



# QUIET ZONE FEASIBILITY STUDY

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## EXECUTIVE SUMMARY

The City of Monroe, Public Works Department initiated the Quiet Zone Feasibility Study (Study) early 2020 to develop options for improving rail crossing conditions at five locations citywide. Community requests for quiet zone implementation in the study areas and recent incidents in the vicinity have generated a focus on evaluating opportunities for grade crossing improvements meeting the needs of a future quiet zone through the City. The scope of this Study includes evaluating existing site conditions, coordinating with approving agencies/stakeholders, developing crossing improvement options, and a methodology for evaluating and scoring the various options for improvements. At-grade railroad crossings, where roads cross railroad tracks at the same level, can typically function adequately while population and traffic levels remain low. As both rail and road traffic increases, and trains get longer, at-grade crossings become more problematic, impacting communities in a variety of ways.

### STUDY PURPOSE

The purpose and need of this Study is to develop options for establishing a Quiet Zone Corridor along the BNSF Railway mainline. Alternatives evaluated include operational, mobility, safety, noise, and cost/benefit analysis at the five public at-grade rail crossing locations within the City of Monroe. The five public at-grade rail crossings locations are:

- Fryelands Blvd
- 179<sup>th</sup> Ave SE
- N Kelsey St
- N Lewis St
- E Main St

#### Establishing Quiet Zones

[Federal regulations](#) require that “... locomotive horns begin sounding 15–20 seconds before entering public highway-rail grade crossings, no more than one-quarter mile in advance.” Likewise, the “the [Federal Railroad Administration \(FRA\)](#) is committed to reducing the number of collisions at highway-rail grade crossings, while establishing a consistent standard for communities who opt to preserve or enhance quality of life for their residents by establishing quiet zones within which routine use of train horns at crossings is prohibited.”

A quiet zone as defined by FRA is:

*“A section of a rail line at least one-half mile in length that contains one or more consecutive public highway-rail grade crossings at which locomotive horns are not routinely sounded when trains are approaching the crossings. The prohibited use of train horns at quiet zones only applies to trains when approaching and entering crossings and does not include train horn use within passenger stations or rail yards. Train horns may be sounded in emergency situations or to comply with other railroad or FRA rules even within a quiet zone. Quiet zone regulations also do not eliminate the use of locomotive bells at crossings. Therefore, a more appropriate description of a designated quiet zone would be a ‘reduced train horn area.’”*

There are two types of quiet zones: (1) a **partial quiet zone** from 10:00pm to 7:00am, and (2) a **full quiet zone** that is 24-hours per day and seven days per week. Based on the [federal regulations](#), some requirements for a quiet zone are that:

- The Quiet Zone Risk Index (QZRI) is less than or equal to the Nationwide Significant Risk

Threshold (NSRT) with or without additional safety measures such as Supplementary Safety Measures (SSMs) or Alternative Safety Measures (ASMs) described below. The QZRI is the average risk for all public highway-rail crossings in the quiet zone, including the additional risk for absence of train horns and any reduction in risk due to the risk mitigation measures. The NSRT is the level of risk calculated annually by averaging the risk at all of the Nation's public highway-rail grade crossings equipped with flashing lights and gates where train horns are routinely sounded.

- The Quiet Zone Risk Index (QZRI) is less than or equal to the Risk Index With Horns (RIWH) with additional safety measures such as SSMs or ASMs. The RIWH is the average risk for all public highway-rail crossings in the proposed quiet zone when loco-motive horns are routinely sounded.
- SSMs installed at every public highway-rail crossing. This is the best method to reduce to reduce risks in a proposed quiet zone and to enhance safety.

SSM's are [pre-approved](#) risk reduction engineering treatments that include<sup>1</sup>: medians or channelization devices, one-way streets with gates, four quadrant gate systems, and temporary or permanent crossing closures. Information worth noting is that costs can vary from \$30,000 to \$1 million per crossing.

ASM's are a safety system or procedure, other than an SSM, established in accordance provided by the appropriate traffic control authority or law enforcement authority and which, after individual review and analysis by the [Associate Administrator](#), is determined to be an effective substitute for the [locomotive horn](#) in the prevention of highway-rail casualties at specific highway-rail grade crossings.

FRA strongly recommends that all crossings in the quiet zone be reviewed by a diagnostic team. A diagnostic team typically consists of representatives from the public authority, railroad, and State agencies responsible for crossing safety and FRA grade crossing managers.

As a helpful guideline, the FRA's quiet zone process entails:

- Determining which crossings will be included.
- Identifying any private highway-rail grade crossings (Reviewed by Diagnostic Team).
- Identifying any pedestrian crossings (Reviewed by Diagnostic Team).
- Updating the US DOT Crossing Inventory Form
- Providing a Notice of Intent (NOI) – 60-day comment period.
- Using Alternative Safety Measures (ASMs) – if used, an application to FRA is required.
- Determining how the QZ will be established (One of 3 conditions).
- Completing the installation of SSMs and ASMs.
- Ensuring that the required signs are installed.
- Providing a Notice of QZ Establishment – effective date no earlier than 21 days after notice is mailed.

## STUDY APPROACH

The Study incorporated a data-driven approach to develop and evaluate engineering options for each study crossing. It started with collecting and reviewing available data for each crossing. Data gaps

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<sup>1</sup> <https://assets.documentcloud.org/documents/2770881/Quiet-Zone-Brochure.pdf>

and inconsistencies were identified, such as where no data existed or where data quality was in question.

A framework was developed through which each crossing can be evaluated within any range of solutions. Solutions included a no action Alternative and implementation of various quiet zone standards. Initial engineering concept Alternatives were developed using Agency input (pending all stakeholder input), best industry practices and expert analysis. QZRI scores were calculated for each corridor Alternative.

Issues, solutions, and rankings including rough order-of-magnitude estimates are for all solutions in this Study. Concept layout plans are developed for the selected Alternatives and ranked for existing and future conditions with evaluation and calculation of QZRI.

A field diagnostic was performed November of 2020 with the stakeholders. Follow up phone reviews occurred with the FRA December 2020 and January 2021. **APPENDIX A contains the Diagnostic Meeting Notes and Diagnostic Team Attendance**, which included input from the stakeholder representatives as follows:

- City of Monroe
- PH Consulting, LLC
- Federal Railroad Administration (FRA)
- Washington Utilities and Transportation Commission (UTC)
- Burlington Northern Santa Fe Railway Company (BNSF)
- Washington State Department of Transportation (WSDOT)

Draft meeting notes from the Field Diagnostic were sent to all the Stakeholders to confirm the Diagnostic Teams discussion and recommendations. Final comments on the meeting minutes were requested by January 18, 2021. The only comments received were from the FRA.

This report incorporates the Diagnostic Team input and recommendations.

## EXISTING CONDITIONS EVALUATION

The project is kicked off with an existing conditions evaluation. These are performed with site reconnaissance data collection, a recommended diagnostic meeting, and review and analysis of all the information collected.

Data was collected from several sources for the existing conditions evaluation. Resources used include the FRA-Rail Crossing Inventory Database, on-line aerial mapping tools, a [database](#)<sup>2</sup> for all the rail crossings evaluated in the State of Washington as a product of the Joint Transportation Committees *Prioritization of Prominent Road-Rail Conflicts in Washington State*<sup>3</sup>, other data from the 2019 Washington State Rail System Plan adopted August 2020<sup>4</sup>, site visits in February and March of 2020, and other sources listed in the existing conditions evaluation section.

The existing conditions analysis section of the report discusses:

- Data Collection Methodology,

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<sup>2</sup> Information derived with the use of the Data Dictionary and Highway-Rail Crossing Inventory Quick Start Data Introduction to the new [FRA Highway-Rail Crossing Inventory Database](#).

<sup>3</sup> Joint Transportation Committee, *Prioritization of Prominent Road-Rail Conflicts in Washington State*, The Transpo Group, 2016. <http://gisdev.transpogroup.com/jtccrossingstudy/>

<sup>4</sup> [Washington State Rail Plan 2019- 2040](#)

- Recent Studies,
- Existing Operational Environment with Prepared Quiet Zone Risk Index (QZRI) Calculations based on current conditions, along with an evaluation on the significance of the calculated QZRI,
- Existing Physical Inventory noting Updated Inventory Forms,
- Safety Considerations, and
- Summary of Existing Conditions.

### **ALTERNATIVE DEVELOPMENT**

The Study is initiated to determine feasibility of a Quiet Zone within the City of Monroe. The Step process of determining the best Cost-Benefit of the corridor for the feasibility of a quiet zone is discussed in detail in Chapter 3 Alternative Development. This report is distributed to the following stakeholders for final comment:

FRA, UTC, WSDOT, BNSF, and Amtrack.

### **EVALUATION FRAMEWORK & SCORING**

The project team developed a framework to evaluate each crossing through many types of engineering Alternatives. A criteria-based decision-making process for selecting investments at the identified at-grade crossing locations. This study developed a process for evaluating at-grade crossing improvements based on specific evaluation criteria developed from public values, guided by expert analysis and considered local, regional, and statewide policy interests. Issues, engineering Alternatives, and rankings were developed based on input from the Diagnostic Team. Rough order-of-magnitude costs and concept plans were developed for each scenario to incorporate the Diagnostic Team recommendations.

The evaluation criteria and framework were developed based on the key values heard from the City. The most prominent concern is noise generated by trains and train horns. Other Rankings considered are:

- QZRI Scores,
- Costs of Capital Construction and Maintenance Costs,
- Funding Success,
- Safety Benefit,
- Right of Way Impacts, and
- Cost-Benefit.

The evaluation process utilized a wide range of criteria to create an approach to evaluating engineering Alternatives at the crossings addressing community input. Evaluation criteria are critical to understanding the differences between crossings, and to rank the identified Alternatives. This section of the report outlines the specific details regarding the evaluation process used in this Study.

### **EVALUATION PROCESS & RESULTS**

Closing the report are the results summary discussion. This report identifies a preferred Corridor Alternative of five at-grade rail crossings. The City of Monroe will provide an additional level of review of the potential Alternatives. A funding strategy for selected project locations based on the data and analysis from this study. Next steps are presented at the end of this report.

## CHAPTER 1: INTRODUCTION

The City of Monroe Quiet Zone Feasibility Study (Study) evaluates five at-grade rail crossing. The Purpose and Need of the Study develops options to improve rail crossing conditions including addressing operational, mobility, safety, noise, cost/benefit, or other quality of life issues. The purpose determines the feasibility of a rail corridor quiet zone through the City of Monroe. The Study performs:

- A Draft and final Existing Conditions and Evaluation Chapter.
- Updated Inventory Reports for submittal to WUTC.
  - Updated Vehicle Counts (AADT), Speed Data, and updated collision history at each location.
  - Five-year projected vehicular and rail traffic counts for any new crossings located within proposed Quiet Zone.
  - Current Signal Pre-emption Operations.
  - Identification of other permit requirements.
  - Quiet Zone Risk Index (QZRI) Calculation and evaluation.
  - Initial analysis if the Quiet Zone can be established without FRA approval.
  - <https://cms8.fra.dot.gov/highway-rail-crossing-and-trespasser-programs/train-horn-rulequiet-zones/train-horn-rule-and-quiet>.
  - Meeting notes, correspondence, and recommended SSM's and ASM's that earn FRA, UTC, WSDOT, CITY, and BNSF consensus.
- Options Development for five locations.
- Evaluation Criteria and Framework.
  - Approach and Assumptions.
  - Criteria and Evaluation.
  - Preliminary Screening Process.
  - Rough Order of Magnitude Costs.
  - Recommendations.

The quiet zone process includes the implementation of safety improvements known as Supplemental Safety Measures (SSMs) or Alternative Safety Measures (ASMs) to reduce the Quiet Zone Risk Index (QZRI) to less than or equal to the National Significant Risk Threshold (NSRT) or the Risk Index with horns (RIWH) to qualify as a quiet zone.

## BACKGROUND

At-grade railroad crossings, where roads cross railroad tracks at the same level, can typically function adequately while population and traffic levels remain low. As both rail and road traffic increases, train service increases, and trains get longer, these at-grade crossings become more problematic, impacting communities in a variety of ways. The phrase “road-rail conflict” is used to describe potentially problematic at-grade crossings. Examples of potential impacts include the following:

- Long unpredictable travel delays for both the public and freight users.
- Collisions between trains and vehicles or pedestrians.
- Temporary increases of emergency response times.
- Increased frequency of train horns contributing to noise pollution.

These potential impacts can lead to secondary concerns such as social and economic impacts to quality-of-life issues.

## RAIL AND ROAD ACTIVITY EXPECTED TO GROW

The Study arose due to community concerns raised related to increases and frequency of train noise twenty-four hours of the day. According to an article published March 7, 2018 in the Tribune<sup>5</sup> there are concerns regarding the disruptions of every day daily life to include government business, hospitals, and safety.

Passenger train service by Amtrak runs through the City of Monroe. With populations expected to increase, so is passenger rail service. Rail service through the City of Monroe is part of the State Strategic Rail Corridor Network Designation (STRACNET)<sup>6</sup>. The Department of Defense and the FRA established the Strategic Rail Corridor Network STRACNET to ensure rail transportation readiness capabilities during a time of need. STRACNET is an interconnected and continuous rail line network consisting of more than 36,000,521 miles of track serving more than 120 defense installations.

The frequency and length of freight trains, and the growth of roadway traffic volumes. Even without proposed export terminals for coal or oil, freight train traffic is expected to grow substantially. According to the Washington Rail System Plan (December 2019) in 2016, *“Washington’s freight rail system moved 122 million tons of goods. The low growth scenario 804 projects a decline in rail tons to 110 million tons (0.4 percent annual decline). Under the moderate 805 forecast, freight rail traffic is projected to grow annually by 2.4 percent to 216 million tons by 2040. The high growth scenario projects major growth to 321 million tons by 2040, an annual growth of 4.1 percent”*.

The projected increase in rail freight volume will result in increases in freight train movements in the State.

Roadway volumes are also expected to increase over time to serve the additional travel demand, especially in growing regions of the state, such as the Puget Sound Metropolitan Areas<sup>7</sup>.

There are three crossings in The Joint Transportation Committee Road-Rail Study Crossing Analysis 2018 located within the City of Monroe. Statewide crossings were ranked 1 (high) to 300 (lower), noting safety and mobility needs. Lewis St Crossing ranked **58**, E Main St was **90**, and Fryelands Blvd **156**. The full Statewide Prioritization is listed in link<sup>8</sup>:

While the Washington Transportation Plan indicates that vehicle miles traveled may decline per capita, vehicle volumes along many roadways are still expected to increase. Furthermore, it is expected that auto occupancy and truck freight volumes will increase due to more emphasis on buses, carpooling, and urban freight deliveries fueled from online retail sales. This means that while vehicle volumes are not expected to increase as substantially as train movements, more people will be traveling in the vehicles and more freight deliveries will be using the crossings to reach their destination.

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<sup>5</sup> [http://www.snoho.com/html/stories\\_2018/03072018\\_Monroe\\_wants\\_to\\_restrict\\_train\\_horns.html](http://www.snoho.com/html/stories_2018/03072018_Monroe_wants_to_restrict_train_horns.html)

<sup>6</sup> US Army Transportation Engineering Agency.  
<https://www.sddc.army.mil/sites/TEA/Functions/SpecialAssistant/Pages/RailroadsNationalDefense.aspx>

<sup>7</sup> JTC Prioritization of Prominent Road-Rail Conflicts in Washington State prepared by Transpo Group

<sup>8</sup> [Prioritization of Prominent Road-Rail Conflicts - WSTC - February 15, 2017 \(wa.gov\)](#)

## MORE TRAINS AND VEHICLES EQUAL MORE MOBILITY IMPACT

More and longer trains, coupled with an increase in roadway volumes, will result in additional traffic delays for people and freight at many at-grade crossings. The Puget Sound Regional Council's (PSRC) evaluation in July 2014 of the regional impacts of increased train traffic found that "gate-down" time, the time which the crossing gates are down, and traffic is stopped, would more than double to about 30 minutes in some locations and nearly 3 hours in others.

Within the City of Monroe, the rail line bisects the City. The crossing locations are the main routes for emergency response to the total City. Crossing closures can have a ripple effect on the transportation network, causing adjoining intersections and corridors to gridlock and resulting in an extended period for the network to return to normal operations after the crossing gates have opened. These traffic delay impacts result from increasing freight and passenger train traffic, but also from increased passenger vehicle and truck freight volumes. The Freight Mobility Strategic Investment Board (FMSIB) and the Washington Public Ports Association (WPPA) have partnered to prepare an update to the Marine Cargo Forecast. The forecast will compare the projected level of rail traffic with the capacity of the major railroad segments in the region and identify the anticipated capacity constraints. Information from the Marine Cargo Forecast was not available to be incorporated into this Project.<sup>9</sup>

## GRADE SEPARATION PROJECTS ARE NOT ALWAYS FEASIBLE

There is a perception that grade separation projects are the only solution to road-rail conflicts. An average grade separation project can cost a minimum of \$20 to \$30 million, with a few projects costing more than \$100 million. The City of Seattle is currently moving forward with an approximately \$140 million grade separation project on Lander Street. Given that many local jurisdictions have multiple crossings within their boundaries, and a backlog of other infrastructure needs, this cost is often more than a jurisdiction can finance on its own.

A grade separation project may not be the only or best solution for every corridor with road-rail conflicts. Alternative at-grade crossing investment options are considered with this project based on prioritized values from the public and expert analysis.

## EXISTING FUNDING FOCUSED ON SAFETY

Washington State has two funding programs exclusively focused on improving safety at crossings. Because grade crossing projects do not generally compete well for funding against other transportation improvements, these programs ensure funding for grade crossing projects because these projects only need to compete against each other. However, the funding for these programs is limited to small scale improvements.

The Washington Utilities and Transportation Commission (UTC) operates the Grade Crossing Protection program for which funding has been limited to \$500,000 per biennium. Typical projects are focused on installation of protective devices such as gates and warning signals. In the 2016 Supplemental Transportation Budget, the program was increased by an additional \$1.1 million to address safety issues at crossings with high volumes of oil train traffic.

WSDOT administers the Federal Highway Safety Improvement Program (HSIP) funded as part of the Fixing America's Surface Transportation (FAST) Act, which includes the Railway-Highways Crossing (Section 130) Program that funds projects at public at grade crossings. The funds are apportioned to each state, with Washington receiving approximately \$4.2 million per year through 2020. In 2020 the WSDOT announced a call for projects Statewide for this program. \$11 million was available and projects that are funded will be notified fall 2020. The City of Monroe submitted a grant application for

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<sup>9</sup> JTC Prioritization of Prominent Road-Rail Conflicts in Washington State prepared by Transpo Group

N Kelsey St ahead of this study being finalized. A continuing Federal resolution for the FAST Act was extended for Federal fiscal year 2021.

Of the \$16 billion Connecting Washington spending plan, as much as \$245 million will be spent on projects which include improvements to at-grade crossings.

### **POLICY INTERESTS**

A key objective of the Study was to identify and confirm interests and concerns. At the local level the road system experiences the most immediate impacts of at grade crossings, including but not limited to traffic back-ups, collisions at crossings, unreliable access to emergency services, and potential conflicts for pedestrians and bicycles. Air quality, noise, and general quality of life impacts are also of concern to these community locations.

### **STUDY OBJECTIVES**

The purpose of the Study evaluates the crossing locations is to develop engineering Alternatives for addressing a wide range of concerns. The Alternatives developed for the five rail crossing locations within the City were focused on improving rail crossing conditions, addressing one or more of the following operational, mobility, safety, noise, and cost/benefit or other quality of life issues.

The following objectives guided this study.

- Train Noise (Horns) Quiet Zone implementation.
- Safety.
- Pedestrian and Bicycle Mobility.
- Vehicle Mobility.
- Cost/Benefit of Improvements.

This Study develops and documents:

- An understanding of the current and future mobility, community impacts, and safety problems at grade crossing locations,
- An understanding of state, local, and private entity policy interests in improving at-grade crossings,
- A criteria-based decision-making process for analyzing engineering Alternatives for at-grade crossings, and
- Feasibility of a Quiet Zone.

### **PUBLIC GRADE CROSSING REQUIREMENTS**

The minimum grade crossing protections required by the Federal Highway Administration (FHWA) varies based on the characteristic of the crossing. For this project the applicable minimum requirements include the following.



R15-1



W10-1

Figure 1

**Table 1 Crossing Locations Meeting Minimum Crossing Requirements**

Crossing	R15-1 (Crossbucks)	W10-1	Pavement Markings
Fryelands Blvd	X	None	X
179 <sup>th</sup> Ave SE	X	X	X
N Kelsey St	X	X	X
N Lewis St	X	X	X
E Main St	X	None	X

**QUIET ZONE DISCUSSION**

A common community theme is train horn noise. The project team applied several options to serve the Quiet Zone creation process. The project team developed engineering options from industry practices for initiating Quiet Zone applications. Federal regulation requires that locomotive horns begin sounding 15-20 seconds before entering public high-rail grade crossings, but no more than one quarter mile in advance. Only a public authority, the governmental entity responsible for traffic control or law enforcement at the crossings, is permitted to create quiet zones.



The quiet zone establishment process is established by the U.S. Department of Transportation Federal Railroad Administration (FRA) with those rules contained in 49 CFR Part 222. A copy of that rule can be viewed at <http://www.fra.dot.gov/eLib/Details/L02809>

The quiet zone process includes the implementation of safety improvements known as Supplemental Safety Measures (SSMs) or Alternative Safety Measures (ASMs) to reduce the Quiet Zone Risk Index (QZRI) to less than or equal to the National Significant Risk Threshold (NSRT) or the Risk Index with Horns (RIWH) to qualify as a quiet zone.

**Examples of SSMs**



*Figure 2 Example SSMs*

Additionally, there is the option of installing a Wayside Horn System (WHS). The train horn rule allows for the installation of WHS as a replacement for the sounding of the train horn which reduces the impact of the locomotive horn on the surrounding area.

A wayside horn may be installed at crossings that have flashing lights, gates, constant warning time devices, and power out indicators. The wayside horn is a way to greatly reduce the impact area of an audible train horn.



*Figure 3 Wayside Horn*

Wayside Horns can be used in a quiet zone and when they are installed, they are considered a SSM.

## CHAPTER 2: EXISTING CONDITIONS EVALUATION

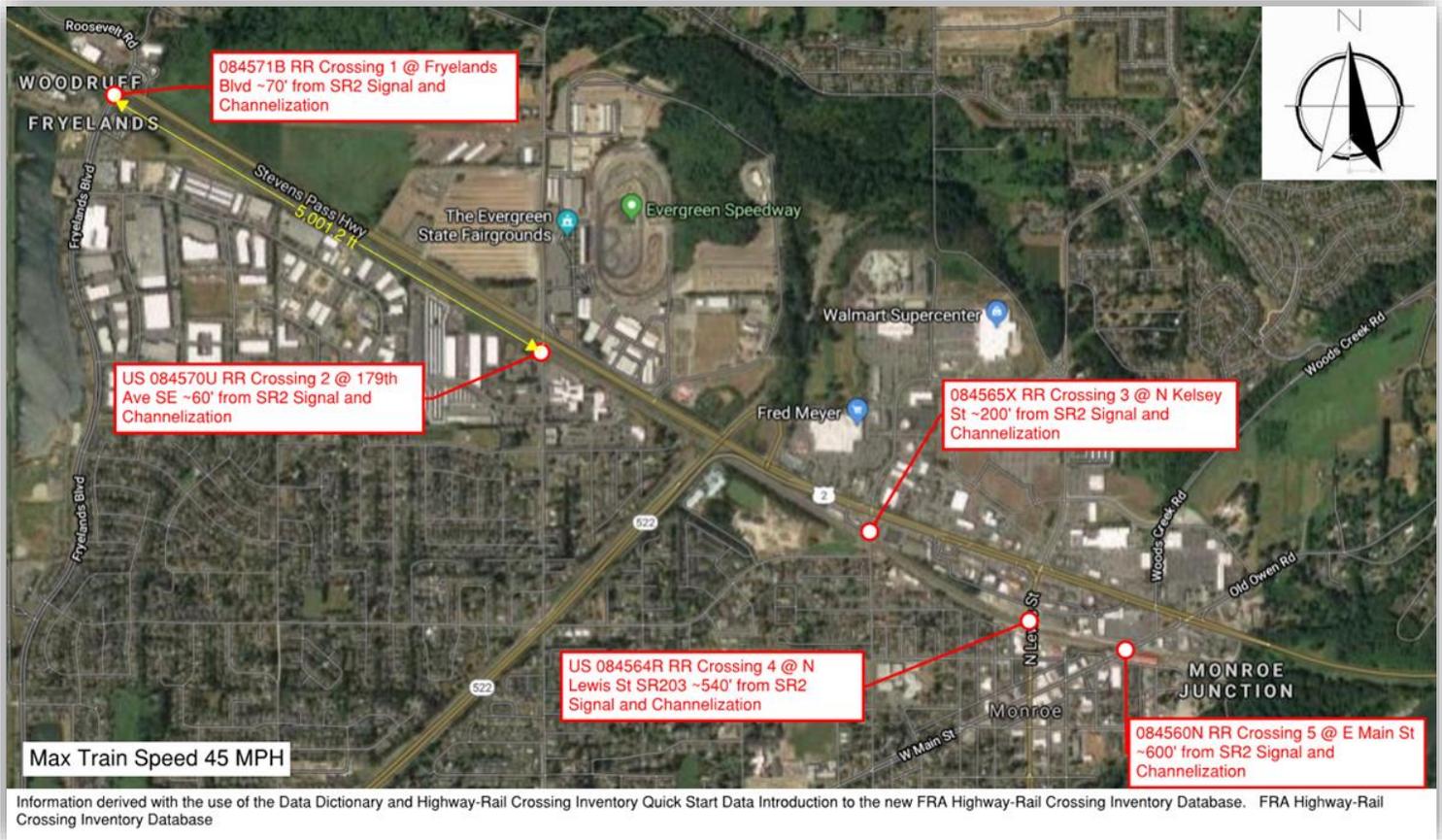


Figure 4 Study Area Vicinity Map

The map above shows the focus areas for the five crossings, listed below, that are the subject of this analysis.

- |                             |                       |                       |
|-----------------------------|-----------------------|-----------------------|
| 1. Fryelands Blvd           | DOT Inventory 084571B | RR Mile Post 1770.660 |
| 2. 179 <sup>th</sup> Ave SE | DOT Inventory 084570U | RR Mile Post 1769.796 |
| 3. N Kelsey St              | DOT Inventory 084565X | RR Mile Post 1769.140 |
| 4. N Lewis St               | DOT Inventory 084564R | RR Mile Post 1768.780 |
| 5. E Main St                | DOT inventory 084560N | RR Mile Post 1768.572 |

The existing conditions section of this report discusses the following key topics:

- Data Collection Methodology,
- Recent Studies,
- Existing Operational Environment,
- Existing Physical Inventory, and
- Safety Considerations.

## DATA COLLECTION METHODOLOGY

Data for the existing conditions analysis was collected from various sources including the following.

- FRA-Rail Crossing Inventory Database,
- On-line aerial mapping tools,
- A database for all the rail crossings evaluated in the State of Washington as a product of the Joint Transportation Committees *Prioritization of Prominent Road-Rail Conflicts in Washington State*<sup>10</sup>,
- Other data from the Washington State Department of Transportation Freight System Report dated December 2017,
- Site investigations during February and March 2020, and
- Local historical knowledge.

## RECENT STUDIES AND REPORTS

This analysis reviewed and incorporated relevant information from several recent studies and reports. Additionally, data from the *Prioritization of Prominent Road-Rail Conflicts in Washington State* report, 2018, published by the Joint Transportation Committee was utilized in the development of this report. This report provided a prioritization of prominent road-rail conflicts in Washington State. These rankings are based on train traffic, car volumes, and collision history where a ranking of 1 reflects a location with the highest need out of the 302 crossings screened. WA State has more than 4000 rail crossings statewide.

There are three crossings in The Joint Transportation Committee Road-Rail Study Crossing Analysis 2018 within the City of Monroe. Statewide crossings were ranked 1 (high) to 300 (lower), noting safety needs. N Lewis St Crossing ranked **58**, E Main St was **90**, and Fryelands Blvd **156**.

## EXISTING OPERATIONAL ENVIRONMENT

Traffic Counts collected 1/8/2018 and a traffic growth rate was added for 2.5 years at 1% per year to update to 2020 AADT.

### **Fryelands Blvd:**

**U.S. DOT Grade Crossing ID: 0844571B RR Mile Post 1770.660**

Fryelands Blvd crosses BNSF Railway Company (BNSF) right of way and is less than 200 feet from the SR 2 traffic signal. Amtrak operates on the BNSF owned tracks. This at-grade public railroad crossing services freight and passenger train service on one (1) mainline track. Land use associated with crossing area is Service Commercial and Light Industrial and there is no current quiet zone associated with this crossing. This rail crossing is located at the westerly limit of the City.

Train count data from GCIS database updated June 29, 2020 reports six (6) trains during the day and six (6) trains during the night, two (2) are passenger trains daily. The maximum timetable speed is 45 MPH, train detection is constant warning time, the track is signaled, and there is an event recorder.

There are four (4) paved traffic lanes crossing the railroad with a crossing surface of concrete panels intersecting with Fryelands Blvd between a 60–90-degree angle. The crossing is classified as a Minor Arterial, 2020 Average Annual Daily Traffic (AADT) is 10,729, school busses and emergency responders use this route.

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<sup>10</sup> <http://leg.wa.gov/JTC/Pages/Road-Rail-Study.aspx>

There is an interconnected State-owned traffic signal at SR 2. The signals have advanced railroad pre-emption circuits. Existing crossing inventory is updated in **APPENDIX B. Table 2** below shows the existing indexes for Fryelands Blvd Crossing.

**Table 2 Existing QZRI Index Fryelands Blvd.**

<b>FRA Quiet Zone Risk Indices Evaluation Existing Conditions</b>						
					<b>Fryelands Blvd</b>	
Zone ID	Senario ID	Crossing	Street	Warning Device	Risk Index	
51739	60830	084571B	Fryelands Blvd	Gates		
					<b>Nationwide Significant Risk Threshold</b>	13,811.00
					<b>Risk Index with Horns</b>	26,115.74
					<b>Quiet Zone Risk Index</b>	43,561.06

**179th AVE SE**

**U.S. DOT Grade Crossing ID: 084570U RR Mile Post 1769.796**

179<sup>th</sup> Ave SE crosses BNSF Railway Company (BNSF) right of way and is less than 200 feet from the SR 2 traffic signal. Amtrak operates on the BNSF owned tracks. This at-grade public railroad crossing services freight and passenger train service on one (1) mainline track and one (1) siding track. Land use associated with crossing area is Professional Office and Multi-Family Residential and there is no current quiet zone associated with this crossing. This rail crossing is located east of Fryelands Blvd.

Train count data from GCIS database updated June 29, 2020 reports six (6) trains during the day and six (6) trains during the night, two (2) are passenger trains daily. The maximum timetable speed is 45 MPH, train detection is constant warning time, the track is signaled, and there is an event recorder. There are three (3) paved traffic lanes crossing the railroad with a crossing surface of concrete panels intersecting with 179<sup>th</sup> Ave SE between a 60–90-degree angle. The crossing is classified as a Major Collector, 2020 Average Annual Daily Traffic (AADT) is 9,054, school busses and emergency responders use this route. There is an interconnected State-owned traffic signal at SR 2. The signals have advanced railroad pre-emption circuits. Existing inventory is updated in **APPENDIX B. Table 3** shows the existing indexes for 179<sup>th</sup> Ave SE.

**Table 3 Existing QZRI 179<sup>th</sup> Ave SE**

<b>FRA Quiet Zone Risk Indices Evaluation Existing Conditions</b>						
					<b>179th Ave SE</b>	
Zone ID	Senario ID	Crossing	Street	Warning Device	Risk Index	
51738	60829	084570U	179th Ave SE	Gates		
					<b>Nationwide Significant Risk Threshold</b>	13,811.00
					<b>Risk Index with Horns</b>	24,005.26
					<b>Quiet Zone Risk Index</b>	40,040.78

**N Kelsey St**

**U.S. DOT Grade Crossing ID: 084565X RR Mile Post 1769.140**

N Kelsey St crosses BNSF Railway Company (BNSF) right of way and is less than 200 feet from the SR 2 traffic signal. Amtrak operates on the BNSF owned tracks. This at-grade public railroad crossing services freight and passenger train service on one (1) mainline track and one (1) siding track. Land use associated with crossing area is Mixed Use Neighborhood Commercial and Multi-Family Residential and there is no current quiet zone associated with this crossing. This rail crossing is located east of 179<sup>th</sup> St SE.

Train count data from GCIS database updated June 29, 2020 reports six (6) trains during the day and six (6) trains during the night, two (2) are passenger trains daily. The maximum timetable speed is 45 MPH, train detection is constant warning time, the track is signaled, and there is an event recorder. There are three (3) paved traffic lanes crossing the railroad with a crossing surface of concrete panels intersecting with N Kelsey St between a 30–59-degree angle. The crossing is classified as a Major Collector, 2020 Average Annual Daily Traffic (AADT) is 14,606, school busses and emergency responders use this route.

There is an interconnected State-owned traffic signal at SR 2. The signals have advanced railroad pre-emption circuits. In February of 2020, the City installed a non-traversable median with channelization devices at this location. Existing inventory is updated in **APPENDIX B. Table 4** shows the existing indexes for N Kelsey St.

**Table 4 Existing QZRI N Kelsey St**

<b>FRA Quiet Zone Risk Indices Evaluation Existing Conditions</b>					
				<b>Kelsey St</b>	
Zone ID	Senario ID	Crossing	Street	Warning Device	Risk Index
51736	60827	084565X	Kelsey St	Gates	
				<b>Nationwide Significant Risk Threshold</b>	13,811.00
				<b>Risk Index with Horns</b>	91,578.63
				<b>Quiet Zone Risk Index</b>	152,753.16
				<b>Non-Traversable Curb Medians with or without Channelization Devices</b>	30,551.63

**N Lewis St**

**U.S. DOT Grade Crossing ID: 084564R RR Mile Post 1768.780**

N Lewis St (SR 203) crosses BNSF Railway Company (BNSF) right of way and is ~ 540 feet from the SR 2 traffic signal. Amtrak operates on the BNSF owned tracks. This at-grade public railroad crossing services freight and passenger train service on one (1) mainline track and one (1) siding track. Land use associated with crossing area is Downtown Commercial and there is no current quiet zone associated with this crossing. This rail crossing is located east of N Kelsey St.

Train count data from GCIS database updated June 29, 2020 reports six (6) trains during the day and six (6) trains during the night, two (2) are passenger trains daily. The maximum timetable speed is 45 MPH, train detection is constant warning time, the track is signaled, and there is an event recorder.

There are three (3) paved traffic lanes crossing the railroad with a crossing surface of concrete panels intersecting with N Kelsey St between a 60–90-degree angle. The crossing is classified as Other Principal Arterial, 2020 Average Annual Daily Traffic (AADT) is 15,093, and emergency responders use this route. There is State-owned traffic signal at SR 2. Existing inventory is updated in **APPENDIX B. Table 5** shows the existing indexes for N Lewis St.

**Table 5 Existing QZRI Indexes N Lewis St**

<b>FRA Quiet Zone Risk Indices Evaluation Existing Conditions</b>						
					<b>Lewis St</b>	
Zone ID	Senario ID	Crossing	Street	Warning Device	Risk Index	
51737	60828	084564R	Lewis St	Gates		
					<b>Nationwide Significant Risk Threshold</b>	13,811.00
					<b>Risk Index with Horns</b>	24,034.64
					<b>Quiet Zone Risk Index</b>	40,089.78

**E Main St**

U.S. DOT Grade Crossing ID: 084560N RR Mile Post 1768.572

E Main St crosses BNSF Railway Company (BNSF) right of way and is ~ 600 feet from the SR 2 traffic signal. Amtrak operates on the BNSF owned tracks. This at-grade public railroad crossing services freight and passenger train service on one (1) mainline track and one (1) siding track. Land use associated with crossing area is Downtown Commercial and there is no current quiet zone associated with this crossing. This rail crossing is located east of N Lewis St.

Train count data from GCIS database updated June 29, 2020 reports six (6) trains during the day and six (6) trains during the night, two (2) are passenger trains daily. The maximum timetable speed is 45 MPH, train detection is constant warning time, the track is signaled, and there is an event recorder.

There are three (3) paved traffic lanes crossing the railroad with a crossing surface of concrete panels intersecting with N Kelsey St between a 30–59-degree angle. The crossing is classified as Minor Arterial, 2020 Average Annual Daily Traffic (AADT) is 9,581, and emergency responders use this route. There is State-owned traffic signal at SR 2. Existing inventory is updated in **APPENDIX B. Table 6** shows the existing indexes for E Main St.

**Table 6 Existing QZRI Indexes E Main St**

<b>FRA Quiet Zone Risk Indices Evaluation Existing Conditions</b>						
					<b>Main Street</b>	
Zone ID	Senario ID	Crossing	Street	Warning Device	Risk Index	
51735	60826	084560N	Main St	Gates		
					<b>Nationwide Significant Risk Threshold</b>	13,811.00
					<b>Risk Index with Horns</b>	24,181.45
					<b>Quiet Zone Risk Index</b>	40,334.66

Average QZRI for the corridor 63,355.89

**EXISTING PHYSICAL INVENTORY**

**Frylands Blvd: 084571B RR MP 1770.660**

Minimum Requirements:

- (2) R15-1 Crossbucks
- W10-2, Advanced Rail Crossing Warning Signs
- Grade Crossing Pavement Markings

Supplemental Devices:

- Automatic Vehicle gates and dual warning lights (Two Quadrants),
- Cantilever (6) Light Sets
- Cantilever (6) Light Sets, (1) Bell

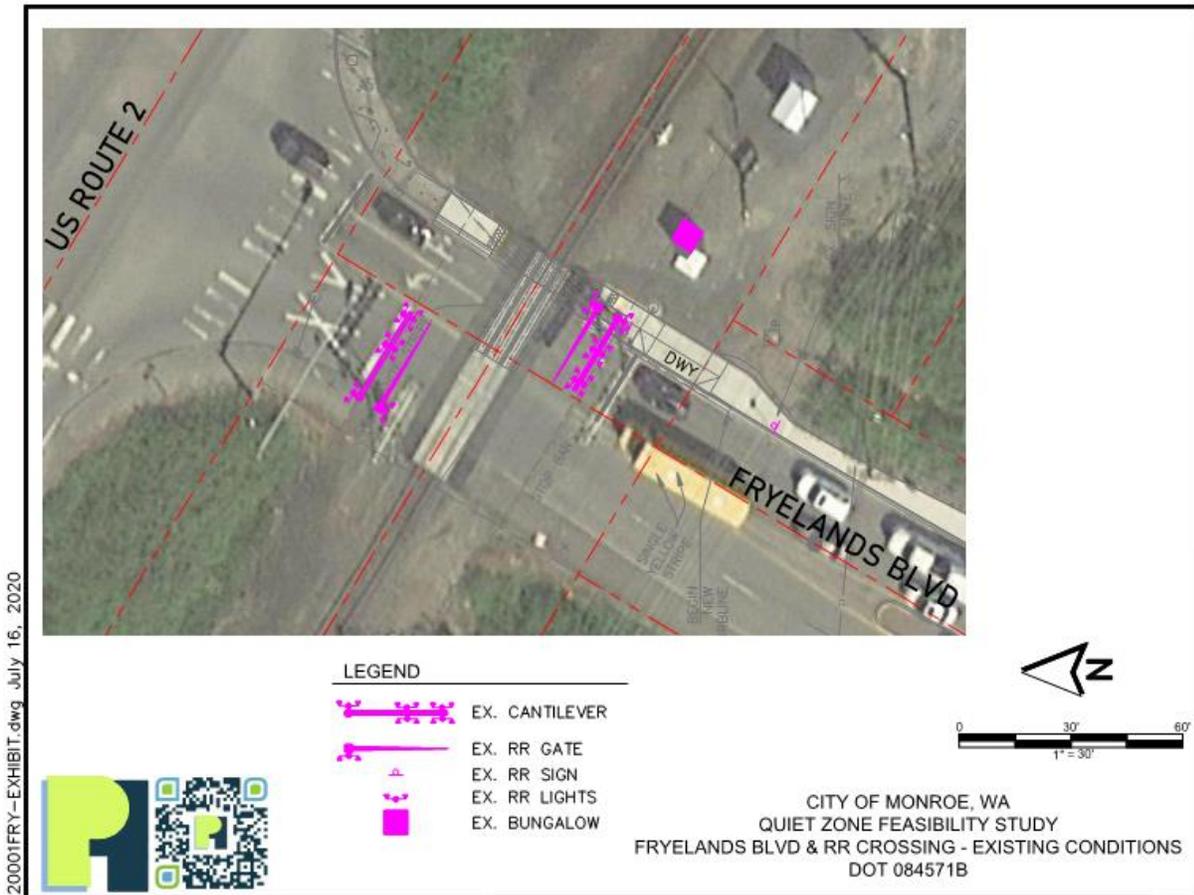
Other MUTCD Signs:

- (1) R8-8 Do Not Stop on Tracks
- (1) R8-10 Wait Here When Flashing
- (1) Blank-out No Right Turn R3-1 on overhead mast are on US2



Figure 5 Frylands Blvd Looking N to SR 2

2020 AADT: 10,729



Note: Easement Lines could not be verified without BNSF and a Survey at this location.

**179th AVE SE 084570U RR MP 1769.796**

Minimum Requirements:

- (2) R15-1 Crossbucks
- (1) W10-1, Advanced Rail Crossing Warning Signs
- Grade Crossing Pavement Markings

Supplemental Devices:

- Automatic Vehicle gates and dual warning lights (Two Quadrants),
- Cantilever (6) Light Sets
- Cantilever (6) Light Sets, (1) Bell

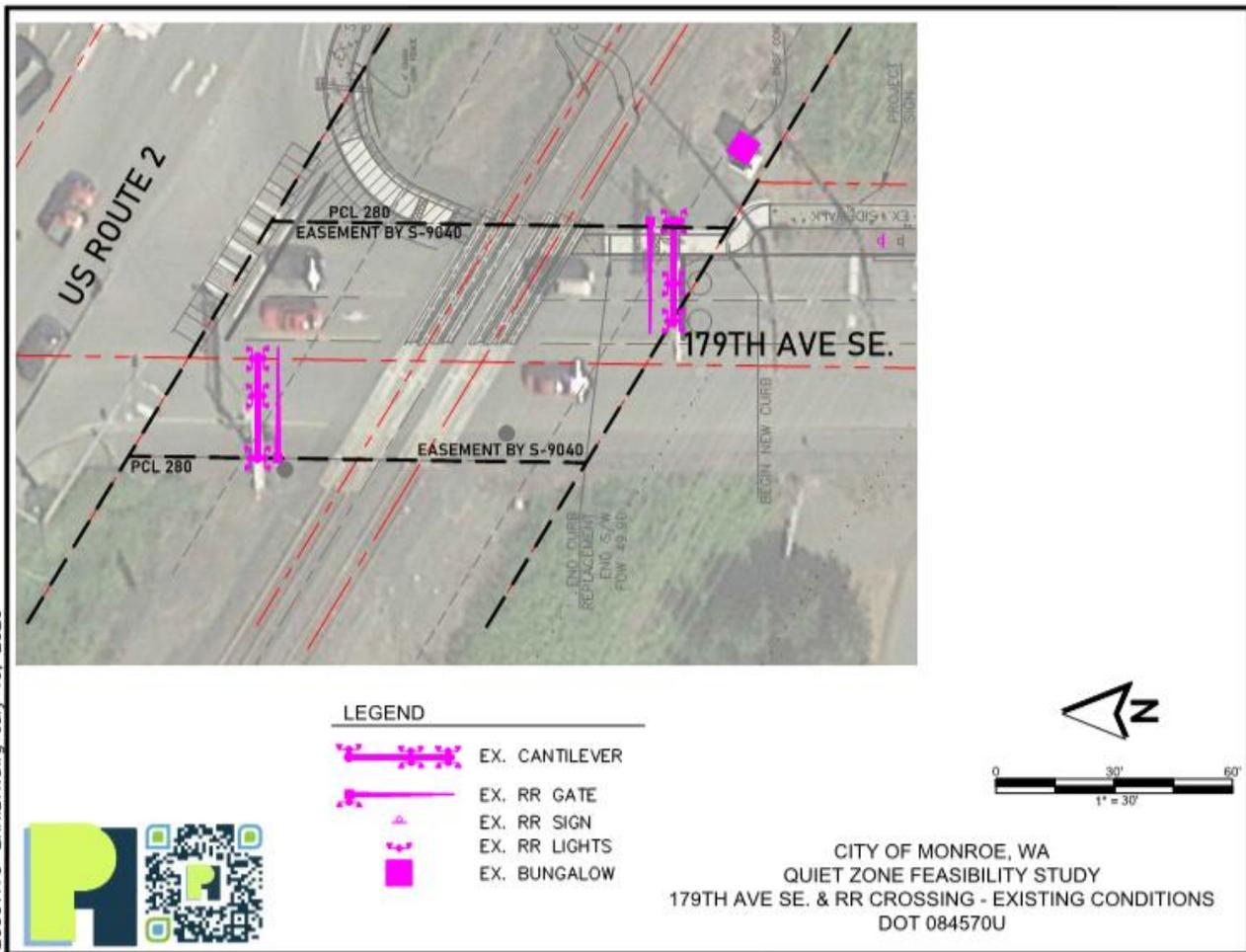
Other MUTCD Signs:

- (1) R8-8 Do Not Stop on Tracks
- (2) R15-2P Number of Tracks

2020 AADT: 9,054



Figure 6 179th Ave Looking N to SR 2



**N Kelsey St 084565X RR MP 1769.140**

Minimum Requirements:

- (2) R15-1 Crossbucks
- (2) W10-1, Advanced Rail Crossing Warning Signs
- Grade Crossing Pavement Markings

Supplemental Devices:

- Automatic Vehicle gates and dual warning lights (Two Quadrants),
- Cantilever (6) Light Sets
- Cantilever (6) Light Sets, (1) Bell

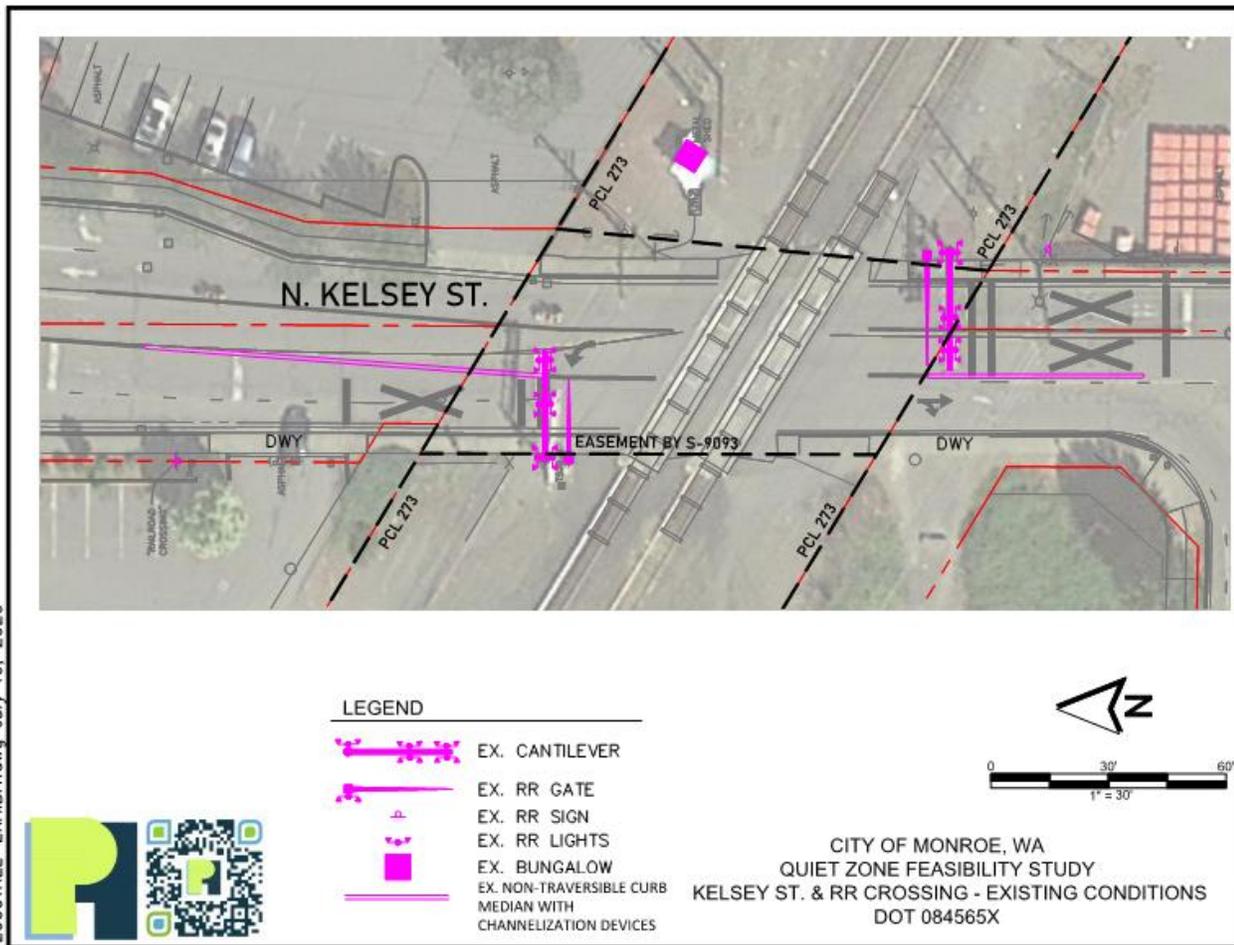
Other MUTCD Signs:

- (1) R8-8 Do Not Stop on Tracks
- (2) R15-2P Number of Tracks

2020 AADT: 14,606



Figure 7 N Kelsey St Looking N to SR 2



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**N Lewis St 084564R RR MP 1768.780**

Minimum Requirements:

- (2) R15-1 Crossbucks
- (2) W10-1, Advanced Rail Crossing Warning Signs
- Grade Crossing Pavement Markings

Supplemental Devices:

- Automatic Vehicle gates and dual warning lights (Two Quadrants),
- Cantilever (5) Light Sets
- Cantilever (5) Light Sets, (1) Bell

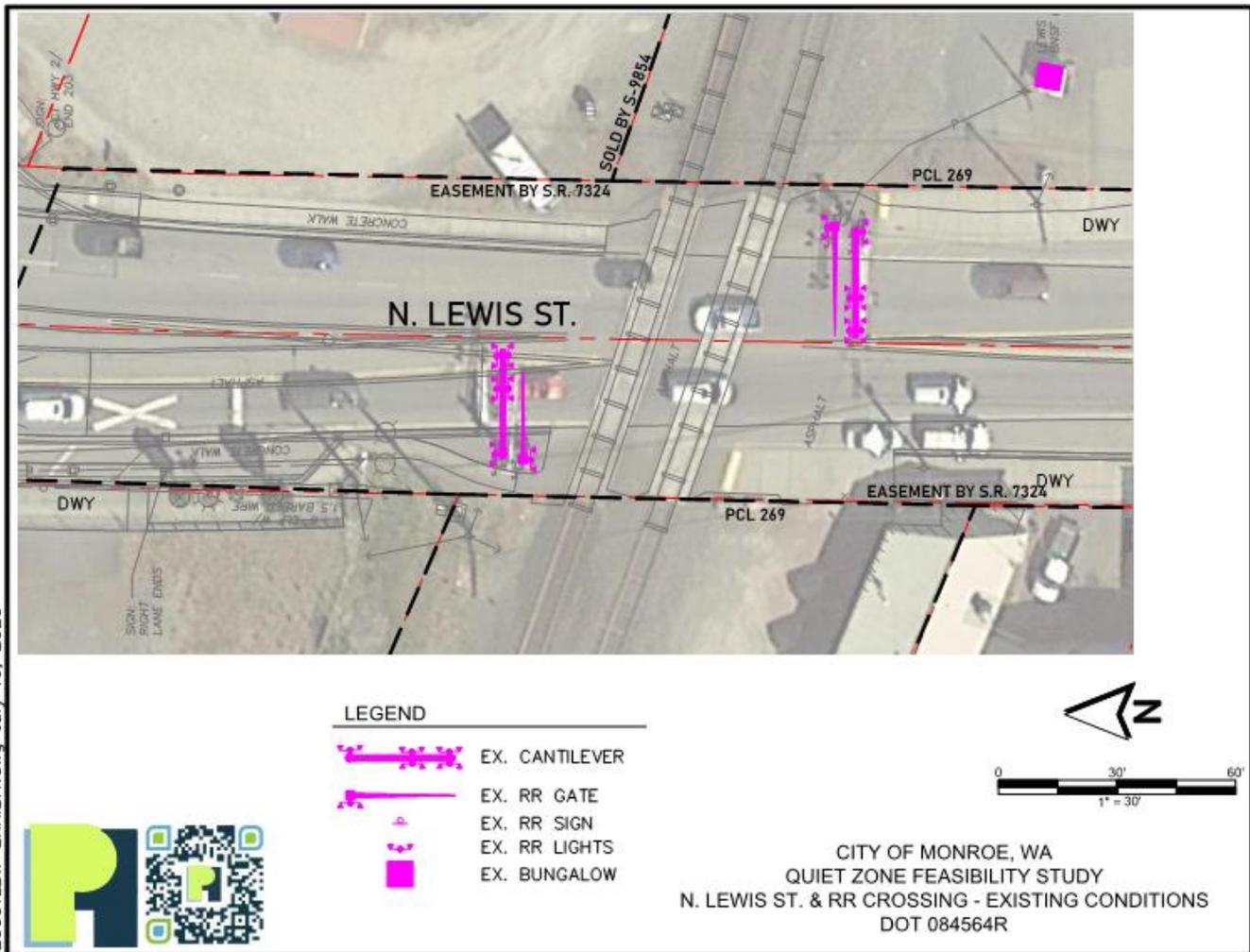
Other MUTCD Signs:

- (2) R15-2P Number of Tracks

2020 AADT: 15,093



Figure 8 N Lewis St Looking N



**E Main St 084560N RR MP 1768.572**

Minimum Requirements:

- (2) R15-1 Crossbucks
- Grade Crossing Pavement Markings

Supplemental Devices:

- Automatic Vehicle gates and dual warning lights (Two Quadrants),
- Cantilever (6) Light Sets
- Cantilever (6) Light Sets, (1) Bell

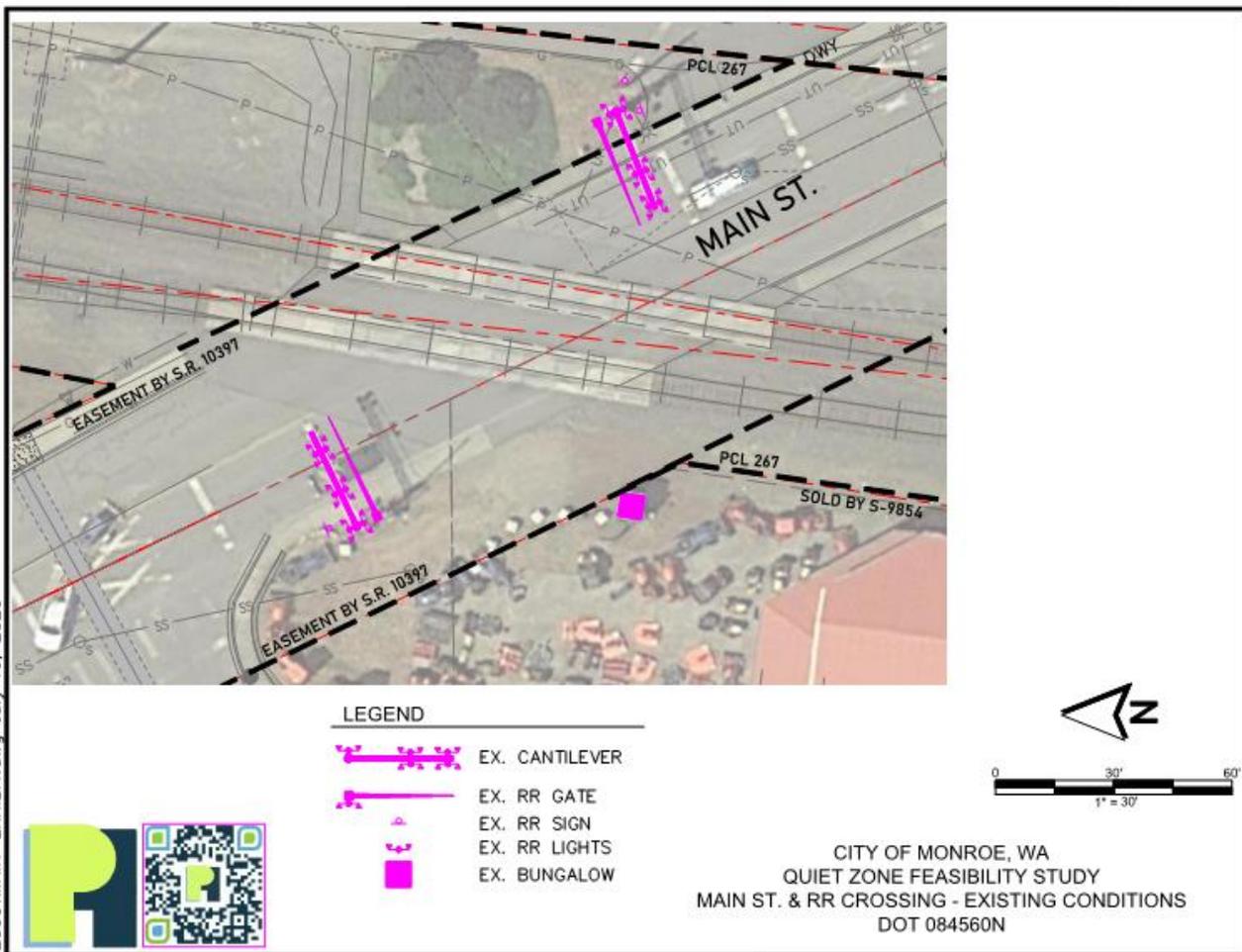
Other MUTCD Signs:

- (2) R8-8 Do Not Stop on Tracks
- (2) R15-2P Number of Tracks

2020 AADT: 9,581



Figure 9 E Main St Looking N



**SAFETY EVALUATION**

The consultant team researched several sources of collision and traffic data to evaluate the existing grade crossing safety conditions. These data sources included:

- Federal Railroad Administration (FRA) Highway-Rail Grade Crossing Accident/Incident Reports,
- 5 years of recent WSDOT Crash Data history of officer reported crashes that occurred at or near the rail crossings,
- Collection of WSP actual reports with diagrams, and
- Recent Media Articles.

**Table 7**

Historical collision report data was compiled for each of the crossings. **Table 7** defines the Warning Codes associated with the warning devices in place at each rail crossing at the time of the incident.

Types of Crossing Warning Codes	
1	Gates
2	Cantilever FLS
3	Standard FLS
4	Wig Wags
5	Hwy. Traffic Signals Audible
6	Audible
7	Cross Bucks
8	Stop Signs
9	Watchman
10	Flagges by Crew
11	Other
12	None

In the collision records that follow, WSP Data does not report the crossing warnings. NA = Not Available.

**Fryelands Blvd**

This location had two WSP records not in the FRA data base, noting one fatality in 1979. The conditions of the FRA data show this crossing was stop controlled without gates or cantilevers. The prevailing recent incidents from WSP records is queuing on the track from the traffic signal.

**Table 8 Fryelands Blvd Collision History**

Incident Reports FRA											
Fryelands Blvd - HWY Name PRIVATE											
US DOT Grade Crossing ID 084571B											
Rail Road Incident No.	Date	Time	Type	Equipment	Visibility	Direction	Speed MPH	Circumstance	Types of Crossing Warning Codes	Highway User	Casualty
PA0309	7/16/1996	8:00 AM	Truck Trailer	Freight Train	Day	East	30	Train Struck Highway User	8	Did Not Stop	Injury
PA0527	10/27/1995	7:08 AM	M (Other)	Train	Day	North	0	Train Struck Highway User	8	Stopped at Crossing	Uninjured
PA181	2/7/1979	3:15 PM	Auto	Train	Day	South	5	Train Struck Highway User	8	Stopped then Proceeded	Killed
Fryelands Incident Reports WSP Not in FRA Data Base											
WSP Report No.	Date	Time	Type	Equipment	Visibility	Direction	Speed MPH	Circumstance	Types of Crossing Warning Codes	Highway User	Casualty
E440625	7/1/2015	4:05 PM	Truck and Trailer	Crossing Arm	NA	North	0	Crossing Arm On Vehicle	NA	Signal Green/Queuing on Track	No Apparent Injury
E543806	5/4/2016	7:05 AM	Truck Tractor and Semi Trailer	Crossing Arm	NA	North	0	Crossing Arm Between Cab and Load	NA	Signal Green/Queuing on Track	Unknown

179<sup>th</sup> St SE

This location had two WSP records not in the data base. In pulling the diagram for the school bus incident, the school bus was stopped at the crossing and was rear ended by another vehicle. This location has three incidents reported and one possible injury.

**Table 9 179th Ave SE Collision History**

Incident Reports FRA											
179th Ave SE - HWY Name 179th Ave SE											
US DOT Grade Crossing ID 084570U											
Rail Road Incident No.	Date	Time	Type	Equipment	Visibility	Direction	Speed MPH	Circumstance	Types of Crossing Warning Codes	Highway User	Casualty
PA2430	12/27/1991	10:00 AM	Auto	Work Train	Day	North	25	Train Struck Highway User	1,3,7	Did Not Stop	Uninjured
179th SE Reports WSP Not in FRA Data Base											
WSP Report No.	Date	Time	Type	Equipment	Visibility	Direction	Speed MPH	Circumstance	Types of Crossing Warning Codes	Highway User	Casualty
E793872	4/26/2018	3:00 PM	School Bus	NA	NA	North	0	V2 School Bus Stopped Rear End V1	NA	Did Not Stop	Possible Injury
E867742	11/27/2018	5:44 AM	Auto	RR Crossing Signal	NA	West	NA	V1 WB Left Struck RR Crossing Pole	NA	Lost Control	Unknown

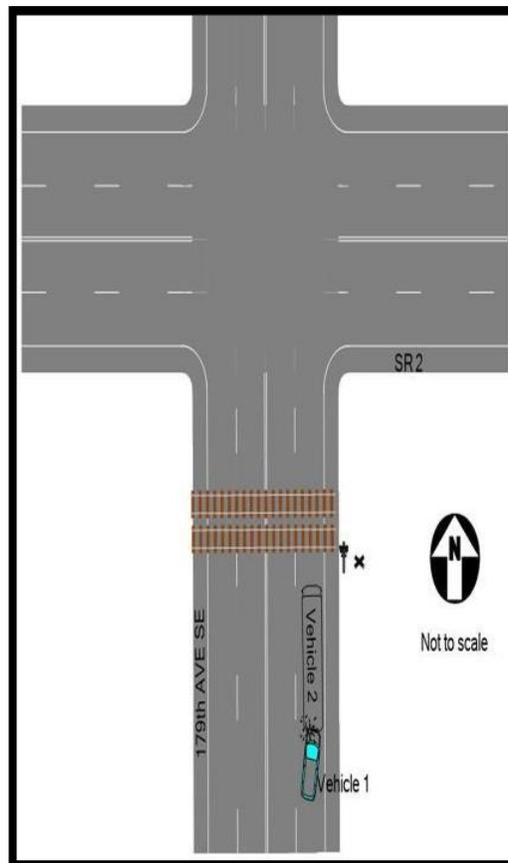


Figure 10 School Bus Incident 179th St SE

**N Kelsey St**

N Kelsey St has the highest incidence rates as compared to the other City locations, with one WSP record that was not in the FRA Data base. This location also reflects the highest severity rate as compared to the other City locations. The City modified this crossing in February 2020 with a non-traversable curb median with channelization. This location had two pedestrian incidences.

**Table 10 Kelsey St Collision History**

Incident Reports FRA											
N Kelsey - HWY Name KELSEY ST											
US DOT Grade Crossing ID 084565X											
Rail Road Incident No.	Date	Time	Type	Equipment	Visibility	Direction	Speed MPH	Circumstance	Types of Crossing Warning Codes	Highway User	Casualty
PA829	6/9/1978	10:35 PM	Auto	Freight Train	Dark	North	20	Rail Equipment Struck by Highway User	7	Moving Over Crossing	Uninjured
PA1704	11/3/1978	5:40 PM	Truck	Freight Train	Dark	South	4	Rail Equipment Struck by Highway User	8	Moving Over Crossing	Uninjured
PA1494	10/22/1980	7:35 PM	Auto	Freight Train	Dark	East	0	Train Struck Highway User	7	Stopped on Crossing	Uninjured
PA545	5/3/1981	3:45 PM	Auto	Freight Train	Day	North	8	Train Struck Highway User	7	Moving Over Crossing	Killed
PA789	9/20/1984	6:31 PM	Truck	Freight Train	Day	South	5	Train Struck Highway User	7	Moving Over Crossing	1 Killed 1 Injured
NW0310201	3/26/2010	8:40 PM	Pedestrian	Freight Train	Dark	East	0	Train Struck Highway User	1,2	Stopped on Crossing	Killed
NW0317201	3/11/2017	10:51 PM	Auto	Train	Dark	South	0	Train Struck Highway User	1,2	Stalled or Stuck on Crossing	Uninjured
NW0918202	9/14/2018	6:11 PM	Pedestrian	Train	Dusk	South	0	Train Struck Highway User	1,2,3,5,6,7	Suicide	Killed
N Kelsey Incident Reports WSP Not in FRA Data Base											
WSP Report No.	Date	Time	Type	Equipment	Visibility	Direction	Speed MPH	Circumstance	Types of Crossing Warning Codes	Highway User	Casualty
E664246	4/1/2017	11:41 PM	Auto	Train	NA	NA	0	Train Struck Highway User	NA	Parked on Crossing	Uninjured

**N Lewis St**

This location has a total of two incidents with the last one reported in 1996.

**Table 11 N Lewis St Collision History**

Incident Reports FRA											
Lewis St - HWY Name LEWIS ST											
US DOT Grade Crossing ID 084564R											
Rail Road Incident No.	Date	Time	Type	Equipment	Visibility	Direction	Speed MPH	Circumstance	Types of Crossing Warning Codes	Highway User	Casualty
PA0085	2/25/1996	9:11 AM	Truck	Freight Train	Day	South	0	Train Struck Highway User	1,3,7	Stopped on Crossing	Uninjured
PA1615	10/6/1979	1:50 AM	Auto	Light Loco	Dark	South	NA	Train Struck Highway User	1	Drove around or Thru Gate	2 Injury

**E Main St**

At E Main St location there are a total of two fatalities, two pedestrian incidents, and the last reported incident was in 2011.

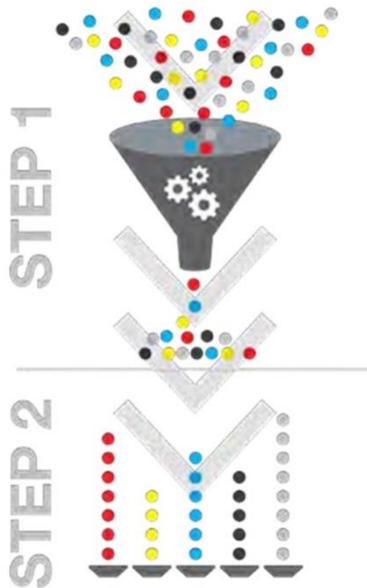
**Table 12 E Main St Collision History**

Incident Reports FRA											
E Main St - HWY Name MAIN ST											
US DOT Grade Crossing ID 084560N											
Rail Road Incident No.	Date	Time	Type	Equipment	Visibility	Direction	Speed MPH	Circumstance	Types of Crossing Warning Codes	Highway User	Casualty
PA1985	12/18/1978	3:05 PM	Truck	Freight Train	Day	North	NA	Rail Equipment Struck by	3	Moving Over Crossing	Uninjured
PA591	4/23/1979	8:50 PM	Auto	Freight Train	Dark	North	0	Train Struck Highway User	3	Stalled on Crossing	Uninjured
PA520	6/29/1982	5:00 PM	Pedestrian	Freight Train	Day	North	NA	Train Struck Highway User	1	Moving Over Crossing	Killed
ATK 841111	11/11/1984	6:10 PM	Auto	Passenger Train	Dark	East	0	Train Struck Highway User	3	Stalled on Crossing	Uninjured
PA1010											
PA430	5/2/1988	11:15 PM	Auto	Freight Train	Dark	North	0	Train Struck Highway User	1	Stalled on Crossing	Killed
PA0199202	1/29/1999	5:08 PM	Pick Up Truck	Freight Train	Dark	South	0	Train Struck Highway User	1,2	Stopped on Crossing	Uninjured
ATK 122224	12/22/2011	6:03 PM	Pedestrian	Passenger Train	Dark	North	NA	Train Struck Highway User	1,2,3,6,7	Moving Over Crossing	Injury
NW1211201											

### CHAPTER 3: ALTERNATIVE DEVELOPMENT

This section of the report summarizes the relationship of the Study purpose and need to the existing conditions evaluation, evaluation criteria and framework, and the evaluation process.

#### PRELIMINARY SCREENING PROCESS



**Step 1** evaluated existing conditions for crossing inventory, traffic volume, number of tracks, angle of the rail crossing, and collision incidents at each location. A range of Alternatives are filtered out high-cost Alternatives comparing to the reduction of the existing conditions RIWH.

**Step 2** three (3) corridor Alternatives were developed evaluated existing conditions utilizing various SSM’s and ASMs in combination as compared to installing a 4 – Quad Gate System.

The range of costs for a grade separated rail crossing can be estimated between \$20 to \$100 million for each location and dependent on grade and properties impacted as well as road reconstruction.

The range of costs for closing a road or converting to one-way system street per location ranges can be \$500 to \$700 thousand, with substantial public access impacts.

The range of costs per each location for converting a 2 – Quad Gate System to a 4 – Quad Gate System can be expected to be \$300 to \$500 thousand and increases if bungalows need to be replaced.

Development of the three corridor Alternatives follow in the next section.

#### ALTERNATIVE DEVELOPMENT

The Study is initiated to determine feasibility of a Quiet Zone within the City of Monroe. The project team evaluated existing conditions of five rail crossings within the City and updated the rail crossing inventory records. Reduction of train noise is to address the public concerns at each location while looking at cost, quiet zone scores, safety, City improvements, MUTCD requirements, and BNSF requirements. Three Alternatives moved to Step 2 Screening are evaluated and discussed in this section and in Chapter 5: Evaluation Criteria and Framework. SSM Effectiveness Rates per FRA’s Calculator are shown in **Table 13**.

**Table 13**

FRA Calculator SSM Rates		
SSM Code	SSM Description	SSM Effectiveness Rate
4	4-Quad Gates Upgrade from 2-Quad, No Detection	0.82
5	4-Quad Gates Upgrade from 2-Quad, w/Medians, No Detection	0.92
6	4-Quad Gates Upgrade from 2-Quad, With Detection	0.77
7	4-Quad Gates Upgrade from 2-Quad, w/Medians, With Detection	0.92
8	4-Quad Gates New Install, No Detection	0.82
9	4-Quad Gates New Install, w/Medians, No Detection	0.92
10	4-Quad Gates New Install, With Detection	0.77
11	4-Quad Gates New Install, w/Medians, With Detection	0.92
12	Mountable Medians with Reflective Traffic Channelization Devices	0.75
13	Non-Traversable Curb medians with or without Channelization Devices	0.80
14	One-Way Street With Gates	0.82

The following recommended improvements summarizes the Alternatives screened and developed to respond to the quiet zone applications at each location for the Corridor Quiet Zone application. To review the Field Diagnostic notes, please see **APPENDIX A**.

## ALTERNATIVE 1

### Fryelands Blvd 084571B RR MP 1770.660

#### Quiet Zone Improvement:

- Install Non-Mountable Medians (ASM)

#### Proposed Additional Safety Improvements:

- MUTCD: - Regulatory and Warning Signage R8-8 (Do not Stop on Tracks), W10-1 (Highway-Rail Crossing Advanced Warning), and W10-9P (No Train Horn Advanced Warning). Evaluate the feasibility of adding custom “Short Storage” Warning Signs and Keep Clear Pavement Markings.
- Update ADA detectible warning surfaces.

#### City Safety:

- Review traffic signal and rail signal pre-emption timing and channelization improvements.

#### Railroad Signals: (By BNSF)

- Upgrade to LED lamps and add warning bell.

#### BNSF Recommended Improvements:

- Upgrade existing constant warning time circuitry.

Alternative score scenarios were evaluated and shown in **Table 15** (page 33).

SSM 4-Quad Gates Upgrade from 2-Quad Gates.

SSM Non-Traversable Curb medians with or without Channelization Devices

### 179th Ave SE 084570U RR MP 1769.796

The improvements proposed are the following:

#### Quiet Zone Improvement:

- Install Non-Mountable Medians (ASM)

#### Proposed Additional Safety Improvements:

- MUTCD: Regulatory and Warning Signage R8-8 (Do not Stop on Tracks), W10-1 (Highway-Rail Crossing Advanced Warning), and W10-9P (No Train Horn Advanced Warning). Evaluate the feasibility of adding custom “Short Storage” Warning Signs and Keep Clear Pavement Markings.
- Update ADA detectible warning surfaces.

#### City Safety:

- Review traffic signal and rail signal pre-emption timing and channelization improvements.
- Install No Turn on Red Blank Out Sign (Advanced Train Warning).
- Evaluate installation of pedestrian escape paths behind railroad crossing gate arm on the east side of 179<sup>th</sup> Ave SE.
- Evaluate signal head visibility and channelization improvements.

#### Railroad Signals: (By BNSF)

- Upgrade to LED lamps and add warning bell.

#### BNSF Recommended Improvements:

- Upgrade existing constant warning time circuitry.

Alternative score scenarios were evaluated and shown in **Table 15** (page 33).  
SSM 4-Quad Gates Upgrade from 2-Quad Gates.  
SSM Non-Traversable Curb medians with or without Channelization Devices

**N Kelsey St 084565X RR MP 1769.140**

The improvements proposed are the following:

Quiet Zone Improvement:

- Install Non-Mountable Medians (ASM)
- Removal of Driveway on the SW Quadrant and Removal of Driveway on the NE Quadrant.

Proposed Additional Safety Improvements:

- MUTCD: Regulatory and Warning Signage R8-8 (Do not Stop on Tracks), W10-1 (Highway-Rail Crossing Advanced Warning), and W10-9P (No Train Horn Advanced Warning) and pavement markings.
- Update ADA detectible warning surfaces.

City Safety:

- Add pedestrian barrier fencing.
- Relocate bus stop.
- Extend sidewalk.
- Review traffic signal and rail signal pre-emption timing.
- Evaluate channelization improvements.

Railroad Signals: (By BNSF)

- Upgrade to LED lamps, add warning bell, and add pedestrian warning flashers.

BNSF Recommended Improvements:

- Upgrade existing constant warning time circuitry.

Alternative score scenarios were evaluated and shown in **Table 15** (page 33).  
SSM 4-Quad Gates Upgrade from 2-Quad Gates.  
SSM Non-Traversable Curb medians with or without Channelization Devices

**N Lewis St 084564R RR MP 1768.780**

The improvements proposed are the following:

Quiet Zone Improvement:

- Install Non-Mountable Medians (ASM)

Proposed Additional Safety Improvements:

- MUTCD: Regulatory and Warning Signage R8-8 (Do not Stop on Tracks) and W10-9P (No Train Horn Advanced Warning), and pavement markings.
- Update ADA detectible warning surfaces.

Railroad Signals: (By BNSF)

- Upgrade to LED lamps and add warning bell.

BNSF Recommended Improvements:

- Upgrade existing constant warning time circuitry.

Alternative score scenarios were evaluated and shown in **Table 15** (page 33).  
 SSM 4-Quad Gates Upgrade from 2-Quad Gates.  
 SSM Non-Traversable Curb medians with or without Channelization Devices

**E Main St 084560N RR MP 1768.572**

The improvements proposed are the following:

Quiet Zone Improvement:

- Install Non-Mountable Medians (ASM)

Proposed Additional Safety Improvements:

- MUTCD: Warning Signage W10-1 (Highway-Rail Crossing Advanced Warning) and W10-9P (No Train Horn Advanced Warning), and pavement markings.
- Update ADA detectible warning surfaces.

City Safety:

- Add pedestrian barrier fencing.
- Expand landscape zone.
- Remove pedestrian pathway.
- Evaluate pedestrian escape paths behind gates.
- Evaluate channelization and turning movement improvements.

Railroad Signals: (By BNSF)

- Upgrade to LED lamps, add warning bell, and add pedestrian warning flashers.

BNSF Recommended Improvements:

- Upgrade existing constant warning time circuitry.

Alternative score scenarios were evaluated and shown in **Table 15** (page 33).  
 SSM 4-Quad Gates Upgrade from 2-Quad Gates.

**ALTERNATIVE 1 RESULTS**

The quiet zone process includes the implementation of safety improvements known as Supplemental Safety Measures (SSMs) or Alternative Safety Measures (ASMs) to reduce the Quiet Zone Risk Index (QZRI) to less than or equal to the National Significant Risk Threshold (NSRT) or the Risk Index with horns (RIWH) to qualify as a quiet zone.

**Table 13 Alternative 1 Results**

<b>Corridor QZRI Alternative 1</b>		<b>27,409.18</b>
Risk Index with Horns	RIWH	37,983.14
National Significant Risk Threshold	NSRT	13,811.00

Alternative 1 is lower than the RIWH, but not lower or equal to the NSRT and meets the FRA threshold. **Table 14** Alternative 1 Risk Index Results per location reflects the analysis of the Alternatives for the corridor per each location with appropriate Risk Indexes for the Improvements.

**Table 15 Alternative 1 Risk Index Results Per Location**

Fryelands Blvd									
Zone ID	Scenario ID	Crossing	Street	Warning Device	SSM/ASM	SSM Effect	ASM Effect	Risk Index	Comments
51739	60830	084571B	Fryelands Blvd	Gates	0	0		43,561.06	
					4	0.82		7,840.99	
					13	0.8		8,712.21	
					Mod (13)		0.64	15,681.98	$(36/60) \cdot .4 + .4 = .64$
179th Ave SE									
Zone ID	Scenario ID	Crossing	Street	Warning Device	SSM/ASM	SSM Effect	ASM Effect	Risk Index	Comments
51738	60829	084570U	179th Ave SE	Gates	0	0		40,040.78	
					4	0.82		7,207.34	
					13	0.8		8,008.16	
					Mod (13)		0.47	21,355.08	$(10/60) \cdot .4 + .4 = .47$
N Kelsey St									
Zone ID	Scenario ID	Crossing	Street	Warning Device	SSM/ASM	SSM Effect	ASM Effect	Risk Index	Comments
51736	60827	084565X	Kelsey St	Gates	0	0		152,753.16	
					4	0.82		27,495.57	
					13	0.8		30,550.63	
					Mod (13)		0.57	66,193.03	$(35/60) \cdot .4 + (50/60) \cdot .4 = .57$ , Commercial Driveway on NE quadrant is relocated north.
N Lewis St									
Zone ID	Scenario ID	Crossing	Street	Warning Device	SSM/ASM	SSM Effect	ASM Effect	Risk Index	Comments
51737	60828	084564R	Lewis St	Gates	0	0		40,089.78	
					4	0.82		7,216.16	
					13	0.80		8,017.96	
					Mod (13)		0.73	10,690.61	$.4 + (50/60) \cdot .4 = .73$ , Commercial Drive on SW Quadrant remains open.
E Main Street									
Zone ID	Scenario ID	Crossing	Street	Warning Device	SSM/ASM	SSM Effect	ASM Effect	Risk Index	Comments
51735	60826	084560N	Main St	Gates	0	0		40,334.66	
					4	0.82		7,260.24	
					13	0.75		10,083.67	Assumed .75 reduction due to Proximity of Butler St and Railroad Ave
					Mod (13)		0.43	23,125.21	$(14/60) \cdot .4 + (50/60) \cdot .4 = .43$

**ALTERNATIVE 2**

Evaluates the corridor for Alternative improvements and scoring.

The following locations have the same scoring and improvements as Alternative 1:

Fryelands Blvd, 179th Ave SE, and E Main St.

The following locations represent these improvement changes for Alternative 2:

**N Kelsey St 084565X RR MP 1769.140**

The improvements proposed are the following:

Quiet Zone Improvement:

- Install Non-Mountable Medians (ASM)
- Removal of Driveway on the SW Quadrant.

Proposed Additional Safety Improvements:

- MUTCD: Regulatory and Warning Signage R8-8 (Do not Stop on Tracks), W10-1 (Highway-Rail Crossing Advanced Warning), W10-9P (No Train Horn Advanced Warning), and pavement markings.
- Update ADA detectible warning surfaces.

City Safety:

- Add pedestrian barrier fencing.
- Relocate bus stop.
- Extend sidewalk.
- Review traffic signal and rail signal pre-emption timing.
- Evaluate channelization improvements.

Railroad Signals: (By BNSF)

- Upgrade to LED lamps, add warning bell, and add pedestrian warning flashers.

BNSF Recommended Improvements:

- Upgrade existing constant warning time circuitry.

Alternative score scenarios were evaluated and shown in **Table 17** (page 35).

SSM 4-Quad Gates Upgrade from 2-Quad Gates.

SSM Non-Traversable Curb medians with or without Channelization Devices

The difference in improvements comparing Alternative 1 to Alternative 2 at N Kelsey St. Alternative 1 includes closing the commercial driveway on the NE quadrant.

**N Lewis St 084564R RR MP 1768.780**

The improvements proposed are the following:

Quiet Zone Improvement:

- Install Non-Mountable Medians on north side of N Lewis St (ASM).
- Install Exit Gate on south side of N Lewis St (ASM).

Proposed Additional Safety Improvements:

- MUTCD: Regulatory and Warning Signage R8-8 (Do not Stop on Tracks), W10-9P (No Train Horn Advanced Warning) and pavement markings.
- Update ADA detectible warning surfaces.

Railroad Signals: (By BNSF)

- Upgrade to LED lamps and add warning bell.

BNSF Recommended Improvements:

- Upgrade existing constant warning time circuitry.

Alternative score scenarios were evaluated and shown in **Table 17** (page 35).

SSM 4-Quad Gates Upgrade from 2-Quad Gates.

**ALTERNATIVE 2 RESULTS**

The quiet zone process includes the implementation of safety improvements known as Supplemental Safety Measures (SSMs) or Alternative Safety Measures (ASMs) to reduce the Quiet Zone Risk Index (QZRI) to less than or equal to the National Significant Risk Threshold (NSRT) or the Risk Index with horns (RIWH) to qualify as a quiet zone.

**Table 16 Alternative 2 Results**

<b>Corridor QZRI Alternative 2</b>		<b>32,086.69</b>
Risk Index with Horns	RIWH	37,983.14
National Significant Risk Threshold	NSRT	13,811.00

Alternative 2 is lower than the RIWH, but not lower or equal to the NSRT. **Table 17** Alternative 2 Risk Index Results per location reflects the analysis of the Alternatives for the corridor per each location with appropriate Risk Indexes for the Improvements.

**Table 17 Alternative 2 Risk Index Results Per Location**

Fryelands Blvd									
Zone ID	Scenario ID	Crossing	Street	Warning Device	SSM/ASM	SSM Effect	ASM Effect	Risk Index	Comments
51739	60830	084571B	Fryelands Blvd	Gates	0	0		43,561.06	
					4	0.82		7,840.99	
					13	0.8		8,712.21	
					Mod (13)		0.64	15,681.98	(36/60)*.4 + .4 = .64
179th Ave SE									
Zone ID	Scenario ID	Crossing	Street	Warning Device	SSM/ASM	SSM Effect	ASM Effect	Risk Index	Comments
51738	60829	084570U	179th Ave SE	Gates	0	0		40,040.78	
					4	0.82		7,207.34	
					13	0.8		8,008.16	
					Mod (13)		0.47	21,355.08	(10/60)*.4 + .4 = .47
N Kelsey St									
Zone ID	Scenario ID	Crossing	Street	Warning Device	SSM/ASM	SSM Effect	ASM Effect	Risk Index	Comments
51736	60827	084565X	Kelsey St	Gates	0	0		152,753.16	
					4	0.82		27,495.57	
					13	0.8		30,550.63	
					Mod (13)		0.40	91,651.89	(10/60)*.4 + (50/60)*.4 = .40, Commercial Driveway on NE Quadrant remains in place.
N Lewis St									
Zone ID	Scenario ID	Crossing	Street	Warning Device	SSM/ASM	SSM Effect	ASM Effect	Risk Index	Comments
51737	60828	084564R	Lewis St	Gates	0	0		40,089.78	
					4	0.82		7,216.16	
					13	0.8		8,017.96	
					Mod (13,6)		0.79	8,619.30	.4 + .385 = .785, Commercial Drive on SW Quadrant remains open. Exit Gate is assumed on SW Quadrant and No Median
E Main Street									
Zone ID	Scenario ID	Crossing	Street	Warning Device	SSM/ASM	SSM Effect	ASM Effect	Risk Index	Comments
51735	60826	084560N	Main St	Gates	0	0		40,334.66	
					4	0.82		7,260.24	
					13	0.75		10,083.67	Assumed .75 reduction due to Proximity of Butler St and Railroad Ave
					Mod (13)		0.43	23,125.21	(14/60)*.4 + (50/60)*.4 = .43

**ALTERNATIVE 3**

Evaluates the corridor for Alternative improvements and scoring. Fryelands Blvd, 179th Ave SE, E Main St, and N Lewis St locations have the same scoring and improvements as Alternative 1 with N Kelsey St improvements as Alternative 2.

### ALTERNATIVE 3 RESULTS

The quiet zone process includes the implementation of safety improvements known as Supplemental Safety Measures (SSMs) or Alternative Safety Measures (ASMs) to reduce the Quiet Zone Risk Index (QZRI) to less than or equal to the National Significant Risk Threshold (NSRT) or the Risk Index with horns (RIWH) to qualify as a quiet zone.

**Table 18 Alternative 3 Results**

<b>Corridor QZRI Alternative 3</b>		<b>32,500.95</b>
Risk Index with Horns	RIWH	37,983.14
National Significant Risk Threshold	NSRT	13,811.00

Alternative 3 is lower than the RIWH, but not lower or equal to the NSRT. **Table 19** (below) are the Alternative 3 Risk Index Results per location reflects the analysis of the Alternatives for the corridor per each location with appropriate Risk Indexes for the Improvements.

**Table 19 Alternative 3 Risk Index Results Per Location**

Fryelands Blvd									
Zone ID	Senario ID	Crossing	Street	Warning Device	SSM/ASM	SSM Effect	ASM Effect	Risk Index	Comments
51739	60830	084571B	Fryelands Blvd	Gates	0	0		43,561.06	
					4	0.82		7,840.99	
					13	0.8		8,712.21	
					Mod (13)		0.64	15,681.98	(36/60)*.4 + .4 = .64
179th Ave SE									
Zone ID	Senario ID	Crossing	Street	Warning Device	SSM/ASM	SSM Effect	ASM Effect	Risk Index	Comments
51738	60829	084570U	179th Ave SE	Gates	0	0		40,040.78	
					4	0.82		7,207.34	
					13	0.8		8,008.16	
					Mod (13)		0.47	21,355.08	(10/60)*.4 + .4 = .47
N Kelsey St									
Zone ID	Senario ID	Crossing	Street	Warning Device	SSM/ASM	SSM Effect	ASM Effect	Risk Index	Comments
51736	60827	084565X	Kelsey St	Gates	0	0		152,753.16	
					4	0.82		27,495.57	
					13	0.8		30,550.63	
					Mod (13)		0.40	91,651.89	(10/60)*.4 +(50/60)* .4 = .40, Commercial Driveway on NE Quadrant remains in place.
N Lewis St									
Zone ID	Senario ID	Crossing	Street	Warning Device	SSM/ASM	SSM Effect	ASM Effect	Risk Index	Comments
51737	60828	084564R	Lewis St	Gates	0	0		40,089.78	
					4	0.82		7,216.16	
					13	0.8		8,017.96	
					Mod (13)		0.73	10,690.61	.4 +(50/60)* .4 = .73, Commercial Drive on SW Quadrant remains open.
E Main Street									
Zone ID	Senario ID	Crossing	Street	Warning Device	SSM/ASM	SSM Effect	ASM Effect	Risk Index	Comments
51735	60826	084560N	Main St	Gates	0	0		40,334.66	
					4	0.82		7,260.24	
					13	0.8		8,066.93	
					Mod (13)		0.43	23,125.21	(14/60)*.4 +(50/60)* .4 = .43

## CHAPTER 4: CAPITAL & MAINTENANCE COSTS, FUNDING, RIGHT OF WAY NEEDS

### CAPITAL AND MAINTENANCE COSTS

This Study looked at capital and quantitative maintenance costs for both the City and BNSF at a high level. There is long-term maintenance cost for adding crossing gates at the rail crossings. This is a cost that is born to the City to pay BNSF annually. For example, the costs would be greater long term for converting 2-Quad Gate Systems to 4-Quad Gate Systems. Additionally, increase in BNSF rail components for that signal system sometimes requires replacement of the BNSF Bungalows at each location.

To mitigate capital and maintenance costs there are proposed pedestrian flashers in lieu of pedestrian crossing gates for some of the Alternative locations. Alternative 2 reflects the installation of (1) one exit gate at N Lewis Street. To improve the Corridor Quiet Zone Score, N Kelsey St explored the City cost to relocate a commercial driveway which had significant right of way and capital costs associated with this improvement. Alternative 1, due to that relocation, is higher in costs. The following Table shows the costs per location if Federally funded.

**Table 20 High Level Cost Estimates Assuming Federal Funding**

		Alternative 1	Alternative 2	Alternative 3
<b>Frylands Blvd</b>	PE/NEPA/RW	\$ 126,428	\$ 126,428	\$ 126,428
	City CN	\$ 134,552	\$ 134,552	\$ 134,552
	BNSF CN	\$ 257,429	\$ 257,429	\$ 257,429
	<b>TOTAL</b>	<b>\$ 518,408</b>	<b>\$ 518,408</b>	<b>\$ 518,408</b>
<b>179th Ave SE</b>				
PE/NEPA/RW	\$ 160,000	\$ 160,000	\$ 160,000	
City CN	\$ 208,436	\$ 208,436	\$ 208,436	
BNSF CN	\$ 257,429	\$ 257,429	\$ 257,429	
<b>TOTAL</b>	<b>\$ 625,865</b>	<b>\$ 625,865</b>	<b>\$ 625,865</b>	
<b>N Kelsey St</b>				
PE/NEPA/RW	\$ 211,450	\$ 166,750	\$ 166,750	
City CN	\$ 249,126	\$ 182,028	\$ 182,028	
BNSF CN	\$ 257,429	\$ 257,429	\$ 257,429	
<b>TOTAL</b>	<b>\$ 718,005</b>	<b>\$ 606,207</b>	<b>\$ 606,207</b>	
<b>N Lewis St</b>				
PE/NEPA/RW	\$ 97,990	\$ 97,990	\$ 97,990	
City CN	\$ 98,828	\$ 85,436	\$ 98,828	
BNSF CN	\$ 257,429	\$ 690,791	\$ 257,429	
<b>TOTAL</b>	<b>\$ 454,247</b>	<b>\$ 874,217</b>	<b>\$ 454,247</b>	
<b>E Main St</b>				
PE/NEPA/RW	\$ 155,200	\$ 155,200	\$ 155,200	
City CN	\$ 192,294	\$ 192,294	\$ 192,294	
BNSF CN	\$ 257,429	\$ 257,429	\$ 257,429	
<b>TOTAL</b>	<b>\$ 604,923</b>	<b>\$ 604,923</b>	<b>\$ 604,923</b>	
<b>Total Corridor</b>		<b>\$ 2,921,447</b>	<b>\$ 3,229,619</b>	<b>\$ 2,809,649</b>
Range		\$3.0 M - \$ 3.5 M	\$ 3.2M - \$ 3.7 M	\$ 2.8 M - \$ 3.3 M

Legend for Table: Preliminary Engineering (PE)  
 National Environmental Policy Act (NEPA)  
 Construction (CN)  
 Million (M)

### ANTICIPATING MAINTENANCE COSTS

This section of the report discusses anticipated on going annual maintenance costs for rail crossing improvements.

### Federally Funded Improvements:

- The UTC provide this RCW: [RCW 81.53.295: Crossing signals, warning devices, etc.—Federal funds used to pay installation costs—Grade crossing protective fund—State and local authorities to pay remaining installation costs—Railroad to pay maintenance costs.](#)

Whereas current state law provides that if the crossing improvements are funded with Federal funds, the cost of on-going maintenance is born to the railroad.

If there are City constructed improvements such as pedestrian escape paths and gates those ongoing maintenance costs are born to the City. Depending on the underlying ownerships of property right of way this is either done by negotiation expanding the existing city easement to accommodate the new area or permitted improvement agreements with BNSF.

The process for the division of construction of improvements and ongoing maintenance is presented in the UTC Petition prepared by the City, agreed to by BNSF, then reviewed and approved by the UTC.

### Non-Federally Funded Improvements:

- The process for the division of construction of improvements and ongoing maintenance is presented in the UTC Petition prepared by the City, agreed to by BNSF, then reviewed and approved by the UTC. The following are the current RCW's related to costs.

<https://app.leg.wa.gov/RCW/default.aspx?cite=81.53.271> and  
<https://app.leg.wa.gov/RCW/default.aspx?cite=81.53.275>

Resources of recent annual maintenance costs as applicable to Quiet Zones:

- City of Bellingham U.S. DOT Crossing 084809E (West Laurel St Signal Modifications) July 25, 2018
  - Non-Federally Funded Annual \$0 (Replace Flashers, gates, bungalow, and constant warning).
- City of Bellingham U.S. DOT Crossing 084805C (Bayview Rd Signal Modifications) May 5, 2020
  - Non-Federally Funded Annual \$14,344.40. (Quad Gates, Bungalow, and Pedestrian Gates).

The City could expect between \$15,000 to \$25,000 annual maintenance costs payable to BNSF per Non-Federally funded crossing improvement based on City negotiations with BNSF.

### APPORTIONMENT OF COSTS

Washington State law addressed apportionment of signal installation and maintenance costs. UTC notes that Grade Crossing Protective Funds are not currently available for maintenance costs.

#### **RCW 81.53.295**

**Crossing signals, warning devices, etc.—Federal funds used to pay installation costs—Grade crossing protective fund—State and local authorities to pay remaining installation costs—Railroad to pay maintenance costs.**

Whenever federal-aid highway funds are available and are used to pay a portion of the cost of installing a grade crossing protective device, and related work, at a railroad crossing of any state highway, city or town street, or county road at the then prevailing federal-aid matching rate, the grade crossing protective fund shall pay ten percent of the remaining cost of such installation and

related work. The state or local authority having jurisdiction of such highway, street, or road shall pay the balance of the remaining cost of such installation and related work. The railroad whose road is crossed by the highway, street, or road shall thereafter pay the entire cost of maintaining the device.

**RCW [81.53.271](#)**

Crossing signals, warning devices—Petition contents—Apportionment of installation and maintenance costs.

The petition shall set forth by description the location of the crossing or crossings, the type of signal or other warning device to be installed, the necessity from the standpoint of public safety for such installation, the approximate cost of installation and related work, and the approximate annual cost of maintenance. If the commission directs the installation of a grade crossing protective device, and a federal-aid funding program is available to participate in the costs of such installation, installation and maintenance costs of the device shall be apportioned in accordance with the provisions of RCW [81.53.295](#). Otherwise, if installation is directed by the commission, it shall apportion the cost of installation and maintenance as provided in this section:

(1) Installation:

- (a) The first twenty thousand dollars shall be apportioned to the grade crossing protective fund created by RCW [81.53.281](#); and
- (b) The remainder of the cost shall be apportioned as follows:
  - (i) Sixty percent to the grade crossing protective fund, created by RCW [81.53.281](#);
  - (ii) Thirty percent to the city, town, county, or state; and
  - (iii) Ten percent to the railroad:

PROVIDED, That, if the proposed installation is located at a new crossing requested by a city, town, county, or state, forty percent of the cost shall be apportioned to the city, town, county, or state, and none to the railroad. If the proposed installation is located at a new crossing requested by a railroad, then the entire cost shall be apportioned to the railroad. In the event the city, town, county, or state should concurrently petition the commission and secure an order authorizing the closure of an existing crossing or crossings in proximity to the crossing for which installation of signals or other warning devices shall have been directed, the apportionment to the petitioning city, town, county, or state shall be reduced by ten percent of the total cost for each crossing ordered closed and the apportionment from the grade crossing protective fund increased accordingly. This exception shall not be construed to permit a charge to the grade crossing protective fund in an amount greater than the total cost otherwise apportionable to the city, town, county, or state. No reduction shall be applied where one crossing is closed and another opened in lieu thereof, nor to crossings of a private nature.

(2) Maintenance:

- (a) Twenty-five percent to the grade crossing protective fund, created by RCW [81.53.281](#); and
- (b) Seventy-five percent to the railroad:  
PROVIDED, that if the proposed installation is located at a new crossing requested by a railroad, then the entire cost shall be apportioned to the railroad.

**RCW [81.53.275](#)**

**Crossing signals, warning devices—Apportionment when funds not available from grade crossing protective fund.**

In the event funds are not available from the grade crossing protective fund, the commission shall apportion to the parties on the basis of the benefits to be derived by the public and the railroad, respectively, that part of the cost which would otherwise be assigned to the fund: PROVIDED,

That in such instances the city, town, county or state shall not be assessed more than sixty percent of the total cost of installation on other than federal aid designated highway projects: AND PROVIDED FURTHER, That in such instances the entire cost of maintenance shall be apportioned to the railroad.

## FUNDING

Infrastructure funding comes from various sources for rail crossing improvements: City funds, State funds, and Federal funds. It is optimal for City and State budgets to reach out for Federal funding. That being the case, the cost estimate ranges for this Study include a Federal impact cost. The costs at each location would be reduced if funded by City local forces, City or State funding.

The Fixing America's Surface Transportation Act or "FAST Act" is the current Federal funding resolution extension set to end September 30, 2021. The last call for rail crossing safety projects was spring of 2020. The WSDOT administers the Federal rail crossing grant program under the Highway Safety Improvement Program (HSIP) as subcategory Railway-Highway Crossings Program<sup>11</sup> which are a Railway-Highway Crossings (Section 130) Program.<sup>12</sup> The next cycle for funds is anticipated in 2 - 3 years. This grant program is for rail safety improvements at spot locations and not the implementation of a Quiet Zone.

As part of this Study, we looked at each rail crossing in the Study area and ranked those single locations for competitive grants. \$11 million is only available Statewide for this grant call for projects.

The following are the rankings in priority of competitiveness of each location based on this safety program based on current vehicle volume, number of trains, and collision rates.

1. N Kelsey St
2. Fryelands Blvd
3. E Main St
4. 179<sup>th</sup> St SE
5. N Lewis St

It is important to weigh the additional cost of Federal funding. Federal funds carry a weight of additional costs. If a location is a lower cost, Federal funds may not be attractive at certain locations but higher in maintenance costs.

## RIGHT OF WAY NEEDS

Based on review from the Diagnostic Team permanent easements may need to be adjusted for pedestrian paths behind the gates, as shown in the exhibits **APPENDIX C**. Projected costs are included in the Preliminary Engineering high level cost estimates. The majority of the locations only impact right of way for the new pedestrian paths behind the gates. The following are the exceptions.

Alternative 1 carries the most right of way impact to the City/Private properties. Closing the commercial driveway on the NE Quadrant at N Kelsey St would impact Rite Aid parking, circulation, and landscaping. A temporary construction easement may be required for closing the driveway at the SW Quadrant. Alternative 1, 2, and 3 at E Main St plans to remove a pedestrian trail west of E Main St and between the rail tracks and Butler St all on BNSF property.

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<sup>11</sup> <https://www.wsdot.wa.gov/localprograms/traffic/railway-crossings-program>

<sup>12</sup> <https://safety.fhwa.dot.gov/hsip/xings/>

## CHAPTER 5: EVALUATION CRITERIA AND FRAMEWORK

### EVALUATION CRITERIA AND FRAMEWORK DEVELOPMENT

**Evaluation:** This task developed criteria used to evaluate the various engineering Alternatives such as, the community identified priorities of noise reduction, ranking of Corridor Quiet Zone scores, safety benefit, capital cost, quantitative maintenance needs and costs, right of way impacts, ease of implementation, and/or other appropriate measures. Additionally, this task develops a proposed framework (ranking/scoring matrix) by which the Corridor Quiet Zone is evaluated based on the identified criteria for a cost-benefit score. The cost benefit score is derived by the benefit divide by the estimated cost in millions.

**Framework:** The framework is a methodology for evaluating and ranking the various engineering Alternatives filtered in Step 2 Preliminary Screening.

The Alternatives developed included implementation of various quiet zone standards (as applicable).

The purpose of evaluating prominent road-rail conflicts and developing an evaluation process is to identify and prioritize investments at each location that meets the framework process.

### APPROACH AND ASSUMPTIONS

Through an existing conditions evaluation Chapter 2, field work for site reconnaissance and data collection methodology, literature/internet reviews, historic knowledge, and ongoing discussions, it was recognized that each at grade crossing is different in terms of road, rail, and other modal uses and operations, geometries, surrounding land uses, control devices, noise, and operational impacts.

### CRITERIA AND EVALUATION

Various criteria were used to evaluate and rank each crossing improvement relative to their location. Also, within the criteria, various measurements, both qualitative and quantitative, were used and applied as summarized by the following:

**1. Corridor QZRI Rank Scores:** This is a technical based score and according to FRA rules. Some locations cannot install full SSMs due to geometric issues; thus, all the locations have SSMs. In all cases all three (3) Alternatives are lower than the RIWH. Compared to the existing Corridor QZRI score, which is almost double the RIWH.

Ranking 1 is a low score, ranking 4 is a high score related to the math of the Corridor QZRI.

**2. Planning Level Cost Estimate:** This includes high level capital cost estimate with a range of costs to account for later year construction.

Ranking 1 is a low score, ranking 4 is a high score related to the costs.

Maintenance costs are quantitative, giving accounting for higher City born BNSF maintenance costs with improvements to the rail crossing signal system.

Ranking 1 is a low score, ranking 4 is a high score related to the quantitative maintenance costs.

**3. Section 130 Grant Funds Success:** Early in this process there was an evaluation of each location for competitive grant funds. Those locations are ranked in the previous chapter. All the locations would be eligible for this grant program.

Typical projects funded by Section 130 are listed below but are not limited to:

- Any public grade crossings that include roadways, bike trails and pedestrian paths.
- Preliminary engineering/design, right of way, and construction phases of projects are eligible for funding.
- The closure of any public railroad crossing(s).
- Safety improvements for Pedestrians and Bicyclists at crossing(s).
- Installation of new crossing protective devices.
- Upgrading existing crossing protective devices.

Crossings are selected by WSDOT staff for inclusion into a funding list based on risk potential, Practical Solutions and cost effectiveness:

- Eliminating or consolidating crossings to help mitigate risk.
- Crash history and trends recorded at the location.
- High Vehicle and train volumes at crossing.
- Pedestrian/Bicyclist path crossing inadequate.
- Crossing geometry.
- Sight Distance is inadequate.
- Other Railroad Items that address safety.

All locations are rated Yes to score related to the quantitative success of future Federal funds in the future.

**4. Crossing Safety Benefit:** Relating to eliminating the likelihood and severity of potential crashes at the existing crossing for each type of improvement. This includes a range of factors including number of tracks at the crossing, the roadway classification, traffic volumes, pedestrian/bicycle volumes, speeds of trains, rail traffic, visibility, pedestrian collision history, vehicle collision history, and geometry. The recommendation is not to use a standard hazard index ranking system due to the complex nature of understanding by the public.

The full definition and application of the rail hazard index ranking system is in **APPENDIX D**. A hazard index for each public rail-highway crossing in a state is calculated annually using Federal Railroad Administration (FRA) formulas and guidelines. The Railroad-Highway Grade Crossing Handbook – Revised Second Edition (the handbook) is used as a basis for the hazard index calculation and is a single reference document based on the prevailing and best practices as well as adopted standards relative to rail-highway crossings. It is a predictability model for future risks in Safety. This report took the approach of setting up the criteria to measure crossing safety benefit importance to the public instead of a complex hazard index matrix for safety. The methodology was utilized to sort locations for grant funding competition success in priority order.

The potential ratings are 1 (low benefit), 2 – 3 (medium benefit), and 4 (high benefit).

- A low benefit of 1 is assigned if there is risk of human error with the improvement.
- A medium benefit of 2 - 3 is assigned if there are permanent preventive measures with the improvement, but still an element of human error with the improvement.
- A high benefit of 4 is assigned if the improvement installs permanent measures that eliminate the risk of human errors.

Listed for reference are the corridor average of the Exposure Index Scores as measured by the number of vehicles and daily train average. Each rail crossing location has a different exposure score, the average is listed for reference. Also listed for reference are the historical number of collisions and fatalities at the total of the corridor locations.

**5. Right of Way Impact:** There is a previous discussion in the early chapter on which Alternatives have right of way impact.

Ranking is set by high, medium, and minimal as a qualitative look at right of way impacts across the Alternatives.

**6. Cost-Benefit:** Is the Benefit summed divided by the estimated cost in millions.

This higher the number the more cost-benefit of the improvement Alternative. Alternative 3 results as the preferred Alternative with the highest cost-benefit score.

**7. Train Noise (Horns):** This benefit was not added to the matrix as all Alternatives relate to benefit of implementing noise reduction measures. There are economic benefits to land use and there are current environmental impacts expressed as concerns today by the surrounding residents and businesses.

## CHAPTER 6: EVALUATION PROCESS & RESULTS

Evaluation criteria are critical to understanding the differences between crossings and to rank the various options. This section tabulates the evaluation process outlined in previous sections.

### EVALUATION PROCESS AND RESULTS SUMMARY

This Study recommends a preferred Corridor Alternative. Alternative 3 is ranked the highest of the Alternative in Cost-Benefit and shown in **Table 21**.

**Table 21 Corridor Alternatives Rankings**

IMPROVEMENT ALTERNATIVES	EXISTING CONDITIONS	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
<b>4 = High Score and 1 = Low</b>				
<b>Corridor QZRI</b>	<b>63,355.89</b>	<b>27,409.18</b>	<b>32,086.69</b>	<b>32,500.95</b>
Risk Index with Horns	37,893.14	37,893.14	37,893.14	37,893.14
National Significant Risk Index	13,811.00	13,811.00	13,811.00	13,811.00
Ranking	1.00	4.00	3.00	2.00
<b>Planning Level Cost Estimate</b>	<b>\$ -</b>	<b>\$ 2,921,447</b>	<b>\$ 3,229,619</b>	<b>\$ 2,809,649</b>
Rough Order of Magnitude Costs	\$ -	\$3.0 M - \$ 3.5 M	\$ 3.2M - \$ 3.7 M	\$ 2.8 M - \$ 3.3 M
Ranking	4.00	2.00	1.00	3.00
Maintenance Cost Ranking City	Low	Low	Low	Low
Maintenance Cost Ranking BNSF to City Costs	Low	Med	Med	Med
Ranking	1.00	2.00	2.00	2.00
<b>Section 130 Grant Funds Success</b>	<b>No</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>
Ranking	1.00	3.00	3.00	3.00
<b>Safety Benefit</b>				
Exposure Index Scores AADT Vs Daily Trains Avg	138,503	138,503	138,503	138,503
Number of Collisions	29	29	29	29
Number of Fatal Collisions	7	7	7	7
Improvement Countermeasure Benefit	No	Yes	Yes	Yes
Ranking	1.00	4.00	4.00	4.00
<b>Right of Way Impact</b>	<b>No</b>	<b>Yes</b>	<b>Minimal</b>	<b>Minimal</b>
Ranking	4.00	1.00	3.00	3.00
<b>Benefit Score</b>	<b>12</b>	<b>16</b>	<b>16</b>	<b>17</b>
<b>Cost - Benefit</b>	<b>NA</b>	<b>5.3</b>	<b>5.0</b>	<b>6.1</b>
<b>Summary</b>				Highest Cost - Benefit
<b>PREFERRED ALTERNATIVE</b>	<b>Alternative 3</b>			

The following graphics (begin on page 44) reflect Alternative 3. While Alternative 1 has a lower risk score, Alternative 3 has a lower cost. All locations provide improved safety benefits as countermeasures to collision incidences.

### SUMMARY OF QZRI SCORE CALCULATIONS

Following the Diagnostic Team meeting November of 2020 and comments from the FRA, the QZRI scores were updated to account for creditable median lengths based on SSMs as defined by FRA. This is applied to an SSM. All the proposed improvements are ASMs and will be recalculated accordingly in the Public Authority Application.

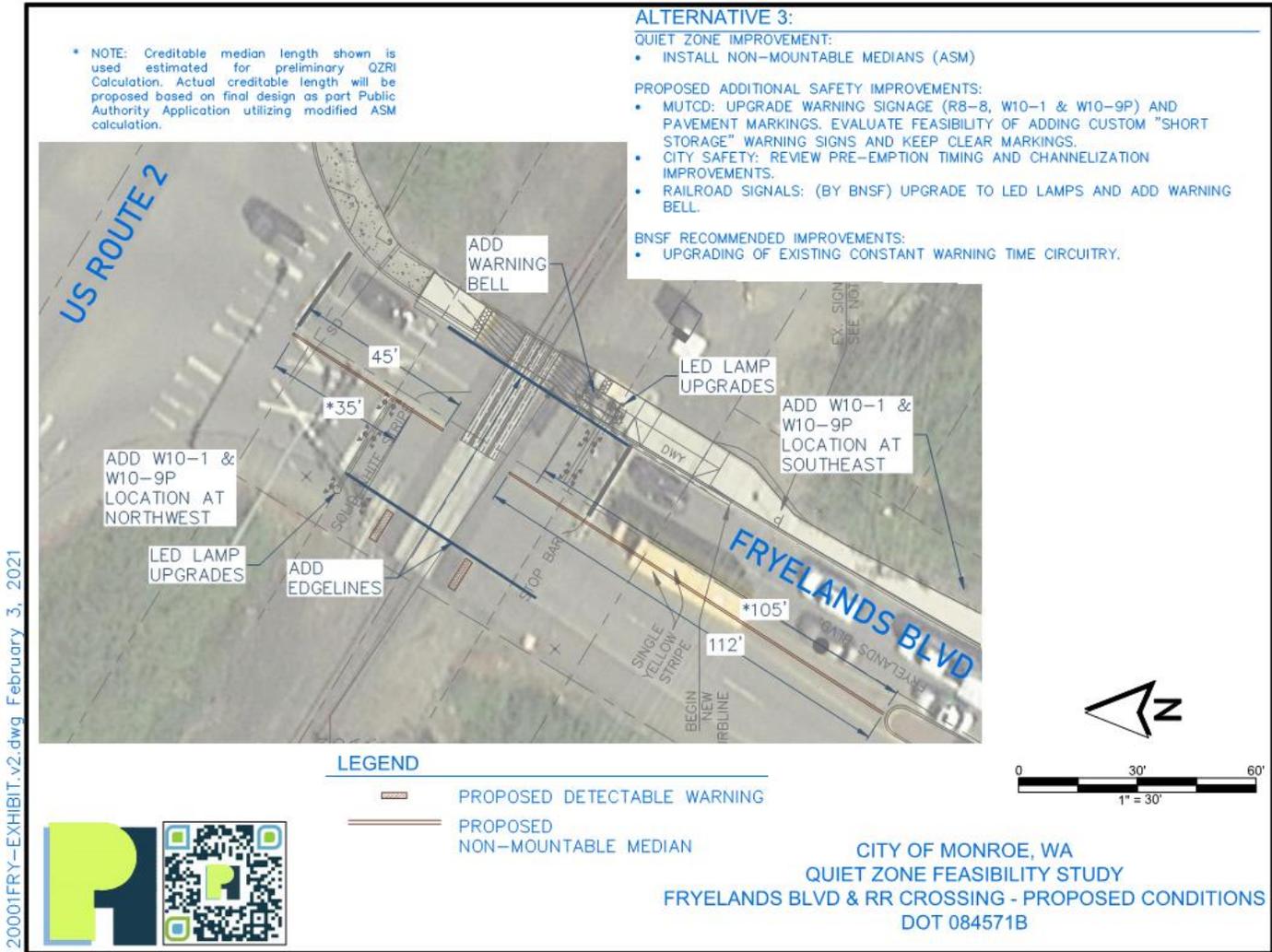


Figure 11 Alternative 3 Frylands Blvd Crossing and Location

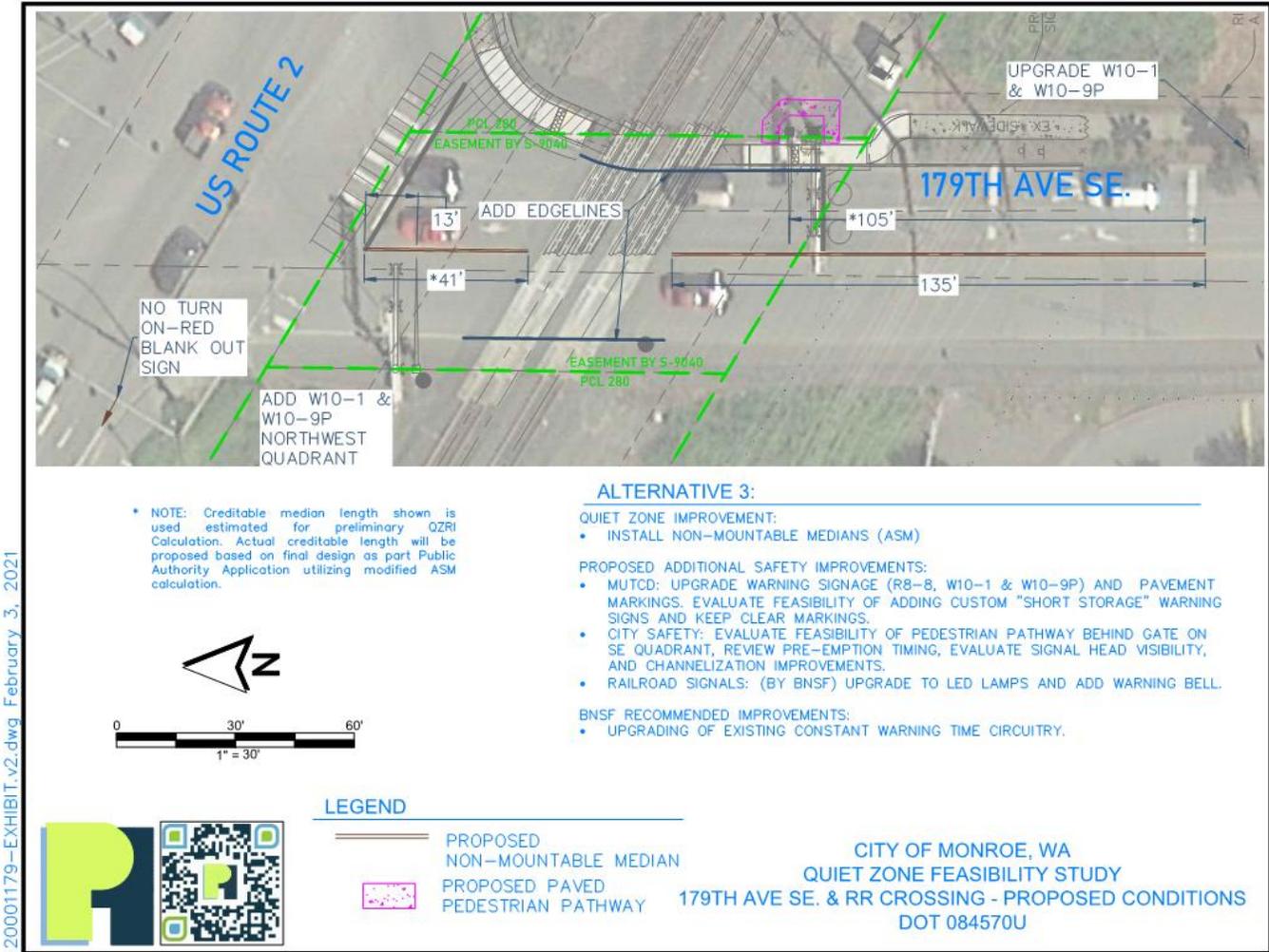
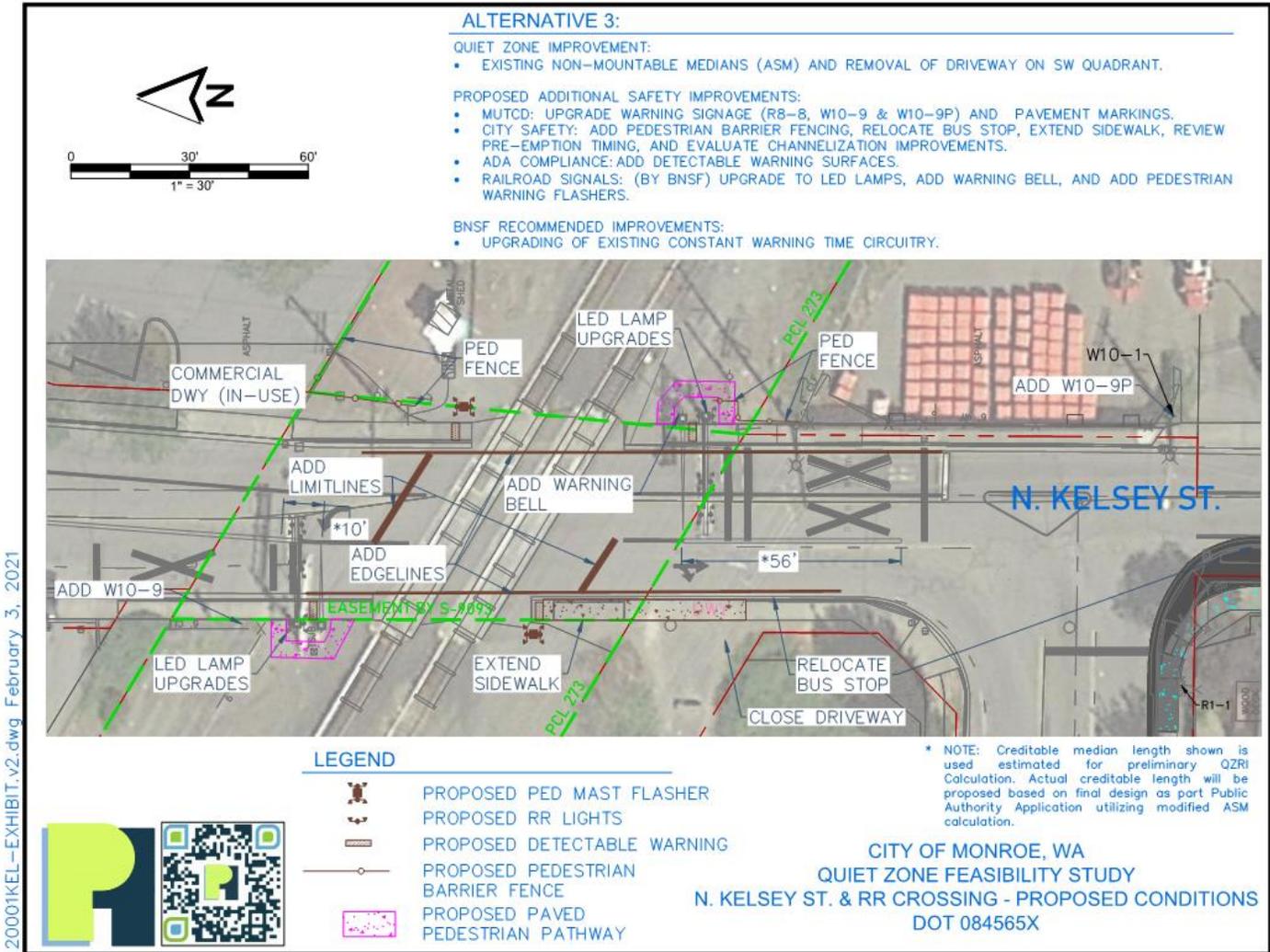


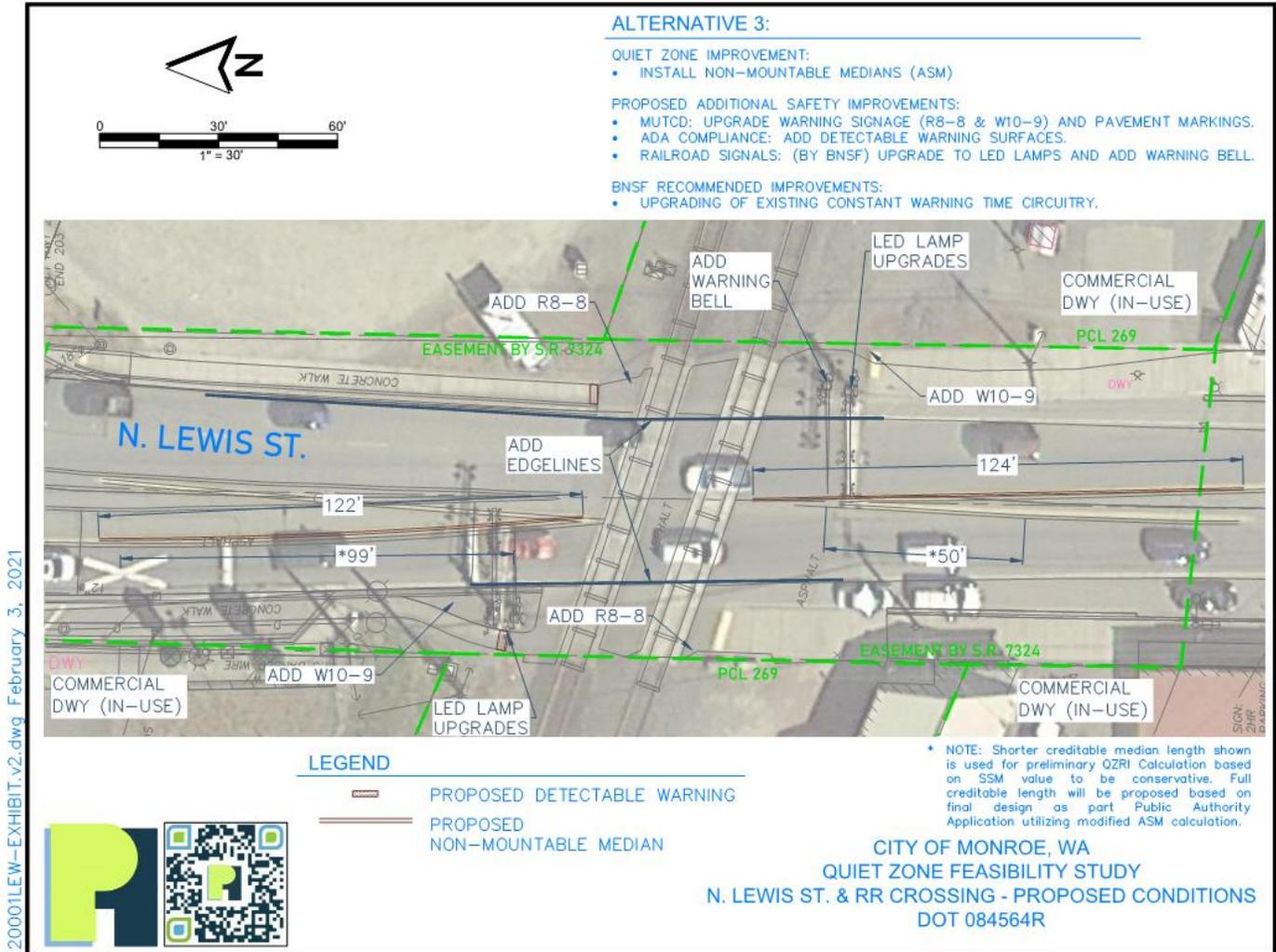
Figure 12 Alternative 3 179<sup>th</sup> Ave SE Crossing and Location



20001KEL-EXHIBIT.v2.dwg February 3, 2021



Figure 13 Alternative 3 N Kelsey St Crossing and Location



20001LEW-EXHIBIT.v2.dwg February 3, 2021



Figure 14 Alternative 3 N Lewis St Crossing and Location

20001MAIN-EXHIBIT.v2.dwg, February 3, 2021

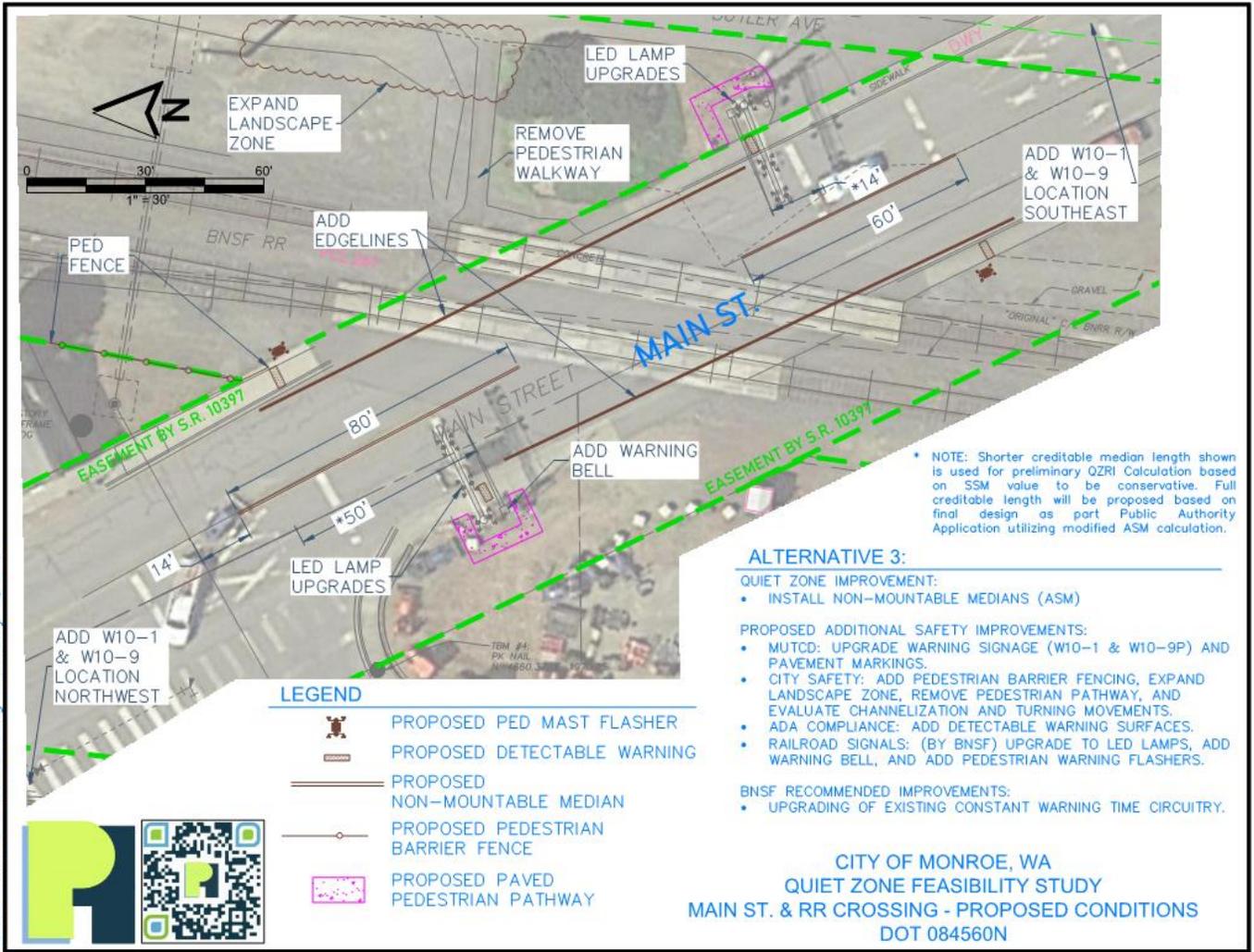


Figure 15 Alternative 3 E Main St Crossing and Location

## OVERVIEW OF NEXT STEPS:

1. City Agreement for engagement with BNSF for Diagnostic and rail signal pre-emption review. Completed November 2020.
2. Diagnostic Meeting with BNSF, UTC, FRA, WSDOT, and City. Completed November 2020.
3. Finalize report following City and Stakeholder Review (FRA, UTC, WSDOT, BNSF, and AMTRAK. Completed April 2021.
4. Notice of Intent (NOI).
5. City works with UTC staff to submit required UTC petition authorizing modifications at each crossing at the time of each crossing improvement.
6. City of Monroe submits Public Authority Application.
7. Provide final inspection of quiet zone improvements to verify FRA requirements are met.
8. Notice of Quiet Zone Establishment (NOE).
9. Technical Memorandum which includes the history of this process.  
It is important to note that the QZRI scores may change with time. A five-year collision history is part of the QZRI scores. Some locations may drop collisions or add collision dependent upon the timeline for each location's improvements.

APPENDIX A  
DIAGNOSTIC MEETING RECORD

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11.18.2020

**BNSF Railway Quiet Zone Corridor  
Feasibility Study and Kelsey St Section 130  
Diagnostic Meeting Notes  
City of Monroe, WA**

The City of Monroe (City), in its effort to explore the possibility of establishing a Quiet Zone along the BNSF Railway (Railroad) corridor through their community, requested a diagnostic meeting with stakeholders to present proposed safety improvements. The diagnostic meeting was held on November 18, 2020 in Monroe, WA.

Attendees are listed on Sign-in Sheet (Attachment A.)

The proposed Quiet Zone Corridor includes the following crossings:

Street or Road Name	DOT No.	Railroad Milepost (MP)	Subdivision	Nearest Parallel Street
Main St	084560N	1768.572	NW-Scenic	Butler St
N Lewis St (SR203)	084564R	1768.780	NW-Scenic	E Stretch St
Kelsey St	084565X	1769.140	NW-Scenic	Blueberry Lane
179 <sup>th</sup> Ave SE	084570U	1769.796	NW-Scenic	SR-2
Fryelands Blvd	084571B	1770.660	NW-Scenic	SR-2

The team met at Main St crossing to begin field inspections. After a Safety briefing by BNSF Railway, Scott Peterson and Pablo Para provided the general background for the proposed quiet zone corridor along the Railroad corridor.

**Post Diagnostic Meeting Notes:**

The study team attended a video conference with the Federal Railroad Administration on December 18, 2020 to review the diagnostic meeting performed. FRA was unable to attend the diagnostic field visit. The purpose of the follow-up meeting was to document concurrence and additional input into the feasibility review of the Quiet Zone Plans.

**Quiet Zone Plans:**

The proposed quiet zone consists of five public crossings located along the BNSF Railway rail corridor between Main St (east) and Fryelands Blvd (west). The City has an on-going corridor Quiet Zone feasibility study which has reviewed all the grade crossings and developed preliminary recommendations for the Quiet Zone improvements. Pablo discussed the City’s plan to establish the Quiet Zone using the Public Authority Application (PAA) process by implementing a combination of SSM’s and ASM’s at the five crossings pursuant to FRA Train Horn Rule, 49 CFR Part 222. These treatments and additional safety measures which are not a requirement of the FRA Train Horn Rule are depicted in the draft layouts provided in Attachment B.

FRA Pre-Meeting Notes: Jeff Stewart (FRA) provided the following general comments/questions prior to field diagnostic meeting.

- Ensure measurement of median used in Quiet Zone Risk Index (QZRI) calculations is from gate tip to nearest driveway or roadway. Try to attain 100 feet of median where possible.
- Are the existing tracks and siding’s constant warning time?
- Please note that FRA Train Horn Rule does not require installation of certain improvements such as additional warning bells.

FRA Post Meeting Notes: Jeff Stewart (FRA) provided the following input:

- Questions were sent to Tammy Wagner (FRA) regarding confirmation of creditable length of medians on skewed intersections with the rail crossing and how that should be measured for total amount of median planned and credit to SSM or ASM.
- Tammy Wagner (FRA) confirmed with a figure that the measurement is from the gate arm to the yellow dot in the pictured exhibit below, with this statement: “If the proposed median length is less than 60 feet, the safety measure is considered an ASM. If more than 60 feet, the median qualifies as an SSM”.

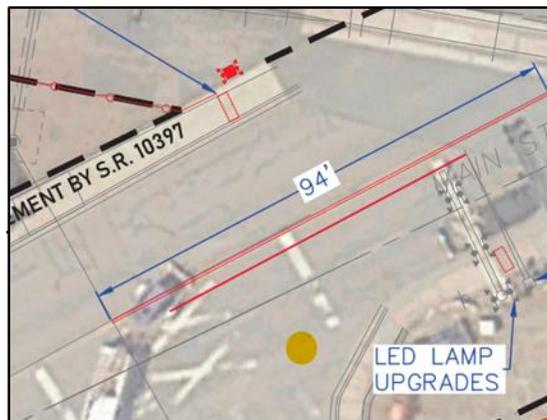


Figure 1 Main Street Crossing Snapshot FRA Creditable Median Length

- Jeff Stewart (FRA) requested the exhibits be updated to show the measurements at all five (5) locations depicting the length of the medians, length of the credit proposed in the QRZI scores. In addition to all locations confirm active use of open commercial driveways, use by railroad access, and/or commercial use to determine creditable median lengths.
- Jeff Stewart (FRA) sent follow notes for meeting documentation on 1/21/2021: regarding the Main St and Lewis crossings – SSM qualifying medians are not possible due to the proximity of intersections and commercial driveways. Others will also need to be reviewed for SSM qualifying medians.

General Notes/Quiet Zone Recommendations:

- Grade Crossing Inventory forms have been updated as of 7/27/2020.
- BNSF Railway confirmed that all mainline rail crossings and spur lines are currently protected by constant warning circuitry. BNSF also noted that the existing circuitry is obsolete and may require upgrading.
- Where possible, the diagnostic team recommends providing pedestrian pathway behind railroad gates at all locations.
- City will evaluate design vehicle turning movements at critical locations to ensure medians do not create operational/ safety concern.
- Diagnostic team recommends providing street lighting at grade crossings if feasible.

FRA Post Meeting Notes: Jeff Stewart (FRA) provided the following input:

- FRA concurred with BNSF recommendations with BNSF noting updating all mainline rail crossings and spur lines are currently protected by constant warning circuitry. BNSF also noted that the existing circuitry is obsolete and may require upgrading to include BNSF Bungalows and possible relocations.

General Non-Quiet Zone Comments-Action Items:

- Diagnostic team recommends minimum MUTCD (W10-1) warning signage be installed at all crossings where not currently in place. City and WSDOT agreed to review existing signage/markings deficiencies and program installation.
- Recommendation for City and WSDOT to mitigate any deficiencies with non-compliance with MUTCD as soon as possible.
- Diagnostic team recommends City provide edge line markings through crossings to better define edge and prevent vehicles turning onto railway. City agreed to implement as part of regular striping/maintenance program.

### **Main St - DOT 084560N: SSM Non-Mountable Medians**

The proposed quiet zone treatment for the Main St crossing will be SSM compliant non-mountable medians. Due to nearby roadways the median lengths are limited to approximately 70 feet to the south and 90 feet to the north. In addition, the City proposes to install supplemental pedestrian active warning lights (by BNSF) on the SW and NE quadrants, install supplemental warning bell on the SE quadrant (by BNSF), upgrade existing warning lamps to LED's (by BNSF) as applicable, install fencing along the SW quadrant, remove a paved pathway and expand landscaping on the NW quadrant, and add MUTCD compliant RR Crossing warning signage and markings.

BNSF expressed concern about the operations of the intersection of Butler St /commercial driveway access with Main St on the NE quadrant of the crossing. BNSF requested that City evaluate channelization, sight distance, adding side RR flashers for Butler Avenue crossing approach, and access improvements at this location. BNSF had the additional following comments:

- Requested providing pedestrian pathway behind railroad gates if possible.
- Requested installation of advance RR Crossing warning signage as soon as possible. BNSF Post Diagnostic comment: (W10-signs on Main Street and W10-4(RT) on signs on Railroad Avenue and Butler Avenue) per MUTCD standards.
- Recommended evaluation of turning templates for design vehicle.
- Make sure proposed fence meets MUTCD requirements and is not a sight obstruction for pedestrians approaching the grade crossing.
- Evaluate location of stop lines relative to gate down position.
- Update FRA Inventory form to reflect that school buses use the grade crossing if applicable.
- Evaluate limiting movements to/from Butler Avenue and/or the adjacent shopping center.
- Further refining the Butler Avenue Roadway limits versus shopping center driveway limits.

Diagnostic team concurs with proposed Quiet Zone treatment of non-mountable medians. City agreed to evaluate the BNSF recommendations and revise proposed layouts accordingly to incorporate feasible improvements as required by FRA Train Horn Rule and to support safe operations.

### **N Lewis St - 084564R: SSM Non-Mountable Median**

The proposed quiet zone treatment for the N Lewis St crossing will be SSM compliant non-mountable medians. Median lengths are proposed to exceed 100' on both approaches. In addition, the City proposes to install supplemental warning bell on the SE quadrant (by BNSF), upgrade existing warning lamps to LED's (by BNSF) as applicable, and add MUTCD compliant warning signage and markings.

BNSF requested evaluation of edge line striping extensions, 'Do Not Stop on Tracks' signs due to reported queuing concerns, installing northbound channelization to discourage vehicles from turning onto RR ROW in northeast quadrant due to past incidents of vehicles hitting the RR signal cabinet, and investigation of reported vehicles driving over the curb in the SW quadrant.

Diagnostic team concurs with proposed Quiet Zone treatment of non-mountable medians. City will incorporate requested signage into proposed crossing layouts and will review reported vehicle activity to determine if any additional countermeasures are warranted.

### **N Kelsey St – 084565X: ASM Non-Mountable Median**

The proposed quiet zone treatment for the N Kelsey St crossing will be non-SSM compliant non-mountable medians. The effective median lengths are approximately 10 feet north of the crossing due to an existing driveway on the NE quadrant and approximately 50 feet south of the crossing due to the adjacent roadway. In addition, the City proposes to install supplemental pedestrian active warning lights (by BNSF) on the SW and NE quadrants, supplemental warning bell on the NW quadrant (by BNSF), upgrade existing warning lamps to LED's (by BNSF) as applicable, removal of existing drive on SW quadrant, relocation of existing transit stop on the SW quadrant, installation of barrier fencing, evaluation of advanced pre-emption timings, and upgrade MUTCD compliant warning signage and markings.

The N Kelsey St diagnostic meeting serves as both a review for the pending Section 130 Grade Crossing Safety Improvement grant project as well as the Quiet Zone Corridor project. During the site meeting the diagnostic team observed regular violations of traffic safety rules by drivers stopping on tracks, queuing over tracks in the northbound direction. Diagnostic team discussed options for mitigating NB queuing across tracks including traffic signal timing review/adjustments, adding a pre-signal, supplemental signage and markings, and police enforcement.

BNSF requested evaluation of the following for this crossing:

- Installation of Queue Cutter/Pre-Signal for NB Kelsey St.
- Installation of additional 'Do Not Stop on Tracks' signs in the northbound and southbound directions, downstream of the crossing (immediate recommendation).
- Supplemental 'keep clear' pavement markings in the northbound direction, downstream of the crossing to indicate limits of dynamic envelope (immediate recommendation).
- Adjacent land-use developments traffic impact analysis (if available).
- Removal of EB left turn movement from Blueberry Lane, towards the crossing in SW Quadrant.
- Relocation of the bus stop in the southwest quadrant.

Connie Raezer (WSDOT) recommended City provide enforcement of existing crossing to help improve compliance. Paul Snow (WSDOT) indicated Local Programs may have additional funding available to cover increased grant project scope. WSDOT Signals representatives indicated concerns with cost, operations, and maintenance of potential pre-signal. BNSF explained that a pre-signal would function as part of the downstream signal and provide better motorist guidance regarding track clearance and queue prevention at the crossing. WSDOT Signal representatives indicated they were not opposed to the pre-signal concept, however, they expressed concern with cost, operations, and maintenance of a potential pre-signal. The diagnostic team agreed to further evaluation. City doesn't support installation of pre-signal at this location due to lack of queuing related collision history or other document safety/operations concerns that can be eliminated with a pre-signal. City has agreed to implement other lower cost queue prevention measures.

Diagnostic team concurs with proposed Quiet Zone treatment of non-mountable medians. Additional discussion is necessary with WSDOT prior to finalizing grant scope and project funding agreement. City will evaluate changes to crossing improvement layout and will incorporate requested signage and markings into proposed crossing layouts.

#### Post Diagnostics Notes:

The diagnostic team recommended upgrading obsolete constant warning time circuitry (new bungalow relocated to south west quadrant) and the addition of pedestrian escape paths which would include swing exit gates.

#### Non-Quiet Zone Recommendations:

- City will request police to conduct targeted enforcement of crossing.
- Coordinate relocation of Bus Stop to south of Blueberry Lane.
- Queue prevention at crossing through signage and striping in near term.

#### **179th Ave SE – 084565X: ASM Non-Mountable Median**

The proposed quiet zone treatment for the 179<sup>th</sup> Ave SE crossing will be non-SSM compliant non-mountable medians. The effective median lengths are approximately 10 feet north of the crossing due to the adjacent roadway and over 100 feet to the south. In addition, the City proposes to install No Right Turn on Red blank out sign for EB traffic on US-2, supplemental warning bell on the SE quadrant (by BNSF), upgrade existing warning lamps to LED's (by BNSF) as applicable, evaluation of advanced pre-emption timings, and upgrade to MUTCD compliant warning signage and markings.

During site meeting City discussed current operations at intersection/crossing during Fairgrounds events. Increased pedestrians and vehicles are monitored during peak periods at the intersection by Police.

BNSF expressed concern about pedestrian operations, storage, and path of travel. BNSF requested evaluation of the following improvements for this crossing:

- Installation of Pre-Signal for NB 179<sup>th</sup> Ave SE
- Additional 'Do Not Stop on Tracks' signs in the northbound direction, downstream of the crossing (immediate recommendation)
- Supplemental 'keep clear' in the northbound direction at the crossing placed adjacent to the tracks (immediate recommendation).
- 'Short Storage Distance' signs for NB traffic downstream of the crossing if needed based on agency-determined design vehicle.

BNSF requested review of signal heads/signs on the southbound traffic signal mast arm obscuring sight of railroad warning lights. BNSF also requested edge line on NW quadrant delineate edge of travel way away from RR equipment.

Connie Raezer (WSDOT) indicated they were supportive of adding a blank out sign for eastbound right turning traffic and would look into it. WSDOT Signals representatives indicated they were not opposed to the pre-signal concept, however, they expressed concern with the cost, operations, and maintenance of a potential pre-signal. The diagnostic team agreed to further evaluation. City doesn't support installation of pre-signal at this location due to lack of collision history or other document safety/operations concerns that can be eliminated with a pre-signal.

Diagnostic team concurs with proposed Quiet Zone treatment of non-mountable medians. City will incorporate requested signage into proposed crossing layouts and revise proposed layouts accordingly to incorporate other feasible improvements as required by FRA Train Horn Rule and to support safe operations.

#### Non-Quiet Zone Recommendations:

- City will evaluate benefits of requesting railroad flagger support during peak fairground activities.
- City will further review traffic control during peak fairground events to determine if roadway flaggers are needed to help mitigate on-track queuing.

### **Fryelands Blvd– 084571B: ASM Non-Mountable Median**

The proposed quiet zone treatment for the Fryelands Blvd. crossing will be non-SSM compliant non-mountable medians. The effective median lengths are approximately 35 feet north of the crossing due to the adjacent roadway and over 100 feet to the south. In addition, the City proposes to install supplemental warning bell on the SE quadrant (by BNSF), upgrade existing warning lamps to LEDs (by BNSF) as applicable, evaluation of advanced pre-emption timings, and upgrade to MUTCD compliant warning signage and markings.

BNSF requested evaluation of the following s for this crossing:

- Installation of Queue Cutter/Pre-Signal for NB Fryelands Blvd.
- Installation of additional 'Do Not Stop on Tracks' signs in the northbound direction, downstream of the crossing (immediate recommendation).
- Supplemental 'keep clear' pavement markings in the northbound direction at the crossing placed adjacent to the tracks (immediate recommendation).
- 'Short Storage Distance' signs for NB traffic downstream of the crossing if needed for agency-determined design vehicle.
- Review Traffic Impact Analysis of adjacent land uses (if available).
- Review addition of street lighting at the crossing.

WSDOT Signals representatives indicated they were not opposed to the pre-signal concept, however, they expressed concern with the cost, operations, and maintenance of a potential pre-signal. The diagnostic team agreed to further evaluation. City does not support installation of Pre-Signal at this location due to lack of collision history or other documented safety/operations concerns that can be eliminated with a pre-signal.

Diagnostic team concurs with proposed Quiet Zone treatment of non-mountable medians. City will evaluate additional street lighting, incorporate requested signage and pavement markings into proposed crossing layouts, and revise proposed layouts accordingly to incorporate other feasible improvements as required by FRA Train Horn Rule and to support safe operations.

11.18.2020

## BNSF Railway Quiet Zone Corridor Diagnostic Meeting Attendance City of Monroe, WA

Name	Affiliation	Phone No.	Email	Initials
Scott Peterson	City of Monroe	360.863.4606	<a href="mailto:speterson@monroewa.gov">speterson@monroewa.gov</a>	SP
Pablo Para	PH Consulting	253.224.2390	<a href="mailto:pablo@phtraffic.com">pablo@phtraffic.com</a>	PP
Maria Tribelhorn	PH Consulting	208.310.6077	<a href="mailto:maria@phtraffic.com">maria@phtraffic.com</a>	MT
Stephen Semenick	BNSF Railway	206.625.6152	<a href="mailto:Stephen.semenick@bnsf.com">Stephen.semenick@bnsf.com</a>	SS
Karen Hankinson	RailPros on behalf of BNSF	714.404.4812	<a href="mailto:Karen.hankinson@railpros.com">Karen.hankinson@railpros.com</a>	KH
Andrew McMahon	WA UTC		<a href="mailto:Andrew.mcmahon@utc.wa.gov">Andrew.mcmahon@utc.wa.gov</a>	AM
Jeffrey Stewart	FRA	360.558.2533	<a href="mailto:Jeffrey.p.stewart@dot.gov">Jeffrey.p.stewart@dot.gov</a>	
Mike Koidal	WSDOT Traffic	360.757.5985	<a href="mailto:koidalm@wsdot.wa.gov">koidalm@wsdot.wa.gov</a>	MK
Connie Raezer	WSDOT Rail	360.705.7459	<a href="mailto:raezerc@wsdot.wa.gov">raezerc@wsdot.wa.gov</a>	CR
Hayden Wong	WSDOT Signal Ops	206.440.4458	<a href="mailto:WongH@wsdot.wa.gov">WongH@wsdot.wa.gov</a>	HW
Martin Dedinsky	WSDOT Signal Ops	206.440.4459	<a href="mailto:DedinsM@wsdot.wa.gov">DedinsM@wsdot.wa.gov</a>	MD
Aidan Cassidy	WSDOT	206.440.4405	<a href="mailto:CassidA@wsdot.wa.gov">CassidA@wsdot.wa.gov</a>	AC
Bob Boston	WA UTC		<a href="mailto:Bob.boston@utc.wa.gov">Bob.boston@utc.wa.gov</a>	BB
Paul Snow	WSDOT		paul.snow@wsdot.wa.gov	PS
Luke Sykora	BNSF Railway	N/A	N/A	LS
Chuck Marino	BNSF Railway	N/A	N/A	CM
Kris Peterson	BNSF Railway	N/A	Kris.Peterson1@bnsf.com	KP
Steve Phillips	BNSF Railway	N/A	Steven.Phillips2@BNSF.com	SP

Note: Not all attendees were at each of the five crossing reviews.

# INSPECTION REPORT

Inspector's Name McMahon, Andrew		Inspector's Signature <i>Andrew McMahon</i>			Inspector's ID No. X5302	Report No. 1	Date yy mm dd 2021 01 06						
Railroad/Company Name & Address 806 West Main Street Monroe WA 98272				R/C C	Division N/A	RR/Co. Representative (Receipt Acknowledged) Name Scott Peterson Title Deputy City Engineer Email speterson@monroewa.gov Signature _____							
From: City MONROE		Codes 1360	Destination City & County			Codes	From Latitude						
State WA		53	City MONROE			1360	From Longitude						
County SNOHOMISH		C061	County SNOHOMISH			C061	To Latitude						
Mile Post: From 1768.57 To 1770.66			Inspection Point FIVE PUBLIC GRADE CROSSINGS				To Longitude						
Activity Code:	QZIM												
Units:	1												
Sub Units:	5												
Item	Initials/Milepost	Equipment/Track #	Type/Kind	49 CFR/USC	Defect	Subrule	Speed	Class	Train #/Site	SNFR*	RCL**	# of Occ.***	Activity Code
1										N	N	0	
Description - [** Comment to Railroad/Company **] On 11-18-2020, the UTC, BNSF, PH Consulting, Rail Pros, City of Monroe, and WSDOT met to discuss a proposed quiet zone. Field site meetings took place at five grade crossings in the City of Monroe between mileposts 1768.57 and 1770.66 (Main Street, SR 203-Lewis Street, N Kelsey Street, 179th Ave SE, Frylands Blvd). Discussions centered around alternative safety measures, warning device installations/upgrades, minimizing risk associated with lack of a train horn, and surface for pedestrian traffic.													
Seal Applied			Seal Removed			Hazard Class			UN/NA ID				
Violation Recommended				<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Latitude:			Longitude:				
Written Notification to FRA of Remedial Action is:				<input type="checkbox"/> Required <input checked="" type="checkbox"/> Optional		Railroad Action Code		Date(mm/dd/yyyy):		Comments on back?			



Fryelands  
DOT# 084571B

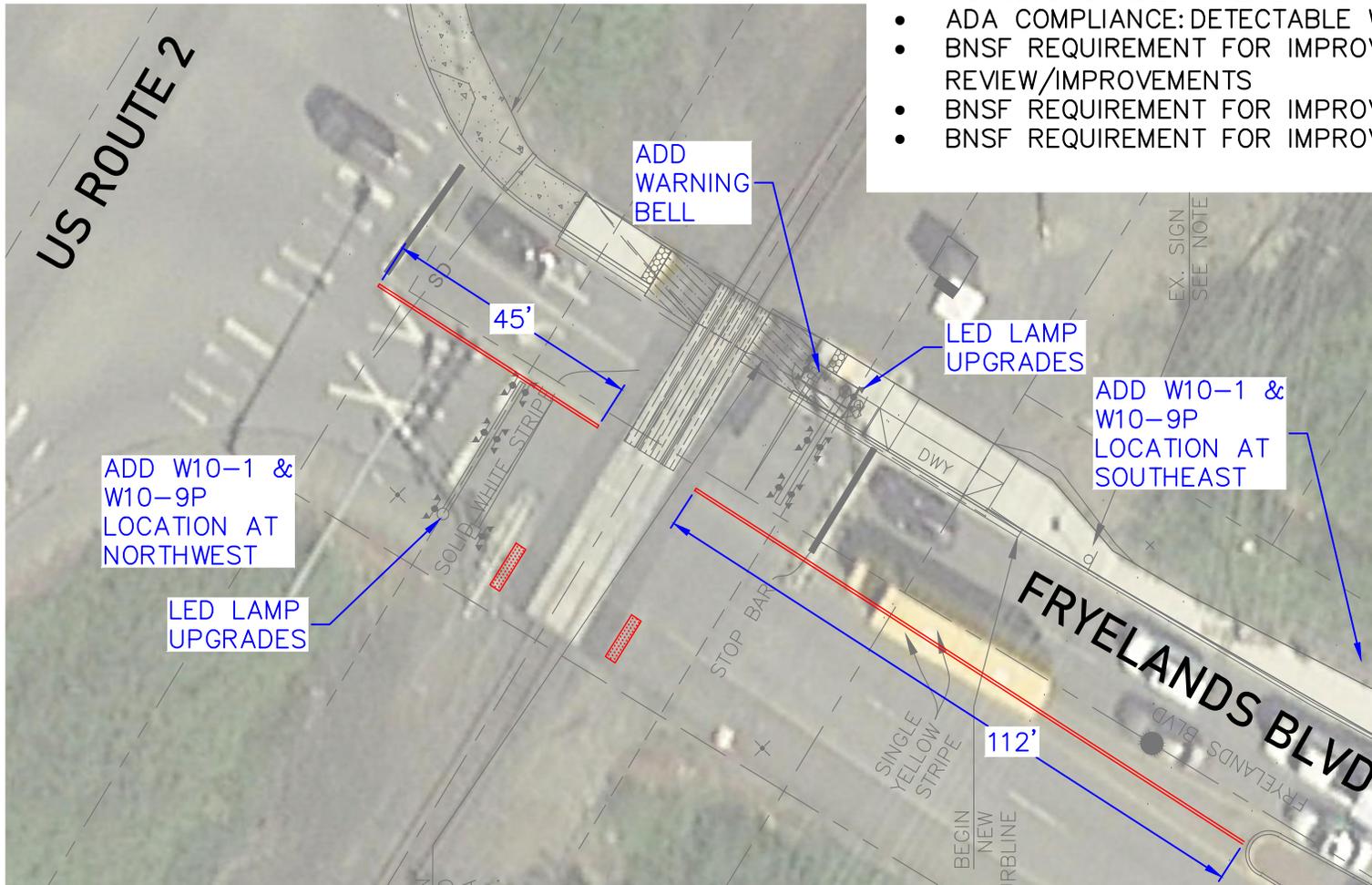
179th Ave SE  
DOT# 084570U

N Kelsey  
DOT# 084565X

N Lewis St  
DOT# 084564R

E Main St  
DOT# 084560N

US ROUTE 2

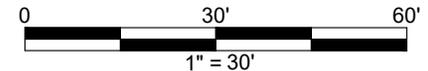
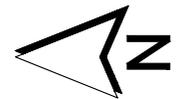


**ALTERNATIVE 3:**

- QUIET ZONE IMPROVEMENT: NON-TRAVERSABLE CURB MEDIANS WITH OR WITHOUT CHANNELIZATION DEVICES MODIFIED ASM EFFECT DUE TO SHORTER LENGTH THAN REQUIRED.
- MUTCD:UPGRADE WARNING SIGNAGE (W10-1 & W10-9P)
- MUTCD:UPGRADE PAVEMENT MARKINGS
- ADA COMPLIANCE:DETECTABLE WARNING SURFACES
- BNSF REQUIREMENT FOR IMPROVEMENTS:PRE-EMPTION TIMING REVIEW/IMPROVEMENTS
- BNSF REQUIREMENT FOR IMPROVEMENTS:LED LAMP UPGRADES
- BNSF REQUIREMENT FOR IMPROVEMENTS:ADD WARNING BELL

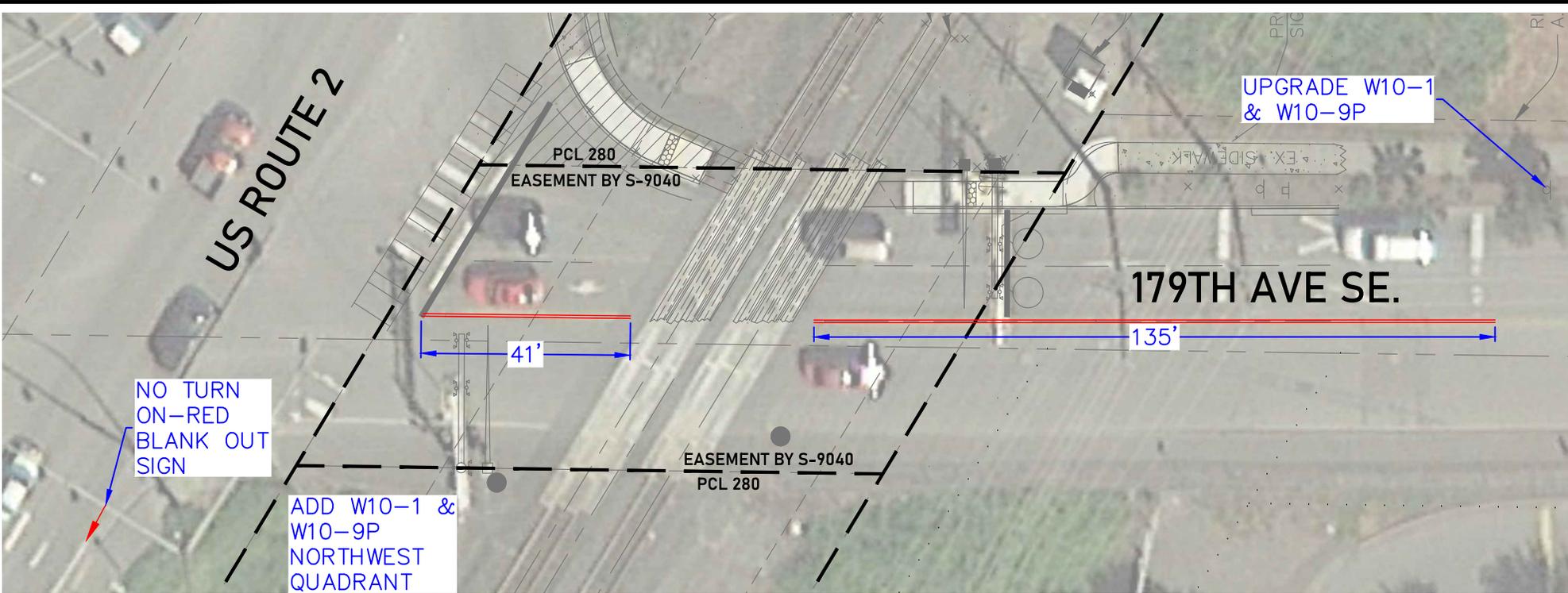
**LEGEND**

-  PROPOSED DETECTABLE WARNING
-  PROPOSED NON-MOUNTABLE MEDIAN



CITY OF MONROE, WA  
 QUIET ZONE FEASIBILITY STUDY  
 FRYLANDS BLVD & RR CROSSING - PROPOSED CONDITIONS  
 DOT 084571B

20001179-EXHIBIT.dwg November 11, 2020

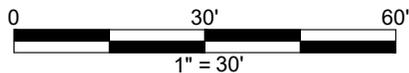


**ALTERNATIVE 3:**

- QUIET ZONE IMPROVEMENT: NON-TRAVERSABLE CURB MEDIANS WITH OR WITHOUT CHANNELIZATION DEVICES MODIFIED ASM EFFECT DUE TO SHORTER LENGTH THAN REQUIRED.
- MUTCD: UPGRADE WARNING SIGNAGE (W10-1 & W10-9P)
- MUTCD: UPGRADE PAVEMENT MARKINGS
- CITY SAFETY IMPROVEMENT: TRAFFIC SIGNAL IMPROVEMENT (BLANK OUT SIGN)
- BNSF REQUIREMENT FOR IMPROVEMENTS: PRE-EMPTION TIMING REVIEW/IMPROVEMENTS

**LEGEND**

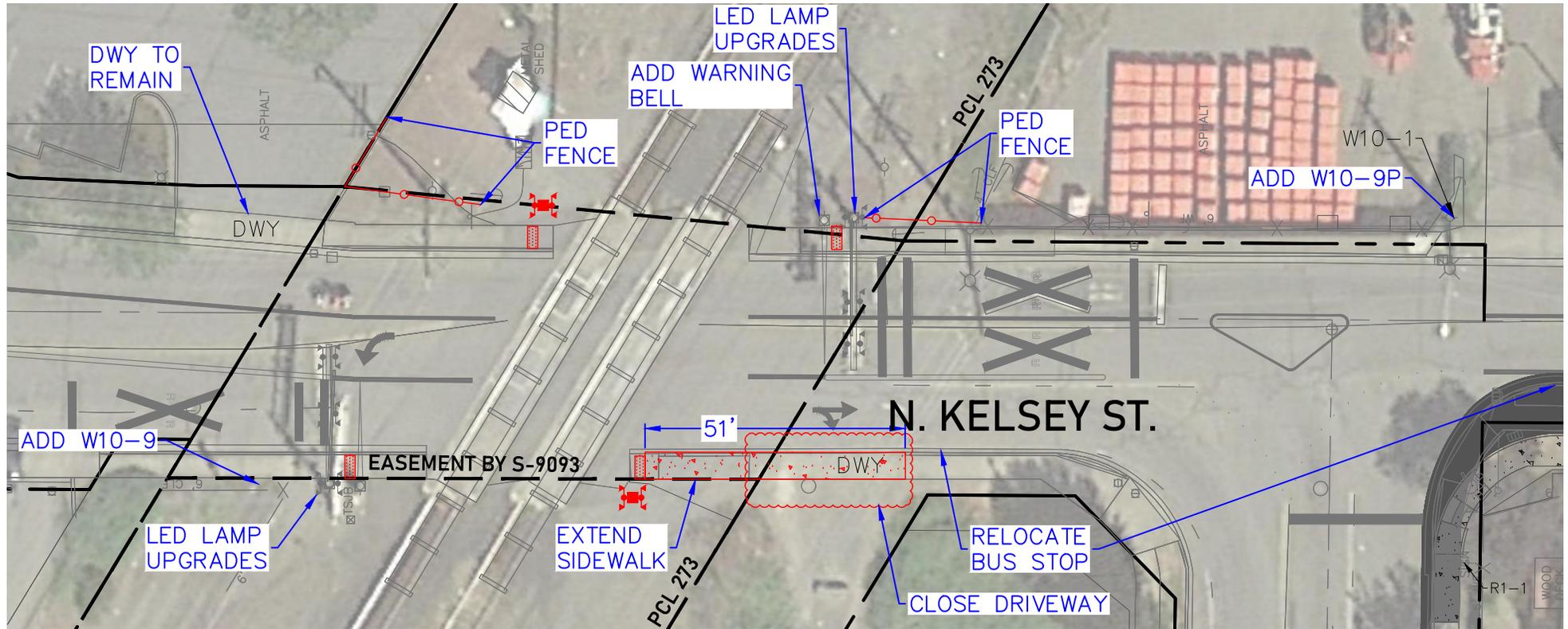
 PROPOSED  
 NON-MOUNTABLE MEDIAN



CITY OF MONROE, WA  
 QUIET ZONE FEASIBILITY STUDY  
 179TH AVE SE. & RR CROSSING - PROPOSED CONDITIONS  
 DOT 084570U

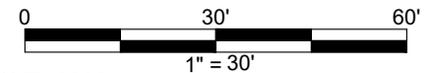
# ALTERNATIVE 3:

- QUIET ZONE IMPROVEMENT: ASM NON-TRAVERSABLE CURB MEDIANS WITH OR WITHOUT CHANNELIZATION DEVICES MODIFIED ASM EFFECT DUE TO THE COMMERCIAL DRIVEWAY IN THE NE QUADRANT REMAINS IN PLACE.
- QUIET ZONE IMPROVEMENT: ASM REMOVE DRIVEWAY SW QUADRANT
- CITY SAFETY: RELOCATE BUS STOP
- CITY SAFETY: EXTEND SIDEWALK
- CITY SAFETY: PEDESTRIAN BARRIER FENCING
- ADA COMPLIANCE: DETECTABLE WARNING SURFACES
- BNSF REQUIREMENT FOR IMPROVEMENTS: PRE-EMPTION TIMING REVIEW/IMPROVEMENTS
- BNSF REQUIREMENT FOR IMPROVEMENTS: LED LAMP UPGRADES
- BNSF REQUIREMENT FOR IMPROVEMENTS: ADD WARNING BELL
- BNSF REQUIREMENT FOR IMPROVEMENTS: ADD PEDESTRIAN MAST FLASHERS
- BNSF REQUIREMENT FOR IMPROVEMENTS: INTERCONNECT SIGNAL REVIEW
- MUTCD: UPGRADE WARNING SIGNAGE (W10-9, W10-9P)



## LEGEND

-  PROPOSED CANTILEVER
-  PROPOSED PED MAST FLASHER
-  PROPOSED RR LIGHTS
-  PROPOSED DETECTABLE WARNING
-  PROPOSED PEDESTRIAN BARRIER FENCE

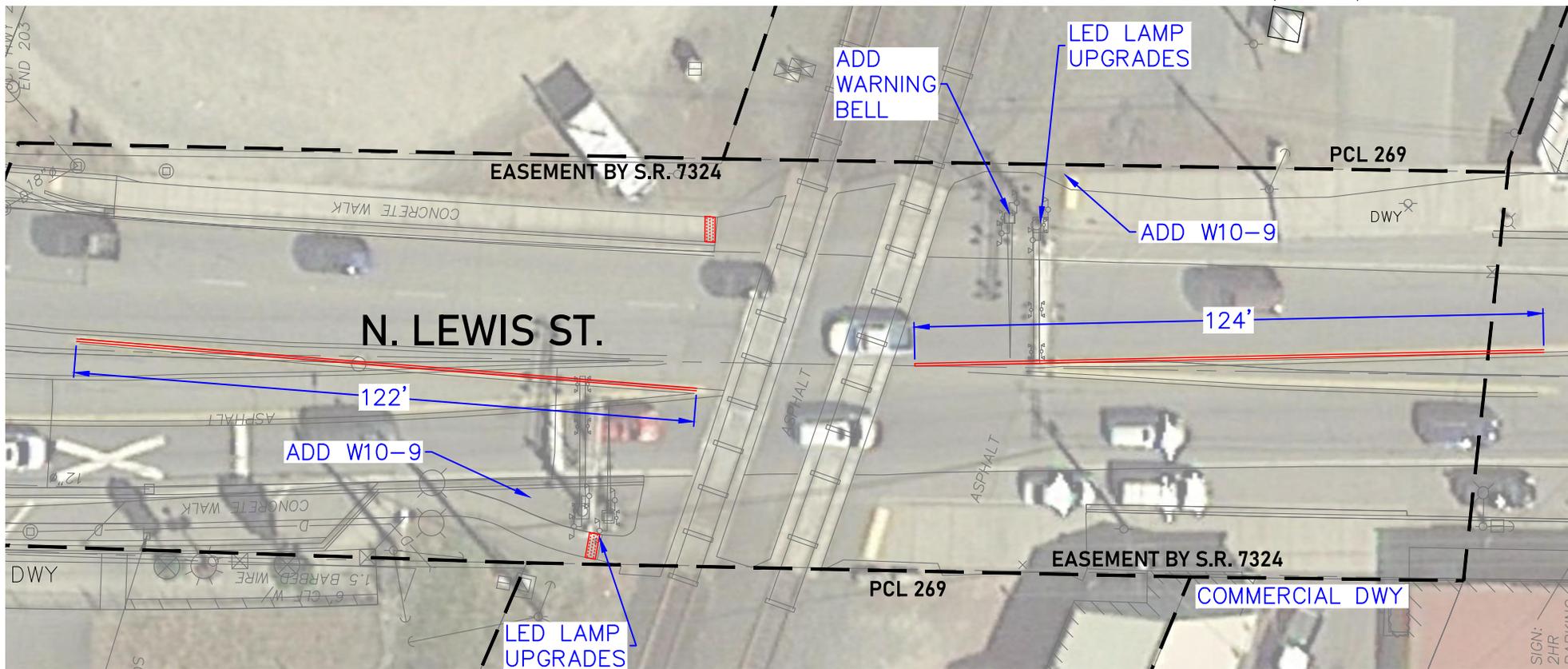


CITY OF MONROE, WA  
 QUIET ZONE FEASIBILITY STUDY  
 N. KELSEY ST. & RR CROSSING - PROPOSED CONDITIONS  
 DOT 084565X



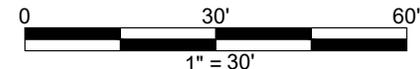
**ALTERNATIVE 3:**

- QUIET ZONE IMPROVEMENT: ASM NON-TRAVERSABLE CURB MEDIANS WITH OR WITHOUT CHANNELIZATION DEVICES MODIFIED ASM EFFECT DUE COMMERCIAL DRIVEWAY ON SW QUADRANT REMAINS OPEN
- MUTCD: UPGRADE PAVEMENT MARKINGS
- ADA COMPLIANCE: DETECTABLE WARNING SURFACES
- BNSF REQUIREMENT FOR IMPROVEMENTS: LED LAMP UPGRADES
- BNSF REQUIREMENT FOR IMPROVEMENTS: ADD WARNING BELL
- MUTCD: UPGRADE WARNING SIGNAGE (W10-9)



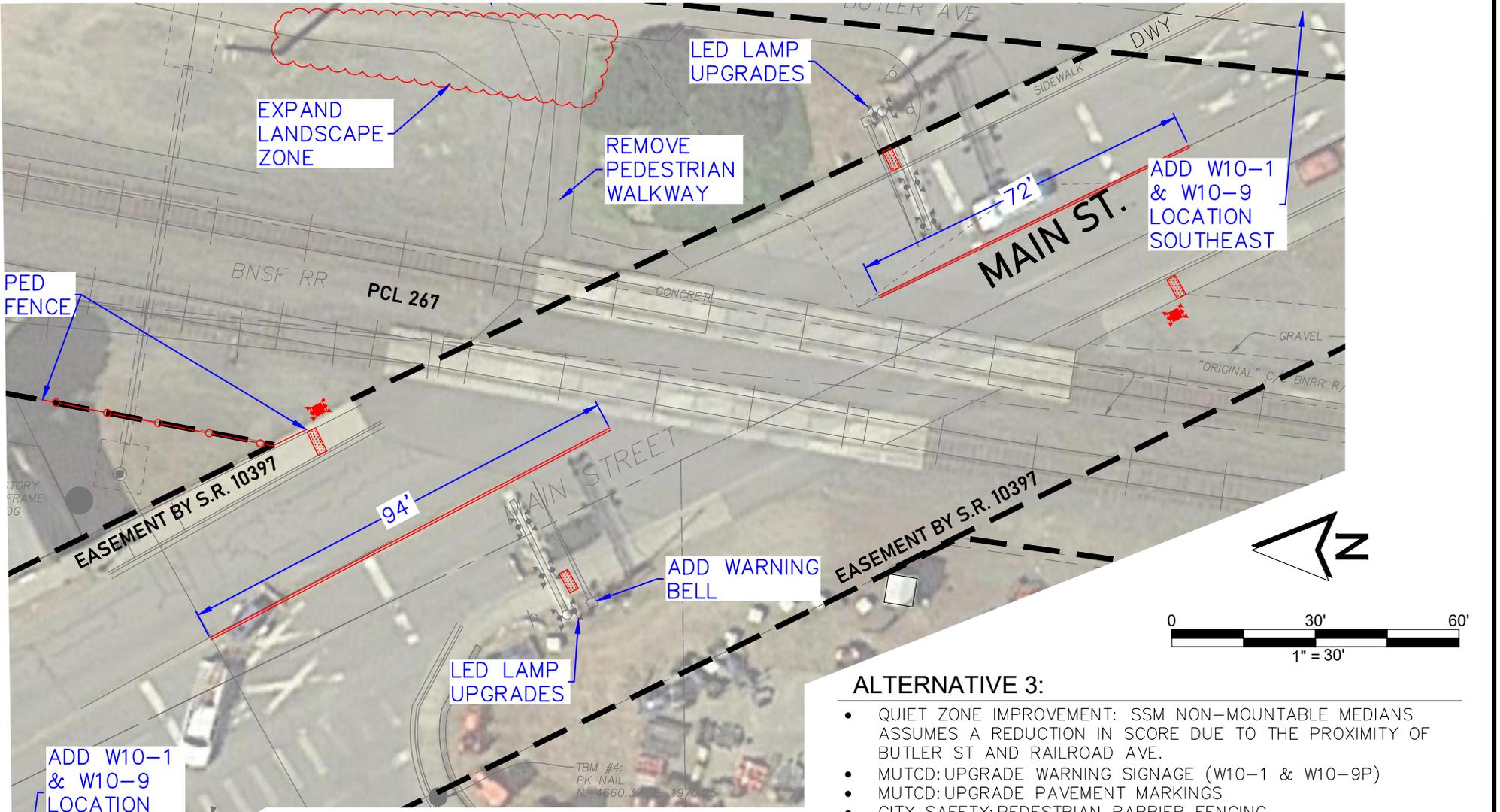
**LEGEND**

-  PROPOSED DETECTABLE WARNING
-  PROPOSED NON-MOUNTABLE MEDIAN



CITY OF MONROE, WA  
 QUIET ZONE FEASIBILITY STUDY  
 N. LEWIS ST. & RR CROSSING - PROPOSED CONDITIONS  
 DOT 084564R





**LEGEND**

-  PROPOSED PED MAST FLASHER
-  PROPOSED DETECTABLE WARNING
-  PROPOSED NON-MOUNTABLE MEDIAN
-  PROPOSED PEDESTRIAN BARRIER FENCE

**ALTERNATIVE 3:**

- QUIET ZONE IMPROVEMENT: SSM NON-MOUNTABLE MEDIANS ASSUMES A REDUCTION IN SCORE DUE TO THE PROXIMITY OF BUTLER ST AND RAILROAD AVE.
- MUTCD: UPGRADE WARNING SIGNAGE (W10-1 & W10-9P)
- MUTCD: UPGRADE PAVEMENT MARKINGS
- CITY SAFETY: PEDESTRIAN BARRIER FENCING
- CITY SAFETY: EXPAND LANDSCAPE ZONE
- ADA COMPLIANCE: DETECTABLE WARNING SURFACES
- BNSF REQUIREMENT FOR IMPROVEMENTS: ADD PED MAST FLASHERS
- BNSF REQUIREMENT FOR IMPROVEMENTS: REMOVE PEDESTRIAN PAVED TRAIL
- BNSF REQUIREMENT FOR IMPROVEMENTS: LED LAMP UPGRADES
- BNSF REQUIREMENT FOR IMPROVEMENTS: ADD WARNING BELL

**CITY OF MONROE, WA**  
**QUIET ZONE FEASIBILITY STUDY**  
**MAIN ST. & RR CROSSING - PROPOSED CONDITIONS**  
**DOT 084560N**



APPENDIX B  
INVENTORY RECORD  
SORTED EAST TO WEST IN ORDER OF CROSSING NUMBERS

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# U. S. DOT CROSSING INVENTORY FORM

**DEPARTMENT OF TRANSPORTATION**  
FEDERAL RAILROAD ADMINISTRATION

OMB No. 2130-0017

Instructions for the initial reporting of the following types of new or previously unreported crossings: For public highway-rail grade crossings, complete the entire inventory Form. For private highway-rail grade crossings, complete the Header, Parts I and II, and the Submission Information section. For public pathway grade crossings (including pedestrian station grade crossings), complete the Header, Parts I and II, and the Submission Information section. For Private pathway grade crossings, complete the Header, Parts I and II, and the Submission Information section. For grade-separated highway-rail or pathway crossings (including pedestrian station crossings), complete the Header, Part I, and the Submission Information section. For changes to existing data, complete the Header, Part I Items 1-3, and the Submission Information section, in addition to the updated data fields. Note: For private crossings only, Part I Item 20 and Part III Item 2.K. are required unless otherwise noted. An asterisk \* denotes an optional field.

<b>A. Revision Date</b> (MM/DD/YYYY) 07 / 27 / 2020	<b>B. Reporting Agency</b> <input type="checkbox"/> Railroad <input type="checkbox"/> Transit <input checked="" type="checkbox"/> State <input type="checkbox"/> Other	<b>C. Reason for Update (Select only one)</b> <input checked="" type="checkbox"/> Change in Data <input type="checkbox"/> Re-Open <input type="checkbox"/> New Crossing <input type="checkbox"/> Date Change Only <input type="checkbox"/> Closed <input type="checkbox"/> Change in Primary Operating RR <input type="checkbox"/> No Train Traffic <input type="checkbox"/> Quiet Zone Update <input type="checkbox"/> Admin. Correction	<b>D. DOT Crossing Inventory Number</b> 084560N
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## Part I: Location and Classification Information

<b>1. Primary Operating Railroad</b> BNSF Railway Company [BNSF]		<b>2. State</b> WASHINGTON		<b>3. County</b> SNOHOMISH	
<b>4. City / Municipality</b> <input checked="" type="checkbox"/> In <input type="checkbox"/> Near MONROE		<b>5. Street/Road Name &amp; Block Number</b> MAIN ST (Street/Road Name)   * (Block Number)		<b>6. Highway Type &amp; No.</b> CITY ST - FCID 2630	
<b>7. Do Other Railroads Operate a Separate Track at Crossing?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, Specify RR			<b>8. Do Other Railroads Operate Over Your Track at Crossing?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If Yes, Specify RR ATK		
<b>9. Railroad Division or Region</b> <input type="checkbox"/> None NORTHWEST		<b>10. Railroad Subdivision or District</b> <input type="checkbox"/> None SCENIC		<b>11. Branch or Line Name</b> <input type="checkbox"/> None WENACHE-SEATTLE	
<b>12. RR Milepost</b> 1768.572 (prefix)   (nnnn.nnn)   (suffix)		<b>13. Line Segment</b> * 37		<b>14. Nearest RR Timetable Station</b> * MONROE	
<b>15. Parent RR (if applicable)</b> <input checked="" type="checkbox"/> N/A		<b>16. Crossing Owner (if applicable)</b> <input type="checkbox"/> N/A BNSF		<b>17. Crossing Type</b> <input checked="" type="checkbox"/> Public <input type="checkbox"/> Private	
<b>18. Crossing Purpose</b> <input checked="" type="checkbox"/> Highway <input type="checkbox"/> Pathway, Ped. <input type="checkbox"/> Station, Ped.		<b>19. Crossing Position</b> <input checked="" type="checkbox"/> At Grade <input type="checkbox"/> RR Under <input type="checkbox"/> RR Over		<b>20. Public Access (if Private Crossing)</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
<b>21. Type of Train</b> <input checked="" type="checkbox"/> Freight <input checked="" type="checkbox"/> Intercity Passenger <input type="checkbox"/> Commuter		<input type="checkbox"/> Transit <input type="checkbox"/> Shared Use Transit <input type="checkbox"/> Tourist/Other		<b>22. Average Passenger Train Count Per Day</b> <input type="checkbox"/> Less Than One Per Day <input checked="" type="checkbox"/> Number Per Day 2	
<b>23. Type of Land Use</b> <input type="checkbox"/> Open Space <input type="checkbox"/> Farm <input type="checkbox"/> Residential <input checked="" type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Institutional <input type="checkbox"/> Recreational <input type="checkbox"/> RR Yard					
<b>24. Is there an Adjacent Crossing with a Separate Number?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, Provide Crossing Number			<b>25. Quiet Zone (FRA provided)</b> <input checked="" type="checkbox"/> No <input type="checkbox"/> 24 Hr <input type="checkbox"/> Partial <input type="checkbox"/> Chicago Excused Date Established		
<b>26. HSR Corridor ID</b> <input checked="" type="checkbox"/> N/A		<b>27. Latitude in decimal degrees</b> (WGS84 std: nn.nnnnnnn) 47.8570694		<b>28. Longitude in decimal degrees</b> (WGS84 std: -nnn.nnnnnnn) -121.966746	
<b>29. Lat/Long Source</b> <input checked="" type="checkbox"/> Actual <input type="checkbox"/> Estimated		<b>30.A. Railroad Use *</b>			
<b>30.B. Railroad Use *</b>		<b>30.C. Railroad Use *</b>			
<b>30.D. Railroad Use *</b>		<b>30.E. Railroad Use *</b>			
<b>31.A. State Use *</b>			<b>31.B. State Use *</b>		
<b>31.C. State Use *</b>			<b>31.D. State Use *</b>		
<b>32.A. Narrative (Railroad Use) *</b> (1.27 1.28 1.29) Value Provided by Railroad, Not Ye			<b>32.B. Narrative (State Use) *</b>		
<b>33. Emergency Notification Telephone No. (posted)</b> 800-832-5452		<b>34. Railroad Contact (Telephone No.)</b> 817-352-1549		<b>35. State Contact (Telephone No.)</b> 360-664-1262	

## Part II: Railroad Information

<b>1. Estimated Number of Daily Train Movements</b>				
<b>1.A. Total Day Thru Trains (6 AM to 6 PM)</b> 6	<b>1.B. Total Night Thru Trains (6 PM to 6 AM)</b> 6	<b>1.C. Total Switching Trains</b> 0	<b>1.D. Total Transit Trains</b> 0	<b>1.E. Check if Less Than One Movement Per Day</b> <input type="checkbox"/> How many trains per week? _____
<b>2. Year of Train Count Data (YYYY)</b> 2019		<b>3. Speed of Train at Crossing</b> 3.A. Maximum Timetable Speed (mph) 45 3.B. Typical Speed Range Over Crossing (mph) From 1 to 45		
<b>4. Type and Count of Tracks</b> Main 1 Siding 1 Yard 0 Transit 0 Industry 0				
<b>5. Train Detection (Main Track only)</b> <input checked="" type="checkbox"/> Constant Warning Time <input type="checkbox"/> Motion Detection <input type="checkbox"/> AFO <input type="checkbox"/> PTC <input type="checkbox"/> DC <input type="checkbox"/> Other <input type="checkbox"/> None				
<b>6. Is Track Signaled?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>7.A. Event Recorder</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>7.B. Remote Health Monitoring</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

# U. S. DOT CROSSING INVENTORY FORM

A. Revision Date (MM/DD/YYYY) 07/27/2020		PAGE 2		D. Crossing Inventory Number (7 char.) 084560N		
<b>Part III: Highway or Pathway Traffic Control Device Information</b>						
1. Are there Signs or Signals? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		2. Types of Passive Traffic Control Devices associated with the Crossing				
2.A. Crossbuck Assemblies (count) 2		2.B. STOP Signs (R1-1) (count) 0	2.C. YIELD Signs (R1-2) (count)	2.D. Advance Warning Signs (Check all that apply; include count) <input checked="" type="checkbox"/> None		
				<input type="checkbox"/> W10-1 _____ <input type="checkbox"/> W10-3 _____ <input type="checkbox"/> W10-11 _____ <input type="checkbox"/> W10-2 _____ <input type="checkbox"/> W10-4 _____ <input type="checkbox"/> W10-12 _____		
2.E. Low Ground Clearance Sign (W10-5) <input type="checkbox"/> Yes (count _____) <input checked="" type="checkbox"/> No		2.F. Pavement Markings <input checked="" type="checkbox"/> Stop Lines <input type="checkbox"/> Dynamic Envelope <input checked="" type="checkbox"/> RR Xing Symbols <input type="checkbox"/> None		2.G. Channelization Devices/Medians <input type="checkbox"/> All Approaches <input type="checkbox"/> Median <input type="checkbox"/> One Approach <input checked="" type="checkbox"/> None	2.H. EXEMPT Sign (R15-3) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	2.I. ENS Sign (I-13) Displayed <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2.J. Other MUTCD Signs Specify Type R8-8 Count 2 Specify Type R15-2P Count 2 Specify Type _____ Count _____		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	2.K. Private Crossing Signs (if private) <input type="checkbox"/> Yes <input type="checkbox"/> No	2.L. LED Enhanced Signs (List types)		
<b>3. Types of Train Activated Warning Devices at the Grade Crossing (specify count of each device for all that apply)</b>						
3.A. Gate Arms (count) Roadway 2 Pedestrian _____	3.B. Gate Configuration <input checked="" type="checkbox"/> 2 Quad <input type="checkbox"/> Full (Barrier) Resistance <input type="checkbox"/> 3 Quad <input type="checkbox"/> Median Gates	3.C. Cantilevered (or Bridged) Flashing Light Structures (count) Over Traffic Lane 2 <input type="checkbox"/> Incandescent Not Over Traffic Lane 0 <input type="checkbox"/> LED		3.D. Mast Mounted Flashing Lights (count of masts) 2 <input type="checkbox"/> Incandescent <input type="checkbox"/> LED <input checked="" type="checkbox"/> Back Lights Included <input type="checkbox"/> Side Lights Included	3.E. Total Count of Flashing Light Pairs 12	
3.F. Installation Date of Current Active Warning Devices: (MM/YYYY) _____/_____/_____ <input type="checkbox"/> Not Required		3.G. Wayside Horn <input type="checkbox"/> Yes Installed on (MM/YYYY) ____/____/_____ <input checked="" type="checkbox"/> No		3.H. Highway Traffic Signals Controlling Crossing <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	3.I. Bells (count) 1	
3.J. Non-Train Active Warning <input type="checkbox"/> Flagging/Flagman <input type="checkbox"/> Manually Operated Signals <input type="checkbox"/> Watchman <input type="checkbox"/> Floodlighting <input checked="" type="checkbox"/> None				3.K. Other Flashing Lights or Warning Devices Count 0 Specify type _____		
4.A. Does nearby Hwy Intersection have Traffic Signals? <input type="checkbox"/> Yes <input type="checkbox"/> No	4.B. Hwy Traffic Signal Interconnection <input type="checkbox"/> Not Interconnected <input type="checkbox"/> For Traffic Signals <input type="checkbox"/> For Warning Signs	4.C. Hwy Traffic Signal Preemption <input type="checkbox"/> Simultaneous <input type="checkbox"/> Advance	5. Highway Traffic Pre-Signals <input type="checkbox"/> Yes <input type="checkbox"/> No Storage Distance * _____ Stop Line Distance * _____	6. Highway Monitoring Devices (Check all that apply) <input type="checkbox"/> Yes - Photo/Video Recording <input type="checkbox"/> Yes - Vehicle Presence Detection <input type="checkbox"/> None		
<b>Part IV: Physical Characteristics</b>						
1. Traffic Lanes Crossing Railroad Number of Lanes 4 <input type="checkbox"/> One-way Traffic <input type="checkbox"/> Two-way Traffic <input type="checkbox"/> Divided Traffic		2. Is Roadway/Pathway Paved? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	3. Does Track Run Down a Street? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	4. Is Crossing Illuminated? (Street lights within approx. 50 feet from nearest rail) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
5. Crossing Surface (on Main Track, multiple types allowed) Installation Date * (MM/YYYY) ____/____/_____ <input type="checkbox"/> 1 Timber <input type="checkbox"/> 2 Asphalt <input type="checkbox"/> 3 Asphalt and Timber <input checked="" type="checkbox"/> 4 Concrete <input type="checkbox"/> 5 Concrete and Rubber <input type="checkbox"/> 6 Rubber <input type="checkbox"/> 7 Metal <input type="checkbox"/> 8 Unconsolidated <input type="checkbox"/> 9 Composite <input type="checkbox"/> 10 Other (specify) _____ Width * _____ Length * _____						
6. Intersecting Roadway within 500 feet? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If Yes, Approximate Distance (feet) _____			7. Smallest Crossing Angle <input type="checkbox"/> 0° - 29° <input checked="" type="checkbox"/> 30° - 59° <input type="checkbox"/> 60° - 90°	8. Is Commercial Power Available? * <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
<b>Part V: Public Highway Information</b>						
1. Highway System <input type="checkbox"/> (01) Interstate Highway System <input type="checkbox"/> (02) Other Nat Hwy System (NHS) <input checked="" type="checkbox"/> (03) Federal AID, Not NHS <input type="checkbox"/> (08) Non-Federal Aid		2. Functional Classification of Road at Crossing <input type="checkbox"/> (0) Rural <input checked="" type="checkbox"/> (1) Urban <input type="checkbox"/> (1) Interstate <input type="checkbox"/> (5) Major Collector <input type="checkbox"/> (2) Other Freeways and Expressways <input type="checkbox"/> (3) Other Principal Arterial <input type="checkbox"/> (6) Minor Collector <input checked="" type="checkbox"/> (4) Minor Arterial <input type="checkbox"/> (7) Local		3. Is Crossing on State Highway System? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	4. Highway Speed Limit 25 _____ MPH <input type="checkbox"/> Posted <input type="checkbox"/> Statutory	
5. Linear Referencing System (LRS Route ID) *						
6. LRS Milepost *						
7. Annual Average Daily Traffic (AADT) Year 2020 AADT 9581		8. Estimated Percent Trucks 2 _____ %	9. Regularly Used by School Buses? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Average Number per Day _____		10. Emergency Services Route <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
<b>Submission Information - This information is used for administrative purposes and is not available on the public website.</b>						
Submitted by _____ Organization _____ Phone _____ Date _____						
Public reporting burden for this information collection is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. According to the Paperwork Reduction Act of 1995, a federal agency may not conduct or sponsor, and a person is not required to, nor shall a person be subject to a penalty for failure to comply with, a collection of information unless it displays a currently valid OMB control number. The valid OMB control number for information collection is 2130-0017. Send comments regarding this burden estimate or any other aspect of this collection, including for reducing this burden to: Information Collection Officer, Federal Railroad Administration, 1200 New Jersey Ave. SE, MS-25 Washington, DC 20590.						

# U. S. DOT CROSSING INVENTORY FORM

**DEPARTMENT OF TRANSPORTATION**  
FEDERAL RAILROAD ADMINISTRATION

OMB No. 2130-0017

Instructions for the initial reporting of the following types of new or previously unreported crossings: For public highway-rail grade crossings, complete the entire inventory Form. For private highway-rail grade crossings, complete the Header, Parts I and II, and the Submission Information section. For public pathway grade crossings (including pedestrian station grade crossings), complete the Header, Parts I and II, and the Submission Information section. For Private pathway grade crossings, complete the Header, Parts I and II, and the Submission Information section. For grade-separated highway-rail or pathway crossings (including pedestrian station crossings), complete the Header, Part I, and the Submission Information section. For changes to existing data, complete the Header, Part I Items 1-3, and the Submission Information section, in addition to the updated data fields. Note: For private crossings only, Part I Item 20 and Part III Item 2.K. are required unless otherwise noted. An asterisk \* denotes an optional field.

<b>A. Revision Date</b> (MM/DD/YYYY) 07 / 27 / 2020	<b>B. Reporting Agency</b> <input type="checkbox"/> Railroad <input type="checkbox"/> Transit <input checked="" type="checkbox"/> State <input type="checkbox"/> Other	<b>C. Reason for Update (Select only one)</b> <input checked="" type="checkbox"/> Change in Data <input type="checkbox"/> Re-Open <input type="checkbox"/> New Crossing <input type="checkbox"/> Date Change Only <input type="checkbox"/> Closed <input type="checkbox"/> Change in Primary Operating RR <input type="checkbox"/> No Train Traffic <input type="checkbox"/> Quiet Zone Update <input type="checkbox"/> Admin. Correction	<b>D. DOT Crossing Inventory Number</b> 084564R
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## Part I: Location and Classification Information

<b>1. Primary Operating Railroad</b> BNSF Railway Company [BNSF]		<b>2. State</b> WASHINGTON		<b>3. County</b> SNOHOMISH	
<b>4. City / Municipality</b> <input checked="" type="checkbox"/> In <input type="checkbox"/> Near MONROE		<b>5. Street/Road Name &amp; Block Number</b> SR 203 LEWIS ST (Street/Road Name)   * (Block Number)		<b>6. Highway Type &amp; No.</b> SR 203 - FASS315	
<b>7. Do Other Railroads Operate a Separate Track at Crossing?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, Specify RR			<b>8. Do Other Railroads Operate Over Your Track at Crossing?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If Yes, Specify RR ATK		
<b>9. Railroad Division or Region</b> <input type="checkbox"/> None NORTHWEST		<b>10. Railroad Subdivision or District</b> <input type="checkbox"/> None SCENIC		<b>11. Branch or Line Name</b> <input type="checkbox"/> None WENACHE-SEATTLE	
<b>12. RR Milepost</b> 1768.780 (prefix)   (nnnn.nnn)   (suffix)		<b>13. Line Segment</b> * 37		<b>14. Nearest RR Timetable Station</b> * MONROE	
<b>15. Parent RR (if applicable)</b> <input checked="" type="checkbox"/> N/A		<b>16. Crossing Owner (if applicable)</b> <input type="checkbox"/> N/A BNSF		<b>17. Crossing Type</b> <input checked="" type="checkbox"/> Public <input type="checkbox"/> Private	
<b>18. Crossing Purpose</b> <input checked="" type="checkbox"/> Highway <input type="checkbox"/> Pathway, Ped. <input type="checkbox"/> Station, Ped.		<b>19. Crossing Position</b> <input checked="" type="checkbox"/> At Grade <input type="checkbox"/> RR Under <input type="checkbox"/> RR Over		<b>20. Public Access (if Private Crossing)</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
<b>21. Type of Train</b> <input checked="" type="checkbox"/> Freight <input checked="" type="checkbox"/> Intercity Passenger <input type="checkbox"/> Commuter		<input type="checkbox"/> Transit <input type="checkbox"/> Shared Use Transit <input type="checkbox"/> Tourist/Other		<b>22. Average Passenger Train Count Per Day</b> <input type="checkbox"/> Less Than One Per Day <input checked="" type="checkbox"/> Number Per Day 2	
<b>23. Type of Land Use</b> <input type="checkbox"/> Open Space <input type="checkbox"/> Farm <input type="checkbox"/> Residential <input checked="" type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Institutional <input type="checkbox"/> Recreational <input type="checkbox"/> RR Yard					
<b>24. Is there an Adjacent Crossing with a Separate Number?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, Provide Crossing Number			<b>25. Quiet Zone (FRA provided)</b> <input checked="" type="checkbox"/> No <input type="checkbox"/> 24 Hr <input type="checkbox"/> Partial <input type="checkbox"/> Chicago Excused Date Established		
<b>26. HSR Corridor ID</b> <input checked="" type="checkbox"/> N/A		<b>27. Latitude in decimal degrees</b> (WGS84 std: nn.nnnnnnn) 47.8576682		<b>28. Longitude in decimal degrees</b> (WGS84 std: -nnn.nnnnnnn) -121.970736	
<b>29. Lat/Long Source</b> <input checked="" type="checkbox"/> Actual <input type="checkbox"/> Estimated					
<b>30.A. Railroad Use *</b>			<b>31.A. State Use *</b>		
<b>30.B. Railroad Use *</b>			<b>31.B. State Use *</b>		
<b>30.C. Railroad Use *</b>			<b>31.C. State Use *</b>		
<b>30.D. Railroad Use *</b>			<b>31.D. State Use *</b>		
<b>32.A. Narrative (Railroad Use) *</b> (1.27 1.28 1.29) Value Provided by Railroad, Not Ye			<b>32.B. Narrative (State Use) *</b>		
<b>33. Emergency Notification Telephone No. (posted)</b> 800-832-5452		<b>34. Railroad Contact (Telephone No.)</b> 817-352-1549		<b>35. State Contact (Telephone No.)</b> 360-664-1262	

## Part II: Railroad Information

<b>1. Estimated Number of Daily Train Movements</b>				
<b>1.A. Total Day Thru Trains (6 AM to 6 PM)</b> 6		<b>1.B. Total Night Thru Trains (6 PM to 6 AM)</b> 6		<b>1.C. Total Switching Trains</b> 0
<b>1.D. Total Transit Trains</b> 0		<b>1.E. Check if Less Than One Movement Per Day</b> <input type="checkbox"/> How many trains per week? _____		
<b>2. Year of Train Count Data (YYYY)</b> 2019		<b>3. Speed of Train at Crossing</b> 3.A. Maximum Timetable Speed (mph) 45 3.B. Typical Speed Range Over Crossing (mph) From 1 to 45		
<b>4. Type and Count of Tracks</b> Main 1 Siding 1 Yard 0 Transit 0 Industry 0				
<b>5. Train Detection (Main Track only)</b> <input checked="" type="checkbox"/> Constant Warning Time <input type="checkbox"/> Motion Detection <input type="checkbox"/> AFO <input type="checkbox"/> PTC <input type="checkbox"/> DC <input type="checkbox"/> Other <input type="checkbox"/> None				
<b>6. Is Track Signaled?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>7.A. Event Recorder</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>7.B. Remote Health Monitoring</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

# U. S. DOT CROSSING INVENTORY FORM

A. Revision Date (MM/DD/YYYY) 07/27/2020		PAGE 2		D. Crossing Inventory Number (7 char.) 084564R	
<b>Part III: Highway or Pathway Traffic Control Device Information</b>					
1. Are there Signs or Signals? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		2. Types of Passive Traffic Control Devices associated with the Crossing			
2.A. Crossbuck Assemblies (count) 2		2.B. STOP Signs (R1-1) (count) 0	2.C. YIELD Signs (R1-2) (count) 0	2.D. Advance Warning Signs (Check all that apply; include count) <input type="checkbox"/> None <input checked="" type="checkbox"/> W10-1 2 <input type="checkbox"/> W10-3 <input type="checkbox"/> W10-11 <input type="checkbox"/> W10-2 <input type="checkbox"/> W10-4 <input type="checkbox"/> W10-12	
2.E. Low Ground Clearance Sign (W10-5) <input type="checkbox"/> Yes (count _____) <input checked="" type="checkbox"/> No		2.F. Pavement Markings <input checked="" type="checkbox"/> Stop Lines <input type="checkbox"/> Dynamic Envelope <input checked="" type="checkbox"/> RR Xing Symbols <input type="checkbox"/> None		2.G. Channelization Devices/Medians <input type="checkbox"/> All Approaches <input type="checkbox"/> Median <input type="checkbox"/> One Approach <input checked="" type="checkbox"/> None	2.H. EXEMPT Sign (R15-3) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2.I. ENS Sign (I-13) Displayed <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		2.J. Other MUTCD Signs <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Specify Type R15-2P Count 2 Specify Type R15-1 Count 2 Specify Type _____ Count _____		2.K. Private Crossing Signs (if private) <input type="checkbox"/> Yes <input type="checkbox"/> No	2.L. LED Enhanced Signs (List types)
3. Types of Train Activated Warning Devices at the Grade Crossing (specify count of each device for all that apply)					
3.A. Gate Arms (count) Roadway 2 Pedestrian _____	3.B. Gate Configuration <input checked="" type="checkbox"/> 2 Quad <input type="checkbox"/> Full (Barrier) Resistance <input type="checkbox"/> 3 Quad <input type="checkbox"/> Median Gates	3.C. Cantilevered (or Bridged) Flashing Light Structures (count) Over Traffic Lane 2 <input type="checkbox"/> Incandescent Not Over Traffic Lane 0 <input type="checkbox"/> LED		3.D. Mast Mounted Flashing Lights (count of masts) 4 <input type="checkbox"/> Incandescent <input type="checkbox"/> LED <input checked="" type="checkbox"/> Back Lights Included <input type="checkbox"/> Side Lights Included	3.E. Total Count of Flashing Light Pairs 12
3.F. Installation Date of Current Active Warning Devices: (MM/YYYY) ____/____/____ <input type="checkbox"/> Not Required		3.G. Wayside Horn <input type="checkbox"/> Yes Installed on (MM/YYYY) ____/____/____ <input checked="" type="checkbox"/> No		3.H. Highway Traffic Signals Controlling Crossing <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	3.I. Bells (count) 1
3.J. Non-Train Active Warning <input type="checkbox"/> Flagging/Flagman <input type="checkbox"/> Manually Operated Signals <input type="checkbox"/> Watchman <input type="checkbox"/> Floodlighting <input checked="" type="checkbox"/> None				3.K. Other Flashing Lights or Warning Devices Count 0 Specify type _____	
4.A. Does nearby Hwy Intersection have Traffic Signals? <input type="checkbox"/> Yes <input type="checkbox"/> No	4.B. Hwy Traffic Signal Interconnection <input type="checkbox"/> Not Interconnected <input type="checkbox"/> For Traffic Signals <input type="checkbox"/> For Warning Signs	4.C. Hwy Traffic Signal Preemption <input type="checkbox"/> Simultaneous <input type="checkbox"/> Advance	5. Highway Traffic Pre-Signals <input type="checkbox"/> Yes <input type="checkbox"/> No Storage Distance * _____ Stop Line Distance * _____	6. Highway Monitoring Devices (Check all that apply) <input type="checkbox"/> Yes - Photo/Video Recording <input type="checkbox"/> Yes - Vehicle Presence Detection <input type="checkbox"/> None	
<b>Part IV: Physical Characteristics</b>					
1. Traffic Lanes Crossing Railroad Number of Lanes 3 <input type="checkbox"/> One-way Traffic <input checked="" type="checkbox"/> Two-way Traffic <input type="checkbox"/> Divided Traffic		2. Is Roadway/Pathway Paved? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	3. Does Track Run Down a Street? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	4. Is Crossing Illuminated? (Street lights within approx. 50 feet from nearest rail) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
5. Crossing Surface (on Main Track, multiple types allowed) Installation Date * (MM/YYYY) ____/____/____ Width * _____ Length * _____ <input type="checkbox"/> 1 Timber <input type="checkbox"/> 2 Asphalt <input type="checkbox"/> 3 Asphalt and Timber <input checked="" type="checkbox"/> 4 Concrete <input type="checkbox"/> 5 Concrete and Rubber <input type="checkbox"/> 6 Rubber <input type="checkbox"/> 7 Metal <input type="checkbox"/> 8 Unconsolidated <input type="checkbox"/> 9 Composite <input type="checkbox"/> 10 Other (specify) _____					
6. Intersecting Roadway within 500 feet? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If Yes, Approximate Distance (feet) 150			7. Smallest Crossing Angle <input type="checkbox"/> 0° - 29° <input type="checkbox"/> 30° - 59° <input checked="" type="checkbox"/> 60° - 90°		8. Is Commercial Power Available? * <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<b>Part V: Public Highway Information</b>					
1. Highway System <input type="checkbox"/> (01) Interstate Highway System <input type="checkbox"/> (02) Other Nat Hwy System (NHS) <input checked="" type="checkbox"/> (03) Federal AID, Not NHS <input type="checkbox"/> (08) Non-Federal Aid		2. Functional Classification of Road at Crossing <input type="checkbox"/> (0) Rural <input checked="" type="checkbox"/> (1) Urban <input type="checkbox"/> (1) Interstate <input type="checkbox"/> (5) Major Collector <input type="checkbox"/> (2) Other Freeways and Expressways <input checked="" type="checkbox"/> (3) Other Principal Arterial <input type="checkbox"/> (6) Minor Collector <input type="checkbox"/> (4) Minor Arterial <input type="checkbox"/> (7) Local		3. Is Crossing on State Highway System? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	4. Highway Speed Limit System 25 _____ MPH <input type="checkbox"/> Posted <input type="checkbox"/> Statutory
5. Linear Referencing System (LRS Route ID) *					
6. LRS Milepost *					
7. Annual Average Daily Traffic (AADT) Year 2020 AADT 15093		8. Estimated Percent Trucks 4 _____ %	9. Regularly Used by School Buses? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Average Number per Day _____		10. Emergency Services Route <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<b>Submission Information - This information is used for administrative purposes and is not available on the public website.</b>					
Submitted by _____ Organization _____ Phone _____ Date _____					
Public reporting burden for this information collection is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. According to the Paperwork Reduction Act of 1995, a federal agency may not conduct or sponsor, and a person is not required to, nor shall a person be subject to a penalty for failure to comply with, a collection of information unless it displays a currently valid OMB control number. The valid OMB control number for information collection is 2130-0017. Send comments regarding this burden estimate or any other aspect of this collection, including for reducing this burden to: Information Collection Officer, Federal Railroad Administration, 1200 New Jersey Ave. SE, MS-25 Washington, DC 20590.					

# U. S. DOT CROSSING INVENTORY FORM

**DEPARTMENT OF TRANSPORTATION**  
FEDERAL RAILROAD ADMINISTRATION

OMB No. 2130-0017

Instructions for the initial reporting of the following types of new or previously unreported crossings: For public highway-rail grade crossings, complete the entire inventory Form. For private highway-rail grade crossings, complete the Header, Parts I and II, and the Submission Information section. For public pathway grade crossings (including pedestrian station grade crossings), complete the Header, Parts I and II, and the Submission Information section. For Private pathway grade crossings, complete the Header, Parts I and II, and the Submission Information section. For grade-separated highway-rail or pathway crossings (including pedestrian station crossings), complete the Header, Part I, and the Submission Information section. For changes to existing data, complete the Header, Part I Items 1-3, and the Submission Information section, in addition to the updated data fields. Note: For private crossings only, Part I Item 20 and Part III Item 2.K. are required unless otherwise noted. An asterisk \* denotes an optional field.

<b>A. Revision Date</b> (MM/DD/YYYY) 07 / 27 / 2020	<b>B. Reporting Agency</b> <input type="checkbox"/> Railroad <input type="checkbox"/> Transit <input checked="" type="checkbox"/> State <input type="checkbox"/> Other	<b>C. Reason for Update (Select only one)</b> <input checked="" type="checkbox"/> Change in Data <input type="checkbox"/> Re-Open <input type="checkbox"/> New Crossing <input type="checkbox"/> Date Change Only <input type="checkbox"/> Closed <input type="checkbox"/> Change in Primary Operating RR <input type="checkbox"/> No Train Traffic <input type="checkbox"/> Quiet Zone Update <input type="checkbox"/> Admin. Correction	<b>D. DOT Crossing Inventory Number</b> 084565X
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## Part I: Location and Classification Information

<b>1. Primary Operating Railroad</b> BNSF Railway Company [BNSF]		<b>2. State</b> WASHINGTON		<b>3. County</b> SNOHOMISH	
<b>4. City / Municipality</b> <input checked="" type="checkbox"/> In <input type="checkbox"/> Near MONROE		<b>5. Street/Road Name &amp; Block Number</b> KELSEY ST (Street/Road Name)   * (Block Number)		<b>6. Highway Type &amp; No.</b> CITY ST FCID 2632	
<b>7. Do Other Railroads Operate a Separate Track at Crossing?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, Specify RR			<b>8. Do Other Railroads Operate Over Your Track at Crossing?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If Yes, Specify RR ATK		
<b>9. Railroad Division or Region</b> <input type="checkbox"/> None NORTHWEST		<b>10. Railroad Subdivision or District</b> <input type="checkbox"/> None SCENIC		<b>11. Branch or Line Name</b> <input type="checkbox"/> None WENACHE-SEATTLE	
<b>12. RR Milepost</b> 1769.140 (prefix)   (nnnn.nnn)   (suffix)		<b>13. Line Segment</b> * 37		<b>14. Nearest RR Timetable Station</b> * MONROE	
<b>15. Parent RR (if applicable)</b> <input checked="" type="checkbox"/> N/A		<b>16. Crossing Owner (if applicable)</b> <input type="checkbox"/> N/A BNSF		<b>17. Crossing Type</b> <input checked="" type="checkbox"/> Public <input type="checkbox"/> Private	
<b>18. Crossing Purpose</b> <input checked="" type="checkbox"/> Highway <input type="checkbox"/> Pathway, Ped. <input type="checkbox"/> Station, Ped.		<b>19. Crossing Position</b> <input checked="" type="checkbox"/> At Grade <input type="checkbox"/> RR Under <input type="checkbox"/> RR Over		<b>20. Public Access (if Private Crossing)</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
<b>21. Type of Train</b> <input checked="" type="checkbox"/> Freight <input checked="" type="checkbox"/> Intercity Passenger <input type="checkbox"/> Commuter		<input type="checkbox"/> Transit <input type="checkbox"/> Shared Use Transit <input type="checkbox"/> Tourist/Other		<b>22. Average Passenger Train Count Per Day</b> <input type="checkbox"/> Less Than One Per Day <input checked="" type="checkbox"/> Number Per Day 2	
<b>23. Type of Land Use</b> <input type="checkbox"/> Open Space <input type="checkbox"/> Farm <input type="checkbox"/> Residential <input checked="" type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Institutional <input type="checkbox"/> Recreational <input type="checkbox"/> RR Yard					
<b>24. Is there an Adjacent Crossing with a Separate Number?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, Provide Crossing Number			<b>25. Quiet Zone (FRA provided)</b> <input checked="" type="checkbox"/> No <input type="checkbox"/> 24 Hr <input type="checkbox"/> Partial <input type="checkbox"/> Chicago Excused Date Established		
<b>26. HSR Corridor ID</b> <input checked="" type="checkbox"/> N/A		<b>27. Latitude in decimal degrees</b> (WGS84 std: nn.nnnnnnn) 47.8600256		<b>28. Longitude in decimal degrees</b> (WGS84 std: -nnn.nnnnnnn) -121.977310	
<b>29. Lat/Long Source</b> <input checked="" type="checkbox"/> Actual <input type="checkbox"/> Estimated		<b>30.A. Railroad Use *</b>			
<b>30.B. Railroad Use *</b>		<b>31.A. State Use *</b>			
<b>30.C. Railroad Use *</b>		<b>31.B. State Use *</b>			
<b>30.D. Railroad Use *</b>		<b>31.C. State Use *</b>			
<b>30.E. Railroad Use *</b>		<b>31.D. State Use *</b>			
<b>32.A. Narrative (Railroad Use) *</b> (1.27 1.28 1.29) Value Provided by Railroad, Not Yet			<b>32.B. Narrative (State Use) *</b>		
<b>33. Emergency Notification Telephone No. (posted)</b> 800-832-5452		<b>34. Railroad Contact (Telephone No.)</b> 817-352-1549		<b>35. State Contact (Telephone No.)</b> 360-664-1262	

## Part II: Railroad Information

<b>1. Estimated Number of Daily Train Movements</b>				
<b>1.A. Total Day Thru Trains (6 AM to 6 PM)</b> 6	<b>1.B. Total Night Thru Trains (6 PM to 6 AM)</b> 6	<b>1.C. Total Switching Trains</b> 0	<b>1.D. Total Transit Trains</b> 0	<b>1.E. Check if Less Than One Movement Per Day</b> <input type="checkbox"/> How many trains per week? _____
<b>2. Year of Train Count Data (YYYY)</b> 2019		<b>3. Speed of Train at Crossing</b> 3.A. Maximum Timetable Speed (mph) 45 3.B. Typical Speed Range Over Crossing (mph) From 1 to 45		
<b>4. Type and Count of Tracks</b> Main 1 Siding 1 Yard 0 Transit 0 Industry 0				
<b>5. Train Detection (Main Track only)</b> <input checked="" type="checkbox"/> Constant Warning Time <input type="checkbox"/> Motion Detection <input type="checkbox"/> AFO <input type="checkbox"/> PTC <input type="checkbox"/> DC <input type="checkbox"/> Other <input type="checkbox"/> None				
<b>6. Is Track Signaled?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>7.A. Event Recorder</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>7.B. Remote Health Monitoring</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

# U. S. DOT CROSSING INVENTORY FORM

A. Revision Date (MM/DD/YYYY) 07/27/2020		PAGE 2		D. Crossing Inventory Number (7 char.) 084565X	
<b>Part III: Highway or Pathway Traffic Control Device Information</b>					
1. Are there Signs or Signals? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		2. Types of Passive Traffic Control Devices associated with the Crossing			
2.A. Crossbuck Assemblies (count) 2		2.B. STOP Signs (R1-1) (count) 0	2.C. YIELD Signs (R1-2) (count) 0	2.D. Advance Warning Signs (Check all that apply; include count) <input type="checkbox"/> None <input checked="" type="checkbox"/> W10-1 2 <input type="checkbox"/> W10-3 <input type="checkbox"/> W10-11 <input type="checkbox"/> W10-2 <input type="checkbox"/> W10-4 <input type="checkbox"/> W10-12	
2.E. Low Ground Clearance Sign (W10-5) <input type="checkbox"/> Yes (count _____) <input checked="" type="checkbox"/> No		2.F. Pavement Markings <input checked="" type="checkbox"/> Stop Lines <input type="checkbox"/> Dynamic Envelope <input checked="" type="checkbox"/> RR Xing Symbols <input type="checkbox"/> None		2.G. Channelization Devices/Medians <input checked="" type="checkbox"/> All Approaches <input checked="" type="checkbox"/> Median <input type="checkbox"/> One Approach <input type="checkbox"/> None	2.H. EXEMPT Sign (R15-3) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2.I. ENS Sign (I-13) Displayed <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		2.J. Other MUTCD Signs <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Specify Type R8-8 Count 1 Specify Type R15-2P Count 2 Specify Type R15-1 Count 2		2.K. Private Crossing Signs (if private) <input type="checkbox"/> Yes <input type="checkbox"/> No	2.L. LED Enhanced Signs (List types)
3. Types of Train Activated Warning Devices at the Grade Crossing (specify count of each device for all that apply)					
3.A. Gate Arms (count) Roadway 2 Pedestrian _____	3.B. Gate Configuration <input checked="" type="checkbox"/> 2 Quad <input type="checkbox"/> Full (Barrier) Resistance <input type="checkbox"/> 3 Quad <input type="checkbox"/> Median Gates	3.C. Cantilevered (or Bridged) Flashing Light Structures (count) Over Traffic Lane 2 <input type="checkbox"/> Incandescent Not Over Traffic Lane 0 <input type="checkbox"/> LED		3.D. Mast Mounted Flashing Lights (count of masts) 2 <input type="checkbox"/> Incandescent <input type="checkbox"/> LED <input checked="" type="checkbox"/> Back Lights Included <input checked="" type="checkbox"/> Side Lights Included	3.E. Total Count of Flashing Light Pairs 14
3.F. Installation Date of Current Active Warning Devices: (MM/YYYY) _____/_____/_____ <input type="checkbox"/> Not Required		3.G. Wayside Horn <input type="checkbox"/> Yes Installed on (MM/YYYY) ____/____/_____ <input checked="" type="checkbox"/> No		3.H. Highway Traffic Signals Controlling Crossing <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	3.I. Bells (count) 1
3.J. Non-Train Active Warning <input type="checkbox"/> Flagging/Flagman <input type="checkbox"/> Manually Operated Signals <input type="checkbox"/> Watchman <input type="checkbox"/> Floodlighting <input checked="" type="checkbox"/> None				3.K. Other Flashing Lights or Warning Devices Count 0 Specify type _____	
4.A. Does nearby Hwy Intersection have Traffic Signals? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	4.B. Hwy Traffic Signal Interconnection <input type="checkbox"/> Not Interconnected <input checked="" type="checkbox"/> For Traffic Signals <input type="checkbox"/> For Warning Signs	4.C. Hwy Traffic Signal Preemption <input type="checkbox"/> Simultaneous <input checked="" type="checkbox"/> Advance	5. Highway Traffic Pre-Signals <input type="checkbox"/> Yes <input type="checkbox"/> No Storage Distance * _____ Stop Line Distance * _____	6. Highway Monitoring Devices (Check all that apply) <input type="checkbox"/> Yes - Photo/Video Recording <input type="checkbox"/> Yes - Vehicle Presence Detection <input type="checkbox"/> None	
<b>Part IV: Physical Characteristics</b>					
1. Traffic Lanes Crossing Railroad Number of Lanes 2 <input type="checkbox"/> One-way Traffic <input type="checkbox"/> Two-way Traffic <input type="checkbox"/> Divided Traffic		2. Is Roadway/Pathway Paved? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	3. Does Track Run Down a Street? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	4. Is Crossing Illuminated? (Street lights within approx. 50 feet from nearest rail) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
5. Crossing Surface (on Main Track, multiple types allowed) Installation Date * (MM/YYYY) ____/____/_____ <input type="checkbox"/> 1 Timber <input type="checkbox"/> 2 Asphalt <input type="checkbox"/> 3 Asphalt and Timber <input checked="" type="checkbox"/> 4 Concrete <input type="checkbox"/> 5 Concrete and Rubber <input type="checkbox"/> 6 Rubber <input type="checkbox"/> 7 Metal <input type="checkbox"/> 8 Unconsolidated <input type="checkbox"/> 9 Composite <input type="checkbox"/> 10 Other (specify) _____					
6. Intersecting Roadway within 500 feet? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If Yes, Approximate Distance (feet) 100		7. Smallest Crossing Angle <input type="checkbox"/> 0° - 29° <input checked="" type="checkbox"/> 30° - 59° <input type="checkbox"/> 60° - 90°		8. Is Commercial Power Available? * <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
<b>Part V: Public Highway Information</b>					
1. Highway System <input type="checkbox"/> (01) Interstate Highway System <input type="checkbox"/> (02) Other Nat Hwy System (NHS) <input checked="" type="checkbox"/> (03) Federal AID, Not NHS <input type="checkbox"/> (08) Non-Federal Aid		2. Functional Classification of Road at Crossing <input type="checkbox"/> (0) Rural <input checked="" type="checkbox"/> (1) Urban <input type="checkbox"/> (1) Interstate <input checked="" type="checkbox"/> (5) Major Collector <input type="checkbox"/> (2) Other Freeways and Expressways <input type="checkbox"/> (3) Other Principal Arterial <input type="checkbox"/> (6) Minor Collector <input type="checkbox"/> (4) Minor Arterial <input type="checkbox"/> (7) Local		3. Is Crossing on State Highway System? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	4. Highway Speed Limit 25 _____ MPH <input type="checkbox"/> Posted <input type="checkbox"/> Statutory
5. Linear Referencing System (LRS Route ID) *					
6. LRS Milepost *					
7. Annual Average Daily Traffic (AADT) Year 2020 AADT 14606		8. Estimated Percent Trucks 12 _____ %	9. Regularly Used by School Buses? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Average Number per Day 16		10. Emergency Services Route <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<b>Submission Information - This information is used for administrative purposes and is not available on the public website.</b>					
Submitted by _____ Organization _____ Phone _____ Date _____					
Public reporting burden for this information collection is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. According to the Paperwork Reduction Act of 1995, a federal agency may not conduct or sponsor, and a person is not required to, nor shall a person be subject to a penalty for failure to comply with, a collection of information unless it displays a currently valid OMB control number. The valid OMB control number for information collection is 2130-0017. Send comments regarding this burden estimate or any other aspect of this collection, including for reducing this burden to: Information Collection Officer, Federal Railroad Administration, 1200 New Jersey Ave. SE, MS-25 Washington, DC 20590.					

# U. S. DOT CROSSING INVENTORY FORM

**DEPARTMENT OF TRANSPORTATION**  
FEDERAL RAILROAD ADMINISTRATION

OMB No. 2130-0017

Instructions for the initial reporting of the following types of new or previously unreported crossings: For public highway-rail grade crossings, complete the entire inventory Form. For private highway-rail grade crossings, complete the Header, Parts I and II, and the Submission Information section. For public pathway grade crossings (including pedestrian station grade crossings), complete the Header, Parts I and II, and the Submission Information section. For Private pathway grade crossings, complete the Header, Parts I and II, and the Submission Information section. For grade-separated highway-rail or pathway crossings (including pedestrian station crossings), complete the Header, Part I, and the Submission Information section. For changes to existing data, complete the Header, Part I Items 1-3, and the Submission Information section, in addition to the updated data fields. Note: For private crossings only, Part I Item 20 and Part III Item 2.K. are required unless otherwise noted. An asterisk \* denotes an optional field.

<b>A. Revision Date</b> (MM/DD/YYYY) 07 / 27 / 2020	<b>B. Reporting Agency</b> <input type="checkbox"/> Railroad <input type="checkbox"/> Transit <input checked="" type="checkbox"/> State <input type="checkbox"/> Other	<b>C. Reason for Update (Select only one)</b> <input checked="" type="checkbox"/> Change in Data <input type="checkbox"/> Re-Open <input type="checkbox"/> New Crossing <input type="checkbox"/> Date Change Only <input type="checkbox"/> Closed <input type="checkbox"/> Change in Primary Operating RR <input type="checkbox"/> No Train Traffic <input type="checkbox"/> Quiet Zone Update <input type="checkbox"/> Admin. Correction	<b>D. DOT Crossing Inventory Number</b> 084570U
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## Part I: Location and Classification Information

<b>1. Primary Operating Railroad</b> BNSF Railway Company [BNSF]		<b>2. State</b> WASHINGTON		<b>3. County</b> SNOHOMISH	
<b>4. City / Municipality</b> <input checked="" type="checkbox"/> In <input type="checkbox"/> Near MONROE		<b>5. Street/Road Name &amp; Block Number</b> 179TH AVE SE <small>(Street/Road Name)   * (Block Number)</small>		<b>6. Highway Type &amp; No.</b> city st - FCID 2673	
<b>7. Do Other Railroads Operate a Separate Track at Crossing?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, Specify RR _____			<b>8. Do Other Railroads Operate Over Your Track at Crossing?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If Yes, Specify RR <u>ATK</u>		
<b>9. Railroad Division or Region</b> <input type="checkbox"/> None <u>NORTHWEST</u>		<b>10. Railroad Subdivision or District</b> <input type="checkbox"/> None <u>SCENIC</u>		<b>11. Branch or Line Name</b> <input type="checkbox"/> None <u>WENACHE-SEATTLE</u>	
<b>12. RR Milepost</b> _____   1769.796   _____ <small>(prefix)   (nnnn.nnn)   (suffix)</small>		<b>13. Line Segment</b> * 37		<b>14. Nearest RR Timetable Station</b> * MONROE	
<b>15. Parent RR (if applicable)</b> <input checked="" type="checkbox"/> N/A		<b>16. Crossing Owner (if applicable)</b> <input type="checkbox"/> N/A <u>BNSF</u>		<b>17. Crossing Type</b> <input checked="" type="checkbox"/> Public <input type="checkbox"/> Private	
<b>18. Crossing Purpose</b> <input checked="" type="checkbox"/> Highway <input type="checkbox"/> Pathway, Ped. <input type="checkbox"/> Station, Ped.		<b>19. Crossing Position</b> <input checked="" type="checkbox"/> At Grade <input type="checkbox"/> RR Under <input type="checkbox"/> RR Over		<b>20. Public Access (if Private Crossing)</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
<b>21. Type of Train</b> <input checked="" type="checkbox"/> Freight <input checked="" type="checkbox"/> Intercity Passenger <input type="checkbox"/> Commuter		<input type="checkbox"/> Transit <input type="checkbox"/> Shared Use Transit <input type="checkbox"/> Tourist/Other		<b>22. Average Passenger Train Count Per Day</b> <input type="checkbox"/> Less Than One Per Day <input checked="" type="checkbox"/> Number Per Day <u>2</u>	
<b>23. Type of Land Use</b> <input type="checkbox"/> Open Space <input type="checkbox"/> Farm <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Institutional <input type="checkbox"/> Recreational <input type="checkbox"/> RR Yard					
<b>24. Is there an Adjacent Crossing with a Separate Number?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, Provide Crossing Number _____			<b>25. Quiet Zone (FRA provided)</b> <input checked="" type="checkbox"/> No <input type="checkbox"/> 24 Hr <input type="checkbox"/> Partial <input type="checkbox"/> Chicago Excused Date Established _____		
<b>26. HSR Corridor ID</b> <input checked="" type="checkbox"/> N/A		<b>27. Latitude in decimal degrees</b> (WGS84 std: nn.nnnnnnn) <u>47.8653296</u>		<b>28. Longitude in decimal degrees</b> (WGS84 std: -nnn.nnnnnnn) <u>-121.990724</u>	
<b>29. Lat/Long Source</b> <input checked="" type="checkbox"/> Actual <input type="checkbox"/> Estimated		<b>30.A. Railroad Use *</b>			
<b>30.B. Railroad Use *</b>		<b>31.A. State Use *</b>			
<b>30.C. Railroad Use *</b>		<b>31.B. State Use *</b>			
<b>30.D. Railroad Use *</b>		<b>31.C. State Use *</b>			
<b>30.E. Railroad Use *</b>		<b>31.D. State Use *</b>			
<b>32.A. Narrative (Railroad Use) *</b> (1.27 1.28 1.29) Value Provided by Railroad, Not Yet			<b>32.B. Narrative (State Use) *</b>		
<b>33. Emergency Notification Telephone No. (posted)</b> 800-832-5452		<b>34. Railroad Contact (Telephone No.)</b> 817-352-1549		<b>35. State Contact (Telephone No.)</b> 360-664-1262	

## Part II: Railroad Information

<b>1. Estimated Number of Daily Train Movements</b>				
<b>1.A. Total Day Thru Trains (6 AM to 6 PM)</b> 6	<b>1.B. Total Night Thru Trains (6 PM to 6 AM)</b> 6	<b>1.C. Total Switching Trains</b> 0	<b>1.D. Total Transit Trains</b> 0	<b>1.E. Check if Less Than One Movement Per Day</b> <input type="checkbox"/> How many trains per week? _____
<b>2. Year of Train Count Data (YYYY)</b> 2019		<b>3. Speed of Train at Crossing</b> 3.A. Maximum Timetable Speed (mph) <u>45</u> 3.B. Typical Speed Range Over Crossing (mph) From <u>1</u> to <u>45</u>		
<b>4. Type and Count of Tracks</b> Main <u>3</u> Siding <u>1</u> Yard <u>0</u> Transit <u>0</u> Industry <u>0</u>				
<b>5. Train Detection (Main Track only)</b> <input checked="" type="checkbox"/> Constant Warning Time <input type="checkbox"/> Motion Detection <input type="checkbox"/> AFO <input type="checkbox"/> PTC <input type="checkbox"/> DC <input type="checkbox"/> Other <input type="checkbox"/> None				
<b>6. Is Track Signaled?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>7.A. Event Recorder</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>7.B. Remote Health Monitoring</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

# U. S. DOT CROSSING INVENTORY FORM

A. Revision Date (MM/DD/YYYY) 07/27/2020		PAGE 2		D. Crossing Inventory Number (7 char.) 084570U	
<b>Part III: Highway or Pathway Traffic Control Device Information</b>					
1. Are there Signs or Signals? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		2. Types of Passive Traffic Control Devices associated with the Crossing			
2.A. Crossbuck Assemblies (count) 2		2.B. STOP Signs (R1-1) (count) 0	2.C. YIELD Signs (R1-2) (count) 0	2.D. Advance Warning Signs (Check all that apply; include count) <input type="checkbox"/> None <input checked="" type="checkbox"/> W10-1 1 <input type="checkbox"/> W10-3 _____ <input type="checkbox"/> W10-11 _____ <input type="checkbox"/> W10-2 0 <input type="checkbox"/> W10-4 _____ <input type="checkbox"/> W10-12 _____	
2.E. Low Ground Clearance Sign (W10-5) <input type="checkbox"/> Yes (count _____) <input checked="" type="checkbox"/> No		2.F. Pavement Markings <input checked="" type="checkbox"/> Stop Lines <input type="checkbox"/> Dynamic Envelope <input checked="" type="checkbox"/> RR Xing Symbols <input type="checkbox"/> None		2.G. Channelization Devices/Medians <input type="checkbox"/> All Approaches <input type="checkbox"/> Median <input type="checkbox"/> One Approach <input checked="" type="checkbox"/> None	2.H. EXEMPT Sign (R15-3) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2.I. ENS Sign (I-13) Displayed <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		2.J. Other MUTCD Signs <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Specify Type R8-8 Count 1 Specify Type R15-2P Count 2 Specify Type R15-1 Count 2		2.K. Private Crossing Signs (if private) <input type="checkbox"/> Yes <input type="checkbox"/> No	2.L. LED Enhanced Signs (List types)
3. Types of Train Activated Warning Devices at the Grade Crossing (specify count of each device for all that apply)					
3.A. Gate Arms (count) Roadway 2 Pedestrian _____	3.B. Gate Configuration <input checked="" type="checkbox"/> 2 Quad <input type="checkbox"/> Full (Barrier) Resistance <input type="checkbox"/> 3 Quad <input type="checkbox"/> Median Gates	3.C. Cantilevered (or Bridged) Flashing Light Structures (count) Over Traffic Lane 2 <input type="checkbox"/> Incandescent Not Over Traffic Lane 0 <input type="checkbox"/> LED		3.D. Mast Mounted Flashing Lights (count of masts) 2 <input type="checkbox"/> Incandescent <input type="checkbox"/> LED <input checked="" type="checkbox"/> Back Lights Included <input type="checkbox"/> Side Lights Included	3.E. Total Count of Flashing Light Pairs 12
3.F. Installation Date of Current Active Warning Devices: (MM/YYYY) _____/_____/_____ <input type="checkbox"/> Not Required		3.G. Wayside Horn <input type="checkbox"/> Yes Installed on (MM/YYYY) ____/____/_____ <input checked="" type="checkbox"/> No		3.H. Highway Traffic Signals Controlling Crossing <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	3.I. Bells (count) 1
3.J. Non-Train Active Warning <input type="checkbox"/> Flagging/Flagman <input type="checkbox"/> Manually Operated Signals <input type="checkbox"/> Watchman <input type="checkbox"/> Floodlighting <input checked="" type="checkbox"/> None				3.K. Other Flashing Lights or Warning Devices Count 0 Specify type _____	
4.A. Does nearby Hwy Intersection have Traffic Signals? <input type="checkbox"/> Yes <input type="checkbox"/> No	4.B. Hwy Traffic Signal Interconnection <input type="checkbox"/> Not Interconnected <input checked="" type="checkbox"/> For Traffic Signals <input type="checkbox"/> For Warning Signs	4.C. Hwy Traffic Signal Preemption <input checked="" type="checkbox"/> Simultaneous <input type="checkbox"/> Advance	5. Highway Traffic Pre-Signals <input type="checkbox"/> Yes <input type="checkbox"/> No Storage Distance * _____ Stop Line Distance * _____	6. Highway Monitoring Devices (Check all that apply) <input type="checkbox"/> Yes - Photo/Video Recording <input type="checkbox"/> Yes - Vehicle Presence Detection <input type="checkbox"/> None	
<b>Part IV: Physical Characteristics</b>					
1. Traffic Lanes Crossing Railroad Number of Lanes 3 <input type="checkbox"/> One-way Traffic <input checked="" type="checkbox"/> Two-way Traffic <input type="checkbox"/> Divided Traffic		2. Is Roadway/Pathway Paved? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	3. Does Track Run Down a Street? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	4. Is Crossing Illuminated? (Street lights within approx. 50 feet from nearest rail) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
5. Crossing Surface (on Main Track, multiple types allowed) Installation Date * (MM/YYYY) ____/____/_____ <input type="checkbox"/> 1 Timber <input type="checkbox"/> 2 Asphalt <input type="checkbox"/> 3 Asphalt and Timber <input checked="" type="checkbox"/> 4 Concrete <input type="checkbox"/> 5 Concrete and Rubber <input type="checkbox"/> 6 Rubber <input type="checkbox"/> 7 Metal <input type="checkbox"/> 8 Unconsolidated <input type="checkbox"/> 9 Composite <input type="checkbox"/> 10 Other (specify) _____					
6. Intersecting Roadway within 500 feet? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If Yes, Approximate Distance (feet) 75		7. Smallest Crossing Angle <input type="checkbox"/> 0° - 29° <input type="checkbox"/> 30° - 59° <input checked="" type="checkbox"/> 60° - 90°		8. Is Commercial Power Available? * <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
<b>Part V: Public Highway Information</b>					
1. Highway System <input type="checkbox"/> (01) Interstate Highway System <input type="checkbox"/> (02) Other Nat Hwy System (NHS) <input type="checkbox"/> (03) Federal AID, Not NHS <input checked="" type="checkbox"/> (08) Non-Federal AID		2. Functional Classification of Road at Crossing <input type="checkbox"/> (0) Rural <input checked="" type="checkbox"/> (1) Urban <input type="checkbox"/> (1) Interstate <input checked="" type="checkbox"/> (5) Major Collector <input type="checkbox"/> (2) Other Freeways and Expressways <input type="checkbox"/> (3) Other Principal Arterial <input type="checkbox"/> (6) Minor Collector <input type="checkbox"/> (4) Minor Arterial <input type="checkbox"/> (7) Local		3. Is Crossing on State Highway System? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	4. Highway Speed Limit 25 _____ MPH <input type="checkbox"/> Posted <input type="checkbox"/> Statutory
7. Annual Average Daily Traffic (AADT) Year 2020 AADT 9054		8. Estimated Percent Trucks 2 _____ %	9. Regularly Used by School Buses? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Average Number per Day 16		10. Emergency Services Route <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<b>Submission Information - This information is used for administrative purposes and is not available on the public website.</b>					
Submitted by _____ Organization _____ Phone _____ Date _____					
Public reporting burden for this information collection is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. According to the Paperwork Reduction Act of 1995, a federal agency may not conduct or sponsor, and a person is not required to, nor shall a person be subject to a penalty for failure to comply with, a collection of information unless it displays a currently valid OMB control number. The valid OMB control number for information collection is 2130-0017. Send comments regarding this burden estimate or any other aspect of this collection, including for reducing this burden to: Information Collection Officer, Federal Railroad Administration, 1200 New Jersey Ave. SE, MS-25 Washington, DC 20590.					

# U. S. DOT CROSSING INVENTORY FORM

**DEPARTMENT OF TRANSPORTATION**  
FEDERAL RAILROAD ADMINISTRATION

OMB No. 2130-0017

Instructions for the initial reporting of the following types of new or previously unreported crossings: For public highway-rail grade crossings, complete the entire inventory Form. For private highway-rail grade crossings, complete the Header, Parts I and II, and the Submission Information section. For public pathway grade crossings (including pedestrian station grade crossings), complete the Header, Parts I and II, and the Submission Information section. For Private pathway grade crossings, complete the Header, Parts I and II, and the Submission Information section. For grade-separated highway-rail or pathway crossings (including pedestrian station crossings), complete the Header, Part I, and the Submission Information section. For changes to existing data, complete the Header, Part I Items 1-3, and the Submission Information section, in addition to the updated data fields. Note: For private crossings only, Part I Item 20 and Part III Item 2.K. are required unless otherwise noted. An asterisk \* denotes an optional field.

<b>A. Revision Date</b> (MM/DD/YYYY) 07 / 27 / 2020	<b>B. Reporting Agency</b> <input type="checkbox"/> Railroad <input type="checkbox"/> Transit <input checked="" type="checkbox"/> State <input type="checkbox"/> Other	<b>C. Reason for Update (Select only one)</b> <input checked="" type="checkbox"/> Change in Data <input type="checkbox"/> Re-Open <input type="checkbox"/> New Crossing <input type="checkbox"/> Date Change Only <input type="checkbox"/> Closed <input type="checkbox"/> Change in Primary Operating RR <input type="checkbox"/> No Train Traffic <input type="checkbox"/> Quiet Zone Update <input type="checkbox"/> Admin. Correction	<b>D. DOT Crossing Inventory Number</b> 084571B
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## Part I: Location and Classification Information

<b>1. Primary Operating Railroad</b> BNSF Railway Company [BNSF]		<b>2. State</b> WASHINGTON		<b>3. County</b> SNOHOMISH	
<b>4. City / Municipality</b> <input type="checkbox"/> In <input checked="" type="checkbox"/> Near MONROE		<b>5. Street/Road Name &amp; Block Number</b> FRYELANDS BLVD (Street/Road Name)   * (Block Number)		<b>6. Highway Type &amp; No.</b> city st - fcid 2633	
<b>7. Do Other Railroads Operate a Separate Track at Crossing?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, Specify RR			<b>8. Do Other Railroads Operate Over Your Track at Crossing?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If Yes, Specify RR ATK		
<b>9. Railroad Division or Region</b> <input type="checkbox"/> None NORTHWEST		<b>10. Railroad Subdivision or District</b> <input type="checkbox"/> None SCENIC		<b>11. Branch or Line Name</b> <input type="checkbox"/> None WENACHE-SEATTLE	
<b>12. RR Milepost</b>   1770.660   (prefix)   (nnnn.nnn)   (suffix)		<b>13. Line Segment</b> * 37		<b>14. Nearest RR Timetable Station</b> * MONROE	
<b>15. Parent RR (if applicable)</b> <input checked="" type="checkbox"/> N/A		<b>16. Crossing Owner (if applicable)</b> <input type="checkbox"/> N/A BNSF		<b>17. Crossing Type</b> <input checked="" type="checkbox"/> Public <input type="checkbox"/> Private	
<b>18. Crossing Purpose</b> <input checked="" type="checkbox"/> Highway <input type="checkbox"/> Pathway, Ped. <input type="checkbox"/> Station, Ped.		<b>19. Crossing Position</b> <input checked="" type="checkbox"/> At Grade <input type="checkbox"/> RR Under <input type="checkbox"/> RR Over		<b>20. Public Access (if Private Crossing)</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
<b>21. Type of Train</b> <input checked="" type="checkbox"/> Freight <input checked="" type="checkbox"/> Intercity Passenger <input type="checkbox"/> Commuter		<input type="checkbox"/> Transit <input type="checkbox"/> Shared Use Transit <input type="checkbox"/> Tourist/Other		<b>22. Average Passenger Train Count Per Day</b> <input type="checkbox"/> Less Than One Per Day <input checked="" type="checkbox"/> Number Per Day 2	
<b>23. Type of Land Use</b> <input type="checkbox"/> Open Space <input type="checkbox"/> Farm <input type="checkbox"/> Residential <input checked="" type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Institutional <input type="checkbox"/> Recreational <input type="checkbox"/> RR Yard					
<b>24. Is there an Adjacent Crossing with a Separate Number?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, Provide Crossing Number			<b>25. Quiet Zone (FRA provided)</b> <input checked="" type="checkbox"/> No <input type="checkbox"/> 24 Hr <input type="checkbox"/> Partial <input type="checkbox"/> Chicago Excused Date Established		
<b>26. HSR Corridor ID</b> <input checked="" type="checkbox"/> N/A		<b>27. Latitude in decimal degrees</b> (WGS84 std: nn.nnnnnnn) 47.8722200		<b>28. Longitude in decimal degrees</b> (WGS84 std: -nnn.nnnnnnn) -122.008170	
<b>29. Lat/Long Source</b> <input checked="" type="checkbox"/> Actual <input type="checkbox"/> Estimated		<b>30.A. Railroad Use *</b>			
<b>30.B. Railroad Use *</b>		<b>31.A. State Use *</b>			
<b>30.C. Railroad Use *</b>		<b>31.B. State Use *</b>			
<b>30.D. Railroad Use *</b>		<b>31.C. State Use *</b>			
<b>30.E. Railroad Use *</b>		<b>31.D. State Use *</b>			
<b>32.A. Narrative (Railroad Use) *</b> (1.27 1.28 1.29) Value Provided by Railroad, Not Yet			<b>32.B. Narrative (State Use) *</b>		
<b>33. Emergency Notification Telephone No. (posted)</b> 800-832-5452		<b>34. Railroad Contact (Telephone No.)</b> 817-352-1549		<b>35. State Contact (Telephone No.)</b> 360-664-1262	

## Part II: Railroad Information

<b>1. Estimated Number of Daily Train Movements</b>				
<b>1.A. Total Day Thru Trains (6 AM to 6 PM)</b> 6	<b>1.B. Total Night Thru Trains (6 PM to 6 AM)</b> 6	<b>1.C. Total Switching Trains</b> 0	<b>1.D. Total Transit Trains</b> 0	<b>1.E. Check if Less Than One Movement Per Day</b> <input type="checkbox"/> How many trains per week? _____
<b>2. Year of Train Count Data (YYYY)</b> 2019		<b>3. Speed of Train at Crossing</b> 3.A. Maximum Timetable Speed (mph) 45 3.B. Typical Speed Range Over Crossing (mph) From 1 to 45		
<b>4. Type and Count of Tracks</b> Main 1 Siding 0 Yard 0 Transit 0 Industry 0				
<b>5. Train Detection (Main Track only)</b> <input checked="" type="checkbox"/> Constant Warning Time <input type="checkbox"/> Motion Detection <input type="checkbox"/> AFO <input type="checkbox"/> PTC <input type="checkbox"/> DC <input type="checkbox"/> Other <input type="checkbox"/> None				
<b>6. Is Track Signaled?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>7.A. Event Recorder</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>7.B. Remote Health Monitoring</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

# U. S. DOT CROSSING INVENTORY FORM

A. Revision Date (MM/DD/YYYY) 07/27/2020		PAGE 2		D. Crossing Inventory Number (7 char.) 084571B	
<b>Part III: Highway or Pathway Traffic Control Device Information</b>					
1. Are there Signs or Signals? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		2. Types of Passive Traffic Control Devices associated with the Crossing			
2.A. Crossbuck Assemblies (count) 2		2.B. STOP Signs (R1-1) (count) 0	2.C. YIELD Signs (R1-2) (count) 0	2.D. Advance Warning Signs (Check all that apply; include count) <input type="checkbox"/> None <input type="checkbox"/> W10-1 _____ <input type="checkbox"/> W10-3 _____ <input type="checkbox"/> W10-11 _____ <input checked="" type="checkbox"/> W10-2 2 <input type="checkbox"/> W10-4 _____ <input type="checkbox"/> W10-12 _____	
2.E. Low Ground Clearance Sign (W10-5) <input type="checkbox"/> Yes (count _____) <input checked="" type="checkbox"/> No		2.F. Pavement Markings <input checked="" type="checkbox"/> Stop Lines <input type="checkbox"/> Dynamic Envelope <input checked="" type="checkbox"/> RR Xing Symbols <input type="checkbox"/> None		2.G. Channelization Devices/Medians <input type="checkbox"/> All Approaches <input type="checkbox"/> Median <input type="checkbox"/> One Approach <input checked="" type="checkbox"/> None	2.H. EXEMPT Sign (R15-3) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2.I. ENS Sign (I-13) Displayed <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		2.J. Other MUTCD Signs <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Specify Type R8-8 Count 1 Specify Type R15-1 Count 2 Specify Type R8-10 Count 1		2.K. Private Crossing Signs (if private) <input type="checkbox"/> Yes <input type="checkbox"/> No	2.L. LED Enhanced Signs (List types)
3. Types of Train Activated Warning Devices at the Grade Crossing (specify count of each device for all that apply)					
3.A. Gate Arms (count) Roadway 2 Pedestrian _____	3.B. Gate Configuration <input checked="" type="checkbox"/> 2 Quad <input type="checkbox"/> Full (Barrier) Resistance <input type="checkbox"/> 3 Quad <input type="checkbox"/> Median Gates	3.C. Cantilevered (or Bridged) Flashing Light Structures (count) Over Traffic Lane 2 <input type="checkbox"/> Incandescent Not Over Traffic Lane 0 <input type="checkbox"/> LED		3.D. Mast Mounted Flashing Lights (count of masts) 4 <input type="checkbox"/> Incandescent <input type="checkbox"/> LED <input checked="" type="checkbox"/> Back Lights Included <input type="checkbox"/> Side Lights Included	3.E. Total Count of Flashing Light Pairs 12
3.F. Installation Date of Current Active Warning Devices: (MM/YYYY) ____/____/____ <input type="checkbox"/> Not Required		3.G. Wayside Horn <input type="checkbox"/> Yes Installed on (MM/YYYY) ____/____/____ <input checked="" type="checkbox"/> No		3.H. Highway Traffic Signals Controlling Crossing <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	3.I. Bells (count) 1
3.J. Non-Train Active Warning <input type="checkbox"/> Flagging/Flagman <input type="checkbox"/> Manually Operated Signals <input type="checkbox"/> Watchman <input type="checkbox"/> Floodlighting <input checked="" type="checkbox"/> None				3.K. Other Flashing Lights or Warning Devices Count 0 Specify type _____	
4.A. Does nearby Hwy Intersection have Traffic Signals? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	4.B. Hwy Traffic Signal Interconnection <input type="checkbox"/> Not Interconnected <input checked="" type="checkbox"/> For Traffic Signals <input type="checkbox"/> For Warning Signs	4.C. Hwy Traffic Signal Preemption <input checked="" type="checkbox"/> Simultaneous <input type="checkbox"/> Advance	5. Highway Traffic Pre-Signals <input type="checkbox"/> Yes <input type="checkbox"/> No Storage Distance * _____ Stop Line Distance * _____	6. Highway Monitoring Devices (Check all that apply) <input type="checkbox"/> Yes - Photo/Video Recording <input type="checkbox"/> Yes - Vehicle Presence Detection <input type="checkbox"/> None	
<b>Part IV: Physical Characteristics</b>					
1. Traffic Lanes Crossing Railroad Number of Lanes 4 <input type="checkbox"/> One-way Traffic <input type="checkbox"/> Two-way Traffic <input type="checkbox"/> Divided Traffic		2. Is Roadway/Pathway Paved? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	3. Does Track Run Down a Street? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	4. Is Crossing Illuminated? (Street lights within approx. 50 feet from nearest rail) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
5. Crossing Surface (on Main Track, multiple types allowed) Installation Date * (MM/YYYY) ____/____/____ Width * _____ Length * _____ <input type="checkbox"/> 1 Timber <input type="checkbox"/> 2 Asphalt <input type="checkbox"/> 3 Asphalt and Timber <input checked="" type="checkbox"/> 4 Concrete <input type="checkbox"/> 5 Concrete and Rubber <input type="checkbox"/> 6 Rubber <input type="checkbox"/> 7 Metal <input type="checkbox"/> 8 Unconsolidated <input type="checkbox"/> 9 Composite <input type="checkbox"/> 10 Other (specify) _____					
6. Intersecting Roadway within 500 feet? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If Yes, Approximate Distance (feet) 85			7. Smallest Crossing Angle <input type="checkbox"/> 0° - 29° <input type="checkbox"/> 30° - 59° <input checked="" type="checkbox"/> 60° - 90°	8. Is Commercial Power Available? * <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
<b>Part V: Public Highway Information</b>					
1. Highway System <input type="checkbox"/> (01) Interstate Highway System <input type="checkbox"/> (02) Other Nat Hwy System (NHS) <input checked="" type="checkbox"/> (03) Federal AID, Not NHS <input type="checkbox"/> (08) Non-Federal Aid		2. Functional Classification of Road at Crossing <input type="checkbox"/> (0) Rural <input checked="" type="checkbox"/> (1) Urban <input type="checkbox"/> (1) Interstate <input type="checkbox"/> (5) Major Collector <input type="checkbox"/> (2) Other Freeways and Expressways <input type="checkbox"/> (3) Other Principal Arterial <input type="checkbox"/> (6) Minor Collector <input checked="" type="checkbox"/> (4) Minor Arterial <input type="checkbox"/> (7) Local		3. Is Crossing on State Highway System? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	4. Highway Speed Limit 35 _____ MPH <input checked="" type="checkbox"/> Posted <input type="checkbox"/> Statutory
5. Linear Referencing System (LRS Route ID) *					
6. LRS Milepost *					
7. Annual Average Daily Traffic (AADT) Year 2020 AADT 10729		8. Estimated Percent Trucks 3 _____ %	9. Regularly Used by School Buses? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Average Number per Day 18		10. Emergency Services Route <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<b>Submission Information - This information is used for administrative purposes and is not available on the public website.</b>					
Submitted by _____ Organization _____ Phone _____ Date _____					
Public reporting burden for this information collection is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. According to the Paperwork Reduction Act of 1995, a federal agency may not conduct or sponsor, and a person is not required to, nor shall a person be subject to a penalty for failure to comply with, a collection of information unless it displays a currently valid OMB control number. The valid OMB control number for information collection is 2130-0017. Send comments regarding this burden estimate or any other aspect of this collection, including for reducing this burden to: Information Collection Officer, Federal Railroad Administration, 1200 New Jersey Ave. SE, MS-25 Washington, DC 20590.					

APPENDIX C  
ALTERNATIVE 3 EXHIBITS

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\* NOTE: Creditable median length shown is used estimated for preliminary QZRI Calculation. Actual creditable length will be proposed based on final design as part Public Authority Application utilizing modified ASM calculation.

### ALTERNATIVE 3:

#### QUIET ZONE IMPROVEMENT:

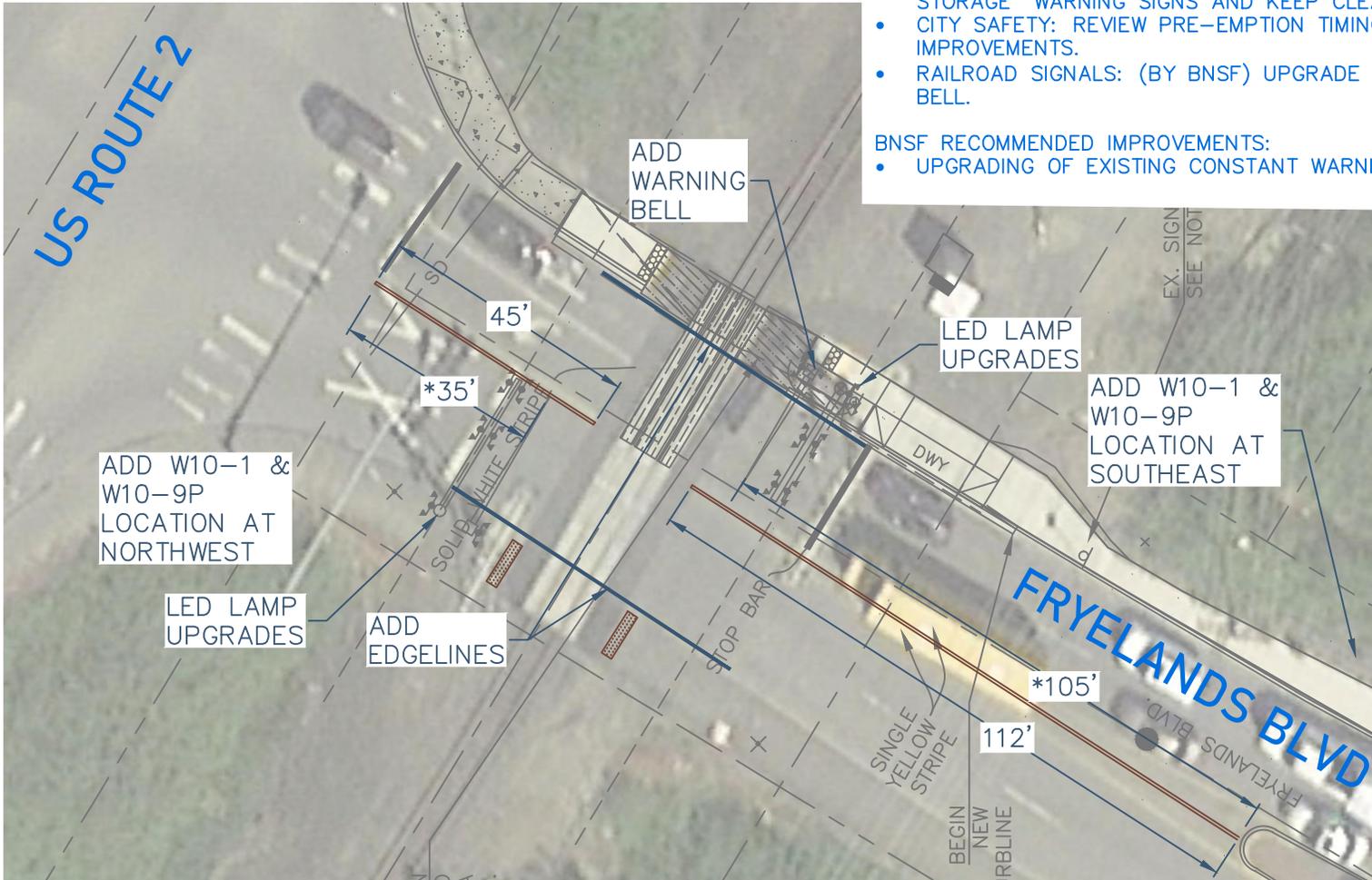
- INSTALL NON-MOUNTABLE MEDIANS (ASM)

#### PROPOSED ADDITIONAL SAFETY IMPROVEMENTS:

- MUTCD: UPGRADE WARNING SIGNAGE (R8-8, W10-1 & W10-9P) AND PAVEMENT MARKINGS. EVALUATE FEASIBILITY OF ADDING CUSTOM "SHORT STORAGE" WARNING SIGNS AND KEEP CLEAR MARKINGS.
- CITY SAFETY: REVIEW PRE-EMPTION TIMING AND CHANNELIZATION IMPROVEMENTS.
- RAILROAD SIGNALS: (BY BNSF) UPGRADE TO LED LAMPS AND ADD WARNING BELL.

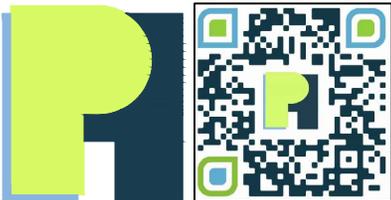
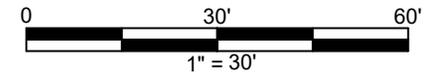
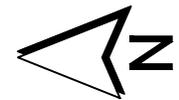
#### BNSF RECOMMENDED IMPROVEMENTS:

- UPGRADING OF EXISTING CONSTANT WARNING TIME CIRCUITRY.

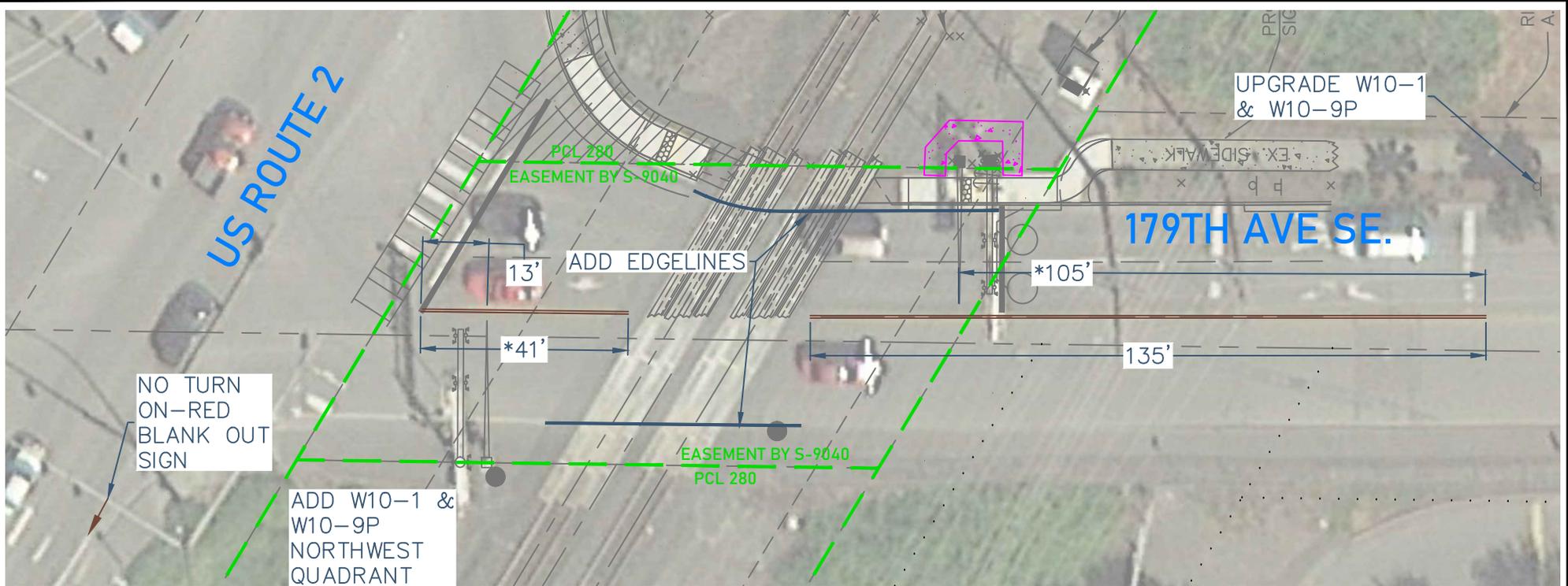


### LEGEND

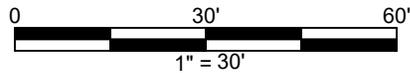
-  PROPOSED DETECTABLE WARNING
-  PROPOSED NON-MOUNTABLE MEDIAN



CITY OF MONROE, WA  
 QUIET ZONE FEASIBILITY STUDY  
 FRYELANDS BLVD & RR CROSSING - PROPOSED CONDITIONS  
 DOT 084571B



\* NOTE: Creditable median length shown is used estimated for preliminary QZRI Calculation. Actual creditable length will be proposed based on final design as part Public Authority Application utilizing modified ASM calculation.



### ALTERNATIVE 3:

#### QUIET ZONE IMPROVEMENT:

- INSTALL NON-MOUNTABLE MEDIANS (ASM)

#### PROPOSED ADDITIONAL SAFETY IMPROVEMENTS:

- MUTCD: UPGRADE WARNING SIGNAGE (R8-8, W10-1 & W10-9P) AND PAVEMENT MARKINGS. EVALUATE FEASIBILITY OF ADDING CUSTOM "SHORT STORAGE" WARNING SIGNS AND KEEP CLEAR MARKINGS.
- CITY SAFETY: EVALUATE FEASIBILITY OF PEDESTRIAN PATHWAY BEHIND GATE ON SE QUADRANT, REVIEW PRE-EMPTION TIMING, EVALUATE SIGNAL HEAD VISIBILITY, AND CHANNELIZATION IMPROVEMENTS.
- RAILROAD SIGNALS: (BY BNSF) UPGRADE TO LED LAMPS AND ADD WARNING BELL.

#### BNSF RECOMMENDED IMPROVEMENTS:

- UPGRADING OF EXISTING CONSTANT WARNING TIME CIRCUITRY.

### LEGEND

- PROPOSED NON-MOUNTABLE MEDIAN
- PROPOSED PAVED PEDESTRIAN PATHWAY



CITY OF MONROE, WA  
 QUIET ZONE FEASIBILITY STUDY  
 179TH AVE SE. & RR CROSSING - PROPOSED CONDITIONS  
 DOT 084570U

### ALTERNATIVE 3:

#### QUIET ZONE IMPROVEMENT:

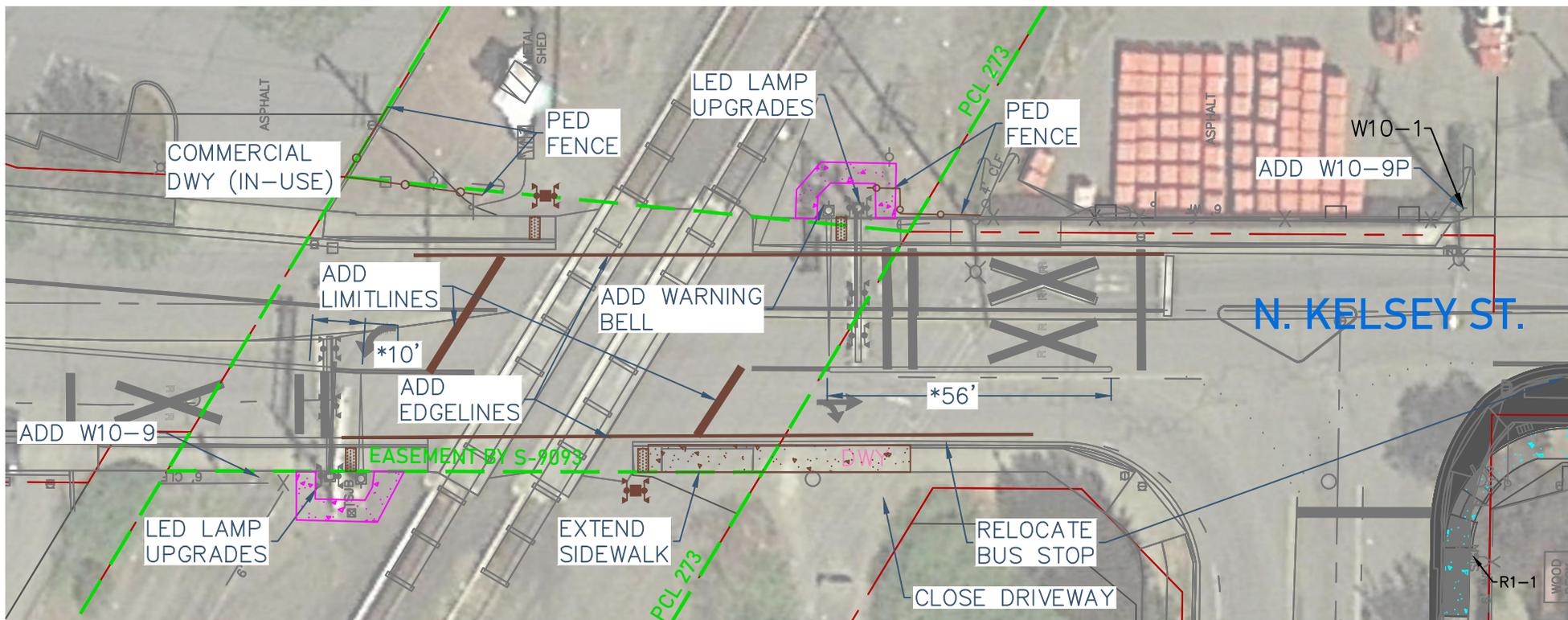
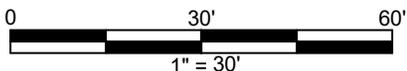
- EXISTING NON-MOUNTABLE MEDIANS (ASM) AND REMOVAL OF DRIVEWAY ON SW QUADRANT.

#### PROPOSED ADDITIONAL SAFETY IMPROVEMENTS:

- MUTCD: UPGRADE WARNING SIGNAGE (R8-8, W10-9 & W10-9P) AND PAVEMENT MARKINGS.
- CITY SAFETY: ADD PEDESTRIAN BARRIER FENCING, RELOCATE BUS STOP, EXTEND SIDEWALK, REVIEW PRE-EMPTION TIMING, AND EVALUATE CHANNELIZATION IMPROVEMENTS.
- ADA COMPLIANCE: ADD DETECTABLE WARNING SURFACES.
- RAILROAD SIGNALS: (BY BNSF) UPGRADE TO LED LAMPS, ADD WARNING BELL, AND ADD PEDESTRIAN WARNING FLASHERS.

#### BNSF RECOMMENDED IMPROVEMENTS:

- UPGRADING OF EXISTING CONSTANT WARNING TIME CIRCUITRY.



#### LEGEND

-  PROPOSED PED MAST FLASHER
-  PROPOSED RR LIGHTS
-  PROPOSED DETECTABLE WARNING
-  PROPOSED PEDESTRIAN BARRIER FENCE
-  PROPOSED PAVED PEDESTRIAN PATHWAY

\* NOTE: Creditable median length shown is used estimated for preliminary QZRI Calculation. Actual creditable length will be proposed based on final design as part Public Authority Application utilizing modified ASM calculation.

CITY OF MONROE, WA  
 QUIET ZONE FEASIBILITY STUDY  
 N. KELSEY ST. & RR CROSSING - PROPOSED CONDITIONS  
 DOT 084565X



## ALTERNATIVE 3:

### QUIET ZONE IMPROVEMENT:

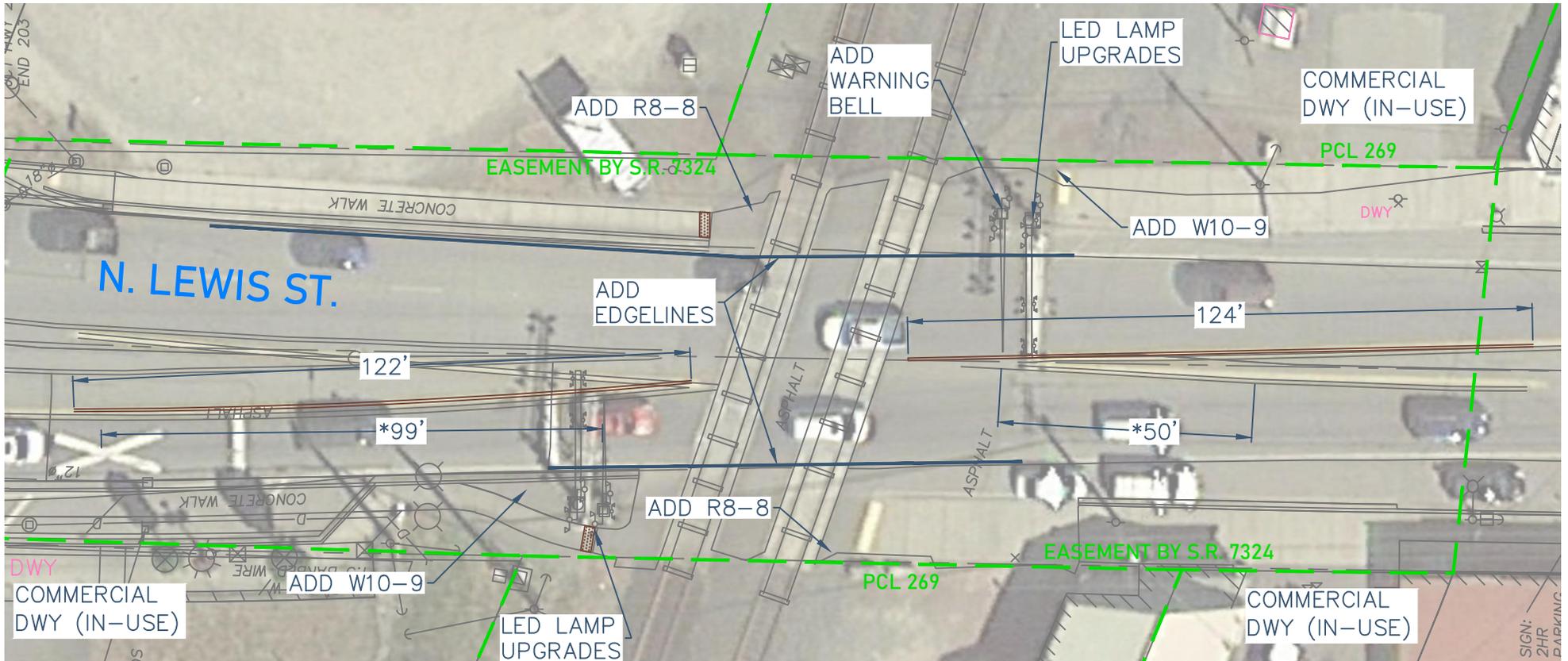
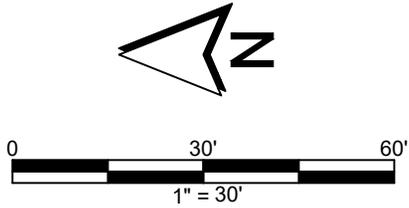
- INSTALL NON-MOUNTABLE MEDIANS (ASM)

### PROPOSED ADDITIONAL SAFETY IMPROVEMENTS:

- MUTCD: UPGRADE WARNING SIGNAGE (R8-8 & W10-9) AND PAVEMENT MARKINGS.
- ADA COMPLIANCE: ADD DETECTABLE WARNING SURFACES.
- RAILROAD SIGNALS: (BY BNSF) UPGRADE TO LED LAMPS AND ADD WARNING BELL.

### BNSF RECOMMENDED IMPROVEMENTS:

- UPGRADING OF EXISTING CONSTANT WARNING TIME CIRCUITRY.



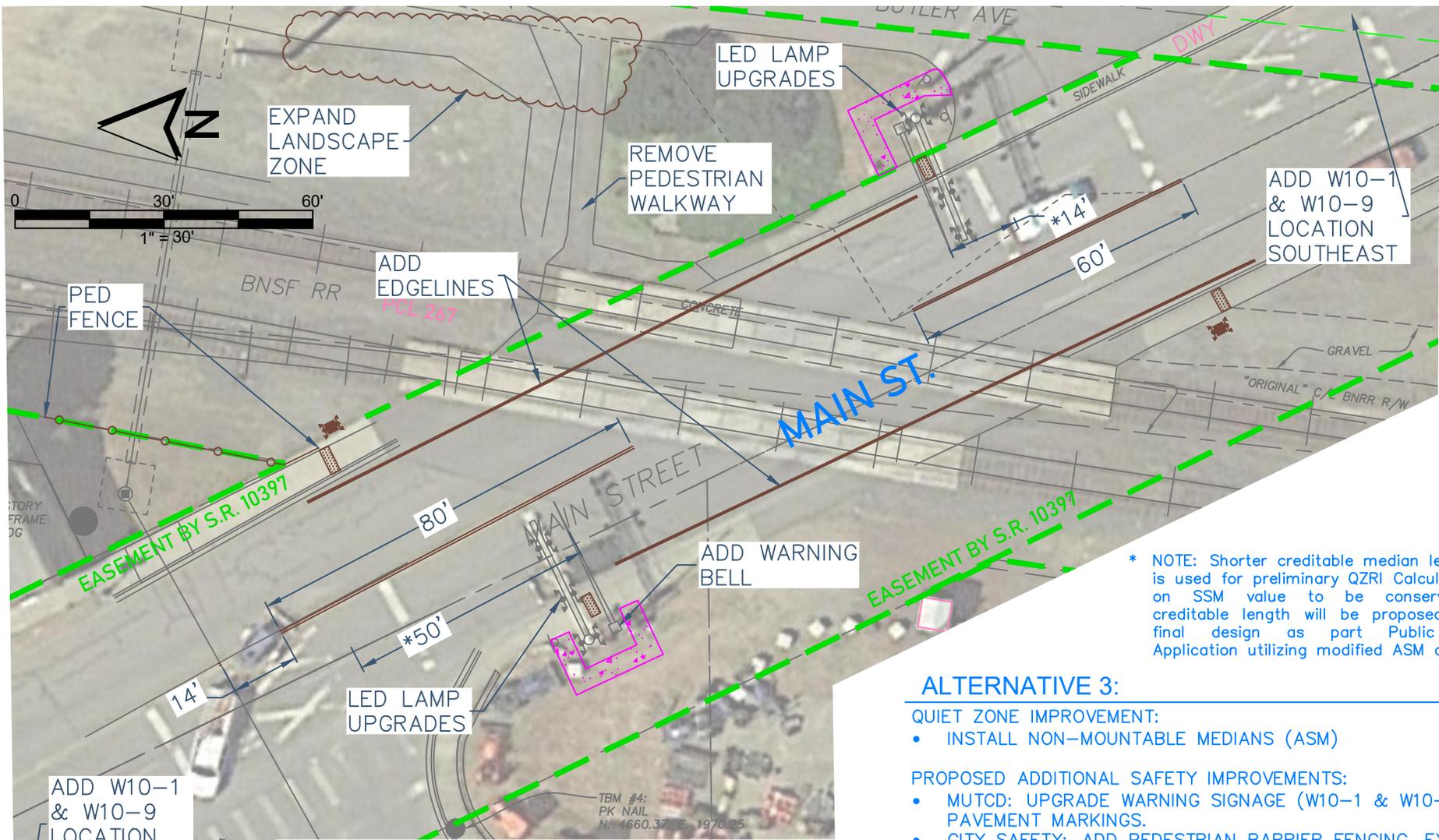
### LEGEND

-  PROPOSED DETECTABLE WARNING
-  PROPOSED NON-MOUNTABLE MEDIAN

\* NOTE: Shorter creditable median length shown is used for preliminary QZRI Calculation based on SSM value to be conservative. Full creditable length will be proposed based on final design as part Public Authority Application utilizing modified ASM calculation.



CITY OF MONROE, WA  
 QUIET ZONE FEASIBILITY STUDY  
 N. LEWIS ST. & RR CROSSING - PROPOSED CONDITIONS  
 DOT 084564R



\* NOTE: Shorter creditable median length shown is used for preliminary QZRI Calculation based on SSM value to be conservative. Full creditable length will be proposed based on final design as part Public Authority Application utilizing modified ASM calculation.

**ALTERNATIVE 3:**

**QUIET ZONE IMPROVEMENT:**

- INSTALL NON-MOUNTABLE MEDIANS (ASM)

**PROPOSED ADDITIONAL SAFETY IMPROVEMENTS:**

- MUTCD: UPGRADE WARNING SIGNAGE (W10-1 & W10-9P) AND PAVEMENT MARKINGS.
- CITY SAFETY: ADD PEDESTRIAN BARRIER FENCING, EXPAND LANDSCAPE ZONE, REMOVE PEDESTRIAN PATHWAY, AND EVALUATE CHANNELIZATION AND TURNING MOVEMENTS.
- ADA COMPLIANCE: ADD DETECTABLE WARNING SURFACES.
- RAILROAD SIGNALS: (BY BNSF) UPGRADE TO LED LAMPS, ADD WARNING BELL, AND ADD PEDESTRIAN WARNING FLASHERS.

**BNSF RECOMMENDED IMPROVEMENTS:**

- UPGRADING OF EXISTING CONSTANT WARNING TIME CIRCUITRY.

**LEGEND**

-  PROPOSED PED MAST FLASHER
-  PROPOSED DETECTABLE WARNING
-  PROPOSED NON-MOUNTABLE MEDIAN
-  PROPOSED PEDESTRIAN BARRIER FENCE
-  PROPOSED PAVED PEDESTRIAN PATHWAY



CITY OF MONROE, WA  
 QUIET ZONE FEASIBILITY STUDY  
 MAIN ST. & RR CROSSING - PROPOSED CONDITIONS  
 DOT 084560N

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APPENDIX D  
HAZARD INDEX DEFINITION

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## Crossing Hazard Index Definition:

A hazard index for each public rail-highway crossing in the state is calculated annually using Federal Railroad Administration (FRA) formulas and guidelines. The Railroad-Highway Grade Crossing Handbook – Revised Second Edition (the handbook) is used as a basis for the hazard index calculation and is a single reference document based on the prevailing and best practices as well as adopted standards relative to rail-highway crossings. The guidelines and alternative improvements presented in the handbook are primarily those that have proved effective and are accepted nationwide.

A rail-highway crossing is unique in that it constitutes the intersection of two very different transportation modes. The hazard index is a measure of the potential for crashes (or predicted number of crashes per year) at the rail-highway crossing. The FRA safety database serves as the source of information for train traffic and accident history at all crossings. The hazard index is based on many factors including the number trains and vehicles at the crossing, the number of main tracks, the road surface type, maximum train speed, and the number of highway lanes.

Because the FRA safety data cannot describe the precise characteristics of each crossing, such as sight distances, the calculation of predicted accident rates is improved by the addition of actual accident experience at a rail-highway crossing. The predicted accident rate is calculated using the factors above and the result is then multiplied by a factor containing the actual accident experience (usually the crash rate over a five-year period). The final hazard index is obtained after applying a normalizing constant. The normalizing constant correlates the accident prediction formulas with actual crash rates on a nationwide basis. This Accident prediction and resource allocation procedure normalizing constant is provided by the FRA.

The hazard index is used to compare the crash potential (predicted number of crashes per year) of one crossing to another in a consistent manner. Crossings with the highest hazard index value are studied in detail. In order to gauge effectiveness of likely countermeasures, crossings selected for improvement are analyzed based upon seven decision criteria to generate a final score or ranking. The seven decision criteria applied are the hazard index, type of improvement selected, type of protection already on the rail corridor, the type of development near the rail-highway crossing, motorist expectancy with regards to train movements, the type of highway, and finally the public or local authority interest or comments on safety of the rail-highway crossing. The seven decision criteria allow Agencies to incorporate the concerns of local officials, new development issues (such change of traffic patterns), and rail corridor projects into the project selection process.