Council Meeting: 04/01/2014
Agenda: New Business
Item #: 11. a.

**CITY OF KIRKLAND**
**Department of Public Works**
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## MEMORANDUM

**To:** Kurt Triplett, City Manager

**From:** Pam Bissonnette, Interim Public Works Director
Rob Jammerman, Development and Environmental Services Manager
Jenny Gaus, Surface Water Engineering Supervisor

**Date:** March 3, 2014

**Subject:** Preview of the Surface Water Master Plan Update

## RECOMMENDATION:

This is an informational presentation on the Surface Water Master Plan Update (SWMP Update) prior to its release in April for public comment. This item was deferred from the March 18 Council meeting. The memo and attachments are unchanged from the March 18 Council packet. Council will have further opportunity for review and discussion at the July 1, 2014 Council Study Session, with final decisions including plan adoption planned for the August 5, 2014 Council meeting.

## BACKGROUND AND DISCUSSION:

### 1. Introduction

The Surface Water Utility (the Utility) is responsible for operation and maintenance of the City's surface water system with the goals of flood reduction, water quality improvement, and fish habitat improvement. The Utility supports achievement of overall City Council goals including economic development, public safety, and dependable infrastructure, and contributes to progress on the Council work program items of Totem Lake revitalization and development of the Cross Kirkland Corridor.

The City's Surface Water Master Plan sets priorities for the next 5-10 years of Surface Water Utility Operation. This plan was last updated in 2005 (see 2005 Surface Water Master Plan). The SWMP Update is currently underway, and will recommend a mix of programs and projects to incorporate new and updated state and federal regulations, Council goals, and community interests. In particular, this update will examine surface water needs in the neighborhoods of Finn Hill, Juanita, and Kingsgate/Evergreen Hill that were annexed by Kirkland in 2011. The final items included in the SWMP Update will be determined by:

- Requirements to meet State and Federal Regulations (primarily the NPDES Stormwater Permit)
- Public Input (see description below)
- Council decisions to balance priorities and rate impacts
- Evaluation of funding by the Surface Water Utility (screen applied to all projects/programs)

The SWMP Update has been in progress since approximately the beginning of 2013 and is scheduled to be brought to Council for consideration at a Study Session on May 6, 2014, and for Council adoption in June, 2014.

Public input has occurred via neighborhood meetings, Citywide Planning days, and a public meeting on the SWMP Update that was held May 1, 2013. The Finn Hill Neighborhood Alliance provided a detailed report that includes recommendations for programs and specific projects (Attachment A – FHNA Report Executive Summary). In addition, the draft SWMP Update will be released for public comment at the beginning of April, and comments will be solicited at a Community Planning Day to be held at City Hall on April 26th.

## 2. Existing Program

The Surface Water Utility provides operating programs and directs and funds construction of surface water capital projects. To provide a context in which to evaluate recommended additions, a summary of existing programs is shown in Table 1. The total Utility budget is $8.54 million per year excluding reserves. There are 27.5 FTE's that staff Utility functions.

**Table 1: Surface Water Utility Program Areas and Functions**

| Operating Program Area | Functions | Annual Cost (millions) |
|---|---|---|
| Maintenance | | $2.67 |
| | Public System Cleaning (pipes, ditches, catch basins, ponds, etc.) | |
| | Public System Inspection | |
| | Flood Response | |
| | Public System Repair and Maintenance | |
| | Spill Response | |
| | Street Sweeping (75% of total cost of program) | |
| | Tree Pruning and Management in Public Right of Way | |
| Customer Service | | $1.39 |
| | Education Outreach and Public Involvement | |
| | Development Review (costs partially recouped by permit fees) | |
| | Engineering/Environmental Permitting Support | |
| | Regulatory Compliance Coordination | |
| | Pollution Source Control | |
| | Watershed/Utility Planning | |
| | Urban Forestry (funded – staff in Planning Dept.) | |
| Capital Improvement | | $2.58 |
| | Surface water portion of transportation projects | |
| | Surface water capital projects (general, neighborhood drainage, streambank stabilization, replacement of aging/failing infrastructure) | |
| Administration | | $1.13 |
| | Supervision, accounting, billing, taxes, employee benefits, general administration of Utility and overhead | |
| Taxes | | $0.77 |
| TOTAL | | $8.54 |

## 3. Operating Program - Proposed Additions

Proposed additions to the operating program are divided into the following categories as shown in Table 2:

*Required*: Necessary to meet current regulatory requirements, or to protect public safety
*Option 1*: Strong interest from the community and meets Council interest or goal
*Option 2*: Recommended based on professional opinion of staff – would position the Utility well for anticipated future State and Federal requirements.
*Option 3*: Items that would position the Utility well for the future, but that could be delayed or funded as/when grant or other funding becomes available.

It is recommended that Council adopts a rate that provides for the "Required" items. Options 1, 2, and 3 can be considered as additions depending on Council's tolerance for rate impacts.

A sheet describing each proposed Operating Program in detail is included in Attachment B. The following summarizes items in each category:

*Required Additions*

The major driver of the required operations program additions is the National Pollution Discharge Elimination System Stormwater Permit[1] (the NPDES Permit), which requires that the City take specific actions to protect water quality. Roughly 60% of current operating costs are associated with Permit compliance. Failure to comply with the NPDES Permit could result in third-party lawsuits, fines or other penalties from the State, and ineligibility for grant funding. Many of the actions required under the NPDES Permit serve multiple functions, and it is likely that the Utility would undertake these actions in the absence of the Permit in order to meet the goals of reducing flooding, protecting water quality, and protecting fish habitat. For example, cleaning catch basins meets both a Permit requirement and helps to prevent flooding; and finding and eliminating cross-connections between the storm and sanitary sewer systems protects human health and fish habitat. The NPDES Permit is revised and re-issued every 5 years, and each re-issuance raises the bar for compliance, leading to increased costs.

A new NPDES Permit became effective on August 1, 2013. The "Required" items in Table 2 associated with the new NPDES Permit include changes to methods that may be used to look for and eliminate sources of pollutants, implementation of new stormwater design regulations and associated development review, review and update of land use codes to incorporate low impact development principles, and an increase in the required frequency of inspection and cleaning of the public stormwater system. This includes items CW-1 through CW-5 in Table 2.

Items not associated with NPDES but that are recommended as "Required" are:

Support of Pavement Overlay Program: Inspect and repair or replace stormwater system elements in locations that will have pavement overlay. This work helps to minimize pavement cuts in newly overlayed areas by addressing maintenance needs prior to the overlay. (item CW-6).

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[1] NPDES is the National Pollutant Discharge Elimination System, a Federal Permit system designed to eliminate sources of pollution that impact our Nation's waterways. In Washington State, the State Department of Ecology is the designated authority that writes NPDES Permits, including the Permit that applies to Municipal Separate Storm Sewers (MS4s) in Western Washington. Please see the City website NPDES Stormwater Permit or Ecology's website (Western Washington Phase II NPDES Municipal Stormwater Permit) for further details.

Increase in Fall Street Sweeping: Street sweeping during the "leaf drop" season in the fall helps to minimize localized flooding. This helps to increase public safety and minimize property damage by reducing the amount of standing water on roadways. (item CW-7)

Rent specialized equipment for system cleaning on Goat Hill: Goat Hill has narrow and winding streets that will not accommodate a regular eductor truck. Crews will need to rent smaller equipment in order to be able to clean the system to meet NPDES Permit requirements and to prevent flooding. Purchase of equipment to perform this function is included as an Option 3 item, but at a minimum rental expenses need to be incorporated into the budget. (item CW-8)

**Table 2: Surface Water Master Plan Update**

**Operating Program Recommended Additions**

| | Project Status | ID | Name |
|---|---|---|---|
| REQUIRED | Augmentation | CW-1 | Ditch maintenance |
| | New | CW-2 | Development Review Evaluation |
| | New | CW-3 | LID Code Scrub |
| | New | CW-4 | LID implementation and manual adoption |
| | New | CW-5 | LID maintenance |
| | Augmentation | CW-6 | Surface water support of overlay program |
| | Augmentation | CW-7 | Street sweeping |
| | Augmentation | CW-8 | Maintenance on Goat Hill - Equipment Rental |
| OPTIONAL 1 | New | CW-9 | Evaluation of incentives and Rebate programs |
| | New | CW-10 | Utility rate study |
| | New | CW-11 | Develop LID feasibility tools |
| | New | CW-12 | Incorporation of LID into City capital projects |
| | Augmentation | CW-13 | Stormwater facility inspection |
| | Augmentation | CW-14 | Service Truck |
| | Augmentation | CW-15 | Watershed Planning |
| | Augmentation | CW-16 | Spill response truck |
| | New | CW-17 | Proactively avoid TMDL (Reduce bacteria sources in Juanita Creek) |
| | Augmentation | CW-18 | City-specific water quality monitoring |
| | Augmentation | CW-19 | Beaver Management Policy |
| OPTIONAL 2 | New | CW-20 | Stream habitat and fish monitoring |
| | Augmentation | CW-21 | O&M CIP Consultation |
| | Augmentation | CW-22 | Environmental permitting for maintenance |
| | New | CW-23 | Property acquisition policy and priority areas |
| | Augmentation | CW-25 | Urban forestry and tree inventory |
| | New | CW-26 | Climate change evaluation |
| | Augmentation | CW-27 | Streamside restoration maintenance |
| | Augmentation | CW-28 | Noxious weeds and invasive plants |
| | New | CW-29 | Juanita Creek floodplain mapping |
| OPTIONAL 3 | New | CW-30 | Maintenance on Goat Hill - Equipment Purchase (Alternative to renting equipment included as "Required" item CW-8) |
| | Augmentation | CW-31 | Stormwater system rehabilitation catch-up |
| | New | CW-32 | Stormwater Pond Edibles |
| | New | CW-33 | Leaf pick-up program |
| | Augmentation | CW-34 | Poop scoop laws |
| | Augmentation | CW-35 | Volunteer use |

*Option 1 Items*
The items listed as Option 1 in Table 2 are recommended as first additions beyond the required items because they meet a community interest and Council goals.

- Surface water rates: Evaluate rate equity, and investigate use of Utility rates as a means of encouraging behavior change by providing rebates and incentives such as a "treebate" program. (items CW-9, CW-10)
- Low Impact Development: Provide tools that citizens and developers can use to evaluate LID feasibility and develop policies for incorporating LID into City projects. (items CW-11, CW-12)
- Maintenance Inspection Staff: Add 0.5 FTE and associated service truck to conduct annual and storm-related inspection of public stormwater facilities. (items CW-13, CW-14)
- Watershed Planning: Identify opportunities for providing regional flow control and water quality treatment, including low impact development facilities.(item CW-15)
- Water Quality: Purchase vehicle to assist with spill response, continue progress on finding and eliminating sources of bacteria in Juanita Creek, conduct water quality monitoring to assist in avoiding or reacting to Ecology Total Maximum Daily Load restrictions for temperature and dissolved oxygen, and begin monitoring the water quality of Totem Lake to support redevelopment plans. (items CW-16, CW-17, CW-18)
- Beaver Management Policy and Activities: Develop policy for when and how the City manages beaver activity, and provide budget for beaver relocation water-level management devices. (CW-19)

*Option 2 Items*
Option 2 items will, in the professional opinion of staff, provide value by addressing the following subjects that will impact Utility operations in the near future.

- Fish Habitat: Conduct habitat assessments and fish monitoring to assist in prioritizing fish barrier removal projects. (item CW-20)
- CIP and Operations Project Coordination: Develop process for coordinated review of capital projects to insure that maintenance needs and costs are incorporated into the design, and the on-going maintenance needs are incorporated full into the maintenance budget. (item CW-21)
- Environmental Permitting for Maintenance Work: Customer Service group staff have provided assistance with environmental permitting work to date, but are finding that this task is increasing in scope and complexity. This project would add consulting and/or staff assistance to promptly and accurately meet permitting needs. (item CW-22)
- Property Acquisition Policy and Planning: Develop Utility acquisition policy, and prioritize undeveloped properties for acquisition. (item CW-23)
- Evaluation of Dredging in Lake Washington: Develop policy recommendations for dredging of stormwater outfalls into Lake Washington, develop costs for dredging projects. (item CW-24)
- Urban Forestry: Conduct a tree inventory and develop quantitative information about the benefits of trees to stormwater management in Kirkland. (item CW-25)
- Climate Change Evaluation: Evaluate potential impacts of climate change on Utility operations, prepare policy recommendations for how to incorporate results of evaluation into programs and projects. (item CW-26)
- Streamside restoration and vegetation management: Provide funding to maintain streamside vegetation planted by volunteers in Parks. Establish permanent easements for City restoration and maintenance of streamside areas. Develop plan to control noxious and invasive weeds at stream restoration projects and sites. (items CW-27, CW-28)

- Flooding: Develop floodplain maps for Juanita Creek to assist residents in preparing for and responding to flooding. (item CW-29)

*Option 3 Items*
These are wish list items that provide improved customer service and would serve to position the Utility well for response to long-term community changes.

- Maintenance: Purchase specialized equipment for maintenance of Goat Hill area (an alternative to equipment rental noted in the Required section as item CW-5), provide additional staff and resources to bring stormwater systems in the new neighborhoods up to standards used in the rest of the city, evaluate planting edibles near stormwater ponds that are not in-line with streams to provide community nutrition and reduce maintenance. (items CW-30, CW-31, CW-32)
- Leaf Pickup Program: Evaluate whether a program to pick up leaves for citizens is a viable alternative for reducing localized flooding. Cities in Oregon and on the East Coast have successfully used leaf pickup programs for this purpose (item CW-33)
- Water Quality: Consider taking a "poop-scoop" law to Council to strengthen efforts to remove pet waste and associated bacteria from our waterways. (item CW-36)
- Volunteers: Evaluate existing and potential involvement of volunteers in surface water activities. (item CW-35)

## 4. Capital Improvement Program

### 4.A Priorities and Policy Choices

There is no state or federal regulatory requirement to construct capital projects. There is a City accounting policy stating that capital funding should at least equal the annual depreciation amount for surface water infrastructure, which was $1.3 million for 2013, and is either spent through the CIP or is placed in reserves to fund future replacement. Despite the lack of State and Federal requirements, capital projects serve to efficiently solve flooding, water quality, and habitat problems and so are an important component of the overall Utility program.

The following are recommended policy statements for use in choosing the types of projects and for prioritizing between different types of surface water capital projects.

*Flood Mitigation:* Prioritize first before other capital projects– this is essential to protecting public safety and infrastructure.

*Water Quality*: Prioritize retrofits based on opportunity to coordinate with transportation projects, and conduct watershed planning to prepare for stormwater retrofit grant opportunities (see Operations Program Item CW-17).

*Habitat*: Commit to progress on fish passage barrier removal and plan for flow and water quality retrofits to prepare for grant opportunities.

*Infrastructure*: Construct projects that coordinate with the pavement overlay program; use information from CCTV inspection of system to prioritize repair/replacement.

*Acquisition*: Review riparian and wetland properties in the city to identify opportunities for acquisition. Subsequent to that study, create opportunity fund within the CIP to

be ready for acquisition opportunities as they arise (see policy discussion below).

The following are capital project policy issues for which staff will be seeking Council direction at the May 6, 2014 Study Session:

CIP Policy Decision 1: Property Acquisition. Retention of trees and intact or functioning riparian areas is one of the most effective means of preventing stormwater pollution. Although the City Zoning Code controls development in streams wetlands and their buffers, required State Reasonable Use provisions often allow development in these areas. Property acquisition would allow the Utility to preserve riparian and wetland areas and their associated stormwater functions. Staff would like clarification that property acquisition can be considered as a solution to certain surface water problems, and direction as to whether a study should be conducted of vacant properties to determine which ones should be prioritized for acquisition.

CIP Policy Decision 2: Dredging of outfalls into Lake Washington. There are several stormwater outfalls into Lake Washington where sediment has built up forming a delta. Most of these are locations where streams enter Lake Washington, and are a natural phenomenon which can be accelerated by poor erosion control and lack of stormwater system maintenance upstream. Deltas can present a hazard to boaters, as the water depth is low and they are typically unmarked. In one instance, the delta interferes with operation of the City boat ramp at Marina Park. Although the stormwater system is the source of the sediment, the presence of these deltas is not strictly a surface water issue. The Utility cleans the upstream stormwater system which slows the buildup of material. Projects to dredge and remove deltas are usually very high cost due to environmental permitting and the specialized equipment required to accomplish the work. Although the size and scope of this type of project is typically considered a capital project, there is some question as to whether this type of expenditure would be considered a capital project (that is depreciated along with other stormwater infrastructure) or whether it would be a maintenance expense. The question for Council is whether surface water funds should be spent to lower or remove deltas.

CIP Policy Decision 3: Surface water funding of transportation projects. Currently, $950,000 per year is allocated towards the surface water portion of transportation projects. This money goes toward installation or replacement of pipes, catch-basins, and flow control and water quality treatment facilities associated with transportation projects. Although the full $950,000 per year is transferred to this fund, historically only about $500,000 per year has been spent. Council may wish to consider reducing the annual transfer either by a set amount or by more closely matching the transfer amount with expected needs in the transportation CIP.

CIP Policy Decision 4: Use of debt to finance surface water capital construction.
For certain high-cost projects, Council may wish to consider debt as a mechanism to fund construction rather than waiting to accumulate funds through rate revenue. Factors to consider in this decision are the cost of debt, the damage that could occur from waiting to construct the project, and whether there are ancillary benefits to constructing a project sooner such as providing incentives for redevelopment.

CIP Policy Decision 5: Review allocation of the CIP. Currently the non-transportation portion of the surface water CIP is allocated as follows:

- Neighborhood Drainage Assistance Program ($50,000 biannual in odd years)

- Annual Streambank Stabilization Program ($1.343 million over 6 years = $224,000 annually)
- Aging Infrastructure Replacement Program ($200,000 annually)
- Surface Water Projects (approximately $1.1 million annually)

The total surface water (i.e. non-transportation related) CIP is funded at $1.59 million annually from surface water rate revenue, plus additional funding based on grants and drawing from reserves.

Staff recommends that Council review the purpose of each allocation, and the amount of the overall CIP dedicated to that purpose.

### 4.B Project List

Table 3 and Attachment C list proposed surface water capital projects for Kirkland that include the following:

- Projects identified in the newly annexed areas
- Priorities for fish passage barrier removal
- New projects that have been identified in "old" Kirkland
- Projects that have been carried forward from past plans (i.e. are already on the 2013-2018 Surface Water CIP but have yet to be started)

Conceptual designs for newly identified projects, as well as the summary portion of the 2013-2018 Surface Water CIP are included as Attachment D. The intent of the list is to present all projects that can be re-arranged and prioritized per Council direction. Projects are listed by basin but are not prioritized. Staff would like to hear of Council priorities in terms of geographic area, problem addressed, or other topics.

Costs for new projects are noted in 2014 dollars, whereas projects that are currently on the 2013-2018 CIP have had inflation factors added to reflect the expected year of construction. It should be noted that $10 million of that is attributable to one project (regional detention in Forbes Creek basin). As noted above, Council may wish to consider debt to finance this project, and/or to consider it separately from the rest of the project list. Current spending on non-transportation surface water projects is $1.59 million per year (plus small additions from grants and reserves). In order to reduce the time it would take to build all of the projects on this list, Council could choose a funding level above the $1.3 million per year depreciation figure as part of the overall rate choice. An increase in the level of CIP spending would need to be balanced with the availability of CIP staff to manage project construction.

## Table 3: Recommended Projects

**Table 3**
Recommended Surface Water Capital Improvement Projects
Surface Water Master Plan Update
March 5, 2014

Notes:
Projects listed on table include those on current 2013-2018 CIP that have not been started or were not funded for the 2013-2018 CIP, and newly identified capital projects.
Unless otherwise notes, estimated costs are in current 2014 dollars.

| | ID | 2013-2018 CIP | Basin | Location | Description | Order of Magnitude Cost ($K) |
|---|---|---|---|---|---|---|
| Capital Priorities (not isted in any order) | CA-1 | SD-0045 | Carillon Creek | Carillon Woods | Erosion Control Measures | $550* |
| | CH-01 | | Champagne Creek | 11553 Holmes Point NE | Undersized pipe to be replaced | $219 |
| | CH-02 | | Champagne Creek | Downstream of Juanita Drive in Juanita Woods | Channel reconstruction | $690 |
| | CH-03 | | Champagne Creek | TBD | Stormwater retrofit | Pending |
| | CW-INF-01 | | City-wide | Various--14 poorly rated pipes located along arterials | Pipe repair and replacement | $769** |
| | CW-INF-02 | | City-wide | Various--70 poorly rated pipes in the rest of the City | Pipe repair and replacement | $3,025** |
| | DE-01 | | Denny Creek | 7718 NE 141st (Inglewood Prebyterian Church) | Sediment removal in channel | $136 |
| | CDE-1 | | Denny Creek | Denny Creek at Juanita Drive | Culvert replacement to improve fish passage | $615 |
| | EC-01 | SD-0063 | Everest Creek | Slater Avenue at Alexander Street | Ravine Stabilization | $830* |
| | EC-02 | SD-0061 | Everest Creek | Everest Park | Everest Park Channel and Riparian Restoration | $1,096* |
| | FO-01 | SD-0049 | Forbes Creek | 108th Ave NE | Fish Passage | $333* |
| | FO-02 | SD-0046 | Forbes Creek | Near NE 116th St | Regional Detention in Forbes Creek Basin | $10,029*** |
| | FO-05 | SD-0051 | Forbes Creek | KC Metro Access Road | Culvert replacement | $1,058* |
| | FO-07 | SD-0053 | Forbes Creek | Coors Pond | Channel grade control | $165* |
| | FO-08 | SD-0054 | Forbes Creek | Forbes Creek Crossing under CKC | Forbes Creek/BNSF Fish Passage Improvements | $424* |
| | FO-12 | | Forbes Creek | NE 90th Street at 120th Ave NE | High low bypass pipe | $449 |
| | HAS-01 | | Houghton Slope A | 62nd and Lakeview Dr. | Pipe replacement, improved hydraulics | $2,369 |
| | JC-01 | | Juanita Creek | 109th Ave NE, north of NE 134th St. (Weaver's Pond) | Sediment removal | $194 |
| | CJC-9 | | Juanita Creek | NW Tributary at 137th | Culvert replacement to improve fish passage | $613** |
| | JC-02 | | Juanita Creek | NE 13nd St between I-405 and 124th Ave NE | Infrastructure/conveyance | $874** |
| | JC-03 | | Juanita Creek | SW corner of intersection of 100th Ave NE and NE 128th St | Juanita Creek Floodplain Creation | $533 |
| | JC-04 | | Juanita Creek | 12204 NE 124th St (north side of Totem Lake Blvd) Comfort Inn Pond | Flow diversion (?) | $266 |
| | JC-05 | | Juanita Creek | 8547 NE Juanita Drive | Groundwater seepage and road stability | Pending |
| | MB-01 | | Moss Bay | Market Street from 4th to 6th Street | Replace stormwater pipes | $680 |
| | XX-XX | | XXXX | XXXXX | Pilot LID project associated with planned transportation project | Pending |
| | RED-01 (SD-0068) | | Redmond | 128th Ave NE and NE 60th Street to NE 64th Street Drainage (Silver spurs) | UIC well | $65 |
| | | | | | | |
| Identified Projects (no costs assigned at this time) | CCH-1 | | Champagne Creek | Juanita Drive at NE 122nd St | Whiskey Creek Culvert replacemnet | no cost calculated at this time |
| | DE-02 | | Denny Creek | Lake Washington | Deposition at mouth is potential fish passage issue | no cost calculated at this time |
| | HP-01 | | Holmes Point | 6060 NE 135th Street | Remove large private dam | no cost calculated at this time |
| | HP-02 | | Holmes Point | Water diversion---downstream of St. Edwards Park | Stream restoration in vicinity of water diversion structures | no cost calculated at this time |
| | Various | | City-wide | Various | Culvert replacements for fish passage improvement: 28 full barriers, 9 partial barriers identified | no cost calculated at this time |

* Cost is based on estimate calculated for 2013 - 2018 CIP during previous budgeting process
** Costs are preliminary (review is still needed)
*** Cost is based on latest 116th Flood Study on most expensive option

## 5. Rate Impacts

The current Surface Water Utility rate is $15.60 per month for a single-family property. Rates for commercial properties are based on the number of "equivalent service units" or ESUs of impervious surface, where 1 ESU is equal to 2600 square feet, or the average amount of impervious surface found on a single-family property as of 1998 (the year the Surface Water Utility was founded).

Rate scenarios are under development. For consideration of order of magnitude, each $1 million annual increase in Utility spending translates to a rate increase of $1.85 per month, or an 11.9% increase, for a single-family residence.

## 6. Next Steps

The draft plan will be released for public comment in early April. A community open house will be held at the citywide community planning event on Saturday, April 26th. The full plan and a greater of level of detail for proposed programs and projects as well as more precise financial/rate information will be presented to Council for discussion at the July 1st Study Session including all public comments that have been received as of that date.

Attachment A: *Surface Water Management and Drainage Concerns in the Finn Hill Neighborhood* – Executive Summary
Attachment B: Detailed descriptions of proposed Operating Program additions
Attachment C: Map of Proposed Surface Water Capital Projects
Attachment D: Conceptual designs for new projects, and 2013-2018 Surface Water CIP Summary

List of Tables:
Table 1 – Surface Water Utility Program Areas and Functions
Table 2 – Proposed Operating Program Additions
Table 3 –Surface Water Capital Project List

Attachment A

# Surface Water Management and Drainage Concerns in the Finn Hill/Holmes Point Neighborhood

## Finn Hill Neighborhood Alliance

## Kirkland, Washington

**June 15, 2012**

**Prepared by Lou Berner**
**Finn Hill Neighborhood Alliance**

# Executive Summary

From Dec-2011 to May-2012, residents of Finn Hill collected information about surface water concerns in our Kirkland, Washington neighborhood. Data collection methods included field reconnaissance, telephone interviews, e-mail correspondence, and a targeted Internet survey.

Our results and recommendations for the Finn Hill neighborhood are similar to those published by the Puget Sound Action Team and the Puget Sound Partnership for watersheds across the Puget Sound basin. Initial results of our project are summarized in five categories of surface water issues. We include recommended actions for each category:

**Juanita Drive and proximity** - Juanita Drive and other impervious surfaces are the primary sources of polluted runoff in the Finn Hill neighborhood. Because of the high number of car miles driven on Juanita Drive, runoff from the road is a major contributor of contaminated surface water to neighborhood streams and to Lake Washington. We request additional information about surface water conveyance features on Juanita Drive. We plan to use that information to design mitigation projects to improve water quality in several strategic locations.

**Denny Creek** – We propose a capital improvement project to Daylight the creek crossing under Juanita Drive, and to install check dams to slow water flow downstream of the road and to improve fish habitat. Include a walking or biking trail under Juanita Drive as part of the daylighting project. Remove the culvert at the beaver ponds in Big Finn Hill Park, repair or modify culvert inlets to mitigate flooding of residences near the creek, and repair or replace storm water conveyance features.

**Repair old infrastructure** - Storm water retention ponds throughout the neighborhood need maintenance or repair. Homemade flumes and tight line configurations are prone to leaks and catastrophic failure; they should be inspected and repaired or replaced, as necessary. The crumbling concrete bulkhead in O.O. Denny Park should be removed.

**Concerns raised by individual land owners** – These concerns include mud slides, rogue runoff, and culvert inlets that are prone to failure. Most of these issues are currently self-managed by residents with solutions installed and maintained at personal expense. Recommendations include a combination of City maintenance or repair of existing systems, and education of homeowners about the effects of surface water outfall to their neighbors.

**Best practices for low impact development** - We provide several examples of poorly implemented surface water management in new residential developments. We recommend that the City consider extending the special district zoning overlay for the entire neighborhood. Currently, the special district overlay applies to a portion of the Finn Hill neighborhood west of Juanita Drive.

Communication with Kirkland Public Works is underway to discuss results and recommendations. Solutions will be discussed and implemented on an ongoing basis. Solutions will be funded by the Finn Hill Neighborhood Alliance, private funding, grant money, the City of Kirkland, and other government agencies.

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| Project: | Ditch Maintenance | | ID: CW-1 |
|---|---|---|---|
| Project Type: | ☐NPDES Compliance ☒ Maintenance ☐Education and Outreach ☐Policy ☐Natural Resources ☐Water Quality ☐Development & Permitting ☐Flooding | Preliminary Proposed Average Annual Project Cost: | $355,621 |
| Problem: | Insufficient capacity to conduct ditch maintenance | Priority: | Required (minimum level of service) |
| Description | Large increase in the length of ditches with annexation and with acquisition of the Cross Kirkland Corridor. Do not have sufficient crew or equipment to conduct maintenance that prevents flooding and protects water quality.<br><br>Juanita/Finn Hill/Evergreen neighborhoods (annexation area) has more ditches than estimated, CKC has added 10 miles of ditches. Investigate ditch enhancements such as compost amendment that could improve water quality. | Project Status | Augmentation of Existing Work |
| | | Work Group | Operations and Maintenance (2017 onward)<br><br>Contractor (2015-2016) |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• Contract ditch work is assumed for 2015-2016 for a one-time cost of $100,000.<br>• Future years (2017 and beyond) would require additional staff (1 senior maintenance worker and 3 utility workers)<br>• Equipment needs include a multi-purpose dumptruck, backhoe and trailer.<br>• Annual equipment costs include O&M and replacement.<br>• Total proposed additional annual costs are assumed to be averages over a 5-year period. | | |
| Project Partners | None. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed average annual additional costs* |
|---|---|---|---|---|---|---|---|---|
| Current Ditching expenditures | $22,277 | $0 | $0 | $ 0 | $ 0 | $ 0 | $ 0 | **$0** |
| Contract ditching (2015-2016) | $0 | $100,000 | $100,000 | $0 | $0 | $0 | $0 | **$33,333** |
| Sr. Maintenance Worker (starting in 2017) | $0 | $0 | $0 | $90,093 | $90,093 | $90,093 | $90,093 | **$60,062** |
| Three utility workers (2017) | $0 | $0 | $0 | $232,788 | $232,788 | $232,788 | $232,788 | **$155,192** |
| Multi-use dumptruck (2017) | $0 | $0 | $0 | $271,568 | $33,044 | $33,044 | $33,044 | **$61,783** |
| Backhoe (2017) | $0 | $0 | $0 | $137,250 | $25,704 | $25,704 | $25,704 | **$35,727** |
| Trailer (2017) | $0 | $0 | $0 | $38,430 | $6,236 | $6,236 | $6,236 | **$9,523** |
| | | | | | | Subtotal | | **$ 355,621** |
| | | | | | Consultant Management (if consultants are used) | 10% | | **$0** |
| | | | | | Washington State Sales Tax (equipment only) | 9.5% | | Included |
| | | | | | Subtotal | | | **$355,621** |
| | | | | | Contingency | 30% | | NA |
| | | | | | Total cost | | | **$355,621** |

*Annual proposed additional costs include annual cost plus one-time additional cost divided by six (number of years assumed for SWMP implementation).

| Project: | Development Review NPDES Analysis | | ID: CW-2 |
|---|---|---|---|
| Project Type: | ☐NPDES Compliance ☐Maintenance ☐Education and Outreach ☐Policy ☐Natural Resources ☐Water Quality ☒ Development & Permitting ☐Flooding | Preliminary Proposed Project Cost: | $4,140 |
| Problem: | New NPDES requirements may increase staff permit review time | Priority: | Required (NPDES) |
| Description | There is a potential increase in the number of development applications that will need to be reviewed because of the NPDES permit changes that require stormwater measures on all properties (not limited to 1-acre threshold).<br><br>As the economy has picked up, there has been an increase in the number of applications requiring stormwater review.<br><br>This programmatic project is a one-time cost to evaluate current permitting trends, time commitments to review applications, staffing needs and permit fees. | Project Status | New |
| | | Work Group | Surface Water Engineering |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• Analysis will be conducted by surface water staff.<br>• Analysis will include a review of numbers of permit applications processed, sizes of projects (number under 1 acre?), and anticipated future permit review needs based on NPDES permit requirements.<br>• 60 hours of staff time are assumed, with a 30% contingency to account for additional hours, if needed.<br>• Project will be completed in 2014. | | |
| Project Partners | None. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total Proposed Cost |
|---|---|---|---|---|---|---|---|---|
| Development review permit analysis | $0 | $4,140 | $ 0 | $ 0 | $ 0 | $ 0 | $ 0 | $4,140 |
| | | | | | | Subtotal | | $ 4,140 |
| | | | | | | Consultant Management (if consultants are used) | 10% | $0 |
| | | | | | | Washington State Sales Tax (equipment only) | 9.5% | $0 |
| | | | | | | Subtotal | | $4,140 |
| | | | | | | Contingency | 30% | Not applied |
| | | | | | | Total cost | | $ 4,140 |

| Project: | LID Code Scrub | | ID: CW-3 |
|---|---|---|---|
| Project Type: | ☒ NPDES Compliance ☐ Maintenance ☐ Education and Outreach ☒ Policy ☐ Natural Resources ☐ Water Quality ☒ Development & Permitting ☐ Flooding | Preliminary Proposed Project Cost: | $45,540 |
| Problem: | New NPDES requirements to make LID preferred and commonly used surface water management approach. | Priority: | Required (NPDES) |

| | | | |
|---|---|---|---|
| Description | NPDES permit requires permittees to "review, revise, and make effective their local development-related codes, rules, standards, or other enforceable documents to incorporate and require LID principles and LID BMPs."<br><br>This one-time programmatic project will complete the code review, revisions, and public outreach necessary for the City to meet the NPDES requirement. | Project Status | New |
| | | Work Groups | Surface Water Engineering<br><br>Planning and Building |

**Considerations and Assumptions**

The following assumptions are included in this estimate:

- LID code scrub will be conducted by surface water staff.
- Tasks to be conducted include:
  - Compile list of development-related codes for review and revision.
  - Assemble a committee of City staff (5 members) from cross-section of departments whose codes/standards could be modified as a result of this permit conditions. Assume this group will meet 6 times over the course of 2 years
  - Review up to twenty codes and develop preliminary list of revisions designed to minimize impervious surfaces, reduce native vegetation loss and reduce stormwater runoff in all types of developments. Assume 20 codes/standards.
  - Conduct internal and external meetings to solicit input on code and/or standard changes. Assume 4 meetings consisting of committee members and invited staff/public
  - Present recommendations to City Council and adopt changes.
- 660 hours of staff time are assumed, with a 30% contingency to account for additional hours, if needed.
- This programmatic project will be conducted between 2014 and 2016 (NPDES deadline is Dec. 31, 2016)

**Project Partners**

Planning and Building will participate in project and will share costs through staff participation.

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed cost |
|---|---|---|---|---|---|---|---|---|
| LID Code Scrub | $0 | $22,770 | $22,770 | $0 | $ 0 | $0 | $ 0 | $45,540 |
| | | | | | | Subtotal | | $ 45,540 |
| | | | | | Consultant Management (if consultants are used) | 10% | | $0 |
| | | | | | Washington State Sales Tax (equipment only) | 9.5% | | $0 |
| | | | | | Subtotal | | | $45,540 |
| | | | | | Contingency | 30% | | Not applied |
| | | | | | Total cost | | | $ 45,540 |

| Project: | LID Implementation and Surface Water Manual Adoption | | ID: CW-4 |
|---|---|---|---|
| Project Type: | ☒ NPDES Compliance ☐ Maintenance ☒ Education and Outreach ☒ Policy ☐ Natural Resources ☒ Water Quality ☒ Development & Permitting ☐ Flooding | Preliminary Proposed Project Cost: | $17,991 |
| Problem: | New NPDES requirements to adopt equivalent 2012 Ecology Stormwater Management Manual for Western Washington and implement LID | Priority: | Required (NPDES) |
| Description | NPDES permit requires permittees to adopt the new 2012 Ecology Stormwater Management Manual for Western Washington, or equivalent, and implement LID techniques.<br><br>This one-time programmatic project will develop a plan to implement LID city-wide, update codes and standards according to new stormwater management manual, and educate the public about changes. | Project Status | New |
| | | Work Group | Surface Water Engineering |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• Manual adoption and LID implementation plan will be conducted by surface water staff.<br>• Tasks to be conducted include:<br>o Development of overall plan to implement city-wide LID including increase in education and outreach, partnering with FHNA to leverage resources, and construction of visible City projects.<br>o Compilation of a list of LID resources and current outreach program<br>o Revision of development standards and compilation of education and outreach material for development community<br>o Identification of LID projects and completion of pre-designs in order to compete for grants<br>o Incorporation of "visibility" as prioritization criteria into City capital projects<br>• 950 hours of staff time are assumed.<br>• This programmatic project will be conducted between 2014 and 2016 (NPDES deadline is Dec. 31, 2016)<br>• Annual costs are for grant applications and grant administration associated with LID implementation. | | |
| Project Partners | Planning and Building will participate in project and will share costs through staff participation.<br>Finn Hill Neighborhood Association for LID implementation. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed average annual cost* |
|---|---|---|---|---|---|---|---|---|
| LID Implementation and Stormwater Management Manual Adoption | $0 | $33,975 | $33,975 | $10,000 | $10,000 | $10,000 | $10,000 | $17,991 |
| | | | | | | Subtotal | | $ 17,991 |
| | | | | | Consultant Management (if consultants are used) | 10% | | $0 |
| | | | | | Washington State Sales Tax (equipment only) | 9.5% | | $0 |
| | | | | | Subtotal | | | $17,991 |
| | | | | | Contingency | 30% | | Not applied |
| | | | | | Total cost | | | $ 17,991 |

*Annual proposed additional costs include annual cost plus one-time additional cost divided by six (number of years assumed for SWMP implementation).

| Project: | LID Maintenance | | ID: CW-5 |
|---|---|---|---|
| Project Type: | ☐NPDES Compliance ☒ Maintenance ☐Education and Outreach ☐Policy ☐Natural Resources ☐Water Quality ☐Development & Permitting ☐Flooding | Preliminary Proposed Average Annual Project Cost: | $10,960 |
| Problem: | LID Maintenance requires different skills and tools | Priority: | Required (NPDES) |
| Description | City LID facilities are currently maintained by Public Works grounds crews who are also responsible for all City facilities including City Hall, parks and street landscaping. At full staff, there are 7 people (4 FTEs, and 3 seasonal employees).<br><br>LID facilities require a different kind of maintenance (weeding and pruning vs. mowing) that takes more time. An example of the required maintenance on one rain garden was 4 people for 4 days. Also, crews have been known to weed whack an entire rain garden not knowing the good plants from the weeds.<br><br>This programmatic strategy is for additional funds for maintenance to be built into the O&M budget as part of the CIP process. | Project Status | New |
| | | Work Group | Operations and Maintenance |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• Twenty LID sites will need to be maintained in the first year, with ten new sites added each year.<br>• Each site requires 40 hours of total labor.<br>• Grounds Crew Laborer is the category of staff that will complete maintenance work.<br>• New equipment will be required (assumed $10,000 as a one-time cost)<br>• Approximately 20 hours of training will be required annually.<br>• This programmatic program addition would be needed beginning in 2017. | | |
| Project Partners | Volunteers could potentially be used to assist with maintenance adjacent to private parcels, however, the Utility has an obligation to maintain capital improvements. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed average annual costs* |
|---|---|---|---|---|---|---|---|---|
| Grounds crew labor | $0 | $0 | $ 0 | $ 13,600 | $ 13,600 | $ 13,600 | $ 13,600 | $9,067 |
| Training | $0 | $0 | $0 | $340 | $340 | $340 | $340 | $226 |
| Equipment and Tools | $0 | $0 | $0 | $10,000 | $0 | $0 | $0 | $1,667 |
| | | | | | | Subtotal | | $10,960 |
| | | | | | Consultant Management (if consultants are used) | 10% | | $0 |
| | | | | | Washington State Sales Tax (equipment only) | 9.5% | | $0 |
| | | | | | Subtotal | | | $10,960 |
| | | | | | Contingency | 30% | | NA |
| | | | | | Total cost | | | $ 10,960 |

*Annual proposed additional costs include annual cost plus one-time additional cost divided by six (number of years assumed for SWMP implementation).

| Project: | Surface Water Maintenance Support of Pavement Overlay Program | | ID: CW-6 |
|---|---|---|---|
| Project Type: | ☐NPDES Compliance ☒ Maintenance ☐Education and Outreach ☐Policy ☐Natural Resources ☐Water Quality ☐Development & Permitting ☐Flooding | Preliminary Proposed Average Annual Project Cost: | $151,526 |
| Problem: | Not enough capacity (staff or equipment) to video inspect pipes ahead of pavement overlay program | Priority: | Required (minimum level of service) |

| | | | |
|---|---|---|---|
| Description | O&M inspects and repairs stormwater infrastructure ahead of paving. Prior to any of the maintenance work, O&M videos and cleans pipes to ensure that everything is ready prior to the overlay program schedule.<br><br>Approximately 60% of the stormwater O&M budget is used for the overlay program. The workload is anticipated to double because of the recent street preservation program levy. Within the recent push to overlay the main arterials, work days are sometimes shorter due to traffic control issues, and the inability to leave excavations open/unfinished for completion the next day.<br><br>The only video inspection truck owned by the city is divided between surface water and sanitary groups. The time to complete video inspections along with sanitary inspections is in excess of full time capacity of one truck. Removing months of inspections due to inspecting systems within the overlay projects, reduces the availability of the video truck for inspecting the remaining system. | Project Status | Augmentation of Existing Work |
| | | Work Group | Operation and Maintenance |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• Two new staff (Sr. maintenance worker, and utility worker), shared by wastewater and surface water.<br>• One new CCTV truck shared by wastewater and surface water.<br>• This will be an on-going, annual cost starting in 2015.<br>• Ongoing expenses for CCTV equipment include O&M, software updates, maintenance and replacement | | |
| Project Partners | None. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total average annual costs* |
|---|---|---|---|---|---|---|---|---|
| Sr. Maintenance Worker (0.5 FTE) | $0 | $ 40,859 | $ 40,859 | $ 40,859 | $ 40,859 | $ 40,859 | $ 40,859 | $ 40,859 |
| Utility Worker (0.5FTE) | $0 | $35,191 | $35,191 | $35,191 | $35,191 | $35,191 | $35,191 | $35,191 |
| CCTV Truck with camera and software (shared) | $0 | $181,080 | $54,356 | $54,356 | $54,356 | $54,356 | $54,356 | $75,476 |
| | | | | | | | Subtotal | $ 151,526 |

| | | |
|---|---|---|
| Consultant Management (if consultants are used) | 10% | $0 |
| Washington State Sales Tax (equipment only) | 9.5% | Included |
| Subtotal | | $151,526 |
| Contingency | 30% | NA |
| Total cost | | $ 151,526 |

*Annual proposed additional costs include annual cost plus one-time additional cost divided by six (number of years assumed for SWMP implementation).

| Project: | Expand Fall Street Sweeping | | ID: CW-7 |
|---|---|---|---|
| Project Type: | ☐NPDES Compliance ☐Maintenance ☐Education and Outreach ☐Policy ☐Natural Resources ☐Water Quality ☐Development & Permitting ☒ Flooding | Preliminary Proposed Average Annual Project Cost: | $25,500 |
| Problem: | Localized flooding, clogged catch basins in the fall | Priority: | Required (minimum level of service) |
| Description | During the fall, street sweeping is needed more intensely because of the amount of debris and leaves on the road and there is a need for 24-hour sweeping. Sweepers currently operate between 6:30 am and 3:00 pm.<br><br>With additional funding, extra street sweeping would occur in the fall using existing staff and overtime funding. | Project Status | Augmentation of Existing Work |
| | | Work Group | Operations and Maintenance |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• Overtime pay for two senior maintenance workers.<br>• No new staff are needed.<br>• This will be an on-going, annual cost starting in 2015.<br>• No new equipment is needed.<br>• Approximately 500 hours of staff time per year is required. | | |
| Project Partners | None. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed additional average annual costs* |
|---|---|---|---|---|---|---|---|---|
| Fall Street Sweeping | $ 226,630 | $25,500 | $ 25,500 | $ 25,500 | $ 25,500 | $ 25,500 | $ 25,500 | $25,500 |
| | | | | | | Subtotal | | $ 25,500 |
| | | | | | | Consultant Management (if consultants are used) | 10% | $0 |
| | | | | | | Washington State Sales Tax (equipment only) | 9.5% | $0 |
| | | | | | | Subtotal | | $25,500 |
| | | | | | | Contingency | 30% | NA |
| | | | | | | Total cost | | $ 25,500 |

*Annual proposed additional costs include annual cost plus one-time additional cost divided by six (number of years assumed for SWMP implementation).

| Project: | Maintenance on Goat Hill | | ID: CW-8 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☒ Maintenance ☐ Education and Outreach ☐ Policy ☐ Natural Resources ☐ Water Quality ☐ Development & Permitting ☐ Flooding | Preliminary Proposed Average Annual Project Cost: | $3,000 |
| Problem: | City equipment and trucks can't access Goat Hill area where there are on-going erosion problems. | Priority: | Required |
| Description | This programmatic alternative is to rent equipment in order to access Goat Hill that is otherwise not accessible by standard size equipment. | Project Status | Augmentation |
| | | Work Group | Operations and Maintenance |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• Equipment rental is $3,000 per year. | | |
| Project Partners | None. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed average annual cost* |
|---|---|---|---|---|---|---|---|---|
| Equipment rental | $0 | $3,000 | $3,000 | $3,000 | $3,000 | $3,000 | $3,000 | $3,000 |
| | | | | | | Subtotal | | $ 3,000 |
| | | | | | | Consultant Management (if consultants are used) | 10% | $0 |
| | | | | | | Washington State Sales Tax (equipment only) | 9.5% | Included |
| | | | | | | Subtotal | | $3,000 |
| | | | | | | Contingency | 30% | NA |
| | | | | | | Total cost | | $ 3,000 |

* Annual proposed additional costs include annual cost plus one-time additional cost divided by six (number of years assumed for SWMP implementation).

| Project: | Evaluation Incentives and Rebate Programs | | ID: CW-9 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☐ Maintenance ☐ Education and Outreach ☒ Policy ☐ Natural Resources ☐ Water Quality ☐ Development & Permitting ☐ Flooding | Preliminary Proposed Average Annual Project Cost: | $1,400 |
| Problem: | Incentives, rebates and assistance could facilitate desirable voluntary actions that accelerate stormwater retrofit. | Priority: | Optional 1 |
| Description | Incentives, rebates and assistance could facilitate desirable voluntary actions by residents and businesses, accelerating stormwater retrofit throughout the City and provide a positive benefit to the public stormwater system.<br><br>This programmatic project is to evaluate existing incentive and rebate programs for financial impacts and effectiveness at achieving desired outcomes. | Project Status | New |
| | | Work Group | Surface Water Engineering<br><br>Finance |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• Surface water engineering and finance staff (120 hours are assumed) would conduct a review of programs upon Council direction.<br>• Project begins in 2015.<br>• The evaluation would include the following tasks:<br>o Review of existing programs<br>o Evaluation of potential changes<br>o Develop preliminary list of existing program modifications and financial impacts. | | |
| Project Partners | None. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed average annual cost* |
|---|---|---|---|---|---|---|---|---|
| Evaluation of incentive and rebate programs | $0 | $8,400 | $0 | $0 | $ 0 | $0 | $0 | $1,400 |
| | | | | | | Subtotal | | $ 1,400 |
| | | | | | | Consultant Management (if consultants are used) | 10% | $0 |
| | | | | | | Washington State Sales Tax (equipment only) | 9.5% | $0 |
| | | | | | | Subtotal | | $1,400 |
| | | | | | | Contingency | 30% | Not applied |
| | | | | | | Total cost | | $ 1,400 |

* Annual proposed additional costs include annual cost plus one-time additional cost divided by six (number of years assumed for SWMP implementation).

| Project: | Utility Rate Study | | ID: CW-10 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☐ Maintenance ☐ Education and Outreach ☒ Policy ☐ Natural Resources ☐ Water Quality ☐ Development & Permitting ☐ Flooding ☒ Administration and Support | Preliminary Proposed Project Cost: | $36,124 |
| Problem: | New permit requirements and additional program needs necessitate the need for a Utility rate study | Priority: | Optional 1 |

| | | | |
|---|---|---|---|
| Description | Programmatic and capital needs identified in this Surface Water Master Plan, plus an evaluation of existing funding for programs and staff requires an updated utility rate study to determine future program funding.<br><br>The programmatic project is to conduct a new rate study and to also evaluate incentive and rebate programs, assess short-term and longer-term program revenue needs, and evaluate partitioning of funds between Operations and Capital projects. | Project Status | New |
| | | Work Group | Consultant and Surface Water Engineering and Finance |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• A consultant will conduct the rate study with oversight by Surface Water Engineering and Finance staff.<br>• Project would be funded in 2014.<br>• Surface water engineering staff and finance staff will compare partition of funds to other cities. | | |
| Project Partners | None. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed project cost |
|---|---|---|---|---|---|---|---|---|
| Utility rate study | $30,000 | $0 | $0 | $0 | $0 | $0 | $0 | $30,000 |
| Compare partitioning of funds | $2,840 | $0 | $0 | $0 | $0 | $0 | $0 | $2,840 |
| | | | | | | Subtotal | | $ 32,840 |
| | | | | | | Consultant Management (if consultants are used) | 10% | $3,284 |
| | | | | | | Washington State Sales Tax (equipment only) | 9.5% | $0 |
| | | | | | | Subtotal | | $36,124 |
| | | | | | | Contingency | 30% | Not applied |
| | | | | | | Total cost | | $ 36,124 |

| Project: | Develop LID Feasibility Tools | | ID: CW-11 |
|---|---|---|---|
| Project Type: | ☒ NPDES Compliance ☐ Maintenance ☒ Education and Outreach ☐ Policy ☐ Natural Resources ☐ Water Quality ☒ Development & Permitting ☐ Flooding ☐ Administration and Support | Preliminary Proposed Project Cost: | $68,200 |
| Problem: | NPDES permit requires LID BMPs unless techniques are proven to be infeasible. | Priority: | Optional 1 |

| | | | |
|---|---|---|---|
| Description | The requirement to prove that LID techniques are infeasible could create a burden for developers, and City staff that review permit applications.<br><br>Information is available for much of the City that indicates infiltrative LID techniques might not be appropriate and that these techniques might be infeasible to implement. This programmatic project is to develop tools that can assist with the LID feasibility analysis that will need to be conducted starting in 2017. | Project Status | New |
| | | Work Group | Consultant with Surface Water Engineering oversight |

**Considerations and Assumptions**

The following assumptions are included in this estimate:

- Project would be funded in 2016.
- LID feasibility tools to be developed include:
  - Infiltration potential map based on geology, slopes, and assumed groundwater elevations. Infiltration potential map would show areas where shallow infiltration is (1) not allowed, (2) poor, (3) good, or (4) very good.
  - If bioretention guidelines are changed, create maps that show where (1) bioretention facilities must not have under-drains, (2) bioretention is not allowed (within 100 feet of groundwater wells used for domestic consumption, and (3) more detailed groundwater and water quality analysis is needed.
- Maps developed would be posted to the City's web-site to aid as a first step for developers in determining stormwater treatment requirements.
- It is assumed that these tasks would be conducted by a consultant.

**Project Partners**

None.

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total project cost |
|---|---|---|---|---|---|---|---|---|
| Develop infiltration potential map | $0 | $0 | $40,000 | $0 | $0 | $0 | $0 | $40,000 |
| Develop bioretention requirement map | $0 | $0 | $11,000 | $0 | $0 | $0 | $0 | $11,000 |
| Post maps to website with instructional materials | $0 | $0 | $11,000 | $0 | $0 | $0 | $0 | $11,000 |
| | | | | | | | Subtotal | $ 62,000 |
| | | | | | | Consultant Management (if consultants are used) | 10% | $6,200 |
| | | | | | | Washington State Sales Tax (equipment only) | 9.5% | $0 |
| | | | | | | Subtotal | | $68,200 |
| | | | | | | Contingency | 30% | Not applied |
| | | | | | | Total cost | | $ 68,200 |

| Project: | Incorporation of LID into City Capital Projects | | ID: CW-12 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☐ Maintenance ☐ Education and Outreach ☒ Policy ☐ Natural Resources ☐ Water Quality ☐ Development & Permitting ☐ Flooding ☐ Administration and Support | Preliminary Proposed Project Cost: | $2,760 |
| Problem: | City should lead by example and incorporate LID on capital projects, if possible | Priority: | Optional 1 |

| | | | |
|---|---|---|---|
| Description | The City encourages developers to use LID techniques on new projects, and where there is an opportunity to incorporate LID on City projects, the City should lead by example. Although, it is may not be required now, public projects could showcase LID as examples of utilizing these newer stormwater management techniques that will be required starting in 2017.<br><br>This programmatic project is to develop a preliminary policy for supporting capital project engineers in the use of LID on City projects, even where it might increase short-term costs. | Project Status | New |
| | | Work Group | Surface Water Engineering<br>Capital Project Engineering<br>City Green Team |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• Project would be funded in 2016.<br>• Surface water engineering staff would develop a preliminary policy to take to City Council that outlines support for inclusion of LID stormwater management techniques on City projects (40 staff hours are assumed). | | |
| Project Partners | None. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total project cost |
|---|---|---|---|---|---|---|---|---|
| Develop policy | $0 | $0 | $2,760 | $0 | $0 | $0 | $0 | $2,760 |
| | | | | | | Subtotal | | $ 2,760 |
| | | | | | | Consultant Management (if consultants are used) | 10% | $0 |
| | | | | | | Washington State Sales Tax (equipment only) | 9.5% | $0 |
| | | | | | | Subtotal | | $2,760 |
| | | | | | | Contingency | 30% | Not applied |
| | | | | | | Total cost | | $ 2,760 |

| Project: | Stormwater Facility Inspection | | ID: CW-13 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☒ Maintenance ☐ Education and Outreach ☐ Policy ☐ Natural Resources ☐ Water Quality ☐ Development & Permitting ☒ Flooding | Preliminary Proposed Average Annual Project Cost: | $40,000 |
| Problem: | Annexation area has increased the number of stormwater facilities needing inspection after major storm events. | Priority: | Optional 1 |
| Description | A large portion of stormwater facilities in the annexation area require inspection after major storm events and staff have difficulty managing the increased workload.<br><br>This programmatic project is to add staff to handle the increased workload. The staff person would be shared with wastewater. | Project Status | Augmentation of Existing Work |
| | | Work Group | Operations and Maintenance (shared with wastewater) |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• One new staff (Sr. maintenance worker) to be shared with wastewater (0.5 FTE dedicated to stormwater).<br>• The new staff will be added in 2015. | | |
| Project Partners | None. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed average annual cost |
|---|---|---|---|---|---|---|---|---|
| Sr. Maintenance Worker (0.5 FTE) | $0 | $40,000 | $40,000 | $40,000 | $ 40,000 | $40,000 | $ 40,000 | $40,000 |
| | | | | | | Subtotal | | $ 40,000 |
| | | | | | | Consultant Management (if consultants are used) | 10% | $0 |
| | | | | | | Washington State Sales Tax (equipment only) | 9.5% | $0 |
| | | | | | | Subtotal | | $40,000 |
| | | | | | | Contingency | 30% | NA |
| | | | | | | Total cost | | $ 40,000 |

| Project: | Service Truck | | ID: CW-14 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☒ Maintenance ☐ Education and Outreach ☐ Policy ☐ Natural Resources ☐ Water Quality ☐ Development & Permitting ☐ Flooding | Preliminary Proposed Average Annual Project Cost: | $36,190 |
| Problem: | Additional service truck is needed for stormwater maintenance activities to haul heavy gear, including pumps, generators, and a small crane. | Priority: | Optional 1 |
| Description | There are three dedicated service trucks used for surface water operations and maintenance. With increased workloads, including operations and maintenance associated with the annexation area and new NPDES requirements, and additional service truck is needed.<br><br>This programmatic project is to add a service truck to the surface water fleet that is capable of hauling heavy gear and a small crane. | Project Status | Augmentation of Existing Work |
| | | Work Group | Operations and Maintenance |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• Service truck will be large enough to haul heavy gear legally, including a small crane.<br>• Service truck would be purchased in 2015.<br>• On-going annual costs include maintenance and replacement. | | |
| Project Partners | None. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed average annual cost* |
|---|---|---|---|---|---|---|---|---|
| Service Truck | $0 | $109,800 | $21,468 | $21,468 | $ 21,468 | $21,468 | $ 21,468 | $36,190 |
| | | | | | | Subtotal | | $ 36,190 |
| | | | | | | Consultant Management (if consultants are used) | 10% | $0 |
| | | | | | | Washington State Sales Tax (equipment only) | 9.5% | Included |
| | | | | | | Subtotal | | $36,190 |
| | | | | | | Contingency | 30% | NA |
| | | | | | | Total cost | | $ 36,190 |

* Annual proposed additional costs include annual cost plus one-time additional cost divided by six (number of years assumed for SWMP implementation).

| Project: | Watershed Planning for Retrofit | | ID: CW-15 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☐ Maintenance ☒ Education and Outreach ☐ Policy ☐ Natural Resources ☐ Water Quality ☒ Development & Permitting ☐ Flooding | Preliminary Proposed Project Cost: | $44,000 |
| Problem: | Retrofit opportunities are often discovered too late in the development review process to effectively partner for mutually beneficial projects. | Priority: | Optional 1 |

| | | | |
|---|---|---|---|
| Description | In order to effectively identify locations where stormwater retrofit should be focused, this programmatic project is to study and prioritize retrofits on a watershed basis where development and redevelopment are most likely to occur and where potential flow control and water quality benefits are greatest.<br><br>The outcome of this study would be specific retrofits that could be acted upon with "opportunity fund" in the CIP to allow for partnering with private developers where it makes the most sense. | Project Status | Augmentation of Existing Work |
| | | Work Group | Consultant with oversight by Surface Water Engineering |

**Considerations and Assumptions**

The following assumptions are included in this estimate:

- Funding begins in 2015.
- A consultant would evaluate different options for stormwater retrofit on a watershed basis, including:
  - Opportunities to build regional facilities that promote redevelopment while preserving or enhancing ecological functions.
  - Opportunities to treat public run-off through contribution of funds for planned adjacent private facilities that are sized to accommodate public run-off.

**Project Partners**

None.

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed project cost |
|---|---|---|---|---|---|---|---|---|
| Study of retrofit opportunities City-wide | $0 | $40,000 | $0 | $0 | $0 | $0 | $0 | $44,000 |
| | | | | | | Subtotal | | $ 40,000 |
| | | | | | | Consultant Management (if consultants are used) | 10% | $4,000 |
| | | | | | | Washington State Sales Tax (equipment only) | 9.5% | $0 |
| | | | | | | Subtotal | | $44,000 |
| | | | | | | Contingency | 30% | Not applied |
| | | | | | | Total cost | | $ 44,000 |

| Project: | Spill Response Vehicle | | ID: CW-16 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☒ Maintenance ☐ Education and Outreach ☐ Policy ☐ Natural Resources ☒ Water Quality ☐ Development & Permitting ☐ Flooding ☐ Administration and Support | Preliminary Proposed Average Annual Project Cost: | $29,356 |
| Problem: | City staff could respond to spills more efficiently if a dedicated vehicle were available with supplies | Priority: | Optional 1 |
| Description | This programmatic project is to purchase a F150 truck with supplies to respond to spills as necessary. | Project Status | Augmentation of Existing Work |
| | | Work Group | Operations and Maintenance |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• Purchase F150 truck in 2016.<br>• Annual costs include operations and maintenance and replacement. | | |
| Project Partners | None. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed average annual project cost* |
|---|---|---|---|---|---|---|---|---|
| F150 Spill Control Truck | $0 | $0 | $104,265 | $17,968 | $17,968 | $17,968 | $17,968 | $29,356 |
| | | | | | | Subtotal | | $ 29,356 |
| | | | | | | Consultant Management (if consultants are used) | 10% | $0 |
| | | | | | | Washington State Sales Tax (equipment only) | 9.5% | included |
| | | | | | | Subtotal | | $29,356 |
| | | | | | | Contingency | 30% | Not applied |
| | | | | | | Total cost | | $29,356 |

* Annual proposed additional costs include annual cost plus one-time additional cost divided by six (number of years assumed for SWMP implementation).

| Project: | Proactively Avoid TMDL | | ID: CW-17 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☐ Maintenance ☐ Education and Outreach ☒ Policy ☐ Natural Resources ☒ Water Quality ☐ Development & Permitting ☐ Flooding | Preliminary Average Annual Project Cost: | $26,200 |
| Problem: | Several City streams do not meet State water quality standards for fecal coliform bacteria, temperature and dissolved oxygen | Priority: | Optional 1 |

| | | | |
|---|---|---|---|
| Description | Several City streams are on the Ecology's 303(d) list for not meeting State water quality standards for fecal coliform bacteria, temperature and dissolved oxygen. Ecology is under court order to write a Total Maximum Daily Load (TMDL) limit for watersheds that have 303(d) listings, including Juanita Creek.<br><br>This programmatic project is to proactively begin implementation measures to reduce fecal coliform loading and stream temperatures that will also affect dissolved oxygen in a positive way. Monitoring water quality will be a component of this program to track progress. Through active measures to improve water quality and testing, the City will attempt to avoid the issuance of a TMDL for Juanita Creek. | Project Status | New |
| | | Work Group | Surface Water Engineering<br><br>Consultant and Lab Fees |

**Considerations and Assumptions**

The following assumptions are included in this estimate:

- Consultant time would be needed to develop implementation plan (one-time cost).
- Surface water engineering staff in coordination with Parks and Transportation would implement water quality improvement projects and monitor progress in subsequent years (assume 40 hours per year)
- Laboratory and equipment fees are assumed to be $20,000 annually for fecal coliform testing.
- Project begins in 2014.

**Project Partners**

None.

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | | Annual additional costs | | Total proposed cost | Total proposed average annual cost* |
|---|---|---|---|---|---|---|---|---|
| Develop implementation plan | $0 | $22,000 | $0 | $0 | $0 | $0 | $0 | $3,667 |
| Fecal coliform testing and equipment | $0 | $ 20,000 | $ 20,000 | $ 20,000 | $ 20,000 | $20,000 | $ 20,000 | $20,000 |
| Staff time to implement program | $0 | $ 2,480 | $ 2,480 | $ 2,480 | $ 2,480 | $ 2,480 | $ 2,480 | $2,480 |
| | | | | | | Subtotal | | $ 26,147 |
| | | | | | Consultant Management (if consultants are used) | 10% | | Not included |
| | | | | | Washington State Sales Tax (equipment only) | 9.5% | | $0 |
| | | | | | Subtotal | | | $26,200 |
| | | | | | Contingency | 30% | | Not applied |
| | | | | | Total cost | | | $ 26,200 |

* Annual proposed additional costs include annual cost plus one-time additional cost divided by six (number of years assumed for SWMP implementation).

| Project: | City-Specific Water Quality Monitoring | | ID: CW-18 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☐ Maintenance ☐ Education and Outreach ☐ Policy ☐ Natural Resources ☒ Water Quality ☐ Development & Permitting ☐ Flooding | Preliminary Proposed Average Annual Project Cost: | $9,727 |
| Problem: | Water quality monitoring at City-specific locations is needed to evaluate trends and outcomes of City-wide water quality programs and initiatives | Priority: | Optional 1 |
| Description | The City currently conducts water quality monitoring at Forbes Lake, and water level monitoring at Totem Lake. Additionally, fecal coliform bacteria monitoring occurs at various stream locations throughout the City.<br><br>This programmatic project is to expand the lake monitoring to include Totem Lake in order to establish a baseline to measure future conditions against as the watershed is retrofit and economic development initiatives are implemented.<br><br>The project also includes and evaluation and pilot implementation of water quality data collection to establish a Water Quality Index (WQI) for select Kirkland stream systems. | Project Status | Augmentation of Existing Work |
| | | Work Group | Surface Water Engineering |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• Funding begins in 2014.<br>• Surface water engineering staff will evaluate whether to collect WQI data (40 hours are assumed)<br>• Surface water engineering staff would implement a pilot program to collect WQI data (60 hours assumed annually)<br>• WQI data would be collected at 3 locations and would require monthly measurements (1 hour per site), and lab costs of approximately $2,000 per year. | | |
| Project Partners | None. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed average annual project cost* |
|---|---|---|---|---|---|---|---|---|
| Monitor Water Quality in Totem Lake | $0 | $7,000 | $7,000 | $7,000 | $ 7,000 | $7,000 | $7,000 | **$7,000** |
| Evaluate WQI program | $0 | $2,640 | $0 | $0 | $0 | $0 | $0 | **$440** |
| Pilot WQI implementation program | $0 | $3,720 | $2,000 | $2,000 | $ 2,000 | $2,000 | $2,000 | **$2,287** |
| | | | | | | Subtotal | | **$ 9,727** |
| | | | | | | Consultant Management (if consultants are used) | 10% | **$0** |
| | | | | | | Washington State Sales Tax (equipment only) | 9.5% | **$0** |
| | | | | | | Subtotal | | **$9.727** |
| | | | | | | Contingency | 30% | Not applied |
| | | | | | | Total cost | | **$ 9.727** |

* Annual proposed additional costs include annual cost plus one-time additional cost divided by six (number of years assumed for SWMP implementation).

| Project: | Beaver Management Policy | | ID: CW-19 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☐ Maintenance ☐ Education and Outreach ☒ Policy ☐ Natural Resources ☐ Water Quality ☐ Development & Permitting ☒ Flooding | Preliminary Proposed Average Annual Project Cost: | $5,400 |
| Problem: | Beavers can have significant impacts on public surface water facilities and private property contributing to flooding. | Priority: | Optional 1 |
| Description | The City currently attempts to manage beaver activity where public infrastructure is impacted. A broader policy may be needed to determine how and when beavers are removed and whether on-going management should include areas where large numbers of private properties are affected.<br><br>This programmatic project is to evaluate the need for a formal policy of how and when to manage beavers that impact public facilities, including trapping and relocation, destruction of beaver-built structures (dams, houses), installation of beaver-deceivers to prevent damming, etc. and also includes budget for on-going trap and relocate costs and beaver deceiver devices. | Project Status | Augmentation of Existing Work |
| | | Work Group | Surface Water Engineering<br><br>Operations and Maintenance |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• Surface water engineering staff will evaluate and/or develop a policy (40 hours are assumed).<br>• On-going costs for beaver trap and relocate, and installation of beaver deceiver devices is included.<br>• Project begins in 2014. | | |
| Project Partners | None. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | | One-time additional cost | | Annual additional costs | | Total proposed cost | Total proposed average annual cost* |
|---|---|---|---|---|---|---|---|---|
| Develop Policy | $0 | $2,400 | $0 | $0 | $ 0 | $0 | $ 0 | $400 |
| Trap and relocate and beaver deceivers | $0 | $5,000 | $5,000 | $5,000 | $ 5,000 | $5,000 | $ 5,000 | $5,000 |
| | | | | | | Subtotal | | $ 5,400 |
| | | | | | Consultant Management (if consultants are used) | 10% | | $0 |
| | | | | | Washington State Sales Tax (equipment only) | 9.5% | | $0 |
| | | | | | Subtotal | | | $5,400 |
| | | | | | Contingency | 30% | | Not applied |
| | | | | | Total cost | | | $ 5,400 |

* Annual proposed additional costs include annual cost plus one-time additional cost divided by six (number of years assumed for SWMP implementation).

| Project: | Stream Habitat and Fish Monitoring | | ID: CW-20 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☐ Maintenance ☒ Education and Outreach ☐ Policy ☒ Natural Resources ☐ Water Quality ☐ Development & Permitting ☐ Flooding | Preliminary Proposed Average Annual Project Cost: | $47,667 |
| Problem: | **Understanding fish populations and habitat conditions is useful to prioritize capital projects inform regional discussions about preservation/restoration of urban streams.** | Priority: | Optional 2 |

**Description**

Performing full habitat assessments on segments of Kirkland's streams provides valuable water quality data. The last full scale assessment was on Juanita Creek in 2000 (in partnership with King County. Items to measure include:

- Water temperature
- Dissolved oxygen
- pH
- length and number of pools, riffles, glides
- Noted outfall pipes (possible illicit connections)
- Fish passage barriers
- Presence or absence of macroinvertebrates

This programmatic project will also include cataloging information about fish counts on Kirkland streams (through both development and maintenance operations).

| | |
|---|---|
| Project Status | New |
| Work Group | Consultant with oversight by Surface Water Engineering |

**Considerations and Assumptions**

The following assumptions are included in this estimate:

- Funding begins in 2016.
- A consultant would conduct the following with oversight by surface water engineering staff:
  - Annual fish surveys at 3 locations. Assumes 1 day each, electrofishing equipment and permits.
  - Annual stream channel cross sections at 3 locations. Assumes 2 days per cross section, and 2 staff to conduct the field work.
  - Biannual habitat surveys on 3 stream reaches. Assumes 2 days per reach, and 2 staff to conduct the field work.

**Project Partners**

None.

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed average annual project cost* |
|---|---|---|---|---|---|---|---|---|
| Electrofishing | $0 | $0 | $22,000 | $22,000 | $22,000 | $22,000 | $22,000 | $18,333 |
| Channel cross sections | $0 | $0 | $22,000 | $22,000 | $22,000 | $22,000 | $22,000 | $18,333 |
| Habitat surveys | $0 | $0 | $22,000 | $0 | $22,000 | $0 | $22,000 | $11,000 |
| | | | | | | Subtotal | | $ 47,667 |
| | | | | | | Consultant Management (if consultants are used) | 10% | Included above |
| | | | | | | Washington State Sales Tax (equipment only) | 9.5% | $0 |
| | | | | | | Subtotal | | $47,667 |
| | | | | | | Contingency | 30% | Not applied |
| | | | | | | Total cost | | $ 47,667 |

*Annual proposed additional costs include annual cost plus one-time additional cost divided by six (number of years assumed for SWMP implementation).

| Project: | Operations and Maintenance CIP Consultation | | ID: CW-21 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☒ Maintenance ☐ Education and Outreach ☐ Policy ☐ Natural Resources ☐ Water Quality ☐ Development & Permitting ☐ Flooding ☒ Administration and Support | Preliminary Proposed Average Annual Project Cost: | $1,270 |
| Problem: | Surface water capital projects could be designed and constructed in a manner that is more conducive to effective long-term maintenance if O&M staff had more input into designs. | Priority: | Optional 2 |
| Description | Currently there is not a formal consultation process for O&M staff to review and provide input on new surface water capital projects and some projects are constructed that are very difficult to operate and maintain in the long-term.<br><br>This programmatic project is to develop a more formal consultation process to allow more input from O&M staff prior to final design and construction of capital projects that will eventually be maintained by O&M staff. | Project Status | Augmentation of Existing Work |
| | | Work Group | Operations and Maintenance<br><br>Capital Projects Engineering |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• Funding begins in 2015.<br>• Operations and maintenance staff would work with capital projects engineering staff to develop review procedures to facilitate timely and effective input to long-term operations and maintenance of new capital facilities and infrastructure (80 staff hours are assumed).<br>• Five projects per year would require O&M review (2 hours per project) | | |
| Project Partners | None. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed average annual cost* |
|---|---|---|---|---|---|---|---|---|
| O&M CIP consultation procedures | $0 | $4,320 | $0 | $0 | $0 | $0 | $0 | $720 |
| O&M Staff time to review projects | $0 | $550 | $550 | $550 | $550 | $550 | $550 | $550 |
| | | | | | | Subtotal | | $ 1,270 |
| | | | | | Consultant Management (if consultants are used) | 10% | | $0 |
| | | | | | Washington State Sales Tax (equipment only) | 9.5% | | $0 |
| | | | | | Subtotal | | | $1,270 |
| | | | | | Contingency | 30% | | NA |
| | | | | | Total cost | | | $ 1,270 |

* Annual proposed additional costs include annual cost plus one-time additional cost divided by six (number of years assumed for SWMP implementation).

| Project: | Environmental Permitting for Maintenance | | ID: CW-22 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☒ Maintenance ☐ Education and Outreach ☐ Policy ☐ Natural Resources ☐ Water Quality ☒ Development & Permitting ☐ Flooding ☐ Administration and Support | Preliminary Proposed Average Annual Project Cost: | $18,000 |
| Problem: | Work load to research and obtain permits for environmental work has increased with annexation | Priority: | Optional 2 |
| Description | Currently surface water engineering staff assist in obtaining necessary environmental permits for required maintenance work. Annexation has increased the number and type of permits required for maintenance as many of the stormwater facilities are in line with streams or have the potential to impact natural resources.<br><br>This programmatic project is to hire staff or set aside budget for consultant to obtain permits and track and report per permit requirements. | Project Status | Augmentation of Existing Work |
| | | Work Group | Surface Water Engineering or Consultant |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• Funding would begin in 2015.<br>• Ten permits will be required annually, and 20 hours of staff or consultant time are needed per permit. The total cost would be shared with streets (50% assigned to each), and only ½ of the estimated cost is included in this budget estimate.<br>• Ten permit reports will be submitted annually, with 10 hours of staff or consultant time needed for each report. Total cost is shared with streets (50% assigned to each), and only ½ of the estimated cost is included in the budget estimate. | | |
| Project Partners | None. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed average annual cost* |
|---|---|---|---|---|---|---|---|---|
| Obtain permits for maintenance activities | $0 | $12,000 | $12,000 | $12,000 | $12,000 | $12,000 | $12,000 | **$12,000** |
| Prepare reports documenting maintenance activities as required by permits. | $0 | $6,000 | $6,000 | $6,000 | $6,000 | $6,000 | $6,000 | **$6,000** |
| | | | | | | Subtotal | | $ 18,000 |
| | | | | | | Consultant Management (if consultants are used) | 10% | $0 |
| | | | | | | Washington State Sales Tax (equipment only) | 9.5% | $0 |
| | | | | | | Subtotal | | $18,000 |
| | | | | | | Contingency | 30% | Not applied |
| | | | | | | Total cost | | $ 18,000 |

* Annual proposed additional costs include annual cost plus one-time additional cost divided by six (number of years assumed for SWMP implementation).

| Project: | Property Acquisition and Priority Map | | ID: CW-23 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☐ Maintenance ☐ Education and Outreach ☒ Policy ☒ Natural Resources ☐ Water Quality ☐ Development & Permitting ☐ Flooding | Preliminary Proposed Project Cost: | $37,260 |
| Problem: | Opportunities for preservation of open space and natural resources is sometimes missed because City isn't positioned to acquire beneficial properties as they come on the market. | Priority: | Optional 2 |

| | | | |
|---|---|---|---|
| Description | Preservation of streams and forested areas could be the most effective strategy for protecting a watershed, rather than trying to restore after degradation has occurred. This programmatic project is to develop a property acquisition policy that would allow the Utility to purchase property where there would be a surface water benefit in doing so.<br><br>Additionally, this project would evaluate undeveloped properties that provide unique or valuable ecologic functions for which preservation would benefit surface water and develop a map for internal use of areas that should be prioritized for potential acquisition. | Project Status | New |
| | | Work Group | Consultant with oversight by Surface Water Engineering |

**Considerations and Assumptions**

The following assumptions are included in this estimate:

- Property acquisition policy would be developed by surface water engineering staff (60 hours staff time are assumed).
- A consultant would develop an evaluation procedure for determining the types of properties that should be considered for acquisition based on surface water benefit (300 hours are assumed).
- If a map is developed, it would be for internal use only.
- Project would be funded in 2015.

**Project Partners**

None.

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed project cost |
|---|---|---|---|---|---|---|---|---|
| Develop property acquisition policy | $0 | $4,260 | $0 | $0 | $0 | $0 | $0 | $4,260 |
| Develop procedures for identifying property for acquisition and/or a map of priority areas | $0 | $30,000 | $0 | $0 | $0 | $0 | $0 | $30,000 |
| | | | | | | | Subtotal | $ 34,260 |
| | | | | | | Consultant Management (if consultants are used) | 10% | $3,000 |
| | | | | | | Washington State Sales Tax (equipment only) | 9.5% | $0 |
| | | | | | | Subtotal | | $37,260 |
| | | | | | | Contingency | 30% | Not applied |
| | | | | | | Total cost | | $ 37,260 |

| Project: | Evaluation of Dredging in Lake Washington | | ID: CW-24 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☐ Maintenance ☐ Education and Outreach ☒ Policy ☐ Natural Resources ☐ Water Quality ☐ Development & Permitting ☐ Flooding ☐ Administration and Support | Preliminary Proposed Project Cost: | $7,100 |
| Problem: | Sediment deposition at the outlets of stormwater outfalls in Lake Washington and other locations can impact marinas and boat launches by reducing water depths and access for boats. | Priority: | Optional 2 |
| Description | This programmatic project is to evaluation whether a policy needs to be developed for if or when the surface water utility would choose to conduct dredging for the purpose of maintaining the functionality of marinas and boat launches. | Project Status | New |
| | | Work Group | Surface Water Engineering |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• Surface water engineering staff would conduct the evaluation of need for dredging, including short- and long-term costs and implications (40 staff hours are assumed)<br>• Project would be funded in 2015.<br>• Surface water engineering staff would draft a policy, if it is determined that there is a need (60 staff hours are assumed). | | |
| Project Partners | None. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed project cost |
|---|---|---|---|---|---|---|---|---|
| Evaluate need for dredging policy | $0 | $2,840 | $0 | $0 | $0 | $0 | $0 | $2,840 |
| Draft policy | $0 | $4,260 | $0 | $0 | $0 | $0 | $0 | $4,260 |
| | | | | | | | Subtotal | $ 7,100 |
| | | | | | | Consultant Management (if consultants are used) | 10% | $0 |
| | | | | | | Washington State Sales Tax (equipment only) | 9.5% | $0 |
| | | | | | | Subtotal | | $7,100 |
| | | | | | | Contingency | 30% | Not applied |
| | | | | | | Total cost | | $7,100 |

| Project: | Urban Forestry and Tree Inventory | | ID: CW-25 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☐ Maintenance ☐ Education and Outreach ☒ Policy ☒ Natural Resources ☐ Water Quality ☐ Development & Permitting ☐ Flooding ☐ Administration and Support | Preliminary Proposed Average Annual Project Cost: | $10,137 |
| Problem: | Urban forests provide a tangible surface water benefit as well as other City-wide benefits. | Priority: | Optional 2 |
| Description | This programmatic project is to evaluate the benefit of the urban forester position to the Utility, and how the position could be used to optimize surface water benefits. An evaluation of potential cost-sharing with other departments, and development of a tree-inventory and treebate program are also included in this project. | Project Status | Augmentation of Existing Work |
| | | Work Group | Surface Water Engineering<br><br>Consultant with oversight by surface water engineering staff |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• Surface water engineering staff would conduct the evaluation of surface water benefit from the urban forestry position (20 staff hours are assumed).<br>• Surface water engineering staff would develop the framework for a treebate program (20 staff hours are assumed).<br>• Surface water engineering staff would identify cost-sharing opportunities within the City (20 staff hours are assumed).<br>• Project would be funded in 2015.<br>• A consultant would conduct a tree inventory with oversight by surface water engineering staff.<br>• The inventory would include only trees within the public right-of-way, and annual follow-up (by City staff) would be required for some trees to keep the inventory current. | | |
| Project Partners | None. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed average annual project cost* |
|---|---|---|---|---|---|---|---|---|
| Evaluate surface water benefit from urban forestry position | $0 | $1,140 | $0 | $0 | $0 | $0 | $0 | $190 |
| Develop Treebate program | $0 | $1,140 | $0 | $0 | $0 | $0 | $0 | $190 |
| Identify cost-sharing opportunities | $0 | $1,140 | $0 | $0 | $0 | $0 | $0 | $190 |
| Conduct tree inventory | $0 | $46,000 | $2,280 | $2,280 | $2,280 | $2,280 | $2,280 | $9,567 |
| | | | | | | Subtotal | | $ 10,137 |
| | | | | | Consultant Management (if consultants are used) | 10% | | $4,600 (incl. above) |
| | | | | | Washington State Sales Tax (equipment only) | 9.5% | | $0 |
| | | | | | Subtotal | | | $10,137 |
| | | | | | Contingency | 30% | | Not applied |
| | | | | | Total cost | | | $10,137 |

* Annual proposed additional costs include annual cost plus one-time additional cost divided by six (number of years assumed for SWMP implementation).

| Project: | Climate Change Evaluation | | ID: CW-26 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☒ Maintenance ☐ Education and Outreach ☒ Policy ☐ Natural Resources ☐ Water Quality ☐ Development & Permitting ☒ Flooding ☐ Administration and Support | Preliminary Proposed Project Cost: | $55,000 |
| Problem: | Climate change has the potential to impact Utility operations | Priority: | Optional 2 |
| Description | Climate change has the potential to impact the Utility through increased flooding and summer droughts. This programmatic project is to evaluate potential effects of climate change and to develop a policy that addresses future infrastructure needs, planning, and adaptive management. | Project Status | New |
| | | Work Group | Consultant with oversight from Surface Water Engineering |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• An initial adaptation study would be conducted with specific recommendations for how climate should be considered in daily business (including factors of safety depending on expected life of infrastructure).<br>• The study would be conducted by a consultant with oversight by surface water engineering staff.<br>• A climate change policy would be developed that would require the Utility to consider climate change when determining plantings, facility sizing and impacts of programs.<br>• Project would be funded in 2015. | | |
| Project Partners | None. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed project cost |
|---|---|---|---|---|---|---|---|---|
| Climate change adaptation study | $0 | $40,000 | $0 | $0 | $0 | $0 | $0 | $40,000 |
| Develop climate change policy | $0 | $10,000 | $0 | $0 | $0 | $0 | $0 | $10,000 |
| | | | | | | Subtotal | | $ 50,000 |
| | | | | | | Consultant Management (if consultants are used) | 10% | $5,000 |
| | | | | | | Washington State Sales Tax (equipment only) | 9.5% | $0 |
| | | | | | | Subtotal | | $55,000 |
| | | | | | | Contingency | 30% | Not applied |
| | | | | | | Total cost | | $55,000 |

| Project: | Streamside Restoration Maintenance | | ID: CW-27 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☒ Maintenance ☐ Education and Outreach ☒ Policy ☐ Natural Resources ☐ Water Quality ☒ Development & Permitting ☐ Flooding ☐ Administration and Support | Preliminary Proposed Average Annual Project Cost: | $30,360 |
| Problem: | Streamside restoration plantings require long-term maintenance for successful establishment and growth | Priority: | Optional 2 |

| | | | |
|---|---|---|---|
| Description | Streamside restoration is a popular and effective technique that benefits surface water quality and stream habitat. In order for such projects to be successful, the plantings need long-term care and monitoring.<br><br>Currently, care of stream projects are handled by different City departments and sometimes by volunteers. A program to identify maintenance responsibility and easements (on private property) is needed.<br><br>This programmatic project provides funding to Green Kirkland to maintain stream restoration sites in City parks, and create permanent easements for maintenance access on private property. | Project Status | Augmentation of Existing Work |
| | | Work Group | Surface Water Engineering<br><br>Green Kirkland |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• The Utility would provide $30,000 per year to Green Kirkland for the purpose of increasing maintenance on stream restoration sites and establishing permanent easements to conduct work on private property.<br>• Surface water engineering staff would also conduct an evaluation of responsibility for maintaining stream capital projects, including length of time and whether easements are established (40 staff hours assumed).<br>• Project would be funded in 2015. | | |
| Project Partners | None. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed average annual project cost* |
|---|---|---|---|---|---|---|---|---|
| Funding to Green Kirkland | $0 | $30,000 | $30,000 | $30,000 | $30,000 | $30,000 | $30,000 | $30,000 |
| Evaluate stream restoration maintenance | $0 | $2,160 | $0 | $0 | $0 | $0 | $0 | $360 |
| | | | | | | Subtotal | | $ 30,360 |
| | | | | | Consultant Management (if consultants are used) | 10% | | $0 |
| | | | | | Washington State Sales Tax (equipment only) | 9.5% | | $0 |
| | | | | | Subtotal | | | $30,360 |
| | | | | | Contingency | 30% | | Not applied |
| | | | | | Total cost | | | $30,360 |

* Annual proposed additional costs include annual cost plus one-time additional cost divided by six (number of years assumed for SWMP implementation).

| Project: | Noxious Weeds and Invasive Plants | | ID: CW-28 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☐ Maintenance ☐ Education and Outreach ☒ Policy ☒ Natural Resources ☐ Water Quality ☐ Development & Permitting ☐ Flooding ☐ Administration and Support | Preliminary Proposed Average Annual Project Cost: | $4,140 |
| Problem: | There is a need for a comprehensive noxious weed program in order to successfully reduce proliferation on capital projects and throughout the City | Priority: | Optional 2 |
| Description | The City invests in capital projects that have vegetative components that require control of weeds and invasive plants. Budget is spent controlling weeds on project sites, but weed proliferation from adjacent properties sometimes occurs negating the initial effort.<br><br>This programmatic project will develop a plan to control noxious weeds in Kirkland, using examples from other jurisdictions. | Project Status | Augmentation of Existing Work |
| | | Work Group | Surface Water Engineering<br>Green Kirkland<br>Parks<br>Volunteers |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• Surface water engineering staff would review noxious weed programs for applicability in Kirkland (20 staff hours are assumed).<br>• Surface water engineering staff would work with Green Kirkland and Parks to jointly develop a noxious weed program for Kirkland (100 staff hours are assumed).<br>• Surface water engineering staff would develop priority eradication areas and develop an implementation plan (100 staff hours are assumed)<br>• Noxious weed program implementation would involve the use of volunteers with oversight by City surface water engineering staff (40 staff hours are assumed per year).<br>• Project would be funded in 2015. | | |
| Project Partners | Green Kirkland, Parks, and Volunteers. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed average annual project cost* |
|---|---|---|---|---|---|---|---|---|
| Evaluate and develop a noxious weed program plan | $0 | $11,880 | $0 | $0 | $0 | $0 | $0 | $1,980 |
| On-going program implementation | $0 | $2,160 | $2,160 | $2,160 | $2,160 | $2,160 | $2,160 | $2,160 |
| | | | | | | | Subtotal | $ 4,140 |
| | | | | | | Consultant Management (if consultants are used) | 10% | $0 |
| | | | | | | Washington State Sales Tax (equipment only) | 9.5% | $0 |
| | | | | | | Subtotal | | $4,140 |
| | | | | | | Contingency | 30% | Not applied |
| | | | | | | Total cost | | $4,140 |

* Annual proposed additional costs include annual cost plus one-time additional cost divided by six (number of years assumed for SWMP implementation).

| Project: | Juanita Creek Floodplain Mapping | | ID: CW-29 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☐ Maintenance ☐ Education and Outreach ☒ Policy ☐ Natural Resources ☐ Water Quality ☐ Development & Permitting ☒ Flooding ☐ Administration and Support | Preliminary Proposed Project Cost: | $11,000 |
| Problem: | Juanita Creek floodplain may require updated mapping | Priority: | Optional 2 |
| Description | This programmatic project is to evaluate the need to map the Juanita Creek floodplain. | Project Status | New |
| | | Work Group | Consultant with oversight by Surface Water Engineering |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• Budget assumption below is the base cost for what might be needed to map the Juanita Creek floodplain and go through a FEMA map revision. Prior to pursuing floodplain mapping, goals and level of effort needed should be determined.<br>• A consultant would conduct the mapping exercise with oversight by surface water engineering staff.<br>• Project would be funded in 2017. | | |
| Project Partners | None. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed project cost |
|---|---|---|---|---|---|---|---|---|
| Conduct floodplain mapping on Juanita Creek | $0 | $0 | $0 | $10,000 | $0 | $0 | $0 | $10,000 |
| | | | | | | Subtotal | | $ 10,000 |
| | | | | | | Consultant Management (if consultants are used) | 10% | $1,000 |
| | | | | | | Washington State Sales Tax (equipment only) | 9.5% | $0 |
| | | | | | | Subtotal | | $11,000 |
| | | | | | | Contingency | 30% | Not applied |
| | | | | | | Total cost | | $11,000 |

* Annual proposed additional costs include annual cost plus one-time additional cost divided by six (number of years assumed for SWMP implementation).

| Project: | Maintenance on Goat Hill | | ID: CW-30 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☒ Maintenance ☐ Education and Outreach ☐ Policy ☐ Natural Resources ☐ Water Quality ☐ Development & Permitting ☐ Flooding | Preliminary Proposed Average Annual Project Cost: | $65,063 |
| Problem: | City equipment and trucks can't access Goat Hill area where there are on-going erosion problems. | Priority: | Optional 3 |
| Description | This programmatic alternative is to purchase a small educator truck and trailer that can access Goat Hill and other hard to reach areas that are not accessible by standard size equipment. | Project Status | New |
| | | Work Group | Operations and Maintenance |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• A 6-yard, single axle Hydro excavator/educator OR trailer with vacuum will be purchased.<br>• Equipment will be purchased in 2016, and on-going annual expenses associated with the equipment will begin in 2015. | | |
| Project Partners | None. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed average annual cost* |
|---|---|---|---|---|---|---|---|---|
| Hydro excavator/eductor | $0 | $275,000 | $23,076 | $23,076 | $ 23,076 | $23,076 | $23,076 | $65,063 |
| | | | | | | Subtotal | | $ 65,063 |
| | | | | | | Consultant Management (if consultants are used) | 10% | $0 |
| | | | | | | Washington State Sales Tax (equipment only) | 9.5% | Included |
| | | | | | | Subtotal | | $65,063 |
| | | | | | | Contingency | 30% | NA |
| | | | | | | Total cost | | $ 65,063 |

* Annual proposed additional costs include annual cost plus one-time additional cost divided by six (number of years assumed for SWMP implementation).

| Project: | Stormwater System Rehabilitation Catch-up | | ID: CW-31 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☒ Maintenance ☐ Education and Outreach ☐ Policy ☐ Natural Resources ☐ Water Quality ☐ Development & Permitting ☐ Flooding ☐ Administration and Support | Preliminary Proposed Average Annual Project Cost: | $24,834 |
| Problem: | Pipe rehabilitation needs are greater than ability of O&M crew to conduct the work | Priority: | Optional 2 |
| Description | The annexation area has increased the amount of rehabilitation work needing to be accomplished, in addition to downtown rehabilitation needs. At the same time, additional pipes are being identified for rehabilitation through the CCTV pipe inspection work.<br><br>This programmatic project is to hire temporary staff and rent equipment to conduct rehabilitation in order to catch-up on the current workload. | Project Status | Augmentation of Existing Work |
| | | Work Group | Temporary staff<br><br>Operations and Maintenance |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• Funding would occur in 2015.<br>• Four temporary maintenance workers would be needed for approximately 6 months to conduct rehabilitation on existing pipes.<br>• Equipment rental (up to $10,000 is included in the estimate) | | |
| Project Partners | None. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed average annual cost* |
|---|---|---|---|---|---|---|---|---|
| Four temporary maintenance workers | $0 | $139,000 | $0 | $0 | $0 | $0 | $0 | $23,167 |
| Equipment | $0 | $10,000 | $0 | $0 | $0 | $0 | $0 | $1,667 |
| | | | | | | Subtotal | | $ 24,834 |
| | | | | | Consultant Management (if consultants are used) | 10% | | $0 |
| | | | | | Washington State Sales Tax (equipment only) | 9.5% | | $0 |
| | | | | | Subtotal | | | $24,834 |
| | | | | | Contingency | 30% | | Not applied |
| | | | | | Total cost | | | $ 24,834 |

* Annual proposed additional costs include annual cost plus one-time additional cost divided by six (number of years assumed for SWMP implementation).

| Project: | Stormwater Pond Edibles | | ID: CW-32 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☒ Maintenance ☐ Education and Outreach ☒ Policy ☐ Natural Resources ☐ Water Quality ☐ Development & Permitting ☐ Flooding ☐ Administration and Support | Preliminary Proposed Average Annual Project Cost: | $1,213 |
| Problem: | Stormwater pond property could be used for food production and community connection | Priority: | Optional 3 |
| Description | This programmatic project is to plant edible food crops in place of grass in the vicinity of stormwater ponds. The result would be reduced mowing and carbon emissions, and a source of food and community connection. | Project Status | Augmentation of Existing Work |
| | | Work Group | Operations and Maintenance |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• Five ponds would serve as a pilot project for planting edible food crops.<br>• Grounds crew laborer would be required for approximately 40 hours per year.<br>• Volunteers would plant, harvest, and maintain edible food crops (100 hours per year).<br>• Project would be funded in 2015.<br>• City would provide plants and seeds (assuming 10,000 square feet of gardening space). Initial investment would be $2,000, with an annual cost of $200. | | |
| Project Partners | None. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed average annual project cost* |
|---|---|---|---|---|---|---|---|---|
| Edible foods at surface water ponds | $0 | $2,880 | $880 | $880 | $880 | $880 | $880 | $1,213 |
| | | | | | | Subtotal | | $ 1,213 |
| | | | | | Consultant Management (if consultants are used) | 10% | | $0 |
| | | | | | Washington State Sales Tax (equipment only) | 9.5% | | $0 |
| | | | | | Subtotal | | | $1,213 |
| | | | | | Contingency | 30% | | Not applied |
| | | | | | Total cost | | | $1,213 |

* Annual proposed additional costs include annual cost plus one-time additional cost divided by six (number of years assumed for SWMP implementation).

| Project: | Leaf Pickup Program Evaluation | | ID: CW-33 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☒ Maintenance ☐ Education and Outreach ☒ Policy ☐ Natural Resources ☐ Water Quality ☐ Development & Permitting ☐ Flooding ☐ Administration and Support | Preliminary Proposed Project Cost: | $11,000 |
| Problem: | Leaf pick-up programs could reduce street sweeping needs in the fall | Priority: | Optional 3 |
| Description | This programmatic project is to evaluate the potential for a leaf pick up program, and whether similar programs in other jurisdictions help alleviate local flooding in the fall. | Project Status | New |
| | | Work Group | Consultant with oversight by surface water engineering staff |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• Evaluation would be conducted by a consultant with oversight by surface water engineering staff.<br>• Project would be funded in 2015. | | |
| Project Partners | None. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed project cost |
|---|---|---|---|---|---|---|---|---|
| Evaluation of leaf pick-up program | $0 | $10,000 | $0 | $0 | $0 | $0 | $0 | $10,000 |
| | | | | | | Subtotal | | $ 10,000 |
| | | | | | Consultant Management (if consultants are used) | 10% | | $1,000 |
| | | | | | Washington State Sales Tax (equipment only) | 9.5% | | $0 |
| | | | | | Subtotal | | | $11,000 |
| | | | | | Contingency | 30% | | Not applied |
| | | | | | Total cost | | | $11,000 |

| Project: | Poop Scoop Law Evaluation | | ID: CW-34 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☐ Maintenance ☐ Education and Outreach ☒ Policy ☐ Natural Resources ☒ Water Quality ☐ Development & Permitting ☐ Flooding ☒ Administration and Support | Preliminary Proposed Project Cost: | $6,480 |
| Problem: | Evaluate poop scoop laws | Priority: | Optional 3 |
| Description | This programmatic project is to evaluate poop scoop laws in other jurisdictions to determine effectiveness and potential applicability to Kirkland. If a law is determined to be viable, an ordinance will be drafted to take to City Council for consideration. | Project Status | Augmentation of Existing Work |
| | | Work Group | Surface Water Engineering |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• Project would be funded in 2016.<br>• Surface water engineering staff will conduct the analysis and make recommendations for City Council consideration (120 staff hours are assumed). | | |
| Project Partners | None. | | |

**Project Cost Estimate**

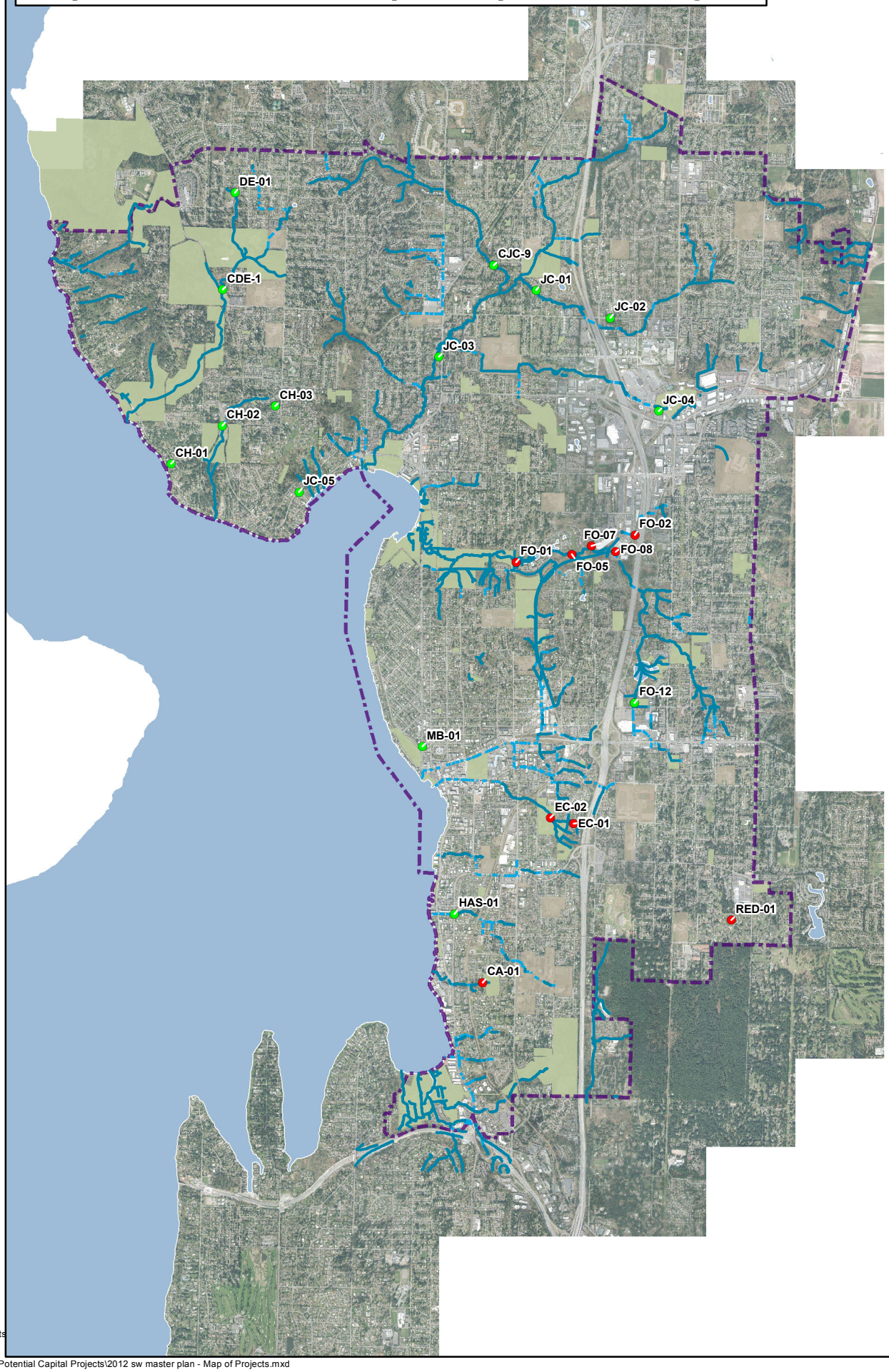
| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed project cost |
|---|---|---|---|---|---|---|---|---|
| Evaluate poop scoop laws, draft ordinance, prepare and attend City Council meetings | $0 | $0 | $6,480 | $0 | $0 | $0 | $0 | $6,480 |
| | | | | | | Subtotal | | $ 6,480 |
| | | | | | | Consultant Management (if consultants are used) | 10% | $0 |
| | | | | | | Washington State Sales Tax (equipment only) | 9.5% | $0 |
| | | | | | | Subtotal | | $6,480 |
| | | | | | | Contingency | 30% | Not applied |
| | | | | | | Total cost | | $6,480 |

| Project: | Volunteer Use | | ID: CW-35 |
|---|---|---|---|
| Project Type: | ☐ NPDES Compliance ☐ Maintenance ☐ Education and Outreach ☒ Policy ☐ Natural Resources ☒ Water Quality ☐ Development & Permitting ☐ Flooding ☒ Administration and Support | Preliminary Proposed Project Cost: | $4,320 |
| Problem: | Volunteers are important contributors to the success of many surface water programs and the optimal use and management of volunteers needs to be evaluated | Priority: | Optional 3 |
| Description | This programmatic project is to evaluate the use of volunteers for surface water activities, and whether the volunteer program should be expanded, diminished or abandoned. Costs associated with using volunteers or not using volunteers will be evaluated. | Project Status | Augmentation of Existing Work |
| | | Work Group | Surface Water Engineering |
| Considerations and Assumptions | The following assumptions are included in this estimate:<br>• Project would be funded in 2015.<br>• Surface water engineering staff will conduct the analysis and make recommendations (80 staff hours are assumed). | | |
| Project Partners | None. | | |

**Project Cost Estimate**

| Tasks | Current 2014 Budget | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total proposed project cost |
|---|---|---|---|---|---|---|---|---|
| Evaluate use of volunteers in surface water management programs | $0 | $4,320 | $0 | $0 | $0 | $0 | $0 | $4,320 |
| | | | | | | Subtotal | | $ 4,320 |
| | | | | | | Consultant Management (if consultants are used) | 10% | $0 |
| | | | | | | Washington State Sales Tax (equipment only) | 9.5% | $0 |
| | | | | | | Subtotal | | $4,320 |
| | | | | | | Contingency | 30% | Not applied |
| | | | | | | Total cost | | $4,320 |

# Attachment C:
# Proposed Surface Water Capitol Improvement Projects

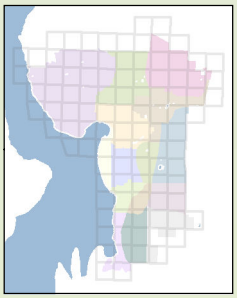



**Legend**

**CIP Projects**

**Currently on CIP**

- NO
- YES
- Open Stream Channel
- Piped Stream Channel
- City Limits
- Lakes
- Parks
- Schools



N W E S

0 1,200 2,400 3,600 4,800 Feet

0 0.2 0.4 0.6 0.8 Miles

CITY OF KIRKLAND WASHINGTON

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Author:
Name: 2012 sw master plan - Map of Projects
Date Saved: 3/5/2014 10:34:14 AM

Path: H:\Pw\Storm\2012 SW Master Plan\Potential Capital Projects\2012 sw master plan - Map of Projects.mxd

| Project: | Denny Creek Culvert | | ID: CDE-1 |
|---|---|---|---|
| Location: | Juanita Drive NE and NE 133rd Pl | Basin: | Denny Creek |
| Project Type:<br><br>Problem: | ☒Infrastructure ☐Water Quality<br>☐Erosion ☒Habitat ☐Flooding<br>Fish passage barrier | Project Cost: | $615,000 |

**Narrative**

The existing 24-inch 138-foot concrete culvert crossing Juanita Dr. NE near NE 133rd Pl. is a fish passage barrier. The culvert's steep slope (3-4%) and long length create high velocities which make it hard for fish to navigate.

The existing channel width is 9-feet wide and approximately 12-feet lower than Juanita Drive NE. The existing culvert is long to accommodate the roadway prism.

The culvert inlet and upstream portion of Denny Creek is located on private property. The culvert outlet and downstream portion of Denny Creek is located on King County Parks' property.

The Denny Creek downstream of the culvert is steeper than the channel is upstream of the culvert.

Home owners in the vicinity have requested a pedestrian underpass in conjunction with the fish passage improvements.

**Outlet of Denny Creek Culvert at Juanita Drive**

**Conceptual Design**

The proposed CIP includes the following improvements:

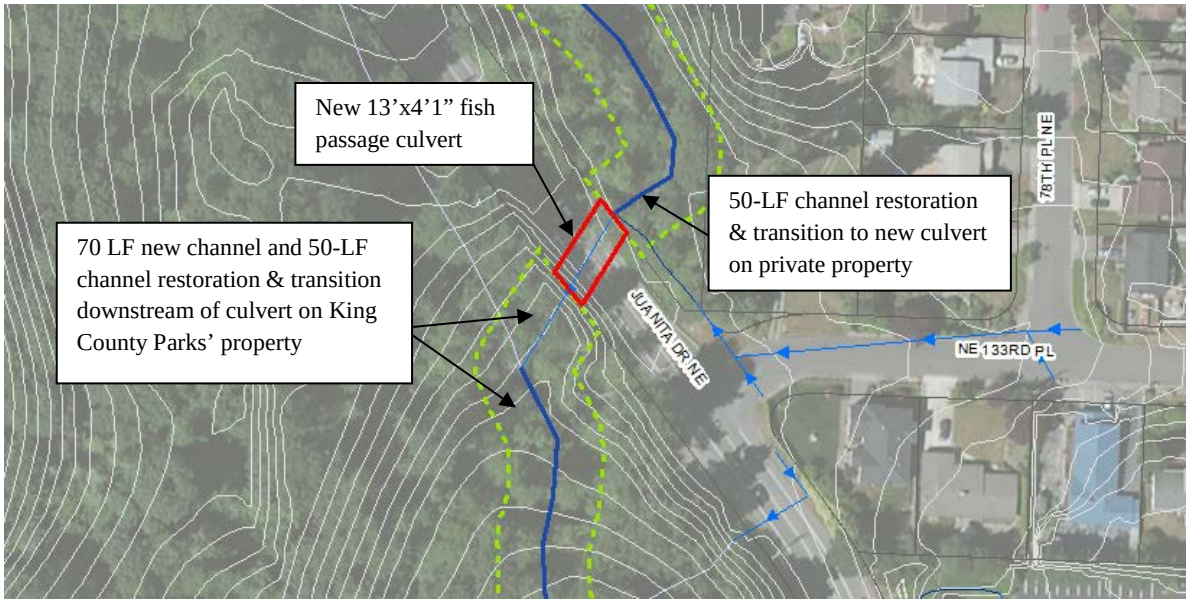
- Install 13' x 4'1" arch fish passable culvert. Culvert is open bottom with footings
- Install headwalls to reduce culvert length from 138 LF to 70LF
- Create new channel length by reducing the culvert length with streambed gravel, and habitat features
- Restore staging areas and channel floodplain with planting and bioengineered restoration

Optional additives:

- Provide a pedestrian underpass by either increasing the culvert size (width and height) or adding a second, parallel culvert. This is not currently included in the cost estimate.

**Considerations for Implementation**

- Environmental permitting including SEPA checklist, WDFW HPA and Army Corps permits.
- A Geomorphologist assessment is recommended to ensure a stable channel design. The existing culvert may be a grade control and/or sediment control. A stable transition from the flatter upstream to the steeper downstream reach of Denny Creek is necessary for a successful project.
- Temporary construction easement will be needed for work on the upstream private property.
- Inclusion of pedestrian underpass by either increasing the culvert size (width and height) or adding a second, parallel culvert. This is not currently included in the cost estimate.




| Project Cost Estimate | | | | |
|---|---|---|---|---|
| Item | Unit | Unit Cost | Quantity | Cost |
| *Water Pollution/Erosion Control* | % | 5% | --- | *$14,000* |
| *SPCC Plan* | LS | $500 | 1 | *$500* |
| *Traffic Control* | % | 7% | — | *$20,000* |
| *Clearing & Grubbing* | SY | $5 | 1,300 | *$6,500* |
| *Remove Asphalt Conc. Pavement* | *SY* | *$28* | *71* | *$1,988* |
| *Excavation Incl. Haul* | *CY* | *$25* | *440* | *$11,000* |
| *Shoring or Extra Excavation Class B* | *SF* | *$1* | *800* | *$800* |
| *Fish Passage Culvert (13'x4'1" arch incl. footings)* | *LF* | *$900* | *70* | *$63,000* |
| *Select Borrow Incl. Haul* | *CY* | *$25* | *220* | *$5,500* |
| *HMA CL 1/2 IN PG 64-22* | *TON* | *$200* | *33* | *$6,600* |
| *Headwall* | *SY* | *$500* | *40* | *$20,000* |
| *Guardrail* | *LF* | *$100* | *40* | *$4,000* |
| *Temporary Stream Bypass* | *LS* | *$24,000* | *1* | *$24,000* |
| *Streambed Gravel* | *CY* | *$30* | *240* | *$7,200* |
| *Stream Habitat Features* | *LS* | *$51,000* | *1* | *$51,000* |
| *Planting and Bioengineered Restoration* | *SY* | *$40* | *1,300* | *$52,000* |
| | | | Subtotal | $288,088 |
| | | Contractor overhead, profit, and mobilization | 10% | $28,809 |
| | | Washington State Sales Tax | 9.5% | $27,368 |
| | | Construction Contingency | 50% | $144,044 |
| | | Subtotal construction costs | | $488,309 |
| | | Administration and engineering design | 20% | $97,662 |
| | | Permitting | | $15,000 |
| | | Geomorphologist | | $7,500 |
| | | Land acquisition and easements | | $6,000 |
| | | Total cost | | $615,000 |

| Project: | Holmes Point Drive Drainage Improvement | | ID: CH-01 |
|---|---|---|---|
| Location: | 11553 Holmes Point Drive NE | Basin: | Champagne Creek |
| Project Type:<br><br>Problem: | ☒Infrastructure ☐Water Quality<br>☐Erosion ☐Habitat ☐Flooding<br>Localized flooding | Preliminary Project Cost: | $219,000 |

**Narrative**

The existing conveyance from the private driveway at 11553 Holmes Point Drive NE to Lake Washington is a series of mismatched and undersized pipes. The driveway is very steep and surface water from the road flows across the yard, resulting in flooding and ponding on private property.

The City added an additional inlet on the opposite side of the driveway which connects to the existing system several years ago, but it does not capture all the runoff. Some runoff flows down the driveway.

This project was identified by the Finn Hill Neighborhood Association.

The recommended solution is to replace the existing pipes with a 12-in tightline. The tightline size was chosen based on other pipe sizes in the area, additional analysis should be performed to verify sizing.

Project benefits include reducing flooding at 11553 Holmes Point Drive NE and neighboring properties.

**Top of Holmes Point driveway, with CB under bush**

**Conceptual Design**

- Remove existing pipes.
- Install 12-in tightline from Holmes Pt Dr NE to Lake Washington.
- Modify existing outfall as needed to fit new pipe diameter.

**Considerations for Implementation**

- Will require a permanent storm drainage easement
- Additional investigation is necessary to locate other stormwater connections to the existing system.
- Additional analysis is recommended to verify pipe sizing.
- Critical Areas permitting may be necessary for the outfall to the lake.

| Project Cost Estimate | | | | |
|---|---|---|---|---|
| Item | Unit | Unit Cost | Quantity | Cost |
| Water Pollution/Erosion Control | % | 5% | – | $4,500 |
| SPCC Plan | LS | $500 | 1 | $500 |
| Traffic Control | % | 3% | – | $2,700 |
| Clearing & Grubbing | SY | $5 | 390 | $1,950 |
| Removal of Structures and Obstructions | LS | $2,000 | 1 | $2,000 |
| High-Density Polyethylene (HDPE) Pipe 12 In. Diam. | LF | $160 | 350 | $56,000 |
| Pipe Anchor | EA | $2,750 | 3 | $8,250 |
| Restoration Planting and Establishment | SY | $40 | 390 | $15,600 |
| | | | Subtotal | $91,500 |
| | | Contractor overhead, profit, and mobilization | 10% | $9,150 |
| | | Washington State Sales Tax | 9.5% | $8,693 |
| | | Construction Contingency | 50% | $45,750 |
| | | Subtotal construction costs | | $155,093 |
| | | Administration and engineering design | 20% | $31,019 |
| | | Permitting | | $15,000 |
| | | Land acquisition and easements | | $17,500 |
| | | Total cost | | $219,000 |

| Project: | Champagne Creek Stabilization | | ID: CH-02 |
|---|---|---|---|
| Location: | Juanita Woodlands Open Space | Basin: | Champagne Creek |
| Project Type:<br><br>Problem: | ☐Infrastructure ☒Water Quality<br>☒Erosion ☒Habitat ☐Flooding<br>Extreme Channel Incision | Preliminary Project Cost: | $689,600 |

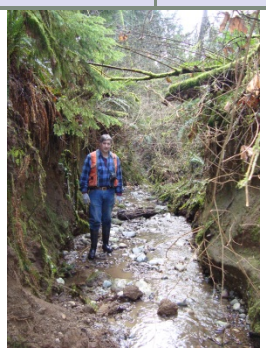
**Narrative**

This project was identified during field reconnaissance in February 2013.

Champagne Creek has been severely downcut through the reach downstream of Juanita Drive in the Juanita Woodlands Open Space. Material eroded from the bed and banks of Champagne Creek is transported downstream and deposited in Lake Washington and the lower stream reaches, causing channel aggradation and impacts to fish habitat there.

A solution to minimizing the continued erosion is to stabilize the channel to prevent further downcutting and erosion. This method in combination with upstream flow control has been employed by King County on Madsen Creek near Renton, Washington with good success at reducing downstream sediment deposition and continued channel erosion.

Project benefits include reduced channel aggradation downstream, and improved aquatic habitat.



Channel incision near Juanita woodlands

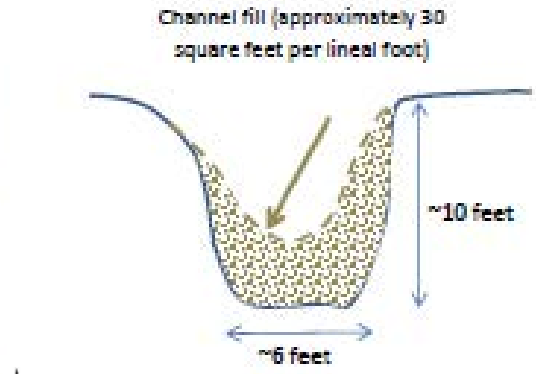
Sedimentation in lower reach of Champagne Creek

**Conceptual Design**

500 LF of roughened channel using a mixture of large boulders, cobbles, gravel, sand, and large wood.
• Roughened area assumed to be approximately 6 feet wide based on assumed cross section.
• A mobile hydraulic crane could be used to place roughening material from outside the stream channel.
• Channel stabilization cost assumed to be $200 per ton of material placed, based on recent project experience.
• Cost estimate includes a site survey (assumed $6,000 per acre).
• Assumed lump sum of $50,000 for equipment rental and operation. Assume that mobile crane can reach from 76th Place NE (west of project area).
• Assumed all project activities can be completed within easements or public property; no land acquisition.

**Considerations for Implementation**

- Project permitting will require a WDFW Hydraulic Project Approval (HPA), Section 404 permit (for discharge of dredged or fill materials to waters of the U.S.), a Section 401 water quality certification obtained from the Washington State Department of Ecology, demonstrated compliance with Section 7 of the Endangered Species Act and Section 106 of the Historic Preservation Act, compliance with the State Environmental Policy Act (SEPA) and local critical area codes and ordinances.
- Dewatering and fish removal is assumed.
- For the construction phase, access and staging areas will be critical. Locations will need to be identified for storing material and placing a crane such that material can be delivered to the channel from above without a disturbance to the surrounding riparian area and adjacent hill slopes.
- Easement may be required to provide construction and maintenance access, and a clearing and grading permit may be necessary for construction of a temporary access road, if needed. The temporary access road will be restored and revegetated upon completion of the project




Approximate Channel Cross Section through incised reach

| Project Cost Estimate | | | | |
|---|---|---|---|---|
| Item | Unit | Unit Cost | Quantity | Cost |
| Dewatering/fish removal | LS | $10,000 | 1 | $10,000 |
| Survey | LS | $6,000 | 1 | $6,000 |
| Contractor Staging Area | LS | $20,000 | 1 | $20,000 |
| Streambed stabilization material (boulder, cobbles, large wood, gravel and sand) | Ton | $200 | 1,200 | $240,000 |
| Equipment rental and operation (mobile crane) | LS | $50,000 | 1 | $50,000 |
| | | | Subtotal | $326,000 |
| | | Contractor overhead, profit, and mobilization | 5% | $16,300 |
| | | Washington State Sales Tax | 9.5% | $32,500 |
| | | Construction Contingency | 50% | $187,400 |
| | | Subtotal construction costs | | $562,200 |
| | | Administration and engineering design | 20% | $112,440 |
| | | Permitting | | $15,000 |
| | | Land acquisition and easements | | $0 |
| | | Total cost | | $689,600 |

| Project: | Juanita Creek Culvert | | ID: CJC-9 |
|---|---|---|---|
| Location: | NE 137th Pl. near Juanita Woodinville Way NE | Basin: | Juanita Creek |
| Project Type:<br><br>Problem: | ☒Infrastructure ☐Water Quality<br>☐Erosion ☒Habitat ☐Flooding<br>Partial fish passage barrier | Project Cost: | $613,000 |

**Narrative**

The existing 36-inch 188-foot concrete culvert crossing NE 137th Pl. near Juanita Woodinville Way NE is a partial fish passage barrier. The lower half of the culvert is backwatered, and fish passable. However, the long length, high velocities, and shallow flows in the upper portion of the culvert make it hard for fish to navigate. The culvert is lacking substrate and has an approximate slope of 2-3%.

The existing channel width is 9-feet wide upstream and 11-feet downstream. No plunge exists at the outfall. The outlet is currently blocked by blackberries.

The culvert is located on private property on both upstream and downstream sides. A small portion of the downstream end of the culvert is located on King County Property Services property.

Juanita Creek has a channel slope of approximately 3-4% slope adjacent to the culvert. Previous studies document fish use in this stream segment.

Juanita Creek Culvert, looking downstream

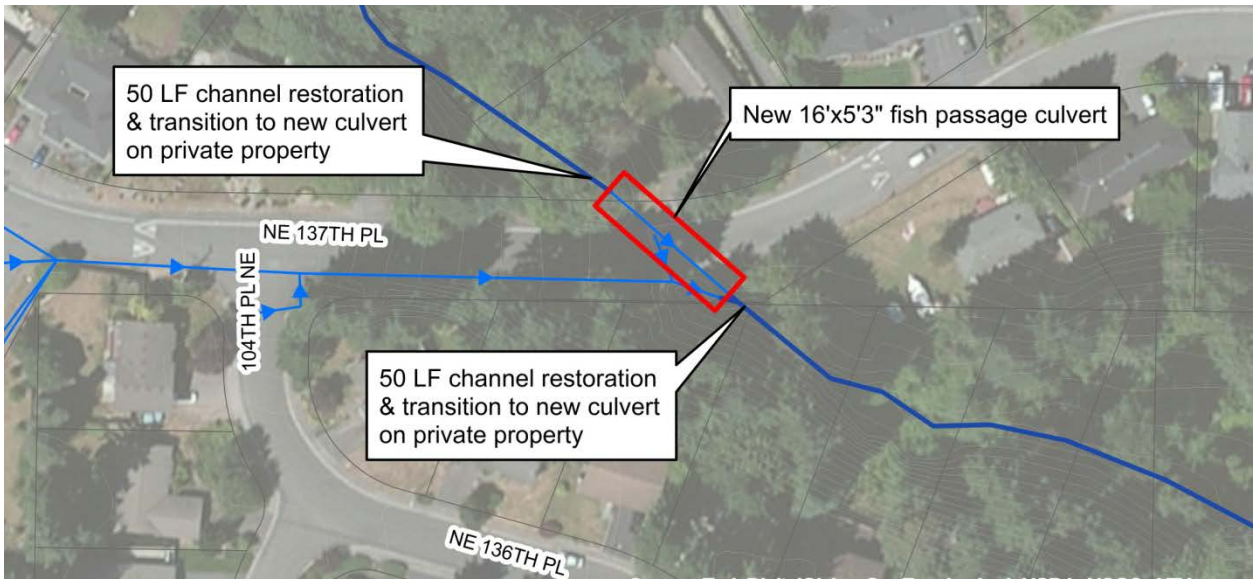
**Conceptual Design**

The proposed CIP includes the following improvements:

- Install 16' x 5'3" arch fish passable culvert. Culvert is open bottom with footings.
  - Culvert width based on WDFW stream simulation design: 1.25 x 11-ft bankfull width rounded to the nearest foot
- Create 50-LF restored channel at the culvert inlet and outlet
- Restore staging areas and channel floodplain with planting and bioengineered restoration

**Considerations for Implementation**

- Environmental permitting including SEPA checklist, WDFW HPA and Army Corps permits.
- A Geomorphologist assessment may be necessary to ensure a stable channel design. The existing culvert may be a grade control and/or sediment control.
- Temporary construction easement will be needed for work on private property.




Project Cost Estimate

| Item | Unit | Unit Cost | Quantity | Cost |
|---|---|---|---|---|
| Water Pollution/Erosion Control | % | 5% | --- | $14,000 |
| SPCC Plan | LS | $500 | 1 | $500 |
| Traffic Control | % | 7% | — | $20,000 |
| Clearing & Grubbing | SY | $5 | 1,100 | $5,500 |
| Remove Asphalt Conc. Pavement | SY | $28 | 120 | $3,360 |
| Excavation Incl. Haul | CY | $25 | 490 | $12,250 |
| Shoring or Extra Excavation Class B | SF | $1 | 640 | $640 |
| Fish Passage Culvert (16'x5'3" arch incl. footings) | LF | $1,100 | 92 | $101,200 |
| Select Borrow Incl. Haul | CY | $25 | 245 | $6,125 |
| HMA CL 1/2 IN PG 64-22 | TON | $200 | 55 | $11,000 |
| Guardrail | LF | $100 | 60 | $6,000 |
| Temporary Stream Bypass | LS | $24,000 | 1 | $24,000 |
| Streambed Gravel | CY | $30 | 230 | $6,900 |
| Stream Habitat Features | LS | $30,000 | 1 | $30,000 |
| Planting and Bioengineered Restoration | SY | $40 | 1,100 | $44,000 |
| | | | Subtotal | $285,475 |
| | | | Contractor overhead, profit, and mobilization 10% | $28,548 |
| | | | Washington State Sales Tax 9.5% | $27,120 |
| | | | Construction Contingency 50% | $142,738 |
| | | | Subtotal construction costs | $483,880 |
| | | | Administration and engineering design 20% | $96,776 |
| | | | Permitting | $15,000 |
| | | | Geomorphologist | $7,500 |
| | | | Land acquisition and easements | $9,800 |
| | | | Total cost | $613,000 |

| Project: | Flooding near Inglewood Presbyterian Church | | ID: DE-01 |
|---|---|---|---|
| Location: | NE 142nd St. and 77th Ave NE | Basin: | Denny Creek |
| Project Type:<br><br>Problem: | ☒Infrastructure ☐Water Quality<br>☐Erosion ☐Habitat ☒Flooding<br>Flooding on NE 142nd St and 77th Ave NE | Preliminary Project Cost: | $136,000 |

**Narrative**

Local road and property flooding has occurred at the intersection of NE 142nd Street and 77th Ave NE in the vicinity of Inglewood Presbyterian Church. The cause of the flooding is not conclusive, and additional analyses and investigation is needed to develop a solution.

The project was identified by the City in 2013.

Potential options include adding an inlet structure near the intersection, channel maintenance through the wetland, adding upstream detention or infiltration, and/or installing a high flow bypass. Additional options analysis and hydrologic and hydraulic modeling is necessary to develop a viable alternative.

Project benefits include reduced flooding along 77th Ave NE, reduced private property flooding, and reduced sedimentation in the wetland.

Flooding at NE 142nd St and 77th Ave NE

**Conceptual Design**

**Preferred Alternative:**

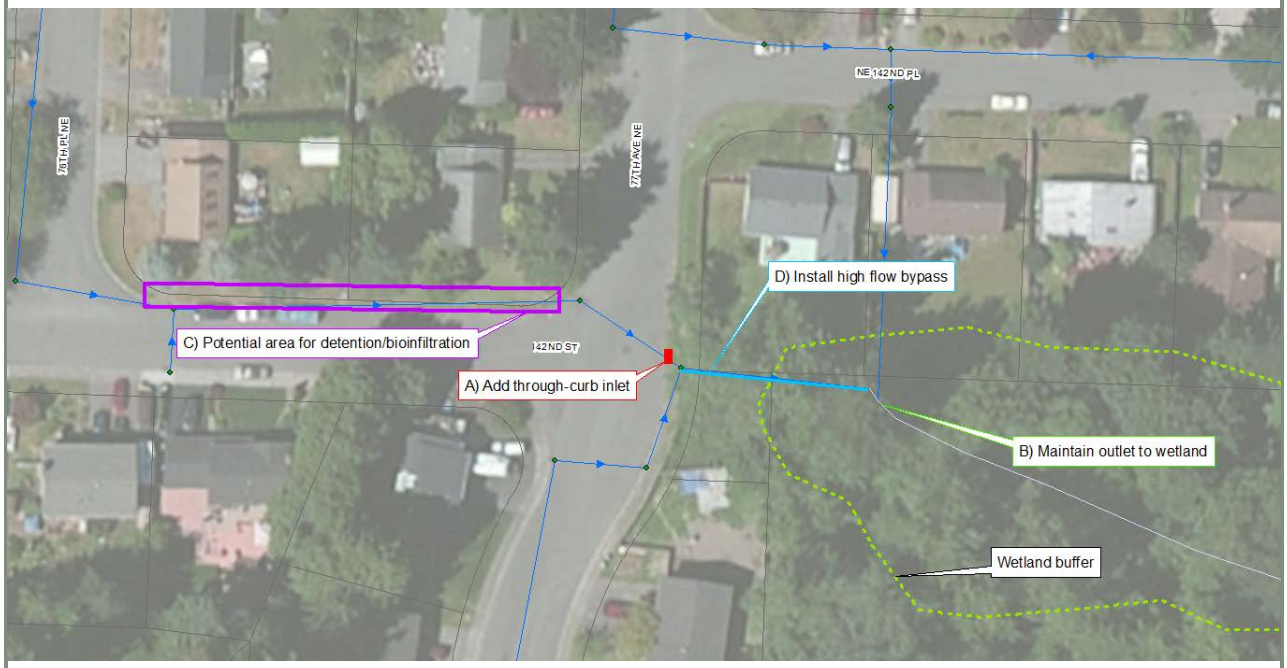
- Maintain a channel through the wetland by removing excess sediment for improved flow at the pipe outfall (green in the figure).

**Other alternatives included:**

- Add a through-curb inlet at low spot on 77th Ave NE (red in the figure) for improved collection of ponded water.
- Add detention/bioinfiltration upstream to reduce peak flows (purple in the figure).
- Install high flow bypass above existing pipe to wetland (blue in the figure).

**Considerations for Implementation**

- Options Analysis, including modeling, is necessary to identify a preferred alternative.
- Temporary/permanent easements may be needed.
- Critical Areas permitting and wetland impact mitigation may be necessary depending on the preferred alternative.




| Project Cost Estimate | | | | |
|---|---|---|---|---|
| Item | Unit | Unit Cost | Quantity | Cost |
| Water Pollution/Erosion Control | % | 5% | – | $3,000 |
| SPCC Plan | LS | $500 | 1 | $500 |
| Traffic Control | % | 3% | – | $2,000 |
| Clearing & Grubbing | SY | $5 | 550 | $2,750 |
| Excavation Incl. Haul | CY | $25 | 190 | $4,750 |
| Temporary Stream Bypass | LS | $24,000 | 1 | $24,000 |
| Planting and Bioengineered Restoration | SY | $40 | 550 | $22,000 |
| | | | Subtotal | $59,000 |
| | | Contractor overhead, profit, and mobilization | 10% | $5,900 |
| | | Washington State Sales Tax | 9.5% | $5,605 |
| | | Construction Contingency | 50% | $29,500 |
| | | Subtotal construction costs | | $100,005 |
| | | Administration and engineering design | 20% | $20,001 |
| | | Permitting | | $15,000 |
| | | Land acquisition and easements | | $0 |
| | | Total cost | | $136,000 |

| Project: | 63rd and Lakeview Drive Conveyance Modification | | ID: HAS-01 |
|---|---|---|---|
| Location: | NE 63rd St and Lakeview Drive | Basin: | Houghton Slope A |
| Project Type:<br><br>Problem: | ☒Infrastructure ☐Water Quality<br>☒Erosion ☐Habitat ☒Flooding<br>Flooding | Preliminary Project Cost: | $2,369,000 |

**Narrative**

The inlet to the pipe crossing at Lakeview Drive near NE 63rd St. floods Lakeview Drive when the existing trash rack becomes clogged, as seen in the top photo. The existing pipe network is 36-in corrugated aluminum.

The City installed a half pipe on the inlet to allow for a higher headwater before the system overflows. The bottom photo to the right shows the new structure.

This project was identified by the City as a capacity problem.

Alternative solutions for this CIP include: O&M of the existing condition, improving inlet capacity with wingwalls, and conveyance capacity improvements. Increased upstream detention was considered, but a suitable site has not been identified.

Project benefits include reduction of flooding at Lakeview Drive.

Modeling or additional analysis is required to verify inlet versus conveyance capacity problems and to size the proposed improvements.

High flow through trash rack structure

Half pipe installed on inlet

**Conceptual Design**

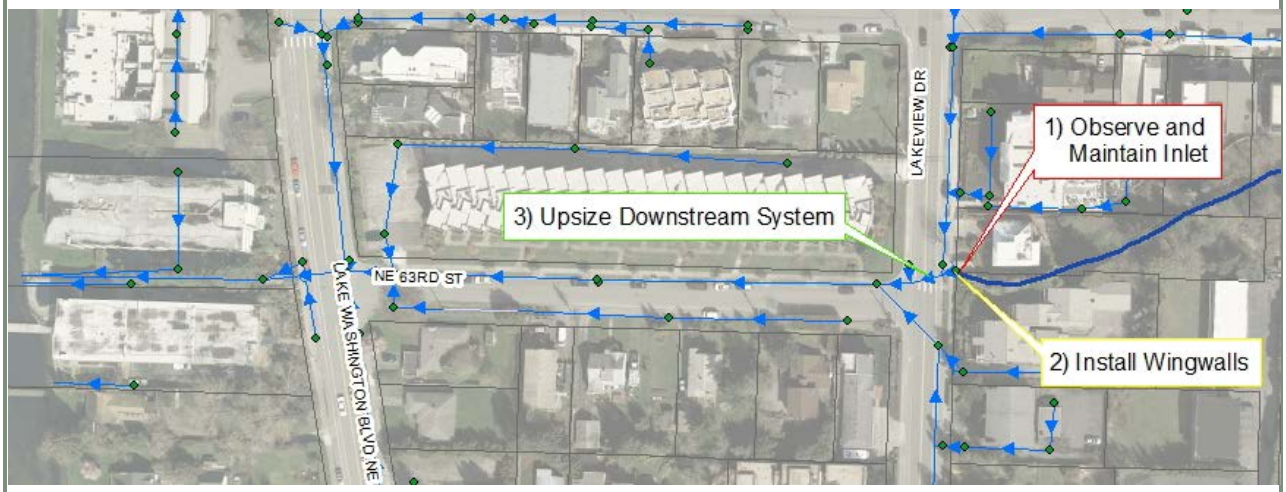
A phased approach is recommended for this site in order to determine the need for additional improvements. The cost estimate assumes all 3 phases are implemented, with the first phase being implemented by City staff. The recommended phases are:

1. Observe and Maintain
   - See how installed half pipe performs, record any overflows.
   - Clear trash rack of leaves and other debris.
   - Maintain vegetation surrounding inlet.
2. Add wingwalls to existing half pipe
   - Maintain existing pipe size.
   - Increase inlet capacity.
3. Upsize downstream system
   - Increase pipe size from 36-in diameter to 42-in diameter.
   - Upsize system to outlet at Lake Washington.

**Considerations for Implementation**

If the current solution (half pipe) is not effective, additional analyses may be needed to support the design and construction of a more permanent solution. The assumptions below were used to estimate cost:

- Hydrologic and hydraulic analysis will be conducted to calculate design flows, assess inlet capacity and pipe conveyance, and size proposed improvements. For cost estimating purposes, a 42-inch diameter replacement pipe is assumed for the length of the downstream pipes (total length is 887 feet).
- A downstream analysis will be conducted to evaluate how or if downstream infrastructure or properties could be affected by improvements.
- Environmental permitting will be required.
- Land acquisition is not necessary.
- Traffic control will be needed.




| Project Cost Estimate | | | | |
|---|---|---|---|---|
| Item | Unit | Unit Cost | Quantity | Cost |
| Water Pollution/Erosion Control | % | 5% | – | $sss |
| SPCC Plan | LS | $500 | 1 | $500 |
| Traffic Control | % | 7% | – | $sss |
| Clearing & Grubbing | SY | $5 | 2,600 | $13,000 |
| Sawcut Pavement | LF | $5 | 1,260 | $6,300 |
| Remove Asphalt Conc. Pavement | SY | $28 | 630 | $17,640 |
| Excavation Incl. Haul | CY | $25 | 32,930 | $823,250 |
| Shoring or Extra Excavation Class B | SF | $1 | 4,880 | $4,880 |
| Concrete Wingwall | CY | $1,900 | 10 | $19,000 |
| Schedule A 42" Storm Sewer Pipe | LF | $120 | 887 | $106,440 |
| Planting and Bioengineered Restoration | SY | $40 | 2,600 | $104,000 |
| HMA CL ½ IN PG 64-22 | TON | $200 | 216 | $43,200 |
| | | | Subtotal | $1,157,210 |
| | | Contractor overhead, profit, and mobilization | 10% | $115,721 |
| | | Washington State Sales Tax | 9.5% | $109,935 |
| | | Construction Contingency | 50% | $578,605 |
| | | Subtotal construction costs | | $1,961,471 |
| | | Administration and engineering design | 20% | $392,294 |
| | | Permitting | | $15,000 |
| | | Land acquisition and easements | | $0 |
| | | Total cost | | $2,369,000 |

| Project: | Weaver's Pond | | ID: JC-01 |
|---|---|---|---|
| Location: | 109th Ave NE and NE 134th St | Basin: | Juanita Creek |
| Project Type:<br><br>Problem: | ☐Infrastructure ☒Water Quality<br>☒Erosion ☒Habitat ☐Flooding<br>Beaver management, water quality improvements | Preliminary Project Cost: | $194,000 |

**Narrative**

Weaver's Pond is privately owned by 31 properties. The low flow outlet pipe is consistently clogged by debris and beavers, resulting in flooding across 109th Ave NE. King County installed an overflow birdcage structure in 1986.

In 2013, the City of Kirkland installed a trash rack on the low flow outlet pipe. No flooding is anticipated if the structures are kept clean. However, the trash rack is not properly connected to the low flow pipe.

This project was identified by the City in 2013.

Solution options include: properly attaching the trash rack to the low flow outlet pipe, maintain the trash rack, and/or dredging the pond for increased dead storage.

Project benefits include reduced flooding at 109th Ave NE, and improved water quality for the pond and Kingsgate Tributary downstream.

**Weaver's Pond with King County structure (right) and City of Kirkland trash rack (left).**

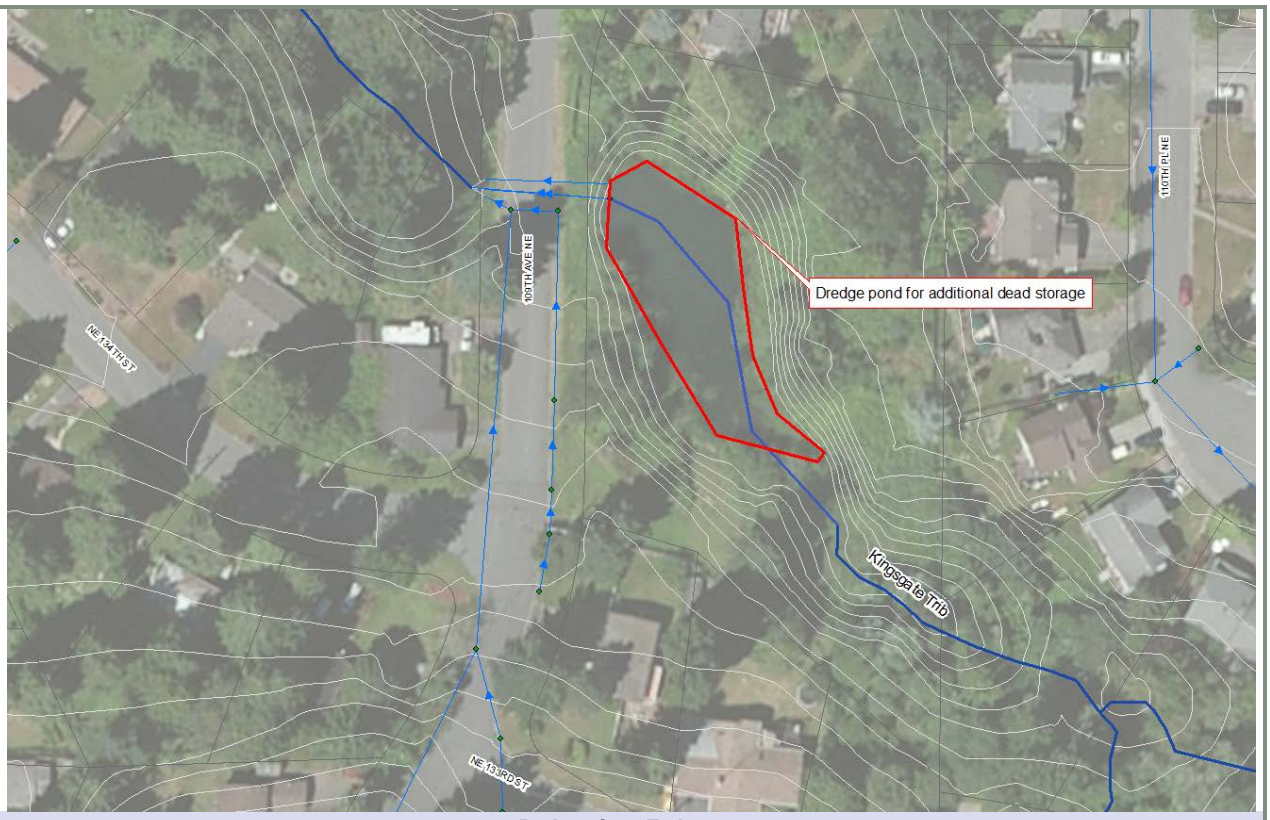
**Conceptual Design**

The CIP design consists of the following:

- Properly attach trash rack to low flow outlet pipe.
- Maintain trash rack and clean before large storms.
- Dredge the pond to increase dead storage for improved water quality.

**Considerations for Implementation**

- The City of Kirkland maintains the structures, the pond maintenance and planting is the property owners' responsibility.
- Beavers dam the low flow outlet, causing flow back up and flooding.
- Critical Areas permitting including WDFW HPA and Army Corps permits.




Project Cost Estimate

| Item | Unit | Unit Cost | Quantity | Cost |
|---|---|---|---|---|
| Water Pollution/Erosion Control | % | 5% | – | $4,000 |
| SPCC Plan | LS | $500 | 1 | $500 |
| Traffic Control | % | 3% | – | $2,400 |
| Clearing & Grubbing | SY | $5 | 750 | $3,750 |
| Excavation Incl. Haul | CY | $25 | 620 | $15,500 |
| Temporary Stream Bypass | LS | $24,000 | 1 | $24,000 |
| Planting and Boiengineered Restoration | SY | $40 | 750 | $30,000 |
| | | | Subtotal | $80,150 |
| | | Contractor overhead, profit, and mobilization | 10% | $8,015 |
| | | Washington State Sales Tax | 9.5% | $7,614 |
| | | Construction Contingency | 50% | $40,075 |
| | | Subtotal construction costs | | $135,854 |
| | | Administration and engineering design | 20% | $27,171 |
| | | Permitting | | $15,000 |
| | | Temporary Construction Easement | | $15,000 |
| | | Total cost | | $194,000 |

| Project: | Brookhaven Pond Modifications | | ID: JC-03 |
|---|---|---|---|
| Location: | 100th Ave NE and NE 128th St | Basin: | Juanita Creek |
| Project Type:<br><br>Problem: | ☐Infrastructure ☒Water Quality<br>☐Erosion ☒Habitat ☐Flooding<br>Existing pond functionality | Project Cost: | $533,000 |

**Narrative**

The existing water quality swale provides treatment for City right of way prior to discharge into Juanita Creek. The swale receives water from 100th Ave NE, and the neighborhood and business park along NE 127th Pl.

Plans have been developed by others to improve the water quality function at this location. However, the site may provide more benefit if converted back into floodplain with water quality treatment relocated into the right of way. Riparian vegetation in Juanita Creek at Brookhaven Pond has been planted as part of a separate project identified in the 2005 Surface Water Master Plan.

This project was identified by the City in the 2013 Surface Water Master Plan list.

Solutions for this CIP include removing the existing water quality feature, improving floodplain connectivity, and installing Filterra systems along 100th Ave NE. Flow control functions will not be changed with these proposed solutions.

Project benefits include additional floodplain storage, habitat and water quality improvements for Juanita Creek, and aesthetic amenity for a community park.

**Brookhaven Pond, with Juanita Creek to the right**

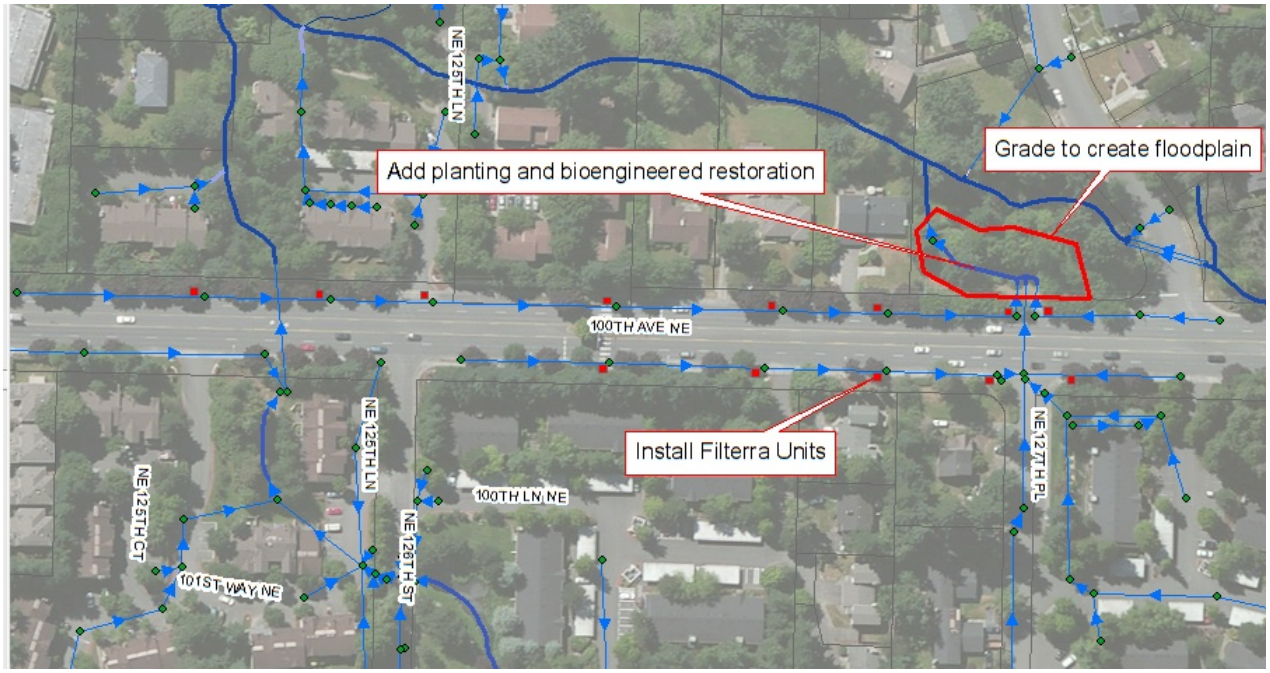
**Conceptual Design**

The proposed CIP includes the following improvements:

- Convert pond to floodplain
  - Grade existing pond to provide storage.
  - Establish plantings for habitat and to disperse flow as it enters the floodplain.
  - Install bioengineered floodplain structures (anchored as needed).
- Install Filterra systems along 100th Ave NE for water quality, and to separate runoff from 100th Ave NE and NE 127th Pl.
  - Design assumes 1, 4x4 Filterra provides enhanced treatment for 6,090 SF of PGIS.
  - NE 127th Pl. drainage will discharge directly to Juanita Creek, and will not be treated by the Filterra units.

**Considerations for Implementation**

- Tree removal is necessary, and will require a City tree removal permit
- Environmental permitting including SEPA checklist, WDFW HPA and Army Corps permits.
- Ensure slopes of floodplain are at safe slopes before removing chain link fence.
- May use this project as an opportunity for public education.




| Project Cost Estimate | | | | |
|---|---|---|---|---|
| Item | Unit | Unit Cost | Quantity | Cost |
| Water Pollution/Erosion Control | % | 5% | – | $20,000 |
| SPCC Plan | LS | $500 | 1 | $500 |
| Traffic Control | % | 7% | – | $28,000 |
| Clearing & Grubbing | SY | $5 | 1,200 | $6,000 |
| Cement Conc. Sidewalk | SY | $52 | 50 | $2,600 |
| Cement Conc. Curb and Gutter | LF | $28 | 80 | $2,240 |
| Remove Chain Link Fence | LF | $5 | 550 | $2,480 |
| Excavation Incl. Haul | CY | $25 | 1,200 | $30,000 |
| Water Quality Structure (Filterra 4x4) | EA | $12,500 | 13 | $162,500 |
| Planting and Bioengineered Restoration | SY | $40 | 1,200 | $48,000 |
| | | | Subtotal | $254,320 |
| | | Contractor overhead, profit, and mobilization | 10% | $25,432 |
| | | Washington State Sales Tax | 9.5% | $24.160 |
| | | Construction Contingency | 50% | $127,160 |
| | | Subtotal construction costs | | $431,072 |
| | | Administration and engineering design | 20% | $86,214 |
| | | Permitting | | $15,000 |
| | | Land acquisition and easements | | $0 |
| | | Total cost | | $533,000 |

| Project: | Comfort Inn Pond Modifications | | ID: JC-04 |
|---|---|---|---|
| Location: | 12204 NE 124th St | Basin: | Juanita Creek |
| Project Type:<br><br>Problem: | ☐Infrastructure ☐Water Quality<br>☐Erosion ☒Habitat ☒Flooding<br>Flooding | Project Cost: | $266,000 |

**Narrative**

The pond at Comfort Inn was initially designed as wetland mitigation.. During heavy flows, the pond overflows and floods Totem Lake Blvd. The current outlet culvert is 12-in corrugated aluminum and may be undersized.

The 2013 Totem Lake Park Master Plan identifies stormwater program opportunities and trail connections, including a future stormwater facility at NE 124th St and Totem Lake Blvd, median plantings with sidewalk improvements, and hummock plantings and habitat features. Improvements to the Comfort Inn Pond/Wetland could be tied into improvements at Totem Lake Park.

This project was identified by the City in the 2013 Surface Water Master Plan list.

Solutions for this CIP include rerouting runoff from the BNSF corridor directly to Totem Lake. Pipe size will be 12-in to match existing pipe sizes in the area. Other options listed below could provide additional benefits to reduce flooding.

Project benefits include reducing flow to the wetland and flooding on Totem Lake Blvd.

**Inlet to culvert from pond/wetland to Totem Lake across Totem Lake Blvd**

**Conceptual Design**

**Preferred Alternative:**

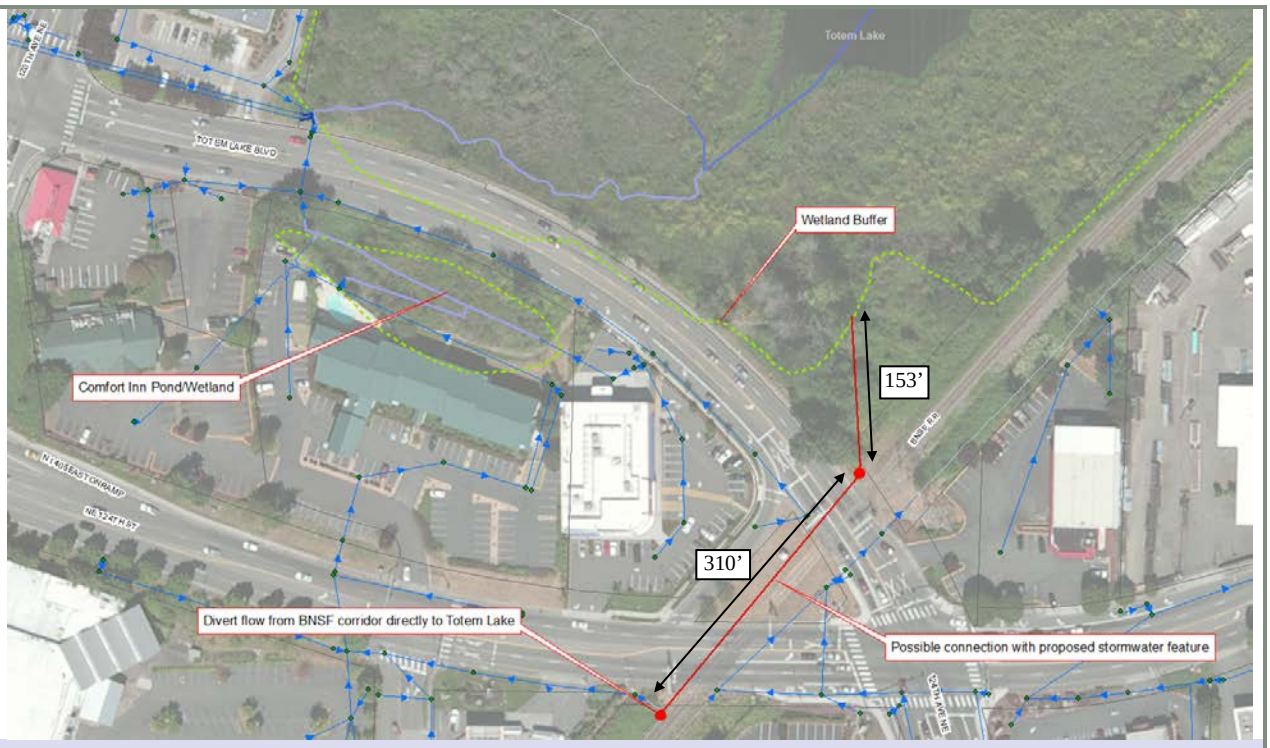
- Re-route stormdrain at railroad to bypass pond/wetland, possibly connect with the stormwater feature at NE 124th St and Totem Lake Blvd, then pipe to Totem Lake.
    - Reduce contributing area to Comfort Inn pond/wetland from 24.75 acres to 16.45 acres.

**Additional options to reduce flooding (not included in this project) :**

- Upsize outlet culvert for wetland to Totem Lake.
- Enlarge pond at Comfort Inn (if no other options are utilized).
- Enhance wetland at Comfort Inn for water quality and habitat (if other flow control options are implemented).
- Upstream flow control (concurrent project with sidewalk improvements or plantings to help with flow control or water quality).
    - Porous sidewalks
    - Bioretention in median
    - Other upstream flow control

**Considerations for Implementation**

- Hydraulic modeling will be necessary to verify pipe sizes.
- Critical Areas report is required.
- Design to include mitigation for buffer impacts.
- Assumes no BNSF railroad permitting is needed.
- Project could tie into other stormwater facilities planned for this area.
- Project partners could include Comfort Inn owners, Friends of Totem Lake, Audubon Society, Kirkland Parks Department




Project Cost Estimate

| Item | Unit | Unit Cost | Quantity | Cost |
|---|---|---|---|---|
| Water Pollution/Erosion Control | % | 5% | – | $6,000 |
| SPCC Plan | LS | $500 | 1 | $500 |
| Traffic Control | % | 7% | – | $8,500 |
| Potholing | EST | $1,000 | 1 | $1,000 |
| Clearing & Grubbing | SY | $5 | 460 | $2,300 |
| Remove Cement Cond. Sidewalk | SY | $25 | 16 | $400 |
| Remove Cement Conc. Curb and Gutter | LF | $17 | 24 | $408 |
| Remove Asphalt Conc. Pavement | SY | $28 | 72 | $2,022 |
| Excavation Incl. Haul | CY | $25 | 480 | $12,000 |
| Shoring or Extra Excavation Class B | SF | $1 | 4,300 | $4,300 |
| Select Borrow Inc. Haul | CY | $25 | 320 | $8,000 |
| Catch Basin – Type 2 – 48" | EA | $4,000 | 2 | $8,000 |
| Schedule A 12" Storm Sewer Pipe | LF | $60 | 716 | $42,981 |
| Planting and Bioengineered Restoration | SY | $40 | 460 | $18,400 |
| HMA CL ½ IN PG 64-22 | TON | $200 | 34 | $6,800 |
| Cement Conc. Sidewalk | SY | $52 | 16 | $832 |
| Cement Conc. Curb and Gutter | LF | $28 | 24 | $672 |
| | | | Subtotal | $123,115 |
| | | Contractor overhead, profit, and mobilization | 10% | $12,311 |
| | | Washington State Sales Tax | 9.5% | $11,696 |
| | | Construction Contingency | 50% | $61,557 |
| | | Subtotal construction costs | | $208,680 |
| | | Administration and engineering design | 20% | $41,736 |
| | | Permitting | | $15,000 |
| | | Total cost | | $266,000 |

| Project: | Market Street Sewer Pipe Replacement | | ID: MB-01 |
|---|---|---|---|
| Location: | Market Street from Central Way to 12th Avenue | Basin: | Kirkland Slope |
| Project Type:<br><br>Problem: | ☒Infrastructure ☐Water Quality<br>☐Erosion ☐Habitat ☐Flooding<br>Failing Stormwater Pipes | Preliminary Project Cost: | $680,000 |

**Narrative**

Review of CCTV video inspection identified poor condition storm sewer pipes along Market Street. The pipes are failing and in need of repair/replacement.

The City is planning an overlay project for Market Street. The City would like to bundle the transportation and storm sewer pipe repair/replacement projects.

This project was identified by the City in 2009.

Solutions include sliplining the existing 24 and 36-in pipes along Market Street from Central Way to 12th Ave. Grouting will also be used to repair joints and fill space where HDPE pipe is smaller than the existing concrete pipe. The 2009 quote provided by Buno Construction, LLC was used to develop the cost estimate provided below.

Project benefits include prevention of flooding and pipe failure. Bundling the transportation and sewer projects offers cost efficiency compared to doing the work as two separate projects.

Market St at Central Way

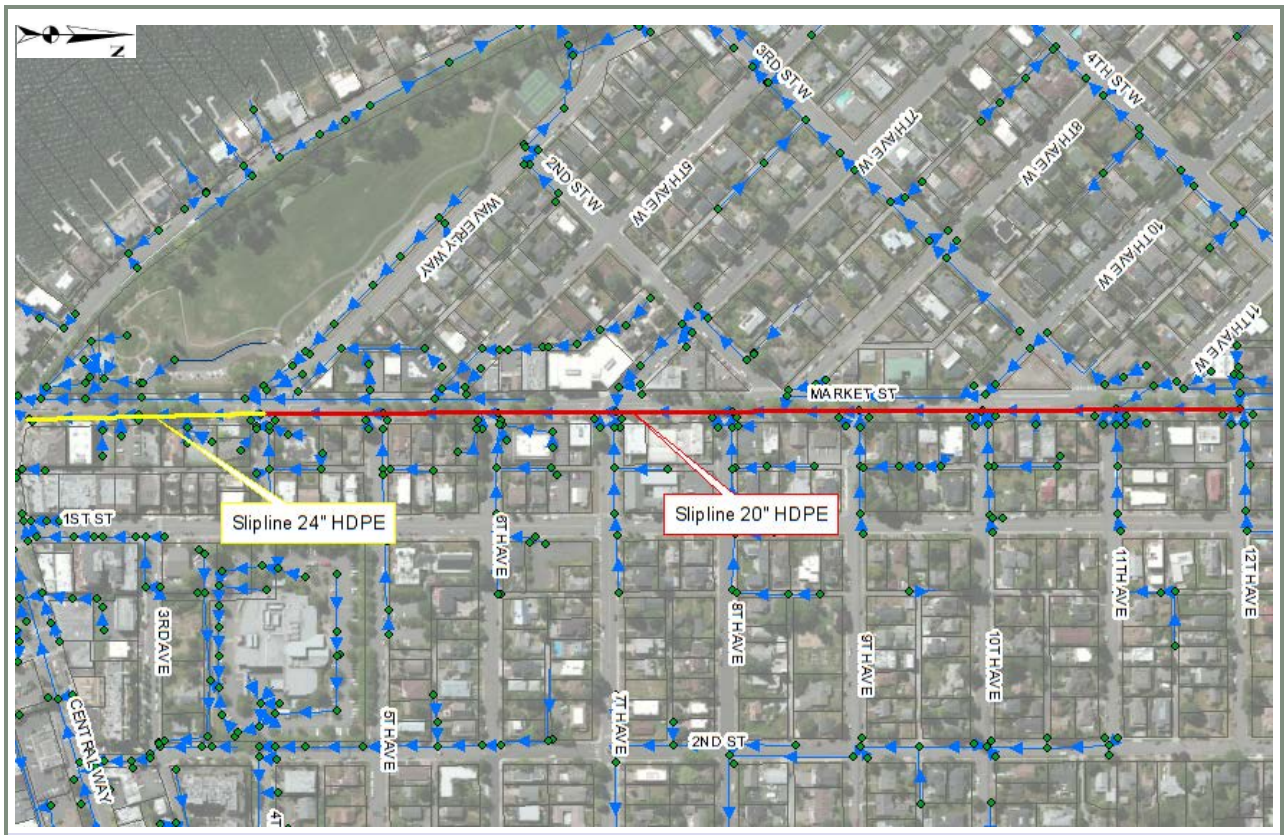
**Conceptual Design**

The design for this project includes:

- Slipline 20" SDR 21 HDPE through existing 36" & 24" Concrete Pipe from 4th Avenue to 12th Avenue.
- Slipline 24" SDR 21 HDPE through existing 36" & 24" Concrete Pipe from Central Way to 4th Avenue.
- Grout annular space between the existing and sliplined pipe and at joints.

**Considerations for Implementation**

- 24" HDPE slipline is needed from Central Way to 4th Avenue because of increased capacity needs. Pipe sizing was determined by others.
- Coordinate project schedule and permitting with the Market Street Overlay.
- Cost estimate assumes shared mobilization, traffic control, and TESC costs with the Market Street Overlay.




| Project Cost Estimate | | | | |
|---|---|---|---|---|
| Item | Unit | Unit Cost | Quantity | Cost |
| Water Pollution/Erosion Control | % | 0 | – | 0 |
| SPCC Plan | LS | 0 | – | 0 |
| Traffic Control | % | 0 | – | 0 |
| 20" HDPE Sliplining | LF | $100 | 2,413 | $241,300 |
| 24" HDPE Sliplining | LF | $180 | 571 | $102,780 |
| | | | Subtotal | $344,080 |
| | | Contractor overhead, profit, and mobilization | 5% | $17,204 |
| | | Washington State Sales Tax | 9.5% | $32,688 |
| | | Construction Contingency | 50% | $172,040 |
| | | Subtotal construction costs | | $566,012 |
| | | Administration and engineering design | 20% | $113,202 |
| | | Permitting | | $0 |
| | | Land acquisition and easements | | $0 |
| | | Total cost | | $680,000 |

| Project: | Silver Spurs Flood Reduction | | ID: RED-01 |
|---|---|---|---|
| Location: | 6139 130th Ave NE | Basin: | City of Redmond |
| Project Type:<br><br>Problem: | ☒Infrastructure ☐Water Quality<br>☐Erosion ☐Habitat ☒Flooding<br>Flooding | Project Cost: | $65,000 |

**Narrative**

The Silver Spurs community is located on the southeast side of Kirkland, adjacent to the City of Redmond. The area has high groundwater and flat slopes. Public and private stormwater is tributary to an infiltration facility located on private property. When infiltration capacity is reached, the system backs up and stormwater flows out of upstream catch basins and ditches. Backups result in overland flow across private property flooding a nearby driveway and crawl space.

The infiltration facility was rehabilitated for increased infiltration capacity in 2011, but does not have an overflow. No flooding has been reported since the rehabilitation, however, the City estimates the infiltration system fills up during storms lower than a 10-year event. As shown in the photo on the right, water levels as high as the first rung on the ladder were evident during a site visit on November 8, 2013.

This project was identified in the existing CIP list from the City.

This project involves a phased approach to evaluate alternatives and design and construct the preferred alternative to reduce future flooding,

Project benefits include reduced crawl space and driveway flooding at 6139 130th Ave NE. Based on the chosen option, this project may also provide additional water quality.

**Infiltration Facility on Private Property**

**Conceptual Design**

The first phase of this project involves an alternatives analysis to determine the best solution to prevent future flooding. One potential alternative was already eliminated because of downstream capacity concerns (Option C, shown in green on the figure) Other options include the following:

A) Add more infiltration in ROW or increase the size of the existing facility to maximum extent (shown in red on figure).
   - Infiltration added in ROW shall be bioinfiltration swales, or equivalent.

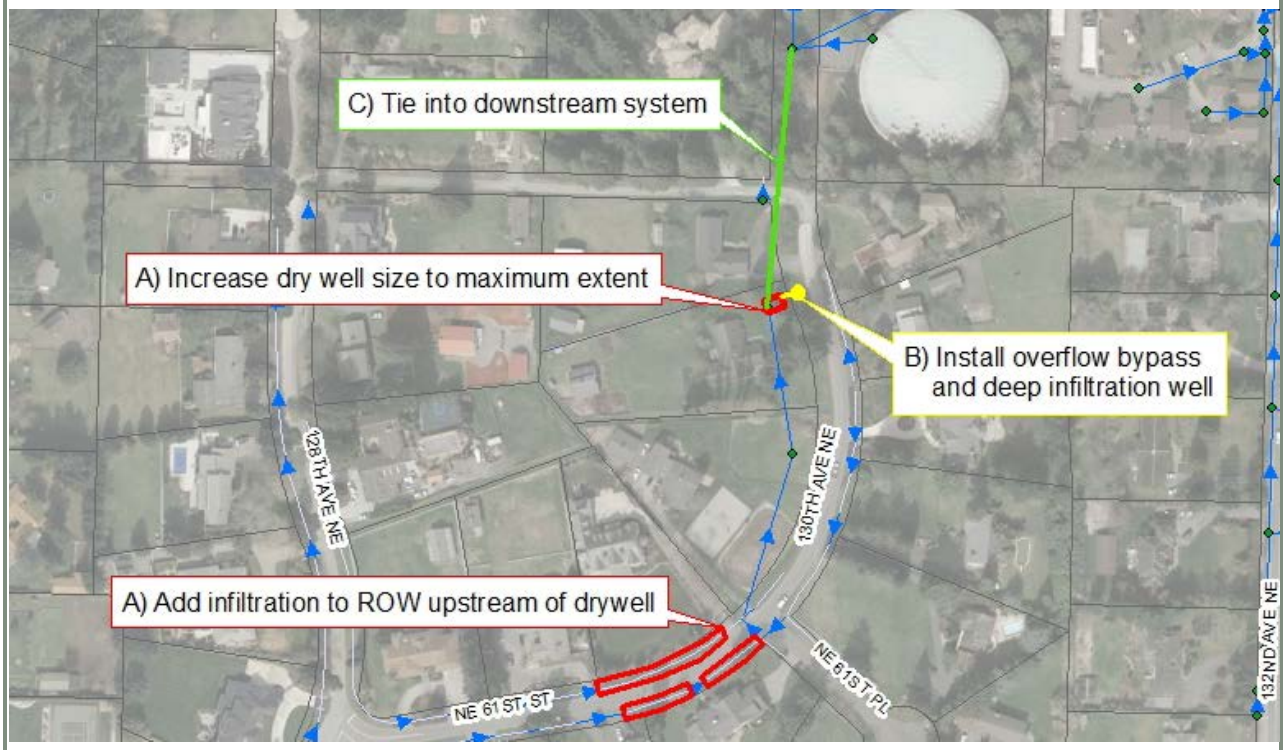
B) Utilize deep infiltration, such as a UIC well, for high flow bypass (shown in yellow on figure).
   - Deep infiltration shall be located in ROW, with a high flow bypass pipe leading from the dry well to the UIC well.

**Considerations for Implementation**

A) The following present challenges for shallow infiltration:
   - High groundwater may not allow for much additional infiltration.
   - Infiltrating soil layer may be shallow, accounting for high GW and flooding.

B) The following are considerations for design of a deep infiltration facility:
   - The UIC or other deep infiltration method may need to be very deep (over 100 feet).
   - May require pretreatment, unless using only for overflow.

- Additional geotechnical evaluation is required for design to determine suitable infiltration location.
- The cost estimate assumes an initial analysis and added infiltration capacity.
- Additional analysis is required to determine overflow bypass pipe sizing.




| Project Cost Estimate | | | | |
|---|---|---|---|---|
| Item | Unit | Unit Cost | Quantity | Cost |
| Water Pollution/Erosion Control | % | 5% | – | $2,000 |
| SPCC Plan | LS | $500 | 1 | $500 |
| Traffic Control | % | 3% | – | $800 |
| Clearing & Grubbing | SY | $5 | 170 | $850 |
| Excavation Incl. Haul | CY | $25 | 20 | $500 |
| Shoring or Extra Excavation Class B | SF | $1 | 190 | $190 |
| UIC Well | EA | $10,000 | 1 | $10,000 |
| Schedule A 12" Storm Sewer Pipe | LF | $60 | 23 | $1,380 |
| Planting and Bioengineered Restoration | SY | $40 | 170 | $6,800 |
| | | | Subtotal | $23,020 |
| | | Contractor overhead, profit, and mobilization | 10% | $2,302 |
| | | Washington State Sales Tax | 9.5% | $2,187 |
| | | Construction Contingency | 50% | $11,510 |
| | | Subtotal construction costs | | $39,019 |
| | | Administration and engineering design | 40% | $15,608 |
| | | Permitting | | $0 |
| | | Land acquisition and easements | | $10,000 |
| | | Total cost | | $65,000 |

| Project: | General Stormwater Pipe Repair | | ID: CW-INF-01, CW-INF-02 |
|---|---|---|---|
| Location: | City-Wide | Basin: | N/A |
| Project Type:<br><br>Problem: | ☒Infrastructure ☐Water Quality<br>☐Erosion ☐Habitat ☐Flooding<br>Failing stormwater pipes | Preliminary Project Cost Example: | $500 / Linear Foot |

**Narrative**

The City of Kirkland has conducted a CCTV assessment of the pipes throughout the city. These pipes have been rated as “excellent”, “good”, “fair”, and “poor”.

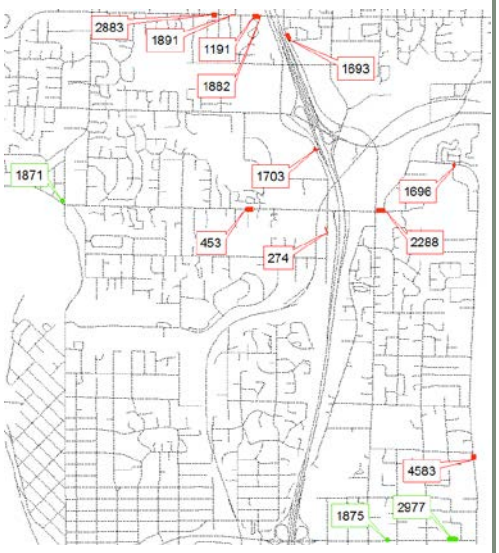
The map to the right shows pipes that have a “poor” rating, 12-in or greater pipe diameter, corrugated material, and cross or are adjacent to an arterial (in red), and pipes receiving a “poor” rating which connect with planned Kirkland transportation projects (in green).

The need for this project was identified by the City.

Solutions include open trench replacement or trenchless repair/replacement. Open cut is the preferred solution at locations of proposed transportation projects. Trenchless pipe repair/replacement is assumed at other locations to limit traffic and asphalt disturbance.

Project benefits include reducing or preventing flooding or erosion due to failing pipes.

Recently annexed areas have not been CCTV inspected yet, therefore, are not included in this assessment.

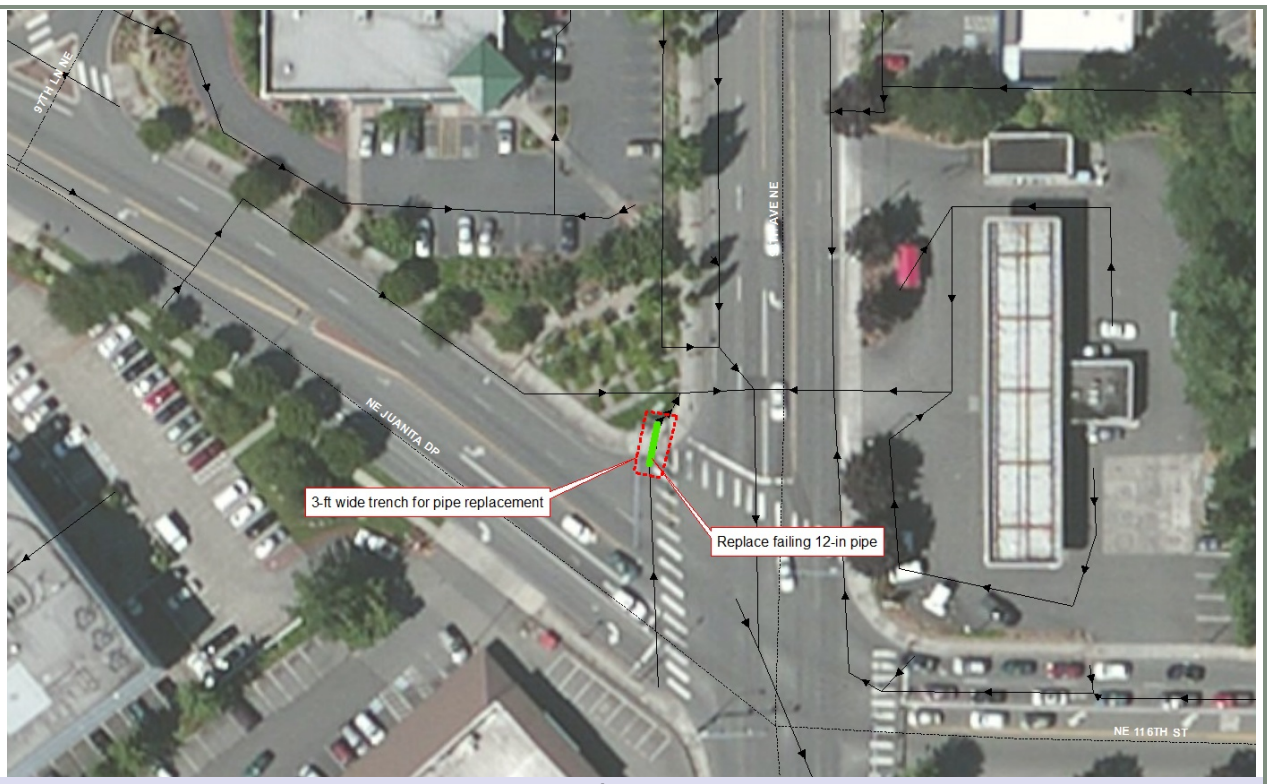



**Conceptual Design**

- Open Trench Replacement at transportation project sites (green in map above):
  - Pipe 1871 with Juanita Dr Corridor Improvements.
  - Pipes 1875 and 2977 with the NE 85th St street improvements.
- Trenchless pipe repair (red in map above).
  - Pipes chosen based on “poor” rating, 12-in or greater diameter, corrugated, and crossing, connecting to, or parallel to an arterial street.
  - Pipes crossing arterial:
    - 1703, 1891, 2288
  - Pipes connecting to or parallel to an arterial:
    - 274, 453, 1191, 1693, 1696, 1882, 2883, 4583
  - Trenchless pipe repair along Market St. in included as a separate CIP INF-KIR-1.

**Considerations for Implementation**

- May require additional options analysis to further prioritize repair/replace locations.
- City should plan for CCTV inspection of recently annexed areas.
- CCTV video should be reviewed to verify pipe failure versus pipes in need of maintenance.
- Cost estimate provided is an **example** cost for one of the replacements mentioned above (Pipe 1871).




## Project Cost Estimate

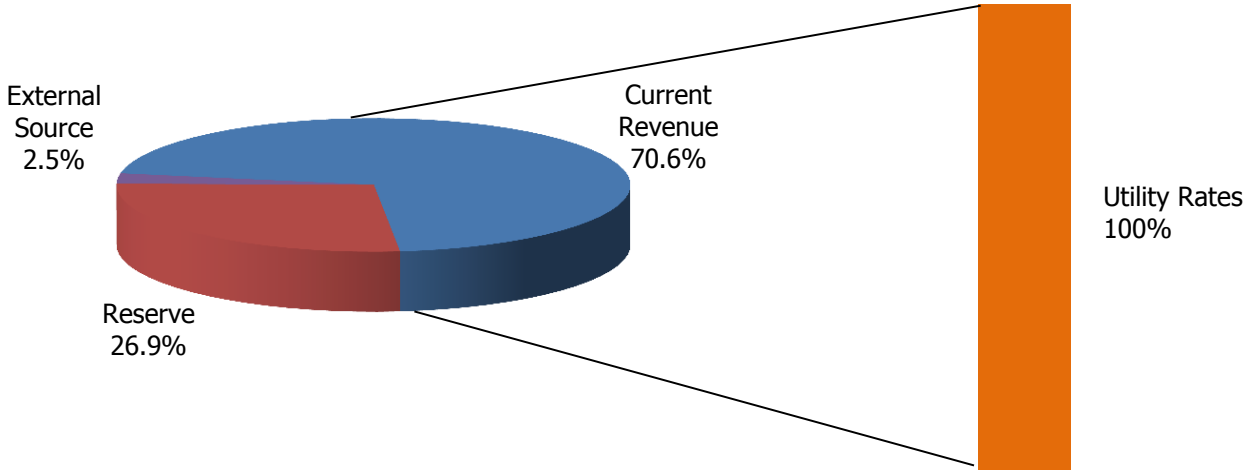
| Item | Unit | Unit Cost | Quantity | Cost |
|---|---|---|---|---|
| Water Pollution/Erosion Control | % | 5% | | $200 |
| SPCC Plan | LS | $250 | 1 | $250 |
| Traffic Control | % | 7% | | $300 |
| Potholing | EST | $1,000 | 1 | $1,000 |
| Sawcut Pavement | LF | $5 | 23 | $115 |
| Remove Cement Conc. Sidewalk | SY | $25 | 20 | $490 |
| Remove Cement Conc. Curb and Gutter | LF | $17 | 10 | $170 |
| Remove Asphalt Conc. Pavement | SY | $28 | 6 | $168 |
| Structure Excavation Incl. Haul | CY | $20 | 8 | $160 |
| Shoring or Extra Excavation Class B | SF | $1 | 72 | $72 |
| Schedule A 12" Storm Sewer Pipe | LF | $60 | 18 | $1,080 |
| Select Borrow Incl. Haul | CY | $25 | 5 | $125 |
| HMA CL ½ IN PG 64-22 | TON | $200 | 3 | $600 |
| | | | Subtotal | $4,140 |
| | | Contractor overhead, profit, and mobilization | 10% | $414 |
| | | Washington State Sales Tax | 9.5% | $393 |
| | | Construction Contingency | 50% | $2,070 |
| | | Subtotal construction costs | | $7,017 |
| | | Administration and engineering design | 20% | $1,403 |
| | | Permitting | | $0 |
| | | Land acquisition and easements | | $0 |
| | | Total cost | | $9,000 |

# Surface Water Management Utility

**Requested - $16,080,100**

**Funded - $13,502,400**

## Funding Sources




**Surface Water Management Utility Funding - $13,502,400**

**Average Annual Current Revenues**
Utility Rates -- $1,588,000
Total Average Annual Revenue -- $1,588,000

# City of Kirkland
# 2013-2018 Capital Improvement Program

## SURFACE WATER MANAGEMENT UTILITY PROJECTS

**Funded Projects:**

| Project Number | Project Title | Prior Year(s) | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2013-2018 Total | Funding Source: Current Revenue | Reserve | Debt | External Source |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SD 0047 | Annual Replacement of Aging/Failing Infrastructure | | 200,000 | 200,000 | 200,000 | 200,000 | 200,000 | 200,000 | 1,200,000 | 1,200,000 | | | |
| SD 0048 | Cochran Springs / Lake Washington Blvd Crossing Enh. | 180,000 | | 340,000 | 667,100 | 450,000 | | | 1,457,100 | 1,457,100 | | | |
| SD 0051* | Forbes Creek/KC Metro Access Road Culvert Enh. | 232,200 | | | | | 688,000 | 370,700 | 1,058,700 | 1,058,700 | | | |
| SD 0053* | Forbes Creek/Coors Pond Channel Grade Controls | 260,200 | | | | | | 164,700 | 164,700 | 164,700 | | | |
| SD 0058* | Surface Water Sediment Pond Reclamation Phase II | 115,400 | | | 497,600 | 238,000 | | | 735,600 | 735,600 | | | |
| SD 0059* | Totem Lake Boulevard Flood Control Measures | 585,400 | 302,800 | 1,048,000 | | | | | 1,350,800 | 1,014,800 | | | 336,000 |
| SD 0067* | NE 129th Place/Juanita Creek Rockery Repair | 115,500 | | | 223,300 | | | | 223,300 | 223,300 | | | |
| ***SD 0075~*** | ***Totem Lake Twin 42 Inch Culvert Replacement*** | ***922,000*** | ***4,347,000*** | | | | | | 4,347,000 | 1,253,200 | 3,093,800 | | |
| ***SD 0076#*** | ***NE 141st Street/111th Avenue NE Culvert Repair*** | | ***181,500*** | - | | | | | 181,500 | | 181,500 | | |
| ***SD 0077#*** | ***Goat Hill Storm Drainage Repair*** | | | ***153,700*** | | | | | ***153,700*** | ***153,700*** | | | |
| ***SD 0078#*** | ***Billy Creek Ravine Stabilization Phase II*** | | | ***67,400*** | | | | | ***67,400*** | ***14,300*** | ***53,100*** | | |
| ***SD 0079*** | ***Public Safety Building Stormwater Quality Demonstration*** | | ***160,000*** | | | | | | ***160,000*** | | ***160,000*** | | |
| ***SD 0081*** | ***Neighborhood Drainage Assistance Program (NDA)*** | | ***50,000*** | | ***50,000*** | | ***50,000*** | | 150,000 | | ***150,000*** | | |
| SD 8888* | Annual Streambank Stabilization Program | | | | | 350,000 | 350,000 | 425,000 | 1,125,000 | 1,125,000 | | | |
| SD 9999* | Annual Surface Water Infrastructure Replacement Program | | | | | 350,000 | 350,000 | 427,600 | 1,127,600 | 1,127,600 | | | |
| **Total Funded Surface Water Management Utility Projects** | | **2,410,700** | **5,241,300** | **1,809,100** | **1,638,000** | **1,588,000** | **1,638,000** | **1,588,000** | **13,502,400** | **9,528,000** | **3,638,400** | **0** | **336,000** |

**Unfunded Projects:**

| Project Number | Project Title | Total |
|---|---|---|
| SD 0045^ | Carillon Woods Erosion Control Measures | 549,600 |
| SD 0046# | Regional Detention in Forbes and Juanita Creek Basins | 2,810,200 |
| SD 0049# | Forbes Creek/108th Avenue NE Fish Passage Improvements | 332,900 |
| SD 0050# | NE 95th Street/126th Avenue NE Flood Control Measures | 55,900 |
| SD 0052^ | Forbes Creek/Slater Avenue Embankment Stabilization | 139,700 |
| SD 0054# | Forbes Creek/BNSFRR Fish Passage Improvements | 424,200 |
| SD 0055 | Forbes Creek / 98th Avenue NE Riparian Plantings | 75,500 |
| SD 0056^ | Forbes Creek Ponds Fish Passage/Riparian Plantings | 213,000 |
| SD 0061^ | Everest Park Stream Channel/Riparian Enhancments | 1,095,500 |
| SD 0062^ | Stream Flood Control Measures at Kirkland Post Office | 345,400 |
| SD 0063^ | Everest Creek-Slater Avenue at Alexander Street | 830,300 |
| SD 0068 | 128th Ave NE/NE 60th Street To NE 64th St Drainage Imp. | 270,300 |
| SD 0070 | Juanita Creek Watershed Enhancement Study | 50,000 |
| SD 0074 | Streambank Stabilization Program – NE 86th Street | 640,200 |
| ***SD 0080*** | ***Regional Decant and City Maintenance Facility*** | ***10,500,000*** |
| **Subtotal Unfunded Surface Water Management Utility Projects** | | **18,332,700** |
| ***Funding Available from Annual Programs for Candidate Projects*** | | ***2,252,600*** |
| **Net Unfunded Surface Water Management Utility Projects** | | **16,080,100** |

**Prior Year(s) Funding (Budget to Actuals):**

| Project Number | Project Title | Budget | Actual | Balance |
|---|---|---|---|---|
| SD 0048 | Cochran Springs / Lake Washington Blvd Crossing Enh. | 180,000 | 0 | 180,000 |
| SD 0051* | Forbes Creek/KC Metro Access Road Culvert Enh. | 232,200 | 88,092 | 144,108 |
| SD 0053* | Forbes Creek/Coors Pond Channel Grade Controls | 260,200 | 84,147 | 176,053 |
| SD 0058* | Surface Water Sediment Pond Reclamation Phase II | 115,400 | 29,151 | 86,249 |
| SD 0059* | Totem Lake Boulevard Flood Control Measures | 585,400 | 379,640 | 205,760 |
| SD 0067* | NE 129th Place/Juanita Creek Rockery Repair | 115,500 | 0 | 115,500 |
| ***SD 0075~*** | ***Totem Lake Twin 42 Inch Culvert Replacement*** | ***922,000*** | ***0*** | ***922,000*** |
| **Total Prior Year(s) Funding (Budget to Actuals):** | | **2,410,700** | **581,030** | **1,829,670** |

Notes

***** = Modification in timing and/or cost (see Project Modification Schedule for greater detail)
+ = Moved from unfunded status to funded status
" = Moved from funded status to unfunded status
^ = Annual Streambank Stabilization Program Project Candidates
# = Annual Storm Drain Replacement Program Project Candidates
Shaded year(s) = Previous timing
***Bold italics = New projects***
~Project approved as new project by Council April 17, 2012

# CITY OF KIRKLAND
# 2013-2018 CAPITAL IMPROVEMENT PROGRAM
# PROJECT SUMMARY

## SURFACE WATER MANAGEMENT UTILITY - Surface Water Management Utility

**SD 0047 000** **ANNUAL REPLACEMENT OF AGING /FAILING INFRASTRUCTURE**

City-wide

The regular replacement of aging and/or failing Surface Water Utility infrastructure. The City will prioritize system improvements through the use of a video system that will investigate surface water piping. Following the prioritization, improvements will be identified for either reconstruction using City forces or through the normal contractor bidding process.

| PROJECT START | Prior Year(s) | 2013-2018 Total | Future Year(s) | TOTAL PROJECT |
|---|---|---|---|---|
| Ongoing | $0 | $1,200,000 | $0 | $1,200,000 |

**SD 0048 000** **COCHRAN SPRINGS / LAKE WASHINGTON BLVD CROSSING ENHANCEMENT**

Lakeview

Sedimentation deposits in the channel downstream of this culvert results in backwater conditions and sedimentation presenting an ongoing maintenance task for City crews. The backwater condition impedes the culvert's capacity to convey large peak events. Additionally, sediment deposition downstream of Lake Washington Boulevard increases the risk of overbank flooding water in the Yarrow Bay business park. Improving fish passage at the culvert will allow access to approximately 375 feet of breeding and rearing habitat. Increasing the culvert's flow capacity will reduce the risk of flooding on Lake Washington Boulevard.

| PROJECT START | Prior Year(s) | 2013-2018 Total | Future Year(s) | TOTAL PROJECT |
|---|---|---|---|---|
| 2012 | $180,000 | $1,457,100 | $0 | $1,637,100 |

**SD 0051 000** **FORBES CREEK / KING COUNTY METRO ACCESS ROAD CULVERT ENHANCEMENT**

South Juanita

An existing 12-foot-wide bottomless arch culvert conveys Forbes Creek under a King County sewer easement access road, approximately 145 yards upstream of Forbes Creek Drive and is in need of repair. The stream is eroding under the culvert footings, a hanging outfall at the downstream end of the culvert has created a fish blockage and the gabion walls on the upstream end of the culvert are collapsing. Corrective measures include the installation of log-boulder grade controls to promote channel aggradations up to and inside the culvert, placement of aggraded gravel to protect the eroding footings, repair to the gabion wall and stabilization of the adjacent streambanks.

| PROJECT START | Prior Year(s) | 2013-2018 Total | Future Year(s) | TOTAL PROJECT |
|---|---|---|---|---|
| 2006 | $232,200 | $1,058,700 | $0 | $1,290,900 |

**SD 0053 000** **FORBES CREEK / COORS POND CHANNEL GRADE CONTROLS**

South Juanita

Existing structures in the stream have created barriers to fish passage while channel downcutting continues. Install grade control structures, cut down height of structures and install habitat structures. These improvements will raise the channel, improve the fish passage and improve the instream habitat.

| PROJECT START | Prior Year(s) | 2013-2018 Total | Future Year(s) | TOTAL PROJECT |
|---|---|---|---|---|
| 2006 | $260,200 | $164,700 | $1,196,100 | $1,621,000 |

**SD 0058 000** **SURFACE WATER SEDIMENT POND RECLAMATION (PHASE II)**

South Juanita

Phase I of the Sediment Pond reclamation project took place in 2004/2005. Phase II will consider flood plain development as an alternative. Project may include additional planting along Juanita Creek. Review potential for converting pond into a flood plain, improve riparian understory vegetation. Plant trees and understory shrubs on City-owned parcel downstream of NE 128th Street. Planting will provide shading for the stream, which will reduce water temperature.

| PROJECT START | Prior Year(s) | 2013-2018 Total | Future Year(s) | TOTAL PROJECT |
|---|---|---|---|---|
| 2012 | $115,400 | $735,600 | $0 | $851,000 |

**SD 0059 000** **TOTEM LAKE BOULEVARD FLOOD CONTROL MEASURES**

Totem Lake

Totem Lake Boulevard has a history of flooding during mid to large storm events. Evaluation of the storm drainage system previously completed under this project has identified options for implementing flood control improvements. The improvements include emergency pumping and removal of sediment and vegetation along the conveyance channel. This work will reduce the frequency and magnitude of flooding on Totem Lake Boulevard.

| PROJECT START | Prior Year(s) | 2013-2018 Total | Future Year(s) | TOTAL PROJECT |
|---|---|---|---|---|
| 2007 | $585,400 | $1,350,800 | $0 | $1,936,200 |

**SD 0067 000** **NE 129TH PLACE/JUANITA CREEK ROCKERY REPAIR**

North Juanita

Project will evaluate the replacement and/or repair of streambank rockery damaged during the December 2007 Storm, to include the possible replacement of the culvert crossing at NE 129th Place.

| PROJECT START | Prior Year(s) | 2013-2018 Total | Future Year(s) | TOTAL PROJECT |
|---|---|---|---|---|
| 2012 | $115,500 | $223,300 | $0 | $338,800 |

**SD 0075 000** **TOTEM LAKE TWIN 42-INCH CULVERT REPLACEMENT**

Totem Lake

This project will replace two segments of 42-inch twin corrugated metal pipe (cmp) culverts at approximately 350 lineal feet in length for each segment (700 lineal feet total). The culverts are 40 years old and have exceeded their useful life. The pipe material has deteriorated and has failed at two locations causing sink holes. The culverts are full of sediment and cannot meet flow requirements. The twin culverts will be replaced with one large diameter culvert that will be designed to meet fish passage requirements. This project will involve acquiring a permanent maintenance easement where the culvert runs through private property and obtaining all necessary permits. This project was approved by City Council at their regular meeting of April 17, 2012.

| PROJECT START | Prior Year(s) | 2013-2018 Total | Future Year(s) | TOTAL PROJECT |
|---|---|---|---|---|
| 2012 | $922,000 | $4,347,000 | $0 | $5,269,000 |

**SD 0076 000** **NE 141ST STREET/111TH AVENUE NE CULVERT HEADWALL REPAIR**

Finn Hill

An existing 48" storm pipe has partially filled with sediment and the reduced flow capacity has created backwater conditions at the inlet resulting in channel aggradation, erosion and undermining of adjacent trees, with partial structural failure of the inlet headwall. Fish were observed in the downstream reach and WDFW permitting will likely be required.

| PROJECT START | Prior Year(s) | 2013-2018 Total | Future Year(s) | TOTAL PROJECT |
|---|---|---|---|---|
| 2013 | $0 | $181,500 | $0 | $181,500 |

**SD 0077 000** **GOAT HILL STORM DRAINAGE REPAIR**

Finn Hill

Stream channel delivers sediment to the bottom of the slope where it impacts existing drainage structures and periodically overflows onto private property during high flow events. Project will evaluate and implement the best drainage alternatives including, but not limited to a tight-line stream channel and installation of a drainage structure for ease of maintenance.

| PROJECT START | Prior Year(s) | 2013-2018 Total | Future Year(s) | TOTAL PROJECT |
|---|---|---|---|---|
| 2014 | $0 | $153,700 | $0 | $153,700 |

**SD 0078 000** **BILLY CREEK RAVINE STABILIZATION PHASE 2**

Finn Hill

Construct additional erosion control measures in an upper reach of Billy Creek that has experienced severe erosion from a failed drainage pipe. Phase I was constructed in winter of 2011/12 and completed to adjacent property where easement is required. Phase 2 will complete the original design as negotiations with property owner are completed.

| PROJECT START | Prior Year(s) | 2013-2018 Total | Future Year(s) | TOTAL PROJECT |
|---|---|---|---|---|
| 2014 | $0 | $67,400 | $0 | $67,400 |

**SD 0079 000** **PUBLIC SAFETY BUILDING STORMWATER TREATMENT/REUSE DEMONSTRATION PROJECT**

Totem Lake

Provide a water quality treatment component to the City of Kirkland Public Safety Building project. The City plans to renovate and existing structure for use as new Police Department, Court and Jail. The scope of work does not trigger storm water treatment permitting requirements; however, the opportunity to showcase innovative and effective ways to treat and reuse storm water is possible with this project. The project will install a 10,000 gallon cistern to collect roof water runoff for reuse as landscape irrigation, as well as providing storm filters and a rain garden for treatment of parking lot runoff.

| PROJECT START | Prior Year(s) | 2013-2018 Total | Future Year(s) | TOTAL PROJECT |
|---|---|---|---|---|
| 2013 | $0 | $160,000 | $0 | $160,000 |

**SD 0081 000** **NEIGHBORHOOD DRAINAGE ASSISTANCE PROGRAM (NDA)**

City-wide

Design and construct small-scale flooding solution occurring outside the public right of way. Projects qualifying for assistance include those situation that are too small to rank highly in the regular Surface Water CIP, will benefit several homes or businesses while serving a general public benefit, and are primarily caused by the cumulative impacts of upstream development. Individual projects will be evaluated and those that qualify will be prioritized. Staff will produce a report each year summarizing the number type and priority of problems that qualify for NDA fixes, and a list of NDA projects completed in the previous year.

| PROJECT START | Prior Year(s) | 2013-2018 Total | Future Year(s) | TOTAL PROJECT |
|---|---|---|---|---|
| 2013 | $0 | $150,000 | $0 | $150,000 |

**SD 8888 000** **ANNUAL STREAMBANK STABILIZATION PROGRAM**

City-wide

Goals of the streambank stabilization program are to provide the public benefits of improved water quality and decreased flooding by stabilizing and restoring stream channels which may in many cases be located on private property. Most common stabilization methods will be upstream detention and in-stream stabilization/restoration using bioengineering techniques. Candidate projects under this Annual Program include: SD 0063 - Everest Creek - Slater Ave at Alexander St, SD 0061 - Everest Park Stream Channel/Riparian Enhancements, SD 0045 - Carillon Woods Erosion Control Measures, SD 0062 - Street Flood Control Measures at Kirkland Post Office, SD 0056 - Forbes Creek Ponds Fish Passage/Riparian Plantings and SD 0052 - Forbes Creek/ Slater Ave Embankment Stabilization.

| PROJECT START | Prior Year(s) | 2013-2018 Total | Future Year(s) | TOTAL PROJECT |
|---|---|---|---|---|
| Ongoing | $0 | $1,125,000 | $0 | $1,125,000 |

**SD 9999 000** **ANNUAL SURFACE WATER INFRASTRUCTURE REPLACEMENT PROGRAM**

City-wide

Goals of the storm drain replacement program are to provide the public benefits of improved storm water conveyance. Individual projects will come from the prioritized list within the Surface Water Master Plan and through urgent maintenance needs as they may arise. Candidate projects under this Annual Program include: SD 0075 - Totem Lake Twin 42-Inch Culvert Replacement, SD 0046 - Regional Detention in Forbes and Juanita Basins, SD 0049 - Forbes Creek/108th Ave NE Fish Passage Improvements, SD 0050 - NE 95th St/126th Ave NE Flood Control Measures, SD 0054 - Forbes Creek/Cross Kirkland Corridor Fish Passage Improvements, SD 0076 - NE 141st Street/111th Avenue NE Culvert Headwall Repair, SD 0077 - Goat Hill Storm Drainage Repair, and SD 0078 - Billy Creek Stabilization Phase II.

| PROJECT START | Prior Year(s) | 2013-2018 Total | Future Year(s) | TOTAL PROJECT |
|---|---|---|---|---|
| Ongoing | $0 | $1,127,600 | $0 | $1,127,600 |

# Funded Storm Water CIP

**Project Locations**

SD 0048 000 - Cochran Springs / Lake Washington Blvd Crossing Enhancement

SD 0051 000 - Forbes Creek / King County METRO Access Road Culvert Enhancement

SD 0053 000 - Forbes Creek / Coors Pond Channel Grade Controls

SD 0058 000 - Surface Water Sediment Pond Reclamation (Phase II)

SD 0059 000 - Totem Lake Blvd Flood Control Measures

SD 0067 000 - NE 129th Pl / Juanita Creek Rockery Repair

SD 0075 000 - Totem Lake Twin 42-inch Culvert Replacement

SD 0076 000 - NE 141st St / 111th Ave NE Culvert Headwall Repair

SD 0077 000 - Goat Hill Drainage Repair

SD 0078 000 - Billy Creek Ravine Stabilization Phase 2

SD 0079 000 - Public Saftey Bldg S/W Quality Demo

**Projects with various locations**

SD 0047 000 - Annual Replacement Of Aging/Failing Infrastructure (Various Locations)

SD 0081 - Neighborhood Drainage Assistance Program (NDA)

SD 8888 Annual Streambank Stabilization Program (Various Locations)

SD 9999 Annual Storm Drain Replacement Program (Various Locations)

**Legend**

CIP Project

Parks

Schools

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Printed Feb 6, 2013 - Public Works GIS