City of Burnaby

Meeting 2014 March 24

COUNCIL REPORT

ENVIRONMENT COMMITTEE

HIS WORSHIP, THE MAYOR
AND COUNCILLORS

SUBJECT: DRAFT SOUTH SLOPE INTEGRATED STORMWATER MANAGEMENT PLANS

RECOMMENDATIONS:

1. THAT Council receive the draft Integrated Stormwater Management Plans (ISMPs) for Byrne Creek and Kaymar Creek.

2. THAT Council approve, in principle, the visions, strategies and the recommended plans for Byrne Creek and Kaymar Creek watersheds.

3. THAT Council authorize staff to finalize the reports and incorporate the recommended action items, where appropriate, into the City's infrastructure and community plan development process.

4. THAT Council forward a copy of this report to all members of the stakeholder consultation group who provided input into development of the proposed plan.

REPORT

The Environment Committee, at its meeting held on 2014 February 11, received a staff report providing an overview of the principles, elements and recommendations of the draft integrated stormwater management plans for Byrne Creek and Kaymar Creek watersheds in South Burnaby. The Committee TABLED the report pending a review by the Byrne Creek Streamkeepers.

The Byrne Creek Streamkeepers reviewed the report and provided their input. At the 2014 March 11 meeting, the Committee LIFTED the *attached* report and adopted the recommendations contained therein.

Respectfully submitted,

Councillor D. Johnston
Chair

Councillor A. Kang
Vice Chair

Councillor N. Volkow
Member

Copied to:	City Manager Director Engineering Director Planning & Building Director Parks, Recr. & Cult. Services Chief Building Inspector

City of Burnaby

Item .....
Meeting .....2014 Feb 11

COMMITTEE REPORT

TO: CHAIR AND MEMBERS ENVIRONMENT COMMITTEE **DATE:** 2014 February 05

FROM: DIRECTOR ENGINEERING **FILE:** 31000 - 40

SUBJECT: **DRAFT SOUTH SLOPE INTEGRATED STORMWATER MANAGEMENT PLANS**

PURPOSE: To provide the Committee and Council with an overview of the principles, elements and recommendations of the draft integrated stormwater management plans for Byrne Creek and Kaymar Creek watersheds in South Burnaby.

RECOMMENDATIONS:

1. **THAT** the Committee recommend that Council:

   a. Receive the draft Integrated Stormwater Management Plans (ISMPs) for Byrne Creek and Kaymar Creek;

   b. Approve, in principle, the visions, strategies and the recommended plans for Byrne Creek and Kaymar Creek watersheds;

   c. Authorize staff to finalize the reports and incorporate the recommended action items, where appropriate, into the City's infrastructure and community plan development process; and

   d. Forward a copy of this report to all members of the stakeholder consultation group who provided input to development of the proposed plan.

REPORT

1.0 BACKGROUND

Based on the commitments made under the municipal component of the regional Integrated Liquid Waste and Resource Management Plan (ILWRMP), the City of Burnaby (the City) is developing Integrated Stormwater Management Plans (ISMPs) for all its watersheds. Throughout the last decade, the City has made significant progress towards achieving better storm water management and creating a healthier environment for all. ISMPs have been developed for the Still Creek, Stoney Creek, and Brunette watersheds, and many initiatives and action plans have since been advanced and incorporated in the development of land use and engineering infrastructure plans.

City initiated ISMPs in the South Slope Region include Byrne Creek and Kaymar Creek (see *attached* figures) were considered concurrently because the two watersheds share many of the same characteristics. Both watersheds are highly urbanized, with single family residential, commercial, light industrial and agricultural land uses. The watersheds are hosts to Coho salmon and cutthroat trout as well as other fish species. They are both important wildlife corridors and recreational amenities for the community.

Byrne Creek ISMP was developed over a three (3) year period beginning in 2007, led by the City, and informed by an interdisciplinary consultant team and input from stakeholders. Three formal public open house and stakeholder meetings have been held to present the study, its goals and strategies and the draft report. A broad cross section of open house and workshop attendees including stream riparian owners, residents in the watershed, environmental stewardship groups, business owners and developers have attended the meetings and provided valuable input. In addition, informal communication with community stakeholders was ongoing over the length of the project. Comments and suggestions received through the public process were included, where appropriate, in the draft report. The Kaymar Creek ISMP was developed over a three (3) year period beginning in 2009. Although community input was sought out through a variety of media outlets, it did not generate the same community interest as Byrne Creek did and had no external workshops.

The South Slope watersheds are going through another phase of rapid redevelopment including the Metrotown Town Centre and the Edmunds Town Centre. Without a holistic approach, the redevelopment can place pressure on a fragile watershed environment leading to further flooding and environmental impacts. With this in mind, it is important to define how development can proceed with minimal impacts to the receiving environment. The South Slope ISMPS developed with staff, in consultation with watershed stakeholders, outlines plan and strategies to follow as the South Slope watersheds redevelop.

The ISMP process strives to preserve watershed health as a whole, while meeting community needs and allowing development and redevelopment to occur. This report summarizes the issues facing the watersheds as well as recommended strategies and approaches and seeks Council's

approval in principal. Copies of the Byrne Creek and Kaymar Creek ISMP reports have been made available in through the Clerk's Department for review.

2.0 DRAFT SOUTH SLOPE ISMPS OVERVIEW

The Byrne Creek watershed (906 ha) includes tributaries Gray Creek (formally Nelson), Frogger's Creek and John Matthews Creek. Byrne Creek flows south from headwaters in the Edmonds and Royal Oak Town Centres, joining the Fraser River in the Big Bend area.

The Kaymar Creek ISMP study area includes adjacent creek systems: Kaymar Creek, Boundary Creek, Glen-Lyon Creek (also called Patterson Creek), and Sussex Creek. Kaymar Creek and adjacent creeks flow south and drain into the Fraser River at separate points of discharge.

The scope of the ISMPs included:

- Assessing the existing condition of the drainage system and the ecological health of the watershed;
- Determining how development can proceed with minimal effects on flooding, erosion, water quality, and ecological health;
- Identifying required remedial and new capital work items; and
- Providing a sustainable plan with minimal operational and maintenance costs.

The overall goal of the ISMPs is to protect and enhance the health and resilience of ecosystems within the watershed while allowing for community development in accordance with existing strategic City plans.

2.1 Watershed Issues

Urban watersheds undergo profound changes to natural watershed conditions by altering the terrain, modifying the vegetation and soil characteristics, and introducing pavement, buildings, drainage, and flood control infrastructure. Hydrologic and geomorphic impacts are closely associated with an increase of impervious area resulting from urban development. Reported impacts have included: increased frequency of flooding and peak flow volumes, decreased base flow, increased sediment loadings, changes in stream morphology, increased organic and inorganic loadings, increased stream temperature, and loss of aquatic/riparian habitat. The consulting work carried out in support of the Byrne Creek ISMP and Kaymar Creek ISMP identified several concerns regarding the health of these watersheds that are commonly associated with urban watersheds:

1. **Capacity Issues:** Flooding and storm sewer surcharges are currently present in areas where stormwater infrastructure is under-sized. Flooding levels and frequency for both existing and future development conditions can be addressed with recommended storm sewer and culvert upgrades and revising stormwater runoff criteria.

2. **Increased Impervious Areas:** Historic development and redevelopment have increased impervious area in the watershed resulting in increase in rainwater runoff. The increased runoff contributes to flashy peak flow events and can exacerbate active erosion areas. The rate of in-stream erosion can be reduced through the use of source controls, a revised stormwater criteria focussing on volumetric reduction of stormwater runoff and revisiting allowed impervious lot areas in the zoning bylaw.

3. **Sediment Deposition:** Ongoing active erosion sites upstream cause sediment to be deposited downstream requiring regular maintenance to remove sediment. The contributions of sediments from developed areas to lowland areas can be minimized by upstream source controls, erosion site remediation, sediment removal ponds and treatment BMPs.

4. **Low Flow:** Decreased groundwater baseflow into stream in summer months. The objective of maintaining summer base flows in the creeks at or above 2007 levels (the monitoring baseline) as a minimum can be accomplished through restrictions on impervious lot areas and with the use of source controls.

5. **Water Quality:** Both point source and non-point source pollutants contribute to water quality concerns. Kaymar and Byrne watersheds currently score low ecological health ratings based on benthic invertebrate scores. In specific cases, water quality issues have been the cause of several fish kills have previously occurred within Byrne Creek watershed. Water quality from non-point sources can be improved through the medium and long term implementation of stormwater source controls. The consequence of point source water quality impairment can be reduced through the construction of multi-use wetland facilities and continued education and outreach efforts to the community.

6. **Ecological Integrity:** Currently areas of sparse riparian vegetation and forest cover result insufficient shade, erosion protection and/or increase in invasive species. These areas can be addressed through restoring and enhancing riparian corridor, floodplain forest and wetlands and increasing watershed forest cover. Mitigating hydrologic impacts from development also enhances the overall stream and ecosystem health over time through source controls and the adoption of new stormwater criteria.

2.2 Proposed Strategies for the South Slope Watersheds

The Byrne Creek ISMP and Kaymar Creek ISMP include many possible strategies which will be further assessed by staff with respect to other corporate priorities. The elements that are of highest priority and meeting the financial and infrastructure requirements will be included in the future City Financial Plan discussion process. The implementation of the South Slope ISMPs include short-term, medium-term, and long-term initiatives. The Byrne Creek and Kaymar Creek ISMPs strive to resolve the above issues through the following strategies to facilitate the achievement of the watershed goals:

1. **Update of Stormwater Management Criteria**

   This action is echoed in ILWRMP action 1.1.20 requiring municipal on-site rainwater management bylaws and policies to meet criteria established in integrated stormwater plans.

   The primary method of attaining the watershed goal of mitigating the hydrologic impacts of future developments and achieving a "net-gain" of watershed ecological health is to manage rainwater at the land use point through the use of land use source controls in order to reduce the volume of runoff leaving the site as well as improving the water quality that is discharged to the receiving environment.

   The current Total Stormwater Management Policy, adopted in 2003, applies varying criteria to developments based upon classification of watercourses to which stormwater runoff is conveyed. The existing criterion addresses stormwater management from a quantity and flow perspective, but does not specifically addresses water quality. The 2003 criteria is applied to multi-family and commercial development sites of 0.4 ha (1.0 acre) and larger. However, single-family housing and associated local roads and lands cover a significant portion of the Byrne Creek watersheds (24% and 18% respectively with a similar land use distribution in Kaymar Creek watershed) and its gradual redevelopment will have a large impact on the water quality and quantity generated if not addressed. It is important to mitigate the impacts of single-family housing at the same time as other land uses.

   A separate detailed report outlining *Stormwater Management Criteria* and *Rainwater Source Controls* will be brought further at a later date detailing the requirements to update bylaws and policies for each land use designation and the resource allocation necessary to implement the stormwater management criteria. Rainwater source control requirements as well as approval and review procedures will be developed in collaboration with the Planning and Building Department.

2. **Creation of a Stormwater Monitoring Program**

   This action is required to address the BC Ministry of Environment (MOE) Condition 7 of the ILWRMP. This Condition states that municipalities are required to develop a coordinated program to monitor stormwater, and to assess and report the implementation end effectiveness of ISMPs. In addition to this program other water quality actions identified include:

   - Updating bylaw to require individual spill prevention and response plans for all commercial and industrial sites;
   - Tracking commercial/industrial chemicals/operations for spill prevention compliance; and
   - Having continued monitoring of water quality to address point and non-point sources of contamination and fish kills.

While the City currently conducts water quality monitoring to address specific issues, the Stormwater Monitoring Program is a comprehensive approach to reflect changes to stormwater due to land use changes and will allow application of adaptive management principles. Engineering staff are currently developing a framework for a Stormwater Monitoring Program for watersheds that includes water quantity and quality monitoring.

3. **Capital Works Program and Environmental Enhancement Opportunities**

The existing condition of the drainage system and the ecological health of the watershed were assessed allowing the development of a robust and complete capital works program. High priority works within the next five years including storm sewer and culvert upgrades, mid-range flow diversions, rehabilitation of severe erosion sites, lowland sediment removal/water quality treatment facilities, and multi-use spill containment/natural wetlands. If the land use specific source controls identified as the new stormwater management criteria are not adopted, the capital works program associated with sewer capacity upgrades will be significantly higher in order to manage stormwater runoff generated by the land uses in the watersheds.

Priority riparian and in-stream enhancement projects have been identified including areas to reduce channelization, daylighting streams where appropriate and constructing instream complexing and of-channel habitats. These projects could be undertaken when compensation works are required, when development opportunities arise or as part of the capital works program.

Staff will prioritize and integrate the projects identified in the South Slope ISMPs with the projects identified in other ISMPs currently in process as part of the overall capital works program as appropriate. These projects will be brought forward to Council as part of the city-wide capital works program for watersheds in 2014.

Some of the enhancement opportunities that have been completed to date include:

- Byrne Creek at BC Parkway crossing upgrade to fish ladder to remove barriers that impede fish passage for juveniles (2013)
- Byrne Creek at Stride and 17th was daylighted through redevelopment
- Watling Street design demonstration project integrated pervious asphalt and roadside swales to showcase alternative street edge treatments to traditional curb and gutter finishing (2012)
- John Matthews Creek stream stabilization, channel and habitat restoration (2012)

Future works already integrated into capital works plan include:

- Exploration of removing additional barriers that impede fish passage in Byrne Creek
- Exploration of channel stabilization at active erosion site on Gray Creek

- Environmental enhancement opportunities in conjunction with Fraser Foreshore dyking upgrades as identified in the Kaymar Creek ISMP

4. Watershed Operations and Maintenance

Current ongoing operation and maintenance efforts includes sediment/debris removal from Byrne, Gray, and Frogger's sediment ponds and John Matthews Creek at culvert inlet as needed as well as routine culvert inspections. In addition, instream erosion stabilization efforts are addressed on an issue response basis. Both Byrne and Kaymar ISMPs recommend the introduction of a comprehensive program for erosion and sediment management to optimize efforts and retain natural stream integrity. In 2013 staff initiated a consultant to complete an inventory of erosion 'sites of interest' as a first step in developing this program.

5. Monitoring and Reporting Requirements

ISMP performance will be monitored with the Stormwater Monitoring Program outlined above and stormwater approaches will be adapted as needed to meet the watershed goal of net gain in ecological health. The City will continue to report to the BC Ministry of the Environment on ISMP implementation progress as required by the ILWMP. The South Slope ISMPs will be re-assessed in twelve years as required by the ILWRMP.

6. **Continued Community Outreach, Collaboration and Education**

As in the past, staff will continue to meet with Byrne Creek Streamkeepers, Kaymar Streamkeepers and other applicable stakeholders to update them on various annual capital projects in the South Slope watersheds. In addition, staff will deliver education programs to increase public awareness of the importance of improving the ecological health of the watersheds.

3.0 CONCLUSION

Since 2007, Burnaby and community stakeholders have been working together to develop an ISMP for the South Slope watersheds that will provide a long term vision for the Byrne Creek and Kaymar Creek watersheds and its stream system integrating the drainage, environmental and recreational values. The reports are now complete and will be used to guide future policies and programs development with the goal of creating a sustainable watershed and protecting the environment and properties through better storm water management practices.

The South Slope ISMP reports contains many possible action items which will be further assessed with respect to other corporate priorities. The action items will be prioritized and included in the City's financial and infrastructure discussion and Council approval process in the future.

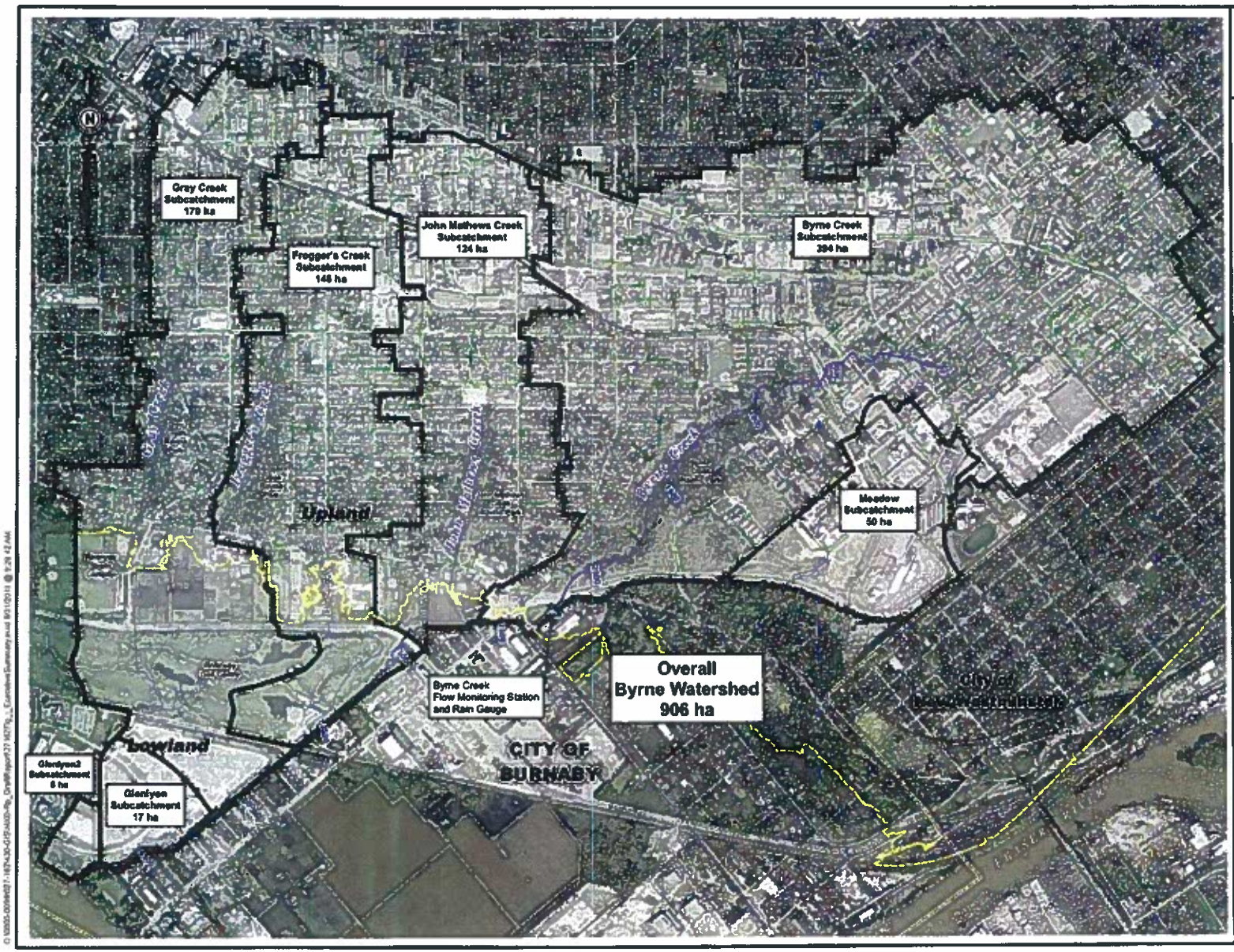
Staff recommend that the committee and Council give approval in principle to the vision, strategies and the recommended plan as outlined in the Byrne Creek and Kaymar Creek ISMP reports. Staff will finalize the report based on input from the Committee and Council and incorporate the report recommendations where appropriate, in the future development and infrastructure improvement programs.

Leon A. Gous, P. Eng., MBA
DIRECTOR ENGINEERING

KC/DD/ac

Attachment

cc: Director of Planning and Building
Director Parks, Recreation and Cultural Services
Chief Building Inspector
City Clerk



City of Burnaby
Byrne Creek ISMP

Legend

- Major Catchment Boundary
- City Boundary
- 1m Contours
- Lowland Boundary
- Watercourse
- Storm Main

See Figure 5-5 for Byrne Creek profile

REFERENCE

Topographic data and 2008 orthophoto provided by The City of Burnaby.

Fraser River Design Flood HGL 3.1 m.

KERR WOOD LEIDAL CONSULTING ENGINEERS

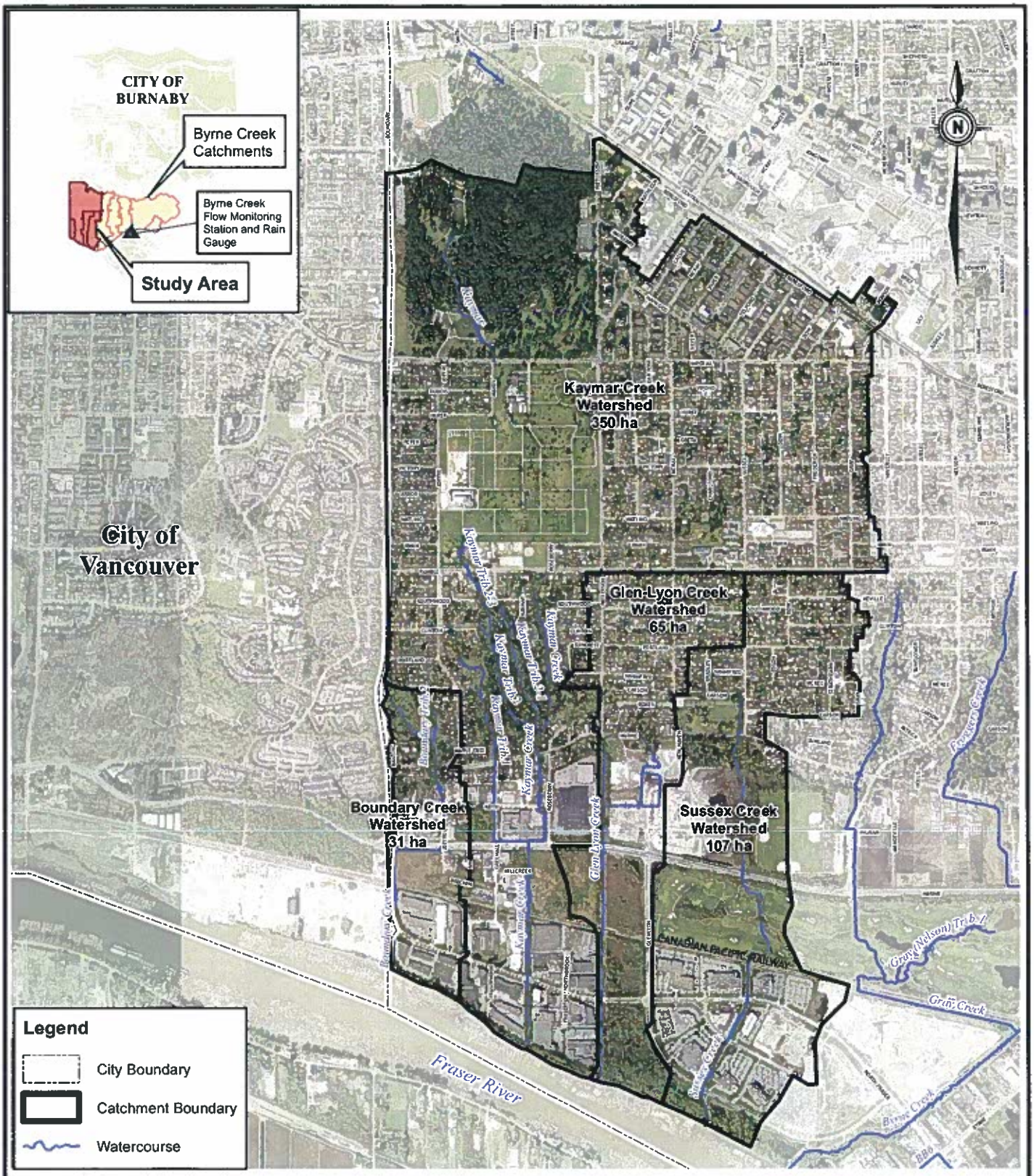
300 0 300

Scale in Metres 1:15,000

Project No	Date
27-162	August 2011

Byrne Creek Watershed Drainage Overview

Figure i



City of Burnaby 2008 Airphoto

KERR WOOD LEIDAL
consulting engineers

City of Burnaby
Kaymar Creek ISMP

Project No.	Date
27-186	April 2013

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2008 Airphoto of Watersheds

Figure 1-1

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