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***BNSF Custer Spur Highway/Railway Grade Crossing Traffic  
Impact Study***

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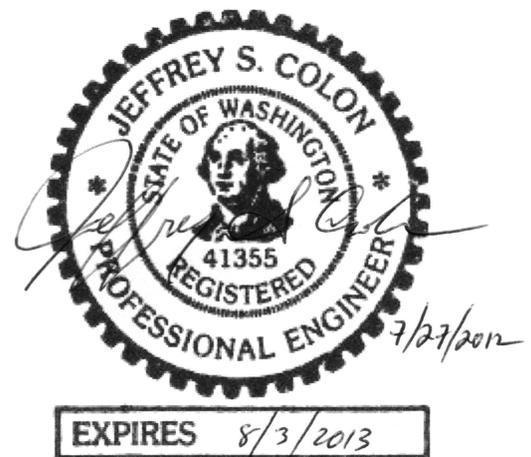
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## Table of Contents

<b>Executive Summary</b> .....	<b>1</b>
<b>1. Introduction and Description</b> .....	<b>3</b>
1.1 <i>Description of Proposed Project</i> .....	3
1.2 <i>Study Data</i> .....	5
<b>2. Methodology</b> .....	<b>6</b>
2.1 <i>Study Periods</i> .....	6
2.2 <i>Train Effect and Frequency</i> .....	6
2.3 <i>Valley View Road Closure</i> .....	8
2.4 <i>Analysis Software and Limitations</i> .....	8
<b>3. Findings and Evaluation</b> .....	<b>10</b>
3.1 <i>Study Crossings</i> .....	10
3.2 <i>Emergency Access and School Bus Route Evaluation</i> .....	10
3.3 <i>Queuing</i> .....	14
3.4 <i>Queue Dissipation</i> .....	15
3.5 <i>Crossing Exposure Index Calculations</i> .....	16
3.6 <i>Findings</i> .....	17
<b>Appendix A Crossing Photos</b> .....	<b>A</b>
<b>Appendix B U.S. DOT Crossing Inventory Information</b> .....	<b>B</b>



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## Figures and Tables

### Figures

*Figure 1.1 Location Map For Study Crossings*.....4

*Figure 3.1 Fire District Boundaries* .....12

*Figure 3.2 School District Boundaries*.....13

### Tables

*Table 1.1 Study Crossings*.....5

*Table 2.1 Conservative Time Effect, Custer Spur at Grandview Road*.....7

*Table 2.2 Anticipated Custer Spur Rail Traffic*.....7

*Table 3.1 Peak Hour Traffic Volume At Crossings* .....10

*Table 3.2 Ferndale School District Existing Bus Routes*.....13

*Table 3.3 Rail Crossing Queuing During P.M. Peak Hour*.....14

*Table 3.4 Estimated Rail Crossing Queuing Dissipation* .....15

*Table 3.5 Custer Spur – Grandview Road Crossing Exposure Index*.....16

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## Executive Summary

The purpose of the BNSF Custer Spur Highway/Railway Grade Crossing Traffic Impact Study is to analyze the impacts of train traffic that could be generated by proposed improvements to the BNSF Custer Spur that are associated with the proposed Gateway Pacific Terminal on vehicle traffic at highway/railway grade crossings within the project limits. The intersection impacts of the vehicular traffic potentially generated by the proposed terminal are not addressed in this report; please refer to *Engineered Traffic Study, Gateway Pacific Terminal, Washington, March, 2012*, by AMEC Environment and Infrastructure, Inc., for this analysis (“AMEC study”).

The results of the Custer Spur Highway/Railway Grade Crossing Traffic Impact Study include the following:

- The crossings at Ham Road and Aldergrove Road have very low traffic volumes. Any additional train traffic could have little impact to the overall roadway network operations or levels of service. The addition of auxiliary left and right turn lanes at intersections adjacent to these crossings would not substantially improve intersection or roadway operations.
- The crossings at Kickerville Road, Bay Road and Brown Road could be impacted by the additional trains on the Custer Spur. However, the roadway volumes and the resulting queues created by the rail traffic may not cause excessive delay, as the queued traffic can dissipate and clear in a reasonable amount of time. The addition of auxiliary left and right turn lanes at intersections adjacent to these crossings would not substantially improve intersection or roadway operations.
- The Custer Spur crossing at Grandview Road is recommended to be a grade separated crossing for the following reasons:
  1. A grade separation at the Custer Spur Grandview Road crossing could provide more efficient bus routes for the Ferndale School District and reduce the potential for significant delay for bus routes crossing the Custer Spur.
  2. Significant queuing, 183 vehicles estimated in the peak hour, would cause Grandview Road traffic to back up and negatively impact traffic operations at the Kickerville Road and Blaine Road intersections.
  3. Proposing auxiliary left and right turn lanes at the intersection of Kickerville Road and Grandview Road will not substantially improve intersection or roadway capacity during a train crossing event because of either lack of traffic flow to the intersection from the west or queuing on the east side of the crossing.
  4. The time needed to dissipate the queue at the crossing is approximately 13 minutes.
  5. The AREMA Crossing Exposure Index threshold of 70,000 for recommending grade separation of rail crossings is projected to be met at the Custer Spur and Grandview Road crossing around the year 2018.

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- Redistributed traffic from the Valley View Road closure may impact the Main Street crossing in Custer. However, additional vehicles rerouted to this crossing in the peak are quite low, 45 vehicles in the existing condition and 62 in 2026. A 12 vehicle queue is anticipated at the Main Street grade crossing in the 2026 condition. The noted queue may spill back from the Main Street railroad crossing into Portal Way. If the queue is observed to spill back into Portal Way, the effects of the spill back queue could be significantly reduced by constructing northbound left and southbound right auxiliary turn lanes at the Portal Way and Main Street intersection.
  - It is anticipated that Emergency Medical Service (EMS) response times to areas near the Custer Spur will not be affected by any potential increase in train traffic or the length of time a crossing could be blocked due to the location of the onsite fire stations at the industrial facilities, the auto dispatch with WCFD7 and NWFR, and the location of the existing stations on either side of Custer Spur.
  - Valley View Road provides access to non-residential parcels (primarily farm fields) and single family residences. Traffic volumes that need to be re-distributed are less than 60 vehicles per hour, which can be safely accommodated on alternate routes with existing crossing signal and gates. Existing traffic volumes can be re-distributed with no more than 2 miles of adverse travel (adverse travel = out-of-the-way of the existing route).

## 1. Introduction and Description

The purpose of the BNSF Custer Spur Highway/Railway Grade Crossing Traffic Impact Study is to analyze the impacts of train traffic that could be generated by proposed improvements to the BNSF Custer Spur that are associated with the proposed Gateway Pacific Terminal on vehicle traffic at highway/railway grade crossings within the project limits. The intersection impacts of the vehicular traffic potentially generated by the proposed terminal are not addressed in this report; please refer to *Engineered Traffic Study, Gateway Pacific Terminal, Washington, March, 2012*, by AMEC Environment and Infrastructure, Inc., for this analysis (“AMEC study”).

### 1.1 Description of Proposed Project

BNSF is proposing to make improvements to the existing BNSF Custer Spur from the Intalco Wye through the Elliott Yard, which aligns generally east-west for 2 miles, then generally north-south for four miles. The start of the BNSF project (Intalco Wye Junction) spurs off the Bellingham Subdivision at the town of Custer. The BNSF project ends where the BNSF Custer Spur intersects with Lonseth Road south of the existing BNSF Elliott Yard.

The improvements would accommodate the potential tonnage of dry bulk commodities for projected rail capacity needs. The expansion would also allow access to/from international and interstate commercial facilities and markets on this rail line. This is the only rail line that provides connecting rail service to existing and proposed industrial facilities. Project activities would consist of constructing a second track, expansion and improvements at both the Intalco and Elliott yards, and the addition of up to three Receiving and Departure (R&D) tracks at the east end of the Custer Spur.

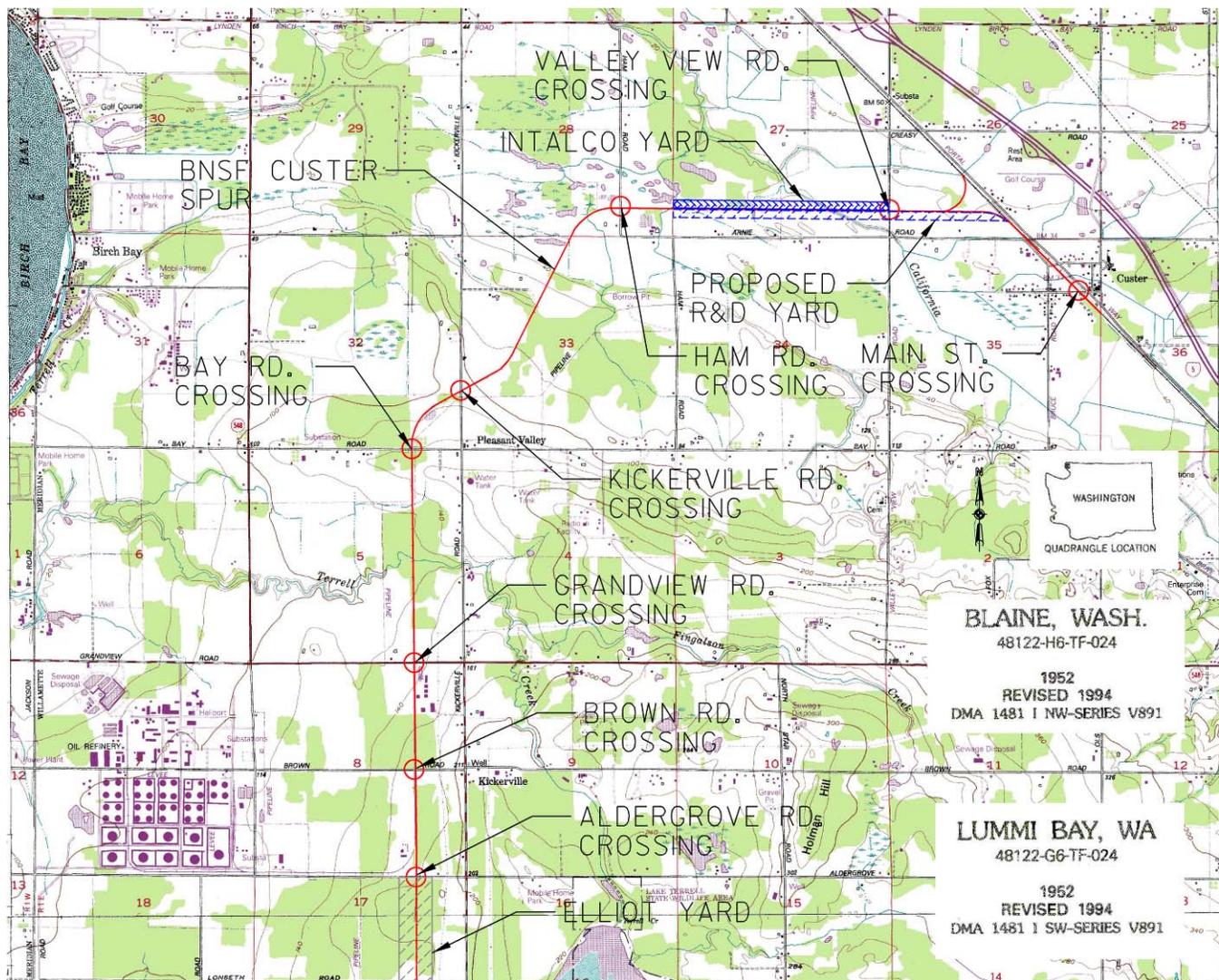
Improvements to the BNSF Custer Spur are necessary to accommodate the number, length, and weight of trains, as well as to safely and efficiently provide rail services for the existing industrial facilities in Cherry Point and for the proposed GPT facility. Current capacity is insufficient to efficiently and safely handle the anticipated volume and length of trains.

The project summary of the main construction elements are as described below:

- Up to three R&D tracks would be developed on the south side of the BNSF Custer Spur starting from the Intalco Wye and ending at Ham Road. Each R&D track would be long enough to provide a holding area for a full length train and avoid blockage of the mainline. The R&D track construction would include expansion of the existing rail embankment, additional trackage, new bridges, improvements to existing bridges, drainage improvements (i.e. culverts/ditches), and closure of the Valley View Road grade crossing.
- The existing Custer Spur mainline and siding tracks would also be upgraded to accommodate anticipated higher volumes of transported commodities while maintaining current service levels. This rail upgrade would include rehabilitation of existing ties, switches, signals, and other existing railbed or structural improvements to support efficient and safe maintenance.

- A second track would be constructed along the length of the existing Custer Spur from the Intalco Wye to Lonseth Road (approximately six miles) on the north side, to the proposed new industrial, commercial facilities connection point. This spur currently services several existing industries by way of a single rail line track. A second track would protect existing rail service and switching capabilities for all customers along the line, including the ability to efficiently accommodate anticipated rail traffic to and from the proposed Gateway Pacific Terminal (GPT).

Figure 1.1 – Location Map for Study Crossings



## 1.2 Study Data

### 1.2.1 Vehicular Traffic Data

Traffic counts were taken from the AMEC study at impacted intersections identified in cooperation with Whatcom County Public Works, Engineering Section. The majority of the counts were taken on June 22 and June 23, 2010; others were taken on March 20, 2011. The AMEC study identified three time periods for analysis: Existing, 2026 No-Build, and 2026 Build. The existing traffic counts were grown at an average annual growth rate of 2% to estimate the 2026 No-Build traffic conditions per Whatcom County. The generated vehicular traffic from the Gateway Pacific Terminal was added to the 2026 No-Build condition to identify the full capacity condition of the terminal.

The vehicular traffic data and methodologies used in the AMEC study were analyzed and determined to be generally acceptable. The vehicular data and traffic volumes were used in this study where applicable.

### 1.2.2 Study Crossings

The Custer spur currently has seven at grade roadway crossings. The BNSF Main Street crossing in Custer, Washington is also analyzed in this study. The analysis at the Main Street crossing was performed as it is anticipated that a majority of vehicles from the proposed Valley View Road crossing closure will be distributed through this crossing.

Photos at each of the highway/railway grade crossings in the study are included in Appendix A.

**Table 1.1 – Study Crossings**

<u>Custer Spur Crossings</u>	<u>BNSF Crossings</u>
Valley View Road – 096110B	Main Street (Custer) – 084843L
Ham Road – 096119M	
Kickerville Road – 096128L	
Bay Road – 096130M	
Grandview Road – 096133H	
Brown Road – 096134P	
Aldergrove Road – 096135W	

## 2. Methodology

### 2.1 Study Periods

There are four study periods analyzed in this traffic study:

- **Existing Condition**
  - Vehicle Traffic: No increase to vehicle traffic
  - Rail Traffic: Non-GPT Anticipated Traffic = 1 train per day (1 loaded, 1 empty)
- **Terminal Opening Day**
  - Vehicle Traffic: Existing condition + redistributed vehicle volumes resulting from the proposed closure of the Valley View Road grade crossing
  - Rail Traffic: GPT Potential Traffic = 5 trains per day (5 loaded, 5 empty)  
Non-GPT Anticipated Traffic = 2 trains per day (2 loaded, 2 empty)
- **2026 No-Build**
  - Vehicle Traffic: Existing condition increased at 2% per year vehicular traffic growth rate.
  - Rail Traffic: Existing condition increased at 2% per year rail traffic growth rate (anticipated to remain at 2 trains per day; 2 loaded, 2 empty)
- **2026 Build**
  - Vehicle Traffic: 2026 No-Build + redistributed vehicle volumes resulting from the proposed closure of the Valley View Road grade crossing.
  - Rail Traffic: GPT Potential Traffic = 9 trains per day (9 loaded, 9 empty)  
Non-GPT Anticipated Traffic = 2 trains per day (2 loaded, 2 empty)

### 2.2 Train Effect and Frequency

To determine anticipated delay at the rail crossings caused by passing trains, the time of closures of those crossings needs to be calculated. For purposes of the traffic impact study, the following key assumptions are used:

- Anticipated train length at full build out of the Gateway Pacific Terminal is 8,500 feet;
- We assume that loaded trains on the Custer Spur will travel at an average speed of 10 mph;
- We assume that empty trains on the Custer Spur will travel at an average speed of 25 mph; and
- We assume that loaded trains will maintain uninterrupted train movement to the terminal.

It is important to note that over time, some assumptions could vary depending on a number of external factors

An anticipated conservative blocking time scenario at the Custer Spur Grandview Road crossing is based on the trailing end of a loaded westbound train clearing the crossing just as the head end of an

empty eastbound train enters the crossing, resulting in a 14-minute blocking time. This calculation is shown in Table 2.1.

**Table 2.1 – Conservative Time Effect, Custer Spur at Grandview Road**

	<u>Train Length (ft)</u>	<u>Speed (mph)</u>	<u>Train Crossing Time (sec.)</u>	<u>Advance Gate Time (sec.)</u>	<u>Total Time (sec.)</u>	<u>Comments</u>
<b>Westbound Loaded Train To Terminal (uphill; 1.8% grade)</b>	8,500	10	579.5	30	609.5	
<b>Eastbound Empty Train From Terminal (downhill)</b>	8,500	25	231.8	0	231.8	Gates already down for loaded train.
			<b>TOTAL TIME (sec.)</b>		<b>841.4</b>	
			<b>TOTAL TIME (min.)</b>		<b>14.0</b>	

Anticipated train activity for the Custer Spur can be seen in Table 2.2. Train activity includes (a) rail traffic resulting from train movements to and from the Gateway Pacific Terminal, and (b) existing and anticipated future rail service on the Custer spur unrelated to the Gateway Pacific Terminal.

The origin of loaded trains and destination of empty trains are unknown at this time. Therefore, the train traffic at the adjacent Grandview crossing cannot be accurately predicted. The Gateway Pacific Terminal is scheduled to operate 24 hours a day, 365 days a year; we assume an even distribution of trains for traffic modeling purposes.

**Table 2.2 – Anticipated Custer Spur Rail Traffic**

	<u>Year</u>	<u>GPT Rail Traffic<sup>1</sup></u>		<u>Existing Rail Service to Non -GPT Industries on Custer Spur<sup>2</sup></u>		<u>Anticipated Future Rail Service to Non -GPT Industries on Custer Spur<sup>2</sup></u>		
		<u>Loaded Trains per Day</u>	<u>Empty Trains per Day</u>	<u>Loaded Trains per Day</u>	<u>Empty Trains per Day</u>	<u>Loaded Trains per Day</u>	<u>Empty Trains per Day</u>	<u>Total Trains per Day</u>
Existing	2012	0	0	1	1	0	0	2
Phase 1	2016	5	5	1	1	1	1	14
Phase 2	2018	6	6	1	1	1	1	16
Phase 3	2021	7.5	7.5	1	1	1	1	19
Phase 4	2026	9	9	1	1	1	1	22

<sup>1</sup>Source: Table 4-5, Draft Revised Project Information Document, Gateway Pacific Terminal, March, 2012

<sup>2</sup>Source: BNSF

### **2.3 Valley View Road Closure**

Valley View Road currently bisects the BNSF Intalco Wye and yard switching tracks servicing several industries. Two of the requirements in the staging of long trains are: a) being on as level as possible surface area, and b) being located close to the operational origination or termination of interstate commerce. Evaluations of Valley View Road looked at no or low impact, 9,000 foot -long segments or tracts of land with close to 0.0 grade.

Closure of the Valley View Road railroad grade crossing will create a contiguous parcel of land long enough and flat enough to develop the proposed receiving and departure tracks described above. The receiving and departure tracks are needed to provide a safe area to perform mandated regulatory inspections, and to avoid blockage of BNSF Railway's mainline.

Based upon a review of existing information, the following recommendations were developed regarding the Valley View Road grade crossing:

1. The Valley View Road railroad grade crossing (DOT 096110B at MP 0.58) on the Custer Spur should be closed;
2. A cul-de-sac for vehicle turn-around on Valley View Road, North of the BNSF ROW to County Specifications should be constructed; and
3. Approximately 600 ft. of Valley View Rd. between Arnie Rd. on the South, and the BNSF right-of-way on the North. (0.11 miles that will no longer need to be maintained by Whatcom County) should be closed and vacated. Utility access would be granted for drainage maintenance, PSE power line maintenance, and waterline maintenance.

### **2.4 Analysis Software and Limitations**

The software used to analyze the rail crossings is *Synchro plus SimTraffic 7* published by Trafficware Ltd. The files used in this analysis were originally created for use in the AMEC study and have been modified and refined to analyze the crossings.

When analyzing the rail crossings, the pertinent information to consider is the queue length caused by the trains, and the time necessary to dissipate this queue. In order to simulate the rail crossing in Synchro, a node using a signalized intersection was created at each rail crossing, and phasing roadway traffic to be in the stop condition while the train is passing. Several key assumptions are necessary to analyze the crossings:

- Only one train in each direction along the Custer Spur would cross during the peak hour.
- Only one train using the Custer Spur would cross the Main Street crossing in Custer during the peak hour.
- The trains would incur the maximum delay and roadway stoppage.
- The queue from the stopped vehicles would dissipate and clear before the arrival of the next train.

These assumptions are based on reasonably foreseeable train traffic in the area, as well as a conservative assumption of train scheduling since both traffic and schedule can vary over time.

Synchro 7 software limitations related to maximum cycle length do not allow SimTraffic to accurately model the near one train per hour arrival. Synchro data was used to populate SimTraffic software and queue length was determined by stopping a simulation run when the signal would change to allow the roadway traffic to proceed across the rail crossing. This method allowed for the maximum number of queued vehicles to be observed. From this point, the shockwave and queuing theory equation was utilized to determine the second pertinent analysis factor which is the queue clearing time.

$$T = \frac{Q_M}{s - q}$$

T = Time to clear queue (seconds)

Q<sub>M</sub> = Maximum Vehicles in queue

s = saturation rate

$$s = \frac{\text{saturation flow rate}}{3600}$$

q = arrival rate

$$q = \frac{\text{max vehicles per hour in one direction}}{3600}$$

Source: *Consistency of Shock-Wave and Queuing Theory Procedures for Analysis of Roadway Bottlenecks*, Rakha and Zhang

With these two characteristics of the rail crossings calculated, it is possible to analyze the impact of the rail crossings on the roadway network.

### 3. Findings and Evaluation

#### 3.1 Study Crossings

The Custer Spur highway/railway grade crossings are listed in Table 1.1. Crossings at Ham Road and Aldergrove Road have traffic volumes under ten vehicles in the peak hour. The impact of trains to these roadways affects very few drivers and will have no impact to the overall roadway network operational level of service. Therefore, the need for any additional roadway improvements at or near Ham Road and Aldergrove Road crossings was not analyzed in greater depth.

The Custer Spur Valley View Road crossing is proposed to be closed with the proposed construction of the BNSF Custer Spur Improvements. The majority of Valley View Road traffic was distributed through the town of Custer and the crossing at Main Street. Table 3.1 shows the peak hour crossing volumes of the study crossings for the different analysis phases.

**Table 3.1 – Peak Hour Traffic Volume at Crossings**

<b>CUSTER SPUR CROSSINGS</b>	Peak Hour Traffic Volume (vehicles per hour)			
	Existing	Opening Day	2026 No-Build	2026 Build
<b>Valley View Road</b>	48	Crossing Closed	66	Crossing Closed
<b>Kickerville Road</b>	153	153	211	215
<b>Bay Road</b>	215	215	295	295
<b>Grandview Road</b>	675	675	927	927
<b>Brown Road</b>	350	350	350	350
<b>RAIL CROSSINGS</b>				
<b>Main Street (Custer)</b>	71	116	95	157

#### 3.2 Emergency Access and School Bus Route Evaluation

##### Emergency Medical Services (EMS)

The area near Custer Spur is served by two fire protection districts, Whatcom County Fire District Seven (WCFD7) and North Whatcom Fire and Rescue (NWFR). See Figure 3.1- Fire District Boundaries. The dividing boundary between these districts is Bay Road. An evaluation was performed to determine the impacts to EMS response times if crossings were blocked by train traffic that could be generated by the BNSF Custer Spur improvements.

WCFD7 and NWFR operate on an auto dispatch system where both districts are notified of emergencies simultaneously. Fire station 63 out of Birch Bay and Fire Station 41 out of Ferndale are the primary stations that serve areas near the Custer Spur. Fire Station 63 is located northwest of the spur whereas Fire Station 41 is located southeast of the spur. A number of additional unmanned volunteer stations are positioned in the nearby area but are considered supplemental services and were not included in the evaluation of the EMS response times. Potential increases in queues

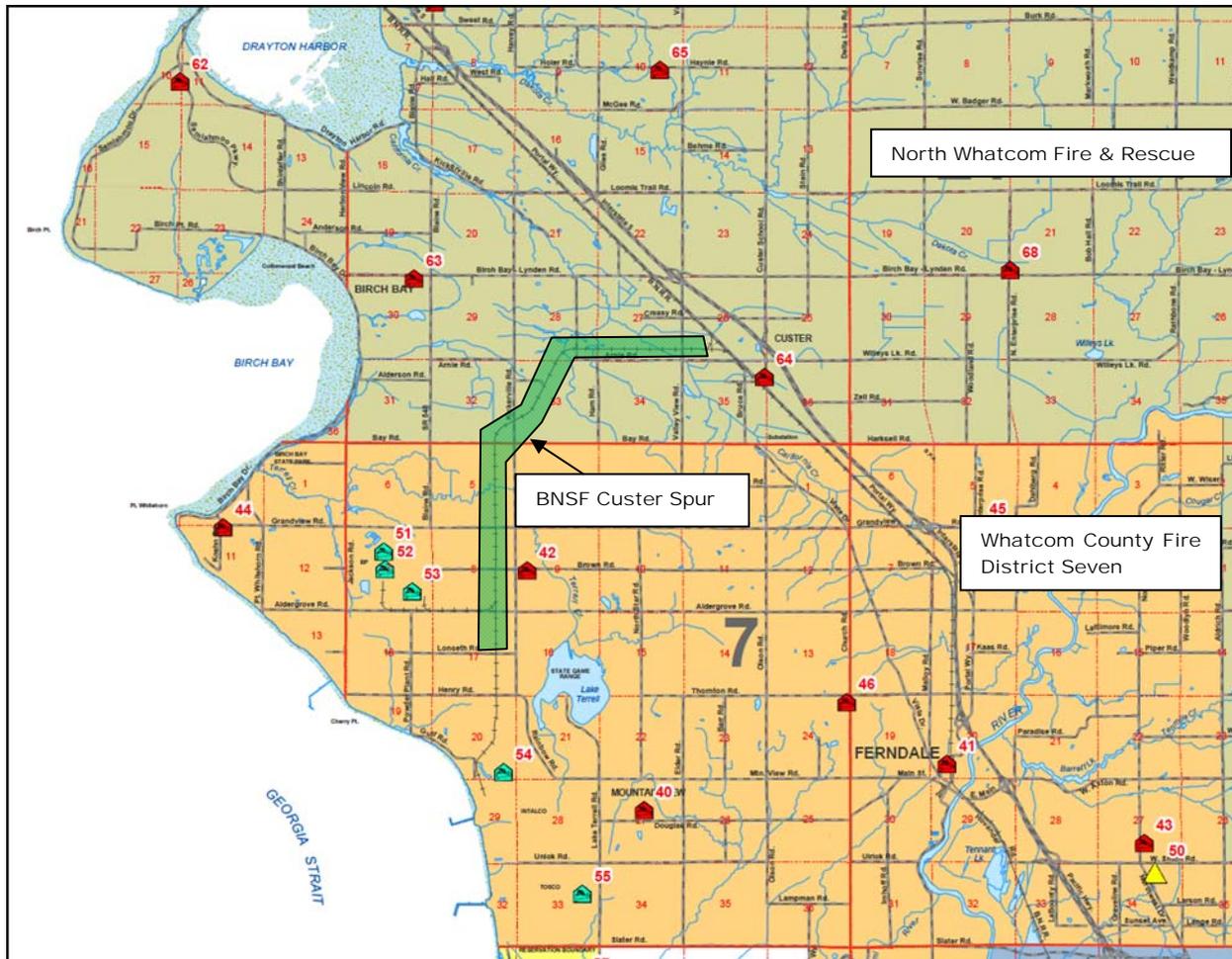
discussed in Section 3.4 are anticipated to have little or no effect on EMS response times because the auto dispatch system allows for the EMS personnel to respond to an incident from either side of a potential blockage along the spur.

Response times to industries near the Custer Spur were also evaluated. These industries, BP Cherry Point, Intalco, and Conoco, are located west of the BNSF Custer Spur. They each have their own on-site fire station. Each of these stations is also linked to the auto dispatch system with WCFD7 and NWFR.

NWFR can respond to incidents west of the spur from station 63 and therefore response times will not be affected. WCFD7 Station 41 would likely be the assisting department for incidents west of the spur. There is a potential for Station 41 to experience response delays if a train is traveling through the corridor at the time of an incident. However, Station 63's location west of the spur would not affect the overall response time to incidents. Similarly WCFD7 will be the first responder to incidents east of the spur.

Therefore it is anticipated that EMS response times to areas near the Custer Spur will not be affected by anticipated increases in train traffic or the length of time a crossing could be blocked due to the location of the onsite fire stations at the industrial facilities, the auto dispatch with WCFD7 and NWFR, and the location of the existing stations on either side of Custer Spur.

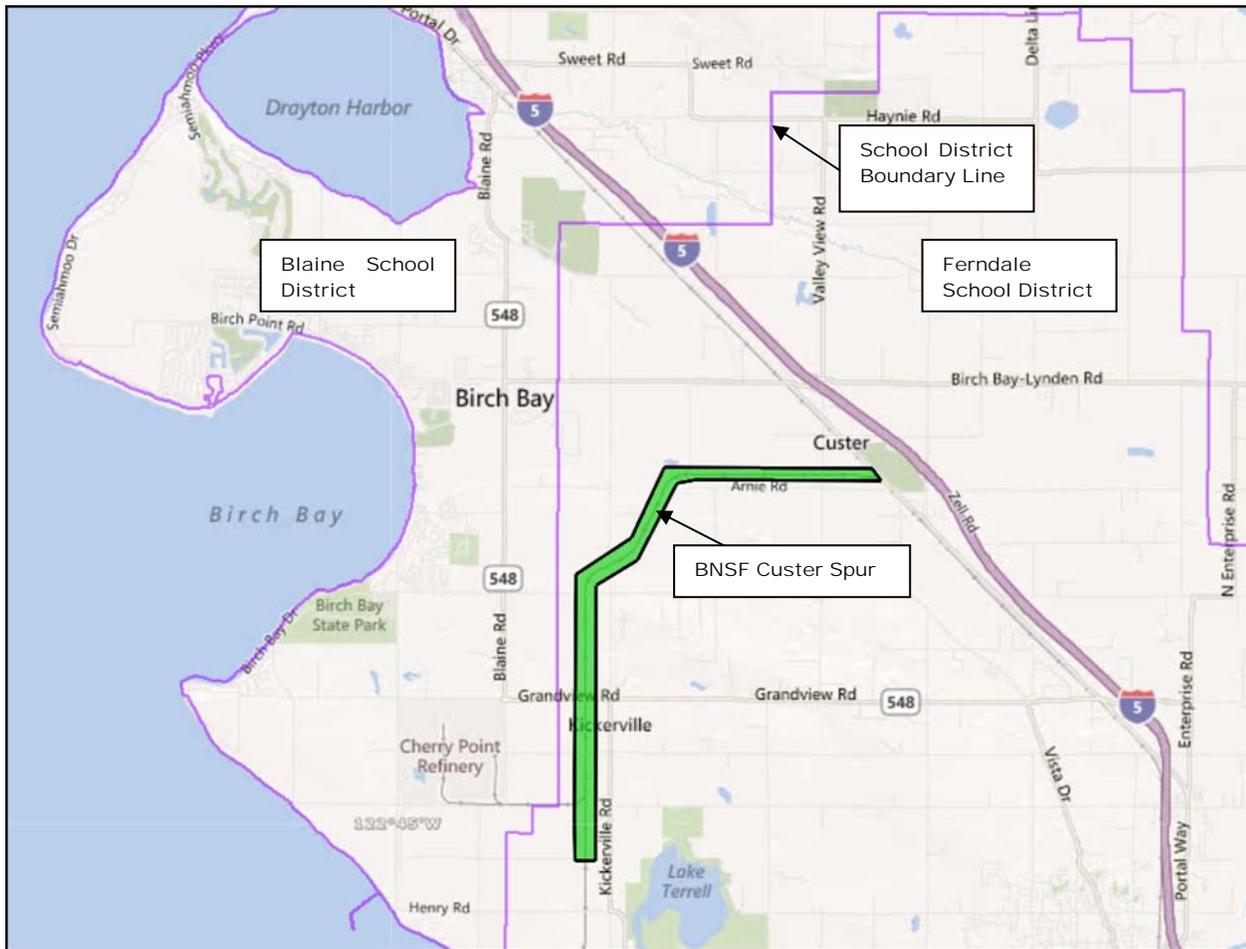
Figure 3.1 – Fire District Boundaries



School Bus Route Evaluation

The areas near the Custer Spur are served by two school districts, Ferndale School District #502 (FSD) and Blaine School District #503 (BSD). See Figure 3.2 - School District Boundaries. The dividing boundary between the school districts is just west of Kickerville Road. The Custer Spur is entirely within the FSD, which has two bus routes that cross the spur that could potentially be affected by increased rail traffic. BSD does not have any bus routes that cross the spur and therefore will not be affected by the proposed improvements.

**Figure 3.2 – School District Boundaries**



The existing FSD bus routes that cross the BNSF Custer Spur are included in Table 3.2.

**Table 3.2 – Ferndale School District Existing Bus Routes**

<u>Bus No.</u>	<u>Route</u>	<u>Time</u>	<u>BNSF Custer Spur Crossing</u>
Bus 46	High School	6:33 AM	Ham Road
	High School	2:52 PM	Ham Road
	High School	3:20 PM	Valley View Road
	Elementary	8:53 AM	Valley View Road
	Elementary	3:54 PM	Valley View Road
Bus 52	Elementary	8:32 AM	Kickerville Road
	Elementary	8:34 AM	Bay Road
	Elementary	4:02 PM	Grandview Road
	Elementary	4:15 PM	Kickerville Road

As discussed in Section 3.1, the existing Valley View Road crossing is proposed to be closed as part of the Custer Spur improvements. This closure will require a new route for Bus 46 which utilizes the Valley View Road crossing three times per day. Either Ham Road, to the west, or Main Street, to the east, may serve as alternative to the current Valley View Road route. By changing to either of these crossings, the Valley View Road route will be affected with as little adverse travel as is feasible.

Bus 52 currently crosses the Custer Spur Grandview Road at-grade crossing near the time frame of the existing p.m. peak hour and may be delayed by the queue described in Section 3.3. Construction of a grade separation at the Custer Spur Grandview Road crossing would provide an uninterrupted flow alternative to buses which currently cross the spur.

Bus crossings at Ham Road, Kickerville Road, and Bay Road could be affected by additional trains on the Custer Spur. However, as discussed in Section 3.6, the roadway volumes and the resulting queues created by the rail traffic may not cause excessive delay and the number of buses crossing per day is very low. If buses on these routes experience delays due to a crossing blockage along the spur, the bus dispatchers could redirect the routes to help mitigate potential delays.

Based on the low number of buses crossing the Custer Spur, it is anticipated that the proposed train traffic will have only minor effects on the bus routes crossing the Custer Spur. However, the FSD will need to reevaluate their bus routes to accommodate the proposed closure of the Custer Spur Valley View Road crossing, and direct buses to either the Ham Road crossing or the Main Street crossing in Custer. A grade separation at the Custer Spur Grandview Road crossing could provide more efficient bus routes for the FSD and reduce the potential for delay for bus routes crossing the Custer Spur.

### 3.3 Queuing

The queuing from the rail crossings was evaluated using SimTraffic. The queuing at the study crossings can be seen in Table 3.3

**Table 3.3 – Rail Crossing Queuing During P.M. Peak Hour**

CUSTER SPUR CROSSINGS	Queuing length (vehicles)			
	Existing	Opening Day	2026 No-Build	2026 Build
Kickerville Road – North[South]	5[17]	3[41]	8[19]	9[43]
Bay Road – East[West]	22[19]	21[27]	14[16]	21[32]
Grandview Road – East[West]	76[29]	148[49]	84[45]	183[57]
Brown Road – East	45	52	52	52
<b>RAIL CROSSING</b>				
Main Street (Custer) – East[West]	4[3]	7[11]	4[3]	8[12]

As illustrated in Table 3.3, a queue of vehicles has the potential to accumulate in the design year at the Custer Spur Grandview Road crossing. Vehicles at the Custer Spur Grandview Road crossing have the potential to spill back into the adjacent Grandview Road intersections (Blaine Road and Kickerville Road) when a train blocking event occurs for 14 minutes of the p.m. peak hour. Auxiliary left and right turn lanes at the intersection of Kickerville Road and Grandview Road will not substantially improve intersection or roadway capacity during a train crossing event because of either lack of traffic flow to the intersection from the west or queuing on the east side of the crossing.

The Main Street crossing at Custer, Washington was analyzed to determine the effects of queues caused by train traffic. This analysis took place because a majority of vehicles from the Valley View Road crossing closure were distributed through the town and the crossing at Main Street. In the 2026 Build condition, the rail crossing at Main Street will accumulate queues that may cause some spill back onto Portal Way. This spill back may inhibit the traffic flow of Portal Way due to the single lane cross-section and lack of auxiliary turn lanes on Portal Way at Main Street.

### **3.4 Queue Dissipation**

The larger directional vehicle queue values per crossing accumulated in Table 3.3 along with a conservatively estimated saturation flow rate of 1,500 vehicles per hour were entered into the equations described in Section 2.4 to calculate the time required for the established queue to dissipate and clear. These values can be seen in Table 3.4

**Table 3.4 – Estimated Rail Crossing Queuing Dissipation**

<b>CUSTER SPUR CROSSINGS</b>	<b>Queue Dissipation Time (seconds)</b>			
	<b>Existing</b>	<b>Opening Day</b>	<b>2026 No-Build</b>	<b>2026 Build</b>
<b>Kickerville Road</b>	44	106	51	115
<b>Bay Road</b>	57	70	43	85
<b>Grandview Road</b>	241	522	360	783
<b>Brown Road</b>	141	163	163	163
<b>RAIL CROSSING</b>				
<b>Main Street (Custer)</b>	10	27	10	30

Table 3.4 shows that predicted queues are estimated to clear within three minutes after train traffic clears the crossing for all Custer Spur crossings except the Grandview Road crossing. The crossing at Grandview Road requires a significant amount of time for the established queue to dissipate and clear, approximately 13 minutes. The reason for the large increase in queue clearing time relates directly to the higher traffic volumes on Grandview Road as compared to the other roadways with Custer Spur crossings.

### **3.5 Crossing Exposure Index Calculations**

Crossing exposure index is a value that is used to calculate when an at-grade rail crossing should be considered to be improved to a grade-separated crossing because of either safety or excessive vehicle delay. Crossing exposure index is represented by the numerical value of the product of ADT (Average Daily Traffic) and the number of trains per day. The AREMA recommended threshold to consider a grade separated crossing is a crossing exposure index of 70,000.

Since the Custer Spur has the potential to carry 22 trains per day in the full build out year, the ADT threshold for a grade separated crossing is approximately 3,200 vehicles per day (70,000 divided by 22 trains per day). Considering the AMEC study p.m. peak hour traffic volumes at Custer Spur crossing locations, only the Grandview Road crossing is projected to be near the 3,200 ADT needed to reach a crossing exposure index of 70,000.

The count information from the AMEC study only gives the p.m. peak hour counts. Therefore, the ADT of the roadways needs to be approximated or an alternative information source needs to be used. The Washington State Department of Transportation (WSDOT) gives a 2010 ADT of 4,100 vehicles per day in the proximity of the current Grandview Road Custer Spur crossing. Using the existing count of 675 vehicles in the peak hour at the crossing, a ratio of 0.16 (peak hour/ADT) can be used. The majority of the traffic along Grandview Road is due to the BP refinery. The ratio of 0.16 is consistent with shift worker travel patterns from a single source traffic generator making the given WSDOT 2010 ADT seem reasonable enough to base future traffic projections. Additionally, the Whatcom County approved average annual growth rate of 2% was used to grow Grandview Road traffic volumes to 2026 conditions. The crossing exposure index calculations for the Grandview Road crossing per terminal phase can be seen in Table 3.5.

**Table 3.5 – Custer Spur – Grandview Road Crossing Exposure Index**

	<u>Year</u>	<u>Trains per Day</u>	<u>Peak Hour</u>	<u>ADT</u>	<u>Exposure Index</u>
Existing	2012	4	675	4,300	17,200
Phase 1	2016	14	736	4,600	64,400
Phase 2	2018	16	791	4,800	76,800
Phase 3	2021	19	839	5,100	96,900
Phase 4	2026	22	927	5,650	124,300

Based upon the forecasted train traffic and vehicular growth, the Custer Spur crossing at Grandview Road could reach the recommended AREMA crossing exposure index threshold in the year 2018 following GPT Phase 2 improvements. It is Hanson's recommendation that vehicular and train volume data should be field verified to confirm the forecasted growth does materialize before action is taken to grade separate the crossing. The field verification of the Grandview Road ADT should include a comparison of the listed Washington Department of Transportation ADT and an independent verification to ensure an accurate calculation of Exposure Index.

### 3.6 Findings

The results of the Custer Spur Highway/Railway Grade Crossing Traffic Impact Study include the following:

- The crossings at Ham Road and Aldergrove Road have very low traffic volumes. Any additional train traffic could have little impact to the overall roadway network operations or levels of service. The addition of auxiliary left and right turn lanes at intersections adjacent to these crossings would not substantially improve intersection or roadway operations.
- The crossings at Kickerville Road, Bay Road and Brown Road could be impacted by the additional trains on the Custer Spur. However, the roadway volumes and the resulting queues created by the rail traffic may not cause excessive delay, as the queued traffic can dissipate and clear in a reasonable amount of time. The addition of auxiliary left and right turn lanes at intersections adjacent to these crossings would not substantially improve intersection or roadway operations.
- The Custer Spur crossing at Grandview Road is recommended to be a grade separated crossing for the following reasons:
  1. A grade separation at the Custer Spur Grandview Road crossing could provide more efficient bus routes for the Ferndale School District and reduce the potential for significant delay for bus routes crossing the Custer Spur.
  2. Significant queuing, 183 vehicles estimated in the peak hour, would cause Grandview Road traffic to back up and negatively impact traffic operations at the Kickerville Road and Blaine Road intersections.
  3. Proposing auxiliary left and right turn lanes at the intersection of Kickerville Road and Grandview Road will not substantially improve intersection or roadway capacity during a train crossing event because of either lack of traffic flow to the intersection from the west or queuing on the east side of the crossing.
  4. The time needed to dissipate the queue at the crossing is approximately 13 minutes.
  5. The AREMA Crossing Exposure Index threshold of 70,000 for recommending grade separation of rail crossings is projected to be met at the Custer Spur and Grandview Road crossing around the year 2018.
- Redistributed traffic from the Valley View Road closure may impact the Main Street crossing in Custer. However, additional vehicles rerouted to this crossing in the peak are quite low, 45 vehicles in the existing condition and 62 in 2026. A 12 vehicle queue is anticipated at the Main Street grade crossing in the 2026 condition. The noted queue may spill back from the Main Street railroad crossing into Portal Way. If the queue is observed to spill back into Portal Way, the effects of the spill back queue could be significantly reduced by constructing northbound left and southbound right auxiliary turn lanes at the Portal Way and Main Street intersection.

- 
- It is anticipated that Emergency Medical Service (EMS) response times to areas near the Custer Spur will not be affected by any potential increase in train traffic or the length of time a crossing could be blocked due to the location of the onsite fire stations at the industrial facilities, the auto dispatch with WCFD7 and NWFR, and the location of the existing stations on either side of Custer Spur.
  - Valley View Road provides access to non-residential parcels (primarily farm fields) and single family residences. Traffic volumes that need to be re-distributed are less than 60 vehicles per hour, which can be safely accommodated on alternate routes with existing crossing signal and gates. Existing traffic volumes can be re-distributed with no more than 2 miles of adverse travel (adverse travel = out-of-the-way of the existing route).

## Appendix A Crossing Photos

Photograph 1 Aldergrove Road Facing East



Photograph 2 Aldergrove Road Facing West



**Photograph 3 Bay Road Facing East**



**Photograph 4 Bay Road Facing West**



**Photograph 5 Brown Road Facing East**



**Photograph 6 Brown Road Facing West**



**Photograph 7 Grandview Road Facing East**



**Photograph 8 Grandview Road Facing West**



**Photograph 9 Ham Road Facing North**



**Photograph 10 Ham Road Facing South**



**Photograph 11 Kickerville Road Facing North**



**Photograph 12 Kickerville Road Facing South**



**Photograph 13 Main Street Facing East**



**Photograph 14 Main Street Facing West**



**Photograph 15 Portal Way Facing North at Main**



**Photograph 16 Portal Way Facing South at Main**



**Photograph 17 Valley View Road Facing North**



**Photograph 18 Valley View Road Facing South**



## Appendix B U.S. DOT Crossing Inventory Information



# U.S. DOT - CROSSING INVENTORY INFORMATION AS OF 3/15/2012

Crossing No.: 084843L      Update Reason: Changed Crossing      Effective Begin-Date of Record: 08/17/06  
 Railroad: BNSF BNSF Rwy Co. [BNSF]      End-Date of Record:  
 Initiating Agency Railroad      Type and Position: Public At Grade

## Part I Location and Classification of Crossing

Division:	NORTHWEST	State:	WA
Subdivision:	BELLINGHAM	County:	WHATCOM
Branch or Line Name:	PA J-US CAN BDR	City:	Near FERNDALE
Railroad Milepost:	0111.77	Street or Road Name:	MAIN ST
RailRoad I.D. No.:	0050	Highway Type & No.:	CO92110
Nearest RR Timetable Stn:	FERNDALE	HSR Corridor ID:	
Parent Railroad:		County Map Ref. No.:	37-3
Crossing Owner:		Latitude:	48.9171276
ENS Sign Installed:		Longitude:	-122.6406279
Passenger Service:	AMTRAK	Lat/Long Source:	Actual
Avg Passenger Train Count:	1	Quiet Zone:	No
Adjacent Crossing with Separate Number:			

### Private Crossing Information:

Category:	Public Access:		
Specify Signs:	Specify Signals:		
ST/RR A	ST/RR B	ST/RR C	ST/RR D

Railroad Use:

State Use:

Narrative:

Emergency Contact: (800)832-5452      Railroad Contact: (913)551-4540      State Contact: (360)664-1262

## Part II Railroad Information

Number of Daily Train Movements:	Less Than One Movement Per Day:	No
Total Trains: 13      Total Switching: 0	Day Thru:	7
Typical Speed Range Over Crossing: From 1 to 79 mph	Maximum Time Table Speed:	79
Type and Number of Tracks: Main: 1      Other: 1	Specify:	SIDING
Does Another RR Operate a Separate Track at Crossing?		No
Does Another RR Operate Over Your Track at Crossing?		Yes: ATK

# U.S. DOT - CROSSING INVENTORY INFORMATION

Crossing 084843L

Continued

Effective Begin-Date of Record: 08/17/06

End-Date of Record:

## Part III: Traffic Control Device Information

Signs:

Crossbucks:	2	Highway Stop Signs:	0
Advanced Warning:	Yes	Hump Crossing Sign:	
Pavement Markings:	No Markings	Other Signs: 0	Specify:
		0	

Train Activated Devices:

Gates:	2	4 Quad or Full Barrier:	
Mast Mounted FL:	2	Total Number FL Pairs:	0
Cantilevered FL (Over):	2	Cantilevered FL (Not over):	0
Other Flashing Lights:	0	Specify Other Flashing Lights:	
Highway Traffic Signals:	0	Wigwags: 0	Bells: 1
Other Train Activated Warning Devices:		Special Warning Devices Not Train Activated:	
Channelization:		Type of Train Detection:	DC/AFO
Track Equipped with Train Signals?	Yes	Traffic Light Interconnection/Preemption:	

## Part IV: Physical Characteristics

Type of Development:	Commercial	Smallest Crossing Angle:	60 to 90 Degrees
Number of Traffic Lanes Crossing Railroad:	2	Are Truck Pullout Lanes Present?	No
Is Highway Paved?	Yes	If Other:	
Crossing Surface:	Timber	Is it Signalized?	
Nearby Intersecting Highway?	Less than 75 feet	Is Crossing Illuminated?	
Does Track Run Down a Street?	No		
Is Commercial Power Available?	Yes		

## Part V: Highway Information

Highway System:	Other FA Highway - Not NHS	Functional Classification of Road at Crossing:	Rural Minor Collector
Is Crossing on State Highway System:	No		
Annual Average Daily Traffic (AADT):	000850	AADT Year:	1994
Estimated Percent Trucks:	07	Avg. No of School Buses per Day:	0
Posted Highway Speed:	0		

# U.S. DOT - CROSSING INVENTORY INFORMATION AS OF 3/15/2012

Crossing No.: 096110B      Update Reason: Changed Crossing      Effective Begin-Date of Record: 08/17/06  
 Railroad: BNSF BNSF Rwy Co. [BNSF]      End-Date of Record:  
 Initiating Agency Railroad      Type and Position: Public At Grade

## Part I Location and Classification of Crossing

Division:	NORTHWEST	State:	WA
Subdivision:	CHERRY POINT	County:	WHATCOM
Branch or Line Name:	INTALCO-CHER PT	City:	Near FERNDALE
Railroad Milepost:	0000.58	Street or Road Name:	VALLEYVIEW ROAD
RailRoad I.D. No.:	0418	Highway Type & No.:	CO23890
Nearest RR Timetable Stn:	FERNDALE	HSR Corridor ID:	
Parent Railroad:		County Map Ref. No.:	37-3
Crossing Owner:		Latitude:	48.9227668
ENS Sign Installed:		Longitude:	-122.6602619
Passenger Service:	None	Lat/Long Source:	Actual
Avg Passenger Train Count:	0	Quiet Zone:	No
Adjacent Crossing with Separate Number:			

### Private Crossing Information:

Category:      Public Access:      Unknown  
 Specify Signs:      Specify Signals:

ST/RR A      ST/RR B      ST/RR C      ST/RR D

Railroad Use:

State Use:

Narrative:

Emergency Contact: (800)832-5452      Railroad Contact: (913)551-4540      State Contact: (360)664-1262

## Part II Railroad Information

Number of Daily Train Movements:		Less Than One Movement Per Day:	No
Total Trains: 4	Total Switching: 0	Day Thru:	2
Typical Speed Range Over Crossing: From 1 to 10 mph		Maximum Time Table Speed:	10
Type and Number of Tracks: Main: 1 Other: 0		Specify:	
Does Another RR Operate a Separate Track at Crossing?			No
Does Another RR Operate Over Your Track at Crossing?			No

# U.S. DOT - CROSSING INVENTORY INFORMATION

Crossing 096110B

Continued

Effective Begin-Date of Record: 08/17/06

End-Date of Record:

## Part III: Traffic Control Device Information

Signs:

Crossbucks:	2	Highway Stop Signs:	0
Advanced Warning:	Yes	Hump Crossing Sign:	
Pavement Markings:	No Markings	Other Signs: 0	Specify:
		0	

Train Activated Devices:

Gates:	2	4 Quad or Full Barrier:	
Mast Mounted FL:	2	Total Number FL Pairs:	0
Cantilevered FL (Over):	2	Cantilevered FL (Not over):	0
Other Flashing Lights:	0	Specify Other Flashing Lights:	
Highway Traffic Signals:	0	Wigwags: 0	Bells: 0
Other Train Activated Warning Devices:		Special Warning Devices Not Train Activated:	
Channelization:		Type of Train Detection:	DC/AFO
Track Equipped with Train Signals?	No	Traffic Light Interconnection/Preemption:	

## Part IV: Physical Characteristics

Type of Development:	Open Space	Smallest Crossing Angle:	60 to 90 Degrees
Number of Traffic Lanes Crossing Railroad:	2	Are Truck Pullout Lanes Present?	No
Is Highway Paved?	Yes	If Other:	
Crossing Surface:	Timber	Is it Signalized?	
Nearby Intersecting Highway?	N/A	Is Crossing Illuminated?	
Does Track Run Down a Street?	No		
Is Commercial Power Available? Yes			

## Part V: Highway Information

Highway System:	Non-Federal-aid	Functional Classification of Road at Crossing:	Rural Local
Is Crossing on State Highway System:	No	AADT Year:	1987
Annual Average Daily Traffic (AADT):	000090	Avg. No of School Buses per Day:	0
Estimated Percent Trucks:	08		
Posted Highway Speed:	0		

**U.S. DOT - CROSSING INVENTORY INFORMATION  
AS OF 3/15/2012**

Crossing No.: **096119M**      Update Reason: **Changed Crossing**      Effective Begin-Date of Record: **08/17/06**  
 Railroad: **BNSF BNSF Rwy Co. [BNSF]**      End-Date of Record:  
 Initiating Agency **Railroad**      Type and Position: **Public At Grade**

**Part I Location and Classification of Crossing**

Division:	<b>NORTHWEST</b>	State:	<b>WA</b>
Subdivision:	<b>CHERRY POINT</b>	County:	<b>WHATCOM</b>
Branch or Line Name:	<b>INTALCO-CHER PT</b>	City:	<b>Near FERNDALE</b>
Railroad Milepost:	<b>0001.86</b>	Street or Road Name:	<b>ARNIE RD</b>
RailRoad I.D. No.:	<b>0418</b>	Highway Type & No.:	<b>CO23940</b>
Nearest RR Timetable Stn:	<b>FERNDALE</b>	HSR Corridor ID:	
Parent Railroad:		County Map Ref. No.:	<b>37-3</b>
Crossing Owner:		Latitude:	<b>48.9229387</b>
ENS Sign Installed:		Longitude:	<b>-122.6880130</b>
Passenger Service:	<b>None</b>	Lat/Long Source:	<b>Actual</b>
Avg Passenger Train Count:	<b>0</b>	Quiet Zone:	<b>No</b>
Adjacent Crossing with Separate Number:			

Private Crossing Information:

Category:	Public Access:	<b>Unknown</b>	
Specify Signs:	Specify Signals:		
ST/RR A	ST/RR B	ST/RR C	ST/RR D

Railroad Use:

State Use:

Narrative:

Emergency Contact: **(800)832-5452**      Railroad Contact: **(913)551-4540**      State Contact: **(360)664-1262**

**Part II Railroad Information**

Number of Daily Train Movements:	Less Than One Movement Per Day:	<b>No</b>
Total Trains: <b>4</b> Total Switching: <b>0</b>	Day Thru:	<b>2</b>
Typical Speed Range Over Crossing: From <b>1</b> to <b>25</b> mph	Maximum Time Table Speed:	<b>25</b>
Type and Number of Tracks:    Main: <b>1</b> Other <b>0</b>	Specify:	
Does Another RR Operate a Separate Track at Crossing?		<b>No</b>
Does Another RR Operate Over Your Track at Crossing?		<b>No</b>

# U.S. DOT - CROSSING INVENTORY INFORMATION

Crossing **096119M**

Continued

Effective Begin-Date of Record: **08/17/06**

End-Date of Record:

## Part III: Traffic Control Device Information

Signs:

Crossbucks:	<b>2</b>	Highway Stop Signs:	<b>2</b>
Advanced Warning:	<b>Yes</b>	Hump Crossing Sign:	
Pavement Markings:	<b>No Markings</b>	Other Signs:	<b>0</b>
		Specify:	<b>0</b>

Train Activated Devices:

Gates:	<b>0</b>	4 Quad or Full Barrier:	
Mast Mounted FL:	<b>0</b>	Total Number FL Pairs:	<b>0</b>
Cantilevered FL (Over):	<b>0</b>	Cantilevered FL (Not over):	<b>0</b>
Other Flashing Lights:	<b>0</b>	Specify Other Flashing Lights:	
Highway Traffic Signals:	<b>0</b>	Wigwags:	<b>0</b>
Other Train Activated Warning Devices:		Bells:	<b>0</b>
Channelization:		Special Warning Devices Not Train Activated:	
Track Equipped with Train Signals?	<b>No</b>	Type of Train Detection:	<b>None</b>
		Traffic Light Interconnection/Preemption:	

## Part IV: Physical Characteristics

Type of Development:	<b>Open Space</b>	Smallest Crossing Angle:	<b>60 to 90 Degrees</b>
Number of Traffic Lanes Crossing Railroad:	<b>2</b>	Are Truck Pullout Lanes Present?	<b>No</b>
Is Highway Paved?	<b>Yes</b>	If Other:	
Crossing Surface:	<b>Timber</b>	Is it Signalized?	
Nearby Intersecting Highway?	<b>N/A</b>	Is Crossing Illuminated?	
Does Track Run Down a Street?	<b>No</b>		
Is Commercial Power Available?	<b>Yes</b>		

## Part V: Highway Information

Highway System:	<b>Non-Federal-aid</b>	Functional Classification of Road at Crossing:	<b>Rural Local</b>
Is Crossing on State Highway System:	<b>No</b>	AADT Year:	<b>1988</b>
Annual Average Daily Traffic (AADT):	<b>000100</b>	Avg. No of School Buses per Day:	<b>0</b>
Estimated Percent Trucks:	<b>08</b>		
Posted Highway Speed:	<b>0</b>		

**U.S. DOT - CROSSING INVENTORY INFORMATION  
AS OF 3/15/2012**

Crossing No.: **096128L** Update Reason: **Changed Crossing** Effective Begin-Date of Record: **08/17/06**  
 Railroad: **BNSF BNSF Rwy Co. [BNSF]** End-Date of Record:  
 Initiating Agency **Railroad** Type and Position: **Public At Grade**

**Part I Location and Classification of Crossing**

Division:	<b>NORTHWEST</b>	State:	<b>WA</b>
Subdivision:	<b>CHERRY POINT</b>	County:	<b>WHATCOM</b>
Branch or Line Name:	<b>INTALCO-CHER PT</b>	City:	<b>Near FERNDALE</b>
Railroad Milepost:	<b>0003.06</b>	Street or Road Name:	<b>KICKERVILLE RD</b>
RailRoad I.D. No.:	<b>0418</b>	Highway Type & No.:	<b>CO92020</b>
Nearest RR Timetable Stn:	<b>FERNDALE</b>	HSR Corridor ID:	
Parent Railroad:		County Map Ref. No.:	<b>37-3</b>
Crossing Owner:		Latitude:	<b>48.9105367</b>
ENS Sign Installed:		Longitude:	<b>-122.7045584</b>
Passenger Service:	<b>None</b>	Lat/Long Source:	<b>Actual</b>
Avg Passenger Train Count:	<b>0</b>	Quiet Zone:	<b>No</b>
Adjacent Crossing with Separate Number:			

Private Crossing Information:

Category:	Public Access:		
Specify Signs:	Specify Signals:		
ST/RR A	ST/RR B	ST/RR C	ST/RR D

Railroad Use:

State Use:

Narrative:

Emergency Contact: **(800)832-5452** Railroad Contact: **(913)551-4540** State Contact: **(360)664-1262**

**Part II Railroad Information**

Number of Daily Train Movements:	Less Than One Movement Per Day:	<b>No</b>
Total Trains: <b>4</b> Total Switching: <b>0</b>	Day Thru:	<b>2</b>
Typical Speed Range Over Crossing: From <b>1</b> to <b>25</b> mph	Maximum Time Table Speed:	<b>25</b>
Type and Number of Tracks: Main: <b>1</b> Other: <b>0</b>	Specify:	
Does Another RR Operate a Separate Track at Crossing?		<b>No</b>
Does Another RR Operate Over Your Track at Crossing?		<b>No</b>

# U.S. DOT - CROSSING INVENTORY INFORMATION

Crossing **096128L**

Continued

Effective Begin-Date of Record: **08/17/06**

End-Date of Record:

## Part III: Traffic Control Device Information

Signs:

Crossbucks:	<b>2</b>	Highway Stop Signs:	<b>0</b>
Advanced Warning:	<b>Yes</b>	Hump Crossing Sign:	
Pavement Markings:	<b>No Markings</b>	Other Signs:	<b>0</b> Specify:
			<b>0</b>

Train Activated Devices:

Gates:	<b>2</b>	4 Quad or Full Barrier:	
Mast Mounted FL:	<b>2</b>	Total Number FL Pairs:	<b>0</b>
Cantilevered FL (Over):	<b>2</b>	Cantilevered FL (Not over):	<b>0</b>
Other Flashing Lights:	<b>0</b>	Specify Other Flashing Lights:	
Highway Traffic Signals:	<b>0</b>	Wigwags:	<b>0</b> Bells: <b>1</b>
Other Train Activated Warning Devices:		Special Warning Devices Not Train Activated:	
Channelization:		Type of Train Detection:	<b>DC/AFO</b>
Track Equipped with Train Signals?	<b>No</b>	Traffic Light Interconnection/Preemption:	

## Part IV: Physical Characteristics

Type of Development:	<b>Open Space</b>	Smallest Crossing Angle:	<b>60 to 90 Degrees</b>
Number of Traffic Lanes Crossing Railroad:	<b>2</b>	Are Truck Pullout Lanes Present?	<b>No</b>
Is Highway Paved?	<b>Yes</b>	If Other:	
Crossing Surface:	<b>Timber</b>	Is it Signalized?	
Nearby Intersecting Highway?	<b>N/A</b>	Is Crossing Illuminated?	
Does Track Run Down a Street?	<b>No</b>		
Is Commercial Power Available?	<b>Yes</b>		

## Part V: Highway Information

Highway System:	<b>Other FA Highway - Not NHS</b>	Functional Classification of Road at Crossing:	<b>Rural Major Collector</b>
Is Crossing on State Highway System:	<b>No</b>	AADT Year:	<b>1987</b>
Annual Average Daily Traffic (AADT):	<b>002320</b>	Avg. No of School Buses per Day:	<b>0</b>
Estimated Percent Trucks:	<b>08</b>		
Posted Highway Speed:	<b>0</b>		

**U.S. DOT - CROSSING INVENTORY INFORMATION  
AS OF 3/15/2012**

Crossing No.: **096130M**      Update Reason: **Changed Crossing**      Effective Begin-Date of Record: **08/17/06**  
 Railroad: **BNSF BNSF Rwy Co. [BNSF]**      End-Date of Record:  
 Initiating Agency **Railroad**      Type and Position: **Public At Grade**

**Part I Location and Classification of Crossing**

Division:	<b>NORTHWEST</b>	State:	<b>WA</b>
Subdivision:	<b>CHERRY POINT</b>	County:	<b>WHATCOM</b>
Branch or Line Name:	<b>INTALCO-CHER PT</b>	City:	<b>Near FERNDALE</b>
Railroad Milepost:	<b>0003.42</b>	Street or Road Name:	<b>BAY RD</b>
RailRoad I.D. No.:	<b>0418</b>	Highway Type & No.:	<b>CO92050</b>
Nearest RR Timetable Stn:	<b>FERNDALE</b>	HSR Corridor ID:	
Parent Railroad:		County Map Ref. No.:	<b>37-3</b>
Crossing Owner:		Latitude:	<b>48.9066484</b>
ENS Sign Installed:		Longitude:	<b>-122.7096320</b>
Passenger Service:	<b>None</b>	Lat/Long Source:	<b>Actual</b>
Avg Passenger Train Count:	<b>0</b>	Quiet Zone:	<b>No</b>
Adjacent Crossing with Separate Number:			

Private Crossing Information:

Category:	Public Access:		
Specify Signs:	Specify Signals:		
ST/RR A	ST/RR B	ST/RR C	ST/RR D
Railroad Use:			
State Use:			

Narrative:

Emergency Contact: **(800)832-5452**      Railroad Contact: **(913)551-4540**      State Contact: **(360)664-1262**

**Part II Railroad Information**

Number of Daily Train Movements:	Less Than One Movement Per Day:	<b>No</b>
Total Trains: <b>4</b>	Total Switching: <b>0</b>	Day Thru: <b>2</b>
Typical Speed Range Over Crossing: From <b>1</b> to <b>25</b> mph	Maximum Time Table Speed:	<b>25</b>
Type and Number of Tracks: Main: <b>1</b> Other <b>0</b>	Specify:	
Does Another RR Operate a Separate Track at Crossing?		<b>No</b>
Does Another RR Operate Over Your Track at Crossing?		<b>No</b>

# U.S. DOT - CROSSING INVENTORY INFORMATION

Crossing **096130M**

Continued

Effective Begin-Date of Record: **08/17/06**

End-Date of Record:

## Part III: Traffic Control Device Information

Signs:

Crossbucks:	<b>2</b>	Highway Stop Signs:	<b>0</b>
Advanced Warning:	<b>Yes</b>	Hump Crossing Sign:	
Pavement Markings:	<b>No Markings</b>	Other Signs:	<b>0</b> Specify:
			<b>0</b>

Train Activated Devices:

Gates:	<b>2</b>	4 Quad or Full Barrier:	
Mast Mounted FL:	<b>2</b>	Total Number FL Pairs:	<b>0</b>
Cantilevered FL (Over):	<b>0</b>	Cantilevered FL (Not over):	<b>0</b>
Other Flashing Lights:	<b>0</b>	Specify Other Flashing Lights:	
Highway Traffic Signals:	<b>0</b>	Wigwags:	<b>0</b> Bells: <b>1</b>
Other Train Activated Warning Devices:		Special Warning Devices Not Train Activated:	
Channelization:		Type of Train Detection:	<b>DC/AFO</b>
Track Equipped with Train Signals?	<b>No</b>	Traffic Light Interconnection/Preemption:	

## Part IV: Physical Characteristics

Type of Development:	<b>Open Space</b>	Smallest Crossing Angle:	<b>60 to 90 Degrees</b>
Number of Traffic Lanes Crossing Railroad:	<b>2</b>	Are Truck Pullout Lanes Present?	<b>No</b>
Is Highway Paved?	<b>Yes</b>	If Other:	
Crossing Surface:	<b>Timber</b>	Is it Signalized?	
Nearby Intersecting Highway?	<b>N/A</b>	Is Crossing Illuminated?	
Does Track Run Down a Street?	<b>No</b>		
Is Commercial Power Available?	<b>Yes</b>		

## Part V: Highway Information

Highway System:	<b>Other FA Highway - Not NHS</b>	Functional Classification of Road at Crossing:	<b>Rural Local</b>
Is Crossing on State Highway System:	<b>No</b>	AADT Year:	<b>1987</b>
Annual Average Daily Traffic (AADT):	<b>000307</b>	Avg. No of School Buses per Day:	<b>0</b>
Estimated Percent Trucks:	<b>08</b>		
Posted Highway Speed:	<b>0</b>		

U.S. DOT - CROSSING INVENTORY INFORMATION  
AS OF 3/15/2012

Crossing No.: **096133H** Update Reason: **Changed Crossing** Effective Begin-Date of Record: **08/17/06**  
Railroad: **BNSF BNSF Rwy Co. [BNSF]** End-Date of Record:  
Initiating Agency **Railroad** Type and Position: **Public At Grade**

Part I Location and Classification of Crossing

Division: **NORTHWEST** State: **WA**  
Subdivision: **CHERRY POINT** County: **WHATCOM**  
Branch or Line Name: **INTALCO-CHER PT** City: **Near FERNDALE**  
Railroad Milepost: **0004.45** Street or Road Name: **GRANDVIEW RD.**  
RailRoad I.D. No.: **0418** Highway Type & No.: **CO92080**  
Nearest RR Timetable Stn: **FERNDALE** HSR Corridor ID:  
Parent Railroad: County Map Ref. No.: **37-3**  
Crossing Owner: Latitude: **48.8920411**  
ENS Sign Installed: Longitude: **-122.7095716**  
Passenger Service: **None** Lat/Long Source: **Actual**  
Avg Passenger Train Count: **0** Quiet Zone: **No**  
Adjacent Crossing with  
Separate Number:

Private Crossing Information:

Category: Public Access:  
Specify Signs: Specify Signals:  
ST/RR A ST/RR B ST/RR C ST/RR D

Railroad Use:

State Use:

Narrative:

Emergency Contact: **(800)832-5452** Railroad Contact: **(913)551-4540** State Contact: **(360)664-1262**

Part II Railroad Information

Number of Daily Train Movements: Less Than One Movement Per Day: **No**  
Total Trains: **4** Total Switching: **0** Day Thru: **2**  
Typical Speed Range Over Crossing: From **1** to **25** mph Maximum Time Table Speed: **25**  
Type and Number of Tracks: Main: **1** Other **0** Specify:  
Does Another RR Operate a Separate Track at Crossing? **No**  
Does Another RR Operate Over Your Track at Crossing? **No**

# U.S. DOT - CROSSING INVENTORY INFORMATION

Crossing **096133H**

Continued

Effective Begin-Date of Record: **08/17/06**

End-Date of Record:

## Part III: Traffic Control Device Information

Signs:

Crossbucks:	<b>2</b>	Highway Stop Signs:	<b>0</b>
Advanced Warning:	<b>Yes</b>	Hump Crossing Sign:	
Pavement Markings:	<b>No Markings</b>	Other Signs:	<b>0</b> Specify:
			<b>0</b>

Train Activated Devices:

Gates:	<b>2</b>	4 Quad or Full Barrier:	
Mast Mounted FL:	<b>2</b>	Total Number FL Pairs:	<b>0</b>
Cantilevered FL (Over):	<b>2</b>	Cantilevered FL (Not over):	<b>0</b>
Other Flashing Lights:	<b>0</b>	Specify Other Flashing Lights:	
Highway Traffic Signals:	<b>0</b>	Wigwags:	<b>0</b> Bells: <b>1</b>
Other Train Activated Warning Devices:		Special Warning Devices Not Train Activated:	
Channelization:		Type of Train Detection:	<b>DC/AFO</b>
Track Equipped with Train Signals?	<b>No</b>	Traffic Light Interconnection/Preemption:	

## Part IV: Physical Characteristics

Type of Development:	<b>Open Space</b>	Smallest Crossing Angle:	<b>60 to 90 Degrees</b>
Number of Traffic Lanes Crossing Railroad:	<b>2</b>	Are Truck Pullout Lanes Present?	<b>Yes</b>
Is Highway Paved?	<b>Yes</b>	If Other:	
Crossing Surface:	<b>Asphalt</b>	Is it Signalized?	
Nearby Intersecting Highway?	<b>N/A</b>	Is Crossing Illuminated?	
Does Track Run Down a Street?	<b>No</b>		
Is Commercial Power Available?	<b>Yes</b>		

## Part V: Highway Information

Highway System:	<b>Other FA Highway - Not NHS</b>	Functional Classification of Road at Crossing:	<b>Rural Major Collector</b>
Is Crossing on State Highway System:	<b>Yes</b>	AADT Year:	<b>1995</b>
Annual Average Daily Traffic (AADT):	<b>002400</b>	Avg. No of School Buses per Day:	<b>0</b>
Estimated Percent Trucks:	<b>10</b>		
Posted Highway Speed:	<b>0</b>		

U.S. DOT - CROSSING INVENTORY INFORMATION  
AS OF 3/15/2012

Crossing No.: **096134P** Update Reason: **Changed Crossing** Effective Begin-Date of Record: **08/17/06**  
Railroad: **BNSF BNSF Rwy Co. [BNSF]** End-Date of Record:  
Initiating Agency **Railroad** Type and Position: **Public At Grade**

Part I Location and Classification of Crossing

Division: **NORTHWEST** State: **WA**  
Subdivision: **CHERRY POINT** County: **WHATCOM**  
Branch or Line Name: **INTALCO-CHER PT** City: **Near FERNDALE**  
Railroad Milepost: **0004.95** Street or Road Name: **BROWN RD**  
Railroad I.D. No.: **0418** Highway Type & No.: **CO22260**  
Nearest RR Timetable Stn: **FERNDALE** HSR Corridor ID:  
Parent Railroad: County Map Ref. No.: **37-3**  
Crossing Owner: Latitude: **48.8847739**  
ENS Sign Installed: Longitude: **-122.7096247**  
Passenger Service: **None** Lat/Long Source: **Actual**  
Avg Passenger Train Count: **0** Quiet Zone: **No**  
Adjacent Crossing with Separate Number:

Private Crossing Information:

Category: Public Access:  
Specify Signs: Specify Signals:  
ST/RR A ST/RR B ST/RR C ST/RR D

Railroad Use:

State Use:

Narrative:

Emergency Contact: **(800)832-5452** Railroad Contact: **(913)551-4540** State Contact: **(360)664-1262**

Part II Railroad Information

Number of Daily Train Movements: Less Than One Movement Per Day: **No**  
Total Trains: **4** Total Switching: **0** Day Thru: **2**  
Typical Speed Range Over Crossing: From **1** to **25** mph Maximum Time Table Speed: **25**  
Type and Number of Tracks: Main: **1** Other **0** Specify:  
Does Another RR Operate a Separate Track at Crossing? **No**  
Does Another RR Operate Over Your Track at Crossing? **No**

# U.S. DOT - CROSSING INVENTORY INFORMATION

Crossing **096134P**

Continued

Effective Begin-Date of Record: **08/17/06**

End-Date of Record:

## Part III: Traffic Control Device Information

Signs:

Crossbucks:	<b>2</b>	Highway Stop Signs:	<b>0</b>
Advanced Warning:	<b>No</b>	Hump Crossing Sign:	
Pavement Markings:	<b>No Markings</b>	Other Signs:	<b>0</b>
		Specify:	<b>0</b>

Train Activated Devices:

Gates:	<b>0</b>	4 Quad or Full Barrier:	
Mast Mounted FL:	<b>0</b>	Total Number FL Pairs:	<b>0</b>
Cantilevered FL (Over):	<b>0</b>	Cantilevered FL (Not over):	<b>0</b>
Other Flashing Lights:	<b>0</b>	Specify Other Flashing Lights:	
Highway Traffic Signals:	<b>0</b>	Wigwags:	<b>0</b>
Other Train Activated Warning Devices:		Bells:	<b>0</b>
Channelization:		Special Warning Devices Not Train Activated:	
Track Equipped with Train Signals?	<b>No</b>	Type of Train Detection:	<b>None</b>
		Traffic Light Interconnection/Preemption:	

## Part IV: Physical Characteristics

Type of Development:	<b>Open Space</b>	Smallest Crossing Angle:	<b>60 to 90 Degrees</b>
Number of Traffic Lanes Crossing Railroad:	<b>2</b>	Are Truck Pullout Lanes Present?	<b>No</b>
Is Highway Paved?	<b>Yes</b>	If Other:	
Crossing Surface:	<b>Timber</b>	Is it Signalized?	
Nearby Intersecting Highway?	<b>N/A</b>	Is Crossing Illuminated?	
Does Track Run Down a Street?	<b>No</b>		
Is Commercial Power Available?	<b>No</b>		

## Part V: Highway Information

Highway System:	<b>Non-Federal-aid</b>	Functional Classification of Road at Crossing:	<b>Rural Local</b>
Is Crossing on State Highway System:	<b>No</b>	AADT Year:	<b>1987</b>
Annual Average Daily Traffic (AADT):	<b>000480</b>	Avg. No of School Buses per Day:	<b>0</b>
Estimated Percent Trucks:	<b>08</b>		
Posted Highway Speed:	<b>0</b>		

**U.S. DOT - CROSSING INVENTORY INFORMATION  
AS OF 3/15/2012**

Crossing No.: **096135W**      Update Reason: **Changed Crossing**      Effective Begin-Date of Record: **08/17/06**  
 Railroad: **BNSF BNSF Rwy Co. [BNSF]**      End-Date of Record:  
 Initiating Agency **Railroad**      Type and Position: **Public At Grade**

**Part I Location and Classification of Crossing**

Division:	<b>NORTHWEST</b>	State:	<b>WA</b>
Subdivision:	<b>CHERRY POINT</b>	County:	<b>WHATCOM</b>
Branch or Line Name:	<b>INTALCO-CHER PT</b>	City:	<b>Near FERNDALE</b>
Railroad Milepost:	<b>0005.45</b>	Street or Road Name:	<b>ALDERGROVE RD</b>
RailRoad I.D. No.:	<b>0418</b>	Highway Type & No.:	<b>CO22120</b>
Nearest RR Timetable Stn:	<b>FERNDALE</b>	HSR Corridor ID:	
Parent Railroad:		County Map Ref. No.:	<b>37-3</b>
Crossing Owner:		Latitude:	<b>48.8774513</b>
ENS Sign Installed:		Longitude:	<b>-122.7095285</b>
Passenger Service:	<b>None</b>	Lat/Long Source:	<b>Actual</b>
Avg Passenger Train Count:	<b>0</b>	Quiet Zone:	<b>No</b>
Adjacent Crossing with Separate Number:			

Private Crossing Information:

Category:	Public Access:		
Specify Signs:	Specify Signals:		
ST/RR A	ST/RR B	ST/RR C	ST/RR D

Railroad Use:

State Use:

Narrative:

Emergency Contact: **(800)832-5452**      Railroad Contact: **(913)551-4540**      State Contact: **(360)664-1262**

**Part II Railroad Information**

Number of Daily Train Movements:	Less Than One Movement Per Day:	<b>No</b>
Total Trains: <b>4</b>	Total Switching: <b>0</b>	Day Thru: <b>2</b>
Typical Speed Range Over Crossing: From <b>1</b> to <b>10</b> mph	Maximum Time Table Speed:	<b>10</b>
Type and Number of Tracks: Main: <b>1</b> Other: <b>0</b>	Specify:	
Does Another RR Operate a Separate Track at Crossing?	<b>No</b>	
Does Another RR Operate Over Your Track at Crossing?	<b>No</b>	

# U.S. DOT - CROSSING INVENTORY INFORMATION

Crossing **096135W**

Continued

Effective Begin-Date of Record: **08/17/06**

End-Date of Record:

## Part III: Traffic Control Device Information

Signs:

Crossbucks:	<b>2</b>	Highway Stop Signs:	<b>0</b>
Advanced Warning:	<b>Yes</b>	Hump Crossing Sign:	
Pavement Markings:	<b>No Markings</b>	Other Signs:	<b>0</b>
		Specify:	<b>0</b>

Train Activated Devices:

Gates:	<b>2</b>	4 Quad or Full Barrier:	
Mast Mounted FL:	<b>2</b>	Total Number FL Pairs:	<b>0</b>
Cantilevered FL (Over):	<b>2</b>	Cantilevered FL (Not over):	<b>0</b>
Other Flashing Lights:	<b>0</b>	Specify Other Flashing Lights:	
Highway Traffic Signals:	<b>0</b>	Wigwags:	<b>0</b>
Other Train Activated Warning Devices:		Bells:	<b>1</b>
Channelization:		Special Warning Devices Not Train Activated:	
Track Equipped with Train Signals?	<b>No</b>	Type of Train Detection:	<b>DC/AFO</b>
		Traffic Light Interconnection/Preemption:	

## Part IV: Physical Characteristics

Type of Development:	<b>Open Space</b>	Smallest Crossing Angle:	<b>60 to 90 Degrees</b>
Number of Traffic Lanes Crossing Railroad:	<b>2</b>	Are Truck Pullout Lanes Present?	<b>No</b>
Is Highway Paved?	<b>Yes</b>	If Other:	
Crossing Surface:	<b>Timber</b>	Is it Signalized?	
Nearby Intersecting Highway?	<b>N/A</b>	Is Crossing Illuminated?	
Does Track Run Down a Street?	<b>No</b>		
Is Commercial Power Available?	<b>Yes</b>		

## Part V: Highway Information

Highway System:	<b>Non-Federal-aid</b>	Functional Classification of Road at Crossing:	<b>Rural Local</b>
Is Crossing on State Highway System:	<b>No</b>	AADT Year:	<b>1987</b>
Annual Average Daily Traffic (AADT):	<b>000920</b>	Avg. No of School Buses per Day:	<b>0</b>
Estimated Percent Trucks:	<b>08</b>		
Posted Highway Speed:	<b>0</b>		



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