



KING COUNTY

1200 King County Courthouse
516 Third Avenue
Seattle, WA 98104

Signature Report

March 17, 2015

FCD Resolution

Proposed No. FCD2015-02.1

Sponsors

1 A RESOLUTION establishing a framework for developing
2 a corridor plan for the Tolt river.

3 WHEREAS, the lower six miles of the Tolt river is impacted by flooding
4 and channel migration; and

5 WHEREAS, the King County Flood Control Zone District ("District")
6 maintains a system of flood containment levees in this area; and

7 WHEREAS, in partnership and collaboration with the Snoqualmie
8 Watershed, the city of Carnation, local residents and others, the District, through
9 King county as its service provider, has initiated the Tolt river corridor plan
10 ("Corridor Plan"); and

11 WHEREAS, the Corridor Plan will emphasize the reduction of public
12 safety risks associated with flooding and river processes and the improvement of
13 flood protection infrastructure in the District's river facility inventory; and

14 WHEREAS, the Corridor Plan will recommend a suite of actions within
15 the river corridor, comprised of levees, floodplain, channel migration and riparian
16 areas to achieve goals and objectives within the scope of the Corridor Plan; and

17 WHEREAS, flooding in recent years, including a significant flood in
18 2009, has overtopped portions of the aging levee system with impacts to farms,
19 homes, roadways and communities; and

20 WHEREAS, neighborhoods adjacent to this river corridor are at risk from
21 bank erosion, flooding and channel migration; and

22 WHEREAS, the District board of supervisors desires to establish a
23 framework for the Corridor Plan, which includes goals and provisional objectives,
24 as well as a range of floodplain management approaches and tools for evaluation;
25 now, therefore,

26 BE IT RESOLVED BY THE BOARD OF SUPERVISORS OF THE KING
27 COUNTY FLOOD CONTROL ZONE DISTRICT:

28

29

30

SECTION 1. The board of supervisors adopts the "Tolt River Corridor Plan

31

Framework, Floodplain Management Goals, Objectives and Conceptual Approaches,"

32

dated February 11, 2015, which is Attachment A to this resolution.

33

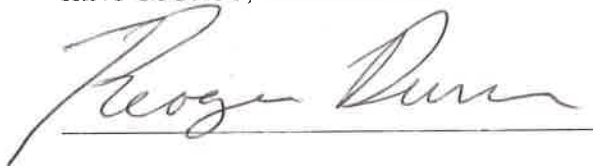
FCD Resolution was introduced on and passed by the King County Flood Control District on 3/16/2015, by the following vote:

Yes: 8 - Mr. Phillips, Mr. von Reichbauer, Mr. Gossett, Ms. Lambert,
Mr. Dunn, Mr. McDermott, Mr. Dembowski and Mr. Upthegrove

No: 0

Excused: 1 - Ms. Hague

KING COUNTY FLOOD CONTROL DISTRICT
KING COUNTY, WASHINGTON



Reagan Dunn, Chair

ATTEST:



Anne Noris, Clerk of the Board

Attachments: A. Tolt River Corridor Plan Framework, Floodplain Management Goals, Objectives and Conceptual Approaches

**TOLT RIVER
CORRIDOR PLAN FRAMEWORK**

**FLOODPLAIN MANAGEMENT GOALS,
OBJECTIVES, AND CONCEPTUAL APPROACHES**

FEBRUARY 11, 2015

Overview

This document establishes a framework for completing a comprehensive floodplain management plan for the Tolt River as part of the King County Flood Control District's capital improvement program. The scope of the Tolt River Corridor Plan is focused on the lower six miles of the Tolt River. This is the area where communities are most impacted by flooding and channel migration, and where King County maintains a discontinuous system of flood protection levees and revetments. Upstream of this six-mile river segment, the floodplain is predominantly undeveloped and located within a landscape owned by large forest landowners or within the City of Seattle's watershed.

The Plan will recommend a suite of actions for the river and its floodplain, channel migration zone, and riparian areas to achieve the goals and objectives outlined in this framework. The Plan is primarily being conducted under the auspices of the King County Flood Control District, in partnership and collaboration with the Snoqualmie Watershed Forum, the City of Carnation and other Snoqualmie valley cities, local residents, and many others affected by floodplain management actions. The Plan will have a significant emphasis on reducing public safety risks associated with flooding and river processes and on improving the flood protection infrastructure in King County's river facility inventory.

The lower six miles of the Tolt River is also an important fish and wildlife corridor, providing habitat for Endangered Species Act-listed stocks of Chinook salmon and steelhead. The river corridor is a priority area for WRIA 7 salmon recovery efforts, which seek to protect high quality habitats and to restore and reconnect those that are degraded. The Tolt River and trails atop its levees also provide open space and access to natural areas for residents of the City of Carnation and other surrounding communities.

A characterization of existing and projected future conditions is underway to evaluate flooding, levee stability, channel migration, and ecological habitat conditions along this corridor. This characterization is based on extensive data collection, computer modeling, technical analysis, and consultation with local residents and interested stakeholders. Together this information describes existing and future conditions and provides a basis for recommending corridor and site-specific floodplain management approaches to improve conditions, leading to a recommended corridor plan.

Background

The Tolt River is formed from two major tributaries – the South Fork and the North Fork – that come together to form the mainstem. It flows through unincorporated King County on its journey from the Cascade Mountains to its confluence with the Snoqualmie River near the City of Carnation. The Tolt River’s headwater area includes a major water supply dam and reservoir on the South Fork operated by the City of Seattle.

For planning purposes, the lower six miles has been divided into two primary reaches – the Valley Reach and the Alluvial Fan Reach – in recognition of their differences in terms of both the river’s character and the continuity of the flood protection facilities located there. In the Valley Reach (upstream of River Mile 2.1), flood protection facilities are sparse and discontinuous, and the river is largely unconstrained. Risks include significant channel migration and deep and fast flows which threaten homes, Tolt River Road, and other infrastructure. Tolt River Road is subject to flood inundation during events as small as a 2-year flow; this flooding can isolate the residents of over 40 homes, making property access difficult or impossible. Habitat conditions in the Valley Reach are generally high quality, and floodplain management actions there have potential to protect and enhance habitat for salmon and other fish and wildlife.

In much of the Alluvial Fan Reach, levees line both banks of the river. These levees provide inadequate and uneven flood protection, with some levees containing Tolt flood flows up to a 100-year flood event (about 16,400 cubic feet per second), while others overtop before a 5-year flow (8,400 cfs) . These levees were constructed prior to the 1960s and do not meet current standards for levee stability. As such, they are at risk of damages from scour, overtopping, and potential breaching. Two levees breached in the January 2009 flood event, creating damages to homes and roadways immediately adjacent or downstream, and contributing to flood overtopping of and damages to SR 203 and isolation of the City of Carnation. The levees in this reach also simplify the river margins and disconnect the river from its floodplain, compromising the quality of instream, off-channel, and riparian habitats. Degradation of these habitats has significantly limited juvenile salmon rearing and survival in the lower Tolt River. Restoring edge habitats and reconnecting off-channel habitats to the river are high priorities in the WRIA 7 salmon conservation plan.

Further complicating the management of the Alluvial Fan Reach are the complex flooding characteristics around the Tolt’s confluence with the Snoqualmie River. Snoqualmie floodwaters can inundate the approaches to the Tolt Hill Road bridge as well as extensive property in the valley, while also creating backwater effects along the Tolt. In the Alluvial Fan Reach, bridges over the Tolt River along State Route 203 and the Snoqualmie Valley Trail confine flows and are susceptible to damages. The City of Carnation, which lies just to the north of this portion of the Tolt River’s floodplain, has historically been isolated due to these multiple flood hazards, and is potentially affected by any actions taken to manage flood hazards throughout the reach.

Flooding in recent years – including as recently as January 2015 – has resulted in impacts to homes, roadways, and communities in unincorporated King County and the City of Carnation. This flooding has also damaged County flood protection facilities. King County has been working to address these ongoing hazards and recurrent damages since the early 1990s, with a much accelerated program beginning in 2008 with the formation

of the King County Flood Control District. Over this time frame, King County has acquired 25 at-risk homes, most of them since the formation of the Flood Control District. Since 2008, King County also has completed several flood damage repair projects along the Tolt River, including two emergency projects during the January 2009 flood event. Additionally in 2008-09, King County completed a large multiple objective levee setback project in Tolt-MacDonald Park – near the confluence with the Snoqualmie River – with funding from the Flood Control District along with the City of Seattle and many other partners.

In summary, Tolt River flooding creates considerable public safety risks and impacts to both local and regional economies. Flows as low as a 2-year flood event overtop roads and isolate over 40 homes. A 100-year flood event would be anticipated to inundate more than 60 structures and properties and portions of SR 203 and Tolt River Road. A 500-year event would create significantly more risk, inundating an estimated 100 structures and causing additional impacts to roadways as well. Without action, future flooding conditions are likely to worsen, as continued gravel accumulation (aggradation) in the lower portions of the river will reduce flow capacity in the channel and increase flood inundation and velocities.

Actions to resolve flood problems can be complementary with those needed to improve habitat conditions, potentially meeting multiple policy goals with efficient use of public funds. Tolt River projects may be appropriate for implementation by multiple parties, using a broad range of both flood risk reduction and habitat restoration funding sources. In addition, projects in this corridor are likely to be strong candidates for multi-objective funding sources such as the State of Washington's Floodplains by Design grant program, which prioritizes projects that integrate flood risk reduction with habitat protection and restoration.

The planning horizon for addressing these problems is 30 to 50 years, and the anticipated design life of any constructed facilities is 50 years or more. The Corridor Plan is intended to create a comprehensive strategy for managing flood risks over this time frame. The overall strategy will address flooding problems and enhance river processes and functions, while implementing more sustainable and cost effective floodplain management actions. The current Flood Control District 6-year CIP incorporates several strategies including ongoing flood buyout projects as well as an adopted corridor plan implementation project to provide potential funding for initial implementation actions. The adopted Plan will augment these projects with additional recommendations and commensurate funding in the 6-year CIP, along with a 10- to 20-year implementation strategy and sequence. In addition to Flood Control District priority projects, some actions may be candidates for financial leveraging with grant funds or partnerships, and some projects may be fully implemented by other entities as well.

Goals and Provisional Objectives

The following goals and provisional objectives are intended to provide clarity about desired outcomes for the Corridor Plan and its recommendations. The goals are consistent with adopted County floodplain management goals and related policies including adopted salmon recovery goals for WRIA 7. The provisional objectives provide targets for the Tolt, against which approaches and potential actions at specific sites can be evaluated. The final Plan may not be able to fully meet every objective, but it should include an

evaluation of tradeoffs among the various objectives in order to recommend a corridor-scale floodplain management approach that meets them to the maximum extent possible.

Goal 1: Reduce risks from flood and channel migration hazards

- Reduce flood impacts in consideration of future sediment aggradation and uncertainties due to climate change.
- Reduce levee breach hazards due to overtopping or erosion.
- Mitigate risks from channel migration and avulsion hazards within 30 years in areas with homes and infrastructure.

Rationale

Increasing public safety by reducing flood risks should be the strongest consideration when comparing among alternative approaches. Most Tolt River flood protection facilities do not provide complete or consistent flood containment and are unstable such that they don't fully function to provide bank stabilization and erosion prevention. Risk reduction should consider these various types of public safety hazards and address both flood inundation and high and moderate geotechnical deficiencies that create levee instabilities and potential breach hazards. In many areas the river is not revetted and the river has high potential to shift courses or meander across its floodplain rapidly, creating hazards related to channel migration, potential avulsions, deep and fast flows, and isolation due to inundated roadways. To be successful, risk reduction measures in these areas should address this full combination of hazards. Throughout the corridor, a minimum 30-year time frame should be used for considering and reducing risks associated with gravel accumulation, channel migration, and avulsion hazards and accounting for uncertainties due to climate change and other factors.

Goal 2: Reduce long-term costs of flood hazard management

- Implement sustainable cost-effective floodplain management solutions.
- Reduce long-term costs of floodplain management, including reducing facility maintenance and repair costs.

Rationale

Floodplain management solutions should be evaluated for both their short- and long-term cost effectiveness to reduce life-cycle floodplain management costs over time. Costs should be a strong consideration when comparing among alternative approaches and this comparison should evaluate costs over the complete life cycle of implementation and maintenance of any investments. This cost comparison should include an evaluation of the additional benefits accruing to progressively more permanent and effective floodplain management solutions.

Goal 3: Improve salmonid habitat and restore natural river processes

- Protect and improve floodplain habitats and off-channel connectivity.
- Protect and improve instream aquatic habitat quality and quantity.
- Protect and improve riparian habitat quality and quantity.

Rationale

Protecting and restoring the Tolt River corridor is a high priority in the Snohomish River Basin (WRIA 7) Salmon Conservation Plan and achieves several adopted King County Comprehensive Plan goals. Floodplain management and habitat protection and restoration needs often comprise the same geographic footprints, and can be achieved through complementary actions. Habitat along portions of the Tolt River corridor is significantly degraded, in large part due to the levees, roads, and development disconnecting the river from its floodplain and riparian areas. Where possible and mutually agreed upon, restoring river processes could provide the most significant salmon habitat improvements with the lowest long-term maintenance costs. In other portions of the corridor, habitats are in good to excellent condition and river processes are more intact; in these areas habitat is in need of more permanent protection and there are opportunities for further enhancement.

Goal 4: Incorporate stakeholder and community input into the Corridor Planning process.

- Incorporate diverse stakeholder input into the Corridor Plan through community and stakeholder engagement.
- Provide meaningful access to decision making for all affected by floodplain management actions.
- Provide equitable outcomes throughout the river corridor to the degree practicable.

Rationale

The Tolt River flows through and near diverse communities with a wide range of interests and demographic characteristics. In addition, many organizations and individuals are affected by floodplain management decisions for the river, including community organizations, local and regional non-governmental organizations, state and federal agencies, the City of Carnation, King County, the Tulalip Tribes, and the Snoqualmie Tribe. It is essential that the interests of all in the community as well as the many diverse stakeholders be considered as the Corridor Plan is being developed. This engagement can build on the neighborhood and public meetings that have been held to date, as well as the many discussions with individuals and organizations with interests throughout the corridor. Meaningful engagement can lead to a Plan that achieves equitable outcomes to the extent possible for communities throughout the corridor.

Conceptual Floodplain Management Approaches for Evaluation

To develop a preferred set of floodplain management actions that will best meet the corridor goals and objectives, it is necessary to establish a range of floodplain management approaches and applicable tools for evaluation. The approaches in this framework are intended to set boundaries for the planning phase of the Tolt Corridor Plan, allowing an evaluation of the full range of potentially feasible solutions within the river corridor that may be effective at meeting the goals and objectives of the Plan. It is anticipated that the preferred approach in the Plan will likely be comprised of a

combination of the approaches and tools in this framework, applied at different sites throughout the river corridor.

Corridor-wide floodplain management approaches to evaluate include:

1. **Prevent flooding and channel migration to the extent feasible** by reconstructing flood protection facilities and reconstructing or elevating roads at or near their current locations to higher flood protection standards.
2. **Continue existing management practices.** Continue to repair levees, revetments, and roads when they are damaged, making targeted improvements where possible. Continue to buy the most at-risk properties as funding becomes available.
3. **Accommodate natural river processes to the extent feasible** by setting back flood protection facilities, removing facilities that no longer provide a useful function, modifying bridge openings, and pursuing extensive buyouts of homes in highest-risk areas.

Floodplain management tools to implement these approaches include:

- a) Levee setbacks
- b) Raising or reconstructing levees and revetments in their current location
- c) Maintenance and repair of existing levees and revetments
- d) Bridge and road modifications
- e) New in-stream structures
- f) Gravel removal
- g) Removal of existing levees and revetments that no longer provide a useful function
- h) Home buyouts and open space acquisition

Rationale

These approaches and tools are intended to reflect the feasible range of floodplain management capital actions that can be undertaken within the river corridor under the auspices of the King County Flood Control District. Approaches not being evaluated include those focused on flow control or broader watershed management, such as new or modified dams and flood storage reservoirs, changes to stormwater management regulations or forestry practices, etc. Land use and zoning recommendations are also not included as they are outside the jurisdiction of the Flood Control District. Development of the Tolt River Corridor Plan should include coordination with organizations responsible for dam operations, watershed management, and land use decisions to assure that the final Plan is compatible with approaches being undertaken by others.