Appendix C

Capital Improvements Projects

CIP-SW01: Relocate Culvert 326 Shallow Shore Dr.

HIGHEST PRIORITY

Project Description

The existing cross culvert located at 326 Shallow Shore Drive discharges onto the western edge of the parcel bordering the lake at that location. During heavy storm events, discharge from this culvert overwhelms an existing private culvert leading to the lake and floods the eastern portion of the property.

The County currently possesses an easement access to the lake approximately 300 LF north along Shallow Shore Drive which could be used as an alternate for this stormwater drainage. The easement could potentially be used to site a surface water quality treatment facility for the flow.

Preferred Project Solution:

The preferred solution for this issue is to regrade the ditchline along the west side of Shallow Shore Drive to drain to a point approximately 300 LF north of existing culvert, install a new cross-culvert directing the flow to the lake via a treatment bioswale within the County easement.

Expected Benefits:

- Eliminate existing flooding issues on the private property.
- Provide water quality treatment of stormwater flow at the new discharge location.

Design Objectives and Requirements:

- Relocate the culvert stormwater discharge to an existing County lake-access easement located approximately 300LF north along Shallow Shore Drive.
- Regrade ditchline along the west edge to Shallow Shore Drive to drain to the new discharge point.
- Provide water quality treatment capacity at the new discharge point in the form of a bioswale or raingarden

Permitting, Regulatory, or Other Issues:

Permitting, regulatory, and other issues affecting this project include; proximity to the lake shoreline, space constraints, traffic control concerns, and Whatcom County limitations on seasonal clearing.

Estimated Costs (2011 dollars)

$160,000

Implementation Schedule:

Within the 6-year planning window.

CIP-SW02: Replace Culvert
North Lake Samish Drive (01)

HIGHEST PRIORITY

Project Description

Under storm conditions, the existing cross culvert (located approximately 1,000 LF west of Greene Point Lane) is currently undersized to provide adequate drainage for flows from the roadway drainage and an existing unnamed creek draining out of the North sub-basin.

Preferred Project Solution:

The preferred alternative to address this issue is the removal/replacement of the existing, undersized culvert with a new cross-culvert sized to convey storm flows safely under the roadway with no flooding.

Expected Benefits:

- Eliminating roadway flooding during storm events,
- Maintenance of slope stability on the north side of the roadway,
- Protection of public health and safety.

Design Objectives and Requirements:

- Provide an adequately sized stormwater conveyance system to safely convey storm flows under the roadway at this location,
- Maintenance of existing aesthetic condition of the area,

Permitting, Regulatory, or Other Issues:

Permitting, regulatory, and other issues affecting this project include; proximity to the lake shoreline, space constraints, traffic concerns and Whatcom County limitations on seasonal clearing.

Estimated Costs (2011 Dollars)

$50,000

Implementation Schedule:

Within the 6-year planning window.

CIP-SW03: Replace Culvert
North Lake Samish Drive (02)

HIGHEST PRIORITY

Project Description

Under storm conditions, the existing cross culvert (located approximately 1,000 LF west of Greene Point Lane) is currently undersized to provide adequate drainage for flows from the roadway drainage and the existing unnamed creek draining out of the North sub-basin.

Preferred Project Solution:

The preferred alternative to address this issue is the removal/replacement of the existing, undersized culvert with a cross-culvert sized to convey storm flows safely under the roadway with no flooding.

Expected Benefits:

- Elimination of roadway flooding,
- Protection of public health and safety.

Design Objectives and Requirements:

- Provide an adequately sized stormwater conveyance system to safely convey storm flows under the roadway at this location.
- Maintenance of slope stability on the north side of the roadway.

Permitting, Regulatory, or Other Issues:

Permitting, regulatory, and other issues affecting this project include; proximity to the lake shoreline, space constraints, traffic control concerns, and Whatcom County limitations on seasonal clearing.

Estimated Costs (2011 Dollars)

$50,000

Implementation Schedule:

Within the 6-year planning window.

CIP-SW04: Ditchline Rehab & Culvert Installation – W Lk Samish Dr.

HIGHEST PRIORITY

Project Description

Under storm conditions, the existing cross culvert (located approximately 2,600 LF east of the bridge) is currently undersized to provide adequate drainage for the roadway drainage flows and the overland flows originating from the slope south of the roadway (Roy East Sub-basin). Additionally, the capacity of the south-side road ditch drainage is insufficient to adequately convey runoff to the culvert inlet.

Preferred Project Solution:

The preferred alternative to address this issue is to regrade the drainage of the adjacent south-side road ditch and to remove/replace the existing, undersized culvert with a cross-culvert sized to convey storm flows safely under the roadway with no flooding.

Expected Benefits:

- Elimination of roadway flooding during heavy storm events,
- Protection of public health and safety.

Design Objectives and Requirements:

- Provide an adequately sized conveyance system to convey storm flows under the roadway at this location,
- Protecting slope stability along the north side of the roadway,
- Preserve the aesthetic integrity of the area.

Permitting, Regulatory, or Other Issues:

Permitting, regulatory, and other issues affecting this project include; proximity to the lake shoreline, space constraints, traffic control concerns, and Whatcom County limitations on seasonal clearing

Estimated Costs (2011 Dollars)

$85,000

Implementation Schedule:

Within the 6-year planning window.

CIP-SW05: Reconfigure Road Drainage
Calmor Cove – W Lk Samish Dr

HIGH PRIORITY

Project Description

An existing County cross-culvert currently discharges to the east side of West Lake Samish Road, directly upstream of a private 12-inch diameter stormdrain located on the property occupied by Calmor Cove Mobile Home Park. The 12-inch stormdrain is approximately 300LF in length and runs under the existing mobile homes to an open channel within the park. The existing private stormdrain is tremendously difficult to service and has backed up in the past, flooding portions of the park.

Preferred Project Solution:

The preferred solution for this issue is to regrade the west-side road ditch and relocate the cross culvert to a point ~750LF north along West Lake Samish Drive. A new storm drain alignment will need to be identified to carry flows from the new culvert discharge to the lake shore.

Expected Benefits:

- Elimination of the flooding potential within the park,
- Potential implementation of water quality treatment to the stormwater flow.

Design Objectives and Requirements:

- Relocation of stormwater flows currently being released above the mobile home park to a location farther north along West Lake Samish Drive,
- Development of a water treatment strategy for the new discharge facility,
- Protection of the existing aesthetic quality of the area.

Permitting, Regulatory, or Other Issues:

Permitting, regulatory, and other issues affecting this project include; proximity to the lake shoreline, potential easement requirements, space constraints, traffic control and Whatcom County limitations on seasonal clearing

Estimated Costs (2011 Dollars)

$232,000

Implementation Schedule:

Within the 6-year planning window.

CIP-SW06: Water Quality Treatment Options for Catch Basins in W. Lk. Samish Dr.

HIGH PRIORITY

Project Description

On the south side of West Lake Samish Drive, approximately 1,000 LF east of the bridge, four storm drain catch basins are located within an expanse of gravel paving. The gravel area is used for parking and as driveway entrances to the homes located south of West Lake Samish Drive at that location. The finish grade rim elevations for these catch basins are slightly below the gravel grade, and sediment regularly washes into the basins during storm events.

Preferred Project Solution:

The preferred alternative is the installation of individual catch basin filter inserts at each catch basin.

Expected Benefits:

- Reduction in the amount of stormwater pollutants discharging to the lake,
- Elimination of the need to replace or reconfigure catch basins.

Design Objectives and Requirements:

- Implementation of a water quality treatment strategy to treat the runoff from the surround impervious gravel area,
- Maintenance of the existing hydraulic profile,
- Provide adequate conveyance for storm flows.

Permitting, Regulatory, or Other Issues:

Permitting, regulatory, and other issues affecting this project include; proximity to the lake shoreline, space constraints, and traffic control issues.

Estimated Costs (2011 Dollars)

$17,000

Implementation Schedule:

Within the current or next 6-year planning window.

CIP-SW07: Energy Dissipation– Pacific Ck East Lk. Samish Dr.

HIGH PRIORITY

Project Description

The existing WSDOT culvert which conveys Pacific Creek from the east side to the west side of the freeway has a hanging pipe discharge which discharges flow into a plunge pool just east of East Lake Samish Drive. The banks surrounding the plunge pool show significant signs of the scour erosion which occurs during heavy storm events. Flow from the plunge pool is directed to the inlet end of an existing County cross-culvert which conveys the creek under East Lake Samish Drive.

Preferred Project Solution:

The preferred solution for this issue is the construction of an armored channel equipped with weir structures for energy dissipation. The project should include revegetation/restoration of the existing scoured area adjacent to East Lake Samish Drive.

Expected Benefits:

- Reduction of sediment discharge to the lake,
- Stabilization of the eroded area adjacent to the roadway,
- Elimination of a potential flooding hazard during large storm events

Design Objectives and Requirements:

- Energy dissipation and flow redirection to reduce scour erosion adjacent to the roadway,
- Elimination of the hanging culvert discharge and plunge pool at the discharge outlet of the WSDOT culvert,
- Revegetation/restoration of the impacted site.

Permitting, Regulatory, or Other Issues:

Permitting, regulatory, and other issues affecting this project include; proximity to the lake shoreline, WSDOT permitting, space constraints, traffic control concerns, and the Whatcom County limitations on seasonal clearing

Estimated Costs (2011 Dollars)

$87,000

Implementation Schedule:

Within the current or next 6-year planning window.

CIP-SW08: Energy Dissipation on Culvert
Unnamed Ck – Manley Road

LOW PRIORITY

Project Description

An existing 36-inch culvert under Manley Road, (~120-150 LF in length), conveys flow from an unnamed creek in the Wefer Sub-basin, (creek located west of Wefer Creek and east of Barnes Creek). The culvert is installed at a 30-40% slope and has a hanging discharge, (10-15 ft above grade), which discharges water to the creek bed below. During storm events, flow velocities in the pipe are high enough to project a discharge stream 15-20 ft from the end of the culvert before the flow hits the creek bed.

Preferred Project Solution:

The preferred solution for this issue is to extend the existing culvert at a down-angle to a point of direct discharge into the creek. Project implementation will require an armored splash pad at the discharge point and restoration of the downstream watercourse utilizing natural drainage alternatives such as amended soils, constructed step-pools, and revegetation with native plants.

Expected Benefits:

- Creek velocity reductions,
- Reduction is stream channel erosion.
- Improvement of aquatic habitat.

Design Objectives and Requirements:

- Energy dissipation and flow redirection to reduce scour erosion at the culvert discharge,
- Elimination of the hanging culvert discharge and plunge pool at the discharge outlet,
- Revegetation/restoration of the eroded stream bank.

Permitting, Regulatory, or Other Issues:

Permitting, regulatory, and other issues affecting this project include; work with the creek bed, site access, and the Whatcom County limitations on seasonal clearing.

Estimated Costs

No cost estimate prepared

Implementation Schedule:

Beyond the 6-year planning window.

CIP-LM01: Friday Ck. Dredging

HIGHEST PRIORITY

Project Description

Since its installation in the 1990s, the Friday Creek retention dam has experienced a build up of stream-deposited sediment both on the upstream and downstream sides of the dam. Questions and concerns have arisen regarding the impact this sedimentation is having on the normal operation of the retention structure. Programmatic recommendations included in this planning effort call for the preparation of a dredging feasibility study to provide recommendations with regard to the following;

a. Required limits of dredging,
b. Dredging schedule (periodic),
c. Permitting strategy
d. Dredging means and methods,
e. Cost comparison between periodic dredging and annual removal of the entire dam structure
f. Funding options.

Based upon the results of this feasibility study, a dredging program may be recommended for the creek.

Preferred Project Solution:

The preferred alternative for this project is to dredge and restore the Friday Creek channel immediately upstream and downstream of the retention dam.

Expected Benefits:

- increased water retention behind the dam structure,
- easier maintenance & operation of dam structure,
- enhanced aquatic habitat.

Design Objectives and Requirements:

- Development of method to remove sediment build-up around the dam structure,
- Protection of existing aquatic habitat,
- Maintenance of lake-level control functions during implementation.

Permitting, Regulatory, or Other Issues:

Permitting, regulatory, and other issues affecting this project include; proximity to the lake shoreline, space constraints, and Whatcom County limitations on seasonal clearing.

Estimated Costs (2011 dollars)

$97,000

Implementation Schedule:

Within the current or next 6-year planning windows.

CIP-LM02: Friday Ck. Flowmeter

LOW PRIORITY

Project Description

Currently, the only method for estimating flow in Friday Creek is relate the height of the water flow over the dam weir to the total flow in the creek. This flow metering method has inherent inaccuracies and is hard to verify. For that reason, a proposal has been made to install a calibrated flow meter structure within the creek channel to measure flows. With the irregular nature of the existing creek channel, the amount of in-stream debris in the creek, and the historic beaver activity in the area; metering of the creek may be impractical. Programmatic recommendations included in this planning effort call for the preparation of a feasibility study to address and/or provide recommendations regarding the following;

a) Applicable metering methods,
b) Channel considerations,
c) Expected environmental effects and permitting strategy,
d) Options for addressing beaver activity,
e) Project costs and funding options

Based upon the results of this feasibility study, a flow metering options may be recommended for the creek.

Preferred Project Solution:

The preferred solution to this issue is the modification of the existing retention dam to provide reliable flow data year round.

Expected Benefits:

- improved operation of the dam structure to provide the maximum in-stream flows possible during the summer months,
- improvements of aquatic habitat.

Design Objectives and Requirements:

- develop an accurate in-stream flow metering strategy for Friday Creek.

Permitting, Regulatory, or Other Issues:

Permitting, regulatory, and other issues affecting this project include; permitting for work within the stream channel, irregularities in the channel cross-section, space constraints, and Whatcom County limitations on seasonal clearing.

Estimated Costs

A concept-level cost estimate has not been prepared for this capital project.

Implementation Schedule:

Beyond the 6-year planning window.