

TO: MUNICIPAL MANAGER 1991 APRIL 05
FROM: DIRECTOR ENGINEERING
SUBJECT: CAPITAL WORKS PROGRAM -
DRAINAGE IMPROVEMENTS TO THE BIG BEND AREA

PURPOSE: To provide Council with a phased plan for improvements to drainage in the Big Bend.

RECOMMENDATIONS:

1. THAT Council endorse the comprehensive strategy for a phased drainage capital improvement program in the Big Bend as outlined in this report.
2. THAT the Director Engineering be authorized to proceed with drainage works in the Big Bend identified in Table 1, Year 1991 at an estimated cost of \$910,000.

REPORT

1.0 INTRODUCTION

Council, at its regular meeting of 1990 December 17, received a report on a Comprehensive Drainage Plan & Environmental Assessment Study for the Western Sector of the Big Bend which was subsequently referred to the Environment & Waste Management Committee.

The report was endorsed by the Committee on 1991 April 09 and is included elsewhere on this agenda for Council's consideration.

This report is to provide Council with an overview of the drainage improvements required for the entire Big Bend area which form the framework of a recommended drainage capital program.

2.0 EXISTING DRAINAGE PROBLEMS

The drainage issues which presently exist in the Big Bend area can be grouped into two main categories:

- flooding of property caused by surcharged culverts and overflowing streams/Fraser River;
- erosion and sedimentation on streams resulting in flow capacity reductions.

A large part of Big Bend is located in the lowland area with natural land elevation in the order of 3m. Localized low lying areas are subjected to frequent flooding which is mainly attributed to a combination of high water level in the Fraser River and high runoff from inland drainage. As the area gradually becomes developed, construction of larger diameter culverts and new dykes is necessary to improve flood protection level.

In addition to the high flow problems in the streams and river system, another major drainage problem which prevails in the Big Bend area is stream erosion and sedimentation. As erosion increases in the upstream area, sedimentation in the downstream flat area is increased brought about by the eroded soils which build up the stream bed and reduce the flow capacity. This problem is clearly visible in the major watercourses in Big Bend. In order to effectively deal with this problem, stream regrading and enhancements are needed to restore proper flow capacities in these major watercourses.

3.0 PROPOSED CAPITAL IMPROVEMENT PROGRAM

Several drainage studies have been completed in the last few years for various areas within Big Bend. With the completion of the recent study on the Western Sector, an overall drainage review for the entire Big Bend is now complete. A summary of the recent and past completed studies and reports is given as follows:

- . Report on Big Bend Drainage - March 1986
- . Pre-Design Report on Meadow Drainage System
- . Pre-Design Report on Marine Drive Culvert Upgrading
- . Report on Flumes Below Marine Drive
- . Design Report for Meadow Avenue Pump Station
- . Report on Dyking and Flood Protection for the Big Bend Area
- . Master Drainage Plan for the Western Sector of the Big Bend Area

Based on the findings and conclusions of the studies, drainage improvement projects are identified to provide relief to existing flooding problems and to accommodate future development growth within the study area. The proposed improvements include storm sewers, culverts, dyking and major channel upgrading works. These projects would offer a reliable and effective means of providing flood protection as well as presenting the most environmentally acceptable alternative.

The main benefits of these proposed improvements are highlighted as follows:

- to improve drainage in the Market Garden area for better agriculture production;
- to improve local drainage to reduce flooding to existing homes and development;
- to improve flood control along major watercourses and Fraser River and provide opportunities for in-stream fisheries enhancement.

A detailed description of the recommended capital improvements and their respective benefits together with the proposed implementation schedule is given in Table 1. Locations of the projects are shown on Figure 1.

The total estimated cost of the capital program is approximately \$5,280,000 (1991 cost). It is recognized that some of the improvements are not required immediately, therefore it is recommended that the program be implemented over a 7-year period. The staged program is designed to provide a balanced annual expenditure and to meet present and projected needs. The priorities were established on the basis of the current condition and needs level and may require minor adjustments when other factors such as road paving program and right-of-way acquisition are taken into consideration.

4.0 FUNDING

4.1 Expenditure Levels

A summary of the annual funding required for the proposed program is summarized below.

<u>Year</u>	<u>Expenditure</u> <u>(1991 Cost)</u>
1991	\$ 910,000
1992	950,000
1993	770,000
1994	700,000
1995	615,000
1996	660,000
1997	<u>675,000</u>
Total Cost	\$5,280,000

These expenditures are based on preliminary cost estimates and will be updated at the detailed design phase of each project.

Historically, storm drainage capital improvements have been identified in the 5 year Capital Budget with funding provided as a contribution to Capital from the Operating Budget. In recent years, the primary emphasis for major drainage projects has been in the Big Bend with the two most recent projects being Byrne Creek Relocation and the Meadow Drainage System Upgrading with construction costs of \$1.8 million and \$2.7 million respectively. The annual expenditure rate shown in the above table maintains expenditures in line with the recent historical trends and would continue an emphasis of drainage improvements within the Big Bend.

Each year's expenditure appropriation would, of course, be subject to specific Council approval.

4.2 1991 Program

The specific program improvements recommended for 1991 are shown in Table 1 with an estimated cost of \$910,000. Funds in the amount of \$350,000 remain unallocated in the 1990-1994 Capital Budget Storm Extensions - Big Bend Area Drainage Improvements Account Code 60-32 and the balance of \$560,000 will be included as a 1991 Appropriation within the same Account.

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Council's approval of the 1991 expenditure in advance of Budget approval is being sought in order that staff are in a position to undertake construction improvements within the permitted time frame "window" requirements dictated by the Federal and Provincial Fisheries Agencies.

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5.0 CONCLUSION

As development takes place, storm water runoff is often increased and its effect may become a major concern with respect to flooding, property damage and deterioration of the natural environment.

In past several years, the Municipality has undertaken several design studies in the Big Bend area to address both the present and future drainage needs. With the completion of the recent study on the Western Sector, an overall drainage review for the entire Big Bend is now complete.

Arising from the studies, a program of capital improvements is identified. In order to provide a balanced expenditure and to establish a phased approach to resolve the drainage issue, a 7-year capital program has been developed and is outlined in Table 1 for Council's consideration. The proposed program would mitigate longstanding agriculture drainage problems and recurring flooding problems in low lying areas, and would offer opportunities for fisheries enhancement in major watercourses.

Although the program is phased over seven years, it is necessary to view it as a comprehensive overall strategy because many of the improvements are interrelated and need to be implemented in total in order to achieve full effectiveness.

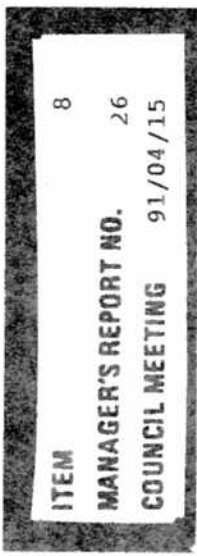
Council's specific approval is sought for the 1991 Drainage Program in the Big Bend in order to be in position to take advantage of the allowable time frame required by Fisheries.


DIRECTOR ENGINEERING

BCD/LSC/WCS:jb
Attach.

cc: Director Finance
Director Planning & Building Inspection
Director Recreation & Cultural Services
Director Administrative & Community Services

TABLE 1:



Item	Area	Activity	Benefits	Year
1.	Nelson Creek	-Design Report -Detailed Design -Railway Culvert Improvements	-Improve drainage and flood control in the Market Garden area	1991
2.	Hollis Creek	-Design Report -Detailed Design	-Establish feasibility of fisheries enhancement and identify right-of-way requirements	
3.	Willard/Thorne	-Design Report -Detailed Design -Construction	-Improve local drainage near the Willard/Thorne intersection	
4.	Marine Dr	At 12th Ave: -Construction At John Mathews Creek: -Construction	-Watercourse improvements to control flooding -Culvert upgrading to improve drainage	
5.	Dyking for the Big Bend Area	-Detailed Design -Construction of some erosion protection	-Provide flood protection from the Fraser River	
6.	Hollis Creek	-Right-of-way acquisition & construction	-Fisheries enhancement -Flooding protection	1992
7.	Nelson Creek	-Complete channel improvements	-Complete flood protection for Market Gardens	1993
8.	Dyking	-Right-of-way acquisition	-Required prior to construction	
9.	Marine Dr Culvert Improvements	-Complete construction	-Provide flood protection to remainder of Marine Dr culverts	1994
10.	Dyking	-Complete construction	-Provide flood protection from Fraser River overflows	1995
11.	CPR Culvert Replacement	-Detailed Design	-Drainage improvements and fisheries enhancements	
12.	Kaymar Creek	-Detailed Design	-Drainage improvements and fisheries enhancements	
13.	CPR Culvert Replacement	-Construction	-Drainage improvements and fisheries enhancements	1996
14.	Kaymar Creek	-Construction	-Drainage improvements and fisheries enhancements	1997
15.	Meadow Ave	-Culvert replacement and ditch regrading	-Drainage improvements	

CAPITAL IMPROVEMENT PROGRAM
 BIG BEND DRAINAGE

REVISION	DATE

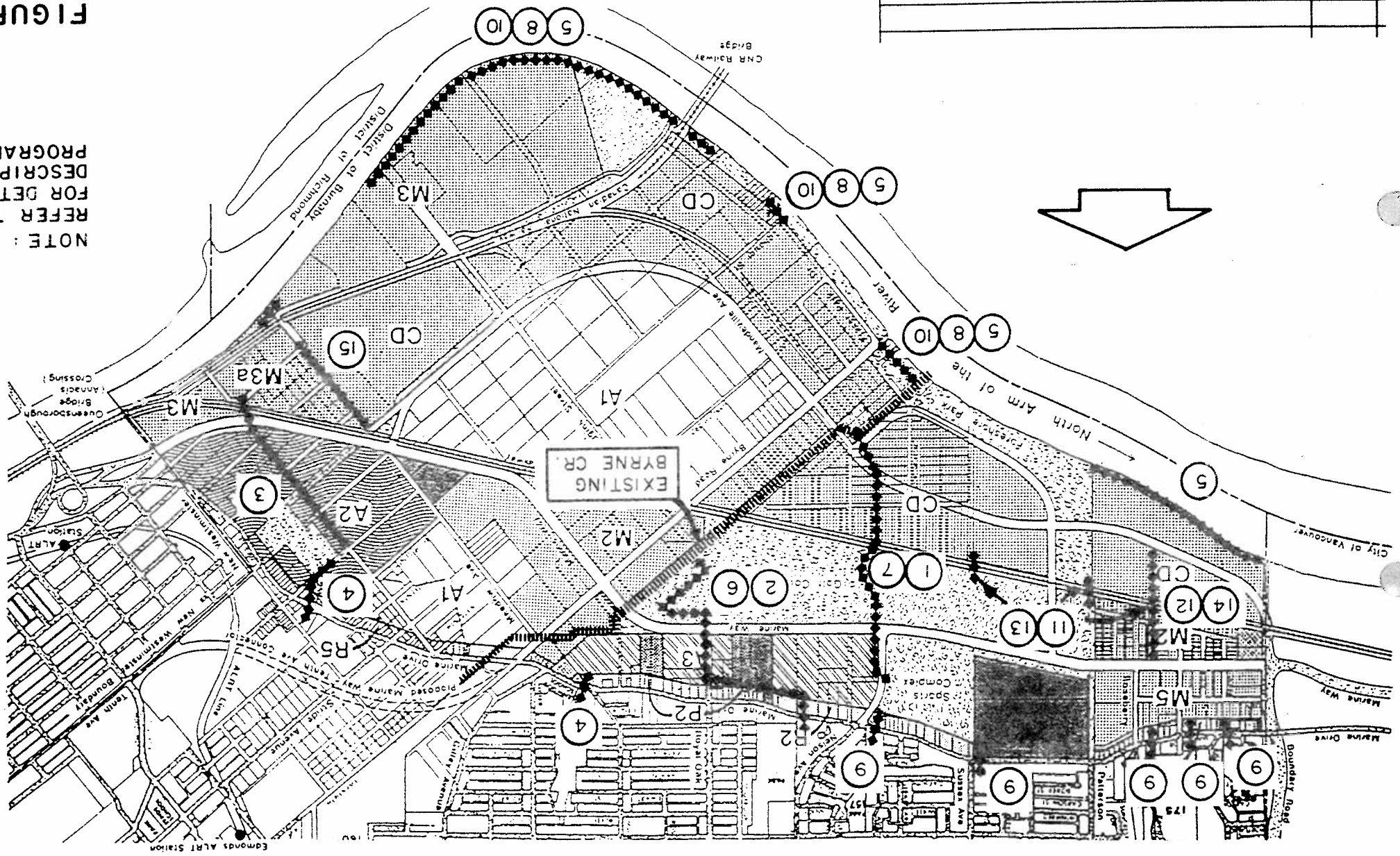
DESIGNED BY: N.T.S.	SCALE:
DRAWN BY: DRColocero	DATE: 91-04-08
CHECKED BY:	
APPRVD BY:	

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FIGURE 1

NOTE: REFER TO TABLE 1 FOR DETAILED DESCRIPTION OF PROGRAM.



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