

Golder Associates Ltd.

243-1889 Springfield Road
Kelowna, British Columbia, Canada V1Y 5V5
Telephone (260) 860-8424
Fax (260) 860-9874



August 29, 1997

Our Ref.: 972-4092

Appel Estates Ltd.
c/o Damax Consultants Ltd.
3862 West 14th Avenue
Vancouver, British Columbia
V6R 2W9

Attention: Mr. David Laird, P. Eng.

**RE: PROPOSED SUBDIVISION OF LOT 28
PLAN KAP 51283, DL 2710, SDYD, EXC PLAN KAP 53733
NORTH CHRISTIE, OKANAGAN FALLS, B.C.**

Dear Sir:

Further to your fax transmittal dated August 22, 1997, Golder Associates Ltd. have conducted an inspection at the above referenced site on August 25, 1997. The purpose of the inspection was to address Item 1 in a letter from the Ministry of Transportation and Highways (file no. 02-088-14461) dated April 16, 1997.

At the time the inspection was conducted, it was noted that the majority of the roads/driveways within the proposed subdivision had been roughly constructed. Trimming of the slope to 1.5 horizontal to 1 vertical along the east side of the proposed subdivision was in progress.

As indicated in our June 3, 1993 letter, a portion of this proposed subdivision was deemed to be at risk from a minor potential rock fall/rolling rock hazard. This area is approximately delineated on Figure 1 attached.

Based on current observations, it is our opinion that safe residential building sites on Lots 10 to 13, inclusive can be established by scaling or removing the loose rock fragments from above these lots. A ditch and berm catchment system is not considered necessary.

The remaining lots in the proposed subdivision are not considered to be at risk from rockfall/rolling rock hazards and therefore no further action is required.

September 3, 1997- 2 -972-4092

We trust the foregoing is sufficient for your present purposes, should you have any questions please do not hesitate to call the undersigned.

Yours very truly,

GOLDER ASSOCIATES LTD.

G. Imada, P. Eng.



B. Carlsen, P. Eng.
Principal, Office Manager

GI/BC/ki

Encl.

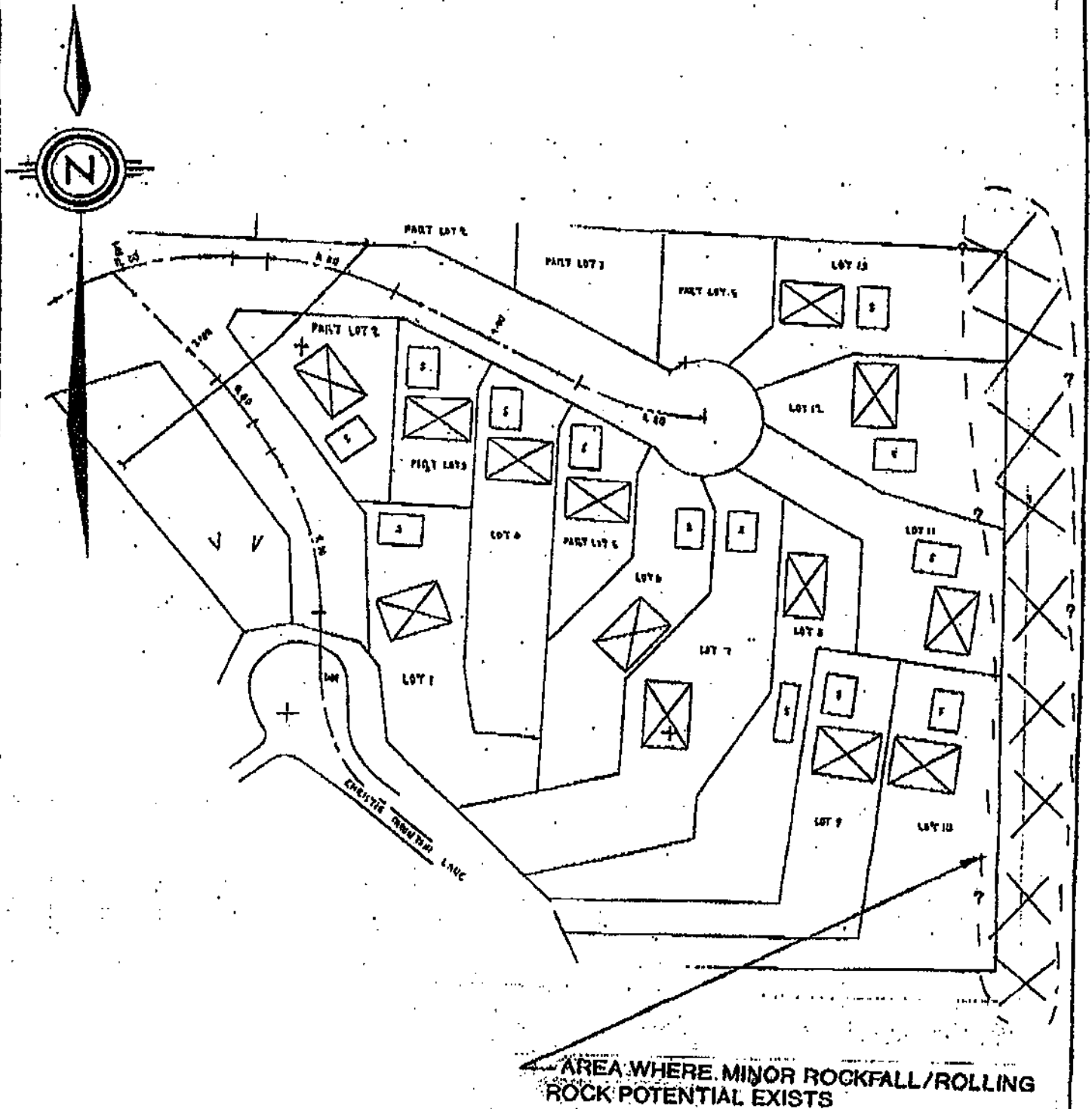
DM19970972-4092AUC29LTR.DOC

Golder Associates

TOTAL P.04

PROPOSED SUBDIVISION

Figure 1



REF. DWG. PROVIDED BY TREVOR WILSON:

SCALE 1:1546 (APPROX)

Golden Associates

Page 5 of 11 P4 2018-83990

Golder Associates Ltd.

243-1889 Springfield Road
Kelowna, British Columbia, Canada V1Y 5V5
Telephone (250) 860-8424
Fax (250) 860-9874



May 14, 1998

Our Ref.:972-4092

Appel Estates Ltd.
c/o Damax Consultants Ltd.
3862 West 14th Avenue
Vancouver, British Columbia
V6R 2W9

Attention: Mr. David Laird, P.Eng.

RE: LOTS 10 TO 13, INCLUSIVE
NORTH CHRISTIE, OKANAGAN FALLS, B.C.

Dear Sir:

Further to our letter (file no. 972-4092) dated August 29, 1997 and subsequent inspections on May 6 and 12, 1998, this letter confirms that the necessary sealing has been completed. Based on current observations, Lots 10 to 13, inclusive are considered safe from rolling rock hazards.

We trust the foregoing is sufficient for your present purposes. If you have any questions, please do not hesitate to call the undersigned.

Yours truly,

GOLDER ASSOCIATES LTD.
G. Imada, P. Eng.

GTI/gi

N:\1997\972-4092\LTRMAY13.DOC

FAX MESSAGE FOR ...

FROM ...

13

DON McKEE PEng

David Laird, P.Eng/Planner
DAMAX CONSULTANTS LTD.
3862 W. 14th Avenue
Vancouver, B.C.
V6R 2W9
Fax: (604) 222-9240
Tel: (604) 224-6827

WATER MANAGEMENT

Program

Bentickton

FAX NO: 492-1314

DATE: APRIL 15/98

TIME: _____

THIS IS THE FIRST OF _____ PAGE(S)

COMMENTS ...

APPROVAL APPLICATION # A 802180

NORTH CHRISTIE "HERITAGE HILLS"

WORTH FILE # 144601

WE APOLOGIZE FOR NOT RESPONDING TO YOU EARLIER ON THE CULVERT INSTALLATION. MANY OTHER UNRELATED ISSUES HAVE AROSE IN THE INTERIM.

WITH RESPECT TO THE ISSUES RAISED IN YOUR LETTER OF MAR 2/97:-

1. THERE IS NOW A GRILLAGE INLET INSTALLED TO PREVENT ENTRY BY CHILDREN ALONG WITH A WINDWALL PROTECTION.

3. THE GRILLAGE INLET WILL ACT AS A THRESH BACK.

4. RIP RAP HAS BEEN INSTALLED AT THE OUTLET TO ACT AS AN ENERGY DISSIPATOR.

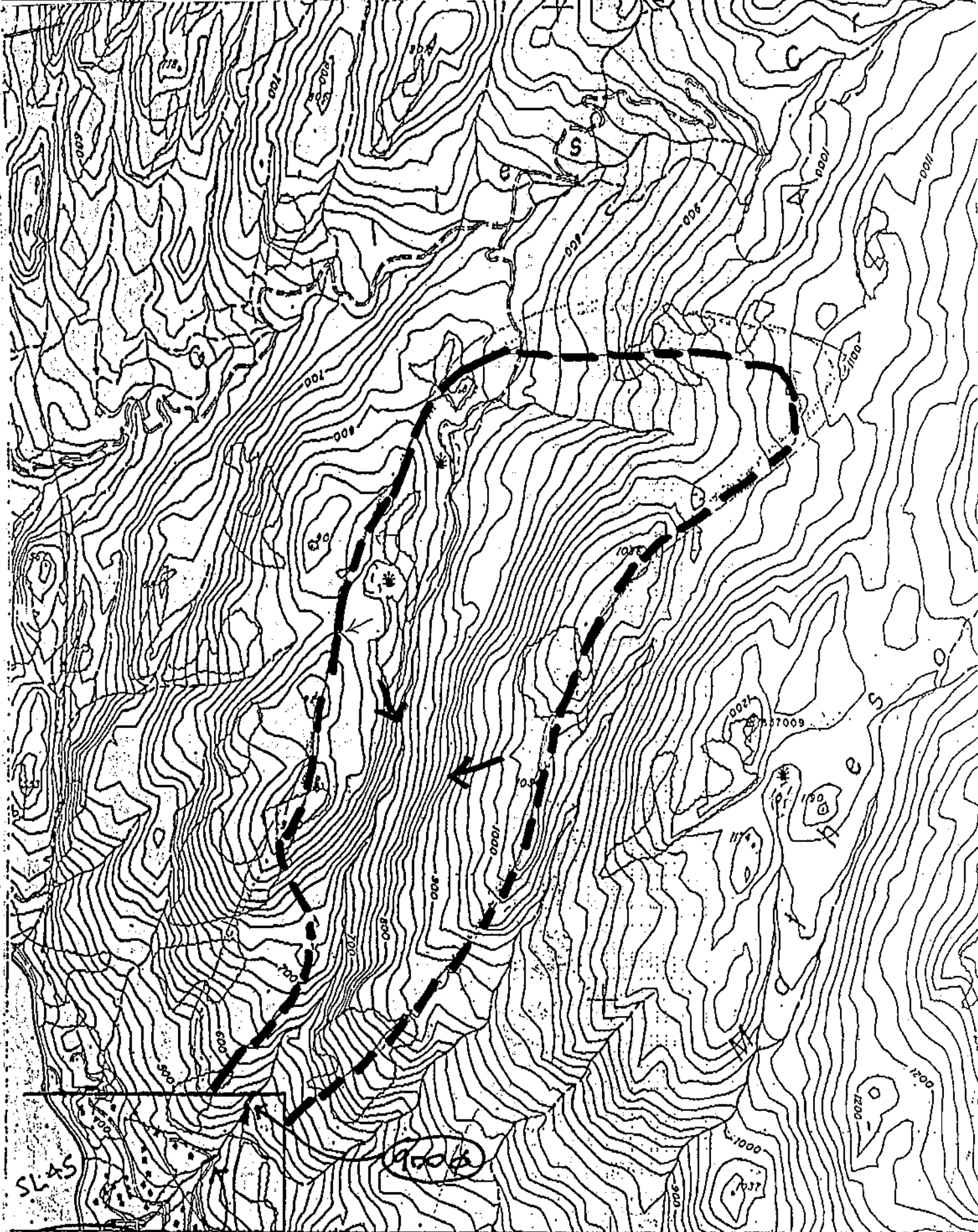
5. WE ATTACH OUR DESIGN CALCULATIONS NOTING THAT FOR AN AREA OF 300 HA ± THE "RATIONAL" METHOD CAN BE VERY UNDEPENDABLE TO PREDICT ACCURATE FLOWS. THE PRESENT CULVERT AT SUNNYBROOK IS 4500 Ø & HAS CAUSED NO PROBLEMS ACCORDING TO THE DEPT. OF HIGHWAYS. THE 900 Ø WILL PROVIDE A FACTOR OF SAFETY OF 4.2 ABOVE THIS PIPE.

6. DUE TO THE HEIGHT OF ROAD FILL IT IS NOT POSSIBLE TO PROVIDE AN ALTERNATE ROUTE. THE OVERSIZING OF THE CULVERT WILL NEGATE THE POSSIBILITY OF BLOCKAGE. IF A BACKUP OCCURED THE INCREASED HEAD WOULD FORCE THE WATER THROUGH THE PIPE WHICH COULD ACCEPT ± 9 M³/S AS A STORM SEWER PAST THE INLET.

WE TRUST THE ABOVE ANSWERS YOUR CONCERNS. PLEASE CONTACT THE WRITER IF YOU HAVE FURTHER QUESTIONS.

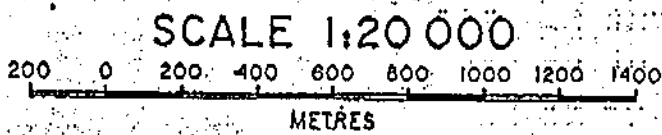
YOURS VERY TRULY
(David Laird PEng.)

cc APPER
cc MOTT



Transverse Mercator Projection on Datum - NAD83	Land District: Land Title Dist.: Latest Plan No.: Date:	MONT # 14461
--	--	-----------------

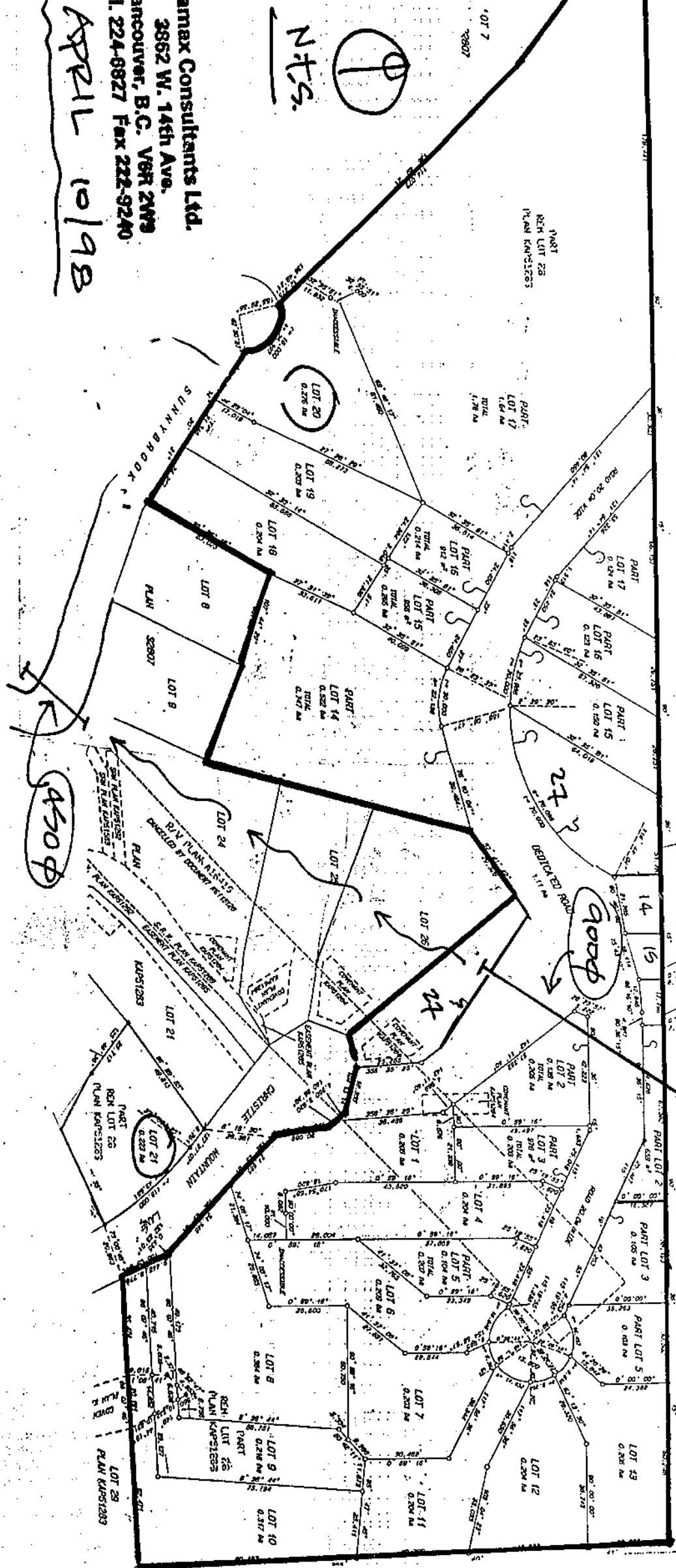
MAR 19/97



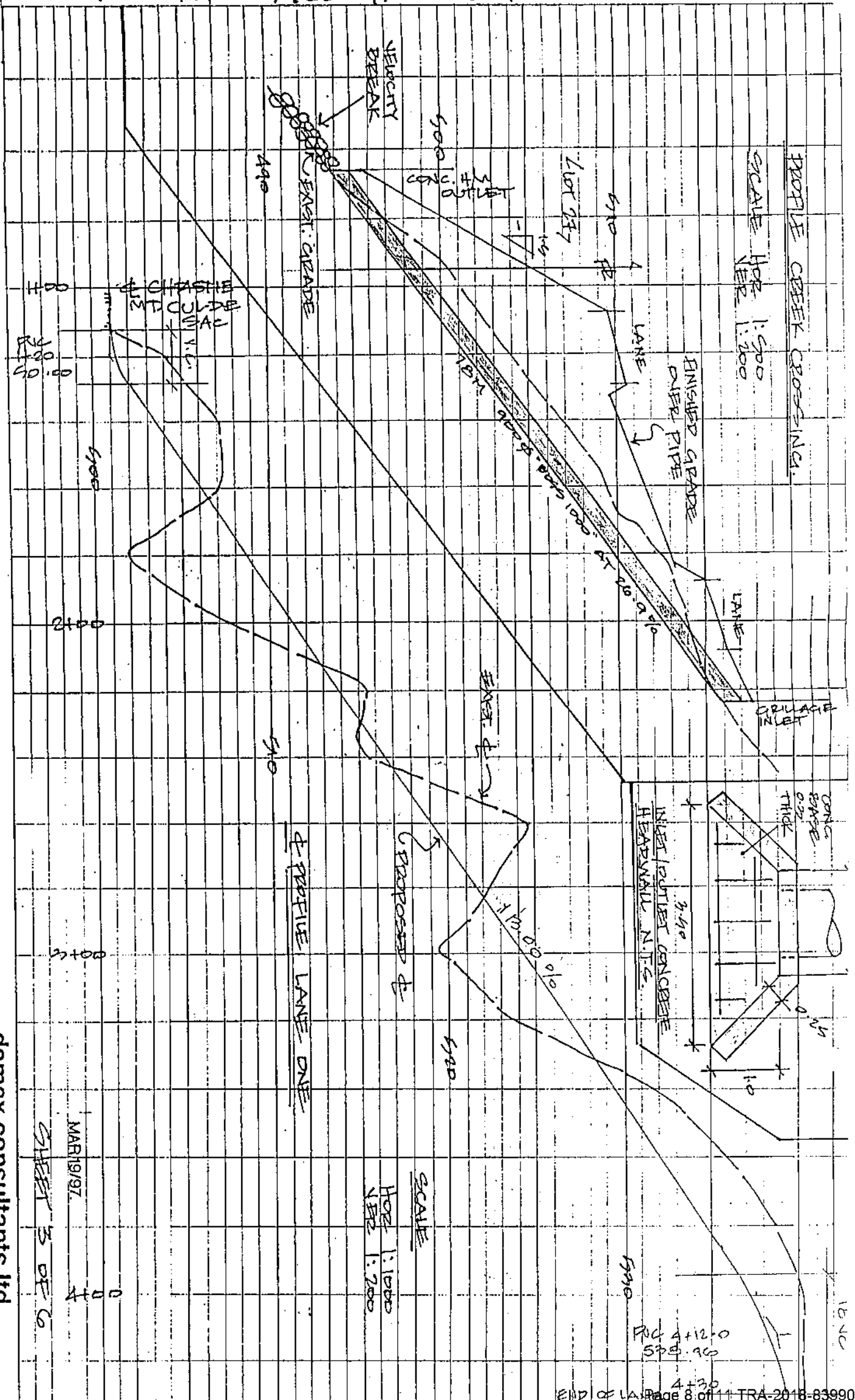
Damax Consultants Ltd.
 3862 W. 14th Ave.
 Vancouver, B.C. V6R 2W9
 Tel. 224-6827 Fax 222-9240

APRIL 10/98

275



CULBERT "NORTH CHRISTIE"
HERBAGE HILLS
MOTH TIE# 14461



4 profiles LANE ONE AND
PROFILE OF FREE CROSSING.

damax consultants ltd.
3862 w. 14th avenue, vancouver v6r 2w9
tel. 224-6827 fax 222-9240

CULVERT DESIGN.

$$A = 300 \text{ HA} \pm$$

$$h = 480 \text{ M}$$

$$L = 4200$$

$$J_c = 0.34$$

$$t_c = \frac{0.5 \times 4200 \times 0.4}{12 \times 0.34}$$

$$= 206 \text{ MIN.}$$

200 yr storm

$$P = 10 \text{ MM.}$$

$$Q = P \text{ AIN}$$

$$= 0.00278 \times 300 \times 0.1 \times 10$$

$$= 0.834 \text{ CMS}$$

INLET CONTROL DESIGN 760 ϕ

USE 900 ϕ (35% FACTOR OF SAFETY)

(EXIST 450 ϕ CULVERT AT SUNNYBROOK
BELOW THIS PIPE Q DESIGN = 0.20 m³/s.

MOTAT 14461

MAR 19/97

Damex Consultants Ltd.
3862 W. 14th Ave.
Vancouver, B.C. V6R 2W9
Tel. 224-6827 Fax 222-9240

FAX MESSAGE FOR ...

FROM ...

Bill Sparkes, AScT

Ministry of Transportation and Highways

South Okanagan District, Penticton

David Laird, P.Eng/Planner
DAMAX CONSULTANTS LTD.
3862 W. 14th Avenue
Vancouver, B.C.
V6R 2W9
Fax: (604) 222-9240
Tel: (604) 224-6827
Cel: (604) 817-4695

FAX NO: 492-1424 DATE: JUNE 17/98.

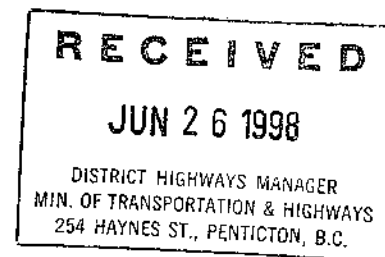
TIME: 3:00 P.M.

THIS IS THE FIRST OF 12 PAGE(S)

COMMENTS ...

"North Christie"

MOTH File 14461



Bill,

As per your fax of June 16, 1998...

PLA #6 We enclose the test results for the roadworks prepared by Okanagan Testing Ltd.

We certify that the works including the steep fill slope, road base, road surface and road drainage have been completed in accordance with the design drawings and good engineering practice.

PLA #8 As per our fax to Don McKee at Ministry of Environment, dated April 15, 1998 which we faxed to you earlier, the majority of the drainage from this subdivision passes through the new 900 mm diameter culvert. Because of the extent of the new road

fill we have been extremely conservative in our design and the culvert could be oversized by a factor of four.

The increase in runoff created by this subdivision compared with the total drainage basin is miniscule and will have little or no effect on the present regime. The 'old' 450 mm diameter culvert under Sunnybrook will handle this flow.

The catchbasins, pipes, manholes etc. have been constructed in general compliance with the design drawings we prepared and submitted to you in January of this year. Again we certify that the works have been completed in accordance with this design and good engineering practice.

PLA #10 As per PLA #8

PLA #12 Ministry of Forests will be responding presently.

PLA #13 M.O.E. Culvert Installation

We attach a copy of Don McKee's fax of April 21, 1998 in which he states "we have addressed most of their concerns."

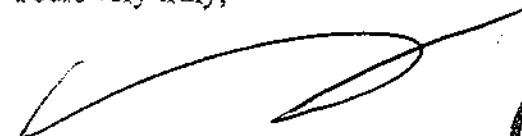
As instructed in that letter we contacted Barb Leslie and she informed us that they were unhappy that the works were installed without all the 'paperwork being in place.' She indicated that the issue is now completed and that there will be no further communication or requirements from M.O.E.

PLA #14 M.O.E. Covenant

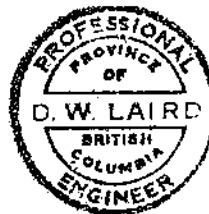
Will be submitted to you presently.

We trust the above now addresses your concerns.

Yours very truly,



(David Laird, P.Eng.)



cc Appel Estates x4