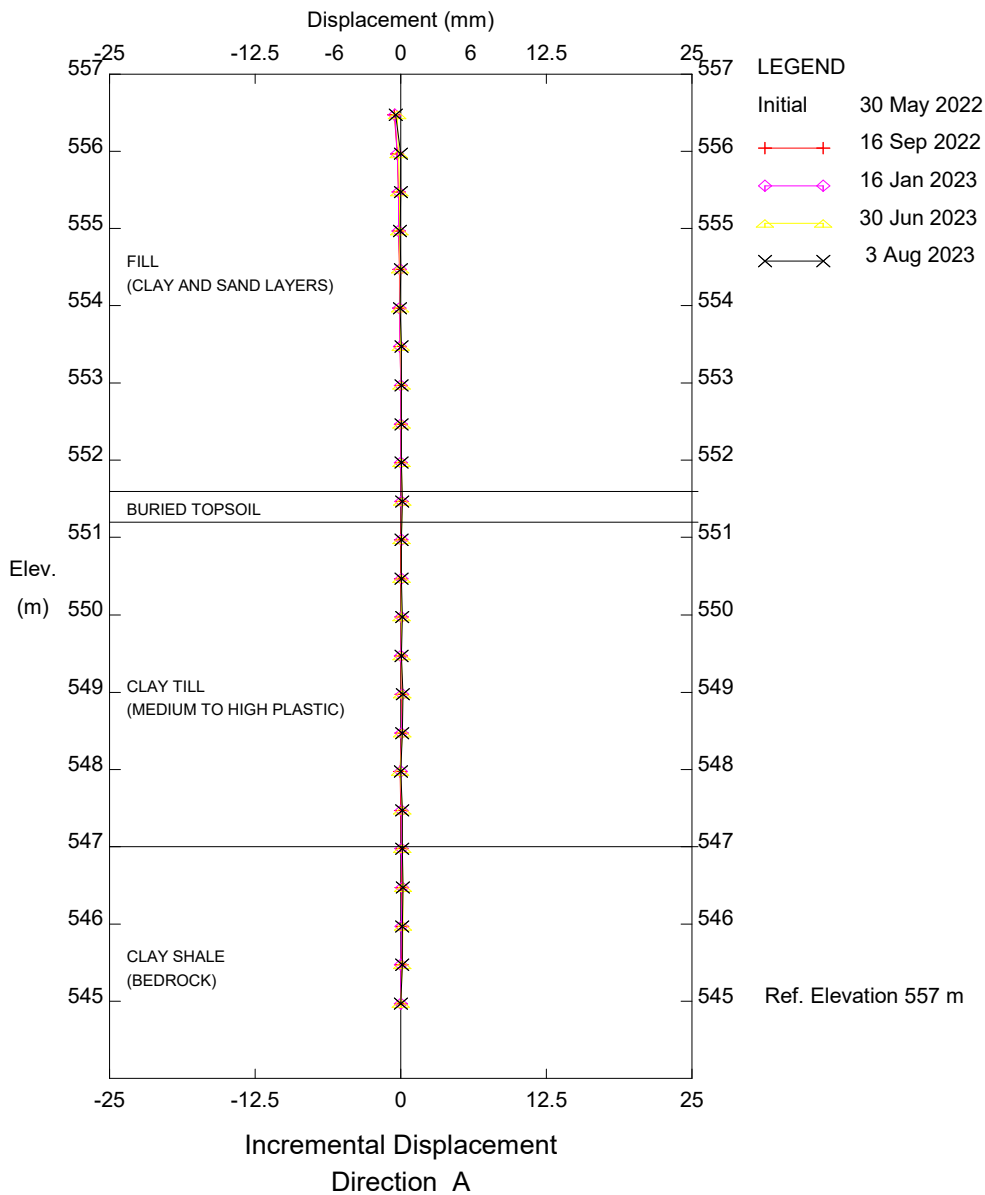
Grid Road 797 Surface Failure, Inclinometer BH22-SI-1

SolidEarth Geotechnical - Edmonton, AB



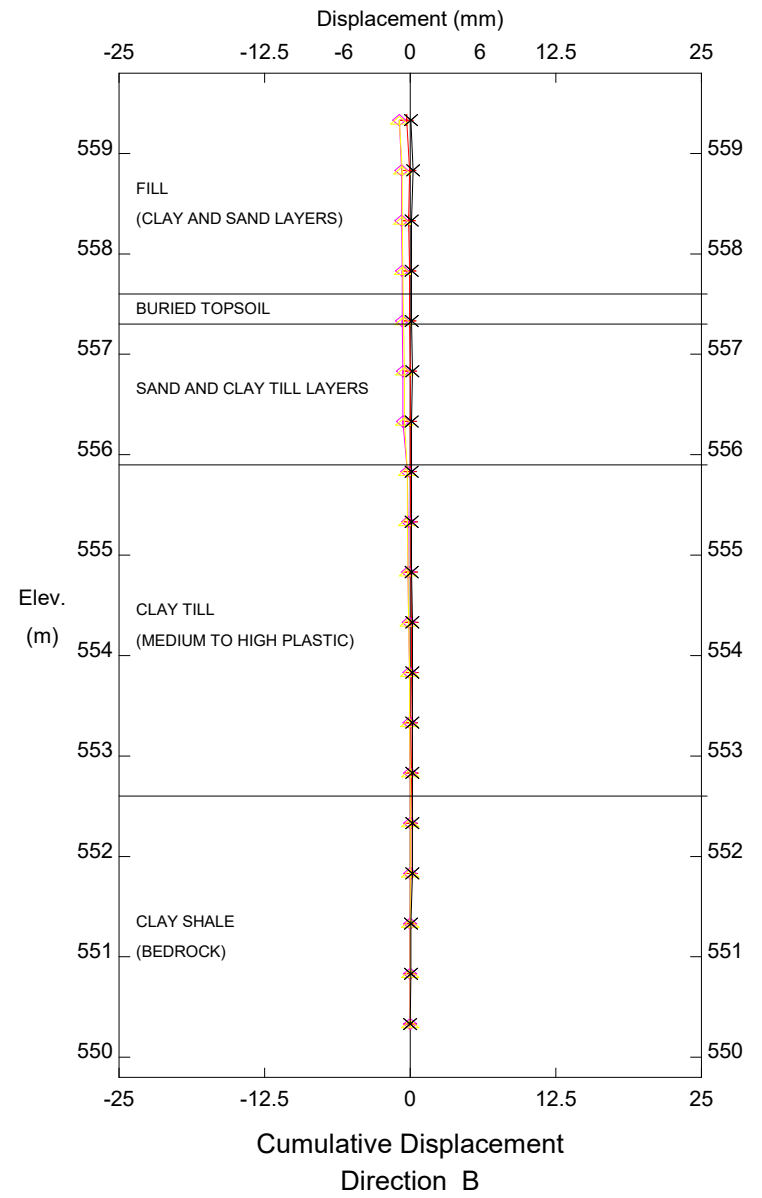
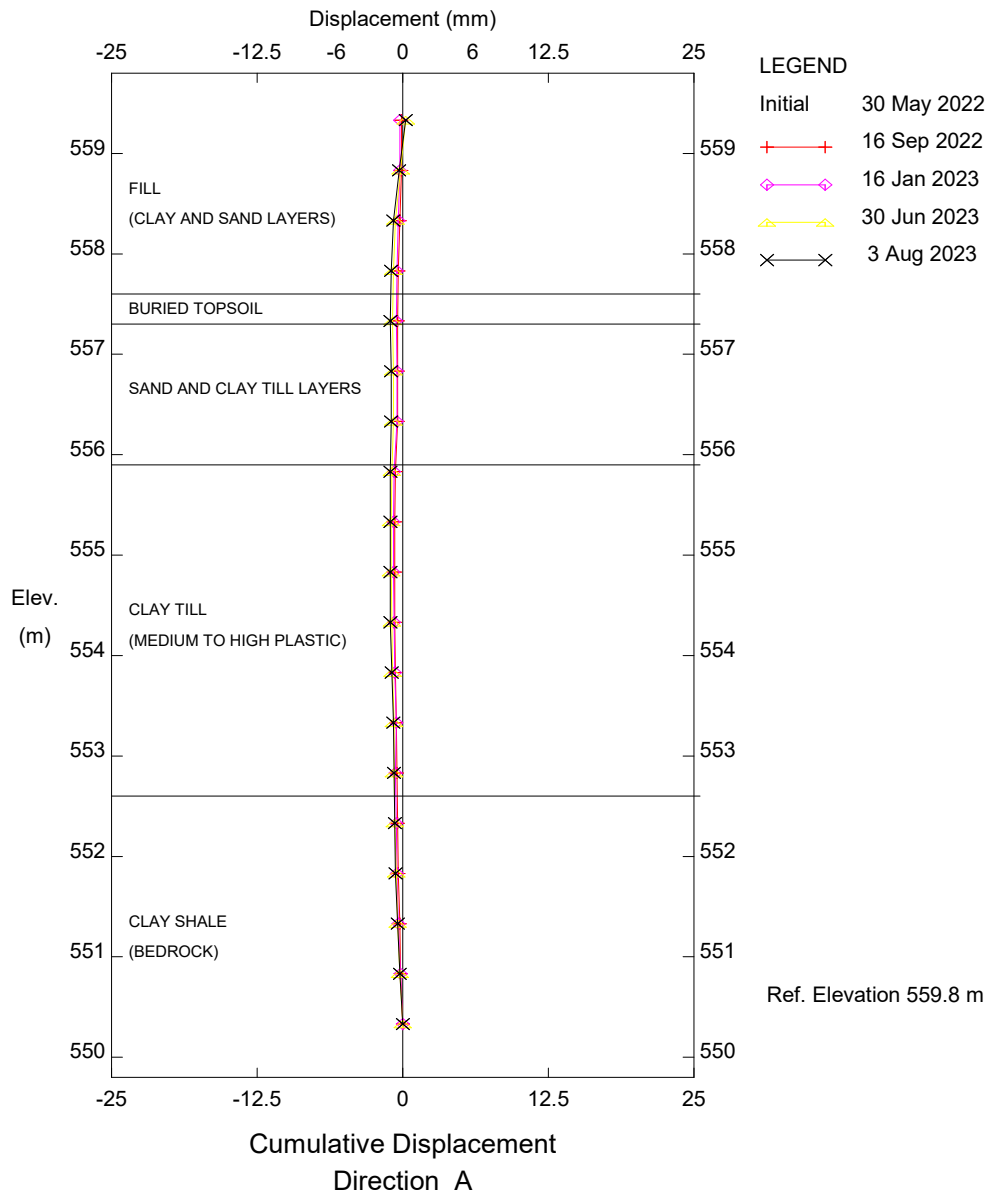
Grid Road 797 Surface Failure, Inclinometer BH22-SI-2

SolidEarth Geotechnical - Edmonton, AB



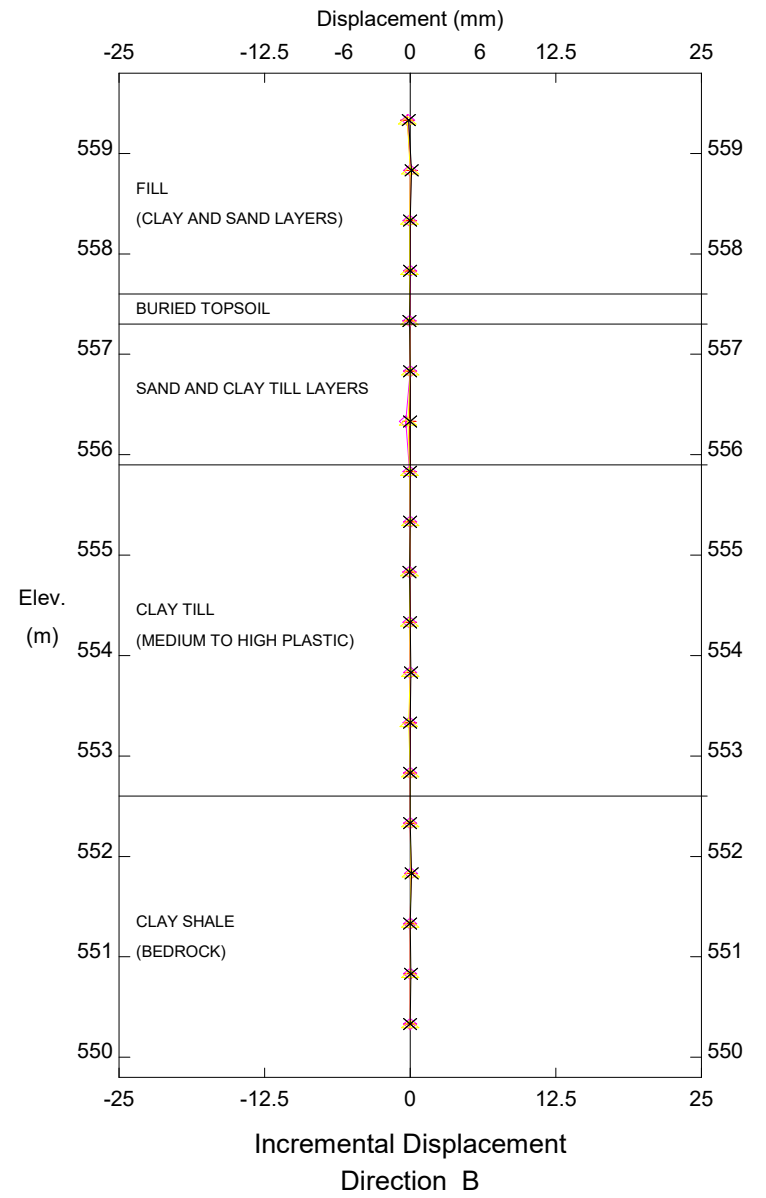
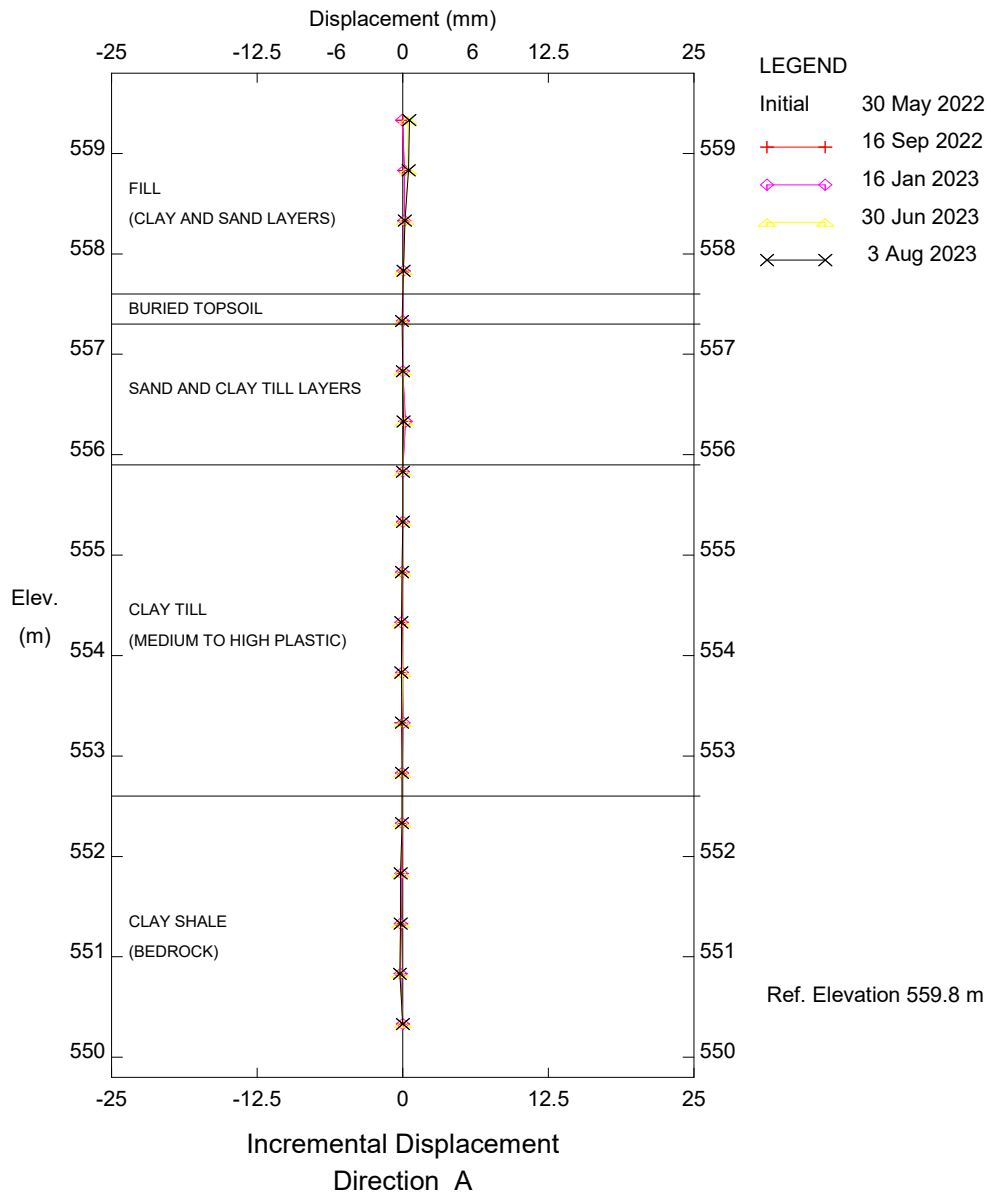
Grid Road 797 Surface Failure, Inclinometer BH22-SI-2

SolidEarth Geotechnical - Edmonton, AB



Grid Road 797 Surface Failure, Inclinometer BH22-SI-3

SolidEarth Geotechnical - Edmonton, AB



Grid Road 797 Surface Failure, Inclinometer BH22-SI-3



PERMITS AND CROSSING AGREEMENTS



10.0 PERMITS, CROSSING AGREEMENTS, & PURCHASE AGREEMENT

The Permits and Crossing Agreements listed below forms an integral part of the Contract Documents:

10.1 Pipeline and Utility Crossing and Proximity Agreements

- SaskPower Crossing Agreement – Overhead and/or Underground Powerlines, January 10, 2025.
- SaskEnergy Facility Crossing Permit # 202500030
- TransGas Facility Crossing or Work Consent Agreement, TGL Permit No. 202001143, Pipeline Number: 23.0100.100.
- Canadian National Resources Ltd. (CNRL) Facility Crossing Agreement, CNRL File: 952996-4, CNRL Surface File 1035875-6, Pipeline 171879-1.

10.2 Environmental Permits

- Water Security Agency, Aquatic Habitat Protection Permit for culvert replacement and roadway upgrades along Hwy 797 crossing Pipestone Creek at SE 04-54-26-W3M approximately 9.2km northwest of Frenchman Butte – NEW, File Number: 2024-NOWE-123, October 30, 2024.
- Heritage Conservation Branch, Pipestone Creek Crossing Road Upgrade and Culvert Replacement SE-04-54-26-W3M, NE-33 & NW-34-53-26-W3 HERITAGE RESOURCE REVIEW, November 28, 2024.

10.3 Purchase Agreement

- Prairie Steel Culverts Quotation, Terms and Conditions of Sale, and Culvert Tender Supply Assurance Agreement, December 17, 2024.

January 10, 2025

BAR Engineering Co. Ltd.
5237 - 70th Avenue
Lloydminster, Alberta
T9V 3N6

Attn: Dylan Brown

**Re: SE 04-54-26 W3, NE 33-53-26 W3, SW 03-54-26 W3 & NW 34-53-26 W3
24MU-598400**

CROSSING AGREEMENT – OVERHEAD and/or UNDERGROUND POWERLINES

This will acknowledge receipt of your letter dated **January 8, 2025** in which you request consent from SaskPower (the “Grantor”) to **RM of Frenchman Butte No. 501** (the “Grantee”) to cross Grantor’s **underground and/or overhead powerlines** located within the Crossing Area with **work to replace existing culvert** at the location listed above and as set out in the drawings attached to this letter agreement (the “Crossing Area”).

The Grantor consents to these crossings subject to the following conditions:

1. The Grantee shall abide by the minimum distance requirements of *The Saskatchewan Employment Act*, and *The Occupational Health and Safety Regulations, 2020* (Saskatchewan), as amended from time to time, when operating any equipment near exposed electrical conductor (wire) or apparatus.
2. Where applicable, the Grantee shall comply with the requirements of Canadian Standard Association (CSA) standards CSA Z662 “Oil and Gas Pipeline Systems”, CSA C22.3#7 “Underground Systems”, and CSA C22.3#1 “Overhead Systems”, as amended from time to time. The Grantee shall also comply with the requirements of SaskPower’s Distribution Construction Standards Manual (the “Manual”), as amended from time to time, of which a copy or applicable portions thereof shall be made available to the Grantee upon request. Where the requirements of the Manual conflict with those of the CSA standards, the provisions of the Manual shall prevail.
3. The limits of the right-of-way owned/leased by the Grantee shall be at least a horizontal distance of three (3) meters from Grantor’s nearest distribution (25 kV and lower) structure or facility; and at least ten (10) meters from Grantor’s nearest transmission (72 kV and higher) structure or facility.
4. If the Grantee is unable to comply with any or all of conditions 1, 2 or 3, above, alternate arrangements must be made, which may include de-energizing and/or relocating Grantor’s facilities, by contacting Grantor at 1-888-SKPOWER (1-888-757-6937).
5. If relocating Grantor’s facilities is required, Grantor must be given sufficient time to design, estimate and construct the relocated facilities.
6. If de-energizing and/or relocating Grantor’s facilities are required, the Grantee shall pay the total resulting costs.
7. The Grantee shall observe the utmost degree of care while carrying out any and all operations in the general vicinity of the Grantor’s powerlines.
8. The following conditions apply where Grantee is crossing Grantor’s underground facilities:
 - a. The Grantee must contact Sask 1st Call at 1-866-828-4888 to locate Grantor’s underground facilities before any excavation is carried out.

- b. The Grantee must contact Grantor at 1-888-SKPOWER (1-888-757-6937) to arrange for Grantor's staff to be on site prior to exposing Grantor's underground facilities.
 - c. The Grantee shall not operate any construction equipment within one (1) meter of the Grantor's buried powerline. In the event the Grantee needs to operate construction equipment within one (1) meter of the buried powerline, the powerline must be exposed by hand digging or by Grantor-approved Hydrovac method before operating construction equipment.
 - d. The Grantee shall maintain one (1) meter of earth cover over Grantor's buried powerline at any point over the crossing on completion of construction. If this condition cannot be met, the Grantee must apply to the Grantor to have the buried powerline lowered and the Grantee shall assume the costs for such work.
9. (a) The Grantee shall be liable to the Grantor for all loss, damages and expenses which the Grantor may suffer, sustain, pay or incur by reason of any matter or thing arising out of or attributable to any act or omission of the Grantee, its servants, agents, contractors or employees in respect of the Grantee's use of the Crossing Area or by reason of this agreement.

(b) The Grantor shall be liable to the Grantee for all loss, damages and expenses which the Grantee may suffer, sustain, pay or incur by reason of any matter or thing arising out of or attributable to any act or omission by the Grantor, its servants, agents, contractors or employees in respect of the Grantor's use of the Crossing Area or by reason of this agreement.
10. The Grantee acknowledges that the installation of cathodic protection in the vicinity of SaskPower's facilities, including but not limited to transmission and distribution powerlines, whether overhead or underground, and to steel structures (collectively "Facilities" in this paragraph 10), has the potential to cause long-term degradation of such Facilities, or to result in a more rapid degradation of any anode associated with such Facilities. The Grantee therefore agrees that if in the Grantor's opinion it may be possible to prevent or mitigate such degradation by the installation of anodes or by any other method, or if relocation or replacement of Grantor's affected Facilities is required either at the time of installation of the Grantee's facilities or upon subsequent discovery of degradation to the Grantor's Facilities, the Grantee shall reimburse the Grantor the reasonable cost of such installation of anodes or other method, or of such relocation or reinstallation of Grantor's affected Facilities.
11. The Grantee acknowledges that the installation of ferromagnetic pipe material in the vicinity of electrical conductor (wires) has the potential to create a risk of electrical induction which may injure individuals installing or working on or near the ferromagnetic pipe material. Without limiting the generality of Grantee's obligation to observe the utmost degree of care as stated in paragraph 7 herein, Grantee will take whatever specific measures are available to it to reduce or mitigate the said risk of electrical induction. Where applicable, the Grantee shall comply with the requirements of CSA standard C22.3#6 "Principles and Practices of Electrical Coordination Between Pipelines and Electric Supply Lines", as amended from time to time.
12. (a) The Grantee shall indemnify and save harmless the Grantor against all actions, proceedings, claims, demands, and costs which may be brought against or suffered by the Grantor or which it may sustain, pay or incur, by reason of any matter or thing arising out of or attributable to any act or omission of the Grantee, its servants, agents, contractors or employees in respect of the Grantee's use of the Crossing Area or by reason of this Agreement.

(b) The Grantor shall indemnify and save harmless the Grantee against all actions, proceeding, claims, demands, and claims which may be brought against or suffered by the Grantee or which it may sustain, pay or incur, by reason of any matter or thing arising out of or attributable to any act or omission of the Grantor, its servants, agents, contractors or employees in respect of the Grantor's use of the Crossing Area or by reason of this Agreement.

(c) Notwithstanding any other provisions of this agreement, neither party shall be liable, whether in contract, tort or otherwise, for consequential or indirect loss, or any loss of revenue, earning, profits or economic loss, whatsoever, arising out of this agreement.

(d) Without limiting the generality of Grantee's obligation to indemnify Grantor as stated in this paragraph 12, Grantee shall indemnify and save harmless Grantor against all actions, proceedings, claims, demands, and costs which may result from, or be in any way related to any electrical induction resulting from or in any way related to the installation of ferromagnetic pipe material in vicinity of Grantor's facilities.
13. The rights and obligations of the parties under this Agreement shall terminate upon proper abandonment or removal of all the Grantee's facilities from the Crossing Area and the completion of any reclamation work required by applicable laws and regulations, except for those rights acquired and obligations incurred prior to such events. Notwithstanding

the foregoing, the rights and obligations of the parties under this Agreement shall terminate **one year from the date hereof** if construction of the Grantee's facility has not commenced.

14. By acting on the consent to undertake the proposed crossing, the Grantee agrees to be bound, and shall be bound, by the terms and conditions contained in this Agreement.

Yours truly,

 **SaskPower**

Amanda LaBatte

Amanda LaBatte on behalf of:
Garry Magnien, Manager
SaskPower Distribution Engineering

Lloydminster Transmission & Distribution

January 10, 2025

BAR Engineering Co. Ltd.
5237 - 70th Avenue
Lloydminster, Alberta
T9V 3N6

Attn: Dylan Brown

Re: SE 04-54-26 W3, NE 33-53-26 W3, SW 03-54-26 W3 & NW 34-53-26 W3
24MU-598400

PERMISSION TO WORK IN PROXIMITY to SASKPOWER FACILITIES

This will acknowledge receipt of your letter dated **January 8, 2025** in which you request consent from SaskPower (the "Grantor") to **RM of Frenchman Butte No. 501** (the "Grantee") for permission to **perform work to replace existing culvert** at the location listed above and as set out in the drawings attached hereto, in proximity to the Grantor's overhead and/or underground powerline and associated structures (the "Proximity Area").

The Grantor consents to the specified work at this location, subject to the following conditions:

1. The Grantee shall observe the utmost degree of care in performing its operations, and abide by the minimum distance requirements of *The Saskatchewan Employment Act*, and *The Occupational Health and Safety Regulations, 2020* (Saskatchewan), as amended from time to time, when operating any equipment near exposed electrical conductor (wire) or apparatus.
2. The Grantee acknowledges and agrees that performance of the work authorized by this agreement in proximity to the Grantor's facilities has the potential to destabilize or otherwise affect such facilities, and the Grantee therefore agrees that it shall take all reasonable measures to ensure that the stability of the Grantor's facilities is not negatively affected by the Grantee's activities and that, if in the opinion of the Grantor the stability of the Grantor's facilities is negatively affected by the Grantee's activities, the Grantee shall pay the Grantor's costs related to remedying same.
3. The Grantee shall not raise or lower the elevation of the ground surrounding the Grantor's powerline structures without obtaining the prior approval of the Grantor.
4. The limits of the right-of-way owned/leased by the Grantee shall be at least a horizontal distance of three (3) meters from Grantor's nearest distribution (25 kV and lower) structure or facility; and at least ten (10) meters from Grantor's nearest transmission (72 kV and higher) structure or facility.
5. If the work involves drilling, the following conditions shall apply:
 - a) The drilling rig shall be set up away from the Line and that the distance from the wellhead to the Line is not less than the rig height plus 3 meters for lines with voltages up to and including 25 kV. Higher voltages will require additional clearance that may require consultation with the Grantor;
 - b) The Grantee shall make arrangements by contacting the Grantor at 1-888-SKPOWER (1-888-757-6937) to de-energize the Line while the drilling rig is being set up in place, and during the dismantling of the rig and/or to arrange for an official to be present during such operations should the Grantor consider it unnecessary, under the circumstances, to de-energize the Line. The Grantee shall be responsible for the Grantor's costs relating to same.
6. If the Grantee is unable to comply with any or all of conditions 1 through 5 above, alternate arrangements must be made, which may include de-energizing and/or relocating Grantor's facilities, by contacting Grantor at 1-888-SKPOWER (1-888-757-6937).

7. If relocating the Grantor's facilities is required, the Grantor must be given sufficient time to design, estimate and construct the relocated facilities.
8. If de-energizing and/or relocating or altering the Grantor's facilities is required, the Grantee will pay the total costs which result.
9. Any unnecessary personnel shall be kept at a safe distance from the powerline.
10. (a) The Grantee shall be liable to the Grantor for all loss, damages and expenses which the Grantor may suffer, sustain, pay or incur by reason of any matter or thing arising out of or attributable to any act or omission of the Grantee, its servants, agents, contractors or employees in respect of the Grantee's use of the Crossing Area or by reason of this agreement.

(b) The Grantor shall be liable to the Grantee for all loss, damages and expenses which the Grantee may suffer, sustain, pay or incur by reason of any matter or thing arising out of or attributable to any act or omission by the Grantor, its servants, agents, contractors or employees in respect of the Grantor's use of the Crossing Area or by reason of this agreement.
11. (a) The Grantee shall indemnify and save harmless the Grantor against all actions, proceedings, claims, demands, and costs which may be brought against or suffered by the Grantor or which it may sustain, pay or incur, by reason of any matter or thing arising out of or attributable to any act or omission of the Grantee, its servants, agents, contractors or employees in respect of the Grantee's use of the Crossing Area or by reason of this Agreement.

(b) The Grantor shall indemnify and save harmless the Grantee against all actions, proceeding, claims, demands, and claims which may be brought against or suffered by the Grantee or which it may sustain, pay or incur, by reason of any matter or thing arising out of or attributable to any act or omission of the Grantor, its servants, agents, contractors or employees in respect of the Grantor's use of the Crossing Area or by reason of this Agreement.

(c) Notwithstanding any other provisions of this agreement, neither party shall be liable, whether in contract, tort or otherwise, for consequential or indirect loss, or any loss of revenue, earning, profits or economic loss, whatsoever, arising out of this agreement or either party's use of the well site.
12. The rights and obligations of the parties under this Agreement shall terminate upon cessation of the Grantee's activities authorized by this Agreement and the completion of any reclamation work required by applicable laws and regulations, except for those rights acquired and obligations incurred prior to such events. Notwithstanding the foregoing, the rights and obligations of the parties under this Agreement shall terminate **one year from the date hereof** if the Grantee's has not commenced any activities authorized by this Agreement.
13. By acting on the consent to undertake the proposed crossing, the Grantee agrees to be bound, and shall be bound, by the terms and conditions contained in this Agreement.

Yours truly,

 **SaskPower**

Amanda LaBatte

Amanda LaBatte on behalf of:
Garry Magnien, Manager
SaskPower Distribution Engineering

Lloydminster Transmission & Distribution



January 8, 2025 | Project No.: 24MU-598400

SaskPower
2121 Saskatchewan Drive
Regina, SK
S4P 3Y2

Attn: To Whom It May Concern

**Re: Permit to Cross and Work Within Proximity of SaskPower U/G Cables and O/H Powerlines
Grid Road 797 Pipestone Creek, RM of Frenchman Butte No. 501, SK**

We are hereby forwarding, on behalf of the RM of Frenchman Butte No. 501 (RM), for your approval, a request to cross and work within proximity to the existing SaskPower lines for the work associated with reconstructing Grid Road 797 within the RM.

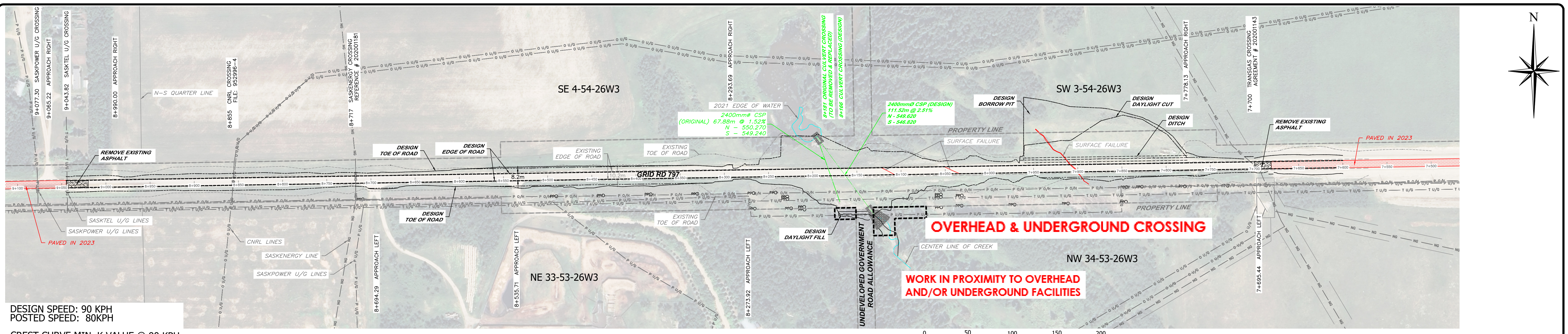
Attached is a drawing illustrating the proposed work along Pipestone Creek, and the proximity of the work to the SaskPower lines. Please note that the road will be excavated to replace the existing culvert, and will be rebuilt to the new proposed profile. The side slopes will be extended beyond their current position. As a result, the depth of cover over the SaskPower lines may be increased due to the addition of new fill material. Contractors will hydro-vac to expose the lines for verification of depth before any excavation work begins.

The planned construction start date is July 1, 2025. If any additional information is required regarding this application, please call Dylan Brown at 780-875-1683.

**Yours truly,
BAR Engineering Co. Ltd.**

**Dylan Brown, P. Eng
Intermediate Engineer
Municipal Division**

Attachments: Rm of Frenchman Butte No. 501 Grid Road 797 RP-1

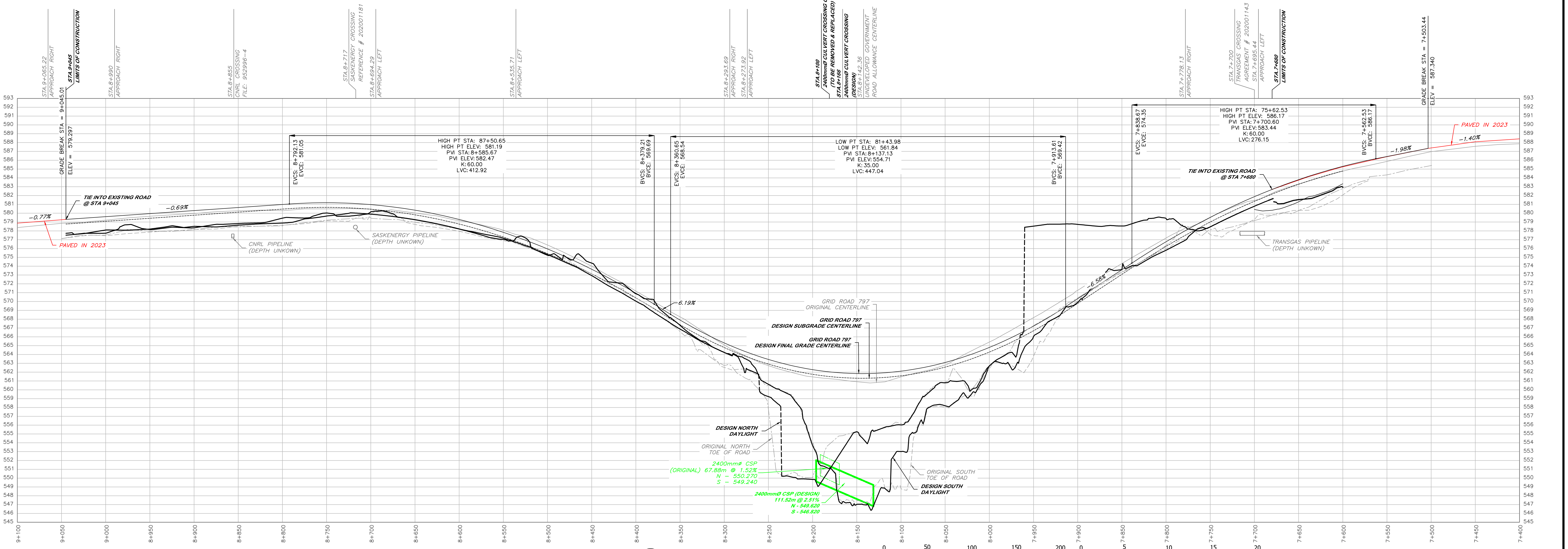
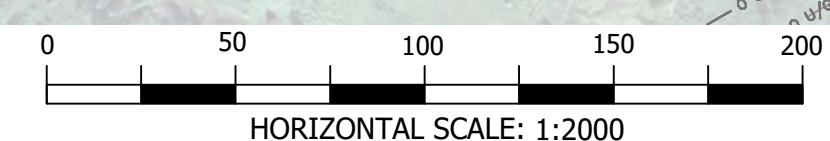


DESIGN SPEED: 90 KPH
POSTED SPEED: 80KPH

CREST CURVE MIN. K VALUE @ 90 KPH
DESIGN SPEED = 60.0

SAG CURVE MIN. K VALUE @ 90 KPH
DESIGN SPEED = 35.0

A PLAN STATION 7+680 TO 9+045 PLAN
Scale: 1:2000



B PROFILE - STATION 7+680 TO 9+045
Scale: HOR. 1:2000 VER. 1:200

Legend	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING
Water Main			Overland Flow		Canalbasin - F-38	
Water Service			Storm Ponding Area		Canalbasin - F-36	
Water Reducer			Sanitary Sewer Main		Power Pole	
Water Meter			Sanitary Sewer Service		Light Standard	
Valve			Storm Sewer Main		Redeal	
Blow-off Valve			Storm Sewer Service		Car Plug In Post	
Hydrant			Sanitary Manhole		Gas Lines	
Water Service C.C.			Sanitary Inspection Riser		Telephone Lines	
Elevations			Storm Manhole		UG Power Lines	
Grades			Curb Ramp		Fence Chain Link	
					Fence Wood	

Note:
The location of the utilities shown is approximate only. Other utilities may exist that are not shown. The exact locations should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall also verify the exact location and invert elevation by hand excavation before construction.

All chainages are calculated along the centerline of way.

NO.	DESCRIPTION	BY	CHK	MM/DD/YYYY
0	ISSUED FOR REVIEW	DB	SWS	11/26/2024

*****PRELIMINARY
NOT FOR
CONSTRUCTION*****

REVISIONS

ENGINEER

PERMIT

BAR ENGINEERING

SCALE: AS SHOWN

PROJECT #: 24MU-598400

DRAWING #: RP-1

RM OF FRENCHMAN BUTTE NO. 501

GRID 797 PIPESTONE CREEK CULVERT REPLACEMENT
ROAD PLAN & PROFILE

RM OF FRENCHMAN BUTTE, SK

SHEET #: 1 of 3

Drawing path: P:\Projects\24MU-598400\24MU-598400-RP-1.dwg
 User: jbar
 Date: 11/26/2024 10:57:47 AM
 Project: 24MU-598400
 Title: GRID 797 PIPESTONE CREEK CULVERT REPLACEMENT ROAD PLAN & PROFILE

Facility Crossing Permit

Issuance Date: January 13, 2025

Sask 1st Call No: _____

SaskEnergy Permit # 202500030

Grantee Reference # 24MU-598400

Applicant Information

Grantee:

Legal (Company) Name: Rural Municipality of Frenchman Butte No. 501

Location of Activity Area: ¼: SE, Section: 4, Township: 54, Range: 26, W3M

Grantee Address for Notices:

Attention: Aaron Neilly

Mailing Address: Box 180
Street Address or P.O. Box

Paradise Hill, SK, S0M 2G0
City / Province / Postal Code

Telephone: 306-837-7601

Email Address: rm501cet@sasktel.net

Activity Reviewed:

*The following proposed Work is acceptable provided the **terms and conditions** listed below are met :*

- | Yes | No | |
|-------------------------------------|-------------------------------------|---|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Foreign Pipeline Crossing(s) (other than water) |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Steam Pipeline Crossing(s) |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Water Utility Pipeline Crossing(s) (e.g. sewer, sanitary) |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Private Utility Lines(e.g. irrigation, seasonal) |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Underground Cable Crossing(s) |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Permanent Road Crossing(s) |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Well Site(s) |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Seismic Activity(s) |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Culvert(s) |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Ground Disturbance / Proximity Work(s) |

Pursuant to Section 7.1 of *The SaskEnergy Regulations*, the consent of SaskEnergy is required for Site Disturbances within SaskEnergy Right of Ways, including an unregistered Right of Way under Section 33 of *The SaskEnergy Act* (typically a 10 metre Right of Way/ 5 metre set back), or within 1.5 metres if no Right of Way exists.

Pursuant to Section 36 of *The SaskEnergy Act*, and 2(2) of *The SaskEnergy Regulations*, a building or other structure is encroaching on a SaskEnergy Pipeline if it is situated on the Pipeline Right of Way, including an unregistered Right of Way, or on or within 1.5 metres of the Pipeline if no Right of Way exists.

Pursuant to Section 57 of *The SaskEnergy Act*, no person shall dig, grade, level, excavate, blast or conduct any other activity on any land within which the corporation's buried pipelines are located; unless that person has requested the corporation to accurately locate the pipelines within that land.

Pursuant to Section 259 of *The Occupational Health and Safety Regulations, 1996*, an employer or contractor shall accurately establish the location of all underground pipelines, cables and conduits in an area where work is to be done, and shall ensure that those locations are conspicuously marked: (a) before commencing work using power tools or powered mobile equipment on an excavation, trench, tunnel, excavated shaft or borehole; or (b) before breaking ground surface with any equipment to a depth that may contact underground utilities.

By proceeding with the Work, the Grantee agrees that the Grantee, its servants, agents, contractors and employees are bound by the following **terms and conditions:**

Terms and Conditions

1. A copy of this approval, and your matching Sask 1st Call ticket number(s), must be on site with your field representative. **The Grantee will arrange for locates of all SaskEnergy facilities through Sask 1st Call prior to commencing Work. A minimum of three (3) full working days' notice is required.** Line locates can be made online at www.sask1stcall.com, www.clickbeforeyoudig.com or by calling toll free **1-866-828-4888**.
2. Work must be commenced within one calendar year of the issuance date on this consent. If the Work is not commenced within this time, there is no consent and the Grantee shall submit a request for consent.
3. The Grantor has the right, but not the obligation, at its sole discretion, to have a field representative onsite during the Work requested. **If communication from the Grantor has stipulated that SaskEnergy must be onsite during your Work, you must contact SaskEnergy Customer Service at 1-888-700-0427, with three (3) full working days' notice, to make arrangements to have a SaskEnergy representative onsite.**
4. The Grantee must not conduct any activities during weekends or statutory holidays, unless prior arrangements and costs are agreed to by SaskEnergy.
5. The Grantee must ensure that all excavation, and subsequent Work, shall be conducted in a manner that will not cause damage to the SaskEnergy Pipeline. If the SaskEnergy Pipeline is exposed, all Work shall be expedited to minimize the length of time the pipe is exposed.
6. **If the SaskEnergy Pipeline is exposed, the person undertaking the Work shall ensure that the SaskEnergy Pipeline is supported, in order to prevent damage to the Pipeline during backfilling, and any subsequent settlement of the ground.**
7. In the event that SaskEnergy's facility suffers contact damage, or other damage, as a result of the Grantee's Work, SaskEnergy shall be notified forthwith, and its repair shall be carried out as directed by SaskEnergy, at the Grantee's cost.
8. For **Pipeline and Underground Cable Crossing(s)**, Grantee shall comply with the attached SaskEnergy **X-ING Table- 1**.
9. For **Permanent Road Crossing(s)**, Grantee shall comply with the attached SaskEnergy **X-ING Table-2**.
10. For **Well Site(s)**, the Work proposed by the Grantee must remain a minimum of 5 metres from any SaskEnergy facilities, approval of the applicable Ministry shall be obtained, and the Work shall otherwise be in accordance with all applicable government approvals and requirements.
11. For **Seismic Activity**, the Work must be at least 3 metres from SaskEnergy facilities, or outside of the Right of Way. It is your responsibility to ensure you are aware of third party requirements, and to ensure that the seismic wave does not damage Pipeline infrastructure. Seismic set back and regulatory requirements will vary depending on the type of Pipeline, the type of seismic activity, and any requirements on your exploration license. *The Seismic Exploration Regulations, 1999*, for example, currently impose setbacks of 3 metres for low pressure Pipelines. You may not Work within those set-backs with, or without, SaskEnergy's consent.
12. For **Culvert installation**, a minimum vertical separation of 0.3 metres between the SaskEnergy Pipeline and the installed facility must be maintained. The culvert should not cross the existing SaskEnergy Pipeline at an angle less than 45 degrees. Culverts with outlets located within 1.5 metres horizontal distance of a SaskEnergy Pipeline must have a permanent erosion control system (e.g. concrete, rock, protective matting).
13. For **Ground Disturbance / Proximity Work incidental to other Work**, subject to the terms of this permit, the Grantee shall:
 - (a) Work only as specified in the attached Location Plan, Profile and Equipment List;
 - (b) Despite otherwise stated in this permit, structures within the Right of Way of the Pipeline may be removed by SaskEnergy at the Grantee or owner's expense, if access is required to construct, inspect, maintain, alter, replace or repair the Pipeline, or if a safety concern arises;
 - (c) Not allow any Mechanical Excavation directly over, or closer than, 0.6 metres to the Pipeline, unless the depth and location of the Pipeline has been visually verified by Hand Digging or hydro-vac;
 - (d) Maintain, or restore, the depth of cover for the width of the Safety Zone, and the slope stability and lateral support shall be maintained, unless otherwise specified in the Location Plan, Profile and Equipment List; and

(e) Before a Demolition begins, ensure that gas services connected to the structure, or the part of the structure that is being demolished, are disconnected by SaskEnergy, and are removed from the immediate Demolition area by SaskEnergy. This Grantee requirement is not complete until the meter, service riser and underground service line are removed.

14. **Temporary Equipment Crossing(s)**, at existing grade, do not generally require the consent of SaskEnergy by legislation. However, Heavy Equipment may damage Pipelines if a minimum depth of cover is not established and maintained. Grantee shall be liable for damage to Pipelines, and third party property, if reasonable and appropriate measures are not taken to protect the public, third party facilities and third party property, whether or not those precautions are imposed by legislation. In addition, where the Temporary Equipment Crossing is used for other Work requiring consent under the terms of this document, all Heavy Equipment Crossing(s) require a minimum depth of cover of 1.5 metres, or a minimum depth of cover of 1.2 metres with supplemental rig matting. Minimum depth of cover, or rig matting, shall extend a minimum of 1.0 metre beyond the travelled portion of the Crossing area.
15. The Grantee shall remove and dispose of all SaskEnergy line locate markers (flags or stakes) once the Work is completed.
16. The Grantee shall be liable to SaskEnergy for all loss, damages and expenses which SaskEnergy may suffer, sustain, pay or incur, and shall indemnify and save harmless SaskEnergy against all actions, proceedings, claims, demands, and costs which may be brought against, or suffered by, SaskEnergy, or which it may sustain pay or incur, by reason of any matter or thing arising out of, or attributable to, willful misconduct, any negligent act, or omission, or any breach of the terms and conditions of this permit by Grantee, its principals, servants, agents, contractors or employees. SaskEnergy shall be liable to Grantee for all loss, damages and expenses which Grantee may suffer, sustain, pay or incur and shall indemnify and save harmless Grantee against all actions, proceedings, claims, demands, and costs which may be brought against or suffered by Grantee, or which it may sustain pay or incur, by reason of any matter, or thing, arising out of, or attributable to, willful misconduct, any negligent act or omission or any breach of the terms and conditions of this permit by SaskEnergy, its principals, servants, agents, contractors or employees.
17. Each party shall at all times comply with any and all applicable codes, statutes, laws, regulations, permits, licenses, orders, and directions of any governmental authority from time to time in force. The minimum applicable technical standards therein shall apply to both parties, unless more stringent standards are provided for in this permit. If compliance with any provision of this permit would result in violation of any applicable codes, statutes, laws, regulations, permits, licenses, orders and directions of any governmental authority, such code, statute, law, regulation, permit, license, order and direction of any governmental authority shall prevail, and this permit shall be deemed to be amended accordingly.
18. Despite otherwise stated in this permit, SaskEnergy reserves all rights of ingress or egress, and other rights with respect to its Pipeline, or Right of Way, which would otherwise exist at law.
19. All distances and locations are relative to the Pipeline, not the line locate marker. Line locate markers (flags, stakes or paint) are deemed accurate if placed within 1.0 metre horizontal distance from the Pipeline, pursuant to Section 57 of *The SaskEnergy Act*. Exposure of the Pipeline by Hand Digging or hydro-vac is required to determine its precise location.
20. Absent an agreement in writing, any Work, or Installations, within the Right of Way, or 1.5 metres of the Pipeline where no Right of Way exists, which is not expressly allowed in this permit, is prohibited and is deemed undertaken without SaskEnergy consent.
21. **In this Facility Crossing Approval, the following capitalized terms shall have the meanings provided below:**
 - Crossing:** any travel, activity or installation in the Right of Way, or within 1.5 metres of a Pipeline if no Right of Way exists, which requires the consent of SaskEnergy.
 - Cultivation:** tillage or preparation of soil by mechanical agitation.
 - Culvert:** A structure that allows water to flow under a road, railroad, trail, or similar obstruction from one side to the other side.
 - Demolition:** tearing down, destroying, breaking up or razing of a Building, or other structure, or of the outer walls, or principal supporting members, of a Building or other structure.
 - Easement:** An Easement is a non-possessory right to use and/or enter onto the real property of another without possessing it. It is best typified in the Right of Way which one landowner, A, may enjoy over the land of another, B.

Farm Cultivation: Cultivation on lands dedicated to the production of crops for sale, of commercial livestock or of commercial livestock feed.

Foreign Pipeline: a Pipeline owned or operated by a party other than SaskEnergy.

Grantee: any party, other than SaskEnergy, performing Work within the Safety Zone.

Ground Disturbance: any work, operation or activity that results in a disturbance of the earth; including excavation, digging, trenching, cultivating, drilling, tunneling, augering, backfilling, blasting, topsoil stripping, land levelling, peat removing, quarrying, clearing and grading.

Hand Digging: the physical exposure of underground facilities using non-destructive excavation techniques that are acceptable to the owner of the buried facility, such as using a shovel with a wooden or insulated handle, but not including picks, bars, stakes or other earth piercing devices. Please note that regulations requiring a locate include hand digging applications.

Heavy Equipment: Vehicles or equipment exceeding 63,000 kilograms (approximately 140,000 lbs.) loaded, including, without limitation, earth movers and haul trucks.

Mechanical Excavation: any Ground Disturbance that is undertaken, other than by Hand Digging or other means approved by SaskEnergy (i.e. hydro-vac), but does not include a Ground Disturbance undertaken for the purpose of Cultivation.

Permanent Road Crossing: a location where Ground Disturbance is to be performed to facilitate the long term use of the site as a vehicle or equipment Crossing (more than one year in duration), including a location where use of the area as a vehicle, or equipment Crossing, in itself results, or would reasonably result, in Ground Disturbance over time, in the form of rutting, or a beaten area, path or trail.

Pipeline: pipelines and equipment and facilities ancillary thereto, and includes without limitation Foreign Pipelines, Steam Pipelines, Water Utility Pipelines, and Private Utility Pipelines hereunder.

Private Utility Lines: irrigation, seasonal water lines, or other water lines, owned by a party other than a public utility.

Proximity Work: Installation Structures in the Right of Way, or within 1.5 metres of a Pipeline, if no Right of Way exists.

Right of Way: a strip of land in which a Pipeline is located. An urban Right of Way typically takes the form of an Easement registered on the property title, and can be ascertained from the land titles registry. A Right of Way is typically 3 metres wide in the yards of most urban homes. Rural Right of Ways can be registered, or unregistered, and may not show up on title. An unregistered rural Easement, such as found in the yards of most rural homes, is typically 10 metres wide (5 metres on each side of the Pipeline).

Safety Zone: The area within a Right of Way, or 1.5 metres from the Pipeline, on either side, where no Right of Way exists, wherein consent of the Corporation is required for a Site Disturbance.

Seismic Activities: field activities for the gathering of seismic information.

Site Disturbance: Site Disturbance includes:

- (i) any excavation, drilling, installing or erecting of any pit, well, foundation, pavement, building, or other structure or installation;
- (ii) any Ground Disturbance that reduces the depth of cover over the Pipeline, to a depth that is less than the cover provided when the Pipeline was installed;
- (iii) Mechanical Excavation below 0.30 metres in depth, or over a Pipeline;
- (iv) Cultivation below 0.30 metres in depth, or Farm Cultivation below 0.45 metres in depth; and
- (v) the tearing down, destroying, breaking up or razing of a structure, or of the outer walls, or principal supporting members, of a structure.

Steam Pipeline: a Pipeline designed to carry pressurized steam.

Temporary Equipment Crossing: the short duration use of the Safety Zone for vehicle, or equipment Crossings, where no Ground Disturbance will result, or the original grade will be restored within one year of the date of this Agreement.

Underground Cables: cable(s) owned or operated by parties other than Saskatchewan Power Corporation or Saskatchewan Telecommunications.

Water Utility Pipeline: a public utility Pipeline designed to carry water, storm water, or sewage.

Well Site: an oil and gas well site, or other well site, as defined in *The Oil and Gas Conservation Regulations, 2012* (Saskatchewan).

Work: any travel, activity or installation in the Right of Way, or within 1.5 metres of a Pipeline if no Right of Way exists, which requires the consent of SaskEnergy

Executed this Monday, January 13, 2025

SaskEnergy Incorporated

Per: 
SaskEnergy Crossing Coordination

Foreign Structure & Road Crossing

Minimum Clearance from Underground Foreign Structures X-ING TABLE 1

Foreign Structure	Minimum Vertical Clearance	Minimum Parallel Clearance	Crossing Specifications
Foreign Pipeline (other than a Steam, Sewer, or Water Pipeline)	0.3 m	1 m	<ul style="list-style-type: none"> - The Pipeline shall cross below the existing SaskEnergy Pipeline. - The Pipeline shall maintain the same depth for the full width of the Safety Zone. - The Pipeline should not cross the existing SaskEnergy Pipeline at an angle less than 45 degrees.
Steam Pipeline	1 m	1 m	<ul style="list-style-type: none"> - The Pipeline shall cross below the existing SaskEnergy Pipeline. - The Pipeline shall maintain the same depth for the full width of the Safety Zone. - The Pipeline should not cross the existing SaskEnergy Pipeline at an angle less than 45 degrees.
Water Utility Pipeline (Including: Storm & Sanitary, and Deep Water)	0.3 m	2.1 m	<ul style="list-style-type: none"> - The Pipeline shall cross below the existing SaskEnergy Pipeline. - The Pipeline shall maintain the minimum depth for the full width of the Safety Zone. - The Pipeline should not cross the existing SaskEnergy Pipeline at an angle less than 45 degrees.
Private Water Utility Lines (Irrigation, Seasonal Water)	0.3 m	1 m	<ul style="list-style-type: none"> - The Private Utility Line may cross below (preferred) or above the existing SaskEnergy Pipeline. - The Private Utility Line shall maintain the same Crossing depth for the full width of the Safety Zone. - The Private Utility Line should not cross the existing SaskEnergy Pipeline at an angle less than 45 degrees.
Underground Cables (Excluding SaskPower and SaskTel)	0.3 m	1 m	<ul style="list-style-type: none"> - The cable or conduit may cross below (preferred) or above the existing SaskEnergy Pipeline. - The cable or conduit shall maintain the same Crossing depth for the full width of the Safety Zone. - The cable or conduit should not cross the existing SaskEnergy Pipeline at an angle less than 45 degrees. - The cable splices and pedestals shall be located outside of the existing Safety Zone.

PERMANENT ROAD CROSSING(S) X-ING TABLE 2

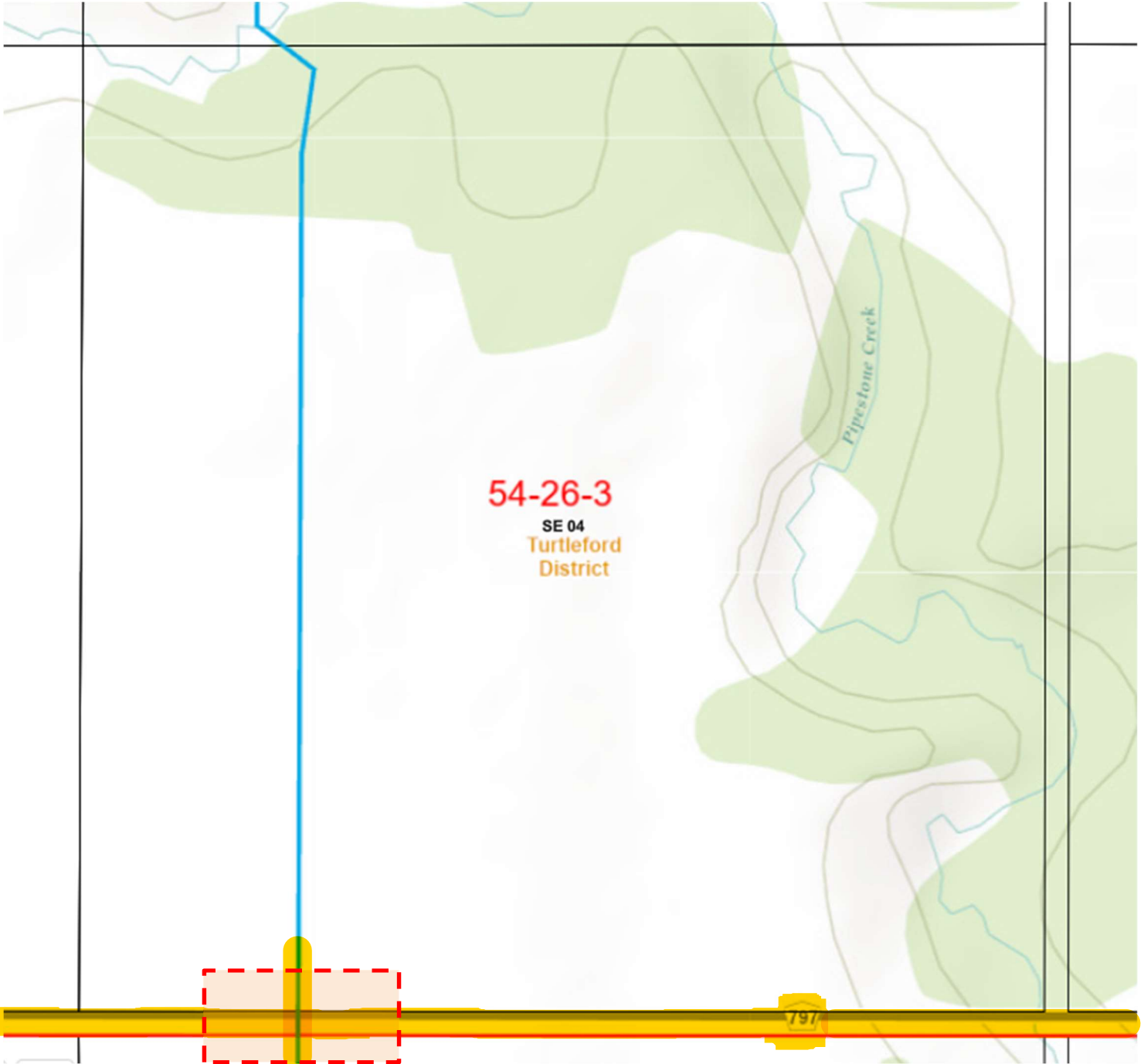
Activity	Crossing Specifications
New Road Construction & Resurfacing (Highways, rural roads, improved rural road allowances)	<ul style="list-style-type: none"> - Where ditch cuts are required, cover over underground SaskEnergy facilities shall not be reduced to less than 1.2 metres. - Grantee shall maintain depth of cover from the travelled surface of the roadway to the Pipeline at a minimum of 1.5 metres. - Crossing angles shall be as close as practicable to 90 degrees, and not at an angle of less than 45 degrees.
New Streets, Lanes & Parking (travelled surface)	<ul style="list-style-type: none"> - Grantee shall maintain depth of cover from the travelled surface of the roadway to the Pipeline at a minimum of 1.2 metres.
Resurfacing Streets, Lanes & Parking (travelled surface)	<ul style="list-style-type: none"> - Depth of cover after resurfacing shall not be less than 1.0 metre. - Contact Crossing Coordination immediately if the minimum depths of cover cannot be met - you are not authorized to proceed.
Backfilling and Compaction (Highways, Roads, Streets, Lanes)	<ul style="list-style-type: none"> - Place the backfill material in the excavation in lifts of 0.3 metres or less. - Hand compaction shall be performed for the first 0.4 metres above the Pipeline. - Hand held mechanical compaction equipment (i.e. Bomag BT65) may be used at a depth of cover greater than 0.4 metres above the Pipeline. - Light vibratory plate or single drum compaction equipment (i.e. Bomag BPH80, BW124DH) may be used at a depth of cover greater than 0.7 metres above the Pipeline. - Medium single drum vibratory or compaction equipment (i.e. Bomag BW211DH) may be used at a depth of cover greater than 1.0 metre above the Pipeline.

Location Plan, Profile and Equipment List

LLD: SE 4 – 54 – 26 – W3M

on behalf of the RM of Frenchman Butte No. 501 (RM), for SEI approval, a request to cross the following existing SaskEnergy gas lines for the work associated with Reconstructing Grid Road 797 within the RM.

- Station 8+717 (Grid Road 797) SE 4-54-26W3 & NE 33-53-26W3





Crossing Co-ordination
500 – 1777 Victoria Ave.
Regina, Saskatchewan,
S4P 4K5

Facility Crossing or Work Consent Agreement

TGL PERMIT No. 202001143

Pipeline Number: 23.0100.100

Grantee Reference No. N/A

Applicant Information	Specific Terms & Conditions																																	
<p>Grantee: Legal (Company) Name: <u>RM of Frenchman Butte No. 501</u></p> <p>Grantee Address for Notices: Attention: <u>Gail Carruthers</u> Mailing Address: <u>PO Box 180</u> <small>Street Address or P.O. Box</small></p> <p><u>Paradise Hill</u> <u>SK</u> <small>City Province/State</small></p> <p><u>S0M 2G0</u> <small>Postal Code/ZIP</small></p> <p>Telephone: <u>306-344-2034</u> Fax: <u>306-344-4434</u></p> <p>Email Address: <u>rm501pwm@sasktel.net</u></p> <p>Grantee Field Contact for Re-Entry: Contact Name: <u>Hartley Walton</u> Telephone: <u>306-518-0276</u> Fax: <u>N/A</u> Email Address: <u>Hartley.Walton@wsp.com</u></p> <p>Location of Activity Area: Legal Land Description <u>LSD or ¼: SW Section: 3 Township: 54 Range: 26 Meridian: W 3 M</u></p>	<p><i>The following work is authorized by this Agreement</i></p> <table border="0"> <tr> <td>Yes</td> <td>No</td> <td></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td>Ground Disturbance Only</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td>Foreign Pipeline Crossing(s) Number of Pipes</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td>Underground Cable Crossing(s) Number of Cables</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td>Above Ground Electrical Crossing(s) Number of Cables</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td>Temporary Equipment/Vehicle Crossing(s) (at existing grade)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td>Temporary Equipment/Vehicle Crossing(s) (additional support required)</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Permanent Road Crossing(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td>Rail Crossing</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td>Fencing</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td>Culvert(s)</td> </tr> </table>	Yes	No		<input type="checkbox"/>	<input checked="" type="checkbox"/>	Ground Disturbance Only	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Foreign Pipeline Crossing(s) Number of Pipes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Underground Cable Crossing(s) Number of Cables	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Above Ground Electrical Crossing(s) Number of Cables	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Temporary Equipment/Vehicle Crossing(s) (at existing grade)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Temporary Equipment/Vehicle Crossing(s) (additional support required)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Permanent Road Crossing(s)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Rail Crossing	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Fencing	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Culvert(s)
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<input type="checkbox"/>	<input checked="" type="checkbox"/>	Culvert(s)																																

TransGas Limited (the "Grantor" or "TransGas") has constructed certain natural gas transportation, transmission, storage or other facilities or has acquired one or more rights-of-way across certain lands, or both (the "Grantor's Facility").

You (the "Grantee") propose to perform certain Work, and/or to install one or more facilities described in Schedule "B" (the "Grantee's Facility"), in an area where the consent of the Grantor is required.

Once executed by the Grantor, this Facility Crossing or Work Consent Agreement shall be the terms and conditions of that consent, as agreed to by Grantor and Grantee, and shall include the following Schedules (the "Agreement" or "Facility Crossing Agreement"):

Schedule "A"

The CAPP Facility Crossing Agreement, Schedule "A", Mutually Agreed to Terms and Conditions (November 1993, reissued December 2001) attached hereto, are hereby incorporated into this Agreement as Schedule "A".

Schedule "B"

The attached Grantee supplied mapping, drawings and equipment list shall constitute Schedule "B", Location Plan, Profile and Equipment List. In the event of a conflict or inconsistency between Schedule "B", and the requirements of this Agreement, including Schedules "A" or "C", the Agreement shall prevail.

Schedule "C"

The specific Terms and Conditions for TransGas --Version Date: June 9, 2020, attached hereto, are hereby incorporated into this Agreement as Schedule "C".

(the "Schedules").

Crossings during weekends and statutory holidays are not permitted unless prior arrangements are agreed to by the Grantor Field Representative. By executing this Agreement, you agree that a Grantor Field Representative be designated by the Grantor in its sole discretion.

Please have particular regard to the requirements of Schedule "C" of the Agreement. **You must contact Sask 1st Call at 1-866-828-4888 prior to any excavation. You must have a paper copy of the Agreement and Schedules "A", "B" and "C" on site. You must contact the TransGas Field Representative prior to commencing work.**

In the event of an EMERGENCY, please phone Gas Control at 306-777-9800 (24 hours).

The individual signing this Agreement certifies they have read the Agreement and the Schedules referenced herein, and, if the Applicant is a corporation, have authority to bind the corporation.

This Agreement may be signed in counterparts. Each counterpart will be an original document and all of the counterparts will constitute one instrument. Any faxed or electronic copy of a signature will be deemed to be an original signature until such time as an original signature has been received by the other party or parties to this agreement.

This Agreement may be executed by the parties and delivered using DocuSign, a generally recognized e-signature technology.

Applicant's Signature

TransGas Limited Approval

Date:

Date:

Legal Company Name:

TransGas Limited

Name: RM of Frenchman Butte No. 501

Name:

Title: *Reeve*
CAO

Sr. Technical Assistant

Signature: 

Signature:

Notices to Grantor and Grantor Field Representative

Grantor's Corporate Office	Grantor's Field Representative
TransGas Limited 1000 – 1777 Victoria Avenue Regina, Saskatchewan S4P 4K5 Attention: Vice President, General Counsel & Corporate Secretary Fax: (306) 565-3332	<u>North (West) Area</u> <small>Field Representative's Name</small> <u>PO Box 1025</u> <small>Street Address</small> <u>Unity</u> , <u>SK</u> <u>S0K 4L0</u> <small>City Province Postal Code</small> Telephone: <u>306-228-7200</u> Fax: <u>306-228-7207</u>

Schedule "C"

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This Agreement may be executed by the parties and delivered using DocuSign, a generally recognized e-signature technology.

Applicant's Signature

Date:

Legal Company Name:

Name: RM of Frenchman Butte No. 501

Title:

Signature:

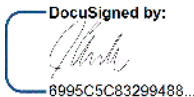
TransGas Limited Approval

Date: November 13, 2020 | 10:56 AM CST

TransGas Limited

Name: Jamie Claude

Sr. Technical Assistant

Signature:  8995C5C83299488...

Notices to Grantor and Grantor Field Representative

Grantor's Corporate Office	Grantor's Field Representative
TransGas Limited 1000 – 1777 Victoria Avenue Regina, Saskatchewan S4P 4K5 Attention: Vice President, General Counsel & Corporate Secretary Fax: (306) 565-3332	<u>North (West) Area</u> <small>Field Representative's Name</small> <u>PO Box 1025</u> <small>Street Address</small> <u>Unity</u> , <u>SK</u> <u>S0K 4L0</u> <small>City Province Postal Code</small> Telephone: <u>306-228-7200</u> Fax: <u>306-228-7207</u>

Schedule "B" – Location Plan, Profile and Equipment List.

Following are map(s) or drawing(s) of the Grantee's proposed Work and an equipment list where a motor vehicle or equipment crossing consent is required. Additional pages may be attached. (Please state number of additional attached pages: 2.)

1/4 SW Section 03 Township 54 Range 26 W 3 M

New Permanent Road Construction:
Paved: Gravel:

Permanent road approved.
Road is being built up in accordance with the cross section profile on page 4.

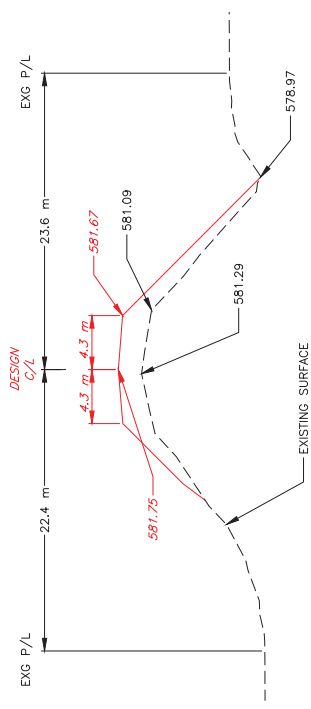
Equipment 1 - Make & Model: CAT 740
Gross Loaded Weight (lbs.): 156176
Equipment 2 - Make & Model: CAT DT8
Gross Loaded Weight (lbs.): 87600
Equipment 3 - Make & Model: CAT 374F L
Gross Loaded Weight (lbs.): 157655
Equipment 4 - Make & Model: CAT 16M3



REVISIONS		CS		TAB NO	
NO	DATE	DATE	SIGNATURE	SHEET	4-1
				DESIGNED BY	20/07/21
				CHECKED BY	20/07/21
				DESIGNED BY	20/07/21
				CHECKED BY	20/07/21
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				CHECKED BY	20/07/21
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				CHECKED BY	20/07/21
				DESIGNED BY	20/07/21
				CHECKED BY	20/07/21

EXAMPLE CROSS SECTIONS
 GRID NO 797
 RM OF FRENCHMAN BUTTE NO 501

SW-03-54-26-3
 NW-34-53-26-3
 TRANSGAS
 74-708



CNRL File: 952996-4
CNRL Surface File(s): 1035852-2, 1035875-6, 1065715-1, 1065733-1
Your File: N/A
Land File: N/A

FACILITY CROSSING AGREEMENT

THIS AGREEMENT is made and effective as of the **13th day of October 2020**

BETWEEN: CANADIAN NATURAL RESOURCES LIMITED ("Grantor")

- and -

R.M. OF FRENCHMAN BUTTE NO. 501 ("Grantee")

WHEREAS Grantor holds one or more rights-of-way for access across the said lands and has constructed a well site / access road / buried cable / pipeline / powerline herein, hereafter referred to as "Grantor's Facility" (which is subject to regulation by the **Ministry of Energy and Resources**); and

WHEREAS Grantee has acquired one or more rights-of-way across the said lands and proposes a(n) **ROAD MAINTENANCE PROGRAM**, details of which are referred to in Schedule "B" as "Grantee's Facility" (which is subject to regulation by the RM of Frenchman Butte No. 501); and

WHEREAS the rights-of-way and/or facilities of the respective parties intersect in the Crossing Area; and

WHEREAS the parties wish to define their respective rights and liabilities with respect to the Crossing Area under certain terms and conditions defined in Schedule "A".

NOW THEREFORE THIS AGREEMENT WITNESSES that in consideration of the premises, mutual covenants and Agreements herein contained, the parties agree that their respective Work in the Crossing Area shall be governed by this Agreement (together with Schedules) as herein described.

1. TERMS AND CONDITIONS

This Agreement including the recitals and the following Schedules, which are attached hereto and made part hereof, shall be the terms and conditions as agreed to by Grantor and Grantee:

Schedule "A" - Mutually Agreed to Terms and Conditions
Schedule "B" - Location Plan and Profile
Schedule "C" - Specific Terms and Conditions

2. LOCATION AND NOTICES

a) **Location of Crossing Area:**

See SCHEDULE "B" – LOCATION PLAN AND PROFILE

b) **Notices:**

Grantor's Corporate Office
Name: **Canadian Natural Resources Limited**
Address: Box 6926, Station "D"
Calgary, Alberta T2P 2G1
Dept.: Surface Land
Contact: Surface Manager



CNRL File: 952996-4

Name: Grantee's Corporate Office
R.M. Of Frenchman Butte No. 501
Address: Box 180
Paradise Hill, SK
S0M 2G0

c. **Field Representative**

Name: Grantor
James Vollman
Position: **Foreman**
Address: Lloydminster

Phone: **(780) 871-8286**
Cell: **(780) 753-1438**

Grantee
Name: _____
Position: _____
Address: _____
Phone: _____

IN WITNESS WHEREOF the parties hereto have caused this Agreement to be duly executed.

CANADIAN NATURAL RESOURCES LIMITED
("GRANTOR")

R.M. OF FRENCHMAN BUTTE NO. 501
("GRANTEE")

PER: _____
Claudia Rico-Ospina
Surface Land Administrator

PER: *Bonnie Nideley, Reeve*

PER: *Allison Reschke, CAO*
Witness



SCHEDULE "A"

MUTUALLY AGREED TO TERMS AND CONDITIONS

**This Schedule "A" to Form Part of the Facility Crossing Agreement between
CANADIAN NATURAL RESOURCES LIMITED (Grantor)
and
R.M. OF FRENCHMAN BUTTE NO. 501 (Grantee)
dated this 13th day of October, 2020**

1. INTERPRETATION

- 1.01 In this Agreement, including the recitals, the words and terms used shall have the following meanings:
- a) "Crossing Area" means the area of intersection of Grantor's and Grantee's rights-of-way and/or Facilities as outlined in red on Schedule "B";
 - b) "Grantee's Facility" means the facility or facilities to be constructed by Grantee and to be located within, across, along, upon, over or under the Crossing Area;
 - c) "Grantor's Facility" means the facility or facilities of Grantor located within, across, along, upon, over or under the Crossing Area;
 - d) "Facility" means:
 - i) any structure that is constructed or placed on the right-of-way of Grantor (concrete slab, concrete conduit, retaining walls, special fences such as chain link, etc.), and;
 - ii) any highway, private road, railway, irrigation ditch, drain, drainage system, sewer, dike, cable line, telecommunication line, telephone line or line for the transmission of hydrocarbons, power or any other substance that is or is to be carried across, along, upon, over or under crossing area;
 - e) "said lands" means the lands described in Schedule "B";
 - f) "the Body of this Agreement" means the Agreement to which this Schedule is attached and which has been executed by the parties;
 - g) "this Agreement" means the Body of this Agreement and the Schedules attached to it, and;
 - h) "Work" means, with respect to a Facility, the carrying, laying, installing, constructing, maintaining, operating, repairing, inspecting, replacing, altering, removing, abandoning and such other operations as may be required from time to time.
- 1.02 Unless a term or provision contained in the Body of this Agreement, if acted upon, would result in violation of any code, statute, law, regulation, permit, license, or governmental order, the following shall apply:

- a) if any term or provision contained in the body of this Agreement conflicts with a term or provision contained in any schedule, the term or provision in the Schedule shall prevail.
- b) if any terms or provisions of the Schedules conflict, the following shall apply: Schedule "C", if present, shall prevail over Schedules "A" and "B", Schedule "B" shall prevail over Schedule "A".

2. **CONSENT**

Grantor hereby agrees, insofar as it has the right to do so, that the Grantee may perform the Work on Grantee's Facility in the Crossing Area in accordance with the terms and conditions of this Agreement.

3. **COMPLIANCE WITH STATUTES AND REGULATIONS**

Grantee shall at all times comply with any and all applicable codes, statutes, laws, regulations, permits, licenses, orders and directions of any governmental authority from time to time in force. The minimum applicable technical standards therein shall apply to both parties unless more stringent standards are provided for in this Agreement. If compliance with any provision of this Agreement would result in violation of any applicable codes, statutes, laws, regulations, permits, licenses, orders and directions of any governmental authority, such code, statute, law, regulation, permit, license, order and direction of any government authority shall prevail and this Agreement shall be deemed to be amended accordingly.

4. **POSITION OF FACILITY**

Unless otherwise indicated in any of the Schedules, or ordered by governmental authority or regulations:

- a) Grantor's Facility shall be entitled to the upper position in the Crossing Area except for above grade facilities;
- b) a minimum distance of 60 cm shall be maintained between the external surface of the underground facilities unless otherwise approved by a CNRL representative; and
- c) Grantee's Facility shall be maintained at the same depth with no side bends for the entire width of the Crossing Area.

5. **CONDITIONS**

When Grantee performs work on Grantee's Facility in the Crossing Area, the following terms and conditions shall apply:

- a) Grantee's Field Representative shall contact Grantor's Field representative directly, either in person or by telephone, a minimum of 72 hours (excluding Saturdays, Sundays and Statutory Holidays) before commencement of Grantee's Work within thirty (30) metres of the Crossing Area and, if unable to so contact that person, Grantee shall serve a minimum of 72 hours written notice pursuant to Clause 8 hereof before commencement of Grantee's Work.



- b) Grantor has the right to have a representative present to inspect the Work of the Grantee in the Crossing Area.
- c) During installation pursuant to this Agreement, Grantee shall have available at the Crossing Area a copy of this Agreement.
- d) Before proceeding to excavate within five (5) metres of the Crossing Area, Grantee shall fully expose Grantor's Facility by hand digging. Grantee shall not use or permit the use of an excavating machine within 1.5 metres of either side of any existing Grantor's Facility unless otherwise agreed to in Schedule "C".
- e) Grantee shall, where applicable, install and maintain during performance of the Work suitable markers indicating the location of Grantor's Facility in the Crossing Area.
- f) Grantee shall lay down and construct its Facility in accordance with all schedules to this Agreement
- g) Grantee shall carry out all Work in the Crossing Area in a proper and diligent manner and in accordance with good engineering and construction practices.
- h) The party performing the Work shall ensure no damage occurs to existing Facilities while the Work is being performed in the Crossing Area including damage which may result from the use of heavy work equipment outside the Crossing Area while performing the Work in the Crossing Area.
- i) Where necessary, Grantee shall support Grantor's Facility as required, or as directed by Grantor, while any Work is being carried out hereunder.
- j) In the event that Grantor's Facility suffers contact damage or other damage as a result of Grantee's Work, Grantor shall be notified forthwith and its repair shall be carried out as directed by Grantor at Grantee's cost.
- k) Where Cathodic Protection is required by Grantor as a result of Grantee's installation, Grantee at its cost shall, at the time of the construction of its Facility, install and thereafter maintain a Cathodic Protection testing station for Grantor's Facility at the crossing in accordance with the attached Schedule "C" or as directed by Grantor's representative.
- l) At least 24 hours (excluding Saturdays, Sundays and Statutory Holidays) prior to covering Grantor's exposed Facility, Grantee's Field Representative shall contact Grantor's Field Representative directly, either in person or by telephone for inspection.
- m) Grantee shall, where applicable, install and maintain suitable buried markers indicating the location of Grantee's Facility in the Crossing Area.
- n) Unless otherwise directed by the Grantor, the Grantee shall cover Grantor's Facility with at least 60 cm of select backfill material prior to commencing backfilling operations. Grantee shall, in backfilling the excavation in the Crossing Area, compact the fill material in 15 cm layers, or such greater depth specified by Grantor's Field Representative.
- o) Grantee shall, as soon as it is reasonably practical after the completion of Grantee's Work in the Crossing Area, restore the surface of the Crossing Area as closely as is practical to the condition in which it existed immediately prior to the Work being commenced.

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- p) Grantee shall maintain the Crossing Area in good order and condition and carry out expeditiously all Work hereunder.
- q) Except as otherwise provided herein, the cost of the Work with respect to each party's Facilities within the Crossing Area undertaken by either party, shall be borne by the party requiring such Work.
- r) The cost associated with the location, identification or supervision shall not be charged to or borne by the other party unless specified in Schedule "C".
- s) Grantee shall be liable for and shall pay all taxes, rates, and assessments on every description whatsoever that may be imposed by any lawful authority by reason of the presence of Grantee's Facility in the Crossing Area or by reason of this Agreement or of anything done by Grantee pursuant to this Agreement. In addition, Grantee shall indemnify Grantor from and against all such taxes, rates and assessments.

6. REMEDY ON DEFAULT

In the case of default by Grantee in carrying out any of the provisions in this Agreement, Grantor may give notice thereof to Grantee. If Grantee fails to commence to remedy such default within 15 days after receipt of such notice and diligently complete such remedy thereafter, Grantor may take such steps as are appropriate to remedy such default and Grantee shall be liable for and shall pay all reasonable costs and expenses incurred by Grantor in remedying the default.

7. FURTHER WORK

- a) If, subsequent to the initial Work undertaken by Grantee for its Facility, either Grantor or Grantee desires to undertake any Work in the Crossing Area in respect of its Facility, this Agreement shall be deemed to grant consent to that party, and the provisions of this Agreement shall apply mutatis mutandis to all subsequent Work undertaken by either party under this Clause 7; and, for further certainty the provision of this Agreement shall be read as if "Grantee" were substituted for "Grantor" and vice versa as the situation requires.
- b) Notwithstanding the foregoing, installation of any Facility other than those shown on attached Schedule "B" shall require a separate Facility Crossing Agreement.
- c) Notwithstanding the foregoing, if emergency Work in the Crossing Area is required with respect to a party's Facility, that party shall commence the necessary Work and shall forthwith give the other party's Field Representative verbal notice of the emergency and necessary Work, and shall forthwith give notice pursuant to Clause 8 hereof.

8. NOTICES

Notices shall be in writing and shall be sent to the parties at the addresses for notice shown in the body of this Agreement. The following shall govern notices:

- a) Either party may, from time to time, change its address for service by giving notice to the other party.

- b) All notices required to be given hereunder may be delivered by hand, mailed by registered or prepaid mail, or sent by telecommunication. If mailed, the notice shall be deemed to have been received seven days (Saturdays, Sundays, and Statutory Holidays excluded) after the mailing thereof. If delivered by hand, the notice shall be deemed to have been received on the day on which it was delivered, or if delivered after regular business hours, it shall be deemed to have been received on the following business day. If sent by telecommunication, the notice shall be deemed to have been received on the first business day following the day it was dispatched.
- c) No notice shall be effective if mailed during any period on which Canadian postal workers are on strike or if a strike of postal workers is imminent and may be anticipated to affect normal delivery thereof.
- d) No notice shall be effective if mailed during any period on which Canadian postal workers are on strike or if a strike of postal workers is imminent and may be anticipated to affect normal delivery thereof.

Notwithstanding the foregoing, to the extent described in this Agreement, Grantor's and Grantee's Field Representatives or designated alternates shall have the right and authority to make, give, receive any notice, information, direction or decision required in conducting Work hereunder.

9. LIABILITY AND INDEMNITY

- a) Grantee shall:
 - i) be liable to Grantor for all loss, damages and expenses which Grantor may suffer, sustain, pay or incur and, in addition,
 - ii) indemnify and save harmless the Grantor against all actions, proceedings, claims, demands and costs which may be brought against or suffered by Grantor or which it may sustain, pay or incur,by reason of any matter or thing arising out of or attributable to any act or omission of Grantee, its servants, agents, contractors or employees in respect of Grantee's use of the Crossing Area or by reason of this Agreement.
- b) Grantor shall:
 - i) be liable to Grantee for all loss, damages and expenses which Grantee may suffer, sustain, pay or incur and, in addition,
 - ii) indemnify and save harmless the Grantee against all actions, proceedings, claims, demands and costs which may be brought against or suffered by Grantee or which it may sustain, pay or incur,by reason of any matter or thing arising out of or attributable to any act or omission of Grantor, its servants, agents, contractors or employees in respect of Grantor's use of the Crossing Area or by reason of this Agreement.
- c) "Notwithstanding clause 9(a) and (b), in no event shall either the Grantee or Grantor be liable to each other for any special, indirect or consequential damages, whatsoever (including liability based on negligence), including, without limitation, loss of profits or

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business interruption.

10. **INSURANCE**

- a) Without in any way limiting the liability of either party under this Agreement, each party shall obtain and keep in force during the term of this Agreement comprehensive general liability insurance covering liability for bodily injury and property damage arising from Work contemplated by this Agreement. The limit of this insurance shall not be less than five million dollars, inclusive, for any one occurrence unless otherwise agreed by the parties in writing. This policy shall provide coverage for liability assumed under this Agreement.
- b) A party, upon request of the other party, shall furnish written documentation, satisfactory to the requesting party, evidencing the required coverage.
- c) As an alternative to the five million dollar policy of comprehensive general liability insurance referred to in Subclause 10 (a), if acceptable to the other party, a party may self-insure against the risks normally covered by such a policy.

11. **CHANGES TO AGREEMENT**

No change, modification or alteration of this Agreement shall be valid unless it be in writing and signed by the parties hereto, and no course of dealing between the parties shall be construed to alter the terms hereof.

12. **ASSIGNMENT**

- a) Neither party to this Agreement shall assign or transfer this Agreement or the rights and privileges hereby granted without the written consent of the other party first had and obtained, and such consent shall not be unreasonably withheld. The party intending to assign or transfer this Agreement shall give to the other party to this Agreement notice of its intent by registered mail.
- b) The other party to this Agreement may require the assignor and assignee to execute a Novation Agreement in a form acceptable to the other party.

This Agreement shall enure to the benefit of and be binding upon the parties, their successors and assigns.

13. **GOVERNING LAW**

This Agreement and the rights and obligations of the parties herein shall be governed and construed according to the laws of the Province in which the Work is to occur.

14. **TERM**

The rights and obligations of the parties under this Agreement shall terminate:

- a) two years from the date hereof if construction of Grantee's Facility has not commenced or,
- b) upon proper abandonment or removal of all of Grantor's or Grantee's Facilities for the Crossing Area and the completion of any reclamation Work required by applicable laws, except for those rights acquired and obligations incurred prior to such events.

15. MISCELLANEOUS

- a) In this Agreement, words importing the singular include the plural and vice versa; words importing the masculine gender include the feminine and vice versa; and words importing persons include firms or corporations and vice versa.
- b) Words such as "hereto", "thereto", "hereof", and "herein" when used in this Agreement, shall be construed to refer to provisions of this Agreement.
- c) The headings of all Clauses of this Agreement, and the Schedules, are inserted for convenience of reference only and shall not affect the meaning or construction thereof.
- d) Time is of the essence of this Agreement.
- e) No waiver of any breach of a covenant or provision of this Agreement shall take effect or be binding upon a party unless it is expressed in writing. A waiver by a party of any breach shall not limit or affect that party's rights with respect to any other or future breach.

16. ENTIRE AGREEMENT

This Agreement including the Recitals and Schedules set forth the entire Agreement between the parties hereto and shall be deemed to have superseded any and all previous Agreements and understandings, whether written or oral, between the parties dealing with the Facilities and the Crossing Area, and all rights and obligations are herein described.

SCHEDULE "B"

LOCATION PLAN AND PROFILE

**This Schedule "B" forms part of the Facility Crossing Agreement between
 CANADIAN NATURAL RESOURCES LIMITED (Grantor)
 and
 R.M. OF FRENCHMAN BUTTE NO. 501 (Grantee)
 dated this 13th day of October, 2020**

Project Description: ROAD MAINTENANCE PROGRAM
Grantee File#: N/A
Broker File#: N/A

Grantee Facility	Request Type	Location	CNRL Facility	CNRL Surface File
Equipment	Crossing	Twp 54 Rge 25 W3M: SW of Section 5	Pipeline 171878-1	1035852-2
Equipment	Crossing	Twp 54 Rge 27 W3M: SW of Section 5	Pipeline 1065733-1	1065733-1
Equipment	Crossing	Twp 54 Rge 26 W3M: SE of Section 4	Pipeline 171879-1	1035875-6
Equipment	Crossing	Twp 54 Rge 27 W3M: SE of Section 3	Pipeline 106113-1	1065715-1
Equipment	Crossing	Twp 53 Rge 25 W3M: NW of Section 32	Pipeline 171878-1	1035852-2
Equipment	Crossing	Twp 53 Rge 27 W3M: NW of Section 32	Pipeline 1065733-1	1065733-1
Equipment	Crossing	Twp 53 Rge 26 W3M: NE of Section 33	Pipeline 171879-1	1035875-6
Equipment	Crossing	Twp 53 Rge 27 W3M: NE of Section 32	Pipeline 106113-1	1065715-1

Schedule "B" - Plan - between CANADIAN NATURAL RESOURCES LIMITED and R.M. OF FRENCHMAN BUTTE NO. 501 And Effective October 14, 2020; Addendum 952996-4

S.W. 1/4 05-54-25-3

N.W. 1/4 32-53-25-3

1+500

+400

+300

+200

+100

CNRL

IMPROVE APPROACH

CLEAN OUT
EXG 500 r
RT INV =
LT INV =

pm ar

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Schedule "B" - Plan - between CANADIAN NATURAL RESOURCES LIMITED and R.M. OF FRENCHMAN BUTTE NO. 501 And Effective October 14, 2020; Addendum 952996-4



Schedule "B" - Plan - between CANADIAN NATURAL RESOURCES LIMITED and R.M. OF FRENCHMAN BUTTE NO. 501 And Effective October 14, 2020; Addendum 952996-4

S.W. 1/4 01-54-26-3

N.W. 1/4 36-53-26-3

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Schedule "B" - Plan - between CANADIAN NATURAL RESOURCES LIMITED and R.M. OF FRENCHMAN BUTTE NO. 501 And Effective October 14, 2020; Addendum 952996-4

S.W. 1/4 02-54-26-3

N.W. 1/4 35-53-26-3



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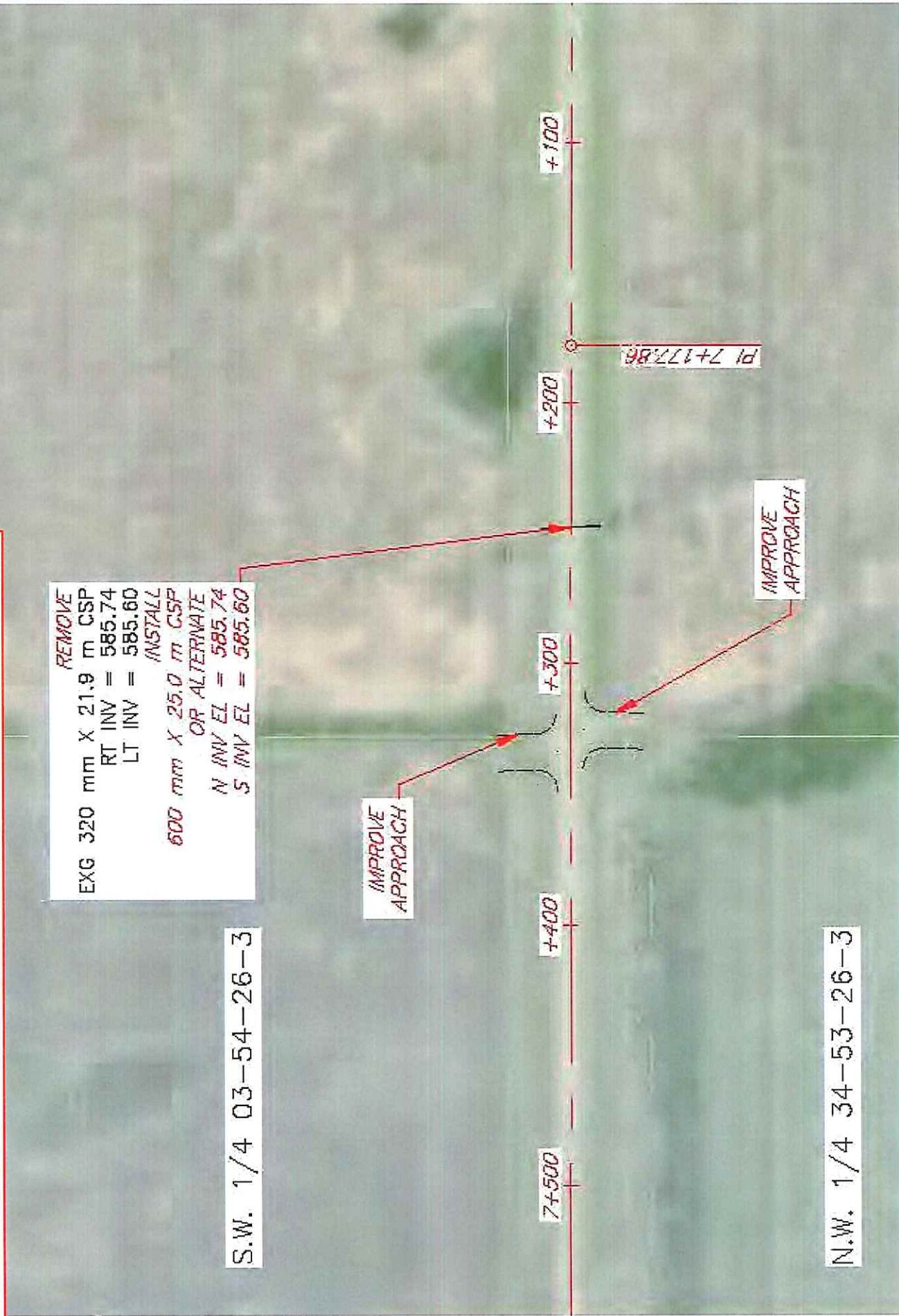
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Schedule "B" - Plan - between CANADIAN NATURAL RESOURCES LIMITED and R.M. OF FRENCHMAN BUTTE NO. 501 And Effective October 14, 2020; Addendum 952996-4

REMOVE
EXG 320 mm X 21.9 m CSP
RT INV = 585.74
LT INV = 585.60
INSTALL
600 mm X 25.0 m CSP
OR ALTERNATE
N INV EL = 585.74
S INV EL = 585.60

S.W. 1/4 03-54-26-3

N.W. 1/4 34-53-26-3

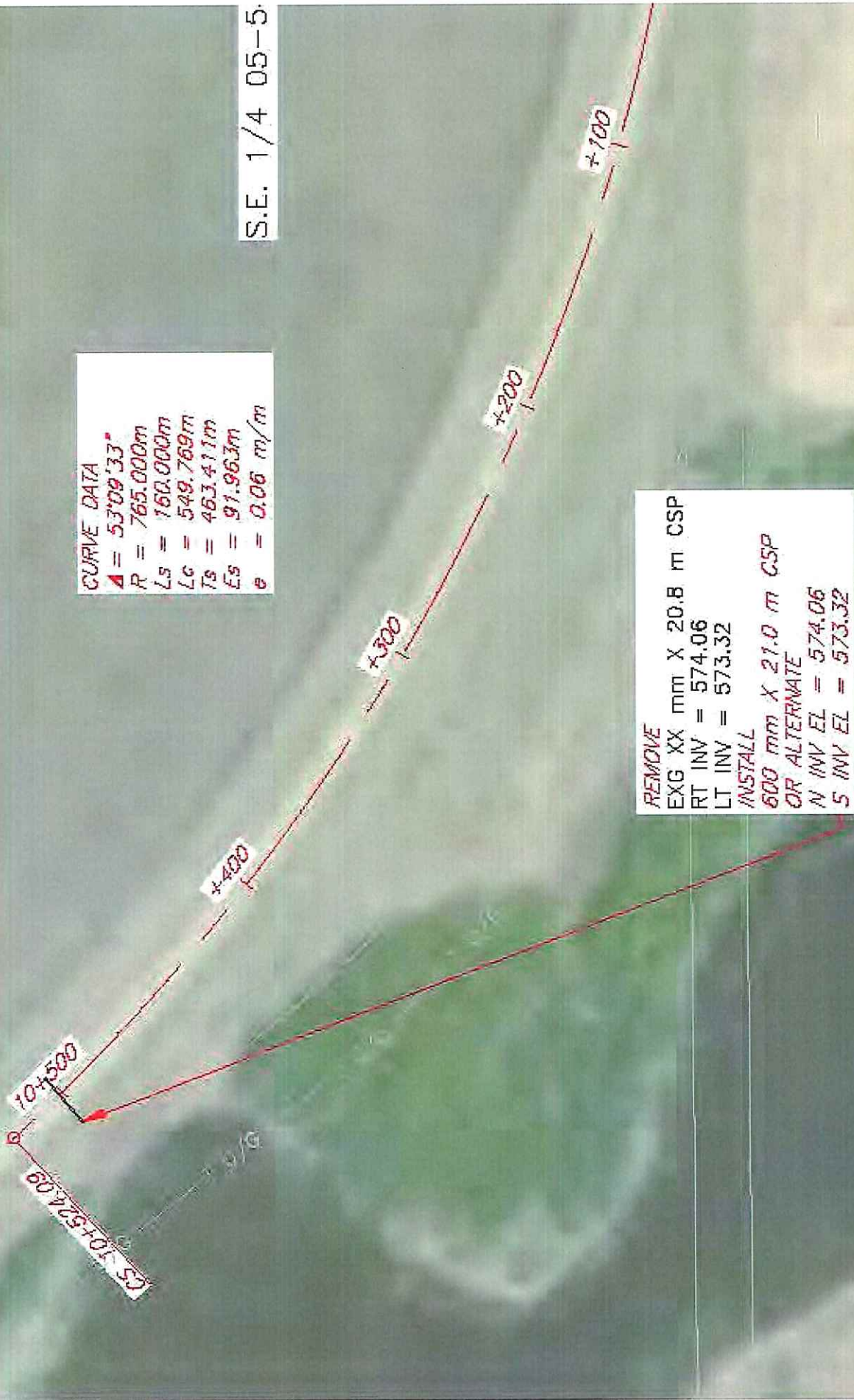


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Schedule "B" - Plan - between CANADIAN NATURAL RESOURCES LIMITED and R.M. OF FRENCHMAN BUTTE NO. 501 And Effective October 14, 2020; Addendum 952996-4



Bruce



CURVE DATA
 $\Delta = 53^{\circ}09'33''$
 $R = 765.000m$
 $L_s = 160.000m$
 $L_c = 549.769m$
 $T_s = 463.411m$
 $E_s = 91.963m$
 $e = 0.06 m/m$

REMOVE
 EXG XX mm X 20.8 m CSP
 RT INV = 574.06
 LT INV = 573.32
 INSTALL
 600 mm X 21.0 m CSP
 OR ALTERNATE
 N INV EL = 574.06
 S INV EL = 573.32

S.E. 1/4 05-5.

N.E. 1/4 32-5

Schedule "B" - Plan - between CANADIAN NATURAL RESOURCES LIMITED and R.M. OF FRENCHMAN BUTTE NO. 501 And Effective October 14, 2020; Addendum 952996-4

REMOVE
EXG 600 mm X 19.0 m CSP
RT INV = 575.43
LT INV = 574.19
INSTALL
600 mm X 22.0 m CSP
OR ALTERNATE
N INV EL = 575.46
S INV EL = 574.50

N.E. 1/4 06-54-26-3

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Schedule "B" - Plan - between CANADIAN NATURAL RESOURCES LIMITED and R.M. OF FRENCHMAN BUTTE NO. 501 And Effective October 14, 2020; Addendum 952996-4

N.E. 1/4 01-54-27-3

IMPROVE APPROACH

+500

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S.E. 1/4 01-54-27-3



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Schedule "B" - Plan - between CANADIAN NATURAL RESOURCES LIMITED and R.M. OF FRENCHMAN BUTTE NO. 501 And Effective October 14, 2020; Addendum 952996-4

N.E. 1/4 02-54-27-3

N.W. 1/4 01-54



S.E. 1/4 02-54-27-3

S.W. 1/4 01-54

Schedule "B" - Plan - between CANADIAN NATURAL RESOURCES LIMITED and R.M. OF FRENCHMAN BUTTE NO. 501 And Effective October 14, 2020; Addendum 952996-4

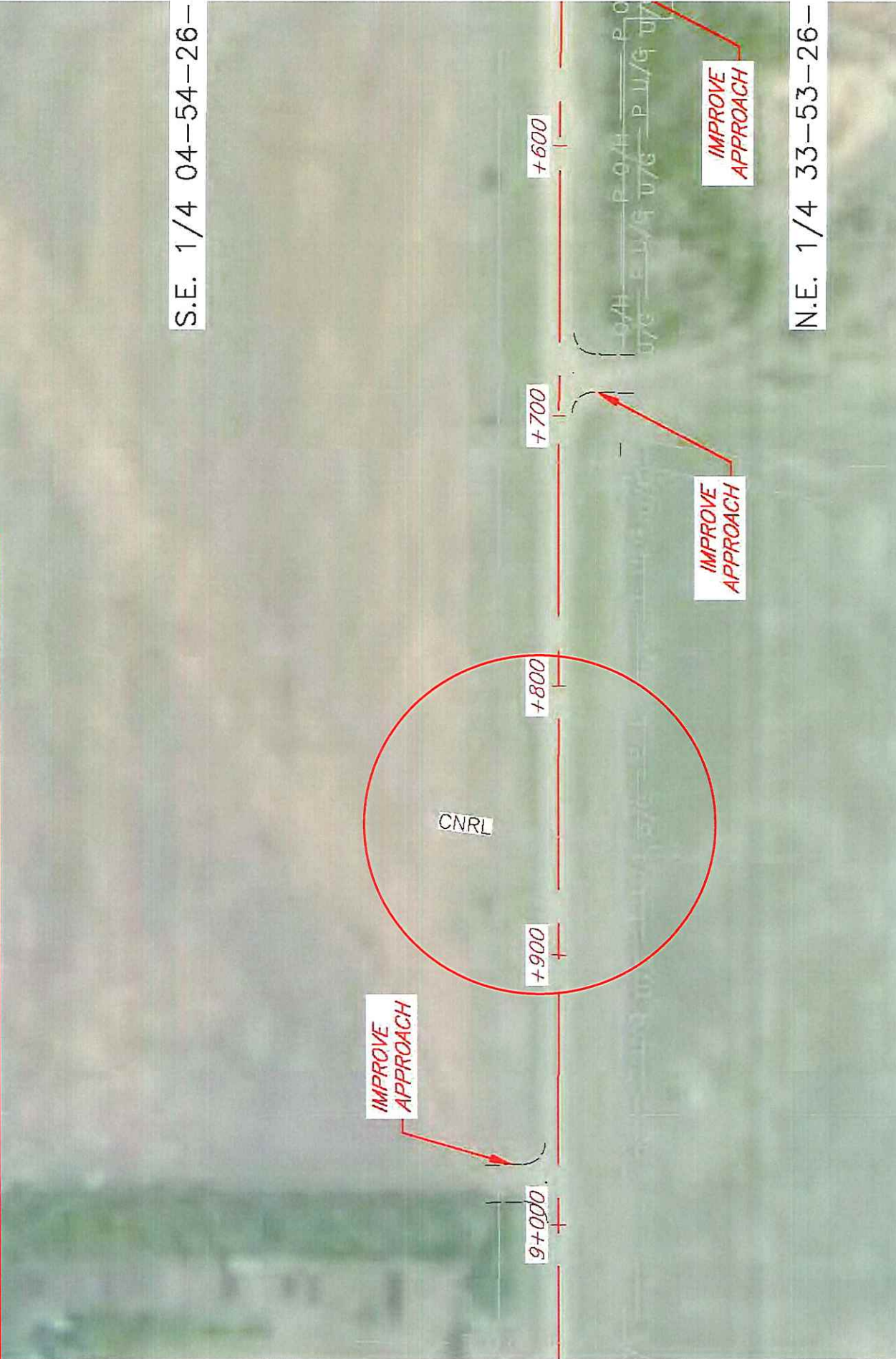


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Schedule "B" - Plan - between CANADIAN NATURAL RESOURCES LIMITED and R.M. OF FRENCHMAN BUTTE NO. 501 And Effective October 14, 2020; Addendum 952996-4

S.E. 1/4 04-54-26-



N.E. 1/4 33-53-26-

OR

Schedule "B" - Plan - between CANADIAN NATURAL RESOURCES LIMITED and R.M. OF FRENCHMAN BUTTE NO. 501 And Effective October 14, 2020; Addendum 952996-4

REMOVE
EXG 600 mm X 19.0 m CSP
RT INV = 575.43
LT INV = 574.19
INSTALL
600 mm X 22.0 m CSP
OR ALTERNATE
N INV EL = 575.46
S INV EL = 574.50

N.E. 1/4 06-54-26-3



Schedule "B" - Plan - between CANADIAN NATURAL RESOURCES LIMITED and R.M. OF FRENCHMAN BUTTE NO. 501 And Effective October 14, 2020; Addendum 952996-4



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S.W. 1/4 03-54-27-3



REMOVE
EXG 400 mm X 25.9 m CSP
RT INV = 585.67
LT INV = 586.17

INSTALL
600 mm X 28.0 m CSP
OR ALTERNATE
N INV EL = 585.67
S INV EL = 586.17

N.W. 1/4 34-53-27-3

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Schedule "B" - Plan - between **CANADIAN NATURAL RESOURCES LIMITED** and **R.M. OF FRENCHMAN BUTTE NO. 501** And Effective **October 14, 2020**; Addendum **952996-4**

S.W. 1/4 04-54-27-3

IMPROVE
APPROACH

19+500 +400 +300 +200 +100

N.W. 1/4 33-53-27-3



Schedule "B" - Plan - between CANADIAN NATURAL RESOURCES LIMITED and R.M. OF FRENCHMAN BUTTE NO. 501 And Effective October 14, 2020; Addendum 952996-4

S.W. 1/4 05-54-27-3

S.E. 1/4 05

EXG 500 mm X 15.0 m CSP
RT INV = 581.45
LT INV = 581.44

IMPROVE
APPROACH

21+000

+900

+800

+700

+600

N.W. 1/4 32-53-27-3

N.E. 1/4 32

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Schedule "B" - Plan - between CANADIAN NATURAL RESOURCES LIMITED and R.M. OF FRENCHMAN BUTTE NO. 501 And Effective October 14, 2020; Addendum 952996-4



S.E. 1/4 06-54-27-3

N.E. 1/4 31-53-27-3

Schedule "B" - Plan - between CANADIAN NATURAL RESOURCES LIMITED and R.M. OF FRENCHMAN BUTTE NO. 501 And Effective October 14, 2020; Addendum 952996-4

EXTEND

EXG 800 mm X 44
RT INV = 560.82
LT INV = 560.25
4.0 m LT

N.E. 1/4 36-53-28-3

EXTEND

EXG 400 mm X XX.X m CSP
RT INV = 573.93
LT INV = ??
4.0 m RT
4.0 m LT



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Schedule "B" - Plan - between **CANADIAN NATURAL RESOURCES LIMITED** and
R.M. OF FRENCHMAN BUTTE NO. 501 And Effective **October 14, 2020**; Addendum **952996-4**

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CNRL File: 952996-4

SCHEDULE "C"

SPECIFIC TERMS AND CONDITIONS

**This Schedule "C" forms part of the Facility Crossing Agreement between
CANADIAN NATURAL RESOURCES LIMITED (Grantor)
and
R.M. OF FRENCHMAN BUTTE NO. 501 (Grantee)
And dated this 13th day of October, 2020**

SPECIAL CONDITIONS:

1.5 m of clay cap must be installed over crossing and maintained for the duration of all crossing activity.

Field contact is Marty Boggust Assistant Foreman 780-205-4507

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SCHEDULE "C"

SPECIFIC TERMS AND CONDITIONS

**This Schedule "C" forms part of the Facility Crossing Agreement between
CANADIAN NATURAL RESOURCES LIMITED (Grantor)
and
R.M. OF FRENCHMAN BUTTE NO. 501 (Grantee)
And dated this 13th day of October, 2020**

***** MUST BE COMPLETED AT THE CROSSING SITE BY THE CNRL FIELD REP AND GRANTEE *****

Pipeline Size _____ mm

Pipeline Operating Pressure _____ kpa

Pipeline Contents _____

Location of Isolation Points _____

SAFETY AWARENESS

All potential ignition sources must be controlled as per the applicable provincial regulations for "hot work" while working within 25 m of a Canadian Natural above ground facility or exposed pipeline (this includes any cutting, grinding welding or non-intrinsically safe electronic devices, smoking, matches or open lights). Vehicles must be operated >6 meters when in the vicinity of Canadian Natural above ground facilities or exposed pipelines lines.

Canadian Natural requires diesel engines (including pick ups) to be equipped with a functional positive air shut off device when operated within 25 meters of potential hydrocarbon sources (above ground facilities or exposed pipelines).

Acknowledgments

Grantor Field Representative _____ Phone # _____

Grantee Onsite Representative _____ Phone # _____

GRANTEE COPY

SCHEDULE "C"

SPECIFIC TERMS AND CONDITIONS

**This Schedule "C" forms part of the Facility Crossing Agreement between
CANADIAN NATURAL RESOURCES LIMITED (Grantor)
and
R.M. OF FRENCHMAN BUTTE NO. 501 (Grantee)
And dated this 13th day of October, 2020**

***** MUST BE COMPLETED AT THE CROSSING SITE BY THE CNRL REP AND GRANTEE *****

Pipeline Size _____ mm

Pipeline Operating Pressure _____ kpa

Pipeline Contents _____

Location of Isolation Points _____

SAFETY AWARENESS

All potential ignition sources must be controlled as per the applicable provincial regulations for "hot work" while working within 25 m of a Canadian Natural above ground facility or exposed pipeline (this includes any cutting, grinding welding or non-intrinsically safe electronic devices, smoking, matches or open lights). Vehicles must be operated >6 meters when in the vicinity of Canadian Natural above ground facilities or exposed pipelines lines.

Canadian Natural requires diesel engines (including pick ups) to be equipped with a functional positive air shut off device when operated within 25 meters of potential hydrocarbon sources (above ground facilities or exposed pipelines).

Acknowledgments

Grantor Field Representative _____ Phone # _____

Grantee Onsite Representative _____ Phone # _____

GRANTOR COPY



October 30, 2024

(306) 933-7653

Via email: rm501cet@sasktel.net

Aaron Neilly
Rural Municipality of Frenchman Butte No. 501
PO Box 180
PARADISE HILL SK S0M 2G0
(306) 344-2034

File number:
2024-NOWE-123

Dear Aaron Neilly:

Re: Aquatic Habitat Protection Permit for culvert replacement and roadway upgrades along Hwy 797 crossing Pipestone Creek at SE-04-54-26-W3M approximately 9.2km northwest of Frenchman Butte – NEW

Please find enclosed the Aquatic Habitat Protection Permit authorizing culvert replacement and roadway upgrades at the above location, insofar as the Aquatic Habitat Protection Program is concerned.

It is understood from your application dated October 8, 2024, and submitted by K Allen (X-Terra Environmental Services Ltd.), that the Rural Municipality of Frenchman Butte No. 501 proposes to upgrade approximately 200 metres of road surface along Grid Road 797, northwest of Frenchman Butte by upgrading the existing roadway as the existing culvert is damaged and the existing road embankment is failing.

It is further understood that the work along Hwy 797 will include replacement of the existing damaged culvert at the Pipestone Creek crossing with a new 2400mm culvert, improvements to the steep road side slopes (widening), and resurfacing. The culvert will also be realigned because the existing alignment is causing significant erosion at the outlet. Only areas necessary for proper back-slope, slope and soil stabilization and road-top widening will be disturbed. Surface disturbances will be minimized.

The replacement culvert will be installed by excavation/trenching methods immediately adjacent to the existing culvert, with a realignment of the downstream end due to erosion at the outlet. Heavy equipment including an excavator, trucks and compaction equipment will be utilized to decommission the existing culvert and installation of the new one.

Appropriate erosion and sediment control techniques and measures will be utilized during all phases of construction to ensure against erosional loss to, and migration within, the watercourse. Following culvert installation works, topsoil will be spread evenly upon the new sideslopes, ditch bottoms, and backslopes wherever disturbed. Topsoil will be placed, compacted and trimmed using a grader or bulldozer. An appropriate native grass seed mixture will be sown on all disturbed and exposed surfaces using either a mechanical seed drill or broadcaster.

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October 30, 2024

WSA highly recommends that culvert replacement work and roadway upgrades are performed during frozen conditions or during a period of low anticipated watercourse flows.

Pipestone Creek is a fish-bearing water body. WSA recommends that work be conducted outside of the *Saskatchewan In-Water Closed Construction Timing Window* for the protection of spawning fish, the incubation of eggs and early-rearing of fry, of April 16 – June 30. WSA further recommends that a fish salvage be conducted by a competent party during drawdown of the isolated work footprint. Contact Ministry of Environment to obtain fish salvage permitting at fisheries.permits@gov.sk.ca.

Records indicate the following species-at-risk have previously been identified and may exist near your work location: Whooping crane (*Grus americana*); Turkey vulture (*Cathartes aura*). It is recommended that all activity follow the *Saskatchewan Activity Restriction Guidelines for Sensitive Species* found at <https://publications.saskatchewan.ca/#/products/79241> to minimize negative impacts from work activities to these species.

If the project changes in any way from that submitted, or the conditions of the attached permit cannot be met, this permit is no longer valid. Please contact this office so that further review and approvals may be conducted.

Permit holders are reminded that the discharge of any substance that may cause an adverse effect or is covered by *The Environmental Management and Protection (Saskatchewan Environmental Code Adoption) Regulations, 2010* shall be reported to the Ministry of Environment (MOE) at 1-800-667-7525. Should you require more information on discharges and spills, please check Saskspills (<https://www.saskatchewan.ca/business/environmental-protection-and-sustainability/hazardous-materials-and-safe-waste-management>) or the MOE website (<http://www.environment.gov.sk.ca>). You may also contact the MOE Client Service Office at 1-800-567-4224.

This Aquatic Habitat Protection Permit allows you to undertake activities affecting the bed, bank and boundary of a water body or watercourse that are otherwise prohibited under subsection 38(4) of *The Environmental Management and Protection Act, 2010*. The purpose of this permit is to mitigate the environmental impacts of the proposed activities. This permit does not release you from the responsibility of obtaining any other approvals that may be required under federal, provincial or municipal legislation. The permit holder is responsible to obtain the necessary approvals from the local municipality for these improvements. Land control and access are also the responsibility of the permit holder.

If you have any questions, please contact me at (306) 933-7653 or at john.salamon@wsask.ca.

Sincerely,

WATER SECURITY AGENCY



John Salamon
Aquatic Habitat Protection Specialist
Science and Licensing Division

cc: Kirsten Allen, X-Terra Environmental Services Ltd., Saskatoon at k.allen@xtec.ca

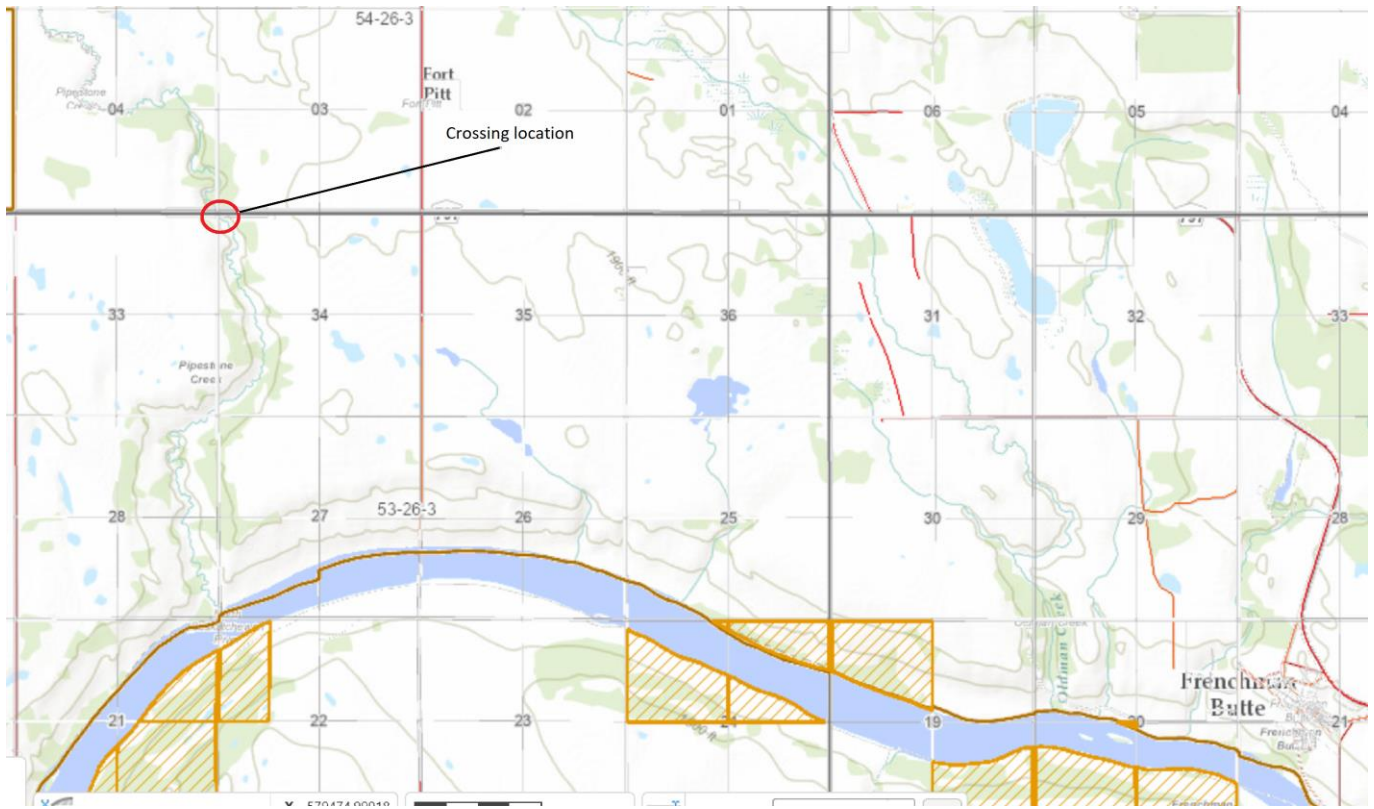


Figure 1: Site location; Culvert replacement and roadway upgrades along Hwy 797 crossing Pipestone Creek at SE-04-54-26-W3M approximately 9.2km northwest of Frenchman Butte.



AQUATIC HABITAT**PROTECTION PERMIT**

Pursuant to Section 6 of *The Environmental Management and Protection (General) Regulations, 2010*, permission is hereby granted to Aaron Neilly ("Permit Holder") on behalf of Rural Municipality of Frenchman Butte No. 501, and any authorized agents acting on behalf of Rural Municipality of Frenchman Butte No. 501, to proceed with culvert replacement and roadway upgrades along Hwy 797 crossing Pipestone Creek at SE-04-54-26-W3M approximately 9.2km northwest of Frenchman Butte, according to the application and additional plans submitted to the Water Security Agency on October 8, 2024.

This permit is issued subject to and restricted to the following conditions:

1. Contact the Water Security Agency at (306) 933-7653 or john.salamon@wsask.ca prior to commencing any earthwork associated with this project.
2. All contractors are to receive copies of all permits before they begin any work. A copy of the permit must always be on site for review by an Environment Officer.
3. Pipestone Creek is a fish-bearing water body. WSA recommends that work be conducted outside of the *Saskatchewan In-Water Closed Construction Timing Window* for the protection of spawning fish of April 16 – June 30. WSA further recommends that a fish salvage be conducted by a competent party during drawdown of the isolated work footprint. Contact Ministry of Environment to obtain fish salvage permitting at fisheries.permits@gov.sk.ca.
4. Records indicate the following species-at-risk have previously been identified and may exist near your work location: Whooping crane (*Grus americana*); Turkey vulture (*Cathartes aura*). It is recommended that all activity follow the *Saskatchewan Activity Restriction Guidelines for Sensitive Species* found at <https://publications.saskatchewan.ca/#/products/79241> to minimize negative impacts from work activities to these species.
5. No work should occur until after November 1st to coincide with the restricted activity periods for Whooping Cranes. If work needs to occur prior to November 1st or extend later than May 1st, an Environmental Monitor should be onsite to identify Whooping Cranes, and work should halt if a Whooping Crane is observed within 1000m.
6. Effective erosion and sediment control measures must be installed, monitored, maintained and replaced or upgraded as necessary prior to, during and following project completion to ensure they remain effective until the project site stabilizes and re-vegetates.
7. All disturbed project site areas, including road ditches and disturbed slopes adjacent to any water body, shall be stabilized with short and long-term erosion control measures that have been tailored to site conditions, to prevent sediment laden runoff from entering the watercourse.

8. Effective measures must be used to minimize any damage to the bed, bank or boundary of any water body or watercourse from the transport and operation of heavy equipment. Machinery and heavy equipment must be located and operated from a stable location above the natural bank.
9. Notwithstanding Condition #8, equipment may work below the bank if the work site has been made isolated.
10. No machinery or heavy equipment is to enter the water under any circumstances. The only exceptions are the use of necessary attached booms, buckets, other tools or implements.
11. Work shall be done under dry or frozen conditions. If the site is not dry or frozen, then work may occur, but only under isolated and de-watered site conditions with flows bypassed around the work site. Heavy machinery and equipment may only be used below the bank if the work site has been isolated appropriately.
12. Cofferdams must be constructed of clean, non-erodible materials such as sand bags, Aquadam-type installations, steel or wood walls, concrete blocks, clean riprap, etc. Earthen fill material containing fine sediments shall not be used unless, prior to its placement within the watercourse, it is contained using a non-erodible material that will prevent the release of sediment contained therein. Once installed, cofferdams shall be appropriately sealed, as required, to prevent the cofferdam structures from leaking.
13. Material for cofferdams must be obtained from outside the bed, bank or boundary of any watercourse or water body. Upon removal, coffer dam locations must be restored and stabilized to the approximate original width, depth and substrate of the watercourse or water body.
14. The culvert(s) must be appropriately sized to accommodate expected water flows and not result in the restriction of natural stream flow patterns.
15. The culvert(s) must be installed in a manner that will not result in it becoming perched or hanging.
16. The culvert(s) must be embedded a minimum of 20% below the watercourse bed elevation to maintain watercourse continuity.
17. The culvert inlet and outlet must be adequately protected with rock rip-rap and/or an approved alternative to prevent erosion and scour of the bed and banks.
18. No earthwork or vegetation removal will be performed outside of the Right-of-Way.
19. Excavated and stockpiled materials shall be located above the bank and stabilized to prevent erosion into any water body or watercourse.
20. Machinery and heavy equipment must arrive at the project site clean and free of fluid leaks, or accumulations of external contaminants that may include, but are not limited to oil, fuel, grease, other lubricants, soils, mud or plant materials.
21. Machinery and heavy equipment must be cleaned, fueled, serviced and stored in a manner that will not contaminate the bed, bank or boundary of any water body or watercourse. During winter, machinery and equipment must not be fuelled or serviced on ice or in drainage ditches to prevent hazardous substances from contaminating water bodies or watercourses.

22. Downstream water flow must be maintained at the natural flow rate at all times for the duration of the project. Water flows are not to be impeded.
23. The discharge areas for all pumps must be armoured with clean rock, geo-textile fabric or some other energy dissipating device to prevent erosion and scouring of the watercourse bed and bank at the points of discharge.
24. Rock riprap, gravel and other excavated material shall be obtained from outside the bed, bank or boundary of any watercourse or water body, except for materials that need to be relocated as part of the project. These materials must also be free from fine sediment or other contaminants.
25. Excavated and stockpiled materials shall be located above the bank and stabilized so they will not erode into any water body or watercourse.
26. All stationary and portable fuel tanks, pumps and engines within 100 metres of a water body or watercourse must have secondary containment capable of holding 110% of the total volume of fuel and oils.
27. Appropriately sized spill basins and/or spill kits for clean ups must always be on site and accessible. All spills of harmful substances (e.g. petroleum products) must be cleaned up and disposed of properly at approved sites.
28. All structures removed or replaced, and temporary works must be removed and disposed of appropriately.
29. Adequate precautions must be taken to prevent debris and sediment from entering the water. Any project debris entering the water must be removed as soon as practical and disposed of in approved sites. It is unacceptable to bury or burn any debris on site.
30. All spills of oil, fuel, hydraulic fluids or hazardous waste goods must be immediately contained, cleaned up and disposed of appropriately. All spills meeting or exceeding the quantities specified in the *Environmental Management and Protection (Saskatchewan Environmental Code Adoption) Regulations, 2010* must be immediately reported and handled according to the regulations. The Provincial Spill Control Centre (Spill Line) is 1-800-667-7525.
31. The Permit Holder is solely responsible for all design, safety, and workmanship aspects of all works associated with this permit.
32. The Permit Holder may be ordered to cease any or all work regarding this project if, in the Agency's opinion, the work is or may cause harm to the environment.
33. The Permit Holder may be ordered to do any further work required to rectify any actual or potential problems deemed necessary to protect the environment.
34. The Permit Holder is solely responsible for and shall obtain and maintain land control on and access to any lands impacted by the works.
35. The Permit Holder agrees to all conditions and/or orders regarding this permit.

36. This permit is valid until **March 31, 2026**. Re-application is required if further work is planned.

This permit allows you to undertake activities affecting the bed, bank and boundary of a water body or watercourse that are otherwise prohibited under subsection 38(4) of *The Environmental Management and Protection Act, 2010*. This permit does not replace or supersede any approvals, licenses or authorizations, including building permits, that may be required under municipal, provincial or federal legislation. The permit holder will maintain in force all such approvals, licenses or authorizations that may be required.

WATER SECURITY AGENCY



John Salamon
Aquatic Habitat Protection Specialist
Science and Licensing Division



Aquatic Habitat Protection Permit Application

It is an offence under section 84 (1) of EMPA, 2010 to knowingly provide false or misleading information when applying for an Aquatic Habitat Protection Permit.

SECTION 1 – APPLICANT INFORMATION

APPLICANT MAILING ADDRESS							
First Name				Last Name			
Company, Organization or Municipality (if applicable)							
Street or PO Box #				Apartment/Unit #			
City			Province			Postal Code	
Phone			Fax				
Email							

TECHNICAL CONTACT (CONTRACTOR/CONSULTANT) MAILING ADDRESS (if applicable)							
First Name				Last Name			
Company							
Street or PO Box #				Apartment/Unit #			
City			Province			Postal Code	
Phone			Fax				
Email							

FUNDING ORGANIZATION CONTACT MAILING ADDRESS (if applicable)							
First Name				Last Name			
Organization							
Name of Funding Program							
Street or PO Box #				Apartment/Unit #			
City			Province			Postal Code	
Phone			Fax				
Email							

SECTION 2 – NAME OF AFFECTED WATERCOURSE/WATER BODY

WATERCOURSE/WATER BODY

Please provide the name of watercourse(s) / water body(ies) that may be affected by the proposed work or development:

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SECTION 3 – LOCATION OF PROPOSED PROJECT

GEOGRAPHIC COORDINATES DATUM USED - NAD 83 WGS84 OTHER (PLEASE

Latitude		N	Longitude		W
----------	--	---	-----------	--	---

OR

UTM COORDINATES DATUM USED - NAD 83 WGS84 OTHER (PLEASE LIST) _____

UTM Zone		Easting		Northing	
----------	--	---------	--	----------	--

OR

LEGAL LAND DESCRIPTION (please add an appendix if more space is required)

¼ Section or LSD		Section		Township		Range		Meridian	
---------------------	--	---------	--	----------	--	-------	--	----------	--

OR

LEGAL LOT DESCRIPTION ***Mandatory for Cottage Developments***

Lot		Block or Parcel		Registered Plan #	
Street Name and Number					
Subdivision/Hamlet or Beach Name				Municipality	

SECTION 4 – REGISTERED LANDOWNER

Is the Applicant the registered landowner of the proposed project site?					YES <input type="checkbox"/>	NO <input type="checkbox"/>			
IF NO, LANDOWNER'S NAME AND CONTACT INFORMATION									
First Name					Last Name				
Company Name (if applicable)									
Phone					Email				
Is the proposed work occurring on Municipal land or Crown land or other Public land?				YES <input type="checkbox"/>	NO <input type="checkbox"/>	Name of Crown Ministry/ Agency/Municipality/Other			
You are required to obtain the permission of the Landowner or Crown or Municipality of the proposed work to occur on their land. Proof of Crown, Municipality or Landowner consent for the applicant to conduct the proposed work is attached to this application?						YES <input type="checkbox"/>			

Note: Land information will be verified, and it is the proponent's responsibility to have authorization to conduct the proposed project.

SECTION 5 – DESCRIPTION OF PROPOSED WORK

EMERGENCY WORK			
Is this project in response to an emergency circumstance related to public safety or protection of public or private infrastructure?		YES <input type="checkbox"/>	NO <input type="checkbox"/>
Explanation:			

WORK DESCRIPTION	
Please explain why this proposed work is required.	

Provide a detailed description of the work you are proposing to do including, the materials and equipment used and the order of construction activities.

Check one or both boxes that describe the construction equipment you will be using:

Hand Tools (e.g. shovel, wheelbarrow, chainsaw)

Heavy Equipment (e.g., track hoe, skid steer)

What are the proposed start and end dates of construction?

Start Date:	Month	Year	End Date:	Month	Year
-------------	-------	------	-----------	-------	------

A sketch of the site plan or design plan for proposed work is required as an attachment to this application. Graph paper for sketch is provided in Appendix A

ATTACHED

Photos of the proposed project area (including the shoreline and upstream and downstream views) with the project area clearly identified are required as an attachment to this application.

ATTACHED

Does this proposed project include the construction of a drainage works?

YES

NO

If yes, have you submitted an approval to Construct and Operate a Drainage Works to the WSA regional office?

YES

NO

SECTION 6 – PROPOSED STABILIZATION MEASURES

PROTECTION MEASURES FOR AQUATIC HABITAT AND AQUATIC ORGANISMS

Please indicate the specific habitat protection measures that will be put in place to minimize effects on aquatic organisms and their habitat. Specific details are required on how and where these protection measures will be installed. See instruction form for examples.

Pre-construction:

During construction:

Post construction:

SECTION 7 – SIGNATURE

By clicking the check box, I confirm that all data and information submitted are truthful and accurate and that no material fact has been omitted. I also acknowledge that an approval granted here does not release me from the responsibility of obtaining any other approvals that may be required under federal, provincial or municipal legislation.

Signature

Date

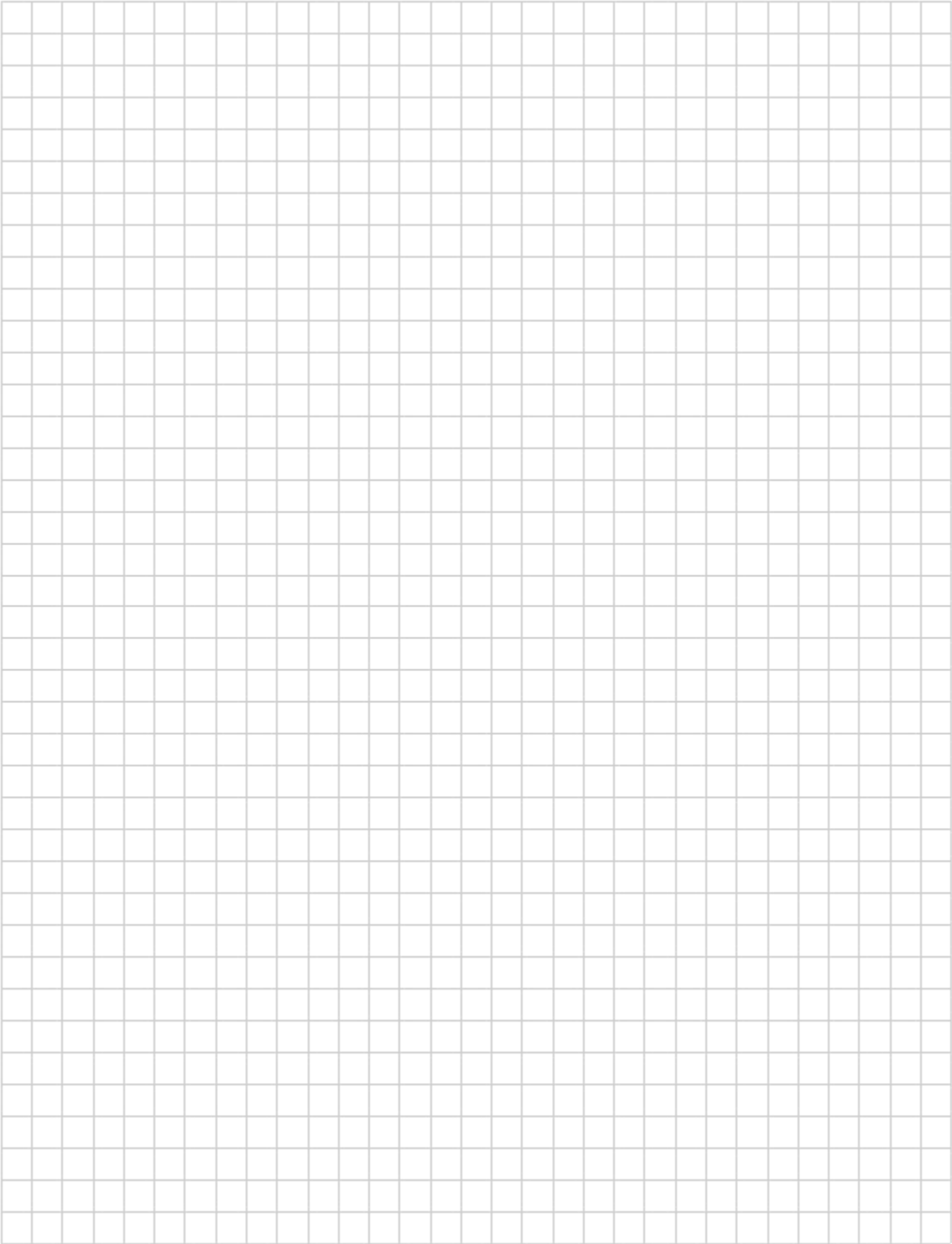
A complete application consists of:

- 1) a completed, signed application form, and
- 2) all required supporting information identified in this application form or the information page.

The Water Security Agency may require additional information during the technical review of any application considered incomplete or in the case of more complicated projects upon initial review, which may cause delays in review process.

The Water Security Agency and/or other compliance/enforcement staff may conduct inspections before, during or after proposed construction.

APPENDIX A - SITE PLAN



November 28, 2024

Our file: 24-1303

Your file: 24317

Kirsten Allen
X-Terra Environmental Services Ltd.
100 – 303 Wheeler Place
SASKATOON SK S7P 0A4
Phone: 306-373-1110
Email: k.allen@xtec.ca

Dear Kirsten Allen:

**Re: RM of Frenchman Butte No 501 – Grid Road 797
Pipestone Creek Crossing Road Upgrade and Culvert Replacement
SE-04-54-26-W3M, NE-33 & NW-34-53-26-W3
HERITAGE RESOURCE REVIEW**

Thank you for referring the proposed subdivision to this office for heritage resource review.

In determining the need for, and scope of, Heritage Resource Impact Assessment (HRIA) pursuant to s.63 of The Heritage Property Act, the following factors were considered: the presence of previously recorded heritage sites, the area's overall heritage resource potential, the extent of previous land disturbance, and the scope of new proposed land development.

No known archaeological sites have been recorded in direct conflict with the proposed grid road upgrade and culvert replacement. The project area is considered to have high heritage potential within the intact portions of terrain adjacent to Pipestone Creek. However, the area has been previously assessed under archaeological permit 11-073. Twelve shovel tests were excavated and a surface inspection was carried out, and no heritage concerns were observed. Therefore, there are no further heritage concerns under *The Heritage Property Act, 1980* regarding this project proceeding as planned.

If you have any questions regarding this review, please contact me.

Sincerely,



Heather Frary
Archaeologist





TERMS AND CONDITIONS OF SALE

Between Prairie Steel Products Ltd. (the "Seller") and Purchaser or Dealer, Builder or Buyer specified on the front hereof (the "Buyer") in connection with the sale of the Seller's material, product and services (collectively, the "Goods"). All orders with the Seller are subjected to the following terms and conditions (the "Terms and Conditions") as may be amended by the Seller from time to time in its sole discretion. By placing an order with the Seller the Buyer will be deemed to have accepted and agreed to be bound by the Terms and Conditions.

ACCEPTANCE. These Terms and Conditions shall govern the Seller's furnishing of all Goods identified in the applicable Quotation of the Seller ("Quotation") issued to the Buyer. While the Seller may acknowledge receipt of a purchase order or any other form or purchase documentation issued by a Buyer by signing and returning it, any terms and conditions in any specific order or purchase documentation used or provided by the Buyer, pre-printed or otherwise, shall be inapplicable and shall not modify these Terms and Conditions.

QUOTATIONS AND PRICES. A Quotation shall expire at the end of the period identified in the Quotation or, if none is stated the Quotation shall expire thirty (30) days from the date of issuance. The Seller's prices exclude, and the Buyer shall pay, in addition to the price of any Goods purchased from the Seller, any and all taxes or like charges which may be imposed by Canadian federal, provincial or municipal authorities on the sale or purchase of such Goods. The terms of payment are as determined by the Seller's Credit Department and as set out on the order acknowledgment.

LIMITED WARRANTIES. The Seller warrants that it can convey good title to the Goods sold under this Quotation and that such Goods are free of liens and encumbrances. The Seller warrants that any Goods sold under a Quotation that are manufactured by the Seller shall be free from any defect due to materials or workmanship for a period of one (1) year after the date of delivery. The Seller does not make, and expressly disclaims, any warranties, expressed or implied, with respect to Goods sold hereunder which are misused, abused, incorrectly unloaded or incorrectly installed. In no event will the Seller be liable or responsible for any defect in the Goods caused by improper installation or poor site conditions (e.g. dents, scrapes, coating damage, misalignment of pipe, deflection, localized bucking) on the part of the Buyer.

THE SELLER DOES NOT MAKE, AND EXPRESSLY DISCLAIMS, WITHOUT LIMITATION, ALL OTHER WARRANTIES, EXPRESS OR IMPLIED UNDER ANY "SALE OF GOODS" LEGISLATION OR OTHERWISE, OF ANY KIND, INCLUDING WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR A PARTICULAR PURPOSE, NON-INFRINGEMENT, AND THOSE WARRANTIES ALLEGEDLY ARISING FROM ANY TRADE USAGE OR FROM ANY COURSE OF DEALING OR PERFORMANCE, ETC.

BUYER REPRESENTATION AND WARRANTY. The Buyer warrants that it has not relied on any representation made by the Seller which has not been stated expressly in writing or upon any descriptions, illustration or specifications contained in any marketing or other publicity material produced by the Seller. Further, the Buyer acknowledges that to the extent the Seller has made any representation which is not otherwise expressly stated in writing, the Buyer has been provided with an opportunity to independently verify the accuracy of any such representation.

LIMITATION OF LIABILITY. The Seller's sole liability to the Buyer shall be, in the sole discretion of the Seller, to REPAIR or REPLACE such part(s) in respect of the Goods that are shown to satisfaction of the Seller to be defective in material, quality or workmanship in accordance with these Terms and Conditions, or, to allow credit to the Buyer at the sole option of the Seller.

IN NO EVENT SHALL THE SELLER BE LIABLE TO THE BUYER FOR ANY BODILY INJURY OR PROPERTY DAMAGE, OR ANY OTHER LOSS, DAMAGE, COST OF REPAIRS OR REPLACEMENT, OR INDIRECT, INCIDENTAL, PUNITIVE, SPECIAL, CONSEQUENTIAL OR LIQUIDATED DAMAGES INCURRED BY THE BUYER, INCLUDING WITHOUT

LIMITATION, DAMAGES FOR LOST BUSINESS OR PROFITS, WHETHER BASED IN CONTRACT, TORT (INCLUDING NEGLIGENCE), INDEMNITY, CONTRIBUTION, STRICT LIABILITY OR ANY OTHER CAUSE OF ACTION, ARISING OUT OF OR IN CONNECTION WITH THE DESIGN, MANUFACTURE, SALE, TRANSPORTATION, INSTALLATION, USE OR REPAIR OF THE GOODS SOLD BY THE SELLER. THE SELLER'S TOTAL LIABILITY, IF ANY, ARISING OUT OF OR IN CONNECTION WITH THE GOODS SOLD UNDER THESE TERMS AND CONDITIONS, FOR CLAIM(S) OF ANY NATURE, SHALL IN NO EVENT EXCEED THE PURCHASE PRICE OF THE GOODS RELATED TO THE CLAIM. THE LIMITATION OR EXCLUSION OF WARRANTIES, REMEDIES, DAMAGES OR LIABILITIES SET FORTH ABOVE ARE INTENDED TO APPLY TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW.

LIMITATION OF BUYER'S REMEDIES AND SELLER'S LIABILITY FOR FAILURE OR DELAY IN DELIVERY. NO DELIVERY DATES ARE GUARANTEED BY THE SELLER. All promises as to the date of shipment and delivery are made in good faith by the Seller and as an estimate only. THE BUYER'S SOLE AND EXCLUSIVE REMEDIES AND SELLER'S ONLY LIABILITY FOR ANY DELAY IN DELIVERY SHALL BE LIMITED AS SET FORTH IN THESE TERMS AND CONDITIONS.

CLAIMS AND HOLDBACKS. Under no circumstances will the Seller accept back charges, claims and holdbacks unless otherwise authorized in writing by the Seller in advance.

FORCE MAJEURE Notwithstanding any provision herein to the contrary, the Seller shall not be deemed to have defaulted under or breached these Terms and Conditions for failure or delay in fulfilling or performing any term or provision of these Terms and Conditions when such failure or delay is caused by any of the following: fire; flood; accident; explosion; equipment or machinery breakdown not related to the Seller's negligence; sabotage; strike or any labor disturbance (regardless of the reasonableness of the demands of labor); civil commotions; riots; invasions; wars (present or future); epidemics or pandemics (present or future); acts, restraints, requisitions, regulations or directions of any Governmental authority, including without limitation, any bulletin, notice or public health communication related to any disease, virus or other biological or physical agent which may be detrimental to human health in any way; voluntary or mandatory compliance by the Seller with any request of any Governmental authority; shortage of labor, fuel, power or raw materials; inability to obtain supplies; failures of normal sources of supplies; inability to obtain or delays of transportation facilities; any act of God; any act or omission of the Purchaser/Buyer (insofar as the Seller or the transactions or arrangements contemplated by these Terms and Conditions are concerned); or any other cause or circumstance beyond the Seller's reasonable control, whether similar or dissimilar to any of the foregoing. Any such causes of delay even though existing on the date of order or on the date of starting of manufacture shall extend the time of the Seller's performance by the length of delays occasioned thereby, including delays reasonably incidental to the resumption of normal procedures.

BUYER'S CANCELLATION. Upon written notice, the Buyer has the right to terminate the agreement formed by the Buyer's acceptance of a Quotation (an "Agreement") in whole or in part. In the event of cancellation, the Seller shall cease work upon receipt of written notice from the Buyer and the Buyer shall be liable for all completed work to that date at the price specified in the particular Quotation. Any partially completed work by the Seller, including raw material, shall be payable by the Buyer to the Seller at a reasonable rate and profit to be determined by the Seller in its discretion, but in no event shall exceed the applicable

Quotation price.

SELLER'S CANCELLATION OR DELAYED SHIPPING. Upon written notice to the Buyer, the Seller has the right to terminate an Agreement outright or to delay the shipping of any Goods forthwith, at the Seller's sole option, if the Buyer's account with the Seller is in arrears.

DESIGN & STANDARDS. It is the Buyer's sole responsibility to ensure that any Goods commissioned by the Buyer are independently designed and verified by a qualified engineer and are suitable for the Buyer's intended application. The Buyer represents, warrants and confirms to the Seller that it has not relied in any aspect of any written or oral statements from Seller in connection with the design, installation, or use of the Goods. If the Seller provides any design and installation guidelines or any specifications whatsoever in respect of the Goods, all Goods supplied by the Seller in connection therewith shall conform to the specifications and parameters requested by the Buyer; any onsite modifications, changes in site conditions, changes in design requirements or specifications are done at the sole risk of the Buyer. Unless otherwise expressly agreed upon in writing by the Seller, all Goods shall be subject to the Seller's standard specifications, manufacturing variations, and tolerances.

Without limiting the foregoing, for MultiPlate and BridgePlate structure Goods, whether purchased from or designed by the Seller or parties other than the Seller, it is the Buyer's responsibility to ensure that all components of any MultiPlate and BridgePlate structures purchased fit together and can be assembled by the Buyer on site based on the combination of thickness, radius and shape of the components ("Constructible"). For certainty, the Seller is not responsible for ensuring that the MultiPlate and BridgePlate structures purchased by the Buyer are Constructible and shall not be liable for any MultiPlate or BridgePlate structures which are not Constructible.

INSURANCE. The Buyer shall maintain, at its sole cost, such insurance and in such amounts as is normally required in the applicable industry including, without limitation, comprehensive general liability insurance and builders' risk insurance (covering the Seller). The Buyer hereby agrees to indemnify the Seller, its servants, representatives and agents against any liability, claims, suits, costs, damages, losses, expenses or otherwise arising out of any injury (including death or total destruction) to any person or property which arises out of or results from the Buyers installation or use of goods supplied hereunder.

The Seller shall maintain the following insurance over the duration of an Agreement: (i) COMMERCIAL GENERAL LIABILITY INSURANCE, including product liability, with a limit not less than three million (\$3,000,000) per occurrence and not less than three million (\$3,000,000) dollars in the aggregate; (ii) AUTOMOBILE LIABILITY COVERAGE, with a limit not less than two million (\$2,000,000) dollars per occurrence and not less than two million (\$2,000,000) dollars in the aggregate; (iii) WORKERS COMPENSATION INSURANCE, which coverage shall be maintained by Seller in respect of all employees in accordance with the applicable statutory requirements having jurisdiction over such employees. Upon request, Seller shall provide written confirmation in respect of the above-listed policies to the Buyer.

INTELLECTUAL PROPERTY RIGHTS AND PATENTS. The Buyer shall indemnify and hold harmless the Seller for any legal fees, costs, expenses or other damages, for any claim or other legal action for the breach or alleged breach of any intellectual property rights in respect of any Goods made by



TERMS AND CONDITIONS OF SALE

the Seller in accordance with the Buyer's drawings, designs, or other specifications whatsoever.

CONFIDENTIALITY. These Terms and Conditions and any Agreement shall be confidential between the Buyer and Seller. The Seller will not publish or disclose any details, scope of work, drawings or specifications governed by these Terms and Conditions without the prior written consent of Buyer. These obligations shall survive the termination of this contract for a period of not less than one (1) year from date of any Quotation. Both the Seller and the Buyer shall keep confidential and prevent the unauthorized disclosure of information disclosed by the other party which is confidential by its nature including, without limitation, technical, commercial, financial, operational or strategic information relating to the business of a party, on any verbal, visual or written medium, whether it is marked confidential or restricted or not. The receiving party shall protect such confidential information from third parties using the same degree that it uses for its own confidential information.

INSPECTIONS AND RETURNS. The Buyer acknowledges that it is the **Buyer's responsibility** to count and inspect the shipped Goods and that the Buyer shall be responsible for inspection upon delivery. The Buyer shall notify the Seller within one (1) day of receipt of goods, and before the Goods are covered or put out of sight, of any deficiencies, shortages, or defects and provide the Seller with reasonable opportunity to inspect these deficiencies. The Seller will not be liable for any deficiencies, shortages or defects alleged with respect to the Goods after the expiry of the one (1) day period.

The Buyer shall not return any Goods without obtaining prior written authorization from the Seller. Upon such authorization, the Seller can arrange for a carrier to pick-up the Goods for return at the Buyer's sole expense. The Seller's standard return policy for STANDARD GOODS is twenty-five (25%) percent of the Invoice purchase price plus any additional freight cost incurred by the Seller. It is at the Seller's sole discretion to accept the return of any CUSTOM GOODS OR ENGINEERED PRODUCTS. The Seller shall under no circumstances be liable for any costs incurred by the Buyer in returning Goods to the Seller.

INSPECTION AND AUDIT. Upon reasonable notice, the Buyer or their third party Representative shall have the right to inspect their Goods in fabrication or storage at the Seller's property. At all reasonable times the Seller will provide the Buyer with safe and convenient access to the Goods for inspection. The Buyer must follow all of the Seller's Health and Safety Practices while on property. Inspection by the Buyer shall not constitute acceptance of the applicable Goods, including any finished or work in process. The Buyer's representative may not be a direct or indirect competitor of the Seller. Upon reasonable notice, the Buyer shall have the right to audit all quality control records, production documentation and steel certification as it pertains to their Goods. Notwithstanding that the Seller may be on site during the unloading, installation or assembly of the Goods, the Buyer shall be solely responsible and the Seller shall have no responsibility or liability whatsoever for, any installation and assembly of Goods in accordance with contract documents or specifications.

QUALITY ASSURANCE/QUALITY CONTROL. The Seller agrees to maintain a Quality Control ("QC") Program. Upon reasonable request, the Seller shall provide the Buyer with details in respect of the QC Program as it pertains to their Goods.

WHERE PURCHASE PRICE NOT PAID IN FULL. Seller shall retain a purchase money security interest (PMSI) in the Goods sold to the applicant everywhere in Canada, except for Quebec where it will have a moveable hypothec in the amount of the Invoice purchase price plus any applicable

interest, until the full Invoice purchase price shall have been paid to the Seller.

TITLE AND RISK OF LOSS. Unless otherwise specified in the applicable Quotation, title to the Goods and risk of loss shall pass to the Buyer, the Buyer's representative, or Buyer's common carrier, as applicable, upon loading of the Goods at Seller's location. Seller shall have no responsibility for any damages or losses attributable to Buyer, or Buyer's carrier transporting the Goods or otherwise from that point. In the event a Quotation specifies F.C.A. jobsite, the risk of loss shall pass to the Buyer at the time of arrival of the Goods at the specified jobsite and prior to unloading the Goods.

TERMS OF PAYMENT. The standard terms of payment under an Agreement are as determined by the Seller's Credit Department and as set out on the Seller's order acknowledgement. Shipment and deliveries of any Goods shall at all times be subject to the approval of the Credit Department of the Seller. The Seller reserves the right to obtain satisfactory security, full or partial payment, and copies of any material bonds prior to shipping Goods to ensure performance of an Agreement. The Seller shall retain a purchase money security interest (PMSI) in all Goods and the proceeds thereof until the Buyer has made payment in full to the Seller of all sums due, including processing and late charges and any collection costs. The Buyer agrees to complete Seller's Application for Credit and provide financial information or such other documents requested by the Seller as may be reasonably necessary to perfect such security interest. Interest on any outstanding amount payable by the Buyer to the Seller shall be charged by the Seller to the Buyer at the rate of 1.5% per month (19.6% per annum) on any Invoices past due.

DELIVERY AND FREIGHT CONDITIONS. Unless otherwise specified in the applicable Quotation or subsequent written agreement between the parties, terms of delivery shall be F.C.A. the Seller point of manufacture (i.e. the Seller shall be responsible for loading the Goods on to the delivery vehicle and after the loading has been completed, the Goods shall be at the risk of the Buyer). If transportation charges are incorporated in the price quoted on the Quotation, such charges are freight prepaid unless otherwise specified. The Seller is authorized to ship any Goods in installments as may be considered appropriate by the Seller in its sole discretion.

SEVERABILITY. If any provision of the Terms and Conditions is held to be invalid or unenforceable for any reason, the remaining provisions shall continue to be valid and enforceable. If a court finds that any provision hereof is invalid or unenforceable but, that by limiting such provision it would become valid or enforceable, then such provision shall be deemed to be written, construed and enforced to be so limited.

NON-WAIVER. The waiver by the Seller of any breach of any provision contained herein shall not be deemed to be a waiver of such provision on any subsequent breach of the same or any other provision contained herein.

NOTICE. Any notices required or permitted to be given to the Seller pursuant to these Terms and Conditions shall be in writing and acknowledged by Seller.

ASSIGNMENT. The Buyer shall not assign its rights nor delegate its duties under these Terms and Conditions without the prior written consent of the Seller and any attempted assignment without such consent will be void. However, the Seller may assign or otherwise transfer its rights or delegate its duties under these Terms and Conditions, in whole or in part and subject to these Terms and Conditions, to a subsidiary or affiliate, or a purchase or transferee of substantially all of the assets used by such party in its business to which these Terms and Conditions

relates or in the event of a merger, acquisition, corporate restructuring or change in control, upon written notice of same to the Buyer.

HEADINGS. Headings used in these Terms and Conditions are for ease of reference only and will not be used to interpret any part of these Terms and Conditions.

CURRENCY. Unless expressly stated otherwise in a Quotation (on a case-by-case basis) or a subsequent agreement in writing between the Seller and the Buyer, all references to currency herein shall be in Canadian dollars.

CONFLICTING PROVISIONS OFFERED BY BUYER. FOR ABSOLUTE CERTAINTY, any terms and conditions of any form, purchase order or other purchase or order documentation whatsoever issued by the Buyer, in connection with a Quotation, which purport to be a modification of, in addition to or inconsistent with the Terms and Conditions express herein, shall not be binding on the Seller nor will such terms modify, add to, or detract from the Terms and Conditions or to any matter to which the Terms and Conditions applies in any way whatsoever.

GOVERNING LAW AND DISPUTE RESOLUTION. This Agreement shall be governed in all respects by the laws of the Province of Manitoba and the federal laws of Canada applicable therein, without regard to conflict of laws principles. The Buyer and Seller specifically agree that any claim, proceeding, legal action or dispute resolution relating to this contract shall be brought in Winnipeg, Manitoba.

ENTIRE AGREEMENT. These Terms and Conditions, in addition to the applicable Quotation, contain the complete and exclusive statement of the terms of agreement with the parties with respect to the subject matter and supersede all prior and contemporaneous understandings, representations and warranties, written and oral.

Culvert Tender Supply Assurance Agreement

Parties Involved:

1. Prairie Steel Products Ltd. (hereinafter referred to as "Supplier").
2. Rural Municipality of Frenchman Butte (hereinafter referred to as "RM").

Purpose of Agreement: This agreement ensures that Prairie Steel will sell the culverts required for the Pipestone Creek Culvert Replacement as outlined in Quote #59181-24, dated December 17, 2024, for the quoted price of \$148,099.09 (inclusive of GST and PST). The Supplier agrees to sell the culverts directly to the contractor awarded the tender or, if necessary, to the RM, at the same quoted price.

Terms and Conditions:

1. **Price Guarantee:** Prairie Steel guarantees the quoted price as outlined in Quote #59181-24 and agrees to honor this price until the awarded contractor purchases the culvert.
2. **Purchase Commitment:**
If the contractor awarded the tender does not purchase the culverts, the RM will purchase them directly from Prairie Steel for the quoted price.
3. **Direct Sale to Contractor:** Prairie Steel agrees to sell the culverts directly to the contractor awarded the project by the RM at the quoted price.
4. **Compliance with Standards:** All culverts supplied will conform to CSA-G401 standards as per the original quotation.
5. **Delivery Terms:** Delivery will be as directed by the contractor or the RM and will align with the project schedule.
6. **Payment Terms:** Payment will be made by either the contractor or the RM, depending on the purchasing party, as per the terms outlined in Prairie Steel's terms and conditions.
7. **Duration of Agreement:** This agreement remains in effect until the full delivery of the culverts.
8. **Modification or Termination:** Any modifications to this agreement must be in writing and signed by both parties. Termination before the 60-day period requires mutual agreement.

Signatures:

For Prairie Steel Products Ltd.:

Name: _____

Position: _____

Date: _____

For RM of Frenchman Butte:

Name: _____

Position: _____

Date: _____



BAR
ENGINEERING

780.875.1683

5237 - 70 Avenue
Lloydminster, AB/SK
T9V 3N6