

CITY OF BURNABY  
ENVIRONMENT COMMITTEE

**E**

HIS WORSHIP, THE MAYOR  
AND COUNCILLORS

**RE: "TOTAL" STORMWATER MANAGEMENT APPROACH**

RECOMMENDATION:

1. **THAT** Council approve a "Total" stormwater management approach for development projects in the City based on the principles previously adopted by Council for stormwater management plans as outlined in Section 3 in this report.

R E P O R T

The Environment Committee, at its 'Open' meeting held on 2003 June 10, received and adopted the attached report seeking approval for a comprehensive stormwater management approach on a total watershed scale to manage storm runoff from development sites.

The Committee advised that the proposed "Total" stormwater management system would conform to stormwater management principles previously adopted by Council, provide flexible and cost effective solutions and develop stormwater management requirements with respect to fisheries, erosion, flooding and infrastructure capacity needs.

The Committee further advised that the building blocks of the proposed "Total" stormwater management system would consist of watershed classification map for runoff management, stormwater management standards, best management practice tools, public education and communication program and system monitoring.

Respectfully submitted,

Councillor D. Johnston  
Chair

Councillor P. Calendino  
Vice Chair

Councillor C. Redman  
Member

COPY - CITY MANAGER  
- DIRECTOR PLANNING & BUILDING  
- DIRECTOR PARKS, RECREATION & CULTURAL SERVICES  
- DIRECTOR ENGINEERING

**TO:** CHAIR AND MEMBERS  
ENVIRONMENT COMMITTEE

**DATE:** 2003 MAY 29

**FROM:** DIRECTOR ENGINEERING  
DIRECTOR PLANNING & BUILDING

**FILE:** 31000-00

**SUBJECT:** *"TOTAL"* STORMWATER MANAGEMENT APPROACH

**PURPOSE:** To seek approval of the Committee and Council for a comprehensive stormwater management approach on a total watershed scale to manage storm runoff from development sites.

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**RECOMMENDATION:**

1. **THAT** the Committee recommend to Council that a "Total" stormwater management approach, based on the principles previously adopted by Council for stormwater management plans as outlined in Section 3 in this report, be approved for development projects in the City.

**REPORT**

**1.0 INTRODUCTION**

Over the past several years, Council has endorsed the principles of stormwater management as part of an integrated solution to manage drainage flow and to reduce storm runoff impact on City streams and their environment. The stormwater management principles adopted by the City include sedimentation control, peak storm runoff reduction, flood protection and water quality enhancement which form the foundation for the City's watershed management plan development process.

Arising from the adoption of the integrated stormwater management principles, several studies were completed in the last five years which led to specific stormwater management requirements for development projects in the Stoney Creek and Byrne Creek watersheds. The growth and experience gained in stormwater management in the recent past have prepared the way for a broader total watershed approach that may be adopted for development projects in other areas of the City.

The purpose of this report is to present a "Total" stormwater management program for Council's consideration and approval.

## 2.0 EXISTING CITY STORMWATER MANAGEMENT POLICIES AND APPROACH

The protection of waterways and streams is one of the environmental protection goals of the City. The Watercourse Protection Bylaw established by Council many years ago provides the foundation for the stormwater management direction adopted by the City in the last decade.

In 1995, Council approved a staff report that outlined the concept of alternative stormwater management practices for urban runoff management in the City. The approved strategy embraced a total system concept that contains many interrelated components such as stormwater storage facilities, watercourse delineation, sedimentation control and wetland construction that can be selected to meet specific watershed needs.

From 1997 to 2001, the City completed stormwater management studies for the Brunette, Stoney Creek and Byrne Creek watersheds that led to the development of specific stormwater management standards for several major development projects including Burnaby Mountain Secondary School, UniverCity residential development project and the current Middlegate redevelopment proposal. Other development projects in the Big Bend industrial area have also adopted the stormwater management principles as part of the site development plan.

In 2000, Council also adopted the GVRD's Liquid Waste Management Plan that included a commitment on all municipalities in the region to develop watershed plans in accordance with established stormwater management principles.

Stormwater management standards developed under the watershed management planning process have been incorporated into several recent development projects in the City. The implementation of these standards has been recognized as an important milestone in the City's environmental sustainability initiative.

Key elements of the City's current stormwater management approach include:

- Stormwater storage (detention facilities)
- Sedimentation control/oil interceptors
- Infiltration trenches/biofiltration ponds
- Permeable surfaces
- Stream corridor protection

## 3.0 PROPOSED "TOTAL" STORMWATER MANAGEMENT PLAN

### 3.1 General Concept of the Plan

The implementation of the City adopted stormwater management principles in the Stoney Creek watershed in the past few years has confirmed that the current principles are sound and practical. Many studies and research projects conducted on

storm water management practices in North America have also reaffirmed that changes in hydrology as a result of development growth are significant and effective stormwater management measures are key elements that must be put in place to protect the environment and to achieve sustainable growth.

Building on the success of the watershed studies and plans undertaken by the City, it is recommended that the existing stormwater management standards established for the Stoney Creek and Byrne Creek watersheds be expanded and applied to other watersheds in the City. The adoption of a "Total" stormwater management plan for the City would provide a holistic approach to address urban runoff for all future development in the City.

The proposed "Total" system is to be guided by the following principles:

- Conforms to stormwater management principles previously adopted by Council,
- Provides flexible and cost effective solutions, and;
- Develops stormwater management requirements with respect to fisheries, erosion, flooding and infrastructure capacity needs.

### 3.2 Key Components of the Plan

The proposed "Total" stormwater management system is comprised of five key building blocks which are described as follows:

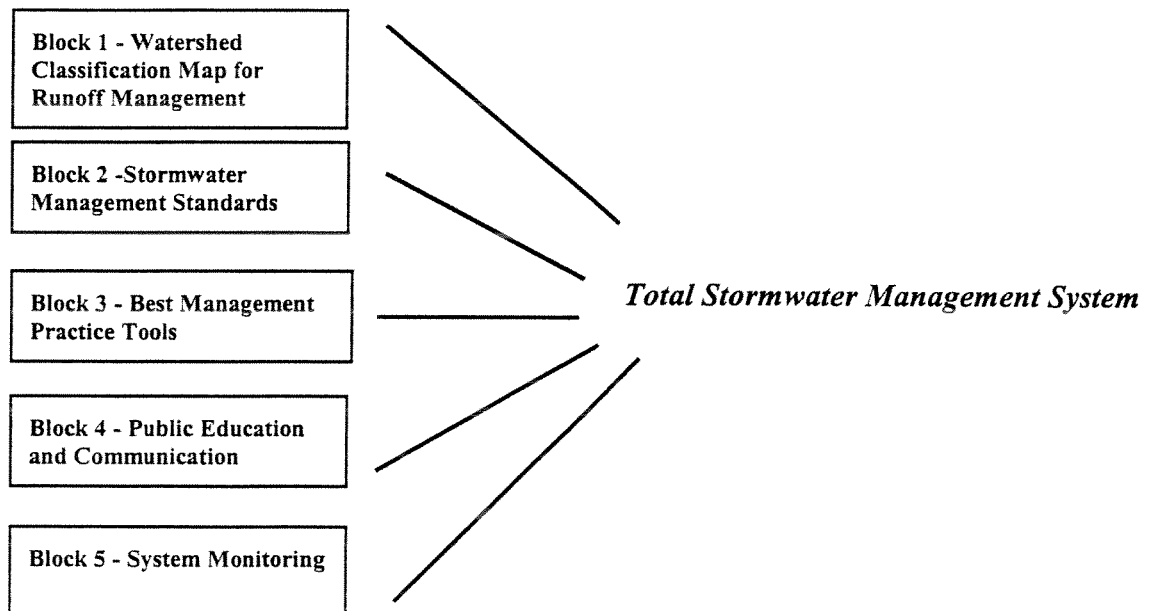


Figure 1. Building Blocks of the "Total" Stormwater Management System

**3.2.1 Building Block 1 - Watershed Classification Map for Runoff Management**

This block comprises of a risk based management strategy whereby each watershed in the City is classified within three categories based on the level of concern and existing records related to flooding, erosion, infrastructure capacity and fisheries significance with respect to runoff volume. The classification focuses on whether improved stormwater flow management would control or mitigate these concerns. For the past several months, Engineering and Planning staff have jointly reviewed all currently available data and known records to produce a classification map which is included in Appendix A attached. It is expected that the classification map will be updated as needed when more data is collected and watershed conditions change in the future. A summary of the watershed classification system is provided in Table 1.

Watershed Classification for Runoff Management	Flooding, Erosion, Infrastructure Capacity and Fisheries Concerns Related to Stormwater Runoff
A	High
B	Medium
C	Low

*Table 1. Watershed Classification*

**3.2.2 Building Block 2 - Stormwater Management Standards**

This block comprises of stormwater management standards for incorporation into development project design to mitigate the impact of post development flow on the receiving streams. The proposed standards are based on those adopted for the Stoney Creek Integrated Stormwater Management Study and have been expanded for a broader application in the City.

Subject to Council approval of the proposed plan, the level of stormwater management standards to be applied to the development projects would be established in accordance with the watershed classification map. In general, the standards would be prescribed on the basis of the following concepts:

- Class A watershed: Provide stormwater management up to the 5 year frequency storm standards for water quantity and quality enhancement;
- Class B watershed: Provide stormwater management up to the 2 year frequency storm standards for water quantity and quality enhancement;
- Class C watershed: Stormwater management is not required but on site best management practices such as infiltration swales and use of permeable surfaces are recommended for general water quality enhancement.

Although it may be desirable to implement stormwater management measures for all development projects in Classes A and B watersheds, their application in development sites with an area smaller than 0.4 ha (1.0 acre) is challenging and at times impractical, due to site constraints and limited management options available. Therefore, the proposed standards would be applied to development projects with a total site area of 0.4 ha (1.0 acre) or larger. Smaller sites (less than 0.4 ha) will be encouraged to incorporate best management practices to address stormwater flow and quality where feasible. The overall impact on the watershed from small scale development should be addressed through the City's integrated stormwater management study for the watersheds.

### **3.2.3 Building Block 3 - Stormwater Best Management Tools**

The proposed "Total" stormwater management approach is an integrated total concept that contains many interchangeable components that may be selected and designed specifically for each project application. To satisfy the stormwater management standards as described in building block 2 above, the development project designer may choose the appropriate stormwater management features from the following list of recommended best management tools :

- sediment trap and basin
- detention/retention pond
- infiltration trench/swale
- biofiltration feature
- underground storage tank
- green roof structure
- impervious area reduction
- stream corridor

It is noted that the implementation of the above management tools may add extra cost to the development project. However, experience has also shown that an efficient site layout plan incorporating multi-purpose use features and alternate landscape design can minimize the additional servicing cost in connection with the stormwater management requirement. Furthermore, the provision of on-site stormwater management control work can often avoid or minimize off-site downstream drainage improvement cost that may be required otherwise. Staff are cognizant of the development needs in the City and will work with the development community to maintain affordable development while meeting the environmental sustainability goals.

#### **3.2.4 Building Block 4 - Public Communication and Education**

The purpose of this building block is to inform the public and the development community of the importance of stormwater as a resource and as a habitat, and the need to provide better management of the resource and the receiving environment. Information pamphlets describing the details of the "Total" stormwater management system, standards and management tools would be prepared. Workshops for staff and the public would be arranged as needed to facilitate the plan implementation process and to seek feedback on the standards and their performance and effectiveness. A manual for developers will also be prepared outlining design, monitoring and maintenance requirements.

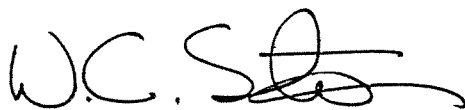
#### **3.2.5 Building Block 5 - System Monitoring**

The purpose of this building block is to evaluate the effectiveness and performance of the plan with respect to the program objectives. Research project partnerships with advanced learning institutions will be explored to conduct post implementation monitoring and data collection to evaluate and compare the effectiveness and benefits of the standards and alternative management tools. Results of the monitoring program will be used to shape and refine future stormwater management policies and practices towards achieving the sustainable growth goal.

#### 4.0 CONCLUSIONS

The purpose of this report is to present the strategy for a holistic stormwater management approach in the context of environmental protection and stream preservation for approval by Council. The proposed management direction is based on a "Total" stormwater management approach which is a consolidated product of the guiding principles previously adopted by Council that are expanded for a broader City wide application. The proposed direction crystallizes the drainage basin approach initiated in 1995 and provides a comprehensive stormwater management policy for development projects.

Studies completed in the recent years such as the Stoney Creek, Byrne Creek and Brunette Basin watershed plans have given the City an excellent opportunity to progressively develop the detailed building blocks towards creating a balanced stormwater management plan that will provide effectively managed urban runoff while accommodating growth and development. Given Council's commitment to protecting the waterways in Burnaby and to improving urban runoff management, it is recommended that the City wide watershed based "Total" stormwater management approach as outlined in this report be adopted.



W.C. Sinclair, P.Eng.  
DIRECTOR ENGINEERING

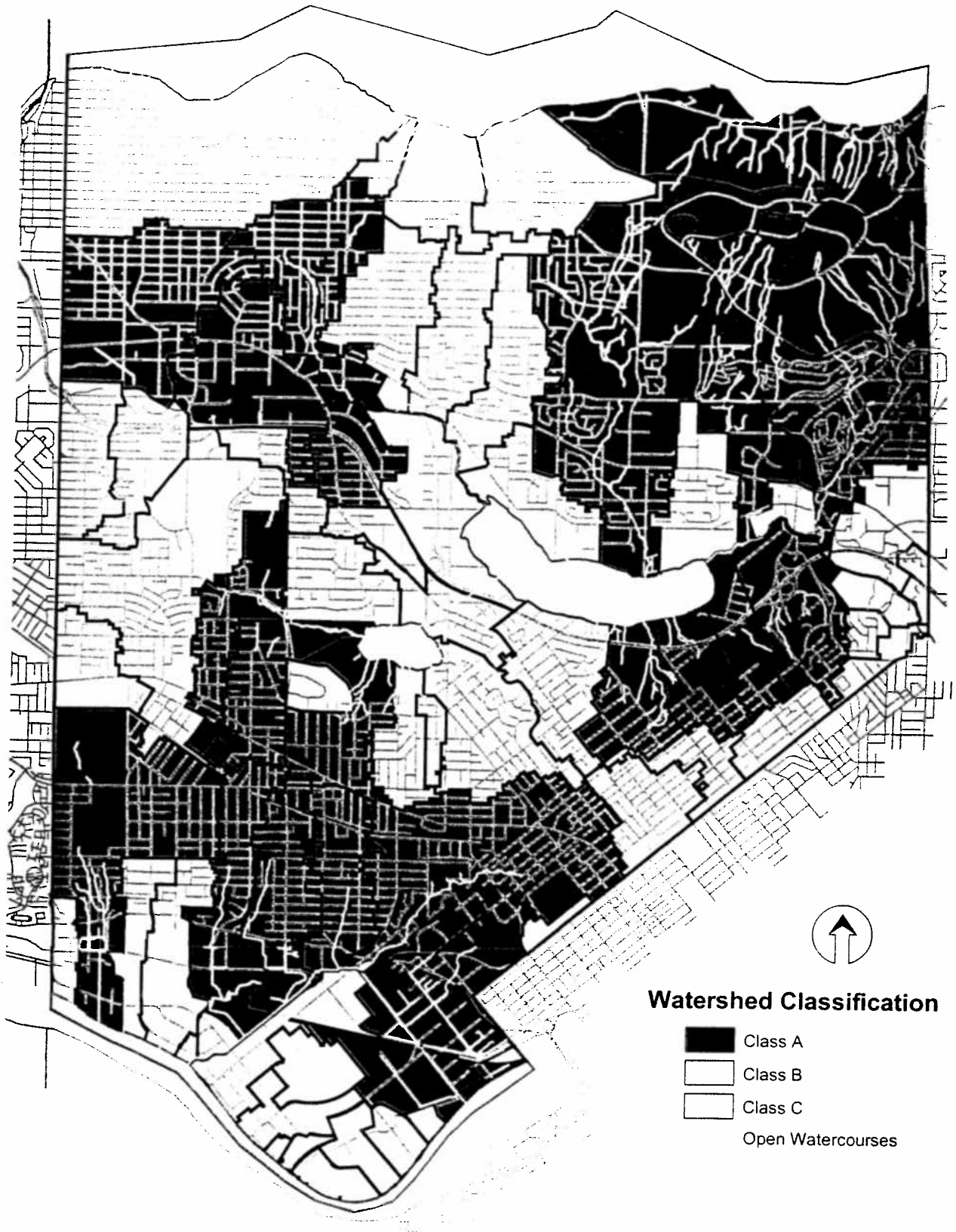


J. Belhouse  
DIRECTOR PLANNING & BUILDING





LSC:dh  
Attachment

cc: City Manager  
Director Parks, Recreation and Cultural Services





**Watershed Classification**

-  Class A
-  Class B
-  Class C
-  Open Watercourses

**Watershed Classification:  
Stormwater Flow Management**

June 2003

