One Introduction

1.A The Surface Water Utility

Kirkland's Surface Water Utility was formed in 1998. The purpose of the Surface Water Utility is to operate and maintain the City's surface water system. This includes both built systems such as pipes and catch basins, and natural systems such as streams and lakes. The Surface Water Utility's projects and programs protect public interests by providing services for three basic areas: flooding, water quality, and aquatic habitat.

1.B Surface Water Master Plan Goals, Overview, and Organization

The overriding goal of this plan is to recommend focus and direction for the next 6 years of Surface Water Utility operation. To reach this endpoint, the plan leads the reader through the following questions and proposals:

- What has happened in the past, and where are we?
- What are current trends and issues in surface water management?
- What are existing conditions and problems in Kirkland's watersheds?
- What are recommended Surface Water Utility and strategies?
- Describe work in each program that follows from the recommended approaches.
- Check that the current rate structure and funding level will support program activities over the next 6 years.
- Propose tools that will be used to measure and track program implementation and effectiveness.

Chapter I of this document contains background information and goals and objectives for the plan. Chapter II describes trends, issues, and constraints that will influence the Surface Water Utility's direction over the next 6 years. Chapter III gives an overview of existing conditions and problems in Kirkland's watersheds. An overall implementation strategy, goals, and recommended approach to the three Surface Water Utility service areas are described in Chapter IV. Chapter V includes specific work that will need to be done in each program that follows from the recommended approaches to the three service areas. Chapter VI describes Surface Water Utility funding needs based on the proposed programs, and Chapter VII describes performance measurement methods that will be applied to the Surface Water Utility.

Supporting studies and documentation are included as the following appendices:

A Public Opinion Survey Results

B Development/Redevelopment Analysis

C HSPF Analysis of Forbes and Juanita Creeks

D Water Quality Monitoring and Index of Biological Integrity (B-IBI) Data for Forbes and Juanita Creeks

E RNA analysis (fecal source tracking) plan

F Stream Inventory and Habitat Evaluation Report

G Conceptual Design and Cost Estimates for Surface Water Capital Improvement Projects

H Prioritization Criteria for Surface Water Capital Improvement Projects

I Streambank Stabilization Project Priority Scoring

J Comparison of Required Flow Control Volumes under requirements of the 1998 and 2005 King County Surface Water Design Manuals

K Preliminary Scopes and Budgets for New Program Elements

L Complex Creek Care grant proposal

M Dry Weather Sampling Plan

N Parametrix Review of Water Quality Monitoring Program

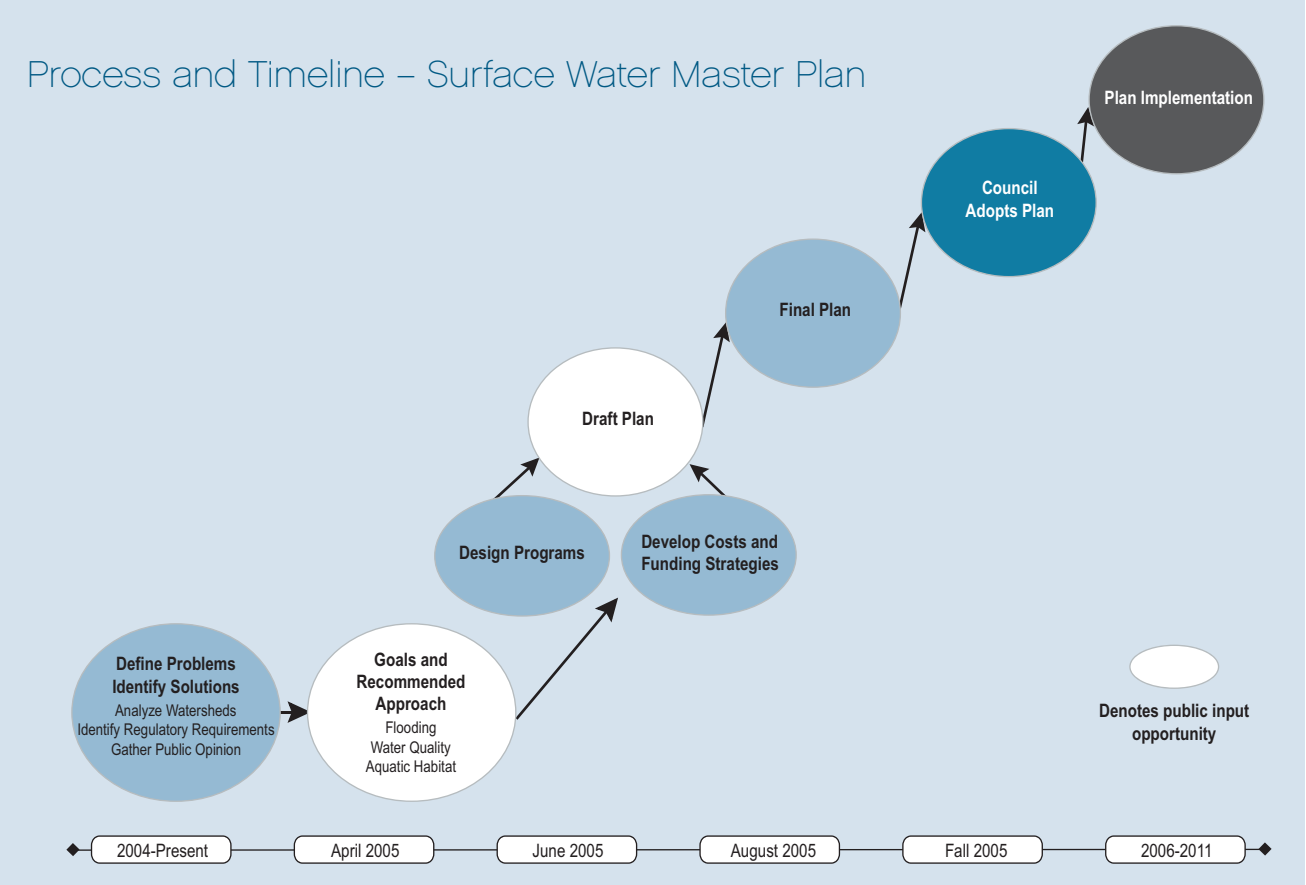
O Financial Analysis – Technical Analysis and Issue Papers

1.C Need for an Updated Plan

There are three basic reasons for undertaking creation of a new surface water master plan at this time. First, as detailed below, much of the work recommended in the 1994 plan has been completed. Because surface water management efforts often take several years to yield results, it is important to maintain a set of long-term goals and to examine funding that will be required to meet those goals. Second, the regulatory environment and approach to surface water management have changed in fundamental ways in the last 10 years. Third and finally, the City of Kirkland's priorities have shifted, as expressed in the City's Comprehensive Plan, which was updated in 2004.

1.D Process for Development and Review of Plan

The following process will be used in development of the surface water master plan as shown in Figure I.1:



Surface Water Utility staff and consultants used the following process to update the surface water master plan, as shown in Figure I.1:

- Develop the draft surface water master plan. City staff conducted land use analysis and identified known flooding, water quality, and aquatic habitat problems. Parametrix, a consultant to the City, used extensive technical analyses and a public opinion survey to develop potential solutions to these problems. City staff and Parametrix then worked together to develop the recommended programs and cost estimate. The Financial Consulting Solutions Group Inc., another consultant to the City, then provided analysis of financial needs based on the recommended program.

- Gather input on the proposed goals and recommended approach at a public meeting on April 18, 2005.
- Present the plan overview to the following commissions, teams, and groups that could be affected by the plan in spring/summer 2005:
  1. Natural Resources Management Team
  2. Planning Department Staff
  3. Neighborhood Associations
  4. Park Board
  5. Houghton Community Council
- Present the draft plan for discussion at the City Council meeting on September 6th, 2005.

Incorporate changes and comments from the public review process and the City Council, then present the final plan to the City Council for adoption in late fall 2005 (date to be determined).

1.E What was achieved with the last master plan?

Surface Water Utility Established

The quality of the city's water resources has improved as a direct result of formation of the Surface Water Utility, which occurred in 1998. The City's last surface water master plan was completed in 1994 and set the course for the Surface Water Utility's formation and initial program focus.

Surface Water Utility formation provided a steady and increased source of funding, which allowed for expansion of existing maintenance programs and creation of engineering programs to focus on capital construction, public education and outreach, development review, code enforcement and technical assistance, policy analysis and regulatory compliance, and monitoring and research. This plan will build on the initial work in each of these programs.

Program Accomplishments

The overall Surface Water Utility work program outlined in 1994 had the following objectives:

- Continue and expand the annual maintenance program.
- Conduct planning and engineering activities:
  - Develop new laws and regulations to meet state and federal requirements.
  - Provide public involvement and education opportunities.
  - Conduct water quality monitoring.
  - Conduct special engineering studies.
  - Inventory surface water infrastructure.
  - Coordinate overall Surface Water Utility work program with the Capital Improvement Program (CIP) and other Public Works Department activities.
- Develop and implement CIP projects to address identified problems.
- Develop a secure source of funding for surface water activities.

Table I.1 (the following pages) details how each objective has been met. Table I.2 shows the CIP project list from the 1994 plan and whether the project has been completed, is still in process, or has been modified or dropped. In summary, the 1994 plan recommended a new emphasis on engineering and capital improvement that would complement the ongoing surface water maintenance activities.

TABLE I. 1 Objectives of 1994 Surface Water Master Plan

Objective	Program, Project or Regulation	Actions	Outcome
Continue and expand annual maintenance program	Program	• Clean all catch-basins once per 3-5 years • Clean all pipes once per 5 years • Inspect all publicly owned detention and water quality treatment systems once per year and clean as needed • Replace/repair drainage structures as needed to prevent flooding and water quality problems • Emergency cleanup of spilled/dumped materials in drainage system • Monitor "hot spots" during large storm events to prevent flooding	Decreased flooding, decreased discharge of sediment and pollutants to streams and lakes
Develop new laws and regulations to meet State and Federal Laws	Regulation and program	• Chapter 15.52 of the Kirkland Municipal Code rewritten in 1999 to meet requirements of the Puget Sound Water Quality Management Plan (see Chapter 2) for details • Regulatory and policy analysis to evaluate need for further laws and regulations is on-going	Increased ability to control quantity and quality of runoff from new and re-developing sites, increased ability to require use of pollution prevention techniques and cleanup of spilled/dumped materials, decreased liability under State and Federal water quality protection laws
Develop inventory and maps of drainage system	Program	GIS database and maps of public system completed in 2003, maintenance and updates on-going	More efficient location of problems, basis for developing condition rating system for built facilities, and facilitates analysis of drainage system
Provide public involvement and education opportunities	Program	• Provide broad range of education and outreach activities including natural lawn care, salmon watcher program, storm drain stenciling, volunteer monitoring, and volunteer restoration projects • Provide opportunities for public input in the surface water master plan, bi-annual CIP, and other items as appropriate	• Informed and involved citizens that change their behavior and attitude to protect water quality • Utility direction and focus in line with citizen priorities
Conduct water quality monitoring	Program	Water quality monitoring conducted in 2001-2003 on Forbes Creek and Forbes Lake, now will shift to Juanita Creek for 2 years. Index of biological integrity monitoring on-going at sites in Forbes and Juanita Creek watersheds	Information on status of local waters can help to focus water quality improvement efforts and prepares City to apply for grants and respond to regulatory requirements

TABLE I. 1 Objectives of 1994 Surface Water Master Plan *cont.*

Objective	Program, Project or Regulation	Actions	Outcome
Conduct special engineering studies	Program	Studies of specific drainage/water quality/habitat issues conducted as needed. Examples of recent studies include detention requirements for land draining to Forbes Lake, and Juanita Creek Stabilization study, as well as this surface water master plan	Information used to update development regulations, identify CIP projects, and focus water quality improvement efforts
Coordinate program with CIP program and other department activities	Program	Surface water staff identify and prioritize CIP projects, participate in development review, and coordinate education efforts with recycling/solid waste work. Extensive intra-departmental coordination also takes place, particularly with Planning and Parks departments and through the Natural Resources Management Team	More coordinated Public Works and City activities lead to more efficient and effective outcomes
Develop and implement a CIP program to address identified problems	Program	Initial CIP developed as part of '94 master plan. CIP has been continually updated since '94 based on shifting Council priorities and most pressing needs (see separate table for status of projects from '94 list)	Reduction of flooding and associated life safety concerns, and mitigation of water quantity, water quality, and habitat impacts of past development on streams and lakes
Develop a secure source of funding for surface water activities	Program	Surface Water Utility formed in 1998 to provide secure source of funds.	Secure funding allows for long range planning and for achievement of long-term improvement in watershed conditions

TABLE I.2 Status of CIP Projects from 1994 Surface Water Master Plan

= completed project or no longer an issue **= in progress** **= pending**

In addition to the above achievements, the 1994 plan set the stage for a greater awareness of surface water policy issues both within and beyond the City, and for coordination of surface water issues between departments.

Flooding and Fish Habitat

ID	CIP No.	Name	Complete	Year (completed or to start)	Comments
S-1	--	Forbes Lake Flooding (Lake Level Issues)	No	2003	2003 Lake level study determined that additional detention requirements for properties left to develop or likely to redevelop would have little impact on lake levels, and that retrofit to lower duration and magnitude of lake level rise is not feasible at this time. Most properties on the lake are now connected to sewer, lowering the urgency of addressing this problem.
S-2	SS-0047	Forbes Creek Lift Station Beaver Dam (Juanita Lift Station Improvements and Evaluation)	No	2004	Lift station removed
S-3	--	116th/Juanita HS Wetland Sedimentation	No Action	--	No known flooding caused by sedimentation – beaver dams are larger issue
S-4	--	116th Ave NE bioswale	Yes	1995	Swale has been raised
S-5	SD-0030	Juanita Creek at NE 129th St	Yes	2002	Woody debris, rock and plantings installed to stabilizize. May eventually want to replace culvert with a bridge.
S-6	SD-0017	Juanita Creek at NE 124th St	No	2003	Culvert at NE 122nd Street also replaced, and habitat improvements included as part of project.
S-7	SD-0018	Juanita Creek at NE 120th St	Yes	1999	2 undersized concrete culverts replaced with one appropriately-sized cmp arch culvert
S-8	SD-0022	NE 63rd Ravine Erosion	Yes	2001	High flow diversion still on CIP, may be eliminated pending detention at NW College and success of stabilization measures
S-9	SD-0021	NE 35th St/Lk Wa Blvd Culvert	No	TBD	See Problem CO-1 in CIP Program Section.
S-10	--	116th Ave NE Flooding	No Action	--	Culvert to be replaced by a bridge during Sound Transit improvements to 116th Ave NE. Flooding between I-405 and Totem Lake to be evaluated separately. Beavers in wetland between 116th Ave NE and Juanita High School may be contributing to problem.
S-11	SD-0025	Forbes Creek at 128th Ave NE/NE 85-87th Streets	Partial	2004-beyond	Detention of water from NE 85th Street to be installed as part of NE 85th Street Corridor Plan. Structure to bypass high flows around the stream channel installed by private developer.
S-12	--	Bridle Trails 128th Ave NE/NE 59th Drainage System	No	TBD	Small works capital project.
S-13	--	NE 80th/128th Ave NE Flooding	Yes		NE 80th Street Improvement Project addressed this problem

= completed project or no longer an issue = in progress = pending

ID	CIP No.	Name	Complete	Year (completed or to start)	Comments
S-14	--	NE 60th from 106th-104th Ave NE Flooding	Yes	1997	Trash rack installed on pipe inlet
S-15	--	NE 80th/131st Ave NE Flooding	Yes		NE 80th Street Improvement Project addressed this problem
S-16	See SD-0025	NE 95th/126th Ave NE Flooding	No	See S-11	Combine with S-11 detention on NE 85th Street will help with this problem.
S-17	SD-0020	Kirkland Ave/Slater Ave Drainage System	No	2005	Project to be combined with stabilization of downstream ravine.
S-18	--	Juanita Creek/93rd Ave NE Drainage System	No	2005	King County to reroute pipe during lift station replacement
S-19	--	NE 132nd/94th Ave NE pipe joints	Yes		King County pipe – KC Roads has been contacted
S-20	--	NE 126th Pl/94th Ave NE Erosion	Yes	1998	Trash rack installed on pipe inlet. Erosion of material from upstream ravine still an issue
S-21	SD-0024	BNSFRR/NE 85th Street Erosion	Yes	2001	Known as the Central Way Bridge Project
S-22	--	Costco Parking Lot Pipes 120th Ave NE at NE 90th St.	Yes	1997	Private problem fixed by private party
S-23	--	NE 132nd/104th-105th Pl NE Loop Rd Flooding	No Action	--	Substandard systems still exist, but are not causing flooding. Small works capital project.
S-24	SD-0028	Casa Juanita Culvert	No	2002	Culvert is in good shape and is fish passable; not an issue
S-25	--	122nd Ave NE NE 70th-NE 73rd Sts Flooding	Yes	various	Improvements required as part of private development projects – no further action needed
S-26	SD-0033	NE 90th/120th Ave NE Sedimentation	No	2005	Design in 2005, construction in 2006

Water Quality

ID	CIP No.	Name	Complete	Year (completed or to start)	Comments
WQ-1	--	Illicit Connections to storm drainage system	On-going	On-going	Illicit connections are removed as they are discovered, may need dry weather survey
WQ-2	--	Erosion, transport, deposition of sediment	On-going	On-going	See Erosion Control Inspection in Code Enforcement and Technical Assistance Program, and Private Streambank Erosion Program in CIP Program Section
WQ-3	--	Nonpoint Pollution	On-going	On-going	
WQ-4	--	Spills of solid and liquid materials	On-going	On-going	
WQ-5	--	Illegal Dumping	On-going	On-going	
WQ-6	--	Septic System Failures	On-going	On-going	Emergency Sewer Program SS-0056- installs sewer mains in areas with failing septic systems.
WQ-7	--	Animal Waste – duck farm and bridle trails	On-going	On-going	Duck farm has closed. Horses for clean water program in Bridle Trails conducted for 2nd time in 2005.
WQ-8	SD-0029	Totem Lake Water Quality	No	On-going	Some WQ improvements will occur with road improvements, private Streambank stabilization, and private development. Project moved to unfunded in 2002. Continue to scope options.

Environmental and Natural Resources					
ID	**CIP No.**	**Name**	**Complete**	**Year (completed or to start)**	**Comments**
E-1	--	Wetlands Management	On-going	On-going	Natural Resources Management Team coordinating this issue
E-2	--	Lack of Riparian Buffers/Corridors (Juanita Beach Park)	On-going	On-going	Natural Resources Management Team coordinating this issue
E-3	--	Delta at mouth of Juanita Creek	No	TBD	Juanita Beach Park now under City ownership. Coordinate with Park Master Plan. Delta is not a fish passage issue.
E-4	--	Juanita Creek - weir downstream of driveway culvert near 120th Place NE is fish passage barrier	Yes	1998	Weir removed when channel reconstructed following 96-97 winter storm
E-5	--	Juanita HS/Springbrook Culvert Fish Barrier	No	TBD	Long-term plan to remove culvert, restore fish passage to JC behind Juanita High School

Current Utility Staffing, Organization and Budget

The Surface Water Utility operated on a budget of approximately $4 million in 2005. This budget funds maintenance equipment and engineering resources, a staff that includes seven maintenance workers and three engineers, and portions of the time of several accounting and GIS staff members who provide vital administrative assistance. Surface water CIP projects were funded at approximately $1 million per year, which came from the $4 million overall budget. Figure I.2 shows where Surface Water Utility employees fit within the overall structure of the Public Works Department.

Figure I.2 Kirkland Surface Water Utility Organizational Relationships

If you separate from the City prior to 7 years of participation for any other reason, you will forfeit the unvested portion of your City contributions, based on the vesting schedule.

Figure I.2