Pines Road/BNSF Grade Separation Project

2018 Consolidated Rail Infrastructure and Safety Improvements (CRISI) Program
Federal Rail Administration & U.S. Department of Transportation

Project Title.	Pines Road/BNSF Grade Separation Project
Lead applicant and co-applicant(s).	City of Spokane Valley
Project Track.	2
Will this project contribute to the Restoration or Initiation of Intercity Passenger Rail Service?	No
Was a Federal grant application previously submitted for this project?	Yes
If yes, state the name of the Federal grant program and title of the project in the previous application.	1. FASTLANE I: Bridging the Valley: Barker Road and Pines Road (SR 27) BNSF Grade Separation Project 2. FASTLANE II: Bridging the Valley: Pines Road (SR27) BNSF Grade Separation Project
If applicable, what stage of NEPA is the project in (e.g., EA, Tier 1 NEPA, Tier 2 NEPA, or CE)?	Categorically Excluded as part of 2006 Bridging the Valley suite of projects. CE documents will be updated as part of this project to create a stand-alone NEPA document.
Is this a Rural Project? What percentage of the project cost is based in a Rural Area?	No, 0%
City(ies), State(s) where the project is located.	Spokane Valley, WA
Urbanized Area where the project is located.	Spokane, WA 83764
Population of Urbanized Area.	387,487 (2010 Census)
Is the project currently programmed in the: State Rail Plan, State Freight Plan, TIP, STIP, MPO Long Range Transportation Plan, State Long Range Transportation Plan?	Yes. 1. TIP (Project #: 2) 2. STIP (ID#: WA-10615) 3. MPO Long Range Transportation Plan, Horizon 2040, Table 4-6 (Project #: P) 4. State Freight Plan - Appendix A Freight Investment Plan

Contents

Appendices

A. Statement of Work
B. Detailed Cost Estimate
C. Benefit Cost Analysis
D. Local Agency Endorsement
E. Standard Forms - Application Attachments

1 Project Summary

In 2017, the Pines Road crossing of the BNSF railroad tracks resulted in nearly 27,000 vehicle hours of delay[1], at least one vehicle incident[2], and an additional 27 collisions at the adjacent Pines Road (SR 27) / Trent Avenue (SR 290) intersection. In 2018, the at-grade crossing was rated Washington State's top Tier 1 road-rail conflict.[3] Spokane Valley seeks $1,246,500 to complete the PE/NEPA phase of the Pines Road/BNSF Grade Separation Project. The project proposes replacing the at-grade rail crossing with an underpass of Pines Road at the BNSF railroad crossing and improving the intersection of Pines Road and Trent Avenue (Figure 1). Once constructed, the project will create a safer, more efficient, and reliable transportation network for its users.

Figure 1: Alternative 1 for Pines Rd/BNSF grade separation. (Final configuration pending WSDOT/BNSF coordination.)

2 Project Funding

2.1 Requested Project Funding

The City of Spokane Valley is committed to a 50% local match for this CRISI application. Table 1 provides a detailed breakdown of the committed and expected funding for both federal and non-federal sources. The project is located in an urban area, see Section 6 – Project Location.

Table 1: PE/NEPA Phase Only Funding Sources

		Total ($)	Total (%)
Federal Funding			
Requested	CRISI - Track 2 PE/NEPA	$1,246,500	50.00%
	Subtotal	**$1,246,500**	**50.00%**
Non-Federal Funding			
Secured	City of Spokane Valley - PE/NEPA Phase Only	$1,246,500	50.00%
	Subtotal	**$1,246,500**	**50.00%**
	Total	**$2,493,000**	**100.00%**

[1] 60 trains/day (freight and passenger) with an average crossing time of 3.55 minutes/train, creating 3.6 hours of roadway blockage due to freight and passenger trains/day (14.8% of the day); with 16,925 vehicles/day (2016 City ADT records projected into 2017), 14.8% of vehicles will be affected for an average of 1.78 minutes (including lead/lag time for gate operations), resulting in 74.3 vehicle hours/day of delay, or 27,100 vehicle hours/year.
[2] Analysis of Washington Department of Transportation (WSDOT) Vehicle Crash Data, 2015-2017
[3] DRAFT Prioritization of Prominent Road-Rail Conflicts Phase 2 Study, May 22, 2018

2.2 Total Project Costs

The cost for the Track 2 - PE/NEPA phase of the project is $2,493,000. Table 2 details the overall project cost and identifies the specific *Preliminary Engineering* phase for which this application requests funding and a detailed cost estimate is included in Appendix B.

Table 2: Total Project Costs & Expenditure Years

Phase	2017 Cost	Year of Expenditure	Inflated Cost (3.5% Annually)
Construction (2022-2024)	$ 14,536,000	2023	$ 17,869,000
Design Engineering (2019-2020)			
Preliminary Engineering	2,326,400	2019	2,493,000
Final Engineering	581,600	2020	645,000
Right-of-Way (2020-2021)	4,200,000	2021	4,820,000
Construction Engineering (2022-2024)	2,399,000	2023	2,949,000
Total Project Cost	**$ 24,043,000**		**$ 28,776,000**

2.2.1 Previously Incurred Project Costs

Previously incurred project costs include:

- $394,385 for planning (done in 2004), preliminary engineering (done in 2004), which included 30% design plans and cost estimates for the previous concept, and environmental documentation (initial NEPA approval in 2006). See Section 9.3.2 for more information.
- The City secured $510,000 for early property acquisition (completed in 2017). This acquisition's final cost was approximately $494,000. Without this acquisition, the parcel was at risk of development and would restrict the configuration of the proposed project.
- $124,000 for preliminary engineering & alternative analysis/selection (2017-2018). The City is completing a preliminary alternative analysis for the proposed project in order to more clearly identify the project's requirements and costs. At the time of this submittal to the CRISI program, the analysis was coordinating with BNSF's future rail expansion project.

2.2.2 Pending Federal Funding Requests

Spokane Valley is actively pursuing funding support from two other federal funding programs:

- **Program:** Surface Transportation Block Grant (STBG)
  Funding Request: $3,795,000
  Funding Obligation Window: 2020-2023 (funds available as early as 2020)
  Description: To streamline the City's efforts with CRISI's PE/NEPA phase, the City requested RW phase only funds from the STBG program. If awarded, the timing of RW funding would align with the completion of the CRISI-funded PE/NEPA phase of the project.

- **Program:** Better Utilizing Investments to Leverage Development (BUILD)
  Funding Request: 80% of total project cost
  Funding Obligation Window: All funds must be obligated by September 30, 2020.
  Description: The City's application to the 2018 BUILD program will request full project funding and does not consider any funding support from CRISI or STBG.

2.2.3 Relationship to Pending Federal Funding Requests

Project funding for the PE/NEPA phase is requested for expenditure between 2018 and 2020. This timing aligns with the anticipated award of RW phase funding from the STBG program.

3 Applicant Eligibility

The City of Spokane Valley incorporated March 31, 2003 and is a non-charter code city and operates under a Council-Manager plan of government.[4] It is governed under the optional municipal code of RCW Chapter 35A. Under this form of government, legislative authority is concentrated in the elected City Council, which hires a professional administrator to implement its policies. The executive branch is led by the City Manager.

4 Project Eligibility

The project is eligible under the program's *Track 2 – PE/NEPA* category. Once constructed, the Pines Road (SR 27) underpass at the BNSF tracks will remove a highway-rail at-grade crossing.[5] Also included in the project is the improved intersection control of two state highways, Pines Road (SR 27) and Trent Avenue (SR 290). The City's preliminary alternative analysis conducted in 2018 will evaluate the benefits of a signalized intersection versus a roundabout.

5 Detailed Project Description

The Pines Road at-grade crossing of the BNSF Railway Company tracks is located 275 feet south of Trent Avenue in the city of Spokane Valley, WA. The BNSF Railway Company carries freight between western ports and Midwest intermodal facilities and also hosts Amtrak, with two passenger trains per day (Figure 2). Pines Road and Trent Avenue are significant corridors for local

Figure 2: BNSF Freight Movement in the Pacific Northwest

[4] City of Spokane Valley Resolution 02-08: http://laserfiche.spokanevalley.org/WebLink8/DocView.aspx?id=8754&dbid=0

[5] Specifically eligible under NOFO Section C.3.a.iii and C.3.a.v and meets the definition of a "Capital Project" per NOFO Section A.2.b.

travel and freight movement. Pines Road is a state highway (SR 27), and is one of Spokane Valley's primary north-south arterial roadways. It directly connects Trent Avenue, also a state highway (SR 290), with Interstate 90 to the south, and is a preferred freight route to I-90 between north Idaho and Canada.

Figure 3: Alternate 2 for Pines/BNSF grade separation. (Final configuration pending WSDOT/BNSF coordination.)

The Pines Road/BNSF Grade Separation Project replaces an existing at-grade crossing with an underpass of BNSF's railroad tracks and provides a roundabout or traffic signal at the intersection of Pines Road and Trent Avenue (Figure 3). These improvements will reduce the risk of collisions between the existing 16,400 vehicles/day[6] and 60 trains/day[7] at the crossing. Train horns through Spokane Valley will be reduced, as will the community severance effects created by the railroad tracks.

Replacement of the existing signalized intersection with a roundabout at the Pines/Trent intersection is predicted to reduce all collisions by 19%, and fatal and injury collisions by 71%.[8]

Pedestrians and cyclists will be able to cross Trent Avenue more safely and comfortably. The improvements support freight movement and regional mobility goals as articulated in various plans such as Horizon 2040, the MPO's regional transportation plan and the Inland Pacific Hub Transportation Study, a partnership of public and private agencies dedicated to creating a freight gateway in the region.

5.1 Transportation Challenges the Project Aims to Address

5.1.1 Safety Risks at and Near the Crossings

Incidents at road intersections and at-grade rail crossings could result in fatalities or serious injuries, particularly when there are high volumes of vehicle or rail traffic, as is the case in this project. The conflicts and risks associated with this project's existing at-grade crossing will continue to grow over time, as both train and vehicle volumes grow. It is projected the number of freight trains on this corridor will increase from 58 trains per day to 114 trains per day by 2035, and

[6] Most recent traffic volume count performed by the City.
[7] WSDOT. Washington State Rail Plan, March 2014. http://www.wsdot.wa.gov/NR/rdonlyres/F67D73E5-2F2D-40F2-9795-736131D98106/0/StateRailPlan-Final201403.pdf, Figures 4.2 and 4.3 showing 48 freight trains in 2010 and 114 freight trains in 2035, or 66 added trains over 25 years (2.64 trains/year). Growth assumes double track capacity, but as of 2018 only a single track exists, providing growth from 2010 equal to 50%, or 1.32 trains/year.
[8] NCHRP Report 705, Evaluation of Safety Strategies at Signalized Intersections, 2011 (https://www.nap.edu/login.php?action=guest&record_id=14573)

further increases will continue beyond 2035 to 114 trains/day.[9] The existing crossing is shown in Figure 4.

Figure 4: View of Existing Pines Road/BNSF Crossing, looking north

In addition to incidents at the Pines at-grade crossing, there are several collisions at the Pines Road / Trent Avenue intersections that can be mitigated as a result of the project (Figure 5). Replacement of the existing signalized intersection with a roundabout would reduce collision severity. Since all traffic moves through the roundabout in the same direction, the highest severity collisions associated with left turn movements will be virtually eliminated. Should an improved signalized intersection be provided, the collision frequency and severity would also likely improve, although not to the extent of a roundabout.

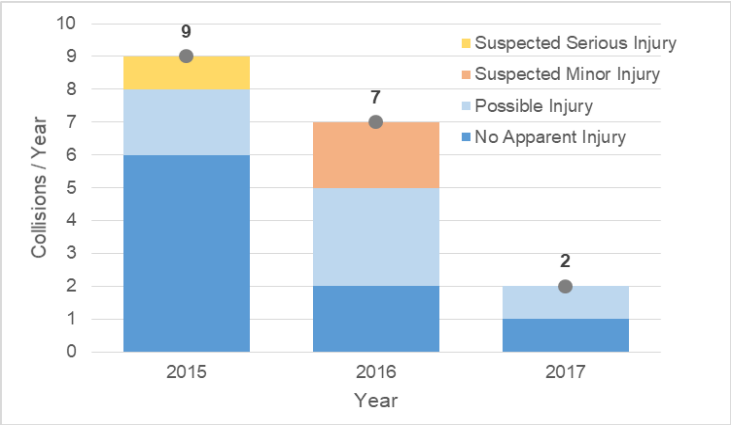

Figure 5: Collision History, Pines Road / Trent Avenue (SR290) Intersection, 2015-2017

[9] WSDOT. Washington State Rail Plan, March 2014. http://www.wsdot.wa.gov/NR/rdonlyres/F67D73E5-2F2D-40F2-9795-736131D98106/0/StateRailPlan-Final201403.pdf, Figures 4.2 and 4.3 showing 48 freight trains in 2010 and 114 freight trains in 2035, or 66 added trains over 25 years (2.64 trains/year). Growth assumes double track capacity but as of 2018 only a single track exists, providing growth from 2010 equal to 50%, or 1.32 trains/year.

5.1.2 Long Delays at the Crossings and Adjacent Intersections

The current daily freight and passenger train volume is estimated to be 60 trains/day, which means that on average, people and freight are delayed 60 times per day at each roadway-railway crossing.[10] A recent City survey recorded an average of 3.55 minutes of delay for each train crossing. This average time over 60 crossings per day results in 74 hours of crossing delays to vehicle traffic on Pines Road daily. Delays are further compounded by the time required for the vehicle queues created by the train crossing to dissipate. In addition, queued vehicles may block adjacent intersections, most importantly the Pines/Trent intersection causing delays to through traffic on Trent Avenue. Figure 6 illustrates the delays due to train crossings.

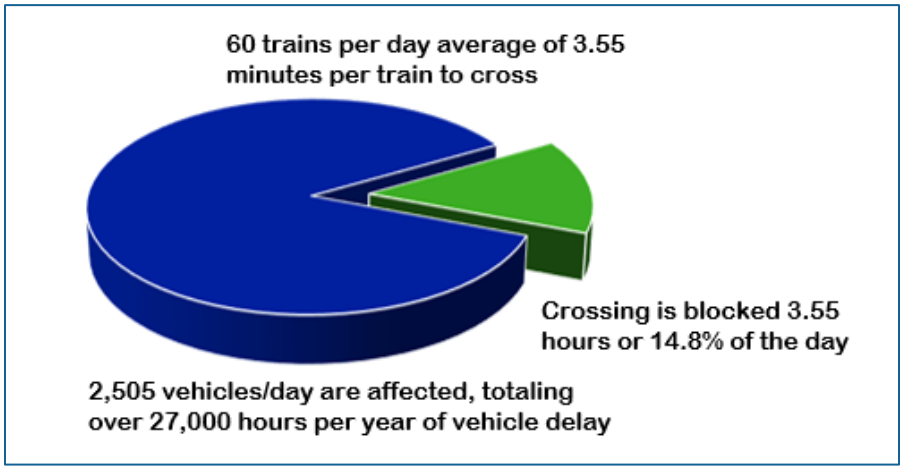

Figure 6: Delays Due to Frequent Train Crossings

The existing Pines/Trent intersection operates at level of service (LOS) D in the afternoon peak hour. The Trent Avenue legs operate at LOS E with average delays per vehicle of approximately 60 seconds. By 2040 the PM peak hour delays will further increase to over two minutes per vehicle (LOS F) if no improvements are implemented. Conversion of this intersection to a roundabout results in significant reduction in delay. With 2040 volumes, the average delay per vehicle is forecast to be 8-9 seconds in the PM peak, with the intersection's roundabout operating at LOS A. If a traffic signal is provided, the average delay per vehicle is forecast to be 30-40 seconds in the PM peak, with the signalized intersection operating at an LOS C-D. The results of the LOS analysis consider the project's two alternate design options for the 2040 horizon year[11].

5.1.3 Inefficient Emergency Services Access

Key emergency services (fire, police, medical) are located south of the railway. Of particular importance is the Valley Hospital located 1.5 miles south of the project location near the intersection of Pines Road and Mission Ave. The long and frequent delays at the rail crossings may cause delays for providing emergency services to the north. The grade-separated crossing removes this barrier to emergency vehicles, creating more reliable access to both sides of the railroad tracks.

[10] Washington Department of Transportation (WSDOT). Washington State Rail Plan. Technical Note 3a: Freight Rail Demand, Commodity Flows and Volumes. Dec. 2013.
[11] DRAFT Pines Road/BNSF Grade Separation – Consolidated Traffic and Safety Analysis, March 27, 2018

5.1.4 Constrained Access to Future Developable Land

Close to 170 acres of mixed-use or commercially-zoned parcels and 56 acres of prime industrially-zoned parcels are undeveloped because property owners and developers cannot afford to mitigate the LOS 'E' operating conditions at the Pines Road /Trent Avenue intersection. In particular, the Pinecroft Business Park, located immediately southeast of the project site, has capacity to double its employee population from 2,000 to over 4,000 employees and nearly double its 500,000 square feet of existing buildings space to upwards of 900,000 square feet.[12] These parcels, along with several hundred more acres beyond the city limits, are some of the last undeveloped parcels available for industrial use in the area.

5.1.5 Lack of Community Connectivity

The rail corridor bisects the northern parts of Spokane Valley from the main city south of the railway. On Pines Road, the rail corridor provides a barrier between neighborhoods, recreation areas, commercial retail sites, and schools located on both sides of the railway. The new grade-separated crossing and roundabout or traffic signal will provide sidewalks along Pines Road, making the route more appealing to pedestrians and more reliable for all users and modes. In addition to grade separated crossing, the roundabout or traffic signal will create a safer and more comfortable crossing of Trent Avenue.

5.1.6 Noise Pollution from Train Horns

Spokane Valley residents have long complained about the noise pollution of the train horns. Federal law requires locomotives to sound their horns at 96 to 110 decibels as they approach at-grade crossings and continue blowing the horn until the lead locomotive fully occupies the crossing. Train horns are a source of significant public concern in Spokane Valley.[13]

5.2 Summary of Project Benefits

5.2.1 Expected Users and Beneficiaries of the Project

Construction of this project has both national and regional significance. At the national level, this project reduces risks for freight trains, passenger trains, and freight trucks by eliminating road/rail conflicts. BNSF Railway Company operates the east-west Class I railway at the heart of this project. The BNSF Railway Company carries freight and passenger trains between western ports and Midwest intermodal facilities. This railway connects Seattle and Portland in the west to Chicago and Minneapolis-St. Paul in the east with many service points in between. This railway also connects customers with the global marketplace and the Spokane region is a convergence of several rail lines on the northern tier of BNSF's network. At a regional level, the elimination of delays at the rail crossing will enhance freight mobility to/from Interstate 90 to the south.

[12] Letter to City of Spokane Valley Council, J. Traeger, JMA Commercial Real Estate, LLC for Pinecroft, LLC (http://www.spokanevalley.org/filestorage/6862/6927/8180/11735/Pinecroft_Business_Park.pdf)
[13] "Spokane Valley, Cheney residents want to silence train whistles." The Spokesman-Review, March 6, 2016. See attachment.

Additional regional benefits include:

- Unlocking the economic potential to develop prime vacant land zoned for industrial, mixed-use, and commercial uses.
- Re-connecting communities and recreation areas.
- Improving the quality of life through noise and emissions reductions.

The project supports regional commerce and achieves regional planning goals that have been in place for more than a decade. Refer to Section 9 for planning and partnership information.

Expected system users that will benefit from this project include:

- Travelers (automobile drivers/passengers, pedestrians, bicyclists)
- Trucking companies and the companies that use their services for freight transport
- BNSF Railway Company and companies that use the railway for freight transport
- Amtrak and their passengers
- Property owners near the project (home and business owners)
- Local residents that cross the railroad for a variety of purposes

Table 3 provides a summary of the conditions at the Pines Road/BNSF railroad crossing with and without the project.

Table 3: Before and After Conditions at Pines Road BNSF Railway Company Crossings

Conditions	No Project	With Project
At-grade crossings	1	0
Longest segment with no at-grade crossings* (miles)	1.0	2.1
Daily Train Horns at Pines/BNSF Crossing	60	0
Predicted annual collisions** – Pines/Trent intersection	27	18***
Predicted annual collision (Fatal and Injury) - Pines/Trent intersection	8	6
Predicted annual incidents** - Pines Road/BNSF crossing	1	0
Annual vehicle hours of peak hour intersection delay** - Pines/Trent intersection	13,432	3,454
Annual vehicle hours of railroad crossing delay** - Pines Road/BNSF crossing	27,100	0

** Between Evergreen Road and Vista Road*
*** Based on 2017 volumes and a roundabout at Pines & Trent; number of predicted collisions and delays will increase as volumes increase*
**** The total number of collisions at the Pines/Trent intersection is predicted to drop 5 collisions/year, but the number of high severity collisions (fatal+injury) is predicted to decrease by 6 collisions/year, indicating that the number of low-severity collisions will increase. The BCA model does not distinguish between different severity levels.*

This project will generate key long-term benefits that leverage federal investment by enhancing the mobility and safety of people and freight in the region, while also providing economic

opportunities and enhancing the environment and surrounding communities. The project outcomes are summarized in Table 4.

Table 4: Expected Project Outcomes

Safety Outcomes	• Eliminates the risk of conflict between roadway users and trains by separating uses • Eliminates potential queuing of vehicles stopped for train crossings • Significantly reduces the potential for high severity collisions at the intersection • Adds ADA-accessible active transportation features to increase safety
State of Good Repair	• Improves infrastructure resilience through new construction of the underpass, intersection improvement via roundabout or improved signalization, and approaches to current standards • The City of Spokane Valley's various street-related funds have sufficient funding to cover operations and maintenance; there is a Capital Reserve available as a contingency • The City has successfully implemented similar projects, including most recently the Sullivan Road West Bridge replacement at the Spokane River and is currently underway with a very similar grade separation project at the intersection of Barker Road and Trent Avenue.
Economic Competitiveness	• Decreases transportation costs and improves long-term efficiency, reliability, and costs in the movement of workers and goods • Contributes to the efficient movement of regional freight • Enhances access and reliability to nearly 170 acres of prime, buildable industrial-zoned land and 56 acres of residential-zoned land
Environmental Sustainability	• Reduces fuel consumption and tailpipe emissions for vehicles idling in delayed traffic • Eliminates the need for routine train horns for a 2.1-mile section
Quality of Life	• Improves community connectedness between neighborhoods, industrial jobs, and nearby recreational areas • Eliminates train horn noise at Pines Road and improves the health and well-being of surrounding residents and businesses[14] • Reduces delay for all modes of travel and improve traffic circulation • Enhances accessibility for active modes by eliminating infrastructure gaps and reducing delay
Partnership and Innovation	• Helps fulfill the vision of the MPO's Horizon 2040 Metropolitan Transportation Plan • Addresses one of Washington State's highest priority road-rail conflicts, see Section 9.3.3.1. • Supports the Great Northern Corridor Coalition's vision for safe, efficient, and environmentally sound transportation services • Refer to Section 9 for additional partnership information.

[14] "Spokane Valley, Cheney residents want to silence train whistles." The Spokesman-Review, March 6, 2016.

5.2.2 Project Benefits Specific to Rural Areas

Rural Areas will directly benefit from the project even though it is located in a designated Urban Area. As identified in Section 6, the project is located less than a half mile from the U.S. Census Bureau's Urban Area limits. The project's two highways are main thoroughfares for rural traffic connecting to interstate rail, freeway routes, and urban economic activity centers.

5.2.3 Proposed Performance Measures & Reporting

The project's performance will be evaluated based on a coordinated list of measures as established by the City and FRA. Preliminarily, the project proposes the following performance measures (Table 5).

Table 5: Proposed Project Performance Measures

Measure: Rail/Track Grade Separation **Unit:** Count **Temporal:** Annual **Primary Strategic Goal:** Economic Competitiveness **Secondary Strategic Goal:** Safety **Description:** The number of annual automobile crossings that are eliminated at the at-grade crossing as a result of the project.
Measure: Vehicle Delay **Unit:** Time **Temporal:** Daily **Primary Strategic Goal:** Economic Competitiveness **Secondary Strategic Goal:** Safety/Quality of Life **Description:** The elimination of total vehicle delays, in hours per day, as a result of the grade separation and intersection improvement.
Measure: Collision Mitigation **Unit**: Count **Temporal:** Annual **Primary Strategic Goal:** Safety **Secondary Strategic Goal:** Quality of Life **Description:** The reduced number and severity of collisions as a result of the grade separation and intersection improvement project.

5.2.4 Grade Crossing Information

The U.S. DOT Crossing Inventory form[15] identifies the following rail specific details:

- **Railroad Owner:** BNSF
- **Primary Railroad Operator:** BNSF Railway Company
- **DOT Crossing Inventory Number:** 066367E
- **Roadway at the Crossing:** Pines Road (SR 27)

5.3 Benefit-Cost Assessment Summary

Table 6 summarizes the BCA findings identified in Appendix C. Annual costs and benefits are computed over the lifecycle of the project (33 years). As stated earlier, construction is expected

[15] Highway-Rail Crossing Inventory Section 8.01-Query by Location: http://safetydata.fra.dot.gov/officeofsafety/default.aspx

to be completed by 2024 with 2025 being the project opening year. Benefits accrue during the full operation of the project.

Table 6: Overall Results of the Benefit Cost Analysis, 2016 Dollars

Project Evaluation Metric	7% Discount Rate	3% Discount Rate
Total Discounted Benefits	$39,240,984	$88,679,091
Total Discounted Costs	$18,240,557	$21,784,430
Net Present Value	$21,000,428	$66,894,661
Benefit / Cost Ratio	2.15	4.07
Internal Rate of Return (%)	13.1%	
Payback Period (years)	6.43	

Values in 2017 Dollars Unless Specified Otherwise

Considering all monetized benefits and costs, the estimated internal rate of return of the project is 13.1%. With a 7% real discount rate, the $18.2 million investment would result in $39.2 million in total benefits for a Net Present Value of $21.0 million and a Benefit/Cost ratio of approximately 2.15.

5.3.1 Cost Share

A community the size of Spokane Valley is greatly challenged to fund a project of this magnitude on its own. With such geographically dispersed benefits generated by this project, federal assistance is not only a necessity but also a wise investment for the broader multi-modal transportation system. Spokane Valley is positioned to financially deliver the PE/NEPA phase of this project with the assistance of the CRISI funding. CRISI support extends the City's local funds and moves the project closer to construction.

The City of Spokane Valley has already invested approximately $625,000 in this project for preliminary design analysis and right of way acquisition. Further, the City has committed an additional $1.7 million of its own funds toward the project and will continue to pursue additional non-Federal funding sources. City funds are planned to be allocated to the project annually.

6 Project Location

The project is located in the City of Spokane Valley, WA, in the northeast corner of the state, approximately 9 miles from the Idaho border and 90 miles south of the Canadian border. The City is the ninth largest city in Washington with a

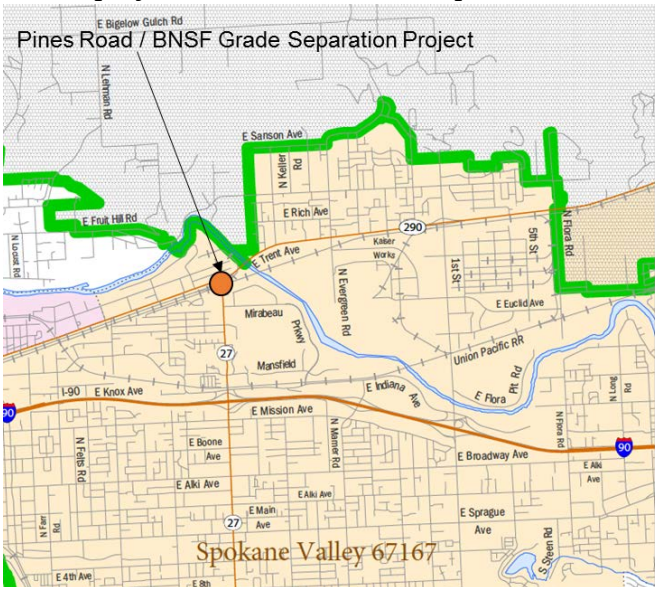

Figure 7: Urbanized Area Boundary

population of 94,890.[16] The greater Spokane region is within the state's 5th Congressional District. The project is within the urbanized area (UA) of Spokane Valley (67167) as shown on Figure 7. The geographic location is 47°41'21" N, 117°14'22" W. Figure 8 shows the proposed project location and surrounding key elements in the area:

- The existing highway-rail at-grade crossing of Pines Road and BNSF tracks
- Freight Rail Routes: BNSF and UPRR lines
- Land Use: key industrial areas, parks and recreation areas, schools, and vacant land
- Traffic Data: BNSF train volumes (Freight 58 per day, Amtrak 2 per day) and average daily traffic on project roadways (up to 27,400 vehicles per day)

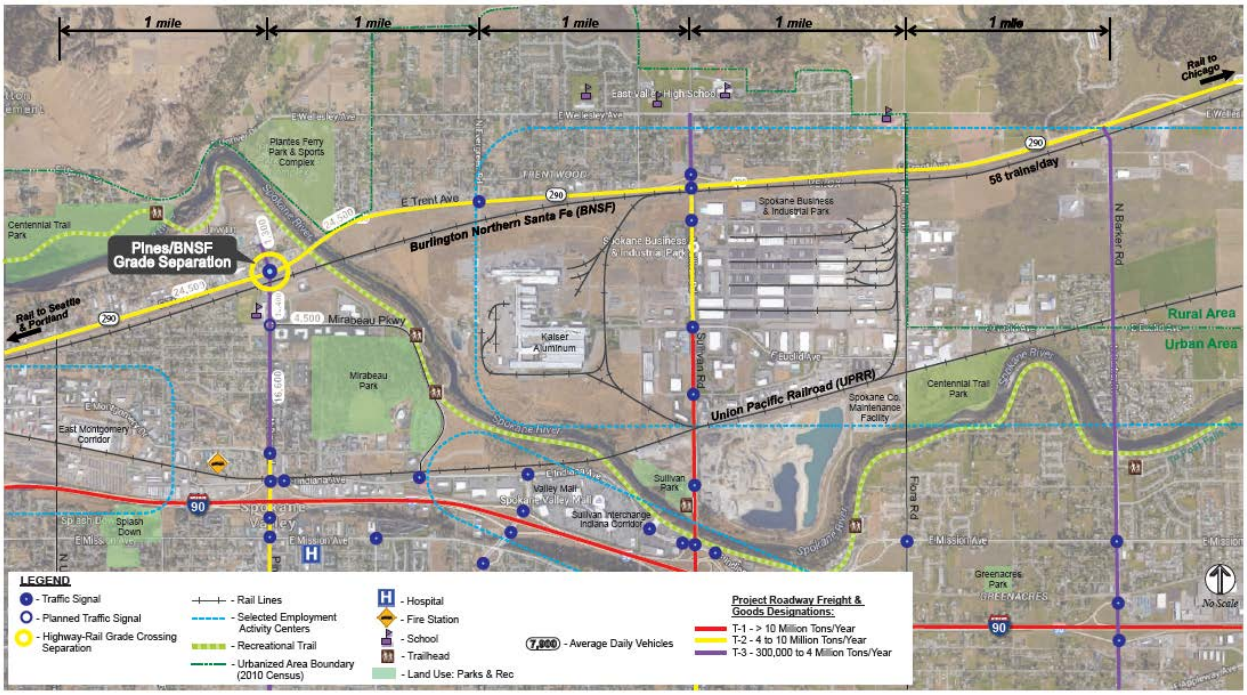

Figure 8: Project Locations and Connections to Existing Transportation Infrastructure

7 Evaluation and Selection Criteria

This section describes key project outcomes related to safety, economic competitiveness, environmental sustainability and quality of life.

7.1 Safety

The BNSF mainline and Trent Avenue are high volume train and vehicle corridors respectively. As such, there is potential for incidents involving vehicle, pedestrian, and bicyclist cross- traffic. There is currently an average of 60 trains per day using the BNSF line at the Pines Road crossing and the rail corridor has the capacity for train volumes to increase to 125 daily trains in the

[16] Washington State Office of Financial Management. https://www.ofm.wa.gov/sites/default/files/public/legacy/pop/april1/ofm_april1_population_final.pdf.

future, or five trains every hour on average.[17] This is of particular concern to the community because the rail corridor is the route for commodity travel from the North American interior through Spokane Valley on its way to west coast terminals. To illustrate the magnitude of shipments, the Washington State Department of Ecology estimates that over 2 billion gallons of Bakken oil travels through Spokane Valley annually.[18] This project eliminates the risk of fatalities, serious injuries, and commodity spills that can happen at a road/rail at-grade crossings.

In addition to the positive outcomes of the highway-railway at-grade closure, the project offers additional safety benefits by replacing the existing intersection of Pines Road at Trent Avenue with either a roundabout or updated traffic signal. As discussed in Section 5, it is expected that a roundabout will result in a 19% reduction in collisions, and a 71% reduction in fatal and injury collisions. Table 7 summarizes the expected collision reduction for the railroad crossing and Pines/Trent intersection in 2040 horizon year (the 2040 horizon year matches the MPO regional travel demand model future forecast horizon).

Table 7: Annual Collision Reduction, 2040 Horizon Year

Location	All Collisions	Fatal and Injury Collisions
Pines / BNSF RR Crossing	1.1	0.5
Pines / Trent Intersection	14.6	4.5
Total	15.7	5.0

The grade separation project also improves emergency access and provides enhanced detour/evacuation routes to residents, businesses, and schools by eliminating the delay impact resulting from crossing trains or incidents on the tracks. Additionally, improved access to Trent Avenue enhances the highway's role as a good alternate route to I-90 and Highway 95 in Idaho.

The safety of active modes will be enhanced with the addition of ADA-accessible sidewalks on the Pines Road underpass. Further, all ADA-related project elements will be improved to current standards.

7.2 Economic Competitiveness

The smooth flow of trade, vital to U.S. economic competitiveness, is facilitated by addressing key deficiencies across the system. The Pines Road grade separation of the BNSF mainline provides an opportunity to target a local deficiency that effectively ripples benefit through the rest of the transportation system. The BNSF mainline that travels through the City of Spokane Valley is part of a broad rail network that moves freight between international marine ports and terminals on the west coast and points across the western half of the U.S. Almost 94% of

[17] WSDOT Washington State Rail Plan, Integrated Freight and Passenger Rail Plan 2013-2035, Figure 4.3: http://www.wsdot.wa.gov/NR/rdonlyres/F67D73E5-2F2D-40F2-9795-736131D98106/0/StateRailPlanFinal201403.pdf

[18] As of April 2018, 42 gallons per barrel x 680 barrels per car x 19,604 cars per quarter x 4 quarters = 2.24 billion gallons:https://fortress.wa.gov/ecy/coastalatlas/storymaps/spills/spills_sm.html

Washington's east-west bulk cargo rail traffic travels through this corridor.[19] The BNSF Railway Company also serves interstate passenger rail service via Amtrak's Empire Builder route between Seattle and Chicago. Currently, the BNSF line carries an average of 58 freight and 2 passenger trains daily, and usage on the line is estimated to grow 143 percent by 2035.[20] BNSF currently plans to provide a second mainline track at the project location, which is consistent with planned growth. Upon completion of the grade separation project, there will be an additional 2.1 miles of rail corridor that will be unencumbered by an at-grade crossing. When combined with the other Horizon 2040 regionally significant projects (Barker Road/BNSF Grade-Separation and Sullivan Road Bridge Reconstruction), the only remaining at-grade crossings between Harvard Road and Vista Road would be at Evergreen and University Roads.

The Pines Road grade separation also has a significant benefit to trade facilitated by trucking. Pines Road serves as a primary arterial roadway directly connecting a State Highway at the project site with Interstate 90 to the south. The project promotes improved interstate freight movement to/from Canada and Idaho through Spokane County/Kootenai County by reducing vehicle-train conflicts as envisioned in the 2006 Bridging the Valley Plan.

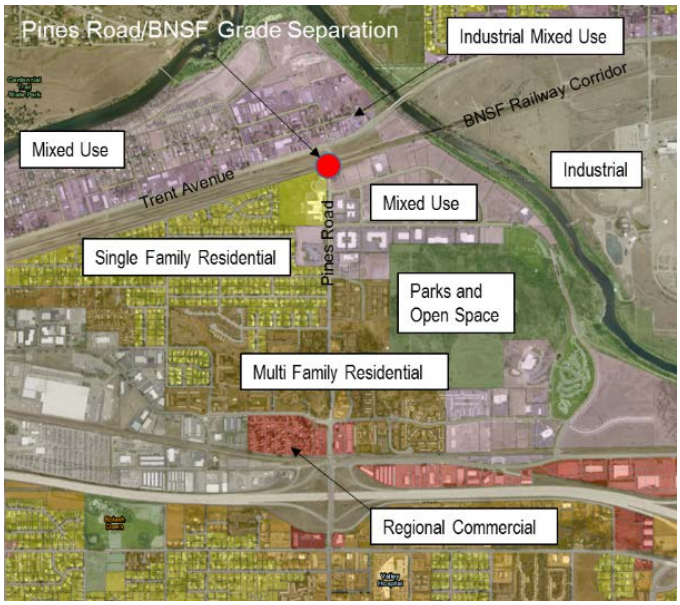

Figure 9: Current Zoning

The project improves regional economic vitality by significantly improving reliability and accessibility to close to 170 acres of mixed-use or commercially-zoned and 56 acres of prime industrially-zoned parcels shown in Figure 9. With the City expected to accommodate an additional 20,000 residents and 18,000 employees, the Pines/Trent/BNSF/I-90 area will remain as a centralized corridor for growth (Figure 10). This project contributes significantly to supporting and managing this economic growth by building transportation infrastructure necessary to attract, retain, and expand businesses.

The investment to expand the capacity of the transportation network will allow the land to support economic development at a much higher density. The economic and tax impacts of that

[19] Washington Department of Transportation (WSDOT). Washington State Rail Plan. Technical Note 3a: Freight Rail Demand, Commodity Flows and Volumes. Dec. 2013.

[20] Ibid.

higher level of development stemming from the construction and occupation of industrial developments are estimated as follows[21]:

- $1.3 billion in total economic output in Spokane County ($686 million in direct spending)
- 8,719 new jobs supported in the county (4,312 direct jobs)
- $8.2 million in new general fund taxes to the city (25 year present value at 4%)
- $101.9 million in new general fund taxes to Washington State (25 year present value at 4%)

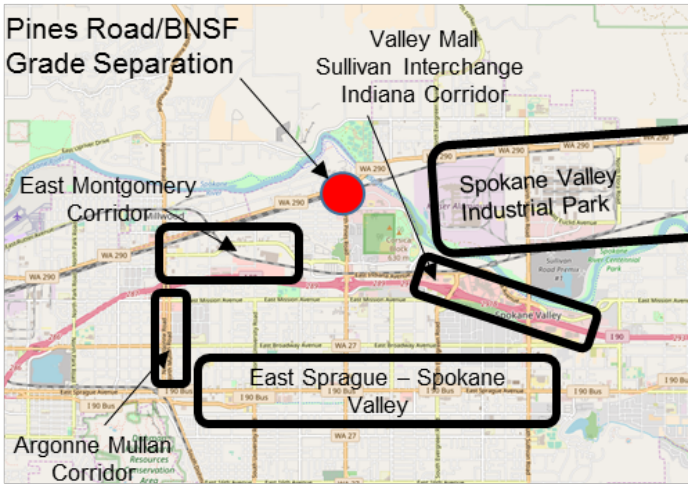

Figure 10: Selected 2040 Employment Activity Centres

7.3 Environmental Sustainability

Grade separation of the BNSF rail line generates environmental benefits in reduced noise and air pollution. For Spokane Valley residents this represents a seemingly continuous sounding of horns along the railway corridor from Barker to Pines Road. The required sounding of train horns is significantly reduced with the grade separation of Pines Road.

The project supports air quality improvements and fuel efficiency. No longer will vehicle traffic be idling waiting for the crossings to be cleared by freight and passenger trains blocking Pines Road. Crossings are occupied for an average of approximately three and a half minutes for each train to pass plus the time to dissipate queues. Further reductions in idling will result from reductions in peak hour intersection delays at the Pines/Trent intersection. Delays are predicted to drop from an average of 47 seconds/vehicle in the PM peak hour to 22 seconds. Idling vehicles consume fuel and emit harmful air pollutants. Spokane Valley and the rest of the region are identified by the U.S. Environmental Protection Agency (EPA) as maintenance areas for Particulate Matter (PM10) and Carbon Monoxide (CO), providing a significant annual reduction in CO, particulate matter, and greenhouse gas as compared with the current configuration.

7.4 Quality of Life

The Pines Road/BNSF Grade Separation project will substantially contribute to the improved livability for residents in the region by enhancing community connectivity while reducing the effects of train horn noise and decreasing transportation delays.

The rail corridor bisects the community. The area north of Trent Avenue is largely residential. Plante's Ferry Park and Sports Complex is also located to the north, while Trent Elementary

[21] Fiscal and Economic Benefits of the Pines Road Underpass Project, ECONorthwest 2016; http://www.spokanevalley.org/PinesBNSF

School is located immediately south of the Pines Road/BNSF crossing. The majority of the City's commercial, employment, and residential uses lie south of the rail corridor and Trent Avenue. This project will help knit together the northern and southern sectors of the community by eliminating barriers that impede mobility.

The project will complete key gaps in the City's pedestrian and bicycle networks that provide transportation and recreational options. Sidewalks are proposed for Pines Road, which will support travel by active modes along Pines Road. Given the location of the project and its proximity to schools, commercial centers, employment areas, parks, and the Spokane River, safe and comfortable pedestrian connections are very important and will provide a great benefit for the community.

This project enhances the unique characteristics of Spokane Valley and significantly improves connections to many community amenities. The 37.5-mile paved, shared-use Centennial Trail runs along the Spokane River between Spokane, Washington and Coeur d'Alene, Idaho. It connects several local amenities, and includes a crossing of the Spokane River. Pines Road is a gateway to the Trail, and the project will provide a safer and more convenient route to it. South of Trent Avenue, Mirabeau Parkway provides access to Mirabeau Point Park from Pines Road, with river and Centennial Trail access. Plante's Ferry Park and Sports Complex is a 95-acre regional sports complex, located north of Trent Avenue, with sporting fields, trails, picnic areas, and playgrounds. Pines Road and Trent Avenue are important routes to this facility.

The project greatly benefits travel time reliability for all modes, and provides redundancy in the network to improve speed and reliability for emergency response vehicles where delay can have tragic outcomes; for school buses where delay means tardiness; and for commercial vehicles where the delay has negative economic impact.

The positive outcome for freight and passenger rail travel achieved by removing the Pines Road at-grade crossing of the BNSF line supports the continued implementation of Horizon 2040 and the previous Bridging the Valley Plan. The project will also accommodate the planned additional mainline tracks for the rail corridor.

7.5 Innovation

The City of Spokane Valley will evaluate innovative bridge construction techniques to reduce the impact on the community and the existing traffic. This may include constructing the structures off-site before staging for construction. The project may also take advantage of the Spokane Regional Transportation Management Center (SRTMC) Intelligent Transportation Systems (ITS) infrastructure to communicate traveler information about construction activities and expected delays throughout the project using SRTMC's website and 511 telephone system. Other ITS technologies, such as work zone queue management and speed management systems, will be evaluated for applicability during project engineering.

8 Project Implementation and Management

This section provides a summary of the technical feasibility, project schedule, required approvals needed, and mitigations for anticipated scope, schedule, and budget risks.

8.1 Design Criteria and Basis of Design

The City is ready to advance the design of the project, and expects to complete the preferred, preliminary design alternative for the project this year. At the time of this submittal, the roundabout option is the most accurate, up to date configuration and represents the City's anticipated alternative, however, the project's full traffic analysis is ongoing and may require revisions to the project and alter the intersection design.

Oversight of the project design and construction will be led by the City of Spokane Valley, in partnership with WSDOT and BNSF. Design criteria was identified in the Bridging the Valley preliminary engineering effort and includes national, City, AASHTO, WSDOT, and BNSF standards.

The requested funding from CRISI's Track 2 aligns with the following scope of work, as outlined in the Project's *Statement of Work* provided in Appendix A.

Task 1: Detailed Project Work Plan, Budget, Schedule
Task 2: Preliminary Engineering and Environmental Review
Task 3: Construction Project Implementation Schedule
Task 4: Construction Project Management Documentation
Task 5: Final Performance Report

The process will follow WSDOT's project development and delivery procedures and standards supplemented with City procedures and standards as applicable to the project. Procedures and design criteria from the *Union Pacific Railroad and BNSF Railway Guidelines for Railroad Grade Separation Projects* and the AREMA *Manual for Railway Engineering* will also guide the project.

The City of Spokane Valley has an excellent working relationship with WSDOT and collaborate on roughly 10 to 20 projects per year. WSDOT maintains and operates 26 miles of state roadways within Spokane Valley. The City and WSDOT are both members of the SRTMC and work together to provide active regional transportation systems management and operations (e.g. incident management, traveler information). WSDOT and the City have delivered several ITS projects together, and WSDOT operates and maintains City traffic signals and ITS infrastructure on the state highways within the City through a long-standing Interlocal Agreement. The City and WSDOT collaboratively review traffic impact studies and permits for properties on Trent Avenue and Pines Road.

Other recent joint projects include planning efforts for three interchange justification reports (IJRs), paving projects, and bridge projects. The City worked closely with WSDOT on the

evaluation process which selected the project's preferred design alternative that is submitted with this application.

The project will address current roadway condition issues as the project will require full reconstruction of the affected portions of those roadways. All design will be to current design standards to provide a robust finished product that will have long term resilience greater than the current infrastructure. WSDOT has responsibility for maintenance of Pines Road and Trent Avenue. WSDOT has the resources to implement and properly maintain the asset for the design life of all elements.

The City coordinates with BNSF Railway Company regarding the roadway crossings (at-grade and grade- separated) throughout the city. The two entities have worked together to complete several crossing diagnostic reviews in the past few years and coordinate all regularly scheduled and unplanned maintenance activities. In recent years, the City and BNSF have worked together to implement structural improvements at an overpass, enhance safety at at-grade crossings, and minor road upgrades at other crossings. The City is actively engaged with BNSF on the fully-funded Barker Road/BNSF grade separation project and also the evaluation of the Pines/BNSF preferred design alternative that is included with this application. As required by CFR 646.210, the project will benefit from BNSF funding support once the project completes the 30% design drawings.

8.1.1 Project Management History

The City successfully manages approximately five to eight million dollars in grants (federal and non-federal) on an annual basis and documents this in its annual budget. The primary source of the City capital funding for transportation projects comes from the City's Real Estate Excise Tax (REET) Revenue. Transportation operations funding comes from state gas tax revenue and a utility tax on telephones. The City's Street Fund has sufficient funding to cover operations and maintenance of the project. The City has a Capital Reserve Fund as a contingency for capital projects, and the General Fund may be used as a contingency for operating costs. Independent Audit Opinions are performed annually for the City of Spokane Valley under the U.S. Office of Management and Budget (OMB) Circular A-133. The two most recent, for fiscal years 2015 and 2016, reported no Significant Deficiencies or Material Weaknesses.

The financial condition of the City of Spokane Valley is reported in its comprehensive annual budget and monthly financial reports.[22] The City employs staff with training and experience in grant, project, and asset management.

The project provides access to currently undeveloped land by adding capacity to the Pines / Trent intersection. Further, this added capacity will accommodate anticipated future development. Further economic activity in the area creates opportunities for direct developer contribution to

[22] Spokane Valley Budget & Financial Reports: http://www.spokanevalley.org/content/6836/6902/7156/default.aspx

future upgrading, and adds to the City's tax base, both of which can further support long-term management of the infrastructure.

The City has recently demonstrated its ability to implement a comparable project. The $15 million Sullivan Road West Bridge Replacement Project combined four funding sources: one federal, two state, and a local city match. The City hired a consultant for the project's design using a RFQ process. The design was completed, the right-of-way was obtained, the project was bid, and construction began in the summer of 2014. The project was administered and inspected by the City. Construction was substantially completed in late 2016.

Also underway is the City's Barker Road/BNSF Grade Separation Project, recipient of a $9 million TIGER IX award offered by the USDOT. The project is federally funded at 64% and non-federally funded at 36%. The project is currently progressing with the engineering phase and scheduled to begin construction in 2020.

8.2 Basis of Cost Estimate and Contingency Levels

As the scope of the project developed through coordination with WSDOT and BNSF, the cost estimate is based on a new 15% design. Costs were developed in 2017 dollars, and were inflated at 3% annually to the start of the respective phase. A 30% contingency has been used for construction costs. The detailed cost estimate is included in the application's Statement of Work.

8.2.1 Scope, Schedule, and Budget Risk Mitigation Measures

The project has been the subject of several reviews. Engineering on the current concept is 15% complete and the project details have been vetted through numerous planning and design efforts. In addition, previous concepts had been completed to over 20%, which identified engineering issues and design risks and evaluated various mitigation strategies to minimize these risks. Both the City of Spokane Valley and WSDOT have proven design standards and project delivery procedures in place. Therefore, the technical risks, and budget risks associated with design uncertainties are low. However, the lack of funding presents risks associated with schedule, which in turn can create scope and budget risks as time passes. For example, the eastward realignment of Pines Road protected access to several businesses on Trent Avenue. If new businesses are developed on Trent Avenue between Pines Road and the Spokane River, the advantages of shifting Pines Road will be lost. In order to protect the new alignment, the City of Spokane Valley will continue with the design and possibly right-of-way acquisition. This will also advance the project allowing it to be quickly implemented once funding is available.

Project Schedule

The project schedule shown in Table 8 includes the major project milestones for engineering, right-of-way acquisition, and construction. Environmental approval was obtained through NEPA in 2006 as part of the Bridging the Valley process and project-specific environmental documentation will be completed as part of the PE/NEPA phase. Right-of-way acquisition and construction are dependent on funding.

Table 8: Project Schedule

PHASE	BEGIN	END
Preliminary Engineering (Incl. RW Plans & Prep)	09/2017	12/2019
Final Engineering Design	01/2020	12/2020
Environmental Documents (NEPA)	01/2019	12/2019
Right of Way Acquisition	01/2020	12/2021
CN Ad/Bid/Award	06/2022	09/2022
Construction*	09/2022	12/2024

*Substantial Completion Date. Construction contract finalization by 12/2025.

8.2.2 Required Approvals

This section provides a summary of all required approvals related to environmental permits and reviews, state and local approvals, and state and local planning.

8.2.2.1 Environmental Permits and Reviews

The project has completed the environmental process as follows:

Environmental Process & Completed Efforts
National Environmental Protection Agency (NEPA) and State EPA (SEPA) Status The Bridging the Valley project has already received NEPA Class II Categorical Exclusion and SEPA Categorical Exemption per WAC 197-11- 800 on August 22, 2006. The approval documentation is posted on the City's website. Project-specific NEPA documentation will be developed as part of the engineering effort and approval is anticipated by end of 2018.
Reviews, Approvals, and Permits by other Agencies The NEPA approval documentation provides a full list of all required permits and reviews. The Bridging the Valley stakeholders listed in Section 9 participated in reviews. This included reviews by the City of Spokane Valley, WSDOT, and BNSF.
Environmental Studies and other Documents Full environmental documentation in hard copy is on file at the Spokane Regional Transportation Council (SRTC). Copies are available upon request. The project was found to have no effect for most environmental components. Where there are small environmental impacts, mitigation measures have been identified and include procedures for hazmat disposal, erosion control, and stormwater treatment facilities.
DOT Discussions on NEPA Compliance As part of the Bridging the Valley study, the project team coordinated with WSDOT to obtain SEPA approval concurrently with the NEPA approval.
Public Engagement Extensive public engagement has been an on-going effort as part of the Horizon 2040 and the previous Bridging the Valley planning and engineering efforts, as well as public engagement to solicit the public's preference for their preferred alternative. Efforts included public open houses, alternatives workshops, site visits with neighborhoods at each crossing in Washington and Idaho, mailings, and outreach. Public support has been overwhelmingly positive. Public engagement will continue through the right-of-way, engineering, and construction of this project.

8.2.2.2 State and Local Approvals

The Pines Road/ BNSF Grade Separation project is included in the Statewide Transportation Improvement Program (STIP), Horizon 2040 Metropolitan Transportation Plan, and the Spokane Valley TIP. A STIP amendment was obtained in May 2017 (STIP ID WA-10613) to proceed with the full engineering phase of the project. Additional right-of-way, engineering, and construction approvals will be obtained from the City, WSDOT, and BNSF at key milestones throughout the project.

Spokane Valley gathers letters of support from local and regional stakeholders. Further, the City has requested support through its website and at local gatherings. Letters of support are posted to the City's website: http://www.spokanevalley.org/PinesBNSF

8.2.2.3 Federal transportation Requirements Affecting State and Local Planning

Significant planning and preliminary engineering for this project have been completed. These efforts show that the proposed project is not only feasible but has the support of all project partners, the community, the region, and beyond:

Planning or Design Effort with Supporting Project Elements
Bridging the Valley Planning Study • Grade Separation Analysis: development, evaluation, refinement, and documentation of grade separation alternatives to support transportation needs and BNSF operations • Traffic Analysis: evaluation of traffic impacts associated with each alternative for 2001 and 2020 • Economic Analysis: benefit-cost analysis of all alternatives
Bridging the Valley 30% Preliminary Engineering • Right-of-Way needs were determined for this project • Design reports (including criteria), 30% plans, cost estimate, and environmental documentation were performed for these projects
Inland Pacific Hub Transportation Investment and Project Priority Blueprint • Lists the Bridging the Valley grade separation projects as priority rail improvement projects with significant project synergy economic benefits • Demonstrates support from local partners and identifies a midterm construction period of 2016-2021
Washington State Freight Mobility Plan 2014 • Identifies project for future implementation
Horizon 2040 Metropolitan Transportation Plan • Identifies this project and other Bridging the Valley grade separation projects
Spokane Valley Comprehensive Plan (2014) • Goal to support and encourage the continued viability of passenger and freight rail system in the region; Policy to support Bridging the Valley grade separation projects
City of Spokane Valley TIP • Includes project funding for early pre-construction activities

Planning or Design Effort with Supporting Project Elements
Fiscal and Economic Analysis of Project Analysis of incremental development, tax revenue benefits, economic output, jobs, and wages showing the significant benefit of implementing this project.[23]
Joint Transportation Committee Prioritization of Rail-Rail Conflicts in Washington State (*DRAFT* May 2018) • Rate the State's overall top priority grade separation project requiring funding support.

8.2.3 Assessment of Project Risks and Mitigation Strategies

The City has identified the following potential project risks and associated mitigation measures:

Potential Risks	Mitigation Measures
Project Funding	The City has multiple options for meeting the project's remaining financing needs. The City plans to pursue other funding opportunities including TIB, STBG, CMAQ, or FMSIB. The schedule also allows some leeway to obtain funding for the construction phase.
Environmental Approvals	The project has already received NEPA approval for a categorical exclusion, and minor mitigation measures (e.g. erosion control, stormwater treatment) have been identified. This information will be used to complete project-specific NEPA documentation.
Water Table at Pines Road	The project is near the Spokane River. Sometimes the water table is low near rivers. The nearby Argonne Road/BNSF Grade Separation project constructed an underpass of the rail line and did not run into any water table issues. Similar construction techniques will be used for excavation.
Utility Conflicts	Potential utility issues were identified during the 15% preliminary engineering, and on earlier designs, which means utility coordination can start early.
Right-of-Way Acquisition	On-going engagement with the public has built positive support for development potential. These efforts will be continued.

9 Planning Readiness for Tracks 2 and 3 Projects

9.1 Evaluation of Project Investment Needs & Service Objectives

Beginning in 2017, the City initiated a preliminary design alternative analysis to evaluate the original 2006 scope identified in the Bridging the Valley study, comparing it to the minimum project requirements while accurately accounting for all impacts to the project area. This evaluation has supported the general concept of a Pines Road underpass at the BNSF tracks, however, the alignment of Pines Road south of Trent Ave. has shown to impact the overall project cost and possible configuration for the intersection improvement. Multiple project presentations have been made to City Council outlining the alternative analysis process and

[23] Fiscal and Economic Benefits of the Pines Road Underpass Project, ECONorthwest 2016; http://www.spokanevalley.org/PinesBNSF

controlling factors for the project. Ongoing project meetings with WSDOT and BNSF have helped refine the project scope further. Additionally, a public meeting was held in October 2017 where over residents and stakeholders could interact with City and provide feedback for the project. The City intends to complete its preliminary alternative analysis by the end of 2018.

9.2 Partnership

This project demonstrates support from numerous public and private partners across the region. Two states, several regional public entities, multiple cities, and local business organization, as well as two Class I railroads actively participated in the Horizon 2040, and in the previous Bridging the Valley plan and other workshops, stakeholder outreach, and funding initiatives. Table 9 summarizes the key partners associated with the project.

Table 9: Partners in the Project Development

State and Local Agencies	
• Idaho Transportation Department • Washington State Department of Transportation • Washington Freight Mobility Strategic Investment Board • Washington Utility and Transportation Commission • State and Federal Legislators	
Regional Agencies	
• Spokane Regional Transportation Council • Spokane Transit Authority • Kootenai Metropolitan Planning Organization	
Railroads	
• BNSF Railway Company	• Union Pacific Railroad
Local Agencies and Districts	
• Kootenai County • Spokane County • City of Athol • Town of Millwood • City of Rathdrum	• City of Spokane • City of Spokane Valley • Area Fire Districts/Emergency Response Systems • Area School Districts
Chambers of Commerce	
• Spokane Valley	• Greater Spokane Incorporated

9.3 Project History and Relationship to Other Plans

The following summarizes some of the other plans that provide context to the Pines Road/BNSF grade-separation project.

9.3.1 Horizon 2040 https://www.srtc.org/horizon-2040/

Horizon 2040 is the SRTC's long-range transportation plan for the Spokane region through 2040. The Pines Road underpass was identified in the regionally significant projects with a recommended implementation horizon of 2021-2030.

9.3.2 Bridging the Valley https://www.srtc.org/bridging-the-valley/#

Bridging the Valley was completed in 2006 and presented a plan to separate vehicle traffic from train traffic in the 42-mile corridor between Spokane, Washington, and Athol, Idaho. This stretch included 75 at-grade rail crossings, 11 of which were to be grade separated. The Pines Road/BNSF project was one of these 11 projects and had a 2001 estimated total project cost of $23 million. The current concept has been proposed as a result of a coordinated review of the project with WSDOT and BNSF that focused on providing the most important benefits, satisfying WSDOT and BNSF requirements and meeting the objectives of Horizon 2040.

9.3.3 Washington State Joint Transportation Committee

The Joint Transportation Committee (JTC) was created in 2005 and its purpose is to review and research transportation programs and issues to better inform state and local government policymakers, including legislators. The JTC conducted an evaluation of prominent road/rail conflicts and developed a prioritization process to address the impacts on a statewide level based on mobility, safety and community criteria. Using this process, Pines Road was ranked number 12 in the state out of over 300 crossings reviewed and out of nearly 4,200 crossings statewide. [24]

9.3.3.1 Washington State Freight Mobility Strategic Investment Board

In spring 2018, the Washington State Freight Mobility Strategic Investment Board (FMSIB) partnered with the State's MPOs to refine the JTC's prioritization of prominent road/rail conflicts. In its first draft release, the Pines/BNSF Grade Separation Project was identified as Washington State's #1 priority road-rail conflict.[25]

9.3.4 Great Northern Corridor Coalition http://greatnortherncorridor.org/coalition

The Great Northern Corridor Coalition is a multi-state cooperative of eight northern tier states, several MPOs, numerous ports, BNSF Railway Company and other interested parties. The Coalition's mission is to promote a premier multi-state corridor by acting collectively to promote public policy, research and multi-modal infrastructure development that expands commerce and enhances safety on the corridor. The BNSF railroad through Spokane Valley is identified as a part of the Great Northern Corridor.

9.3.5 Inland Pacific Hub https://www.srtc.org/inland-pacific-hub/

The Inland Pacific Hub (IPH) is a partnership of public and private sector representatives from northern Idaho and eastern Washington working together to create a multi-modal global gateway to foster increased domestic and international commerce. Phase 2 of the IHP initiative identified priority projects to support its vision, including Horizon 2040 and Bridging the Valley.[26]

[24] Prioritization of Prominent Road-Rail Conflict in Washington State, Washington State Joint Transportation Committee, January 2017
[25] DRAFT Prioritization of Prominent Road-Rail Conflicts – MP/RTPO/WSDOT Coordinating Committee, May 22, 2018.
[26] Inland Pacific Hub Transportation Investment and Project Priority Blueprint, 2012

Appendix A

Statement of Work

City of Spokane Valley

Pines Road/BNSF Grade Separation Project

Consolidated Rail Infrastructure and Safety Improvements (CRISI)

I. BACKGROUND

The Pines Road/BNSF Grade Separation Project is located on the BNSF Railway Company railroad corridor (Corridor), which currently hosts 58 freight trips and 2 Amtrak passenger trips, totaling 60 daily train trips. It is projected that the number of freight trains on this Corridor will increase to 114 trains per day by 2035, and further increases will continue beyond 2035 to 125 trains per day.[1] The Corridor is owned by BNSF Railway Company.

On February 21, 2018, the Federal Railroad Administration (FRA) issued a Notice of Funding Opportunity (NOFO) for Consolidated Rail Infrastructure and Safety Improvements program (CRISI). In response to this NOFO, the City of Spokane Valley submitted an application for the Pines Road/BNSF Grade Separation Project under the Program's Track 2 – PE/NEPA project track. FRA reviewed Grantee's application for eligibility and ranking with the criteria outlined in the NOFO. On the basis of this evaluation, the USDOT Secretary of Transportation selected the City of Spokane Valley for an award, through a cooperative agreement between FRA and the Grantee, of $1,246,500 for the Project.

For the purposes of this statement of work, the term "Project" means the completion of preliminary engineering (PE) and environmental review of the Pines Road/BNSF Grade Separation Project. Also for the purposes of this SOW, the term "Construction Project" means the future final design, right of way acquisition and construction work activities for the Pines Road/BNSF Grade Separation Project.

II. OBJECTIVE

The objective of this Grant/Cooperative Agreement is for the Grantee to complete PE and the environmental review resulting in the required documentation and approvals to support final design and construction of the Pines Road/BNSF Grade Separation Project.

When completed, the Construction Project will provide the following:

- An underpass of Pines Road at the BNSF railroad crossing.
    - The proposed bridge improvements will be designed to accommodate future expansion of the BNSF track network.
- Intersection control improvements at the intersection of the project's two state highways: Pines Road (SR 27) and Trent Avenue (SR 290).
- Bike and pedestrian improvements on the new paved highways, including ADA accessible routes, including a shared-use pathway.

Completion of the Pines Road/BNSF Grade Separation Project will result in many benefits to the Corridor and region:

[1] WSDOT Washington State Rail Plan, Integrated Freight and Passenger Rail Plan 2013-2035

- Improved safety of freight and passenger trains, freight trucks and commuter vehicle traffic by eliminating the road/rail at-grade conflict.
- Regionally, the elimination of delays at the rail crossing will improve mobility of freight vehicles traveling to/from Interstate 90 just south of the project.
- Safety and operability improvements will be provided at the intersection of Pines Road and Trent Avenue, improving traffic capacity and safety while eliminating impacts from the adjacent road/rail crossing and accommodating long-term growth of the region.
- Unlock the economic potential of prime vacant industrial, commercial, and mixed-use properties adjacent to the project site.
- Improved non-motorized user accessibility.
- Emergency access redundancy and improved community connectivity.

III. PROJECT LOCATION

The project is located in the City of Spokane Valley, WA, in the northeast corner of the state, approximately 9 miles from the Idaho border and 90 miles south of the Canadian border. The greater Spokane region is within the state's 5th Congressional District. The project is within the urbanized area of Spokane Valley (67167). The geographic location is 47°41'21" N, 117°14'22" W.

The project provides for improvements to the existing intersection of two state highways: State Route 27 (Pines Road) and State Route 290 (Trent Avenue). Trent Avenue is a preferred freight route to I-90 between north Idaho and Canada. Pines Road is a primary north-south arterial serving the City and rural areas to the north and south in Spokane County. The BNSF Railway carriers freight between western ports and Midwest intermodal facilities and also hosts Amtrak's Empire Builder passenger rail service. The Pines Road underpass of the BNSF tracks is approximately 275' south of Trent Avenue.

IV. DESCRIPTION OF WORK

The FRA-funded project is for the PE and environmental review phase and is part of the larger Construction Project that will be funded outside of this CRISI funding request. The following description of tasks is specific to the PE and environmental review, FRA-funded, portion of the project.

Task 1: Detailed Project Work Plan, Budget, and Schedule

The Grantee will prepare a Detailed Project Work Plan, Budget, and Schedule for the following tasks, which may result in a revised statement of work. The Project Work Plan will describe, in detail, the activities and steps necessary to complete the tasks outlined in the statement of work. The work plan will also include information about the project management approach (including team organization, team decision-making, roles and interaction with FRA), as well as address quality assurance and quality control procedures. In addition, the work plan will include the project schedule (with grantee and agency review durations), a detailed project budget, and an environmental class of action recommendation memorandum (if applicable). Because the Grantee needs to secure an agreement with BNSF Railway Company to access the railroad's property and perform the engineering, environmental, or construction activities, the executed

agreement should be included with the work plan. Similarly, agreements governing the maintenance of the project should also be included. The Detailed Project Work Plan, Budget, and Schedule will be reviewed and approved by the FRA.

The Grantee acknowledges that work on subsequent tasks will not commence until Task 1 has been completed and the Grantee has received approval in writing from FRA. The FRA will not reimburse the Grantee for costs incurred in contravention of this requirement.

Task 1 Deliverables:

- Detailed Project Work Plan, Budget, and Schedule
- Project Agreements (if applicable)

Task 2: Preliminary Engineering and Environmental Review

The Grantee shall complete PE and environmental review for FRA review and approval to support the Construction Project. The following documentation will be prepared to accompany the design and specifications.

Task 2.1: *Project Administration*

Project management will be on-going during the course of the project. The project manager will maintain communication with the Consultants, WSDOT, and BNSF to monitor the project's scope, schedule, and budget. Project team meetings will be held regularly to enforce project accountability to the scope, schedule and budget.

The Grantee will prepare Construction Project management documentation for the implementation of the Construction Project following completion of PE. The Construction Project management documentation will address the following minimum requirements, as approved by FRA:

- Identify the stakeholders involved in the Construction Project's implementation and describe their respective roles and mechanisms through which these parties will interact with one another.
- Demonstrate that the Grantee has the adequate staff organization with well-defined statements of responsibilities, job descriptions, and job qualifications.

Task 2.1 Deliverables:

- Monthly progress reports, invoice packages, and project schedule updates

Task 2.2: *Coordination and Meetings*

The project will require frequent communication to facilitate design decisions. As the Grantee, the City and its Consultants will meet regularly to discuss ongoing project topics, including conflicts that require resolution. The project's design team will hold meetings as necessary to communicate project needs relating to the various design elements.

Task 2.2 Deliverables:

- Meeting Agendas and Meetings Minutes

Task 2.3: *Quality Control/Quality Assurance Review*

Quality Control reviews will occur regularly between the Grantee and its Consultants prior to submittal of major deliverables.

Task 2.3 Deliverables:

- QC/QA is realized in the deliverables of other Tasks, not specifically in the task itself

Task 2.4: *Utilities and Data Collection*

Data obtained from the Grantee's existing preliminary design analysis will be used as a basis for coordination with all existing utilities impacted by the Construction Project.

Task 2.4 Deliverables:

- Meeting minutes
- Copies of information obtained
- Copies of field records
- Utility Information Matrix – used to identify utility contacts, descriptions, and project impacts

Task 2.5: *Geotechnical Engineering*

Prepare a geotechnical report to document geotechnical explorations, testing, and recommendations required for the project. Geotechnical reports may include, but not be limited to, geotechnical design recommendations for the design and construction of the BNSF underpass (Pines Road bridge), bridge foundations, pavement design and stormwater management facilities.

Task 2.5 Deliverables:

- Geotechnical Report (PDF)

Task 2.6: *Public Involvement Program*

Public involvement will be initiated by the Grantee and its Consultant but will be coordinated with the WSDOT. The City will generate public outreach documents to share information and receive feedback from residents and stakeholders. Meetings with impacted property owners will also occur throughout the Project.

Task 2.6 Deliverables:

- Public outreach documents (i.e. advertisements, media releases, mailers, flyers, public meeting/Open House handouts and presentation materials)

- Meeting minutes

Task 2.7: *NEPA Compliance*

The Grantee will complete FRA-approved environmental clearance documentation for the Construction Project. The determination of the appropriate class of action and/or level of documentation and the Construction Project's environmental impact will be made by FRA.

FHWA and WSDOT approved a NEPA CE for the entire suite of Bridging the Valley projects in 2006, which included the Pines Road/BNSF Grade Separation Project. Environmental tasks included in this scope are focused on maintaining NEPA-compliance and developing a stand-alone NEPA document for the Pines Road/BNSF Grade Separation Project.

The Grantee will follow FRA's *Procedures for the Consideration of Environmental Impacts* (effective May 26, 1999) (Environmental Procedures) to complete the FRA CE worksheet and submit it to assist FRA in making a class of action and/or level of documentation determination.

If FRA determines the appropriate class of action is a CE, the Grantee will complete any additional studies and documentation for the FRA CE in accordance with the Environmental Procedures. The Grantee will then submit the final CE worksheet with supporting documentation for FRA review and approval.

If FRA does not concur that a CE is appropriate for this Construction Project, the Grantee will undertake an Environmental Assessment (EA) in accordance with FRA's Environmental Procedures. In addition, the Grantee is responsible for identifying all necessary permits required for the Construction Project's implementation.

Task 2.7 Deliverables (Subject to change, as coordinated with FRA):

- Section 106 Report
- Traffic Noise Analysis Report
- Land Use Assessment documentation
- Environmental Justice documentation
- Hazardous Materials Memorandum
- Categorical Exclusion documentation
- SEPA Checklist

Task 2.8: *Topographic Survey and Basemapping*

The Grantee and its Consultant will prepare a survey basemap in coordination with WSDOT standards that may include topographic data, boundary and right-of-way data, utility infrastructure data, and coordinated railway elements as needed.

Task 2.8 Deliverables:

- Notification letters to impacted property owners regarding upcoming survey work.
- Control diagram and project control report per WSDOT standards.
- Electronic survey drawing of the completed project base map.
- Retracement Record of Survey, if applicable.

Task 2.9: *Preliminary Bridge Plans - BNSF Coordination and Submittal*

The Grantee and its Consultant will prepare submittals for BNSF Railway review in accordance with Union Pacific Railroad and BNSF Railway Guidelines for Railroad Grade Separation Projects and the AREMA Manual for Railway Engineering.

Task 2.9 Deliverables:

- BNSF Railway Design Packages
    - BNSF Design Phase A Package
        - In accordance with the 'Guidelines for Railroad Grade Separation Projects'
    - BNSF Design Phase B Package
        - Bridge Plans
        - Hydraulics Summary
        - Railroad Profile Grade Diagrams
    - BNSF Design Phase C Package
        - Bridge Plans
        - Hydraulics Summary
        - Railroad Profile Grade Diagrams
- Draft Railroad Agreement

Task 2.10: *Intersection Control Analysis*

This work includes the Intersection Control Analysis (ICA) report for submittal to WSDOT for approval of the preferred intersection control method. At this time, the Project is evaluating the impacts of a roundabout versus an improved signalized intersection. The ICA will follow the WSDOT Design Manual.

Task 2.10 Deliverables:

- ICA Report

Task 2.11: *Preliminary Design Package*

The Grantee and its Consultant will prepare submittals for WSDOT review, the design elements may include survey, demolition, plan & profile, intersection, bridge, channelization, paving, stormwater, erosion control, traffic control, signage, landscaping and irrigation, details, and illumination plans. The Grantee will prepare a design approval memorandum following WSDOT's Design Manual.

Task 2.11 Deliverables:

- Preliminary Submittal Package may include:
    - Plans Set for Construction Project
    - Specifications

- Hydraulics Report
- Opinion of Probable Cost
- Basis of Estimate
- Design Approval Memorandum

Task 2.11.A: *Financial Planning Documentation*

The Grantee will prepare financial planning documentation demonstrating how the implementation of the Construction Project will be financed following completion of PE. Based on the Construction Project cost estimate, the minimum requirements for the financial planning documentation are listed below.

- A cost-loaded schedule depicting the cash outflow forecast for the Construction Project by calendar quarter, in both base year and "year of expenditure" (i.e., inflation-adjusted "nominal") dollars.
- A description of the inflation assumptions used to arrive at the year of expenditure values.
- A description of the degree to which funding for the implementation of the Construction Project has been committed and a description of the risks associated with the availability of the other sources of funding.
- A description of other financing risks associated with the Construction Project, including cost risks represented in the cost estimate and schedule risks represented in the schedule.
- A description of the Grantee's plan for financing any cost overruns, including addressing the availability of the sources of funding that may be used to finance overruns.
- A description of how operating and maintenance costs of the Construction Project will be financed.

Task 2.11.A Deliverables:

- Financial Planning Document (may be submitted as part of the Opinion of Probably Cost and/or Basis of Estimate, in a coordinated, FRA-approved format)

Task 2.12: *Right of Way Plans and Preparation*

Upon approval of Preliminary Design Plans, the Grantee and its Consultant will prepare Right-of-Way documents. Title reports for the property owners impacted by the project will be reviewed to develop a Total Ownership Map, Right-of-Way/Limited Access Plans in accordance with WSDOT Right-of-Way Manual and Plans Preparation Manual. Revisions to property boundaries will be captured with a Record of Survey.

Task 2.12 Deliverables:

- Total Ownership Map
- Right-of-Way and Limited Access Plans
- Record of Survey

Task 3: Construction Project Implementation Schedule:

The Grantee will prepare a Construction Project implementation schedule consistent with the preliminary design plans and specifications. The minimum requirements for the Construction Project implementation schedule are listed below.

a. The Construction Project implementation schedule, including final design, will be presented in a format approved by FRA.

b. The Construction Project implementation schedule will incorporate an appropriate allowance for Construction Project schedule risk, whether through inclusion of schedule contingency or through another method approved by FRA.

Task 3 Deliverables:

c. Construction Project Implementation Schedule

Task 4: Construction Project Management Documentation

The Grantee will prepare Construction Project management documentation for the implementation of the Construction Project following completion of PE. The Construction Project management documentation may address the following minimum requirements, as approved by FRA:

- Identify the stakeholders involved in the Construction Project's implementation and describe their respective roles and contact information.
- Demonstrate that the Grantee has the adequate staff organization with well-defined, statements of functional responsibilities, job descriptions, and job qualifications.

Task 4 Deliverables:

- Construction Project Management Documentation

Task 5: Final Performance Report

The Grantee will submit a Final Performance Report within 90 days of the end of the grant's period of performance which should describe the cumulative activities of the project, including a complete description of the Grantee's achievements with respect to the project objectives and milestones. The Report must be in an FRA-approved format.

Task 5 Deliverables:

- Final Performance Report

V. PROJECT SCHEDULE AND DELIVERABLES

The period of performance for all work will be approximately [12] months, from [January/2019] to [December/2019]. The deliverables associated with this Grant/Cooperative Agreement are listed below. The Grantee must complete these deliverables to FRA's satisfaction in order to be authorized for funding reimbursement and for the Project to be considered complete.

Task	**Deliverable Name**	**Due Date**
1	Detailed Project Work Plan, Budget, and Schedule	February 1, 2019
1	Project Agreements (if applicable)	March 1, 2019
2	See Task Subsections	December 31, 2019
2.1	Monthly progress reports, invoice packages, and project schedule updates.	Ongoing
2.2	Meeting Agendas and Meetings Minutes	Ongoing
2.3	N/A (Internal QA/QC))	Ongoing
2.4	Meeting minutes, information obtained, field records	Ongoing
2.4	Utility Information Matrix – used to identify utility contacts, descriptions, and project impacts	April 1, 2019
2.5	Geotechnical Report	April 1, 2019
2.6	Public Outreach, Meeting Minutes	December 31, 2019
2.7	Section 106 Report	December 31, 2019
2.7	Traffic Noise Analysis Report	December 31, 2019
2.7	Land Use Assessment documentation	December 31, 2019
2.7	Environmental Justice documentation	December 31, 2019
2.7	Hazardous Materials Memorandum	December 31, 2019
2.7	Categorical Exclusion documentation	December 31, 2019
2.7	SEPA Checklist	December 31, 2019
2.8	Survey work notification letters	February 1, 2019
2.8	Control diagram and project report	May 1, 2019
2.8	Electronic survey drawing of complete project base map	May 1, 2019
2.8	Retracement Record of Survey, if applicable	July 1, 2019
2.9	BNSF Railway Design Package	August 1, 2019
2.9	Draft Railroad Agreement	October 1, 2019
2.10	Intersection Control Analysis Report	August 1, 2019
2.11	Preliminary Design Package	October 1, 2019
2.11.A	Financial Planning Document	October 1, 2019
2.12	Total Ownership Map	November 1, 2019
2.12	Right-of-Way and limited Access Plans	November 1, 2019
2.12	Record of Survey	December 31, 2019
3	Construction Project Implementation Schedule	December 31, 2019
4	Construction Project Management Documentation	December 31, 2019
5	Final Performance Report	March 30, 2020

VI. PROJECT ESTIMATE/BUDGET

The total estimated cost of the Project is $2,493,000 for which the FRA grant will contribute up to 50% of the total cost, not to exceed $1,246,500. Any additional expense required beyond that provided in this grant to complete the Project shall be borne by the Grantee.

Project Estimate by Task

Task #	Task Name	Total Cost
1	Detailed Project Work Plan, Budget, and Schedule	$ 7,500
2	Preliminary Engineering & Environmental Review	2,475,500
3	Construction Project Implementation Schedule	2,500
4	Construction Project Management documentation	2,500
5	Final Performance Review	5,000
	Total Project Cost	**$ 2,493,000**

Project Estimate Contributions

Funding Source	Project Contribution Amount	Percentage of Total Project Cost
FRA Grant	$ 1,246,500	50%
Grantee	1,246,500	50%
Total Project Cost	**$ 2,493,000**	**100%**

VII. PROJECT COORDINATION

The Grantee shall perform all tasks required for the Project through a coordinated process, which will involve affected railroad owners, operators, and funding partners, including:

- Grantee's Engineering Consultants
- BNSF
- WSDOT
- FRA

VIII. PROJECT MANAGEMENT

As identified in Tasks 2, 3, and 4, the Grantee is responsible for facilitating the coordination of all activities necessary for implementation of the Project. Upon award of the Project, the Grantee will monitor and evaluate the Project's progress through regular meetings scheduled throughout the period of performance. The Grantee will:

- Participate in a Project kickoff meeting with FRA
- Hold regularly scheduled Project meetings with FRA
- Inspect and approve work as it is completed
- Review and approve invoices as appropriate for completed work
- Perform Project close-out audit to ensure contractual compliance and issue close-out report
- Submit to FRA all required Project deliverables and documentation on-time and according to schedule, including periodic receipts and invoices
- Comply with all FRA Project reporting requirements, including, but not limited to:
    a. Status of project by task breakdown and percent complete
    b. Changes and reason for change in project's scope, schedule and/or budget
    c. Description of unanticipated problems and any resolution since the immediately preceding progress report
    d. Summary of work scheduled for the next progress period
    e. Updated Project schedule

Appendix B

Detailed Cost Estimate

City of Spokane Valley, WA
Pines Road/BNSF Grade Separation Project
Opinion of Probable Construction Cost
Alternative 1

Formatted By: Adam Jackson
Date: June 11, 2018

Contingency Code (%) or Unit	ITEM	UNIT	TRENT QUANTITY	PINES QUANTITY	TOTAL QUANTITY	UNIT PRICE (YEAR 2017)	ITEM COST (YEAR 2017)
%	CLEARING AND GRUBBING	LS			1	$50,000.00	$50,000.00
%	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS			1	$10,000.00	$10,000.00
U	REMOVING ASPHALT CONC. PAVEMENT	SY	11274	4500	15774	$4.00	$63,097.78
%	CONSTRUCTION SURVEYING	LS			1	$15,000.00	$15,000.00
%	SPCC PLAN	LS			1	$4,000.00	$4,000.00
%	TRAFFIC CONTROL	LS			1	$510,000.00	$510,000.00
%	SURVEYING	LS			1	$150,000.00	$150,000.00
%	RECORD DRAWING (MIN BID $10,000 LS)	LS			1	$10,000.00	$10,000.00
%	MINOR CHANGE, UNEXPECTED SITE CONDITIONS	LS			1	$50,000.00	$50,000.00
%	CONTRACTING AGENCY FIELD OFFICE	LS			1	$10,000.00	$10,000.00
%	PROPERTY RESTORATION	LS			1	$10,000.00	$10,000.00
%	UTILITY POTHOLING	LS			1	$10,000.00	$10,000.00
U	ROADWAY EXCAVATION INLC. HAUL	CY	49149	147587	196736	$10.00	$1,967,359.00
U	CATCH BASIN	EACH	8		8	$2,500.00	$20,000.00
U	STORM SEWER PIPE 18 IN. DIAM.	LF	1200	400	1600	$60.00	$96,000.00
U	SEWER MANHOLE	EACH	6		6	$3,000.00	$18,000.00
U	WORK ACCESS	LS		1	1	$25,000.00	$25,000.00
U	TEMPORARY SHORING	LS		1	1	$50,000.00	$50,000.00
U	STRUCTURE EXCAVATION CLASS A INCL. HAUL	CY		1272	1272	$25.00	$31,800.00
U	GRAVEL BACKFILL FOR GRAVITY BLOCK RETAINING WAL	CY		23	23	$50.00	$1,150.00
U	FURNISHING AND DRIVING STEEL TEST PILE	EACH		4	4	$17,000.00	$68,000.00
U	FURNISHING ST. PILING	LF		4600	4600	$100.00	$460,000.00
U	DRIVING ST. PILE	EACH		46	46	$4,500.00	$207,000.00
U	FURNISHING STEEL PILE TIP OR SHOE	EACH		50	50	$500.00	$25,000.00
U	PILE SPLICES	EACH		50	50	$500.00	$25,000.00
U	CONTROLLED DENSITY FILL	CY		66	66	$150.00	$9,900.00
U	CONC. CLASS 4000 FOR BRIDGE (ENCASEMENT)	CY		142	142	$650.00	$92,300.00
U	ST. REINF. BAR FOR BRIDGE (ENCASEMENT)	LB		18800	18800	$1.25	$23,500.00
U	PRECAST REINFORCED CONCRETE	LS		1	1	$178,000.00	$178,000.00
U	PRESTRESS 42" CONC. DOUBLE CELL BEAM W/ CURB & V	LF		686	686	$800.00	$548,800.00
U	ELASTOMERIC PAD - SUPERSTR.	EACH		32	32	$1,500.00	$48,000.00
U	ERECTION OF SUPERSTRUCTURE	LS		1	1	$100,000.00	$100,000.00
U	RR BRIDGE SAFETY RAILING	LF		689	689	$200.00	$137,800.00
U	STRUCTURAL CARBON STEEL	LS		1	1	$8,931.00	$8,931.00
U	BRIDGE DECK WATERPROOFING	SY		660	660	$160.00	$105,600.00
U	PRECAST GRAVITY BLOCK RETAINING WALL	SF		500	500	$85.00	$42,500.00
U	CANTILEVER SOLDIER PILE WALL	SF	2572		2572	$120.00	$308,640.00
U	CRUSHED SURFACING BASE COURSE (CSBC)	CY		573	573	$20.00	$11,460.00
U	CRUSHED SURFACING TOP COURSE (CSTC)	CY	1454	912	2366	$60.00	$141,960.00
U	CEMENT CONC. PAVEMENT (PCC)	CY	3540	1995	5535	$300.00	$1,660,500.00
U	HMA Plantmix Pavement	TON		1740	1740	$110.00	$191,400.00
%	IRRIGATION SYSTEM	LS			1	$20,000.00	$20,000.00
%	EROSION/WATER POLLUTION CONTROL	LS			1	$150,000.00	$150,000.00
U	SEEDING, FERTILIZING, AND MULCHING	ACRE	1.10	1.75	3	$5,000.00	$14,250.00
%	LANDSCAPING	LS			1	$100,000.00	$100,000.00
U	CEMENT CONC. TRAFFIC CURB	LF	2394	3120	5514	$33.00	$181,962.00
U	PRECAST CONCRETE BARRIER	LF	1197	200	1397	$50.00	$69,850.00
U	PAINT LINE	LF	9095	8500	17595	$0.25	$4,398.63
%	MISC PLASTIC STRIPING	LS			1	$5,000.00	$5,000.00
%	PERMANENT SIGNING	LS			1	$20,000.00	$20,000.00
%	ILLUMINATION SYSTEM COMPLETE	LS			1	$100,000.00	$100,000.00
%	TRAFFIC SIGNAL SYSTEM	LS			1	$300,000.00	$300,000.00
%	ITS SYSTEM COMPLETE	LS			1	$50,000.00	$50,000.00
U	UTILITIES - GAS MAIN RELOCATION	LF			0	$200.00	$0.00
U	UTILITIES - WATER LINE RELOCATION	LF	800	1560	2360	$100.00	$236,000.00
U	UTILITIES - FIBER OPTIC RELOCATION Centrury Link	LF	1425	575	2000	$200.00	$400,000.00
U	UTILITIES - TELECOMMUNICATION RELOCATION	LF			0	$150.00	$0.00
U	UTILITIES - SEWER	LF	1500		1500	$200.00	$300,000.00
U	CEMENT CONCRETE SIDEWALK	SY	1945	2900	4845	$50.00	$242,250.00
	UTILITIES - YELLOWSTONE PIPELINE RELOCATION						
%	Shoofly				1	$860,000.00	$860,000.00
U	Railroad Flagging	Day			400	$1,000.00	$400,000.00
U	Temporary Shoring for Construction Staging - Roadway	SF	2100		2100	$30.00	$63,000.00

1	Construction Subtotal			$11,012,408
2	Mobilization		10%	$1,101,241
3	**Subtotal**			**$12,113,649**
4	Unit Price Contingencies	$8,578,408	20%	$1,715,682
5	Percentage Item Contingencies	$2,434,000	29%	$705,860
7	**Contingencies**		**20.0%**	**$2,421,542**
8	**Subtotal**			**$14,535,191**
9	Sales Tax (N/A included in unit costs)			$0
10	**Subtotal**			**$14,535,191**
11	Total Construction Subtotal			$14,535,191
12	Design Engineering (PE + FE)		20%	$2,907,038
13	RIGHT-OF-WAY			$4,200,000
14	Construction Engineer and Inspection		16.5%	$2,398,307
15	**TOTAL PROJECT COST (DESIGN, CONSTRUCTION, CONSTRUCTION ENGINEERING)**			**$24,040,536**

YEAR 2017 CONCEPTUAL ESTIMATE TOTAL ALTERNATIVE 1 **$24,040,536**

Phase	2017 Cost ($1,000)	Year of Expenditure	Inflated Cost (@3.5%)
Construction (2022-2024) Design Engineering (2019-2020)	$14,536,000	2023	$17,869,000
Preliminary Engineering	$2,326,400	2019	$2,493,000
Final Engineering	$581,600	2020	$645,000
Right of Way (2020-2021)	$4,200,000	2021	$4,820,000
Construction Engineering (2022-2024)	$2,399,000	2023	$2,949,000
Total			$28,776,000

Appendix C

Benefit Cost Analysis

Pines Road Grade Separation

Benefit Cost Analysis Supplementary Documentation

Consolidated Rail Infrastructure and Safety Improvements (CRISI) Grants Program

City of Spokane Valley

June 18, 2018

Contents

Tables

Figures

1 Executive Summary

With increasing growth in freight train traffic, the Pines Road grade crossing is becoming increasingly difficult for motorists, pedestrians, and other users. Extended delays at the project location result in inefficient emergency services access, noise pollution from train whistles, inefficient freight truck movements along a preferred long-haul freight route, and a worsening Level of Service (LOS) projected to reach 'F' in future years due to high traffic volumes. The Pines Road/BNSF Grade Separation Project replaces an existing at-grade crossing with an underpass of BNSF's railroad tracks and provides a roundabout or traffic signal at the intersection of Pines Road and Trent Avenue. This will allow pedestrians and cyclists to be able to cross Trent Avenue more safely and comfortably. The improvements support freight movement and regional mobility goals as articulated in various plans such as Horizon 2040, the MPO's regional transportation plan, and the Inland Pacific Hub Transportation Study, a partnership of public and private agencies dedicated to creating a freight gateway in the region.

The City of Spokane Valley seeks $1,246,500 to complete the PE/NEPA phase of the Pines Road/BNSF Grade Separation Project under Track 2 of the CRISI program.

The proposed concept is illustrated in Figure 1.

Figure 1: Pines Road/BNSF Grade Separation Project

Table ES-1 summarizes the impacts and associated monetary benefits expected from the project.

Table ES-1: Summary of Infrastructure Improvements and Associated Benefits

Current Status or Baseline & Problems to be Addressed	Changes to Baseline / Alternative	Type of Impacts	Population Affected by Impacts	Economic Benefits	Summary of Results ($2017, Discounted at 7%)
With increasing growth in freight train traffic, the Pines Road grade crossing is becoming increasingly difficult for motorists, pedestrians, and other users. Extended delays at the project location result in inefficient emergency services access, noise pollution from train whistles, inefficient freight truck movements along a preferred long-haul freight route, and a lack of industrial development potential due to a current Level of Service (LOS) 'E' operating condition, with an LOS 'F' condition expected due to worsening conditions.	The project replaces an existing at-grade crossing with an underpass of BNSF's railroad tracks and provides a roundabout or improved signalized controls at the intersection of Pines Road and Trent Avenue. The improvements support freight movement and regional mobility goals as articulated in various plans such as Horizon 2040, the MPO's regional transportation plan, and the Inland Pacific Hub Transportation Study, a partnership of public and private agencies dedicated to creating a freight gateway in the region. The elimination of delays at the rail crossings will improve the mobility of freight trucks traveling from Canada to Interstate 90, unlock the economic potential to develop prime vacant commercial and industrial land, support active pedestrian and bicycle lifestyles, and improving the quality of life through noise and emissions reductions.	Reduced Travel Time Costs from Vehicle Idling and Delay Time at Pines Road Crossing	Motorists, shippers, local businesses and residents	Reduced Travel Time Costs	**$18,401,917**
		Improved Safety and Avoided Accident Costs from Eliminated Pines Road Grade Crossing	Motorists, shippers, local businesses and residents	Improved Safety and Avoided Accident Costs	**$19,015,787**
		Avoided Emission Costs from Vehicle Idling and Delay Time at Pines Road Crossing	Local residents and residents across the country	Avoided Emissions Costs	**$34,342**
		Reduced Vehicle Operating Costs from Vehicle Idling and Delay Time at Pines Road Crossing	Motorists, shippers, local businesses and residents	Reduced Vehicle Operating Costs	**$883,590**
		Residual Value of Infrastructure Asset	Local, state, and federal governments	Residual Value of Infrastructure Asset	**$820,344**
		Reduced Ongoing Infrastructure Maintenance Cost	Motorists, shippers, local businesses and residents	Operations & Maintenance Cost Savings	**$85,005**

Current Status or Baseline & Problems to be Addressed	Changes to Baseline / Alternative	Type of Impacts	Population Affected by Impacts	Economic Benefits	Summary of Results ($2017, Discounted at 7%)
		Fewer rail crossing blockages will improve travel time reliability as there will be a significantly lower chance for drivers to be delayed thus reducing the unpredictability of trips in the area. This also allows both short and long-haul trucks to experience improved delivery timeliness.	Motorists, shippers, local businesses and residents	Improved Travel Time Reliability	**n/a**
		Close to 170 acres of mixed-use or commercially-zoned parcels and 56 acres of prime industrially-zoned parcels are undeveloped because property owners and developers cannot afford to mitigate the LOS 'E' operating conditions at the Pines Road /Trent Avenue intersection. These parcels, and several hundred more acres beyond the city limits, are some of the last undeveloped parcels available for industrial use in the area.	Motorists, shippers, local businesses and residents, local/state/federal governments	Unlock Future Development Potential	**n/a**

Current Status or Baseline & Problems to be Addressed	Changes to Baseline / Alternative	Type of Impacts	Population Affected by Impacts	Economic Benefits	Summary of Results ($2017, Discounted at 7%)
		Grade separation will provide pedestrian and cycling facilities allowing for greater connectivity and promotion of active lifestyles, in addition to improved access to nearby businesses and other public facilities.	Pedestrians, cyclists, local businesses and residents.	Improved Connectivity	**n/a**
		Grade separation will reduce noise pollution from train whistles.	Pedestrians, cyclists, local businesses and residents.	Reduced Noise Pollution	**n/a**
		Fewer rail crossing blockages will improve travel time and reliability for emergency responders that may otherwise not be able to pass or be forced to take a longer route.	Motorists, shippers, local businesses and residents	Improved Emergency Vehicle Access	**n/a**

The period of analysis used in the estimation of benefits and costs is 38 years, including 8 years of construction and planning and 30 years of operation. The total project costs include $24.0 million dollars in future capital costs as shown in Table ES-2.

Table ES-2: Summary of Project Costs, Millions of 2017 Dollars

Cost Component	2017 Dollars
Construction	$14,535,191
Right of Way	$4,200,000
Construction Engineering	$2,398,307
Preliminary Engineering	$2,325,631
Final Engineering	$581,408
Total Future Project Costs	**$24,040,536**

Tables ES-3, ES-4 and ES-5 provide various summaries of the relevant data and calculations used to derive the benefits and costs of the project. Based on the analysis presented in the rest of this document, the project is expected to generate $39.2 million in discounted benefits and $18.2 in discounted costs, using a 7 percent real discount rate. Therefore, the project is expected to generate a Net Present Value of $21.0 million and a Benefit/Cost Ratio of 2.15.

Table ES-3: Summary of Total Project Benefits and Costs

Calendar Year	Project Year	Direct Beneficiaries	Total Benefits ($2017)	Total Costs ($2017)	Undiscounted Net Benefits ($2017)	Discounted Total Benefits at 7% ($2017)	Discounted Total Costs at 7% ($2017)	Discounted Net Benefits at 7% ($2017)
2017	1	Workers otherwise unemployed (shadow wage benefit); not quantified	$0	-$945,718	-$945,718	$0	-$945,718	-$945,718
2018	2		$0	-$41,333	-$41,333	$0	-$38,629	-$38,629
2019	3		$0	-$41,333	-$41,333	$0	-$36,102	-$36,102
2020	4		$0	-$5,007,038	-$5,007,038	$0	-$4,087,235	-$4,087,235
2021	5		$0	-$2,100,000	-$2,100,000	$0	-$1,602,080	-$1,602,080
2022	6		$0	-$8,466,749	-$8,466,749	$0	-$6,036,675	-$6,036,675
2023	7		$0	-$5,080,049	-$5,080,049	$0	-$3,385,051	-$3,385,051
2024	8		$0	-$3,386,699	-$3,386,699	$0	-$2,109,066	-$2,109,066
2025	9	Federal and State governments, pedestrians, cyclists, motorists, local residents and businesses, trucking companies, AMTRAK and their passengers, property owners along the project corridor, and other residents across the country.	$3,555,960	$0	$3,555,960	$2,069,601	$0	$2,069,601
2026	10		$3,671,533	$0	$3,671,533	$1,997,070	$0	$1,997,070
2027	11		$3,793,051	$0	$3,793,051	$1,928,195	$0	$1,928,195
2028	12		$3,920,889	$0	$3,920,889	$1,862,786	$0	$1,862,786
2029	13		$4,056,471	$0	$4,056,471	$1,801,122	$0	$1,801,122
2030	14		$4,200,124	$0	$4,200,124	$1,742,902	$0	$1,742,902
2031	15		$4,351,808	$0	$4,351,808	$1,687,706	$0	$1,687,706
2032	16		$4,512,185	$0	$4,512,185	$1,635,423	$0	$1,635,423
2033	17		$4,680,314	$0	$4,680,314	$1,585,384	$0	$1,585,384
2034	18		$4,859,047	$0	$4,859,047	$1,538,250	$0	$1,538,250
2035	19		$5,047,551	$0	$5,047,551	$1,493,388	$0	$1,493,388
2036	20		$5,237,457	$0	$5,237,457	$1,448,201	$0	$1,448,201
2037	21		$5,435,670	$0	$5,435,670	$1,404,680	$0	$1,404,680
2038	22		$5,619,836	$0	$5,619,836	$1,357,264	$0	$1,357,264
2039	23		$5,733,837	$0	$5,733,837	$1,294,202	$0	$1,294,202
2040	24		$5,849,933	$0	$5,849,933	$1,234,025	$0	$1,234,025
2041	25		$5,968,601	$0	$5,968,601	$1,176,689	$0	$1,176,689
2042	26		$6,089,634	$0	$6,089,634	$1,122,010	$0	$1,122,010
2043	27		$6,213,957	$0	$6,213,957	$1,070,015	$0	$1,070,015
2044	28		$6,341,431	$0	$6,341,431	$1,020,529	$0	$1,020,529
2045	29		$6,472,186	$0	$6,472,186	$973,431	$0	$973,431
2046	30		$6,606,221	$0	$6,606,221	$928,589	$0	$928,589
2047	31		$6,743,960	$0	$6,743,960	$885,935	$0	$885,935

Calendar Year	Project Year	Direct Beneficiaries	Total Benefits ($2017)	Total Costs ($2017)	Undiscounted Net Benefits ($2017)	Discounted Total Benefits at 7% ($2017)	Discounted Total Costs at 7% ($2017)	Discounted Net Benefits at 7% ($2017)
2048	32		$6,883,520	$0	$6,883,520	$845,110	$0	$845,110
2049	33		$7,027,861	$0	$7,027,861	$806,385	$0	$806,385
2050	34		$7,176,876	$0	$7,176,876	$769,610	$0	$769,610
2051	35		$7,327,463	$0	$7,327,463	$734,354	$0	$734,354
2052	36		$7,481,760	$0	$7,481,760	$700,764	$0	$700,764
2053	37		$7,639,860	$0	$7,639,860	$668,759	$0	$668,759
2054	38		$17,829,424	$0	$17,829,424	$1,458,604	$0	$1,458,604
Total			**$180,328,417**	**-$25,068,921**	**$155,259,497**	**$39,240,984**	**-$18,240,557**	**$21,000,428**

Table ES-4: Summary of Project Benefits by Benefit Type

Calendar Year	Project Year	Reduced Travel Time Costs	Improved Safety and Avoided Accident Costs	Avoided Emissions Costs	Reduced Vehicle Operating Costs	Residual Value of Infrastructure Asset	Operations and Maintenance Cost Savings
2017	1	$0	$0	$0	$0	$0	$0
2018	2	$0	$0	$0	$0	$0	$0
2019	3	$0	$0	$0	$0	$0	$0
2020	4	$0	$0	$0	$0	$0	$0
2021	5	$0	$0	$0	$0	$0	$0
2022	6	$0	$0	$0	$0	$0	$0
2023	7	$0	$0	$0	$0	$0	$0
2024	8	$0	$0	$0	$0	$0	$0
2025	9	$1,328,352	$2,155,081	$3,225	$58,302	$0	$11,000
2026	10	$1,413,335	$2,181,221	$3,229	$62,748	$0	$11,000
2027	11	$1,503,758	$2,207,959	$3,242	$67,092	$0	$11,000
2028	12	$1,599,970	$2,235,311	$3,265	$71,343	$0	$11,000
2029	13	$1,702,342	$2,263,291	$3,286	$76,552	$0	$11,000
2030	14	$1,811,269	$2,291,913	$3,371	$82,571	$0	$11,000
2031	15	$1,927,170	$2,321,193	$3,478	$88,967	$0	$11,000
2032	16	$2,050,492	$2,351,146	$3,606	$95,941	$0	$11,000
2033	17	$2,181,711	$2,381,786	$3,765	$102,052	$0	$11,000
2034	18	$2,321,332	$2,413,130	$3,964	$109,621	$0	$11,000
2035	19	$2,469,893	$2,445,194	$4,192	$117,272	$0	$11,000

Calendar Year	Project Year	Reduced Travel Time Costs	Improved Safety and Avoided Accident Costs	Avoided Emissions Costs	Reduced Vehicle Operating Costs	Residual Value of Infrastructure Asset	Operations and Maintenance Cost Savings
2036	20	$2,617,606	$2,477,994	$4,433	$126,424	$0	$11,000
2037	21	$2,774,156	$2,511,546	$4,695	$134,273	$0	$11,000
2038	22	$2,916,256	$2,545,868	$4,974	$141,739	$0	$11,000
2039	23	$2,989,724	$2,580,978	$5,144	$146,992	$0	$11,000
2040	24	$3,065,050	$2,616,895	$5,327	$151,661	$0	$11,000
2041	25	$3,142,284	$2,653,636	$5,524	$156,157	$0	$11,000
2042	26	$3,221,472	$2,691,222	$5,664	$160,277	$0	$11,000
2043	27	$3,302,665	$2,729,671	$5,873	$164,748	$0	$11,000
2044	28	$3,385,915	$2,769,003	$6,088	$169,425	$0	$11,000
2045	29	$3,471,273	$2,809,238	$6,312	$174,363	$0	$11,000
2046	30	$3,558,794	$2,850,398	$6,542	$179,487	$0	$11,000
2047	31	$3,648,533	$2,892,502	$6,780	$185,144	$0	$11,000
2048	32	$3,740,546	$2,935,574	$7,026	$189,373	$0	$11,000
2049	33	$3,834,893	$2,979,635	$7,280	$195,053	$0	$11,000
2050	34	$3,931,631	$3,024,708	$7,543	$201,993	$0	$11,000
2051	35	$4,030,824	$3,070,817	$7,733	$207,089	$0	$11,000
2052	36	$4,132,533	$3,117,984	$7,928	$212,315	$0	$11,000
2053	37	$4,236,823	$3,166,235	$8,128	$217,673	$0	$11,000
2054	38	$4,343,761	$3,215,594	$8,334	$223,167	$10,027,568	$11,000
Total		**$86,654,365**	**$78,886,723**	**$159,950**	**$4,269,812**	**$10,027,568**	**$330,000**

Table ES-5: Summary of Pertinent Quantifiable Data

Calendar Year	Project Year	Avoided Person Hours of Delay at Crossing	Avoided Gasoline Consumption (Gallons)	Avoided Diesel Consumption (Gallons)	Avoided Motor Oil Consumption (Quarts)	Avoided Fatalities	Avoided Injuries
2017	1	0	0	0	0	0	0
2018	2	0	0	0	0	0	0
2019	3	0	0	0	0	0	0
2020	4	0	0	0	0	0	0
2021	5	0	0	0	0	0	0
2022	6	0	0	0	0	0	0
2023	7	0	0	0	0	0	0
2024	8	0	0	0	0	0	0
2025	9	84,435	13,542	2,982	1,502	0	4
2026	10	89,837	14,408	3,173	1,598	0	4
2027	11	95,584	15,330	3,376	1,700	0	4
2028	12	101,700	16,311	3,592	1,809	0	4
2029	13	108,207	17,354	3,822	1,925	0	5
2030	14	115,131	18,465	4,067	2,048	0	5
2031	15	122,498	19,646	4,327	2,179	0	5
2032	16	130,336	20,903	4,604	2,319	0	5
2033	17	138,677	22,241	4,898	2,467	0	5
2034	18	147,552	23,664	5,212	2,625	0	5
2035	19	156,995	25,179	5,545	2,793	0	5
2036	20	166,384	26,685	5,877	2,960	0	5
2037	21	176,335	28,281	6,229	3,137	0	5
2038	22	185,367	29,729	6,548	3,298	0	5
2039	23	190,037	30,478	6,713	3,381	0	6
2040	24	194,825	31,246	6,882	3,466	0	6
2041	25	199,735	32,033	7,055	3,553	0	6
2042	26	204,768	32,841	7,233	3,643	0	6
2043	27	209,929	33,668	7,415	3,735	0	6
2044	28	215,221	34,517	7,602	3,829	0	6
2045	29	220,646	35,387	7,794	3,925	0	6
2046	30	226,209	36,279	7,990	4,024	0	6
2047	31	231,914	37,194	8,192	4,126	0	7
2048	32	237,762	38,132	8,398	4,230	0	7

Calendar Year	Project Year	Avoided Person Hours of Delay at Crossing	Avoided Gasoline Consumption (Gallons)	Avoided Diesel Consumption (Gallons)	Avoided Motor Oil Consumption (Quarts)	Avoided Fatalities	Avoided Injuries
2049	33	243,759	39,094	8,610	4,336	0	7
2050	34	249,908	40,080	8,827	4,446	0	7
2051	35	256,213	41,092	9,050	4,558	0	7
2052	36	262,678	42,128	9,278	4,673	0	7
2053	37	269,307	43,192	9,512	4,791	0	8
2054	38	276,105	44,282	9,753	4,912	0	8
Total		**5,508,056**	**883,382**	**194,556**	**97,988**	**5.08**	**173**

In addition to the monetized benefits presented in Tables ES-3 to ES-5, the project would generate benefits that are difficult to monetize. A brief description of those benefits is provided below.

Economic Competitiveness

- ***Improved Travel Time Reliability***

  On average, motorists are delayed 60 times per day at each roadway-railway crossing. With some trains nearly one and a half miles in length, crossings are closed for approximately three to five minutes for each train to pass. Delays are further compounded by the time required for the vehicle queues created by the train crossing to dissipate. Furthermore, the current Pines Road and Trent Avenue intersection operates at a LOS of 'E' which is projected to reach LOS 'F' due to worsening conditions. The project would transform the intersection to a LOS 'A' for a roundabout or LOS 'D' for a traffic signal, which will improve travel time reliability as there will be a significantly lower chance for drivers to be delayed thus reducing the unpredictability of trips in the area.

- ***Improved Access to Future Development Potential***

  Close to 170 acres of mixed-use or commercially-zoned parcels and 56 acres of prime industrially-zoned parcels are undeveloped because property owners and developers cannot afford to mitigate the LOS 'E' operating conditions at the Pines Road /Trent Avenue intersection. These parcels, and several hundred more acres beyond the city limits, are some of the last undeveloped parcels available for industrial use in the area.

Quality of Life

- ***Improved Connectivity***

  Grade separation will provide pedestrian and cycling facilities allowing for greater connectivity and promotion of active lifestyles, in addition to improved access to nearby businesses and other public facilities. The BNSF Railway bisects the northern parts of Spokane Valley from the main city south of the railway. The project will connect a diverse neighborhoods surrounding the Study area including residential, commercial, mixed-use and industrial areas. The new grade-separated crossing and roundabout will provide sidewalks, making the route more appealing to pedestrians and bicyclists. In addition to an improved crossing of the railroad tracks, the roundabout will create a safer and more comfortable crossing of Trent Avenue.

- ***Improved Emergency Vehicle Access***

  Key emergency services (fire, police, and EMS) are located south of the railway crossing. The long and frequent delays at the rail crossings causes delays for providing emergency services to the north. Eliminating the Pines Road grade crossing will improve travel time and reliability for emergency responders that may otherwise not be able to pass or be forced to take a longer route.

- ***Reduced Noise Pollution***

  Spokane Valley residents have long complained about the noise pollution of the train whistles. Federal law requires locomotives to sound their horns at 96 to 100 decibels as they approach at-grade crossings and continue blowing the horn until the train clears the crossing. Not only do the horns disturb the peacefulness of the surrounding area, medical studies have linked loud noises, such as train whistles, to stress-related health problems.[1] As part of the broader Bridging the

[1] "Spokane Valley, Cheney residents want to silence train whistles." The Spokesman-Review, March 6, 2016.

Valley plan, all existing at-grade crossings will be eliminated, which will allow noise from train horns and whistles to be severely reduced. The Pines Road project alone will significantly reduce the amount of train horn and whistle noise and serves as an incremental improvement toward the overall goal of removing all at-grade crossings.

2 Introduction

This document provides detailed technical information on the economic analyses conducted in support of the Grant Application for the Pines Road/BNSF Grade Separation project.

- Section 1 – Executive Summary
- Section 2 – Introduction: Outlines the BCA document layout and structure to assist USDOT FRA reviewers.
- Section 3 - Methodological Framework: Introduces the conceptual framework used in the Benefit-Cost Analysis (BCA).
- Section 4 - Project Overview: Provides an overview of the project, including a brief description of existing conditions and proposed alternatives; a summary of cost estimates and schedule; and a description of the types of effects that the Pines Road/BNSF Grade Separation is expected to generate.
- Section 5 - General Assumptions: Discusses the general assumptions used in the estimation of project costs and benefits.
- Section 6 – Demand Projections: Estimates of travel demand and traffic volumes.
- Section 7 – Estimation of Economic Benefits: Details the specific data elements and assumptions used to address the goals of the project and to comply with program requirements.
- Section 8 – Summary of Findings and Benefit-Cost Outcome: Estimates the project's Net Present Value (NPV), its Benefit/Cost Ratio (BCR), and other project evaluation metrics.
- Section 9 – Benefit Cost Sensitivity Analysis: Provides the outcomes of the sensitivity analysis that evaluates the different assumptions made by the City and the impact that the variability of those assumptions may have on the overall project.
- Section 10 - Supplementary Data Tables: Includes a breakdown of all benefits associated with the merit criteria outcomes for the project, including annual estimates of benefits and costs, as well as intermediate values to assist DOT in its review of the application.

3 Methodological Framework

The specific methodology developed for this application was developed using the above BCA principles and is consistent with the USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Applications (June 2018). In particular, the methodology involves:

- Establishing existing and future conditions under the Build and No Build scenarios;
- Assessing benefits with respect to each of the merit criteria outcomes common with major infrastructure projects (i.e. state of good repair, economic competitiveness, safety, and environmental);

- Measuring benefits in dollar terms, whenever possible, and expressing benefits and costs in a common unit of measurement;
- Using DOT guidance for the valuation of travel time savings, safety benefits and reductions in air emissions, while relying on industry best practice for the valuation of other effects;
- Discounting future benefits and costs with the real discount rates recommended by the DOT (7 percent, and 3 percent for sensitivity analysis); and
- Conducting a sensitivity analysis to assess the impacts of changes in key estimating assumptions.

4 Project Overview

With increasing growth in freight train traffic, the Pines Road grade crossing is becoming increasingly difficult for motorists, pedestrians, and other users. Extended delays at the project location result in inefficient emergency services access, noise pollution from train whistles, inefficient freight truck movements along a preferred long-haul freight route, and a worsening Level of Service (LOS) projected to reach 'F' in future years due to high traffic volumes. The Pines Road/BNSF Grade Separation Project replaces an existing at-grade crossing with an underpass of BNSF's railroad tracks and provides a roundabout or traffic signal at the intersection of Pines Road and Trent Avenue. This will allow pedestrians and cyclists to be able to cross Trent Avenue more safely and comfortably. The improvements support freight movement and regional mobility goals as articulated in various plans such as Horizon 2040, the MPO's regional transportation plan, and the Inland Pacific Hub Transportation Study, a partnership of public and private agencies dedicated to creating a freight gateway in the region. In 2018, the at-grade crossing was rated Washington State's top Tier 1 road-rail conflict.[2]

The project will improve the current conditions in the area and in nearby neighborhoods by:

- ***Creating*** an underpass which will foster increased connectivity for all road users, pedestrians, and cyclists by installing new sidewalks and shared-use lanes
- ***Convert*** an existing intersection into an improved roundabout allowing a greater flow of traffic
- ***Improving*** public safety by eliminating rail/vehicle encounters at the Pines Road/BNSF crossing
- ***Improving*** travel time reliability through the elimination of rail crossing blockages, allowing for greater predictability in travel times
- ***Improving*** emergency services access along the Project corridor
- ***Eliminating*** wait times and prolonged queuing both at the crossing and along the Project corridor
- ***Eliminating*** vehicle queuing along Trent Avenue as a result of train crossings
- ***Reducing*** noise pollution arising from train whistles at the Pines Road/BNSF crossing
- ***Unlocking*** the economic development potential of prime industrial, commercial, and mixed-use land near the Project location
- ***Linking*** a large residential neighborhood to the north with the City's commercial and employment hub to the south
- ***Unlocking*** the economic development potential of approximately 170 acres of mixed-use or commercially-zoned parcels and 56 acres of prime industrially-zoned parcels are undeveloped because property owners and developers cannot afford to mitigate the LOS 'E' operating conditions at the Pines Road /Trent Avenue intersection.

[2] DRAFT Prioritization of Prominent Road-Rail Conflicts Phase 2 Study, May 22, 2018

4.1 Base Case and Alternative Case

4.1.1 Base Case

The Base Case for the Pines Road Grade Separation project is defined as the No Build scenario. In the Base Case, the lack of grade separation and continued freight train growth continues to delay road users and maintains the LOS 'E' designation. Vehicle queuing along Trent Avenue continues to pose severe safety concerns.

The key assumptions used to define the Base Case (No Build Scenario) are as follows:

- Average Annual Daily Traffic (AADT) on Trent Avenue (East of Pines Road) of **27,393** (2017), growing at a rate of **2.5% per year** which is the historical 10-year annual average growth rate (AAGR) based upon City of Spokane Valley traffic counts. Forecasted peak volume AADT is in line with historical trends. Through analysis, it was determined that the 10-year growth rate (AAGR) to be most suitable.
- AADT on Trent Avenue (West of Pines Road) of **22,825** (2017), growing at a rate of **1.1% per year** which is the historical 10-year annual average growth rate based upon City of Spokane Valley traffic counts. Forecasted peak volume AADT is in line with historical trends. Through analysis, it was determined that the 10-year growth rate (AAGR) to be most suitable.
- AADT at the Pines Road crossing of **16,925** (2017), growing at a rate of **2.3% per year** derived using the historical 10-year annual average growth rate. Forecasted peak volume AADT is in line with historical trends. Through analysis, it was determined that the 10-year growth rate (AAGR) to be most suitable. AADT is broken down by the following modes:
    - **87%** passenger vehicles
    - **12%** trucks, and
    - **1%** transit
- **58** daily freight trains (2017) growing at a rate of **3.8% per year** until 2035, in line with WSDOT projections, and **3.4% per year** thereafter taking into account anticipated freight growth
- Average freight train speed of **25 miles per hour**
- Average freight train length of **6,500 feet**
- **2** daily passenger trains (2017) growing at rate of **2.0% per year**
- Average passenger train speed of **35 miles per hour**
- Average passenger train length of **1,000 feet**
- Average lead and lag time for gate closure of **0.6 minutes**

4.1.2 Alternative Case

The Alternative Case is defined as the Build scenario. In the Alternative Case, grade separation will eliminate train/vehicle encounters and eliminate wait times at the Pines Road crossing. The existing signalized intersection is converted to a roundabout allowing for greater flow of traffic and reduced collision severity. Traffic congestion and related safety concerns along Trent Avenue [due to train crossings] are eliminated. Specifically, the new infrastructure and improved process described in the project overview section above will result in the following changes to some key inputs and assumptions:

- AADT on Trent Avenue (East of Pines Road) of **27,393** (2017), growing at a rate of **2.3% per year** based on the historical 10-year annual average growth rate informed by the City of Spokane Valley's traffic counts**.** Forecasted peak volume AADT is in line with historical trends. Through analysis, it was determined that the 10-year growth rate (AAGR) to be most suitable.

- AADT on Trent Avenue (West of Pines Road) of **22,825** (2017), growing at a rate of **1.1% per year** which is the historical 10-year annual average growth rate based upon City of Spokane Valley traffic counts. Forecasted peak volume AADT is in line with historical trends. Through analysis, it was determined that the 10-year growth rate (AAGR) to be most suitable.
- AADT at the Pines Road crossing of **16,925** (2017), growing at a rate of **2.5% per year** derived using historical 10-year annual average growth rates. Forecasted peak volume AADT is in line with historical trends. Through analysis, it was determined that the 10-year growth rate (AAGR) to be most suitable.
    - **87%** passenger vehicles (same as Base Case)
    - **12%** trucks (same as Base Case), and
    - **1%** transit (same as Base Case)
- **58** daily freight trains (2017, same as Base Case) growing at a rate of **3.8% per year** until 2035, in line with WSDOT projections, and **3.4% per year** thereafter taking into account anticipated freight growth
- Average freight train speed of **25 miles per hour** (same as Base Case)
- Average freight train length of **6,500 feet** (same as Base Case)
- **2** daily passenger trains (same as Base Case) growing at a rate of **2.0% per year** (same as Base Case)
- Average passenger train speed of **35 miles per hour** (same as Base Case)
- Average passenger train length of **1,000 feet** (same as Base Case)
- Average lead and lag time of **0.6 minutes** (same as Base Case)

4.2 Project Cost and Schedule

Table 6 summarizes the project's capital cost components, with preliminary engineering commencing in 2017 and substantial completion expected at the end of 2024. Costs shown below includes future projects costs and costs already incurred.

Table 6: Cost Summary Table, 2017 Dollars

Year	2017 Dollars	Year of Expenditure Dollars
2017	$945,718	$951,985
2018	$41,333	$43,063
2019	$41,333	$44,571
2020	$5,007,038	$5,588,176
2021	$2,100,000	$2,425,766
2022	$8,466,749	$10,122,471
2023	$5,080,049	$6,286,055
2024	$3,386,699	$4,337,378
Total	**$25,068,921**	**$29,799,464**

Table 7: Capital Cost Components, Millions of 2017 Dollars

Component	2017 Dollars	Year of Expenditure Dollars
Previously Incurred Costs	$1,028,385	$1,028,385
Construction	$14,535,191	$17,867,461
Right of Way	$4,200,000	$4,819,597
Construction Engineering	$2,398,307	$2,948,131
Preliminary Engineering	$2,325,631	$2,491,274
Final Engineering	$581,408	$644,617
Total Project Cost	**$25,068,921**	**$29,799,464**

4.3 Benefit Outcomes

The main benefit categories associated with the project are mapped into five merit criteria outcomes in the table below.

Table 8: Expected Effects on Merit Criteria Outcomes and Benefit Categories

Merit Criteria	Impact Categories	Description	Monetized	Qualitative
Safety	Improved Safety and Avoided Accident Costs	Improved Safety and Avoided Accident Costs from Eliminated Pines Road Grade Crossing	Yes	-
State of Good Repair	Residual Value of Infrastructure Asset	Residual Value of Infrastructure Asset	Yes	-
	Operations & Maintenance Cost Savings	Reduction in maintenance costs for the existing at-grade crossing	Yes	-
Economic Competitiveness	Reduced Travel Time Costs	Reduced Travel Time Costs from Vehicle Idling and Delay Time at Pines Road Crossing	Yes	-
	Reduced Vehicle Operating Costs	Reduced Vehicle Operating Costs from Vehicle Idling and Delay Time at Pines Road Crossing	Yes	-

Merit Criteria	Impact Categories	Description	Monetized	Qualitative
	Improved Travel Time Reliability	Fewer rail crossing blockages will improve travel time reliability as there will be a significantly lower chance for drivers to be delayed thus reducing the unpredictability of trips in the area. This also allows both short and long-haul trucks to experience increase in delivery timeliness	-	Yes
	Improved Access to Economic Development Potential	Close to 170 acres of mixed-use or commercially-zoned parcels and 56 acres of prime industrially-zoned parcels are undeveloped because property owners and developers cannot afford to mitigate the LOS 'E' operating conditions at the Pines Road /Trent Avenue intersection. These parcels, and several hundred more acres beyond the city limits, are some of the last undeveloped parcels available for industrial use in the area.	-	Yes
Environmental Protection	Avoided Emissions Costs	Avoided Emission Costs from Vehicle Idling and Delay Time at Pines Road Crossing	Yes	-
Quality of Life	Improved Connectivity	Grade separation will provide pedestrian and cycling facilities allowing for greater connectivity and promotion of active lifestyles, in addition to improved access to nearby businesses and other public facilities	-	Yes

Merit Criteria	Impact Categories	Description	Monetized	Qualitative
	Improved Emergency Vehicle Access	Fewer rail crossing blockages will improve travel time reliability as there will be a significantly lower chance for drivers to be delayed thus reducing the unpredictability of trips in the area.	-	Yes
	Reduced Noise Pollution	Grade separation will reduce noise pollution from train whistles.	-	Yes

5 General Assumptions

The BCA measures benefits against costs throughout a period of analysis beginning at the start of construction and including 30 years of operations.

The monetized benefits and costs are estimated in 2017 Dollars with future dollars discounted in compliance with CRISI requirements using a 7 percent real rate, and sensitivity testing at 3 percent.

The methodology makes several important assumptions and seeks to avoid overestimation of benefits and underestimation of costs. Specifically:

- Input prices are expressed in 2017 Dollars;
- The period of analysis begins in 2017 and ends in 2054. It includes project development and construction years (8) and full years of operations (30).
- A constant 7 percent real discount rate is assumed throughout the period of analysis. A 3 percent real discount rate is used for sensitivity analysis.

6 Demand Projections

Accurate demand projections are important to ensure the reasonable BCA output results. The magnitudes of the long-term benefits accruing over the Pines Road Grade Separation project study period are a function of vehicle traffic at the Pines Road Crossing and Pines Road / Trent Avenue intersection, and freight and passenger train growth.

6.1 Methodology

Recent and historical traffic counts supplied by the City of Spokane Valley were used to inform and provide historical 10-year annual average growth rates. Moreover, although motorists may choose to take longer detours to avoid the congested and unreliable crossings which could be avoided in the Alternative Case, the additional benefits of avoided detours were not estimated due to a lack of reliable data.

6.2 Assumptions

All assumptions used in the estimation of demand inputs for the Pines Road Grade Separation project are provided in Table 9.

Table 9: Assumptions used in the Estimation of Demand

Variable Name	Unit	Value	Source
Pines Road Crossing			
AADT (2017)	vehicles/day	16,512	2016 actual traffic count data grown by validated historical AAGR. Share of vehicle counts based upon engineering estimates.
Passenger Vehicles	%	87.0%	
Trucks	%	12.0%	
Buses	%	1.00%	
AADT Growth Rate	%	2.51%	Historical 10-year average annual growth rate at crossing validated through comparison with Spokane Regional Transportation Council (SRTC) Travel Demand Model (TDM) outputs
Maximum Trains at Crossing	trains/day	125	WSDOT State Rail Plan *http://www.wsdot.wa.gov/NR/rdonlyres/F67D73E5-2F2D-40F2-9795-736131D98106/0/StateRailPlanFinal201403.pdf*
Freight Train Traffic Growth (2017-2035)	%	3.81%	
Freight Train Traffic Growth (2036-2054)	%	3.40%	HDR assumption. Growth is capped at 125 trains per day.
Passenger Train Traffic Growth	%	2.00%	HDR assumption based on long term population growth
Freight Trains at Crossing (2017)	trains/day	58.1	WSDOT State Rail Plan http://www.wsdot.wa.gov/NR/rdonlyres/F67D73E5-2F2D-40F2-9795-736131D98106/0/StateRailPlanFinal201403.pdf
Passenger Trains at Crossing (2017)	trains/day	2.04	Amtrak
Avg. Freight Train Speed	miles/hour	25.0	BNSF
Avg. Passenger Train Speed	miles/hour	30.0	HDR assumption
Avg. Freight Train Length	feet	6,500	BNSF
Avg. Passenger Train Length	feet	1,000	HDR assumption
Lead and Lag Time	minutes	0.60	HDR based upon industry standard
Trent Avenue Intersection			
AADT, East of Pines Road (2017)	vehicles/day	27,393	Traffic counts conducted in 2015 and 2016. Data grown by validated historical AAGR.
AADT, West of Pines Road (2017)	vehicles/day	22,825	
AADT Growth Rate East of Pines Road	%	2.30%	Historical 10-year average annual growth rate validated through comparison with SRTC Travel Demand Model outputs
AADT Growth Rate West of Pines Road	%	1.12%	

6.3 Demand Projections

The resulting projections for average traffic volumes at the Pines Road crossing and Trent Avenue intersection, as well as train volumes and expected hours of vehicle delay (Base Case) are presented in the table below.

Table 10: Demand Projections

Category	2025	2034	2044	2054
Total Annual Traffic at Pines Road Crossing	7,530,081	9,408,480	12,049,969	15,433,073
Total Annual Traffic at Trent Ave. Intersection	11,990,442	14,709,550	18,459,769	23,166,112
Annual Freight Trains at Pines Road Crossing	28,623	40,082	45,625	45,625
Annual Passenger Trains at Pines Road Crossing	872	1,043	1,271	1,549
Total Vehicle Hours of Delay - Passenger Vehicles	13,825,737	24,160,853	35,241,231	45,210,666
Total Vehicle Hours of Delay - Trucks	1,906,998	3,332,531	4,860,859	6,235,954
Total Vehicle Hours of Delay - Bus Driver and Passenger	158,917	277,711	405,072	519,663

7 Estimation of Economic Benefits

This section describes the measurement approach used for each benefit or impact category identified in Table ES-1 and provides an overview of the associated methodology, assumptions, and estimates.

7.1 State of Good Repair Outcomes

7.1.1 Methodology

The proposed project would contribute to the state of good repair by converting an existing intersection into an improved roundabout. Due to the time period considered for the analysis, the remaining (or residual) value of the new infrastructure asset is not fully captured. As a result, the residual value of the new grade separation underpass is monetized. The estimated underpass lifespan was deducted from the benefit cost analysis benefit period to obtain the service life outside the study period. The remaining life as a factor of the estimated asset service life was multiplied by the project capital costs to derive the estimate.

7.1.2 Assumptions

The assumptions used in the estimation of State of Good Repair benefits are summarized in the table below.

Table 11: Assumptions used in the Estimation of State of Good Repair Benefits

Variable Name	Unit	Date	Value	Source
Estimated Asset Service Life	years	2017-2054	50.0	Transportation for America, Bridges Overview. "Expected Lifespan of 50 years."
BCA Benefit Period	years	2017-2054	30.0	HDR Calculations with City of Spokane Valley Consultation
Service Life Remaining	years	2017-2054	20.0	
Project Capital Costs	2017$	2017-2054	$25,068,921	
Annual Maintenance Cost Savings	2017$	2017-2054	$11,000	Estimate based upon long term maintenance of at-grade crossing infrastructure

7.1.3 Benefit Estimates

The table below shows the estimated residual value of the new infrastructure asset. With a 7 percent discount rate, the estimated present value is $0.83 million. See Section 10.3 for more information.

Table 12: Estimates of State of Good Repair Benefits, 2017 Dollars

	In Project Opening Year	Over the Project Lifecycle	
		In Constant Dollars	Discounted at 7 Percent
Residual Value of Infrastructure Asset	$0	$7,818,570	$732,310
Operations and Maintenance Cost Savings	$11,000	$330,000	$97,322
Total	**$11,000**	**$8,148,570**	**$829,632**

7.2 Economic Outcomes

To quantify the benefits associated with economic outcomes, multiple impacts were considered primarily in relevance to motorists. Specifically, these impacts included travel time costs, vehicle operating costs, and pavement maintenance costs – all of which were monetized.

7.2.1 Methodology

Travel time savings will be generated for motorists (automobiles, trucks, and transit buses) at the Pines Road crossing. Reduced crossing blockage times will lead to decreased vehicle travel time costs which are monetized using DOT guidance for value of time of automobile drivers and passengers, bus passengers, as well as heavy vehicle truck drivers and bus drivers. Out-of-pocket vehicle operating cost savings will accrue from decreased vehicle wait times and idling as a result of the new underpass across Trent Avenue. The out-of-pocket cost savings were monetized based on the change in delay time and associated fuel and oil used while idling.

Travel time savings in hours between the Base and the Alternative Cases were estimated based on AADT forecasts derived on the City of Spokane's historical traffic counts and the Federal Rail Administration (FRA) database regarding daily train counts, speeds, and lengths. The expected crossing time delay was then derived by applying the probability of delay which is a function of train frequency, speed, length, and lead and lag time.

Value of time for vehicle type, as well as occupancy assumptions for both automobiles and trucks are available in the Benefit-Cost Analysis Guidance for Discretionary Grant Applications published by US

DOT. The average transit bus occupancy was derived from consultation with the City of Spokane Valley. The estimate for travel time savings is simply the product of hours of delay, vehicle occupancy, and respective value of time.

The reduction in vehicle idling time at Pines Road crossing will translate into lower vehicle operating costs from reduced fuel and motor oil consumption in the Alternative. The change in vehicle delay time (by vehicle type and by year) is multiplied by the associated vehicle fuel consumption rate to obtain annual estimates of fuel consumption from idling. This multiplied by the cost per unit of fuel provides an estimate of the change in fuel costs. The same methodology is applied to track the change in motor oil consumption and costs. The sum of the two costs produces an estimate for the overall vehicle operating cost impacts due to vehicle delay time at the crossing.

7.2.2 Assumptions

The assumptions used in the estimation of economic outcomes and benefits are summarized in the table below.

Table 13: Assumptions used in the Estimation of Economic Outcomes

Variable Name	Unit	Date	Value	Source
Average Passenger Vehicle Occupancy	persons	2017-2054	1.39	Federal Highway Administration Highway Statistics 2016, Table VM1
Average Truck Occupancy	persons	2017-2054	1.00	
Average Transit Bus Occupancy	persons	2017-2054	60.0	City of Spokane Valley
Value of Time for Automobile Driver and Passenger	2017$/hour	2017-2054	$14.8	**Revised Departmental Guidance on Valuation of Travel Time in Economic Analysis** https://www.transportation.gov/office-policy/transportation-policy/revised-departmental-guidance-valuation-travel-time-economic
Value of Time for Truck Driver	2017$/hour	2017-2054	$28.6	
Value of Time for Bus Driver	2017$/hour	2017-2054	$30.0	
Value of Time for Bus Passenger	2017$/hour	2017-2054	$14.8	
Vehicle Fuel Burned at Idle - Automobile	gal/hr	2017-2054	0.36	US DOE: Alternative Fuels Data Center and Argonne National Laboratory, "Idle Reduction Savings Worksheet" (2014) - Average of gasoline passenger vehicles
Vehicle Diesel Burned at Idle - Truck	gal/hr	2017-2054	0.49	US DOE: Alternative Fuels Data Center and Argonne National Laboratory, "Idle Reduction Savings Worksheet" (2014) - Combination Trucks
Vehicle Diesel Burned at Idle - Transit Bus	gal/hr	2017-2054	0.97	US DOE: Alternative Fuels Data Center and Argonne National Laboratory, "Idle Reduction Savings Worksheet" (2014) - Transit Bus
Average Consumption of Motor Oil per Hour	quarts/hr	2017-2054	0.03	Based on US DOT: HERS-ST Highway Economic Requirements System (2002) oil consumption of 1.38qt/1000miles and assuming that "One hour of idle time is equal to approximately 25 miles of driving" (Ford Motor Company, 2011)
Cost of Motor Oil - Automobile	2017$/hour	2017-2054	$10.16	Average oil price sourced from HERS model and inflated to 2017$ by Motor Oil CPI (BLS CUUR0000SS47021)

Variable Name	Unit	Date	Value	Source
Cost of Motor Oil - Truck	2017$/hour	2017-2054	$4.06	
Cost of Motor Oil - Bus	2017$/hour	2017-2054	$4.06	
		2017	$1.92	Gasoline and Diesel Source: US EIA Annual Energy Outlook 2016. Converted to 2017$, net of Federal & State Taxes
		2018	$1.89	
		2019	$2.10	
		2020	$2.23	
		2021	$2.35	
		2022	$2.47	
		2023	$2.50	
		2024	$2.53	
		2025	$2.57	
		2026	$2.61	
		2027	$2.62	
		2028	$2.62	
		2029	$2.64	
		2030	$2.69	
		2031	$2.73	
		2032	$2.78	
		2033	$2.78	
		2034	$2.81	
		2035	$2.83	
		2036	$2.90	
		2037	$2.90	
		2038	$2.92	
		2039	$2.96	
		2040	$2.99	
		2041	$3.01	
		2042	$3.02	
		2043	$3.03	
		2044	$3.04	
		2045	$3.06	
		2046	$3.07	
		2047	$3.09	
		2048	$3.08	
		2049	$3.09	
		2050	$3.14	
		2051	$3.14	
		2052	$3.14	
		2053	$3.14	
		2054	$3.14	
		2017	$2.18	Gasoline and Diesel Source: US EIA Annual Energy Outlook 2016. Converted to 2017$, net of Federal & State Taxes
		2018	$2.46	
		2019	$2.65	
		2020	$2.77	
		2021	$2.86	
		2022	$2.96	
		2023	$3.01	
		2024	$3.06	
		2025	$3.14	
		2026	$3.20	

Variable Name	Unit	Date	Value	Source
		2027	$3.24	
		2028	$3.26	
		2029	$3.30	
		2030	$3.37	
		2031	$3.43	
		2032	$3.50	
		2033	$3.50	
		2034	$3.55	
		2035	$3.58	
		2036	$3.65	
		2037	$3.66	
		2038	$3.67	
		2039	$3.72	
		2040	$3.74	
		2041	$3.75	
		2042	$3.75	
		2043	$3.75	
		2044	$3.76	
		2045	$3.78	
		2046	$3.80	
		2047	$3.85	
		2048	$3.85	
		2049	$3.89	
		2050	$3.93	
		2051	$3.93	
		2052	$3.93	
		2053	$3.93	
		2054	$3.93	

7.2.3 Benefit Estimates

The complete set of economic outcomes is shown in the table below. With a 7 percent discount rate, the estimated present value of benefits over the project life cycle is over $19.2 million. These benefits accrue to many users including motorists, local residents and businesses, and shippers. See Section 10.4 and 10.5 for additional information.

Table 14: Estimates of Economic Benefits, 2017 Dollars

	In Project Opening Year	Over the Project Lifecycle	
		In Constant Dollars	Discounted at 7 Percent
Reduced Travel Time Costs	$1,328,352	$86,654,365	$18,401,917
Reduced Vehicle Operating Costs	$58,302	$4,269,812	$883,590
Total	**$1,386,654**	**$90,924,177**	**$19,285,507**

Improved Travel Time Reliability

On average, motorists are delayed 60 times per day at each roadway-railway crossing. With some trains nearly one and a half miles in length, crossings are closed for approximately three to five minutes for each train to pass. Delays are further compounded by the time required for the vehicle queues created by

the train crossing to dissipate. Furthermore, the current Pines Road and Trent Avenue intersection operates at a LOS of 'E' which is projected to reach LOS 'F' due to worsening conditions. The project would transform the intersection to a LOS 'A' for a roundabout and LOS 'D' for a traffic signal, which will improve travel time reliability as there will be a significantly lower chance for drivers to be delayed thus reducing the unpredictability of trips in the area.

Improved Access to Future Development Potential

Close to 170 acres of mixed-use or commercially-zoned parcels and 56 acres of prime industrially-zoned parcels are undeveloped because property owners and developers cannot afford to mitigate the LOS 'E' operating conditions at the Pines Road /Trent Avenue intersection. These parcels, and several hundred more acres beyond the city limits, are some of the last undeveloped parcels available for industrial use in the area.

7.3 Quality of Life Outcomes

Improved Connectivity

Grade separation will provide pedestrian and cycling facilities allowing for greater connectivity and promotion of active lifestyles, in addition to improved access to nearby businesses and other public facilities. The BNSF Railway bisects the northern parts of Spokane Valley from the main city south of the railway. The project will connect a diverse neighborhoods surrounding the Study area including residential, commercial, mixed-use and industrial areas. The new grade-separated crossing and roundabout will provide sidewalks, making the route more appealing to pedestrians and bicyclists. In addition to an improved crossing of the railroad tracks, the roundabout will create a safer and more comfortable crossing of Trent Avenue.

Improved Emergency Vehicle Access

Key emergency services (fire, police, and EMS) are located south of the railway crossing. The long and frequent delays at the rail crossings causes delays for providing emergency services to the north. Eliminating the Pines Road grade crossing blockage will improve travel time and reliability for emergency responders that may otherwise not be able to pass or be forced to take a longer route.

Reduced Noise Pollution

Spokane Valley residents have long complained about the noise pollution of the train whistles. Federal law requires locomotives to sound their horns at 96 to 100 decibels as they approach at-grade crossings and continue blowing the horn until the train clears the crossing. Not only do the horns disturb the peacefulness of the surrounding area, medical studies have linked loud noises, such as train whistles, to stress-related health problems.[3] As part of the broader Bridging the Valley plan, all existing at-grade crossings will be eliminated, which will allow noise from train horns and whistles to be severely reduced. The Pines Road project alone will significantly reduce the amount of train horn and whistle noise and serves as an incremental improvement toward the overall goal of removing all at-grade crossings.

[3] Spokane Valley, Cheney residents want to silence train whistles." The Spokesman-Review, March 6, 2016.

7.4 Safety Outcomes

The proposed project would contribute to promoting merit outcomes through accident reductions due to eliminated train/vehicle encounters at the Pines Road grade crossing.

7.4.1 Methodology

Accident costs, and impacts on life, limb and property, are a significant component of road user costs. Road safety is a key economic factor in the planning of roads, as well as an important indicator of transportation efficiency, while outside of the economic context, highway safety is often the object of public concern and a leading social issue. Estimating safety benefits requires data on the frequency and severity of accidents for the type of road and area under consideration; in addition, the costs of injuries and fatalities must be monetized. Base Case collisions at the Pines Road crossing were derived using the FRA's collision prediction formulae. Collisions at the Pines Road and Trent Avenue were calculated using crash data actuals provided by the City of Spokane Valley and crash modification factors (CMF) obtained from the US DOT Crash Modification Factor Clearinghouse. While PDO (property damage only) accidents occur, only benefits realized from mitigated injury accidents and fatalities were monetized.

7.4.2 Assumptions

The assumptions used in the estimation of safety benefits are summarized in the table below.

Table 15: Assumptions used in the Estimation of Safety Benefits

Variable Name	Unit	Value	Source
Value of a Statistical Life	2017$/fatality	$9,600,000	US DOT, Guidance on Treatment of the Economic Value of a Statistical Life in U.S. Department of Transportation Analyses. 2017.
Average Cost per Accident Injury	2017$/injury	$174,000	US DOT, Based on MAIS Injury Severity Scale and KACBO-AIS Conversion if Injury Unknown. Department of Transportation Analyses. 2017.
2017 Expected Accident Rate	accidents/year	1.0868	HDR Calculations Using FRA Collision Prediction Formulae. See: https://www.ite.org/marketplace/gradecrossing/sec03.htm
2026 Expected Accident Rate	accidents/year	1.0869	
2036 Expected Accident Rate	accidents/year	1.0869	
2046 Expected Accident Rate	accidents/year	1.0869	
Fatalities as Share of Total Accidents	%	9.09%	HDR calculation using FRA GX Tool. See: https://www.fra.dot.gov/Page/P1056
Injuries as Share of Total Accidents	%	36.4%	
Crash Modification Factor	factor	0.68	US DOT Crash Modification Factor Clearinghouse. "Convert Intersection With Minor-Road Stop Control to Modern Roundabout
Expected Intersection Fatalities - No Build	fatalities	0.13	Washington Department of Transportation
Expected Intersection Injuries - No Build	injuries	9.87	

Variable Name	Unit	Value	Source
Expected Intersection Fatalities - Build	fatalities	0.09	Washington Department of Transportation
Expected Intersection Injuries - Build	injuries	6.71	
Growth in Intersection Accidents	%/year	2.30%	Historical 10-year Average Annual Growth Rate at Crossing

7.4.3 Benefit Estimates

The table below shows the benefit estimates of eliminated train/vehicle encounters. With a 7 percent discount rate applied to the benefits, the estimated present value is $19.0 million. See Section 10.6 and 10.7 for additional information.

Table 16: Estimates of Safety Benefits, 2017 Dollars

	In Project Opening Year	Over the Project Lifecycle	
		In Constant Dollars	Discounted at 7 Percent
Improved Safety and Avoided Accident Costs	$2,155,081	$78,886,723	$19,015,787
Total	**$2,155,081**	**$78,886,723**	**$19,015,787**

7.5 Environmental Protection Outcomes

The proposed project would contribute to environmental sustainability benefits through a net reduction in emissions due to reduced vehicle delay time at the Pines Road Crossing. Environmental costs are increasingly considered as an important component in the evaluation of transportation projects and the main environmental impacts of vehicle use and exhaust emissions can impose wide-ranging social costs on people, material, and vegetation. The negative effects of pollution depend not only on the quantity of pollution produced, but also on the types of pollutants emitted and the conditions into which the pollution is released.

7.5.1 Methodology

The change in vehicle delay time at the Pines Road crossing is used to estimate the total fuel consumption while idling by vehicle type. The total estimated vehicle delay times are multiplied by the appropriate emission factors for tons of for CO_2, NO_x VOC, PM, and SO_2 per hour of vehicle idling. Each pollutant is then multiplied by its monetary value to get the total emission cost impact due to vehicle delay time.

7.5.2 Assumptions

The assumptions used in the estimation of environmental sustainability benefits are summarized in the table below.

Table 17: Assumptions used in the Estimation Environmental Sustainability Benefits

Variable Name	Unit	Year	Value	Source
Highway Emissions Inputs				
CO_2 per Gallon of Fuel Burned - Highway Vehicles (Idling)	grams/hour	2017	3,079	MOVES Average Annual Emissions Factors for Idling, Using US National Default Fleet Mix of Highway Vehicles
		2018	3,017	
		2019	2,955	
		2020	2,892	
		2021	2,828	
		2022	2,764	
		2023	2,699	
		2024	2,633	
		2025	2,567	
		2026	2,506	
		2027	2,449	
		2028	2,396	
		2029	2,350	
		2030	2,310	
		2031	2,275	
		2032	2,243	
		2033	2,216	
		2034	2,196	
		2035	2,179	
		2036	2,165	
		2037	2,155	
		2038	2,146	
		2039	2,140	
		2040	2,137	
		2041	2,137	
		2042	2,137	
		2043	2,137	
		2044	2,137	
		2045	2,137	
		2046	2,137	
		2047	2,137	
		2048	2,137	
		2049	2,137	
		2050	2,137	
		2051	2,137	
		2052	2,137	
		2053	2,137	
		2054	2,137	
NOx per Gallon of Fuel Burned - Highway Vehicles (Idling)	grams/hour	2017	3.48	MOVES Average Annual Emissions Factors for Idling, Using US National Default Fleet Mix of Highway Vehicles
		2018	3.07	
		2019	2.71	
		2020	2.40	
		2021	2.13	
		2022	1.91	
		2023	1.72	
		2024	1.55	
		2025	1.40	
		2026	1.28	
		2027	1.16	
		2028	1.06	
		2029	0.98	
		2030	0.91	
		2031	0.86	
		2032	0.81	
		2033	0.78	
		2034	0.75	
		2035	0.74	

Variable Name	Unit	Year	Value	Source
		2036	0.72	
		2037	0.71	
		2038	0.71	
		2039	0.70	
		2040	0.70	
		2041	0.70	
		2042	0.70	
		2043	0.70	
		2044	0.70	
		2045	0.70	
		2046	0.70	
		2047	0.70	
		2048	0.70	
		2049	0.70	
		2050	0.70	
		2051	0.70	
		2052	0.70	
		2053	0.70	
		2054	0.70	
VOC per Gallon of Fuel Burned - Highway Vehicles (Idling)	grams/hour	2017	0.81	MOVES Average Annual Emissions Factors for Idling, Using US National Default Fleet Mix of Highway Vehicles
		2018	0.68	
		2019	0.57	
		2020	0.48	
		2021	0.41	
		2022	0.35	
		2023	0.31	
		2024	0.27	
		2025	0.23	
		2026	0.21	
		2027	0.19	
		2028	0.17	
		2029	0.15	
		2030	0.14	
		2031	0.13	
		2032	0.12	
		2033	0.12	
		2034	0.11	
		2035	0.11	
		2036	0.11	
		2037	0.11	
		2038	0.11	
		2039	0.10	
		2040	0.10	
		2041	0.10	
		2042	0.10	
		2043	0.10	
		2044	0.10	
		2045	0.10	
		2046	0.10	
		2047	0.10	
		2048	0.10	
		2049	0.10	
		2050	0.10	
		2051	0.10	
		2052	0.10	
		2053	0.10	
		2054	0.10	
PM per Gallon of Fuel Burned -	grams/hour	2017	0.19	
		2018	0.17	

Variable Name	Unit	Year	Value	Source
Highway Vehicles (Idling)		2019	0.15	MOVES Average Annual Emissions Factors for Idling, Using US National Default Fleet Mix of Highway Vehicles
		2020	0.13	
		2021	0.11	
		2022	0.10	
		2023	0.09	
		2024	0.08	
		2025	0.07	
		2026	0.06	
		2027	0.06	
		2028	0.05	
		2029	0.04	
		2030	0.04	
		2031	0.04	
		2032	0.03	
		2033	0.03	
		2034	0.03	
		2035	0.03	
		2036	0.03	
		2037	0.03	
		2038	0.03	
		2039	0.03	
		2040	0.03	
		2041	0.03	
		2042	0.03	
		2043	0.03	
		2044	0.03	
		2045	0.03	
		2046	0.03	
		2047	0.03	
		2048	0.03	
		2049	0.03	
		2050	0.03	
		2051	0.03	
		2052	0.03	
		2053	0.03	
		2054	0.03	
SO_2 per Gallon of Fuel Burned - Highway Vehicles (Idling)	grams/hour	2017	0.02	MOVES Average Annual Emissions Factors for Idling, Using US National Default Fleet Mix of Highway Vehicles
		2018	0.02	
		2019	0.02	
		2020	0.02	
		2021	0.02	
		2022	0.02	
		2023	0.02	
		2024	0.02	
		2025	0.02	
		2026	0.02	
		2027	0.02	
		2028	0.02	
		2029	0.02	
		2030	0.02	
		2031	0.02	
		2032	0.02	
		2033	0.02	
		2034	0.02	
		2035	0.02	
		2036	0.02	
		2037	0.02	
		2038	0.02	
		2039	0.02	

Variable Name	Unit	Year	Value	Source
		2040	0.02	
		2041	0.02	
		2042	0.02	
		2043	0.02	
		2044	0.02	
		2045	0.02	
		2046	0.02	
		2047	0.02	
		2048	0.02	
		2049	0.02	
		2050	0.02	
		2051	0.02	
		2052	0.02	
		2053	0.02	
		2054	0.02	
Emission Value Inputs				
CO_2 cost per short ton	2017$/short ton	2017	$10.13	Interagency Working Group on Social Cost of Carbon, United States Government. Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866 (May 2013; revised July 2015). Adjusted global C02 values to domestic based upon 2016 current GDP (24.58%). It's assumed the fraction of GDP lost due to climate change is similar across countries and thus the domestic benefit would be proportional to the U.S. share of global GDP.
		2018	$10.39	
		2019	$10.65	
		2020	$10.91	
		2021	$10.91	
		2022	$11.17	
		2023	$11.43	
		2024	$11.69	
		2025	$11.95	
		2026	$12.21	
		2027	$12.47	
		2028	$12.73	
		2029	$12.73	
		2030	$12.99	
		2031	$13.25	
		2032	$13.51	
		2033	$13.77	
		2034	$14.03	
		2035	$14.29	
		2036	$14.55	
		2037	$14.81	
		2038	$15.07	
		2039	$15.33	
		2040	$15.59	
		2041	$15.85	
		2042	$15.85	
		2043	$16.11	
		2044	$16.37	
		2045	$16.63	
		2046	$16.89	
		2047	$17.15	
		2048	$17.41	
		2049	$17.67	
		2050	$17.93	
		2051	$17.93	
		2052	$17.93	
		2053	$17.93	
		2054	$17.93	
Domestic CO_2 Adjustment	US GDP/World GDP	2017-2054	24.58%	Adjusted to US GDP (2016) as a percentage of World GDP (2016).
NOx cost per short ton	2017$/short ton	2017-2054	$7,508	Corporate Average Fuel Economy for MY2017-MY2025 Passenger Cars and Light Trucks (August

Variable Name	Unit	Year	Value	Source
VOC cost per short ton	2017$/short ton	2017-2054	$1,905	2012), page 922, Table VIII-16, "Economic Values Used for Benefits Computations (2010 dollars)". Inflated to 2017$.
PM cost per short ton	2017$/short ton	2017-2054	$343,442	
SO_2 cost per short ton	2017$/short ton	2017-2054	$44,373	

7.5.3 Benefit Estimates

The table below shows the benefit estimates of reducing vehicle delay times. With a 7 percent discount rate, the estimated present value of benefits over the project life cycle is $0.15 million dollars. See Section 10.8, 10.9, and 10.10 for additional information.

Table 18: Estimates of Community and Environmental Benefits, 2017 Dollars

	In Project Opening Year	Over the Project Lifecycle	
		In Constant Dollars	Discounted at 7 Percent
Avoided Emissions Costs	$3,225	$159,950	$34,342
Total	**$3,225**	**$159,950**	**$34,342**

8 Summary of Findings and Benefit-Cost Outcomes

The tables below summarizes the BCA findings. Annual costs and benefits are computed over the lifecycle of the project (38 years). As stated earlier, construction is expected to be completed by 2024 with 2025 being the project opening year. Benefits accrue during the full operation of the project.

Table 19: Overall Results of the Benefit Cost Analysis, 2017 Dollars

Project Evaluation Metric	7% Discount Rate	3% Discount Rate
Total Discounted Benefits	$39,240,984	$88,679,091
Total Discounted Costs	$18,240,557	$21,784,430
Net Present Value	$21,000,428	$66,894,661
Benefit / Cost Ratio	2.15	4.07
Internal Rate of Return (%)	13.1%	
Payback Period (years)	6.43	

Values in 2017 Dollars Unless Specified Otherwise

Considering all monetized benefits and costs, the estimated internal rate of return of the project is 13.1 percent. With a 7 percent real discount rate, the $18.2 million investment would result in $39.2 million in total benefits for a Net Present Value of $21.0 million and a Benefit/Cost ratio of approximately 2.15.

With a 3 percent real discount rate, the Net Present Value of the project would increase to $66.9 million, for a Benefit/Cost ratio of 4.07

Table 20: Benefit Estimates by Merit Criteria Outcome for the Full Build Alternative

Merit Criteria	Impact Categories	7% Discount Rate	3% Discount Rate
Safety	Improved Safety and Avoided Accident Costs	$19,015,787	$40,653,882
State of Good Repair	Residual Value of Infrastructure Asset	$820,344	$3,359,064
	Operations & Maintenance Cost Savings	$85,005	$175,306
Economic Competitiveness	Reduced Travel Time Costs	$18,401,917	$42,348,159
	Reduced Vehicle Operating Costs	$883,590	$2,064,343
	Improved Travel Time Reliability	n/a	n/a
	Unlock Future Development Potential	n/a	n/a
Environmental Protection	Avoided Emissions Costs	$34,342	$78,337
Quality of Life	Improved Connectivity	n/a	n/a
	Improved Emergency Vehicle Access	n/a	n/a
	Reduced Noise Pollution	n/a	n/a
Total Benefit Estimates		**$39,240,984**	**$88,679,091**

9 Benefit Cost Sensitivity Analysis

9.1 Variation in Key Inputs and Assumptions

The BCA outcomes presented in the previous sections rely on a large number of assumptions and long-term projections; both of which are subject to considerable uncertainty.

The primary purpose of the sensitivity analysis is to help identify the variables and model parameters whose variations have the greatest impact on the BCA outcomes: the "critical variables."

The sensitivity analysis can also be used to:

- Evaluate the impact of changes in individual critical variables – how much the final results would vary with reasonable departures from the "preferred" or most likely value for the variable; and
- Assess the robustness of the BCA and evaluate, in particular, whether the conclusions reached under the "preferred" set of input values are significantly altered by reasonable departures from those values.

The outcomes of the quantitative analysis for the Pines Road Grade Separation project using a 7 percent discount rate are summarized in the table below. The table provides the percentage changes in project NPV associated with variations in variables or parameters, as indicated in the column headers.

Table 21: Quantitative Assessment of Sensitivity, Summary (Discounted at 7%)

Original NPV (discounted at 7%)	Parameters	Change in Parameter Value	New NPV (discounted at 7%)	Change in NPV	New B/C Ratio
$23,380,256	Capital Expenditures	+25% Growth	$16,440,288	-21.7%	1.72
		-25% Growth	$25,560,567	21.7%	2.87
	AADT Growth Rate	+2% Growth	$36,619,394	74.4%	3.01
		-2% Growth	$11,049,229	-47.4%	1.61
	Freight Train Growth Rate	+2% Growth	$23,343,373	11.2%	2.28
		-2% Growth	$19,079,854	-9.1%	2.05

As to be expected, lowering the growth rates for both traffic and freight train growth reduce the net present value of the projects. However, freight train growth does not significantly alter the results of the project due to the capacity constraints of the rail network, resulting in the benefit cost changing by no more than 5%. Traffic growth provides significant variation, with a 2% increase or decrease resulting in the net present value to range between increasing $2.3 million to decreasing $9.9 million. Decreasing or increasing capital costs by 25% results in the BCR ranging between 1.72 and 2.87. The sensitivity analysis indicates that the Pines Road Grade Separation project is robust across the changes, with the benefit cost ratio exceeding 1.5 in each of the cases examined, resulting in beneficial impacts to stakeholders and society.

10 Supplementary Data Tables

This section breaks down all benefits associated with the merit criteria outcomes (State of Good Repair, Economic Competitiveness, Quality of Life, Safety, and Environmental Sustainability) in annual form for the Pines Road Grade Separation project. Supplementary data tables are also provided for some specific benefit categories.

10.1 Annual Estimates of Total Project Benefits and Costs

Calendar Year	Project Year	Total Benefits ($2017)	Total Costs ($2017)	Undiscounted Net Benefits ($2017)	Discounted Net Benefits at 7%	Discounted Net Benefits at 3%
2017	1	$0	-$945,718	-$945,718	-$945,718	-$945,718
2018	2	$0	-$41,333	-$41,333	-$38,629	-$40,129
2019	3	$0	-$41,333	-$41,333	-$36,102	-$38,961
2020	4	$0	-$5,007,038	-$5,007,038	-$4,087,235	-$4,582,149
2021	5	$0	-$2,100,000	-$2,100,000	-$1,602,080	-$1,865,823
2022	6	$0	-$8,466,749	-$8,466,749	-$6,036,675	-$7,303,492
2023	7	$0	-$5,080,049	-$5,080,049	-$3,385,051	-$4,254,461
2024	8	$0	-$3,386,699	-$3,386,699	-$2,109,066	-$2,753,697
2025	9	$3,555,960	$0	$3,555,960	$2,069,601	$2,807,108
2026	10	$3,671,533	$0	$3,671,533	$1,997,070	$2,813,924
2027	11	$3,793,051	$0	$3,793,051	$1,928,195	$2,822,386
2028	12	$3,920,889	$0	$3,920,889	$1,862,786	$2,832,534
2029	13	$4,056,471	$0	$4,056,471	$1,801,122	$2,845,127
2030	14	$4,200,124	$0	$4,200,124	$1,742,902	$2,860,080
2031	15	$4,351,808	$0	$4,351,808	$1,687,706	$2,877,058
2032	16	$4,512,185	$0	$4,512,185	$1,635,423	$2,896,200
2033	17	$4,680,314	$0	$4,680,314	$1,585,384	$2,916,617
2034	18	$4,859,047	$0	$4,859,047	$1,538,250	$2,939,803
2035	19	$5,047,551	$0	$5,047,551	$1,493,388	$2,964,904
2036	20	$5,237,457	$0	$5,237,457	$1,448,201	$2,986,849
2037	21	$5,435,670	$0	$5,435,670	$1,404,680	$3,009,599
2038	22	$5,619,836	$0	$5,619,836	$1,357,264	$3,020,939
2039	23	$5,733,837	$0	$5,733,837	$1,294,202	$2,992,446
2040	24	$5,849,933	$0	$5,849,933	$1,234,025	$2,964,113
2041	25	$5,968,601	$0	$5,968,601	$1,176,689	$2,936,156
2042	26	$6,089,634	$0	$6,089,634	$1,122,010	$2,908,443
2043	27	$6,213,957	$0	$6,213,957	$1,070,015	$2,881,379
2044	28	$6,341,431	$0	$6,341,431	$1,020,529	$2,854,843
2045	29	$6,472,186	$0	$6,472,186	$973,431	$2,828,842
2046	30	$6,606,221	$0	$6,606,221	$928,589	$2,803,326
2047	31	$6,743,960	$0	$6,743,960	$885,935	$2,778,422
2048	32	$6,883,520	$0	$6,883,520	$845,110	$2,753,319

Calendar Year	Project Year	Total Benefits ($2017)	Total Costs ($2017)	Undiscounted Net Benefits ($2017)	Discounted Net Benefits at 7%	Discounted Net Benefits at 3%
2049	33	$7,027,861	$0	$7,027,861	$806,385	$2,729,179
2050	34	$7,176,876	$0	$7,176,876	$769,610	$2,705,871
2051	35	$7,327,463	$0	$7,327,463	$734,354	$2,682,181
2052	36	$7,481,760	$0	$7,481,760	$700,764	$2,658,893
2053	37	$7,639,860	$0	$7,639,860	$668,759	$2,635,999
2054	38	$17,829,424	$0	$17,829,424	$1,458,604	$5,972,553

10.2 Annual Demand Projections

Calendar Year	Project Year	Total Annual Traffic at Pines Road Crossing	Total Annual Traffic at Trent Ave. Intersection	Annual Freight Trains at Pines Road Crossing	Annual Passenger Trains at Pines Road Crossing	Total Vehicle Hours of Delay - Passenger Vehicles	Total Vehicle Hours of Delay - Trucks	Total Vehicle Hours of Delay - Bus Driver and Passenger
2017	1	16,925	27,393	58.1	2.04	0	0	0
2018	2	17,349	28,022	60.4	2.08	0	0	0
2019	3	17,784	28,666	62.7	2.12	0	0	0
2020	4	18,229	29,324	65.0	2.16	0	0	0
2021	5	18,686	29,998	67.5	2.21	0	0	0
2022	6	19,154	30,687	70.1	2.25	0	0	0
2023	7	19,634	31,392	72.8	2.30	0	0	0
2024	8	20,126	32,113	75.5	2.34	0	0	0
2025	9	20,630	32,851	78.4	2.39	37,879	5,225	435
2026	10	21,147	33,605	81.4	2.44	40,302	5,559	463
2027	11	21,677	34,377	84.5	2.49	42,881	5,915	493
2028	12	22,220	35,167	87.7	2.54	45,624	6,293	524
2029	13	22,777	35,974	91.1	2.59	48,543	6,696	558
2030	14	23,347	36,801	94.6	2.64	51,649	7,124	594
2031	15	23,932	37,646	98.2	2.69	54,954	7,580	632
2032	16	24,532	38,511	101.9	2.75	58,471	8,065	672
2033	17	25,147	39,395	105.8	2.80	62,213	8,581	715
2034	18	25,777	40,300	109.8	2.86	66,194	9,130	761
2035	19	26,422	41,226	114.0	2.91	70,430	9,715	810
2036	20	27,084	42,173	117.9	2.97	74,643	10,296	858
2037	21	27,763	43,141	121.9	3.03	79,107	10,911	909

Calendar Year	Project Year	Total Annual Traffic at Pines Road Crossing	Total Annual Traffic at Trent Ave. Intersection	Annual Freight Trains at Pines Road Crossing	Annual Passenger Trains at Pines Road Crossing	Total Vehicle Hours of Delay - Passenger Vehicles	Total Vehicle Hours of Delay - Trucks	Total Vehicle Hours of Delay - Bus Driver and Passenger
2038	22	28,459	44,132	125.0	3.09	83,159	11,470	956
2039	23	29,172	45,146	125.0	3.15	85,254	11,759	980
2040	24	29,902	46,183	125.0	3.22	87,402	12,055	1,005
2041	25	30,652	47,244	125.0	3.28	89,604	12,359	1,030
2042	26	31,420	48,329	125.0	3.35	91,862	12,671	1,056
2043	27	32,207	49,439	125.0	3.41	94,177	12,990	1,082
2044	28	33,014	50,575	125.0	3.48	96,551	13,317	1,110
2045	29	33,841	51,736	125.0	3.55	98,985	13,653	1,138
2046	30	34,689	52,925	125.0	3.62	101,481	13,997	1,166
2047	31	35,558	54,140	125.0	3.70	104,040	14,350	1,196
2048	32	36,449	55,384	125.0	3.77	106,664	14,712	1,226
2049	33	37,362	56,656	125.0	3.84	109,354	15,083	1,257
2050	34	38,298	57,957	125.0	3.92	112,113	15,464	1,289
2051	35	39,257	59,289	125.0	4.00	114,941	15,854	1,321
2052	36	40,241	60,651	125.0	4.08	117,842	16,254	1,355
2053	37	41,249	62,044	125.0	4.16	120,815	16,664	1,389
2054	38	42,282	63,469	125.0	4.24	123,865	17,085	1,424
Total		**1,054,394**	**1,634,061**	**3,944**	**114**	**2,470,999**	**340,827**	**28,402**

10.3 State of Good Repair: Annual Benefits Estimates

Calendar Year	Project Year	Residual Value of Infrastructure Asset	Operations and Maintenance Cost Savings	Total State of Good Repair Benefits	Total Discounted Benefits at 7%	Total Discounted Benefits at 3%
2017	1	$0	$0	$0	$0	$0
2018	2	$0	$0	$0	$0	$0
2019	3	$0	$0	$0	$0	$0
2020	4	$0	$0	$0	$0	$0
2021	5	$0	$0	$0	$0	$0
2022	6	$0	$0	$0	$0	$0
2023	7	$0	$0	$0	$0	$0
2024	8	$0	$0	$0	$0	$0
2025	9	$0	$11,000	$11,000	$6,402	$8,684
2026	10	$0	$11,000	$11,000	$5,983	$8,431
2027	11	$0	$11,000	$11,000	$5,592	$8,185
2028	12	$0	$11,000	$11,000	$5,226	$7,947
2029	13	$0	$11,000	$11,000	$4,884	$7,715
2030	14	$0	$11,000	$11,000	$4,565	$7,490
2031	15	$0	$11,000	$11,000	$4,266	$7,272
2032	16	$0	$11,000	$11,000	$3,987	$7,060
2033	17	$0	$11,000	$11,000	$3,726	$6,855
2034	18	$0	$11,000	$11,000	$3,482	$6,655
2035	19	$0	$11,000	$11,000	$3,255	$6,461
2036	20	$0	$11,000	$11,000	$3,042	$6,273
2037	21	$0	$11,000	$11,000	$2,843	$6,090
2038	22	$0	$11,000	$11,000	$2,657	$5,913
2039	23	$0	$11,000	$11,000	$2,483	$5,741
2040	24	$0	$11,000	$11,000	$2,320	$5,574
2041	25	$0	$11,000	$11,000	$2,169	$5,411
2042	26	$0	$11,000	$11,000	$2,027	$5,254
2043	27	$0	$11,000	$11,000	$1,894	$5,101
2044	28	$0	$11,000	$11,000	$1,770	$4,952
2045	29	$0	$11,000	$11,000	$1,654	$4,808

Calendar Year	Project Year	Residual Value of Infrastructure Asset	Operations and Maintenance Cost Savings	Total State of Good Repair Benefits	Total Discounted Benefits at 7%	Total Discounted Benefits at 3%
2046	30	$0	$11,000	$11,000	$1,546	$4,668
2047	31	$0	$11,000	$11,000	$1,445	$4,532
2048	32	$0	$11,000	$11,000	$1,351	$4,400
2049	33	$0	$11,000	$11,000	$1,262	$4,272
2050	34	$0	$11,000	$11,000	$1,180	$4,147
2051	35	$0	$11,000	$11,000	$1,102	$4,026
2052	36	$0	$11,000	$11,000	$1,030	$3,909
2053	37	$0	$11,000	$11,000	$963	$3,795
2054	38	$10,027,568	$11,000	$10,038,568	$821,244	$3,362,749
Total		**$10,027,568**	**$330,000**	**$10,357,568**	**$905,349**	**$3,534,371**

10.4 Economic Competitiveness: Pertinent Quantifiable Impacts

Calendar Year	Project Year	Avoided Person Hours of Delay at Rail Crossings	Avoided Gasoline Consumption (Gallons)	Avoided Diesel Consumption (Gallons)	Avoided Motor Oil Consumption (Quarts)
2017	1	0	0	0	0
2018	2	0	0	0	0
2019	3	0	0	0	0
2020	4	0	0	0	0
2021	5	0	0	0	0
2022	6	0	0	0	0
2023	7	0	0	0	0
2024	8	0	0	0	0
2025	9	84,435	13,542	2,982	1,502
2026	10	89,837	14,408	3,173	1,598
2027	11	95,584	15,330	3,376	1,700
2028	12	101,700	16,311	3,592	1,809
2029	13	108,207	17,354	3,822	1,925
2030	14	115,131	18,465	4,067	2,048
2031	15	122,498	19,646	4,327	2,179
2032	16	130,336	20,903	4,604	2,319
2033	17	138,677	22,241	4,898	2,467
2034	18	147,552	23,664	5,212	2,625
2035	19	156,995	25,179	5,545	2,793
2036	20	166,384	26,685	5,877	2,960
2037	21	176,335	28,281	6,229	3,137
2038	22	185,367	29,729	6,548	3,298
2039	23	190,037	30,478	6,713	3,381
2040	24	194,825	31,246	6,882	3,466
2041	25	199,735	32,033	7,055	3,553
2042	26	204,768	32,841	7,233	3,643
2043	27	209,929	33,668	7,415	3,735
2044	28	215,221	34,517	7,602	3,829
2045	29	220,646	35,387	7,794	3,925
2046	30	226,209	36,279	7,990	4,024
2047	31	231,914	37,194	8,192	4,126
2048	32	237,762	38,132	8,398	4,230

Calendar Year	Project Year	Avoided Person Hours of Delay at Rail Crossings	Avoided Gasoline Consumption (Gallons)	Avoided Diesel Consumption (Gallons)	Avoided Motor Oil Consumption (Quarts)
2049	33	243,759	39,094	8,610	4,336
2050	34	249,908	40,080	8,827	4,446
2051	35	256,213	41,092	9,050	4,558
2052	36	262,678	42,128	9,278	4,673
2053	37	269,307	43,192	9,512	4,791
2054	38	276,105	44,282	9,753	4,912
Total		**5,508,056**	**883,382**	**194,556**	**97,988**

10.5 Economic Competitiveness: Annual Benefit Estimates

Calendar Year	Project Year	Reduced Travel Time Costs	Reduced Vehicle Operating Costs	Total Economic Competitiveness Benefits	Total Discounted Benefits at 7%	Total Discounted Benefits at 3%
2017	1	$0	$0	$0	$0	$0
2018	2	$0	$0	$0	$0	$0
2019	3	$0	$0	$0	$0	$0
2020	4	$0	$0	$0	$0	$0
2021	5	$0	$0	$0	$0	$0
2022	6	$0	$0	$0	$0	$0
2023	7	$0	$0	$0	$0	$0
2024	8	$0	$0	$0	$0	$0
2025	9	$1,328,352	$58,302	$1,386,654	$807,045	$1,094,637
2026	10	$1,413,335	$62,748	$1,476,083	$802,891	$1,131,294
2027	11	$1,503,758	$67,092	$1,570,850	$798,541	$1,168,860
2028	12	$1,599,970	$71,343	$1,671,313	$794,029	$1,207,392
2029	13	$1,702,342	$76,552	$1,778,894	$789,850	$1,247,681
2030	14	$1,811,269	$82,571	$1,893,840	$785,876	$1,289,613
2031	15	$1,927,170	$88,967	$2,016,137	$781,893	$1,332,904
2032	16	$2,050,492	$95,941	$2,146,433	$777,966	$1,377,714
2033	17	$2,181,711	$102,052	$2,283,763	$773,590	$1,423,166
2034	18	$2,321,332	$109,621	$2,430,953	$769,577	$1,470,766
2035	19	$2,469,893	$117,272	$2,587,165	$765,449	$1,519,687
2036	20	$2,617,606	$126,424	$2,744,030	$758,747	$1,564,882

Calendar Year	Project Year	Reduced Travel Time Costs	Reduced Vehicle Operating Costs	Total Economic Competitiveness Benefits	Total Discounted Benefits at 7%	Total Discounted Benefits at 3%
2037	21	$2,774,156	$134,273	$2,908,429	$751,593	$1,610,327
2038	22	$2,916,256	$141,739	$3,057,995	$738,546	$1,643,823
2039	23	$2,989,724	$146,992	$3,136,715	$707,998	$1,637,028
2040	24	$3,065,050	$151,661	$3,216,712	$678,555	$1,629,881
2041	25	$3,142,284	$156,157	$3,298,440	$650,276	$1,622,614
2042	26	$3,221,472	$160,277	$3,381,749	$623,084	$1,615,142
2043	27	$3,302,665	$164,748	$3,467,413	$597,073	$1,607,821
2044	28	$3,385,915	$169,425	$3,555,339	$572,162	$1,600,575
2045	29	$3,471,273	$174,363	$3,645,636	$548,312	$1,593,423
2046	30	$3,558,794	$179,487	$3,738,281	$525,463	$1,586,326
2047	31	$3,648,533	$185,144	$3,833,677	$503,619	$1,579,424
2048	32	$3,740,546	$189,373	$3,929,919	$482,488	$1,571,917
2049	33	$3,834,893	$195,053	$4,029,945	$462,400	$1,564,977
2050	34	$3,931,631	$201,993	$4,133,625	$443,268	$1,558,485
2051	35	$4,030,824	$207,089	$4,237,913	$424,721	$1,551,267
2052	36	$4,132,533	$212,315	$4,344,848	$406,951	$1,544,087
2053	37	$4,236,823	$217,673	$4,454,496	$389,926	$1,536,946
2054	38	$4,343,761	$223,167	$4,566,928	$373,615	$1,529,843
Total		**$86,654,365**	**$4,269,812**	**$90,924,177**	**$19,285,507**	**$44,412,502**

10.6 Safety Outcomes: Pertinent Quantifiable Impacts

Calendar Year	Project Year	Fatalities Avoided	Injuries Avoided
2017	1	0.00	0.00
2018	2	0.00	0.00
2019	3	0.00	0.00
2020	4	0.00	0.00
2021	5	0.00	0.00
2022	6	0.00	0.00
2023	7	0.00	0.00
2024	8	0.00	0.00
2025	9	0.15	4.18
2026	10	0.15	4.27

Calendar Year	Project Year	Fatalities Avoided	Injuries Avoided
2027	11	0.15	4.36
2028	12	0.15	4.45
2029	13	0.15	4.54
2030	14	0.15	4.64
2031	15	0.16	4.74
2032	16	0.16	4.83
2033	17	0.16	4.94
2034	18	0.16	5.04
2035	19	0.16	5.15
2036	20	0.16	5.26
2037	21	0.16	5.37
2038	22	0.17	5.48
2039	23	0.17	5.60
2040	24	0.17	5.72
2041	25	0.17	5.84
2042	26	0.17	5.97
2043	27	0.17	6.09
2044	28	0.18	6.23
2045	29	0.18	6.36
2046	30	0.18	6.50
2047	31	0.18	6.64
2048	32	0.18	6.78
2049	33	0.18	6.93
2050	34	0.19	7.08
2051	35	0.19	7.23
2052	36	0.19	7.39
2053	37	0.19	7.55
2054	38	0.20	7.71
Total		**5.08**	**172.84**

10.7 Safety Outcomes: Annual Benefit Estimates

Calendar Year	Project Year	Improved Safety and Avoided Accident Costs	Total Safety Benefits	Total Discounted Benefits at 7%	Total Discounted Benefits at 3%
2017	1	$0	$0	$0	$0
2018	2	$0	$0	$0	$0
2019	3	$0	$0	$0	$0
2020	4	$0	$0	$0	$0
2021	5	$0	$0	$0	$0
2022	6	$0	$0	$0	$0
2023	7	$0	$0	$0	$0
2024	8	$0	$0	$0	$0
2025	9	$2,155,081	$2,155,081	$1,254,277	$1,701,241
2026	10	$2,181,221	$2,181,221	$1,186,440	$1,671,724
2027	11	$2,207,959	$2,207,959	$1,122,414	$1,642,929
2028	12	$2,235,311	$2,235,311	$1,061,980	$1,614,836
2029	13	$2,263,291	$2,263,291	$1,004,928	$1,587,427
2030	14	$2,291,913	$2,291,913	$951,063	$1,560,681
2031	15	$2,321,193	$2,321,193	$900,199	$1,534,582
2032	16	$2,351,146	$2,351,146	$852,163	$1,509,111
2033	17	$2,381,786	$2,381,786	$806,793	$1,484,250
2034	18	$2,413,130	$2,413,130	$763,935	$1,459,983
2035	19	$2,445,194	$2,445,194	$723,445	$1,436,294
2036	20	$2,477,994	$2,477,994	$685,186	$1,413,165
2037	21	$2,511,546	$2,511,546	$649,031	$1,390,582
2038	22	$2,545,868	$2,545,868	$614,860	$1,368,529
2039	23	$2,580,978	$2,580,978	$582,561	$1,346,993
2040	24	$2,616,895	$2,616,895	$552,026	$1,325,959
2041	25	$2,653,636	$2,653,636	$523,155	$1,305,413
2042	26	$2,691,222	$2,691,222	$495,855	$1,285,343
2043	27	$2,729,671	$2,729,671	$470,037	$1,265,734
2044	28	$2,769,003	$2,769,003	$445,617	$1,246,575
2045	29	$2,809,238	$2,809,238	$422,516	$1,227,853
2046	30	$2,850,398	$2,850,398	$400,660	$1,209,556
2047	31	$2,892,502	$2,892,502	$379,980	$1,191,673
2048	32	$2,935,574	$2,935,574	$360,409	$1,174,192

Calendar Year	Project Year	Improved Safety and Avoided Accident Costs	Total Safety Benefits	Total Discounted Benefits at 7%	Total Discounted Benefits at 3%
2049	33	$2,979,635	$2,979,635	$341,887	$1,157,103
2050	34	$3,024,708	$3,024,708	$324,354	$1,140,394
2051	35	$3,070,817	$3,070,817	$307,755	$1,124,057
2052	36	$3,117,984	$3,117,984	$292,040	$1,108,080
2053	37	$3,166,235	$3,166,235	$277,158	$1,092,454
2054	38	$3,215,594	$3,215,594	$263,064	$1,077,169
Total		**$78,886,723**	**$78,886,723**	**$19,015,787**	**$40,653,882**

10.8 Environmental Sustainability: Pertinent Quantifiable Impacts (1 of 2)

Calendar Year	Project Year	Annual Emissions Avoided - CO_2 (tons)	Annual Emissions Avoided - NOx (tons)	Annual Emissions Avoided - VOC (tons)	Annual Emissions Avoided - PM (tons)	Annual Emissions Avoided - SO_2 (tons)
2017	1	0.0	0.000	0.000	0.000	0.000
2018	2	0.0	0.000	0.000	0.000	0.000
2019	3	0.0	0.000	0.000	0.000	0.000
2020	4	0.0	0.000	0.000	0.000	0.000
2021	5	0.0	0.000	0.000	0.000	0.000
2022	6	0.0	0.000	0.000	0.000	0.000
2023	7	0.0	0.000	0.000	0.000	0.000
2024	8	0.0	0.000	0.000	0.000	0.000
2025	9	123.2	0.067	0.011	0.003	0.001
2026	10	127.9	0.065	0.011	0.003	0.001
2027	11	133.0	0.063	0.010	0.003	0.001
2028	12	138.5	0.061	0.010	0.003	0.001
2029	13	144.5	0.060	0.009	0.003	0.001
2030	14	151.2	0.060	0.009	0.003	0.001
2031	15	158.4	0.060	0.009	0.003	0.001
2032	16	166.1	0.060	0.009	0.002	0.001
2033	17	174.7	0.061	0.009	0.002	0.001
2034	18	184.2	0.063	0.010	0.002	0.001
2035	19	194.4	0.066	0.010	0.002	0.001
2036	20	204.8	0.068	0.010	0.002	0.001

Calendar Year	Project Year	Annual Emissions Avoided - CO_2 (tons)	Annual Emissions Avoided - NOx (tons)	Annual Emissions Avoided - VOC (tons)	Annual Emissions Avoided - PM (tons)	Annual Emissions Avoided - SO_2 (tons)
2037	21	216.0	0.071	0.011	0.003	0.002
2038	22	226.2	0.074	0.011	0.003	0.002
2039	23	231.2	0.076	0.011	0.003	0.002
2040	24	236.6	0.078	0.012	0.003	0.002
2041	25	242.6	0.080	0.012	0.003	0.002
2042	26	248.7	0.082	0.012	0.003	0.002
2043	27	254.9	0.084	0.012	0.003	0.002
2044	28	261.4	0.086	0.013	0.003	0.002
2045	29	268.0	0.088	0.013	0.003	0.002
2046	30	274.7	0.090	0.013	0.003	0.002
2047	31	281.6	0.093	0.014	0.003	0.002
2048	32	288.7	0.095	0.014	0.003	0.002
2049	33	296.0	0.097	0.014	0.003	0.002
2050	34	303.5	0.100	0.015	0.004	0.002
2051	35	311.1	0.102	0.015	0.004	0.002
2052	36	319.0	0.105	0.016	0.004	0.002
2053	37	327.0	0.108	0.016	0.004	0.002
2054	38	335.3	0.110	0.016	0.004	0.002
Total		**6,823**	**2.38**	**0.36**	**0.09**	**0.05**

10.9 Environmental Sustainability: Pertinent Quantifiable Impacts (2 of 2)

Calendar Year	Project Year	Avoided Vehicle-hours of Delay Time
2017	1	0
2018	2	0
2019	3	0
2020	4	0
2021	5	0
2022	6	0
2023	7	0
2024	8	0
2025	9	43,539

Calendar Year	Project Year	Avoided Vehicle-hours of Delay Time
2026	10	46,324
2027	11	49,288
2028	12	52,441
2029	13	55,797
2030	14	59,367
2031	15	63,166
2032	16	67,208
2033	17	71,509
2034	18	76,085
2035	19	80,955
2036	20	85,796
2037	21	90,927
2038	22	95,585
2039	23	97,993
2040	24	100,462
2041	25	102,993
2042	26	105,589
2043	27	108,250
2044	28	110,979
2045	29	113,776
2046	30	116,645
2047	31	119,586
2048	32	122,602
2049	33	125,694
2050	34	128,865
2051	35	132,116
2052	36	135,450
2053	37	138,868
2054	38	142,373
Total		**2,840,229**

10.10 Environmental Sustainability: Annual Benefit Estimates (1 of 2)

Calendar Year	Project Year	Avoided Emissions Costs	Total Environmental Sustainability Benefits	Total Discounted Benefits at 7%	Total Discounted Benefits at 3%
2017	1	$0	$0	$0	$0
2018	2	$0	$0	$0	$0
2019	3	$0	$0	$0	$0
2020	4	$0	$0	$0	$0
2021	5	$0	$0	$0	$0
2022	6	$0	$0	$0	$0
2023	7	$0	$0	$0	$0
2024	8	$0	$0	$0	$0
2025	9	$3,225	$3,225	$1,877	$2,546
2026	10	$3,229	$3,229	$1,756	$2,475
2027	11	$3,242	$3,242	$1,648	$2,412
2028	12	$3,265	$3,265	$1,551	$2,359
2029	13	$3,286	$3,286	$1,459	$2,305
2030	14	$3,371	$3,371	$1,399	$2,295
2031	15	$3,478	$3,478	$1,349	$2,299
2032	16	$3,606	$3,606	$1,307	$2,314
2033	17	$3,765	$3,765	$1,275	$2,346
2034	18	$3,964	$3,964	$1,255	$2,398
2035	19	$4,192	$4,192	$1,240	$2,462
2036	20	$4,433	$4,433	$1,226	$2,528
2037	21	$4,695	$4,695	$1,213	$2,600
2038	22	$4,974	$4,974	$1,201	$2,674
2039	23	$5,144	$5,144	$1,161	$2,685
2040	24	$5,327	$5,327	$1,124	$2,699
2041	25	$5,524	$5,524	$1,089	$2,718
2042	26	$5,664	$5,664	$1,043	$2,705
2043	27	$5,873	$5,873	$1,011	$2,723
2044	28	$6,088	$6,088	$980	$2,741
2045	29	$6,312	$6,312	$949	$2,759

Calendar Year	Project Year	Avoided Emissions Costs	Total Environmental Sustainability Benefits	Total Discounted Benefits at 7%	Total Discounted Benefits at 3%
2046	30	$6,542	$6,542	$920	$2,776
2047	31	$6,780	$6,780	$891	$2,793
2048	32	$7,026	$7,026	$863	$2,810
2049	33	$7,280	$7,280	$835	$2,827
2050	34	$7,543	$7,543	$809	$2,844
2051	35	$7,733	$7,733	$775	$2,831
2052	36	$7,928	$7,928	$743	$2,818
2053	37	$8,128	$8,128	$712	$2,805
2054	38	$8,334	$8,334	$682	$2,792
Total		**$159,950**	**$159,950**	**$34,342**	**$78,337**

Appendix D

Local Agency Endorsement

10210 E Sprague Avenue ♦ Spokane Valley WA 99206
Phone: (509) 720-5000 ♦ Fax: (509) 720-5075 ♦ www.spokanevalley.org

Federal Rail Administration & U.S. Department of Transportation

Consolidated Rail Infrastructure & Safety Improvements (CRISI) Grant Program

Call for Projects

Local Agency Project Endorsement

Project: Pines Road/BNSF Grade Separation Project

The attached project application reflects established local funding priorities consistent with the adopted local plans and programs.

The project described is financially feasible; local match revenue identified in the project application is available and committed to the project. Costs identified in the application represent accurate planning level estimates needed to accomplish the work described herein.

This project has the full endorsement of the governing body/leadership of this agency or organization. This document must be signed by a person in a position or a representative of a governing body that has the authority to make decisions for the entire organization.

Mark Calhoun, City Manager
Name and Title of Designated Representative

Mark Calhoun
Signature of Designated Representative

6/20/2018
Date

Appendix E

Standard Forms – Application Attachments

(Submitted separately via Grants.Gov workspace)

WORKSPACE FORM

1-800-518-4726
SUPPORT@GRANTS.GOV

This Workspace form is one of the forms you need to complete prior to submitting your Application Package. This form can be completed in its entirety offline using Adobe Reader. You can save your form by clicking the "Save" button and see any errors by clicking the “Check For Errors” button. In-progress and completed forms can be uploaded at any time to Grants.gov using the Workspace feature.

When you open a form, required fields are highlighted in yellow with a red border. Optional fields and completed fields are displayed in white. If you enter invalid or incomplete information in a field, you will receive an error message. Additional instructions and FAQs about the Application Package can be found in the Grants.gov Applicants tab.

OPPORTUNITY & PACKAGE DETAILS:

Opportunity Number:	FR-CRS-18-001
Opportunity Title:	Consolidated Rail Infrastructure and Safety Improvements (CRISI)
Opportunity Package ID:	PKG00238504
CFDA Number:	20.325
CFDA Description:	Consolidated Rail Infrastructure and Safety Improvements
Competition ID:	FR-CRS-18-001-060238
Competition Title:	Consolidated Rail Infrastructure and Safety Improvements (CRISI)
Opening Date:	02/21/2018
Closing Date:	06/21/2018
Agency:	DOT/Federal Railroad Administration
Contact Information:	Amy Houser E-mail: amy.houser@dot.gov Phone: 202-493-0303

APPLICANT & WORKSPACE DETAILS:

Workspace ID:	WS00151101
Application Filing Name:	Pines Road/BNSF Grade Separation Project (Track 2)
DUNS:	1682406170000
Organization:	SPOKANE VALLEY, CITY OF
Form Name:	Application for Federal Assistance (SF-424)
Form Version:	2.1
Requirement:	Mandatory
Download Date/Time:	Jun 04, 2018 07:38:33 PM EDT
Form State:	No Errors

FORM ACTIONS:

OMB Number: 4040-0004
Expiration Date: 12/31/2019

Application for Federal Assistance SF-424

* 1. Type of Submission:
- [ ] Preapplication
- [x] Application
- [ ] Changed/Corrected Application

* 2. Type of Application:
- [x] New
- [ ] Continuation
- [ ] Revision

* If Revision, select appropriate letter(s):

* Other (Specify):

* 3. Date Received: Completed by Grants.gov upon submission.

4. Applicant Identifier:

5a. Federal Entity Identifier:

5b. Federal Award Identifier:

State Use Only:

6. Date Received by State:

7. State Application Identifier:

8. APPLICANT INFORMATION:

* a. Legal Name: City of Spokane Valley

* b. Employer/Taxpayer Identification Number (EIN/TIN): 71-0914170

* c. Organizational DUNS: 1682406170000

d. Address:

* Street1: 10210 East Sprague Avenue
Street2:
* City: Spokane Valley
County/Parish: Spokane
* State: WA: Washington
Province:
* Country: USA: UNITED STATES
* Zip / Postal Code: 99206-6110

e. Organizational Unit:

Department Name: Community and Public Works

Division Name: Engineering

f. Name and contact information of person to be contacted on matters involving this application:

Prefix: Mr.
* First Name: Adam
Middle Name:
* Last Name: Jackson
Suffix:

Title: Engineer - Planning & Grants

Organizational Affiliation: City of Spokane Valley - Economic Development Division

* Telephone Number: 509-720-5024
Fax Number:

* Email: ajackson@spokanevalley.org

Application for Federal Assistance SF-424

*** 9. Type of Applicant 1: Select Applicant Type:**

C: City or Township Government

Type of Applicant 2: Select Applicant Type:

Type of Applicant 3: Select Applicant Type:

* Other (specify):

*** 10. Name of Federal Agency:**

DOT/Federal Railroad Administration

11. Catalog of Federal Domestic Assistance Number:

20.325

CFDA Title:

Consolidated Rail Infrastructure and Safety Improvements

*** 12. Funding Opportunity Number:**

FR-CRS-18-001

* Title:

Consolidated Rail Infrastructure and Safety Improvements (CRISI)

13. Competition Identification Number:

FR-CRS-18-001-060238

Title:

Consolidated Rail Infrastructure and Safety Improvements (CRISI)

14. Areas Affected by Project (Cities, Counties, States, etc.):

4a. Form SF-424 #14 Attachment.docx | Add Attachment | Delete Attachment | View Attachment

*** 15. Descriptive Title of Applicant's Project:**

Pines Road/BNSF Grade Separation Project (Track 2)

Attach supporting documents as specified in agency instructions.

Add Attachments | Delete Attachments | View Attachments

Application for Federal Assistance SF-424

16. Congressional Districts Of:

* a. Applicant: WA-005 * b. Program/Project: WA-005

Attach an additional list of Program/Project Congressional Districts if needed.

Add Attachment | Delete Attachment | View Attachment

17. Proposed Project:

* a. Start Date: 01/01/2019 * b. End Date: 12/31/2019

18. Estimated Funding ($):

* a. Federal	1,246,500.00
* b. Applicant	1,246,500.00
* c. State	0.00
* d. Local	0.00
* e. Other	0.00
* f. Program Income	0.00
* g. TOTAL	2,493,000.00

*** 19. Is Application Subject to Review By State Under Executive Order 12372 Process?**

☐ a. This application was made available to the State under the Executive Order 12372 Process for review on .

☐ b. Program is subject to E.O. 12372 but has not been selected by the State for review.

☒ c. Program is not covered by E.O. 12372.

*** 20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes," provide explanation in attachment.)**

☐ Yes ☒ No

If "Yes", provide explanation and attach

Add Attachment | Delete Attachment | View Attachment

21. *By signing this application, I certify (1) to the statements contained in the list of certifications and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 218, Section 1001)**

☒ ** I AGREE

** The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions.

Authorized Representative:

Prefix: Mr. * First Name: Mark

Middle Name:

* Last Name: Calhoun

Suffix:

* Title: City Manager

* Telephone Number: 509-720-5100 Fax Number:

* Email: mcalhoun@spokanevalley.org

* Signature of Authorized Representative: Completed by Grants.gov upon submission. * Date Signed: Completed by Grants.gov upon submission.

City of Spokane Valley Project: Pines Road/BNSF Grade Separation Project (Track 2)

Standard Form 424 Attachment for Box #14:

Areas Affected by Project (Cities, Counties, States, etc.)

- City of Spokane Valley
- Spokane County
- State of Washington
- State of Idaho

WORKSPACE FORM

1-800-518-4726
SUPPORT@GRANTS.GOV

This Workspace form is one of the forms you need to complete prior to submitting your Application Package. This form can be completed in its entirety offline using Adobe Reader. You can save your form by clicking the "Save" button and see any errors by clicking the “Check For Errors” button. In-progress and completed forms can be uploaded at any time to Grants.gov using the Workspace feature.

When you open a form, required fields are highlighted in yellow with a red border. Optional fields and completed fields are displayed in white. If you enter invalid or incomplete information in a field, you will receive an error message. Additional instructions and FAQs about the Application Package can be found in the Grants.gov Applicants tab.

OPPORTUNITY & PACKAGE DETAILS:

Opportunity Number:	FR-CRS-18-001
Opportunity Title:	Consolidated Rail Infrastructure and Safety Improvements (CRISI)
Opportunity Package ID:	PKG00238504
CFDA Number:	20.325
CFDA Description:	Consolidated Rail Infrastructure and Safety Improvements
Competition ID:	FR-CRS-18-001-060238
Competition Title:	Consolidated Rail Infrastructure and Safety Improvements (CRISI)
Opening Date:	02/21/2018
Closing Date:	06/21/2018
Agency:	DOT/Federal Railroad Administration
Contact Information:	Amy Houser E-mail: amy.houser@dot.gov Phone: 202-493-0303

APPLICANT & WORKSPACE DETAILS:

Workspace ID:	WS00151101
Application Filing Name:	Pines Road/BNSF Grade Separation Project (Track 2)
DUNS:	1682406170000
Organization:	SPOKANE VALLEY, CITY OF
Form Name:	Budget Information for Non-Construction Programs (SF-424A)
Form Version:	1.0
Requirement:	Optional
Download Date/Time:	Jun 04, 2018 07:39:36 PM EDT
Form State:	No Errors

FORM ACTIONS:

BUDGET INFORMATION - Non-Construction Programs

OMB Number: 4040-0006
Expiration Date: 01/31/2019

SECTION A - BUDGET SUMMARY

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1. Consolidated Rail Infrastructure and Safety Improvements (CRISI)	20.325	$ 0.00	$ 0.00	$ 1,246,500.00	$ 1,246,500.00	$ 2,493,000.00
2.						
3.						
4.						
5. Totals		$ 0.00	$ 0.00	$ 1,246,500.00	$ 1,246,500.00	$ 2,493,000.00

SECTION B - BUDGET CATEGORIES

6. Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY				Total
	(1) Consolidated Rail Infrastructure and Safety Improvements (CRISI)	(2)	(3)	(4)	(5)
a. Personnel	$ 125,000.00	$	$	$	$ 125,000.00
b. Fringe Benefits	63,000.00				63,000.00
c. Travel	0.00				0.00
d. Equipment	0.00				0.00
e. Supplies	5,000.00				5,000.00
f. Contractual	2,200,000.00				2,200,000.00
g. Construction	0.00				0.00
h. Other	100,000.00				100,000.00
i. Total Direct Charges (sum of 6a-6h)	2,493,000.00				$ 2,493,000.00
j. Indirect Charges	0.00				$ 0.00
k. TOTALS (sum of 6i and 6j)	$ 2,493,000.00	$	$	$	$ 2,493,000.00
7. Program Income	$ 0.00	$	$	$	$ 0.00

SECTION C - NON-FEDERAL RESOURCES

(a) Grant Program	(b) Applicant	(c) State	(d) Other Sources	(e)TOTALS
8. Consolidated Rail Infrastructure and Safety Improvements (CRISI)	$ 1,246,500.00	$	$	$ 1,246,500.00
9.				
10.				
11.				
12. TOTAL (sum of lines 8-11)	$ 1,246,500.00	$	$	$ 1,246,500.00

SECTION D - FORECASTED CASH NEEDS

	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
13. Federal	$ 1,246,500.00	$ 311,625.00	$ 311,625.00	$ 311,625.00	$ 311,625.00
14. Non-Federal	$ 1,246,500.00	311,625.00	311,625.00	311,625.00	311,625.00
15. TOTAL (sum of lines 13 and 14)	$ 2,493,000.00	$ 623,250.00	$ 623,250.00	$ 623,250.00	$ 623,250.00

SECTION E - BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT

(a) Grant Program	FUTURE FUNDING PERIODS (YEARS)			
	(b)First	(c) Second	(d) Third	(e) Fourth
16. Consolidated Rail Infrastructure and Safety Improvements (CRISI)	$ 2,493,000.00	$	$	$
17.				
18.				
19.				
20. TOTAL (sum of lines 16 - 19)	$ 2,493,000.00	$	$	$

SECTION F - OTHER BUDGET INFORMATION

21. Direct Charges:

22. Indirect Charges:

23. Remarks:

WORKSPACE FORM

1-800-518-4726
SUPPORT@GRANTS.GOV

This Workspace form is one of the forms you need to complete prior to submitting your Application Package. This form can be completed in its entirety offline using Adobe Reader. You can save your form by clicking the "Save" button and see any errors by clicking the “Check For Errors” button. In-progress and completed forms can be uploaded at any time to Grants.gov using the Workspace feature.

When you open a form, required fields are highlighted in yellow with a red border. Optional fields and completed fields are displayed in white. If you enter invalid or incomplete information in a field, you will receive an error message. Additional instructions and FAQs about the Application Package can be found in the Grants.gov Applicants tab.

OPPORTUNITY & PACKAGE DETAILS:

Opportunity Number:	FR-CRS-18-001
Opportunity Title:	Consolidated Rail Infrastructure and Safety Improvements (CRISI)
Opportunity Package ID:	PKG00238504
CFDA Number:	20.325
CFDA Description:	Consolidated Rail Infrastructure and Safety Improvements
Competition ID:	FR-CRS-18-001-060238
Competition Title:	Consolidated Rail Infrastructure and Safety Improvements (CRISI)
Opening Date:	02/21/2018
Closing Date:	06/21/2018
Agency:	DOT/Federal Railroad Administration
Contact Information:	Amy Houser E-mail: amy.houser@dot.gov Phone: 202-493-0303

APPLICANT & WORKSPACE DETAILS:

Workspace ID:	WS00151101
Application Filing Name:	Pines Road/BNSF Grade Separation Project (Track 2)
DUNS:	1682406170000
Organization:	SPOKANE VALLEY, CITY OF
Form Name:	Assurances for Non-Construction Programs (SF-424B)
Form Version:	1.1
Requirement:	Optional
Download Date/Time:	Jun 20, 2018 01:37:25 PM EDT
Form State:	No Errors

FORM ACTIONS:

OMB Number: 4040-0007
Expiration Date: 01/31/2019

ASSURANCES - NON-CONSTRUCTION PROGRAMS

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.

NOTE: Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the awarding agency. Further, certain Federal awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.

As the duly authorized representative of the applicant, I certify that the applicant:

1. Has the legal authority to apply for Federal assistance and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project cost) to ensure proper planning, management and completion of the project described in this application.

2. Will give the awarding agency, the Comptroller General of the United States and, if appropriate, the State, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the award; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.

3. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.

4. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.

5. Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. §§4728-4763) relating to prescribed standards for merit systems for programs funded under one of the 19 statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).

6. Will comply with all Federal statutes relating to nondiscrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C.§§1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U. S.C. §§6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended, relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. §§290 dd-3 and 290 ee- 3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; (i) any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made; and, (j) the requirements of any other nondiscrimination statute(s) which may apply to the application.

7. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal or federally-assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of Federal participation in purchases.

8. Will comply, as applicable, with provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.

9. Will comply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. §§276a to 276a-7), the Copeland Act (40 U.S.C. §276c and 18 U.S.C. §874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. §§327-333), regarding labor standards for federally-assisted construction subagreements.

10. Will comply, if applicable, with flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is $10,000 or more.

11. Will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514; (b) notification of violating facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. §§1451 et seq.); (f) conformity of Federal actions to State (Clean Air) Implementation Plans under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. §§7401 et seq.); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended (P.L. 93-523); and, (h) protection of endangered species under the Endangered Species Act of 1973, as amended (P.L. 93-205).

12. Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§1271 et seq.) related to protecting components or potential components of the national wild and scenic rivers system.

13. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. §470), EO 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469a-1 et seq.).

14. Will comply with P.L. 93-348 regarding the protection of human subjects involved in research, development, and related activities supported by this award of assistance.

15. Will comply with the Laboratory Animal Welfare Act of 1966 (P.L. 89-544, as amended, 7 U.S.C. §§2131 et seq.) pertaining to the care, handling, and treatment of warm blooded animals held for research, teaching, or other activities supported by this award of assistance.

16. Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. §§4801 et seq.) which prohibits the use of lead-based paint in construction or rehabilitation of residence structures.

17. Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act Amendments of 1996 and OMB Circular No. A-133, "Audits of States, Local Governments, and Non-Profit Organizations."

18. Will comply with all applicable requirements of all other Federal laws, executive orders, regulations, and policies governing this program.

19. Will comply with the requirements of Section 106(g) of the Trafficking Victims Protection Act (TVPA) of 2000, as amended (22 U.S.C. 7104) which prohibits grant award recipients or a sub-recipient from (1) Engaging in severe forms of trafficking in persons during the period of time that the award is in effect (2) Procuring a commercial sex act during the period of time that the award is in effect or (3) Using forced labor in the performance of the award or subawards under the award.

SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL	TITLE
Completed on submission to Grants.gov	City Manager
APPLICANT ORGANIZATION	DATE SUBMITTED
City of Spokane Valley	Completed on submission to Grants.gov

U.S. Department of Transportation
Federal Railroad Administration

Certifications Regarding Debarment, Suspension and Other Responsibility Matters, Drug-Free Workplace Requirements and Lobbying

PART A: Certification Regarding Debarment, Suspension and Other Responsibility Matters – Primary Covered Transactions (Pursuant to 2 CFR Part 180)

(1) The grantee certifies to the best of its knowledge and belief, that it and its principles:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded by any Federal department or agency;

(b) Have not within a three-year period preceding this application been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal of State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and

(d) Have not within a three-year period preceding this application had one or more public transactions (Federal, State or local) terminated for cause or default.

(2) Where the grantee is unable to certify to any of the statements of this certification, he or she shall attach an explanation to this application.

PART B: Certification Regarding Drug-Free Workplace Requirements (Pursuant to 49 CFR Part 32)

A. The grantee certifies that it will or continue to provide a drug-free workplace by:

(a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition;

(b) Establishing an ongoing drug-free awareness program to inform employees about—
   (1) The dangers of drug abuse in the workplace;
   (2) The grantee's policy of maintaining a drug-free workplace;
   (3) Any available drug counseling, rehabilitation, and employee assistance programs; and
   (4) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace;

(c) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (a);

(d) Notifying the employee in the statement required by paragraph (a) that, as a condition of employment under the grant, the employee will—
   (1) Abide by the terms of the statement; and
   (2) Notify the employer in writing of his or her conviction for a violation of criminal drug statute occurring in the workplace no later than five calendar days after such conviction;

(e) Notifying the agency in writing, within ten calendar days after receiving notice under subparagraph (d)(2) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees must provide notice, including position title, to every grant officer on whose grant activity the convicted employee was working, unless the Federal agency has designated a central point for the receipt of such notices. Notice shall include the identification number(s) of each affected grant;

(f) Taking one of the following actions, within 30 calendar days of receiving notice under subparagraph (d)(2), with respect to any employee is so convicted—
   (1) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or
   (2) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency;

(g) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (a), (b), (c), (e) and (f).

B. The grantee may insert in the space below the site(s) for the performance of work done in connection with the specific grant:

Place of Performance (Street address, city, county, state, zip code)
10210 E. Sprague Ave., Spokane Valley, WA 99206_____
_____
_____
Check ____if there are workplaces on file that are not identified here.

PART C: Certification Regarding Lobbying (Pursuant to 49 CFR Part 20)

CHECK__X__IF APPLICABLE
CERTIFICATION IS FOR THE AWARD OF A GRANT OR COOPERATIVE AGREEMENT EXCEEDING $100,000
OR
A FEDERAL LOAN EXCEEDING $150,000

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award document for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 USC 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

As the authorized certifying official, I hereby certify that the certifications in Parts A, B, and C (if C is applicable) are true.

Mark Calhoun

SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL

Mark Calhoun, City Manager

TYPED NAME AND TITLE

6/20/2018

DATE

WORKSPACE FORM

1-800-518-4726
SUPPORT@GRANTS.GOV

This Workspace form is one of the forms you need to complete prior to submitting your Application Package. This form can be completed in its entirety offline using Adobe Reader. You can save your form by clicking the "Save" button and see any errors by clicking the “Check For Errors” button. In-progress and completed forms can be uploaded at any time to Grants.gov using the Workspace feature.

When you open a form, required fields are highlighted in yellow with a red border. Optional fields and completed fields are displayed in white. If you enter invalid or incomplete information in a field, you will receive an error message. Additional instructions and FAQs about the Application Package can be found in the Grants.gov Applicants tab.

OPPORTUNITY & PACKAGE DETAILS:

Opportunity Number:	FR-CRS-18-001
Opportunity Title:	Consolidated Rail Infrastructure and Safety Improvements (CRISI)
Opportunity Package ID:	PKG00238504
CFDA Number:	20.325
CFDA Description:	Consolidated Rail Infrastructure and Safety Improvements
Competition ID:	FR-CRS-18-001-060238
Competition Title:	Consolidated Rail Infrastructure and Safety Improvements (CRISI)
Opening Date:	02/21/2018
Closing Date:	06/21/2018
Agency:	DOT/Federal Railroad Administration
Contact Information:	Amy Houser E-mail: amy.houser@dot.gov Phone: 202-493-0303

APPLICANT & WORKSPACE DETAILS:

Workspace ID:	WS00151101
Application Filing Name:	Pines Road/BNSF Grade Separation Project (Track 2)
DUNS:	1682406170000
Organization:	SPOKANE VALLEY, CITY OF
Form Name:	Disclosure of Lobbying Activities (SF-LLL)
Form Version:	1.2
Requirement:	Optional
Download Date/Time:	Jun 04, 2018 07:48:16 PM EDT
Form State:	No Errors

FORM ACTIONS:

DISCLOSURE OF LOBBYING ACTIVITIES

Complete this form to disclose lobbying activities pursuant to 31 U.S.C.1352

Approved by OMB
4040-0013

1. * Type of Federal Action:
- [ ] a. contract
- [x] b. grant
- [ ] c. cooperative agreement
- [ ] d. loan
- [ ] e. loan guarantee
- [ ] f. loan insurance

2. * Status of Federal Action:
- [ ] a. bid/offer/application
- [x] b. initial award
- [ ] c. post-award

3. * Report Type:
- [x] a. initial filing
- [ ] b. material change

4. Name and Address of Reporting Entity:

[x] Prime [ ] SubAwardee

** Name:* City of Spokane Valley

** Street 1:* 10210 E. Sprague Ave. *Street 2:*

** City:* Spokane Valley *State:* WA: Washington *Zip:* 99206

Congressional District, if known: WA-005

5. If Reporting Entity in No.4 is Subawardee, Enter Name and Address of Prime:

6. * Federal Department/Agency:
DOT/Federal Railroad Administration

7. * Federal Program Name/Description:
Consolidated Rail Infrastructure and Safety Improvements

CFDA Number, *if applicable:* 20.325

8. Federal Action Number, *if known:*

9. Award Amount, *if known:*
$

10. a. Name and Address of Lobbying Registrant:

Prefix: Ms. ** First Name:* Briahna *Middle Name:*

** Last Name:* Murray *Suffix:*

** Street 1:* 1201 Pacific Avenue, Suite 2100 *Street 2:*

** City:* Tacoma *State:* WA: Washington *Zip:* 98402

b. Individual Performing Services (including address if different from No. 10a)

Prefix: Ms. ** First Name:* Chelsea *Middle Name:*

** Last Name:* Hager *Suffix:*

** Street 1:* *Street 2:*

** City:* *State:* *Zip:*

11. Information requested through this form is authorized by title 31 U.S.C. section 1352. This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the tier above when the transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be reported to the Congress semi-annually and will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

*** Signature:** Completed on submission to Grants.gov

***Name:** *Prefix:* Mr. ** First Name:* Mark *Middle Name:*

** Last Name:* Calhoun *Suffix:*

Title: City Manager **Telephone No.:** 509-720-5100 **Date:** Completed on submission to Grants.gov

Federal Use Only:

Authorized for Local Reproduction
Standard Form - LLL (Rev. 7-97)