Biological Assessment

Tolt Bridge (#1834A) Replacement (CIP 200394)

King County Department of Transportation
Road Services Division

Parametrix

July 2003

Final (Revised) Biological Assessment

Tolt Bridge (#1834A) Replacement (CIP 200394)

Biological Assessment for

Puget Sound Chinook Salmon,

Bull Trout, Coho Salmon and Bald Eagle,

For Coordination with:

National Oceanic and Atmospheric Administration and
U.S. Fish and Wildlife Service

Prepared for

King County Department of Transportation
Road Services Division
201 South Jackson Street
Seattle, WA 98104-3856

Prepared by

Parametrix
5808 Lake Washington Blvd. NE, Suite 200
Kirkland, Washington 98033
(425) 822-8880
www.parametrix.com

Peter Lawson, Fish Biologist
Margaret Clancy, Project Manager

July 2003
Project No. 553-1521-052 (07/02)

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ACRONYMS

BA	Biological Assessment
BMPs	Best Management Practices
cfs	cubic feet per second
DPS	Distinct Population Segment
EFH	Essential Fish Habitat
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FWS	U.S. Fish and Wildlife Service
HPA	Hydrologic Project Approval
LWD	large wood debris
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OHWM	ordinary high water mark
PHS	Priority Habitat and Species
RM	river mile
ROW	right-of-way
RSD	King County Department of Transportation Road Services Division
SBSRTC	Snohomish Basin Salmonid Recovery Technical Committee
SPCC	Spill Containment and Control
SR	State Route
SWPPP	Stormwater Pollution Prevention Plan
TSS	Total suspended solids
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WRIA	Water Resources Inventory Area

EXECUTIVE SUMMARY

King County Department of Transportation Road Services Division (RSD) is proposing to replace the Tolt Bridge Number 1834A. Federal funds will be used to perform the bridge replacement, which provides a federal nexus for the project. Parametrix was retained by the King County Department of Transportation RSD to conduct a Biological Assessment (BA) to determine the potential effects of a proposed bridge replacement on listed and candidate species and their habitats. The Endangered Species Act (ESA) requires federal agencies to ensure their actions do not jeopardize the continued existence of a threatened or endangered species, or the critical habitat for threatened or endangered species. Analyses of potential impacts were made based on a review of plans for the proposed action, an on-site evaluation of existing habitat conditions, data on the current and historical distributions of each species, and personal communications with local biologists. Based on this review, determinations of effects were made for the proposed project.

Within the project or action area, listed fish species addressed include Puget Sound Chinook salmon and bull trout. The bald eagle is the only listed wildlife species addressed. There were no listed plant species identified in the project or action areas. Coho salmon, a candidate for listing under ESA, is addressed in an appendix. The National Oceanic and Atmospheric Administration (NOAA) Fisheries, formerly known as National Marine Fisheries Service or NMFS, designated critical habitat to include all marine, estuarine, and river reaches accessible to listed Chinook salmon in Puget Sound (NMFS 2000a). However, the rule designating critical habitat for 19 ESUs of salmon and steelhead on the West Coast, including the Puget Sound Chinook salmon ESU was recently vacated by the courts. Critical habitat will be evaluated using the previous designation (NMFS 2000a), since the Snoqualmie River contains critical habitat for Puget Sound Chinook salmon, under the previous designation.

The purpose of this action is to replace the current bridge with a new bridge capable of conveying modern truck traffic and to improve road safety in the area. The existing bridge, constructed in 1922, does not meet current traffic safety standards associated with vertical and horizontal clearance, super elevation, and stopping sight distance. The bridge is posted for one legal load at a time and, due to its structural inadequacy, is considered obsolete for carrying modern truck traffic. The proposed project involves the construction a six-span steel plate girder structure with a main span length of 262.5 feet, and the removal of the current bridge. This long span length is necessary to avoid placement of piers within the ordinary high water mark of the Snoqualmie River. An analysis of various alternatives (Lin and Associates 2002a) concluded that the new bridge should be located on a different alignment than that of the existing bridge due to improved curve transition, sight distance and grade, and clearance considerations.

The current bridge is located on NE Tolt Hill Road and crosses the mainstem of the Snoqualmie River about a mile southwest of the City of Carnation (Section 20 and 21, Township 25N, Range 7E). The proposed replacement bridge crosses the Snoqualmie River on a tangent section approximately 165 feet south of the existing structure. This location is at river mile (RM) 25.15 of the Snoqualmie River, approximately 500 feet upstream of the confluence of the Snoqualmie and Tolt Rivers. The project site is located approximately 14.5 miles downstream of Snoqualmie Falls, within Water Resources Inventory Area (WRIA) 7.

The Snoqualmie River provides valuable spawning, rearing, and migration habitat to a variety of salmonid species, including Chinook, coho, chum, and pink salmon. Steelhead, rainbow, and cutthroat trout are also present in the Snoqualmie River and its tributaries (Williams et al. 1975). High quality spawning habitat on the Snoqualmie River is present below the confluence of the Tolt River. This habitat is used by Chinook, pink, and chum salmon. Little information exists regarding the current distribution of bull trout in the Snoqualmie River basin, but some bull trout do occur in the Snoqualmie River mainstem or its major tributaries (King County 2000). Spawning populations have not been identified in the Snoqualmie River or its tributaries (WDFW 1998). The U.S. Fish and Wildlife Service (FWS) indicates that nesting and wintering bald eagles may be present in the project vicinity, although the closest identified nesting site is over 2 miles from the project.

Potential direct effects of the proposed project upon Chinook salmon, bull trout, and bald eagles include human disturbance during bridge construction and removal as well as temporary and localized sedimentation (see Chapter 6). Potential indirect effects to these species may include temporary changes to invertebrate and forage fish resources, or disturbance to prey species. No cumulative effects are anticipated. The effects upon fish species can be minimized by application of project BMPs. Even if BMPs were to fail, the effect of a sediment plume should be short-lived and discountable. Effects upon wintering bald eagles can be minimized by conducting the vast majority of project work between April 1 and October 30, a time frame that is outside the wintering period for eagles. Additionally, any disturbance to foraging behavior would be temporary and suitable foraging habitat exists in the surrounding areas of the Snoqualmie River basin.

We concluded that the construction of the proposed bridge replacement project **may affect, [but is] not likely to adversely affect** Chinook salmon and bull trout. The proposed project **may impact, [but is] not likely to adversely impact** coho salmon, a candidate species, as discussed in Appendix A. The proposed project will have **no effect** on nesting bald eagles but **may affect, [but is] not likely to adversely affect** wintering bald eagles. The project will have **no effect** on pacific salmon Essential Fish Habitat (EFH). A review of findings for each species is summarized in Table E-1.

Table E-1. Summary of Findings for Listed and Candidate Threatened and Endangered Species

Common *Scientific*	ESA Status[a]	Life Stages Considered	Impacts Analysis Determination (Conditional Effect Determination)
Chinook salmon *Oncorhynchus tshawytscha*	T	All freshwater phases	May affect, not likely to adversely affect
Bull trout *Salvelinus confluentus*	T	All freshwater phases	May affect, not likely to adversely affect
Coho salmon *Oncorhynchus kisutch*	C	All freshwater phases	May impact, not likely to adversely impact
Bald eagle *Haliaeetus leucocephalus*	T	Nesting	No effect
		Wintering	May affect, not likely to adversely affect

[a] T=Threatened, C=Candidate

1. INTRODUCTION

Section 7 of the Endangered Species Act (ESA) requires federal agencies to ensure that their actions do not jeopardize listed species or their habitat. In this regard, federal actions include providing funding or issuing federal permits for a project. To initiate review of a project or action under Section 7, an agency, or its representative, requests a list of endangered or threatened species from the U.S. Fish and Wildlife Service (FWS) and the National Oceanic and Atmospheric Administration (NOAA) Fisheries Service (also referred to as the National Marine Fisheries Service or NMFS). If a listed species is known to occur in the project vicinity, the lead agency, or its designee, must complete a Biological Assessment (BA) describing how the project would affect the species. If the evaluation determines that a listed species is likely to be harmed by the project, the agency must enter formal consultation with FWS and/or NOAA Fisheries to ensure that its actions will conserve the species and its critical habitat.

The King County Road Services Division (RSD) is proposing to replace the Tolt Bridge Number 1834A with a new bridge located on a tangent alignment approximately 165 feet south of the existing structure. The current bridge is located on NE Tolt Hill Road and crosses the mainstem of the Snoqualmie River about a mile southwest of the City of Carnation in unincorporated King County (Sections 20 and 21, Township 25N, Range 7E) (Figure 1). The proposed replacement bridge is a six-span steel plate girder structure with a main span length of 262.5 feet, a total length of 1,085.5 feet, and a roadway width approximately 43 feet.

Parametrix was contracted by the King County RSD to prepare a BA to assess the effects of the project on fish, wildlife, and plant resources in the project vicinity and document protection measures included in the proposed action. Information on listed species and habitats known to occur or potentially occurring in the project vicinity was provided by state and federal agencies (Appendix A). This information is summarized below (Table 1).

Table 1. Data and Data Sources for Information on Listed Species in the Vicinity of the Tolt Bridge (No. 1834A)

Species and Habitats	Agency/ Data Source	Data Provided
Endangered, threatened, rare, and sensitive plant species and high quality plant communities	Washington Department of Natural Resources (WDNR)	No such species or communities occur in the project vicinity
Federally threatened and endangered plants, fish, and wildlife species	FWS	Two threatened species could occur in the project vicinity: (1) Coastal Puget Sound distinct population segment (DPS) of bull trout (*Salvelinus confluentus*) (threatened) (2) Wintering and nesting bald eagles (*Haliaetus leucocephalus*)
Federally threatened, endangered, and candidate fish species	NOAA Fisheries http://www.nwr.noaa.gov/1salmon/salmesa/index.htm	One threatened species and one candidate species could occur in the project vicinity: (1)Threatened - Puget Sound ecologically significant unit (ESU) of Chinook salmon (*Oncorhynchus tshawytscha*) (2) Candidate - Puget Sound/Strait of Georgia ESU of coho salmon (*O. kisutch*)
Priority Habitats and Species (PHS)	Washington Department of Fish and Wildlife (WDFW)	No bald eagle nests within two miles of the project Chinook, coho, chum, and pink salmon and steelhead in Snoqualmie River

This BA addresses direct and indirect project-related impacts on habitat and foraging base for Chinook salmon, bull trout, and wintering and nesting bald eagles. Effects on coho salmon are addressed in Appendix B. The effects determinations are based on life history analysis, habitat requirements, literature review, agency consultation, and field reconnaissance studies conducted by Parametrix biologists. Effects on Essential Fish Habitat (EFH), as defined by NMFS (1999a) are also examined.

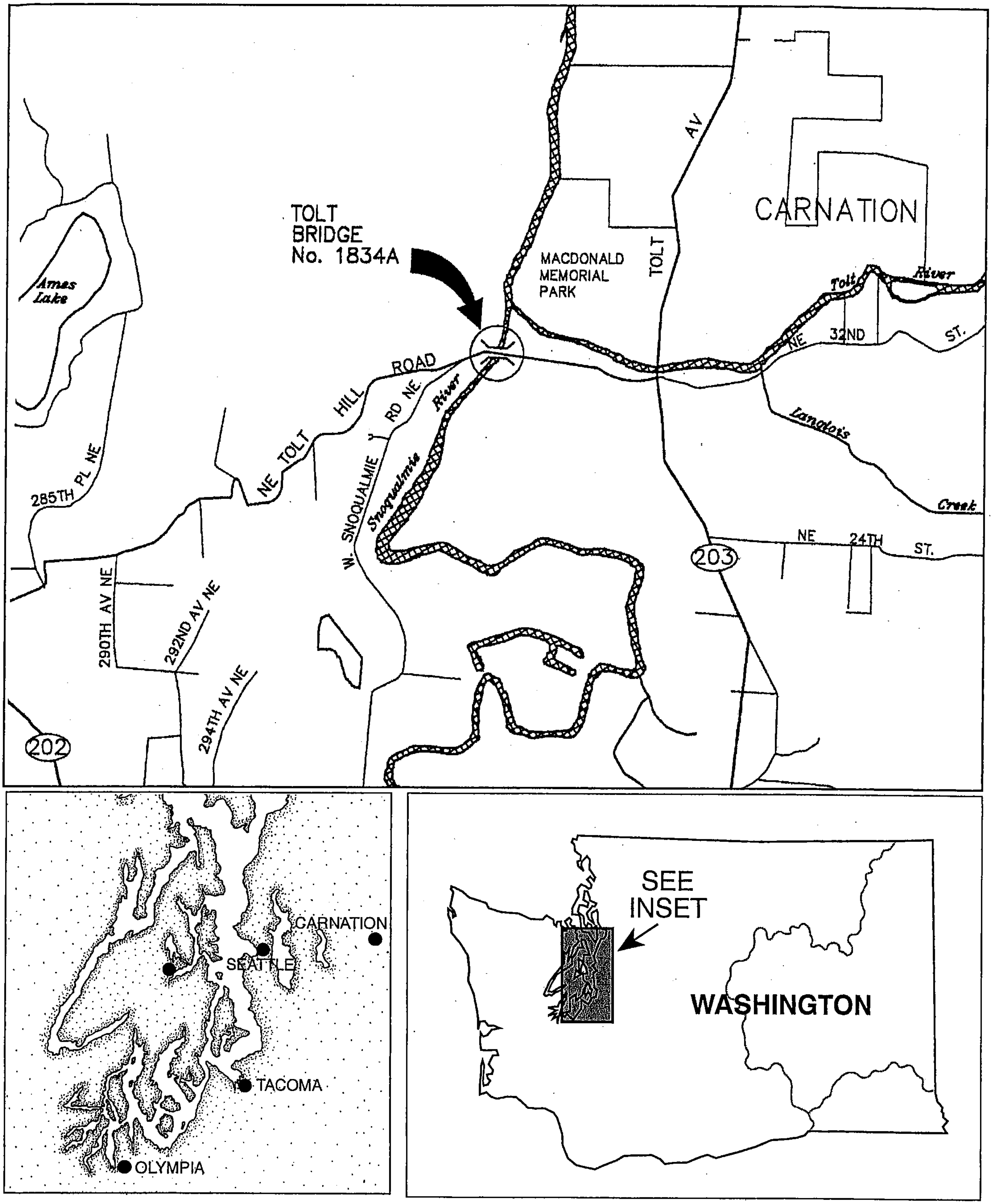

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Figure 1
Vicinity Map
Tolt Bridge (#1834A)
Replacement Project

2. DESCRIPTION OF PROJECT SITE AND ACTION AREA

2.1 GENERAL PROJECT LOCATION

The Tolt Bridge is located on NE Tolt Hill Road just east of the intersection with West Snoqualmie River Road NE (see Figure 1). The area has a rural character and consists of farmland, scattered residences, and the Tolt River-John MacDonald Park. For the most part, the project area on the east side of the river is a privately owned farm known as the Foster Farm (Figure 2). The property west of the river is forest land owned by the Washington Department of Natural Resources (WDNR)

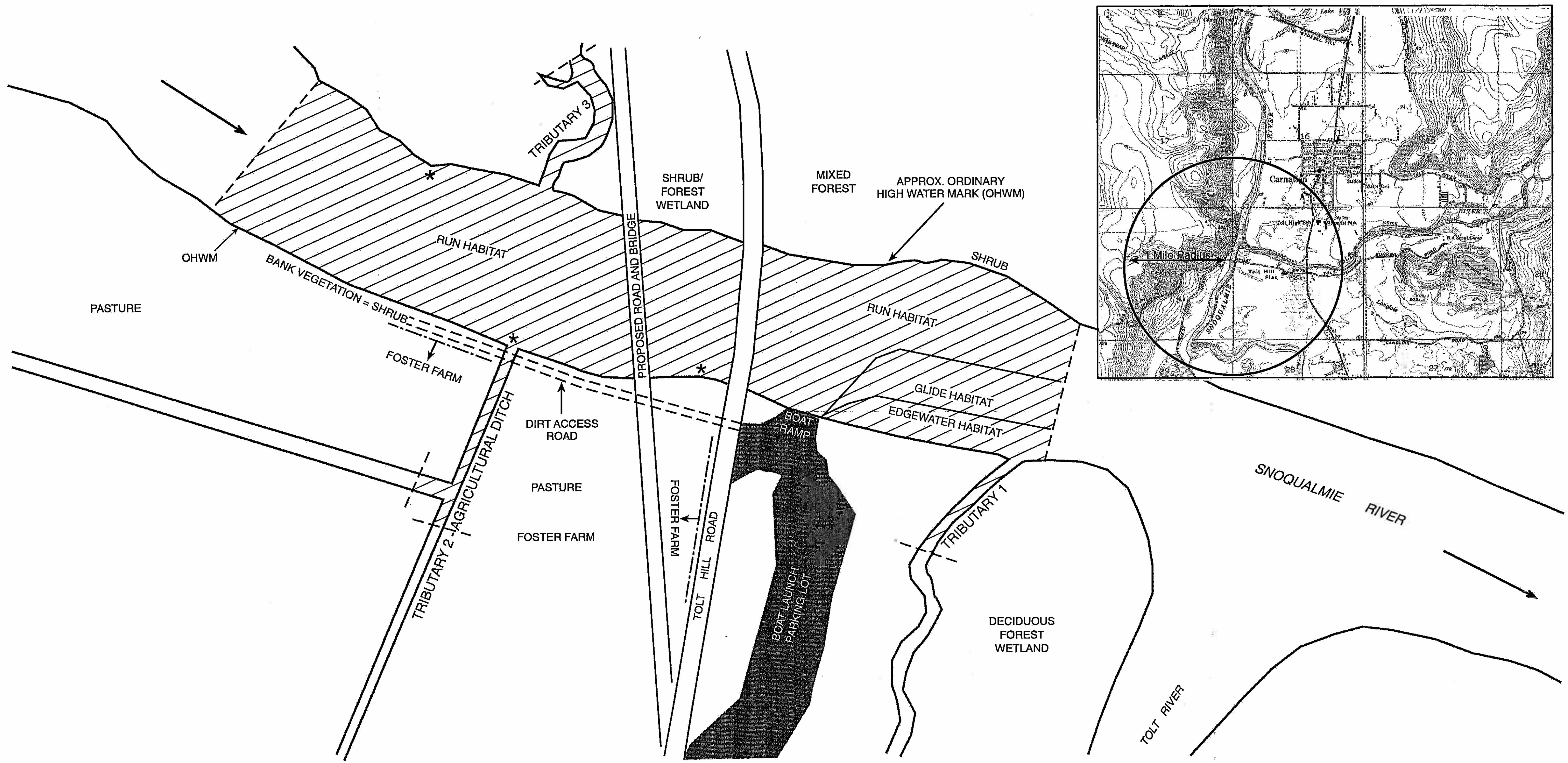
The existing bridge crosses the Snoqualmie River near its confluence with the Tolt River, approximately 25 miles upstream of the point where the Snoqualmie and Skykomish Rivers join to form the Snohomish River [within Water Resources Inventory Area (WRIA) 7]. These rivers originate near the crest of the Cascade Range, north of Snoqualmie Pass. The Snoqualmie River originates from three forks on the west slopes of the Cascade Mountains, which join approximately 4 miles east of the town of Snoqualmie, just upstream of Snoqualmie Falls. Below the 268-foot drop of Snoqualmie Falls (located 14.5 miles upstream of the project), the river flows 36 miles past the towns of Fall City, Carnation, and Duvall to its confluence with the Skykomish River, where it becomes the Snohomish River. This 36-mile section of river lies in a relatively broad and flat valley floor, most of which is farmland with widely scattered rural residents. Recreation use is heavy, consisting of fishing, hunting, boating, biking, and other activities. The valley is bordered by low hills with moderately steep slopes and dominated by deciduous trees with some conifer cover (Williams et al. 1975). The Snoqualmie watershed drains approximately 693 square miles.

The Snoqualmie River in the project area is a "shoreline of state-wide significance" due to its annual flow of more than 1,000 cubic feet per second (cfs). There are three tributaries and six wetlands in the vicinity of the bridge. The three tributaries are classified as Class 2 streams with salmonids (Class 2s) according to the King County's regulations. As designated by King County, the wetlands include two Class 2 forested wetlands, a Class 1 forested/scrub-shrub/emergent/open water wetland, one Class 2 emergent wetland, and two Class 3 emergent wetlands on agricultural land (Figure 2). All of these features are located within the 100-year floodplain of the river.

2.2 PROJECT SITE AND ACTION AREA

The project site is defined as the vicinity where the majority of the proposed action will occur. Descriptions of existing conditions for aquatic, terrestrial, and wetland resources are discussed in detail below.

An action area is "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 CFR §402.02). Effects from the project are not expected beyond the action area directly affected by the construction. Therefore, the action area for the project is defined as the immediate work and construction area and all terrestrial habitats within a 1-mile radius of the project site. Furthermore, the action area includes the reach of the Snoqualmie River from 500 feet upstream of the proposed bridge alignment to the confluence of the Tolt and Snoqualmie Rivers (750 feet downstream of the existing bridge), and three nearby tributaries (for the purposes of this report referred to as Tributary 1, Tributary 2, and Tributary 3) from their confluence with the Snoqualmie River upstream 300 feet (see Figure 2). This area also includes the 100-foot-wide stream buffers for all streams listed above. This action area would be appropriate for all fish and terrestrial species potentially present within the action area during construction activities. We believe this is a conservative estimate of the extent to which water quality impacts could result from the proposed project should BMPs fail. In particular, the downstream extent of the action area is the Tolt River, because any sediment delivery from project related activities would be minor compared with the sediment load continuously delivered from the Tolt River.



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APPROXIMATE SCALE IN FEET

0 75 150 300

N

--- Limits of Surveys

* LWD Pieces

Action Area

Terrestrial Action Area 1-Mile Radius

Figure 2
Stream and Riparian Habitat Map and Action Area for Tolt Bridge Replacement Project

Additionally, noise disturbance from construction activities is not expected to affect wildlife species beyond the 1-mile radius action area.

2.3 AQUATIC RESOURCES

This project is located at RM 25.15 of the Snoqualmie River, approximately 500 feet upstream of the confluence of the Snoqualmie and Tolt Rivers (see Figure 1). A detailed stream survey was conducted in the project vicinity in May and June of 2002. This survey identified four streams within the study area: the Snoqualmie River, and three unnamed tributaries to the Snoqualmie River (Parametrix 2003a). The survey included the reach of the Snoqualmie River that extends approximately 500 feet upstream (RM 25.05) and downstream (RM 25.25) of the proposed replacement bridge.

The Snoqualmie River, a shoreline of the state and a shoreline of statewide significance, has a Washington Department of Natural Resources (WDNR) rating 1 (WAC 222-16-030), and a King County rating of Class 1, which requires a 100-foot buffer. Tributary 1 flows along the north side of the boat launch parking lot, east of the existing Tolt Bridge. Tributary 2 is a ditch that drains the pastures on the east side of the Snoqualmie River, south of NE Tolt Hill Road. Tributary 3 is located south of the existing bridge, on the west side of the river, within a large wetland complex. All three tributaries have a King County rating of 2s and require a 100-foot buffer. Detailed information regarding stream habitat in the study area can be found in the Stream Survey Report prepared by Parametrix (2003a).

2.3.1 Snoqualmie River

In the vicinity of the project area, the Snoqualmie River is a low-gradient river that meanders through a broad floodplain with numerous remnant oxbow lakes. The project area, however, includes a relatively straight segment of river channel. This reach serves as migration and rearing waters for a variety of anadromous salmonids including chinook, coho, chum, and pink salmon (Williams et al. 1975; WDF et al. 1993; SBSRTC 1999). High quality spawning habitat on the Snoqualmie River is present below the confluence of the Tolt River. These spawning areas are used by several species including chinook, pink, and chum salmon. Steelhead, rainbow, and cutthroat trout are also present in the Snoqualmie River and its tributaries (Williams et al. 1975). It is probable that foraging bull trout occur in the Snoqualmie River mainstem and/or its major tributaries (Pfeifer 1994 personal communication *in* FWS 1998a, King County 2000).

No measured stream flow data were available for the Snoqualmie River directly at the project site. However, USGS data from a gauge near Carnation, below the Tolt River confluence, indicate that mean annual flows are 4,350 cfs, based on 71 years of data (USGS 2002). The maximum recorded flow was 65,200 cfs recorded in 1991. The 100- and 500-year flood flows at the existing bridge are 74,600 and 81,000 cfs, respectively (West Consultants Inc. 2002).

Most of the study reach, including the entire reach upstream of the existing bridge, was characterized by relatively deep, uniform "run" habitat (see Figure 2). The stream banks were steep in this area, and dropped off quickly to a relatively uniform depth. Average depth was approximately 10 feet over most of the wetted width. The thalweg appeared to be located in or near the center of the channel in this reach. No riffles or distinct pools were observed or indicated by cross-sections taken in this reach. Downstream of the existing bridge, three distinct habitat types were observed. The left bank habitat was deeper "run" habitat similar to that observed upstream. This run habitat accounted for a total of 100 percent of the rivers wetted width at the bridge, and approximately 60 percent of the river wetted width at near the mouth of Tributary 1 (see Figure 2). From the boat launch, downstream to the mouth of Tributary 1, edgewater habitat was present. This habitat was formed where many islands, heavily vegetated with reed canarygrass, were present. These islands varied in length from 6 to 33 feet, and were in various states of inundation. Between these islands were narrow 3- to 6-foot-deep channels containing relatively slow-moving water. A 115-foot-long side channel was also present in this area, adjacent to the right bank, with the inlet about 25 feet downstream of the boat launch. This channel was approximately 8 feet in width and averaged 1 foot deep. The maximum width of this edgewater habitat was approximately 40 feet, in the vicinity of the mouth of Tributary 1 (see Figure 2). Glide habitat comprised the third habitat type. The glide was located between the edgewater and the run habitat and occupied a maximum of one-quarter of the river wetted width.

Overall stream bank condition appeared stable, with no major signs of bank sloughing, slumping, or fracturing. Although comprised of mud and silt, signs of bank scour appeared infrequently over the study area. Most of the upper banks were moderately to heavily vegetated with shrubs and herbaceous plants, which adds to their stability. The banks were uniformly steep with many sections being nearly vertical. Some overhanging banks were present.

Substrate composition in most of the surveyed area consisted of silt and sand, found in the deep, uniform run habitat that predominated the study reach. Based on the results of the survey, this substrate profile typifies the entire width of the channel downstream of the existing bridge. This condition is also indicated by the results of the underwater inspection, where silt and sand were found deposited over gravel (Lin and Associates 1995). The substrate of the edgewater area was silt and sand, similar to that of the run habitat. In contrast to the above areas, the glide unit located between the run and edgewater habitat units has substrate dominated by rock. Large gravel substrate was dominant and cobble substrate was subdominant. This habitat unit showed the effects of sediment deposition to a much lesser degree than did other areas of the study reach. The embeddedness of the gravel and cobble substrates was not measured, but David Evans and Associates (DEA 1997) reported 30 percent embeddedness in this area.

Five pieces of large woody debris (LWD) were observed in the study area in the mainstem Snoqualmie River. These pieces ranged in diameter from 0.3 to 1.6 feet. Several pieces appeared to be anchored into the riverbed, or had large enough root wads to hold them in place, although the true stability of these LWD pieces is unknown, and high winter or spring flows may dislodge these pieces and carry them downstream. Other pieces of LWD were comprised of trees that had fallen in along the banks. There were several pieces of small woody debris (about 0.3 feet in diameter above the water line) located in the river, just west of the outlet of Tributary 2. These may provide some cover for juvenile salmonids.

Other cover along the banks is provided by the large amount of overhanging vegetation, particularly along the left bank. In some cases, the overhanging vegetation extended out over the water surface a distance of 6 to 9 feet. Some cover was also provided by the vegetated islands present in the edgewater habitat unit. No pools were present in the surveyed reaches, but the water depth in the river thalweg may provide deep-water cover for fish during periods of lower flows.

Pasture is the dominant riparian vegetation on the east side of the Snoqualmie River upstream from the existing bridge. The dirt access road separates the pasture from the river. In the narrow (15 to 30 feet) zone immediately adjacent to the river, the vegetation consists primarily of Himalayan blackberry (*Rubus discolor*), with several deciduous trees scattered near the existing bridge. The boat launch and parking lot, with a few shrubs on the river bank, make up the riparian zone for about the first 100 feet of the right bank downstream of the existing bridge. The remaining downstream portion of the right bank consists of a forested wetland. Riparian vegetation in the project area on the left bank of the river is a mixture of shrub-scrub, forested, and emergent wetland species. South of NE Tolt Hill Road, the wetland is separated from the river by a natural levee. The vegetation on this 50- to 150-foot strip consists mostly of salmonberry (*Rubus spectabilis*), red elderberry (*Sambucus racemosa*), and Indian plum (*Oemleria cerasiformis*). Some smaller trees, such as big-leaf maple (*Acer macrophullum*) and red alder (*Alnus rubra*), are also scattered throughout this area. North of NE Tolt Hill Road, a natural levee continues and separates the river from the northern portion of Wetland 2. The bank vegetation north of Wetland 2, between the Snoqualmie River and the access road, is comprised of shrub species, primarily Himalayan blackberry, with only a few trees present.

2.3.2 Snoqualmie River Tributaries

Three tributaries to the Snoqualmie River are also included in the action area. The mouth of the first of these is located on the right bank, approximately 410 feet downstream of the existing bridge. This tributary originates just east of SR 203, and flows west about two-thirds of a mile, paralleling NE Tolt Hill Road. It flows through a forested wetland.

Tributary 1 has an average wetted width of approximately 11.3 feet and is approximately 1.3-foot average depth. Maximum pool depth is 2.6 feet. The lower reaches of this stream have ample LWD, with individual pieces ranging from 0.3 to 1.6 feet in diameter. Undercut banks are present, as is overhanging vegetation in the form of reed canarygrass (*Phalaris arundinacea*) and salmonberry.

The substrate in the channel consists primarily of silt or sand, although a patch of gravel was observed about 30 feet upstream of the mouth. In this area, numerous coho salmon fry (1.2 to 2 inches length) were observed during the survey. Numerous sticklebacks were also observed. The riparian overstory consists of cottonwood (*Populus trichocarpa*), maple, and alder.

Water velocities in this deep channel were low, indicative of the very low gradient topography (<0.5 percent) at the site. Several beaver dams were present in this stream. This reach offers refugia for salmonid species during periods of high flow in the Snoqualmie River. The abundance of LWD, deep pools, and cover from overhanging vegetation and undercut banks all contribute to the excellent rearing habitat present in the lower reaches of this tributary. Although no gravelly riffles or other likely spawning habitat were observed in this tributary, the stream has sufficient structure to provide beneficial rearing habitat for a variety of salmonid species, including coho and chinook salmon.

The other two tributaries are located upstream of both the existing and proposed bridges. Both of these channels are located directly across the river from one another, approximately 280 feet upstream of the existing bridge. The channel on the right (east) bank of the river (Tributary 2) is basically an agricultural ditch, draining the fields east and south of the project area. This channel flows to the Snoqualmie River through a 48-inch-diameter culvert located under a dirt access road, which runs parallel to the river. This culvert was 90 percent full of water at the time of the site visit. The wetted width of the channel is about 13 feet, with a maximum depth of more than 6.5 feet. No pools or riffles exist, with channel morphology consisting exclusively of a channelized run. The 16 feet of the stream directly upstream of the road has large concrete slabs lining the stream bottom. The stream banks are steep and consist of mud.

The main channel/ditch of Tributary 2 is formed by the joining of two drainage ditches, one flowing west and one running north, about 200 feet upstream of the confluence with the Snoqualmie River. These channels are about 8 feet wide and average about 3 feet in depth. They were choked with dead vegetation and debris in places, with the water appearing somewhat stagnant. Above the confluence of the two ditches, no riparian vegetation exists along either ditch, except for a narrow zone of reed canarygrass less than 3 feet tall surrounded by mowed agricultural fields. Flow in the channel was extremely low velocity, with a possible partial backwater condition occurring on the inlet side of the culvert.

The riparian corridor of Tributary 2 within the first 160 feet of the access road consists of several small patches of deciduous trees, blackberry, and reed canarygrass. Upstream of this, no riparian vegetation exists along either ditch, except for a narrow zone of reed canarygrass less than 3 feet tall, surrounded by mowed agricultural fields.

This tributary lacks channel complexity, riparian shading, and spawning habitat. Water quality is likely degraded and rearing habitat is marginal at best. Downstream of the culvert, the mouth of the tributary opens into a 23-foot-wide, 16-foot-deep outlet channel in the Snoqualmie River. This area has some overhanging vegetation and several LWD pieces, including a few small snags near the outlet. This area could provide some refugia to migrating salmonids during periods of high flow.

Tributary 3, the second of the upstream tributaries, is located on the left (west) bank of the Snoqualmie River, and drains a large forested/shrub-scrub wetland. The lower 90 feet of channel is a run habitat, with a 12-foot wide channel and a 9-foot wetted width at the time of the survey in May 2002. This stream had an average depth of 1.3 feet, with a maximum depth of 2.6 feet. The stream substrate was comprised of silt/mud and there was a fine sediment layer of up to 0.6 feet on the bottom of the channel.

At the upstream end of this reach is a beaver dam. The dam measures ten feet wide by one meter deep by one meter high, and impounds a large amount of water. The water level above the dam is about one-half meter higher than that below the dam. The stream above the dam is substantially wider (about 13 feet) and very deep, with the maximum depth exceeding 3 feet in places. Several pieces of LWD are present, with much overhanging vegetation, particularly red osier dogwood (*Cornus sericea)*. This wider channel runs for an additional 100 feet above the dam. The stream originates from three ill-defined channels that drain the large wetland complex.

2.4 WETLAND RESOURCES

Six wetlands (Table 2; Figure 3) were identified and delineated in the project area. For more detailed descriptions of the various wetlands in the project area, including information on soils, drainage, and plant species present, see the Tolt Bridge Replacement (#1834A) Draft Wetland Critical Areas Report (Parametrix 2003b). Wetland 1, classified as a palustrine emergent wetland under the Cowardin classification system (Cowardin et al. 1979), is located east of the Snoqualmie River on the south side of NE Tolt Hill Road. The vegetation in Wetland 1, which occupies a topographic depression within a farmed field, is dominated by domestic grasses and forbs planted as hay.

Wetland 1 provides a small amount of floodwater storage, and its position near the shoreline and the dense herbaceous vegetation help stabilize the soils during floods. The low vegetation structure and lack of plant species diversity limit the value of the wetland as wildlife habitat. Organic export is limited due to the small size and low productivity of the wetland.

Wetland 2 is classified as a palustrine wetland with forested, scrub-shrub, emergent and open water components under the Cowardin classification system. It occupies a swale between the natural levee on the west bank of the Snoqualmie River and the hillslope to the west, along NE Tolt Hill Road and Snoqualmie River Road NE. The portion of Wetland 2 within the study area is 3.42 acres. King County (1990) estimates the total wetland size as 8.0 acres.

Vegetation in Wetland 2 is dominated by shrub and emergent vegetation, though forested cover from the adjacent uplands does overlap into the wetland. The forested edges are dominated by red alder and black cottonwood with Himalayan blackberry present in substantial amounts on the upland side.

Table 2. Wetlands in the Study Area, Tolt Bridge Replacement

Wetland	Size (Acres)[a]	Ecology Rating[b]	King County Rating[c]	Buffer (ft)[d]	USFWS Classification[e]
1	1.07	III	2	50	Emergent
2	3.42[f]	II	1	100	Forested/Scrub-Shrub/Emergent/ Open Water
3	0.24[f]	III	2	50	Forested
4	>5.0[f]	II	2	50	Forested/Emergent
5	0.04[f]	III	3	25	Emergent
6	0.04	III	3	25	Emergent

a Wetland size within the project area, as surveyed by King County.
b Ecology (1993).
c King County Wetlands Inventory (1990).
d King County Sensitive Areas Ordinance (2001).
e Cowardin et al. (1979). All wetlands are Palustrine.
f Wetland continues off-site.

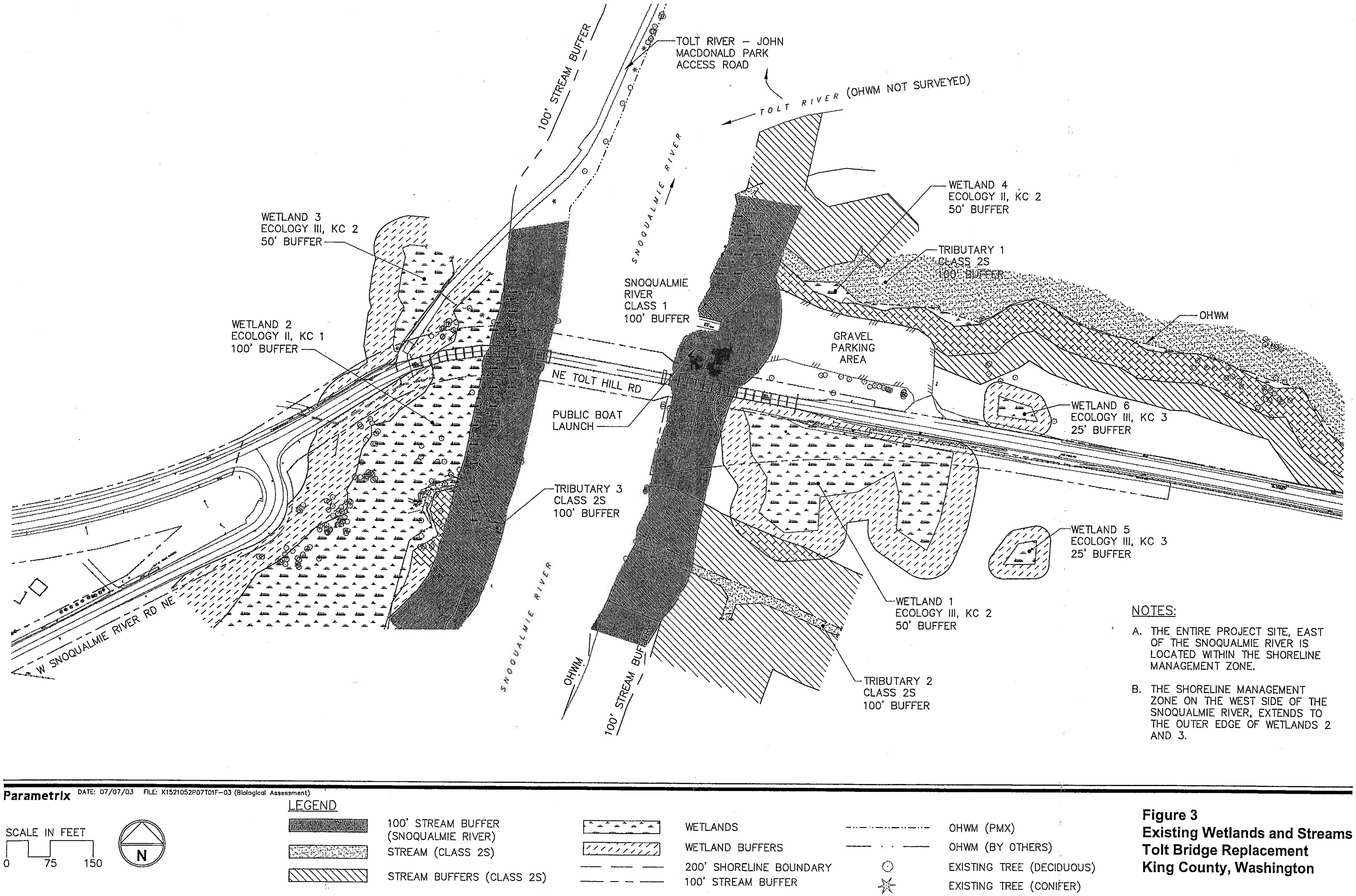


Figure 3
Existing Wetlands and Streams
Tolt Bridge Replacement
King County, Washington

Wetland 2 provides moderate floodwater storage due to its size and proximity to the Snoqualmie River. The dense shoreline vegetation in Wetland 2 stabilizes the riverbanks, and improves water quality by reducing water velocity during flood events, which helps remove suspended sediments. The diverse shrub and emergent vegetation provides habitat for birds and mammals and the open water component provides habitat for waterfowl, amphibians and fish. The surface connection to the Snoqualmie River may also provide rearing habitat for salmonids under some flow conditions. Beaver also use the stream as habitat.

Wetland 3 is classified as a palustrine forested wetland, and occupies a shallow shelf on the north side of NE Tolt Hill Road, on the west side of the Snoqualmie River. Functions and values provided by Wetland 3 are limited due to its small size. Moderate potential was noted for the flood/stormwater control and baseflow/groundwater support categories. Wetland 3 has high potential for natural biological support, but the potential for overall habitat and specific habitat functions was moderate to low.

Wetland 4 is also classified as a palustrine forested/emergent wetland. It is located on the north side of NE Tolt Hill Road, east of the Snoqualmie River. It occupies a low area between the Tolt River and the public access boat launch parking lot. Wetland 4 provides moderate floodwater storage due to its size and proximity to the Snoqualmie River. The dense shoreline vegetation stabilizes the banks of Tributary 1 and the Snoqualmie River. It also improves water quality by reducing water velocity during flood events, which helps remove suspended sediments. The diverse shrub and emergent vegetation provides habitat for birds and mammals and the open water component provides habitat for waterfowl, amphibians and fish.

Wetland 5 is a palustrine emergent wetland located east of the Snoqualmie River on the south side of NE Tolt Hill Road. It occupies a topographic depression within a farmed field, just to the east of Wetland 1. Wetland 5 provides minimal floodwater storage, and little to no wildlife habitat.

Wetland 6 is a palustrine emergent wetland located east of the Snoqualmie River on the north side of NE Tolt Hill Road. It occupies a shallow roadside swale, just to the east of boat launch parking lot. Wetland 6 provides minimal floodwater storage, and little to no wildlife habitat.

2.5 WILDLIFE HABITAT

Two different vegetative communities are present within the project area. The first is a wooded complex of wetlands and uplands, composed of young, deciduous and mixed forests along the Snoqualmie River banks and upslope on both the east and west sides of the river. The land to the west of the river consists of Tolt River-John MacDonald Park lands, which have been left in a natural state, with scattered residential uses nearby. The wooded area dominates the west bank of the Snoqualmie River both north and south of NE Tolt Hill Road, and the east bank north of the road. Vegetation in this community consists of red alder, bigleaf maple, black cottonwood, willow (*Salix* spp.), Douglas fir (*Pseudotsuga menziesii*), in the canopy, and red osier dogwood, Nootka rose (*Rosa nutkana*), salmonberry, snowberry (*Symphoricarpos albus*), and Himalayan blackberry in the shrub layer

The second community consists of areas of the floodplain that have been converted to agricultural uses, particularly hay production. The agricultural land is dominated by pasture grasses with some reed canarygrass and various forbs, though the banks of the Snoqualmie River themselves are dominated by red alder, black cottonwood, and Himalayan blackberry. Some grazing is also present to the south of the study area.

Common suburban birds such as song sparrows, robins, crows, and starlings are the most abundant avian species in the area. However, black-capped chickadees, spotted towhees, yellow warblers, and flickers are likely to nest and forage in forested areas and wetlands. Mammals such as beavers, skunks, raccoons, opossum, mice, rats, shrews, voles and moles are also likely to occur in the area. Tracks of black-tailed deer, likely inhabitants of young deciduous forests were observed in the project vicinity, as were several black bear tracks that were observed in Wetland 4. The riparian area surrounding the Snoqualmie River serves as a corridor for wildlife movement between uplands and the river. WDFW Priority Habitats and Species (PHS) data indicate two osprey nests located approximately 2/3-mile southwest of the project site, and a bald eagles nest located about 2.25 miles north, in the vicinity of Horseshoe Lake.

Wetland 1 is located in a pasture, and floods in the winter. This wetland likely provides habitat to geese, ducks, pheasant, quail, as well as providing forage habitat for species such as the red-tailed hawk and the common barn owl.

The project site is also expected to provide abundant breeding habitat for aquatic-breeding amphibians because of the presence of perennial streams and breeding ponds. Wetlands 2, 3, and 4 in the project vicinity contain amphibian habitat including open water, emergent vegetation, and shade. Likely amphibians present include salamanders, newts, and frogs. Reptiles are also likely present in the project area, and garter snakes were observed during the field investigation.

Shrub and tree species that compose riparian vegetation adjacent to the river include red alder, bigleaf maple, black cottonwood, hawthorne (*Crataegus* spp.), willow, Douglas fir, redosier dogwood, Nootka rose, salmonberry, and Himalayan blackberry, with some reed canarygrass. Riparian vegetation such as red alder, snowberry, Nootka rose, Japanese knotweed (*Polygonum cuspidatum*), Himalayan blackberry, and reed canarygrass appears to help stabilize the banks in areas of localized erosion that have not been protected with rock.

2.6 ENVIRONMENTAL BASELINE CONDITIONS

The *Checklist for Documenting Environmental Baseline and Effects of Proposed Actions(s) on Relevant Indicators* (NMFS 1996) is included as Table 3 and was used to assess current baseline parameters as well as to guide the determination of effect for the proposed action on chinook salmon, coho salmon, and bull trout. Descriptions of individual parameters follow.

Temperature

NMFS criteria states that stream temperatures should not exceed 60° F (15 ° C) in areas used by salmonid adults during migration. The Snoqualmie River has several 303(d) listed reaches for temperature (Ecology 2000). These include the reach near RM 23, downstream of the project, and the reach near RM 36, upstream of the project. Using the matrix of pathways and indicators criteria, overall baseline conditions for temperature are *at risk*. The amount of impervious surface will increase in the basin due to the project, and there will be a slight decrease in riparian cover along the new bridge alignment. However, considering the lack of existing streamside riparian vegetation, the great width of the river, and the magnitude of the streamflows conveyed by the Snoqualmie River, these affects are of such a small magnitude the project will *maintain* the baseline conditions.

Sediment/Turbidity

The predominant substrate composition of the Snoqualmie River in the project vicinity is sand and silt (>12 percent fines), with only a few patches of small gravel. Some of this sediment is likely naturally present, as this reach has a very low gradient and acts as a natural deposition zone. However, based on other literature (Gersib et al. 1999) and NMFS criteria, baseline conditions for sediment are *not properly functioning*. The project will result in increased impervious area in the basin, but the application of appropriate BMPs and sediment control measures should minimize any sediment impacts to the Snoqualmie River. Furthermore, this project will not lead to an increase of future development in the basin. Thus, this project is anticipated to *maintain* baseline conditions.

Table 3. Checklist for Documenting Environmental Baseline and Effects of Proposed Action(s) on Relevant Indicators

PATHWAYS: INDICATORS	ENVIRONMENTAL BASELINE			EFFECTS OF THE ACTION(S)		
	Property [a] Functioning	At Risk [a]	Not Properly [a] Functioning	Restore [b]	Maintain [c]	Degrade [d]
Water Quality:						
Temperature		X			X	
Sediment			X		X	
Chem. Contam./Nut.		X			X	
Habitat Access:						
Physical Barriers		X		X		
Habitat Elements:						
Substrate			X		X	
Large Woody Debris			X		X	
Pool Frequency [e]					X	
Pool Quality			X		X	
Off-channel Habitat		X			X	
Refugia		X			X	
Channel Cond. and Dyn.:						
Width/Depth Ratio	X				X	
Streambank Condition	X				X	
Floodplain Connectivity		X			X	
Flow/Hydrology:						
Peak/Baseflows		X			X	
Drainage Network Increase		X			X	
Watershed Conditions:						
Road Density/Location		X			X	
Disturbance History		X			X	
Riparian Reserves			X		X	
Bull Trout Sub. Pop. Characteristics						
Sub-population size [f]			X		X	
Growth and Survival [f]			X		X	
Life History Diversity and Isolation [f]			X		X	
Persistence and Genetic Integrity [f]			X		X	

Watershed Name: Snoqualmie River **Location:** T25N R07E Sec 20 and 21

a These three categories of function ("properly functioning", "at risk", and "not properly functioning") are defined for each indicator in the "Matrix of Pathways and Indicators".

b For the purposes of this checklist, "restore" means to change the function of an "at risk" indicator to "properly functioning" (i.e., it does not apply to "properly functioning" indicators).

c For the purposes of this checklist, "maintain" means that the function of an indicator does not change (i.e., it applies to all indicators regardless of functional level).

d For the purposes of this checklist, "degrade" means to change the function of an indicator for the worse (i.e., it applies to all indicators regardless of functional level). In some cases, a "not properly functioning" indicator may be further worsened, and this should be noted.

e This parameter has no associated NMFS criteria due to the large (>200m) channel width.

f There are no known reproducing populations of bull trout in the Snoqualmie River basin, and general information on bull trout distribution in the basin is very limited.

Chemical Contaminants/Nutrients

The Snoqualmie River has no 303(d) designated reaches for chemical contaminants in the project vicinity (Ecology 2000). Increasing urban and rural development upstream increases the risk of contamination from non-point source contaminants such as nitrogen, phosphorus, and heavy metals from roads, industry and farms. Increased nutrient loading exists in the upper mainstem Snoqualmie River (Gersib et al. 1999). Based on the matrix of pathways and indicators criteria, baseline conditions for chemical contaminants and nutrients are *at risk* (Ecology 2000). The project is expected to *maintain* baseline conditions because it will not contribute to either further development or greater traffic volumes in the project area.

Physical Barriers

No permanent fish passage barriers currently exist on the Snoqualmie River in the project area. However, the existing culvert on Tributary 2 is likely a partial fish passage barrier during some flows. Construction of the replacement bridge will not result in the installation of any permanent in-water structures, but the culvert on Tributary 2 will be replaced with a fully fish passable culvert. Based on the matrix of pathways and indicators criteria, the baseline conditions are *at risk*, and the project will act to *restore* baseline conditions for fish passage.

Substrate

The Snoqualmie River, in the project vicinity is characterized by substrate consisting primarily of silt and sand with relatively low bedload transport, due to the gentle gradient of the river. Substrate embeddedness is estimated greater than 30 percent, and therefore the substrate is *not properly functioning* according to NMFS criteria. The proposed project in not expected to substantially increase sedimentation rates, and the project is using the 1998 King County Surface Water manual in the design of the stormwater facilities. Therefore it is expected that substrate embeddedness conditions will be *maintained* as a consequence of the proposed project because it will not contribute to either further development or greater traffic volumes in the project area.

Large Woody Debris

For the purposes of this assessment, LWD is defined as pieces of woody debris in excess of 24 inches in diameter and 50 feet in length. The LWD and LWD recruitment potential in the majority of the action area is low and is considered *not properly functioning* according to NMFS criteria. Although the project will result in the loss of a small amount of riparian vegetation, this condition will be offset by riparian planting of streambanks near the current and proposed bridge alignment. Therefore, the project is anticipated to *maintain* LWD functions.

Pool Frequency

A properly functioning pool habitat frequency for streams with a 100-foot channel width is equal or greater than 18 pools/mile. The Snoqualmie River in the project has a channel width of over 200 feet. Therefore, NMFS criteria cannot be applied. However, construction of the replacement bridge is expected *maintain* current pool functions in the project area.

Pool Quality

The Snoqualmie River did not contain any observable pools in the reach associated with the project area, and no pools that meet large pool criteria (>1 meter deep). In the project reach this habitat element is considered *not properly functioning*. The project is anticipated to *maintain* pool functions in the project area.

Off-Channel Habitat

Historically, the Snoqualmie River has been leveed, and disconnected from off-channel habitat features such as oxbow lakes, wetlands, tributaries in the general project area. Existing features in the project vicinity that contain off-channel habitat include the side channel habitat located downstream from the existing bridge on the right bank. Other off-channel areas that may be used by salmonid species include the three tributaries in the project area. However, some of these areas lack complete cover, and are of limited size. This constitutes *at risk* conditions according to NMFS criteria. The proposed project will *maintain* the existing level of off/side-channel habitat.

Refugia

Some refuge habitat capable of supporting and maintaining all life stages of salmonids exists in the project reaches of the Snoqualmie River, but these are few in number and they are not adequately sized. Also, they lack proper buffers. This habitat element is *at risk* according to NMFS criteria. The proposed project is predicted to *maintain* these baseline conditions.

Width/ Depth Ratio

The wetted width to scour pool depth ratio for the Snoqualmie River within the project vicinity is generally in the range of 15 to 20. This is a result of the run-type channel morphology that typifies this reach. Based on this condition, the baseline indicator is *properly functioning*. These findings are consistent with baseline conditions for floodplain connectivity. The project will *maintain* current width-to-depth ratios, as no new in-water structures will be constructed as part of the project.

Streambank Condition

The streambanks of the Snoqualmie River in the project site are relatively stable. No large stretches of bank instabilities were observed during the field visit. Since the river has greater than 90 percent, the bank stability condition is considered to meet the *properly functioning* condition. The project is not expected to impact streambank conditions and thus will *maintain* existing conditions.

Floodplain Connectivity

Off-channel areas of the Snoqualmie River have reduced hydrologic linkage to the main river channel with reduced overbank flows. Agricultural clearing on private property has modified large areas of the historic floodplain upstream and downstream of the project area. Although some floodplain connectivity exists in certain areas, reductions in hydrologic function and connectivity to the natural floodplain coupled with diking and agricultural disturbance have limited and altered the downstream riparian zone vegetation regime. Accordingly, the baseline condition indicators for floodplain connectivity are *at risk*. Project effects are anticipated to *maintain* the baseline conditions for floodplain connectivity.

Changes in Peak/Baseflows

The Snoqualmie River in the vicinity of the project has undergone reductions in baseflow, exceeding both the average and the median 7-day low flow near Carnation (Pentec 1998). This situation is most likely due to the large extent (17 percent) of impervious surface present in the basin (Purser et al. 2000). Therefore the baseline condition is *at risk* according to NMFS criteria. The amount of stormwater from the increase in impervious surface from the project is not expected to measurably alter baseflows or peakflows in the Snoqualmie River or its tributaries, and therefore will *maintain* the current baseline conditions.

Increases in Drainage Network

Human disturbance has significantly reduced natural channel lengths in the reaches above the project area, and there has been a moderate increase in drainage network density. The baseline condition is *at risk* and the project is expected to *maintain* the current baseline conditions.

Road Density and Location

The drainage areas in the project vicinity consist largely of rural and undeveloped land. The highest road densities are concentrated downstream in the City of Carnation. Current overall road densities are not at urban or undisturbed watershed levels, but rather in-between. Therefore, existing baseline conditions are *at risk*. The completion of this project will not add any lane capacity and should not lead to any growth in population. Project effects are anticipated to *maintain* the baseline conditions.

Disturbance Regime

In the project area, there are limited disturbances in unstable or potentially unstable areas. Most of these disturbances in the river basin have occurred in the floodplain. Natural processes (sediment, LWD, and hydrology regimes) are mostly *at risk*. Nonetheless, salmonid life stages and life history forms have an adequate amount of watershed complexity in which to exist both upstream and downstream of the project area. Based on the matrix of pathways and indicators criteria, the existing baseline conditions are *at risk*. The completion of this project is not expected to substantially affect or disturb unstable areas. Therefore, the project effects will *maintain* these baseline conditions.

Riparian Reserves

On a watershed scale, the upper mainstem of the Snoqualmie River has had impacts to riparian buffers. Only 25 percent of the Snoqualmie River has 200 plus feet of forested buffer, while 60 percent has grass, brush, or a single line of trees (Pentec 1998). Based on the matrix of pathways and indicators criteria, the existing baseline conditions for riparian reserves are *not properly functioning* and although mitigation activities slightly improve the baseline conditions, the limited scale of these activities are anticipated to *maintain* these conditions.

3. PROPOSED ACTION AND BIOLOGICAL IMPACTS

3.1 PROJECT PURPOSE

The purpose of the proposed bridge replacement is to correct safety and structural deficiencies associated with the existing bridge. The existing bridge is a 200-foot-long steel truss that rests on concrete piers inside the banks of the Snoqualmie River. The truss span was constructed in 1922 and the existing approaches were constructed in 1968. The bridge is currently in a deteriorated condition and is considered obsolete for modern truck traffic. Paint failure and surface rust are present. Although the bridge is capable of carrying the loads for which it was designed, greater modern truck weights require the Tolt Bridge to be posted for one truck at a time, with maximum truck weights as much as 32 percent below state legal limits.

In addition to the structural deficiencies, there are several safety concerns with the existing bridge. The bridge has a substandard ability to resist seismic forces (Lin and Associates 2002b), and the approach spans have substandard horizontal and vertical curvatures, which reduce sight distances. The narrow roadway creates a substandard traffic condition for passing vehicles and there is no shoulder for safe pedestrian/bicycle access. All of the driveways on NE Tolt Hill Road have substandard sight distances in at least one direction. Since 1989, 10 accidents have occurred on NE Tolt Hill Road east of West Snoqualmie River Road NE (Lin and Associates 2002a).

The County evaluated several alternatives for replacing the existing bridge. The proposed alternative is to replace the bridge on a new alignment in accordance with current standards. This alternative will provide the benefits listed below:

- Improved sightlines and stopping distances.
- Shortest overall length.
- No displacement of residences or the public boat launch facility.
- Allows the existing bridge to remain open during construction of the new bridge.
- Provides the most cost effective means of achieving the project purpose.
- Allows commercial traffic at current state legal limits.
- Provides greater clearance between oncoming traffic, bicyclists, and pedestrians.
- Complies with current seismic standards.

The proposed alignment was selected based on balancing the structural efficiency of the proposed structure with environmental, construction, social, and economic impacts. The proposed alignment will result in some sensitive area impacts, but overall, it is preferable to the other alternatives evaluated (Lin and Associates 2002a).

3.2 EXISTING BRIDGE AND ROADWAY ALIGNMENT AND SPECIFICATIONS

NE Tolt Hill Road provides rural, residential and commercial access from Fall City-Carnation Road NE (State Route [SR] 203) to the Redmond area via SR 202. It is classified as a minor arterial and has a posted speed of 35 mph and an average daily traffic volume in 2000 of 4,065 (Lin and Associates 2002a). There are four intersections along NE Tolt Hill Road within the study area. They include one public roadway (West Snoqualmie River Road NE), two public driveways, and one private driveway. West Snoqualmie River Road NE intersects NE Tolt Hill Road from the south, approximately 300 feet west of the west bridge approach structure. A public access driveway on the west side of the Snoqualmie River and north of NE Tolt Hill Road provides access to King County's Tolt River-John MacDonald Park. The second public driveway is located on the east side of the Snoqualmie River along the north side of NE Tolt Hill Road, and provides access to a public boat launch. The private driveway is located west of the Snoqualmie River on the north side of NE Tolt Hill Road, and provides access to several residences.

The existing bridge has a 200-foot-long main span consisting of a Parker sub-type steel Pratt Truss, which rests on concrete piers in the river channel. Each of the existing approaches consists of 16 precast concrete girder spans and together they total 248 feet in length. The steel truss and approach structures total 696 feet in length. The current roadway width is 19 feet, which is striped for two 9.5-foot lanes. The bridge does not have shoulders or pedestrian access. The approach roadway sections consist of two 11-foot-wide lanes. The shoulders on NE Tolt Hill Road are 6 feet wide on each side.

3.3 DESCRIPTION OF PROPOSED ACTION

3.3.1 Primary Features

Approaching from the west, the alignment for the proposed replacement bridge follows NE Tolt Hill Road to a point approximately 500 feet west of the intersection with West Snoqualmie River Road NE (see Project Plans in Appendix C and project photos in Appendix D). At this point, the alignment would begin a tangent section that would cross the Snoqualmie River approximately 165 feet south of the existing bridge. Once the main span crosses over the river, the horizontal alignment will start a large radius curve to match into the existing alignment of NE Tolt Hill Road. The new bridge will be a steel plate girder structure 1,085.5 feet in length with a 262.5-foot-long main span. The bridge abutments and all piers will be concrete pier walls built on drilled shafts. Seven piers; three west of the river and four east of the river (the piers are numbered 1 through 7 from west to east) will be required to support the bridge and approaches. The two main span piers (Piers 3 and 4) are located so drilled shaft-footings will have at adequate clearance to the ordinary high water mark (OHWM) of the Snoqualmie River. All of the bridge piers, including the two main span piers will be placed outside the OHWM of the river. The vertical alignment will be approximately the same as the existing bridge. The bottom of the structure would be a minimum of three feet above the river flood stage (based on the 100-year flood).

The proposed bridge cross section will be 43 feet, 2 inches wide. This includes two 12-foot-wide lanes, 8-foot-wide shoulders, and barriers of approximately 1 foot, 7 inches in width. Bicyclists and pedestrians will share the shoulders. The intersections of NE Tolt Hill Road with West Snoqualmie River Road, the two public facilities driveways, and the private driveway will all be modified to meet the appropriate stopping site and entering site distance requirements.

The proposed NE Tolt Hill Road roadway sections east and west of the bridge will have 11-foot-wide lane widths, 8-foot-wide shoulders, and a ditch and guardrail where necessary. The roadway section of West Snoqualmie River Road in the project area will also have 11-foot-wide lane widths, but the shoulders will be 4 feet wide.

3.3.2 Secondary Features

Construction of the east bridge approaches will require modification of the existing gravel access road to the public boat launch on the east side of the river. The driveway to the parking lot will be moved approximately 350 feet to the east. The new driveway also will be used temporarily during construction of the east approach roadway to route vehicles around the construction area. The parking lot will also be used as a staging and storing area during construction. Additional staging areas include the gravel area on the west side of the river just north of the proposed Pier 1, and the area under the proposed bridge on the east side of the river. Best Management Practices (BMPs), such as silt fences, will be employed to minimize the potential for stored materials to enter wetlands or surface waters. Additional BMPs include designated refueling activities located in an area away from the river, streams, or any designated wetland areas and daily inspection of equipment for fluid leaks. The County (or construction contractor) will prepare a Stormwater Pollution Prevention Plan (SWPPP) and a Spill Containment and Control (SPCC) Plan for the project, which will spell outdetail specific BMPs to address these issues.

The project will also involve modification/relocation of an existing gravel access road along the east bank of the river south of the existing bridge. The road runs along the west edge of an agricultural field (known as the Foster Farm) about 30 feet from the top of the riverbank (see Figure 2). Movement of the road to the east will allow revegetation of the riparian buffer through planting (as described in the project mitigation plan being prepared as a separate document). The access road currently crosses an agricultural ditch (which carries a King County Class 2 stream with salmonids, referred to herein as Tributary 2) via a 48-inch culvert. The culvert will be replaced with a culvert that is designed as fish passable according to Washington Department of Fish and Wildlife (WDFW) standards.

The utility relocations required as part of this project include Century Telephone and AT&T Broadband. The telephone and cable TV lines will be located under the deck of the new bridge. NE Tolt Hill Road and West Snoqualmie River Road NE will generally remain open to traffic during construction of this project. However, brief road closures of West Snoqualmie River Road NE and NE Tolt Hill Road will be required to relocate and tie in the roads to the new alignment. These relatively brief closures may consist of two to three consecutive weekends. After the new bridge is completed and opened to traffic, the existing bridge will be closed and subsequently removed (see Section 2.4.6.3 for a description of the bridge removal).

3.3.3 General Project Timing and Sequence

Project construction is scheduled to begin in 2004. The general sequence of construction activities includes initial work to realign West Snoqualmie River Road, and construction of the temporary work platform, followed by construction of the drilled shafts and columns. Next, the superstructure and deck of the new bridge will be completed. The temporary work platform will then be removed and the roadway approaches to the bridge completed and tied in. When the new structure is open to traffic, the existing bridge will be stripped and removed and the east approach will be filled. Figure 4 shows a potential construction schedule. It should be noted that this schedule is only a likely representation of what the actual schedule may be and that variations in work timing may occur due to contractor delays or adverse weather conditions.

3.3.4 Impervious Area

The total area of impervious surface associated with the proposed alignment is 106,748 square feet (Table 4). Approximately 30,445 square feet of existing impervious surface will be removed when the existing bridge and approaches are no longer needed. Overall, the net gain of impervious surface from this project is 31,446 square feet.

		WEEKS	March		APRIL				MAY				JUNE				JULY				AUGUST				SEPTEMBER				OCTOBER				NOVEMBER				DECEMBER				JANUARY				FEBRUARY				MARCH				APRIL			
	TASK/WEEK		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
1	NTP (based on award end Jan. 2004)	16-Mar-04	■																																																					
2	Shop drawing review & procurement	8 weeks	■	■	■	■	■	■	■	■																																												
3	Mobilization, TESC, Traffic Control	2 weeks		■	■																																																	
4	East side - Temp. bypass road & constr. access	2 weeks				■	■																																															
5	Snoq. River road realignment - temporary	1 week						■																																														
6	Construct temp. work platform west side	4 weeks				■	■	■	■																																													
7	East - drilled shaft construction (5 days ea. shaft)	3 weeks								■	■	■																																										
8	East Column Construction	3 weeks											■	■	■	■																																						
9	East Crossbeams	4 weeks															■	■	■	■																																		
10	East abutment at Pier 1	2 weeks															■	■																																				
11	West - drilled shaft construction	4 weeks											■	■	■	■																																						
12	West Column Construction	4 weeks															■	■	■	■																																		
13	West Crossbeams	5 weeks																			■	■	■	■	■																													
14	West abutment at Pier 7	2 weeks																			■	■																																
15	Set Girders	3 weeks																								■	■	■																										
16	Form Superstructure	4 weeks																									■	■	■	■																								
17	Rebar Placement	3 weeks																												■	■	■																						
18	Pour Deck and Approachs	4 weeks																															■	■	■	■																		
19	Barrier	3 weeks																																			■	■	■																
20	Remove temp. work bridge	2 weeks																																						■	■														
21	Snoq. River Rd/NE Tolt Rd realignment west side	2 weeks																																							■	■													
22	NE Tolt Rd realignment - east side	2 weeks																																								■	■												
23	Final paving/open new bridge/road to traffic	1 week																																										■											
24	Mobilization for existing bridge removal	2 weeks																																											■	■										
25	Construct containment for existing bridge demo.	1 week																																												■										
26	Strip existing bridge	1 week																																													■									
27	Remove existing bridge and approach pilings	2 weeks																																														■	■							
28	Construct containment for existing pier removal	1 week																																																■						
29	Remove existing bridge piers	1 week																																																	■					
30	Remove Exist. East Approach fill	3 weeks																																																		■	■	■		
31	Pond, Bioswale (s)	3 weeks																																								■	■	■												
32	Mitigation Planting (extent unknown)	4 weeks																																																	■	■	■	■		
33	Clean up, De-mob, site restoration	2 weeks																																																				■	■	

Figure 4. Potential Construction Schedule - Tolt Bridge (#1834A) Replacement Project.

Table 4. Existing and Post-Project Impervious Surface Conditions

	Impervious Surface Area [sq. ft. (acres).		
Location	Existing Alignment	Proposed Alignment	Difference Between Pre- and Post- project
NE Tolt Hill Road (Sta 25+00 to Sta 46+00)	60,260 (1.38)	87,409 (2.01)	27,149 (0.62)
W. Snoqualmie River Road (Sta15+90 to Sta 18+23)	15,042 (0.35)	9,453 (0.22)	-5,589 (0.13)
Boat Launch Access Road	0	9,886 (0.23)	9,886 (0.23)
Total	**75,302 (1.73)**	**106,748 (2.45)**	**31,446 (0.72)**

3.3.5 Stormwater Treatment Facilities

Currently, there is limited drainage along the existing road and most road runoff from east of the existing bridge appears to sheet flow into the adjacent fields where it infiltrates the soil or is drained to the river via ditches and/or tributary streams. The bridge deck is drained by deck scuppers, which deposit stormwater directly into the Snoqualmie River. Drainage from the west side of the project either sheet flows off the shoulder or is collected in a roadside ditch and pipe system that eventually discharges into Wetland 2 where it is dispersed just south of the existing bridge. The area has sparse vegetative cover consisting primarily of herbaceous plants.

The project includes stormwater treatment for all of the proposed road surfaces, which is a net benefit over existing conditions (no stormwater treatment is currently provided). The proposed stormwater system for the replacement bridge is being designed to meet the requirements of the King County Surface Water Design Manual (King County 1998) and is intended to be equivalent to the 2001 Washington State Department of Ecology Stormwater Manual (Ecology 2001). Because the project discharges all storm flows to the Snoqualmie River, stormwater detention or flow control is not required. As a receiving body, the lower Snoqualmie River has been shown to have lower peak flows and flood elevations if local stormwater is discharged directly to the river, prior to the peak flows of the river itself, which can lag significantly from the peak of a storm event. Stormwater detention retards the release of project runoff, stacking peak discharge onto the peak flows of the river (or nearer to). Proposed stormwater collection and conveyance features include catch basins, storm pipes, and ditches.

On the east side of the bridge, stormwater runoff will be treated using a bioswale located under the existing bridge right-of-way (ROW). The swale will be 2 feet wide with a 0.5 percent slope. The depth will be very shallow (0.5 to 1 foot deep) at the east end to minimize the depth near the river. Near the river, the swale will be closer to four or five feet wide to help dissipate flood flows and assure adequate flow conveyance. The swale will be approximately 700 feet long. The eastern-most 100 feet of the swale is in the Snoqualmie River buffer and will only be used for conveyance, not for treatment. The swale will outfall above the OHWM and will include an energy dissipater. No bank excavation below OHWM will be required for construction of the outfall or dissipater.

A bioswale is preferred over Enhanced Treatment options because the site is located within the floodway of a salmonid bearing stream (Snoqualmie River). A bioswale in this location reduces the risk of fish stranding as well as failure during flood events. This swale will treat all stormwater from Station 31+00 to Station 46+00 on the proposed alignment, including the new access driveway for the boat launch. This will provide 80% total suspended solids (TSS) removal as required by the 1998 King County Surface Water Design Manual. While it will not provide the same levels of metals removal as an Enhanced

Treatment facility, the additional length of the proposed bioswale is intended to provide enough TSS removal (beyond the 80% required) to compensate for the lack of metals removal, thereby meeting the intent of the 2001 DOE Stormwater Management Manual.

3.3.6 Construction Details

3.3.6.1 *Proposed Bridge Construction*

Project construction will require clearing, grading, and a limited amount of filling along the proposed alignment and along the existing bridge alignment. Permanent and temporary impacts to wetlands, streams, and buffers are discussed in detail in Section 4. (Update those sections with latest info from Pat's report)In addition, construction of the new bridge, approaches, and removal of the existing bridge will require a number of temporary structures. These include a temporary work platform and two temporary work trestles on the west side of the river, and a temporary access road and temporary access easement on the east side of the river. A general description of the construction process is provided below.

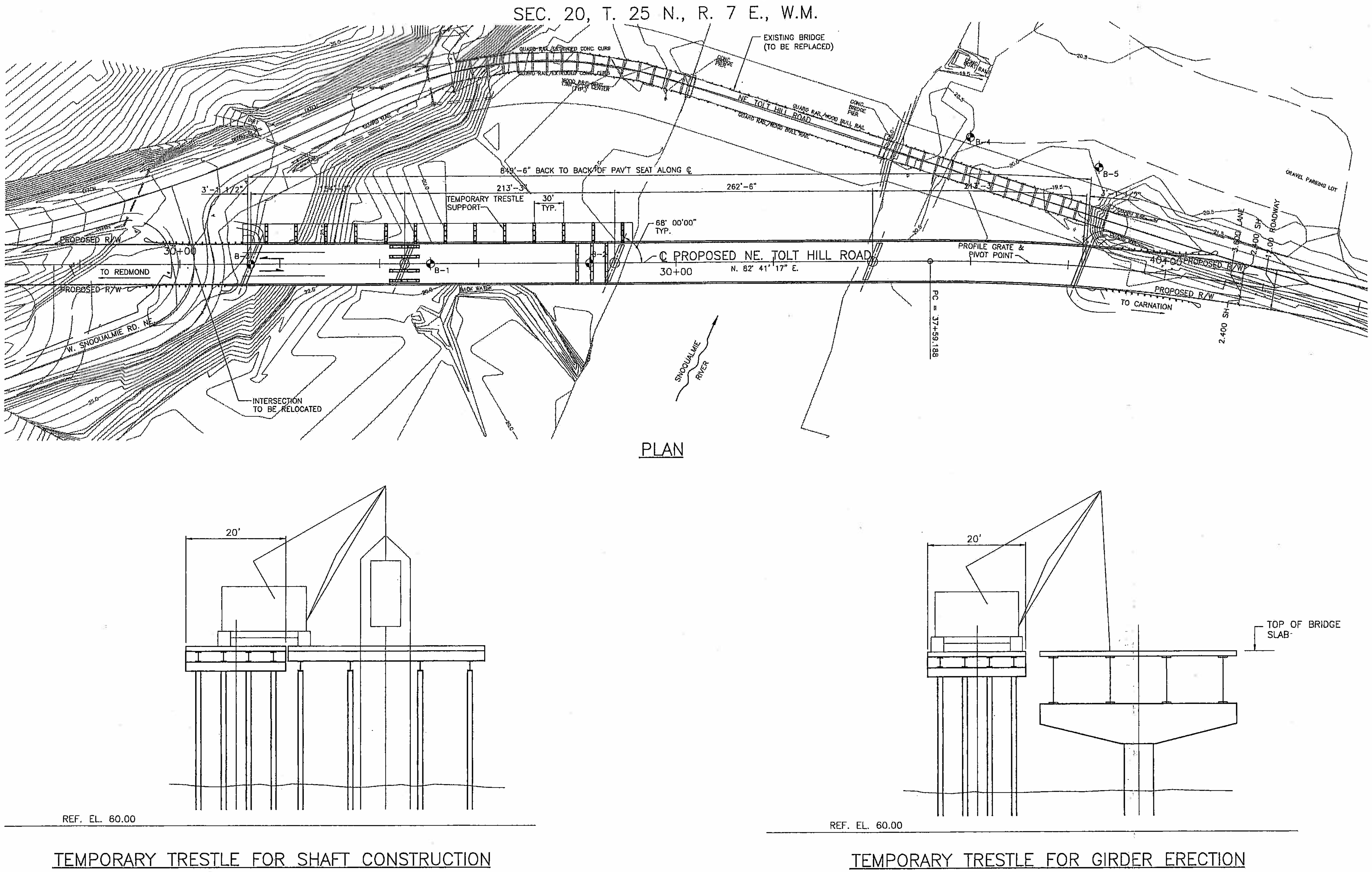
Drilled Shafts for Placement of Permanent Concrete Piers

Seven 10-foot-diameter shafts will be drilled for the bridge support piers, four shafts on the eastern side of the Snoqualmie River and three shafts on the western side. Each pier is anticipated to have one drilled shaft for pier support. This will likely require use of a 150- to 200-ton crane. Material that is excavated from the shafts will be hauled off-site to an approved receiving facility. Dewatering of the drilled shafts may be required prior to pier concrete pouring operations if the shafts fill due to groundwater elevation. If dewatering is necessary, then any turbid water or slurry material will be pumped from the excavation hole into a Baker tank where suspended sediments will be settled out and the water will be treated for pH. The treated water will then be released into the existing storm drainage system on the west side of the project area or it will be pumped (sprayed) into the agricultural fields on the Foster Farm.

West of Snoqualmie River

A temporary work platform, approximately 300-feet long and 25-feet wide will be required on the west side of the river, just north of the proposed bridge alignment (Figure 5 and Appendix C). The temporary work platform will be located on the north side of the proposed bridge approach, just north of a small tributary (Tributary 3) to the Snoqualmie River. The temporary work platform will require approximately 13 temporary supports each of which will require 3 to 4 steel piles spaced approximately 6 feet apart (depending on the equipment used for the permanent pier installation). The supports will be spaced at approximately 20-foot intervals along the proposed alignment. Extensions from the temporary work platform (finger piers) will be placed at the permanent bridge piers locations to support equipment for excavation of the shafts. Each extension would require 1 or 2 additional supports, each composed of 3-4 piles. Once the permanent bridge piers are completed, the work platform and temporary piles would be removed to allow construction of the pier caps.

Construction of the temporary work platform will require removal of trees and other woody vegetation on the west side of the river, however it requires substantially less clearing and ground disturbance than would be required if the work occurred at-grade. The maximum width of any tree clearing area would be 100 feet and within King County right-of-way (50 feet north and south of the proposed bridge). This includes the area under the temporary trestle, the area under the new bridge, and an area extending south of the new bridge that is required for bridge maintenance. Trees will be felled by chain saw and will be left in place on the ground.



Parametrix DATE: 07/08/03 FILE: K1521052P07T01F-05 (Biological Assessment)

SCALE IN FEET
0 75 150

N

LEGEND
TEMPORARY TRESTLE PILINGS
BRIDGE PIER

Figure 5
Temporary Trestle Configuration for the Tolt Bridge Replacement Project
King County, Washington

Construction of the temporary work platform, including pile driving is expected to take about 4 weeks, and will use equipment located on the work platform. The timing of the pile driving could potentially be scheduled to avoid the outmigration timing for juvenile chinook salmon. All pile driving will occur landward of the OHWM and most will occur more than 30 feet from the bank of the Snoqualmie River. Work will start on the west end of the temporary work platform and proceed east toward the river as the platform is extended. Temporary piles for the work platform and the extensions will be located at least 10 feet from the OHWM of the Snoqualmie River and approximately 30 feet from the OHWM of Tributary 3. If it is necessary to remove stumps to facilitate placement of the temporary supports, a trackhoe positioned on temporary work platform the will be used.

The temporary work platform is necessary for the phase of construction consisting of the excavation of the drilled shafts though the phase involving the pouring of the deck. Once the shafts are fully excavated, the finger pier extensions and support piles at the piers will be removed to allow for construction of the pier caps and new bridge. With the exception of the replanting with shrubs and trees, all of the above work is scheduled to be complete by January 2005.

All temporary disturbed areas will be restored and replanted with shrubs and trees following construction. The utility of salvaging plants in this area to be utilized for revegetation will be analyzed and considered.

Two temporary work trestles will be required for removal of the existing bridge (see also Section 3.3.6.3). Each temporary trestle will be approximately 80 feet long and 20 feet wide, and they will be located on the north and south sides of the existing bridge approach, extending west from the Snoqualmie River. Each of the temporary work trestles will require 4 temporary supports, spaced approximately 20 feet apart. The temporary supports will each require 3 to 4 piles, spaced approximately 6 feet apart. The piles will be steel, about 12 to 18 inches in diameter, and driven approximately 20 to 30 feet below the surface (depending on the equipment to be used). A trackhoe located on the existing approach will be used to remove stumps for the temporary supports if necessary.

East of Snoqualmie River

For construction of the shafts on the east side of the river, a 20-foot-wide temporary access road and 30-foot-wide temporary construction easement will be used. These will both be located on the south side of the proposed bridge in the agricultural field (Foster Farm). Both the access and easement areas and all ROW south of the existing bridge approach between the new bridge piers will be covered with geotextile fabric and then a gravel layer. The impact will be temporary and will require removal of only a few existing trees. Some materials and equipment, (e.g. rebar, concrete forms) may be stored, assembled, or staged within the right-of-way under and just north of the existing bridge. These areas would also utilize the temporary placement of geotextile fabric and gravel.

Bridge Spans

The girders for spans 1 and 2, located on the west side of the Snoqualmie River, will most likely be placed using one crane located on the temporary work platform. Span three, located over the Snoqualmie River, may require floating barges in the river to help transport the girders to the proper locations. To construct the girders for span 4, 5, and 6, located on the east side of the river, the contractor will likely set girders using a crane from the ground. Girder activity is expected to last approximately 3 weeks.

Bridge Deck

The forming of the new permanent bridge deck will not require any special construction methods. On the west side of the project, the temporary work platform will be used to transport supplies such as forms, reinforcements, and concrete to the needed locations. During the forming and concrete pouring of the deck, the contractor will use a containment tarp to prevent any materials from falling or dropping into project waters or wetlands.

3.3.6.2 *Construction of New Approaches and Remaining Civil Roadway Work*

After the new bridge is completed the roadway approaches will be constructed. The roadway approaches will be constructed in two segments, the eastern and western roadway approaches. Construction of each segment will require approximately 7 weeks and will begin in the beginning of June and August, respectively (see Figure 4).

3.3.6.3 *Removal of Existing Bridge*

Removal of the existing structure will result in a number of temporary impacts, the majority of which will be on the west side of the Snoqualmie River. These impacts are all related to the removal of the existing concrete piers and wooden piles, and temporary structures necessary to remove them. A description of the bridge removal and its impacts is provided below.

On the west side of the river the existing piers under the west approach may not be strong enough to support a crane large enough to remove the steel truss, so additional supports are required. If this is the case a temporary support trestle approximately 80 feet long and 20 feet wide on each side of the existing structure will be required. The location of this trestle would be west of the existing concrete pier outside the river channel but within the buffer. The remaining sequence and steps involved in the removal of the existing steel truss bridge and its elements include:

- A containment system will be installed to prevent any materials from falling or dropping into river.
- Removal of the bridges decking and railing.
- Removal of the bridge truss. The County proposes to remove the truss as one unit, by moving it off to the east side of the river, and removing it from the project site. Barges will be used to support the west side of the bridge during removal. A jacking system may be used on the barges to lift the existing bridge off the piers. The bridge can then be lowered, and moved towards the east side of the river into the existing boat launch parking lot. The barges may be maneuvered with a work boat, or with lines and equipment from the shore. They may be anchored by tying to existing piers or other solid structures on shore. One or more cranes, positioned on either side of the river, may also be needed during this phase.
- Removal of the existing approaches. The existing approaches are composed of concrete panels and timber caps and piles. Removal of the concrete panels will be achieved by using a small excavator. The timber piles will most likely be cut at ground level or pulled out by a trackhoe and capped by hand. Any remaining portions of the timber footing will be left in place.
- Removal of the bridge piers.
- Removal of the existing pavement on both sides of the bridge approach.

The old bridge and all associated waste material from the bridge, bridge surface, and approaches will be hauled off-site and properly disposed of. The bridge piers are concrete slabs located below the OHWM. The piers rest on top of wood piles and a cap, which are buried below the existing bank profile. The goal is to remove as much of the pier as practicable, down to the existing mud line. The removal will require some in-water work.

Three alternatives exist for removing the piers. The first method uses wire sawing to remove the piers, and the remaining two use a trackhoe. The difference between methods 2 and 3 is the method used to isolate the piers. All three methods are described below.

3.3.6.4 *Method 1*

Wire sawing would be the most feasible for removal of existing concrete piers. There is relatively little noise, no dust, no oil/pollutants, and no vibration. Cutting may be performed underwater if needed, although divers are required if water is deeper than 4 feet. Cutting at the mud line, even if it is in an angle, is possible. Wire cutting entails wrapping the pier with a wire, and cutting through the concrete using a guided pulley system. The wire is cooled by water during cutting, resulting in a small amount of slurry. A contractor (Accurate Concrete Cutting) noted that if the cutting is performed underwater, there is no visible difference in-water clarity. If needed, any slurry may be contained in the water by fabric floating with buoys, or by placing plastic sheeting and sandbagging. Several cuts can be made to remove the pier, depending on the capacity of the equipment used to lift the structure away. This system is advantageous in that the only piece of equipment actually in water is the cutting cable itself. Several divers are also required to set/guide the cable during the procedure. This process has received approval as preferred method on Federal projects over rivers by the Army Corps of Engineers and WSDOT.

3.3.6.5 *Method 2*

The second method of removal uses a vibrating trackhoe to remove the piers. For this method, the piers must be isolated and the area dewatered. The preferred method of isolation is to stack sandbags around the pier, into which a plastic sheet cofferdam is installed. Water depths may preclude the use of this method in some areas. In that case, the third method will be used.

After installation of the cofferdam, a work area is created around the pier, roughly five-foot diameter. All fish will be removed from the cofferdam by a qualified fish biologist using a dipnet. A pump (fitted with a screen of a mesh size to prevent fish becoming entrained) will be used to dewater the work area. The area will be again inspected for stranded fish, which will be removed and placed back into the river. All of the in-water work will be performed during the summer low flows according to the work window determined by WDFW (likely July 1 to September 15). A trackhoe and vibrating spike will be used to break off the piers at the mud line, and they will then be lifted out of the river. The degree of sedimentation during the cutting process would be minimal and temporary. Containment tarps will be used to minimize the possibility of concrete or other materials getting into the river. Any slurry that results from the cutting of the piers will be contained by the placement of plastic sheeting within the sandbags. The slurry will be removed, the water treated with a Baker tank, and the clean water then sprayed to the Foster Farm for dispersal. The containment tarp will then be carefully removed, taking care to have minimal sediment entry into project waters. Once removed, any sediment on the containment tarp will be properly disposed of.

3.3.6.6 *Method 3*

The third method of pier removal is identical to the second, except for the method of isolating the piers. In the event that water levels are too high to use the sandbag cofferdams, and alternative method will used to isolate the work area. This would likely consist of a sheetpile cofferdam. After demolition the temporary support trestle will be removed, and all areas of temporary fill will be restored to the original grades. All cleared areas will be replanted with native trees and shrubs.

3.3.7 Long-term Operations and Maintenance

No major changes in the current use patterns for the roadway or surrounding landscape are expected from the project. Also, no permanent increases in noise level should result from the project. The proposed bridge will require routine maintenance activities, such as inspections, deck repairs, and painting. The scope of these maintenance activities will be narrower and the frequency of these activities will be less than those required of the existing bridge, which is much older and in a deteriorated condition.

4. BIOLOGICAL IMPACTS

This section describes temporary and permanent impacts to wetlands, streams and their buffers in the Tolt Bridge Replacement study area. Temporary impacts generally include vegetation removal or disturbance, increased potential for erosion and sedimentation, and noise disturbance during construction. Examples of permanent impacts would include filling wetlands or streams, clearing/reducing wetland or streambuffers, or loss of wildlife habitat.

4.1 WETLAND AND WETLAND BUFFER IMPACTS

Wetland impacts in the study area can be divided into two categories: permanent and temporary. Temporary impacts generally include vegetation removal or disturbance, increased potential for erosion and sedimentation, and noise disturbance during construction. Permanent impacts occur where there is a permanent loss of wetland or buffer area or function. This includes loss of wetlands or buffers due to placement of fill (i.e., for the piers), vegetation clearing, and/or a conversion of wetland from one class (forest) to another class (shrub or emergent) due to shading by the bridge or the approaches.

In the study area, permanent fill occurs where the drilled shafts will be installed (each shaft requires 78.5 square feet of fill), at the west end of the west approach structure where the aerial structure ties into the existing slope, and where the intersection of West Snoqualmie River Road NE and NE Tolt Hill Road will be realigned (Figure 1). Permanent clearing and shading impacts occur when the wetland or buffer vegetation is removed and/or replaced by a different type of vegetation. This includes all areas within (under) the proposed bridge footprint on the east and west sides of the river.

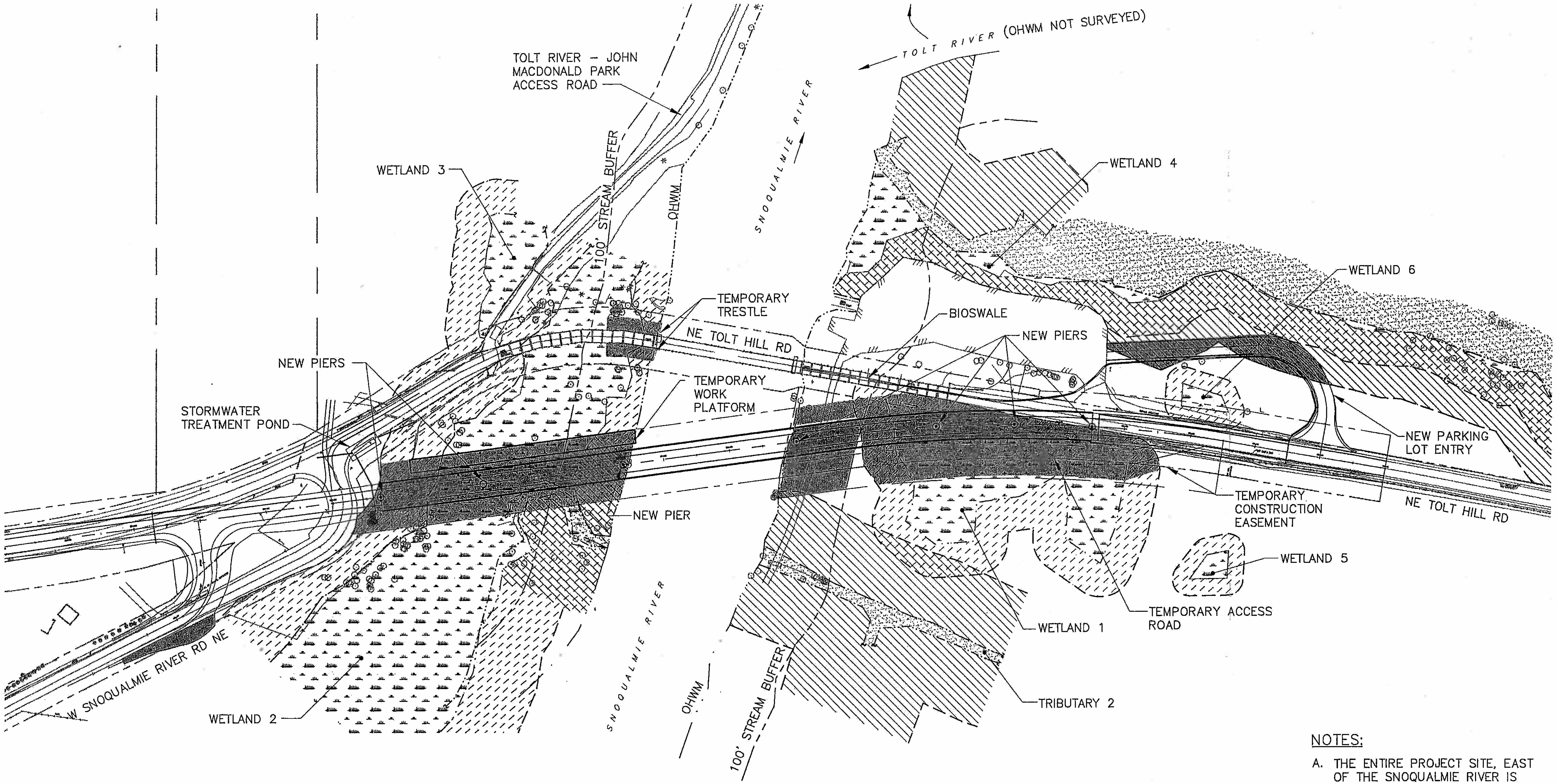
Nearly all of the cleared areas within the permanent bridge footprint will be re-vegetated following construction; however, in some cases there will be a change in the vegetation class of the wetland or buffer compared to pre-project conditions. This community type change is characterized as a shading impact and is a subset of the clearing impacts (not in addition to the clearing impacts). In the study area, these impacts occur where the west bridge approach limits the height of plants that can grow beneath it. This can effectively change a forested community into a shrub or herbaceous community. The size of the wetland (or buffer) remains unchanged, but the type of available habitat is altered.

Temporary impacts occur where there is a short-term loss of wetland area or function, but the area is restored after construction is complete. The result is that there is no net loss of wetland (or buffer) area or function (such as flood storage or wildlife habitat). Temporary impacts from the project are divided into two categories, fill and clearing. Temporary fill occurs on the east side of the river when fill is placed to provide construction access and easements. This fill may remain in place up to one year but will be removed and the areas restored after construction. Temporary clearing occurs when vegetation is cleared, but the areas are replanted after construction is complete. This includes the area on the west side of the bridge where the temporary work platform will be installed adjacent to the proposed bridge during construction.

Wetland and wetland buffer impacts from the Tolt Bridge replacement are described in detail below and shown in Figure 6. Tables 5 and 6 summarize the impacts. Included in the impact areas are approximately 48 trees[1] that will be removed. These trees are within both the temporary and permanent impact areas. Affected trees are categorized by location, species, and size (Table 7).

Figure

[1] Trees are woody stems greater than 6 inches in diameter at breast height and taller than 20 feet. This includes some species such as vine maple that are considered to be shrubs but in this case meet the aforementioned size criteria.



NOTES:

A. THE ENTIRE PROJECT SITE, EAST OF THE SNOQUALMIE RIVER IS LOCATED WITHIN THE SHORELINE MANAGEMENT ZONE.

B. THE SHORELINE MANAGEMENT ZONE ON THE WEST SIDE OF THE SNOQUALMIE RIVER, EXTENDS TO THE OUTER EDGE OF WETLANDS 2 AND 3.

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SCALE IN FEET

0 75 150

N

LEGEND

PERMANENT IMPACT

TEMPORARY IMPACT

WETLAND BUFFERS

WETLANDS

STREAM (CLASS 2S)

STREAM BUFFERS (CLASS 2S)

OHWM (PMX)

OHWM (BY OTHERS)

EXISTING TREE (DECIDUOUS)

EXISTING TREE (CONIFER)

Figure 6
Wetland, Stream and Buffer Impacts at the Tolt Bridge Replacement King County, Washington

Table 5. Wetland Impacts in the Tolt Bridge Replacement Study Area [a]

Wetland	Permanent Impacts in Square Feet		Total	Temporary Impacts in Square Feet		
	Fill	Clearing		Fill	Clearing	Total
1	78.5	6,775	6,854	18,300	939	19,239
2	78.5	9,426[b]	9,505	-	14,115[c]	14,115
3	—	—	—	—	—	—
4	—	—	—	—	—	—
5	—	—	—	—	—	—
6	—	—	—	—	—	—
Total	**157**	**16,201**	**16,358**	**18,300**	**15,054**	**33,354**

a Impact areas based on preliminary design footprint (King County, May 2003).

b Calculated impact for Wetland 2 includes permanent shading to Tributary 3.

c Temporary clearing impacts shown for Wetland 2 includes temporary shading to Tributary 3.

Table 6. Wetland Buffer Impacts in the Tolt Bridge Replacement Study Area [a]

Buffer	Permanent Impacts in Square Feet		Total	Temporary Impacts in Square Feet		
	Fill	Clearing		Fill	Clearing	Total
1	97.5	7,376	7,474	5,479	3,509	8,988
2	2,751	7,008	9,759	-	11,210	11,210
3	-	-	-	-	-	-
4	-	-	-	-	-	-
5	-	-	-	-	-	-
6	410	-	410	-	-	-
Total	**3,259**	**14,384**	**17,643**	**5,479**	**14,719**	**20,198**

a Impact areas based on preliminary design footprint (King County, May 2003).

Table 7. Tree Clearing Impacts Associated with the Tolt Bridge Replacement Project

Tree Species	Trees >6-inches dbh
West Side	
Red alder	21
Black cottonwood	0
Willow	4
Big leaf maple	1
Other (Dogwood, Elderberry, Vine maple, unidentified snags)	14
West Side Total	**40**
East Side	
Red alder	5
Black cottonwood	1
Big leaf maple	1
East Side Total	**7**
Removal of the existing structure (unidentified tree)	**1**
Overall Total	**48**

4.1.1 West Side Snoqualmie River

4.1.1.1 *Permanent Impacts*

Permanent impacts on the west side of the Snoqualmie River include small areas of wetland and buffer fill and a larger area of permanent vegetation clearing (see Tables 6 and 7). The permanent fill will result from the three 10-foot-diameter drilled shafts that will be excavated for the new bridge span and approach piers (Piers 1, 2, and 3). One pier (Pier 2) will be placed in Wetland 2 (Category II/1) and will require approximately 78.5 square feet of fill. The remaining two piers are located in the Wetland 2 buffer, one (Pier 1) on the west side of the wetland and one (Pier 3) on the east side of the wetland (Pier 3 is also located within the 100-foot buffer of the Snoqualmie River approximately 10 feet landward of the OHWM [see Figure 6]). Permanent fill impacts also occur at two locations along the western edge of the Wetland 2 buffer. The first location is where the bridge approach meets NE Tolt Hill Road (237 square feet), and the second is where the intersection of West Snoqualmie River Road NE and NE Tolt Hill Road will be realigned (2,357 square feet). The total area of fill in the Wetland 2 buffer is 2751 square feet.

Other permanent impacts to Wetland 2 include 9,426 square feet of wetland clearing and 7,008 square feet of buffer clearing. This permanent clearing results from the location of the new western bridge approach, which will limit the height of trees underneath it.

Within the permanent impact areas noted above, 26 trees over 6 inches in diameter (including 6 snags) will be cut down (see Table 7). The felled trees and snags will be left in place where they will continue to provide habitat for small mammals and amphibians and contribute organic material to the river.

A water quality pond (approximately 1,000 square feet in size) will be created to treat the runoff from the portion of the project west of the new bridge (Station 25+00 to Station 31+00). The water quality pond will be located at the intersection of West Snoqualmie River Road NE and NE Tolt Hill Road, outside of any sensitive areas or buffers and in an area that is currently paved and/or graveled. The water quality pond will discharge into an existing storm drain system that conveys existing runoff from the north side of NE Tolt Hill Road and the west side of the Tolt River - John MacDonald Park access road. The outfall from this storm drain system is located at the edge of Wetland 2, south of the existing bridge approach. No additional construction is planned for the outfall and no additional impacts will occur.

4.1.1.2 *Temporary Impacts*

Temporary fill and clearing impacts to wetlands and their buffers on the west side of the Snoqualmie River will be limited to two areas. The first area (in Wetland 2) is the location of the temporary work platform immediately adjacent to the new bridge approach on the north side (see Figure 5). Clearing will occur on both the north and south sides of the new approach, but the temporary work platform will be located only on the north. The second area is adjacent to the existing bridge approach (also in Wetland 2). In both of these locations construction will involve clearing wetland and buffer vegetation and the placement of temporary piles (temporary piles will be placed outside the wetted perimeter of the river and any tributary channels). These impacts are considered temporary because the piles would be removed and the grades restored to pre-construction condition, and all cleared areas will be replanted with appropriate native vegetation following construction.

Temporary impacts will include 14,115 square feet of clearing on Wetland 2 and 11,210 square feet of clearing in the Wetland 2 buffer. Within the temporarily cleared areas, 14 trees over 6 inches in diameter will be cut, including two dead snags. Trees will be felled by chain saw and will be left in place on the ground, where they will continue to provide habitat value. Where piles are driven for the temporary trestle, tree stumps may have to be removed using a trackhoe or similar equipment.

A 10-foot wide strip on the south side of the new bridge approach (within the cleared area) will be maintained to provide foot access for periodic bridge inspection and maintenance. This access will be created by moving felled trees as needed, and will meander around vegetation to minimize impacts. Hand clearing will likely be used when necessary.

4.1.2 East Side of the Snoqualmie River

4.1.2.1 *Permanent Impacts*

Permanent impacts on the east side of the Snoqualmie River (in the agricultural areas of the Foster Farm) will include filling a small area and clearing a larger area of Wetland 1 and its buffer, and filling of a small area of the Wetland 6 buffer (Tables 5 and 6). These impacts will result from the placement of the piers for the new bridge structure (three of which will impact sensitive areas) and the placement of a small amount of fill where the new alignment merges into the existing NE Tolt Hill Road grade (Figure 5). Stream and buffer impacts in this area are discussed in Section 4.2.

Pier 5 will be within Wetland 1, which has a wetland rating of III/2 (Ecology/King County). This pier will require approximately 78.5 square feet of permanent wetland fill in Wetland 1. Pier 6 will be placed in the buffer of Wetland 1, and will require an additional 78.5 square feet of permanent wetland buffer fill. Pier 7 is located in the eastern buffer of Wetland 1 and will require 19 square feet of permanent buffer fill. Approximately 410 square feet of the buffer of Wetland 6 (a Category III/3 wetland) will be filled where the new alignment matches into the existing edge of NE Tolt Hill Road.

Permanent clearing in Wetland 1 will result in an additional 6,775 square feet of impact. The total permanent impacts will be 9,505 square feet of Wetland 1 and 7,474 square feet of Wetland 1 buffer.

The height of the eastern bridge approach (which varies from 10 to 20 feet from the bottom of the structure to the ground surface) will preclude the growth of trees in the future, however this area is an agricultural field and does not support woody vegetation. As a result, there will be no change in vegetation type between pre- and post-project conditions. Examination of the areas under the existing bridge and several similar two-lane east-west bridges indicates that emergent vegetation (and shrubs) can continue to grow under structure even when they are within 10 feet of the ground (P. Togher personal observations 2003). Following construction, the areas under the east approach will be reseeded with native grasses. While shading from the approach is likely reduce the plant density under the approach structure, emergent vegetation is expected continue to grow in this area. As a result, there will be no permanent conversion of vegetation or change in wetland or buffer function compared to pre-project conditions.

On the east side of the bridge, stormwater runoff will be treated using a bioswale. This bioswale will be constructed along the alignment of the existing NE Tolt Hill Road eastern bridge approach after it is removed, and will convey water from the new bridge and eastern approach (including the new access road for the boat launch). Construction of the bioswale will result in an overall improvement in-water quality, since runoff from the existing bridge and approaches is not treated.

4.1.2.2 *Temporary Impacts*

For construction of the shafts on the east side of the river, a 20-foot-wide temporary access road and 30-foot-wide temporary construction easement will be required (see Figure 5). These will both be located on the south side of the proposed bridge in the agricultural field (Foster Farm). The access and easement area and all right-of-way south of the existing bridge approach between the new bridge piers will be covered with geotextile fabric and steel plates or a gravel layer, to allow construction equipment access and a work area. This temporary fill will prevent construction vehicles from being mired and reduce soil compaction and rutting. The amount of temporary fill in Wetland 1 and its buffer is 23,779 square feet.

The temporary access road will require approximately 11,800 square feet of temporary fill, including portions of Wetland 1 and its buffer. The temporary construction easement will require approximately 11,979 square feet of temporary fill, also in portions of Wetland 1 and its buffer.

The total temporary clearing will be 4,448 square feet along the north side of the proposed approach in Wetland 1 and its buffer. Temporary impacts to the buffer on the east side of the Snoqualmie River are described in Section 4.2.

Within the impact areas, approximately four trees over 6 inches in diameter will be removed on the east side of the Snoqualmie River. This will include one large big leaf maple, two red alders, and one black cottonwood. Trees will be felled with chain saws, and left in place on the ground. All temporary disturbance areas will be restored and replanted. After construction is complete, the temporary road and easement fill and geotextile fabric will be removed, the grades restored to pre-construction elevations, and appropriate vegetation will be planted. In the County right-of-way, native species will be used. Since the existing vegetation in these areas is dominated by pasture grasses, the replacement of the right-of-way areas with native species will result in a net improvement in vegetation quality.

4.2 STREAM AND BUFFER IMPACTS

The design of the proposed bridge will minimize impacts to streams and their buffers within the study area by avoiding the need for structures within the OHWM of the Snoqualmie River and the three tributaries located in the project area. Permanent and temporary impacts are shown in Figure 6 and listed below in Table 8.

Table 8. Stream Buffer Impacts in the Tolt Bridge Replacement Study Area [a]

Buffer	Permanent Impacts in Square Feet				Temporary Impact in Square Feet		
	Fill	Clearing	—	Total	Fill	Clearing	Total
Snoqualmie River, east bank [b]	78.5	4,701	—	4,780	6,414	2,647	9,061
Tributary 1	10,332	—	—	10,332	—	—	—
Tributary 2[c]	—	—	—	—	—	—	—
Tributary 3[d]	—	—	—	—	—	—	—
Total	**10,411**	**4,701**	—	**15,112**	**6,414**	**2,647**	**9,061**

[a] Impact areas based on preliminary design footprint (King County, May 2003).

[b] Buffer areas on the west side of the Snoqualmie River have been included with impacts to the Wetland 2 buffer.

[c] Temporary buffer impacts for Tributary 2 have been included in the Snoqualmie River temporary buffer impact calculations.

[d] Temporary buffer impacts for Tributary 3 have been included in the Wetland 2 temporary buffer impact calculations.

4.2.1 Permanent Impacts

The permanent impacts to the streams and their buffers in the study area include a small area of permanent fill in the Snoqualmie River buffer, a larger area of permanent fill in the Tributary 1 buffer, and a small area of permanent shading of Tributary 3 (259 square feet, calculated as impact to Wetland 2) (Table 8). There will be no permanent impacts to Tributary 2 or its buffer as a result of the project, and no permanent fill will be placed in any streams in the study area.

Permanent impacts to the buffer on the west side of the Snoqualmie River have been calculated with the Wetland 2 and Wetland 2 buffer impacts. Permanent impacts to the buffer on east side of the Snoqualmie River are limited to two small areas of permanent fill and a larger area of permanent clearing. The permanent fill results from the placement of Pier 4 (78.5 square feet). The permanent clearing (4,701 square feet) results from the permanent location of the west bridge over approach over the buffer.

Stormwater runoff on the east side of the bridge will be treated using a bioswale. The construction of the bioswale will require approximately 2,657 square feet of excavation in the Snoqualmie River buffer but no fill will be placed. This excavation will take place the existing under the existing eastern bridge approach, and areas outside the bioswale will be reseeded with appropriate vegetation after construction. As a result, this excavation will not result in additional impact.

The swale will be 2 feet wide with a 0.5 percent slope. Near the river, the swale will be approximately four feet wide (to help dissipate flood flows and assure adequate flow conveyance), and 0.5 to 1 foot deep (to minimize the depth near the river). The swale will outfall above the OHWM and will include an energy dissipater to prevent erosion.

Approximately 4,701 square feet of the Snoqualmie River buffer will be cleared. The permanent impact in this area results from shading by the east bridge approach. The majority of the Snoqualmie River buffer on the east side is vegetated with pasture grasses and no trees are present. The area will be reseeded with native grasses after construction is complete, resulting in an improvement in the vegetation present. The presence of the new approach will increase shading of the banks of the Snoqualmie River, resulting in a small improvement in overall shading. As a result, the overall impacts of the permanent shading are expected to be minimal.

On the west side of the river, permanent clearing of the Snoqualmie River buffers is the result of the location of the new bridge and alignment over these features. The structure will limit the height to which vegetation in the Snoqualmie River buffer can grow, effectively changing the composition of the plant community. Permanent fill in the west side Snoqualmie River buffer is the result of the placement of Pier 3 in the buffer.

Permanent impacts to the Tributary 1 buffer consist of the placement of 10,332 square feet of fill for the new boat launch access road. This includes the area that will be directly filled by the road and a smaller area that will be isolated from the rest of the buffer (see Figure 6). Non-native grasses and Himalayan blackberry dominate vegetation in this portion of the buffer, although three red alder over 6 inches dbh are present and will be cut. Since the filled area is along the outer portion of the buffer (nearly 100 feet from the stream), stream shading and streambank protection will not be affected. The fill will result in a small reduction in the available wildlife habitat in the buffer, and the presence of the access road will likely cause some additional noise disturbance due to traffic.

Permanent impacts to Tributary 3 (and its buffer) include a small area of shading (256 square feet of channel, included as impact to Wetland 2) and an area of permanent buffer clearing (calculated as impact to the Wetland 2 buffer) (see Tables 5 and 6). The implications of these impacts include a small increase in potential for erosion, and a reduction in organic input from trees along the streambanks. While the vegetated buffer will be converted from forested to scrub/shrub, woody vegetation will still be present to stabilize the streambanks and provide organic input. Shading provided by the west bridge approach will offset the loss of streambank shading provided by trees.

4.2.2 Temporary Impacts

The project will result in temporary impacts to the buffers of the Snoqualmie River, Tributary 2, and Tributary 3. No temporary impacts are expected to Tributary 1 or its buffer as a result of the project. Temporary impacts include areas of temporary fill in the Snoqualmie River buffer and areas of temporary clearing on the west side if the Snoqualmie River (see Table 8).

Temporary impacts to the east bank Snoqualmie River buffer include the placement of 6,414 square feet of temporary fill for the temporary access road and temporary construction easement on the south side of the proposed approach. The temporary clearing of the Snoqualmie River east side buffer will result from the temporary work area (2,647 square feet) on the north side of the proposed alignment. After construction all fill will be removed from the temporary fill areas, and the grades will be restored to pre-existing elevations. All temporarily filled and cleared areas will be replanted with appropriate vegetation. In the County right-of-way, native species will be used. Since the existing vegetation in these areas is dominated by pasture grasses, the replacement of the right-of-way areas with native species will result in a net improvement in vegetation quality. Four trees are located along the banks of the Snoqualmie River and will be cut. These trees will be replaced after construction is complete as part of an overall mitigation program to compensate for project impacts (see separate Mitigation Plan).

Temporary fill in the Tributary 2 buffer has been calculated with the temporary impacts to the Snoqualmie River buffer, since this area is actually closer to the Snoqualmie River than to Tributary 2 (see Figure 6). King County proposes to move the existing gravel access road, which is located south of the existing bridge on the east bank of the Snoqualmie River. Moving this road to the east will allow a greater area for mitigation planting adjacent to the east side riverbank. This will require the replacement of the existing culvert conveying Tributary 2 with a new fish passable culvert, causing a small area of temporary fill. Since the replacement culvert will be the replacement culvert will result in an improvement in fish access to Tributary 2.

The culvert replacement on Tributary 2 will involve a replacement with a fully fish passable culvert. Exact specifications have not been defined but the culvert will be designed according to WDFW fish passage standards (*Fish Passage Design at Road Culverts, A Design Manual for Road Crossing* [WDFW 1999]). The stream will be required to be diverted if the culvert is to be replaced, but care will be taken to screen off the work area and remove any fish prior to dewatering. The diversion will be designed to both minimize sedimentation and ensure removal of fish species. The work to replace the culvert will occur over the shortest time period possible, limiting the duration of the diversion.

In addition to the replacement of the culvert on Tributary 2, three other separate construction activities may require adherence to the WDFW fish window (likely July 1 to September 15) as requirements of the Hydraulic Project Approval (HPA) (not yet issued). These activities include, the removal of the existing bridge piers, the installation of the bioswale outfall, and the potential removal of the existing stormwater system on the west side of the Snoqualmie River. Any in-water work will be conducted within and adhere strictly to the HPA (when issued).

Temporary impacts to the outer portion of the buffer of Tributary 3 result from the placement of the temporary work platform. These impacts have been calculated with the impacts to Wetland 2 and the Wetland 2 buffer, and are discussed in Section 4.1.1.

Tree cutting on the west bank of the Snoqualmie River during road and bridge construction will also potentially affect streams and fish. Possible effects including a reduction in the amount and quality of large woody debris recruited to the stream; a reduction in stream shade, which in turn could increase stream temperature; and a potentially destabilizing effect on streambanks, adding to streambank erosion.

While these impacts are important, it should be noted that the existing riparian vegetation on the west side of the river is composed mostly of shrub species with some smaller deciduous trees that currently provide minimal shading or recruitment of large woody debris, and the existing vegetation on the east bank of the river is primarily agricultural fields (pasture). A fringe of Himalayan blackberry is present on both banks of the river. A revegetation program will be implemented as part of the project mitigation to offset these impacts and replace the functions provided by the existing vegetation. In time, the planted trees and shrubs will provide a full range of functions and values equal to or greater than what is provided by the existing riparian community.

All riparian areas temporarily cleared or disturbed will be replanted with appropriate native species. This will result in an overall improvement of vegetation along the east shoreline, and minimal reduction in buffer quality on the west. Also, the new bridge, when constructed, will provide some additional amount of stream shading. Additional detail on west side impacts are provided in Section 4.1.1.

4.3 OTHER IMPACTS

Noise impacts will temporarily affect the wetlands, streams, and buffers overall, rather than affecting a specific area. Noise affects the quality of wildlife habitat, particularly with respect to the selection of nesting sites. Noise impacts from the project will be temporary and will result from construction related activities.

Construction noise will be produced by a number of different construction activities: excavation of the permanent support shafts; driving piles for the temporary work platform and temporary trestle; construction of the new bridge deck and approaches; and removal of the existing bridge and approaches. Noise impacts related to construction will cease when construction is complete, and are not expected to have any long-term effects on habitat.

4.4 MITIGATON FOR WETLAND AND STREAM IMPACTS

Washington State and federal regulatory agencies require that mitigation efforts follow a prescribed sequence. Project mitigation can be divided into two broad categories: measures to avoid and minimize impacts to sensitive areas, and measures to repair and compensate for unavoidable impacts.

Although complete avoidance of project impacts is not possible, the proposed alignment was chosen based on its ability to fulfill the project goals while minimizing disturbance to residences, existing facilities, and sensitive areas, and minimizing project costs. Pedestrian and bicycle traffic will share the shoulder on the bridge, which allows a reduction in the bridge width and the new bridge approaches will be placed on support piers to limit filling of sensitive areas. These support piers will be located outside the OHWM of the Snoqualmie River and its tributaries. The piers will be within the floodway of the Snoqualmie River, however the floodway is approximately 1,700 feet wide at NE Tolt Hill Road, and no practical alternative exists if the failing bridge is to be replaced. The bridge will not substantially affect flood carrying capacity of the streams or flood storage capacity of the affected wetlands in the study area, and wetland hydrology in the area will not be affected.

King County requires compensatory mitigation for impacts to wetlands at a ratio of 2:1 (restoration/enhancement to impact) for Class 1 and 2 wetlands, and a ratio of 1:1 for Class 3 wetlands. These mitigation ratios assume that mitigation will be on site and will result in equivalent or improved hydrologic or habitat functions. A 1:1 ratio is required for stream and wetland buffers.

The County proposes 35,515 square feet of wetland mitigation and 54,385 square feet of buffer mitigation as compensation for unavoidable impacts to wetlands and buffers. This exceeds the required wetland mitigation by 2,797 square feet and the required buffer mitigation by 21,630 square feet. All of this mitigation is on site (within the project area).

Six locations have been selected to provide compensatory mitigation for project impacts. The areas range in size from approximately 5,000 square feet to over 28,000 square feet (Table 9). These mitigation sites are located at varying distances from the proposed bridge and approaches, and on both sides of the Snoqualmie River. The selection of a multiple mitigation areas allows the County to more closely replicate the lost wetland, stream, and buffer functions.

Table 9. Potential Mitigation Areas in the Tolt Bridge Replacement Study Area

Mitigation Area	Wetland Area (Square Feet)	Buffer Area (Square Feet)	Location
1	3,480	985	West side of Snoqualmie River, under the existing western bridge approach.
2	15,530	-	West side of the Snoqualmie River, between the existing ROW and the new alignment
3	-	12,200	West side of Snoqualmie River, vacated area of West Snoqualmie River Drive.
4	-	a	West side of Snoqualmie River, between the Snoqualmie River and Tolt River - John MacDonald Park access road.
5	16,505	13,068	East side of Snoqualmie River, north and south of the proposed right-of-way.
6	-	28,132	East side of Snoqualmie River, along the river south of the new bridge (Foster Farm).
Total	**35,515**	**54,385**	

[a] Mitigation area may be utilized if required, pending the outcome of property acquisition discussions currently underway with landowner.

Plants selected for the mitigation will be native species. The selection takes into account the hydrology and available lighting conditions for the respective planting areas. The Tolt Bridge Replacement Mitigation Plan (in preparation) will describe the species composition and planting densities for each of the individual mitigation areas.

Mitigation area 1 is located under the existing western bridge approach. This area is 4,785 square feet in size and includes both wetland and buffer. The proposed mitigation would include restoring forested cover to this portion of Wetland 2 and its buffer by removing the existing structure (which limits plant height and shades the area beneath it) and enhancing the existing vegetation with native trees. No grading is necessary in this area and any temporary impacts related to the removing the structure would be restored immediately after construction.

Mitigation Area 1 is intended to provide several benefits, including restoration of native forest cover and improved forage and potential nesting habitat. Plantings closest to the Snoqualmie River will provide stream bank stabilization, a source for large woody debris recruitment, and shading for the Snoqualmie River buffer.

Mitigation area 2 is located between the existing west bridge approach and the proposed west bridge approach. This area comprises approximately 15,530 square feet within Wetland 2. The proposed mitigation for this area consists of enhancement with native tree and shrub species, which will provide tree cover. This restored forest cover is intended to provide more diverse wildlife habitat, including greater potential for nesting. The shrub component of the planting is intended to increase the diversity of the area and provide additional forage for wildlife.

Mitigation Area 3 is located in the vacated road right-of-way on the south side of West Snoqualmie River DriveRoad NE. Mitigation Area 3 is currently paved and includes both gravel and asphalt road surfaces. The area will provide approximately 12,200 square feet of buffer restoration, and will increase the width of the Wetland 2 buffer from the existing 40 to 100 feet width, to 80 to 175 feet. This increase in the buffer width will provide additional wildlife forage and potential nesting habitat and increase plant diversity in the buffer. As the plantings mature, they will provide additional screening of West Snoqualmie River Road for Wetland 2.

Mitigation Area 4 is located on the west bank of the Snoqualmie River, between the top of bank above the OHWM and the Tolt River - John MacDonald Park access road. Mitigation Area 4 is approximately 15 feet wide and 510 feet long. This area will be enhanced with native trees and shrubs, infill planted with the existing trees. The enhancement will increase plant diversity, provide shade and stabilization for the banks of the Snoqualmie River, and provide a future source of woody debris for the river. The plants have been selected with the lighting conditions (full sunlight) and varying water level (from dry to periods of inundation) in mind.

Mitigation Area 5 includes the areas under the proposed bridge approach and the areas to the north and south of the approach, within the 100-foot right-of-way. The areas of Wetland 1 beneath the eastern bridge approach will be replanted with emergent vegetation to offset the impact resulting from the bridge and approach. This reflects that the areas under the east approach will continue to support vegetation and provide cover and forage material for wildlife. While there will likely be a decrease in plant density from the existing conditions, the substitution of native plants for mowed pasture grasses will provide a net improvement in the biologic functions of this system.

Additional enhancement is proposed north and south of the new right-of-way, which will be used during construction for the temporary access road and a temporary work platform. Rather than restoring this area to the pre-construction condition (degraded pasture), the County proposes that the areas be enhanced with native trees and shrubs. This enhancement is intended to replace the lost cover in Wetland 1 and its buffer and provide forage and nesting habitat for wildlife not currently present.

Mitigation Area 6 is located on the Foster property, along the east bank of the Snoqualmie River. Mitigation Area 6 can be divided into three sub-areas. The first area is underneath the proposed right-of-way, the second area includes portions of the new right-of-way north and south of the proposed approach, and the third is a strip of land south the new bridge approach along the bank of the Snoqualmie River. This third area is approximately 280 feet and fifty feet wide. The third planting area will be set back from the top of the riverbank about 10 feet to reduce the need for clearing along the bank, which could expose the soils to erosion. The existing gravel access road will be moved to the east of the mitigation, and a fish passable replacement culvert will be installed on Tributary 3.

Mitigation Area 6 is intended to provide four functions: improvement in the diversity of the plant community, stabilization of the banks of the Snoqualmie River, shading for the river itself, and potential material for wood debris recruitment. These functions will be provided through native tree and shrub plantings (no trees will be planted under the new approach).

4.5 BEST MANAGEMENT PRACTICES AND CONSERVATION MEASURES

Incorporating BMPs and conservation measures into a proposed action is done to avoid, minimize, rectify, or compensate for impacts to species and critical habitat. King County has designed the proposed action to incorporate conservation measures during and after construction as listed below:

- If dewatering of the drilled shafts is required due to groundwater elevation, turbid water will be pumped from the excavation hole; any water or slurry material will be pumped into a tank where water quality treatment will consist of the settling out of sediment and adjustment of the water pH.

- Debris from work on the bridge over or adjacent to the river will be contained and prevented from entering the river by placing a containment tarp or platform directly under the bridge to capture debris.
- No wet or curing concrete, including washout of equipment, will enter project waters. A containment tarp will be used to isolate any runoff from activities involving wet or curing concrete activities.
- Erosion of disturbed areas will be controlled using silt dams or catchments between the site and the river, use of mulch and hydroseeding, and planting disturbed areas as soon as possible to establish cover vegetation. Disturbed areas will be re-landscaped with native vegetation where feasible.
- Erosion control devices will be inspected daily during the rainy season, weekly during the dry season, monthly on inactive sites. If inspection shows that the erosion controls are ineffective, work crews will be mobilized immediately, during working and off-hours, to make repairs, install replacements, or install additional controls as necessary.
- Every effort will be made to install, maintain, and monitor sediment and erosion control BMPs. However, these measures will be judged ineffective if turbidity plumes resulting from proposed activities are evident in waters occupied by listed salmonids during any part of the year.
- If soil erosion and sedimentation resulting from construction activities is not effectively controlled, the engineer will limit the amount of disturbed area to that which can be adequately controlled.
- Sediment will be removed from sediment controls once it has reached 1/3 of the exposed height of the control. Whenever straw bales are used, they will be staked and dug into the ground 5 inches (12 cm). Catch basins will be maintained so that no more than 6 inches (15 cm) of sediment depth accumulates within traps or sumps.
- Sediment-laden water created by construction activity will be filtered before it leaves the ROW or enters a stream or other water body. Silt fences or other detention methods will be installed as close as reasonable to culvert outlets to reduce the amount of sediment entering aquatic systems
- To the extent possible, wetlands and ditches will be avoided when locating temporary access roads and staging areas.
- Any designated wetland areas without barrier ditches and surface water features (e.g., drainage areas and ditches) will be protected with silt fencing.
- When heavy equipment is required, the project contractor will use equipment having the least impact necessary to accomplish the authorized work (e.g. low ground pressure, minimally sized, rubber tired).
- Equipment that is used for instream work will be cleaned prior to operations below the bankfull elevation. External oil and grease will be removed, along with dirt and mud. No untreated wash and rinse water will be discharged into streams and rivers without adequate treatment.
- Refueling activities will be conducted within a designated refueling area away from the river, streams, or any designated wetland areas. Additionally, drip pans will be fitted with absorbent pads and placed under all equipment being fueled.

- All vehicles operated within 150 feet of any stream or water body will be inspected daily for fluid leaks before leaving the vehicle staging area. Any leaks detected will be repaired before the vehicle resumes operation. When not in use, all vehicles where it is practicable will be stored in the vehicle staging area. Other vehicles, such as cranes, that may be stored in place, will be inspected daily for fluid leaks.
- Spill control and emergency response plans will be implemented for fueling and concrete activity areas.
- Clearing limits will be delineated with fencing or flags prior to any ground disturbing activities and maintained throughout construction.
- Work will occur primarily during the day and any essential night work will be conducted with minimal light and noise near Snoqualmie River.
- All staging areas will be restored to original grade.
- Erosion potential from areas disturbed during construction will be monitored. Silt dams or screens, run-off catchments, and vegetation will be maintained to minimize erosion potential.
- Any water intake structure must have a fish screen installed, and be operated and maintained in accordance to NOAA Fisheries fish screen criteria.
- Although tree felling will occur in the project area, trees within the bridge right of way will be limbed rather than removed where it is practicable. Any fallen trees or limbs trimmed will remain in the wetland or associated buffer.
- The project contractor will prevent unauthorized access via a temporary road corridor. Where stream crossings are essential, the crossing design will accommodate reasonably foreseeable risks (e.g., flooding and associated bedload and debris) to prevent diversion of stream flow out of the channel and down the road in the event of crossing failure.
- Any instream large wood or riparian vegetation that is moved or altered during construction will stay on site or be replaced with a functional equivalent.
- Boulders, rock, woody materials and other natural construction materials used for the project must be obtained from outside of the riparian area.
- Bank stabilization materials are to protect the road prism only at the inverts of crossing structures when required for the preservation of the structure.
- Any in-water work for the replacement of the culvert on Tributary 2, will occur only after the work area (including diversion inlet) is netted off and any fish present are removed by dip-nets by a qualified fish biologist. A biologist will also be on hand to remove any fish stranded during dewatering.
- BMPs and restoration work will be monitored during and after the bridge replacement.

5. FISH SPECIES EVALUATIONS

5.1 CHINOOK SALMON

5.1.1 ESA and Stock Status

NMFS recently completed an ESA status review of chinook salmon (*Oncorynchus tshawytscha*) populations from Washington, Oregon, Idaho, and California and defined 15 evolutionarily significant units (ESUs) (each considered a species under the ESA) within the region. Naturally spawned spring, summer/fall, and fall chinook salmon runs from the Puget Sound ESU were considered likely to become endangered in the foreseeable future (Myers et al. 1998). The abundance of chinook salmon in the Puget Sound ESU has declined substantially from historic levels, and there is concern over the effects of hatchery supplementation on genetic fitness of stocks, as well as severely degraded spawning and rearing habitats throughout the area (Myers et al. 1998). In addition, harvest exploitation rates in excess of 90 percent were estimated to occur on some Puget Sound chinook salmon stocks. Subsequent to this status review, NMFS issued a ruling in May 1999 listing the Puget Sound ESU as threatened (NMFS 1999a). Primary factors contributing to declines in chinook salmon in the Puget Sound ESU include habitat blockages, hatchery introgression, urbanization, logging, hydropower development, harvests, and flood control and flood effects (NMFS 1998).

Chinook salmon spawning in the mainstem Snoqualmie River occurs roughly between Snoqualmie Falls and Harris Creek at RM 21 (WDF et al. 1993). Table 10 lists the chinook salmon in the Snoqualmie River as part of the Snohomish River fall chinook salmon stock, which spawns primarily from late September through October (WDF et al. 1993). The Snohomish River fall chinook salmon stock is part of the Puget Sound ESU (NMFS 1999a), but is genetically distinct from Snohomish summer, Skykomish hatchery fall, and Bridal Veil Creek fall chinook salmon stocks (WDF et al. 1993). Snohomish River fall chinook salmon spawning occurs in the Snoqualmie River, Sultan River, Pilchuck River, Woods Creek, and Elwell Creek (WDF et al. 1993). The Snohomish River fall chinook salmon stock is native and genetically distinct from the Skykomish hatchery fall chinook salmon stock, even though they share the same run timing in the same system. This suggests the potential for limited hybridization between the stocks (WDF et al. 1993).

The Snohomish fall chinook salmon stock is depressed based on chronically low escapement levels and run sizes entering Puget Sound (WDF et al. 1993). Escapement levels of Snohomish fall chinook, based upon redd or carcass counts, averaged 1,774 from 1979 to 1998 with a range of 908 to 2,695 fish (SBSRTC 1999). The total chinook (fall and summer) run has been below its escapement goal of 5,250 fish since 1981 and there is no supplementation program for this stock (WDF et al. 1993). The fall chinook salmon escapement record for the Snoqualmie sub-basin during a similar time frame (1979-2000) indicates that annual escapement to the Snoqualmie sub-basin has ranged from an estimated 443 in 1979 to 2,213 in 1993, and averaged 1,110 (Kraemer 2001), or 62.6 percent of the Snohomish River basin total.

5.1.2 Pertinent Life History

In general, summer/fall chinook salmon migrate into freshwater in August and September (Wydoski and Whitney 1979). Spawn timing begins in late September and peaks in October, similar to other chinook salmon stocks in south Puget Sound (see Table 10) (WDF et al. 1993). Adult chinook salmon would be migrating in the mainstem of the Snoqualmie River from August through early October (see Table 10).

Table 10. Timing of Chinook Salmon and Bull Trout Freshwater Life Stages in the Snoqualmie River, Washington[a,b].

Species	Life Stage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Snohomish Fall Chinook Salmon	Upstream Migration						▒	▒	█	█	▒		
	Spawning									▒	▒	▒	
	Incubation	▒	▒							▒	▒	▒	▒
	Juvenile Rearing	▒	▒	▒	▒	▒	▒	▒					
	Juvenile Outmigration				█	█	▒	▒					
Bull Trout	Upstream Migration					▒	▒	▒					
	Spawning									▒	▒	▒	
	Incubation	▒	▒	▒	▒	▒	▒			▒	▒	▒	▒
	Juvenile Rearing	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒

[a] The grey shaded boxes indicate timing for the particular life history stage. The black boxes indicate peak migration times in project area waters.

[b] Adapted from Williams et al. (1975); WDF et al. (1993); WDFW 1998

Spawning occurs both downstream of the project site (RM22) and upstream of the project site (just below Snoqualmie Falls).

After emergence, juvenile chinook salmon rear in freshwater from a few days to 3 years (Wydoski and Whitney 1979); however, most juvenile chinook salmon in Puget Sound streams migrate to the marine environment during their first year (Myers et al. 1998). These chinook are called "ocean type" due to their short freshwater residence and because they make extensive use of the nearshore marine environment for rearing. Ocean type chinook salmon generally migrate downstream in the spring, just months after emerging from the gravel, or during the summer and autumn after a brief period of rearing in freshwater (Healey 1991; Myers et al. 1998). Migrant juvenile chinook salmon timing is poorly known in the Snoqualmie River system, but there is the potential for some fry or pre-smolts to be moving downstream during the project construction. It is expected that most would have moved into the lower Snohomish River and estuarine areas by July, as seen in other Puget Sound systems (Hayman et al. 1996).

Juvenile chinook salmon that remain in freshwater after emergence may migrate to the ocean any time of year, though most chinook salmon within a population tend to migrate at similar times and ages (Healey 1991). Migration commonly occurs during the night under the cover of darkness, although some fish may migrate during the day (Healey 1991). Chinook salmon fry tend to migrate along the banks and avoid the high velocity water near the center (thalweg) of the channel (Healey 1991).

5.1.3 Occurrences of Chinook Salmon in the Project Area

Chinook salmon redd densities in spawned reaches of the Snoqualmie River in 2000 indicate the most heavily spawned reach is that which extends downstream about 6.5 miles from the mouth of Tokul Creek to several miles downstream of Fall City (Parametrix 2001). Chinook salmon redd densities in this reach are nearly double that seen in the 4.5 mile reach extending downstream from the mouth of the Tolt River. The reach of the Snoqualmie River below the confluence with the Tolt River is, nevertheless, of great value, and currently supports total redd numbers greater than that seen in the major tributaries (Tolt, Raging Rivers).

5.1.4 Critical Habitat

On April 30, 2002, the U.S. District Court vacated the rule designating critical habitat for 19 ESUs of salmon and steelhead on the West Coast, including the Puget Sound chinook salmon ESU. NOAA Fisheries is currently reconsidering the designation of critical habitat. In the event that critical habitat is re-designated before this action is fully implemented, an analysis of the effects of the project on critical habitat, as defined under the vacated rule, has been included in this BA. This analysis may be relevant in determining whether re-initiation of consultation will be necessary if critical habitat is re-designated.

The designation of critical habitat for listed species was required under Section 4(a)(3)(A) of the ESA. The ESA defined critical habitat in Section 3(5)(A) as "the specific areas within the geographic area occupied by the species, on which are found those physical or biological features that are essential to the conservation of the species and that may require special management considerations or protection." Before the rule was vacated, NMFS (2000a) designated critical habitat to include all marine, estuarine, and river reaches accessible to listed chinook salmon in Puget Sound.

The Snoqualmie River is one of many river basins that contain critical habitat for Puget Sound chinook salmon (NMFS 2000a). The Snoqualmie River, in the vicinity of the project, provides important migration and rearing habitat for chinook salmon. A large portion of chinook salmon spawning in the Snoqualmie River occurs immediately downstream of the project area, below the confluence of the Tolt River. According to the definition, the Snoqualmie River and Tributaries 1 and 3 represent Puget Sound chinook salmon critical habitat. To a lesser degree, Tributary 2 may also represent chinook salmon critical habitat.

5.2 BULL TROUT

5.2.1 ESA and Stock Status

FWS (1998a) recently completed a determination of the status of bull trout, identifying five distinct population segments (DPSs) in the continental U.S. The Coastal-Puget Sound bull trout DPS is composed of 34 sub-populations (FWS 1998b, 1999a). FWS listed bull trout in the Coastal-Puget Sound DPS as threatened under the ESA on November 1, 1999 (FWS 1999a).

Four life history forms are generally recognized for bull trout, which include resident (non-migratory), adfluvial (lake dwelling), fluvial (migratory stream and river dwelling), and anadromous fish (saltwater migratory). The Coastal-Puget Sound population segment of bull trout, which includes the Skykomish River/Snohomish River sub-population, is unique because it is thought to contain the only anadromous forms of bull trout within the continental U.S. (FWS 1998a). The status of the migratory (fluvial, adfluvial, and anadromous) forms are of greatest concern throughout most of their range. The majority of the remaining populations in some areas may be largely composed of resident bull trout (Leary et al. 1991; Williams and Mullan 1992). The stock status of the Skykomish River/Snohomish River sub-population is healthy (WDFW 1998; FWS 1998b).

Bull trout have a wide, but very patchy distribution across their range, even in pristine environments (Rieman and McIntyre 1993). Bull trout have been extirpated from many of the large rivers within their historic range and exist primarily in isolated headwater populations. The decline of bull trout has been attributed to habitat degradation, blockage of migratory corridors by dams, poor water quality, the introduction of non-native species, and the effects of past fisheries management practices (FWS 1998a).

5.2.2 Pertinent Life History

The anadromous life-history form of bull trout is poorly studied (see FWS 1999a). For many years it was thought that anadromous char[2] in Washington were Dolly Varden (*Salvelinus malma*), and that freshwater char were bull trout. There is conclusive evidence that anadromous bull trout populate Puget Sound (Kraemer 1994), and anecdotal evidence suggests these native char were once much more abundant (FWS 1999a). In Washington State, bull trout and Dolly Varden, two closely related char species, coexist and are managed as a single species. Separate inventories are not maintained by the WDFW due to the considerable biological similarities in life history and habitat requirements that exist between the two species. Although historic reports of char may have specified either bull trout or Dolly Varden, methodologies for reliably distinguishing between the two have only recently been developed and have not yet been widely applied (WDFW 1998).

Bull trout are considered to be optionally anadromous, (i.e., the survival of individuals is not dependent upon whether they can migrate to sea), in contrast to obligate anadromous species like pink (*Oncorynchus gorbuscha*) and chum salmon (*O. keta*) (Pauley 1991). Nonetheless, the anadromous life history form is important to the long-term persistence of bull trout and their meta-population structure. Anadromous fish are generally larger and more fecund than their freshwater counterparts, and migratory forms play an important role in facilitating gene flow among sub-populations.

Bull trout are believed to be restricted in their spawning distribution by water temperature. Bull trout spawn in late summer and early fall (Bjornn 1991). Locally, anadromous forms typically return to freshwater in late summer and fall to spawn in upper tributaries and headwater areas. In the Snohomish River system, all known spawning occurs in the upper portions of the Skykomish River (both forks). Puget Sound stocks typically initiate spawning in late October or early November as water temperature falls below 7 to 8° C. Spawning habitat almost invariably consists of very clean gravel, often in areas of groundwater upwelling or cold spring inflow (Goetz 1994). Neither of these conditions exist in the action area. Egg incubation temperatures needed for survival have been shown to range from 2 to 4° C (Willamette National Forest 1989). Bull trout eggs require approximately 100 to 145 days to hatch, followed by an additional 65 to 90 days of yolk sac absorption during alevin incubation. Thus, in-gravel incubation spans more than 6 months. Hatching occurs in winter or late spring and fry emergence occurs from early April through May (Rieman and McIntyre 1993).

Generally, for their first 1 to 2 years, bull trout juveniles rear near their natal tributary and exhibit a preference for cool water temperatures (Bjornn 1991), although they appear less restricted by temperature than are spawners. Newly emerged bull trout fry are often found in shallow, backwater areas of streams that contain woody debris. Later, or in other habitats lacking woody debris for refugia, fry are bottom dwellers, and may occupy interstitial spaces in the streambed (Brown 1992). Since all known spawning occurs in the upper Skykomish sub-basin, these habitat requirements are not pertinent in the action area.

Resident forms of bull trout spend their entire lives in small streams, while migratory forms live in tributary streams for several years before migrating to larger rivers (fluvial form) or lakes (adfluvial form). Migratory individuals typically move downstream in the summer and often congregate in large, low-velocity pools to feed (Bjornn 1991). Anadromous bull trout usually remain in freshwater 2 or 3 years before migrating to saltwater in spring (Wydoski and Whitney 1979).

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[2] The biological similarities of bull trout and Dolly Varden make them virtually indistinguishable in the field. As a result, they are often referred to collectively as "native char." In fact, WDFW has combined information on their status and distribution into a common inventory (WDFW 1998).

Bull trout life histories are plastic (i.e., variable and changeable between generations), and juveniles may develop a life history strategy that differs from their parents. The shift between resident and migratory life forms may depend on environmental conditions. For example, resident forms may increase within a population when survival of migratory forms is low (Rieman and McIntyre 1993). Char are generally longer-lived than salmon, and bull trout up to 12 years old have been identified in Washington (Brown 1992).

5.2.3 Occurrences of Bull Trout in the Project Area

Bull trout are believed to have been historically well distributed throughout the central Puget Sound region (Goetz 1994). Although information regarding the current distribution of bull trout in the Snoqualmie River basin is meager, it is probable that foraging bull trout occur in the Snoqualmie River mainstem and/or its major tributaries (Pfeifer 1994 personal communication *in* FWS 1998b). This has been verified by observations of adult native char in very low numbers in pools in the upper Tolt River (King County 2000). Spawning populations have not been identified in the Snoqualmie River or its tributaries. Anglers report occasionally catching native char on the lower Snoqualmie River (Franzen 1997 personal communication *in* FWS 1998b). Older native char caught in the Snoqualmie River, and reported by Washington Trout snorkelers in the North Fork Tolt River, are most likely rearing individuals from the Skykomish River sub-population/s that are on feeding forays in the Snoqualmie basin.

5.2.4 Critical Habitat

The designation of critical habitat for listed species is required under Section 4(a)(3)(A) of the ESA and is generally determined at the time of the listing. The critical habitat designation was deemed "not determinable" by FWS (1998a) due to the meager understanding of the biological needs of bull trout. A critical habitat designation is generally expected within 2 years of the proposed rule, but it is not known when this designation will be made for the Puget Sound bull trout DPS (FWS 1998a).

Use of the Snoqualmie River by bull trout is largely unknown. There are no known documented occurrences of bull trout in the immediate project area. Currently, elevated water temperatures, low stream flows, and a degraded stream corridor would tend to obstruct or deter bull trout movement into the project area during the summer low flow period. However, the Snoqualmie River serves as a migratory corridor for bull trout elsewhere in the basin, where they occasionally occur. Suitable habitat for bull trout in the action area is limited to foraging habitat within the Snohomish River basin, and overwintering habitat.

5.3 ESSENTIAL FISH HABITAT

The Magnuson-Stevens Act requires the evaluation of proposed projects with a federal nexus to evaluate impacts on habitat of commercially managed fish populations. EFH has been defined for the purposes of the Magnuson-Stevens Act as "*those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity*" (NMFS 1999b). NOAA Fisheries has further added the following interpretations to clarify this definition:

- "Waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include areas historically used by fish where appropriate;
- "Substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities;
- "Necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and

- "Spawning, breeding, feeding, or growth to maturity" covers the full life cycle of a species.

5.3.1 Pacific Coast Salmon

NOAA Fisheries has recently proposed EFH for Pacific Coast salmon, including chinook, within Amendment 14 to the Pacific Coast Salmon Plan (NMFS 2000b). Any reasonable attempt to encourage the conservation of EFH must take into account actions that occur outside of EFH, such as upstream and upslope activities that may have an adverse effect on EFH.

Chapter 3, Section 3.2.5.5 of Amendment 14 (NMFS 2000b) addresses construction/urbanization impacts upon salmon habitat. Construction projects can significantly alter the land surface, soil, vegetation, and hydrology and adversely impact salmon EFH through habitat loss or modification A small amount of riparian shrubs or trees will be removed as a result of this construction, and some wetland fill will occur. However, both the construction of the proposed Tolt Bridge (#1834A) and the removal of the existing bridge will involve only minimal in-water work. Among numerous types of non-fishing activities that may affect EFH, should BMPs fail, those applicable to the project area are those that would:

- Alter sediment delivery to, and quantity in streams and estuaries.
- Alter water flow, quantity, timing, temperature, or chemistry.
- Alter the amount or types of nutrients or prey.
- Discharge pollutants, nutrients, or contaminants.

The use of BMPs during construction will avoid and minimize any potential effects upon salmon EFH. Examples of BMPs, as stated in the NMFS EFH guidance (2000b), include avoiding ground disturbing activities during the wet season; minimizing the time disturbed lands are left exposed; using erosion prevention and sediment control methods; minimizing vegetation disturbance; maintaining buffers of vegetation around wetlands, streams, and drainage ways; avoiding building activities in areas of steep slopes with highly erodible soils; and using methods such as sediment ponds, sediment traps, or other facilities designed to slow water run-off and trap sediment and nutrients. In light of these guidelines and the proposed design of the replacement Tolt Bridge (#1834A), there should be no significant adverse impact to EFH for chinook salmon in the Snoqualmie River.

6. WILDLIFE SPECIES EVALUATIONS

6.1 BALD EAGLES

6.1.1 ESA Status and Distribution

Bald eagles were first protected by the Bald Eagle Protection Act of 1940 and later listed as endangered under the Endangered Species Act of 1973. In 1978 the eagle was reclassified as threatened in five states, including Washington. Once numbering between 250,000 and 500,000 in the continental U.S., human development and the use of the pesticide DDT reduced the population to a low of about 400 pairs by the early 1960s. With the banning of DDT in 1972, and a number of subsequent recovery efforts, the continental U.S. population of bald eagles has since made a dramatic recovery, and by 1998 breeding pairs numbered approximately 6,000. Because of this recovery, FWS has proposed that the bald eagle be delisted (FWS 1999b). However, no final ruling has been made.

Recovery has been dramatic in Washington State, where there are now over 600 nesting pairs, with approximately 300 pairs in Puget Sound alone. Bald eagle nesting territories are now found along much of the shorelines of Puget Sound and Lake Washington. Washington State also supports the largest wintering population of bald eagles in the continental U.S. (Eagles nesting in Washington commonly winter in British Columbia and Southeast Alaska where winter runs of salmon occur.) A few thousand birds can be found throughout the state where waterfowl and fish congregate, including along the shorelines of Puget Sound.

6.1.2 Pertinent Life History

Nesting, foraging, and perching habitat for bald eagles is typically associated with water features such as rivers, lakes, and coast shorelines where eagles prey upon fish, waterfowl, and seabirds (Stalmaster 1980, 1983, 1987). During breeding season, eagles establish and maintain territorial boundaries, and breeding birds will rarely be found in high numbers. The nesting period occurs from January 1 through August 15. Breeding eagles show strong fidelity to a particular nesting territory, and will prevent other eagles from entering it (Grubb 1980). Territories frequently contain two or more nests, but will be used exclusively by one breeding pair, thereby reducing competition for local food resources. Suitable nesting habitat for bald eagles is typically in mature forests that contain large, dominant trees for nesting, and is in close proximity to aquatic foraging habitat (Anthony and Isaacs 1989). Douglas fir (*Pseudotsuga menziesii*) appears to be the most common tree species used for nesting in forests of western Oregon and Washington. Lack of suitable nesting habitat has been shown to be limiting factor for population growth in some raptors (Newton 1979). Unoccupied nests may indicate suitable physical habitat attributes are available but human activity precludes their successful use (Anthony and Isaacs 1989). There are no bald eagles nests within 2 miles of the Tolt Bridge.

Bald eagles may spend nights together in communal roosts, more commonly in winter and extreme weather. Many roosts are traditional sites that are used repeatedly and are typically located in areas where the eagles have protection from the weather, and away from human activity (Hansen et al. 1980). PHS data do not indicate any roost sites near the project.

Construction projects can affect bald eagles by creating disturbance, and/or by degrading their habitat (Bottorff et al. 1987; Anthony and Isaacs 1989). Disturbance can affect nesting eagles by frightening them from their nest, which may affect success and can even result in desertion (Stalmaster 1987). Anthony and Isaacs (1989) found that nests that are secluded from human disturbance tend to be more productive than those closer to human activities. Some studies suggest that eagles become habituated to human presence, but this apparently depends upon the level, proximity, and duration of the disturbance (Fraser et al. 1985; Mathisen 1968; Stalmaster and Newman 1979). Foraging eagles can be affected by disturbance that may displace them to less preferred areas (Stalmaster and Newman 1979; Stalmaster 1980).

Habitat degradation can be a consequence of construction projects that involve the removal of nesting, perching, roosting, or foraging habitat. Since eagle nesting and foraging habitat is almost always associated with shorelines, construction, and development frequently result in the loss of nesting, perching, and foraging opportunities (Stalmaster 1987). While eagle productivity has been positively correlated to the proximity of nest to water (Anthony and Isaacs 1989), nests in developed areas tend to be further from shorelines (Fraser et al. 1985).

6.1.3 Occurrences of Bald Eagles in the Project Area

FWS indicate that bald eagles occur within the vicinity of the project. Bald eagle occurrence is primarily during the wintering period from October 31 through March 31. Although FWS indicated that nesting bald eagles are also in the vicinity, PHS data from WDFW show there are no bald eagle nests, territories, or wintering concentration areas within at least 1 mile of the project area. A bald eagle nest is located due north of the project site, but it is over 2 miles away.

6.1.4 Critical Habitat

Critical habitat has not been designated for bald eagles.

7. EFFECTS DETERMINATIONS FOR LISTED SPECIES

7.1 EFFECTS ANALYSIS FOR CHINOOK SALMON

7.1.1 Direct and Indirect Effects

Potential direct effects on chinook salmon could include direct disturbance to individuals due to excavation and human or machine activity during the in-water phases of project construction. This construction will occur in Tributary 2 during the culvert replacement and in the Snoqualmie River during removal of the existing bridge piers. These effects should be minimal due to the fact that the reach of Tributary 2 where these activities are to occur will be blocked off with nets during the duration of any diversion and the isolated work area will undergo extensive dip netting to remove any individual fish that may be present. Furthermore, Tributary 2 is a agricultural ditch with little habitat complexity, that likely experiences high summer temperatures. Tributary 2 would offer only very limit habitat to juvenile chinook or bull trout.

The preferred method for pier removal (cable saw) would not require dewatering, create little turbidity, and require only minimal equipment in the water. The presence of underwater divers during this operation would likely deter fish from entering the immediate work area. If one of the other two methods is chosen (see Section 3.3.6.3) for pier removal, fish removal activities will occur in the coffer dams around the piers in the Snoqualmie River prior to their dewatering. Again this will be completed with dip nets, and all pump intakes will be screened to prevent entrainment of fish. For all in-water activities, work will be completed as quickly as possible, to minimize the time the diversion is in place. All conditions of the WDFW HPA permit, including timing restrictions, will be strictly adhered to (the HPA has not yet been issued). Furthermore, a field habitat assessment by a Parametrix biologist characterized the habitat in Tributary 2 as being severely impacted and not likely habitat for chinook salmon or bull trout (Parametrix 2003a). The replacement of the culvert on Tributary 2 will result in an improvement in fish passage conditions for the stream.

Also at issue are the potential effects of exposing adult, juvenile, and embryonic chinook salmon to degraded water quality associated with the Tolt Bridge (#1834A) replacement. There will be no in-water work during construction of the new bridge. The vegetation clearing, project grading, and drilled shaft construction may have potential direct and indirect effects on chinook salmon, but implemented BMPs (i.e., erosion control) will reduce or eliminate the potential to introduce fine sediment into the river channel. Fine sediment and turbidity have the potential to affect the behavior or feeding success of juvenile chinook salmon. Suspended solids will reduce light transmission and, if chronic, suppress primary production. Suspended solids can also coat gills, reducing respiration efficiency. Migrating adult chinook salmon may be affected if BMPs fail, although adult spawning chinook salmon have not been reported in the reach of the river where bridge construction and removal are taking place due to a lack of suitable habitat (Williams et al. 1975; WDF et al. 1993). (The closest suitable gravel riffles in the Snoqualmie River occur below the Tolt River confluence at RM 25, 750 feet downstream from the project site.) Adult chinook salmon would be present in the work area only briefly as they migrate upstream. Salmon commonly migrate under freshet conditions, when suspended sediment and turbidity levels are high, much higher than would be expected during project construction.

Because the project will meet applicable water quality standards, the survival of adult and juvenile fish will not be reduced. Some additional impervious surface (0.72 acre) will be added to the project site. However, stormwater treatment facilities will be installed to treat all runoff from the project site (there is no stormwater treatment at present). The stormwater facilities will consist of both constructed open water quality ponds and properly sized bioswales. The stormwater treatment design based on the King County

Surface Water Design Manual (King County 1998) and is intended to be equivalent to the 2001 Washington State Department of Ecology Stormwater Manual (Ecology 2001). The net result of the project will likely be an improvement in the water quality of the stormwater runoff entering the Snoqualmie River.

Implementing the BMPs and conservation measures described herein during construction will substantially reduce the potential for degrading water quality. Even if these measures were to fail, the effects would be discountable (discountable effects are those extremely unlikely to occur). The effect of a sediment plume should be short-lived and would not create toxic conditions or result in take. Assuming major earthwork occurs in spring, chinook salmon pre-smolts would be expected to have migrated through the work area to the Snohomish Estuary by the time onsite grading and soil disturbance takes place (Cramer & Associates 1999).

The removal of forest cover in the riparian corridor could have a variety of possible effects including a reduction in the amount and quality of LWD recruited to the stream, a reduction in stream shade that in turn could increase stream temperature, and a destabilizing effect on streambanks, adding to streambank erosion. However, the only vegetation removed in the stream buffers is along the alignment of the project, directly under and adjacent to where the bridge will be constructed. These areas, along the Snoqualmie River and Tributary 3, are relatively small with only 48 trees of over 6 inches dbh to be removed. All temporarily disturbed areas will be replanted with appropriate native vegetation, including tree species where feasible. Areas directly under the new bridge on the west side will also be replanted with native shrubs and herbaceous plants, while on the east side of the river only herbaceous species will be planted. In the latter case it is assumed that the new structure will be high enough to admit enough light for plant growth, but will not provide enough room for trees or large shrubs. Furthermore, the new bridge itself will provide some shading of the Snoqualmie River and Tributary 3. Due to these reasons, the (mostly temporary) removal of riparian vegetation is not expected to have any of the deleterious effects listed above and should not significantly alter LWD recruitment or stream shading in the system.

The noise associated with the bridge construction is not expected to have adverse effects on salmon migrating through the project area. No piles would be placed waterward of the OHWM. The only pile driving activity that is occurring as part of the project would be located in the soft mucky wetland area west of the river, entirely **outside of the OHWM**. This includes the pile driving necessary to construct the temporary work platform on the west side of the river (approximately 4 consecutive weeks total construction time) and that (if necessary) needed to construct the temporary work trestle (about 2 to 4 consecutive weeks total construction time). Steel piles will be driven at each of the pier locations with the piles closest being approximately 10 feet landward of the OHWM. In-water pile driving can generate considerable noise and vibration impacts and driving steel pile has been found to cause both injury and behavioral changes in some specific cases. These effects have primarily occurred with steel piles driven hard in-water locations.

In the marine environment, it has been demonstrated that in-water pile driving does have tangible effects on the general behavior and distribution of salmonids and that salmonids may be affected by pile driving sound within a radius of 600 meters of the sound source and that pile driving operations may affect salmonids (Feist et al.1992). However, the same study indicated that although juvenile pink and chum salmon avoided the immediate area of pile driving activity, they did not change their shoreline orientation or cease foraging (Feist et al. 1992). It should be noted that this research focused on in-water pile driving, which will not occur as part of this project. A study investigating the effects of vibratory sheet pile driving on the banks (landward side) of the Duwamish River found that the maximum in-water sound levels were below those known to cause physiological damage to salmonids (Greeneridge Sciences, Inc. 2003). The authors indicated that although it is difficult to predict a behavioral response, the available literature indicates that a response may be unlikely at the noise levels generated by pile driving (a maximum of around 150 dB).

Dr. John Stadler (Personal communication 2003) indicated that since the pile driving for the Tolt Bridge Replacement project would occur on land as opposed to in-water, the effects on fish would be attenuated, especially since most of the piles would be 40 feet or more from the river. He also stated that although it is difficult to predict how the sound would be transmitted through the sediments, given the presence of soft sediments in the pile driving areas (Wetland 2) and the distance from the river, the cause for concern over effects to chinook salmon would be minimized.

The sensory capability of different fish species is variable and there is some evidence that relatively high levels of noise may not alter the behavior of some salmonid species. Mate et al. (1987) conducted neurological tests on coho salmon and determined that their hearing was most sensitive around 50 Hz with an upper limit of 800 Hz. Their work, plus that conducted at the Ballard Locks with chinook salmon and steelhead (NMFS and WDW 1992) and acoustic devices capable of ensonifications up to 220 dB, conclusively showed no effect on fish behavior. Laboratory fish tank studies by Mate et al. (1987) indicated that sound pressure levels of 195 dB in a frequency range of 8 to 12 KHz had no effect on adult salmonids or egg and sperm viability. Frequencies above 1 KHz were shown to be beyond the normal "hearing" range of the fish.

Tests were conducted with a transducer in the upper chamber of the Ballard Locks fishway on September 25, 1992 to determine if increased sound pressure levels from acoustic deterrent devices would cause a reaction to migrating salmon. Tests were conducted with a jack coho salmon and an adult chinook salmon present. No response by the fish to the ensonifications was observed, although the sound pings could be heard by observers through glass windows 4 to 5 inches thick. The adult chinook salmon was finally induced to move by bumping the fish with the actively pinging transducer. A WDFW fish pathologist indicated that tissue damage to steelhead (or salmon) would be unlikely if no sign of response was observed when exposed to the sound.

Multiple years of work in the Lake Washington Ship Canal where a variety of acoustic deterrence devices were employed failed to show any evidence of delay in the migration of steelhead (Pfeifer et al. 1989; Infometrix 1994; Tabor et al. 1994). Migrating salmon and steelhead are accustomed to the "noisy" environment of turbulent streams, plunge pools at the base of cascades and waterfalls, etc. Low-intensity sound generated by work conducted out of the water, away from the river when fish may be rearing or migrating through the project area would not be expected to have any harmful effects. This analysis applies to coho salmon and bull trout as well.

No additional instream structures within ordinary high water will be introduced to the Snoqualmie River or its tributaries as part of this project. Two of the piers for the existing bridge that are presently located within the Snoqualmie River will be cut off as low to the mud-line as possible during the removal of the existing bridge. The preferable method for this action requires only the use of a wire saw in-water and does not require dewatering or the installation of coffer dams. Furthermore, the timing of this activity will comply with the conditions of the HPA permit (when issued), including any and all timing restrictions. As discussed previously, BMPs will be implemented to minimize turbidity effects during the process of pier removal, regardless of the method used.

Other potential direct effects may stem from falling debris or dust into the Snoqualmie River from work on the bridge deck, rails, and other structures. The effects from these activities to water quality would be the same as similar to those discussed for runoff above and will be minimized by following the conservation measures described herein, including the use of special screens to prevent material from entering the river.

As the Tolt Bridge (#1834A) is being replaced with a bridge with no additional lane capacity, no increase in human population growth within the project vicinity attributable to the project is expected.

7.1.2 Cumulative Effects

No state or private action is expected to occur in the vicinity of the project site in the foreseeable future that would measurably add to any unmitigated effects of the project.

7.1.3 Interrelated and interdependent Actions

Interrelated actions are those that are part of the primary action and dependent upon that action for their justification. Interdependent activities have no independent utility apart from the proposed action. Interrelated and interdependent effects are those that would not occur "but for" the proposed action. No interrelated and interdependent effects on chinook salmon are expected from the proposed project as the project is not linked, directly or indirectly, to any other projects in the area.

7.1.4 Determination

As a result, we conclude that the project **may affect, but [is] not likely to adversely affect** chinook salmon, and that should critical habitat for chinook salmon be reinstated, the project **will not result in the destruction or adverse modification of critical habitat** for chinook salmon in the action area.

7.2 EFFECTS ANALYSIS FOR BULL TROUT

7.2.1 Direct and Indirect Effects

Because no current, reliable information exists about the distribution of bull trout in the Snoqualmie River basin, for this analysis we examined the potential life history strategies of bull trout that might exist in the project vicinity, including resident and migratory forms. Resident forms of bull trout spend their entire lives in tributary reaches of rivers. However, much of the Snoqualmie River mainstem is lacking the habitat complexity and cold water temperatures required by bull trout, therefore it is extremely unlikely that any bull trout utilize the Snoqualmie River or its tributaries in the project vicinity for spawning or rearing activities. Anadromous bull trout may however, use the Snoqualmie River as a migration corridor. If anadromous bull trout are present in the action area, they are most likely utilizing the area for transportation to and from better quality spawning habitat that may be located in tributaries of the Snoqualmie or Raging Rivers.

Potential direct and indirect effects of the bridge replacement on the bull trout are similar to those described above for chinook salmon. The bridge replacement construction on the Snoqualmie River will meet water quality standards imposed by the state and federal laws (e.g., CWA404/401, HPA permits). Implementing the conservation measures as described during construction will substantially reduce the potential for degrading water quality.

7.2.2 Cumulative Effects

No state or private action is expected to occur in the vicinity of the project site in the foreseeable future that would measurably add to any unmitigated effects of the project.

7.2.3 Interrelated and Interdependent Actions

No interrelated and interdependent effects on bull trout are expected from the proposed project. The project is not linked, directly or indirectly, to any other projects in the area.

7.2.4 Determination

In summary, migrating bull trout may be present in the immediate project construction area. However, based on the project design, project activities, mitigation, and conservation measures discussed in Section 2.4.10, we conclude that the project **may affect, but [is] not likely to adversely affect** bull trout.

7.3 EFFECTS ANALYSIS FOR ESSENTIAL FISH HABITAT

The determination of the effects of the proposed bridge replacement project on EFH is made pursuant to Section 305(b)(2) of the Magnuson-Stevens Act. Under this act, Federal agencies are required to consult with NOAA Fisheries regarding any of their actions or proposed actions authorized, funded, or undertaken that may "adversely affect" EFH. "Adverse effect" means any impact which reduces the quality and/or quantity of EFH, that can include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific, or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

Cumulative impacts are incremental impacts, occurring within a watershed or marine ecosystem context that may result from individually minor but collectively significant actions. The assessment of cumulative impacts is intended in a generic sense to examine actions occurring within the watershed or marine ecosystem that adversely affect the ecological structure or function of EFH. The assessment should specifically consider the habitat variables that control or limit a managed species' use of a habitat. It should also consider the effects of all impacts that affect either the quantity or quality of EFH. For any Federal action that may adversely affect EFH (except those activities covered by a General Concurrence) Federal agencies must provide NMFS with a written assessment of the effects of that action on EFH. Federal agencies may incorporate an EFH Assessment into documents prepared for other purposes such as Section 7 Biological Evaluations or Assessments.

7.3.1 Direct, Indirect, and Cumulative Effects

Potential impacts of the replacement of the Tolt Bridge to ESA listed species are discussed in Sections 6.1.1 and 6.1.2 in this BA. As discussed, strict adherence to BMPs will protect the Snoqualmie River from water quality effects during project construction. As such, there should be no direct, indirect, or cumulative adverse effects upon Pacific Coast salmon EFH during project construction.

7.3.2 Determination

Based on the EFH requirements of Pacific Coast salmon species, BMPs, and conservation and mitigation measures proposed as part of the project, the determination for EFH is **no effect**.

7.4 EFFECTS ANALYSIS FOR BALD EAGLES

7.4.1 Direct Effects

The proposed project would have no direct effects on nesting bald eagles or their prey base. PHS data do not indicate any winter concentration areas, roost sites, or nest sites within 1.5 miles of the project area. However, FWS does indicate that wintering bald eagles may occur in the project vicinity. Immediately along the shoreline are a few large black cottonwood, red alder, and Douglas fir trees that may provide suitable perches for bald eagles. Most of these trees will be left undisturbed, and no larger coniferous trees will be cut as a result of the proposed project. Noise and human disturbance resulting from project construction activities will occur, but the effects of this disturbance to foraging behavior would be temporary and suitable foraging habitat exists in the surrounding areas of the Snoqualmie and Tolt Rivers and associated wetlands. Short-term noise and human disturbance associated with construction activities will not affect bald eagle behavior. Local bald eagles are likely habituated to human activities, including auto and boat traffic, in the project vicinity. Additionally, the vast majority of bridge replacement work, and all activities with high noise levels (e.g., pile driving) will be conducted between April 1 and October 31, which is outside the wintering period for eagles.

7.4.2 Indirect Effects

Possible indirect effects to bald eagles would include disturbance and other adverse impacts to prey species, primarily waterfowl and fish. However, disturbance of prey during construction is unlikely, as there are few features such as pools or side channels where prey are likely to congregate immediately adjacent to the proposed bridge alignment or the bridge removal. Therefore, it is unlikely that bald eagles will spend much time foraging in the immediate project vicinity. Additionally, by implementing the conservation measures as described, the potential for degrading water quality will be substantially reduced.

7.4.3 Cumulative Effects

No state or private action is expected to occur in the vicinity of the project site in the foreseeable future that would measurably add to any unmitigated effects of the project.

7.4.4 Interrelated and Interdependent Actions

No interrelated and interdependent effects on bald eagles are expected from the proposed project. The project is not linked, directly or indirectly, to any other projects in the area.

7.4.5 Determination

Based on the above assessment, the project **may affect, [but is] not likely to adversely affect** wintering bald eagles and will have **no affect** on nesting bald eagles. Furthermore, potential winter roost sites and known foraging areas will not likely be significantly impacted.

7.5 SUMMARY OF EFFECT DETERMINATIONS

The *Checklist for Documenting Environmental Baseline and Effects of Proposed Actions(s) on Relevant Indicators* is included in Section 3.3 and was used to guide the determination of effect for the proposed action on each fish species. An extensive field survey of the habitat parameters identified in the checklist was not performed in the action area. Rather, the checklist was completed using the best available scientific information for the area and through visual observation of the project vicinity.

An assessment was made for potential direct and indirect impacts resulting from the completion of the proposed project. The proposed bridge construction activities aim to improve automobile, pedestrian and bicycle safety while causing minimal disturbance to critical areas that, in the worst possible case, may indirectly be associated with apparent critical habitat or proposed critical habitat for species that are listed, proposed to be listed, or a candidate for listing for protection under the ESA. Temporary impacts to any species from the construction activities of the proposed project will be minimized or eliminated by utilizing appropriate BMPs, while long term impacts to wetlands and wetland buffers will be mitigated.

Based on field work by natural resource specialists, evaluation of the proposed design, review of pertinent literature, and interviews with fish and wildlife authorities, we conclude that the project will result in a **may affect, not likely to adversely affect** determination for **chinook salmon, bull trout**, and **wintering bald eagles**. The project will have **no effect** on nesting bald eagles. Additionally, there will be **no negative impacts** to **coho salmon**. Should coho salmon become listed as threatened or endangered in the future, the project may result in a **may affect, not likely to adversely affect** determination for this species. This project will not result in the "take" of any listed or candidate species. Should critical habitat for chinook salmon be reinstated, our finding is that the project **will not result in the destruction or adverse modification of critical habitat** for chinook salmon in the action area.

Based on the EFH requirements of Pacific Coast salmon species, the potential direct, indirect, and cumulative effects of the construction of the proposed project will have **no effect** on any identified EFH for the project site or action area evaluated. No long-term impacts to EFH are anticipated.

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APPENDIX A

Agency Response Letters

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Western Washington Fish and Wildlife Office
510 Desmond Drive SE, Suite 102
Lacey, Washington 98503
Phone: (360) 753-9440 Fax: (360) 534-9331

MAY 6 2003

Dear Species List Requester:

We (U.S. Fish and Wildlife Service) are providing the information you requested to assist your determination of possible impacts of a proposed project to species of Federal concern. Attachment A includes the listed threatened and endangered species, species proposed for listing, candidate species, and/or species of concern that may be within the area of your proposed project.

Any Federal agency, currently or in the future, that provides funding, permitting, licensing, or other authorization for this project must assure that its responsibilities under section 7(a)(2) of the Endangered Species Act of 1973, as amended (Act), are met. Attachment B outlines the responsibilities of Federal agencies for consulting or conferencing with us.

If both listed and proposed species occur in the vicinity of a project that meets the requirements of a major Federal action (i.e., "major construction activity"), impacts to both listed and proposed species must be considered in a biological assessment (BA) (section 7(c); see Attachment B). Although the Federal agency is not required, under section 7(c), to address impacts to proposed species if listed species are not known to occur in the project area, it may be in the Federal agency's best interest to address impacts to proposed species. The listing process may be completed within a year, and information gathered on a proposed species could be used to address consultation needs should the species be listed. However, if the proposed action is likely to jeopardize the continued existence of a proposed species, or result in the destruction or adverse modification of proposed critical habitat, a formal conference with us is required by the Act (section 7(a)(4)). The results of the BA will determine if conferencing is required.

The Federal agency is responsible for making a determination of the effects of the project on listed species and/or critical habitat. For a Federal agency determination that a listed species or critical habitat is likely to be affected (adversely or beneficially) by the project, you should request section 7 consultation through this office. For a "not likely to adversely affect" determination, you should request our concurrence through the informal consultation process.

Candidate species and species of concern are those species whose conservation status is of concern to us, but for which additional information is needed. Candidate species are included as an advance notice to Federal agencies of species that may be proposed and listed in the future. Conservation measures for candidate species and species of concern are voluntary but recommended. Protection provided to these species now may preclude possible listing in the future.

For other federally listed species that may occur in the vicinity of your project, contact the National Marine Fisheries Service (NOAA Fisheries) at (360) 753-9530 to request a list of species under their jurisdiction. For wetland permit requirements, contact the Seattle District of the U.S. Army Corps of Engineers for Federal permit requirements and the Washington State Department of Ecology for State permit requirements.

Thank you for your assistance in protecting listed threatened and endangered species and other species of Federal concern. If you have additional questions, please contact Tami Black at (360) 753-4322 or Yvonne Dettlaff at (360) 753-9582.

Sincerely,

L. Karolee Owens

for Ken S. Berg, Manager
Western Washington Fish and Wildlife Office

Enclosure(s)

ATTACHMENT A

April 30, 2003

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES, CRITICAL HABITAT, CANDIDATE SPECIES, AND SPECIES OF CONCERN THAT MAY OCCUR IN THE VICINITY OF THE PROPOSED TOLT BRIDGE 1834A REPLACEMENT PROJECT IN KING COUNTY, WASHINGTON

(T25N R7E S20)

FWS REF: 1-3-03-SP-1201

LISTED

There is one bald eagle (*Haliaeetus leucocephalus*) nesting territory located in the vicinity of the project at T25N R7E S28. Nesting activities occur from January 1 through August 15.

Wintering bald eagles may occur in the vicinity of the project. Wintering activities occur from October 31 through March 31.

Bull trout (*Salvelinus confluentus*) occur in the vicinity of the project.

Major concerns that should be addressed in your biological assessment of the project impacts to listed species include:

1. Level of use of the project area by listed species;
2. Effect of the project on listed species' primary food stocks, prey species, and foraging areas in all areas influenced by the project; and
3. Impacts from project construction (i.e., habitat loss, increased noise levels, increased human activity) that may result in disturbance to listed species and/or their avoidance of the project area.

PROPOSED

None

CANDIDATE

None

CRITICAL HABITAT

None

SPECIES OF CONCERN

The following species of concern have been documented in the county where the project is located. These species or their habitat could be located on or near the project site. Species in **bold** were specific occurrences located on the database within a 1-mile radius of the project site.

Beller's ground beetle (*Agonum belleri*)
California wolverine (*Gulo gulo luteus*)
Cascades frog (*Rana cascadae*)
Hatch's click beetle (*Eanus hatchi*)
Larch Mountain salamander (*Plethodon larselli*)
Long-eared myotis (*Myotis evotis*)
Long-legged myotis (*Myotis volans*)
Northern goshawk (*Accipiter gentilis*)
Northwestern pond turtle (*Emys* (= *Clemmys*) *marmorata marmorata*)
Northern sea otter (*Enhydra lutris kenyoni*)
Olive-sided flycatcher (*Contopus cooperi*)
Pacific fisher (*Martes pennanti pacifica*)
Pacific Townsend's big-eared bat (*Corynorhinus townsendii townsendii*)
Pacific lamprey (*Lampetra tridentata*)
Peregrine falcon (*Falco peregrinus*)
River lamprey (*Lampetra ayresi*)
Tailed frog (*Ascaphus truei*)
Valley silverspot (*Speyeria zerene bremeri*)
Western toad (*Bufo boreas*)
Aster curtus (white-top aster)
Botrychium pedunculosum (stalked moonwort)

ATTACHMENT B

FEDERAL AGENCIES' RESPONSIBILITIES UNDER SECTIONS 7(a) AND 7(c) OF THE ENDANGERED SPECIES ACT OF 1973, AS AMENDED

SECTION 7(a) - Consultation/Conference

Requires:

1. Federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species;

2. Consultation with the U.S. Fish and Wildlife Service (FWS) when a Federal action may affect a listed endangered or threatened species to ensure that any action authorized, funded, or carried out by a Federal agency is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. The process is initiated by the Federal agency after it has determined if its action may affect (adversely or beneficially) a listed species; and

3. Conference with the FWS when a Federal action is likely to jeopardize the continued existence of a proposed species or result in destruction or an adverse modification of proposed critical habitat.

SECTION 7(c) - Biological Assessment for Construction Projects *

Requires Federal agencies or their designees to prepare a Biological Assessment (BA) for construction projects only. The purpose of the BA is to identify any proposed and/or listed species that is/are likely to be affected by a construction project. The process is initiated by a Federal agency in requesting a list of proposed and listed threatened and endangered species (list attached). The BA should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable). If the BA is not initiated within 90 days of receipt of the species list, please verify the accuracy of the list with the Service. No irreversible commitment of resources is to be made during the BA process which would result in violation of the requirements under Section 7(a) of the Act. Planning, design, and administrative actions may be taken; however, no construction may begin.

To complete the BA, your agency or its designee should (1) conduct an onsite inspection of the area to be affected by the proposal, which may include a detailed survey of the area to determine if the species is present and whether suitable habitat exists for either expanding the existing population or potential reintroduction of the species; (2) review literature and scientific data to determine species distribution, habitat needs, and other biological requirements; (3) interview experts including those within the FWS, National Marine Fisheries Service, state conservation department, universities, and others who may have data not yet published in scientific literature; (4) review and analyze the effects of the proposal on the species in terms of individuals and populations, including consideration of cumulative effects of the proposal on the species and its habitat; (5) analyze alternative actions that may provide conservation measures; and (6) prepare a report documenting the results, including a discussion of study methods used, any problems encountered, and other relevant information. Upon completion, the report should be forwarded to our Endangered Species Division, 510 Desmond Drive SE, Suite 102, Lacey, WA 98503-1273.

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* "Construction project" means any major Federal action which significantly affects the quality of the human environment (requiring an EIS), designed primarily to result in the building or erection of human-made structures such as dams, buildings, roads, pipelines, channels, and the like. This includes Federal action such as permits, grants, licenses, or other forms of Federal authorization or approval which may result in construction.

Habitat Conservation Division
NOAA Fisheries National Marine Fisheries Service

Northwest Region Species List

Endangered, Threatened, Proposed, and Candidate Species under
National Marine Fisheries Service Jurisdiction that Occur in Oregon, Washington, and Idaho

Listed Species

Coho Salmon (*Oncorhynchus kisutch*)

- Southern Oregon/Northern California Coasts Evolutionarily Significant Unit (ESU)(Threatened)
- Oregon Coast ESU (Threatened)

Chinook Salmon (*O. tshawytscha*)

- Snake River Fall-run ESU (Threatened)
- Snake River Spring/Summer-run ESU (Threatened)
- Puget Sound ESU (Threatened)
- Lower Columbia River ESU (Threatened)
- Upper Willamette River ESU (Threatened)
- Upper Columbia River Spring-run ESU **(Endangered)**

Chum Salmon (*O. keta*)

- Hood Canal Summer-run ESU (Threatened)
- Columbia River ESU (Threatened)

Sockeye Salmon (*O. nerka*)

- Snake River ESU **(Endangered)**
- Ozette Lake ESU (Threatened)

Steelhead (*O. mykiss*)[1]

- Upper Columbia River ESU **(Endangered)**
- Snake River Basin ESU (Threatened)
- Lower Columbia River ESU (Threatened)
- Upper Willamette River ESU (Threatened)

- Middle Columbia River ESU (Threatened)

Sea-run Cutthroat Trout (*O. clarki clarki*)

- Umpqua River ESU **(Endangered)**

Proposed for Listing

Chinook Salmon

- Southern Oregon/Northern California Coastal ESU (Proposed Threatened)

Sea-run Cutthroat Trout

- Southwestern Washington/Columbia River ESU (Proposed Threatened)

Candidates for Listing

Coho Salmon

- Puget Sound/Straight of Georgia ESU
- Lower Columbia River/Southwest Washington ESU

Steelhead

- Klamath Mountains Province ESU
- Oregon Coast ESU

Sea-run Cutthroat Trout

- Oregon Coast ESU

Updated February 2, 2000
Species List Updated April 1999

Protected Resources

NOAA Fisheries — National Marine Fisheries Service

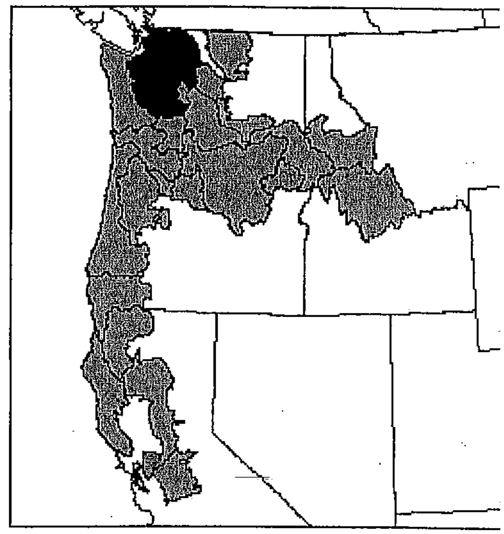
CHINOOK SALMON

Oncorhynchus tshawytscha

PUGET SOUND ESU

LISTED THREATENED

March 1999



ESU* STATUS AND DESCRIPTION: Listed as a threatened species on March 24, 1999. The ESU includes all naturally spawned populations of chinook salmon from from rivers and streams flowing into Puget Sound including the Straits of Juan De Fuca from the Elwha River, eastward, including rivers and streams flowing into Hood Canal, South Sound, North Sound and the Strait of Georgia in Washington. Chinook salmon (and their progeny) from the following hatchery stocks are considered part of the listed ESU: Kendall Creek (spring run); North Fork Stillaguamish River (summer run); White River (spring run); Dungeness River (spring run); and Elwha River (fall run).

** An Evolutionarily Significant Unit or "ESU" is a distinctive group of Pacific salmon, steelhead, or sea-run cutthroat trout.*

CRITICAL HABITAT:
Current Status **-** Under development. On April 30, 2002, the U.S. District Court for the District of Columbia approved a NMFS consent decree withdrawing a February 2000 critical habitat designation for this and 18 other ESUs.

PROTECTIVE REGULATIONS: On July 10, 2000, NMFS published a final rule that identifies several exceptions to the Endangered Species Act's Section 9 take prohibitions.

ESU MAPS AND DATA:

- View Detailed Puget Sound Chinook Salmon ESU Map (Adobe Acrobat PDF format)§
- View Range Map for all Chinook ESUs
- Download Chinook salmon ESU data in Arc/Info export and shape file format
- Download E-sized plot files of West Coast chinook salmon listings in RTL file format for large format plotters

STATUS REVIEWS:
NOAA Technical Memorandum NMFS-NWFSC-35, February 1998
Status Review of Chinook Salmon from Washington, Idaho, Oregon, and California

STATUS REVIEW UPDATE MEMOS:
Conclusions Regarding the Updated Status of Puget Sound, Lower Columbia River, Upper Willamette River, and Upper Columbia River Spring-run ESUs of West Coast Chinook Salmon, 12/23/98 (under construction)
Evaluation of the Status of Chinook and Chum Salmon and Steelhead and Steelhead Hatchery Populations for ESUs

Protected Resources

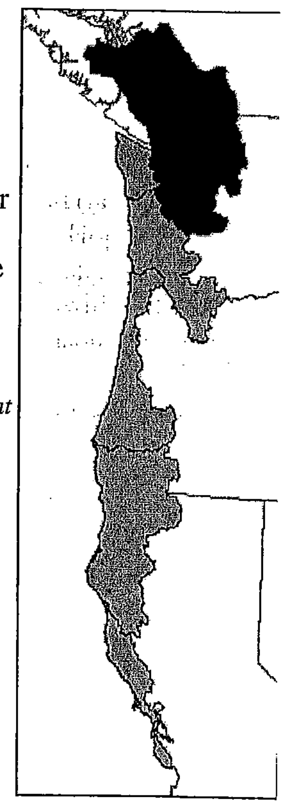
NOAA Fisheries National Marine Fisheries Service

COHO SALMON

Oncorhynchus kisutch

PUGET SOUND/STRAIT OF GEORGIA ESU CANDIDATE

July 1995



ESU* STATUS AND DESCRIPTION: On July 25, 1995, NMFS determined that listing was not warranted for this ESU. However, the ESU is designated as a candidate for listing due to concerns over specific risk factors. The ESU includes all naturally spawned populations of coho salmon from drainages of Puget Sound and Hood Canal, the eastern Olympic Peninsula (east of Salt Creek), and the Strait of Georgia from the eastern side of Vancouver Island and the British Columbia mainland (north to and including the Campbell and Powell Rivers), excluding the upper Fraser River above Hope. Major U.S. river basins containing spawning and rearing habitat for this ESU comprise approximately 13,821 square miles in Washington. The following counties lie partially or wholly within these basins: Clallam, Grays Harbor, Island, Jefferson, King, Kitsap, Kittitas, Lewis, Mason, Pierce, San Juan, Skagit, Snohomish, Thurston, and Whatcom.

** An Evolutionarily Significant Unit or "ESU" is a distinctive group of Pacific salmon, steelhead, or sea-run cutthroat trout.*

CRITICAL HABITAT:
Current Status **-** not applicable.
Description **-** not applicable.

PROTECTIVE REGULATIONS: not applicable.

ESU MAPS AND DATA:

- View Detailed Puget Sound/Strait of Georgia Coho ESU Map (Adobe Acrobat PDF format)§
- View Range Map for all Coho ESUs
- Download coho salmon ESU data in Arc/Info export and shape file format
- Download E-sized plot files of West Coast coho salmon listings in RTL file format for large format plotters

STATUS REVIEWS:
NOAA Technical Memorandum NMFS-NWFSC-24, September 1995
Status Review of Coho Salmon from Washington, Oregon, and California

FEDERAL REGISTER NOTICES:
View Federal Register Notices for Coho Salmon§

§You will need Adobe Acrobat Reader in order to view and print the detailed ESU map file and the Federal Register Notices. This program is available for free at the following link. Get Acrobat Reader

APPENDIX B

Coho Salmon Life History and Effects Analysis

COHO SALMON

ESA and Stock Status

A status review of coho salmon was recently completed by NOAA Fisheries in response to petitions seeking to list several Pacific Northwest populations as threatened or endangered (Weitkamp et al. 1995). Based on genetic, life history, biogeographic, geologic, and environmental information, six ESUs were defined for coho salmon in Washington, Oregon, and California. Despite recent stable trends, or population abundance near historic levels for some stocks, the status of the Puget Sound/Strait of Georgia ESU was determined to warrant further consideration for listing due to concerns over current genetic, environmental, and habitat conditions (NMFS 1995). Risk factors identified as potentially deleterious to Puget Sound coho salmon stocks included high harvest rates, extensive habitat degradation, unfavorable ocean conditions, and declines in adult size (Weitkamp et al. 1995). The genetic fitness of Puget Sound coho salmon stocks has been altered by widespread and intensive artificial propagation that includes inter-basin transfers of broodstock, and by natural spawning between wild and hatchery fish. Hatchery supplementation has been particularly extensive (Weitkamp et al. 1995).

Coho salmon inhabiting the Snoqualmie River are managed as part of the Snoqualmie coho salmon stock. This stock is defined by its distinct geographic spawning distribution, but has no unique biological characteristics and its spawning timing is not distinct (WDF et al. 1993). Coho salmon are distributed throughout the accessible reaches of the tributaries draining into the Snohomish River system (WDF et al. 1993). This stock is considered to be a mixture of native and introduced non-native stocks (WDF et al. 1993). Stock status is healthy, based on trends in spawning escapement (WDF et al. 1993).

Pertinent Life History

Adults coho salmon enter freshwater in September and October, and spawning occurs mostly from late October through January (Williams et al. 1975; WDF et al. 1993). Coho salmon typically return to spawn at age 3, though sexually mature 2-year-old males are not unusual. These "jacks", as they are called, return to freshwater to spawn after only 5 to 7 months at sea. The proportion of jacks within a population is highly variable and is influenced by genetic and environmental factors (Weitkamp et al. 1995). All coho salmon are semelparous. Coho salmon usually spend 2 weeks or less on the spawning grounds from the time of their arrival to the time of their death (Sandercock 1991).

Coho salmon typically hatch after 6 to 8 weeks and emerge from the gravel 2 to 3 weeks later (Wydoski and Whitney 1979). The length of time required for incubation depends largely on water temperatures, as it does for other salmonids. After emergence coho salmon feed voraciously on terrestrial and aquatic insects, often selecting prey that drifts on the surface or in the water column (Sandercock 1991). Coho salmon generally rear in freshwater from 1 to 2 years then migrate to salt water where they remain for about 18 months prior to returning to freshwater to spawn (Wydoski and Whitney 1979; Sandercock 1991). Typically, coho salmon smolts migrate with increased spring flows, between mid-April and mid-July with peak migration in May.

The most productive rearing areas for coho salmon tend to be small streams with abundant slack water habitats (Wydoski and Whitney 1979; Sandercock 1991). Rearing juvenile coho salmon tend to prefer pools (Bisson et al. 1988) and woody debris is an important structural element that creates this type of habitat (Bustard and Narver 1975; Bisson et al. 1987). Woody debris also provides areas of cover, and provides food to many aquatic insects that are in turn prey for rearing coho salmon juveniles and other salmonids. As winter nears and flows increase, coho salmon will commonly seek refuge in ponds and small tributaries where they can avoid being flushed downstream during extreme high flow events

(Peterson 1982; Cederholm and Scarlett 1982). Locally, coho salmon habitat has often been reduced in agricultural or urbanized areas. Diking, dredging, ditching, and other methods of bank protection have vastly reduced the amount of complex low-gradient side channels available for coho salmon summer and winter rearing habitat in the Snohomish River basin (Beechie et al. 1994). Loss of pools and native riparian vegetation associated with sedimentation and landscaping, respectively, are common problems in the urban area (May 1996).

Occurrences of Coho Salmon in the Project Area

Coho salmon utilize almost all of the accessible tributaries draining into the Snohomish River system. The Snoqualmie stock is comprised of both native and non-native fish, although the contribution of each type of fish to the stock is unknown (WDF et al. 1993). There have been substantial off-station releases of hatchery stocks in this drainage. The status of the stock is healthy, based on spawning escapement of 10,000 to 59,000 from 1977 to 1992. Adults enter freshwater in September and October, and spawning occurs mostly from late October through January (Williams et al. 1975; WDF et al. 1993). The most productive rearing areas for coho salmon tend to be the small streams with abundant slack water habitats (Wydoski and Whitney 1979; Sandercock 1991). Rearing juvenile coho salmon tend to prefer pools (Bisson et al. 1988) and woody debris is an important structural element that creates this type of habitat (Bustard and Narver 1975; Bisson et al. 1987).

Critical Habitat

The designation of critical habitat for listed species is required under Section 4(a)(3)(A) of the ESA. Currently, NMFS (1995) has not determined critical habitat for Puget Sound coho salmon as they are a candidate species and their status has yet to be determined. Recently, NOAA Fisheries proposed that critical habitat for Oregon Coast coho salmon should include all freshwater waterways and substrates below longstanding, naturally impassable barriers (i.e., natural waterfalls in existence for at least several hundred years) and several dams that block access to former coho salmon habitats (NMFS 1999c). Should Puget Sound coho salmon become listed or proposed for listing, then a definition of critical habitat similar to that of Oregon Coast coho salmon critical habitat is conceivable. The Snoqualmie River in the general vicinity of the project site provides both spawning and rearing habitat for juvenile coho. As such, the Snoqualmie River within the action area would be considered critical habitat under the definition proposed for Oregon Coast coho.

EFFECTS ANALYSIS FOR COHO SALMON

Direct and Indirect Effects

Potential effects of the bridge replacement on coho salmon are virtually identical to those described above (Section 6.1) for chinook salmon. Coho salmon spawning occurs in the many of the tributaries of the Snoqualmie River upstream and downstream of the project area, as well as in the Raging River and its tributaries (Williams et al. 1975). Unlike chinook salmon, however, some juvenile coho salmon rearing almost certainly occurs in the action area, particularly the tributaries. All other discussion under chinook salmon regarding the effects of and mitigation of water quality impacts apply to coho salmon as well.

Cumulative Effects

No state or private action is expected to occur in the vicinity of the project site in the foreseeable future that would measurably add to any unmitigated effects of the project.

Interrelated and Interdependent Effects

No interrelated and interdependent effects on coho salmon are expected from the proposed project. The project is not linked, directly or indirectly, to any other projects in the area.

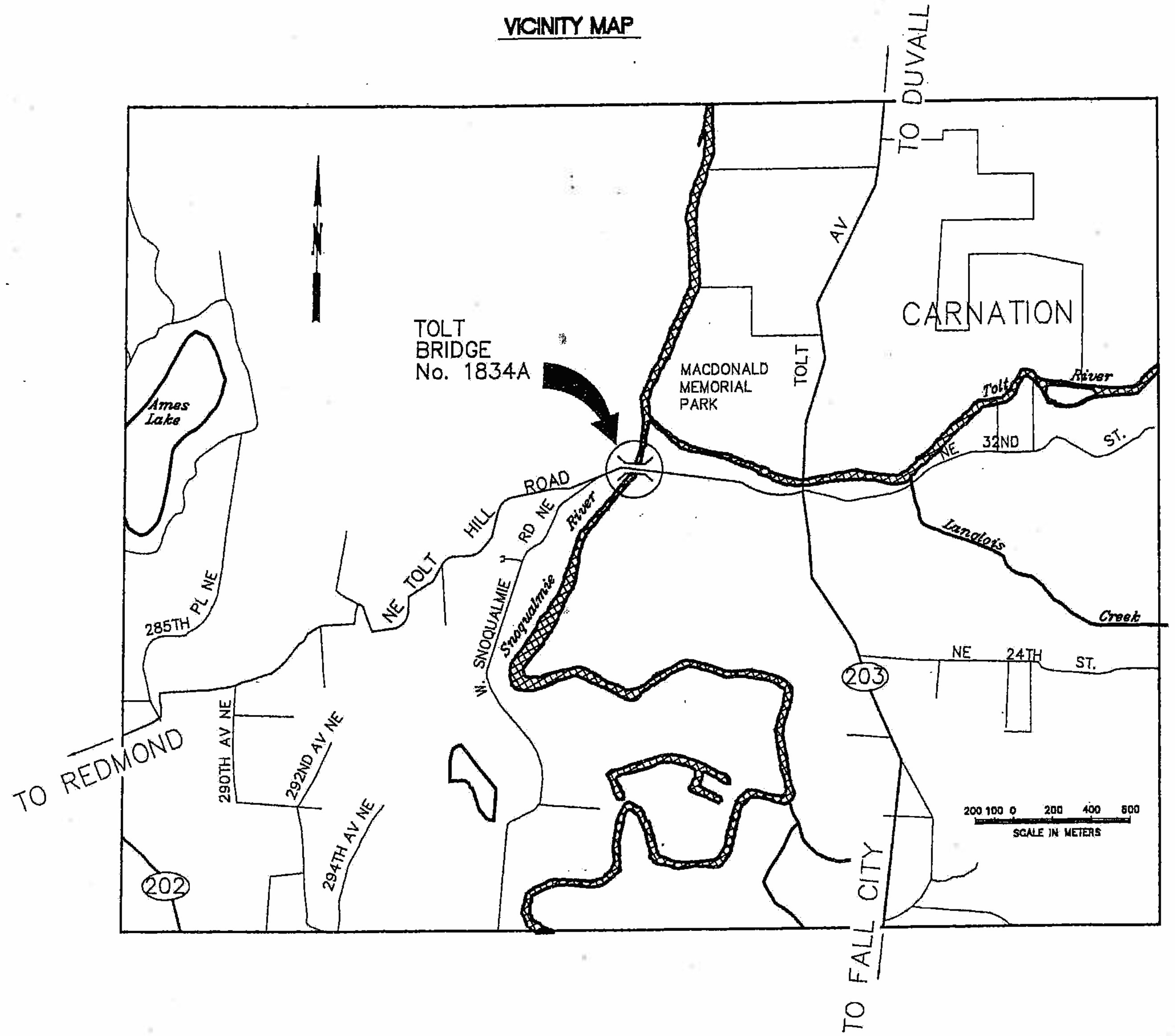
Determination

The known distribution of coho salmon includes the Snoqualmie River and the project area tributaries. However, based on the project design, project activities, mitigation, and conservation measures discussed in Section 2.4.10, we conclude that the effect determination for the project is **may impact, [is] not likely to adversely impact** coho salmon. This determination is equivalent to **may affect, [is] not likely adversely affect** for listed species.

APPENDIX C

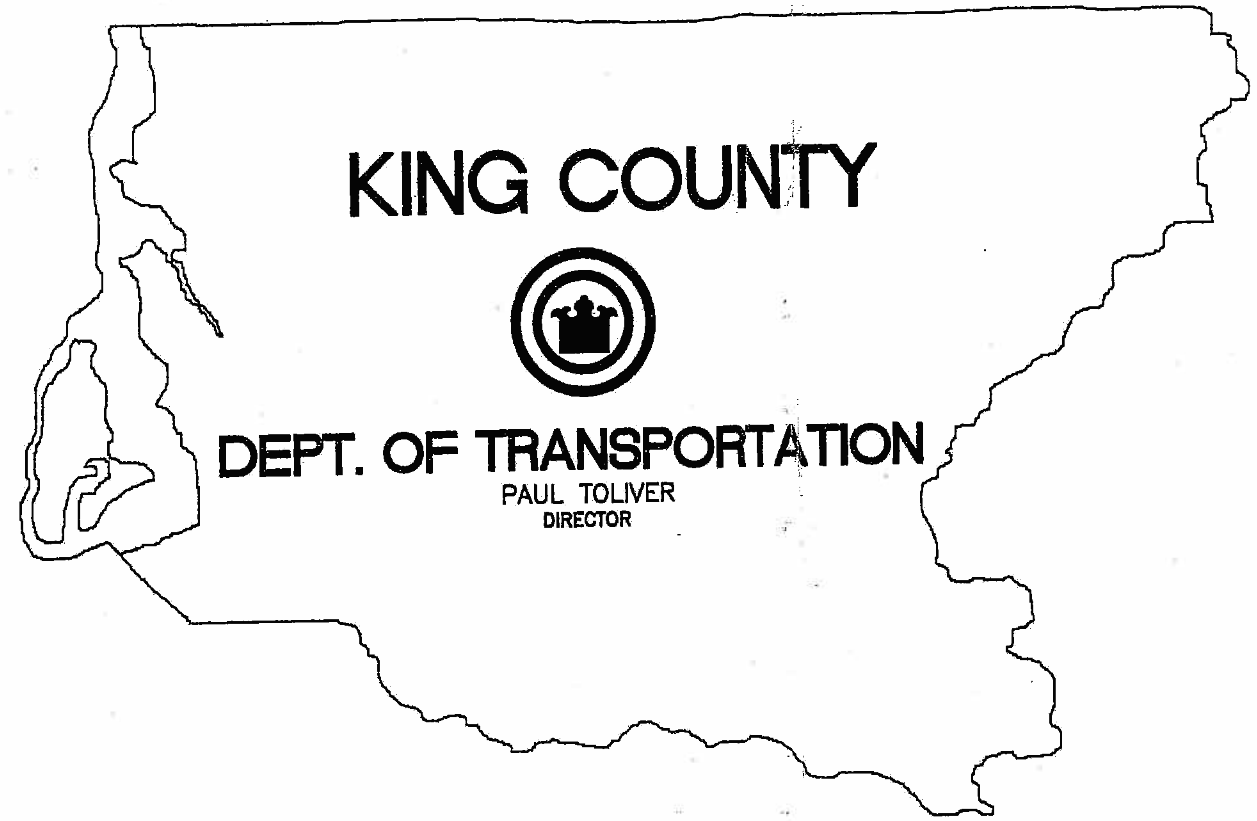
Tolt Bridge Project Plans

VICINITY MAP



INDEX

SHEET	DESCRIPTION
1	COVER SHEET
2	PLAN (STA 21+00 TO 30+00)
3	PLAN (STA 30+00 TO 39+00)
4	PLAN (STA 39+00 TO 48+50)
5	PROFILE
6	ROADWAY SECTION
7	BRIDGE LAYOUT



TOLT BRIDGE REPLACEMENT

No. 1834A

FIELD BOOK: ____
SURVEYED:
SURVEY BASE MAP:
DESIGN ENTERED:
DESIGNED:
CHECKED:
SUPERVISOR:

REVISION | BY | DATE

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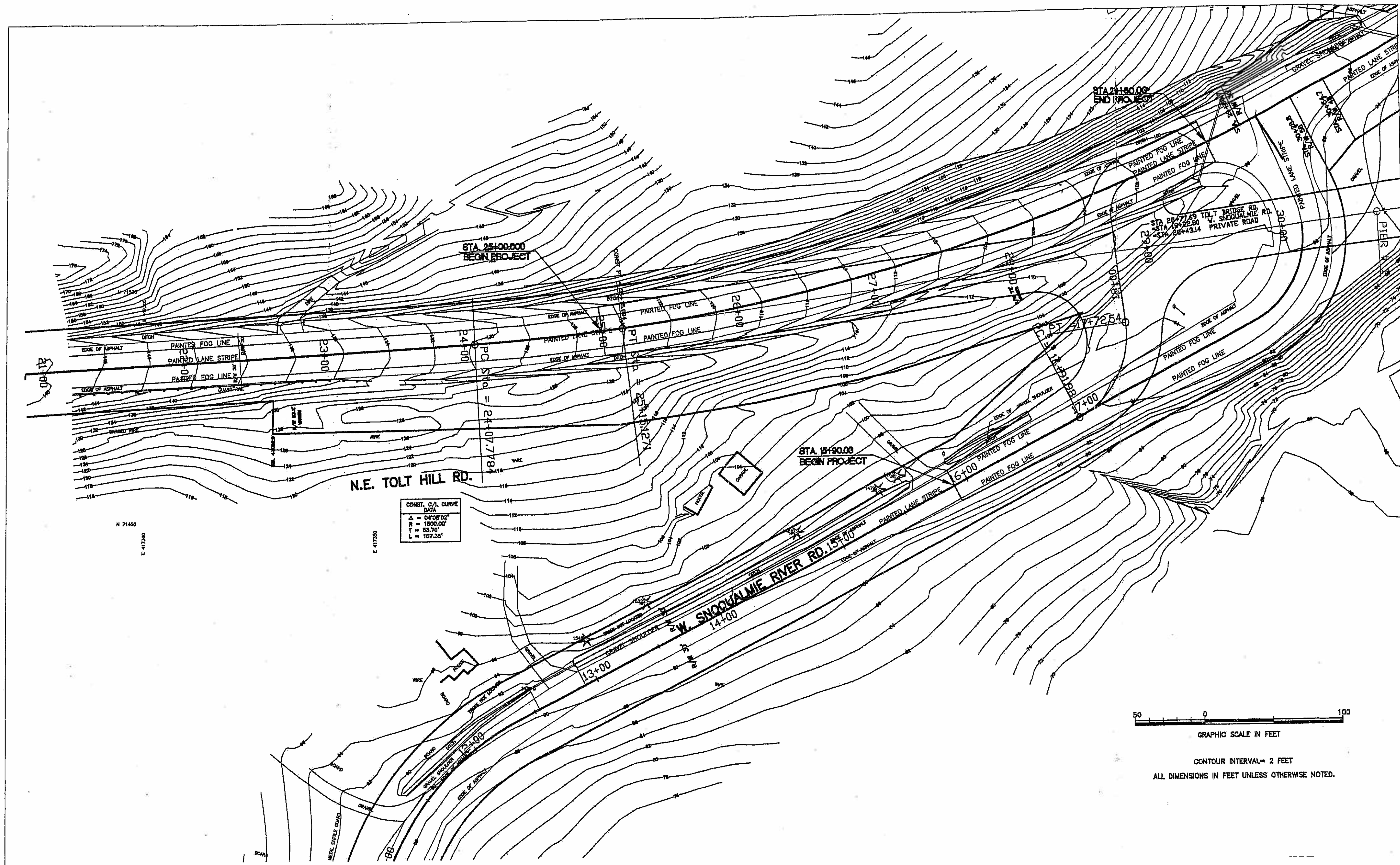
PROJECT No.
SURVEY No.
MAINTENANCE DIVISION No. —

PAULETTE M. NORMAN, STATE OF WASHINGTON, REGISTERED PROFESSIONAL ENGINEER 29116 — EXPIRES 8/31/03 — COUNTY ROAD ENGINEER

KING COUNTY DEPT. OF TRANSPORTATION
PAUL TOLIVER, DIRECTOR

TOLT BRIDGE
#1834A
COVER SHEET – ALTERNATE B

SHEET 1 OF 7 SHEETS



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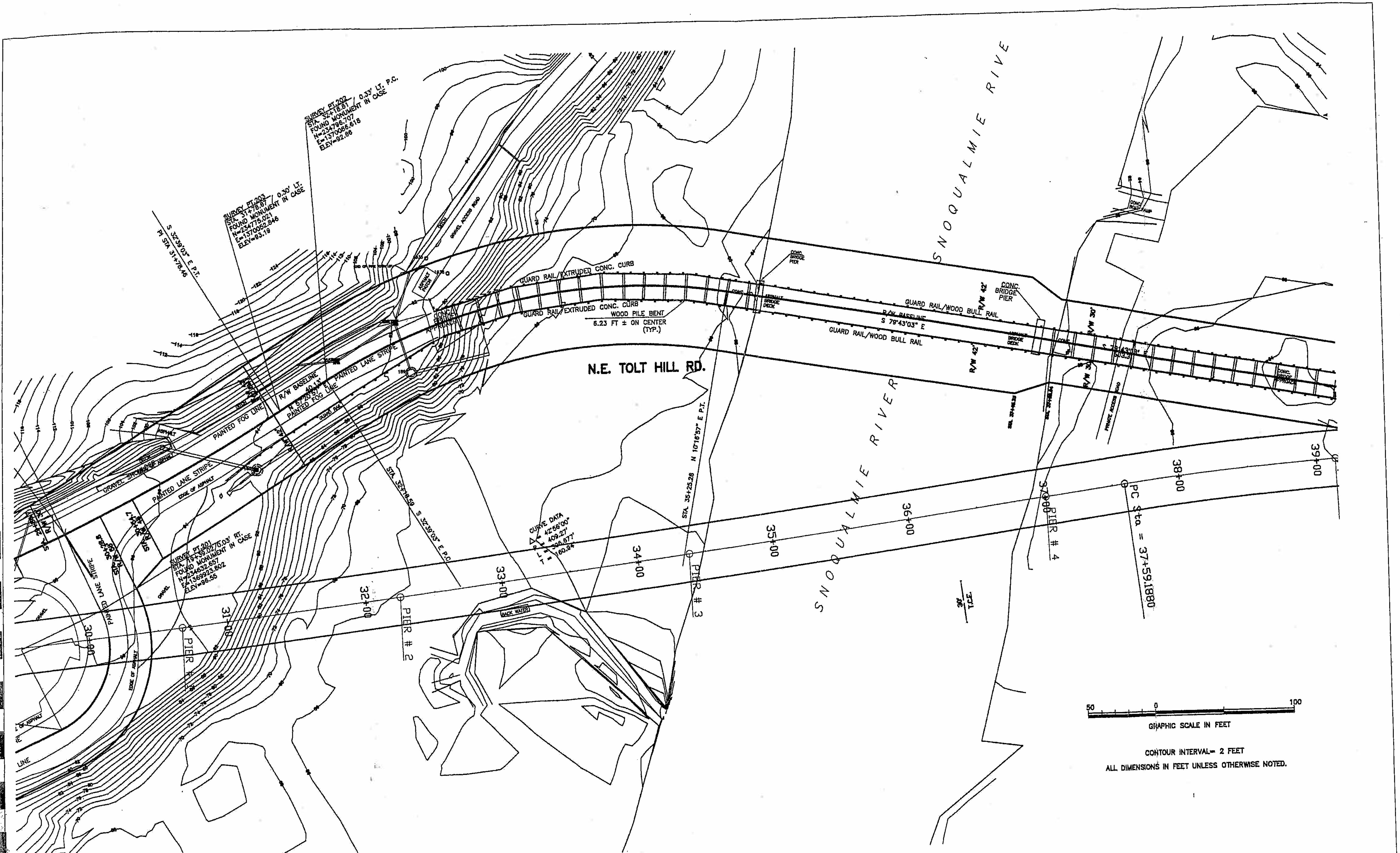
PAUL TOLIVER, DIRECTOR

TOLT BRIDGE
#1834A
PLAN (STA. 21+00 TO 30+00) ALT. B

SHEET 2 OF 7 SHEETS



CONTOUR INTERVAL= 2 FEET

ALL DIMENSIONS IN FEET UNLESS OTHERWISE NOTED.

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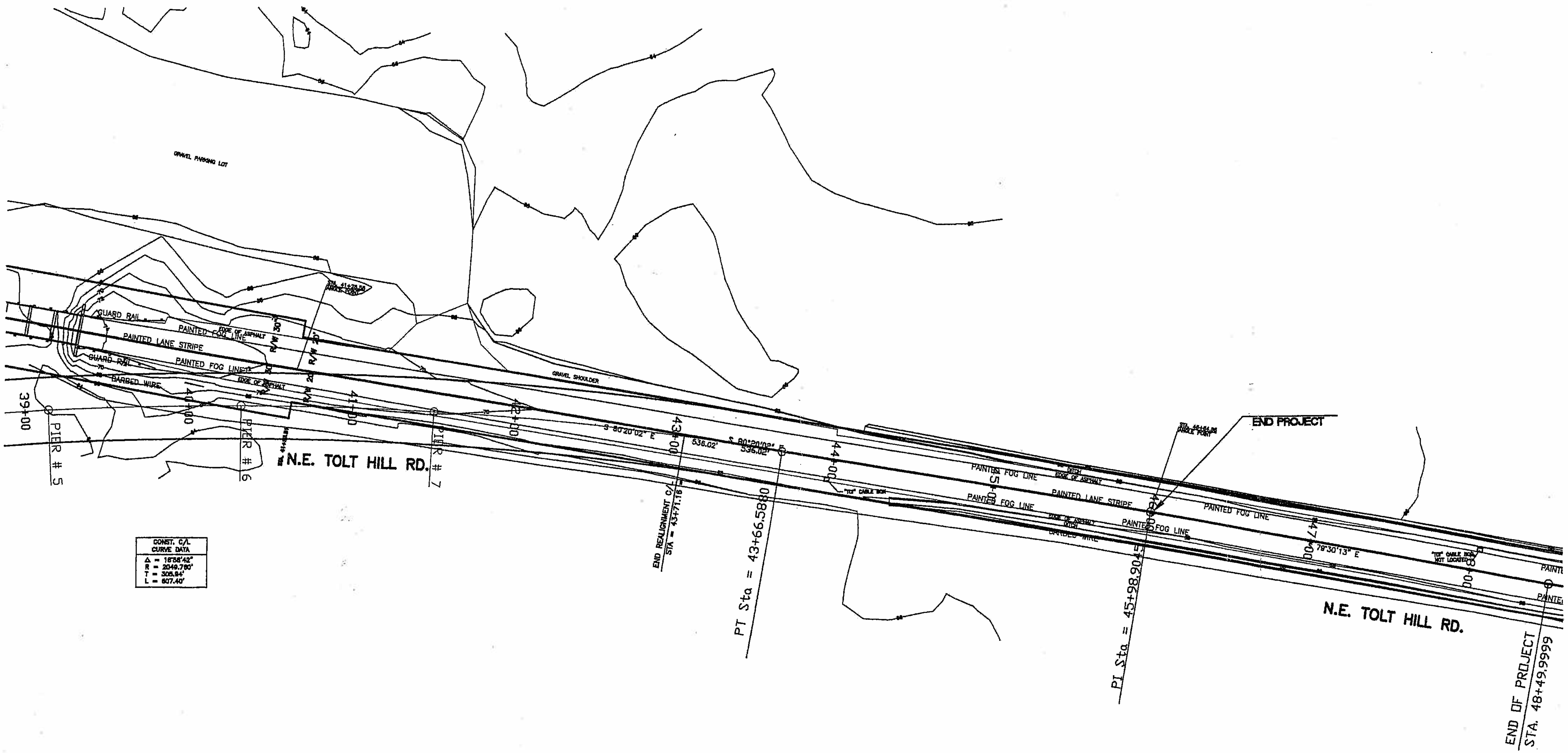
#1834A

PLAN (STA 30+00 TO 39+00) ALT. B

SHEET 3 OF 7 SHEETS



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CONTOUR INTERVAL= 2 FEET

ALL DIMENSIONS IN FEET UNLESS OTHERWISE NOTED.

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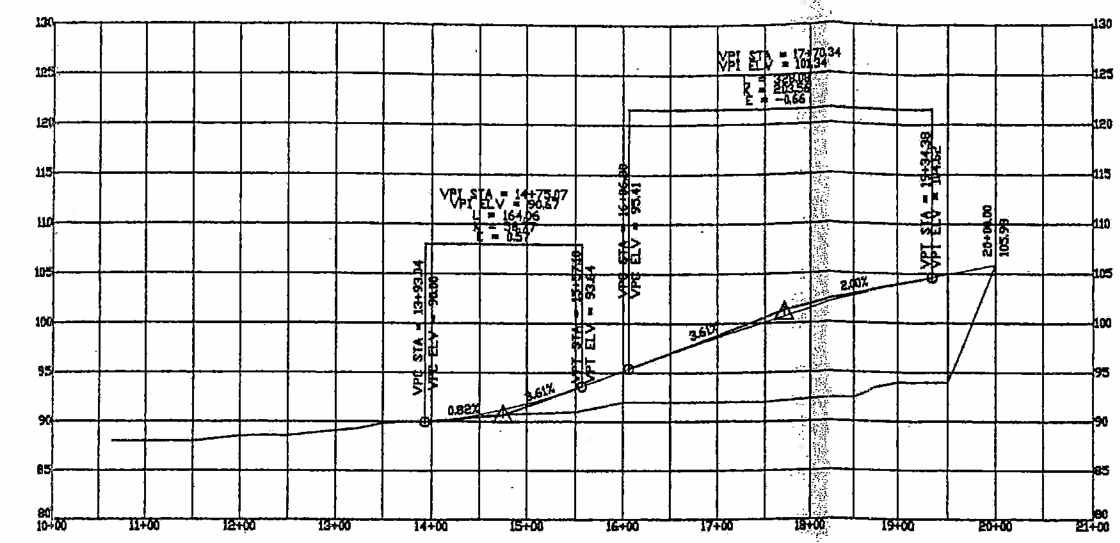
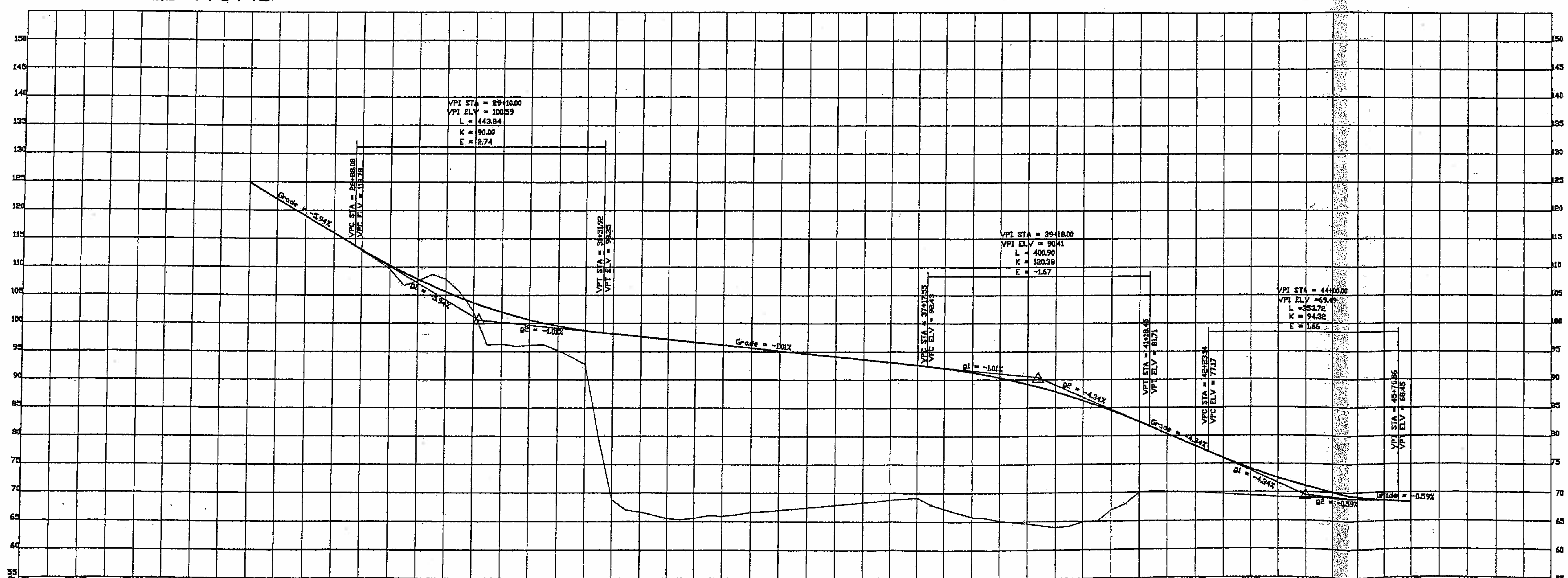
#1834A
PLAN (STA 39+00 TO 48+50) ALT. B

SHEET 4 OF 7 SHEETS

SNOQUALMIE RIVER ROAD



TOLT HILL ROAD



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…VISOR: ______

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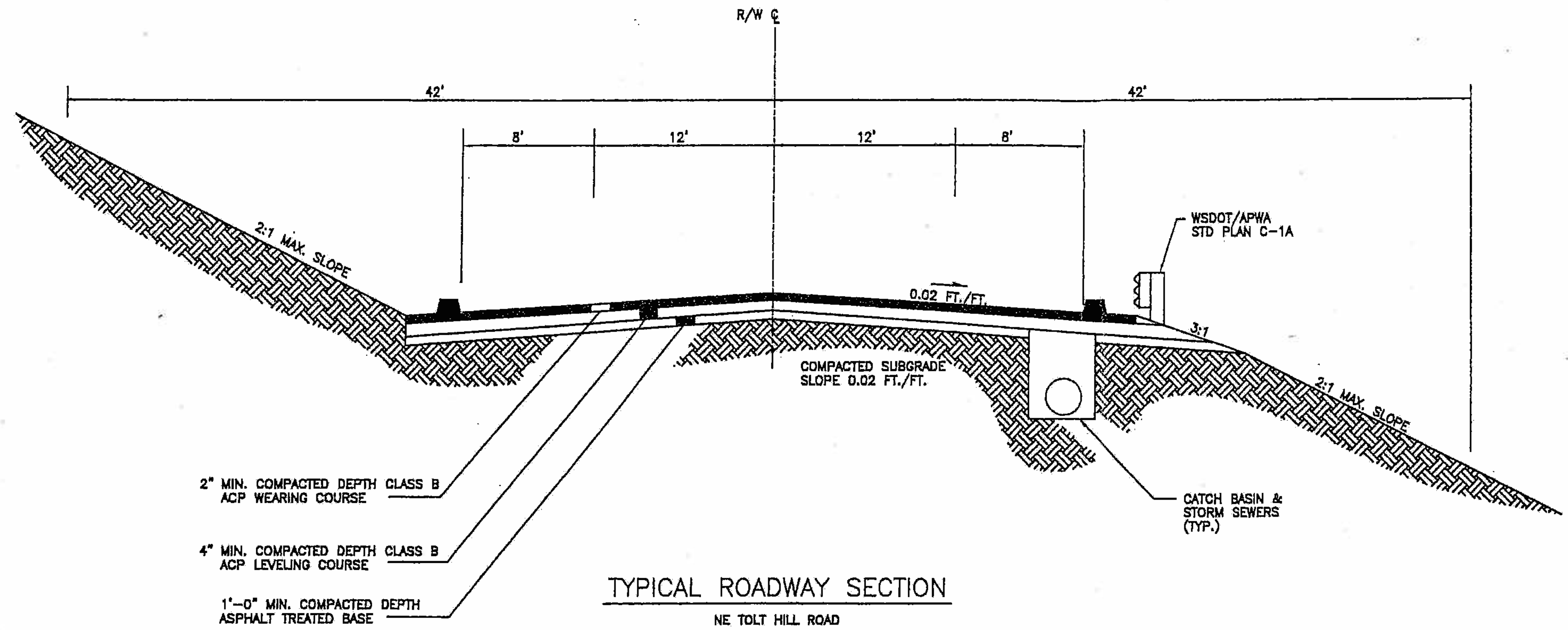
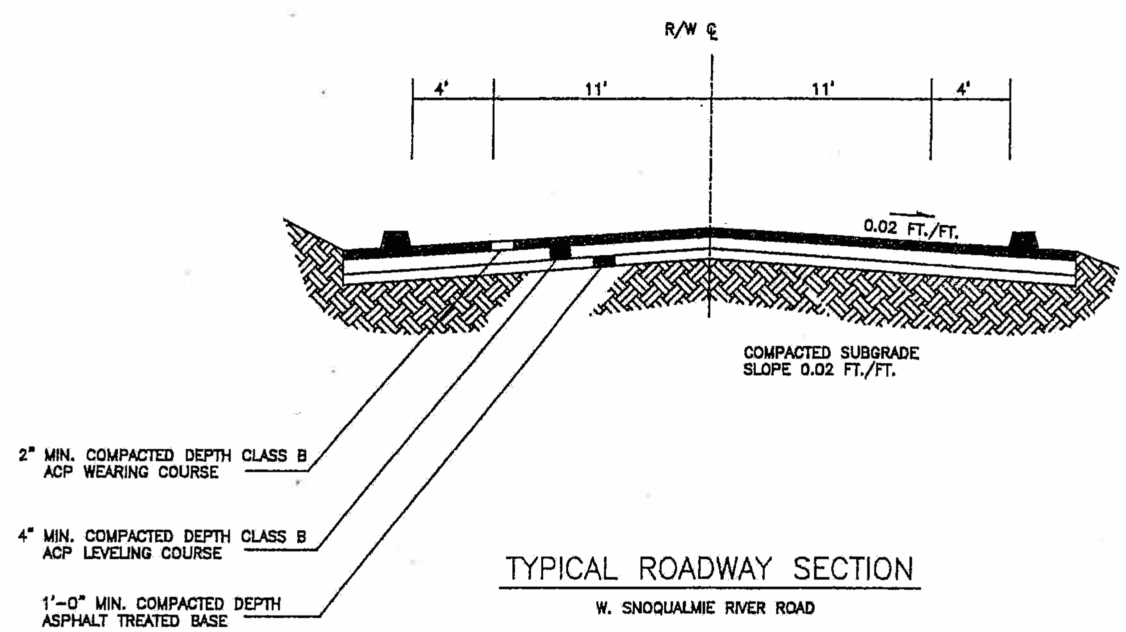
PROFILE – ALTERNATE B

SHEET 5 OF 7 SHEETS



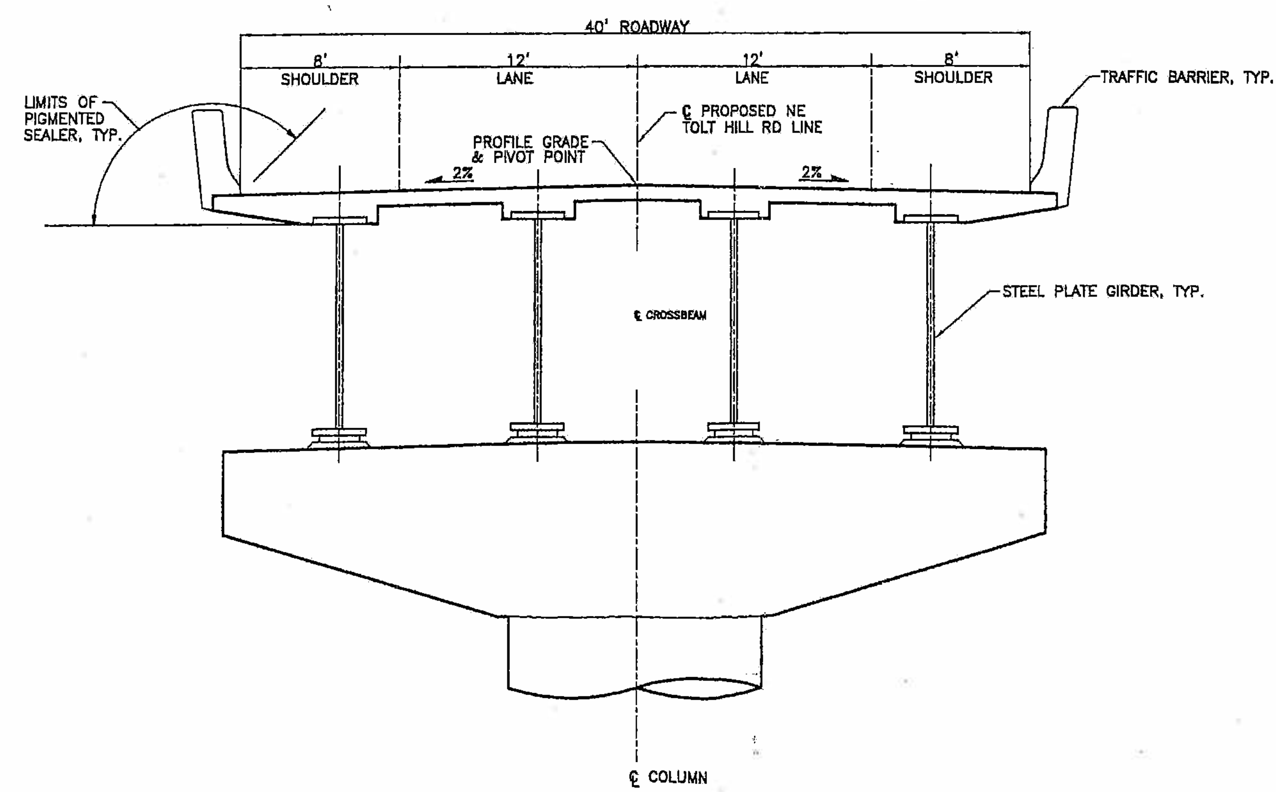
TYPICAL ROADWAY SECTION

NE TOLT HILL ROAD



TYPICAL ROADWAY SECTION

W. SNOQUALMIE RIVER ROAD



TYPICAL BRIDGE SECTION

NE TOLT HILL ROAD

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SURVEY BASE MAP:			
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KING COUNTY DEPT. OF TRANSPORTATION

PAUL TOLIVER, DIRECTOR

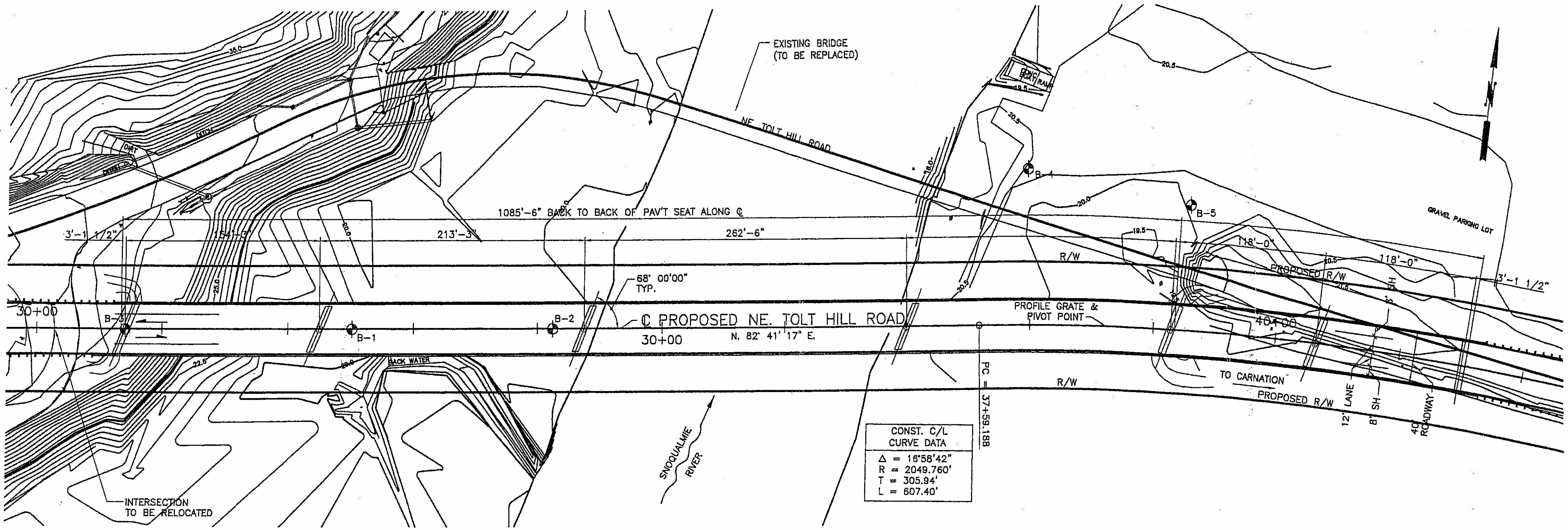
TOLT BRIDGE

#1834A

ROADWAY SECTION – ALTERNATE B

SHEET 6 OF 7 SHEETS

SEC. 20, T. 25 N., R. 7 E., W.M.



PLAN

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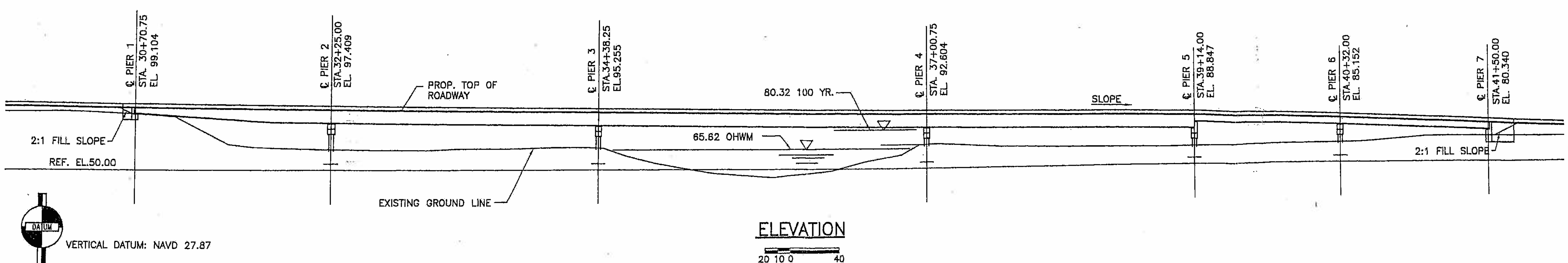

ELEVATION

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SCALE IN FEET

FIELD BOOK:
SURVEYED:
SURVEY BASE MAP:
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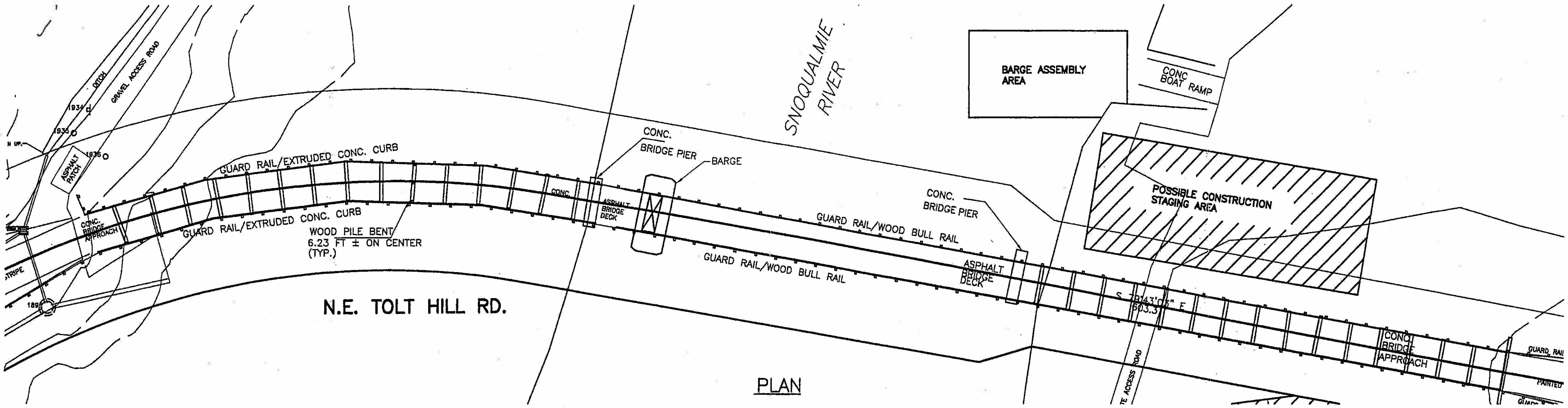
EXPIRES 8/31/03

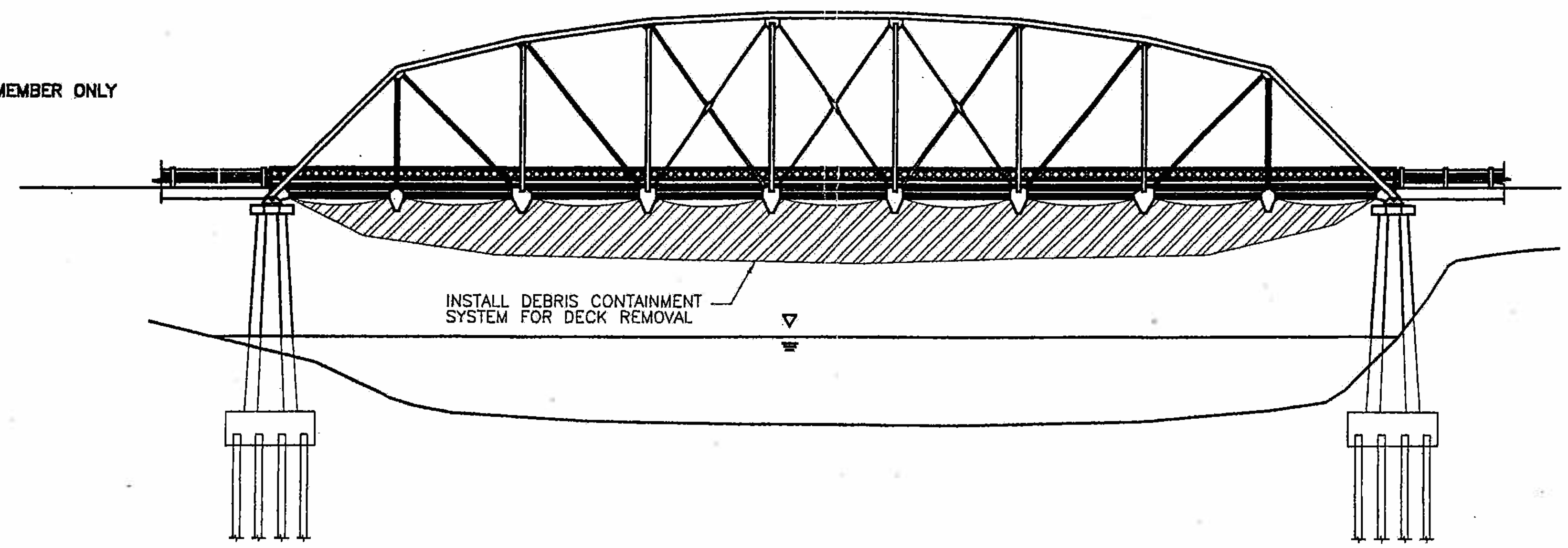
KING COUNTY DEPT. OF TRANSPORTATION
PAUL TOLIVER, DIRECTOR
TOLT BRIDGE
#1834A
BRIDGE LAYOUT – ALTERNATE B

SHEET 7 OF 7 SHEETS



PLAN

TRUSS WEIGHT = 200 KIPS TRUSS MEMBER ONLY
TRUSS LENGTH = 200'-3"



STAGE 1

1. INSTALL DEBRIS CONTAINMENT SYSTEM.
2. REMOVE DECKING & RAILING ON EXIST. TRUSS BRIDGE.

CALL 2 DAYS
BEFORE YOU DIG
1-800-424-5555
(UNDERGROUND UTILITY LOCATIONS ARE APPROX.)

FIELD BOOK:					
SURVEYED:					
SURVEY BASE MAP:					
DESIGN ENTERED:					
DESIGNED					
CHECKED:					
	DATE	REVISION	BY	DATE	

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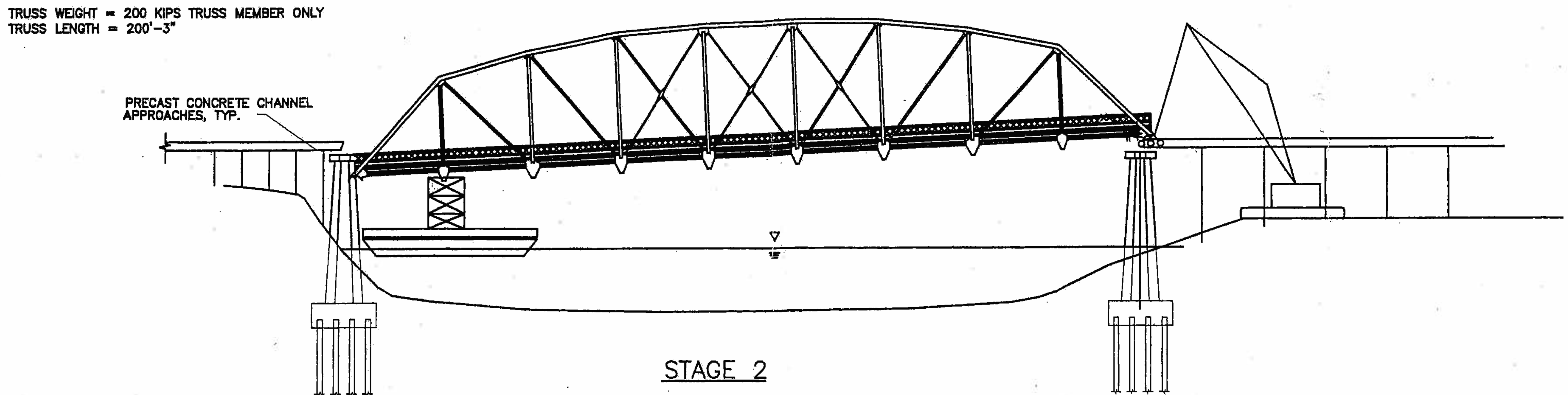
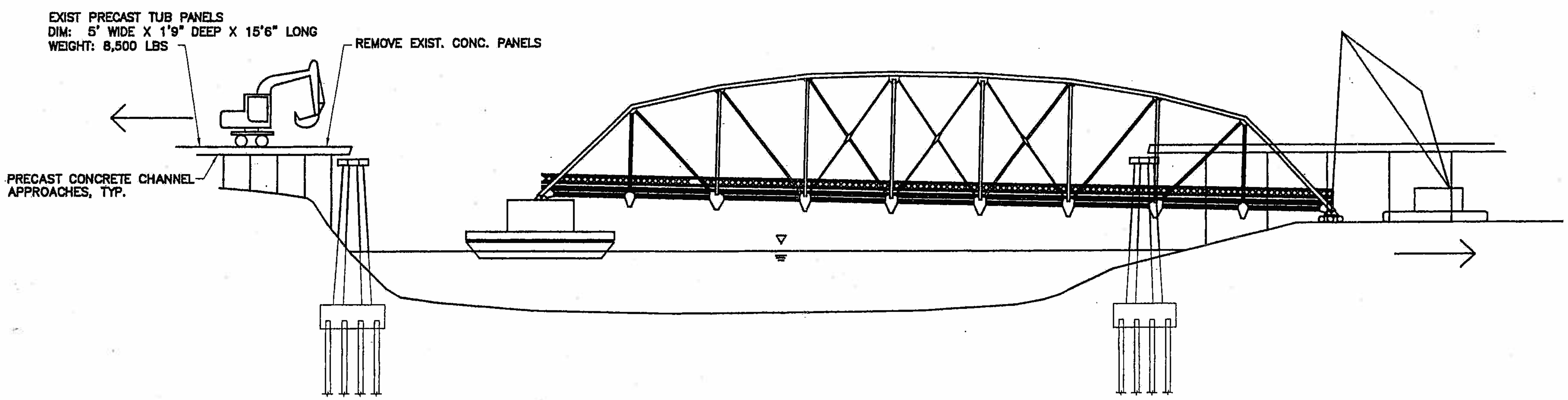
TOLT BRIDGE
DEMOLITION (1)

SHEET 1 OF 2 SHEETS



STAGE 2

3. PLACE PONTOON BARGE WITH JACKING SYSTEM.
4. JACK UP EXISTING TRUSS BRIDGE.
5. PLACE TRUSS ON ROLLERS ON EAST SIDE.
6. SUPPORT WEST END OF THE TRUSS WITH THE BARGE.
7. GUIDE TRUSS TO NORTH OF EXIST. PIERS.
8. LOWER TRUSS AS REQUIRED FOR STABILITY.



STAGE 3

8. ROLL THE TRUSS OFF OF THE EXISTING BRIDGE TO THE EAST, USING THE BARGE AND CRANE.
9. REMOVE APPROACH SPAN PANELS.
10. CUT EXISTING PIERS TO MUD LINE.

CALL 2 DAYS
BEFORE YOU DIG
1-800-424-5555
(UNDERGROUND UTILITY LOCATIONS ARE APPROX.)

FIELD BOOK:
SURVEYED:
SURVEY BASE MAP:
DESIGN ENTERED:
DESIGNED
CHECKED:

DATE | REVISION | BY | DATE

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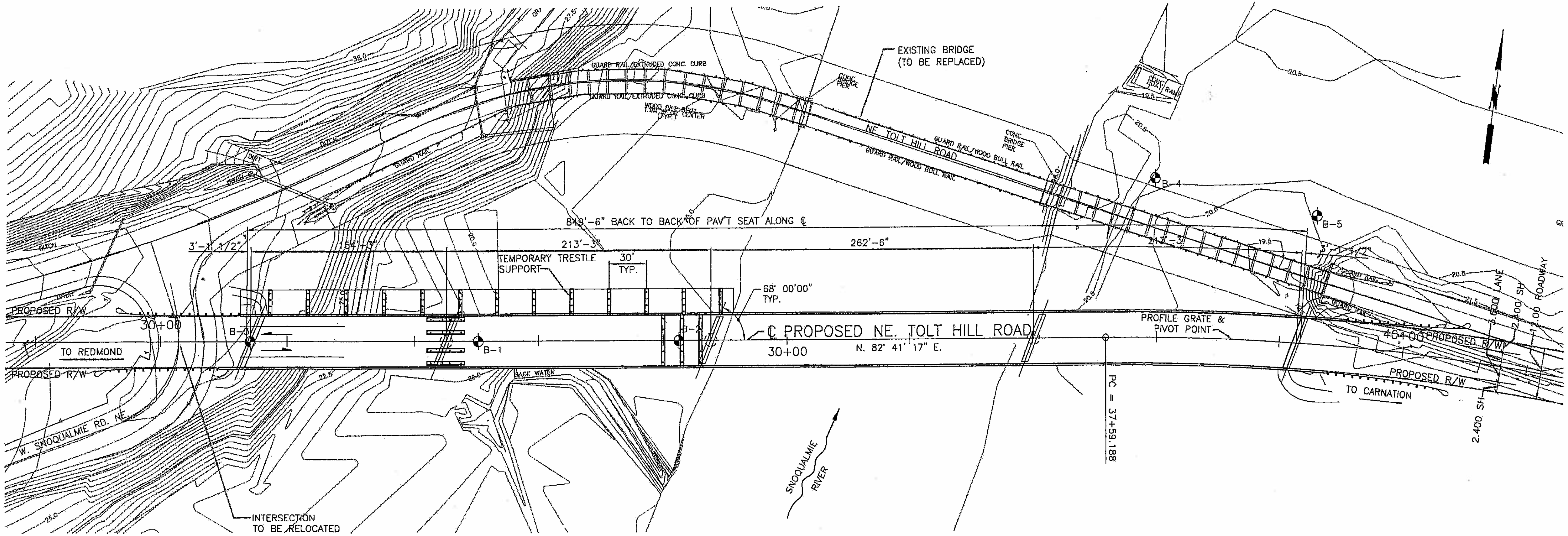
TOLT BRIDGE

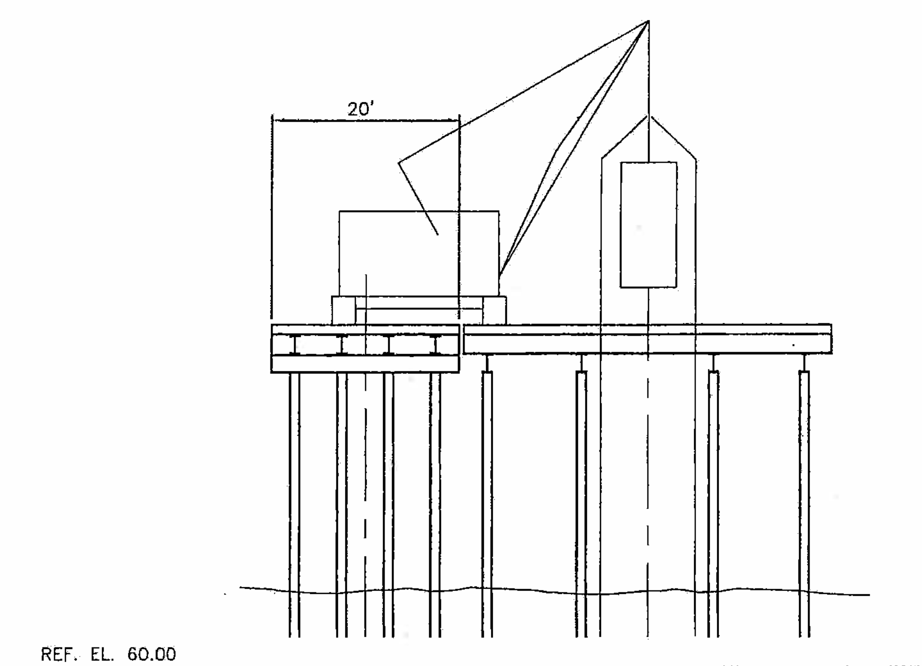
DEMOLITION (2)

SHEET 2 OF 2 SHEETS

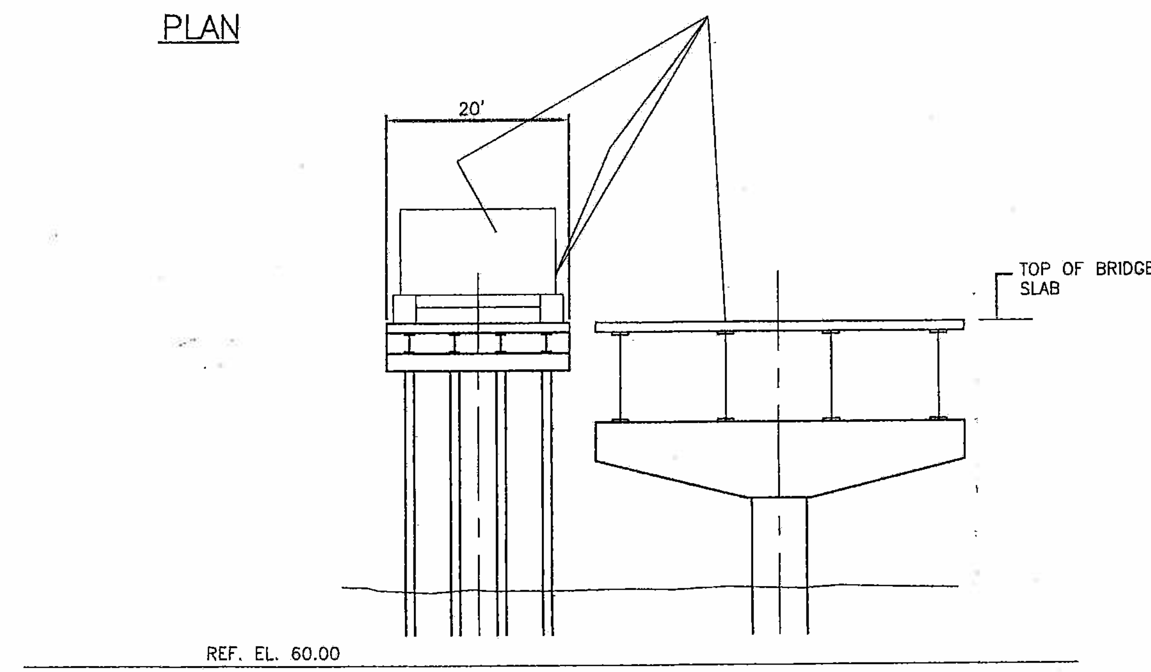
SEC. 20, T. 25 N., R. 7 E., W.M.



PLAN



TEMPORARY TRESTLE FOR SHAFT CONSTRUCTION



TEMPORARY TRESTLE FOR GIRDER ERECTION

MAR 2002

H:\9818

SHAFT CONSTRUCTION

APPENDIX D

Project Area Photos

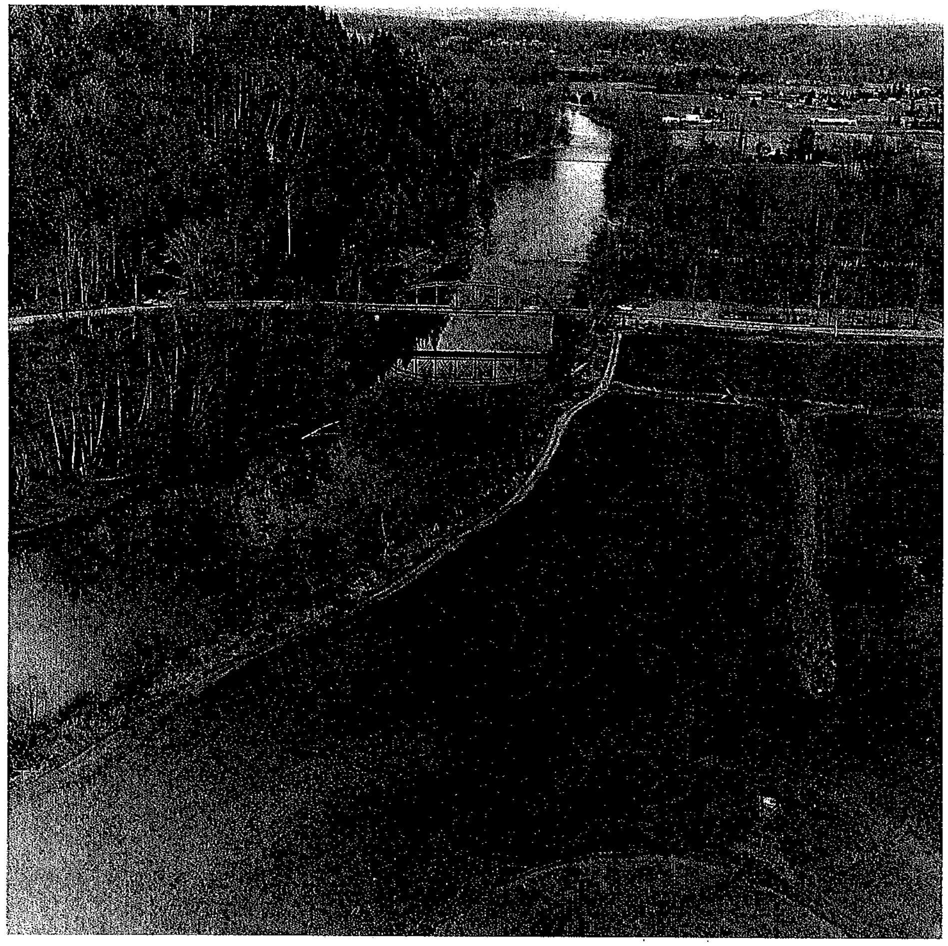


Photo 1. Older aerial view of existing Tolt Hill Bridge and project site , looking north (downstream). Note agricultural ditch (Tributary 2) on right bank running through pasture land. This ditch now contains some riparian vegetation along the lower 150 feet of channel.

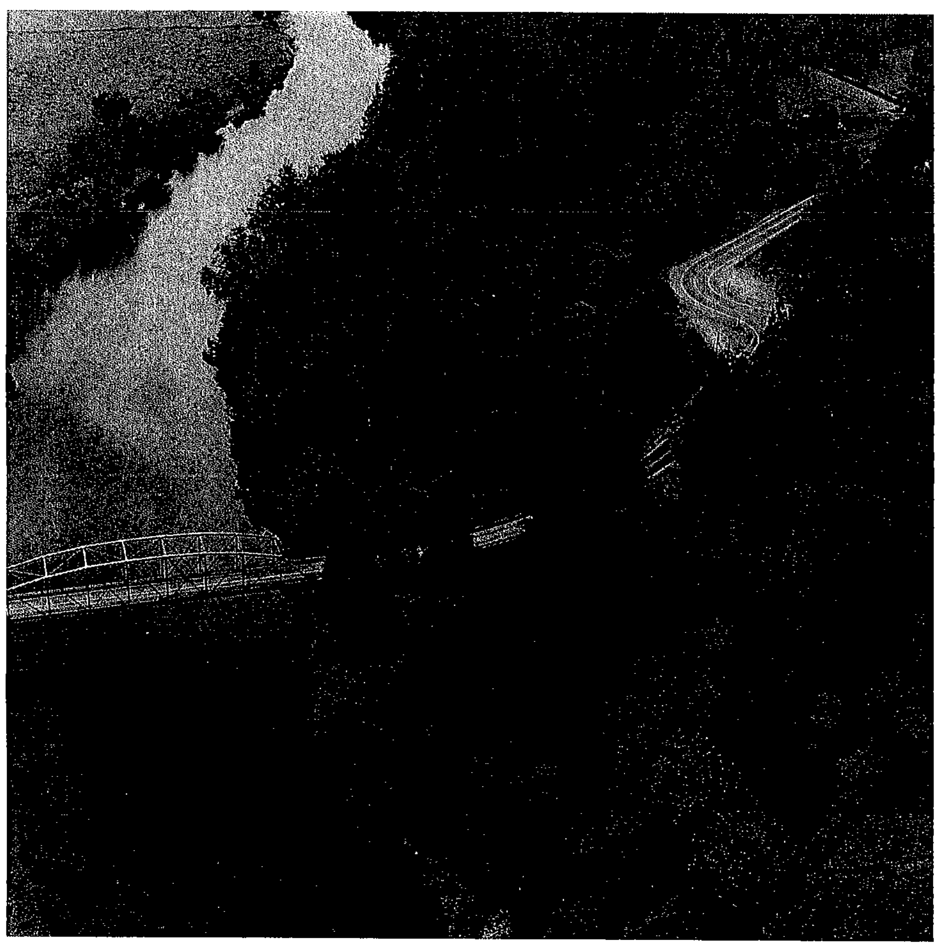


Photo 2. Older aerial view of project site, looking south from the existing Tolt Hill Bridge.

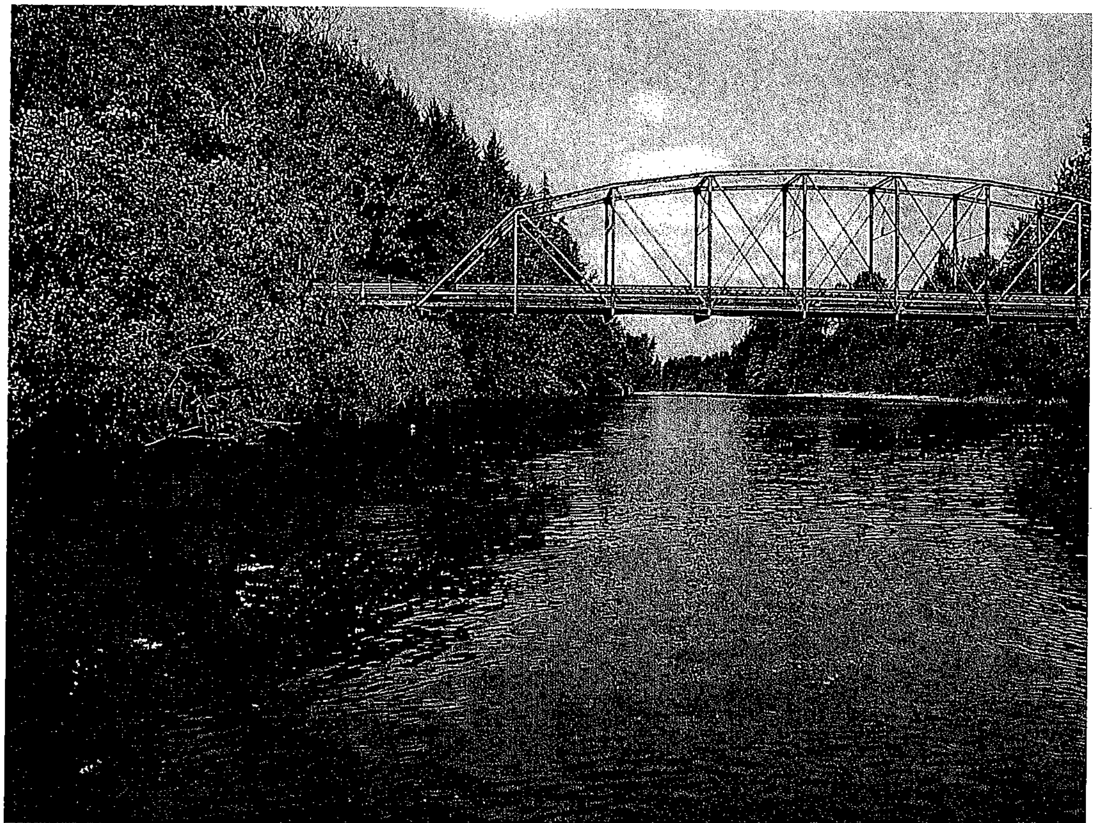


Photo 3. View looking downstream (north), from about 100m upstream of existing Tolt Hill Bridge. Channel morphology of the river in this area is dominated by deep run-type habitat. Riparian vegetation consists of large shrubs and small deciduous trees, with much of the vegetation overhanging the riverbank.

Photo 4. View of right bank of the Snoqualmie River, upstream of proposed bridge alignment. This photo is indicative of the riparian condition in this reach. Banks are very steep, and covered with reed canary grass and blackberry. Only a few individual deciduous trees are present in a narrow strip, with a service road and agricultural fields located immediately behind them.

Photo 5. View of side channel on the right bank of the Snoqualmie River, located between Tributary 1 and the boat launch. This side channel was approximately 35 m long, and could provide valuable overwintering habitat for salmonids.

Photo 6. View of Tributary 1, which is located on the right bank of the Snoqualmie River, downstream of the current and proposed bridges. View is from mouth, looking upstream (east). This tributary contains plentiful overhanging vegetation, LWD, and some deep pools and provides valuable refugia and rearing habitat for salmonids. Juvenile coho salmon were observed utilizing this reach during the time of the site visit.

Photo 7. View upstream of Tributary 2, looking east (upstream) from the access road near the mouth. This RB stream/agricultural ditch displays little channel complexity, is deep and channelized, and is dominated with mud/silt substrate. The water was very turbid with little active flow.

Photo 8. Tributary 3, which drains a large wetland, is located on the left bank of the Snoqualmie River, upstream of the current and proposed bridges. View is looking upstream, to the east, from the confluence of the channel with the Snoqualmie River.