

At-Risk Crossings - Priority Ranking Associated With Oil By Rail Legislative Study

The Utilities and Transportation Commission (commission) provided input and technical expertise on the *2014 Marine and Rail Oil Transportation Study*, as was directed in the 2014 Supplemental Operating Budget, regarding the transportation of volatile crude oil within Washington state. On June 11, 2014, Governor Inslee issued Directive 14-06 which asked the commission, in part, for risks along rail lines and to identify, prioritize and estimate costs to mitigate those risks.



Cross buck and stop sign at 48th Avenue NW, Snohomish County (#1)

One specific area of risk that commission staff identified is public railroad-highway grade crossings along oil routes. As a result of its review, commission staff identified 347 public grade crossings along routes used by BNSF Railway Company (BNSF) and Union Pacific Railroad (UP) to transport crude oil across the state.

Commission staff's analysis of these crossings relied on information contained in commission and the Federal Railroad Administration (FRA) databases, along with reference documents, site visits, and other research tools. Staff reviewed each crossing for a variety of elements that may indicate that a particular crossing was at a higher risk than another crossing for an incident involving crude oil. In particular, staff looked at the following risk factors:

- Crossings protected only by passive traffic control devices, such as cross bucks and/or stop or yield signs.
- Crossings protected only by train-activated flashing lights.
- Crossings with limited sight distance down the tracks, in one or both directions, and not protected by automatic gates.
- Crossings with a significant grade or slope approaching the crossing and not protected by automatic gates.
- Crossings with nearby roadway intersections that may cause traffic to queue over the tracks and not protected by automatic gates.
- Roadways that cross the tracks at an acute angle at a crossing not protected by automatic gates.
- More than one mainline track intersects the roadway at a crossing not protected by automatic gates.
- The crossing exposure factor (i.e., the number of trains per day times the average number of vehicles using the crossing per day) is at a level that poses a higher risk. The number of vehicles using a crossing each day is called "Average Daily Traffic" or ADT.



South approach Port Kelley Road, Walla Walla Co.

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Commission staff analyzed the selected risk factors for crossings along oil routes and identified 14 of the 347 crossings that are under-protected and would benefit from investments in protection. These crossings were selected based on the identified risk factors and the existing levels of protection. Commission staff also conducted on site diagnostic reviews and held meetings at each crossing with representatives from the respective railroad, state agencies and local government. As a team, the participants reviewed the crossing characteristics; discussed possible solutions to improve safety; and generally agreed on a future course of action to improve the crossing.

The 14 identified crossings may not represent the crossings with the highest overall risk factors in the state. There are crossings with greater risk potential, such as those in high population density areas. These crossings are already protected with active warning devices and there are few remaining mitigation measures available. There were 10 additional crossings considered in this review process and a determination was made that no further action was needed. Information regarding this process and the crossing locations are available upon request.

The estimates contained in the table are preliminary in nature. They were calculated based on these sources:

- The Safe Transportation Research and Education Center at the University of California Berkeley,
- Quandel Consultants in Chicago, IL a company specializing in pre-construction planning and engineering for railroad projects, and
- Commission Grade Crossing Protective Fund grant documents.

Commission staff expects that interim upgrades can be completed within one year and that long-term recommendations may take up to three years. Both interim and long-term projects will require the support and cooperation of the railroad and the road authority.

Legislative Inquiries


Amanda Cecil, Legislative Director
(360) 561-1247 or acecil@utc.wa.gov

At-Risk Crossing Inquiries

Kathy Hunter, Rail Safety Manager
(360) 664-1257 or khunter@utc.wa.gov

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UTC Staff Recommended Crossing Projects – In Priority Order with Estimated Costs

	Crossing Location USDOT # Legislative/ Congressional Districts	Interim Recommendation and Estimated Cost	Long-Term Recommendation and Estimated Cost	Commission Staff Summary of Risk Factors
1.	48 th Avenue NW Snohomish County USDOT #084683A Leg Districts: 10 / 2 <i>(Photo on page 1)</i>	N/A	Install active warning devices consisting of shoulder-mounted Light Emitting Diode (LED) lights and gates. \$350,000	This crossing is on BNSF’s mainline. The crossing is currently protected by cross bucks and stop signs. Both approach grades are over five percent ¹ , which limits sight distance down the tracks; makes it difficult for some vehicles (e.g. large trucks and vehicles towing trailers) to stop, restart, and quickly clear the crossing; and may cause some vehicles such as low-boy semi-trailers to high-center and get stuck on the tracks. There have been two accidents at the crossing in the past five years and three accidents in the past 10 years.
2.	Walnut Street City of Bingen Klickitat County USDOT #090168N Leg Districts: 14 / 3 	Replace incandescent bulbs with LED. \$2,500	Upgrade active warning devices to shoulder-mounted LED lights and gates. \$350,000 Install concrete crossing surfaces. \$128,000²	This crossing is a triple-track crossing on BNSF’s mainline. The crossing is currently protected by flashing lights with no gates. A motorist must stop when lights are flashing but may proceed across the crossing when he or she perceives it to be safe. The three tracks make it a very wide crossing, which takes longer to clear than a standard one-track crossing. In addition, multiple track crossings can deceive a motorist into thinking it is safe to cross when one train passes, not realizing there is a second train approaching on another track. The exposure factor is over 4000 (number of trains per day x number of vehicles per day, which represents the number of opportunities for a collision every day). There is limited sight distance in one quadrant, which means a motorist cannot see far enough down the tracks to make an informed decision on whether or not it is safe to cross. There is a warehouse on one side of the tracks and large trucks may stop in the roadway, either loading or unloading from the warehouse. When this happens, vehicles may stop on the tracks and be unable to move when a train approaches.

¹ Snohomish County provided an estimate of \$753,000 to reduce the “hump” at the crossing, decreasing the grade on both roadway crossing approaches.



² There is \$22.9M in funding for a grade-separated crossing in Bingen at SR 14 (L2220062), which may affect the operation and configuration of the existing Walnut St crossing.

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	Crossing Location USDOT # Legislative/ Congressional Districts	Interim Recommendation and Estimated Cost	Long-Term Recommendation and Estimated Cost	Commission Staff Summary of Risk Factors
3.	Spearfish Road, Columbia Hills State Park Klickitat County USDOT #090183R Leg Districts: 14 / 3 	Install constant-flashing solar-powered LED light stop signs. \$20,000	Construct a single span bridge grade separation near the existing crossing and close the at-grade crossing. \$6 million³	This crossing is on BNSF's mainline. The crossing is currently protected by cross bucks and stop signs. The south approach grade is over five percent which limits sight distance down the tracks and makes it difficult for some vehicles (in this case vehicles towing boat trailers) to stop, restart, and quickly clear the crossing. This crossing leads to a seasonal high use boat launch. There is no parking on the river side of the crossing. A motorist must cross the tracks in his or her vehicle, launch the boat, drive back across the tracks to park the vehicle, then cross the tracks on foot to reach the boat. After boating, the motorist must do the reverse to get the boat back on its trailer. This means each time a boat is launched, a person crosses the tracks six times.
4.	Butler Road Skamania County USDOT #090135B Leg Districts: 14 / 3 	Replace incandescent bulbs with LED. \$2,500 Replace cross bucks and 2-track signs. \$350 Move stop signs to expand containment; WSDOT completing within current budget. \$-0-	Relocate bungalow. \$100,000 Install concrete crossing surfaces. \$104,000 	This crossing is a double-track crossing on BNSF's mainline. The crossing is currently protected by flashing lights. A motorist must stop when lights are flashing but may proceed across the crossing when he or she perceives it to be safe. The second track is used for trains to pass each other when going in opposite directions. In addition, multiple track crossings can deceive a motorist into thinking it is safe to cross when one train passes, not realizing there is a second train approaching on another track. The south approach grade is over five percent which limits sight distance down the tracks and makes it difficult for some vehicles (e.g. large trucks and vehicles towing trailers) to stop, restart, and quickly clear the crossing. There is limited sight distance, which means a motorist cannot see far enough down the tracks to make an informed decision on whether or not it is safe to cross. This crossing is in close proximity to SR-14 with limited containment, meaning vehicles stopped at the tracks for a train can back up to SR-14. This makes it difficult to enter or exit the highway safely. Likewise, cars stopped to enter SR-14 can back up over the tracks, unable to clear the tracks if a train approaches.

³ This estimate includes the cost of constructing a bypass track/shoofly which will be used during construction of the grade separation.

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	Crossing Location USDOT # Legislative/ Congressional Districts	Interim Recommendation and Estimated Cost	Long-Term Recommendation and Estimated Cost	Commission Staff Summary of Risk Factors
5.	Scribner Road West Spokane County USDOT #065968K Leg Districts: 6 / 5 	Install constant-flashing solar-powered LED light stop signs. \$20,000	Close crossing. ⁴ \$154,000	This crossing is on BNSF's mainline. The crossing is currently protected by cross bucks and stop signs. The south approach grade is over five percent, which limits sight distance down the tracks and makes it difficult for some vehicles (e.g. large trucks and vehicles towing trailers) to stop, restart, and quickly clear the crossing. In addition, the approach is on a gravel/dirt road, making it even more difficult for vehicles to stop, restart and clear the crossing.
6.	Scribner Road East ⁵ Spokane County USDOT #095923K Leg Districts: 6 / 5 	Install constant-flashing solar-powered LED light stop signs. \$20,000	Close crossing. ⁶ \$154,000	This crossing is on BNSF's mainline. The crossing is currently protected by cross bucks and stop signs. The south approach grade is over five percent, which limits sight distance down the tracks and makes it difficult for some vehicles (e.g. large trucks and vehicles towing trailers) to stop, restart, and quickly clear the crossing. In addition, the approach is on a gravel/dirt road, making it even more difficult for vehicles to stop, restart and clear the crossing. There is limited sight distance on the north approach, which means a motorist cannot see far enough down the tracks to make an informed decision on whether or not it is safe to cross. This crossing is in close proximity to Cheney-Spokane Highway with limited containment, meaning vehicles stopped at the tracks for a train can back up the highway. This makes it difficult to enter or exit the highway safely. Likewise, cars stopped to enter the Cheney-Spokane Highway can back up over the tracks, unable to clear the tracks if a train approaches.

⁴ BNSF intends to file a petition to close the crossing. If no petition is filed by July 2016, commission staff will re-evaluate. Estimated costs include \$60,000 for UTC regulatory costs plus \$94,000 for railroad to physically remove crossing.

⁵ Scribner Road East was added because the staff site visit revealed this crossing met the same risk factors as Scribner Road West. Crossings are 0.1 miles apart.




⁶ BNSF intends to file a petition to close the crossing. If no petition is filed by July 2016, commission staff will re-evaluate. Estimated costs include \$60,000 for UTC regulatory costs plus \$94,000 for railroad to physically remove crossing.

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7.	Wellesley Avenue Spokane County USDOT #662535B Leg Districts: 4 / 5 	N/A	Upgrade active warning devices to shoulder-mounted lights and gates and median barriers. \$364,000 Install LED hard-wired active advance warning signs. \$50,000	This crossing is on UP's mainline. The crossing is currently protected by flashing lights. A motorist must stop when lights are flashing but may proceed across the crossing when he or she perceives it to be safe. Almost 4000 vehicles travel this road every day. The tracks cross the highway at a severe angle, making it difficult for a motorist to look down the tracks and see a train approaching. There is limited sight distance, which means a motorist cannot see far enough down the tracks to make an informed decision on whether or not it is safe to cross. There is an intersection with Railroad Avenue between crossing signals, which is confusing and poses a potential conflict with other traffic at the crossing.
8.	Marguerite Street ⁷ City of Millwood Spokane County USDOT #662513B Leg Districts: 4 / 5 	Move/install signage to change traffic flow and improve safety at the crossing; City completed within current budget 10/2015. \$-0-	Install active warning devices to shoulder-mounted LED lights and gates. \$350,000	This crossing is on UP's mainline. The crossing is currently protected by cross bucks and stop signs. The north approach grade is over five percent, which limits sight distance down the tracks and makes it difficult for some vehicles (e.g. large trucks and vehicles towing trailers) to stop, restart, and quickly clear the crossing. The crossing is in close proximity to Euclid Avenue with limited containment. Vehicles stopped at the tracks for a train can back up the highway. This makes it difficult to enter or exit the roadway safely. Likewise, cars stopped to enter Euclid Avenue can back up over the tracks, unable to clear the tracks if a train approaches.
9.	Port Kelley Road Walla Walla County USDOT #844389C Leg Districts: 16 / 4 <i>(Photo on page 1)</i>	Improve asphalt approaches; Waiting for cost estimate from the County. \$Unknown	Install active warning devices consisting of shoulder-mounted LED lights and gates. \$350,000	This crossing is on UP's mainline. The crossing is currently protected by cross bucks and stop signs. There is limited sight distance on the north approach, which means a motorist cannot see far enough down the tracks to make an informed decision on whether or not it is safe to cross. The exposure factor (number of trains per day x vehicles per day which represents the number of opportunities for a collision everyday) is over 1500. There is high seasonal truck and recreational vehicle traffic.

⁷ Marguerite Street was added because Union Pacific Railroad recommended this crossing for evaluation. Commission staff supported the recommendation.

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	Crossing Location USDOT # Legislative/ Congressional Districts	Interim Recommendation and Estimated Cost	Long-Term Recommendation and Estimated Cost	Commission Staff Summary of Risk Factors
10.	Brown Road Whatcom County USDOT #096134P Leg Districts: 42 / 1 	N/A	Install active warning devices consisting of shoulder-mounted LED lights and gates \$350,000 Install concrete crossing surfaces. \$52,000 Widen roadway approach lanes to at least 11 feet. \$120,000	This crossing is on a BNSF branch line. The crossing is currently protected by cross bucks and stop signs. The exposure factor (number of trains per day x number of vehicles per day which represents the number of opportunities for a collision everyday) is over 1500. The crossing is on a very narrow road with heavy use by BP Cherry Point refinery for employees and deliveries.
11.	Lower Norton Avenue City of Everett Snohomish County USDOT #084620V Leg Districts: 38 / 2  	Limit access to vehicle traffic on Lower Norton Avenue using signage; City completing within current budget. \$-0- Stripe roadway approaches to better define travel lanes; City completing within current budget. \$-0- Install stop lines until crossing upgrades are implemented; City completing within current budget. \$-0-	Upgrade active warning devices to LED lights and four-quad gates. \$556,000 Install concrete crossing surfaces. \$156,000	This crossing is a triple-track crossing on BNSF's mainline. The crossing is currently protected by flashing lights. A motorist must stop when lights are flashing but may proceed across the crossing when he or she perceives it to be safe. The crossing is currently semi-inactive due to closure of a nearby pulp mill. The three tracks make it a very wide crossing, taking longer to clear than a standard one-track crossing. In addition, multiple track crossings can deceive a motorist into thinking it is safe to cross when one train passes, not realizing there is a second train approaching on another track. The tracks cross the highway at a severe angle, making it difficult for a motorist to look down the tracks and see a train approaching. There is limited sight distance, which means a motorist cannot see far enough down the tracks to make an informed decision on whether or not it is safe to cross. There are multiple rail car switching movements nearby which may cause the lights to flash even if the train never enters the crossing. The switching can also cause confusion if a moving train is visible and no lights are flashing.

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12.	Hailey Road Franklin County USDOT #089696T Leg Districts: 9 / 4	Install constant-flashing solar-powered LED light stop signs. \$20,000	Close crossing ⁸ \$154,000 	This crossing is on BNSF's mainline. The crossing is currently protected by cross bucks and yield signs. The exposure factor (number of trains per day x number of vehicles per day which represents the number of opportunities for a collision everyday) is over 1500.
13.	Dodd Road Walla Walla County USDOT #844396M Leg Districts: 16 / 4 	N/A	Upgrade active warning devices to shoulder-mounted LED lights and gates. \$350,000	This crossing is on UP's mainline. The crossing is currently protected by flashing lights. A motorist must stop when lights are flashing but may proceed across the crossing when he or she perceives it to be safe. The exposure factor (number of trains per day x number of vehicles per day which represents the number of opportunities for a collision everyday) is over 4000.
14.	Charles Tobin Road Whitman County USDOT #814028R Leg Districts: 9 / 4 	N/A	Reduce approach grades; County completed work within current budget 10/2015. \$-0-	This crossing is on UP's mainline. The crossing is currently protected by cross bucks and stop signs. Both approach grades are over five percent, which limits sight distance down the tracks; makes it difficult for some vehicles (e.g. large trucks and vehicles towing trailers) to stop, restart, and quickly clear the crossing; and may cause some vehicles such as low-boy semitrailers to high-center and get stuck on the tracks. In addition, there is limited sight distance, which means a motorist cannot see far enough down the tracks to make an informed decision on whether or not it is safe to cross.
	TOTAL	INTERIM \$85,350	LONG-TERM \$10,192,000	

⁸ BNSF intends to file a petition to close the crossing. If no petition is filed by July 2016, Commission staff will re-evaluate.

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