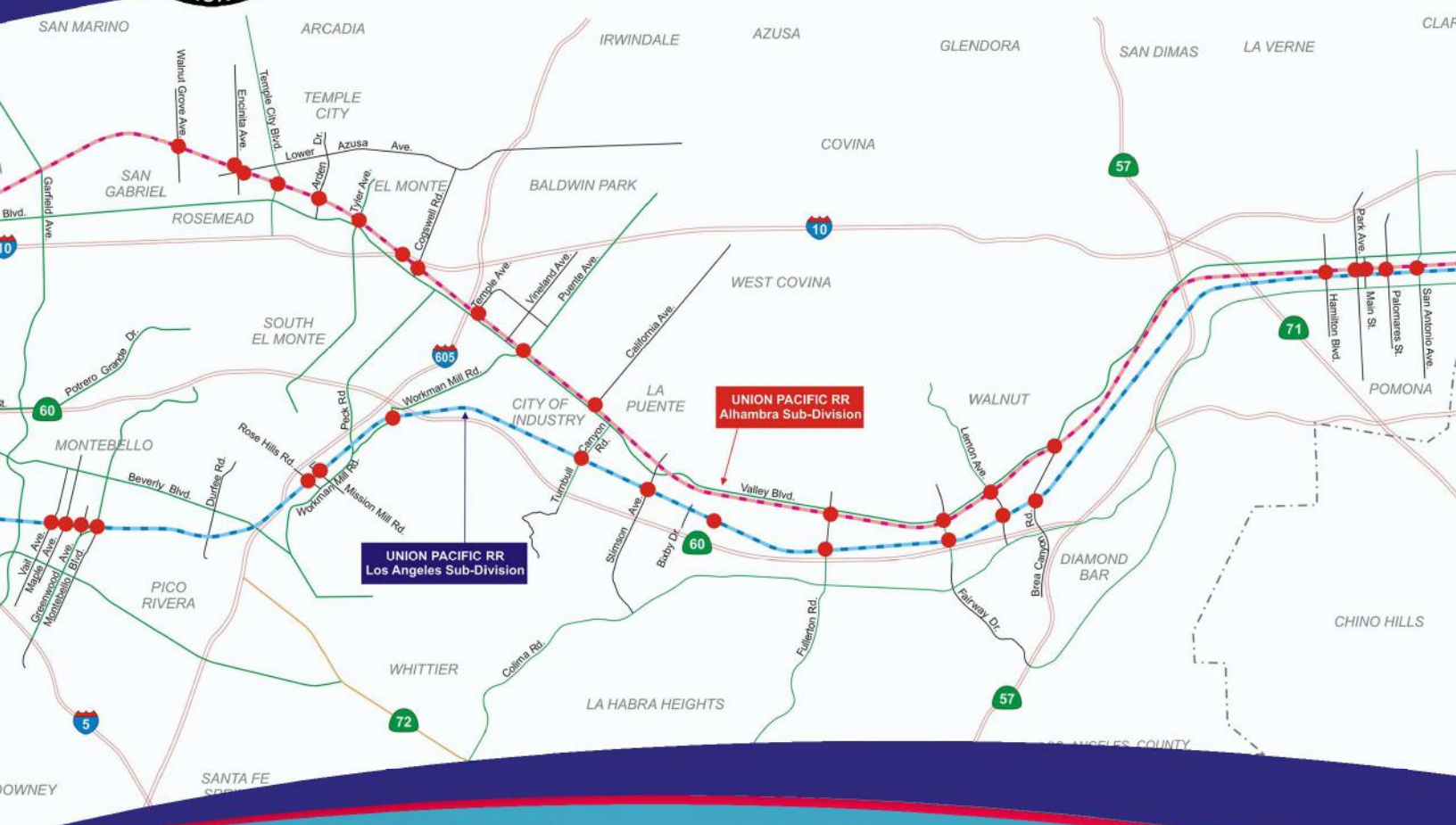
FINAL REPORT
Alameda Corridor East Phase II Grade Separation Traffic Study and Concept Plans
December 2011



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EXECUTIVE SUMMARY

The Board of the Alameda Corridor – East Construction Authority (ACE) has commissioned a study of street – railroad grade crossings of Union Pacific Railroad's (UPRR) Alhambra and Los Angeles subdivision main lines in the San Gabriel Valley and Pomona. This report updates a 1998 study developed by the San Gabriel Valley Council of Governments SGVCOG), which led to the creation of ACE and programming of 20 grade crossing elimination projects. These projects were divided into two phases.

The first portion of this report contains information on vehicular traffic volumes and train movements over 34 grade crossings of the two subdivisions, obtained from videotaped observations, local public works agencies and the railroad. These observations are used to develop time-of-day vehicular flow rates. Forecasts of future rail and vehicular traffic at the grade crossings for the years 2025 and 2035 are presented, using modeling developed by the Southern California Association of Governments (SCAG). Iterative analyses of the time-based vehicular and train count/crossing occupancy data and these forecasts are used to predict existing and expected future total vehicular delay at each crossing. The state grade separation priority list index is also calculated for each crossing.

The grade crossings experiencing the greatest vehicular delay due to train occupancies are the two Fullerton Road grade crossings of the Alhambra and Los Angeles subdivisions, followed by the two Fairway Drive grade crossings of the two subdivisions. The Fullerton Road – Alhambra subdivision crossing is located at the entry into UPRR's City of Industry Yard. Trains entering or leaving the yard are often slower than at other locations, lengthening their occupancy of the grade crossing. The three other locations experience heavy vehicular traffic.

The second portion of this report examines Phase II of ACE's grade crossing elimination program. Presently, 14 of the 20 grade crossing elimination projects contained in the two-phase ACE program are either completed, in construction or in the design/right of way acquisition phase. The six remaining previously adopted locations are:

Fairway Drive (Los Angeles subdivision)

Fairway Drive (Alhambra subdivision)

Puente Avenue (Alhambra subdivision)

Montebello Boulevard (Los Angeles subdivision)

Rose Hills Road (Los Angeles subdivision)

Turnbull Canyon Road (Los Angeles subdivision)

In the intervening period since the project was adopted, alternative scopes or locations have been suggested by the host jurisdictions for these remaining six locations. The alternatives are:

Adopted Location	Alternative
Fairway Drive (LA sub)	Lemon Avenue (LA sub)
Fairway Drive (Alh sub)	Lemon Avenue (Alh sub)
Montebello Boulevard	Partial railroad lowering
	Full railroad lowering
Puente Avenue	Two underpass versions
Rose Hills Road – overpass	No alternative suggested
Turnbull Canyon Road	No alternative suggested

Subsequent to the release of the draft of this report other alternative project configurations at adopted locations were added to the scope of the restudy. They were:

Fairway Drive	Railroad flyover (Fairway Drive alone & Fairway Drive and Lemon Avenue)
Montebello Option	Railroad flyover (Montebello Boulevard, Greenwood Avenue, Maple Street)
	Greenwood Avenue – underpass

In late 2010 the draft report was referred by the SGVCOG Governing Board to its Public Works Directors' Technical Advisory Committee for review and comment, which lead to the formation of a subcommittee to carry out the review. The subcommittee requested that concept plans for four additional grade separation locations – not part of the originally adopted project – also be provided. They were:

- Durfee Avenue (Los Angeles subdivision) Underpass
- Fullerton Road (Los Angeles subdivision) Underpass
- Hamilton Boulevard (Los Angeles/Alhambra) Underpass
- San Antonio Avenue (Los Angeles/Alhambra) Underpass

The objective of this review is to produce sufficient information for ACE and the SGVCOG to adopt an implementation plan for moving ahead with the completion of the ACE Project. This report provides updated information for the adopted projects and alternatives. It identifies, at a cursory level, any major aspects, such as utility relocation requirements or property impacts, which may make project implementation unusually difficult. Different configurations (for example, overpasses vs. underpasses) were considered conceptually and the most viable configuration evaluated in more depth. The alternatives were reviewed with the host jurisdictions. Any candidate projects moving into engineering will have more extensive local consultation on alternative configurations, including outreach to the public.

Cost estimates were developed for the following alternatives:

Project Location and Configuration	Estimated Cost
Lemon Avenue (LA sub) – underpass	$81.4 million
Fairway Drive (LA sub) – underpass	$100.1 million
Fairway Drive/Lemon Avenue (Alh sub) – railroad flyover	$145.9 million
Fairway Drive (Alh sub) – railroad flyover	$72.9 million
Rose Hills Road (LA sub) – overpass	$45.8 million
Turnbull Canyon Road (LA sub) – underpass	$84.8 million
Durfee Avenue (LA sub) – underpass	$64.5 million
Fullerton Road (LA sub) – underpass	$131.8 million
Puente Avenue (Alh sub) – underpass	$82.8 & 60.5million [1]
Hamilton Boulevard (LA/Alh) – underpass	$68.1 million
San Antonio Avenue (LA/Alh) – underpass	$83.4 million
Montebello Boulevard (LA sub) – underpass	$97.2 million
Montebello – partial railroad lowering	$266.6 million
Montebello – full railroad lowering	$389.4 million
Montebello – partial railroad raise	$174.1 million
Montebello – Greenwood Avenue – underpass	$61.7 million

1. Two underpass concept plans were developed for the City of industry by AECOM. This present report summarizes information contained in the AECOM study.

INTRODUCTION

In November 2008 the Board of the Alameda Corridor – East Construction Authority (ACE) commissioned an updated study of previously-adopted Phase II grade separation locations and identification/prioritization of potential alternatives/additions to Phase II beyond those already adopted by the Board. This Phase II report updates a 1997 study that led to the creation of ACE.

1997 GRADE CROSSING STUDY: In 1995, recognizing that completion of the Alameda Corridor project (from the Ports of Los Angeles and Long Beach into downtown Los Angeles) would trigger an increase in rail traffic through the San Gabriel Valley, the San Gabriel Valley Council of Governments (COG) commissioned a comprehensive grade crossing study. The intent was to assess the condition of 55 highway-rail grade crossings between downtown Los Angeles and the City of Pomona and to develop a corridor improvement program that would mitigate safety and mobility issues. Analyses of train movements, vehicular traffic volumes, roadway capacities, congestion/delay observations and forecasts of future rail and vehicular traffic for highway-rail grade crossings of the two railroad main lines within the valley were to be included. The COG created a Grade Crossings Project Steering Committee comprised of technical and policy-level representatives from local and county agencies having responsibilities for street and road construction and operations, the railroads and regional agencies such as the Southern California Association of Governments (SCAG) and the Los Angeles Metropolitan Transportation Authority (Metro). Interim study working papers, technical memoranda and concept plans were reviewed by the steering committee at meetings held during 1995 and 1996. SCAG regional modeling was the source of roadway traffic forecasts used in the study. Rail traffic estimates were extrapolated from Union Pacific Railroad (UPRR) forecasts made at the time it was acquiring the Denver Rio Grande/Southern Pacific Railroad (SP).

The final report, published in January 1997, presented a staged development program. Twenty of the 55 grade crossings were identified as candidates for elimination through the construction of grade separations. Four stages, beginning with a "Jump Start" grade crossing safety improvement program, were initially proposed; the staging evolved into two phases.

During 1996 UPRR completed its acquisition of the SP. The former Southern Pacific main line through the valley (referred to as the "SP line" in the 1997 report) was designated the Alhambra subdivision of the UPRR, joining UPRR's Los Angeles subdivision (called the "UP line" in the 1997 report).

CREATION OF ACE: In 1998, the COG created the Alameda Corridor – East Construction Authority (ACE) to implement the projects identified in the 1997 study. The ACE Construction Authority is comprised of six jurisdictions: the Cities of El Monte, Industry, Montebello, Pomona, San Gabriel, and Los Angeles County. Each is represented on the ACE Board of Directors along with an at-large representative of the COG and an ex-officio SANBAG representative.

ACE'S PROGRAM, 1999 – 2009: In November 1999 the newly-created ACE Board adopted a Program Implementation Plan (PIP), which consisted of a grade crossing safety improvement program, a Phase I grade separation program and a Phase II category, to be initiated when all of Phase I was funded and programmed for construction.

During the decade the Board re-prioritized projects, considered new project alternatives and shifted projects between phases. By 2009 ACE completed or had in construction the grade crossing safety improvements and seven Phase I grade separations which eliminated 10 grade crossings; two additional grade separations were expected to be in construction in 2010.

In April 2003 the Board restated its Phase I priorities and in December 2006 the Board received an updated overall program cost estimate and near-term priority program for funding.

As of this date, there remain six of the originally adopted grade separations that are the subject of this study. They are:

PROJECT LOCATION	JURISDICTION(S)
Montebello Boulevard (LA subdivision)	Montebello
Puente Avenue (Alhambra subdivision)	Industry/L.A. County
Fairway Drive (Alhambra subdivision)	Walnut/Industry
Fairway Drive (LA subdivision)	L.A. County/Industry
Turnbull Canyon Road (LA subdivision)	Industry/L.A. County
Rose Hills Road (L.A. subdivision)	Industry/L.A. County

DEVELOPMENT OF ACE'S PHASE II PROGRAM: With the passage of Metro's Measure R, the upcoming reauthorization of the Federal transportation program, and ACE's continued efforts to secure other funding, the Board determined there was reason to expect sufficient project funding to warrant an updated implementation plan for the remaining grade separations in the Phase II program beyond those already established as priorities (San Gabriel Trench). There had been a significant passage of time since the original 1997 COG study used to establish the adopted ACE program, and ACE corridor cities were expressing interests in considering substitute and/or additional grade separation locations. The Board directed staff to use techniques similar to those used in the 1997 study to update data and analyses which led to the original project selection process, develop comparable data for substitute or additional locations, and develop updated or new concept designs and rough cost estimates for Phase II locations.

PART 1 – TRAFFIC STUDY
CHAPTER 1 - STUDY AREA – UPRR GRADE CROSSINGS IN THE SAN GABRIEL VALLEY

1.1 STUDY AREA DESCRIPTION

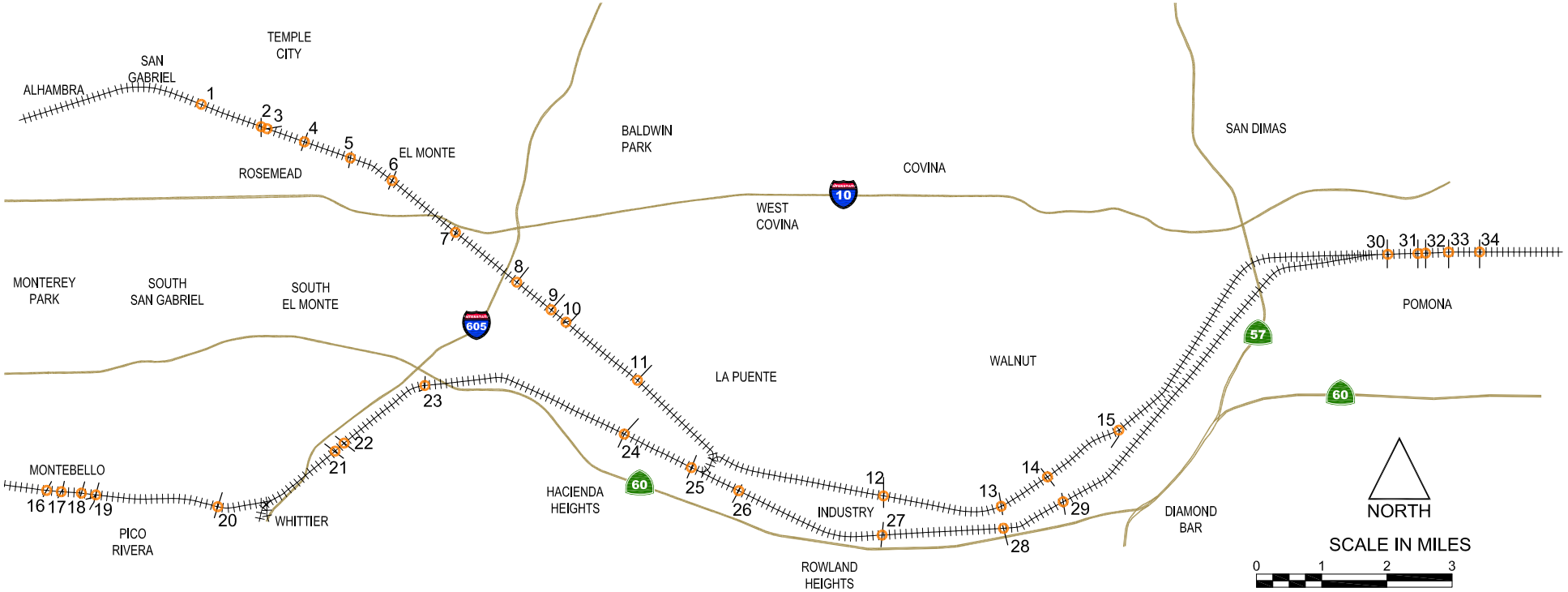
The 34 at-grade railroad crossings under this study are located in the San Gabriel Valley on both the Alhambra Subdivision and Los Angeles Subdivision of the Union Pacific Railroad (UPRR). These lines carry UPRR freight, Metrolink commuter and Amtrak interstate passenger trains. Fifteen crossings are located along the Alhambra Subdivision, 14 crossings are located along the Los Angeles Subdivision, and 5 crossings are located along the combined Alhambra/Los Angeles Subdivisions in downtown Pomona. All these crossings have flashing light signals with gates and bells. Thirteen of the crossings are adjacent to intersections controlled by traffic signals that are preempted upon detection of an approaching train. Table 1-1 shows a listing of the 34 study railroad crossings. The crossing locations are depicted in Figure 1-1.

Table 1-1: Study Railroad Crossing Locations

No.	Crossing Number	Street	Subdivision Crossing	Area
1	746884W	Walnut Grove Ave	Alhambra	LA County/Rosemead
2	746886K	Encinita Ave*	Alhambra	Temple City/Rosemead
3	746887S	Lower Azusa Rd*	Alhambra	Temple City/Rosemead
4	746889F	Temple City Blvd	Alhambra	El Monte/Rosemead
5	746891G	Arden Dr	Alhambra	El Monte
6	746893V	Tyler Ave	Alhambra	El Monte
7	746898E	Cogswell Rd	Alhambra	El Monte
8	746903Y	Temple Ave*	Alhambra	Industry/LA County
9	746904F	Vineland Ave*	Alhambra	Industry/LA County
10	746905M	Puente Ave*	Alhambra	Industry/LA County
11	746908H	California Ave*	Alhambra	Industry/LA County
12	753601N	Fullerton Rd*	Alhambra	Industry/LA County
13	746913E	Fairway Dr*	Alhambra	Industry/Walnut
14	746915T	Lemon Ave*	Alhambra	Industry/Walnut
15	746916A	Brea Canyon Rd*	Alhambra	Industry/Walnut
16	811077C	Vail Ave	Los Angeles	Montebello
17	811076V	Maple Ave	Los Angeles	Montebello
18	811075N	Greenwood Ave	Los Angeles	Montebello
19	811074G	Montebello Blvd	Los Angeles	Montebello
20	811219R	Durfee Ave	Los Angeles	Pico Rivera
21	811057R	Rose Hills Rd	Los Angeles	Industry/LA County
22	811061F	Mission Mill Rd	Los Angeles	Industry/LA County
23	811063U	Workman Mill Rd	Los Angeles	Industry/LA County
24	810867E	Turnbull Canyon Rd	Los Angeles	Industry/LA County
25	810871U	Stimson Ave	Los Angeles	Industry
26	810905L	Bixby Dr	Los Angeles	Industry
27	810880T	Fullerton Rd*	Los Angeles	Industry
28	810883N	Fairway Dr	Los Angeles	Industry/LA County
29	810885C	Lemon Ave	Los Angeles	Industry/Diamond Bar
30	746925Y	Hamilton Blvd	Alhambra/Los Angeles	Pomona
31	746927M	Park Ave	Alhambra/Los Angeles	Pomona
32	746928U	Main St	Alhambra/Los Angeles	Pomona
33	746930V	Palomares St*	Alhambra/Los Angeles	Pomona
34	746932J	San Antonio Ave*	Alhambra/Los Angeles	Pomona

* Preempted by railroad interconnected to traffic signal system.

AT-GRADE RAILROAD CROSSING STUDY LOCATIONS



UPRR Alhambra Subdivision Grade Crossings

1. Walnut Grove Ave., Rosemead/LA County
2. Encinita Ave., Temple City/Rosemead
3. Lower Azusa Rd., Temple City/Rosemead
4. Temple City Blvd., El Monte/Rosemead
5. Arden Dr., El Monte
6. Tyler Ave., El Monte
7. Cogswell Rd., El Monte
8. Temple Ave., Industry/LA County
9. Vineland Ave., Industry/LA County
10. Puente Ave., Industry/LA County
11. California Ave., Industry/LA County
12. Fullerton Rd., Industry/LA County
13. Fairway Dr., Industry/Walnut
14. Lemon Ave., Industry/Walnut
15. Brea Canyon Rd., Industry/Walnut

UPRR Los Angeles Subdivision Grade Crossings

16. Vail Ave., Montebello
17. Maple Ave., Montebello
18. Greenwood Ave., Montebello
19. Montebello Blvd., Montebello
20. Durfee Ave., Pico Rivera
21. Rose Hills Rd., Industry/LA County
22. Mission Mill Rd., Industry/LA County
23. Workman Mill Rd., Industry/LA County
24. Turnbull Canyon Rd., Industry/LA County
25. Stimson Ave., Industry
26. Bixby Dr., Industry
27. Fullerton Rd., Industry
28. Fairway Dr., Industry/LA County
29. Lemon Ave., Industry/Diamond Bar

Both Subdivision Grade Crossings (Downtown Pomona)

30. Hamilton Blvd., Pomona
31. Park Ave., Pomona
32. Main St., Pomona
33. Palomares St., Pomona
34. San Antonio Ave., Pomona

FIGURE 1-1

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FN: ACE PHASE 2 TRAFFIC STUDY\SCREENLINE AREA (34 Locations)

1.2 AGENCY COORDINATION

This traffic study was prepared under the direction of ACE staff. UPRR personnel and local agency staff, including representatives for Los Angeles County and the Cities of Industry, Diamond Bar, Walnut, and Montebello were involved in the study process.

1.3 EXISTING CONDITIONS AT RAILROAD CROSSINGS

KOA staff conducted field observations at all 34 study railroad crossing locations to collect information on existing conditions. Information collected on roadway conditions included number of lanes at the railroad crossings, queuing distance in each direction, railroad flashers, traffic control signals, signage, pavement markings, sidewalks, adjacent roadways or driveways, center median islands and highway grades. Appendix A contains more-detailed descriptions of the grade crossings. These conditions are summarized below:

Rail Crossing: 1. Walnut Grove Avenue, Alhambra Subdivision

Walnut Grove Avenue is a north-south minor arterial providing one travel lane in each direction north of the crossing and two travel lanes in each direction south of the crossing. Existing conditions at the crossing include flashers with a crossing gate on the right side of the road in each direction, a raised center median island, and driveways located adjacent to all quadrants of the crossing. The crossing is located on the border between the City of Rosemead and unincorporated Los Angeles County. Distances to curbs from street centerlines vary between the two jurisdictions. This crossing is within the eastern approach into the San Gabriel Trench project. The railroad vertical curve for the trench requires lowering and alteration of the crossing. The crossing will not be eliminated by the trench project.

Rail Crossing: 2. Encinita Avenue, Alhambra Subdivision

Encinita Avenue is a north-south minor arterial providing one travel lane in each direction. Existing conditions at the Encinita Avenue rail crossing include flashers with a crossing gate on the right side of the road in each direction, a raised center median island, and a driveway located on the northeast quadrant of the crossing. Traffic signals at the adjacent intersection of Encinita Avenue with Lower Azusa Road are electrically-interconnected with the grade crossing signal control system. As trains approach the grade crossing, traffic signal programming is pre-empted to provide a track clearance interval and avoid conflicting traffic signal and railroad signal aspects (railroad preemption).

Rail Crossing: 3. Lower Azusa Road, Alhambra Subdivision

Lower Azusa Road is an east-west major arterial providing two travel lanes in each direction. The existing conditions at the Lower Azusa Road rail crossing include flashers with a crossing gate and overhead flashing-light structure on the right side of the road in each direction, a raised center median island, and driveways located on the northwest, southwest, and southeast quadrants of the crossing.

Traffic signals at the adjacent intersection of Lower Azusa Road with Encinita Avenue have railroad pre-emption.

Rail Crossing: 4. Temple City Boulevard, Alhambra Subdivision

Temple City Boulevard is a north-south major arterial providing two travel lanes in each direction. The existing conditions at the Temple City Boulevard rail crossing include flashers with a crossing gate and overhead flashing-light structure on the right side of the road in each direction and driveways located on the northwest and southeast quadrants of the crossing.

Rail Crossing: 5. Arden Drive, Alhambra Subdivision

Arden Drive is a north-south minor arterial providing two travel lanes in each direction. The existing conditions at the Arden Drive rail crossing include flashers with a crossing gate and overhead flashing-light structure on the right side of the road in each direction, a raised center median island, and driveways located on all quadrants of the crossing.

Rail Crossing: 6. Tyler Avenue, Alhambra Subdivision

Tyler Avenue is a north-south minor arterial providing two travel lanes in each direction. The existing conditions at the Tyler Avenue rail crossing include flashers with a crossing gate and overhead flashing-light structure on the right side of the road in each direction, a raised center median island, and driveways located on the northwest and northeast quadrants of the crossing.

Tyler Avenue, Cogswell Road and Temple Avenue are dual crossings within which UPRR and Southern California Regional Rail Authority's Metrolink commuter rail service each operate trackage and dispatch trains. Each railroad operates grade crossing track circuits and control systems for their own trackage which are electrically interconnected for the operation of the grade crossing warning signals, bells and gates. The two railroads share responsibilities for operation and maintenance of the signals.

Rail Crossing: 7. Cogswell Road, Alhambra Subdivision

Cogswell Road is a north-south collector providing one travel lane in each direction. The existing conditions at the Cogswell Road rail crossing include flashers with a crossing gate on the right side of the road in each direction, flashers on the left side of the road in each direction, a raised center median island, and driveways located on the northeast, southwest, and southeast quadrants of the crossing.

Rail Crossing: 8. Temple Avenue, Alhambra Subdivision

Temple Avenue is a north-south secondary arterial providing two travel lanes in each direction. The existing conditions at the Temple Avenue rail crossing include flashers with a crossing gate on the center median island and the right side of the road in each direction, a raised center median island, a driveway located on the southwest quadrant of the crossing. The unsignalized intersection of Temple Avenue and Railroad Avenue is located 80' north of the rail crossing. The signalized intersection of Valley Boulevard and Temple Avenue is located 200' south of the rail crossing and is interconnected with the railroad signal to provide preemption.

Rail Crossing: 9. Vineland Avenue, Alhambra Subdivision

Vineland Avenue is a north-south collector providing one travel lane in each direction. The existing conditions at the Vineland Avenue rail crossing include flashers with a crossing gate on the right side of the road in each direction and a small adjacent street with no street name located 50' north of the rail crossing. The signalized intersection of Valley Boulevard and Vineland Avenue is located 50' south of the rail crossing and is interconnected with the railroad signal to provide preemption. The intersection has a pre-signal located north of the grade crossing for southbound traffic to discourage motorists from stopping vehicles within the track area.

Rail Crossing: 10. Puente Avenue, Alhambra Subdivision

Puente Avenue is a north-south major arterial providing two travel lanes in each direction north of the crossing. The existing conditions at the Puente Avenue rail crossing include flashers with a crossing gate on the center median island and the right side of the road in each direction, and a raised center median island. The signalized intersection of Valley Boulevard and Puente Avenue is located 40' south of the rail crossing and is interconnected with the railroad signal to provide preemption. The intersection has a pre-signal located north of the grade crossing for southbound traffic to discourage motorists from stopping vehicles within the track area.

Rail Crossing: 11. California Avenue, Alhambra Subdivision

California Avenue is a north-south collector providing one travel lane in the northbound direction and two travel lanes in the southbound direction at the crossing. Existing conditions at the California Avenue rail crossing include flashers with a crossing gate on the right side of the road in each direction, and driveways located on the northwest and northeast quadrant of the crossing. The signalized intersection of Valley Boulevard and California Avenue is located 40' south of the rail crossing and is interconnected with the railroad signal to provide preemption. The intersection has a pre-signal located north of the grade crossing for southbound traffic to discourage motorists from stopping vehicles within the track area. This crossing is within ACE's Sunset Avenue grade separation project limit and the roadway was re-profiled as part of that project.

Rail Crossing: 12. Fullerton Road, Alhambra Subdivision

Fullerton Road is a north-south minor arterial providing three travel lanes in the northbound direction and two travel lanes in the southbound direction at the crossing. The existing conditions at the Fullerton Road rail crossing include flashers with a crossing gate and overhead flashing-light structure on the right side of the road in each direction and a driveway located on the southeast quadrant of the crossing. The signalized intersection of Valley Boulevard and Fullerton Road is located 50' north of the rail crossing and is interconnected with the railroad signal to provide preemption. This crossing is within a railroad control point at the east end of Industry Yard.

Rail Crossing: 13. Fairway Drive, Alhambra Subdivision

Fairway Drive is a north-south minor arterial providing three travel lanes in the northbound direction and two travel lanes in the southbound direction at the crossing. The existing conditions at the Fairway Drive rail crossing include flashers with a crossing gate on the center median island and the right side of the road in each direction, a raised center median island, and a driveway located on the southwest

quadrant of the crossing. The signalized intersection of Valley Boulevard and Fairway Drive is located 50' north of the rail crossing and is interconnected with the railroad signal to provide preemption. There is a pre-signal for this intersection located south of the grade crossing for northbound traffic, to discourage motorists from stopping vehicles within the track area.

In April 2010, additional grade crossing signal foundations were being installed for the installation of additional flashing light signals with gates, to create a four-quadrant gate grade crossing. This work is part of the extension of the Pomona – Grand Avenue quiet zone westward, past Nogales Street. A railroad quiet zone, under Federal Railroad Administration requirements, restricts use of locomotive horns upon approach to grade crossings.

Rail Crossing: 14. Lemon Avenue, Alhambra Subdivision

Lemon Avenue is a north-south minor arterial providing three travel lanes in the northbound direction and two travel lanes in the southbound direction at the crossing. The existing conditions at the Lemon Avenue rail crossing include flashers with a crossing gate on the center median island and the right side of the road in each direction, a raised center median island and driveways located on the southwest and southeast quadrants of the crossing. The signalized intersection of Valley Boulevard and Lemon Avenue is located 50' north of the rail crossing and is interconnected with the railroad signal to provide preemption.

In April, 2010, pre-signals for the intersection of Lemon Avenue and Valley Boulevard were being installed between the grade crossing and the intersection for northbound traffic. Additional grade crossing signal foundations were installed for the installation of additional flashing light signals with gates, to create a four-quadrant gate grade crossing, as part of the westward extension of the Pomona – Grade Avenue railroad quiet zone.

Rail Crossing: 15. Brea Canyon Road, Alhambra Subdivision

Brea Canyon Road is a north-south major arterial providing four travel lanes in the northbound direction and two travel lanes in the southbound direction at the crossing. The existing conditions at the Brea Canyon Road rail crossing include flashers with a crossing gate and overhead flashing-light structure on the center median island and the right side of the road in each direction, a raised center median island and a driveway located on the southeast quadrant of the crossing. The unsignalized intersection of Brea Canyon Road and Old Ranch Road is located 180' south of the rail crossing. The signalized intersection of Brea Canyon Road and Valley Boulevard is located 180' north of the rail crossing and is interconnected with the railroad signal to provide preemption.

This crossing will be modified into a four-quadrant gate grade crossing as part of the westward extension of the Pomona – Grand Avenue railroad quiet zone.

Rail Crossing: 16. Vail Avenue, Los Angeles Subdivision

Vail Avenue is a north-south local road providing one travel lane in each direction. The existing conditions at the Vail Avenue rail crossing include flashers with a crossing gate on the right side of the road in each direction, driveways located on all quadrants of the crossing. The unsignalized intersection of Vail Avenue and Mines Avenue is located 60' south of the rail crossing.

Rail Crossing: 17. Maple Avenue, Los Angeles Subdivision

Maple Avenue is a north-south collector providing one travel lane in each direction. The existing conditions at the Maple Avenue rail crossing include flashers on the left side of the road in each direction, flashers with a crossing gate and overhead flashing-light structure on the right side of the road in the northbound direction, flashers with a crossing gate on the right side of the road in the southbound direction, and driveways located on all quadrants of the crossing.

Rail Crossing: 18. Greenwood Avenue, Los Angeles Subdivision

Greenwood Avenue is a north-south local road with a curved alignment providing one travel lane in each direction. The existing conditions at the Greenwood Avenue rail crossing include flashers on the left side of the road in each direction, flashers with a crossing gate on the right side of the road in each direction, and driveways located on the northwest, southwest and southeast quadrants of the crossing. The unsignalized intersection of Greenwood Avenue and Truck Way is located 50' south of the rail crossing.

Rail Crossing: 19. Montebello Boulevard, Los Angeles Subdivision

Montebello Boulevard is a north-south major arterial providing two travel lanes in each direction. The existing conditions at the Montebello Boulevard rail crossing include flashers with a crossing gate on the center median island and the right side of the road in each direction, a raised center median island, and driveways located on all quadrants of the crossing. The unsignalized intersection of Montebello Boulevard and Roosevelt Avenue is located 60' south of the rail crossing. The signalized intersection of Montebello Boulevard and Olympic Boulevard is located 250' north of the crossing. The signalized intersection of Montebello Boulevard and Truck Way is located 300' south of the rail crossing.

Rail Crossing: 20. Durfee Avenue, Los Angeles Subdivision

Durfee Avenue is a north-south minor arterial providing one travel lane in each direction. The existing conditions at the Durfee Avenue rail crossing include flashers with a crossing gate on the right side of the road in each direction, a pedestrian crossing gate on the northeast quadrant of the crossing, a painted center median island, a steep grade at the crossing, and driveways located on all quadrants of the crossing.

Rail Crossing: 21. Rose Hills Road, Los Angeles Subdivision

Rose Hills Road is a north-south minor arterial providing two travel lanes in each direction. The existing conditions at the Rose Hills Road rail crossing include flashers with a crossing gate on the center median island and the right side of the road in each direction and a raised center median island.

Rail Crossing: 22. Mission Mill Road, Los Angeles Subdivision

Mission Mill Road is a north-south minor arterial providing one travel lane in each direction. The existing conditions at the Mission Mill Road rail crossing include flashers with a crossing gate on the right side of the road in each direction, a raised center median island, and a driveway located on the northwest quadrant of the crossing.

Rail Crossing: 23. Workman Mill Road, Los Angeles Subdivision

Workman Mill Road is a north-south minor arterial providing two travel lanes in each direction. The existing conditions at the Workman Mill Road rail crossing include flashers with a crossing gate on the center median island and the right side of the road in each direction, a raised center median island, and driveways located on all quadrants of the crossing.

Rail Crossing: 24. Turnbull Canyon Road, Los Angeles Subdivision

Turnbull Canyon Road is a north-south minor arterial providing two travel lanes in each direction. The existing conditions at the Turnbull Canyon Road rail crossing include flashers with a crossing gate on the center median island and the right side of the road in each direction, a raised center median island, and a driveway located on the northeast quadrant of the crossing. The unsignalized intersection of Turnbull Canyon Road and Salt Lake Avenue is located 80' north of the crossing.

Rail Crossing: 25. Stimson Avenue, Los Angeles Subdivision

Stimson Avenue is a north-south minor arterial providing two travel lanes in each direction. The existing conditions at the Stimson Avenue rail crossing include flashers with a crossing gate on the center median island and the right side of the road in each direction, a raised center median island, and driveways located on all quadrants of the crossing.

Rail Crossing: 26. Bixby Drive, Los Angeles Subdivision

Bixby Drive is a north-south local road providing one travel lane in each direction. The existing conditions at the Bixby Drive rail crossing include flashers on the right side of the road in each direction, a raised center median island, and driveways located on the northeast, southwest and southeast quadrants of the crossing.

Rail Crossing: 27. Fullerton Road, Los Angeles Subdivision

Fullerton Road is a north-south minor arterial providing three travel lanes in each direction. The existing conditions at the Fullerton Road rail crossing include flashers with a crossing gate on the center and right side of the road in each direction, a raised center median island, and a driveway located on the southeast quadrant of the crossing. The signalized intersection of Fullerton Road and Railroad Street is located 30' north of the crossing and is interconnected with the railroad signal to provide preemption.

Rail Crossing: 28. Fairway Drive, Los Angeles Subdivision

Fairway Drive is a north-south major arterial providing two travel lanes in each direction. The existing conditions at the Fairway Drive rail crossing include flashers with a crossing gate on the center and right side of the road in each direction, a raised center median island, and driveways located on the northwest, northeast, and southwest quadrants of the crossing. In February 2010 a diagnostic team review was held at the crossing to discuss alternatives for reducing motorist queuing over the track area (see Chapter 4.2 Introduction for further information).

Rail Crossing: 29. Lemon Avenue, Los Angeles Subdivision

Lemon Avenue is a north-south minor arterial providing two travel lanes in each direction. The existing conditions at the Lemon Avenue rail crossing include flashers with a crossing gate on the center and right side of the road in each direction and a raised center median island. The signalized intersection of Lemon Avenue and Lycoming Street is located 180' south of the rail crossing.

Rail Crossing: 30. Hamilton Boulevard, Alhambra/Los Angeles Subdivision

Hamilton Boulevard is a north-south collector providing two travel lanes in each direction. Existing conditions at the Hamilton Boulevard rail crossing include flashing light signals with bells and gates and overhead cantilevered flashing-light signals on all four corners of the grade crossing (four-quadrant gates). Inductive pavement loops laid within street pavement at the grade crossing are connected to an exit gate operation management system within the grade crossing control shelter. This system delays descent of the exit gates to encourage motorists to avoid stopping vehicles in the track area. There are driveways located on the northwest and northeast quadrants of the crossing. The unsignalized intersection of Hamilton Boulevard and 1st Street is located 20' south of the rail crossing.

Rail Crossing: 31. Park Avenue, Alhambra/Los Angeles Subdivision

Park Avenue is a north-south collector providing one travel lane in each direction. The existing conditions at the Park Avenue rail crossing include four-quadrant flashing light signals with gates, a raised center median island at the southbound approach, and driveways located on the northwest and northeast quadrants of the crossing. The unsignalized intersection of Park Avenue and 1st Street is located 20' south of the rail crossing.

Rail Crossing: 32. Main Street, Alhambra/Los Angeles Subdivision

Main Street is a north-south local road providing one travel lane in each direction. The existing conditions at the Main Street rail crossing include four-quadrant flashing light signals with gates and a driveway located on the northeast quadrant of the crossing. The unsignalized intersection of Main Street and 1st Street is located 20' south of the rail crossing.

Rail Crossing: 33. Palomares Street, Alhambra/Los Angeles Subdivision

Palomares Street is a north-south collector providing one travel lane in each direction. The existing conditions at the Palomares Street rail crossing include four-quadrant flashing light signals with gates, and a raised center median island at the southbound approach. The signalized intersection of Palomares Street and 1st Street is located 20' south of the rail crossing and is electrically interconnected with the grade crossing signal control system to provide railroad preemption.

Rail Crossing: 34. San Antonio Avenue, Alhambra/Los Angeles Subdivision

San Antonio Avenue is a north-south minor arterial providing two travel lanes in each direction. The existing conditions at the San Antonio Avenue rail crossing include four-quadrant flashing light signals with gates, and a raised center median island. There are four tracks through the grade crossing. The signalized intersection of San Antonio Avenue and 1st Street is located 20' south of the rail crossing and is interconnected with the railroad signal to provide preemption.

CHAPTER 2 - TECHNICAL ANALYSIS

2.1 EXISTING COUNT DATA COLLECTION

Existing railroad activity and vehicular traffic counts were collected at all 34 at-grade crossings in order to ensure the use of the most current traffic data for this study. Count data were collected through video recordings to determine the current number and type of rail traffic as well as vehicular traffic activities. The video recordings were collected in September 2009 and covered a 24-hour period at each crossing location during weekdays. Types of rail traffic activity included freight, Amtrak and Metrolink trains. The video recordings also identified blockages due to rail switching and maintenance activities. It should be noted that vehicular traffic counts for the Walnut Grove Avenue crossing were based on tube counts conducted in May 2010. Rail traffic and activity data for the Encinita Avenue crossing was assumed for the Walnut Grove Avenue crossing. The vehicle count data sheets are found in Appendix F.

2.2 FUTURE MOTOR VEHICLE TRAFFIC FORECAST

Forecasts of future vehicular traffic are based on the Southern California Associated Governments' (SCAG) 2008 Regional Transportation Plan (RTP) model.

The SCAG model encompasses all major roadways within Los Angeles, Orange, San Bernardino, Riverside, Ventura and Imperial counties. It also consists of land use information, traffic volumes and other socio-economic data. Traffic volumes are segregated by passenger cars and heavy duty trucks. The SCAG model analyzes traffic for the following time periods:

- AM peak period (7:00 AM to 10:00 AM)
- Midday period (10:00 AM to 3:00 PM)
- PM peak period (3:00 PM to 7:00 PM)
- Night time period (7:00 PM to 7:00 AM)

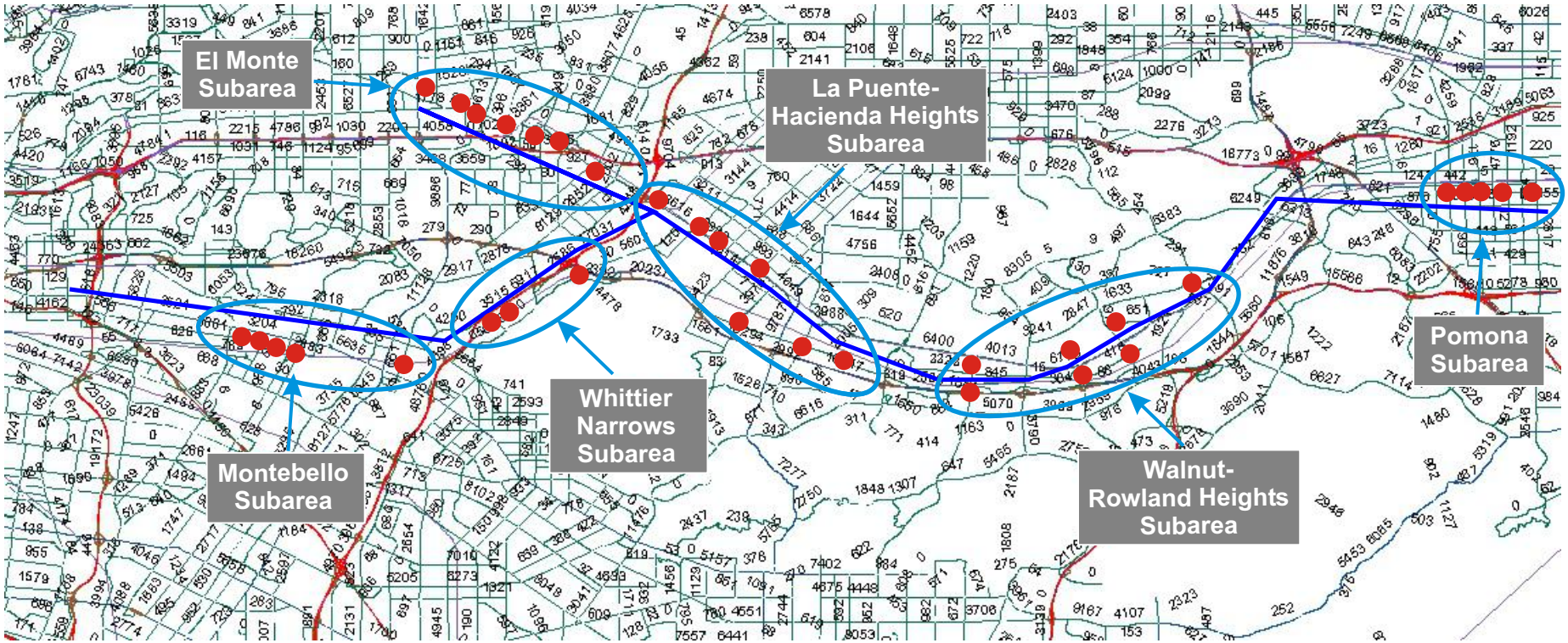
Year 2025 forecasts used in this study are interpolated between base year 2008 traffic volumes and horizon year 2035 traffic projections provided by the SCAG model.

Future traffic at each of the 34 railroad crossing locations was estimated through the use of screenlines, or groupings of crossings along imaginary lines over which traffic flow is estimated for both 2008 and 2035. Screenlines grouped the 34 grade crossings into six subareas: Montebello, Whittier Narrows, El Monte, La Puente–Hacienda Heights, Walnut–Rowland Heights, and Pomona. Figure 2-1 shows the screenlines and the six subarea groupings.

Projected Passenger Vehicle and Truck Traffic Growth

Tables C-1 and C-2 found in Appendix C summarize passenger and truck traffic volumes and forecasted growth for 2008 and 2035.

As shown in Table C-1, total daily passenger car traffic volume crossing the screenlines for 2008 was found to be 610,821. For the year 2035, total daily passenger car traffic volume crossing the screenlines was found to be 683,270. Table C-2 shows 2008 daily truck traffic volume as 25,682, and forecasted 2035 daily truck volume as 31,068.



LEGEND

- Rail Road Crossing
- Screenline

N

Not to Scale

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PLANNING & ENGINEERING

ACE Phase II Grade Separation Traffic Study and Concept Plans — Figure 2-1

Screenlines at Railroad Crossing Locations

These volumes were divided among the six subareas in order to calculate annual subarea growth rates, shown in the last column of the two tables.

Average annual growth rate by subarea for passenger cars was applied to the streets that were classified as major/secondary highways and collector streets. It was assumed that volumes on roadways classified as local streets would not grow as much as major/secondary highways and collector streets. Hence, passenger car volumes on local streets were assumed to increase by half of that growth rate.

Total Motor Vehicle Traffic Growth

Future 2025 traffic volumes for each crossing were obtained by applying the subarea growth rates calculated above to the actual 2009 daily counts of cars and trucks. Table 2-1 summarizes the existing 2009 traffic counts and the projected future 2025 traffic volumes at the 34 railroad crossings.

Table 2-1: Projected Future Traffic Volumes

Crossing #		Street	Existing 2009 ADT - Autos	Existing 2009 ADT - Trucks	Existing 2009 ADT - Total (Autos + Trucks)	Overall Growth rate (Autos)	Overall Growth rate (Trucks)	Future 2025 ADT - Autos	Future 2025 ADT - Trucks	Future 2025 ADT - Total (Autos + Trucks)
1	746884W	Walnut Grove Ave *	14837	150	14987	1.059	1.059	15,715	159	15,874
2	746886K	Encinita Avenue	6,220	19	6,239	1.059	1.059	6,588	20	6,608
3	746887S	Lower Azusa Road	16,938	69	17,007	1.059	1.059	17,941	73	18,014
4	746889F	Temple City Boulevard	20,287	110	20,397	1.059	1.059	21,488	117	21,605
5	746891G	Arden Drive	10,725	75	10,800	1.059	1.059	11,360	79	11,439
6	746893V	Tyler Avenue	11,470	34	11,504	1.059	1.059	12,149	36	12,185
7	746898E	Cogswell Road	9,830	8	9,838	1.059	1.059	10,412	8	10,420
8	746903Y	Temple Avenue	24,850	1,587	26,437	1.067	1.115	26,520	1,770	28,290
9	746904F	Vineland Avenue	11,979	287	12,266	1.067	1.115	12,784	320	13,104
10	746905M	Puente Avenue	30,336	737	31,073	1.067	1.115	32,375	822	33,196
11	746908H	California Avenue	17,773	571	18,344	1.067	1.115	18,967	637	19,604
12	753601N	Fullerton Road	17,462	403	17,865	1.061	1.173	18,524	473	18,996
13	746913E	Fairway Drive	18,929	455	19,384	1.061	1.173	20,080	534	20,614
14	746915T	Lemon Road	16,425	360	16,785	1.061	1.173	17,424	422	17,846
15	746916A	Brea Canyon Road	13,814	249	14,063	1.061	1.173	14,654	292	14,946
16	811077C	Vail Avenue	7,568	162	7,730	1.024	1.074	7,750	174	7,924
17	811076V	Maple Avenue	5,349	87	5,436	1.048	1.147	5,606	100	5,706
18	811075N	Greenwood Avenue	7,092	28	7,120	1.024	1.074	7,262	30	7,292
19	811074G	Montebello Boulevard	20,058	50	20,108	1.048	1.147	21,021	57	21,078
20	811219R	Durfee Avenue	13,575	83	13,658	1.048	1.147	14,227	95	14,322
21	811057R	Rose Hills Road	9,139	105	9,244	1.107	1.058	10,119	111	10,230
22	811061F	Mission Mill Road	1,975	156	2,131	1.054	1.029	2,081	160	2,241
23	811063U	Workman Mill Road	7,431	51	7,482	1.107	1.058	8,228	54	8,282
24	810867E	Turnbull Canyon Road	13,578	556	14,134	1.067	1.115	14,490	620	15,110
25	810871U	Stimson Avenue	14,122	283	14,405	1.067	1.115	15,071	316	15,387
26	810905L	Bixby Drive	2,438	464	2,902	1.034	1.058	2,520	491	3,011
27	810880T	Fullerton Road	22,311	1,405	23,716	1.061	1.173	23,668	1,648	25,315
28	810883N	Fairway Drive	22,897	1,904	24,801	1.061	1.173	24,289	2,233	26,522
29	810885C	Lemon Road	14,454	283	14,737	1.061	1.173	15,333	332	15,665
30	746925Y	Hamilton Boulevard	7,797	25	7,822	1.093	1.125	8,521	28	8,549
31	746927M	Park Avenue	5,523	10	5,533	1.093	1.125	6,036	11	6,047
32	746928U	Main Street	1,509	23	1,532	1.046	1.062	1,579	24	1,603
33	746930V	Palomares Street	3,769	5	3,774	1.093	1.125	4,119	6	4,124
34	746932J	San Antonio Avenue	6,560	168	6,728	1.093	1.125	7,169	189	7,358

* Traffic Counts obtained in May 2010

2.3 FUTURE RAILROAD TRAIN MOVEMENT FORECAST

Due to a lack within the industry of rail traffic growth projections beyond year 2025, the horizon year 2025 was used in this analysis to represent the benchmark year for future conditions. The estimates of freight, Amtrak and Metrolink train traffic for the future year 2025 were based on projections cited in the Inland Empire Railroad Main Line (IERML) Study, June 30, 2005, which was prepared for SCAG by Leachman and Associates LLC. The projections and their sources for each type of rail traffic are described below.

Freight Train Traffic Forecast

Future freight train projection from the IERML Study was based on growth rates referenced in the Inland Empire Railroad Main Line Advanced Planning Study, prepared by the Los Angeles Economic Development Corporation (LAEDC) in 2002. In that study, the future freight traffic volumes were projected based on 90th percentile-day freight traffic volumes in year 2000 (existing condition). The report points out that the 90th percentile counts are typically 20% higher than the average daily train counts.

LAEDC estimated growth rates applicable to various types of freight trains. Applying those growth rates to the different types of freight trains, a total of 117 freight trains was projected for the Alhambra and Los Angeles subdivisions combined in both directions on a peak day by year 2025. For this analysis, the projected 117 freight trains were used to estimate the growth rate of freight trains between the Existing (2009) and Future (2025) conditions at the 34 at-grade crossing locations.

Passenger Train Traffic Forecast

The IERML study draws upon a Southern California Regional Rail Authority (SCRRA) report for forecasts of future Metrolink commuter rail train traffic. SCRRA's "Strategic Assessment", dated January 26, 2007, provides guidance on future demand for commuter rail service and the railroad infrastructure required to support that demand. There is a forecast that future growth could warrant 46 trips per weekday between Riverside and Los Angeles, 36 of which could be routed over UPRR's Los Angeles subdivision (the remainder being routed through Fullerton). Capital improvements required to support demand for this level of service would include triple-tracking significant portions of the subdivision. However, the present-day level of 12 commuter trips (6 round-trips) per weekday over the subdivision is the maximum allowed under existing agreements between SCRRA, SCRRA's member agencies and UPRR. ACE has seen no information that indicates UPRR will allow increased use of either the Alhambra or Los Angeles subdivisions by passenger trains, Amtrak or Metrolink. In the absence of this kind of information, this present traffic study will use present-day passenger train counts for projections into the year 2025.

The IERML study did not have projections on Metrolink's San Bernardino line. Presently Metrolink operates 19 round-trips per week day on this line. On Saturdays there are 10 round-trips and on Sundays there are 7 round-trips. Metrolink's San Bernardino line runs on separate trackage within three UPRR Alhambra subdivision grade crossings included in this study: Tyler Avenue, Cogswell Road and

Temple Avenue (next to I-605). For the purpose of this analysis, KOA assumed no change in commuter rail frequency for the San Bernardino line.

Alhambra Subdivision Capital Improvements

UPRR's Los Angeles Subdivision has two main tracks through the study area, with additional trackage used for sidings and leads into industrial spurs. The Alhambra Subdivision is generally single main line trackage with some long sidings. UPRR's long-range capital improvement program calls for double-tracking along the Alhambra subdivision, and ACE's grade separations are designed to accommodate this.

For the purpose of this analysis, forecasted delay analyses were conducted based on two future (2025) rail traffic condition scenarios: "With Alhambra Subdivision Single-Tracked" and "With Alhambra Subdivision Double-Tracked." For the "With Alhambra Subdivision Single-Tracked" scenario, it is assumed that the Los Angeles Subdivision (being double-tracked) would carry twice the number of freight traffic as compared to the Alhambra Subdivision (being single-tracked). For the "With Alhambra Subdivision Double-Tracked" scenario, it is assumed the number of freight trains would be split equally between the Alhambra and Los Angeles Subdivisions. Table 2-2 summarizes the total freight and passenger rail traffic volumes for existing (2009) condition and for future (2025) conditions for both the "With Alhambra Subdivision Single-Tracked" and "With Alhambra Subdivision Double-Tracked" scenarios.

Table 2-2: Total Rail Traffic Volumes

	Rail Traffic Volumes, With Alhambra Subdivision (Single-Tracked)			
	Year 2009		Year 2025	
Subdivision	Freight	Passenger	Freight	Passenger
Alhambra [1]	18	2	40	2
Alhambra [2]	18	40	40	40
Los Angeles	37	12	79	12
Alhambra/Los Angeles in Pomona	67	14	127	14

	Rail Traffic Volumes, With Alhambra Subdivision (Double-Tracked)			
	Year 2009		Year 2025	
Subdivision	Freight	Passenger	Freight	Passenger
Alhambra [1]	18	2	59	2
Alhambra [2]	18	40	59	40
Los Angeles	37	12	60	12
Alhambra/Los Angeles in Pomona	67	14	127	14

[1] All crossings in Alhambra Subdivision except crossings at Tyler Avenue, Cogswell Road and Temple Avenue.
[2] Crossings in Alhambra Subdivision: Tyler Avenue, Cogswell Road and Temple Avenue. These crossings have different rail traffic volumes than the other crossings in Alhambra Subdivision due to the presence of Metrolink traffic.
Note: 'Freight' includes freight trains and switching and maintenance activities. 'Passenger' includes both metrolink and Amtrak trains.

Based on the existing (2009) and future (2025) total rail traffic volumes summarized above, the rail traffic growth rates at the 34 crossings for the two future (2025) traffic condition scenarios were determined and are summarized in Table 2-3. As shown in this table, the projected rail traffic growth on the combined Alhambra/Los Angeles Subdivisions in Pomona would be identical whether the Alhambra Subdivision remains single-tracked or is improved to become double-tracked. The freight growth rates for the Alhambra and Los Angeles Subdivisions taken each individually are approximately the same if the Alhambra Subdivision remains single-tracked. However, the freight traffic growth rate on the Alhambra Subdivision would be more than triple compared to the growth rate on the Los Angeles Subdivision if the Alhambra Subdivision is improved to double-track in the future.

Based on the highway traffic forecast and rail traffic growth estimates described above, vehicular delay at the 34 crossing locations were calculated for the future 2025 traffic conditions using the same methodology that was used for the delay analysis of existing conditions. The 2025 vehicle delay analysis worksheets are found in Appendix F.

Table 2-3: Projected Rail Traffic Growth Rates Between Existing (2009) and Future (2025) Conditions

	Future (2025) Rail Growth Projection			
	With Alhambra Subdivision (Single-Tracked)		With Alhambra Subdivision (Double-Tracked)	
Subdivision	**Freight**	**Passenger**	**Freight**	**Passenger**
Alhambra [1]	122%	0%	228%	0%
Alhambra [2]	122%	0%	228%	0%
Los Angeles	114%	0%	62%	0%
Alhambra/Los Angeles in Pomona	90%	0%	90%	0%

[1] All crossings in Alhambra Subdivision except crossings at Tyler Avenue, Cogswell Road and Temple Avenue.
[2] Crossings in Alhambra Subdivision: Tyler Avenue, Cogswell Road and Temple Avenue.
Note: 'Freight' includes freight trains and switching and maintenance activities. 'Passenger' includes both metrolink and Amtrak trains.

2.4 DELAY METHODOLOGY

With 2008 and 2025 vehicular and train traffic data and forecasts in hand, a traffic delay-based analysis was conducted for each of the 34 grade crossings. For isolated crossing locations, the general methodology used for the delay analysis is based on Webster's model of uniform delay. This delay-based methodology was also used in the Grade Crossing Study dated January 1997 prepared for the San Gabriel Valley Council of Governments. This delay-based model is applicable for isolated grade crossing locations, but it tends to underestimate delay at grade crossings with adjacent intersections controlled by traffic signals, where the programming of those traffic signals is preempted by the grade crossing signal control system (railroad preemption). For crossings with railroad preempted traffic signals, a more enhanced methodology was used for this study. The alternative methodology takes into account traffic signal operations during preemption, including the number and duration of phase sequences after the passage of trains through the crossings.

Appendix D includes detailed discussions of these methodologies. The grade crossing delay analysis methodology used in this study is based on several factors:

Crossing gate blockage event during a single activation event includes advance warning time (before the train reaches the crossing), train passage time and lag time (the time for gates to rise after the train has departed the crossing). Frequency and duration of crossing gate blockage events were determined by video recordings conducted in September 2009 over periods of several days for each crossing. Figure 2-2 shows the total daily blockage duration in minutes observed at the 34 at-grade crossing locations.

Vehicular arrival rate is the number of vehicles arriving at the grade crossing within an identified time period. The arrival rate is based on the traffic count data collected with video recordings in September 2009 at each crossing over a 24-hour period. For the purpose of calculating delay (in vehicle-hours) at the rail crossings during a gate blockage event, the vehicular arrival rate was assumed to be the number of vehicle arrivals during the hour when the gate was down.

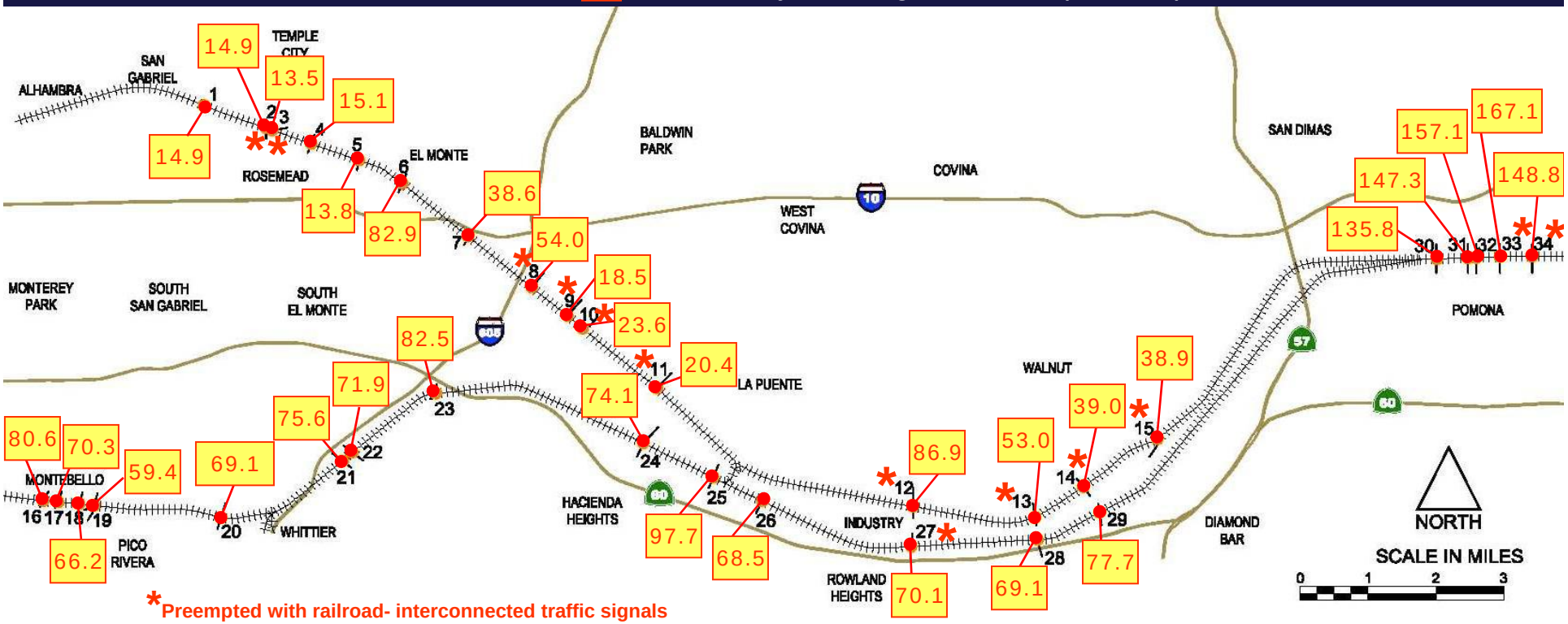
Lost time is the lag time for each motorist as they start to move after waiting in a queue. Lost time is typically about 2 seconds. Lost time was added to the total blockage event duration as it contributes to the total delay at the crossings.

Vehicular saturation flow rate is the maximum number of vehicles for a lane group to traverse the crossing immediately after a gate blockage event. This rate excludes any start-up lost time vehicles experience prior to queue dissipation after the end of a gate blockage event. Based on traffic flow observations, a saturation flow rate of 1,700 vehicles per hour per lane (vphpl) was observed at isolated crossing locations.

For grade crossings with railroad preemption of adjacent intersections, saturation flow was adjusted downward to account for the lost in capacity due to traffic signal operations. KOA personnel observed traffic signal operations during and after railroad preemption for all 13 crossings with interconnected intersections. Traffic signal controllers can be set to serve motorists who have waited the longest for a green signal, or the phase that was interrupted by railroad pre-emption. Signal phase sequencing at these locations is not necessarily always the same after each blockage event.

FIGURE 2-2
EXISTING 2009 DAILY BLOCKAGE DURATION

X Total Daily Blockage Duration (Minutes)



*Preempted with railroad- interconnected traffic signals

UPRR Alhambra Subdivision Grade Crossings

1) Walnut Grove Ave., LA County/Rosemead
2) Encinita Ave., Temple City/Rosemead
3) Lower Azusa Rd., Temple City/Rosemead
4) Temple City Blvd., El Monte/Rosemead
5) Arden Dr., El Monte
6) Tyler Ave., El Monte
7) Cogswell Rd., El Monte
8) Temple Ave., Industry/LA County
9) Vineland Ave., Industry/LA County
10) Puente Ave., Industry/LA County
11) California Ave., Industry/LA County
12) Fullerton Rd., Industry/LA County
13) Fairway Dr., Industry/Walnut
14) Lemon Ave., Industry/Walnut
15) Brea Canyon Rd., Industry/Walnut

UPRR LA Subdivision Grade Crossings

16) Vail Ave., Montebello
17) Maple Ave., Montebello
18) Greenwood Ave., Montebello
19) Montebello Blvd., Montebello
20) Durfee Ave., Pico Rivera
21) Rose Hills Rd., Industry/LA County
22) Mission Mill Rd., Industry/LA County
23) Workman Mill Rd., Industry/LA County
24) Turnbull Canyon Rd., Industry/LA County
25) Stimson Ave., Industry
26) Bixby Dr., Industry
27) Fullerton Rd., Industry
28) Fairway Dr., Industry/LA County
29) Lemon Ave., Industry/Diamond Bar

Both Subdivision Grade Crossings (Downtown Pomona)

30) Hamilton Blvd., Pomona
31) Park Ave., Pomona
32) Main St., Pomona
33) Palomares St., Pomona
34) San Antonio Ave., Pomona

The saturation flow rate for a crossing with signal preemption could not be adjusted solely based on signal phase sequence. Instead, the number and duration of signal phases was observed and used to estimate the saturation flow rate. Some of these crossings have two adjacent intersections with railroad preemption, where motorists will drive through the first before entering the crossing, and the second after leaving the crossing (upstream and downstream intersections). For these crossings the minimum of the upstream and downstream base saturation flow rates was used.

Trucks, buses and other heavy vehicles affect saturation flow rates as acceleration from stops, turns and maximum speeds are slower than automobiles, SUVs and light trucks. Saturation flow rates at the crossings were adjusted for buses and heavy vehicles using a passenger-car-equivalent (PCE) factor of 2.0, based on field observations.

Queue duration is the period starting when the gates begin to descend until the vehicles queued at a crossing dissipate after a gate blockage event.

Total vehicle delay is the total delay in vehicle-hours that is caused by the blockage event.

The Fullerton Road crossing of the Los Angeles Subdivision in the City of Industry is presented in Appendix D as an example of the adjustments made to account for preemption. Two Union Pacific Railroad tracks cross Fullerton Road, which has two lanes in each direction. This crossing represents the most complicated scenario, with a preempted signal at intersections on each side of the crossing. As a result, adjustments for both an upstream and downstream preempted signal were applied to delay calculations for each direction of motor vehicle travel.

The example of the Fullerton Road crossing is for the 20th blockage event in the northbound direction. Similar calculations were applied to the 38 other northbound blockage events that occurred that day, and for the events in the opposite (southbound) direction.

These same calculations were performed for all 34 crossings. A summary of the total daily vehicle delay at the 34 at-grade crossing locations for existing conditions is shown in Table 2-4. Table 2-5 shows the summary of the future 2025 daily vehicle delay at the 34 crossing locations for both the "With Alhambra Subdivision Single-Tracked" and "With Alhambra Subdivision Double-Tracked" scenarios.

Table 2-4: Total Daily Vehicular Delay Existing (2009) Traffic Condition

Study Location No.	Street	Subdivision Crossing	Total Delay (Veh-Hr)
1	Walnut Grove Ave	Alhambra	2.8
2	Encinita Ave *	Alhambra	1.2
3	Lower Azusa Rd *	Alhambra	2.9
4	Temple City Blvd	Alhambra	3.7
5	Arden Dr	Alhambra	1.3
6	Tyler Ave	Alhambra	18.8
7	Cogswell Rd	Alhambra	3.9
8	Temple Ave *	Alhambra	18.8
9	Vineland Ave *	Alhambra	3.9
10	Puente Ave *	Alhambra	13.0
11	California Ave *	Alhambra	6.0
12	Fullerton Rd *	Alhambra	80.5
13	Fairway Dr *	Alhambra	36.5
14	Lemon Ave *	Alhambra	12.8
15	Brea Canyon Rd *	Alhambra	9.6
16	Vail Ave	Los Angeles	10.2
17	Maple Ave	Los Angeles	4.6
18	Greenwood Ave	Los Angeles	6.7
19	Montebello Blvd	Los Angeles	20.2
20	Durfee Ave	Los Angeles	15.3
21	Rose Hills Rd	Los Angeles	11.4
22	Mission Mill Rd	Los Angeles	2.0
23	Workman Mill Rd	Los Angeles	17.8
24	Turnbull Canyon Rd	Los Angeles	17.3
25	Stimson Ave	Los Angeles	23.3
26	Bixby Dr	Los Angeles	2.6
27	Fullerton Rd *	Los Angeles	50.4
28	Fairway Dr	Los Angeles	27.6
29	Lemon Ave	Los Angeles	13.0
30	Hamilton Blvd	Alhambra/Los Angeles	17.8
31	Park Ave	Alhambra/Los Angeles	15.8
32	Main St	Alhambra/Los Angeles	4.5
33	Palomares St *	Alhambra/Los Angeles	13.8
34	San Antonio Ave *	Alhambra/Los Angeles	17.9

* Preempted by railroad interconnected to traffic signal system.

Table 2-5: Total Daily Vehicular Delay Future (2025) Traffic Condition

Study Location No.	Street	Subdivision Crossing	Total Delay (Veh-Hr)	
			Alhambra Subdivision Single-Tracked	Alhambra Subdivision Double-Tracked
1	Walnut Grove Ave	Alhambra	6.1	8.9
2	Encinita Ave *	Alhambra	2.7	4.0
3	Lower Azusa Rd *	Alhambra	6.7	9.7
4	Temple City Blvd	Alhambra	8.1	11.6
5	Arden Dr	Alhambra	3.0	4.3
6	Tyler Ave	Alhambra	30.1	47.9
7	Cogswell Rd	Alhambra	6.6	8.6
8	Temple Ave *	Alhambra	30.1	38.1
9	Vineland Ave *	Alhambra	9.1	13.4
10	Puente Ave *	Alhambra	31.5	46.3
11	California Ave *	Alhambra	14.7	21.7
12	Fullerton Rd *	Alhambra	192.3	284.2
13	Fairway Dr *	Alhambra	87.6	129.4
14	Lemon Ave *	Alhambra	30.6	45.1
15	Brea Canyon Rd *	Alhambra	22.8	33.7
16	Vail Ave	Los Angeles	19.8	15.6
17	Maple Ave	Los Angeles	10.1	7.7
18	Greenwood Ave	Los Angeles	14.4	11.0
19	Montebello Blvd	Los Angeles	43.5	33.4
20	Durfee Ave	Los Angeles	34.0	25.8
21	Rose Hills Rd	Los Angeles	26.9	20.5
22	Mission Mill Rd	Los Angeles	4.5	3.4
23	Workman Mill Rd	Los Angeles	42.2	32.0
24	Turnbull Canyon Rd	Los Angeles	38.9	29.7
25	Stimson Ave	Los Angeles	52.7	40.1
26	Bixby Dr	Los Angeles	5.7	4.4
27	Fullerton Rd *	Los Angeles	115.4	88.2
28	Fairway Dr	Los Angeles	62.5	47.8
29	Lemon Ave	Los Angeles	28.8	22.0
30	Hamilton Blvd	Alhambra/Los Angeles	36.8	36.8
31	Park Ave	Alhambra/Los Angeles	32.7	32.7
32	Main St	Alhambra/Los Angeles	8.7	8.7
33	Palomares St *	Alhambra/Los Angeles	28.7	28.7
34	San Antonio Ave *	Alhambra/Los Angeles	37.2	37.2

* Preempted by railroad interconnected to traffic signal system.

CHAPTER 3 – CPUC FORMULA

The traffic delay methodology presented above is one of several methods of evaluating railroad grade crossings as candidates for elimination by the construction of grade separation projects. Other methods attempt to quantify the benefits of eliminating train – vehicle accidents, along with the benefits of eliminating delay. One of these methods is the California Public Utilities Commission (CPUC) grade separation priority list.

Each year the California Transportation Commission allocates $15 million in state grade separation funds under Section 190 of the Streets and Highways Code. CPUC prioritizes projects through the submittal of applications by project sponsors and technical evaluation of projects by CPUC staff, culminating in evidentiary hearings on a bi-annual basis. The bi-annual proceeding, or investigation, by CPUC produces a ranking of submitted projects. Caltrans' Division of Rail administers the funds for the CTC through a second application process, under S&H Code §§ 2450 - 2499.

Since 1957, CPUC has used numeric formulae to prioritize projects. The first formula is applied to grade crossing elimination projects; a second is used to evaluate proposals to replace existing grade separations. These formulae have evolved through the years through the investigation process. Project proponents have the opportunity of suggesting changes to the formulae during the bi-annual CPUC investigations. The formulae have also been modified by statute and State Supreme Court order. Because the formulae are regularly "tested" through these public processes they have gained general acceptance as programming tools. They are occasionally used to evaluate projects that have funding sources other than S&H Code §190. In 2008 the CPUC grade crossing elimination formula was used to evaluate projects submitted for $150 million in Highway – Railroad Crossing Safety Account funds (Proposition 1B of 2006).

KOA evaluated the 34 study area grade crossings with the formula for grade crossing elimination projects used in CPUC's current investigation (I. 09-07-028). The Priority Indices and the ranking of the 34 crossings, relative to one another, are shown in Table 3-1.

A detailed explanation of the CPUC formula is contained in Appendix E.

The current CPUC investigation was to conclude with publication of a final list in June 2010. Hearings were held in April 2010 and a draft priority list was circulated for review and comment. A proposed CPUC decision was circulated in May 2010. If the 34 study area crossings had been nominated for inclusion on this draft list, Temple Avenue next to the I-605 over the Alhambra subdivision would have ranked 9th at a Priority Index of 2439 points. The third highest of the 34, Fullerton Road over the Los Angeles subdivision, at 776 points, would have ranked 24th.

Table 3-1: Priority Index Ranking Based on CPUC Formula

Study Location No.	Street	Subdivision Crossing	Priority Index Number	Priority Index Ranking
1	Walnut Grove Ave	Alhambra	41	31
2	Encinita Ave *	Alhambra	30	34
3	Lower Azusa Rd *	Alhambra	53	30
4	Temple City Blvd	Alhambra	67	28
5	Arden Dr	Alhambra	38	33
6	Tyler Ave	Alhambra	133	17
7	Cogswell Rd	Alhambra	151	15
8	Temple Ave *	Alhambra	2439	1
9	Vineland Ave *	Alhambra	91	23
10	Puente Ave *	Alhambra	965	2
11	California Ave *	Alhambra	128	18
12	Fullerton Rd *	Alhambra	302	7
13	Fairway Dr *	Alhambra	182	13
14	Lemon Ave *	Alhambra	163	14
15	Brea Canyon Rd *	Alhambra	87	24
16	Vail Ave	Los Angeles	77	26
17	Maple Ave	Los Angeles	54	29
18	Greenwood Ave	Los Angeles	69	27
19	Montebello Blvd	Los Angeles	289	8
20	Durfee Ave	Los Angeles	247	10
21	Rose Hills Rd	Los Angeles	185	12
22	Mission Mill Rd	Los Angeles	92	22
23	Workman Mill Rd	Los Angeles	87	25
24	Turnbull Canyon Rd	Los Angeles	554	5
25	Stimson Ave	Los Angeles	711	4
26	Bixby Dr	Los Angeles	39	32
27	Fullerton Rd *	Los Angeles	776	3
28	Fairway Dr	Los Angeles	230	11
29	Lemon Ave	Los Angeles	268	9
30	Hamilton Blvd	Alhambra/Los Angeles	462	6
31	Park Ave	Alhambra/Los Angeles	97	21
32	Main St	Alhambra/Los Angeles	105	20
33	Palomares St *	Alhambra/Los Angeles	134	16
34	San Antonio Ave *	Alhambra/Los Angeles	124	19

* Preempted by railroad interconnected to traffic signal system.

PART 2 - GRADE SEPARATION CONCEPT PLANS AND COST ESTIMATES METHODOLOGY AND DEVELOPMENT

This second part of the report presents the Phase II Grade Separation Concept Plans and Cost Estimates.

ACE grade separation program objectives are:

- Eliminate at-grade crossings between Union Pacific Railroad main line tracks and selected arterial streets.
- Eliminate at-grade crossings to reduce vehicular traffic congestion and improve Level of Service (LOS) within the project area.
- The risks of train – vehicle collisions are eliminated when at-grade crossings are grade separated.
- Access for emergency response vehicles across railroad main line rights-of-way are unimpeded by train movements when grade crossings are eliminated.
- Air quality is improved when vehicles no longer are required to stop and idle as trains occupy grade crossings.

This report presents the findings of a preliminary alternatives study only. Studies performed at this stage are conceptual in nature and are intended to identify key project conditions, issues and constraints. Future development of these projects would include public outreach, community involvement, determination of environmental impacts (including temporary construction impacts), additional design engineering effort and formal appraisal of full and partial property takings.

The universe of grade separation alternatives evaluated was based on the six grade separations in the adopted program remaining to be implemented and any nearby alternative locations where they existed. This generated additional project alternatives beyond the initial six locations.

Nine crossing elimination projects were studied along the Union Pacific Los Angeles Subdivision. These crossings are:

	CPUC ID No.	U.S. DOT ID No.
• Lemon Avenue	3-24.40	810885G
• Fairway Drive	3-23.40	810883N
• Rose Hills Road	3-12.30	811057R
• Turnbull Canyon Road	3-17.20	810867E
• Montebello Boulevard	3-8.50	811074G
• Greenwood Avenue	3-8.30	811075N
• Maple Avenue	3-8.00	811076V

• Durfee Avenue	3-10.3	811219R
• Fullerton Road	3-21.4	810880T

Three crossing elimination projects were studied along the Union Pacific Alhambra Subdivision. These crossings are:

	CPUC ID No.	U.S. DOT ID No.
• Puente Avenue	B-498.20	746905M
• Lemon Avenue	B-506.70	746915T
• Fairway Drive	B-505.75	746913E

As part of the Montebello Boulevard study, two options for a depressed railway, or trench, under Montebello Boulevard were studied. These are the full lowering (long trench) and partial lowering (short trench) options. Both will be presented later in this report. In addition to the Lemon Avenue and Fairway Drive underpass studies two additional alternatives for a raised railway, or flyover were considered. Option 1is an analysis of a flyover at Fairway Drive, continuing over Lemon Avenue. Option 2 consists of a flyover at Fairway Drive only.

CHAPTER 4 – LOS ANGELES SUBDIVISION LOCATIONS

As stated in the introduction, eight crossings (excluding the Montebello Boulevard crossing) were studied along the Union Pacific Railroad (UPRR), Los Angeles Subdivision: Lemon Avenue, Fairway Drive, Greenwood Avenue, Maple Avenue, Rose Hills Road, Turnbull Canyon Road, Fullerton Road, and Durfee Avenue. The discussion of Montebello Boulevard is presented in Chapter 6 of this report.

4.1 LEMON AVENUE - 3-24.40 - 810885G

INTRODUCTION

ACE investigated the feasibility of constructing a grade separation at the street – railroad grade crossing of Lemon Avenue and the Union Pacific Railroad tracks in order to reduce traffic congestion and increase safety at the crossing. Two alternatives were initially considered, an underpass and an overpass. Both were found to be feasible. The overpass option was dropped from further study after initial concept plans were reviewed by ACE staff and staff from the Cities of Industry and Diamond Bar. The underpass option requires less of a footprint, resulting in fewer impacts to adjacent private properties and the surrounding community. Pedestrian sidewalk design consistent with Federal Americans with Disabilities Act (ADA) requirements can also be achieved with the underpass option.

In general, underpasses require significantly greater design and construction effort than overpasses, generating greater civil and structural construction, utility relocation and railroad force account costs. However, where properties adjacent to the grade crossing have fully developed industrial, commercial or retail uses, the reductions in project area and associated property takings and access impacts associated with underpasses, as compared to overpasses, can result in expected overall lower costs. There are also important qualitative judgments to be made when choosing between overpasses and underpasses. Overpasses can create significant pedestrian circulation, Americans with Disabilities Act (ADA), viewline and daylight barriers. The aerial structures may also broadcast vehicular engine and tire noise over a wide area.

This preliminary finding that a grade separation project at the Lemon Avenue grade crossing be an underpass is consistent with ACE's experiences in development, design and construction of its Phase I grade separation projects in developed urban areas. Under Federal and state guidelines, further engineering design effort on eliminating the Lemon Avenue grade crossing would include a value engineering activity as part of preliminary engineering (development of 30%-level content). The value engineering requirement would apply to all Phase II locations. A routine part of the value engineering activity would be re-examination of underpass vs. overpass cost and quality-of-life trade-offs.

This report discusses the underpass option for the Lemon Avenue grade separation and addresses construction impact limits, right-of-way impacts, vertical and horizontal design parameters, constructability, construction cost, utilities, as well as other factors.

Lemon Avenue lies in the border between the Cities of Industry and Diamond Bar. This portion of Lemon Avenue is bounded by Valley Boulevard to the north and the Pomona Freeway (State Route 60) to the south. See Figure 4-1 for a vicinity map. In choosing a grade separation design, the criteria used in evolving the concepts were maintenance of roadway vehicular traffic capacity and safe travel speeds through the completed underpass, minimization of construction project limits and impacts on access into adjacent properties, mitigation of impacts on the surrounding community, avoidance of disruption to railroad operations, relocation or protection of all affected utility facilities while minimizing utility service outages, and minimization of permanent and temporary property and right-of-way takings required for the crossing elimination.

Figure 4-1: Lemon Avenue Vicinity Map (Los Angeles Subdivision)

DESIGN PARAMETERS

The horizontal and vertical roadway alignment standards used in the design consisted of the Caltrans Highway Design Manual, AASHTO policy of Geometric Design of Highways and Streets, and the BNSF/UPRR Design Guidelines for Railroad Grade Separations. The following includes the specific guidelines that were used in the design of these alternatives:

- Design Speeds

Lemon Avenue	V = 40 mph
Lycoming Avenue	V = 35 mph
Walnut Drive	V = 35 mph
Currier Road	V = 35 mph
Glenwick Avenue	V = 35 mph

- Horizontal Alignment

Transition & Curves	Caltrans minimum requirement for design speed without super-elevation

- Vertical Alignment

Crest Curves	AASHTO stopping sight distance
Sag Curves	AASHTO comfortable speed for well-lit roadways
Max Grade	5% max to accommodate ADA Standards

- Vertical Clearance

Roadway	16'-6"
Rail (Permanent)	24'
Rail (Temporary)	21'-6"

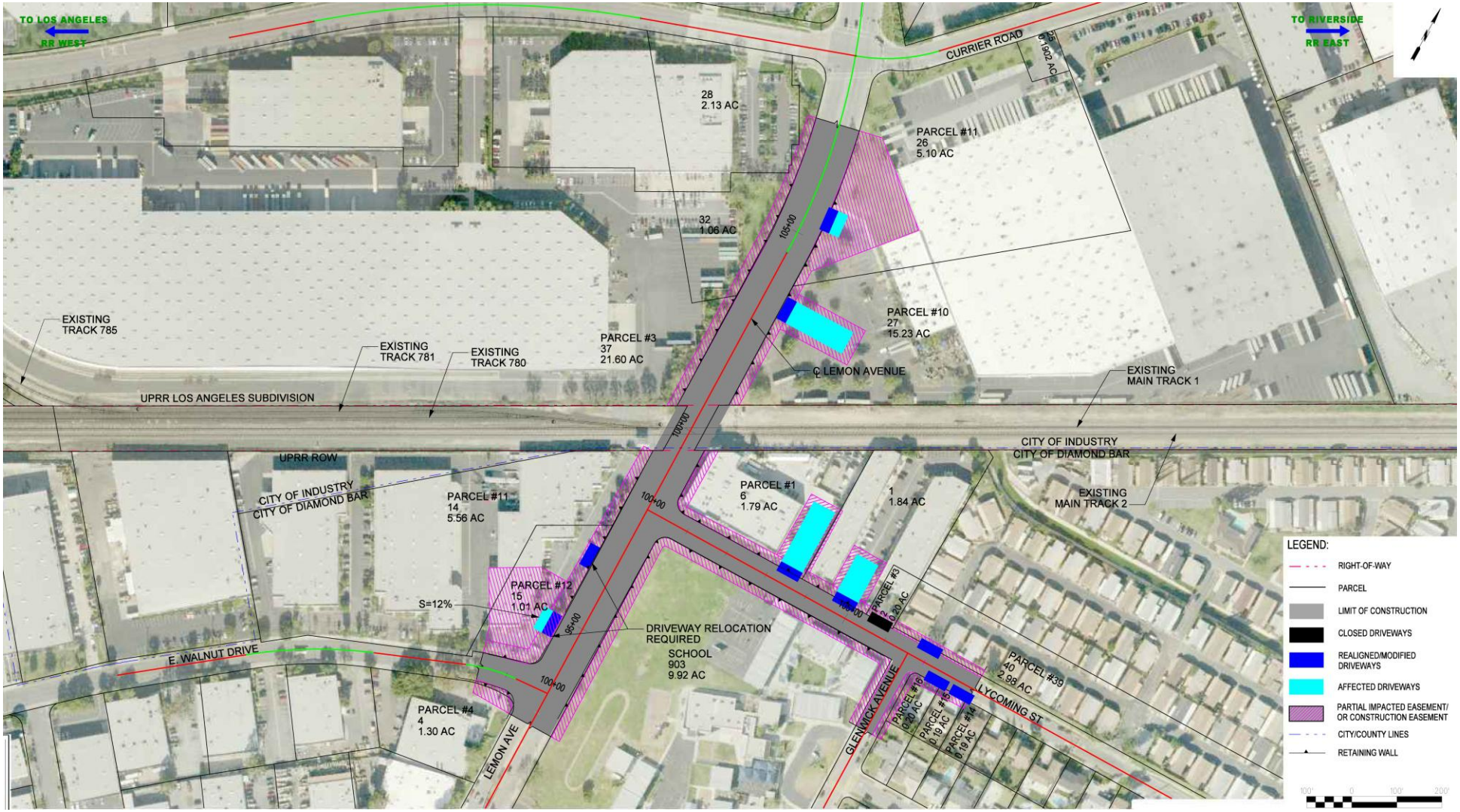
- Cross-Section

Lemon Avenue	84' curb-to-curb minimum, minimum 8' sidewalk, two lanes each direction

- Truck Size — Caltrans 2005 (US) — CA LEGAL-65

UNDERPASS ALTERNATIVE

This alternative proposes to construct an underpass structure under the UPRR tracks generally along the original alignment of Lemon Avenue. The concept plan is presented in Figure 4-2 and the remaining plans are presented in Appendix G. The existing at-grade crossing would be eliminated. The underpass would have a four lane configuration with final vertical clearance of the underpass structure conforming to the UPRR/BNSF jointly developed "Guidelines for Railroad Grade Separation Projects." The minimum vertical clearance from the finished roadway surface up to the bridge superstructure soffit (bottom surface of the bridge) for the proposed type of structure would be 16'-6".



Source: JL Patterson & Associates, Inc.

HORIZONTAL LAYOUT

The proposed centerline layout of Lemon Avenue remains consistent with the existing centerline location. The overall curb face to curb face width on Lemon Avenue will match the existing 84' width and the number of lanes will remain intact. The affected roadways of Lycoming Street and E. Walnut Drive will match their existing centerline alignments and cross section dimensions.

PROFILE

The proposed underpass is being lowered under the UPRR tracks. The vertical curves are based on the minimum requirements by Caltrans vertical curve design parameters.

CROSS-SECTION

The existing Lemon Avenue cross section spans 84' from curb face to curb face. The street is striped as a four lane divided roadway with a 14' median. The underpass cross section is proposed to match the existing curb face to curb face dimensions, with 8' sidewalks being provided on either side of the street.

Lycoming Street is a two lane roadway with a curb face to curb face cross section of 40'. There is a 10' sidewalk on the northerly side and a 6' non-curb adjacent sidewalk on the southerly side.

East Walnut Drive is a four lane roadway with curb face to curb face dimensions of 48'. There is intermittent 8' sidewalk on the north side of the street, while the south side of the street has 8' sidewalk.

BRIDGE TYPE

The bridge type needs to the studied in more detail at an advanced design phase of the project. However, it is assumed a 2-span structure alternative, with a center pier located in a raised median, would be selected for a Lemon Avenue underpass of the Los Angeles Subdivision. A steel deck girder bridge superstructure is the first choice of the Union Pacific Railroad under their guidelines. However, pre-cast pre-stressed concrete girders may also be used and these have been built by ACE in its Phase I program, with UPRR's permission, when the angle of intersection between the street and railroad is close to perpendicular (90 degrees between railroad track and street centerline). A 2-span concrete deck girder bridge with a center pier bent within the median of Lemon Avenue is assumed for this project and its cost estimate.

Shoring would be required around the construction area when constructing the bridge. Retaining walls would be required for the roadway depression. A soldier pile lagging wall system may be used to reduce the excavation needs, thus minimizing the impacts to the surrounding properties.

DRAINAGE

Surface runoff from the underpass would be collected at the low point below the structure. The storm runoff can be handled by a pump system. The runoff will be discharged unto the existing storm drain system on Lemon Avenue. This system will be designed to adhere to LA County Flood Control District standards and requirements.

RAILROAD SHOOFLY

Because the proposed grade separation would be an underpass, and because of the need for not disrupting railroad operations, two temporary "shoofly", or detour, tracks are required to keep the railroad in full operation. The existing Los Angeles Division is double track and Union Pacific would require that the project provide a double track shoofly. The geometry of these two tracks would have to provide curves and transitions for existing passenger and freight train speeds (timetable speeds). The railroad right-of-way is wide enough to accommodate a double track shoofly as it is shown on the exhibit in Appendix G. The shoofly tracks have been preliminarily designed, for this concept level report, to accommodate speeds of 65 miles per hour for freight operations and 70 miles per hour for passenger trains.

UTILITIES

A preliminary investigation of the utilities along Lemon Avenue has been completed. Based upon this research, several facilities were identified as potential impacts:

- Water line (14" ACP, 21" SMLC, Walnut Valley Water District)
- Storm drain (72" RCP, 7' X 4' RCB)
- Sanitary sewer (36" RCP, 33" RCP Trunk sewer, 12" VCP sewer)
- UG power line (Southern California Edison)
- Gas line (2" Southern California Gas)
- Overhead transmission power line (Southern California Edison)
- UG telephone (Verizon)
- Communication fiber optic line (Verizon/MCI)

These utility lines will have to be relocated in order to accommodate the underpass option.

RIGHT-OF-WAY

The right-of-way impacts from an underpass option are typical for this type of grade separation. For this report, significant effort was made to minimize the partial/total impacts to driveways and properties. In many instances, if a driveway could be saved at the existing location by altering the vertical profile of the roadway/access, then a partial impact was called on the exhibits. The final configuration of these driveways would be similar to those on other locations along the corridor like the picture shown below from Nogales Avenue (Alhambra) Grade Separation.

NORTHEAST QUADRANT

The properties located on the northeast quadrant of the intersection of Lemon Avenue and the UPRR tracks consist of a commercial warehouse building, currently unoccupied, with access through Lemon Avenue. The southerly driveway (closest to the tracks) that accesses the property, (shown on the exhibits as Parcel #10-27) will be affected by the grade separation due to the differences in elevation, but could possibly remain open. However, entrance to the property can be modified through the northerly driveway and therefore only a partial impact is anticipated at this quadrant.

NORTHWEST QUADRANT

The properties located on the northwest quadrant are commercial warehouses that are all accessed through Currier Road; therefore, the proposed underpass should not have any impact to these properties other than easements for retaining walls.

SOUTHWEST QUADRANT

The southwest quadrant is the Walnut Park Business Center. There is one existing driveway along Lemon Avenue which will require closure due to grade differences. The driveway closure will affect access to the buildings' parking lot. Instead of the closure, a driveway relocation is possible in order to maintain access from Lemon Avenue. This can be achieved by shifting the driveway south closer to the intersection at E. Walnut Drive. However, if accessibility can be negotiated through E. Walnut Drive, then a full property take may not be necessary and only partial impacts to the properties due to the required retaining walls will be needed.

SOUTHEAST QUADRANT

The southeast quadrant consists of 8 affected parcels spanning the Lemon Avenue frontage, as well as along Lycoming Street and Glenwick Avenue. The properties directly southeast of the Lemon Avenue/UPRR tracks crossing have two points of entry, which are from Lycoming Street. Due to the grade difference at the driveways and the existing site layout, driveway modifications for the Lycoming Industrial Park (Parcel #1-6) will be unavoidable but a full take may not be required. However, if access to the other two affected parcels can be provided through the driveway closest to the intersection of

Glenwick Avenue and Lycoming, then again, a full take may be not required. In addition, the driveway into the Mobile Estates along the north side of Lycoming Avenue will require modification as well as two residential driveways on the south side.

There is an existing public elementary school, Walnut Elementary School, east of Lemon Avenue and south of Lycoming Street. There are no driveways within the undercrossing impacts and only easements for retaining walls will be needed.

In summary, the right-of-way impacts of the Lemon Avenue (Los Angeles Subdivision) underpass are:

- Northeast Quadrant – 2 partially affected parcels
- Northwest Quadrant – 3 partially affected parcels
- Southwest Quadrant – 3 partially affected parcels
- Southeast Quadrant – 8 partially affected parcels

Total affected parcels = 16. The partially affected parcels include one school and one residential parcel, with the remainder being commercial lots.

WORK AREA TRAFFIC CONTROL & DETOUR(S) DURING CONSTRUCTION:

The construction of the underpass structure retaining walls, excavation, and shoofly within the 100 feet of right-of-way may be expedited by the closure of the crossing during the construction. Alternative routes are available through Brea Canyon Road to the East, and Fairway Drive to the West of the Lemon Avenue at-grade crossing. A small conceptual traffic detour plan is presented in Appendix G.

A Summary of the project cost estimate (rough order of magnitude) is shown below. The detailed cost estimate is found in Appendix G.

CONCEPTUAL ESTIMATE (Rough Order of Magnitude) – LEMON AVENUE – LOS ANGELES SUBDIVISION

Grade Separation Type: Underpass

Summary of Project Cost Estimate:

Roadway	$7,083,253
Track	$ 4,453,800
Structures	$15,192,060
Right-of-Way Notes 3, 4, & 5	$23,436,126
Utilities Notes 1 & 2	$ 1,870,000
Project Costs including: Geotechnical Investigation, Surveying, Engineering, Flagging, Construction Management, Agency, and Program Management Costs Notes 6 & 7	$16,015,440
Contingency 30%	$13,384,462
TOTAL PROJECT COST	$81,435,000

Notes:

1. Utility relocation cost estimates assume all affected utilities (sewer and storm drain) can be relocated by gravity flow systems similar to the existing systems.
2. Cost for drainage item includes construction of one storm drain pump station at the project area.
3. Right of Way cost estimates are based on $100/SF which covers the land and building allowance for full takes or areas affected by part takes.
4. Right of Way costs do not include any associated relocation costs or severance damages to the business operators.
5. Right of Way costs include a 26% allowance for acquisition costs. (appraisals, negotiation, labor, legal, closing cost, etc.)
6. Agency Costs include Agency Project Management direct labor and Agency indirect costs.
7. Program Management costs include third party project support costs such as community outreach, environmental management, DBE and labor compliance, and property survey.
8. This estimate is prepared using construction cost information based on current dollar cost as of 2011.

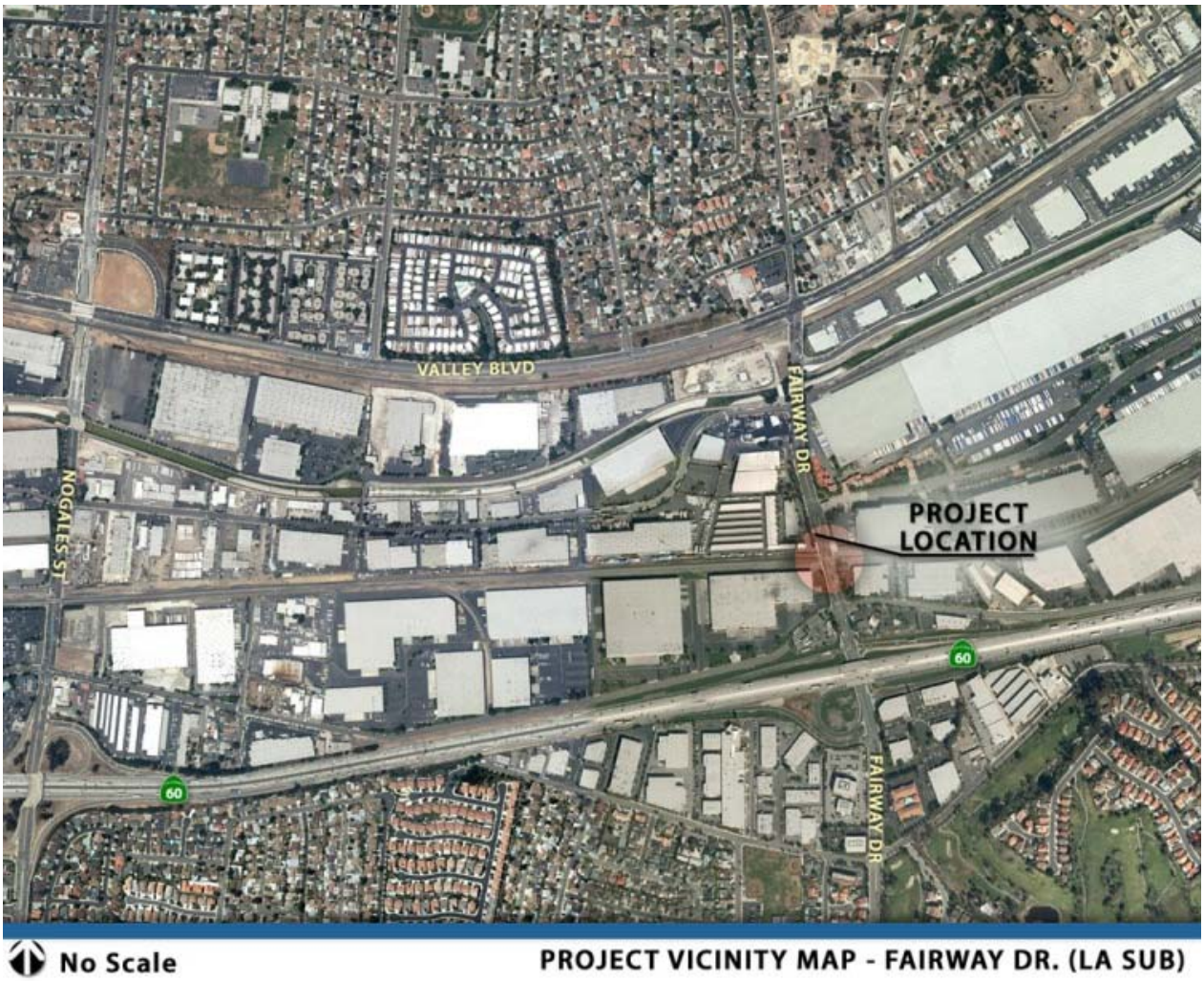
4.2 FAIRWAY DRIVE- 3-23.40 - 810883N

INTRODUCTION:

The Fairway Drive grade crossing of UPRR's Los Angeles Subdivision main line is bounded by the Pomona Freeway (State Route 60) and the surrounding streets of E. Walnut Drive, Business Parkway, San Jose Avenue and Harrison Avenue (See Figure 4-3). Fairway Drive is a primary arterial street, and this grade crossing is located in the unincorporated portion of Los Angeles County. Harrison Avenue, San Jose Avenue, Business Parkway and E. Walnut Drive are all residential streets that intersect Fairway Drive. As discussed above for Lemon Avenue, two alternatives, an underpass and an overpass, were also initially considered for Fairway Drive. Because an underpass was found to be feasible, the overpass option was disregarded early in the process. An overpass of Fairway Drive at this location would have property and community impacts similar to those discussed previously for Lemon Avenue. Additionally, the Fairway Drive grade crossing is located close enough to the Pomona Freeway that an overpass would require reconfiguration or temporary alteration of the freeway bridge and access ramps. This report discusses the underpass option for the grade separation and addresses construction impact limits, right-of-way impacts, vertical and horizontal design parameters, constructability, construction cost, utilities, as well as other factors.

During the development of this report, staff for the Cities of Industry and Diamond Bar called attention to observations of congested traffic and long queues of motor vehicles at the Fairway Drive grade crossing during weekday afternoon peak hours of operation, between 4 – 6 pm. A follow-up on-site meeting was requested by the City of Industry and UPRR. This meeting was held on the afternoon of February 16th, 2010, and included representatives for the railroad, the City of Industry, LACDPW, ACE and the California Public Utilities Commission. Queuing over the crossing in both directions back from Fairway Drive's adjacent intersections with E. Walnut Drive and Business Parkway was observed. Several mitigation measures were discussed by the diagnostic team. UPRR agreed to ask the railroad signal department for a cost estimate to provide additional advance warning time from the grade crossing warning signal system. Additional warning time would facilitate implementation of the several mitigation measures discussed, including advance railroad preemption of the adjacent traffic signals at both intersections and installation of queue-cutter signals or pre-signals at the crossing. A similar warning time enhancement was jointly developed by the UPRR, City of Industry and LACDPW during the 1990's at the Fullerton Road grade crossing over the Los Angeles Subdivision, a location with similarities to the Fairway Drive crossing. The Fullerton Road project is generally believed to have successfully reduced queuing over the grade crossing.

Figure 4-3: Fairway Drive Vicinity Map (Los Angeles Subdivision)



In the development of a cost estimate for a Fairway Drive underpass, the additional railroad grade crossing signal warning time and some selection of the other mitigation measures discussed at the February 16th meeting would be a significant expense ($500,000 - $1M). As noted by the City of Industry at the meeting, any early programming of an underpass project at this location might obviate the need to do the grade crossing improvement. In that sense the cost of the grade crossing improvement might be described as an avoidable cost. Decision makers may choose to consider this when evaluating Fairway Drive – Los Angeles Subdivision within ACE's Phase II program.

DESIGN PARAMETERS

The horizontal and vertical roadway alignment standards used in the design consisted of the Caltrans Highway Design Manual, AASHTO policy of Geometric Design of Highways and Streets, and the

BNSF/UPRR Design Guidelines for Railroad Grade Separations. The following includes the specific guidelines that were used in the design of these alternatives:

- Design Speeds

Fairway Drive	V = 40 mph
Walnut Drive	V = 35 mph
Business Parkway	V = 35 mph

- Vertical Alignment

Crest Curves	AASHTO stopping sight distance
Sag Curves	AASHTO comfortable speed for well-lit roadways
Max Grade	5% max to accommodate ADA Standards

- Horizontal Alignment

Transition & Curves	AASHTO minimum requirement for design speed Without super-elevation

- Vertical Clearance

Roadway	16'-6"
Rail (Permanent)	24'
Rail (Temporary)	21'-6"

UNDERPASS ALTERNATIVE

This alternative proposes to construct an underpass structure under the UPRR tracks, generally along the original alignment of Fairway Drive. The existing at-grade crossing would be eliminated. The underpass would have a four lane configuration with final vertical clearance of the underpass structure conforming to the UPRR/BNSF jointly developed "Guidelines for Railroad Grade Separation Projects." The vertical clearance for the proposed type of structure would be 16'-6". The concept plan is presented in Figure 4-4 and the remaining plans are presented in Appendix H.

HORIZONTAL LAYOUT

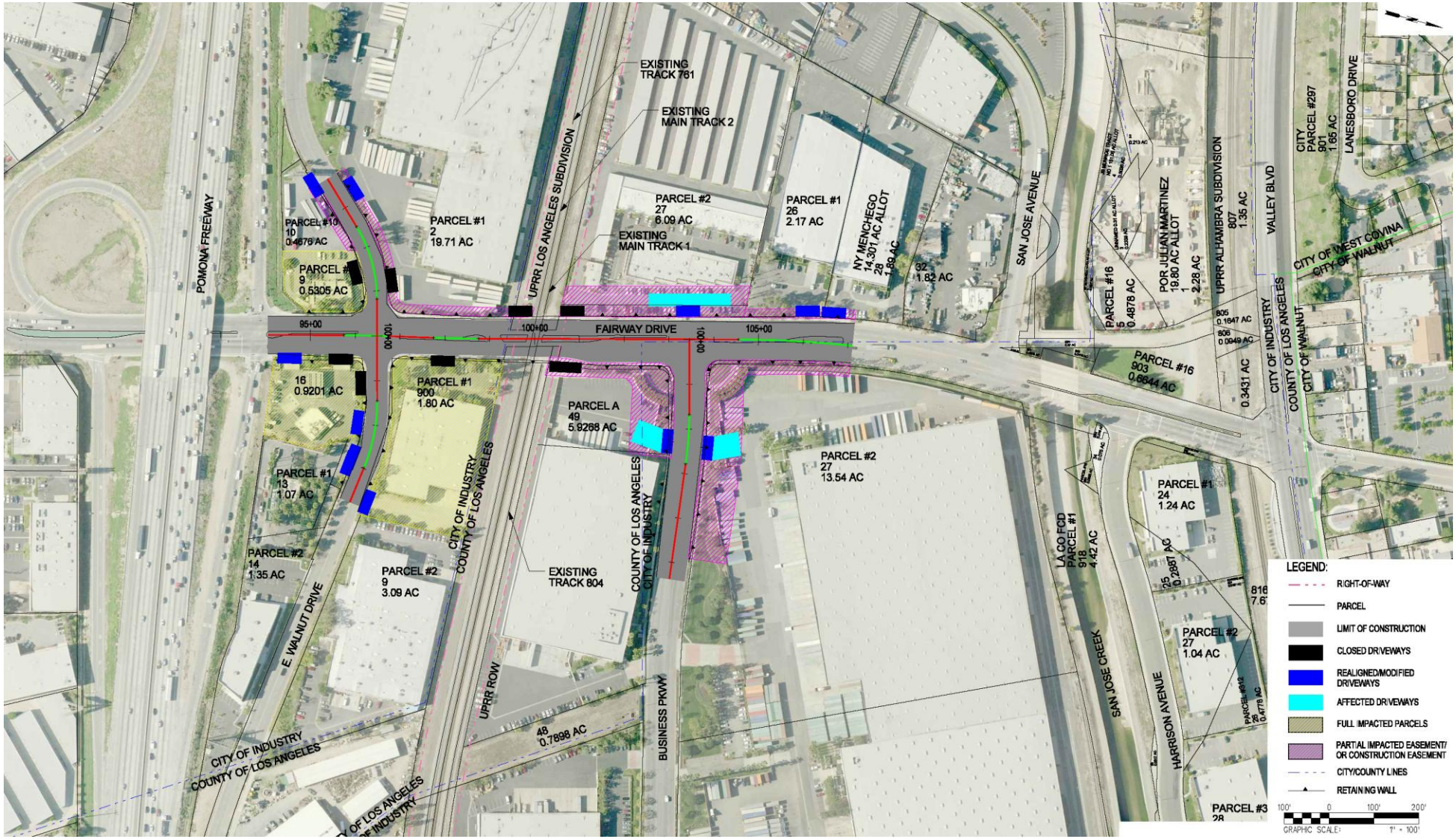
The proposed centerline layout of Fairway Drive remains consistent with the existing centerline location. The overall curb face to curb face width on Fairway Drive will match the existing width and the number of lanes will remain intact. The affected roadways of E. Walnut Drive and Business Parkway will match their existing centerline alignments and cross section dimensions.

PROFILE

The proposed underpass is being lowered under the UPRR tracks. The vertical curves are based on the minimum requirements by Caltrans vertical curve design parameters.

CROSS-SECTION

The existing Fairway Drive cross section spans 87' from curb face to curb face. The street is striped as a four lane divided roadway with a 14' median. The underpass cross section is proposed to match the existing curb face to curb face dimensions, with 6'-6" sidewalks being provided on either side of the street.



Source: JL Patterson & Associates, Inc.

East Walnut Drive is a four lane roadway with a curb face to curb face cross section of 48'. There is a 6' sidewalk on the southerly side and no sidewalk nor curb on the northerly side.

Business Parkway is a four lane roadway with curb face to curb face dimensions of 65'. There is intermittent 5' sidewalk on the north and south sides of the street.

BRIDGE TYPE

The bridge type needs to the studied in more detail at an advanced design phase of the project. However, it is assumed a 2-span structure alternative, with a center pier located in a raised median, would be selected for a Fairway Drive underpass of the Los Angeles Subdivision. A steel deck girder bridge superstructure is the first choice of the Union Pacific Railroad under their guidelines. However, pre-cast pre-stressed concrete box girders may also be used and these have been built by ACE in its Phase I program, with UPRR's permission, when the angle of intersection between the street and railroad is close to perpendicular (90 degrees between railroad track and street centerline). A 2-span concrete deck girder bridge with a center pier bent within the median of Fairway Drive is assumed for this project and its cost estimate.

Shoring would be required around the construction area when constructing the bridge. Retaining walls would be required for the roadway depression.

DRAINAGE

Surface runoff from the underpass would be collected at the low point below the structure. The storm runoff can be handled by a pump system. The runoff will be discharged unto the existing storm drain system on Fairway Drive. This system will be designed to adhere to LA County Flood Control District standards and requirements.

RAILROAD SHOOFLY

In order to maintain railroad operations during the construction of the underpass grade separation, the construction of a temporary shoofly track is warranted. The existing UPRR - Los Angeles Subdivision consists of two mainline tracks and the railroad would require ACE to build a double track shoofly. The railroad right-of-way is wide enough to accommodate a double track shoofly as it is shown on the exhibit in Appendix H. The shoofly tracks have been preliminarily designed, for this concept level report, to accommodate timetable speeds both freight and passenger operations (65mph passenger; 55mph freight).

UTILITIES

A preliminary investigation of the utilities along Fairway Drive has been completed. Based upon this research, several facilities were identified as potential impacts:

- Water line (16" ACP, 20" SMLC-Reclaimed, Walnut Valley Water District)
- Storm drain (10 x 12 RCB, 63" RCP, 57" RCP)
- Sanitary sewer (18" VCP sewer)

- UG power line (Southern California Edison)
- Gas line
- UG telephone (Verizon)
- Communication fiber optic line (Verizon/MCI)

These utility lines will have to be relocated in order to accommodate the underpass option.

RIGHT-OF-WAY

The right-of-way impacts from an underpass option are typical for this type of grade separation and in the case of Fairway Drive, they consist of the following:

NORTHEAST QUADRANT

The property located on the northeast quadrant of the intersection of Fairway Drive and the UPRR tracks consists of commercial properties that are part of Fairway Business Park (Parcel A-49) and comprises an area of about 5.9 acres that would be affected by the grade separation. The access to the property from Business Parkway would be ramped to avoid taking the property in full. Again, this concept has precedence in the corridor as shown on the Nogales Grade Separation photograph presented in the discussion of Lemon Avenue Underpass.

NORTHWEST QUADRANT

The property located on the northwest quadrant houses a Public Storage business and it is labeled as Parcel #2-27. It comprises a surface area of 6.09 acres that would be affected by the grade separation. Since the only access is from Fairway Drive, the ramping of their driveway will be required. However, if access to this parcel can be negotiated from San Jose Avenue, then only a partial impact will be accounted for.

SOUTHEAST QUADRANT

The southeast quadrant would affect two parcels north and south of E. Walnut Drive: Parcel #1-900 consisting of 1.8 acres and currently has an unoccupied building, and Parcel #16 which is an ARCO gas station with an AM/PM market consisting of 0.92 acres. Parcel #1 is bounded by the UPRR railroad tracks on the north and would require a full take since its only access is through Fairway Drive. It might be possible to access both the gas station and the market by modifying the driveways along Walnut Avenue, thereby avoiding a full take.

SOUTHWEST QUADRANT

The southwest quadrant would affect one parcel north of E. Walnut Drive and two parcels south of E. Walnut Drive. They are: a 200,000 SF building currently listed as available for lease and it is labeled in the exhibits as Parcel #1-2 consisting of 19.71 acres; this parcel is only partially affected and a full take would not be required by the grade separation. Instead, an easement for the retaining walls may be all that is needed. However, Parcels #9 and #10, which are occupied currently by Carl's Jr on the south side of E. Walnut Drive, would be affected by the grade separation. If access through the Carl's Jr

restaurant can be negotiated through E. Walnut Drive, then a full take may not be needed. However, the current parking lot and entrance configuration will need to be modified.

In summary, the right-of-way impacts of Fairway Drive (Los Angeles Subdivision) underpass are:

- Northeast Quadrant – 1 affected parcel (5.9 acres)
- Northwest Quadrant- 1 affected parcel (6.09 acres)
- Southeast Quadrant – 2 affected parcels (2.72 acres)
- Southwest Quadrant – 3 affected parcels (20.7 acres)

Total affected parcels = 7

WORK AREA TRAFFIC CONTROL & DETOUR(S) DURING CONSTRUCTION:

The construction of the underpass structure retaining walls, excavation, and shoofly within the 100 feet of right-of-way may be expedited by the closure of the crossing during the construction. Alternative routes are available through Lemon Avenue to the East, and Nogales Street to the West of the Fairway Drive at-grade crossing.

A Summary of the project cost estimate (rough order of magnitude) is shown below. The detailed cost estimate is found in Appendix H.

CONCEPTUAL ESTIMATE (Order of Magnitude) – FAIRWAY DRIVE – LOS ANGELES SUBDIVISION

Grade Separation Type: Underpass

Summary of Project Cost Estimate:

Roadway	$ 12,366,043
Track	$ 4,244,410
Structures	$ 14,455,610
Right-of-Way Notes 3, 4, & 5	$ 32,656,932
Utilities Notes 1 & 2	$ 2,180,000
Project Costs including: Geotechnical Investigation, Surveying, Engineering, Flagging, Construction Management, Agency, and Program Management Costs Notes 6 & 7	$ 18,617,760
Contingency 30%	$ 15,559,220
TOTAL PROJECT COST	$100,080,000

Notes:

1. Utility relocation cost estimates assume all affected utilities (sewer and storm drain) can be relocated by gravity flow systems similar to the existing systems.
2. Cost for drainage item includes construction of one storm drain pump station at the project area.
3. Right of Way cost estimates are based on $100/SF which covers the land and building allowance for full takes or areas affected by part takes.
4. Right of Way costs do not include any associated relocation costs or severance damages to the business operators.
5. Right of Way costs include a 26% allowance for acquisition costs. (appraisals, negotiation, labor, legal, closing cost, etc.)
6. Agency Costs include Agency Project Management direct labor and Agency indirect costs.
7. Program Management costs include third party project support costs such as community outreach, environmental management, DBE and labor compliance, and property survey.
8. This estimate is prepared using construction cost information based on current dollar cost as of 2011.

4.3 ROSE HILLS ROAD 3-12.30- 811057R

INTRODUCTION

Rose Hills Road is located within the City of Industry. It is a primary arterial street that connects on- and off-ramps of the I-605 freeway to Workman Mill Road. Workman Mill Road provides motorists southbound access to Whittier and northbound access to Rio Hondo College, the City of Industry and South El Monte. Rose Hills Road also provides access to two driveways into Rose Hills Memorial Park, portions of which are located east of the grade crossing, both north and south of the road. A local street, Capitol Avenue, parallels the railroad to the west and connects East Mission Mill Road to Rose Hills Road. See Figure 4-5 for a vicinity map.

Figure 4-5: Rose Hills Road Vicinity Map

The UPRR tracks are approximately 200' from the I-605 on- and off-ramps. Rose Hills Road is currently striped to accommodate four lanes of traffic, two lanes in each direction with raised medians near the crossing. The conceptual design assumption was that a grade separation would maintain the same lane configuration as well as preserving the Capitol Avenue intersection.

As was done for other Phase II locations, both an underpass and overpass alternative were initially considered during the development of this report. Rose Hills Road has been identified within ACE's Phase II program as an overpass. The presence of a drainage channel closely adjacent and parallel to the railroad has been generally considered to be a significant impediment to designing a feasible underpass alternative. The lesser density and types of uses of adjacent property also weighs in favor of an overpass alternative. The overpass vs. underpass decision was re-reviewed with ACE and City of Industry staff and the direction given to KOA confirms the earlier determination that an overpass project has advantages at this location. Any further engineering design effort on a Rose Hills Road grade separation will include a value engineering exercise in the preliminary stage. The value engineering exercise should include a review of this finding.

The surviving overpass alternative proposes to raise Rose Hills Road over the Union Pacific Railroad (UPRR) tracks. The overpass option considers Capitol Avenue as a full closure; a cul-de-sac will be placed at the intersection to maintain access to adjacent businesses. The Cemetery driveways along Rose Hills Road will also be raised to meet grade. In addition to raising the driveways to meet grade, retaining walls will need to be constructed. In the overpass alternative, businesses will only have minor impacts along Rose Hills Road and therefore no full takes are expected. There are no residences along this area of work, only businesses and Rose Hills Memorial Park. The driveways heading into Memorial Park would be affected but the cemetery itself would not have to be disturbed.

This report will discuss the overpass alternative in detail as it will have impacts and issues in safety, construction costs, feasibilities, right-of-way impacts and impacts of the surrounding businesses. The alternative will discuss the horizontal layout, profile, traffic, structures, rail, right-of-way and construction staging. Utilities and drainage will be analyzed and discussed in subsequent sections following the alternative analysis section. The concept plan is presented in Figure 4-6 and the remaining plans are presented in Appendix I.

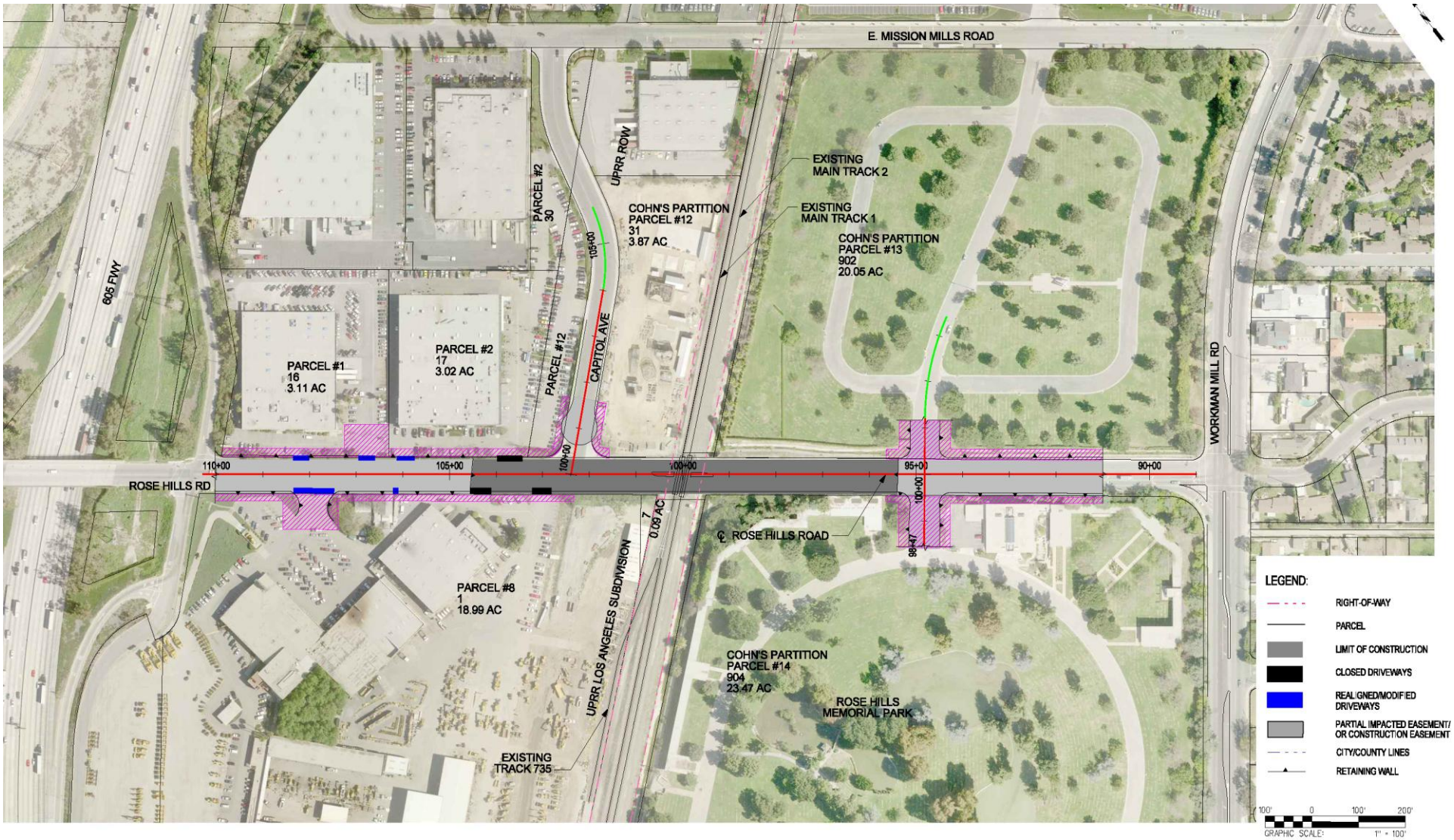
DESIGN PARAMETERS

HORIZONTAL ALIGNMENT

The recommended horizontal alignment of the grade separation is the existing centerline of Rose Hills Road. Capitol Avenue will also remain on its existing centerline. No changes in the alignment are required. Sidewalks curb and gutters will be designed to match the existing street section.

PROFILE

In this overpass option, Rose Hills Road is being raised above the UPRR tracks. The minimum vertical clearance for the bridge is 24' above rail. Vertical curves were designed based on AASHTO vertical curve guidelines and requirements in Caltrans' *Highway Design Manual*.



Source: JL Patterson & Associates, Inc.

East of the railroad, Caltrans and AASHTO vertical curve guidelines allow a maximum grade of 7% with transition curves into and out of this grade. With the assumed 24-foot maximum clearance above the railroad, the elevated roadway approach drops to existing ground level approximately 250' west of the intersection of Rose Hills Road and Workman Mill Road. West of the railroad, a maximum design gradient of 7% with transition curves meets the existing roadway surface just east of the intersection of Shepherd Street and the on-ramp for northbound I-605 Freeway, just east of the freeway itself.

Americans with Disabilities Act (ADA) requirements prescribe maximum slopes for sidewalks for new roadway construction. These maximums are 5%. There are other requirements for sidewalk widths and lengths of sloped sidewalks before level sections (no slopes) must be provided. Overpass designs which include sidewalks along the sides of overpass roadways force a reduction in maximum roadway slope down to the 5%. Because the railroad overhead clearance cannot be reduced, this requires extending the overpass approaches. For a Rose Hills Road Overpass, extending the overpass approaches to provide ADA-complaint sidewalks would impact both the intersections of Rose Hills Road with Workman Mill Road and Shepherd Street/I-605 northbound on-ramp. Both intersections would have to be raised, and the bridge over the freeway modified.

Alternatives to building an ADA pedestrian-compliant roadway overpass would be to build a separate pedestrian overpass in the vicinity, with elevators or circular/switchback ramps for its approaches; building an at-grade pedestrian grade crossing with flashing lights, signals and gates next to the roadway overpass, or designating the adjacent existing Mission Mill Road grade crossing as the ADA pedestrian alternative crossing for Rose Hills Road. Determining the suitability of this last alternative would require an investigation into ADA rules and recommended practices, and perhaps a pedestrian trip origins and destinations study, to determine whether the Mission Mill Road alternative is acceptable under state and Federal guidelines. Analyses of these alternatives are beyond the scope of this present study.

Capitol Avenue will be closed at the intersection of Rose Hills Road, in order to maintain access and reduce impacts to adjacent properties.

Driveways on Rose Hills Road connecting to the Memorial Park present a different challenge in the design. One of the major problems of the Memorial Park driveway, south of Rose Hills Road, is the lack of space to tie into existing with a 5% grade. The Memorial Park driveway would have to be raised for a distance of 200 feet. The driveway on the north side of Rose Hills Road connecting to Memorial Park could be built to meet ADA standards without an encroachment into the cemetery area.

CROSS-SECTION

The existing cross section on Rose Hills Road consists of a 61-foot curb to curb width and 6-foot sidewalks. The existing striping consists of two lanes in each direction with a 10-foot striped median and it does not include striping for a bike lane. The proposed overpass cross section will match existing cross section conditions. There will be no median required for the proposed overpass.

The Capitol Avenue existing cross section consists of a 48-foot curb to curb width and 5-foot sidewalks. The existing striping has one lane in each direction. Capital Avenue will be closed with a cul-de-sac.

The driveways for Memorial Park will maintain their existing alignments. Each driveway is 51 feet curb to curb and each has an entrance and an exit. They consist of 21-foot lanes, one in each direction, along with a 4-foot landscaped median. The driveways contain curb along with a 2-foot gutter.

BRIDGE TYPE

A 9-span structure alternative would work well at this location. The preliminary bridge type selection is a post-tensioned box girder bridge. The vertical clearance to accommodate the railroad double stack intermodal trains would be 24' and the use of MSE walls is recommended.

UTILITIES

A preliminary investigation of the utilities along Rose Hills Road has been completed. Based upon this research, several facilities were identified as potential impacts:

- Water line
- Sanitary sewer (10" VCP sewer)
- UG power line (Southern California Edison)
- Gas line (4" Southern California Gas)

These utility lines will have to be relocated or protected in place in order to accommodate the overpass option

RIGHT-OF-WAY

The majority of the impact sustained throughout the project will be in the northwest quadrant of Rose Hills Road. Commercial parcels will be affected, but only partially, since driveways can be modified to give access to the businesses with no major impacts. However, easements will be needed for walls. In this particular area of the project, the street right-of-way is approximately 70'.

Parcels 1 and 2 (Los Angeles County Carpentry), located on the northwest quadrant of Rose Hills Road, and Parcel 8 (Quinn Rental Services), located in the southwest quadrant, are the most affected in this proposal. Parcels 13 and 14 have minimal impact.

SOUTHWEST QUADRANT

Parcel 8 (Quinn Rental Services), located on the southwest quadrant of Rose Hills Road and the UPRR tracks, is a large CAT facility that contains a few large buildings and a lot for all the machinery and tractors. Two driveways will be closed on the southwest quadrant because of the grade difference of the grade separation on Rose Hills Road. Although two driveways are being closed in this quadrant, the driveways closest to the I-605 Freeway will remain open to permit access to the facility's parking lot. In

addition to that driveway being open, there are two other driveways open along Shepherd Street that provide access to the whole CAT facility.

NORTHWEST QUADRANT

Parcels 1 and 2 (Los Angeles County Carpentry) are in the northwest quadrant of Rose Hills Road, and the UPRR tracks, and consist of commercial buildings along with parking. In this quadrant, two driveways will be closed due to the grade difference on Rose Hills Road. Two existing driveways on Rose Hills Road will be used to enter and exit these parcels. Another two existing driveways on the north side of this quadrant along Mission Mill Road will also be used to enter and exit these business properties. Parcel 12 is also part of this quadrant. It consists of a commercial building and a few storage shacks. Access to this parcel can be modified to a location closer to Mission Mill Road so that only a partial impact will be required.

SOUTHEAST QUADRANT

Parcel 14 (Cohn's Partition) is located in the southeast quadrant of Rose Hills Road, and the UPRR tracks, and consists of Memorial Park property. Not all of the entrances and exits to this parcel will be closed or moved to another location. The main entrance to the parcel, which is entrance Gate 10, is going to be raised to meet with Rose Hills Road. The work needed on the entrance driveway will not have an impact on the cemetery plots.

NORTHEAST QUADRANT

Parcel 13 (Cohn's Partition) is located in the northeast quadrant of Rose Hills Road, and the UPRR tracks, and consists of Memorial Park property. Similar to the southeast quadrant, not all entrances and exits to this parcel will be affected. The main entrance to the parcel, which is entrance Gate 9, is going to be raised to meet with Rose Hills Road. The work needed on the entrance driveway will not have an impact on the cemetery plots.

WORK AREA TRAFFIC CONTROL & DETOUR(S) DURING CONSTRUCTION:

The construction of the overpass structure and retaining walls within the 70' of right-of-way may be expedited by the closure of the crossing during the construction. Alternative routes are available through Mission Mill Road to the east and Pioneer Boulevard to the west of Rose Hills Road.

A Summary of the project cost estimate (rough order of magnitude) is shown below. The detailed cost estimate is found in Appendix I.

CONCEPTUAL ESTIMATE (Order of Magnitude) – ROSE HILLS ROAD – LOS ANGELES SUBDIVISION

Grade Separation Type: Overpass

Summary of Project Cost Estimate:

Roadway	$ 5,664,680
Track	$ 0
Structures	$ 10,800,000
Right-of-Way Notes 2, 3, & 4	$ 9,165,870
Utilities Notes 1	$ 1,620,000
Project Costs including: Geotechnical Investigation, Surveying, Engineering, Flagging, Construction Management, Agency, and Program Management Costs Notes 5 & 6	$ 10,127,600
Contingency 30%	$ 8,463,639
TOTAL PROJECT COST	$ 45,842,000

Notes:

1. Utility relocation cost estimates assume all affected utilities (sewer and storm drain) can be relocated by gravity flow systems similar to the existing systems.
2. Right of Way cost estimates are based on $100/SF which covers the land and building allowance for full takes or areas affected by part takes.
3. Right of Way costs do not include any associated relocation costs or severance damages to the business operators.
4. Right of Way costs include a 26% allowance for acquisition costs. (appraisals, negotiation, labor, legal, closing cost, etc.)
5. Agency Costs include Agency Project Management direct labor and Agency indirect costs.
6. Program Management costs include third party project support costs such as community outreach, environmental management, DBE and labor compliance, and property survey.
7. This estimate is prepared using construction cost information based on current dollar cost as of 2011.

4.4 TURNBULL CANYON ROAD - 3-17.20- 810867E

INTRODUCTION

The Turnbull Canyon Road grade crossing of UPRR's Los Angeles Subdivision is located in the City of Industry. Turnbull Canyon Road is bounded by Valley Boulevard to the north and the Pomona Freeway (State Route 60) to the south. See Figure 4-7 for vicinity map. Turnbull Canyon Road is identified as an underpass project in ACE's Phase II program. An evaluation of the suitability of building an overpass at this location was outside the scope of this report; however, it was determined that an underpass is feasible and the density of adjacent land utilization weighs in favor of the underpass alternative. As noted in the discussions of other underpass project locations, above, further design engineering effort on the Turnbull Canyon Road location would include a value engineering exercise with the preliminary engineering stage. Re-evaluation of the overpass vs. underpass alternatives should be part of the value engineering exercise.

In choosing an underpass grade separation design, the criteria used in evolving the concept were maintaining roadway capacity and safe vehicle speeds along Turnbull Canyon Road, minimizing project limits and the area needed for its construction, mitigating environmental and access impacts to adjacent properties and the surrounding community, avoiding disruption to rail operations and utility services and minimizing the amount of property takings required to build the grade separation.

DESIGN PARAMETERS

The horizontal and vertical roadway alignment standards used in the design consisted of the Caltrans Highway Design Manual, AASHTO policy of Geometric Design of Highways and Streets, and the BNSF/UPRR Design Guidelines for Railroad Grade Separations. The following includes the specific guidelines that were used in the design of these alternatives:

- Design Speeds

Turnbull Canyon Road	V = 40 mph
Poplar Avenue	V = 35 mph
Clark Avenue	V = 35 mph
Salt Lake Avenue	V = 35 mph

- Horizontal Alignment

Transition & Curves	Caltrans minimum requirement for design speed without super-elevation

- Vertical Alignment

Crest Curves	AASHTO stopping sight distance

Sag Curves	AASHTO comfortable speed for well-lit roadways
Max Grade	5% max to accommodate ADA Standards

Figure 4-7: Turnbull Canyon Road Vicinity Map

- Vertical Clearance

Roadway	16'-6"
Rail (Permanent)	24'
Rail (Temporary)	21'-6"

- Cross-Section

Turnbull Canyon Road	60' curb-to-curb minimum, minimum 10' sidewalk, Two lanes each direction

- Truck Size — Caltrans 2005 (US) — CA LEGAL-65

UNDERPASS ALTERNATIVE

This alternative proposes construction of an underpass structure under the UPRR tracks, generally along the original alignment of Turnbull Canyon Road. The existing at-grade crossing would be eliminated. The underpass would have a four lane configuration with final vertical clearance of the underpass structure conforming to the UPRR/BNSF jointly developed "Guidelines for Railroad Grade Separation Projects." The vertical clearance for the proposed type of structure would be 16'-6". The conceptual roadway plan is shown in Figure 4-8. Appendix J includes detailed conceptual plans for this alternative.

HORIZONTAL LAYOUT

The proposed centerline layout of Turnbull Canyon Road remains consistent with the existing centerline location. The overall curb face to curb face width on Turnbull Canyon Road will match the existing 60' width and the number of lanes will remain intact. The affected roadways of Poplar Avenue, Clark Avenue and Salt Lake Avenue will match their existing centerline alignments and cross section dimensions.

PROFILE

The proposed underpass is being lowered under the UPRR tracks. The vertical curves are based on the minimum requirements by Caltrans vertical curve design parameters.

CROSS-SECTION

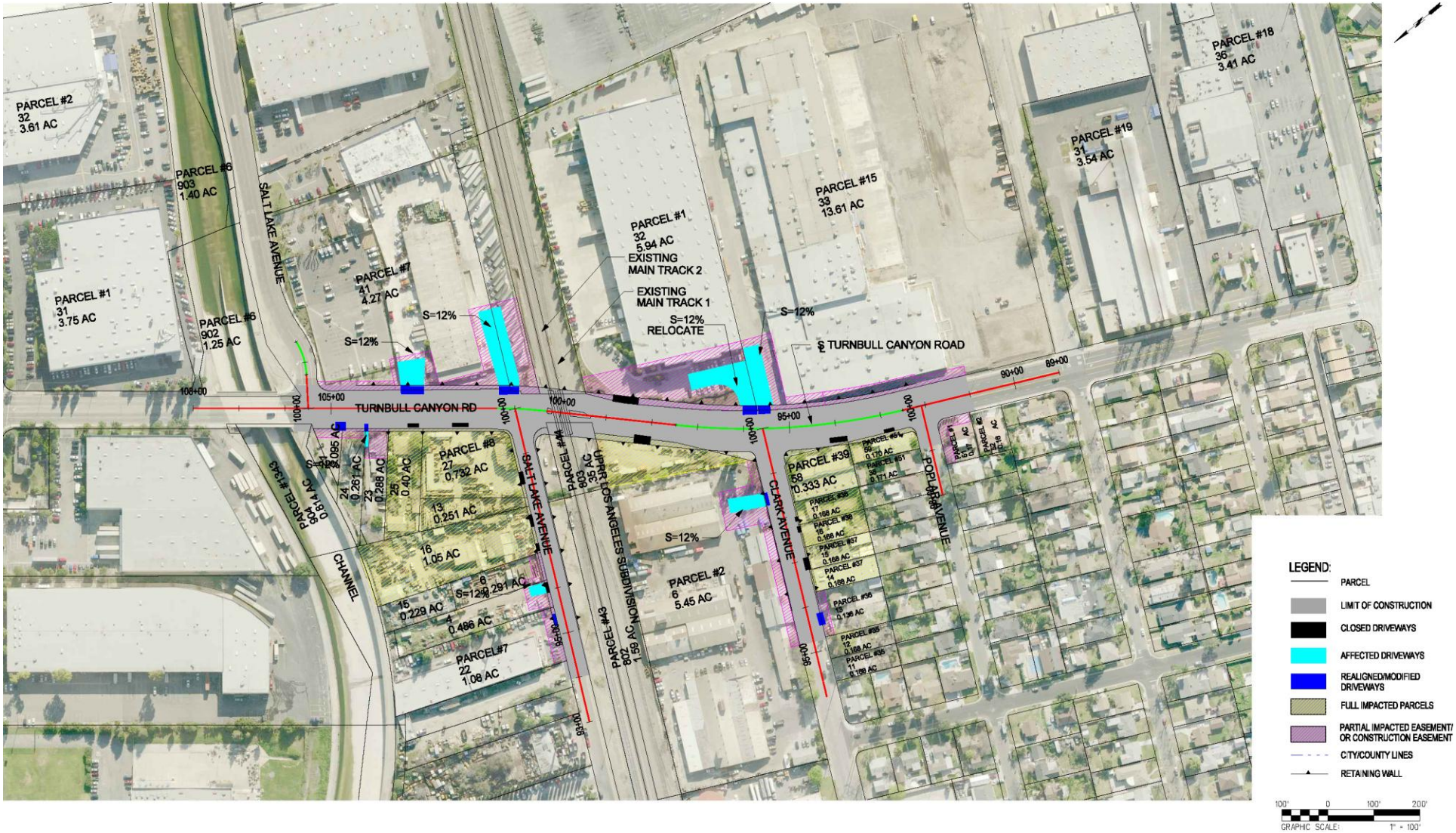
The existing Turnbull Canyon Road cross section spans 60' from curb face to curb face. The street is striped as a four lane divided roadway with a 12' median. The underpass cross section is proposed to match the existing curb face to curb face dimensions, with 10' sidewalks being provided on either side of the street.

Poplar Avenue is a two lane roadway with a curb face to curb face cross section of 28'. There is no sidewalk on the northerly side or on the southerly side.

Clark Avenue is a two lane roadway with curb face to curb face dimensions of about 45'. There is intermittent 8'sidewalk on the north side of the street, while the south side of the street has 5' sidewalk.

Salt Lake Avenue is a two lane roadway with partial curb face to curb face dimensions of about 32'. There is 5' of partial sidewalk on the north side of the street.

N. Salt Lake Avenue is a four lane roadway with partial curb face to curb face dimensions of about 47'. There is partial sidewalk of 8' on the south side of the street.



Source: JL Patterson & Associates, Inc.

BRIDGE TYPE

The bridge type needs to the studied in more detail at an advanced design phase of the project. However, it is assumed a 2-span structure alternative, with a center pier located in a raised median, would be selected for a Turnbull Canyon Road underpass of the Los Angeles subdivision. A steel deck girder bridge superstructure is the first choice of the Union Pacific Railroad under their guidelines. However, pre-cast pre-stressed concrete box girders may also be used and these have been built by ACE in its Phase I program, with UPRR's permission, when the angle of intersection between the street and railroad is close to perpendicular (90 degrees between railroad track and street centerline). A 2-span concrete deck girder bridge with a center pier bent within the median of Turnbull Canyon Road is assumed for this project and its cost estimate.

Shoring would be required around the construction area when constructing the bridge. Retaining walls would be required for the roadway depression.

DRAINAGE

Surface runoff from the underpass would be collected at the low point below the structure. The storm runoff can be handled by a pump system. The runoff will be discharged unto the existing storm drain system on Turnbull Canyon Road. This system will be designed to adhere to LA County Flood Control District standards and requirements.

RAILROAD SHOOFLY

In order to maintain railroad operations during the construction of the underpass grade separation, the construction of a temporary shoofly track is warranted. The existing UPRR - Los Angeles Division consists of two mainline tracks; therefore, the railroad would most likely require ACE to build a double track shoofly. The railroad right-of-way is wide enough to accommodate a double track shoofly as it is shown on the exhibit in Appendix J. The shoofly tracks have been preliminarily designed, for this concept level report, to accommodate speeds of 65 miles per hour for freight operations and 70 miles per hour for passenger trains.

UTILITIES

A preliminary investigation of the utilities along Turnbull Canyon Road has been completed. Based upon this research, several facilities were identified as potential impacts:

- Water line (12" Water, Vallecito Water)
- Storm drain (75" RCP)
- Sanitary sewer (18" Sewer)
- UG power line (Southern California Edison)
- Gas line (3" Gas)
- Overhead transmission power line (Southern California Edison)

- UG telephone (Verizon)
- Communication fiber optic line (Verizon/MCI)

These lines will have to be relocated in order to build the underpass option.

RIGHT-OF-WAY

The right-of-way impacts from an underpass option are typical for this type of grade separation and in the case of Turnbull Canyon Road, they would consist of the property takes and business relocations.

NORTHEAST QUADRANT

The northeast quadrant has a commercial parcel, Western Commerce Corporation, with two driveway entrances from Turnbull Canyon Road. The access driveway may be ramped to avoid taking the property in full.

NORTHWEST QUADRANT

The northwest quadrant has a parcel owned by Pacific Coast Pallets with driveway entrances from Turnbull Canyon Road and Salt Lake Avenue. Unfortunately, the driveway on Salt Lake Avenue will not be able to remain due to the difference in elevation, but the driveway on Turnbull Canyon Road may be ramped to avoid taking the property in full. In addition, other parcels in the quadrant will be partially affected due to driveway locations from Turnbull Canyon Road and Salt Lake Avenue. The driveway closest to the drainage channel may be able to remain (subject to negotiations), and if the properties can be accessed from there, then full takes may not be needed.

SOUTHEAST QUADRANT

The southeast quadrant has one large parcel, Wang's International, whose only access is through Turnbull Canyon Road. The northern limit of the parcel is the UPRR railroad. Therefore, if access cannot be modified from Clark Avenue, a full take may be needed.

SOUTHWEST QUADRANT

The southwest quadrant has one large industrial parcel that could be accessed from Clark Avenue after coming off the grade separation and meeting existing grade. A full take may not be needed. In addition, the residential neighborhood and a church (St. Mark's Chinese Lutheran) within the Turnbull Canyon Road and Clark Avenue intersection may also be impacted due to the difficulty in accessing the properties. For the purposes of this study, we have assumed all those parcels will be taken.

In summary, the right-of-way impacts of Turnbull Canyon Road (Los Angeles Subdivision) underpass are:

- Northwest Quadrant – 3 affected parcels
- Northeast Quadrant- 1 affected parcel
- Southwest Quadrant – 1 affected industrial parcel, 1 affected institutional parcel and 4 residential parcels

- Southeast Quadrant – 1 affected parcel

Total affected parcels – 11

A Summary of the project cost estimate (rough order of magnitude) is shown below. The detailed cost estimate is found in Appendix J.

CONCEPTUAL ESTIMATE (Order of Magnitude) – TURNBULL CANYON ROAD – LOS ANGELES SUBDIVISION

Grade Separation Type: Underpass

Summary of Project Cost Estimate:

Roadway	$ 6,878,701
Track	$ 4,241,590
Structures	$ 15,351,000
Right-of-Way Notes 3, 4, & 5	$ 26,729,640
Utilities Notes 1 & 2	$ 2,180,000
Project Costs including: Geotechnical Investigation, Surveying, Engineering, Flagging, Construction Management, Agency, and Program Management Costs Note 6 & 7	$ 16,045,120
Contingency 30%	$ 13,409,208
TOTAL PROJECT COST	$ 84,836,000

Notes:

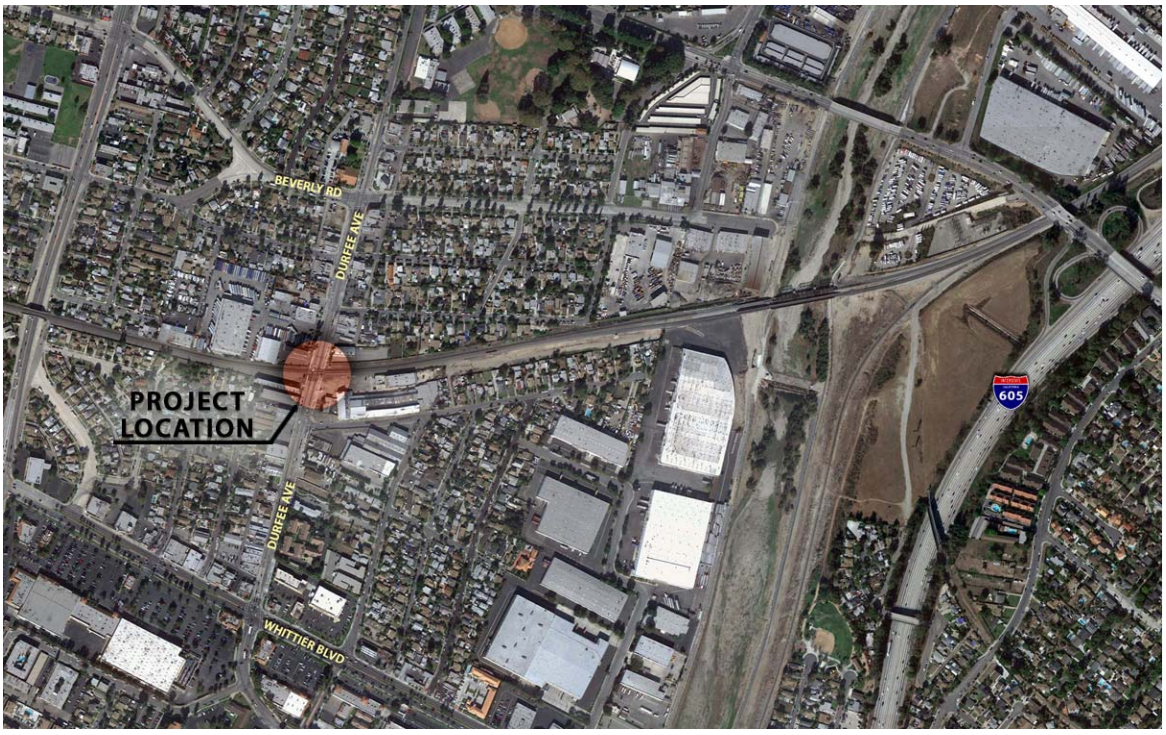
1. Utility relocation cost estimates assume all affected utilities (sewer and storm drain) can be relocated by gravity flow systems similar to the existing systems.
2. Cost for drainage item includes construction of one storm drain pump station at the project area.
3. Right of Way cost estimates are based on $100/SF which covers the land and building allowance for full takes or areas affected by part takes.
4. Right of Way costs do not include any associated relocation costs or severance damages to the business operators.
5. Right of Way costs include a 26% allowance for acquisition costs. (appraisals, negotiation, labor, legal, closing cost, etc.)
6. Agency Costs include Agency Project Management direct labor and Agency indirect costs.
7. Program Management costs include third party project support costs such as community outreach, environmental management, DBE and labor compliance, and property survey.
8. This estimate is prepared using construction cost information based on current dollar cost as of 2011.

4.5 DURFEE AVENUE – 10.30- 811219R

INTRODUCTION

The Durfee Avenue at-grade crossing of the UPRR railroad tracks is located in the City of Pico Rivera, bounded by Beverly Road and Whittier Boulevard. Durfee Avenue is a minor arterial road with one-lane in each direction with a parking lane and a center turning lane in both directions. Durfee Avenue connects Beverly Boulevard to the north and Whittier Boulevard to the south. This minor arterial street serves mostly residential neighborhoods north of the railroad and commercial/industrial properties south of the railroad. The following sections address the impacts to adjacent properties per the concept plans included in Appendix K. See Figure 4-9 for a vicinity map.

Figure 4-9: Durfee Avenue Vicinity Map (Los Angeles Subdivision)



UNDERPASS VERSUS OVERPASS ALTERNATIVES

Two grade separation alternatives were initially considered, underpass and overpass grade separation. After an initial evaluation, the underpass option was determined to be superior for several reasons and the overpass option was subsequently dropped from further study. A major benefit of the underpass option includes a smaller footprint, resulting in fewer impacts to adjacent private properties and the surrounding community. Underpasses are desirable where properties adjacent to the at-grade crossing have fully developed industrial, commercial or retail uses. Pedestrian sidewalk design that is consistent

with the Federal Americans with Disabilities Act (ADA) requirements can also be achieved with the underpass option. While underpasses generally require significantly greater design and construction effort than overpasses, they typically result in a lower overall cost once reductions in project area and associated property takings and access impacts are taken into consideration. There are also important qualitative judgments to be made when choosing between overpasses and underpasses. Overpasses can create significant pedestrian circulation, ADA, view line and daylight barriers. The aerial structures may also broadcast vehicular engine and tire noise over a wide area.

This preliminary finding that a grade separation project at the Durfee Avenue at-grade crossing be an underpass is consistent with ACE's experiences in development, design, and construction of its Phase I grade separation projects in developed urban areas. Under Federal and State guidelines, further engineering design effort on eliminating the Durfee Avenue grade crossing would include a value engineering activity as part of preliminary engineering (development of 30%-level content). The value engineering requirement would apply to all Phase II locations. A routine part of the value engineering activity would be re-examination of underpass versus overpass cost and quality-of-life trade-offs.

In choosing a grade separation design, the criteria used in evolving the concepts were maintenance of roadway, vehicular traffic capacity, safe travel speeds through the completed underpass, minimization of construction project limits, impacts on access into adjacent properties, mitigation of impacts on the surrounding community, avoidance of disruption to railroad operations, relocation or protection of all affected utility facilities while minimizing utility service outages, and minimization of permanent and temporary property and right-of-way takings required for the crossing elimination.

DESIGN PARAMETERS

The horizontal and vertical roadway alignment standards used in the design consisted of the Caltrans Highway Design Manual, AASHTO policy of Geometric Design of Highways and Streets, and the BNSF/UPRR Design Guidelines for Railroad Grade Separations. The following includes the specific guidelines that were used in the design of these alternatives:

- Design Speeds

Durfee Avenue	V = 35 mph

- Horizontal Alignment

Transition & Curves	Caltrans minimum requirement for design speed without super-elevation

- Vertical Alignment

Crest Curves	Caltrans stopping sight distance
Sag Curves	AASHTO comfortable speed for well-lit roadways
Max Grade	6% max

- Vertical Clearance

Roadway	16'-6"-17-6" Per UPRR Bridge type Selection
Rail (Permanent)	24'
Rail (Temporary)	21'-6"

- Cross-Section

  Durfee Avenue — One travel lane with parking each direction 22' curb-to-curb, 12' center median and 10' raised sidewalks, Total = 76' to face of retaining walls

- Truck Size — Caltrans 2005 (US) — CA LEGAL-65

UNDERPASS ALTERNATIVE

This alternative proposes to construct an underpass roadway structure below the partially-raised UPRR tracks along the original alignment of Durfee Avenue. The plans are presented in Appendix K. The underpass would have a two-lane configuration with the final vertical clearance of the underpass structure conforming to the UPRR/BNSF jointly developed "Guidelines for Railroad Grade Separation Projects." The vertical clearance for the proposed type of structure would be 17'-6", based on a concrete bridge. The concept plan is presented in Figure 4-10 and the remaining plans are presented in Appendix K.

GEOMETRY – HORIZONTAL, VERTICAL, AND CROSS SECTION

HORIZONTAL LAYOUT

The existing horizontal alignment will be maintained on Durfee Avenue. Two road closures would be necessary at Stephens Street and Walnut Avenue. These closures are warranted due to the proximity to the railroad. Lowering the roads to meet the proposed vertical alignment of Durfee Road would result in significant right-of-way impacts to adjacent properties. Stephens Street would maintain access from Passons Boulevard; Walnut Avenue would have access from Canal Way and an adjacent alley that connects to Olympic Boulevard.

PROFILE

The proposed underpass will be lowered under the UPRR tracks. The vertical curves are based on the Caltrans parameters for minimum required length. The vertical alignment has been designed per the posted speed limit of 30 mph in order to reduce the project footprint.

CROSS-SECTION

The underpass cross section will be one lane with a parking lane in each direction with 22 feet curb-to-curb, a 12-foot center median, and 10-foot raised sidewalks. The proposed width will match the existing width of Durfee Avenue.

STRUCTURES

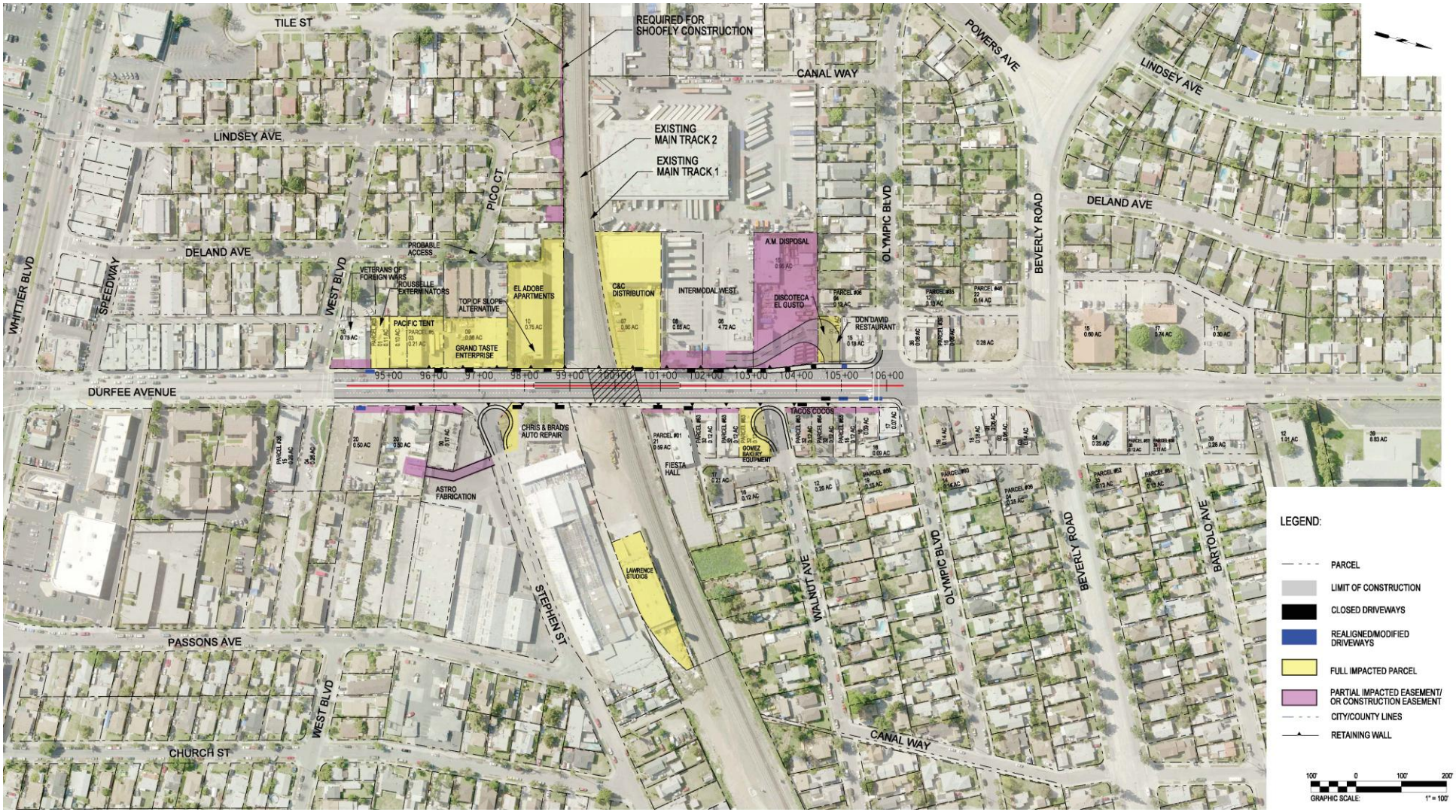
BRIDGE TYPE

The bridge type selection is required to be studied in detail at an advanced design phase of the project. For this conceptual design and conceptual cost estimating purposes, a two-span structure is proposed. The bridge uses 43-foot UPRR standard concrete single-cell precast prestressed girders. This type of structure is selected where the available vertical clearance is restricted and the use of a deeper single span structure is not feasible. The fascia girders are proposed to accommodate sidewalks as required by UPRR and can be treated with widely available patterns for aesthetics.

These girders, if designed as an impact protection device, vertical clearance requirements may be reduced subject to UPRR approval. The proposed bridge is on a slight skew, requiring a longer span. Cantilever-type abutments using a single row of CIDH are proposed unless geotechnical findings prohibit the use. Alternatively, cantilever-type abutments with pile cap using driven piles or a smaller diameter CIDH pile may be used. The lowered roadway approaches, including raised sidewalk, is assumed to be retained by a soldier pile wall system with precast concrete lagging panels which can be treated with architectural features, as required.

RIGHT-OF-WAY

The right-of-way impacts from an underpass option are typical for this type of grade separation; however, significant effort was made to minimize the partial/total impacts to driveways and properties. In many instances, if a driveway could be saved at the existing location by altering the vertical profile of the roadway/access, then a partial impact was called out on the exhibits.



Source: JL Patterson & Associates, Inc.

NORTHWEST QUADRANT

The following properties are located on the northwest quadrant starting from the railroad right-of-way to Olympic Boulevard, north of the project limits. C&C Distribution is adjacent to the railroad tracks and would be impacted by the roadway underpass. Currently the business receives access from Durfee Avenue and, per this study, access will be eliminated due to the significant grade separation from the underpass. This would be a suitable location for the pump station needed for the underpass drainage. Intermodal West Inc, a distribution yard, receives its access from Durfee Avenue. This access would be affected by the underpass. However, it may be possible to maintain access by providing an access road through the adjacent parcels as shown on the underpass exhibit in Appendix K. Due to the close proximity to the right-of-way, it is not possible to maintain access to A.M. Disposal Co, Discoteca El Gusto, and Don David Restaurant without significant impacts to the buildings or properties themselves. A full take is warranted at these locations.

NORTHEAST QUADRANT

The following properties are located on the northeast quadrant starting from the railroad right-of-way to Olympic Boulevard, north of the project limits. Fiesta Hall, a party venue, is located on the northeast quadrant adjacent to the railroad right-of-way. This business currently gains access from Durfee Avenue and an alley east of Durfee Avenue which intersects Walnut Avenue. Per this study, access from Durfee Avenue would be eliminated. However, access from the alley would not be affected and could serve as the primary access; a partial take was considered for this property. Lewen's Neon Wholesale and an adjacent vacant warehouse would no longer have access from Durfee Avenue. However, access from the alley would be maintained. Therefore, a partial take was considered at these locations. In order to reduce property impacts along Walnut Avenue, a road closure was proposed. A full take of the Gomez Bakery Equipment property would need to be acquired in order to accommodate the future cul-de-sac, as shown on the underpass exhibit. Tacos Cocos would no longer have access from Durfee Avenue but could maintain access from Walnut Avenue and the adjacent alley. La Potosina Bakery and Edith Beauty Salon would need driveway modifications in order to maintain access from Durfee Avenue, if sight distance permits.

SOUTHWEST QUADRANT

The following properties are located on the southwest quadrant from the railroad right-of-way to West Boulevard. Due to the proximity of the properties to the right-of-way, it was not feasible to maintain access from Durfee Avenue; therefore it is proposed that these properties be considered full takes. The properties include the El Adobe Apartments located adjacent to the railroad tracks, Grand Taste Enterprises, Pacific Tent, and Rousselle Exterminators. For the purpose of this report, the apartments were considered a full take, however access from Deland Avenue may be achieved with some on-site modifications and an access easement established with the adjacent apartment properties.

SOUTHEAST QUADRANT

The following properties are located on the southeast quadrant from the railroad right-of-way to West Boulevard. Due to the proximity of the Lawrence Studios property to the railroad, a full take is warranted for this location in order to provide a two-track shoofly. In order to reduce property impacts along Stephens Street, a road closure is proposed. In order to accommodate the future cul-de-sac, a partial take of Chris and Brads Auto Repair would be required, as shown on the underpass exhibit.

Access to the existing electrical substation would be maintained off Stephens Street. The adjacent mobile home park would no longer have access from Durfee Avenue and a new access would need to be provided from Stephens Street, with an access easement through Astro Fabrication's parking lot; a partial take is considered for both of these properties. The fire station is located at the end of the work limits and only minor modifications will be needed to maintain access.

SUMMARY

The right-of-way impacts affected by the Durfee Avenue (Los Angeles Subdivision) underpass alternative are:

QUADRANT	PARTIALLY AFFECTED	FULL TAKE	TOTAL AFFECTED PARCELS
Northwest	3	2	5
Northeast	7	1	8
Southwest	1	5	6
Southeast	4	2	6
Total	15	10	25

The project would result in 25 affected parcels. The 15 partially affected parcels are commercial/industrial properties with the exception of the mobile home park. The 10 full takes include the El Adobe Apartments, Grand taste Enterprise, Pacific Tent, Russell Exterminators, Lawrence Studios, Gomez Bakery Equipment, Don David Restaurant, Discoteca El Gusto, and C&C Distribution.

UTILITIES

A preliminary investigation of the utilities along Durfee Avenue has been completed. Based upon this research, several facilities were identified as potential impacts:

- 15" Trunk sanitary sewer
- 6" Gas line
- 8" Water line
- Underground Telephone line
- 30" Storm Drain
- 6" Oil line (Texas Oil)
- Fiber optics – MCI (on railroad right-of-way)

These lines will have to be relocated in order to build the underpass option. Appendix K shows the utility relocation schematic.

DRAINAGE

Surface runoff from the underpass would be collected at the low point below the structure. The storm runoff will be handled by a pump system. The runoff will be discharged into the existing tributary storm drain system found on Stephens Street. This system will be designed to adhere to LACFCD standards and requirements.

RAILROAD SHOOFLY

In order to maintain railroad operations during the construction of the underpass grade separation, the construction of a temporary shoofly track is warranted. The existing UPRR - Los Angeles Division consists of two mainline tracks; therefore, the railroad would most likely require ACE to build a double track shoofly. The railroad right-of-way is wide enough to accommodate portions of a double track shoofly east of Durfee, with the exception of the Lawrence Studios which will require full property take. West of Durfee Avenue, the railroad right-of-way narrows down from 160 feet to 60 feet, which requires 6 partial takes in order to complete the shoofly as it is shown on the exhibit in Appendix K. Two major features drove the design of the shoofly tracks: the proximity of the existing bridges over the San Gabriel River and Rosemead Boulevard; in addition, the existing tracks are on a super elevated curve through the grade separation. In order to accommodate these restrictions, it was not possible to maintain the existing operating speed of 65 miles per hour for passenger trains through the proposed shoofly without significantly impacting the adjacent properties and the existing bridges. The shoofly tracks have been preliminarily designed, for this concept level report, with a speed restriction of 60 miles per hour for freight and passenger.

WORK AREA TRAFFIC CONTROL AND DETOURS DURING CONSTRUCTION

Construction related to the underpass structure retaining walls, excavation, and shoofly within the right-of-way would be expedited by the closure of the crossing during the construction. Alternative routes are available through Rosemead Boulevard to the west. Conceptual traffic detour plans are presented in Appendix K.

CONCEPTUAL ESTIMATE (Order of Magnitude) – DURFEE AVENUE UNDERPASS – LOS ANGELES SUBDIVISION

A Summary of the project cost estimate (rough order of magnitude) is indicated below. A detailed cost estimate is included in Appendix K.

Roadway	$3,993,000
Track	$3,395,000
Structures	$6,605,000
Right-of-Way Notes 3, 4 & 5	$31,096,800
Utilities Notes 1 & 2	$2,500,000
Project Costs including: Geotechnical Investigation, Surveying, Engineering, Flagging, Construction Management, Agency, and Program Management Costs Notes 6 & 7	$9,236,000
Contingency 30%	$7,719,000
TOTAL PROJECT COST	$64,545,000

Notes:

1. Utility relocation cost estimates assume all affected utilities (sewer and storm drain) can be relocated by gravity flow systems similar to the existing systems.
2. Cost for drainage item includes construction of one storm drain pump station at the project area.
3. Right of Way cost estimates are based on $100/SF which covers the land and building allowance for full takes or areas affected by part takes.
4. Right of Way costs do not include any associated relocation costs or severance damages to the business operators.
5. Right of Way costs include a 26% allowance for acquisition costs. (appraisals, negotiation, labor, legal, closing cost, etc.)
6. Agency Costs include Agency Project Management direct labor and Agency indirect costs.
7. Program Management costs include third party project support costs such as community outreach, environmental management, DBE and labor compliance, and property survey.
8. This estimate is prepared using construction cost information based on current dollar cost as of 2011.

4.6 FULLERTON ROAD – 21.40 – 810880T

PROJECT DESCRIPTION

The Fullerton Road at-grade crossing of the UPRR railroad tracks is located in the City of Industry, bounded by Rowland Street and State Route 60. Fullerton Road is a minor arterial street with two lanes in each direction and a center turning lane for both directions north of Gale Avenue. Fullerton Road serves as a connector to State Route 60 and intersects Valley Boulevard to the north, carrying an Average Daily Traffic of 22,300 (2009) across the railroad tracks. This arterial serves mostly commercial/industrial properties north of the tracks. The following sections will address the impacts to adjacent properties per the concept plans included in Appendix L. See Figure 4-11 for a vicinity map.

Figure 4-11: Fullerton Road Vicinity Map (Los Angeles Subdivision)

UNDERPASS VERSUS OVERPASS ALTERNATIVES

Three grade separation alternatives were initially considered; underpass, overpass and a combination of a partial track raise and underpass grade separation. After an initial evaluation, the underpass option was determined to be superior over both the overpass and the combination grade separation options for several reasons mentioned latter in this report. The overpass and combination option were subsequently dropped from further study. A major benefit of the underpass options includes a smaller footprint, resulting in fewer impacts to adjacent private properties and the surrounding community. Underpasses are desirable where properties adjacent to the at-grade crossing have fully developed industrial, commercial or retail uses. Pedestrian sidewalk design that is consistent with Federal Americans with Disabilities Act (ADA) requirements can also be achieved with the underpass option.

While underpasses generally require significantly greater design and construction effort than overpasses, they typically result in a lower overall cost once reductions in project area and associated property takings and access impacts are taken into consideration. There are also important qualitative judgments to be made when choosing between overpasses and underpasses. Overpasses can create significant pedestrian circulation, ADA, view line and daylight barriers. The aerial structures may also broadcast vehicular engine and tire noise over a wide area. In investigating the possibility of providing an underpass with a minor track raise, it was noted that no substantial benefits were realized. The initial investigation did not prove to reduce the required property takes or significantly impact the construction cost due to the increase in structural, track work and shoofly track associated with the track raise. Due to these reasons, no further investigation was deemed necessary. A conceptual track profile was created in house using the existing track grades found within the available LA subdivision track charts. There are two industry tracks located to the east and west of the project limits. These tracks will have to be maintained as close to existing grade in order to minimize impacts to track operations and costs. Using these points as constraints and maintaining the existing track grade of 0.54% provided a maximum clearance of approximately 7'-6" at Fullerton Road which equates to approximately the required bridge deck. The proposed track would then reverse curve back into the existing track grade of 0.65% before impacting the industry track to east of the project. The raise track footprint is approximately 4,600 TF.

This preliminary finding that a grade separation project at the Fullerton Road at-grade crossing be an underpass is consistent with ACE's experiences in development, design, and construction of its Phase I grade separation projects in developed urban areas. Under Federal and State guidelines, further engineering design effort on eliminating the Fullerton Road grade crossing would include a value engineering activity as part of preliminary engineering (development of 30%-level content). The value engineering requirement would apply to all Phase II locations. A routine part of the value engineering activity would be re-examination of underpass versus overpass cost and quality-of-life trade-offs.

In choosing a grade separation design, the criteria used in evolving the concepts were maintenance of roadway, vehicular traffic capacity, safe travel speeds through the completed underpass, minimization of construction project limits, impacts on access into adjacent properties, mitigation of impacts on the surrounding community, avoidance of disruption to railroad operations, relocation or protection of all affected utility facilities while minimizing utility service outages, and minimization of permanent and temporary property and right-of-way takings required for the crossing elimination.

DESIGN PARAMETERS

The horizontal and vertical roadway alignment standards used in the design consisted of the Caltrans Highway Design Manual, AASHTO policy of Geometric Design of Highways and Streets, and the BNSF/UPRR Design Guidelines for Railroad Grade Separations. The following includes the specific guidelines that were used in the design of these alternatives:

- Design Speeds

Fullerton Road	V = 40 mph
Railroad Street	V = 35 mph
Gale Avenue	V = 30 mph

- Horizontal Alignment

Transition & Curves	Caltrans minimum requirement for design speed without super-elevation

- Vertical Alignment

Crest Curves	Caltrans stopping sight distance
Sag Curves	AASHTO comfortable speed for well-lit roadways
Max Grade	6% max

- Vertical Clearance

Roadway	16'-6"-17-6" Per UPRR Bridget type Selection
Rail (Permanent)	24'
Rail (Temporary)	21'-6"

- Cross-Section

Fullerton Road (Ultimate)	Three lanes with left turn lanes each direction, 39'curb-to-curb, 18' center median and 10' raised sidewalks, Total = 116' to face of retaining walls
Gale Avenue (Ultimate)	Two lanes each direction, 11' left turn lane, 10' right turn lane and 7' raised sidewalks, Total = 80' to face of retaining walls
Railroad Street (Ultimate)	Two lanes with left turn lanes each direction, 5' raised sidewalk on north side, 5' buffer on south side, Total = 80' to face of retaining walls

- Truck Size — Caltrans 2005 (US) — CA LEGAL-65

UNDERPASS ALTERNATIVE

This alternative proposes to construct an underpass roadway structure under the UPRR tracks, along the original alignment of Fullerton Road. The plans are presented in Appendix L. The underpass will be built to the ultimate right-of-way of 116 feet, consisting of a three-lane configuration with the final vertical clearance of the underpass structure conforming to the UPRR/BNSF jointly developed "Guidelines for Railroad Grade Separation Projects." The vertical clearance for the proposed type of structure would be 16'-6" based on a steel bridge. As part of this alternative, Gale Avenue and Railroad Street will also be lowered to join Fullerton Road and will be built out to the ultimate right-of-way of 80 feet. The concept plan is presented in Figure 4-12 and the remaining plans are presented in Appendix L.

Source: JL Patterson & Associates, Inc.

GEOMETRY – HORIZONTAL, VERTICAL, AND CROSS SECTION

HORIZONTAL LAYOUT

The existing horizontal alignment will be maintained on Fullerton Road; however the underpass will be widened to the ultimate right-of-way in order to accommodate the existing traffic volume. Fullerton Road is currently built-out south of the railroad tracks; therefore this project will continue the ultimate cross section across Railroad Street and transition back to existing at Arenth Avenue. Gale Avenue will maintain its existing alignment and will continue its ultimate width of 80 feet across Fullerton Road and transition back to existing, 700 feet from the intersection. Railroad Street will also maintain its horizontal alignment and ultimate cross section of 80 feet, which would be carried out to the end of the project. Raised sidewalks will be used in order to maintain ADA compliance.

PROFILE

The proposed underpass will be lowered under the UPRR tracks. The vertical curves are based on the minimum requirements by Caltrans vertical curve design parameters. The vertical curves are designed per the respective posted speed limits in order to reduce the project footprint. The length of the sag curve for Fullerton Road was reduced per AASHTO guidelines, which allows that driving comfort can be considered where adequate lighting is provided for sight distance.

CROSS-SECTION

The underpass cross section is proposed to be three lanes in each direction, an 8-foot center median, and 10-foot raised sidewalks. The proposed width will be built-out to the ultimate cross section of 116 feet.

STRUCTURES

BRIDGE TYPE

The bridge type selection is required to be studied in detail at an advanced design phase of the project. For this conceptual design and cost estimating purposes, a 164-foot long, two-span bridge, using steel plate girder is proposed at this location. As a general rule, per UPRR Guidelines, the use of a steel superstructure for underpasses is preferred over a concrete superstructure. The proposed steel superstructure as compared to a concrete superstructure reduces vertical clearance requirements by one foot and can cover a longer span with the same structure depth. Use of minimum vertical clearance and structure depth reduces the impact of roadway excavation to the ramps of State Route 60 and also covers the longer span required over the widened Fullerton Road as it meets Railroad Street. The slight skew of the bridge is easily accommodated by this type of structure. Taking into consideration the aforementioned variables, the use of a steel bridge at this location is warranted. A steel deck using steel plates is proposed in order to reduce the structural depth.

Cantilever-type abutments with a single row of CIDH with abutment cap are proposed unless geotechnical findings prohibit the use. Alternatively, cantilever-type abutments with pile cap using driven piles or a smaller diameter CIDH pile may be used. A soldier pile retaining wall is proposed; alternatively, a standard cast-in-place retaining wall with spread footing with or without piles may be

used.

RIGHT-OF-WAY

The right-of-way impacts from an underpass option are typical for this type of grade separation; however, significant effort was made to minimize the partial/total impacts to driveways and properties. In many instances, if a driveway could be saved at the existing location by altering the vertical profile of the roadway/access, then a partial impact was called out on the exhibits.

NORTHWEST QUADRANT

The following properties are located on the northwest quadrant starting from the Railroad Street to Arenth Avenue north of the project limits. Lee & Ro Inc. is adjacent to Railroad Street and will be impacted by the roadway underpass. Currently this business receives access from Fullerton Road and Railroad Street. Per this study, access will be eliminated due to the significant grade separation from the underpass. The pump station needed for the underpass drainage along with a utility corridor can be placed at this location. In addition, this area could be used to provide landscaped slopes and reduce the use of retaining walls. Astro Span Inc. receives its access from Fullerton Road which will be affected by the underpass; however, modifications to the driveway will restore access such that a partial take was considered for construction.

NORTHEAST QUADRANT

The following properties are located on the northeast quadrant starting from Railroad Street to Arenth Avenue north of the project limits. In order to provide the ultimate cross section of 116 feet, it is necessary to encroach into this quadrant. Fullerton Stone and RDD Freight Int. will be affected as full takes since access to these properties will no longer be available. This area could be used to provide landscaped slopes and reduce the use of retaining walls, along with a utility corridor for the storm drain and trunk sanitary sewer. Actek, immediately to the north of these properties, will also be affected by the underpass and the widening. This property is identified as a partial take because it may be possible that only a portion of the building be acquired and access restored to the property. ChiefPick.com located on the corner of Fullerton Road and Arenth Avenue will need to have its access restored from Fullerton Road, however, no major impacts were noted.

SOUTHWEST QUADRANT

The following properties are located on the southwest quadrant starting from the railroad right-of-way to State Route 60, just south of the project limits. The retail center, which includes Jack in the Box and IHOP are adjacent to the railroad tracks and will be impacted by the construction of the shoofly and retaining walls. In addition, one of its driveways will be closed due to the grade difference on Gale Avenue; a partial take was assumed for this property. Gale Avenue will be lowered to meet Fullerton Road, affecting the retail center to the south. It will be impacted by the construction of the retaining walls, such that a partial take was assumed for construction purposes.

SOUTHEAST QUADRANT

The following properties are located on the southeast quadrant starting from the railroad right-of-way to State Route 60 just south of the project limits. NGY Stone & Cabinet access will be severed from Gale Avenue due to the grade difference along with the proposed street widening. The building layout

does not permit any modifications in order to restore it to its original state, therefore it has been considered a full take. A utility corridor can be placed at this location. In addition, this area could be used to provide landscaped slopes, enhancing the aesthetics of the underpass and reducing the use of retaining walls. Cathay Bank is located on the south side of Gale Avenue; due to its proximity to the intersection, it is not practical to maintain access to the property. A full take has been assumed, which could be used as landscaped slopes. Another option for this property is to provide an alternate access through the eastern parking lot of B&R Carrier Inc., however this option was not considered as part of the report. The entrance and exit for westbound traffic on State Route 60 will have to be lowered to meet grades. Further studies are needed to evaluate the extent of improvements needed at these ramp locations. Initial inspection suggests that modifications can be achieved without encroaching into the highway.

SUMMARY

The right-of-way impacts of Fullerton Road (Los Angeles Subdivision) underpass are:

QUADRANT	PARTIALLY AFFECTED	FULL TAKE	TOTAL AFFECTED PARCELS
Northwest	5	2	7
Northeast	5	1	6
Southwest	6	0	6
Southeast	3	2	5
Total	19	5	24

The project would result in 24 affected parcels. These partially affected parcels are commercial/industrial properties. The 5 full takes include Lee & Ro Inc, RDD Freight Int, Fullerton Stone, NGY Stone & Cabinet, and Cathay Bank.

UTILITIES

A preliminary investigation of the utilities along Fullerton Road, Gale Avenue, and Railroad Street has been completed. Based upon this research, several facilities were identified as potential impacts:

- 54" Trunk sanitary sewer
- 8" Sewer
- 54" Storm Drain
- 30" Gas line
- 6" Gas line
- 12" Water line
- Underground Telephone line
- Underground Electrical lines
- Fiber optics – MCI (on railroad right-of-way)

These lines will have to be relocated in order to build the underpass option. The existing storm drain and trunk sanitary sewer will be a challenge to relocate as the cover is approximately 8 feet above the grade separation, making it difficult to continue its existing alignment across Fullerton Road. It has been considered that these systems maintain adequate flow and velocity to consider the use of a siphon system. The use of a siphon would allow the relocation to maintain minimum cover below the underpass and avoid the use of a pump station for these facilities. Further investigation is needed to validate its use. See Appendix L for utility relocation schematic.

DRAINAGE

Surface runoff from the underpass would be collected at the low point below the structure. The storm runoff will be handled by a pump system. The runoff will be discharged into the existing tributary storm drain system found on the south side of the tracks. This system will be designed to adhere to LACFCD standards and requirements.

RAILROAD SHOOFLY

In order to maintain railroad operations during the construction of the underpass grade separation, the construction of a temporary shoofly track is warranted. The existing UPRR - Los Angeles Division consists of two mainline tracks; therefore, the railroad would most likely require ACE to build a double track shoofly. The railroad right-of-way is wide enough to accommodate portions of a double track shoofly; however there will be a need for obtaining construction easements or partial property takes. The proposed shoofly design maintains the existing train speed for both passenger and freight; however it was necessary to encroach into the southern properties. An approximate 12-foot wide portion of land would be required during the construction and operation of the shoofly as is shown in Appendix L. Another alternative would be to shift the track within the railroad right-of-way in order to avoid this encroachment.

WORK AREA TRAFFIC CONTROL AND DETOURS DURING CONSTRUCTION

Construction related to the underpass structure retaining walls, excavation, and shoofly within the right-of-way would be expedited by the closure of the crossing during construction. Alternative routes are available through Nogales Street to the east and Azusa Avenue to the west. Conceptual traffic detour plans are presented in Appendix L.

CONCEPTUAL ESTIMATE (Order of Magnitude) – FULLERTON ROAD UNDERPASS – LOS ANGELES SUBDIVISION

A Summary of the project cost estimate (rough order of magnitude) is shown below. The detailed cost estimate is found in Appendix L.

Roadway	$12,673,000
Track	$2,676,000
Structures	$19,945,000
Right-of-Way Note 3 & 4	$52,552,080
Utilities Note 1 & 2	$3,800,000
Project Costs including: Geotechnical Investigation, Surveying, Engineering, Flagging, Construction Management, Agency, and Program Management Costs Note 6 &7	$21,893,000
Contingency 30%	$18,296,000
TOTAL PROJECT COST	$131,836,000

Notes:

1. Utility relocation cost estimates assume all affected utilities (sewer and storm drain) can be relocated by gravity flow systems similar to the existing systems.
2. Cost for drainage item includes construction of one storm drain pump station at the project area.
3. Right of Way cost estimates are based on $100/SF which covers the land and building allowance for full takes or areas affected by part takes.
4. Right of Way costs do not include any associated relocation costs or severance damages to the business operators.
5. Right of Way costs include a 26% allowance for acquisition costs. (appraisals, negotiation, labor, legal, closing cost, etc.)
6. Agency Costs include Agency Project Management direct labor and Agency indirect costs.
7. Program Management costs include third party project support costs such as community outreach, environmental management, DBE and labor compliance, and property survey.
8. This estimate is prepared using construction cost information based on current dollar cost as of 2011.

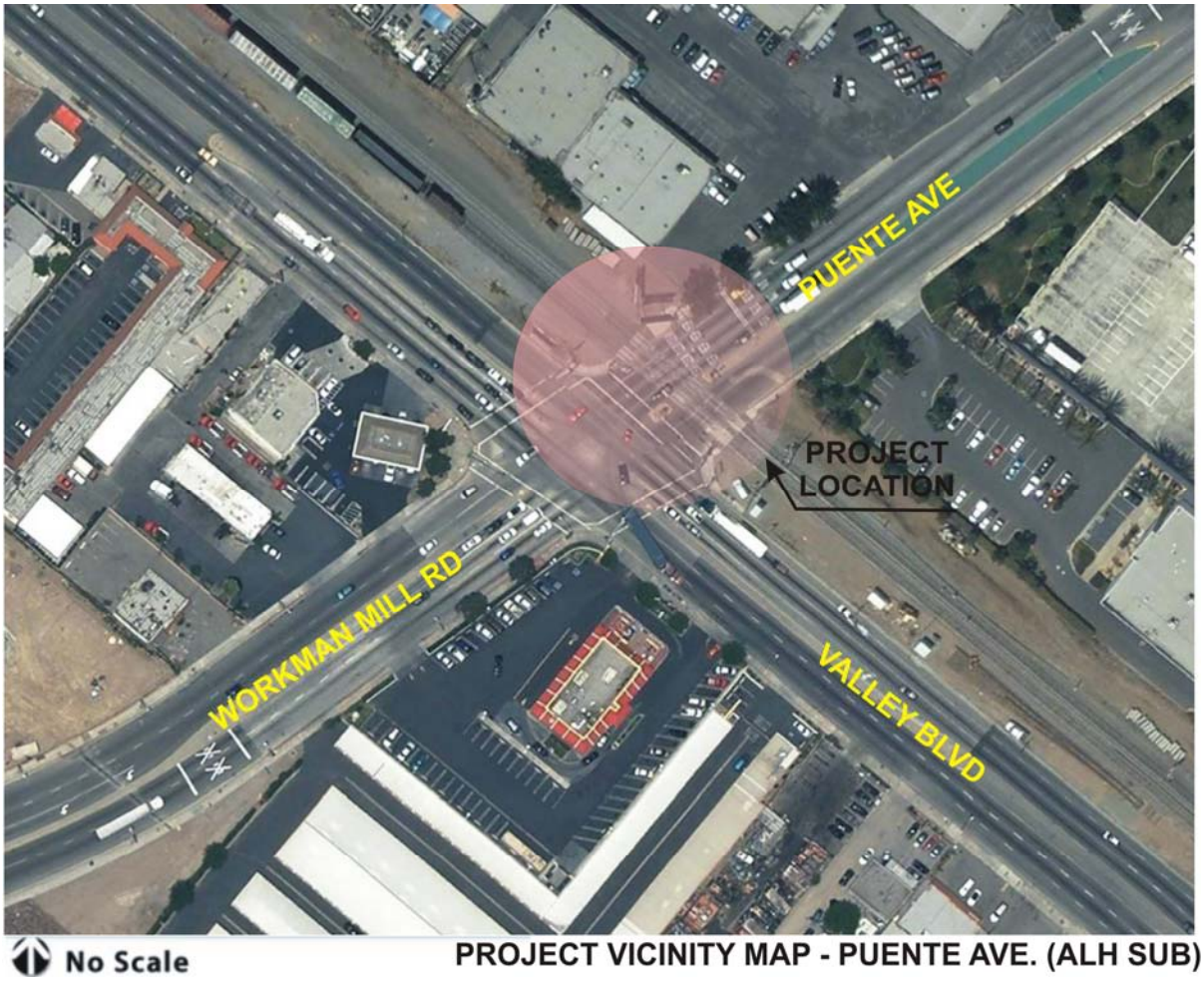
CHAPTER 5 – ALHAMBRA SUBDIVISION LOCATIONS

5.1 PUENTE AVENUE - B-498.20 - 746905M

INTRODUCTION

At the same time that this report was being developed, the City of Industry commissioned AECOM to perform a feasibility study to evaluate the alternatives for the construction of a Puente Avenue grade separation. See Figure 5-1 for a vicinity map. A copy of the AECOM report was made available to ACE. The City of Industry has given permission to quote portions of that report here. AECOM's findings and cost estimating methodology have been reviewed and it is believed they are similar enough to support comparison of proposed Puente Avenue project alternatives with the grade separation project concept plans presented elsewhere in this report.

Figure 5-1: Puente Avenue Vicinity Map



Source: *Alameda Corridor-East Construction Authority*

Two underpass alternatives were studied by AECOM. Both alternatives assume that the existing direct connecting intersection between Valley Boulevard and Puente Avenue is eliminated. Instead, a connector road is built with intersections to Valley Boulevard and Puente Avenue at either end. A similar connector road can be seen at the Nogales Street Underpass of UPRR's Alhambra subdivision, in the Cities of Industry and West Covina (this was an ACE project).

Alternative 1 is a railroad underpass of Puente Avenue with a connector road east of Puente Avenue and south of Valley Boulevard. Alternative 2 is also an underpass in the same location and with a connector road west of Puente Avenue south of Valley Boulevard. The connector road intersection with Puente Avenue in this second alternative would be an extension of South 3rd Avenue.

The AECOM report does use a design assumption that differs from that used in the preparation of this present report. The AECOM report states that the assumed minimum vertical distance between the underpass roadway and the railroad bridge soffit (bottom surface of the bridge) is 16 feet. This present report generally assumes a minimum vertical clearance of 16½ feet at railroad underpass locations. ACE's experience on other grade separation projects is that UPRR would prefer the 16½ feet minimum clearance, but has allowed the 16-foot clearance if bridge facia girders are designed with lower-edge impact protection.

DESIGN PARAMETERS

The governing design standards for horizontal and vertical roadway alignments used in the AECOM concept plan consisted of City of Industry standards, the Caltrans Highway Design Manual, AASHTO's Policy of Geometric Design of Highways and Streets, and the BNSF/UPRR Design Guidelines for Railroad Grade Separations. The following includes the specific guidelines that were used in the design of these alternatives:

- Design Speeds
  - Puente Avenue — V = 45 mph
  - Connector Roads — V = 30 mph
- Horizontal Alignment
  - Transition & Curves — Caltrans minimum requirement for design speed without super-elevation
- Vertical Alignment
  - Crest Curves — AASHTO stopping sight distance
  - Sag Curves — AASHTO comfortable speed for well-lit roadways
  - Max Grade — 5% max to accommodate ADA Standards
- Vertical Clearance
  - Roadway — 16'
  - Rail (Permanent) — 23'
  - Rail (Temporary) — 21'-6"
- Cross-Section
  - Puente Avenue — 84' curb-to-curb, 8' sidewalk on both sides. Two lanes each direction

Connector Roads	68' curb-to-curb, minimum 8' sidewalk on both sides Two lanes each direction	
• Truck Size	Caltrans 2005 (US)	CA LEGAL-65

STRUCTURES

Two bridges would be required for alternatives studied in the AECOM – City of Industry report. One would be the railroad bridge and the second would be a Valley Boulevard bridge over Puente Avenue. The railroad bridge would require a deeper bridge section (increased vertical dimension, or thickness) and would determine the ultimate depth of the underpass roadway (to provide the necessary roadway overhead clearance). The railroad bridge would have to be designed in accordance with the BNSF/UPRR "Guidelines for Railroad Grade Separation Projects", which incorporate AREMA requirements (American Railway Engineering and Maintenance Association). The railroad generally prefers steel bridge superstructures; however, for underpasses with little skew between the railroad and the roadway (a close to perpendicular crossing), ACE has been successful in obtaining UPRR agreement that precast concrete deck "I"-girder or box girder bridges can be built. As discussed, above, for the other underpass projects, concrete girder alternatives have an initial construction cost advantage over steel, they allow a wider range of acceptable architectural treatments, and they have reduced long-term maintenance costs.

The vehicular bridge assumed in the AECOM – City of Industry report is a cast-in-place pre-stressed concrete box girder. This is similar to roadway-over-roadway bridges built by ACE adjacent to railroad underpasses at Nogales Street, Reservoir Road and East End Avenue.

UTILITIES

There are numerous existing utilities within both alternatives for the Puente Avenue Underpass project footprint. These include:

- 16-inch and 48-inch diameter sanitary sewer (LACSD)
- Two 24-inch, one 36-inch & one 78-inch diameter stormwater sewer (LA County Flood Control District)
- Street lighting, intersection safety lighting and intersection traffic signals (SCE and LA County/Industry)
- 10-inch diameter water (San Gabriel Valley Water)
- 16-inch diameter water (City of Industry)
- Overhead and underground telecommunications (Verizon)
- Overhead TV cable (Charter)
- Overhead and underground electrical power distribution (SCE)
- Railroad right-of-way fiber optic lines (Level 3)
- Natural gas distribution (Southern California Gas Company)

Proposed utilities will be relocated into acquired parcels or utility easements to facilitate a single relocation where feasible. Dependent on available space for such easements, remaining utilities may require both a temporary relocation to clear construction activities and a permanent relocation for the final condition. A 48" sewer runs along the northerly property line of the UPRR and will be severed by the lowering of Puente Avenue. Record drawings indicate that the pipe has a very flat slope (S=0.0020) and therefore rerouting the pipe around the lowered segment of Puente Avenue is not feasible. In that case, the only other option would be to construct a large sewer lift station to accommodate the flow.

RAILROAD SHOOFLY

To construct either underpass alternatives, temporary railroad shooflies are required. UPRR standards indicate that shoofly alignments must maintain current timetable speeds. The existing UPRR alignment at Puente Avenue consists of two tracks at approximately 15' track centers with the north track as the main track and the south track a siding track. The tracks cross at a slight skew to Puente Avenue on tangent track. The entire length of the main line shoofly track would be approximately 2800 feet. To maintain a minimum shoring clearance of 25 feet from the proposed bridge limits, a portion of the shoofly would encroach into the west bound lanes of Valley Boulevard, necessitating the temporary closure of that portion to traffic. Westbound traffic would be temporarily detoured around the shoofly utilizing the eastbound lanes. Lane widths in both directions would be reduced to two 12' lanes with no median.

The shoofly will not impact the newly constructed Sunset Avenue Grade Separation Project which begins approximately 1500 feet east of Puente Avenue.

RECOMMENDATION

AECOM made a recommendation to the City of Industry in its report. From their analysis, it appeared that Alternative 1 is the preferred alternative over Alternative 2 because it utilizes an existing and clear County of Los Angeles easement, has minimal impact on a future residential development, has a longer Connector Road providing greater queue storage at the intersections and eliminates sight distance issues at the Connector Road intersection.

UNDERPASS ALTERNATIVE 1

Alternative 1 proposes to lower Puente Avenue under the Union Pacific Railroad tracks and Valley Boulevard. Two separate bridges would be constructed for this alternative. A connector road on the east side of Puente Avenue will provide a connection for Valley Boulevard south of the crossing. 3rd Avenue would be closed at Workman Mill Road and a new road would be constructed to Workman Mill Road. Conceptual layouts and order of magnitude estimates were developed by AECOM. This team validated the data as presented, which includes the following costs:

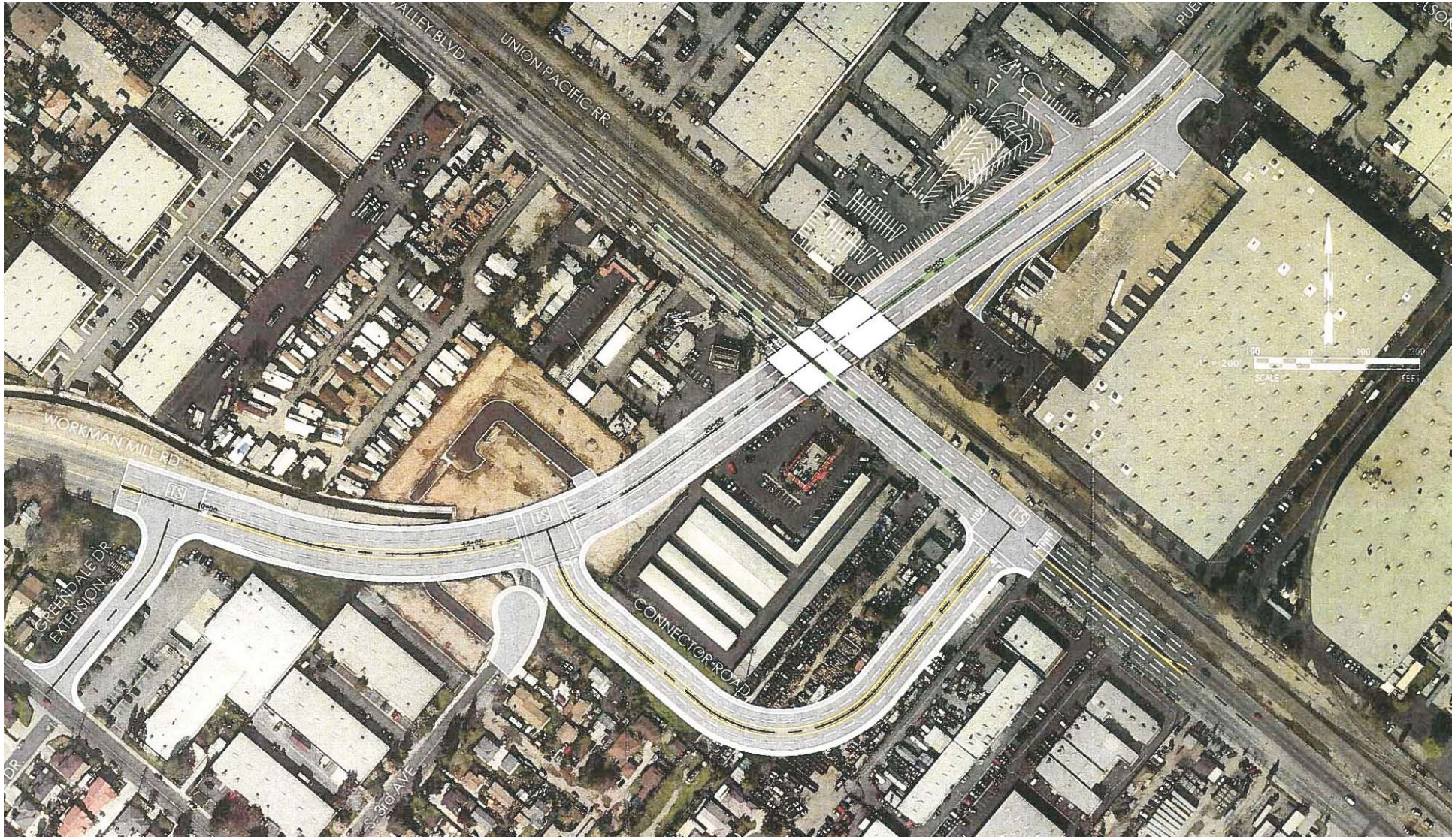
CONCEPTUAL ESTIMATE (Order of Magnitude) – PUENTE AVENUE UNDERPASS – ALHAMBRA SUBDIVISION

Roadway	$ 11,721,878
Track	$ 5,652,000
Structures	$ 10,215,500
Right-of-Way Notes 3, 4, & 5	$ 25,286,940
Utilities Note 1 & 2	$ 786,000
Project Costs including: Geotechnical Investigation, Surveying, Engineering, Flagging, Construction Management, Agency, and Program Management Costs Note 6 & 7	$ 15,890,100
Contingency 30%	$ 13,279,530
TOTAL PROJECT COST	$82,832,000

Notes:

1. Utility relocation cost estimates assume all affected utilities (sewer and storm drain) can be relocated by gravity flow systems similar to the existing systems.
2. Cost for drainage item includes construction of one storm drain pump station at the project area.
3. Right of Way cost estimates are based on $100/SF which covers the land and building allowance for full takes or areas affected by part takes.
4. Right of Way costs do not include any associated relocation costs or severance damages to the business operators.
5. Right of Way costs include a 26% allowance for acquisition costs. (appraisals, negotiation, labor, legal, closing cost, etc.)
6. Agency Costs include Agency Project Management direct labor and Agency indirect costs.
7. Program Management costs include third party project support costs such as community outreach, environmental management, DBE and labor compliance, and property survey.
8. This estimate is prepared using construction cost information based on current dollar cost as of 2011.

The conceptual plan is shown in Figure 5-2 and in Appendix M. The detailed cost estimate can also be found in Appendix M.



Source: Puente Avenue at Valley Boulevard Grade Separation Project, City of Industry, California, AECOM. August, 2009.

UNDERPASS ALTERNATIVE 2

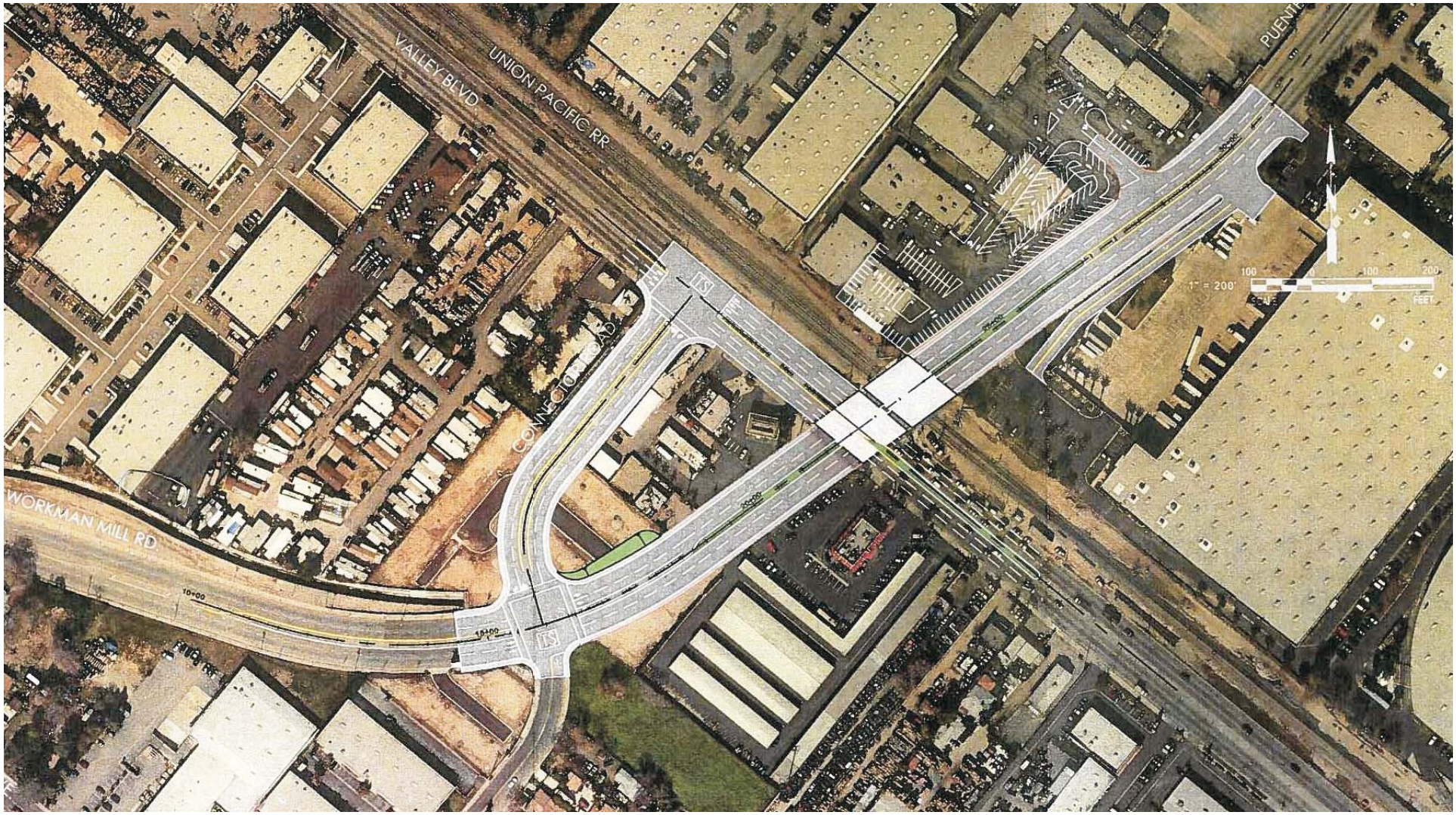
Alternative 2 is similar to the first alternative, which will also lower Puente Avenue under the UPRR tracks and Valley Boulevard. However, the connector road to Valley Boulevard will be constructed to the west of Puente Avenue. This alternative does not affect 3rd Avenue and reduces right-of-way needs. AECOM also developed conceptual layouts for this alternative as well as order of magnitude estimates, which were as follows:

Roadway	$ 9,200,000
Track	$ 2,800,000
Structures	$ 8,600,000
Right-of-Way Notes 3, 4, & 5	$ 15,876,000
Utilities Note 1 & 2	$ 3,000,000
Project Costs including: Geotechnical Investigation, Surveying, Engineering, Flagging, Construction Management, Agency, and Program Management Costs Note 6 & 7	$ 8,100,000
Contingency 30%	$ 12,930,000
TOTAL PROJECT COST	$60,506,000

Notes:

1. Utility relocation cost estimates assume all affected utilities (sewer and storm drain) can be relocated by gravity flow systems similar to the existing systems.
2. Cost for drainage item includes construction of one storm drain pump station at the project area.
3. Right of Way cost estimates are based on $100/SF which covers the land and building allowance for full takes or areas affected by part takes.
4. Right of Way costs do not include any associated relocation costs or severance damages to the business operators.
5. Right of Way costs include a 26% allowance for acquisition costs. (appraisals, negotiation, labor, legal, closing cost, etc.)
6. Agency Costs include Agency Project Management direct labor and Agency indirect costs.
7. Program Management costs include third party project support costs such as community outreach, environmental management, DBE and labor compliance, and property survey.
8. This estimate is prepared using construction cost information based on current dollar cost as of 2011.

The conceptual plan is shown in Figure 5-3 and in Appendix M.



Source: Puente Avenue at Valley Boulevard Grade Separation Project, City of Industry, California, AECOM. August, 2009.

5.2 LEMON AVENUE - B-506.70- 746915T

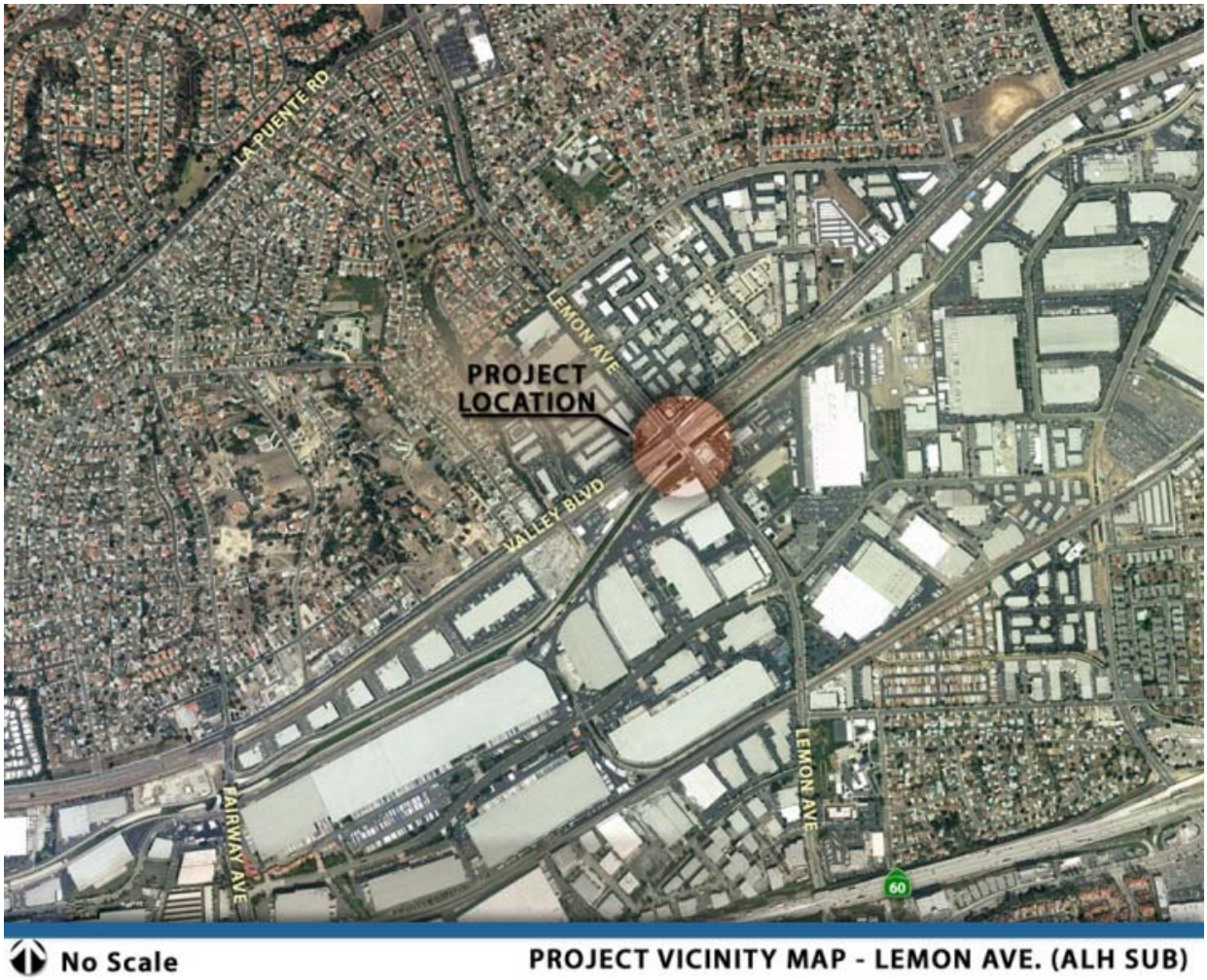
INTRODUCTION

This section assesses options for a grade separation at the intersection of Lemon Avenue and the Union Pacific Railroad (UPRR) tracks, Alhambra Subdivision, located in the Cities of Walnut and Industry in the County of Los Angeles, California. See Figure 5-4 for vicinity map. The grade separation will aim to alleviate traffic congestion as well as increase the overall safety of the grade crossing. There is only one viable option due to the San Jose Creek that runs under Lemon Avenue, therefore making the option of lowering Lemon Avenue under the UPRR tracks unfeasible. As a result of discussions over the preliminary plan for a Lemon Avenue overpass and the issues cited above with staff of the City of Walnut, a grade separation involving the raising or lowering of Lemon Avenue was not considered acceptable.

This option proposes to grade separate Lemon Avenue over the Union Pacific Railroad (UPRR) tracks. The Lemon Avenue overcrossing will additionally affect Valley Boulevard, which runs parallel to the UPRR tracks. Valley Boulevard would not be elevated to meet the Lemon Avenue overpass, but ramps would be constructed to provide access between Valley Boulevard and Lemon Avenue. Additionally, the influence of the Lemon Avenue overcrossing will result in property acquisitions as well as the closure or relocation of multiple driveways along Lemon Avenue and Valley Boulevard. This alternative would consist of multiple aerial roadway structures that would create a visual nuisance to the surrounding community. As an alternative to ramps at Valley Boulevard, the Lemon/Valley connection could be retained by use of streets north of the grade separation, but this would create a circuitous route and require additional traffic signal on Valley Boulevard to permit turning movements. The project runs along Lemon Avenue and is bounded by Paseo Del Prado to the north and Business Parkway/Currier Road to the south. This section discusses construction impact limits, right-of-way impacts, vertical and horizontal design parameters, constructability, construction cost, utilities, and other additional items that would be affected by a grade separation.

Lemon Avenue is classified as a primary arterial highway and is striped with two traffic lanes in each direction, separated primarily by a striped median.

Figure 5-4: Lemon Avenue Vicinity Map (Alhambra Subdivision)



DESIGN PARAMETERS

The horizontal and vertical roadway alignment standards used in the design consisted of the Caltrans Highway Design Manual, AASHTO policy of Geometric Design of Highways and Streets, and the BNSF/UPRR Design Guidelines for Railroad Grade Separations. The following includes the specific guidelines that were used in the design of these alternatives:

- Design Speeds
  - Lemon Avenue ramp — V = 35 mph
  - Valley Boulevard — V = 40 mph
- Horizontal Alignment
  - Transition & Curves — Caltrans minimum requirement for design speed without super-elevation
- Vertical Alignment
  - Crest Curves — AASHTO stopping sight distance

	Sag Curves	AASHTO comfortable speed for well-lit roadways
	Max Grade	6% max, 5% max where sidewalks are required to accommodate ADA Standards
• Vertical Clearance		
	Roadway	16'-6"
	Rail (Permanent)	24'
	Rail (Temporary)	21'-6"
• Cross-Section		
	Lemon Avenue	84' curb-to-curb minimum, minimum 6' sidewalk on one side (varies), Two lanes each direction.
• Truck Size	Caltrans 2005 (US)	CA LEGAL-65

OVERPASS ALTERNATIVE - Overpass with connector ramps to Valley Boulevard

HORIZONTAL LAYOUT

The proposed centerline layout of Lemon Avenue remains consistent with the existing centerline location. The overall curb face to curb face width on Lemon Avenue will match the existing 84' width and the number of lanes will remain intact. Furthermore, Lemon Avenue at Valley Boulevard will include connector ramps to transition traffic to and from the overpass.

The Valley Boulevard horizontal and vertical alignments will remain intact, with the exception of the connector ramps linking the existing Valley Boulevard to the proposed Lemon Avenue overpass.

Access to the San Jose Creek will be provided with a connector road aligned west of Lemon Avenue and will then intersect with the modified driveway, located approximately 650' south of the Lemon Avenue/Valley Boulevard intersection.

The aerial intersection would be signalized.

PROFILE

The proposed overpass is being raised over the UPRR tracks and the San Jose Creek as well. The minimum vertical clearance is 24' as specified by the UPRR Engineering Standards.

The vertical curves are based on the minimum requirements by Caltrans vertical curve design parameters.

CROSS SECTION

The Lemon Avenue existing cross section spans 84' from curb face to curb face. The street is striped as a four lane divided roadway with a 14' median. The overpass cross section is proposed to match the

existing curb face to curb face dimensions. An 8' sidewalk will be provided on the easterly side of Lemon Avenue south of Valley Boulevard.

Lemon Avenue north of Valley Boulevard will match the existing 84'cross section from curb face to curb face, and will incorporate 12' lower grade lanes on either side of the aerial structure, with parallel 8' sidewalks.

The connector ramps between Lemon Avenue and Valley Boulevard will consist of a two lane divided bridge structure with 14' lane widths.

RIGHT-OF-WAY

NORTHWEST QUADRANT

The property located on the northwest quadrant of the Lemon Avenue and Valley Boulevard intersection is comprised of six parcels. The corner parcel is undeveloped, while four of the five remaining parcels consist of the Walnut Tech Business Center. The sixth parcel is a Del Taco restaurant. The westerly buildings facing Lemon Avenue will primarily be affected by the proposed grade separation.

Property take will be required to accommodate street widening on both Valley Boulevard and Lemon Avenue. The Lemon Avenue frontage will require the greatest property take due to the increased width of Lemon Avenue. Due to the encroachment onto the properties fronting Lemon Avenue, retaining walls will need to be utilized to keep the existing property layout intact.

There are four existing driveways along Lemon Avenue. The three southerly driveways will require modification, but will remain open. The driveway farthest north will require closure due to the grade difference.

NORTHEAST QUADRANT

The property located on the northeast quadrant is comprised of eight parcels. These parcels are developed as a commercial business center.

Property take will be required to accommodate street widening on both Valley Boulevard and Lemon Avenue. The Lemon Avenue frontage will require the greatest property take due to the increased width of Lemon Avenue. Due to the encroachment onto the properties fronting Lemon Avenue, retaining walls will need to be utilized to keep the existing property layout intact.

There are two driveways on Lemon Avenue. Of these two, the farthest north will require closure due to grade changes, while the remaining driveway will require modification to remain open. There will need to be parking lot reconfiguration to incorporate the change of grade and decreased length of the southerly driveway.

SOUTHWEST QUADRANT

The property located on the southwest quadrant of the intersection of Lemon Avenue and the UPRR tracks consists of ten parcels lying along Lemon Avenue frontage, bounded to the south by Business Parkway. These parcels consist of the San Jose Creek property, a shipping company, with the remainder being comprised of an industrial warehouse park.

There are five existing driveways along the west side of the Lemon Avenue frontage. Direct access to the San Jose Creek access roads and the shipping company property will have to be rerouted under the proposed grade separation, and will require connection to Lemon Avenue via a connector road on the east side of Lemon Avenue. Two driveways that access the industrial warehouse park will require closure, while the southerly driveway will remain open with its existing configuration.

SOUTHEAST QUADRANT

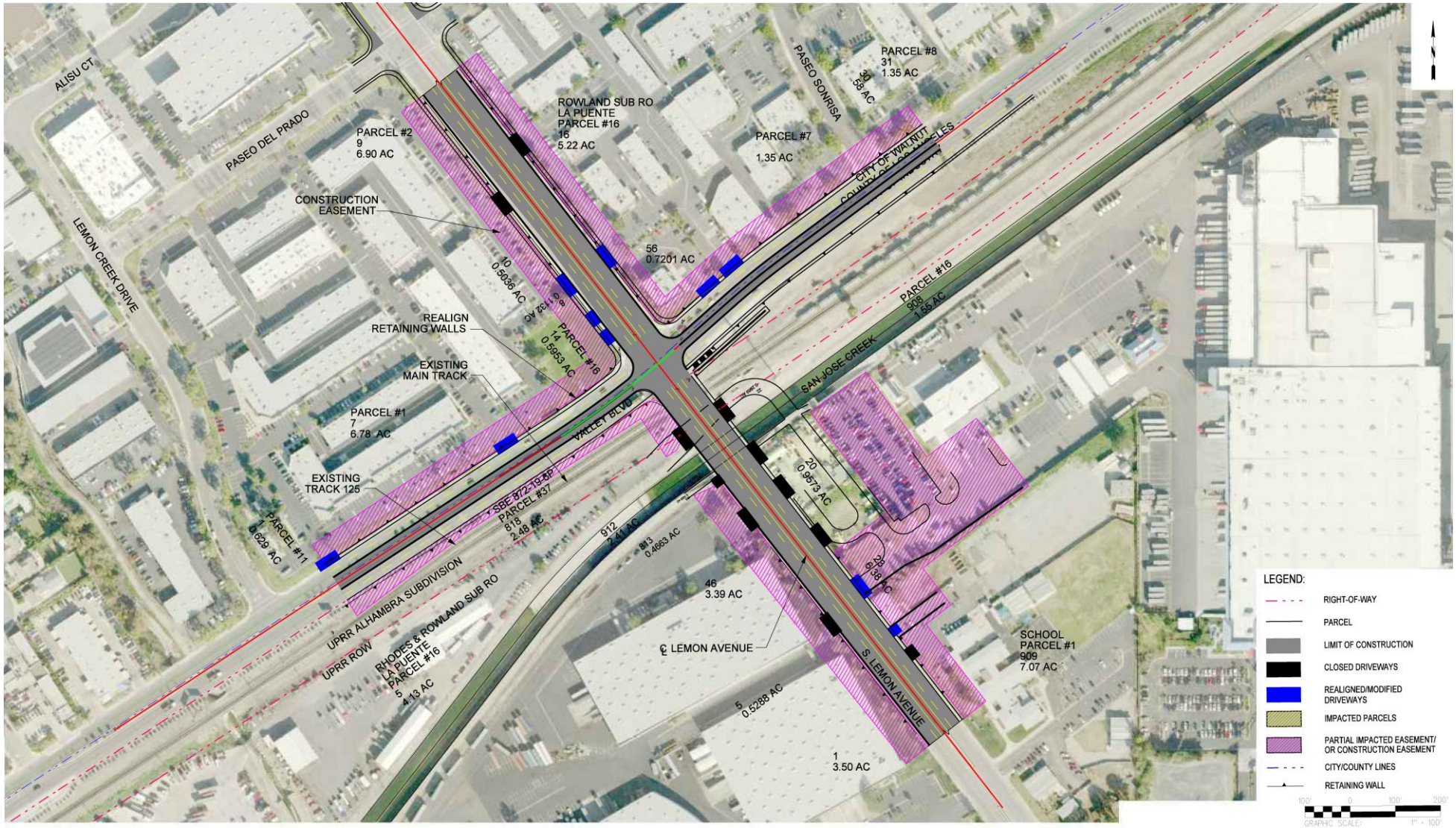
The property located on the southeast quadrant of the intersection of Lemon Avenue and the UPRR tracks consists of six parcels lying along the Lemon Avenue frontage, bounded to the south by Currier Road. These parcels consist of the San Jose Creek property, an automotive rental and repair shop, an undeveloped parcel seemingly used for storage, Sysco distribution warehouse, a Walnut Valley Unified School District child care center, as well as a Walnut Valley Unified School District public high school. There are nine existing driveways along Lemon Avenue, one of which is permanently fenced off.

Due to the close proximity to Lemon Avenue and the size of the parcel, the automotive rental and repair shop and storage yard properties will require property take, as well as the closure of the three driveways. These properties can then be utilized as an access corridor for the San Jose Creek access roads as well as the shipping company located west of Lemon Avenue. This access will join with the entrance to the Sysco Systems Company, which will need to be sloped from the proposed grade separation back approximately 450' to join grade.

Due to clearance issues between the Walnut Valley Unified School District child care center and the grade separation aerial structure, the existing child care center structure may require demolition. In addition, the adjacent public high school will require the partial loss of the northerly parking lot and closure of one of the two driveways to allow for a ramped driveway to join grade.

There are nine existing driveways along Lemon Avenue, one of which is permanently fenced off. The proposed layout requires the closure of three of the driveways accessing the automotive rental and repair shop, as well as the driveway accessing the storage yard. The driveway accessing the San Jose Creek will be realigned at grade and is proposed to connect with the proposed connector road.

Figure 5-5 illustrates the conceptual overpass alternative at Lemon Avenue which is also found in Appendix N.



Source: JL Patterson & Associates, Inc.

5.3 FAIRWAY DRIVE – B-505.75 -746913E

The Fairway Drive Alhambra Subdivision crossing is bounded by Walnut Drive, Business Parkway and San Jose Avenue on the south and Valley Boulevard on the north. Fairway Drive is a main arterial in the City of Industry. However, north of Valley Boulevard it becomes a narrow residential street, Camino De Teodoro, in the City of Walnut. See Figure 5-6 for a vicinity map. Because Fairway Drive transforms from an arterial serving a commercial/industrial area on the south to a two-lane residential street on the north, a conventional through underpass or overpass is inappropriate. As with Lemon Avenue to the east, it would also be necessary to maintain a connection between the arterial (Fairway Drive) and Valley Boulevard. Unlike Lemon Avenue, however, ramp connections would intrude substantially into an existing residential area with significant property acquisitions and substantial impacts on the remaining residences. For these reasons, a grade separation of Fairway Drive by raising or lowering Fairway Drive was determined to be infeasible in terms of impacts to the community under either configuration. This was confirmed in discussions with the staff from the City of Walnut.

Since the raising or lowering of Fairway Drive is infeasible, an alternative approach to a grade separation is to elevate the railroad. This is discussed in the two following sections. One option is to raise the railroad above both Fairway Drive and Lemon Avenue. The other option is to raise the railroad only over Fairway Drive.

Figure 5-6: Fairway Drive Vicinity Map (Alhambra Subdivision)

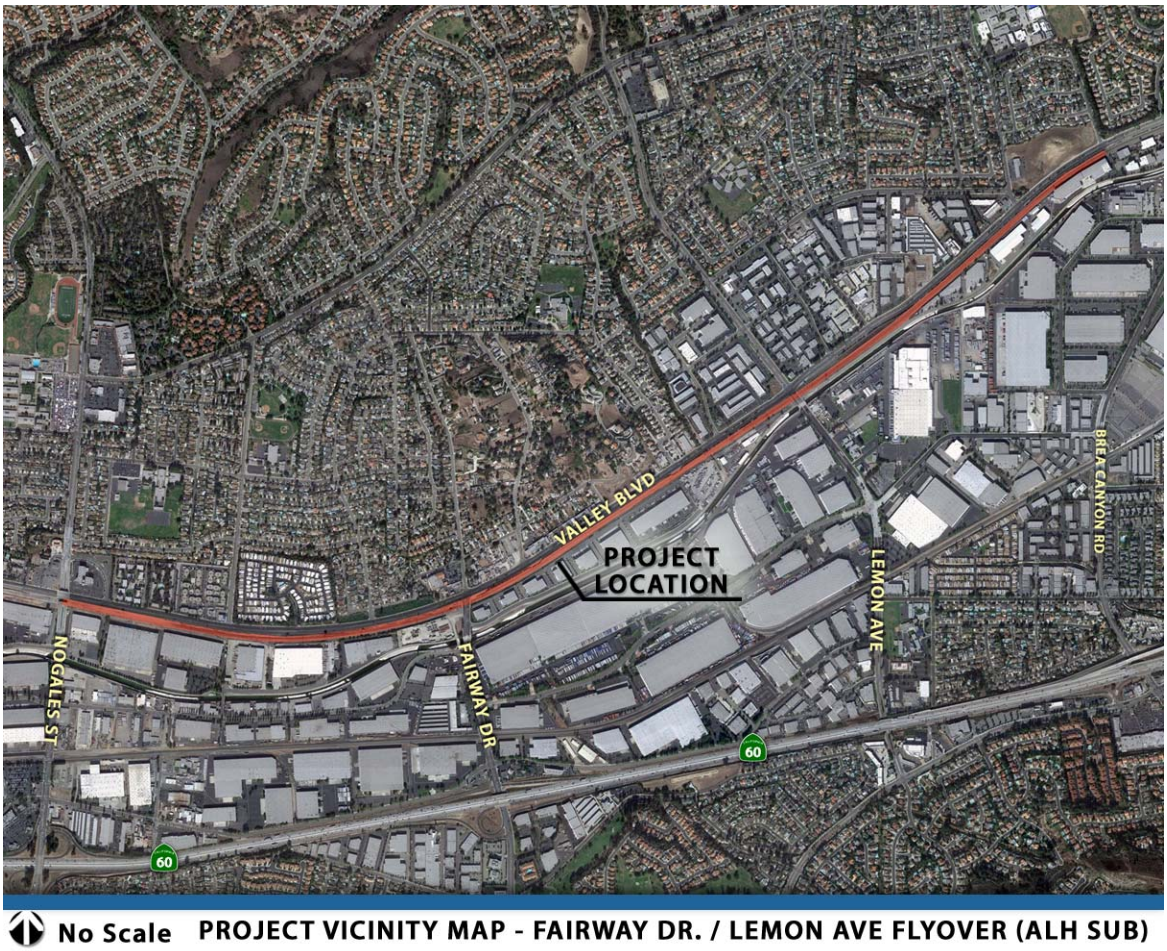
Source: *Alameda Corridor-East Construction Authority*

5.4 FAIRWAY DRIVE - B-505.75 -746913E / LEMON AVENUE - B - 506.70 - 746915T

INTRODUCTION

The existing UPRR right-of-way is approximately 100 feet wide between Nogales Street and Brea Canyon Road. The right-of-way is generally free of outside encroachments or other improvements of a substantial nature. A flyover structure, or raise of the railroad, will be studied in two options. Option 1 will consider a grade separation of Fairway Drive and Lemon Avenue, Option 2 will separate Fairway Drive. The limits of work will be from Nogales Street to Brea Canyon. There is one industry track at the beginning of the work limits; per this study, the service to the mainline can continue to serve the business. See Figure 5-7 for a vicinity map. Based on the infeasibility of grade separating either Fairway Drive or Lemon Avenue by moving either road, the option of elevating the UPRR over one or both streets was considered.

Figure 5-7: Fairway Drive/Lemon Avenue Vicinity Map (Alhambra Subdivision)



This report appraises alternatives for the partial raise of the UPRR Alhambra Subdivision between MP 504 and MP 508. The project is located in the City of Industry, California, and generally bound by Nogales Street to the west, Brea Canyon Road to the east, Valley Boulevard to the north and State Route 60 to the south. This segment of railroad consists of 1 main track with a 7,000 foot siding and traverses 2 at-grade crossings, Fairway Drive and Lemon Avenue. Current rail traffic (2009) is estimated at 20 trains or railroad events in a 24-hour period. This accounts for 17 freight trains and 3 local switchers. This number is a result of the recent economic downturn and is expected to double in the near future.

The following analysis is aimed at the physical separation of trains and autos at Fairway Drive and Lemon Avenue via the raise of the UPRR railroad at the street crossings. This alternative was evaluated by applying the UPRR vertical curve design criteria.

OPTION 1-FAIRWAY DRIVE AND LEMON AVENUE

UPRR Vertical Curve Design

Brea Canyon Road – Return to Grade
Lemon Road – Raise Track 23.7'
Fairway Drive –Raise Track 22'
Nogales Street – Return to Grade

OPTION 2-FAIRWAY DRIVE

UPRR Vertical Curve Design

Lemon Road – Return to Grade
Fairway Drive –Raise Track 22'
Nogales Street – Return to Grade

UPRR Vertical Curve Criteria

In order to raise the railroad, it is necessary to adhere to vertical curve design criteria as established by the UPRR railroad. This criterion establishes that for main tracks, the maximum average change in gradient per 100' stations (V/L) may not exceed 0.06 in sag curves and 0.10 in summit curves. This criterion is established in UPRR STD DWG 0016. Based on the UPRR criteria and the restricted limits to the east and west of the project area, the maximum rise obtainable for the structure is approximately 24 feet.

ENGINEERING ANALYSIS

The existing ruling track grade of 1.06% was optimized within the work limits of Nogales Street and Brea Canyon Road while maintaining UPRR railroad criterion. In order to maintain operation to the track while under construction, a temporary shoofly track is warranted. The existing UPRR - Los Angeles Division consists of one mainline track; therefore, the railroad would most likely require ACE to build a single track shoofly. The railroad right-of-way is wide enough to accommodate the shoofly as it is shown on the exhibit in Appendix N. The shoofly tracks have been preliminarily designed, for this concept level report, to accommodate speeds of 65 miles per hour for freight operations and 70 miles per hour for passenger trains.

The raised structure for this study consists of a 50-foot inside wall to inside wall dimension and allows for two main tracks at 15-foot track centers with room for a 8-foot access road and 12-foot centerline of track to edge of access road within the raised structure (Figure 5-8). The railroad right-of-way is assumed to be 100 feet throughout the entire limits of the project. An existing spur track servicing a warehouse just east of Nogales Street will remain with no major improvements required.

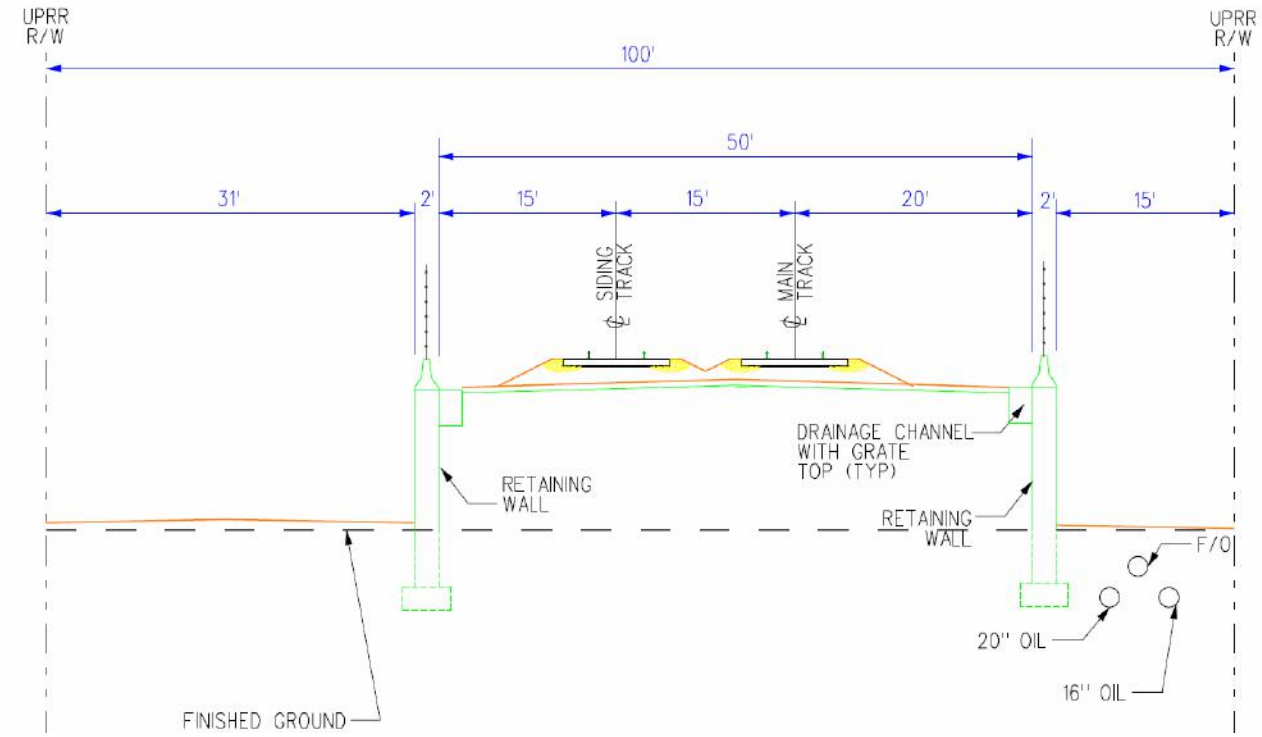


Figure 5-8: Proposed flyover section final configuration

Figures 5-9, 5-10, and 5-11show that with the construction of the shoofly track, the railroad can remain in service and construction of the flyover structure can be completed within the available right-of-way. As each phase is completed, traffic will shift from the main track to the shoofly and ultimately onto the structure. Phasing will be similar in both options.

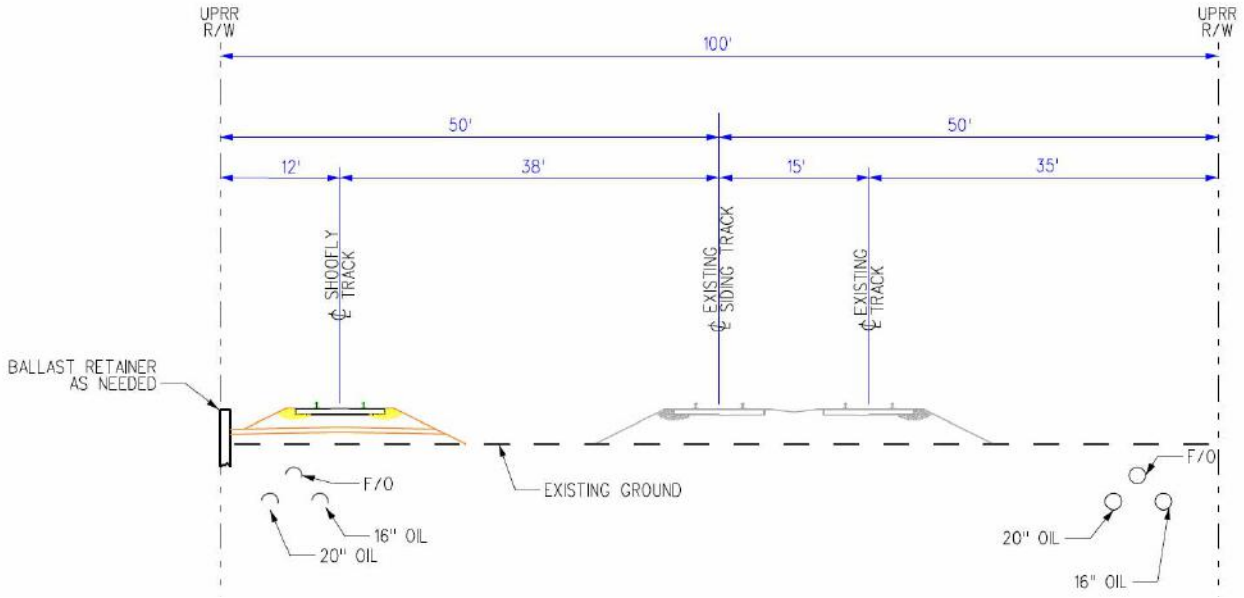


Figure 5-9: Required main track configuration during shoofly operation

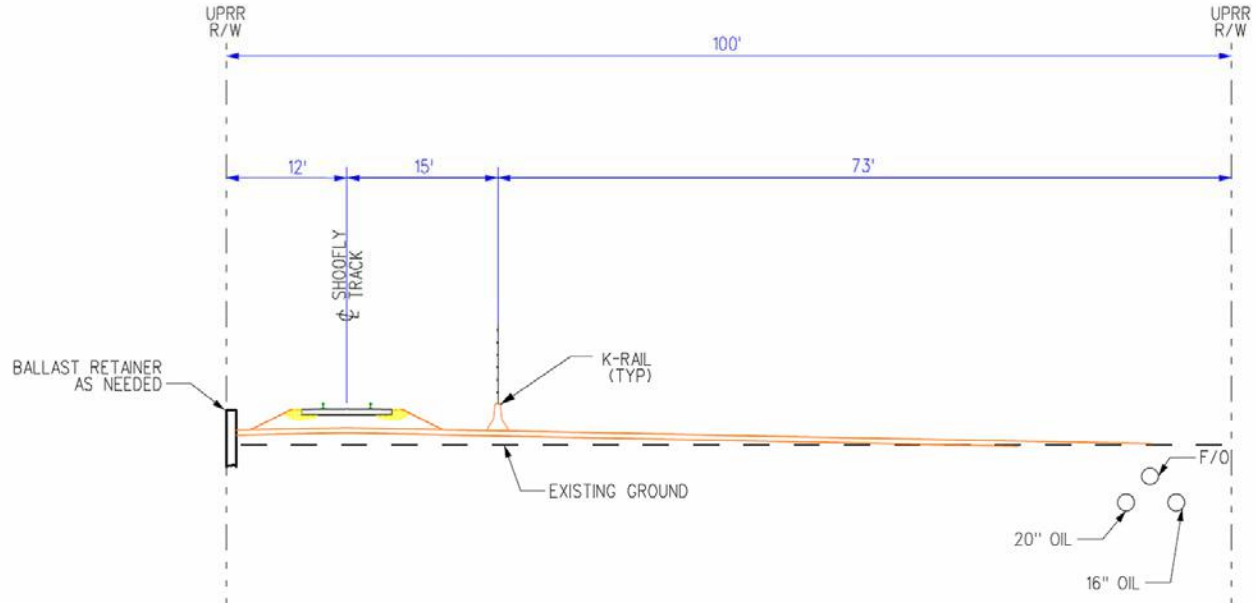


Figure 5-10: Move traffic to shoofly and remove main track

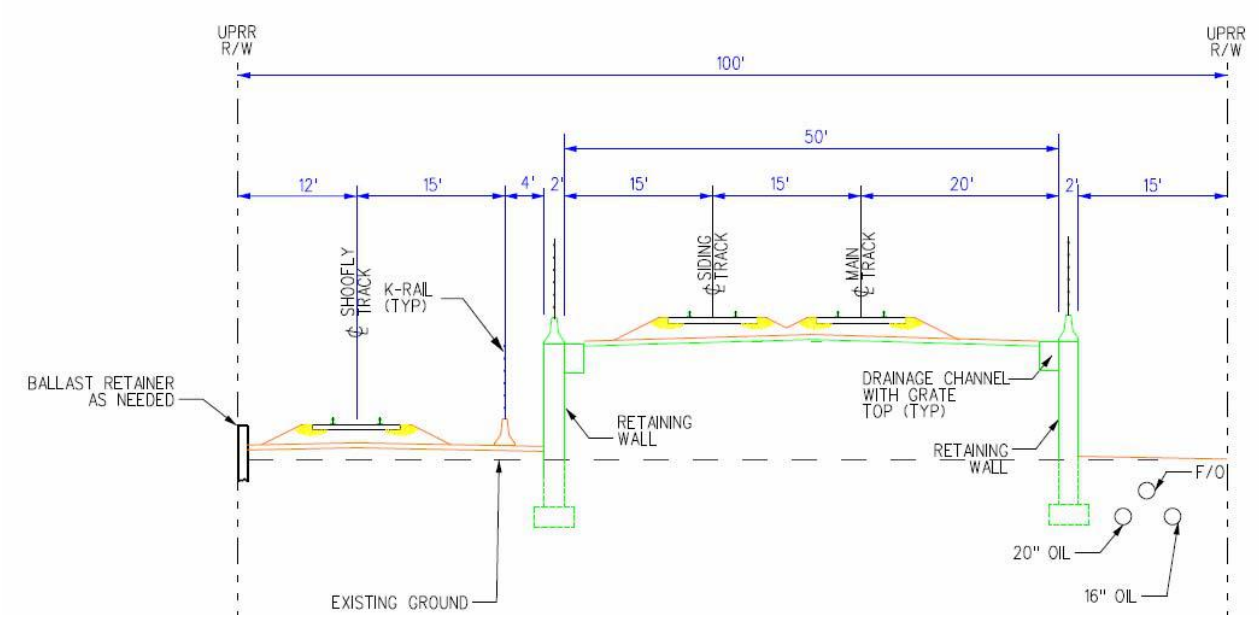


Figure 5-11: Construct retaining walls and tracks

UTILITIES

A preliminary investigation of the utilities along the right-of-way has been completed. Based upon this research, several facilities were identified as potential impacts:

- 16" Oil line – Kinder Morgan
- 20" Oil Line – Kinder Morgan
- Fiber Optic – Level 3
- Overhead Power lines at Crossings and along right-of-way

The utility relocation is necessary for the construction of the shoofly track, a 15-foot wide utility corridor is being provided on the south side of the property where the oil and fiber optic lines can be relocated.

STRUCTURAL TYPE SELECTION

The types of the bridges and walls to be used at various locations are selected by considering the following factors:

- The geometry of the railroad and roadway alignment to be tied in the existing location.
- Minimize loss of revenue – minimize traffic impact on both railroad and roadway
- Minimize disturbances during construction
- Minimize right-of-way impacts and takings

- Constructability

BRIDGE TYPE SELECTION (Fairway Drive and Lemon Avenue)

The bridge type selection is required to be studied in detail at an advanced design phase of the project. However, for this conceptual design and cost estimating purposes, a 110-foot long bridge with two spans using steel rolled beams is proposed at these locations. As a general rule, per UPRR Guidelines, the use of a steel superstructure for undercrossing is given the first preference. The use of a steel beam superstructure instead of concrete reduces the vertical clearance requirement by one foot to 16.5 feet. Based on the ruling track grade the minimum vertical clearance of 16.5 feet was obtainable over Fairway Drive. The use of a steel superstructure is warranted based on the minimum clearance available and the required span to cross over the roadway. The slight skew of the bridge is easily accommodated by this type of structure. Taking into consideration the aforementioned variables, the use of a steel bridge at both locations is warranted. Steel deck using steel plates is proposed in order to reduce the structural depth.

The cantilever types of abutments with a single row of CIDH with abutment cap should be considered unless geotechnical findings prohibit the use. Alternatively, driven piles or a smaller diameter CIDH pile with a pile cap may be used. The earth under the abutment cap may be retained by an MSE system.

RETAINING WALL TYPE SELECTION

In order to raise the railroad tracks in an efficient and practical manner, an MSE system is proposed. Alternatively, a T-Wall System may be used. Both retaining systems serve the same purpose. However, the use of an MSE system may prove to be a more efficient system. Comparatively, traditional retaining structures are costly and cannot be used efficiently in the restricted room available for the shoofly and the construction stages required for the grade separation scheme adopted.

RIGHT-OF-WAY

Based on the available 100-foot right-of-way throughout the alignment and the proposed construction phasing discussed earlier on, it appears that no significant right-of-way impacts are apparent. At an advanced design phase of the project, future right-of-way impacts should be evaluated on the completion of an EIR.

ENVIRONMENTAL CONSIDERATIONS

The environmental setting within the project area consists of a highly urbanized area with a mix of industrial and residential uses. Following is a description of the environmental processes affecting the project as well as anticipated environmental issues.

ENVIRONMENTAL COMPLIANCE

NEPA

Railroad grade separations are identified as NEPA Categorical Exclusions under 23 CFR 771.117(d) and it is anticipated that this will be the recommended NEPA documentation for the proposed project (i.e.,

NEPA CE with technical studies). However, for a NEPA CE to be prepared, a single build alternative must be identified and agreed upon early in the process.

California Environmental Quality Act (CEQA)

Railroad grade separations are statutorily exempt from CEQA, as identified in Section 21080.13 of the Public Resources Code and in Section 15282(g) of the CEQA Guidelines. Statutorily exempt projects are excused entirely from the environmental review process and the requirements of CEQA. In addition, all activities performed to support the grade separation project are included in the exemption. It is assumed that all project components would be associated with the railroad grade separation and would be covered under the exemption. Therefore, it is assumed that no CEQA document or documentation will be required for the proposed project.

NOISE AND VIBRATION – LONG AND SHORT TERM

It is expected that there will be an increase in noise and vibration during construction and ongoing after project completion. The project area itself is bounded by an industrial zone to the south and to the north. However, residential zoning is found one block north of Valley Boulevard. Due to the proximity of residential land uses, the increase in noise is of concern. In regard to ongoing/operational noise levels, the project involves raising the track approximately 22 feet and 24 feet higher than the existing conditions at Fairway Drive and Lemon Avenue, respectively; therefore, noise levels related to trains passing by could be amplified. A pre- and post-construction noise study may be required along with a study considering the advantages of certain design features, such as sound walls that can be used to mitigate noise levels.

AIR QUALITY – LONG AND SHORT TERM

The project will have a positive impact on long term air quality. The separation of the railroad from automobile traffic will serve to reduce idling of vehicles that would otherwise need to wait as a train passes through the crossing. Additionally, improved and more reliable train service should have a minor positive impact in heavy truck trips on highways.

TRAFFIC

This project will have a positive impact on long term traffic in the area, relieving congestion on heavily utilized arterials. During construction, there could be short-term impacts if the roads need to be closed.

SOCIAL

Property Impacts

There are no significant property impacts that can be seen at this concept level. It is assumed that construction can be maintained within the available railroad right-of-way.

Aesthetics

The project is not anticipated to significantly impact the views or skyline from nearby residences, as it is located at a lower elevation than the residences to the north. Additionally it may provide a distinct separation between the industrial areas to the south and the residential area to the north. In order to improve this transition, landscaping and architectural features along with local art can be proposed on

the north side of the retaining walls to screen and soften the appearance from surrounding areas.

SUMMARY: OPTION 1- FAIRWAY DRIVE/LEMON AVENUE GRADE SEPARATION

- Length of raised structure section approximately 14,017'
- Begin raising railroad tracks at Nogales Street
- Raise Fairway Drive by 22', construct bridge
- Raise Lemon Avenue by 23.7', construct bridge
- Return to grade 2,400' from Brea Canyon Road

See Appendix N.1 for railroad alignment and profile.

SUMMARY: OPTION 2- FAIRWAY DRIVE GRADE SEPARATION

- Length of raised structure section approximately 7,562'
- Begin raising railroad tracks at Nogales Street
- Raise Fairway Drive by 22', construct bridge
- Return to grade 1,200' from Lemon Avenue

See Appendix N.2 for railroad alignment and profile.

A Summary of the project cost estimate (rough order of magnitude) is shown below. The detailed cost estimate is found in Appendix N.1.

CONCEPTUAL ESTIMATE (Rough Order of Magnitude) –RAILROAD TRACK RAISE – ALHAMBRA SUBDIVISION

OPTION 1- FAIRWAY DRIVE/LEMON AVENUE GRADE SEPARATION

Summary of Project Cost Estimate:

Roadway(See Grade Crossing Estimates)	$13,253,000
Track	$6,672,000
Structures	$48,309,000
Right-of-Way Note 2 & 3	$1,890,000
Utilities Note 1	$2,800,000
Project Costs including: Geotechnical Investigation, Surveying, Engineering, Flagging, Construction Management, Agency, and Program Management Costs Note 6 &7	$39,779,040
Contingency 30%	$33,243,900
TOTAL PROJECT COST	$145,947,000

Notes:

1. Utility relocation cost estimates assume all affected utilities (sewer and storm drain) can be relocated by gravity flow systems similar to the existing systems.
2. Right of Way cost estimates are based on $100/SF which covers the land and building allowance for full takes or areas affected by part takes.
3. Right of Way costs do not include any associated relocation costs or severance damages to the business operators.
4. Right of Way costs include a 26% allowance for acquisition costs. (appraisals, negotiation, labor, legal, closing cost, etc.)
5. Agency Costs include Agency Project Management direct labor and Agency indirect costs.
6. Program Management costs include third party project support costs such as community outreach, environmental management, DBE and labor compliance, and property survey.
7. This estimate is prepared using construction cost information based on current dollar cost as of 2011.

CONCEPTUAL ESTIMATE (Order of Magnitude) – FAIRWAY DRIVE FLYOVER– ALHAMBRA SUBDIVISION

A Summary of the project cost estimate (rough order of magnitude) is shown below. The detailed cost estimate is found in Appendix N.2.

OPTION 2- FAIRWAY DRIVE GRADE SEPARATION

Summary of Project Cost Estimate:

Roadway	$7,618,000
Track	$3,410,000
Structures	$22,600,000
Right-of-Way Note 2, 3 & 4	$1,260,000
Utilities Note 1	$1,700,000
Project Costs including: Geotechnical Investigation, Surveying, Engineering, Flagging, Construction Management, Agency, and Program Management Costs Note 5 & 6	$19,784,240
Contingency 30%	$16,533,900
TOTAL PROJECT COST	$72,907,000

Notes:

1. Utility relocation cost estimates assume all affected utilities (sewer and storm drain) can be relocated by gravity flow systems similar to the existing systems.
2. Right of Way cost estimates are based on $100/SF which covers the land and building allowance for full takes or areas affected by part takes.
3. Right of Way costs do not include any associated relocation costs or severance damages to the business operators.
4. Right of Way costs include a 26% allowance for acquisition costs. (appraisals, negotiation, labor, legal, closing cost, etc.)
5. Agency Costs include Agency Project Management direct labor and Agency indirect costs.
6. Program Management costs include third party project support costs such as community outreach, environmental management, DBE and labor compliance, and property survey.
7. This estimate is prepared using construction cost information based on current dollar cost as of 2011.

CHAPTER 6 – LOS ANGELES/ALHAMBRA SUBDIVISION LOCATIONS

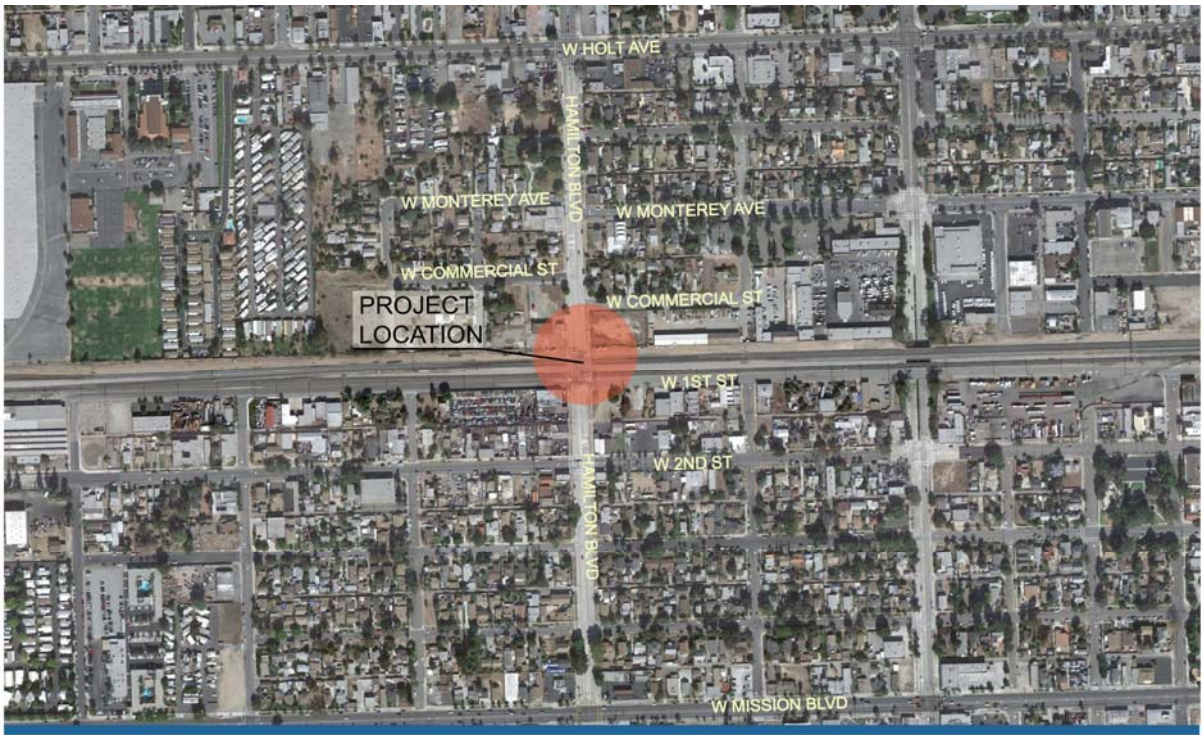
6.1 HAMILTON BOULEVARD - 31.24 - 746925Y

INTRODUCTION

This section of the report is prepared to evaluate the feasibility of constructing a grade separation at the Hamilton Boulevard and Union Pacific Railroad (UPRR) intersection in the City of Pomona. The project analyzed the construction impact limits, right-of-way impacts, vertical and horizontal design parameters, constructability, construction cost, utilities, as well as other design factors.

The Hamilton Boulevard at-grade crossing of the UPRR railroad tracks is located in the City of Pomona, bounded by 1st Street and 2nd Street to the south, and Monterey Avenue and Commercial Street to the north. The street is oriented north-south, approximately one mile south of the I-10 Freeway. It crosses Holt Avenue to the north and Mission Boulevard to the south of the grade crossing. See Figure 6.1-1 for the vicinity map. Extensive delay due to frequent train movements is a major issue for drivers and local citizens. Pedestrian and vehicle crossing-related safety concerns are another reason for the project need and purpose.

Figure 6.1-1: Hamilton Boulevard Vicinity Map (Alhambra/Los Angeles Subdivision)



Hamilton Boulevard is currently striped to accommodate four lanes with two lanes in each direction. The intersection of Hamilton Boulevard and 2nd Street is signalized. Other cross streets, including 1st Street, Commercial Street and Monterey Avenue at Hamilton Boulevard are two-way stop controlled. 1st Street which runs parallel to the UPRR railway track crosses Hamilton Boulevard about 20-30 feet south of the at-grade crossing. The proposed grade separation will maintain the same lane configuration along Hamilton Boulevard in the study area. Land uses surrounding the project site include mostly

commercial and industrial uses with some single family and multi family residential units. The driveways to some of these uses along Hamilton Boulevard are expected to be closed or relocated. A partial take of easements or complete take of the property is expected to affect the surrounding parcels.

The Los Angeles and Alhambra Subdivisions of the UPRR west of the Hamilton Boulevard grade crossing run parallel to each other until they split east of Ramona Avenue. Approximately 77 railroad events (trains and switching activities) occur at this at-grade crossing daily. The track layout across the Hamilton Boulevard crossing currently consists of three main lines. The fourth main line is currently under construction and expected to be connected through Hamilton Boulevard in the near future. The rail crossing area includes flashing warning light signals with bells and gates, and overhead cantilevered flashing warning lights on all four corners of the at-grade crossing (four-quadrant gates).

During the conceptual design process, coordination meetings with City staff and ACE staff have been conducted. As-build drawings and other reference plans/documents have been obtained from the City, ACE, and other relevant agencies. Utility companies have also been contacted. Field reviews and notes have been collected by the project team.

UNDERPASS VERSUS OVERPASS ALTERNATIVES

The grade separation project will reduce traffic congestion and increase safety at the crossing. Two alternatives were initially considered, underpass and overpass grade separation. The overpass option was dropped from further study after initial concept plans were reviewed by ACE staff and staff from the City of Pomona. The underpass option requires a smaller footprint, resulting in fewer impacts to adjacent private properties and the surrounding community. Pedestrian sidewalk design consistent with Federal Americans with Disabilities Act (ADA) requirements can also be achieved with the underpass option.

In general, underpasses require significantly greater design and construction effort than overpasses, generating greater civil and structural construction, utility relocation and railroad force account costs. However, where properties adjacent to the at-grade crossing have fully developed industrial, commercial or retail uses, the reductions in project area and associated property takings and access impacts associated with underpasses, as compared to overpasses, can result in expected overall lower costs. There are also important qualitative judgments to be made when choosing between overpasses and underpasses. Overpasses can create significant pedestrian circulation, ADA, view line and daylight barriers. The aerial structures may also broadcast vehicular engine and tire noise over a wide area.

This preliminary finding that a grade separation project at the Hamilton Boulevard at-grade crossing be an underpass is consistent with ACE's experiences in development, design and construction of its Phase I grade separation projects in developed urban areas. Under Federal and State guidelines, further engineering design effort on eliminating the Hamilton Boulevard grade crossing would include a value engineering activity as part of preliminary engineering (development of 30%-level content). The value engineering requirement would apply to all Phase II locations. A routine part of the value engineering activity would be re-examination of underpass vs. overpass cost and quality-of-life trade-offs.

The underpass alternative also proposes to lower Hamilton Boulevard under 1st Street. A separate bridge will be proposed for 1st Street south of the UPRR railway bridge. The project also proposes the closure of Commercial Street and all impacted driveways along Hamilton Boulevard. Retaining walls will need to be constructed at some locations to protect the adjacent parcel uses.

In choosing a grade separation design, the criteria used in evolving the concepts were maintenance of roadway vehicular traffic capacity and safe travel speeds through the completed underpass, minimization of construction project limits and impacts on access into adjacent properties, mitigation of impacts on the surrounding community, avoidance of disruption to railroad operations, relocation or protection of all affected utility facilities while minimizing utility service outages, and minimization of permanent and temporary property and right-of-way takings required for the crossing elimination.

DESIGN PARAMETERS

The horizontal and vertical roadway alignment standards used in the design consisted of the *Caltrans Highway Design Manual*, *AASHTO Policy of Geometric Design of Highways and Streets*, and the *BNSF/UPRR Design Guidelines for Railroad Grade Separations*. The following includes the specific guidelines that were used as the design parameters:

- Design Speeds (V)

Hamilton Boulevard	V = 40 mph
1st Street	V = 35 mph
Monterey Avenue	V = 35 mph
2nd Street	V = 35 mph
Railroad Shoofly Track	V = 65-70 mph

- Horizontal Alignment

Transition & Curves	Caltrans minimum requirement for design speed without super-elevation

- Vertical Alignment

Crest Curves	AASHTO stopping sight distance
Sag Curves	AASHTO comfortable speed for well-lit roadways
Max Grade	6% max per Caltrans Highway Design Manual

- Vertical Clearance

Roadway	16'-6" per Caltrans Highway Design Manual
Rail (Permanent)	24'
Rail (Temporary)	21'-6"

- Cross-Section

Hamilton Boulevard	84' curb-to-curb minimum, minimum 8' sidewalk, two lanes each direction

- Truck Size — Caltrans 2005 (US) — CA LEGAL-65

UNDERPASS ALTERNATIVE

The underpass alternative proposes to construct an underpass structure under the UPRR tracks generally along the original alignment of Hamilton Boulevard. The existing at-grade crossing would be eliminated and separate bridges will be installed for the UPRR tracks and 1st Street. The underpass would have a four lane configuration with final vertical clearance of the underpass structure conforming to the UPRR/BNSF jointly developed "Guidelines for Railroad Grade Separation Projects." The minimum vertical clearance from the finished roadway surface up to the bridge superstructure soffit (bottom surface of the bridge) for the proposed type of structure would be 16'-6".

GEOMETRY – HORIZONTAL, VERTICAL, AND CROSS SECTION

HORIZONTAL LAYOUT

The proposed centerline layout of Hamilton Boulevard remains consistent with the existing centerline location. The overall curb face to curb face width on Hamilton Boulevard will match the existing 84' width and the number of lanes will remain intact. Due to the change in elevation, the affected roadway of Commercial Street will be closed to form a cul-de-sac. A separate bridge will be provided for 1St Street, south of the UPRR railway bridge, maintaining the existing centerline alignment and cross section dimensions of the street. The signalized intersection at Hamilton Boulevard and 2nd Street will be retained with modified intersection and signal design. The east and west legs of Monterey Avenue at Hamilton Boulevard will maintain the existing stop-control devices.

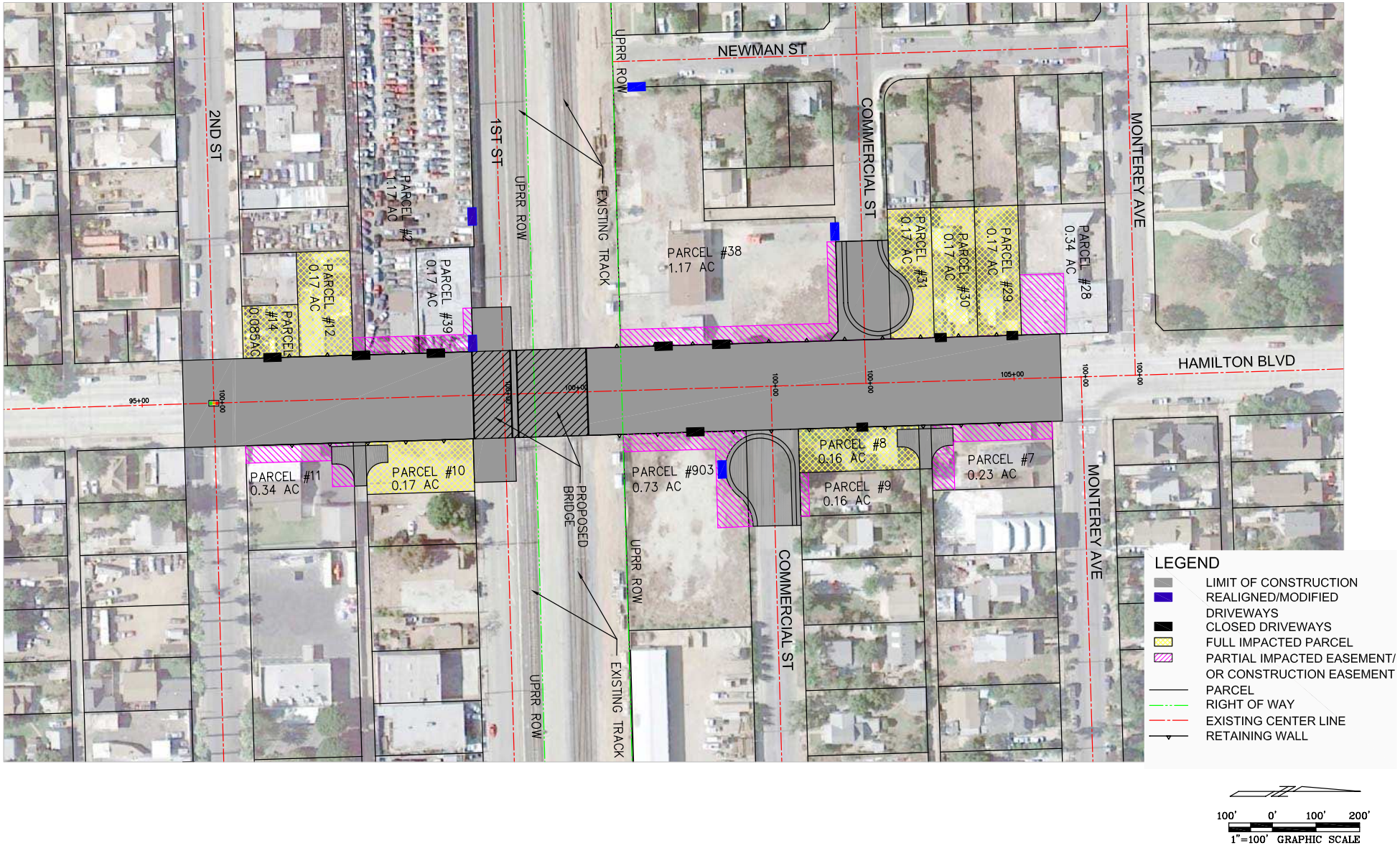
The horizontal concept plan is illustrated on Figure 6.1-2 and Page 1 of Appendix O.

PROFILE

The proposed Hamilton Boulevard underpass will be below the grade of the UPRR tracks and 1st Street. The minimum vertical clearance allowed is 16 feet throughout the width of the bridge with a sacrificial beam provided per UPRR requirements. This is consistent with several previously conducted ACE grade separation projects.

The vertical curves are based on the minimum requirements consistent with Caltrans vertical curve design parameters. In addition, the sag vertical curves are based on the AASHTO comfort equation which decreases the length of the vertical curve required, and therefore allows the roadway to join existing conditions sooner and reduces the overall project footprint.

The vertical profile concept plan is illustrated on Page 2 of Appendix O of this report.



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PLANNING & ENGINEERING

ACE Phase II Grade Separation Traffic Study and Concept Plans

Figure 6.1-2

HAMILTON BOULEVARD (LOS ANGELES/ALHAMBRA SUBDIVISION RAILROAD) ROADWAY HORIZONTAL CONCEPT PLAN

CROSS-SECTION

The existing Hamilton Boulevard cross-section includes a 68-foot curb to curb width and 8-foot sidewalks on each side of the roadway. The street is striped for two lanes in each direction with parking allowed on most parts of the project segment, outside the railroad right of way defined by the crossing signal gates. The Hamilton Boulevard right of row (ROW) is about 100 feet.

The underpass cross-section proposes to widen the curb to curb width to 84-foot. A raised median of 10-foot is proposed for the majority of the project limit. Two lanes in each direction will be striped along the sag portion of the street. Additional exclusive left turn lane will be striped at the intersections of 2nd Street and Monterey Avenue. Sidewalks of 8-foot wide will be provided on both sides of the street. Because of the gradient of the curve and to meet ADA requirements, the sidewalks will be elevated from the street, which will meet the existing sidewalk at the end of the project limits. In addition, this elevation of the sidewalk will provide a separation of the pedestrians from the vehicular traffic.

First Street is a two lane roadway with curb to curb dimensions of 40 feet. There is a 5-foot sidewalk on the southwest side of the street, and an 8-foot sidewalk on the southeast side of the street. The north side of the street close to the railway tracks has no sidewalk. The proposed cross-section of 1st street, which will be bridged over Hamilton Boulevard, will match the existing cross-section. The proposed cross-section will be 40 feet curb to curb with a 6-foot sidewalk along the south side of the street. The cross-section concept plan is illustrated on Page 3 of Appendix O of this report.

STRUCTURES

BRIDGE TYPE

The bridge type needs to be studied in more detail at an advanced design phase of the project. In general, three bridges will be required for this underpass grade separation project, one for the two northerly railroad tracks, another for the southerly railroad tracks, and the third is for the adjacent 1st Street.

The railway bridge will be designed to meet the requirements of the BNSF/UPRR Guidelines for Railroad Grade Separation Projects. A 2-span structure alternative, with a center pier located in a raised median, would be selected for a Hamilton Boulevard underpass. A steel deck girder bridge superstructure is the first choice of the Union Pacific Railroad under their guidelines, as they are easy to replace in case of damage. However, the cost of construction and long term maintenance of the steel structures are high. A pre-cast and pre-stressed concrete girder bridge may also be used and these have been built by ACE in its Phase I program, with UPRR's permission, when the angle of intersection between the street and railroad is close to perpendicular (90 degrees between railroad track and street centerline). A 2-span concrete deck girder bridge with a center pier bent within the median of Hamilton Boulevard is assumed for this project and its cost estimate. The width of each rail bridge will be 81 feet for the railroad, which will accommodate four main line tracks. The width of the bridge for 1st Street will be 42.75 feet, which will accommodate 36.75 feet of roadway and 6 feet of sidewalk.

For 1st Street, a separate single span concrete structure is assumed to be built, which will be operated and maintained by the local agency. The design will be in accordance with the Caltrans Highway Design manual criteria. The bridge structure will provide for a 40-foot curb to curb width and a 6-foot sidewalk on the southern side of the street.

Shoring would be required around the construction area during the constructing stage.

RETAINING WALL

For the elevated difference of the proposed roadway, either cut slope or a retaining wall can be provided. The cut slope with landscaping is the most cost effective and aesthetically pleasing solution to the grade separation project. To minimize impacts and acquisitions into the existing or future developments, a retaining wall may be required. A soldier pile lagging wall system may be used to reduce the excavation needs, thus minimizing the impacts to the surrounding properties.

As the buildings on the south-west side of the grade crossing are too close to the right-of-way line, a retaining wall may be required to be constructed at this location. On the northern side of the grade crossing, the setback of the building may be adequate for the construction of the cut slopes.

RIGHT-OF-WAY

The right-of-way impacts are typical for this type of underpass grade separation. Significant effort was made to minimize the partial/total impacts to driveways and properties. In some instances, if a driveway is located on Hamilton Boulevard, then that driveway is proposed to be relocated in order to save the property from a complete takeover. With residential, industrial and commercial parcels adjoining the project location, both full and partial takeover are required for this grade separation project. The following sections discuss the impacts in detail for all four quadrants surrounding the grade separation project site.

NORTHEAST QUADRANT

The properties located on the northeast quadrant of the intersection of Hamilton Boulevard and the UPRR tracks consist of vacant land (shown on Figure 6.1-2 as Parcel #903) between the UPRR right-of-way and Commercial Street. The driveway to this property, which is located along Hamilton Boulevard, will be closed and relocated to Commercial Street in order to avoid complete takeover of the property. There are single family and multi family houses between Commercial Street and Monterey Avenue. The house (shown on Figure 6.1-2 as Parcel #8) between Commercial Street and the alley needs complete takeover. The adjacent property (shown on Figure 6.1-2 as Parcel #9) needs partial takeover for construction easement. However, access to the Parcel #9 property will remain open during construction. For Parcel #7 located between the alley and Monterey Avenue, the house is approximately 26-foot from the property line, which may not need to be demolished. Since the access to this property is on Monterey Avenue, partial property takeover will be required. Easements for retaining wall and utilities will be required on portions of the properties.

NORTHWEST QUADRANT

The properties located on the northwest quadrant of the UPRR tracks and Hamilton Boulevard are industrial, commercial and residential uses. There are many driveways and entrances along Hamilton Boulevard. The property (shown on Figure 6.1-2 as Parcel #38) between the UPRR right-of-way and Commercial Street is an industrial use which has two driveways along Hamilton Boulevard. These driveways will need to be closed. Since this property also has access on Commercial Street and Newman Street, complete takeover of the property is not required. One of the two buildings on the property is in close proximity to the property line, which will need to be demolished. The three residential properties between Commercial Street and Monterey Avenue, (shown on Figure 6.1-2 as Parcels #29, #30 and #31) will need to be acquired completely. The commercial building (shown on Figure 6.1-2 as Parcel #28) at the south-west corner of Hamilton Boulevard and Monterey Avenue is located along the property line and has its entrance on Hamilton Boulevard. Partial takeover of this property will be required as the building is close to the property line. Easements for retaining wall and utilities will be required on portions of the properties.

SOUTHWEST QUADRANT

The southwest quadrant between 1st Street and 2nd Street, has commercial and industrial uses (shown on Figure 6.1-2 as Parcels #39, #2, #12 and #14). They all have entrances and driveways along Hamilton Boulevard. The driveway to Parcels #2 and #39 should be relocated to 1st Street in order to avoid a complete takeover. The building shown on Parcels #12 and #14 which has entrance on Hamilton Boulevard will require takeover completely. Easements for retaining wall and utilities will be required on portions of the properties.

SOUTHEAST QUADRANT

The southeast quadrant between 1st Street and 2nd Street has vacant land (shown on Figure 6.1-2 as Parcel #10) between 1st Street and the alley, and a commercial use occupied by Baker Lumber (shown on Figure 6.1-2 as Parcel #11). The entrance to the vacant lot is on 1st Street and the entrance to Baker Lumber is on 2nd Street. A full takeover of Parcel #10 will be required. The Baker Lumber building at the northeast corner of 2nd Street and Hamilton Boulevard which is located on the property line may be demolished or a retaining wall may be needed to protect the building. Easements for retaining wall and utilities will be required on portions of the properties.

In summary, the right-of-way impacts of the Hamilton Boulevard (Alhambra/Los Angeles Subdivision) underpass are:

- Northeast Quadrant – 1 fully affected parcel and 3 partially affected parcels
- Northwest Quadrant – 3 fully affected parcels and 2 partially affected parcels
- Southeast Quadrant – 1 fully affected parcel and 1 partially affected parcel

- Southwest Quadrant – 2 fully affected parcels and 2 partially affected parcels

There is a total of 15 affected parcels with 73,540 square feet of right of way acquisition.

UTILITIES

A preliminary investigation of the utilities along Hamilton Boulevard showed that several facilities were identified as potential impacts due to the lowering of Hamilton Boulevard. Page 4 of Appendix O illustrates the existing layout of the utilities being affected. The existing utilities that may be impacted are:

- Water line (6" and 10", City of Pomona)
- Sanitary sewer (10" RCP, City of Pomona)
- Sanitary sewer (18" relief trunk sewer and 21" RCP, Tri Cities Outfall)
- UG power line (Southern California Edison) (not presented in the as-build drawing)
- Gas line (6" Southern Counties Gas Company)
- Overhead transmission power line (Southern California Edison) (not presented in the as-build drawing)
- UG telephone (General Telephone Company)

All the existing utilities mentioned above lie within the project footprint and will be relocated into acquired parcels or utility easements. If there is a constraint in space within the available easement, some utilities may need to be relocated on a temporary basis. A permanent relocation plan will be required for those utilities after the construction. The utility lines that branch out to serve the local developments also need to be relocated and a temporary tie-in may be required. Service will be maintained at all times for all the utility services. The existing utility location was based on the as-builts obtained from the City of Pomona. The utility lines which run across Hamilton Boulevard close to the tracks are the 18" relief trunk sewer, a water line and a gas line south of the tracks, and lie under 1st Street and an oil line north of the tracks, within the UPRR right-of-way. Page 5 of Appendix O illustrates the conceptual utility relocation plan.

DRAINAGE

Surface runoff from the underpass would be collected at the low point below the structure. The storm runoff can be handled by a pump system. The runoff will be discharged into the nearest existing storm drain system. This system will be designed to adhere to LA County Flood Control District standards and requirements.

CONSTRUCTION PHASES

In order to minimize the disruption to vehicle, pedestrian, bicycle and train traffic during construction, the following construction phases are planned to carry through for the construction of the project:

- Phase 1: Maintain two southerly main tracks, and build two shoofly tracks between Alhambra Subdivision main track and north side of UPRR right-of-way

a. Construct two shoofly tracks to shift all rail traffic to the two northerly tracks and two new shooflies by UPRR

b. Construct southern portion of the railroad bridge over Hamilton Boulevard by civil contractor

c. Relocate existing utilities

- Phase 2: Maintain Shoofly's and open southerly main tracks over the new bridge

  a. Construct the remaining portion of the railroad bridge over Hamilton Boulevard between shoofly and the main tracks by civil contractor

  b. Relocate existing utilities

  c. Move rail traffic back to the northerly alignment over the finished bridge and remove shoofly tracks by UPRR

- Phase 3: Construct roadway bridge for 1st Street over Hamilton Boulevard by civil contractor

RAILROAD SHOOFLY

In order to maintain railroad operation during the construction of the underpass grade separation, the construction of temporary shoofly tracks are warranted. The existing condition has three tracks with two Alhambra subdivision tracks and one Los Angeles subdivision track. One additional Los Angeles subdivision track is currently under construction and will be in use in the near future to replace the current Los Angeles subdivision track.

UPRR will require ACE to maintain the existing railroad track capacities during construction of the grade separation project. One shoofly track for the Los Angeles subdivision main track and one shoofly track for the Alhambra subdivision main track are proposed. Two existing main tracks will need to maintain operation during different phases of construction. The railroad right-of-way is wide enough to accommodate the two shooflies as shown on the conceptual drawings. The proposed shoofly tracks run parallel to the Alhambra and Los Angeles subdivision tracks.

DETOUR ROUTE

It is proposed that Hamilton Boulevard will be closed during construction between 2nd Street and Monterey Avenue. If required, the intersection of Hamilton Boulevard and 2nd Street will be closed on a temporary basis. Traffic traveling north-south using Hamilton Boulevard will be detoured to the adjacent White Avenue. The closure of Hamilton Boulevard will impact local traffic, which will need to find alternative routes/accesses for their destinations/origins. The through traffic on 1st Street and the traffic on Commercial Street which uses Hamilton Boulevard will be detoured to nearby streets to travel to their final destinations. A conceptual traffic detour plan is presented on Page 8 of Appendix O of this report.

Modifications to some of the traffic signals (e.g., protective and permissive left turn signals) need to be made to handle the additional traffic and for their acceptable level of service operations. The impact to the adjacent streets will have a temporary impact because of the detour.

A Summary of the project cost estimate (rough order of magnitude) is shown below. The detailed cost estimate is found in Appendix O.

CONCEPTUAL ESTIMATE (Order of Magnitude) – HAMILTON BOULEVARD UNDERPASS – LOS ANGELES/ALHAMBRA SUBDIVISION

A summary of the project cost estimate (rough order of magnitude) is indicated below.

Roadway	$9,564,031
Track	$ 4,984,000
Structures	$10,386,148
Right-of-Way Notes 3, 4, & 5	$9,266,292
Utilities Note 1 & 2	$ 4,100,000
Project Costs including: Geotechnical Investigation, Surveying, Right-of-Way Certification, Flagging, Permitting, Engineering, Construction Management and Agency Costs Note 6 & 7	$16,259,140
Contingency 30%	$13,587,996
TOTAL PROJECT COST	$68,147,608

Notes:

1. Utility relocation cost estimates assume all affected utilities (sewer and storm drain) can be relocated by gravity flow systems similar to the existing systems.
2. Cost for drainage item includes construction of one storm drain pump station at the project area.
3. Right of Way cost estimates are based on $100/SF which covers the land and building allowance for full takes or areas affected by part takes.
4. Right of Way costs do not include any associated relocation costs or severance damages to the business operators.
5. Right of Way costs include a 26% allowance for acquisition costs. (appraisals, negotiation, labor, legal, closing cost, etc.)
6. Agency Costs include Agency Project Management direct labor and Agency indirect costs.
7. Program Management costs include third party project support costs such as community outreach, environmental management, DBE and labor compliance, and property survey.
8. This estimate is prepared using construction cost information based on current dollar cost as of 2011.

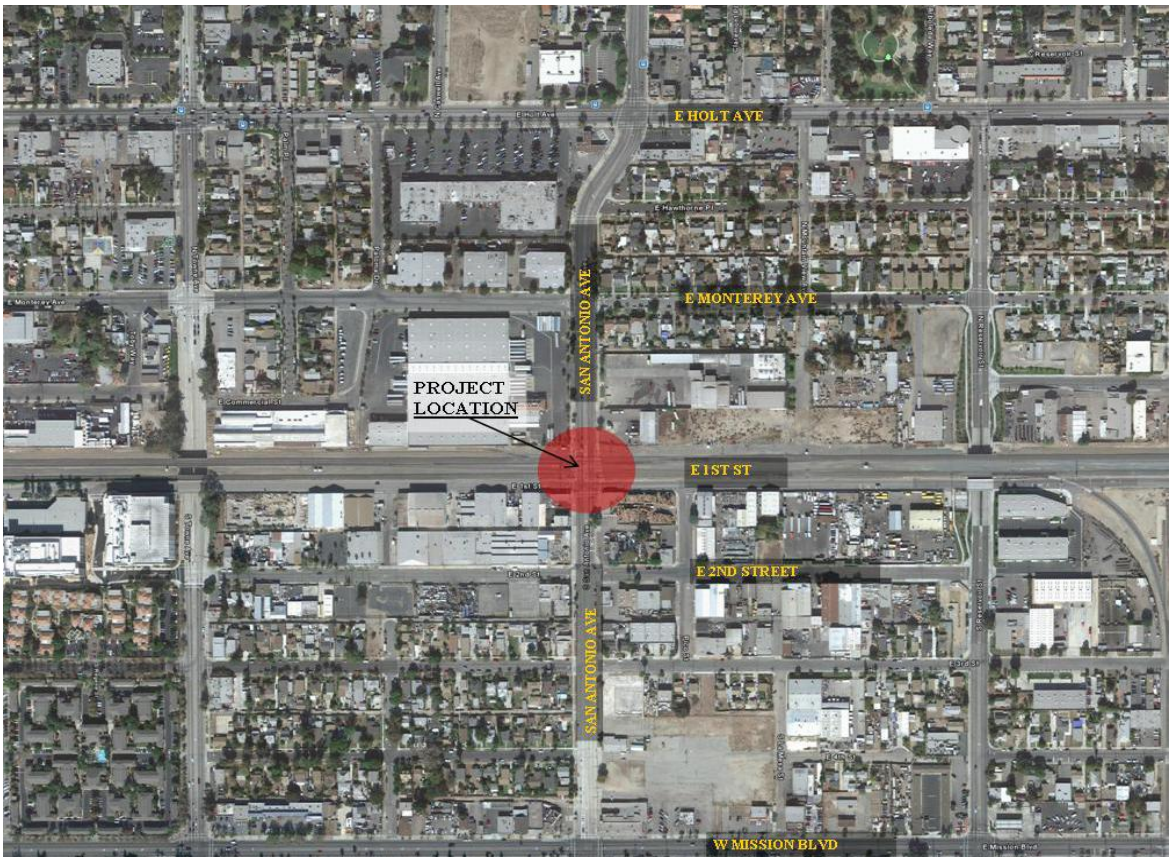
6.2 SAN ANTONIO AVENUE - 32.74 - 746932J

INTRODUCTION

This section of the report is prepared to evaluate the feasibility of constructing a grade separation at the San Antonio Avenue and Union Pacific Railroad (UPRR) intersection in the City of Pomona. The project analyzed the construction impact limits, right-of-way impacts, vertical and horizontal design parameters, constructability, construction cost, utilities, as well as other design factors.

The San Antonio Avenue at-grade crossing of the UPRR railroad tracks is located in the City of Pomona, bounded by 1st Street and 2nd Street to the south, and Monterey Avenue to the north. Figure 6.2-1 shows the vicinity map for San Antonio Avenue. The street is oriented north-south, approximately 1.4 miles south of the I-10 Freeway. It crosses Holt Avenue to the north and Mission Boulevard to the south of the grade crossing. Extensive delay due to frequent train crossing movements is a major issue for drivers and local citizens. Pedestrian and vehicle crossing-related safety concerns are another reason for the project need and purpose.

Figure 6.2-1: San Antonio Avenue Vicinity Map (Alhambra/Los Angeles Subdivision)



San Antonio Avenue is currently striped to accommodate four lanes with two lanes in each direction. The intersection of San Antonio Avenue and 2nd Street is signalized. Other cross streets, including 1st Street and Monterey Avenue at San Antonio Avenue are two-way stop controlled. 1st Street which runs parallel to the UPRR railway track crosses San Antonio Avenue about 20-30 feet south of the at-grade crossing. The proposed grade separation will maintain the same lane configuration along San Antonio Avenue in the study area. Land uses surrounding the project site include mostly commercial and industrial uses with some single family and multi family residential units. The driveways to some of these uses along San Antonio Avenue are expected to be closed or relocated. A partial take of easements or complete take of the property is expected to affect the surrounding parcels.

The Los Angeles and Alhambra Subdivisions of the UPRR, west of the San Antonio Avenue grade crossing run parallel to each other until they split east of Ramona Avenue. Approximately 77 railroad events (trains and switching activities) occur at this at-grade crossing daily. The track layout across the San Antonio Avenue crossing currently consists of four main lines. The rail crossing area includes flashing warning lights with bells and gates, and overhead cantilevered flashing warning lights on all four corners of the at-grade crossing (four-quadrant gates).

During the conceptual design process, coordination meetings with City staff and ACE staff have been conducted. As-build drawings and other reference plans/documents have been obtained from the City, ACE, and other relevant agencies. Utility companies have also been contacted. Field reviews and notes have been collected by the project team.

UNDERPASS VERSUS OVERPASS ALTERNATIVES

The grade separation project will reduce traffic congestion and increase safety at the crossing. Two alternatives were initially considered, underpass and overpass grade separation. The overpass option was dropped from further study after initial concept plans were reviewed by ACE staff and staff from the City of Pomona. The underpass option requires a smaller footprint, resulting in fewer impacts to adjacent private properties and the surrounding community. Pedestrian sidewalk design consistent with Federal Americans with Disabilities Act (ADA) requirements can also be achieved with the underpass option.

In general, underpasses require significantly greater design and construction effort than overpasses, generating greater civil and structural construction, utility relocation and railroad force account costs. However, where properties adjacent to the at-grade crossing have fully developed industrial, commercial or retail uses, the reductions in project area and associated property takings and access impacts associated with underpasses, as compared to overpasses, can result in expected overall lower costs. There are also important qualitative judgments to be made when choosing between overpasses and underpasses. Overpasses can create significant pedestrian circulation, ADA, view line and daylight barriers. The aerial structures may also broadcast vehicular engine and tire noise over a wide area.

This preliminary finding that a grade separation project at the San Antonio Avenue at-grade crossing be an underpass is consistent with ACE's experiences in development, design and construction of its Phase I grade separation projects in developed urban areas. Under Federal and State guidelines, further engineering design effort on eliminating the San Antonio Avenue grade crossing would include a value

engineering activity as part of preliminary engineering (development of 30%-level content). The value engineering requirement would apply to all Phase II locations. A routine part of the value engineering activity would be re-examination of underpass vs. overpass cost and quality-of-life trade-offs.

The underpass alternative also proposes to lower San Antonio Avenue under 1st Street. A separate bridge will be proposed for 1st Street south of the UPRR railway bridge. The project also proposes the closure of all impacted driveways along San Antonio Avenue. Retaining walls will need to be constructed at some locations to protect the adjacent parcel uses.

In choosing a grade separation design, the criteria used in evolving the concepts were maintenance of roadway vehicular traffic capacity and safe travel speeds through the completed underpass, minimization of construction project limits and impacts on access into adjacent properties, mitigation of impacts on the surrounding community, avoidance of disruption to railroad operations, relocation or protection of all affected utility facilities while minimizing utility service outages, and minimization of permanent and temporary property and right-of-way takings required for the crossing elimination.

All conceptual plans are included in Appendix P of the report.

DESIGN PARAMETERS

The horizontal and vertical roadway alignment standards used in the design consisted of the *Caltrans Highway Design Manual*, *AASHTO Policy of Geometric Design of Highways and Streets*, and the *BNSF/UPRR Design Guidelines for Railroad Grade Separations*. The following includes the specific guidelines that were used as the design parameters:

- Design Speeds (V)

San Antonio Avenue	V = 40 mph
1st Street	V = 35 mph
Monterey Avenue	V = 35 mph
2nd Street	V = 35 mph
Railroad Shoofly Track	V = 65-70 mph

- Horizontal Alignment

Transition & Curves	Caltrans minimum requirement for design speed without super-elevation

- Vertical Alignment

Crest Curves	AASHTO stopping sight distance
Sag Curves	AASHTO comfortable speed for well-lit roadways
Max Grade	6% max per Caltrans Highway Design Manual

- Vertical Clearance

Roadway	16'-6" per Caltrans Highway Design Manual
Rail (Permanent)	24'

Rail (Temporary)	21'-6"	

- Cross-Section

San Antonio Avenue	84' curb-to-curb minimum, minimum 8' sidewalk, two lanes each direction

- Truck Size — Caltrans 2005 (US) — CA LEGAL-65

UNDERPASS ALTERNATIVE

The underpass alternative proposes to construct an underpass structure under the UPRR tracks generally along the original alignment of San Antonio Avenue. The existing at-grade crossing would be eliminated and separate bridges will be installed for the UPRR tracks and 1st Street. The underpass would have a four lane configuration with final vertical clearance of the underpass structure conforming to the UPRR/BNSF jointly developed "Guidelines for Railroad Grade Separation Projects." The minimum vertical clearance from the finished roadway surface up to the bridge superstructure soffit (bottom surface of the bridge) for the proposed type of structure would be 16'-6".

GEOMETRY – HORIZONTAL, VERTICAL, AND CROSS SECTION

HORIZONTAL LAYOUT

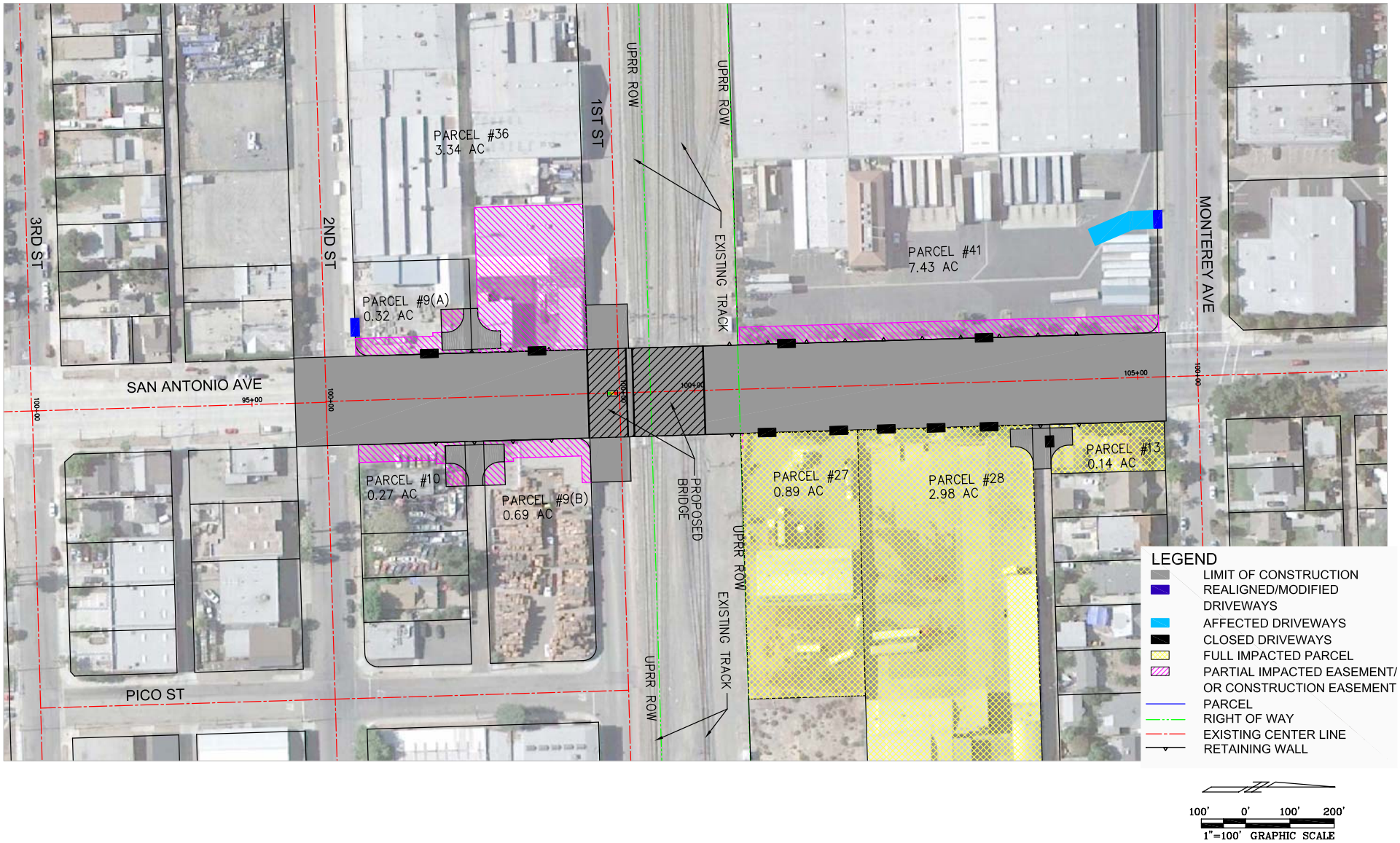
The proposed centerline layout of San Antonio Avenue remains consistent with the existing centerline location. The overall curb face to curb face width on San Antonio Avenue will match the existing 84' width and the number of lanes will remain intact. A separate bridge will be provided for 1St Street, south of the UPRR railway bridge, maintaining the existing centerline alignment and cross section dimensions of the street. The intersections of San Antonio Avenue at 2nd Street and at Monterey Avenue will maintain as existing stop-controlled intersections.

The horizontal concept plan is illustrated on Figure 6.2-2 and Page 1 of Appendix P of this report.

PROFILE

The proposed San Antonio Avenue underpass will be below the grade of the UPRR tracks and 1st Street. The minimum vertical clearance allowed is 16 feet throughout the width of the bridge with a sacrificial beam provided per UPRR requirements. This is consistent with several previously conducted ACE grade separation projects.

The vertical curves are based on the minimum requirements consistent with Caltrans vertical curve design parameters. In addition, the sag vertical curves are based on the AASHTO comfort equation which decreases the length of the vertical curve required, and therefore allows the roadway to join existing conditions sooner and reduces the overall project footprint. The vertical profile concept plan is illustrated on Page 2 of Appendix P of this report.



KOA CORPORATION
PLANNING & ENGINEERING

ACE Phase II Grade Separation Traffic Study and Concept Plans

Figure 6.2-2

SAN ANTONIO AVENUE (LOS ANGELES/HALHAMBRA SUBDIVISION RAILROAD) ROADWAY HORIZONTAL CONCEPT PLAN

CROSS-SECTION

The existing San Antonio Avenue cross-section includes a 68-foot curb to curb width and 8-foot sidewalks on each side of the roadway. The street is striped for two lanes in each direction with parking allowed on most parts of the project segment, outside the railroad right of way defined by the crossing signal gates. The San Antonio Avenue right of way (ROW) is about 100 feet.

The underpass cross-section proposes to widen the curb to curb width to 84 feet. A 10-foot raised median is proposed for the majority of the project limit. Two lanes in each direction will be striped along the sag portion of the street. Additional exclusive left turn lanes will be striped at the intersections of 2nd Street and Monterey Avenue. Sidewalks of 8-feet wide will be provided on both sides of the street. Because of the gradient of the curve and to meet ADA requirements, the sidewalks will be elevated from the street, which will meet the existing sidewalk at the end of the project limits. In addition, this elevation of the sidewalk will provide a separation of the pedestrians from the vehicular traffic.

First Street is a two lane roadway with curb to curb dimensions of 40 feet. There is an 8-foot sidewalk on the south-west side of the at-grade crossing, and a 5-foot sidewalk on the south-east side of the at-grade crossing. The north side of the street close to the railway tracks has no sidewalk. The proposed cross-section of 1st street, which will be bridged over San Antonio Avenue, will match the existing cross-section. The proposed cross-section will have 40-feet curb to curb and a 6-foot sidewalk along the south side of the street.

The cross-section concept plan is illustrated on Page 3 of Appendix P of this report.

STRUCTURES

BRIDGE TYPE

The bridge type needs to be studied in more detail at an advanced design phase of the project. In general, two bridges will be required for this underpass grade separation project, one for the four railroad tracks, another for the adjacent 1st Street.

The railway bridge will be designed to meet the requirements of the BNSF/UPRR Guidelines for Railroad Grade Separation Projects. A 2-span structure alternative, with a center pier located in a raised median, would be selected for a San Antonio Avenue underpass. A steel deck girder bridge superstructure is the first choice of the Union Pacific Railroad under their guidelines, as they are easy to replace in case of damage. However, the cost of construction and long term maintenance of the Steel structures are high. A pre-cast and pre-stressed concrete girder bridge may also be used and these have been built by ACE in its Phase I program, with UPRR's permission, when the angle of intersection between the street and railroad is close to perpendicular (90 degrees between railroad track and street centerline). A 2-span concrete deck girder bridge with a center pier bent within the median of San Antonio Avenue is assumed for this project and its cost estimate. The width of each rail bridge will be

81 feet for the railroad, which will accommodate four main line tracks. The width of the bridge for 1st Street will be 42.75 feet, which will accommodate 36.75 feet of roadway and 6 feet of sidewalk.

For 1st Street, a separate single span concrete structure is assumed to be built, which will be operated and maintained by the local agency. The design will be in accordance with the Caltrans Highway Design manual criteria. The bridge structure will provide for a 40-foot curb to curb width and a 6-foot sidewalk on the southern side of the street.

Shoring would be required around the construction area during the constructing stage.

RETAINING WALL

For the elevated difference of the proposed roadway, either cut slope or a retaining wall can be provided. The cut slope with landscaping is the most cost effective and aesthetically pleasing solution to the grade separation project. To minimize impacts and acquisitions into the existing or future developments, a retaining wall may be required. A soldier pile lagging wall system may be used to reduce the excavation needs, thus minimizing the impacts to the surrounding properties.

As the buildings on the south-west side of the grade crossing exist too close to the right-of-way line, a retaining wall may be required to be constructed at this location. On the northern side of the grade crossing, the setback of the building may be adequate for the construction of the cut slopes.

RIGHT-OF-WAY

The right-of-way impacts are typical for this type of underpass grade separation. Significant effort was made to minimize the partial/total impacts to driveways and properties. In some instances, if a driveway is located on San Antonio Avenue, then that driveway is proposed to be relocated in order to save the property from a complete takeover. With residential, industrial and commercial parcels adjoining the project location, both full and partial takeover are required for this grade separation project. The following sections discuss the impacts in detail for all four quadrants surrounding the grade separation.

NORTHEAST QUADRANT

All properties located on the northeast quadrant of the intersection of San Antonio Avenue and the UPRR tracks will require a full takeover. These properties include Hasco Oil Co Inc. and Fernandez Roy Sr / Fernandez Roy Jr & Perlita (shown on Figure 6.2-2 as Parcels #27 and #28, respectively). The driveway to these properties are located on San Antonio Avenue. Since the relocation of the driveways is not feasible, a complete takeover will be required for both properties. The single family house between the alley and Monterey Avenue (shown on Figure 6.2-2 as Parcel #13) will also need to be acquired completely.

NORTHWEST QUADRANT

The property located on the northwest quadrant of the UPRR tracks and San Antonio Avenue is an industrial property, occupied by WAR Pomona LLC, which has driveways on San Antonio Avenue.

These driveways will be closed and access would need to be relocated to Monterey Avenue in order to avoid property takeover. Partial takeover will be required for the retaining wall and utility easement. The driveway relocation also requires grading and other civil work to allow adequate truck access.

SOUTHWEST QUADRANT

The southwest quadrant between 1st Street and 2nd Street are industrial properties, occupied by Pomona Industrial Center LLC / Jecard Properties LLC and Godlew Ska Elizabeth (shown on Figure 6.2-2 as Parcel #36 & Parcel #9A). These properties have entrances and driveways along San Antonio Avenue. The driveway to Parcel #9A can be relocated to 2nd Street in order to avoid a complete takeover. Partial takeover will be required as easement for retaining wall and utilities. The northeast corner of Parcel #36 will require a partial takeover, as the driveway to the property cannot be relocated.

SOUTHEAST QUADRANT

The southeast quadrant between 1st Street and 2nd Street includes industrial properties (shown on Figure 6.2-2 as Parcels #9B and #10). The entrance to Parcel #9B is on Pico Street and to Parcel #10 is on the alley and 2nd Street. Since both properties do not have driveways on San Antonio Avenue, full takeover is not required. The proposed project should not have any impact to these properties other than easements for retaining walls and utilities.

In summary, the right-of-way impacts of the San Antonio Avenue (Alhambra/Los Angeles Subdivision) underpass are:

- Northeast Quadrant – 3 fully affected parcels
- Northwest Quadrant – 1 partially affected parcel
- Southwest Quadrant – 2 partially affected parcels
- Southeast Quadrant – 2 partially affected parcels

There is a total of 8 affected parcels with 214,743 square feet of right of way acquisition.

UTILITIES

A preliminary investigation of the utilities along San Antonio Avenue shows several facilities identified as potential impacts due to the lowering of San Antonio Avenue. Page 4 in Appendix P illustrates the existing layout of the utilities being affected. The existing utilities that may be impacted are:

- Water line (16" and 8", City of Pomona)
- Sanitary sewer (12" VCP & 8" VCP, City of Pomona)
- Storm Drain (66" RCP, Los Angeles County)
- UG power line (Southern California Edison) (not presented on the as-built)
- Gas line (6" Southern Counties Gas Company)

- Overhead transmission power line (Southern California Edison) (not presented on the as-built)
- UG telephone (General Telephone Company)
- Level (3) fiber optics
- 20" Petroleum Pipe
- 10" Petroleum Pipe

All the existing utilities mentioned above lie within the project footprint and will be relocated into acquired parcels or utility easements. If there is a constraint in space within the available easement, some utilities may be relocated on a temporary basis. A permanent relocation plan will be required for those utilities after the construction. The utility lines that branch out to serve the local developments also need to be relocated and a temporary tie-in may be required. Service will be maintained at all times for all the utility services. The existing utility location was based on the as-builts obtained from the City of Pomona. The utility lines which run across San Antonio Avenue close to the tracks are the Level (3) fiber optics, 20" & 10" petroleum line within the UPRR right-of-way, 16" water line and 8" & 10" gas line south of the tracks, and lie under 1st Street. These lines will be relocated temporarily to keep them operational during the construction. Provisions will be made in the bridge structure to maintain their existing alignment.

Page 5 of Appendix P illustrates the conceptual utility relocation plan.

DRAINAGE

Surface runoff from the underpass would be collected at the low point below the structure. The storm runoff can be handled by a pump system. The runoff will be discharged into the nearest existing storm drain system. This system will be designed to adhere to LA County Flood Control District standards and requirements.

CONSTRUCTION PHASES

In order to minimize the disruption to vehicle, pedestrian, bicycle and train traffic during construction, the following construction phases are planned to carry through for the construction of the project:

- Phase 1: Maintain one northerly main track, and construct one shoofly track between Alhambra subdivision main track and UPRR right -of-way

    a. Construct shoofly for Alhambra subdivision main track and Los Angeles subdivision main track to shift all rail traffic to the north side by UPRR
    b. Construct southern portion of the railroad bridge over San Antonio Avenue by civil contractor
    c. Relocate existing utilities

- Phase 2: Maintain the shoofly between Alhambra subdivision main track and UPRR right-of-way and utilize the southerly main tracks constructed by Phase 1

d. Construct the remaining portion of the railroad bridge over San Antonio Avenue by civil contractor
e. Relocate existing utilities
f. Move rail traffic back to the existing alignment and remove shoofly tracks by UPRR

- Phase 3: Construct roadway bridge for 1st Street over San Antonio Avenue by civil contractor

RAILROAD SHOOFLY

In order to maintain railroad operation during the construction of the underpass grade separation, the construction of a temporary shoofly track and temporary crossover tracks is warranted. The existing condition has four tracks at the San Antonio Avenue and UPRR railway at-grade crossing. The four tracks are: one Los Angeles subdivision main track, one crossover track from Los Angeles subdivision main track to the Alhambra subdivision main track, and two Alhambra subdivision main tracks (main track #1 & main track #2). There is also one siding track serving an industrial property, located at the northwest quadrant of the crossing (owned by WAR Pomona LLC).

UPRR will require ACE to build shoofly track and temporary cross-over tracks to keep the rail operation as existing capacity conditions. The following shoofly and crossover tracks are proposed: one shoofly track for the Alhambra subdivision main track, two cross-over tracks to shift the Los Angeles main track to the Alhambra main track #2 and back to the Los Angeles main track, and one cross-over for the Alhambra main track #1 to the Alhambra main track #2. Another temporary cross-over is proposed to be built for the siding from the shoofly to the industrial property. The railroad right-of-way is wide enough to accommodate the shoofly and crossover tracks. The proposed shoofly track will run parallel to the Alhambra subdivision track on the northern side.

DETOUR ROUTE

It is proposed that San Antonio Avenue will be closed during construction between 2nd Street and Monterey Avenue. If required, the intersection of San Antonio Avenue and 2nd Street will be closed on a temporary basis. Traffic traveling north-south using San Antonio Avenue will be detoured to the adjacent Towne Avenue and Reservoir Street. The closure of San Antonio Avenue will impact local traffic, which will need to find alternative routes/accesses for their destinations/origins. The through traffic on 1st Street which uses San Antonio Avenue will be detoured to nearby streets to travel to their final destinations. A conceptual traffic detour plan is presented on Page 8 of Appendix P of this report.

Modifications to some of the traffic signals (e.g., protective and permissive left turn signals) need to be made to handle the additional traffic and for their acceptable level of service operations. The impact to the adjacent streets will have a temporary impact because of the detour.

A Summary of the project cost estimate (rough order of magnitude) is shown below. The detailed cost estimate is found in Appendix P.

CONCEPTUAL ESTIMATE (Order of Magnitude) – SAN ANTONIO AVENUE UNDERPASS – LOS ANGELES/ALHAMBRA SUBDIVISION

A summary of the project cost estimate (rough order of magnitude) is indicated below.

Roadway	$8,866,832
Track	$ 4,644,500
Structures	$10,385,500
Right-of-Way Notes 3, 4, & 5	$27,057,618
Utilities Note 1 & 2	$ 3,900,000
Project Costs including: Geotechnical Investigation, Surveying, Right-of-Way Certification, Flagging, Permitting, Engineering, Construction Management and Agency Costs Note 6 & 7	$15,566,226
Contingency 30%	$13,008,917
TOTAL PROJECT COST	$83,429,592

Notes:

1. Utility relocation cost estimates assume all affected utilities (sewer and storm drain) can be relocated by gravity flow systems similar to the existing systems.
2. Cost for drainage item includes construction of one storm drain pump station at the project area.
3. Right of Way cost estimates are based on $100/SF which covers the land and building allowance for full takes or areas affected by part takes.
4. Right of Way costs do not include any associated relocation costs or severance damages to the business operators.
5. Right of Way costs include a 26% allowance for acquisition costs. (appraisals, negotiation, labor, legal, closing cost, etc.)
6. Agency Costs include Agency Project Management direct labor and Agency indirect costs.
7. Program Management costs include third party project support costs such as community outreach, environmental management, DBE and labor compliance, and property survey.
8. This estimate is prepared using construction cost information based on current dollar cost as of 2011.

CHAPTER 7 – MONTEBELLO OPTIONS

INTRODUCTION

Under ACE's original program implementation plan adopted in 1999, an underpass of UPRR's Los Angeles subdivision main line at Montebello Boulevard was included in the first phase of its grade separation program. A concept plan and cost estimate had been previously developed in 1997 as part of the SGVCOG study. The conceptual grade separation was estimated to cost $65 Million in 1997 dollars.

Eliminating the Montebello Boulevard grade crossing presented the consulting engineers working on the 1997 concept plan with significant site constraints. The intersection of Montebello Boulevard with Olympic Boulevard is 250 feet north of the crossing, while the connections of Roosevelt Avenue and Truck Way/Montebello Way to Montebello Boulevard are 80 feet and 300 feet south of the crossing, respectively. The engineers found that safe roadway profiles (the vertical slopes and transition curves required for adequate motorist sightlines and safe stopping distances) significantly lengthened the proposed underpass. The intersecting streets would either have to be:

1) Lowered, along with their intersections with Montebello Boulevard. As sightlines for motorists entering intersections are an important component of safe intersection design, all four corners of any lowered intersection would have to be significantly cut back to maintain safe views of cross traffic. There were significant potential impacts to adjacent properties with this approach, including businesses and homes on all five streets;

2) Or, be terminated with cul-de-sacs or other end-of-street measures at the underpass project limits. The intersections would be eliminated. This would have included terminating Olympic Boulevard, an arterial street in the center of the city's business district, on either side of Montebello Boulevard;

3) Or, extend the underpass beyond both sides of the railroad. A Montebello Boulevard underpass could extend to north of the intersection of Montebello Boulevard with Olympic Boulevard. It could "daylight", or end south of the intersection of Montebello Way and Montebello Boulevard. All three intersections (including the intersection of Roosevelt Avenue and Truck Way) could be rebuilt, at their present elevation, on top of the extended underpass structure. The length of the underpass would be approximately 630 feet.

The third design approach was considered to be the most feasible and was taken to the concept level. Because of the 630-foot length of the underpass box structure itself, this has sometimes been called the "tunnel" alternative. Another feature of this design alternative was that any existing on-street parking north or south of the crossing would have to be eliminated to provide flanking one-way surface access roads to properties fronting Montebello Boulevard **[1]**.

In mid-2000, City of Montebello officials and staff asked ACE to investigate options to lower the railroad under Montebello Boulevard. Railroad vertical profiles generally have to be no steeper than 1%. Any

[1] Constructing this project while maintaining functioning intersections and access into these properties presents significant challenges. See discussion beginning on Page 129.

proposal to even slightly change the elevation of a railroad track results in changes to the track and railroad right-of-way for many hundreds of feet on either side. The result of a track lowering is an extended excavation of the railroad operating right-of-way commonly called a "trench". Any trench project grade-separating Montebello Boulevard would necessarily affect the railroad, road and utility crossings and other facilities in the city. These could include the grade crossings at Vail Avenue, Maple Avenue and Greenwood Avenue; the overpass at Bluff Road; the Metrolink Commerce/Montebello commuter rail station; utility crossings and other facilities at all these locations; and railroad wayside control signals, track drainage facilities and other railroad right-of-way facilities (such as third-party communications lines). A Montebello trench would have similarities to the Alhambra and Alameda Street trenches and ACE's San Gabriel trench, now in design.

In 2000, ACE tasked its in-house engineering consultant, Korve Engineering, to develop a Montebello trench study. At the concept level the study concluded that a railroad trench was feasible. The study was of a full-length trench that would eliminate all four grade crossings in the city (from west to east: Vail, Maple, Greenwood and Montebello). It was estimated to cost $194 million in then-current dollars. Over the first half of 2002 ACE and the City continued discussions over the scope of the Montebello project. The concept of a minimum railroad lowering which would address Montebello Boulevard and retain the opportunity of a future full lowering was introduced. After numerous discussions the City continued its insistence on a full lowering. In late 2002 the ACE Board and the SGVCOG Governing Board declined to make the project substitution. This was based on the substantively increased cost of the City-preferred lowering and the relatively light traffic volumes and projected vehicular delays at the Vail, Maple and Greenwood crossings. The ACE project implementation plan was amended to move the Montebello project into Phase II of the overall ACE program, with the type of project to be determined later.

In 2006, City of Montebello officials asked Metro to facilitate a community outreach process, including an open house meeting, to review the grade separation options of rail crossings along the Union Pacific Railroad in their city. At that time, the options included:

- Montebello Boulevard Grade Separation
  The "tunnel" underpass project, described above.

- Greenwood Avenue Grade Separation
  A four-lane depressed roadway that would begin south of Olympic Boulevard and end near the transition of Montebello Way into South Greenwood Avenue. This project would have included alterations of the intersections of Greenwood Avenue and Montebello Boulevard with Olympic Boulevard to facilitate north-south traffic flow from Montebello Boulevard to South Greenwood Avenue. These alterations would have included additional left and right turning lanes and coordinated traffic signal programming to maximize the efficiency and throughput at the intersections.

- Partial Railroad Lowering
  The minimum lowering first introduced in 2002 (see above). A gradual lowering of train tracks beginning at Maple Avenue, passing under Montebello Boulevard and ascending to Bluff Road. An advantage of this alternative was that it provided the desired grade separation at Montebello Boulevard at a lesser cost than the full lowering. Vail and Maple Avenues would remain at-grade (alterations at the crossings would be required), while Greenwood would also be grade-

separated (because of its proximity to Montebello Boulevard). Arched street bridges would be built over the partial lowering of the tracks at Montebello and Greenwood.

The majority of open-house participants and follow-up responders to the Metro outreach stated their preference for a lowering of the railroad track.

The scope of services for this present report includes a re-evaluation of the 1997 Montebello Boulevard underpass "tunnel', and the full lowering and partial lowering trench alternatives.

The discussion of the Montebello Boulevard underpass begins below. The discussion of trench alternatives begins on Page 132.

MONTEBELLO BOULEVARD UNDERPASS DESIGN PARAMETERS

Horizontal and vertical roadway alignment standards used in the design consist of the Caltrans Highway Design Manual, AASHTO policy of Geometric Design of Highways and Streets, and the BNSF/UPRR Design Guidelines for Railroad Grade Separations. The following assumptions were used when applying these standards:

- Design Speeds
  - Montebello Boulevard V = 35 mph
  - W. Olympic Boulevard V = 35 mph
  - Roosevelt Avenue V = 25 mph
  - S. Montebello Boulevard V = 25 mph

- Horizontal Alignment
  - Transition & Curves: Caltrans minimum requirement for design speed without super-elevation

- Vertical Alignment
  - Crest Curves: AASHTO stopping sight distance
  - Sag Curves: AASHTO comfortable speed for well-lit roadways
  - Max Grade: 6% max

- Vertical Clearance
  - Roadway: 16'-6"
  - Rail (Permanent): 24'
  - Rail (Temporary): 21'-6"

- Cross-Section
  - Montebello Boulevard: 84' curb-to-curb minimum, minimum 8' sidewalk, two lanes each direction

- Truck Size: Caltrans 2005 (US) CA LEGAL-65

UNDERPASS ALTERNATIVE

This alternative proposes to construct an underpass structure under the UPRR tracks, generally along the original alignment of Montebello Boulevard. The roadway concept plan is presented in Figure 7-1 and in Appendix Q. The underpass would have a four lane configuration. In accordance with the UPRR/BNSF jointly-developed "Guidelines for Railroad Grade Separation Projects" and highway engineering criteria, the minimum vertical clearance from crown of roadway pavement to the underpass bridge soffit is 16'-6".

HORIZONTAL LAYOUT

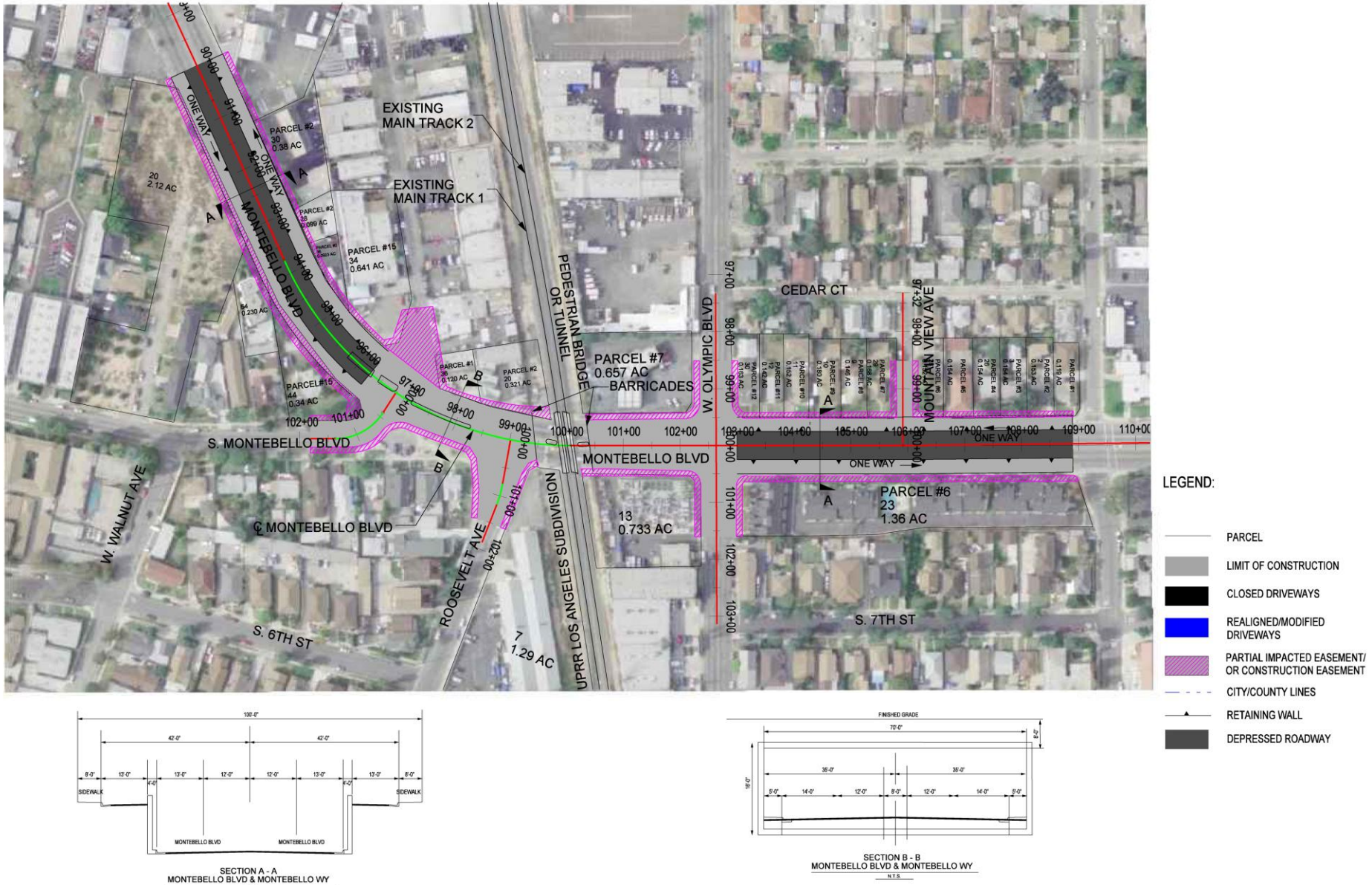
The proposed centerline layout of Montebello Boulevard remains consistent with the existing centerline location. The overall curb face to curb face width on Montebello Boulevard will match the existing 84' width and the number of lanes will remain intact. Because of the configuration of Montebello Boulevard, there are a number of affected roadways both north and south of the UPRR tracks. The affected roadways are: S. Montebello Boulevard, Roosevelt Avenue, Montebello Way and Truck Way. Olympic Boulevard would be bridged across the underpass. A new "decked" intersection would connect Roosevelt Avenue, Montebello Way and Truck Way. Other residential roadways that will be impacted are Cedar Court, Mountain View Avenue and 7th Street. All of them would match their existing centerline alignments and cross section dimensions.

PROFILE

The proposed underpass is being lowered under the UPRR tracks. Roadway vertical curves and transitions are based on vehicular design speeds, minimum motorist sightlines required for observing and following other moving vehicles at safe distances, and motorist reaction time and safe stopping distances in the event vehicles are stopped over the crest of a curve. Minimum roadway profile requirements are developed and published by Caltrans and AASHTO (American Association of State Highway and Transportation Engineers).

CROSS-SECTION

The existing Montebello Boulevard cross section spans 84' from curb face to curb face. The street is striped as a four lane divided roadway with median islands. The underpass cross section is proposed to match the existing curb face to curb face dimensions, with 8' sidewalks being provided on either side of the street. Flanking the underpass roadway are the one-way surface access roads. West Olympic Boulevard is a four-lane roadway with a curb face to curb face cross section of 40'. Roosevelt Avenue is a two-lane roadway and S. Montebello Boulevard is also a two-lane roadway.



SECTION A - A
MONTEBELLO BLVD & MONTEBELLO WY
N.T.S.

SECTION B - B
MONTEBELLO BLVD & MONTEBELLO WY
N.T.S.

Source: JL Patterson & Associates, Inc.

BRIDGE TYPE

Bridge structures need to the studied in more detail at an advanced design phase of the project. The extended "tunnel" project has two distinct bridge requirements:

1) The railroad bridge, designed to handle railroad locomotive and railcar dead and live loads; and,
2) The underpass extensions north and south of the railroad bridge, which would be designed to handle vehicular loads at the intersections of Montebello Boulevard with Olympic Boulevard, Roosevelt Avenue and Truck Way.

The railroad bridge superstructure can be assumed to be a two-span structure, with a center pier located in a raised median. In a typical railroad underpass project the maintenance of and responsibility for the bridge superstructure is assigned to the railroad, and railroad engineering department "Cooper E80" live load bridge criteria take precedence. A steel deck girder bridge superstructure is the first choice of the Union Pacific Railroad under their guidelines. However, pre-cast pre-stressed concrete box girders may also be used and these have been built by ACE in its Phase I program, with UPRR's permission, when the angle of intersection between the street and railroad is close to perpendicular (90 degrees between railroad track and street centerline). A two-span concrete deck girder bridge with a center pier bent within the median of Montebello Boulevard is assumed for the railroad bridge portion of this project and its cost estimate. The north and south underpass extensions are assumed to be concrete box structures that would be operated and maintained by the local agency, and designed in accordance with Caltrans Highway Design manual criteria.

Shoring would be required around the construction area when constructing the railroad bridge, the underpass extensions north and south of the railroad bridge, and the retaining walls between the one-way surface access streets and the underpass roadway with its sidewalks. As shoring requires a set-back behind the ultimate finished structure, and its installation requires use of cranes and pile drivers, a further analysis of shoring installation requirements is needed to determine whether access to adjacent properties can be maintained during construction.

DRAINAGE

Surface runoff from the underpass would be collected at the low point below the structure. The storm runoff can be handled by a pump system. The runoff will be discharged unto the existing storm drain system on Montebello Boulevard. This system will be designed to adhere to LA County Flood Control District standards and requirements.

RAILROAD SHOOFLY

In order to maintain railroad operations during the construction of an underpass grade separation, the construction of temporary detour tracks, or "shooflies', is required. The existing UPRR - Los Angeles Division consists of two mainline tracks. UPRR's Engineering Department has informed ACE that the railroad would require ACE to build the project using a double-track shoofly. The railroad right-of-way is wide enough to accommodate a double track shoofly as it is shown in Appendix Q, but a land-based survey is recommended to confirm current track-to-boundary distances (see discussion of track "meander', above) and better establish that railroad operating clearances can be maintained throughout construction.

The shoofly tracks have been preliminarily designed, for this concept level report, to accommodate speeds of 65 miles per hour for freight operations and 70 miles per hour for passenger trains.

UTILITIES

A preliminary investigation of the utilities along Montebello Boulevard has been completed. Based upon this research, several facilities were identified as potential impacts:

- 17' x 11' reinforced concrete box storm drain
- Sanitary sewer
- Gas line
- UG telephone (Verizon)
- Communication fiber optic line (Verizon/MCI)

These lines will have to be relocated in order to build the underpass option.

RIGHT-OF-WAY

The right-of-way impacts from this underpass option are extensive. The neighborhood is mixed-use with residential housing as well as commercial development in the area. Because of the configuration of the streets, it may be possible to provide cul-de-sacs and still maintain some of the properties with partial impacts. However, many parcels on all quadrants will require full takes.

WORK AREA TRAFFIC CONTROL & DETOUR(S) DURING CONSTRUCTION:

The construction of the underpass structure retaining walls, excavation, and shoofly within the right-of-way may be expedited by the closure of the crossing during the construction. Alternative routes are available through S. Greenwood Avenue to the west, and Bluff Road to the east of the Montebello Boulevard at-grade crossing.

TRENCH ALTERNATIVES: PARTIAL AND FULL LOWERING

Both trench alternatives, the partial and the full trenches, have been analyzed using two railroad vertical curve design criteria (the requirements for maximum ascending and descending railroad grades and transition curve requirements between changes in grades). This was found to be necessary at the concept level because the two criteria result in significantly different design results. The two criteria are UPRR's own published engineering requirements, and a less-restrictive criteria promulgated by the American Railroad Engineering and Maintenance Association (AREMA). The UPRR criteria requires longer vertical curve approaches than the AREMA criteria. The differences in these criteria are shown in Appendix Q.

The railroad lowering location is generally bounded by Garfield Avenue and the Metrolink Montebello/Commerce station to the west, the Rio Hondo River and its UPRR bridge to the east,

Olympic Boulevard to the north and Mines Avenue to the south. This segment of railroad consists of two main tracks and traverses four at-grade crossings, Vail Avenue, Maple Avenue, Greenwood Avenue and Montebello Boulevard, and one vehicular overpass at Bluff Road.

The following alternatives were evaluated by applying both the UPRR vertical curve design criteria and AREMA vertical curve design criteria.

- Partial Railroad Lowering
  The physical separation of trains and vehicles at Greenwood Avenue and Montebello Boulevard via lowering, or trenching, of the UPRR railroad.

- Full Railroad Lowering
  The physical separation of trains and vehicles at Vail Avenue, Maple Avenue, Greenwood Avenue and Montebello Boulevard via lowering, or trenching, of the UPRR railroad.

The partial and full railroad lowering AREMA Plans are presented in Appendix Q.

It is important to note that land-based surveying was not included as part of this phase of the analysis. Instead, existing track elevation data obtained from railroad geometry car readings was used. This is a type of geographical information system (GIS) data and is very useful in this kind of analysis, but the accuracy of the data is less than that generated by the use of land-survey techniques. **Because slight differences in elevations have a significant multiplying effect on lengths of railroad vertical curves and, therefore, the effect on streets crossing the railroad, it is recommended that standard land surveying control points be established before proceeding with further refinement of railroad trench concepts and cost estimates**.

The existing UPRR right-of-way is approximately 100' wide between the Garfield Avenue grade separation and the Rio Hondo Bridge. The right-of-way is generally free of outside encroachments or other improvements of a substantial nature. There is one industry spur within the limits of both the partial and full trench alternatives, the Fleischman Vinegar/Nabisco spur located east of Montebello Boulevard. UPRR officials contacted during the course of this study indicated the shipper actively uses the spur at least several times a week and that Fleischman/Nabisco is expected to remain a rail service customer indefinitely. The trench alternatives developed in this study assume that the spur track continues to be served during construction and after the project is completed. Maintaining the spur track requires use of a shoofly track as the industry lead during construction, and retention of the lead track and its at-grade street crossings after the project is completed. The proposed at-grade lead track grade crossings are somewhat similar to the drill track grade crossings used at ACE's Sunset Avenue railroad main line grade separation "flyover" project, now under construction.

The table below compares the impacts of the two alternatives with application of the UPRR and AREMA vertical design criteria.

	Full Lowering (UPRR)	Full Lowering (AREMA)	Partial Lowering (UPRR)	Partial Lowering (AREMA)
Length of Trench Section	8,200'	8,000'	5,700'	5,500'
Bluff Road	Begin lowering railroad tracks 1'	Begin lowering railroad tracks 1'	Begin lowering railroad tracks 6"	Begin lowering railroad tracks 1'
Montebello Boulevard	Raise street 6'	No change in grade	Raise street 9'-6"	Raise street 1'
Greenwood Avenue	No change in grade	No change in grade	Raise street 4'-6"	No change in grade
Maple Avenue	Raise street 3'	No change in grade	Lower street 3'	Lower street 5'-6"
Vail Avenue	Raise street 5'-6"	No change in grade	No change in grade	No change in grade
Metrolink Station Platform	Lower platform 14'	Lower platform 15'	No change in grade	No change in grade

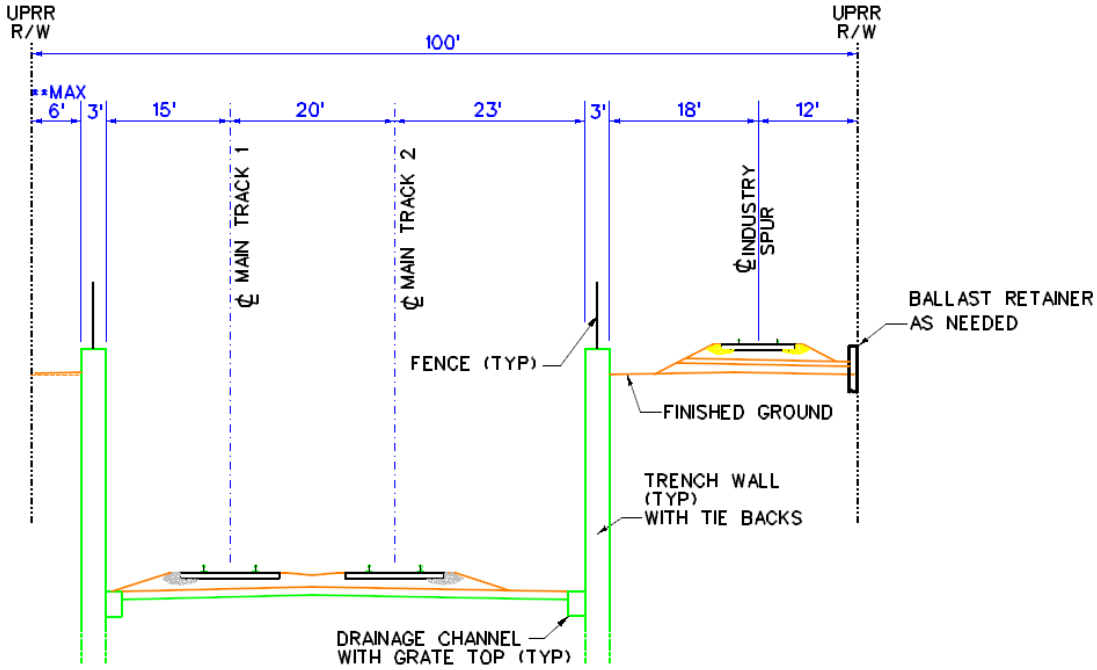
Both alternatives under each vertical curve scenario would require modification of the Bluff Road overpass to allow for shoofly. The railroad tracks would begin to lower at Bluff Road between 6" to 1'. Due to the relatively short distance between the Vail Avenue crossing and the Metrolink Montebello/Commerce Station, the platforms would be significantly impacted by the full lowering. The UPRR and AREMA vertical design criteria both require significant alteration of the station.

ALTERNATIVES

Two alternatives were analyzed and each evaluated against both the AREMA and UPRR vertical design criteria. It is important to note that the AREMA criteria are designated in the industry as a recommended minimum practice, while the UPRR criteria are established as its standard. The trench section for all options evaluated was modeled after the ACE San Gabriel Trench and consists of a 58' inside wall to inside wall dimension and allows for two main tracks at 20' track centers with room for a 10' access road and 13' centerline of track to edge of access road within the trench (Figure 7-2). The

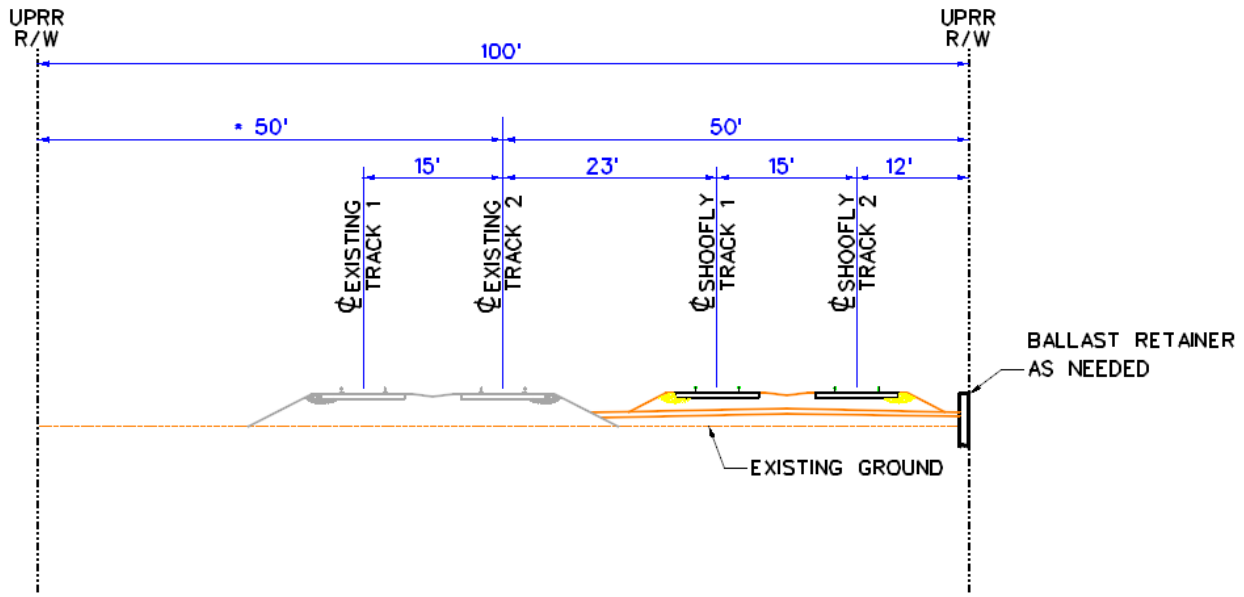
railroad right-of-way is assumed to be 100' throughout the entire limits of the project. An existing spur track servicing Fleischman Vinegar/Nabisco just east of Montebello Boulevard is assumed to remain in service and at-grade in the final configuration. It is assumed that the spur track grade can be raised or lowered in either scenario with the knowledge that it will remain at-grade in any configuration across Montebello Boulevard.

Figure 7-2: Proposed Trench Section Final Configuration



In evaluating the existing horizontal alignments within the proposed work area, it was noted that the existing main tracks meander within the railroad right-of-way. The main track alignment in relation to the existing centerline of railroad right-of-way varies anywhere from 2' to 16'. In order to properly accommodate the proposed trench construction and shoofly, it will be necessary to realign the existing main tracks for approximately 6,500 track feet for the partial lowering alternative and for approximately 7,500 track feet for the full lowering alternative, so that existing main track 2 is exactly 50' from centerline of track to either right-of-way. (See Figure 7-3 below for the required main track section during shoofly operation.)

Figure 7-3: Required Main Track Section During Shoofly Operation



Alternative 1 – Full lowering UPRR vertical design standard

- Length of trench section approx. 8,200'
- Modification/protection to Bluff Road overpass to allow for shoofly
- Begin lowering railroad tracks at Bluff Road (by 1')
- Raise Montebello Boulevard by 6', construct bridge over depressed tracks
- Greenwood Avenue remains at current grade, construct bridge over depressed tracks
- Raise Maple Avenue 3' over depressed tracks, construct bridge over depressed tracks
- Raise Vail Avenue 5.5' over depressed tracks, construct bridge over depressed tracks
- Lower Existing Metrolink station platform 14'

Alternative 1 – Full lowering AREMA vertical design standard

- Length of trench section approx. 8,000'
- Modification/protection to Bluff Road overpass to allow for shoofly
- Begin lowering railroad tracks at Bluff Road (by 1')
- Montebello Boulevard remains at current grade, construct bridge over depressed tracks
- Greenwood Avenue remains at current grade, construct bridge over depressed tracks
- Maple Avenue remains at current grade, construct bridge over depressed tracks
- Vail Avenue remains at current grade, construct bridge over depressed tracks
- Lower existing Metrolink station platform, 15'

Alternative 2 – Partial lowering UPRR vertical design standard

- Length of trench section approx. 5,700'
- Modification/protection to Bluff Road overpass to allow for shoofly
- Begin lowering railroad tracks at Bluff Road (by 6")
- Raise Montebello Boulevard by 9.5', construct bridge over depressed tracks
- Raise Greenwood Avenue 4.5', construct bridge over depressed tracks
- Lower Maple Avenue 3', construct new at grade crossing
- No impact to Vail Avenue
- No impact to existing Metrolink station platform

Alternative 2 – Partial lowering AREMA vertical design standard

- Length of trench section approx. 5,500'
- Modification/protection to Bluff Road overpass to allow for shoofly
- Begin lowering railroad tracks at Bluff Road (by 1')
- Raise Montebello Boulevard by 1' to clear depressed tracks
- Greenwood Avenue remains at current grade, construct bridge over depressed tracks

- Lower Maple Avenue 5.5', construct new at grade crossing
- No impact to Vail Avenue
- No impact to existing Metrolink station platform

CROSS-SECTIONS

Roadway cross-sections for bridges over the partial and full lowering alternatives are assumed to be the same as the existing streets. The multi-lane roadway at Montebello Boulevard is described within the underpass discussion above. Vail, Maple and Greenwood Avenues are minor streets.

BRIDGE TYPES

The types of bridges used to span either the partial or the full lowering need to be studied in more detail at any advanced design phase of the project. For the purposes of developing cost estimates for both alternatives, unit costs for poured-in-placed, pre-stressed reinforced concrete bridges were assumed. ACE is presently designing, to the full-content level, the San Gabriel Trench. The San Gabriel project will have detours of vehicular and pedestrian traffic during its construction, whereby traffic is diverted over an existing adjacent street crossing while a bridge crossing is constructed. An exception is San Gabriel Boulevard, where a split construction of a roadway bridge is contemplated. It was beyond the scope of this present report to develop a traffic management plan for construction of a partial or full lowering of the railroad in Montebello. However, for development of cost estimates, it is assumed that the minor streets may be used as detours for construction of bridges at adjacent minor crossings. Montebello Boulevard would have to be built either as a split bridge, similar to San Gabriel Boulevard, or with a detour temporary grade crossing.

DRAINAGE

Storm water runoff from either the partial or full lowering projects could be handled with gravity flow towards the Rio Hondo. A directionally-drilled stormwater sewer from the low point of either trench alternative to the river is a possible alternative to deeper excavation of the slope required for gravity drainage. Within any trench, UPRR would require closely-spaced inlet structures similar to those being designed for the San Gabriel Trench, to provide positive flow away from the track structure and ballast. LA County Flood Control District standards would probably require that the project include grease and debris separators. Rainwater retention storage, to spread outfalls over greater periods of time, might also be required.

RAILROAD SHOOFLIES/"SPLIT" TRENCH CONSTRUCTION

In order to maintain railroad operations during the construction of the underpass grade separation, the construction of a temporary shoofly track is warranted. The existing UPRR - Los Angeles Division consists of two mainline tracks; therefore, the railroad would require that the project build a double track shoofly. Appendix Q contains a series of cross-sectional views that show how the project could be built, in stages, with two timetable-speed tracks active at any time during construction. It requires construction of the trench in longitudinal stages, whereby one-half of the railroad right-of-way is lowered by excavation while the other half contains the operating railroad. The intermediate stage, also depicted in Appendix Q, requires excavation and construction throughout the length of any trench in the middle of the cross-section, between an active shoofly track and an already-lowered main line track. The logistics of using construction equipment, such as excavators, cranes, bucket loaders, etc, while

insuring that safe railroad operating clearances are maintained, will require detailed planning with the use of extensive training and strict operational controls, the development of which are beyond the scope of this present study. When developing cost estimates for the partial and full lower projects at this concept level, this intermediate phase of the construction was the most difficult to conceive, and assigning costs to it is difficult. It is recommended that, as design on the San Gabriel Trench advances into constructability review, this information be used to examine constructability constraints and costs for the Montebello lowering project alternatives.

UTILITIES

Utilities for Montebello Boulevard are described in the underpass project discussion, above. Vail, Maple and Greenwood Avenues have the following types of utilities:

- Water line (8-inch and 12-inch diameter)
- Storm drains
- Sanitary sewers (16-inch and 18-inch diameter)
- Aerial power lines (Southern California Edison)
- Gas lines (Southern California Gas Company)
- Overhead cable television and telecommunications lines (on the SCE poles)

The 17-foot by 11-foot reinforced concrete box storm drain within Montebello Boulevard is a major constraint on both the partial and full lowering projects. While investigation of re-routing options is beyond the scope of this study, it is recommended that re-routing of the storm drain be an early value engineering exercise in any further design of trench alternatives. A re-routing could result in a significant capital cost savings, as compared to other alternatives (for example, a siphon).

RIGHT-OF-WAY

There will be right-of-way costs for either trench alternative for use of property adjacent to the railroad required to access and build the project. There may also be cases where additional right-of-way will be needed. It is not possible to make detailed assessments for the trench alternatives at this point, so allowances have been included in the conceptual cost estimates. The results of ACE's experience with the San Gabriel Trench, when available, can be used to better estimate real estate costs of these two Montebello alternatives.

A Summary of the project cost estimate (rough order of magnitude) is shown below. The detailed cost estimate is found in Appendix Q.

CONCEPTUAL ESTIMATE (Rough Order of Magnitude) – MONTEBELLO BOULEVARD UNDERPASS – LOS ANGELES SUBDIVISION

Roadway	$8,822,390
Track	$3,505,160
Structures	$29,362,200
Right-of-Way Notes 3,4 & 5	$8,190,000
Utilities Notes 1 & 2	$2,180,000
Project Costs including: Geotechnical Investigation, Surveying, Engineering, Flagging, Construction Management, Agency, and Program Management Costs Notes 6 & 7	$24,567,200
Contingency 30%	$20,531,100
TOTAL PROJECT COST	$97,158,000

CONCEPTUAL ESTIMATE (Rough Order of Magnitude) – MONTEBELLO TRENCH FULL LOWERING – LOS ANGELES SUBDIVISION

Trench	$26,452,000
Roadway	$9,679,800
Station	$6,566,000
Track	$13,000,500
Structures	$119,650,000
Right-of-Way Notes 3,4 & 5	$10,710,000
Utilities Notes 1 & 2	$11,360,000
Project Costs including: Geotechnical Investigation, Surveying, Engineering, Flagging, Construction Management, Agency, and Program Management Costs Notes 6 & 7	$104,556,648
Contingency 30%	$87,379,484
TOTAL PROJECT COST	$389,354,432

CONCEPTUAL ESTIMATE (Rough Order of Magnitude) – MONTEBELLO TRENCH PARTIAL LOWERING – LOS ANGELES SUBDIVISION

Trench	$19,798,250
Roadway	$7,337,600
Track	$10,399,000
Structures	$82,630,000
Right-of-Way	$8,190,000
Utilities	$7,240,000
Project Costs including: Geotechnical Investigation, Surveying, Engineering, Flagging, Construction Management, Agency, and Program Management Costs Notes 6 &7	$71,346,716
Contingency 30%	$59,625,470
TOTAL PROJECT COST	$266,568,000

Notes:

1. Utility relocation cost estimates assume all affected utilities (sewer and storm drain) can be relocated by gravity flow systems similar to the existing systems.
2. Cost for drainage item includes construction of one storm drain pump station at the project area.
3. Right of Way cost estimates are based on $100/SF which covers the land and building allowance for full takes or areas affected by part takes.
4. Right of Way costs do not include any associated relocation costs or severance damages to the business operators.
5. Right of Way costs include a 26% allowance for acquisition costs. (appraisals, negotiation, labor, legal, closing cost, etc.)
6. Agency Costs include Agency Project Management direct labor and Agency indirect costs.
7. Program Management costs include third party project support costs such as community outreach, environmental management, DBE and labor compliance, and property survey.
8. This estimate is prepared using construction cost information based on current dollar cost as of 2011.

7.1 MONTEBELLO FLYOVER OPTIONS

INTRODUCTION

The existing UPRR right-of-way is approximately 100 feet wide between Vail Avenue and the existing bridge at Bluff Road. The right-of-way is generally free of outside encroachments or other improvements of a substantial nature. A flyover structure, or raise of the railroad, between Vail Avenue and Bluff Road, would appear feasible. There is one industry track within the limits of the work and this study demonstrates that industry service to the mainline track can continue to serve the business. See Figure 7-4 for a vicinity map.

Figure 7-4: Montebello Flyover Project Vicinity Map

This report appraises alternatives for the partial raise of the UPRR Los Angeles Subdivision between MP 7.5 and MP 8.9. The project is located in the City of Montebello, California, and is generally bounded by the Metrolink Montebello/Commerce station to the west, the Rio Hondo River to the east, Olympic Boulevard to the north and Mines Avenue to the south. This segment of railroad consists of 2 main tracks and traverses 4 at-grade crossings, S. Vail Avenue, Maple Avenue, Greenwood Avenue and Montebello Boulevard and 1 vehicular overpass, Bluff Road. Current rail traffic (2010) is estimated at 65

trains in a 24-hour period. This accounts for 21 Metrolink trains and 44 freight trains. This deflated number is a result of the recent economic downturn and is expected to double in the near future.

The following analysis is aimed at the physical separation of trains and automobiles at Maple Avenue, Greenwood Avenue and Montebello Boulevard via the partial raise of the UPRR railroad and partial lowering at each of the street crossings. This alternative was evaluated by applying the UPRR vertical curve design criteria.

UPRR Vertical Curve Design

Bluff Road – Return to Grade
Montebello Boulevard – Lower Street by 16', Raise Track 10.8'
Greenwood Avenue – Lower Street by 11', Raise Track 14.6'
Maple Avenue – Lower Street by 18', Raise Track 9.3'
Vail Avenue – Raise Street by 1'
Montebello Metrolink Station – Return to Grade

UPRR Vertical Curve Criteria

In order to raise the railroad, it is necessary to adhere to vertical curve design criteria as established by the UPRR railroad. This criterion establishes that, for main tracks, the maximum average change in gradient per 100-foot stations (V/L) may not exceed 0.06 in sag curves and 0.10 in summit curves. This criterion is established in UPRR STD DWG 0016. Based on the UPRR criteria and the physical limitations of the project boundaries (Rio Hondo Bridge and the Metrolink station), the maximum rise obtainable for the structure is approximately 15 feet.

ENGINEERING ANALYSIS

The major physical constraints are the Metrolink Montebello/Commerce station to the west and the existing bridge clearance at the Bluff Road overpass to the east. The existing ruling track grade of 1.0% was optimized within these limits while maintaining UPRR railroad criterion. In order to maintain railroad operation during construction, a temporary shoofly track is warranted. The existing UPRR – Los Angeles Division consists of two mainline tracks; therefore, the railroad would most likely require ACE to build a double track shoofly. The railroad right-of-way is wide enough to accommodate a double track shoofly on the south side of the existing track, as shown on the Montebello Construction Phasing exhibit in Appendix Q. The shoofly tracks have been preliminarily designed, for this concept level report, to accommodate speeds of 65 miles per hour for freight operations and 70 miles per hour for passenger trains.

Figure 7-5 shows the proposed cross section for the raised structure. It consists of a 60 foot inside wall to inside wall dimension and allows for two main tracks at 20 foot track centers with room for a 10 foot access road and 15 foot centerline of track to edge of access road within the raised structure. The railroad right-of-way is assumed to be 100 feet throughout the entire limits of the project. An existing spur track serving Fleischman Vinegar/Nabisco just east of Montebello Boulevard will remain in service and at-grade in the final configuration. It is assumed that the spur track will receive service by retaining a portion of the proposed shoofly track after construction is complete. From the point of switch, approximately 330 feet of tail track will service the Vinegar/Nabisco spur track. A change in operation will be required to maintain service.

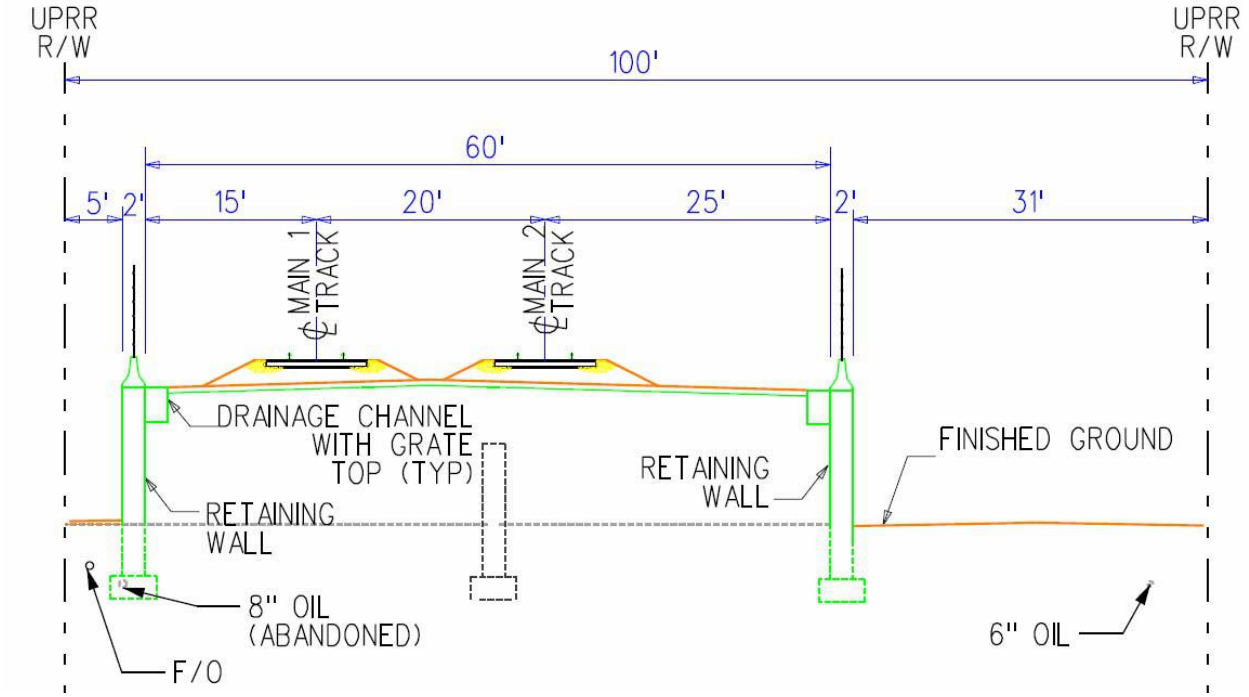


Figure 7-5: Proposed flyover section final configuration

In evaluating the existing horizontal alignments within the proposed work area, it was noted that the existing main tracks meander within the railroad right-of-way. The main track alignment in relation to the existing centerline of railroad right-of-way varies anywhere from 2 feet to 16 feet. In order to accommodate the required trench construction and shoofly, it will be necessary to realign the existing main tracks for approximately 6,800 track feet, so that the centerline of Main Track 2 is exactly 50 feet from centerline of track to either right-of-way, as shown in Figure 7-6.

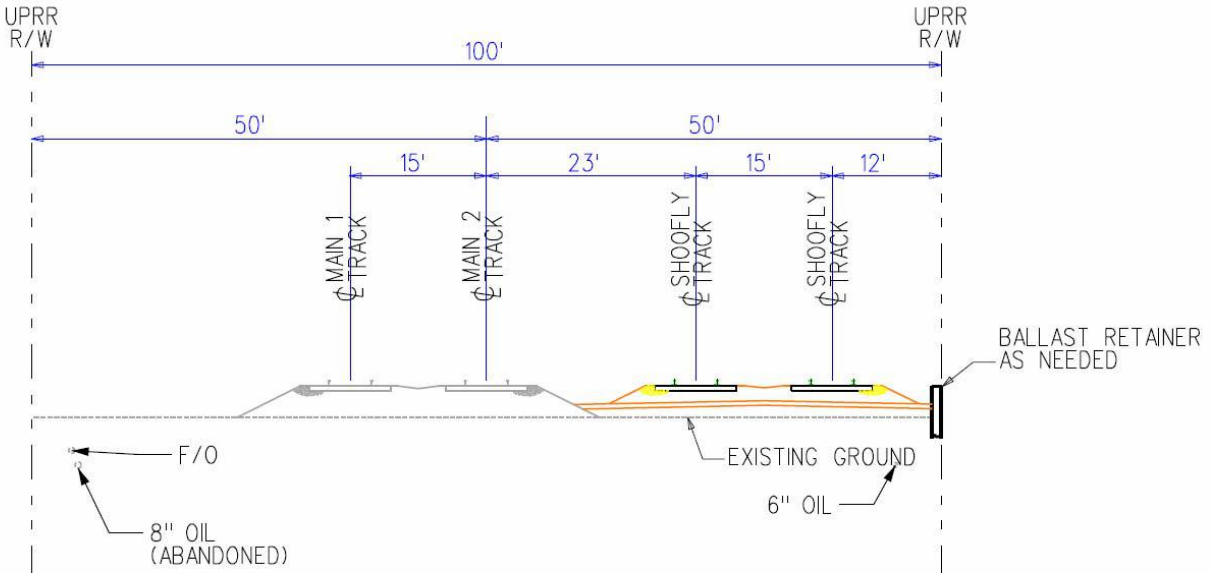


Figure 7-6: Required main track configuration during shoofly operation

Once the initial track shift and construction of the shoofly is complete, construction of the raised structure would commence. The construction phasing shown in Figures 7-7 and 7-8 maintain track operations at all times and allows for the construction within the right-of-way. As each phase is completed, traffic from the shoofly will be moved onto the structure. As noted earlier, in order to keep the industry spur in operation, a section of the shoofly will remain. Complete street closures at the grade crossing would be required upon construction of the railroad bridges. Once the bridges are in place, construction of the underpasses would commence.

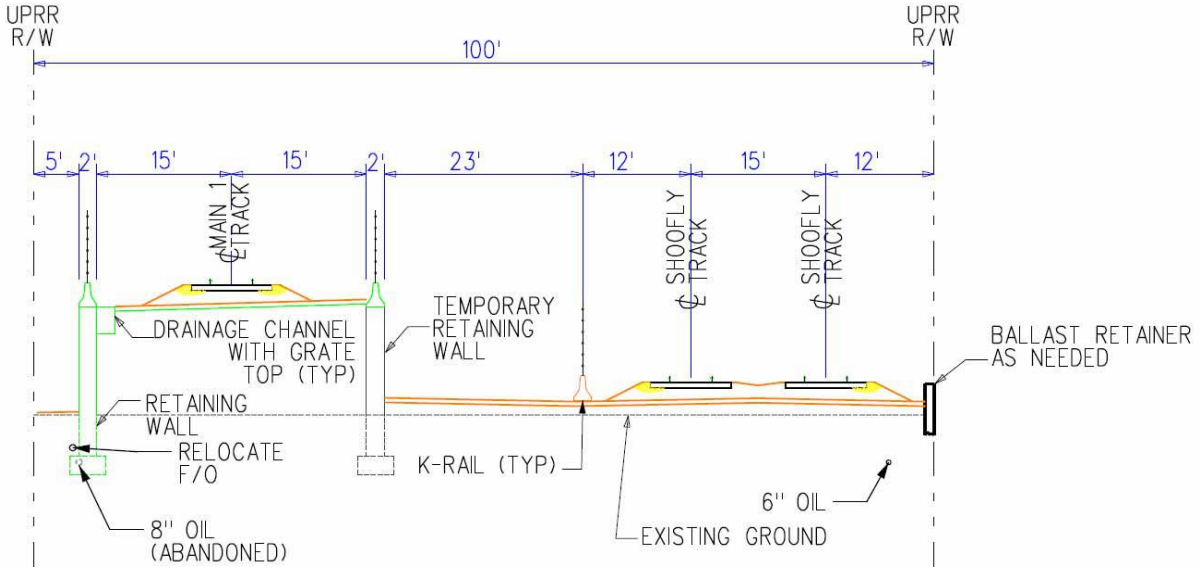


Figure 7-7: Construct northern flyover structure

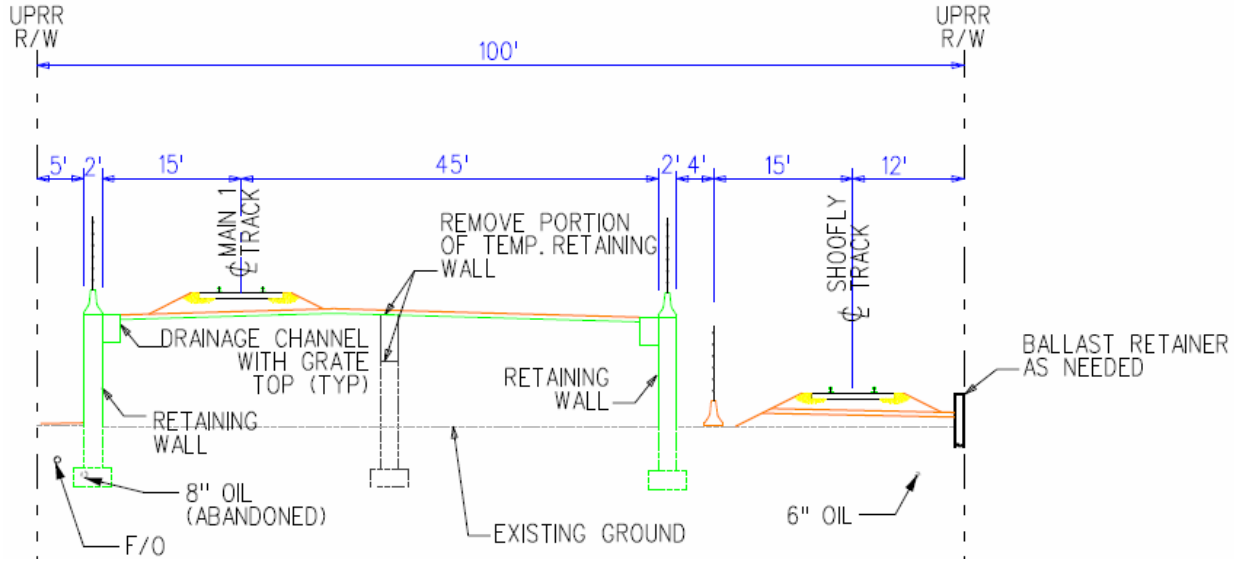


Figure 7-8: Move traffic to Track 1 on structure and remove shoofly to construct southern wall

UTILITIES

A preliminary investigation of the utilities along the right-of-way has been completed. Based upon this research, several facilities were identified as potential impacts:

- 8" Oil (abandoned)
- Fiber Optics – MCI
- 6" Oil – Mobile Oil Co.
- Overhead Power lines at crossings

A major portion of the proposed cross section rests on the northerly side of the UPRR right-of-way, as shown on Figure 7-8. This configuration affects the existing fiber optic line along the northerly property line. The fiber optic line can be relocated to the 5-foot gap between the retaining wall and the railroad right-of-way, or alternatively, adjusted to grade within the structure. The 6-inch oil line along the southerly property line would be protected in place during construction as the shoofly is proposed directly above. At the crossings, the oil line will have to be raised as needed and cross within the bridges at these points.

STRUCTURAL TYPE SELECTION

The following important factors were considered in selecting the appropriate bridge and wall types to be used at various locations:

- The geometry of the railroad and roadway alignment to be tied in the existing location.
- Minimize loss of revenue – minimize traffic impact on both railroad and roadway
- Minimize disturbances during construction

- Minimize right-of-way impacts and takings
- Constructability

BRIDGE TYPE SELECTION

As a general rule, per UPRR Guidelines, the preferred alternative is the use of steel superstructures for undercrossings. The use of a steel superstructure reduces the vertical clearance requirement by one foot to 16.5 feet. Caltrans has recently adopted and encouraged the use of precast prestressed girders (mainly Bulb Tee sections) for all typical highway and roadway overcrossings. As a result, competition among the precast concrete manufactures in California has increased considerably bringing the cost of manufacturing and installation of precast prestressed girders down. Further, the Bulb-Tee sections are structurally very efficient. It is also noted that steel structures have a higher initial cost as well as increased maintenance cost in its lifespan versus their counterpart. Minimum of 58 feet clear width is provided at all bridges for the existing and future tracks except at Fairway Drive and Lemon Road underpasses where 50 feet of minimum clear width is provided.

RETAINING WALL TYPE SELECTION

A soldier pile retaining wall system uses HP piles placed in drilled holes and concreted in place; and precast concrete lagging panels. This type of retaining system is typically used for roadway approaches requiring excavation. The use of this system eliminates the traditional retaining wall footing and provides considerable savings on the excavation and footprint that would otherwise be required for traditional retaining walls. The impact to adjacent businesses would be drastically minimized or eliminated with a soldier pile retaining system. In addition, the precast lagging panels can be treated with a variety of architectural features, as required.

In order to raise the railroad tracks partially in an efficient and practical manner, a Mechanized Stabilized Embankment System (MSE) is proposed. Alternatively, a T-Wall System may be used. Both retaining systems serve the same purpose. However, the use of an MSE system may prove to be more efficient. In comparison, traditional retaining walls are more costly, and cannot be used efficiently in the limited space available for the shoofly and construction stages for the grade separation scheme adopted.

RIGHT-OF-WAY

Based on the available 100-foot right-of-way throughout the alignment and the proposed construction phasing discussed previously, no significant right-of-way impacts are apparent. At an advanced design phase of the project, an analysis of right-of-way impacts should be performed as part of an Environmental Impact Report (EIR). Since a partial track raise is only part of the solution for the complete grade separation of Montebello Boulevard, Greenwood Avenue, and Maple Avenue, right-of-way impacts at these proposed underpass locations must also be considered. Right-of-way impacts at these locations are significant and will be covered in detail in their corresponding analyses.

WORK AREA TRAFFIC CONTROL & DETOUR(S) DURING CONSTRUCTION:

The construction of the flyover structure and underpass would have to be closely coordinated as it would require full closures of Montebello Boulevard, Greenwood Avenue, and Maple Avenue. Phasing of these road closures will have to be coordinated with City officials, as they may affect project scheduling. Full closures will be necessary after the flyover approaches are completed and the first railroad bridges

are installed across the roadways. Once this phase has been completed, railroad traffic will be moved from one of the shooflies and onto the structure. Since the track is only a partial raise, the road will have to be lowered at this point to restore access through the crossing. See preliminary Detour Concept plan in Appendix Q.

SUMMARY: PARTIAL TRACK RAISE – PARTIAL ROAD LOWER

- Length of raised structure section approximately 5,200'
- Modification/protection to Bluff Road overpass to allow for shoofly
- Begin raising railroad tracks 100' west of Bluff Road
- Raise tracks at Montebello Boulevard by 10.8', construct bridge, depress road
- Raise tracks at Greenwood Avenue by 14.6', construct bridge, depress road
- Raise tracks at Maple Avenue by 9.3', construct bridge, depress road
- Raise Vail crossing 1.1'
- Return to grade at Metrolink station platform

As a companion to this alternative, the following three grade separation studies are as follows.

1. **Montebello Boulevard**
2. **Greenwood Avenue**
3. **Maple Avenue**

See Appendix Q for railroad alignment and profile.

CONCEPTUAL ESTIMATE (Rough Order of Magnitude) – PARTIAL RAILROAD TRACK RAISE – LOS ANGELES SUBDIVISION

The roadway cost is a summation of all three grade separations which is all inclusive of the cost of the railroad bridge, retaining wall system required for the lowering, utility relocations, and the civil work required for the track raise. The structure portions will include the costs associated with the partial raise, exclusive of the cost generated from the street lowering. The costs associated with Right-of-Way are a summation of all the acquisitions for the underpass construction. The detailed cost estimate is found in Appendix Q.

Grade Separation Type: Partial Raise

Summary of Project Cost Estimate:

Roadway(See Grade Crossing Estimates)	$32,013,000
Track	$8,274,000
Structures	$15,693,000
Right-of-Way Notes 1, 2 & 3	
Montebello Blvd	$33,062,000
Greenwood Ave	$7,320,000
Maple Ave	$17,747,000
Right-of-Way Total	$58,128,840
Utilities(Within Railroad ROW)	$1,193,000
Project Costs including: Geotechnical Investigation, Surveying, Engineering, Flagging, Construction Management, Agency, and Program Management Costs Notes 4 & 5	$32,016,160
Contingency 30%	$26,756,748
TOTAL PROJECT COST	$174,073,000

Notes:

1. Right of Way cost estimates are based on $100/SF which covers the land and building allowance for full takes or areas affected by part takes.
2. Right of Way costs do not include any associated relocation costs or severance damages to the business operators.
3. Right of Way costs include a 26% allowance for acquisition costs. (appraisals, negotiation, labor, legal, closing cost, etc.)
4. Agency Costs include Agency Project Management direct labor and Agency indirect costs.
5. Program Management costs include third party project support costs such as community outreach, environmental management, DBE and labor compliance, and property survey.
6. This estimate is prepared using construction cost information based on current dollar cost as of 2011.

7.2 MONTEBELLO BOULEVARD – MP 8.5 - 811074G

INTRODUCTION

The original Alameda Corridor East program included this crossing as an underpass option. Unfortunately, the community impacts are just as severe today as they were in the mid-1990's, with many businesses and residences being affected by the grade separation.

DESIGN PARAMETERS

The horizontal and vertical roadway alignment standards used in the design consisted of the Caltrans Highway Design Manual, AASHTO policy of Geometric Design of Highways and Streets, and the BNSF/UPRR Design Guidelines for Railroad Grade Separations. The following includes the specific guidelines that were used in the design of these alternatives:

- Design Speeds

Montebello Boulevard	V = 45 mph
W. Olympic Boulevard	V = 35 mph
Roosevelt Avenue	V = 25 mph
S. Montebello Boulevard	V = 25 mph

- Horizontal Alignment

Transition & Curves	Caltrans minimum requirement for design speed without super-elevation

- Vertical Alignment

Crest Curves	AASHTO stopping sight distance
Sag Curves	AASHTO comfortable speed for well-lit roadways
Max Grade	6% max

- Vertical Clearance

Roadway	16'-6"/17-6" Per UPRR Bridget type Selection
Rail (Permanent)	24'
Rail (Temporary)	21'-6"

- Cross-Section

Montebello Boulevard	68'-3" curb-to-curb minimum, minimum 8' sidewalk, two lanes each direction

- Truck Size — Caltrans 2005 (US) — CA LEGAL-65

UNDERPASS ALTERNATIVE

This alternative proposes to construct an underpass structure under the partially raised UPRR tracks, generally along the original alignment of Montebello Boulevard. The plans are presented in Appendix Q. The underpass would have a four-lane configuration with final vertical clearance of the underpass structure conforming to the UPRR/BNSF jointly developed "Guidelines for Railroad Grade Separation Projects." The vertical clearance for the proposed structure would be 17'-6" based on a concrete bridge.

HORIZONTAL LAYOUT

The proposed centerline location of Montebello Boulevard would remain consistent with existing. The overall curb face to curb face width and the number of lanes would be preserved. The existing inside radius may be difficult to maintain based on the required horizontal sight distance since the proposed retaining walls along the right-of-way would affect the current sight distance. In order to overcome this issue, either a speed reduction or an increase to the inside radius of Montebello Boulevard would be required. Because of the existing street configuration of Montebello Boulevard, the affected roadways both north and south of the UPRR tracks include S. Montebello Boulevard, Roosevelt Avenue, and W. Olympic Boulevard. Other residential roadways that will have minor impacts are Cedar Court, Mountain View Avenue, and 7th Street. All streets would maintain their existing centerline alignments and cross section dimensions.

PROFILE

The proposed street underpass is being lowered under the raised UPRR tracks. The vertical curves are based on the minimum requirements by AASHTO vertical curve design parameters. Caltrans standards were also observed, as practical.

CROSS-SECTION

The existing Montebello Boulevard cross section spans 84 feet from curb face to curb face. The street is striped as a four-lane divided roadway with median islands. The underpass cross section is proposed to match the existing curb face to curb face dimensions, with 8-foot sidewalks being provided on either side of the street.

W. Olympic Boulevard is a two-lane roadway with a curb face to curb face cross section of 40 feet. Roosevelt is a two-lane roadway and S. Montebello Boulevard is also a two-lane roadway.

BRIDGE TYPE

The bridge type selection is required to be studied in detail at an advanced design phase of the project. For this conceptual design and cost estimating purposes, a 108-foot long, two-span Bridge is proposed. The bridge supporting the railroad over the roadway uses 54-foot precast prestressed modified Bulb-Tee Girders with a central bent support at the roadway median. The overall bridge deck width of 65 feet includes cantilever cast-in-place sidewalk. Montebello Boulevard is on a curve at the railroad crossing and therefore the center columns would be placed slightly offset with respect to the center line of median so that all columns lie at the center line of the bent. The abutments are assumed to be

cantilevered using CIDH piles with a short pile cap. The earth under the abutment cap may be retained by an MSE system in lieu of soldier pile wall.

As mention earlier, an MSE system is proposed to raise the track. Alternatively, a Precast T-Wall proprietary system may be used. The soldier pile wall system with precast concrete lagging panels is proposed to retain the lowered roadway. The lagging panels can be treated with architectural features, as required.

DRAINAGE

Surface runoff from the underpass would be collected at the low point below the structure. The storm runoff can be handled by a pump system. The runoff will be discharged into the existing storm drain system on Montebello Boulevard. This system will be designed to adhere to Los Angeles County Flood Control District (LACFCD) standards and requirements.

RAILROAD SHOOFLY

In order to maintain railroad operations during the construction of the underpass grade separation, the construction of the raised railroad will have to be completed and the bridge be put in place. The shoofly construction will be required for the raising of the railroad.

UTILITIES

A preliminary investigation of the utilities along Montebello has been completed. Based upon this research, several facilities were identified as potential impacts:

- 17' x 11' reinforced concrete box storm drain (RCB) – LACFCD Facility No. 1109
- 8" Sanitary sewer
- Gas line
- UG telephone (Verizon)
- Communication fiber optic line (Verizon/MCI)
- Water Line
- 8" Oil line (abandoned, on railroad right-of-way)
- Fiber optics – MCI (On railroad right-of-way)
- 6" Oil line-Union Oil Co (On railroad right-of-way)

These lines would be relocated in order to build the underpass option. See Appendix Q for utility relocation schematic.

RIGHT-OF-WAY

The right-of-way impacts from an underpass option are typical for this type of grade separation; however, significant effort was made to minimize the partial/total impacts to driveways and properties. If a driveway could be saved at the existing location by altering the vertical profile of the roadway/access, then a partial impact was called out on the exhibits.

NORTHWEST QUADRANT

The following properties are located on the northwest quadrant starting from the railroad right-of-way crossing Olympic Boulevard toward the northern end of the project limits. Valero Gas is adjacent to the railroad tracks and would be significantly impacted by the roadway underpass. Currently the gas station receives access from Montebello Boulevard and Olympic Boulevard. Access from Olympic Boulevard can remain. However, access from Montebello Boulevard will be restricted. North of Olympic Boulevard consists of a block of detached single-family residences. Due to the lowering of the intersection of Olympic Boulevard and Montebello Boulevard, the adjacent properties will have to be acquired. The remaining homes can remain, with minor driveway modifications.

NORTHEAST QUADRANT

The following properties are located on the northeast quadrant starting from the railroad right-of-way crossing Olympic Boulevard towards the northern project limits. Olympic Machinery is adjacent to the railroad right-of-way and will be significantly impacted. Currently this business receives access from Olympic Boulevard. Access from Olympic Boulevard can remain. However there will be some impacts to the property. In addition, if relocation of the 11-foot by 17-foot RCB is required, the realignment will cross through this property, in which case it may need to be acquired. North of Olympic Boulevard consists of a block of residential condominiums. Due to the lowering of the intersection of Olympic Boulevard and Montebello Boulevard the adjacent properties will have minor driveway modifications. Parcel #47 has a 6-unit apartment building which obtains access from Olympic Boulevard and 7th street. It may not be feasible to preserve driveway access from Olympic Boulevard; however, access from 7th Street will remain intact.

SOUTHWEST QUADRANT

The southwest quadrant includes properties from the railroad right-of-way towards the southern project limits. Gage Extermination is located adjacent to the railroad and will have to be acquired as access to this property would not be possible with the lowering of Montebello Boulevard. J&E Auto Repair will also be affected as access will be restricted from Montebello Boulevard. As part of the concept plan, it has been proposed to cul-de-sac Truck Way and to provide a new access point from Montebello Way. In doing so, access to the Auto repair and business on Truck Way can remain. Minor modifications to the driveway serving Otani Radiator may be required. In order to provide access to Truck Way from Montebello Way, the carwash property will be affected as a full or partial take. The wash bays can be saved, however the retail building on the property will be affected. The access road on WJ Tolstoy Construction Co. (Parcel #24) would also require a full take.

SOUTHEAST QUADRANT

The southeast quadrant includes properties from the railroad right-of-way towards the southern project limits. A portion of the Conroy and Knowlton property will be needed in order to provide a cul-de-sac for Roosevelt Avenue. In addition, if the 11-foot by 17-foot RCB needs to be relocated, the new alignment would traverse this parcel in which case a full take will be required. Montebello Boulevard will dead end in a cul-de-sac at the grade separation. In order to maintain access to Montebello Boulevard, a new roadway through Parcel # 20 is proposed. This parcel consists of 5 single-family homes and a large empty dirt lot. The new roadway would replace the existing dirt road servicing these lots and would tie into Montebello Way.

SUMMARY

The right-of-way impacts of Montebello Boulevard (Los Angeles Subdivision) underpass are:

QUADRANT	PARTIALLY AFFECTED	FULL TAKE	TOTAL AFFECTED PARCELS
Northwest	5	1	6
Northeast	2	1	3
Southwest	3	3	6
Southeast	2	1	3
Total	**12**	**6**	**18**

The project would result in 18 affected parcels. The properties that would require a full take include Olympic Machinery, Gage Extermination, the self-service carwash, WJ Tolstoy Construction Co., Parcel # 12 (single-family residence), and Parcel #20 (partially vacant 2-acre lots). The partially affected parcels include industrial properties and single- and multiple-family residences.

WORK AREA TRAFFIC CONTROL & DETOUR(S) DURING CONSTRUCTION:

The construction of the underpass structures and the partial raise will have to be closely coordinated as it will require full closures of Montebello Boulevard, Greenwood Avenue and Maple Avenue. Phasing of these road closures will have to be coordinated with City officials, as they may affect project scheduling.

CONCEPTUAL ESTIMATE (Rough Order of Magnitude) – MONTEBELLO BOULEVARD – LOS ANGELES SUBDIVISION

Grade Separation Type: Underpass

Summary of Crossing Cost Estimate:

Roadway	$5,309,505
Structures	$6,914,250
Right-of-Way Notes 3, 4 & 5	$33,062,000
Utilities Notes 1 & 2	$1,815,000
TOTAL CROSSING COST	$47,100,755

Notes:

1. Utility relocation cost estimates assume all affected utilities (sewer and storm drain) can be relocated by gravity flow systems similar to the existing systems.
2. Cost for drainage item includes construction of one storm drain pump station at the project area.
3. Right of Way cost estimates are based on $100/SF which covers the land and building allowance for full takes or areas affected by part takes.
4. Right of Way costs do not include any associated relocation costs or severance damages to the business operators.
5. Right of Way costs include a 26% allowance for acquisition costs. (appraisals, negotiation, labor, legal, closing cost, etc.)
6. This estimate is prepared using construction cost information based on current dollar cost as of 2011.

7.3 GREENWOOD AVENUE – MP 8.30 – 811075N

INTRODUCTION

Greenwood Avenue is a collector road with one lane in each direction which bridges Olympic Boulevard and the three-point intersection of Mines Avenue and Montebello Way. This alignment primarily serves an industrial stretch of properties and a mobile home park. The grade separation study of Greenwood Avenue is closely correlated with the proposed Montebello Avenue flyovers discussed earlier. The following sections will address the impacts to adjacent properties per the concept plans in Appendix Q.

DESIGN PARAMETERS

The horizontal and vertical roadway alignment standards used in the design consisted of the Caltrans Highway Design Manual, AASHTO policy of Geometric Design of Highways and Streets, and the BNSF/UPRR Design Guidelines for Railroad Grade Separations. The following includes the specific guidelines that were used in the design of these alternatives:

- Design Speeds

Greenwood Avenue	V = 35 mph
W. Olympic Boulevard	V = 35 mph

- Horizontal Alignment

Transition & Curves	Caltrans minimum requirement for design speed without super-elevation

- Vertical Alignment

Crest Curves	AASHTO stopping sight distance
Sag Curves	AASHTO comfortable speed for well-lit roadways
Max Grade	6% max

- Vertical Clearance

Roadway	16’-6”-17-6” Per UPRR Bridget type Selection
Rail (Permanent)	24’
Rail (Temporary)	21’-6”

- Cross-Section

Greenwood Avenue	22’-0” curb-to-curb minimum, minimum 6’ raised sidewalks, one lane each direction

- Truck Size — Caltrans 2005 (US) — CA LEGAL-65

UNDERPASS ALTERNATIVE

This alternative proposes to construct an underpass structure under the partially raised UPRR tracks, generally along the original alignment of Greenwood Avenue. The plans are presented in Appendix Q. The underpass would have a one-lane configuration with the final vertical clearance of the underpass structure conforming to the UPRR/BNSF jointly developed "Guidelines for Railroad Grade Separation Projects." The vertical clearance for the proposed type of structure would be 17'-6" based on a concrete bridge.

HORIZONTAL LAYOUT

The existing alignment of Greenwood Avenue is on an S-curve as it passes through the railroad tracks. In order to provide adequate sight distance around the curves, Greenwood Avenue would be realigned. The new alignment also facilitates ease of construction of the underpass. The overall curb face to curb face width on Greenwood Avenue will match the existing curb width of 44 feet and the number of lanes will remain. It has been considered that the inside radius may need to be studied further in final design as the required horizontal sight distance along the curve might be affected by the retaining walls along the raised sidewalk. In order to overcome this issue, either a speed reduction or an increase to the inside radius of Greenwood Avenue will be required. Because of the raised railroad tracks, the work limits are in the immediate area of the existing grade crossing.

PROFILE

The proposed street underpass is being lowered under the raised UPRR tracks. The vertical curves are based on the minimum requirements by AASHTO vertical curve design parameters. Caltrans standards were also observed, as practical.

CROSS-SECTION

The existing Greenwood Avenue cross section spans 40 feet from curb face to curb face with 12-foot sidewalks. The street is striped as a one-lane roadway. The underpass cross section is proposed to be 44 feet from curb face to curb face dimensions, with 6-foot raised sidewalks being provided on either side of the street.

BRIDGE TYPE

The bridge type selection is required to be studied in detail at an advanced design phase of the project. For the conceptual design and cost estimating purposes, a single span bridge, consisting of 65-foot precast prestressed modified Bulb-Tee Girders, is used to carry the railroad over the roadway. The overall bridge deck width of 65 feet includes cantilever cast-in-place sidewalk. Cantilever-type abutments using a single row of CIDH are proposed at this location unless geotechnical findings prohibit the use. Alternatively, driven piles or a smaller diameter CIDH pile with a pile cap may be used. The earth under the abutment cap may be retained by an MSE system.

As mentioned earlier, an MSE system is proposed to retain the track raise. Alternatively, a Precast T-Wall proprietary system may be used. The lowered roadway approaches are assumed to be retained by a soldier pile wall system with precast concrete lagging panels which can be treated with architectural

features as required. The raised sidewalks may be retained by MSE walls within the bridge area and with a soldier pile system beyond the bridge.

DRAINAGE

Surface runoff from the underpass would be collected at the low point below the structure. The storm runoff can be handled by a pump system. The runoff will be discharged into the existing storm drain system at the intersection of Mines Avenue and Montebello Way. This system will be designed to adhere to LACFCD standards and requirements.

RAILROAD SHOOFLY

In order to maintain railroad operations during the construction of the underpass grade separation, the construction of the raised railroad will have to be completed and the bridge put in place. The shoofly construction will be required for the raising of the railroad.

UTILITIES

A preliminary investigation of the utilities along Greenwood Avenue has been completed. Based upon this research, several facilities were identified as potential impacts:

- 8" Sanitary sewer
- Gas line
- Water line
- Buried Telephone line
- 8" Oil line (abandoned, on railroad right-of-way)
- Fiber optics – MCI (on railroad right-of-way)
- 6" Oil line – Union Oil Co. (on railroad right-of-way)

These lines will have to be relocated in order to build the underpass option. See Appendix Q for utility relocation schematic.

RIGHT-OF-WAY

The right-of-way impacts from an underpass option are typical for this type of grade separation; however, significant effort was made to minimize the partial/total impacts to driveways and properties. If a driveway could be saved at the existing location by altering the vertical profile of the roadway/access, then a partial impact was called out on the exhibits.

NORTHWEST QUADRANT

The following properties are located on the northwest quadrant starting from the railroad right-of-way to Olympic Boulevard toward the northern project limits. The City of Montebello Corporate Yard is adjacent to the railroad tracks and will be impacted by the roadway underpass. Currently the yard

receives access from Greenwood Avenue and Taylor Avenue to the west. Access from Greenwood Avenue would be eliminated with access to the yard available via Taylor Avenue. The Montebello Street Maintenance office on the corner of Olympic Boulevard and Greenwood Avenue may have possible impacts; however at this time it is assumed that the soldier pile system has adequate room to separate the road. A sewer easement may be needed to restore service to the Corporate Yard.

NORTHEAST QUADRANT

The City of Montebello owns the vacant property west of the American Trucking Company located on the northeast quadrant. The property is adjacent to the railroad right-of-way and this business currently gains access from Olympic Boulevard and Greenwood Avenue; per this study, access from Olympic Boulevard can remain; however, there will be some impacts to the property along Greenwood Avenue. As noted earlier, the realignment is necessary to provide adequate sight distance within the underpass and results in an encroachment of approximately 40 feet into the parking lot. This will be a partial take of the property.

SOUTHWEST QUADRANT

The Montebello Unified School District Transportation Department is located on the southwest quadrant and is adjacent to the railroad. Access to the property will be restricted by the lowering of Greenwood Avenue. Access to the property can be reestablished by shifting the driveway further south and restriping would allow use of their parking lot. A storm drain easement and possible location of the pumping station may require a partial take to the yard.

SOUTHEAST QUADRANT

The southeast quadrant includes the property from the railroad right-of-way towards the southern work limits. A portion of the Cal-Metro Distributing property will be needed in order to provide a cul-de-sac for Truck Way. Service to and from Greenwood Avenue will be partially closed due to the underpass grades. However, this property receives its primary access from Montebello Way which will remain.

SUMMARY

The right-of-way impacts of the Greenwood Avenue (Los Angeles Subdivision) underpass are:

QUADRANT	PARTIALLY AFFECTED	FULL TAKE	TOTAL AFFECTED PARCELS
Northwest	2	-	2
Northeast	1	-	1
Southwest	1	-	1
Southeast	1	-	1
Total	**5**	**-**	**5**

The project would result in 5 affected parcels. The partially affected parcels are industrial properties.

WORK AREA TRAFFIC CONTROL & DETOUR(S) DURING CONSTRUCTION:

The construction of the underpass structures and the partial raise will have to be closely coordinated as it will require full closures of Montebello Boulevard, Greenwood Avenue and Maple Avenue. Phasing of these road closures will have to be coordinated with City officials, as they may affect project scheduling See Appendix Q for preliminary Traffic Detour Concept plan.

CONCEPTUAL ESTIMATE (Rough Order of Magnitude) GREENWOOD AVENUE – LOS ANGELES SUBDIVISION

Grade Separation Type: Underpass

Summary of Crossing Cost Estimate:

Roadway	$1,625,387
Structures	$3,191,288
Right-of-Way Notes 3, 4 & 5	$7,320,000
Utilities Notes 1 & 2	$830,000
TOTAL CROSSING COST	$12,966,675

Notes:

1. Utility relocation cost estimates assume all affected utilities (sewer and storm drain) can be relocated by gravity flow systems similar to the existing systems.
2. Cost for drainage item includes construction of one storm drain pump station at the project area.
3. Right of Way cost estimates are based on $100/SF which covers the land and building allowance for full takes or areas affected by part takes.
4. Right of Way costs do not include any associated relocation costs or severance damages to the business operators.
5. Right of Way costs include a 26% allowance for acquisition costs. (appraisals, negotiation, labor, legal, closing cost, etc.)
6. This estimate is prepared using construction cost information based on current dollar cost as of 2011.

7.4 MAPLE AVENUE–MP 8.0 – 811076V

INTRODUCTION

Maple Avenue is a collector road with one lane in each direction which bridges Olympic Boulevard and Mines Avenue. This alignment serves an industrial stretch of properties with the exception of a public school currently under construction, and a block of five single-family homes. The grade separation study of Maple Avenue is closely correlated with the proposed Montebello Avenue flyover as discussed earlier. The following sections will address the impacts to adjacent properties per the concept plans found in Appendix Q.

DESIGN PARAMETERS

The horizontal and vertical roadway alignment standards used in the design consisted of the Caltrans Highway Design Manual, AASHTO policy of Geometric Design of Highways and Streets, and the BNSF/UPRR Design Guidelines for Railroad Grade Separations. The following includes the specific guidelines that were used in the design of these alternatives:

- Design Speeds
  - Maple Avenue: V = 35 mph
- Horizontal Alignment
  - Transition & Curves: Caltrans minimum requirement for design speed without super-elevation
- Vertical Alignment
  - Crest Curves: AASHTO stopping sight distance
  - Sag Curves: AASHTO comfortable speed for well-lit roadways
  - Max Grade: 6% max
- Vertical Clearance
  - Roadway: 16'-6"-17-6" Per UPRR Bridget type Selection
  - Rail (Permanent): 24'
  - Rail (Temporary): 21'-6"
- Cross-Section
  - Greenwood Avenue: 20'-0" curb-to-curb minimum, minimum 8' raised sidewalks, one lane each direction
- Truck Size: Caltrans 2005 (US) CA LEGAL-65

UNDERPASS ALTERNATIVE

This alternative proposes to construct an underpass structure under the partially-raised UPRR tracks, generally along the original alignment of Maple Avenue. The underpass would have a one-lane configuration with the final vertical clearance of the underpass structure conforming to the UPRR/BNSF jointly developed "Guidelines for Railroad Grade Separation Projects." The vertical clearance for the proposed type of structure would be 17'-6" based on a concrete bridge. The plans are presented in Appendix Q.

HORIZONTAL LAYOUT

The existing alignment of Maple Avenue has a slight angle as it passes through the railroad tracks. In order to provide adequate sight distance around the curve, Maple Avenue would be slightly realigned. The new alignment will also improve on the ease of construction of the underpass. The overall curb face to curb face width on Maple Avenue will match the existing curb width of 40 feet and the number of lanes will remain. Because of the raised railroads tracks, the work limits stay fairly close to the existing grade crossing.

PROFILE

The proposed street underpass is being lowered under the raised UPRR tracks. The vertical curves are based on the minimum requirements by AASHTO vertical curve design parameters. Caltrans standards were also observed, as practical.

CROSS-SECTION

The existing Maple Avenue cross section spans 40 feet from curb face to curb face with 10 feet sidewalks. The street is striped as a one lane roadway. The underpass cross section is proposed to be 40 feet from curb face to curb face dimensions, with 8-foot raised sidewalks on either side of the street.

BRIDGE TYPE

The bridge type selection is required to be studied in detail at an advanced design phase of the project. For this conceptual design and cost estimating purposes, a single span bridge, consisting of a 65-foot precast prestressed modified Bulb-Tee Girders, is used to carry the railroad over the roadway. The overall bridge deck width of 65 feet includes cantilever cast-in-place sidewalk. Cantilever type abutments using a single row of CIDH, are proposed at this location unless geotechnical findings prohibit the use. Alternatively, driven piles or a smaller diameter CIDH pile with a pile cap may be used. The earth under the abutment cap may be retained by a MSE System.

As mention earlier, a MSE System is proposed to retain the track raise. Alternatively, a Precast T-Wall proprietary system may be used. The lowered roadway approaches are assumed to be retained by a soldier pile wall system with precast concrete lagging panels which can be treated with architectural features, as required. The raised sidewalks may be retained by MSE walls within the bridge area and with a soldier pile system beyond the bridge.

DRAINAGE

Surface runoff from the underpass would be collected at the low point below the structure. The storm runoff can be handled by a pump system. The runoff will be discharged into the existing storm drain system at the intersection of Mines Avenue and Maple Avenue. This system will be designed to adhere to LACFCD standards and requirements.

RAILROAD SHOOFLY

In order to maintain railroad operations during the construction of the underpass grade separation, the construction of the raised railroad will have to be completed and the bridge put in place. The shoofly construction will be required for the raising of the railroad.

UTILITIES

A preliminary investigation of the utilities along Maple Avenue has been completed. Based upon this research, several facilities were identified as potential impacts:

- 8" Sanitary sewer
- 24" Trunk Sewer
- Gas line
- Water line
- Oil line (along Maple Avenue, North of Tracks)
- 8" Oil line (abandoned, on railroad right-of-way)
- Fiber optics – MCI (on railroad right-of-way)
- 6" Oil line – Union Oil Co. (on railroad right-of-way)

These lines will have to be relocated in order to build the underpass option. See Appendix Q for the utility relocation schematic.

RIGHT-OF-WAY

The right-of-way impacts from an underpass option are typical for this type of grade separation; however, significant effort was made to minimize the partial/total impacts to driveways and properties. If a driveway could be saved at the existing location by altering the vertical profile of the roadway/access, then a partial impact was called out on the exhibits.

NORTHWEST QUADRANT

The following properties are located on the northwest quadrant starting from the railroad right-of-way to Colegrove Avenue to the end of the project limits. The Orowheat Baking plant is adjacent to the railroad tracks and will be impacted by the roadway underpass. Currently, access to the loading docks is

gained primarily from Maple Avenue and secondarily from Vail Avenue to the west. Therefore, access from Maple Avenue will remain, and access from Vail Avenue will be temporary during construction. Some modifications to the northern driveway may be able to preserve service to the loading docks. Some operating changes will need to be coordinated in order to properly serve the loading docks as before. The intersection of Maple Avenue and Colegrove Avenue will have some minor improvements; however, no impacts to the residences at the corner are anticipated, with the exception of possible grading easements.

NORTHEAST QUADRANT

The following properties are located on the northeast quadrant starting from the railroad right-of-way to Colegrove Avenue, north to the project limits. This quadrant includes 5 residential properties, 4 of which would have to be acquired. Full takes are warranted since the grade difference from the underpass would make access to these homes impossible. These properties can be used for a storm drain easement, grading and possible location of the pumping station. A multi-unit complex on the corner will have no impact besides minor grading easements, as needed.

SOUTHWEST QUADRANT

The southwest quadrant includes the properties from the railroad right-of-way towards the southern work limits at Mines Avenue. Broguieres Fresh Farm Dairy is located adjacent to the railroad and access to this property will be restricted by the lowering of Maple Avenue. If an agreement can be reached with the adjacent property owner of Montebello Unified Warehouse, access from the adjacent parking lot may be able to restore operation to the establishment. The driveways for the parking lot along Maple Avenue will need to be relocated; however existing access from Mines Avenue will remain.

SOUTHEAST QUADRANT

The southeast quadrant includes the property from the railroad right-of-way towards the southern work limits. A school is currently under construction on the adjacent parcel. A 20-foot wide utility easement is needed along Maple Avenue and this easement will allow for sewer realignment and for possible storm drain alignment from the pump station.

SUMMARY

The right-of-way impacts of the Maple Avenue (Los Angeles Subdivision) underpass are:

QUADRANT	PARTIALLY AFFECTED	FULL TAKE	TOTAL AFFECTED PARCELS
Northwest	3	-	3
Northeast	-	4	4
Southwest	1	1	2
Southeast	1	-	1
Total	**5**	**5**	**10**

The project would result in 10 affected parcels. The properties that would require a full take include the Broguieres Fresh Farm Dairy, Parcels # 5 and #2 which are single-family residences. The partially

affected parcels include Orowheat Baking plant, Montebello Unified Warehouse, and the new public school under construction.

WORK AREA TRAFFIC CONTROL & DETOUR(S) DURING CONSTRUCTION:

The construction of the underpass structures and the partial raise will have to be closely coordinated as it will require full closures of Montebello Boulevard, Greenwood Avenue and Maple Avenue. Phasing of these road closures will have to be coordinated with City officials, as they may affect project scheduling See Appendix Q for preliminary Traffic Detour Concept plan.

CONCEPTUAL ESTIMATE (Rough Order of Magnitude) MAPLE AVENUE – LOS ANGELES SUBDIVISION

Grade Separation Type: Underpass Summary of Crossing Cost Estimate:

Roadway	$1,648,114
Structures	$4,093,460
Right-of-Way Notes 3, 4& 5	$17,747,000
Utilities Notes 1 & 2	$1,200,000
TOTAL CROSSING COST	$24,688,574

Notes:

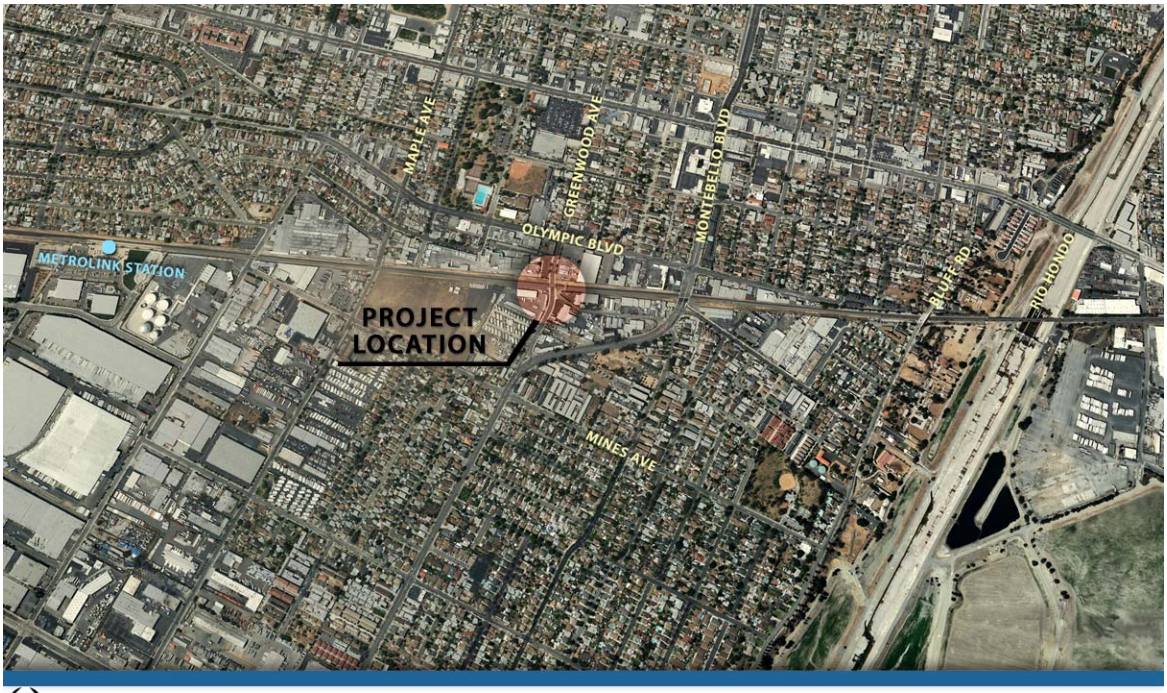
1. Utility relocation cost estimates assume all affected utilities (sewer and storm drain) can be relocated by gravity flow systems similar to the existing systems.
2. Cost for drainage item includes construction of one storm drain pump station at the project area.
3. Right of Way cost estimates are based on $100/SF which covers the land and building allowance for full takes or areas affected by part takes.
4. Right of Way costs do not include any associated relocation costs or severance damages to the business operators.
5. Right of Way costs include a 26% allowance for acquisition costs. (appraisals, negotiation, labor, legal, closing cost, etc.)
6. This estimate is prepared using construction cost information based on current dollar cost as of 2011.

7.5 GREENWOOD AVENUE STAND ALONE UNDERPASS MP 8.30 – 811075N:

INTRODUCTION

Greenwood Avenue is a collector road with one-lane in each direction which bridges Olympic Boulevard and the three point intersection of Mines Avenue and Montebello Way. This alignment serves a primarily industrial stretch of properties and a mobile home park. The following sections will address the impacts to adjacent properties per the concept plans found in Appendix Q. See Figure 7-9 for a vicinity map.

Figure 7-9: Greenwood Avenue Vicinity Map



DESIGN PARAMETERS

The horizontal and vertical roadway alignment standards used in the design consisted of the Caltrans Highway Design Manual, AASHTO policy of Geometric Design of Highways and Streets, and the BNSF/UPRR Design Guidelines for Railroad Grade Separations. The following includes the specific guidelines that were used in the design of these alternatives:

- Design Speeds

Greenwood Avenue	V = 35 mph
W. Olympic Boulevard	V = 35 mph

Montebello Way	V = 35 mph

- Horizontal Alignment

Transition & Curves	Caltrans minimum requirement for design speed without super-elevation

- Vertical Alignment

Crest Curves	AASHTO stopping sight distance
Sag Curves	AASHTO comfortable speed for well-lit roadways
Max Grade	6% max

- Vertical Clearance

Roadway	16'-6"-17-6" Per UPRR Bridget type Selection
Rail (Permanent)	24'
Rail (Temporary)	21'-6"

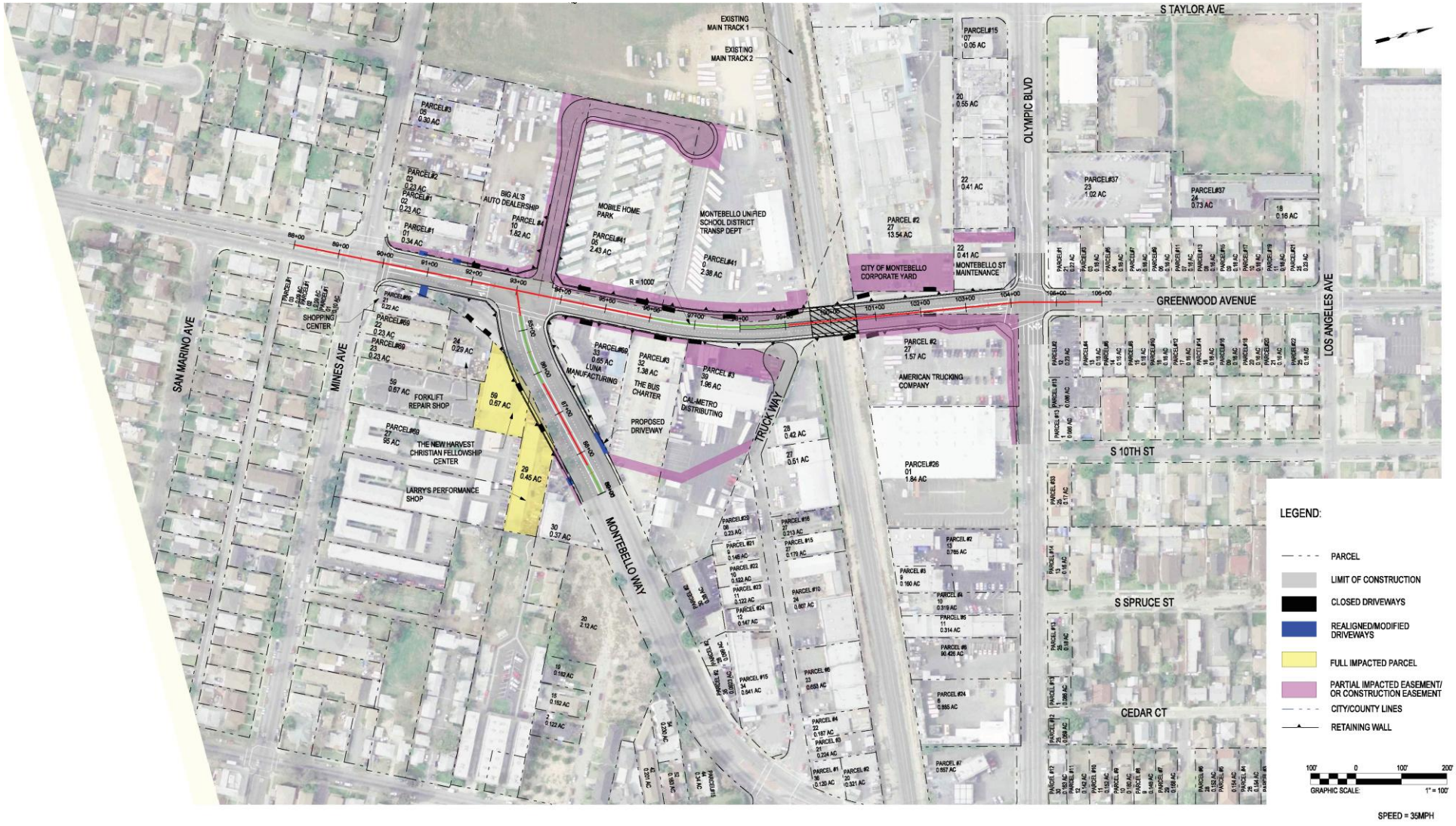
- Cross-Section

Greenwood Avenue	Two lanes each direction 22'-0" curb-to-curb, 8' center median and 6' raised sidewalks

- Truck Size — Caltrans 2005 (US) — CA LEGAL-65

UNDERPASS ALTERNATIVE

This alternative proposes to construct an underpass roadway structure under the UPRR tracks, generally along the original alignment of Greenwood Avenue. The roadway concept plan is presented in Figure 7-10 and in Appendix Q. The underpass would have a four-lane configuration with the final vertical clearance of the underpass structure conforming to the UPRR/BNSF jointly developed "Guidelines for Railroad Grade Separation Projects." The vertical clearance for the proposed type of structure would be 17'-6" based on a concrete bridge. This underpass option is being considered in conjunction with a change of traffic signal operations on Montebello Way. Modifications to the traffic signal operations are needed in order to detour traffic away from the grade crossing on Montebello Way and onto Greenwood Avenue, when the at grade crossing is in operation. The objective is to maintain traffic on Greenwood Avenue through the underpass onto Olympic Boulevard as a detour option when the grade crossing at Montebello way is active. This would be accomplished via synchronized signalization at the intersection of Olympic Boulevard at Montebello Boulevard and at the intersection of Greenwood Avenue at Montebello Way. Greenwood Avenue will be realigned and widened to improve capacity. There will also be dual westbound left turn lanes and dual northbound right turn lanes at the intersection of Olympic Boulevard at Greenwood Avenue in order to facilitate traffic flow during the detour phase.



Source: JL Patterson & Associates, Inc.

HORIZONTAL LAYOUT

The existing alignment of Greenwood Avenue is on an S-curve as it passes through the railroad tracks. In order to provide adequate sight distance around the curves, Greenwood Avenue would be realigned. The new alignment will also improve on the ease of construction of the underpass. The underpass improvements will be from Olympic Boulevard to Mines Avenue, and will realign the intersection of Montebello Way. The realignment of Montebello Way is necessary in order to provide a safe intersection for the suggested traffic operations. It has been considered that the inside radius of Greenwood Avenue may need to be studied further in final design as the required horizontal sight distance along the curve might be affected by the retaining walls along the raised sidewalk. In order to overcome this issue, either a speed reduction or an increase to the inside radius of Greenwood Avenue would be required. In order to provide for free flow of the detoured traffic, Greenwood Avenue will be widened with an additional through lane in each direction, and two westbound turn lanes will be provided on Olympic Boulevard at Greenwood Avenue. In addition to the intersection improvements at Greenwood Avenue and Montebello Way, a new access road to the Mobile Home Park and Montebello Unified School District Transportation Department will be provided. This access road will service both properties from the rear of the lots.

PROFILE

The proposed underpass is being lowered under the raised UPRR tracks. The vertical curves are based on the minimum requirements by AASHTO vertical curve design parameters. Caltrans standards were also observed, as practical.

CROSS-SECTION

The underpass cross section is proposed to be two lanes in each direction with 22 feet curb-to-curb, 8-foot center median and 6-foot raised sidewalks. The proposed width will match the existing width of Montebello Boulevard south of Mines Avenue.

BRIDGE TYPE

The bridge type selection is required to be studied in detail at an advanced design phase of the project. For this conceptual design and for cost estimating purposes, a two-span structure is proposed. The bridge uses 36-foot UPRR standard concrete single cell precast prestressed girders. This type of structure is selected where the available vertical clearance is restricted and the use of a deeper single span structure is prohibited. The fascia girders are proposed to accommodate sidewalks as required by UPRR and can be treated with widely available patterns for aesthetics. These same girders if designed as an impact protection device, vertical clearance requirements may be reduced subject to UPRR approval. The proposed bridge is on a slight skew, requiring a large span. The cantilever type of abutments using single row of CIDH are proposed unless geotechnical findings prohibit the use. Alternatively, driven piles or a smaller diameter CIDH pile with a pile cap may be used. The lowered roadway approaches including raised sidewalk is assumed to be retained by a soldier pile wall system with precast concrete lagging panels which can be treated with architectural features, as required.

DRAINAGE

Surface runoff from the underpass would be collected at the low point below the structure. The storm runoff can be handled by a pump system. The runoff will be discharged into the existing storm drain system at the intersection of Mines Avenue and Montebello Way. This system will be designed to adhere to LACFCD standards and requirements.

RAILROAD SHOOFLY

In order to maintain railroad operations during the construction of the underpass grade separation, the construction of a temporary shoofly track is warranted. The existing UPRR - Los Angeles Division consists of two mainline tracks; therefore, the railroad would most likely require ACE to build a double track shoofly. The railroad right-of-way is wide enough to accommodate a double track shoofly as it is shown on the exhibit in Appendix Q. The shoofly tracks have been preliminarily designed, for this concept level report, to accommodate speeds of 65 miles per hour for both freight and passenger operations.

UTILITIES

A preliminary investigation of the utilities along Greenwood Avenue has been completed. Based upon this research, several facilities were identified as potential impacts:

- 8" Sanitary sewer
- Gas line
- Water line
- Buried Telephone line
- Storm Drain
- 8" Oil line (abandoned, on railroad right-of-way)
- Fiber optics – MCI (on railroad right-of-way)
- 6" Oil line – Union Oil Co. (on railroad right-of-way)

These lines will have to be relocated in order to build the underpass option. See Appendix Q for utility relocation schematic.

RIGHT-OF-WAY

The right-of-way impacts from an underpass option are typical for this type of grade separation; however, additional right-of-way on the east side of Greenwood Avenue was needed in order to provide room for the realignment and widening of the road. In addition, property at the intersection of Greenwood Avenue at Olympic Boulevard is required in order to provide the turning movements to maintain the flow of traffic during the traffic detour operation when Montebello is closed during train

movements. Significant effort was made to minimize the partial/total impacts to driveways and properties. In many instances, if a driveway could be saved at the existing location by altering the vertical profile of the roadway/access, then a partial impact was called out on the exhibits

NORTHWEST QUADRANT

The following properties are located on the northwest quadrant starting from the railroad right-of-way to Olympic Avenue to north of the project limits. City of Montebello Corporate yard is adjacent to the railroad tracks and will be impacted by the roadway underpass. Currently the yard receives access from Greenwood Avenue and Taylor Avenue to the west. Per this study, access from Greenwood Avenue will be eliminated and access to the yard will be available from Taylor Avenue. The Montebello Street Maintenance office on the corner of Olympic Boulevard and Greenwood Avenue may have possible impacts; however at this time it is assumed that the soldier pile system has adequate room to separate the road. A sewer easement may be needed to restore service to the yard.

NORTHEAST QUADRANT

The City of Montebello owns the vacant property west of the American Trucking Company located on the northeast quadrant and is adjacent to the railroad right-of-way. This business currently gains access from Olympic Boulevard and Greenwood Avenue. Per this study, access from Olympic Boulevard can remain; however, there will be some impacts to the property along Greenwood Avenue. The realignment of Greenwood Avenue encroaches about 40 feet into the properties parking lot. As noted earlier, the realignment is necessary to provide adequate sight distance within the underpass. This will be a partial take of the property.

SOUTHWEST QUADRANT

The southwest quadrant includes the property from the railroad right-of-way towards the southern work limits. The Montebello Unified School District Transportation Department Yard is located adjacent to the railroad and access to this property will be eliminated by the lowering of Greenwood Avenue. The existing mobile home park entrance will also be eliminated. A new access road through Big Al's Auto Dealership will provide service to the rear of the mobile home park and the Transportation Department yard. A partial take will be required for this lot (Parcel #4). A storm drain easement and possible location of the pumping station may require a partial take to the yard. Minor modifications to the Catalytic Converter Center will be required.

SOUTHEAST QUADRANT

The southeast quadrant includes the property from the railroad right-of-way towards the southern work limits at Mines Avenue. A portion of the Cal-Metro Distributing property will be needed in order to provide a cul-de-sac for Truck Way; in addition, service from Greenwood Avenue will be eliminated due to the underpass grades. This property gains primary access from Montebello Way which would remain intact. A new sewer easement would traverse this site and the adjoining property to the south. The bus charter business will also lose access from Greenwood Avenue, but access from Montebello Way would remain intact. The Luna Manufacturing business at the intersection for Greenwood Avenue and Montebello Way will lose access from Greenwood Avenue, however there is a possibility of restoring access from Montebello Way; a new driveway approach will have to be provided and on-site traffic operations modified. Based on the new alignment of Montebello Way, there will be two properties affected. While the encroachment is only 10 feet into the properties, the structures and

driveway approaches would be affected due to the existing building setbacks. The New Harvest Christian Fellowship Center and Larry's Performance Shop will require a full take. These sites can be referred to alternative future business locations nearby. The forklift repair shop property is affected with the realignment; however, access to the site can be provided through a new lot created by the realignment of the intersection.

SUMMARY

The right-of-way impacts of the Greenwood Avenue (Los Angeles Subdivision) underpass are:

QUADRANT	PARTIALLY AFFECTED	FULL TAKE	TOTAL AFFECTED PARCELS
Northwest	1	-	1
Northeast	1	-	1
Southwest	4	-	4
Southeast	3	2	5
Total	**9**	**2**	**11**

The project would result in 11 affected parcels. The 9 partially affected parcels are commercial/industrial properties with the exception of the mobile home park. The 2 full takes include the Harvest Christian Fellowship Center and Larry's Performance Shop.

WORK AREA TRAFFIC CONTROL & DETOUR(S) DURING CONSTRUCTION:

Construction related to the underpass structure retaining walls, excavation, and shoofly within the 100 feet of right-of-way would be expedited by the closure of the crossing during the construction. Alternative routes are available through Montebello Boulevard to the east and Maple Avenue to the west of the existing crossing. Conceptual traffic detour plans are presented in Appendix Q.

A Summary of the project cost estimate (rough order of magnitude) is shown below. The detailed cost estimate is found in Appendix Q.

CONCEPTUAL ESTIMATE (Rough Order of Magnitude) GREENWOOD AVENUE – LOS ANGELES SUBDIVISION

Grade Separation Type: Underpass

Summary of Project Cost Estimate:

Roadway	$6,305,000
Track	$2,600,000
Structures	$9,441,000
Right-of-Way Notes 3 & 4	$20,855,520
Utilities Notes 1 & 2	$1,800,000
Geotechnical Investigation, Surveying, Engineering, Flagging, Construction Management, Agency, and Program Management Costs Notes 6 & 7	$11,282,000
Contingency 30%	$9,428,844
TOTAL PROJECT COST	$61,714,000

Notes:

1. Utility relocation cost estimates assume all affected utilities (sewer and storm drain) can be relocated by gravity flow systems similar to the existing systems.
2. Cost for drainage item includes construction of one storm drain pump station at the project area.
3. Right of Way cost estimates are based on $100/SF which covers the land and building allowance for full takes or areas affected by part takes.
4. Right of Way costs do not include any associated relocation costs or severance damages to the business operators.
5. Right of Way costs include a 26% allowance for acquisition costs. (appraisals, negotiation, labor, legal, closing cost, etc.)
6. Agency Costs include Agency Project Management direct labor and Agency indirect costs.
7. Program Management costs include third party project support costs such as community outreach, environmental management, DBE and labor compliance, and property survey.
8. This estimate is prepared using construction cost information based on current dollar cost as of 2011.