Prepared for: Tillamook Estuaries Partnership (TEP)

Burton-Fraser Road/Eckloff Road Upgrades
Alternatives Comparison

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1.0 Introduction and Executive Summary

ESA is assisting Tillamook Estuaries Partnership (TEP), in partnership with Tillamook County Public Works (TCPW), to develop a multi-benefit design solution for restoring hydrologic connectivity to the Tillamook River Wetlands and improving the safety and resiliency of the surrounding roadway system. The Tillamook River Wetlands (TRW) site is situated along the south side of the Tillamook River, from River Mile 2.5 to 3.5. The 73-acre site was purchased by North Coast Land Conservancy (NCLC) in 2020 for the purpose of restoring salmonid rearing habitat.

Burton-Fraser Road runs generally east-to-west along the south bank of the Tillamook River, between Hwy 131 on the west end and Tillamook River Road on the east end (***Figure 1, Figure 2***). Partially constructed prior to 1900 and completed in the early 1960s, Burton-Fraser Road has experienced significant deterioration over the decades and is on the verge of catastrophic failure.

The road's location directly adjacent to the Tillamook River and construction on a base of poor-quality marsh subsoils has led to severe settlement and sinking resulting in several low points where the river frequently overtops and flows across the roadway during high tides and moderate flow events. In 2012, TCPW constructed a series of six scour protection aprons at overflow points, but these features are also beginning to fail. The settlement, bank erosion, and scour due to overflowing water has resulted in failures of the pavement, shoulders, and guard rail/cable barriers creating many safety hazards. Several traffic accidents have occurred on the roadway in recent years, with multiple vehicles entering the Tillamook River.

The embankment of Burton-Fraser Road forms an earthen dike along the river that disconnects the land behind it from natural tidal and riverine processes. TEP is interested in restoring the hydrologic connection between TRW and the Tillamook River, thereby restoring fish passage and natural ecological processes to the TRW site. Two primary alternatives for achieving this goal are being considered.

Alternative 1 would connect the TRW site to the Tillamook River by reconstructing the historical tidal channel with a new bridge crossing on Burton-Fraser Road (***Figure 3***). A new bridge crossing alone would cost upwards of $3 Million, but the adjacent connecting roadway segments would remain in poor condition. Alternative 1 as described in this report includes raising Burton-Fraser Road above annual flood levels and replacing the other bridge and culverts to make the road usable for the next 30 years, as well as restoration actions and internal site improvements at TRW. The estimated total project cost for Alternative 1 is approximately $26 Million, including design, permitting, construction, and administration.

Even with such a significant investment, Burton-Fraser Road could still be vulnerable to erosion, less frequent flood events and future higher water levels, and continued settlement due to underlying geotechnical conditions. The roadway would also remain susceptible to mass failure during seismic events.

Alternative 2 would remove a portion of Burton-Fraser Road along the TRW site frontage, allowing restoration of the historical primary tidal channel (Fraser Slough) and additional natural floodplain connections. The nearby Eckloff Road would be upgraded to replace Burton-Fraser Road as the County's

primary roadway between Tillamook River Road and Hwy 131. The eastern 2 miles of Eckloff Road would require only minor improvements including repaving, addressing targeted slumping locations, and limited widening. The middle 1.5 miles require more-substantial widening and road reconstruction. The westernmost 3/4 miles is currently a gravel logging road with steep grades, sharp curves, and rough surfacing unsuitable for the traffic that currently uses Burton-Fraser Road. This section of roadway would likely need to be realigned, constructing a new roadway to meet Tillamook County/AASHTO design criteria for a 45 mile per hour roadway (***Figure 4***). These roadway improvements and restoration actions are estimated to cost approximately $21.5 Million.

Alternative 2 is considered to be a more effective and resilient long-term solution for maintaining the County access route between Hwy 131 and Tillamook River Road/Hwy 101. TCPW has a strong preference for Alternative 2, due to the poor condition and vulnerability of Burton-Fraser Road. Alternative 2 would also be most effective maximizing hydrologic connectivity, fish passage, and restoration potential at TRW and adjacent riverside properties. However, in order to advance this concept towards final design, it will be necessary to gain broad project support from stakeholders including the Tillamook County Board of Commissioners, Stimson Lumber Company, several private landowners in the immediate project vicinity, and funding agencies.

This report provides background information and reasoning for the project, describes existing conditions on the two roadways including deficiencies and safety hazards, details the proposed alternative configurations and means of roadway improvements, and compares the costs and benefits of implementing the two alternatives. Our results and recommendations will be presented to the internal stakeholder group including TEP, NCLC, and TCPW. Subsequently, this information will be presented to the Tillamook County Board of Commissioners and the public.

This report was developed from site reconnaissance and desktop data analysis, topographic and bathymetric surveying, and information provided by Tillamook County Public Works Department.

This report is primarily focused on the roadway improvement components of these alternatives. The planned restoration actions are described in more detail in the Tillamook River Wetlands Tidal Wetland Restoration 60% Plans and Basis of Design Report.

2.0 Existing Conditions Characterization

The following subsections describe the existing conditions of the two roadways, including history of road construction and repairs; current traffic conditions, traffic patterns, and road users; structural conditions, deficiencies, failures, and hazards; public safety concerns; local access considerations; and environmental considerations.

2.1 Burton-Fraser Road

Burton-Fraser Road is a primary connection between Hwy 101 and Hwy 131, south of Tillamook. The roadway is used by local residents travelling to and from the Netarts Bay area, as well as to and from the Tillamook Transfer Station at 1315 Eckloff Road. Additionally, there is significant commercial traffic, since the road provides a route that avoids traveling through the City of Tillamook (Images 1 and 2). S-C Paving Company uses this road as the daily route for transferring crushed aggregate from their Oceanside quarry to the asphalt plant located east of town along Trask River Road. Class 8, freight, industrial timber, and service trucks use Burton-Fraser Road on a regular basis. Recreational and vacation travelers also use Burton-Fraser Road for travel to and from the beach communities. According to TCPW traffic count data from December 2020, Burton-Fraser Road had an Average Daily Traffic (ADT) count of approximately 550 trips. Burton-Fraser Road is currently the sole access available to four private properties.

Image 1: *Commercial traffic on Burton-Fraser Road*

Image 2: *Commercial traffic driving through high water on Burton-Fraser Road*

2.1.1 - History of Burton-Fraser Road's Construction

According to the Tillamook County Public Works Department (TCPW), the section of the road from Hwy 131 south to the end of Old Fraser Road was constructed before 1900 as a plank road, wagon trail. At the time of construction, wagons were used as aids to guide rafts of logs out to the bay where mills would process the logs and load lumber on ships for transport. As a plank road, the effects of repeated tidal over topping and storm washouts would have been negligible and quick and easy to repair/replace (TCPW, 2021).

The section of the current Burton-Fraser Road from Old Fraser Road to Tillamook River Road was built sometime during the early 1960s. The base of the road was built on clay soils excavated from the surrounding area. TCPW has no record of the base of the road, but there is no indication that the base

was amended with aggregate. As seen in the 1954 construction drawings, the roadway was constructed to a consistent crest elevation of 14 feet (MLLW datum, that appears to be within 1 foot of NAVD88). Within 30 years, the roadway had settled several feet in some locations. In the 1980s TCPW obtained permits from Oregon Department of State Lands (DSL) to construct an earthen berm and drainage improvements along the western portion of the roadway to try to alleviate overtopping and ponding. The road continued to sink in places, and several additional low points also developed on the eastern stretch of roadway along TRW. In 2012, continued roadway overtopping led TCPW to construct a series of scour protection aprons at overflow points.

Image 3: *1939 aerial photo showing "Fraser Road West" and "Old Fraser Road" as unimproved roadways*

Image 4: *1960 aerial photo showing Burton-Fraser Road under construction along the edge of Tillamook River*

2.1.2 - Current Structural Conditions, Deficiencies, and Failures

Over the decades since construction, Burton-Fraser Road has experienced significant deterioration and is on the verge of catastrophic failure. The road's location directly adjacent to the Tillamook River and construction on a base of poor-quality marsh subsoils has led to severe settlement and sinking of between two to five feet in many locations. The roadway embankment on the river side is directly exposed to river forces and has experienced bank erosion, animal burrowing, and slumping which has eliminated the gravel shoulder and undermined the guardrail/cable barrier along much of its length. Other segments of the existing guardrail and cable barrier are damaged or missing due to traffic accidents.

Frequent Overtopping and Flooding

The sinking roadway has resulted in several low points where the river frequently overtops and flows across the roadway during high tides and moderate river flow events. The river overtops the roadway when water levels exceed 9.0' elevation (NAVD88). According to water level data collected in 2019-2021, water overtops the roadway 20 to 50 times per year during seasonal high tides and moderate riverine flood events Roughly 10 times per year, water depths can reach up to two feet or more, with maximum water depths of about 5 feet. Due to the underlying marsh soils, the road is continuously subsiding, which will in-turn increase the frequency of overtopping over time. The roadway is wholly within the FEMA mapped 100-year floodplain (Image 5) (FEMA, 2018).

During overtopping events, water overflowing across the roadway has eroded the back/wetland side of the roadway embankment, creating abrupt edge conditions and threatening to undermine the edge of the roadway pavement (Images 6 and 7). To temporarily address the erosion on the back side of the

road, TCPW constructed scour protection aprons in six locations where water frequently overtops and flows across the roadway. The aprons were constructed in 2012 using a wire mesh-reinforced controlled density fill (CDF), a self-compacting, cementitious material. These scour protection measures are temporary and incomplete solutions for preventing ultimate failure of the roadway, and the aprons are showing significant deterioration the less than 10 years they have been in place (Images 8, 9, and 10).

During each overtopping event, water continues to erode and undermine these features, and significant changes have been observed in the past year alone. In several locations the edges of the CDF are failing, and two of the CDF aprons have been undermined and pushed away from the road's edge leaving an abrupt edge and additional safety hazard. The volume and velocity of water that crosses the road during overtopping is expected to eventually erode the CDF and adjacent embankments. It is likely that an overtopping event and/or culvert collapse could blow out the roadway embankment, rendering the road impassable.

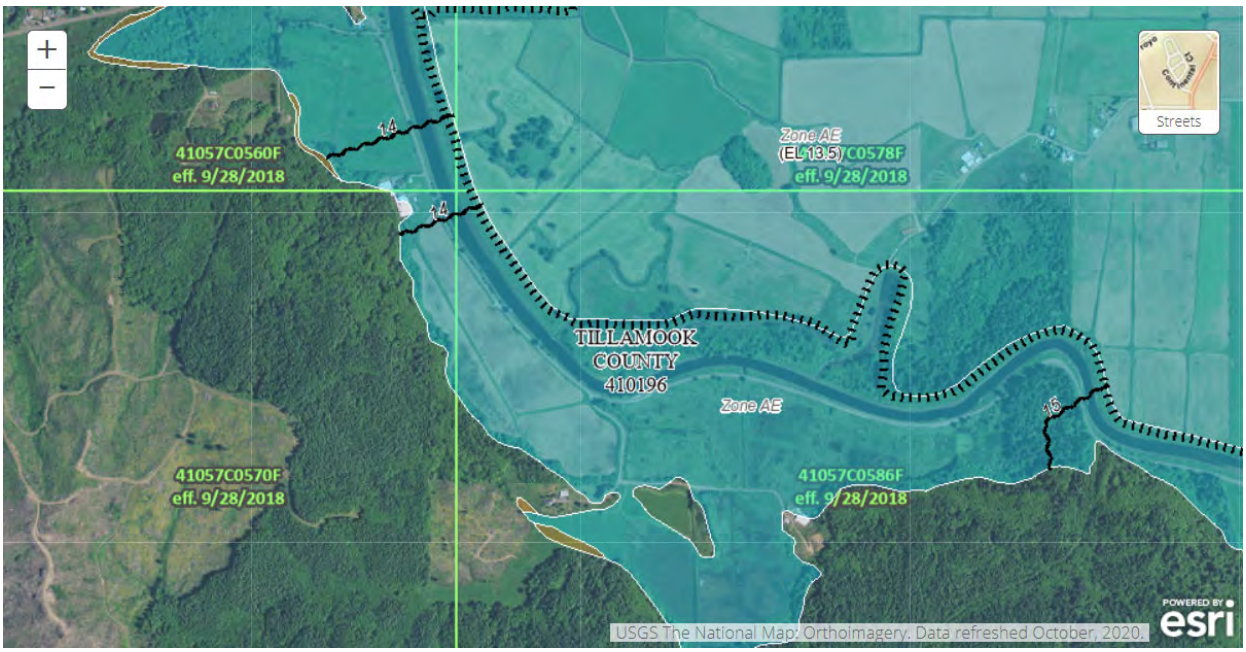

Image 5: *FEMA Map showing Burton-Fraser Road within Zone AE (100-year floodplain), base flood elevation 14-15' NAVD88*

Image 6: *Burton-Fraser Road during flood conditions, eastern end of TRW site, January 12, 2021*

Image 7: *Burton-Fraser Road during flood conditions, eastern end of TRW site, January 12, 2021*

Image 8: *Damaged CDF scour protection apron creating abrupt edge hazard*

Image 9: *CDF Apron with overflowing water during moderate high tide event, west of TRW (Silveira), January 27, 2021*

Image 10: *CDF Apron with overflowing water during moderate high tide event along TRW, January 27, 2021*

At the western end of Burton-Fraser Rd, Fagan Creek passes beneath the roadway through an existing bridge. The Fagan Creek Bridge is a timber structure with a wood pile foundation set in 1965. The most recent bridge inspection report in 2019 resulted in a sufficiency rating of 35, indicating this bridge will need to be replaced in the near future to avoid a failure. In the 2019 report, David Evans and Associates Inc. noted that "this bridge has been found to have significant structural deficiencies. Deterioration in several bridge elements has reduced the load carrying capacity of this bridge."

There are a series of at least seven culverts with tide gates in various states of disrepair that provide drainage and limit tidal inflows into TRW and the Silveira pastures. Most of these culverts are more than 50 years old and are in poor condition. If one of these culverts were to collapse, the road would be impassable until a temporary bridge or replacement culvert could be installed.

A summary of the current deficiencies and failing conditions of Burton-Fraser Road (***Figures 5 and 6***) include:

- Pavement failures including fracturing, crocodile cracking, and edge deterioration (Image 11),
- Uneven roadway surface and severe cross slopes due to settlement and sinking of the roadway (Image 12),
- Low points along the roadway where water overtops and flows across the roadway
- Deterioration and failure of the CDF aprons
- Missing or damaged segments of guardrail/cable barrier due to traffic accidents, rotted posts, and undermining (Images 13 and 14).
- Bank erosion and sloughing of the roadway embankment (Images 15 and 16),

Image 11: *Crocodile cracking in pavement, a condition prevalent along Burton-Fraser Road due to underlying settlement*

Image 12: *Severe cross slope on Burton-Fraser Road due to non-uniform sinking of roadway*

Image 13: *Missing guard rail due to recent traffic accident*

Image 14: *Loss of cable barrier posts due to rotting and bank erosion*

Image 15: *Sloughing undercut bank at edge of roadway*

Image 16: *Sloughing undercut bank at edge of roadway*

2.1.3 - Public Safety Concerns

In its existing condition, Burton-Fraser Road poses a safety hazard to the public due to frequent flooding, abrupt edges of the roadway, failing guardrails, and irregular travel surface. During high water level events, many travelers still risk driving through flooded areas, where they risk stalling out, hitting pot holes, missing the roadway striping edge, or underestimating the depth and forces of the water overflowing across the road. The lack of shoulder and functioning guard rails along the river's edge leads to a high risk of drivers entering the river or hitting the edge and overcorrecting. In 2013, a driver died when her car plunged into the Tillamook River. It is believed that she drifted the right front tire of her vehicle off the paved roadway onto the south shoulder of the road. When she corrected to get back into the traffic lane she overcorrected and ended up nearly perpendicular to centerline in the river. Numerous additional reported and unreported accidents have occurred on Burton-Fraser Road.

Additionally, vegetation on the side of the road creates blind corners during spring through fall. The intersection of Burton-Fraser Road at Hwy 131 is located on a sharp curve of Hwy 131 that reduces sight lines and creates unsafe conditions for some turning movements.

In the event of a natural disaster, there are two routes that connect Oceanside, Netarts, and the Cape Meares to the City of Tillamook and Hwy 101: Hwy 131 and Burton-Fraser Road. Hwy 131 crosses the Tillamook River just west of Tillamook on a bridge built out of a combination of wood and concrete piles with concrete pile caps and a deck with asphalt overlay. During a major earthquake event, the bridge is likely to be compromised. Because Burton-Fraser Road is built at the top of the bank of the Tillamook River, the same event could cause lateral spreading, which would result in sections of the road sinking or sliding into the river making the road permanently impassable. If these two roads both become impassable in a single event, the majority of people in the headland communities would be stranded with no way out and no way for emergency responders or supplies to get to them. The current Eckloff Road alignment could be used, but since the northerly ¾ mile of the road is a single lane forest road, pilot cars would be needed to address two-way traffic.

2.1.4 - Local Access Considerations

Burton-Fraser Road is currently the sole access available to four private properties neighboring the TRW site owned by the Toth family, Bennett/Valley Venture Farms, Silveira family farm, and the Tillamook Shooters Association (TSA).

Under existing conditions, neighboring landowners are often unable to get to and from their properties during flood events. During high water events, Old Fraser Road, which provides access to the Toth family property, Valley Venture Farms pasture, and TSA property, floods with up to 3 feet of water just south of the intersection with Burton-Fraser Road. Burton-Fraser Road also floods with 2-3 feet of water east and west of the intersection, creating an island during high water events. The access road at the western edge of the Silveira farm property can be impacted by water backing up into Fagan Creek overflowing the access road. If significant overtopping fills the TRW and Silveira pastures, high water is prolonged, even after the water level drops in the river, due to slow drainage through the existing culverts.

The seven culverts that provide drainage through the roadway are in poor condition, and culvert failure or a washout of the road embankment during overtopping could strand these residents until a

temporary bridge or culvert could be installed. In the event of a catastrophic failure of Burton-Fraser Road, these primary access routes could be permanently severed.

2.1.5 - Environmental Considerations

The TRW site supports five species of salmonids and provides wintering refuge habitat for migratory birds on the Pacific Flyway. Many other wildlife species have been observed at TRW and the surrounding forest, including deer, elk, river otters, beaver, muskrat, nutria, cougar, newts, and garter snakes.

The embankment of Burton-Fraser Road currently forms a continuous levee along the south bank of the Tillamook River that disconnects the land behind it, including the TRW site, from natural tidal and riverine processes. The series of culverts along the roadway provide drainage and limited tidal connectivity due to failing or broken tide gates, but fish passage is severely constrained by the undersized pipe openings which limit access due to physical blockage or high velocities during drain out of the upstream wetlands. Some culverts are barely visible or full of sediment, further preventing connectivity and fish passage.

The levee feature along the river also limits natural sediment accretion processes at TRW, and this combined with the former agricultural land use has led to subsidence of the land surface of several feet or more. This is evident from historical aerial photos showing forested areas within TRW that are now too low-lying to support tree species upon reconnection.

Restoring a natural tidal connection between TRW and the Tillamook River would provide significant ecological uplift and habitat improvements for the species that use the area. This connectivity could be restored through new bridges and culvert replacements, but removing a portion of the roadway would allow for an unrestrained tidal connection as well as natural riverine floodplain connectivity. With no road along the north side of the Tillamook River in this reach, removing Burton-Fraser Road would result in a unique, roadless natural area with river, marsh, swamp, and forest habitat, a rare condition along the Tillamook River. Furthermore, removing the roadway would allow for the river bank and riparian area along the south side of the river to be restored to a natural form and revegetated with riparian trees and shrubs that would provide shading over the Tillamook River.

In addition to direct benefits to fish and wildlife, reconnection and potential removal of the roadway would improve wildlife viewing and bird watching opportunities in the area. These activities attract many visitors to Tillamook County each year, providing a boost to the local economy. Depending on the extent of road removal, wildlife viewing opportunities could be provided through limited parking areas, overlooks or viewing platforms, foot paths, or via water access for boaters launching from the nearby Burton Bridge boat ramp.

The current failing conditions of the roadway and culverts in the project area also directly contribute sediment to the waterways where scour and erosion is occurring at the pipe outfalls. A culvert collapse or road failure/levee breach would be an episodic environmental impact to the river. Vehicles occasionally entering the river due to traffic accidents can contribute pollutants such as gas, oil, and other fluids.

2.2 Eckloff Road

Eckloff Road is a rural county road used mostly for timber land traffic, landfill traffic, and local property access. Similar to Burton-Fraser Road, Eckloff Road connects to Tillamook River Road on the east end and Hwy 131 on the west end. Eckloff Road runs generally parallel to Burton-Fraser Road, one to two miles to the south, making it a logical replacement to maintain this county route/travel pattern if Burton-Fraser Road was no longer usable.

The eastern ½ mile, which currently receives the most traffic heading to the Tillamook County Landfill, was recently paved and is in good condition. The eastern 2 miles of roadway are in fair condition with two lanes and is readily usable by passenger vehicles in its current condition. From this point west, the paved road narrows to a single lane width with pull offs, and the pavement fades to gravel. The western ¾ mile of the road is a single-lane gravel forest road with steep grades and tight curves that runs through Stimson Timber Company forest land. This portion of the road can be rough at times with many potholes and loose gravel. These conditions at the east end generally keep the road from being used regularly by most passenger cars and trucks. When Burton-Fraser Road is flooded, some motorists use Eckloff Road as a detour route. Eckloff Road is the sole access available to six private residences and additional farm and forest parcels.

2.2.1 - History of Eckloff Road's Construction

Eckloff Road was built in 1878 and established as a state road in 1883. By 1885, the road was established as a county road (Tillamook County Board of Commissioners' Meeting Minutes, November 4, 1987). Eckloff Road was the main connection to Netarts Bay until 1920. In 1959, the Crown Zellerbach Corporation, a paper company with timberland along the road, urged the County to vacate Eckloff Road, which was no longer the main route to Netarts Bay, but due to objections at the hearing, the vacation was dropped. In 1987, the Cavenham Forest Industries, who took over the Crown Zellerbach timberland, requested a permit to gate the road to prevent trash drops and vandalism. Cavenham had gated the road previously based on the assumption that it was a private road, but in 1987, the Board of Commissioners confirmed the road was a county road that needed to be maintained open for public access. In March 1991, the road was legalized (TCPW, 2021). Survey and legalization documents related to Eckloff Road, a.k.a. South Prairie/Netarts Highway, a.k.a. State Road, are included in Appendix D.

2.2.2 - Structural Conditions

Although Eckloff Road is currently passable by most vehicles, the road would not able to handle increased traffic and industrial vehicles in its current state due to unpaved portions, steep grades, sharp curves, and narrow width. In particular, the western ¾ mile is a rough, unpaved gravel logging road with grades of up to 18%, and many sharp curves requiring slow travel speeds to negotiate. The eastern 2 miles of Eckloff Road are in fair condition, though several short sections have experienced minor slumping, creating dips and pavement damage. The road has one bridge over the fish-bearing Beaver Creek that is in good condition (TCPW, 2021). ***Figure 7*** provides an overview of the existing conditions along Eckloff Road.

Image 17: *Eastern ½ mile of Eckloff Road in good condition*

Image 18: *Eastern 0.5 to 1.5 miles in fair condition*

Image 19: *Slumping section on eastern 1.5 miles of Eckloff Road*

Image 20: *Beaver Creek bridge on Eckloff Road, facing west*

Image 21: *West of Beaver Creek Bridge road condition degrades*

Image 22: *Moving west road narrows and pavement fades to gravel and broken pavement surfacing*

Image 23: *Eckloff Road beyond last house, entering forest land through buffer of Bear Creek*

Image 24: *Eastern ¾ miles of Eckloff Road rough forest road with steep grade, sharp curves*

2.2.3 - Public Safety Concerns

In addition to the structural conditions of the unimproved ¾ miles of road which pose a hazard to drivers, the intersection of Eckloff Road with Hwy 131 is located to the south of a vertical crest curve on Hwy 131, making difficult for southbound traffic on Hwy 131 to see vehicles turning south from Eckloff Road. An upgrade to Eckloff road should consider relocating this intersection to improve sight distances.

Eckloff Road runs parallel to Beaver Creek and Bear Creek where there is a FEMA mapped 100-year floodplain, but the roadway is outside of this flood hazard area. The Beaver Creek bridge is also excluded from the floodplain boundary and is not known to overtop during flood events (FEMA, 2018). Disruptions due to flooding are not anticipated and motorists do not have to drive through standing water on this roadway.

During a major earthquake, portions of Eckloff Road could become impassable due to landslides, but the slides could be cleared and transportation connection restored far faster than at Hwy 131 or Burton-Fraser Road. The existing slumping sections of roadway described at the east end are more vulnerable to failure resulting in hazards in their current state and should be repaired prior to significant traffic increases.

2.2.4 - Local Access Considerations

Although the current road is not regularly maintained by the County, access is not impacted during flood events. The FEMA 100-year floodplain extends up Beaver Creek where Eckloff Road crosses over on a bridge. The bridge deck elevation is approximately 22 feet (NAVD88) and is mapped just outside of the 100-year floodplain (Image 25). The Beaver Creek bridge is rated in good condition.

Eckloff Road is currently the sole access to six properties along the road. Improving Eckloff Road would improve access conditions for these landowners and provide a more reliable route to the west. However, increased traffic may be viewed as a disadvantage to these few landowners who have grown accustomed to the quiet setting and low-traffic roadway. The Tillamook County Landfill is located at the eastern end of Eckloff Road. While many people utilize Burton-Fraser Road to travel to and from the

landfill, upgrading Eckloff Road would provide a more direct route from the west. This improved route could also direct more trucks and industrial traffic away from downtown Tillamook.

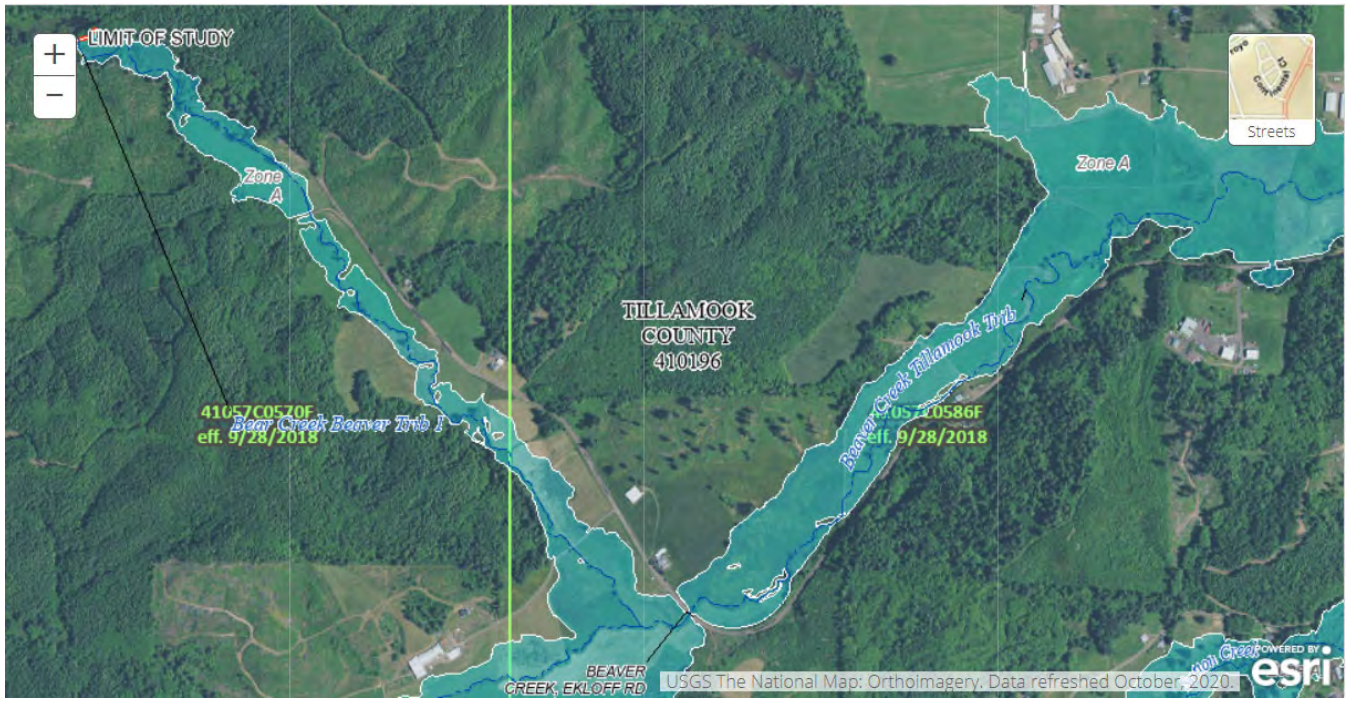

Image 25: *FEMA Map Eckloff Road outside of Zone A (100-year floodplain), including Beaver Creek Bridge*

2.2.5 - Environmental Considerations

The eastern 1.5 miles of Eckloff Road generally follows the Beaver Creek valley. From the intersection at Tillamook River Road, Eckloff Rd traverses west along base of the adjacent forest slope towards the Tillamook County Landfill, then southwest to a curve at the Beaver Creek bridge (50' span, 26' road width). In this location, Beaver Creek has an active channel width of approximately 20 feet. The bridge crossing does not appear to be a fish passage barrier, and ODFW lists is passage status as unknown.

The lower reach of Beaver Creek is tidally influenced and is connected to the Tillamook River just downstream of the Tillamook River Road tide gate structure. The leaky tide gates provide a muted tidal connection, and the pastures upstream of the tide gate are frequently inundated. ODFW lists this tide gate as a partial fish passage barrier. The head of tide is at Beaver Creek RM 1.6, about 0.25 miles downstream of the Beaver Creek Bridge.

Beyond the bridge, Eckloff Road continues northwest, generally following the Bear Creek valley. The headwaters of Bear Creek are timberland owned by Stimson Lumber Company and are primarily clear cuts with some small stream buffers. Several small drainages combine into Bear Creek, where it flows through a forested wetland that runs along Eckloff Road. Any widening or realignment of Eckloff Road should avoid impacts to these wetlands. The creek then flows through pasture land towards its confluence with Beaver Creek.

Bear Creek and Beaver Creek are both reported to support Coho salmon, winter steelhead, and coastal cutthroat trout. Beaver Creek has two culverts listed as partial passage barriers, and Bear Creek has one culvert crossing listed as a partial passage barrier (ODFW, 2021).

3 - Roadway Improvement Alternatives

3.1 - Alternative 1 – Reconnect TRW with Burton-Fraser Road in Place (Upgrade Burton-Fraser Road)

Alternative 1 would reconnect the TRW site to the Tillamook River by reconstructing the historical tidal channel and building a new bridge crossing on Burton-Fraser Road (***Figure 3***). Additional high-flow culverts could be installed to increase floodplain connectivity at the east end of TRW, and two additional culvert replacements at the east end of TRW would all for reconnection of the remnant spruce swamp. For long term serviceability of Burton-Fraser Road, the Fagan Creek bridge would also be replaced with a new bridge crossing.

The bridges would be elevated above flood levels, with a deck elevation of 15 feet NAVD88 or even higher to meet standard freeboard requirements. In order to be safely passable during regular high-water events, the adjacent road sections would be elevated up to at least 13 feet NAVD88, or 15 feet NAVD88 to be above current 100-year flood levels. This would require raising the road in front of TRW by a minimum of 2 feet and up to six feet in some locations.

3.1.1 - Process of Upgrading/Raising Burton-Fraser Road

Due to the numerous structural issues with the road, any work on the road would require significant repair or replacement efforts to address underlying instabilities and comply with regulatory agency requirements. To raise Burton-Fraser Road, a new base would need to be built by completely removing the existing roadway surfacing and any base rock. At a minimum, this exposed surface would be proof-rolled to check for deflection or pumping, and poor subsoils would need to be removed and replaced with a minimum of 3 feet of crushed rock. Some areas could require significantly more over-excavation and rock placement to stabilize the subgrade. Subgrade stabilization areas would be overlaid with a synthetic geogrid. Additional imported crushed rock would be used to fill up to subgrade elevations, followed by road base aggregate and asphalt pavement.

The weight of placement of new rock material would also likely cause non-uniform settlement of the underlying soils of up to 3 to 5 feet or more, particularly in unconsolidated areas outside of the current embankment footprint. While much of this settlement is anticipated to occur within the first year of fill placement, additional long term settlement would continue to occur indefinitely as the underlying marsh soils compress. Once settlement rates have slowed, the road could be paved and returned to service. Paving before settlement has slowed would result in pavement damage and need resurfacing. At a minimum, the roadway would be out of commission for 2 years or more during construction to allow for phased fill placement, settlement, and paving to occur.

A complicated guard rail system would need to be designed and constructed, likely including deeper piles where the existing guardrail posts have become undermined due to bank erosion. Continued maintenance would be required to address road subsidence beyond normal road upkeep. A geotechnical analysis by Shannon & Wilson concluded that even if the road was raised, subsidence would continue due to the underlying geotechnical conditions.

3.1.2 - Environmental and Permitting Considerations

Excavating to these depths would require dewatering of shallow groundwater and work-area isolation from the daily tide levels in the Tillamook River. Existing sloughing embankments would need to be repaired and stabilized using large rock and bioengineering bank stabilization measures to prevent future bank erosion and undermining. This would require in-water work in the Tillamook River and TRW wetlands, impacting waters and wetlands and requiring significant environmental permitting.

As the road is elevated, stable side slopes would further widen the embankment prism and require more lateral space, further increasing impacts to waters and wetlands and increasing the challenge of permitting. The widened embankment prism would cause fill impacts within the Ordinary High Water Mark of the Tillamook River and within jurisdictional wetlands at the TRW site. Additional cost of mitigation for these impacts should be considered as part of the full project cost. Raising the roadway would also require substantial fill placement within the 100-year floodplain and floodway of the Tillamook River. It's unlikely this design could receive a no-rise certification and would likely require a letter of map revision and FEMA approval.

3.1.3 - Tillamook River Wetlands Restoration and Interior Site Improvements

Proposed restoration actions at TRW include excavating tidal channels to restore the historical channel network that existed prior to diking, ditching, and farming the site. The new primary tidal channel would connect to the Tillamook River, passing beneath a new bridge crossing on Burton-Fraser Road. Most drainage ditches would be filled, and drainage culverts/tide gates would be removed to focus tidal flux through the primary tidal channel connection. The two tidal channels connecting the existing spruce swamp at the east end of the site would be reconnected to the river through new larger culverts or bridges. Some areas within the marsh may be raised to foster tidal scrub-shrub and forested wetland plant communities that were supported prior to clearing and subsidence. These features would also improve the ecotone transition from upland forest, to forested wetland, to tidal marsh. The drainage ditch and berm network at the perimeter of the site would be modified to allow for freshwater sources from the forested hillslope to enter the tidal wetland, creating valuable freshwater refugia for juvenile salmonids and other species.

Upon tidal reconnection to TRW, the low-lying portions of Old Fraser Road would be raised by several feet to maintain access to three private properties. A new bridge crossing would be installed where Old Fraser Road bisects the north and south wetlands to allow restoration of the historical tidal channel that once passed through this area. At the southwest property boundary, the existing dike has failed allowing water levels from the south wetland to propagate into the Bennett Pasture. A series of setback dike alternatives are under consideration to provide flood protection and maintain pasture use in this area.

3.2 - Alternative 2 – Upgrade Eckloff Road and Remove Part of Burton-Fraser Road

Alternative 2 would remove a portion of Burton-Fraser Road in order to connect TRW to the Tillamook River without requiring a new bridge and other improvements to Burton-Fraser Road (***Figure 4***). Eckloff Road would be upgraded to serve as the County's primary route between Tillamook River Road and Hwy 131.

3.2.1 - Process of Upgrading Eckloff Road

Upgrading Eckloff Road to accommodate the increased traffic on a 45 mile per hour roadway would involve:

- Realigning the western end of Eckloff Road and constructing a new roadway to meet maximum grade requirements and increase curve radii to allow for 45 miles per hour traffic (***Figures 8 and 9***).
  - Clearing and grubbing the new alignment footprint
  - Installing drainage culverts at low points and headwater stream crossings
  - Preparing subgrade and importing crushed rock road base material
  - Constructing the roadway base and pavement
  - Installing new signage, striping, and guardrails where needed
  - Relocating the intersection at Hwy 131 to the north to improve safety and sight distances

- Widening the central portion of the existing roadway from the Beaver Creek Bridge to realigned portion described above:
  - Earthwork Cut/Fill to widen roadway prism
  - Installing widening base rock layer
  - Paving/Repaving the road segment

- Reconstructing the base of several short sections of the eastern roadway segment where slumping has occurred,

- Finishing (e.g., paving, striping) the road from the landfill to Beaver Creek bridge

Once traffic is rerouted to Eckloff Road, the portion of Burton-Fraser Road along the TRW site (from Old Fraser Road to the Spruce Swamp) could be removed to restore natural tidal and floodplain processes to TRW and restore the south bank of the Tillamook River to a natural form with a healthy riparian corridor. Eventually, the western segment of Burton-Fraser Road could also be removed if an alternate access route was established to the private properties accessed via Old Fraser Road (***Figure 10***).

3.2.2 - Environmental and Permitting Considerations

The western roadway improvements should be designed to avoid wetland impacts to the forested wetlands along Bear Creek by shifting the grading upslope and preventing fill slopes from extending towards the wetland. Widening this roadway segment to accommodate a wider travel way, shoulders, and drainage will require some tree removal along the upslope edge of the roadway, which appears to be a forested buffer retained during clear-cutting the slope above. The realigned roadway segment crosses through clear-cut and regrowth forest lands. Several drainage culverts will be required, but fish passage is not expected to be required at these small headwater drainage flow paths.

3.2.3 - Geotechnical Engineering Considerations

Shannon & Wilson conducted a preliminary geotechnical assessment at TRW, but no geotechnical investigations have been completed in the Eckloff Road area. Subsurface conditions in this area are expected to be more conducive to constructing a stable roadway than the deep, soft marsh soils along the wetlands fringing the Tillamook River. Still, some subgrade stabilization measures may be necessary. With excavations and embankments as deep as 25 feet, it will be important to conduct a geotechnical investigation and engineering analysis in the next design phase to provide recommendations for

designing and constructing the new roadway. The eastern mile of Eckloff Road has some existing slumping sections that would need to be repaired through subgrade stabilization and repaving. Some slope stabilization, particularly downslope of the roadway towards Beaver Creek, may be required.

3.2.4 - Tillamook River Wetlands Restoration and Interior Site Improvements

Proposed restoration actions at TRW would be similar under this alternative, except the portion of Burton-Fraser Road along the TRW site would be fully removed allowing the primary tidal channel and spruce swamp tidal channels to connect directly to the Tillamook River without the need for costly bridges or culvert structures. Rather than expanding and armoring the south bank of the Tillamook River, the roadway materials would be removed and the river bank would be regraded to mimic historical conditions as observed in the 1939 aerial photo, including natural levee high ground that could be revegetated with a riparian forest plant community to provide shade and improved habitat conditions along the river. Removal of the road would also allow for re-creation of a lower, sparsely forested, area where Tillamook River flood flows would have entered and moved through the site during riverine flood events.

This memorandum is primarily focused on the roadway improvement components of these alternatives, and the restoration actions are described in more detail in the Tillamook River Wetlands Tidal Wetland Restoration 60% Plans and Basis of Design Report.

4 - Cost-Benefit Analysis

4.1 – Cost Estimating Basis and Methodology

This section provides planning-level cost estimates for implementing the two roadway upgrade alternatives. We developed preliminary grading surfaces and roadway cross sections for the propose roadway upgrades as described in Section 3, to estimate quantities of the primary items including earthwork, aggregate base and subbase rock materials, subgrade stabilization, and paving. Items including Mobilization, Traffic Control, Erosion and Sediment Control are estimated on a percentage basis. We consulted ODOT Average Awarded Bid Prices for the last 3 years and ODOT Bid Tabulations for select roadway construction projects with similar project elements and scale of quantities. We also considered bid tabs for recent road and bridge construction projects in Tillamook County.

It should be noted that contractor bids for many infrastructure construction projects in 2021 have increased sharply due to fluctuating prices for steel, asphalt, fuel, lumber, and other materials. Challenges in the global and national supply chain and labor market have also impacted the availability and lead times for some products and materials. With a likely increase in infrastructure construction projects in the coming years, potential market volatility and bidding climate create additional uncertainty in estimating construction costs. These estimated costs should be used as a basis for comparing the relative cost differences between Alternatives 1 and 2, and as a basis of potential funding needs for subsequent project phases and implementation.

We also estimated construction costs for restoration and internal site improvements for the Tillamook River Wetland Restoration Project. These restoration and internal TRW site elements are largely the same between Alternatives 1 and 2, except the TRW Restoration estimate for Alternative 2 includes the cost for removing the section of Burton-Fraser Road along the TRW site and re-grading the river bank to simulate historical conditions. In Alternative 1, costs for the bridges and culvert structures and other improvements within the footprint of Burton-Fraser Road are included in the Roadway Improvements part of the estimate. Costs for restoration activities including channel excavation, ditch filling, setback dikes, revegetation, large wood, and other habitat enhancements were estimated based on bid tabs from recently-constructed tidal wetland restoration projects on the Oregon Coast.

4.2 – Alternative 1 – Estimated Project Costs

Table 1 provides the planning-level cost estimate for Alternative 1 to upgrade Burton-Fraser Road in place and reconnect TRW with bridges and culverts.

Table 1. Alternative 1 – Estimated Project Costs for Implementation

TRW Restoration and Internal Site Improvements	
Mobilization, Site Prep, and Demo	$466,750
Earthwork	$826,600
Internal Site Culverts/Bridges	$432,000
Access Road Improvements	$488,900
Revegetation and Large Wood	$815,675
Subtotal	**$3,030,000**
Contingency (20%)	$454,489
CONSTRUCTION TOTAL (TRW)	**$3,480,000**
Burton-Fraser Road Improvements	
Mobilization, Site Prep, Clearing, and Demo	$2,464,000
Earthwork	$220,000
Structures/Drainage Culverts	$3,950,000
Aggregate Base, Subbase, Subgrade	$4,038,750
Paving, Striping, Signage, Guardrail	$1,054,300
Bank Stabilization	$1,142,000
Roadside Restoration/Seeding	$55,000
Subtotal	**$12,920,000**
Contingency (30%)	$3,876,000
CONSTRUCTION TOTAL (Burton-Fraser Rd)	**$16,800,000**
ALTERNATIVE 1 CONSTRUCTION TOTAL	**$20,280,000**
Design and Permitting (20%)	$4,056,000
Construction Admin/Engineering (10%)	$2,028,000
ALTERNATIVE 1 TOTAL PROJECT COSTS	**$26,360,000**

4.3 – Alternative 2 – Estimated Project Costs

Table 2 provides the planning-level cost estimate for Alternative 2 to upgrade Eckloff Road and remove part of Burton-Fraser Road to reconnect TRW to the Tillamook River.

Table 2. Alternative 2 – Estimated Project Costs for Implementation

TRW Restoration and Internal Site Improvements	
Mobilization, Site Prep, and Demo	$504,650
Earthwork	$862,600
Internal Site Culverts/Bridges	$432,000
Access Road Improvements	$488,900
Revegetation and Large Wood	$815,675
Subtotal	**$3,100,000**
Contingency (20%)	$620,765
CONSTRUCTION TOTAL (TRW)	**$3,720,000**
Eckloff Road Improvements	
Mobilization, Site Prep, Clearing, and Demo	$1,594,000
Earthwork	$1,380,000
Structures/Drainage Culverts	$306,000
Aggregate Base, Subbase, Subgrade	$5,274,771
Paving, Striping, Signage, Guardrail	$1,275,643
Roadside Restoration/Seeding	$55,000
Subtotal	**$9,890,000**
Contingency (30%)	$2,965,624
CONSTRUCTION TOTAL (Eckloff Rd)	**$12,860,000**
ALTERNATIVE 2 CONSTRUCTION TOTAL	**$16,580,000**
Design and Permitting (20%)	$3,316,000
Construction Admin/Engineering (10%)	$1,658,000
ALTERNATIVE 2 TOTAL PROJECT COSTS	**$21,550,000**

4.4 – Cost Comparison and Cost Benefit Analysis

Table 3 provides a summary comparing the estimated costs of implementing Alternatives 1 and 2.

Table 3. Alternatives Cost Comparison Summary

	Alternative 1 (Burton-Fraser Rd)	Alternative 2 (Eckloff Rd)
TRW Restoration and Site Improvements	$3,480,000	$3,720,000
County Roadway Improvements	$16,800,000	$12,860,000
CONSTRUCTION TOTAL	**$20,280,000**	**$16,580,000**
Design and Permitting (20%)	$4,056,000	$3,316,000
Construction Admin/Engineering (10%)	$2,028,000	$1,658,000
TOTAL PROJECT COSTS	**$26,360,000**	**$21,550,000**

Implementing either alternative would be a significant investment in the resiliency of county roadway infrastructure and estuary habitat restoration along the Tillamook River. We estimate that Alternative 1 would be nearly 25% more expensive than Alternative 2, to provide a nearly-equivalent level of service and long-term reliability. However, the estimate for Alternative 1 assumes Burton-Fraser Road is raised to an elevation of 13 feet NAVD88, which would still be prone to flooding during extreme events including the 100-year flood. Raising the roadway above the base flood elevation of 14-15 feet NAVD88 would be increase project costs by another $2M or more. Even after such a significant investment, Burton-Fraser Road would still be subject to long term settlement and failure during seismic events due to its foundation on deep, soft marsh subsoils.

Alternative 1, upgrading Burton-Fraser Road, would have significantly more impacts to the water and wetlands, requiring significant in-water work and bank stabilization measures, as well as fill placement within the wetlands adjacent to the roadway. The process of upgrading Burton-Fraser Road, requiring phased fill placement, settlement monitoring, and final paving would put the roadway out of commission for 2 years or more during construction, causing traffic to detour to the unimproved Eckloff Road or through downtown Tillamook.

Tables 4 and 5 provide summaries of advantages and disadvantages to consider for each alternative.

Table 4. Advantages and Disadvantages of Alternative 1

Alternative 1 – Upgrade Burton-Fraser Road in Place and Reconnect TRW with new bridges/culverts	
Advantages	• Fewer stakeholders and landowners involved. No land or right-of-way acquisition needed. Potentially less opposition from neighboring landowners and public. • Maintains current road user travel patterns, less disruption/change for traveling public and commercial road users. • Provides limited reconnection of TRW to tidal processes and a significant improvement upon current conditions
Disadvantages	• Higher cost of implementation due to the extent of repairs needed and underlying geotechnical instabilities, requiring reconstruction of road base, extensive subgrade stabilization, settlement monitoring/management, phased fill placement, and repaving. • Required construction activities, including phased fill placement to manage settlement expected to occur after initial fill placement, would require full road closure for 2 years or more during construction, causing users to detour on unimproved Eckloff Road or through downtown Tillamook. • Significant environmental impacts including direct fill placement within the Tillamook River and wetlands adjacent to the roadway. Raising road elevation would also require extending fill slopes outward into the river and wetlands. Extensive bank stabilization armoring needed to repair sloughing/undercut section and to protect against erosion. These actions may be very difficult to permit. • Requires large volumes of fill placement within the FEMA-mapped Zone AE (100-year floodplain) that may be challenging to permit through the County's floodplain development permit process. May require a Letter of Map Revision through FEMA. • Even with such significant investment, the roadway would still be directly adjacent to the Tillamook River and would still be prone to overtopping during extreme flood events, bank erosion, and fluctuating water levels. Even with extensive subgrade stabilization, the road would be overlying deep, soft marsh soils that would likely contribute to long term settlement. • Higher long-term maintenance costs to address less frequent overtopping/flooding and potential scour/bank erosion, pavement damage due to settlement and overtopping, and inspection and maintenance of approximately six new bridges and culverts on the roadway.

Table 5. Advantages and Disadvantages of Alternative 2

Alternative 2 – Remove a portion of Burton-Fraser Road and Improve Eckloff Road	
Advantages	• Lower implementation cost compared to Alternative 1. • Would provide a more resilient roadway with better long-term reliability, even during flood conditions. Eckloff Road is fully outside of the FEMA 100-year floodplain, including the Beaver Creek bridge that is shown just above the 100-year flood elevation. • Lower long-term road maintenance costs and more resilient infrastructure. Fewer bridges and large culvert structures to inspect and maintain than Alternative 1. • Would reduce travel times for some travel patterns/routes, including from Hwy 101 to Netarts. Would direct commercial/industrial traffic further away from downtown Tillamook. • Removing part of Burton-Fraser Road provides the maximum restoration potential for TRW and other low-lying lands along the Tillamook River. Road removal would allow for restoration of the historical/natural tidal and floodplain connection between TRW and the Tillamook River, without the need to construct expensive bridges or culvert structures. • Better connection between TRW and Tillamook River than Alt 1, allowing improved natural processes such as increased flow and nutrient exchange and sedimentation. • This alternative would also enable future restoration on the Silveira property, where the wet pasture is currently suffering from very low-lying land and regular inundation from the river, as well as slow drain out that limits pasture productivity. • Road removal would create a 'road-less' section of the Tillamook River that would be beneficial for a variety of wildlife and could provide incredible recreation opportunities along the Tillamook River. Could include bird-watching overlooks, or access via water by launching at the existing Burton-Bridge boat ramp.
Disadvantages	• Will require more stakeholder engagement and a larger set of affected landowners. May meet some opposition from residents on Eckloff Road that will be burdened by increased traffic and noise in the area. • Requires realigning a portion of Eckloff Road through Stimson Lumber Company land, which will require coordination with Stimson for right-of-way acquisition or dedication. • The steep hillsides along the western portion of Eckloff Road may be subject to landslides during heavy rainfall or seismic events, but transportation could be restored much faster than catastrophic failure on Burton-Fraser Road. • May slightly increase some travel times for some routes, such as from Hwy 101 northbound to Cape Meares/Bay Ocean Road. • Unsafe intersection at Eckloff Road and Hwy 131 needs to be relocated. Transportation engineering/intersection analysis needed to determine optimum intersection location.

4.5 – Less Extensive/Expensive Options and Potential Phasing

This estimate for Alternative 1 assumes that the full length of Burton-Fraser Road, from Hwy 131 to the Spruce Swamp would be reconstructed and raised above flood elevations. We acknowledge that less extensive roadway improvements, such as only constructing a single new bridge to accommodate the primary tidal channel connection, would be the bare minimum for reconnecting TRW. However, TCPW and other stakeholders have expressed that they would not support investing upwards of $3 Million in a new bridge crossing while the rest of the road remained in a degraded and flood-prone state. Low points in the road would still be subject to overtopping 20 to 50 times per year, at risk of catastrophic failure due to scour that occurs during overtopping events. Furthermore, the other culvert crossings and Fagan Creek bridge are in poor condition and would need to be replaced in the near future to maintain access into the future. For a true comparison against Alternative 2, which would provide a long-term reliable route, even during flood conditions, Alternative 1 represents the costs to upgrade Burton-Fraser Road to provide a near-equivalent level of long-term reliability, to the maximum extent feasible.

Similarly, less extensive improvements to Eckloff Road, or phased implementation of improvements could make Alternative 2 less expensive, or achievable over a longer period of time. For example, in order to make Eckloff Road usable to regular traffic, the western road realignment and some widening could be completed first. Additional improvements to the eastern 2 miles of roadway could be deferred to a subsequent phase when funding is available.

4.6 – Comparison to the "Do Nothing" Alternative

While the potential major investments outlined in Alternatives 1 and 2 will be challenging to fund and implement, inaction would result in eventual failure of Burton-Fraser Road by way of an embankment failure or culvert collapse. The roadway will continue to sink and overtopping will likely become even more frequent in the future. Noticeable deterioration has occurred in just the past few years, with two of the scour protection aprons failing and being pushed away from the roads edge creating a safety hazard. In some locations, the embankment has been eroded to the edge of the roadway, and undercut banks could fail causing loss of part of the roadway. Full breach of the roadway embankment would close the roadway until emergency repairs could be made, and depending on the extent of failure, simple repairs may not be feasible. With widespread failures along the length of the roadway, it is only a matter of time before the road becomes unusable without major intervention. In this case, the County would lose secondary emergency access route and commonly used route for commercial/industrial, residential, and tourist traffic. By way of necessity, this traffic would shift to other routes such as the unimproved Eckloff Road, or through downtown Tillamook where Hwy 131 turns into 3rd Street.

Under this scenario, the TRW site would likely be reconnected to the Tillamook River through an unplanned breach of the Burton-Fraser Road dike. While passive restoration may eventually result in habitat improvements, a well-planned restoration design would more effectively and quickly restore natural and historical conditions and ecological uplift. The Old Fraser Road access routes and remaining pasture land adjacent to TRW would be subject to higher water levels on a daily basis and during flood events, without the proposed internal site improvements for property access, flood protection, and fish passage.

5 - Recommendations and Next Steps

Based on the information contained in this report, we recommend proceeding with Alternative 2 to upgrade Eckloff Road as the primary County route between Highway 131 and Tillamook River Road/Hwy 101, and to remove a portion of Burton-Fraser Road along the Tillamook River Wetlands site. Upon delivery of this report to TEP, we anticipate presenting this information to the technical team and internal stakeholders including NCLC and TCPW.

5.1 – Building Consensus and Gaining Support

If the team agrees on pursuing Alternative 2, the next steps will include utilizing the information in this report to build a broad consensus to advance the project towards implementation. This will require support from stakeholders including:

- **Tillamook County Board of Commissioners** – We anticipate co-presenting this project alongside TCPW at an upcoming monthly board meeting.

- **Stimson Lumber Company –** We understand that TCPW would lead communications with Stimson to work towards an agreement to realign the western end of Eckloff Road. The County's records may designate a County right-of-way on the existing/historical alignment of Eckloff Road, a.k.a. State Road, a.k.a. South Prairie/Netarts Highway, but new right-of-way would be needed to realign Eckloff Road as described herein.

  The preliminary alternate private access routes identified in ***Figure 10*** also pass through edges of Stimson land, and access easements would likely be required. However, the alternate private access routes are not critical to removing the portion of Burton-Fraser Road along TRW. Alternate access would only be necessary in order to remove the portion along the Silveira property that connects to Old Fraser Road.

- **Affected landowners along Burton-Fraser Road** – TEP has been coordinating with the landowners adjacent to TRW including TSA, Toth, Valley Venture Farms/Bennett, Silveira, and Smith Forest. These landowners have a general sense of the failing roadway conditions and regularly experience the frequent flooding problems. As long as continued access and an equivalent or better level of flood protection can be provided, these landowners will likely support the project.

- **Affected landowners along Eckloff Road** – To date there has been minimal outreach to the landowners along Eckloff Road. With the information in this document, TEP and TCPW can begin coordinating with these landowners to convey the severity of failures on Burton-Fraser Road and the reasoning behind the need to upgrade Eckloff Road. These landowners may be most opposed to the project, as they currently live on a quiet road with very little traffic. The increased traffic and noise would be the most burdensome to these residents. Measures such screening vegetation or berm grading could help to mitigate these effects.

ESA can assist TEP and TCPW as needed with information, graphics, or in-person communications to these stakeholders.

5.2 – Fundraising for Final Design, Permitting, and Construction

With full buy-in from the stakeholders identified above, the next challenge will be raising the funding needed to design, permit, and construct the preferred alternative, including the roadway upgrades and removal, as well as restoration actions at TRW. The roadway and restoration projects are inextricably linked, which causes some challenges but may also provide opportunities to seek funding from a wider variety of grants or other sources including federal stimulus funds for infrastructure.

While the TRW site restoration elements have been designed to approximately 60%-level as documented in the Tillamook River Wetlands Tidal Wetland Restoration Project – 60% Plans and Basis of Design Report, Eckloff Road designs are at a conceptual level only. The Eckloff Road design will require additional topographic surveying, geotechnical investigation and engineering, and transportation engineering. Both TRW and Eckloff Road portions of the project will require environmental permitting, cultural resources investigations, and final design services. The ESA project team, including sub consultant teammates, is well-equipped to provide all services needed to bring this landmark project to fruition.

6 - References

Cramer, M., K. Bates, D. Miller, K. Boyd, L. Fotherby, P. Skidmore, T. Hoitsma, B. Heiner, K. Buchanan, P. Powers, G. Birkeland, M. Rotar, and D. White. 2003. Integrated streambank protection guidelines. Washington Department of Fish and Wildlife, Habitat Technical Assistance. Olympia, Washington. http://wdfw.wa.gov/publications/00046/wdfw00046.pdf

FEMA / Federal Emergency Management Agency. 2018. The Flood Insurance Study for Tillamook County, Oregon and Incorporated Areas. Effective dated September 28, 2018. FIS Number 41057CV001A. https://map1.msc.fema.gov/data/41/S/PDF/41057CV001A.pdf?LOC=12f4f7d2caaf6077e0b665a469f254af

ODFW/Oregon Department of Fish and Wildlife. 2021. Oregon Fish Habitat Distribution and Barriers Web Map. https://nrimp.dfw.state.or.us/FHD_FPB_Viewer/index.html

ODOT/Oregon Department of Transportation. 2021. Average Bid Item Prices. 2018-2021 Mid-year. https://www.oregon.gov/odot/Business/Pages/average_bid_item_prices.aspx

ODOT/Oregon Department of Transportation. 2021. Bid Tabulations. https://www.oregon.gov/odot/Business/Procurement/Pages/BT.aspx

StreamNet GIS Data (2021). Metadata for Pacific Northwest coho salmon fish distribution spatial data set. Portland (OR): StreamNet, August 2021. [28 August 2021]. URL: http://www.streamnet.org/online-data/GISData.html

TCPW / Tillamook County Public Works Department. Email, phone, and in-person communication with Ron Newton and Chris Laity. Various dates in 2021. ***TCPW contributed a significant amount of information used in preparing this document, including historical information and documentation of the roadways, traffic use and user information, accident reports, maintenance records, permit documents, and Public Works' opinion on their desire and willingness to invest in upgrades to Burton-Fraser Road.***

Appendix A – Figures

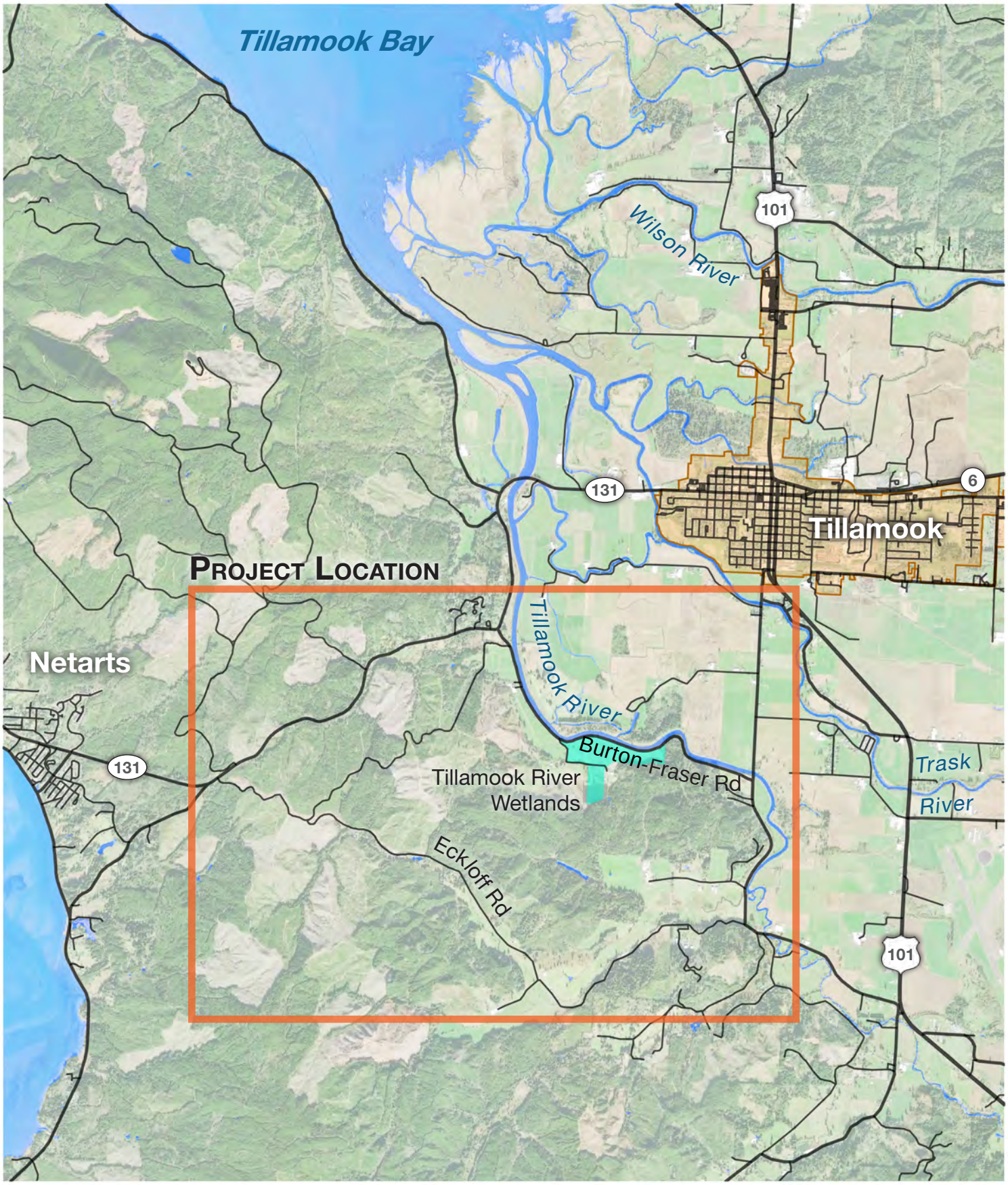

FIGURE 1 | VICINITY MAP

Burton-Fraser Road/Eckloff Road Upgrades - Alternatives Comparison

August 2021

Tillamook Estuaries Partnership
A National Estuary Project

ESA

0 1/4 1/2 1
SCALE MILES

N

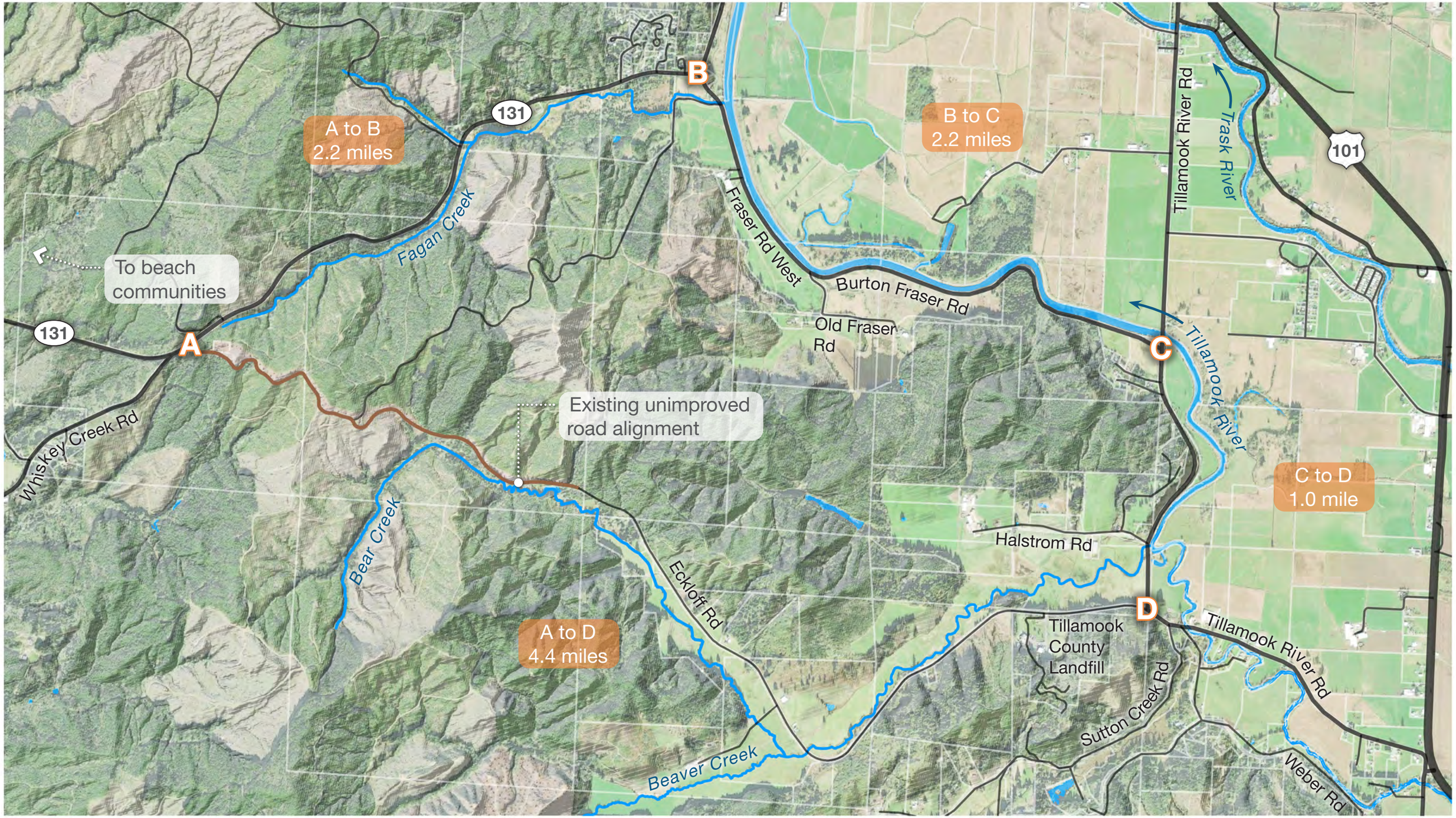

FIGURE 2 | ROADWAY SYSTEM CONTEXT MAP

Burton-Fraser Road/Eckloff Road **Upgrades** - Alternatives Comparison

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SCALE 0 1/8 1/4 1/2 MILES

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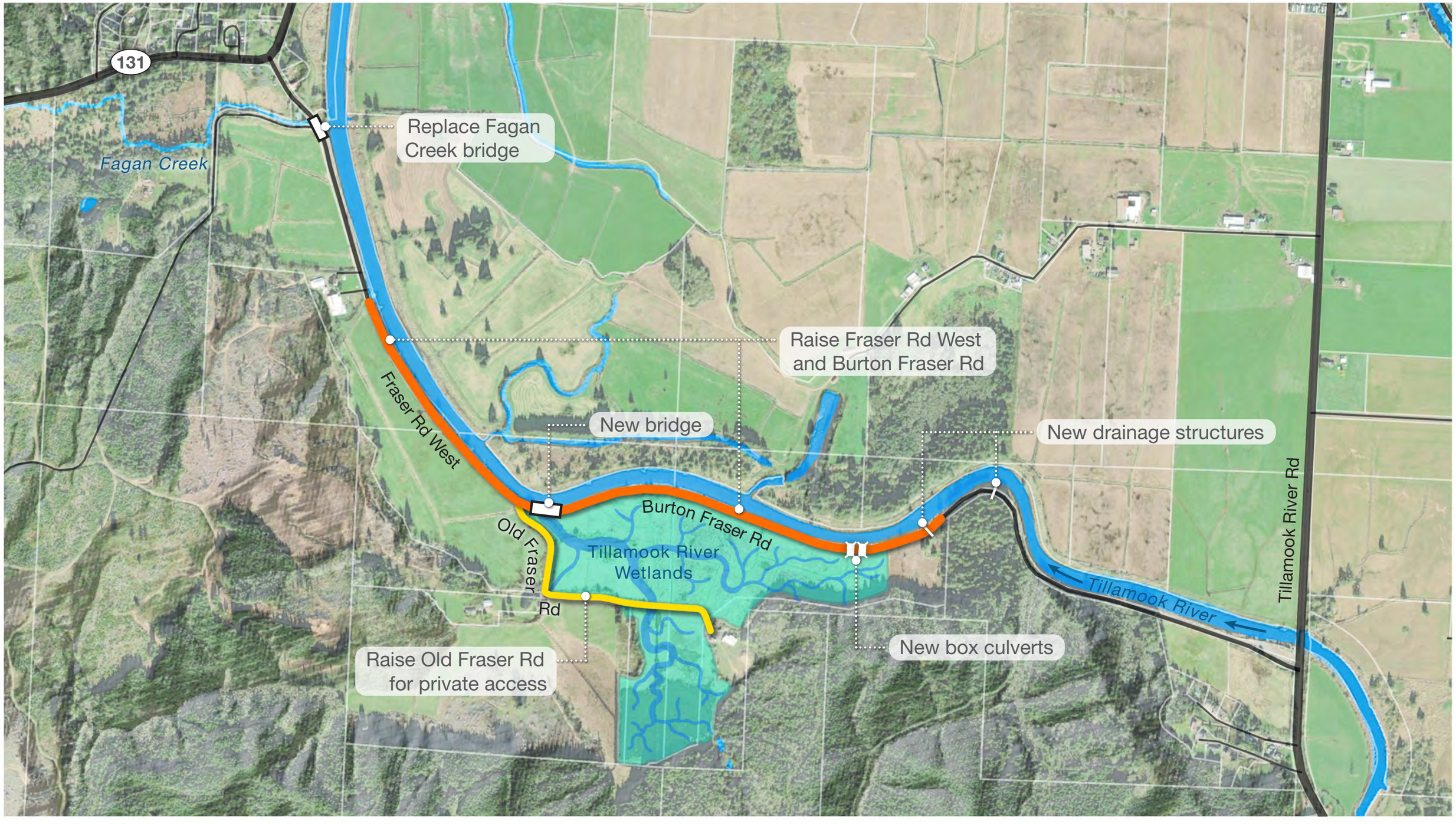

FIGURE 3 | ALTERNATIVE 1: RECONNECT TRW WITH BURTON FRASER ROAD IN PLACE

Burton-Fraser Road/Eckloff Road Upgrades - Alternatives Comparison

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SCALE 0 250 500 1,000 FEET

N

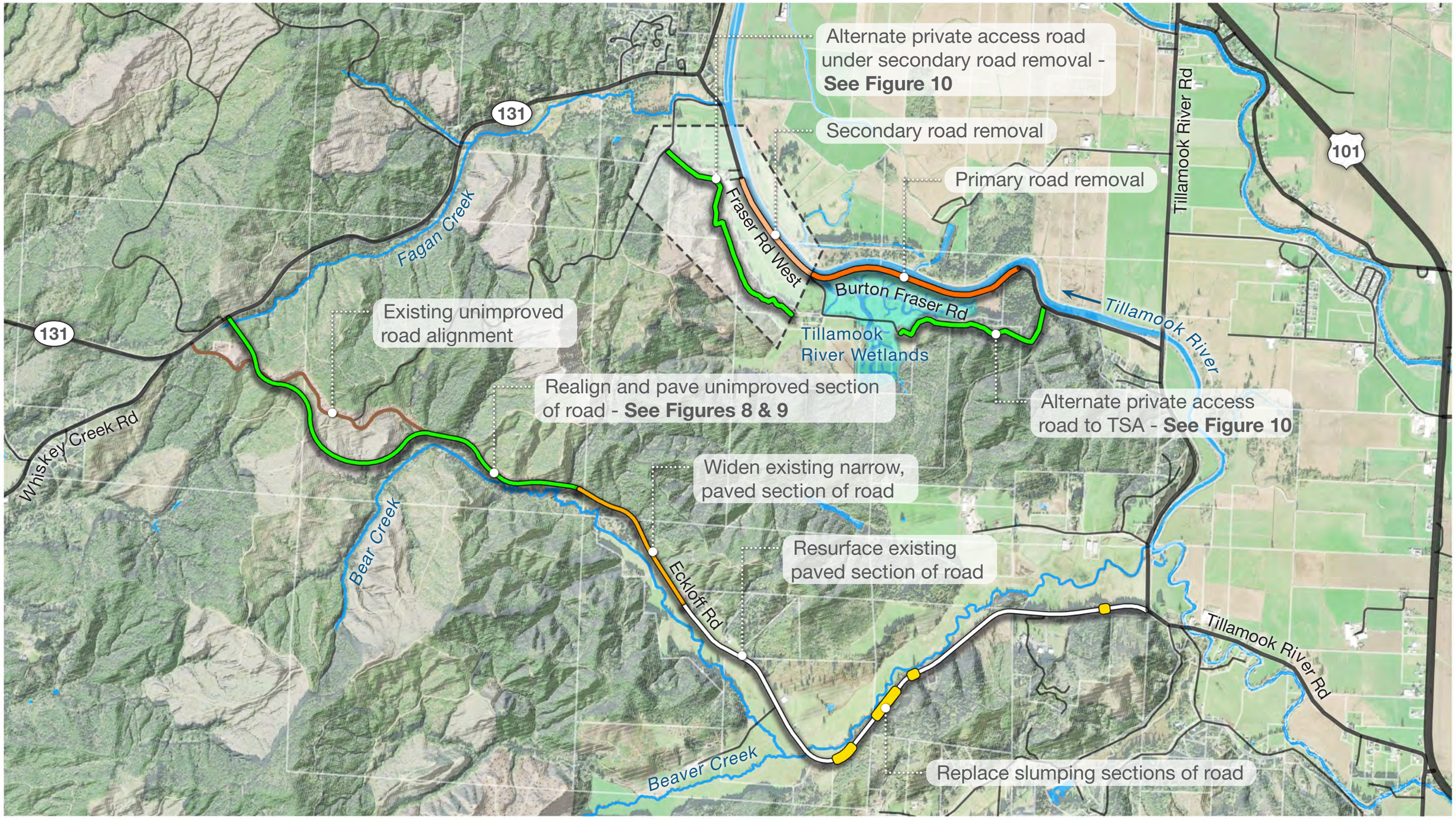

FIGURE 4 | ALTERNATIVE 2: UPGRADE ECKLOFF RD AND REMOVE PART OF BURTON-FRASER RD

Burton-Fraser Road/Eckloff Road **Upgrades** - Alternatives Comparison

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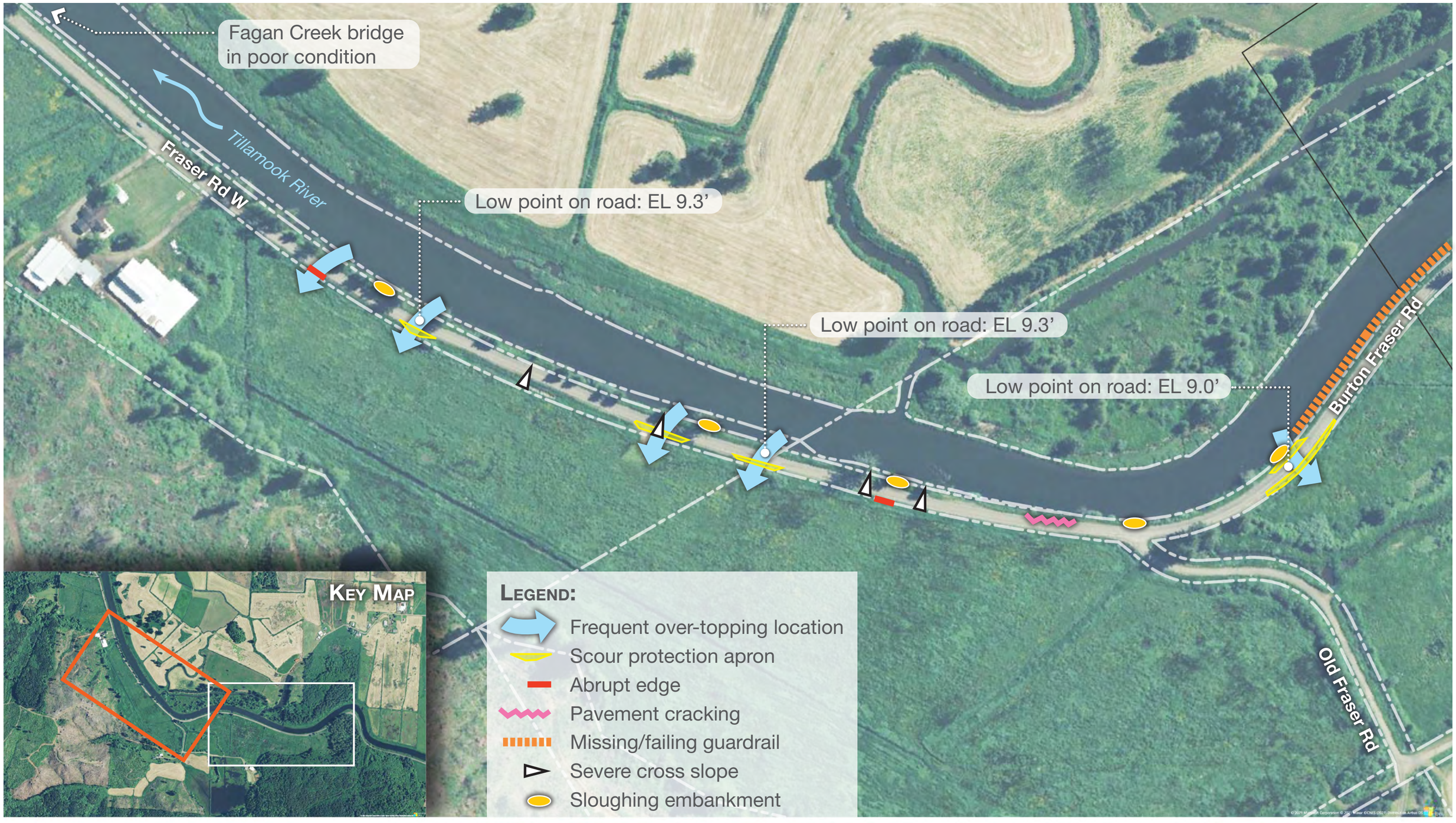

FIGURE 5 | BURTON-FRASER ROAD DEFICIENCIES AND HAZARDS - WEST

Burton-Fraser Road/Eckloff Road Upgrades - Alternatives Comparison

August 2021

Tillamook Estuaries Partnership
A National Estuary Project

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0 100 200 400
SCALE FEET

Failing culvert and broken tide gate

Failing culvert and broken tide gate

Low point on road: EL 9.6’

Tillamook River

Burton Fraser Rd

KEY MAP

LEGEND:

- Frequent over-topping location
- Scour protection apron
- Abrupt edge
- Pavement cracking
- Missing/failing guardrail
- Severe cross slope
- Sloughing embankment

FIGURE 6 | BURTON-FRASER ROAD DEFICIENCIES AND HAZARDS - EAST

Burton-Fraser Road/Eckloff Road Upgrades - Alternatives Comparison

August 2021

Tillamook Estuaries Partnership
A National Estuary Project

ESA

0 100 200 400
SCALE FEET

N

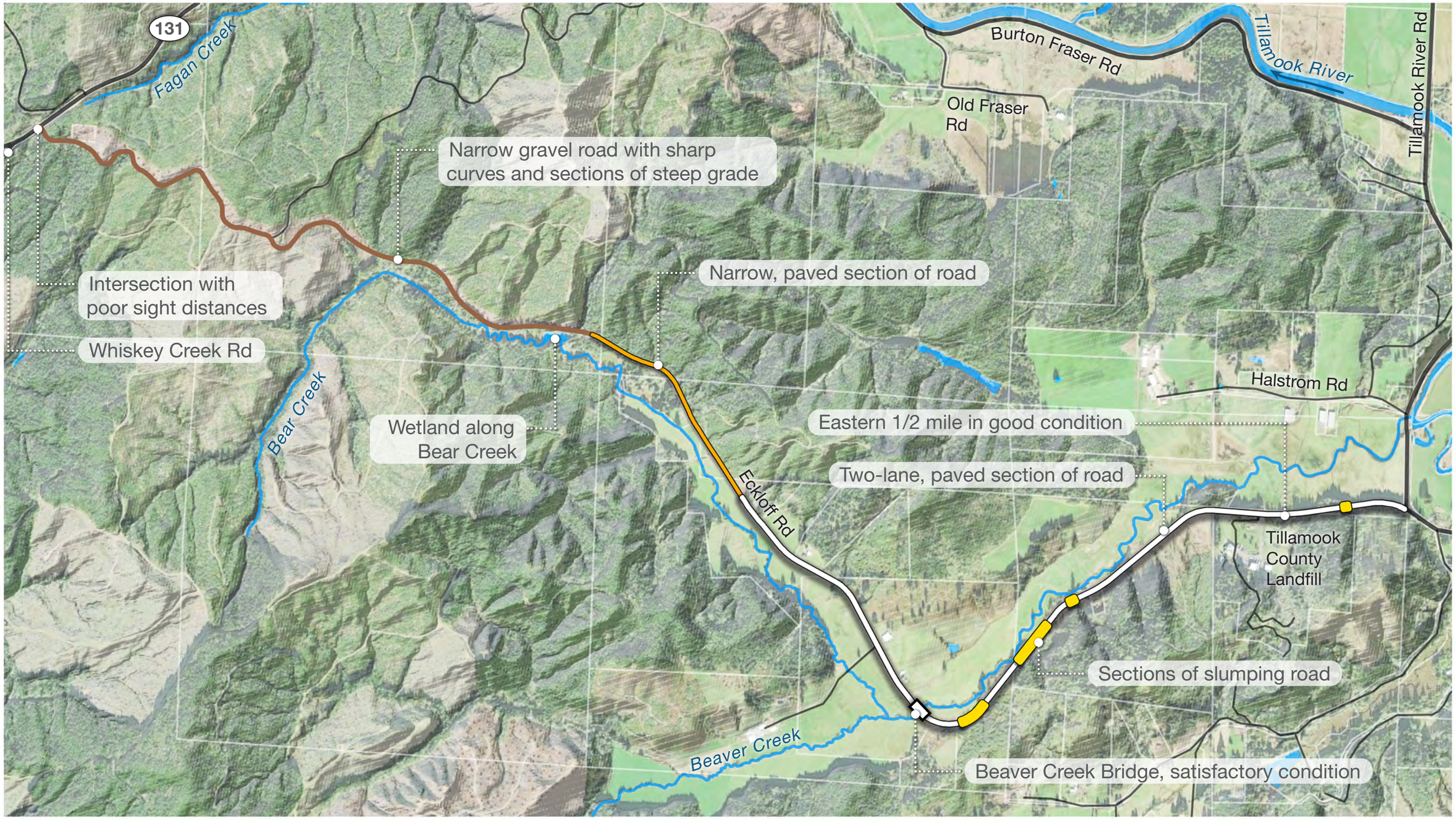


FIGURE 7 | ECKLOFF ROAD EXISTING CONDITIONS OVERVIEW

Burton-Fraser Road/Eckloff Road **Upgrades** - Alternatives Comparison

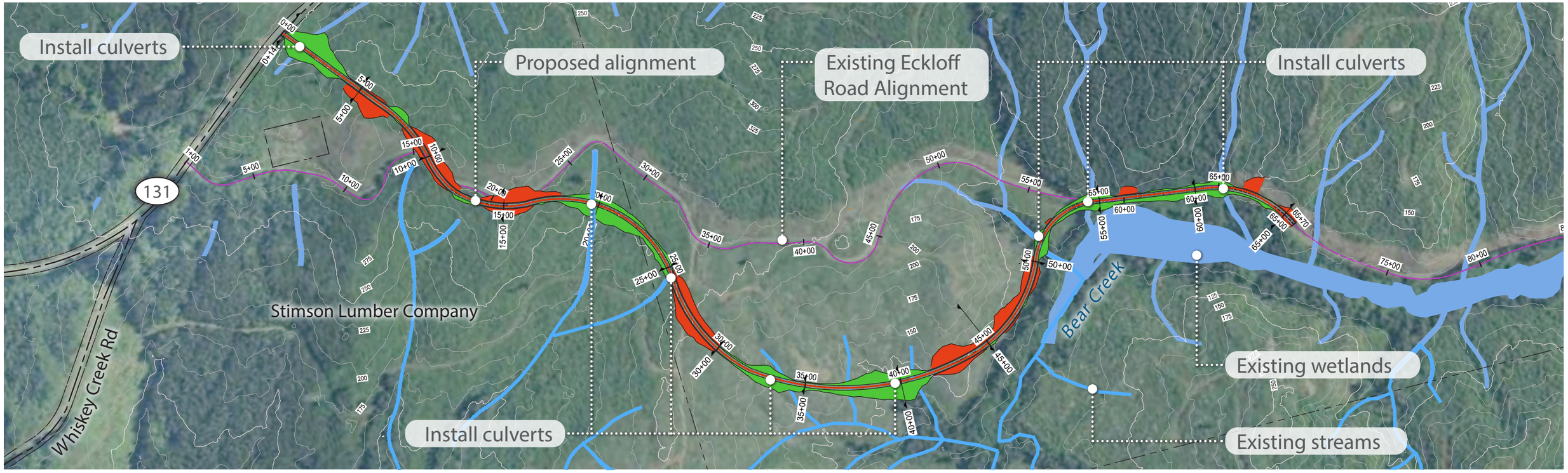
August 2021

Tillamook Estuaries Partnership
A National Estuary Project

ESA

0 500 1,000 2,000
SCALE FEET

N



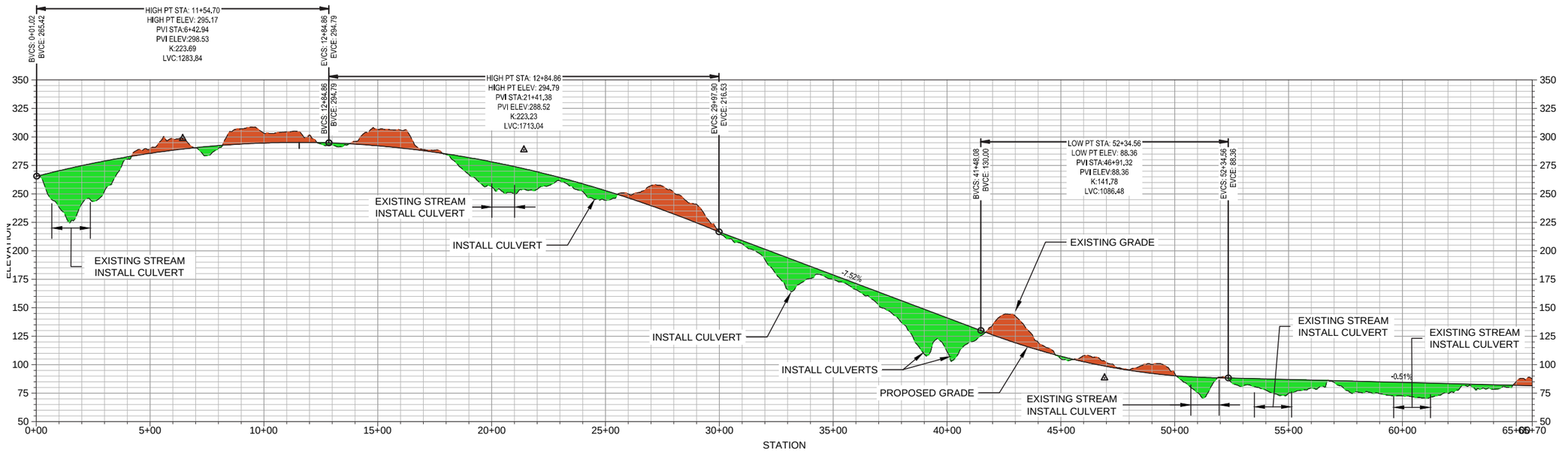


Figure 8 | Eckloff Road Western End Realignment Concept Plan and Profile

Burton-Fraser Road/Eckloff Road Upgrades - Alternatives Comparison

August 2021

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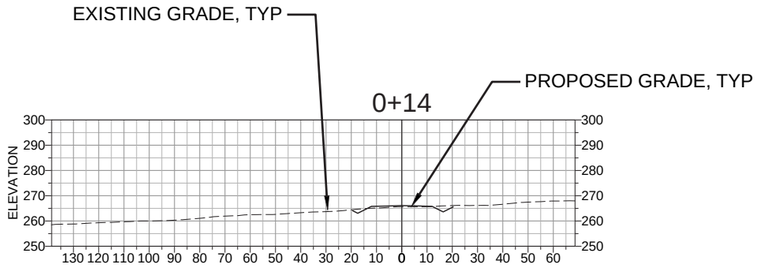

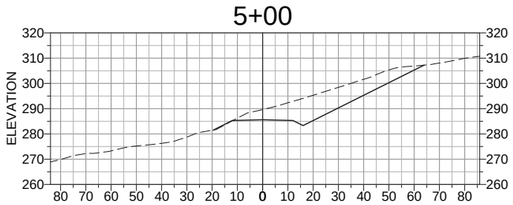

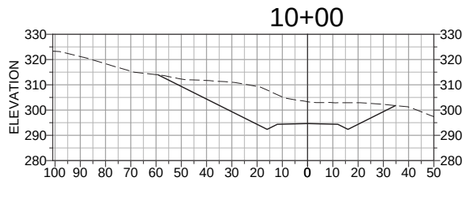

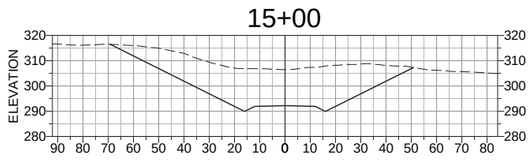

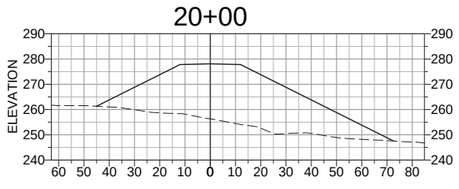

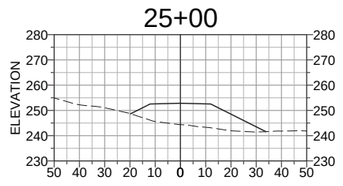

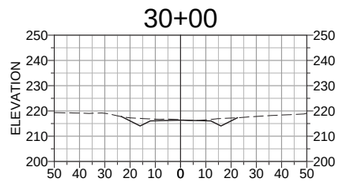

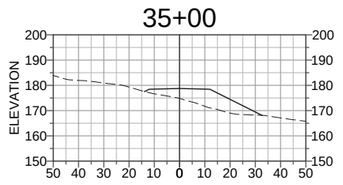

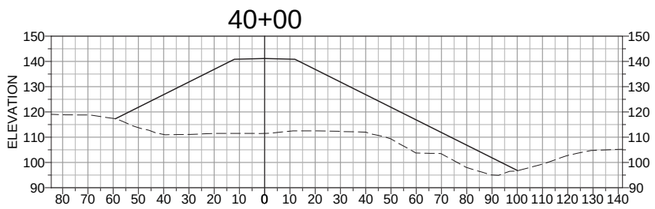

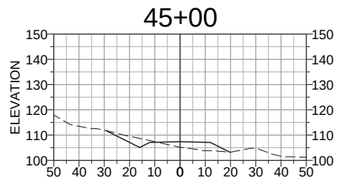

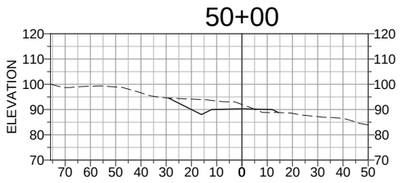

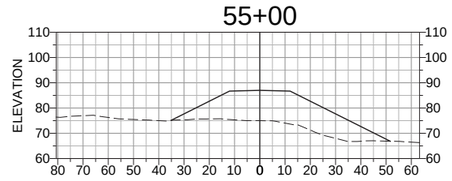

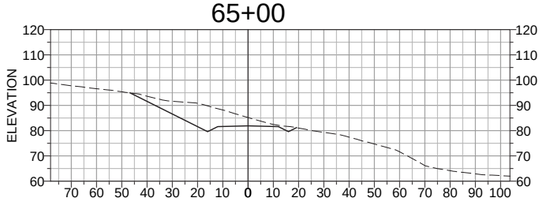

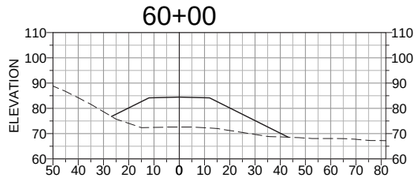

FIGURE 9 | ECKLOFF ROAD WESTERN END REALIGNMENT CONCEPT SECTIONS

Burton-Fraser Road/Eckloff Road Upgrades - Alternatives Comparison

August 2021

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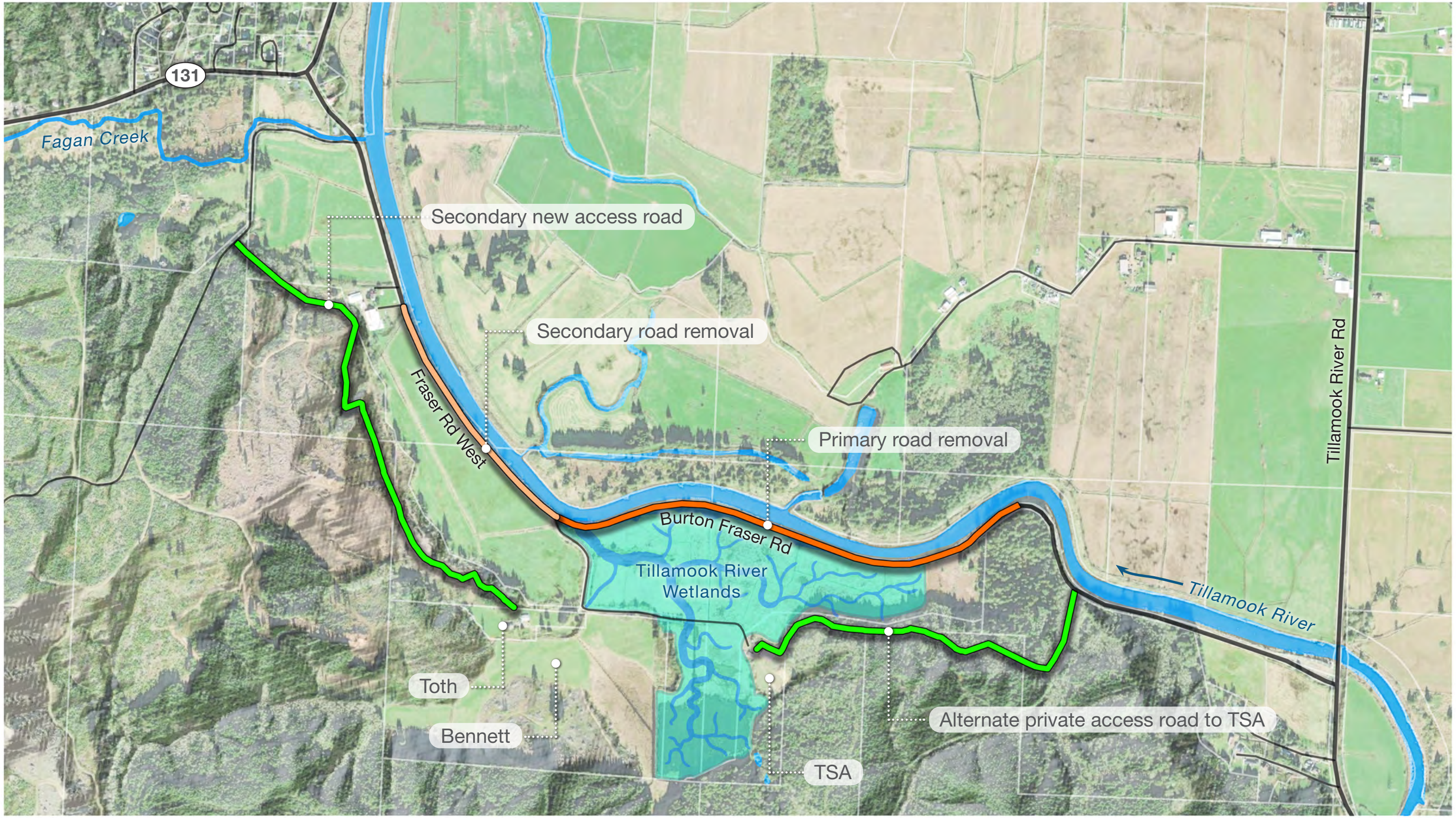

FIGURE 10 | ALTERNATE PRIVATE ACCESS ROUTE OPTIONS

Burton-Fraser Road/Eckloff Road Upgrades - Alternatives Comparison

August 2021

Tillamook Estuaries Partnership
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Appendix B – Planning-Level Cost Estimates

Tillamook River Wetlands - Tidal Wetland Restoration Design **8/31/2021**

Estimate of Probable Construction Cost - 60% Design - Does Not Include Roadway Work (See Road Alts Memo Est)

Roadway Alternative 1 - Upgrade Burton Fraser Road In Place

Item No.	ODOT Spec.	Item Description	Qty	Unit	Unit Cost	Total
		Site Preparation				
1	00210	Mobilization	1	LS	10%	$ 275,000
2	00225	Temporary Works Zone Traffic Control	1	LS	$ 20,000	$ 20,000
3	00245	Temporary Water Management / Work Area Isolation	1	LS	$ 40,000	$ 40,000
4	00253	Temporary Site Access and Staging	1	LS	$ 20,000	$ 20,000
5	00280	Erosion & Sediment Control (wetland site only)	1	LS	$ 35,000	$ 35,000
6	00305	Construction Surveys (Staking, As-Built)	1	LS	$ 25,000	$ 25,000
		Demo				
7	00310	Demo Culverts and Tide Gates, Reconstruct Embankments	1	LS	$ 30,000	$ 30,000
8	00310	Abandon Water Well at TSA	1	LS	$ 1,000	$ 1,000
9	00310	Remove Wire Fencing	500	LF	$ 1.50	$ 750
10	00320	Clearing and Grubbing	1	LS	$ 20,000	$ 20,000
		Earthwork				
Excavation Activities (Cut)						
11	00330	Excavate Tidal Channels	43,000	CY	$ 12	$ 516,000
12	00330	Excavate Freshwater Connections through berms	5	EA	$ 1,000	$ 5,000
Embankment Activities (Fill)						
13	00300	Fill Existing Ditches	8,000	CY	$ 8	$ 64,000
14	00330	Fill - Southwest Setback Dike and Raised Pasture	8,800	CY	$ 8	$ 70,400
15	00330	Fill - Eastern Setback Berm (Optional pending landowner)	1,200	CY	$ 8	$ 9,600
16	00330	Fill - Overbuild Old Fraser Rd embankment (5:1 slope, to Toth)	5,000	CY	$ 8	$ 40,000
17	00330	Fill - TSA South Access Route	800	CY	$ 8	$ 6,400
18	00330	Excess/Unsuitable Fill Placement - spruce mounds	19,200	CY	$ 6	$ 115,200
		Structures				
19	00445	60" HDPE Culvert w/ MTR Tide Gate (Bennett Creek/Old Fraser)	1	LS	$ 150,000	$ 150,000
20	00445	36" HDPE Culvert w/ Simple Tide Gate (Silvera/Old Fraser)	1	LS	$ 20,000	$ 20,000
21	00445	36" HDPE Culverts at TSA South Access Rd	2	LS	$ 6,000	$ 12,000
22	00500	70' Bridge (TSA Access across Wetland/New Tidal Channel)	1	LS	$ 250,000	$ 250,000
		Roadway, Riprap, Aggregate				
23	00641	3/4" Aggregate Base - Raise Old Fraser Road (to Toth)	160	CY	$ 30	$ 4,800
24	00641	3/4" Aggregate Base - Raise Old Fraser Road (Toth to TSA)	150	CY	$ 30	$ 4,500
25	00641	3" Aggregate Base - Raise Old Fraser Road (to Toth)	2,400	CY	$ 32	$ 76,800
26	00641	3" Aggregate Base - Raise Old Fraser Road (Toth to TSA)	2,200	CY	$ 32	$ 70,400
27	00641	Aggregate Base - Gravel Surface for TSA South Access Rd	130	CY	$ 30	$ 3,900
28	00641	Additional Aggregate to account for Settlement	6,400	CY	$ 32	$ 204,800
29	00641	Woven Subgrade Geotextile/Geogrid	5,500	SY	$ 10	$ 55,000
30	00390	Class 700 Riprap	945	TON	$ 60	$ 56,700
		Other Restoration & Site Work				
31	-	Drill New Water Well (Replace TSA Well)	1	LS	$ 12,000	$ 12,000
32	01091	Large Woody Debris - Imported Logs	500	EA	$ 1,000	$ 500,000
33	01040	Spruce Riparian Forest Planting	2.1	AC	$ 17,500	$ 36,750
34	01040	Tidal Forested Spruce Swamp Planting	5.5	AC	$ 17,500	$ 96,250
35	01040	Tidal Shrub Swamp Planting	5.2	AC	$ 14,000	$ 72,800
36	01040	Tidal Marsh Planting	5.25	AC	$ 9,500	$ 49,875
37	01030	Permanent Native Seeding	20	AC	$ 2,000	$ 40,000
38	01030	Temporary Native Seeding	20	AC	$ 1,000	$ 20,000
		Direct Item Subtotal				***$ 3,029,925***
		Contingency			15%	$ 454,489
		Construction Total				**$ 3,480,000**

ALTERNATIVE 1 - BURTON FRASER ROAD UPGRADE WITH BRIDGES TO CONNECT TRW

Roadway Improvement Elements Only (See separate estimate for TRW Restoration and Internal Site Work)

Item No.	ODOT Spec.	Item Description	Qty	Unit	Unit Cost	Total
PART 00200 - TEMPORARY FEATURES AND APPURTENANCES						
1	00210	MOBILIZATION	ALL	LS	10%	$1,079,000
2	00221	TEMPORARY WORK ZONE TRAFFIC CONTROL, COMPLETE	1	LS	3%	$324,000
3	00225	TEMPORARY WATER MANAGEMENT	1	LS	$300,000	$300,000
4	00280	EROSION CONTROL & POLLUTION PREVENTION	1	LS	4%	$432,000
PART 00300 - ROADWORK						
5	00305	CONSTRUCTION SURVEY WORK	1	LS	$40,000	$40,000
6	00310	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	1	LS	$40,000	$40,000
7	00320	CLEARING AND GRUBBING	5	ACRE	$5,000	$25,000
8	00330	GENERAL EXCAVATION	11,000	CY	$20	$220,000
9	00331	24-INCH SUBGRADE STABILIZATION	30,000	SY	$55	$1,650,000
10	00390	FILTER BLANKET	2,000	TON	$15	$30,000
11	00390	RIPRAP CLASS 700	17,600	TON	$45	$792,000
PART 00500 - BRIDGES						
12	00500	BRIDGE AT PRIMARY CHANNEL CROSSING	1	LS	$1,500,000	$1,500,000
13	00500	BRIDGE AT FAGAN CREEK	1	LS	$1,100,000	$1,100,000
14	00595	BOX CULVERTS - HIGH-FLOW CONNECTION	2	EACH	$125,000	$250,000
15	00545	BRIDGES AT SPRUCE SWAMP CHANNEL CONNECTIONS	2	EACH	$550,000	$1,100,000
PART 00600 - BASES						
16	00770	COLD PLANE PAVEMENT REMOVAL, 0 - 3 INCHES DEEP	28,000	SY	$8	$224,000
17	00640	AGGREGATE BASE	20,250	TON	$35	$708,750
18	00640	AGGREGATE BASE (Extra 3.5' depth for Settlement)	48,000	TON	$35	$1,680,000
PART 0700 - WEARING SURFACES						
19	00744	LEVEL 3, 1/2 INCH ACP MIXTURE (TRW Frontage Paving)	3,500	TON	$85	$297,500
20	00744	LEVEL 3, 1/2 INCH ACP MIXTURE (West End/Silviera Frontage)	3,300	TON	$85	$280,500
PART 00800 - PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES						
21	00810	GUARDRAIL, ON PILES	5,200	FOOT	$85	$442,000
22	00860	LONGITUDINAL PAVEMENT MARKINGS	46,500	LF	$0.20	$9,300
PART 09000 - PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS						
23	01210	SIGNING	1	LS	$25,000	$25,000
PART 01000 - RIGHT OF WAY DEVELOPMENT AND CONTROL						
24	01030	TEMPORARY SEEDING	5	ACRE	$5,000	$25,000
25	01030	PERMANENT SEEDING	5	ACRE	$6,000	$30,000
26	01040	LIVE STAKES FOR VEGETATED RIPRAP STABILIZATION	80,000	EACH	$4	$320,000
					DIRECT ITEM CONSTRUCTION SUBTOTAL	**$ 12,920,000**
					ESTIMATE UNCERTAINTY CONTIGENCY (30%)	**$ 3,876,000**
					TOTAL OPINION OF PROBABLE COST FOR CONSTRUCTION	**$ 16,800,000**

NOTES:

1. The above cost opinion is in 2021 dollars and does not include future escalation or financing costs.

2. Any estimate of construction cost prepared by esa represents its judgement as a design professional and is supplied for general guidance to the Client. Since ESA has no control over the cost of labor and material, competitive bidding, or market conditions, ESA does not guarantee the accuracy of such estimates as compared to Contractor bids or actual costs to the Client.

Tillamook River Wetlands - Tidal Wetland Restoration Design **8/31/2021**

Estimate of Probable Construction Cost - 60% Design - Does Not Include Eckloff Road Work (See Road Alts Memo Est)

Roadway Alternative 2 - Upgrade Eckloff Road and Removal Part of Burton_Fraser Road

Item No.	ODOT Spec.	Item Description	Qty	Unit	Unit Cost	Total
		Site Preparation				
1	00210	Mobilization	1	LS	10%	$ 282,000
2	00225	Temporary Works Zone Traffic Control	1	LS	$ 20,000	$ 20,000
3	00245	Temporary Water Management / Work Area Isolation	1	LS	$ 40,000	$ 40,000
4	00253	Temporary Site Access and Staging	1	LS	$ 20,000	$ 20,000
5	00280	Erosion & Sediment Control (wetland site only)	1	LS	$ 35,000	$ 35,000
6	00305	Construction Surveys (Staking, As-Built)	1	LS	$ 25,000	$ 25,000
		Demo				
7	00310	Demo Culverts and Tide Gates, Reconstruct Embankments	1	LS	$ 30,000	$ 30,000
8	00310	Abandon Water Well at TSA	1	LS	$ 1,000	$ 1,000
9	00310	Pavement Removal (Burton-Fraser Rd)	10,300	SY	$ 3	$ 30,900
10	00310	Remove Wire Fencing	500	LF	$ 1.50	$ 750
11	00320	Clearing and Grubbing	1	LS	$ 20,000	$ 20,000
		Earthwork				
Excavation Activities (Cut)						
12	00330	Excavate Tidal Channels	43,000	CY	$ 12	$ 516,000
13	00330	Excavate - grading to naturalize river bank	2,000	CY	$ 12	$ 24,000
14	00330	Excavate Freshwater Connections through berms	5	EA	$ 1,000	$ 5,000
Embankment Activities (Fill)						
15	00300	Fill Existing Ditches	8,000	CY	$ 8	$ 64,000
16	00330	Fill - Southwest Setback Dike and Raised Pasture	8,800	CY	$ 8	$ 70,400
17	00330	Fill - Eastern Setback Berm (Optional pending landowner)	1,200	CY	$ 8	$ 9,600
18	00330	Fill - Overbuild Old Fraser Rd embankment (5:1 slope, to Toth)	5,000	CY	$ 8	$ 40,000
19	00330	Fill - TSA South Access Route	800	CY	$ 8	$ 6,400
20	00330	Excess/Unsuitable Fill Placement - spruce mounds	21,200	CY	$ 6	$ 127,200
		Structures				
21	00445	60" HDPE Culvert w/ MTR Tide Gate (Bennett Creek/Old Fraser)	1	LS	$ 150,000	$ 150,000
22	00445	36" HDPE Culvert w/ Simple Tide Gate (Silvera/Old Fraser)	1	LS	$ 20,000	$ 20,000
23	00445	36" HDPE Culverts at TSA South Access Rd	2	LS	$ 6,000	$ 12,000
24	00500	70' Bridge (TSA Access across Wetland/New Tidal Channel)	1	LS	$ 250,000	$ 250,000
		Roadway, Riprap, Aggregate				
25	00641	3/4" Aggregate Base - Raise Old Fraser Road (to Toth)	160	CY	$ 30	$ 4,800
26	00641	3/4" Aggregate Base - Raise Old Fraser Road (Toth to TSA)	150	CY	$ 30	$ 4,500
27	00641	3" Aggregate Base - Raise Old Fraser Road (to Toth)	2,400	CY	$ 32	$ 76,800
28	00641	3" Aggregate Base - Raise Old Fraser Road (Toth to TSA)	2,200	CY	$ 32	$ 70,400
29	00641	Aggregate Base - Gravel Surface for TSA South Access Rd	130	CY	$ 30	$ 3,900
30	00641	Additional Aggregate to account for Settlement	6,400	CY	$ 32	$ 204,800
31	00641	Woven Subgrade Geotextile/Geogrid	5,500	SY	$ 10	$ 55,000
32	00390	Class 700 Riprap	945	TON	$ 60	$ 56,700
		Other Restoration & Site Work				
33	-	Drill New Water Well (Replace TSA Well)	1	LS	$ 12,000	$ 12,000
34	01091	Large Woody Debris - Imported Logs	500	EA	$ 1,000	$ 500,000
35	01040	Spruce Riparian Forest Planting	2.1	AC	$ 17,500	$ 36,750
36	01040	Tidal Forested Spruce Swamp Planting	5.5	AC	$ 17,500	$ 96,250
37	01040	Tidal Shrub Swamp Planting	5.2	AC	$ 14,000	$ 72,800
38	01040	Tidal Marsh Planting	5.25	AC	$ 9,500	$ 49,875
39	01030	Permanent Native Seeding	20	AC	$ 2,000	$ 40,000
40	01030	Temporary Native Seeding	20	AC	$ 1,000	$ 20,000
		Direct Item Subtotal				***$ 3,103,825***
		Contingency			20%	$ 620,765
		Construction Total				**$ 3,730,000**

ALTERNATIVE 2 - ECKLOFF ROAD UPGRADE

Roadway Improvement Elements Only (See separate estimate for TRW Restoration and Internal Site Work)

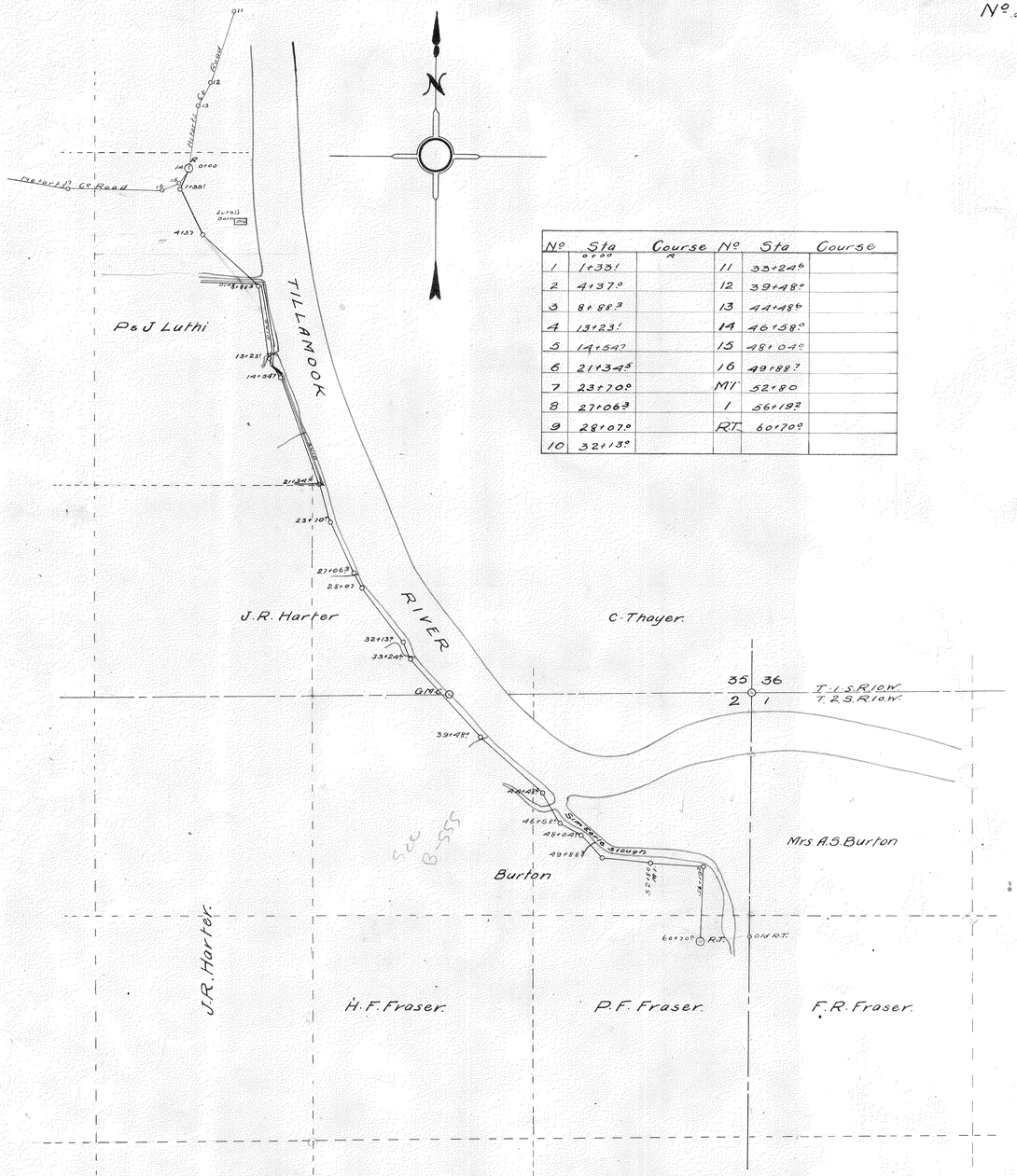
Item No.	ODOT Spec.	Item Description	Qty	Unit	Unit Cost	Total
PART 00200 - TEMPORARY FEATURES AND APPURTENANCES						
1	00210	MOBILIZATION	ALL	LS	10%	$859,000
2	00221	TEMPORARY WORK ZONE TRAFFIC CONTROL, COMPLETE	1	LS	3%	$258,000
3	00225	TEMPORARY WATER MANAGEMENT	1	LS	$10,000	$10,000
4	00280	EROSION CONTROL & POLLUTION PREVENTION	1	LS	2%	$172,000
PART 00300 - ROADWORK						
5	00305	CONSTRUCTION SURVEY WORK	1	LS	$180,000	$180,000
6	00310	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	1	LS	$25,000	$25,000
7	00320	CLEARING AND GRUBBING	18	ACRE	$5,000	$90,000
8	00330	GENERAL EXCAVATION	115,000	CY	$12	$1,380,000
9	00331	24-INCH SUBGRADE STABILIZATION	3,000	SY	$55	$165,000
PART 00500 - BRIDGES						
10	00445	24" DRAINAGE CULVERTS	51	EACH	$6,000	$306,000
PART 00600 - BASES						
11	00640	AGGREGATE BASE (ROAD BASE)	3,136	TON	$35	$109,771
12	00640	AGGREGATE BASE (3"-0") - ROCK FILL	125,000	TON	$40	$5,000,000
PART 0700 - WEARING SURFACES						
13	00744	LEVEL 3, 1/2 INCH ACP MIXTURE (West End Realign)	4,900	TON	$85	$416,500
14	00744	LEVEL 3, 1/2 INCH ACP MIXTURE (central, widened Section)	5,025	TON	$85	$427,125
15	00744	LEVEL 3, 1/2 INCH ACP MIXTURE (East End, overlay)	3,690	TON	$85	$313,650
PART 00800 - PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES						
16	00810	GUARDRAIL, TYPE 4	1,200	FOOT	$50	$60,000
17	00860	LONGITUDINAL PAVEMENT PARKINGS	41,840	LF	$0.20	$8,368
PART 09000 - PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS						
18	01210	SIGNING	1	LS	$50,000	$50,000
PART 01000 - RIGHT OF WAY DEVELOPMENT AND CONTROL						
19	01030	TEMPORARY SEEDING	5	ACRE	$5,000	$25,000
20	01030	PERMANENT SEEDING	5	ACRE	$6,000	$30,000
					DIRECT ITEM CONSTRUCTION SUBTOTAL	**$ 9,890,000**
					ESTIMATE UNCERTAINTY CONTIGENCY (30%)	**$ 2,967,000**
					TOTAL OPINION OF PROBABLE COST FOR CONSTRUCTION	**$ 12,860,000**

NOTES:

1. The above cost opinion is in 2021 dollars and does not include future escalation or financing costs.
2. Any estimate of construction cost prepared by esa represents its judgement as a design professional and is supplied for general guidance to the Client. Since ESA has no control over the cost of labor and material, competitive bidding, or market conditions, ESA does not guarantee the accuracy of such estimates as compared to Contractor bids or actual costs to the Client.

Appendix C – Historical Documentation of Burton-Fraser Road

Petition
Nº 233



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2	4+37.0		12	39+48.0	
3	8+88.3		13	44+48.6	
4	13+23.1		14	46+58.0	
5	14+54.7		15	48+04.0	
6	21+34.5		16	49+88.7	
7	23+70.0		M1	52+80	
8	27+06.3		1	56+19.2	
9	28+07.0		RT	60+70.0	
10	32+13.5				

C7 15 PAGE 122

MAP
OF
FRASER COUNTY ROAD
TILLAMOOK COUNTY
SEC'S 2, 2S. R 10W. & 35, 1S. R 10 W. W.M.
U.G. Jackson County Surv.
MARCH 14 1913 SCALE 1"=400'

Filed April 3rd 1913 J. Fred Golden, Clerk

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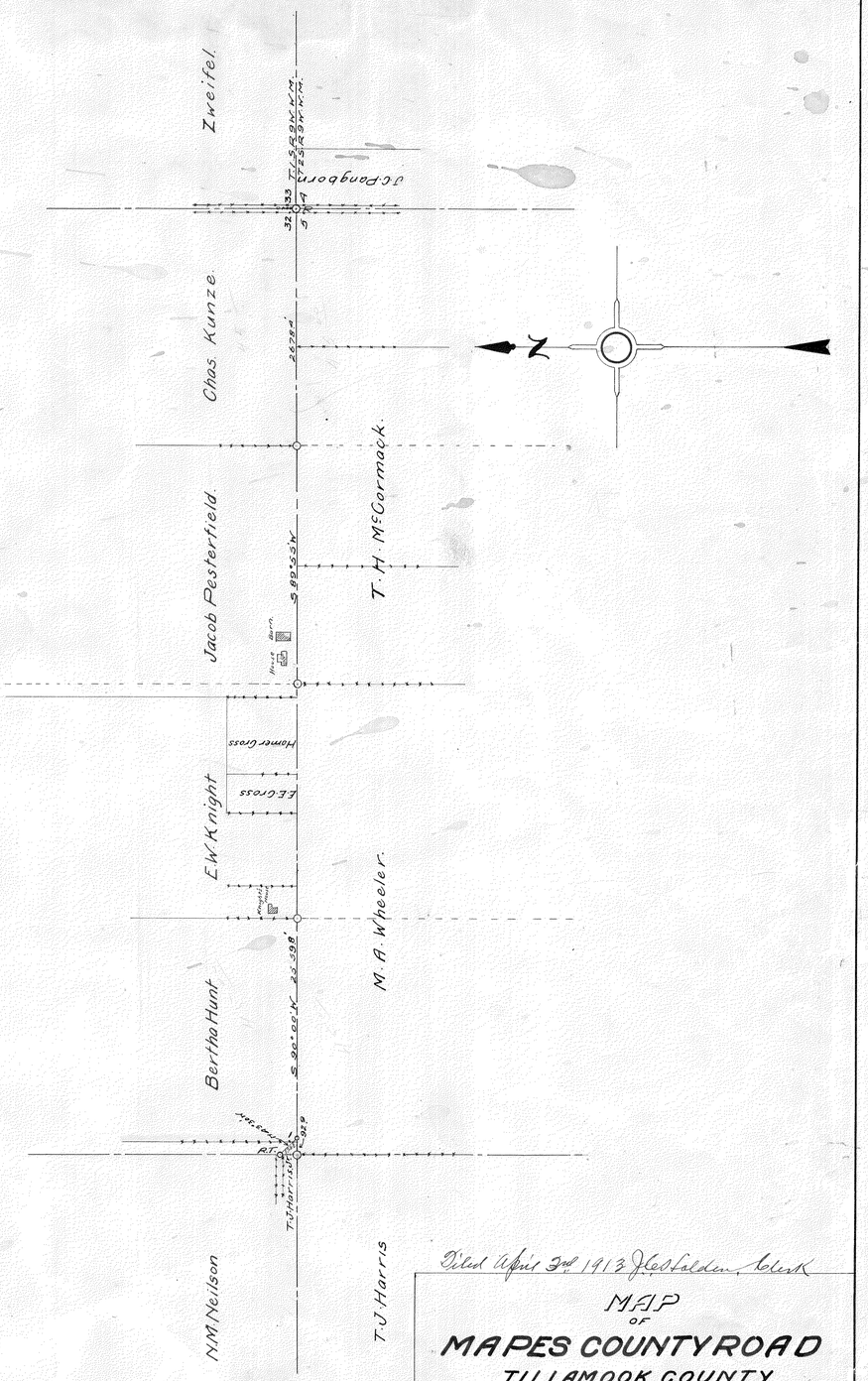
Nº 60

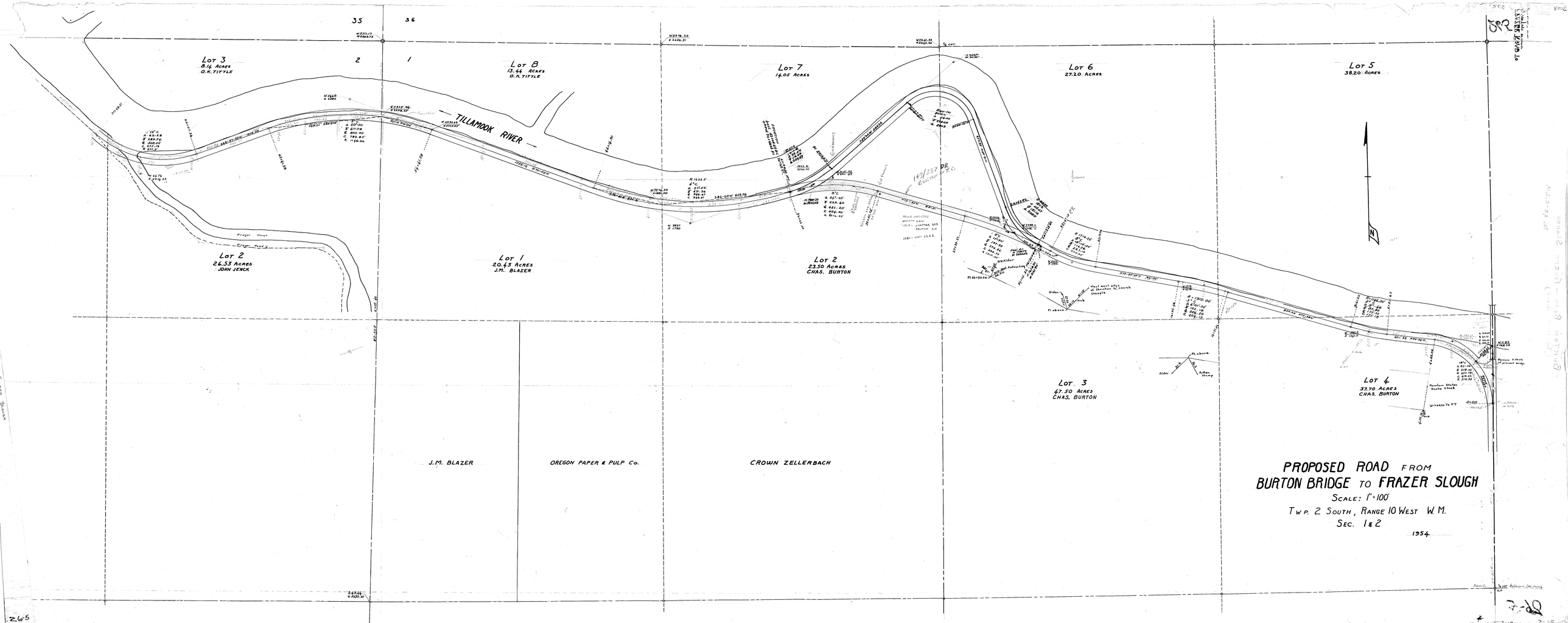


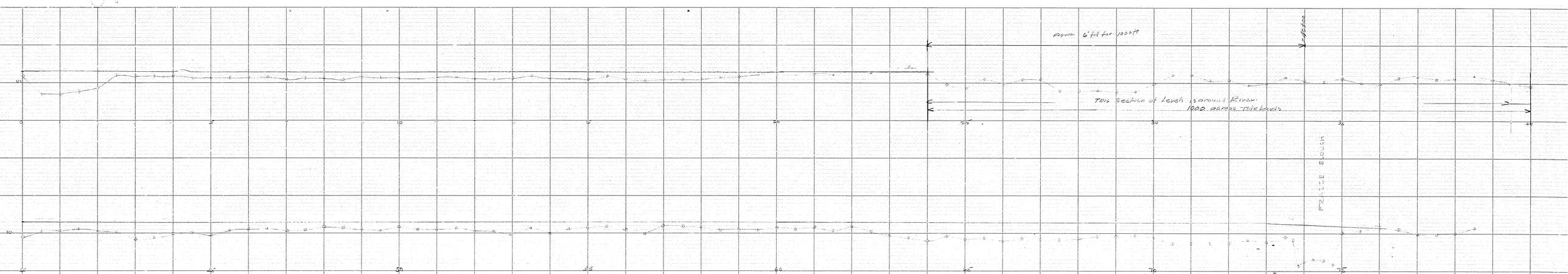
CL-9 Page 22 "40' WIDE"
For notes see See Book "CL-9 P.22 etc

Filed April 3rd 1913 J. Fred Golden, Clerk

MAP
OF
MAPES COUNTY ROAD
TILLAMOOK COUNTY
Bet. SEC'S. 32, T1S, R9W. & 5, T.2S, R9W. W.M.
U.G. Jackson County Surv.
MARCH 11, 1913. SCALE 1"=400'.

60


35
36
2
1
Lot 3
8.14 Acres
O.K. TITTLE
Lot 8
13.46 Acres
O.K. TITTLE
Lot 7
14.05 Acres
Lot 6
27.20 Acres
Lot 5
38.20 Acres
TILLAMOOK RIVER
Lot 2
26.53 Acres
JOHN JENCK
Lot 1
20.43 Acres
J.M. BLAZER
Lot 2
23.50 Acres
CHAS. BURTON
Lot 3
47.50 Acres
CHAS. BURTON
Lot 4
37.70 Acres
CHAS. BURTON
J.M. BLAZER
OREGON PAPER & PULP Co.
CROWN ZELLERBACH
PROPOSED ROAD FROM
BURTON BRIDGE TO FRAZER SLOUGH
SCALE: 1" = 100'
TWP. 2 SOUTH, RANGE 10 WEST W.M.
SEC. 1 & 2
1954



COUNTY ROAD
ERECTION TO BURTON BRIDGE
SITUATED IN
SECTIONS 12 & TWP 2 S.R. 1 E. OF WILLAMETTE MER. 1924
SCALES: HOR. 1"=10'
VERT. 1"=10'
W.E. Anderson
Co. Engr.

TILLAMOOK RIVER RD. -
0+00 -- 17+50

-1954-

Station	dist	area cut	Area Fill	c.y cut	c.y Fill	Total Cut	Total Fill
0+00							
	50						
0+50							
	50						
1+00			235				
	50		434		407		
1+50			204				
	50		360		364		
2+00			164				
	50		329		297		
2+50			132				
	50		299		266		
3+00			155				
	50		320		296		
3+50			165				
	50		341		306		
4+00			165				
	50		328		301		
4+50			160				
	50		318		289		
5+00			152				
	50		324		300		
5+50			172				
	50		337		312		
6+00			165				
	50		318		295		
6+50			153				
	50		332		307		
7+00			179				
	50		361		335		
7+50			183				
	50		343		317		
8+00			160				
	50		362		335		
8+50			206				
	50		353		327		
9+00			151				
	50		321		297		
9+50			170				
	50		343		317		
10+00			172				
	50		324		300		
10+50			152				
	50		310		286		
11+00			157				
	50		314		291		
11+50			157				
	50		315		292		
12+00			158				
	50		328		304		
12+50			170				
	50		341		316		
13+00			171				
	50		292		271		
13+50			128				
	50		253		235		
14+00			138				
	50		244		226		
14+50			114				
	50		238		93		
14+72			116				
	28		238		96		
15+00			123				
	50		191		80		
15+50			75				
	50		175		162		
16+00			100				
	50		215		199		
16+50			115				
	50		282		261		
17+00			167				
	50		360		329		
17+50			183		9404		

49+50 to 67+50

Station	dist	Area cut	Area Fill	c.y cut	c.y Fill	Total Cut	Total Fill
49+50			185				
	50		404		394		
50+00			219				
	50		429		397		
50+50			210				
	50		404		374		
51+00			194				
	50		406		368		
51+50			203				
	50		429		397		
52+00			206				
	50		430		398		
52+50			204				
	50		409		379		
53+00			200				
	50		395		366		
53+50			195				
	50		409		379		
54+00			214				
	50		424		393		
54+50			210				
	50		421		390		
55+00			211				
	50		464		430		
55+50			253				
	50		426		396		
56+00			175				
	50		382		354		
56+50			207				
	50		382		354		
57+00			176				
	50		342		317		
57+50			167				
	50		331		306		
58+00			164				
	50		325		301		
58+50			161				
	50		304		282		
59+00			143				
	50		262		243		
59+50			119				
	50		249		231		
60+00			150				
	50		248		230		
60+50			118				
	50		243		225		
61+00			125				
	50		255		236		
61+50			130				
	50		279		254		
62+00			141				
	50		294		272		
62+50			150				
	50		305		285		
63+00			158				
	50		311		288		
63+50			153				
	50		318		294		
64+00			165				
	50		332		309		
64+50			169				
	50		356		330		
65+00			187				
	50		356		331		
65+50			171				
	50		348		322		
66+00			177				
	50		335		310		
66+50			158				
	50		322		298		
67+00			164				
	50		383		355		
67+50			219				

11,763

17+50 to 49+50

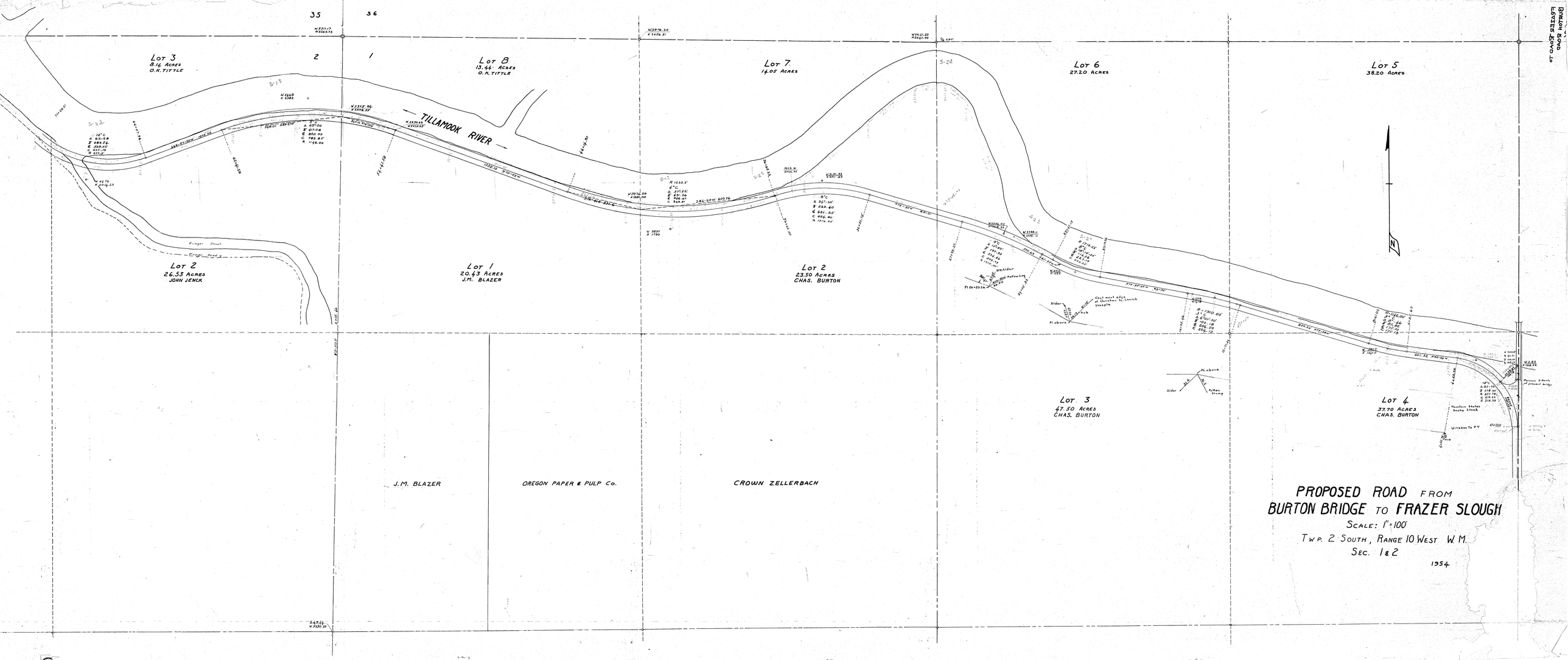
Station	dist	Area Cut	Area Fill	C.Y. Cut	C.Y. Fill	Total Cut	Total Fill
17+50			183				
	50		351		325		
18+00			168				
	50		323		299		
18+50			155				
	50		285		264		
19+00			130				
	50		237		219		
19+50			107				
	50		237		219		
20+00			130				
	50		240		223		
20+50			110				
	50		202		187		
21+00		—	92				
	50		147		136		
21+50		—	55				
	50		63		58		
22+00		23	8				
	50	113	32	104	29		
22+50		89	24				
	50	224	32	208	29		
23+00		135	8				
	50	280		259			
23+50		145	—				
	6	145		16			
23+56		00	00				
	44		87		70		
24+00			87				
~~	~~~	~~~	~~~	~~~			
39+50							
	50						
40+00			245				
	50		468		433		
40+50			223				
	50		436		404		
41+00			213				
	50		426		394		
41+50			213				
	50		472		437		
42+00			[illegible]				
	50		429		397		
42+50			170				
	50		362		335		
43+00			[illegible]				
	50		383		354		
43+50			[illegible]				
	50		405		375		
44+00			[illegible]				
	50		413		382		
44+50			[illegible]				
	50		414		383		
45+00			[illegible]				
	50		425		394		
45+50			[illegible]				
	50		432		400		
46+00			[illegible]				
	50		426		394		
46+50			[illegible]				
	50		438		406		
47+00			[illegible]				
	50		467		432		
47+50			[illegible]				
	50		439		407		
48+00			206				
	50		403		373		
48+50			197				
	50		400		371		
49+00			203				
	50		388		359		
49+50			185				
				587	8488		

TILLAMOOK RIVER RD.
67+50 to 74+75

BURTON BRIDGE TO FRAZE SLOUGH
-1951-

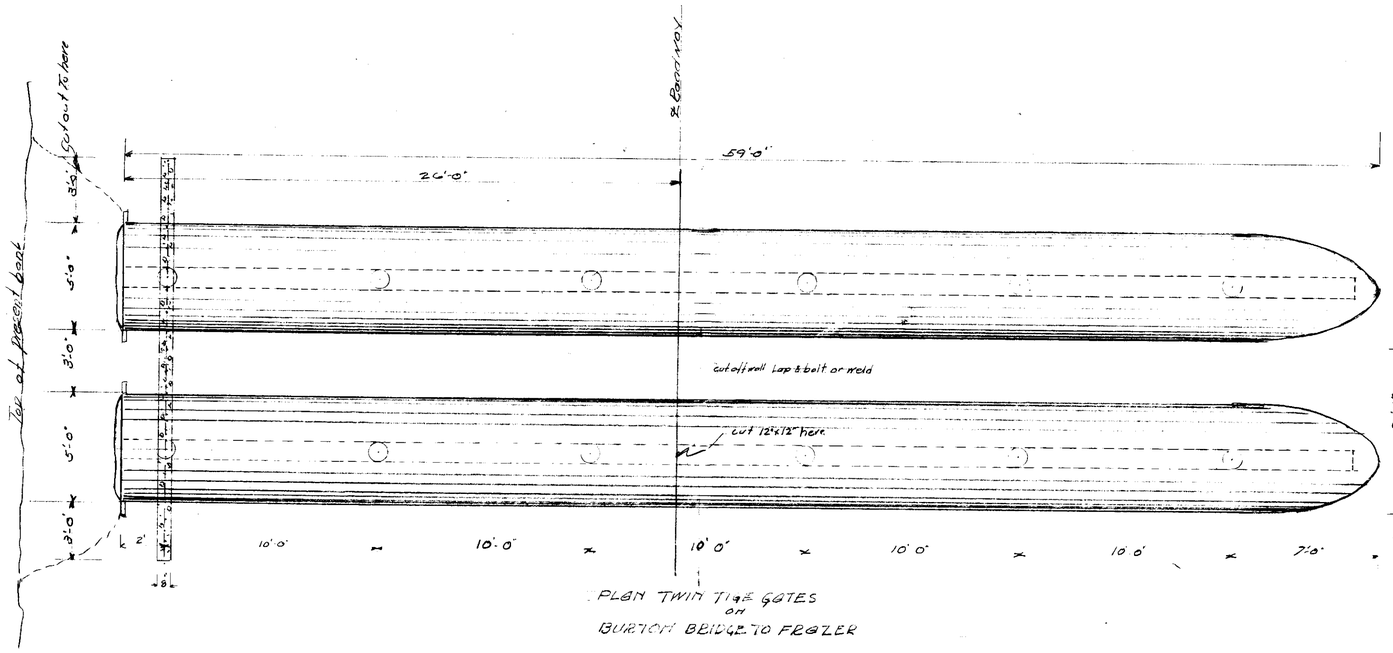
Station	dist	area cut	Area Fill	c.y. cut	c.y. Fill	Total Cut	Total Fill
67+50			219				
	50		307		368		
68+00			198				
	50		385		356		
68+50			207				
	50		378		394		
69+00			165				
	50		360		333		
69+50			195				
	50		381		353		
70+00			186				
	50		378		350		
70+50			192				
	50		397		368		
71+00			205				
	50		429		397		
71+50			224				
	50		421		390		
72+00			197				
	50		430		398		
72+50			233				
	50		465		431		
73+00			232				
	50		419		388		
73+50			167				
	20		226		138		
73+70			185				
	15		276		209		
73+85			567				
	15		495		300		
74+00			468				
	25		588		411		
74+25			420				
	25		359		397		
74+50			439				
	25		491		454		
74+75			542		6,385		
	1000		285		10,500		

2,64
220
5,28

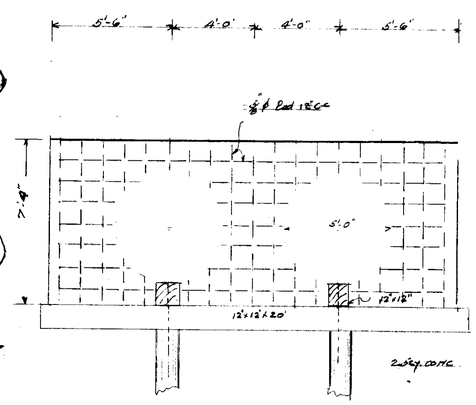

35
36
2
1
Lot 3
8.16 Acres
O.K. Tittle
Lot 8
13.64 Acres
O.K. Tittle
Lot 7
14.05 Acres
Lot 6
27.20 Acres
Lot 5
38.20 Acres
TILLAMOOK RIVER
Lot 2
26.53 Acres
John Jenck
Lot 1
20.43 Acres
J.M. Blazer
Lot 2
23.50 Acres
Chas. Burton
Lot 3
47.50 Acres
Chas. Burton
Lot 4
37.70 Acres
Chas. Burton
J.M. BLAZER
OREGON PAPER & PULP Co.
CROWN ZELLERBACH
PROPOSED ROAD FROM
BURTON BRIDGE TO FRAZER SLOUGH
SCALE: 1" = 100'
TWP. 2 SOUTH, RANGE 10 WEST W.M.
SEC. 1 & 2
1954


7+50
8+00
8+50
9+00
9+50
10+00
16+50
17+00
17+50
18+00
18+50
19+00

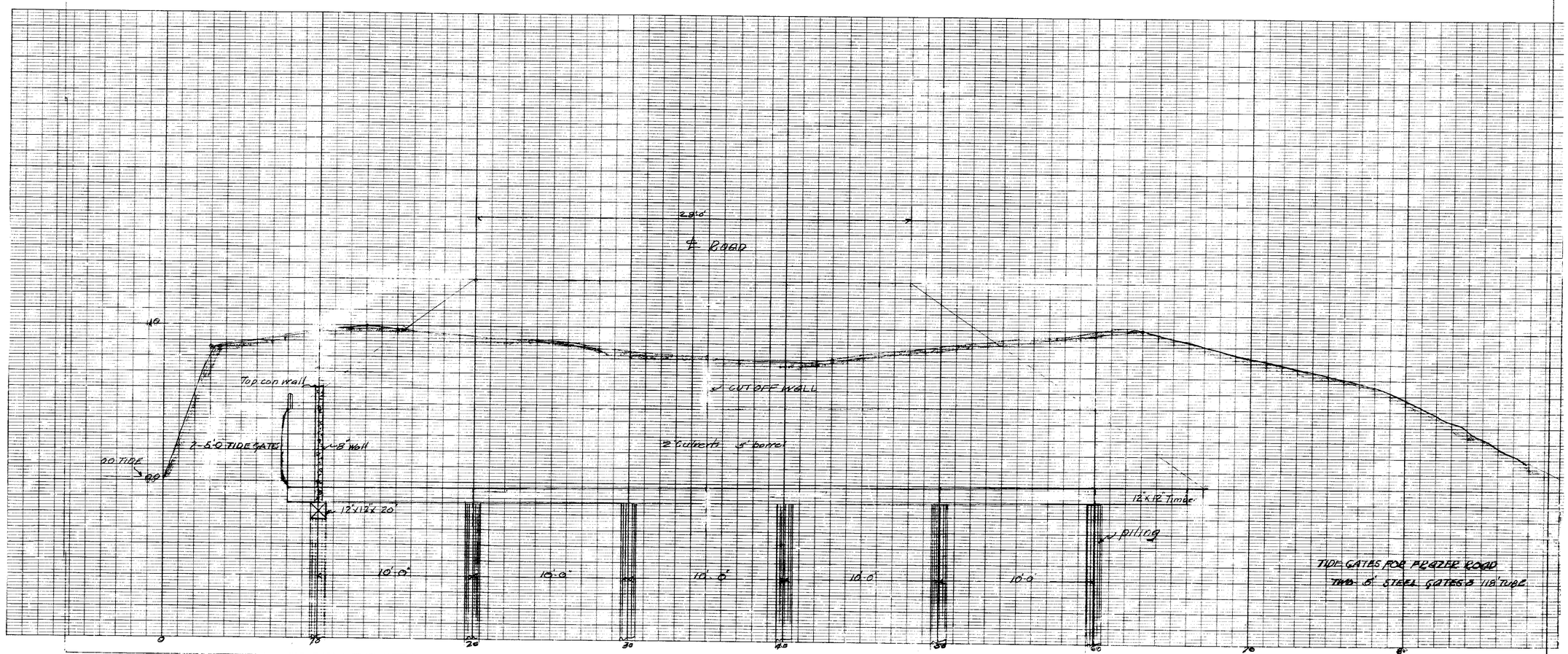
B-3771



PLAN TWIN TIDE GATES
ON
BURTON BRIDGE TO FRAZER



ELEV FROM RIVER
Scale 1" = 4'-0"

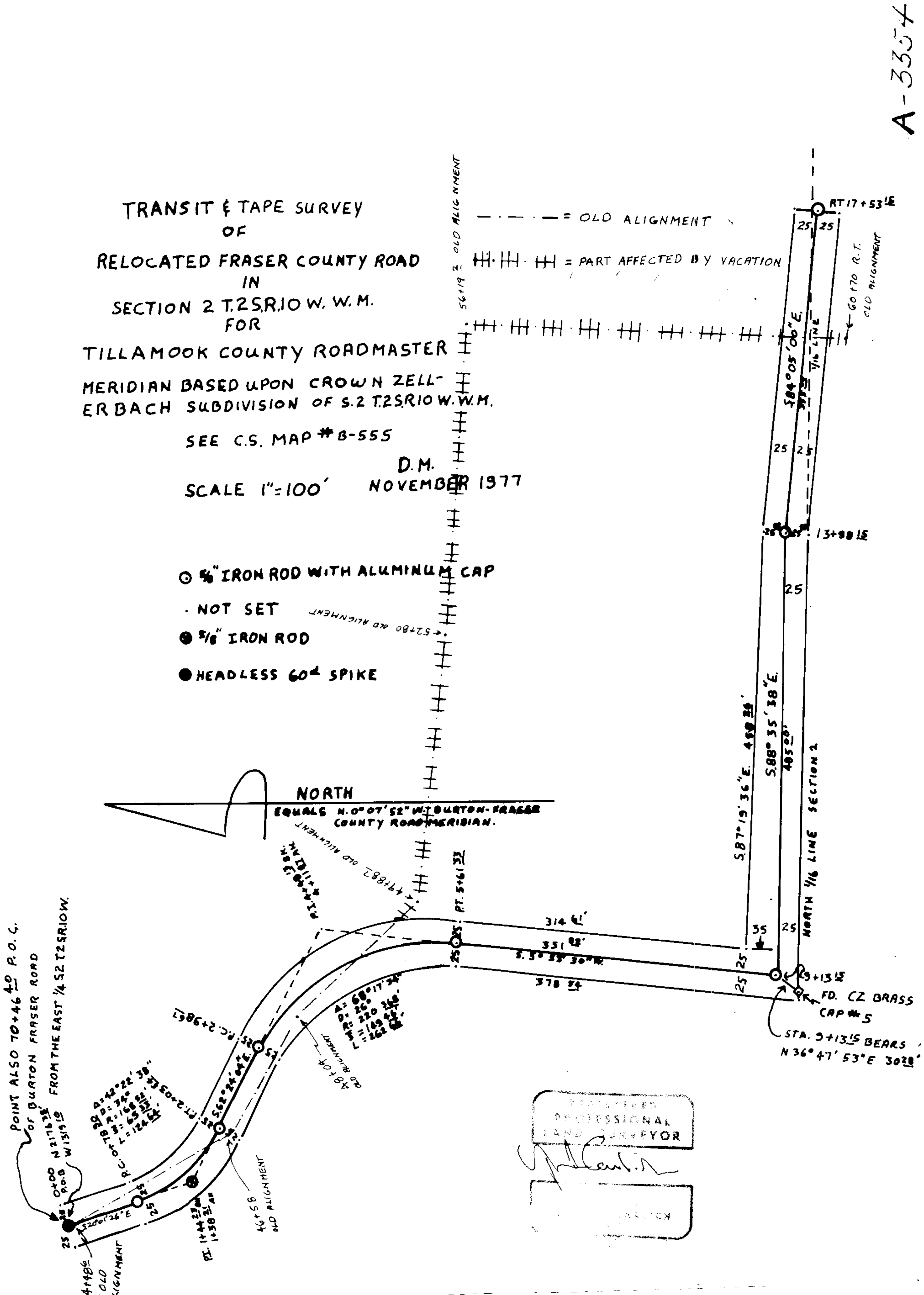


TIDE GATES FOR FRAZER ROAD
TWO 5' STEEL GATES @ 118' TIDE

PRINTED IN U.S.A.
ON 100% RAG PAPER MADE IN U.S.A.

2-2.5, 10.

Appendix D – Historical Documentation of Eckloff Road, a.k.a. South Prairie/Netarts Highway, a.k.a. State Road



A-3354
TRANSIT & TAPE SURVEY
OF
RELOCATED FRASER COUNTY ROAD
IN
SECTION 2 T.2S.R.10 W. W.M.
FOR
TILLAMOOK COUNTY ROADMASTER
MERIDIAN BASED UPON CROWN ZELLERBACH SUBDIVISION OF S.2 T.2S.R10 W.W.M.
SEE C.S. MAP # B-555
D.M.
SCALE 1"=100'
NOVEMBER 1977
= OLD ALIGNMENT
= PART AFFECTED BY VACATION
⊙ 5/8" IRON ROD WITH ALUMINUM CAP
· NOT SET
● 5/8" IRON ROD
● HEADLESS 60d SPIKE
NORTH
EQUALS N.0°07'52"W. BURTON-FRASER COUNTY ROAD MERIDIAN.
PT 17+53
13+98
S.84°05'00"E.
S.88°35'38"E.
S.87°19'36"E.
NORTH 1/16 LINE SECTION 2
314.61'
331.92'
S.3°33'30"W.
378.54
9+13
FD. CZ BRASS CAP #5
STA. 9+13 BEARS N 36°47'53"E 30.28'
PT. 5+61.33
S.62°24'04"E.
S20°01'26"E
0+00 P.O.B.
POINT ALSO 70+46 P.O.C. OF BURTON FRASER ROAD
46+58 OLD ALIGNMENT
48+04 OLD ALIGNMENT
52+80 OLD ALIGNMENT
47+88 OLD ALIGNMENT
REGISTERED PROFESSIONAL LAND SURVEYOR

BOOK 111 PAGE 417
COUNTY COURT JOURNAL

COUNTY COURT JOURNAL
BOOK 10 PAGE 919

BOOK 334 PAGE 236

BEFORE THE BOARD OF COUNTY COMMISSIONERS

FOR TILLAMOOK COUNTY, OREGON

4 35 PM '91
JOSEPHINE VELTRI
COUNTY CLERK
DEPUTY

In the Matter of Legalizing a Portion of the State Road, a.k.a. Ekloff Road, a.k.a. South Prairie - Netarts Highway	))))	ORDER 0-91-47

THIS MATTER coming on to be heard this 13th day of March 1991, at a regular meeting of the Board of Commissioners, at which time it appears that heretofore it has come to the attention of the Board that due to several alignments, numerous changes, and inaccurate surveys, it is impossible for the County Surveyor to retrace the location of the County Road running from South Prairie to Netarts, and being particularly that portion of said County Road beginning at the end of Ekloff Road to State Highway 131; and

WHEREAS; the uncertainties as to the location of said portion of County Road also involves road alignments between said points known as portions of: the J.H. Groff Road (Road Petition No. 18), the Dickson Road (Road Petition No. 16), the Josiah Biggs Road (Road Petition No. 20), the Netarts Road (Road Petitions No. 31 & 51) and the Old State Road (Road Petition No. 60); and

WHEREAS; Al Duncan, the Tillamook County Surveyor, performed a survey of the As-Built Centerline of the State Road. The results of the survey are shown on the Tillamook County Surveyor's Drawing No. F-2020. The legal description of the survey is shown in the attached Appendix "A"; and

WHEREAS; ORS 368.201(2)(a)&(b) provides for the legalization of a County Road if the location of the road cannot be accurately determined due to numerous alterations of the road; or a defective survey of the road; and

WHEREAS; The County Surveyor notes in his survey; "Several alignments, numerous changes, and inaccurate surveys of this road have made any retracement impossible"; and

749

WHEREAS; ORS 368.201(1)(a)(A) specifies the width of a legalized road to be the laws governing the width of roads at the time the road was originally established; and

WHEREAS; no right-of-way width was specified in the establishment documents of the State Road. However, at the time the State Road was established, Oregon State Law prescribed 60 feet as standard width when no width was stated in the establishment documents; and

WHEREAS; the Tillamook County Director of Public Works filed a report with the Tillamook County Board of Commissioners in accordance with ORS 368.206(1)(b); and

WHEREAS; notice of the proceedings for legalization was provided by service to owners of abutting land and by posting in accordance with ORS 368.206(1)(c); and

WHEREAS; a public hearing regarding the legalization of this portion of the State Road was held on February 13, 1991, at which time no information was presented controverting the information provided by the County Surveyor or Director of Public Works, or alleging any new matter relevant to the proceeding; and

WHEREAS; no abutting property owners filed a claim for compensation for an established structure encroaching on real property subject to the legalization proceedings; and

WHEREAS; the Tillamook County Board of Commissioners finds that the legalization of the State Road is in the public interest.

NOW THEREFORE, IT IS HEREBY ORDERED, that the portion of the State Road shall be legalized, with a 60 foot right-of-way width, at the location described in the attached Appendix "A" and as shown on the Tillamook County Survey No. F-2020. This portion of the State Road shall be named Ekloff Road, as it is an extension of the existing Ekloff Road; and

IT IS FURTHER ORDERED, that any records showing the location of the road that conflict with the location of the road described in this order, including the Road Petitions identified on page one of this Order, are void pursuant to ORS 368.216(4)(a); and

IT IS FURTHER ORDERED, that this order shall be recorded with the County Clerk and copies of this order shall be filed with the County Surveyor and the County Assessor.

Dated this 3rd day of April, 1991.

BOARD OF COUNTY COMMISSIONERS
FOR TILLAMOOK COUNTY, OREGON

Kenneth M. Burdick, Chairman

Jerry A. Dove, Vice-Chairman

Ida A. Lane, Commissioner

APPROVED AS TO FORM:

William K. Sargent
County Counsel

NOTARY PUBLIC)
STATE OF OREGON)
County of Tillamook)

On April 3, 1991, the above signed Tillamook County Commissioners personally appeared before me and acknowledged the foregoing instrument to be their voluntary act and deed.

Notary Public for Oregon
My Commission Expires: 9-14-93

BEFORE THE BOARD OF COUNTY COMMISSIONERS

FOR TILLAMOOK COUNTY, OREGON

In the Matter of the Ordering a Survey for the Legalization Proceedings for the South Prairie --Netarts Highway)

O R D E R

O-87-147

WHEREAS; this matter having come before the Tillamook County Board of Commissioners at the request of the Tillamook County Director of Public Works; and

WHEREAS; the Tillamook County Board of Commissioners has determined that the South Prairie to Netarts Highway, from the end of Ekloff Road to Highway 131, as traveled and used for over 10 years may not conform to the location of the road described in the county records; and

WHEREAS; the Tillamook County Board of Commissioners has determined that it is in the public's interest to determine the actual location and width of the South Prairie to Netarts Highway right-of-way, as provided under ORS 368.201-368.221 "LEGALIZATION OF ROADS."

NOW THEREFORE, IT IS HEREBY ORDERED by the Tillamook County Board of Commissioners that the County Surveyor survey the South Prairie to Netarts Highway, from the end of Ekloff Road to Highway 131, and provide the Tillamook County Director of Public Works with a survey map showing the discrepancies between the original establishment and the existing roadway alignment.

749 EKLOFF (ECKLOFF) TILLAMOOK RV RD → STATE HWY 131

749

IT IS FURTHER ORDERED, that the Tillamook County Director of Public Works, upon receipt of the County Surveyor's map, provide the Tillamook County Board of Commissioners with a written road official's report and cause notice of the proceedings for legalization to be provided under ORS 368.401 to 368.426 by service to owners of abutting land and by posting.

Dated this 17 day of November, 1987

BOARD OF COUNTY COMMISSIONERS
FOR TILLAMOOK COUNTY, OREGON

Dean J. Kinkade

Dean J. Kinkade, Chairman

Gerald J. Creasy

Gerald J. Creasy, Vice Chairman

Gerald A. Woodward

Gerald A. Woodward, Commissioner

APPROVED AS TO FORM:

Neal C. Lemery

Neal C. Lemery,
Acting County Counsel

APPENDIX "A"

"STATE ROAD"

Legal description of the as-built centerline of State Road, Road Petition #60, from Netarts Highway #131 near the summit to the west end of Netarts Road change, described in book 181 at page 46, of the Tillamook County Clerk's Records and depicted on Tillamook County Surveyors Map #B-454, to wit.

A strip of land 60 feet wide in Sections 2, 3, 4 and 11, Township 2 South, Range 10 West, Willamette Meridian, Tillamook County Oregon, being 30 feet on each side of the following described centerline:

Beginning at a 5/8" iron rod with a yellow plastic Tillamook County random cap in the apparent centerline of the "State Road, engineers station 0+34, North 60.86 feet and West 2166.18 feet of the 1/4 corner common to sections 3 and 4, Township 2 South, Range 10 West, Willamette Meridian;

thence, North 36°41'13" West, 34 feet, more or less, to the apparent centerline of Netarts State Highway;

thence, South 36°41'13" East, 128.12 feet, to Engineers station 1+28.12 P.C.;

thence, 151.43 feet along the arc of a 141.46 foot radius curve left, whose long chord bears South 67°21'15" East, a distance of 128.12 feet, to Engineers station 2+79.55 P.T.;

thence, North 81°58'43" East, 110.55 feet, to Engineers station 3+90.10 P.C.;

thence, 194.37 feet along the arc of a 326.87 foot radius curve right, whose long chord bears South 80°59'10" East, a distance of 191.52 feet, to Engineers station 5+84.47 P.T., the P.I. of which is monumented with a railroad spike in a 60" spruce stump;

thence, South 63°57'02" East, 152.41 feet, to Engineers station 7+36.88 P.C.;

thence, 133.86 feet along the arc of a 378.23 foot radius curve right, whose long chord bears South 53°48'43" East, a distance of 133.16 feet, to Engineers station 8+70.74 P.T., the P.I. of which is monumented with a 5/8" iron rod with a yellow plastic Tillamook County random cap;

thence, South 43°40'23" East, 129.18 feet, to Engineers station 9+99.92 P.C.;

thence, 41.42 feet along the arc of a 27.83 foot radius curve left, whose long chord bears South 86°18'31" East, a distance of 37.70 feet, to Engineers station 10+41.34 P.T., the P.I. of which is monumented with a 5/8" iron rod with a yellow plastic Tillamook County random cap;

thence, North 51°03'22" East, 214.16 feet, to a 5/8" iron rod with a yellow plastic Tillamook County random cap, at engineers station 12+55.50;

thence, North 82°14'25" East, 105.84 feet, to Engineers station 13+61.34 P.C.;

thence, 60.54 feet along the arc of a 52.99 foot radius curve right, whose long chord bears South 65°01'56" East, a distance of 57.30 feet, to Engineers station 14+21.88 P.T., the P.I. of which is monumented with a 5/8" iron rod with a yellow plastic Tillamook County random cap;

thence, South 32°18'17" East, 145.19 feet, to Engineers station 15+67.07 P.C.;

thence, 89.59 feet along the arc of a 222.53 foot radius curve left, whose long chord bears South 43°50'19" East, a distance of 88.99 feet, to Engineers station 16+56.66 P.T., the P.I. of which is monumented with a 5/8" iron rod with a yellow plastic Tillamook County random cap;

thence, South 55°22'20" East, 318.32 feet, to Engineers station 19+74.98 P.C.;

thence, 60.99 feet along the arc of a 58.29 foot radius curve left, whose long chord bears South 85°20'47" East, a distance of 58.24 feet, to Engineers station 20+35.97 P.T., the P.I. of which is monumented with a 5/8" iron rod with a yellow plastic Tillamook County random cap;

thence, North 64°40'46" East, 450.77 feet, to Engineers station 24+86.74 P.C.;

thence, 93.38 feet along the arc of a 67.82 foot radius curve right, whose long chord bears South 75°52'43" East, a distance of 86.17 feet, to Engineers station 25+80.12 P.T., the P.I. of which is monumented with a 5/8" iron rod with a yellow plastic Tillamook County random cap;

thence, South 36°26'11" East, 431.95 feet, to Engineers station 30+12.07 P.C.;

thence, 107.19 feet along the arc of a 210.83 foot radius curve right, whose long chord bears South 21°52'19" East, a distance of 106.04 feet, to Engineers station 31+19.26 P.T., the P.I. of which is monumented with a 5/8" iron rod with a yellow plastic Tillamook County random cap;

thence, South 07°18'26" East, 165.21 feet, to Engineers station 32+84.47 P.C.;

thence, 57.22 feet along the arc of a 48.00 foot radius curve left, whose long chord bears South 41°27'22" East, a distance of 53.89 feet, to Engineers station 33+41.69 P.T., the P.I. of which is monumented with a 5/8" iron rod with a yellow plastic Tillamook County random cap;

thence, South 75°36'17" East, 192.90 feet, to a 5/8" iron rod with a yellow plastic Tillamook County random cap, at engineers station 35+34.59;

thence, South 78°17'51" East, 315.03 feet, to Engineers station 38+49.62 P.C.;

thence, 123.53 feet along the arc of a 168.39 foot radius curve right, whose long chord bears South 57°16'51" East, a distance of 120.78 feet, to Engineers station 39+73.15 P.T., the P.I. of which is monumented with a 5/8" iron rod with a yellow plastic Tillamook County random cap;

thence, South 36°15'51" East, 117.15 feet, to Engineers station 40+90.30 P.C.;

thence, 27.07 feet along the arc of a 25.85 foot radius curve left, whose long chord bears South 66°16'02" East, a distance of 25.85 feet, to Engineers station 41+17.37 P.T., the P.I. of which is monumented with a 5/8" iron rod with a yellow plastic Tillamook County random cap;

thence, North 83°43'47" East, 97.61 feet, to Engineers station 42+14.98 P.C.;

thence, 99.71 feet along the arc of a 112.74 foot radius curve left, whose long chord bears North 58°23'31" East, a distance of 96.50 feet, to Engineers station 43+14.69 P.T., the P.I. of which is monumented with a 5/8" iron rod with a yellow plastic Tillamook County random cap;

thence, North 33°03'14" East, 146.08 feet, to Engineers station 44+60.77 P.C.;

thence, 160.92 feet along the arc of a 279.38 foot radius curve right, whose long chord bears North 49°33'17" East, a distance of 158.70 feet, to Engineers station 46+21.69 P.T., the P.I. of which is monumented with a 5/8" iron rod with a yellow plastic Tillamook County random cap;

thence, North 66°03'19" East, 139.11 feet, to Engineers station 47+60.80 P.C.;

thence, 255.73 feet along the arc of a 233.46 foot radius curve right, whose long chord bears South 82°33'50" East, a distance of 243.13 feet, to Engineers station 50+16.53 P.T.;

thence, South 51°10'59" East, 285.67 feet, to Engineers station 53+02.20 P.C.;

thence, 138.28 feet along the arc of a 482.14 foot radius curve left, whose long chord bears South 59°23'57" East, a distance of 137.80 feet, to Engineers station 54+40.48 P.T., the P.I. of which is monumented with a 5/8" iron rod with a yellow plastic Tillamook County random cap;

thence, South 67°36'55" East, 343.13 feet, to Engineers station 57+83.61 P.C.;

thence, 173.94 feet along the arc of a 546.06 foot radius curve left, whose long chord bears South 76°44'27" East, a distance of 173.21 feet, to Engineers station 59+57.55 P.T., the P.I. of which is monumented with a 5/8" iron rod with a yellow plastic Tillamook County random cap;

thence, South 85°51'59" East, 263.94 feet, to Engineers station 62+21.49 P.C.;

thence, 210.09 feet along the arc of a 379.90 foot radius curve right, whose long chord bears South 70°01'26" East, a distance of 207.42 feet, to Engineers station 64+31.58 P.T., the P.I. of which is monumented with a 5/8" iron rod with a yellow plastic Tillamook County random cap;

thence, South 54°10'53" East, 119.38 feet, to Engineers station 65+50.96 P.C.;

thence, 93.42 feet along the arc of a 222.29 foot radius curve right, whose long chord bears South 42°08'29" East, a distance of 92.74 feet, to Engineers station 66+44.38 P.T., the P.I. of which is monumented with a 5/8" iron rod with a yellow plastic Tillamook County random cap;

thence, South 30°06'04" East, 260.35 feet, to a 5/8" iron rod with a yellow plastic Tillamook County random cap, at engineers station 69+04.79;

thence, South 49°47'42" East, 261.61 feet, to a 5/8" iron rod with a yellow plastic Tillamook County random cap, at engineers station 71+66.34;

thence, South 61°15'42" East, 317.81 feet, to Engineers station 74+84.15 P.C.;

thence, 199.71 feet along the arc of a 324.38 foot radius curve left, whose long chord bears South 78°53'56" East, a distance of 196.57 feet, to Engineers station 76+83.86 P.T., the P.I. of which is monumented with a 5/8" iron rod with a yellow plastic Tillamook County random cap;

thence, North 83°27'50" East, 242.18 feet, to Engineers station 79+26.04 P.C.;

thence, 209.73 feet along the arc of a 1377.8511 foot radius curve right, whose long chord bears North 87°49'28" East, a distance of 209.52 feet, to Engineers station 81+35.77 P.T., the P.I. of which is monumented with a 5/8" iron rod with a yellow plastic Tillamook County random cap;

thence, South 87°48'54" East, 23.12 feet, to Engineers station 81+58.89 P.C.;

thence, 388.90 feet along the arc of a 3785.1978 foot radius curve right, whose long chord bears South 84°52'18" East, a distance of 388.73 feet, to Engineers station 85+47.79 P.T., the P.I. of which is monumented with a 5/8" iron rod with a yellow plastic Tillamook County random cap;

thence, South 81°55'42" East, 77.00 feet, to Engineers station 86+24.79 P.C.;

thence, 357.29 feet along the arc of a 1076.1293 foot radius curve right, whose long chord bears South 72°25'01" East, a distance of 355.65 feet, to Engineers station 89+82.08 P.T., the P.I. of which is monumented with a 5/8" iron rod with a yellow plastic Tillamook County random cap;

thence, South 62°54'20" East, 321.91 feet, to Engineers station 93+03.99 P.C.;

thence, 290.31 feet along the arc of a 2111.1498 foot radius curve left, whose long chord bears South 66°50'42" East, a distance of 290.08 feet, to Engineers station 95+94.30 P.T., the P.I. of which is monumented with a 5/8" iron rod with a yellow plastic Tillamook County random cap;

thence, South 70°47'04" East, 310.66 feet, to Engineers station 99+04.96 P.C.;

thence, 38.60 feet along the arc of a 64.49 foot radius curve right, whose long chord bears South 53°38'13" East, a distance of 38.03 feet, to Engineers station 99+43.56 P.T., the P.I. of which is monumented with a 5/8" iron rod with a yellow plastic Tillamook County random cap;

thence, South 36°29'22" East, 174.48 feet, to a 5/8" iron rod with a yellow plastic Tillamook County random cap, at engineers station 101+18.04;

thence, South 28°02'03" East, 520.55 feet, to a 5/8" iron rod with a yellow plastic Tillamook County random cap, at engineers station 106+38.59;

thence, South 34°57'32" East, 521.17 feet, to a 5/8" iron rod with a yellow plastic Tillamook County random cap, at engineers station 111+59.76;

thence, South 35°03'58" East, 804.59 feet, to Engineers station 119+64.35 P.C.;

thence, 99.78 feet along the arc of a 830.8577 foot radius curve left, whose long chord bears South 38°30'23" East, a distance of 99.72 feet, to Engineers station 120+64.13 P.T., the P.I. of which is monumented with a 5/8" iron rod with a yellow plastic Tillamook County random cap;

thence, South 41°56'48" East, 613.44 feet, to Engineers station 126+77.57 P.C.;

thence, 247.14 feet along the arc of a 645.90 foot radius curve left, whose long chord bears South 52°54'30" East, a distance of 245.64 feet, to Engineers station 129+24.71 P.T.;

thence, South 63°52'12" East, 570.76 feet, to Engineers station 134+95.47 P.C.; point also being engineers station 95+84.1 P.T. of relocation of Old Netarts Road, (see Tillamook County Surveyors Map #B-454);

thence, 333.05 feet along the arc of a 573.0508 foot radius curve right, whose long chord bears South 47°13'12" East, a distance of 328.39 feet, to Engineers station 138+28.52 P.T., point also being engineers station 92+51.1 P.C. of said relocation, and bears South 305.14 and West 2163.74 from the 1/4 corner common to Sections 11 and 12 T.2S.,R10W.,W.M.

The basis of bearings for the above description are true from Tillamook County Surveyors Map #A-1634 from southwest corner of Section 4 T.2S.,R10W.,W.M. to the 1" iron bar at the P.I. of an 8° curve right = South 46°16' East.

Bird Ruble Work

30613

I hereby certify that the within instrument was received for record and recorded in the County of Tillamook, State of Oregon.

TILLAMOOK COUNTY CLERK — STATE OF OREGON

Apr 3 11 51 AM '96

BOOK 334 PAGE 235

Witness my hand and seal affixed.
JOSEPHINE VELTRI, County Clerk

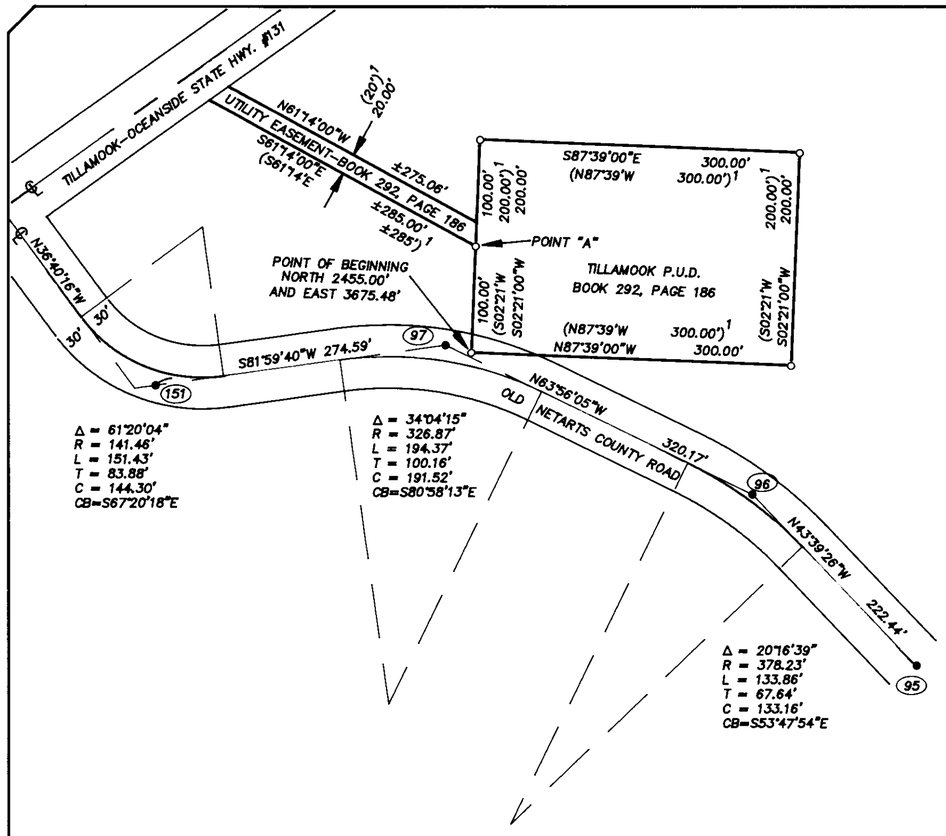
Deputy

A&T - $20
PLCP - $8
Adm - $1
Lien

45.00

Feb 24 96

B-2323



N

SCALE:
1" = 100'

BASIS OF BEARING

THE LINE BETWEEN FOUND MONUMENTS (159) AND (166) AS SHOWN HEREON, BEARS NORTH 65°12'44" EAST (BEING TRUE MERIDIAN), THE CALCULATED BEARING FROM RECORD INFORMATION ON MAP B-659, TILLAMOOK COUNTY SURVEY RECORDS.

NARRATIVE

THIS SURVEY WAS DEPENDENT SURVEY OF THE PUD TRACT AS DESCRIBED IN BOOK 292, PAGE 186, TILLAMOOK COUNTY DEED RECORDS. THE PURPOSE OF THIS SURVEY IS TO MONUMENT, POST AND FLAG THE EXTERIOR BOUNDARY AS SHOWN HEREON.

THE PUD TRACT WAS LAID OUT AT RECORD BEARINGS AND DISTANCES FROM MONUMENT (159), AS INDICATED IN THE DEED.

THE OLD NETARTS COUNTY ROAD WAS LAID IN AT RECORD FROM MONUMENTS (95) AND (96), FROM RECORD INFORMATION FROM MAP F-20-20 AS SHOWN HEREON.

MONUMENT NOTES

(95) FOUND 5/8" REBAR WITH YELLOW PLASTIC CAP MARKED "COUNTY RANDOM", IN CONCRETE, 1' BELOW GROUND, SEE MAP F-20-20, HELD FOR CENTERLINE PI CURVE.

(96) FOUND 5/8" REBAR WITH YELLOW PLASTIC CAP MARKED "COUNTY RANDOM", IN CONCRETE, 0.7' BELOW ROAD SURFACE, SEE MAP F-20-20, HELD FOR CENTERLINE PI CURVE.

(97) FOUND RR SPIKE IN TOP ROTTEN SPRUCE STUMP, SEE MAP F-20-20, AT POSITION.

(151) FOUND 5/8" REBAR WITH YELLOW PLASTIC CAP MARKED "COUNTY RANDOM", IN CONCRETE, 0.7' BELOW ROAD SURFACE, SEE MAP F-20-20, AT POSITION.

(159) FOUND TILLAMOOK COUNTY BRASS CAP IN CONCRETE, IN FIELD, TOP FLUSH WITH GROUND, STAMPED "T2N R10W S4 S5 S8 S9 RS287 1974", SEE REWITNESS CARD #442 AND MAP B-659, HELD FOR SOUTHWEST CORNER OF SECTION 4.

(166) FOUND CZ BRASS CAP IN CONCRETE, TOP FLUSH WITH GROUND, STAMPED "LS 849 1/4 S4 S3 1974", SEE MAP B-659, HELD FOR BASIS OF BEARINGS. FOUND 8" (6") FIR TREE WITH HEALED FACE (N 76° E 9.32'), 20" (11") FIR TREE WITH HEALED FACE (N 26° W 10.86') AND SET WHITE FIBERGLASS POST 1' NORTH.

LEGEND

- ○ INDICATES 5/8" X 40" REBAR SET WITH YELLOW PLASTIC CAP MARKED "TERRY JONES LS 2507" WITH 6' STEEL FENCE POST
- ◉ INDICATES MONUMENT FOUND AS NOTED HEREON USED FOR CONTROL
- ● INDICATES MONUMENT FOUND AS NOTED HEREON
- ( )1 INDICATES RECORD VALUE BOOK 292, PAGE 186
- ( )2 INDICATES RECORD VALUE MAP B-659
- < > INDICATES CALCULATED VALUE
- NO ( ) OR < > INDICATES MEASURED VALUE

PS\PUDNETAR.DWG
PUDNTTL.CR5 #12

REGISTERED
PROFESSIONAL
LAND SURVEYOR
OREGON
JULY 22, 1991
TERRY L. JONES
2507
RENEWAL DATE: JUNE 30, 2001

SURVEY BY: BAYSIDE SURVEYING ©
11765 HWY 101 SOUTH
TILLAMOOK, OR. 97141
(503) 842-5551

SURVEY FOR: TILLAMOOK PUD
THAT TRACT AS DESCRIBED IN
BOOK 292, PAGE 186
TILLAMOOK COUNTY DEED RECORDS
EAST 1/2 OF SECTION 4, T2S, R10W, W.M.
TILLAMOOK COUNTY

DATE	EQUIPMENT	FIELD	DRAWN	CHECKED	JOB NO.
NOV. 23, 1999	TOPCON GTS-303 TDS 480	TLJ/CJH	CJH	TLJ	837

TILLAMOOK COUNTY
JAN 11 2000
SURVEYORS OFFICE

B-2323

B-3432

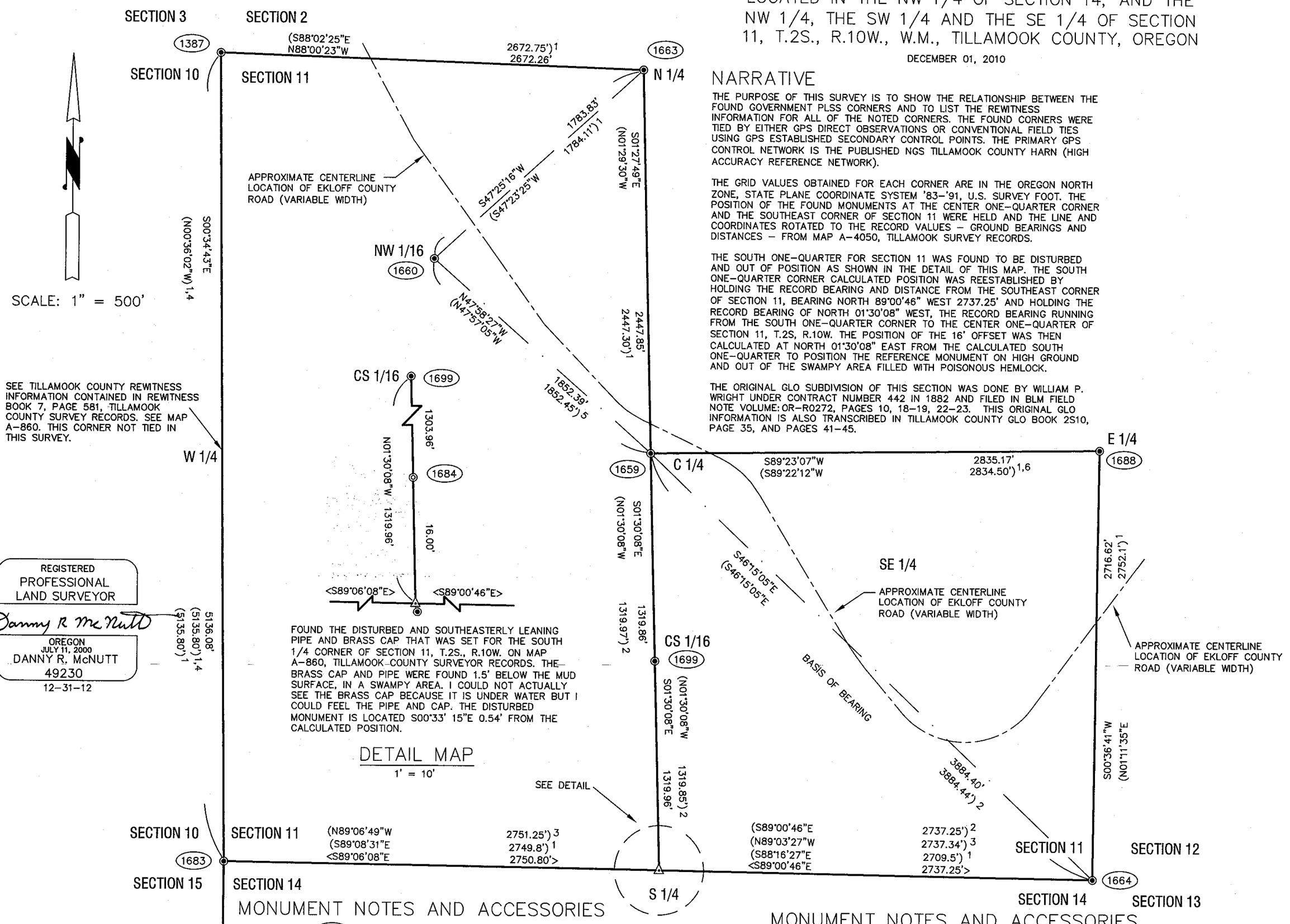
REWITNESS AND RESTORATION MAP FOR THE TILLAMOOK COUNTY SURVEYOR'S OFFICE

LOCATED IN THE NW 1/4 OF SECTION 14; AND THE NW 1/4, THE SW 1/4 AND THE SE 1/4 OF SECTION 11, T.2S., R.10W., W.M., TILLAMOOK COUNTY, OREGON

DECEMBER 01, 2010

BASIS OF BEARING

THE LINE BETWEEN FOUND MONUMENTS (1659) AND (1664) WHICH BEARS SOUTH 46°15' 05" EAST THE RECORD DERIVED VALUE FROM MAP A-4050, TILLAMOOK COUNTY SURVEY RECORDS.



TILLAMOOK COUNTY SURVEYOR'S OFFICE
JAN 3 2011

TILLAMOOK COUNTY SURVEYOR'S OFFICE
TILLAMOOK COUNTY COURTHOUSE
201 LAUREL AVENUE
TILLAMOOK OREGON, 97141
503-842-3423

1696

WITNESSED BY MICHAEL R. RICE, L.S.I. 16723; JOSEPH V. JENSEN, P.L.S. 60067; DANNY R. McNUTT, P.L.S. 49230.

EQUIPMENT USED:
TOPCON GPT 3005.
SOKKIA GSR2700 ISX DUAL FREQUENCY GPS RECEIVERS.
SOKKIA SPECTRUM SURVEY VERSION 4.13 POST-PROCESSING SOFTWARE.

LEGEND

- ◉ INDICATES FOUND MONUMENT AS NOTED HEREON.
- ◎ INDICATES SET MONUMENT AS NOTED HEREON.
- △ INDICATES CALCULATED VALUES
- ( )1 INDICATES RECORD VALUE FROM MAP A-860
- ( )2 INDICATES RECORD VALUE FROM MAP A-4050
- ( )3 INDICATES RECORD VALUE FROM MAP B-820
- ( )4 INDICATES RECORD VALUE FROM MAP B-562
- ( )5 INDICATES RECORD VALUE FROM MAP B-3196
- ( )6 INDICATES RECORD VALUE FROM MAP A-2056
- < > INDICATES CALCULATED VALUES

NO ( ) OR < > INDICATES MEASURED VALUES

COGO FILE NAME: G:\LLCOGO\L3DFILES\JOHNSTON.L3D

DRAWING NAME: C:\LAND PROJECTS 3\JOHNSTON\DWG\JOHNSTON.DWG

NARRATIVE

THE PURPOSE OF THIS SURVEY IS TO SHOW THE RELATIONSHIP BETWEEN THE FOUND GOVERNMENT PLSS CORNERS AND TO LIST THE REWITNESS INFORMATION FOR ALL OF THE NOTED CORNERS. THE FOUND CORNERS WERE TIED BY EITHER GPS DIRECT OBSERVATIONS OR CONVENTIONAL FIELD TIES USING GPS ESTABLISHED SECONDARY CONTROL POINTS. THE PRIMARY GPS CONTROL NETWORK IS THE PUBLISHED NGS TILLAMOOK COUNTY HARN (HIGH ACCURACY REFERENCE NETWORK).

THE GRID VALUES OBTAINED FOR EACH CORNER ARE IN THE OREGON NORTH ZONE, STATE PLANE COORDINATE SYSTEM '83-'91, U.S. SURVEY FOOT. THE POSITION OF THE FOUND MONUMENTS AT THE CENTER ONE-QUARTER CORNER AND THE SOUTHEAST CORNER OF SECTION 11 WERE HELD AND THE LINE AND COORDINATES ROTATED TO THE RECORD VALUES - GROUND BEARINGS AND DISTANCES - FROM MAP A-4050, TILLAMOOK SURVEY RECORDS.

THE SOUTH ONE-QUARTER FOR SECTION 11 WAS FOUND TO BE DISTURBED AND OUT OF POSITION AS SHOWN IN THE DETAIL OF THIS MAP. THE SOUTH ONE-QUARTER CORNER CALCULATED POSITION WAS REESTABLISHED BY HOLDING THE RECORD BEARING AND DISTANCE FROM THE SOUTHEAST CORNER OF SECTION 11, BEARING NORTH 89°00'46" WEST 2737.25' AND HOLDING THE RECORD BEARING OF NORTH 01°30'08" WEST, THE RECORD BEARING RUNNING FROM THE SOUTH ONE-QUARTER CORNER TO THE CENTER ONE-QUARTER OF SECTION 11, T.2S, R.10W. THE POSITION OF THE 16' OFFSET WAS THEN CALCULATED AT NORTH 01°30'08" EAST FROM THE CALCULATED SOUTH ONE-QUARTER TO POSITION THE REFERENCE MONUMENT ON HIGH GROUND AND OUT OF THE SWAMPY AREA FILLED WITH POISONOUS HEMLOCK.

THE ORIGINAL GLO SUBDIVISION OF THIS SECTION WAS DONE BY WILLIAM P. WRIGHT UNDER CONTRACT NUMBER 442 IN 1882 AND FILED IN BLM FIELD NOTE VOLUME: OR-R0272, PAGES 10, 18-19, 22-23. THIS ORIGINAL GLO INFORMATION IS ALSO TRANSCRIBED IN TILLAMOOK COUNTY GLO BOOK 2S10, PAGE 35, AND PAGES 41-45.

MONUMENT NOTES AND ACCESSORIES

(1684) WITNESS/REFERENCE FOR SOUTH 1/4 CORNER OF SECTION 11, T.2S., R.10W.,

SET 3" DIAMETER TILLAMOOK COUNTY BRASS CAP IN 120 POUNDS OF CONCRETE,, 1' BELOW THE SURFACE. SET HAT SECTION POST SOUTH 01° EAST 3.0' IN AN EXISTING EAST-WEST RUNNING ELECTRIC FENCE. SET A 5/8" REBAR WITH RED PLASTIC CAP STAMPED "TILLAMOOK CO. SURVEY" BEARING NORTH 54°43'02" WEST 20.05'. THE MONUMENT IS ALSO LOCATED 16.5' EAST OF A FENCE CORNER THAT RUNS IN A SOUTHERLY DIRECTION. SEE THE DETAIL ON THIS MAP FOR A DESCRIPTION OF THE FOUND DISTURBED AND LEANING MONUMENT. NO NEW BEARING TREES MARKED. RECORD BEARING TREES: A VERY ROTTEN 36" DIAMETER X 3' TALL SPRUCE STUMP, NO VISIBLE SCRIBE MARKS. FOUND AT RECORD POSITION.

(1683) SOUTHWEST CORNER OF SECTION 11, T.2S., R.10W.,

FOUND A 3" DIAMETER OREGON STATE BOARD OF FORESTRY BRASS CAP, FLUSH WITH THE GROUND. THE MONUMENT IS IN GOOD CONDITION. SET A 12" DIAMETER PLASTIC CYLINDER AND 120 POUNDS OF CONCRETE AROUND THE MONUMENT. SET A 72" HAT SECTION POST 2.0' WEST OF THE MONUMENT. NEW BEARING TREES: 27" DIAMETER HEMLOCK WHICH BEARS SOUTH 29° EAST 20.3' SCRIBED "T2SR10WS14BT" WITH A NAIL AND ALUMINUM WASHER STAMPED "TILL. CO. SURVEYOR" SET BETWEEN THE SCRIBED 'B&T'; 19" DIAMETER SPRUCE WHICH BEARS NORTH 37° EAST 13.9' SCRIBED "T2SR10WS11BT" WITH A NAIL AND ALUMINUM WASHER STAMPED "TILL. CO. SURVEYOR" SET BETWEEN THE SCRIBED 'B&T'. RECORD BEARING TREES: FOUND A 50" DIAMETER X 3' TALL CEDAR STUMP, HOLLOWED OUT WITH GROWN OVER FACE, FOUND AT RECORD POSITION. FOUND A 42" DIAMETER X 6' TALL VERY ROTTEN SPRUCE STUMP, NO SCRIBES VISIBLE, FOUND AT RECORD POSITION. FOUND A 27" DIAMETER X 5' TALL HEMLOCK STUMP WITH RUSTY TAG AND HEALED FACE, FOUND AT RECORD POSITION.

(1664) SOUTHEAST CORNER OF SECTION 11, T.2S., R.10W.,

FOUND A 3" DIAMETER TILLAMOOK COUNTY BRASS CAP IN GOOD CONDITION AND UP 0.5' ABOVE THE GROUND. FOUND A HAT SECTION POST 1.5' WEST OF MONUMENT. THE FOUND MONUMENT IS LOCATED 1.0' EAST AND 3.0' NORTH OF THE INTERSECTION OF A FENCE RUNNING NORTH AND WEST. SEE REWITNESS CARD #453, TILLAMOOK COUNTY SURVEYOR RECORDS FOR REWITNESS INFORMATION.

(1660) NORTHWEST 1/16 CORNER OF SECTION 11, T.2S., R.10W.,

FOUND A 3" DIAMETER OREGON STATE BOARD OF FORESTRY BRASS CAP DOWN 1.5' IN THE MIDDLE OF A FARM PASTURE AND LOCATED APPROXIMATELY 40' WEST OF A CREEK. NEW ACCESSORIES: FOUND A 5/8" REBAR WITH YELLOW PLASTIC CAP STAMPED "TERRY JONES LS 2507" LOCATED NORTH 39° WEST 236.7' FROM THE FOUND MONUMENT. SET A 72" HAT SECTION POST NORTH 62° EAST 32.2' IN AN EXISTING FENCE LINE. SEE REWITNESS BOOK 1, PAGE 408, AND MAP A-860 FOR REWITNESS INFORMATION. RECORD BEARING TREES: FOUND A ±36" DIAMETER X 4' TALL SPRUCE STUMP WITH SCRIBING VISIBLE AT RECORD POSITION (WAS A 28" DIAMETER SPRUCE BEARING SOUTH 37° WEST 107.5' - REWITNESS BOOK 1, PAGE 408); FOUND THE VERY ROTTEN REMAINS OF A SPRUCE STUMP, IN AN IRREGULAR MASS, ABOUT 1' HIGH, AT RECORD POSITION (WAS A 24" DIAMETER SPRUCE BEARING SOUTH 89-1/2° WEST 94.9' - REWITNESS BOOK 1, PAGE 408); THE WHITE PAINTED CEDAR FENCE POST IS GONE;

(1663) NORTH 1/4 CORNER OF SECTION 11, T.2S., R.10W.,

FOUND A 3" DIAMETER OREGON STATE BOARD OF FORESTRY BRASS CAP IN GOOD CONDITION LYING WITHIN A CREEK THAT RUNS IN A NORTHEASTERLY DIRECTION. PLACED A 12" DIAMETER PLASTIC CYLINDER AND 120 POUNDS OF CONCRETE AROUND THE MONUMENT. SET A 72" HAT SECTION POST SOUTH 3.0' FROM MONUMENT. NEW BEARING TREES: A 16" ALDER WHICH BEARS NORTH 82° WEST 44.6' BARK SCRIBED "T2SR10W1/4S2BT" WITH NAIL AND ALUMINUM WASHER STAMPED "TILL. CO. SURVEYOR" SET BETWEEN THE SCRIBED 'B&T'; A 10" DIAMETER HEMLOCK WHICH BEARS NORTH 23°30' WEST 20.15' SCRIBED "T2SR10WS2BT" WITH NAIL AND ALUMINUM WASHER STAMPED "TILL. CO. SURVEYOR" SET BETWEEN THE SCRIBED 'B&T'; RECORD BEARING TREES: FOUND A DOWN AND VERY ROTTEN TREE IN THE CREEK (WAS A 25" FIR BEARING NORTH 79° WEST 47.0' - SET ON MAP A-860); FOUND A ±40" DIAMETER X 6' TALL ROTTEN DOUBLE-FIR AT RECORD POSITION (WAS A 37" DIAMETER DOUBLE-FIR BEARING SOUTH 36° WEST 50.0' - SET ON MAP A-860);

MONUMENT NOTES AND ACCESSORIES

(1659) CENTER 1/4 SECTION 11, T.2S., R.10W.,

FOUND A 3" DIAMETER TILLAMOOK COUNTY BRASS CAP FLUSH WITH THE GROUND AND IN GOOD CONDITION. MONUMENT FOUND IN CONCRETE. SEE REWITNESS CARD #451, TILLAMOOK COUNTY SURVEY RECORDS. I PLACED A YELLOW METAL LOCATION TAG ON A FOUND 6" DIAMETER WOOD FENCE POST. THE FENCE POST BEARS SOUTH 0.6'. SEE MAPS A-4050, B-3196, A-2056, B-1096, TILLAMOOK COUNTY SURVEY RECORDS.

(1387) NORTHWEST CORNER OF SECTION 11, T.2S., R.10W., W.M.

SEE THE REWITNESS INFORMATION CONTAINED IN REWITNESS BOOK 7, PAGE 458, TILLAMOOK COUNTY SURVEY RECORDS.

(1699) CENTER-SOUTH 1/16 CORNER OF SECTION 11, T.2S., R.10W.,

FOUND A 2-1/2" DIAMETER BRASS CAP, UP 1.5' IN AN EAST/WEST BARBED WIRE FENCE. SET A 12" DIAMETER PLASTIC CYLINDER AND 120 POUNDS OF CONCRETE AROUND MONUMENT. SET A 72" HAT SECTION POST WITH YELLOW METAL LOCATION TAG 3.0' EAST OF MONUMENT. NEW BEARING TREES AND ACCESSORIES: 13" DIAMETER HEMLOCK TREE SCRIBED "CS1/16S11BT" WHICH BEARS NORTH 67° EAST 8.0'. SET A NAIL AND ALUMINUM WASHER STAMPED "TILL. CO. SURVEYOR" BETWEEN THE 'B&T'. SET A 5/8" REBAR WITH RED PLASTIC CAP STAMPED "TILLAMOOK CO. SURVEYOR" WHICH BEARS SOUTH 62°33'34" EAST 145.98'. FOUND BEARING TREES: A 30" DIAMETER HEMLOCK TREE WITH 2 YELLOW METAL LOCATION TAGS, NO FACE, AT RECORD POSITION (WAS AN 8" DIAMETER HEMLOCK TREE BEARING SOUTH 2°30' EAST 12.27' MAP B-521); A 30" DIAMETER X 5' TALL HEMLOCK STUMP AT RECORD POSITION (WAS A 30" DIAMETER HEMLOCK WHICH BEARS NORTH 37°22' EAST 8.74' MAP B-521); SEE MAP A-4050 AND B-562, TILLAMOOK COUNTY SURVEY RECORDS.

(1688) EAST 1/4 CORNER OF SECTION 11, T.2S., R.10W.,

FOUND 3" DIAMETER TILLAMOOK COUNTY BRASS CAP UPRIGHT, IN GOOD CONDITION AND IN CONCRETE. FOUND HAT SECTION POST WEST 1.5'. CORNER IS LOCATED IN AN OLD N-S FENCE AND APPROXIMATELY 3' NORTH OF A WESTERLY RUNNING FENCE. FOUND A STONE 10" X 10" X 24" WITH NO LEGIBLE MARKS LAYING NEXT TO MONUMENT. RECORD BEARING TREES: FOUND A ROTTEN 6" DIAMETER X 3' TALL STUB WITH NO MARKS AT RECORD POSITION (WAS A 9" FIR BEARING NORTH 53°10' EAST 21.62' - REWITNESS CARD #452); FOUND A 25" DIAMETER ALDER TREE WITH SCRIBES VISIBLE AT RECORD POSITION (WAS AN 18" DIAMETER ALDER TREE BEARING NORTH 34°16' EAST 13.05' - REWITNESS CARD #452); FOUND A 21" DIAMETER ALDER TREE (NOT TWIN), WITH SCRIBES VISIBLE, AT RECORD POSITION (WAS A 15" TWIN ALDER BEARING SOUTH 77°22' WEST 11.00' - REWITNESS CARD #452); SEE MAPS A-2056 AND B-1096, TILLAMOOK COUNTY SURVEY RECORDS.

(1696) WEST 1/4 SECTION 14, T.2S., R.10W.,

FOUND A 3" DIAMETER OREGON STATE BOARD OF FORESTRY BRASS CAP IN GOOD CONDITION. PLACED A 12" DIAMETER PLASTIC CYLINDER AND 120 POUNDS OF CONCRETE AROUND THE MONUMENT. THE BRASS CAP IS ROTATED TO N20°E. SET A 72" HAT SECTION POST WEST 2.5' FROM MONUMENT. NEW BEARING TREES AND ACCESSORIES: A 10" FIR WHICH BEARS SOUTH 28° WEST 10.6' SCRIBED "T2S10WS15BT" WITH NAIL AND ALUMINUM WASHER STAMPED "TILL. CO. SURVEYOR" SET BETWEEN THE SCRIBED 'B&T'; A 9" DIAMETER HEMLOCK WHICH BEARS SOUTH 36° EAST 9.9' SCRIBED "T2SR10W14BT" WITH NAIL AND ALUMINUM WASHER STAMPED "TILL. CO. SURVEYOR" SET BETWEEN THE SCRIBED 'B&T'; A 9" FIR WHICH BEARS NORTH 60° EAST 11.5' SCRIBED "T2S10WS14BT" WITH A NAIL AND ALUMINUM WASHER STAMPED "TILL. CO. SURVEYOR" SET BETWEEN THE SCRIBED 'B&T'. SET A 5/8" REBAR WITH YELLOW PLASTIC CAP STAMPED "TILLAMOOK CO. RANDOM" WHICH BEARS SOUTH 81°41'18" EAST 223.08. RECORD BEARING TREES: FOUND A ROTTEN HEMLOCK STUMP APPROXIMATELY 2.0' TALL WITH VISIBLE SCRIBING (WAS A 12" HEMLOCK BEARING SOUTH 82° EAST 19.4' - REWITNESS BOOK 1, PAGE 409); FOUND THE VERY ROTTEN REMAINS OF A HEMLOCK STUMP, APPROXIMATELY 1.0' TALL WITH VISIBLE SCRIBING (WAS A 10" DIAMETER HEMLOCK BEARING SOUTH 28° WEST 26.4' - REWITNESS BOOK 1, PAGE 409);