

Solano Rail Crossings Safety Improvement Plan

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Executive Summary

The Solano Transportation Authority (STA) completed the original Solano Rail Crossing Inventory and Improvement Plan (Plan) in 2011, which created a comprehensive inventory of rail crossings in Solano County (County) and identified a prioritized list of rail crossing safety projects. An update to the project list and improvements was then updated as part of the Solano Rail Facilities Plan Update in 2015. This plan is an update to the previous plans identifying rail crossing safety projects using updated data and also prioritizes the grade crossings that are in most need of the safety improvements.

The prioritization process was based on data collected from various sources to understand the impact of the at grade crossings on safety for the users. The data collected included:

- Grade Crossing Locations
- Incidents – collected from the Federal Railroad Administration (FRA), Statewide Integrated Traffic Records System (SWITRS), and Capital Corridor Joint Powers Authority (CCJPA)
- Key Facilities – the key facilities are used as a proxy for potential exposure for vulnerable populations
- Traffic Volumes – where available, average daily traffic volumes were collected from the local jurisdictions
- Project Readiness – this criteria includes plans or improvements the local agencies have completed or in the process of completing to enhance the safety of the at grade crossing locations.

Each of these metrics was assigned a graphical level of importance into certain categorized as shown in Figure A-1.





	Most Important		Somewhat Important
	Very Important		Important

Figure A-1 – Ranking Levels of Importance

Many of the criteria were evaluated and assigned a level of importance based on two or more criteria subsets. For example, incidents at the crossing will be assigned a level of importance based on both the total number of incidents, and number of fatalities at the crossing. If different levels of importance are assigned to a single criteria for a crossing, the highest level of importance was used for final prioritization and evaluation.



















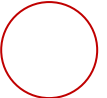








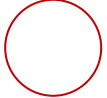

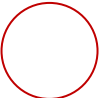
Based on the prioritization methodology, a list of prioritized grade crossings with their respective safety improvements was developed as shown in Table A-1. Each of these locations has associated recommended safety measures, where the safety measures were recommended based on a toolbox approach and a high-level review of each location. They were not based on engineering analysis or field visits.

The types of improvements recommended have shorter-term implementation timelines focused on immediate safety impacts including:

- Gates and barrier arms
- Traffic signalization
- Enhanced Striping and signage
- Improved lighting
- Relocating driveways.

The recommended improvements and the associated order of magnitude costs are provided in Appendix D.

Table A-1 – Tier 1 Railroad Crossing Prioritization Matrix

Ranking	Location	Incidents	Proximity to Key Facilities	Traffic Volumes	Train Speed and Volumes	Capital Costs	Project Readiness
1 - 7	East Tabor Ave (Fairfield), 1st St (Dixon), Pitt School Rd (Uninc), Sunset Ave (Suisun City), Canon Rd (Fairfield), Pedestrian Xing (Solano Rail Hub) (Suisun), Midway (Uninc)						
8-12	Elmira Rd (Uninc), Industrial Way (Benicia), Batavia Rd(Uninc), Fox Rd (Uninc), Fox Rd (Uninc)						
13-19	Chadbourne Rd (Uninc), Rio Dixon Rd (Uninc), Red Top Rd (Uninc) Fry Rd (Uninc), Robben Rd (Uninc), Hawkins Rd (Uninc), Lewis Rd (Uninc)						
20-30	Valle Vista Avenue (Vallejo), Ped Xing (Vallejo), Valle Vista Avenue (Vallejo), Nebraska (Vallejo), Florida Street (Vallejo), Georgia Street (Vallejo), Maine Street (Vallejo), Sereno Drive (Vallejo), Redwood Street(Vallejo), Lopes Road (Fairfield), Hwy 37 / Lewis Brown Dr (Vallejo)						
31+	Solano Avenue (Vallejo), Nebraska Street (Vallejo), Louisiana Street (Vallejo), Wilson Avenue (Vallejo), Mini Drive (Vallejo), Tennessee Street (Vallejo), Curtola Parkway (Vallejo), Mississippi Street (Vallejo), Mare Island Way (Vallejo), Sonoma Blvd (SR 29) (Vallejo)						

1.0 BACKGROUND AND PURPOSE

The Solano Transportation Authority (STA) completed the original Solano Rail Crossing Inventory and Improvement Plan (Plan) in 2011, which created a comprehensive inventory of rail crossings in Solano County (County) and identified a prioritized list of rail crossing safety projects. An update to the project list and improvements was then updated as part of the Solano Rail Facilities Plan Update in 2015.

Since the last update of the Plan, there have been an increasing number of incidents at at-grade railroad crossings involving trains, vehicles, and pedestrians. Over that same period, there has been an increase in vehicle, pedestrian, and bicycle traffic crossing the railroad tracks in Solano County.

The STA Rail Crossing Safety Improvement Plan identifies at-grade crossings that frequently experience incidents with trains and are in need of safety improvements. The purpose of the Plan is to prioritize rail crossing safety improvement projects in Solano County that will be used to pursue grant funding to deliver the improvements.

2.0 REPORT ORGANIZATION

The Rail Crossing Safety Improvements Plan documents the process to inventory, analyze, and prioritize the rail crossings and recommend appropriate improvements. This report incorporates feedback from the local agencies in the County. The local agencies provided information for the data collection process. They also provided feedback on the prioritization methodology and ultimate recommendations included in this report. This report is organized into the following sections.

- Section 3 – Inventory Update – this section describes the data sources and data types used for the prioritization.
- Section 4 – Prioritization Methodology – this section describes the methodology and data rankings used to prioritize the at grade crossings.
- Section 5 – Grade Crossing Improvements – this section describes the suite of safety improvements recommended for at grade crossings for each location including high-level estimate of costs.
- Section 6 – Prioritization Results – this section describes the results of the prioritization analysis.
- Section 7 – Funding – this section describes potential funding sources.

3.0 INVENTORY UPDATE

Detailed inventory data was gathered from various sources and included the following:

- Grade Crossing Locations

- Incidents
- Key Facilities
- Future Developments
- Traffic Volumes

Each of these data elements is described below including brief summaries of the findings.

3.1. Grade Crossing Locations

The initial list of crossings was provided from the 2015 Solano Rail Facilities Plan and cross-checked with the latest Federal Railroad Administration and California Public Utilities Commission inventory databases. Only crossings listed in either database were maintained in this version of the plan update. Additional crossings provided in the 2015 Plan that are not recorded in these websites have been removed from the list of crossings in Solano County in the inventory database as these crossings are not considered within the purview of being regulated by the Federal Railroad Administration or the California Public Utilities Commission. Additionally, the inventory includes all private crossings, but these crossings would not be considered for safety improvements under the Solano Rail Safety Improvements Plan given that they are not publicly operated and maintained and fall out of the jurisdiction of the local agencies. A full list of the crossings are provided in Appendix A.

Federal Railroad Administration (FRA)

The FRA data was downloaded from the FRA website in May 2023 which contained data updated through April 2023. The information is updated monthly by both the state (CPUC) and railroads. The data gathered from the FRA website includes the following.

- Crossing Data (crossing number, roadway name, jurisdiction, primary rail operator, rail line and subdivision, etc.)
- Average Annual Daily Traffic (AADT) Volumes and Year
- Train Speed and Frequency

California Public Utilities Commission (CPUC)

Although the FRA database serves as the primary data source, CPUC data was used to supplement and verify FRA data. CPUC inventory data includes crossing data such as crossing number, roadway name, jurisdiction, primary rail operator, rail line and subdivision, etc. Some crossings that appeared in CPUC did not appear in FRA inventory and were added to the database grade crossing list accordingly. The two databases are not updated on the same timelines, so typically there will be inconsistencies between the two databases.

3.2. Incidents

Incident data was gathered from three sources including the FRA and Statewide Integrated Traffic Records System (SWITRS) databases, as well as from Capital Corridor.

FRA Data

All Train/Vehicle, Train/Bicycle, and Train/Passenger grade crossing incidents resulting in a non-injury, injury, or fatality between January 2012 and April 2023 (10 years and 4 months duration) were gathered. This data was added to the inventory and was cross-checked with the other data sources to eliminate duplicates. The incidents are documented in Appendix B.

SWITRS Data

The SWITRS incident data is updated annually for both train and non-train related incidents. The SWITRS query provides a list of incidents for the past 10 years (Jan 2012 to Dec 2022). The data was post-processed in ArcGIS to reflect only incidents within 200 feet of a rail crossing. All SWITRS data was added to the inventory and documented collisions were cross-checked with the other data sources to eliminate duplicates.

Capital Corridor Data

Incident data which consists of near misses was provided by the Capital Corridors Joint Powers Authority (CCJPA).

From these three data sources, the following is an overall summary of the incidents. Of the 138 total crossings, a total of 133 incidents occurred at 39 crossings.

- 127 incidents were collisions and six incidents were near misses.
- There were 42 train related incidents, and from those incidents, 12 involved fatalities, 11 involved injuries, and 19 resulted in no injuries.
- There were 85 total incidents recorded that occurred at rail crossings but where a train was not directly involved. These incidents include Vehicle/Vehicle, Vehicle/Pedestrian and Vehicle/Bicycle incidents. Of these non-train related incidents, none involved a fatality, 35 resulted in injuries and 50 resulted in no injuries.
- The nine train crossings with more than one train related incidents encompass a total 37 out of the total 42 train-related incidents.
- The 13 train crossings with more than one non-train related incidents encompass a total 72 out of the total 85 non-train related incidents.

Table 1 presents a list of those crossings that have more than one train related and/or more than one non-train related incident. The full list of crossings with incidents is provided in the Appendix.

Table 1: Summary of Incidents by Crossing					
Crossing	DOT No.	Jurisdiction	Number of Incidents		
			Train	Non-Train	Total
Midway Road	751255U	Unincorporated	7	17	24
Canon Road	751291P	Fairfield	9	2	11
Pitt School Road	751254M	Dixon	1	5	6
Sunset Avenue	751295S	Suisun City	4	2	6
Industrial Way	751550Y	Benicia	3	0	3
Fry Road	751289N	Unincorporated	1	3	4
Elmira Road	751288G	Unincorporated	3	1	4
Fox Road	751258P	Unincorporated	2	0	2
Chadbourne Road	751491Y	Unincorporated	2	0	2
East Tabor Avenue	751294K	Fairfield	1	0	1
Rio Dixon Road	687614J	Unincorporated	0	13	13
Red Top Road	751317P	Unincorporated	0	12	12
Park Road	751548X	Benicia	0	3	3
Lopes Road	751313M	Fairfield	0	3	3
Pennsylvania Avenue	751300L	Suisun City	0	2	2
Pedrick Road	751248J	Dixon	0	2	2
Park Road	751558D	Benicia	0	2	2
Gate Road	687605K	Fairfield	0	2	2

3.3. Proximity to Key Facilities

Key facility information gathered were based on the facility types listed below, with those facilities located within a ½ and ¼ mile from the crossings identified. Key facility proximity information is provided in the Appendix.

- Schools
- Senior centers/Community Centers
- Transit Stations/Centers,
- Industrial Centers,
- Large Employment Centers
- Parks, and
- Government Centers.

The locations of bus stops, hospitals, government buildings, community centers, Amtrak stations, and parks were provided directly by the County of Solano County Department of Information Technology. The location of schools, industrial centers, and large employment areas were not provided.

Where comprehensive information for the County of Solano was not directly provided, data was been derived by the land use designated by the online Solano County Parcel services and supplemented by data as provided by the City of Suisun and City of Fairfield

where available. To confirm this methodology, the location of County provided location points was compared against relevant parcels from the Online GIS Portal.

From the data gathered, the following is an overall summary of the key facilities.

- Schools - 22 crossings are within a ½ mile and six within a ¼ mile.
- Senior/Community Centers – Seven crossings are within a ½ mile and four within a ¼ mile.
- Transit Stop/Center - 35 crossings are within a ½ mile.
- Industrial Center - 76 crossings are within a ½ mile.
- Large Employment Center - No crossings are within a ½ mile.
- Hospital – Two crossings are within a ½ mile.
- Park - 25 crossings are within a ½ mile.
- Government Center – One crossing is within a ½ mile.

Table 2 on the following page provides the indicators of increased safety risks introduced by key facilities when located adjacent to rail crossings.

Table 2 – Risk Indicators by Key Facility Type

Key Facility Types	Increased Vehicular Volumes	Increased Pedestrian Volumes	Higher Risk Populations	High-Risk Vehicles
Schools	X	X	X	X
Senior Centers / Community Centers	X	X	X	X
Transit Stations / Centers	X	X		X
Industrial Centers	X			X
Large Employment Areas	X			
Hospitals				X
Parks		X	X	
Government Centers	X			

3.4. Future Developments

Where available, relevant future developments anticipated to be completed by 2028 within Solano County are included. Information provided by the local jurisdictions were used as the sole data source. The data from the Cities of Suisun and Fairfield were filtered to reflect relevant future developments within the predetermined Key Facilities categories. No information from other jurisdictions was provided.

3.5. Traffic Volumes

FRA Data

Where available, AADT volumes from the FRA database is to be used as the primary data source at each rail crossing. However, this data can be as much as ten years old and would be supplemented by additional data sources where possible. If no additional data is available, the base FRA data is to remain until additional information can be provided at a later time.

Local Agency Data

All jurisdictions have been contacted to provide traffic volumes where available. This information is used to fill-in gaps within the FRA dataset. Only the City of Suisun and City of Fairfield have provided this information. No information from other jurisdictions is available at this time.

Replica Data

Replica data was used to fill in gaps for any locations without FRA and agency-provided data, where no other information is available. While other sources might be aggregated by tube counts or video counts, Replica data is sourced by cell phone data and in-unit GPS data. The data is compiled from comprehensive travel information from the region, as opposed to FRA and local agency data that are intentionally collected at specific crossings and roadway segments. The data is buffered to only include segments that run across the railroad grade crossings.

3.6. Train Speeds and Volumes

Train speeds and volumes were gathered from the latest FRA inventory database and recorded in the criteria database and will include the following:

- Total Daily Trains – number of trains may be less than one per day if volumes are recorded on a weekly basis on the FRA inventory form.
- Maximum Speed (mph)
- Typical Speed Range (mph)

Crossings will consider two thresholds of train volumes: 12 or more and less than 12 trains per day. This is based on the CCJPA typical weekday train schedule of 12 trains per day.

3.7. Capital Costs

Capital costs to implement the identified safety improvements were generated during the evaluation process. The safety improvements were determined by evaluating existing crossing infrastructure such as pedestrian facilities, automated gate arms, medians, and/or traffic signal infrastructure relative to the type and frequency of recorded incidents and/or proximity to key facilities. Only those crossings that have recorded

incidents or are located near key facilities, were assigned initial recommendations for safety improvements.

Rough order of magnitude costs were generated for each qualifying crossing based on recent bid and estimate data for each recommended improvement.

4.0 PRIORITIZATION METHODOLOGY


The prioritization process was iterative, with each of the evaluation criteria being weighted relative to their individual perceived safety risk and/or the capital cost to implement the recommended safety improvements.

Initial assessment of the crossings was based on reported incidents and/or proximity to key facilities. Crossings noting either of these criteria were further evaluated and prioritized based on the remainder of the evaluation criteria. Crossings with no recorded incidents in the past five (5) years or are not in the defined proximity to key facilities were noted as low priority crossings in the report without further evaluation or recommended improvements.

4.1. Criteria Evaluation and Ranking

All applicable evaluation criteria for each crossing were assigned a graphical level of importance categorized by the following:

Table 3 – Level of Importance Categories






	Most Important		Somewhat Important
	Very Important		Important

Many of the criteria were evaluated and assigned a level of importance based on two or more criteria subsets. For example, incidents at the crossing were assigned a level of importance based on both the total number of incidents, and number of fatalities at the crossing. If different levels of importance are assigned to a single criteria for a crossing, the highest level of importance were used for final prioritization and evaluation.

Incidents

All crossings with one or more incidents were assigned a level of importance to be considered in the prioritization process. Type and frequency of incidents were evaluated to determine the perceived safety risk, which were determined as follows:




Table 4 – Levels of Importance - Incidents

Type of Incident	Number of Incidents	Level of Importance
Fatalities	1 or more	
Injuries	2 or more	
	1	
Collision (No Injuries) and Near Misses	2 or more	
	1	

Proximity to Key Facilities

The level of importance of each key facility is assigned based on the type of facility and, in some cases, how close the facility is to the crossing, as shown in Table 5.

Table 5 – Levels of Importance - Key Facilities

Type of Facility	Proximity	Level of Importance
<ul style="list-style-type: none"> School Senior Center / Community Center 	Within ¼ mile	
	½ mile to ¼ mile	
<ul style="list-style-type: none"> Transit Station / Center Industrial Center Large Employment Area Hospital Park Government Centers 	Within ½ mile	

Schools and senior centers / community centers are sorted into two proximity categories to capture the impact associated with the increased likelihood that the higher risk population associated with those facilities would be pedestrians at the crossing if within ¼-mile, as opposed to ½-mile.




Future Developments

A separate level of importance table is not provided for Future Developments. The Level of Importance for this category was assigned based on the criteria set forth for Incidents and/or Proximity to Key Facilities. Like all other criteria rankings, the highest level of importance determined for this criteria was used for final prioritization and evaluation.

Traffic Volumes

Traffic volume level of importance was evaluated based on average daily traffic (ADTs). Since the risk of future incidents is greater given the number of vehicles passing through the crossing, the level of importance is assigned based on existing or future volumes, whichever is greater, regardless of roadway classification.






Table 6 – Level of Importance – Traffic Volumes

Existing and Future Average Daily Traffic Volumes	Level of Importance
More than 15,000	
Between 5,000 and 15,000	
Less than 5,000	

Train Speeds and Volumes

Level of importance for train speeds and volumes was evaluated based first on train speed, followed by the total daily trains at the crossing, as shown in **Table 7** below. Crossings with 12 or more train events per day will be assigned a higher level of importance compared to crossings experiencing similar train speeds with less than 12 trains per day. This is due to the inherent safety risk associated with each train event at a crossing.

Table 7 – Level of Importance – Train Speeds and Volumes

Train Speeds	Daily Trains	Level of Importance
Greater than 75 mph	12 or more	
	Less than 12	
Between 35 mph and 75 mph	12 or more	
	Less than 12	
Less than 35 mph	12 or more	
	Less than 12	Not Important





Capital Costs

A rough order of magnitude cost was determined for each qualifying crossing given the recommended safety improvements. Crossings were ranked from highest to lowest estimated capital costs for improvements. Based on the rankings, each crossing falls within the following four percentile categories: above the 95th, between the 75th and 95th, between the 50th and 75th, and below the 50th percentile.

Since level of importance for each criteria directly correlates to the prioritization of a crossing, capital costs that are below the 50th percentile were assigned the highest level of importance since they are considered the most favorable for implementation.

Conversely, crossings that require improvements costing in the top 95th percentile for Capital Costs were considered the lowest level of importance (see **Table 8**).

Table 8 – Level of Importance – Capital Costs

Capital Cost	Level of Importance
Lower than 50 th Percentile	
Between the 50 th and 75 th Percentile	
Between the 75 th and 95 th Percentile	
Above the 95 th Percentile	

The levels of importance assigned in this category are determined based on the risk to implementing the recommended improvements. Since crossings with recommended

safety improvements falling within the 95th percentile of Capital Costs will be the most expensive, they are likely to face greater funding challenges. Additionally, these crossings may result in less funding from other crossings in need of improvements.

Project Readiness

The project readiness category recognizes that some projects and agencies have already developed plans or projects for the individual grade crossings. Those locations receive a higher score than locations without any project improvement development. The locations with a higher project readiness score already have momentum behind the project development process, which makes them a high priority for the community and a better match for future grant funding.

4.2. Prioritization

Crossings will ultimately be ranked and divided into two tiers, as follows:

- Tier 1 – high priority
- Tier 2 – low priority

All crossings in Tier 1 will, at a minimum, have either a history of incidents at the crossing, or are located in proximity to a key facility. All crossings without at least one of these qualifying criteria will be placed in the Tier 2 category. Within both tiers, crossings will be ranked (prioritized) based on their assigned levels of importance.

Crossings in the Tier 1 category will be first ranked based on the first two criteria: incidents and proximity to key facilities. Crossings with higher levels of importance in these two criteria will be ranked higher relative to crossings with lower levels of importance. The crossings will be further ranked based on the levels of importance assigned in the traffic volumes, proximity to key facilities, and train speeds and volumes criteria. Capital costs are the final criteria to be used in the rankings after all other criteria. **Table 9** provides an example of a ranking of crossings in the Tier 1 level.

Table 9 – Tier 1 Rankings Example

Ranking	Incidents	Proximity to Key Facilities	Traffic Volumes	Future Developments	Train Speed and Volumes	Capital Costs
1						
2						
3						

Tier 2 crossings are considered low priority and will have been assigned as such given no recorded incidents or proximity to key facilities. These crossings will be ranked based on the levels of importance assigned in the traffic volumes, future developments, and train speed and volumes criteria. Since improvements will not be evaluated for Tier 2 crossings, capital costs for improvements will not be determined and, therefore, a level of importance related to capital costs will not be assigned.

The final crossing prioritization will be presented as a table with each crossing listed in order from highest to lowest priority. This table will include ranking assignment, crossing DOT number, roadway name, all evaluation criteria, assigned level of importance for each category, and the approximate capital cost for each of the qualifying crossings.

4.3. Rail Crossing Improvements

Rail crossing improvements were identified for each Tier 1 location. For each incident location, the source data was examined to determine the conditions at the time of the incident – speed, location, number of vehicles or pedestrians involved, etc. For all crossings, aerial imagery was used to review visibility, existing improvements, lighting conditions, and signalization. In addition, traffic volumes and traffic patterns were assessed to understand potential contributing factors.

5.0 DESCRIPTION OF GRADE CROSSING IMPROVEMENTS

The potential grade crossing improvements described below can be used as stand-alone improvements or can be combined together depending on the need at each specific crossing location. The types of grade crossing improvements identified and evaluated for the crossings include:

Active Barriers

Active Barriers include automatic gates and flashing lights (flashers) that are triggered when a train is approaching to prevent vehicles and/or pedestrians from crossing the railroad tracks.



Example of Active Barriers

Median Treatments/Channelization/Bulb-outs

Median Treatments can be effective to narrow the effective width of the crossing to provide more visibility to motorists that they are approaching a grade crossing. Raised medians and other channelizing devices are also used to prevent vehicles from driving around the active barriers. These are best applied in locations with wide streets and can be used in low traffic volume locations.



Examples of Median Treatments and Channelization

Driveway Relocations/Modifications

Driveway relocations or modifications are implemented when a driveway is close enough to the tracks that vehicular movements into and/or out of the driveway creates queuing that backs up to the tracks. In addition, this type of improvement can be combined with median treatments and bulbouts to create a narrow footprint for the crossing. These improvements require coordination with private property owners.

Traffic Signalization/Queue Cutter and Railroad Preemption

As a queue management strategy, installing traffic signals at a grade crossing provides a highly visible traffic control mechanism to prevent vehicles from stopping on the railroad tracks. This strategy is referred to as a queue cutter which uses detection that is positioned a certain distance downstream of a crossing to detect vehicle queues. The downstream distance is a function of the volume and speed of the vehicles crossing the tracks such that once the queues are detected, the queue cutter will stop arriving vehicles from crossing the tracks so that the queues will not back up to the tracks.

Railroad preemption uses communications from the railroad's train control system to the traffic signal to notify the traffic signal when a train is approaching the crossing to enable the traffic signal to clear vehicles queued on the tracks and stop arriving vehicles from entering the crossing.



Queue Cutter Example

Railroad Signal Arm Re-orientation

Railroad signal arms should be oriented at a 90-degree angle to the roadway such that the gates and flashers are positioned over and cover up to 90% of the vehicle travel lanes. In locations where the railroad is at skew angle, it is important the signal arm is

oriented to provide maximum visibility from the roadway.

Sidewalk Orientation and Automatic Pedestrian Gates

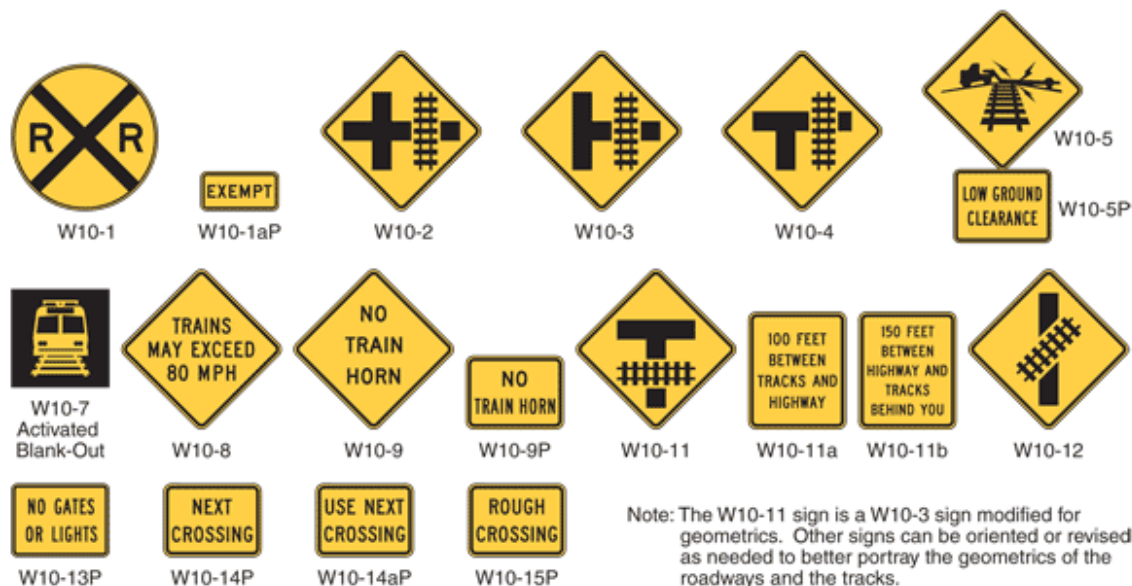
Sidewalks should be oriented for maximum sight visibility to approaching trains at a 90-degree angle to the tracks. Pedestrian gates can be used to prevent pedestrians from crossing the tracks when a train is approaching.



Example of Pedestrian Gate in Use

Enhanced Signage and Striping

Enhanced signage can include grade crossing signs, additional warning signs and striping, such as edge line striping to prevent turning on tracks. At a minimum, signing and striping improvements need to comply with the California Manual on Uniform Traffic Control Devices (CAMUTCD) requirements, which is constantly evolving.



Grade Crossing Warning Signage

Crossing Closure

Closing a crossing is reserved for locations where there are other alternative crossings nearby and where there are a high volume of severe incidents. This requires coordination with the railroad, CPUC and the local jurisdiction, and traffic modeling to determine the impacts to the street network. The decision to close a crossing ultimately rests with the owning jurisdiction (roadway authority).

Grade Separation

The use of grade separation physically separates railroad crossings from all other modes of transportation. This treatment requires high capital improvement costs and extensive design considerations. This option should be reserved for locations with high volumes, high history of incidents, and high implications for delays, typical of dense urban areas. Grade separation is an important, while costly, improvement. This report focuses on lower cost alternatives that provide benefit while grade separation is being pursued.

5.1. Safety Improvements

Proposed safety improvements were recommended for locations with train-related fatalities, train-related injuries, and high incidence of non-train-related injuries. Non-train-related injuries are defined to be injuries that do not directly involve a train but occur within in the vicinity of the relevant crossing. For example, a vehicle – vehicle collision that results in an injury would be included as a non-train related injury if it occurred close to a train track. There are no non-train-related fatalities. The details of each of the crashes were reviewed to determine potential causes or complicating factors.

This section defines the proposed safety improvements for each Tier 1 crossing. The improvements are based on best practices and standards but have not been field verified per location. It is assumed the improvements would be implemented by the local jurisdiction (roadway authority).

Table 10 presents a list of those crossings that have recorded incidents resulting in fatalities or injuries, and near misses that are associated or related to the grade crossings along with their recommended safety improvements. Incident data was gathered from three sources including the FRA and Statewide Integrated Traffic Records System (SWITRS) databases, as well as from Capital Corridor. Table 1 summarizes the data from the inventory update. Figure 1 shows the locations of the Tier 1 crossings within the County based on the prioritization in Section 6. Those costs are detailed in Appendix D. Following Table 10, there is a summary of incidents at each crossing and a brief description of recommended improvements and existing conditions.

Solano County Tier 1 Railroad Crossings

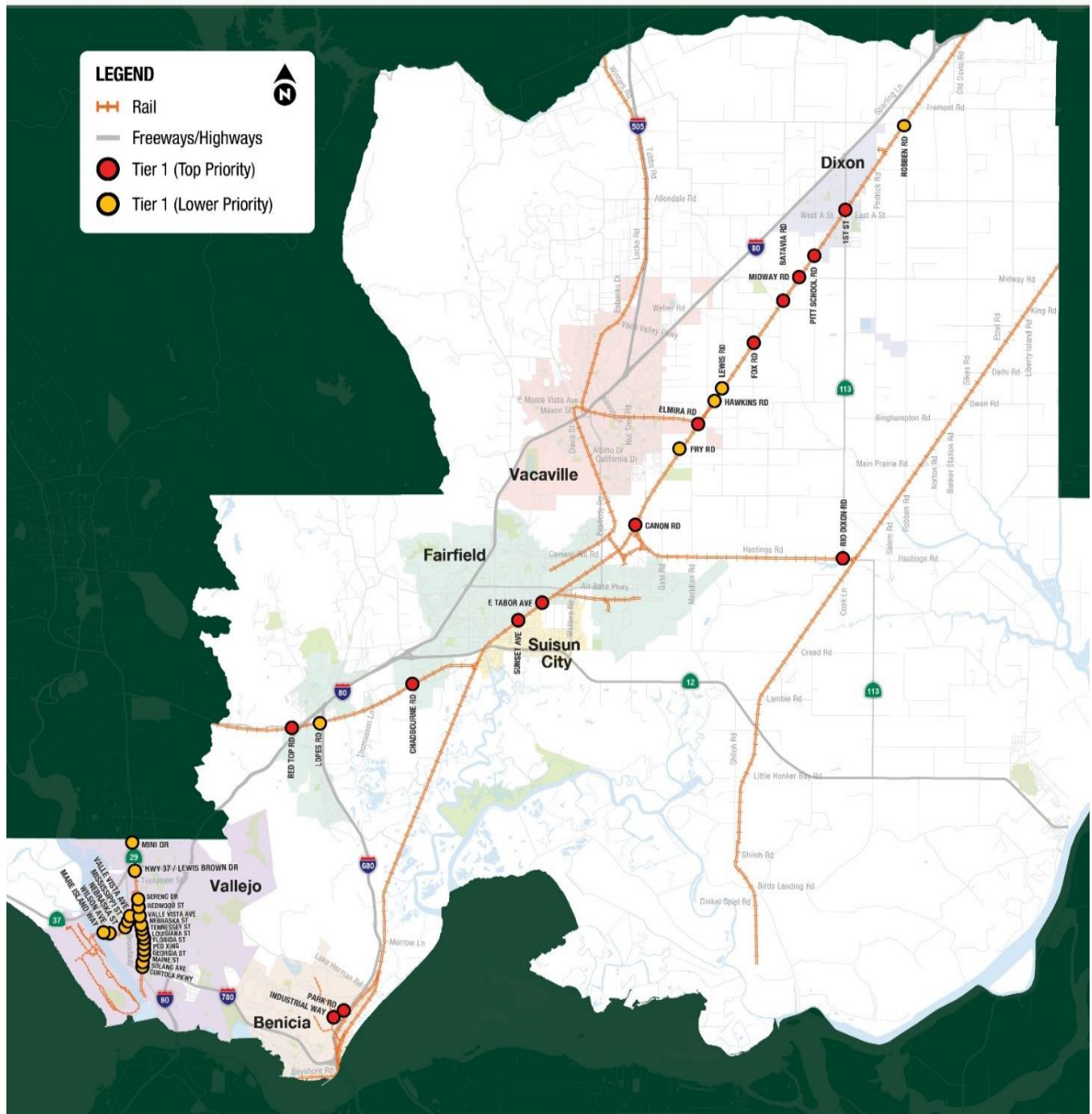


Figure 1 Tier 1 Crossings

Table 10 – Tier 1 Crossings - Summary of Incidents and Safety Measures

Crossing	DOT No.	Jurisdiction	Railroad Owner	Tier 1 Criteria			Proximity to Activity Centers	Safety Measures
				Number of Incidents				
				Train	Non-Train	Total		
Park Road	751527E	Benicia	Union Pacific	1	0	1	Transit centers, industrial centers, and parks	<ul style="list-style-type: none"> • Striping • Signalization • Streetlights • Median treatment/channelization • Roadway elements
Industrial Way	751550Y	Benicia	Union Pacific	3	0	3	Transit and Industrial centers	<ul style="list-style-type: none"> • Signage and striping • Streetlights • Roadway elements • Update gate arms from passing to active
1st Street	751250K	Dixon	Union Pacific	1	1	2	No	<ul style="list-style-type: none"> • Pedestrian gates • Pavement markings • Realign sidewalks • Median treatment
Canon Road	751291P	Fairfield	Union Pacific	9	2	11	No	<ul style="list-style-type: none"> • Signalization and preemption • Pavement markings • Streetlights • Medians/channelization
East Tabor Avenue	751294K	Fairfield	Union Pacific	1	0	1	School	<ul style="list-style-type: none"> • Median treatment • Pavement markings • Curb treatment • Pedestrian treatments and

Table 10 – Tier 1 Crossings - Summary of Incidents and Safety Measures

Crossing	DOT No.	Jurisdiction	Railroad Owner	Tier 1 Criteria			Proximity to Activity Centers	Safety Measures
				Number of Incidents				
				Train	Non-Train	Total		
							sidewalks	
Lopes Road	751313M	Fairfield	CFNR	0	3	3	Schools, Transit and Industrial Centers	<ul style="list-style-type: none"> • Signage and striping • Median treatment • Roadway elements
Sunset Avenue	751295S	Suisun City	UP	4	2	6	No	<ul style="list-style-type: none"> • Queue cutter • Pedestrian gates • Sidewalk realignment
Pedestrian Xing (Solano Rail Hub)	441093N	Suisun City	UP	0	1	1	School, Transit Centers	<ul style="list-style-type: none"> • Trespass mitigation • Active Warning Devices • Pedestrian improvements
Pitt School Road	751254M	Unincorporated	Union Pacific	1	5	6	No	<ul style="list-style-type: none"> • Pavement markings • Bulbout/Road diet • Signalization
Rio Dixon Road	687614J	Unincorporated	Western Railway Museum (WRM)	0	13	13	No	<ul style="list-style-type: none"> • Active Warning Devices • Pavement markings • Streetlights • Curb and gutter
Robben Road	751247C	Unincorporated	UP	1	0	1	No	<ul style="list-style-type: none"> • Signage and striping • Streetlights • Median treatment • Roadway elements

Table 10 – Tier 1 Crossings - Summary of Incidents and Safety Measures

Crossing	DOT No.	Jurisdiction	Railroad Owner	Tier 1 Criteria				Safety Measures
				Number of Incidents			Proximity to Activity Centers	
				Train	Non-Train	Total		
Midway Road	751255U	Unincorporated	Union Pacific	7	17	24	No	<ul style="list-style-type: none"> • Pavement markings • Streetlights • Re-align intersection • Median treatment
Batavia Road	751256B	Unincorporated	Union Pacific	1	0	1	No	<ul style="list-style-type: none"> • Pavement markings • Streetlights • Re-orient railroad arm • Median treatment
Fox Road	751258P	Unincorporated	Union Pacific	2	0	2	No	<ul style="list-style-type: none"> • Pavement markings • Streetlights • Median treatments
Lewis Road	751259W	Unincorporated	UP	1	0	1	No	<ul style="list-style-type: none"> • Signage and striping • Streetlights • Pavement/roadway elements
Hawkins Road	751260R	Unincorporated	UP	1	0	1	No	<ul style="list-style-type: none"> • Streetlights • Pavement markings • Roadway elements
Elmira Road	751288G	Unincorporated	Union Pacific	3	1	4	No	<ul style="list-style-type: none"> • Pavement markings • Streetlights • Signalization

Table 10 – Tier 1 Crossings - Summary of Incidents and Safety Measures

Crossing	DOT No.	Jurisdiction	Railroad Owner	Tier 1 Criteria			Proximity to Activity Centers	Safety Measures
				Number of Incidents				
				Train	Non-Train	Total		
Fry Road	751289N	Unincorporated	UP	1	3	4	No	<ul style="list-style-type: none"> • Pavement markings • Streetlights • Roadway elements • Bulbouts
Red Top Road	751317P	Unincorporated	California Northern Railroad (CFNR)	0	12	12	No	<ul style="list-style-type: none"> • Pavement markings • Streetlights • Landscape maintenance
Chadbourne Road	751491Y	Unincorporated	UP	2	0	2	No	<ul style="list-style-type: none"> • Active warning devices • Pavement markings • Median treatment • Streetlights
Mini Drive	751462N	Vallejo	CFNR	0	0	0	School, Transit, Parks	<ul style="list-style-type: none"> • Signalization • Streetlights • Pavement markings • Update roadway elements • Pedestrian treatment
Lewis Brown (Hwy 37)	751463V	Vallejo	CFNR	0	0	0	School, Industrial Center, Parks	<ul style="list-style-type: none"> • Pavement markings • Median treatment • Roadway elements • Vegetation removal/trimming
Redwood Street	928445S	Vallejo	CFNR	0	0	0	School, Industrial Centers, Parks	<ul style="list-style-type: none"> • Update signage and striping

Table 10 – Tier 1 Crossings - Summary of Incidents and Safety Measures

Crossing	DOT No.	Jurisdiction	Railroad Owner	Tier 1 Criteria			Proximity to Activity Centers	Safety Measures
				Number of Incidents				
				Train	Non-Train	Total		
								<ul style="list-style-type: none"> • Repaving • Pedestrian treatment • Streetlights • Median treatment
Valle Vista Avenue	928446Y	Vallejo	CFNR	0	0	0	School, Hospital	<ul style="list-style-type: none"> • Pavement markings • Pedestrian gates • Roadway elements • Median treatment
Nebraska Street	751468E	Vallejo	CFNR	0	0	0	School, Hospital, Parks	<ul style="list-style-type: none"> • Signage and striping • Pedestrian treatment • Median treatment • Roadway elements
Tennessee Street	751469L	Vallejo	CFNR	0	0	0	School, Industrial Center, Parks	<ul style="list-style-type: none"> • Striping • Pedestrian treatments • Roadway elements • Railroad devices
Louisiana Street	751470F	Vallejo	CFNR	0	0	0	School, Industrial Centers, Parks	<ul style="list-style-type: none"> • Pedestrian treatment • Streetlights • Median treatment • Gate arms • Vegetation removal

Table 10 – Tier 1 Crossings - Summary of Incidents and Safety Measures

Crossing	DOT No.	Jurisdiction	Railroad Owner	Tier 1 Criteria			Proximity to Activity Centers	Safety Measures
				Number of Incidents				
				Train	Non-Train	Total		
Florida Street	751472U	Vallejo	CFNR	0	0	0	School, Senior/Community Center, Parks, Government Center	<ul style="list-style-type: none"> • Signage and striping • Pedestrian treatment • Streetlights • Median treatment/channelization • Roadway elements • Gate arms
Ped Xing	751473B	Vallejo	CFNR	0	0	0	School, Senior/Community Center, Parks, Government Center	<ul style="list-style-type: none"> • Signage • Streetlights • Gate arms
Georgia Street	751474H	Vallejo	CFNR	0	0	0	School, Senior/Community Center, Parks, Government Center	<ul style="list-style-type: none"> • Signage treatment • Pavement elements • Pedestrian treatment • Bulbouts • Trim vegetation
Maine Street	751475P	Vallejo	CFNR	0	0	0	School, Senior/Community Center, Park, Government Center	<ul style="list-style-type: none"> • Signage and striping • Pedestrian treatment • Streetlights • Roadway elements • Bulbouts
Solano Avenue	751476W	Vallejo	CFNR	0	0	0	School, Senior/Community Center, Parks	<ul style="list-style-type: none"> • Striping • Streetlights • Median

Table 10 – Tier 1 Crossings - Summary of Incidents and Safety Measures

Crossing	DOT No.	Jurisdiction	Railroad Owner	Tier 1 Criteria			Proximity to Activity Centers	Safety Measures
				Number of Incidents				
				Train	Non-Train	Total		
								<ul style="list-style-type: none"> treatment/channelization Roadway elements
Curtola Parkway	751980J	Vallejo	CFNR	0	0	0	School, Senior/Community Center, Transit, and Parks	<ul style="list-style-type: none"> Pavement markings Streetlights Pedestrian gates and sidewalks Median treatment
Sereno Drive	928443D	Vallejo	CFNR	0	0	0	School, Hospital, Parks	<ul style="list-style-type: none"> Pavement markings Streetlights Pedestrian gates Median treatment Restrict driveways Landscape removal
Redwood Street	751466R	Vallejo	CFNR	0	0	0	School, Industrial Centers, Hospitals	<ul style="list-style-type: none"> Pedestrian treatment Interconnect/queue cutter Gate arms
Valle Vista Avenue	751467X	Vallejo	CFNR	0	1	1	School, Hospital	<ul style="list-style-type: none"> Striping and signage Pre-signal and interconnect Roadway elements
Sonoma Blvd (SR 29)	928447F	Vallejo	CFNR	0	0	0	School, Hospital, Parks	<ul style="list-style-type: none"> Update signage and striping Repaving

Table 10 – Tier 1 Crossings - Summary of Incidents and Safety Measures

Crossing	DOT No.	Jurisdiction	Railroad Owner	Tier 1 Criteria			Proximity to Activity Centers	Safety Measures
				Number of Incidents				
				Train	Non-Train	Total		
								<ul style="list-style-type: none"> • Pedestrian treatment • Streetlights • Median treatment
Mississippi Street	928448M	Vallejo	CFNR	0	0	0	School, Hospital, Parks	<ul style="list-style-type: none"> • Signage and striping • Pavement repair • Pedestrian treatment • Streetlights • Median treatment/channelization
Nebraska Street	928449U	Vallejo	CFNR	0	0	0	School, Parks	<ul style="list-style-type: none"> • Signage and striping • Pavement repair • Pedestrian treatment • Streetlights • Median treatment
Wilson Avenue	928450N	Vallejo	CFNR	0	0	0	School, Government Center, Park	<ul style="list-style-type: none"> • Update signage and striping • Pedestrian treatment • Roadway elements
Mare Island Way	928451V	Vallejo	CFNR	0	0	0	School, Government Center, Parks	<ul style="list-style-type: none"> • Signage and striping • Pedestrian treatment • Roadway elements

Benicia

Industrial Way – Benicia (DOT 751550Y)

Industrial Way in the City of Vallejo is a Tier 1 crossing because of its close proximity to critical activity centers including a transit center and industrial center.

The recommended safety improvements are:

- Install roadway elements
- Install pavement markings per CA MUTCD
- Install lighting
- Upgrade from passive to active – 2 gate arms



Industrial Way Looking South



Industrial Way Looking North

Park Road – Benicia (DOT 751527E)

Park Rd in the City of Benicia is a Tier 1 crossing because of its close proximity to critical activity centers including transit center, industrial center, and parks.

The recommended safety improvements are:

- Install roadway elements
- Install pavement markings per CA MUTCD
- Install medians/channelization devices
- Install traffic signal
- Install lighting



Park Road Looking Southwest



Park Road Looking Northeast

Dixon

1st Street – Dixon (DOT 751250K)

1st Street in Dixon had one fatal incident. A pedestrian was struck and killed. Geometrically, this is a skewed intersection that does not have any traffic control other than the railroad crossing gates. The pedestrian path of travel is not protected from the railroad. The proposed safety improvements are:

- Install automatic pedestrian gates

- Re-align sidewalks to provide better sight distance for pedestrians at the crossing
- Install pavement markings per CA MUTCD
- Channelization or median treatment



1st Street Looking North



1st Street Looking South

Pitt School Road – Unincorporated County (DOT 751254M)

This crossing has one train-related fatal incident and 5 non-train-related incidents. The combination of the incidents resulted in a total of 1 death and 8 injuries at this crossing with one incident involving 2 injuries, another involving 3 injuries, and one injury for each remaining incident. The fatal crash resulted in one fatality and no injuries.

The train-related fatality was the result of a train striking an occupied vehicle. The occupied vehicle proceeded past the gate and stopped on the Pitt School Road crossing. Upon being struck by the train, the vehicle caught fire, killing the one passenger in the occupied vehicle.

The 5 non-train related incidents were all broadside collisions with 3 injuries with complaints of pain and 2 with visible injuries. Of the 5 incidents, 2 were the result of traffic signals and signs violation, 2 violated automobile right-of-way, and 1 was due to unsafe starting or backing. All incidents occurred during daylight; 1 incident occurred during cloudy, wet road conditions while the rest were clear and dry.

Geometrically, this is a skewed intersection that does not have any traffic control other than the railroad crossing gates. The northside of the crossing has an intersection within 200' of the railroad crossing, which is Porter Road.

It is noted that this crossing at Pitt School Road in the unincorporated County may be slated for closure with the planned grade separation from Parkway Blvd in Dixon. This is a planned project in the project development process. Until such time that the planned grade separation is constructed, the Unincorporated County is currently working on Pitt School Road Safety Improvements as an interim solution. The context of adjacent planning and design efforts is considered as part of the project readiness assessment as part of the inventory and prioritization effort.

The following safety measures are proposed for this crossing:

- Install pavement markings per CA MUTCD
- Bulbout/Road diet
- Signalize Porter/Pitt School and Install Pre-signal



Pitt School Road Looking North



Pitt School Road Looking East

Fairfield

Canon Road – Fairfield (DOT 751291P)

The Canon Road grade crossing in Fairfield has experienced two train-related incidents, resulting in a total of 3 injured individuals, along with two near misses as reported by Capitol Corridor. In one incident, a tractor trailer was struck while on the main track. In the other incident, an occupied vehicle with two people was struck as the vehicle drove onto the track as the train was passing. Canon Road is a T-intersection with Vanden Road without pavement markings or sidewalks. This location is in the project development process with safety improvements including short term traffic operations improvements, and longer-term grade separation projects. The following safety measures are recommended:

- Signalization with pre-signal and railroad preemption
- Install pavement markings per CA MUTCD
- Install medians/channelization
- Install streetlights



Canon Road Looking East



Canon Road Looking West

East Tabor Avenue – Fairfield (DOT 751294K)

The East Tabor Avenue grade crossing is in Fairfield and is at the border of Fairfield and Suisun. The crossing has had one train-related fatality. The fatality occurred as a vehicle was struck while crossing the railroad tracks. There are nearby driveways and the intersection with Railroad Avenue is approximately 115' away. There are existing medians on both sides of the tracks. There are existing plans in place for various improvements related to safety within the East Tabor Avenue Area by the City of Suisun to improve traffic flow.

The following safety measures are recommended:

- Install pavement markings and signage per CA MUTCD
- Additional warning signage
- Install traffic signal
- Pedestrian treatments/sidewalks
- Install additional streetlights



East Tabor Avenue Looking East



East Tabor Avenue Looking West

Lopes Road – Fairfield (DOT 751313M)

Lopes Rd in Fairfield is a Tier 1 crossing because of its close proximity to critical activity centers including a school and industrial center.

The following safety improvements are recommended:

- Install medians and channelization devices
- Roadway elements
- Install pavement markings per CA MUTCD



Lopes Road Looking South



Lopes Road Looking South



Lopes Road Looking North



Lopes Road Looking North

Suisun City

Pedestrian Xing (Solano Rail Hub)-Suisun City (DOT 441093N)

The grade crossing along the Pedestrian Crossing at the Suisun-Fairfield (SIU) Amtrak Station has experienced 1 non-train related incident. No fatality and no injuries were sustained. While there is an existing pedestrian bridge at the station that connects Suisun to Fairfield, the jurisdiction has highlighted that the existing geometry of the

crossing does not discourage users from taking advantage of its unprotected nature and crossing the track through gaps within the existing fence system. The shortcut is seen as a bypass to connect Fairfield and Suisun City, and it has a high pedestrian population due to schools and transit riders crossing the tracks to other activity centers. The risk of trespass is high because of the current access challenges and the lack of active warning devices. The existing bridge is also not ADA-compliant in slope and elevation and further north from the station. There is a proposal to upgrade the pedestrian crossing (either through an undercrossing or overcrossing) to improve safety that is currently in the project development process. Until that project is completed, additional safety improvements are recommended.

The safety measures recommended at this intersection include:

- Trespass mitigation
- Install Active Warning Devices
- Install pedestrian improvements



*Suisun-Fairfield Amtrak Station Existing Bike and Pedestrian Bridge
(from Suisun City, northeast of Station)*

Sunset Avenue – Suisun City (DOT 751295S)

The grade crossing at Sunset Avenue in Suisun City has experienced three train-related fatalities, as a result of three separate incidents. In two cases, a pedestrian trespasser walked onto the path of the train and was struck by an oncoming train. In another case, a pedestrian was struck but it is unclear if the pedestrian was trespassing at the time. The nearby cross street, Travis Boulevard, approximately 350' to the north of the railroad crossing, is an access point to I-80. The safety measures recommended at this intersection include:

- Install pavement markings and signage per CA MUTCD
- Install queue cutter signal – subject to queue studies

- Install automatic pedestrian gates with sidewalk realignment



Sunset Ave Looking North



Sunset Ave Looking South

Unincorporated

Batavia Road – Unincorporated (DOT 751256B)

The grade crossing at Batavia Road in unincorporated County has one train-related fatality. A train struck the occupied vehicle that intentionally drove around lowered/activated gates and waited to be struck at the crossing. This is a skewed intersection with no sidewalks and with driveway access close to the southern leg of the intersection. The safety measures being proposed here are:

- Install medians and channelization
- Install pavement markings per CA MUTCD
- Improved street lighting
- Re-orient railroad arm



Batavia Road Looking North



Batavia Road Looking South

Chadbourne Road – Unincorporated (DOT 751491Y)

The grade crossing at Chadbourne Road in unincorporated County had one incident, resulting in one train-related fatality and one train-related injury. The fatality and injury occurred as the train struck a truck on the tracks. The crossing does not have any curb and gutter, pavement markings, or sidewalks. The following safety measures are recommended:

- Install automatic gates and flashers
- Install pavement markings per CA MUTCD
- Install streetlights



Chadbourne Rd Crossing

Elmira Road – Unincorporated (751259W)

The Elmira Road grade crossing in unincorporated County has one train-related fatality and one train-related injury, resulting from one incident. During this incident, the train collided with a minivan on the track. This is an intersection with California Pacific Road near the western end of the railroad crossing and with A Street on the eastern end of the crossing. The following safety measures are recommended:

- Install pavement markings and signage per CA MUTCD
- Install medians
- Install Queue Cutter with railroad preemption – subject to queue studies
- Install streetlights



Elmira Road Looking West



Elmira Road Looking East

Fox Road – Unincorporated (751258P)

The Fox Road grade crossing in unincorporated County has one train-related fatality and injury. The fatality and severe injury occurred within the same incident, during a clear night with no streetlights. The incident was noted to have been under the influence of alcohol or drugs. Geometrically, this is a skewed intersection without sidewalks. The safety measures proposed here are:

- Install medians and channelization
- Install bulbouts
- Install pavement markings per CA MUTCD
- Improved street lighting



Fox Road Looking North



Fox Road Looking South

Fry Rd - Unincorporated (DOT 751289N)

The Fry Rd in Unincorporated County has one train related non-injury, one non-train related injury, and two non-train related non-injury incidents. The incidents are accumulated over 3 separate incidents. The train related non-injury and a non-train related non-injury occurred on the same day and are understood to be recordings of separate understandings of the incident.

The train related incident was due to a truck reportedly illegally crossing the gates while the gate was down, being struck by the train sustaining damage to the rear end, and reportedly fleeing the scene. The non-train related non-injury documents an incident in which a vehicle disobeyed traffic signals and signs on a clear day.

For the other two incidents, both occurred on clear conditions at night with no streetlight. The non-train related injury involved hitting an object during wet conditions.

The non-train related non-injury is associated with property damage due to vehicle improper turning in dry conditions.

The recommended safety improvements are:

- Install pavement markings per CA MUTCD
- Install streetlights
- Install Roadway elements

- Install Bulbouts



Fry Road Looking East



Fry Road Looking West

Hawkins Rd, Unincorporated County (DOT 751260R)

Hawkins Rd in Unincorporated County is a Tier 1 crossing. It has one train-related injury. The broadside vehicle-train incident occurred during the daytime in the rain. The incident is associated with vehicle driving at an unsafe speed.

The recommended safety improvements are:

- Install pavement markings per CA MUTCD
- Roadway elements (upgrade curb and gutter, etc.)
- Install streetlights



Hawkins Road Looking West



Hawkins Road Looking West

Lewis Road – Unincorporated (DOT 751259W)

Lewis Rd in Vacaville is a Tier 1 crossing because it has one train-related injury. The incident, which resulted in an injury with complaint of pain, occurred during a clear day. The broadside vehicle-train incident is associated with vehicle improper use of traffic signals and signs.

The following safety improvements are recommended:

- Install pavement markings per CA MUTCD
- Install roadway elements
- Install street lighting



Lewis Road Looking North



Lewis Road Looking South

Midway Road – Unincorporated (DOT 751225U)

Midway Road is a skewed intersection in unincorporated Solano County. There is a total of one train-related fatality, one train-related incident, and 8 non-train-related incidents at this intersection. The train-related fatality occurred as a train stuck an occupied vehicle that had driven around a lowered/activated gate. Similarly, the one train-related injury was also the result of a train striking an occupied vehicle. In this case, the occupied vehicle drove onto the crossing and got stuck on the tracks, resulting in the injury of the one passenger in the occupied vehicle upon being struck by the train. The 8 non-train related incidents were all broadside collisions except one that

was a collision with an object. Of the 8, 5 incidents were associated with complaints of pain, 2 with no complaints but with visible injuries, and 1 with severe injury. Automobile right-of-way violations caused 6 incidents; improper turning was the cause of the other 2. Five incidents were recorded during Daylight, 2 occurred in the dark (with and without streetlights), and 1 occurred at dusk-dawn. The weather varied between clear, cloudy, and rainy.

Porter Road ends at the Midway Road intersection at the railroad crossing. Midway Road is an entrance to I-80 to 2.5 miles to the West. The Unincorporated County is looking to plan a grade separation project for this crossing as a long-term priority. Until such time that the planned grade separation is constructed, the following safety measures are recommended for this intersection include:

- Install pavement markings per CA MUTCD
- Improved street lighting
- Re-align eastbound Midway Road to a right-turn movement
- Channelization or median treatment



Midway Road Looking West



Midway Road Looking West



Midway Road Looking East

Red Top Road – Unincorporated (DOT 751317P)

The Red Top Road grade crossing in unincorporated County has experienced six non-train related incidents with a total of seven injuries. The non-train related injuries were a mix of object, broadside, and overturned collisions. Two incidents were related to improper turning, one was due to unsafe driving speed, two were associated with automobile right of way, and one was related to driving under the influence of alcohol or drugs. Of the incidents, three incidents were associated with complaints of pain and the other three incident resulted in no complaints but had visible injuries. Two incidents occurred within a construction/repair zone, with one during wet and daytime conditions and the other during dry, day conditions. Of the remaining incidents outside of construction/repair zones, three were under dry conditions and one was during wet conditions.

The Red Top Road grade crossing is considered to receive a grade separation as part of the Phase 2 of the Interstate 80/ 60/ 12 Interchange project. Package 5 of the I-80/I-680/SR 12 Interchange Project will extend Business Center Drive to connect with a realigned Red Top Road. Part of the Red Top Road realignment will include construction of a grade-separated rail crossing. A new interchange will also be constructed at SR 12 and Business Center Drive/Red Top Road.

Red Top Road starts from Lincoln Highway with a 90 degree turn onto the road, with the crossing located around 150' south of the highway. Southbound vehicles have an obstructed view of the railway crossing due to trees on both sides of the road. The safety improvements being recommended are:

- Install pavement markings per CA MUTCD
- Install streetlights
- Tree removals



Red Top Rd Looking North

Rio Dixon Road – Unincorporated (DOT 687614J)

The Rio Dixon Road grade crossing in Unincorporated County has six non-train-related incidents, resulting in a total of eight injuries. The non-train related injuries were a mix of object, broadside, overturned, rear end, and head-on collisions. Two incidents were related to improper turning, three were due to unsafe driving speed, and one was associated with driving under the influence of alcohol or drugs. Of the incidents, three injuries were associated with complaints of pain, two with no complaints but with visible injuries, and one was noted as severe. All incidents occurred during dry conditions, with three during daylight hours and three during nighttime hours under varied lighting conditions.

Rio Dixon Road is a 90-degree crossing with no sidewalks. Roughly 40' south of the crossing, Rio Dixon roadway curves and proceeds east-west, while also maintaining a branch moving north-south. The following safety improvements are recommended for this location:

- Install active warning devices
- Install pavement markings per CA MUTCD
- Install streetlights
- Install curb and gutter



Rio Dixon Road Looking West



Rio Dixon Rd Looking North/West



Rio Dixon Rd Looking South

Robben Road – Unincorporated (DOT 751247C)

Robben Rd in Unincorporated County is a Tier 1 crossing has one train related non-injury and is in close proximity to critical activity centers, including an industrial center. The train related incident was due to a vehicle crossing the crossing.

The recommended safety improvements are:

- Install medians or channelization devices
- Install street lighting
- Install roadway elements
- Install pavement markings per CA MUTCD



Robben Road Looking North



Robben Road Looking South

Vallejo

Curtola Parkway – Vallejo (DOT 751980J)

Curtola Parkway in the City of Vallejo is a Tier 1 crossing because of its proximity to critical activity centers including schools, senior/community centers, and parks.

The safety improvements being recommended are:

- Install pavement markings per CA MUTCD
- Install streetlights

- Install pedestrian treatments
- Install medians/channelization



Curtola Pkwy Looking West



Curtola Pkwy Looking East

Florida Street – Vallejo (DOT 751472U)

Florida St in the City of Vallejo is a Tier 1 crossing because of its close proximity to critical activity centers including schools, senior/community centers, parks, and government centers.

The safety improvements being recommended are:

- Install pedestrian devices
- Install streetlighting
- Install bulbouts
- Install pavements marking per CA MUTCD
- Install active warning devices



Florida Street Looking East



Florida Street Looking West

Georgia Street – Vallejo (DOT 7514774H)

Georgia St in the City of Vallejo is a Tier 1 crossing because of its close proximity to critical activity centers including schools, senior/community centers, parks, and government centers.

The safety improvements being recommended are:

- Install medians/channelization
- Install pedestrian treatments
- Install pavement markings per CA MUTCD
- Install bulbouts
- Trim vegetation



Georgia Street Looking West



Georgia Street Looking East

Highway 37 – Lewis Brown – Vallejo (DOT 751463V)

Highway 37/Lewis Brown in Vallejo is a Tier 1 crossing because of its close proximity to critical activity centers including schools and parks.

The recommended safety improvements are:

- Install pavement markings per CA MUTCD
- Install medians/channelization
- Install roadway elements
- Vegetation removal/trimming



Lewis Brown Dr Looking East



Lewis Brown Dr Looking West

Louisiana Street – Vallejo (DOT 751470F)

Louisiana St in the City of Vallejo is a Tier 1 crossing because of its close proximity to critical activity centers including schools and parks.

The safety improvements being recommended are:

- Install medians/channelization
- Install streetlighting
- Install active warning devices
- Install pedestrian treatments

- Vegetation removal



Louisiana Street Looking West



Louisiana Street Looking East

Maine Street – Vallejo (DOT 751475P)

Maine St in the City of Vallejo is a Tier 1 crossing because of its close proximity to critical activity centers including schools, senior/community centers, parks, and government centers.

The safety improvements being recommended are:

- Install streetlighting
- Install pavement markings per CA MUTCD
- Install roadway elements
- Install pedestrian treatments
- Install bulbouts



Maine Street Looking West



Maine Street Looking East

Mare Island Way – Vallejo (DOT 728451V)

Mare Island Way in Vallejo is a Tier 1 crossing because of its close proximity to critical activity centers including schools, parks, and government centers.

The safety improvements being recommended are:

- Install roadway elements
- Install pavement markings per CA MUTCD
- Install pedestrian treatments



Mare Island Way Looking North



Mare Island Way Looking South

Mini Drive - Vallejo (DOT 751462N)

Mini Dr in Vallejo is a Tier 1 crossing because of its close proximity to critical activity centers including schools and parks.

The recommended safety improvements are:

- Install pavement markings per CA MUTCD
- Upgrade roadway elements (repave, etc.)
- Install pedestrian gates for four quadrants
- Install traffic signalization with pre-signal and railroad preemption
- Install streetlighting



Mini Dr Looking East



Mini Dr Looking West



Mini Dr Looking West

Mississippi Street – Vallejo (DOT 928448M)

Mississippi St in the City of Vallejo is a Tier 1 crossing because of its close proximity to critical activity centers including schools, hospitals, and parks.

The safety improvements being recommended are:

- Install roadway elements
- Install pavement markings per CA MUTCD
- Install pedestrian treatments
- Install streetlighting
- Install medians/channelization



Mississippi Street Looking West



Mississippi Street Looking East

Nebraska Street – Vallejo (DOT 751468E)

Nebraska St in the City of Vallejo is a Tier 1 crossing because of its close proximity to critical activity centers including schools, hospitals, and parks.

The safety improvements being recommended are:

- Install roadway elements
- Install pavement markings per CA MUTCD
- Install pedestrian treatments
- Install medians/road diet



Nebraska Street Looking East

Nebraska Street – Vallejo (DOT 928449U)

Nebraska St in Vallejo is a Tier 1 crossing because of its close proximity to critical activity centers including schools and parks.

The safety improvements being recommended are:

- Install pavement markings per CA MUTCD
- Install pedestrian improvements
- Install medians/channelization
- Install streetlighting



Nebraska Street Looking West



Nebraska Street Looking West



Nebraska Street Looking West

Ped Xing – Vallejo (DOT 751473B)

Ped Xing in the City of Vallejo is a Tier 1 crossing because of its close proximity to critical activity centers including schools, senior/community centers, parks, and government centers.

The safety improvements being recommended are:

- Install active warning devices
- Install pavement markings per CA MUTCD
- Install streetlighting



Aerial View of Ped Xing

Redwood Street – Vallejo (DOT 928445S)

Redwood St in the City of Vallejo is a Tier 1 crossing because of its proximity to critical activity centers including schools and hospitals.

The safety improvements being recommended are:

- Install pavement markings per CA MUTCD
- Repaving of roadway elements
- Install pedestrian treatments
- Install streetlighting
- Restrict driveway access (right in, right out)
- Install medians/channelization



Redwood Street Looking West



Redwood Street Looking East

Redwood St – Vallejo (DOT 751466R)

Redwood St in Unincorporated County is a Tier 1 crossing because of its close proximity to critical activity centers including schools and hospitals.

The recommended safety improvements are:

- Install pedestrian treatments

- Install traffic signal/ queue cutter
- Install active warning devices



Redwood Street Looking East



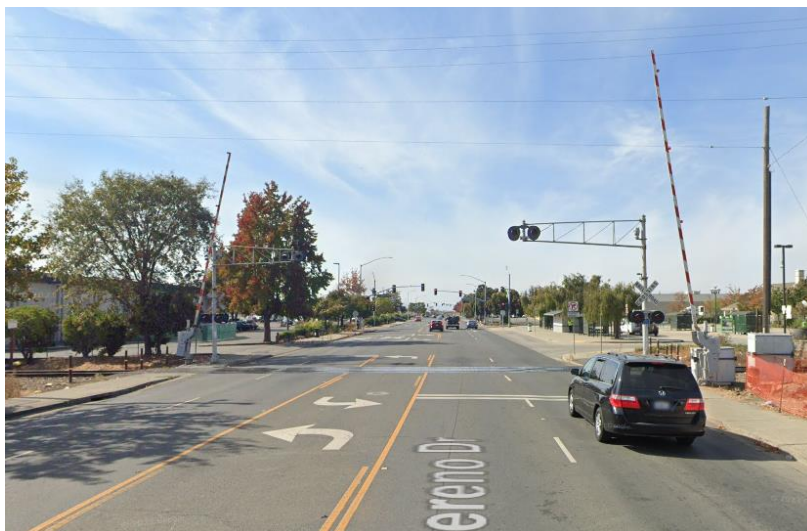
Redwood Street Looking West

Sereno Dr – Vallejo (DOT 928443D)

Sereno Dr. in the City of Vallejo is a Tier 1 crossing because of its proximity to critical activity centers including schools, hospitals, and parks.

The safety improvements being recommended are:

- Install pavement markings per CA MUTCD
- Install streetlights
- Install pedestrian treatments
- Install medians/channelization
- Restrict driveway access
- Landscape removal



Sereno Dr Looking West



Sereno Dr Looking East

Solano Avenue – Vallejo (DOT 751476W)

Solano Ave in the City of Vallejo is a Tier 1 crossing because of its close proximity to critical activity centers including schools, senior/community centers, and parks.

The recommended safety improvements are:

- Install roadway elements
- Install streetlighting
- Install pavement markings per CA MUTCD
- Install medians/channelization



Solano Avenue Looking South



Solano Avenue Looking North

Sonoma Blvd/SR 29 – Vallejo (DOT 928447F)

Sonoma Blvd/SR-29 in the City of Vallejo is a Tier 1 crossing because of its close proximity to critical activity centers including schools, hospitals, and parks.

The safety improvements being recommended are:

- Install pavement markings per CA MUTCD
- Install pedestrian treatments
- Install streetlights
- Install medians/channelization



Sonoma Blvd/SR 29 Looking North



Sonoma Blvd/SR 29 Looking South

Tennessee Street – Vallejo (DOT 751469L)

Tennessee St in the City of Vallejo is a Tier 1 crossing because of its close proximity to critical activity centers including schools and parks.

The safety improvements being recommended are:

- Install active warning devices/barrier gates
- Install pavement markings per CA MUTCD
- Install roadway elements
- Install pedestrian treatments



Tennessee Street Looking North



Tennessee Street Looking South



Tennessee Street Looking East



Tennessee Street Looking West

Valle Vista Ave – Vallejo (DOT 928446Y)

Valle Vista Ave in the City of Vallejo is a Tier 1 crossing because of its proximity to critical activity centers including schools and hospitals.

The safety improvements being recommended are:

- Install pavement markings per CA MUTCD
- Install pedestrian gates
- Install roadway elements

- Install streetlights
- Install medians/channelization



Valle Vista Looking West



Valle Vista Looking East

Valle Vista Ave – Vallejo (751467X)

The Valle Vista Ave in Vallejo has one non-train non-injury and is in close proximity to critical activity centers including schools and hospitals.

The recommended safety improvements are:

- Install roadway elements
- Install pavement markings per CA MUTCD Striping
- Install traffic signal (Pre-signal)



Valle Vista Ave Looking West



Valle Vista Ave Looking East

Wilson Ave – Vallejo (DOT 928450N)

Wilson Ave in Vallejo is a Tier 1 crossing because of its close proximity to critical activity centers including schools, parks, and government centers.

The safety improvements being recommended are:

- Install pedestrian improvements

- Install pavement markings per CA MUTCD
- Install roadway elements



Wilson Ave Looking North



Wilson Ave Looking South

6.0 COST ESTIMATES

The costs associated with improving rail crossings have been generalized and evaluated for each of the crossings listed in Table 1. The costs assume the local jurisdiction (i.e., roadway authority) would be responsible for the implementation of the improvements.

6.1. ASSUMPTIONS AND METHODOLOGY

The magnitude of improvements associated with rail crossing upgrades can vary greatly depending on the level of improvements. For the purposes of this memo, the improvements associated with rail crossing upgrades have been vastly generalized using a few key assumptions drawing from experiences from other railroad improvement plans, the railroad's current set of guidelines and standards, a series of desktop research and use of a range of typical costs for the various improvements identified. These improvements are based on a toolbox approach to addressing safety concerns. They are not based on specific field or site conditions and no survey or traffic studies have been completed for the locations.

Project Controls - With respect to project controls, cost estimates may allocate a percentage of budget to mobilization, traffic control, and time related overhead (usually associated with construction delays, e.g., rain delays). This analysis assumes a lump sum cost for these items as one "Project Controls" item, set to 10% of the construction cost.

Demolition and Removals - Demolitions and removals have been combined into one line item, and are assumed to include the following: concrete flatwork, with an assumed removal of curb or curb and gutter equal to 300 LF; concrete sidewalk pavement removal equal to 1500 SF; asphalt roadway pavement removals equal to 4000 SF; striping removals equal to 1500 LF; relocation of five utility markers; adjusting to finish grade five surface utility structures, like valves and manholes.

Installation of Roadway Elements, Medians, and Gates - Installation of roadway elements is assumed to include curb and gutter as well as asphalt pavement for roadway. Installation of medians is assumed to be representative of two (2), 100' long and 4' wide medians that are constructed with 6" vertical curb and filled with concrete. Installation of UPRR access gates involves providing two maintenance access gates and associated decomposed granite for vehicles; if four gates are to be provided, the quantities were increased from one (1) to two (2).

Installation of Pedestrian Treatments - Installation of full pedestrian treatments is assumed to be representative of one side of the roadway. A sidewalk would not be constructed in one quadrant of a rail crossing but may be constructed on one side of the roadway through the crossing, and so the unit cost is reflective of two quadrants' worth of costs. This cost is assumed to include two each of the following: CPUC

Standard 9-D automatic gate device, emergency egress swing gates, sidewalk approaches from the roadway up to the tracks; detectable warning surface in advance of the crossing. For full pedestrian treatments in all four quadrants, increase the quantity from one (1) to two (2).

Roadway Striping - Roadway striping is assumed to be for a roadway with one travel lane in each direction. For additional travel lanes, increase the quantity appropriately.

Lighting Installation - Installation of lighting is assumed to include two (2) streetlights, associated conduit, and one (1) pull box for each light. For additional lights, increase the quantity appropriately.

Traffic signalization/Preemption - Installation of signal preemption and associated improvements is assumed to include preemption, installation of a new traffic signal (pre-signal or queue cutter), and all associated connections to the railroad warning devices and downstream traffic signal. If this quantity is greater than 1, it will assume full signalization of a second intersection.

Railroad Removal - Railroad removals is assumed to include the removal of all crossing panels and existing two (2) warning devices. Railroad installation of crossing panels is assumed to be on a per-track basis, with an assumed twelve crossing panels per track. Installation of railroad devices assumes installation of two automatic gate arms; if CPUC Standard 9-A devices are provided, this cost would be doubled. Installation of both a signal cabin and Railroad Signal Design Allowance are items that are required by the Railroad authority when significant modifications occur to the crossing.

6.2. Cost Estimate Summary

The cost estimates were prepared based on the following assumptions:

- Initial recommendations
- Ultimate configuration

The initial recommendations encapsulates the costs associated with the base set of recommended safety improvements to mitigate the safety issues that exist at the crossings. These are the items described in this memorandum.

The ultimate configuration adds the costs that would be incurred as part of a larger upgrade to bring the crossing up to the full set of the most recent CPUC and railroad standards which includes the initial recommendations set of safety improvements. For example, automatic gate arms will need to be replaced, upgraded, or modified to meet the recent standards which would require an entirely new set of automatic gates. This set of costs would be considered the full suite of crossing improvements.

Table 2 – Summary of Costs (Rough Order of Magnitude)				
Crossing location	DOT#	Jurisdiction	Cost	
			Initial Recommendations	Ultimate Configuration
Park Road	751527E	Benicia	\$2,500,000	\$5,000,000
Industrial Way	751550Y	Benicia	\$2,600,000	\$3,500,000
1st Street	751250K	Dixon	\$2,200,000	\$4,700,000
Canon Road	751291P	Fairfield	\$2,400,000	\$5,900,000
East Tabor Avenue	751294K	Fairfield	\$2,100,000	\$4,300,000
Lopes Road	751313M	Fairfield	\$1,300,000	\$4,300,000
Sunset Avenue	751295S	Suisun City	\$3,600,000	\$5,700,000
Pedestrian Xing (Solano Rail Hub)	441093N	Suisun City	\$2,000,000	\$3,800,000
Rio Dixon Road	687614J	Unincorporated	\$2,700,000	\$3,500,000
Robben Road	751247C	Unincorporated	\$1,500,000	\$3,500,000
Pitt School Road	751254M	Unincorporated	\$1,600,000	\$5,200,000
Midway Road	751255U	Unincorporated	\$3,100,000	\$5,700,000
Batavia Road	751256B	Unincorporated	\$1,600,000	\$4,100,000
Fox Road	751258P	Unincorporated	\$1,500,000	\$4,100,000
Lewis Road	751259W	Unincorporated	\$1,200,000	\$3,700,000
Hawkins Road	751260R	Unincorporated	\$1,200,000	\$3,800,000
Elmira Road	751288G	Unincorporated	\$2,020,000	\$4,900,000
Fry Road	751289N	Unincorporated	\$1,500,000	\$4,100,000
Red Top Road	751317P	Unincorporated	\$1,500,000	\$3,400,000
Chadbourn Road	751491Y	Unincorporated	\$1,900,000	\$3,600,000
Mini Drive	751462N	Vallejo	\$3,400,000	\$5,700,000
Hwy 37 / Lewis Brown Dr	751463V	Vallejo	\$1,300,000	\$3,800,000
Redwood Street	751466R	Vallejo	\$4,000,000	\$6,000,000
Valle Vista Avenue	751467X	Vallejo	\$2,000,000	\$4,000,000
Nebraska	751468E	Vallejo	\$2,500,000	\$5,000,000

Tennessee Street	751469L	Vallejo	\$4,100,000	\$5,900,000
Louisiana Street	751470F	Vallejo	\$3,200,000	\$5,200,000
Florida Street	751472U	Vallejo	\$3,200,000	\$5,200,000
Ped Xing	751473B	Vallejo	\$2,700,000	\$3,400,000
Georgia Street	751474H	Vallejo	\$2,800,000	\$4,800,000
Maine Street	751475P	Vallejo	\$2,700,000	\$5,000,000
Solano Avenue	751476W	Vallejo	\$1,300,000	\$3,800,000
Curtola Parkway	751980J	Vallejo	\$1,900,000	\$5,400,000
Sereno Drive	928443D	Vallejo	\$2,700,000	\$5,200,000
Redwood Street	928445S	Vallejo	\$2,700,000	\$5,200,000
Valle Vista Avenue	928446Y	Vallejo	\$2,700,000	\$4,700,000
Sonoma Blvd (SR 29)	928447F	Vallejo	\$2,700,000	\$6,200,000
Mississippi Street	928448M	Vallejo	\$2,700,000	\$5,700,000
Nebraska Street	928449U	Vallejo	\$2,700,000	\$4,700,000
Wilson Avenue	928450N	Vallejo	\$2,900,000	\$4,900,000
Mare Island Way	928451V	Vallejo	\$1,600,000	\$5,900,000

7.0 PRIORITIZATION

The grade crossings were prioritized according to the Rail Crossing Safety Study Methodology Memorandum. The methodology for prioritization ranks safety as a primary category, with proximity to activity centers and traffic and train volumes as secondary categories to safety. Higher costs were ranked lower than lower cost crossing improvements. **Error! Reference source not found.**³ identifies the prioritization of the Tier 1 crossings. The crossings are categorized in groups because of logical patterns in the data and using engineering judgement about the relative safety concerns at the crossings. For example, higher traffic volume locations with higher frequency and higher speed trains may be considered a larger safety concern than a location with lower speed trains with lower traffic volumes. Project readiness was added as an additional criteria because of the momentum of the project development process and the recognition from the stakeholders of the importance of the safety concerns at those locations.

Table 3 – Tier 1 Railroad Crossing Prioritization Matrix

Ranking	Location	Incidents	Proximity to Key Facilities	Traffic Volumes	Train Speed and Volumes	Capital Costs	Project Readiness
1 - 7	East Tabor Ave (Fairfield), 1st St (Dixon), Pitt School Rd (Uninc), Sunset Ave (Suisun City), Canon Rd (Fairfield), Pedestrian Xing (Solano Rail Hub) (Suisun), Midway (Uninc)						
8-12	Elmira Rd (Uninc), Industrial Way (Benicia), Batavia Rd(Uninc), Fox Rd (Uninc), Fox Rd (Uninc)						
13-19	Chadbourne Rd (Uninc), Rio Dixon Rd (Uninc), Red Top Rd (Uninc) Fry Rd (Uninc), Robben Rd (Uninc), Hawkins Rd (Uninc), Lewis Rd (Uninc)						
20-30	Valle Vista Avenue (Vallejo), Ped Xing (Vallejo), Valle Vista Avenue (Vallejo), Nebraska (Vallejo), Florida Street (Vallejo), Georgia Street (Vallejo), Maine Street (Vallejo), Sereno Drive (Vallejo), Redwood Street(Vallejo), Lopes Road (Fairfield), Hwy 37 / Lewis Brown Dr (Vallejo)						
31+	Solano Avenue (Vallejo), Nebraska Street (Vallejo), Louisiana Street (Vallejo), Wilson Avenue (Vallejo), Mini Drive (Vallejo), Tennessee Street (Vallejo), Curtola Parkway (Vallejo), Mississippi Street (Vallejo), Mare Island Way (Vallejo), Sonoma Blvd (SR 29) (Vallejo)						

8.0 FUNDING

This section addresses potential funding sources for the railroad-related projects. This includes federal and state funding sources. The amount of funding available and timing of funding opportunities is constantly changing, but the links to the programs are provided for more updated information.

8.1. Railway Highway Grade Crossings (Section 130) Program

Administering Agency: California Public Utilities Commission (CPUC) and Caltrans

The purpose of the Section 130¹ funding program is to reduce the number and severity of highway accidents and enhance safety for vehicles, bicycles, and pedestrians at current at-grade crossings. Section 130 program provides federal funds authorized by Title 23, United States Code, Section 130 (23 U.S.C 130) to local agencies and railroads administered by California Department of Transportation (Caltrans). The at-grade crossing improvement projects include the installation of railroad protection systems such as traffic signals, guardrails, pedestrian/bicycle path improvements, active warning equipment installation/upgrades, roadway geometry improvements and grade crossing elimination.

Section 130 funded projects are 90% federally funded with a 10% local match contribution. Caltrans will fund the local match requirement through the Surface Transportation Program (STP). California generally is allotted approximately \$17 million per year through the Infrastructure Investment and Jobs Act (IIJA). Due to limited funding, project selection is determined by the California Public Utilities Commission (CPUC) in collaboration with Caltrans.

The CPUC develops a priority list annually based on the scope of work needed to eliminate hazards at existing at-crossing sites according to available data and current conditions. Once the highest ranked crossings are identified, the local agencies and railroads of those crossings must collaborate with CPUC and Caltrans to conduct field diagnostic reviews and ensure the project is in alignment with the funding criteria to qualify for this program. Projects must be included in the Federal Statewide Transportation Improvement Program (FSTIP) and approved by the Federal Highway administration (FHWA) to be considered. The criteria to qualify for Section 130 funding considers accident history, vehicle and train volumes, pedestrian issues, and geometry. Once potential locations have been identified, a site visit with all representatives and staff will be conducted in order to provide an in-depth analysis of the existing conditions.

¹ <https://highways.dot.gov/safety/hcip/xings/railway-highway-crossing-program-overview>

CPUC finalizes the priority list in the August of each year and provides the list to Caltrans RHCP manager to proceed with the contract award process.

8.2. Consolidated Rail Infrastructure and Safety Improvements (CRISI) Program

Administering Agency: Federal Railroad Administration (FRA) and the United States Department of Transportation (USDOT)

The CRISI² program invests in various railroad projects that improve safety, efficiency, and reliability. Projects that enhance good movements, multi-modal connections and improve or create new Intercity Passenger Rail Transportation corridors are considered for funding. The following improvements are eligible for funding; deployment of railroad safety technology, highway-rail grade crossing safety improvement projects such as railroad crossing signals, gates, and related technologies. Capital projects as well as the development and implementation of safety programs are eligible for funding. Safety improvements such as railroad gates and crossing signals in the proposed grade crossing improvements will qualify for funding under this grant. This grant is administered by the Federal Railroad Administration (FRA) and the United States Department of Transportation (USDOT).

This grant contains multiple application tracks that cover activities ranging from rail planning, preliminary engineering, plans, specifications, and estimate (PS&E) development and construction. There is no limit to the number of tracks that can be included under one application. The application package will include project narrative, scope of work, benefit-cost analysis (BCA), environmental compliance documentation, and standard federal forms.

Based on the FRA selection criteria, preference is given to projects that request less than 50% of funding, create maximum benefit of grant funds based on the BCA, and develop and implement measures that reduce trespassing and injuries and fatalities in the top 25 counties with the most pedestrian casualties and follow FRA's Community Trespassing Prevention Program. Based on these requirements, the level of match that STA has available will determine the competitiveness of the application.

The minimum match requirement is 20% with a maximum federal cost share of 80%. The match funding can include state, local or private sector funds. The total available funding in Fiscal Year (FY) 22 was \$1.4 billion with no predetermined amounts for minimum or maximum awards.

8.3. Nationally Significant Multimodal Freight & Highway Projects Program (INFRA)

Administering Agency: USDOT

² <https://railroads.dot.gov/grants-loans/competitive-discretionary-grant-programs/consolidated-rail-infrastructure-and-safety-2>

The INFRA³ program is a competitive grant intended for projects that provide national or regional significance administered by USDOT. This grant supports improvement projects that focus on safety, efficiency, and reliability of transportation infrastructure such as freight and additional modes in both rural and urban areas. Eligible projects include highway-railway grade crossing projects and freight rail projects that provide public benefit. The proposed grade crossing improvements can be combined with multimodal projects within the selected project locations to create a competitive funding request.

The application package consists of a project description, project location in Excel, project budget, funding commitment documentation, merit criteria, project readiness, BCA narrative and calculations, and standard federal forms.

The federal share for this grant is up to 80% with a 20% non-federal match. The IJA has made \$8 billion available to INFRA for FY 22 through FY 26. \$3.1 billion was allocated for the FY 23-24 INFRA grant. Award sizes were estimated to be up to \$50 million.

USDOT streamlined the process and combined the application for the Mega, INFRA, and Rural programs into one Multimodal Project Discretionary Grant Opportunity (MPDG). The selection criteria for this program includes the following categories:

- Safety
- State of good repair
- Economic impacts, freight movement and job creation
- Climate change, resilience, and the environment
- Equity, multimodal options, and quality of life

8.4. Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Grant

Administering Agency: USDOT

The RAISE⁴ program provides funding for surface infrastructure projects such as road, rail, transit, and port that enhance safety, increase environmental sustainability, improve quality of life, mobility, and community connectivity that have a significant impact locally or regionally. This is a competitive funding opportunity that all public entities are eligible for. It is funded through IJA and administered by the USDOT. Eligible project types include capital improvements to passenger and freight rail transportation. The proposed safety improvements can be included in this funding request as this grant is intended for projects that face challenges acquiring funding through traditional DOT discretionary grants.

Applicants must submit a package which includes: a project information form using a provided Excel template; project description; project location file, either in a Shapefile,

³ <https://www.transportation.gov/grants/infra-grant-program>

⁴ <https://www.transportation.gov/RAISEgrants>

KML/KMZ, or GEOJSON; project budget, sources, and uses of funding; funding commitment documentation; outcome criteria narrative; project readiness; project requirements; BCA narrative and calculations. Applicants also have the option to submit letters of support, a community benefits plan, and/or a Title VI plan.

The funding available in FY 23 was about \$1.5 billion with an awards size between \$1 million to \$25 million and typically requires a 20% local match and 80% federal share. A merit-criteria are used to select projects that provide extraordinary benefits and provide highly needed infrastructure.

USDOT is anticipated to publish the next RAISE NOFO in Winter 2024. STA is competitive for this program, but it is highly competitive within the nation.

8.5. Railroad Crossing Elimination Grant Program

Administering Agency: Federal Railroad Administration (FRA)

The focus of this program is to fund highway-rail or pathway-rail crossing improvement projects that enhance safety and mobility for goods and people. The projects that are eligible for funding include improvement or installation of protective devices, signals, signs, or additional ways to improve safety of goods and pedestrian mobility at at-grade crossing. This includes planning, environmental review, and the design of the proposed elements.

Eligible recipients include states, a unit of local government or group of local governments, metropolitan planning organizations and public port authorities. This grant supports grade separations, closing crossings, and corridor-wide grade crossing improvements that significantly improve safety along the rail network. The proposed safety improvements can be combined in the funding request as a corridor-wide improvement to a region that faces multiple safety hazards. The selection criteria for this program includes an evaluation of the project benefits, technical merit, and selection criteria. The selection criteria include the following categories:

- Safety
- Equitable economic strength and improving core assets
- Equity and barriers to opportunity
- Climate change and sustainability
- Transformation of our nation's transportation infrastructure (state of good repair)
- Eliminating crossings and making corridor-wide improvements
- Geographic diversity

This grant is distributed by the Federal Railroad Administration (FRA). Based on the FY22 NOFO, the total funding available was \$573 million. FRA award minimum award is \$1 million while there is not a predetermined maximum. The maximum federal cost share is 80% of the project cost and the minimum match requirement is 20%. STA is not

as competitive for this opportunity because California has relatively lower rate of incidents as compared to the nation.

The FRA's target publication period for the FY 23 Railroad Crossing Elimination program NOFO is September/October 2023. Requirements and eligibility may vary once the FY 23 NOFO is released⁵.

9.0 STATE FUNDING PROGRAMS

9.1. Senate Bill 1 (SB 1)

The SB 1 or [Road Repair and Accountability Act of 2017](#) funds an estimated \$5 billion annually to invest in the repair of roads, freeways and bridges in California. SB 1 allocated an estimated \$7.7 billion for rail and transit investment over the next 10 years. This bill funds programs that focus on specific challenges the state infrastructure may face. The following programs within SB 1 can serve as potential funding sources for safety improvements at various at-grade crossing locations.

9.2. State Rail Assistance (SRA) Program

Administering Agency: California State Transportation Agency (CalSTA)

The SRA ⁶program funds operation and capital railroad improvements that provide benefit to the public funded by Senate Bill 1. Capital improvements include track and station investments that reduce travel time, delays, improve accessibility and enhance traveler experience. The proposed safety improvements can be included into additional capital or operation investments. Commuter rails that increase safety can attract new riders and increase overall long-term ridership.

CalSTA distribute the funds. Eligible recipients are public agencies, including joint power agencies that are responsible for state-supported intercity or commuter rail services. Funding is distributed between commuter and intercity rail agencies. Funds for intercity rail are flexible and able to give awards to existing or aspiring corridors and Caltrans.

CalSTA offers funding requests to projects that provide enhanced connectivity and increase rail ridership. An Allocation Request form is used to determine if the project meets all the requirements. Funding is elevated through a statutory formula and stakeholder engagement is encouraged. This grant is specific to commuter and intercity rail that was allocated about \$454 million from the SB 1 program. For the safety improvements to be most competitive, additional rail improvements would need to be

⁵ <https://railroads.dot.gov/grants-loans/competitive-discretionary-grant-programs/railroad-crossing-elimination-grant-program>

⁶ <https://calsta.ca.gov/subject-areas/state-rail-assistance>

bundled and Capitol Corridor Joint Powers Authority (CCJPA) would need to be the applicant.

9.3. Trade Corridor Enhancement Program (TCEP)

Administering Agency: California Transportation Commission

The purpose of the TCEP⁷ is to fund infrastructure improvements on federally designated Trade Corridors of National and Regional Significance and on the National Highway System. This includes freight rail system improvements. TCEP considers freight system factors, transportation factors (such as safety, congestion reduction/mitigation), community factors and overall benefits and cost of the project. The proposed safety improvements can be bundled with projects that address the additional factors evaluated in the criteria.

This program requires a match of 30% from either private, local, federal or state funds. Projects nominated by Caltrans do not require a match. Projects nominated by regions are required to have a match. STA is competitive for this fund source.

This competitive state grant has an estimated \$300 million per year available for funding that was allocated by SB 1 and an additional \$515 million in National Highway Freight Program funds. Public entities are eligible to apply, but need the support of railroad partners. Funds may be used for plans, specifications, and estimates, right-of-way, and construction phases.

9.4. State Transportation Improvement Program (STIP)

STIP⁸ projects are included in a five-year investment plan and updated every two years. These projects are funded by state excise tax on gasoline. Capital improvement projects are eligible to receive funding. STIP consist of the Regional Transportation Improvement Program (RTIP) and the Interregional Transportation Improvement Program (ITIP).

10.0 Regional Funding Programs

The Metropolitan Transportation Commission (MTC) comprises nine Bay Area counties including Solano County. MTC offers the following sources of funding. Transit agencies can apply these funds to capital improvement projects or operations.

10.1. Transportation Development Act (TDA)

The TDA program funds state transit projects ranging from transit operations to transportation planning. The funds for this program are generated from two major funding sources: the Local Transportation Fund (LTF) and the State Transit Assistance (STA) fund. These funds can be requested through MTC through an application

⁷ <https://catc.ca.gov/programs/sb1/trade-corridor-enhancement-program>

⁸ <https://mtc.ca.gov/funding/state-funding/state-transportation-improvement-program-stip>

workbook⁹. Fund requests are evaluated each month except for August and take approximately 2.5 months to process. Proposed safety improvements that benefit bicycle and pedestrian users should seek funding from the Transportation Development Act Article 3 (TDA 3)¹⁰ fund.

10.2. State Transit Assistance (STA) Fund

The STA¹¹ funds are secured through sales tax on fuel and diesel fuel and are source of funding for the TDA. The availability of this fund source is dependent on the yearly cost of fuel. This fund source is divided into two parts population-based funds and revenue-funds which are used methods used to distribute funding to eligible agencies.

10.3. Local Transportation Fund (LTF)

This funding source¹² obtains funding from ¼ cent of the general sales tax collected throughout the state. Funding is available in each county for administration, planning and programming, pedestrian and bicycle projects and passenger rail projects.

⁹ <https://mtc.ca.gov/funding/regional-funding/tda-sta/allocation-requests-audits>

¹⁰ <https://mtc.ca.gov/funding/regional-funding/tda-sta/bicycle-pedestrian-funds-tda-3>

¹¹ <https://mtc.ca.gov/funding/regional-funding/transportation-development-act-tda-state-transit-assistance-sta>

¹² <https://dot.ca.gov/-/media/dot-media/programs/rail-mass-transportation/documents/f0009844-tda-07-2018-a11y.pdf>

11.0 LOCAL FUNDING PROGRAMS

5.1 Regional Traffic Impact Fee (RTIF)¹³

This fee is applied to approved development projects that will have an impact on the cost of public transportation infrastructure. These fees are used to fund transportation projects within multiple counties throughout region. The Solano County's Public Facility Fee (PFF) includes a \$1,500 per dwelling unit equivalent that is allocated within Solano County, STA administration, and regional transit improvements.

Appendix E provides a summary of the grant opportunities including funding source, available funds, minimum/maximum awards, match requirements and special considerations/requirements.

¹³ <https://sta.ca.gov/operations/funding/local/>

Table 1 - Grant Funding Opportunities

Grant	Grant Administering Agency	Available Funding	Max/Min Award Amount	Match Requirements	Special Considerations/ Requirements	Eligible Projects	Date
Federal Funding Sources							
Railway Highway Grade Crossings (Section 130) Program	Federal Highway Administration (FHWA), California Department of Transportation (Caltrans), California Public Utilities Commission (CPUC)	~ \$17 million per year	Determined based on agreed upon scope	10% Local Match – Fulfilled through Caltrans STP Fund	Project must be on the CPUC Priority List Included in FSTIP Existing accident history, vehicle and train volumes, pedestrian issues, and geometry	Traffic signalization/Railroad preemption Guardrails Pedestrian/Bicycle Path Improvements Active Warning Equipment	Annual
Consolidated Rail Infrastructure and Safety Improvements (CRISI) Program	Federal Railroad Administration (FRA), Department of Transportation (USDOT)	FY 22 \$1.4 billion available in funding	None	20% minimum local match – can include state or private entity funds	Preference is given to federal requests less than 50% of project cost Benefit-Cost Analysis (BCA) is required	A highway-rail grade crossing improvement project such as railroad crossing signals, gates, and related technologies, highway lighting	

Grant	Grant Administering Agency	Available Funding	Max/Min Award Amount	Match Requirements	Special Considerations/ Requirements	Eligible Projects	Date
						<p>and crossing approach signage</p> <p>Road improvements, railroad crossing panels and surfaces</p>	
<p>Nationally Significant Multimodal Freight & Highway Projects Program (INFRA)</p>	<p>USDOT</p>	<p>FY 22 \$3.1 billion, FY 22 – FY 26 \$8 billion available</p>	<p>Up to \$50 million</p>	<p>20% minimum non-federal match, 80% maximum federal cost share</p>	<p>Projects are evaluated based on outcome criteria that includes safety, state of good repair, economic impacts, climate change, and equity</p> <p>Historically Disadvantaged Communities and Areas of Persistent Poverty are considered in the selection criteria</p> <p>BCA is required</p>	<p>A highway-railway grade crossing or grade separation project</p> <p>Network of project such as a rail corridor that increase rail safety and reduce congestion</p>	<p>Annual</p>

Grant	Grant Administering Agency	Available Funding	Max/Min Award Amount	Match Requirements	Special Considerations/ Requirements	Eligible Projects	Date
Railroad Crossing Elimination Grant Program	FRA	FY 22 \$573 million available	Minimum \$1 million, no maximum	20% minimum non-federal match, 80% maximum federal cost share	Funding request can combine proposed safety improvements at various at-grade crossing locations as corridor-wide improvement to region	Improvement or Installation of protective devices, signals, signs or other measures that improve safety Includes Planning, environmental review, and design of an eligible project	
State Funding Sources							
State Rail Assistance (SRA) Program	California State Transportation Agency (CalSTA)	~\$454 million over the first 10 years of SB 1	Based on distribution formula per rail agency	None	Environmental documentation must be complete Funding request is made through an Allocation Request form	Transportation planning and mass transportation purposes Operations and capital improvements that provide benefit to the public	Annual

Grant	Grant Administering Agency	Available Funding	Max/Min Award Amount	Match Requirements	Special Considerations/ Requirements	Eligible Projects	Date
Trade Corridor Enhancement Program (TCEP)	California Transportation Commission (CTC)	~\$300 million per year from SB 1 and ~\$515 million over 3 years in National Highway Freight Program funds	Distribution is on a corridor basis	30% match requirement from either private, local, federal or state funds. If project is nominated by Caltrans, no match is required.	Elevation criteria includes freight system, transportation, and community factors and overall benefits and cost of the project	Freight rail system improvements, surface transportation, local road, and connector road improvements to facilitate the movement of goods	Annual
State Transportation Improvement Program (STIP)	Caltrans, Metropolitan Transportation Commission (MTC), CTC	Each county is designated an amount of STIP funding	Varies	None	Project proposals must align with goals of Plan Bay Area 2050, region's transportation and land-use priorities CTC will have final approval of project proposals submitted by MTC for Regional Transportation Improvement Program (RTIP) and by Caltrans for the Interregional Transportation	Transit and Rail Projects programmed in the RTIP Bicycle and Pedestrian projects programmed in the STIP and eligible for federal funds	Annual

Grant	Grant Administering Agency	Available Funding	Max/Min Award Amount	Match Requirements	Special Considerations/ Requirements	Eligible Projects	Date
					Improvement Program (ITIP)		

Regional Funding Sources

Transportation Development Act (TDA)	MTC	Amount available fluctuates based on sales tax on fuel and diesel fuel	Funding is requested through an allocation form based on a Fund Estimate prepared by MTC released in the beginning of the year	None	Available funds through the Local Transportation Fund (LTF) are determined annually.	Transit Operations Bus and rail projects Pedestrian and bicycle facilities Transportation planning	Monthly
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Local Funding Sources

Regional Traffic Impact Fee (RTIF)	Solano County Board of Supervisors	Varies	Varies	None	5% of funds are allocated to regional transit improvements through Solano County's Public Facility Fee (PFF)	Transportation projects	n/a
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APPENDIX A – RAILROAD CROSSING INVENTORY

APPENDIX B- RAILROAD CROSSING INCIDENT INVENTORY

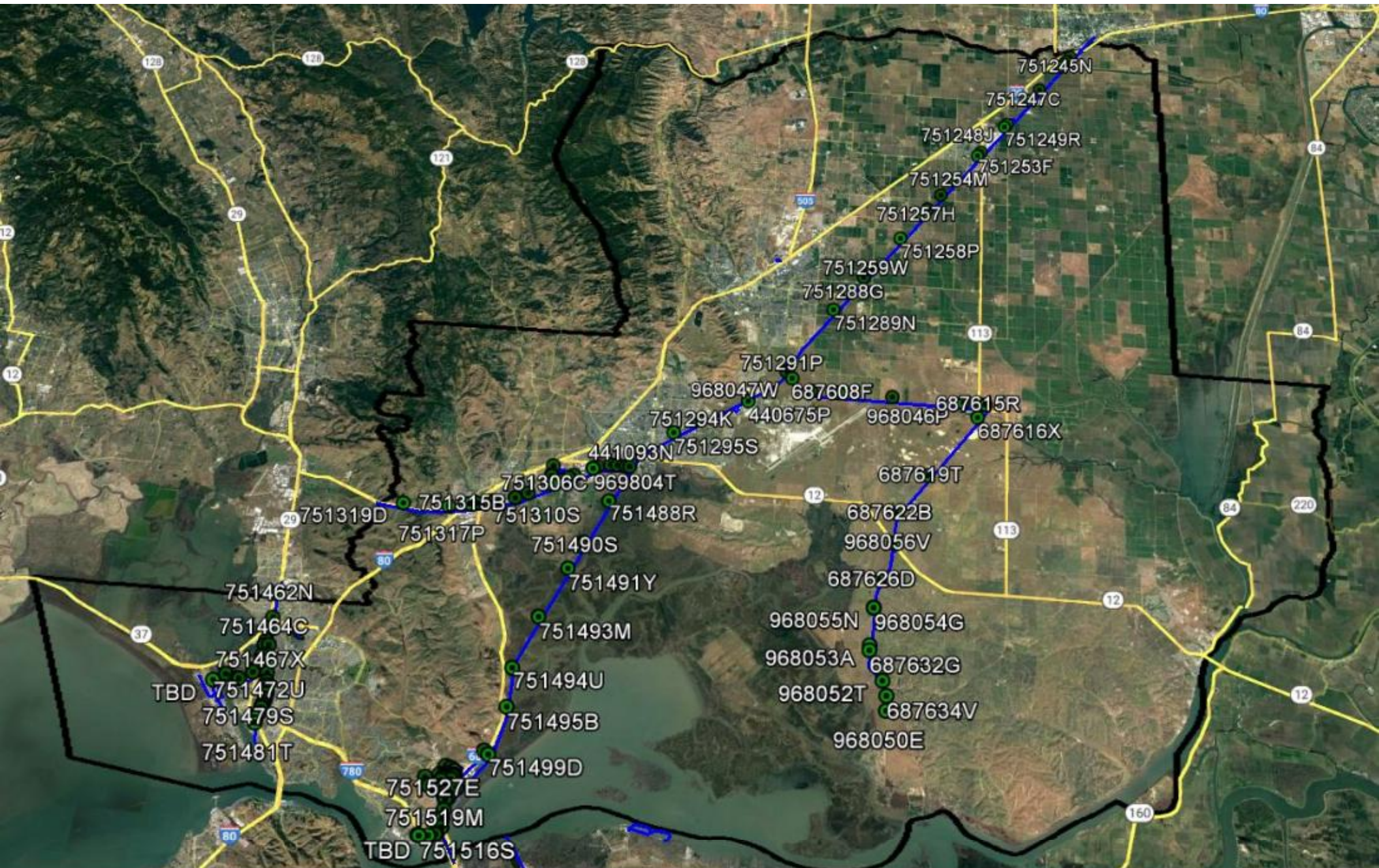
APPENDIX C – METHODOLOGY CRITERIA LEVELS OF IMPORTANCE

Incidents		
Types of Incident	Number of Incidents	Level of Importance
Fatalities	1 or more	
Injuries	2 or more	
	1	
Collision (No Injuries) and Near Misses	2 or more	
	1	
Proximity to Key Facilities		
Types of Facility	Proximity	Level of Importance
<ul style="list-style-type: none"> • Schools • Senior Centers / Community Centers 	Within ¼ mile	
	½ mile to ¾ mile	
<ul style="list-style-type: none"> • Transit Station / Center • Industrial Center • Large Employment Area • Hospital • Park • Government Centers 	Within ½ mile	
Traffic Volumes		
Existing and Future Average Daily Traffic Volumes		Level of Importance
More than 15,000		
Between 5,000 and 15,000		
Less than 5,000		
Train Speeds and Volumes		
Train Speeds	Daily Trains	Level of Importance
Greater than 75mph	12 or more	
	Less than 12	
Between 35mph and 75mph	12 or more	
	Less than 12	
Less than 35mph	12 or more	
	Less than 12	Not Important
Capital Costs		
Lower than 50 th Percentile		
Between the 50 th and 75 th Percentile		
Between the 75 th and 95 th Percentile		
Above the 95 th Percentile		

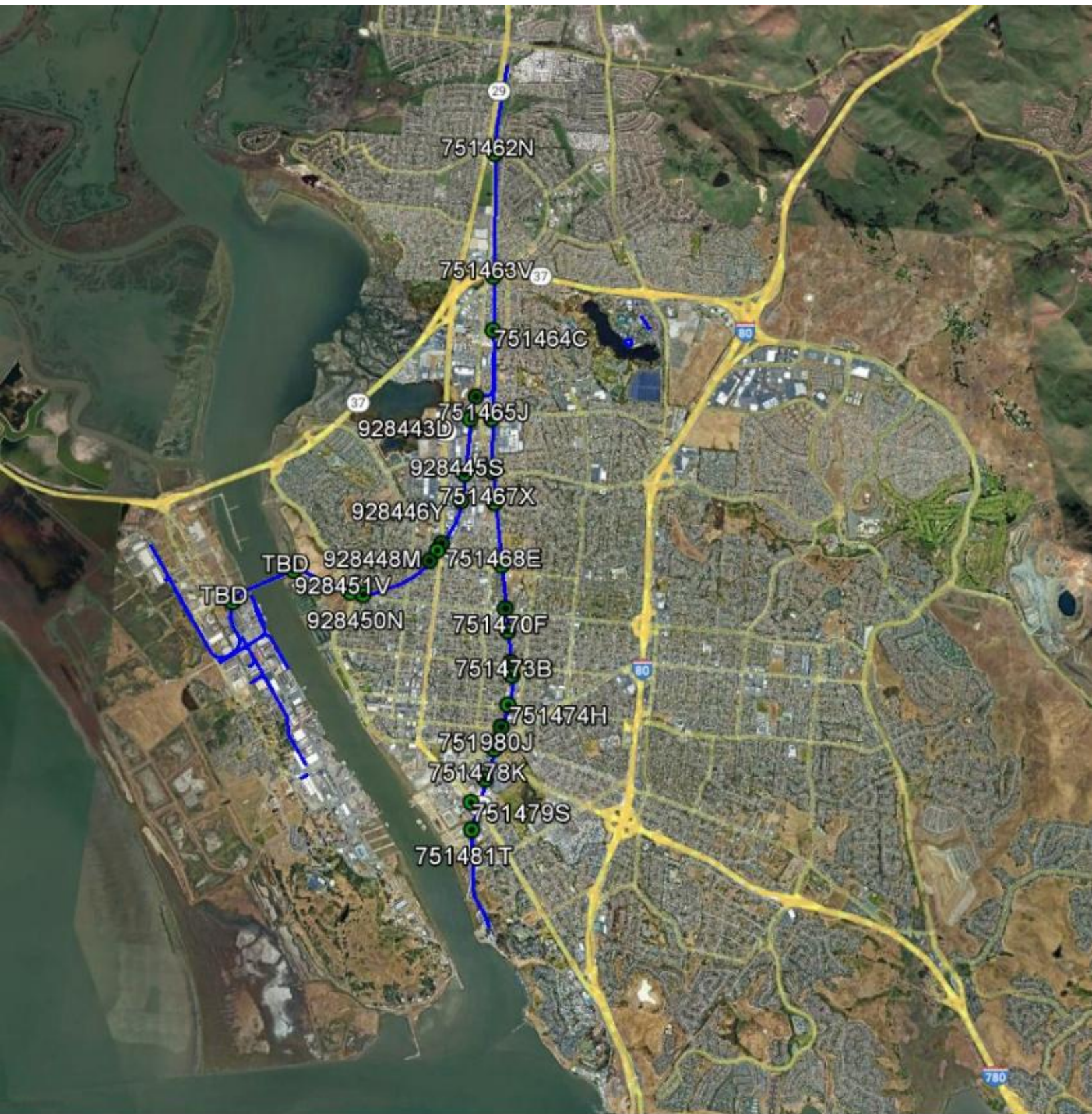
APPENDIX D – COST ESTIMATES

APPENDIX E – FUNDING OPPORTUNITIES TABLE

APPENDIX A – RAILROAD CROSSING INVENTORY



Overall Solano County



City of Vallejo



City of Benicia



City of Fairfield and County



Cities of Fairfield and Vacaville and County



City of Dixon and County



Solano County - Eastern County

APPENDIX B- RAILROAD CROSSING INCIDENT INVENTORY

Solano Rail Crossings Inventory Update - Summary of Incidents

Updated: 07/11/2023					Incidents						
					Train				Non-Train		
No.	DOT No.	Roadway Name	City or Town	Private	Fatality	Injury	Non-Injury	Near-Miss	Fatality	Injury	Non-Injury
98	751548X	Park Road	Benicia							2	1
99	751550Y	Industrial Way	Benicia			1	2				
100	751556P	East Channel Road	Benicia								
101	751558D	Park Road	Benicia							1	1
102	751559K	Park Road	Benicia								
103	751560E	Nevada Street	Benicia								
104	751561L	Iowa Street	Benicia								
105	751562T	Stone Way	Benicia								
106	751565N	Bayshore Road	Benicia								
107	751980J	Curtola Parkway	Vallejo								
108	753750P	Private Industry - Hadley	Benicia	X							
109	928442W	Broadway Avenue	Vallejo								
110	928443D	Sereno Drive	Vallejo								
111	928445S	Redwood Street	Vallejo								
112	928446Y	Valle Vista Avenue	Vallejo								
113	928447F	Sonoma Blvd (SR 29)	Vallejo								
114	928448M	Mississippi Street	Vallejo								
115	928449U	Nebraska Street	Vallejo								
116	928450N	Wilson Avenue	Vallejo								
117	928451V	Mare Island Way	Vallejo								
118	932169Y	Private	Fairfield	X							
119	932170T	Private	Fairfield	X							
120	968046P	Private	Unincorporated	X							
121	968047W	Private	Unincorporated	X							
122	968048D	Private	Unincorporated	X			2	3			
123	968050E	Private	Unincorporated	X							
124	968052T	Birds Landing Road	Unincorporated								
125	968053A	Private	Unincorporated	X							
126	968054G	Private	Unincorporated	X							
127	968055N	Private	Unincorporated	X							
128	968056V	Western Railway Museum	Unincorporated	X							
129	968057C	Private	Unincorporated	X							
130	969804T	Private	Fairfield	X							
131	969805A	Private Road	Fairfield	X							
132	969806G	Private Road	Fairfield	X							
133	TBD	Pedestrian Waterfront Access	Benicia	X							
134	TBD	Private (S/O Tyler and Bayshore)	Benicia	X							
135	TBD	Refinery Access Road	Benicia								
136	TBD	Mare Island Causeway	Vallejo								
137	TBD	Nimitz Avenue	Vallejo								
138	TBD - Private Exxon	Private Exxon	Benicia	X						1	
TOTALS					12	11	19	6	0	35	50

Black text = Listed in FRA and CPUC databases

Blue text = Listed in FRA database

Green text = Listed in CPUC database

Solano Rail Crossings Inventory Update - Summary of Key Facilities

Updated: 07/11/2023					Key Facilities										
No.	DOT No.	Roadway Name	City or Town	Private	School		Senior / Community Center		Transit Center	Ind. Center		Large Empl. Area	Hospital	Park	Gov. Center
					1/4 Mile	1/2 Mile	1/4 Mile	1/2 Mile	1/2 Mile	1/2 Mile	1/2 Mile	1/2 Mile	1/2 Mile	1/2 Mile	1/2 Mile
1	440675P	Huntington Drive	Fairfield							x				x	
2	441093N	Pedestrian	Unincorporated							x					
3	450529L	Industrial Court	Benicia							x					
4	687605K	Gate Road	Fairfield												
5	687608F	Meridian Road	Unincorporated												
6	687614J	Rio Dixon Road	Unincorporated												
7	687615R	State Route 113	Unincorporated												
8	687616X	Cook Lane	Unincorporated												
9	687619T	Creed Road	Unincorporated												
10	687622B	Lambie Road	Unincorporated												
11	687626D	Little Honker Bay Road	Fairfield												
12	687632G	Shiloh Road	Unincorporated												
13	687634V	Dinkel Spiel Road	Fairfield												
14	751241L	Old Davis Road	Unincorporated												
15	751242T	Private	Unincorporated	X											
16	751244G	Private	Unincorporated	X											
17	751245N	Private	Unincorporated	X											
18	751246V	Tremont Road	Unincorporated												
19	751247C	Robben Road	Unincorporated							x					
20	751248J	Pedrick Road	Dixon							x					
21	751249R	Vaughn Road	Dixon							x					
22	751250K	1st Street	Dixon							x				x	
23	751253F	West A Street	Dixon							x					x
24	751254M	Pitt School Road	Dixon											x	
25	751255U	Midway Road	Unincorporated												
26	751256B	Batavia Road	Unincorporated												
27	751257H	Weber Road	Unincorporated												
28	751258P	Fox Road	Unincorporated												
29	751259W	Lewis Road	Unincorporated												
30	751260R	Hawkins Road	Unincorporated												
31	751288G	Elmira Road	Unincorporated												
32	751289N	Fry Road	Unincorporated												
33	751291P	Canon Road	Fairfield												
34	751294K	East Tabor Avenue	Fairfield			x			x						
35	751295S	Sunset Avenue	Suisun City						x					x	
36	751298M	Cordelia Road	Suisun City						x					x	
37	751299U	Cordelia Road	Suisun City											x	
38	751300L	Pennsylvania Avenue	Suisun City												
39	751301T	Beck Avenue	Fairfield						x	x					
40	751302A	Cordelia Road	Fairfield							x					
41	751303G	Chadbourne Road	Fairfield							x					
42	751304N	Private Road	Fairfield	X						x					
43	751305V	Cordelia Road	Fairfield							x					
44	751306C	Private Road	Fairfield	X						x					
45	751307J	Thomasson	Fairfield	X											
46	751309X	Private Road	Fairfield	X											
47	751310S	Private Road	Fairfield	X											
48	751311Y	Bridgeport Avenue	Unincorporated												
49	751313M	Lopes Road	Fairfield			x			x	x					
50	751314U	Cordelia Road Spur	Fairfield						x	x					
51	751315B	Cordelia Road	Unincorporated							x					
52	751317P	Red Top Road	Unincorporated							x					
53	751319D	Private Road	Unincorporated	X											
54	751462N	Mini Drive	Vallejo			x			x						
55	751463V	Hwy 37 / Lewis Brown Dr	Vallejo			x			x	x					
56	751464C	Tuolumne	Vallejo						x	x					

Solano Rail Crossings Inventory Update - Summary of Key Facilities

Updated: 07/11/2023					Key Facilities									
No.	DOT No.	Roadway Name	City or Town	Private	School		Senior / Community Center		Transit Center	Ind. Center	Large Empl. Area	Hospital	Park	Gov. Center
					1/4 Mile	1/2 Mile	1/4 Mile	1/2 Mile	1/2 Mile	1/2 Mile	1/2 Mile	1/2 Mile	1/2 Mile	1/2 Mile
123	968050E	Private	Unincorporated	X										
124	968052T	Birds Landing Road	Unincorporated											
125	968053A	Private	Unincorporated	X										
126	968054G	Private	Unincorporated	X										
127	968055N	Private	Unincorporated	X										
128	968056V	Western Railway Museum	Unincorporated	X										
129	968057C	Private	Unincorporated	X										
130	969804T	Private	Fairfield	X				x	x					
131	969805A	Private Road	Fairfield	X					x					
132	969806G	Private Road	Fairfield	X					x					
133	TBD	Pedestrian Waterfront Access	Benicia	X										
134	TBD	Private (S/O Tyler and Bayshore)	Benicia	X										
135	TBD	Refinery Access Road	Benicia						x					
136	TBD	Mare Island Causeway	Vallejo										x	
137	TBD	Nimitz Avenue	Vallejo											
138	TBD - Private Exxon	Private Exxon	Benicia	X						x				
TOTALS					6	22	4	7	35	76	0	2	25	1

Black text = Listed in FRA and CPUC databases

Blue text = Listed in FRA database

Green text = Listed in CPUC database

Solano Rail Crossings Inventory Update - Summary of Future Developments, Traffic Data and Train Data

Updated: 07/11/2023					Future Development			Traffic Data		Train Data			
No.	DOT No.	Roadway Name	City or Town	Private	Key Facility Type	Approx. Distance to RR Crossing	Future AADT	Latest AADT	Source / Date	Source: FRA Database			
						1/4 Mile	1/2 Mile			Daily Trains	Weekly Trains	Date	Max Speed
1	440675P	Huntington Drive	Fairfield					2,000	FRA / 2020	-	1	2021	10
2	441093N	Pedestrian	Unincorporated							38	-	2019	70
3	450529L	Industrial Court	Benicia					830	FRA / 2016	-	1	2019	10
4	687605K	Gate Road	Fairfield							-	-	-	-
5	687608F	Meridian Road	Unincorporated							-	-	-	-
6	687614J	Rio Dixon Road	Unincorporated							-	-	-	-
7	687615R	State Route 113	Unincorporated							-	-	-	-
8	687616X	Cook Lane	Unincorporated							-	-	-	-
9	687619T	Creed Road	Unincorporated							-	-	-	-
10	687622B	Lambie Road	Unincorporated							-	-	-	-
11	687626D	Little Honker Bay Road	Fairfield							-	-	-	-
12	687632G	Shiloh Road	Unincorporated							-	-	-	-
13	687634V	Dinkel Spiel Road	Fairfield							-	-	-	-
14	751241L	Old Davis Road	Unincorporated							-	-	-	-
15	751242T	Private	Unincorporated	X						-	-	-	-
16	751244G	Private	Unincorporated	X						38	-	2019	79
17	751245N	Private	Unincorporated	X						-	-	-	-
18	751246V	Tremont Road	Unincorporated					1,778	FRA / 2016	40	-	2019	79
19	751247C	Robben Road	Unincorporated					833	FRA / 2016	38	-	2019	79
20	751248J	Pedrick Road	Dixon					3,412	FRA / 2016	40	-	2019	79
21	751249R	Vaughn Road	Dixon					2,734	FRA / 2016	38	-	2019	79
22	751250K	1st Street	Dixon					11,440	FRA / 2016	38	-	2019	79
23	751253F	West A Street	Dixon					8,370	FRA / 2016	38	-	2019	79
24	751254M	Pitt School Road	Dixon					1,195	FRA / 2016	40	-	2019	79
25	751255U	Midway Road	Unincorporated					2,698	FRA / 2016	40	-	2019	79
26	751256B	Batavia Road	Unincorporated					308	FRA / 2016	40	-	2019	79
27	751257H	Weber Road	Unincorporated					557	FRA / 2016	40	-	2019	79
28	751258P	Fox Road	Unincorporated					152	FRA / 2016	40	-	2019	79
29	751259W	Lewis Road	Unincorporated					1,487	FRA / 2016	40	-	2019	79
30	751260R	Hawkins Road	Unincorporated					1,418	FRA / 2016	40	-	2019	79
31	751288G	Elmira Road	Unincorporated					2,165	FRA / 2016	40	-	2019	79
32	751289N	Fry Road	Unincorporated					4,312	FRA / 2016	40	-	2019	79
33	751291P	Canon Road	Fairfield					7,455	FRA / 2016	40	-	2019	79
34	751294K	East Tabor Avenue	Fairfield					10,839	FRA / 2016	38	-	2019	79
35	751295S	Sunset Avenue	Suisun City					20,926	FRA / 2016	40	-	2019	79
36	751298M	Cordelia Road	Suisun City					2,690	FRA / 2016	40	-	2019	79
37	751299U	Cordelia Road	Suisun City					400	FRA / 1988	4	-	2022	25
38	751300L	Pennsylvania Avenue	Suisun City					2,052	FRA / 1988	4	-	2015	25
39	751301T	Beck Avenue	Fairfield							4	-	2015	25
40	751302A	Cordelia Road	Fairfield					1,200	FRA / 1988	4	-	2015	25
41	751303G	Chadbourne Road	Fairfield					3,753	FRA / 2013	4	-	2021	25
42	751304N	Private Road	Fairfield	X						4	-	2021	25
43	751305V	Cordelia Road	Fairfield					200	FRA / 1988	1	-	2006	10
44	751306C	Private Road	Fairfield	X						4	-	2021	25
45	751307J	Thomasson	Fairfield	X						4	-	2021	25
46	751309X	Private Road	Fairfield	X						4	-	2021	25
47	751310S	Private Road	Fairfield	X						4	-	2021	25
48	751311Y	Bridgeport Avenue	Unincorporated					300	FRA / 1988	4	-	2015	25
49	751313M	Lopes Road	Fairfield					1,200	FRA / 1979	4	-	2015	25
50	751314U	Cordelia Road Spur	Fairfield					1,700	FRA / 1988	1	-	2021	25
51	751315B	Cordelia Road	Unincorporated					200	FRA / 1988	-	-	2021	0
52	751317P	Red Top Road	Unincorporated					800	FRA / 1988	4	-	2015	25
53	751319D	Private Road	Unincorporated	X						4	-	2021	25
54	751462N	Mini Drive	Vallejo					4,800	FRA / 1988	1	-	2006	10
55	751463V	Hwy 37 / Lewis Brown Dr	Vallejo					20,000	FRA / 1989	-	1	2021	10
56	751464C	Tuolumne	Vallejo					10,500	FRA / 1995	1	-	2006	10
57	751465J	Sereno Drive	Vallejo					7,000	FRA / 1988	-	-	2021	0
58	751466R	Redwood Street	Vallejo					17,700	FRA / 1995	-	-	2021	0
59	751467X	Valle Vista Avenue	Vallejo					6,000	FRA / 1995	-	-	2021	0
60	751468E	Nebraska	Vallejo					6,200	FRA / 1988	-	-	2021	0
61	751469L	Tennessee Street	Vallejo					20,000	FRA / 1988	-	-	2021	0

Solano Rail Crossings Inventory Update - Summary of Future Developments, Traffic Data and Train Data

Updated: 07/11/2023					Future Development			Traffic Data			Train Data			
No.	DOT No.	Roadway Name	City or Town	Private	Key Facility Type	Approx. Distance to RR Crossing		Future AADT	Latest AADT	Source / Date	Source: FRA Database			
						1/4 Mile	1/2 Mile				Daily Trains	Weekly Trains	Date	Max Speed
62	751470F	Louisiana Street	Vallejo						11,800	FRA / 1995	-	-	2021	0
63	751472U	Florida Street	Vallejo						5,500	FRA / 1988	-	-	2021	0
64	751473B	Ped Xing	Vallejo								-	-	2021	0
65	751474H	Georgia Street	Vallejo						9,000	FRA / 1988	-	-	2021	0
66	751475P	Maine Street	Vallejo						8,000	FRA / 1988	-	-	2021	0
67	751476W	Solano Avenue	Vallejo						4,100	FRA / 1988	-	-	2021	0
68	751478K	5th Street	Vallejo						5,000	FRA / 1988	-	-	2021	0
69	751479S	Sonoma Boulevard	Vallejo						21,000	FRA / 1995	-	-	2021	0
70	751481T	Chestnut Street	Vallejo						700	FRA / 1988	-	-	2021	0
71	751488R	Private Duck Club	Unincorporated	X							38	-	2019	79
72	751489X	Jacksnipe Road	Unincorporated	X							38	-	2019	79
73	751490S	Private Duck Club	Unincorporated	X							38	-	2019	79
74	751491Y	Chadborn Road	Unincorporated	X							38	-	2019	79
75	751493M	Private Industry	Unincorporated	X							38	-	2019	79
76	751494U	Pierce Lane	Unincorporated						54	FRA / 2016	40	-	2019	79
77	751495B	Morrow Lane	Unincorporated	X							38	-	2019	10
78	751498W	Lake Herman Road	Benicia								-	-	2016	79
79	751499D	Lake Herman Road	Benicia	X							44	-	2019	60
80	751501C	Private Industry - Verizon	Benicia	X							2	-	2019	10
81	751505E	Private	Benicia	X							4	-	2019	10
82	751506L	Private	Benicia	X							4	-	2019	10
83	751516S	Bayshore Road	Benicia						200	FRA / 1988	-	-	2022	0
84	751517Y	Jackson Street	Benicia						500	FRA / 1988	-	-	2022	0
85	751518F	All Private in Yard - Valero	Benicia	X							20	-	2016	10
86	751519M	Private	Benicia	X							4	-	2019	10
87	751523C	Private	Benicia	X							2	-	2019	10
88	751524J	Private	Benicia	X							2	-	2019	10
89	751525R	Private Industry Ironworkers	Benicia	X							4	-	2019	10
90	751527E	Park Road	Benicia						500	FRA / 1988	14	-	2019	10
91	751529T	City Street	Benicia	X					200	FRA / 1988	8	-	2019	10
92	751534P	Private Exxon	Benicia	X					200	FRA / 1988	10	-	2016	10
93	751537K	Private Industry - Shell Oil	Benicia	X							12	-	2019	10
94	751538S	Private Industry - Shell Oil	Benicia	X							20	-	2019	10
95	751545C	Bayshore Road	Benicia						200	FRA / 1988	6	-	2019	10
96	751546J	Industrial Way	Benicia						300	FRA / 1988	18	-	2019	10
97	751547R	Oregon Street	Benicia						50	FRA / 1988	2	-	2019	10
98	751548X	Park Road	Benicia						1,300	FRA / 2012	2	-	2019	10
99	751550Y	Industrial Way	Benicia						300	FRA / 1988	-	1	2019	10
100	751556P	East Channel Road	Benicia						300	FRA / 1970	8	-	2019	10
101	751558D	Park Road	Benicia						300	FRA / 1988	6	-	2019	10
102	751559K	Park Road	Benicia						500	FRA / 1988	10	-	2019	10
103	751560E	Nevada Street	Benicia						50	FRA / 1988	2	-	2019	10
104	751561L	Iowa Street	Benicia						60	FRA / 2012	2	-	2019	10
105	751562T	Stone Way	Benicia						400	FRA / 2012	2	-	2019	10
106	751565N	Bayshore Road	Benicia								-	-	2016	60
107	751980J	Curtola Parkway	Vallejo						8,289	FRA / 1983	-	-	2021	0
108	753750P	Private Industry - Hadley	Benicia	X					300	FRA / 2014	44	-	2019	60
109	928442W	Broadway Avenue	Vallejo								-	2	2019	10
110	928443D	Sereno Drive	Vallejo								-	2	2019	10
111	928445S	Redwood Street	Vallejo								-	2	2019	10
112	928446Y	Valle Vista Avenue	Vallejo								-	2	2019	10
113	928447F	Sonoma Blvd (SR 29)	Vallejo								-	2	2019	10
114	928448M	Mississippi Street	Vallejo								-	2	2019	10
115	928449U	Nebraska Street	Vallejo								-	2	2019	10
116	928450N	Wilson Avenue	Vallejo								-	2	2019	10
117	928451V	Mare Island Way	Vallejo								-	2	2019	10
118	932169Y	Private	Fairfield	X							4	-	2021	25
119	932170T	Private	Fairfield	X							4	-	2021	25
120	968046P	Private	Unincorporated	X							-	1	2015	30
121	968047W	Private	Unincorporated	X							-	1	2015	30
122	968048D	Private	Unincorporated	X							-	1	2015	30
123	968050E	Private	Unincorporated	X							-	1	2015	10
124	968052T	Birds Landing Road	Unincorporated						20	FRA / 2015	-	1	2015	10
125	968053A	Private	Unincorporated	X							8	-	2015	10
126	968054G	Private	Unincorporated	X							8	-	2015	30
127	968055N	Private	Unincorporated	X							8	-	2015	30

Solano Rail Crossings Inventory Update - Summary of Future Developments, Traffic Data and Train Data

Updated: 07/11/2023					Future Development			Traffic Data			Train Data			
No.	DOT No.	Roadway Name	City or Town	Private	Key Facility Type	Approx. Distance to RR Crossing		Future AADT	Latest AADT	Source / Date	Source: FRA Database			
						1/4 Mile	1/2 Mile				Daily Trains	Weekly Trains	Date	Max Speed
128	968056V	Western Railway Museum	Unincorporated	X							24	-	2015	20
129	968057C	Private	Unincorporated	X							-	1	2017	30
130	969804T	Private	Fairfield	X							1	-	2021	10
131	969805A	Private Road	Fairfield	X							4	-	2021	10
132	969806G	Private Road	Fairfield	X							4	-	2021	10
133	TBD	Pedestrian Waterfront Access	Benicia	X							-	-	-	-
134	TBD	Private (S/O Tyler and Bayshore)	Benicia	X							-	-	-	-
135	TBD	Refinery Access Road	Benicia								-	-	-	-
136	TBD	Mare Island Causeway	Vallejo								-	-	-	-
137	TBD	Nimitz Avenue	Vallejo								-	-	-	-
138	TBD - Private Exxon	Private Exxon	Benicia	X							-	-	-	-

Black text = Listed in FRA and CPUC databases

Blue text = Listed in FRA database

Green text = Listed in CPUC database

APPENDIX C – METHODOLOGY CRITERIA LEVELS OF IMPORTANCE

Incidents		
Types of Incident	Number of Incidents	Level of Importance
Fatalities	1 or more	
Injuries	2 or more	
	1	
Collision (No Injuries) and Near Misses	2 or more	
	1	
Proximity to Key Facilities		
Types of Facility	Proximity	Level of Importance
<ul style="list-style-type: none"> Schools Senior Centers / Community Centers 	Within ¼ mile	
	½ mile to ¼ mile	
<ul style="list-style-type: none"> Transit Station / Center Industrial Center Large Employment Area Hospital Park Government Centers 	Within ½ mile	
Traffic Volumes		
Existing and Future Average Daily Traffic Volumes		Level of Importance
More than 15,000		
Between 5,000 and 15,000		
Less than 5,000		
Train Speeds and Volumes		
Train Speeds	Daily Trains	Level of Importance
Greater than 75mph	12 or more	
	Less than 12	
Between 35mph and 75mph	12 or more	
	Less than 12	
Less than 35mph	12 or more	
	Less than 12	Not Important
Capital Costs		
Lower than 50 th Percentile		
Between the 50 th and 75 th Percentile		
Between the 75 th and 95 th Percentile		
Above the 95 th Percentile		

APPENDIX D – COST ESTIMATES

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)
PROPOSED CROSSING IMPROVEMENTS**

Crossing location	DOT#	City	Cost by crossing (general)	Cost by crossing (full)
Rio Dixon Road	687614J	Unincorporated	\$2,700,000	\$3,500,000
Robben Road	751247C	Unincorporated	\$1,500,000	\$3,500,000
1st Street	751250K	Dixon	\$2,200,000	\$4,700,000
Pitt School Road	751254M	Dixon	\$1,600,000	\$5,200,000
Midway Road	751255U	Unincorporated	\$3,100,000	\$5,700,000
Batavia Road	751256B	Unincorporated	\$1,600,000	\$4,100,000
Fox Road	751258P	Unincorporated	\$1,500,000	\$4,100,000
Lewis Road	751259W	Unincorporated	\$1,200,000	\$3,700,000
Hawkins Road	751260R	Unincorporated	\$1,200,000	\$3,800,000
Elmira Road	751288G	Unincorporated	\$2,020,000	\$4,900,000
Fry Road	751289N	Unincorporated	\$1,500,000	\$4,100,000
Canon Road	751291P	Fairfield	\$2,400,000	\$5,900,000
East Tabor Avenue	751294K	Fairfield	\$2,100,000	\$4,300,000
Pedestrian Xing	441093N	Suisun City	\$2,000,000	\$3,800,000
Sunset Avenue	751295S	Suisun City	\$3,600,000	\$5,700,000
Lopes Road	751313M	Fairfield	\$1,300,000	\$4,300,000
Red Top Road	751317P	Unincorporated	\$1,500,000	\$3,400,000
Mini Drive	751462N	Vallejo	\$3,400,000	\$5,700,000
Hwy 37 / Lewis Brown Dr	751463V	Vallejo	\$1,300,000	\$3,800,000
Redwood Street	751466R	Vallejo	\$4,000,000	\$6,000,000
Valle Vista Avenue	751467X	Vallejo	\$2,000,000	\$4,000,000
Nebraska	751468E	Vallejo	\$2,500,000	\$5,000,000
Tennessee Street	751469L	Vallejo	\$4,100,000	\$5,900,000
Louisiana Street	751470F	Vallejo	\$3,200,000	\$5,200,000
Florida Street	751472U	Vallejo	\$3,200,000	\$5,200,000
Ped Xing	751473B	Vallejo	\$2,700,000	\$3,400,000
Georgia Street	751474H	Vallejo	\$2,800,000	\$4,800,000
Maine Street	751475P	Vallejo	\$2,700,000	\$5,000,000
Solano Avenue	751476W	Vallejo	\$1,300,000	\$3,800,000
Chadbourne Road	751491Y	Unincorporated	\$1,900,000	\$3,600,000
Park Road	751527E	Benicia	\$2,500,000	\$5,000,000
Industrial Way	751550Y	Benicia	\$2,600,000	\$3,500,000
Curtola Parkway	751980J	Vallejo	\$1,900,000	\$5,400,000
Sereno Drive	928443D	Vallejo	\$2,700,000	\$5,200,000
Redwood Street	928445S	Vallejo	\$2,700,000	\$5,200,000
Valle Vista Avenue	928446Y	Vallejo	\$2,700,000	\$4,700,000
Sonoma Blvd (SR 29)	928447F	Vallejo	\$2,700,000	\$6,200,000
Mississippi Street	928448M	Vallejo	\$2,700,000	\$5,700,000
Nebraska Street	928449U	Vallejo	\$2,700,000	\$4,700,000
Wilson Avenue	928450N	Vallejo	\$2,900,000	\$4,900,000
Mare Island Way	928451V	Vallejo	\$1,600,000	\$5,900,000

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)
PROPOSED CROSSING IMPROVEMENTS**

ROUGH ORDER OF MAGNITUDE

September 2023

Sunset Avenue - Suisun						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$160,000	\$160,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	0	LS	\$100,000	\$0
Installations	3	Install Roadway Elements	0	LS	\$250,000	\$0
	4	Install Medians/Channelization	0	LS	\$150,000	\$0
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$300,000	\$600,000
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	1	LS	\$500,000	\$500,000
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	1	EA	\$300,000	\$300,000
	14	Railroad Signal Design Allowance	1	LS	\$150,000	\$150,000

Construction Subtotal: \$1,910,000
 Design, Environmental and Construction Management (20%): \$382,000
 Contingency (40%): \$764,000
 Escalation (3% for 5 years): \$486,742
TOTAL: \$3,542,742

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Sunset Avenue - Suisun						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$262,000	\$262,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	0	LS	\$100,000	\$0
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	0	LS	\$150,000	\$0
	5	Install 2 UPRR Access Gates	2	EA	\$35,000	\$70,000
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$300,000	\$600,000
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	1	LS	\$500,000	\$500,000
RR Improvements	10	Railroad Removals	1	LS	\$50,000	\$50,000
	11	Install 1 Track of Crossing Panels	2	EA	\$75,000	\$150,000
	12	Install 2 Railroad Devices	2	EA	\$250,000	\$500,000
	13	Install Signal Cabin	1	EA	\$300,000	\$300,000
	14	Railroad Signal Design Allowance	1	LS	\$150,000	\$150,000

Construction Subtotal: \$3,032,000
 Design, Environmental and Construction Management (20%): \$606,400
 Contingency (40%): \$1,212,800
 Escalation (3% for 5 years): \$772,670
TOTAL: \$5,623,870

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Curtola Pkwy - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$90,000	\$90,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	1	EA	\$300,000	\$300,000
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	0	EA	\$100,000	\$0
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal: \$990,000

Design, Environmental and Construction Management (20%): \$198,000

Contingency (40%): \$396,000

Escalation (3% for 5 years): \$252,290

TOTAL: \$1,836,290

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Curtola Pkwy - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 249,500.00	\$ 249,500.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	1	LS	\$ 150,000.00	\$ 150,000.00
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	1	EA	\$ 300,000.00	\$ 300,000.00
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	1	EA	\$ 100,000.00	\$ 100,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	1	LS	\$ 500,000.00	\$ 500,000.00
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	1	EA	\$ 75,000.00	\$ 75,000.00
	12	Install 2 Railroad Devices	2	EA	\$ 250,000.00	\$ 500,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal: \$ 2,894,500

Design, Environmental and Construction Management (20%): \$ 578,900

Contingency (40%): \$ 1,157,800

Escalation (3% for 5 years): \$737,630

TOTAL: \$ 5,368,830

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Sereno Drive - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$130,000	\$130,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$300,000	\$600,000
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal: \$1,430,000
 Design, Environmental and Construction Management (20%): \$286,000
 Contingency (40%): \$572,000
 Escalation (3% for 5 years): \$364,419
TOTAL: \$2,652,419

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Sereno Drive - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 239,500.00	\$ 239,500.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	1	LS	\$ 150,000.00	\$ 150,000.00
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$ 300,000.00	\$ 600,000.00
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	2	EA	\$ 100,000.00	\$ 200,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$ 500,000.00	\$ -
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	1	EA	\$ 75,000.00	\$ 75,000.00
	12	Install 2 Railroad Devices	2	EA	\$ 250,000.00	\$ 500,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal: \$ 2,784,500
 Design, Environmental and Construction Management (20%): \$ 556,900
 Contingency (40%): \$ 1,113,800
 Escalation (3% for 5 years): \$709,598
TOTAL: \$ 5,164,798

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Redwood St - Vallejo (928445S)						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$130,000	\$130,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$300,000	\$600,000
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal:	\$1,430,000
Design, Environmental and Construction Management (20%):	\$286,000
Contingency (40%):	\$572,000
Escalation (3% for 5 years):	\$364,419
TOTAL:	\$2,652,419

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Redwood St - Vallejo (928445S)						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 239,500.00	\$ 239,500.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	1	LS	\$ 150,000.00	\$ 150,000.00
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$ 300,000.00	\$ 600,000.00
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	2	EA	\$ 100,000.00	\$ 200,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$ 500,000.00	\$ -
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	1	EA	\$ 75,000.00	\$ 75,000.00
	12	Install 2 Railroad Devices	2	EA	\$ 250,000.00	\$ 500,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal:	\$ 2,784,500
Design, Environmental and Construction Management (20%):	\$ 556,900
Contingency (40%):	\$ 1,113,800
Escalation (3% for 5 years):	\$ 709,598
TOTAL: \$	5,164,798

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Valle- Vista Ave - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$130,000	\$130,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$300,000	\$600,000
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal: \$1,430,000
 Design, Environmental and Construction Management (20%): \$286,000
 Contingency (40%): \$572,000
 Escalation (3% for 5 years): \$364,419
TOTAL: \$2,652,419

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Valle- Vista Ave - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 214,500.00	\$ 214,500.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	1	LS	\$ 150,000.00	\$ 150,000.00
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$ 300,000.00	\$ 600,000.00
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	2	EA	\$ 100,000.00	\$ 200,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$ 500,000.00	\$ -
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	1	EA	\$ 75,000.00	\$ 75,000.00
	12	Install 2 Railroad Devices	1	EA	\$ 250,000.00	\$ 250,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal: \$ 2,509,500
 Design, Environmental and Construction Management (20%): \$ 501,900
 Contingency (40%): \$ 1,003,800
 Escalation (3% for 5 years): \$639,517
TOTAL: \$ 4,654,717

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Sonoma Blvd (SR-29) - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$130,000	\$130,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$300,000	\$600,000
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal: \$1,430,000
 Design, Environmental and Construction Management (20%): \$286,000
 Contingency (40%): \$572,000
 Escalation (3% for 5 years): \$364,419
TOTAL: \$2,652,419

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Sonoma Blvd (SR-29) - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 289,500.00	\$ 289,500.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	1	LS	\$ 150,000.00	\$ 150,000.00
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$ 300,000.00	\$ 600,000.00
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	2	EA	\$ 100,000.00	\$ 200,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	1	LS	\$ 500,000.00	\$ 500,000.00
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	1	EA	\$ 75,000.00	\$ 75,000.00
	12	Install 2 Railroad Devices	2	EA	\$ 250,000.00	\$ 500,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal: \$ 3,334,500
 Design, Environmental and Construction Management (20%): \$ 666,900
 Contingency (40%): \$ 1,333,800
 Escalation (3% for 5 years): \$849,759
TOTAL: \$ 6,184,959

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Mississippi Street - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$130,000	\$130,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$300,000	\$600,000
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal: \$1,430,000
 Design, Environmental and Construction Management (20%): \$286,000
 Contingency (40%): \$572,000
 Escalation (3% for 5 years): \$364,419
TOTAL: \$2,652,419

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Mississippi Street - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 264,500.00	\$ 264,500.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	1	LS	\$ 150,000.00	\$ 150,000.00
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$ 300,000.00	\$ 600,000.00
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	2	EA	\$ 100,000.00	\$ 200,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	1	LS	\$ 500,000.00	\$ 500,000.00
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	1	EA	\$ 75,000.00	\$ 75,000.00
	12	Install 2 Railroad Devices	1	EA	\$ 250,000.00	\$ 250,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal: \$ 3,059,500
 Design, Environmental and Construction Management (20%): \$ 611,900
 Contingency (40%): \$ 1,223,800
 Escalation (3% for 5 years): \$779,678
TOTAL: \$ 5,674,878

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Nebraska Street - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$130,000	\$130,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$300,000	\$600,000
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal: \$1,430,000
 Design, Environmental and Construction Management (20%): \$286,000
 Contingency (40%): \$572,000
 Escalation (3% for 5 years): \$364,419
TOTAL: \$2,652,419

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Nebraska Street - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 212,000.00	\$ 212,000.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	1	LS	\$ 150,000.00	\$ 150,000.00
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$ 300,000.00	\$ 600,000.00
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	1	EA	\$ 100,000.00	\$ 100,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$ 500,000.00	\$ -
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	2	EA	\$ 75,000.00	\$ 150,000.00
	12	Install 2 Railroad Devices	1	EA	\$ 250,000.00	\$ 250,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal: \$ 2,482,000
 Design, Environmental and Construction Management (20%): \$ 496,400
 Contingency (40%): \$ 992,800
 Escalation (3% for 5 years): \$632,509
TOTAL: \$ 4,603,709

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Wilson Avenue - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$140,000	\$140,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	2	LS	\$250,000	\$500,000
	4	Install Medians/Channelization	0	LS	\$150,000	\$0
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$300,000	\$600,000
	7	Install pavement markings and signage	2	LS	\$100,000	\$200,000
	8	Install Lighting	0	EA	\$100,000	\$0
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal: \$1,540,000
 Design, Environmental and Construction Management (20%): \$308,000
 Contingency (40%): \$616,000
 Escalation (3% for 5 years): \$392,451
TOTAL: \$2,856,451

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Wilson Avenue - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 224,500.00	\$ 224,500.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	2	LS	\$ 250,000.00	\$ 500,000.00
	4	Install Medians/Channelization	0	LS	\$ 150,000.00	\$ -
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$ 300,000.00	\$ 600,000.00
	7	Install pavement markings and signage	2	LS	\$ 100,000.00	\$ 200,000.00
	8	Install Lighting	1	EA	\$ 100,000.00	\$ 100,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$ 500,000.00	\$ -
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	1	EA	\$ 75,000.00	\$ 75,000.00
	12	Install 2 Railroad Devices	1	EA	\$ 250,000.00	\$ 250,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal: \$ 2,619,500
 Design, Environmental and Construction Management (20%): \$ 523,900
 Contingency (40%): \$ 1,047,800
 Escalation (3% for 5 years): \$667,550
TOTAL: \$ 4,858,750

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Mare Island Way - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$75,000	\$75,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	0	LS	\$150,000	\$0
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	1	EA	\$300,000	\$300,000
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	0	EA	\$100,000	\$0
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal: \$825,000
 Design, Environmental and Construction Management (20%): \$165,000
 Contingency (40%): \$330,000
 Escalation (3% for 5 years): \$210,242
TOTAL: \$1,530,242

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Mare Island Way - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 274,500.00	\$ 274,500.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	1	LS	\$ 150,000.00	\$ 150,000.00
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	1	EA	\$ 300,000.00	\$ 300,000.00
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	1	EA	\$ 100,000.00	\$ 100,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	1	LS	\$ 500,000.00	\$ 500,000.00
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	1	EA	\$ 75,000.00	\$ 75,000.00
	12	Install 2 Railroad Devices	3	EA	\$ 250,000.00	\$ 750,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal: \$ 3,169,500
 Design, Environmental and Construction Management (20%): \$ 633,900
 Contingency (40%): \$ 1,267,800
 Escalation (3% for 5 years): \$807,711
TOTAL: \$ 5,878,911

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Nebraska Street - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$120,000	\$120,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$300,000	\$600,000
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	0	EA	\$100,000	\$0
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal: \$1,320,000
 Design, Environmental and Construction Management (20%): \$264,000
 Contingency (40%): \$528,000
 Escalation (3% for 5 years): \$336,387
TOTAL: \$2,448,387

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Nebraska Street - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 229,500.00	\$ 229,500.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	1	LS	\$ 150,000.00	\$ 150,000.00
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$ 300,000.00	\$ 600,000.00
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	1	EA	\$ 100,000.00	\$ 100,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$ 500,000.00	\$ -
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	1	EA	\$ 75,000.00	\$ 75,000.00
	12	Install 2 Railroad Devices	2	EA	\$ 250,000.00	\$ 500,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal: \$ 2,674,500
 Design, Environmental and Construction Management (20%): \$ 534,900
 Contingency (40%): \$ 1,069,800
 Escalation (3% for 5 years): \$681,566
TOTAL: \$ 4,960,766

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Tennessee Street - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$185,000	\$185,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	0	LS	\$150,000	\$0
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$300,000	\$600,000
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	0	EA	\$100,000	\$0
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	2	EA	\$250,000	\$500,000
	13	Install Signal Cabin	1	EA	\$300,000	\$300,000
	14	Railroad Signal Design Allowance	1	LS	\$150,000	\$150,000

Construction Subtotal:	\$2,185,000
Design, Environmental and Construction Management (20%):	\$437,000
Contingency (40%):	\$874,000
Escalation (3% for 5 years):	\$556,822
TOTAL:	\$4,052,822

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Tennessee Street - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 274,500.00	\$ 274,500.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	0	LS	\$ 150,000.00	\$ -
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$ 300,000.00	\$ 600,000.00
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	2	EA	\$ 100,000.00	\$ 200,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	1	LS	\$ 500,000.00	\$ 500,000.00
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	1	EA	\$ 75,000.00	\$ 75,000.00
	12	Install 2 Railroad Devices	2	EA	\$ 250,000.00	\$ 500,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal:	\$ 3,169,500
Design, Environmental and Construction Management (20%):	\$ 633,900
Contingency (40%):	\$ 1,267,800
Escalation (3% for 5 years):	\$ 807,711
TOTAL: \$	5,878,911

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Louisiana Street - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$155,000	\$155,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$300,000	\$600,000
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	1	EA	\$250,000	\$250,000
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal:	\$1,705,000
Design, Environmental and Construction Management (20%):	\$341,000
Contingency (40%):	\$682,000
Escalation (3% for 5 years):	\$434,500
TOTAL:	\$3,162,500

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Louisiana Street - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 239,500.00	\$ 239,500.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	1	LS	\$ 150,000.00	\$ 150,000.00
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$ 300,000.00	\$ 600,000.00
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	2	EA	\$ 100,000.00	\$ 200,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$ 500,000.00	\$ -
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	1	EA	\$ 75,000.00	\$ 75,000.00
	12	Install 2 Railroad Devices	2	EA	\$ 250,000.00	\$ 500,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal:	\$ 2,784,500
Design, Environmental and Construction Management (20%):	\$ 556,900
Contingency (40%):	\$ 1,113,800
Escalation (3% for 5 years):	\$ 709,598
TOTAL: \$	\$ 5,164,798

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Florida Street - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$155,000	\$155,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$300,000	\$600,000
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	1	EA	\$250,000	\$250,000
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal: \$1,705,000
 Design, Environmental and Construction Management (20%): \$341,000
 Contingency (40%): \$682,000
 Escalation (3% for 5 years): \$434,500
TOTAL: \$3,162,500

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Florida Street - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 239,500.00	\$ 239,500.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	1	LS	\$ 150,000.00	\$ 150,000.00
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$ 300,000.00	\$ 600,000.00
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	2	EA	\$ 100,000.00	\$ 200,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$ 500,000.00	\$ -
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	1	EA	\$ 75,000.00	\$ 75,000.00
	12	Install 2 Railroad Devices	2	EA	\$ 250,000.00	\$ 500,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal: \$ 2,784,500
 Design, Environmental and Construction Management (20%): \$ 556,900
 Contingency (40%): \$ 1,113,800
 Escalation (3% for 5 years): \$709,598
TOTAL: \$ 5,164,798

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Ped Xing - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$115,000	\$115,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	0	LS	\$250,000	\$0
	4	Install Medians/Channelization	0	LS	\$150,000	\$0
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	1	EA	\$300,000	\$300,000
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	1	EA	\$250,000	\$250,000
	13	Install Signal Cabin	1	EA	\$300,000	\$300,000
	14	Railroad Signal Design Allowance	1	LS	\$150,000	\$150,000

Construction Subtotal:	\$1,415,000
Design, Environmental and Construction Management (20%):	\$283,000
Contingency (40%):	\$566,000
Escalation (3% for 5 years):	\$360,597
TOTAL:	\$2,624,597

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Ped Xing - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 152,500.00	\$ 152,500.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	0	LS	\$ 150,000.00	\$ -
	5	Install 2 UPRR Access Gates	0	EA	\$ 35,000.00	\$ -
	6	Install 2 Quadrants of Full Pedestrian Treatments	1	EA	\$ 300,000.00	\$ 300,000.00
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	1	EA	\$ 100,000.00	\$ 100,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$ 500,000.00	\$ -
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	1	EA	\$ 75,000.00	\$ 75,000.00
	12	Install 2 Railroad Devices	1	EA	\$ 250,000.00	\$ 250,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal:	\$ 1,827,500
Design, Environmental and Construction Management (20%):	\$ 365,500
Contingency (40%):	\$ 731,000
Escalation (3% for 5 years):	\$465,717
TOTAL: \$	3,389,717

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Georgia Street - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$135,000	\$135,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	2	LS	\$150,000	\$300,000
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$300,000	\$600,000
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	0	EA	\$100,000	\$0
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal:	\$1,485,000
Design, Environmental and Construction Management (20%):	\$297,000
Contingency (40%):	\$594,000
Escalation (3% for 5 years):	\$378,435
TOTAL:	\$2,754,435

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Georgia Street - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 219,500.00	\$ 219,500.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	2	LS	\$ 150,000.00	\$ 300,000.00
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$ 300,000.00	\$ 600,000.00
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	1	EA	\$ 100,000.00	\$ 100,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$ 500,000.00	\$ -
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	1	EA	\$ 75,000.00	\$ 75,000.00
	12	Install 2 Railroad Devices	1	EA	\$ 250,000.00	\$ 250,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal:	\$ 2,564,500
Design, Environmental and Construction Management (20%):	\$ 512,900
Contingency (40%):	\$ 1,025,800
Escalation (3% for 5 years):	\$ 653,533
TOTAL: \$	4,756,733

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Maine Street - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$130,000	\$130,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$300,000	\$600,000
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal: \$1,430,000
 Design, Environmental and Construction Management (20%): \$286,000
 Contingency (40%): \$572,000
 Escalation (3% for 5 years): \$364,419
TOTAL: \$2,652,419

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Maine Street - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 229,500.00	\$ 229,500.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	1	LS	\$ 150,000.00	\$ 150,000.00
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$ 300,000.00	\$ 600,000.00
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	1	EA	\$ 100,000.00	\$ 100,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$ 500,000.00	\$ -
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	1	EA	\$ 75,000.00	\$ 75,000.00
	12	Install 2 Railroad Devices	2	EA	\$ 250,000.00	\$ 500,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal: \$ 2,674,500
 Design, Environmental and Construction Management (20%): \$ 534,900
 Contingency (40%): \$ 1,069,800
 Escalation (3% for 5 years): \$681,566
TOTAL: \$ 4,960,766

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Solano Avenue - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$60,000	\$60,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	0	EA	\$100,000	\$0
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal: \$660,000
 Design, Environmental and Construction Management (20%): \$132,000
 Contingency (40%): \$264,000
 Escalation (3% for 5 years): \$168,193
TOTAL: \$1,224,193

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Solano Avenue - Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 169,500.00	\$ 169,500.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	2	LS	\$ 250,000.00	\$ 500,000.00
	4	Install Medians/Channelization	1	LS	\$ 150,000.00	\$ 150,000.00
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$ 300,000.00	\$ -
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	1	EA	\$ 100,000.00	\$ 100,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$ 500,000.00	\$ -
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	1	EA	\$ 75,000.00	\$ 75,000.00
	12	Install 2 Railroad Devices	1	EA	\$ 250,000.00	\$ 250,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal: \$ 2,014,500
 Design, Environmental and Construction Management (20%): \$ 402,900
 Contingency (40%): \$ 805,800
 Escalation (3% for 5 years): \$513,372
TOTAL: \$ 3,736,572

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Park Road - Benicia						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$120,000	\$120,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	1	LS	\$500,000	\$500,000
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal:	\$1,320,000
Design, Environmental and Construction Management (20%):	\$264,000
Contingency (40%):	\$528,000
Escalation (3% for 5 years):	\$336,387
TOTAL:	\$2,448,387

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Park Road - Benicia						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 229,500.00	\$ 229,500.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	1	LS	\$ 150,000.00	\$ 150,000.00
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$ 300,000.00	\$ -
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	2	EA	\$ 100,000.00	\$ 200,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	1	LS	\$ 500,000.00	\$ 500,000.00
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	1	EA	\$ 75,000.00	\$ 75,000.00
	12	Install 2 Railroad Devices	2	EA	\$ 250,000.00	\$ 500,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal:	\$ 2,674,500
Design, Environmental and Construction Management (20%):	\$ 534,900
Contingency (40%):	\$ 1,069,800
Escalation (3% for 5 years):	\$ 681,566
TOTAL: \$	4,960,766

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Industrial Way - Benicia						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$110,000	\$110,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	0	LS	\$150,000	\$0
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	1	EA	\$250,000	\$250,000
	13	Install Signal Cabin	1	EA	\$300,000	\$300,000
	14	Railroad Signal Design Allowance	1	LS	\$150,000	\$150,000

Construction Subtotal:	\$1,360,000
Design, Environmental and Construction Management (20%):	\$272,000
Contingency (40%):	\$544,000
Escalation (3% for 5 years):	\$346,580
TOTAL:	\$2,522,580

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Industrial Way - Benicia						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 154,500.00	\$ 154,500.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	1	LS	\$ 150,000.00	\$ 150,000.00
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$ 300,000.00	\$ -
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	2	EA	\$ 100,000.00	\$ 200,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$ 500,000.00	\$ -
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	1	EA	\$ 75,000.00	\$ 75,000.00
	12	Install 2 Railroad Devices	1	EA	\$ 250,000.00	\$ 250,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal:	\$ 1,849,500
Design, Environmental and Construction Management (20%):	\$ 369,900
Contingency (40%):	\$ 739,800
Escalation (3% for 5 years):	\$ 471,324
TOTAL: \$	3,430,524

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Robben Road - Unincorporated						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$70,000	\$70,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal: \$770,000
 Design, Environmental and Construction Management (20%): \$154,000
 Contingency (40%): \$308,000
 Escalation (3% for 5 years): \$196,226
TOTAL: \$1,428,226

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Robben Road - Unincorporated						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 154,500.00	\$ 154,500.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	1	LS	\$ 150,000.00	\$ 150,000.00
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$ 300,000.00	\$ -
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	2	EA	\$ 100,000.00	\$ 200,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$ 500,000.00	\$ -
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	1	EA	\$ 75,000.00	\$ 75,000.00
	12	Install 2 Railroad Devices	1	EA	\$ 250,000.00	\$ 250,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal: \$ 1,849,500
 Design, Environmental and Construction Management (20%): \$ 369,900
 Contingency (40%): \$ 739,800
 Escalation (3% for 5 years): \$471,324
TOTAL: \$ 3,430,524

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

1st Street - Dixon						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$55,000	\$55,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	0	LS	\$150,000	\$0
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal: \$605,000
 Design, Environmental and Construction Management (20%): \$121,000
 Contingency (40%): \$242,000
 Escalation (3% for 5 years): \$154,177
TOTAL: \$1,122,177

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

1st Street - Dixon						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 164,500.00	\$ 164,500.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	0	LS	\$ 150,000.00	\$ -
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments		EA	\$ 300,000.00	\$ -
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	2	EA	\$ 100,000.00	\$ 200,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$ 500,000.00	\$ -
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	1	EA	\$ 75,000.00	\$ 75,000.00
	12	Install 2 Railroad Devices	2	EA	\$ 250,000.00	\$ 500,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal: \$ 1,959,500
 Design, Environmental and Construction Management (20%): \$ 391,900
 Contingency (40%): \$ 783,800
 Escalation (3% for 5 years): \$499,356
TOTAL: \$ 3,634,556

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Hawkins Rd - Unincorporated						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$55,000	\$55,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	0	LS	\$150,000	\$0
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal: \$605,000
 Design, Environmental and Construction Management (20%): \$121,000
 Contingency (40%): \$242,000
 Escalation (3% for 5 years): \$154,177
TOTAL: \$1,122,177

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Hawkins Rd - Unincorporated						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 172,000.00	\$ 172,000.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	0	LS	\$ 150,000.00	\$ -
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$ 300,000.00	\$ -
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	2	EA	\$ 100,000.00	\$ 200,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$ 500,000.00	\$ -
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	2	EA	\$ 75,000.00	\$ 150,000.00
	12	Install 2 Railroad Devices	2	EA	\$ 250,000.00	\$ 500,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal: \$ 2,042,000
 Design, Environmental and Construction Management (20%): \$ 408,400
 Contingency (40%): \$ 816,800
 Escalation (3% for 5 years): \$520,380
TOTAL: \$ 3,787,580

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Lopes Rd - Fairfield						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$60,000	\$60,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	0	EA	\$100,000	\$0
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal: \$660,000
 Design, Environmental and Construction Management (20%): \$132,000
 Contingency (40%): \$264,000
 Escalation (3% for 5 years): \$168,193
TOTAL: \$1,224,193

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Lopes Rd - Fairfield						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 194,500.00	\$ 194,500.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	1	LS	\$ 150,000.00	\$ 150,000.00
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$ 300,000.00	\$ -
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	1	EA	\$ 100,000.00	\$ 100,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$ 500,000.00	\$ -
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	1	EA	\$ 75,000.00	\$ 75,000.00
	12	Install 2 Railroad Devices	3	EA	\$ 250,000.00	\$ 750,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal: \$ 2,289,500
 Design, Environmental and Construction Management (20%): \$ 457,900
 Contingency (40%): \$ 915,800
 Escalation (3% for 5 years): \$583,453
TOTAL: \$ 4,246,653

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Mini Dr- Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$165,000	\$165,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	0	LS	\$150,000	\$0
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$300,000	\$600,000
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	1	LS	\$500,000	\$500,000
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal: \$1,815,000
 Design, Environmental and Construction Management (20%): \$363,000
 Contingency (40%): \$726,000
 Escalation (3% for 5 years): \$462,532
TOTAL: \$3,366,532

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Mini Dr- Vallejo						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 264,500.00	\$ 264,500.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	0	LS	\$ 150,000.00	\$ -
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$ 300,000.00	\$ 600,000.00
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	1	EA	\$ 100,000.00	\$ 100,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	1	LS	\$ 500,000.00	\$ 500,000.00
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	1	EA	\$ 75,000.00	\$ 75,000.00
	12	Install 2 Railroad Devices	2	EA	\$ 250,000.00	\$ 500,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal: \$ 3,059,500
 Design, Environmental and Construction Management (20%): \$ 611,900
 Contingency (40%): \$ 1,223,800
 Escalation (3% for 5 years): \$779,678
TOTAL: \$ 5,674,878

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

1st Street - Dixon						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$60,000	\$60,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	0	EA	\$100,000	\$0
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal: \$660,000
 Design, Environmental and Construction Management (20%): \$132,000
 Contingency (40%): \$264,000
 Escalation (3% for 5 years): \$168,193
TOTAL: \$1,224,193

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

1st Street - Dixon						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 169,500.00	\$ 169,500.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	1	LS	\$ 150,000.00	\$ 150,000.00
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$ 300,000.00	\$ -
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	1	EA	\$ 100,000.00	\$ 100,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$ 500,000.00	\$ -
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	1	EA	\$ 75,000.00	\$ 75,000.00
	12	Install 2 Railroad Devices	2	EA	\$ 250,000.00	\$ 500,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal: \$ 2,014,500
 Design, Environmental and Construction Management (20%): \$ 402,900
 Contingency (40%): \$ 805,800
 Escalation (3% for 5 years): \$513,372
TOTAL: \$ 3,736,572

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Redwood Street - Vallejo (751466R)						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$195,000	\$195,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$300,000	\$600,000
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	0	EA	\$100,000	\$0
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	1	LS	\$500,000	\$500,000
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	1	EA	\$250,000	\$250,000
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal:	\$2,145,000
Design, Environmental and Construction Management (20%):	\$429,000
Contingency (40%):	\$858,000
Escalation (3% for 5 years):	\$546,629
TOTAL:	\$3,978,629

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Redwood Street - Vallejo (751466R)						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 279,500.00	\$ 279,500.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	1	LS	\$ 150,000.00	\$ 150,000.00
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$ 300,000.00	\$ 600,000.00
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	1	EA	\$ 100,000.00	\$ 100,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	1	LS	\$ 500,000.00	\$ 500,000.00
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	1	EA	\$ 75,000.00	\$ 75,000.00
	12	Install 2 Railroad Devices	2	EA	\$ 250,000.00	\$ 500,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal:	\$ 3,224,500
Design, Environmental and Construction Management (20%):	\$ 644,900
Contingency (40%):	\$ 1,289,800
Escalation (3% for 5 years):	\$ 821,727
TOTAL: \$	5,980,927

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Valle Vista Avenue - Vallejo (751467X)						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$95,000	\$95,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	0	LS	\$150,000	\$0
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	0	EA	\$100,000	\$0
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	1	LS	\$500,000	\$500,000
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal: \$1,045,000
 Design, Environmental and Construction Management (20%): \$209,000
 Contingency (40%): \$418,000
 Escalation (3% for 5 years): \$266,306
TOTAL: \$1,938,306

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Valle Vista Avenue - Vallejo (751467X)						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 179,500.00	\$ 179,500.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	0	LS	\$ 150,000.00	\$ -
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$ 300,000.00	\$ -
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	1	EA	\$ 100,000.00	\$ 100,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	1	LS	\$ 500,000.00	\$ 500,000.00
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	1	EA	\$ 75,000.00	\$ 75,000.00
	12	Install 2 Railroad Devices	1	EA	\$ 250,000.00	\$ 250,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal: \$ 2,124,500
 Design, Environmental and Construction Management (20%): \$ 424,900
 Contingency (40%): \$ 849,800
 Escalation (3% for 5 years): \$541,404
TOTAL: \$ 3,940,604

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Fry Rd- Unincorporated						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$70,000	\$70,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal: \$770,000
 Design, Environmental and Construction Management (20%): \$154,000
 Contingency (40%): \$308,000
 Escalation (3% for 5 years): \$196,226
TOTAL: \$1,428,226

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Fry Rd- Unincorporated						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 187,000.00	\$ 187,000.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	1	LS	\$ 150,000.00	\$ 150,000.00
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$ 300,000.00	\$ -
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	2	EA	\$ 100,000.00	\$ 200,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$ 500,000.00	\$ -
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	2	EA	\$ 75,000.00	\$ 150,000.00
	12	Install 2 Railroad Devices	2	EA	\$ 250,000.00	\$ 500,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal: \$ 2,207,000
 Design, Environmental and Construction Management (20%): \$ 441,400
 Contingency (40%): \$ 882,800
 Escalation (3% for 5 years): \$562,429
TOTAL: \$ 4,093,629

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

1st Street - Dixon						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$105,000	\$105,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	0	LS	\$150,000	\$0
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$300,000	\$600,000
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	0	EA	\$100,000	\$0
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal: \$1,155,000
 Design, Environmental and Construction Management (20%): \$231,000
 Contingency (40%): \$462,000
 Escalation (3% for 5 years): \$294,338
TOTAL: \$2,142,338

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

1st Street - Dixon						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 212,000.00	\$ 212,000.00
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$ 100,000.00	\$ 100,000.00
Installations	3	Install Roadway Elements	1	LS	\$ 250,000.00	\$ 250,000.00
	4	Install Medians/Channelization	1	LS	\$ 150,000.00	\$ 150,000.00
	5	Install 2 UPRR Access Gates	2	EA	\$ 35,000.00	\$ 70,000.00
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$ 300,000.00	\$ 600,000.00
	7	Install pavement markings and signage	1	LS	\$ 100,000.00	\$ 100,000.00
	8	Install Lighting	1	EA	\$ 100,000.00	\$ 100,000.00
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$ 500,000.00	\$ -
RR Improvements	10	Railroad Removals	1	LS	\$ 50,000.00	\$ 50,000.00
	11	Install 1 Track of Crossing Panels	2	EA	\$ 75,000.00	\$ 150,000.00
	12	Install 2 Railroad Devices	1	EA	\$ 250,000.00	\$ 250,000.00
	13	Install Signal Cabin	1	EA	\$ 300,000.00	\$ 300,000.00
	14	Railroad Signal Design Allowance	1	LS	\$ 150,000.00	\$ 150,000.00

Construction Subtotal: \$ 2,482,000
 Design, Environmental and Construction Management (20%): \$ 496,400
 Contingency (40%): \$ 992,800
 Escalation (3% for 5 years): \$632,509
TOTAL: \$ 4,603,709

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

PROPOSED CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Pitt School Road - Dixon						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$60,000	\$60,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	0	LS	\$100,000	\$0
Installations	3	Install Roadway Elements	0	LS	\$250,000	\$0
	4	Install Medians/Channelization	0	LS	\$150,000	\$0
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	0	EA	\$100,000	\$0
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	1	LS	\$500,000	\$500,000
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	1	LS	\$150,000	\$150,000

Construction Subtotal:	\$810,000
Design, Environmental and Construction Management (20%):	\$162,000
Contingency (40%):	\$324,000
Escalation (3% for 5 years):	\$206,419
TOTAL:	\$1,502,419

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Dixon - Pitt School Road						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$237,000	\$237,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	2	EA	\$35,000	\$70,000
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	2	EA	\$100,000	\$200,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	1	LS	\$500,000	\$500,000
RR Improvements	10	Railroad Removals	1	LS	\$50,000	\$50,000
	11	Install 1 Track of Crossing Panels	2	EA	\$75,000	\$150,000
	12	Install 2 Railroad Devices	2	EA	\$250,000	\$500,000
	13	Install Signal Cabin	1	EA	\$300,000	\$300,000
	14	Railroad Signal Design Allowance	1	LS	\$150,000	\$150,000

Construction Subtotal:	\$2,757,000
Design, Environmental and Construction Management (20%):	\$551,400
Contingency (40%):	\$1,102,800
Escalation (3% for 5 years):	\$702,590
TOTAL:	\$5,113,790

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)
PROPOSED CROSSING IMPROVEMENTS**

ROUGH ORDER OF MAGNITUDE

September 2023

Midway Road - Unincorporated County						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$135,000	\$135,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments		LS	\$100,000	\$0
Installations	3	Install Roadway Elements	2	LS	\$250,000	\$500,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates		EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments		EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	1	LS	\$500,000	\$500,000
RR Improvements	10	Railroad Removals		LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels		EA	\$75,000	\$0
	12	Install 2 Railroad Devices		EA	\$250,000	\$0
	13	Install Signal Cabin		EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	1	LS	\$150,000	\$150,000

Construction Subtotal: \$1,635,000
 Design, Environmental and Construction Management (20%): \$327,000
 Contingency (40%): \$654,000
 Escalation (3% for 5 years): \$416,661
TOTAL: \$3,032,661

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Midway Road - Unincorporated County						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$262,000	\$262,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	2	LS	\$250,000	\$500,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	2	EA	\$35,000	\$70,000
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	2	EA	\$100,000	\$200,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	1	LS	\$500,000	\$500,000
RR Improvements	10	Railroad Removals	1	LS	\$50,000	\$50,000
	11	Install 1 Track of Crossing Panels	2	EA	\$75,000	\$150,000
	12	Install 2 Railroad Devices	2	EA	\$250,000	\$500,000
	13	Install Signal Cabin	1	EA	\$300,000	\$300,000
		Railroad Signal Design Allowance	1	LS	\$150,000	\$150,000

Construction Subtotal: \$3,032,000
 Design, Environmental and Construction Management (20%): \$606,400
 Contingency (40%): \$1,212,800
 Escalation (3% for 5 years): \$772,670
TOTAL: \$5,623,870

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)
PROPOSED CROSSING IMPROVEMENTS**

ROUGH ORDER OF MAGNITUDE

September 2023

Batavia Road - Unincorporated County						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$60,000	\$60,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	0	LS	\$100,000	\$0
Installations	3	Install Roadway Elements	0	LS	\$250,000	\$0
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	1	EA	\$250,000	\$250,000
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	1	LS	\$150,000	\$150,000

Construction Subtotal: \$810,000
 Design, Environmental and Construction Management (20%): \$162,000
 Contingency (40%): \$324,000
 Escalation (3% for 5 years): \$206,419
TOTAL: \$1,502,419

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Batavia Road - Unincorporated County						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$187,000	\$187,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	2	EA	\$35,000	\$70,000
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	2	EA	\$100,000	\$200,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	1	LS	\$50,000	\$50,000
	11	Install 1 Track of Crossing Panels	2	EA	\$75,000	\$150,000
	12	Install 2 Railroad Devices	2	EA	\$250,000	\$500,000
	13	Install Signal Cabin	1	EA	\$300,000	\$300,000
	14	Railroad Signal Design Allowance	1	LS	\$150,000	\$150,000

Construction Subtotal: \$2,207,000
 Design, Environmental and Construction Management (20%): \$441,400
 Contingency (40%): \$882,800
 Escalation (3% for 5 years): \$562,429
TOTAL: \$4,093,629

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)
PROPOSED CROSSING IMPROVEMENTS**

ROUGH ORDER OF MAGNITUDE

September 2023

Fox Road - Unincorporated County						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$70,000	\$70,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
		Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal: \$770,000
 Design, Environmental and Construction Management (20%): \$154,000
 Contingency (40%): \$308,000
 Escalation (3% for 5 years): \$196,226
TOTAL: \$1,428,226

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Fox Road - Unincorporated County						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$187,000	\$187,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	2	EA	\$35,000	\$70,000
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	2	EA	\$100,000	\$200,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	1	LS	\$50,000	\$50,000
	11	Install 1 Track of Crossing Panels	2	EA	\$75,000	\$150,000
	12	Install 2 Railroad Devices	2	EA	\$250,000	\$500,000
	13	Install Signal Cabin	1	EA	\$300,000	\$300,000
		Railroad Signal Design Allowance	1	LS	\$150,000	\$150,000

Construction Subtotal: \$2,207,000
 Design, Environmental and Construction Management (20%): \$441,400
 Contingency (40%): \$882,800
 Escalation (5% for 4 years): \$562,429
TOTAL: \$4,093,629

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)
PROPOSED CROSSING IMPROVEMENTS**

ROUGH ORDER OF MAGNITUDE

September 2023

Elmira Road - Unincorporated County						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$85,000	\$85,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	0	LS	\$100,000	\$0
Installations	3	Install Roadway Elements	0	LS	\$250,000	\$0
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	1	LS	\$500,000	\$500,000
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	1	LS	\$150,000	\$150,000

Construction Subtotal: \$1,085,000
 Design, Environmental and Construction Management (20%): \$217,000
 Contingency (40%): \$434,000
 Escalation (3% for 5 years): \$276,500
TOTAL: \$2,012,500

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Elmira Road - Unincorporated County						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$222,000	\$222,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	0	LS	\$150,000	\$0
	5	Install 2 UPRR Access Gates	2	EA	\$35,000	\$70,000
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	2	EA	\$100,000	\$200,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	1	LS	\$500,000	\$500,000
RR Improvements	10	Railroad Removals	1	LS	\$50,000	\$50,000
	11	Install 1 Track of Crossing Panels	2	EA	\$75,000	\$150,000
	12	Install 2 Railroad Devices	2	EA	\$250,000	\$500,000
	13	Install Signal Cabin	1	EA	\$300,000	\$300,000
		Railroad Signal Design Allowance	1	LS	\$150,000	\$150,000

Construction Subtotal: \$2,592,000
 Design, Environmental and Construction Management (20%): \$518,400
 Contingency (40%): \$1,036,800
 Escalation (3% for 5 years): \$660,541
TOTAL: \$4,807,741

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)
PROPOSED CROSSING IMPROVEMENTS**

ROUGH ORDER OF MAGNITUDE

East Tabor Avenue - Fairfield						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$85,000	\$85,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	0	LS	\$100,000	\$0
Installations	3	Install Roadway Elements	0	LS	\$250,000	\$0
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	1	EA	\$300,000	\$300,000
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	0	EA	\$100,000	\$0
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	1	EA	\$300,000	\$300,000
	14	Railroad Signal Design Allowance	1	LS	\$150,000	\$150,000
Construction Subtotal:						\$1,085,000
Design, Environmental and Construction Management (20%):						\$217,000
Contingency (40%):						\$434,000
Escalation (3% for 5 years):						\$276,500
TOTAL:						\$2,012,500

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

East Tabor Avenue - Fairfield						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$207,000	\$207,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	2	EA	\$35,000	\$70,000
	6	Install 2 Quadrants of Full Pedestrian Treatments	1	EA	\$300,000	\$300,000
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	1	LS	\$50,000	\$50,000
	11	Install 1 Track of Crossing Panels	2	EA	\$75,000	\$150,000
	12	Install 2 Railroad Devices	2	EA	\$250,000	\$500,000
	13	Install Signal Cabin	1	EA	\$300,000	\$300,000
	14	Railroad Signal Design Allowance	1	LS	\$150,000	\$150,000
Construction Subtotal:						\$2,277,000
Design, Environmental and Construction Management (20%):						\$455,400
Contingency (40%):						\$910,800
Escalation (5% for 4 years)						\$580,267
TOTAL:						\$4,223,467

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)
PROPOSED CROSSING IMPROVEMENTS**

ROUGH ORDER OF MAGNITUDE

September 2023

Pedestrian Xing (Solano Rail Hub)						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$80,000	\$80,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	0	LS	\$100,000	\$0
Installations	3	Install Roadway Elements	0	LS	\$250,000	\$0
	4	Install Medians/Channelization	0	LS	\$150,000	\$0
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$300,000	\$600,000
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	1	LS	\$150,000	\$150,000

Construction Subtotal: \$1,030,000
 Design, Environmental and Construction Management (20%): \$206,000
 Contingency (40%): \$412,000
 Escalation (3% for 5 years): \$262,484
TOTAL: \$1,910,484

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Pedestrian Xing (Solano Rail Hub)						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$172,000	\$172,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	0	LS	\$100,000	\$0
Installations	3	Install Roadway Elements	0	LS	\$250,000	\$0
	4	Install Medians/Channelization	0	LS	\$150,000	\$0
	5	Install 2 UPRR Access Gates	2	EA	\$35,000	\$70,000
	6	Install 2 Quadrants of Full Pedestrian Treatments	2	EA	\$300,000	\$600,000
	7	Install pavement markings and signage	0	LS	\$100,000	\$0
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	2	EA	\$75,000	\$150,000
	12	Install 2 Railroad Devices	2	EA	\$250,000	\$500,000
	13	Install Signal Cabin	1	EA	\$300,000	\$300,000
	14	Railroad Signal Design Allowance	1	LS	\$150,000	\$150,000

Construction Subtotal: \$2,042,000
 Design, Environmental and Construction Management (20%): \$408,400
 Contingency (40%): \$816,800
 Escalation (3% for 5 years): \$520,380
TOTAL: \$3,787,580

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)
PROPOSED CROSSING IMPROVEMENTS**

ROUGH ORDER OF MAGNITUDE

September 2023

Chadbourne Road - Unincorporated County						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$75,000	\$75,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	0	LS	\$100,000	\$0
Installations	3	Install Roadway Elements	0	LS	\$250,000	\$0
	4	Install Medians/Channelization	0	LS	\$150,000	\$0
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	1	EA	\$250,000	\$250,000
	13	Install Signal Cabin	1	EA	\$300,000	\$300,000
	14	Railroad Signal Design Allowance	1	LS	\$150,000	\$150,000

Construction Subtotal: \$975,000
 Design, Environmental and Construction Management (20%): \$195,000
 Contingency (40%): \$390,000
 Escalation (3% for 5 years): \$248,468
TOTAL: \$1,808,468

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Chadbourne Road - Unincorporated County						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$159,500	\$159,500
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	2	LS	\$250,000	\$500,000
	4	Install Medians/Channelization	0	LS	\$150,000	\$0
	5	Install 2 UPRR Access Gates	2	EA	\$35,000	\$70,000
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	2	EA	\$100,000	\$200,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	1	EA	\$75,000	\$75,000
	12	Install 2 Railroad Devices	1	EA	\$250,000	\$250,000
	13	Install Signal Cabin	1	EA	\$300,000	\$300,000
		Railroad Signal Design Allowance	1	LS	\$150,000	\$150,000

Construction Subtotal: \$1,904,500
 Design, Environmental and Construction Management (20%): \$380,900
 Contingency (40%): \$761,800
 Escalation (5% for 4 years): \$485,340
TOTAL: \$3,532,540

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)
PROPOSED CROSSING IMPROVEMENTS**

ROUGH ORDER OF MAGNITUDE

September 2023

Canon Road - Fairfield						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$100,000	\$100,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	0	LS	\$100,000	\$0
Installations	3	Install Roadway Elements	0	LS	\$250,000	\$0
	4	Install Medians/Channelization	0	LS	\$150,000	\$0
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	1	LS	\$500,000	\$500,000
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	1	EA	\$300,000	\$300,000
	14	Railroad Signal Design Allowance	1	LS	\$150,000	\$150,000

Construction Subtotal: \$1,250,000
Design, Environmental and Construction Management (20%): \$250,000
Contingency (40%): \$500,000
Escalation (3% for 5 years): \$318,548
TOTAL: \$2,318,548

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Canon Road - Fairfield						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$272,000	\$272,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	0	LS	\$150,000	\$0
	5	Install 2 UPRR Access Gates	2	EA	\$35,000	\$70,000
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	2	EA	\$100,000	\$200,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	2	LS	\$500,000	\$1,000,000
RR Improvements	10	Railroad Removals	1	LS	\$50,000	\$50,000
	11	Install 1 Track of Crossing Panels	2	EA	\$75,000	\$150,000
	12	Install 2 Railroad Devices	2	EA	\$250,000	\$500,000
	13	Install Signal Cabin	1	EA	\$300,000	\$300,000
	14	Railroad Signal Design Allowance	1	LS	\$150,000	\$150,000

Construction Subtotal: \$3,142,000
Design, Environmental and Construction Management (20%): \$628,400
Contingency (40%): \$1,256,800
Escalation (3% for 5 years): \$800,703
TOTAL: \$5,827,903

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)
PROPOSED CROSSING IMPROVEMENTS**

ROUGH ORDER OF MAGNITUDE

September 2023

Unincorporated - Rio Dixon Road						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$117,500	\$117,500
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	0	LS	\$150,000	\$0
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	1	EA	\$100,000	\$100,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	1	EA	\$75,000	\$75,000
	12	Install 2 Railroad Devices	1	EA	\$250,000	\$250,000
	13	Install Signal Cabin	1	EA	\$300,000	\$300,000
	14	Railroad Signal Design Allowance	1	LS	\$150,000	\$150,000

Construction Subtotal: \$1,442,500
 Design, Environmental and Construction Management (20%): \$288,500
 Contingency (40%): \$577,000
 Escalation (3% for 5 years): \$367,605
TOTAL: \$2,675,605

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Unincorporated - Rio Dixon Road						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$154,500	\$154,500
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	2	EA	\$35,000	\$70,000
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	2	EA	\$100,000	\$200,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	1	LS	\$50,000	\$50,000
	11	Install 1 Track of Crossing Panels	1	EA	\$75,000	\$75,000
	12	Install 2 Railroad Devices	1	EA	\$250,000	\$250,000
	13	Install Signal Cabin	1	EA	\$300,000	\$300,000
	14	Railroad Signal Design Allowance	1	LS	\$150,000	\$150,000

Construction Subtotal: \$1,849,500
 Design, Environmental and Construction Management (20%): \$369,900
 Contingency (40%): \$739,800
 Escalation (3% for 5 years): \$471,324
TOTAL: \$3,430,524

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)
PROPOSED CROSSING IMPROVEMENTS**

ROUGH ORDER OF MAGNITUDE

September 2023

Unincorporated - Red Top Road						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$70,000	\$70,000
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	0	LS	\$100,000	\$0
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	0	EA	\$35,000	\$0
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	2	EA	\$100,000	\$200,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	0	EA	\$75,000	\$0
	12	Install 2 Railroad Devices	0	EA	\$250,000	\$0
	13	Install Signal Cabin	0	EA	\$300,000	\$0
	14	Railroad Signal Design Allowance	0	LS	\$150,000	\$0

Construction Subtotal: \$770,000
 Design, Environmental and Construction Management (20%): \$154,000
 Contingency (40%): \$308,000
 Escalation (3% for 5 years): \$196,226
TOTAL: \$1,428,226

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

September 2023

Unincorporated - Red Top Road						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Extended Cost
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$149,500	\$149,500
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments	1	LS	\$100,000	\$100,000
Installations	3	Install Roadway Elements	1	LS	\$250,000	\$250,000
	4	Install Medians/Channelization	1	LS	\$150,000	\$150,000
	5	Install 2 UPRR Access Gates	2	EA	\$35,000	\$70,000
	6	Install 2 Quadrants of Full Pedestrian Treatments	0	EA	\$300,000	\$0
	7	Install pavement markings and signage	1	LS	\$100,000	\$100,000
	8	Install Lighting	2	EA	\$100,000	\$200,000
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements	0	LS	\$500,000	\$0
RR Improvements	10	Railroad Removals	0	LS	\$50,000	\$0
	11	Install 1 Track of Crossing Panels	1	EA	\$75,000	\$75,000
	12	Install 2 Railroad Devices	1	EA	\$250,000	\$250,000
	13	Install Signal Cabin	1	EA	\$300,000	\$300,000
	14	Railroad Signal Design Allowance	1	LS	\$150,000	\$150,000

Construction Subtotal: \$1,794,500
 Design, Environmental and Construction Management (20%): \$358,900
 Contingency (40%): \$717,800
 Escalation (3% for 5 years): \$457,308
TOTAL: \$3,328,508

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)**

ROUGH ORDER OF MAGNITUDE

September 2023

Unit Costs						
Section	Item No.	Description	Quantity	Unit	Unit Cost	Notes
Project Controls	1	Project Controls (10% of Construction)		LS	10%	Mobilization, Traffic Control, Time Related Overhead (10% of Construction Cost)
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments		LS	\$ 100,000.00	Removals of concrete flatwork, roadway pavement, striping; relocate utility markers; adjust utility structures to grade
Installations	3	Install Roadway Elements		LS	\$ 250,000.00	Install curb and gutter, asphalt pavement for roadway including bulbouts
	4	Install Medians/Channelization		LS	\$ 150,000.00	Install median curb and gutter, concrete fill for median
	5	Install 2 UPRR Access Gates		EA	\$ 35,000.00	Install UPRR Maintenance gate, decomposed granite pathway (by quadrant)
	6	Install 2 Quadrants of Full Pedestrian Treatments		EA	\$ 300,000.00	Install CPUC Std. 9-D, emergency egress gate, concrete sidewalk to roadway, tactile. (for two quadrants / per half of roadway)
	7	Install pavement markings and signage		LS	\$ 100,000.00	
	8	Install Lighting		EA	\$ 100,000.00	Install 2 streetlights, conduit, 2 pull boxes
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements		LS	\$ 500,000.00	Installation of a new traffic signal (queue cutter or pre-signal) and associated connection to RRTCD
RR Improvements	10	Railroad Removals		LS	\$ 50,000.00	Removal of existing crossing panels and existing warning devices.
	11	Install 1 Track of Crossing Panels		EA	\$ 75,000.00	Install one set of panels per track
	12	Install 2 Railroad Devices		EA	\$ 250,000.00	Assumes 2 gate arms; double if including a cantilever
	13	Install Signal Cabin		EA	\$ 300,000.00	
	14	Railroad Signal Design Allowance		LS	\$ 150,000.00	

Escalation Duration **5.0**
 Escalation Percent **3%**
 Design, Environmental and Construction Management (20%): **20%**
 Contingency (40%): **40%**

Escalation (3% for 5 years):

$$\text{ESCALATION} = [\text{Cost}] * [1 + \langle \text{Escalation Percent} \rangle^{\langle \text{Escalation Duration} \rangle} - [\text{Cost}]]$$

**SOLANO RAIL CROSSINGS SAFETY IMPROVEMENT PLAN
OPINION OF PROBABLE CONSTRUCTION COSTS (DRAFT)
PROPOSED CROSSING IMPROVEMENTS**

ROUGH ORDER OF MAGNITUDE

2023

Unincorporated - Private Industry

Section	Item No.	Description	Quantity	Unit	Unit Cost	Totals
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 0.10	\$ 0.10
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments		LS	\$ 100,000.00	\$ -
Installations	3	Install Roadway Elements		LS	\$ 250,000.00	\$ -
	4	Install Medians/Channelization		LS	\$ 150,000.00	\$ -
	5	Install 2 UPRR Access Gates		EA	\$ 35,000.00	\$ -
	6	Install 2 Quadrants of Full Pedestrian Treatments		EA	\$ 300,000.00	\$ -
	7	Install pavement markings and signage		LS	\$ 100,000.00	\$ -
	8	Install Lighting		EA	\$ 100,000.00	\$ -
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements		LS	\$ 500,000.00	\$ -
RR Improvements	10	Railroad Removals		LS	\$ 50,000.00	\$ -
	11	Install 1 Track of Crossing Panels		EA	\$ 75,000.00	\$ -
	12	Install 2 Railroad Devices		EA	\$ 250,000.00	\$ -
	13	Install Signal Cabin		EA	\$ 300,000.00	\$ -
		Railroad Signal Design Allowance		LS	\$ 150,000.00	\$ -

Construction Subtotal: \$ 0.10
Contingency (25%) \$ 0.03
Escalation (5% for 4 years) \$ 0.03
Total \$ 0.15

FULL CROSSING IMPROVEMENTS

ROUGH ORDER OF MAGNITUDE

2023

Unincorporated - Private Industry

Section	Item No.	Description	Quantity	Unit	Unit Cost	Totals
Project Controls	1	Project Controls (10% of Construction)	1	LS	\$ 0.10	\$ 0.10
Demolition and Removals	2	Remove concrete, asphalt, striping, utility adjustments		LS	\$ 100,000.00	\$ -
Installations	3	Install Roadway Elements		LS	\$ 250,000.00	\$ -
	4	Install Medians/Channelization		LS	\$ 150,000.00	\$ -
	5	Install 2 UPRR Access Gates		EA	\$ 35,000.00	\$ -
	6	Install 2 Quadrants of Full Pedestrian Treatments		EA	\$ 300,000.00	\$ -
	7	Install pavement markings and signage		LS	\$ 100,000.00	\$ -
	8	Install Lighting		EA	\$ 100,000.00	\$ -
	9	Install Signal Preemption, Traffic Signals/Queue Cutter and Associated Improvements		LS	\$ 500,000.00	\$ -
RR Improvements	10	Railroad Removals		LS	\$ 50,000.00	\$ -
	11	Install 1 Track of Crossing Panels		EA	\$ 75,000.00	\$ -
	12	Install 2 Railroad Devices		EA	\$ 250,000.00	\$ -
	13	Install Signal Cabin		EA	\$ 300,000.00	\$ -
		Railroad Signal Design Allowance		LS	\$ 150,000.00	\$ -

Construction Subtotal: \$ 0.10
Contingency (25%) \$ 0.03
Escalation (5% for 4 years) \$ 0.03
Total \$ 0.15

APPENDIX E – FUNDING OPPORTUNITIES TABLE

Table 1 - Grant Funding Opportunities

Grant	Grant Administering Agency	Available Funding	Max/Min Award Amount	Match Requirements	Special Considerations/ Requirements	Eligible Projects	Date
Federal Funding Sources							
Railway Highway Grade Crossings (Section 130) Program	Federal Highway Administration (FHWA), California Department of Transportation (Caltrans), California Public Utilities Commission (CPUC)	~ \$17 million per year	Determined based on agreed upon scope	10% Local Match – Fulfilled through Caltrans STP Fund	Project must be on the CPUC Priority List Included in FSTIP Existing accident history, vehicle and train volumes, pedestrian issues, and geometry	Traffic signalization/Railroad preemption Guardrails Pedestrian/Bicycle Path Improvements Active Warning Equipment	Annual
Consolidated Rail Infrastructure and Safety Improvements (CRISI) Program	Federal Railroad Administration (FRA), Department of Transportation (USDOT)	FY 22 \$1.4 billion available in funding	None	20% minimum local match – can include state or private entity funds	Preference is given to federal requests less than 50% of project cost Benefit-Cost Analysis (BCA) is required	A highway-rail grade crossing improvement project such as railroad crossing signals, gates, and related technologies, highway lighting	

Grant	Grant Administering Agency	Available Funding	Max/Min Award Amount	Match Requirements	Special Considerations/ Requirements	Eligible Projects	Date
						<p>and crossing approach signage</p> <p>Road improvements, railroad crossing panels and surfaces</p>	
<p>Nationally Significant Multimodal Freight & Highway Projects Program (INFRA)</p>	<p>USDOT</p>	<p>FY 22 \$3.1 billion, FY 22 – FY 26 \$8 billion available</p>	<p>Up to \$50 million</p>	<p>20% minimum non-federal match, 80% maximum federal cost share</p>	<p>Projects are evaluated based on outcome criteria that includes safety, state of good repair, economic impacts, climate change, and equity</p> <p>Historically Disadvantaged Communities and Areas of Persistent Poverty are considered in the selection criteria</p> <p>BCA is required</p>	<p>A highway-railway grade crossing or grade separation project</p> <p>Network of project such as a rail corridor that increase rail safety and reduce congestion</p>	<p>Annual</p>

Grant	Grant Administering Agency	Available Funding	Max/Min Award Amount	Match Requirements	Special Considerations/ Requirements	Eligible Projects	Date
Railroad Crossing Elimination Grant Program	FRA	FY 22 \$573 million available	Minimum \$1 million, no maximum	20% minimum non-federal match, 80% maximum federal cost share	Funding request can combine proposed safety improvements at various at-grade crossing locations as corridor-wide improvement to region	Improvement or Installation of protective devices, signals, signs or other measures that improve safety Includes Planning, environmental review, and design of an eligible project	
State Funding Sources							
State Rail Assistance (SRA) Program	California State Transportation Agency (CalSTA)	~\$454 million over the first 10 years of SB 1	Based on distribution formula per rail agency	None	Environmental documentation must be complete Funding request is made through an Allocation Request form	Transportation planning and mass transportation purposes Operations and capital improvements that provide benefit to the public	Annual

Grant	Grant Administering Agency	Available Funding	Max/Min Award Amount	Match Requirements	Special Considerations/ Requirements	Eligible Projects	Date
Trade Corridor Enhancement Program (TCEP)	California Transportation Commission (CTC)	~\$300 million per year from SB 1 and ~\$515 million over 3 years in National Highway Freight Program funds	Distribution is on a corridor basis	30% match requirement from either private, local, federal or state funds. If project is nominated by Caltrans, no match is required.	Elevation criteria includes freight system, transportation, and community factors and overall benefits and cost of the project	Freight rail system improvements, surface transportation, local road, and connector road improvements to facilitate the movement of goods	Annual
State Transportation Improvement Program (STIP)	Caltrans, Metropolitan Transportation Commission (MTC), CTC	Each county is designated an amount of STIP funding	Varies	None	Project proposals must align with goals of Plan Bay Area 2050, region's transportation and land-use priorities CTC will have final approval of project proposals submitted by MTC for Regional Transportation Improvement Program (RTIP) and by Caltrans for the Interregional Transportation	Transit and Rail Projects programmed in the RTIP Bicycle and Pedestrian projects programmed in the STIP and eligible for federal funds	Annual

Grant	Grant Administering Agency	Available Funding	Max/Min Award Amount	Match Requirements	Special Considerations/ Requirements	Eligible Projects	Date
					Improvement Program (ITIP)		

Regional Funding Sources

Transportation Development Act (TDA)	MTC	Amount available fluctuates based on sales tax on fuel and diesel fuel	Funding is requested through an allocation form based on a Fund Estimate prepared by MTC released in the beginning of the year	None	Available funds through the Local Transportation Fund (LTF) are determined annually.	Transit Operations Bus and rail projects Pedestrian and bicycle facilities Transportation planning	Monthly
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Local Funding Sources

Regional Traffic Impact Fee (RTIF)	Solano County Board of Supervisors	Varies	Varies	None	5% of funds are allocated to regional transit improvements through Solano County's Public Facility Fee (PFF)	Transportation projects	n/a
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