Draft Environmental Assessment
Leudinghaus Road Bridge Replacement Project

Lewis County, Washington

FEMA-1734-DR-WA (Public Assistance)
Applicant: Lewis County

Prepared for:

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Acronyms and Abbreviations

APE	Area of Potential Effects
bgs	below the ground surface
BMP	best management practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
CMP	corrugated metal pipe
Corps	U.S. Army Corps of Engineers
CWA	Clean Water Act
DAHP	Washington Department of Archaeology and Historic Preservation
dB(A)	decibel (A-weighted)
DPS	Distinct Population Segment
EA	Environmental Assessment
Ecology	Washington State Department of Ecology
EDNA	environmental designation for noise abatement
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EMD	Washington Emergency Management Division (Military Department)
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIS	Flood Insurance Study
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
GHG	greenhouse gas
GIS	geographic information system
HHPR	Harper Houf Peterson Righellis
HPA	Hydraulic Project Approval
HUC	Hydrologic Unit Code
I-5	Interstate 5
KGA	Kramer Gehlen and Associates
LCC	Lewis County Code
LF	linear foot
MBTA	Migratory Bird Treaty Act
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MUTCD	Manual on Uniform Traffic Control Devices
NAVD88	North American Vertical Datum 1988
NEPA	National Environmental Policy Act
NHC	Northwest Hydraulic Consultants
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSO	northern spotted owl

NTU	Nephelometric turbidity unit
NWI	National Wetlands Inventory
OHWM	Ordinary High Water Mark
PA	Public Assistance
PCBs	polychlorinated biphenyls
PFMC	Pacific Fishery Management Council
PHS	Priority Habitats and Species
PNP	Private Non-Profit
RCW	Revised Code of Washington
RDD	Rural Development District
RM	river mile
ROW	right-of-way
RUSLE	Revised Universal Soil Loss Equation
SEPA	State Environmental Policy Act
Services	U.S. Fish and Wildlife Service + National Marine Fisheries Service
SHPO	State Historic Preservation Officer
SMA	Shoreline Management Act
SMP	Shoreline Master Program
SPCC	Spill Prevention, Control, and Countermeasures
SR	State Route
State Parks	Washington State Parks and Recreation Commission
STP	shovel test probe
SWPP	Stormwater Pollution Prevention
TCP	Traditional Cultural Property
TESC	Temporary Erosion and Sediment Control
TMDL	Total Maximum Daily Load
TS&L	Type, Size, and Location
U.S.C.	United States Code
USFWS	U.S. Fish and Wildlife Service
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WNHP	Washington Natural Heritage Program
WQI	Water Quality Index
WRIA	Water Resource Inventory Area
WSDOT	Washington State Department of Transportation

1.0 Introduction

The U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) is proposing to support the Lewis County Department of Public Works for a project in the unincorporated community of Meskill, approximately 15 miles west of Chehalis, in unincorporated Lewis County, Washington (Figure 1-1, *Vicinity Map*). The proposed project is to replace a bridge over the Chehalis River that was washed away during a severe winter storm and flooding on December 3, 2007. The president declared the flooding event a major disaster (FEMA 1734-DR-WA), making federal funding available for emergency work and repair or replacement of disaster-damaged facilities. Lewis County has applied through the Washington State Emergency Management Division (EMD) to FEMA for partial funding of this project.

In accordance with the National Environmental Policy Act (NEPA) of 1969, FEMA must evaluate the environmental consequences of a proposed action on the human environment before deciding to fund an action; including evaluating alternative means of addressing the purpose and need for a federal action. The President's Council on Environmental Quality (CEQ) has developed a series of regulations for implementing NEPA. These regulations are included in Title 40 of the Code of Federal Regulations (CFR), Parts 1500–1508.

As part of the NEPA process, FEMA prepared this Draft Environmental Assessment (EA) to analyze potential effects associated with the bridge replacement project. The EA was prepared in accordance with both CEQ regulations and FEMA's NEPA regulations (44 CFR Part 10). FEMA is also using the EA to document compliance with other applicable federal laws and executive orders, including the Endangered Species Act (ESA), the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the National Historic Preservation Act (NHPA), Executive Order (EO) 11988 (*Floodplain Management*), EO 11990 (*Protection of Wetlands*), and EO 12898 (*Environmental Justice*).

FEMA will use the findings in this Draft EA and public comments received during the public review period to determine whether to prepare a Finding of No Significant Impact (FONSI) or a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) for the proposed project.

1.1 PROJECT LOCATION AND BACKGROUND

The project site is located along the Chehalis River in the Doty-Dryad-Meskill area (generally considered to be the "project vicinity" in this EA) of western Lewis County, Washington, approximately 15 miles west of the city of Chehalis via State Route (SR) 6 (Figure 1-1). The project site is located in Sections 3, 4, 9, and 10 of Township 13 North, Range 4 West. The project coordinates are 46.63398 N (latitude) / -123.190842 W (longitude).

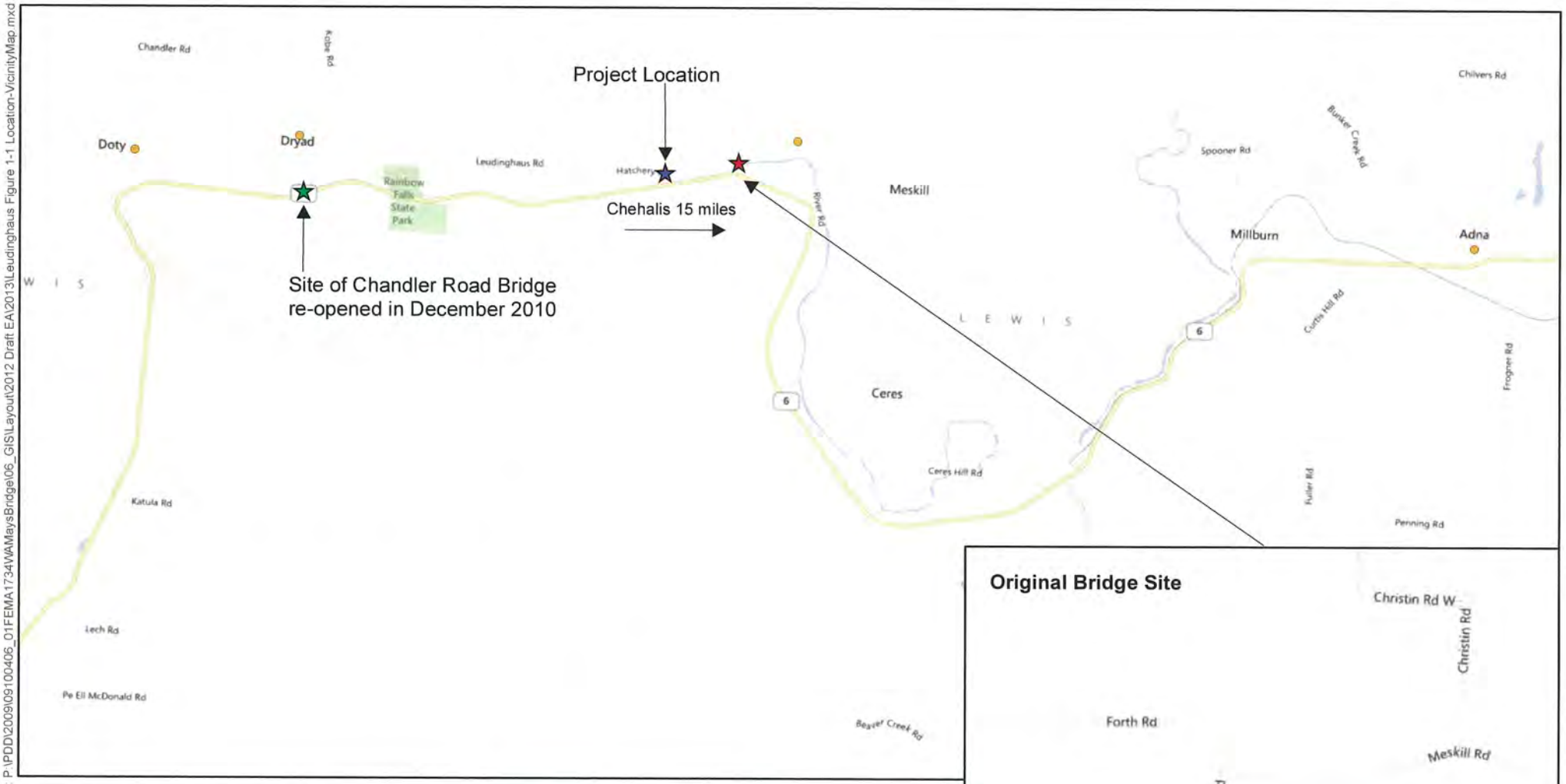
The project vicinity is rural in character and includes several relatively small unincorporated towns (Doty and Dryad) and crossroads communities (Meskill) surrounded by low-density rural homes, farms, and vast areas of open space, including agricultural and forest lands, a State Park, and a recreational trail. SR 6 (the only major road in the project vicinity) is the primary access to homes, businesses, and the natural and recreational resources located on the north side of the Chehalis River.

Prior to the December 2007 storms and associated flooding of the Chehalis River, areas north of the river in the Meskill vicinity were accessed from SR 6 via River Road and the Leudinghaus Road Bridge. This two-lane bridge connected River Road to Leudinghaus Road on the north side of the river, just west of a curve in the road where Leudinghaus Road becomes Meskill Road. The Leudinghaus Road Bridge (also known as Mays Bridge) consisted of a double-span steel truss bridge supported by two end abutments and a single center pier. The main span was a steel truss 130 feet in length with a 20-foot-wide deck. The minimum deck and low chord (i.e., the bottom of the lowest girder) elevations at the upstream side of the bridge were 263.9 feet and 260.9 feet North American Vertical Datum 1988 (NAVD88), respectively. (Note: All elevations in this EA are in NAVD88.) The bridge was aligned approximately perpendicular to the river flow. The original bridge had a single pier that tapered in width from 6 feet at the footing to 3 feet at the top. The pier supported the south side of the main span and constricted river flow during major flood events. After the December 2007 flood, enormous quantities of woody debris piled up on the riverbanks in the vicinity of the bridge, with significant amounts lodged in the bridge truss structure (NHC 2008; 2013). The damaged bridge was removed from the Chehalis River in July 2008; however, the bridge abutments remain.

The December 2007 flood that destroyed the Leudinghaus Road Bridge also destroyed two upstream vehicle river crossings: the public entrance bridge to Rainbow Falls State Park (approximately 2.5 miles to the west), and the Chandler Road Bridge (approximately 3.5 miles to the west). The Washington State Parks and Recreation Commission (State Parks) has no plans to replace the former bridge to the park, and visitors now access Rainbow Falls on the north side of the river from Leudinghaus Road via an entrance formerly used as a service entrance by park employees (FEMA 2012). As described in more detail in Section 4.5.3 (*Transportation and Access*), the Chandler Road Bridge (also called the Dryad Bridge) was rebuilt in place and re-opened in December 2010.

To provide a crossing of the Chehalis River after the three bridges were destroyed, the Washington State Department of Transportation (WSDOT) installed a temporary modular bridge (called a Bailey bridge) just upstream of the former Leudinghaus Road Bridge site, on loan to Lewis County. The Bailey bridge, pictured on site at left, had some important limitations. The temporary bridge was a one-lane bridge, and due to weight limitations only one vehicle could cross at a time. Additionally, the turn radius onto the Bailey bridge from River Road (from the south) was severe. These conditions slowed traffic across the river and may have prohibited larger vehicles (e.g., logging trucks, recreational vehicles) from using this route.

The WSDOT Bailey bridge was not intended to provide a permanent river crossing between River Road and Leudinghaus Road, and on October 3, 2011, the bridge was closed to allow for it to be dismantled and returned to WSDOT for use in another location. The Bailey bridge was removed on October 18, 2011. With the Bailey bridge removed, residents and others needing to cross the Chehalis River in the Meskill area now need to use longer, alternative routes. The closest river crossing is the rebuilt Chandler Road Bridge, approximately 3.5 miles to the west, which reopened in December 2010.



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N W E S

0 0.5 1 2 Miles

Figure 1-1. Vicinity Map

Legend

- Project Location
- Chandler Road Bridge
- Original Leudinghaus Road Bridge Site
- Cities and Towns

Path: P:\PDD\2009\09100406_01FEMA1734WAMaysBridge\06_GIS\Layout\2012 Draft EA\2013\Leudinghaus Figure 1-1 Location-VicinityMap.mxd

Print Date: 8/5/2013

2.0 Purpose and Need

The purpose of the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1973 (Stafford Act), as amended, is to provide a range of federal assistance to state and local governments to supplement efforts and resources in alleviating damage or loss from major disasters and/or emergencies. The objective of the FEMA Public Assistance (PA) Grant Program is to provide assistance to state, tribal, and local governments, and certain types of Private Non-Profit (PNP) organizations so that communities can quickly respond to and recover from major disasters or emergencies declared by the president. Through the PA Grant Program, FEMA provides supplemental federal disaster grant assistance for debris removal, emergency protective measures, and the repair, replacement, restoration, or relocation of disaster-damaged, publicly owned facilities and the facilities of certain PNP organizations.

The purpose of this project and the FEMA action is to restore the vehicle access between communities and resources on the north and south sides of the Chehalis River in the Meskill area that was disrupted when the Leudinghaus Road Bridge was destroyed by flooding of the river in December 2007. The original bridge provided a critical socioeconomic link for residents living in this rural community area, as well as faster access for residents, workers, emergency service providers, and others living, working, or serving the project area. Lewis County needs to re-establish this critical socioeconomic link, as well as a safe and secure ingress/egress route for the Meskill area residents living in the Chehalis River floodplain.

Lewis County identified the following objectives to meet the project need (KGA 2008; Lewis County 2009b, 2011a, 2012a, 2012b, 2012c):

- Restore safe, secure, and reasonable vehicle access across the Chehalis River between SR 6 and the Meskill area.
- Minimize the potential for future damage to public transportation infrastructure from flooding and woody debris.
- Minimize impacts on connecting roadways.
- Minimize the distance and time required for emergency service providers to travel between SR 6 and the Meskill area north of the Chehalis River.
- Minimize traffic safety issues for large trucks (e.g., logging trucks) at intersections and on connecting roadways.
- Minimize impacts on local property owners and residences.
- Minimize impacts on natural and cultural resources.

3.0 Alternatives

The CEQ regulations require federal agencies to consider a reasonable range of alternatives that meet the purpose and need of a proposed action. Reasonable alternatives are different ways of meeting a project need, but with varying degrees of environmental impact. Alternatives that would clearly result in substantially greater environmental impact than the proposed action do not require detailed analysis.

The following sections describe the alternatives being considered for the Leudinghaus Road Bridge Replacement Project, and the process that was used to develop these alternatives. It first describes alternatives that were considered but not carried forward for further analysis. This EA presents an analysis of three alternatives for the project: the No Action Alternative, Alternative 1 (Proposed Action - New Design at Intersection of Hatchery Road and SR 6), and Alternative 2 (New Design at Original Bridge Site with New SR 6 Intersection).

3.1 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD

Lewis County has explored several bridge structure and alignment alternatives for replacing the bridge access over the Chehalis River. In 2008, the county evaluated four bridge structure alternatives and four horizontal alignments for the project, described in detail in the 2008 Type, Size, and Location (TS&L) Report prepared for Lewis County by Kramer Gehlen and Associates (KGA 2008). A preferred bridge structure (Bridge Alternative 1: single-span precast girder bridge in the 2008 TS&L Report) and horizontal alignment (Option 1 in the 2008 TS&L Report) were selected in 2008 from the range of alternatives evaluated at that time.

However, as described in detail in Section 5.1 (*Public Involvement*), Meskill area property owners and residents, and local emergency service providers attending various public meetings on the project later asked Lewis County to revisit the alignment alternatives for the project. Public comments indicated that the alignment the county had selected as the preferred alignment (Preliminary Alternative A - described below), which involved constructing a new bridge structure just downstream of the original bridge location, was not the preferred location for the new bridge for a variety of reasons, as described in Section 5.1 (*Public Involvement)*. In response, Lewis County developed a new set of seven project alternatives, referred to as Preliminary Alternatives A through G (Appendix A). Of these, the following preliminary alternatives were eliminated from further consideration in this EA because they do not meet the project purpose and need, are not practical, are less optimal than the county's preferred alternative, or are not considered suitable for FEMA funding under its PA program.

Preliminary Alternative A - construct a new bridge downstream of the original bridge site. This alternative would involve constructing an improved bridge approximately 100 feet downstream of the original bridge site and raising the grade of the approach roads on both sides of the river to meet the higher elevation of the new bridge deck. This alternative was considered less optimal than the county's identified preferred alternative (Preliminary Alternative E) because of the following issues:

- **Property impacts and right-of-way (ROW) acquisition** - This alternative would have greater effects on private properties and residences than the county's preferred alternative, and adjacent property owners have strongly indicated that they are not interested in ROW acquisition. At least two of the four property owners that would be affected by this alternative have informed Lewis County they would seek legal action to prevent ROW acquisition of their property (or portions of their property) needed for the project.
- **Geometric constraints -** A substandard intersection at River Road and SR 6, along with 90 degree intersections at both ends of the bridge under this alternative, present difficulties for access by emergency vehicles and large trucks (e.g., logging trucks).
- **Physical constraints** - Approach fill heights near the Chehalis River and homes would require costly retaining walls.
- **Floodplains -** This alternative would require extensive floodplain fill parallel to the river.
- **Cultural resources -** An archaeological site eligible for listing on the National Register of Historic Places (NRHP) was identified in the project vicinity.

Preliminary Alternative B - construct a new bridge downstream of the original bridge site with a new SR 6 intersection. This alternative would also involve constructing an improved, higher elevation bridge in the same location as Preliminary Alternative A and making related grade changes to the approach roads, but would include a new intersection with SR 6. This alternative was also considered less optimal than the county's preferred alternative (Preliminary Alternative E, evaluated as the Proposed Action/Alternative 1 in this EA) because of the following issues:

- **Property impacts and ROW acquisition** - This alternative would have the same property impacts and ROW issues as Preliminary Alternative A, with the addition of having severe effects on a property and residence in the southeastern quadrant of the project that would likely require the county to purchase the property in its entirety.
- **Geometric constraints -** 90 degree intersections at both ends of the bridge under this alternative present difficulties for emergency vehicles and large trucks (e.g., logging trucks). The new intersection with SR 6 would be adequate, but excavation along SR 6 would be necessary to meet engineering standards for sight distance.
- **Physical constraints** - Same issues as Preliminary Alternative A.
- **Floodplains -** Same issues as Preliminary Alternative A.
- **Cultural resources -** Same issues as Preliminary Alternative A.

Preliminary Alternative D - construct a new bridge at the intersection of River Road and SR 6. This alternative would involve constructing an improved bridge upstream of the original bridge site at the (western) intersection of River Road and SR 6. This alternative was also considered less optimal than the county's preferred alternative (Preliminary Alternative E) because of the following issues:

- **Property impacts and ROW acquisition** - This alternative would require substantial ROW acquisition from one property on the north side of the river, and the property owner is unwilling to sell.
- **Geometric constraints -** This alternative would require raising the grade of SR 6 to meet the elevation of the bridge deck.

- **Emergency services access -** This alternative would require closing River Road at its west end, which would double emergency service response times for existing residents at the west end of River Road.

Preliminary Alternative F - construct a new bridge near the west end of Hatchery Road. This alternative would involve constructing a bridge upstream of the original bridge site on the western portion of Hatchery Road and making related grade changes to the approach roads. This alternative was considered less than optimal than the county's preferred alternative (Preliminary Alternative E) because of the following issues:

- **Property impacts and ROW acquisition** - Difficulty in ROW acquisition; the adjacent property owner on the south side of the Chehalis River on Hatchery Road is adamantly opposed to this alternative due to substantial ROW acquisition needs that would impact the property and concerns about increases in average daily traffic in front of the residence**.**
- **Geometric constraints -** 90 degree intersections at both ends of the bridge under this alternative present difficulties for emergency vehicles and large trucks (e.g., logging trucks).
- **Physical constraints** - Same issues as Preliminary Alternative A.

Preliminary Alternative G - purchase a temporary bridge to be used in emergency situations. This alternative project would involve purchasing a temporary bridge to be used in emergency situations. No permanent bridge would be constructed to replace the original bridge destroyed during the December 2007 storm event. This alternate project was eliminated from consideration because it would not meet the purpose and need for the project.

The main elements of Preliminary Alternative E are carried forward as Alternative 1, as presented and analyzed in this EA, and the main elements of Preliminary Alternative C are carried forward as Alternative 2, as described below.

3.2 NO ACTION ALTERNATIVE

NEPA analyses must include an evaluation of the No Action Alternative, against which the effects of the action alternatives can be evaluated and compared. Under the No Action Alternative, FEMA would not provide funding to Lewis County to replace the former Leudinghaus Road Bridge. Lewis County could choose to move forward with construction of a replacement bridge on its own with additional financial assistance from other sources; however, the potential for this to occur is entirely speculative.

Therefore, for the purposes of this NEPA analysis, it is assumed that under the No Action Alternative no new bridge would be constructed across the Chehalis River in the Meskill area to replace the bridge destroyed in the December 2007 flood event. Residents and visitors in the area would need to continue crossing the Chehalis River at the nearest existing bridge crossings (either the Chandler Road Bridge approximately 3.5 miles to the west, or the Ceres Hill Road Bridge approximately 6 miles to the east via Meskill Road and Ceres Hill Road).

3.3 ALTERNATIVE 1 (PROPOSED ACTION) - NEW DESIGN AT INTERSECTION OF HATCHERY ROAD AND SR 6

Under Alternative 1 (the Proposed Action), FEMA would provide funding to Lewis County for the design and construction of a new bridge crossing over the Chehalis River approximately 2,500 feet upstream (west) of the original Leudinghaus Road Bridge (Figures 3-1 and 3-2). Major elements of the project, construction activities and methods, impact avoidance and minimization measures (including best management practices [BMPs]), and project timing are described below. Alternative 1 as analyzed in this EA is essentially the same as Preliminary Alternative E as developed by Lewis County, with the alignment shifted to the east to avoid Hope Creek.

Project information provided in this Draft EA is based on 95% design details and 40% plan sheets of the project provided by Lewis County. The 40% plan sheets were developed based on a preliminary estimate of the 100-year flood elevation at the proposed bridge site of 269.1 feet. Northwest Hydraulic Consultants (NHC) was retained to develop a hydraulic model of the Chehalis River in the project vicinity and estimate the maximum water surface elevation at the proposed bridge site during the 100-year flood (the design event). The draft study (NHC 2013) estimated the 100-year flood elevation at the proposed bridge site at 268.5 feet. The project design and plan sheets will be updated to incorporate the estimated 100-year flood elevation of 268.5 feet from the hydraulic model, and updated plan sheets will be included in the Final EA if available at the time of publication. The preliminary 40% plan sheets are included in Appendix B for reference.

Some project details for the Proposed Action may change as the design process moves forward. Changes that are not substantive would be incorporated into the Final EA. If changes are substantive, a revised Draft EA will be prepared and circulated. For example, final construction methods for erecting the proposed bridge structure will be determined by the contractor and approved by Lewis County. Lewis County's proposed bridge construction method described and evaluated in this EA does not involve in-water work. Should the contractor choose to pursue an alternative bridge construction method involving in-water work that could result in substantive environmental impacts, a revised Draft EA detailing and evaluating the impacts of the revised bridge construction method would be prepared and circulated.

3.3.1 PROJECT ELEMENTS

The proposed project involves the following major elements (Figure 3-1, page 3-16):

- Staging and demolition
- Bridge construction
- Road construction
- Stormwater facility construction
- Hydroseeding and shoreline planting

Design details and construction activities associated with implementation of Alternative 1 are described below. More detailed information regarding specific construction methods as they pertain to various resources is included in Chapter 4 (*Affected Environment and Potential Impacts*) as applicable.

Staging and Demolition

Alternative 1 would require the purchase of two parcels (referred to as Parcels 1-A and 1-B) for new ROW (Figure 3-1). Additional minor ROW acquisition (less than 500 square feet) to transition from the elevated bridge crossing to the existing roadway alignment might also be necessary on three additional properties (referred to as Parcels 1-C, 1-D, and 1-E) along Leudinghaus Road. Construction staging on the south side of the river would utilize public ROW and Parcel 1-B. Staging on the north side of the river would utilize a field on Parcel 1-A.

Parcel 1-A contains a single-family residence. The residential home, other auxiliary structures, and landscape materials on the property would be demolished and materials disposed of at the Lewis County solid waste facility in Centralia. The site would be graded as required for bridge and road construction. Prior to on-site demolition and grading, clearing limits would be flagged, and contractors would be required to have all erosion and sediment control plans in place and functioning. Hazardous materials (e.g., polychlorinated biphenyls [PCBs], asbestos, lead-based paint, household hazardous waste, petroleum products, underground storage tanks) would also be identified prior to the start of demolition and grading activities, and would be removed and disposed of in accordance with applicable laws and regulations. Excavators and/or bulldozers would be used to demolish the residential home and other structures.

Bridge Construction

The new bridge crossing would be located downstream of the confluence of Hope Creek and the Chehalis River. The new bridge structure would be a 200-foot single span bridge over the Chehalis River using a steel truss construction, supported on cast-in-place concrete stub abutments, and founded on 6-foot diameter drilled shafts. The 100-year flood elevation at the project site is estimated at 268.5 feet (NHC 2013). The bridge is being designed to provide a minimum of 3 feet of clearance above the 100-year flood elevation (see Section 4.2, *Water Resources*, for a more detailed discussion).

Lewis County has developed a suggested construction sequence for erecting the proposed bridge that will be included in the plan set issued for bid of the project. The suggested method involves launching the bridge frame from the riverbank and would require no work waterward of the ordinary high water mark (OHWM). Plan sheets illustrating the suggested construction sequence for the proposed bridge, including the location of temporary and permanent structures, are contained in Appendix B. The suggested construction sequence involves site preparation, construction of the bridge abutments, erection of the bridge frame on temporary bridge tracks, launching the bridge frame across the river from the south bank using cables and winches, lifting the bridge frame into position on the north bank, and final construction of the north abutment and bridge structure after the bridge frame is set into position.

The project site between SR 6 and the south bank of the Chehalis River would be cleared, excavated, and graded as necessary for bridge and road construction, including areas needed for operation of a crane to erect the bridge frame. Excavation in this area includes the removal of existing materials that are unsuitable for road construction where the southern approach road would be constructed (refer to the 40% plan sheets in Appendix B). Lewis County bid specifications for the project would require the contractor to prepare a plan for the disposal of materials excavated from the site that

complies with all applicable regulations and permits for approval by Lewis County (the disposal of materials within floodplains would require a floodplain permit and potential mitigation for associated floodplain impacts). Prior to any site clearing, excavation, grading, or bridge construction activities, clearing limits would be flagged and contractors would be required to have all erosion and sediment control plans in place and functioning.

The south abutment would be constructed first. The north abutment would be only partially constructed at this stage (the backwall would not be completed until after the bridge frame is set). Both the south and north abutments would be located outside of the wetted perimeter of the OHWM, but within the FEMA-mapped floodway and 100-year floodplain of the Chehalis River. The drilled shafts and the bottom of the bridge abutments would extend below the 100-year surface water elevation, while the top of the bridge abutments and the bridge frame and deck would be above the 100-year surface water elevation (refer to the40% plan sheets contained in Appendix B). An oscillator would be used to excavate material for the 6-foot diameter drilled shafts for the bridge abutments. The material, comprised of soil and rock, would be removed from the drilled shafts and transported from the site for disposal at an approved location in accordance with the approved material disposal plan described above. The concrete for the shafts would be placed using a tremie tube or elephant hose. The shafts would be installed within a temporary casing to contain any water encountered. Lewis County's bid specifications for the project would also require that the contractor prepare a plan for the treatment of water encountered during excavation of the shafts or displaced by concrete for the shafts and would comply with all applicable environmental regulations and permits. This could involve the water being pumped to a natural or constructed in-ground sediment basin within uplands on site where suspended solids would settle out and the water would infiltrate into the ground. Alternatively, if insufficient space is available for an on-site sediment basin, the water could be pumped into a portable sediment settling tank (commonly known as a Baker Tank) for treatment, and the treated water then disposed of in uplands on or off site in accordance with the approved water treatment plan. The treatment plan for this water prepared by the contractor and approved by Lewis County would require that water encountered during construction of the drilled shafts not be discharged directly into surface waters (e.g., Chehalis River, Hope Creek).

After the drilled shafts are constructed, the stub abutments would be constructed and backfilled. Backfilling involves placing and compacting previously excavated soils or other suitable material around the abutments for structural support. Riprap would be placed around the bridge abutments on both sides of the river and keyed in to prevent scour around the abutments during extreme high flood flows. Riprap around the abutments would be below the estimated 100-year flood elevation, but would not extend below the OHWM. If the existing soil is too hard, it may need to be removed for riprap placement. If the existing soil is soft enough, it could be left in place and the riprap pushed into the material.

A temporary support bent would be installed in front of the south abutment outside the OHWM to support launching of the bridge frame across the river. Lewis County anticipates that the temporary support bent would consist of steel piles driven into the soil with a vibratory hammer, a concrete pile cap (a concrete mat that spreads the weight across the support structure), and steel diagonal support beams. Temporary bridge tracks would be erected that would extend from approximately SR 6, across the south abutment to the temporary support bent in front of the abutment. Two temporary

work platforms for crane operation would be constructed on the north bank up- and downstream of the north abutment and outside the OHWM.

The bridge frame would then be erected atop roller supports on the temporary bridge tracks, and winches and cables would be installed at the south abutment for use in launching the bridge frame across the river from the south bank. Cranes would be used as required on the north bank to lift the bridge frame into position atop the north abutment. The temporary support bent and any other support structures would be removed prior to final placement of the bridge frame. After the bridge frame is set into final position, the temporary support bent, bridge tracks, and work platforms on the south and north banks would be completely removed from the site, the north abutment would be completed, and final construction of the bridge structure would occur, including erection of remaining bridge stringers, and installation of the concrete deck, joints, curb, railing, and utilities.

Road Construction

On the south side of the bridge, Alternative 1 would include a new intersection with SR 6 and a connection to Hatchery Road southeast of where Hatchery Road crosses Hope Creek. The design includes two 12-foot travel lanes with 2-foot shoulders for a 28-foot wide roadway. A combination of fill and retaining walls would be required for the base of the new approaches. The new intersection with SR 6 would require the installation of a 60-foot long by 5-foot high by 20-foot wide, three-sided concrete box culvert to convey flow from a small unnamed intermittent stream (referred to as Stream 1 in this EA) that flows north under SR 6 just east of Hatchery Road, then northeast under the proposed new intersection. On the north side of the bridge, a new intersection with Leudinghaus Road would be constructed that would include using fill to raise the elevation of Leudinghaus Road a maximum of 5.5 feet (with a maximum profile grade of 3.5%). Within the project limits, Leudinghaus Road would be shifted south up to approximately 13 feet at the new bridge approach to better utilize the new ROW. A retaining wall would be required in one location along Leudinghaus Road to the west of the new bridge approach. Two driveways on the north side of Leudinghaus Road (one east and one west of the new bridge) would need to be altered to match the new alignment and grade of the road.

Road construction would involve clearing and grubbing of existing vegetation within the project clearing limits; saw-cutting existing pavement at the point-of-intersection where the roadway improvements would occur; pulverizing and removing asphalt within the project limits prior to the placement of fill; grading; placement and compacting of fill, subgrade, base, top course, and asphalt for the roadways and crushed gravel for the shoulders; construction of retaining walls and drainage ditches; and the installation of guard rails.

Stormwater Facility Construction

Stormwater facilities would be constructed during road construction. The new bridge elevation would be the highest point of the project, and all stormwater runoff from the new impervious surface created by the new bridge and approach roads would flow through a curb and gutter system to catch basins where it would be conveyed through storm pipes to two new stormwater detention and treatment ponds. Treated stormwater would be released according to natural drainage rates and directed via drainage pipes to Stream 1 and the Chehalis River (Figure 3-1).

Stream 1 currently collects stormwater runoff from SR 6. Under the proposed project, treated water from the southern stormwater pond would discharge to Stream 1 west of the new intersection with SR 6. An existing concrete pipe culvert buried under an old road bed roughly 230 feet downstream of SR 6 on Stream 1 would be removed, and the stream would be excavated and graded from SR 6 to the location of the old concrete pipe culvert as required to accommodate 25-year design flows. A 60-foot long by 5-foot high by 20-foot wide, three-sided concrete box culvert would be installed to convey the stream under the new intersection with SR 6. On the north side of the river, treated water from the northern stormwater pond would be conveyed via stormwater pipe to a discharge point on the north bank of the Chehalis River.

Hydroseeding and Shoreline Planting

Upon completion of bridge and road construction activities, all exposed areas would be hydroseeded. Staging areas would be graded and hydroseeded. Shoreline areas on Parcel 1-A and any other areas disturbed during construction would be graded and planted with native vegetation appropriate to site conditions and as specified in permits or conservation measures based on agency consultation for the project.

Construction is anticipated to include standard construction equipment such as drill rigs, cranes, excavators, dozers, backhoes, graders, dump trucks, concrete trucks, rollers, pavers, and jackhammers, in addition to smaller tool trucks and hand tools. A vibratory pile driver would be required to install the steel piles for the temporary support bent in front of the south abutment.

3.3.2 Impact Avoidance and Minimization Measures

Lewis County would adhere to federal, state, and county regulations; permit and approval conditions; agency conservation measures; and BMPs for the design, construction, and long-term maintenance of the proposed project, including, but not limited to:

Temporary Erosion Sediment Control, Spill Control, and Water Quality

- Comply with the requirements of any U.S. Army Corps of Engineers (Corps) permit issued for work recontouring Stream 1.
- Carry out construction activities in accordance with the requirements of the Hydraulic Project Approval (HPA) issued by the Washington Department of Fish and Wildlife (WDFW), to minimize effects on aquatic species.
- Implement a temporary erosion and sediment control (TESC) plan to minimize erosion and sedimentation.
- Implement a spill prevention, control, and countermeasure (SPCC) plan to minimize spills and ensure that all harmful materials are properly stored, contained, and disposed of.
- Implement a stormwater pollution prevention (SWPP) plan to prevent stormwater contamination, control sedimentation and erosion, and comply with the requirements of the Clean Water Act (CWA) for the construction site operator’s activities.
- Any stormwater runoff will be contained using erosion control BMPs. Specifically, a silt fence will be installed around upland construction sites to filter sediment that may be suspended in runoff water.

- Treat any sediment-laden wastewater (in an upland area) produced by the project prior to discharge.
- Contain or remove from the site any water having direct contact with uncured concrete, as appropriate. Test any such water (i.e., for pH) prior to direct discharge.
- Establish concrete chute cleanout areas to properly contain wet concrete and wash water outside of environmentally sensitive areas.
- Completely seal all concrete forms to prevent the possibility of fresh concrete from entering surface waters.
- Reuse or dispose of excavated soil and rock at an approved location outside of floodplains in accordance with applicable floodplain regulations and permits.
- Inspect equipment daily for leaks and proper function. Ensure that equipment is clean and free of external petroleum-based products.
- Equipment will be washed before entering the job site and inspected daily for fuel or lubricant leaks.
- Equipment staging and fueling areas will be completely isolated from surface waters to avoid the possibility of impacts on surfaces waters. To the extent practicable, fuel and maintain equipment at least 150 feet landward of the OHWM.
- To the extent possible, work in or near surface waters would be timed to occur during the drier summer months and associated low-flow conditions.
- Cease project operations under high-flow conditions that may result in inundation of the construction zone, except for efforts to minimize resource damage. Remove all equipment from stream banks during storm events to minimize the occurrence of bank failures.
- Install rock at construction site access points to control tracking of sediments onto public roads and stormwater ditches.
- All exposed soils would be stabilized during the first available period or no more than 7 days following project completion.
- Erosion control seeding and final seeding will be applied to surfaces subject to erosion.
- During November 1 through March 31, all disturbed areas greater than 5,000 square feet that are subject to erosion will be stabilized by mulch or plastic covering.

Temporary Access

- Locate staging areas above the OHWM and outside of environmentally sensitive areas.
- Staging and temporary access areas should occur within the previously disturbed areas whenever possible.

Footprint Minimization

- Install high-visibility fencing around areas to be preserved before construction to avoid unintended effects on upland vegetation, wetlands, riparian, or other sensitive areas.
- Limit vegetation removal and retain large trees to the extent practicable. Protect root zones of the trees that would be retained by installing silt fencing at the dripline of each tree to create equipment exclusion zones.
- Areas undergoing temporary alteration shall not be grubbed.

Migratory Bird Protection

- If vegetation removal in the project area is scheduled to occur within the active breeding season of migratory birds (between March 1 and September 15), a qualified biologist shall conduct a pre-construction survey for active nests.
- Pre-construction surveys shall be conducted in all areas proposed for clearing and occur 15 days prior to commencement of construction activities. If surveys show no evidence of nests, no additional conservation measures shall be required.
- If any active nests are located in the construction area, the nest areas shall be flagged and a no disturbance buffer zone of 100 feet shall be provided around the active nest and maintained until the end of the breeding season or until the young have fledged. Guidance from the U.S. Fish and Wildlife Service (USFWS) shall be requested if establishing a 100-foot buffer zone is impractical.

3.3.3 Project Timing

Project construction is expected to begin in May or June, and end in January of the following year. Alternative 1 would not involve any in-water work or work waterward of the OHWM. However, an HPA from WDFW is required for the construction of any bridge structure across the OHWM of state waters, and applies to the proposed project. The estimated construction timeframe depends on acquiring funding and the appropriate permits for the project.

3.4 ALTERNATIVE 2 - NEW DESIGN AT ORIGINAL BRIDGE SITE WITH NEW SR 6 INTERSECTION

Under Alternative 2, FEMA would provide funding to Lewis County for the design and construction of a new bridge at the original bridge site with a new SR 6 intersection (Figure 3-2). Major elements of the project, construction activities and methods, impact avoidance and minimization measures (including BMPs), and project timing are similar to Alternative 1 and are described below. Information provided in this Draft EA for Alternative 2 is based on a conceptual (approximately 3%) design of the project alternative provided by Lewis County. Alternative 2 as analyzed in this EA is essentially the same as Preliminary Alternative C as developed by Lewis County (as described in Section 3.1, *Alternatives Considered But Not Carried Forward*).

3.4.1 Project Elements

The proposed project involves the following major elements (Figure 3-2):

- Staging
- Bridge construction
- Road construction
- Road decommissioning
- Hydroseeding and shoreline planting

Alternative 2 would require new ROW acquisition affecting four parcels (referred to as Parcels 2-A, 2-B, 2-C, and 2-D) (Figure 3-2). Design details and construction activities associated with implementation of Alternative 2 are described below. More detailed information regarding specific

construction methods as they pertain to various resources is included in Chapter 4 (*Affected Environment and Potential Impacts*) where applicable and relevant to a particular resource topic.

Staging

River Road would be closed between its existing intersection with SR 6 (to the west of the bridge site) to the location of the new intersection with SR 6, and would be available for construction staging on the south side of the river. It is anticipated that staging on the north side of the river would be located on Parcel 2-D.

Bridge Construction

Under Alternative 2, a new bridge structure would be constructed at the original bridge location. The new structure would be a single span bridge over the Chehalis River using precast/prestressed concrete girders, supported on cast-in-place concrete abutments with spread footings. The bridge would have a final clear span of 175 feet. The 100-year flood elevation at the original bridge location is estimated at 266 to 267 feet (NHC 2008). This is above the river channel banks. The abutment footings would be below the 100-year flood elevation but above the OHWM (estimated at 253 feet in elevation) (Lewis County 2008), and the bottom of the proposed bridge deck would be a minimum of 3 feet above the 100-year flood elevation.

Construction of the proposed bridge structure would include construction/placement of the bridge footings, abutments, girders, and deck; construction of a temporary false deck for construction workers; construction of retaining walls; and riprap placement. These activities would require excavation and fill below the 100-year flood elevation and the OHWM (2-year flood elevation) of the Chehalis River. Fill below the 100-year flood elevation would include concrete, structural fill, and riprap associated with the bridge structure and common borrow or gravel borrow associated with the roadway. Fill below the OHWM would be limited to riprap.

The bridge abutment spread footings would be constructed by excavating down to the bedrock where they would be embedded 1 foot into the rock, with rock anchors installed at each abutment to ensure stability. The footings would be located within the 100-year floodplain but above the OHWM. It is anticipated that construction of both footings could be accomplished in the dry (outside of the wetted perimeter) during lower flow conditions in the river. After the footings are constructed, the abutments would be constructed. The adjacent segmental block walls would be constructed simultaneously with the abutments.

Once the abutments are constructed, they would be backfilled and heavy, loose riprap placed around the bridge abutments on both sides of the river and keyed in to prevent future scour. The limits of riprap would extend below the OHWM on both sides of the river. Riprap placement could likely be accomplished entirely in the dry, during low-flow conditions of the river. Should water levels rise during riprap placement, the work area would be isolated from the river using sandbags or other materials to form cofferdams. If necessary, fish would be relocated outside of the work in accordance with protocols specified through consultation with the National Marine Fisheries Service (NMFS) (e.g., NMFS 2000) and in the HPA.

The bridge girders would be placed by either constructing a girder launcher or by using two large cranes. If the crane method is selected, a 30x30 foot gravel work pad may need to be constructed on the north bank of the Chehalis River. The gravel pad would likely be constructed at the same time as the north abutment since construction activities would be below the OHWM but outside of the wetted perimeter of the river. The crane on the south side could remain behind the abutment.

If a girder launcher were used, a temporary in-water support structure (temporary pier) would be required. The temporary pier would extend from the north bank and would consist of piling driven into the river, steel bracing, and a timber block support platform. It is anticipated that in-water work would be limited to the installation and removal of the steel piles for the temporary pier. The steel piles would be driven into the riverbed using either a vibratory or impact pile driver. According to Lewis County, an impact pile driver, rather than a vibratory pile driver, would likely be used to install the steel piles. The location of the bridge site on high, steep banks above the Chehalis River requires that an impact pile driver be mounted on a crane and lifted out over the water. Bubble curtains would be used to minimize the underwater noise effects typically associated with impact pile driving. If a vibratory pile driver is used at this location, it would need to be operated from within the riverbed. This would require constructing access roads and cofferdams from both sides of the river to mobilize the necessary equipment down to the riverbed to install the steel piles, and would involve greater disturbance to the riverbanks. The temporary pier would be removed after the girders are set. It is anticipated that the temporary pier would need to be in place for approximately 1 week.

After the girders are placed and braced, a false deck for construction workers would be constructed and the diaphragms built. The false deck would prohibit construction materials from entering the river. The bridge deck and barriers could then be constructed, after which the false deck would be removed.

Road Construction

On the south side of the bridge, Alternative 2 would include a new intersection with SR 6, which would involve raising the grade of approximately 300 linear feet (LF) of River Road to the east of the new intersection to meet the elevation of the new bridge approach. Raising the grade of River Road in this area would require the installation of segmental block retaining walls adjacent to the abutments to support the embankments, and might also require altering at least one residential driveway (on Parcel 2-A) to match the new road grade. West of the new intersection, River Road would be decommissioned and planted with native plants appropriate to the site. The new SR 6 intersection would also require the removal of vegetation and bedrock on the south side of SR 6 to meet engineering standards for sight distance on the highway (Figure 3-2).

On the north side of the bridge, Alternative 2 would include raising the grade of approximately 750 LF of Leudinghaus and Meskill roads to the west and east (respectively) of the new bridge and approach. Raising the grade of roadway in this area would require installing segmental block retaining walls adjacent to the bridge abutments to support the embankment, and on both sides of the roadway along the Leudinghaus/Meskill Road curve (to the east of the new bridge) where it crosses over an unnamed perennial stream (referred to as Stream 2 in this EA). Stream 2 flows beneath the roadway at the center of the Leudinghaus/Meskill Road curve via a 4x4-foot concrete box culvert before flowing into the Chehalis River several feet downstream of the culvert. The roadway

embankment falls off quickly toward the culvert, and the stream bottom is approximately 25 feet below the existing road. The grade changes to Meskill Road (to the east of the new bridge) would also require altering at least one driveway (on Parcel 2-D) (Figure 3-2). Alternative 2 would create less impervious surface than the existing roadway in this area and therefore does not require stormwater detention or associated facilities.

Road construction for the new intersection with SR 6 and regrading of the existing approach roads would involve clearing and grubbing of existing vegetation within the project clearing limits; saw-cutting existing pavement at the point-of-intersection where the roadway improvements would occur; pulverizing and removing asphalt within the project limits prior to the placement of fill; grading; placement and compacting of fill, subgrade, base, top course, and asphalt for the roadways and crushed gravel for the shoulders; and the installation of guard rails. At least one private driveway on the south side of the river on River Road (on Parcel 2-A) and one private driveway on the north side of the river on Meskill Road (on Parcel 2-D) would be reconfigured and graded as necessary to match the regraded roadways. It might also be necessary to relocate a pasture fence along Meskill Road on Parcel 2-D due to the wider road prism associated with raising the grade of the roadway.

The reconfigured road approaches for Leudinghaus and Meskill roads on the north side of the river would cross Stream 2 and would require installing a new 160-foot long, 48-inch diameter corrugated metal pipe (CMP) culvert and filling in portions of the ravine. The existing 4x4 foot concrete box culvert that currently carries Stream 2 beneath the Leudinghaus/Meskill curve would be abandoned. Replacement of the culvert on Stream 2 would involve installing a check dam on the existing channel upstream of the new culvert location; excavation, grading, and installation of the new culvert; altering the alignment of the stream channel and diverting the streamflow to the new culvert; abandonment of the old culvert; vegetation clearing, fill, and grading of the stream banks to tie into the reconfigured roadway embankments; and constructing roadside ditch outfalls to the stream.

Abandonment of the box culvert would involve constructing 2-foot (minimum) long concrete plugs at each end, secured in place by bar dowels. The stream channel would be shortened by approximately 100 LF. Stream 2 is a perennial stream, and it is anticipated that some in-water work would take place during realignment of the stream channel upstream of the roadways. The regraded stream banks and new roadway embankments would be replanted and/or hydroseeded after construction.

On the south side of SR 6, vegetation and rock would be removed to meet sight distance engineering standards on the highway for the new intersection. Blasting would be required to remove rock from the bedrock wall in this area. This would require narrowing the two-lane highway down to one lane with periodic closures for a period of approximately 3 weeks.

Road Decommissioning

River Road west of the new SR 6 intersection would be decommissioned. This would involve grinding the pavement in place and decompacting the road surface. The decommissioned roadway would be replanted with native species appropriate to site conditions. A small seasonal stream (Stream 3) flows under River Road via dual 24-inch concrete pipe culverts within the segment to be

decommissioned and outfalls directly into the Chehalis River. The dual culverts would be left in place unless WDFW requires their removal as a condition of the HPA permit for the project.

Hydroseeding and Shoreline Planting

Upon completion of bridge and road construction activities, all exposed areas would be hydroseeded. Staging areas would be graded and hydroseeded. Shoreline areas disturbed during construction would be graded and planted with native vegetation appropriate to site conditions and as specified in permits for the project.

Construction is anticipated to include standard construction equipment such as drill rigs, cranes, excavators, dozers, backhoes, graders, dump trucks, concrete trucks, rollers, pavers, and jackhammers, in addition to smaller tool trucks and hand tools. A pile driver would be required to install steel piles for the temporary in-water support structure.

3.4.2 Impact Avoidance and Minimization Measures

Impact avoidance and minimization measures under Alternative 2 would be similar to Alternative 1, with the addition of measures to avoid and minimize impacts on aquatic habitats and species associated with in-water work or work waterward of the OHWM, including, but not limited to:

Work Below OHWM

- Comply with the requirements of any U.S. Army Corps of Engineers (Corps) permit issued for work below the OHWM.
- Comply with conservation recommendations that result from MSA consultation with NMFS regarding Essential Fish Habitat (EFH).
- In-water work in the Chehalis River shall be conducted during the in-water work window as determined by NMFS and stipulated by the HPA issued by WDFW.
- In-stream work areas will be isolated from surface waters to prevent sediment-laden water from impacting waters outside the work area and to protect fish resources.
- Dewater identified in-water work areas and relocate fish outside of the construction zone before in-water work begins. NMFS and WDFW shall be notified in case of fish kills.
- Any waste from the project shall be the responsibility of the contractor and would be disposed of at a properly permitted upland site of their choosing.
- Install individual pieces of cofferdams in sequence, starting at the upstream end to discourage fish from entering the construction zone and to allow fish that become trapped to escape through the downstream opening.
- Conduct cofferdam dewatering in two or three stages, pausing between stages to accommodate fish removal.
- Do not remove cofferdam devices until turbidity levels within the work area are the same as background levels outside of the isolated area.
- Regulate the rate of flow back into isolated areas through the slow removal of cofferdams.
- Monitor and maintain the cofferdam seal.
- Comply with water quality standards for surface waters of the State of Washington (Washington Administrative Code [WAC] 173-201A) during construction of the project.

- Monitor turbidity periodically during in-water work and at a distance downstream of the construction zone (mixing zone) as determined by the Washington State Department of Ecology (Ecology) to ensure that the Nephelometric turbidity unit (NTU) limit complies with thresholds in Table 200 (1)(e) Aquatic Life Turbidity Criteria in WAC 173-201A.
- Stop in-water work if the NTU level exceeds turbidity criteria and adjust to comply with the NTU limit. However, it is not anticipated that state water quality standards will be exceeded at the point of compliance.
- Develop a sediment monitoring protocol for measuring downstream turbidity levels during sediment-generating activities (e.g., in-water construction) that will require approval from the USFWS.

Temporary Access

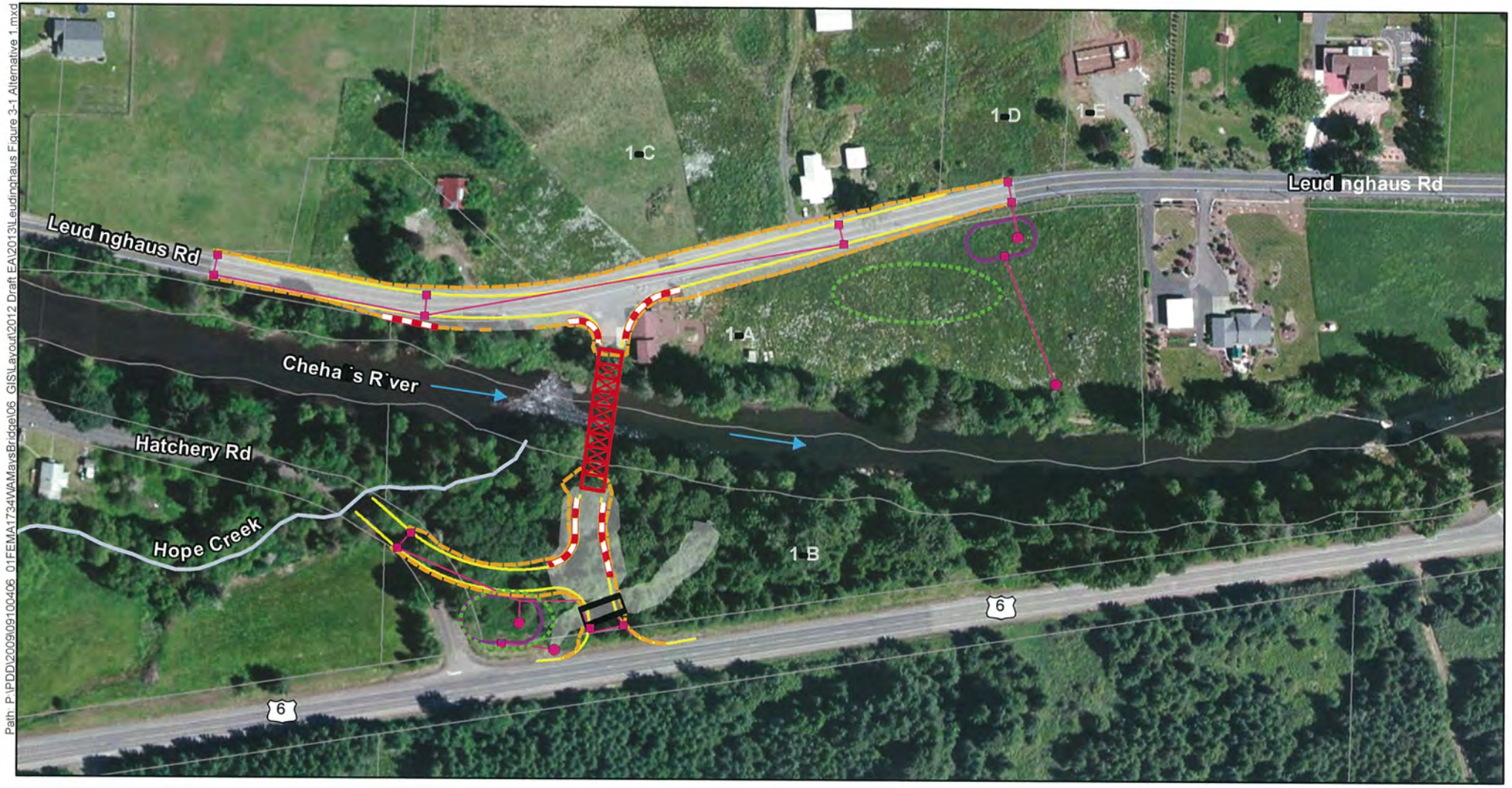
- Locate staging areas above the OHWM and outside of environmentally sensitive areas.
- Staging and temporary access areas should occur within the previously disturbed areas whenever possible.

Fish Handling and Exclusion

- Lewis County will follow the fish handling and exclusion protocol as documented in the NMFS Guidelines for electrofishing waters containing salmonids listed under the ESA (NMFS 2000).

3.4.3 Project Timing

Project construction is expected to begin in May or June, and end in January of the following year. According to Lewis County, a temporary in-water support structure would be necessary if a girder launcher is used to place the girders. Lewis County anticipates that the temporary in-water support structure would need to be in place for about 1 week. The recommended in-water work window for the Chehalis River in Lewis County, upstream of the South Fork Chehalis River, is August 1 to August 31 (WDFW 2010). In-water work, which would be limited to construction and removal of the temporary in-water support structure, could be accomplished entirely within the WDFW recommended in-water work window. The estimated construction timeframe is dependent upon acquiring funding and the appropriate permits and approvals for the project.



Draft Environmental Assessment
Leudinghaus Road Bridge Replacement Project
Lewis County, Washington

FEMA-1734-DR-WA (Public Assistance)
Applicant: Lewis County

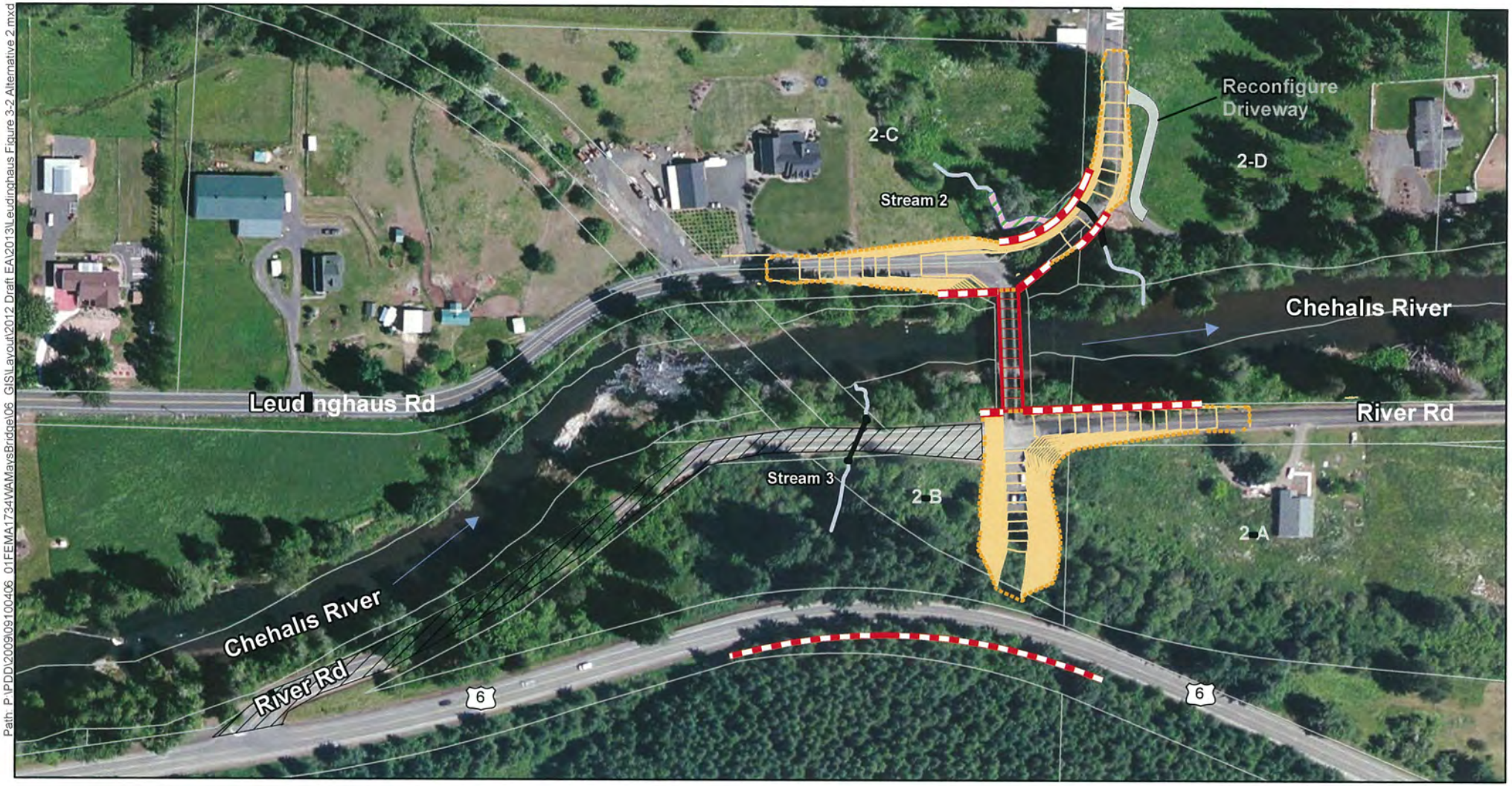
N W E S

0 50 100 200 Feet

Figure 3-1. Alternative 1
Legend

- Staging Area
- Excavation and Grading
- Fill
- New/Reconstructed Road
- Bridge Structure
- Retaining Wall
- Catch Basin
- Discharge
- Culvert
- Stormwater Pipe
- Stormwater Pond
- Stream 1
- Flow Direction
- 1-C Parcel Boundary

Print Date: 9/16/2013



Path: P:\PDD\2009\09100406_01FEMA1734WAMaysBridge\06_GIS\Layout\2012 Draft EA\2013\Leudinghaus Figure 3-2 Alternative 2.mxd

Draft Environmental Assessment
Leudinghaus Road Bridge Replacement Project
Lewis County, Washington

FEMA-1734-DR-WA (Public Assistance)
Applicant: Lewis County

N W E S

0 50 100 200 Feet

Figure 3-2. Alternative 2

Legend

- Fill
- New/Reconstructed Road
- Driveway Reconfiguration
- Bridge
- Retaining Wall
- Road Decommissiong
- Stream
- Wetland A
- Existing Culverts
- Flow Direction
- 2-C Parcel Boundary

Print Date: 9/16/2013

4.0 Affected Environment and Potential Impacts

This chapter describes the affected environment and potential impacts associated with implementation of the alternatives, organized by the following resource topics: physical resources, water resources, biological resources, cultural resources, and socioeconomic resources. The CEQ and FEMA regulations (44 CFR Section 10) that implement NEPA require NEPA documents to be concise, focus on the issues relevant to the project, and exclude extraneous background data and discussion of subjects that are not relevant or would not be affected by the project alternatives. Accordingly, the following is a summary of resource areas not evaluated in detail in this EA:

- **Air Quality:** The project is not located in a nonattainment area. The project is in a rural area with low population density and low traffic volumes. Construction would create dust and vehicle emissions; however, impacts would be minor and temporary. The project alternatives are not expected to result in an increase in traffic volumes or vehicle emissions that would affect air quality in the area.
- **Coastal Resources:** The project is not located in a coastal zone.
- **Public Services and Utilities:** The project is in a rural, unincorporated area with low population density. The project alternatives would not increase the need for public services or utilities.
- **Public Health and Safety:** The project is in a rural, unincorporated area with low population density. Issues related to flooding and access to the project area by emergency service providers are addressed in the water resources and transportation and access sections.
- **Hazardous Materials:** No hazardous materials have been identified in the project area. Construction of the bridge, road, and stormwater facilities is not expected to result in any hazardous materials or toxic waste related impacts. Demolition of structures may produce small amounts of hazardous materials (e.g., asbestos, lead-based paint, household hazardous waste, and white goods). Handling and disposal of hazardous materials will be in accordance with local, state and federal requirements.

The NEPA compliance process requires federal agencies to consider direct and indirect impacts on the environment. For each resource category, the impact analysis follows the same general approach in terms of impact findings. When possible, quantitative information is provided to establish impacts. Qualitatively, these impacts will be measured as outlined below.

Impact Scale	Criteria
None/Negligible	The resource area would not be affected, or changes would be either non-detectable or if detected, would have effects that would be slight and local. Impacts would be well below regulatory standards.
Minor	Changes to the resource would be measurable, although the changes would be small and localized. Impacts would be within or below regulatory standards. Mitigation measures would reduce any potential adverse effects.
Moderate	Changes to the resource would be measurable and have both localized and regional scale impacts. Impacts would be within or below regulatory standards, but historical conditions are being altered on a short-term basis. Mitigation measures would be necessary and the measures would reduce any potential adverse effects.

Major	Changes would be readily measurable and would have substantial consequences on a local and regional level. Impacts would exceed regulatory standards. Mitigation measures to offset the adverse effects would be required to reduce impacts, though long-term changes to the resource would be expected.

Impacts are disclosed based on the amount of change or loss to the resource from the baseline conditions and may be direct or indirect. Direct impacts are caused by an action and occur at the same time and place as the action. Indirect impacts are caused by an action and occur later in time or are farther removed from the area, but are reasonably foreseeable. Cumulative impacts are described in Section 4.6 (*Cumulative Impacts*).

The following table summarizes, by resource topic, potential impacts associated with implementation of the alternatives, based on the full analysis in Sections 4.1 through 4.6.

Table 4.0-1. Summary of Potential Impacts of the Alternatives.

Resource Area	No Action Alternative	Alternative 1 – Proposed Action	Alternative 2 – Rebuild in Place
PHYSICAL RESOURCES			
Geology and Soils	No effects on geology and soils.	No effects on geology. Negligible, short-term adverse effects on soils/sediments from ground disturbance and soil exposure during construction, vibratory pile driving along shoreline, and from channel grading and culvert removal/installation on Stream 1. Direct, minor, long-term adverse effects on soils from conversion of native soils to impervious surfaces. Indirect, negligible, long-term adverse impacts on soils from potential erosion on north bank at new stormwater outfall. Minor, beneficial effects associated with reduced channel downcutting and bank erosion in lower reach of Stream 1.	Negligible direct or indirect adverse effects related to earthquake-induced liquefiable soils at the south abutment site. Negligible, short-term adverse effects on soils/sediments from ground disturbance and soil exposure during construction and from pile driving. No direct or indirect, long-term adverse effects on soils from conversion of native soils to impervious surfaces or from erosion associated with stormwater runoff because Alternative 2 contains less impervious surface than existing conditions (negligible long-term beneficial effect).
Farmland	No effects on farmland.	Negligible, long-term adverse effects on farmland through conversion of 7.3 acres of Prime Farmland to nonagricultural uses, which is equivalent to 0.001% of total farmland available in the county. Minor, long-term beneficial effects through improved local access, which would reduce time and cost of transporting goods.	Negligible, long-term adverse effects on farmland through conversion of 11.1 acres of Prime Farmland and Statewide Important Farmland to nonagricultural uses, which is equivalent to 0.002% of total farmland available in the county. Minor, long-term beneficial effects through improved local access, which would reduce time and cost of transporting goods.
Shoreline Stability	No effects on shoreline stability.	Minor, short-term adverse effects on shoreline stability from operation of heavy equipment and vibratory pile driving near top of bank.	Negligible, short-term adverse effects on shoreline stability; similar to Alternative 1. Minor, long-term adverse effects on shoreline stability associated with increased loading

Resource Area	No Action Alternative	Alternative 1 – Proposed Action	Alternative 2 – Rebuild in Place
		Minor, long-term adverse effects on shoreline stability associated with abutments and approach road fill within the floodway.	from fill for the abutments and retaining walls for the approach roads.
Climate Change	No effect on climate change. No increase in risk to infrastructure as a result of climate change.	No effect on climate change. Potential beneficial effects for infrastructure; reduced risk to new, higher elevation bridge structure should an increase in flooding occur as a result of climate change.	Same as Alternative 1.
WATER RESOURCES			
Hydrology, Groundwater and Floodplains	No effects on hydrology, groundwater, or floodplains.	No short-term adverse effects on hydrologic conditions in the Chehalis River, or groundwater. Negligible short-term and minor long-term adverse effects on floodplains associated with installation of bridge abutments within the 100-year floodplain and bridge occupancy within the floodplain. Minor, short-term adverse effects on hydrologic conditions in Stream 1 from channel grading and culvert installation during construction. Minor, long-term adverse effects on hydrologic conditions in the Chehalis River at the proposed bridge site during high-flow/flood events from abutments, approach roads, and riprap within the floodplain and floodway. Minor, long-term beneficial effect on hydrologic conditions in Stream 1 associated with the new culvert and stream realignment.	Minor, short-term adverse impact on hydrology of Stream 2 during culvert installation. Negligible short-term adverse effect on groundwater during construction. Negligible short-term and minor long-term adverse effects on floodplains associated with the installation of bridge abutments within the 100-year floodplain and bridge occupancy within the floodplain. Minor, long-term adverse effects on hydrologic conditions in the Chehalis River from site-specific increases in near-bank velocities during both bankfull and high-flow events caused by riprap on the riverbanks. Minor, long-term adverse effects on hydrology associated with the installation of longer culvert and stream realignment on perennial tributary stream on north bank or Chehalis River.

Resource Area	No Action Alternative	Alternative 1 – Proposed Action	Alternative 2 – Rebuild in Place
		Negligible, long-term adverse effects on groundwater recharge from an increase in impervious surface.	Negligible long-term beneficial effect on groundwater recharge from reduced impervious surface compared to existing conditions.
Water Quality	No short- or long-term effects on water quality.	Minor, short-term adverse effects on water quality from mobilization of sediments and increased turbidity during pile driving. Minor, short-term adverse effects from increased erosion and sedimentation associated with ground-disturbing activities during construction. Negligible, short-term adverse effects on water quality from accidental spills or stormwater discharges of construction-related contaminants. Negligible, long-term adverse effects on water quality associated with increased stormwater runoff and alteration of existing drainage patterns.	Minor, short-term adverse effects on water quality from mobilization of sediments and increased turbidity during pile driving. Negligible, short-term adverse effects on water quality from increased erosion and sedimentation as a result of ground-disturbing activities. Negligible, short-term adverse effects on water quality from accidental spills or stormwater discharges of construction-related contaminants. Negligible, long-term beneficial effects on water quality associated with small decrease in impervious surface and stormwater runoff.
Wetlands	No effects on wetlands.	No effects on wetlands.	Minor, short-term adverse effects on Wetland A associated with ground-disturbing activities, culvert installation, and channel realignment of perennial tributary and associated riparian fringe wetlands on north bank of the Chehalis River. Minor, long-term adverse effects from filling about 0.02 acre of Wetland A.

Resource Area	No Action Alternative	Alternative 1 – Proposed Action	Alternative 2 – Rebuild in Place
BIOLOGICAL RESOURCES			
Vegetation	No adverse effects on vegetation.	Long-term minor adverse effects on vegetation; construction would permanently clear approximately 1 acre of riparian forest, 0.9 acre of grassland, and 0.2 acre of disturbed uplands.	Similar to Alternative 1, Alternative 2 would have long-term minor adverse effects on vegetation; construction would permanently clear 0.4 acre of riparian forest and 0.8 acre of grassland.
General Wildlife	No adverse effects on general wildlife.	Negligible to minor adverse effect on general wildlife from construction disturbance and permanent habitat removal.	Negligible to minor adverse effect on general wildlife from construction disturbance and permanent habitat removal.
Threatened and Endangered Species	No adverse effects on threatened and endangered species.	No adverse effect on threatened and endangered species (none are present).	No adverse effect on threatened and endangered species (none are present).
Essential Fish Habitat (EFH)	No adverse effects on EFH.	Within the context of NEPA, Alternative 1 is expected to have a minor adverse effect on EFH for Chinook and coho salmon from the removal of riparian vegetation adjacent to the Chehalis River and Hope Creek, and an increase in artificial (bridge) overwater shading on the Chehalis River.	In contrast to Alternative 1, Alternative 2 would involve the installation of bridge abutments below the OHWM. This would require fill (riprap) below the 100-year flood elevation to protect the abutments from scour. Bridge construction activities would likely have a moderate short-term (adverse modification to EFH) and minor long-term, adverse effect on EFH for Chinook and coho salmon.
Migratory Birds	No adverse effects on migratory birds.	Negligible to minor adverse effects on migratory birds would result from construction disturbance and permanent habitat removal.	Similar to Alternative 1, Alternative 2 would likely have a negligible to minor adverse effect on migratory birds.
Priority Fish and Wildlife	No adverse effects on priority fish and wildlife species.	Minor adverse effects on priority fish species from permanent removal of riparian vegetation and artificial overwater shading from the proposed bridge. A minor adverse effect on wild turkey, cavity-nesting ducks, and elk would result from the construction disturbance and permanent habitat removal.	In contrast to Alternative 1, Alternative 2 would involve the installation of bridge abutments below the OHWM, and short-term construction activities would likely have a moderate short-term and minor long-term adverse effect on priority fish species. Similar to Alternative 1, Alternative 2 would likely have a minor adverse effect on priority wildlife species.

Resource Area	No Action Alternative	Alternative 1 – Proposed Action	Alternative 2 – Rebuild in Place
CULTURAL RESOURCES			
Cultural Resources	No effects on cultural resources.	No effects anticipated; however, there is potential for encountering NRHP-eligible buried archaeological resources within the project Area of Potential Effects (APE).	Known prehistoric archaeological site within the APE. The resource would be avoided by creating a temporary exclusion area around the perimeter of the archaeological site. No effects anticipated; however, there is potential for encountering buried archaeological resources within the project APE.
SOCIOECONOMIC RESOURCES			
Land Use	No adverse effects on land use anticipated, but potential long-term change in land use and/or growth may occur due to a decrease in accessibility between both sides of the river and the community's social network.	Minor, long-term adverse effects on land use from the conversion of two existing rural residential parcels to public uses for new roadway and stormwater facilities, and additional minor ROW acquisition on other parcels along Leudinghaus Road.	Minor, long-term adverse effects on land use from the conversion of one undeveloped, rural residential parcel to public uses for new roadway and additional ROW acquisition on four other parcels along River Road, Leudinghaus Road, and Meskill Road that would encroach on existing passive uses and cattle pasture on one property.
Visual Resources	No effects on visual resources.	No effects on landscape-level views. Minor, long-term adverse effects on site-level views associated with altering views of the Chehalis River corridor from SR 6 and residences along Leudinghaus Road.	No effects on landscape-level views. Minor, long-term adverse effects on site-level views associated with altering views of the Chehalis River corridor from SR 6 and residences along River Road, Leudinghaus and Meskill Road. Because the proposed bridge and elevated approach roads under Alternative 2 would be closer to residences than Alternative 1, there would be a greater visual impact on individual adjacent properties compared to Alternative 1.
Transportation and Access	Moderate, long-term adverse effects on local roads and local access for residents, workers, emergency service providers,	Minor, short-term adverse effects on traffic flow and local access, including one private driveway, during construction.	Same as Alternative 1.

Resource Area	No Action Alternative	Alternative 1 – Proposed Action	Alternative 2 – Rebuild in Place
	and others due to need to continue using longer alternative routes to access the project area.	Negligible, long-term adverse effects on access from reconfiguration of one private driveway. Moderate, long-term beneficial effects for local residents, businesses, and emergency services, from restoring access across the Chehalis River between SR 6 and the Meskill area.	
Noise	No effects on noise environment.	Minor, short-term adverse effects on noise environment from construction noise. Negligible, long-term adverse noise effects associated with altering traffic flow patterns on local roads in the project area and steeper grade of the bridge approaches, which would increase noise generated by large trucks during acceleration.	Moderate, short-term adverse effects on noise environment from construction that would include blasting for 2-3 days. Negligible, long-term adverse noise effects associated with altering traffic flow patterns on local roads in the project area and steeper grade of the bridge approaches, which would increase noise generated by large trucks during acceleration.
Socioeconomics and Environmental Justice	Minor, long-term adverse effect on socioeconomic conditions related to transportation system. No effects on environmental justice.	Minor, short-term beneficial effect on socioeconomic conditions associated with construction and related employment and spending. Minor, long-term beneficial effect on socioeconomic conditions related to transportation system improvements. No impacts on environmental justice.	Same as Alternative 1.
CUMULATIVE IMPACTS			
	No cumulative effects.	Minor cumulative adverse and beneficial effects.	Minor cumulative adverse and beneficial effect.

4.1 PHYSICAL RESOURCES

This section describes the physical resources (geology and soils, farmland, shoreline stability, and climate and climate change) associated with the Leudinghaus Road Bridge Replacement project. The study area for physical resources described in this section includes the footprint of all ground-disturbing activities (i.e., bridge abutments/approach, new road, road realignment, stormwater facilities, and staging areas), as well as stormwater discharge points.

FEMA is obligated to protect physical resources as required by federal statutes that include, but are not limited to, the Clean Water Act, Clean Air Act, and recent CEQ NEPA guidance regarding greenhouse gas (GHG) emissions and climate change (CEQ 2010). While no federal laws specifically address soils, erosion is addressed under the Clean Water Act, in particular the National Pollutant Discharge Elimination System (NPDES) program. The project occurs on the Chehalis River, which is classified as a "shoreline of statewide significance" under the Shoreline Management Act (Revised Code of Washington [RCW] 90.58; WAC 173-18-270). As such, the project must comply with the Lewis County Shoreline Master Program and other local regulations for conducting work in and adjacent to water bodies, including the HPA program administered by WDFW. Additional information regarding these programs can be found in Section 4.2, *Water Resources*.

4.1.1 GEOLOGY AND SOILS

The upper Chehalis River basin, like most of the Willapa Hills, is dominated by Oligocene-Eocene marine sedimentary rocks from the Lincoln Creek Formation (Wells 1981). During the earliest Columbia River basalt flows, approximately 17 million years ago, the Willapa Hills were uplifted, forming the dominant north-south ridgelines of the area. Many local surface geology features were formed during multiple dynamic Pleistocene glacial advances and retreats, followed by the formation of the present-day Chehalis River bed, with evidence of recurrent glacial and riverine shaping of the landscape apparent along SR 6 and the banks of the Chehalis River. Deep, quaternary alluvial deposits form the extensive northern floodplain of the Chehalis River, supporting extensive agriculture for over half a mile from the northern top-of-bank of the river (WDNR 2008). Sandstone and tuffaceous siltstone underlay these extensive alluvial deposits, with Grande Ronde basalt forming the riverbed and south bank of the Chehalis River within the study area (Lasmanis 1991, HHPR 2008).

GeoEngineers conducted a geotechnical investigation of the Alternative 1 site in January 2013 (GeoEngineers 2013), which included drilling boreholes to investigate soil and rock at the proposed abutment locations. Conditions at the proposed south abutment location generally consist of about 14 feet of alluvial deposits underlain by black vesicular basalt. Groundwater was encountered in boreholes between the alluvial soils and basalt at about 13 feet below the ground surface (bgs). Flowing artesian groundwater was also encountered during drilling of the borehole at the location of the proposed south abutment at the Alternative 1 site, and flowed to the ground surface at a rate of approximately 2 gallons per minute when drilling had advanced to about 30 feet bgs. Conditions at the north abutment location (Alternative 1 site) consist of about 24 feet of alluvial deposits underlain by marine sedimentary rocks. Groundwater at the proposed north abutment was encountered between the alluvial soils and marine sedimentary rock at about 24 feet bgs. Artesian groundwater was not encountered at the north abutment location (GeoEngineers 2013).

Harper Houf Peterson Righellis (HHPR) conducted a geotechnical investigation at the Alternative 2 site in August 2008 (HHPR 2008). The HHPR (2008) study indicated that conditions at both the south and north abutment locations include about 12 inches of fill (asphalt concrete and aggregate base rock) from the destroyed bridge abutment and approach underlain by alluvial deposits of silt and sand to a depth of about 14.5 bgs. The alluvium is underlain by Grande Ronde basalt. Outcrops of basalt extend from the riverbanks on both sides into the river channel. On the north bank, terrace gravel occurs on the downstream side of the north abutment location from about 12 feet bgs to 18 feet bgs. Groundwater was not directly observed during the drilling of boreholes at the site. However, the geotechnical study estimated typical groundwater levels to be at approximately 10 to 15 feet bgs during the average wet season (HHPR 2008).

Multiple fault lines occur throughout the Willapa Hills as a result of the complex geologic history of the area, although none are within or near the study area (WDNR 2008, HHPR 2008). The banks of the Chehalis River, where deep sand and alluvial deposits are found, have the potential for liquefaction-induced settling and lateral spread associated with earthquakes and seismic activity (HHPR 2008, GeoEngineers 2013). The geotechnical study conducted for the Alternative 1 site concluded that the liquefaction potential at the Alternative 1 site is likely limited to the very loose alluvium observed at the south abutment location (GeoEngineers 2013). At the Alternative 2 site, results of the 2008 HHPR geotechnical study indicate that the south abutment location is susceptible to liquefaction-induced settlement and lateral spread for an earthquake occurring when water levels are at or below the 2-year flood (equivalent to the OHWM) level due to the deep and very loose sand over bedrock in that location. The majority of deep, loose sands over bedrock downstream of the north abutment location and along the approach road embankment are above the 2-year flood elevation, and liquefaction-induced settlement is expected to be minor for an earthquake during occurring during normal river conditions (HHPR 2008).

Four soil types are mapped in the study area (see Table 4.1-1) (NRCS 2012). Chehalis silt loam is the most extensive soil in the study area, is found on both banks, and encompasses most of the floodplain and the riverbed itself. Chehalis silt loam is described as “very deep, well drained soils formed in alluvium and found on flood plains” (NRCS 2012). These soils are found in long, narrow deposits that parallel the river and intersperse with each other in a stacked arrangement, suggesting river deposition over time, punctuated with years of higher deposits. Chehalis soils are commonly cultivated as pasture or for other agricultural uses. In addition to the Chehalis silt loam, three other soils types occur in the study area in minor amounts: Baumgard silt loam, Cloquato silt loam, and Newberg fine sandy loam.

Table 4.1-1. Mapped Soils in the Leudinghaus Road Bridge Replacement Project Study Area.

Map Unit	Map Unit Name	Risk of Erosion (k factor) [a]	Acreage in Study Area [b]
9	Baumgard silt loam, 8-30%	Moderate (.17)	1.3 (6.5%)
47	Chehalis silt loam	Slight (.32)	16.6 (83.6%)
61	Cloquato silt loam	Slight (.37)	0.3 (1.5%)
148	Newberg fine sandy loam	Slight (.24)	0.1 (0.5%)

[a]- Risk or erosion is approximated using Natural Resources Conservation Service (NRCS) Erosion Hazard (off road/off-trail). The k-factor, from the Revised Universal Soil Loss Equation (RUSLE), is used to provide a measure of the erosion susceptibility of newly exposed soils from runoff.
[b]- The study area includes 1.6 acres (7.9%) of water in addition to 18.3 acres of mapped soils. Percentages are based on the total study area, which includes water.
Source: NRCS 2012.

Soils in the study area are generally only slightly erosive when exposed to surface runoff. Baumgard silt loam is the most erosive, primarily due to its location on steeper slopes. In the study area, topography is generally flat in the valley bottom. South of SR 6, slopes increase on the forested hillside where Baumgard soils are present. One area of existing erosion was observed at the Alternative 1 site on the south bank during site visits conducted as part of the environmental analysis. Stream 1, described in Section 3.3, *Alternative 1*, and in more detail in Section 4.2, *Water Resources*, extends through the project site from SR 6 to the Chehalis River. Surface runoff from Hatchery Road and SR 6 activates Stream 1 when it rains. Approximately 230 feet downstream of SR 6, Stream 1 flows through an old concrete pipe culvert under an old abandoned road bed. The downstream end of the culvert is perched approximately 2 feet above the stream channel. Upstream of the culvert, the channel is swale-like, with very little defined bed and bank and no obvious signs of erosion. Downstream of the culvert, the stream channel is deeply incised within deep alluvium and indications of stream bank erosion and sediment delivery to the Chehalis River are visible.

4.1.2 Farmland

The Farmland Protection Policy Act (FPPA) requires federal agencies to minimize the extent to which their programs contribute to the unnecessary and irreversible conversion of prime farmland, unique farmland, and farmland of statewide or local importance to non-agricultural uses. Farmland subject to the FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land, but not water or urban built-up land.

All lands within the footprint of the project alternatives have been mapped by the Natural Resources Conservation Service (NRCS) as either Prime Agricultural Land or Farmland of Statewide Importance (NRCS 2013) (see Appendix C, *Important Farmland Analysis*). Prime Farmland is defined as that land with the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor. It may include land that possesses the above characteristics but is being used currently to produce livestock feed and timber. Lands within the Alternative 1 project footprint have all been mapped by the NRCS as Prime Farmland. Lands within the Alternative 2 project footprint have been mapped by the NRCS as Prime Farmland (approx. 81%) and Farmland of Statewide Importance (11%). Farmland of Statewide Importance is defined as land other than Prime Farmland that has a good combination of physical and chemical characteristics for crop production. An analysis of the effects on farmland under FPPA has been conducted, and a Farmland Conversion Impact Rating form has been completed and provided to NRCS as required (see Appendix C, *Important Farmland Analysis*).

4.1.3 Shoreline Stability

In the project area, the Chehalis River shorelines generally consist of high (roughly 20–30 feet) steep slopes covered with soft or loose alluvium at or near the ground surface that is held in place by vegetation. Alluvium in the project area generally consists of deep deposits of very loose silts and sands underlain by basalt (HHPR 2008; GeoEngineers 2013). Basalt outcrops occur along the riverbanks and extend into the river channel in many locations. Shorelines along the Chehalis River in the project reach have experienced slope failures and sloughing in the past (GeoEngineers 2013) and are only marginally stable in some areas (HHPR 2008). Given the deep, loose alluvium and

steep banks of the Chehalis River, natural processes (e.g., gravity, periodic high flows, and flood events) will continue to affect slope stability in this system over the long term.

Lower in the watershed, many small dikes and levees, created from dredged materials, have historically stabilized the riverbanks (Corps 1991), although recent and repeated flooding events have overwhelmed and destroyed many of these flood control systems. Any flow attenuation achieved through the retention of large woody debris, wetland conservation, riparian vegetation, and appropriate planning for shoreline structures positively affects the stability of the highly erodible material that forms the shorelines. Site-specific conditions for Alternative 1 and Alternative 2 are described below.

Alternative 1 Site

The Chehalis River at the Alternative 1 site is a relatively straight reach with an incised main channel both up- and downstream of the proposed bridge site. Shorelines at the proposed bridge site consist of high, steep slopes covered with soft, loose alluvium held in place by vegetation (NHC 2013, GeoEngineers 2013). Topography on the south bank of the river is relatively flat between SR 6 and the riverbank. However, the top of the south bank at the project site is roughly 20 feet above the riverbed, and the south bank slopes steeply down to the Chehalis River at about a 1.5 to 1 horizontal to vertical ratio. An existing slope failure approximately 15 feet wide and 2 feet deep occurs on the south bank just upstream of the location of the proposed south abutment (GeoEngineers 2013). Topography on the north bank of the river is essentially flat between Leudinghaus Road and the riverbank. However, the north bank is roughly 25 feet or more above the riverbed and nearly vertical, sloping at about a 1:1 ratio down to the river. Evidence of past slope failures and sloughing are visible on the north bank downstream of the location of the proposed north abutment (GeoEngineers 2013). A large hole, approximately 8 feet wide by 8 feet deep, was observed at the crest of the north bank downstream (east) of the location of the proposed north abutment on Parcel 1-A (Figure 3-1). The surrounding trees suggest that this hole may be where a tree was uprooted. The hole is sparsely vegetated with some reed canarygrass (*Phalaris arundinacea*), blackberry (*Rubus* spp.), and red alder saplings (*Alnus rubra*) growing in it, suggesting that the disturbance occurred recently. A slope stability analysis conducted as part of the geotechnical investigation for Alternative 1 indicates that proposed fill for the bridge abutments and approach roads at the top of the bank could reduce slope stability (GeoEngineers 2013).

Alternative 2 Site

At the Alternative 2 site, the Chehalis River is a relatively straight reach with an incised main channel both up- and downstream of the proposed bridge location that cuts through a broad plateau. Shorelines at the proposed bridge site consist of high (25–30 feet), steep slopes covered in soft, loose alluvium held in place by vegetation (NHC 2008; HHPR 2008). The south bank inclines down to the riverbed at a horizontal to vertical ratio ranging from 0.8:1 to 1.8:1 (HHPR 2008). No signs of slope failure were observed during site visits. A slope stability analysis conducted as part of the geotechnical study indicates that the south and north banks are both stable to marginally stable during 2- and 100-year flood events and seismic shaking, but that added loads from the proposed embankments for the bridge abutments and retaining walls along the approach roads could cause the slopes to fail or reduce the factors of safety below those recommended by WSDOT (HHPR 2008).

4.1.4 Climate and Climate Change

The climate in the project vicinity is tempered by the coastal mountains that absorb most of the storms and weather systems moving east off the Pacific Ocean (WRCC 2012a). Average annual precipitation ranges from 50 to 57 inches, with a small proportion falling as snow during winter months (WRCC 2012b). In summer, rainfall is generally lighter than winter months. Summers are fairly warm but hot days are rare. Winters are cool with freezing temperatures that commonly occur under the influence of dry air masses. The average annual temperature is 52 degrees Fahrenheit.

The CEQ has issued a draft NEPA guidance document encouraging federal agencies to improve their consideration of the effects on GHG emissions and climate change in their evaluations of proposals subject to NEPA documentation (CEQ 2010). According to the CEQ guidance, the threshold at which NEPA documents should include quantitative analysis for an action is if it would release more than 25,000 metric tons of GHG per year, which is roughly equivalent to the emissions from the annual energy use of approximately 2,300 homes, or the annual GHG emissions from approximately 4,600 passenger vehicles.

The Federal Highway Administration (FHWA) has released regional summaries describing climate change through the end of the century (2100) as it relates to transportation projects (FHWA 2010). In the Pacific Northwest, climate change is expected to increase average temperatures between 3 and 8 degrees by the end of 2100. Precipitation is likely to increase during the fall, winter, and spring months, and decrease during the summer months. Due to the warming temperatures, most precipitation is expected to fall as rain and subsequently decrease winter snow packs. The combination of warming temperatures and increased rain is likely to increase flows to local river systems and may also increase the frequency of flood events. Overall, climate change presents a potential hazard to roads and associated infrastructure through increased exposure to storm damage (i.e., road washouts, bridge failures, or bank failures).

4.1.5 Consequences of Alternatives

An action was determined to result in a significant effect on physical resources if the project:

- For geology, would compromise structural stability due to unstable geologic conditions that could result in substantial property damage, or expose people or structures to adverse effects from geologic hazards.
- For soils, would result in long-term soil erosion rates substantially greater than current levels.
- For farmland, would result in the conversion of substantial areas of farmland classified as Prime, Unique, Statewide Important, or Local Important Farmland such that it would reduce the demand for farm support services to a degree that would jeopardize the continued existence of these services, and thus the viability of the farms remaining in the area.
- For shoreline stability, would result in slope failures along the Chehalis River from decreased shoreline stability that would lead to an accumulation of sediment in aquatic habitats such that it would substantially degrade important fish spawning or rearing habitat.
- For climate change, would generate GHG emissions, either directly or indirectly, that may have a substantial effect on the environment, and/or conflict with an applicable federal agency plan, policy, or regulation for the purpose of reducing GHG emissions.

This section describes the potential effects of the project alternatives on physical resources in the immediate vicinity of the project. Mitigation measures to avoid, minimize, or compensate for any identified effects are also described, as applicable.

No Action Alternative

The No Action Alternative would have no impacts on geology or soils, farmland, or shoreline stability. Specific resources are addressed below.

Geology and Soils

The No Action Alternative would have **no effect** on geology or soils. Under the No Action Alternative, no construction activities would occur and soils would not be disturbed. No new sources of erosion or sediment delivery to aquatic habitat would be created. However, as described above, soils around the remaining bridge abutments of the original Leudinghaus Road Bridge consist of deep alluvial deposits of very loose sand and silt over basalt. The alluvial deposits are mostly above 2-year flood levels; however, the area around the remaining bridge abutments would continue to be subject to erosion, primarily during flood events. Due to the straight and incised channel, and local hydraulic conditions along this reach of the river, soil erosion during flood events is expected to remain localized to the site and occur at low levels. Erosion around the remaining abutments would occur periodically, would be temporary and minor, and would decrease in frequency and intensity as the channel stabilizes.

Farmland

The No Action Alternative would have **no effect** on farmland. Under the No Action Alternative, the proposed project would not be constructed and there would be no conversion of Prime, Unique, Statewide Important, or Local Important Farmland to non-agricultural uses.

Shoreline Stability

The No Action Alternative would have **no effect** on shoreline stability. Under the No Action Alternative, the Leudinghaus Road Bridge would not be built across the Chehalis River, and no ground-disturbing activities in shoreline areas would occur.

Alternative 1 (Proposed Action)

Geology and Soils

Short-Term (Construction-Related) Effects

Alternative 1 would have **negligible short-term adverse effects on soils** during construction. Alternative 1 would have **no short-term adverse effects on geology.** Clearing, excavation, grading, and soil compaction associated with the construction and use of temporary access roads, staging and work areas, construction of the new bridge abutments and approach roads, and road realignment along Leudinghaus Road on the north bank would disturb and expose soils and increase the risk of erosion during construction. The project site is relatively flat, except along the shorelines, and most construction activities would occur on Chehalis silt loam, which is considered to be only slightly erosive. Additionally, standard erosion and sediment control BMPs (including but not limited to those outlined in Section 3.3.2, *Impact Avoidance and Minimization Measures*) would be

implemented as part of the project. With the implementation of these impact avoidance and minimization measures, effects on soils at the project site related to these activities are expected to be temporary, slight, and local. This would be a **negligible, short-term adverse effect.**

A temporary support bent on the south bank would be constructed to support the bridge as it is launched into place. Steel piles for the temporary support bent would be driven into the soil using a vibratory hammer, potentially increasing shoreline erosion rates above background levels during pile installation. Vibrations on the stream bank could potentially travel to the river, resulting in sediment suspension and subsequent downstream transport. Relative to impact pile driving, vibratory pile driving minimizes the extent and level of disturbance to surface soils (Warrington 1992). With the implementation of impact avoidance and minimization measures listed in Section 3.3.2, including erosion and sediment control BMPs, shoreline erosion related to vibratory pile on the south bank is expected to be small and localized, compared to the overall dynamic nature of the sediment and erosion processes naturally present in this system. This would be a **temporary, negligible adverse effect.**

Alternative 1 includes the removal of an existing culvert, channel excavation and grading, and construction of a new box culvert on Stream 1. As described in Section 4.1.1, *Geology and Soils*, Stream 1 is an ephemeral drainage activated by roadway surface runoff during precipitation events, and shows evidence of channel downcutting and bank erosion downstream of the existing perched culvert. The project area around Stream 1 is covered with deep, loose alluvium, and work within and around Stream 1 has the potential to increase erosion and sediment delivery to the Chehalis River, especially when the stream is flowing. However, work within Stream 1 would be timed to occur during the drier summer months, and as described above, the project includes measures (described in detail in Section 3.3.2, *Impact Avoidance and Minimization Measures*) to avoid and minimize potential erosion and sedimentation effects associated with these activities. Because Stream 1 is ephemeral and activated during precipitation events, and the area is covered by deep, loose alluvium, an initial sediment flush is expected to occur during the first rainfall following construction. This initial sediment flush is not expected to result in a measurable accumulation of sediment in aquatic habitat (in the Chehalis River), and the **temporary adverse effect would be negligible.** Following the initial flush, Stream 1 is expected to stabilize and have lower rates of erosion and sediment delivery to the Chehalis River than its present condition because of the removal of the existing perched culvert in its lower reach.

Long-Term (Operational) Effects

Alternative 1 would have **minor, long-term adverse effect** on soils. Long-term, permanent impacts on soils would occur where native soils are covered over by impervious surfaces. Proposed new impervious surfaces include the bridge abutments and approaches, the extension of Hatchery Road, the new intersection with SR 6, realignment of Leudinghaus Road, and proposed shoreline hardening (riprap) around the abutments. Direct effects on soil resources over the long term from covering by new impervious surfaces would be measurable but relatively small and localized. **This is a direct, minor, long-term adverse effect.**

Impervious surfaces are unable to infiltrate precipitation, thereby generating increased runoff during precipitation events. Untreated runoff has the potential to increase erosion on adjacent slopes from a combination of increased volume and velocity. Impervious surfaces can also disrupt natural erosion

and sediment delivery to the aquatic system. As described in Section 3.3 *(Alternative 1*), stormwater runoff from all new impervious surfaces associated with Alternative 1 would flow through a curb and gutter system to catch basins where it would be conveyed through storm pipes to two new stormwater detention and treatment ponds (one on the south bank and one on the north bank [see Figure 3-1]). Treated stormwater would be released according to natural drainage rates and directed via drainage pipes to Stream 1 and the Chehalis River. On the north bank, the proposed stormwater outfall would be in the vicinity of the existing hole described previously. Direct discharge of treated stormwater into this eroded area could increase shoreline erosion on the north bank. All stormwater facilities for Alternative 1, including outfalls, would be designed according to Ecology's current Stormwater Management Manual (Ecology 2012c) and Lewis County stormwater management regulations (Lewis County Code [LCC] Chapter 15.45), which would incorporate appropriate stormwater and erosion control BMPs, and require compliance with all applicable permits. With these measures incorporated into the project, erosion of soils on the north bank over the long term is expected to be slight and localized. **This would be an indirect, negligible, long-term adverse effect.** On the south bank, stormwater from the proposed stormwater pond would flow into Stream 1. Widening of the channel and removal of the existing perched culvert are expected to reduce the channel downcutting and bank erosion observed in its lower reach, resulting in a small, localized (i.e., **minor**) **beneficial effect** on soils in this area over the long-term.

Farmland

Alternative 1 would have **negligible, long-term adverse effects on lands classified as Prime Farmland**. The Alternative 1 site includes roughly 7.3 acres of land classified as Prime Farmland. Existing public road ROW, existing residences, outbuildings, and associated built up areas comprise approximately 2 acres of this, leaving about 5.3 acres of undeveloped Prime Farmland on the site that could be available for farming. Of the remaining undeveloped areas currently available for farming, approximately 4 acres would be directly converted to non-agricultural uses by the project for roadways and associated stormwater management facilities. The remaining land would become essentially non-farmable due to the size, configuration, and location of the available area in relation to surrounding land uses.

According to the NRCS, approximately 609,971 acres of land, or 49.6% of the total land area, in Lewis County is farmable. Of this, 596,072 acres, or 48.5% of the total land area is classified as Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or Farmland of Local Importance under the FPPA. The area of Prime Farmland that would be converted to non-agricultural uses under Alternative 1 constitutes only 0.001% of the total farmland available in Lewis County, but the relative value of the farmland that would be converted is high. The NRCS valued the Prime Farmland to be converted under Alternative 1 at 100 on a scale of 0–100 for the relative value. Only 7.0% of farmland in Lewis County is considered to be of the same or higher value. The Prime Farmland that would be converted under Alternative 1 rated high for currently being in non-urban use and surrounded by non-urban uses. However, it rated low in other important areas: the site has not recently been used for timber harvest, pasture, crops, or other farming purposes; is not protected by any state, local, or private farmland protection policies or programs; is substantially smaller than the average farming size unit in Lewis County of 77 acres; currently has no on-farm investments (e.g., barns, orchards, irrigation, etc.) intended for agricultural purposes; and conversion of the farmland on the site to non-agricultural uses would have no effect on farm support services or affect the viability of other farms in the area. On the NRCS farmland impact rating for

corridor type projects (see Appendix C, *Important Farmland Analysis)*, the site received a score of 152 points on a scale 0 to 260 for impacts on FPPA farmland.

While the Prime Farmland to be converted to non-agricultural uses under Alternative 1 is of high value, it constitutes an extremely small (0.001%) of the total FPPA farmland in the county. It has not recently, and is not currently being used for agricultural purposes, has no on-farm investments, and conversion to non-agricultural purposes would have no effect on farming locally or regionally. For this reason, the **long-term adverse effects** on farmland are considered to be **negligible**.

Alternative 1 would improve local access to farmland in the surrounding area, including forest resource lands, reducing the time and cost to transport goods, which would have a **minor, long-term beneficial effect** on these resources.

Shoreline Stability

Short-Term (Construction-Related) Effects

Short-term adverse effects on shoreline stability from construction are expected to be minor. Short-term, temporary impacts associated with construction of the bridge structure include a temporary support bent above the OHWM, and operation of heavy equipment near the top of the bank. While the existing banks at this area are stable and show no signs of failure, the potential for slope failure would be greatest when heavy equipment is operating during storm events. If storm events result in high flows, or ground saturation, work will be stopped and equipment should be moved away from the top of the bank to minimize the potential for bank failure.

The use of vibratory pile driving equipment has the potential to impact shoreline stability during construction of the temporary support bent due to the proximity of the temporary piling to the OHWM. The temporary piles would be driven into the top of a steep bank that consists of loose alluvium (sand and silt) held in place by vegetation. Minor amounts of soil movement (e.g., sloughing) are expected during vibration and would be controlled by BMPs that are specified in the project-specific TESC plan. More frequent cleaning and/or inspections of BMPs may be required during the pile driving phase of construction.

Excessive vibrations could result in localized slope failure during construction. The contractor will provide equipment suitable for the size of temporary piles needed, and will monitor bank stability during pile installation. If slope failures are observed, mitigation measures may be required to correct the failure (see *Mitigation Measures and Residual Effects*). The contractor will stop work and take steps to correct the failures and ensure bank stability. The project includes BMPs that are designed to minimize sediment delivery to the Chehalis River. Project activities would meet all permit requirements for working near water and on shorelines.

The proposed abutment construction would have **negligible adverse effects** on shoreline stability that would result from drilling shafts for concrete piers. The drilled shafts would require the use of heavy equipment operating near the top of the stream bank. While the proposed abutments are set back from the bank, operation of equipment during storm events could potentially result in bank failures. Because the project design would require equipment to be moved out of the area during storms, bank failures are not expected to occur during construction.

Long-Term (Operational) Effects

Long-term adverse effects on shoreline stability are expected to be minor, and localized to the bridge abutments and road embankments. Proposed abutments, approaches, and road realignment would be located upslope of OHWM; however, they would still fall within the 100-year floodplain and FEMA-mapped floodway. The bridge abutments would be founded on bedrock and supported by concrete piers. Impacts on shoreline stability have been reduced in the project design by placing riprap around the abutments to prevent erosion and scour around the bridge structure. Proposed road realignment and bridge approaches, created out of the need to raise the existing grade to match the proposed bridge elevation, would be designed to all permitting requirements for slope stability. Road approaches include walls to retain fill slopes and minimize scour on the southwest side of the bridge (GeoEngineers 2013, NHC 2013). All exposed soils and slopes would be hydroseeded to retain soils and encourage sediment retention after construction.

Alternative 2

Geology and Soils

Alternative 2 would have **negligible adverse effects on geology**. The southern abutment location is susceptible to liquefaction-induced settlement and lateral spread from an earthquake occurring when water levels are at or below the 2-year flood. The abutment, however, would be constructed on bedrock, and thus below the liquefiable layer, and not anticipated to be susceptible failure.

Alternative 2 would have **negligible short-term adverse effects on soils** from increases in short-term erosion associated with pile driving for temporary work platforms, temporary access roads, clearing and grading activities, and staging areas. Alternative 2 includes the construction of a box culvert on Stream 2 to accommodate the proposed realignment of Leudinghaus/Meskill Road, which would require additional fill adjacent to the stream. Lewis County or its contractor would be required to comply with applicable permits and associated conditions. Typically, the conditions include the implementation of a project-specific SWPP plan, and the use of temporary erosion and sediment control BMPs is expected to contain sediment-laden runoff and minimize any sediment delivery to aquatic systems. With these measures incorporated into the project, short-term impacts on soils from ground-disturbing activities are expected to be negligible.

Alternative 2 would have **no long-term adverse effects on soils**. Alternative 2 has no net increase in impervious surfaces and would therefore have no direct long-term adverse effect on soils from a conversion of native soils to impervious surfaces. Under Alternative 2, no stormwater management facilities are proposed because the current project design contains less impervious surface than the original bridge. Alternative 2 would generate less stormwater runoff than the original bridge or existing conditions, and would therefore have no indirect long-term adverse impacts on soils associated with erosion from stormwater runoff. Alternative 2 would have a **negligible long-term beneficial effect** on native soils from a reduction in impervious surfaces compared to existing conditions, including the decommissioning and revegetation of River Road (described in Section 3.4, *Alternative 2 – New Design at Original Bridge Site with New SR 6 Intersection).*

Farmland

Alternative 2 would have **negligible, long-term adverse effects** on lands classified as Prime Farmland and Farmland of Statewide Importance. The Alternative 2 site includes roughly 9.8 acres land classified as Prime Farmland and 1.3 acres classified as Farmland of Statewide Importance, for a total of 11.1 acres. Of these FPPA farmland areas, existing public road ROW and residences and associated built-up areas comprises about 5 acres, with essentially unfarmable river and stream banks and terraces comprising another 1 acre. Only about 5.1 acres of the total area classified as Prime or Statewide Important Farmland is available for farming. Essentially all of the FPPA farmlands available for farming would be directly converted to non-agricultural uses by the project for roadways. A small portion of the site is currently used as cattle pasture, while other areas appear to be used for hay.

According to the NRCS, approximately 609,971 acres of land, or 49.6% of the total land area, in Lewis County is farmable. Of this, 596,072 acres, or 48.5% of the total land area, is classified as Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or Farmland of Local Importance under the FPPA. The total area of Prime Farmland that would be converted to non-agricultural uses under Alternative 2 constitutes only 0.002% of the total farmland available in Lewis County, but the relative value of the farmland that would be converted is high. The NRCS valued the Prime Farmland to be converted under Alternative 2 at 98 on a scale of 0–100 for the relative value (2 points lower than Prime Farmland at the Alternative 1 site). Approximately 12.8% of farmland in Lewis County is considered to be of the same or higher value. The Prime Farmland and Farmland of Statewide Importance that would be converted under Alternative 2 rated high for currently being in non-urban use, surrounded by non-urban uses, and being under local government protection under the Shoreline Management Act. However, it rated low in other important areas: the site has not recently been used for timber harvest, pasture, crops, or other farming purposes; and is substantially smaller than the average farming size unit in Lewis County of 77 acres. Other than pasture fences, the site currently has little evidence of on-farm investments (e.g., barns, orchards, irrigation, etc.) intended for agricultural purposes. Conversion of the farmland on the site to non-agricultural uses would have no effect on farm support services or affect the viability of other farms in the area. On the NRCS farmland impact rating for corridor type projects (see Appendix C, *Important Farmland Analysis*), the site received a score of 159 points on a scale of 0 to 260.

While the Prime Farmland and Farmland of Statewide Importance to be converted to non-agricultural uses under Alternative 2 is of high value, it constitutes an extremely small (0.002%) of the total FPPA farmland in the county. Current agricultural uses and farm investments are limited to pasture and pasture fencing. Conversion of the farmland on the Alternative 2 site would have slight, local short- and long-term adverse effects on one farming unit along the eastside of Meskill Road associated with minor ROW acquisition that would encroach on existing pasture and require a slight relocation of pasture fencing. Lewis County would be required to compensate the property owner for any ROW acquisition. However, the conversion of farmland under Alternative 2 would have no adverse effect on any other farming units in the vicinity or regionally. The short- and long-term adverse impacts on farmland under Alternative 2 are considered to be minor as they would be slight, local, and compensation for ROW acquisition would reduce any potential adverse effects.

Similar to the Alternative 1 (the Proposed Action), Alternative 2 would improve local access to farmland in the surrounding area, including forest resource lands, reducing the time and cost to transport goods, which would have a minor, long-term beneficial effect on these resources.

Shoreline Stability

Alternative 2 would have **negligible, short-term** and **minor, long-term adverse effects on shoreline stability.** As described in Section 4.1.3 (*Shoreline Stability*), the south and north banks of the Chehalis River at the Alternative 2 site are covered with about 12 inches of fill from the destroyed bridge abutment and approach road, underlain by soft, loose silt and sand (HHPR 2008). Alternative 2 would involve removing existing pavement and fill near the shoreline in addition to the remaining abutments. The HHPR (2008) study indicated that the exposed subgrade, if wet, would be easily disturbed and may not provide adequate support for construction equipment. Additionally, the HHPR (2008) study indicated that soft, loose alluvium is likely to be encountered in the ravine at the location of the existing discharge and proposed culvert replacement on Stream 2, and recommends that all soft, loose soils be removed prior to installation of the new culvert or placement of new structural fill. Impact avoidance measures included in Section 3.3.2 *(Impact Avoidance and Minimization Measures*) and following recommendations in the HHPR (2008) geotechnical study for site development would minimize the risks to shoreline stability during construction, and short-term impacts are expected to be negligible.

Potential long-term impacts on shoreline stability are associated with the abutments and retaining walls for the approach roads. As described in Section 4.1.3 (*Shoreline Stability*), HHPR conducted a slope stability analysis as part of the geotechnical study at the Alternative 2 site (HHPR 2008). The HHPR (2008) study indicated that that the south and north banks are both stable to marginally stable during 2- and 100-year flood events and seismic shaking, but that added loads from the proposed embankments for the bridge abutments and retaining walls along the approach roads could cause the slopes to fail or reduce the factors of safety below those recommended by WSDOT (HHPR 2008). The HHPR (2008) study included numerous site-specific design recommendations to address slope stability both during and after construction. While Alternative 2 is currently only at 3% design, it is expected that Lewis County would incorporate recommendations in the HHPR (2008) geotechnical study to address shoreline stability and other issues should Alternative 2 be selected as the Preferred Alternative. HHPR design recommendations already included in the project design include the recommendation that the abutment design use spread footings founded on bedrock. The HHPR 2008 study notes that native soils in front of the abutments would remain marginally stable and susceptible to landslides during flooding or seismic shaking (HHPR 2008). The Alternative 2 design includes the placement of riprap around the abutments to stabilize the banks. The embankments would be seeded to provide for long-term vegetation establishment and stabilization in accordance with appropriate permit requirements or conditions. With the incorporation of the HHPR 2008 recommendations, long-term **adverse effects** on shoreline stability are expected to be **minor**.

Climate Change

All Alternatives

None of the project alternatives would produce 25,000 metric tons of GHG annually, or affect regional climate or result in a significant long-term increase in GHG emissions. Construction activities under the action alternatives would generate short-term, minor amounts of construction

vehicle emissions that would cease after the project is completed. While general traffic patterns may change in the project vicinity, because traffic would no longer have to cross the river at Chandler Road, no new vehicle trips are expected to be generated by the project.

In Washington, infrastructure is expected to experience an increased risk of flooding from changing precipitation regimes as a result of climate change (Ecology 2012a). Under the No Action Alternative, the Leudinghaus Road Bridge would not be rebuilt. Therefore, there would be no increased risk to a bridge from potential increased precipitation and flooding.

Under Alternatives 1 and 2, a new, single-span bridge would be built across the Chehalis River to provide access between SR 6 and Leudinghaus Road. The bridge structure under both alternatives is designed to accommodate the 100-year storm event and debris passage by providing a minimum 3-foot clearance between the 100-year flood water surface elevation and the minimum deck and low chord elevation of the bridge. Compared to the previous bridge, this represents an increase in the bridge elevation of 14 feet. The single span bridge design and increased design elevation are expected to minimize future repetitive damage to the bridge structure from flood events and associated debris transport. For comparison, the 2007 flood that destroyed the previous bridge (a double-span bridge supported on two end abutments and a single central pier) was estimated to be between a 100- and 500-year event (NHC 2013).

Mitigation Measures and Residual Effects

Mitigation for potential bank failures during vibratory pile driving will include:

- Lewis County or its contractor would conduct visual inspections of the bank during pile driving to monitor for slope failure and soil movement.
- If failures are observed, work will stop and the contractor will evaluate the slope stability and the integrity of the temporary structure.
- Corrective actions may be delayed until pile driving is complete as continued vibrations may undo any interim corrective action. Corrective actions may include, but are not limited to, placement of additional perimeter control BMPs to minimize sediment delivery to the aquatic system, removal of excess material from above the OHWM, or placement of armor (riprap) above the OHWM.

4.2 WATER RESOURCES

This section describes water resources and the associated functions of wetlands and floodplains within the affected environment of the project alternatives, and the potential effects of the project alternatives on these resources. FEMA is obligated to protect water resources as required by federal statutes that include, but are not limited to, the Clean Water Act, EO 11988 (*Floodplain Management*), and EO 11990 (*Protection of Wetlands*). The Clean Water Act, Section 402, requires the regulation of stormwater runoff from construction and operation activities, which is implemented through NPDES permits. Ecological functions of floodplains associated with vegetation, fish, and wildlife are addressed in Section 4.3 (*Biological Resources*).

In addition to federal requirements, any work that uses, diverts, obstructs, or changes the natural flow or bed of any fresh water or saltwater of the state requires an HPA from WDFW. To protect water quality and stream habitat, HPA permits specify conditions under which work can be performed in and near stream habitats, and provide site- and project-specific conditions and timing restrictions for performing this work.

The project is also subject to Lewis County flood damage prevention (LCC Chapter 15.35) and stormwater management regulations (LLC Chapter 15.45). LCC Chapter 15.35 (*Flood Damage Prevention*) contains specific standards for flood hazard reduction, including standards for fill or materials deposited within floodplains. No compensatory flood storage is required for projects that limit a rise in the base (100-year) flood elevation to 1 foot or less. LCC 15.45 (*Stormwater Management*) contains design criteria and guidelines for temporary (i.e., construction) and permanent stormwater management, including performance standards for source control, runoff treatment, stream bank erosion control, and erosion and sediment control BMPs.

4.2.1 HYDROLOGY

Drainage Area and Climate

The project site is in the Chehalis River basin. The mainstem Chehalis River and its tributaries form the Chehalis River basin, which drains approximately 2,700 square miles. The basin is bounded by the Pacific Ocean to the west, the Deschutes River basin to the east, the Olympic Mountains to the north, and the Willapa Hills and Cowlitz River basin to the south. Elevations within the basin range from sea level at the Pacific Ocean to over 3,000 feet in the Coast Range. The basin is divided into two Water Resource Inventory Areas (WRIAs): WRIA 22, which contains the upper Chehalis River basin upstream from the town of Porter, and WRIA 23, which contains the lower Chehalis River basin downstream of Porter (Chehalis River Basin Flood Authority 2010). WRIAs are major watersheds in Washington delineated for planning purposes under the state's Water Resources Management Program. The project is in the upper Chehalis River basin in WRIA 23, in the 8th field hydrologic unit code (HUC) 17100103, upper Chehalis River watershed.

The climate in the Chehalis River basin is temperate throughout the year, with wet winters and dry summers. Most precipitation occurs in the fall and winter, and the majority falls as rain. The surrounding mountain ranges receive snow accumulations during winter months, although snow generally does not accumulate for long periods. Most precipitation accumulates between October

and May. Peak river discharges generally occur between December and March (Chehalis River Basin Flood Authority 2010).

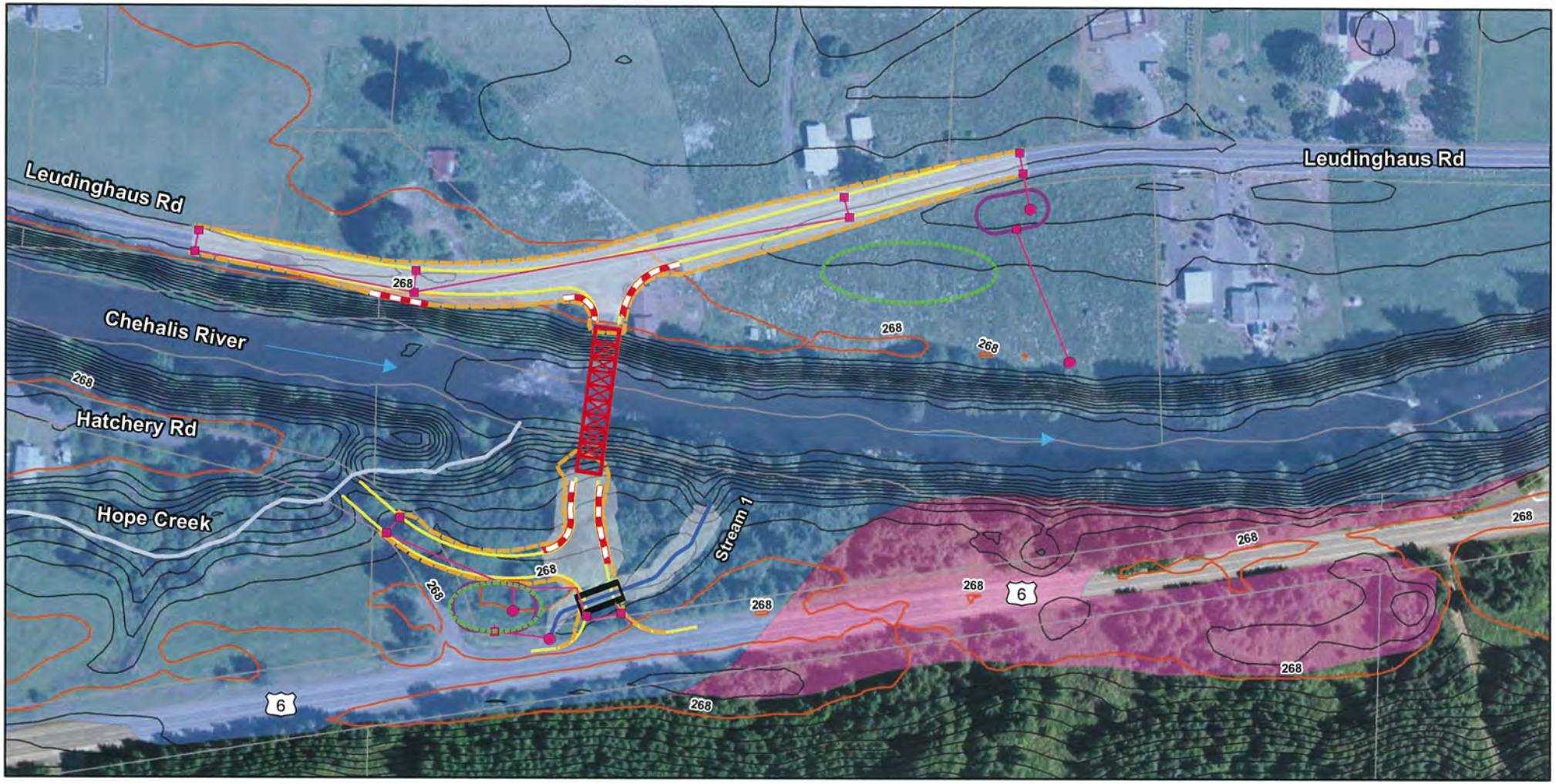
Rivers and Streams

Both action alternatives evaluated in this EA would cross the mainstem Chehalis River. Alternative 1 would cross the Chehalis River roughly 200 feet downstream of the Hope Creek confluence, near river mile (RM) 95 (Figure 4.2-1, *Water Resources [Alternative 1]*). Alternative 2 would cross the Chehalis River in the same location as the previous bridge site, at approximately RM 94.262 (Figure 4.2-2, *Water Resources [Alternative 2]*).

The Chehalis River originates in the Willapa Hills, part of the Coast Range. The mainstem Chehalis River flattens into an open river valley downstream of the town of Pe Ell, where the project is located. The river passes through relatively straight, incised main channels at the proposed bridge locations under both action alternatives, and on average, the streambed is 25 to 30 feet lower than the floodplain. The riverbed in the project area consists primarily of sandy/silty deposits interspersed with substantial areas of exposed bedrock. The riverbanks rise steeply to the upland plain, which is dominated by mixed conifer-hardwood forest, with sparse residential developments, and large areas of agricultural fields and open space.

Tributaries to the Chehalis River in the vicinity of the project alternatives include Hope Creek and three unnamed tributaries, referred to as Stream 1, Stream 2, and Stream 3 in this EA (Figures 4.2-1 and 4.2-2). Hope Creek is a moderately sized perennial stream that flows north-northeast through a large concrete box culvert on Hatchery Road and discharges into the Chehalis River on the south bank roughly 200 feet upstream of the proposed bridge crossing under Alternative 1. Between Hatchery Road and the Chehalis River, the stream channel ranges from approximately 10 to 15 feet wide. The streambed is comprised of exposed and algae-covered bedrock with scattered fine silt and small cobble overburden interspersed with small, silt-laden pools. The stream flows through moderately incised cut banks approximately 3–5 feet high, with no low-lying or floodplain surfaces along the channel. Riparian vegetation along this reach of Hope Creek consists of mature mixed conifer-hardwood forest with a closed canopy, and relatively dense native shrubs overhang the stream edges contributing to leaf input and shading.

Stream 1 is a relatively small drainage that begins as a roadside ditch on the south side of SR 6 in the vicinity of the Alternative 1 site. Based on observations made in August 2012 during the dry season and again in November and December 2012 during the wet season, Stream 1 appears to respond primarily to rainfall and is considered ephemeral. It collects runoff from SR 6 and the forested slopes to the south before flowing north under SR 6 several feet east of the Hatchery Road intersection. North of SR 6, Stream 1 flows north-northeast through mature mixed conifer-hardwood forest with a closed canopy. The native shrub, fern, and herbaceous groundcover understory along this drainage ranges from sparse to relatively dense. Roughly 230 feet downstream of SR 6, the stream flows through an old concrete pipe culvert buried beneath what appears to be an old road or railroad bed. Along most of its length between SR 6 and the concrete pipe culvert, the stream channel is relatively swale-like, but a defined bed and bank and exposed substrate are discernible in some areas. Downstream of the concrete pipe culvert, the stream plunges about 2 feet and flows through a narrow, deeply incised channel an additional 100 feet where it outlets high onto the south bank of the Chehalis River about 90 feet downstream of the proposed bridge crossing under Alternative 1.



Draft Environmental Assessment
Leudinghaus Road Bridge Replacement Project
Lewis County, Washington

FEMA-1734-DR-WA (Public Assistance)
Applicant: Lewis County

N W E S

0 50 100 200 Feet

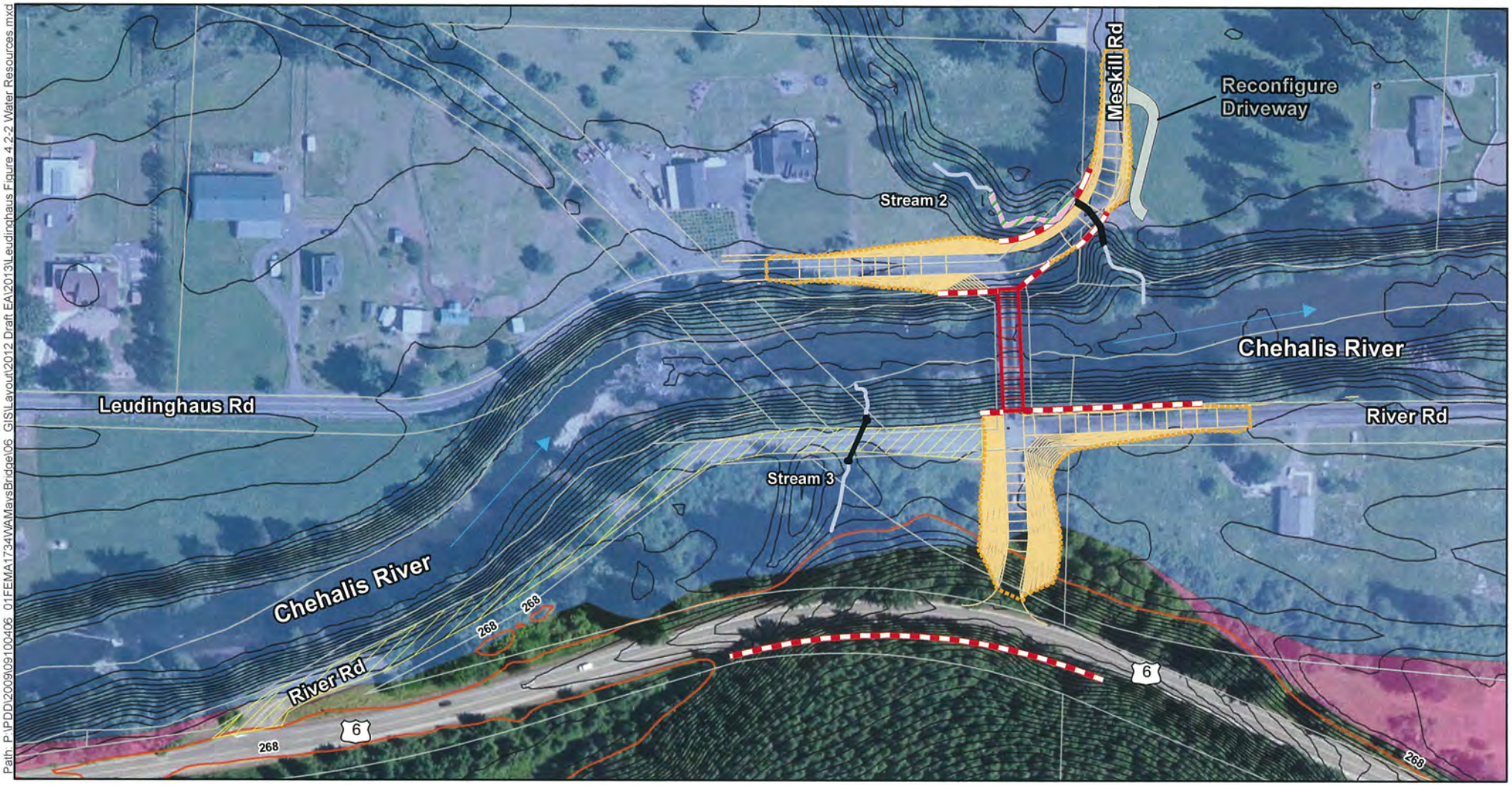
Figure 4.2-1. Water Resources (Alternative 1)

Source: FEMA

Legend

- 2-foot contours
- Contour 268'
- 100-year Floodplain (Zone A)
- FEMA Mapped Floodway
- Staging Area
- Excavation and Grading Staging Area
- Fill Limit
- New/Reconstructed Road
- Bridge Structure
- Retaining Wall
- Catch Basin
- Discharge
- Culvert
- Stormwater Pipe
- Detention Pond
- Drainage Ditch
- Flow Direction

Path: P:\PDD\2009\09100406_01FEMA1734WAMaysBridge\06_GIS\Layout\2012 Draft EA\2013\Leudinghaus Figure 4.2-2 Water Resources.mxd



Draft Environmental Assessment
Leudinghaus Road Bridge Replacement Project
Lewis County, Washington

FEMA-1734-DR-WA (Public Assistance)
Applicant: Lewis County

N W E S

0 50 100 200 Feet

Figure 4.2-2. Water Resources (Alternative 2)

Source: FEMA

Legend

- 2-foot contours
- Contour 268'
- 100-year Floodplain (Zone A)
- FEMA Mapped Floodway
- Fill
- New/Reconstructed Road
- Driveway Reconfiguration
- Bridge
- Retaining Wall
- Road Decommissioning
- Wetland A
- Stream
- Existing Culverts
- Flow Direction
- Parcel Boundaries

Print Date: 9/16/2013

Between the concrete pipe culvert and confluence with the Chehalis River, the stream channel and the surrounding floodplain bench are covered in several inches of alluvial deposition with evidence of recent erosion, indicating frequent flooding.

At the Alternative 2 site, Stream 2 is a relatively small perennial stream that flows southeast through private property on the north side of the Chehalis River and Leudinghaus Road, then beneath the Leudinghaus/Meskill Road curve via a 4 x 4-foot concrete box culvert, before flowing into the Chehalis River just downstream of the proposed bridge crossing under Alternative 2. Upstream of the concrete box culvert, the stream channel ranges from 4 to 13 feet wide and is bound by steeply sloping vegetated banks roughly 8 to 12 feet high. A narrow band of closed-canopy mixed conifer-hardwood forest lines the stream corridor in this area, and the stream banks are vegetated with a relatively dense native shrub, Himalayan blackberry (*Rubus armeniacus*), and native/non-native herbaceous understory overhanging the stream channel. The riparian fringe includes a palustrine emergent wetland (Wetland A) described below. The streambed is consolidated sand and silt, with gravel and cobble deposits left by high flows and bank scour during rain events.

Stream 3 is a relatively small, seasonal stream that flows north under River Road via dual 24-inch concrete pipe culverts and outlets high onto the south bank of the Chehalis River just upstream of the proposed bridge crossing under Alternative 2. The stream is dry during the summer months and is considered to be seasonal. South of River Road, Stream 3 flows north through mature mixed conifer-hardwood forest with a closed canopy and relatively dense shrub and groundcover understory. The stream is densely shaded by overhanging vegetation including salmonberry *(Rubus spectabilis)*, red osier dogwood *(Cornus sericeae)*, and lady fern *(Athyrium felix-femina)*. This reach of the stream has a defined bed and bank with gradually sloping vegetated banks, but no obvious floodplain. The scour zone defining the OHWM averages approximately 36 inches in width. The streambed is comprised of cobble, gravel, and sediment. North of River Road, Stream 3 drops several feet from the dual concrete pipe culverts into a short, steep, deeply incised channel cut into the south bank of the Chehalis River.

Groundwater

GeoEngineers conducted a geotechnical investigation of the Alternative 1 site in January 2013 (GeoEngineers 2013), which included drilling boreholes to investigate soil and rock at the proposed abutment locations, in addition to depth to groundwater (see Section 4.1, *Physical Resources* for a detailed discussion of the geotechnical investigation at the Alternative 1 site). Groundwater was encountered in boreholes between the alluvial soils and basalt at about 13 feet bgs (Elevation 249 feet). Flowing artesian groundwater was also encountered during drilling of the borehole at the location of the proposed south abutment at the Alternative 1 site, and flowed to the ground surface at a rate of approximately 2 gallons per minute when drilling had advanced to about 30 feet bgs (Elevation 232 feet).

HHPR conducted a geotechnical investigation immediately adjacent to and downstream of the Alternative 2 site in August 2008 (HHPR 2008) (see Section 4.1, *Physical Resources* for a detailed discussion of the geotechnical investigation at the Alternative 2 site). Groundwater was not directly observed during the drilling of boreholes at the site. However, the geotechnical study estimated typical groundwater levels to be at approximately 10 to 15 feet bgs during the average wet season (HHPR 2008).

Floodplains

EO 11988, *Floodplain Management*, requires federal agencies to reduce the risk of flood loss; minimize the impact on human health, safety, and welfare; and restore the natural and beneficial values served by floodplains. Under FEMA's implementing regulations at 44 CFR Part 9, FEMA must evaluate the potential effects of any actions it may take in a floodplain and consider alternatives to avoid adverse effects. An extensive analysis of practicable alternatives was conducted and is documented in Section 3.1, *Alternatives Considered but Not Carried Forward*, and Section 5.0, *Public Involvement and Agency Coordination*. FEMA's agency guidelines include the completion of an eight-step process by which compliance with 44 CFR Part 9 can be assessed, included as Appendix D (*Floodplain Management Review*) in this EA.

FEMA regulations define a floodplain as "the lowland and relatively flat areas adjoining inland and coastal waters including, at a minimum, that area subject to a 1% or greater chance of flooding in any given year" (44 CFR 9.4). The proposed bridge site under both action alternatives is within the 100-year floodplain and FEMA-mapped floodway (FEMA 2010; NHC 2008; 2013) (see Figures 4.2-1 and 4.2-2). The flood profile for the Chehalis River in FEMA's most recent Flood Insurance Study (FIS) for Lewis County (FEMA 2010) indicates that the estimated 100-year flood elevation for the Chehalis River is 268 feet at the confluence of Hope Creek, approximately 269 feet at the proposed bridge site for Alternative 1, and 265 feet at the original Leudinghaus Road Bridge location (the proposed bridge site under Alternative 2). NHC estimated the 100-year flood elevation at the proposed bridge site under Alternative 1 at 268.5 feet (NHC 2013), which closely matches the flood profile for the Chehalis River in the FEMA 2010 FIS (FEMA 2010). NHC estimated the 100-year flood elevation at the original Leudinghaus Road Bridge location at 266 to 267 feet (NHC 2008), slightly higher than the FEMA 2010 FIS.

4.2.2 Water Quality

The Clean Water Act, Section 303, requires states, territories, and authorized tribes to develop lists of impaired waters. Ecology's Water Quality Assessment lists the water quality status for a particular location in one of five categories recommended by the U.S. Environmental Protection Agency (EPA). The 303(d) list reports on Category 5 waters, polluted waters for which water quality standards have been violated for one or more pollutants. Waters on the 303(d) list (Category 5) require the preparation of a plan to improve water quality by limiting pollutant loads.

Ecology monitors water quality on the Chehalis River at four ambient water quality monitoring stations to assess and characterize surface waters and assess compliance with the applicable water quality standards. Water quality measurements of temperature, dissolved oxygen, fecal coliform bacteria, pH, turbidity, suspended sediment, specific conductivity, and nutrients are periodically taken at each monitoring station. To interpret the water quality results, Ecology developed a water quality index (WQI) system (Ecology 2002), whereby a unitless numeric value is calculated for each water quality parameter listed above and an overall WQI value encompassing all of these parameters. Scores range from 1 to 100. In general, scores less than 40 indicate that water quality did not meet expectations or was poor. Scores of 40 through 79 indicate moderate quality, and scores of 80 and above indicate that water quality met expectations and is good. The WQI may not be consistent with the Ecology's 303(d) listing because WQI and 303(d) analyses use different data

sources, different constituents, different time periods, and different evaluation techniques (Ecology 2012b).

The closest monitoring station to the proposed project site is the Water Quality Monitoring Station 23A160 Chehalis River at Dryad, at RM 97.8 just downstream of the recently re-opened Chandler Road Bridge, and approximately 3.5 miles upstream of the Alternative 1 site. The overall WQI value at Station 23A160 for 2011, the most recent water year, was 51, adjusted for flow (Ecology 2012b), indicating that overall water quality at this station is moderate (and of moderate concern). Individual WQI values for 2011 are: fecal coliform bacteria (71), oxygen (71), pH (92), suspended solids (53), temperature (74), total persulfate nitrogen (67), total phosphorus (46), and turbidity (55) (Ecology 2012b). The trend in overall WQI scores from 1994 to 2011 (adjusted for flow) has been relatively stable.

Neither the Chehalis River, its tributaries, nor any other waters in the project vicinity are listed on Ecology's 2008 303(d) list (Ecology 2008), the current EPA-approved 303(d) list for the state of Washington, or on Ecology's 2010 candidate 303(d) list (Ecology 2010), which is currently under EPA review. However, the reach of the Chehalis River up- and downstream of Station 23A160 is listed as a Category 4a water for temperature and a Category 2 water for pH on the 2008 303(d) list and the 2010 candidate 303(d) list. Category 4a waters are those that have an approved Water Quality Improvement Project (a.k.a Total Maximum Daily Load [TMDL]) in place that is actively being implemented. A TMDL for surface water temperature standard exceedences was developed by Ecology in 2001 (Ecology 2001). Category 2 waters are waters of concern where there is some evidence of a water quality problem, but not enough to require development of a TMDL.

4.2.3 WETLANDS

EO 11990, *Protection of Wetlands*, requires that federal agencies take action to minimize the destruction, loss, or degradation of wetlands (as defined in 44 CFR Part 9.4), and to preserve and enhance the natural and beneficial effects of wetlands. FEMA's responsibilities under this executive order are also found in 44 CFR Part 9. Projects funded by FEMA must also comply with permit requirements under the Clean Water Act Section 404 for the discharge of dredged or fill materials into waters of the United States, including wetlands.

USFWS National Wetlands Inventory (NWI) map data (USFWS 2012a) include several wetlands in the general project vicinity; however, none are present within or adjacent to the construction footprint of either project alternative or within potentially affected areas. AECOM conducted an on-site wetland investigation in the vicinity of Alternative 2 in 2009 (AECOM 2009a). No wetlands were identified using the Corps' wetlands delineation manual in the vicinity of Alternative 2 during that investigation; however, one likely wetland (Wetland A) was observed on nearby private property where access was denied (AECOM 2009a). This presumed wetland occurs along the riparian fringe of Stream 2 and appears to be supported by the capillary fringe of lateral groundwater expansion associated with perennial streamflow. It is dominated by red alder, red osier dogwood, salmonberry, reed canarygrass, field horsetail *(Equisetum arvense)*, and lady fern. Soils were not examined due to the access restrictions, although hydrology criteria are met because of the site's geomorphic position in a stream valley, and adjacency to a perennial stream. The area appears to meet both the wetland delineation criteria (vegetation and hydrology) that were observed from off site, and is presumed to be a wetland until soils can be examined to complete and verify the wetland

determination. Wetland A encompasses approximately 1,500 square feet (0.034 acre) within the construction footprint of the project, but likely extends beyond that upstream along the stream channel to the northwest.

4.2.4 Consequences of Alternatives

An alternative would reach the significance threshold for effects on water resources if it would:

- For all water resources, potentially create a permanent violation of any federal, state, or local standard or regulations concerning hydrology (including groundwater), water quality, wetlands, or floodplains.
- For wetlands or riverine systems, substantially alter or degrade these resources due to the placement of fill such that functions are permanently lost or impaired beyond recovery and mitigation cannot compensate for impacts, and/or cause adverse effects on wetlands that are not minimized in accordance with FEMA's standards in 44 CFR 9.11.
- For groundwater, cause substantial permanent interference with the recharge of groundwater resources.
- For water quality, cause prolonged adverse alteration to baseline water quality conditions.
- Substantially alter or degrade floodplains due to the placement of fill or other activities such that floodplain functions (e.g., flood-storage capacity) are permanently lost or impaired beyond recovery, regulatory thresholds are exceeded, and mitigation cannot compensate for impacts.

No Action Alternative

The No Action Alternative would have **no direct or indirect, short-term or long-term impacts on hydrology, groundwater, floodplains, water quality, or wetlands**. Under the No Action Alternative, no construction activities would occur and existing water resources and adjacent landscapes in the project vicinity would not be disturbed or altered. However, residents in the floodplain will continue to occupy the floodplain and be affected by flooding.

Alternative 1

Hydrology

Short-Term (Construction-Related) Effects

Alternative 1 could have a **minor, short-term adverse effect on hydrologic conditions in Stream 1** during construction. Construction of the new Hatchery Road intersection with SR 6, along with channel grading and culvert installation, could temporarily interfere with ephemeral flows in Stream 1. It is anticipated that stream and culvert work in Stream 1 would take place in the dry; however, if water is flowing in Stream 1, a check dam or temporary bypass may need to be installed. Given the size and ephemeral nature of Stream 1, this potential direct, short-term, adverse impact on hydrology is considered to be minor. Alternative 1 does not involve any construction activities that would affect hydrologic conditions in the Chehalis River.

Alternative 1 would have **no short-term adverse effect on groundwater** during construction. Construction of the drilled shafts is not expected to intercept groundwater resources. The drilled shafts for the south abutment would be to a depth of approximately 258.31 feet in elevation, and the

drilled shafts for the north abutment would be to a depth of approximately 260.35 feet in elevation. Groundwater at the south abutment was not encountered during the geotechnical study (GeoEngineers 2013) until 249 feet in elevation, and groundwater at the north abutment location was not encountered until 244 feet in elevation.

Alternative 1 would have **negligible short-term adverse effect on floodplains** related to construction activities in the floodplain and the potential discharge of minor amounts of sediment and other pollutants. Construction activities are not expected to affect the Chehalis River floodway or interfere with 100-year flood discharges. It is anticipated that all work within the floodway and 100-year floodplain of the Chehalis River would be conducted during low-flow conditions. However, if high-flow conditions were to occur that could inundate the construction zone, construction operations would cease and construction equipment would be removed from the area until the risk of flooding has passed.

Long-Term (Operational) Effects

Alternative 1 would have a **minor, long-term adverse effect on hydrologic conditions in the Chehalis River** at the proposed bridge site during high-flow/flood events, and a **minor, long-term adverse effect on overall floodplain function**.

The proposed bridge structure under Alternative 1 would be a single, clear span bridge over the Chehalis River. The bridge abutments would be located outside of the OHWM and main channel of the Chehalis River and would therefore not provide a constriction or otherwise alter the capacity of the main river channel to convey flows during normal and high-flow conditions that do not overtop the banks of the main channel.

The proposed single, clear span bridge structure is being designed to accommodate the 100-year flood (the design event) on the Chehalis River. As mentioned in Section 3.3, *Alternative 1*, NHC conducted a hydrologic and hydraulic evaluation of the project reach to estimate the maximum water surface elevation expected at the proposed bridge site (the design elevation) during the 100-year flood (NHC 2013). The 2013 NHC study estimates the 100-year flood elevation at the proposed bridge location at 268.5 feet. To accommodate flood flows and pass large woody debris, the bridge deck is being designed with a minimum 3-foot clearance above the 100-year water surface elevation (compared with -5.4 feet for the original bridge structure [NHC 2008]). Based on the design elevation of 268.5 feet, the minimum low chord of the proposed bridge would be 271.5 feet. Coincidentally, 271.5 feet was also the estimated maximum water surface elevation at the proposed bridge site during the 2007 flood event (estimated to be between a 100-year and 500-year flood event), which destroyed several bridges in the upper Chehalis River (NHC 2013). The 2013 NHC study indicates that the proposed design would result in a slight lowering of the 100-year flood water surface levels along the project reach compared to pre-2007 conditions (NHC 2013). This change in the 100-year flood elevation is measurable and would result in a small increase in flood storage capacity and improvement in floodplain function. The effects would be relatively small and localized.

While the proposed bridge structure with its higher design elevation would not vertically confine or obstruct the 100-year flood flows, the bridge abutments and fill for the approach roads are located within the FEMA mapped floodway of the Chehalis River and would horizontally constrict 100-year

flood flows. The 2013 NHC study indicated that flows during large flood events would contract around the south approach road fill and be forced into the main channel, and that this could cause up to 3 feet of scour in the main channel and 11 feet of scour around the south abutment (NHC 2013).

The NHC study also indicated that complex flow patterns around both the south and north abutments could lead to increased scour at the base of the abutments as well as lateral erosion of the approach fills. The proposed project includes riprap inlaid into the existing bank slope around the bridge abutments and at the base of the approach fills to protect the abutments and fills, which would reduce the risk of infrastructure damage during flood events. Riprap around the abutments would not extend below the OHWM, and would therefore have no effect on channel velocities or cause scour during low and normal flows, but could cause site-specific increases in near-bank velocities during higher flow events compared to the existing rough, vegetation riverbanks. The effects of riprap on near-bank velocities during high flows that do not overtop the main river channel would likely be very slight and would have a negligible impact. However, the location of the bridge abutments and approach roads within the floodway, and expected contraction of flows around the south approach road fill in combination with riprap, is expected to result in an increase in 100-year channel velocities at the bridge during higher flow events, including 100-year flood events or greater. The project's effects on channel velocities during the 100-year and other large flow events are expected to be measurable, but localized, and would occur periodically over the long term. This would be a minor, long-term adverse impact on hydrologic conditions in the Chehalis River during high-flow/flood events relative to existing condition at the project site.

Alternative 1 would provide direct access from SR 6 to communities on the north side of the Chehalis River. It would not increase the overall capacity of the local transportation network in a manner that would induce additional development within the project area floodplain beyond the expected normal growth for the Meskill area. However, it would provide incentive to maintain occupancy in the floodplain with its associated risk. This is a minor, long-term adverse effect on floodplains. Potential long-term effects on the ecological functions of floodplains associated with vegetation, fish, and wildlife are addressed in Section 4.3 (*Biological Resources*).

Alternative 1 would have a **minor, long-term beneficial effect on hydrologic conditions in Stream 1.** The new Hatchery Road intersection with SR 6 would require the installation of a new culvert on Stream 1, and minor regrading and realignment of the stream channel upstream of the existing perched culvert (which would be removed) to accommodate design flows. Because Stream 1 is not considered to be fish-passable, Lewis County anticipates that the culvert and stream channel would be sized to accommodate a 25-year storm event. At this pre-design phase of the project, a stormwater analysis has not been completed. Stormwater management and design of all stormwater facilities would be implemented according to Ecology's current Stormwater Management Manual (Ecology 2012c) and Lewis County stormwater management regulations (LCC Chapter 15.45), which would incorporate appropriate stormwater BMPs, and require compliance with all applicable permits. With these measures incorporated into the project, widening and altering the alignment of Stream 1 and installing a new culvert are not expected to adversely affect the function of the drainage, and there would be no adverse impact on hydrology. Widening of the drainage and removal of the existing perched culvert are expected to reduce the channel downcutting and bank erosion observed at its lower reach (described in Section 4.1.1, *Geology and Soils*), resulting in a small, localized beneficial effect on hydrology. This is a minor, long-term beneficial impact.

Alternative 1 would have a **negligible, long-term adverse effect on groundwater.** No wells would be constructed, and the project includes no barriers that would alter groundwater discharge or flow conditions. Alternative 1 would include a minor increase in impervious surfaces that would interfere with groundwater recharge where the new impervious surfaces cover currently exposed ground. Runoff from new impervious surfaces would be directed via catch basins and pipes to stormwater ponds where it would be treated, then discharged to surface waters. Because changes in groundwater resources in the project area at not expected to be detectable, this is considered to be a negligible, long-term adverse impact.

Water Quality

Short-Term (Construction-Related) Effects

Short-term adverse effects on water quality under Alternative 1 would range from negligible to minor. Impacts would primarily relate to the disturbance of sediments and soils associated with bridge and road construction activities, including pile driving on the shoreline, vegetation clearing, grubbing, excavation, grading, and riprap placement, or contaminated surface runoff or other pollutants entering the Chehalis River.

Vibratory pile driving to install piles for the temporary support bent would occur on the shoreline and outside of the OHWM, but has the potential to mobilize fine sediments on the shoreline that could enter the Chehalis River, or cause sediment suspension and subsequent downstream transport, temporarily increasing turbidity and reducing water quality in the vicinity. The project includes impact avoidance and minimization measures (described in Section 3.3, *Alternative 1*) including preparation and implementation of TESC and SWPP plans that include measures to control erosion and sedimentation during construction.

Work adjacent to the Chehalis River would require an HPA from WDFW, which typically includes measures to minimize these effects as conditions of the permit, monitoring turbidity levels, or other conditions such as heavy rains or high-flow events develop. Adherence to impact avoidance and minimization measures, including permit conditions specified in the HPA, would minimize potential effects on water quality in the Chehalis River. Increased turbidity levels in the Chehalis River are expected to be measurable, but small and local, and would be temporary, occurring over a period of a few days at a time during the installation and/or removal of the steel piles. Increases are expected to be within or below regulatory standards. Although the banks appear to be stable at the project site, past evidence of slope failure and sloughing is present in the area (GeoEngineers 2013). Vibratory pile driving on the shoreline could potentially result in localized slope failure. A slope failure at the site could range from minor sloughing of soils off the bank that only deposits material above the OHWM to a slide that deposits substantial amounts of sediment within the active channel. Lewis County or its contractor would monitor slope stability during pile driving, and if indications of slope failure are observed, the contractor would stop work to evaluate the stability of the slope and implement mitigation measures to stabilize soils and minimize sediments entering the river. Mitigation measures to minimize sedimentation and stabilize slopes during and after construction could include the placement of additional erosion and sediment control BMPs, the removal of excess amounts of material deposited above the OHWM, the placement of additional riprap above the OHWM, and native vegetation plantings after construction. With the implementation of impact

avoidance and minimization measures and mitigation for potential slope failures, **direct, short-term, adverse effects on water quality from pile driving on the shoreline are expected to be minor.**

Vegetation clearing, grubbing, excavation, grading, placement of riprap, and other ground-disturbing construction activities have the potential to increase sediment levels entering the Chehalis River in stormwater runoff during rain events, which could also increase turbidity and reduce water quality in the project vicinity. Floodplain terraces within the construction footprint of the project on both sides of the river are covered in several feet of very loose alluvium (GeoEngineers 2013), adding to the volume of fine sediments that could be mobilized. Ground disturbance would include construction activities on or at the top of the steep banks of the river, including the use of a vibratory pile driver to install piles for the temporary support bent (as described above), increasing the potential for disturbed soils and fine sediments to enter the river. Implementation of the impact avoidance and minimization measures described in Section 3.3.2 (*Impact Avoidance and Minimization Measures*), compliance with construction stormwater permit conditions (including preparation and use of an SWPP plan), the use of BMPs, and water quality monitoring would address potential erosion problems and minimize sediments entering waterways. The applicant or its contractor would prepare project-specific TESC and SWPP plans, which will include BMPs to minimize erosion and sedimentation effects on the Chehalis River both during and after construction. All temporary use or other areas with exposed soils, including construction staging areas, temporary access roads and work areas, roadway embankments, and temporarily disturbed river/stream banks, would be graded and/or hydroseeded, or planted with native vegetation appropriate to site conditions and in accordance with permit conditions. The applicant or its contractor would be responsible for ensuring that the TESC and SWPP plans, BMPs, and planting plan are implemented, and for complying with applicable permit conditions. With these measures incorporated into the project, **direct, short-term, adverse effects on water quality from ground-disturbing activities are expected to be minor.**

The staging and operation of construction vehicles and equipment, pouring concrete for the drilled shafts, and the removal of existing asphalt and placement of new asphalt pose the risk of accidental spills of petroleum products, concrete, or other waste materials to enter the Chehalis River. In addition to TESC and SWPP plans, the applicant or its contractor would prepare and implement a project-specific SPCC plan, and would be responsible for complying will all applicable permit conditions to ensure that all pollutants are controlled and contained. With these measures incorporated into the project, specifically including adherence to permit conditions specified in the HPA for work near and over water, **direct, short-term, adverse effects on water quality from accidental spills or stormwater discharges of construction-related contaminants are expected to negligible.**

Long-Term (Operational) Effects

Long-term adverse effects on water quality under Alternative 1 would be negligible. Potential long-term effects on water quality are primarily associated with stormwater runoff from new impervious surfaces. Stream 1 functions primarily as a stormwater drainage to the Chehalis River. Currently, the drainage collects stormwater runoff from SR 6 and adjacent forested slopes. After construction of the project, the drainage would also convey treated stormwater from the new bridge and road on the south side of the project. In addition to the stormwater runoff from new impervious surfaces on the south side of the project that would be directed to Stream 1, stormwater runoff from Leudinghaus Road on the north side of the project would be directed to a new stormwater treatment

pond and conveyed through pipes to the north bank of the Chehalis River. No stormwater runoff from the project would be directed to Hope Creek.

Wetlands

Alternative 1 would have **no short- or long-term effects on wetlands** as none are present in or adjacent to areas that could be affected by the project.

Alternative 2

Hydrology

Short-Term (Construction-Related) Effects

Short-term adverse effects on hydrology under Alternative 2 would be minor. Short-term effects on hydrology under Alternative 2 would be limited to culvert installation on Stream 2. A check dam would be installed on the existing channel upstream of the new culvert location, temporarily disrupting flow through the channel while the new culvert is installed. Culvert installation is expected to occur during the dry summer months when streamflow is low, and this **direct, short-term, adverse effect is considered to be minor.**

Alternative 2 could have **a negligible short-term effect on groundwater** during construction. Groundwater elevations in the project vicinity are expected to rise and fall rapidly with the surface water levels in the Chehalis River and perched water is likely to be encountered much of the year atop denser site soils and bedrock materials (HHPR 2008). The HHPR (2008) study recommends the contractors be prepared to dewater excavations during construction. Effects on groundwater resources would be slight and highly localized. This would be a negligible impact.

Alternative 2 could have **negligible short-term effects on floodplains** during construction**,** similar to Alternative 1, related to construction activities in the floodplain and the potential discharge of minor amounts of sediment and other pollutants into the floodplain. Construction activities would not interfere with 100-year flood discharges, and all work within the FEMA floodway (of the Chehalis River) would be conducted during low-flow conditions in the river.

Long-Term (Operational) Effects

Long-term adverse effects on hydrology under Alternative 2 would be minor. The proposed single, clear span bridge structure would be designed to accommodate the 100-year flood (the design event) on the Chehalis River. The 100-year flood elevation at the original bridge location is estimated at 266 to 267 feet in elevation (NHC 2008). This is above the river channel banks. The abutment footings would be below the 100-year flood elevation but above the OHWM (estimated at 253 feet in elevation) (Lewis County 2008), and the bottom of the proposed bridge structure would be a minimum of 3 feet above the 100-year flood elevation (compared with -5.4 feet for the original bridge structure NHC 2008]) to accommodate flood flows and pass large woody debris. The proposed bridge structure would not constrict or otherwise alter the capacity of the main river channel to convey 2-year flood flows or affect the 2-year flood stage or channel velocities at or upstream of the bridge location. However, riprap around the abutments would extend below the 2-year flood elevation, and could cause site-specific increases in near-bank velocities at the 2-year flood stage. This would be considered a **direct, minor, long-term adverse effect on existing hydrologic conditions at normal (2-year) flows in the Chehalis River.**

Hydraulic analysis conducted for Lewis County's original preferred alternative (i.e., Preliminary Alternative A as described in Section 3.1, *Alternatives Considered but not Carried Forward*) with the same bridge structure located approximately 100 feet downstream (NHC 2008) indicated that the proposed bridge design would not increase average main channel velocity or maximum velocity, or increase the 100-year flood stage upstream of the bridge face. Hydraulic effects of the proposed bridge structure under Alternative 2 are expected to be similar and would have no effect on the hydrology of the Chehalis River during 100-year flood events. Riprap placed around the abutments below the 100-year flood elevation could cause site-specific increases in near-bank velocities during the 100-year flood or other high-flow events. This would be considered a **direct, minor, long-term adverse effect on existing hydrologic conditions at high (100-year) flows in the Chehalis River.**

Reconfiguring the Leudinghaus and Meskill road approaches on the north side of the river would require filling in a portion of Stream 2 and installing a new, longer, 160-foot long, 48-inch diameter CMP culvert. The old culvert would be abandoned, and the stream channel upstream of the culvert would be realigned and shortened by approximately 50 feet. Downstream of the culvert, the stream channel would be shortened by approximately 100 feet. While not eliminated, the function of this stream would be altered. This would be considered a **direct, minor, long-term adverse effect on hydrology.**

Alternative 2 would have **a negligible long-term adverse effect on groundwater**. As described above, groundwater elevations in the project vicinity are expected to rise and fall rapidly with the surface water levels in the Chehalis River. The retaining walls for the approach roads would likely intercept groundwater flows during some portions of the year (HHPR 2008). The HHPR (2008) study indicates that back-of-wall drains would be required for all retaining walls. No wells would be constructed under Alternative 2 and Alternative 2 would include no net increase in impervious surfaces. The effect of the back-of-wall drains on groundwater flows would be slight and highly localized. Because changes in groundwater resources in the project area at not expected to be detectable, interception of the retaining walls with groundwater would be a negligible, long-term adverse impact.

Alternative 2 would have a **direct, minor, long-term adverse effect on floodplains.** Although the bridge deck would have a minimum 3-foot clearance above the 100-year flood water surface elevation, Alternative 2 would require excavation and fill within the 100-year floodplain for the abutments and road approaches. At this pre-design phase of the project, excavation and fill quantities are unknown. Fill within the floodplain has the potential to reduce local flood storage capacity and cause a rise in the 100-year flood elevation. Hydraulic analysis conducted for Lewis County's original preferred alternative with the same bridge structure located approximately 100 feet downstream (NHC 2008) indicated that the proposed bridge design would not increase the 100-year flood stage upstream of the bridge face. Hydraulic effects of the proposed bridge structure under Alternative 2 are expected to be similar. No compensatory flood storage is required for projects that limit a rise in the base (100-year) flood elevation to 1 foot or less (LCC 15.35).

Alternative 2 would provide direct access from SR 6 to communities on the north side of the Chehalis River. It would not increase the overall capacity of the local transportation network in a manner that would induce additional development within the project area floodplain beyond the

expected normal growth for the Meskill area. However, it would provide incentive to maintain occupancy in the floodplain with its associated risk.

Water Quality

Short-Term (Construction-Related) Effects

In-water impact or vibratory pile driving in the Chehalis River could mobilize fine sediments, temporarily increasing turbidity and reducing water quality in the vicinity. Vegetation clearing, grubbing, excavation, grading, placement of riprap, and other ground-disturbing activities have the potential to increase sediment levels entering the Chehalis River in stormwater runoff during rain events, increasing turbidity and reducing water quality in the vicinity. Measures to minimize potential water quality effects from these activities would be similar to those implemented for Alternative 1. **Direct, short-term, adverse effects on water quality from pile driving in the Chehalis River would be minor. Direct, short-term, adverse effects on water quality from ground-disturbing activities or from accidental spills or stormwater discharges of construction-related contaminants are expected to be negligible.**

Long-Term (Operational) Effects

The new bridge and new intersection with SR 6 would add impervious surfaces; however, River Road would be decommissioned from its existing intersection with SR 6 to the new intersection, and the project is expected to result in a small net decrease in impervious surface area under Alternative 2 and a small net decrease in stormwater runoff. Stormwater runoff from impervious surfaces would continue to be treated as currently, with runoff sheetflowing to adjacent uplands or to roadside ditches. The small decrease in impervious surface area and stormwater runoff would have a **direct, negligible, long-term beneficial effect on water quality.**

Wetlands

Short-Term (Construction-Related) Effects

Construction activities within and in the vicinity of Wetland A, including wetland and riparian vegetation removal, soil disturbance, culvert installation, and channel realignment, would have **direct, minor, short-term adverse effects on Wetland A**. BMPs, including temporary erosion and sediment controls, would be implemented to avoid and minimize potential impacts during construction. Areas outside of the permanent project features would be hydroseeded and/or replanted with native vegetation appropriate to site conditions and in compliance with permit conditions.

Wetland A would likely be considered jurisdictional under Section 404 of the Clean Water Act. However, if this alternative were selected, confirmation with the Corps would be necessary to determine if this transportation project is exempt from Section 404. If it were deemed exempt, then avoidance and minimization of wetland impacts would be addressed per FEMA's regulations implementing EO 11990 (*Protection of Wetlands*). If it is not exempt, then mitigation measures to compensate for temporary impacts on wetlands and non-wetland waters of the U.S. (the Chehalis River and Stream 2) would be developed during the Clean Water Act (CWA) Section 404 and HPA permitting process with the Corps, Ecology, and WDFW. Those measures would suffice for meeting FEMA's regulations for complying with EO 11990. The project would also be required to meet the compensatory mitigation requirements of the Lewis County Critical Areas Ordinance (LCC Chapter 17.35A).

Long-Term (Operational) Effects

Alternative 2 would require permanently filling up to 0.02 acre (estimated) of Wetland A along the edges of the Stream 2. This would be considered a **minor adverse effect**. Mitigation measures to compensate for permanent impacts on wetlands and non-wetland waters of the U.S. (if required) would be developed during the CWA Section 404 and HPA permitting process with the Corps, Ecology, and WDFW. If the CWA Section 404 permit is exempted, then FEMA's regulations will require pursuing opportunities to preserve and enhance the existing wetlands. The project is not anticipated to forgo any opportunity to restore the natural and beneficial values served by the existing wetlands. The project would also be required to meet the compensatory mitigation requirements of the Lewis County Critical Areas Ordinance (LCC Chapter 17.35A).

Mitigation Measures and Residual Impacts

The proposed project includes measures to avoid and minimize potential impacts both during and after construction, including compliance with applicable permit conditions. With these measures incorporated into the project, short- and long-term adverse impacts of the two action alternatives evaluated in this EA range from negligible to minor. The project would have no significant impacts on water resources.

Although project impacts would be negligible to minor, impacts on some resources (e.g., wetlands, floodplains) may still require mitigation by regulating agencies. Mitigation measures to compensate for short- and long-term impacts on the Chehalis River, tributary streams, and wetlands would be developed during the CWA Section 404, Section 401, and HPA permitting processes with the Corps, Ecology, and WDFW (Lewis County's responsibility). The project would also be required to meet compensatory mitigation requirements of Lewis County's critical areas regulations.

4.3 BIOLOGICAL RESOURCES

FEMA is obligated to protect biological resources as required by federal statutes that include, but are not limited to, the Endangered Species Act (ESA), Magnuson-Stevens Fishery Conservation Management Act (MSA), Bald and Golden Eagle Protection Act, and Migratory Bird Treaty Act (MBTA). This section presents information on vegetation and habitats available to support sensitive plant and wildlife species and builds on information from Section 4.2 *Water Resources*, which describes aquatic habitats available to support sensitive fish species.

4.3.1 VEGETATION

Vegetation types at the action alternative sites are typical of those found along the upper Chehalis River and its floodplains. Although this section of the Chehalis River is mostly rural, it has a long history of disturbance from agricultural practices and once-intensive logging and timber management. This section of the river and its floodplain are affected by transportation corridors that once included a railway infrastructure and currently include Leudinghaus Road and SR 6. This section of the upper Chehalis River is deeply incised with steep, nearly vertical slopes, is relatively linear with little to no sinuosity, and has no off channel or secondary channel areas that typically occur in river systems this large. This section of the Chehalis River exhibits a “flashy” hydrograph (that is, a short lag and high peak discharge, with steep increasing and decreasing velocity changes), with an annual mean velocity of 577 cubic feet per second (cfs), which increased to 55,000 cfs in December 2007 (USGS 2008).

These factors influence the vegetation able to persist at both the Alternative 1 and 2 sites. In general, the steep banks of the Chehalis River are only able to support herbaceous vegetation dominated by reed canarygrass and overhanging blackberry (*Rubus* spp.) and beaked hazelnut (*Corylus cornuta*). Immediately adjacent near the top of the banks are medium sized 50-foot tall trees that include bigleaf maple (*Acer macrophyllum*), red alder, and Douglas-fir (*Pseudotsuga menziesii*), typical of the thin strip of riparian forest that is encroached on by rural residences, agricultural development, and SR 6 along this segment of the upper Chehalis River.

Alternative 1 Site

On the southern portion of the Alternative 1 site is mostly riparian forest characterized by bigleaf maple and alder with a small patch of mature western red cedar (*Thuja plicata*). The understory includes salmonberry, snowberry (*Symphoricarpos albus*), red osier dogwood, beaked hazelnut, and Himalayan blackberry. This forested area is contiguous with riparian forested habitat along Hope Creek upstream and downstream of the site. Hope Creek is a documented fish-bearing stream (WDFW 2012a, 2012b). The southern portion of the site also has weedy herbaceous areas immediately adjacent to Hatchery Road and SR 6.

A non-fish bearing ephemeral drainageway (Stream 1) begins as a roadside ditch parallel to SR 6 then flows northeast and drains to the Chehalis River. The intermittent drainageway was determined to be non-fish bearing based on limited fish access from the debris piles of wood and sediment and the steep gradient drop of surface water to the Chehalis River. The drainageway is a deep, V-shaped channel with steep banks actively eroding. The steep gradient from the Chehalis River also limits access. Vegetation includes nonnative grasses, Canada thistle (*Cirsium arvense*), and perennial pea

(*Lathyrus latifolius*). Most of the northern portion of the Alternative 1 site is a large grassland area, likely once a pasture but now infested with a dense cover of 4-foot tall reed canarygrass with thistle and perennial pea. Adjacent is a rural residence with landscaped areas including a small garden. Along the top of the northern banks of the Chehalis River is a thin strip of medium sized deciduous trees that are slowly slumping in the river and is evidence of slope instability as described in Section 4.1, *Physical Resources*.

Alternative 2 Site

The northern portion of the site includes riparian forest and a wetland area associated with Stream 2 and disturbed grasslands (AECOM 2009a). Stream 2 is a perennial stream mapped by the Washington Department of Natural Resources (WDNR) as a non-fish bearing (WDNR 2009). Like most tributaries to the Chehalis River, Stream 2 has a moderately steep drop in gradient from surface water to the Chehalis River, which limits fish access. The box culvert under Meskill Road is not fish passable (WDNR 2009). The grasslands are essentially reed canarygrass that occurs in open areas along forest edges, roads, and pastures. Reed canarygrass forms dense cover in areas where shrubs and trees shade the understory. Himalayan blackberry, perennial pea, Oregon manroot (*Marah oreganus*), and various shrub species are common and abundant in these grasslands. Grassland areas adjacent to Leudinghaus Road are mowed and maintained.

Similar to the Alternative 1 site, the southern portion of the site is mostly riparian forest. The riparian forest is dominated by red alder in the tree layer, although bigleaf maple and Douglas-fir are also common species. Salmonberry, snowberry, red osier dogwood, beaked hazelnut, vine maple (*Acer circinatum*), and Himalayan blackberry are dominant shrub layer species. The dominant herb layer species include reed canarygrass, rigid hedgenettle (*Stachys rigida*), lady fern, youth-on-age (*Tolmeia menziesii*), perennial pea, stinging nettle (*Urtica dioica*), and Oregon manroot. River Road crosses Stream 3. Stream 3 is an ephemeral stream and non-fish bearing (WDNR 2009).

4.3.2 Fish and Wildlife Species

Fish habitat consists of the Chehalis River and Hope Creek. General fish species that occur in the Chehalis River and Hope Creek include sculpin (*Cottus* spp.), speckled dace (*Rhinichthys osculus*), and three-spine stickleback (*Gasterosteus aculeatus*). Priority fish species occurrences within 1 mile of the project site are summarized in Table 4.3-1.

Wildlife habitat at the project site is dominated by riparian forest, grassland, and disturbed uplands in a rural agricultural setting and supports wildlife tolerant of moderate but persistent human presence. The Chehalis River and Hope Creek provide habitat for native waterfowl and riparian birds. Riparian forest and grasslands at the project sites provide foraging opportunities for raptors. Common mammal species include raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), and black-tailed deer (*Odocoileus hemionus columbianus*). Two adult red-legged frogs (*Rana aurora*) and two larval Columbia torrent salamanders (*Rhyacotriton kezeri*) were observed in Stream 1 during the July 2009 field surveys. Garter snakes (*Thamnophis* spp.) are common reptiles that occur in grassland and disturbed upland areas.

4.3.3 Sensitive Species and Regulatory Context

For the purposes of this assessment, sensitive species are considered those federally listed threatened and endangered species (listed species) protected under the ESA, Pacific salmon fishery species protected under the MSA, and bird species protected under the MBTA. In addition, sensitive species include WDFW-designated priority species. These species also require protective measures for their survival due to their population status, sensitivity to habitat alteration, and/or recreational, commercial, or tribal importance. Priority species include State Endangered, Threatened, Sensitive, and Candidate species; animal aggregations (e.g., wild turkey [*Meleagris gallopavo*] or cavity-nesting ducks concentration areas) considered vulnerable; and species of recreational, commercial, or tribal importance that are vulnerable (WDFW 2008).

Threatened and Endangered Species

The ESA of 1973 (16 United States Code [U.S.C.] 1531 et seq.), as amended, established a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat on which they depend. Section 7 of the ESA requires federal agencies, in this case FEMA, to consult with the USFWS and NMFS (i.e., the Services), as appropriate, regarding species protected under the ESA. A county-wide species list for Lewis County was compiled by the USFWS (2012b) and information retrieved from the NMFS Northwest Regional Office website most current posting for Snapshot of Salmon and Steelhead ESA Status (NMFS 2011) (see Appendix E, *Species Lists for Lewis County*). AECOM biologists visited the site and surrounding lands on July 24 and August 3, 2009, and July 24, August 23, and November 29, 2012, to determine the status and availability of suitable habitat for listed species, and to evaluate the potential impacts of the project.

The following wildlife species are included on the Lewis County list (USFWS 2012b): Canada lynx *(Lynx canadensis*), gray wolf (*Canis lupus*), grizzly bear (*Ursus arctos = U. a. horribilis*), marbled murrelet (*Brachyramphus marmoratus*), and northern spotted owl (NSO, *Strix occidentalis*). Suitable habitat and documented presence (WDFW 2012a) for these species do not occur in or near the project site. Therefore, the project alternatives would have **no effect** on these species. Similarly critical habitats are designated for the NSO and marbled murrelet in Lewis County (USFWS 2012b); however, these critical habitats occur more than 20 miles east of the project site (WDFW 2012a) and would not be affected by the project alternatives. Therefore, the project alternatives would have **no effect** on these designated critical habitats.

The NSO Management Buffer covers an entire township (36 square miles) and overlaps with the project site (WDFW 2012a). These management buffers are used to approximate the home range around an established NSO activity center. This species uses old-growth and mature coniferous forests for nesting, and these habitat types do not occur within many miles of the project site. The project vicinity is fragmented patches of riparian forest along the Chehalis River surrounded by rural residences and agriculture. Suitable habitat for the NSO does not occur within many miles of the project area. Therefore, the project alternative would have **no effect** on the NSO.

Kincaid's lupine (*Lupinus sulphureus* ssp. *kincaidii*) and Nelson's checker mallow (*Sidalcea nelsoniana*) are plant species also included on the Lewis County list (USFWS 2012b). Kincaid's lupine critical habitat is also designated in Lewis County but occurs more than 5 miles south of the project site (WNHP 2012a, 2012b). These species require native wetland prairie and grassland

habitats (WNHP 2005). The conversion of lands for agricultural uses and grazing has contributed to unfavorable habitat conditions for these species. Wetlands occur at the Alternative 2 site, but conditions are not consistent with Kincaid's lupine and Nelson's checker mallow habitat and are low quality, rated as Category III wetlands (AECOM 2009a). Because on-site wetland habitat is of poor quality, generally not consistent with suitable habitat for these species, and the species were not identified during prior wetland delineations and subsequent field visits, the project alternative would have **no effect** on Kincaid's lupine, Kincaid's lupine critical habitat, and Nelson's checker mallow.

Bull trout (*Salvelinus confluentus)* are no longer on the USFWS Lewis County list (USFWS 2012b) and are not documented in or near the project site, which is located near RM 95 of the Chehalis River (WDFW 2012a, 2012b). Bull trout have not been documented in the Chehalis River upstream of Oakville, WA, approximately 50 miles downstream of the project site (pers. comm. Chan 2009, Corps 2001) and habitat conditions are degraded in the upper Chehalis River basin (Rieman and McIntyre 1993).

The Chehalis River is also critical habitat for the Coastal-Puget Sound Distinct Population Segment (DPS) of bull trout from the mouth to approximately RM 40, more than 50 miles downstream from the project site. Therefore, the project will have **no effect** on bull trout critical habitat. The project site occurs within the range of three Evolutionarily Significant Units (ESUs) or DPSs of salmonids under the jurisdiction of the NMFS (2011)(Ford et al. 2010). None of these ESUs or DPSs are listed under the ESA. Therefore, the project alternative would have **no effect** on listed salmon.

Because the project would have **no effect** on federally listed species, FEMA is not required to consult with the Services and listed species are not addressed further in this EA. This fulfills FEMA's obligation under ESA. However, FEMA is required to consult with NMFS under the MSA if the Proposed Action would have an adverse effect on Essential Fish Habitat (EFH) (see below).

Essential Fish Habitat and the Pacific Salmon Fishery

The MSA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires federal agencies to consult with NMFS on activities that may adversely affect EFH. The Pacific Fishery Management Council (PFMC) has designated EFH for the Pacific salmon fishery, ground fish, and coastal pelagic fisheries (PFMC 2012). Of these, only species associated with the Pacific salmon fishery occur within the project area. Accordingly, none of the alternatives would affect EFH for groundfish or the coastal pelagic fishery. The Pacific salmon fishery in this designation includes all streams, lakes, ponds, wetlands, and other water bodies currently or historically accessible to salmon in Washington, Oregon, Idaho, and California except above the impassable barriers identified by PFMC. The Pacific salmon fishery includes Chinook (*Oncorhynchus tshawytscha*), coho (O. *kisutch)*, and pink salmon (*O. gorbuscha*), in its designation; of these, Chinook and coho salmon are present in the project site in the Chehalis River and Hope Creek (WDFW 2012a, 2012b). If a federal agency determines that a federal action may adversely impact EFH, then the federal agency must prepare an EFH assessment. If a federal agency determines that a federal action will not adversely affect EFH, then the federal agency is not required to prepare an EFH Assessment. An analysis of potential effects on EFH is described in Section 4.3.4, *Consequences of Alternatives*.

Bald Eagle

Administered by the USFWS, the Bald and Golden Eagle Protection Act provides for the protection of the bald eagle (*Haliaeetus leucocephalus*) and the golden eagle (*Aquila chrysaetos*) by prohibiting, except by permit, the taking, possession, and commerce of such birds. Golden eagles are extremely rare in the general area, and there are no documented occurrences within 1 mile of the project site (WDFW 2012a). Bald eagles are more prevalent in western Washington, but there are no active bald eagle nest sites within 1 mile of the project site.

Migratory Birds

The MBTA prohibits persons, unless by permit, "to pursue, take, or kill…any migratory bird, or any part, nest or egg of any such bird." Direct and indirect acts are prohibited under this definition, although harassment and habitat modification are not included unless they result in the direct loss of birds, nests, or eggs. The MBTA protects all native species of birds not including upland game birds.

The current checklist for Lewis County includes 268 species of birds (Washington Birder 2012). The Chehalis River provides habitat for native waterfowl and riparian birds. Riparian forest and agricultural pasture in the project area provide foraging opportunities for raptors. Common species that use the project area and were observed during field visits include mallard (*Anas platyrhynchos*), green-winged teal (*Anas crecca*), northern flicker (*Colaptes auratus*), black-capped chickadee (*Poecile atricapillus*), Pacific wren (*Troglodytes pacificus*), American robin (*Turdus migratorius*), song sparrow (*Melospiza melodia*), and dark-eyed junco (*Junco hyemalis*) (Washington Birder 2012, eBird 2012).

Migratory birds nest not only on tree branches and in tree and snag cavities, but also among shrubs and downed vegetation, on open ground, and on cliffs. Many nests, if not most, are well camouflaged or otherwise almost undetectable. While adult birds can usually escape construction activities, their eggs and chicks have no defense. Destruction of active bird nests, eggs, or nestlings that results from vegetation clearing, grubbing, and other site preparation and construction activities would violate the MBTA. To avoid illegal take, it is recommended that clearing and other site preparation activities be timed to occur outside of the local bird nesting season. The USFWS is the federal agency responsible for administering the MBTA, and consultation is required if an action is determined to cause a potential take of migratory birds to determine measures to minimize or avoid these impacts.

Priority Fish and Wildlife Species and Rare Plants

In addition to species protected by federal laws, the applicant, Lewis County, is obligated to protect priority fish and wildlife species and rare plants. Priority fish and wildlife species are determined by WDFW and listed as Priority Habitats and Species (PHS). Priority fish and wildlife species occurrences within 1 mile of the project site are summarized in Table 4.3-1.

Table 4.3-1. Priority Fish and Wildlife Occurrences within 1 Mile of the Project Site.

Species Name	Federal Status	State Status	Occurrence
Sensitive Fish			
Chinook Salmon *Oncorhynchus tshawytscha* Washington Coast ESU	Not Warranted	None	Spawning Area Chehalis River
Coho Salmon *Oncorhynchus kisutch* Southwest Washington ESU	Undetermined	None	Spawning Area Chehalis River and Hope Creek
Steelhead Trout *Oncorhynchus mykiss* Southwest Washington DPS	Not Warranted	None	Spawning Area Chehalis River and Hope Creek
Coast Resident Cutthroat *Oncorhynchus clarki*	None	None	Occurrence/Migration Chehalis River
Riffle Sculpin *Cottus gulosus*	None	Monitored	Hope Creek, near mouth
Reticulate Sculpin *Cottus perplexus*	None	Monitored	Hope Creek, near mouth
Pacific Lamprey *Lampetra tridentata*	Species of concern	Monitored	Hope Creek
Sensitive Wildlife			
Dunn's salamander *Plethodon dunni*	None	Candidate	Hope Creek, 3,000 feet SE of Alt 1 site
Wild turkey *Meleagris gallopavo*	None	None	Regular Concentration
Cavity-nesting Ducks	None	None	Breeding Area
Roosevelt Elk *Cervus elaphus roosevelti*	None	None	Regular Concentration
Source: WDFW 2012a, 2012b.			

Rare plant species that potentially occur in the project vicinity were determined from the county-wide list obtained from the Washington Natural Heritage Program (WNHP) for Lewis County, Washington (WNHP 2012a). WNHP geographic information system (GIS) data indicated no rare plant occurrences in the project area (WNHP 2012b). The nearest rare plant community mapped is a population of tall bugbane (*Cimcifugia elata*), approximately 1 mile to the north of the project site. Because the project alternatives would have no effect on rare plant species, these species are not addressed further in this EA.

4.3.4 Consequences of Alternatives

Impacts on biological resources would be considered significant if project-related activities directly or indirectly cause substantial loss, reduction, degradation, disturbance, or fragmentation to native species habitats or their populations, and on any sensitive habitats, natural communities, or special status species that are afforded protection under federal law or regulation.

No Action Alternative

Under the No Action Alternative, no bridge construction or related activities would take place. Terrestrial and aquatic habitat elements important to plants, fish, and wildlife would remain unaltered from their current condition and there would **no effect** on biological resources.

Alternative 1 (Proposed Action)

Under Alternative 1, FEMA would provide funding to Lewis County for a new bridge at the intersection of SR 6 and Hatchery Road, as described in Section 3.3 (*Alternative 1*).

Essential Fish Habitat and the Pacific Salmon Fishery

Based on the evaluation of the Proposed Action (Alternative 1), FEMA has determined that the Proposed Action would have **no adverse effect on EFH** under MSA and no EFH consultation is necessary. FEMA based their determination on the following:

1) No in-water-work or work below the OHWM is proposed for the project. No substantial long-term changes in substrate composition, water quality (e.g., dissolved oxygen, nutrients, temperature) or water quantity are anticipated. Depth, velocity, channel gradient, stability, space, access and passage, and floodplain and habitat connectivity should remain similar to pre-construction conditions. Both during construction and post-project implementation, salmon would be able to migrate to upstream spawning habitat and downstream rearing areas.

2) Project BMPs and mitigation measures as outlined in Section 3.3.2 (*Impact Avoidance and Mitigation Measures)* will be implemented, including but not limited to the following:

    a. Carry out construction activities in accordance with the requirements of the HPA issued by WDFW, to minimize effects on aquatic species.
    b. Implement a TESC plan to minimize erosion and sedimentation to adjacent water bodies.
    c. Implement an SPCC plan to minimize spills and ensure that all harmful materials are properly stored, contained, and disposed of.
    d. Implement an SWPP plan to prevent stormwater contamination, control sedimentation and erosion, and comply with the requirements of the CWA for the construction site operator's activities.
    e. Completely seal all concrete forms to prevent the possibility of fresh concrete from entering surface waters.
    f. Equipment staging and fueling areas will be completely isolated from surface waters to avoid the possibility of impacts on surfaces waters. To the extent practicable, fuel and maintain equipment at least 150 feet landward of the OHWM.
    g. To the extent possible, work in or near surface waters would be timed to occur during the drier summer months and associated low-flow conditions.
    h. Limit vegetation removal and retain large trees to the extent practicable. Protect root zones of the trees that would be retained by installing silt fencing at the dripline of each tree to create equipment exclusion zones.

3) Upon completion of construction activities, all exposed areas would be hydroseeded. Shoreline areas on Parcel 1-A and any other areas disturbed during construction will be graded and planted with native vegetation appropriate to site conditions and as specified in permits or conservation measures based on agency consultation for the project.

4) If it is determined that the loss of trees associated with removal might negatively impact stream habitat, compensatory mitigation, in the form of woody tree and shrub plantings, will likely be required by Lewis County along the Chehalis River to replace any lost riparian function (pers. comm., Weckback 2013). Compensatory mitigation in the form of planting will likely be required under the WDFW HPA.

Project elements that could potentially affect EFH for Chinook and coho salmon include the following: riparian vegetation removal, artificial overwater shading, and indirect effects on Hope Creek.

Riparian Vegetation Removal
The project would require the removal of approximately 1 acre of forest and shrub riparian vegetation. Riparian vegetation provides shade, nutrient inputs, and prey production for salmonids. Large woody debris in the channel has the potential to provide cover and food for salmonids. The removal of riparian vegetation would have a **minor adverse effect** on EFH for Chinook and coho salmon.

Artificial Overwater Shading
The project would create additional shading over the Chehalis River. Light plays an important role in fish species defense from predation. Prey species, in this case juvenile salmonids, are better able to see predators under high light intensity, thus providing the prey species with an advantage (Hobson 1979, Helfman 1981). Petersen and Gadomski (1994) found that predator success, in general, was higher at lower light intensities. Prey fish lose their ability to school at low light intensities, making them vulnerable to predation (Petersen and Gadomski 1994).

However, the bridge height, limited ambush cover, and preference for juvenile salmonid species to quickly move downstream to avoid higher temperatures in the upper Chehalis River basin, combine to aid predator avoidance. As a result, the new bridge deck would not likely increase predation on juvenile salmonids above baseline conditions. Artificial overwater shading from the new bridge would have a **minor adverse effect** on EFH for Chinook and coho salmon.

Indirect Effects on Hope Creek
The placement of the south bridge approach and change in alignment of Hatchery Road have the potential for indirect effects on EFH for Chinook and coho salmon in Hope Creek. The roadway embankment would be built up and elevated above the 100-year floodplain but still within the floodway, which has the potential to impound flood waters, create backflow, and deliver increased sediment into Hope Creek over the long term. However, this would occur intermittently and only during higher flood events. Excess sediment accumulated in Hope Creek would likely be gradually flushed and have a **minor adverse effect on EFH** for rearing Chinook and coho juvenile salmon.

Overall Effects on EFH
Overall, the project is expected to **not adversely affect** EFH for the Pacific Salmon Fishery under the MSA. Within the NEPA context, **minor adverse effects are anticipated**. As noted, WDFW (HPA) and Lewis County local permitting would include permit provisions and terms and

conditions, including likely compensatory mitigation to replace lost riparian functions, that would minimize effects.

Migratory Birds

Direct effects on migratory birds as well as other wildlife would result from permanent habitat alterations. Noise and disruption of movement caused by construction crews may cause migratory birds to move away from the construction areas. However, these habitats in the project area are connected and contiguous with similar habitats that extend beyond the construction areas; many species would relocate to these nearby areas during construction. Furthermore, as noted in Section 3.3.2 (*Impact Avoidance and Mitigation Measures*), specific measures shall be implemented under the project to avoid and/or minimize effects on nesting migratory birds. Therefore, a **negligible to minor effect on migratory birds** is anticipated as a result of construction disturbance and permanent habitat removal.

Priority Fish and Wildlife Species

Priority fish species share aquatic habitat with Chinook and coho salmon EFH; therefore, project effects described for EFH also apply to cutthroat trout (*Oncorhynchus clarki*), riffle sculpin (*Cottus gulosus*), reticulate sculpin (*C. perplexus*), and Pacific lamprey (*Lampetra tridentata*). Project effects from riparian vegetation removal and artificial overwater shading would have a **minor effect** on priority fish species.

Wild turkey, cavity-nesting ducks, and elk (*Cervus elaphus roosevelti)* use the project site. Similar to the analysis for migratory birds, noise and disruption of movement caused by construction crews may cause these wildlife species to move away from the construction areas. **A minor effect** on wild turkey, cavity-nesting ducks, and elk would result from the construction disturbance and permanent habitat removal.

Vegetation, Fish, and Wildlife

Direct impacts would occur from the removal of vegetation during construction. These ground-disturbing construction-related activities would include clearing and grading, increased human presence, and increased vehicle traffic. Construction would permanently clear approximately 1 acre of riparian forest, 0.9 acre of grassland, and 0.2 acre of disturbed uplands. Overall, these would be **minor adverse effects** on vegetation.

Similar to effects on EFH and priority fish species, project elements that could potentially affect general fish species include riparian vegetation removal and artificial overwater shading. These would have **minor adverse effects** on general fish species.

Similar to effects on migratory birds and priority wildlife species, project elements that could potentially affect general wildlife species include temporary construction disturbance and permanent habitat removal. Approximately 1 acre of riparian forest, 0.9 acre of grassland, and 0.2 acre of disturbed uplands would be removed. A **negligible to minor adverse effect** on general wildlife would result from construction disturbance and permanent habitat removal.

Alternative 2

Similar to Alternative 1, direct impacts would occur under Alternative 2 from the removal of vegetation during construction. These ground-disturbing construction-related activities would include clearing and grading, increased human presence, and increased vehicle traffic. Construction would permanently clear 0.4 acre of riparian forest and 0.8 acre of grassland. Overall, these would be **long-term, minor adverse effects on vegetation**.

Alternative 2 could potentially affect EFH for Chinook and coho salmon from the installation and construction of temporary in-water work structures, riparian vegetation removal, and artificial overwater shading. Alternative 2 would involve the installation of bridge abutments below the OHWM. This would require fill (riprap) below the 100-year flood elevation to protect the abutments from scour and would have a l**ong-term permanent impact on EFH.**

Temporary In-water Support Structures
Temporary in-water support structures would be required to construct and install the new bridge. Impact pile driving of eight steel piles would be necessary to support the steel truss as it is constructed. Impact pile driving would increase turbidity and aquatic noise.

Turbidity: Sedimentation and turbidity are primary contributors to the degradation of salmonid habitat (Bash et al. 2001). Excess sediment loading and turbidity levels can clog the gills of fish, smother eggs, embed spawning gravels, disrupt feeding and growth patterns of juveniles, delay the upstream migration of adults, and scour nutrients from the stream substrate (Bruton 1985). These exposures may temporarily cause fish, including Chinook and coho salmon, to avoid the project site, may impede or discourage free movement through the project site, prevent individuals from exploiting preferred habitats, and/or expose individuals to less favorable conditions.

A temporary increase in turbidity downstream during the installation and removal of the steel piles is likely to occur but is expected to be of short duration. Because turbidity would be increased only for a short time, for a small distance downstream, and at a time of year when listed species of fish are least likely to be present in the project site, the effects from increases in turbidity would likely have a **moderate effect** on EFH for Chinook and coho salmon.

Aquatic Noise: Sound pressure waves generated by in-water construction activities have the potential to injure and even kill fish and disturb or alter their behavior (see Popper and Hastings 2009a, 2009b; and ICF Jones & Stokes and Illingworth and Rodkin 2009 for a complete discussion of noise impacts on fish). In general, sound pressure levels exceeding established thresholds for injury are only possible with in-water pile driving. The disturbance threshold is the sound level at which normal fish behavior is altered, which has been established at 150 decibels by the Fishery Hydroacoustic Working Group (2008).

Information on the size of each pile and number of strikes to drive each pile is unavailable at this stage of design. However, the aquatic noise impact without any attenuation devices would reach across the Chehalis River and likely extend 2,000 feet upstream and 1,500 feet downstream where the bends in the river would block the underwater sound pressure waves from propagating further. Unmitigated, the underwater noise generated by this activity is likely to exceed threshold for

disturbance and possibly injury and would likely have **moderate effect** on EFH for Chinook and coho salmon.

Overall, Alternative 2 is expected to **adversely affect EFH** for the Pacific Salmon Fishery, primarily related to in-water-work and potential aquatic noise disturbance associated with pile driving. In the NEPA context, this is considered a **moderate, adverse effect, and would also apply to priority fish species.** WDFW and NMFS would likely require mitigation on the Chehalis River and condition construction activities to offset and reduce permanent impacts below the OHWM and effects on fish species. Similar to Alternative 1, Alternative 2 would likely have a **negligible to minor short-term adverse effect** on migratory birds and a **minor adverse effect** on priority wildlife species. If Alternative 2 were selected as the preferred alternative, FEMA would be required to prepare an EFH analysis and consult with NMFS.

Mitigation Measures and Residual Effects

Mitigation measures to compensate for the effects on biological resources will be developed during the EFH consultation process with NMFS (FEMA's responsibility), as well as the HPA process with WDFW (Lewis County's responsibility). As described in Section 3.3.3, *Project Timing,* an HPA would be required. Additional impact minimization measures are built into the project. With incorporation of the identified mitigation measures and associated agency coordination, implementation of the project would not cause any significant impacts on biological resources in the project site.

The action alternative would require local, state, and federal permitting. As noted previously, permitting conditions typically require mitigation measures for stream and buffer area loss and other potential impacts on fish, wildlife and habitat. It is anticipated that local and state permitting would require the creation or enhancement of riparian habitat, in-kind, to mitigate the loss in function due to riparian habitat loss from the project.

As described in Section 3.3.2, *Impact Avoidance and Minimization Measures* for Migratory Bird Protection, if vegetation removal in the project area occurs between March 1 and September 15 when migratory birds may be nesting, a qualified biologist shall conduct a pre-construction survey for active nests. The survey shall be conducted in all areas proposed for clearing and occur 15 days prior to the commencement of construction activities. If surveys show no evidence of nests, no additional mitigation are required. If any active nests are located in the construction area, the nest areas shall be flagged and a no-disturbance buffer zone of 100 feet shall be delineated around the active nest and maintained until the end of the breeding season or until the young have fledged. Guidance from the USFWS will be requested if establishing a 100-foot buffer zone is impractical.

4.4 CULTURAL RESOURCES

This section describes cultural resources in the vicinity of the project area and the potential effects of the project alternatives on these resources. The term *cultural resource* refers to archaeological sites, traditional cultural properties (TCPs), and built environment structures, regardless of eligibility for listing in the National Register of Historic Places (NRHP). Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to consider the effects of undertakings that are federally funded, or approved to take place on federally administered lands, if those undertakings have the potential to affect any district, site, building, structure, or object that is listed on or eligible for listing in the NRHP. Under Section 106 of the NHPA, the lead federal agency must provide the State Historic Preservation Officer (SHPO), affected Tribes, and stakeholders with an opportunity to comment. Section 106 of the NHPA and its implementing regulations (36 CFR Part 800) outline the procedures to be followed in the documentation, evaluation, and mitigation of potential impacts on cultural resources.

FEMA initiated cultural resources investigations for the Leudinghaus Road Bridge Replacement project in 2009, and supplemental investigations were conducted in 2012 when the project alternatives were revised. An initial intensive cultural resources study of the Alternative 2 site, consisting of shovel test probes (STPs), was conducted from August 25 through August 30, 2009. Due to the discovery of early Native American artifacts within four STPs in the vicinity of the Alternative 2 site, a follow-up site investigation consisting of more extensive subsurface testing was conducted between October 12 and October 21, 2009, to determine if the initial discovery of prehistoric materials was indicative of a larger intact archaeological deposit eligible for listing in the NRHP. The prehistoric archaeological site, referred to as site 45LE795, was recommended eligible for listing in the NRHP under Criterion D, as a property that has yielded, or may be likely to yield, information important in prehistory or history (AECOM 2010).

A supplemental cultural resources study of the Alternative 1 site (Proposed Action) was conducted in 2012 to include those portions of the Area of Potential Effects (APE) not included in the original study from 2009. No archaeological sites were identified within the Alternative 1 site. This section summarizes AECOM's cultural resources investigations of the alternatives and presents the information on the affected environment and consequences of the alternatives (AECOM 2010 and 2013).

The cultural resources study for the proposed project included the following tasks: delineation of the APE and consultation with the Confederated Tribes of the Chehalis Reservation; background research including a records search at the Washington Department of Archaeology and Historic Preservation (DAHP) in Olympia, Washington and other locations in August 2009 and December 2012; and completion of cultural resources investigations for two alternatives (Alternative 1 and Alternative 2). Investigations for Alternative 1 (Proposed Action), conducted by AECOM in 2012, included a pedestrian survey and excavation of STPs to determine the potential for cultural resources to be located within the Alternative 1 site. Investigations for Alternative 2 included a pedestrian survey and the excavation of STPs in 2009. Based on the identification of cultural resources from this earlier investigation, additional subsurface testing, with STPs and excavation units, was conducted in 2010. Technical reports were prepared documenting the findings of the investigations for Alternative 1 (the Proposed Action) (AECOM 2013), and Alternative 2 (AECOM 2009b and

2010). In October 2012, Alternative 2 was revised, encompassing the original project area. Under this revision, River Road to SR 6 would be decommissioned and a new road extending south from the proposed bridge would intersect with SR 6.

Results of the cultural resource analysis are described below, with information presented on the prehistoric context, historic context, historic properties, and potential project impacts.

4.4.1 Prehistoric Context

The APE is within the traditional Southwestern Coast Salish territory and was most likely inhabited by the Upper Chehalis and the Cowlitz (Hajda 1990). The territorial boundaries between the inland groups, Upper Chehalis and Cowlitz, and the groups to the west, the Lower Cowlitz and the Kwalhioqua, were porous in the vicinity of the project area; effectively a crossroads between Puget Sound, Portland basin, Grays Harbor, the Pacific Ocean, and the Cascade crest (Kopperl et al. 2009; Krauss 1990). The Upper Chehalis located villages along confluences of the Chehalis River and its major tributaries. Two examples are Grand Mound, north of the project area, and a second village 1 mile upstream from the confluence of the Chehalis and Skookumchuck rivers, near site 45LE795 (Marr et al. 1989).

Fish were the major source of nutritional importance. Chinook, chum, and coho salmon ran on the Chehalis River and its tributaries. Techniques for catching fish varied. On the upper Chehalis River, each village had one or more fish weirs, dip nets, and clubs. Plants were also especially important. The Upper Chehalis and Cowlitz harvested large quantities of camas. Pit-roasted camas would be mashed and formed into cakes for storage and/or trade. Berries were extensively gathered, eaten fresh or dried for storage. Other dietary staples included crab apples, fern roots, clover roots, cattail roots, salmonberry shoot, cow parsnip, wild celery roots, and hazelnuts (Hajda 1990).

4.4.2 Historic Context

The earliest documented regional contact that native peoples had with Euro-Americans was the passage through the area by the Lewis and Clark expedition, when they camped along the Cowlitz River in 1806. In 1838 Simon Plamondon, a French-Canadian trapper, settled on the Hudson's Bay Company's 4,000-acre Puget Sound Agricultural Company farm (Crowell 2007). North of Toledo, this farm became a focal point from which other settlements and development took place. Significant Euro-American immigration into Lewis County began in the 19th century, with farming and logging key to regional economic development. The arrival of the railroad was a major factor in the development of the logging and lumber industries for Lewis County (DeJoseph 2011).

The establishment of Fort Vancouver in 1825 and Fort Nisqually in 1833 by the Hudson's Bay Company provided trading opportunities with Euro-American traders and trappers as well as distant tribal groups (Hajda 1990). Much of this trade was disrupted as a result of the Treaty of Washington in 1846 and the Oregon Donation Act of 1850. As a result of these legislative acts, the Upper Chehalis and Cowlitz groups were forced from their traditional territories onto a reservation along the Chehalis River. The reservation was officially designated by the U.S. government in 1864 (Hajda 1990).

Lewis County, formed in 1845, was the first county in the Oregon Territory, which included present day Washington State. The Oregon Treaty of 1846 with England recognized the 49th parallel as the

border between Canada and the United States (Coffman 1926, Tenlen 2008). Lewis County became part of the Washington Territory in 1853.

Population increased along the Chehalis River Valley as the Homestead Act of 1862 played a large role in settling the area for agrarian use. The western extension of the Northern Pacific Railway started in Kalama, Oregon, in 1870, and reached Tacoma, Washington, by 1873. The completion of the transcontinental line between Puget Sound and Lake Superior in 1887 saw a steady rise of immigrants into the Washington Territory (Luttrell 1997).

In 1890, the Yakima and Pacific Coast Railway Company incorporated to construct the first branch line from Chehalis to the coast. The railroad line envisioned connecting with Northern Pacific's Cascade line over the mountains, thereby creating a shorter route to the ocean from wheat producing Eastern Washington. However, by 1892 only 19 miles of track, from Chehalis to Dryad, was constructed before ownership was transferred to the United Railroads of Washington branch of the Northern Pacific Railroad Company (Luttrell 1997). What became known as the South Bend Branch or the Willapa Harbor Line, subdivision 21 of Northern Pacific Railway's Tacoma Division, was completed in 1893 from Chehalis to South Bend (Northern Pacific Railway Historical Association 2009). The towns of Littell, Adna, Ceres, Meskill, Dryad, Doty, and Pe Ell were established along the line west from Chehalis by lumber companies to house employees close to logging operations (Tenlen 2008).

The South Bend branch was the single-most significant railroad in the Chehalis River Valley; however, the only other major railway represented in the vicinity of the project area was the Chicago, Milwaukee and St Paul Railway, which was along the south side of the Chehalis River. By 1909, many smaller shortline railroads extending only limited distances were built as spurs to service sawmills. In 1913, with the growing number of cars, the National Park Highway (present day SR 6) was designated and in 1923 renumbered State Road 12. During the 1964 highway renumbering program, the road was changed to SR 6 (State of Washington 1915 and 1945).

4.4.3 Historic Properties

The term *historic property* refers to archaeological sites, TCPs, and built environmental structures that are eligible for listing in the NRHP.

One historic property was identified by AECOM during the cultural resources investigation conducted for Alternative 2 in 2010. The archaeological site 45LE795 is located west of the current bridge design location and adjacent and to the south of that portion of River Road that would be decommissioned under Alternative 2. A total of 384 prehistoric artifacts were recovered from subsurface investigations, including three intact projectile points and a hammerstone. Fire-cracked rock was also identified, suggesting possible heath features, used for food preparation and/or heat. The majority of artifacts recovered were lithic debitage, flakes or fragments resulting from the manufacture or use of stone tools. Most artifacts and both hearth features encountered at this site were situated within a relatively narrow spatial context. The vertical distribution of artifacts suggests that 45LE795 was occupied during a relatively limited temporal period, ca 1000 years before present (BP).

Although 45LE795 does not represent a major habitation site subject to long-term occupation and activities, its position immediately adjacent to the Chehalis River and small stream would have provided the inhabitants with ready access to a diverse range of natural resources within and near riparian environments. Activities carried out at 45LE795 were limited and, based on available data, restricted to game hunting and probably food processing. Little on-site available lithic material appears to have been utilized. Instead, regionally available raw materials were brought onto the site, where they were subsequently modified for utilization. The presence of raw material from central Oregon indicates that the inhabitants of 45LE795 maintained a degree of long-distance contact (AECOM 2013).

No historic properties were identified within the Alternative 1 site. An historic linear transportation feature was recorded and includes an approximately 250-foot abandoned section of River Road. The earliest documented record of River Road, a 1948 Metskers map, depicts the road running parallel to Washington SR 6 (also known as Ocean Beach Highway), on the south side of the Chehalis River, from the historic Mays Bridge. Constructed in 1921, this bridge was added to the DAHP historic property inventory in 2000. The road continued west, terminating at the Chehalis River Hatchery Barn. Constructed in 1918, this working barn was listed in the NRHP in 2008.

During the 1950s, several minor roadway realignment projects terminated River Road into SR 6 at the southwestern edge of Alternative 2. The remaining section of road west of the project area was renamed Hatchery Road. The decommissioned section of road, between Hatchery Road and River Road, has been recommended as not eligible for listing in the NRHP (AECOM 2013). The structure is an isolated, linear road segment that provides no important information about local transportation networks, or about transportation in general, that cannot be obtained through documentary sources. Therefore, the structure has not yielded and is not likely to yield information important in prehistory or history.

FEMA has consulted with the SHPO at DAHP. DAHP provided concurrence regarding the APE for the purpose of compliance with Section 106 of the NHPA, in a letter dated October 28, 2013 (see Appendix F, *Consultation, Coordination, and Public Involvement*).

As part of its NEPA scoping effort, FEMA contacted the Confederated Tribes of the Chehalis Reservation, Confederated Tribes and Bands of the Yakama Nation, Cowlitz Indian Tribe, Nisqually Indian Tribe, Shoalwater Bay Tribe, and the Quinault Indian Nation, to help determine if there are any historic properties of religious or cultural significance to them within or near the APE. To date no information has been provided by Tribes. A copy of this report was provided to Tribes for comment opportunity.

If archaeological resources are discovered during construction, all work would cease and FEMA would follow unanticipated discovery protocols as provided in an unanticipated discovery plan. The unanticipated discovery plan will be prepared by Lewis County prior to construction.

4.4.4. Consequences of Alternatives

This section describes the potential effects of project alternatives on cultural resources. Environmental commitments to avoid, reduce or mitigate potential impacts on these resources are also identified. A project alternative would reach the significance threshold if it would diminish or

destroy the integrity of a property that is on or eligible for the NRHP, for which effects cannot be resolved or mitigated. When there are no historic properties present, or the action will have no impact on historic properties, the action is considered to have **no effect**.

No Action Alternative

Under the No Action Alternative, FEMA would not provide funding to Lewis County to replace the Leudinghaus Road Bridge. No clearing or ground-disturbing activities would occur. Therefore, the No Action Alternative would have **no effect on cultural resources.**

Alternative 1 (Proposed Action)

An inventory for Alternative 1 did not identify the presence of resources eligible for listing in the NRHP. Given the findings from AECOM (2013), Alternative 1 has the potential to disturb resources eligible for listing in the NRHP. The area is located at the confluence of the Chehalis River and Hope Creek and is generally considered sensitive for buried archaeological sites. Due to the potential for encountering buried archaeological sites, archaeological monitoring is recommended during ground-disturbing activities. The implementation of environmental commitments described below would further reduce potential impacts on cultural resources. In the event that cultural resources are identified during project-related activities, work would be halted in the immediate vicinity of the find, a professional archaeologist would evaluate the significance of the resource, and protocols established in the unanticipated discovery plan would be followed. No significant unavoidable adverse effects on cultural resources are anticipated from implementation of this alternative; thus, this alternative is anticipated to have **no effect on cultural resources.**

Alternative 2

A prehistoric site eligible for listing in the NRHP is located within the Alternative 2 project area. Lewis County would avoid disturbing the site by creating a temporary exclusion area around the perimeter of the archaeological site during any construction. No ground-disturbing activities or staging of any kind would be conducted within the site boundary. Furthermore, the implementation of environmental commitments described below would further reduce potential impacts on cultural resources. In the event that cultural resources were identified during project-related activities, work would be halted in the immediate vicinity of the find and a professional archaeologist notified to evaluate the significance of the resource and ensure compliance with the NHPA. This alternative is anticipated to have **no effect on cultural resources.**

Mitigation Measures

Based on the archaeological sensitivity of the project area and the presence of extensive modern alluvial deposits, the potential exists for encountering buried archaeological resources within the project area. Lewis County would contract with a qualified archaeologist to prepare an archaeological monitoring plan and an unanticipated discovery plan and submit them to FEMA for review and approval. FEMA would then submit the monitoring plan and unanticipated discovery plan to SHPO and the Tribes prior to construction. Monitoring would be conducted in accordance with the approved monitoring plan by a qualified archaeologist. Tribes would be given advance notice of project initiation so that they could be present while work was being conducted. A monitor would be present during all ground disturbing activities identified in the monitoring plan to

determine if deeply buried historic properties are present. Lewis County would also provide a report documenting the monitoring results, and submit it to FEMA and SHPO for review and approval. FEMA would provide the Tribes with the report.

In the event that archaeological materials are discovered during ground-disturbing activities, the contractor would halt excavations in the vicinity of the find and follow the procedures outlined in the unanticipated discovery plan including further consultation with DAHP and the affected Indian tribes regarding the nature of the archaeological deposits discovered during construction. If human skeletal remains are discovered, the Lewis County Sheriff, FEMA, and DAHP would be notified immediately.

4.5 SOCIOECONOMIC RESOURCES

This section describes the socioeconomic resources in the project vicinity, and the potential effects of the project alternatives on these resources. Resource topics addressed in the analysis include land use, visual resources, transportation and access, noise, and socioeconomics and environmental justice.

4.5.1 LAND USE

Existing land uses within and adjacent to the footprint of the project alternatives include rural residential, open space, and timber lands. Alternative 1 would involve constructing a new bridge and approach roads, and realigning and widening existing roads on several parcels that are currently in use as rural residential land and one parcel that is unused timber land (Figure 4.5-1). Alternative 2 would involve constructing a new bridge and intersection with SR 6 and widening existing roads on several parcels that are currently in use as rural residential land (Figure 4.5-2).

The project area is located in rural, unincorporated Lewis County, and is subject to the regulatory jurisdiction of the county government. All parcels within and adjacent to the construction footprint of Alternatives 1 and 2 are within areas designated by the Lewis County Comprehensive Plan as Rural Development District (RDD-10 or RDD-20) (Lewis County 2012e) (Figures 4.5-1 and 4.5-2). RDDs are intended to be predominantly residential, but allow non-residential uses at a scale consistent with rural character in which open space, the natural landscape, and vegetation predominate over the built environment (Lewis County 2012e).

The Chehalis River is subject to the Lewis County Shoreline Master Program (SMP) (Lewis County 1998), which sets forth policy, rules, and regulations for the development of shorelines within the county. Lewis County initially adopted its SMP in 1974 pursuant to the Washington State Shoreline Management Act (SMA) (RCW 90.58). The SMA requires local jurisdictions to plan for and regulate land uses within areas designated as shorelines of the state to ensure appropriate uses of shorelines, environmental protection, and public access. Shorelines of the state generally include land within 200 feet of marine water bodies and freshwater rivers, streams, and lakes above a certain size threshold, including the Chehalis River. The county's SMP meets objectives of the SMA by applying shoreline environment designations to portions of shoreline within the county, establishing regulations for land uses and shoreline modifications, and establishing shoreline permitting requirements. Implementing regulations of the SMP are codified in LCC Chapter 17.25 *(Shoreline Management).*

The segment of the Chehalis River in the project area is designated "conservancy" under the Lewis County SMP (Lewis County 1998) (Figures 4.5-1 and 4.5-2). The conservancy environment is intended to provide for multiple use activities, although the intensity of uses is limited because of extensive commercial forests, steep slopes, flooding, desirability for low-intensity recreational use, and wildlife habitat values (Lewis County 1998). The conservancy environment is for areas intended to maintain their existing character. The preferred uses are non-consumptive of the physical and biological resources in the area. Non-consumptive uses can utilize resources on a sustained basis while minimally reducing opportunities for other future uses of the resources in the area. Activities and uses of a non-permanent nature are appropriate for a conservancy environment.

Path: P:\PDD\2009\09100406_01FEMA1734WAMaysBridge\06_GIS\Layout\2012 Draft EA\2013\Leudinghaus Figure 4.5-1 Land Use.mxd

Draft Environmental Assessment
Leudinghaus Road Bridge Replacement Project
Lewis County, Washington

FEMA-1734-DR-WA (Public Assistance)
Applicant: Lewis County

N W E S

0 50 100 200 Feet

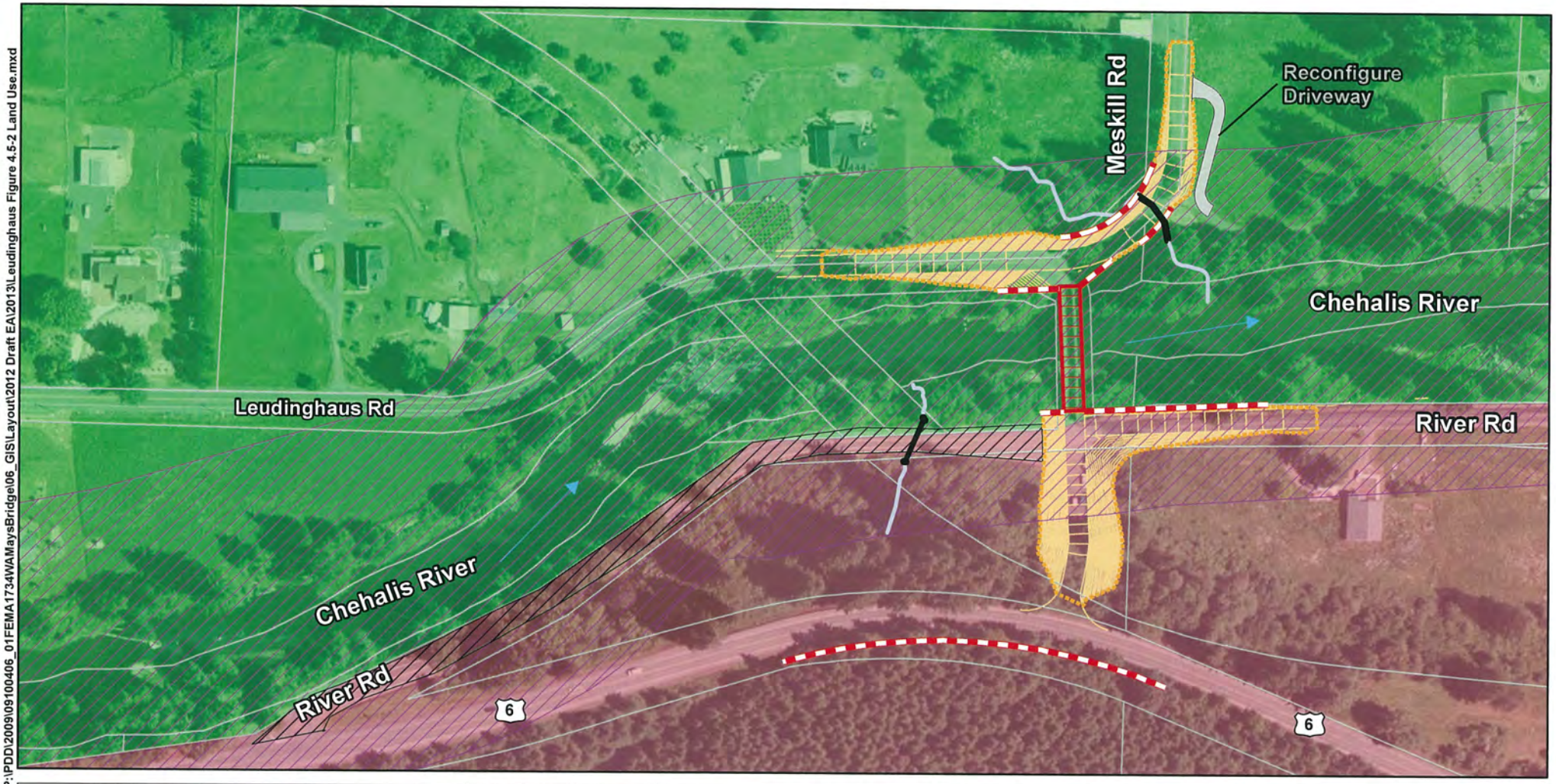
Figure 4.5-1. Land Use (Alternative 1)

ZONE
- RDD-10
- RDD-20

SMP Designation
- Conservancy

- Staging Area
- Excavation and Grading Staging Area
- Fill
- New/Reconstructed Road
- Bridge Structure
- Retaining Wall
- Catch Basin
- Discharge
- Culvert
- Stormwater Pipe
- Stormwater Pond Pond
- Stream 1
- Flow Direction
- Parcel Boundary

Print Date: 9/16/2013



Path: P:\PDD\2009\09100406_01FEMA1734WAMaysBridge\06_GIS\Layout\2012 Draft EA\2013\Leudinghaus Figure 4.5-2 Land Use.mxd

Draft Environmental Assessment
Leudinghaus Road Bridge Replacement Project
Lewis County, Washington

FEMA-1734-DR-WA (Public Assistance)
Applicant: Lewis County

N W E S

0 50 100 200 Feet

Figure 4.5-2. Land Use (Alternative 2)

ZONE
- RDD-10
- RDD-20

SMP Designation
- Conservancy

- Fill
- New/Reconstructed Road
- Driveway Reconfiguration
- Bridge Structure
- Retaining Wall
- Road Decommissioning
- Stream
- Culvert
- Flow Direction
- Parcel Boundary

Print Date: 9/16/2013

Examples of uses that might predominate in a conservancy environment include diffuse outdoor recreation activities, passive agricultural uses such as pasture and range lands, and other related uses and activities (Lewis County 1998). The SMP includes general policies related to road design and construction in shoreline areas and regulations for permitted uses within each shoreline designation. Road construction is allowed in conservancy environments when a roadway design provides for minimized alteration of the natural movement of surface and groundwater that is satisfactory to the planning director (Lewis County 1998).

4.5.2 Visual Resources

The landscape surrounding the project area is characterized by the Chehalis River riparian corridor, which consists of narrow bands of mixed conifer-hardwood forest (described in detail in Section 4.3.1, *Vegetation*); riparian corridors of tributary streams, including Hope Creek; the broad Chehalis River floodplain with scattered rural residences, agricultural fields, and cattle pastures; and surrounding forested hillsides.

Landscape-level views to the north and south are of the surrounding Willapa Hills. These views are generally a patchwork of commercial forest at different stages of maturity, including clearcuts. Sight distance varies; within riparian areas, sight distance is generally limited to the immediate area with fragmented views of the surrounding landscape. Elsewhere, sight distance is relatively expansive and extends to the surrounding hillsides.

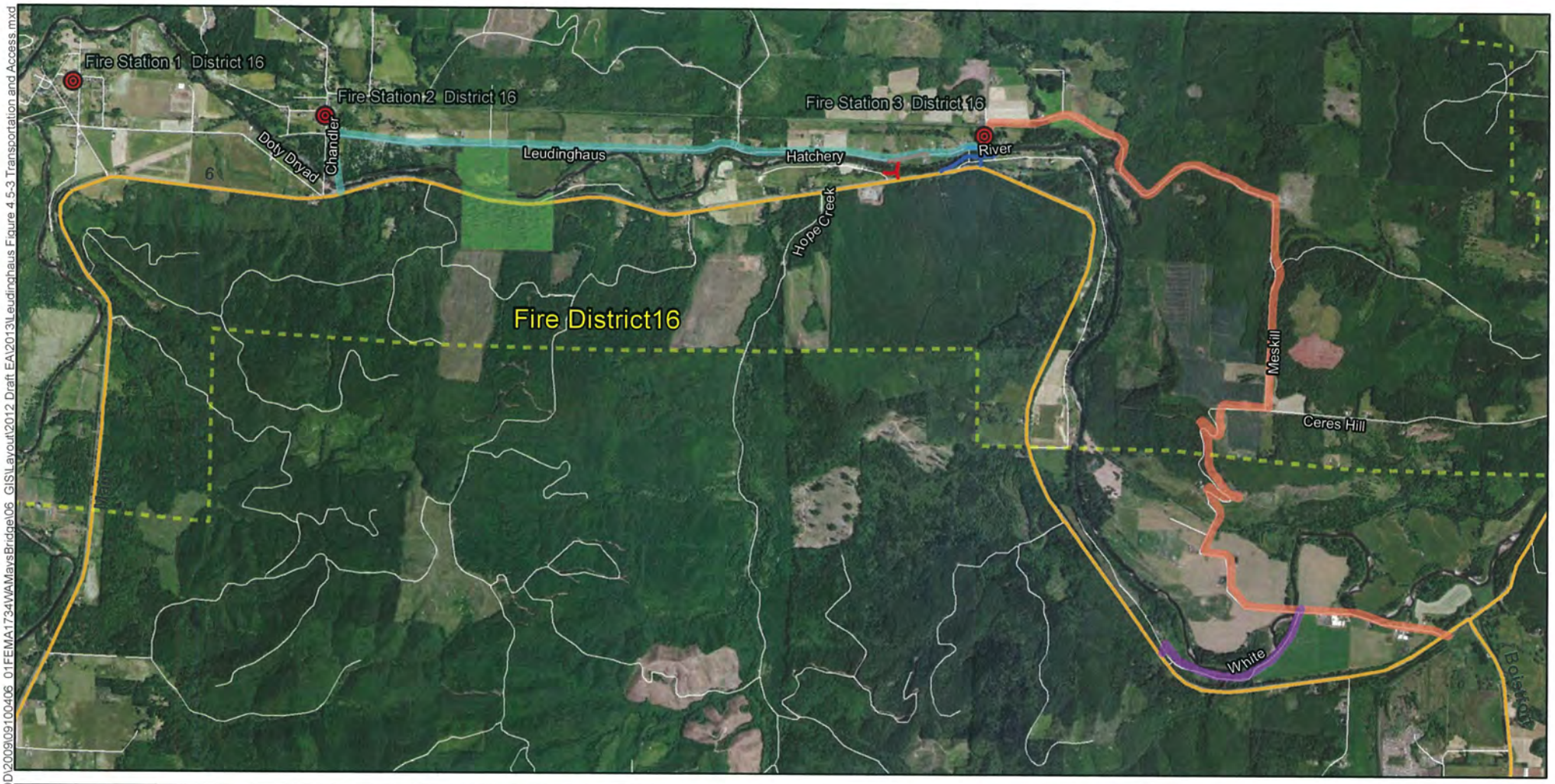
Site-level views along the project corridor under Alternative 1 include SR 6, the Chehalis River and Hope Creek and associated riparian vegetation, and scattered residences along Leudinghaus Road, along with orchards, fields, wetlands, and open space. Site-level views along the project corridor under Alternative 2 are similar in nature; however, riparian vegetation along the Chehalis River and tributaries is of lesser quantity and quality.

4.5.3 Transportation and Access

Transportation and access potentially affected by the project alternatives include SR 6, public local access roads, and private driveways. Through western Lewis County to Pacific County, SR 6 is the primary east-west connection between Interstate 5 (I-5) and the Pacific Coast. SR 6 serves Chehalis and Pe Ell and is the primary access route to intervening rural areas. SR 6 closely follows the Chehalis River in the project vicinity (Figure 4.5-3, *Transportation and Access*).

Hatchery Road, River Road, Leudinghaus Road, and Meskill Road are local access roads owned and maintained by Lewis County. These roads provide access to scattered rural residences north and south of the Chehalis River in the project vicinity. Prior to the washout of the Leudinghaus Road Bridge, access across the river to the Meskill area was provided via River Road. Access to the Meskill area is currently disrupted because of the bridge washout, and longer alternative access routes must currently be used to access this area.

The project area can be accessed from the east from SR 6 via Ceres Hill Road, Meskill Road, and Leudinghaus Road (Figure 4.5-3). Meskill Road intersects with Leudinghaus Road on the north side of the Chehalis River, just north of the former Leudinghaus Road Bridge site. Alternatively, White Road can be used to access the Ceres Hill Road - Leudinghaus Road route from SR 6.



Path: P:\PDD\2009\09100406_01FEMA1734WAMaysBridge\06_GIS\Layout\2012 Draft EA\2013\Leudinghaus Figure 4.5-3 Transportation and Access.mxd

Draft Environmental Assessment
Leudinghaus Road Bridge Replacement Project
Lewis County, Washington

FEMA-1734-DR-WA (Public Assistance)
Applicant: Lewis County

N W E S

0 0.5 1 Miles

Figure 4.5-3. Transportation and Access

Legend

Alternative Access Routes
- Ceres Hill/Meskill Road Route
- Chandler/Leudinghaus Road Route
- White/Ceres Hill/Meskill Road Route

- Fire Stations
- Fire District 16 Boundary
- Alternative 1 (Preferred Alternative)
- Alternative 2

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The Meskill area can currently be accessed from the east via the new Chandler Road Bridge and Leudinghaus Road.

Emergency service providers and residents in the area have expressed concern with the reduced options for crossing the Chehalis River between SR 6 and the project area since the washout of the Leudinghaus Road Bridge. Lewis County Fire District 16 serves the Doty/Dryad and Meskill areas and other communities along SR 6, and has three fire stations in the project vicinity: one in Doty, one in Dryad, and one at Meskill. Lacking the Leudinghaus Road Bridge crossing, emergency service providers, in some cases, must use longer alternative routes to respond to incidents. This has been estimated to increase the average response time to incidents in the area by approximately 15 minutes (pers. comm., Newell 2009).

4.5.4 NOISE

This section describes existing noise conditions in the project area (including noise-sensitive land uses and noise receivers, and applicable noise regulations), and the potential effects of the project alternatives on noise receivers. Noise-sensitive land uses are those where exposure would result in adverse effects on users or occupants and where quiet is an essential element of the intended purpose of the land use. Noise-sensitive land uses include residences, parks, hospitals, churches, libraries, and similar uses where low noise levels are essential. Noise receivers are the users or occupants of these types of land uses and may include both humans and wildlife. In this EA, noise effects on fish and wildlife are described in Section 4.3 (*Biological Resources*).

When relating environmental noise to human sensitivity, an A-weighted decibel [dB(A)] scale is used to describe and quantify the noise levels experienced by a receiver. A 1-dB(A) increase is considered to be imperceptible, a 3-dB(A) increase is barely perceptible, a 6-dB(A) increase is clearly noticeable, and a 10-dB(A) increase is subjectively perceived as approximately twice as loud. A long-term noise level increase of 3 dB(A) or greater is generally considered to be a substantial degradation of the human noise environment (Egan 1988).

The project is in unincorporated Lewis County in a low-density rural area. Noise in the project area consists primarily of intermittent traffic noise on SR 6 and local roads, human-related noises (people talking, children playing), and noise from home maintenance equipment (e.g., lawnmowers and other power tools). Other intermittent noise sources include aircraft flyovers and domestic animals. Rural areas typically have ambient sound levels of 35 to 40 dB(A) (EPA 1979). Noise-sensitive land uses nearest the project corridor are rural residences along Hatchery Road and Leudinghaus Road in the vicinity of the Alternative 1 site, and along River Road, Leudinghaus Road, and Meskill Road in the vicinity of the Alternative 2 site.

Noise in the project area is regulated by Lewis County land development regulations pertaining to noise (LCC 17.145.050), which specify that no development shall exceed the maximum environmental noise levels established by Chapter 173-60 (Maximum Environmental Noise Levels) of the WAC. Noise from temporary construction sites is exempt from the provisions of WAC Chapter 173-60, except where it relates to noise impacts between the hours of 10:00 p.m. and 7:00 a.m. on Class A EDNAs (environmental designation for noise abatement), which are lands where people reside and sleep (e.g., residential areas).

4.5.5 Socioeconomics and Environmental Justice

This section describes relevant socioeconomic conditions and minority and low-income populations in the study area, and analyzes the potential socioeconomic and environmental justice impacts related to implementation of the project alternatives.

Environmental justice is the fair and meaningful involvement in the development and implementation of environmental laws, regulations, and policies, of all people regardless of race, color, national origin, or income.

EO 12898 (*Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*) requires federal agencies to achieve environmental justice by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on these populations. Potential effects are evaluated by examining the demographics of the area affected by the proposed action(s) and the potential of those actions to have disproportionately high and adverse effects on minority and low-income populations.

Environmental justice effects were determined using EPA guidance (EPA 1998). According to the EPA guidelines, a minority population refers to a minority group that has a population of greater than 50% of the affected area's general population. Although not specifically stated in the text, the same rule is used for low-income populations; a low-income population exists if there is a community whose general population comprises 50% or more living under the threshold for low income.

The project is in rural, western Lewis County. The area immediately surrounding the Alternative 1 and Alternative 2 sites is characterized by scattered rural residences and farms with a low population density. The small town of Pe Ell with an estimated 2011 population of 633 (U.S. Census Bureau 2012a) is west of the project site via SR 6. The majority of project-related effects would be limited to the immediate vicinity. However, potential effects of the project alternatives (including the No Action Alternative) on transportation and access, specifically related to access for emergency service providers, could extend farther east and west along the SR 6/Chehalis River corridor because emergency service providers physically located in Meskill and as far away as Chehalis may need to travel to or from the project area to respond to emergency incidents in the region.

To evaluate environmental justice in this EA, the affected environment is defined as the population of Lewis County. Statistics for the state of Washington are provided for comparison and context. Table 4.5-1 presents the race and ethnicity of Lewis County and state of Washington residents.

Low-income households are defined by the U.S. Census Bureau as households with incomes at or below 80% of area median household income. For 2007 to 2011, the median household income in Lewis County was estimated at $44,373; for Washington as a whole, it was $48,890 (U.S. Census Bureau 2012b). Approximately 13.5% of the Lewis County population lived below the poverty threshold, compared to 12.5% of the population of Washington as a whole (U.S. Census Bureau 2012b).

Table 4.5-1. Race/ethnicity in Lewis County and Washington State 2010.

Race/Ethnicity	Lewis County (%)	Washington State (%)
White	93.4	82.0
Black	0.7	3.8
American Indian and Alaska Native	1.7	1.8
Asian	0.9	7.5
Native Hawaiian and Other Pacific Islander	0.2	0.7
Two or more races	3.0	4.3
Hispanic or Latino (of any race)	8.9	11.6
Source: U.S. Census Bureau 2012b.		

Based on the definitions under EPA's environmental justice guidance (EPA 1998), the affected environment of the project area does not include either minority or low-income populations.

4.5.6 Consequences of Alternatives

An alternative would reach the significance threshold for effects on socioeconomic resources if it would:

- For land use, substantially conflict with applicable land use plans, policies, regulations, or laws, or substantially interfere with major land-based activities.
- For visual resources, substantially degrade existing views or the rural (pastoral) character of the area.
- For transportation and access, result in physical constraints or congestion that would substantially impede travel, including the following: resulting in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion; or substantially increased hazards because of a design feature or incompatible uses.
- For noise, noise levels during construction or operation of the project that substantially exceed state or local standards.
- For socioeconomics and environmental justice, substantially degrade existing socioeconomic conditions in the study area or have disproportionately high and adverse human health or environmental impacts on low-income or minority populations.

No Action Alternative

As described below, the No Action Alternative would have **no short- or long-term effects on land use, visual resources, noise, socioeconomics, or environmental justice.** The No Action Alternative would have **direct adverse effects (short- and long-term) on transportation infrastructure and access** in the project area.

Land Use

Under the No Action Alternative, no ROW acquisition would occur and no construction activities would take place. Therefore, the No Action Alternative would have **no short- or long-term effects** on land use.

Visual Resources

Under the No Action Alternative, no construction activities would take place and no physical changes would occur. Therefore, the No Action Alternative would have **no short- or long-term**

effects on site- or landscape-level views, and would not change the natural visual character of the area.

Transportation and Access

Under the No Action Alternative, no construction activities would take place. However, the No Action Alternative would have **moderate direct, adverse effects (both short- and long-term) on transportation infrastructure and access** in the project area. Without FEMA funding, the Leudinghaus Road Bridge crossing of the Chehalis River would continue to be displaced from the Lewis County transportation network for an indefinite length of time. Without a crossing at this location, access from SR 6 to rural residences, state and private forest resources, and access to the Willapa Hills Trail in the Meskill area on the north side of the river would remain in the current state indefinitely, or until such time as Lewis County moves forward with restoring the Leudinghaus Road Bridge with other funding.

Access between the north and south sides of the river would continue to require the use of the longer alternative routes (described in Section 4.5.3, *Transportation and Access*). This could increase the travel distances and time it takes for some residents to evacuate the area during flood events and increase emergency response times. The alternative routes are comprised entirely of public local access roads and primarily serve rural residences. It is anticipated that these alternative routes would continue to incur minor long-term increases in car and light truck traffic over the pre-disaster condition due to Meskill area residents traveling them to access their homes on the north side of the river. Additionally, logging truck and other forestry-related traffic would continue to use alternative routes to the former Leudinghaus Road Bridge crossing to access forest resource lands north of Meskill.

Noise

Under the No Action Alternative, no new bridge would be constructed. Therefore, the No Action Alternative would have **no short- or long-term effects** on the noise environment.

Socioeconomics and Environmental Justice

The No Action Alternative would have **no direct effect on socioeconomic conditions** in the study area. However, under the No Action Alternative, local residents, workers, and others commuting to and from the project area, and businesses transporting goods, would permanently be required to use longer routes than were available under the pre-disaster condition. This would permanently increase travel times and associated costs, including fuel. This is anticipated to be a **minor, but long-term adverse impact on socioeconomic** conditions in the project area.

The general population of the affected environment does not include minority or low-income populations as defined under EPA's environmental justice guidance (EPA 1998). Therefore, the No Action Alternative would have **no environmental justice effects**.

Alternative 1 (Proposed Action)

As described below, Alternative 1 would have minor long-term adverse impacts on land use and visual resources; minor short-term beneficial effects on socioeconomics; and no impact on environmental justice. Construction would generate minor short-term impacts on access and noise,

and implementation would generate long-term beneficial effects on access and transportation in the project area.

Land Use

In general, Alternative 1 would have **minor, long-term adverse effects** on land use. Alternative 1 would not conflict with existing land use laws or development regulations. The effects of Alternative 1 on land use are primarily related to ROW acquisition of private property within the construction footprint of the project and encroachment of the elevated roadways on adjacent occupied parcels (effects on private driveways are addressed under *Transportation and Access*).

Under Alternative 1, one timber parcel (Parcel 1-B) and one rural residential parcel (Parcel 1-A) would be acquired in their entirety and converted to public land uses for transportation infrastructure and related stormwater facilities. The timber parcel, on the south side of the Chehalis River between SR 6, the river, and Hatchery Road, is not currently being used for timber production. The property owner has indicated to Lewis County that the parcel is not suitable for timber production due to its small size and location, and there are no plans to log it in the future. Parcel 1-A is currently in use as a single-family residence. Fields on the property are not currently in use for any agricultural purposes. Alternative 1 would have a direct, long-term adverse impact on existing land uses on these two parcels, but would have little effect on adjacent land uses. Therefore this impact is considered to be minor.

The project would also require minor ROW acquisition on additional rural residential parcels along Leudinghaus Road. The project design includes realigning Leudinghaus Road to the south to take advantage of ROW acquisition on the south side of the road and minimize ROW needs on the north side of the road, and direct adverse effects are expected to be minor. The reconstructed roadway would not encroach closely upon built structures or active use areas on these parcels as observed during site visits, but it is reasonable to anticipate that the project could inhibit future active or passive uses near the roadway, an indirect, minor, adverse effect.

Lewis County would be required to fairly compensate property owners for the acquisition of their property in accordance with applicable regulations. Coordination with property owners regarding ROW acquisition and agreements regarding compensation generally occur during the ROW acquisition phase of a project. No additional mitigation measures are proposed separate from this process.

Visual Resources

Alternative 1 would have **no impact on landscape-level views** and **minor, long-term adverse effects on site-level views**. Under Alternative 1, the new bridge and roadway would have no effect on landscape-level views. The new bridge and elevated roadway would be visible from SR 6 and parcels along the north side of Leudinghaus Road near the project, and would directly alter site-level views from these locations. Existing views of the Chehalis River riparian corridor from these locations would be fragmented by the new elevated bridge and road. The elevated bridge structure would have a greater visual effect on the pastoral character of the landscape than the original bridge due to its height. However, because the visual impacts are limited to a relatively small area, direct, long-term adverse impacts on visual resources are considered to be minor.

Transportation and Access

Alternative 1 would have **minor short-term (construction-related) adverse effects** on transportation and access, **negligible long-term (operational) adverse effects** on private driveway access, and would have **moderate long-term beneficial effects** on transportation and access in the project and surrounding areas north of the Chehalis River. These effects are described below.

Short-Term (Construction-Related) Effects

Constructed-related activities would temporarily disrupt local access on Hatchery Road and Leudinghaus Road compared to current conditions, including temporary road closures, traffic diversions, and driveway alterations. Limited access to local residents would be maintained at all times, and these impacts are expected to be minor.

Alternative 1 would include the reconfiguring of at least one private driveway on the north side of Leudinghaus Road, north of the river. Access to this property would be partially disrupted while work takes place on the approach roadway and driveway. However, the contractor would be required to maintain ingress and egress to all private driveways for the duration of the project, and would be required to coordinate construction of the driveway approach with the property owner to minimize disruption of their access.

In addition to the road closures and traffic diversions, there is some potential for temporary minor impacts on traffic flow along SR 6 and alternative access routes during various construction phases of the project. Construction of the project would require the transport of large construction equipment (e.g., excavators, dozers, backhoes, cranes) and large quantities of material to the project site on both sides of the river, increasing the volume of traffic along these roadways during construction. It is expected that effects would be concentrated toward the early stages of the project when the majority of construction materials and equipment are transported to the project site. During later stages, increases in construction-related traffic would predominantly be from construction workers traveling to and from the site each day.

All project-related temporary traffic control would be required to conform to WSDOT standard specifications and the Manual on Uniform Traffic Control Devices (MUTCD) (FHWA 2009). These measures would minimize effects on transportation and access to the extent practicable.

Long-Term (Operational) Effects

Long-term adverse effects on transportation and access related to operation of Alternative 1 are negligible and related to the driveway alteration on the north side of the river described above. One private driveway along Leudinghaus Road on the north side of the river would be permanently altered. Reconstruction of the driveway would be required to comply with Lewis County standards. The long-term adverse impacts of altering the private driveway are expected to be negligible.

The primary effects of Proposed Action on transportation and access would be beneficial, reflecting the purpose and need for the project. Implementation of Alternative 1 would replace and improve Lewis County transportation infrastructure damaged during the December 2007 flooding of the Chehalis River, and would restore access between SR 6 and Meskill and the surrounding areas north of the river to pre-disaster conditions. Access to this area would no longer require the use of the

much longer alternative routes, which would have a substantial beneficial effect on access to these areas, including for logging trucks and emergency service vehicles.

While the proposed bridge and approaches would be elevated above the 100-year flood elevation, approach roads on both the south (SR 6) and north (Leudinghaus Road) sides of the river would still be below the 100-year flood elevation. Use of the proposed bridge crossing under Alternative 1 as an evacuation route during floods would be limited by approach road elevations.

Noise

Alternative 1 would have **minor, short-term adverse effects** on noise environment from construction noise, and **negligible, long-term adverse noise effects** associated with altering traffic flow patterns, as described below.

Short-Term (Construction-Related) Effects

The operation of heavy equipment, including pile drivers, jackhammers, drill rigs, cranes, excavators, dozers, backhoes, graders, compaction equipment, large trucks, and other typical construction equipment, would temporarily generate noise levels above ambient levels during construction of the project. The intensity of construction activities and noise levels generated would vary over the duration of the project.

Assuming a worst-case scenario in which several of the loudest pieces of construction equipment are all operating at the same time, the combined noise levels generated by construction equipment could range from 80 to 90 dB(A) at 50 feet from the source (FHWA 2006; FTA 2006). Based on the rural nature of the project vicinity and the dominant noise sources noted during site visits, weekday noise levels in the immediate project vicinity are estimated to be in the range of 35 to 40 dB(A). Because ambient noise levels are so low, construction noise would be considered loud (an increase greater than 10dB(A) for residents within at least one-third mile from construction and noticeable for residents within about one-half mile from construction). Construction noise would dissipate to ambient noise levels about two-thirds of a mile from construction.

Impacts on noise receivers would vary depending on their proximity to construction activities. Impacts would be greatest for residences on the north side of Leudinghaus Road. Construction would comply with Lewis County noise regulations, and overall, short-term adverse noise impacts from construction would be minor.

Long-Term (Operational) Effects

Long-term noise effects from operation of the project are limited to traffic noise. While traffic noise modeling has not been conducted for this project, traffic noise along the project corridor is estimated to be relatively low given the low volume and intermittent nature of traffic on Leudinghaus Road. Alternative 1 is not expected to increase overall traffic volumes on local roads in the area, but rather would re-route some traffic that is currently using alternative routes to cross the Chehalis River to the project corridor. The increased grade of the approach roads would increase noise from larger trucks during acceleration. However, overall, adverse noise effects on existing residences on Hatchery Road and Leudinghaus Road from the anticipated changes in traffic flow patterns would be negligible.

Socioeconomics and Environmental Justice

Alternative 1 would have **minor short-term and long-term beneficial effects on socioeconomic conditions**. Construction projects often provide increased short-term employment and spending within the project area during construction. The extent of these effects depends on the source of project funding and the makeup of work crews used during project construction. Funds from local or regional sources are considered transfers of money that could be spent by residents and businesses on other economic activities. Federal or state funds that are new to the region can have a measurable economic effect on employment and income gains resulting from project construction. FEMA and Lewis County would provide the majority of funds for the proposed project, and its construction would result in some income and job benefits that would otherwise not occur. During construction, some materials would be purchased locally and some local firms and workers would be involved in construction. However, firms outside of the immediate study area might also provide workers and supplies, particularly due to the rural, noncommercial nature of the project area. Household income and employment benefits related to construction of the project would probably have a minor, short-term beneficial effect on socioeconomic conditions within the study area, but would have no significant benefit or adverse effect on minority or low-income populations.

The general population of the affected environment does not include minority or low-income populations as defined under EPA's environmental justice guidance (EPA 1998). Therefore, adverse impacts of Alternative 1 would not disproportionately affect these populations, and Alternative 1 would have no effect on environmental justice.

Alternative 2

Land Use

Alternative 2 would have **minor, long-term adverse effects** on land use. Similar to Alternative 1, the effects of Alternative 2 on land use are primarily related to ROW acquisition of private property within the construction footprint of the project, and encroachment of the elevated roadway on adjacent occupied parcels (effects on private driveways are addressed under *Transportation and Access*).

Alternative 2 would require new ROW acquisition affecting four parcels, referred to as Parcels 2-A, 2-B, 2-C, and 2-D (Figure 3-2). ROW acquisition on Parcel 2-A to accommodate fill for the approach roads (see Figure 3-2) would have a negligible effect on existing uses of the property. The project design would avoid encroachment on the existing residence on this property. Alternative 2 may require partial or full ROW acquisition of Parcel 2-B (undeveloped timber land). Parcel 2-B is quite small for a timber unit and is not currently being used for timber production. Potential ROW acquisition of Parcel 2-B would have no effect on current uses of the property and little effect adjacent land uses. ROW acquisition on Parcels 2-C and 2-D would not encroach on the residences or any other built structures. However, the need to reconfigure the existing driveway on Parcel 2-D would likely encroach on an existing cattle pasture, reducing the size of the pasture and requiring relocation of existing fencing. Overall, Alternative 2 would have direct, long-term adverse effects on these parcels, but would have little effect on adjacent land use in the area. Therefore, this impact is considered to be minor.

Lewis County would be required to fairly compensate property owners for the acquisition of their property in accordance with applicable regulations. Coordination with property owners regarding ROW acquisition and agreements regarding compensation generally occur during the ROW acquisition phase of a project. No additional mitigation measures are proposed separate from this process.

Visual Resources

Alternative 2 would have no effect on landscape-level views and **minor, long-term adverse effect on site-level views**. The new bridge and approach road would be visible from SR 6 and parcels along the south (River Road) and north (Leudinghaus Road and Meskill Road) sides of the river, and would directly alter site-level views from these locations. Existing views of upland forest from SR 6 would be fragmented by the new, elevated bridge and road. Views from occupied parcels on River Road, Leudinghaus Road, and Meskill Road previously included the original Leudinghaus Road Bridge and fragmented riparian vegetation along the Chehalis River. The new, elevated bridge would have greater visual effect on the pastoral character of the landscape than the original bridge due to its height, but would have little effect the overall visual quality of the riparian vegetation in the immediate area. Views from Parcel 2-A (Figure 3-2) would be most affected because the new intersection with SR 6 would result in that property being bordered by roads on two sides instead of one as is the current situation. Overall, the visual impacts are limited to a relatively small area, and within the NEPA context, direct adverse impacts on visual resources are considered to be minor.

Transportation and Access

Similar to Alternative 1, Alternative 2 would have **minor short-term (construction-related) adverse effects** on transportation and access, **minor long-term (operational) adverse effects** on private driveway access, and would have **moderate long-term beneficial effects** on transportation and access in the project and surrounding areas north of the Chehalis River. These impacts are described below.

Short-Term (Construction-Related) Effects

Alternative 2 would require reconfiguring one private driveway on Meskill Road on the north side of the river (on Parcel 2-D). Access to this property would be partially disrupted while work takes place on the approach roadway and driveway. However, the contractor would be required to maintain ingress and egress to all private driveways for the duration of the project, and would be required to coordinate construction of the driveway approach with the property owners to minimize disruption of their access.

Long-Term (Operational) Effects

Long-term adverse effects on transportation and access related to operation of Alternative 2 would be similar to Alternative 1 and would be minor. The private driveway on the north side of the river on Parcel 2-D would be permanently altered, with its length and grade increased relative to the existing configuration. Reconstruction of this driveway approach would be required to comply with Lewis County standards. This is considered to be a permanent but minor impact.

As with Alternative 1, the primary effects of Alternative 2 on transportation and access would be beneficial. Implementation of Alternative 2 would replace and improve Lewis County transportation

infrastructure damaged during the December 2007 flooding of the Chehalis River, and would restore access between SR 6 and Meskill and the surrounding areas north of the river to pre-disaster conditions. Access to this area would no longer require the use of the much longer alternative routes, which would have a substantial beneficial effect on access to these areas, including for logging trucks and emergency service vehicles. The new Leudinghaus Road intersection with SR 6 and the corresponding decommissioning of the River Road/SR 6 intersection would have no significant effect on transportation or access in the project area.

Similar to Alternative 1, while the proposed bridge and approaches would be elevated above the 100-year flood elevation, approach roads on both the south (SR 6) and north (Leudinghaus Road and Meskill Road) sides of the river would still be below the 100-year flood elevation. Use of the proposed bridge crossing under Alternative 1 as an evacuation route during floods would be limited by approach road elevations.

Noise

Alternative 1 would have **moderate, short-term adverse effects** on noise environment from construction noise, and **negligible, long-term adverse noise effects** associated with altering traffic flow patterns, as described below.

Short-Term (Construction-Related) Effects

Short-term noise impacts under Alternative 2 would be similar to Alternative 1, but slightly greater as residences are generally closer to the construction footprint of the project at the Alternative 2 site. Additionally, Alternative 2 would require blasting to clear bedrock on the south side of SR 6 to meet sight distance requirements. Overall, short-term adverse noise impacts from construction under Alternative 2 would be moderate.

Long-Term (Operational) Effects

Long-term noise effects from operation of the project under Alternative 2 would be **negligible**, similar to Alternative 1.

Socioeconomics and Environmental Justice

Alternative 2 would have the same effects on socioeconomic conditions and environmental justice as Alternative 1.

4.6 CUMULATIVE IMPACTS

Cumulative impacts are the effect on the environment that results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Impacts are only cumulative for a given resource.

The geographic scope can be different for each cumulative impact issue. Often, a resource is not limited by jurisdictional boundaries; rather, the resource extends across a natural area of influence, such as an air basin, watershed, or habitat community. For this analysis, the geographic scope is limited to the upper Chehalis River basin (WRIA 23).

The upper Chehalis River basin has a high proportion (87%) of forestland. Agricultural, urban, and industrial land uses comprise only 11% of the basin; however, they are concentrated near major rivers, including the Chehalis River. Past forestry and farming practices, and development near important basin rivers and streams, have left a legacy of resource-related issues that are both large scale and project-specific. Both natural and human resources in the basin show evidence of historic and ongoing cumulative effects in the project area, including effects on rivers and streams, water quality, floodplains, plants, fish and wildlife, roads and bridges, and homes and businesses.

The Chehalis River basin has a history of major flooding. Bridge construction causes some obstruction to flood flows, as do railroad trestles. Road construction within the floodplain has sometimes created low levees throughout the basin. Levee construction has been proposed and, in some cases, constructed on the Chehalis River and other rivers in the basin. Levees occur throughout the basin, both constructed by public entities and built by private property owners (Chehalis Basin Partnership 2004). Numerous modifications to river channels (e.g., bank protection, dredging, etc.) have occurred throughout the basin, which in some cases speeds river flows to downstream areas, which are in turn inundated more frequently than before. Encroachment on floodplains, whether by structures or by fill material, reduces the flood-carrying capacity of the river, increases the flood heights and velocities, and increases the flood hazards in areas outside of the encroachment.

Land use practices over time, including forest harvest practices, have reduced resident time of water on the land and increased the likelihood and frequency of flash flood conditions throughout the basin, which exacerbates erosion and increases flood damage. Major floods have occurred in the Chehalis River basin in 1972, 1975, 1986, 1990, 1996, and most recently in 2007 and 2009 (FEMA 2010). In addition to these large-scale, long-term factors, the recent construction and operation of the Chandler Road Bridge project (described in Section 1.1, *Project Location and Background*), also has the potential to contribute to cumulative effects in the project vicinity.

Most of the potential effects of the project are short-term effects associated with construction activity and are highly localized. In general, the few long-term effects on the various resources previously described would have a negligible cumulative effect on resources in the Chehalis River basin, when added to the other past, present, and reasonably foreseeable future actions, including the recent and nearby Chandler Road Bridge project.

The minor adverse cumulative effects of Alternative 1 on hydrological and biological resources are coupled with long-term beneficial effects of Alternative 1 on socioeconomic resources. Together with the Chandler Road Bridge project, Alternative 1 would incrementally contribute to safer and more reliable access across the Chehalis River for local residents, workers, emergency service providers, and others. Additionally, the elevated bridge design under both of these projects would reduce future risks of flood-related damage to transportation infrastructure in the Chehalis River basin.

5.0 Public Involvement and Agency Coordination

5.1 PUBLIC INVOLVEMENT

5.1.1. PUBLIC MEETINGS AND SCOPING

Public involvement activities for the Leudinghaus Road Bridge Replacement Project have been ongoing since shortly after the December 2007 flood event, conducted with the intent to meet the requirements of EO 11988 and NEPA. These activities have included public meetings conducted by Lewis County and FEMA, both independently and in coordination with FEMA. Public involvement activities conducted to date are summarized below in chronological order. Appendix F (*Consultation, Coordination, and Public Involvement*) contains public and agency comments received at various points in the process.

December 2007 – February 2009. The original Leudinghaus Road Bridge was destroyed by flood waters on December 3, 2007. The temporary Bailey bridge was installed on December 18, 2007. Lewis County hosted several community meetings at the Dryad Fire Station following the December 3, 2007 flood event. At a meeting on February 26, 2009, the community supported construction of both the Chandler Road Bridge and the Leudinghaus Road Bridge destroyed in the flood event, rather than one structure geographically somewhere in between. The community supported construction of the Chandler Road Bridge first, with construction of the Leudinghaus Road Bridge later. Comments regarding replacement of the Leudinghaus Road Bridge included concerns about the safety of the intersection of River Road and SR 6, property impacts on local residents, and access during construction (Lewis County 2009a, 2009b, 2012b).

September 2009. As part of the NEPA process, FEMA initiated public scoping for the Leudinghaus Road Bridge Replacement project in September of 2009, in conjunction with public scoping for the Chandler Road Bridge Replacement project. The purpose of public scoping is to inform the public and interested federal, state, tribal, and local agencies about a proposed project and to actively solicit their input regarding the scope of the project, alternatives to the proposed action, and the potential natural, cultural, and social issues and concerns that should be evaluated through the NEPA process.

On September 1, 2009, FEMA sent out a scoping notice to governmental agencies, local residents, and other stakeholders (see Appendix F, *Consultation, Coordination, and Public Involvement*). The scoping notice explained the NEPA process and the proposal for relocating and replacing the Leudinghaus Road Bridge crossing (and the Chandler Road Bridge crossing), and afforded recipients 30 days to provide comments. FEMA received three public comments on the proposed bridge replacement projects, one from Ecology and two from local property owners; one of these pertained to the Leudinghaus Road Bridge project, while the other pertained to the Chandler Road Bridge project (see Appendix F, *Consultation, Coordination, and Public Involvement*).

September 2009 – December 2010. While the NEPA process for both bridge replacement projects moved forward, environmental review of the Chandler Road Bridge Replacement project was prioritized. FEMA completed the NEPA process for the Chandler Road Bridge Replacement Project in December of 2009 with publication of the Final EA and FONSI. Lewis County began construction of the project in early 2010, and the new Chandler Road Bridge was opened in December 2010.

Although the NEPA process for the Chandler Road Bridge Replacement project was completed in 2009, the NEPA process for the Leudinghaus Road Bridge Replacement project was temporarily interrupted when early information gathered for the environmental review raised questions about the need for replacing both bridges, given their proximity, and cultural resources field investigations revealed the presence of archeological artifacts within the APE of the original preferred alternative. As a result, alternatives to replacing the Leudinghaus Road Bridge were evaluated as part of the floodplain review process. This process included substantial public involvement.

August 2010. Lewis County continued to keep the community informed about the status of the project and related issues (e.g., timeframe for removal of the Bailey bridge). During this timeframe, local property owners, residents, and emergency service providers asked Lewis County to revisit the alternatives for replacing the original bridge crossing. It was generally felt that the original preferred alternative identified by the county was not the best location for a variety of reasons. In response, Lewis County developed a new set of project alternatives. On August 24, 2010, Lewis County conducted a community public meeting/open house where they presented sketches and preliminary estimates for five potential bridge locations within 1/2 mile of the former bridge site. The options were preliminary, and no preferred alternative had yet been selected. Residents provided both verbal and written comments. Area residents overwhelmingly indicated that the Hatchery Road alternative would be the best location for a new bridge (Lewis County 2012b).

September–October 2011. On September 22, 2011, Lewis County conducted an informational public meeting to discuss removal of the temporary Bailey bridge and revisited discussion of the alternatives for replacing the Leudinghaus Road Bridge. The Hatchery Road site was again determined to be the safest and least intrusive to local residents (Lewis County 2011a, 2012b). The Bailey bridge was removed in October 2011.

January 2012. In late 2011, discussion continued between FEMA and Lewis County about the need for the project and eligibility for FEMA funding. FEMA requested a public meeting to obtain direct feedback from the community on whether the recently constructed Chandler Road Bridge (or other routes) provided adequate access for local residents without constructing another bridge to replace the destroyed Leudinghaus Road Bridge and, if funding were available, which alternative was preferable. The meeting was held on January 30, 2012. Community input from the meeting and additional information provided to FEMA by Lewis County and the EMD (Lewis County 2012d) confirmed the need for the project, and FEMA re-initiated the NEPA process for the Leudinghaus Road Bridge Replacement project.

August 2012. Because more than 2 years had passed since initial scoping, Lewis County had developed a broader range of alternatives for geographic placement and design, and had since identified a new preferred alternative in a different location, FEMA re-initiated scoping for the project by sending out a scoping notice on August 13, 2012, to governmental agencies, tribes, local residents, and other stakeholders (see Appendix F, *Consultation, Coordination, and Public Involvement*). The new scoping notice explained the NEPA process and the proposal for relocating and replacing the Leudinghaus Road Bridge crossing at the revised preferred alternative location. Recipients were afforded 30 days to provide comments.

FEMA received seven comments on the revised proposal, six from local property residents and one from Ecology (see Appendix F, *Consultation, Coordination, and Public Involvement*). All six

comments submitted by local residents indicated a preference for the Hatchery Road alternative (Alternative 1, Lewis County's preferred alternative, and the Proposed Action in this EA). No specific concerns were raised pertaining to the Hatchery Road alternative. In the comments submitted, Alternative 1 was viewed as the safest alternative, having fewer property impacts, and would be less disruptive to residents. Concerns about Alternative 2 (replacing the bridge in its original location with a new SR 6 intersection) included the following: property impacts (including loss of property, driveway impacts, and cattle pasture impacts), visual impacts, longer travel times and related economic concerns (including extra fuel costs and vehicle/tire wear and tear), and public safety concerns related to greater isolation from emergency services (police, fire, ambulance) and getting trapped during flooding since Leudinghaus and other local roads flood both east and west of the Alternative 2 bridge site. Most of the issues raised in these NEPA public scoping comments reflect public comments previously raised during the various community meetings held by Lewis County.

This Draft EA is being released for public review. The Draft EA will be made available to agencies, Tribes, and stakeholders that participated in scoping. A public notice announcing its availability to the general public for comment will be provided in the local newspaper (*The Chronicle*), and the Draft EA will be available for viewing at the Vernetta Smith Chehalis Timberland Library. The public notice and Draft EA will be posted to both the FEMA and Lewis County Public Works websites, the web addresses of which will be included in the public notice.

Based on comments received during the review period, the EA analysis will be revised as appropriate. A Final EA, and a decision as to whether a FONSI or an EIS notice of intent is required, will be provided at the FEMA website. Either of these decision documents will also be provided at the FEMA website, which is:

> https://www.fema.gov/environmental-planning-and-historic-preservation-program/environmental-documents-and-public-notice-1

The distribution list for the Draft EA is presented on the following page.

5.2 AGENCY COORDINATION

FEMA has consulted with federal, state, and local agencies; tribes; and other stakeholders throughout the EA process to gather valuable input and to meet regulatory requirements. This coordination has been integrated into the analysis of project effects. Agencies that were consulted during preparation of the EA are included on the distribution list for the Draft EA, as listed on the following page.

EA Distribution List

FEDERAL AGENCIES

National Marine Fisheries Service (NMFS)
U.S. Army Corps of Engineers (Corps)
U.S. Environmental Protection Agency (EPA)
U.S. Fish and Wildlife Service (USFWS)

STATE AGENCIES

Washington Department of Ecology (Ecology)
Washington Department of Fish and Wildlife (WDFW)
Washington State Department of Archaeology and Historic Preservation (DAHP)
Washington State Department of Transportation (WSDOT)
Washington State Emergency Management Division (EMD)
Washington State Parks & Recreation Commission

COUNTY AGENCIES

Lewis County Conservation District
Lewis County Fire Districts 11, 13, and 16
Lewis County Public Works

TRIBES

Confederated Tribes and Bands of the Yakama Nation
Confederated Tribes of the Chehalis Reservation
Cowlitz Indian Tribe
Nisqually Indian Tribe
Quinault Indian Nation
Shoalwater Bay Tribe

OTHER ORGANIZATIONS

Backcountry Horsemen
Chehalis Basin Education Consortium
Chehalis Basin Fisheries Task Force
Chehalis Basin Partnership
Chehalis River Basin Land Trust
Chehalis River Council
Lewis County Community Trails
Northwest Motorcycle Association
Washington Trails Association
Vernetta Smith Chehalis Timberland Library

ADJACENT LAND OWNERS AND NEIGHBORS

[*included in distribution but names withheld for privacy*]

6.0 Permitting, Project Conditions, and Mitigation Measures

Lewis County is required to obtain and comply with all required local, state, and federal permits, approvals, and requirements prior to implementing the Proposed Action. These include, but may not be limited to, compliance with the State Environmental Policy Act (SEPA); Site Development, Floodplain, and Building Permits; Critical Areas Review; HPA; Section 401 Water Quality Certification; Section 404 Individual or Nationwide Permit; Section 106 compliance; and ESA compliance. Failure to obtain all appropriate permits and approvals may jeopardize FEMA funding.

As described in Section 3.3.2 (*Impact Avoidance and Minimization Measures)* and Chapter 4 (*Affected Environment and Potential Impacts*), the project includes numerous construction BMPs, including the preparation of TESC, SPCC, and SWPP plans, and may include conservation measures, as a result of agency consultation. Lewis County is responsible for ensuring that all BMPs and conservation measures are implemented during construction activities. In general, implementation of these measures is expected to avoid and minimize impacts on human, biological, water, physical, and cultural resources.

Mitigation measures included in Chapter 4 (*Affected Environment and Potential Impacts*) are listed below. These measures are necessary to minimize potential impacts on physical, aquatic, biological, and cultural resources. Failure to comply with these conditions may jeopardize receipt of FEMA funding.

- Lewis County or its contractor would monitor slope stability during pile driving for the temporary support bent; if indications of slope failure are observed, the contractor would stop work to evaluate the stability of the slope and implement mitigation measures to stabilize soils and minimize sediments entering the river during continued pile driving and after construction activities on the shoreline are complete. Mitigation measures to minimize sedimentation and stabilize slopes during and after construction could include the placement of additional erosion and sediment control BMPs, the removal of excess amounts of material deposited above the OHWM, the placement of additional riprap above the OHWM, and native vegetation plantings after construction. Corrective actions to permanently stabilize slopes may be delayed until pile driving is complete as continued vibrations may undo any interim corrective action.
- If vegetation removal in the project area occurs between March 1 and September 15 when migratory birds may be nesting, a qualified biologist shall conduct a pre-construction survey for active nests. The survey shall be conducted in all areas proposed for clearing and occur 15 days prior to the commencement of construction activities. If surveys show no evidence of nests, no additional mitigation is required. If any active nests are located in the construction area, the nest areas shall be flagged and a no-disturbance buffer zone of 100 feet shall be delineated around the active nest and maintained until the end of the breeding season or until the young have fledged. Guidance from the USFWS will be requested if establishing a 100-foot buffer zone is impractical.
- Additional mitigation measures to compensate for the effects on biological resources will be developed during the HPA process with WDFW and local Lewis County permitting.

Conservation measures arising from the HPA permit conditions are considered part of the project conditions.

- Lewis County would contract with a qualified archaeologist to prepare an archaeological monitoring plan and an unanticipated discovery plan, and submit them to FEMA for review and approval. FEMA would then submit the monitoring plan and unanticipated discovery plan to SHPO and the Tribes prior to construction. Monitoring would be conducted in accordance with the approved monitoring plan by a qualified archaeologist. Tribes would be given advance notice of project initiation so that they could be present while work was being conducted. A monitor would be present during all ground-disturbing activities identified in the monitoring plan to determine if deeply buried historic properties are present. Lewis County would also provide a report documenting the monitoring results, and submit it to FEMA and SHPO for review and approval. FEMA would provide the Tribes with the report. In the event that archaeological materials are discovered during ground-disturbing activities, the contractor would halt excavations in the vicinity of the find and follow the procedures outlined in the unanticipated discovery plan including further consultation with DAHP and the affected Indian Tribes regarding the nature of the archaeological deposits discovered. If human skeletal remains are discovered, the Lewis County Sheriff, FEMA, and DAHP would be notified immediately.

Any change to the approved scope of work will require re-evaluation by FEMA for compliance with NEPA and other laws and EOs, before approval and funding.

7.0 Conclusions

The Draft EA evaluated environmental and cultural resources that could be affected by the Proposed Action. The evaluation did not identify any significant adverse impacts on physical, water, biological, cultural, or socioeconomic resources. Compliance with applicable laws and regulations, implementation of BMPs, and compliance with applicable permit conditions is expected to avoid or minimize adverse effects associated with the Proposed Action.

8.0 List of Preparers

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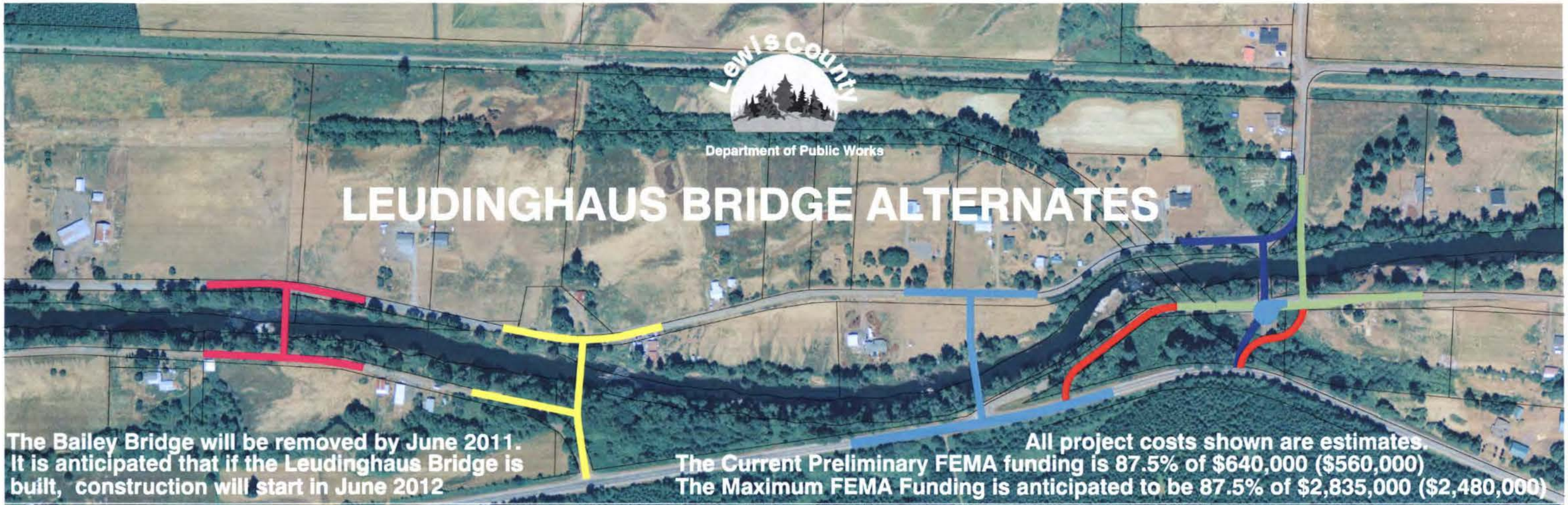
Appendix A

Preliminary Alternatives, Lewis County

Lewis County

Department of Public Works

LEUDINGHAUS BRIDGE ALTERNATES



The Bailey Bridge will be removed by June 2011.
It is anticipated that if the Leudinghaus Bridge is built, construction will start in June 2012

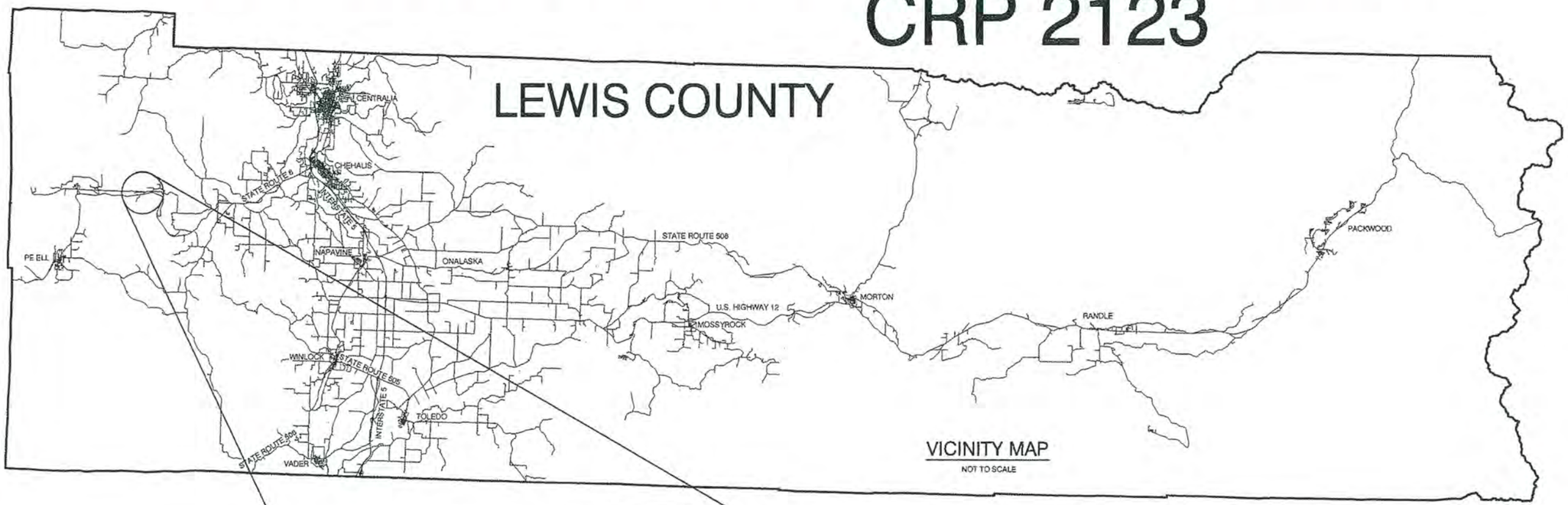
All project costs shown are estimates.
The Current Preliminary FEMA funding is 87.5% of $640,000 ($560,000)
The Maximum FEMA Funding is anticipated to be 87.5% of $2,835,000 ($2,480,000)

ALTERNATE	ALTERNATE TITLE	BRIDGE COST	ROADWAY COST	PRELIMINARY ENGINEERING COST	CONSTRUCTION ENGINEERING COST	TOTAL COST	COST TO LEWIS COUNTY	KNOWN ADVANTAGES	KNOWN DISADVANTAGES
A	Current Design	$1,135,000.00	$1,350,000.00	$50,000.00	$300,000.00	$2,835,000.00	$355,000.00	The Preliminary Engineering is 90% complete, Environmental permitting is 75% complete, Project is FEMA funded to 87.5% of cost, Meskill Road alignment is improved	Local Property Owners and residences are impacted
B	Current Design with New SR6 intersection	$1,135,000.00	$1,600,000.00	$75,000.00	$300,000.00	$3,110,000.00	$530,000.00	The Preliminary Engineering is 80% complete, Less impact to residence on south side of River Road, Meskill alignment is improved, Intersection with SR6 is improved.	Local Property Owners and residences are impacted, Tight curves necessitate wider lanes and warning signs, FEMA participation is capped at $2,480,000
C	New Design at original bridge site with new SR6 intersection	$1,135,000.00	$1,350,000.00	$280,000.00	$300,000.00	$3,065,000.00	$505,000.00	Less impact to residence on south side of River Road	New bridge plans must be developed at county expense ($250,000), FEMA participation is capped at $2,480,000, existing Meskill road alignment is retained.
D	New Design at intersection of River Road and SR6	$1,507,350.00	$2,088,750.00	$380,000.00	$400,000.00	$4,376,100.00	$2,146,100.00	Minimal impact to residences	FEMA funding is capped at $2,480,000, New bridge plans must be developed at county expense ($250,000), Work must be performed on SR6 to bring roadway profile up to bridge elevation, WSDOT approval of plans required, River Road is no longer a through route.
E	New Design at intersection of Hatchery Road and SR6	$1,139,000.00	$1,497,500.00	$280,000.00	$325,000.00	$3,241,500.00	$761,000.00	Good Approach to SR6	FEMA funding is capped at $2,480,000, New bridge plans must be developed at county expense ($250,000), Residences on north side of Chehalis River impacted, Fish bearing stream impacted on south side of Chehalis River.
F	New Design on Hatchery Road	$1,625,000.00	$945,500.00	$280,000.00	$300,000.00	$3,150,000.00	$670,000.00	Good Approach to SR6, Minimal impacts to residences	FEMA funding is capped at $2,480,000, New bridge plans must be developed at county expense ($250,000)
G	Alternate Project					$576,000	$72,000.00	A temporary bridge could be purchased to use in emergency situations, 87.5% FEMA funded to $576,000	No Bridge would be built

Appendix B

40% Plan Sheets

LEUDINGHAUS BRIDGE PROJECT
CRP 2123



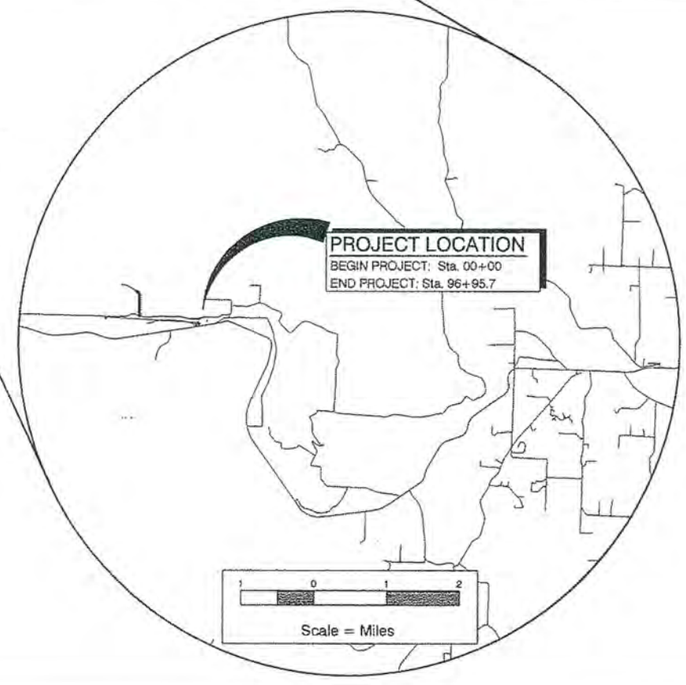
VICINITY MAP

NOT TO SCALE

LEWIS COUNTY
DEPARTMENT OF PUBLIC WORKS
APPROVED FOR CONSTRUCTION:

Assistant County Engineer Date

RODNEY TROY LAKEY
STATE OF WASHINGTON
#29573
REGISTERED
PROFESSIONAL ENGINEER



COMMISSIONERS:

EDNA FUND, DISTRICT 1
P.W. SCHULTE, DISTRICT 2
F. LEE GROSE, DISTRICT 3

Lewis County
Department of Public Works

ENGINEERING-
DESIGN SECTION

SHEET INDEX		LEGEND
NO.	DESCRIPTION	
1		
2		
	ROADWAY	
3		CENTERLINE
4		
5		CUT LIMITS
6		
7		FILL LIMITS
8		
9		WETLAND BUFFER BOUNDARY
10		
11		WETLAND BOUNDARY
12		
13		
14		
15		
	WALLS	
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25		
	MISCELLANEOUS DETAILS	
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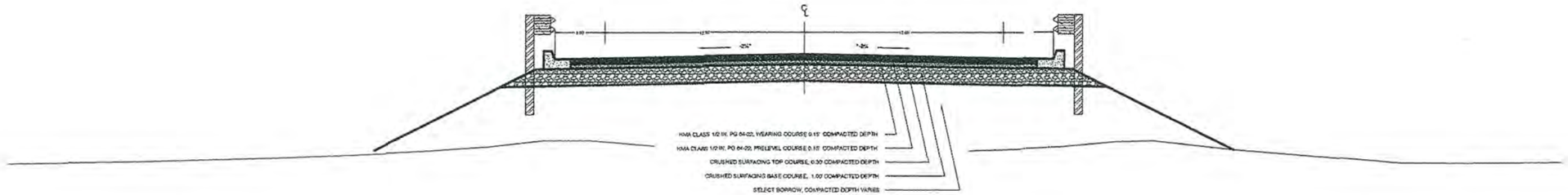
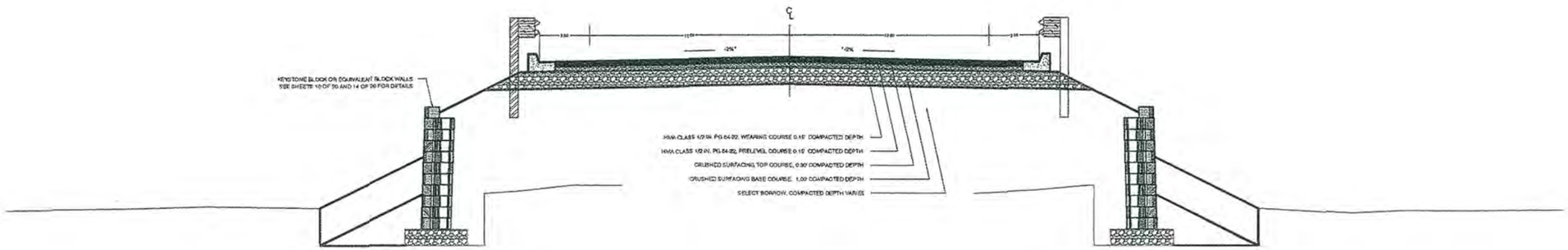
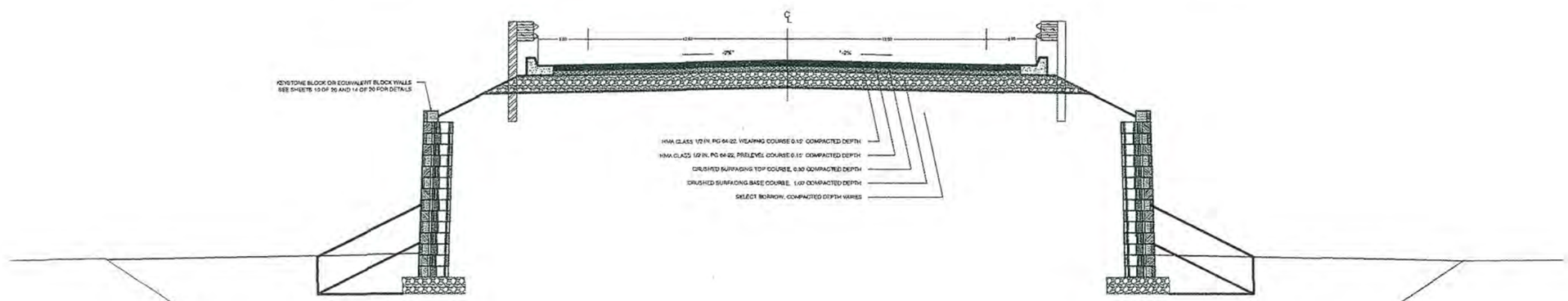
40% PLANS
NOT FOR CONSTRUCTION







40% PLANS
NOT FOR CONSTRUCTION

Lewis County
Department of Public Works
2025 NE KRESKY AVE.
CHEHALIS WA 98532
PHONE # (360) 740-1123
FAX # (360) 740-2719

DESIGNED BY : KRM
DRAWN BY : KRM
CHECKED BY :
DATE :

NO.	DATE	REVISION	BY	APP.

LEUDINGHAUS BRIDGE PROJECT

LEUDINGHAUS BRIDGE PROJECT
CRP 2123

TYPICAL SECTIONS

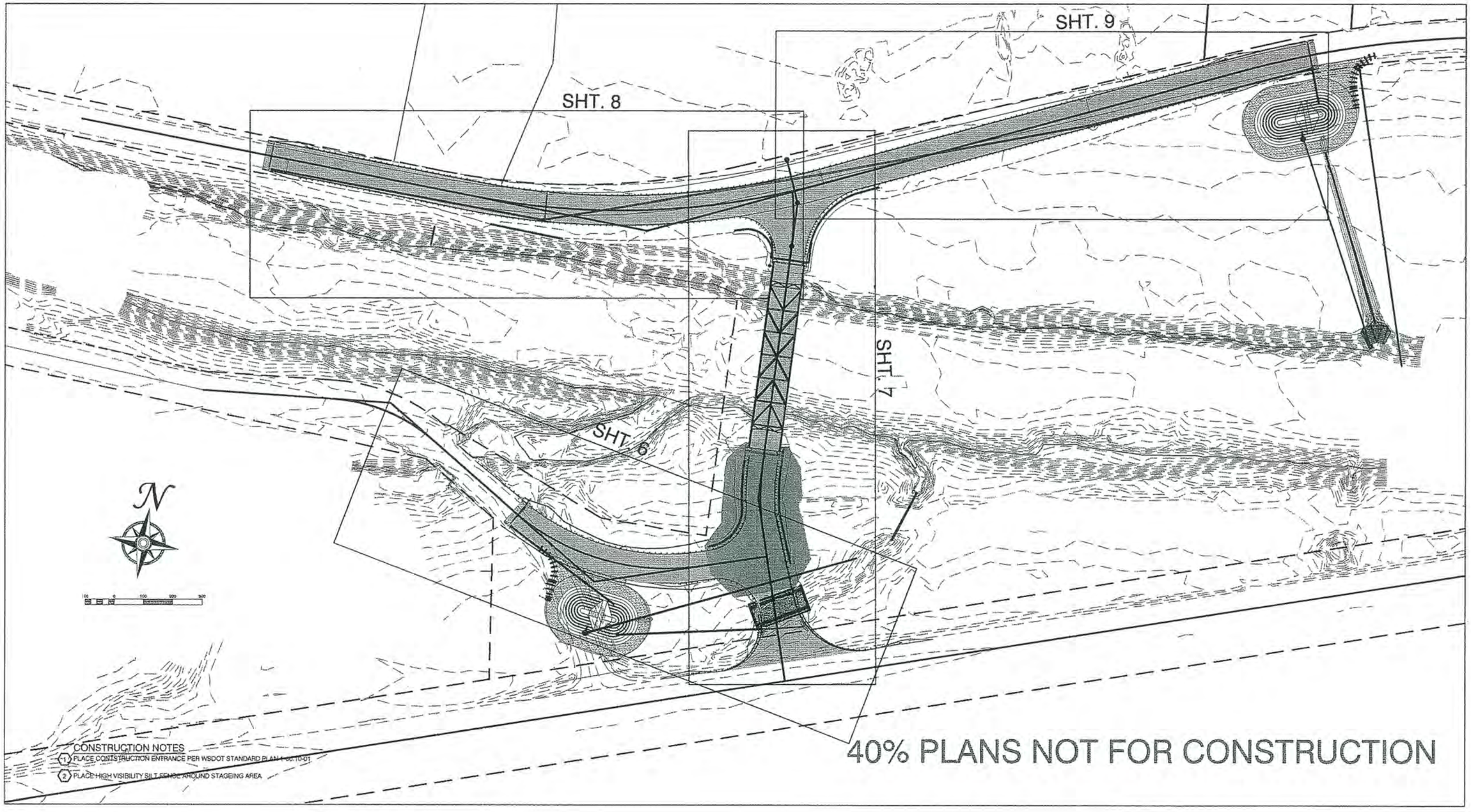
SHEET 3 OF 00

CALL 48 HOURS BEFORE YOU DIG
1-800-424-5555
"It's the Law"
Utilities Underground Location Center

Keith Robert Muggoch, P.E.
Senior Engineer/Design

Date: _____

TWP. 14N. RGE. 2W. W.M.



Lewis County
Department of Public Works
2025 NE KRESKY AVE.
CHEHALIS WA 98532
PHONE # (360) 740-1123
FAX # (360) 740-2719

DESIGNED BY : KRM
DRAWN BY : KRM
CHECKED BY :
DATE :

NO.	DATE	REVISION	BY	APP.

LEUDINGHAUS BRIDGE PROJECT

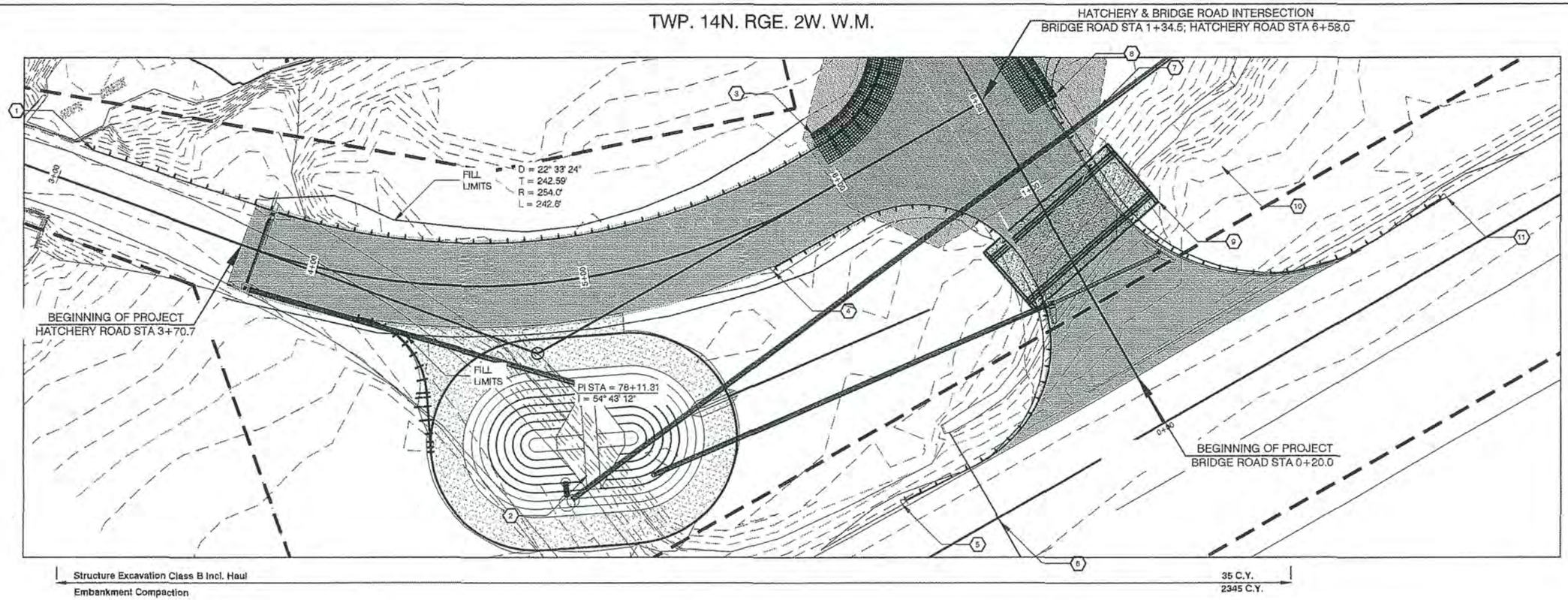
LEUDINGHAUS BRIDGE PROJECT
CRP 2123

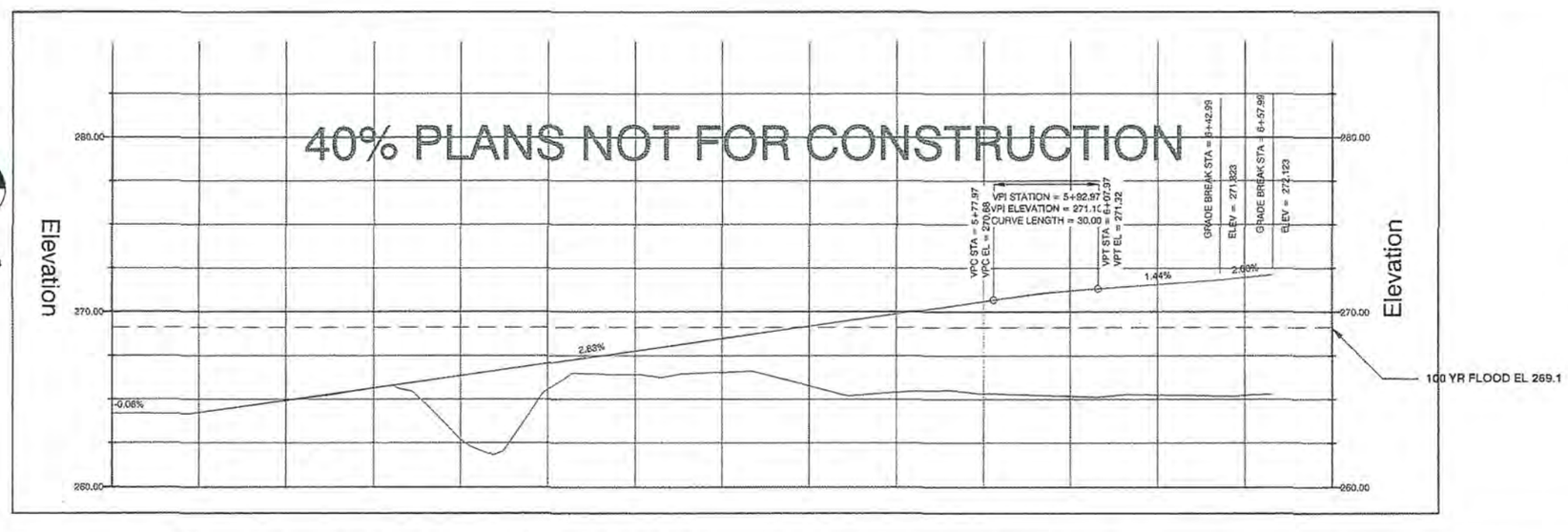
SHEET LAYOUT

SHEET 5 OF 00

CALL 48 HOURS BEFORE YOU DIG
1-800-424-5555
"It's the Law"
Utilities Underground Location Center

TWP. 14N. RGE. 2W. W.M.





CONSTRUCTION NOTES

1. STA 3+08.50 RT. ATTACH BEAM GUARDRAIL TYPE 31 TO BEAM GUARDRAIL TYPE 1 WSDOT STD. PLAN C-25.80-02
2. STORM WATER POND SEE SHEET 10 FOR ALL STORM WATER DETAILS.
3. STA 6+00.00 RT. WALL A SEE SHEET 14 & 16
4. STA 5+83.65 LT. INSTALL NON FLARED TERMINAL PER WSDOT STD. PLAN C-22.40-02. OFFSET END OF TERMINAL 1' FROM TYPE 31 BEAM GUARDRAIL. OFFSET FACE OF RAIL TYPE 31 BEAM GUARDRAIL 15' OFF CENTERLINE.
5. STA 0+20.00 RT. BRIDGE ROAD ALIGNMENT INSTALL NON FLARED TERMINAL PER WSDOT STD. PLAN C-22.40-02. OFFSET END OF TERMINAL 1' FROM TYPE 31 BEAM GUARDRAIL. OFFSET FACE OF RAIL TYPE 31 BEAM GUARDRAIL 15' OFF CENTERLINE.
6. STA 0+20.00 RT. BRIDGE ROAD ALIGNMENT EXISTING 24" RCP TO REMAIN IN PLACE
7. EXCAVATION LIMITS FOR UNSUITABLE MATERIAL SEE SHEETS 3 AND 7
8. STA 1+23.00 LT BRIDGE ROAD ALIGNMENT WALL B SEE SHEET 15 & 18
9. STA 0+77.50 BRIDGE ROAD ALIGNMENT INSTALL 5' X 20' X 60' PRECAST CONCRETE CULVERT SEE SHEETS 11 AND 12
10. STA 0+77.50 BRIDGE ROAD ALIGNMENT; DITCH REGRADE SEE SHEET 11
11. STA 0+20.00 LT. BRIDGE ROAD ALIGNMENT INSTALL NON FLARED TERMINAL PER WSDOT STD. PLAN C-22.40-02. OFFSET END OF TERMINAL 1' FROM TYPE 31 BEAM GUARDRAIL. OFFSET FACE OF RAIL TYPE 31 BEAM GUARDRAIL 15' OFF CENTERLINE.

Lewis County Department of Public Works
2025 NE KRESKY AVE.
CHEHALIS WA 98532
PHONE # (360) 740-1123
FAX # (360) 740-2719

DESIGNED BY : KRM
DRAWN BY : KRM
CHECKED BY :
DATE :

NO.	DATE	REVISION	BY	APP.

LEUDINGHAUS BRIDGE PROJECT

LEUDINGHAUS BRIDGE PROJECT
CRP 2123

PLAN PROFILE 0+00 - 9+00

SHEET 6 OF 00

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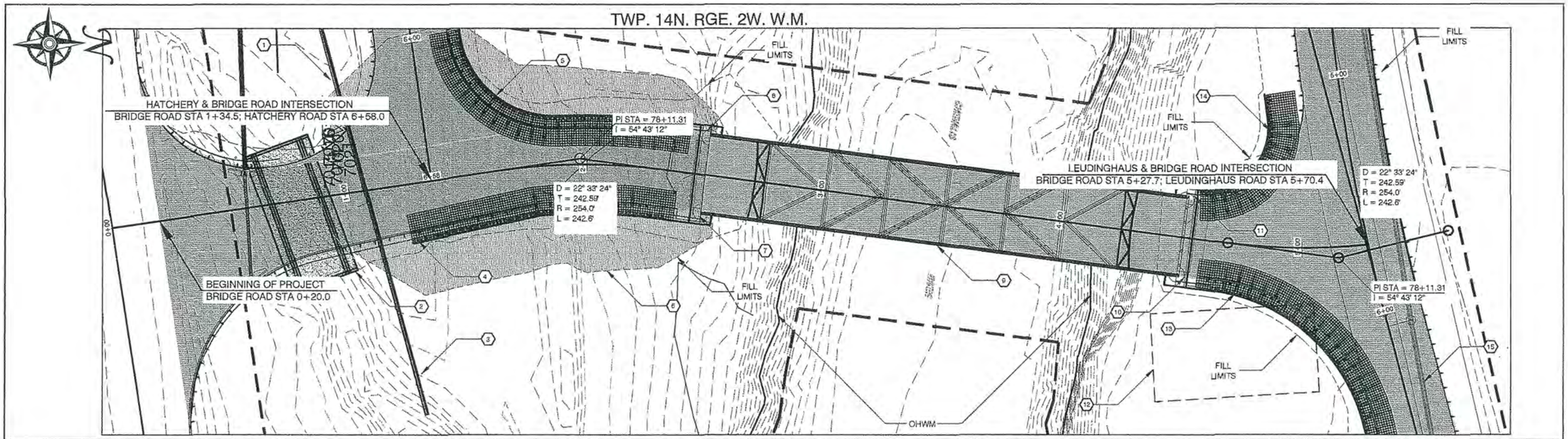
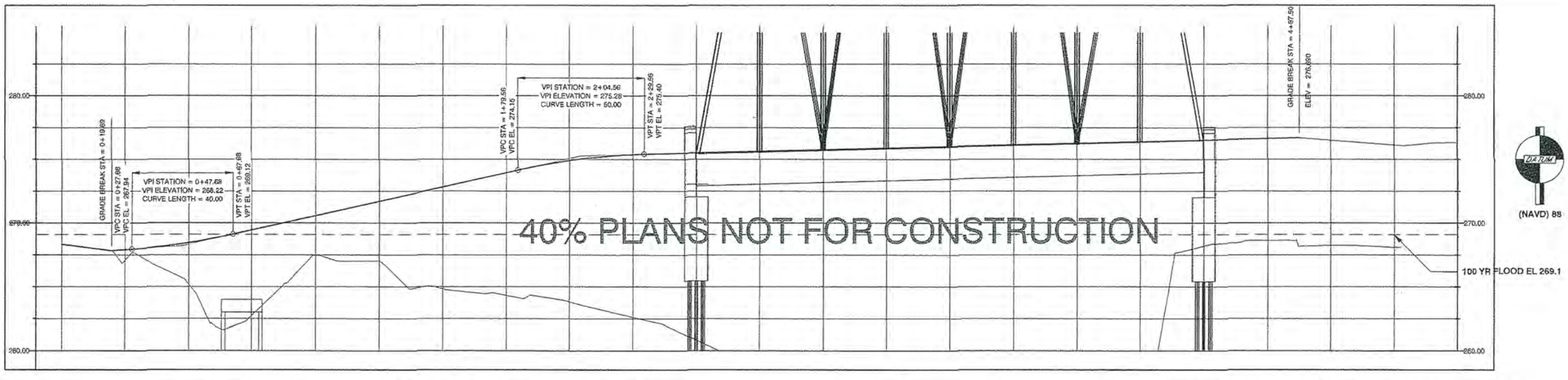
Keith Robert Muggoch, P.E.
Senior Engineer/Design

Date: _____



CONSTRUCTION NOTES

1. STORM WATER POND SEE SHEET 10 FOR ALL STORM WATER DETAILS.
2. STA 0+77.50 INSTALL 9' X 20' X 60' PRECAST CONCRETE CULVERT SEE SHEETS 11 AND 12
3. STA 0+77.50 DITCH REGRADE SEE SHEET 11
4. STA 1+23.00 LT WALL B SEE SHEET 15 & 18
5. STA 2+40.00 LT. WALL A SEE SHEET 14 & 18
6. EXCAVATION LIMITS FOR UNSUITABLE MATERIAL SEE SHEETS 3 AND 7
7. STA. 2+50.00 RT INSTALL BEAM GUARDRAIL (TYPE 31) TRANSITION SECTION TYPE 23 PER WSDOT STANDARD PLAN C-25.26-02
8. STA. 2+50.00 LT INSTALL BEAM GUARDRAIL (TYPE 31) TRANSITION SECTION TYPE 23 PER WSDOT STANDARD PLAN C-25.26-02
9. STA 2+50.00 TO STA 4+50.00 STEEL TRUSS BRIDGE SEE SHEETS S-1 TO S-10
10. STA. 4+50.00 RT INSTALL BEAM GUARDRAIL (TYPE 31) TRANSITION SECTION TYPE 23 PER WSDOT STANDARD PLAN C-25.26-02
11. STA. 4+50.00 LT INSTALL BEAM GUARDRAIL (TYPE 31) TRANSITION SECTION TYPE 23 PER WSDOT STANDARD PLAN C-25.26-02
12. REMOVAL OF STRUCTURE SEE SPECIAL PROVISION ??.??
13. STA 4+60.00 RT. CONTRUCT WALL C SEE SHEET 16 &18
14. STA 4+60.00 LT. CONTRUCT WALL D SEE SHEET 17 & 18
15. STORM WATER PIPE SEE SHEET 10 FOR ALL STORM WATER DETAILS.
16. 4



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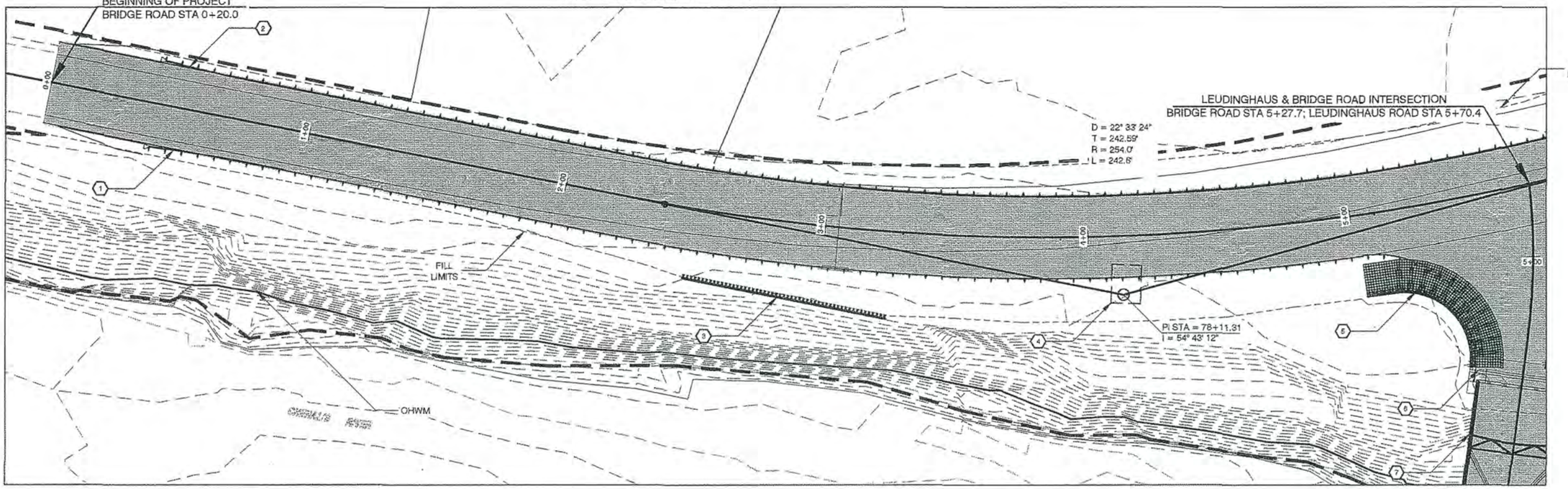
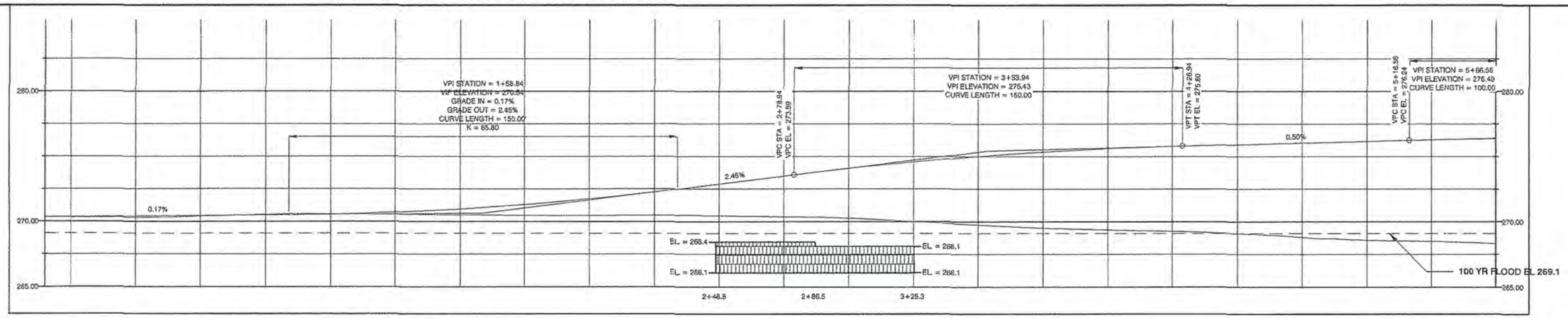


Structure Excavation Class B Incl. Haul	35 C.Y.
Embankment Compaction	2345 C.Y.

CONSTRUCTION NOTES

1. STA 00+41.25 RT. INSTALL NON FLARED TERMINAL PER WSDOT STD. PLAN C-22.40-02. OFFSET END OF TERMINAL 1' FROM TYPE 31 BEAM GUARDRAIL. OFFSET FACE OF RAIL TYPE 31 BEAM GUARDRAIL 15' OFF CENTERLINE.
2. STA 00+41.25 RT. INSTALL NON FLARED TERMINAL PER WSDOT STD. PLAN C-22.40-02. OFFSET END OF TERMINAL 1' FROM TYPE 31 BEAM GUARDRAIL. OFFSET FACE OF RAIL TYPE 31 BEAM GUARDRAIL 15' OFF CENTERLINE.
3. STA 2+48.00 RT. OFFSET FACE OF WALL 27.0' CONSTRUCT WALL E TO STA 3+25.3 RT. OFFSET 33.5 (ACTUAL LENGTH 79.5 FEET) SEE SHEET 18.
4. REMOVAL OF STRUCTURE SEE SPECIAL PROVISION ??.??
5. STA 5+02.02 RT. CONTRUCT WALL D SEE SHEET 17 & 18
6. STA. 4+50.00 LT BRIDGE ROAD ALIGNMENT; INSTALL BEAM GUARDRAIL (TYPE 31) TRANSITION SECTION TYPE 23 PER WSDOT STANDARD PLAN C-25.26-02
7. STA 2+50.00 TO STA 4+50.00 BRIDGE ROAD ALIGNMENT; STEEL TRUSS BRIDGE SEE SHEETS S-1 TO S-10

40% PLANS NOT FOR CONSTRUCTION



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PLAN PROFILE 0+00 - 9+00

SHEET 8 OF 00

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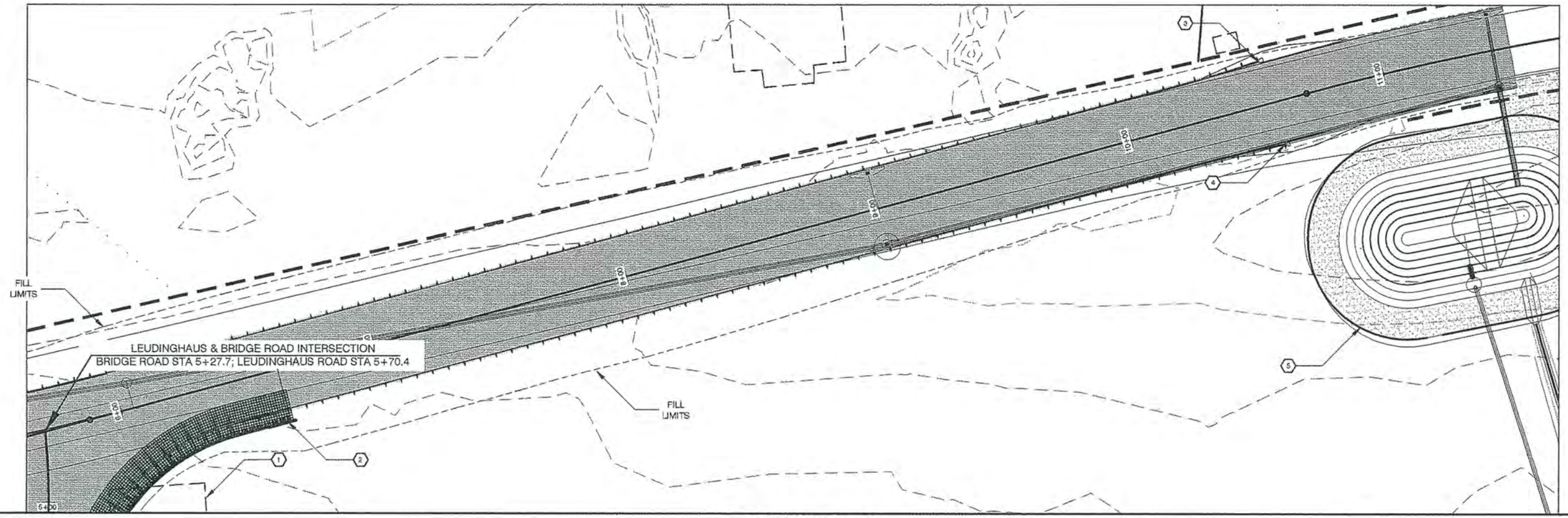
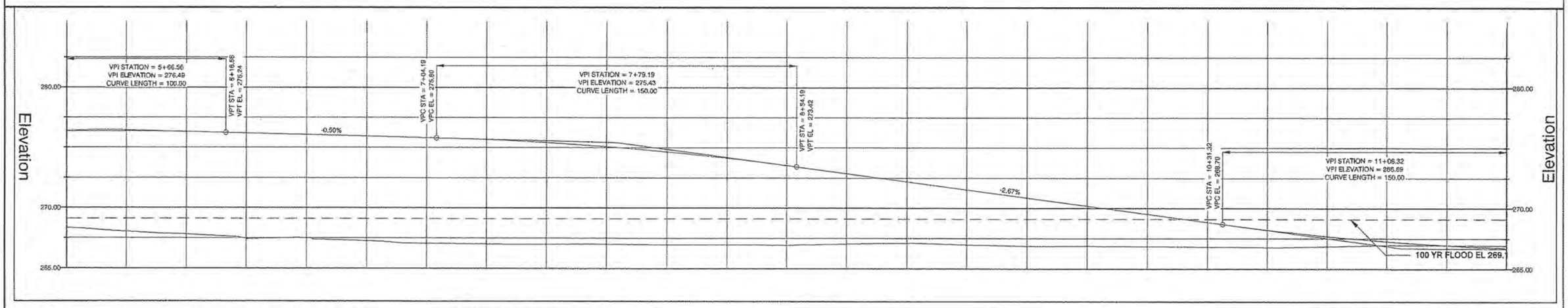


CONSTRUCTION NOTES

1. REMOVAL OF STRUCTURE SEE SPECIAL PROVISION ??.??
2. STA 6+81.40 LT WALL C SEE SHEET 16 & 18
3. STA 10+54.6 LT. BRIDGE ROAD ALIGNMENT INSTALL NON FLARED TERMINAL PER WSDOT STD. PLAN C-22.40-02. OFFSET END OF TERMINAL 1' FROM TYPE 31 BEAM GUARDRAIL. OFFSET FACE OF RAIL TYPE 31 BEAM GUARDRAIL 15' OFF CENTERLINE.
4. STA 10+56.7 RT. BRIDGE ROAD ALIGNMENT INSTALL NON FLARED TERMINAL PER WSDOT STD. PLAN C-22.40-02. OFFSET END OF TERMINAL 1' FROM TYPE 31 BEAM GUARDRAIL. OFFSET FACE OF RAIL TYPE 31 BEAM GUARDRAIL 15' OFF CENTERLINE.
5. STORM WATER POND SEE SHEET 10 FOR ALL STORM WATER DETAILS.

40% PLANS NOT FOR CONSTRUCTION



Lewis County Department of Public Works	2025 NE KRESKY AVE. CHEHALIS WA 98532 PHONE # (360) 740-1123 FAX # (360) 740-2719	DESIGNED BY : KRM DRAWN BY : KRM CHECKED BY : DATE :	NO. / DATE / REVISION / BY / APP.	LEUDINGHAUS BRIDGE PROJECT	LEUDINGHAUS BRIDGE PROJECT CRP 2123 PLAN PROFILE 0+00 - 9+00	SHEET 9 OF 00	CALL 48 HOURS BEFORE YOU DIG 1-800-424-5555 Utilities Underground Location Center

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Senior Engineer/Design

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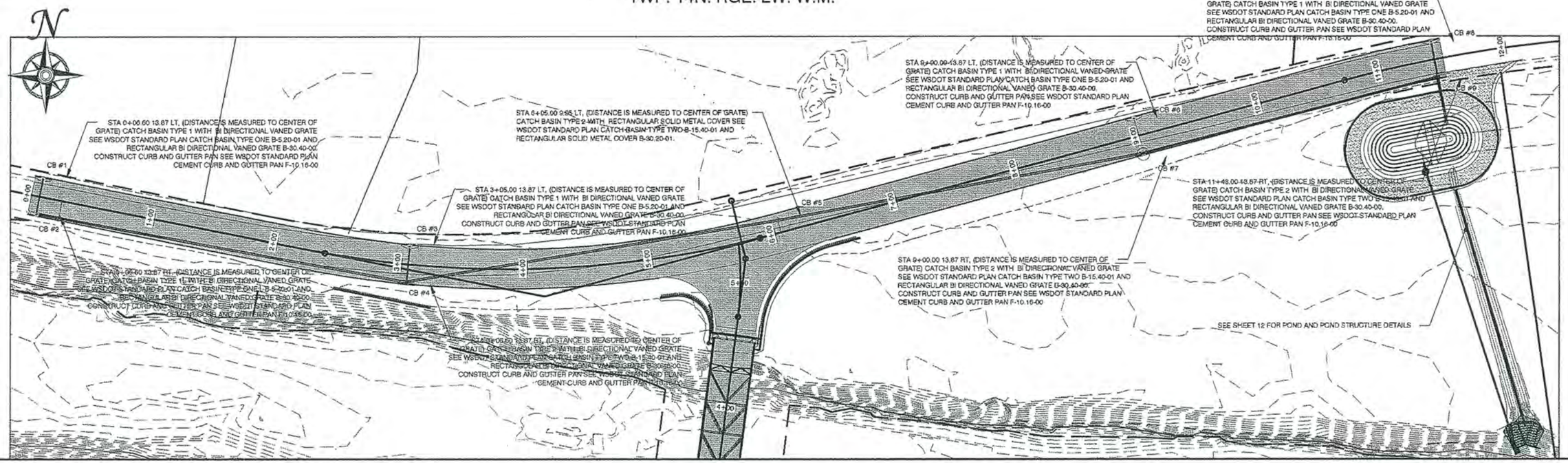


40% PLANS NOT FOR CONSTRUCTION

DATUM
(NAVD) 88

CB #1
STA. 0+06.60
TYPE 1 CB, 13.87 LT
W/BI-DIRECTIONAL VANED GRATE
(DISTANCE TO CENTER OF GRATE)
RIM = 270.08
IE = 268.00 (12" S)

CB #2
STA. 0+06.60
TYPE 1L CB, 13.87 RT
W/BI-DIRECTIONAL VANED GRATE
(DISTANCE TO CENTER OF GRATE)
RIM = 270.08
IE = 267.85 (18" E)
IE = 267.85 (12" N)

CB #3
STA. 3+05.00
TYPE 1 CB, 13.87 LT
W/BI-DIRECTIONAL VANED GRATE
(DISTANCE TO CENTER OF GRATE)
RIM = 273.28
IE = 271.20 (12" S)

CB #4
STA. 3+05.00
TYPE 2 CB 48 IN. DIAM., 13.87 RT
W/BI-DIRECTIONAL VANED GRATE
(DISTANCE TO CENTER OF GRATE)
RIM = 275.08
IE = 271.05 (12" N)
IE = 268.10 (18" W)
IE = 268.00 (18" E)

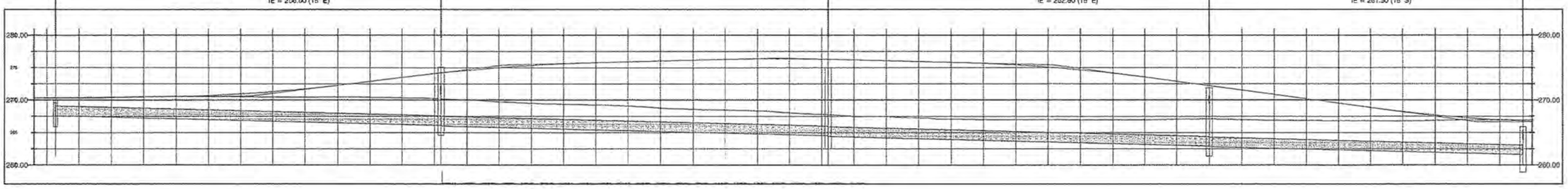
CB #5
STA. 6+05.00
TYPE 2 CB 48 IN. DIAM., 9.95 LT
W/RECTANGULAR SOLID COVER
(DISTANCE TO CENTER OF COVER)
RIM = 275.90
IE = 264.50 (18" W)
IE = 264.40 (18" E)

CB #6
STA. 9+00.00
TYPE 1 CB, 13.87 LT
W/BI-DIRECTIONAL VANED GRATE
(DISTANCE TO CENTER OF GRATE)
RIM = 271.90
IE = 269.80 (12" S)

CB #7
STA. 9+00.00
TYPE 2 CB 48 IN. DIAM., 13.87 RT
W/BI-DIRECTIONAL VANED GRATE
(DISTANCE TO CENTER OF GRATE)
RIM = 271.90.17
IE = 269.05 (12" N)
IE = 262.90 (18" W)
IE = 262.80 (18" E)

CB #8
STA. 11+43.00
TYPE 1 CB, 13.87 LT
W/BI-DIRECTIONAL VANED GRATE
(DISTANCE TO CENTER OF GRATE)
RIM = 267.70
IE = 265.60 (12" S)

CB #9
STA. 11+43.00
TYPE 2 CB 48 IN. DIAM., 13.87 RT
W/BI-DIRECTIONAL VANED GRATE
(DISTANCE TO CENTER OF GRATE)
RIM = 265.90
IE = 264.10 (12" N)
IE = 261.80 (18" W)
IE = 261.50 (18" S)



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LEUDINGHAUS BRIDGE PROJECT

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CRP 2123

STORMWATER NORTH

SHEET 10 OF 00

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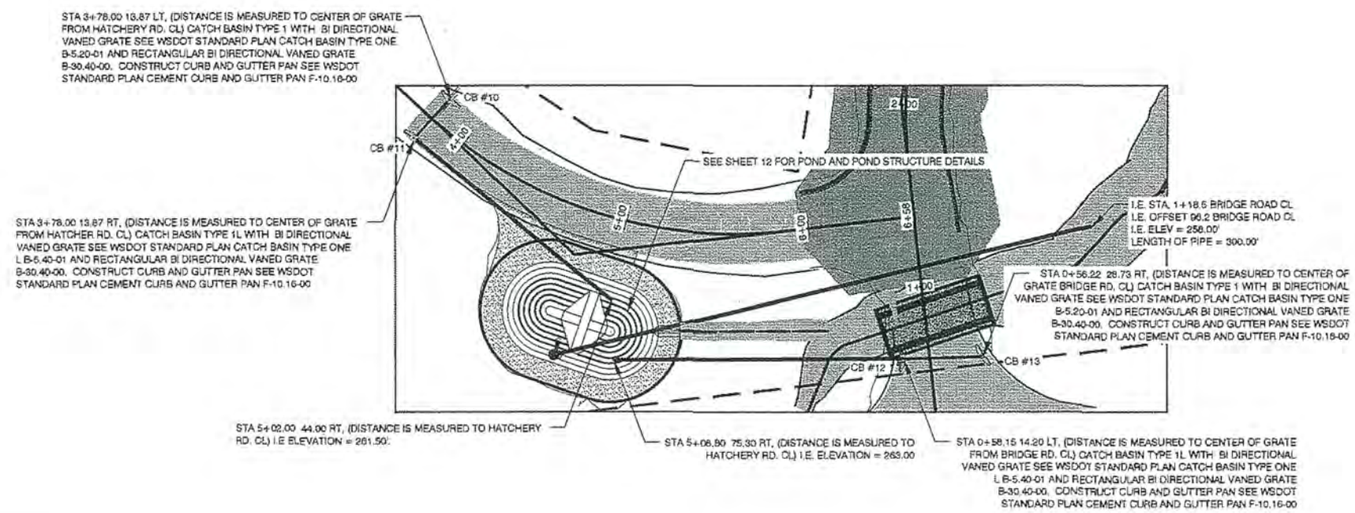
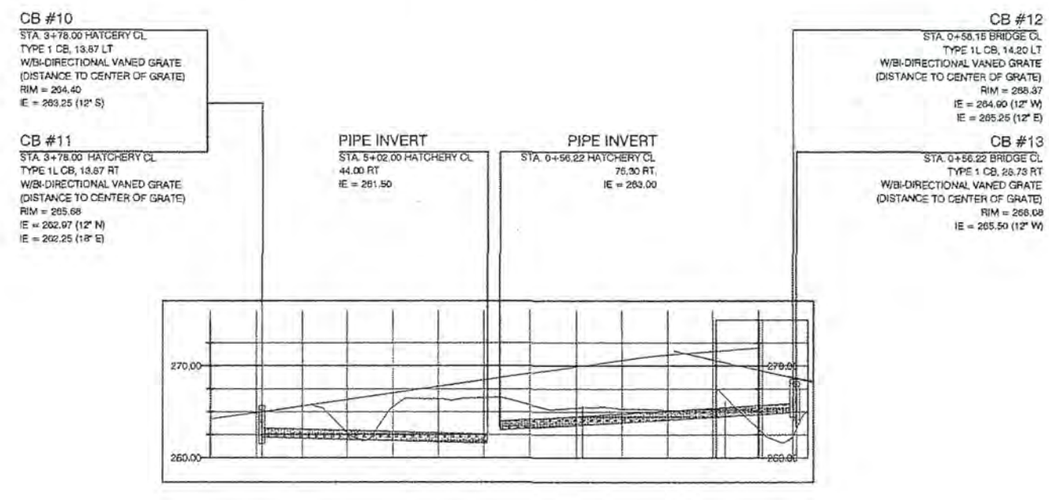


(NAVD) 88

40% PLANS NOT FOR CONSTRUCTION



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STORMWATER SOUTH

SHEET 11 OF 00

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Keith Robert Muggoch, P.E.
Senior Engineer/Design

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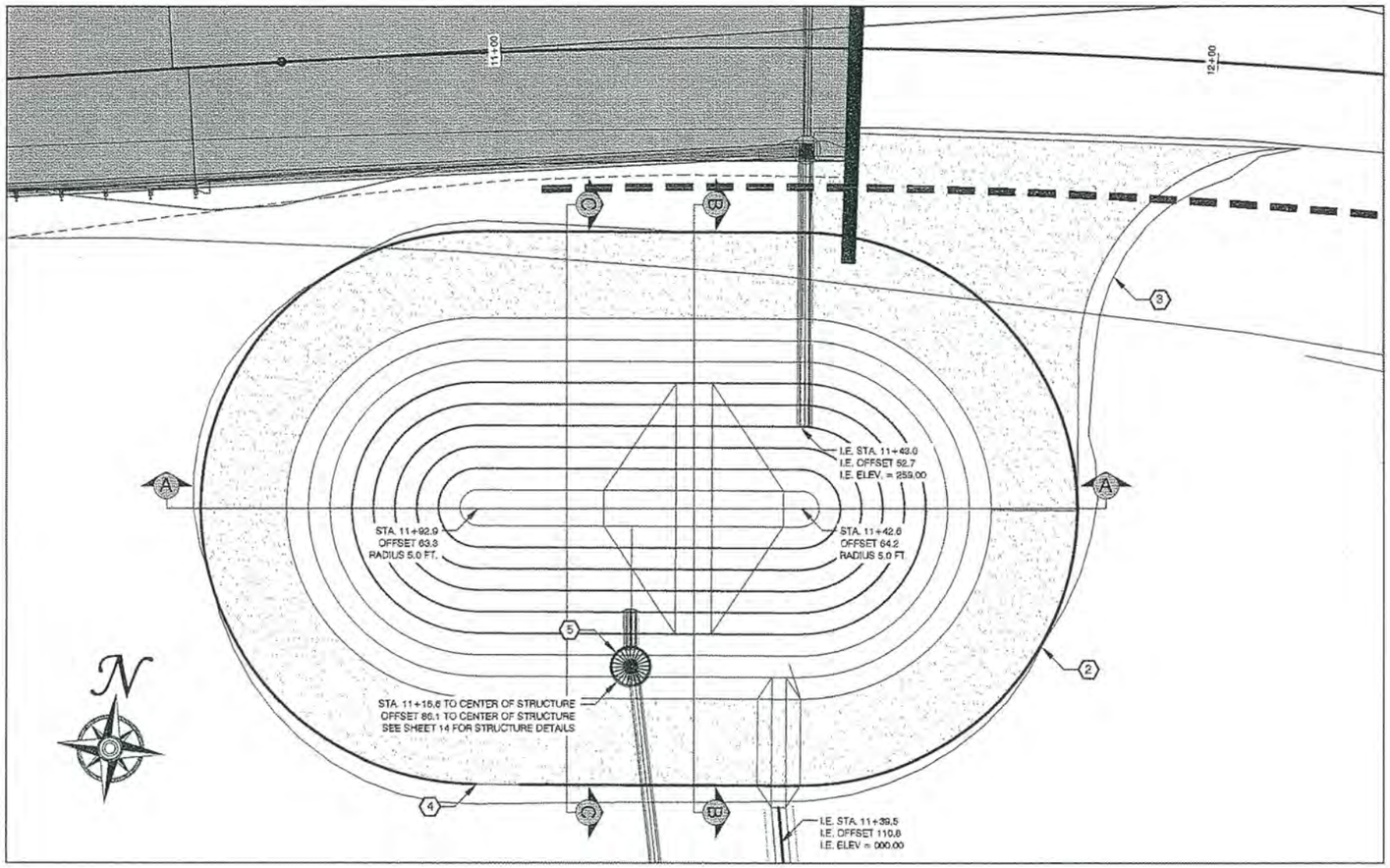
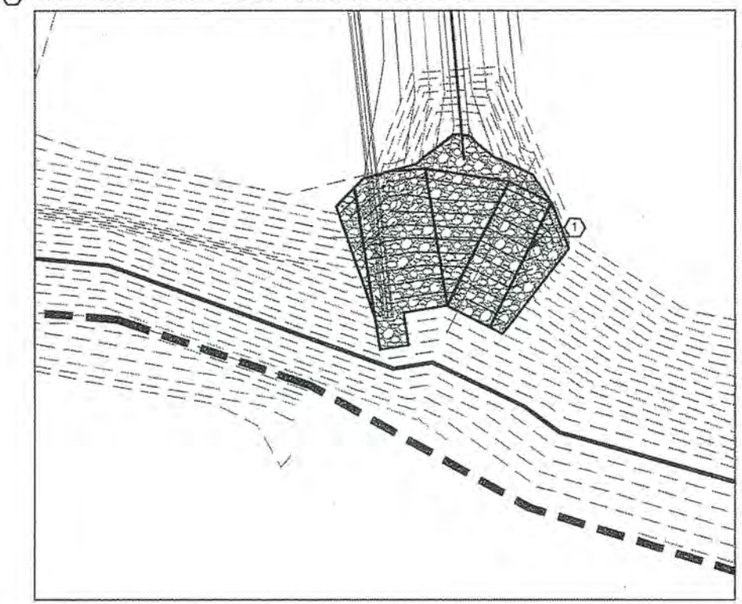
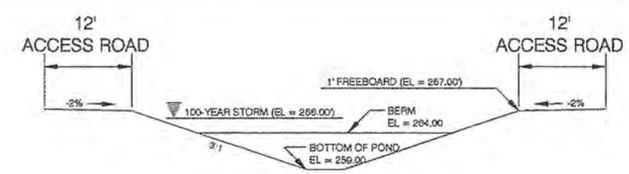
TWP. 14N. RGE. 2W. W.M.



CONSTRUCTION NOTES

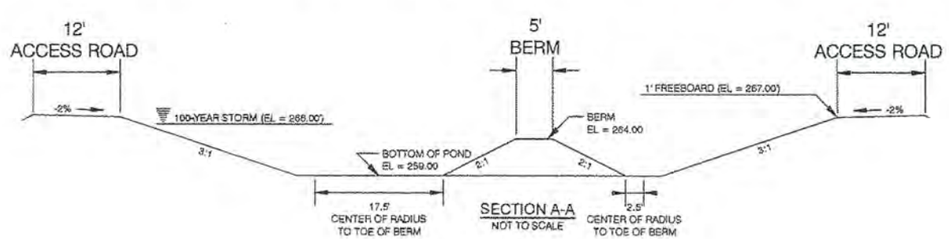
1. CONSTRUCT ROCK PAD AT THE OUTLET OF STORM WATER DITCH. SEE ROCK PAD DETAIL ON TREATMENT SHEET 14 OF 22.
   5 TON QUARRY SPALLS
2. CONSTRUCT STORMWATER TREATMENT & DETENTION POND AS STAKED IN THE FIELD.
   1201 C.Y. STRUCTURE EXCAVATION INCL. HAUL CLASS B
3. CONSTRUCT ROAD APPROACH AS STAKED IN THE FIELD.
   1201 C.Y. CSTC
4. CONSTRUCT EMERGENCY OVERFLOW SPILLWAY. SEE EMERGENCY OVERFLOW SPILLWAY DETAIL ON SHEET 45 OF 60.
   75 TON QUARRY SPALLS
   20 S.Y. CONSTRUCTION GEOTEXTILE FOR DITCH LINING
5. CONSTRUCT DETENTION POND STORMWATER OUTLET STRUCTURE. SEE OUTLET STRUCTURE SPECIAL 54 IN. TYPE 2 WITH DEBRIS CAGE DETAIL ON SHEET 14 OF 22.
   10 TON QUARRY SPALLS
6. CONSTRUCT 1' FLAT BOTTOM DRAINAGE DITCH. SEE DRAINAGE DITCH DETAIL ON 49 OF 60.



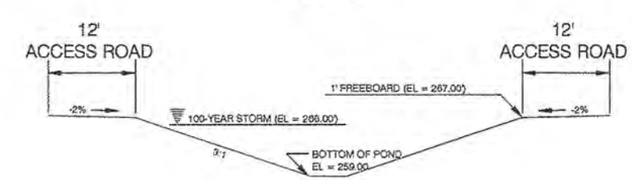


SECTION B-B
NOT TO SCALE

40% PLANS NOT FOR CONSTRUCTION



SECTION A-A
NOT TO SCALE



SECTION C-C
NOT TO SCALE

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LEUDINGHAUS
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LEUDINGHAUS POND

SHEET 12 OF 00

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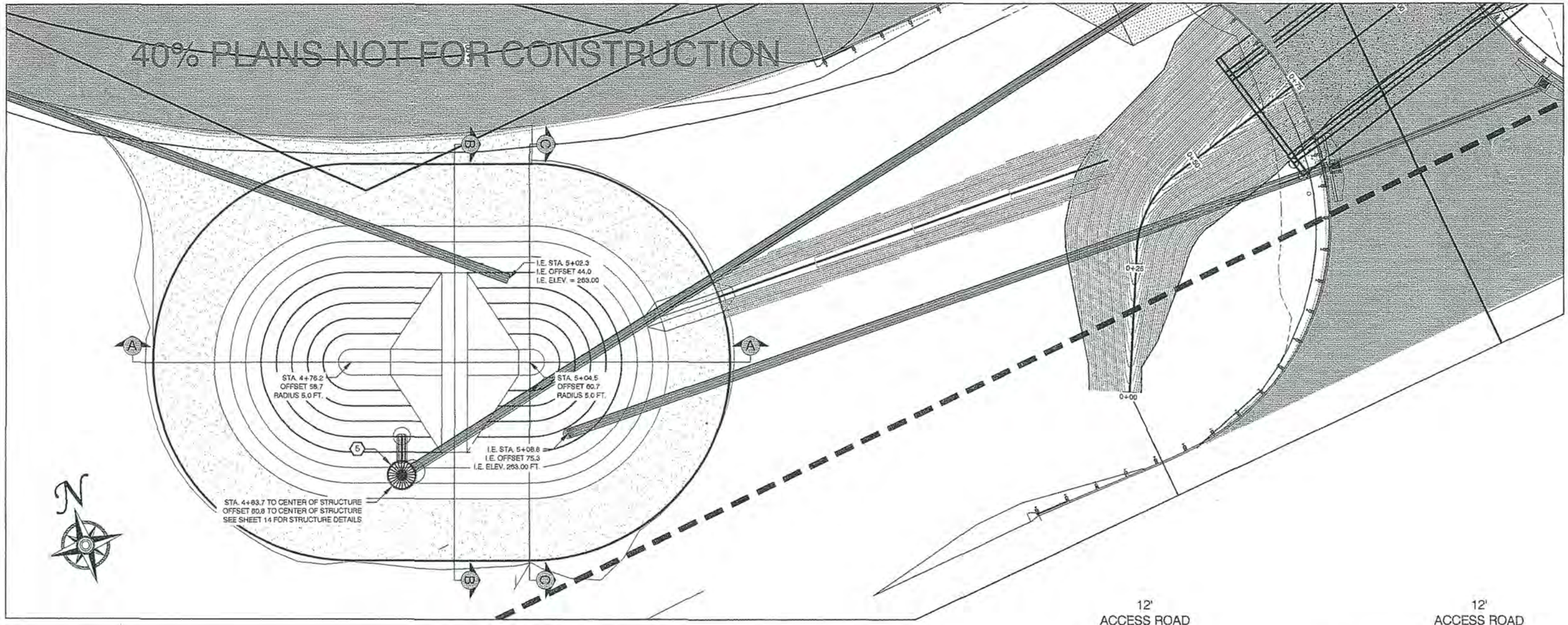
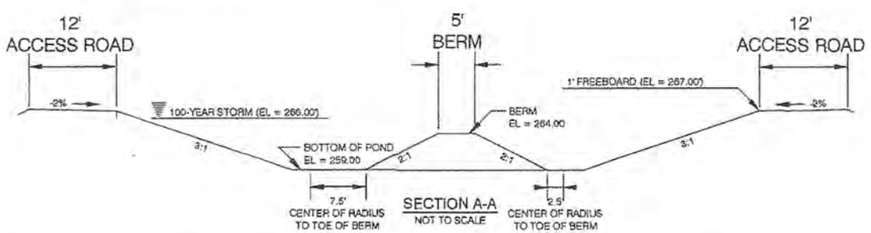
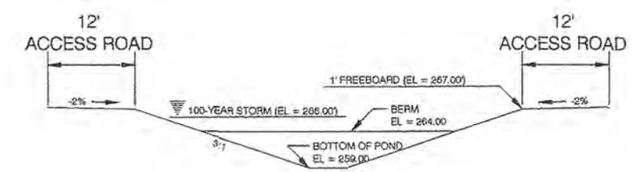


CONSTRUCTION NOTES

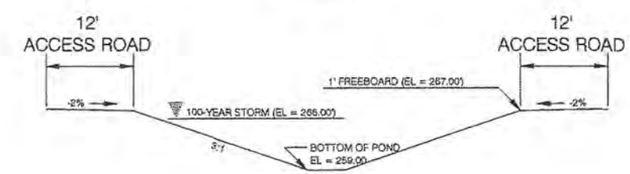
1. CONSTRUCT ROCK PAD AT THE OUTLET OF 18 IN. DIAM. STORM SEWER PIPE. SEE ROCK PAD DETAIL ON TREATMENT SHEET 14 OF 22 ..... 5 TON QUARRY SPALLS
1. CONSTRUCT STORMWATER TREATMENT & DETENTION POND AS STAKED IN THE FIELD ..... 1201 C.Y. STRUCTURE EXCAVATION INCL. HAUL CLASS B
1. CONSTRUCT ROAD APPROACH AS STAKED IN THE FIELD ..... 1201 C.Y. CSTC
1. CONSTRUCT EMERGENCY OVERFLOW SPILLWAY. SEE EMERGENCY OVERFLOW SPILLWAY DETAIL ON SHEET 46 OF 60 ..... 75 TON QUARRY SPALLS AND 20 S.Y. CONSTRUCTION GEOTEXTILE FOR DITCH LINING
1. CONSTRUCT DETENTION POND STORMWATER OUTLET STRUCTURE. SEE OUTLET STRUCTURE SPECIAL 54 IN. TYPE 2 WITH DEBRIS CAGE DETAIL ON SHEET 14 OF 22 ..... 10 TON QUARRY SPALLS
1. CONSTRUCT 1' FLAT BOTTOM DRAINAGE DITCH. SEE DRAINAGE DITCH DETAIL ON 49 OF 60.



SECTION A-A
NOT TO SCALE



SECTION B-B
NOT TO SCALE



SECTION C-C
NOT TO SCALE

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HATCHERY POND

SHEET 13 OF 00

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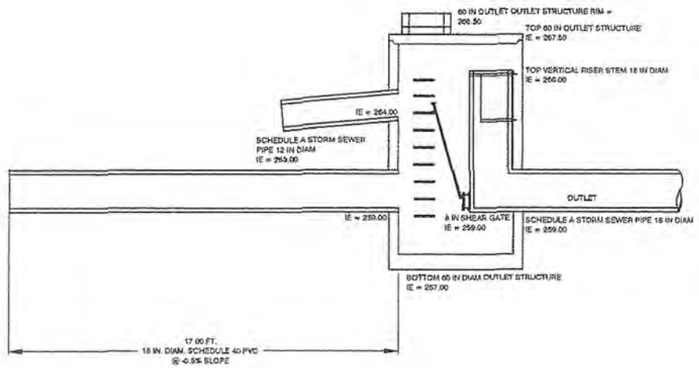
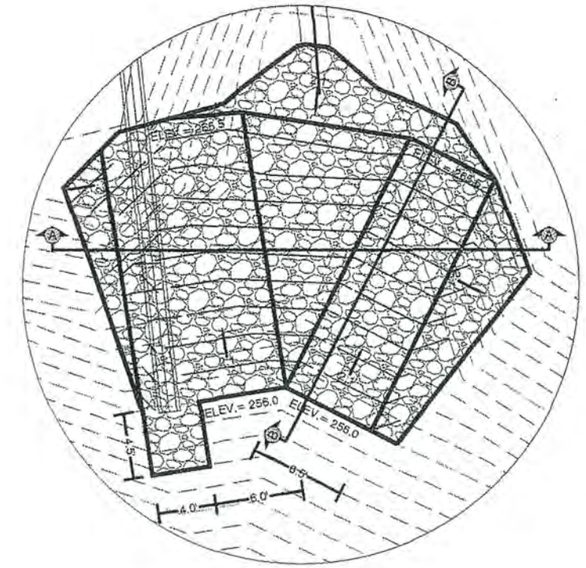
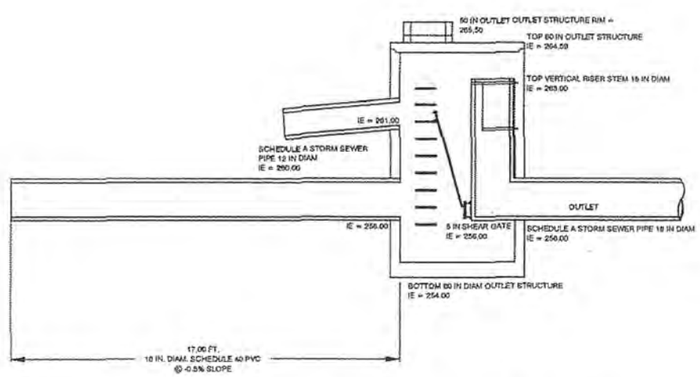
Senior Engineer/Design

Date: _____

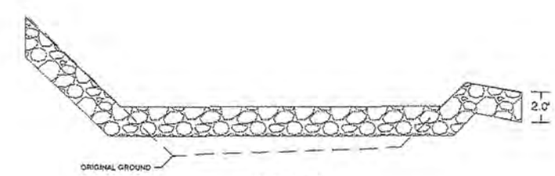


HATCHERY POND
OUTLET STRUCTURE

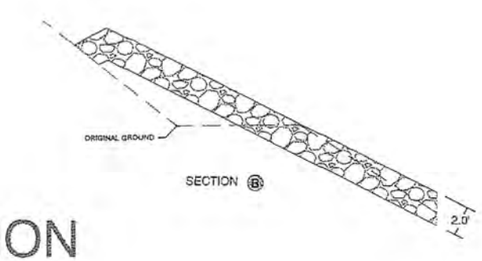




LEUDINGHAUS POND
OUTLET STRUCTURE



SECTION A



SECTION B

40% PLANS NOT FOR CONSTRUCTION

Lewis County
Department of Public Works
2025 NE KRESKY AVE.
CHEHALIS WA 98532
PHONE # (360) 740-1123
FAX # (360) 740-2719

DESIGNED BY : KRM
DRAWN BY : KRM
CHECKED BY :
DATE :

NO.	DATE	REVISION	BY	APP.

LEUDINGHAUS
BRIDGE PROJECT

LEUDINGHAUS BRIDGE PROJECT
CRP 2123

STORMWATER DETAILS

SHEET 14 OF 00

CALL 48 HOURS BEFORE YOU DIG
1-800-424-5555
"It's the Law"
Utilities Underground Location Center

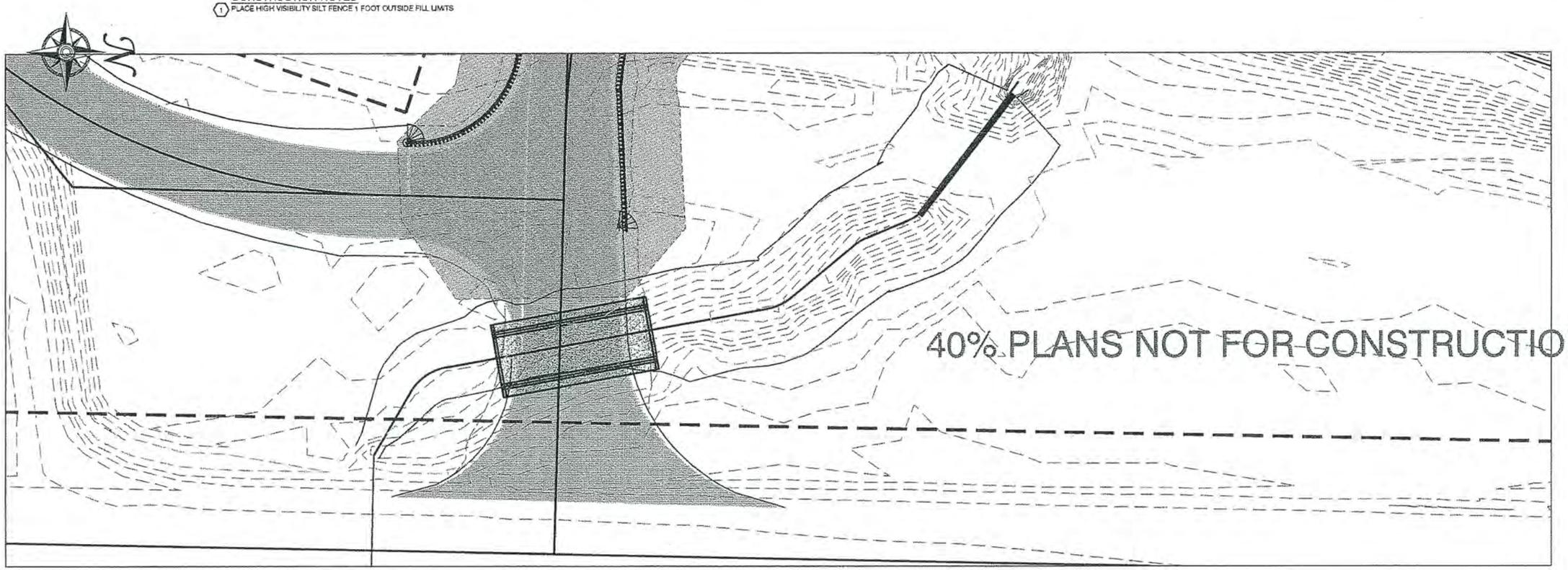
Keith Robert Muggoch, P.E.
Senior Engineer/Design

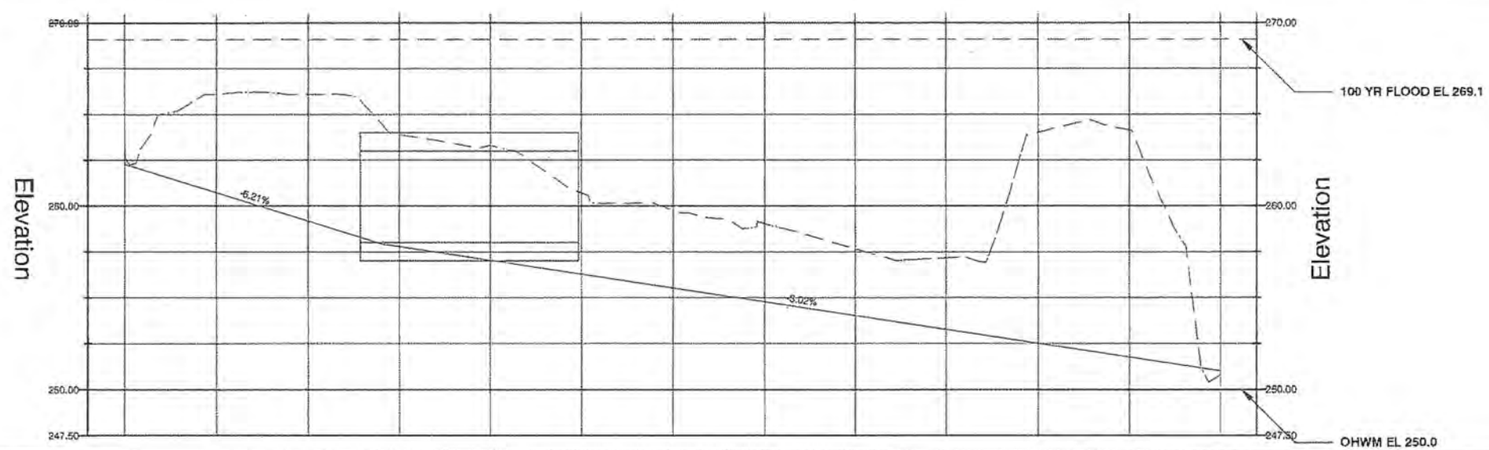
Date: _____

TWP. 14N. RGE. 2W. W.M.

CONSTRUCTION NOTES

1. PLACE HIGH VISIBILITY SILT FENCE 1 FOOT OUTSIDE FILL LIMITS



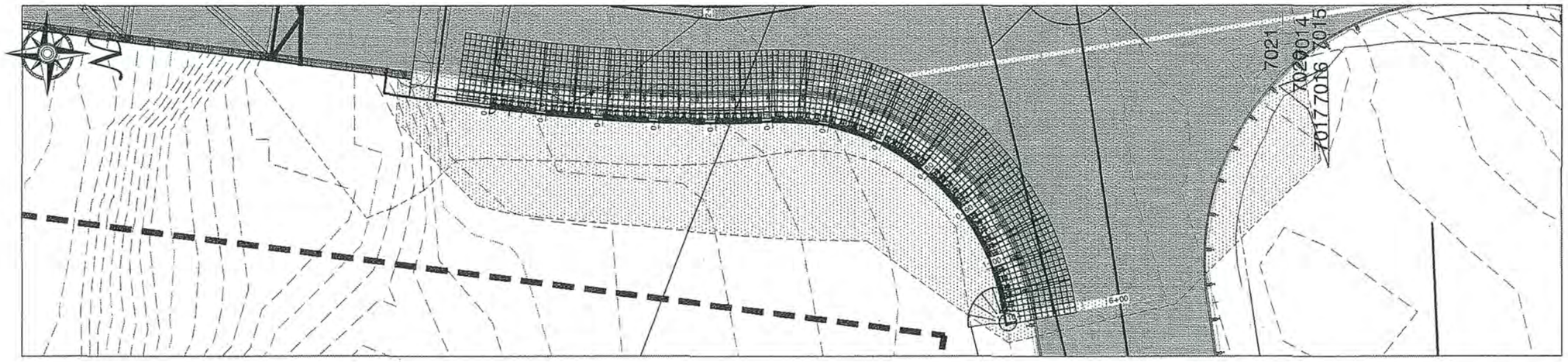


Lewis County Department of Public Works	2025 NE KRESKY AVE. CHEHALIS WA 98532 PHONE # (360) 740-1123 FAX # (360) 740-2719	DESIGNED BY : KRM DRAWN BY : KRM CHECKED BY : DATE :	NO. / DATE / REVISION / BY / APP.	LEUDINGHAUS BRIDGE PROJECT	LEUDINGHAUS BRIDGE PROJECT CRP 2123 PLAN PROFILE STREAM and CULVERT	SHEET 15 OF 00	CALL 48 HOURS BEFORE YOU DIG 1-800-424-5555 "It's the Law" Utilities Underground Location Center	Keith Robert Muggoch, P.E. Senior Engineer/Design Date:

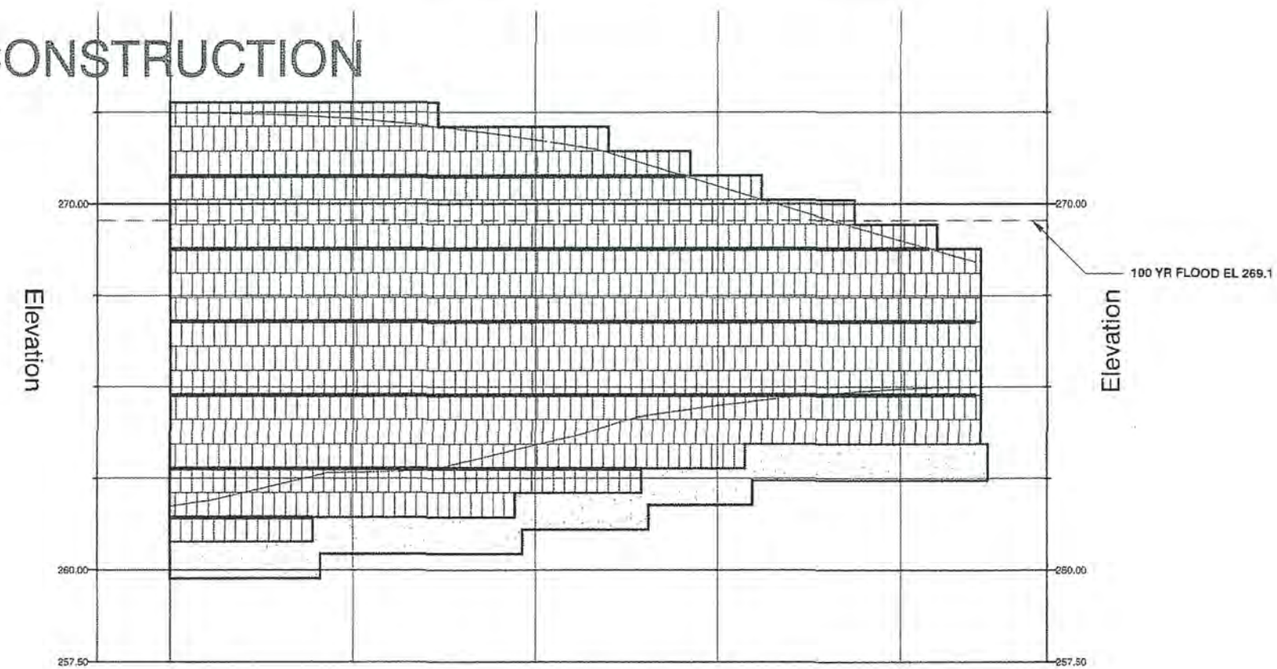
TWP. 14N. RGE. 2W. W.M.

CONSTRUCTION NOTES

1 PLACE HIGH VISIBILITY SILT FENCE 1 FOOT OUTSIDE FILL LIMITS



40% PLANS NOT FOR CONSTRUCTION



DATUM

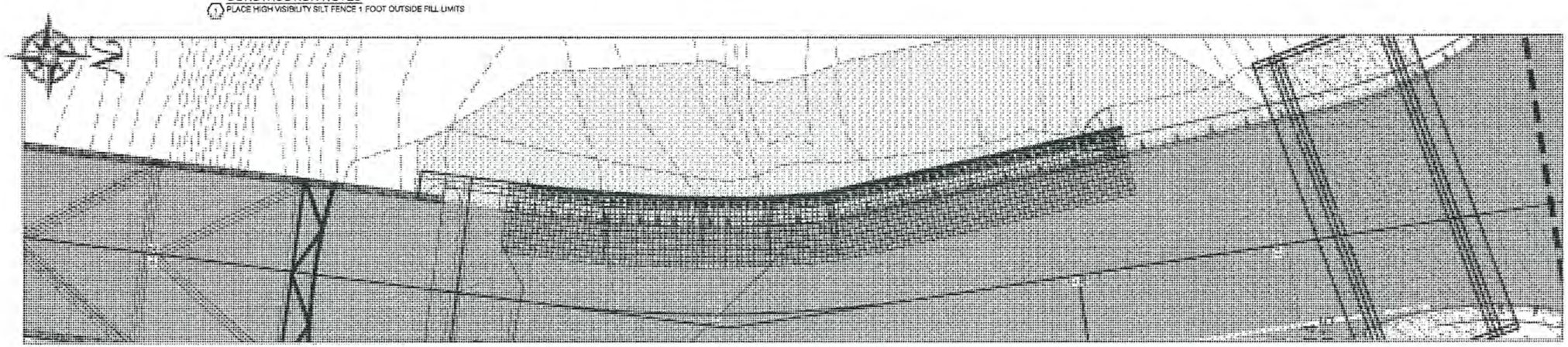
(NAVD) 88

Lewis County Department of Public Works	2025 NE KRESKY AVE. CHEHALIS WA 98532 PHONE # (360) 740-1123 FAX # (360) 740-2719	DESIGNED BY : KRM DRAWN BY : KRM CHECKED BY : DATE :	NO.	DATE	REVISION	BY	APP.	LEUDINGHAUS BRIDGE PROJECT	LEUDINGHAUS BRIDGE PROJECT CRP 2123 WALL A PLAN PROFILE	SHEET 17 OF 00	CALL 48 HOURS BEFORE YOU DIG 1-800-424-5555 "It's the Law" Utilities Underground Location Center	Keith Robert Muggoch, P.E. Senior Engineer/Design Date:

TWP. 14N. RGE. 2W. W.M.

CONSTRUCTION NOTES

1. PLACE HIGH VISIBILITY SILT FENCE 1 FOOT OUTSIDE FILL LIMITS



40% PLANS NOT FOR CONSTRUCTION

DATUM

(NAVD) 88

Lewis County
Department of Public Works
2025 NE KRESKY AVE.
CHEHALIS WA 98532
PHONE # (360) 740-1123
FAX # (360) 740-2719

DESIGNED BY : KRM
DRAWN BY : KRM
CHECKED BY :
DATE :

NO.	DATE	REVISION	BY	APP.

LEUDINGHAUS BRIDGE PROJECT

LEUDINGHAUS BRIDGE PROJECT
CRP 2123

WALL B PLAN PROFILE

SHEET 18 OF 00

CALL 48 HOURS BEFORE YOU DIG
1-800-424-5555
"It's the Law"
Utilities Underground Location Center

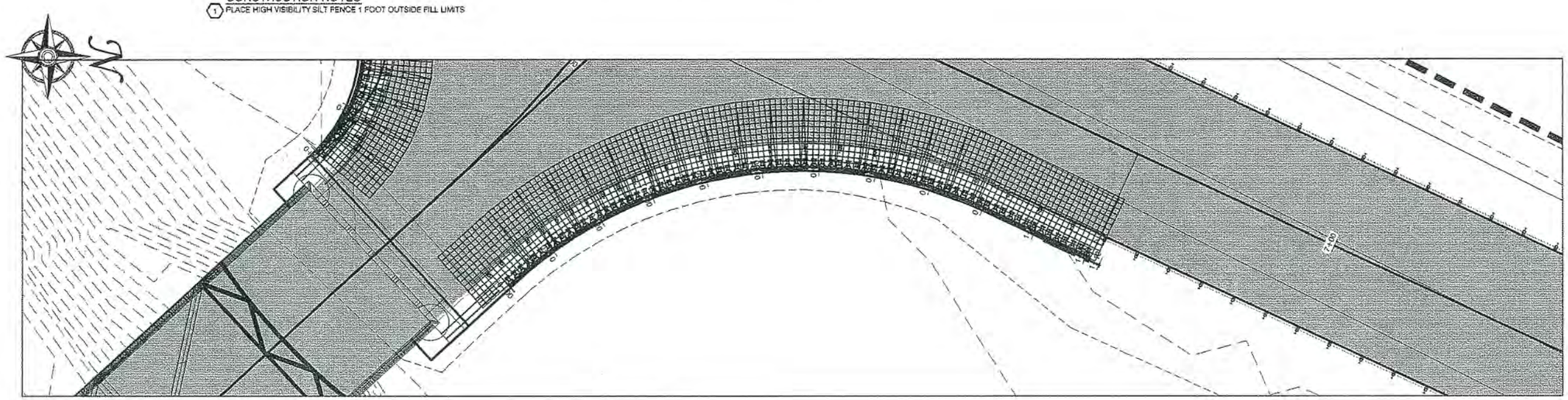
Keith Robert Muggoch, P.E.
Senior Engineer/Design

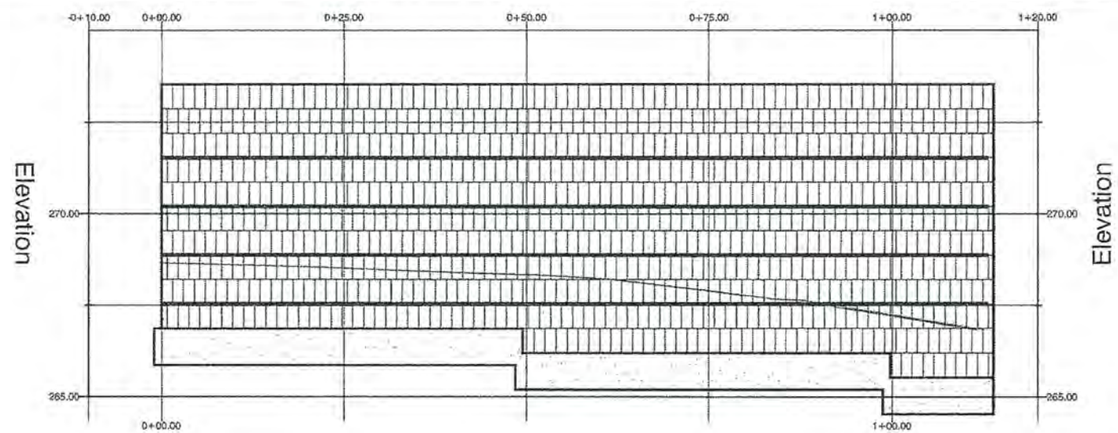
Date: _____

TWP. 14N. RGE. 2W. W.M.

CONSTRUCTION NOTES

1. PLACE HIGH VISIBILITY SILT FENCE 1 FOOT OUTSIDE FILL LIMITS





DATUM

(NAVD) 88

40% PLANS NOT FOR CONSTRUCTION

Lewis County Department of Public Works

2025 NE KRESKY AVE.
CHEHALIS WA 98532
PHONE # (360) 740-1123
FAX # (360) 740-2719

DESIGNED BY : KRM
DRAWN BY : KRM
CHECKED BY :
DATE :

NO.	DATE	REVISION	BY	APP.

LEUDINGHAUS BRIDGE PROJECT

LEUDINGHAUS BRIDGE PROJECT
CRP 2123

WALL C PLAN PROFILE

SHEET 19 OF 00

CALL 48 HOURS BEFORE YOU DIG 1-800-424-5555 "It's the Law" Utilities Underground Location Center

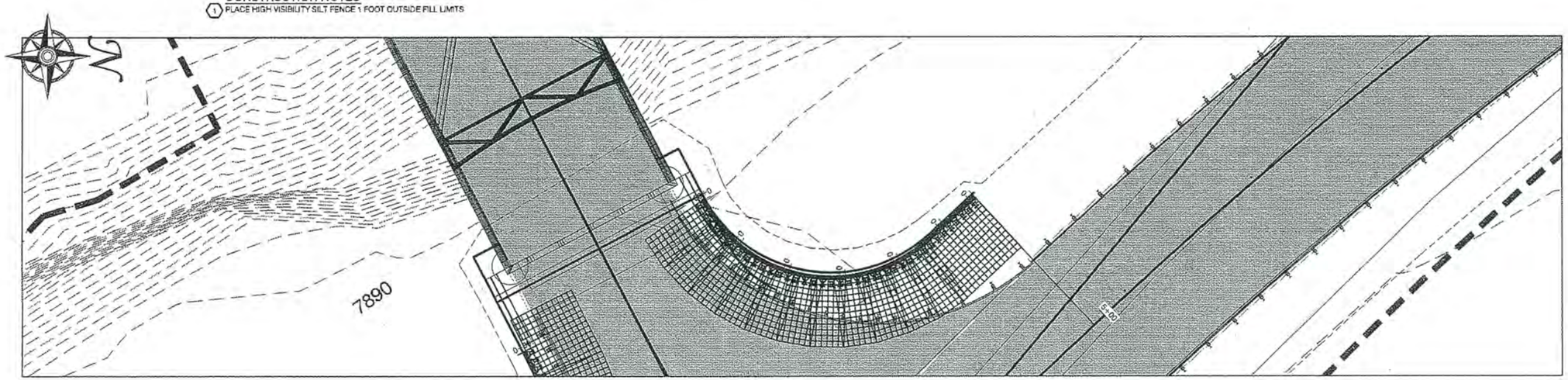
Keith Robert Muggoch, P.E.
Senior Engineer/Design

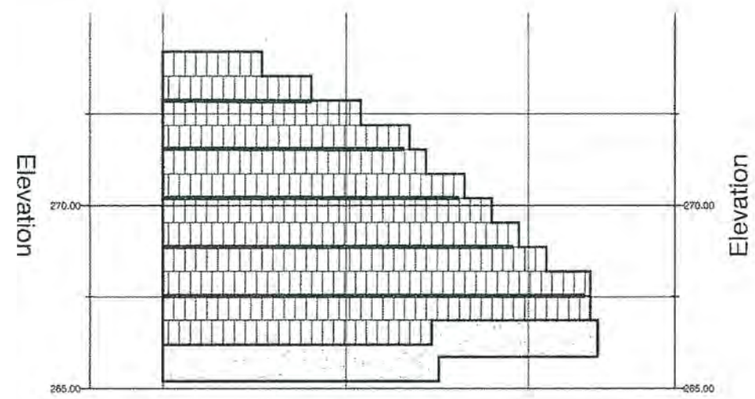
Date: _____

TWP. 14N. RGE. 2W. W.M.

CONSTRUCTION NOTES

1. PLACE HIGH VISIBILITY SILT FENCE 1 FOOT OUTSIDE FILL LIMITS





(NAVD) 88

40% PLANS NOT FOR CONSTRUCTION

Lewis County
Department of Public Works
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DESIGNED BY : KRM
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CHECKED BY :
DATE :

NO.	DATE	REVISION	BY	APP.

LEUDINGHAUS BRIDGE PROJECT

LEUDINGHAUS BRIDGE PROJECT
CRP 2123

WALL C PLAN PROFILE

SHEET 20 OF 00

CALL 48 HOURS BEFORE YOU DIG
1-800-424-5555
"It's the Law"
Utilities Underground Location Center

Keith Robert Muggoch, P.E.
Senior Engineer/Design

Date: _____

Appendix C

Important Farmland Analysis

U.S. DEPARTMENT OF AGRICULTURE
Natural Resources Conservation Service

NRCS-CPA-106
(Rev. 1-91)

FARMLAND CONVERSION IMPACT RATING FOR CORRIDOR TYPE PROJECTS

PART I *(To be completed by Federal Agency)*	3. Date of Land Evaluation Request 1/31/13	4. Sheet 1 of 2
1. Name of Project Leudinghaus Bridge Replacement	5. Federal Agency Involved Federal Emergency Management Agency	
2. Type of Project Bridge construction over Chehalis River	6. County and State Lewis County, Washington	

PART II *(To be completed by NRCS)*	1. Date Request Received by NRCS 1/31/13	2. Person Completing Form C. Natsuhara
3. Does the corridor contain prime, unique statewide or local important farmland? (If no, the FPPA does not apply - Do not complete additional parts of this form). YES ☑ NO ☐		4. Acres Irrigated 7292 / Average Farm Size 77 acs.
5. Major Crop(s) forage, hay, corn, christmas trees, berrries	6. Farmable Land in Government Jurisdiction Acres: 609,971 % 49.6	7. Amount of Farmland As Defined in FPPA Acres: 596,072 % 48.5
8. Name Of Land Evaluation System Used Lewis County	9. Name of Local Site Assessment System none	10. Date Land Evaluation Returned by NRCS 2/19/13

PART III *(To be completed by Federal Agency)*	Alternative Corridor For Segment			
	Corridor A	Corridor B	Corridor C	Corridor D
A. Total Acres To Be Converted Directly	7.3	11		
B. Total Acres To Be Converted Indirectly, Or To Receive Services	0	0		
C. Total Acres In Corridor	7.3	11		
PART IV *(To be completed by NRCS) Land Evaluation Information*				
A. Total Acres Prime And Unique Farmland	7.3	9.7		
B. Total Acres Statewide And Local Important Farmland	0	1.3		
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted	0.001%	0.002%		
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value	7.0%	12.8%		
PART V *(To be completed by NRCS) Land Evaluation Information Criterion Relative value of Farmland to Be Serviced or Converted (Scale of 0 - 100 Points)*	100	98		

PART VI *(To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))*	Maximum Points	Corridor A	Corridor B	Corridor C	Corridor D
1. Area in Nonurban Use	15	15	15		
2. Perimeter in Nonurban Use	10	10	10		
3. Percent Of Corridor Being Farmed	20	0	0		
4. Protection Provided By State And Local Government	20	0	9		
5. Size of Present Farm Unit Compared To Average	10	0	0		
6. Creation Of Nonfarmable Farmland	25	25	25		
7. Availablility Of Farm Support Services	5	2	2		
8. On-Farm Investments	20	0	0		
9. Effects Of Conversion On Farm Support Services	25	0	0		
10. Compatibility With Existing Agricultural Use	10	0	0		
TOTAL CORRIDOR ASSESSMENT POINTS	160	52	61	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland (From Part V)	100	100	98	0	0
Total Corridor Assessment (From Part VI above or a local site assessment)	160	52	61	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	152	159	0	0

1. Corridor Selected:	2. Total Acres of Farmlands to be Converted by Project:	3. Date Of Selection:	4. Was A Local Site Assessment Used? YES ☐ NO ☐

5. Reason For Selection:

Signature of Person Completing this Part: | DATE

NOTE: Complete a form for each segment with more than one Alternate Corridor

CORRIDOR - TYPE SITE ASSESSMENT CRITERIA

The following criteria are to be used for projects that have a linear or corridor - type site configuration connecting two distant points, and crossing several different tracts of land. These include utility lines, highways, railroads, stream improvements, and flood control systems. Federal agencies are to assess the suitability of each corridor - type site or design alternative for protection as farmland along with the land evaluation information.

(1) How much land is in nonurban use within a radius of 1.0 mile from where the project is intended?
More than 90 percent - 15 points
90 to 20 percent - 14 to 1 point(s)
Less than 20 percent - 0 points

(2) How much of the perimeter of the site borders on land in nonurban use?
More than 90 percent - 10 points
90 to 20 percent - 9 to 1 point(s)
Less than 20 percent - 0 points

(3) How much of the site has been farmed (managed for a scheduled harvest or timber activity) more than five of the last 10 years?
More than 90 percent - 20 points
90 to 20 percent - 19 to 1 point(s)
Less than 20 percent - 0 points

(4) Is the site subject to state or unit of local government policies or programs to protect farmland or covered by private programs to protect farmland?
Site is protected - 20 points
Site is not protected - 0 points

(5) Is the farm unit(s) containing the site (before the project) as large as the average - size farming unit in the County ? (Average farm sizes in each county are available from the NRCS field offices in each state. Data are from the latest available Census of Agriculture, Acreage or Farm Units in Operation with $1,000 or more in sales.)
As large or larger - 10 points
Below average - deduct 1 point for each 5 percent below the average, down to 0 points if 50 percent or more below average - 9 to 0 points

(6) If the site is chosen for the project, how much of the remaining land on the farm will become non-farmable because of interference with land patterns?
Acreage equal to more than 25 percent of acres directly converted by the project - 25 points
Acreage equal to between 25 and 5 percent of the acres directly converted by the project - 1 to 24 point(s)
Acreage equal to less than 5 percent of the acres directly converted by the project - 0 points

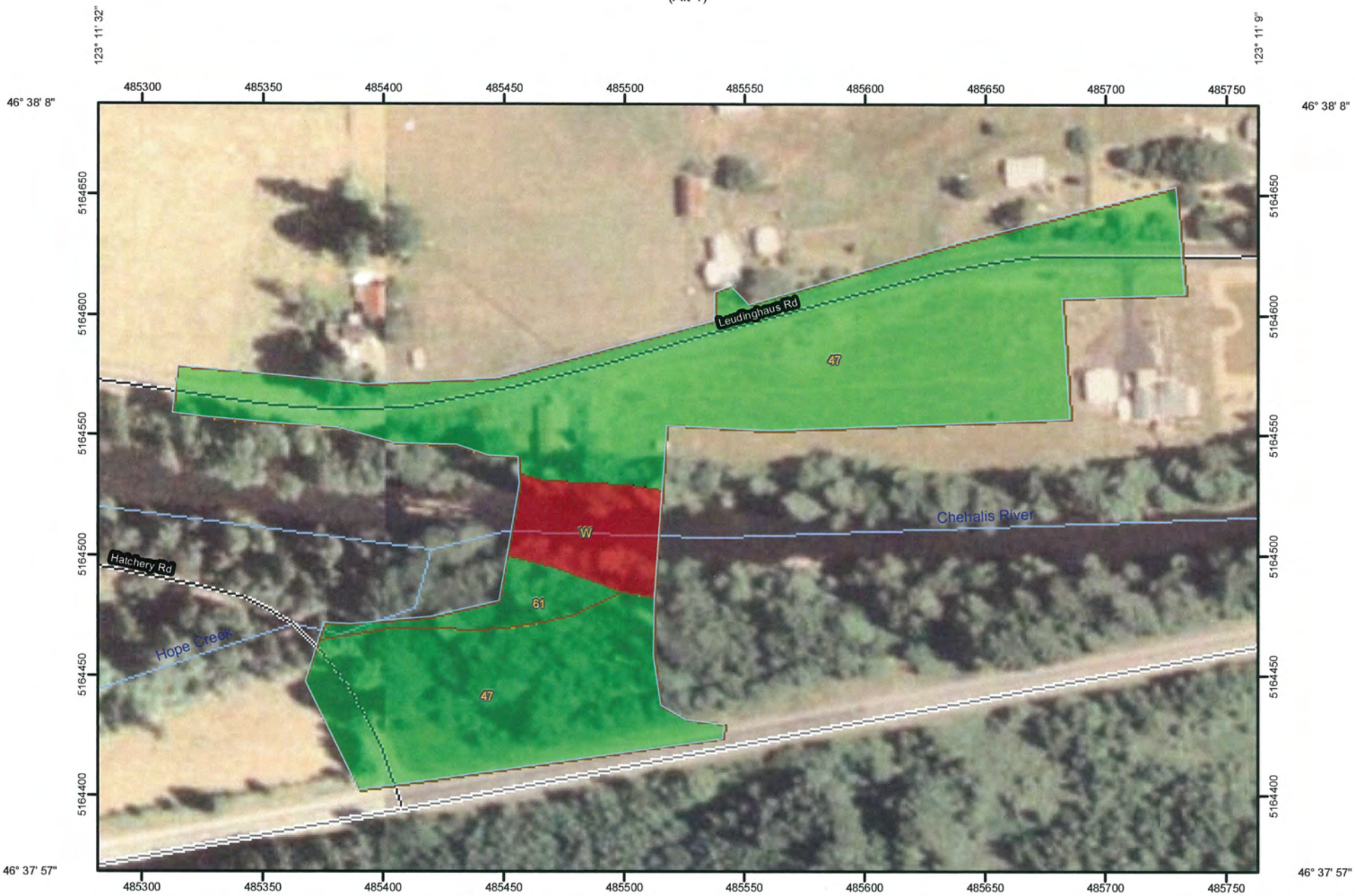
(7) Does the site have available adequate supply of farm support services and markets, i.e., farm suppliers, equipment dealers, processing and storage facilities and farmer's markets?
All required services are available - 5 points
Some required services are available - 4 to 1 point(s)
No required services are available - 0 points

(8) Does the site have substantial and well-maintained on-farm investments such as barns, other storage building, fruit trees and vines, field terraces, drainage, irrigation, waterways, or other soil and water conservation measures?
High amount of on-farm investment - 20 points
Moderate amount of on-farm investment - 19 to 1 point(s)
No on-farm investment - 0 points

(9) Would the project at this site, by converting farmland to nonagricultural use, reduce the demand for farm support services so as to jeopardize the continued existence of these support services and thus, the viability of the farms remaining in the area?
Substantial reduction in demand for support services if the site is converted - 25 points
Some reduction in demand for support services if the site is converted - 1 to 24 point(s)
No significant reduction in demand for support services if the site is converted - 0 points

(10) Is the kind and intensity of the proposed use of the site sufficiently incompatible with agriculture that it is likely to contribute to the eventual conversion of surrounding farmland to nonagricultural use?
Proposed project is incompatible to existing agricultural use of surrounding farmland - 10 points
Proposed project is tolerable to existing agricultural use of surrounding farmland - 9 to 1 point(s)
Proposed project is fully compatible with existing agricultural use of surrounding farmland - 0 points

Farmland Classification—Lewis County Area, Washington
(Alt 1)



Map Scale: 1:2,280 if printed on A size (8.5" x 11") sheet.

N

Meters: 0 30 60 120 180

Feet: 0 100 200 400 600

Farmland Classification—Lewis County Area, Washington
(Atl 2)

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Soil Ratings

- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if subsoiled, completely removing the root inhibiting soil layer
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance
- Farmland of local importance
- Farmland of unique importance
- Not rated or not available

Political Features

- Cities

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:2,280 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 10N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lewis County Area, Washington
Survey Area Data: Version 9, Jun 29, 2012

Date(s) aerial images were photographed: 7/21/2006

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Farmland Classification

Farmland Classification— Summary by Map Unit — Lewis County Area, Washington (WA641)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
47	Chehalis silt loam	All areas are prime farmland	7.0	88.5%
61	Cloquato silt loam	All areas are prime farmland	0.3	4.0%
W	Water	Not prime farmland	0.6	7.5%
Totals for Area of Interest			**7.9**	**100.0%**

Description

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978.

Rating Options

Aggregation Method: No Aggregation Necessary

Tie-break Rule: Lower

Farmland Classification—Lewis County Area, Washington
(Atl 2)

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Soil Ratings

- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if subsoiled, completely removing the root inhibiting soil layer
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance
- Farmland of local importance
- Farmland of unique importance
- Not rated or not available

Political Features

- Cities

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:3,170 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 10N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lewis County Area, Washington
Survey Area Data: Version 9, Jun 29, 2012

Date(s) aerial images were photographed: 7/21/2006

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Farmland Classification

Farmland Classification— Summary by Map Unit — Lewis County Area, Washington (WA641)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
9	Baumgard silt loam, very deep, 8 to 30 percent slopes	Farmland of statewide importance	1.3	10.7%
47	Chehalis silt loam	All areas are prime farmland	9.7	80.2%
148	Newberg fine sandy loam	All areas are prime farmland	0.1	0.9%
W	Water	Not prime farmland	1.0	8.1%
Totals for Area of Interest			**12.0**	**100.0%**

Description

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978.

Rating Options

Aggregation Method: No Aggregation Necessary

Tie-break Rule: Lower

Appendix D

Floodplain Management Review

Leudinghaus Road Bridge Replacement Project

EXECUTIVE ORDER 11988 – FLOODPLAIN MANAGEMENT EIGHT-STEP DECISION MAKING PROCESS

Executive Order 11988 (Floodplain Management) requires federal agencies "to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of the floodplain and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative." FEMA's implementing regulations are at 44 CFR Part 9, which includes an eight-step decision making process for actions that may affect, or be affected by, floodplains or wetlands, require compliance with the executive order. This eight-step process is necessary because abutments, riprap supporting those abutments, and fill to support new bridge approaches would be placed in the floodplain and FEMA mapped floodway of the Chehalis River.

The steps in the decision-making process are provided in this appendix. These steps involve public notice, identification and evaluation of alternatives to the proposed action, identification and minimization of adverse impacts, and implementation of the action

APPLICABILITY

The process includes a preliminary evaluation of whether a proposed action has the potential to affect floodplains or their occupants, support floodplain development, could potentially be subject to harm by location in floodplains, or could harm floodplains. The Proposed Action involves the construction of a single, clear span bridge, with the bridge deck elevated a minimum of 3 feet above the 100-year water surface elevation (268.5 ft NAVD88) of the Chehalis River. The bridge abutments and approach road fill would be within the 100-year floodplain and FEMA-mapped floodway. The approach roads would be below the 100-year flood elevation at their intersection with connecting roadways and would rise above the 100-year flood elevation as they near the bridge.

The project would require fill within the 100-year floodplain and FEMA-mapped floodway for the abutments and approach roads, including riprap to prevent scour around the bridge abutments and retaining walls for the approach roads, and could affect floodplain functions. The project would still be subject to harm by its location within the 100-year floodplain. The project would not increase the capacity of the local transportation network nor induce additional development within the Chehalis River floodplain. The project would maintain the support for occupancy and modification of the floodplain similar to the pre-flood event baseline.

STEP 1: DETERMINE WHETHER THE PROPOSED ACTION IS LOCATED IN THE 100-YEAR FLOODPLAIN (500-YEAR FLOODPLAIN FOR CRITICAL ACTIONS).

According to the FEMA *FIRM Panel No. 530102 0220B*, dated December 15, 1981 (FEMA 1981), the project is located within the 100-year (Zone A) and 500-year (Zone C) floodplain. The flood profile for the Chehalis River in FEMA's *Preliminary Draft Flood Insurance Study for Lewis County, Washington and Incorporated Areas, Flood Insurance Study Number 530102V001A*, dated November 11, 2010 (FEMA 2010), indicates that the estimated 100-year flood elevation of the Chehalis River is approximately 268 to 269 feet (NAVD88]) in the project area. Northwest Hydraulic Consultants (NHC)

conducted a hydrologic and hydraulics analysis of the proposed project and estimated the 100-year flood elevation at the proposed bridge site at 268.5 feet (NHC 2013). This elevation is above the banks of the Chehalis River. Figure 4.2-1 of the EA illustrates the relationship of the project to the mapped 100-year floodplain and floodway based on the 2010 flood insurance study (FIS) (FEMA 2010).

The bridge deck would have a minimum 3-foot clearance above the 100-year flood elevation (268.5 feet), and the surface of the approach roads would be above the 100-year flood elevation where the approach roads meet the bridge deck. However, because the connecting roads on the south side of the river (SR 6 and Hatchery Road) are below the 100-year flood elevation, the south approach roads would also be below the 100-year flood elevation at their intersection. On the north side of the river, the bridge approach and connecting reconstructed segment of Leudinghaus Road would be above the 100-year flood elevation. However, east and west of the project footprint, Leudinghaus Road is below the 100-year flood elevation. The 40% plan sheets provided in Appendix B of the EA illustrate the road plan and profile in relationship to the estimated 100-year flood elevation. The bridge abutments and approach roads on both sides of the river would be within the FEMA-mapped floodway (see Figure 4.2-1 of the EA).

STEP 2: NOTIFY THE PUBLIC AT THE EARLIEST POSSIBLE TIME OF THE INTENT TO CARRY OUT AN ACTION IN A FLOODPLAIN, AND INVOLVE THE AFFECTED AND INTERESTED PUBLIC IN THE DECISION-MAKING PROCESS.

A disaster cumulative notice was provided to the public after the disaster was declared and was published in papers of record in the declared counties. In addition, extensive public involvement activities for the project have been ongoing since that time. These have included public meetings conducted by Lewis County and FEMA, both independently and in coordination, and FEMA's NEPA public scoping activities.

Public meetings related to the project were held by Lewis County in February 2009, August 2010, September 2011, and January 2012. On August 13, 2012, FEMA sent a second NEPA scoping letter to agencies, Tribes, and local interested parties. The letter described the proposed project and requested comments on issues and concerns, the range of alternatives, and potential effects regarding the project. Comments were received from the Washington State Department of Ecology and local residents. These comments, in addition to public comments submitted to Lewis County at the various public meetings held related to the project since December 2007, were considered and addressed in the preparation of the EA.

See Section 5 of the EA for more information regarding public involvement.

STEP 3: IDENTIFY AND EVALUATE PRACTICABLE ALTERNATIVES TO LOCATING THE PROPOSED ACTION IN A FLOODPLAIN (INCLUDING ALTERNATIVE SITES, ACTIONS, AND THE "NO ACTION" OPTION). IF A PRACTICABLE ALTERNATIVE EXISTS OUTSIDE THE FLOODPLAIN, FEMA MUST LOCATE THE ACTION AT THE ALTERNATIVE SITE.

FEMA is required to utilize alternative sites outside the floodplain or alternative actions that avoid the floodplain, unless no practicable alternative exists. A thorough alternatives analysis process considered other roadway options and a number of design alternatives to comply with this requirement (see Section 3.1, *Alternatives Considered but not Carried Forward*). The Preferred Action Alternative (i.e., the Proposed Action) was determined to be the best engineering solution with the least effect on the floodplain of the numerous alternatives analyzed. Several alternatives were reviewed but eliminated from

further consideration in the EA because they did not meet the project purpose and need, they were not practical, or they were not suitable for FEMA funding under its PA program.

The No Action Alternative is a practicable alternative to locating the project within the floodplain, but the No Action Alternative would not met the purpose and need for the project.

Given the purpose and need for the project, which is to restore access between the south and north sides of the Chehalis River in the project area, and the elevation and horizontal extent of the 100-year (base) and 500-year floodplains of the Chehalis River in the project area, there is no practicable action alternative site location outside of the Chehalis River floodplain. Alternative actions, such as shifting the function of this bridge to the Chandler Bridge, were also considered. Due to the width of the floodplain throughout the valley and the distance needed to travel by local residents to evacuate the floodplain, combined with the social and cultural fabric of the community on both sides of river that was created by the location of the former bridge, no practicable alternative action was found.

STEP 4: IDENTIFY THE POTENTIAL DIRECT AND INDIRECT IMPACTS ASSOCIATED WITH THE OCCUPANCY OR MODIFICATION OF FLOODPLAINS AND THE POTENTIAL DIRECT AND INDIRECT SUPPORT OF FLOODPLAIN DEVELOPMENT THAT COULD RESULT FROM THE PROPOSED ACTION.

The proposed bridge structure under Alternative 1 would be a single, clear span bridge over the Chehalis River. The proposed single, clear span bridge structure is being designed to accommodate the 100-year flood (the design event) on the Chehalis River. NHC conducted a hydrologic and hydraulic evaluation of the project reach to estimate the maximum water surface elevation expected at the proposed bridge site (the design elevation) during the 100-year flood (NHC 2013). The 2013 NHC study estimated the 100-year flood elevation at the proposed bridge location at 268.5 feet. To accommodate flood flows and pass large woody debris, the bridge deck is being designed with a minimum 3-foot clearance above the 100-year water surface elevation (compared with -5.4 feet for the original bridge structure [NHC 2008]). Based on the design elevation of 268.5 feet, the minimum low chord of the proposed bridge would be 271.5 feet. The 2013 NHC study indicated that the proposed design would result in a slight lowering of the 100-year flood water surface levels along the project reach compared to pre-2007 conditions (NHC 2013).

While the proposed bridge structure with its higher design elevation would not vertically confine or obstruct the 100-year flood flows, the bridge abutments and fill for the approach roads are located within the FEMA-mapped floodway of the Chehalis River and would horizontally constrict 100-year flood flows. The 2013 NHC study indicated that flows during large flood events would contract around the south approach road fill and be forced into the main channel, and that this could cause up to 3 feet of scour in the main channel and 11 feet of scour around the south abutment (NHC 2013).

The NHC study also indicated that complex flow patterns around both the south and north abutments could lead to increased scour at the base of the abutments as well as lateral erosion of the approach fills. The proposed project includes riprap inlaid into the existing bank slope around the bridge abutments and at the base of the approach fills to protect the abutments and fills, which would reduce the risk of infrastructure damage during flood events. Riprap around the abutments would not extend below the OHWM, and would therefore have no effect on channel velocities or cause scour during low and normal flows, but could cause site-specific increases in near-bank velocities during higher flow events compared

to the existing rough, vegetation riverbanks. The effects of riprap on near-bank velocities during high flows that do not overtop the main river channel would likely be very slight and would have a negligible impact. However, the location of the bridge abutments and approach roads within the floodway, and expected contraction of flows around the south approach road fill in combination with riprap, is expected to result in an increase in 100-year channel velocities at the bridge during higher flow events, including 100-year flood events or greater. The project's effects on channel velocities during the 100-year and other large flow events are expected to be measurable, but localized, and would occur periodically over the long term. This would be a minor, long-term adverse impact on hydrologic conditions in the Chehalis River during high flow/flood events relative to existing condition at the project site.

As described above, the 2013 NHC study indicated that the proposed design would result in a slight lowering of the 100-year flood water surface levels along the project reach compared to pre-disaster (2007) conditions (NHC 2013). Alternative 1 would provide direct access from SR 6 to communities on the north side of the Chehalis River. It would not increase the overall capacity of the local transportation network in a manner that would induce additional development within the project area floodplain beyond the expected normal growth for the Meskill area. However, it would provide incentive to maintain occupancy in the floodplain with its associated risk. This is a minor, long-term adverse impact on floodplains. It would restore support for floodplain development to its pre-disaster condition.

Impact of Flood Water on the Proposed Facilities

The single-clear span bridge structure with the bridge deck elevated a minimum of 3 feet above the 100-year water surface would be at considerably less risk of harm during future flood events than the original Leudinghaus Road Bridge, which was destroyed in the December 2007 flooding of the Chehalis River. The Proposed Action would have a substantial benefit on transportation and access in the project area by restoring access between the south and north sides of the Chehalis River to its pre-disaster condition. This benefit outweighs the minor unavoidable adverse effects of the project on the floodplain.

Impact of the Proposed Action on Natural Values

Natural values are defined in 44 CFR 9.4 and described in 44 CFR 9.10(b)(2) as including water resource values (see above), living resource values (fish and wildlife and biological production), cultural resource values (including archaeological and historic sites, open space, natural beauty, and recreation), and agricultural and forestry resource values.

In addition to impacts on the Chehalis River and its floodplain/floodway described above, the Proposed Action would have a minor, short-term (construction-related) adverse impact on a small ephemeral drainage during culvert removal/installation and channel widening. Alterations to the stream channel are expected to improve existing downcutting and bank erosion in its lower reach and reduce sediment delivery to the Chehalis River during high flows. New impervious surfaces would increase stormwater runoff and alter existing drainage patterns in the project area. Stormwater runoff from the project would be treated in proposed stormwater ponds and released to the ephemeral drainage described above and the Chehalis River according to natural drainage rates. Ground disturbance and pile driving on the shoreline could have minor, short-term adverse impacts on water quality from temporary erosion, mobilization of sediments, and increased turbidity during construction. Overall, the Proposed Action would have

negligible to minor adverse impacts on hydrology, groundwater recharge, and water quality in surface waters.

The Proposed Action would have negligible to minor adverse impacts on vegetation and terrestrial wildlife (wild turkey, cavity-nesting ducks, and elk), due to disturbance during construction and the permanent clearing of riparian forest, grasslands, and disturbed uplands. The project area provides habitat for additional wildlife tolerant of human presence, such as waterfowl, songbirds, and raptors; raccoon, opossum, and black-tailed deer; and some reptile species. The Proposed Action would have negligible to minor adverse effects on migratory birds.

The Proposed Action would have a minor adverse effect on priority fish species and essential fish habitat (EFH) for Chinook and coho salmon due to the permanent removal of riparian vegetation adjacent to the Chehalis River and Hope Creek and from artificial overwater shading from the proposed bridge. The Proposed Action would have no effect on threatened and endangered species as none are present.

Archaeological testing for resources has been conducted, and no resources were found, except for a 1940s road that has been determined not to have historical significance. However, based on the archaeological sensitivity of the project area and the presence of extensive modern alluvial deposits, the potential exists for encountering buried archaeological resources within the project area. The clearing of riparian forest and the elevated bridge, large fill for the approach roads, and stormwater ponds would alter site-level views of the Chehalis River and adjacent areas, but would have no impact on the overall landscape level views.

The Proposed Action would have a negligible long-term adverse impact on farmland associated with the permanent conversion of approximately 7.3 acres of Prime Farmland to non-agricultural uses. The farmland to be converted is not currently in production and no farm facilities are present on the site. Based on input from the NRCS, the Proposed Action would have a negligible long-term adverse effect on farmland in Lewis County.

STEP 5: MINIMIZE THE POTENTIAL ADVERSE IMPACTS AND SUPPORT TO OR WITHIN FLOODPLAINS TO BE IDENTIFIED UNDER STEP 4, RESTORE AND PRESERVE THE NATURAL AND BENEFICIAL VALUES SERVED BY FLOODPLAINS.

As described in Section 2.0 (*Purpose and Need*) and Section 3.0 (*Alternatives*) of the EA, the Proposed Action is designed to minimize floodplain impacts to the extent possible, and provide safer and more reliable access across the Chehalis River. The bridge deck would have a minimum 3-feet of clearance above the 100-year flood elevation of the Chehalis River, and the bridge abutments and approaches would be located above the 100-year flood elevation. Riprap would be placed around the abutments and base of the approach road retaining walls to prevent scour.

As described in Section 3.3.2 (*Impact Avoidance and Minimization Measures*) of the EA, the Proposed Action includes a list of environmental conditions that address erosion and sediment control, spill prevention, stormwater pollution prevention, temporary access, footprint minimization, migratory bird protection, and inadvertent discovery of archeological resources during construction.

STEP 6: REEVALUATE THE PROPOSED ACTION TO DETERMINE FIRST, IF IT IS STILL PRACTICABLE IN LIGHT OF ITS EXPOSURE TO FLOOD HAZARDS, THE EXTENT TO WHICH IT WILL AGGRAVATE THE HAZARDS TO OTHERS, ITS POTENTIAL TO DISRUPT FLOODPLAIN VALUES AND SECOND, IF ALTERNATIVES PRELIMINARILY REJECTED AT STEP 3 ARE PRACTICABLE IN LIGHT OF THE INFORMATION GAINED IN STEPS 4 AND 5. FEMA SHALL NOT ACT IN A FLOODPLAIN UNLESS IT IS THE ONLY PRACTICABLE LOCATION.

Given the location of the Proposed Action relative to the Chehalis River and its floodplain and the purpose and need for the project, which is to restore access between the south and north sides of the river in the project area, no practicable action alternatives have been identified to locating the project (a bridge crossing) within the Chehalis River floodplain. The No Action Alternative is a practicable alternative to locating the project in floodplains, but the No Action Alternative would not meet the purpose and need for the project.

The Proposed Action, under which FEMA would provide funding to Lewis County for implementation of the Preferred Alternative, would have minor adverse effects on floodplains, primarily from fill within the floodplain associated with the new bridge structure and approach roads. The proposed project would not increase the capacity of the local transportation network and is not anticipated to induce additional development within the floodplain in the project area. It would restore support for floodplain development to its pre-disaster condition. The Proposed Action would have a significant beneficial effect on transportation and access in the area affected by the proposed project by restoring access between south and north sides of the Chehalis River to its pre-disaster condition. This benefit outweighs the minor unavoidable adverse effects on the floodplain of the project. The Proposed Action would be re-evaluated following comments on the Public Draft EA and prior to the Final EA.

STEP 7: PREPARE AND PROVIDE THE PUBLIC WITH A FINDING AND PUBLIC EXPLANATION OF ANY FINAL DECISION THAT THE FLOODPLAIN IS THE ONLY PRACTICABLE ALTERNATIVE.

The Final EA and decision document (FONSI or NOI) will provide the public with the agency's final decision regarding the project.

STEP 8: REVIEW THE IMPLEMENTATION AND POST-IMPLEMENTATION PHASES OF THE PROPOSED ACTION TO ENSURE THAT THE REQUIREMENTS STATED IN SECTION 44CFR 9.11 ARE FULLY IMPLEMENTED. OVERSIGHT RESPONSIBILITY SHALL BE INTEGRATED INTO EXISTING PROCESSES.

The Proposed Action will be constructed in accordance with applicable floodplain regulations. Oversight responsibility will be built into the implementation and post-implementation phases.

REFERENCES

FEMA (Federal Emergency Management Agency). 1981. Flood Insurance Rate Map (FIRM), Lewis County, Washington (unincorporated areas). Community Pane Number 530102 0220B. Effective Date December 15, 1981.

FEMA. 2010. Flood Insurance Study, Lewis County, Washington and Incorporated Areas. Flood Insurance Study Number 530102V001A. Preliminary, November 11, 2010.

NHC (Northwest Hydraulic Consultants). 2008. Hydraulic Evaluation Report, Leudinghaus Road Bridge Replacement Project, Chehalis River near Doty. Prepared for Harper Houf Peterson Righellis, Inc. and Lewis County Department of Public Works. November 2008 Draft. Seattle, WA.

NHC. 2013. Hydrologic and Hydraulic Evaluation, Leudinghaus Road Bridge Replacement, Chehalis River near Meskill. Prepared for BergerABAM Inc. and Lewis County Public Works Department. Seattle, WA. July 17, 2013.

Appendix E

Species Lists for Lewis County

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES AND CRITICAL HABITAT; CANDIDATE SPECIES; AND SPECIES OF CONCERN IN LEWIS COUNTY AS PREPARED BY THE U.S. FISH AND WILDLIFE SERVICE WASHINGTON FISH AND WILDLIFE OFFICE

(Revised March 15, 2012)

LISTED

Canada lynx (*Lynx canadensis*)
Gray wolf (*Canis lupus*)
Grizzly bear (*Ursus arctos* = *U. a. horribilis*)
Marbled murrelet (*Brachyramphus marmoratus*)
Northern spotted owl (*Strix occidentalis caurina*)

Major concerns that should be addressed in your Biological Assessment of 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.

3. Impacts from project activities and implementation (e.g., increased noise levels, increased human activity and/or access, loss or degradation of habitat) that may result in disturbance to listed species and/or their avoidance of the project area.

Lupinus sulphureus ssp. *kincaidii* (Kincaid's lupine)
Sidalcea nelsoniana (Nelson's checker-mallow)

Major concerns that should be addressed in your Biological Assessment of project impacts to listed plant species include:

1. Distribution of taxon in project vicinity.

2. Disturbance (trampling, uprooting, collecting, etc.) of individual plants and loss of habitat.

3. Changes in hydrology where taxon is found.

DESIGNATED

Critical habitat for the marbled murrelet
Critical habitat for the northern spotted owl
Critical habitat for *Lupinus sulphureus* ssp. *kincaidii* (Kincaid's lupine)

PROPOSED

None

CANDIDATE

Fisher *(Martes pennanti)* – West Coast DPS
North American wolverine *(Gulo gulo luteus)* – contiguous U.S. DPS
Whitebark pine *(Pinus albicaulis*)

SPECIES OF CONCERN

Bald eagle (*Haliaeetus leucocephalus*)
Cascades frog (*Rana cascadae*)
Coastal cutthroat trout (*Oncorhynchus clarki clarki*) [southwest Washington DPS]
Columbia torrent salamander (*Rhyacotriton kezeri*)
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*)
Olive-sided flycatcher (*Contopus cooperi*)
Oregon vesper sparrow (*Pooecetes graminus affinis*)
Pacific lamprey (*Lampetra tridentata*)
Pacific Townsend's big-eared bat (*Corynorhinus townsendii townsendii*)
Peregrine falcon (*Falco peregrinus*)
River lamprey (*Lampetra ayresi*)
Tailed frog (*Ascaphus truei*)
Valley silverspot (*Speyeria zerene bremeri*)
Van Dyke's salamander (*Plethodon vandykei*)
Western gray squirrel (*Sciurus griseus griseus*)
Western toad (*Bufo boreas*)
Cimicifuga elata (tall bugbane)
Delphinium leucophaeum (pale larkspur)
Meconella oregana (white meconella)

Endangered Species Act Status of West Coast Salmon & Steelhead

(Updated Aug. 11, 2011)

Species[1]			*Current Endangered Species Act Listing Status*	*ESA Listing Actions Under Review*
Sockeye Salmon (*Oncorhynchus nerka*)	1	Snake River	***Endangered***	
	2	Ozette Lake	***Threatened***	
	3	Baker River	*Not Warranted*	
	4	Okanogan River	*Not Warranted*	
	5	Lake Wenatchee	*Not Warranted*	
	6	Quinalt Lake	*Not Warranted*	
	7	Lake Pleasant	*Not Warranted*	
Chinook Salmon (*O. tshawytscha*)	8	Sacramento River Winter-run	***Endangered***	
	9	Upper Columbia River Spring-run	***Endangered***	
	10	Snake River Spring/Summer-run	***Threatened***	
	11	Snake River Fall-run	***Threatened***	
	12	Puget Sound	***Threatened***	
	13	Lower Columbia River	***Threatened***	
	14	Upper Willamette River	***Threatened***	
	15	Central Valley Spring-run	***Threatened***	
	16	California Coastal	***Threatened***	
	17	Central Valley Fall and Late Fall-run	***Species of Concern***	
	18	Upper Klamath-Trinity Rivers	*Not Warranted*	
	19	Oregon Coast	*Not Warranted*	
	20	Washington Coast	*Not Warranted*	
	21	Middle Columbia River spring-run	*Not Warranted*	
	22	Upper Columbia River summer/fall-run	*Not Warranted*	
	23	Southern Oregon and Northern California Coast	*Not Warranted*	
	24	Deschutes River summer/fall-run	*Not Warranted*	
Coho Salmon (*O. kisutch*)	25	Central California Coast	***Endangered***	
	26	Southern Oregon/Northern California	***Threatened***	
	27	Lower Columbia River	***Threatened***	• Critical habitat
	28	Oregon Coast	***Threatened***	
	29	Southwest Washington	*Undetermined*	
	30	Puget Sound/Strait of Georgia	***Species of Concern***	
	31	Olympic Peninsula	*Not Warranted*	
Chum Salmon (*O. keta*)	32	Hood Canal Summer-run	***Threatened***	
	33	Columbia River	***Threatened***	
	34	Puget Sound/Strait of Georgia	*Not Warranted*	
	35	Pacific Coast	*Not Warranted*	
Steelhead (*O. mykiss*)	36	Southern California	***Endangered***	
	37	Upper Columbia River	***Threatened***	
	38	Central California Coast	***Threatened***	
	39	South Central California Coast	***Threatened***	
	40	Snake River Basin	***Threatened***	
	41	Lower Columbia River	***Threatened***	
	42	California Central Valley	***Threatened***	
	43	Upper Willamette River	***Threatened***	
	44	Middle Columbia River	***Threatened***	
	45	Northern California	***Threatened***	
	46	Oregon Coast	***Species of Concern***	
	47	Southwest Washington	*Not Warranted*	
	48	Olympic Peninsula	*Not Warranted*	
	49	Puget Sound	***Threatened***	• Critical habitat
	50	Klamath Mountains Province	*Not Warranted*	
Pink Salmon (*O. gorbuscha*)	51	Even-year	*Not Warranted*	
	52	Odd-year	*Not Warranted*	

1 The ESA defines a "species" to include any distinct population segment of any species of vertebrate fish or wildlife. For Pacific salmon, NOAA Fisheries Service considers an evolutionarily significant unit, or "ESU," a "species" under the ESA. For Pacific steelhead, NOAA Fisheries Service has delineated distinct population segments (DPSs) for consideration as "species" under the ESA.

Appendix F

Consultation, Coordination, and Public Involvement

U.S. Department of Homeland Security
Region X
130 228th Street, SW
Bothell, WA 98021-9796

FEMA

October 11, 2012

Allyson Brooks, Ph.D.
State Historic Preservation Officer
Washington State Department of Archaeology and Historic Preservation
P.O. Box 48343
Olympia, Washington 98504-8343

RE: Section 106 Consultation for the Leudinghaus Road Bridge Replacement Project

Dear Dr. Brooks:

Lewis County has applied through the Washington State Emergency Management Division (EMD) to the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) for funding assistance to replace the Leudinghaus Road Bridge (also known as the Mays Bridge) across the Chehalis River near the community of Meskill in Lewis County, Washington. The original bridge was washed away during a severe winter storm and flooding on December 3, 2007. The President declared the storm event a major disaster (FEMA-1734-DR-WA), making funds available for public infrastructure projects. The project will replace the former bridge that was destroyed by flooding of the Chehalis River during the December 2007 storm event. FEMA is preparing an Environmental Assessment (EA) and the project is being reviewed as the proposed action.

The purpose of this letter is to re-initiate consultation with you pursuant to Section 106 of the National Historic Preservation Act and its implementing regulations at 36 CFR 800.4(a) regarding the Leudinghaus Road Bridge Project.

FEMA first initiated consultation with Washington State Department of Archaeology and Historic Preservation (DAHP) on the Leudinghaus Road Bridge Replacement Project in 2009 (initiated as part of the Leudinghaus and Chandler Road Bridge Replacement Projects). At that time, the project included one project alternative for the Leudinghaus Road Bridge Replacement Project. An initial, intensive site survey of the approved project Area of Potential Effects (APE), consisting of shovel test pits (STPs), was conducted from August 25 through August 30, 2009. A report titled *"Cultural Resources Inventory and Evaluation Report, Leudinghaus and Chandler Road Bridge Replacement Projects, Lewis County, Washington,"* documenting the results of the August 2009 site survey, was prepared in October 2009. Because early Native American artifacts were discovered within four STPs within the project APE, a follow-up site investigation consisting of more-extensive subsurface testing was conducted between October 12 and October 21, 2009, to determine if the initial discovery of prehistoric materials was indicative of a larger intact archaeological deposit eligible for listing on the National Register of Historic Places (NRHP). A report titled *"National Register of Historic Places Evaluation Report, Leudinghaus*

Bridge Replacement Project, Lewis County, Washington," documenting the results of the October 2009 follow-up investigation, was prepared in November 2010. The follow-up report included a recommendation that the prehistoric archaeological site, referred to as site 45LE795, be determined eligible for NRHP listing under Criterion D. These two reports were provided to you informally by FEMA Historic Preservation Specialist, Charles Diters, in 2010.
In late 2010, about the same time the November 2010 NRHP evaluation report was submitted, the project was put on hold while FEMA evaluated the need for the project and eligibility for FEMA funding. These issues were resolved in January 2012, and the project has since been re-initiated. However, the project alternatives have now been revised. The current project includes two project alternatives, and the original alternative is no longer being considered. The overall project description (including the current project alternatives) and the proposed new APE are described below.

Project Description

During the December 2007 storm, the Chehalis River overflowed its banks, carrying large woody debris downstream. This debris hit and destroyed the vehicular bridge that connected River Road, on the south side of the river, to Leudinghaus Road, on the north side of the river. The bridge provided access from State Route 6 (SR 6) via River Road across the Chehalis River to homes, businesses, and natural and recreational resources on the north side of the river. The project would restore vehicular access between these areas by constructing a new bridge over the Chehalis River. The proposed bridge design is a single-span structure with an elevated bridge deck to better accommodate debris associated with high-flow events in the river (the new bridge deck would be raised by approximately 14 feet relative to the old bridge). The higher elevation of the proposed bridge structure would require alterations to the approach roads on both sides of the river to match the elevation of the new bridge, including grade changes, realignment, and new roadway.

FEMA has identified two project action alternatives for evaluation in the Environmental Assessment (EA). The two action alternatives involve construction of a new bridge at different locations along the Chehalis River (see attached *Vicinity Map*). Alternative 1, which Lewis County has identified as their Preferred Alternative, involves construction of a new bridge approximately 2,500 feet upstream (west) of the former bridge location. Under Alternative 1, the new bridge would extend from the intersection of Hatchery Road and SR 6 on the south side of the river to Leudinghaus Road on the north side of the river. Alternative 2 involves construction of a new bridge at the original bridge location with a new SR 6 intersection. Under Alternative 2, River Road, from SR 6 to its western intersection, would be decommissioned.

The project is located in western Lewis County, approximately 15 miles west of Chehalis via SR 6. Alternative 1 is located in Section 9 of Township 13 North, Range 4 West. Alternative 2 is located in Sections 3, 4, 9, and 10 of Township 13 North, Range 4 West.

Area of Potential Effects (APE)

FEMA has identified a proposed revised APE based on the current scope of the project. We are proposing that the revised APE encompass the original APE due to the location and configuration of Alternative 2 in relation to the original project alternative. The proposed APE is equal to the maximum extent of ground disturbance and possible indirect effects for both project action alternatives, including areas of temporary disturbance (e.g., construction staging areas), to a depth equal to specific construction disturbances (see attached *Area of Potential Effects Maps 1 & 2)*. The APE considers potential effects on archaeological properties and historical buildings and structures in the project vicinity.

AECOM of Seattle, Washington, is assisting FEMA with its Section 106 responsibilities. As part of this assistance, AECOM will conduct a site visit to the project area to assess the need for fieldwork (survey, shovel testing) to identify historic properties, including archaeological properties, traditional cultural properties, or other resources of concern. FEMA is consulting with the Confederated Tribes of the Chehalis Reservation, Confederated Tribes and Bands of the Yakama Nation, Cowlitz Indian Tribe, Nisqually Indian Tribe, and the Quinault Indian Nation to identify properties of cultural or religious significance that may be affected by the project. FEMA will notify the Tribes of the site visit and fieldwork, and will invite them to participate and/or provide comment.

We request your comment and/or concurrence on the proposed revised APE for the project, and any other concerns you may have about the project. If you have any questions or comments, please contact Susan King, FEMA Region 10 Environmental Specialist, at the above address, or by phone (425-487-4582) or email (susan.king2@fema.dhs.gov) or myself by phone (425-487-4713) or email (science.kilner@fema.dhs.gov).

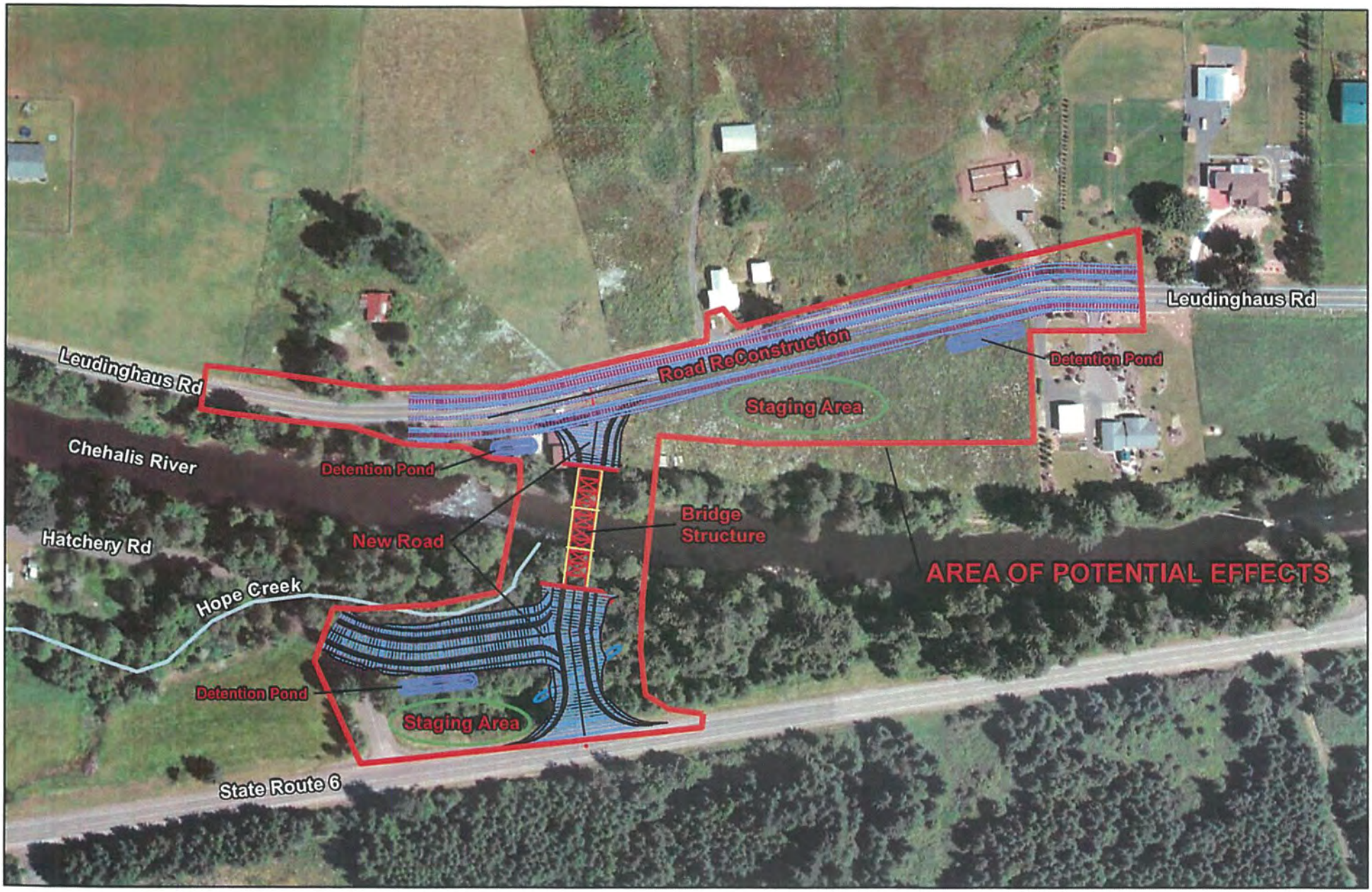
Sincerely,

Barry Hall for

Science Kilner
Acting Regional Environmental Officer

Enclosures:
Vicinity Map
Area of Potential Effects Map

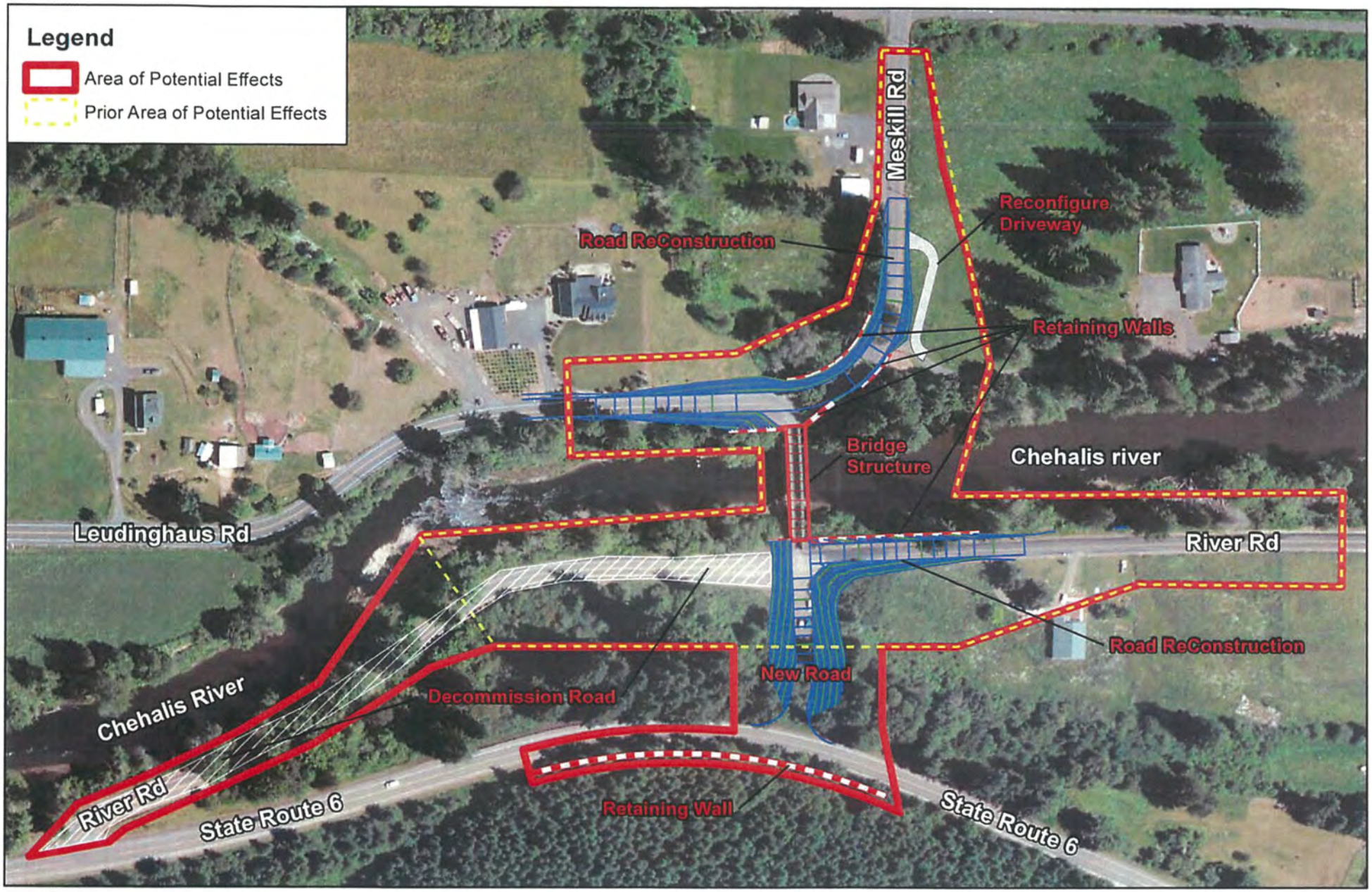
SK:bb



AREA OF POTENTIAL EFFECTS MAP (1 of 2)
Leudinghaus Bridge Replacement Project - Alternative 1 (Preferred Alternative)
Lewis County Public Works

N W E S

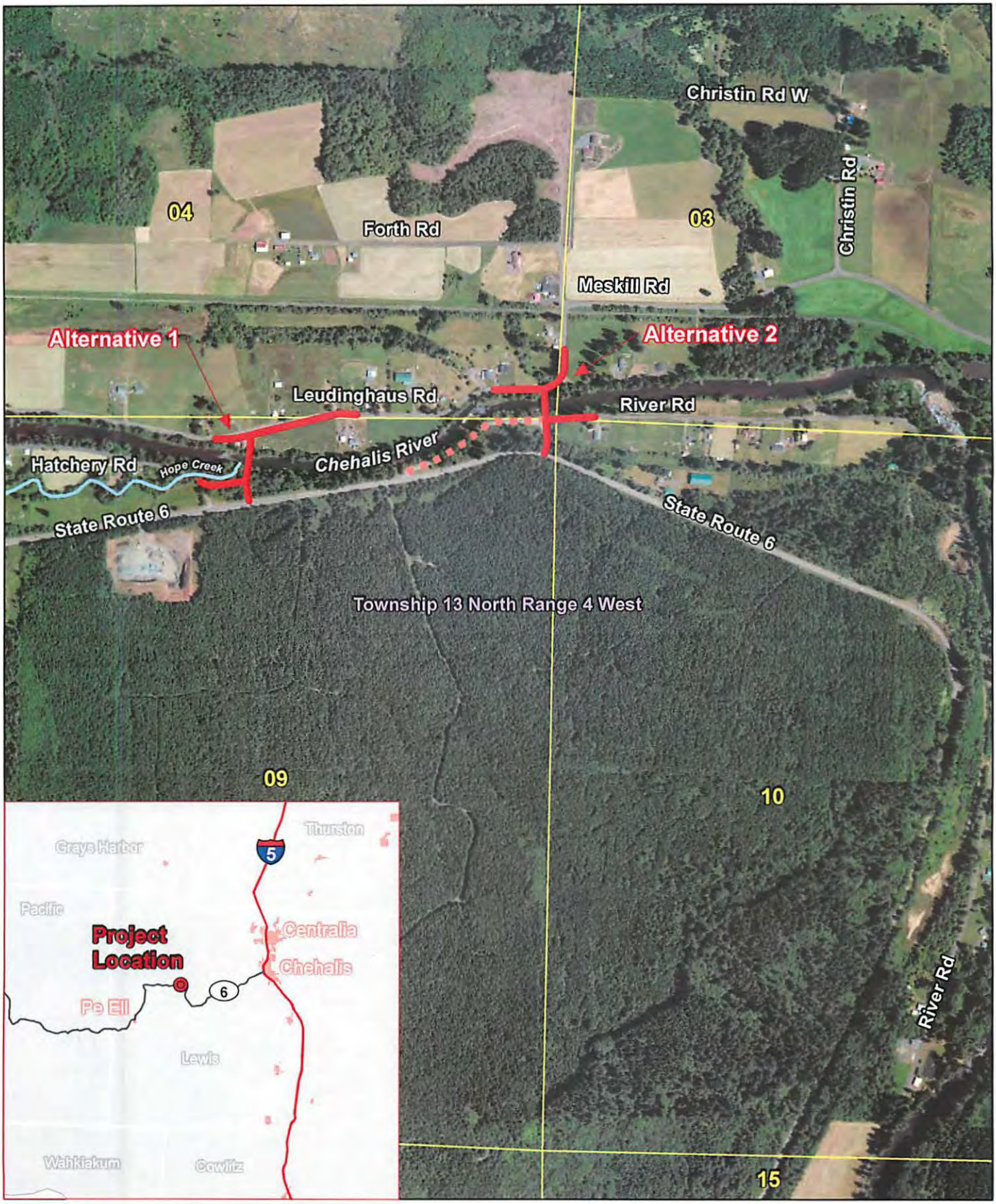
Feet
0 50 100 200



AREA OF POTENTIAL EFFECTS MAP (2 of 2)
Leudinghaus Bridge Replacement Project - Alternative 2
Lewis County Public Works

N W E S

Feet
0 50 100 200



VICINITY MAP
Leudinghaus Bridge Replacement
Lewis County Public Works

Alternative Alignment

Decommission Existing Road

N W E S

Feet
0 600 1,200

Allyson Brooks, Director
State Historic Preservation Officer

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

Protect the Past, Shape the Future

October 29, 2012

Ms. Science Kilner
Deputy Environmental Officer
FEMA
130 228th Street SW
Bothell, WA 98021

In future correspondence please refer to:
Log: 011110-01-FEMA
Property: Dryad (Leudinghaus) Bridge Replacement
Re: Archaeology – Revised APE Concur

Dear Ms. Kilner:

We have reviewed the materials forwarded to our office for the above referenced project. Thank you for your description of the revised area of potential effect (APE) for the project. We concur with the new definition of the APE. We look forward to the results of your cultural resources survey efforts, your consultation with the concerned tribes, and receiving the survey report. We would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4) and the survey report when it is available.

These comments are based on the information available at the time of this review and on behalf of the State Historic Preservation Officer in conformance with Section 106 of the National Historic Preservation Act and its implementing regulations 36CFR800. Should additional information become available, our assessment may be revised.

Thank you for the opportunity to review and comment. If you have any questions, please feel free to contact me.

Sincerely,

Lance Wollwage, Ph.D.
Transportation Archaeologist
(360) 586-3536
lance.wollwage@dahp.wa.gov

RECEIVED
OCT 31 2012
FEMA REGION X

U.S. Department of Homeland Security
Region X
130 228th Street, SW
Bothell, WA 98021-9796

FEMA

August 19, 2013

Dr. Allyson Brooks
Washington State Historic Preservation Officer
Department of Archaeology and Historic Preservation
P. O. Box 48343
Olympia, Washington 98504-8343

Re: FEMA 1734 DR WA Public Assistance Grant Program
Dryad (Leudinghaus) Bridge Replacement, Lewis County
SHPO Log: 011110-01-FEMA

Dear Dr. Brooks:

Please consider this follow-up to your letter of March 4, 2013, regarding the Area of Potential Effects (APE) for the above Undertaking. The enclosed cultural resources report, prepared by AECOM under contract to the Federal Emergency Management Agency (FEMA), describes results from identification and evaluation efforts. The cultural resources survey identified no historic properties that would be impacted by the proposed Undertaking. An isolate archaeological resource was identified, the remains of the original River Road, but this was determined not eligible for *National Register of Historic Places*. The Undertaking includes demolition of a residential property, built in 1993, which is not discussed in the enclosed report. That property also is not eligible for the *National Register*. Initial outreach has occurred with Tribes to help determine if there are any historic properties of religious or cultural significance to them within the APE and no responses have been received to date. The enclosed report is also being provided to Tribes for comment.

Because of the potential for deeply buried cultural resources within the APE, Lewis County will be required to develop an archaeological monitor plan for implementation during excavation work. We will provide your office with a draft of that plan once available for review and approval. Based on identification and evaluation efforts to date, FEMA has determined that the proposed Undertaking will result in No Historic Properties Affected.

To assist your review please find enclosed a hard copy and CD of the cultural resources report. We respectfully request your concurrence with these findings or additional comment. Should you have any questions please contact Mr. Bill Kerschke at (425) 487-2187 or william.kerschke@fema.dhs.gov. Thank you.

Sincerely,

for Jacinda Von

Mark Eberlein
Regional Environmental Officer

Enclosure

cc: Gary Urbas, EMD

DEPARTMENT OF
ARCHAEOLOGY &
HISTORIC PRESERVATION
Protect the Past, Shape the Future

Allyson Brooks Ph.D., Director
State Historic Preservation Officer

September 19, 2013

Mr. Mark Eberlein
Federal Emergency Management Administration
130 228TH ST SW
Bothell, WA 98021

In future correspondence please refer to:
Log: 011110-01-FEMA
Property: Dryad (Leudinghaus) Bridge Replacement
Re: More Information Needed

Dear Mr. Eberlein:

Thank you for contacting our office and providing the cultural resources report for the archaeological investigation associated with the Alternative 1 area of potential effect. I have reviewed the materials you provided for this project. In order to complete our review we request the following material to be provided to our office:

- DAHP does not accept reports with temporary field numbers assigned to archaeological resources. Please contact Morgan McLemore at DAHP to request a trinomial for the resource, update the cultural resources report, and resubmit to our agency at your convenience.

I would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4) and the survey report when it is available.

These comments are based on the information available at the time of this review and on behalf of the State Historic Preservation Officer pursuant to Section 106 of the National Historic Preservation Act and its implementing regulations 36CFR800. Please contact me should you have any specific questions about our request and we look forward to receiving this material.

Please note that DAHP requires that all historic property inventory and archaeological site forms be provided to our office electronically. If you have not registered for a copy of the database, please log onto our website at www.dahp.wa.gov and go to the Survey/Inventory page for more information and a registration form. To assist you in conducting a survey, DAHP has developed a set of cultural resource reporting guidelines. You can obtain a copy from our website.

Finally, please note that effective Nov. 2, 2009, DAHP requires that all cultural resource reports be submitted in PDF format on a labeled CD along or electronically. For further information please go to http://www.dahp.wa.gov/documents/CR_ReportPDF_Requirement.pdf.

Thank you for the opportunity to review and comment. If you have any questions, please feel free to contact me.

Sincerely,

Matthew Sterner, M.A.
Transportation Archaeologist
(360) 586-3082
matthew.sterner@dahp.wa.gov

DEPARTMENT OF
ARCHAEOLOGY &
HISTORIC PRESERVATION
Protect the Past, Shape the Future

Allyson Brooks Ph.D., Director
State Historic Preservation Officer

October 16, 2013

Mr. Mark Eberlein
Federal Emergency Management Administration
130 228TH ST SW
Bothell, WA 98021

In future correspondence please refer to:
Log: 011110-01-FEMA
Property: Dryad (Leudinghaus) Bridge Replacement
Re: Not Eligible, No Historic Properties

Dear Mr. Eberlein:

Thank you for contacting our office and providing a copy of the revised cultural resources survey report completed by AECOM. I concur with their professional recommendations that the remnant road feature, identified as 45LE873, is not eligible for listing in the National Register of Historic Places. As a result, I concur with your finding of no historic properties affected for the project. Since archaeological monitoring is recommended in the report, I would advise you to have a robust Inadvertent Discovery plan (IDP) in place and follow the suggestion to have deeper excavations monitored during construction.

We would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4).

These comments are based on the information available at the time of this review and on the behalf of the State Historic Preservation Officer in conformance with Section 106 of the National Historic Preservation Act and its implementing regulations 36CFR800.

Should additional information become available, our assessment may be revised. In the event that archaeological or historic materials are discovered during project activities, work in the immediate vicinity must stop, the area secured, and this office and the concerned tribes notified.

Thank you for the opportunity to review and comment. If you have any questions, please contact me.

Sincerely,

Matthew Sterner, M.A.
Transportation Archaeologist
(360) 586-3082
matthew.sterner@dahp.wa.gov

DEPARTMENT OF
ARCHAEOLOGY &
HISTORIC PRESERVATION
Protect the Past, Shape the Future

Allyson Brooks Ph.D., Director
State Historic Preservation Officer

October 28, 2013

Mr. Bill Kerschke
Federal Emergency Management Administration
130 228th St SW
Bothell, WA 98021

In future correspondence please refer to:
Log: 011110-01-FEMA
Property: Dryad (Leudinghaus) Bridge Replacement
Re: APE Modification Concur, No Historic Properties

Dear Mr. Kerschke:

I have reviewed the materials forwarded to our office for the Dryad (Leudinghaus) Bridge Replacement project. Thank you for your description of the revised area of potential effect (APE) for the project. We concur with the definition of the revised APE. Based on the procedures outlined in your correspondence, I concur with a continued determination of no historic properties affected for the project

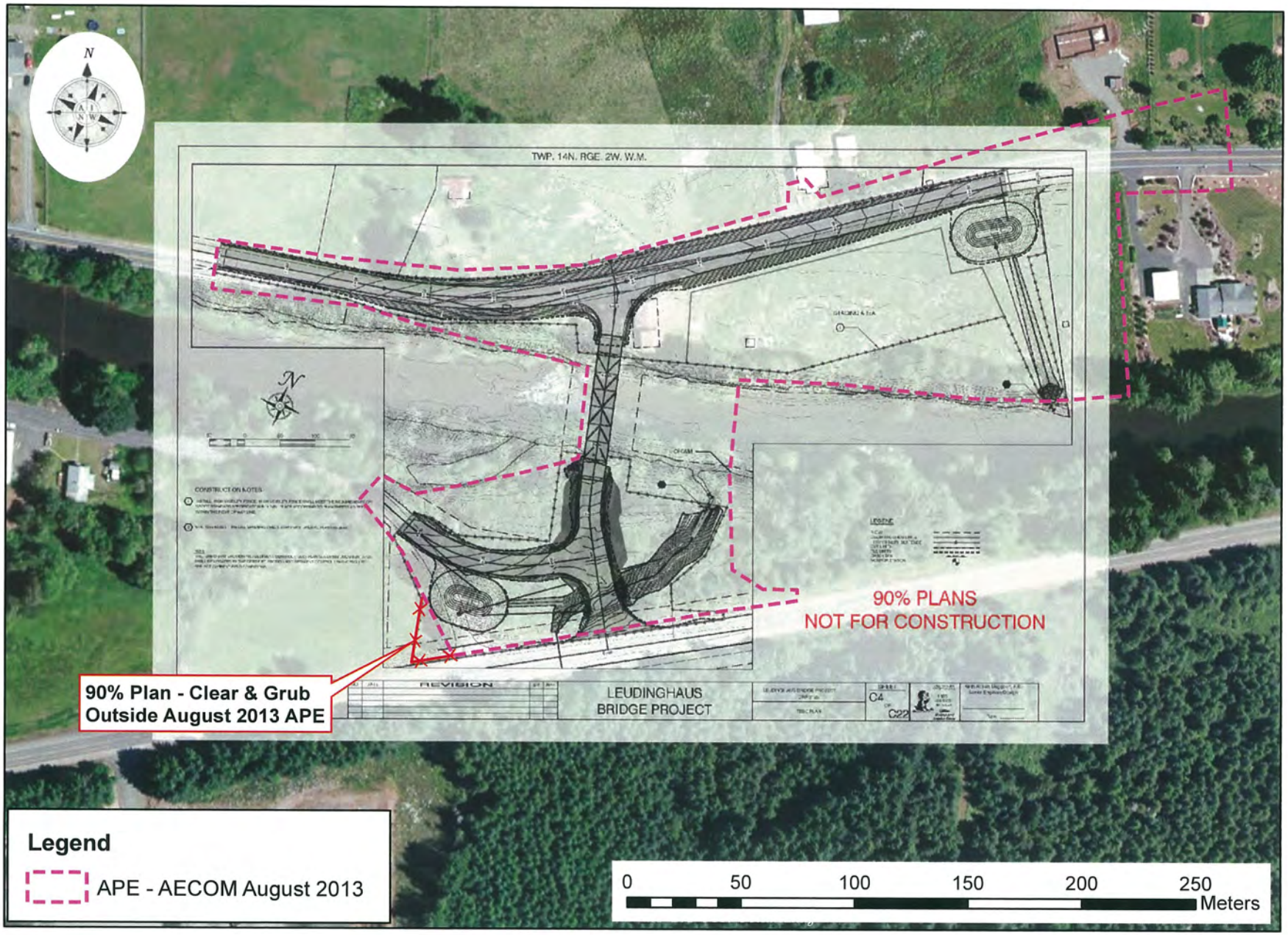
We would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4) and the survey report when it is available.

These comments are based on the information available at the time of this review and on behalf of the State Historic Preservation Officer in conformance with Section 106 of the National Historic Preservation Act and its implementing regulations 36CFR800. Should additional information become available, our assessment may be revised.

Thank you for the opportunity to review and comment. If you have any questions, please feel free to contact me.

Sincerely,

Matthew Sterner, M.A.
Transportation Archaeologist
(360) 586-3082
matthew.sterner@dahp.wa.gov


N
TWP. 14N. RGE. 2W. W.M.
CONSTRUCTION NOTES
REVISION
LEUDINGHAUS
BRIDGE PROJECT
C4
C22
90% PLANS
NOT FOR CONSTRUCTION
90% Plan - Clear & Grub
Outside August 2013 APE
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U.S. Department of Homeland Security
Region X
130 228th Street SW
Bothell, WA 98021-9796

FEMA

Dear Interested Party

The Department of Homeland Security's Federal Emergency Management Agency (FEMA) is proposing to support Lewis County by providing partial funding to repair/replace two bridges on the Chehalis River, near Dryad, Washington: (1) the Dryad Bridge, on Chandler Road; and (2) the Mays Bridge, on Leudinghaus Road. Severe storms in the region on December 3, 2007, caused extensive flooding, landslides, and mudslides. A presidential disaster was declared in the region on December 8, 2007, making funds available to public entities for damage repairs.

The purpose of these two proposed projects is to provide road access for two bridges that were completely destroyed during the December 2007 storms. Bridge crossings along the Chehalis River are necessary to provide access from State Route (SR) 6 to residents living on the north side of the river. Currently, no river crossing access is provided at the former Dryad Bridge site. At the Mays Bridge site, a temporary modular bridge (called a Bailey bridge), on loan from the Washington State Department of Transportation (WSDOT), currently provides a one-lane crossing at the site of the former bridge site. The Mays Bridge site is approximately 3 miles east of the Chandler Bridge site (see the attached figures).

The proposed project at the Dryad Bridge site (also called the Chandler Bridge) includes the construction of a precast post tensioned spliced girder bridge, at a revised alignment. The proposed bridge design is a 220-foot long and 28-foot wide single-span concrete structure, 19 feet longer than the former bridge. The new alignment is slightly upstream (west of) the former bridge alignment, and the new grade of the approach and bridge deck would be raised by approximately 14 feet to improve the connection to SR 6.

The proposed project at the Mays Bridge site includes the construction of a precast girder bridge, with a revised alignment. The proposed bridge design is a 180-foot long and 28-foot wide single-span concrete structure, 10 feet wider than the former bridge. The new alignment is slightly downstream (east of) the former bridge alignment, which will allow the temporary Bailey bridge to remain in use as the new bridge is constructed. The grade of the new approach and bridge deck would be raised by approximately 14 feet.

Both bridge construction projects have been designed in accordance with standard design practices established by the American Association of State Highway and Transportation Officials (AASHTO) as documented in the AASHTO Bridge Manual. Both new proposed bridges are single-span structures, designed to better pass debris associated with high-flow events in the river. The currently proposed designs were selected after an initial engineering review of potential design solutions. There may be deviations to the designs depending on comments and other alternatives identified through the scoping process or the environmental review process. At both sites, the new approaches would require acquisition of right-of-way easements with several landowners in the vicinity.

The Scoping Process

The purpose of this notice is to invite you to participate in the "scoping process" by reviewing the initial proposals as outlined in this notice and providing comments to support the development of the Environmental Assessment (EA) documents being prepared. The National Environmental Policy Act (NEPA) requires FEMA to evaluate the impacts of these proposed actions on the human and natural environments. FEMA intends to prepare a separate EA for each of these two projects. We are asking your assistance to identify the scope of issues and concerns to be addressed in the analysis, develop alternatives to the proposed actions, and identify potential impacts of implementing either of the two projects.

Please submit your written comments on these proposals (or, if you represent an agency, a written confirmation of receipt of this notice stating that your agency has no comments to contribute) to FEMA's consultant:

Jim Keany, EDAW AECOM
710 Second Avenue, Suite 1000
Seattle WA, 98104
Jim.Keany@aecom.com

Comments must be received by October 1, 2009.

If you have questions about this letter, the projects, or if you want to receive a copy of the Draft EA document for review and comment when it is released later during the public involvement process, please feel free to contact Jerry Creek, Environmental Specialist via email (jerry.creek@dhs.gov) or phone (425-482-3719) or me via email (mark.eberlein@dhs.gov) or phone (425-487-4735).

Sincerely,

Mark Eberlein
Regional Environmental Officer
FEMA Region 10

Enclosure: Project Vicinity Maps
Distribution List

Distribution List

FEDERAL AGENCIES

U.S. Environmental Protection Agency (EPA)
- Christine Reichgott, NEPA Review Unit Mgr
- Gretchen Hayslip, Office of Env Assessment, Aquatic Biologist
- Lillian Herger, Office of Env Assessment, Fisheries Biologist
- Wendy Marshall, Office of Water and Watersheds

Federal Emergency Management Agency (FEMA)
- Bill Gadberry, Public Assistance Program

U.S. Fish and Wildlife Service (USFWS)
- Rowan Baker, Region 1 NEPA Coordinator
- Brian Peck, Chehalis Fisheries Restoration Program
- John Grettenberger, Division Manager

National Marine Fisheries Service (NMFS)
- Kathe Hawe, NW NEPA Coordinator
- Steve Landino, WA State Habitat Office

U.S. Army Corps of Engineers (Corps)
- Lester Soule, Chief, Civil Projects Branch
- Patricia Robinson, Floodplain Mgmt Program

STATE AGENCIES

Washington State Historic Preservation Office (SHPO)
- Allyson Brooks, DAHP, SHPO
- Matthew Sterner, DAHP, Transportation Archaeologist
- Rob Whitlam, SHPO, Archaeologist

Washington Department of Ecology (Ecology)
- Chris Hempleman, WA Dept of Ecology, Shorelands & Env Assistance
- Dave Rountry, WA Dept of Ecology, Water Q Program
- Peg Plummer, WA Dept of Ecology, SEPA Register Coordinator
- Scott McKinney, WA Dept of Ecology, Flood Program

Washington Department of Fish and Wildlife (WDFW)
- Bob, Burkle
- Scott, Brummer
- Steve, Manlow
- Chad, Stussy, Watershed Stewardship Biologist

Washington State Emergency Mgmt Division
- Gary, Urbas, Public Assistance

Washington Department of Transportation
- Cheryl, McNamara, NEPA Specialist
- Ernest , Combs, NEPA Specialist
- Colin, Newell, Area Engineer

Washington Department of Emergency Management
- SEPA Center

Local Agencies

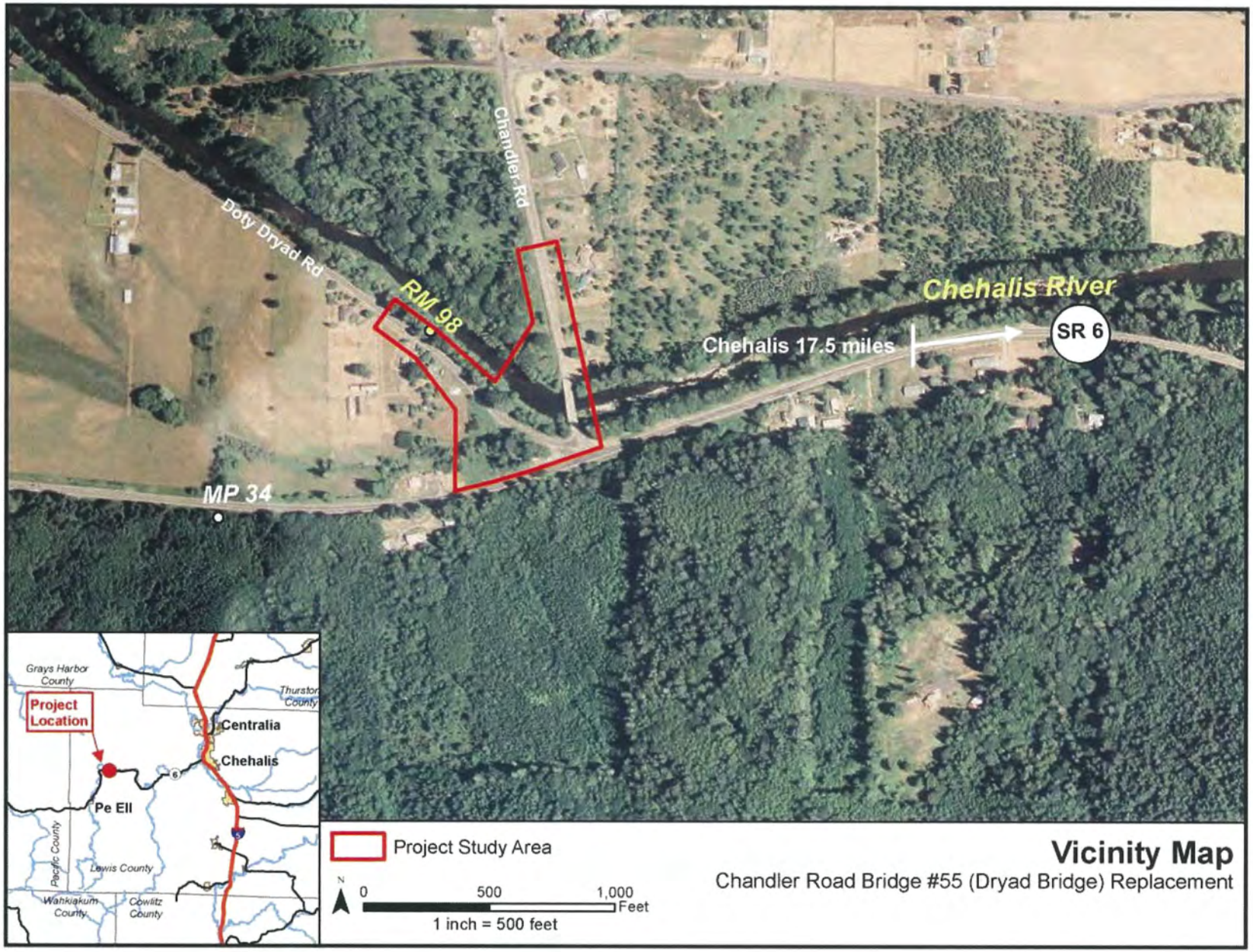
Bob Amrine, Lewis County Conservation District, District Manager
Keith Muggoch, Lewis County Public Works
Kernen Lien, Lewis County, Senior Planner

Tribal Contacts

Richard Bellon, Chehalis Confederated Tribes

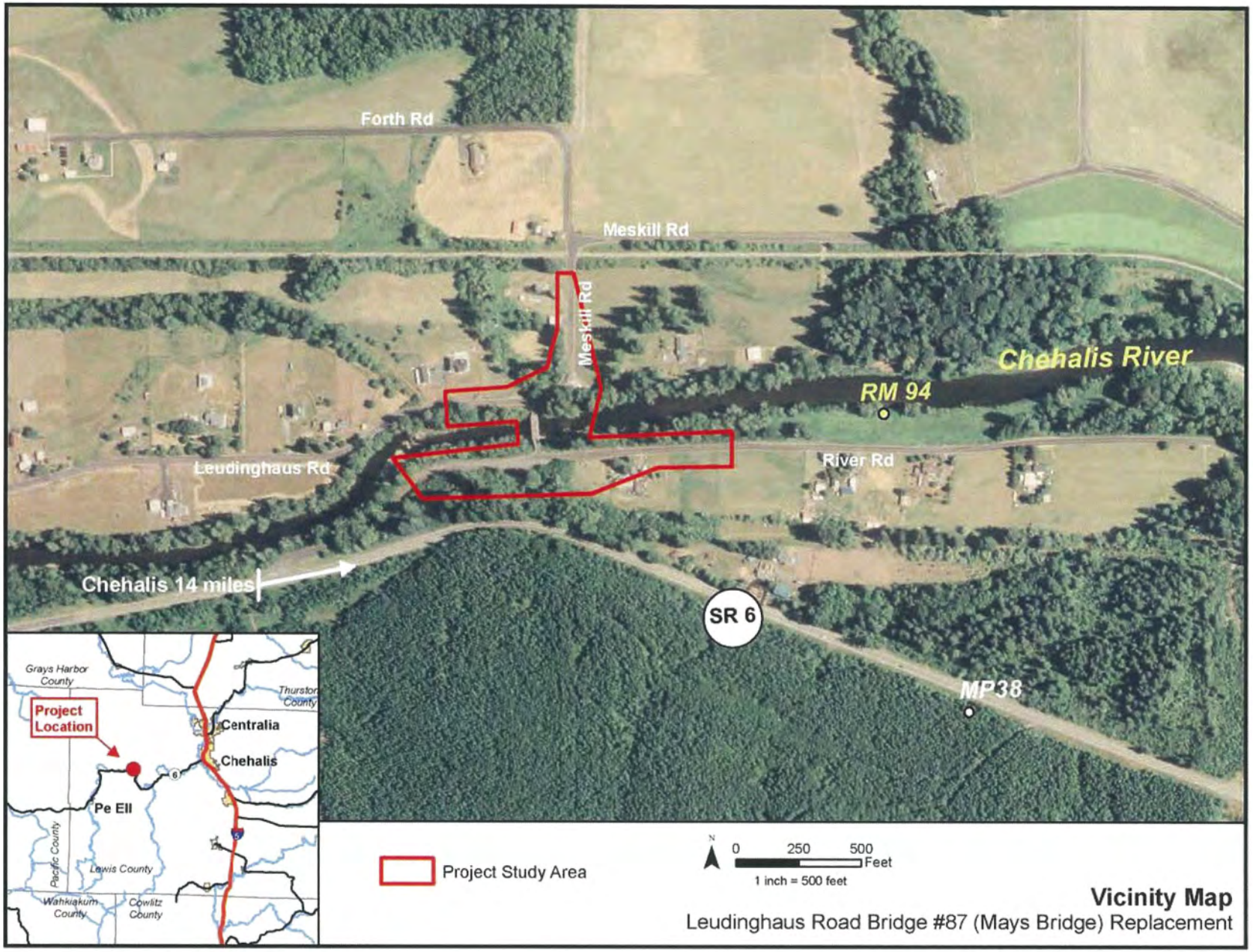
Other Stakeholders

Kathy Jacobson, Chehalis Basin Education Consortium
Chehalis Basin Fisheries Task Force
Lee Napier, Chehalis Basin Partnership
Janet Strong, Chehalis River Basin Land Trust
Chehalis River Council
Fay, Osbourn, Neighbor
John, Baker, Neighbor
Marvin & Diana, McCloud, Neighbor
Brenda, Boardman, Neighbor
Donald & Margret, Colley, Neighbor
William & Faith, McConnell, Neighbor
Irene, LeMaster, Neighbor
William & Nicole, Bush, Neighbor
Troy & Heather, Cox, Neighbor
Jacqueline, Morgan Trust, Neighbor
Elliot & Valerie, Bornstein, Neighbor



Vicinity Map

Chandler Road Bridge #55 (Dryad Bridge) Replacement



Vicinity Map

Leudinghaus Road Bridge #87 (Mays Bridge) Replacement

Elliot and Valerie Bornstein
553 River Road
Chehalis, WA 98532
(360)291-3620

September 26th, 2009

Jim Keany, EDAW AECOM
FEMA Consultant
710 Second Avenue, Suite 1000
Seattle, WA 98104

RE: MAY'S BRIDGE

Mr. Keany:

I am writing in regards to the proposed May's Bridge project. I have several questions and concerns about this matter.

My main concern is that two bridges are not necessary; one bridge would be sufficient. If the May's Bridge is to be replaced, why not move it west where it would have much less impact. I am having trouble understanding why the government would spend millions of dollars to put in a bridge that will destroy our property and home, when the Chandler Bridge is approximately four miles away. Putting in the May's Bridge will only save commuters six to eight minutes of driving time.

First, Why is it necessary to put the bridge further east (downstream), instead of further west (upstream)? As moving it east puts it closer to our home. Second, why is it necessary for the bridge to be ten feet wider? We are in the country; this is a country road, not a highway! This would create an opportunity for increased traffic and speed. Third, why is it necessary for the bridge to be raised fourteen feet? We have lived in this home for approximately twenty years; in that time, the flood waters have never even reached our road. Fourth, what other proposals have there been in regard to this project? And, if there are others, why have we not been informed of these as well? This is a huge decision to make. It seems like we would have been informed of a project of this magnitude prior to us setting our foundation, for the building of our new home. Fifth, how much will this project affect the current and future value of our home and property? This is our only asset; our retirement. This home and property is to be left to our children upon our passing.

This proposed project will have a direct impact on mine and my family's quality of life. We chose to live here and raise our family so we could enjoy the quiet and beauty of the tranquil country setting. With the amount of property you want to take, it will take away all of our river-front property and all of the area used by my children and grandchildren

to run, play with their dogs, and play sports. They also spend the summers swimming in the river and enjoying the outside country life. I worry about the safety of my husband and grandchildren. There are no sidewalks in the country, therefore when our grandchildren ride bikes, take walks, rollerblade, or any other activity that requires a lot of space, they have to play partly in the road (of course always with adult supervision). Looking at your project study area photo, the new road will come up to our front porch; completely taking away any area for my husband or grandchildren to walk and play safely. In addition, losing this amount of property will result in ruining all future projects that we have had planned for our grandchildren and ourselves.

Nine years ago my husband was in an accident- semi vs. train, resulting in a Traumatic Brain Injury (TBI), which includes cognitive deficits, balance issues, memory issues, etc. He is permanently disabled and requires twenty-four hour care. It directly affects his health and well-being when he is removed from his familiar surroundings. While we were temporarily misplaced due to the flood, we were in a rental. During this time, he was very confused, disoriented, agitated, and depressed, until we were able to move back onto our property. He has a terrible fear of trains due to the accident and TBI. He gets very scared when he hears a train; out here in our home, he is unable to hear a train, and therefore he does not panic.

Years prior to the December 2007 flood, we had our home remodeled to accommodate his needs. We had a circular driveway put in so that he was able to walk on a level surface with the use of his walker or with the use of his wheelchair, depending on what he needed at the time. If this project proceeds, that driveway will be inaccessible. My husband has many needs that require a lot of attention and careful planning. With the outcome of this project his quality of life will be damaged to the extreme.

We have already lost everything we have ever owned. All we had were the clothes on our backs!! I think that losing everything in your life once, is more than anyone should have to go through. We were displaced from our home for eighteen months. We have put so much time, money, and effort to be able to move back home. We have only been home for about two months. The thought of losing our home once again, has added an overwhelming amount of stress to our lives.

Nature was responsible for taking our home the first time. A natural disaster, which is unpreventable, and now it is the Government who is responsible for wanting to take our home the second time, something which is completely preventable. There are other options that would cause much less impact.

Sincerely,

Valerie Bornstein

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

October 1, 2009

Jim Keany, Senior Ecologist
EDAW AECOM
710 Second Avenue, Suite 100
Seattle, WA 98104

Dear Mr. Keany:

Thank you for the opportunity to comment on the national environmental policy act/scoping for the Dryad Bridge & Mays Bridge Repair/Replace project located on Chandler Road and Leudinghaus Road. The Department of Ecology (Ecology) reviewed the information provided and has the following comment(s):

SEPA REGIONAL PROJECT LEAD: Sarah Lukas (360) 407-7459

I recommend the Environmental Analysis include an analysis of the proposed placement of the replacement structures. The analysis should contend that the proposed placement of the structures will:

- Avoid and minimize detriment to riparian habitat;
- Ensure the proposed bridges will sustain future flood levels equal to a 100-year flood event; and,
- Establish consistency with the Lewis County Shoreline Master Program, the State and Federal Clean Water Acts, and other applicable laws.

Ecology's comments are based upon information provided by the lead agency. As such, they may not constitute an exhaustive list of the various authorizations that must be obtained or legal requirements that must be fulfilled in order to carry out the proposed action.

If you have any questions or would like to respond to these comments, please contact the appropriate reviewing staff listed above.

Department of Ecology
Southwest Regional Office

(SM: 09-5157)

cc: Sarah Lukas, SEA

From: McCloud9 LLC [mailto:the_mccloud9@yahoo.com]

Sent: Saturday, September 05, 2009 2:44 PM

To: Keany, Jim

Cc: mark.eberlein@dhs.gov

Subject: Property on Hwy 6 effected by new bridge

We have the property on hwy 6 (4212 state route 6) that is going to be effected by this bridge going in. Looking at your map and boundries you are wanting to bring it to on our property, it looks like you are taking 1/3 of our acerage. We are wanting to relocate elsewear and sell our property. It would be almost impossible to sell this property after it has been cut down that much. Especially since visibility coming off that angle will be very dangerous due to the blockage of our trees on the rest of our property line. This would most likely mean you plan on taking out all our trees on the property line as well, which leaves our place bare of protection from the road. We would like to ask that you purchase the whole piece of property so we can move somewhere else. Please let us know what your intentions are. Thanks.Marvin & Diana McCloud,Jr.

U.S. Department of Homeland Security
Region X
130 228th Street SW
Bothell, WA 98021-9796

FEMA

August 13, 2012

RE: FEMA Proposal to Fund Leudinghaus Road Bridge Replacement
FEMA-1734-DR-WA, PW 110
Lewis County, Washington
NEPA Scoping for Environmental Assessment

Dear Interested Party:

The U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) is proposing to support the Lewis County Public Works Department by providing partial funding to replace the Leudinghaus Road Bridge (also known as Mays Bridge) across the Chehalis River near the community of Meskill in Lewis County, Washington. The original bridge was washed away during a severe winter storm and flooding on December 3, 2007 (see below). The President declared the storm event a major disaster (FEMA 1734-DR-WA), making funds available for public infrastructure repairs.

The purpose of this notice is to invite you to participate in a National Environmental Policy Act (NEPA) scoping process by reviewing the initial proposal as outlined in this letter and providing comments to help FEMA prepare a draft Environmental Assessment (EA) under NEPA. The EA will evaluate the impacts of this proposed action on the natural and cultural environment. We are asking your assistance in identifying the scope of issues and concerns to be addressed in the analysis, developing viable alternatives to the proposed action, and identifying potential impacts of implementing the project.

During the storm, the Chehalis River overflowed its banks, carrying large woody debris downstream. This debris hit and destroyed the vehicular bridge that connected River Road, on the south side of the river, to Leudinghaus Road, on the north side of the river. This bridge provided access from State Route (SR) 6 via River Road across the Chehalis River to homes, businesses, and natural and recreational resources on the north side of the river.

The project proposal is to restore vehicular access between these areas by constructing a new bridge structure over the Chehalis River. The proposed bridge design is a single-span structure with an elevated bridge deck to better accommodate debris associated with high-flow events in the river (the new bridge deck would be raised by approximately 14 feet). The higher elevation of the proposed bridge structure would require alterations to the approach roads on both sides of the river to match the elevation of the new bridge, including grade changes, realignment, and new roadway.

In several public meetings and workshops, FEMA solicited input from residents and interested parties in Lewis County regarding different location alternatives for bridge replacement. As a result of these meetings, FEMA identified two potential action alternatives for evaluation in the NEPA EA, which involve construction of the proposed new bridge at different locations along the Chehalis River, but will

consider alternate or additional action alternatives identified during this scoping process, which involves a larger audience.

Action Alternative 1, which Lewis County has identified as their Preferred Alternative, involves construction of a new bridge at a new location approximately 2,500 feet upstream (west) of the former bridge site. Under Action Alternative 1, the new bridge would extend from the intersection of Hatchery Road and SR 6 on the south side of the river to Leudinghaus Road on the north side of the river. Action Alternative 2 involves construction of a new bridge at the original bridge site with a new SR 6 intersection.

The project area is located in western Lewis County, approximately 15 miles west of Chehalis via SR 6. The project area is located in Section 9 of Township 13N, Range 04W (see attached map). The project coordinates are 46.63398 N (latitude) / -123.190842 W (longitude).

Submittal of Comments

Please submit your written comments on this proposal (or, if you represent an agency, a written confirmation of receipt of this notice stating that your agency has no comments to contribute) to FEMA via a reply to the email forwarding this notice. Or you may submit written comments via regular mail to:

Science Kilner
Acting Regional Environmental Officer
FEMA Region 10
130 228th St. SW
Bothell, WA 98021-9796

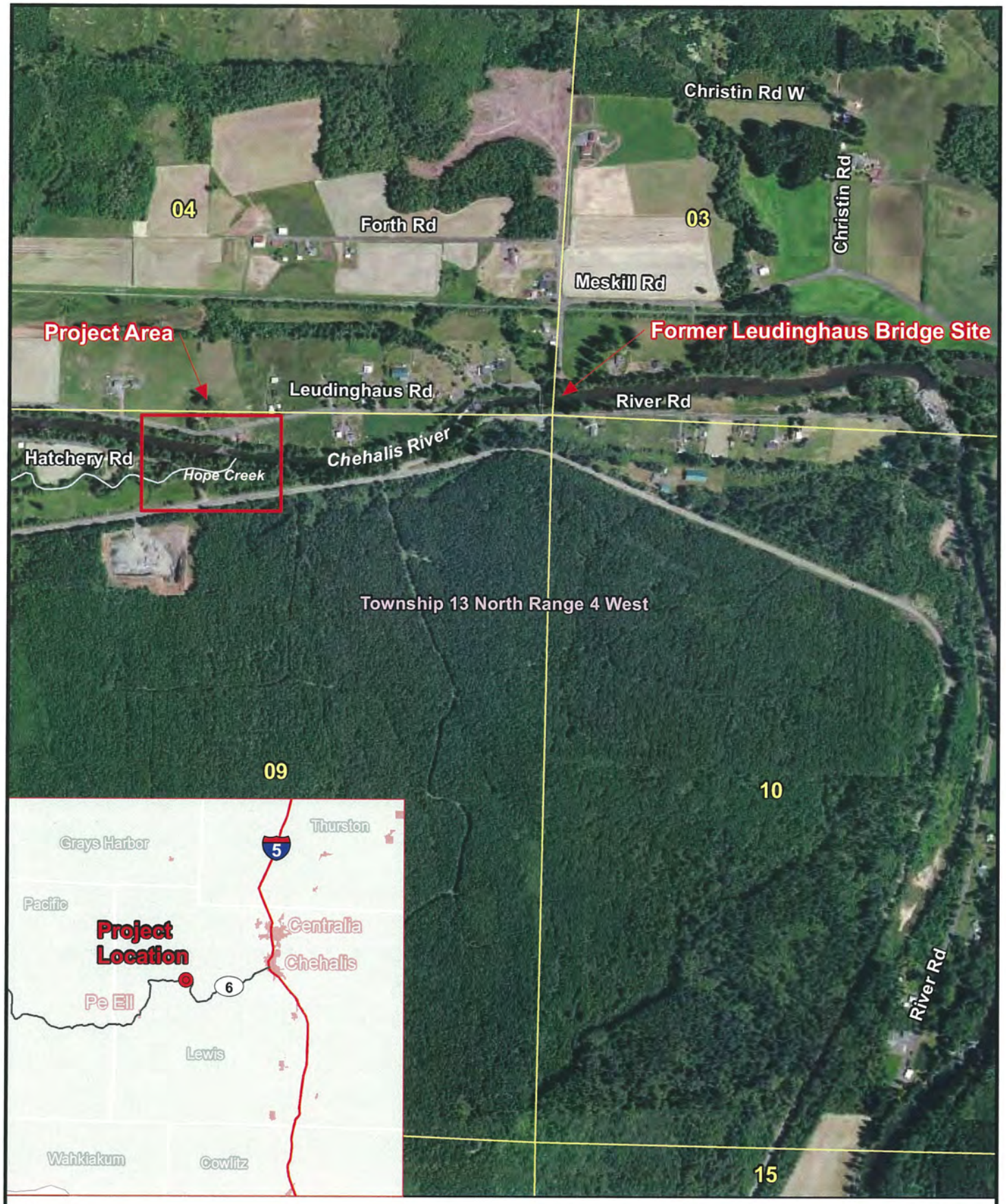
Comments must be received in writing prior to 5:00 p.m. on Friday, September 21, 2012.

If you have questions about this letter, the project, or if you want to receive a copy of the Draft EA document for review and comment when it is released later during the public involvement process, please feel free to contact me via email (science.kilner@fema.dhs.gov) or phone (425-487-4713).

Sincerely,

Science Kilner
Acting Regional Environmental Officer
FEMA Region 10

Enclosures:
Project Vicinity Map



N

0 0.25 0.5 Miles

Vicinity Map

Leudinghaus Bridge Replacement

Howard, Linda

From: HALEY RICHARDS [haley.richards@live.com]
Sent: Sunday, August 19, 2012 8:25 PM
To: Howard, Linda
Subject: Re: NEPA Scoping Notice for the Leudinghaus Bridge Replacement Project Environmental Assessment

Haley and Dave Richards
708 Meskill rd chehalis, wa. 98532
We choose the hatchery rd bridge project.
Thank you for wanting out input..
Haley Richards

Sent from my iPad

On Aug 14, 2012, at 12:04 PM, "Howard, Linda" <Linda.Howard@aecom.com> wrote:

Dear Interested Parties:

Attached is a letter from the Federal Emergency Management Agency (FEMA) announcing the public scoping process associated with a proposed disaster-related funding action for the Leudinghaus Road Bridge Replacement Project in Lewis County, Washington. Details of this project are included in the letter.

As part of its compliance responsibilities under the National Environmental Policy Act (NEPA), FEMA is inviting you to participate in the scoping process for preparation of an environmental assessment (EA). Your assistance will help to identify the scope of issues and concerns to be addressed in the analysis, develop viable alternatives to the proposed action, and identify potential impacts of implementing the project. The attachment to this email provides additional information regarding the project.

As noted in the letter, please send any scoping-related comments you may have to FEMA by 5:00 p.m. on Friday, September 21, 2012 by replying to this email or by submitting written comments via regular mail to:

Science Kilner
Acting Regional Environmental Officer
FEMA Region 10
130 228th St. SW
Bothell, WA 98021-9796

<Leudinghaus-Bridge-Scoping-Notice.pdf>

Howard, Linda

From: Nikki Bush [bushfam99@hotmail.com]
Sent: Monday, August 20, 2012 9:49 PM
To: Howard, Linda
Subject: RE: NEPA Scoping Notice for the Leudinghaus Bridge Replacement Project Environmental Assessment

Science Kilner
Acting Regional Environmental Officer
FEMA Region 10
130 228th St. SW
Bothell, WA 98021-9796

As a Leudinghaus Rd community member and one of numerous families directly impacted by the devasting flood of 2007, we are very excited to hear of the advancement in the replacement of the Leudinghause bridge. We are very much in favor of Action Alternative 1 involving construction at new location of Hatchery Rd and SR 6. Our property would be of direct involvement with Alternative 2 which would include loss of property and extreme change of landscape. Having attended several meetings it is understood that the environmental change would be drastic due to the new bridge requirements. The elevation of a new bridge, grade changes with approach, realignment and roadways which includes change of our personal driveway and pasture would change both short and long term of our personal and professional lives. The property and land we own now is vital to the raising of beef.

Alternatives were never given to us as a property owner that would be affected at the beginning of this long process of replacement. We were pleased to have heard that an alternative location was a possibility and we are VERY STRONGLY in favor of the change in location from where it was initially. Hatchey Rd and SR 6 would affect the least amount of property owners and restore vehicular access over Chehalis River on the East end of Leudinghaus. Emergency response time would improve as well.

Thank you for the consideration and allowing comments of the proposal for the Leudinghaus Bridge Replacement Project.

Sincerely,

Bill and Nikki Bush
707 Meskill Rd
Chehalis, WA 98532

Linda.Howard@aecom.com
To: Linda.Howard@aecom.com
Subject: NEPA Scoping Notice for the Leudinghaus Bridge Replacement Project Environmental Assessment
Date: Tue, 14 Aug 2012 19:04:07 +0000

Dear Interested Parties:

Attached is a letter from the Federal Emergency Management Agency (FEMA) announcing the public scoping process associated with a proposed disaster-related funding action for the Leudinghaus Road Bridge Replacement Project in Lewis County, Washington. Details of this project are included in the letter.

As part of its compliance responsibilities under the National Environmental Policy Act (NEPA), FEMA is inviting you to participate in the scoping process for preparation of an environmental assessment (EA). Your assistance will help to identify the scope of issues and concerns to be addressed in the analysis, develop viable alternatives to the proposed action, and identify potential impacts of implementing the project. The attachment to this email provides additional information regarding the project.

As noted in the letter, please send any scoping-related comments you may have to FEMA by 5:00 p.m. on Friday, September 21, 2012 by replying to this email or by submitting written comments via regular mail to:

Science Kilner
Acting Regional Environmental Officer
FEMA Region 10
130 228th St. SW
Bothell, WA 98021-9796

Howard, Linda

From: Heather Cox [hcox425@yahoo.com]
Sent: Tuesday, August 21, 2012 4:22 PM
To: Howard, Linda
Subject: Re: NEPA Scoping Notice for the Leudinghaus Bridge Replacement Project Environmental Assessment

Science Kilner
Acting Regional Environmental Officer
FEMA Region 10

Ladies and Gentlemen:

As a resident of Meskill on Leudinghaus Rd, we would like to offer our preferred choice in the Meskill Bridge Replacement. We feel that Option 1 would be the best alternative. It would be the safest from the highway and cause the least disruption to residents.
We look forward to watching the progression of our bridge replacement at the Hatchery Rd site.
Thankyou,
Sincerely,

Troy & Heather Cox
120 Leudinghaus Rd
Chehalis, WA 98532

From: "Howard, Linda" <Linda.Howard@aecom.com>
To: "Howard, Linda" <Linda.Howard@aecom.com>
Sent: Tuesday, August 14, 2012 12:04 PM
Subject: NEPA Scoping Notice for the Leudinghaus Bridge Replacement Project Environmental Assessment

Dear Interested Parties:

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Acting Regional Environmental Officer
FEMA Region 10
130 228th St. SW
Bothell, WA 98021-9796

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Science Kilner
Acting Regional Environmental Officer
FEMA Region 10
130 228th St. SW
Bothell, WA 98021-9796

<Leudinghaus-Bridge-Scoping-Notice.pdf>

August 28, 2011

Dear Science Kilner,

We are in favor of a bridge at <u>either</u> <u>site</u>.

Our main concern is without a bridge we are too far from a fire dept; for insurance reasons.

thank-you

Guy and Gillen Bauman
267 River Rd
Chehalis, WA
98532

Howard, Linda

From: Sue Rosbach [suerosbach@yahoo.com]
Sent: Monday, September 03, 2012 9:37 PM
To: Howard, Linda
Subject: Re: NEPA Scoping Notice for the Leudinghaus Bridge Replacement Project Environmental Assessment

Thank you for giving us the opportunity to have some input for the placement of the Leudinghaus Bridge. My family has lived on this property since 1902, so needless to say it is very near and dear to our hearts. We are strongly in favor of placing the replacement bridge with Action ALternative 1 for many reasons; first, the safety of turning onto the road from Highway 6. The Hatchery Road turnoff is much safer, has better visibility and you have much more time to either slow down or get up to speed on the highway. Second, there is no hairpin turn on Hatchery Road, which is incredibly dangerous on River Road; third, fewer homeowners would be adversely affected with the Hatchery Road option. In fact, I understand the homeowners on the Leudinghaus side that would be the only home affected are completely in favor of this choice. The other option would adversely affect several homeowners, and none of them are willing to devalue their property, in fact lose property with the new design.

I urge you to get the replacement bridge in place soon. The extra time (15 minutes each way) that it now takes is a burden. The lack of safety with being so isolated is very unsettling with the police and fire departments as well as the ambulance taking so long to get to our house. This is NOT a feeling we should have to endure. There has always been a bridge in this small community of Meskill, but is/was used by more than just the people that live here. We NEED this bridge soon.

Thank You,
Joe and Sue Rosbach
128 Christin Rd.
Chehalis,WA. 98532

Phone: 360 520-1340 cell. 360 291-3624 home.

Sent from my iPad

On Aug 14, 2012, at 12:04 PM, "Howard, Linda" <Linda.Howard@aecom.com> wrote:

> Dear Interested Parties:
>
> Attached is a letter from the Federal Emergency Management Agency (FEMA) announcing the public scoping process associated with a proposed disaster-related funding action for the Leudinghaus Road Bridge Replacement Project in Lewis County, Washington. Details of this project are included in the letter.

To: Science Kilner

I've received the letter concerning the Leudinghaus bridge. I am a resident of Meskill Washington. Since the bridge was destroyed and the Bailey bridge was removed it has put a large damper on traveling for me. The longer drive is putting extra wear and tear on my vehicles, including tires, brakes, appearance, and more fuel to drive the longer route. The Hatchery Road proposal , I believe would be the best location for the new bridge. I hope this information gives us as a community the opportunity to get a new bridge developed.

Thank you for the opportunity to share my opinions about the project.

Sincerely,

Mr. Charles Christin

630 Meskill Road

Chehalis, WA 98532

RECEIVED

SEP 20 2012

FEMA REGION X

From: King, Susan
To: Howard, Linda
Subject: Fw: FEMA Proposal to Fund Leudinghaus Road Bridge Replacement
Date: Thursday, September 20, 2012 1:36:20 PM

From: Kilner, Science
Sent: Thursday, September 20, 2012 04:34 PM
To: King, Susan
Subject: FW: FEMA Proposal to Fund Leudinghaus Road Bridge Replacement

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From: Linda Stanley [mailto:lis59@msn.com]
Sent: Thursday, September 20, 2012 1:30 PM
To: Kilner, Science
Subject: FEMA Proposal to Fund Leudinghaus Road Bridge Replacement

Dear Science Kilner,

I am writing you this email in response to a letter I received in the mail about the bridge replacement for the Leudinghaus Bridge. I'm really not sure what you what us to say, we said everything in the last meeting we had with FEMA and the County. So...all I would like to say is that we really need a bridge and as quick as possible!!! We have the 911 issue, where it takes them about 10 minutes longer to get to us, which in an emergency is a lot of time!!! And the county has left us out on an island in the event there was another flood, we are blocked from getting out of our property, due to the little stream's that would flood over the roadway way before it would our property, so we would be trapped!!! Plus, I do have a in-home business, which requires customers to be able to get to my home, which limit's my income, because I can only pull from one area, due to the fact it is 8-10 miles out of the direction where I live, which if there was a bridge right by where I live (like their use to be) I could draw people from both directions? In this economy, it is a hardship on my husband and I to have him drive an extra 50 miles a week just to get to work and back also.
If you have any questions please feel free to contact me at lis59@msn.com or (360) 623-0277. Thank You Linda Stanley and Joe Givens 101 Forth Road, Chehalis, Wa 98532

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

September 21, 2012

Ms. Science Kilner
Acting Regional Environmental Officer
FEMA Region 10
130 228th Street Southwest
Bothell, WA 98021-9796

Dear Ms. Kilner:

Thank you for the opportunity to comment on the NEPA scoping for the Leudinghaus Road Bridge Replacement project (FEMA-1734-DR-WA, PW 110) located in Lewis County. The Department of Ecology (Ecology) reviewed the information provided and has the following comment(s):

SHORELANDS & ENVIRONMENTAL ASSISTANCE:
Alex Callender (360) 407-6167

The project must be consistent with the shoreline Management Act and the local Shoreline Master Program. Any in water work may require state and federal Water quality certification and mitigation. I f wetland impacts are expected, now would be the time to consider your mitigation options. There is a new umbrella bank that should be available for credits shortly.

WASTE 2 RESOURCES: Mike Drumright (360) 407-6397

If greater than 250 cubic yards of inert, demolition, and/or wood waste is used as fill material, a solid waste handling permit is required from the local jurisdictional Health Department (WAC 173-350-990).

All grading and filling of land must utilize only clean fill, i.e., dirt or gravel. All other materials, including waste concrete and asphalt, are considered to be solid waste and permit approval must be obtained through the local jurisdictional health department prior to filling (WAC 173-350-990).

Recycle Construction, Demolition and Land Clearing (CDL):
Property owners, developers, and contractors are encouraged to recycle all possible leftover CDL materials and reduce waste generated. Recycling construction debris is often less expensive than landfill disposal. Please visit Ecology's 1 800 Recycle Hotline database at: http://1800recycle.wa.gov or call the 1-800-RECYCLE hotline to find facilities that will accept your CDL materials for reuse or recycling.

SEPA REVIEWER: Sonia Mendoza
WATER QUALITY CONTACT: Sheila Pendleton-Orme (360) 690-4787

Any discharge of sediment-laden runoff or other pollutants to waters of the state is in violation of Chapter 90.48 RCW, Water Pollution Control, and WAC 173-201A, Water

Quality Standards for Surface Waters of the State of Washington, and is subject to enforcement action.

Erosion control measures must be in place prior to any clearing, grading, or construction. These control measures must be effective to prevent stormwater runoff from carrying soil and other pollutants into surface water or stormdrains that lead to waters of the state. Sand, silt, clay particles, and soil will damage aquatic habitat and are considered to be pollutants.

Proper disposal of construction debris must be on land in such a manner that debris cannot enter water of the state (e.g., Chehalis River) and stormdrains draining to waters of the state or cause water quality degradation of state waters.

During construction, all releases of oils, hydraulic fluids, fuels, other petroleum products, paints, solvents, and other deleterious materials must be contained and removed in a manner that will prevent their discharge to waters and soils of the state. The cleanup of spills should take precedence over other work on the site.

A permanent vegetative cover should be established on denuded areas at final grade if they are not otherwise permanently stabilized.

Provision should be made to minimize the tracking of sediment by construction vehicles onto paved public roads. If sediment is deposited, it should be cleaned every day by shoveling or sweeping. Water cleaning should only be done after the area has been shoveled out or swept.

Wash water from paint and wall finishing equipment should be disposed of in a way which will not adversely impact waters of the state. Untreated disposal of this wastewater is a violation of State Water Quality laws and statutes and, as such, would be subject to enforcement action.

Ecology's comments are based upon information provided by the lead agency. As such, they may not constitute an exhaustive list of the various authorizations that must be obtained or legal requirements that must be fulfilled in order to carry out the proposed action.

If you have any questions or would like to respond to these comments, please contact the appropriate reviewing staff listed above.

Department of Ecology
Southwest Regional Office

(SM:12-3968)

cc: Alex Callender, SEA
Mike Drumright, W2R
Sheila Pendleton-Orme, VFO/WQ