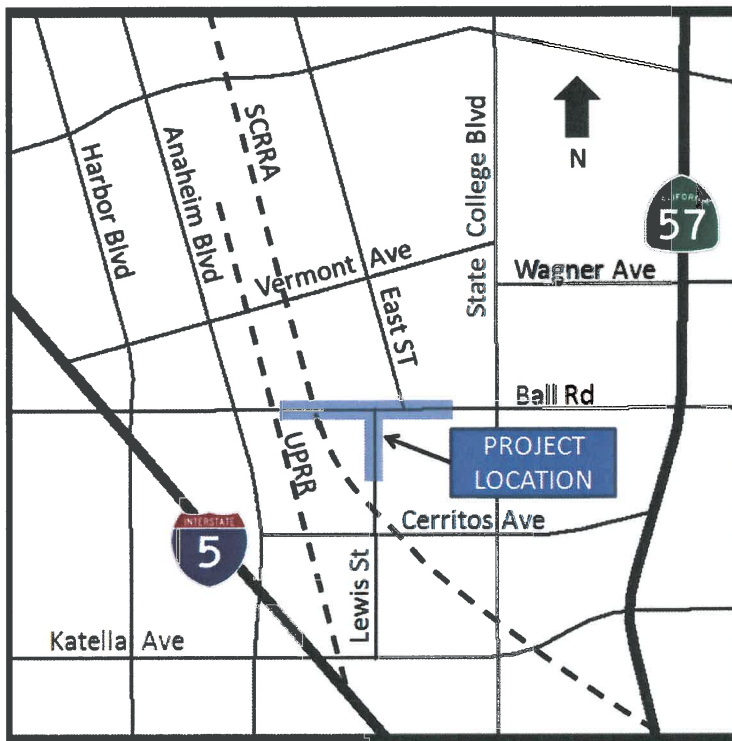


PROJECT STUDY REPORT-Equivalent



On Ball Road

Between Union Pacific Railroad At-Grade Crossing

And Approximately 800' east of East Street

APPROVAL RECOMMENDED:


PROJECT MANAGER

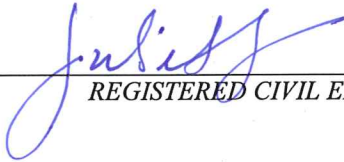
APPROVED:


DIRECTOR

7.11.12
DATE

Ball Road/SCRRRA Grade Separation

This Project Study Report has been prepared under the direction of the following Registered Engineer. The registered civil engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.


REGISTERED CIVIL ENGINEER

4/27/12
DATE



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Appendix A	Location Map and Project Footprint
Appendix B	Preliminary Design Plans <ul style="list-style-type: none"> - Alternatives Layout, Profile, and Typical Section - Underpass Advance Planning Study - Track Alignment
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1. INTRODUCTION

As part of the Los Angeles-San Diego-San Luis Obispo (LOSSAN) Rail Corridor grade separation projects, the Orange County Transportation Authority (OCTA) proposes to grade separate the railroad crossing at Ball Road, a primary arterial, and the Southern California Regional Rail Authority (SCRRA) tracks to enhance the safety of the rail-arterial crossing and to address future traffic and circulation issues. The Ball Road at-grade crossing at milepost (MP) 169.20 (California Public Utilities Commission (CPUC) Crossing No. 1010R-169.20, Federal DOT Crossing No. 026649L), on the SCRRA Orange Subdivision tracks, is located in the City of Anaheim, in the vicinity between Interstate 5 and State Route 57, and is operated and maintained by Metrolink, with operating rights by Amtrak and the BNSF Railway (BNSF). A project location map is included in Appendix A.

The Project Study Report-Equivalent (PSR(E)) serves to identify and investigate the alternatives for the proposed project to grade separate Ball Road from the existing SCRRA corridor, which currently consists of two mainline tracks at the Ball Road crossing. The proposed separation will be designed to meet year 2035 traffic volumes on Ball Road and the future expansion of mainline tracks for Metrolink's Expansion Program, as well as the LOSSAN and the City of Anaheim's Platinum Triangle and Anaheim Regional Transportation Intermodal Center (ARTIC) projects. The alternatives being considered for the grade separation project are based on economic, environmental, and physical considerations of the project site.

The estimated project cost (in April 2012 dollars) for each alternative is outlined below. An escalation rate of 3% should be applied for each year after April 2012. The detailed cost estimates for each alternative are provided in Appendix E.

Costs (rounded to the nearest \$100k)	Alternatives		
	2A – Underpass with Lewis Realignment	2B – Underpass with Temporary Bypass Rd	3 – Overhead with Temporary Bypass Rd
Construction	\$42,000,000	\$49,300,000	\$46,700,000
Right of Way/Utilities	\$41,100,000	\$39,400,000	\$36,900,000
PA/ED Design (3%*)	\$1,400,000	\$1,500,000	\$1,400,000
PS&E Design (10%*)	\$4,200,000	\$4,900,000	\$4,700,000
Construction Management (15%*)	\$6,300,000	\$7,400,000	\$7,000,000
TOTAL PROJECT COST	\$95,000,000	\$102,500,000	\$96,700,000

* Represent support costs calculated as a percentage of the construction cost.

It is anticipated that preliminary design and project approval will be obtained in 2013, final design and right of way acquisitions will be completed in 2016, and construction will begin in 2017.

Project Limits (Dist., Co., Rte., PM)	In the City of Anaheim on Ball Road between the UPRR at-grade crossing and 800' east of East Street
Number of Alternatives:	3 (Including No Build Alternative)
Alternative Recommended for Programming:	2A Underpass with Lewis Street Realignment
Programmed or Proposed Capital Construction Costs	\$42,000,000
Programmed or Proposal Capital Right of Way Costs:	\$41,100,000
Funding Source:	To Be Determined
Type of Facility (conventional, expressway, freeway):	Primary Arterial
Number of Structures:	1
Anticipated Environmental Determination/Document	Categorical Exclusion (NEPA) Statutory Exemption (CEQA)
Legal Description	Grade Separation

Other approvals required are:

- Orange County Transportation Authority Board
- City of Anaheim Department of Public Works
- Southern California Regional Rail Authority

2. BACKGROUND

An OCTA staff report ranked the safety and circulation importance of 51 at-grade crossings on SCRRA's Orange and Olive subdivision lines. As a result of this study, a number of crossings were selected for further development, including Ball Road. The PSR(E) planning phase for the Ball Road grade separation began in early 2011.

The project limits on Ball Road are between the Union Pacific Railroad (UPRR) at-grade crossing (CPUC Crossing No. 001BK-511.30, Federal DOT Crossing No. 761166E), west of Allec Street, through the Lewis Street intersection to east of East Street. The area is developed with industrial, commercial, and retail facilities, with residential properties located in the northeast quadrant of the Ball Road/East Street intersection.

Ball Road is a six-lane, primary arterial highway with a posted speed limit of 40 miles per hour (mph). The existing roadway through the project limits has sidewalks along portions of the traveled way and a 13' striped median. Ball Road within the project area is not currently striped for bike lanes and is not a designated bike route on the Orange County Bikeways Master Plan or the City of Anaheim General Plan.

Ball Road provides east-west traffic movements through the City of Anaheim and currently carries 36,000 to 40,000 vehicles per day, with over 48,000 to 50,000 vehicles projected in year 2035. This arterial provides an important link in the goods movement network through the region and serves as a major entry point for the Anaheim Resort area, which includes the Anaheim Convention Center, the Disneyland Resort, and a portion of the Platinum Triangle development, including Angel Stadium, the Honda Center, and the proposed ARTIC.

The proposed grade separation will be located at the crossing of Ball Road and the SCRRA/Metrolink Orange Subdivision tracks, located between Lewis Street and Allec Street in the City of Anaheim, California. The Orange Subdivision of the LOSSAN corridor runs between Fullerton Junction and Oceanside, California. The LOSSAN corridor links California's three most populous counties, Los Angeles, Orange and San Diego. The rail corridor is used by Amtrak intercity passenger rail service, Metrolink and Coaster commuter rail services, and BNSF freight service, and loosely parallels I-5 from Los Angeles Union Station through Orange County to San Diego's Santa Fe Depot.

In the existing condition, two tracks cross Ball Road at a skew angle of approximately 15 degrees. The existing at-grade crossing is currently protected by FRA #9A quadrant gates with flashing lights, warning bell, and separate cantilever signals with flashing lights. The center island gates are protected by a raised median. To prevent queuing of vehicular traffic on the railroad tracks, signal lights with preemption have been installed in the eastbound direction. As part of the Railroad Crossing Safety Enhancement Program sponsored by the OCTA in partnership with the City of Anaheim, safety improvements including new raised medians were installed at the Ball Road at-grade crossing. With these enhancements in place, the crossing has been designated with the Federal Railroad Administration "Quiet Zone" status which allows trains to pass through the Ball Road at-grade crossing without blowing their whistle.

The two tracks carry approximately 51 trains (22 Amtrak, 25 Metrolink, and 4 BNSF) per day. Based on discussions with each agency, approximately 85 train trips (36 Amtrak, 45 Metrolink, and 4 BNSF) are projected in the next 15 to 20 years. The expansion plans of each passenger service and those of BNSF (the freight operator) must be taken into account when considering improvements along the rail corridor.

Through the project development process, the project alternatives presented in this document have been concurred with by the OCTA, SCRRA, and the City of Anaheim.

3. PURPOSE AND NEED STATEMENT

Need:

Ball Road is a primary arterial highway that provides east-west traffic movement through the City of Anaheim; this corridor serves as a major entry point from the Anaheim Resort area into the Platinum Triangle and provides an important link in the goods movement network through the region. Ball Road currently carries 36,000 to 40,000 vehicles per day, with over 48,000 to 50,000 vehicles projected in year 2035. The two existing SCRRA tracks carry 51 trains (22 Amtrak, 25 Metrolink, and 4 BNSF Railway) per day, with approximately 85 train trips (36 Amtrak, 45 Metrolink, and 4 BNSF) projected in the next 15 to 20 years. The existing at-grade crossing causes vehicle delays and congestion which currently impedes emergency response time and results in idling vehicles and contributes to decreases in air quality. Without improvement to the at-grade railroad crossing, existing and projected future increases in train and vehicular volumes may:

- Escalate the potential for future traffic incidents caused by the presence of the at-grade railroad crossing.
- Cause traffic and circulation issues due to the conflicting railroad and vehicular traffic movements.

Purpose:

The purpose of the project is to meet the goals and objectives of the LOSSAN Rail Corridor Program: to improve safety of rail-highway crossings and to address future traffic and circulation issues forecasted for the project area. The project will address this purpose by eliminating the Ball Road at-grade railroad crossing while minimizing environmental and economic impacts.

4. DEFICIENCIES

4A. Primary Deficiencies

Traffic and Circulation: The traffic analysis for this project examined the existing year 2011 and future year 2035 conditions of 10 intersections and nine roadway segments in the project vicinity using the level of service analysis method and criteria defined by the City.

The City's acceptable level of service is D for intersections and C for roadway segments. In the existing condition, all study intersections and roadway segments operate at acceptable levels of service. By future year 2035, it is anticipated that the number of train trips will increase by 50% and vehicle traffic within the project area will increase by 25% to 40%, resulting in all study intersections falling below the acceptable level of service for at least one peak period and the study roadway segments on Anaheim Boulevard and Ball Road falling below the acceptable level of service in

both peak periods.

Additionally, per Section 5A of the Federal Highway Administration Grade Crossing Handbook (August 2007), a grade crossing should be considered in this location because the crossing exposure (product of average annual daily traffic (AADT) and number of trains per day) exceeds one million and the passenger train crossing exposure (product of AADT and number of passenger trains per day) exceeds 800,000 in the current condition. Based on the traffic analysis, these exposure calculations will worsen in the future condition.

Due to this increase in train and vehicular volumes, the potential for future traffic incidents caused by the presence of the at-grade railroad crossing is expected to escalate. The Traffic Analysis Report, without appendices, is provided in Appendix C.

4B. Secondary Deficiencies

Pedestrian Access: Within the existing project area, accessible sidewalks are discontinuous. As part of this project, sidewalk continuity will be addressed and pedestrian facilities designed to meet current standards for accessible public sidewalk and designed to have logical termini. Final determinations will be made during final design.

Bike Lane: Ball Road is not currently designated as a bike route on the Orange County Bikeways Master Plan or the City of Anaheim General Plan. The City has indicated that a bike lane will be included from Lemon Street to the Santa Ana River in the next update of the City's Bicycle Master Plan. The potential for future bike lanes should be studied as part of the next design phase of the project and a determination made as to their feasibility.

Drainage: Per the City of Anaheim's Storm Drain Master Plan, the existing storm drain facilities through the project limits including upstream and downstream of the project are undersized for the recommended design storm event. As part of this project, the feasibility of upsizing the drainage facilities within the project limits to meet the recommended design storm event was studied. The City of Anaheim plans to address the upstream and downstream drainage facilities through separate projects. A final determination of the storm drain sizing should be made in the next phase of design.

5. CORRIDOR AND SYSTEM COORDINATION

The Ball Road grade separation improvements accomplish several program and corridor goals for OCTA, SCRRA, and the City. This project is part of the LOSSAN Rail Corridor improvement program planned for implementation through OCTA's Measure M2, in conjunction with SCRRA, to improve safety and local street traffic circulation along the corridor.

Additionally, the proposed grade separation improvements will accommodate SCRRA's Metrolink Expansion program for a future track within the railroad corridor through the Ball Road crossing and the removal of the at-grade crossing also prepares the LOSSAN corridor and the City's ARTIC development for potential use by the California High Speed Rail (CHSR) program.

Through a separate program, SCRRA plans to install positive train control (PTC) signals along this corridor.

The project will eliminate the traffic circulation problems associated with an at-grade crossing along this primary east-west arterial within the City's local street network which will allow for better goods and people movement through the Resort Area and the Platinum Triangle development. It will also improve the pedestrian connectivity and facilities through the project area.

In order to implement the Alternative 2A improvements, the City must update the Circulation Element of their General Plan to reflect the connection of Lewis Street at the existing East Street intersection.

6. ALTERNATIVES

The build alternatives have been designed using the SCRRA and American Railway Engineering and Maintenance-of-Way Association (AREMA) guidelines for rail, the Orange County Highway Design Manual (OCHDM) standards supplemented with the City of Anaheim standard plans and the Caltrans Highway Design Manual (HDM) for roadway, and the American Association of State Highway and Transportation Officials (AASHTO) LRFD Bridge Design Specifications for structures. In addition, the geometrics for each build alternative were designed to comply with current Americans with Disabilities Act (ADA) guidelines.

As directed by the City, the design speed used for the design of facilities within the project limits is recommended to be 10 mph above the posted speed limit. The build alternatives have been designed using design speed of 50 mph on Ball Road (posted 40 mph), 55 mph on Lewis Street (posted 45), and 50 mph on East Street (posted 40 mph). Allec Street and Lewis Street extension, north of Ball Road, do not have posted speed limits and are not classified on the Orange County Master Plan of Arterial Highways or in the City of Anaheim's speed limit ordinance.

These streets have been designed to a 25 mph design speed in accordance with the OC HDM minimum standard for Industrial/Commercial Local Streets.

The existing Ball Road is a six-lane facility and no additional lanes are proposed as part of this project. The Ball Road cross section is based on the City of Anaheim standard 60' half-section for a primary, six-lane facility with bike lanes. This section includes a raised median, three travel lanes in each direction, and a 6' wide striped bike lane. Although this segment of Ball Road is not currently shown as a bike route on the Orange County Master Plan of Bikeways or the City's General Plan, bike lanes have been considered in the build alternatives as part of the analysis in order to determine their feasibility and to understand the maximum footprint and potential impacts. A final determination regarding the implementation of bike facilities through the project area should be made in the next phase of design.

The westerly project limit is constrained by the UPRR at-grade crossing located approximately 1200' west of the SCRRA at-grade crossing. Horizontal and vertical improvements, including temporary roadways, must tie-in prior to the UPRR at-grade crossing to avoid impacts to the at-grade crossing facilities and UPRR operations. At the easterly project limit, the alternatives are designed to minimize impacts to the existing residential community in the northeast quadrant of the Ball Road/East Street intersection.

Several businesses have driveway access directly from Ball Road through the project limits in the existing condition. With the change in profile required for the grade separation build alternatives, these driveways will be eliminated, however, access to the properties, vehicle turning movements, and emergency vehicle circulation will be provided via Allec Street, Lewis Street, and East Street. The build alternatives also address sight distance and sidewalk continuity.

The grade separation alternatives have been designed to accommodate a future track within the SCRRA rail corridor.

Three feasible build alternatives have been developed for the project. The alternatives studies are as follows:

- Alternative 1 - No-build
- Alternative 2 - Underpass
 - 2A: Underpass with Lewis Street realignment
 - 2B: Underpass with temporary bypass road
- Alternative 3 - Overhead with temporary bypass road

The project improvements on Ball Road stretch from the UPRR at-grade crossing at the westerly limit through the Allec Street, Lewis Street, and East Street intersections, to approximately 800' east of the East Street intersection. The

project improvements on the SCRRA tracks are between Vermont Avenue to the north and the Lewis Street underpass structure to the south. Preliminary design plans for each alternative are included in Appendix B.

6A. ALTERNATIVE 1 – NO-BUILD

The No-build Alternative proposes no improvements to the SCRRA at-grade crossing at Ball Road. This alternative does not meet the project purpose and need to improve safety of the rail-highway crossings and to address future traffic and circulation issues forecasted for the project area. The purpose of this alternative is to provide a baseline to measure improvements and cost of the build alternatives.

In the existing condition, Ball Road is a six-lane, primary arterial highway with a posted speed limit of 40 mph. The existing roadway through the project limits has sidewalks along portions of the traveled way and a 13' striped median. Ball Road within the project area is not currently striped for bike lanes and is not a designated bike route on the Orange County Bikeways Master Plan or the City of Anaheim General Plan.

Two SCRRA tracks cross Ball Road at the existing at-grade crossing a skew angle of approximately 15 degrees and is currently protected by FRA #9A quadrant gates with flashing lights, warning bell, and separate cantilever signals with flashing lights. The center island gates are protected by a raised median. To prevent queuing of vehicular traffic on the railroad tracks, signal lights with preemption have been installed in the eastbound direction. As part of the Railroad Crossing Safety Enhancement Program sponsored by the OCTA in partnership with the City of Anaheim, safety improvements including new raised medians were installed at the Ball Road at-grade crossing. With these enhancements in place, the crossing has been designated with the Federal Railroad Administration "Quiet Zone" status which allows trains to pass through the Ball Road at-grade crossing without blowing their whistle.

6B. ALTERNATIVE 2 – UNDERPASS

This alternative maintains three lanes in each direction on Ball Road. The City of Anaheim standard 60' half-section with a 6' striped bike lane is proposed. No change to the Ball Road existing horizontal alignment is proposed. The vertical profile is designed for a 50 mph design speed and utilizes less than 4% longitudinal slopes to lower Ball Road under the SCRRA rail crossing which meet ADA requirements.

The limits of the profile improvements on Ball Road extend from just east of the UPRR right of way to the East Street intersection. With the change in profile, the existing driveways with direct access from Ball Road cannot be

maintained. Access to the properties will be restored via Allec Street, Lewis Street, and East Street.

The grade separation structure type proposed is a two-span, steel-deck, rolled beam girder with cast-in-drilled-hole (CIDH) pile foundation. The lowered roadway profile will be supported by soldier pile retaining walls at the back of sidewalk along the north and south sides of Ball Road for the length of the improvements.

Construction of the Underpass structure will impact the railroad track alignments and operations. To minimize the impact, the structure is proposed to be built in three stages in order to facilitate a track shift construction concept to optimize the use of the existing tracks during construction and reduce the number of track shifts required as compared to a conventional shoofly construction concept. In addition, with the three-stage construction concept, it is proposed to construct only the substructure for the future track which will provide a capital cost savings to the project. This construction concept, along with the soldier pile wall type and CIDH bridge foundation, lends itself to the “top down” construction method for excavation for the lowering of the Ball Road. The maximum excavation for the underpass alternative is anticipated to be approximately 60 feet to accommodate the structure foundations and the pump station wet well and structure.

A pump station for the storm water runoff will be required to accommodate the sump condition caused by the sag curve. Existing utilities, including gravity flow storm drain and sewer mainlines, located in the existing Ball Road roadbed will be relocated to a public utility corridor. The utility corridor is proposed on the north side of Ball Road. The drainage will be routed back into the existing area drainage patterns.

Two variations were considered to address impacts to Lewis Street.

6B.1 Alternative 2A – Underpass with Lewis Street Realignment

In Alternative 2A, Lewis Street will be realigned to connect to Ball Road at the East Street/Ball Road intersection. No change to the typical section of Lewis Street is proposed. However, the proposed horizontal realignment does accommodate the future six-lane facility as designated in the City’s General Plan Circulation Element. To minimize impacts to the local businesses, the horizontal alignment design speed of 45 mph is proposed to reduce the realignment footprint. The proposed profile of the realigned Lewis Street will generally follow the existing ground grade.

With the realigned Lewis Street in place, the “existing Lewis Street” can remain at grade in order to maintain access to properties along this segment

of roadway. The “existing Lewis Street” will be cul-de-sac’d at Ball Road and north of the tie-in of the realigned Lewis Street to the existing alignment. A connector road will provide connectivity between the “existing Lewis Street” and the realigned facility. This alternative eliminates the need to lower the “existing Lewis Street” profile to maintain connectivity to the proposed Ball Road Underpass profile and constructing retaining walls along the roadway to minimize right of way impacts to the adjacent businesses, realizing a construction cost savings related to the retaining walls and construction duration required to excavate the roadway and construct the retaining walls.

Minor turn lane modifications are also proposed on southbound East Street and on westbound Ball Road at the intersection of East Street/Ball Road to optimize the intersection operations.

The realignment of Lewis Street requires acquisition of the existing Salvation Army Donations Center, partial acquisitions from the Extron campus with no impacts to existing buildings, and partial acquisition from Ganahl Lumber, including the relocation of an industrial railroad spur track.

The realigned Lewis Street is proposed to be constructed and operational as the first order of work and will be used as a detour route for Ball Road traffic. With this facility in place as a detour route, the City of Anaheim will allow the full closure of Ball Road during the construction of the grade separation. This eliminates the need for a temporary bypass road, which is required in both Alternative 2B and 3, realizing a construction cost savings related to the temporary bypass road including temporary traffic handling, right of way, temporary lighting, and temporary at-grade signal crossing. The construction duration for Alternative 2A is anticipated to be approximately two years which is a reduction of approximately one year as compared to Alternatives 2B and 3 that require a temporary bypass road.

In the permanent condition, this realignment provides a direct benefit to traffic circulation by eliminating the existing weaving between East Street and Lewis Street on Ball Road and reducing left turn queue demands related to this weaving movement. The City’s Circulation Element of their General Plan would need to be amended to reflect the Alternative 2A realignment of Lewis Street.

6B.2 Alternative 2B – Underpass with Temporary Bypass Road

In Alternative 2B, Lewis Street will be maintained in its existing horizontal location and the profile lowered to meet the proposed Ball Road Underpass profile. To maintain the 55 mph design speed, the profile improvements on Lewis Street extend from the intersection with Ball Road to approximately 1100’ south of the Ball Road intersection. The lowered roadway profile will

be supported by soldier pile retaining walls at the back of sidewalk along the east and west side of Lewis Street for the length of the improvements to minimize right of way impacts to the adjacent businesses. The lowered profile of Lewis Street significantly impacts the driveway access to businesses along Lewis Street. To address this, the proposed improvements include driveway reconstruction, relocating access points, and constructing return walls along driveways which requires some permanent loss of parking.

By maintaining Lewis Street in its current horizontal location, the existing weaving condition from East Street to Lewis Street via Ball Road is perpetuated. In the future year 2035 with the traffic volume increases, the existing turn lanes at both intersections are not sufficient for the demand. The addition of a second left turn lane from westbound Ball Road to Lewis Street and from eastbound Ball Road to East Street, and the addition of a dedicated right turn lane from westbound Ball Road to East Street and eastbound Ball to Lewis Street is required.

In order to maintain through traffic on Ball Road during construction, a temporary bypass road is required. To minimize right of way impacts, a four-lane facility is proposed. It was determined that constructing the facility on the south side of Ball Road would result in less right of way cost to the project. The temporary bypass road in the Underpass condition requires a horizontal separation from the Ball Road roadway in order to provide sufficient horizontal clearance for the underpass structure to be constructed. The resulting footprint of the temporary bypass road results in significant right of way impacts to the adjacent parcels including impacts to landscaping, parking lots, and buildings. In some cases, impacts are significant enough to require full acquisition of the parcel.

The temporary bypass road, including coordination required to install a temporary at-grade railroad crossing and shift traffic from the temporary bypass road onto the newly constructed Ball Road, and lowering Lewis Street is expected to increase the duration of Alternative 2B by one year over Alternative 2A. The total construction duration for Alternative 2B is anticipated to be approximately three years.

6C. ALTERNATIVE 3 – OVERHEAD WITH TEMPORARY BYPASS ROAD

The Overhead Alternative maintains three lanes in each direction on Ball Road. The City of Anaheim standard 60' half-section with a 6' striped bike lane is proposed. No change to the Ball Road existing horizontal alignment is proposed. The vertical profile is designed for a 50 mph design speed and requires a maximum 5% longitudinal slope to raise Ball Road over the SCRRA rail corridor to meet ADA requirements.

The limits of the profile improvements on Ball Road extend from just east of the UPRR right of way to 450' east of the East Street intersection. In order to avoid impacts to the existing UPRR at-grade crossing and provide sufficient vertical clearance over the SCRRA right of way, the high point of the vertical profile is shifted approximately 300' east of the grade separation resulting in a significant change in elevation at both the Lewis Street and East Street intersections. Approximately 500' of Allec Street will be reconstructed, approximately 1200' of Lewis Street, and approximately 900' of East Street.

With the change in profile on Ball Road, the existing driveways with direct access from Ball Road cannot be maintained. Access to the properties will be restored via a proposed cul-de-sac southeast of Allec Street, a new driveway extension of Allec Street on the north side of Ball Road and a permanent ingress/egress easement from East Street. The existing Ball Road connection to the northerly extension of Lewis Street will be eliminated.

The grade separation structure type proposed is a single-span, precast concrete bulb-tee girder. The raised roadway profile will be supported by mechanically stabilized embankment (MSE) retaining walls at the back of sidewalk along both sides of the roadway of Ball Road, Allec Street, Lewis Street, and East Street. The MSE "zone," which includes the MSE wall structural straps and fill, will extend past the sidewalk and into the roadway. Because of the straps, planted parkways are not feasible with this Alternative. The maximum excavation for the overhead alternative is anticipated to be approximately 10 feet to accommodate the underground utility relocation and the maximum fill height is anticipated to be approximately 40 feet.

Construction of the Overhead structure will minimally impact the railroad tracks and operations. The precast structure type was chosen to expedite on-site construction work and does not require falsework for the bridge construction and has a slimmer structure depth which allows the profile on Ball Road to be reduced.

A pump station is not required for the Overhead Alternative. Existing utilities, including gravity flow storm drain and sewer mainlines, located in the existing Ball Road roadbed will be relocated to a public utility corridor proposed on the north side of Ball Road. The existing local drainage pattern will be impacted due to the sag points created by the reprofiling of Allec Street, Lewis Street, and East Street. The drainage will be routed back into the existing area drainage patterns.

Lewis Street will be maintained in its current horizontal location perpetuating the existing weaving condition from East Street to Lewis Street

via Ball Road. In the future year 2035 with the traffic volume increase expected, the existing turn lanes at both intersections are not sufficient for the demand. The addition of a second left turn lane from westbound Ball Road to Lewis Street and from eastbound Ball Road to East Street is required, and the addition of a dedicated right turn lane from westbound Ball Road to East Street and eastbound Ball to Lewis Street is required.

In order to maintain through traffic on Ball Road during construction, temporary bypass road is required. To minimize right of way impacts, a four-lane facility is proposed. It was determined that constructing the facility on the north side of Ball Road would result in less right of way cost to the project. The temporary bypass road will extend beyond the profile construction limits on Ball Road in order to optimize the construction area for the Contractor. The existing railroad signal house is in conflict with the bypass road footprint and will require relocation prior to construction of the bypass road. In order to minimize the temporary bypass road impact on adjacent properties, it is proposed that the overhead structure be constructed in two stages to allow for an overlap of the temporary bypass road footprint with the existing Ball Road roadbed.

Relocation of the existing signal house and construction of the temporary bypass road, including coordination required to install a temporary at-grade railroad crossing, is anticipated to require approximately one year. When traffic is shifted from the bypass road onto the proposed Ball Road alignment, it is anticipated that the second stage of the structure construction will require approximately an additional six to nine months. Once the structure is completed, another six months of construction is required before construction is completed. The total construction duration is anticipated to be approximately four years.

6D. REJECTED ALTERNATIVES

Include Adjacent UPRR Corridor in Grade Separation

The nearby UPRR at-grade crossing on Ball Road presented a geometric constraint at the westerly project limit. A preliminary analysis was performed for the overhead profile to span the SCRRA tracks and the UPRR tracks. Because the existing ground elevation at the UPRR crossing is higher than that at the SCRRA crossing, in order to maintain minimum clearance at UPRR, the profile of Ball Road to span both UPRR and SCRRA would be higher than the profile required to span only SCRRA. There would be no improvement to the geometric design or any cost savings associated with expanding the project limits to include the UPRR crossing. Additionally, the grade separation of the UPRR crossing is not within the scope of this project. Therefore, this alternative was not considered for further study.

Overhead with Lewis Street Realignment

A preliminary analysis was performed for realigning Lewis Street with the Overhead Alternative. Because of the raised profile of Ball Road at the intersection of East Street in the Overhead Alternative, the realigned Lewis Street would not be able to remain at grade in order to connect to the proposed Ball Road profile. Retaining walls along the realigned Lewis Street would be required, increasing the construction cost and impacting access to the adjacent parcels. In addition, the realigned Lewis Street would not be available as a detour route without full reconstruction of the East Street improvements and intersection. Therefore, the temporary bypass road cannot be eliminated for this alternative. Without the benefit of eliminating retaining walls on Lewis Street and eliminating the temporary bypass road, this alternative was not considered for further study.

6E. STRUCTURES

Walls

In each Alternative, retaining walls are proposed to accommodate the grade separation reprofiling of Ball Road and impacted cross streets. The wall location is proposed along the back of sidewalk on each side of the roadway. The maximum wall heights are anticipated to be approximately 22' in the Underpass Alternatives and 36' in the Overhead Alternative.

Retaining wall types considered for the Underpass Alternative are:

- Conventional cast-in-place reinforced concrete cantilevered walls (similar to Caltrans standard type 1)
- Mechanically stabilized embankment (MSE) walls
- Tieback/soil nail walls
- Soldier pile walls

Because of its inherent “top-down” construction methodology which lends itself very well to the Underpass Alternatives roadway cut conditions and railroad construction concept, the soldier pile wall type is recommended. Additionally, during construction, this wall type requires less temporary easement behind the final wall limits, compared to the other wall types considered, which reduces the impacts to properties adjacent to the improvement limits.

The construction of the soldier pile retaining walls would begin with vertically drilled holes (24” to 48” diameters and 5’ to 8’ spacing), then wide-flange steel beam sections, the soldier piles, would be lowered into the drilled holes. Concrete backfill would then be placed around each soldier pile within the lower portion of the drilled hole and lean concrete would be used to backfill the upper portion of the drilled hole. “Top-down” excavation along the roadway side of the soldier piles would proceed and timber lagging would be installed between the front flanges of adjacent

soldier piles to retain the vertically-cut soil in-between them. Finally, a cast-in-place reinforced concrete facing wall would be constructed and anchored to the soldier piles and a reinforced concrete pile cap would be constructed to connect the tops of the soldier piles.

Retaining wall types considered for the Overhead Alternative are:

- Conventional cast-in-place reinforced concrete cantilevered walls (similar to Caltrans standard type 1)
- Mechanically stabilized embankment (MSE) walls
- Modular precast concrete walls, and soldier pile walls

Because of its inherent “bottom-up” construction methodology which lends itself very well to the Overhead Alternative roadway fill conditions and the roadway/bypass road construction concept, the MSE wall type is recommended. Additionally, during construction, this wall type requires less temporary easement behind the final wall limits, compared to the other wall types considered, which reduces the impacts to properties adjacent to the improvement limits. The MSE “zone” will extend past the sidewalk and into the roadbed; therefore, planted parkway areas are not feasible with this Alternative.

The construction of the MSE walls would generally follow a sequence whereby layers of engineered reinforced earth fill with precast concrete wall face panels are installed from approximately 4’ below the existing ground elevation to the proposed wall height. Once the wall has reached its final height, the precast concrete wall face panels would be capped with a cast-in-place concrete barrier slab which would support the concrete barrier and sidewalk.

As part of the final design phase, the actual wall type will be determined in conjunction with the geotechnical engineer’s final foundation recommendations and any updated construction cost data. Additionally, decisions for the installation of reinforced concrete parapet, concrete barrier, fencing, railing, soundwall, or a combination thereof, should be made after considering the proposed site use and constraints on the retained (rear) side of the wall.

Grade Separation Structure

Each of the grade separation structure alternatives accommodates the future third track as required by the SCRRA guidelines. Additionally, the superstructures and substructures have been designed to span the full width of the SCRRA right of way.

In the Underpass Alternatives, the final grade separation structure will maintain a minimum 16.5’ vertical clearance from the finished grade of Ball Road to the bottom of the structure. It is anticipated that the Underpass

bridge structure will be a two-span structure over Ball Road. SCRRA guidelines require a steel structure type due to the span length of the bridge. In accordance with SCRRA guidelines, the following bridge structure types are permitted and were considered:

- Steel deck rolled beam girder
- Deck Welded plate girder
- Steel Thru girder

Based on the meetings with SCRRA and the SCRRA Grade Separation Guidelines (dated May 2010), it was determined that the steel deck rolled beam girders type is preferred. This type of bridge allows for a shallow bridge depth which will optimize the Underpass Alternative profile and reconstruction limits along Ball Road. The Underpass Advance Planning Study (APS) is provided in Appendix B.

Cast-in-drilled-hole (CIDH) piles for the foundations are anticipated to be used for the bridge substructure to take advantage of the “top down construction.” method. This is consistent with the construction method anticipated for the soldier pile wall type and useful for the railroad track shift construction concept presented in a subsequent section.

In the Overhead Alternative 3, the final grade separation structure will maintain a minimum 24’ vertical clearance from top of rail to the bottom of the structure. It is anticipated that the Overhead bridge structure will be a single span structure. SCRRA does not have a requirement for Overhead structure type. The following bridge structure types were considered:

- Cast-in-place prestressed (CIP/PS) concrete box girder
- Precast concrete bulb-tee girders

The construction costs for both bridge types were evaluated and found to be comparable. A precast concrete bulb-tee girder type has been selected because using a precast type structure will expedite on-site construction work and does not require falsework for the bridge construction which minimizes impacts to railroad operations and additional vertical clearance requirements which optimizes the Overhead Alternative profile and reconstruction limits along Ball Road.

6F. AESTHETICS

Aesthetic treatments within the project area will be considered in the next phase of design.

Structures

The OCTA Orangethorpe Corridor Grade Separation Aesthetic Guidelines will be considered for the aesthetics treatments anticipated to be applied to the walls and grade separation structure.

Landscape

Planting within the project area is anticipated to be implemented adjacent to sidewalk areas and within the raised median areas. In addition to the aesthetic application, landscaped areas will function as water quality treatment as described in the Water Quality section of this document.

6G. RAILROAD

Track Information

In the existing condition, there are two existing track alignments with 21' track center separation. The railroad has designated the geographic eastern track as Mainline 1 and the western track as Mainline 2. The tracks cross Ball Road at the at-grade crossing on a tangent with an approximate 15° skew.

In the existing condition, SCRRA maintenance staff can access all four quadrants of the right of way at the at-grade crossing. In the next phase of design, a conceptual access plan for construction and for the final condition will be coordinated; SCRRA has requested, at a minimum, access at opposite quadrants of the right of way.

In the existing condition, the SCRRA right of way through the project limits is 100' wide. North of the Vermont Avenue at-grade crossing, north of the project, and south of the Lewis Street grade separation, south of the project, the right of way width narrows to 50' wide. The existing track alignments are centered within the 50' right of way north of the project. Following south along the alignments, the existing tracks shift to the westerly side of the right of way as it widens to 100'. South of the Ball Road crossing, the existing alignment "dog legs" with reversing curves which shifts the tracks across to the east side of the 100' right of way. Additionally, south of the Ball Road crossing, there is an in-service industrial spur track and switch that will be incorporated into the permanent track alignments for this project. The alignment through the project limits is shown in Appendix B.

The track speed, as outlined in the Metrolink timetable, for both of the tracks is 79 mph for passenger and 50 mph for freight. At the alignment curve south of the Ball Road at-grade crossing, there is a designated speed restriction of 70 mph for passenger; freight speed is unaffected at this location. Track speeds will also be maintained during construction and in the final alignment.

SCRRA guidelines require that grade separation structures accommodate a future track. The agency does not have a future track alignment plan at this time. Based on the existing conditions and recommended underpass grade separation construction concept, discussed separately in this section, it is

anticipated that the future third main track alignment will be on the eastern side of the SCRRA right of way and the existing tracks will be realigned to remove the existing “dog leg” reversing curve and have 23’ track centers.

Construction

In Underpass Alternatives 2A and 2B, the existing track alignments will be impacted by the construction of the underpass structure. SCRRA requires that two mainline tracks remain in operation during construction.

A conventional shoofly concept was considered for the underpass construction. This concept would require cutover of the existing track alignments onto shoofly tracks to the geographic west side of the existing mainline track alignments with 25’ clearance between the shoofly track centerline and the construction of the underpass structure, including 15’ clearance from the face of shored excavation to the track centerline, to comply with SCRRA guidelines. It is anticipated that piling would be installed to shore the shoofly tracks for the excavation and construction of the underpass in one stage as a single structure. The mainline track alignments would then require a second cutover to return the tracks to their permanent alignments. Finally, shoofly tracks would be demolished and the associated subgrade removed.

The conventional shoofly concept has several impacts. The shoofly track will be within existing right of way but the required railroad side clearances and maintenance access along the western side of the west shoofly will require temporary construction easements from the adjacent private parcel, Ball Road Business Center. Existing overhead electric transmission lines and poles along the western right of way line and the line/poles will be in conflict with the shoofly footprint and will require temporarily relocation. The industrial switch south of Ball Road will be out of service during the duration of the construction and will be placed back in service when the mainline tracks are moved back to their permanent alignments.

As an alternative, a track shift construction concept was considered and is recommended. This concept proposes to construct the Underpass structure in three stages using a “top down” construction method, taking advantage of the location of the existing track alignments along the east side of the 100’ right of way. The first stage is the construction of the western track bridge while the two mainline tracks remain in place and operational. A permanent line over of westerly track alignment, Mainline 2, to the new bridge will be performed at the end of the first stage. The second stage is the construction of the middle track bridge, between the realigned Mainline 2 track and the existing easterly track alignment, Mainline 1 and a permanent line over of Mainline 1. During the construction between live tracks, adequate construction clearances that comply with SCRRA guidelines will be

maintained. The third stage is the construction of the substructure for the future third track bridge.

The track shift concept has several advantages over the traditional shoofly concept. Each mainline track will have a single, permanent shift to a proposed alignment that accommodates the future third track and eliminates the existing “dog leg” reversing curve. The single alignment shift reduces impacts to railroad operations during construction when compared to a traditional shoofly construction concept. This concept also eliminates temporary railroad easements, temporary utility relocations, shoring, shoofly track and grading “throw away” costs that are typical in a traditional shoofly concept with bottom-up construction.

In Overhead Alternative 3, no railroad track work is anticipated because the bridge structure can be constructed without impacting the mainline track alignments.

Temporary At-Grade Crossing Improvements

For Alternatives 2B and 3, which require a temporary bypass road for Ball Road, a temporary at-grade crossing is required to facilitate the detour of vehicular traffic around the construction zone. The construction of the temporary at-grade crossing will require coordination with the City, the railroad, and the CPUC. The existing at-grade crossing warning protection will remain operational, and vehicle traffic will remain on existing Ball Road, while the temporary at-grade crossing warning protection is installed. A short-term closure of Ball Road is required to switch at-grade crossing control from the existing to the temporary signal system and vehicle traffic will be shifted to the bypass road alignment when the temporary signal is operational. Protection for the crossing will need to meet or exceed the existing crossing protection currently in place at the existing Ball Road at-grade crossing.

Permits and Approvals

Meetings with SCRRA have been conducted to obtain existing track and construction methods information and to review the proposed structures and construction methods to obtain preliminary concurrence with these concepts.

CPUC review and permitting is not anticipated until the PS&E design phase.

6H. CONSTRUCTION AND SCHEDULE

The purpose of construction staging is to develop a feasible way to construct the project improvements while providing both a safe work environment for the Contractor and the best possible access and circulation to the traveling public. This section provides a description of roadway construction and vehicle circulation concepts for each Alternative. A description of the

construction concepts and impacts to the railroad corridor and track alignments are discussed in the previous section.

In both Underpass Alternatives, a “top down” construction method is anticipated; the roadway is excavated as the walls and structures are constructed. This reduces the throw away costs associated with temporary shoring and excavations. The soldier pile wall type and track shift railroad construction concept both accommodate this method of construction.

In the Underpass Alternative 2A, the realigned Lewis Street is proposed to be constructed and operational as the first order of work and will be used as a detour route for Ball Road traffic. With this facility in place as a detour route, the City of Anaheim will allow the full closure of Ball Road during the construction of the grade separation because this detour route does not require travel through the existing Cerritos Avenue at-grade. The complete closure of Ball Road will reduce the construction duration and “throw away” costs associated with a temporary bypass road and temporary at-grade railroad crossing required by the other alternatives.

The anticipated construction concept is to construct the Lewis Street realignment improvements as the first order of work while maintaining traffic on existing Ball Road and Lewis Street. Construction of access improvements on Allec Street will also be constructed in the first stage. Once the realigned Lewis Street is completed, the detour routes will be established and Ball Road will be closed to traffic. Local business access will be maintained, via Allec Street, Lewis Street, and East Street, during this closure. The duration for Alternative 2A is approximately two years.

In the Underpass Alternative 2B and Overhead Alternative 3, a four-lane, temporary bypass road with a temporary at-grade railroad crossing is required to maintain adequate traffic circulation and access during construction. Short term closures of Ball Road and the bypass road are anticipated to construct tie-ins locations. Preliminary design plans for the bypass road are provided in Appendix B.

In the Underpass Alternative 2B, the temporary bypass road requires a horizontal separation from the Ball Road roadway in order to provide sufficient horizontal clearance to construct the underpass structure and the pump station. The temporary bypass road alignment is proposed on the south side of Ball Road to allow the bypass road to utilize right of way already being acquired for the project.

In Overhead Alternative 3, the Ball Road structure can be built in two stages. This facilitates the use of a portion of the existing Ball Road roadway to be used as part of the temporary bypass road which results in a narrower footprint and less impact to adjacent parcels as compared to the

Underpass Alternative 2B. Because of the narrower footprint, the temporary bypass road is proposed on the north side of Ball Road where the impact would be substantially landscaped areas and parking lots, rather than buildings on the south side. The northerly alignment will conflict with the existing at-grade crossing signal house. The signal house will need to be relocated and may have a long lead time for coordination with SCRRA.

The anticipated construction concepts for Alternatives 2B and 3 are similar. The first orders of work will be access modifications on Lewis Street and Allec Street and construction of the bypass road and temporary at-grade railroad crossing. Once the bypass road is operational, construction of the walls, structure, and Ball Road improvement will begin. Traffic will then be shifted onto the newly constructed Ball Road while final construction of Lewis Street, and East Street in Alternative 3, are completed. Local business access will be maintained at all times. The durations for Alternatives 2B and 3 are approximately three years and three and a half years, respectively.

Transportation Management Plan

A preliminary Transportation Management Plan (TMP) evaluation has been conducted to identify potential issues in traffic circulation during construction. This preliminary evaluation considers impacts to traffic due to a full closure for part of the construction duration and operation of a four-lane bypass road, which is considered as a partial closure of Ball Road due to the reduction in capacity. During the final design phase, a TMP will be prepared to identify appropriate traffic control measures consistent with industry practice and City of Anaheim traffic management standards.

The existing street network and detour model plots generated from the Anaheim Traffic Analysis Model (ATAM) provided by City of Anaheim Traffic Engineering staff were reviewed in developing a systematic detour plan. The ATAM was used for this project at the request of the City of Anaheim in order to capture the Platinum Triangle traffic forecast. Streets considered the most practical routes for a driver were studied to determine the capacity of the roads in order to gauge their ability to accommodate the detoured traffic.

Under the full closure scenario, the ATAM projected that the majority of traffic detoured from Ball Road would use Vermont Avenue, Katella Avenue, and Cerritos Avenue. Combined, these facilities have the reserve capacity to accommodate detour traffic and a complete closure is considered feasible. Anaheim Boulevard and State College Boulevard experience either no change or a decrease in ADT volumes which indicates that the majority of commuters would detour in the north/south direction outside of the study area during a closure.

Under the partial closure scenario, a four-lane bypass road for Ball Road will be constructed to accommodate a portion of existing traffic and is anticipated to accommodate approximately 35% of traffic currently utilizing Ball Road. This leaves approximately 26,000 ADT to be accommodated on other facilities. Lincoln Avenue and Cerritos Avenue, combined, have a reserve capacity sufficient to accommodate detour traffic and a partial closure is considered feasible.

During construction of the project, signed detour routes for Ball Road and connections to Lewis Street, East Street, and Allec Street will be required to direct traffic away from the construction area. Katella Avenue, Lincoln Avenue, and Cerritos Avenue have been preliminarily identified as facilities with capacity available to carry displaced Ball Road traffic. State College Boulevard and Anaheim Boulevard are available as north-south connections to these facilities. The ATAM indicated that three undivided residential streets (Vermont Avenue, Santa Ana Avenue, and South Street) become attractive detour routes due to their reserve capacities and close proximity to Ball Road. Because these streets are residential they will not be signed detour routes and must be monitored carefully to avoid increased congestion and impacts to residences along these streets. It is recommended that proper signage be posted along these streets as part of the TMP plan to minimize their desirability.

Mitigations and Permits

There is the potential for migratory birds to use the ornamental trees located within the project area for nesting. The project will need to comply with the Migratory Bird Treaty Act (MBTA) which provides for the protection of migratory birds, including any part, nest, or egg of a migratory bird. Potential impacts to raptors or other nesting birds should be avoided by conducting a preconstruction survey, conducted by a qualified biologist, or removing trees outside of the nesting season.

A National Pollutant Discharge Elimination System (NPDES) permit is anticipated to be required during construction. The Contractor will be required to prepare an appropriate water quality management plan to be submitted with the permit application.

6I. TRAFFIC ANALYSIS

With input from the City's Traffic Engineering staff, ten study intersections and nine roadway segments within the project vicinity were chosen for study as part of the Traffic Impact Analysis prepared in this design phase. These locations are shown in Figure 1. The study area encompasses many school, public safety, and hospital facilities; including the Anaheim City School District office; two high schools, two junior high schools, three private K-8 schools, and seven elementary schools; the Anaheim Police

Department located on the northwest corner of Harbor Boulevard and Santa Ana Street; the Anaheim Fire Department, which houses the station, fire fighters, and paramedics, located on Anaheim Boulevard, south of Lincoln Avenue; and Western Medical Center of Anaheim located on Anaheim Boulevard north of Ball Road. Adequate and consistent traffic circulation is critical to all of these facilities.

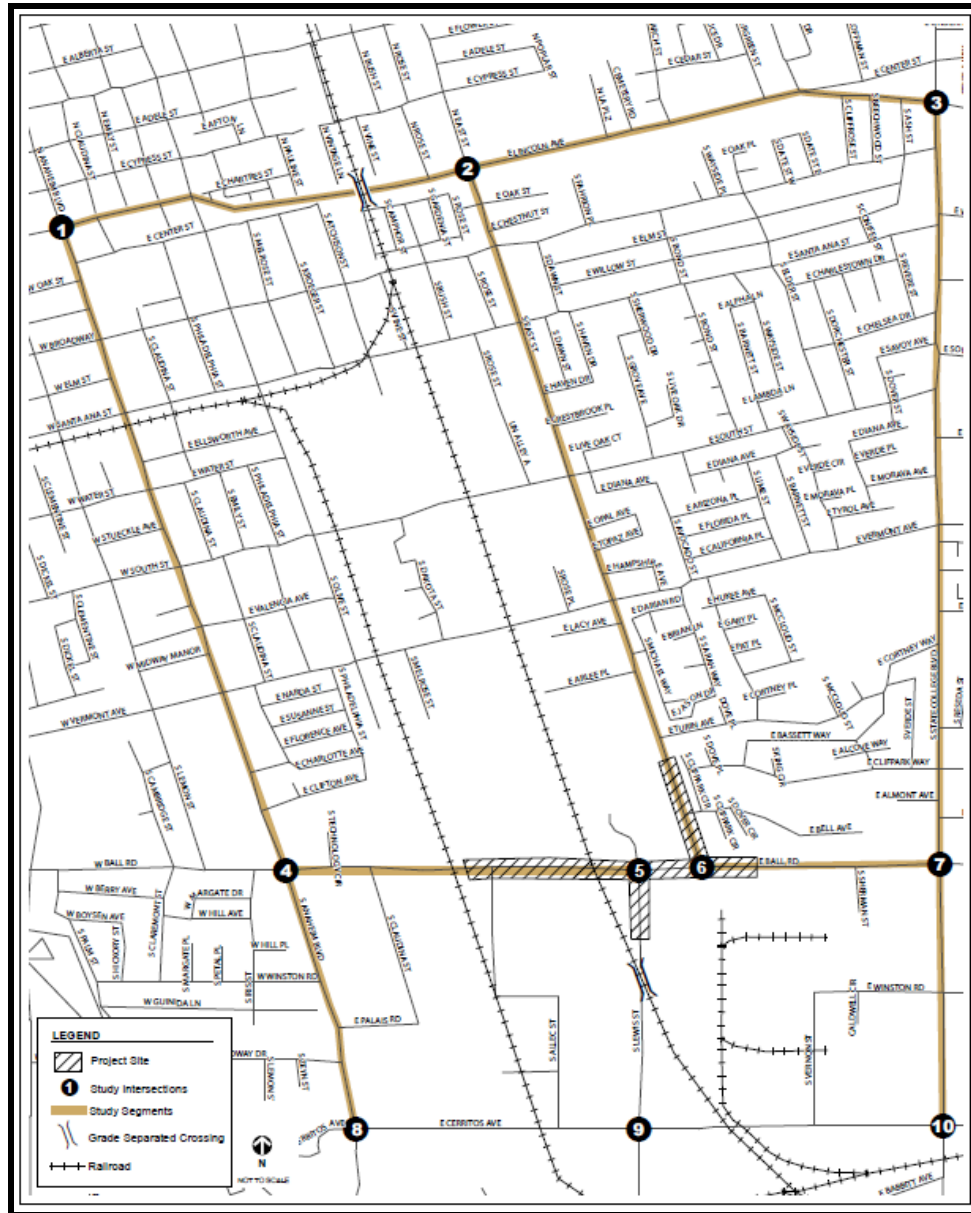


Figure 1 – Study Intersections and Roadway Segments

For the study locations, accident data from May 2007 to April 2010 was collected from the City of Anaheim Traffic Engineering staff. Additionally, accident data during the history of the railway at the Ball Road/SCRRRA crossing was collected from the Federal Railroad Administration (FRA). A

total of five accidents have been recorded at this grade crossing. The review of the accident data did not indicate any specific design issues that currently exist in the study area that should be addressed as part of this effort.

Methodology

The traffic model was developed using current traffic counts and the Anaheim Traffic Analysis Model (ATAM). The City requested that this model be used, instead of the OCTAM, because the project is within the area of influence for the Platinum Triangle development. Existing intersection turning movement counts were conducted at the morning (7 am to 9 am) and evening (4 pm to 6 pm) peak periods for the ten study intersections and existing intersection machine vehicle (tube) counts were collected for the nine roadway segments to determine the average daily traffic (ADT). The ATAM encompasses existing and future land use development, including the planned development in the Platinum Triangle, within the City of Anaheim and the region. The model also reflects planned roadway improvements within the City.

Intersection Capacity Utilization (ICU) analysis for intersections and the Roadway Segment Thresholds set by the *Orange County Highway Design Manual* for roadway segments was used to document the current year condition and to evaluate the future year 2035 with and without project conditions at each study location. The opening year condition analysis will be included in the next phase of design.

The *City of Anaheim Criteria for Preparation of Traffic Impact Studies* criteria was applied to the traffic forecasting results to determine the effects of the grade separation. For study intersections, the Level of Service (LOS) threshold is LOS D and, for study segments, the LOS threshold is LOS C. To separate project impacts from expected no-build future year facility deficiencies, the significance criteria, as shown in the table below, is applied to the comparison of the “without project” to “with project” conditions to identify “significant” impacts caused by the project.

Table 1 – Significance Criteria

Level of Service	Final V/C Ratio	Project-Related Increase in V/C
C	> 0.700-0.800	≥ 0.050
D	> 0.800-0.900	≥ 0.030
E, F	> 0.900	≥ 0.010

Results

In the existing condition, all study intersections operate at an LOS B or better and all roadway segments operate at LOS C or better in the am and pm peak hours, as shown in the following tables. Highlighted cells are study locations within the project improvement limits.

Table 2 – Existing Intersection LOS

Intersection	Peak Hour	V/C	LOS
1. Anaheim Boulevard/Lincoln Avenue	AM	0.514	A
	PM	0.576	A
2. East Street/Lincoln Avenue	AM	0.543	A
	PM	0.651	B
3. State College Boulevard/Lincoln Avenue	AM	0.556	A
	PM	0.611	B
4. Anaheim Boulevard/Ball Road	AM	0.551	A
	PM	0.652	B
5. Lewis Street/Ball Road	AM	0.429	A
	PM	0.555	A
6. East Street/Ball Road	AM	0.587	A
	PM	0.676	B
7. State College Boulevard/Ball Road	AM	0.645	B
	PM	0.646	B
8. Anaheim Boulevard/Cerritos Avenue	AM	0.428	A
	PM	0.622	B
9. Lewis Street/Cerritos Avenue	AM	0.279	A
	PM	0.355	A
10. State College Boulevard/Cerritos Avenue	AM	0.390	A
	PM	0.386	A

Table 3 – Existing Roadway Segment LOS

Segment	Lanes	Daily Volume	LOS
1. Lincoln Ave between Anaheim Blvd and East St	6D	23,630	A
2. Lincoln Ave between East St and State College Blvd	4D	27,440	C
3. Anaheim Blvd between Lincoln Ave and Ball Rd	4D	20,640	A
4. East St between Lincoln Ave and Ball Rd	4U	13,220	A
5. State College Blvd between Lincoln Ave and Ball Rd	6D	23,730	A
6. Ball Rd between Anaheim Blvd and Lewis St	6D	36,330	B
7. Ball Rd between East St and State College Blvd	6D	40,120	C
8. Anaheim Blvd between Ball Rd and Cerritos Ave	4D	27,310	C
9. State College Blvd between Ball Rd and Cerritos Ave	6D	22,750	A

D=Divided, U=Undivided

The 2035 No-Build Alternative 1 condition identifies baseline deficiencies anticipated in the future year and is used as a basis of comparison for improvement Alternative impacts. Per the City’s traffic impact guidelines, impacts identified in the Build Alternatives must be resolved only to the No Build condition level of service and do not need to include improvements that bring the facility to the standard LOS thresholds. Within the project improvement limits, Ball Road/Lewis Street intersection will have a LOS of D(am)/F(pm), Ball Road/East Street intersection will have a LOS of E(am and pm), the East Street study segment will have an LOS of B, and the Ball Road study segments each have an LOS of D in this condition.

In each of the 2035 Build Alternative ATAM’s, adjustments were made to account for changes in traffic loading associated with the grade separation

project: driveways along Ball Road are relocated to alternate locations and a portion of the traffic that currently uses on Cerritos Avenue to avoid the at-grade Ball Road crossing has been redistributed back to Ball Road.

An additional adjustment was made to the ATAM in Alternative 2A for the Lewis Street realignment which provides a direct connection to East Street. The realignment of Lewis Street is not anticipated to induce travel demand in the area; the existing and future year No-Build models currently reflect connectivity between East Street and Lewis Street via Ball Road. The realignment will only provide more efficient access between East Street and Lewis Street, eliminating weaving maneuvers on Ball Road and reducing queuing in the study area. Additionally, since it directly connects two off-set roadways, queuing is reduced in the area and storage pocket lengths are reduced.

A summary of the future year 2035 results for all Alternatives is shown in the Tables 4 and 5.

Table 4 – 2035 Intersection LOS

Intersection	Peak Hour	Alt 1		Alt 2A		Alt 2B		Alt 3	
		V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
1. Anaheim Blvd/Lincoln Ave	AM	0.760	C	0.760	C	0.760	C	0.760	C
	PM	0.864	D	0.864	D	0.864	D	0.864	D
2. East St/Lincoln Ave	AM	0.644	B	0.644	B	0.644	B	0.644	B
	PM	0.825	D	0.825	D	0.825	D	0.825	D
3. State College Blvd /Lincoln Ave	AM	0.768	C	0.768	C	0.768	C	0.768	C
	PM	0.925	F	0.925	F	0.925	F	0.925	F
4. Anaheim Blvd /Ball Rd	AM	0.833	D	0.833	D	0.833	D	0.833	D
	PM	0.990	E	0.992	E	0.992	E	0.992	E
5. Lewis St/Ball Rd	AM	0.869	D	0.921	E	0.928	E	0.869	D
	PM	1.194	F			1.278	F	0.924	E
6. East Street/Ball Rd	AM	0.957	E	0.815	D	0.970	E	1.048	F
	PM	0.987	E			1.011	F	1.175	F
7. State College Blvd /Ball Rd	AM	0.739	C	0.755	C	0.755	C	0.755	C
	PM	0.918	E	0.942	E	0.942	E	0.942	E
8. Anaheim Blvd /Cerritos Ave	AM	0.808	D	0.733	C	0.733	C	0.733	C
	PM	0.859	D	0.831	D	0.831	D	0.831	D
9. Lewis St/Cerritos Ave	AM	0.868	D	0.828	D	0.828	D	0.828	D
	PM	0.903	E	0.869	D	0.869	D	0.869	D
10. State College Blvd /Cerritos Ave	AM	0.891	D	0.860	D	0.860	D	0.860	D
	PM	0.755	C	0.723	C	0.723	C	0.723	C

Table 5 – 2035 Roadway LOS

Segment	Lanes	Alt 1 Daily Volume	Alt 2 & 3 Daily Volume	LOS
1. Lincoln Ave between Anaheim Blvd and East St	6D	27,970	27,970	A
2. Lincoln Ave between East St and State College Blvd	6D	31,200	31,200	A
3. Anaheim Blvd between Lincoln Ave and Ball Rd	4D	37,730	37,730	F
4. East St between Lincoln Ave and Ball Rd	4U	15,030	15,030	B
5. State College Blvd between Lincoln Ave and Ball Rd	6D	33,080	33,080	A
6. Ball Rd between Anaheim Blvd and Lewis St	6D	48,410	48,640	D
7. Ball Rd between East St and State College Blvd	6D	49,600	49,830	D
8. Anaheim Blvd between Ball Rd and Cerritos Ave	6D	48,200	48,090	D
9. State College Blvd between Ball Rd and Cerritos Ave	6D	36,630	36,670	B

D=Divided, U=Undivided

The future year 2035 traffic models do not reflect a significant increase in roadway segment daily traffic volumes for the Build Alternatives. Slight increases in the daily traffic volumes can be attributed to driveways along Ball Road which are relocated to cross street and the redistribution of a portion of the traffic that currently uses on Cerritos Avenue to avoid the at-grade Ball Road crossing has been redistributed back to Ball Road. None of the build alternatives negatively impact the roadway segment level of service and, therefore, no roadway segment measures are recommended to improve traffic operations.

In Alternative 2A, there are no significant intersection impacts identified. The realignment of Lewis Street to intersect Ball Road at the existing East Street/Ball Road intersection will improve the LOS of both of the study intersections within the project area and provide direct connectivity between Lewis Street and East Street which eliminates existing weaving conditions and decreases left and right turn queue demands.

In Alternative 2B, intersection deficiencies within the project limits are exacerbated by the project improvements at East Street/Ball Road and at Lewis Street/East Street. The addition of a westbound right turn lane to the East Street/Ball Road intersection and implementation of northbound right-turn overlap phase with a westbound U-turn prohibition at the Lewis Street/Ball Road intersection will improve the LOS to within the significance criteria for each intersection.

In Alternative 3, intersection deficiencies within the project limits are exacerbated by the project improvements at East Street/Ball Road. The addition of a westbound right turn lane to the East Street/Ball Road intersection will improve the LOS to within the significance criteria for this intersection.

Signals

A preliminary signal warrant assessment was performed to examine the general correlation between the planned level of future development and the need to install new traffic signals by estimating future development-generated traffic and comparing this against a sub-set of the standard traffic signal warrants recommended in the Federal Highway Administration Manual on Uniform Traffic Control Devices and associated State guidelines.

In all Build Alternatives, the project proposes to remove all of the driveways between Allec Street and the LOSSAN railroad tracks on Ball Road. With this proposed change, access to businesses will be diverted to Allec Street. Currently, the intersection of Allec Street and Ball Road is stop-controlled on the northbound and southbound approaches. Using estimated traffic volumes, the intersection is projected to satisfy the MUTCD Peak Hour Traffic Volume Warrant for traffic signal installation under existing conditions. Future growth in the area will add traffic to this location and exacerbate the need for a traffic signal. As such, a traffic signal will likely be needed prior to or concurrent with the grade separation project

In Alternative 2A, the intersection of the connector road at the newly aligned Lewis Street is projected to satisfy the peak hour volume warrant for traffic signal installation between Year 2015 and Year 2020.

In a subsequent design phase, the full set of warrants and regular monitoring of actual traffic conditions should be investigated based on field-measured traffic data and a thorough study of traffic and roadway conditions to determine if a signal will be required.

6J. ENVIRONMENTAL CONSIDERATIONS

A Preliminary Environmental Study (PES) checklist was prepared to evaluate the temporary and permanent impacts for each Alternative. Below is a summary of the findings. The PES Checklist is provided in Appendix D.

Noise: The vertical alignment change proposed in the Build Alternatives classifies the project as Type I. In the next phase of design, a Noise Study Report will be prepared per California Department of Transportation/Federal Highway Administration (Caltrans/FHWA) guidelines. A Noise Abatement Decision Report is not anticipated to be required because the project is not anticipated to include sound walls.

Air Quality: As a grade separation, the project is exempt from the requirement for air quality conformity. However, the project proposes to remove access points on Ball Road which will change existing access conditions and direct more traffic to Allec Street. Pending further analysis in the next design phase, a traffic signal is anticipated to be warranted at the

Allec Street/Ball Road intersection to replace the current stop-controlled condition. If the traffic signal is warranted, the project is no longer exempt and preparation of an Air Quality Analysis technical report would be required to address the potential impact of the new traffic signal.

Biological Resources: In the next phase of design, a Natural Environment Study (Minimal Impacts) (NES[MI]) will be prepared to address potential project impacts to biological resources, including federally listed threatened or endangered species and their designated critical habitat but there is no critical habitat or essential fish habitat within the project limits. There is the potential for migratory birds to use the ornamental trees in the project area for nesting and the proposed project has the potential to result in the spread of invasive plant species. The NES(MI) will address the potential impacts to biological resources, including the effect on migratory birds and impacts to biological species, noxious weed management, and invasive species. There are no potential wetlands or potentially jurisdictional drainages observed during surveys of the project site. Therefore, permits (Section 404, Section 401, Section 1602) are not anticipated to be required.

Land Use, Community, and Relocation: The project will likely displace at least three commercial properties, including: (1) the Goodyear Brake and Tire store; (2) Johnstone Supply; and (3) Prestige Cabinetry and Flamingo Showgirls. Additional displacements are anticipated for the Salvation Army Donations Center in the Alternative 2A, Express Pipe and Supply Company in Alternative 2B, and Pinner Construction Company in Alternative 3. A Community Impact Assessment (CIA) and a Relocation Impact Statement (RIS) will be prepared in the next phase of design to address the potential impacts to the community from partial acquisitions and displacements by the project.

All Build Alternatives improve and enhance of existing roadways and are consistent with the goals and policies identified in the City of Anaheim General Plan to improve circulation and enhance roadway safety. Alternative 2A, Underpass with Lewis Street Realignment, is inconsistent with the City's current Circulation Element. Moving forward with this Alternative would require an amendment to the City of Anaheim General Plan Circulation Element.

Visual/Aesthetics: The project site is located in an urban area surrounded by light industrial and office land uses. There are no designated visual or scenic attributes within or adjacent to the project, and the project is not located on or near a designated State Scenic Highway (Caltrans Officially Designated State Scenic Highways website). Ball Road, East Street, Lewis Street, and Allec Street do not have a scenic designation in the City of Anaheim General Plan. The project would involve a substantial amount of earthwork and a bridge structure that could affect the visual character and

quality of the area. Potential visual impacts will be addressed in an abbreviated Visual Impact Assessment (VIA) to be prepared in the next design phase.

Parking: There is no on-street parking within the project limits on Ball Road, Lewis Street, or East Street. Existing on-street parking on Allec Street is not expected to be impacted by this project. The project will have temporary and permanent parking impacts within private properties adjacent to the project limits. Impacts to parking and opportunities to replace lost parking spaces will be explored during a subsequent project design and will be addressed in the CIA prepared during the Project Approval/Environmental Document (PA/ED) phase of the project.

6K. DRAINAGE

The City of Anaheim is divided into 43 drainage areas that are supported by a network of storm drain pipes and concrete lined channels to collect the street runoff and convey it to the Anaheim Bay-Huntington Harbour and Santa Ana River. The Hydraulics and Hydrology Report developed for this phase of design evaluates the grade separation project effects on Drainage Areas 20 and 26.

Drainage Area 20 covers approximately 116 acres of fully developed commercial and residential areas. The existing storm drain system collects the storm water runoff from the roadway and private properties on East Street between Vermont Avenue and Turin Avenue and on Ball Road between East Street and the UPRR tracks. The main trunk line is a 36" Reinforced Concrete Pipe (RCP) at Turin Avenue then turns south on East Street then turns west on Ball Road. At the SCRRA at-grade crossing, the mainline enlarges to a 48" RCP. At the UPRR at-grade crossing, the mainline reduces to a 45" RCP and continues on Ball Road until outfalling into the Anaheim Bay-Huntington Harbour via the Anaheim Barber City (ABC) Channel.

Drainage Area 26 covers approximately 120 acres fully developed commercial and residential areas. The existing storm drain system collects storm water runoff from the roadway and private properties on East Street between Turin Avenue and Ball Road; on Ball Road between East Street and State College Boulevard; and on Lewis Street. The main trunk line is a 42" RCP east of the project area on Ball Road that enlarges to a 42" RCP at East Street then enlarges to a 54" RCP when it turns south on Lewis Street until outfalling into the Anaheim Bay-Huntington Harbour via the East Garden Grove-Wintersburg Channel.

Within the SCRRA right of way, the stormwater runoff along tracks flows away from Ball Road and is collected in shallow swales within the railroad

right-of-way. The tributary area and drainage pattern along the railroad tracks will remain unchanged in all Alternatives and no modifications to the system are proposed.

The existing watershed map is provided in Appendix F. There are no hydrological conditions of concern associated with this project because the project is located in a developed area and its connection is into existing concrete lined drainage systems.

The hydrology, pipe system and street flow capacity for Drainage Areas 20 and 26 were analyzed for a 10-year storm event as required per the City of Anaheim's Storm Drainage Manual. Additionally, the Anaheim Barber City channel has capacity restrictions limiting the design flow to a 10-year storm. The results of the analysis indicate that the existing system is undersized and inlets should be added to satisfy the City's street flood width standard. These findings are consistent with the City of Anaheim's Master Plan of Storm Drainage for Anaheim Barber City Channel Tributary Area. Within the project limits, the improvements needed correct existing system deficiencies:

Drainage Area 20:

- Replace 36" RCP with 10'x4' Reinforced Concrete Box (RCB) on East Street
- Replace 36" and 48" RCP with 10'x4' RCB Ball Road

Drainage Area 26:

- Replace 36" and 42" RCP with 48" RCP on Ball Road
- Replace 54" RCP with 60" RCP on Lewis Street

These recommendations are consistent with the City's Master Plan of Storm Drainage for these Drainage Areas. Additional improvements, outside of the project area, are recommended by the City's document. None of the facility modifications have been programmed for construction. Because there are no immediate plans to upgrade the downstream system for Drainage Area 20, at the westerly project limit a hydraulic jump is anticipated where the trunk line transitions from a 10'x4' RCB to a 48" RCP. As a cost saving alternative, the project can relocate the trunk lines and maintain the existing drainage facility sizes until the entire system can be reconstructed.

In order to preserve the existing drainage pattern and gravity flow profile, the proposed drainage improvements should be relocated into a drainage easement behind the retaining walls and outside of the street right of way. Existing drainage from adjacent private properties onto Ball Road will be accommodated with site drainage connections into the relocated trunk mainline. Final determinations for pipe size and location should be determined in subsequent design phases.

In Underpass Alternative 2A, a pump station will be required to handle sump condition created by the Ball Road reprofiling in Drainage Area 20. It is anticipated that a 24" RCP line will be sufficient to carry the storm water from the pump station well into the 10'x4' RCB and will be designed with sufficient capacity to avoid downstream hydrology concerns. In Drainage Area 26, improvements will be installed along the realigned Lewis Street and the existing RCP within the existing Lewis Street alignment will remain in place, to maintain existing drainage patterns from adjacent private properties, and will connect into the new improvements at the Lewis Street connector road.

In Underpass Alternative 2B, a pump station will be required just as in Alternative 2A. In addition, approximately 13 acres of tributary area will be redirected from Drainage Area 26 to Drainage Area 20 because Lewis Street is lowered to match the lowered Ball Road profile which reverses the existing direction of surface runoff along Lewis Street. Coordination with Orange County Flood Control District will be required in subsequent design phases for approval of this redirection.

In Overhead Alternative 3, the proposed reprofiling of Ball Road and the raising of Allec Street, Lewis Street, and East Street to match the raised Ball Road profile will reverse the existing drainage patterns on all of these facilities. New inlets and laterals are anticipated at the proposed sag locations at the project limits which will then redirect runoff back into trunk lines that will preserve the existing flow patterns to the ABC Channel and the East Garden Grove-Wintersburg Channel for each Drainage Area.

6L. UTILITIES

Within the project limits, the existing utilities are electrical transmission and distribution lines and fiber optic lines on overhead joint poles behind the curb, and underground 15" and 8" sewer mains, 16" and 12" high pressure gas lines, fiber optic duct banks, telephone transmission lines, and 18" and 34" municipal water mains within the roadbed. Additionally, City of Anaheim overhead electric transmission lines are present along the westerly SCRRA right of way limit, City of Anaheim overhead electric distribution lines on joint poles with fiber optic lines are present along the easterly SCRRA right of way limit, and Metrolink's Positive Train Control underground fiber optic line is present along the easterly side of the SCRRA right of way. Table 6 details the utility facilities and location.

Table 6 – Existing Utility Information

OWNER	FACILITY	LOCATION
City of Anaheim Electric	Overhead on joint poles	Along Ball Rd and Lewis St.
SCE Transmission	Overhead on joint poles	Along north of Ball Rd, east sided of Lewis St and
AT&T	Overhead 230kV Lines	Along west side of SCRRA right of way
	Overhead 66 kV lines on joint poles	Along east side of Lewis, south side of Ball Rd, and east side of East St
MCI (Verizon Business)	Underground Transmission Fiber Optic lines	Along east side of Lewis St, along north side Ball Rd, and along east side of Ball Rd
Sunesys	Underground Distribution Fiber Optic lines	Along north and south of Ball Rd, west of Allec St, and East of Lewis St
Time Warner	Underground and Overhead Fiber Optic lines on joint poles	Along South side of Ball Rd, OH Fiber Optic along east side of Lewis St, south side of Ball Rd, east side of East St and east side of SCRRA right of way
	Overhead Fiber Optic on joint poles	Along north side of Ball Rd and east side of East St
XO Communications	Overhead Fiber Optic lines on joint poles	along north and south side of Ball Rd and east side of Lewis St and west side of East St
Southern California Gas - Distribution	Underground Fiber Optic Lines	Along south side of Ball Rd and east side of Allec Rd
	Underground Fiber Optic lines	Along south side of Ball Rd
	12" Natural Gas Line	Along center of Lewis St
	2" Natural Gas Line	Along west side of Allec St
Questar Pipeline Company	12" and 3" Natural Gas Line	Along north and south side of Ball Rd respectively
City of Anaheim	3" Natural Gas Line	Along west side of East St.
	16" High Pressure Natural Gas Line	Along north side of Ball Rd
	15" VCP Sewer	Along center of Ball Rd
	10" VCP Sewer	Along center of East St
	8" VCP Sewer	Along center of Lewis St
	8" VCP Sewer	Along center of Allec St
	54" RCP Storm Drain	Along south side of Ball Rd
36" RCP Storm Drain	Along north side of Ball Rd	
Metropolitan Water of Southern California	54" RCP Storm Drain	Along west side of Lewis St

In each Alternative, due to the reprofiling and slightly wider cross section for Ball Road, major overhead and underground utilities within the improvement limits will require relocation to a public utility corridor to the north of Ball Road. The relocated utilities will tie into existing lines east of

the UPRR at-grade crossing and west of East Street. Lateral service connections will be reestablished from the lines within the utility corridor or from nearby trunk lines. The public utility easement is anticipated to be 35' wide to accommodate the relocated utility facilities and the minimum clearances required by each owner.

In Overhead Alternative 3, additional relocation to underground the overhead electrical transmission and overhead joint poles with electrical distribution and cable lines along the SCRRA right of way will be required at the structure location.

It is anticipated that all utilities, with the exception of Southern California Edison (SCE) transmission, Metropolitan Water District (MWD), and the City-owned utilities, are within franchise through the project limits and will be required to relocate at the expense of the utility owner. Relocations and cost responsibilities should be determined in subsequent phases of design.

6M. RIGHT OF WAY REQUIREMENTS

The area within the project limits is fully developed consisting primarily of industrial use properties, along with a new mixed-use commercial office building, and properties with some retail element. Existing driveway access is from Ball Road, Allec Street, Lewis Street, and East Street. A residential community is located in the northeast quadrant of the Ball Road/East Street intersection.

Due to the nature of the project, the profile of Ball Road will substantially change, resulting in complex impacts to the fronting properties due to inferior visibility and lack of direct access to Ball Road. Costs for acquisitions, damages, goodwill, and relocation have been estimated for the various impacts to each property in all alternatives. For all right of way impacts, excess land values are not included in the cost estimate at this phase because the future value of the land cannot be predicted with enough certainty to rely on for funding purposes. The subsections below highlight the major right of way requirements for the project Alternatives.

Acquisitions

In all alternatives, there are three parcels that require complete acquisition: Johnstone Cabinetry (APN 082-130-22), Prestige Cabinetry/Flamingo Showgirls (APN 082-140-34) at the southeast quadrant of the Ball Road/Allec Street intersection; and Goodyear Tire (APN 234-101-19) at the northeast corner of the Ball Road/SCRRA right of way intersection. The acquisitions at the Allec Street intersection are required to construct an at-grade cul-de-sac behind the proposed walls for the grade separation to maintain access to larger parcels on the south side of Ball Road, west of the SCRRA right of way. The acquisition of the Goodyear tire store is required

because it is not feasible to maintain access to the parcel once Ball Road is reprofiled for the grade separation. In addition, in all Alternatives, the project cross section of Ball Road is slightly wider than the existing cross section which will require sliver right of way take in fee from the properties along Ball Road through the project limits and properties adjacent to the project limits will have permanent visual and access impacts.

In Underpass Alternative 2A, the realignment of Lewis Street will require the full acquisition of the Salvation Army Donations Center (APN 082-150-12) and partial acquisitions within the Salvation Army Adult Rehabilitation Center (APN 082-160-11), the Extron complex south of Ball Road, and Ganahl Lumber (APNs 082-150-34, 082-150-26, and 082-150-43). It is anticipated that the Donations Center can be relocated to the area south of the Adult Rehabilitation Center, which appear to currently be used as a storage lot and the items currently being stored can be relocated to the remnant of the existing Donations Center parcel. An existing railroad spur within the Ganahl Lumber impact area will require relocation.

In Underpass Alternative 2B, full acquisition of Express Pipe Supply (APN 082-140-13) is more cost effective than restoration of the property to provide access to the lowered elevation of Lewis Street and reconstruction after temporary bypass road impacts.

In Overhead Alternative 3, full acquisition of Pinner Construction (APN 082-140-50) is required to restore access to Express Pipe Supply (APN 082-140-13) and the northerly entrance to the Burke Lewis Street Business Center.

Permanent Easements

For all alternatives, a 35' public utility easement is required north of the Ball Road public right of way line, typically the back of wall gutter. This easement will not require fencing but it will restrict the property owner's ability to construct improvements within 35' of the public right of way limit.

In Overhead Alternative 3, two permanent ingress/egress easements are required. The first will restore access to the Extron building (APN 082-150-46). The ingress/egress for this parcel will be provided from the reconstructed driveway from the parcel to the south (APN 082-150-47). The second will restore access to the L3 southern parking lot (APN 234-101-26). The ingress/egress for this parking lot will be provided from existing access available on the northerly side of the adjacent parcel to the east (APN 234-101-29).

Temporary Easements

In all alternatives, during construction, temporary construction easements will be required to accommodate the construction of wall and roadway improvements and for utility relocations.

In Underpass Alternatives 2A and 2B, a temporary ingress/egress easement are required to provide access to the L3 southern parking lot (APN 234-101-26) while the northerly extension of Lewis Street is being reconstructed. The ingress/egress for this parking lot will be provided from existing access available on the northerly side of the adjacent parcel to the east (APN 234-101-29).

In Alternatives 2B and 3, additional temporary construction easements will be required to accommodate construction and operation of the temporary bypass road. No bypass road is required for Alternative 2A.

The bypass road in Underpass Alternative 2B is proposed to be constructed to the south of Ball Road. In order to avoid conflict with the proposed underpass bridge, the bypass road in this alternative is approximately 26' from the existing Ball Road roadbed. This separation will cause the bypass road footprint to encroach well into the adjacent properties parking lot areas and buildings; this encroachment requires the refacing of an existing building in ENS Kitchen & Bath (APN 082-140-11) and contributes to the full acquisition required at Express Pipe Supply (APN 082-140-13).

The bypass road in Overhead Alternative 3 is proposed to be constructed to the north of Ball Road. Because the overhead structure can be constructed in two phases, the temporary bypass road in this alternative will overlap the existing Ball Road roadbed and the temporary construction easement requirements are reduced to minor parking and landscaped area encroachments; no structures are anticipated to be impacted.

6N. WATER QUALITY

The project site is hydrologically located within the Anaheim Bay-Huntington Harbor watershed. A Watershed Infiltration and Hydromodification Management Plan (WIHMP) for this watershed is scheduled to be adopted in May 2012. Downstream receiving waters include Anaheim Barber City Channel, Bolsa Chica Channel, East Garden Grove Wintersburg Channel, Huntington Harbour, and the Pacific Ocean. According to the Clean Water Act (CWA) 303(d) water quality impairments list, Bolsa Chica Channel, East Garden Grove Wintersburg Channel, and Huntington Harbour are currently listed as impaired water bodies with required Total Maximum Daily Loads (TMDLs).

There are no Hydrologic Conditions of Concern for this project and, therefore, no stream susceptibility determinations are required. Also, no environmentally sensitive areas have been identified for protection during construction.

Because the improvements are a reconstruction of public roadway, the Water Quality Management Plan (WQMP) Technical Guidance Document (TGD) classifies the project land use category as “Streets, Highways & Freeways” with anticipated pollutants being suspended solid/sediments, heavy metals, oil & grease, toxic organic compounds, and trash & debris and to a lesser extent nutrients, pathogens (bacteria/virus) and pesticides. The primary pollutants of concern for this project are copper, lead, and nickel (heavy metals) and sediment toxicity (suspended solids/sediments). Secondary pollutants of concern for this project are trash & debris, and oil & grease.

The project footprint for the overhead alternative is approximately 11.2 acres with approximately 85% impervious surfaces consisting of asphalt concrete roadway and concrete sidewalk. Landscape medians and sidewalk planting account for the remaining 15% (1.7 acres) of the project area. The project footprint for the underpass alternative is approximately 8.2 acres with approximately 84% impervious surfaces consisting of asphalt concrete roadway and concrete sidewalk. Landscape medians and sidewalk planting account for the remaining 16% (1.3 acres) of the project area. The project footprint for the underpass (Lewis Street) alternative is 12.7 acres with approximately 84% impervious surfaces consisting of asphalt concrete roadway and concrete sidewalk. Landscape medians and sidewalk planting account for the remaining 16% (2.0 acres) of the project area.

In addition to the main project footprint, access roads and driveways to the surrounding businesses are also impacted due to the grade separation. The amount of area impacted varies from 2.55 acres to 3.11 acres for the various alternatives. The access roads and driveways are on private property and are subject to the NPDES “new development” requirements of reusing the stormwater runoff. To meet this requirement, it is recommended that infiltration basins/trenches are constructed on the excess portion of the acquired parcels. Infiltration of the stormwater will prevent any hydromodification concerns due to an increase peak flow rate within the municipal drainage system.

Also, a utility easement is located on the north side of Ball Road for all three alternatives. The surface treatment for this area will be determined in later phases of design. It is assumed the area will, at a minimum, maintain the existing pervious area. The pervious area may decrease if the surface treatment for this public utility easement is landscaped in some way.

Under the 2009 Orange County NPDES Permit and the 2011 Model WQMP, the project qualifies as Priority Project because the proposed improvements are a replacement of more than 5,000 square feet of impervious area which requires implementing applicable Low Impact Development (LID), site design, treatment control, source control, and/or hydromodification control BMPs to achieve numeric performance criteria described the WQMP TGD. For the portion of the project located within the street right of way, the LID criteria described in “Managing Wet Weather with Green Infrastructure Municipal Handbook: Green Streets” are recommended to the Maximum Extent Practicable (MEP). For the portion of the project located on private property, the new development requirements of the permit are recommended. BMPs recommended from the Conceptual WQMP prepared for this design phase, described below, comply with the Orange County National Pollutant Discharge Elimination Permit System (NPDES) No. CAS 618030 Permit (Order No. R8-2009-0030, amended by Order No. R8-2010-0062) to meet the required design capture for the project. Final BMP recommendations must be made in the final design phase. The project is not eligible for Water Quality Credits.

Hydrologic Source Controls: Street trees will be planted in the landscape median at approximately 100-foot spacing to provide canopy interception Hydrologic Source Control (HSC). HSC are not required for this project, but street trees are incorporated into the project as part of biotreatment BMP’s. Inclusion of street trees for the project will depend on the biotreatment BMP’s recommended in the subsequent phases of design.

Minimize Impervious Area: The project will modify the current median width from a 13’, striped median to a 16’, raised, landscaped median. Bifurcated sidewalks with planting strips are also proposed on both sides of Ball Road. As a result, the impervious area will be reduced approximately by 5%.

Preserve Existing Drainage Patterns and Time of Concentrations: The existing regional drainage pattern will be preserved. The proposed drainage system will collect the same amount of stormwater runoff from roadway into the same existing drainage channels before discharging into the Pacific Ocean at Huntington Harbour.

Protect Existing Vegetation Areas: The small amount of existing landscaping along the sidewalks will be replaced and the street median will be changed to a landscaped area as described above to minimize runoff.

Infiltration BMPs: Infiltration basins/trenches will be located on the excess portion of the parcels acquired for the project to the maximum extent practicable. The basins will be used to treat stormwater runoff from the

access roads and driveways impacted by the project improvements to conform to the new development requirements of reusing the water and prevent hydromodification concerns within the City's storm drainage system. Any excess volume available in the basins may be used to treat the street runoff.

Biotreatment BMPs: Vegetated swales will treat sediments, heavy metals, organic compounds, oil & grease, trash & debris with medium level of efficiency and can be implemented on this project. The project will also incorporate the Filterra Bioretention System proprietary biotreatment BMP. The Filterra system is an effective BMP that treats heavy metals, solids, and oil & grease. These BMPs will treat primary pollutants of concerns (heavy metals and sediments) and other pollutants (oil & grease, and trash and debris). The vegetated swales will be located between the curb and the sidewalk within the planter area. Stormwater runoff from upstream will be carried in the gutter and outlet through curb opening into the vegetated swales. The remaining downstream runoff will be treated by the Filterra System.

Source Control BMPs: Routine non-structural and structural source control BMPs will be anticipated to be implemented.

Matching the existing condition, all improvements and BMPs will be maintained, inspected, and operated by the City.

Through a combination of the street trees, vegetated swales, and the Filterra Bioretention systems all of the stormwater runoff from the project site will be treated for the anticipated pollutants created by a street project. The portion of the right-of-way acquisitions not being used for the grade separation can be used for infiltration basins/trenches. In this manner all of the street right-of-way will be used to the maximum extent possible for improving the quality of the stormwater runoff.

60. HAZARDOUS MATERIALS

Historical aerial photographs and regulatory databases were reviewed and regulatory file reviews were conducted as needed for properties within the project area, and within a ¼-mile radius of the project limits, to assess whether historical practices would have a potential impact to the project.

The following actions, described in the Initial Site Investigation prepared for this design phase, should be taken in subsequent design phases to further identify potential environmental concerns, including those which have the potential for residual impact to be encountered during construction activities, to evaluate the potential for construction worker exposure and for potential waste characterization purposes.

- Asbestos containing material (ACM) and lead-based paint (LBP) may be present in structures within the project area along East Ball Road.
- Aerially deposited lead (ADL) may be present in the soil as a result of historical vehicle emissions during the era of leaded gasoline.
- File reviews should be conducted at the Santa Ana Regional Water Quality Control Board, the Orange County Health Care Agency, and City of Anaheim Fire Department – Hazardous Materials Section for properties located within the project area that are listed on the leaking underground storage tank (LUST) database and spills, leaks, investigations, and cleanups (SLIC) database.
- Soil along the length of the SCRRA corridor should be sampled and analyzed to evaluate for the presence of chemicals typically used along railroad tracks including chlorinated herbicides, metals, polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPHs), and polychlorinated biphenyls (PCBs).
- A subsurface investigation should be completed at APN 234-121-20 (Weyerhaeuser Paper Company at 601 East Ball Road) for volatile organic compounds (VOCs) and Title 22 Metals.
- A subsurface investigation should be conducted where soil is to be disturbed during the project for VOCs, TPH, and Title 22 Metals.
- Collecting and analyzing groundwater samples for VOCs and other constituents needed to apply for a construction dewatering discharge permit.
- Prepare and submit a work plan and site-specific health and safety.

6P. GEOTECHNICAL CONDITION

The project area lies in the Tustin Plain within the southeastern margin of the Los Angeles Basin, near the lower reaches of the Santa Ana River. The site is expected to be underlain by man-made fill and young alluvial fan deposits and the groundwater depth is expected to be approximately 70 feet below ground surface.

Principal geological and geotechnical conditions were qualitatively evaluated and summarized in the Conceptual Geotechnical Report for this design phase. Based on information gained from review of published documents and site reconnaissance and the resulting potentially significant geotechnical hazards are summarized below. Final geotechnical recommendations should be based on project-specific field investigations performed in subsequent phases of design.

For the final improvements, proper design to current standards and overexcavation with soil replacement and/or densification are anticipated to

be sufficient to reduce these hazards to a less than significant condition for the project improvements. During construction, proper temporary erosion control measures and proper transportation, testing, handling, and disposal of imported and excavated materials are anticipated.

Seismic Ground Shaking: The hazard posed by seismic shaking is considered to be high, due to the proximity of known active faults and the nature of the materials underlying the site.

Seismically Induced Settlements: Dynamic settlement (above groundwater) and liquefaction settlement (below groundwater) occur primarily in loose sandy soils and are caused by strong ground shaking that allows the soil particles to become more tightly packed, thereby reducing pore space.

Unstable Fill Slopes: Temporary and permanent cut slopes are expected to expose potentially unstable alluvial deposits of sand and silty sand.

Compressible Soils: The near-surface, alluvial soils at the site may be compressible. The resulting settlement may occur immediately after or over a period of time after fill and structure loading in the overhead condition.

Expansive Soils: The underpass condition may be supported on clayey soils which can cause damage by cracking, heaving, buckling, and differential settlement may be encountered in the borings by the project site at depths of 20 to 30 feet below grade.

Erosion: Erosion by water is likely to occur during periods of prolonged rainfall (most common during the winter rainy season) or high-intensity and short-duration storms (such as summer thunderstorms). Strong winds can cause downwind movement of silt and fine to medium sand particles, depending on the wind velocity. This process is most likely to occur during construction in areas where the surface has been disturbed or the vegetation has been removed.

Flooding: Local drainage, accomplished by sheet flow, will be altered by the project. In the underpass condition, potential for flooding in increase due to the sump condition created by the improvements.

Handling and Disposal of Excavated Material: The project site is surrounded by commercial and industrial properties. The historic uses of these properties have potentially negative environmental impacts to soils. During excavation in the underpass condition special handling and proper disposal of the excavated material may be required.

Import Material: In the overhead condition, fill will be required to raise the roadway profile to the proper elevation. Transportation consideration and proper testing for moisture conditioning and adequate compaction are anticipated.

7. COMMUNITY INVOLVEMENT

The City of Anaheim has been involved in the development of the project alternatives and has provided input for this planning document.

Some impacts to the nearby businesses and residents are expected during construction and in the final condition. A public outreach program will be needed for the project and will be addressed during the next phase of the design.

Presently, there have been no project-specific community meetings.

8. ENVIRONMENTAL DOCUMENT

It is anticipated that any of the feasible alternatives presented this document will be cleared for National Environmental Policy Act (NEPA) with a Section 6004, 23 CFR 771, activity (d) (3) Categorical Exclusion (CE) for grade separation projects and California Environmental Quality Act (CEQA) Statutory Exemption (SE) for grade separation projects. Review and approval from Caltrans Local Assistance Division is required for NEPA clearance and the City of Anaheim's review and approval is required for CEQA clearance.

The preliminary environmental analysis has identified areas of environmental interest to be further evaluated in the design phase including air quality analysis for the new traffic signal at the Allec Street/Ball Road intersection, migratory bird observation, and hazardous soil contamination due to historical and current land uses.

The following is a list of environmental technical studies anticipated to be required, in subsequent phases of design, in support of the NEPA compliance document for the proposed project:

- Noise Study Report
- Air Quality Analysis (an air quality conformity determination will also be required)
- Natural Environment Study – Minimal Impact (NES-MI)
- Water Quality Assessment Report
- Hazardous Waste Initial Site Assessment (ISA) Phase 1
- Preliminary Site Assessment (PSA) Phase 2
- Community Impact Assessment (CIA)
- Visual Impact Assessment (abbreviated)
- Relocation Impact Statement (RIS)
- Traffic Study
- Parking Study

9. CAPITAL COST

The estimated project cost (in April 2012 dollars) for each alternative is outlined below. An escalation rate of 3% should be applied for each year after April 2012. The detailed cost estimates for each alternative are provided in Appendix E.

Costs (rounded to the nearest \$100k)	Alternatives		
	2A – Underpass with Lewis Realignment	2B – Underpass with Temporary Bypass Rd	3 – Overhead with Temporary Bypass Rd
<i>Construction Costs</i>			
Roadway Items	\$28,400,000	\$34,600,000	\$38,900,000
Structures Items	\$11,700,000	\$11,700,000	\$6,300,000
Railroad Items	\$1,900,000	\$3,100,000	\$1,500,000
Right of Way Items	\$41,100,000	\$39,300,000	\$36,900,000
<i>Support Costs</i>			
PA/ED Design (3%*)	\$1,400,000	\$1,500,000	\$1,400,000
PS&E Design (10%*)	\$4,200,000	\$4,900,000	\$4,700,000
Construction Management (15%*)	\$6,300,000	\$7,400,000	\$7,000,000
TOTAL PROJECT COST	\$95,000,000	\$102,500,000	\$96,700,000

* Support Cost calculated as a percentage of the Construction Cost

Cooperative agreement for cooperative features among the OCTA, SCRRA, and the City of Anaheim will be developed during the PS&E phase of design.

10. SCHEDULE

Milestones	Delivery Date
Project Initiation	2011
Project Approval	2012-2013
Project PS&E	2013-2015
Right of Way Certification	2015-2016
Ready to List	2016
Approve Contract	2016
Contract Acceptance	2017
End Project	2019

11. FHWA COORDINATION

This Report has not been reviewed by *the FHWA Liaison Engineer*. Review will be required if, per the *latest federal Transportation Act*, this project is eligible for federal-aid funding and is considered to be *STATE-AUTHORIZED or FULL-OVERSIGHT* under current FHWA-Caltrans Stewardship Agreements.

Additionally, Federal "engineering and operational acceptability" and CMAQ Eligibility determinations will be required.

12. AGENCY CONTACTS

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(714) 560-5833

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Southern California Regional Rail Association
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(909) 592-7937

Rudy Emami
Design Services Manager
City of Anaheim
Public Works, Engineering
City Hall, 2nd Floor
200 South Anaheim Boulevard
Anaheim, CA 92805

13. PROJECT REVIEWS

Field Review	<u>To be completed at next design phase</u>	Date	<u>N/A</u>
Constructability Review	<u>To be performed at next design phase</u>	Date	<u>N/A</u>

Appendix A – Location Map and Project Footprint

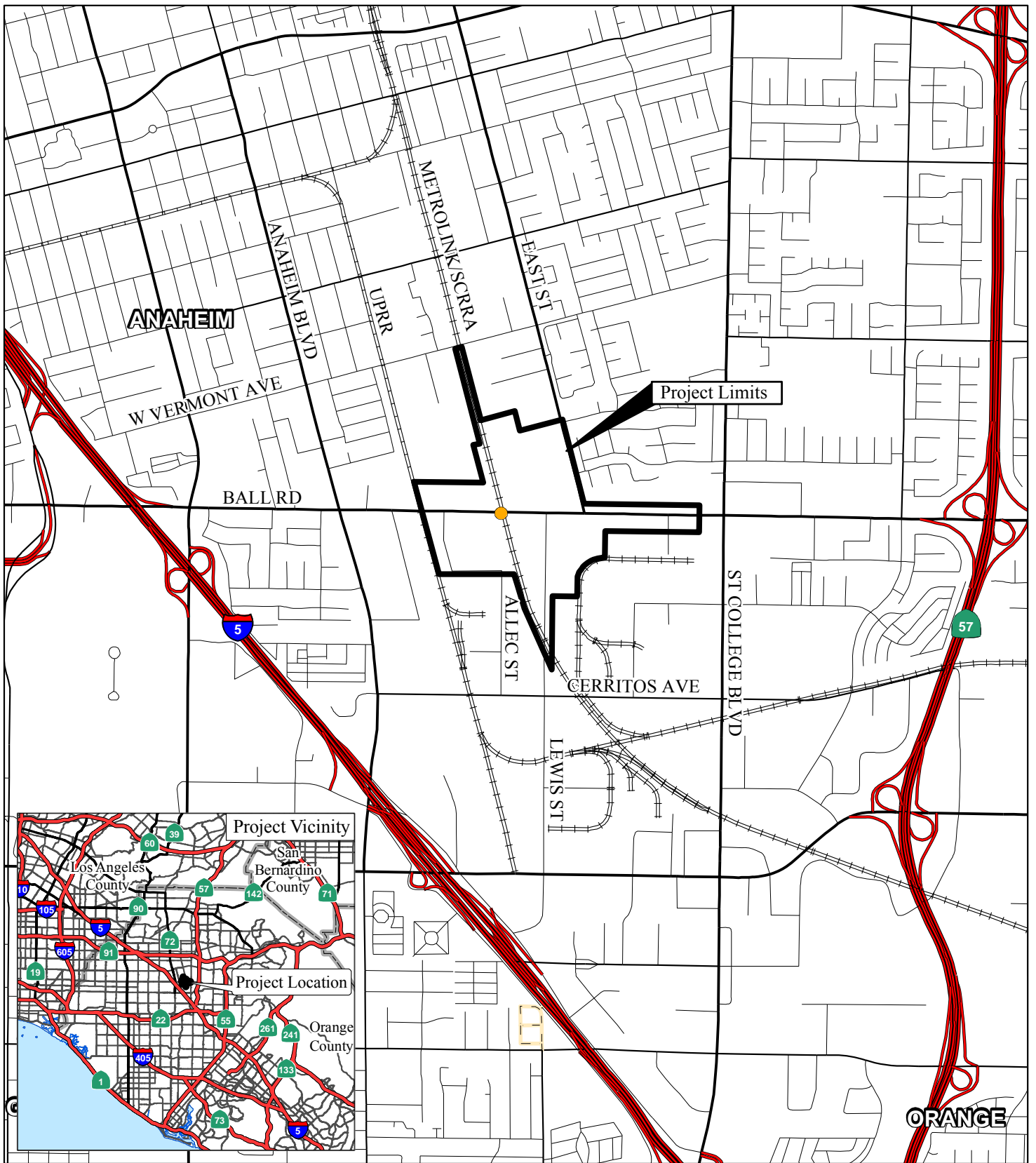
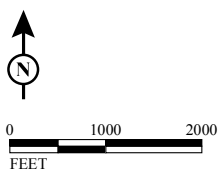


FIGURE 1

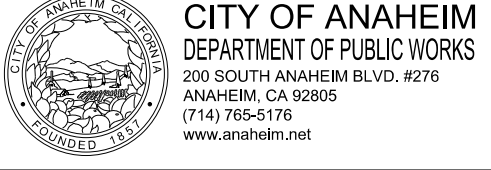
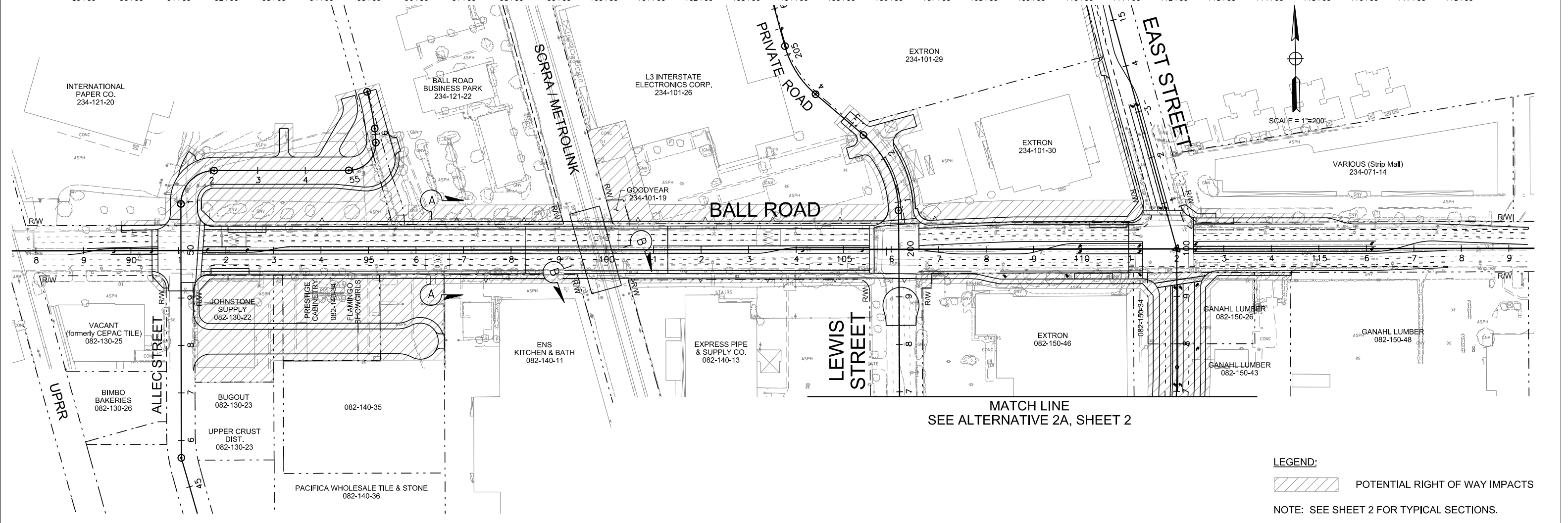
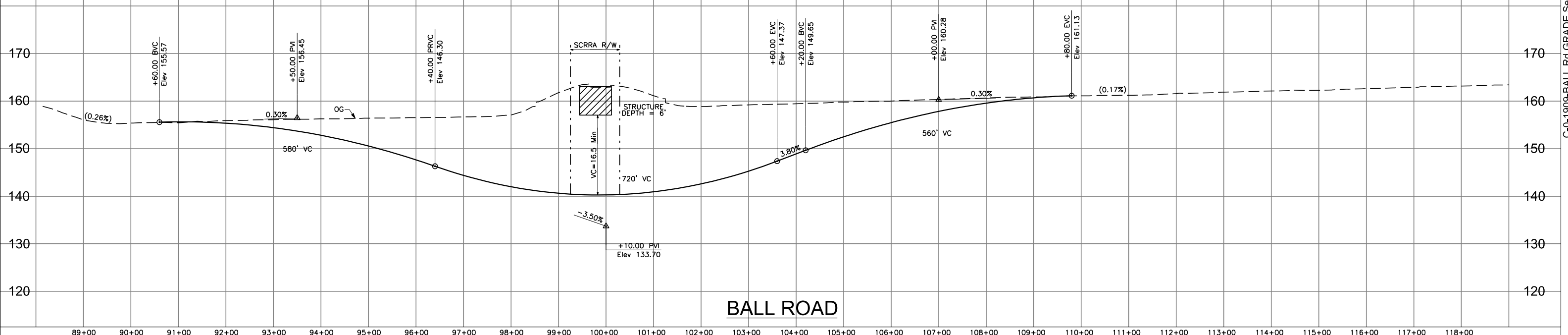
- LEGEND
- Project Limits
 - Grade Separation Location



Ball Road Grade Separation - Anaheim
Project Vicinity and Regional Location Map

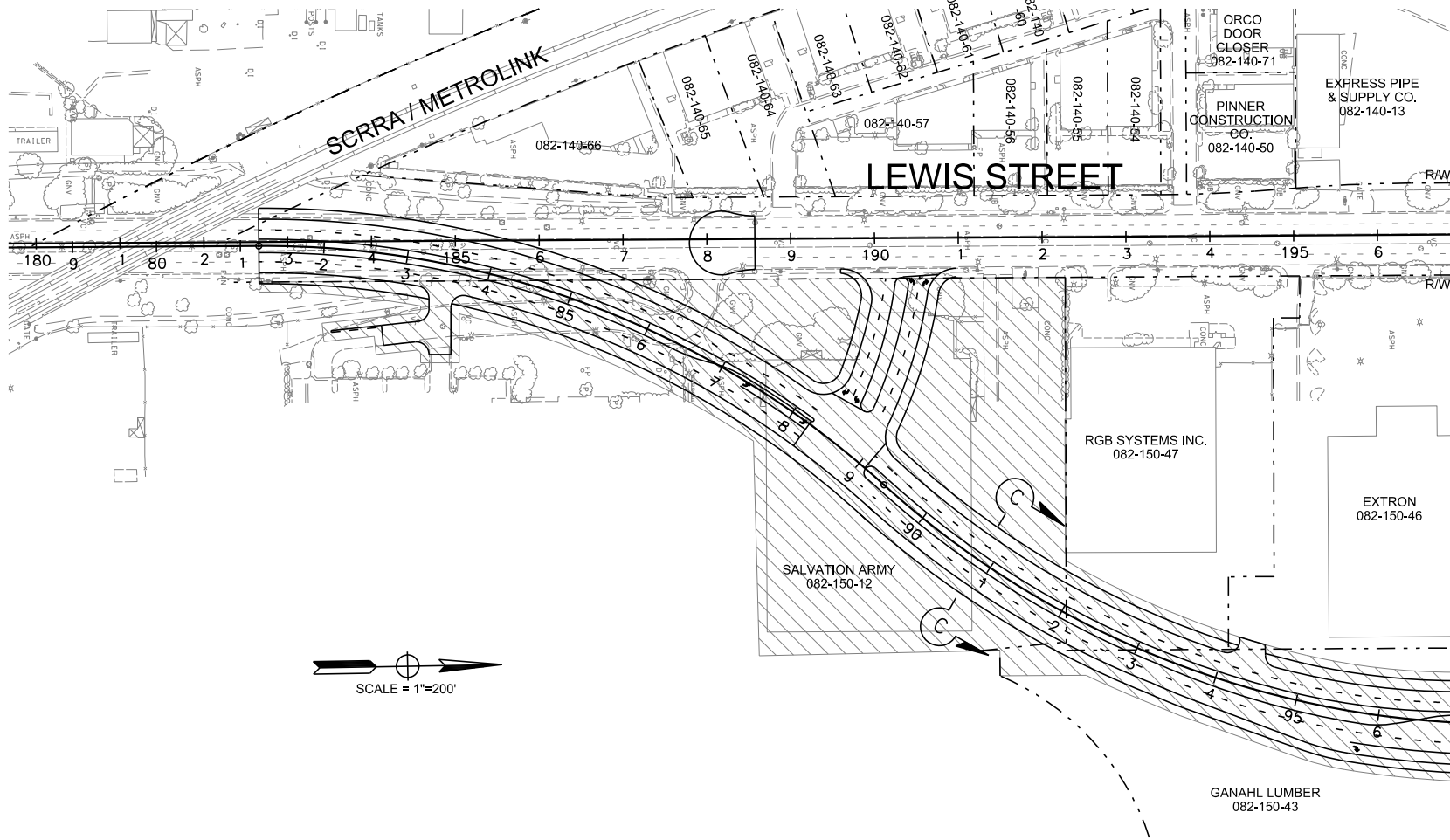
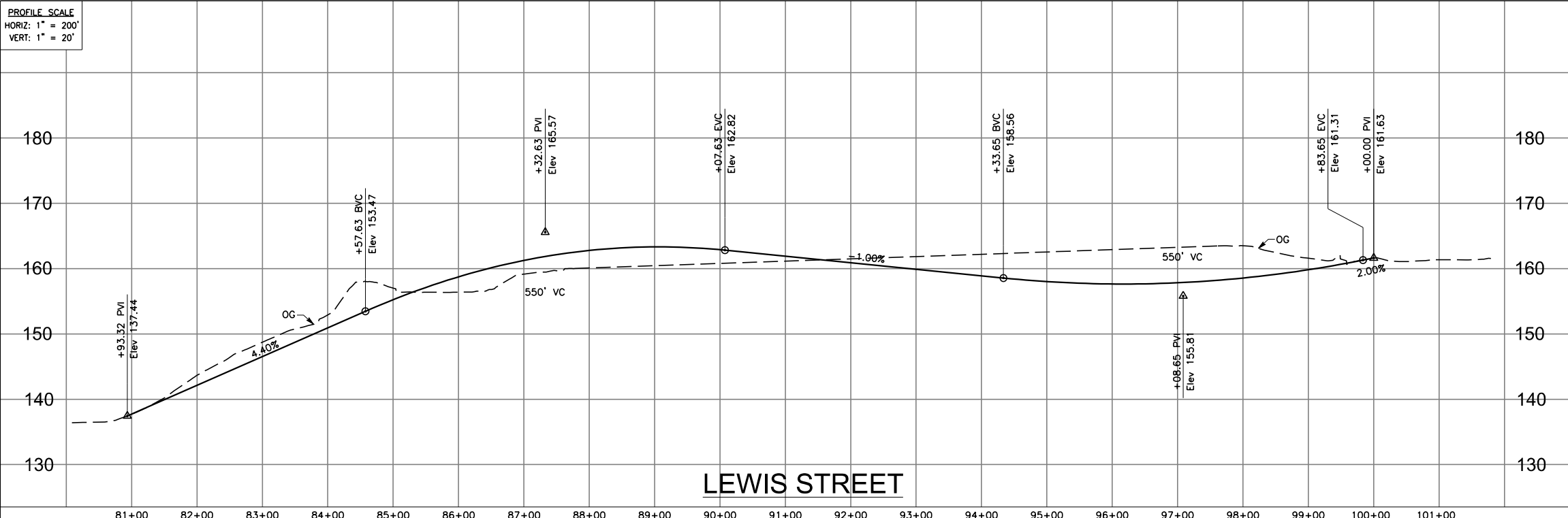
Appendix B – Preliminary Design Plans

PROFILE SCALE
 HORIZ: 1" = 200'
 VERT: 1" = 20'

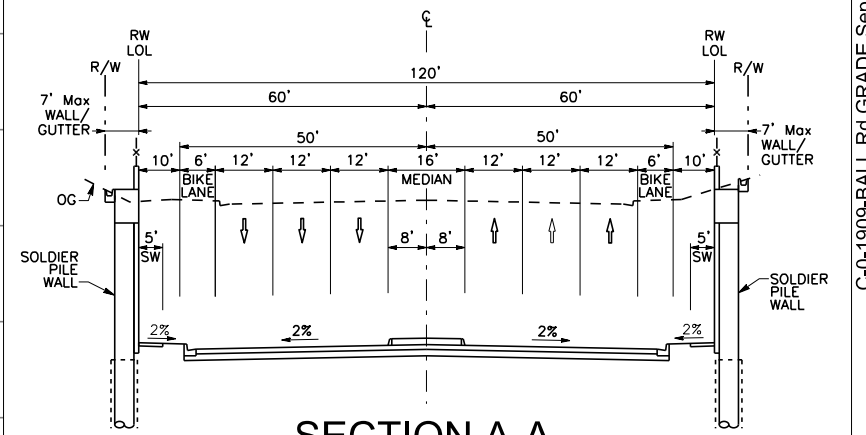


BALL ROAD GRADE SEPARATION PSR(E) Ball Road Underpass with Lewis Street Realignment BALL ROAD		SHEET <u>1</u> OF <u>2</u> ALTERNATIVE 2A
CITY OF ANAHEIM DEPARTMENT OF PUBLIC WORKS		

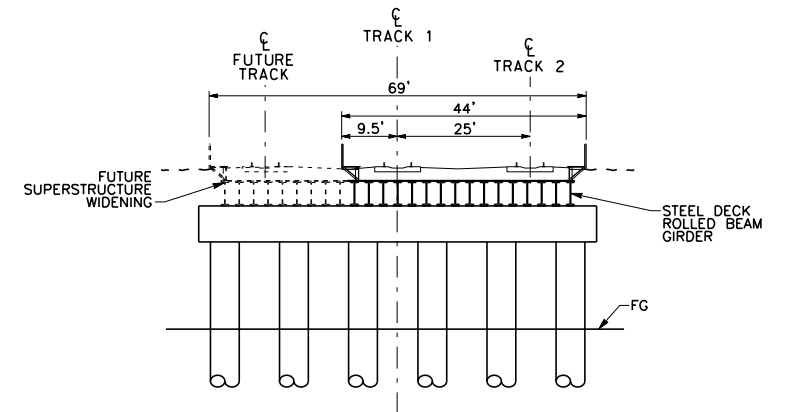
C-0-1909-BALL Rd GRADE Sep PSR(E)



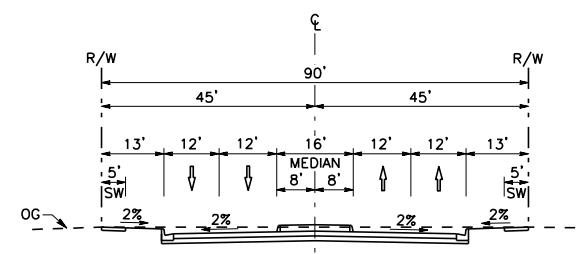
MATCH LINE
SEE ALTERNATIVE 2A, SHEET 1



SECTION A-A
BALL ROAD
NOT TO SCALE



SECTION B-B
TYPICAL BRIDGE SECTION (SCRRA / METROLINK)
(LOOKING SOUTH)
NOT TO SCALE



SECTION C-C
LEWIS STREET
NOT TO SCALE



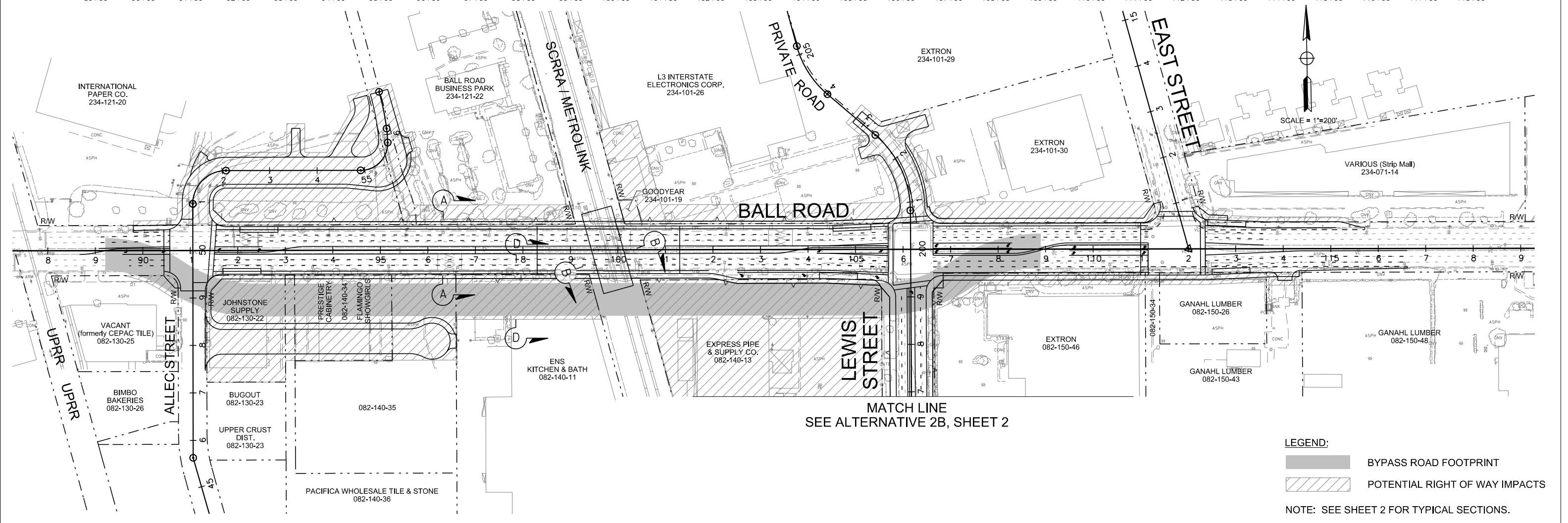
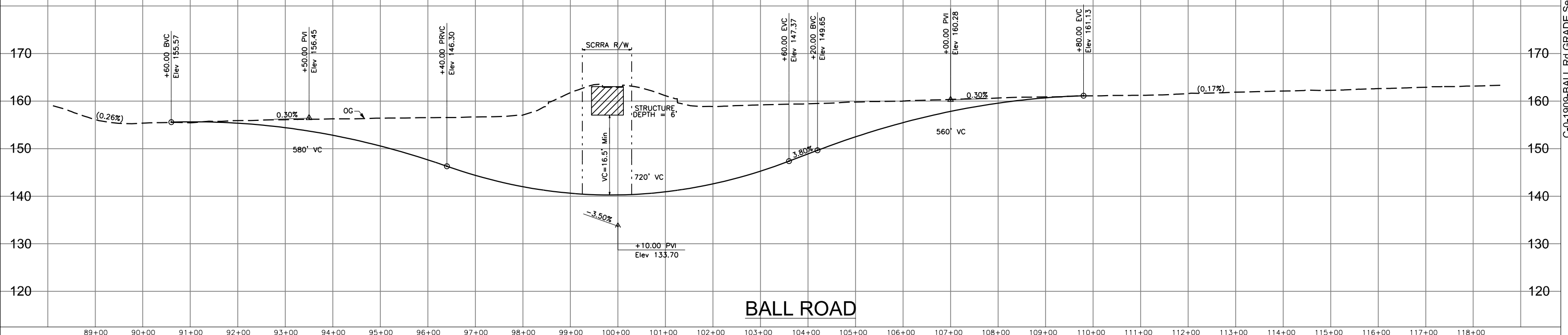
BALL ROAD GRADE SEPARATION PSR(E)
Ball Road Underpass with Lewis Street Realignment
LEWIS STREET

CITY OF ANAHEIM
DEPARTMENT OF PUBLIC WORKS

SHEET 2 OF 2
ALTERNATIVE
2A

C-0-1909-BALL Rd GRADE Sep PSR(E)

PROFILE SCALE
 HORIZ: 1" = 200'
 VERT: 1" = 20'



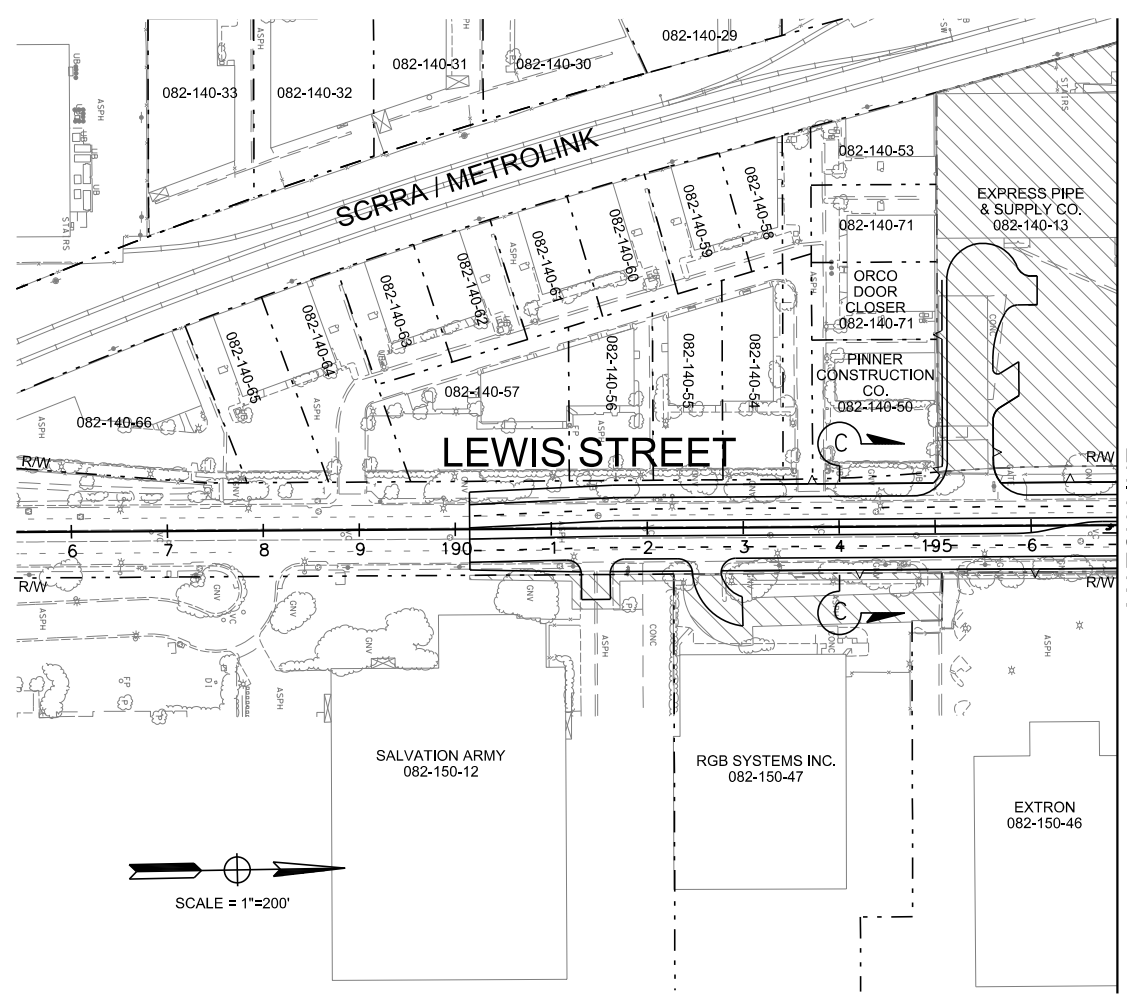
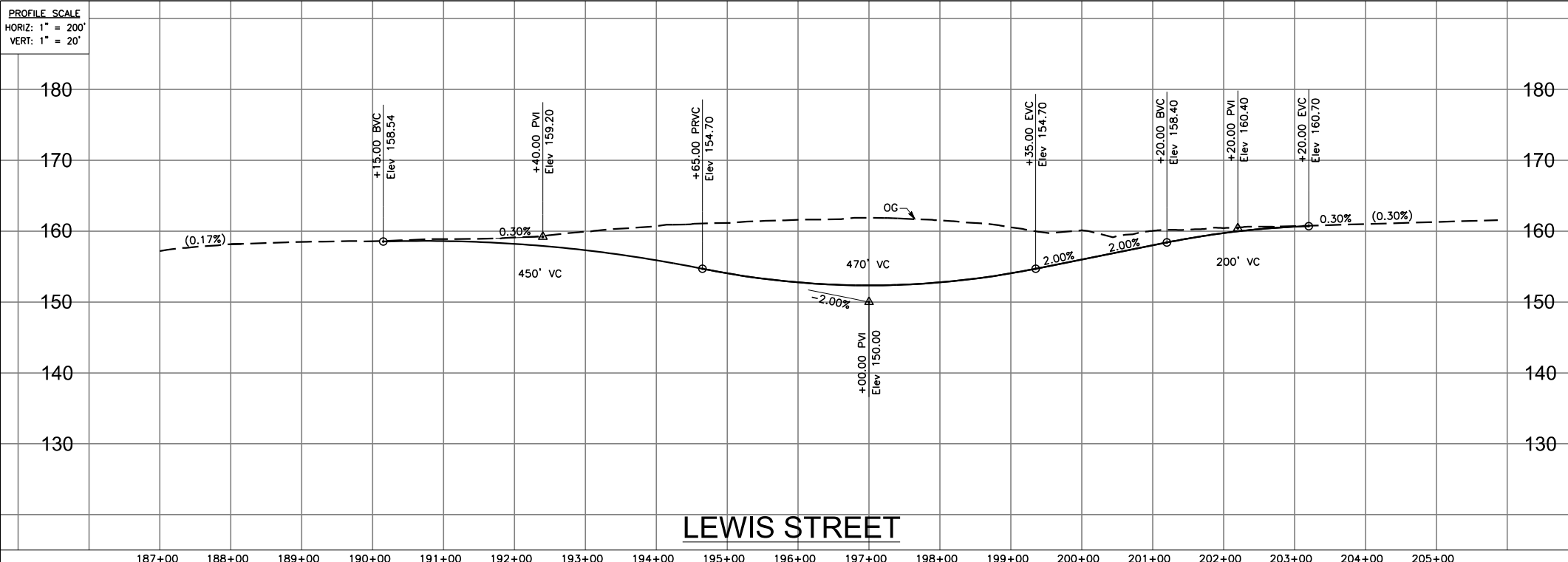
LEGEND:
 [Solid Grey Box] BYPASS ROAD FOOTPRINT
 [Hatched Box] POTENTIAL RIGHT OF WAY IMPACTS
 NOTE: SEE SHEET 2 FOR TYPICAL SECTIONS.



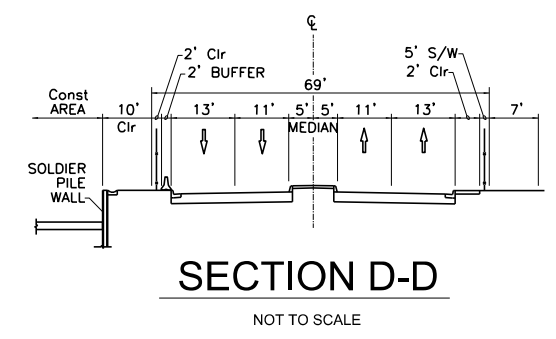
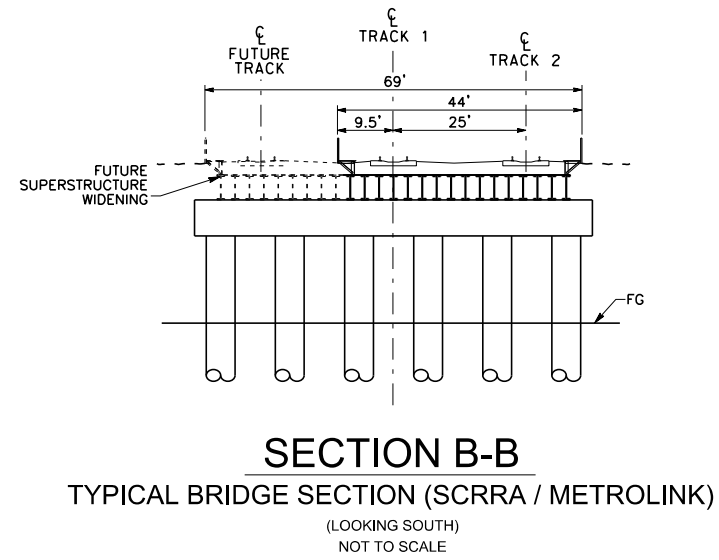
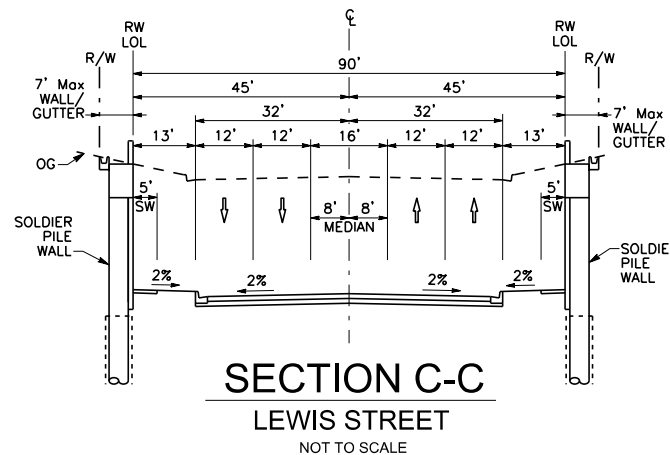
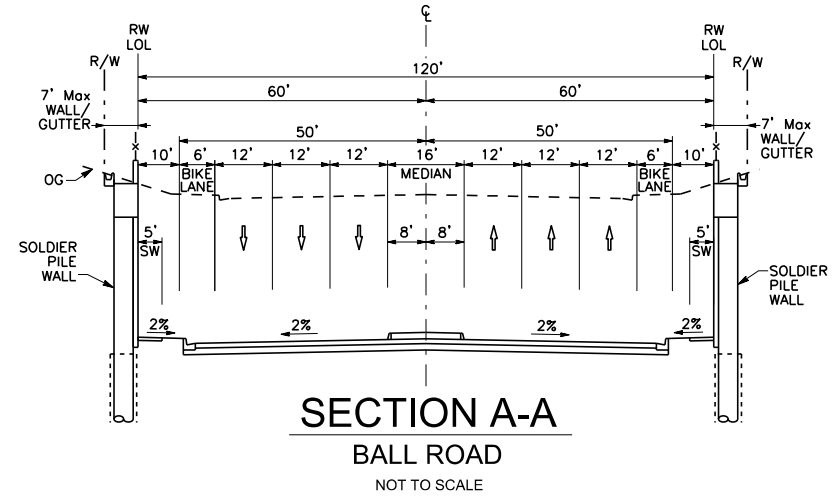
BALL ROAD GRADE SEPARATION PSR(E)
Ball Road Underpass with Temporary Bypass Road
BALL ROAD
 CITY OF ANAHEIM
 DEPARTMENT OF PUBLIC WORKS

SHEET 1 OF 2
 ALTERNATIVE
 2B

C-0-1909-BALL Rd GRADE Sep PSR(E)



MATCH LINE
 SEE ALTERNATIVE 2B, SHEET 1

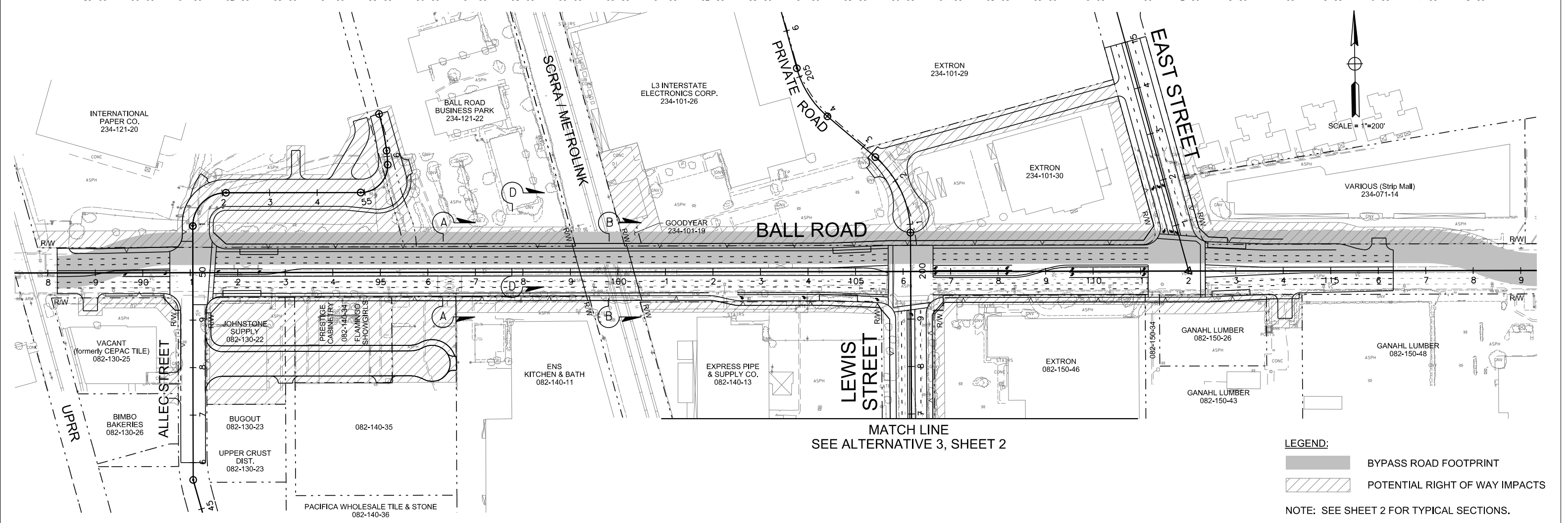
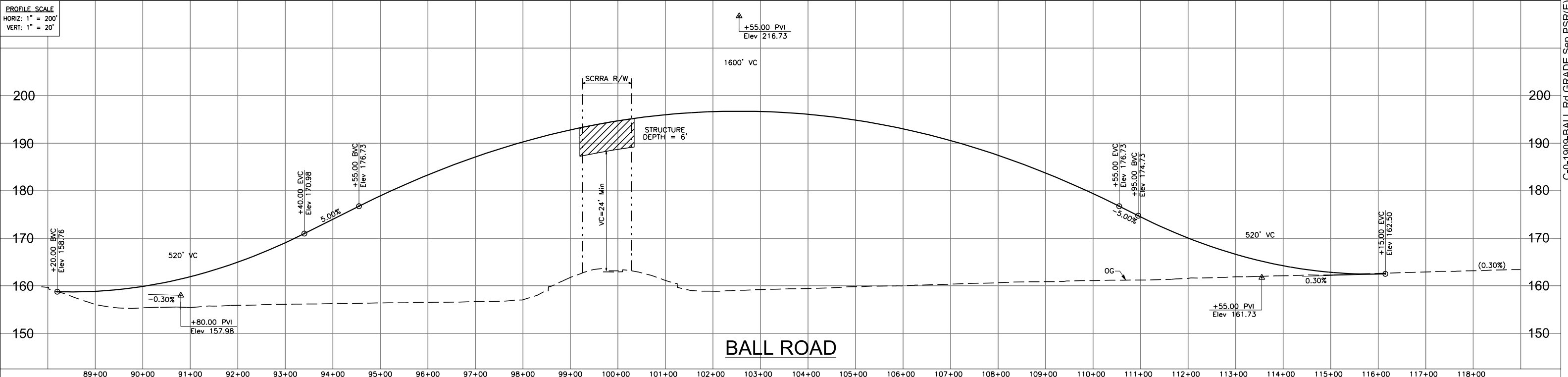


BALL ROAD GRADE SEPARATION PSR(E)
 Ball Road Underpass with Temporary Bypass Road
 LEWIS STREET

CITY OF ANAHEIM
 DEPARTMENT OF PUBLIC WORKS

SHEET 2 OF 2
 ALTERNATIVE
 2B

PROFILE SCALE
 HORIZ: 1" = 200'
 VERT: 1" = 20'



LEGEND:
 [Solid Grey Box] BYPASS ROAD FOOTPRINT
 [Hatched Box] POTENTIAL RIGHT OF WAY IMPACTS

NOTE: SEE SHEET 2 FOR TYPICAL SECTIONS.

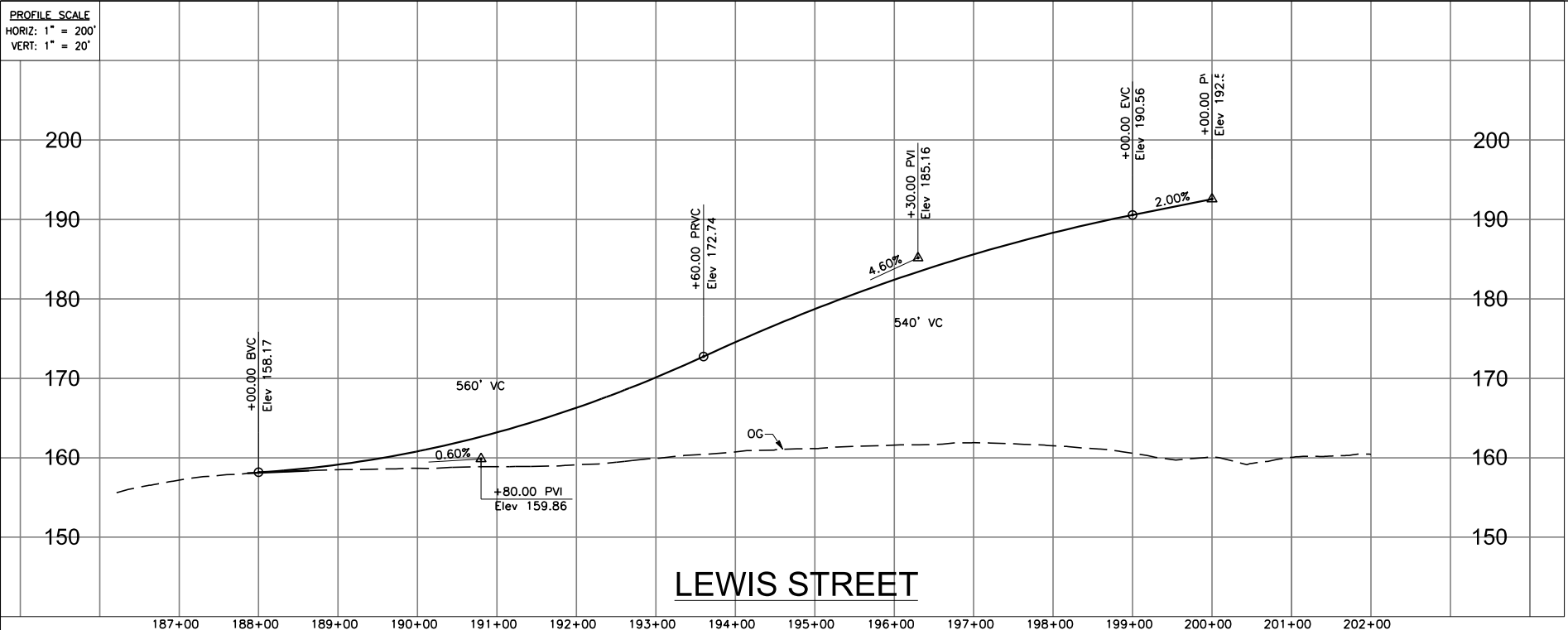


BALL ROAD GRADE SEPARATION PSR(E)
 Ball Road Overhead with Temporary Bypass Road
BALL ROAD

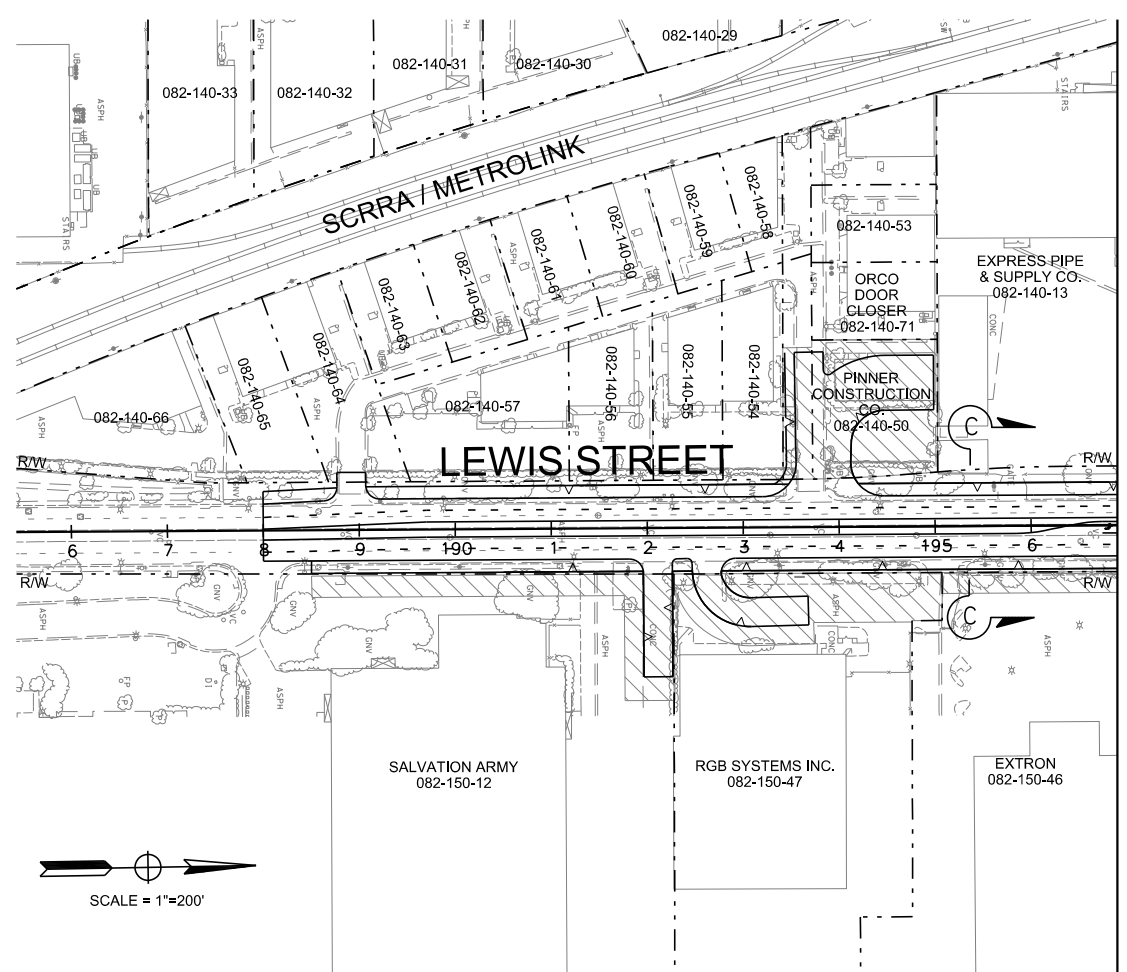
CITY OF ANAHEIM
 DEPARTMENT OF PUBLIC WORKS

SHEET 1 OF 2
 ALTERNATIVE
3

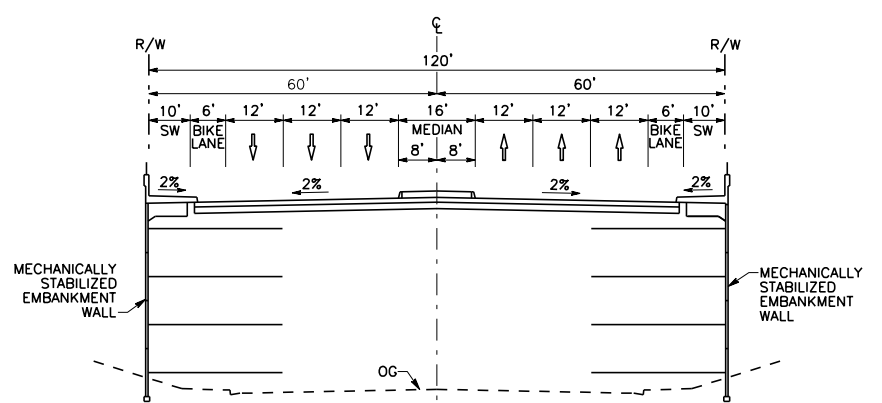
C-0-1909-BALL Rd GRADE Sep PSR(E)



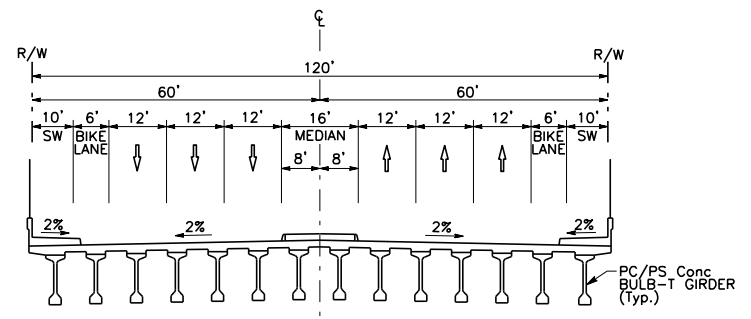
LEWIS STREET



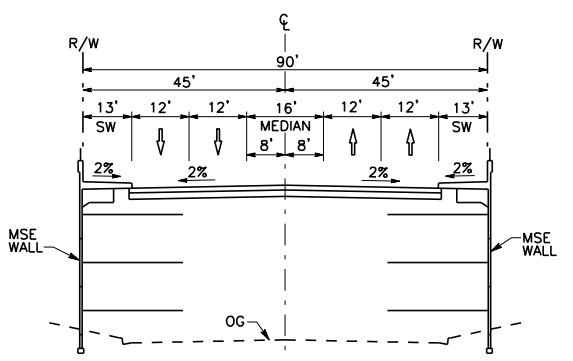
MATCH LINE
SEE ALTERNATIVE 3, SHEET 1



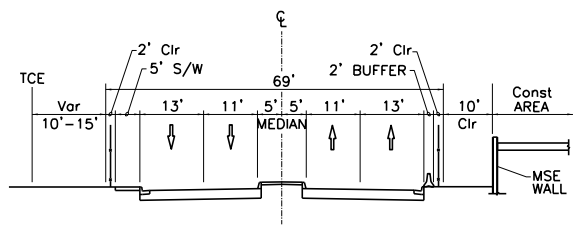
SECTION A-A
BALL ROAD
NOT TO SCALE



SECTION B-B
TYPICAL BRIDGE SECTION (SCRR / METROLINK)
NOT TO SCALE



SECTION C-C
LEWIS STREET
NOT TO SCALE



SECTION D-D
NOT TO SCALE

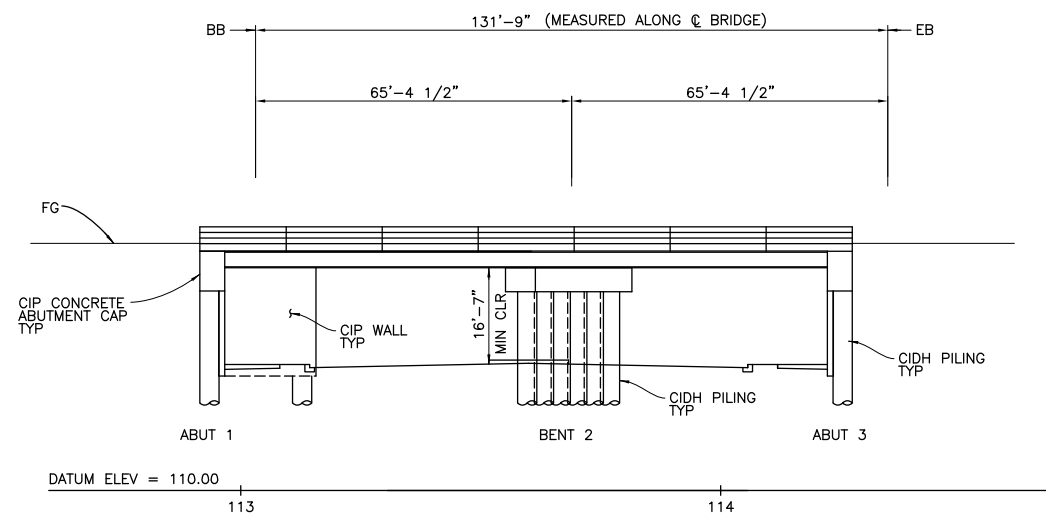


BALL ROAD GRADE SEPARATION PSR(E)
Ball Road Overhead with Temporary Bypass Road
LEWIS STREET
CITY OF ANAHEIM
DEPARTMENT OF PUBLIC WORKS

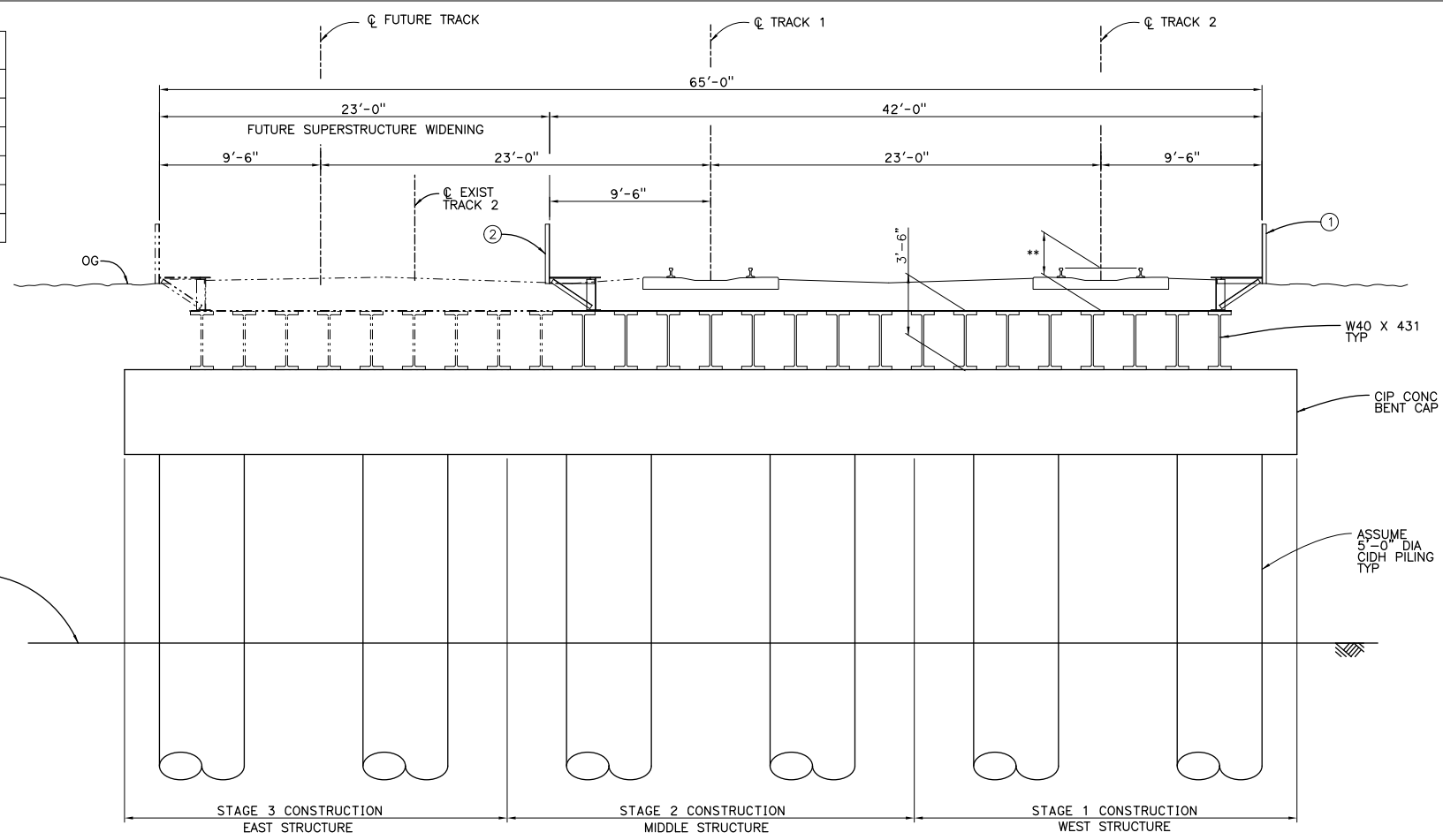
SHEET 2 OF 2
ALTERNATIVE
3

C-0-1909-BALL Rd GRADE Sep PSR(E)

** MIN DISTANCE TO T/R TO TOP OF STEEL DECK PLATE	
RAIL	8"
CONCRETE PILE	9"
BALLAST	8"
HOT MIX ASPHALT	4"
WATERPROOFING	1"
TOTAL	30"



ELEVATION
SCALE: 1"=20'-0"

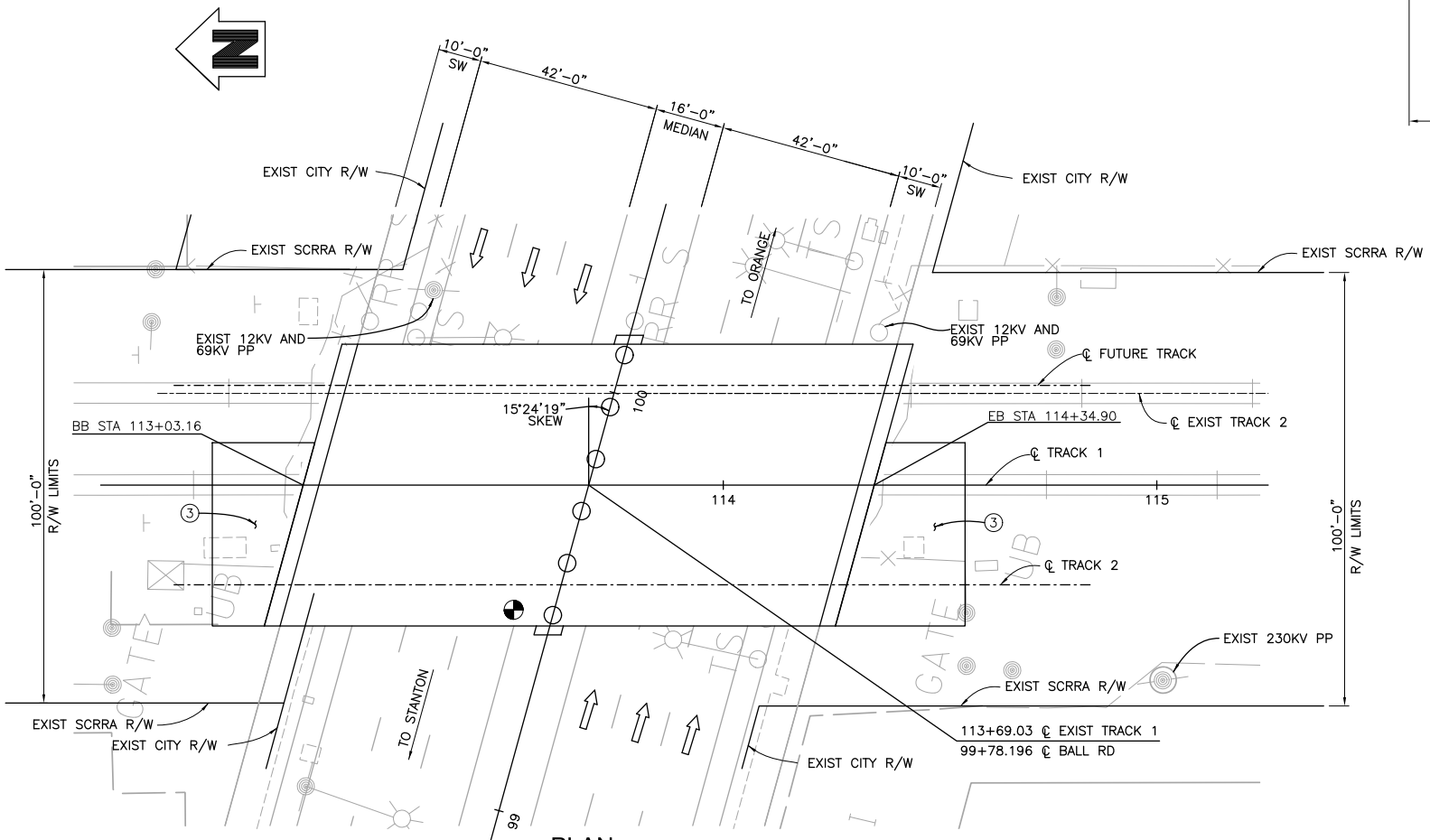


TYPICAL SECTION
(LOOKING SOUTH)
SCALE: 1"=5'-0"

- LEGEND**
- FUTURE SUPERSTRUCTURE WIDENING
 - ⊕ INDICATES POINT OF MINIMUM VERTICAL CLEARANCE
 - ➔ INDICATES DIRECTION OF TRAFFIC
 - ① BALLAST RETAINER AND WALKWAY
 - ② TEMPORARY BALLAST RETAINER AND WALKWAY
 - ③ STRUCTURE APPROACH SLAB

SUGGESTED CONSTRUCTION PROCEDURE:

- STAGE 1:**
1. DRILL CIDH PILING FOR WESTERN SUBSTRUCTURE
 2. POUR CIP CONCRETE ABUTMENT/BENT CAPS
 3. ERECT STEEL GIRDERS
 4. PLACE STEEL DECK PLATES AND WATERPROOFING
 5. LAY BALLAST, CONCRETE TIES, AND RAIL
 6. CONSTRUCT WALKWAY AND FENCING ON WESTERN EDGE OF DECK
 7. SHIFT EXIST TRACK 2 TO REALIGNED TRACK 2
- STAGE 2:**
1. DRILL CIDH PILING FOR MIDDLE SUBSTRUCTURE
 2. POUR CIP CONCRETE ABUTMENT/BENT CAPS
 3. ERECT STEEL GIRDERS
 4. PLACE STEEL DECK PLATES AND WATERPROOFING
 5. LAY BALLAST, CONCRETE TIES, AND RAIL
 6. CONSTRUCT WALKWAY AND FENCING ON EAST EDGE OF DECK
 7. SHIFT EXIST TRACK 1 TO REALIGNED TRACK 1
- STAGE 3:**
1. DRILL CIDH PILING FOR EASTERN SUBSTRUCTURE
 2. POUR CIP CONCRETE ABUTMENT/BENT CAPS
- STAGE 4:**
1. EXCAVATE BALL ROAD
 2. POUR CIP ABUTMENT WALLS



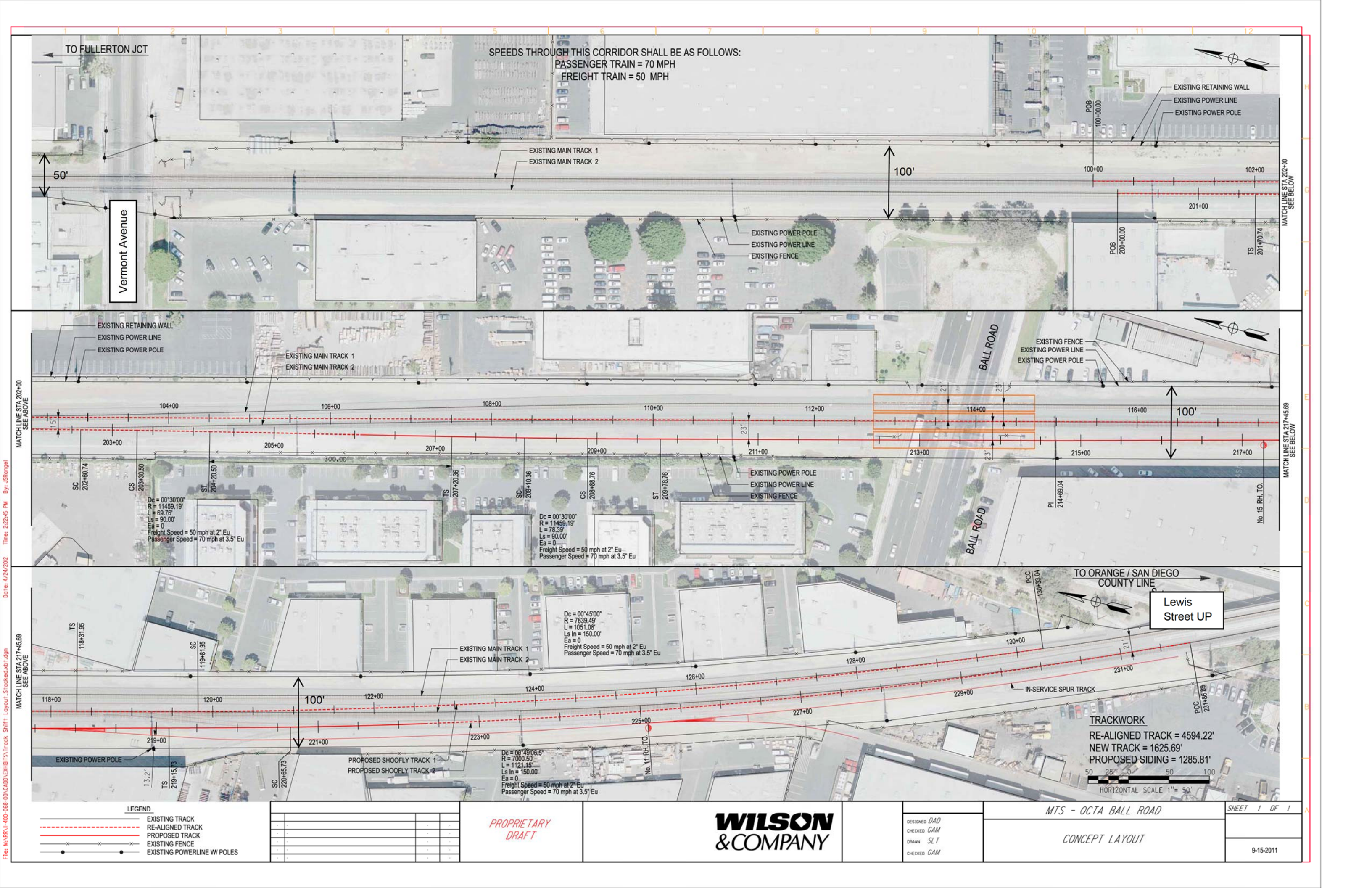
PLAN
SCALE: 1"=20'-0"



BALL ROAD GRADE SEPARATION PSR(E)
BALL ROAD UNDERPASS
PLANNING STUDY
CITY OF ANAHEIM
DEPARTMENT OF PUBLIC WORKS

SHEET _____ OF _____
ALTERNATIVE

I:\vfile02\anteater\Projects\IR-11103\Ball Road\Design\CAD\Masters\BORDER.dgn 1/1/0001 12:00:00 AM



TO FULLERTON JCT

SPEEDS THROUGH THIS CORRIDOR SHALL BE AS FOLLOWS:
 PASSENGER TRAIN = 70 MPH
 FREIGHT TRAIN = 50 MPH

Vermont Avenue

EXISTING MAIN TRACK 1
 EXISTING MAIN TRACK 2

EXISTING POWER POLE
 EXISTING POWER LINE
 EXISTING FENCE

EXISTING RETAINING WALL
 EXISTING POWER LINE
 EXISTING POWER POLE

EXISTING RETAINING WALL
 EXISTING POWER LINE
 EXISTING POWER POLE

EXISTING MAIN TRACK 1
 EXISTING MAIN TRACK 2

EXISTING FENCE
 EXISTING POWER LINE
 EXISTING POWER POLE

BALL ROAD

EXISTING POWER POLE
 EXISTING POWER LINE
 EXISTING FENCE

Lewis Street UP

EXISTING MAIN TRACK 1
 EXISTING MAIN TRACK 2

Dc = 00°45'00"
 R = 7639.49'
 L = 1051.08'
 Ls In = 150.00'
 Ea = 0
 Freight Speed = 50 mph at 2" Eu
 Passenger Speed = 70 mph at 3.5" Eu

TO ORANGE / SAN DIEGO COUNTY LINE

PROPOSED SHOOFLY TRACK 1
 PROPOSED SHOOFLY TRACK 2

Dc = 08°49'06.5"
 R = 7000.50'
 L = 1121.15'
 Ls In = 150.00'
 Ea = 0
 Freight Speed = 50 mph at 2" Eu
 Passenger Speed = 70 mph at 3.5" Eu

TRACKWORK
 RE-ALIGNED TRACK = 4594.22'
 NEW TRACK = 1625.69'
 PROPOSED SIDING = 1285.81'

HORIZONTAL SCALE 1" = 50'

LEGEND

- EXISTING TRACK
- - - RE-ALIGNED TRACK
- PROPOSED TRACK
- - - EXISTING FENCE
- EXISTING POWERLINE W/ POLES

PROPRIETARY DRAFT

WILSON & COMPANY

DESIGNED DAD
 CHECKED GAM
 DRAWN SLT
 CHECKED GAM

MTS - OCTA BALL ROAD

CONCEPT LAYOUT

SHEET 1 OF 1

9-15-2011

File: M:\RRV1-400-068-00\CADD\X\B\15\Track_Split_Layou1_Stocked.rvt.dgn
 Date: 4/24/2012 Time: 2:22:45 PM By: JSBengal

MATCH LINE STA 202+00
SEE ABOVE

MATCH LINE STA 217+45.69
SEE ABOVE

MATCH LINE STA 202+00
SEE BELOW

MATCH LINE STA 217+45.69
SEE BELOW

Appendix C – Traffic Analysis Executive Summary

EXECUTIVE SUMMARY

Fehr & Peers has completed an assessment for the Ball Road Grade Separation (PSR(E)) Project in the City of Anaheim, CA. The project is located at the crossing between Ball Road and the Los Angeles-San Diego-San Luis Obispo (LOSSAN) rail corridor. The project is intended to replace the existing at-grade crossing with a grade-separated solution.

The following scenarios were evaluated:

- Existing Conditions (2011) – Consists of Existing Year 2011 counts collected for intersections and roadway segments in the study area.
- Design Year (2035) Alternative 1 Conditions – Consists of a “no build” scenario in Year 2035. Traffic volumes obtained from the Anaheim Traffic Analysis Model (ATAM).
- Design Year (2035) Alternative 2 Conditions – Traffic volumes obtained from the ATAM plus the Alternative 2 traffic. Alternative 2 consists of an underpass design. There are two designs that are contemplated for Alternative 2 that were evaluated as part of this effort, as described below:
 - Alternative 2A – Includes the realignment of Lewis Street eastward to intersect at the existing Ball Road/East Street intersection. The existing Lewis Street alignment would become a cul-de-sac, terminating just south of Ball Road. The existing Lewis Street and the newly aligned Lewis Street would be connected with a 150’ connector road. This alternative also includes intersection improvements at the Ball Road/Newly Aligned Lewis Street/East Street intersection.
 - Alternative 2B – Includes the existing alignment of the roadways in the area, except for revised driveway access associated with the underpass design.
- Design Year (2035) Alternative 3 Conditions – Traffic volumes obtained from the ATAM plus the Alternative 3 traffic. Alternative 3 consists of an overhead design.

Deficiencies were identified and measures to improve traffic operations were recommended. Deficiencies occur when the project affects an intersection beyond significance criteria thresholds set by the *City of Anaheim Criteria for Preparation of Traffic Impact Studies*. The project related increase in V/C ratios must be less than 0.050 for intersections performing at LOS C in the “without project” scenario, less than 0.030 for intersections performing at LOS D in the “without project” scenario, and less than 0.010 for intersections performing at LOS E and F in the “without project” scenario. These recommendations are summarized below and on Figure I.

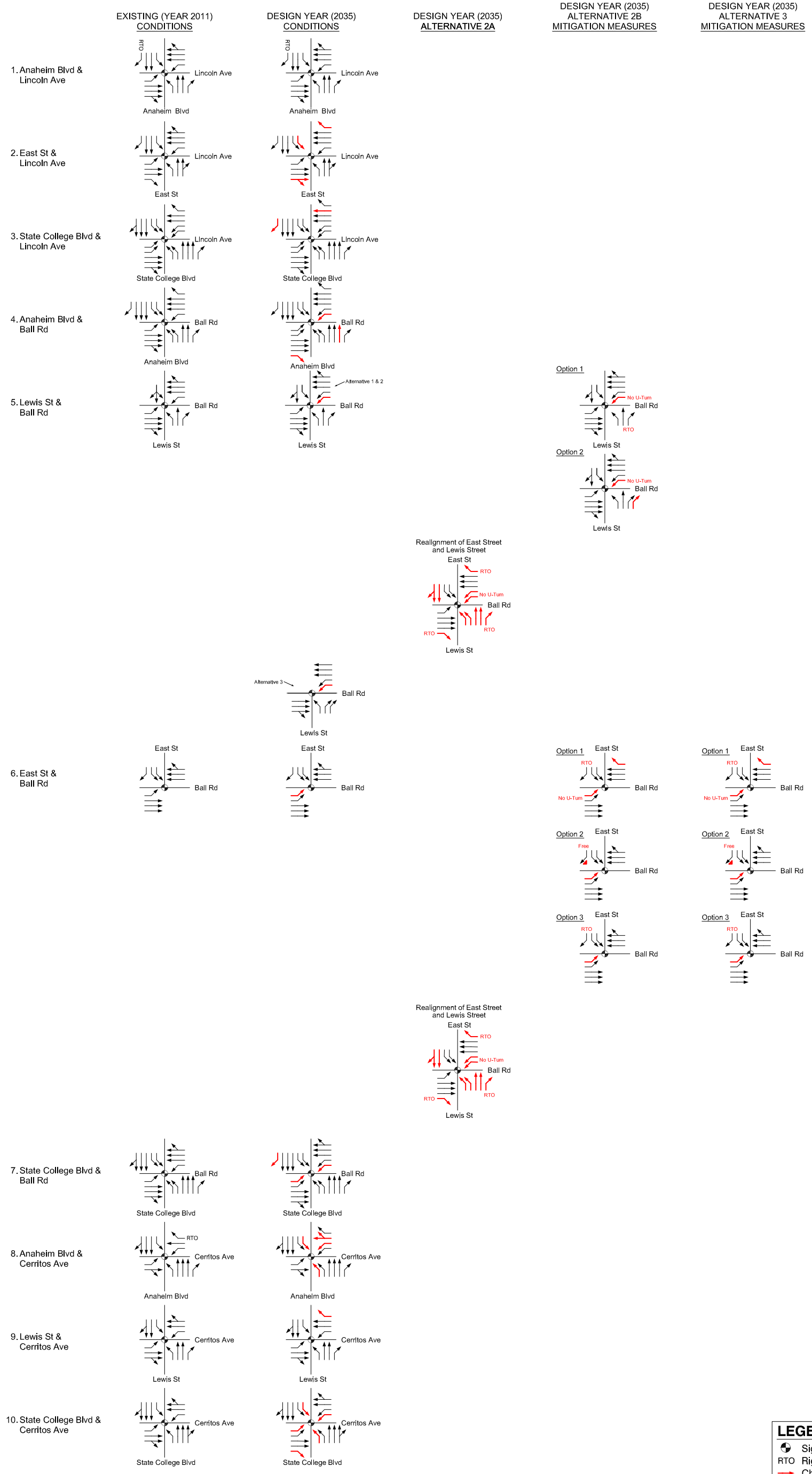
KEY FINDINGS

Existing Conditions:

- All 10 intersections operate acceptably at LOS D or better.
- All nine roadway segments operate acceptably at LOS C or better.

Design Year (2035) comparison between Alternative 1 and Alternative 2A Conditions:

- No additional improvements are required under this alternative (beyond those proposed by the project alternative).



LEGEND

- Signalized
- RTO Right-Turn Overlap
- Change in Lane Configuration

Design Year (2035) comparison between Alternative 1 and Alternative 2B Conditions:

- Two intersections are impacted by the project:
 - Lewis Street & Ball Road
 - East Street & Ball Road

Design Year (2035) comparison between Alternative 1 and Alternative 3 Conditions:

- One intersections is impacted by the project:
 - East Street & Ball Road

The recommended measures to improve project impacts are listed below.

- Lewis Street & Ball Road – Implement northbound right-turn overlap phase. This will require prohibiting westbound U-turns at the intersection. This measure is needed to improve the intersection under Alternative 2B.
- East Street & Ball Road – Add a westbound right-turn lane to the existing westbound lane configuration of three through lanes. Currently, the outer westbound through lane acts as a through/right-turn lane though it is not designated as such. Therefore, this right-turn lane will be in addition to the three westbound lanes which exist today. Acquiring public right-of-way will be required to implement this improvement. Also, implement southbound right-turn overlap phase. This will require prohibiting eastbound U-turns at the intersection. This measure is needed to improve the intersection under Alternative 2B and 3 impacts.

Appendix D – PES Checklist

Exhibit 6-A Preliminary Environmental Study (PES) Form

Federal Project No.: <u> [TBD] </u> <i>(Federal Program Prefix-Project No., Agreement No.)</i>	Final Design: <u> [TBD] </u> <i>(Expected Start Date)</i>
--	---

To: <u> Jim Kaufman </u> <i>(District Local Assistance Engineer)</i> <u> 12 </u> <i>(District)</i> <u> 3347 Michelson Drive, Suite 100 </u> <u> Irvine, CA 92612-8894 </u> <i>(Address)</i> <u> Jim_Kaufman@dot.ca.gov </u> <i>(E-mail Address)</i>	From: <u> Orange County Transportation Authority (OCTA) </u> <i>(Local Agency)</i> <u> Mary Toutouchi, (714) 560-6282 </u> <i>(Project Manager's Name and Telephone No.)</i> <u> 550 S. Main Street Mailing Address </u> <u> Orange, CA 92863 P.O. Box 14184 </u> <i>(Address)</i> <u> mtoutouchi@octa.net </u> <i>(E-mail Address)</i>
--	--

Is this Project "ON" the State Highway System? Yes No **IF YES, STOP HERE** and contact the District Local Assistance Engineer regarding the completion of other environmental documentation.

Federal State Transportation Improvement Program (FSTIP) http://www.dot.ca.gov/hq/transprog/fedpgm.htm	<u> [TBD] </u> <i>(Currently Adopted Plan Date)</i>	<u> [TBD] </u> <i>(Page No.2 attach to this form)</i>
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Programming for FSTIP:	<u> [TBD] </u> \$ <u> [TBD] </u> <i>(Fiscal Year) (Dollars)</i>	Right of Way <u> [TBD] </u> \$ <u> [TBD] </u> <i>(Fiscal Year) (Dollars)</i>	Construction <u> [TBD] </u> \$ <u> [TBD] </u> <i>(Fiscal Year) (Dollars)</i>
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Project Description as Shown in RTP and FSTIP: (TBD)

Detailed Project Description: *(Describe the following, as applicable: purpose and need, project location and limits, required right of way acquisition, proposed facilities, staging areas, disposal and borrow sites, construction activities, and construction access.)*

As part of the Los Angeles-San Diego-San Luis Obispo (LOSSAN) Rail Corridor grade separation projects, the Orange County Transportation Authority (OCTA) and the City of Anaheim propose to grade-separate the existing railroad crossing at Ball Road and the Metrolink/Southern California Regional Rail Authority (SCRRA) tracks to enhance the safety of the rail-arterial crossing and to address future traffic and circulation issues.

(Continue description on "Notes" sheet, last page of this Exhibit, if necessary)

Preliminary Design Information:

Does the project involve any of the following? Please check the appropriate boxes and delineate on an attached map, plan, or layout including any additional pertinent information.

<table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%; padding: 2px;">Yes</td> <td style="width:50%; padding: 2px;">No</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	Yes	No	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%; padding: 2px;">Yes</td> <td style="width:50%; padding: 2px;">No</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	Yes	No	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%; padding: 2px;">Yes</td> <td style="width:50%; padding: 2px;">No</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	Yes	No	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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Required Attachments:

- Regional map Project location map Project footprint map (existing/proposed right of way)
 Engineering drawings (existing and proposed cross sections), if available Borrow/disposal site location map, if applicable
(Note: all maps (except project location map and regional maps) should be consistent with the project description (minimum scale: 1" = 200').)
 Notes to support the conclusions of this checklist/project description continuation page (attached)

- Figure 1: Project Vicinity and Regional Location Map
Figure 2: Project Footprint
Figure 3: Floodplain Map
Figure 4: Underpass with Lewis Street Realignment Alternative Layout, Cross Section & Profiles
Figure 5: Underpass with Temporary Bypass Alternative Layout, Cross Section & Profiles
Figure 6: Overhead with Temporary Bypass Alternative Layout, Cross Section & Profiles
Figure 7: Right of Way and Displacements
Attachment 1: Species List
Attachment 2: Potential Parking Impacts

Examine the project for potential effects on the environment, direct or indirect and answer the following questions. The "construction area," as specified below, includes all areas of ground disturbance associated with the project, including staging and stockpiling areas and temporary access roads.

Each answer must be briefly documented on the "Notes" pages at the end of the PES Form.

A. Potential Environmental Effects	Yes	To Be Determined	No
General			
1. Will the project require future construction to fully utilize the design capabilities included in the proposed project?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Will the project generate public controversy?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Noise			
3. Is the project a Type I project as defined in 23 CFR 772.5(h); "construction on new location or the physical alteration of an existing highway, which significantly changes either the horizontal or vertical alignment or increases the number of through-traffic lanes"?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Does the project have the potential for adverse construction-related noise impacts (such as related to pile driving)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Air Quality			
5. Is the project in a NAAQS non-attainment or maintenance area?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Is the project exempt from the requirement that a conformity determination be made? (If "Yes," state which conformity exemption in 40 CFR 93.126, Table 2 applies).	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7. Is the project exempt from regional conformity? (If "Yes," state which conformity exemption in 40 CFR 93.127, Table 3 applies): <u>Changes in Vertical and Horizontal Alignment (please see detail on page 6-83.)</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. If project is not exempt from regional conformity, (If "No" on Question #7). N/A			
Is project in a metropolitan non-attainment/maintenance area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is project in an isolated rural non-attainment area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is project in a CO, PM10 and/or PM2.5 non-attainment/maintenance area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Hazardous Materials/Hazardous Waste			
9. Is there potential for hazardous materials (including underground or aboveground tanks, etc.) and/or hazardous waste (including oil/water separators, waste oil, asbestos-containing material, lead-based paint, ADL, etc.) within or immediately adjacent to the construction area?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water Quality/Resources			
10. Does the project have the potential to impact water resources (rivers, streams, bays, inlets, lakes, drainage sloughs) within or immediately adjacent to the project area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11. Is the project within a designated sole-source aquifer?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Coastal Zone			
12. Is the project within the State Coastal Zone, San Francisco Bay, or Suisun Marsh?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Floodplain			
13. Is the construction area located within a regulatory floodway or within the base floodplain (100-year elevation of a watercourse or lake)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Wild and Scenic Rivers			
14. Is the project within or immediately adjacent to a Wild and Scenic River System?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Biological Resources			
15. Is there a potential for federally listed threatened or endangered species, or their critical habitat or essential fish habitat to occur within or adjacent to the construction area?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
16. Does the project have the potential to directly or indirectly affect migratory birds, or their nests or eggs (such as vegetation removal, box culvert replacement/repair, bridge work, etc.)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Is there a potential for wetlands to occur within or adjacent to the construction area?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
18. Is there a potential for agricultural wetlands to occur within or adjacent to the construction area?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
19. Is there a potential for the introduction or spread of invasive plant species?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sections 4(f) and 6(f)			
20. Are there any historic sites or publicly owned public parks, recreation areas, wildlife or waterfowl refuges (Section 4[f]) within or immediately adjacent to the construction area?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
21. Does the project have the potential to affect properties acquired or improved with Land and Water Conservation Fund Act (Section 6[f]) funds?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Visual Resources			
22. Does the project have the potential to affect any visual or scenic resources?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Relocation Impacts			
23. Will the project require the relocation of residential or business properties?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Land Use, Community, and Farmland Impacts			
24. Will the project require any right of way, including partial or full takes? Consider construction easements and utility relocations.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Is the project inconsistent with plans and goals adopted by the community?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Does the project have the potential to divide or disrupt neighborhoods/communities?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
27. Does the project have the potential to disproportionately affect low-income and minority populations?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
28. Will the project require the relocation of public utilities?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Will the project affect access to properties or roadways?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Will the project involve changes in access control to the State Highway System (SHS)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
31. Will the project involve the use of a temporary road, detour, or ramp closure?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Will the project reduce available parking?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
33. Will the project construction encroach on state or federal lands?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
34. Will the project convert any farmland to a different use or impact any farmlands?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Cultural Resources

35. Is there National Register listed, or potentially eligible historic properties, or archaeological resources within or immediately adjacent to the construction area?
(Note: Caltrans PQS answers question #35)
36. Is the project adjacent to, or would it encroach on Tribal land?
-

For Sections B, C, and D, check appropriate box to indicate required technical studies, coordination, permits, or approvals.

B. Required Technical Studies and Analyses	C. Coordination	D. Anticipated Actions/Permits/Approvals
<input checked="" type="checkbox"/> Traffic <i>Check one:</i> <input checked="" type="checkbox"/> Traffic Study <input type="checkbox"/> Technical Memorandum <input type="checkbox"/> Discussion in ED Only	<input checked="" type="checkbox"/> Caltrans <input type="checkbox"/> Caltrans <input type="checkbox"/> Caltrans	<input checked="" type="checkbox"/> Approval <input type="checkbox"/> Approval <input type="checkbox"/> Approval
<input checked="" type="checkbox"/> Noise <i>Check as applicable:</i> <input checked="" type="checkbox"/> Traffic Related <input checked="" type="checkbox"/> Construction Related <i>Check one:</i> <input checked="" type="checkbox"/> Noise Study Report <input type="checkbox"/> NADR <input type="checkbox"/> Technical Memorandum <input type="checkbox"/> Discussion in ED Only	<input checked="" type="checkbox"/> Caltrans <input type="checkbox"/> Caltrans <input type="checkbox"/> Caltrans <input type="checkbox"/> Caltrans	<input checked="" type="checkbox"/> Approval <input type="checkbox"/> Approval <input type="checkbox"/> Approval <input type="checkbox"/> Approval
<input checked="" type="checkbox"/> Air Quality <i>Check as applicable:</i> <input checked="" type="checkbox"/> Traffic Related <input checked="" type="checkbox"/> Construction Related <i>Check one:</i> <input checked="" type="checkbox"/> Air Quality Report <input type="checkbox"/> Technical Memorandum <input type="checkbox"/> Discussion in ED Only	<input type="checkbox"/> Caltrans <input type="checkbox"/> Caltrans <input type="checkbox"/> Caltrans <input type="checkbox"/> FHWA <input type="checkbox"/> Caltrans <input type="checkbox"/> Regional Agency	<input type="checkbox"/> Approval <input type="checkbox"/> Approval <input type="checkbox"/> Approval <input type="checkbox"/> Conformity Finding (6005 CEs, EAs, EISs) <input type="checkbox"/> Conformity Finding (6004 CEs) <input type="checkbox"/> PM ₁₀ /PM _{2.5} Interagency Consultation
<input checked="" type="checkbox"/> Hazardous Materials/ Hazardous Waste <i>Check as applicable:</i> <input checked="" type="checkbox"/> Initial Site Assessment (Phase 1) <input checked="" type="checkbox"/> Preliminary Site Assessment (Phase 2) <input type="checkbox"/> Discussion in ED Only	<input checked="" type="checkbox"/> Caltrans <input checked="" type="checkbox"/> Caltrans <input type="checkbox"/> Caltrans <input type="checkbox"/> Cal EPA DTSC <input type="checkbox"/> Local Agency	<input checked="" type="checkbox"/> Approval <input checked="" type="checkbox"/> Approval <input type="checkbox"/> Approval <input type="checkbox"/> Review Database <input type="checkbox"/> Review Database
<input checked="" type="checkbox"/> Water Quality/Resources <i>Check as applicable:</i> <input checked="" type="checkbox"/> Water Quality Assess. Report <input type="checkbox"/> Technical Memorandum <input type="checkbox"/> Discussion in ED Only	<input checked="" type="checkbox"/> Caltrans <input type="checkbox"/> Caltrans <input type="checkbox"/> Caltrans	<input checked="" type="checkbox"/> Approval <input type="checkbox"/> Approval <input type="checkbox"/> Approval
<input type="checkbox"/> Sole-Source Aquifer (Districts 5, 6 and 11)	<input type="checkbox"/> EPA (S.F. Regional Office)	<input type="checkbox"/> Approval of Analysis in ED
<input type="checkbox"/> Coastal Zone	<input type="checkbox"/> CCC	<input type="checkbox"/> Coastal Zone Consistency Determination

B. Required Technical Studies and Analyses	C. Coordination	D. Anticipated Actions/Permits/Approvals
<input type="checkbox"/> Floodplain		
<i>Check as applicable:</i>		
<input type="checkbox"/> Location Hydraulic Study	<input type="checkbox"/> Caltrans	<input type="checkbox"/> Approval
<input type="checkbox"/> Floodplain Evaluation Report	<input type="checkbox"/> Caltrans	<input type="checkbox"/> Approval
<input type="checkbox"/> Summary Floodplain Encroachment Report	<input type="checkbox"/> Caltrans	<input type="checkbox"/> Approval
	<input type="checkbox"/> Caltrans	<input type="checkbox"/> Only Practicable Alternative Finding
	<input type="checkbox"/> FHWA	<input type="checkbox"/> Approves significant encroachments and concurs in Only Practicable Alternative Findings
<input type="checkbox"/> Wild and Scenic Rivers	<input type="checkbox"/> River Managing Agency	<input type="checkbox"/> Wild and Scenic Rivers Determination
<input checked="" type="checkbox"/> Biological Resources		
<i>Check as applicable:</i>		
<input checked="" type="checkbox"/> NES, Minimal Impact	<input checked="" type="checkbox"/> Caltrans	<input checked="" type="checkbox"/> Approval
<input type="checkbox"/> NES		
<input type="checkbox"/> BA	<input type="checkbox"/> Caltrans	<input type="checkbox"/> Approves for Consultation
	<input type="checkbox"/> USFWS	<input type="checkbox"/> Section 7 Informal/Formal Consultation
	<input type="checkbox"/> NOAA Fisheries	
<input type="checkbox"/> EFH Evaluation	<input type="checkbox"/> NOAA Fisheries	<input type="checkbox"/> MSA Consultation
<input type="checkbox"/> Bio-Acoustic Evaluation	<input type="checkbox"/> NOAA Fisheries	<input type="checkbox"/> Approval
<input type="checkbox"/> Technical Memorandum	<input type="checkbox"/> Caltrans	<input type="checkbox"/> Approval
<input type="checkbox"/> Wetlands		
<i>Check as applicable:</i>		
<input type="checkbox"/> WD and Assessment	<input type="checkbox"/> Caltrans	<input type="checkbox"/> Approval
	<input type="checkbox"/> ACOE	<input type="checkbox"/> Wetland Verification
	<input type="checkbox"/> NRCS	<input type="checkbox"/> Agricultural Wetland Verification
	<input type="checkbox"/> Caltrans	<input type="checkbox"/> Wetlands Only Practicable Alternative Finding
<input checked="" type="checkbox"/> Invasive Plants		
<input type="checkbox"/> Discussion in ED Only	<input checked="" type="checkbox"/> Caltrans	<input checked="" type="checkbox"/> Approval
<input type="checkbox"/> Section 4(f)		
<i>Check as applicable:</i>		
<input type="checkbox"/> De minimis	<input type="checkbox"/> Caltrans	<input type="checkbox"/> Determine Temporary Occupancy
<input type="checkbox"/> De minimis	<input type="checkbox"/> Caltrans	De minimis finding
<input type="checkbox"/> Programmatic 4(f) Evaluation Type: _____	<input type="checkbox"/> Caltrans	<input type="checkbox"/> Approval
<input type="checkbox"/> Individual 4(f) Evaluation	<input type="checkbox"/> Caltrans	<input type="checkbox"/> Approval
	<input type="checkbox"/> Agency with Jurisdiction	
	<input type="checkbox"/> SHPO	
	<input type="checkbox"/> DOI	
	<input type="checkbox"/> HUD	
	<input type="checkbox"/> USDA	

B. Required Technical Studies and Analyses	C. Coordination	D. Anticipated Actions/Permits/Approvals
<input type="checkbox"/> Section 6(f)	<input type="checkbox"/> Agency with Jurisdiction <input type="checkbox"/> NPS	<input type="checkbox"/> Determines Consistency with Long-Term Management Plan
	<input type="checkbox"/> NPS	<input type="checkbox"/> Approves Conversion
<input checked="" type="checkbox"/> Visual Resources <i>Check one:</i> <input type="checkbox"/> Visual Impact Assessment	<input type="checkbox"/> Caltrans	<input type="checkbox"/> Approval
<input checked="" type="checkbox"/> Technical Memorandum	<input checked="" type="checkbox"/> Caltrans	<input checked="" type="checkbox"/> Approval
<input type="checkbox"/> Discussion in ED Only	<input type="checkbox"/> Caltrans	<input type="checkbox"/> Approval
<input checked="" type="checkbox"/> Relocation Impacts <i>Check one:</i>		
<input type="checkbox"/> Relocation Impact Memo	<input type="checkbox"/> Caltrans	<input type="checkbox"/> Approval
<input checked="" type="checkbox"/> Relocation Impact Study	<input checked="" type="checkbox"/> Caltrans	<input checked="" type="checkbox"/> Approval
<input type="checkbox"/> Relocation Impact Report	<input type="checkbox"/> Caltrans	<input type="checkbox"/> Approval
<input checked="" type="checkbox"/> Land Use and Community Impacts <i>Check one:</i>		
<input checked="" type="checkbox"/> CIA	<input checked="" type="checkbox"/> Caltrans	<input checked="" type="checkbox"/> Approval
<input type="checkbox"/> Technical Memorandum	<input type="checkbox"/> Caltrans	<input type="checkbox"/> Approval
<input type="checkbox"/> Discussion in ED Only	<input type="checkbox"/> Caltrans	<input type="checkbox"/> Approval
<input type="checkbox"/> Construction/Encroachment on State Lands <i>Check as applicable:</i>		
<input type="checkbox"/> SLC Jurisdiction	<input type="checkbox"/> SLC	<input type="checkbox"/> SLC Lease
<input type="checkbox"/> Caltrans Jurisdiction	<input type="checkbox"/> Caltrans	<input type="checkbox"/> Encroachment Permit
<input type="checkbox"/> SP Jurisdiction	<input type="checkbox"/> SP	<input type="checkbox"/> Encroachment Permit
<input type="checkbox"/> Construction/Encroachment on Federal Lands	<input type="checkbox"/> Federal Agency with Jurisdiction	<input type="checkbox"/> Encroachment Permit
<input type="checkbox"/> Construction/Encroachment On Indian Trust Lands	<input type="checkbox"/> Bureau of Indian Affairs	<input type="checkbox"/> Right of Way Permit
<input type="checkbox"/> Farmlands <i>Check one:</i>		
<input type="checkbox"/> CIA	<input type="checkbox"/> Caltrans	<input type="checkbox"/> Approval
<input type="checkbox"/> Technical Memorandum	<input type="checkbox"/> Caltrans	<input type="checkbox"/> Approval
<input type="checkbox"/> Discussion in ED Only	<input type="checkbox"/> Caltrans	<input type="checkbox"/> Approval
<i>Check as applicable:</i> <input type="checkbox"/> Form AD 1006	<input type="checkbox"/> NRCS	<input type="checkbox"/> Approves Conversion
<input type="checkbox"/> Conversion to Non-Agri Use	<input type="checkbox"/> CDOC	<input type="checkbox"/> Approves Conversion
<input type="checkbox"/> Conversion to Non-Agri Use	<input type="checkbox"/> ACOE	

B. Required Technical Studies and Analyses	C. Coordination	D. Anticipated Actions/Permits/ Approvals
<input checked="" type="checkbox"/> Cultural Resources (PQS completes this section) <i>Check as applicable:</i>		
<input checked="" type="checkbox"/> APE Map	<input checked="" type="checkbox"/> Caltrans PQS	<input checked="" type="checkbox"/> Screened Undertaking
	<input checked="" type="checkbox"/> Caltrans PQS and DLAE	<input checked="" type="checkbox"/> Approves APE Map
<input checked="" type="checkbox"/> HPSR <input checked="" type="checkbox"/> ASR <input checked="" type="checkbox"/> HRER (if necessary)	<input checked="" type="checkbox"/> Local Preservation Groups and/or Native American Tribes <input checked="" type="checkbox"/> Caltrans	<input checked="" type="checkbox"/> Provides Comments Regarding Concerns with Project <input checked="" type="checkbox"/> Approves for Consultation
<input type="checkbox"/> Finding of Effect Report	<input type="checkbox"/> Caltrans	<input type="checkbox"/> Concurs on No Effect, No Adverse Effect with Standard Conditions
	<input type="checkbox"/> SHPO	<input type="checkbox"/> Letter of Concurrence on Eligibility, No Adverse Effect without Standard
<input type="checkbox"/> MOA	<input type="checkbox"/> Caltrans <input type="checkbox"/> SHPO <input type="checkbox"/> ACHP (if requested)	<input type="checkbox"/> Approves MOA <input type="checkbox"/> Approves MOA <input type="checkbox"/> Approves MOA
<input checked="" type="checkbox"/> Permits Copies of permits and a list of mitigation commitments are mandatory submittals following NEPA approval.	<input type="checkbox"/> ACOE <input type="checkbox"/> ACOE <input type="checkbox"/> Caltrans/ACOE/EPA <input type="checkbox"/> USFWS <input type="checkbox"/> NOAA Fisheries <input type="checkbox"/> ACOE <input type="checkbox"/> USCG <input type="checkbox"/> RWQCB <input type="checkbox"/> CDFG <input type="checkbox"/> RWQCB <input type="checkbox"/> CCC <input type="checkbox"/> Local Agency <input type="checkbox"/> BCDC	<input type="checkbox"/> Section 404 Nationwide Permit <input type="checkbox"/> Section 404 Individual Permit <input type="checkbox"/> NEPA/404 Integration MOU <input type="checkbox"/> Rivers and Harbors Act Section 10 Permit <input type="checkbox"/> USCG Bridge Permit <input type="checkbox"/> Section 401 Water Quality Certification <input type="checkbox"/> Section 1602 Streambed Alteration Agreement <input checked="" type="checkbox"/> NPDES Permit <input type="checkbox"/> Coastal Zone Permit <input type="checkbox"/> BCDC Permit

Notes: Additional studies may be required for other federal agencies.

ACHP	=	Advisory Council on Historic Preservation	HUD	=	U.S. Housing and Urban Development
ACOE	=	U.S. Army Corps of Engineers	MOA	=	Memorandum of Agreement
ADL	=	Aerially Deposited Lead	MSA	=	Magnuson-Stevens Fishery Conservation and Management Act
APE	=	Area of Potential Effect	NEPA	=	National Environmental Policy Act
APN	=	Assessor Parcel Number	NADR	=	Noise Abatement Decision Report
ASR	=	Archaeological Survey Report	NES	=	Natural Environment Study
BA	=	Biological Assessment	NHPA	=	National Historic Preservation Act
BCDC	=	Bay Conservation and Development Commission	NOAA	=	National Oceanic and Atmospheric Administration
BE	=	Biological Evaluation	NMFS	=	National Marine Fisheries Service
BO	=	Biological Opinion	NPDES	=	National Pollutant Discharge Elimination System
Cal EPA	=	California Environmental Protection Agency	NPS	=	National Park Service
CCC	=	California Coastal Commission	NRCS	=	Natural Resources Conservation Service
CDFG	=	California Department of Fish and Game	PM10	=	Particulate Matter 10 Microns in Diameter or Less
CDOC	=	California Department of Conservation	PM2.5	=	Particulate Matter 2.5 Microns in Diameter or Less
CE	=	Categorical Exclusion	PMP	=	Project Management Plan
CIA	=	Community Impact Assessment	PQS	=	Professionally Qualified Staff
CWA	=	Clean Water Act	ROD	=	Record of Decision
DLAE	=	District Local Assistance Engineer	RTIP	=	Regional Transportation Improvement Program
DOI	=	U.S. Department of Interior	RTP	=	Regional Transportation Plan
DTSC	=	Department of Toxic Substances Control	RWQCB	=	Regional Water Quality Control Board
EA	=	Environmental Assessment	SER	=	Standard Environmental Reference
ED	=	Environmental Document	SEP	=	Senior Environmental Planner
EFH	=	Essential Fish Habitat	SHPO	=	State Historic Preservation Officer
EIS	=	Environmental Impact Statement	SLC	=	State Lands Commission
EPA	=	U.S. Environmental Protection Agency	SP	=	State Parks
FEMA	=	Federal Emergency Management Agency	TIP	=	Transportation Improvement Program
FHWA	=	Federal Highway Administration	USCG	=	U.S. Coast Guard
FONSI	=	Finding of No Significant Impacted	USDA	=	U.S. Department of Agriculture
FTIP	=	Federal Transportation Improvement Program	USFWS	=	U.S. Fish and Wildlife Service
HPSR	=	Historic Property Survey Report	WD	=	Wetland Delineation
HRER	=	Historical Resources Evaluation Report			

E. Preliminary Environmental Document Classification (NEPA)

Based on the evaluation of the project, the environmental document to be developed should be:

Check one:

- Environmental Impact Statement (*Note: Engagement with participating agencies in accordance with SAFETEA-LU Section 6002 required*)
 - Compliance with SAFETEA-LU Section 6002 regarding Participating Agencies required
- Complex Environmental Assessment
- Routine Environmental Assessment
- Categorical Exclusion without required technical studies
- Categorical Exclusion with required technical studies

(if Categorical Exclusion is selected, check one of the following):

- Section 6004
 - 23 CFR 771 activity (c)(____)
 - 23 CFR 771 activity (d) (3)
 - Activity ____ listed in the Section 6004 MOU
- Section 6005

F. Public Availability and Public Hearing

Check as applicable:

- Not Required
- Notice of Availability of Environmental Document
- Public Meeting
- Notice of Opportunity for a Public Hearing
- Public Hearing Required

G. Signatures

Local Agency Staff and/or Consultant Signature

(Signature of Preparer)

(Date)

(949) 553-0666
(Telephone No.)

King Thomas
(Name)

Local Agency Project Engineer Signature

This document was prepared under my supervision, in accordance with the *Local Assistance Procedures Manual*, Exhibit 6-B, "Instructions for Completing the Preliminary Environmental Study Form."

(Signature of Local Agency)

(Date)

(Telephone No.)

Appendix E – Cost Estimate

Project Planning Cost Estimate

Ball Road Grade Separation PSR(E)
Orange County Transportation Authority
April 2012

PROJECT DESCRIPTION:

Limits On Ball Road between Union Pacific Railroad at-grade crossing to East Street and Lewis

Street from Southern California Regional Rail Authority underpass to Ball Road.

Proposed Improvement (Scope) Grade separate the Southern California Regional Rail Authority

railroad crossing at Ball Road.

Alternative 2A - Underpass with Lewis Street Realignment

SUMMARY OF PROJECT COST ESTIMATE

TOTAL ROADWAY ITEMS	\$	<u>28,423,259</u>
TOTAL STRUCTURE ITEMS	\$	<u>13,622,380</u>
SUBTOTAL CONSTRUCTION	\$	<u>42,045,639</u>
TOTAL RIGHT OF WAY ITEMS	\$	<u>41,146,500</u>
TOTAL PROJECT CAPITAL OUTLAY COSTS	\$	<u>83,192,139</u>

Note: Escalation will be 3% per year with a start of construction estimated for 2017

Reviewed by OCTA Program Manager _____

Approved by OCTA Project Manager _____

Lisa Alviso

Date _____

Phone No. (714) 782-9232

Page No. 1 of 7

Ball Road Grade Separation PSR(E) - Alt 2A Underpass with Lewis Realignment
Orange County Transportation Authority
April 2012

I. ROADWAY ITEMS

<u>Section 1 Earthwork</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
Roadway Excavation	116,000	CY	\$ 13	\$ 1,508,000	
Imported Borrow			\$	\$	
Clearing & Grubbing	1	LS	\$ 140,000	\$ 140,000	
Develop Water Supply			\$	\$	
Top Soil Reapplication			\$	\$	
Stepped Slopes and Slope Rounding (Contour Grading)			\$	\$	
Imported Borrow (Select Fill)	8,000	CY	\$ 14	\$ 112,000	
			Subtotal Earthwork		\$ 1,760,000
<u>Section 2 Pavement Structural Section*</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
PCC Pavement (9" Depth)	810	CY	\$ 215	\$ 174,150	
PCC Pavement (___ Depth)			\$	\$	
Asphalt Concrete	14,800	TON	\$ 68	\$ 1,006,400	
Lean Concrete Base			\$	\$	
Cement-Treated Base			\$	\$	
Aggregate Base	10,300	CY	\$ 42	\$ 432,600	
Treated Permeable Base			\$	\$	
Aggregate Sub base			\$	\$	
Pavement Reinforcing Fabric			\$	\$	
Edge Drains			\$	\$	
			Subtotal Pavement Structural Section		\$ 1,613,150
<u>Section 3 Drainage</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
Large Drainage Facilities	1	LS	\$ 2,300,000	\$ 2,300,000	
Storm Drains	1	LS	\$ 340,000	\$ 340,000	
Pumping Plants	1	LS	\$ 1,500,000	\$ 1,500,000	
Project Drainage (X-Drains, overside, etc.)			\$	\$	
			\$	\$	
			Subtotal Drainage		\$ 4,140,000

*Reference sketch showing typical pavement structural section elements of the roadway. Include (if available) T.I., R-Value and date when tests were performed.

NOTE: Extra lines are provided for items not listed; use additional lines as appropriate.

Ball Road Grade Separation PSR(E) - Alt 2A Underpass with Lewis Realignment
 Orange County Transportation Authority
 April 2012

<u>Section 4: Specialty Items</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
Retaining Walls (Soldier Pile)	37,400	SQFT	\$ 196	\$ 7,330,400	
Noise Barriers			\$	\$	
Barriers and Guardrails			\$	\$	
Equipment/Animal Passes			\$	\$	
Water Pollution Control	1	LS	\$ 256,000	\$ 256,000	
Hazardous Waste Investigation and/or Mitigation Work	1	LS	\$ 1,200,000	\$ 1,200,000	
Environmental Compliance	1	EA	\$ 3,000	\$ 3,000	
Resident Engineer Office Space	1	LS	\$ 200,000	\$ 200,000	
			\$	\$	
Subtotal Specialty Items					<u>\$ 8,989,400</u>

<u>Section 5: Traffic Items</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
Lighting	1	LS	\$ 250,000	\$ 250,000	
Traffic Delineation Items	1	LS	\$ 44,700	\$ 44,700	
Traffic Signals	1	LS	\$ 650,000	\$ 650,000	
Overhead Sign Structures			\$	\$	
Roadside Signs	1	LS	\$ 19,300	\$ 19,300	
Traffic Control Systems	1	LS	\$ 134,000	\$ 134,000	
Transportation Management Plan	1	LS	\$ 300,000	\$ 300,000	
Temporary Detection System			\$	\$	
Staging	1	LS	\$ 965,000	\$ 965,000	
Under Crossing Lighting	1	LS	\$ 46,000	\$ 46,000	
Subtotal Traffic Items					<u>\$ 2,409,000</u>

NOTE: Extra lines are provided for items not listed; use additional lines as appropriate.

Ball Road Grade Separation PSR(E) - Alt 2A Underpass with Lewis Realignment
Orange County Transportation Authority
April 2012

<u>Section 6: Planting and Irrigation</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
Highway Planting	1	LS	\$ 186,000	\$ 186,000	
Replacement Planting	1	LS	\$ 68,000	\$ 68,000	
Irrigation Modification	1	LS	\$ 150,000	\$ 150,000	
Relocate Existing Irrigation Facilities			\$	\$	
Irrigation Crossovers			\$	\$	
Plant Establishment Period	1	LS	\$ 20,000	\$ 20,000	
Subtotal Planting and Irrigation Section					\$ 424,000

<u>Section 7: Roadside Management and Safety Section</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
Vegetation Control Treatments			\$	\$	
Gore Area Pavement			\$	\$	
Pavement beyond the gore area			\$	\$	
Miscellaneous Paving			\$	\$	
Erosion Control			\$	\$	
Slope Protection			\$	\$	
Side Slopes/Embankment Slopes			\$	\$	
Maintenance Vehicle Pull outs			\$	\$	
Off-freeway Access (gates, stairways, etc.)			\$	\$	
Roadside Facilities (Vista Points, Transit, Park and Ride, etc.)			\$	\$	
Relocating roadside facilities/features			\$	\$	
Subtotal Roadside Management and Safety Section					\$ -

TOTAL SECTIONS: 1 thru 7 \$ 19,335,550

NOTE: Extra lines are provided for items not listed; use additional lines as appropriate.

Ball Road Grade Separation PSR(E) - Alt 2A Underpass with Lewis Realignment

Orange County Transportation Authority

April 2012

Section 8: Minor Items

\$ 19,335,550 x 5% = \$ 966,778
 (Subtotal Sections 1 thru 7)

TOTAL MINOR ITEMS \$ 966,778

Section 9: Roadway Mobilization

\$ 20,302,328 x 10% = \$ 2,030,233
 (Subtotal Sections 1 thru 8)

TOTAL ROADWAY MOBILIZATION \$ 2,030,233

Section 10: Roadway Additions

Supplemental Work

\$ 20,302,328 x 5% = \$ 1,015,116
 (Subtotal Sections 1 thru 8)

Contingencies

\$ 20,302,328 x 25% = \$ 5,075,582
 (Subtotal Sections 1 thru 8)

TOTAL ROADWAY ADDITIONS \$ 6,090,698

TOTAL ROADWAY ITEMS \$ 28,423,259
 (Subtotal Sections 1 thru 10)

Estimate Prepared By Kelsie Anderson Phone # 949.477.9000 Date 4/26/2012
 (Print Name)

Estimate Checked By Juliet Su Phone # 949.477.9000 Date 4/26/2012
 (Print Name)

** Use appropriate percentage per Chapter 20.

Ball Road Grade Separation PSR(E) - Alt 2A Underpass with Lewis Realignment
Orange County Transportation Authority
April 2012

II. STRUCTURES ITEMS

	Structure (1)	Structure (2)	Structure (3)	
Bridge Name	<u>Ball Road UP</u>			
Structure Type	<u>Steel Girder</u>			
Width (out to out) - (ft)	<u>65</u>			
Span Lengths - (ft)	<u>131.75</u>			
Total Area - (ft ²)	<u>8,564</u>			
Footing Type (Pile/Spread)	<u>Pile</u>			
Cost Per (ft ²) (incl. 10% mobilization and 20% contingency)	<u>\$ 1,363</u>			
Total Cost for Structure	<u>\$ 11,680,000</u>			
			SUBTOTAL STRUCTURES ITEMS (Sum of Total Cost for Structures)	<u>\$ 11,680,000</u>
<u>Railroad Related Costs:</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>
Track Work	<u>1</u>	<u>LS</u>	<u>\$ 1,390,000</u>	<u>\$ 1,390,000</u>
Grading	<u>1</u>	<u>LS</u>	<u>\$ 48,800</u>	<u>\$ 48,800</u>
Temporary Crossing				
Signal House Relocation 10% mobilization and 25% contingency	<u>1</u>	<u>LS</u>	<u>\$ 503,580</u>	<u>\$ 503,580</u>
			SUBTOTAL RAILROAD ITEMS	<u>\$ 1,942,380</u>
			TOTAL OF STRUCTURES ITEMS (Sum of Structures Items plus Railroad Items)	<u>\$ 13,622,380</u>

COMMENTS:

Structures Estimate Prepared By: Susan Michalski Phone # 949.477.9000 Date 4/20/2012
(Print Name)

Railroad Estimate Prepared By: Garrett Montoya Phone # 909.806.8007 Date 4/20/2012
(Print Name)

NOTE: If appropriate, attach additional pages as backup

Ball Road Grade Separation PSR(E) - Alt 2A Underpass with Lewis Realignment
Orange County Transportation Authority
April 2012

III. RIGHT OF WAY ITEMS	VALUE
A. Acquisition, including excess lands, damages to remainder(s) and goodwill	<u>\$ 28,600,000</u>
B. Utility Relocation (OCTA Share)	<u>\$ 3,900,000</u>
C. Relocation Assistance	<u>\$ 34,500</u>
D. Clearance/Demolition	<u>\$ 230,000</u>
E. Title and Escrow Fees	<u>\$ 152,000</u>
25% Contingency	<u>\$ 8,230,000</u>
TOTAL RIGHT OF WAY ITEMS	<u>\$ 41,146,500</u>

F. Construction Contract Work

Brief Description of Work:

Restore properties to existing conditions after temporary construction easement, reconstruct gates, and reconstruct road approaches and access driveways.

Right of Way Branch Cost Estimate for Work* \$ 400,000

* This dollar amount is to be included in the Roadway and/or Structures Items of Work, as appropriate. Do not include in Right of Way Items.

COMMENTS:

Estimate Prepared By Chris LaBonte Phone # 951.683.2353 Date 4/20/2012
(Print Name)

NOTE: If appropriate, attach additional pages and backup.

Project Planning Cost Estimate

Ball Road Grade Separation PSR(E)
Orange County Transportation Authority
April 2012

PROJECT DESCRIPTION:

Limits On Ball Road between Union Pacific Railroad at-grade crossing to East Street and Lewis

Street from Southern California Regional Rail Authority underpass to Ball Road.

Proposed Improvement (Scope) Grade separate the Southern California Regional Rail Authority
railroad crossing at Ball Road.

Alternative 2B -Underpass with Temporary Bypass Road

SUMMARY OF PROJECT COST ESTIMATE

TOTAL ROADWAY ITEMS	\$	<u>34,554,261</u>
TOTAL STRUCTURE ITEMS	\$	<u>14,771,230</u>
SUBTOTAL CONSTRUCTION	\$	<u>49,325,491</u>
TOTAL RIGHT OF WAY ITEMS	\$	<u>39,350,000</u>
TOTAL PROJECT CAPITAL OUTLAY COSTS	\$	<u>88,675,491</u>

Note: Escalation will be 3% per year with a start of construction estimated for 2017

Reviewed by OCTA Program Manager _____

Approved by OCTA Project Manager _____

Lisa Alviso

Date _____

Phone No. (714) 782-9232

Page No. 1 of 7

Ball Road Grade Separation PSR(E) - Alt 2B Underpass with Temporary Bypass Road
Orange County Transportation Authority
April 2012

I. ROADWAY ITEMS

<u>Section 1 Earthwork</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
Roadway Excavation	124,300	CY	\$ 13	\$ 1,615,900	
Imported Borrow			\$	\$	
Clearing & Grubbing	1	LS	\$ 190,000	\$ 190,000	
Develop Water Supply			\$	\$	
Top Soil Reapplication			\$	\$	
Stepped Slopes and Slope Rounding (Contour Grading)			\$	\$	
Imported Borrow (Select Fill)	8,200	CY	\$ 14	\$ 114,800	
			Subtotal Earthwork		\$ 1,920,700
<u>Section 2 Pavement Structural Section*</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
PCC Pavement (9" Depth)	860	CY	\$ 215	\$ 184,900	
PCC Pavement (___ Depth)			\$	\$	
Asphalt Concrete	13,500	TON	\$ 68	\$ 918,000	
Lean Concrete Base			\$	\$	
Cement-Treated Base			\$	\$	
Aggregate Base	11,300	CY	\$ 42	\$ 474,600	
Treated Permeable Base			\$	\$	
Aggregate Sub base			\$	\$	
Pavement Reinforcing Fabric			\$	\$	
Edge Drains			\$	\$	
			\$	\$	
			Subtotal Pavement Structural Section		\$ 1,577,500
<u>Section 3 Drainage</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
Large Drainage Facilities	1	LS	\$ 2,300,000	\$ 2,300,000	
Storm Drains	1	LS	\$ 350,000	\$ 350,000	
Pumping Plants	1	LS	\$ 1,500,000	\$ 1,500,000	
Project Drainage (X-Drains, overside, etc.)			\$	\$	
			\$	\$	
			Subtotal Drainage		\$ 4,150,000

*Reference sketch showing typical pavement structural section elements of the roadway. Include (if available) T.I., R-Value and date when tests were performed.

NOTE: Extra lines are provided for items not listed; use additional lines as appropriate.

Ball Road Grade Separation PSR(E) - Alt 2B Underpass with Temporary Bypass Road
Orange County Transportation Authority
April 2012

<u>Section 4: Specialty Items</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
Retaining Walls (Soldier Pile)	51,800	SQFT	\$ 203	\$10,515,400	
Noise Barriers			\$	\$	
Barriers and Guardrails			\$	\$	
Equipment/Animal Passes			\$	\$	
Water Pollution Control	1	LS	\$ 208,000	\$ 208,000	
Hazardous Waste Investigation and/or Mitigation Work	1	LS	\$ 1,100,000	\$ 1,100,000	
Environmental Compliance	1	LS	\$ 4,500	\$ 4,500	
Resident Engineer Office Space	1	LS	\$ 200,000	\$ 200,000	
			\$	\$	
Subtotal Specialty Items					<u>\$ 12,027,900</u>

<u>Section 5: Traffic Items</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
Lighting	1	LS	\$ 220,000	\$ 220,000	
Traffic Delineation Items	1	LS	\$ 37,400	\$ 37,400	
Traffic Signals	1	LS	\$ 650,000	\$ 650,000	
Overhead Sign Structures			\$	\$	
Roadside Signs	1	LS	\$ 25,800	\$ 25,800	
Traffic Control Systems	1	LS	\$ 216,000	\$ 216,000	
Transportation Management Plan	1	LS	\$ 450,000	\$ 450,000	
Temporary Detection System			\$	\$	
Staging	1	LS	\$ 1,806,000	\$ 1,806,000	
Under Crossing Lighting	1	LS	\$ 46,000	\$ 46,000	
Subtotal Traffic Items					<u>\$ 3,451,200</u>

NOTE: Extra lines are provided for items not listed; use additional lines as appropriate.

Ball Road Grade Separation PSR(E) - Alt 2B Underpass with Temporary Bypass Road
Orange County Transportation Authority
April 2012

<u>Section 6: Planting and Irrigation</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
Highway Planting	1	LS	\$ 138,000	\$ 138,000	
Replacement Planting	1	LS	\$ 90,000	\$ 90,000	
Irrigation Modification	1	LS	\$ 131,000	\$ 131,000	
Relocate Existing Irrigation Facilities			\$	\$	
Irrigation Crossovers			\$	\$	
Plant Establishment Period	1	LS	\$ 20,000	\$ 20,000	
Subtotal Planting and Irrigation Section					\$ 379,000

<u>Section 7: Roadside Management and Safety Section</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
Vegetation Control Treatments			\$	\$	
Gore Area Pavement			\$	\$	
Pavement beyond the gore area			\$	\$	
Miscellaneous Paving			\$	\$	
Erosion Control			\$	\$	
Slope Protection			\$	\$	
Side Slopes/Embankment Slopes			\$	\$	
Maintenance Vehicle Pull outs			\$	\$	
Off-freeway Access (gates, stairways, etc.)			\$	\$	
Roadside Facilities (Vista Points, Transit, Park and Ride, etc.)			\$	\$	
Relocating roadside facilities/features			\$	\$	
Subtotal Roadside Management and Safety Section					\$ -

TOTAL SECTIONS: 1 thru 7 \$ 23,506,300

NOTE: Extra lines are provided for items not listed; use additional lines as appropriate.

Ball Road Grade Separation PSR(E) - Alt 2B Underpass with Temporary Bypass Road
Orange County Transportation Authority
April 2012

Section 8: Minor Items

<u>\$ 23,506,300</u>	x	5%	=	<u>\$ 1,175,315</u>
(Subtotal Sections 1 thru 7)				
TOTAL MINOR ITEMS				<u>\$ 1,175,315</u>

Section 9: Roadway Mobilization

<u>\$ 24,681,615</u>	x	10%	=	<u>\$ 2,468,162</u>
(Subtotal Sections 1 thru 8)				
TOTAL ROADWAY MOBILIZATION				<u>\$ 2,468,162</u>

Section 10: Roadway Additions

Supplemental Work

<u>\$ 24,681,615</u>	x	5%	=	<u>\$ 1,234,081</u>
(Subtotal Sections 1 thru 8)				

Contingencies

<u>\$ 24,681,615</u>	x	25%	=	<u>\$ 6,170,404</u>
(Subtotal Sections 1 thru 8)				

TOTAL ROADWAY ADDITIONS				<u>\$ 7,404,485</u>
-------------------------	--	--	--	---------------------

TOTAL ROADWAY ITEMS (Subtotal Sections 1 thru 10)				<u>\$ 34,554,261</u>
--	--	--	--	----------------------

Estimate Prepared By	<u>Kelsie Anderson</u>	Phone # <u>949.477.9000</u>	Date <u>4/26/2012</u>
	(Print Name)		

Estimate Checked By	<u>Juliet Su</u>	Phone # <u>949.477.9000</u>	Date <u>4/26/2012</u>
	(Print Name)		

** Use appropriate percentage per Chapter 20.

Ball Road Grade Separation PSR(E) - Alt 2B Underpass with Temporary Bypass Road
Orange County Transportation Authority
April 2012

II. STRUCTURES ITEMS

	Structure (1)	Structure (2)	Structure (3)
Bridge Name	<u>Ball Road UP</u>	_____	_____
Structure Type	<u>Steel Girder</u>	_____	_____
Width (out to out) - (ft)	<u>65</u>	_____	_____
Span Lengths - (ft)	<u>131.75</u>	_____	_____
Total Area - (ft ²)	<u>8,564</u>	_____	_____
Footing Type (Pile/Spread)	<u>Pile</u>	_____	_____
Cost Per (ft ²) (incl. 10% mobilization and 20% contingency)	\$ <u>1,363</u>	_____	_____
Total Cost for Structure	\$ <u>11,680,000</u>	_____	_____

SUBTOTAL STRUCTURES ITEMS \$ 11,680,000
(Sum of Total Cost for Structures)

<u>Railroad Related Costs:</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>
Track Work	<u>1</u>	<u>LS</u>	\$ <u>1,390,000</u>	\$ <u>1,390,000</u>
Grading	<u>1</u>	<u>LS</u>	\$ <u>48,800</u>	\$ <u>48,800</u>
Temporary Crossing	<u>1</u>	<u>LS</u>	\$ <u>851,000</u>	\$ <u>851,000</u>
Signal House Relocation 10% mobilization and 25% contingency	<u>1</u>	<u>LS</u>	\$ <u>801,430</u>	\$ <u>801,430</u>
SUBTOTAL RAILROAD ITEMS				\$ <u>3,091,230</u>

TOTAL OF STRUCTURES ITEMS \$ 14,771,230
(Sum of Structures Items plus Railroad Items)

COMMENTS:

Structures Estimate Prepared By Susan Michalski Phone # 949.477.9000 Date 4/20/2012
(Print Name)

Railroad Estimate Prepared By Garrett Montoya Phone # 909.806.8007 Date 4/20/2012
(Print Name)

NOTE: If appropriate, attach additional pages as backup

Page No. 6 of 7

Ball Road Grade Separation PSR(E) - Alt 2B Underpass with Temporary Bypass Road
Orange County Transportation Authority
April 2012

III. RIGHT OF WAY ITEMS	VALUE
A. Acquisition, including excess lands, damages to remainder(s) and goodwill	<u>\$ 26,400,000</u>
B. Utility Relocation (OCTA Share)	<u>\$ 4,590,000</u>
C. Relocation Assistance	<u>\$ 36,000</u>
D. Clearance/Demolition	<u>\$ 315,000</u>
E. Title and Escrow Fees	<u>\$ 139,000</u>
25% Contingency	<u>\$ 7,870,000</u>
TOTAL RIGHT OF WAY ITEMS	<u>\$ 39,350,000</u>

F. Construction Contract Work

Brief Description of Work:

Restore properties to existing conditions after temporary construction easement, reconstruct gates, and reconstruct road approaches and access driveways.

Right of Way Branch Cost Estimate for Work* \$ 500,000

* This dollar amount is to be included in the Roadway and/or Structures Items of Work, as appropriate. Do not include in Right of Way Items.

COMMENTS:

Estimate Prepared By Chris LaBonte Phone # 951.683.2353 Date 4/20/2012
(Print Name)

NOTE: If appropriate, attach additional pages and backup.

Project Planning Cost Estimate

Ball Road Grade Separation PSR(E)
Orange County Transportation Authority
April 2012

PROJECT DESCRIPTION:

Limits On Ball Road between Union Pacific Railroad at-grade crossing to East Street and Lewis Street from Southern California Regional Rail Authority underpass to Ball Road.

Proposed Improvement (Scope) Grade separate the Southern California Regional Rail Authority railroad crossing at Ball Road.

Alternative 3 - Ball Road Overhead with Temporary Bypass Road

SUMMARY OF PROJECT COST ESTIMATE

TOTAL ROADWAY ITEMS	\$	<u>38,917,662</u>
TOTAL STRUCTURE ITEMS	\$	<u>7,782,600</u>
SUBTOTAL CONSTRUCTION	\$	<u>46,700,262</u>
TOTAL RIGHT OF WAY ITEMS	\$	<u>36,864,500</u>
TOTAL PROJECT CAPITAL OUTLAY COSTS	\$	<u>83,564,762</u>

Note: Escalation will be 3% per year with a start of construction estimated for 2017

Reviewed by OCTA Program Manager _____

Approved by OCTA Project Manager _____ Date _____
Lisa Alviso

Phone No. (714) 782-9232 Page No. 1 of 7

Ball Road Grade Separation PSR(E) - Alt 3 Overhead with Temporary Bypass Road
Orange County Transportation Authority
April 2012

I. ROADWAY ITEMS

<u>Section 1 Earthwork</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
Roadway Excavation	56,800	CY	\$ 13	\$ 738,400	
Imported Borrow	219,500	CY	\$ 13	\$ 2,853,500	
Clearing & Grubbing	1	LS	\$ 200,000	\$ 200,000	
Develop Water Supply			\$	\$	
Top Soil Reapplication			\$	\$	
Stepped Slopes and Slope Rounding (Contour Grading)			\$	\$	
Imported Borrow (Select Fill)	55,600	CY	\$ 14	\$ 778,400	
				Subtotal Earthwork	<u>\$ 4,570,300</u>
<u>Section 2 Pavement Structural Section*</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
PCC Pavement (9" Depth)	160	CY	\$ 215	\$ 34,400	
PCC Pavement (___ Depth)			\$	\$	
Asphalt Concrete	17,000	TON	\$ 68	\$ 1,156,000	
Lean Concrete Base			\$	\$	
Cement-Treated Base			\$	\$	
Aggregate Base	13,400	CY	\$ 42	\$ 562,800	
Treated Permeable Base			\$	\$	
Aggregate Sub base			\$	\$	
Pavement Reinforcing Fabric			\$	\$	
Edge Drains			\$	\$	
			\$	\$	
				Subtotal Pavement Structural Section	<u>\$ 1,753,200</u>
<u>Section 3 Drainage</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
Large Drainage Facilities	1	LS	\$ 2,400,000	\$ 2,400,000	
Storm Drains	1	LS	\$ 640,000	\$ 640,000	
Pumping Plants					
Project Drainage (X-Drains, overside, etc.)			\$	\$	
			\$	\$	
				Subtotal Drainage	<u>\$ 3,040,000</u>

*Reference sketch showing typical pavement structural section elements of the roadway. Include (if available) T.I., R-Value and date when tests were performed.

NOTE: Extra lines are provided for items not listed; use additional lines as appropriate.

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<u>Section 4: Specialty Items</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
Retaining Walls (MSE)	142,500	SQFT	\$ 69	\$ 9,832,500	
Noise Barriers			\$	\$	
Barriers and Guardrails			\$	\$	
Equipment/Animal Passes			\$	\$	
Water Pollution Control	1	LS	\$ 285,000	\$ 285,000	
Hazardous Waste Investigation and/or Mitigation Work	1	LS	\$ 900,000	\$ 900,000	
Environmental Compliance	1	LS	\$ 6,000	\$ 6,000	
Resident Engineer Office Space	1	LS	\$ 200,000	\$ 200,000	
			\$	\$	
			Subtotal Specialty Items		\$ 11,223,500
<u>Section 5: Traffic Items</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
Lighting	1	LS	\$ 285,000	\$ 285,000	
Traffic Delineation Items	1	LS	\$ 39,600	\$ 39,600	
Traffic Signals	1	LS	\$ 650,000	\$ 650,000	
Overhead Sign Structures			\$	\$	
Roadside Signs	1	LS	\$ 27,300	\$ 27,300	
Traffic Control Systems	1	LS	\$ 306,000	\$ 306,000	
Transportation Management Plan	1	LS	\$ 500,000	\$ 500,000	
Temporary Detection System			\$	\$	
Staging	1	LS	\$ 3,810,000	\$ 3,810,000	
			Subtotal Traffic Items		\$ 5,617,900

NOTE: Extra lines are provided for items not listed; use additional lines as appropriate.

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<u>Section 6: Planting and Irrigation</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
Highway Planting	1	LS	\$ 28,700	\$ 28,700	
Replacement Planting	1	LS	\$ 90,000	\$ 90,000	
Irrigation Modification	1	LS	\$ 131,000	\$ 131,000	
Relocate Existing Irrigation Facilities			\$	\$	
Irrigation Crossovers			\$	\$	
Plant Establishment Period	1	LS	\$ 20,000	\$ 20,000	
Subtotal Planting and Irrigation Section					\$ 269,700

<u>Section 7: Roadside Management and Safety Section</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
Vegetation Control Treatments			\$	\$	
Gore Area Pavement			\$	\$	
Pavement beyond the gore area			\$	\$	
Miscellaneous Paving			\$	\$	
Erosion Control			\$	\$	
Slope Protection			\$	\$	
Side Slopes/Embankment Slopes			\$	\$	
Maintenance Vehicle Pull outs			\$	\$	
Off-freeway Access (gates, stairways, etc.)			\$	\$	
Roadside Facilities (Vista Points, Transit, Park and Ride, etc.)			\$	\$	
Relocating roadside facilities/features			\$	\$	
			\$	\$	
Subtotal Roadside Management and Safety Section					\$ -

TOTAL SECTIONS: 1 thru 7 \$ 26,474,600

NOTE: Extra lines are provided for items not listed; use additional lines as appropriate.

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Section 8: Minor Items

<u>\$ 26,474,600</u>	x	5%	=	<u>\$ 1,323,730</u>	
(Subtotal Sections 1 thru 7)					
				TOTAL MINOR ITEMS	<u>\$ 1,323,730</u>

Section 9: Roadway Mobilization

<u>\$ 27,798,330</u>	x	10%	=	<u>\$ 2,779,833</u>	
(Subtotal Sections 1 thru 8)					
				TOTAL ROADWAY MOBILIZATION	<u>\$ 2,779,833</u>

Section 10: Roadway Additions

Supplemental Work

<u>\$ 27,798,330</u>	x	5%	=	<u>\$ 1,389,917</u>	
(Subtotal Sections 1 thru 8)					

Contingencies

<u>\$ 27,798,330</u>	x	25%	=	<u>\$ 6,949,583</u>	
(Subtotal Sections 1 thru 8)					

	TOTAL ROADWAY ADDITIONS	<u>\$ 8,339,499</u>
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	TOTAL ROADWAY ITEMS (Subtotal Sections 1 thru 10)	<u>\$ 38,917,662</u>
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Estimate Prepared By	<u>Kelsie Anderson</u>	Phone # <u>949.477.9000</u>	Date <u>4/26/2012</u>
	(Print Name)		

Estimate Checked By	<u>Juliet Su</u>	Phone # <u>949.477.9000</u>	Date <u>4/26/2012</u>
	(Print Name)		

** Use appropriate percentage per Chapter 20.

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II. STRUCTURES ITEMS

	Structure (1)	Structure (2)	Structure (3)	
Bridge Name	<u>Ball Road oh</u>	<u> </u>	<u> </u>	
Structure Type	<u>PC/PS Bulb-T Girder</u>	<u> </u>	<u> </u>	
Width (out to out) - (ft)	<u>120</u>	<u> </u>	<u> </u>	
Span Lengths - (ft)	<u>110.00</u>	<u> </u>	<u> </u>	
Total Area - (ft ²)	<u>13,200</u>	<u> </u>	<u> </u>	
Footing Type (Pile/Spread)	<u>Pile</u>	<u> </u>	<u> </u>	
Cost Per (ft ²) (incl. 10% mobilization and 20% contingency)	<u>\$ 479</u>	<u> </u>	<u> </u>	
Total Cost for Structure	<u>\$ 6,330,000</u>	<u> </u>	<u> </u>	
SUBTOTAL STRUCTURES ITEMS (Sum of Total Cost for Structures)				<u>\$ 6,330,000</u>

<u>Railroad Related Costs:</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>
Track Work	<u> </u>	<u> </u>	<u> </u>	<u> </u>
Grading	<u> </u>	<u> </u>	<u> </u>	<u> </u>
Temporary Crossing	<u>1</u>	<u>LS</u>	<u>\$ 851,000</u>	<u>\$ 851,000</u>
Signal House Relocation 10% mobilization and 25% contingency	<u>1</u>	<u>LS</u>	<u>\$ 225,000</u>	<u>\$ 225,000</u>
	<u>1</u>	<u>LS</u>	<u>\$ 376,600</u>	<u>\$ 376,600</u>
SUBTOTAL RAILROAD ITEMS				<u>\$ 1,452,600</u>
TOTAL OF STRUCTURES ITEMS (Sum of Structures Items plus Railroad Items)				<u>\$ 7,782,600</u>

COMMENTS:

Structures Estimate Prepared By: Susan Michalski Phone # 949.477.9000 Date 4/20/2012
(Print Name)

Railroad Estimate Prepared By Garrett Montoya Phone # 909.806.8007 Date 4/20/2012
(Print Name)

NOTE: If appropriate, attach additional pages as backup

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III. RIGHT OF WAY ITEMS	VALUE
A. Acquisition, including excess lands, damages to remainder(s) and goodwill	<u>\$ 23,000,000</u>
B. Utility Relocation (OCTA Share)	<u>\$ 5,970,000</u>
C. Relocation Assistance	<u>\$ 80,000</u>
D. Clearance/Demolition	<u>\$ 310,000</u>
E. Title and Escrow Fees	<u>\$ 131,500</u>
25% Contingency	<u>\$ 7,373,000</u>
TOTAL RIGHT OF WAY ITEMS	<u>\$ 36,864,500</u>

F. Construction Contract Work

Brief Description of Work:

Restore properties to existing conditions after temporary construction easement, reconstruct gates, and reconstruct road approaches and access driveways.

Right of Way Branch Cost Estimate for Work* \$ 600,000

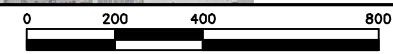
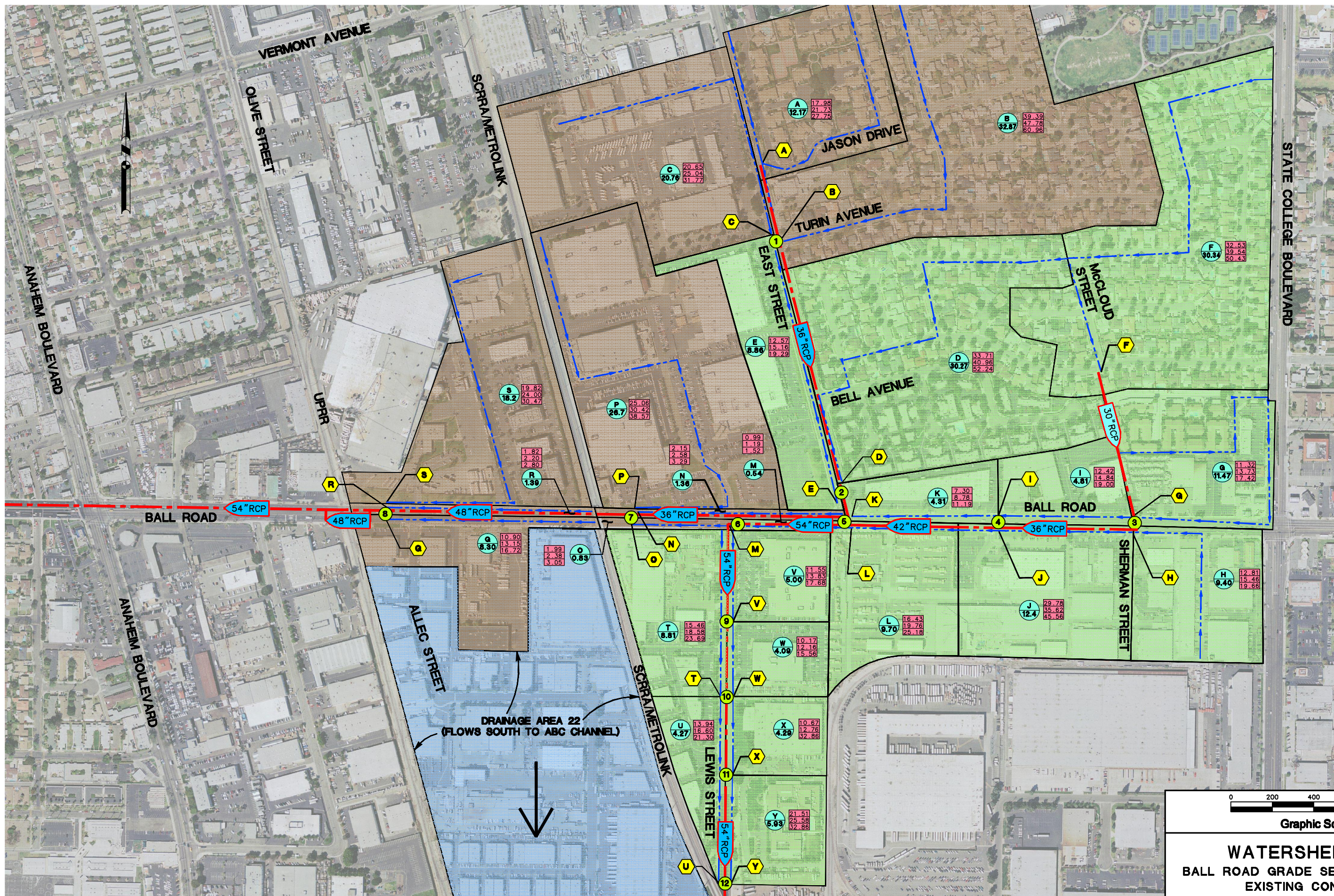
* This dollar amount is to be included in the Roadway and/or Structures Items of Work, as appropriate. Do not include in Right of Way Items.

COMMENTS:

Estimate Prepared By Chris LaBonte Phone # 951.683.2353 Date 4/20/2012
(Print Name)

NOTE: If appropriate, attach additional pages and backup.

Appendix F – Existing Watershed Map



Graphic Scale

WATERSHED MAP
BALL ROAD GRADE SEPARATION PSRE
EXISTING CONDITION

- LEGEND**
- DRAINAGE AREA 20
 - DRAINAGE AREA 22
 - DRAINAGE AREA 26
 - TRIBUTARY AREA (ACRE)
 - PEAK FLOW RATE (CFS)
 - PER STORM EVENT
 - NODE
 - JUNCTION
 - 54" RCP
 - EXISTING STORM DRAIN SYSTEM
 - FLOW DIRECTION

10 YR	25 YR	100 YR
10.67	12.76	32.86
1.85		

MARK THOMAS & COMPANY, INC.
 16795 VON KARMAN AVENUE, SUITE 205
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DRAWN BY:
 CHECKED BY:
 DATE: 3-5-2012
 SCALE: 1" = 200'