

# Technical Approach

Washington State rail traffic has grown and at the same time highway rail incidents, which had traditionally been declining, have increased in the last three years. To help the JTC evaluate road-rail conflicts, we have brought together a team with extensive local experience in rail-grade crossing evaluation in Washington State. Our team offers expertise in freight and rail project evaluation, coordination and facilitation of the Joint Transportation Committee and other elected bodies, and knowledge of statewide evaluation processes.

The Prioritization of Prominent Road-Rail Conflicts in Washington State project seeks to develop a systems-based approach for prioritizing and addressing at-grade crossing impacts and needs on a statewide basis. Our team has been assembled to assist the Joint Transportation Commission develop a policy and decision making framework for evaluating the impacts of increased rail and vehicle traffic at crossings throughout the state.

Our approach to completing the project is based upon the scope of work identified in the Request for Proposals (RFP). We have expanded on the scope to describe how we would approach completing each task, the deliverables

that we would produce, the approximate level of effort, and the timeline for completing each task. The tasks have been broken down into subtasks, as shown in the schedule graphic on page 16 and cost proposal in Section 4.

Table 1 provides an overview of the project, who is responsible for leading each task, and the estimated level of effort of each task in terms of man hours and percentage of the overall work program. A more detailed breakdown of the level of effort may be found in the cost proposal.



Table 1. Responsibilities and Level of Effort

PROJECT TASK	STAFF LEAD	APPROXIMATE NUMBER OF HOURS	% OF TOTAL WORK PROGRAM
Task 1 - Database Development	Erinn Walter	612	40%
Task 2 - Prioritization Process	Michael Houston	264	17%
Task 3 - Organizational Structure	Jeanne Acutanza	160	10%
Task 4 - Advisory Panel and Staff Workgroup	Allegra Calder	270	17%
Task 5 - Draft and Final Reports	Jon Pascal	222	14%
Task 6 - Presentations	Jon Pascal	36	2%
	<b>TOTAL</b>	<b>1,564</b>	<b>100%</b>

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### APPROACH BY TASK

#### TASK 1: DATABASE OF ROAD-RAIL CONFLICTS

With the most extensive expertise in evaluation of rail-highway conflicts in the state, Erinn Walter will lead the development of the at-grade crossing database. She will build on her expertise obtained through her project for the Puget Sound Regional Council, Skagit Council of Governments, and City of Seattle. She will be supported by Michael Houston in designing the database structure and the development of prioritization criteria to be included in the database. The team will utilize the advice and counsel of Daniel Brod from Decisiontek on the prioritization criteria, and the database development.

##### Assemble and Screen the Data

A central database of all 2,196 statewide at-grade rail crossings will be developed starting with the recent inventory of public railroad crossings by the Washington State Utilities and Transportation Commission. The initial inventory will assist in identifying the prominent road-rail conflicts in the state. The database will be designed to be used by a range of stakeholders, including the State, local jurisdictions, and other interested parties. The database will be accessible via an online platform that includes a mapping tool that organizes the data included in the database by each at-grade crossing, as described below. Data from a number of other readily available sources, including previously collected JTC data, INRIX, WSDOT, Federal Railroad Administration, the Department of Ecology, and other applicable reports in the state will be added to the inventory of crossings to develop a database of at-grade crossing information. Any data gaps will also be identified through the process, and if needed, up to \$10,000 in additional data would be collected. The potential for additional data collection costs is reflected in the cost proposal in Section 4.

In addition to reviewing available data, best practice research will be conducted to identify how other organizations have approached similar data needs and prioritization processes on a regional or statewide level. Decisiontek has been added to the team to provide strategic advice based on their involvement in at-grade crossing studies throughout the nation, and development of their own tool GradeDec.Net. This research will inform direction on development of the database.

In order to focus detailed evaluation on the most prominent crossings in the state, a two-step screening process will be applied to the inventory of statewide at-grade crossings. The screening process will start by developing Level 1 criteria to isolate potential high priority road-rail conflicts for further analysis and data collection. Level 1 criteria could include 3 to 4 criteria such as railroad classification, train volume, vehicle volume, previously identified crossing projects, and/or location on an oil/coal train route. The screening process could organize crossings by county or region to include a geographic distribution of locations throughout the state in the more detailed analysis. The Level 1 screening will identify the top 10 to 15 percent of at-grade rail crossings for the more detailed screening.

The next part of the screening process will use Level 2 criteria to identify the most prominent road-rail conflicts in the state. Level 2 criteria will allow decision-makers to understand where future mobility and safety problems exist at at-grade crossings in the state. This will be achieved by summarizing a variety of data for the Level 2 at-grade crossings, such as gate-down time at crossings, delay to freight, collision history, level of protection, and/or environmental impacts. Analysts will use readily available data and follow similar methodologies as were used in other recent studies, including the Skagit Council of Governments Rail Crossing Study, PSRC's Economic Evaluation of Regional Impacts for the Proposed Gateway Pacific Terminal at Cherry Point, and the City of Seattle's Coal Train Study.

##### Establish Prioritization Criteria

The team will evaluate the data available and identify the types of information that will be necessary to use as criteria for ranking or prioritizing road-rail conflicts. The criteria selected will represent State, local, and private entity policy interests and will be selected in consultation with the Advisory Panel with a priority on available or easy to obtain data. See Tasks 3 and 4 for how the criteria will be confirmed.

As discussed, the criteria will be allocated into levels to focus specific attention on the highest priority crossings throughout the state. Example Level 1 criteria have been listed in Table 2 and are based on past analysis of at-grade crossings. Level 2 criteria will use an additional 6 to 10 criteria to identify the most prominent road-rail conflicts in the state. The list of possible data to be used in the screening process is summarized in Table 2.

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Table 2. Statewide Road-Rail Conflict Database Criterion

DATA / CRITERION	STATE, LOCAL, AND/OR PRIVATE ENTITY POLICY INTEREST	POSSIBLE MEASUREMENT
<b>Level 1 Criteria</b>		
Class I, II, or III railroad classification	State	Classification
Vehicle Volumes	Local	ADT
Rail Volumes / Frequencies	Local	Daily Train Traffic
Oil / Coal Train Presence	State, Local, Private Entity	Amount of Potential Activity
Crossing Exposure Factor	State, Local	Trains per day by average daily traffic at xing
Previously Identified Crossing Project	State, Local	Type of Project
<b>Level 2 Criteria</b>		
General Purpose Delay/Gate-down Time	State, Local	Total daily gate-down time, marginal increase in gate-down time
Freight Truck Delay	State, Local, Private Entity	Freight percentage
Roadway Freight Classification	State	Classification
Emergency Vehicle Access	Local	Proximity to fire station, police station, or hospital; network redundancy
Collision History	State, Local	Accidents per million entering vehicles; accidents per thousand entering trains
Safety Enhancement/Level of Protection	Local	Type of enhancement
Proximity to Ports and Intermodal Facilities	State, Local, Private Entity	Proximity to intermodal facilities
Located on State Highway	State	State highway classification
Environmental Impact	State, Local	Proximity to wetlands; proximity to water bodies; proximity to protected lands
Social Equity Impacts	State, Local	Proximity to minority populations; proximity to low-income populations

## Online Database Tool

An online platform that includes a mapping tool will be developed to allow users to easily view the data included in the database for each at-grade crossing included in the Level 2 evaluation. This web-based tool will be easily accessible for the public and stakeholders. Figure 1 shows an example of the type of platform that could be used. The mapping tool will use a geodatabase file format to connect the database of at-grade crossing data, or attributes, to the locations of the crossings on a map. This tool can be easily maintained by a public organization after the completion of the project. The mapping tool could look similar to Google Maps and will allow users to click, or highlight a crossing to view the attributes that are associated with that crossing. The mapping tool will be a Geographic Information System (GIS) developed using ESRI Software.

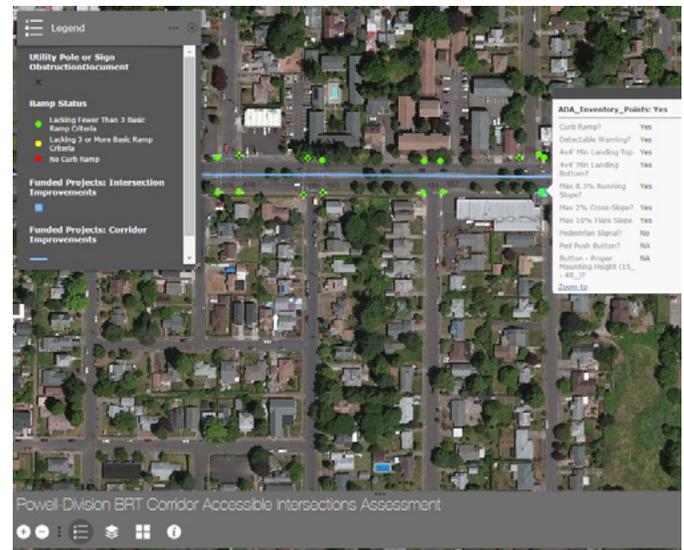


Figure 1. Example Platform for Road-Rail Conflicts

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The tool will be interactive and will allow the State and local agencies to export data included in the database as Excel spreadsheets for use in planning and prioritizing projects. Individual at-grade crossing locations could also be isolated in the tool to provide the user with detailed information on the data for a set of crossing locations. The database tool will also allow different local agencies and the State to coordinate projects and prioritize improvements across the State.

Database documentation will be prepared that summarizes the data contained in the database, where the data was obtained, the date collected, and other valid information consistent with typical database documentation parameters.

### DELIVERABLES

- ▶ Documentation on best practice research on database structure and prioritization criteria (in Word format)
- ▶ Database (in Excel and ESRI Geodatabase format)
- ▶ Online database tool
- ▶ Database documentation (in Word format)

### JTC RESPONSIBILITIES

- ▶ Attendance at project team meetings
- ▶ Weekly project manager phone conversations with Transpo project manager

## TASK 2: DEVELOP PRIORITIZATION PROCESS FOR ROAD-RAIL CONFLICTS

Erinn Walter and Michael Houston will help lead the development of the prioritization process to identify high priority at-grade crossings for improvement. Jeanne Acutanza and Jon Pascal will assist in leading the background discussion providing the context to the problem statement of why road-rail conflicts have become a more critical issue.

The process will start by providing an overview of the road-rail conflict issue and how a statewide prioritization effort of at-grade crossings may help communities identify and address their needs related to unsafe at-grade crossings. The team then will develop a criteria-based decision-making process that can be used to prioritize statewide investments for at-grade crossing solutions. This will be accomplished by working with the Advisory Panel to identify priorities.

## Context and Impact of Rail-Rail Conflicts

Using presentations and a web-based landing page, such as the one shown on Figure 2, we will deliver information to the Advisory Panel regarding changes occurring in Washington State that impact road-rail conflicts and the transportation system. This will include information on the growth of commodity and freight train traffic in Washington State, existing funding challenges for at-grade crossing solutions, and changes in freight and general-purpose traffic.

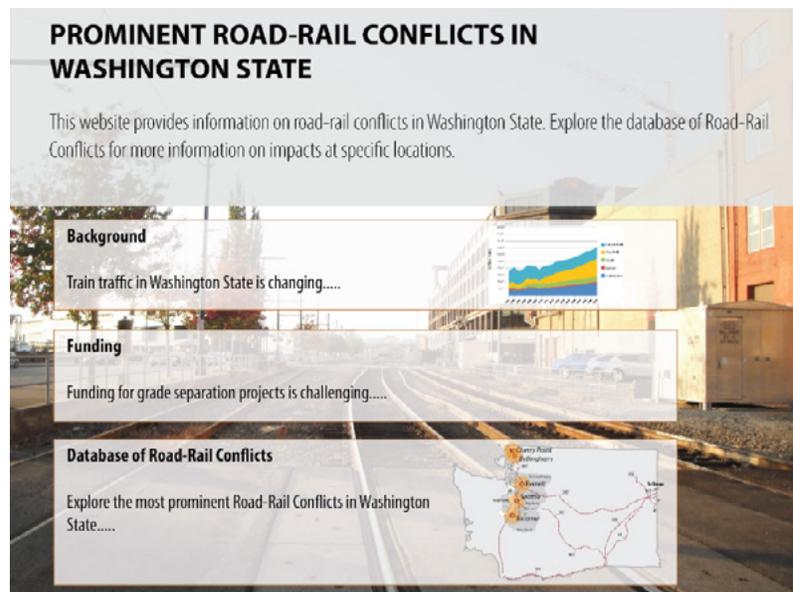


Figure 2. Example of Web-Based Landing Page

The web-based landing page will allow users, including the public, to view background information, mapping, and data for road-rail conflicts in Washington State. Web-based mapping will also be used to show the geographic distribution and corridor groupings of at-grade crossings as well as how mobility, safety, and other impacts are geographically distributed in the state. At-grade crossings could be grouped into corridors by rail route, region, or by county. The web-based mapping tool will allow users to turn information and criteria on and off to clearly display geographic patterns of impacts.

## Define Potential Prioritization Options

We will also work with the Advisory Panel to develop different options for the prioritization of criteria that show how results change based on how criteria are weighted. Options could include prioritizing safety over delay or freight delay over general-purpose delay, or economic impacts, to name a few. Other options could be

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developed based on different geographic corridors, such as county groupings or regional groupings of at-grade crossings. Consideration could be given to current constructs such as FAST Corridor Projects, or those projects already prioritized by regional MPOs.

## Test and Present Options

Based on discussions and feedback from the Advisory Panel, several options will be evaluated and tested to understand how the resulting priorities may change at a statewide or regional level. For example, a prioritized table based on different criteria weighting, as shown on Figure 3, will be used alongside mapping tools to display the results of different prioritization options for the Advisory Panel to consider.

USDOT Crossing Number	City/County	Cross Streets	2040 Maximum Daily Train Volumes (Freight and Passenger)	2040 Daily Gate-Down Time (min)	2040 Average Daily Traffic Volume	2040 Average Daily Freight Truck Delay	Impact to Emergency Services	Accidents per Million Entering Vehicles	Proximity to Ports	Score with Safety Focus	Score with Delay Focus
<b>Corridor 1</b>											
XXXXXX	Spokane County	Wellesley Ave								1	3
XXXXXX	Seattle	S Lander St and 3rd Ave S								3	1
XXXXXX	Ridgefield	Mill Street								4	2
XXXXXX	Blaine	Bell Road and Hughes Ave								2	4

Figure 3. Example Rating Table

The tools and illustrations, such as those shown previously, will be utilized in a series of meetings with the Advisory Panel to establish the feedback needed to confirm the criteria-based decision making process. The team will demonstrate how this process could allow the State and local agencies to strategically plan for and prioritize road-rail conflict solutions across the State, such that the State can take a systemic approach to addressing the issue.

Best practices employed by other organizations such as the Transportation Improvement Board (TIB), the Freight Mobility Strategic Investment Board (FMSIB), or the County Road Administration Board (CRAB) will be assembled to provide an overview of how other organizations evaluate and prioritize projects on a statewide competitive basis. The team will also review the prioritized UTC list of projects or crossings against the potential options. This information will be utilized with the Advisory Panel as the organizational structure is developed for prioritizing at-grade crossings.

### DELIVERABLES

- ▶ Documentation on background and problem statement (in Word and PPT Presentation format)
- ▶ Summary and evaluation of prioritization options (in Word and PPT Presentation format)

## EXAMPLE BEST PRACTICE PRIORITIZATION PROCESS FROM CALIFORNIA PUBLIC UTILITIES COMMISSION

### Prioritization Formula for Crossing Nominated for Separation or Elimination:

$$P = \frac{V*(T+0.1*LRT)*(AH+1)}{C} + SF$$

#### Where:

- P is Priority Index Number
- V is Average Daily Vehicle Traffic
- T is Average Daily Freight/Commuter Train Traffic
- LRT is Average Daily Light Rail Train Traffic
- C is Project Cost Share to be Allocated from the Grade Separation Fund
- AH is Accident History (number of accidents at crossing)
- SF is Separation Factor

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### TASK 3. DEVELOP ORGANIZATIONAL STRUCTURE FOR PRIORITIZING INVESTMENTS

Jeanne will work closely with Allegra to develop potential organizational structures for prioritizing investments to at-grade crossings.

#### Potential Structures

The work to identify potential organizational structures will start from the best practice research conducted in Task 2 along with input and feedback from Advisory Panel interviews (Task 4) and conversations with the Staff Workgroup. Based on the input received, the team will develop 3 to 4 potential options for an organizational structure to prioritize crossing investments. Considerations in developing the options will include policy objectives such as representation of membership in terms of geography, interest, and expertise; fit with existing processes; opportunity for partnerships; level of project development; amount of new resources needed (whether staff or other costs); frequency needed given available funding and how that might change with additional funds; and frequency of database updates and other inputs (for example, site visits or other qualitative data).

#### Trade-offs and Evaluation

The trade-offs of each potential structure will be evaluated by the team by engaging with the Advisory Panel. The Advisory Panel will consider the prioritization process that will best fit the overall objectives. The team will facilitate the Advisory Panel discussion (See Meeting 3) to reach consensus on a preferred option. It is anticipated the discussions will include the evaluation of tradeoffs for each option, including anticipated costs. All options may be presented in the final report with a summary of how they were evaluated.

#### DELIVERABLES

- ▶ Documentation on potential organizational structures (in Word and PPT Presentation format)

### TASK 4. ADVISORY PANEL AND STAFF WORK GROUP

Allegra Calder will facilitate the Advisory Panel and Working Group, helping set agendas, organize meetings, and incorporate feedback from the group.

This study will be guided and informed by two work groups, an Advisory Panel with representation from diverse freight interests including, cities; counties; transportation planning organizations, including WSDOT; railroads; ports; and utilities; and a larger Staff Workgroup. The Staff Workgroup will serve as a resource and sounding board for the technical components of the project. The Staff Workgroup will draw its membership from staff of the JTC, House and Senate Transportation Committees, the Office of Financial Management, and several other associations and state agencies.

We will bring our expert process design, agenda development, and facilitation skills to this effort, ensuring that the meetings are well planned, make efficient use of everyone's time, and increase understanding and the ability to provide informed input into the study process. We will plan to send materials out to the groups in advance along with any key discussion questions.

Our team has a strong track record in successfully supporting Advisory Panels and Workgroups, including extensive experience with similarly organized JTC-led studies. We are particularly adept at working through challenging and/or complex issues with stakeholders and elected officials. We are accustomed to making recommendations on difficult issues and working through our reasoning with members while being responsive to their concerns.

#### Advisory Panel Interviews

As part of the project initiation process and to ensure that the perspectives of the key stakeholder participants are integrated into the work program, we will conduct phone interviews with Advisory Panel members prior to the JTC meeting in June.

#### Advisory Panel Meeting Plan

The team will prepare for and facilitate up to four meetings of the Advisory Panel. The preliminary plan calls for meetings of this group in May, late July/early August, September, and early November. The preliminary meeting plan for this group has been prepared and is described below.

#### Meeting #1: Project Initiation and Database Overview (late May).

Project start-up and scope briefing; Staff Workgroup membership, and future meeting plan; identification of key questions and issues; review of the existing materials, processes, and agencies involved; overview of proposed database structure and criteria.

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### Meeting #2: Prioritization (late July/early August).

Update on database progress; prioritization discussion, questions to be discussed might include:

- ▶ What are the objectives of the prioritization process? Are there competing objectives? If so, how should we balance them?
- ▶ How can we think about prioritization from a systems perspective?
- ▶ How do we prioritize crossings along corridors or other geographical constructs?
- ▶ How do we account for local/regional priorities? (e.g. MPO, RTPO)
- ▶ How do we adapt the process to accommodate unplanned/unknown future changes? How do we ensure projects are viable?
- ▶ In addition to the database are other inputs needed?
- ▶ How can the process incorporate updated or additional data?
- ▶ How do we measure success?

This meeting would also include a discussion of alternative solutions to grade separation. It could also incorporate a Freight Users panel to allow their input into the process.

### Meeting #3: Preliminary Findings, including Organizations Structure (late September).

Review of a proposed organizational structure with a discussion guide to solicit input on key questions related to the process.

- ▶ What organizational structures exist?
- ▶ Who should participate?
- ▶ How often?
- ▶ Is dedicated funding needed?
- ▶ How to leverage existing local processes and retain a statewide focus?
- ▶ How to measure and monitor program success?



### Meeting #4: Draft Recommendations and Report (early November before the JTC presentation).

Discussion of key project findings and draft study recommendations; review and discuss draft report, and demo of the database tool.

### Staff Workgroup Facilitation and Management

The team will prepare for and conduct four 2 to 3-hour meetings of the Staff Workgroup, beginning in early May and running through October. The Work Plan for the group is below.

#### Meeting #1 (early May, prior to Advisory Panel meeting)

Meeting to review project scope, schedule, meeting plan, key project questions, and existing players and processes. Other topics will include the review of initial database options and Advisory Panel materials; discussion of JTC presentation; and identification of additional information or analysis needed.

#### Meeting #2 (July, prior to Advisory Panel meeting)

Review of Advisory Panel materials and preliminary run through of the discussion questions – how would the Staff Workgroup answer the questions, what do they want to know from the Advisory Panel; Workgroup input on organizational structure.

#### Meeting #3 (September, prior to Advisory Panel meeting)

Review materials for Advisory Panel meeting and discussion of proposed organizational structure.

#### Meeting #4 (October, prior to Advisory Panel meeting)

Review key issues and recommendations, and draft JTC presentation.

### DELIVERABLES

- ▶ List of Advisory Panel interview questions
- ▶ Documentation of Advisory Panel interviews (in Word format)
- ▶ Advisory panel meeting materials (in Word and PPT Presentation format)
- ▶ Staff Workgroup meeting materials (in Word and PPT Presentation format)

### JTC RESPONSIBILITIES

- ▶ Polling and scheduling of Advisory Panel and Staff Workgroup members for meetings.

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## REPORT GRAPHICS

*Transpo's in-house Creative Services team is experienced at creating rich reports and graphics that help transform data and information into clear and easy-to-understand formats.*



*Sample Plan Covers designed and prepared by Transpo.*

### TASK 5. DRAFT AND FINAL REPORTS

Jon will lead the production of the draft and final report documents, and completion of the other deliverables. The draft report will be delivered by November 22nd to the Advisory Panel and Staff Workgroup members, and the draft final report would be delivered to JTC staff by December 14, 2016.

The timeline for the turnaround of the draft final report is aggressive and in order to meet the deadline the team will prepare a spreadsheet for reviewers to complete that highlights who made the comment, the location of the comment, and how the project team addressed the comment. The team will work closely with the JTC project manager to review and address the comments.

We will consolidate our research, analysis, and recommendations into a draft and final report. The final report will be an accessible synopsis of the work of Tasks 1 to 4, using graphics, charts, maps, and tables to present information in a compelling and straightforward manner. Accompanying the final report, we will deliver other project elements such as the online database tool and database documentation. We will also produce a summary presentation to brief the JTC on November 15th and the

House and Senate Transportation Committees during the 2017 session.

The development of the Draft Report will be an iterative process. The consultant team will be primarily responsible for developing and revising successive drafts of the document, involving JTC staff, the Staff Workgroup, and other identified key stakeholders in the review and revision process as necessary. This process will ensure the final product is top quality and that, at time of adoption, key stakeholders will be familiar with it, as many of them will have contributed to its development.

### DELIVERABLES

- ▶ Draft report (Word and PDF format)
- ▶ Draft Final report (Word and PDF format)
- ▶ Hard copies of the final report (25 copies)

### TASK 6. PRESENTATIONS

Jon will work with the team to assemble and provide presentations to the JTC. The presentation materials will be developed based on materials produced as part of previous tasks. Jon will work closely with JTC staff to finalize the presentations ahead of the meetings, then attend each of the 4 meetings to provide updates on the study effort, and also the overall study recommendations. Consultant staff will also be available to attend the Rail Tour in September to see firsthand some of the at-grade crossing issues, and hear directly from the JTC and Advisory Panel members.

### DELIVERABLES

- ▶ Three presentations in PPT format



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## SCHEDULE

A proposed project schedule has been prepared and highlights the timeline for completion of each task. We are confident that the project tasks and milestones set forth can be completed within the specified time frame. At the project's outset, Transpo's project manager, Jon Pascal, will work with you to review this schedule and determine the optimal timeline, including key deliverables, critical path tasks, required review times, and other time-sensitive events. We will use the revised schedule as a baseline to monitor progress over the course of the project.

Prioritization of Prominent Road-Rail Conflicts in Washington State Project Schedule	Month										
	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Jan	
<b>Task 1: Database Development</b>											
Assemble and Screen Available Data	█										
Establish Prioritization Criteria	█	█									
Online Database Tool		█									
<b>Task 2: Prioritization Process</b>											
Context / Impact of Road-Rail Conflicts		█									
Define Potential Prioritization Options		█	█								
Test and Present Options			█								
<b>Task 3: Organizational Structure</b>											
Potential Structures				█							
Trade-Offs and Evaluation					█	█					
<b>Task 4: Advisory Panel and Staff Work Groups</b>											
Advisory Panel Interviews		█									
Advisory Panel Meetings			★			★		★		★	
Staff Workgroup Facilitation		★			★		★	★			
<b>Task 5: Draft and Final Reports</b>											
Draft Report								█			
Final Report										█	
<b>Task 6: Presentations</b>											
Presentations				★					★	★	

- ★ Advisory Panel Meeting
- ★ Staff Workgroup
- ★ Presentation
- ★ Presentation During 2017 Legislative Session