

# Traffic Analysis Data Collection

- Existing train crossings at Park Road and Iron Workers Union Driveway
- Intersection and Roadway Vehicle Counts (Including Truck Counts)
- Intersection Traffic Controls
- Intersection Lane Configurations
- Roadway Speed Limits
- Analysis done according to the Highway Capacity Manual (HCM) Level of Service (LOS) Methodology via the VISSIM Software

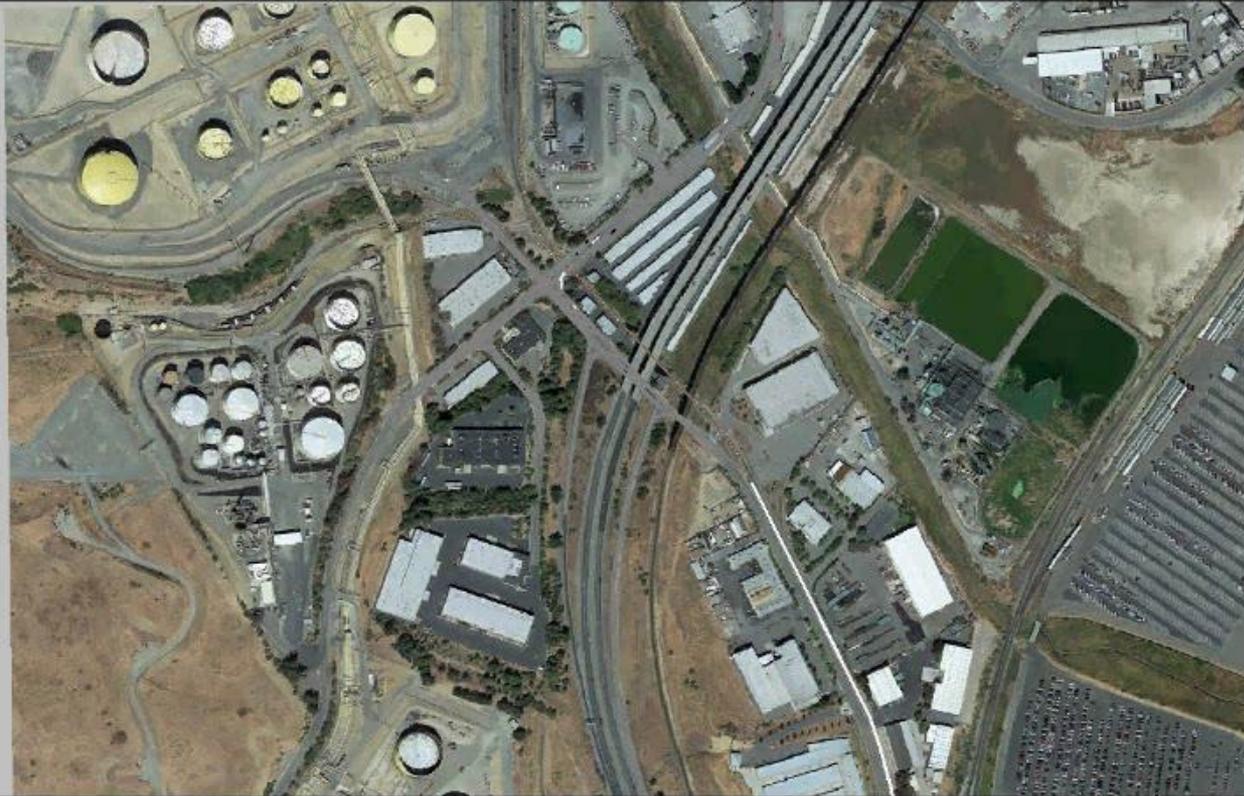
**TABLE 2-2  
EXISTING WEEKDAY AT-GRADE RAIL OPERATIONS**

<b>Measure</b>	<b>Park Road At-Grade Crossing</b>	<b>Iron Workers Union Driveway At-Grade Crossing</b>
Range of Crossings Per Day	4 - 18	4 - 6
Average Crossings Per Day – Weekdays	10	5
Average Crossing Duration – Weekdays	02:50	03:15
Average Number of Railcars Per Day – Weekdays	95	69
Average Number of Railcars Per Crossing - Weekdays	10	15
Range of Number of Railcars Per Crossing - Weekdays	2 - 35	2 - 43
Maximum Observed Crossing Duration – Weekdays	16:17	24:50

Source: Fehr & Peers, 2013.

# Project Train Crossings

- Project proposes train crossings that would occur during non-peak hours (avoiding 6:00 AM to 9:00 AM, 12:00 PM to 1:00 PM, and 4:00 PM to 6:00 PM on Weekdays)
- 4 crossings per day, 50 railcars per train
- Typical railcar length is 60 feet
- 200 feet of locomotive per train delivery
- Average travel speed across the Park Road at-grade railroad crossing is 5 mph
- Train crossing duration of 8 minutes and 18 seconds
- One hour headways between train crossings assumed



# Primary Significance Criteria

- The transportation impact analysis assumes that the Project would have a significant impact if the Project's train crossings during the designated study hours would:
  - Cause any intersection's operations to degrade from LOS D or better to LOS E or F; or
  - Increase the average vehicle delay by one second or more at a train crossing that currently operates at LOS F (or by two seconds or more at a train crossing that currently operates at LOS E).
- LOS was evaluated for the hour (2:45 – 3:45 PM) with the highest traffic volumes along Park Road during scheduled Project train crossing time periods. LOS is not an evaluation of cumulative delay over a 24 hour period.

**TABLE 3-1  
EXISTING OFF-PEAK HOUR INTERSECTION LEVEL OF SERVICE<sup>1</sup>**

Location	Control <sup>2</sup>	Existing Conditions With Existing Train Crossings <sup>4</sup>		Existing Conditions With Only Project Train Crossings <sup>5</sup>	
		Delay <sup>3</sup>	LOS	Delay <sup>3</sup>	LOS
1. Park Road / Bayshore Road	AWSC	<b>236</b>	<b>F</b>	<b>116</b>	<b>F</b>
2. I-680 SB On-Ramp / Bayshore Road	FREE	<b>54</b>	<b>F</b>	<b>50</b>	<b>F</b>
3. I-680 NB Off-Ramp / Bayshore Road	SSSC	<b>152 (212)</b>	<b>F (F)</b>	<b>57 (80)</b>	<b>F (F)</b>
4. Park Road / Bay Vista Court	SSSC	27 ( <b>51</b> )	D ( <b>F</b> )	3 (8)	A (A)
5. Park Road / Valero Refinery Driveway	SSSC	<b>148 (285)</b>	<b>F (F)</b>	<b>57 (97)</b>	<b>F (F)</b>

Notes: **Bold** denotes locations where level of service threshold is exceeded.

- Analysis hour is between 2:45 and 3:45 PM, which represents the highest total volume hour within the off-peak periods.
- AWSC = all way stop controlled intersection, SSSC = side street stop controlled intersection, Free = uncontrolled intersection.
- Intersection level of service based on average intersection control delay (in seconds) according to the *Highway Capacity Manual* (Transportation Research Board, 2000). For side-street stop-controlled intersections, delay is reported as intersection average (worst case approach).
- Assumes an existing single train crossing duration of 11 minutes and 50 seconds at the Park Road at-grade railroad crossing.
- Assumes a single Project train crossing duration of eight minutes and 18 seconds at the Park Road at-grade railroad crossing.

Source: Fehr & Peers, 2013.

**TABLE 4-1  
YEAR 2035 OFF-PEAK HOUR INTERSECTION LEVEL OF SERVICE<sup>1</sup>**

Location	Control <sup>2</sup>	Year 2035 Conditions With Existing Train Crossings <sup>4</sup>		Year 2035 Conditions With Only Project Train Crossings <sup>5</sup>	
		Delay <sup>3</sup>	LOS	Delay <sup>3</sup>	LOS
1. Park Road / Bayshore Road	AWSC	<b>253</b>	<b>F</b>	<b>116</b>	<b>F</b>
2. I-680 SB On-Ramp / Bayshore Road	FREE	<b>69</b>	<b>F</b>	<b>50</b>	<b>F</b>
3. I-680 NB Off-Ramp / Bayshore Road	SSSC	<b>148 (220)</b>	<b>F (F)</b>	<b>109 (158)</b>	<b>F (F)</b>
4. Park Road / Bay Vista Court	SSSC	<b>72 (104)</b>	<b>F (F)</b>	13 (22)	A (C)
5. Park Road / Valero Refinery Driveway	SSSC	<b>170 (375)</b>	<b>F (F)</b>	<b>114 (223)</b>	<b>F (F)</b>

Notes: **Bold** denotes locations where level of service threshold is exceeded.

1. Analysis hour is between 2:45 and 3:45 PM, which represents the highest total volume hour within the off-peak periods.
2. AWSC = all way stop controlled intersection, SSSC = side street stop controlled intersection, Free = uncontrolled intersection.
3. Intersection level of service based on average intersection control delay (in seconds) according to the *Highway Capacity Manual* (Transportation Research Board, 2000). For side-street stop-controlled intersections, delay is reported as intersection average (worst case approach).
4. Assumes an existing single train crossing duration of 11 minutes and 50 seconds at the Park Road at-grade railroad crossing.
5. Assumes a single Project train crossing duration of eight minutes and 18 seconds at the Park Road at-grade railroad crossing.

Source: Fehr & Peers, 2013.

# Conclusions

- Extensive data collection was conducted for the traffic analysis
- Micro-simulation analysis models validated according to FHWA and Caltrans guidelines
- Analysis methodologies, assumptions and significance criteria vetted and approved by City of Benicia staff and ESA staff
- Project train crossings would result in lower average hourly delays and queues compared to non-Project train crossings under Existing Conditions