Appendix K

Capital Project Summaries and Planning Level Cost Estimates

Appendix K- Capital Project Summaries and Planning Level Cost Estimates

ID	Project	Primary goal	Preliminary cost	Page #
CA-1	Erosion control measures	Water quality	$550,000	K-1
CDE-01	Culvert replacement to improve fish passage	Habitat	$615,000	K-3
CH-01	Undersized pipe to be replaced	Infrastructure	$219,000	K-5
CH-02	Channel reconstruction	Habitat	$690,000	K-7
CH-03	Rain garden and bioretention retrofit	Water quality	$85,000	K-9
CH-04	Groundwater seepage and road stability	Infrastructure	$126,000	K-11
CJC-9	Culvert replacement to improve fish passage	Habitat	$613,000	K-13
CW-INF-01	Pipe repair and replacement	Infrastructure	$769,000	K-15
CW-INF-02	Pipe repair and replacement	Infrastructure	$3,025,000	K-17
DE-01	Sediment removal in channel	Flooding	$136,000	K-19
EC-01	Ravine stabilization	Water quality	$830,000	K-21
EC-02	Everest Park channel and riparian restoration	Habitat	$1,096,000	K-23
FO-01	Fish passage	Habitat	$333,000	K-25
FO-02	Regional detention in Forbes Creek basin	Flooding	$10,000,000	K-27
FO-05	Culvert replacement	Habitat	$1,058,000	K-29
FO-07	Channel grade control	Water quality	$165,000	K-31
Fo-08	Forbes Creek/BNSF Fish Passage Improvements	Habitat	$424,000	K-33
FO-13	Pilot LID water quality project associated with planned transportation project	Water quality	$65,000	K-35
HAS-01	Pipe replacement, improved hydraulics	Infrastructure	$2,369,000	K-37
JC-01	Sediment removal	Water quality	$194,000	K-39
JC-02	Infrastructure/conveyance	Infrastructure	$874,000	K-41
JC-03	Juanita Creek floodplain creation	Habitat	$533,000	K-43
JC-04	Flow diversion	Flooding	$266,000	K-45
JC-05	NE 141st Street/111th Avenue NE culvert replacement	Infrastructure	$765,000	K-47
JC-06	Goat Hill route flow away from open channel	Flooding	$521,000	K-49
JC-07	Goat Hill stabilize eroding channel	Flooding	$299,000	K-52
JC-08	Goat Hill increase pipe conveyance capacity	Flooding	$490,000	K-55
MB-01	Replace stormwater pipes	Infrastructure	$680,000	K-58
RED-01	Underground injection control well (infiltration facility)	Flooding	$65,000	K-60

CITY OF KIRKLAND
CAPITAL IMPROVEMENT PROGRAM
2013 TO 2018

Surface Water Master Plan
Project ID CA-1

PROJECT #	**SD 0045 000**
DEPARTMENT	Public Works
DEPARTMENT CONTACT	Dave Snider

PROJECT TITLE	CARILLON WOODS EROSION CONTROL MEASURES		
PROJECT LOCATION	Carillon Woods, NE 55th Street at 105th Avenue NE	**PROJECT START**	**PROJECT STATUS**
		Undetermined	Modified Project

DESCRIPTION/JUSTIFICATION

The new Carillon Woods (formerly the King County Water District #1 property) requires further evaluation and the possible establishment of erosion control measures to handle the re-direction of ground water into an established drainage basin situated on the west side of the property. This is a candidate project included as a component of the Annual Streambank Stabilization Program Project, SD 8888.

REASON FOR MODIFICATION (WHERE APPLICABLE)

Project identified as potential candidate for SD 8888 - Annual Streambank Stabilization Program Project.

POLICY BASIS

Surface Water Comprehensive Plan
CA-1

METHOD OF FINANCING (%)

Current Revenue	0 %
Reserve	0 %
Grants	0 %
Other Sources	0 %
Debt	0 %
Unfunded	100 %

CAPITAL COSTS	**COSTS TO BE FUNDED**
Planning/Design/ Engineering	142,800
In-House Professional Svcs.	69,100
Land Acquisition	0
Construction	337,700
Computer Hardware/Software	0
Equipment	0
Other Services	0
Total	549,600
NEW MAINT. AND OPER.	0
NEW FTE	0.00

CITY OF KIRKLAND
CAPITAL IMPROVEMENT PROGRAM 2013 TO 2018 Surface Water Master Plan Project ID CA-1

PROJECT #	**SD 0045 000**
DEPARTMENT	Public Works
DEPARTMENT CONTACT	Dave Snider

PROJECT TITLE	CARILLON WOODS EROSION CONTROL MEASURES

CRITERIA	PROJECT IMPACTS (RESPOND TO ALL SECTIONS WHICH APPLY)
Amount of public disruption and inconvenience caused	*None; project entirely within Park area that is currently off limits to the public.*
Community economic impacts	*Depending on solution will reduce maintenance costs.*
Health and safety, environmental, aesthetic, or social effects	*If allowed to go unchecked, existing spring water could lead to erosion and/or other environmental issues.*
Responds to an urgent need or opportunity	*The results of removing this source of water for the Point communities is not yet known. Monitoring will establish the need and scope of the improvements.*
Feasibility, including public support and project readiness	*Design/solution is pending.*
Conforms to legal or contractual obligations	*Will be designed and constructed per professional and legal standards and guidelines.*
Responds to state and/or federal mandate	*A more monitored and consistent water supply was required for the Point communities; the resulting surplus of ground water from these springs will revert to natural conditions. Alternative solutions will need to meet the Department of Ecology requirements.*
Benefits to other capital projects	*None at this time.*
Implications of deferring the project	*Unknown at this time.*
CONFORMANCE WITH ADOPTED COMPRE-HENSIVE PLAN	Name of Neighborhood(s) in which located: *Central Houghton* Is there a specific reference to this project or land use in the immediate vicinity? How does the project conform to such references? Attachments: ☐ (Specify)
LEVEL OF SERVICE IMPACT	☑ Project provides no new capacity (repair, replacement or renovation). ☐ Project provides new capacity. Amount of new capacity provided: ☐ Project assists in meeting/maintaining adopted level of service. ☐ Project required to meet concurrency standards.

Project:	Denny Creek Culvert		ID: CDE-01
Location:	Juanita Drive NE and NE 133rd Pl	Basin:	Denny Creek
Project Type: Problem:	☒Infrastructure ☐Water Quality ☐Erosion ☒Habitat ☐Flooding 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:

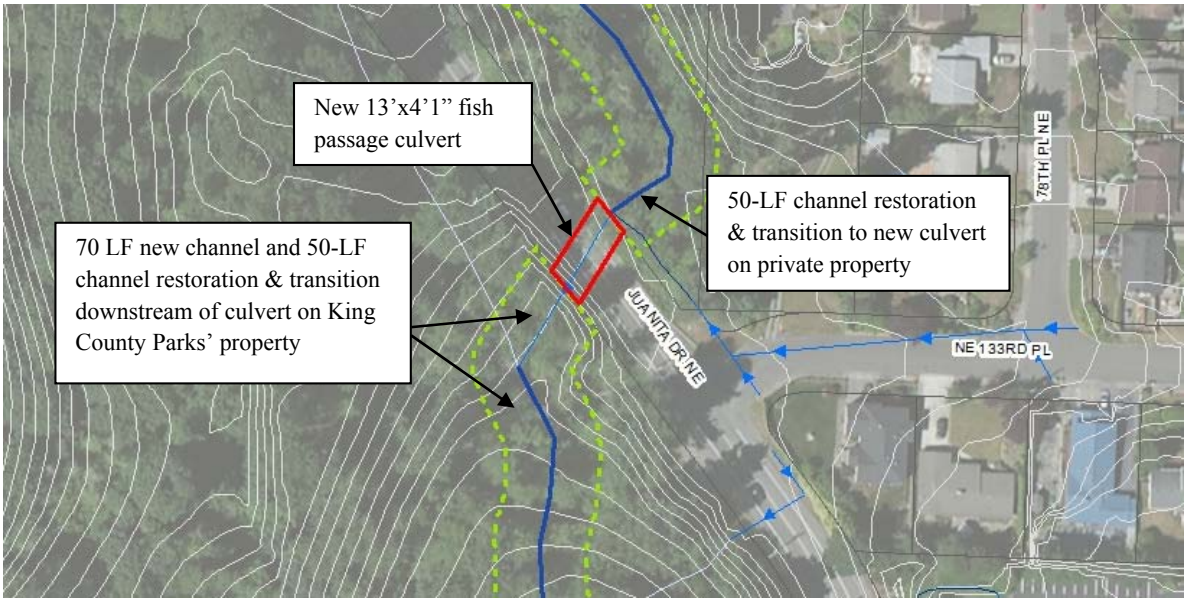
- Install 13' x 4'1" arch fish passable culvert. Culvert is open bottom with footings
- Install headwalls to reduce culvert length from 138 LF to 70LF
- Create new channel length by reducing the culvert length with streambed gravel, and habitat features
- Restore staging areas and channel floodplain 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: Problem:	☒Infrastructure ☐Water Quality ☐Erosion ☐Habitat ☐Flooding 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

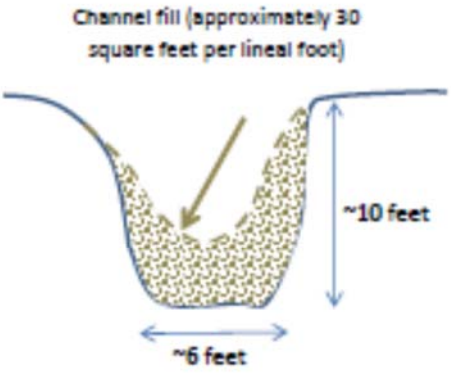
- Remove existing pipes.
- Install 12-in tightline from Holmes Pt Dr NE to Lake Washington.
- Modify existing outfall as needed to fit new pipe diameter.

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: Problem:	☐Infrastructure ☒Water Quality ☒Erosion ☒Habitat ☐Flooding 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:	Champagne Creek Stormwater Retrofit		ID: CH-03
Location:	80th Ave NE and NE 122nd Pl.	Basin:	Champagne Creek
Project Type: Problem:	☐ *Infrastructure* ☒ *Water Quality* ☒ *Flow Control* ☐ *Habitat* **Lack of Stormwater Treatment**	Preliminary Project Cost:	$85,000

Narrative

The City of Kirkland is concerned about the ecological functions of Champagne Creek. The creek shows signs of erosion and water quality issues. Minimal stormwater infrastructure is in place upstream to treat stormwater runoff for water quality or flow control. An existing ditch and pipe system carries runoff along NE 123rd St. and NE 122nd Pl. to Juanita Drive NE, where it discharges into Champagne Creek.

The Champagne Creek Reconstruction CIP H-CHA-1 is proposed downstream of this project.

This project was identified as part of the retrofit analysis as requested by the City.

Solutions include installing a rain garden in the ROW and connecting it to the existing system.

Project benefits include improved water quality treatment and peak flow reduction upstream of Champagne Creek. This will reduce erosion and water quality issues in the lower reaches of the creek.

ROW at the intersection of 80th Ave NE, NE 122nd Pl, and NE 123rd St. (looking northeast)

Conceptual Design

Stormwater Design:

- Construct a 2,500 SF rain garden at the intersection, within the ROW, which treats 3.21 AC.
- Install a flow splitter structure at end of existing driveway culvert.
- High flows bypass the rain garden via the existing asphalt ditch.

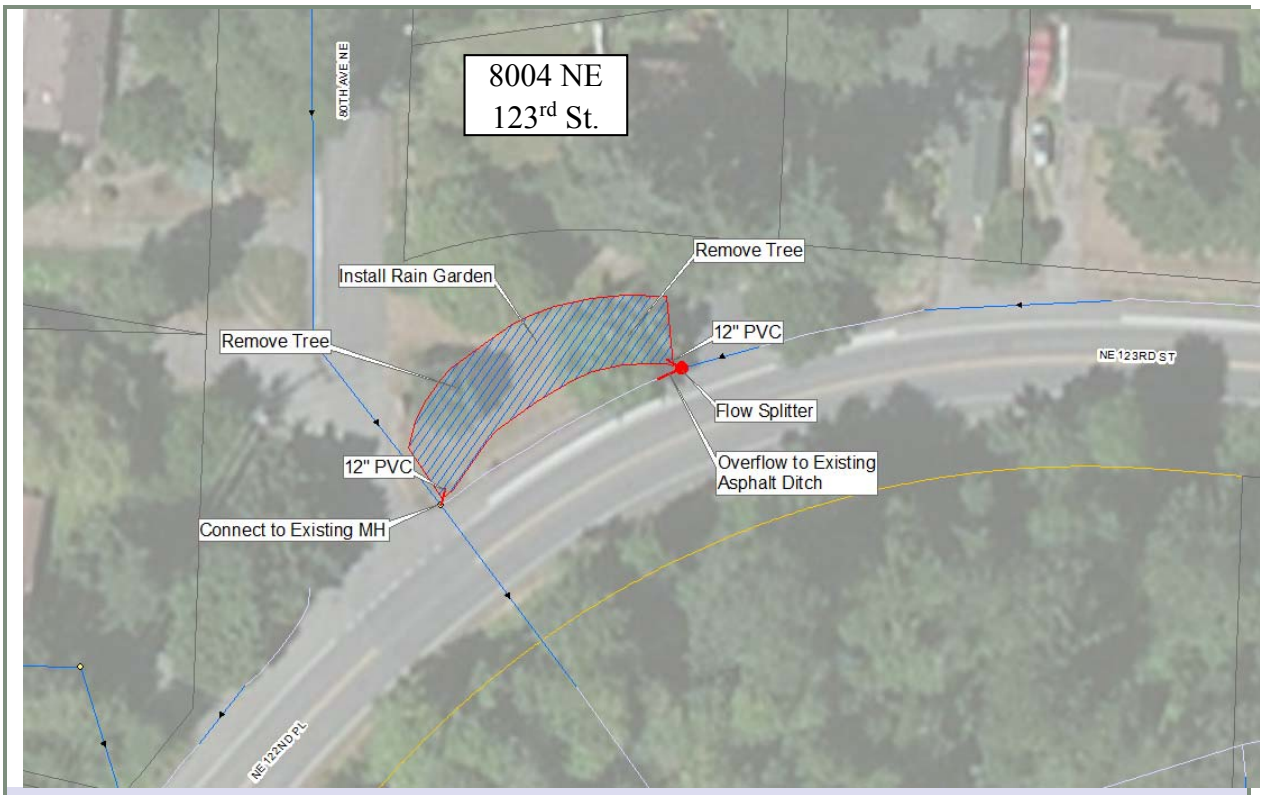
Additional Options Include:

- Swale or bioretention facility on south side of NE 122nd Pl/NE 123rd St.
- Stormwater facility on City owned property south of NE 123rd St.

Considerations for Implementation

- Tree removal is necessary for two small trees.
- Coordination with 8004 NE 123rd St. Maintain property access during construction.

➢ Geotechnical evaluation is required for design to determine actual infiltration rates.



Project Cost Estimate

Item	Unit	Unit Cost	Quantity	Cost
Water Pollution/Erosion Control	%	5%	–	$1,800
SPCC Plan	LS	$500	1	$500
Traffic Control	%	7%	–	$2,500
Clearing & Grubbing	SY	$5	300	$1,500
Remove Tree	EA	$500	2	$1,000
Excavation Incl. Haul	CY	$25	240	$6,000
Connection to Existing Drainage Structure	EA	$500	1	$500
Catch Basin – Type 1L	EA	$4,300	1	$4,300
Schedule A 12" Storm Sewer Pipe	LF	$60	10	$600
Embankment Construction	CY	$2	150	$300
Bioretention Soil	CY	$50	90	$4,500
Planting and Bioengineered Restoration	SY	$40	300	$12,000
			Subtotal	$35,500
		Contractor overhead, profit, and mobilization	10%	$3,550
		Washington State Sales Tax	9.5%	$3,373
		Construction Contingency	50%	$17,750
		Subtotal construction costs		$60,173
		Administration and engineering design	40%	$24,069
		Permitting		$0
		Land acquisition and easements		$0
		Total cost		$85,000

Project:	Juanita Dr. Flooding		ID: CH-04
Location:	NE Juanita Dr. near 86th Ave NE	Basin:	Champagne Creek
Project Type: Problem:	☒Infrastructure ☐Water Quality ☐Erosion ☐Habitat ☒Flooding Ice collecting at driveway and roadway shoulder	Preliminary Project Cost:	$126,000

Narrative

During winter months water collects and freezes at the driveway of 8541, 8545, 8547, 8549, and 8551 NE Juanita Dr. The ice is dangerous and a hazard for the residents. One of the residents has alerted the City to the problem.

No piped stormwater system exists at the driveway along NE Juanita Dr. The following observations were made during a site visit in the rain (3/8/14):

- Runoff from a private driveway sheet flows across Juanita Dr. towards the problem area
- The existing asphalt berm is insufficient at conveying stormwater past the driveways. It is too short and there is no other method to collect stormwater at its terminus.

This project was identified in 2014 after complaints were filed in the winter of 2013.

Solutions for this CIP include installing asphalt berms and a stormwater collection system on the southeast side of NE Juanita Dr.

Project benefits include reduced flooding and ice accumulation. The driveway and shoulder at NE Juanita Dr. will be safer for residents.

Ice on driveway at NE Juanita Dr., looking southwest.

Conceptual Design

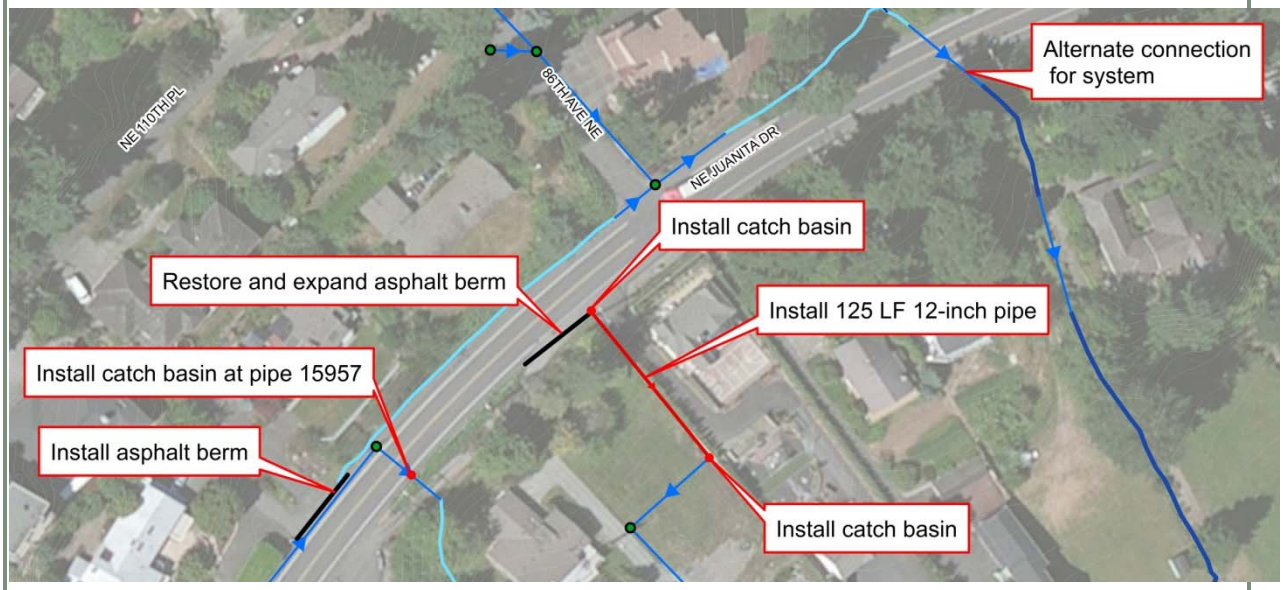
The proposed CIP includes the following improvements:

- Install asphalt berms to direct flow.
  - New berm at driveways for 8516 and 8538 NE Juanita Dr. to direct flow to ditch, instead of across the road.
  - Extend existing berm at driveway for 8541, 8545, 8547, 8549, and 8551 NE Juanita Dr. to ensure flow continues on NE Juanita Dr. and does not flow down driveway.
- Install additional catch basin for pipe 15957 to capture flow crossing NE Juanita Dr.
- Install stormwater system at NE Juanita Dr. that ties into the existing system to the south.
  - 125 LF of new 12-inch pipe.
  - 3 new catch basins (Type 1).

Another alternative was considered which connected with the creek to the northeast, rather than the system on private property. This alternative requires 1,680 LF of 12-inch pipe, 5 catch basins, and is more expensive, but keeps the infrastructure within existing City right of way.

Considerations for Implementation

- Hydraulic modeling is recommended to confirm pipe and catch basin sizes.
  - Proposed sizes are based on other pipes and structures in the vicinity.
- Consider opportunities to add water quality treatment to this CIP.
- Utility potholing may be required.
- A temporary and/or permanent easement is needed.



Project Cost Estimate

Item	Unit	Unit Cost	Quantity	Cost
Water Pollution/Erosion Control	%	5%	–	$3,000
SPCC Plan	LS	$500	1	$500
Traffic Control	%	7%	–	$4,200
Clearing & Grubbing	SY	$5	750	$3,750
Sawcut Pavement	LF	$5	40	$200
Remove Asphalt Conc. Pavement	SY	$28	10	$280
Excavation Incl. Haul	CY	$25	50	$1,250
Roadway Excavation Incl. Haul	CY	$92	10	$920
Catch Basin – Type 1	EA	$1,200	3	$3,600
Schedule A 12" Storm Sewer Pipe	LF	$60	125	$7,500
Planting and Bioengineered Restoration	SY	$40	750	$30,000
Extruded Curb, HMA	LF	$14	110	$1,540
HMA CL ½ IN PG 64-22	TON	$200	10	$2,000
			Subtotal	$58,740
		Contractor overhead, profit, and mobilization	10%	$5,874
		Washington State Sales Tax	9.5%	$5,580
		Construction Contingency	50%	$29,370
		Subtotal construction costs		$99,564
		Administration and engineering design	20%	$19,913
		Permitting		$0
		Land acquisition and easements		$6,250
		Total cost		$126,000

Project:	Juanita Creek Culvert		ID: CJC-9
Location:	NE 137th Pl. near Juanita Woodinville Way NE	Basin:	Juanita Creek
Project Type: Problem:	☒Infrastructure ☐Water Quality ☐Erosion ☒Habitat ☐Flooding 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

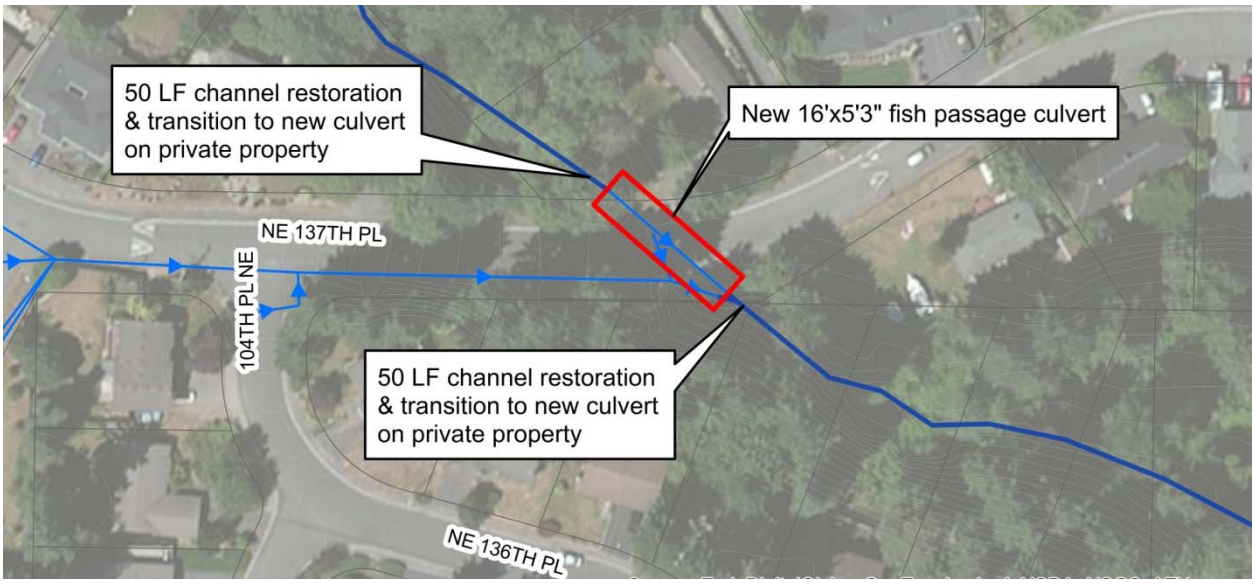
Conceptual Design

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:	General Stormwater Pipe Repair		ID: CW-INF-01
Location:	City-Wide	Basin:	N/A
Project Type: Problem:	☒Infrastructure ☐Water Quality ☐Erosion ☐Habitat ☐Flooding Failing stormwater pipes	Preliminary Project Cost:	$769,000

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".

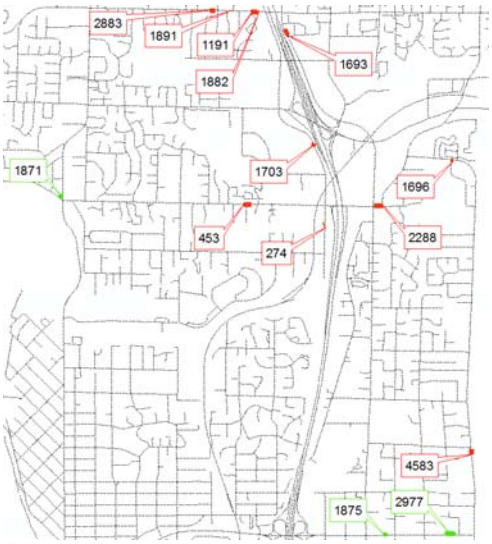
The map to the right shows pipes that have a "poor" rating, 12-in or greater pipe diameter, corrugated material, and cross or are adjacent to an arterial (in red), and pipes receiving a "poor" rating which connect with planned Kirkland transportation projects (in green).

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.



City-wide poor condition pipes (≥12", corrugated, at arterials)

Conceptual Design

Pipe Prioritization: Poor rated pipes are prioritized based on risk factors to identify the pipes that are more likely to fail and/or have a larger impact during failure. This methodology repairs the higher risk pipes first and results in a manageable CIP cost as demonstrated in the bullets below (assumes $500/LF pipe).

- Poor rated pipe, all sizes and pipe types (289 pipes; 22,144 LF; $11,072,000)
- Poor rated pipe, >12-in diameter, and corrugated (84 pipes; 7,588 LF; $3,794,000)
- Poor rated pipe, >12-in diameter, corrugated, and cross or are adjacent to an arterial (14 pipes; 1,538 LF $769,000). Replacement of these pipes is included in this CIP.

This CIP assumes pipe replacements may include both open trench and trenchless construction methods.

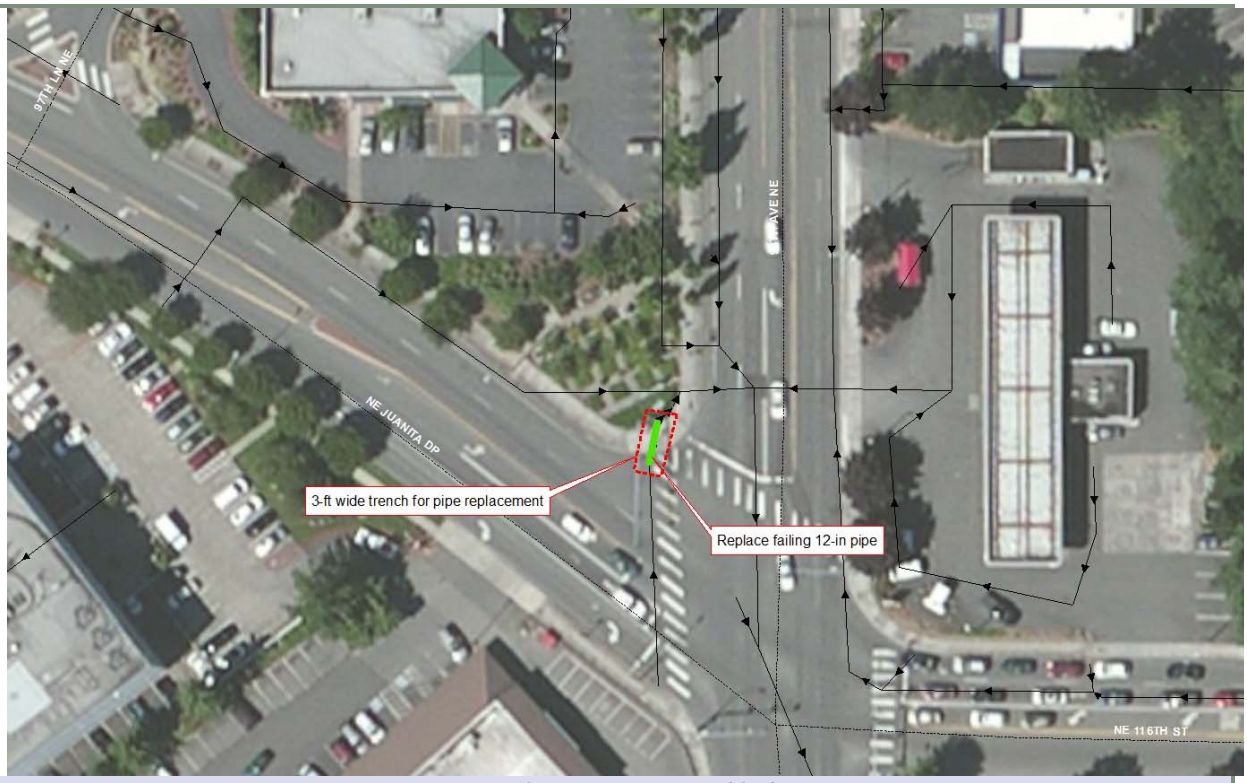
- Open Trench Replacement at transportation project sites (green in map above):
  - Pipe 1871 with Juanita Dr. Corridor Improvements.
  - Pipes 1875 and 2977 with the NE 85th Street improvements.
- Trenchless pipe repair (red in map above).
  - Pipes crossing arterial: 1703, 1891, 2288
  - Pipes connecting 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.
- Consider repair of "fair" condition pipes that are located in close proximity to proposed improvements.
- 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 considerations:

- The cost estimate provided on the next page is an example cost for one of the replacements mentioned above (Pipe 1871) and results in a planning level replacement cost of $500/LF pipe. The $500/LF cost was used to estimate the total cost of this CIP.
- Actual cost of pipe replacement will vary per location.



Project Cost Estimate Pipe 1871

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
		Planning level cost per LF of pipe		$500
CIP Project Cost	LF	$500	1,538	$769,000

Project:	General Stormwater Pipe Repair		ID: INF-ALL-1
Location:	City-Wide	Basin:	N/A
Project Type: Problem:	☒Infrastructure ☐Water Quality ☐Erosion ☐Habitat ☐Flooding Failing stormwater pipes	Preliminary Project Cost:	$769,000

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".

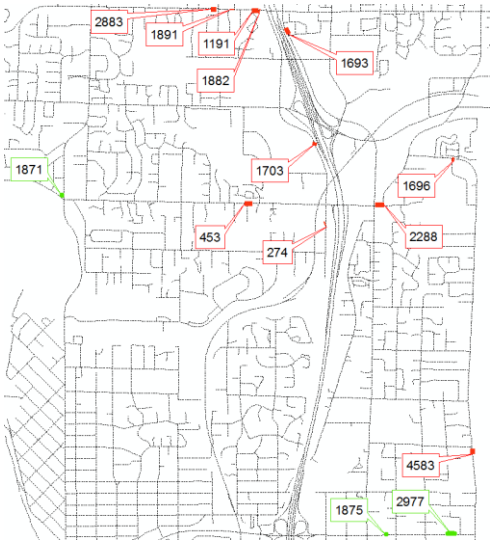
The map to the right shows example pipes that have a "poor" rating, 12-in or greater pipe diameter, corrugated material, and cross or are adjacent to an arterial (in red), and pipes receiving a "poor" rating which connect with planned Kirkland transportation projects (in green). These pipes are proposed for repair and replacement in CIP #CW-INF-01. The remaining poorly rated 12-inch diameter corrugated metal pipes are recommended for repair or replacement in this CIP.

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.



City-wide poor condition pipes (≥12", corrugated, at arterials)

Conceptual Design

- Poor rated pipe, >12-in diameter, and corrugated (70 pipes; 6,050 LF; $3,025,000)

This CIP assumes pipe replacements may include both open trench and trenchless construction methods.

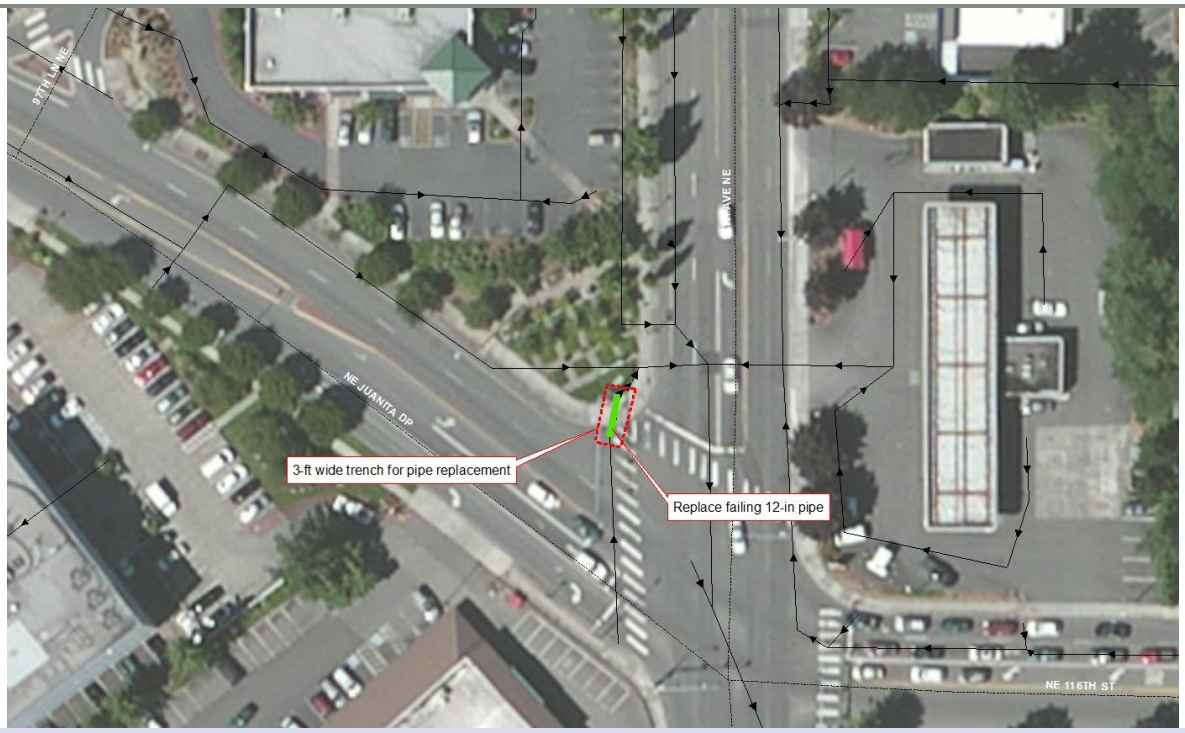
-

Considerations for Implementation

- May require additional options analysis to further prioritize repair/replace locations.
- Consider repair of "fair" condition pipes that are located in close proximity to proposed improvements.
- 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 considerations:

- The cost estimate provided on the next page is an example cost for one of the replacements mentioned above (Pipe 1871) and results in a planning level replacement cost of $500/LF pipe. The $500/LF cost was used to estimate the total cost of this CIP.
- Actual cost of pipe replacement will vary per location.



Project Cost Estimate Pipe 1871

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
			Planning level cost per LF of pipe	$500
Cost for Example Pipe Replacement	LF	$500	1,538	$769,000
Total Cost for CIP	LF	$500	6,050	$3,025,000

Project:	Flooding near Inglewood Presbyterian Church		ID: DE-01
Location:	NE 142nd St. and 77th Ave NE	Basin:	Denny Creek
Project Type: Problem:	☒Infrastructure ☐Water Quality ☐Erosion ☐Habitat ☒Flooding 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:

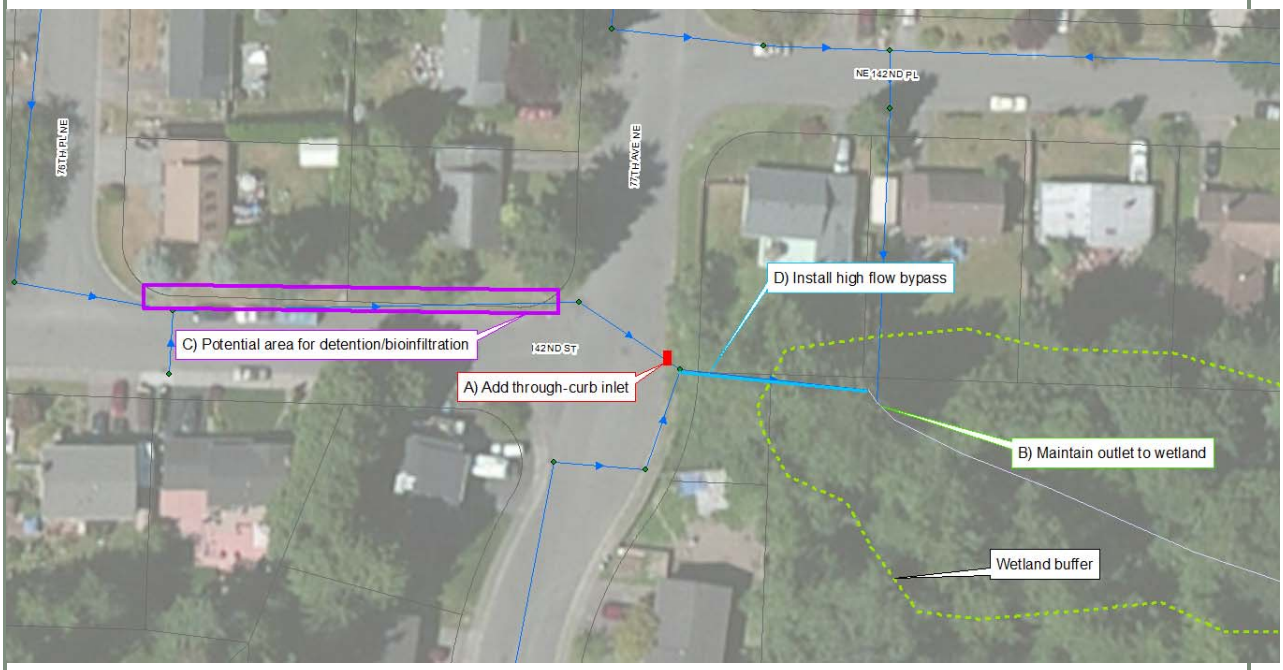
- Maintain a channel through the wetland by removing excess sediment for improved flow at the pipe outfall (green in the figure).

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

CITY OF KIRKLAND
CAPITAL IMPROVEMENT PROGRAM
2013 TO 2018

Surface Water Master Plan
Project ID EC-01

PROJECT #	**SD 0063 000**
DEPARTMENT	Public Works
DEPARTMENT CONTACT	Dave Snider

PROJECT TITLE	EVEREST CREEK - SLATER AVENUE AT ALEXANDER STREET		
PROJECT LOCATION	Slater Avenue and Alexander Street	**PROJECT START**	**PROJECT STATUS**
		Undetermined	Modified Project

DESCRIPTION/JUSTIFICATION

Flow enters this small ravine from an approximately 135 acre upstream basin via a pipe. Severe erosion around the pipe outlet has de-stabilized a road near the ravine, and sends large quantities of sand to downstream reaches of the creek, which results in increased maintenance needs in Everest Park. Installation of a highflow bypass and/or other stabilization features will prevent further damage to the road, and will reduce delivery of sediment to downstream areas thus reducing maintenance needs. This project is a potential candidate for the Annual Streambank Stabilization Program Project (SD 8888).

REASON FOR MODIFICATION (WHERE APPLICABLE)

Project identified as potential candidate for SD 8888 - Annual Streambank Stabilization Program Project.

POLICY BASIS

Current service and/or functional objectives

Surface Water Comprehensive Plan

PRIOR YEAR(S) BUDGET TO ACTUALS

Budget	$120,200
Actual	$1,359
Balance	$118,841

METHOD OF FINANCING (%)

Current Revenue	0 %
Reserve	0 %
Grants	0 %
Other Sources	0 %
Debt	0 %
Unfunded	100 %

CAPITAL COSTS	**COSTS TO BE FUNDED**
Planning/Design/ Engineering	126,700
In-House Professional Svcs.	119,500
Land Acquisition	0
Construction	584,100
Computer Hardware/Software	0
Equipment	0
Other Services	0
Total	830,300
NEW MAINT. AND OPER.	0
NEW FTE	0.00

CITY OF KIRKLAND
CAPITAL IMPROVEMENT PROGRAM 2013 TO 2018 Surface Water Master Plan Project ID EC-01

PROJECT #	**SD 0063 000**
DEPARTMENT	Public Works
DEPARTMENT CONTACT	Dave Snider

PROJECT TITLE	EVEREST CREEK - SLATER AVENUE AT ALEXANDER STREET

CRITERIA	PROJECT IMPACTS (RESPOND TO ALL SECTIONS WHICH APPLY)
Amount of public disruption and inconvenience caused	*During construction of this project, adjacent property owners and motorists will be impacted by construction equipment and possible traffic detours.*
Community economic impacts	*Would reduce the potential fro property damage and road closures due to localized flooding, channel incision, and sedimentation of stormwater infrastructure.*
Health and safety, environmental, aesthetic, or social effects	*Would reduce flooding, sedimentation, channel migration/incision associated health, safety and the above community impacts.*
Responds to an urgent need or opportunity	*Ravine is inherently unstable as it has highly erosive soils in a high seismic hazard area. It is difficult to predict when or if the walls of the ravine will collapse, but the damage that would occur if this were to happen is significant. Because of this uncertainty, there is a somewhat urgent need for this project.*
Feasibility, including public support and project readiness	*Access to the project area is relatively easy, and public support would likely by high. Permitting and environmental issues will be addressed during design.*
Conforms to legal or contractual obligations	*Will be designed and constructed per professional and legal standards and guidelines.*
Responds to state and/or federal mandate	*Project improves water quality. Several species listed under the Federal Endangered Species Act live in Lake Washington. The City is obligated to protect these species by improving the quality of water that flows to Lake Washington.*
Benefits to other capital projects	*May reduce the required scope of SD-0061 as sediment delivery will be reduced.*
Implications of deferring the project	*Ravine is unstable. Deferring the project may increase the likelihood of ravine collapse.*
CONFORMANCE WITH ADOPTED COMPRE-HENSIVE PLAN	Name of Neighborhood(s) in which located: *Moss Bay* Is there a specific reference to this project or land use in the immediate vicinity? How does the project conform to such references? Attachments: ☐ (Specify)
LEVEL OF SERVICE IMPACT	☑ Project provides no new capacity (repair, replacement or renovation). ☐ Project provides new capacity. Amount of new capacity provided: ☐ Project assists in meeting/maintaining adopted level of service. ☐ Project required to meet concurrency standards.

CITY OF KIRKLAND
CAPITAL IMPROVEMENT PROGRAM 2013 TO 2018

Surface Water Master Plan
Project ID EC-02

PROJECT #	**SD 0061 000**
DEPARTMENT	Public Works
DEPARTMENT CONTACT	Dave Snider

PROJECT TITLE	EVEREST PARK STREAM CHANNEL / RIPARIAN ENHANCEMENTS		
PROJECT LOCATION	Everest Park, adjacent to 10th Street South	**PROJECT START**	**PROJECT STATUS**
		Undetermined	Modified Project

DESCRIPTION/JUSTIFICATION

Channel downcutting, unstable banks, poor quality riparian vegetation, and invasive vegetation will be minimized through the installation of 12 grade control log-boulder channel structures together with bioengineering methods employed to stabilize the streambanks. The blackberries are to be removed with trees and understory shrubs being planted along a 50-foot riparian planting zone for 1000 feet of channel. This is a candidate project included as a component of the Annual Streambank Stabilization Program Project, SD 8888.

REASON FOR MODIFICATION (WHERE APPLICABLE)

Project identified as potential candidate for SD 8888 - Annual Streambank Stabilization Program Project.

POLICY BASIS

Surface Water Comprehensive Plan

METHOD OF FINANCING (%)

Current Revenue	0 %
Reserve	0 %
Grants	0 %
Other Sources	0 %
Debt	0 %
Unfunded	100 %

CAPITAL COSTS	**COSTS TO BE FUNDED**
Planning/Design/ Engineering	284,600
In-House Professional Svcs.	137,700
Land Acquisition	0
Construction	673,200
Computer Hardware/Software	0
Equipment	0
Other Services	0
Total	1,095,500
NEW MAINT. AND OPER.	0
NEW FTE	0.00

CITY OF KIRKLAND
CAPITAL IMPROVEMENT PROGRAM 2013 TO 2018

Surface Water Master Plan
Project ID EC-02

PROJECT #	**SD 0061 000**
DEPARTMENT	Public Works
DEPARTMENT CONTACT	Dave Snider

PROJECT TITLE	EVEREST PARK STREAM CHANNEL / RIPARIAN ENHANCEMENTS

CRITERIA	PROJECT IMPACTS (RESPOND TO ALL SECTIONS WHICH APPLY)
Amount of public disruption and inconvenience caused	*Stretches of this stream are located within Everest Park and as such will require design/construction to avoid peak activity periods. Coordination with the Parks and Community Services schedule of events will be developed during the design process. A public pedestrian easement will be utilized for construction access and alternatives will need to be developed for pedestrians impacted by the construction activities.*
Community economic impacts	*Would reduce the potential for property damage, loss of business and road closures due to localized flooding, channel migration/incision, and sedimentation of stormwater infrastructure.*
Health and safety, environmental, aesthetic, or social effects	*Would reduce flooding, sedimentation, channel migration/incision associated health, safety and the above community impacts. Proposed riparian and channel enhancements would provide aquatic, terrestrial and avian habitat benefits as well as aesthetically pleasing community green/open space. The location of this project would provide the opportunity for public education relating to natural resources stewardship and stormwater quality.*
Responds to an urgent need or opportunity	*This project is identified as a high priority in the Surface Water Comprehensive Plan.*
Feasibility, including public support and project readiness	*During the design development and community involvement process, the access and delivery needs of the neighbors will be addressed. This project does not present significant engineering issues. Permitting and environmental issues will be addressed during design.*
Conforms to legal or contractual obligations	*Will be designed and constructed per professional and legal standards and guidelines.*
Responds to state and/or federal mandate	*Environmental and habitat enhancement for fish including native cutthroat and other species is consistent with the Endangered Species Act.*
Benefits to other capital projects	*None at this time.*
Implications of deferring the project	*Continued flooding, sedimentation, channel migration/incision, habitat degradation, reduction of downstream conveyance capacity, damage to downstream capital projects and possible violations of state and/or federal stormwater regulations.*
CONFORMANCE WITH ADOPTED COMPRE-HENSIVE PLAN	Name of Neighborhood(s) in which located: *Everest* Is there a specific reference to this project or land use in the immediate vicinity? How does the project conform to such references? Attachments: ☐ (Specify)
LEVEL OF SERVICE IMPACT	☑ Project provides no new capacity (repair, replacement or renovation). ☐ Project provides new capacity. Amount of new capacity provided: ☐ Project assists in meeting/maintaining adopted level of service. ☐ Project required to meet concurrency standards.

CITY OF KIRKLAND
CAPITAL IMPROVEMENT PROGRAM
2013 TO 2018

Surface Water Master Plan
Project ID FO-01

PROJECT #	**SD 0049 000**
DEPARTMENT	Public Works
DEPARTMENT CONTACT	Dave Snider

PROJECT TITLE	FORBES CREEK / 108TH AVENUE NE FISH PASSAGE IMPROVEMENTS		
PROJECT LOCATION	108th Ave NE, between Forbes Creek Drive and NE 108th Street at Forbes Creek	**PROJECT START**	**PROJECT STATUS**
		Undetermined	Modified Project

DESCRIPTION/JUSTIFICATION

108th Avenue NE is elevated above Forbes Creek and the adjacent wetlands. Curbs on both sides of the road appear to prevent street runoff from draining to the stream resulting in standing water on the road during storm events. The existing dual 36-inch corrugated metal pipe culverts also have created a barrier to fish passage. The culverts are located in a depositional area of Forbes Creek resulting in one of the two culverts filling with sediment, restricting fish passage. This is a candidate project included as a component of the Annual Storm Drain Replacement Program Project, SD 9999.

REASON FOR MODIFICATION (WHERE APPLICABLE)

Project identified as potential candidate for SD 9999 - Annual Storm Drain Replacement Program Project.

POLICY BASIS

Surface Water Comprehensive Plan
FO-01

METHOD OF FINANCING (%)

Current Revenue	0 %
Reserve	0 %
Grants	0 %
Other Sources	0 %
Debt	0 %
Unfunded	100 %

CAPITAL COSTS	**COSTS TO BE FUNDED**
Planning/Design/ Engineering	86,500
In-House Professional Svcs.	41,800
Land Acquisition	0
Construction	204,600
Computer Hardware/Software	0
Equipment	0
Other Services	0
Total	332,900
NEW MAINT. AND OPER.	0
NEW FTE	0.00

CITY OF KIRKLAND
CAPITAL IMPROVEMENT PROGRAM
2013 TO 2018

Surface Water Master Plan
Project ID FO-01

PROJECT #	**SD 0049 000**
DEPARTMENT	Public Works
DEPARTMENT CONTACT	Dave Snider

PROJECT TITLE	FORBES CREEK / 108TH AVENUE NE FISH PASSAGE IMPROVEMENTS

CRITERIA	PROJECT IMPACTS (RESPOND TO ALL SECTIONS WHICH APPLY)
Amount of public disruption and inconvenience caused	*During construction, anticipated to last 2-3 weeks, alternate routes for the residents living north of Forbes Creek along 108th Ave NE will be required.*
Community economic impacts	*Overall maintenance costs will be reduced.*
Health and safety, environmental, aesthetic, or social effects	*Localized flooding and environmental degradation will continue if the sedimentation along this stretch of Forbes Creek is not addressed. Available fish habitat would be enhanced with the projects.*
Responds to an urgent need or opportunity	*This project is identified as a high priority in the Surface Water Comprehensive Plan.*
Feasibility, including public support and project readiness	*During the design development and community involvement process, the access and delivery needs of the neighbors will be addressed. This project does not present significant engineering issues. Permitting and environmental issues will be addressed during design.*
Conforms to legal or contractual obligations	*Will be designed and constructed per professional and legal standards and guidelines.*
Responds to state and/or federal mandate	*Environmental and habitat enhancement for fish including native cutthroat and other species is consistent with the Endangered Species Act.*
Benefits to other capital projects	*Project timing will be coordinated with other utility projects (WA 0101 and SS 0062).*
Implications of deferring the project	*Continued flooding events.*
CONFORMANCE WITH ADOPTED COMPRE-HENSIVE PLAN	Name of Neighborhood(s) in which located: *South Juanita* Is there a specific reference to this project or land use in the immediate vicinity? How does the project conform to such references? Attachments: ☐ (Specify)
LEVEL OF SERVICE IMPACT	☐ Project provides no new capacity (repair, replacement or renovation). ☑ Project provides new capacity. Amount of new capacity provided: approximately 30-40% ☐ Project assists in meeting/maintaining adopted level of service. ☐ Project required to meet concurrency standards.

Project:	Forbes Creek Regional Detention		ID: FO-02
Location:	Vicinity of NE 116th and I-405	Basin:	Forbes Creek
Project Type: Problem:	☐Infrastructure ☐Water Quality ☐Erosion ☐Habitat ☒Flooding Flooding at NE 116th Street Interchange	Preliminary Project Cost:	~$10,000,000

Narrative

Washington State Department of Transportation (WSDOT) and the City of Kirkland jointly evaluated conveyance and regional detention alternatives to address flooding and closure of NE 116th Street, protect Forbes Creek from future flow increases, and address risk to property damages due to flooding.

A solution to utilize surplus WSDOT property near NE 116th Street was identified to add regional detention upstream of I-405 and conduct additional conveyance system improvements to divert flows to a new vault west of I-405 within the City-owned CKC trail.

The basis for this CIP is results of the alternatives evaluation in the Flood Study conducted by WSDOT (WSDOT 2013).

Options 5c and 7 were assumed for cost estimating purposes.

Flooding on NE 116th Street (looking east), December 3, 2007.

Conceptual Design

The CIP design consists of the following:

- Regional detention as described in the WSDOT flood study (WSDOT, 2013)
- Conveyance improvements as described in the WSDOT flood study (WSDOT 2013)

Considerations for Implementation

- No property acquisition is required, since surplus WSDOT property and City of Kirkland right-of-way would be utilized for planned facilities.
- Wetland mitigation would be required.
- Hazardous material cleanup may be needed for work within the City of Kirkland right-of-way (former BNSF railroad corridor).
- Coordination with WSDOT.

		Option 5b/6b				Option 5c/7			
	Item	*Quantity*	*Unit*	*Cost / Unit*	*Cost*	*Quantity*	*Unit*	*Cost / Unit*	*Cost*
Detention									
	Detention Mod. in WSDOT right-of-way	1	LS	$ 440,000	$440,000	1	LS	$ 374,000	$374,000
	Detention Mod. in Slater Pond	1	LS	$ -	$0	0	LS	$ 24,700	$0
	Detention Mod. US of Culvert 22	1	LS	$ 238,000	$238,000	0	LS	$ 238,000	$0
	Vault in railroad right-of-way	0	SF	$ 120	$0	20000	SF	$ 120	$2,400,000
	Total Detention Site costs				**$678,000**				**$2,774,000**
Conveyance									
	NE 116th Street Conveyance changes	200	LF	$ 190	$38,000	200	LF	$ 190	$38,000
	Bore pipe under I-405	260	LF	$ 800	$208,000	0	LF	$ 800	$0
	Conveyance - NE 116th to Culvert 22	0	LF	$ 150	$0	0	LF	$ 150	$0
	Conveyance - Culvert 22 to 120th Ave.	0	LF	$ 150	$0	480	LF	$ 150	$72,000
	Conveyance - 120th Ave to Railroad	0	LF	$ 150	$0	470	LF	$ 150	$70,500
	Conveyance - 112th Street	0	LF	$ 150	$0	0	LF	$ 150	$0
	Conveyance - Culvert 22 to WSDOT Outfall.	0	LF	$ 300	$0	0	LF	$ 150	$0
	Bore pipe for siphon	0	LF	$ 799	$0	0	LF	$ 799	$0
	Total Conveyance				**$246,000**				**$180,500**
Other									
	Wetland Mitigation (Area = 3x impacted wetland)	1.285	Ac	$ 250,000	$321,250	0.430	Ac	$ 250,000	$107,500
	Wetland Mitigation Property Acquisition	0.500	Ac	$ 653,400	$326,700	0.500	Ac	$ 653,400	$326,700
	WSDOT Property Value	2.042	Ac	$ 653,400	$1,334,040	2.042	Ac	$ 653,400	$1,334,040
	Slader Pond Drainage Easement Acquisition	0.000	Ac	$ 100,000	$0	0.000	Ac	$ 100,000	$0
	C22 Pond Site Property Acquisition	1.035	Ac	$ 653,400	$675,945	0.000	Ac	$ 653,400	$0
	HazMat Cleanup (Excavation in railroad)	0	CY	$ 50	$0	60000	CY	$ 50	$3,000,000
	Engineering (12%)	12%	LS	$ 924,000	$110,880	12%	LS	$ 2,954,500	$354,540
	Permitting	1	LS	$ 50,000	$50,000	1	LS	$ 50,000	$50,000
	Construction Management (10%)	10%	LS	$ 924,000	$92,400	10%	LS	$ 2,954,500	$295,450
	Mobilization (10%)	10%	LS	$ 924,000	$92,400	10%	LS	$ 2,954,500	$295,450
	TESC per work area	4	LS	$ 80,000	$320,000	3	LS	$ 80,000	$240,000
	Traffic Control per work area	2	LS	$ 80,000	$160,000	2	LS	$ 80,000	$160,000
	Sales Tax (9.5%)	9.5%	LS	$ 924,000	$87,780	9.5%	LS	$ 2,954,500	$280,678
	Total Conveyance				**$3,483,615**				**$6,163,680**
	Contingency/Escalation (10%)	1	LS	$ 440,762	$440,762	1	LS	$ 911,818	$911,818
				Total Option 5b/6b	**$4,848,377**			**Total Option 5c/7**	**$10,029,998**

CITY OF KIRKLAND
CAPITAL IMPROVEMENT PROGRAM 2013 TO 2018

Surface Water Master Plan
Project ID FO-05

PROJECT #	**SD 0051 000**
DEPARTMENT	Public Works
DEPARTMENT CONTACT	Dave Snider

PROJECT TITLE	FORBES CREEK / KING COUNTY METRO ACCESS ROAD CULVERT ENHANCEMENT		
PROJECT LOCATION	Adjacent to the 11100 block of Forbes Creek Drive at Forbes Creek	**PROJECT START**	**PROJECT STATUS**
		2006	Modified Project

DESCRIPTION/JUSTIFICATION

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.

REASON FOR MODIFICATION (WHERE APPLICABLE)

Project re-start date changed from 2013 to 2017 due to State permitting challenges and timelines. Project cost changed from $965,900 to $1,290,900.

POLICY BASIS

Surface Water Comprehensive Plan
FO-05

PRIOR YEAR(S) BUDGET TO ACTUALS

Budget	$232,200
Actual	$88,092
Balance	$144,108

METHOD OF FINANCING (%)

Current Revenue	100 %
Reserve	0 %
Grants	0 %
Other Sources	0 %
Debt	0 %
Unfunded	0 %

CAPITAL COSTS	Prior Year(s)	2013	2014	2015	2016	2017	2018	**2013-2018 TOTAL**	Future Year(s)	**Total Project**
Planning/Design/ Engineering	25,000	0	0	0	0	0	0	0	0	25,000
In-House Professional Svcs.	30,000	0	0	0	0	0	0	0	0	30,000
Land Acquisition	0	0	0	0	0	0	0	0	0	0
Construction	177,200	0	0	0	0	688,000	370,700	1,058,700	0	1,235,900
Computer Hardware/Software	0	0	0	0	0	0	0	0	0	0
Equipment	0	0	0	0	0	0	0	0	0	0
Other Services	0	0	0	0	0	0	0	0	0	0
Total	232,200	0	0	0	0	688,000	370,700	1,058,700	0	1,290,900
NEW MAINT. AND OPER.	0	0	0	0	0	0	0	0	0	0
NEW FTE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CITY OF KIRKLAND
CAPITAL IMPROVEMENT PROGRAM 2013 TO 2018 Surface Water Master Plan Project ID FO-05

PROJECT #	**SD 0051 000**
DEPARTMENT	Public Works
DEPARTMENT CONTACT	Dave Snider

PROJECT TITLE	FORBES CREEK / KING COUNTY METRO ACCESS ROAD CULVERT ENHANCEMENT

CRITERIA	PROJECT IMPACTS (RESPOND TO ALL SECTIONS WHICH APPLY)
Amount of public disruption and inconvenience caused	*None. This project is located outside of the public right of way and is not adjacent to any private residents or commercial activity.*
Community economic impacts	*N/A*
Health and safety, environmental, aesthetic, or social effects	*Project will stabilize the existing footings that support an existing 12' culvert, improve fish passage, and stabilize the bank on the upstream end of the culvert that if unchecked could fail at a future date.*
Responds to an urgent need or opportunity	*This project is identified as a high priority in the Surface Water Comprehensive Plan.*
Feasibility, including public support and project readiness	*During the design development and community involvement process, the access and delivery needs of the neighbors will be addressed. This project does not present significant engineering issues. Permitting and environmental issues will be addressed during design.*
Conforms to legal or contractual obligations	*Will be designed and constructed per professional and legal standards and guidelines.*
Responds to state and/or federal mandate	*Environmental and habitat enhancement for fish including native cutthroat and other species is consistent with the Endangered Species Act.*
Benefits to other capital projects	*A number of projects are identified in the Forbes Creek basin; this is one element of those improvements.*
Implications of deferring the project	*Possible erosion leading to failure of existing facilities; failure of King County Sewermain.*
CONFORMANCE WITH ADOPTED COMPRE-HENSIVE PLAN	Name of Neighborhood(s) in which located: *South Juanita* Is there a specific reference to this project or land use in the immediate vicinity? How does the project conform to such references? Attachments: ☐ (Specify)
LEVEL OF SERVICE IMPACT	☑ Project provides no new capacity (repair, replacement or renovation). ☐ Project provides new capacity. Amount of new capacity provided: ☐ Project assists in meeting/maintaining adopted level of service. ☐ Project required to meet concurrency standards.

CITY OF KIRKLAND
CAPITAL IMPROVEMENT PROGRAM 2013 TO 2018

Surface Water Master Plan
Project ID FO-07

PROJECT #	**SD 0053 000**
DEPARTMENT	Public Works
DEPARTMENT CONTACT	Dave Snider

PROJECT TITLE	FORBES CREEK / COORS POND CHANNEL GRADE CONTROLS		
PROJECT LOCATION	South side of Forbes Creek Drive between 115th Ct NE and 113th Ct NE	**PROJECT START**	**PROJECT STATUS**
		2006	Modified Project

DESCRIPTION/JUSTIFICATION

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.

REASON FOR MODIFICATION (WHERE APPLICABLE)

Project re-start date changed from 2013 to 2018 due to State permitting issues and coordination with SD 0051. Project cost changed from $1,227,200 to $1,621,000

POLICY BASIS

Surface Water Comprehensive Plan
FO-07

PRIOR YEAR(S) BUDGET TO ACTUALS

Budget	$260,200
Actual	$84,147
Balance	$176,053

METHOD OF FINANCING (%)

Current Revenue	100 %
Reserve	0 %
Grants	0 %
Other Sources	0 %
Debt	0 %
Unfunded	0 %

CAPITAL COSTS	Prior Year(s)	2013	2014	2015	2016	2017	2018	**2013-2018 TOTAL**	Future Year(s)	**Total Project**
Planning/Design/ Engineering	45,000	0	0	0	0	0	94,100	94,100	230,700	369,800
In-House Professional Svcs.	30,000	0	0	0	0	0	70,600	70,600	95,300	195,900
Land Acquisition	0	0	0	0	0	0	0	0	0	0
Construction	185,200	0	0	0	0	0	0	0	870,100	1,055,300
Computer Hardware/Software	0	0	0	0	0	0	0	0	0	0
Equipment	0	0	0	0	0	0	0	0	0	0
Other Services	0	0	0	0	0	0	0	0	0	0
Total	260,200	0	0	0	0	0	164,700	164,700	1,196,100	1,621,000
NEW MAINT. AND OPER.	0	0	0	0	0	0	0	0	0	0
NEW FTE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CITY OF KIRKLAND
CAPITAL IMPROVEMENT PROGRAM 2013 TO 2018

Surface Water Master Plan
Project ID FO-07

PROJECT #	**SD 0053 000**
DEPARTMENT	Public Works
DEPARTMENT CONTACT	Dave Snider

PROJECT TITLE	FORBES CREEK / COORS POND CHANNEL GRADE CONTROLS

CRITERIA	PROJECT IMPACTS (RESPOND TO ALL SECTIONS WHICH APPLY)
Amount of public disruption and inconvenience caused	*None; project is not on public right of way, nor near any existing buildings.*
Community economic impacts	*Reduces downstream sediment load and thus reduces need for City forces to conduct routine maintenance.*
Health and safety, environmental, aesthetic, or social effects	*Would reduce flooding, sedimentation, channel migration/incision associated health, safety and the above community impacts.*
Responds to an urgent need or opportunity	*This project is identified as a high priority in the Surface Water Comprehensive Plan.*
Feasibility, including public support and project readiness	*During the design development and community involvement process, the access and delivery needs of the neighbors will be addressed. This project does not present significant engineering issues. Permitting and environmental issues will be addressed during design.*
Conforms to legal or contractual obligations	*Will be designed and constructed per professional and legal standards and guidelines.*
Responds to state and/or federal mandate	*Environmental and habitat enhancement for fish including native cutthroat and other species is consistent with the Endangered Species Act.*
Benefits to other capital projects	*A number of projects are identified in the Forbes Creek basin; this is one element of those improvements.*
Implications of deferring the project	*Continued flooding, sedimentation, channel migration/incision, habitat degradation, reduction of downstream conveyance capacity, damage to downstream capital projects and possible violations of state and/or federal stormwater regulations.*
CONFORMANCE WITH ADOPTED COMPRE-HENSIVE PLAN	Name of Neighborhood(s) in which located: *South Juanita* Is there a specific reference to this project or land use in the immediate vicinity? How does the project conform to such references? Attachments: ☐ (Specify)
LEVEL OF SERVICE IMPACT	☑ Project provides no new capacity (repair, replacement or renovation). ☐ Project provides new capacity. Amount of new capacity provided: ☐ Project assists in meeting/maintaining adopted level of service. ☐ Project required to meet concurrency standards.

CITY OF KIRKLAND
CAPITAL IMPROVEMENT PROGRAM 2013 TO 2018

Surface Water Master Plan
Project ID FO-08

PROJECT #	**SD 0054 000**
DEPARTMENT	Public Works
DEPARTMENT CONTACT	Dave Snider

PROJECT TITLE	FORBES CREEK / CROSS KIRKLAND CORRIDOR FISH PASSAGE IMPROVEMENTS		
PROJECT LOCATION	Forbes Creek crossing under the Cross Kirkland Corridor behind the business located at 10830 117th Ave NE	**PROJECT START**	**PROJECT STATUS**
		Undetermined	Modified Project

DESCRIPTION/JUSTIFICATION

The grade of the existing culverts passing under a former railroad spur and under the Cross Kirkland Corridor tracks is too great creating an impediment to fish passage. Restore open channel under the former railroad spur and replace the culvert under Cross Kirkland Corridor track. This improvement will improve fish passage to upstream habitat and is a candidate project included as a component of the Annual Storm Drain Replacement Project, SD 9999.

REASON FOR MODIFICATION (WHERE APPLICABLE)

Project identified as potential candidate for SD 9999 - Annual Storm Drain Replacement Program Project.

POLICY BASIS

Surface Water Comprehensive Plan

METHOD OF FINANCING (%)

Current Revenue	0 %
Reserve	0 %
Grants	0 %
Other Sources	0 %
Debt	0 %
Unfunded	100 %

CAPITAL COSTS	**COSTS TO BE FUNDED**
Planning/Design/ Engineering	110,200
In-House Professional Svcs.	53,300
Land Acquisition	0
Construction	260,700
Computer Hardware/Software	0
Equipment	0
Other Services	0
Total	424,200
NEW MAINT. AND OPER.	0
NEW FTE	0.00

CITY OF KIRKLAND
CAPITAL IMPROVEMENT PROGRAM 2013 TO 2018 Surface Water Master Plan Project ID FO-08

PROJECT #	**SD 0054 000**
DEPARTMENT	Public Works
DEPARTMENT CONTACT	Dave Snider

PROJECT TITLE	FORBES CREEK / CROSS KIRKLAND CORRIDOR FISH PASSAGE IMPROVEMENTS

CRITERIA	PROJECT IMPACTS (RESPOND TO ALL SECTIONS WHICH APPLY)
Amount of public disruption and inconvenience caused	*Permitting and coordination will be required with the Cross Kirkland Corridor. No anticipated public impacts.*
Community economic impacts	*Would reduce the potential for property damage, localized flooding, channel migration/incision, and sedimentation of stormwater infrastructure.*
Health and safety, environmental, aesthetic, or social effects	*Improvements to Forbes Creek fish habitat are enhanced with these improvements.*
Responds to an urgent need or opportunity	*This project is identified as a high priority in the Surface Water Comprehensive Plan.*
Feasibility, including public support and project readiness	*During the design development and community involvement process, the access and delivery needs of the neighbors will be addressed. This project does not present significant engineering issues. Permitting and environmental issues will be addressed during design.*
Conforms to legal or contractual obligations	*Will be designed and constructed per professional and legal standards and guidelines.*
Responds to state and/or federal mandate	*Environmental and habitat enhancement for fish including native cutthroat and other species is consistent with the Endangered Species Act.*
Benefits to other capital projects	*A number of projects are identified in the Forbes Creek basin; this is one element of those improvements.*
Implications of deferring the project	*Continued flooding, sedimentation, channel migration/incision, habitat degradation, reduction of downstream conveyance capacity, damage to downstream capital projects and possible violations of state and/or federal stormwater regulations.*
CONFORMANCE WITH ADOPTED COMPRE-HENSIVE PLAN	Name of Neighborhood(s) in which located: *South Juanita* Is there a specific reference to this project or land use in the immediate vicinity? How does the project conform to such references? Attachments: ☐ (Specify)
LEVEL OF SERVICE IMPACT	☐ Project provides no new capacity (repair, replacement or renovation). ☑ Project provides new capacity. Amount of new capacity provided: approximately 30-50% ☐ Project assists in meeting/maintaining adopted level of service. ☐ Project required to meet concurrency standards.

Project:	Rose Hill LID Retrofit		ID: FO-13
Location:	125th Ave NE and NE 100th St	Basin:	Forbes Creek
Project Type: Problem:	☒Infrastructure ☒Water Quality ☐Erosion ☐Habitat ☐Flooding Stormwater pond retrofit	Preliminary Project Cost:	$65,000

Narrative

The existing pond provides treatment for neighborhoods near the North Rose Hill Woodlands Park at 124th Ave NE and NE 100th St. The photo to the right shows the existing ditch leading to the pond.

The pond was installed in 1997 and collects runoff from several subdivisions. Complaints have been filed by the residents of the condominiums adjacent to the pond. These complaints include flooding of 124th Ave NE and questions regarding the upkeep of the pond.

This project was identified during the retrofit analysis in 2014.

Solutions for this CIP include restoring and maintaining the existing upland buffer, converting an existing ditch to a bioswale, and replacing the poor pipe(s) on 125th Ave NE.

Project benefits include reduction of peak flow, added water quality, and preventing pipe failure in the North Rose Hill neighborhood.

Ditch at 125th Ave NE and NE 100th St., looking west.

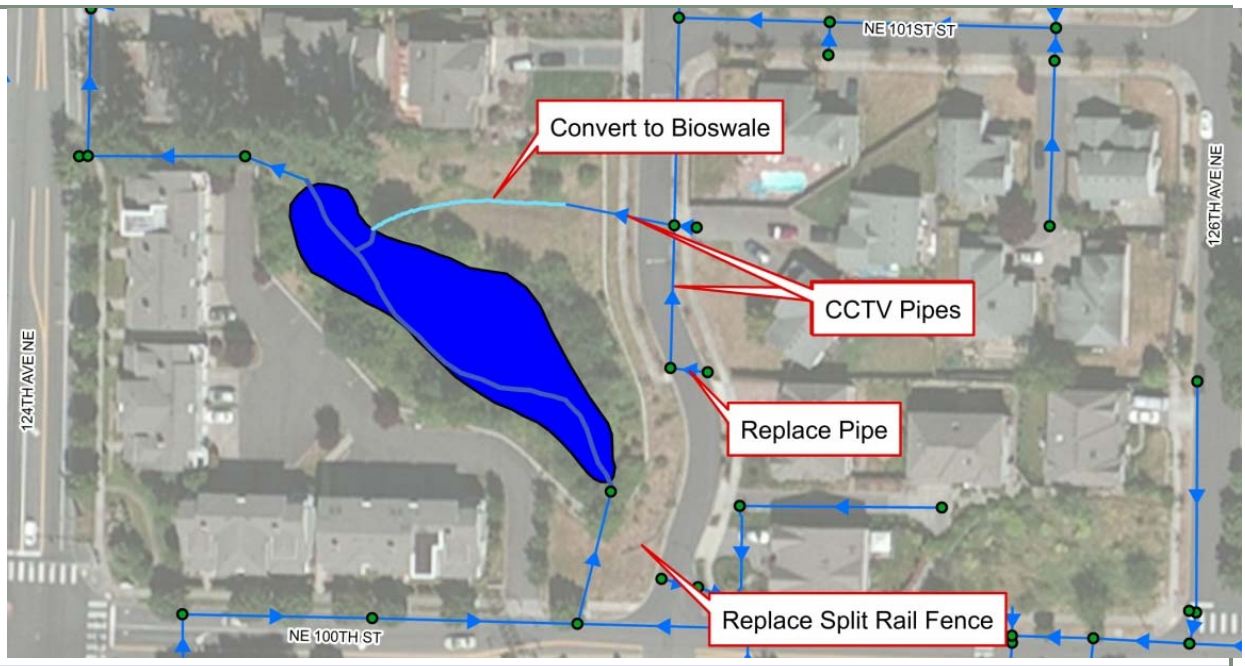
Conceptual Design

The proposed CIP includes the following improvements:

- Convert the existing ditch to a bioswale
  - Install bioswale plants
  - Utilize bioretention soil
- Replace poor pipes on 125th Ave NE
  - CCTV "null" pipes in the area to determine if poor, replace if necessary
  - Replace pipe crossing 125th Ave NE (21 LF)
- Fix split rail fence around wetland buffer

Considerations for Implementation

- Tree removal may be necessary, and will require a City tree removal permit.
- Environmental permitting including SEPA checklist.
- Delineate existing wetland on-site, and minimize impacts to the wetland and upland buffer.
- Protect existing sidewalk.
- May use this project as an opportunity for public education as an LID demonstration project.
- CCTV of additional pipes is needed to determine if others need to be replaced.



Project Cost Estimate

Item	Unit	Unit Cost	Quantity	Cost
Water Pollution/Erosion Control	%	5%	–	$1,500
SPCC Plan	LS	$500	1	$500
Traffic Control	%	7%	–	$2,000
Clearing & Grubbing	SY	$5	230	$1,150
Sawcut Pavement	LF	$5	42	$210
Remove Cement Conc. Curb and Gutter	LF	$17	10	$170
Remove Asphalt Conc. Pavement	SY	$28	20	$560
Remove Tree	EA	$500	2	$1,000
Excavation Incl. Haul	CY	$25	120	$3,000
Roadway Excavation Incl. Haul	CY	$92	20	$1,840
Shoring or Extra Excavation Class B	SF	$1	105	$105
Schedule A 12" Storm Sewer Pipe	LF	$60	21	$1,260
Bioretention Soil	CY	$50	70	$3,500
Planting and Bioengineered Restoration	SY	$40	230	$9,200
HMA CL ½ IN PG 64-22	TON	$200	6	$1,200
Cement Conc. Curb and Gutter	LF	$28	10	$280
Split Rail Fence	LF	$5	140	$700
			Subtotal	$28,975
		Contractor overhead, profit, and mobilization	10%	$2,898
		Washington State Sales Tax	9.5%	$2,753
		Construction Contingency	50%	$14,488
		Subtotal construction costs		$49,113
		Administration and engineering design	20%	$9,823
		CCTV Vendor		$2,500
		Wetland Delineation		$3,500
		Land acquisition and easements		$0
		Total cost		$65,000

Project:	63rd and Lakeview Drive Conveyance Modification		ID: HAS-01
Location:	NE 63rd St and Lakeview Drive	Basin:	Houghton Slope A
Project Type: Problem:	☒Infrastructure ☐Water Quality ☒Erosion ☐Habitat ☒Flooding 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

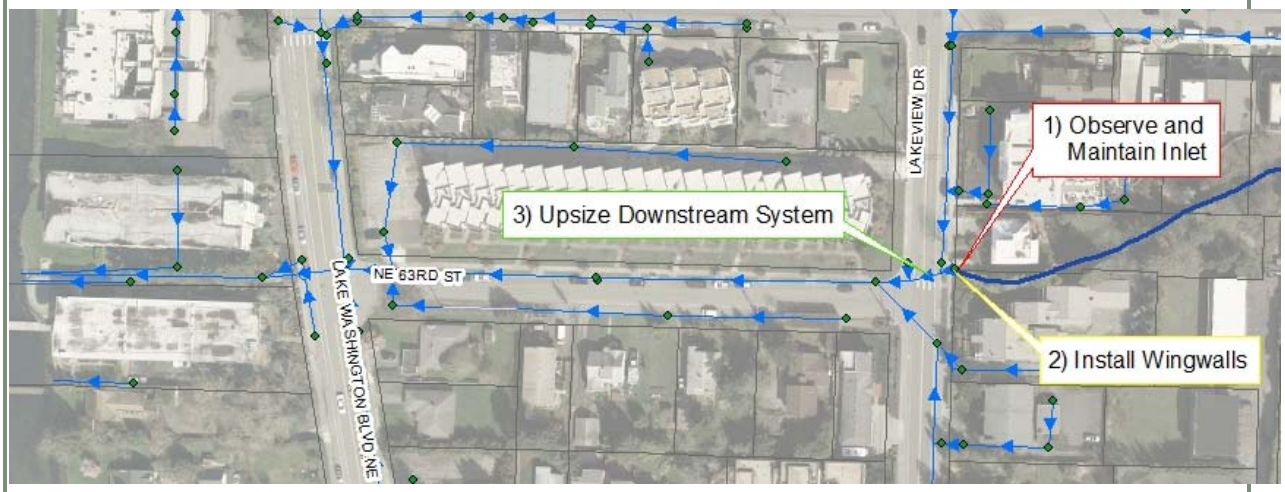
A phased approach is recommended for this site in order to determine the need for additional improvements. The cost estimate assumes all 3 phases are implemented, with the first phase being implemented by City staff. The recommended phases are:

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: Problem:	☐Infrastructure ☒Water Quality ☒Erosion ☒Habitat ☐Flooding 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).

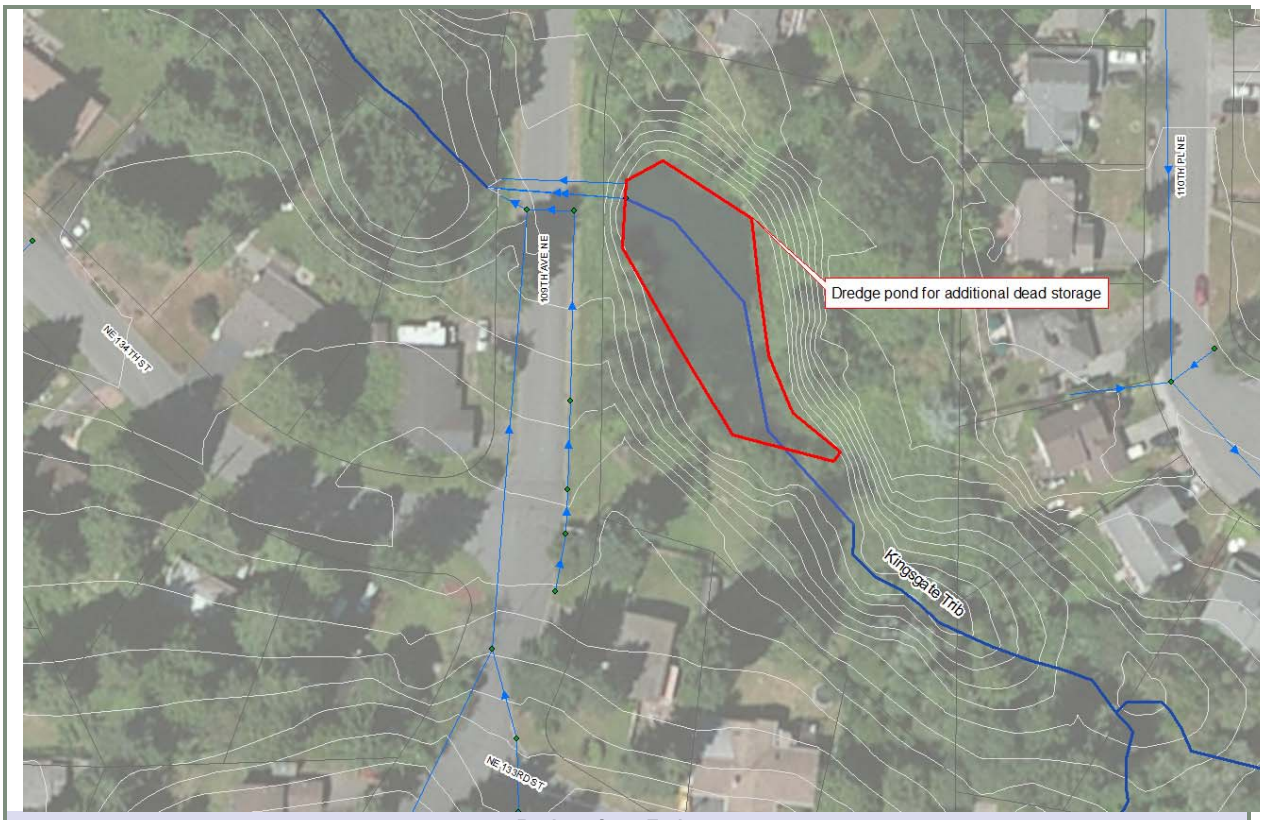
Conceptual Design

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 Bioengineered 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:	NE 132nd Street Pipe Replacement		ID: JC-02
Location:	NE 132nd Street from I-405 to 124th Ave NE	Basin:	Juanita Creek
Project Type: Problem:	☒Infrastructure ☐Water Quality ☐Erosion ☐Habitat ☐Flooding Failing Stormwater Pipes	Preliminary Project Cost:	$874,000

Narrative

The City has identified a series of pipes along NE 132nd Street which require replacement. The existing corrugated metal pipes, ranging from 12-in diameter to 24-in, have been corroded.

Traffic control will be a big part of this project. NE 132nd Street is a high traffic arterial road. Totem Lake Blvd and 124th Avenue NE, which intersect NE 132nd Street within the limits of the pipe replacement, are also high traffic arterials.

This project was identified by the City in 2014.

Construction may be by open cut of trenchless methods. The mainline and laterals are in need of repair.

Project benefits include prevention of flooding and pipe failure.

NE 132nd Street east of Totem Lake Blvd

Conceptual Design

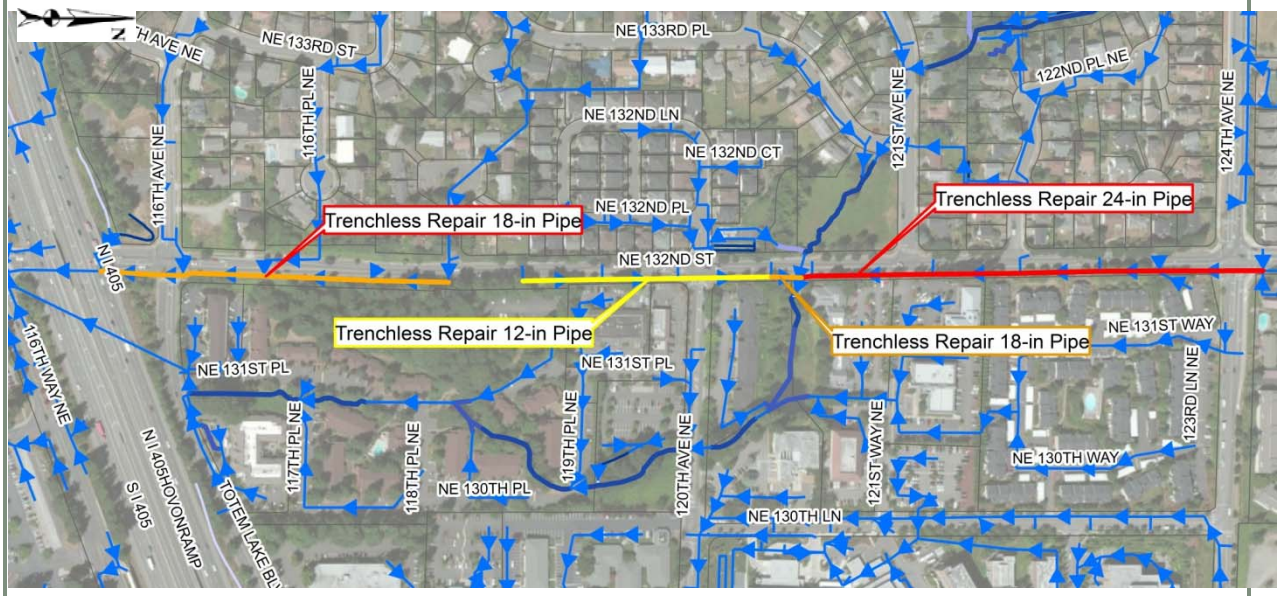
The design for this project includes:

- Trenchless repair of 624 LF of 12-in corrugated pipes.
- Trenchless repair of 953 LF of 18-in corrugated pipes.
- Trenchless repair of 1,010 LF of 24-in corrugated pipes.
- Trenchless repair of 151 LF of 24-in concrete pipe.

These pipes are not included in the General Pipe Repair CIP. They are rated at "null" in the City's GIS database.

Considerations for Implementation

- Trenchless repair will alleviate the traffic control needs, allows for a lower impact on commuters, and reduces site restoration costs. If the City plans to overlay the entire road, then open cut pipe replacement may be more cost effective.
- The pipes are in two sections, flowing opposite directions on NE 132nd Street.



Project Cost Estimate

Item	Unit	Unit Cost	Quantity	Cost
Water Pollution/Erosion Control	%	5%	–	$22,000
SPCC Plan	LS	$500	1	$500
Traffic Control	%	3%	–	$13,000
12-in Trenchless Replacement	LF	$90	624	$56,160
18-in Trenchless Replacement	LF	$135	953	$128,655
24-in Trenchless Replacement	LF	$180	1,161	$208,980
			Subtotal	$429,295
		Contractor overhead, profit, and mobilization	10%	$42,930
		Washington State Sales Tax	9.5%	$40,783
		Construction Contingency	50%	$214,648
		Subtotal construction costs		$727,655
		Administration and engineering design	20%	$145,531
		Permitting		$0
		Land acquisition and easements		$0
		Total cost		$874,000

Project:	Brookhaven Pond Modifications		ID: JC-03
Location:	100th Ave NE and NE 128th St	Basin:	Juanita Creek
Project Type: Problem:	☐Infrastructure ☒Water Quality ☐Erosion ☒Habitat ☐Flooding 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

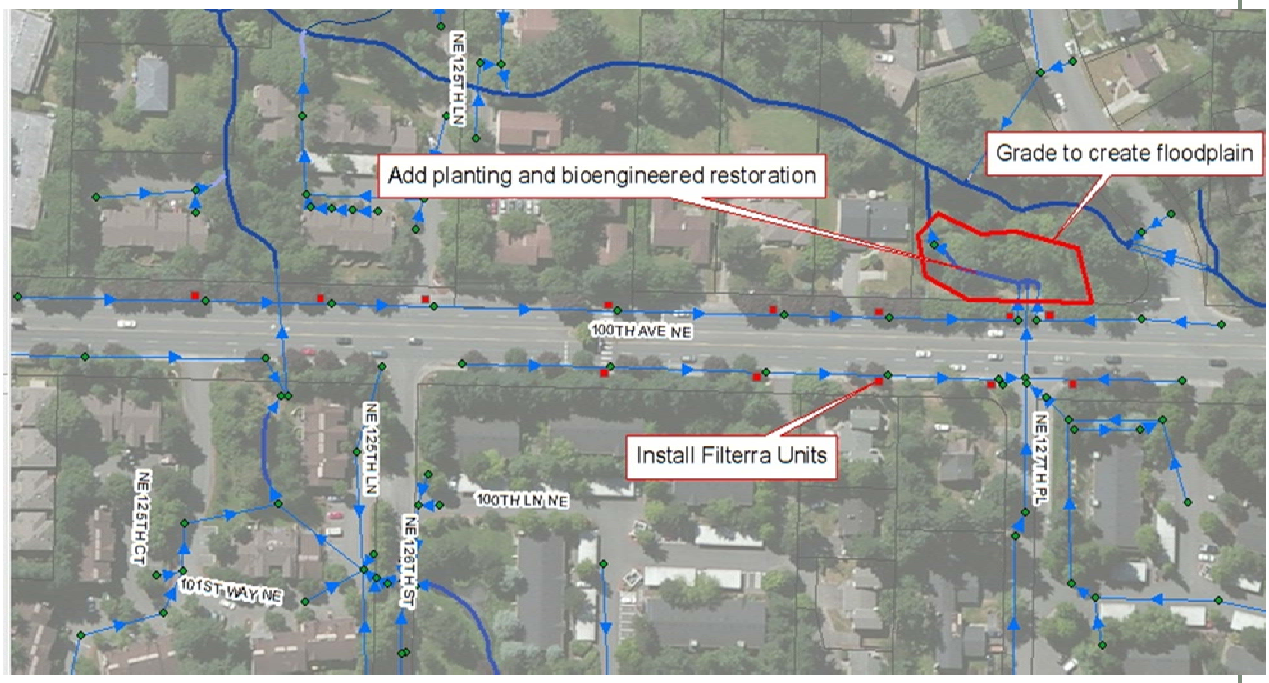
Conceptual Design

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: Problem:	☐Infrastructure ☐Water Quality ☐Erosion ☒Habitat ☒Flooding 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:

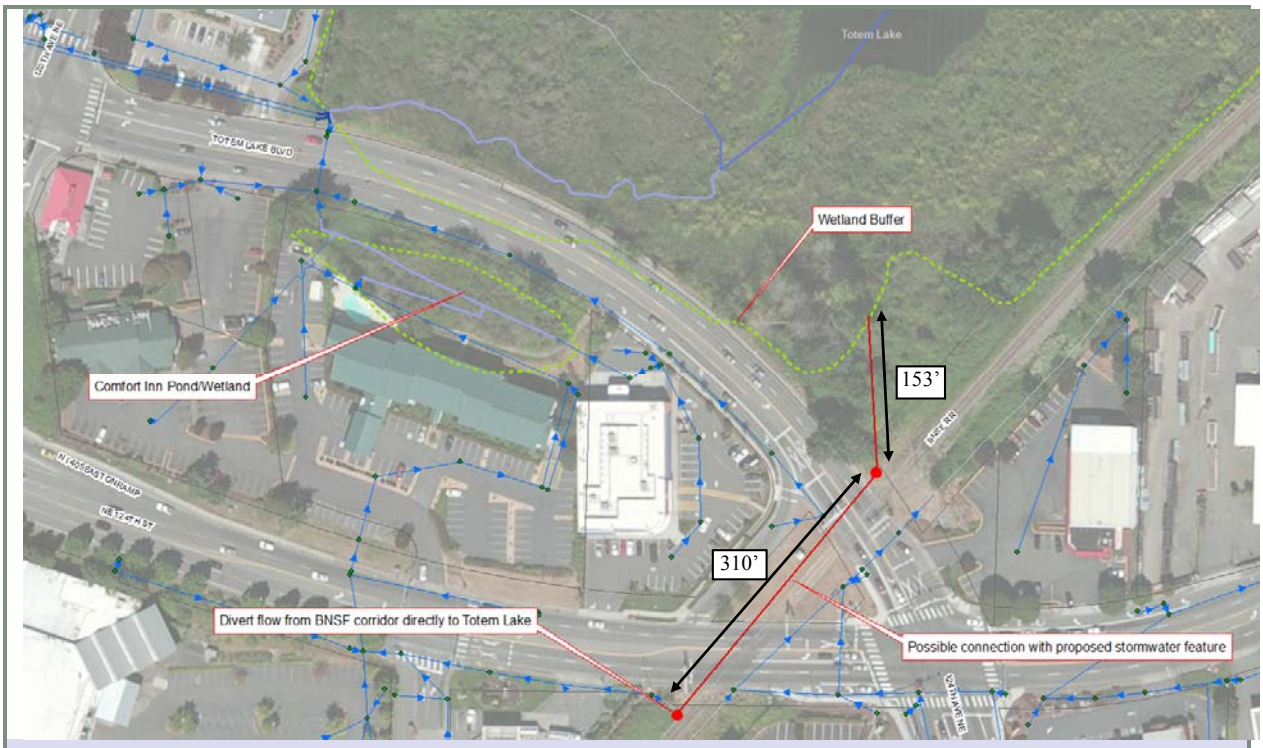
- Re-route stormdrain at railroad to bypass pond/wetland, possibly connect with the stormwater feature at NE 124th St and Totem Lake Blvd, then pipe to Totem Lake.
  - Reduce contributing area to Comfort Inn pond/wetland from 24.75 acres to 16.45 acres.

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:	111th Ave NE Culvert Replacement		ID: JC-05
Location:	111th Ave NE approx. 110-ft north of NE 141st St.	Basin:	Juanita
Project Type: Problem:	☒Infrastructure ☐Water Quality ☐Erosion ☒Habitat ☐Flooding Replace 48" Diameter CMP and Headwall	Project Cost:	$765,400

Narrative

Juanita Creek flows beneath 111th Avenue NE through an existing 48-inch diameter CMP culvert located approximately 100 feet north of NE 141st Street. The culvert is more than 40 years old and is showing signs of deterioration. The water surface elevations upstream of the culvert reach bank-full levels during heavy rain events. Slope stability upstream of the existing culvert is also an area of concern; fill (primarily crushed rock) has been placed at the top of the bank and to fill in eroded areas near the culvert headwall several times.

Adjacent home owner has expressed concern over flooding and slope saturation and stability.

The project will replace the existing 48-inch diameter corrugated metal pipe (CMP) with a 10-foot wide by 4-foot tall concrete fish passable box culvert with concrete headwalls. This will resolve the headwall issue as well as capacity issues while being permissible to State and Federal Agencies for fish passage concerns. The streambank will be restored upstream and downstream of the new culvert to reduce erosion and sedimentation.

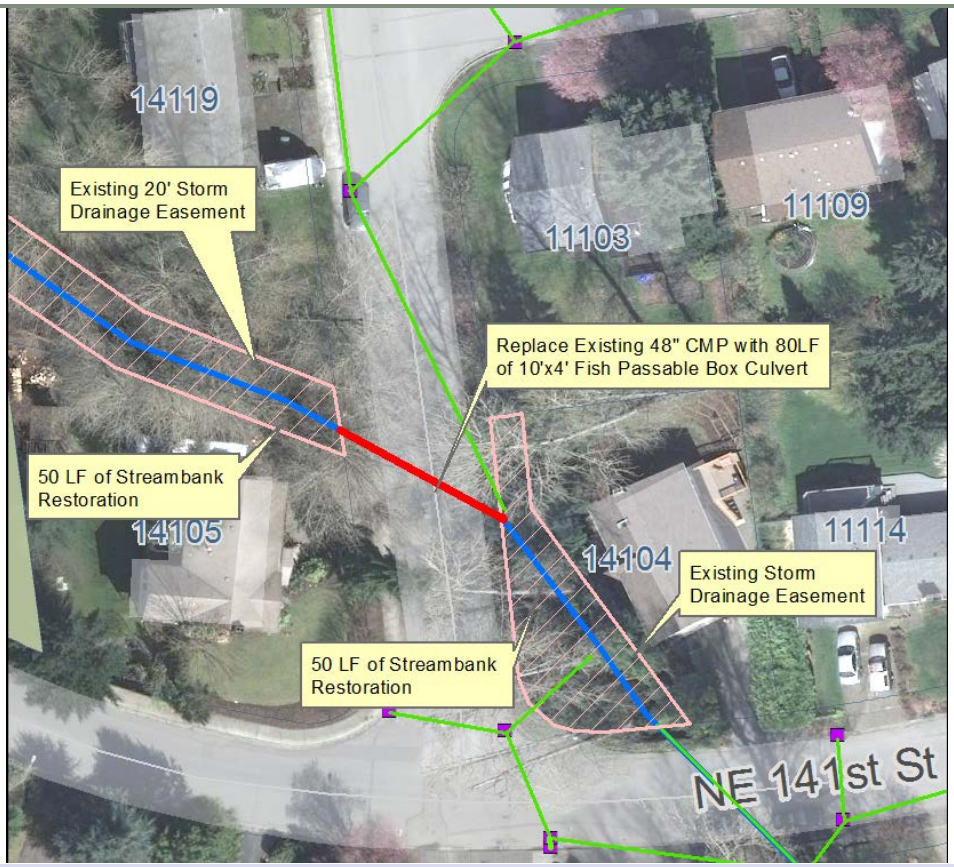
Existing 48" CMP Inlet

Conceptual Design

- Precast concrete bottomless box culvert designed with the zero-slope design method per WDFW guidelines.
- Culvert clear span of 10-feet based on informal bank-full width measurements ranging between 9 and 10.5 feet.
- Precast concrete headwall and wing walls.
- Open trench construction with 2:1 excavation side slopes.
- Existing streambed elevation will be matched.
- Temporary utility relocations (water, gas, power, and cable).
- Slope stability improvements 50 feet upstream of the culvert replacement.
- Stream channel restoration 50 feet upstream and downstream of the culvert replacement.
- Road and sidewalk will be restored to match existing conditions.

Considerations for Implementation

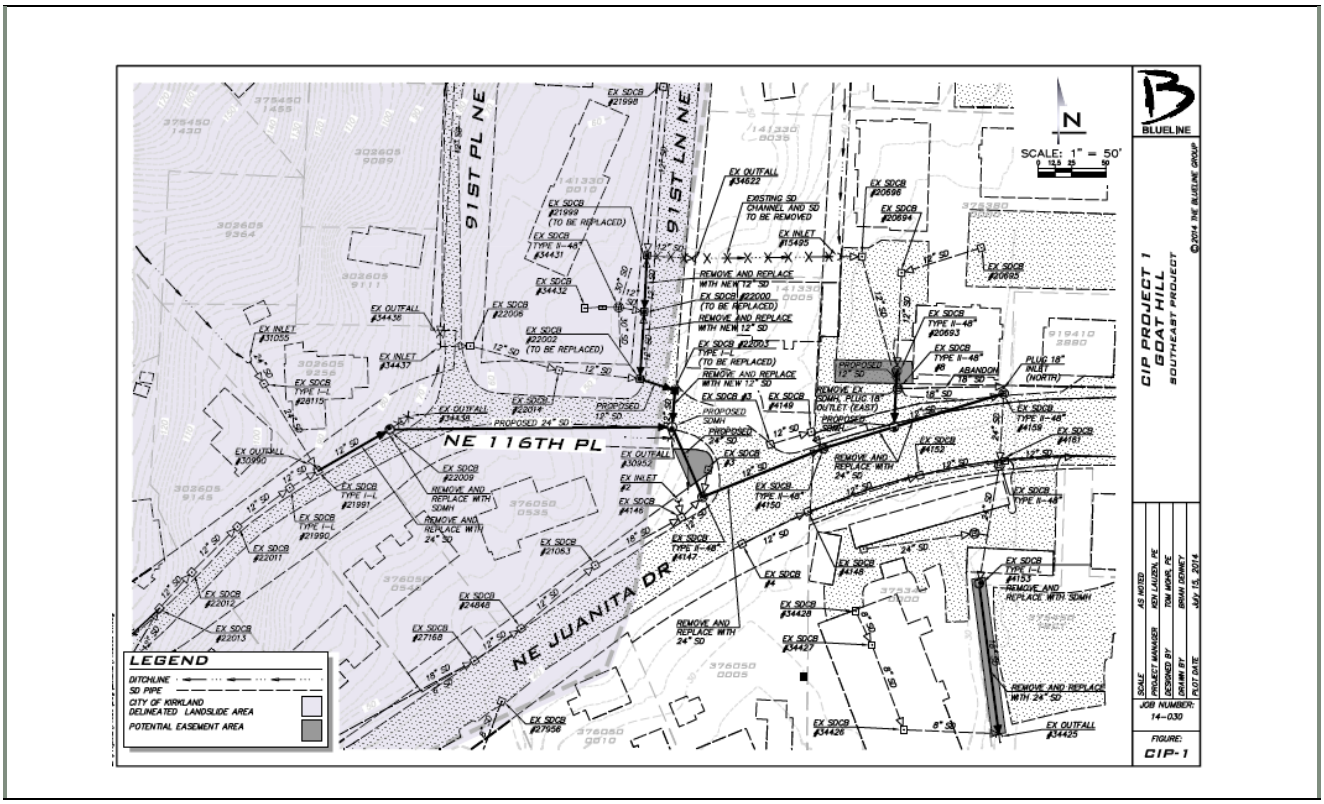
- Environmental permitting including SEPA checklist, WDFW HPA and Army Corps permits.
- A Geomorphologist assessment is recommended to ensure a stable channel design.
- Work will have to be completed during the Fish Window
- Easements currently exist but may need to be increased
- Road may be closed during construction



Project Cost Estimate

Item	Unit	Unit Cost	Quantity	Cost
Mobilization (10%)	LS	$33,000	1	$33,000
Temporary Erosion & Sediment Control	LS	$6,000	1	$6,000
Temporary Traffic Control	LS	$5,000	1	$5,000
Excavation & Disposal of culvert, roadway & embankment	LF	$600	180	$48,000
Dewatering During Construction	LS	$20,000	1	$20,000
Stream Bypass Pumping	LS	$20,000	1	$20,000
Road Restoration	LS	$20,000	1	$20,000
Fish Passable Culvert (10-ft span)	LF	$1,400	80	$112,000
Streambank Stabilization (50-ft up & downstream of culvert)	LS	$40,000	1	$40,000
Planting/Property Restoration	LS	$20,000	1	$20,000
Utility Relocations	LS	$40,000	1	$40,000
			Subtotal	$364,000
		Contractor overhead, profit	10%	$36,400
		Construction Contingency	30%	$109,200
		Washington State Sales Tax	9.5%	$34,580
		Subtotal construction costs		$544,180
		Administration and engineering design	32%	$176,220
		Permitting		$45,000
		Total cost		$765,400

Project:	Goat Hill Drainage Diversion		ID: JC-06
Location:	91st Lane NE and NE 116th Place	Basin:	Juanita Creek
Project Type: Problem:	☐Infrastructure ☐Water Quality ☐Erosion ☐Habitat ☒Flooding Local flooding	Project Cost:	$521,000
Narrative	The Juanita Townhomes parking lot floods during periods of heavy rain, and the property owner reports that the private stormwater system needs to be maintained more frequently because of sedimentation from upstream erosion occurring on steep slopes. This project is to re-route a portion of the stormwater system around the open channel that is contributing to downstream sedimentation. The project will reduce stormwater flow into the private system at Juanita Townhomes and alleviate flooding concerns, and reduce sediment transport downstream into private and public systems, reducing maintenance requrirements. The project will also upsize existing system pipes to accommodate increased future flows. This project was evaluated and proposed as part of the Goat Hill Storm Drainage Basin Study (Blueline July 2014).		
Conceptual Design	The proposed CIP includes the following improvements: • Abandon a storm drainage channel. • ReOroute a portion of the system along 91st Lane NE and NE 116th Place. • Add a new 24-inch storm pipe and structures. • Upsize the existing 12-inch storm drainage piping to 24 inches. • Abandon a portion of the existing 18-inch system. • Remove an existing storm drainage manhole.		
Considerations for Implementation	• Environmental permitting including SEPA checklist, WDFW HPA and Army Corps permits, compliance with Kirkland's Sensitve Areas Ordinance and Shoreline Master Program and Ecology 401 Water Quality Certification. • The proposed abandonment of the storm drainage channel may result in wetlands and/or streams being eliminated and may require mitigation. • Temporary construction easement and permanent drainage easements may be needed for work on the private property. • Utility conflicts may exist, and will need to be determined during final survey and design.		

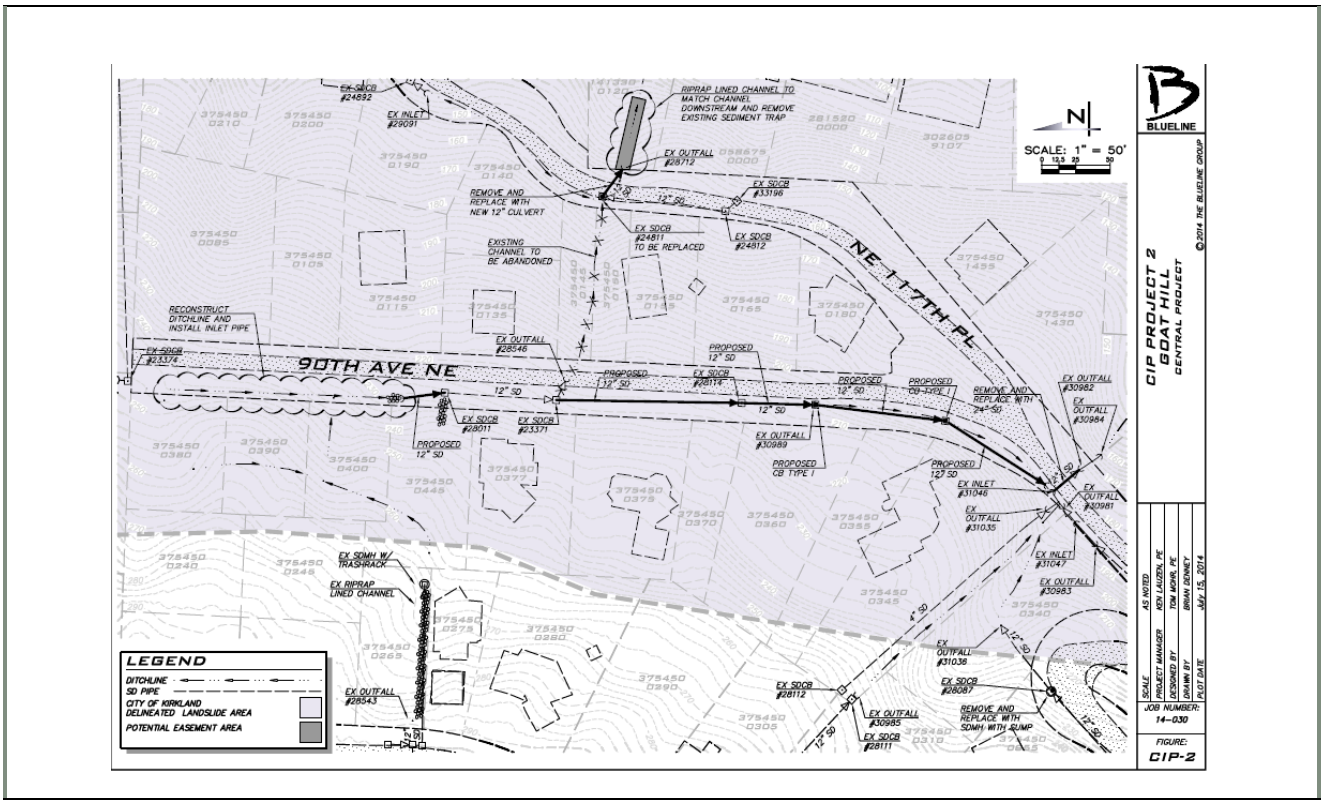

91ST PL NE
91ST LN NE
NE 116TH PL
NE JUANITA DR
N
SCALE: 1" = 50'
LEGEND
DITCHLINE
SD PIPE
CITY OF KIRKLAND DELINEATED LANDSLIDE AREA
POTENTIAL EASEMENT AREA
BLUELINE
CIP PROJECT 1
GOAT HILL
SOUTHEAST PROJECT
©2014 THE BLUELINE GROUP
SCALE AS NOTED
PROJECT MANAGER KEV LAUDEN, PE
DESIGNED BY TIM HOPE, PE
DRAWN BY BRIAN SONKY
PLOT DATE JULY 15, 2014
JOB NUMBER: 14-030
FIGURE: CIP-1

Project Cost Estimate

CIP Project 1: Goat Hill Southeast Project

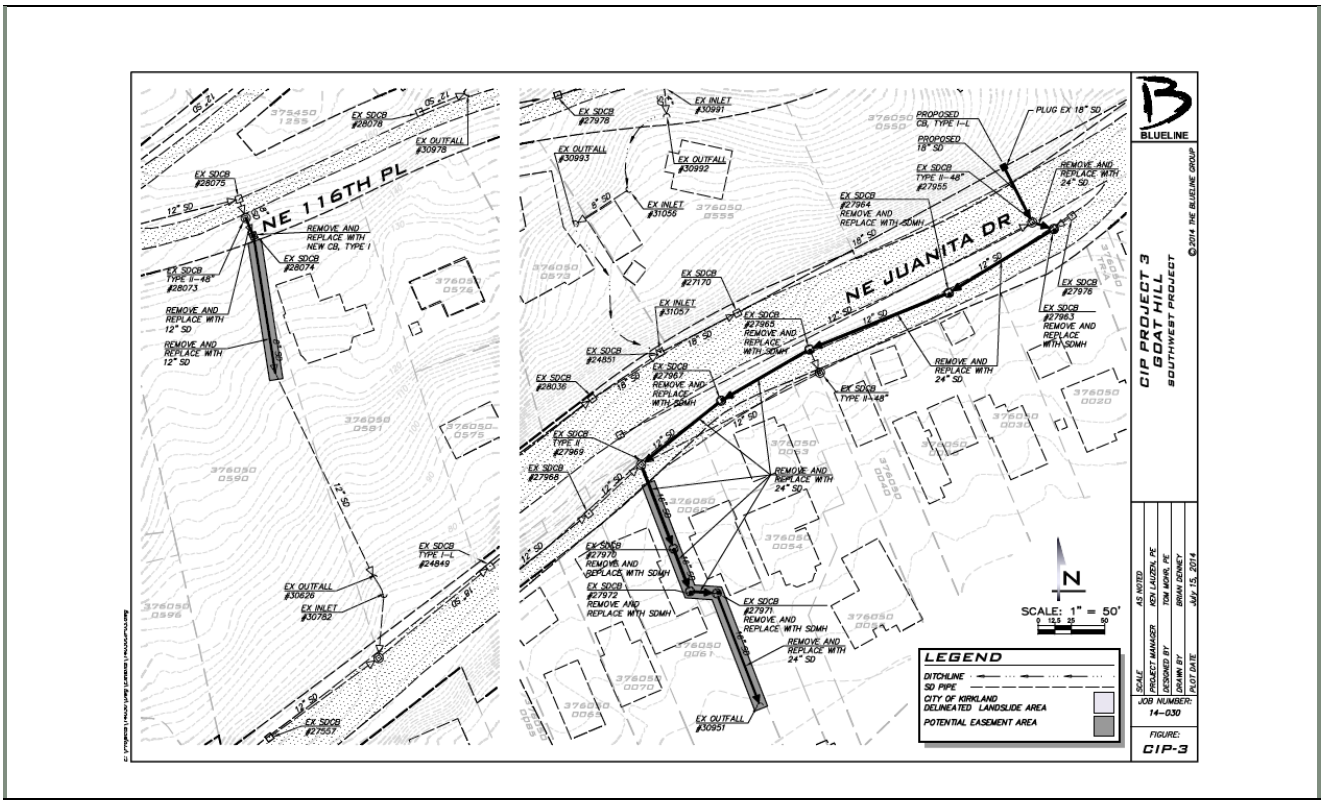
ITEM	QUANTITY	UNITS	UNIT PRICE	AMOUNT
Mobilization	1	LS	$21,000	$21,000
Shoring and Trench Safety	1	LS	$5,000	$5,000
Bypass Pumping	1	LS	$5,000	$5,000
12-Inch Storm Sewer Pipe	200	LF	$50	$10,000
24-Inch Storm Sewer Pipe	675	LF	$125	$84,375
Catch Basin Type I	4	EA	$1,400	$5,600
Catch Basin Type II - 48-Inch	4	EA	$4,000	$16,000
Connect to Existing CB	7	EA	$500	$3,500
Controlled Density Fill	100	CY	$75	$7,500
Foundation Gravel	100	TON	$25	$2,500
Crushed Surfacing Top Course	960	TON	$30	$28,800
HMA Class B Trench Patch	150	TON	$125	$18,750
Storm Abandonment	1	LS	$5,000	$5,000
Stream/Wetland Mitigation	1	LS	$10,000	$10,000
Property Restoration	1	LS	$5,000	$5,000
			Subtotal	$228,025
			Sales Tax (9.5%)	$21,662
			Construction Contingency (25%)	$57,006
			Total Construction Cost	$306,694
			Consultant Design and Construction Administration/Inspection (30%)	$92,008
			In House Design and Construction Costs (30%)	$92,008
			Permitting (5%)	$15,335
			Easements (5%)	$15,335
			Total Project Cost	$521,379

Project:	Goat Hill Drainage Ditch and Channel Stabilization		ID: JC-07
Location:	90th Avenue NE and NE 117th Place	Basin:	Juanita Creek
Project Type: Problem:	☐Infrastructure ☐Water Quality ☒Erosion ☐Habitat ☐Flooding Erosion and Sedimentation	Project Cost:	$299,000
Narrative	A stormwater channel between private property parcels was identified by City staff as a problem for channel erosion, embankment failure at the outlet of the culvert crossing, and sediment deposition in the downstream channel in the vicinity of NE 117th Place. This project is to re-route a portion of the stormwater away from the eroding drainage course and overlay 90th Avenue NE with a thickened edge to reduce sheet flow to steep slopes below. The project will reduce sediment transport to downstream areas, resulting in reduced maintenance needs, accommodate future flows, and reduce erosion on the hillslope below the project area. This project was evaluated and proposed as part of the Goat Hill Storm Drainage Basin Study (Blueline July 2014).		
Conceptual Design	The proposed CIP includes the following improvements: • Reconstruct a ditch line along the west side of 90th Avenue NE. • Abandon a culvert crossing along 90th Avenue NE. • Abandon a storm drainage channel. • Replace a catch basin and culvert crossing along NE 117th Place • Stabilize a drainage swale with rip-rap below the culvert crossing along NE 117th Place • Install catch basins and 12-inch storm drainage pipe along 90th Avenue NE • Edge grind and overlay 500 feet of roadway with a thickened edge. • Upsize a 12-inch culvert crossing to a 24-inch culvert along NE 117th Place.		
Considerations for Implementation	• Environmental permitting including SEPA checklist, WDFW HPA and Army Corps permits, compliance with Kirkland's Sensitve Areas Ordinance and Shoreline Master Program and Ecology 401 Water Quality Certification. • The proposed abandonment of the storm drainage channel may result in wetlands and/or streams being eliminated and may require mitigation. • Temporary construction easement and permanent drainage easements may be needed for work on the private property. • Utility conflicts may exist, and will need to be determined during final survey and design. • Review of steep slopes downstream of proposed 24-inch culvert crossing along NE 117th Place to ensure additional stormwater will not adversely impact the hillside.		


CIP PROJECT 2
GOAT HILL
CENTRAL PROJECT
BLUELINE
SCALE: 1" = 50'
90TH AVE NE
NE 117TH PL
RIPRAP LINED CHANNEL TO MATCH CHANNEL DOWNSTREAM AND REMOVE EXISTING SEDIMENT TRAP
REMOVE AND REPLACE WITH NEW 12" CULVERT
EXISTING CHANNEL TO BE ABANDONED
RECONSTRUCT DITCHLINE AND INSTALL INLET PIPE
EX RIPRAP LINED CHANNEL
EX SDMH W/ TRASHRACK
REMOVE AND REPLACE WITH SDMH WITH SUMP
LEGEND
DITCHLINE
SD PIPE
CITY OF KIRKLAND DELINEATED LANDSLIDE AREA
POTENTIAL EASEMENT AREA
JOB NUMBER: 14-030
FIGURE: CIP-2

Project Cost Estimate CIP Project 2: Goat Hill Central Project				
ITEM	QUANTITY	UNITS	UNIT PRICE	AMOUNT
Mobilization	1	LS	$12,000	$12,000
Shoring and Trench Safety	1	LS	$2,500	$2,500
Bypass Pumping	1	LS	$2,500	$2,500
12-Inch Storm Sewer Pipe	450	LF	$50	$22,500
24-Inch Storm Sewer Pipe	35	LF	$125	$4,375
Catch Basin Type I	3	EA	$1,400	$4,200
Catch Basin Type II - 48-Inch	1	EA	$4,000	$4,000
Reconstruct Ditch	200	LF	$30	$6,000
Connect to Existing CB	4	EA	$500	$2,000
Controlled Density Fill	35	CY	$75	$2,625
Foundation Gravel	50	TON	$25	$1,250
Crushed Surfacing Top Course	525	TON	$30	$15,750
HMA Class B Trench Patch	125	TON	$125	$15,625
HMA Class B Overlay (including thickened edge)	850	SY	$18	$15,300
Edge Grind	425	SY	$6	$2,550
Storm Abandonment	1	LS	$5,000	$5,000
Stream/Wetland Mitigation	1	LS	$10,000	$10,000
Property Restoration	1	LS	$2,500	$2,500
			Subtotal	$130,675
			Sales Tax (9.5%)	$12,414
			Construction Contingency (25%)	$32,669
			Total Construction Cost	$175,758
			Consultant Design and Construction Administration/Inspection (30%)	$52,727
			In House Design and Construction Costs (30%)	$52,727
			Permitting (5%)	$8,788
			Easements (5%)	$8,788
			Total Project Cost	$298,788

Project:	Goat Hill Drainage Conveyance Capacity		ID: JC-08
Location:	Vicinity of NE Juanita Drive	Basin:	Juanita Creek
Project Type: Problem:	☒Infrastructure ☐Water Quality ☐Erosion ☐Habitat ☐Flooding Inadequate conveyance capacity	Project Cost:	$490,000
Narrative	The stormwater pipes along NE Juanita Drive were identified as having inadequate capacity to convey the 100-year storm event. This project will replace existing stormwater pipes with larger pipes to improve conveyance. This project was evaluated and proposed as part of the Goat Hill Storm Drainage Basin Study (Blueline July 2014).		
Conceptual Design	The proposed CIP includes the following improvements: • Replacement of 12-inch culvert along NE 118th Place • Replacement of 8-inch storm drainage pipe with a 12-inch storm drainage pipe. • Replacement of 8-inch culvert with 12-inch culvert along NE 166th Place • Replacement of Type 1 Catch Basin along NE 116th Place • Replacement of 12-inch storm drainage pipe with 24-inch storm drainage pipe. • Replacement of catch basins with storm drainage manholes.		
Considerations for Implementation	• Environmental permitting including SEPA checklist, WDFW HPA and Army Corps permits, compliance with Kirkland's Sensitve Areas Ordinance and Shoreline Master Program and Ecology 401 Water Quality Certification. • The proposed abandonment of the storm drainage channel may result in wetlands and/or streams being eliminated and may require mitigation. • Temporary construction easement and permanent drainage easements may be needed for work on the private property. • Review of steep slopes that will be impacted by replacement of the 8-inch storm drainage line.		


NE 116TH PL
NE JUANITA DR
REMOVE AND REPLACE WITH NEW CB, TYPE I
REMOVE AND REPLACE WITH 12" SD
REMOVE AND REPLACE WITH 24" SD
PROPOSED CB, TYPE I-L
PROPOSED 18" SD
PLUG EX 18" SD
EX OUTFALL #30978
EX OUTFALL #30993
EX OUTFALL #30992
EX OUTFALL #30951
EX OUTFALL #30629
EX INLET #30782
EX INLET #30991
EX INLET #31056
EX INLET #31057
EX SDCB #28078
EX SDCB #28075
EX SDCB #28074
EX SDCB TYPE II-48" #28073
EX SDCB #27978
EX SDCB #27170
EX SDCB #27965 REMOVE AND REPLACE WITH SDMH
EX SDCB #27967 REMOVE AND REPLACE WITH SDMH
EX SDCB #27964 REMOVE AND REPLACE WITH SDMH
EX SDCB #27963 REMOVE AND REPLACE WITH SDMH
EX SDCB #27976
EX SDCB TYPE II-48" #27955
EX SDCB #24851
EX SDCB #28036
EX SDCB TYPE II #27969
EX SDCB #27968
EX SDCB #27970 REMOVE AND REPLACE WITH SDMH
EX SDCB #27972 REMOVE AND REPLACE WITH SDMH
EX SDCB #27971 REMOVE AND REPLACE WITH SDMH
EX SDCB TYPE I-L #24849
EX SDCB #27557
EX SDCB TYPE II-48"
SCALE: 1" = 50'
0 12.5 25 50
N
LEGEND
DITCHLINE
SD PIPE
CITY OF KIRKLAND DELINEATED LANDSLIDE AREA
POTENTIAL EASEMENT AREA
BLUELINE
CIP PROJECT 3
GOAT HILL
SOUTHWEST PROJECT
©2014 THE BLUELINE GROUP
SCALE AS NOTED
PROJECT MANAGER KEN LAUZEN, PE
DESIGNED BY TOM MOHR, PE
DRAWN BY BRIAN DENNEY
PLOT DATE May 15, 2014
JOB NUMBER: 14-030
FIGURE: CIP-3

Project Cost Estimate

CIP Project 3: Goat Hill Southwest Project

ITEM	QUANTITY	UNITS	UNIT PRICE	AMOUNT
Mobilization	1	LS	$19,000	$19,000
Shoring and Trench Safety	1	LS	$5,000	$5,000
Bypass Pumping	1	LS	$5,000	$5,000
12-Inch Storm Sewer Pipe	185	LF	$50	$9,250
18-Inch Storm Sewer Pipe	50	LF	$65	$3,250
24-Inch Storm Sewer Pipe	575	LF	$125	$71,875
Catch Basin Type I	1	EA	$1,400	$1,400
Catch Basin Type I-L	1	EA	$1,600	$1,600
Catch Basin Type II - 48-Inch	7	EA	$4,000	$28,000
Connect to Existing CB	5	EA	$500	$2,500
Controlled Density Fill	30	CY	$75	$2,250
Foundation Gravel	85	TON	$25	$2,125
Crushed Surfacing Top Course	830	TON	$30	$24,900
HMA Class B Trench Patch	135	TON	$125	$16,875
Stream/Wetland Mitigation	1	LS	$5,000	$5,000
Property Restoration	1	LS	$10,000	$10,000
			Subtotal	$208,025
			Sales Tax (9.5%)	$19,762
			Construction Contingency (25%)	$52,006
			Total Construction Cost	$279,794
			Consultant Design and Construction Administration/Inspection (30%)	$83,938
			In House Design and Construction Costs (30%)	$83,938
			Permitting (5%)	$13,990
			Easements (10%)	$27,979
			Total Project Cost	$489,639

Project:	Market Street Sewer Pipe Replacement		ID: MB-01
Location:	Market Street from Central Way to 12th Avenue	Basin:	Moss Bay
Project Type: Problem:	☒Infrastructure ☐Water Quality ☐Erosion ☐Habitat ☐Flooding 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

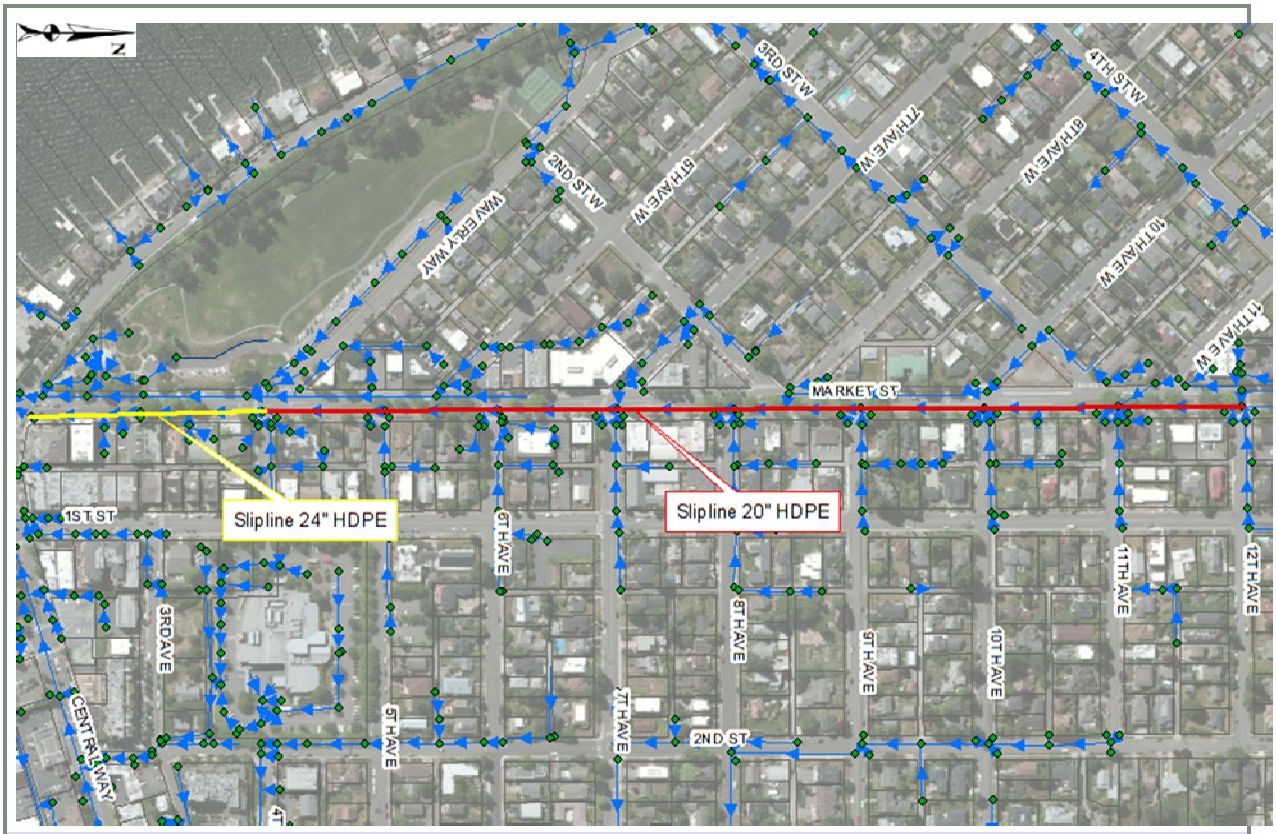
Conceptual Design

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: Problem:	☒Infrastructure ☐Water Quality ☐Erosion ☐Habitat ☒Flooding 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.

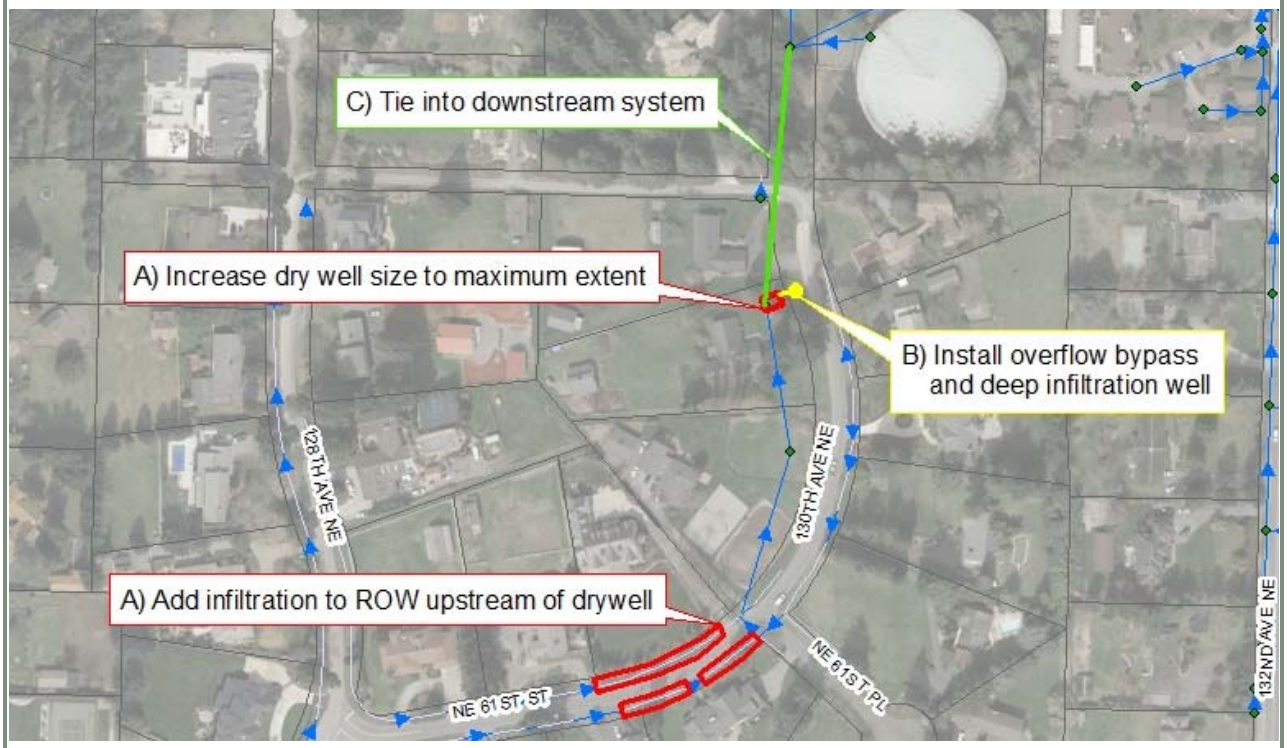
B) Utilize deep infiltration, such as a UIC well, for high flow bypass (shown in yellow on figure).
   - Deep infiltration shall be located in ROW, with a high flow bypass pipe leading from the dry well to the UIC well.

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