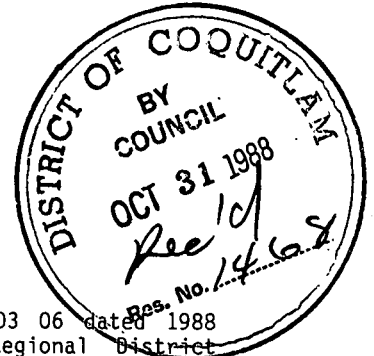


DRAINAGE COMMITTEE

AGENDA NO.1001
MINUTES OF A MEETING OF THE DRAINAGE COMMITTEE
HELD AT COQUITLAM MUNICIPAL HALL AT 0900 H ON FRIDAY 1988 OCTOBER 28

ATTENDING: Alderman W. LeClair, Chairman (Conference Call)
Alderman B. Robinson, (Conference Call)
Alderman D. White
Neil Nyberg
Sever Rondestvedt
Al Kersey



CALL TO ORDER

1001-1 COQUITLAM/PORT MOODY SCARP DRAINAGE STUDY

The Committee reviewed engineering memo report 01 03 06 dated 1988 October 27 and examined the Greater Vancouver Regional District memorandum dated 1988 October 13. The Committee moved that the recommendations of the Engineer's report and the GVRD memorandum be approved, and directed staff to determine the financing implications to Coquitlam.

MOVED BY ALDERMAN LECLAIR
SECONDED BY ALDERMAN WHITE

COUNCIL
ACTION
REQUIRED

That subject to approval of the GVRD financing package, Council approve the recommendations of the GVRD memorandum dated 1988 October 13 to:

- a. Declare Ottley Creek and Axford Creek major drainage areas within the Schoolhouse Creek and Kyle Street Drainage Areas respectively;
- b. Establish an implementation program in accordance with the GVRD Drainage Master Plan including cost sharing;
- c. Formulate drainage policies and establish an emergency plan; and
- d. Proceed with the proposed Drainage Master Plan construction of the 1989 drainage improvement works estimated at a total cost of \$283,800 of which Coquitlam's share would be approximately \$121,400.

See C.R. 1469/88

1001-2 DITCH ELIMINATION PROGRAM FUNDING

The Committee reviewed engineering memo report 01 03 06 dated 1988 October 26 (attached) which recommended that the Capital Drainage Works Funding Bylaw be amended to allow expenditures from both principal and interest earned thereon:

MOVED BY ALDERMAN ROBINSON
SECONDED BY ALDERMAN WHITE

COUNCIL
ACTION
REQUIRED

That Council give first, second and third reading to Bylaw "Capital Drainage Works Fund Reserve Amending Bylaw No. 1930, 1988" to amend Bylaw 1297, 1982.

APP'D 12/14/88, 1470, 1471, 1472/88

The Chairman adjourned the meeting at 0920 h.

D I S T R I C T O F C O Q U I T L A M

Inter Office Memo

TO: J.L. Tonn, Municipal Manager DEPARTMENT: Administration DATE: 1988 October 27
FROM: Neil Nyberg DEPARTMENT: Engineering FILE:
SUBJECT: COQUITLAM/PORT MOODY MASTER DRAINAGE PLAN OUR FILE: 01 03 06
FOR: DRAINAGE COMMITTEE

REFERENCE: A. Dayton & Knight Study of Coquitlam/Port Moody Drainage Area
B. Engineer's report to Drainage Committee 1988 May 26
C. Coquitlam Drainage Committee Minutes 1988 June 16
D. GVRD memorandum dated 1988 October 13

1.00 BACKGROUND

- 1.01 Council Resolution 912 (1988 June 20) in part endorsed the improvement plan contained in the Dayton and Knight report (Reference A) based on the Municipal Engineer's report (Reference B) and Drainage Committee recommendations (Reference C).
- 1.02 The G.V.R.D. memorandum (Reference D) is drafted from the Dayton and Knight report but differs in several key places.
- 1.03 This memorandum recommends that the 1989 program be adjusted in accordance with the G.V.R.D. recommendations.

2.00 DISCUSSION


- 2.01 The G.V.R.D. memorandum wishes to establish Ottley Creek and Axford Creek to be major drainage facilities within the Schoolhouse Creek and Kyle Street Drainage Areas respectively. This results in a net change to the benefitting user formula for Coquitlam/Port Moody cost-sharing in each area:
 - a. Ottley Creek improvement works would take place entirely within Port Moody while a percentage of the runoff being controlled originates in Coquitlam. The G.V.R.D. memorandum redefines the Schoolhouse Creek Area improvement cost-share to Coquitlam as 47.88 per cent of \$535,000 or \$256,000. This is a \$145,876 increase over the \$110,124 amount endorsed by Council Resolution 912, 1988.
 - b. Axford Creek improvement within Port Moody are intended to control runoff from Coquitlam. The G.V.R.D. memorandum redefines the Kyle Street area improvement cost-share to Coquitlam as 45.80 per cent of \$752,000 or \$344,000. This is a \$38,514 increase over the \$305,486 amount endorsed by Council Resolution 912, 1988.

The net increase would be \$184,390 to redefine Coquitlam's share as \$836,000 of \$1,867,000 costs. The Engineer's memo (Reference B) defined Coquitlam's share as \$651,554.


- 2.02 The G.V.R.D. memorandum recommends that implementation of the program would be agreed on an annual basis between the District, Coquitlam and Port Moody in accordance with the established priority in the Master Plan for each improvement item and within the annual financial capability of each municipality.
- 2.03 The G.V.R.D. memorandum proposes that inspection trails be constructed to access all ravines for an estimated cost to Coquitlam of \$30,700 or about 45 per cent of \$68,800 total.
- 2.04 The G.V.R.D. memorandum also proposes right-of-way acquisition for Ottley Creek and Oxford Creek for an estimated cost to Coquitlam of \$19,000 or about 47.5 per cent of \$40,000 total.
- 2.05 The memorandum recommends that the Greater Vancouver Regional District, Coquitlam and Port Moody continue liaison to formulate drainage policies and guidelines with respect to creek protection, and to establish an emergency plan to deal effectively with emergency situations that arise in the basins.
- 2.06 Finally, the G.V.R.D. memorandum recommends that, in accordance with the proposed Drainage Master Plan, the G.V.R.D. proceed with the design and construction of the proposed 1989 drainage improvement works, estimated at a total cost of \$283,800, as listed in Appendix A and B of the memorandum. Coquitlam's share would be \$121,400.

3.00 RECOMMENDATIONS

- 3.01 That Council endorse the recommendations of the G.V.R.D. memorandum dated 1988 October 13 to:
 - a. Declare Ottley Creek and Axford Creek major drainage areas within the Schoolhouse Creek and Kyle Street Drainage Areas respectively;
 - b. Establish an implementation program in accordance with the G.V.R.D. Drainage Master Plan including cost sharing;
 - c. Formulate drainage policies and establish an emergency plan; and
 - d. Proceed with the proposed Drainage Master Plan construction of the 1989 drainage improvement works estimated at a total cost of \$283,800 of which Coquitlam's share would be approximately \$121,400.


Neil Nyberg, P. Eng.
Municipal Engineer

DAK/pin
Enc

MANAGER APPROVED
 10/27/82

DISTRICT OF COQUITLAM

Inter-Office Communication

J.L. Tonn, Municipal Manager DEPARTMENT: Administration

DATE: 504.5
1988 May 26

FROM: Neil Nyberg DEPARTMENT: Engineering

YOUR FILE:

SUBJECT: COQUITLAM/PORT MOODY
SCARP DRAINAGE STUDY

OUR FILE: 01 03 06

2.03 The following table lists key project elements by location and estimated cost:

Priority and Description	Location		Total Cost
	Port Moody:	Coquitlam	
1 Ottley Creek storage, inlet and grating	50,000	50,000	50,000
1 Axford Creek storage, inlet and grating	60,000	60,000	60,000
1 Gatensbury storm discharge relocation	1,084	1,084	1,084
1 Williams Creek debris and flood control	29,660	20,340	50,000
1 Dallas, Correl and Elginhouse diversion	8,898	6,102	15,000
Sub-totals Priority One	149,642	27,358	177,000
2 Albert Street debris trashrack	10,424	9,576	20,000
2 St. John's Street culvert inlet	7,818	7,818	15,000
2 Kyle Creek debris flow and flood control	24,390	20,610	45,000
2 Hachley Creek debris and flood control	162,600	137,400	300,000
2 Sundial Creek east erosion protection	8,130	6,870	15,000
2 1300 m storm sewer collector (1/2 Priority Three)	54,200	45,800	100,000
2 Elginhouse inlet and grating improvements	8,898	6,102	15,000
a Elginhouse storm drain and inlet	192,790	132,210	325,000
2 Elginhouse track crossing and closure	103,810	71,190	175,000
2 Ottley Creek outlet impact structure	15,000	15,000	15,000
2 Ottley Creek channel enclosures	75,000	75,000	75,000
Sub-totals Priority Two	663,060	436,940	1,100,000
3 Ottley Creek track crossing	90,000	90,000	90,000
3 Ingersol outfall reconstruction	26,060	26,060	50,000
3 Noble Creek outfall improvements	5,212	4,788	10,000
3 Noble Creek freeboard increase	13,030	11,970	25,000
3 Clarke St. inlets, culverts and ditch	36,484	33,516	70,000
3 Goulet storage expansion	27,100	22,900	50,000
3 Sundial inlet modifications	18,970	16,030	35,000
3 1300 m storm sewer collector (1/2 Priority Two)	54,200	45,800	100,000
Sub-totals Priority Three	271,056	158,944	430,000
4 Schoolhouse Creek major flow flood control	20,848	19,152	40,000
4 Ottley Creek concrete pipe upgrading	75,000	75,000	75,000
4 Kyle Street major flow flood control	25,000	25,000	25,000
4 Baron Drive outfall	10,840	9,160	20,000
Sub-totals Priority Four	131,688	28,312	160,000
TOTAL 27 PROJECTS	1,215,446	651,554	1,867,000

FOR DRAINAGE COMMITTEE

Reference 'A' - Dayton & Knight Drainage Studied March, 1988

1.00 BACKGROUND

1.01 After excessive flooding occurred in Port Moody in November 1986, the Greater Vancouver Sewerage and Drainage District (GVS&DD), the City of Port Moody and Coquitlam agreed to examine a more rigorous approach to flood control. On 1987 August 13, the GVS&DD commissioned Dayton & Knight Ltd. to prepare a report on improving the effectiveness of the intermunicipal drainage systems. The scope of work included measuring the adequacy of the existing drainage structures and recommending new construction to reduce the risks of damage due to landslides on the escarpment.

1.02 This memorandum recommends endorsing the Dayton and Knight study. The next step is to approach the GVS&DD Board to initiate funding and carry out construction of the work.

1.03 The GVS&DD maintains drainage works on behalf of Port Moody and Coquitlam in three drainage basins: Schoolhouse, Williams Creek and Kyle Creek. Costs of construction and maintenance are received by the GVS&DD through assessments on Port Moody and Coquitlam.

2.00 DISCUSSION

2.01 The Greater Vancouver Sewerage and Drainage District exercises responsibility for flood control in several major drainage basins which cross municipal boundaries on behalf of Coquitlam and Port Moody.

2.02 The total estimated cost for the Master Drainage Plan improvements in these basins approaches \$1,867,000. Annual assessments for these improvements would be funded by Port Moody and Coquitlam in accordance with benefitting user formulae as follows:

Drainage Area	Port Moody Share	Coquitlam Share
Schoolhouse	52.12%	47.88%
Williams	59.32%	40.68%
Kyle	54.20%	45.80%
Ottley	100.00%	0.00%

2.04 In addition to major construction projects there are four more immediate requirements for possible consideration in the 1988 Annual Amended Budget:

- Priority One - Erosion and bank stability protection on the Kyle Creek drainage system. This project requires relocation of the Gatsensbury storm discharge for an estimated cost to Coquitlam of \$1,084.
- Priority Two - Bank erosion and bank stability protection on the Sundial Creek (east) drainage system. This project requires 40 m of channel diversion and bank protection for an estimated cost to Coquitlam of \$6,870.
- Priority Three - Erosion control on Noble Creek drainage system. This project requires outfall improvements in Coquitlam for an estimated cost to Coquitlam of \$4,788.
- Priority Four - Erosion control on Goulet Creek drainage system. This project requires improvement to Baron Drive outfall by extension and construction of flow control structure including 100 meters of 200 mm diameter pipe for an estimated cost to Coquitlam of \$9,160.

2.05 Cost sharing for projects identified by the Master Drainage Plan are tabulated as follows:

Priority	Project Function	Port Moody	Coquitlam	Total Cost
One	Debris Flow Control	149,642	27,358	177,000
Two	Erosion & Flood Control	663,060	436,940	1,100,000
Three	Erosion & Flood Protection	271,056	158,944	430,000
Four	Flood Control for Major Flow	131,688	28,312	160,000
		\$1,215,446	\$651,554	\$1,867,000

...4

3.00 CONCLUSIONS

- 3.01 The Master Drainage Plan prepared by Dayton & Knight identified proposed drainage responsibilities of Port Moody and Coquitlam in undertaking action for protection of the creek systems.
- 3.02 Twenty-seven improvement projects costing about \$1.87 million should be accomplished over a two to three year program. Allowing for engineering, this work should commence in 1989.
- 3.03 If \$651,554 is financed over a period of 20 years at 11 percent, with a 3 percent allowance for financing and administration, then the annual GVSDD assessment against Coquitlam for drainage would be increased by approximately \$98,000 per annum.
- 3.04 There are a number of small projects (para 2.04) of immediate importance which should be carried out by Coquitlam in the near future.

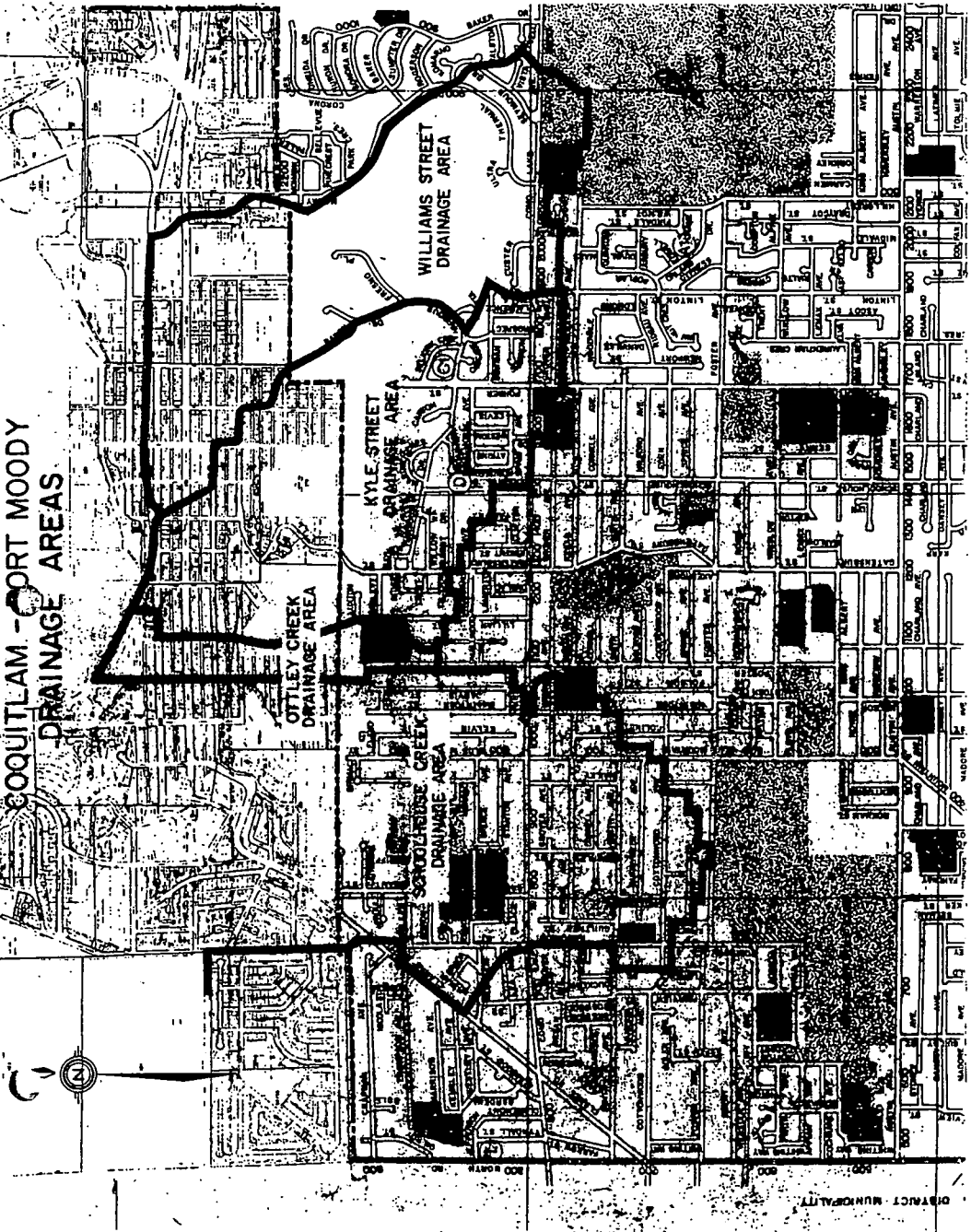
4.00 RECOMMENDATIONS

- 4.01 That the Committee endorse the Greater Vancouver Regional District plan of action as defined by the Dayton & Knight Ltd. Master Drainage Plan contained in their study of March, 1988.
- 4.02 That the Committee recommend to Council that a formal request to initiate the work be transmitted to the Water and Waste Committee of the Greater Vancouver Regional District.
- 4.03 That the Committee instruct the Engineering Department to bring forward a plan.

Neil Nyberg
 Neil Nyberg, P. Eng.
 Municipal Engineer

DAK/fb

COQUITLAM - PORT MOODY
DRAINAGE AREAS



file: 010301



Greater Vancouver Regional District
4330 Kingsway, Burnaby, British Columbia, Canada V5H 4G8

Engineering & Operations Department

Engineering: 432-6450 • Forestry: 432-6410 • Operations & Maintenance: 432-6405 • Pollution Control: 432-6420

File: SD 91.07.01

050587/02

ENGINEERING DEPT.		
COPIES TO:		
October 17 1988		
RECEIVED		
OCT 18 1988		
CIRC.	INIT.	DATE
AL	SS	10/18/88
AL	SS	26

District of Coquitlam
Municipal Hall
1111 Brunette Avenue
Coquitlam, B. C.
V3K 1E9

Attention: Mr. N. Nyberg, P. Eng.
Municipal Engineer

Dear Sirs:

Re: Master Plan for the Coquitlam/Port Moody Drainage Area

Thank you for your letter of July 15, 1988. We have now completed a draft Master Plan for the Coquitlam/Port Moody Drainage Area, which includes an action plan for the implementation of the priority improvement works for 1989.

The draft Master Plan is detailed in the inter-office memorandum dated October 13, 1988 prepared by Mr. Simon So for the undersigned. Attached is a copy of this memo for your consideration.

We would be pleased to meet with you and with Mr. Tom Hunt of the City of Port Moody to discuss the proposed Plan in detail. As indicated in the memo, it is our intention to present the proposed Master Drainage Plan to this District's Administration Board in November 1988. In order for us to meet the mailing deadline for the Water and Waste Management Committee meeting, which precedes the Board meeting, we must receive official endorsement of the Plan from both Coquitlam and Port Moody Council by November 1, 1988.

Mr. Simon So will telephone you shortly to arrange a meeting to discuss the above matter.

Yours truly,

K. Taylor

K. Taylor, P. Eng.
Administrator, Sewers

SS/cnm
3/262
Attachment

Reference 'D'

MEMORANDUM

Greater Vancouver Regional District

TO: K. Taylor DATE: October 13, 1988

RE: Master Plan for the FILE: SD. 91.07.01
 Coquitlam/Port Moody Drainage
 Area

RECOMMENDATION:

(1) Master Drainage Plan

That, for the purpose of future management of the watershed and implementation of the necessary drainage improvement works, the District adopt the Master Drainage Plan for the Coquitlam/Port Moody Drainage Area as follows:

(a) Ottley Creek and Axford Creek

Ottley Creek and Axford Creek be declared major drainage facilities within the Schoolhouse Creek and Kyle Street Drainage Area respectively and their development, improvement and maintenance be the responsibility of the Greater Vancouver Sewerage and Drainage District.

(b) Drainage Improvement Program

The drainage improvement program identified in the Dayton & Knight Report (Table 5-1), estimated at a total cost of \$1,867,000, be endorsed. The implementation of the program would be agreed on an annual basis between the District, Coquitlam and Port Moody in accordance with the established priority in the Master Plan for each improvement item and within the annual financial capability of each municipality.

(c) Policy and Management

The District, Coquitlam and Port Moody to continue liaison to formulate drainage policies and guidelines with respect to creek protection, and to establish an emergency plan to deal effectively with emergency situations that arise in the basins.

(2) Proposed 1989 Drainage Improvement Works

That, in accordance with the above proposed Drainage Master Plan, the District proceed with the design and construction of the proposed 1989 drainage improvement works, estimated at a total cost of \$283,800, as listed in Appendix A and B.

BACKGROUND:

The need for a long-term drainage plan for the Coquitlam/Port Moody Drainage Area was recognized by the District in 1987. As a result, the Administration Board authorized that a study be carried out to:

- . consolidate available information
- . determine adequacy and condition of existing drainage structures
- . recommend new construction where necessary
- . establish methods to reduce the risk of flooding due to landslides.

The study was undertaken for the District by Dayton & Knight and completed earlier this year. The study was very comprehensive and therefore took longer to complete than anticipated. Copies of the report were sent to Coquitlam and Port Moody on May 30, 1988.

DISCUSSION:

(1) Master Drainage Plan

For the purpose of future management of the watershed and implementation of the necessary drainage improvement works, it is essential for the District to adopt a Master Drainage Plan for the Coquitlam/Port Moody Drainage Area. Based on the Dayton & Knight Report, the District should adopt a Master Drainage Plan which consists of the following:

(a) Ottley Creek and Axford Creek

Ottley and Axford Creek Basin are currently managed by Coquitlam and Port Moody within their jurisdictional boundaries. Both creeks have their headscapes situated in Coquitlam, thus qualifying as interjurisdictional basins. In order to provide continuity in the watershed management, it would be logical for this District to assume responsibility of development, improvement and maintenance for these two basins by declaring Ottley Creek and Axford Creek as major drainage facilities in the Schoolhouse Creek Drainage Area and Kyle Street Drainage Area respectively.

The total cost for the complete improvement works identified in the Dayton & Knight Report and for providing inspection trails are estimated to be \$305,000 and \$4,800 respectively for Ottley Creek, and \$85,000 and \$4,000 respectively for Axford Creek. For the purposes of operation and maintenance of these two creeks by this District and in keeping with the responsibilities stated in the 1962 Drainage Agreement, statutory right-of-ways must be acquired from the private properties through which both creeks traverse. Approximately 16 private properties would be involved for the two creeks and

the cost of right-of-way acquisition have been estimated at \$30,000 and \$10,000 for Ottley Creek and Axford respectively as included in Appendix B.

It is estimated that for the District to assume responsibility for the two creeks, the District's annual maintenance costs will be increased by approximately \$10,000 each for Schoolhouse Creek and Kyle Street Drainage Area.

(b) Drainage Improvement Program

The total drainage improvement program identified in the Dayton & Knight Report (Table 5-1) was estimated to cost \$1,867,000 and the breakdown for each drainage area and cost apportionment for Coquitlam and Port Moody are as follows:

Estimated Cost of Improvements

<u>Drainage Area</u>	<u>Total Cost \$</u>	<u>Coquitlam Portion \$ (3)</u>	<u>Port Moody Portion \$ (3)</u>
Schoolhouse Creek (1)	535,000	256,000	279,000
Kyle Street (2)	752,000	344,000	408,000
William Street	580,000	236,000	344,000
TOTAL	\$1,867,000 (4)	\$836,000 (4)	\$1,031,000 (4)

(1) Includes Ottley Creek improvements.

(2) Includes Axford Creek improvements.

(3) Cost apportionment based on 1987 Assessment.

(4) Does not include estimated cost of:

Inspection trail for all ravines \$68,800

Right of way acquisition for Ottley & Axford \$10,000

It is envisioned by the District that the implementation of the drainage improvement program be completed within the next 5 years. Therefore each municipality is urged to review the priorities of their individual drainage capital works program for the next 5 years to accommodate the proposed program described above.

(c) Policy and Management

The Master Drainage Plan should include policies governing development activities within the gullies and the natural floodplains. These policies would prohibit any activities that might cause instability in the escarpments such as fill dumping, tree cutting, etc. The current bylaws and policies of each municipality dealing with these activities should be reviewed.

The report also strongly recommends that a committee be formed to formulate an emergency plan to deal effectively with drainage related emergency situation.

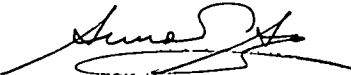
(2) Proposed 1989 Drainage Improvement Works

The drainage improvement works proposed for 1989 as listed in Appendix A and B including improvements for Ottley and Axford Creeks, estimated at a cost of \$283,000, are ranked highest priority in the Dayton & Knight Report. One major item in the program is provision of inspection trail for each ravine, estimated to cost \$68,800. This is one of the strongest recommendations in the Report that scheduled inspection of the ravines is essential to identify instability and erosion within the ravine drainages in the early stages of their development so that further progress of slides or erosion can be arrested. Description of each improvement item is detailed in Appendix C.

TIMING:

I understand that the following timing will be necessary for the proposed improvements to be budgeted for construction in 1989.

1. Oct. 17, 1988 - Submission of this memo by letter to Coquitlam and Port Moody for their consideration.
2. Oct. 24, 1988 - Submission to City of Port Moody Council for endorsement.
3. Oct. 31, 1988 - Submission to District of Coquitlam Council for endorsement.
4. Nov. 1, 1988 - Written notification of both Councils resolutions to be received by GVS&DD.
5. Nov. 1, 1988 - Completion of final report to the District's Water and Waste Management Committee.
6. Nov. 10, 1988 - Approval by Water and Waste Management Committee.
7. Nov. 30, 1988 - Approval by Administration Board.
8. July/August, 1989 - Construction of 1989 improvement works.


Simon So
Project Engineer

SS/cnm
3/256

APPENDIX A

PROPOSED 1989 DRAINAGE IMPROVEMENT WORKS (1)

FOR COQUITLAM/PORT MOODY DRAINAGE AREA

Drainage Area	Basin	Improvement Description	Estimated Cost of Improvements		
			Total Cost \$	Coquitlam Portion \$(2)	Pt. Moody Portion \$(2)
Schoolhouse Creek	Schoolhouse Noble	Inspection trail	10,000	4,800	5,200
Kyle Street	Kyle, Hackley, Sundial (E&W), Goulet	Inspection trails	27,000	12,400	14,600
Williams Street	Williams	Sediment storage basin, inlet structure & grating	50,000	20,300	29,700
	Dallas	80 m of diversion ditch	15,000	6,100	8,900
	Williams, Elginhouse, Correl, Dallas	Inspection trails	<u>23,000</u>	<u>9,400</u>	<u>13,600</u>
		TOTAL	<u>125,000</u>	<u>53,000</u>	<u>72,000</u>

- (1) Improvement works ranked highest priority in Dayton & Knight Report.
- (2) Cost apportionment based on 1987 Assessment. Actual cost apportionment for 1989 works will be based on 1988 Assessment which is not yet available.

APPENDIX B

PROPOSED 1989 DRAINAGE IMPROVEMENT WORKS (1)

FOR OTTLEY & AXFORD CREEKS (2)

Drainage Area	Basin	Improvement Description	Estimated Cost of Improvements		
			Total Cost \$	Coquitlam Portion \$(2)	Pt. Moody Portion \$(2)
Schoolhouse Creek	Ottley	Sediment storage basin, inlet structure and grating	50,000	20,300	29,700
		Inspection trail	4,800	2,300	2,500
		Right-of-way acquisition	30,000	14,400	15,600
Kyle Street	Axford	Sediment storage basin, inlet structure & grating	60,000	25,000	35,000
		Inspection trail	4,000	1,800	2,200
		Right-of-way acquisition	<u>10,000</u>	<u>4,600</u>	<u>5,400</u>
		TOTAL	<u>158,800</u>	<u>68,400</u>	<u>90,400</u>

- (1) Improvement works ranked highest priority in Dayton & Knight Report.
- (2) Currently outside of the jurisdiction of GVS&DD.
- (3) Cost apportionment based on 1987 Assessment. Actual cost apportionment for 1989 works will be based on 1988 Assessment which is not yet available.

APPENDIX C

DESCRIPTION OF PROPOSED 1989 DRAINAGE IMPROVEMENT WORKS

LISTED UNDER APPENDIX A & B

<u>DRAINAGE BASIN</u>	<u>DESCRIPTION OF IMPROVEMENT WORKS</u>
All	<p><u>Inspection Trail</u></p> <p>Provision of an inspection access trail in every ravine from each ravine's outlet to its headscarp. This would allow ease of inspection and increase in inspection frequency. The objective of the inspection program is to detect signs and early warning of potentially hazardous situations which may lead to landslides, debris flows or floods; and to monitor problem areas in the creeks in order to note changes and establish priorities for maintenance and remedial work accordingly.</p>
Williams	<p><u>Sediment Storage Basin, Inlet Structure & Grating</u></p> <p>Construction of sediment storage basin with grating for containment in the event of a debris flow. Reconstruction of existing inlet structure to improve the inlet capacity and construction of overflow channel to contain storm flow in the event of a major blockage at the inlet.</p>
Dallas	<p><u>80 m of Diversion Ditch</u></p> <p>Construction of 80 m of a storm flow diversion ditch to protect the townhouse complex on James Road from possible flooding during major flows.</p>
Ottley	<p><u>Sediment Storage Basin, Inlet Structure & Grating</u></p> <p>Construction of sediment storage basin with grating for containment in the event of a debris flow. Reconstruction of existing inlet structure to improve the inlet capacity and construction of overflow channel to contain storm flow in the event of a major blockage at the inlet.</p> <p><u>Right-of-Way Acquisition</u></p> <p>Ottley Creek basin consists of alternating sections of storm sewers and open channel through 12 private properties without any statutory right-of-ways. For the purpose of operation and maintenance by GVS&DD, right-of-way acquisition would be necessary.</p>

Axford

Sediment Storage Basin, Inlet Structure & Grating

Construction of sediment storage basin with grating for containment in the event of a debris flow. Reconstruction of existing inlet structure to improve the inlet capacity and construction of overflow channel to contain storm flow in the event of a major blockage at the inlet.

Right-of-Way Acquisition

Axford Creek basin consists of alternating sections of storm sewers and open channel through 4 private properties without any statutory right-of-ways. For the purpose of operation and maintenance by GVS&DD, right-of-way acquisition would be necessary.

SS/11/cnm
3/243

D I S T R I C T O F C O Q U I T L A M

Inter Office Memo

TO: J.L.Tonn, Municipal Manager DEPARTMENT: Administration DATE: 1988 October 26
FROM: Neil Nyberg DEPARTMENT: Engineering FILE:
SUBJECT: DITCH ELIMINATION PROGRAM FUNDING OUR FILE: 01 03 06
FOR: DRAINAGE COMMITTEE

REFERENCE: A. Engineering memo report to Finance & Audit Committee
1988 March 28.

1.00 BACKGROUND

- 1.01 The original Bylaw 1297, 1982 established a reserve fund for capital drainage (ditch elimination) works via a transfer of \$4,000,000 from the Municipal Land Sales to a new reserve fund: the Coquitlam Capital Drainage Works Reserve Fund.
- 1.02 The original program was intended to be funded solely from interest proceeds over a 28-year period. However, in 1988, the Council examined a plan to complete the Southwest Coquitlam Ditch Elimination Program in 10 years. On 1988 June 20 Council gave final adoption to Bylaw 1867, 1988 to transfer \$1,000,000 into the Drainage Capital Reserve Fund. The final step in expediting the ditch enclosure problem is to pass a bylaw which amends the original terms of reference for the fund. For the next ten years, interest and principle will be spent on ditch elimination.

2.00 DISCUSSION

- 2.01 Bylaws and Council Resolutions subsequent to Bylaw 1297, 1982 have increased the Capital Drainage Fund Reserve to accelerate the Ditch Elimination Program to be completed by 1998. Bylaw 1297, 1982 stipulates that expenditures may only be made from the interest earned from the Capital Drainage Fund Reserve. Bylaw 1930, 1988 which authorizes expenditure of capital and principle, should be adopted prior to the 1989 construction season.

3.00 RECOMMENDATION

- 3.01 That the Drainage Committee recommends to Council:

Give first, second and third reading to Bylaw "Capital Drainage Works Fund Reserve Amending Bylaw No. 1930, 1988" to amend Bylaw 1297, 1982.

Neil Nyberg
Neil Nyberg, P. Eng.
Municipal Engineer

NWN/mw

MANAGER APPROVED

J. L. Tonn

DISTRICT OF COQUITLAM

Bylaw No. 1930, 1988

A Bylaw to amend the "District of Coquitlam
Capital Drainage Works Reserve Fund Bylaw
No. 1297, 1982".

WHEREAS certain amendments are necessary to authorize expenditures from both principal paid into the "Coquitlam Capital Drainage Works Reserve Fund" and interest earned thereon.

NOW THEREFORE the Municipal Council of the District of Coquitlam in open meeting assembled, ENACTS AS FOLLOWS:

1. This Bylaw may be cited for all purposes as the "District of Coquitlam Capital Drainage Works Reserve Fund Amendment Bylaw No. 1930, 1988".
2. The "District of Coquitlam Capital Drainage Works Reserve Fund Establishment Bylaw No. 1297, 1982" is amended as follows:
 - (a) The fourth paragraph of the preamble is hereby amended by striking out the words starting on the third line thereof "subject only to the minister's approval and he may direct before approval that the bylaw receive the assent of the electors;"
 - (b) The sixth paragraph of the preamble is hereby deleted in its entirety and the following is substituted "AND WHEREAS it is the intention of Council to authorize expenditures from the "Coquitlam Capital Drainage Works Reserve Fund", consisting of both principal and interest earned thereon, from time to time for capital drainage works."
 - (c) Section 4, is hereby amended by striking out the words starting on the third line thereof "and the Municipal Treasurer outlining a proposed program of capital drainage works expenditure from said reserve fund which could be undertaken without using any of the principal portion of said reserve fund." and substituting the phrase therefore "outling a proposed program of capital drainage works expenditure which could be undertaken using funds, consisting of both principal and interest earned thereon, credited to said reserve fund."

3. This Bylaw shall come into force and effect upon final adoption by Council.

READ A FIRST TIME this day of A. D. 1988
READ A SECOND TIME this day of A. D. 1988
READ A THIRD TIME this day of A. D. 1988.

RECONSIDERED, FINALLY PASSED AND ADOPTED and the Seal of the District
affixed this day of A.D. 1988.

MAYOR

CLERK

10 YEAR DITCH ELIMINATION PROGRAM FINANCIAL MODEL

Revised 1988 February 02

Print Date : 88-10-26

HISTORICAL DATA

Year Area	DEP Fund Bylaw Balance (\$)	Ditch Enclosures (m)	Construction Unit Cost (\$/m)	Bylaw Amount (\$)	Annual Investment (\$)	Interest Bearing Funds (FV\$)	Interest Proceeds (FV\$)	Investment Present Value (PV\$)
1983	4,000,000				4,000,000	4,000,000	255,068	5,877,000
1983 1	4,255,068	2,100	121.46	255,068	0	4,000,000	324,168	0
1984 1-2	4,324,168	1,200	158.33	190,000	0	4,134,168	352,759	0
1985 2-3	4,486,927	3,893	124.06	482,950	0	4,003,977	412,040	0
1986 3	4,416,017	2,720	147.06	400,000	0	4,016,017	304,060	0
1987 4	5,320,077	1,850	169.73	314,000	1,000,000	5,006,077	425,517	1,080,000
Historical Totals :		11,763	\$149.79	\$1,642,018	\$5,000,000	\$25,160,239	\$2,073,612	\$6,957,000

NOTE : PROPOSED PROGRAM GOVERNED BY DITCH ENCLOSURE LENGTHS

ASSUMPTIONS :
 10 Years To Program Completion - Reference Year = 1988
 \$1,000,000 Annual Investment
 8.00% Average Annual Interest Rate
 \$170.00 Present Value Unit Cost of Construction (\$/m)
 4.00% Average Annual Construction Cost Variance

RESULTS :	Future Value	Present Value
Total Investment	\$15,000,000	\$14,203,000
Residual Fund Balance	\$8,125,000	\$3,484,673
Net Investment	\$6,875,000	\$10,718,327

Year Area	DEP Fund Balance (April) (FV\$)	Ditch Enclosures (m)	Construction Unit Cost (FV\$/m)	Construction Cost (FV\$)	Investment To DEP Fund (FV\$)	Interest Bearing Funds (FV\$)	Interest Proceeds (FV\$)	Investment Present Value (PV\$)
1988 4-5	5,440,000	2,100	209.52	440,000	1,000,000	6,000,000	480,000	1,000,000
1989 5-7	6,480,000	4,650	176.80	822,000	1,000,000	6,658,000	533,000	926,000
1990 8-11	7,191,000	5,450	183.87	1,002,000	1,000,000	7,189,000	575,000	857,000
1991 12	7,764,000	8,400	191.23	1,606,000	1,000,000	7,158,000	573,000	794,000
1992 13	7,731,000	6,300	198.88	1,253,000	1,000,000	7,478,000	598,000	735,000
1993 14-15	8,076,000	5,920	206.83	1,224,000	1,000,000	7,852,000	628,000	681,000
1994 16-20	8,480,000	6,480	215.10	1,394,000	1,000,000	8,086,000	647,000	630,000
1995 21-23	8,733,000	5,900	223.71	1,320,000	1,000,000	8,413,000	673,000	583,000
1996 24-25	9,086,000	7,000	232.66	1,629,000	1,000,000	8,457,000	677,000	540,000
1997 26-27	9,134,000	5,100	241.96	1,234,000	1,000,000	8,900,000	712,000	500,000
1998 27-28	9,612,000	8,300	251.64	2,089,000		7,523,000	602,000	0
1999	8,125,000							0
Projected Totals :		65,600		\$14,013,000	\$10,000,000		\$6,698,000	\$7,246,000
Program Totals :		77,363		\$15,655,018	\$15,000,000		\$8,771,612	\$14,203,000

DISTRICT OF COQUITLAM

Inter-Office Communication

J.L. Tonn

DEPARTMENT: Administration

DATE: 1988 March 28

FROM:

N.W. Nyberg

DEPARTMENT: Engineering

YOUR FILE:

SUBJECT:

10 YEAR DITCH ELIMINATION PROGRAM

OUR FILE: 01 03 06

Reference: For Finance and Audit Committee

1.00 BACKGROUND

- 1.01 Mayor Sekora's Inaugural speech made reference to accelerating the Ditch Elimination Program.
- 1.02 Reports from this Department to the Drainage Committee dated January 18, 1988 and February 3, 1988, outlined various financial alternatives for accelerating this Program.
- 1.03 An annual investment of \$1,000,000 per year from 1988 to 1997 should complete the Ditch Elimination Program in 10 years with a residual balance. The amount of the residual will depend upon prevailing interest rates and the inflation of construction costs.

2.00 BACKGROUND

- 2.01 The attached printout is a 'most likely' scenario construction costs, total investment and the residual reserve fund balance of the 10 year Ditch Elimination Program based on assumed inflation and investment rates of 4% and 8% per annum, respectively.
- 2.02 In order to initiate the accelerated program in accordance with the schedule presented on the printout, the first of 10 annual \$1,000,000 investments in the Ditch Elimination reserve fund should be made in April of this year.

3.00 RECOMMENDATION

- 3.01 That Council authorize staff to prepare and present a bylaw to transfer \$1,000,000.00 from the Land Sales Reserve to the Ditch Elimination Reserve.



Neil Nyberg, P. Eng.
Municipal Engineer

MC/fb
Attach.

PROJECT DESCRIPTION

1987 March 28

Item: 10 Year Ditch Elimination Program

File: 01 03 06

Account No. 533055

Finance: Drainage Reserve Fund

Schedule: 1988 to 1998

Project Objectives:

To eliminate all ditches alongside urban residential streets in the southwest portion of Coquitlam. This program will:

- provide enclosed street drainage to approximately 8,200 lots in southwest Coquitlam;
- improve public safety and convenience for pedestrians and motorists;
- reduce operations and maintenance costs associated with open ditches; and
- collect and convey runoff from a 10 year storm event and will direct larger storms to flood routes.

Scope of Work:

Approximately 65,600 metres of existing ditches are to be enclosed over a 10 year period. Work includes ditch cleaning, laying of PVC or concrete pipe, backfilling and resurfacing with gravel or sod. Driveways are repaired to match existing surface. Asphalt curbs are placed where grades are greater than 3% or where special drainage problems exist. Boulevards are restored with gravel or sod, depending on function and erosion potential. A 1.5 m. gravel strip is provided for parking. Boulevard drainage is confined to a sod lined swale leading to lawn basins or catch basins.

Justification:

Ditch elimination programming is established by drainage area and considers erosion potential, flooding potential, vehicle and pedestrian hazard, maintenance cost and appearance factors. The program normally operates within one or more drainage basins, concentrating on the lower reaches at the outset, and progressing towards the upstream streets.

10 YEAR DITCH ELIMINATION PROGRAM FINANCIAL MODEL

Revised 1988 February 02

Print Date : 88-03-25

LOCAL DATA

Dr Area	DEP Fund Bylaw Balance (\$)	Ditch Enclosures (m)	Construction Unit Cost (\$/m)	Bylaw Amount (\$)	Annual Investment (\$)	Interest Bearing Funds (FV\$)	Interest Proceeds (FV\$)	Investment Present Value (FV\$)
3	4,000,000				4,000,000	4,000,000	255,068	5,577,000
3 1	4,255,068	2,100	121.46	255,068	0	4,000,000	324,168	0
4 1-2	4,324,168	1,200	158.33	190,000	0	4,134,168	382,759	0
5 2-3	4,486,927	3,893	124.06	482,950	0	4,003,977	412,040	0
6 3	4,416,017	2,720	147.06	400,000	0	4,016,017	304,060	0
7 4	5,320,077	1,850	169.73	314,000	1,000,000	5,006,077	423,517	1,080,000
Operational Totals :		11,753	\$149.79	\$1,542,018	\$5,000,000	\$25,160,239	\$2,873,612	\$6,957,000

PROPOSED PROGRAM GOVERNED BY DITCH ENCLOSURE LENGTHS

- ASSUMPTIONS :
- 10 Years To Program Completion - Reference Year = 1988
 - \$1,000,000 Annual Investment
 - 8.00% Average Annual Interest Rate
 - \$170.00 Present Value Unit Cost of Construction (\$/m)
 - 4.00% Average Annual Construction Cost Variance

- 3.00%
- 4.00%
- 5.00%
- 6.00%

RESULTS :

	Future Value	Present Value
Total Investment	\$15,000,000	\$14,203,000
Residual Fund Balance	\$8,125,000	\$3,284,573
Net Investment	\$6,875,000	\$10,718,327

Dr Area	DEP Fund Balance (April) (FV\$)	Ditch Enclosures (m)	Construction Unit Cost (FV\$/m)	Construction Cost (FV\$)	Investment To DEP Fund (FV\$)	Interest Bearing Funds (FV\$)	Interest Proceeds (FV\$)	Investment Present Value (FV\$)
88 4-5	5,440,000	2,100	209.52	440,000	1,000,000	6,000,000	480,000	1,000,000
89 5-7	6,480,000	4,650	176.80	822,000	1,000,000	6,658,000	533,000	926,000
90 8-11	7,191,000	5,450	183.87	1,002,000	1,000,000	7,189,000	575,000	657,000
91 12	7,764,000	6,400	191.23	1,606,000	1,000,000	7,158,000	573,000	794,000
92 13	7,731,000	6,300	198.88	1,253,000	1,000,000	7,478,000	593,000	735,000
93 14-15	8,076,000	5,920	206.85	1,224,000	1,000,000	7,352,000	625,000	681,000
94 16-20	8,480,000	6,450	215.10	1,394,000	1,000,000	8,086,000	647,000	650,000
95 21-23	8,733,000	5,900	223.71	1,320,000	1,000,000	8,413,000	673,000	583,000
96 24-25	9,086,000	7,000	232.56	1,629,000	1,000,000	8,457,000	677,000	540,000
97 26-27	9,134,000	5,100	241.96	1,234,000	1,000,000	8,700,000	712,000	500,000
98 27-28	9,612,000	8,300	251.64	2,069,000		7,523,000	602,000	0
99	8,125,000							0
Projected Totals :		65,600		\$14,013,000	\$10,000,000		\$6,653,000	\$7,246,000
Program Totals :		77,363		\$15,655,018	\$15,000,000		\$8,771,612	\$14,203,000

MODEL DESCRIPTION

A. The Input variables for the financial model are:

1. Drainage Area Ditch Lengths (M): The Ditch Elimination Program is broken down into zones. Each zone has a length of storm sewer that has to be enclosed. The Ditch Elimination Program is set up so that work would progress in full zones only each year thereby containing the program from being too widespread and disruptive to local traffic patterns and public convenience. Inputting the system lengths sets the duration of the Program.
2. Ditch Elimination Unit Cost/Metre (\$/M): This figure can be entered on the basis of historical trends progression average costs over a discrete period of time or any other method. The unit cost is entered in the first year of the program.
3. Annual Interest Rate (%): This is the assumed annual interest rate. It can be varied yearly as required to match predicted interest rate variations.
4. Annual Construction Cost Variation (%). This is the change in the unit construction cost per year. It is assumed to coincide with the annual average inflation rate.
5. Annual Investment (\$): This is the amount added to the program each year.
6. Residual Principal Value (\$): This is the amount left at the end of the program.
7. Principal Start Balance (\$): This is the amount that is available in the first year of the program (1988).
8. Construction programs are grouped by completion in 7, 10 or 13 years for Drainage Area Ditch lengths as follows:

<u>Year</u>	<u>Drainage Area</u>	<u>7 Year Program</u>	<u>Drainage Area</u>	<u>10 Year Program</u>	<u>Drainage Area</u>	<u>13 Year Program</u>
1989	5,6,7,8,9	9,126m	5-7	5,376m	5-6	4,876m
1990	10,11,12 (part)	9,200	8-11	5,450	7-10	5,300
1991	12 (part) 13,14	7,920	12	8,400	11-12 (part)	4,650
1992	15,16,17,18	9,360	13	6,300	12 (part)	4,400
1993	19,20,21,22,23	8,220	14-15	5,920	13 (part)	4,000
1994	24-26	8,400	16-20	6,480	13 (part) 14	3,020
1995	27,28	12,000	21-23	5,900	15	5,200
1996			24-25	7,000	16-19	4,480
1997			26-27	5,100	20-21	4,900
1998			27-28	8,300	22-24	5,000
1999					25	5,000
2000					26-27	5,100
2001					28	8,300
		64,226metres		64,226metres		64,226metres

C. Assumptions in the model include:

- . unit construction cost \$170/M
- . annual interest rate 8%
- . annual cost inflation 3%
- . Initial investment \$5.4/M

DISTRICT OF COQUITLAM

BYLAW NO. 1297, 1982

A bylaw to establish a reserve fund for expenditures for or in respect of capital drainage works and extension or renewal of drainage works

WHEREAS, in the opinion of Council, there is need to make special provision for funding new capital drainage works as well as extension or renewal of existing capital drainage works;

AND WHEREAS, pursuant to Section 378(1)(a) of the "Municipal Act" being Chapter 290 of the 1979 Revised Statutes of British Columbia and amendments thereto, Council may by bylaw establish a reserve fund for expenditures for or in respect of capital projects and extension or renewal of existing capital works;

AND WHEREAS, pursuant to Section 378(2) of the said Municipal Act, Council may authorize that money may be paid into such reserve fund, as available;

AND WHEREAS Council may, by bylaw adopted by at least two-thirds of its members, provide for expenditure of any money in such a reserve fund and interest earned on it subject only to the minister's approval and he may direct before approval that the bylaw receive the assent of the electors;

AND WHEREAS it is the present intention of Council to authorize, pursuant to the provisions of Section 380 of the said Municipal Act, the transfer of Four Million Dollars (\$4,000,000) (hereinafter referred to as principal sum) from the Municipal Lands Reserve Fund to a capital reserve fund to be created by these presents which capital reserve fund may be referred to as "Coquitlam Capital Drainage Works Reserve Fund".

AND WHEREAS it is the present intention of Council to preserve the principal sum paid into the "Coquitlam Capital Drainage Works Reserve Fund" and to authorize expenditures therefrom for capital drainage works only such amounts that the Council determines is the interest earned upon the principal sum.

NOW THEREFORE, the Council of the District of Coquitlam in open meeting assembled, ENACTS AS FOLLOWS:

1. A reserve fund is hereby established to be known as "Coquitlam Capital Drainage Works Reserve Fund" hereafter referred in this bylaw as "said reserve fund".
2. Council may, from time to time, authorize, as permitted under the said Municipal Act, payment into said reserve fund; such payments to be recorded as and be referred to as principal portion of said reserve fund.
3. The Municipal Treasurer shall invest the balance in said reserve fund in securities authorized by law and interest shall be recorded as such.

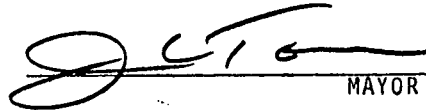
4. Each year, on or before the 15th of May, there shall be presented to Council through the Municipal Manager, a report signed by the Municipal Engineer and the Municipal Treasurer outlining a proposed program of capital drainage works expenditure from said reserve fund which could be undertaken without using any of the principal portion of said reserve fund.
5. All expenditures from said reserve fund shall be authorized by bylaw adopted by at least two-thirds of the members of Council and approved by the minister.
6. This bylaw shall come into force and effect upon any sum being authorized for payment to said reserve fund.
7. This bylaw may be cited for all purposes as the "District of Coquitlam Capital Drainage Works Reserve Fund Establishment Bylaw No. 1297, 1982".


READ A FIRST TIME this 22nd day of November A.D., 1982.

READ A SECOND TIME this 22nd day of November A.D., 1982.

READ A THIRD TIME this 22nd day of November A.D., 1982.

RECONSIDERED, FINALLY PASSED and ADOPTED this 7th day of
December A.D., 1982.


MAYOR


CLERK

I hereby certify the foregoing By-Law
to be a True and Correct copy of the
DISTRICT OF COQUITLAM
CAPITAL DRAINAGE WORKS
RESERVE FUND ESTABLISHMENT
By-Law No. 1297 1982 as
adopted by the Council of the District
of Coquitlam in accordance with the
provisions of the Municipal Act on the
7th day of December 1982

Date of Certification
1982 12 18
Municipal Clerk
District of Coquitlam

DISTRICT OF COQUITLAM

1002

Inter Office Memo

TO: J.L.Tonn, Municipal Manager DEPARTMENT: Administration DATE: 1988 October 31
FROM: Neil Nyberg DEPARTMENT: Engineering FILE:
SUBJECT: COQUITLAM/PORT MOODY DRAINAGE MASTER PLAN - FINANCING 01 03 06



FOR ONWARD TRANSMITTAL TO COUNCIL

1.00 BACKGROUND

1.01 At the Friday, 1988 October 28 meeting, the Drainage Committee directed staff to report on financing for implementing the Drainage Plan.

1.02 The cost anticipated by the GVRD memorandum is \$121,400 in 1989.

2.00 DISCUSSION

2.01 The design and construction costs to implement the proposed works contained in the Drainage Plan will be billed to Coquitlam as Capital Works. These charges will be separate from the annual Greater Vancouver Sewerage and Drainage District billing charges for Operation and Maintenance.

2.02 Capital Works charges will be billed monthly to Coquitlam and Port Moody for direct consultant, contractor and supplier invoices. The GVRD will receive progress claims for all design, labour, equipment, materials and other fees, consolidate them as a monthly total cost, and then bill Coquitlam and Port Moody for their respective share.

2.03 There will be no GVRD financing charges.

2.04 Design work could start early in 1989 and construction could begin in early May.

3.00 CONCLUSIONS

3.01 A provision is required in the 1989 Annual Budget for \$121,400 for the 1989 Capital Works in the Coquitlam/Port Moody Master Drainage Plan.

Neil Nyberg
Neil Nyberg, P. Eng.
Municipal Engineer

NWN/mw

MANAGER APPROVED

J 10/31/88