Tenney, Chad TH:EX

From: Dupas, Jacques TH:EX
Sent: Tuesday, January 18, 2000 11:09 AM
To: Tenney, Chad TH:EX
Cc: Vaughan-Irving, Gerald TH:EX
Subject: FW: Passmore Slide

We will monitor for movement in the Spring.

Larry Brown
A/District Highways Manager

-----Original Message-----
From: Vaughan-Irving, Gerald TH:EX
Sent: Tuesday, January 18, 2000 10:54 AM
To: Dupas, Jacques TH:EX
Subject: RE: Passmore Slide

On Dec.22,1999 VSA went in and removed new slough and resloped the bank.

Jacques figures it will move again in the spring.

Gerald

-----Original Message-----
From: Dupas, Jacques TH:EX
Sent: Tuesday, January 18, 2000 10:46 AM
To: Vaughan-Irving, Gerald TH:EX
Subject: FW: Passmore Slide

Gerald,

Can you update me on this?

Larry Brown
A/District Highways Manager
-----Original Message-----
From: Dupas, Jacques TH:EX
Sent: Wednesday, December 01, 1999 3:18 PM
To: Dupas, Jacques TH:EX
Subject: FW: Passmore Slide

-----Original Message-----
From: Tenney, Chad TH:EX
Sent: Wednesday, December 01, 1999 9:41 AM
To: Bailey, Brent TH:EX
Cc: Dupas, Jacques TH:EX; Walsh, Mike TH:EX
Subject: Passmore Slide

Brent,

It is understood that VSA began construction for the winter remediation of the Passmore Slide during the week of November 22, 1999. I visited the site on November 24, 1999 to see how the construction was progressing. When I arrived on site I noticed that the construction was not following the design that was submitted to the district on November 2, 1999.

The contractor had removed the toe of the slide and oversteepened the slope face. The recommended slope angle was 2H:1V. The contractor had cut the slope at an angle of approximately 1H:1V and in some places the slope was near vertical. The reason the design was for 2H:1V is due to the high silt content of the material.

It is also understood from talking to you yesterday that the ditch and drain have been completed, but the unstable slope angle has not yet been addressed by the contractor.

It is recommended that this slope be graded to a slope angle of 2H:1V. If this slope angle is not achieved there are two main concerns.

(1) The slope will continue to slough, depositing silt into the ditch and completely plugging the filter cloth making the drainage system ineffective as well as causing a maintenance issue.

(2) There is a safety issue associated with the current slope angle. There is the possibility that this slope could fail and cause a large deposit of material onto the highway.

For your files I have attached two photographs that were taken on November 24, 1999.

If you have any questions or comments please do not hesitate to call.

Chad

<< File: passmore1.bmp >> << File: passmore2.bmp >>

Chad Tenney, E.I.T.
Geotechnical Engineer
610 Lakeside Drive
Nelson BC V1L 5S7
Ph: (250) 354-6954
Fax: (250) 354-6619

Tenney, Chad TH:EX

From: Tenney, Chad TH:EX
Sent: Tuesday, February 22, 2000 3:10 PM
To: Dupas, Jacques TH:EX; Atkins, Brian TH:EX; Vaughan-Irving, Gerald TH:EX
Cc: Walsh, Mike TH:EX; Gerraghty, David TH:EX; Nesbitt, Richard TH:EX
Subject: Passmore Slide

At approximately 11:00 pm February 21, 2000 a mudslide occurred at the Passmore Slide site on Highway 6.

A site visit was conducted this morning by myself and Brian Atkins, Acting Area Manager. The material had been removed from the road and placed on the shoulder of the southbound lane.

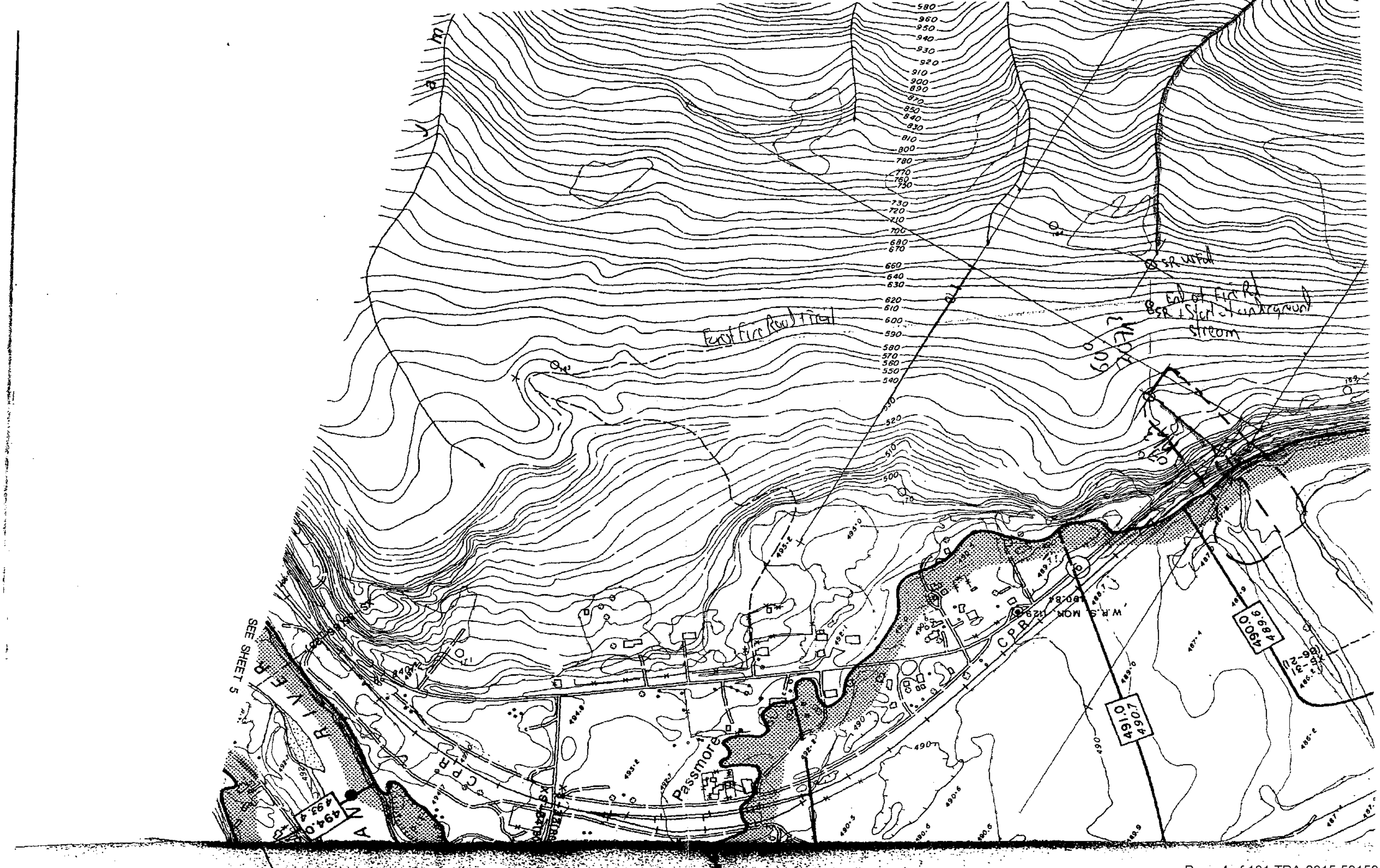
The material is saturated and still unstable. It is recommended that 24 hour flagging be in place as long as it is raining. One flag person should act as a spotter for the slide.

It is recommended that no construction work be completed until the rain has stopped. Once the rain has stopped, it is recommended that the slide site be re-evaluated by the geotechnical branch.

I am currently looking at the cross sections and I will provide a slope angle and limits of excavation for remediation later this week. It should be recognized by the District that excavating the slope will not provide a long term solution to the problem.

If there are any further questions or comments please feel free to contact me at your earliest convenience.

Chad Tenney, EIT
Ministry of Transportation & Highways
Geotechnical & Materials Engineering - Region 3
Phone: (250) 354-6954 Fax: (250) 354-6619


SEE SHEET 5
Passmore
CPR
491.0
490.7
490.0
489.6
494.0
493.4
End of Fire Rd
stream

53571
87690 525 FI

53722
87581
540 FI

5488000

5487000

PASSMORE

D.L. 4812

HIGHWAY 6

P. 4577

P. 4277

P. 89814'

P. 4587

P. 124923'

P. 17969'

P. 17968'

P. 5129

P. 5121

P. 4915

P. 4178

P. 73727'

P. 35807'

Purchased 55

6-37

PASSMORE OLD RD # 39

C.P.R.

P. 638 c

TPP

D.L. 4812

D.L. 9302

P. R/W 170

B
P. 2950

D.L. 12800

N90°E

655m

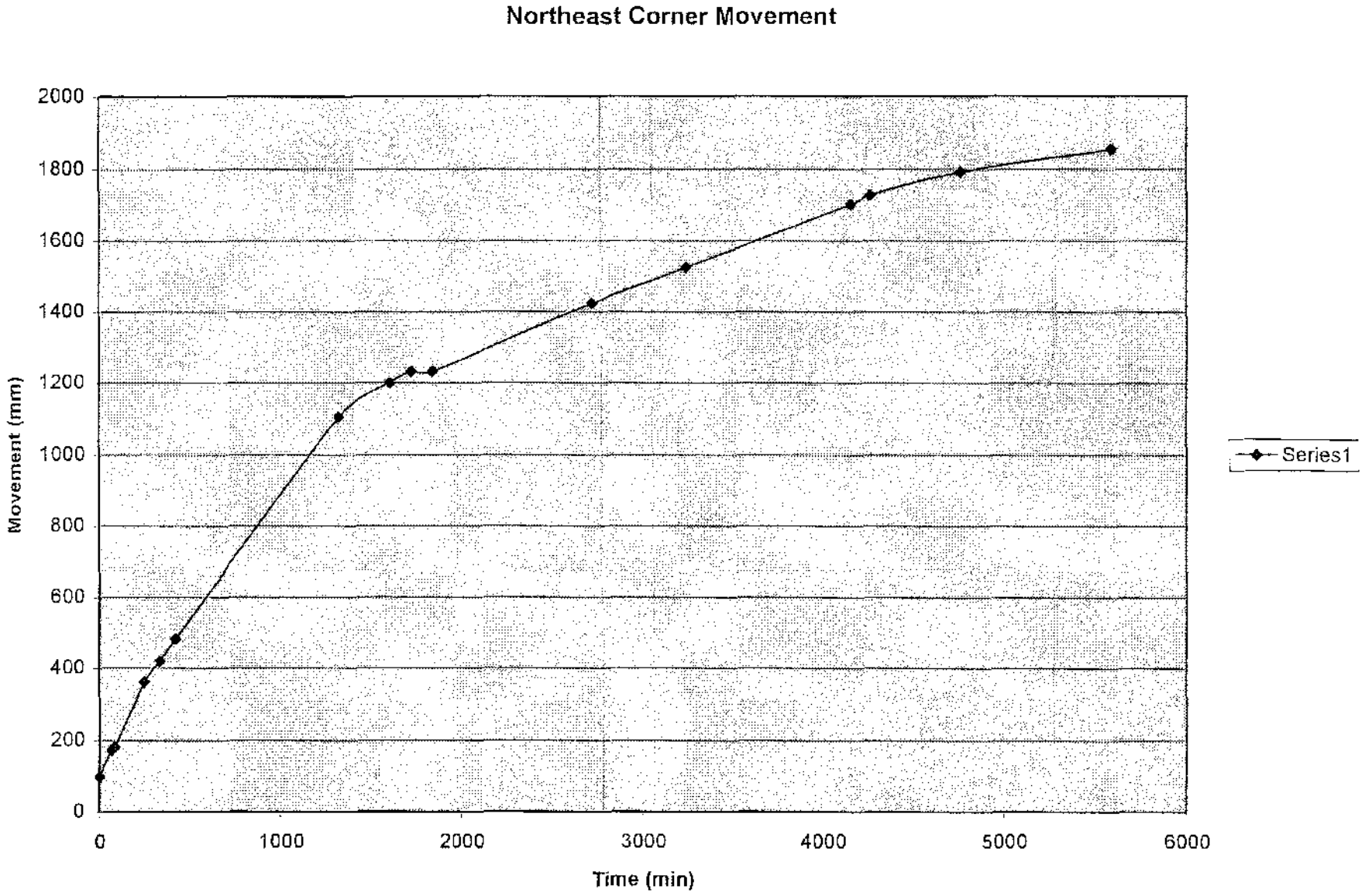
Underground Stream Under R/W

548700 0

Page 006

Withheld pursuant to/removed as

Copyright


Northeast Corner Movement
Movement (mm)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
1000
2000
3000
4000
5000
6000
Time (min)
Series1

Ministry of Transportation and Highways
Geotechnical and Materials Branch
DESIGN CALCULATION SHEET

File No. _____

Project Passmore Slide

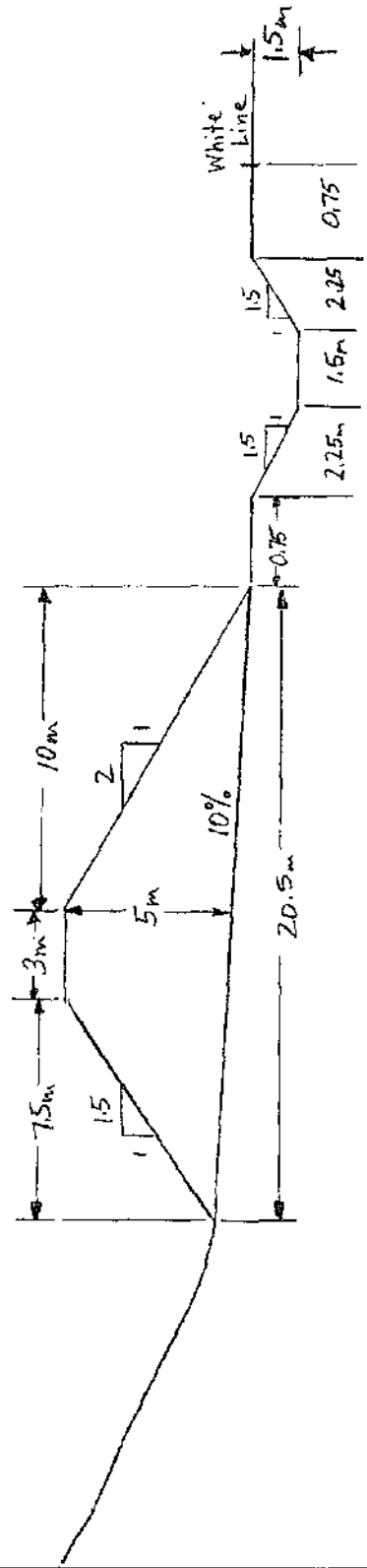
Date April 18, 2000

Region _____ **District** _____

Calculation by CRT

Sheet 1 **of** ____

Passmore Slide - Debris Retention Berm



Debris Retention Berm.

① Berm foundation should be covered with woven geotextile. The geotextile should be rolled out long enough to allow for it to be wrapped over the top of the rock layer.

② Rock thickness of 1.5m should be placed on the geotextile.

③ The remainder of the berm can be constructed out of the granular material deposited by the slide.

H-174 (Rev. 08/95 Speedy Printing)

Ministry of Transportation and Highways
Geotechnical and Materials Branch
DESIGN CALCULATION SHEET

File No. _____

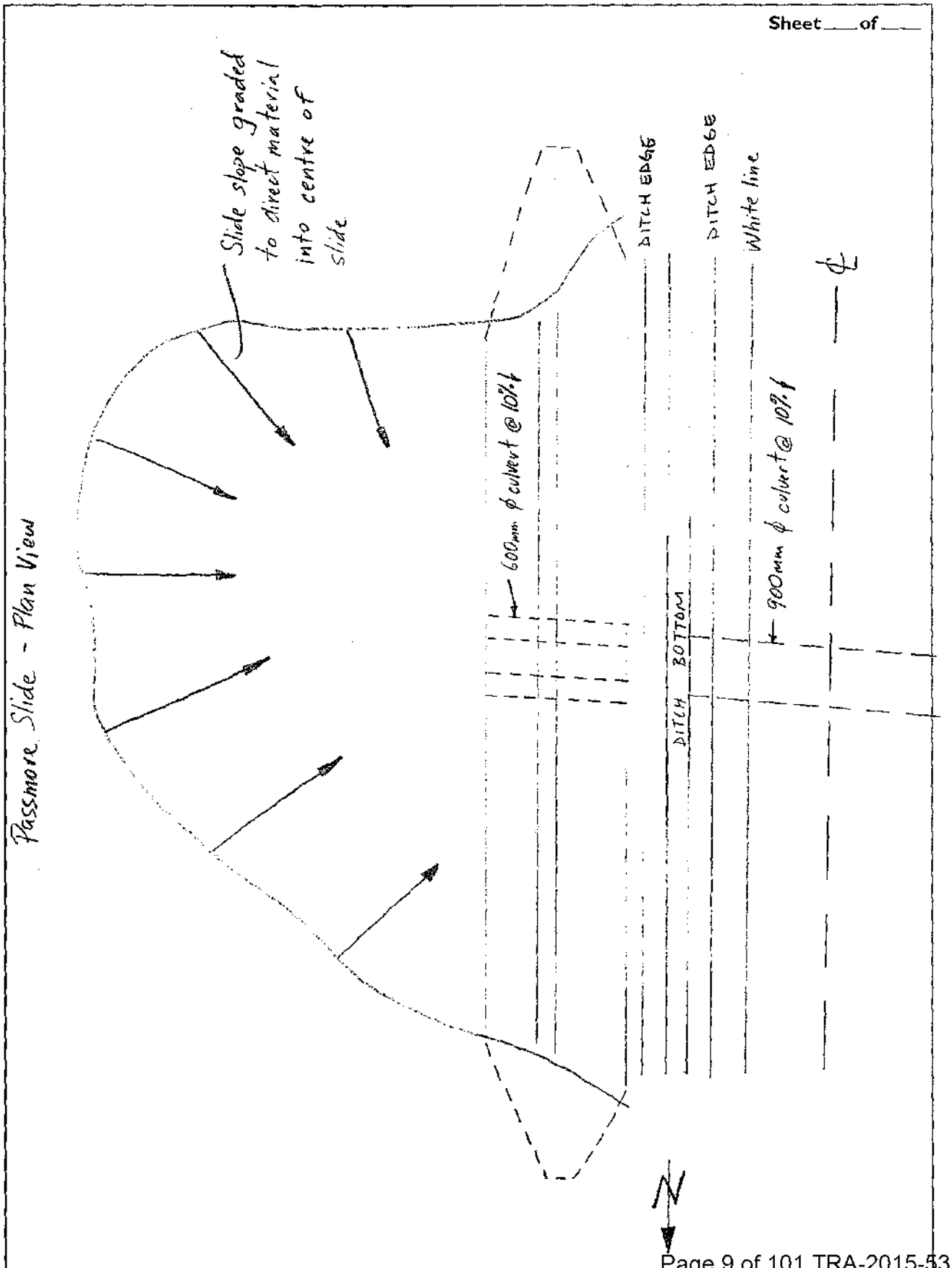
Project Passmore Slide

Date April 18, 2000

Region _____ **District** _____

Calculation by CRT

Sheet ___ of ___



H 174 (Rev. 08/95 Speedy Printing)

D.L. 12800

Debris Retention Berm

Access Road to back of berm

Pcl. C

EXP PLAN
35807 I

D.L. 4812

SLOCAN CITY

NELSON

SLOCAN RIVER

OLD CPR RAILWAY GRADE

C.P.R. R/W PLAN 638C

P.O.T. 5+00.000

T.S. 5+39.572

S.C. 5+89.572

R 920
Δ 6. 08. 08.
ΔC 3. 01. 18.
AD. 74.312
ARC 48.519
ES 1.434

B. L. 50.000
B. 1.33'25"

C.S. 6+38.090

S.T. 6+88.090

S. 7+21.631

R 209
Δ 27. 24. 50.
ΔC 10. 57. 55.
AD. 81.136
ARC 39.999
ES 6.865

S.C. 7+81.630

C.S. 8+21.631

L. 60.000
B. 8.13'27"

S.T. 8+81.631

P.O.T. 8+93.159

SCALE 0 1:500 25

Rev	Date	REVISIONS	Signature

Province of British Columbia
MINISTRY OF TRANSPORTATION AND HIGHWAYS
PROFESSIONAL SERVICES
SURVEY AND ENGINEERING BRANCH

PLAN
PASSMORE SLIDE
HIGHWAY #8

DESIGNED ____ DATE ____
QUALITY CONTROL ____ DATE ____
DRAWN LK DATE JULY 1995

PROJECT No. 31513
REG. 3
DRAWING No. 1 OF 1

Post-it™ Fax Note 7671E	Date MAY 10	# of pages ▸ 1
To CHAD	From KELLY	
Co./Dept. MOTH	Co. NILEX	
Phone #	Phone # 604-420-6433	
Fax # 250 - 354-6617	Fax # 604-420-0445	

VernoGuard™IG 30

Industrial Grade 30 Mil PVC

VernoGuard™IG is a specially formulated[1] PVC product to provide the optimum performance. The table highlights the typical physical properties.

Typical Properties	Test Method	Product Values
Thickness (Gauge) Mils ± 5% Metric	ASTM D1593	30 (0.03") 0.76 mm.
Specific Gravity	ASTM D792	1.21
Tensile Properties Spec. (Typical)	ASTM D882	
Break Strength Lbs./in.	Method A (MD & TD)	81 / 80
Elongation at Break %	Method A (MD & TD)	560 / 590
Modulus at 100%	Method A (MD & TD)	32 / 31
Tear Resistance. Lbs./in.	ASTM D1004, Die C	10 / 10
Low Temp. Pass ° C	ASTM D1790	-31
Dimensional Stability	ASTM D1204 (MD & TD)	2.0
Water Extraction	ASTM D3083	0.10
Volatile Loss	ASTM D1203 (A)	0.60
Resistance to Soil Burial	ASTM D3083	Pass
Breaking Factor		5%
Elongation at Break		20%
100% Modulus		20%
Water Vapor Transmission cm/sec (max)	ASTM D814	5.0×10^{-9}
Hydrostatic Resist. lbs./in.²	ASTM D751 (A)	93
Seam Properties	ASTM D413	
Peel Strength, lbs./in.(min.)		15
Shear Strength, lbs./in.(min.)		58.4
Specification #	Vernon Plastic Ref.	VP.EPG.PVC.IG30 REV.3/99

Typical uses for VernoGuard™IG products include:

• Landfill lining and capping • Pond and lagoon liners • Landscaping • Dam Facing
• Dike and levy liners • Waterproofing • Construction • Emergency Containment

A more detailed list of uses is shown in the general VernoGuard™ brochure [2].

VernoGuard™IG products are available in 20, 30, 40 and 60 mils. It is also available in custom thicknesses in both unsupported IG and fabric reinforced IG-R.

Contact Customer Service for additional information on this and other Vernon products.

Notes:

1. Formulations to conform to PGT 1197 specifications are available
2. VernoGuard™ brochure is available through 'Customer Service Department'

VERNON PLASTICS
SHELLEY ROAD, P.O. BOX 8248, HAVERHILL, MA 01835-0748
TELEPHONE 978-373-1551 • FAX 978-373-6562 • WWW.VERNONPLASTICS.COM

Post-it™ Fax Note 7671E	Date MAY 10	# of pages ▸ 1
To CHAD	From KELLY	
Co./Dept. MOTH	Co. NILEX	
Phone #	Phone # 604-420-6433	
Fax # 250-354-6619	Fax # 604-420-0445	

VernoGuard™IG 40

Industrial Grade 40 Mil PVC

VernoGuard™IG is a specially formulated[1] PVC product to provide the optimum performance. The table highlights the typical physical properties.

Typical Properties	Test Method	Product Values
Thickness (Gauge) Mils ± 5% Metric	**ASTM D1593**	**40 (0.04") 1.00 mm.**
Specific Gravity	ASTM D792	1.21
Tensile Properties Spec. (Typical) Break Strength, Lbs./in. Elongation at Break % Modulus at 100%	ASTM D882 Method A (MD & TD) Method A (MD & TD) Method A (MD & TD)	 108 / 104 570 / 600 41 / 40
Tear Resistance, Lbs./in.	ASTM D1004, Die C	12 / 12
Low Temp. Pass ° C	ASTM D1790	-31
Dimensional Stability	ASTM D1204 (MD & TD)	2.0
Water Extraction	ASTM D3083	0.10
Volatile Loss	ASTM D1203 (A)	0.60
Resistance to Soil Burial Breaking Factor Elongation at Break 100% Modulus	ASTM D3083	Pass 5% 20% 20%
Water Vapor Transmission cm/sec (max)	ASTM D814	5.0×10^{-9}
Hydrostatic Resist. lbs./in².	ASTM D751 (A)	120
Seam Properties Peel Strength, lbs./in.(min.) Shear Strength, lbs./in.(min.)	ASTM D413	 15 77.6
Specification #	Vernon Plastic Ref.	VP.EPG.PVC.IG40 REV.3/99

Typical uses for VernoGuard™IG products include:

• Landfill lining and capping • Pond and lagoon liners • Landscaping • Dam Facing
• Dike and levy lining • Waterproofing • Construction • Emergency Containment

A more detailed list of uses is provided in the general brochure [2].

VernoGuard™IG products are available in 20, 30, 40 and 60 mils. It is also available in custom thicknesses in both unsupported IG and fabric reinforced IG-R.

Contact Customer Service for additional information on this and other Vernon products.

Notes:

1. Formulations to conform to PGT 1197 specifications are available
2. VernoGuard™ brochure is available by contacting 'Customer Service'

VERNON PLASTICS

SHELLEY ROAD, P.O. BOX 8248, HAVERHILL, MA 01835-0748
TELEPHONE 978-373-1551 • FAX 978-373-6562 • WWW.VERNONPLASTICS.COM

SALES ORDER/PACKING SLIP

NILEX INC.

Pacific & YT
3963 Phillips Avenue
Burnaby, BC Canada
V5A 3K4
PHONE: (604) 420-6433
FAX: (604) 420-0445

South Prairie & SK
1521 Hastings Crescent SE
Calgary, AB Canada
T2G 4C8
PHONE: (403) 543-5454
FAX: (403) 543-5455

North Prairie & NT
9304 - 39 Avenue
Edmonton, AB Canada
T6E 5T9
PHONE: (780) 463-9535
FAX: (780) 463-1773

Manitoba & N.Ont.
14 Bangor Avenue
Winnipeg, MB Canada
R3E 3B4
PHONE: (204) 925-4466
FAX: (204) 775-9286

NUMBER	PAGE
102466	1

DATE: May 11 00

SOLD TO
BC MINISTRY OF TRANSPORTATION
COMP. NO. 1 LAKESIDE DRI
GROUP BOX
NELSON, BC
V1L 6B9

SHIP TO
BC MINISTRY OF TRANSPORTATION
610 LAKESIDE DRIVE
C/O GEOTECHNICAL & MAT'L
NELSON, BC
CANADA

CUSTOMER NO.	PURCHASE ORDER NO.	ORDERED BY:	SHIP VIA	DATE REQUIRED		FREIGHT TERMS	TERMS
LECM56 KD	PASS MORE	CHAD	CANADIAN FREI	May 11 00		NILEX	NET 30 DAYS

ITEM DESCRIPTION	QUANTITY ORDERED	QUANTITY SHIPPED	U/M	UNIT PRICE	EXTENDED PRICE
40MIL INDUSTRIAL GRADE PV	116.80			4.78	558.30
1 40MIL PVC PANEL @ 10M X 11.68M					
FREIGHT CHARGE	1.00			71.50	71.50
WHEN SHIPPING USE CFL QUOTE # WAI784629					

Post-it™ Fax Note 7671E | Date MAY 10 | # of pages ▸ 1
To CHAD | From KELLY
Co./Dept. MOTH | Co. NILEX
Phone # | Phone # 604-420-6433
Fax # 250-354-6619 | Fax # 604-420-0445

SUBTOTAL	629.80
PST	
GST	
TOTAL	

RECEIPT OF GOODS ACKNOWLEDGED: _____

DATE: _____ _____
(PRINT FULL NAME)

THANK YOU FOR YOUR ORDER. PLEASE CALL US TO REORDER OR FOR TECHNICAL ASSISTANCE.

ITEMS ON BACK ORDER WILL BE COMPLETED UNLESS WE ARE OTHERWISE ADVISED BY RETURN MAIL.
ALWAYS COMMUNICATE WITH US BEFORE RETURNING GOODS. RETURNS WILL NOT BE ACCEPTED WITHOUT OUR PRIOR CONSENT ... CUSTOM FABRICATED ITEMS ARE NON-RETURNABLE.
A RE-STOCKING CHARGE OF 15% WILL APPLY TO ALL GOODS IN GOOD CONDITION WHICH ARE ACCEPTED FOR RETURN.

Tenney, Chad TH:EX

From: Bancroft, Mike C TH:EX
Sent: Friday, June 02, 2000 11:22 AM
To: Bailey, Brent TH:EX; Tenney, Chad TH:EX
Cc: Menu, Fred TH:EX
Subject: Passmore Slide 2000 - Well Water testing prior to construction of pipeline

Hi Chad:

There was another couple of items discussed with Brent s.22

First, that of testing the quantity and quality of well water of various private wells in the general vicinity of the construction area prior to start of construction. With construction now commencing in Brent's absence, I thought I would bring this issue to your attention.

Roy Lidgren had verbally expressed his concern that this be done before construction commenced. Perhaps you could discuss this further with Kevin Richter and/or Roy Lidgren.

AND

Has Ministry of Environment been approached yet for a License for MoTH to redirect the waterfall water into a pipe?

I just thought I bring these two issues to your attention as Brent is away and his last comments to me were he wasn't expecting construction to commence until after he came back s.22

Tenney, Chad TH:EX

From: Bancroft, Mike C TH:EX
Sent: Thursday, June 01, 2000 2:10 PM
To: Tenney, Chad TH:EX
Cc: Bailey, Brent TH:EX; Preston, Joan TH:EX; Menu, Fred TH:EX
Subject: Passmore Slide - s.22

Importance: High

Hi Chad:

I've left a phone message for you to please call me.

Brent advised me earlier in the week he was leaving s.22 on May 31st and he didn't expect any construction activities to commence until after he returned s.22

Joan Preston, A/Safety Officer, advised she was onsite earlier today and construction is now commencing on preparing the site for laying the pipeline through s.22 property but not in the location originally discussed with s.22 back on May 16th between Brent and s.22

Below is a file summary of that discussion:

2000-05-16 Met with s.22 [Owner] and Brent Bailey [Project Mgr.] We walked along most of access trail and where pipeline is to be laid. s.22

- In recent years his basement and barn got flooded so he built a ditch to divert water.
- When fire trail was used [back around 1974] he figures construction of trail broke clay seal and resulted in diversion of water flow causing damage to his basement and barn.
- He doesn't want MoTH excavating the trail on the portion where the draw directs water towards his house.
- MoTH can do whatever it wants along the draw where the slide occurred.

s.22 signed two temporary Licenses; one for the old fire road and the second for the laying of the pipeline.

The License for Construction Access covering the portion of the old fire road going through s.22 property includes a clause which states

- "The Licensee [MoTH] shall not excavate the grounds/Property unless prior permission from the Licensor s.22 is obtained."

The License for Construction Access which permits MoTH to install and use a drainage pipeline also includes a clause which states:

- "...to utilize the Property shown in bold outline for access. Blockages such as fallen trees and brush will be pushed aside."

AND

- "...to utilize the Property highlighted in yellow for installation and use of a drainage pipeline."

This pipeline area is fairly explicit. Any deviation of say just a few metres either side of the centre line highlighted in yellow WILL require either an amendment to this License or an entirely new License to accommodate a change in location for the pipeline. Please advise me ASAP on this particular issue.

s.22 has been extremely co-operative to date. **The one key issue of major concern for him is that MoTH does NOT do any construction activities OR any movement of heavy machinary on the natural water draw immediately to the west of where the slide area occurred.** He believes such activities will greatly worsen spring flooding problems for his house and barn during subsequent spring thaws.

I'll prepare the H443's later today and I'll fax them out to Brent If you're close by 310 Ward Street, please come by and see me on the 4th floor so I can show you the two Licenses and plans attached to those Licenses.

FYI, after construction is all done, I still have to go back to s.22 and have him agree to sign a Statutory Right of Way Agreement to register on his title covering the pipeline and pipeline maintenance areas.

Please also call me to let me know how the revised construction areas impact the License areas. [eg. Will the revised construction areas fall outside the existing two License areas?] **Will I need to obtain a third[or possibly a fourth?] License from** s.22 **If so, please ensure that construction activities do NOT occur outside the existing**

License areas until after s.22 **has signed a third License covering the expanded area.**

File Hwy 6
1940, 13.6 km.

MEMO

DATE: 00/03/31

SUBJECT: Settlement/Sinkhole, N. Possmore Slide

TO: Mike

Conversation with Gerald Irving.

Gerald phoned reporting a settlement in the road just ~~south~~ South of Possmore Slide. Settlement is 2m in diameter and road has dropped in the centre 150mm Vehicles are still able to drive over the settlement I advised Gerald to have the Maintenance Contractor pulet the settlement bringing the travelled surface back to grade.

Gerald provided information concerning a historical sinkhole on Hwy 6 700m south of Possmore. At this location the settlement did become a sinkhole. Excavation found decaying wood in the subbase Event occured 20 years ago.

DATE: 00/04/03

Conversation with Gerald Irving

The area was patched and no further settlement occurred over the weekend.

Date 00/04/05

Inspected the site and took photos. Did not see anything that led me to believe the depression was a sinkhole.

British Columbia Transportation and Highways

SERVICES

SERVICES REQUESTED FROM THE FOLLOWING: **C.F.S. AGREEMENT No:** **31000143**

☐ HEADQUARTERS ☒ REGION: KOOTENAY ☐ DISTRICT:

BUSINESS UNIT: GEOTECH AND MATERIALS BR.

SERVICE AGREEMENT

PROJECT INFORMANTION:

Vote	Resp.	Account	Project	Sub-project/Work Pkg.
0 4 6	5 5 3 1 0	6 1 8 1 0	3 1 5 8 8	

Project Name: Passmore Slide 2000

Location: South of passmore

Hwy. Route: Hwy 6 Segment: kms:

Project Manager: Brent Bailey Phone: 354-6517 Fax: 354-6547

SERVICES TO BE PROVIDED

Activity No.	Service Description	Agreed Completion Date (YEAR / MONTH / DAY)
	Provide on site geotech recommendations and investigation during the slide. Provide on site construction recommendations for the	0 0 / 0 6 / 2 8
	retention berms. Design a water diversion system to catch the water that is contributing to the slide instability. Provide on	
	site recommendations/direction during the installation of the pipe. Assist district in obtaining any permits required.	

Agreed Charge Out Rate: ____ X 1.5 ☒ Other 1.75

Cost Distribution: (A) ☐ Waived ☐ Required (B) External Cost: ☐ Direct ☐ Journal Vouchered

Approved Service Expenditure: Single Year $ Multi Year $

For This Fiscal Year: $ (Internal) + $ (External) = $ (Total) 25,500

Team Member/Business Unit Designate Assigned: Chad Tenney Phone: 354-6954 Fax: 354-8619

AMENDMENTS

Amendment No.: This Amends C.F.S. No.:

Amendment To: ☐ Service Description ☐ Approved Service Expenditure ☐ Completion Date

Requesting Responsibility Centre (Project)

Signature: RR Hopper

Name (print): ROD HOPPER

Address: 2nd Floor 310 Ward St.
NELSON

Title: A/DISTRICT TECHNICIAN

Phone: 354-6520 Fax: 354-6547

Year 00 Month 04 Day

(Requesting R.C. Authority)

- Project Manager*
- District Highways Manager
- Regional Manager
- Appropriate Regional/Branch/Project Director

*Project Manager refers to an employee whose official position title is Project Manager; not an employee given responsibility to manage a project.

Service Responsibility Centre (Business Unit)

Signature: Mike Walsh

Name (print): MIKE WALSH

Address: 610 LAKESIDE DR.
NELSON

Title: RGME

Phone: 356792 Fax: 354-6819

Year 00 Month 05 Day 11

Resp 341 Account 90960 Project 31540 Sub-Project

(Service R.C. Authority)

- Business Unit Manager
- District Highways Manager
- Regional Manager
- Appropriate Regional/Branch/Project Director

1-514 (95/06) SECOND COPY-BUSINESS UNIT MANAGER

Internal/External Cost Estimating Sheet

Project Name/Number:	Passmore Slide	CFS Number:	31000.143
Team Designate:	Chad Tenney	Date:	8-May-00

Staff (Internal)	Hrs/day	Number of Days	Hourly Rate ($/hr)	Expense Type (Daily) (External)	Daily Expenses	Cost
Dennis, S	8	5	$23.49	Lunch	$10.75	$1,698.05
Tenney, C	8	20	$23.49	Lunch	$10.75	$6,792.20
Walsh, M	8	8	$36.20	Lunch	$10.75	$4,140.40
					Staff Costs	$12,276
					Expenses	$355

MoTH Vehicles (Internal)	Quantity	Number of Hours	Hourly Rate ($/Hr)	Cost
2/4Wheel Drive	1	75	$10.00	$750.00
			MoTH Veh Cost	$750

Private Vehicles (External)	Dist to Site (one way) (km)	No. of Rnd Trips	Total (km)	Cost
Dennis, S	45	5	450	$180.00
#REF!	45	10	900	$360.00
			Mileage Cost	$540

Mileage Rate ($/km)
$0.40

Materials (Internal)	Quantity	Unit Rate ($/unit)	Cost
film (ea)	5	$20.00	$100.00
		Materials Costs	$100

External Costs (External)	Cost ($)
Big 'O' Pipe	$11,000.00
Drafting	$500.00
Misc. Costs	$11,500

Lab Costs (Internal)	Quantity	Unit Rate (avg)	Cost
		Lab Costs	

Internal	$13,125.90
External	$12,394.75

TOTAL COST = Staff Cost/Lab Costs + Vehicle Cost + Materials + External Cost = $25,521

=> CFS for $ 25,500

Notes:
(1) Hours per day must be entered
(2) Staff cost includes a multiplier of 1.75
(3) External costs includes external CFS's, LMW/SC, hired equip, travel, pass through expenses

CFS 31000.143 - Passmore Slide
Rev 0 dated May 11, 00

Completion Date: Jun 28, 00
Reference: 1940:14

PROJECT 31588 Account: 61810
31588 (310) Passmore Slide 2000 (Hwy 6)

TO
Rod Hopper

FROM
Michael Walsh
341 - 341 - Engineering Branch
112 - Geotech (31540)

Team Designate: Chad Tenney

STATUS:

Mar 01

Item	Complete?	CO Rate & Method	Month Work TD Actual	Fiscal Budget Allocation	– Work TD Actual	– Work TD Accrued	– Obligation	– Planned Expend	= Surplus/ Deficit
BIG O PIPE	N	1.750 J	0	11,000	10,067	0	0	0	933
* Difference	N	1.750 J	0	14,500	12,229	0	0	0	2,271
			0	25,500	22,296	0	0	0	3,204

Team Member/Designate Signature _____ Date _____

PROJECT 310-31588-0000 (310) PASSMORE SLIDE 2000 (HWY 6)

Contract: * Passmore Slid

Item ID	Desc	Month	Date	Cost Type	Employee	Activity	STOB	Actual	Accrued	Total
-	field	May 00	Apr 15/00	I Bulk Mat		Analysis	5100	40.00		40.00
-	field	May 00	Apr 29/00	I Bulk Mat		Field	5100	40.00		40.00
-	field	May 00	May 13/00	I Travel	Michael Walsh	Field	1010	282.50		282.50
-	field	May 00	May 13/00	I Travel	Michael Walsh	Field	1010	233.70		233.70
-	field	May 00	May 13/00	I Travel	Michael Walsh	Field	5702	207.30		207.30
-	field	May 00	May 13/00	I Travel	Sarah Dennis	Field	5702	9.00		9.00
-	field	May 00	May 13/00	I Travel	Sarah Dennis	Field	5702	162.65		162.65
-	field	May 00	May 13/00	I Travel	Chad Tenney	Field	5702	107.75		107.75
-	Engineering Geo	May 00	Apr 29/00	I Min Vehi	Chad Tenney	Field	7098	180.00		180.00
-	Engineering Geo	May 00	Apr 15/00	I Min Vehi	Chad Tenney	Field	7098	95.00		95.00
-	Engineering Geo	May 00	Apr 15/00	I Wages	Michael Walsh	Field	5001	1,337.56		1,337.56
-	Engineering Geo	May 00	Apr 29/00	I Wages	Michael Walsh	Field	5001	1,783.41		1,783.41
-	Engineering Geo	May 00	Apr 29/00	I Wages	Michael Walsh	Field	5001	346.77		346.77
-	Engineering Geo	May 00	May 13/00	I Wages	Michael Walsh	Field	5001	247.70		247.70
-	Engineering Geo	May 00	May 13/00	I Wages	Michael Walsh	Field	5001	247.70		247.70
-	Engineering Geo	May 00	Apr 29/00	I Wages	Chad Tenney	Field	5001	1,197.79		1,197.79
-	Engineering Geo	May 00	Apr 29/00	I Wages	Chad Tenney	Analysis	5001	515.97		515.97
-	Engineering Geo	May 00	Apr 29/00	I Wages	Chad Tenney	Field	5001	294.84		294.84
-	Engineering Geo	May 00	Apr 29/00	I Wages	Sarah Dennis	Field	5001	239.56		239.56
-	Engineering Geo	May 00	Apr 29/00	I Wages	Sarah Dennis	Field	5001	92.14		92.14
-	Engineering Geo	May 00	Apr 15/00	I Wages	Chad Tenney	Field	5001	73.71		73.71
-	Engineering Geo	May 00	Apr 15/00	I Wages	Chad Tenney	Field	5001	1,363.64		1,363.64
-	Engineering Geo	May 00	Apr 15/00	I Wages	Chad Tenney	Analysis	5001	350.12		350.12
						Total for May 00		9,448.81		9,448.81
BIG O PIPE	big O pipe	Jun 00	May 08/00	E Invoices		GEOTECH ENG.	6903	10,067.43		10,067.43
-	OC	Jun 00	May 23/00	E Invoices		GEOTECH	6317	6.28		6.28
-	field	Jun 00	May 27/00	I Travel	Chad Tenney	Field	5702	68.00		68.00
-	field	Jun 00	May 27/00	I Travel	Sarah Dennis	Field	5702	52.40		52.40
-	Engineering Geo	Jun 00	May 13/00	I Min Vehi	Chad Tenney	Field	7098	40.00		40.00
-	Engineering Geo	Jun 00	Jun 10/00	I Min Vehi	Chad Tenney	Field	7098	54.00		54.00

-	Engineering Geo	Jun 00	May 13/00	I Wages	Chad Tenney	Field	5001	147.42		147.42
-	Engineering Geo	Jun 00	May 13/00	I Wages	Chad Tenney	General Duties	5001	350.12		350.12
-	Engineering Geo	Jun 00	May 27/00	I Wages	Chad Tenney	General Duties	5001	128.99		128.99
-	Engineering Geo	Jun 00	Jun 10/00	I Wages	Chad Tenney	General Duties	5001	423.83		423.83
-	Engineering Geo	Jun 00	Jun 10/00	I Wages	Chad Tenney	Field	5001	221.13		221.13
-	Engineering Geo	Jun 00	Jun 10/00	I Wages	Chad Tenney	General Duties	5001	55.28		55.28
						Total for Jun 00		11,614.88		11,614.88
-	Aggregate/Terrn	Jul 00	Jun 24/00	I Wages	Wendy Sladen	Field	5001	119.93		119.93
						Total for Jul 00		119.93		119.93
-	Granite draf	Aug 00	Aug 31/00	E VISA		GEOTECH	6903	409.75		409.75
-	Engineering Geo	Aug 00	Jul 22/00	1 Min Vehi	Chad Tenney	Field	7098	40.00		40.00
-	Engineering Geo	Aug 00	Jul 08/00	I Wages	Chad Tenney	General Duties	5001	184.28		184.28
-	Engineering Geo	Aug 00	Jun 24/00	I Wages	Chad Tenney	Geo Eng.Meeting	5001	239.56		239.56
-	Engineering Geo	Aug 00	Jul 22/00	I Wages	Chad Tenney	General Duties	5001	92.14		92.14
-	Engineering Geo	Aug 00	Jul 22/00	I Wages	Chad Tenney	Field	5001	147.42		147.42
						Total for Aug 00		1,113.15		1,113.15
						Total for 31000.143		22,296.77		22,296.77
						TOTAL FOR PROJECT 310-31588-0000		22,296.77		22,296.77

BRITISH COLUMBIA

Ministry of Transportation and Highways

Date:

File No:

Facsimile Record

To:	From:
Brent Beattie and or Chad Jenney	Brent Bailey Central Kootenay District 2nd Floor 310 Ward Street Nelson, B. C. V1L 5S4
C/O	

FAX no:	Phone No:	Fax No: (250)354-6547	Phone No: (250)354-6521

ORIGINAL PAGES TO BE:

☐ FILED ☐ MAILED ☐ COURIERED ☐ OTHER (Specify)

Subject: Passmore slide Environment Approval

See attached Min of Envir requires info regarding Passmore slide in order to proceed with approvals.

Thanks

BB

PAGES: 9 (including this sheet)

B.B.

Operators Signature

H-6 (96/04)

BRITISH COLUMBIA

Ministry of Environment, Lands and Parks

Environment and Lands Kootenay Region

FAX SHEET

Date: Friday, May 19, 2000

# of pages (including this sheet) x 2

To: **Brent Bailey**

Fax # **354-6547**

Office: MOTH

Phone # 354-6521

From: **V. Stanford**

Kootenay Region - Region 4

Phone # (250) 354-6380

Fax # (250) 354-6332

Re: Passmore Slide Approval Application

Dear Brent Bailey:

I have reviewed your application for works to stabilize the Passmore slide. I have not received the detailed construction plans yet and perhaps they would clarify the few questions I have. However, to expedite the approval process could you please ensure that the following concerns are addressed.

Design flow- Was the design based on flow measurements ? No Please provide data and calculations or provide alternative rationale to justify the design specifications.

Catchment design – No low outlet overflow apparent. What are anticipated maintenance needs? No need for a trash rack? What fail-safe measures will be in place should the entrance to the pipe become blocked? – not required.

How will MOTH protect their interest in works over the long term? Do you propose to place a restrictive covenant over the area occupied by the works and covering the slide area? Expropriate the unstable slope? Pursue an easement from the landowner? statutory right of-way.

Please address these concerns in the detailed construction plans if you have not already done so.

a low-inlet option as required with velocity will keep it clear

not at entrance

375mm

cause erosion – No

– # of checks for culvert.

Yours truly,

Virginia Stanford
Water Allocation Officer
VS/

Please refer to the application guidelines (see over) when completing this Notification Form

1. Application Name: MINISTRY of TRANSPORTATION & HWYS.
   Address: 2ND FLOOR 310 WARD ST.
   NELSON Postal Code V1L 5S4
   Phone: 354-6521 Fax: 354-6547
2. Location of Works: 14.4 Km NORTH OF HWY 3A ON HWY 6 IN DL 12800
   Stream Name:
   Location on Stream:
   What stream/river/lake does it flow into: SLOCAN RIVER
   Legal description of property: DL 12800
3. Sketch Plan and Site Map: attach a drawing showing lot boundaries, location of proposed works, stream direction and flow and location of buildings, also include map showing location of site.
4. Proposed Timing:
   Start (day/month/year): Finish: (day/month/year)

5. Type of Works Covered by Section 44 of Regulations (check appropriate box):

- [ ] Road crossing culvert (installation and/or removal)
- [ ] Clear span bridge (installation and/or removal)
- [ ] Pipeline crossing in a naturally dry channel
- [ ] Pier or wharf (construction, maintenance or removal)
- [ ] Flow or water level measuring devices by government (construction, maintenance or removal)
- [ ] Fish fences or screens, fish or game guards by government
- [ ] Stream channel restoration or maintenance by a municipality or the province
- [ ] Cutting annual vegetation
- [ ] Fish habitat restoration or maintenance by government
- [ ] Existing dike or erosion protection works repair or maintenance
- [ ] Storm sewer outfalls
- [ ] Aquatic vegetation control
- [ ] Routine maintenance by a public utility
- [ ] The removal of a beaver dam under Section 9 of the Wildlife Act
- [ ] The construction of a temporary ford across a stream
- [ ] The construction of a temporary diversion around or through a worksite.

Detailed Description of Work to be Performed: TO STABILIZE THE HEADSCARP BY PREVENTING WATER FROM ENTERING INTO THE GROUNDWATER SYSTEM

MORE DETAILED INFORMATION IN ATTACHED LETTER AND DRAWINGS.

6. Do you own the land on which the works are to be located? Yes ____ No X
   If no, who owns the land? BYRON HOPLAND
   Private: X Crown:
   Landowner's approval, if different from applicant: Byron Hopland
   Landowner's name: BYRON HOPLAND
   Address: Comp 1, Group 18, RR#1
   WINLAW B.C. V0L 2E0
   Phone: ( ) HOME
   Landowner's Signature: Byron Hopland
   (Attach tenure document for Crown Land)
7. Who is doing the work? VSA HWY. MAINTENANCE LTD.
   If different from applicant:
   Company Name: VSA Contact Name:
   Address: 801 FRONT ST
   NELSON V1L 4B8
   Phone Number: (250) 352 3242
8. Statement of Intent:

I declare that the information contained on this form is complete and accurate information. I have read, understood and will meet the requirements to construct works and changes in and about a stream in accordance with Section 7 of the Water Act and the Regulation.

Signed: Date:

MINISTRY USE ONLY:
____ meets the requirements to proceed under regulation ____; approval required

Notification form reviewed by: Date:

BRITISH COLUMBIA
Ministry of Transportation and Highways
Geotechnical & Materials Engineering Branch
610 Lakeside Drive
Nelson, BC V1L 5S7
Telephone: (250) 354-6954
Facsimile: (250) 354-6619

MEMORANDUM

Rod Hopper
A/ District Technician
Central Kootenay District
2nd Floor – 310 Ward Street
Nelson BC V1L 5S4

May 12, 2000

Re: Passmore Slide
Water Diversion Pipe

The purpose of this letter is to provide a detailed description of the works to be performed at the Passmore Slide site to stabilize the headscarp by preventing water from entering into the groundwater system.

Preliminary investigation indicates that the source of the water is from winter snow melt. The water runs down a bedrock face until it enters a talus slope at an approximate elevation of 655 metres. The water flows along the talus slope for approximately 70 m until it has totally dissipated into the ground. This water source appears to be the only source of surface water providing recharge to the groundwater within the local topography. The water reappears approximately 10 m below the headscarp of the landslide and is currently flowing through the slide runout zone. The water at the scarp is presumed to be from this source.

It has been determined that the Passmore Slide was initiated by groundwater flow through natural piping in the subsurface. Natural piping has been observed on the North and South side of the slide scarps. In addition sinkholes have been continuously developing since the slide. The headscarp of the slide is unstable and further slides may occur from pipe collapse and surcharge of groundwater behind the scarp. To stabilize the headscarp of the slide, it is recommended that the water source be controlled where it enters the groundwater system.

It is recommended that a catch basin be established at the bedrock/talus interface and the water be transported down the slope in a 375 mm diameter Big 'O' pipe. It is recommended that the pipe be buried with a minimum cover of 300 mm of natural bedding, and the natural bedding not contain any material larger than 100 mm. There is an old "tote" road that provides access to the water source that will allow a small excavator to be easily mobilized. The pipe should be able to be installed with minimal damage to large diameter trees on the slope.

It is proposed that the catch basin be constructed out of cement bags and an impermeable geomembrane. It is recommended that the cement bags be held in place with 20M rebar. It is also recommended that the catch basin be a minimum of 4 m across. It is estimated that this catch basin will retain approximately 80 –85 % of the water.

It is recommended that the pipe be directed down the slope to allow it to daylight on the skid trail road that was constructed along the scarp on the south side. Where the water exits the pipe it is recommended that a non-woven geotextile and 500 kg rip rap be placed to protect against erosion. The water will then be directed along the back of the berm and through the existing 900 mm dimeter culvert.

Detailed construction plans of the above proposed catch basin are currently being prepared and should be completed by May 18, 2000, however, sketches have been attached that should provide all of the required information. If you have any questions or comments, or require further details of the proposed construction, please do not hesitate to call.

Prepared by: Chad Tenney, EIT
Geotechnical Engineer

Reviewed by: Michael P. Walsh, P. Eng.
Regional Geotechnical & Materials Engineer

Cc.: Jacques Dupas, P. Eng., District Highways Manager
Brent Bailey, Area Manager, Nelson
Michael P. Walsh, P. Eng., R.G.M.E.

Ministry of Transportation and Highways
Geotechnical and Materials Branch
DESIGN CALCULATION SHEET

File No. _____

Project Passmore Slide - Water Diversion

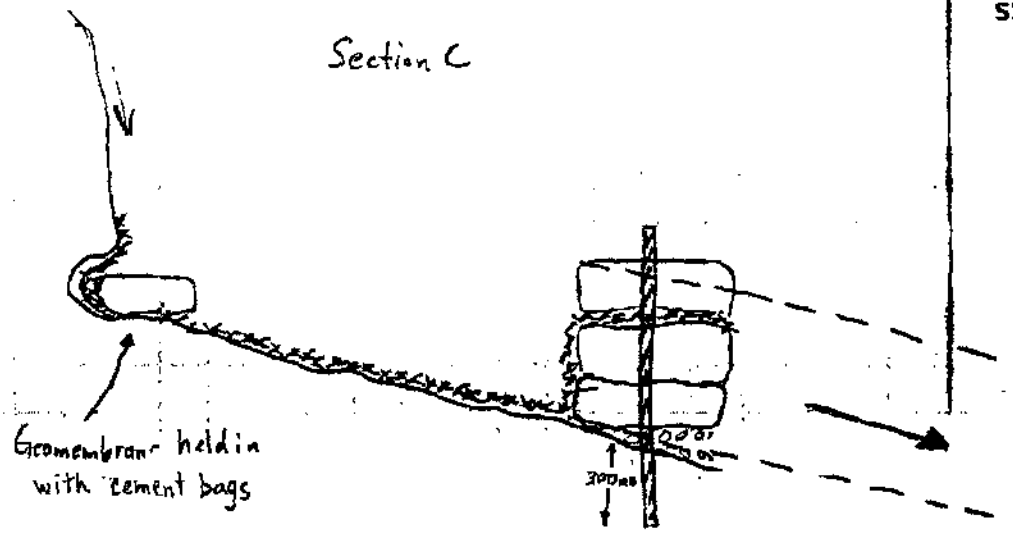
Date _____

Region _____ **District** _____

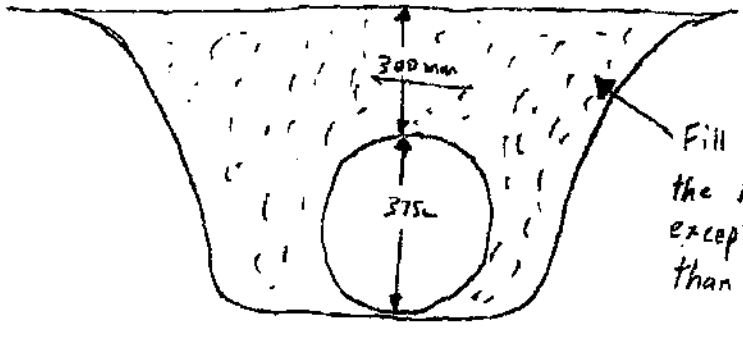
Calculation by _____

Sheet 2 of ____

Section C



Section D



Fill Material can be the natural ~~[illegible]~~ material except for rocks larger than 150mm.

H-174 (Rev. 04/95 Speedy Printing)

Ministry of Transportation and Highways
Geotechnical and Materials Branch
DESIGN CALCULATION SHEET

File No.

Project Passmore Slide - Water Diversion

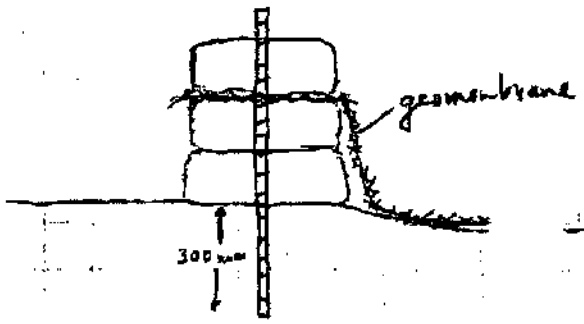
Date

Region District

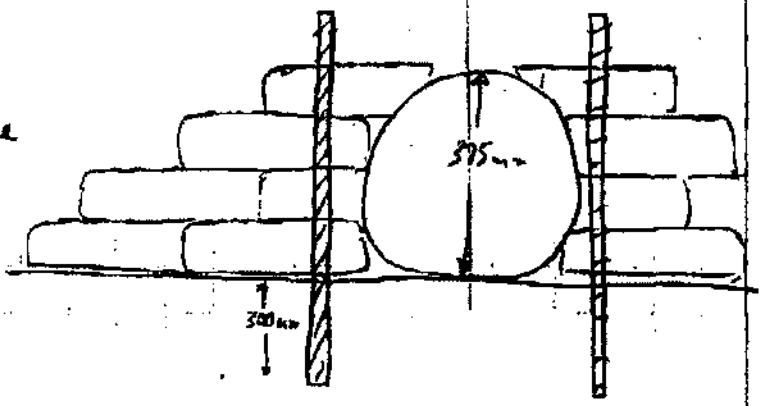
Calculation by

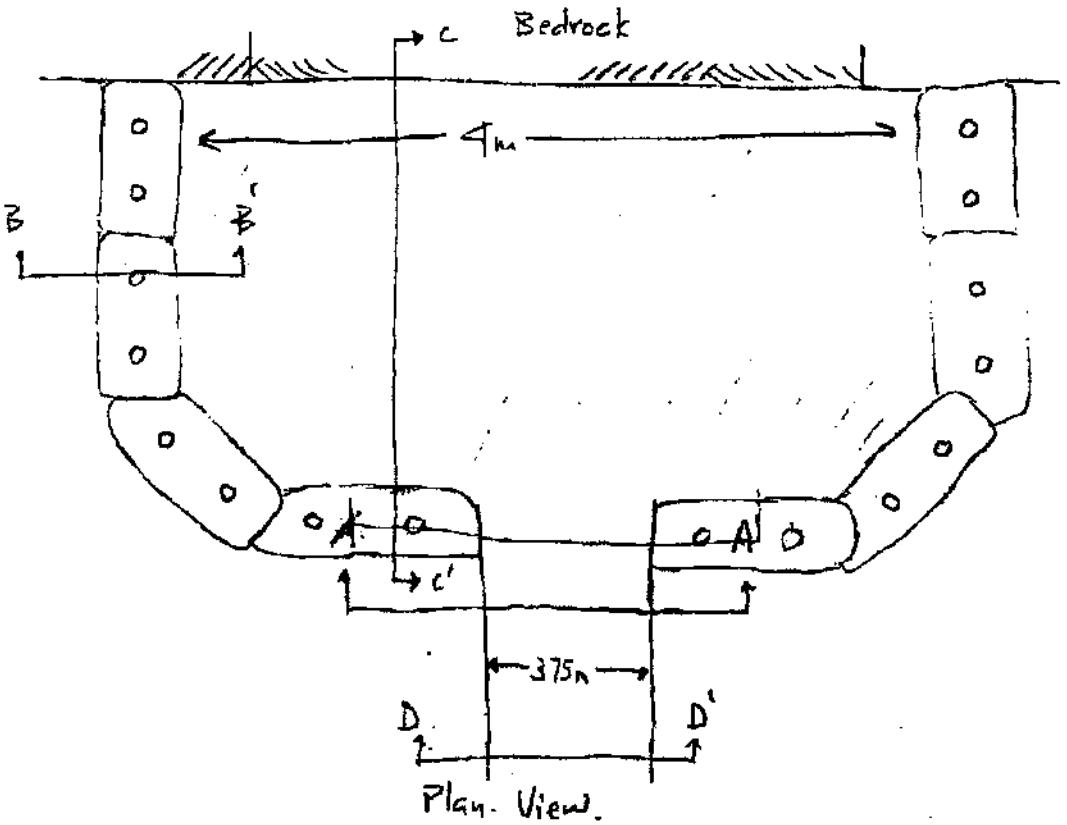
Sheet 1 of

Section B



Section A





Ministry of Transportation and Highways
Geotechnical and Materials Branch
DESIGN CALCULATION SHEET

File No. _____

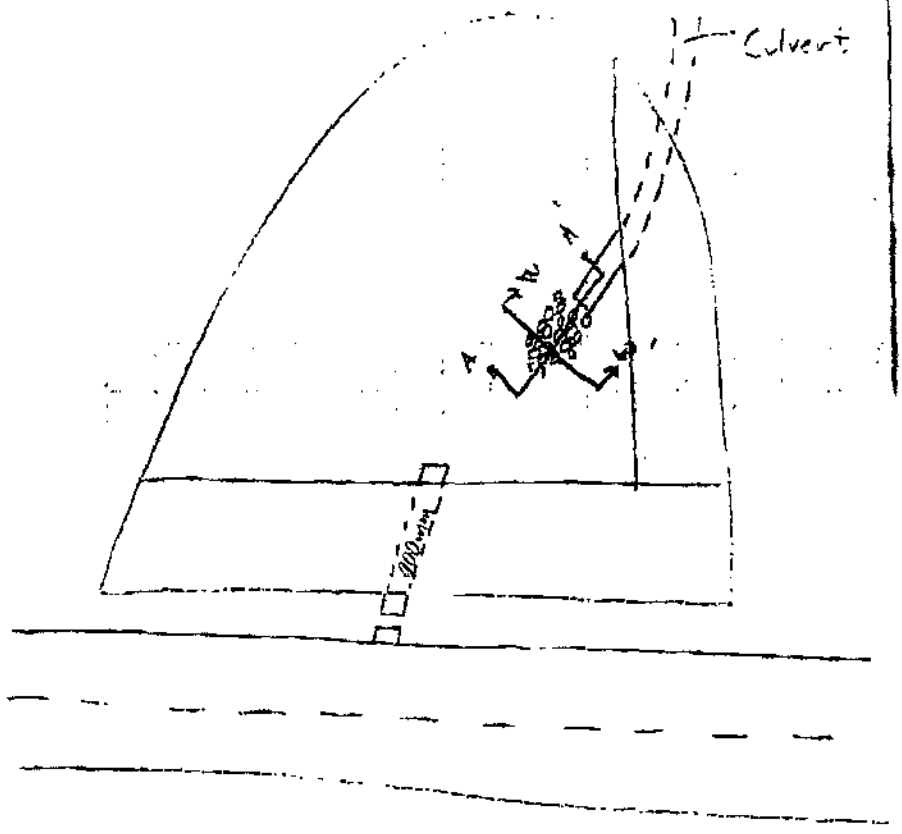
Project Passmore Slide - Water Diversion

Date _____

Region _____ **District** _____

Calculation by _____

Sheet 3 of ____



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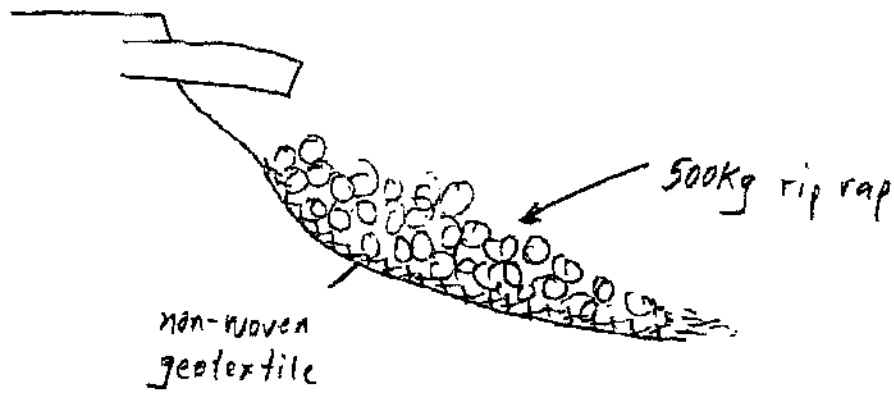

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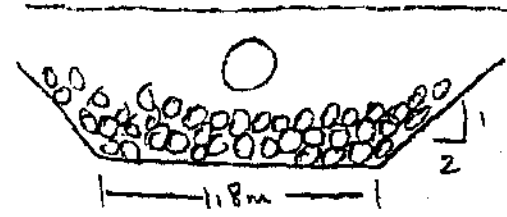
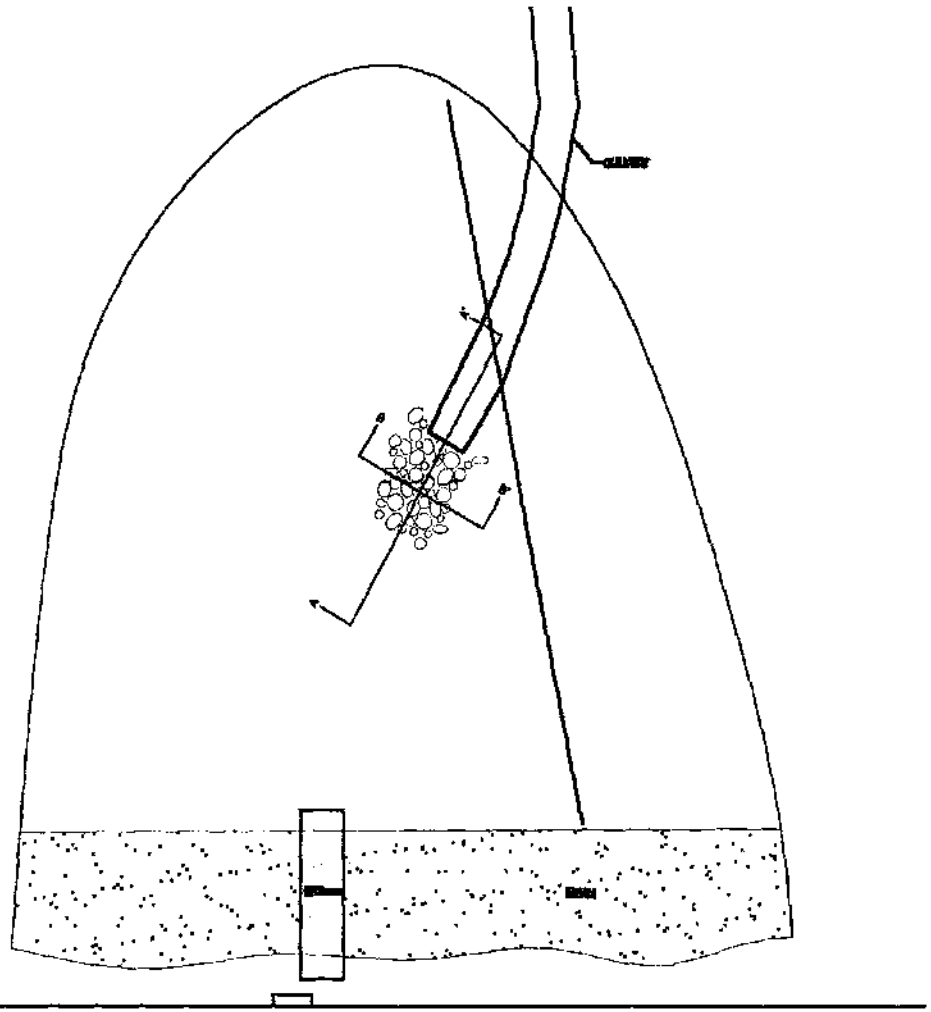
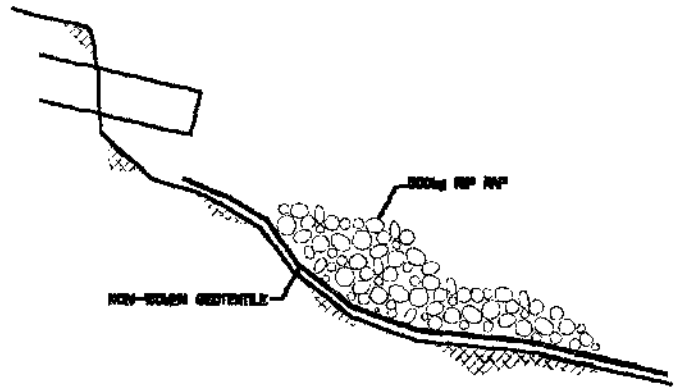


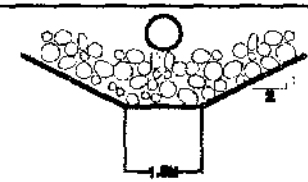
H-174 (Rev. 08/95 Speedy Printing)



PLAN VIEW



SECTION A–A'



SECTION B–B'

Province of British Columbia
MINISTRY OF TRANSPORTATION AND HIGHWAYS
GEOTECHNICAL AND MATERIALS ENGINEERING

HIGHWAY No. 5

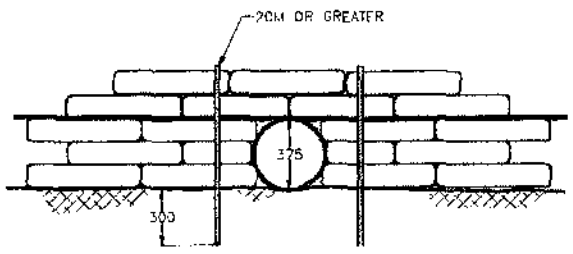
PASSMORE SLIDE – WATER DIVERSION

TYPICAL SECTIONS

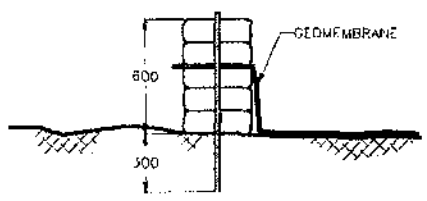
DRAWN BY:	DATE:	SCALE:
Grizzle Drafting & Design	17 MAY 2000	NOT TO SCALE
FILE No.	PROJECT No. 31513	REV. 3
	DRAWING No. 31513_3.dwg	

CANCEL PRINTS BEARING PREVIOUS LETTER

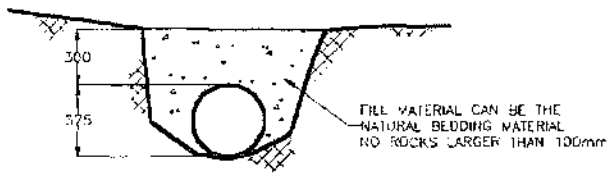
Project # - 31588 SAME AS WHITEWATER?



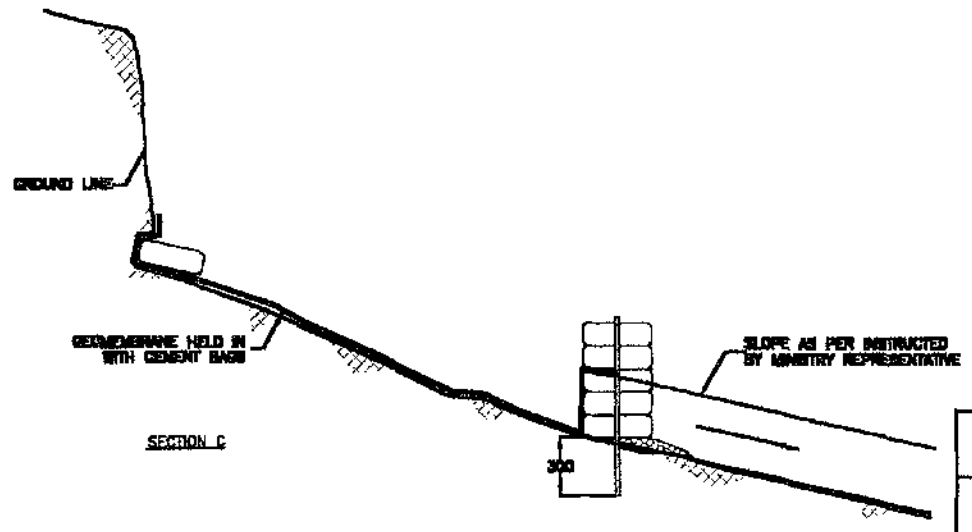
SECTION A



SECTION B



SECTION D



SECTION C

Province of British Columbia
MINISTRY OF TRANSPORTATION AND HIGHWAYS
GEOTECHNICAL AND MATERIALS ENGINEERING

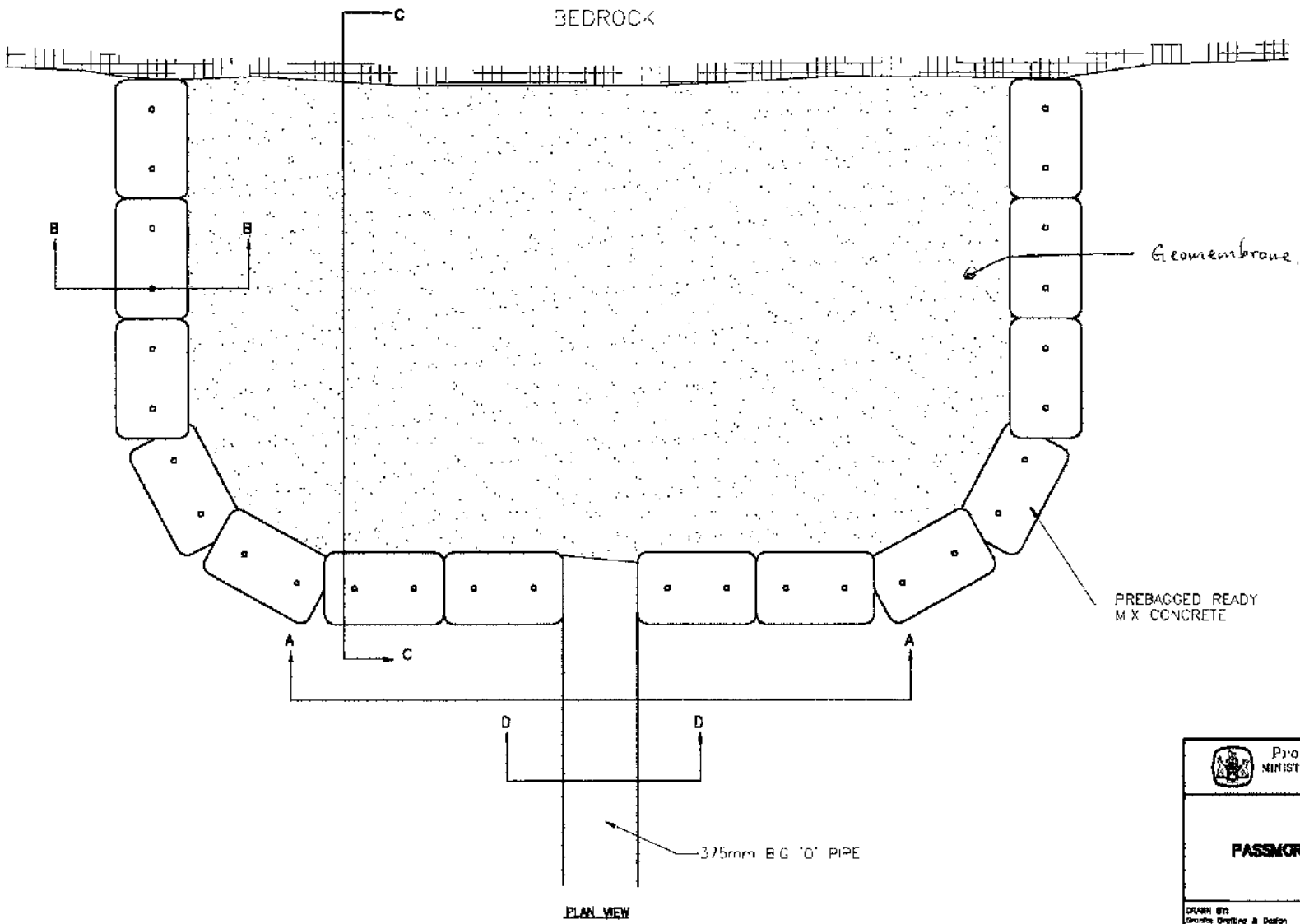
HIGHWAY No. 5

PASSMORE SLIDE – WATER DIVERSION

TYPICAL SECTIONS

DRAWN BY: Granville Grotting & Design	DATE: 17 MAY 2000	SCALE: NOT TO SCALE
FILE No.	PROJECT No. 31513	REV. 3
		DRAWING No. 31513_2.dwg

CANCEL PRINTS BEARING PREVIOUS LETTER



PLAN VIEW

Province of British Columbia
MINISTRY OF TRANSPORTATION AND HIGHWAYS
GEOTECHNICAL AND MATERIALS ENGINEERING

HIGHWAY No. 8

PASSMORE SLIDE – WATER DIVERSION
PLAN VIEW

DRAWN BY:	DATE:	SCALE:
Geomtrix Engineering & Design	17 MAY 2002	NOT TO SCALE
FILE No.	PROJECT No. / REV.	DRAWING No.
	31513 / 3	31513_1.dwg

CANCEL PRINTS BEARING PREVIOUS LETTER

4a

BRITISH COLUMBIA

JUN 2 8 2000

Reference: 80645

Hans Cunningham, Chair
Regional District of Central Kootenay
601 Vernon Street
Nelson BC V1L 4E9

Dear Hans Cunningham:

Re: Public Involvement Program in the Slocan Valley

I am writing in response to your letter of May 23, 2000, regarding the Regional District of Central Kootenay's request for a public involvement program in the Slocan Valley as a result of the slide event of April 13, 2000, on Highway 6 at Passmore.

Ministry staff agree that an informed and prepared public is essential, particularly when landslides occur, or have the potential to occur. As such, communications to the public are issued regularly whenever situations warrant.

Ministry staff would be happy to discuss existing safety and response programs with the Regional District of Central Kootenay and any concerned members of the public.

If you require further information Larry Brown, Area Manager, would be please to assist you. He can be reached at (250)354-6518, or at 2nd Floor, 310 Ward Street, Nelson, British Columbia, V1L 5S4.

Thank you for bringing these concerns to my attention.

Sincerely,

Harry S. Lali
Minister

Ministry of Transportation and Highways

Office of the Minister

Mailing Address:
Parliament Buildings
Victoria BC V8V 1X4

Regional District of Central Kootenay

601 Vernon Street
Nelson, BC V1L 4E9

Telephone (250) 352-6665 Fax (250) 352-9300
BC Toll Free 1-800-268-7325
PIN 5-17

May 23, 2000

The Honourable Harry Lali
Minister of Transportation & Highways
Parliament Buildings
Victoria, B.C. V8V 1X4

Dear Mr. Lali:

Re: **MOH *PUBLIC INVOLVEMENT PROGRAM***
SLOCAN VALLEY

Please be advised of the following resolution of the Board adopted at the meeting held on April 29, 2000:

497/2000 **WHEREAS a serious land slip occurred in the Slocan Valley severing Highway #6 and cutting electrical power and telephone services;**

AND WHEREAS the public has expressed major concerns about safety and access;

THEREFORE BE IT RESOLVED THAT the Ministry of Transportation and Highways be requested to undertake a public involvement program in the Slocan Valley to provide information to the public on:

1. **completed geo-technical research reports on land slips;**
2. **locations of potential land slips; and**
3. **a description of the steps that the Ministry is undertaking and intends to undertake to address these concerns.**

... /2

File Name: W:\Users\Execsec\Winword\Board\Corres99\Highways.Doc

Public concern respecting travel on Highway 6 through the Slocan Valley has been heightened to an uncomfortable degree. Public knowledge of the reality of the identified requests is being sought from the Ministry of Transportation & Highways

⇒ to restore the confidence of both residents and the travelling citizenry, and

⇒ to provide assurance that the Province, and public, are well prepared for future emergencies.

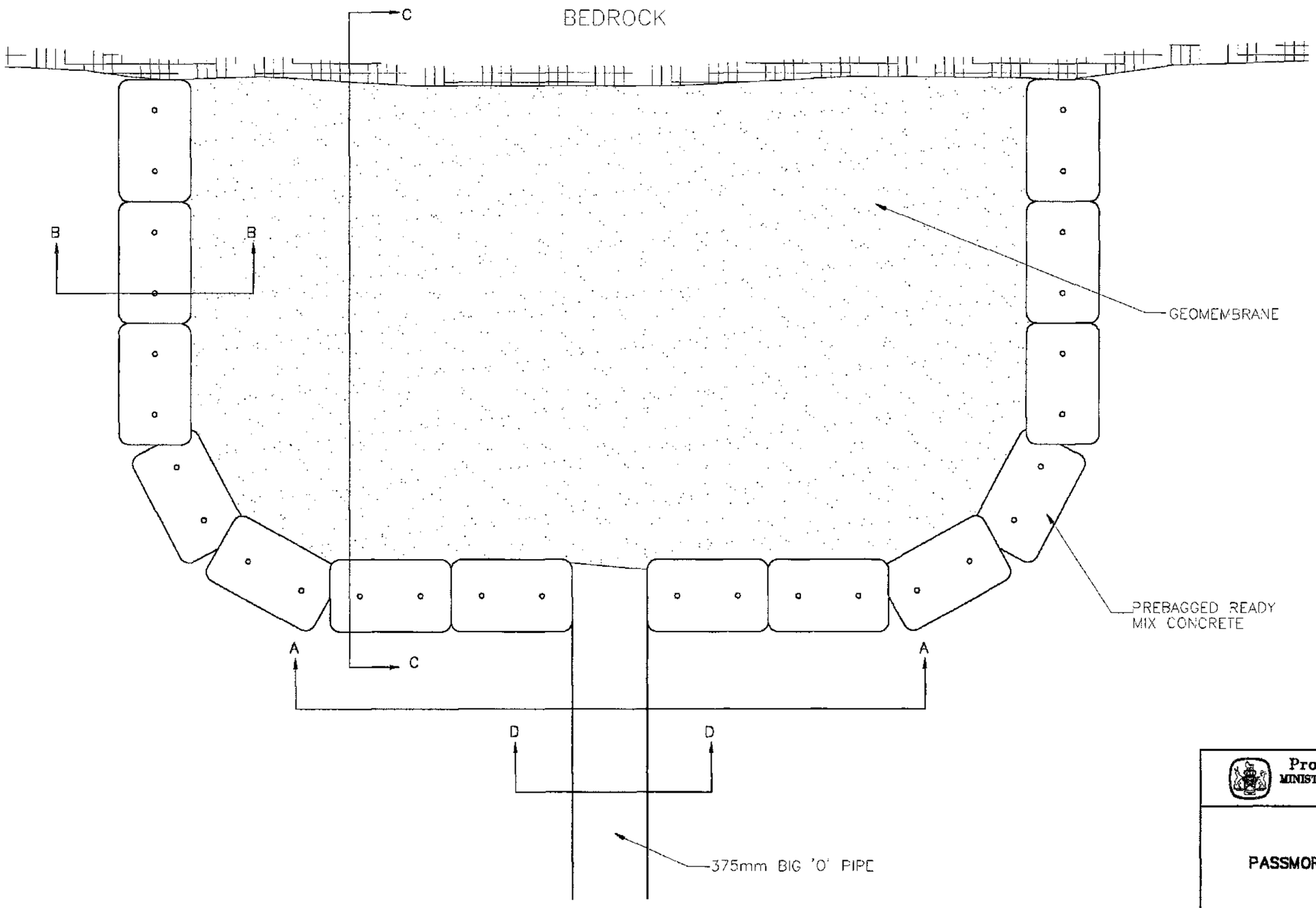
Accordingly, the Board is putting forward the request for a *public involvement program* from your Ministry.

Yours very truly,

Hans Cunningham
Chair of the Board

cc: Mr. Peter Milburn, Regional Director, Kootenays Regional Office

File Name: W:\Users\Execsec\Winword\Board\Corres99\Highways.Doc



PLAN VIEW

Province of British Columbia
MINISTRY OF TRANSPORTATION AND HIGHWAYS
GEOTECHNICAL AND MATERIALS ENGINEERING

HIGHWAY No. 6

PASSMORE SLIDE – WATER DIVERSION

PLAN VIEW

DRAWN BY:	DATE:		SCALE:
Granite Drafting & Design	29 MAY 2000		NOT TO SCALE
FILE No.	PROJECT No.	REG.	DRAWING No.
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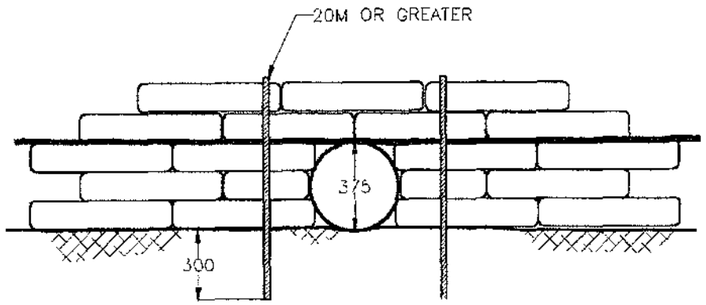
CANCEL PRINTS BEARING PREVIOUS LETTER



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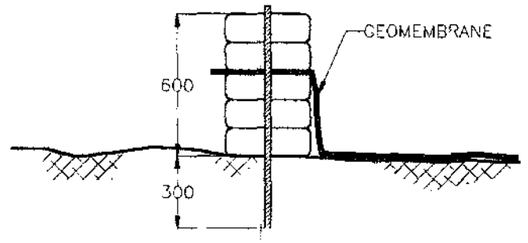

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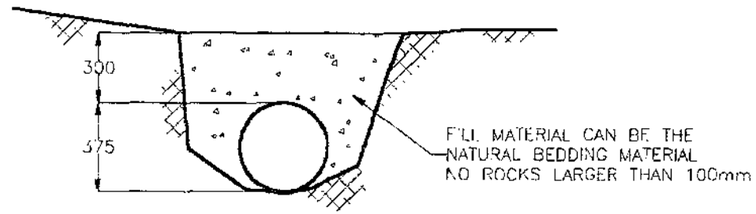

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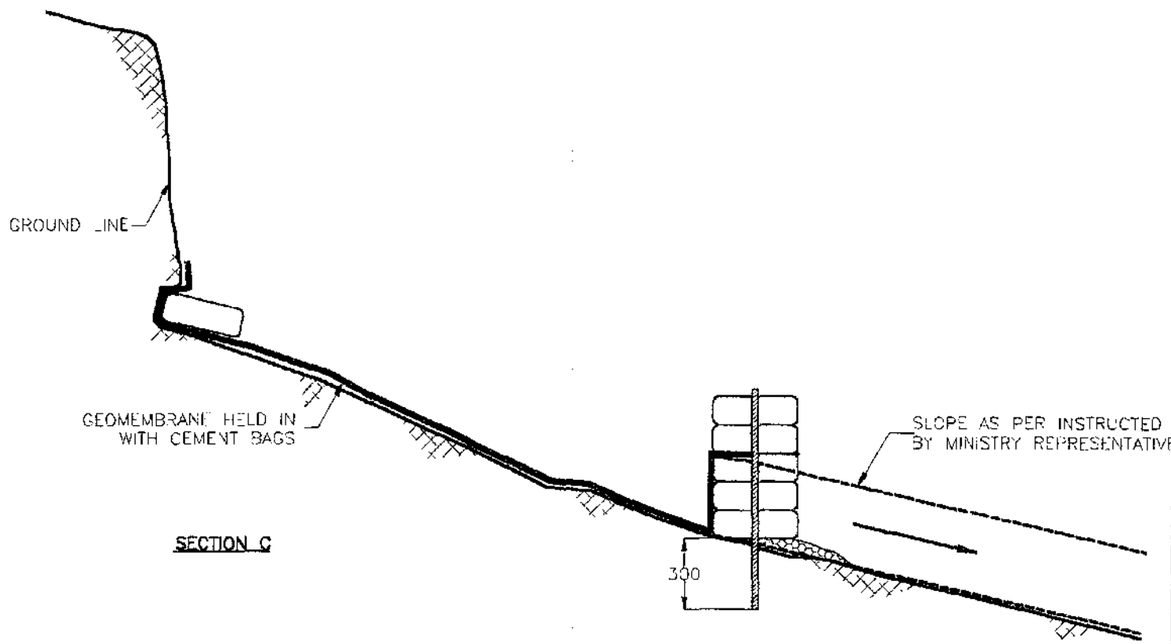


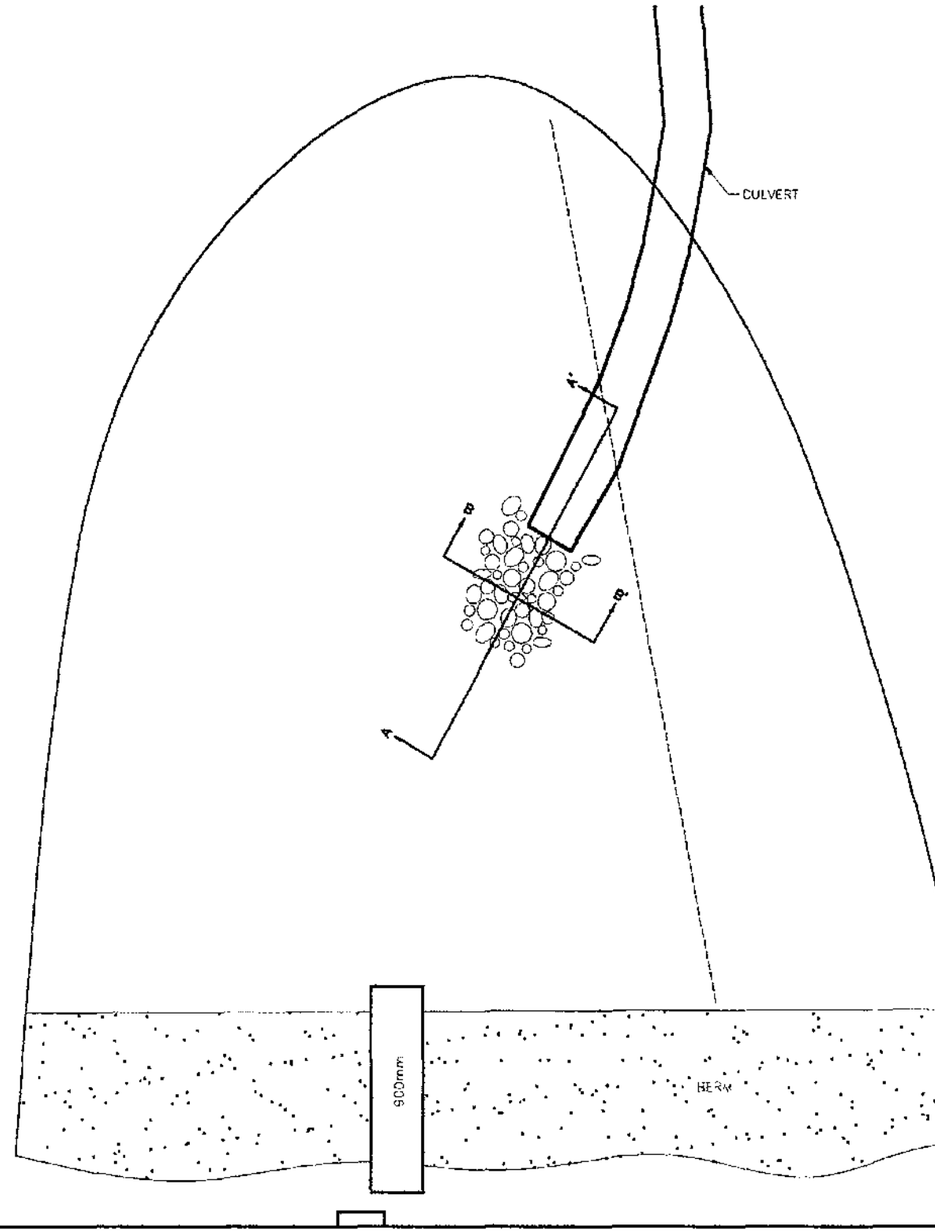
SECTION C

Province of British Columbia
MINISTRY OF TRANSPORTATION AND HIGHWAYS
GEOTECHNICAL AND MATERIALS ENGINEERING

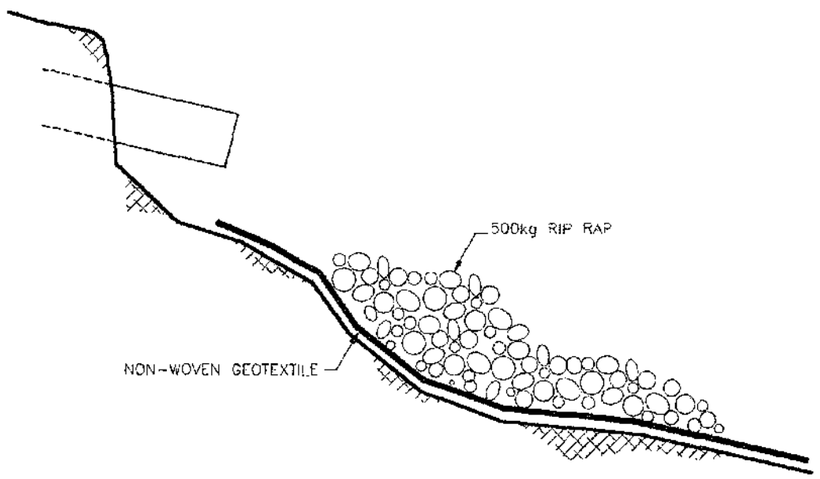
HIGHWAY No. 6
PASSMORE SLIDE – WATER DIVERSION
TYPICAL SECTIONS

DRAWN BY:	DATE:		SCALE:
Granite Drafting & Design	28 MAY 2000		NOT TO SCALE
FILE No.	PROJECT No.	REV.	DRAWING No.
	31588	3	31588_2.dwg

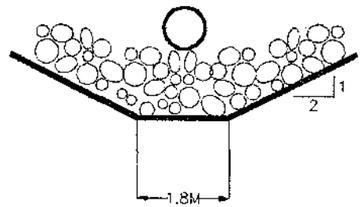
CANCEL RIGHTS BEARING PREVIOUS LETTER



PLAN VIEW



SECTION A–A'



SECTION B–B'

Province of British Columbia
MINISTRY OF TRANSPORTATION AND HIGHWAYS
GEOTECHNICAL AND MATERIALS ENGINEERING

HIGHWAY No. 6
PASSMORE SLIDE – WATER DIVERSION
TYPICAL SECTIONS

DRAWN BY:	DATE:		SCALE:
Granite Drafting & Design	29 MAY 2000		NOT TO SCALE
FILE No.	PROJECT No.	REV.	DRAWING No.
	31588	3	31588_3.dwg

CANCEL PRINTS BEARING PREVIOUS LETTER

BRITISH COLUMBIA

Ministry of Transportation and Highways

Date: 2006 06 06

File No:

Facsimile Record

To: Mike Bancroft 354 6714

(Cc) Linney 354 6619

C/O Gerard Huber 352 2172

From: GA Warden - Irving

Central Kootenay District
2nd Floor
310 Ward Street
Nelson, B. C. V1L 6S4

FAX no: **Phone No:** **Fax No: (250)354-6547** **Phone No: (250)354-6521**

ORIGINAL PAGES TO BE:

☐ FILED ☐ MAILED ☐ COURIERED ☐ OTHER (Specify)

Subject: Passmore Water Licence - Approval

PAGES: 3 (including this sheet)

Operators Signature

H-8 (06/04)

BRITISH COLUMBIA

File: A401511

June 6, 2000

Ministry of Transportation and Highways
310 Ward St
Nelson BC V1L 5S4

Attention Gerald Vaughan-Irving

Dear Gerald Vaughan-Irving:

Re: Approval - Unnamed Stream

Approval for the above has been granted and the approval document verifying this is attached. If you have any questions or concerns regarding the document issued contact the Nelson Water Management Branch office.

Please note clause (m) in your Approval document.

A right of appeal from my decision lies to the Environmental Appeal Board. Notice of any appeal must (1) be in writing, (2) include grounds for the appeal, (3) be directed by registered mail or personally delivered to the Chair, Environmental Appeal Board, 4th Floor 836 Yates Street, Victoria, BC V8V 1X5 (4) be delivered within 30 days from the date notice of the decision is given, and (5) be accompanied by a fee of $25, payable to the Minister of Finance and Corporate Relations.

Yours truly,

Dwain Boyer, P. Eng.
Engineer under the Water Act

VS/hc

cc: Conservation Officer Service, Castlegar

Ministry of Environment, Lands and Parks
Environment and Lands Kootenay Region
Mailing/Location Address: 401 - 333 Victoria Street Nelson BC V1L 4K3
Telephone: (250) 354-6333
Facsimile: (250) 354-6332
PP Facsimile: (250) 354-6367

MINISTRY OF ENVIRONMENT, LANDS & PARKS
WATER MANAGEMENT BRANCH
NELSON, B.C.

A P P R O V A L

WATER ACT - Section 9
(Changes in and about a stream)

Minister of Transportation and Highways is hereby authorized to make changes in and about a stream as follows:

a) The name of the stream is unnamed within District Lot 12800, Kootenay District, which is crossed by Highway 6 at a point 1.4 km north of the junction of Highway 3A and Highway 6.

b) The change to be made in and about the stream is to stabilize the headscarp by preventing the infiltration of surface runoff. The works shall consist of 375 mm pipeline buried to an adequate depth in a location shown on the sketch submitted June 2, 2000. All other works shall be constructed as shown in the drawings submitted in support of the application dated May 17, 2000.

c) Any machinery operated in the vicinity of surface water shall be free of excess oil and grease.

d) All riprap material used shall be clean, angular, durable, well graded and suitably sized to resist movement by the unnamed stream.

e) The riprap shall be placed as shown on the sketch accompanying the application dated May 17, 2000.

f) Vegetation within the construction area shall be disturbed as little as possible.

g) All disturbed areas shall be restored to their original condition or better and protected from erosion.

h) Care shall be exercised during all phases of construction to minimize siltation and to prevent debris from entering Slocan River.

i) The holder of this approval shall take reasonable care to avoid damaging any land, works, trees or other property, and shall make full compensation to the owners for any damage or loss resulting from the exercise of the rights granted with this Approval.

j) The work authorized shall be completed on or before August 31, 2000.

k) The holder of this approval shall advise the Regional Water Engineer for the Kootenay Region immediately prior to commencement of construction of the works and again immediately after the changes have been completed.

l) A copy of this Approval must be available at the work site during the period of time that the work authorized by clause (b) of this document is being performed.

m) It is the responsibility of the holder of this Approval/Permit to ensure compliance with all other applicable legislation that may be in force, in particular the conditions of the Fisheries and Waste Management Acts. In addition, authorizations may be required by other government agencies.

This Approval does not authorize entry onto privately held or Crown land.

Dwain Boyer

Dwain Boyer, P. Eng.
Engineer under the Water Act

File: A401511

Date: June 6, 2000

BRITISH COLUMBIA

Ministry of Transportation and Highways

Date: 2000 06 08

File No:

FILE

Facsimile Record

To:	Mike Bancroft 354 6719	From:	GA Vander-Irving
	Chad Linney 354 6619		Central Kootenay District
			2nd Floor
			310 Ward Street
C/O	Gerrod Huber 352 2172		Nelson, B. C. V1L 5S4
FAX no:	Phone No:	Fax No: (250)354-6547	Phone No: (250)354-6521

ORIGINAL PAGES TO BE:

☐ FILED ☐ MAILED ☐ COURIERED ☐ OTHER (Specify)

Subject: Passmore Water License - Approval Amendment

PAGES: 4 (including this sheet)

Operators Signature

H-6 (96/04)

BRITISH COLUMBIA

File: A401511

June 14, 2000

Ministry of Transportation and Highways
310 Ward St
Nelson BC V1L 5S4

Attention Gerald Vaughan-Irving

Dear Gerald Vaughan-Irving:

Re: Approval - Unnamed Stream

An Order amending clause (b) to the above mentioned approval document is attached. If you have any questions or concerns regarding the document issued contact the Water Management Branch office.

A right of appeal from my decision lies to the Environmental Appeal Board. Notice of any appeal must (1) be in writing, (2) include grounds for appeal, (3) be directed by registered mail or personally delivered to the Chair, Environmental Appeal Board, 4th Floor 836 Yates Street, Victoria, BC V8V 1X5 (4) be delivered within 30 days from the date notice of the decision is given, and (5) be accompanied by a fee of $25, payable to the Minister of Finance and Corporate Relations.

Yours truly,

Dwain Boyer

Dwain Boyer, P. Eng.
Engineer under the Water Act

VS/hc

cc: Conservation Officer Service, Castlegar

Ministry of Environment, Lands and Parks
Environment and Lands Kootenay Region
Mailing/Location Address: 401 - 333 Victoria Street Nelson BC V1L 4K3
Telephone: (250) 354-6333
Facsimile: (250) 354-6332
PP Facsimile:(250) 354-6367

ORDER

WATER ACT

SECTION 18

File Number A401511 Approval Number A401511

The provisions of the British Columbia Water Act having been complied with and being satisfied that no person's rights will be affected, the above approval document is amended as follows:

1) Clause (b) shall read:

The change to be made in and about the stream is to stabilize the headscarp by preventing the infiltration of surface runoff. The works shall consist of 375 mm pipeline buried to an adequate depth in a location shown on the sketch submitted June 14, 2000. All other works shall be constructed as shown in the drawings submitted in support of the application dated May 17, 2000.

All other clauses dated June 6, 2000 are to remain.

Dated at Nelson, British Columbia this 14th day of June, 2000.

Dwain Boyer

Dwain Boyer, P. Eng.
Engineer under the Water Act


water tank
Turtle Rock
Diversion
Pipe line
on surface
silt
489.0
488.6
490.0
489.6
488.0
487.6

Ministry of Transportation and Highways

BRITISH COLUMBIA

CONDITIONS OF ENTRY FOR CONSTRUCTION PURPOSES

DATE: June 7, 2000
PROJECT: 31588 – 0000 Passmore Slide 2000
PROPERTY SERVICE: 100493-00 s.22
AGENT: Mike Bancroft TEL: 354-6746

TO:		
	District Highways Manager	Jacques Dupas
	Project Manager	Brent Bailey
	Regional Design Supervisor	Lorne Bonderoff
	Regional Mgr, Design and Field Services	Kevin Richter
	GEOTECH Engineer	Chad Tenney ← TO

The following terms have been agreed upon in connection with:

Plan No.:
Station No.:
Owner: s.22
Civic Address: Highway 6
Passmore
Legal Description: District Lot 12800, Kootenay District

Construction and Special Instructions: s.22 MoTH et al to utlize the portion shown in bold outline for access to facilitate installation of the drainage pipeline in the location highlighted in yellow on the License for Construction Access dated May 15, 2000 [straight down the hill route]. Blockages such as fallen trees and brush will be pushed aside. No other works will be done by the Licensee [MoTH]. License Term is from June 6, 2000 to August 31, 2000.

Contact Person: s.22 Phone No.: s.22

Change
~~Right-of-way~~ has been consentually acquired.

Change
Date ~~Right-of-way~~ available for construction: June 16, 2000

Date June 7/00

Property Agent: Mike Bancroft
Phone Number: 354-6746

H-443 (95-11)

Ministry of Transportation and Highways

LICENSE FOR CONSTRUCTION ACCESS

DATE: June 6, 2000
PROJECT: 31588 – 0000 Passmore Slide 2000
PROPERTY SERVICE: 100493-00 s.22
AGENT: Mike Bancroft TEL: 354-6746

LICENSOR:

s.22 of Comp 1 Group 18, RR #1, Winlaw, BC, V0G 2J0

(hereinafter called "the Licensor")

LICENSEE:

Her Majesty the Queen in Right of the Province of British Columbia as represented by the Minister of Transportation and Highways (hereinafter called "the Licensee")

GRANT: For and in consideration of the sum of ONE 00/100 DOLLARS ($1.00), being sufficient consideration in full, receipt of which is hereby acknowledged by the Licensor, the Licensor grants the Licensee and the employees, contractors, agents and invitees of the Licensee together with their machinery, vehicles, supplies, and equipment, a right to enter upon and occupy the following described lands:

Parcel Identifier No: 012-157-104

Legal Description: That part of District Lot 12800, Kootenay District ~~shown highlighted in yellow on the Plan attached hereto as Schedule A and comprised of two areas approx. 20 metres wide by approx. 300 metres long [pipeline option "A"] and approx. 20 metres wide by approx. 650 metres long [pipeline option "B"] for a total area of approx. 1.9 hectares~~, AND shown in bold outline on said Schedule A and containing approx. 4.0 hectares s.22 s.22

Civic Address: Highway 6 Passmore

INITIALS

(the "Property"), and conduct the Activities (as hereinafter described) on the following terms and conditions:

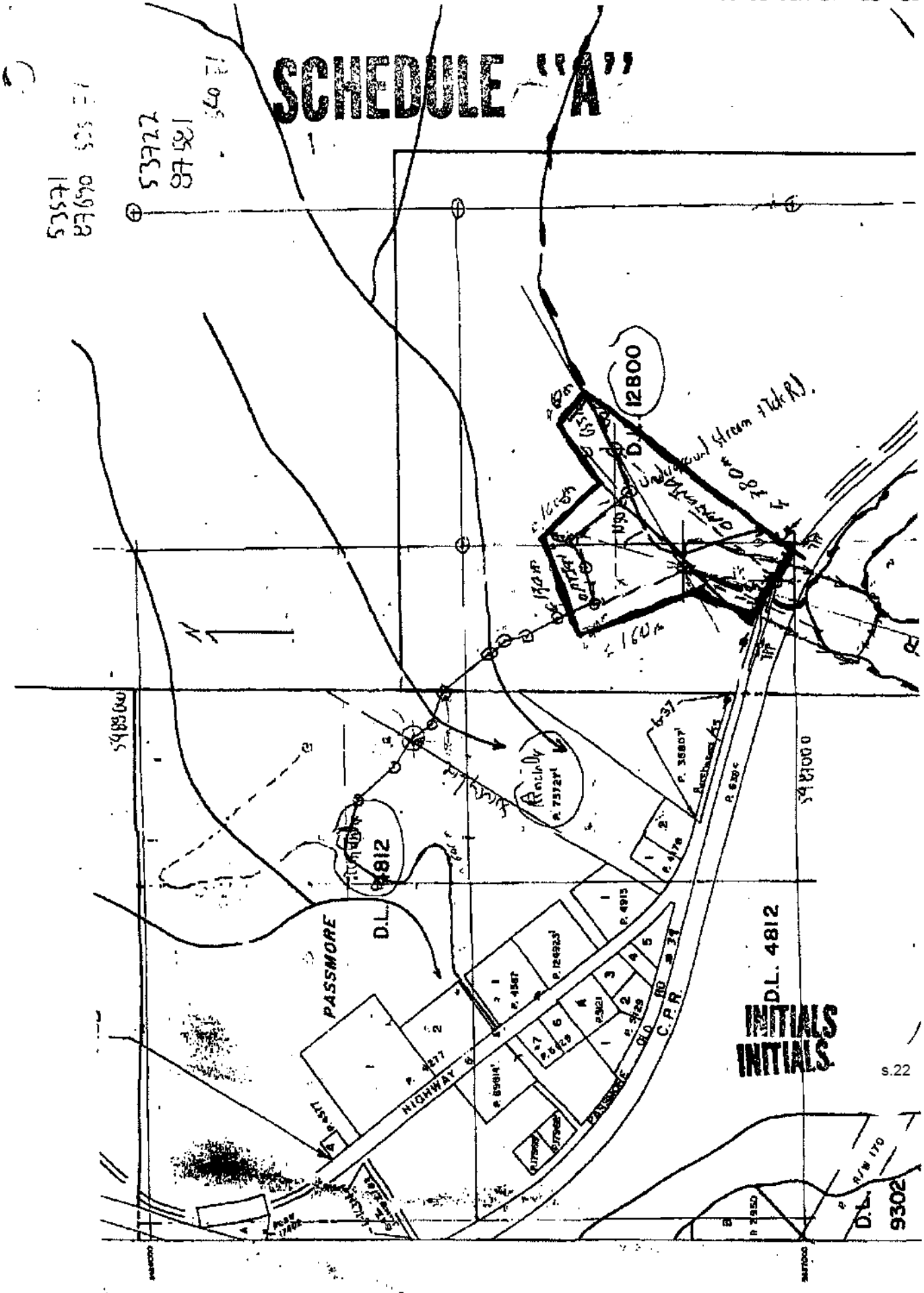
INITIALS

s.22

1.00 COVENANT NOT TO REVOKE:

1.00 For and in consideration of the promise by the Licensee to pay the sum of ONE 00/100 DOLLARS ($1.00), being sufficient consideration in full, the Licensor covenants not to revoke this License.

SCHEDULE "A"


D.L. 12800
D.L. 4812
PASSMORE
D.L. 4812
INITIALS
INITIALS
s.22
HIGHWAY 6
C.P.R.
D.L. 9302

File: Passmore Slide

BRITISH COLUMBIA

July 4, 2000

Garred Huber
Quality Control Manager
VSA Highway Maintenance Ltd.
801 Front Street
Nelson BC V1L 4B8
(Sent by facsimile 352 – 2172)

Re: Passmore Slide Rock Bolts

As requested, this letter provides the rock bolting information that you require to provide direction to the rockwork contractor.

The rock bolts that are to be installed in the rock bluff at the Passmore Slide site are to be a #7 Dywidag (60 ksi) Threadbar or equivalent. The bolts should be 2 m in length and installed at an angle that will match the angle of the cable (see attached diagram). The bolts should be installed as outlined in section 206 of the Ministry's Standard Specifications for Highway Construction Manual (2000). A copy of section 206 has been attached for your reference. It is important that the contractor performs the tensioning test and completes the tensioning record form that is also included in section 206.

If you have any questions or comments with regards to the above, please do not hesitate to call.

Prepared by: Chad Tenney, EIT
Geotechnical Engineer

Reviewed by: Michael P. Walsh, P. Eng.
Regional Geotechnical and Materials Engineer

Cc.: Brent Bailey, Area Manager, Nelson – MoTH
Mike Walsh, P. Eng., R.G.M.E.

Ministry of Transportation and Highways
Geotechnical and Materials Engineering Branch
610 Lakeside Drive
Nelson BC V1L 5S7
Phone: (250) 354-6954
Facsimile: (250) 354-6619

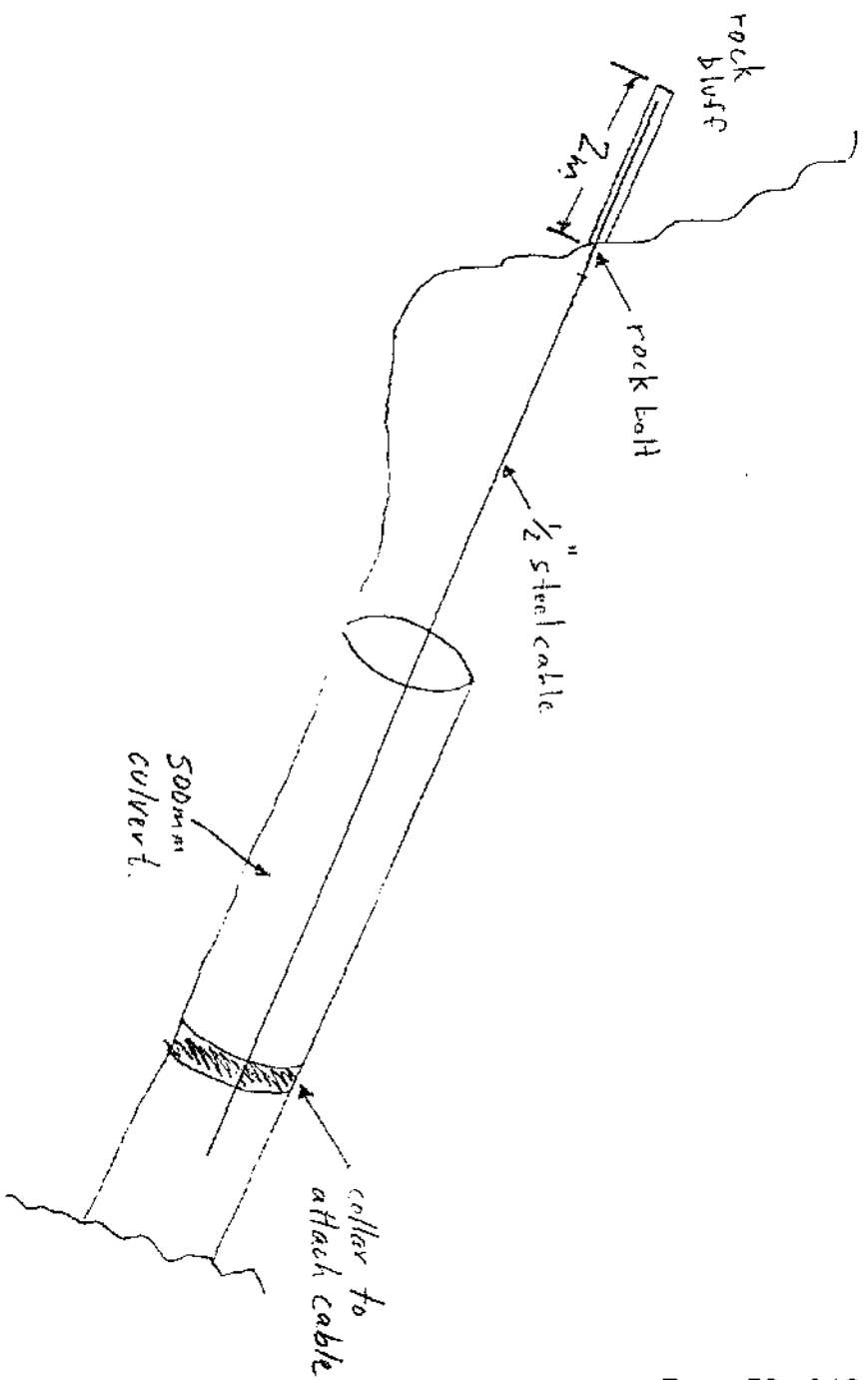
Ministry of Transportation and Highways
Geotechnical and Materials Branch
DESIGN CALCULATION SHEET

File No. _____

Project Passmore Slide **Date** July 4, 2000

Region Kootenay **District** Central **Calculation by** CRT

Sheet 1 **of** 1



TYPICAL SECTION
- Rock Bolts -

H-174 (Rev. 08/95 Speedy Printing)

SECTION 206

ROCK BOLTS

DESCRIPTION

206.01 Scope - This Section covers the installation, by appropriate rock bolting methods, of anchored steel bars tensioned and locked off against face plates in the areas designated by the Ministry Representative. Unless otherwise stated below, all rock bolts shall be installed and tensioned to the rock bolt manufacturer's specifications.

206.02 Codes And Standards

CAN/CSA G164	Hot Dip Galvanizing of Irregularly Shaped Articles.
CAN/CSA G30.18	Billet Steel Bars for Concrete Reinforcement
CAN/CSA G40.21	Structural Quality Steels
CAN/CSA A23.2-9C.....	Compressive Strength of Cylindrical Concrete Specimens.

206.03 Quality Control - The Contractor shall provide quality control for rock bolt operations.

206.04 Submittals - The Contractor shall supply the following to the Ministry Representative:

206.04.01 Proposed Rock Bolt System - Provide documentation as follows for the proposed rock bolt system for review at least 5 working days before commencing rock bolt installation.

a) **Rock Bolts** - Type, dimensions and manufacturer of the bar, face plate, washer (where applicable), and nut.

b) **Resin** - Published specifications showing name of material, manufacturer, graph of unconfined compressive strength development versus time, gel time, viscosity, shelf life, storage and handling requirements.

c) **Grout** - Published specifications showing name of material, manufacturer, 7 and 28 day unconfined compressive strength, composition, shelf life, storage and handling requirements.

d) **Data Sheets** - Upon request, supply the manufacturer's product data sheets.

e) **Properties of Steel** - Upon request, supply the physical and chemical properties for each lot or heat number of the steel.

f) **Test Results** - Upon request, submit a certified statement from an independent testing laboratory of the physical dimensions and mechanical properties of the rock bolt bar proposed for use. This statement shall include:

- Minimum cross-sectional area of the threaded portion of the bar.
- Minimum cross-sectional area of the unthreaded portion of the bar.
- Yield strength of the bar.
- Ultimate tensile strength of the bar.
- Percent elongation of the bar at yield and ultimate strength.

g) **Quick Setting Mortar** - Name of material, manufacturer, 7 and 28 day unconfined compressive strength, and composition.

206.04.02 Calibration Certificates - Provide tensioning jack calibration certificates 5 working days before commencing rock bolt installation. Calibration of jacks shall have been performed by an authorized testing agency not more than 30 days prior to rock bolt testing. The certificate shall show the relationship between gauge pressure and applied load. Pumps and jacks shall be paired for calibration.

206.04.03 Contractor's Rock Bolt Records - Provide daily rock bolt tensioning records within one day of each day's rock bolt operations. Records shall include contractor name, date of tensioning, weather, temperature, test jack identification number, pump identification number, name of person who tested the rock bolt, rock bolt location, rock bolt number, rock bolt length, resin or grout details, test start time, test end time, gauge reading for each minute of the creep test, and lock off load. For resin systems, records shall also include the start and end times of spinning the bar through the resin in the hole.

MATERIALS

206.11 Materials - Steel materials shall be hot-dip galvanized to CSA G164. All resin, grout and steel materials shall be the product of established manufacturers regularly engaged in the manufacture of rock bolt materials for at least five years. Materials shall meet the following additional requirements:

a) Rock Bolt Bars

- Steel hot-rolled Grade 400 meeting CAN/CSA G30.18.
- Nominal bar diameter 22 mm unless otherwise specified.
- Threadlike surface deformations for full length of

bar and suitable for mechanical coupling.
- Cut-thread reinforcing bar not permitted.

b) **Miscellaneous Hardware**

- Steel hardware to be compatible in size and strength with rock bolt bars.
- Face plates to CAN/CSA G40.21 Grade 300W.
- Face plate dimensions 10 mm by 150 mm by 150 mm unless otherwise specified.
- Face plates date stamped after galvanizing on the side visible when installed with the current year (in the format YYYY) in numbers 10 mm high.
- Face plates slotted for grout tube if grout is used.

c) **Resin**

- Fast-set and slow-set resin in cartridge form.
- A minimum unconfined compressive strength when fully mixed and cured of 90 MPa, tested in accordance with CAN/CSA A23.2-9C.
- Encased in a plastic film that provides optimum resistance to moisture, and is easily ruptured to enable complete mixing during installation.
- Suitable thixotropic and viscous properties to permit adequate mixing of the resin components by rotation of the rock bolt bar and to contain the resin within the drill hole.
- Easily identifiable gel time and as recommended by the resin manufacturer.
- Reach 80% of its ultimate strength within a time interval equal to five times the gel time.
- Non-shrink after the gel time.
- Unaffected by mild acids or mild alkalis.
- Cartridge boxes labelled with the resin expiry date.

d) **Grout**

- Pre-mixed, unsanded, non-metallic, and non-shrink cementitious grout containing silica fume.
- Can be mixed to a flowable consistency.
- Minimum 7 day compressive strength of 30 MPa and a minimum 28 day compressive strength of 40 MPa, tested in accordance with CAN/CSA A23.2-9C.
- Admixtures to be used according to the manufacturer's specifications.
- Calcium chloride accelerator is not permitted.

e) **Mortar Pads**

- Portland-cement based.
- Quick setting.

CONSTRUCTION

206.31 Execution

206.31.01 General - The entire rock bolt system shall be stored under cover away from deleterious materials. All grease and other deleterious material shall be removed from the steel prior to rock bolt installation.

206.31.02 Site Preparation - Where rock bolts may be adversely impacted, rock removal above and around proposed rock bolt locations shall be completed before installation of rock bolts commences. Any minor rock scaling performed in conjunction with rock bolting shall be considered incidental to rock bolting.

206.31.03 Drill Holes

a) **Location, Orientation and Depth** - The location, direction, angle and depth of the holes will be dependent on field conditions encountered and will be detailed by the Ministry Representative.

b) **Hole Diameter** - The diameter of the holes shall be suitable for the rock bolt system chosen. Where grout is used, the hole size shall be according to the rock bolt manufacturer's recommendations. Where only resin is used, the hole size shall be according to the resin manufacturer's recommendations.

206.31.04 Cleaning - All water, grease, oil, cuttings and other deleterious materials shall be removed from finished holes by a water and/or air jet as required.

206.31.05 Installation

a) **General** - Rock bolts shall be inserted (or rotated) into the drill holes and fully encapsulated in resin or grout to the drill hole collar. When resin is used, the bolt shall be advanced and rotated at a rate recommended by the resin manufacturer.

b) **Anchorage Length** - The anchorage length shall be the last 1000 mm of the inserted end of the bar, unless otherwise specified.

c) **Centralizers** - If grout is used, centralizers on 3.0 m centres shall centralize the rock bolt in the drill hole before grout is placed. Centralizers shall be suitable for holes in rock.

d) **Resin** - Resin cartridges shall be installed as follows or as specified by the resin manufacturer:

- **Fast-Set Resin** - A sufficient number of fast-

setting cartridges shall be placed at the bottom of the hole for the anchorage.

- **Slow -Set Resin** - A sufficient number of slow-setting cartridges shall be placed between the anchorage and the collar of the hole.

e) **Grout** - Grout shall be prepared and placed as follows unless otherwise specified by the grout manufacturer:

- **Mixing** - Grout shall be mixed in a colloidal or high shear grout mixer according to the grout manufacturer's published instructions. Mixing paddles shall be slotted and perforated. Mixing time shall be not less than two minutes.

- **Batching** - All ingredients for the grout mix shall be batched by mass. Water shall be added to the drum first and dry ingredients afterwards. Grout shall not be re-tempered after initial mixing. Grout shall be placed immediately after mixing.

- **Grout Placement** - Grout shall be pumped using a grout tube extending to the bottom of the hole. The inserted end of the tube shall remain below the level of the grout in the hole to effect a continuous air free column as the grout level rises. Grout shall be placed quickly and continuously to avoid overworking, segregation, bleeding and disturbance of initial set. Grout that has stiffened due to delay in placing shall not be used in the work and shall be disposed of at an authorized location.

f) **Rock Face Preparation** - The bearing surface shall be prepared to allow the face plate to be oriented within the limits recommended by the anchor manufacturer. If necessary, rock shall be chipped from around the face plate contact area.

g) **Mortar Pad Construction** - Mortar pads shall be constructed as required to ensure the bar is within 20° of a line perpendicular to the face plate. The pad shall not crack or deform when loaded. Sufficient time shall be provided to allow pads to achieve sufficient bearing capacity prior to test-tensioning.

h) **End Hardware Installation**

- Nuts shall bear uniformly against the face plate.
- The bolt extension beyond the nut shall be 100 mm ± 10 mm.

206.31.06 Tensioning - All rock bolts shall be test-tensioned and locked off following set-up (or curing) of the anchorage. Prior to testing, the grout and resin shall meet the strength specified by the anchor manufacturer. The following procedure applies to 22 mm diameter bars. An alternative procedure may be specified for different bar sizes.

a) **Equipment** - Equipment required for tensioning shall be supplied by the Contractor and shall be of a size adequate to provide the required tension. A torque wrench shall not be used for tensioning.

b) **Test-Tensioning and Creep Test** - Rock bolts shall be test-tensioned to 139 kN (31,000 lb). This load shall be held for 10 minutes for the creep test.

c) **Lock-Off Tension** - Rock bolts shall be locked-off to a tension of 111 kN (25,000 lb) after testing.

d) **Acceptance Criteria** - During the creep test a load loss of greater than 10% of the load applied shall be indicative of anchorage failure. Creep movement at the anchor head shall not exceed 2 mm during the creep test. A replacement rock bolt shall be installed at the Contractor's expense where these criteria are not met.

206.31.07 Rock Bolt Evaluation - The Ministry Representative will implement a program of evaluation of rock bolts installed. After locking off the anchor, the load shall be re-applied to determine the lift-off load. The lift-off load shall be the tension level at which the anchor nut can be loosened by hand. Lift-off tests shall be performed on rock bolts chosen by the Ministry Representative to a minimum of 5% of the total number of rock bolts. One additional lift-off test on a different bolt shall be performed for each bolt whose lift-off load is not within 10% of the specified lock-off load. Following lift-off testing, all bolts shall be locked off as specified.

MEASUREMENT

206.81 Rock Bolts - Rock bolts will be measured by the METRE installed. The measurement length shall be the length of bar in the rock.

PAYMENT

206.91 Rock Bolts - Payment for ROCK BOLTS will be at the Contract Unit Price per metre. Payment for rock bolts will be authorized after installation to the contract specifications and after submittal of the completed Contractor's Daily Rock Bolt Testing and Tensioning Record. The Unit Price will be considered full compensation for all work and materials supplied according to the requirements of this Section.

File # _____

CONTRACTOR'S DAILY ROCK BOLT TESTING AND TENSIONING RECORD

PROJECT NO. _____

(TO BE SUBMITTED WITHIN 1 DAY AFTER EACH DAY'S ROCK BOLTING OPERATION)

Contractor Name _____ Sample calculation for this grout: Date _____

Bolt Type _____ Size _____ Resin/Grout Type _____ Weight of each bag of grout (M) _____ kg Weather _____

Anchorage Length _____ m Volume of water added for each bag (V) _____ L Temperature _____ °C

Test Jack Number(s) _____ Actual Water / Cement Ratio (V/M) _____

Name of Person who Installed and Tested the Rock Bolt	Zone	Area	Bolt Sequence Number for the Area	Bolt Length (m)	Bolt Rotation Time Through Resin Start	Bolt Rotation Time Through Resin End	Test Start Time	Test Details: Record Guage Reading for Each Minute Elapsed Time (minute) 1	2	3	4	5	6	7	8	9	10	Lock Off Load (kN)	Test End Time	Grout Cube #	Certified Correct by Tester (Signature)

Certified Correct: _____
(Contractor's Superintendent)

(Use Additional Sheets if Necessary)

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION & HIGHWAYS
GEOTECHNICAL & MATERIALS ENGINEERING

FAX COVER SHEET

PLEASE DELIVER THE FOLLOWING PAGES TO:

NAME: Garred Huber

TITLE: Quality Control Manager

LOCATION: VSA Highway Maintenance Ltd.

FAX NUMBER: (250) 352-2172

FROM: **Ministry of Transportation & Highways**
Kootenays Regional Office
610 Lakeside Drive
NELSON, British Columbia
V1L 5S4

Chad Tenney, EIT
Geotechnical Engineer
Geotechnical & Materials
Engineering Branch
Kootenays Region

FAX NUMBER: 354-6619 **TELEPHONE: 354-6954**

DATE SENT: July 4, 2000

TOTAL PAGES: 7

COMMENTS:

Garred,

Please find attached the information that you require for the rock bolts at the Passmore Slide. If you need any more information please let me know.

Chad

Ministry of Transportation and Highways
Geotechnical and Materials Branch
DESIGN CALCULATION SHEET

File No. _____

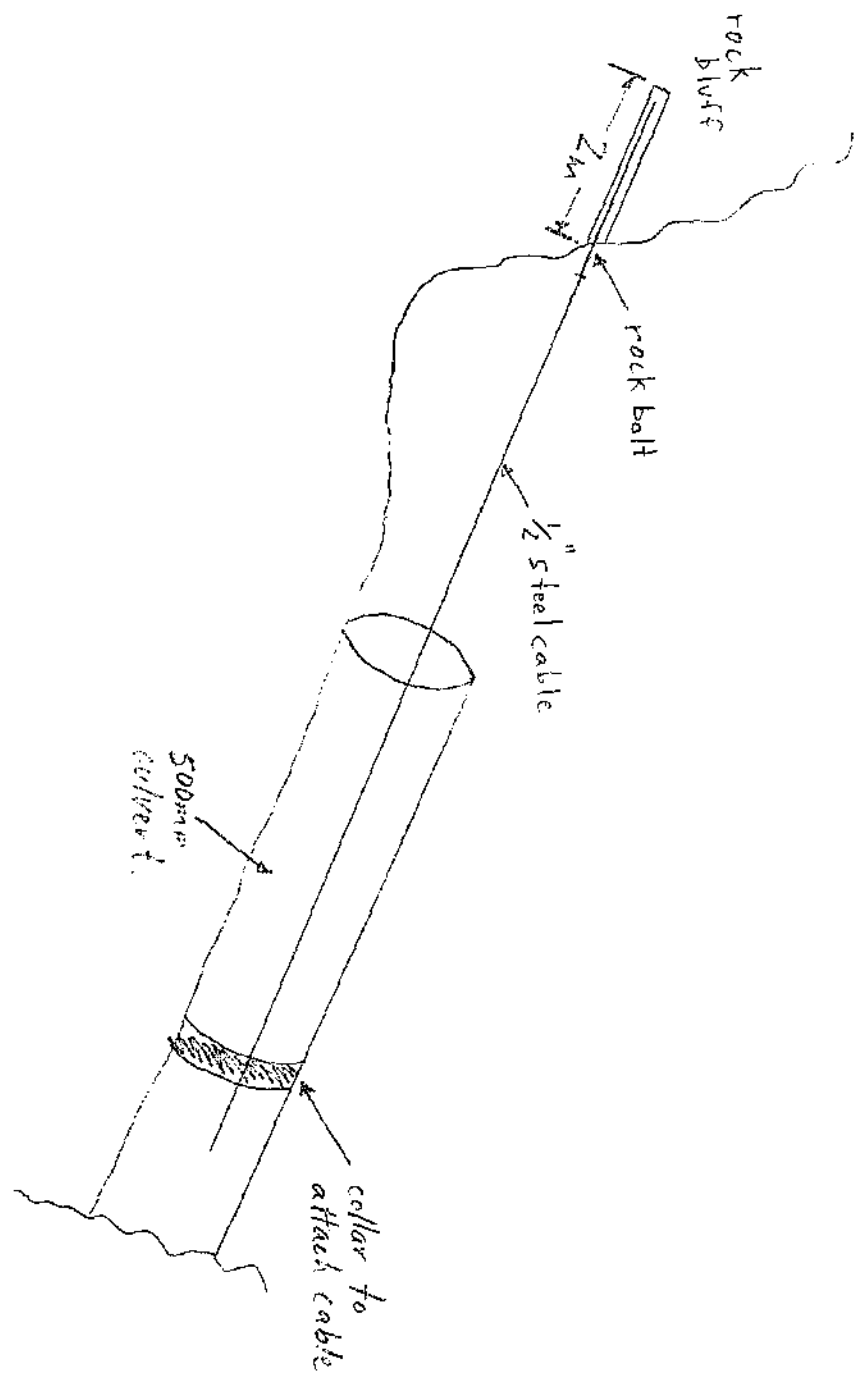
Project Passmore Slide

Date July 9, 2000

Region Kootenay District Central

Calculation by CRT

Sheet 1 of 1



TYPICAL SECTION
- Rock Bolts -

Post-it™ Fax Note 7671E	Date	# of pages ▸
To CHAD TENNEY	From BRIAN	
Co./Dept.	Co. ARMTEC	
Phone #	Phone #	
Fax #	Fax #	

armtec LIMITED
0451 Shelbridge Way
Richmond, B.C.
V6X 2W8
Tel: (604) 278-3881

Date	P.O.#	Shipped from	Date Shipped	Invoice Date	Invoice Number
05/08/00	CHAD TENNEY	RICHMOND			

Order #	Customer #	Terms Disc	Products						Salesman	F.O.B.	Wanted Date
418399	1190580	1	601	000	000	83			DAVEY NELSON	PREPAID	05/10

Sold to:
TRANSPORTATION & HIGHWAYS, MINISTRY OF
310 WARD ST.
GEOTECHNICAL BRANCH
NELSON
BC
V1L 5S4

Ship to:
MINISTRY OF TRANS & HWYS
C/O JOBSITE
HWY 6 AT PASSMORE
REFER TO ATTACHED MAP

Part No.	Description	Qty Ordered	Unit price	Amount
	BOSS 2000 BELLED PIPE			
01	XAO2376 B2 375 MM 210 KPA 6M	42	175.38	7365.96
	HIGH DENSITY POLYETHYLENE - BOSS2000			
02	418399A 375mm Dia Shrink wrap	42	27.50	1155.00
	375mm Dia shrink wrap couplers			
03	*FRT601 FREIGHT CHARGES	1	950.00	*950.00
	* DENOTES NON-PST TAXABLE ITEM			9470.96

Total Weight	G.S.T. Exempt #	P.S.T. Exempt #	7. % P.S.T.	596.47
4,252	EXEMPT		TOTAL ORDER	10067.43

Acknowledgement

Thank you for this order which has been entered on our work order as above. Please note carefully and advise us IMMEDIATELY of any errors or omissions.

armtec LIMITED

REGION OFFICE:
245-10451 Shellbridge Way
Richmond, BC V6X 2W8
Phone (604) 278-3881
Fax (604) 278-8530

PLANT:
2001 Industrial Way
Prince George, BC V2N 5S6
Phone: (250) 561-0017
Fax: (250) 561-1240

QUOTATION

00-078

TO: Ministry of Transportation & Highways

DATE: 4/18/00

Fax: (250) 354-6619

Attention: Chad Tenney

PAGE: 1 of 1

F.O.B: Prince George & Langley, BC

PROJECT: Nelson Landslide

TERMS: Net 30 Days on Approved Credit

CURRENT SHIPMENT: As Noted

CLOSE DATE: n/a

We are pleased to submit our quotation for the SUPPLY ONLY of the undernoted Drainage and Allied Products. Offloading responsibility of contractor unless otherwise stated.

Qty.	Stiffness	Size	Description	Price	Per	Amount
			Option #1			
351.5 m	210 kPa	375mm Ø x 9.5m Lengths	Big 'O' BOSS 2000 HDPE Pipe - Non-CSA c/w Plain Ends. - leakage	$21.900	m	$7,697.85
1			Prepaid Freight Charge from Prince George to Nelson			$1,240.00
			Delivery: 2 - 3 days			
			Option #2			
354 m	210 kPa	375mm Ø x 6m Lengths	Big 'O' BOSS 2000 HDPE Pipe - Non-CSA c/w Bell & Gasket Ends - no leakage	$29.23	m	$10,347.42
1			Prepaid Freight Charge from Langley to Nelson			$950.00
			Delivery: 2 weeks			
			Option #3			
352 m	320 kPa	375mm Ø x 4m Lengths	Big 'O' BOSS 2000 HDPE Pipe - CSA Certified c/w Bell & Gasket Ends	$34.08	m	$11,996.16
1			Prepaid Freight Charge from Langley to Nelson			$950.00
			Delivery: 2 weeks			
1 ea.		375mm Ø	BOSS 2000 Split Coupler	$20.60	ea.	
1 ea.		375mm Ø	Shrink Wrap Coupler	$27.50	ea.	

This quotation is firm for acceptance in full within thirty (30) days from this date and is subject to the conditions of sale.

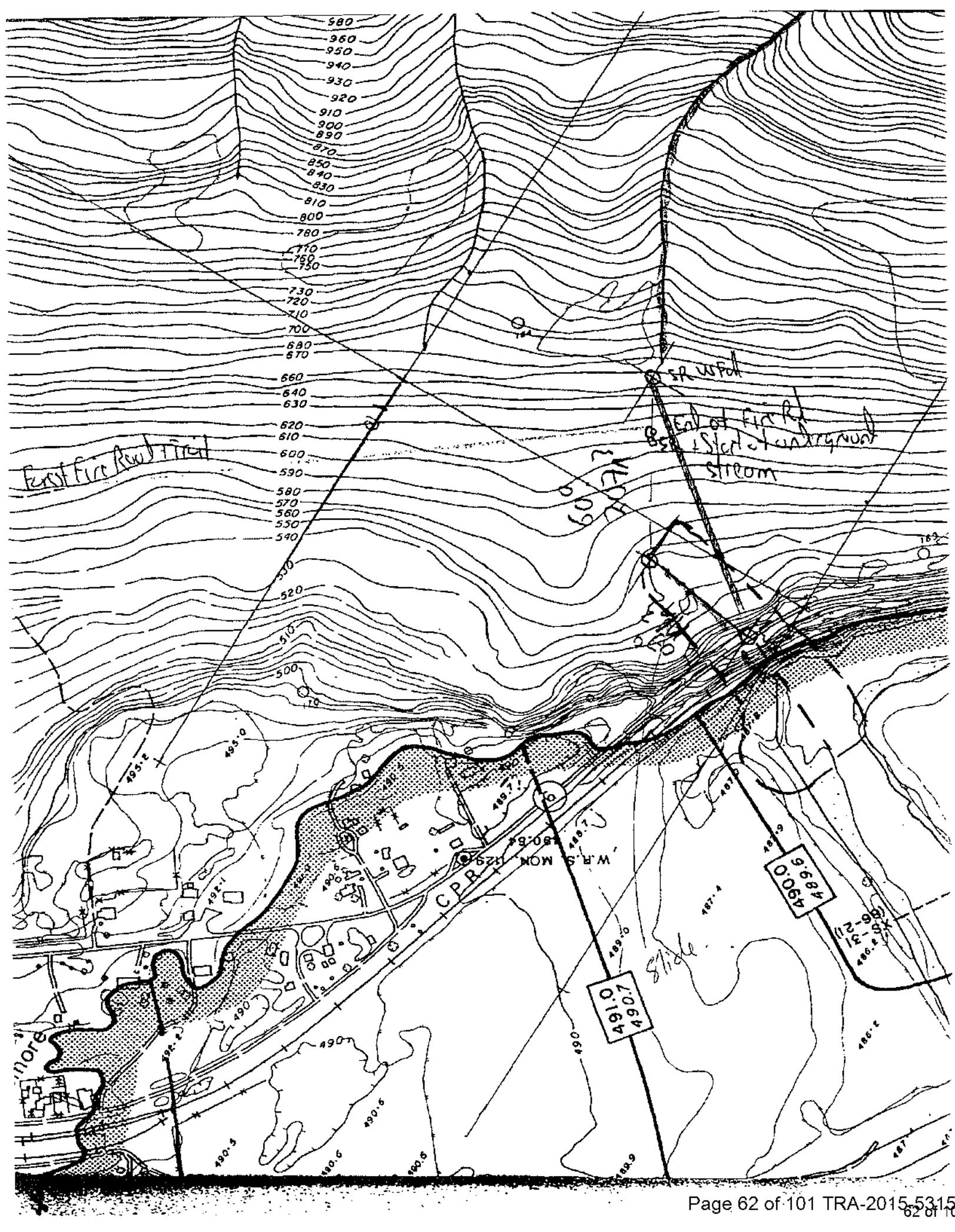
Taxes are Extra

- Shipping address
- P.O. #
- contact # on site.

Brock.

Armtec

Brock Nesbit, AScT
Sales Coordinator


First Fire Road Trail
End of Fire Rd & Start of Underground Stream
SR WPoll
Slide
CPR
W.P.S. MON 1129
490.0
489.6
491.0
490.7
(86-21)

Regional District of Central Kootenay

601 Vernon Street
Nelson, BC V1L 4E9

Telephone (250) 352-6665 Fax (250) 352-9300
368-7325

August 1, 2000

Aug 30/00

Mike Walsh

Mr. Jacques Dupas
District Highways Manager
Central Kootenay District Office
Ministry of Transportation and Highways
2nd Floor, 310 Ward Street
Nelson, B.C., V1l 5S4

Dear Mr. Dupas:

RE: PUBLIC INVOLVEMENT PROGRAM IN THE SLOCAN VALLEY TO DISCUSS LANDSLIDE

PASSMORE SLIDE

Please be advised that the Board of the Regional Di held on July 22, 2000, adopted the following resolution

Resolution No. 757/2000

The communication from the Honourable Harry Lali, Minister of Transportation and Highways dated June 28, 2000 relative to the RDCK's request for a public involvement program in the Slocan Valley be received and staff be instructed to arrange a public meeting with Larry Brown, Area Manager, Ministry of Transportation & Highways invited to attend.

Attached, please find copies of the following correspondence:

1. Minister Lali's letter to the RDCK dated June 28, 2000
2. The RDCK letter to the Minister dated May 23, 2000.

We are interested in setting a date for a public meeting, preferably in September, and are now in contact with you to identify a date and time that fits with your schedule. Prior to the public meeting, the RDCK representative for Area H, the Slocan Valley, Director Don Munro, would appreciate meeting with you to discuss the landslides issue and the proposed public meeting.

Please call me to discuss at: 352 8158. Thank you for your assistance.

Sincerely,

Don Harasym

DON HARASYM, M.C.I.P.
Planning Manager

DH:amk w:\users\plandept\board\svlandslides.doc

okay - return to me after

Copy to Mike Walsh

Remember - we are trying Sept 12 (Tue) for our tour w Don Munro. Do you have plans?

BRITISH COLUMBIA
Ministry of Transportation and Highways
Selkirk Highways District
PO Box 710
Revelstoke, BC V0E 2S0
Telephone: (250) 837-7646
Facsimile: (250) 837-9407

MEMORANDUM

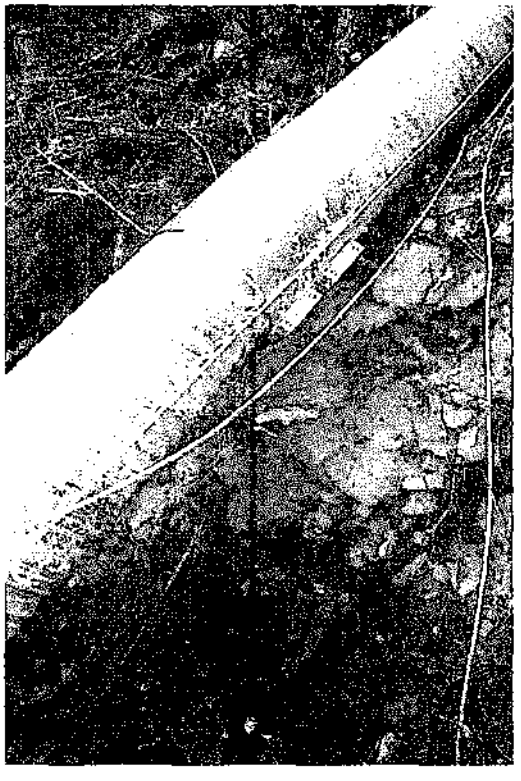
Mike Walsh
G & M Engineer

April 27, 2001

File: Passmore Slide

Re:

Passmore Slide Inspection April 26th 2001



Please note the water leaking from the joint. This photo is at the end of the old Fire Road.

GOVERNMENT OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS

FAX COVER SHEET

OUR FILE: _____

YOUR FILE: _____

PLEASE DELIVER THE FOLLOWING PAGES TO:

NAME: Mike Bancroft

TITLE: _____

LOCATION: _____

FAX NUMBER: _____

FROM:

NAME: Chad Tenney

TITLE: _____

Ministry of Transportation and Highways
Geotechnical and Materials Eng.
610 Lakeside Drive
NELSON, British Columbia
V1L 5S7

FAX NUMBER: (250) 354-6619 TELEPHONE: (250) 354-6681

DATE SENT: _____

TOTAL NUMBER OF PAGE 2 (including this sheet)

COMMENTS:

Mike

The straight line from the start of the water fall to the base of the slide is the approx. location of the pipe.

If still unclear, please call me 354-6954

SIGNATURE: C.

Marilyn

Plan intake

Cross Section of intake

Detail of pipe/membrane seal

Bag Placement/scour detail

Cross section of pipe burial

→ 300mm cover

→ natural bedding/backfill
except material > 150mm

Granite Drafting & Design

Phone: 250.505.5500
FAX: 250.606.5060
email: cramton@telus.net

Facsimile

To: Chad Tenney
MoTH
Fax: 250-354-6619
Tel: 250-354-6954
From: Granite Drafting & Design
Date: Wednesday May 10, 2000
Re: Sample Drawing
Pages: 3, including this

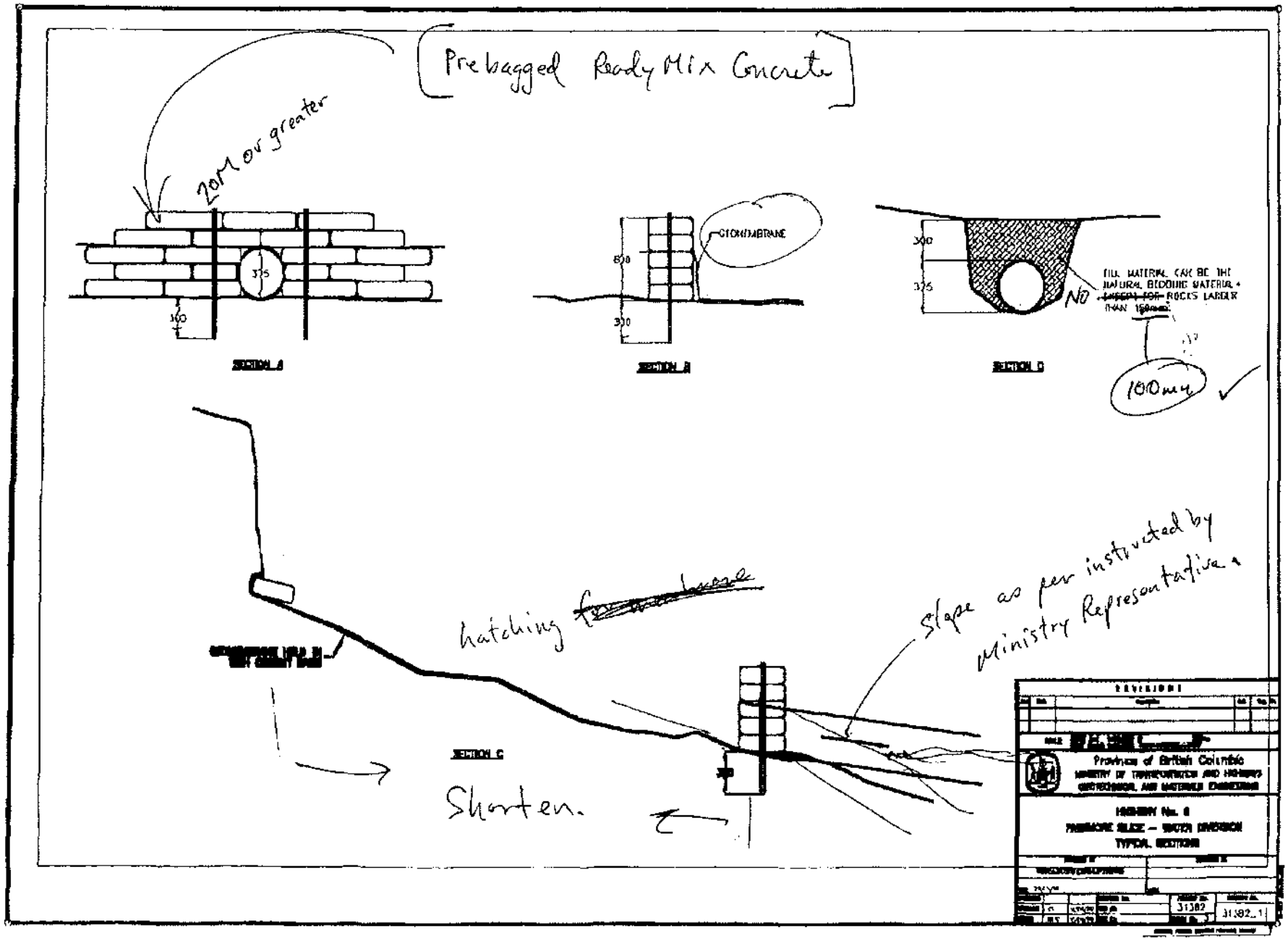
Attention: Chad

Here is a sample of the drawings. This is only the first go around. I know that there will be changes. Can you fax me back any changes and the notes that you wanted to include. I can come into your office if it will be easier for you.

Is the title block OK and are there any other changes? ie, project #, etc.

They are not to scale and I have put them onto 8.5x11 paper for faxing, they were drawn for 11x17.

Bruce



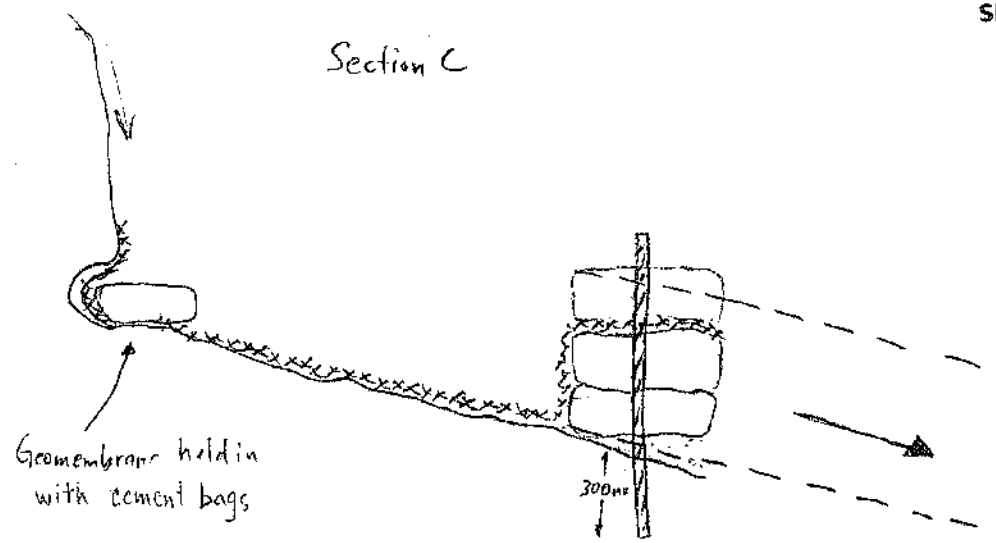
Ministry of Transportation and Highways
Geotechnical and Materials Branch
DESIGN CALCULATION SHEET

File No. _____

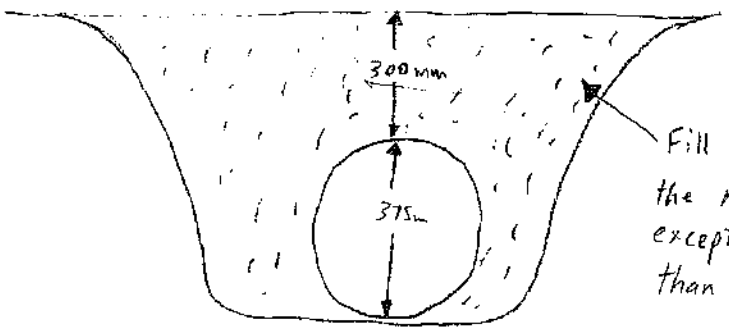
Project Passmore Slide - Water Diversion **Date** _____

Region _____ **District** _____ **Calculation by** _____

Section C



Section D



Fill Material can be the natural ~~[illegible]~~ material except for rocks larger than 150mm.

Ministry of Transportation and Highways
Geotechnical and Materials Branch
DESIGN CALCULATION SHEET

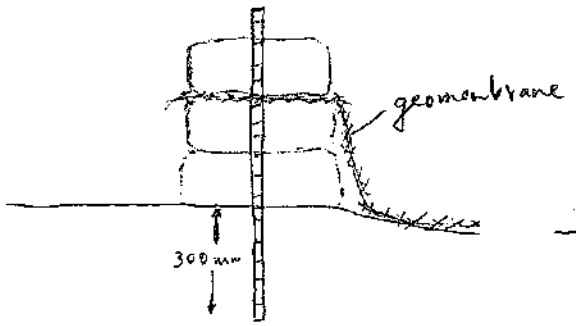
File No. _____

Project Passmore Slide - Water Diversion **Date** _____

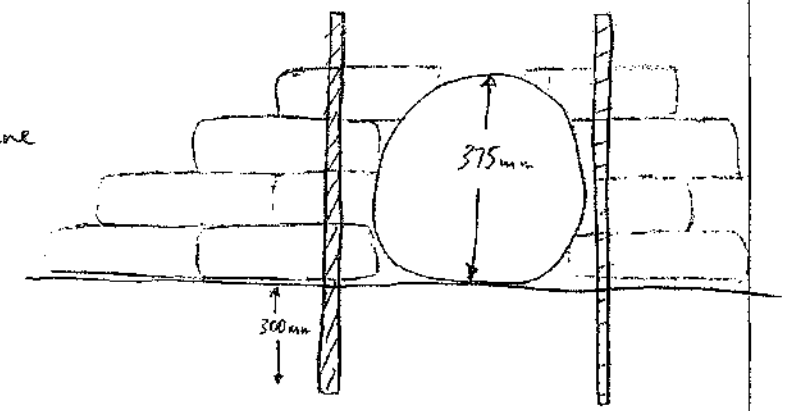
Region _____ **District** _____ **Calculation by** _____

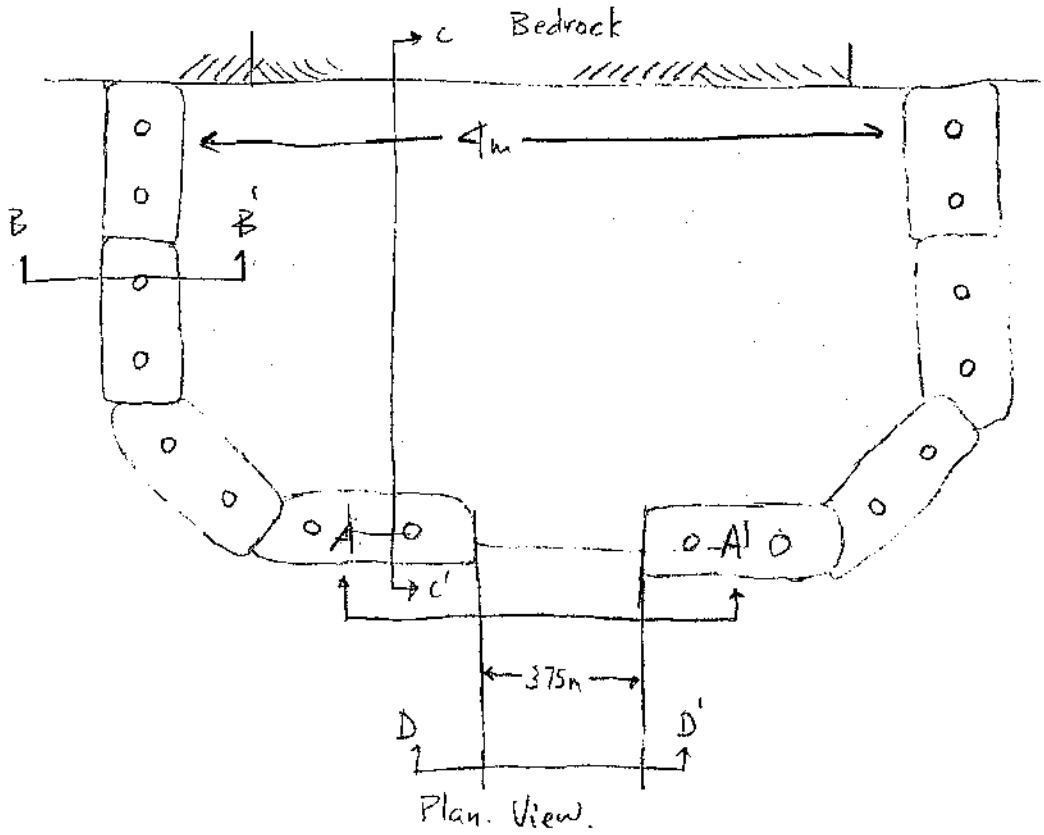
Sheet 1 **of** _____

Section B



Section A





Plan View.

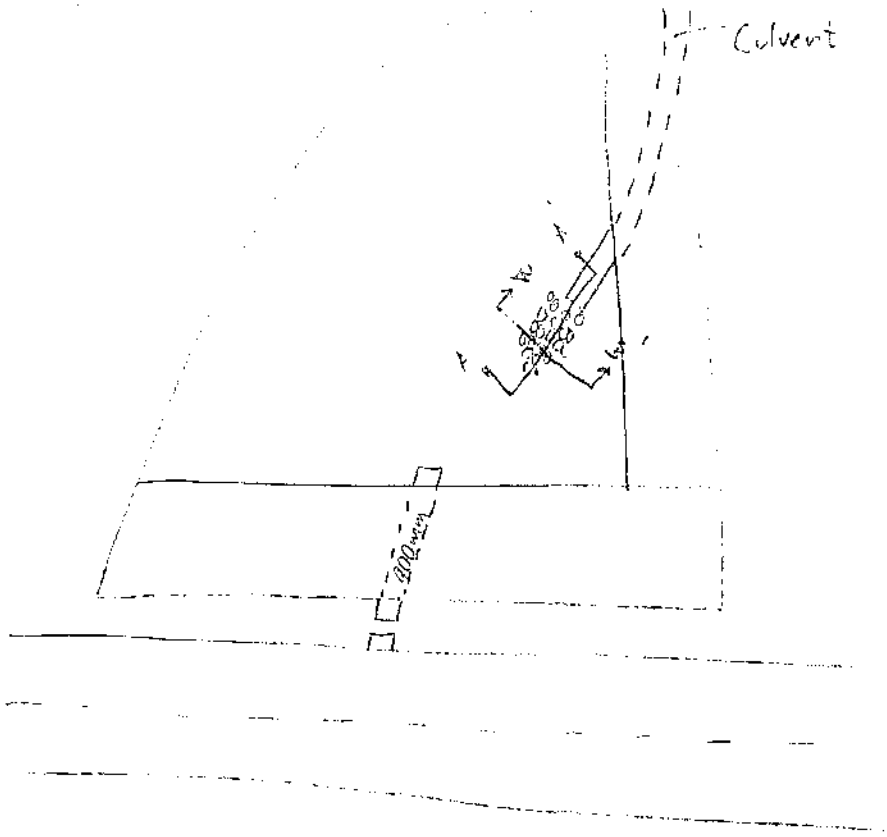
Ministry of Transportation and Highways
Geotechnical and Materials Branch
DESIGN CALCULATION SHEET

File No. _____

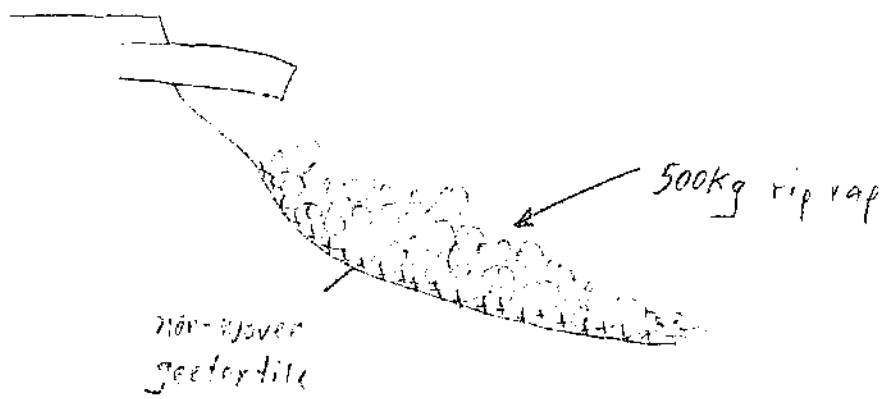
Project Passmore Slide - Water Diversion **Date** _____

Region _____ **District** _____ **Calculation by** _____

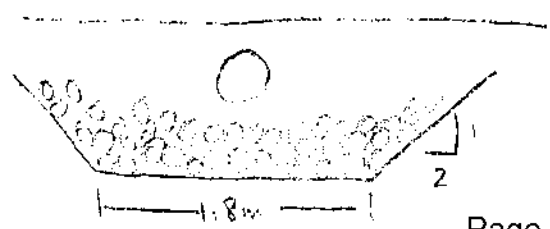
Sheet 3 **of** _____



Section A-A'



Section B-B'



Ministry of Transportation and Highways
Geotechnical and Materials Branch
DESIGN CALCULATION SHEET

File No. _____

Project Passmore Slide

Date _____

Region _____ District Central Kootenay

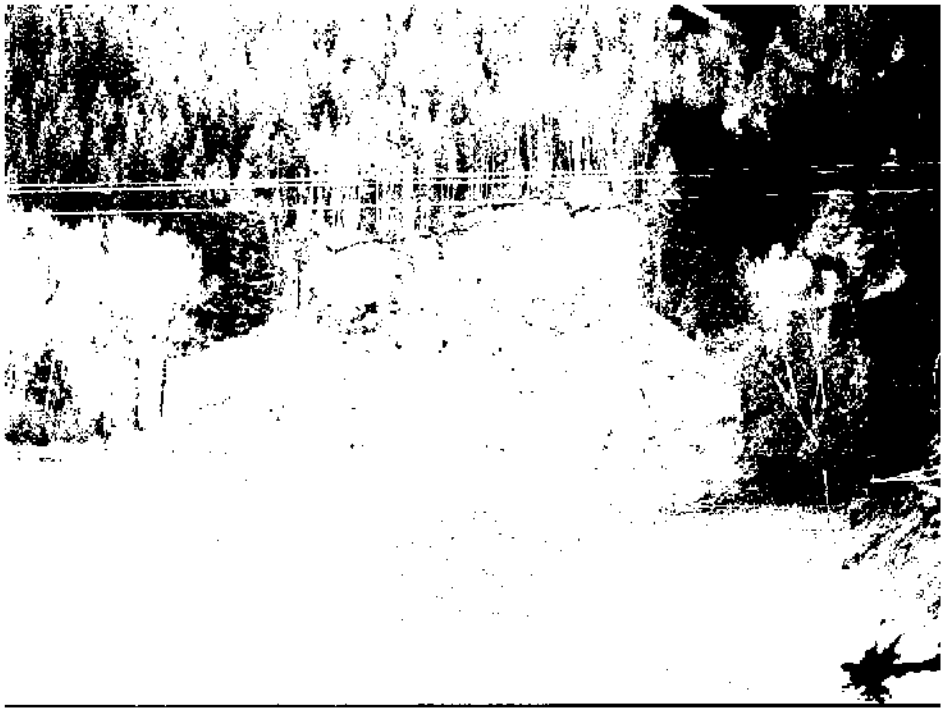
Calculation by CRT

Sheet ___ of ___

Modelling Data

γ_{moist}	γ_{sat}	c (kPa)	ϕ	F.S.
20	20.5	80	0	0.995
20	20.5	40	0	0.497
* change TERMINATION/INITIATION POINTS				
20	20.5	40	0	0.606
20	20.5	80	0	1.212
* change TERM/INIT. POINTS.				
20	20.5	80	0	1.107
20	20.5	40	0	0.553
21	21.5	40	0	0.527
21	21.5	80	0	1.054

Terrain Stability and Forest Management in the Interior of British Columbia

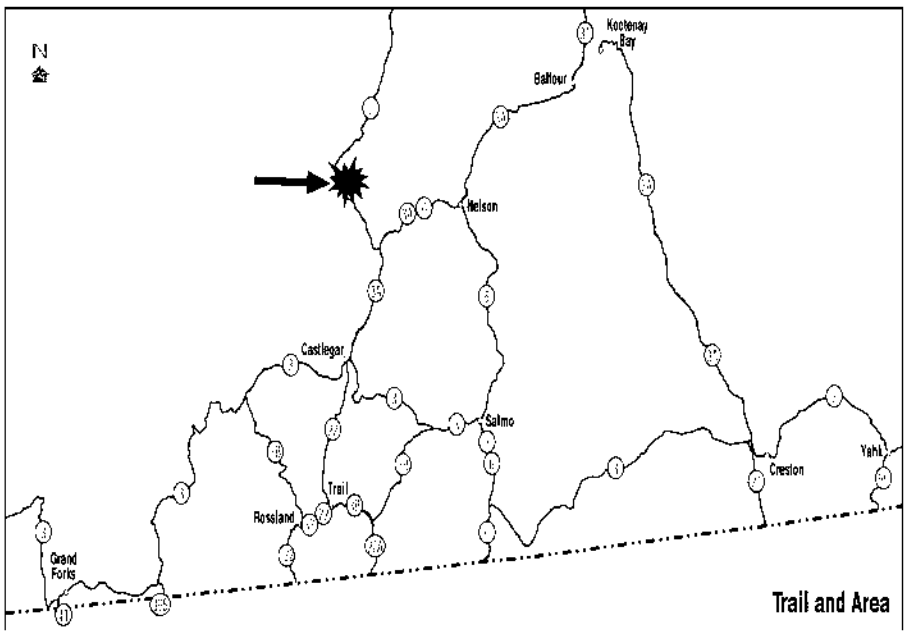


Passmore Slide Field Visit
Highway 6

M. P. Walsh, P.Eng.
Regional Geotechnical & Materials Engineer
Minstry of Transportation & Highways

History

The Passmore Slide is located on private land on the upslope side of Highway 6 approximately 20 kilometres north of the Highway 3A/Highway 6 junction (see Figure 1). Slide monitoring was first initiated in the Spring on 1994 when small slope creep movements encroached on the highway shoulder.



Passmore Slide Location Map
Figure 1

Previous to the main slide, typical slide movements were generally 1 to 2 metres of slow creeping movement over a two month timeframe during mid-spring. The movements were mostly confined to the toe of the slide at the highway shoulder and no movement of the highway was observed. (se Figure 2). The overall slide comprised of several slump blocks extending approximately 70 metres upslope to the present backscarp.

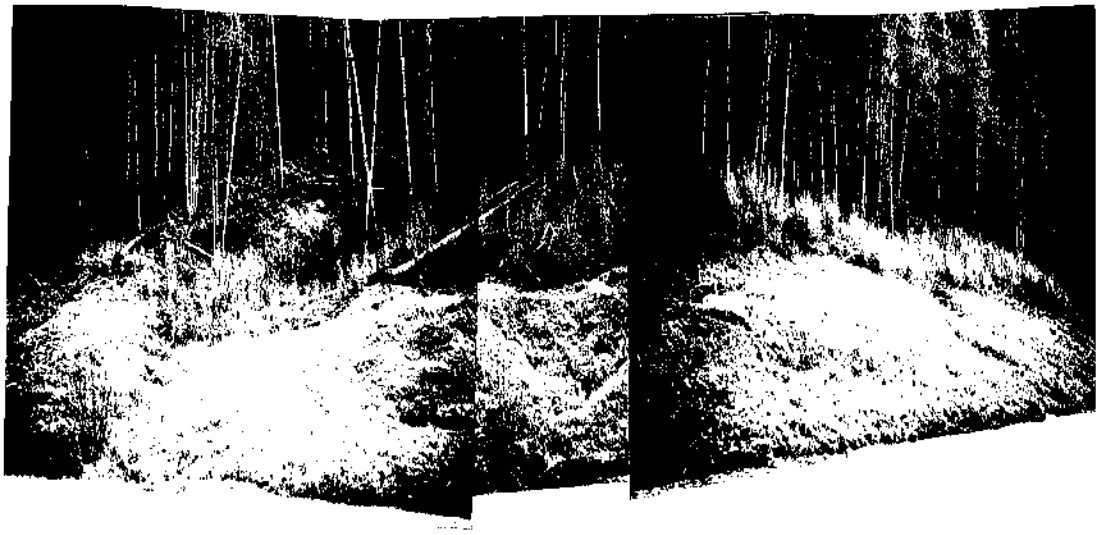
Given the nature of the slide and the location on private land, no mitigative measures were undertaken. An observational approach was used.

Site Investigation

A subsurface invewstigation and review of the local geology was performed in the fall of 1999. Two drill holes were advanced on the lower portions of the slide to determine soil types, groundwater elevations and to install groundwater monitoring and slope movement instrumentation.

The investigation revealed loose to dense sands overlying very stiff varved silts. No sunstantial groundwater in the sand or the silts was discovered, however, zones of surface water were observed in the slide zone.

A review of the area indicated that the local groundawater was sourced by a waterfall coming off bedrock approximately 300 metres upslope of the slide. The waterfall completely infiltrated into the ground with no visible surface flows occurred downslope.



Pre-slide, typical toe movement
Figure 2

Pre - Failure

In February of 2000, a small failure at the toe of the slide occurred, depositing approximately 250 cubic metres of material on the road (see Figure 3). This was the "worst case" type of failure that was envisioned for the site.

February 2000 Surficial failure
Figure 3

Day of Failure

On April 13, 2000 larger than normally observed movements of the slide bagan. There was approximately 2 metres of translational movement of the toe and 3 metres vertical drop of the block at the headscarp.

Maintenance crews excavated material at the toe of the slope to maintain traffic flow through the area. Traffic was reduced to 1 lane alternating during and after the maintenance crew was on site. West kootenay power was informed that a power pole was involved in the slide movement and that there may be damaged if movement continues. The lines were set to not re-energize if the breaker was tripped.

There was a noticeable increase in surficial water flow at the toe of the slide and significant bulging of the asphalt in the northbound lane at the north edge of the slide. Neither of which were observed before.

Some cracking and falling of trees was also observed during the day.

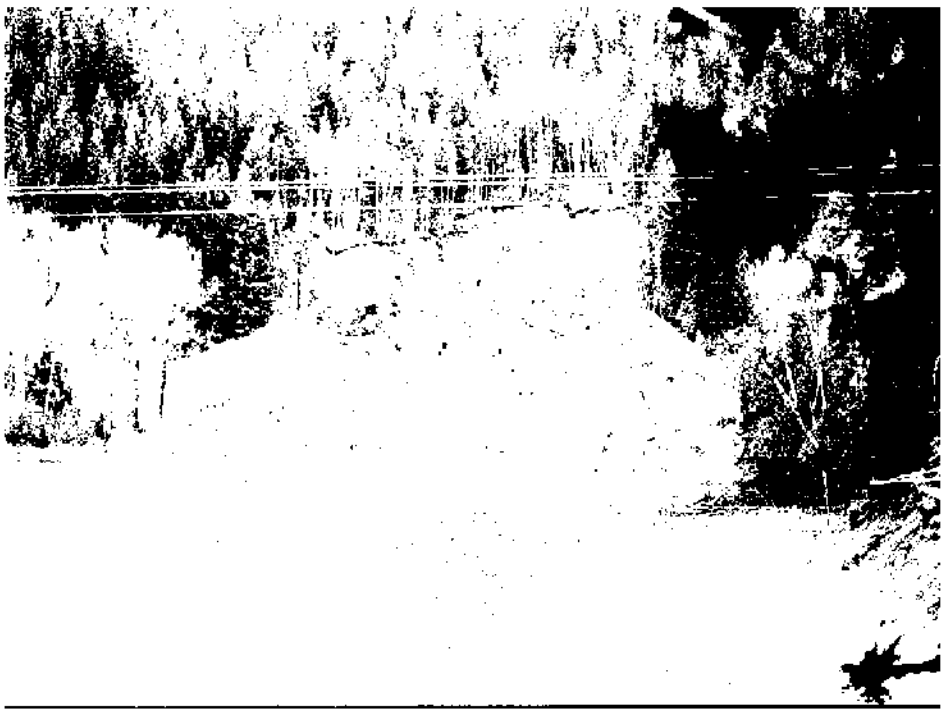
Maintenance crews left the site at 3:30pm and the traffic was left at one lane alternating with the flaggers approximately 30 metres back of the slide boundaries.

At approximately 5:15pm a 75,000 cubic metre slide catastrophically relaesed. The debris flowed across the Slocan river and blocked the flow for approximately 5 mintutes. Personnel on site at the time had no warning of the release. They described the movement of the slide mass as fluid like and very fast.

The slide removed the powerlines on the east side of the road and the fibreoptic BC Tel lines on the west side of the road. The extreme force on lines caused them to detach from the poles for 1 kilometre to the north and 500 metres to the south.

Slide debris in Slocan River
Figure 4

During the failure of the powerlines, the lines crossed the road flipping a pick-up truck on its side and knocking over a flagperson. No injuries were reported and no vehicles or persons were in the path of the failure.



Slide debris in Slocan River
Figure 4

Cause of Failure

Until the failure, the slide was attributed to weaker soils and high spring groundwater conditions. After the failure it was apparent the the source of water was a consequence of natural piping of the silty sand. Three natural pipes were exposed in the scarps of the failure; one of which contained a flow of water close to that of the waterfall above the slide, the other two were dry at the time of failure.

The blockage of the "pipes" from minor ground movement forced the water to infiltrate the varved silts at the toe of the slope. With the seasonal increase in flows of the waterfall above the slide in spring, the soil became weaker (reduced effective stress), resulting in the strain movement observed.

Sufficient strain movement and/or adjacent piping had likely occurred in the spring of 2000 causing a "dam" large enough to raise the local groundwater water elevation to point where the soil strength was reduced to the point of failure. The catastrophic fluid like nature of the failure was a consequence of the saturated condition of the soils.

Post Failure

After the slide the roadway was covered three metres deep for approximately 90 metres, essentially closing the highway.

There were several slump blocks still perched after the failure causing concern for further slides. Numerous monitoring stations were placed on the slump blocks and scarps. These sites were constantly monitored and numerous sites indicated movement. The rates of movement were reviewed over time and a several zones indicated accelerating movement; pointing towards a potential failure.

Two subsequent failures did occur. Both events comprised of approximately 1500 to 2000 cubic metres of material and emanated from blocks in the rear of the scarp.

Removal of debris within the main slide was not allowed until three days after the failure due to continued movement of the area around the slide. One lane traffic was allowed at the end of the third day.

Remediation of the slide

Given that the main mechanism that was thought to have caused the slide still existed (the natural piping), there was concern that failure or slumping of the back scarp above the main pipe would cause a blockage and the initiation of a similar sequence of events that lead to the original failure.

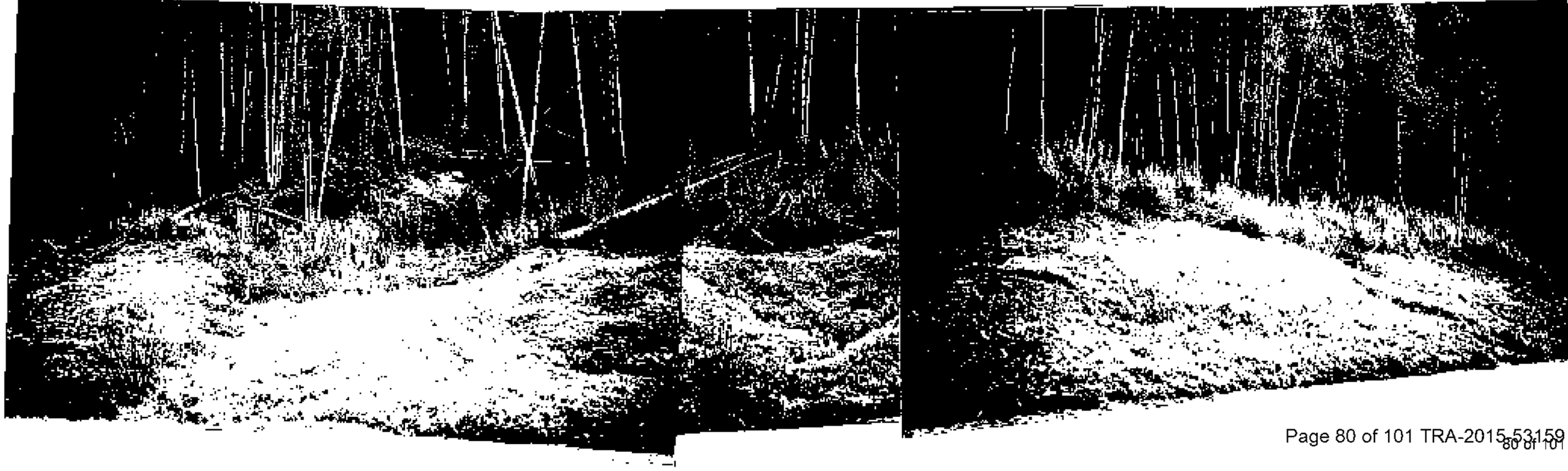
The best method for control of further failure was considered to be control of the groundwater. As outlined before, the recharge of the local groundwater was mostly controlled by the waterfall above the failure. Several scenarios for caputuring and piping the flow were considered. The determination of the best option was complicated by private property issues, liability, maintenance access, costs and constructability.

Both the slide and the waterfall were within one private lot, therefore, to reduce impacts to adjacent land owners and ease the legal requirements for maintenance access, the pipe and access were constructed on a steep road directly up the slope.

The catchment at the base of the waterfall was constructed using a basin shaped from stacked concrete sacks rebarred together and a geomembrane liner. The pipe is a smoothwall 400mm Big "O" PVC pipe comprised of 6 metre sections.

To reduce the costs and complexity of construction of the pipe over the steep rocky terrain immediately below the waterfall, the pipe was constructed above ground. To mitigate problems of tree fall and avalanche debris on the PVC pipe, the pipe was installed in a steel culvert which was anchored at the top of the slope using rockbolts and cable. The PVC pipe was secured within the culvert pipe by injecting expanding polystyrene foam at zones along the length of the pipe.

Commencement of Slide Clean-up
Figure 5

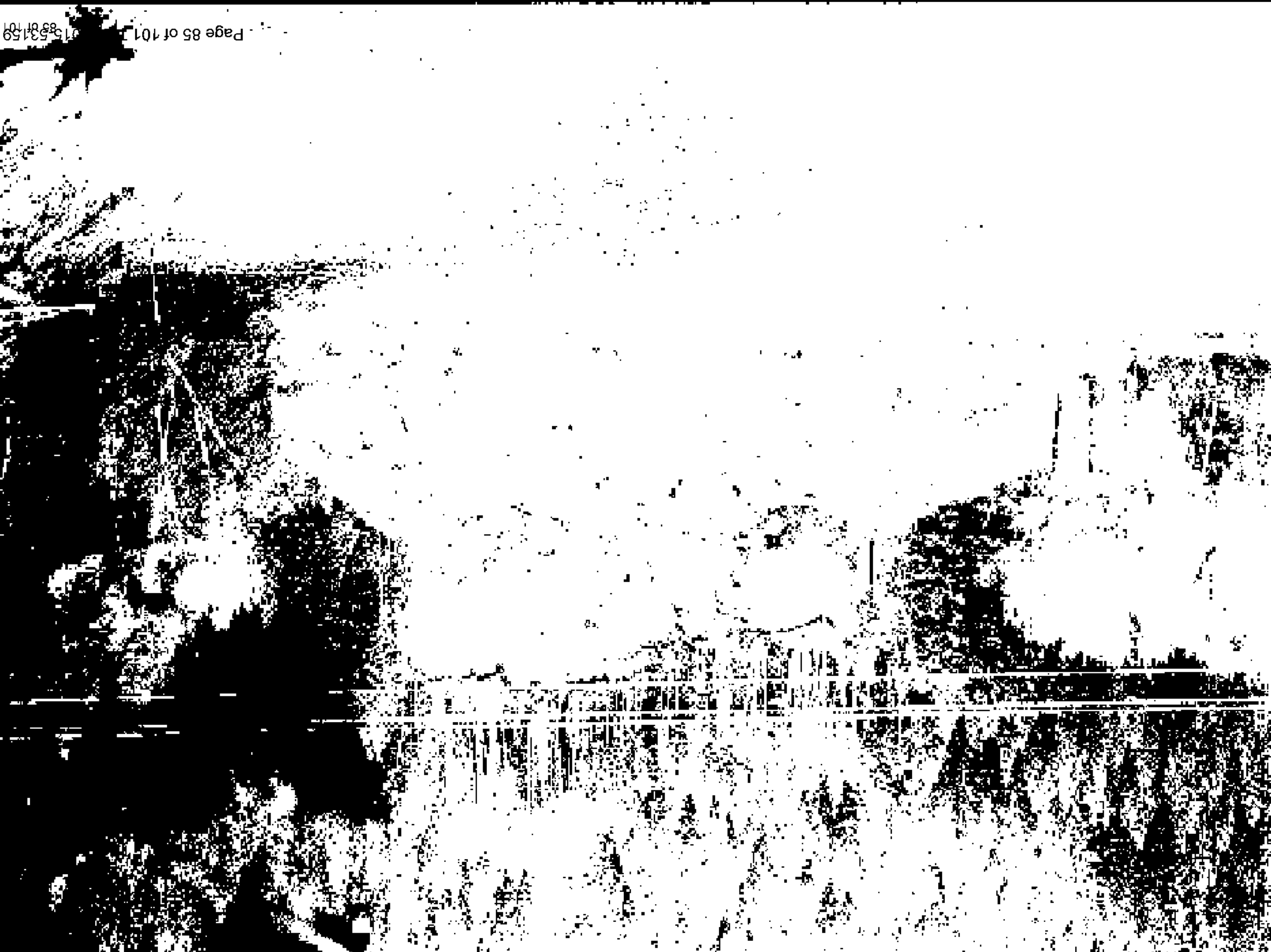


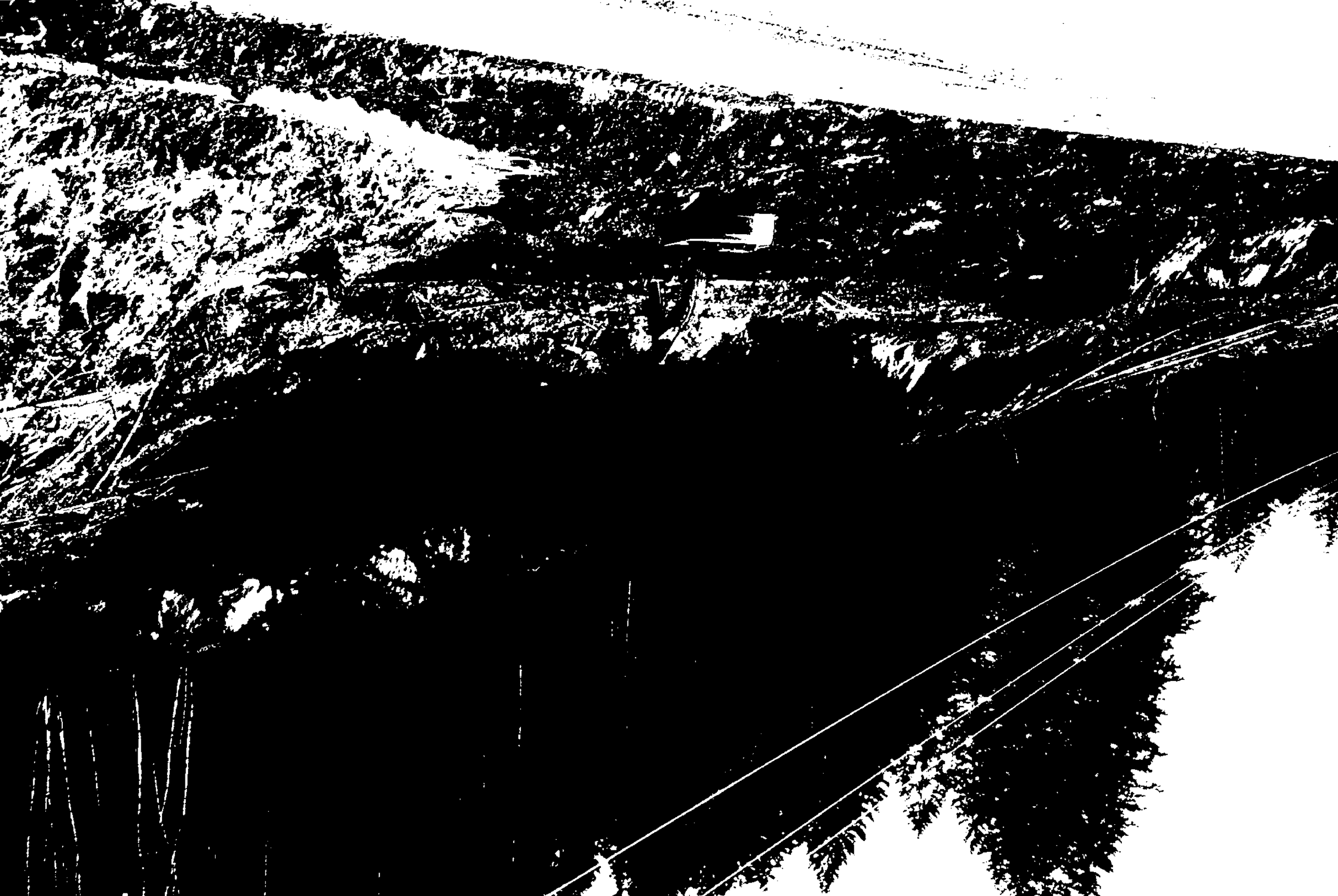
490

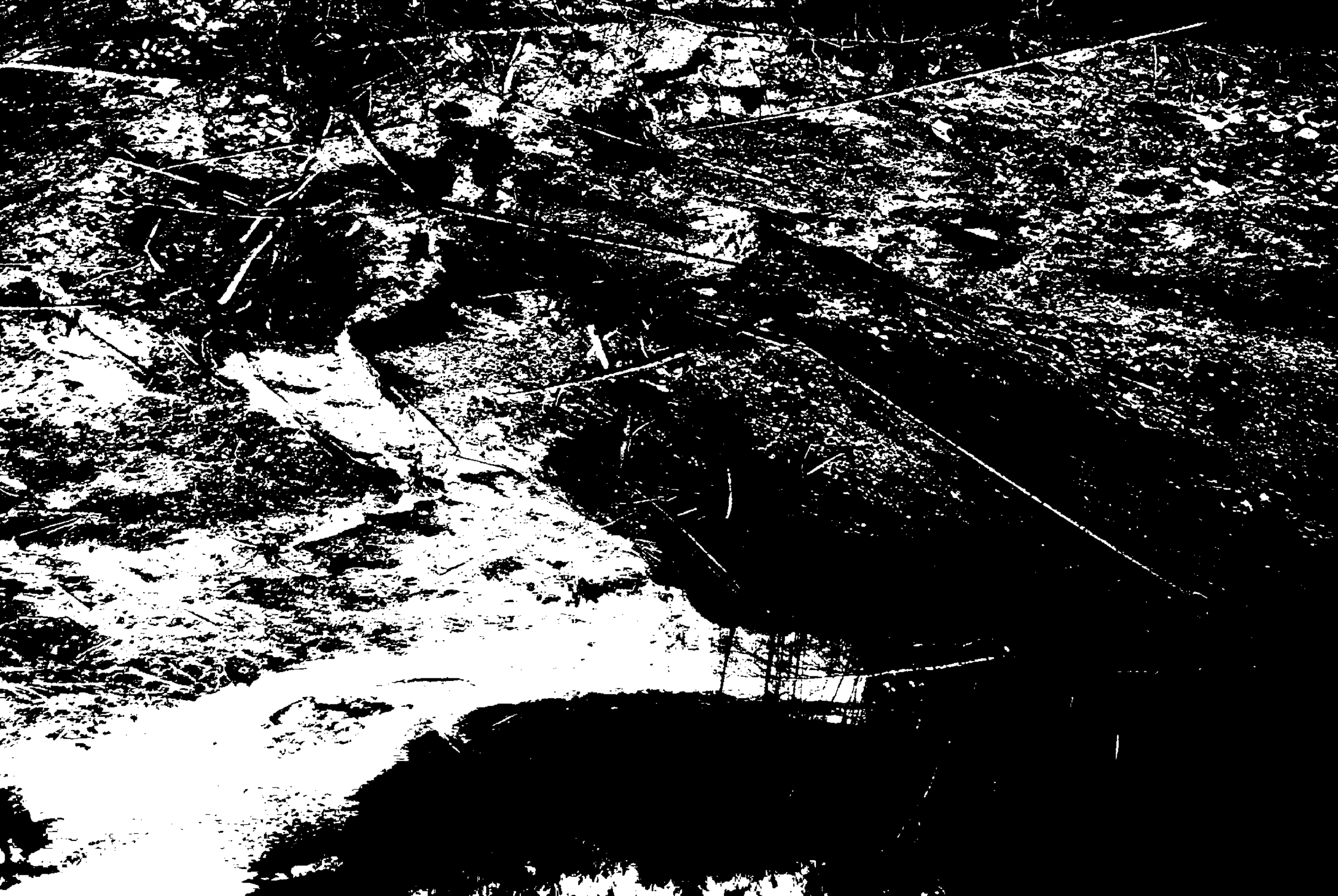
JOHN DEERE

490

JOHN DEERE







490

JOHN DEERE