



San Diego Association of Governments

**Birmingham Drive Grade Separation
Draft Project Study Report**

DRAFT

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
1 INTRODUCTION.....	2
2 PROJECT LOCATION	3
3 SCOPE OF WORK	5
4 PROJECT NEED.....	6
5 BENEFITS.....	7
6 GRADE SEPARATION CONSIDERATIONS	8
6.1 BIRMINGHAM DRIVE EXTENSION AND BRIDGE OVERPASS	8
6.2 TRENCH.....	9
6.3 DRAINAGE	10
6.4 UTILITIES.....	11
6.5 TRAFFIC.....	11
6.6 CONCEPTUAL PHASING.....	12
6.7 ENVIRONMENTAL CONSIDERATIONS	13
6.8 OTHER CONSIDERATIONS	15
7 PROJECT CONSTRUCTION COST ESTIMATE	18

List of Figures

Figure 1-1. (Figure 2.5.1-4 Options to be Retained for Further Study in Encinitas) From the LOSSAN EIS/EIR	3
Figure 2-1. San Elijo Double Track Location Map	4
Figure 2-2. LOSSAN Rail Corridor.....	5
Figure 4-1. Current and Future Train Volumes from Cambridge Prioritization Analysis.....	7

Appendices

Appendix A: Draft Rail Grade Crossing Evaluation Summary

Appendix B: Birmingham Drive Overpass Plan and Profile

Appendix C: Grade Separation Trench Plan and Profile

Appendix D: Cost Estimate

EXECUTIVE SUMMARY

The purpose of this Project Study Report is to consider the feasibility of aligning a double track railroad in a trench structure to create a grade separation at Birmingham Drive and closing the Chesterfield Drive at-grade crossing. In the 2003 *LOSSAN South Strategic Plan* and associated Final LOSSAN Program EIR/EIS (2007), this Project is identified as one option for the Rail Improvements Alternative through Encinitas. The “Encinitas - AT-GRADE double tracking with grade-separations at major intersections” option calls for “double-tracking through Encinitas primarily at-grade, with a short trench segment for the rail corridor on either side of Birmingham Drive. This option would also include reconfiguring the street intersection at Birmingham Drive and San Elijo Avenue, and closure of Chesterfield Drive at San Elijo Avenue”.

The proposed alternative in this Project Study Report was developed to balance the criteria below identified by SANDAG and previous studies:

- Consistent with the LOSSAN EIS/EIR recommendations.
- Lower the railroad in a trench to pass under a Birmingham Drive overpass.
- Keep Chesterfield Drive at-grade crossing open during construction.
- Minimize the impact to the railroad operations during construction.
- Track alignment must accommodate current design speeds and standards.
- Cost effective alternative that can be constructed using typical means and methods.

In addition to the criteria above, there are two projects being advanced concurrently that have an impact on the Birmingham Drive Grade Separation. These two projects include the Montgomery Avenue Pedestrian Underpass and the San Elijo Lagoon Double Track (SELDT) Project.

The Montgomery Avenue Pedestrian Underpass has been proposed by the City of Encinitas and is currently in the planning stages. This undercrossing would conflict with the proposed Birmingham Drive Grade Separation and it is recommended that only one of these projects move forward into the design phase. Alternatively, the Montgomery Avenue pedestrian crossing could be planned as an overpass that would remain in place after trench construction.

The San Elijo Lagoon Double Track Project has been proposed by SANDAG and is currently in the 60% Design Phase. This project has been funded and is planned for construction end of 2015. To comply with the Kehoe Bill, the SELDT must be constructed concurrently with the Caltrans I-5 widening and San Elijo Lagoon restoration also planned for construction. The alternative proposed in this project study report does not conflict with the SELDT proposed design. However, this grade separation has not been planned for funding in the near future per SANDAG’s 2030 Regional Transportation Plan (RTP). Therefore, the Birmingham Drive Grade Separation could be constructed in the future, when funding is planned. The SELDT alignment and features would serve as the existing condition to a future Birmingham Drive Grade Separation, as detailed in the conceptual layout in Appendix B and C.

1 INTRODUCTION

The existing Chesterfield Drive at-grade railroad crossing and the proposed grade separation at Birmingham Drive are located along the LOSSAN corridor within the City of Encinitas. In the existing condition, access between the Cardiff community of the City of Encinitas and Highway 101 (beach access) is primarily via Chesterfield Drive. The nearest grade crossing is 2.2 miles north of Chesterfield Drive at Encinitas Boulevard. The existing Chesterfield Drive at-grade crossing is bounded on either side of the tracks by closely spaced intersections at San Elijo Avenue and Highway 101, with approximately 250 feet of space separating the two intersections. The short distance between the two intersections provides limited queuing space for stopped vehicles which have the potential back up onto the railroad tracks.

To enhance rail capacity and eliminate the existing Chesterfield Drive at-grade crossing, the 2003 *LOSSAN South Strategic Plan* and associated Final LOSSAN Program EIR/EIS (2007) proposed trenching the railroad in this area and construction of a new overpass crossing at Birmingham Drive. This project is identified in the aforementioned documents as the “Encinitas - At-Grade double tracking with grade-separations at major intersections.” Two potential options for the project were presented as feasible alternatives:

- **At-grade (with Grade Separations) Option** – This alternative would involve double-tracking through Encinitas, primarily at-grade, with a short trench segment for the rail corridor on either side of Birmingham Drive. Birmingham Drive would be extended over the rail trench to Highway 101, and the existing Chesterfield Avenue grade crossing would be closed. This option would include reconfiguring the street intersection at Birmingham Drive and San Elijo Avenue, and closing Chesterfield Drive at San Elijo Avenue. Another trench section and arterial grade separation would be constructed at Leucadia Boulevard to the north. Pedestrian undercrossings would be placed along the route to enhance pedestrian and bicycle circulation within the community.
- **Short Trench Option** – This alternative would involve double-tracking in the same alignment as the at-grade option above, but with an additional covered trench under Encinitas Boulevard and a transitional open trench about 1,500 feet either side of Encinitas Boulevard. This option was determined to be superior to the Long Trench option, which was eliminated from consideration (Section 2.2), because it would provide the same benefits as the longer trench at a lower cost. In this option, enhancements to the existing Coaster station would be needed, including new platforms and access facilities (similar to the existing Solana Beach station, where the tracks are also located in a trench).

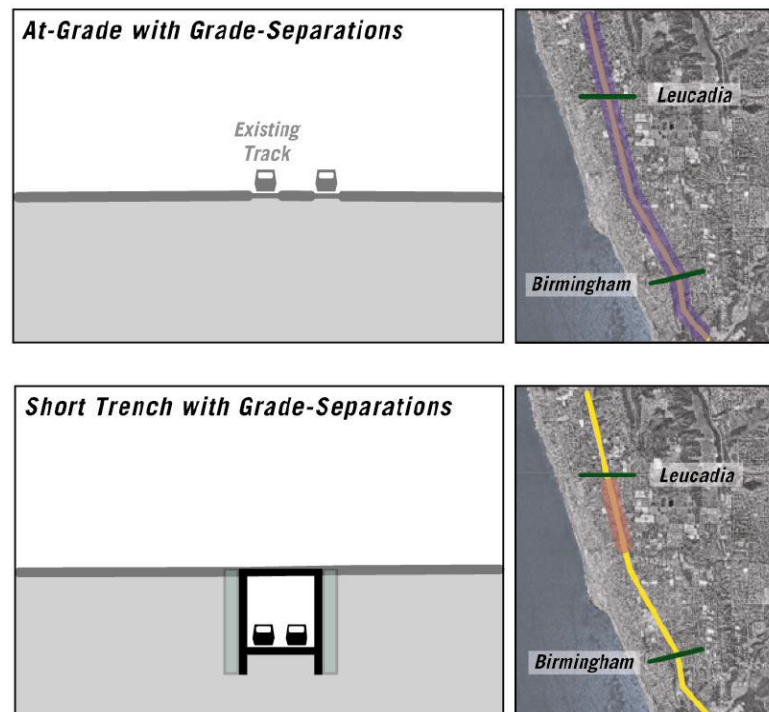


Figure 1-1. Figure 2.5.1-4 “Options to be Retained for Further Study in Encinitas” from the LOSSAN EIS/EIR

Both of the alternatives include creating a trench segment to grade separate Birmingham Drive and closing the existing Chesterfield at-grade crossing.

In addition to the LOSSAN EIS/EIR, SANDAG has recognized the need for grade separations per the proposed “Action 5” in the 2030 SANDAG Regional Transportation Plan:

“[Action] 5. Fund regional rail grade separation program, pursue additional revenue sources to match regional program, and develop a ranking system to identify regional priorities.”

The SANDAG grade separations are prioritized according to ranking points in a list that can be found in Appendix A. Only the top 27 grade separations are listed in the table and Birmingham Drive was not among those that were chosen. Therefore, is not planned for construction in the near future.

2 PROJECT LOCATION

The proposed Grade Separation at Birmingham Drive (Project) is located near the Cardiff Community in the City of Encinitas. The project lies near the coastline of the Pacific Ocean and will provide a new connection between Highway 101 and San Elijo Avenue, just north of the Chesterfield Drive grade crossing. The Birmingham overpass will cross over the railroad property owned and operated by North County Transit District (NCTD) at Mile Post 239.63 on the San Diego Subdivision, which is part of the LOSSAN Corridor.

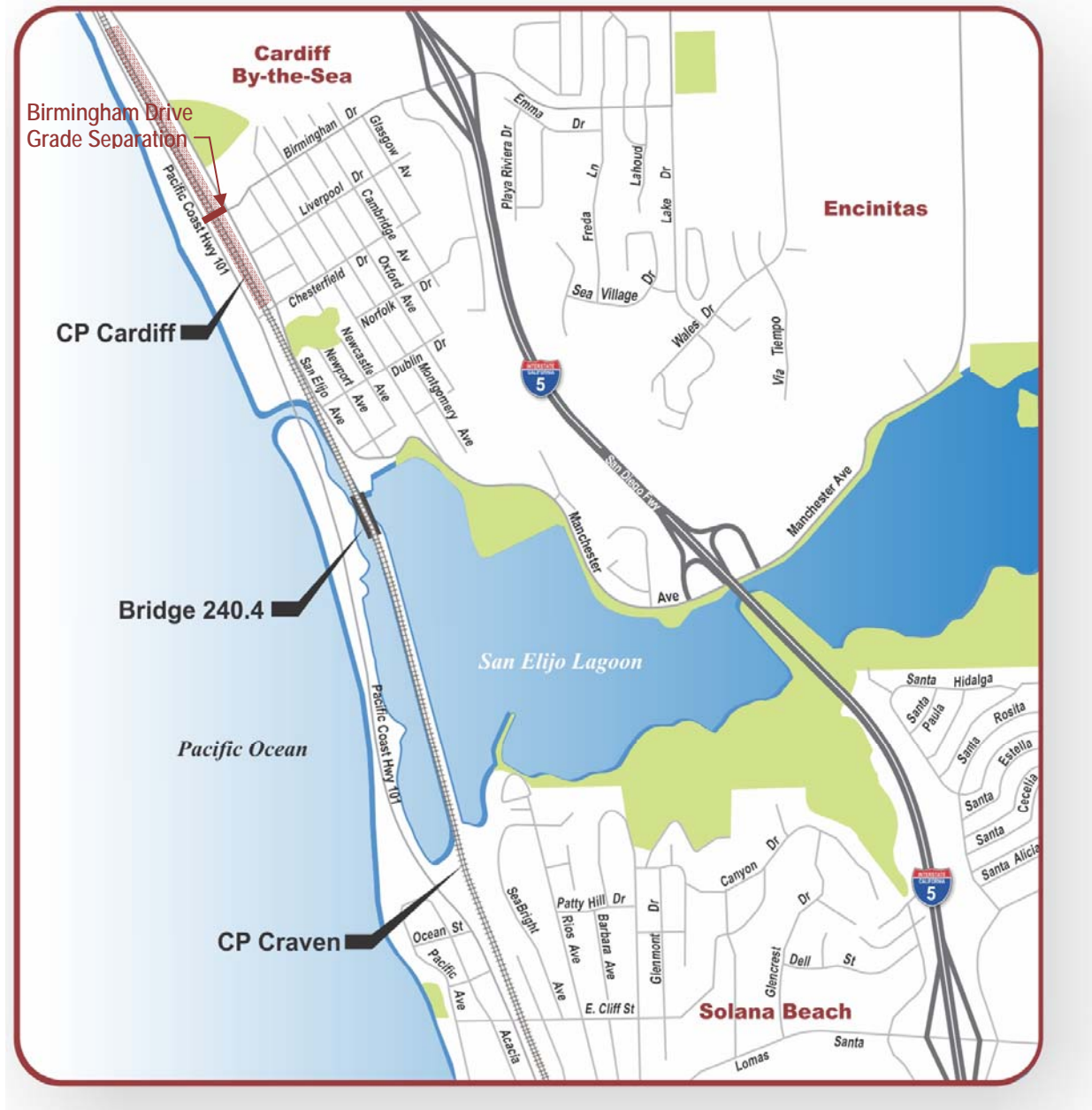


Figure 2-1. Birmingham Drive Grade Separation Location Map

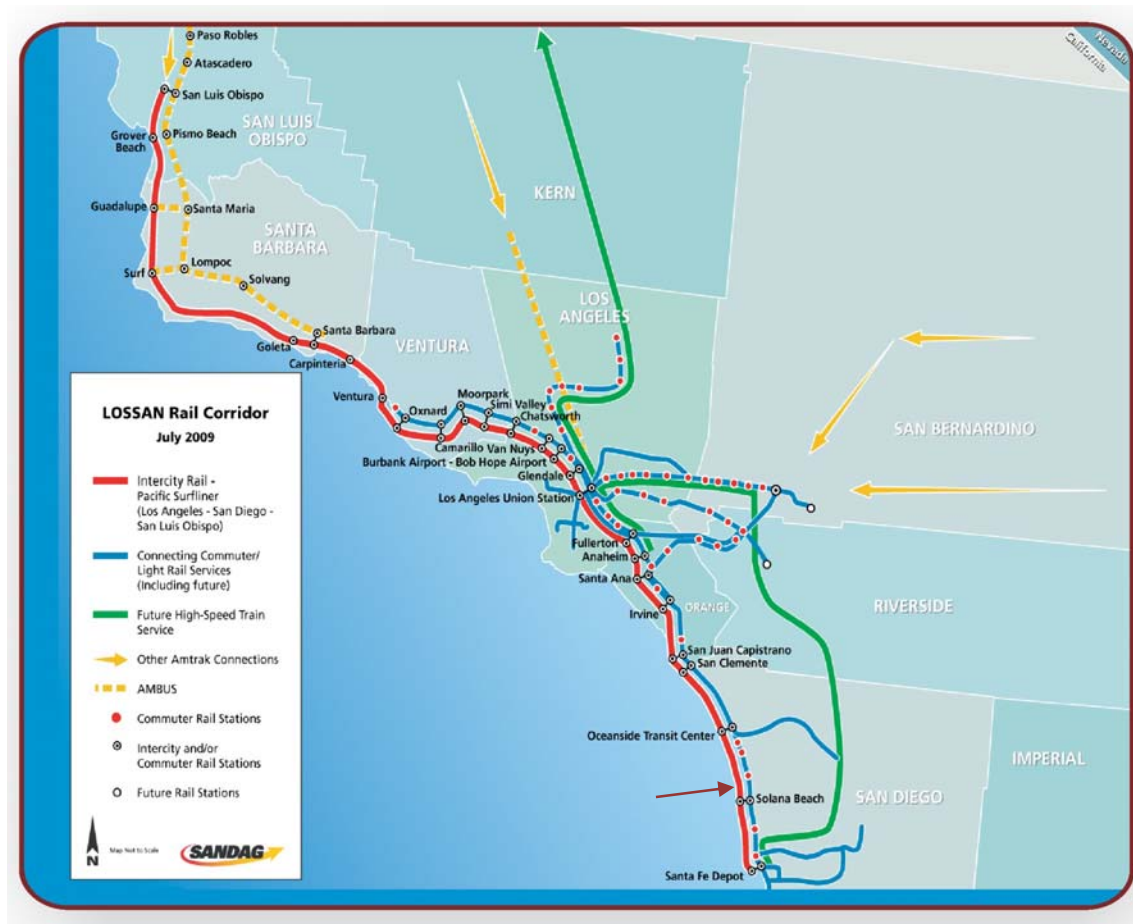


Figure 2-2. LOSSAN Rail Corridor

3 SCOPE OF WORK

The scope of this project study report is to evaluate the feasibility of aligning a double track railroad in a trench structure to create a grade separation at Birmingham Drive. This concept is consistent with the recommendations made in the LOSSAN EIS/EIR. As directed by SANDAG, the project study report evaluates one alternative that meets the following criteria:

- Consistent with the LOSSAN EIS/EIR recommendations.
- Lower the railroad in a trench to pass under a proposed Birmingham Drive overpass.
- Keep Chesterfield Drive at-grade crossing open during construction.
- Minimize impacts to railroad operations during construction.
- The track alignment must accommodate current design speeds and standards.
- Provide a cost-effective alternative that can be constructed using typical means and methods.

The goal of the proposed alternative is to provide a cost-effective approach that addresses the above criteria.

4 PROJECT NEED

The LOSSAN EIS/EIR identified the need to double track through Encinitas to increase capacity on the corridor and to grade-separate Birmingham Drive. The Birmingham Drive grade separation was proposed to enhance safety by providing for the closure of the Chesterfield at-grade crossing.

As mentioned previously, the current Chesterfield at-grade crossing is the only connection point between Cardiff and Highway 101 and provides for beach access. The short distance between the traffic signals at San Elijo Avenue and Highway 101 provides limited storage lengths and capacity for vehicular travel. Additionally, this is a common crossing point for pedestrian movement between Cardiff, the beach, and local hiking trails.

With a range of 65 to 73 trains presently traversing the corridor each weekday, the LOSSAN Corridor is one of the busiest and fastest passenger railroads in the U.S. Much of the main line has a passenger train speed limit of 79 miles per hour (mph), with a number of line segments at 90 mph. See Figure 4.1 below for current train traffic volumes. There has also been significant growth in the demand for freight and passenger rail services on the railroad, driven by a number of factors including:

- Population and employment;
- Congestion on adjoining highways;
- Increased goods movement; and
- Higher fuel prices.

Train service on the line is projected to grow in the future, on weekdays as well as weekends for all rail services, as summarized in the excerpt below from the Cambridge Prioritization Analysis conducted in 2008.

Future Rail Service Levels by Operator
Weekday

Extent	2008 Base				Near Term (2015)				Mid Term (2025)				Long Term (2030)			
	AM	PM	Off-Peak	Total	AM	PM	Off-Peak	Total	AM	PM	Off-Peak	Total	AM	PM	Off-Peak	Total
Metrolink																
Laguna Niguel to Oceanside*	5	5	6	16	6	5	5	16	6	5	5	16	7	7	6	20
Amtrak																
Los Angeles Union Station to San Diego	4	6	12-14	22-24	5	6	15	26	7	8	17	32	8	9	19	36
COASTER																
Oceanside to San Diego	7	9-10	6-9	22-26	11	11	8	30	13	14	9	36	19	19	16	54
BNSF																
Vehicle	0	0	2-4	2-4	0	0	4	4	0	0	4	4	0	0	4	4
Manifest	0	0	2	2	0	0	2	2	0	0	4	4	0	0	4	4
Local	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
Total	16	20-21	29-36	65-73	22	22	35	79	26	27	40	93	34	35	50	119

*Metrolink service levels based on SCRRA Strategic Assessment, 2007. All other service levels based on LOSSAN Corridor Strategic Business Plan, 2007.

Figure 4-1. Current and Future Train Volumes from Cambridge Prioritization Analysis

The predicted rise in train traffic would cause additional delays to vehicular, bicycle, and pedestrian traffic at Chesterfield Drive grade crossing.

The proposed Birmingham Drive Overpass would be located only 1250 feet north of the existing Chesterfield Drive grade crossing. By moving the crossing from Chesterfield Drive to Birmingham Drive, vehicular delays during construction would be minimized. In addition, the topography at the Birmingham Drive location is better suited for a street overpass. The proposed grade separation would allow the vehicular, bicycle, and pedestrian traffic to cross freely over the tracks with no interruption, and would improve safety by elimination of the existing at-grade crossing.

5 BENEFITS

The addition of the Birmingham Drive grade separation and closure of the Chesterfield Drive at-grade crossing would enhance safety by eliminating the existing at-grade crossing as mentioned above.

Currently, some pedestrians attempt to trespass on the railroad right-of-way (ROW) and cross the tracks between the existing grade crossings, creating a safety hazard. The trench would serve to restrict the movement of pedestrians trying to cross the railroad right-of-way between the designated crossings, which would further enhance safety.

Birmingham Drive is also an exit on the I-5 freeway. Connecting Birmingham drive to Highway 101 will provide more direct connectivity between Highway 101 and I-5 for motorists, which will improve traffic operations.

6 GRADE SEPARATION CONSIDERATIONS

6.1 Birmingham Drive Extension and Bridge Overpass

The proposed overpass would connect San Elijo Avenue to Highway 101 by extension of Birmingham Drive over the proposed rail trench. It is assumed that vertical curves would be used along this new segment of roadway to gain the maximum vertical clearance over the rail tracks while avoiding the need to modify the profiles of San Elijo Avenue or Highway 101 at their intersections with Birmingham Drive. Any attempt to significantly raise San Elijo Avenue would result in significant access impacts into the Jack in the Box property on the northeast corner of the Birmingham Drive/San Elijo Avenue intersection. Likewise any vertical change required of Highway 101 would require lane closures and delays on the heavily traveled roadway. Access to the San Elijo State Beach would also be impacted and would require temporarily closure to facilitate construction.

The Birmingham Drive grade separation would consist of a bridge structure over the railroad trench only and would be supported on embankment fill outside of the trench. With a clear span of approximately 54 feet between trench walls, it is estimated that the structure depth from the top of the roadway pavement to the bottom of the girder soffit would be approximately 4 feet. The preferred vertical clearance required by SANDAG forthcoming standards is 26 feet between the bridge girder soffit and top of rail. To reduce project costs, a SANDAG design exception would be requested to reduce the clearance to the previous standard of 24 feet. If 26 feet of clearance is required the trench wall heights would increase as would the associated costs. With 24 feet of clearance, the top of rail would be lowered a minimum of 14.5 feet from an existing elevation of 57.65' to a proposed elevation of 43.12'. The width of the bridge was established to provide two 12-foot lanes, 5-foot bike lanes, and 10-foot sidewalks in each direction. This width assumption is considered a conservative estimate for the purpose of this report based on the following:

- The lane configuration along the Birmingham Avenue extension would allow for a single through lane and a single left turn lane in each direction between the Highway 101 and San Elijo Avenue intersections. The single through lane in each direction is consistent with the existing configuration along Birmingham Drive east of San Elijo Avenue to I-5. Based on the short spacing between the intersections and the anticipated traffic along the Birmingham Avenue extension, an exclusive left turn lane in each direction that would extend the full length between the intersections is proposed. Traffic analysis will be required during a subsequent project phase to confirm this assumption or determine whether a single, back-to-back left turn lane would be suitable to accommodate the left turn movements at this intersection. If so, the Birmingham Drive extension could be reduced from four to three lanes and the bridge width could be reduced accordingly.
- The existing pedestrian traffic crossing the rail corridor within this area is significant due to the large number of residents east of the tracks wanting to access the beach on the west. Providing a 10' wide sidewalk in each direction provides a generous width to safely accommodate a large number of pedestrians, many of whom are carrying surfboards and other beach-related items.

It is assumed that the new Birmingham Avenue/Highway 101 intersection would be signalized with regard to accommodating motorists and pedestrians. The existing entrance

to the San Elijo State Beach campground along Highway 101 is currently located just south of this new intersection. To facilitate efficient access into the campground for motorists and pedestrians, potential relocation of this driveway to the new signalized intersection as part of the project may be appropriate. The campground entrance would become the fourth/westerly leg of the new signalized intersection. Relocating the existing entrance to the new intersection may require the partial reconfiguration of the campground area and internal access roads adjacent to the new entrance.

6.2 Trench

The proposed trench profile at the Birmingham Avenue bridge crossing was controlled by the bridge overpass and vertical clearance as mentioned above. With this top of rail elevation set, the grades north and south of the overpass bridge were determined to satisfy the requirements of the project. The profile south of the bridge was designed to tie back into existing before reaching the Chesterfield at-grade crossing. The benefit of this is to allow the Chesterfield at-grade crossing to remain open during construction. If the track was lowered through Chesterfield, the crossing would need to be closed during the re-profiling. Doing so would restrict access to Highway 101 to Encinitas Boulevard 2.2 miles to the north. However, in order to match the existing profile north of Chesterfield, a sag curve (with negative slope in and positive slope out) is required within the depressed segment which creates sump condition in the trench. As a result, a pump station would likely be required at the low point within the trench to drain the sump, unless the runoff can be gravity drained via a pipe to the San Elijo lagoon to the south. A pump station was assumed for the purpose of the cost estimate included as part of this document.

The profile north of the Birmingham overpass was designed to minimize the length of the trench walls in order to reduce costs while minimizing operational impacts to freight and passenger trains. Therefore, the slope was maximized without adversely impacting the speed or the number of locomotives per train required to negotiate this grade. The maximum northbound (Railroad West) grade in the project vicinity is -1.2%, and the average westbound ruling grade on Miramar Hill is -1.6%. The maximum grade selected for use in the trench was -1.5% for a length of 2,000 feet. At this length it is believed that the freight locomotives can negotiate this grade with little effect to speed. Passenger locomotives should also experience minimal negative effects due to this grade. However, according to the SANDAG Rail Operations Modeling Analysis conducted by Parsons Brinkerhoff dated July 3, 2012, a universal crossover is required at this location in the near term. Placing the universal crossover at this location will make stopping and starting trains at the crossover more difficult due to the effects of the additional grade. Relocating the universal crossover to a different location should be analyzed during the design phase.

The railroad right-of-way is wide in this area (approx. 200 feet), and there is sufficient space east of existing track to offset the trench alignment. Consequently, the horizontal alignment of the track and trench was offset from the existing to allow the existing track to remain in service during construction. The curves were designed to be consistent with the existing condition using 90 mph passenger and 60 mph freight speeds. The horizontal tie-in point on the north was designed to minimize the number of curves while keeping the trench far enough from the existing track to keep it in service during trench construction. The tie-in point on the south was designed to minimize the impacts to Chesterfield Drive and

maintain the existing design speed. Although it would have been desirable to tie into the existing tracks north of Chesterfield Drive, the existing tracks are located on a horizontal curve through the existing crossing. As such, the tie in point had to be extended south of the horizontal curve. This will require minimal shifting of the grade crossing panels (approximately 1 foot) and asphalt repair to the at-grade crossing during an interim phase of construction. The Chesterfield Drive at-grade crossing will be permanently closed after the Birmingham Drive overpass is open for service.

Trench retaining walls are assumed to be soldier pile type concrete walls utilizing CIDH piles. CIDH piles would first be drilled, and the walls would be constructed from the top down as the trench was excavated by the installation of concrete lagging between the piles.

6.3 Drainage

Need for pump station and rerouting of existing drainage ditch.

The construction of the trench section as depicted in the attached conceptual plans creates the following two issues with regard to project drainage:

- As noted above, the trench profile proposed in the attached plans creates a sump condition within the trench at the low point of the profile. To drain the runoff from the sump, a pump station may need to be constructed adjacent to the low point to pump water out of the trench and convey it into an existing drainage system. Pump stations are costly to construct and require regular maintenance. Since the prevailing grade of the rail corridor and the adjacent roadways slopes to the south toward San Elijo Lagoon, it may be possible to gravity drain the sump by constructing a pipe from the low point within the trench to the south to a point in which the ground elevation is low enough to allow the pipe to drain. A pump station was selected for cost estimating purpose. Further drainage analysis, would be conducted as part of the design phase.
- An existing drainage crossing located south of the proposed Birmingham overcrossing adjacent to Liverpool Drive will be cut off by the construction of the rail trench. This existing crossing conveys runoff from the east side of the rail corridor under the tracks and into an existing concrete ditch that runs along the west side of the tracks. This ditch continues south and eventually outlets into the San Elijo Lagoon. East of the tracks, this facility collects surface runoff from San Elijo Avenue as well as runoff from within the rail corridor which is conveyed to the facility via an earthen ditch. This crossing is part of a large drainage system that is responsible for conveying runoff for much of the west portion of the City of Encinitas (approximate tributary area of 363 acres per City of Encinitas Drainage Master Plan). This is a critical drainage facility for the City and must be restored as part of the project. One way of restoring this facility would be to reroute it along the east side of the trench section to connect to an existing crossing of the tracks located just north of Chesterfield Drive. At this location, a 54" pipe conveying street runoff crosses under the tracks and connects to the concrete channel along the west side of the rail corridor. This crossing may need to be upsized to accommodate the additional runoff being redirected around the trench. Other portions of this existing system impacted by the project may need to be improved or

upsized as part of the project to meet the City's drainage needs. The attached project cost estimate includes a cost for implementing this approach.

These issues would warrant further, detailed analysis as part of the project approval phase to determine the most effective approach for addressing each in coordination with the City of Encinitas.

6.4 Utilities

Based on a review of existing utility facilities within the project limits, utility impacts associated with the trench construction and roadway extension should be minimal. An existing MCI fiber optic line runs longitudinally within the rail corridor along the west side of the existing tracks but is outside the limits of the trench construction. An existing water line crossing the tracks at Sta. 80+50 (Existing MT-1) will be impacted by the trench construction and may require the realignment and lowering of the line at the trench crossing to avoid the CIDH piles along the trench walls. Several subsurface utilities cross the rail corridor at Chesterfield Drive, including gas and AT&T telecom. It is assumed that these facilities could remain in place as part of the closure of this crossing.

A detailed utilities study and impact analysis should be conducted as part of the project approval phase to clearly identify potential conflicts and identify mitigation strategies.

6.5 Traffic

A detailed traffic study will be required as part of the project approval phase to address the following traffic and access issues:

- To make a determination as to the number of lanes to be provided along the Birmingham Drive extension between Highway 101 and San Elijo Avenue.
- To provide a recommendation of the preferred intersection approach configurations at the new Birmingham Drive/Highway 101 intersection and the modified Birmingham Drive/San Elijo Avenue and Chesterfield Drive/San Elijo Avenue intersection.
- To analyze the impacts to the existing San Elijo State Beach campground entrance along Highway 101 and to make a determination as to whether it should be relocated to the new Birmingham Drive intersection as part of the project.
- To analyze impacts to pedestrian circulation associated with the construction of the rail trench and the relocation of the pedestrian crossing from Chesterfield Drive to Birmingham Drive to determine how they should best be accommodated as part of the project.
- To analyze temporary impacts to traffic, circulation, and impacts to local residents and businesses during construction.

6.6 Conceptual Phasing

The grade separation and trench can be feasibly constructed using the conceptual phasing below:

Phase 1

- Construct Trench Retaining walls outside of foul zone from STA 76+00 to STA 106+00 (STA 99+50 for West wall) and excavate new rail trench
- Construct Proposed MT-1 and MT-2 outside of foul zone
- Construct new Birmingham Drive overcrossing bridge abutments and superstructure
- Construct new Universal Crossover between Proposed MT-1 and MT-2.

Phase 2

- Remove Existing MT-1 from service and Turnouts between STA 70+68 and STA 105+00, spike turnouts in through position and leave in place until Phase 4
- Continue to run trains on existing MT-2 only (single track operation only during this phase)
- Construct temporary shoring for proposed MT-1 and complete excavation and construction of Proposed MT-1 track

Absolute Work Window #1

- Adjust grade crossing panels at Chesterfield
- Shift and tie Proposed MT-1 into Existing MT-1 at STA 63+08
- Shift and tie Proposed MT-1 into Existing MT-1 at STA 111+44
- Adjust signals for interim condition (Verify signal operation of Chesterfield Drive crossing signals using new MT-1 track. No operational crossover for the interim condition)
- Open Proposed MT-1 to train traffic

Phase 3

- Run train traffic on Proposed MT-1 and on Existing MT-2 (Interim dual track operation)
- Construct remaining Proposed MT-2 to clearance points

Absolute Work Window #2

- Remove temporary shoring
- Re-grade connection at south tie-in point
- Shift and tie Proposed MT-2 into Existing MT-2 at STA 63+06
- Shift and tie Proposed MT-2 into Existing MT-2 at STA 111+50
- Open Proposed MT-2 (Final dual track operation)
- Adjust signals for final condition (Verify signal operation of Chesterfield Drive crossing signals using new MT-2 track. Test and place new control point crossovers in operation)

Note: No Crossover in operation between AWW Phase 2 and completion of AWW Phase 3.

Phase 4

- Remove remaining existing MT-1 and MT-2 trackage including turnouts between STA 70+66 and STA 105+00
- Construct structure approaches and additional roadway/intersection improvements along Birmingham Drive extension
- Open Birmingham Drive grade separation to traffic and close Chesterfield At-grade Crossing and remove operating crossing signals

6.7 Environmental Considerations

The trench would be placed within the railroad ROW, with the exception of the Birmingham Drive overpass that would link San Elijo Avenue and Highway 101, east and west of the railroad ROW, respectively. The following discussion outlines the key considerations for: 1) the environmental clearance and regulatory permitting for the Project; and 2) environmental resources that align with the Project's benefits as described in Section 5 above.

State and Local Permitting Preemption

Under the Interstate Commerce Commission Termination Act ("ICCTA"), 49 U.S. Section 10101 et seq., the federal Surface Transportation Board ("STB") has "exclusive" jurisdiction over "transportation by rail carriers" and "the construction, acquisition, operation, abandonment, or discontinuance of spur, industrial, team switching, or side tracks, or facilities, even if the tracks are located, or intended to be located, entirely in one State." (49 U.S.C. § 10501(b), emphasis added). Here, the Project would be preempted from State and Local environmental laws and regulations due to the fact that the Project increases the efficiency of the "transportation" of property by rail. (See 49 U.S.C. § 10102(9)).

Environmental Clearance and Regulatory Permitting

At this stage of Project development, environmental clearance and permitting/approvals required to implement the Project would include compliance with the National Environmental Policy Act (NEPA), issuance of a Federal Coastal Consistency Certification from the California Coastal Commission (CCC), 401 Water Quality Certification from the Regional Water Quality Control Board, and 404 Nationwide Permit from the U.S. Army Corps of Engineers. In terms of NEPA compliance and based on existing site conditions, it is anticipated that a Categorical Exclusion (CE) under either FTA or FRA's NEPA guidance would be applicable to this project.

Technical studies will be required to support the NEPA and CCC processes, including biological resources and cultural resources.

- Biological Resources - Existing vegetation would be removed on the east side of the railroad ROW to construct the trench and Birmingham Drive overpass. Based on previous vegetation and jurisdictional delineation field work disturbed habitat, non-native grassland, disturbed coastal sage scrub, and small portion of disturbed

wetland and unvegetated streambed is located in this area. North of the San Elijo Lagoon, the coastal sage scrub is highly fragmented and disturbed, and could support dispersal/foraging habitat but likely not nesting habitat for the California Gnatcatcher. Overall, the biological sensitivity of this area is low due to the disturbed nature of the project area.

- **Coastal Resources** - As part of the Federal Coastal Consistency Certification process, CCC will evaluate the Project to determine if the Project impacts coastal access or resources. At this stage of project development, with respect to coastal access, it is anticipated that grade separation and extension of Birmingham Drive to Highway 101 will improve coastal access in the Cardiff community. In addition, closing the existing Chesterfield grade crossing will improve safety for vehicles, bicyclists, and pedestrians accessing coastal resources in the Cardiff community. As discussed above, the potential to impact moderate to high quality environmentally sensitive habitat areas (ESHA) is low. Overall, the coastal resource sensitivity is low.
- **Cultural Resources** - Based on a cultural resources evaluation conducted in the project area by ASM Affiliates, three cultural resources were previously identified along this segment of the corridor; two of which are located outside of the railroad ROW and one located within the railroad ROW approximately 100 feet from the existing tracks. One site (W-80), a shell and artifact scatter, is located adjacent to the edge of the ROW on a bluff, and has not been previously evaluated. The second site (SDI-6854H), is a poorly documented 1915 kelp factory that does not appear to extend in the ROW. The third site (P-37-029481 or ASM-1) is a 1932-1933 railroad berm located across the northern part of the mouth of San Elijo Lagoon. This resource is not eligible under National Register of Historic places (NRHP) criteria. Overall, the cultural resource sensitivity is low.
- **Noise** – Implementation of the Project will decrease noise in the area of the Chesterfield Avenue at-grade crossing because the crossing will be closed, eliminating the need for warning horns and bells at this crossing. Short-term construction noise would occur during construction of the Project. Placement of the railroad within a trench is not expected to result in noise increases over existing levels because overall train noise through this segment of the corridor is expected to be reduced as concluded in the *Final Program EIR/EIS*.
- **Air Quality** – Implementation of the Project would result in reduced air quality/greenhouse gas emissions resulting from less traffic congestion at the existing Chesterfield Avenue grade crossing; a more direct route between the freeway and coastal areas via Birmingham Drive, and continued train travel through this segment of the corridor. Construction activities would generate pollutants; however, there is a low potential for the Project to exceed pollutant emission standards during construction.
- **Visual Resources** – Implementation of the Project through this portion of Encinitas and grade separation at Birmingham Drive would require removal of the existing bluffs within the railroad ROW, parallel to San Elijo Avenue. However, removal of the bluffs would be outweighed by placement of the railroad below grade.

Placement of the railroad below grade would reduce visual and barrier effects of the LOSSAN railroad corridor through this portion of the community. In consideration of these factors, implementation of the Project has a low potential to result in adverse effects to visual resources.

6.8 Other Considerations

Right of Way Needs

No temporary or permanent right of way requirements are anticipated at this time to construct the proposed rail trench, the Birmingham Drive extension, and associated improvements. The work falls within the existing railroad, State, and City of Encinitas right of way. It is assumed all parties would cooperate due the added value to each organization.

Montgomery Pedestrian Crossing

The City of Encinitas has planned a pedestrian underpass at Montgomery Avenue just one block north of Birmingham Drive. The underpass will connect San Elijo Avenue to Highway 101 with a pedestrian tunnel that will be constructed under the railroad tracks. As part of the Birmingham Avenue grade separation the railroad will be in a trench approximately 15 feet below the existing track at this location. Therefore, if constructed, the proposed Montgomery pedestrian underpass would be removed in order to construct the trench and grade separate Birmingham Drive. Another alternative would be to create a pedestrian overpass at Montgomery Avenue that may remain in place after the construction of the trench.

Grade Separating Chesterfield Drive

The LOSSAN EIS/EIR proposes creating a trench segment to grade separate Birmingham Drive and close the existing Chesterfield at-grade crossing. Alternatively, a grade separation may occur at Chesterfield Drive inline with the existing at-grade crossing. The main benefit of this option would be to maintain pedestrian and vehicular traffic along its current path; thus maintaining the visibility of local businesses near the Chesterfield and San Elijo intersection. Therefore, it is assumed any roadway raising or lowering should not require the closure of these businesses or severely restrict accessibility. To maintain accessibility to these businesses, roadway re-profiling would start on the west side of San Elijo Ave at the Chesterfield Drive intersection. An additional assumption is that the existing Chesterfield Drive grade crossing must remain in service during construction. Only minimal length closures would be allowed; extended length closure of Chesterfield during construction would not be allowed due to the lack of nearby rail crossings. The sections below will further discuss the feasibility of grade separating Chesterfield Drive.

Chesterfield Under Railroad

Lowering of Chesterfield Drive

A potential option to grade separate Chesterfield Drive would include the lowering of Chesterfield Drive and raising of the railroad tracks. As mentioned

above, the re-profiling of Chesterfield would begin along the west side of San Elijo Ave to maintain access to the local businesses. Lowering the profile of Chesterfield further west would require retaining walls that would limit pedestrian access to the local businesses and pedestrian crossing at the intersection. The short distance between the west edge of San Elijo Ave and the railroad tracks limits the amount of roadway lowering to a couple feet. The lowering of Chesterfield would require several utility relocations and the lowering of the Highway 101 intersection and its approaches. Additionally, the proposed rail crossing would be pushed further east towards San Elijo Ave to maintain rail service during construction. Therefore, the effective lowering of Chesterfield Drive is minimal.

Raising of Railroad Tracks

In order to provide the minimum vertical clearance, the railroad track would have to be raised substantially. The minimum vertical clearance per SCRRRA's Grade Separation Guidelines Section 8.8.1 is 16'-6" between the top of road and the bottom of the railroad bridge structure. Chesterfield Drive roadway and pedestrian walkways would be approximately 100 feet wide. Therefore, it is estimated for a double track bridge that the structure depth from the top of the rail to the bottom of the girder soffit would be approximately 6'-3" for a single 100' span through plate girder, or 5'-6" for two 50' span rolled beam girders. A through plate girder structure would likely minimize the closures to Chesterfield Drive. Two single track, through plate girder superstructures would reduce the superstructure depth further; however, the limited space between the existing track and San Elijo Ave do not allow for the track spacing and structure width to accommodate this structure type. The resulting railroad profile would have to be raised approximately 22'-9" to provide the necessary clearance for a Chesterfield underpass.

A track raise of this magnitude would require re-profiling beginning at STA 99+00, near Birmingham drive, and sloping up at 1.5% (the maximum slope identified in Section 6.2 above). After Chesterfield, the track would slope down at 1.5% and meet the existing track in the middle of the lagoon near STA 145+00. This would result in an approximate 10' track raise at Bridge 240.4 and a large retained earth structure under the track for the majority of this distance. All utilities and storm drain crossings along this distance would require relocation.

Constructability

The proposed raised track alignment would be located between the existing track and San Elijo Avenue in order to keep the existing track in service during construction. There is limited space in this area, requiring the removal of all existing gardens, walkways, and parking spaces. The existing track may also require realignment to the west in order to provide room for construction equipment. The raised alignment would require large retaining walls up to 23' tall on either side of the track. The largest drawback to this alternative would be the blocking of ocean views to all the businesses and housing east of the railroad tracks.

Chesterfield Over Railroad

Raising of Chesterfield Drive

A potential option to grade separate Chesterfield Drive would include the raising of Chesterfield Drive and lowering of the railroad in a trench. The limitations governing the lowering of Chesterfield would also apply to its raising. To maintain access to the local businesses, a raise of a couple feet would be possible. A roadway bridge similar to the proposed Birmingham overpass would be required.

Lowering of Railroad Tracks

In order to provide the minimum vertical clearance the railroad track would have to be lowered in a trench similar to the Birmingham discussion above. The span of 54' would have an estimated structure depth from the top of the roadway pavement to the bottom of the girder soffit of 4 feet. Similar to Birmingham, a SANDAG design exception would be requested to reduce the clearance to 24 feet between the Chesterfield bridge soffit and top of rail. Assuming a 2 foot raise of Chesterfield, the railroad tracks must be lowered approximately 26 feet from an existing elevation of 45.5' to a proposed elevation of 19.5'. The trench would start approximately 660' north of the Birmingham trench at STA 42+50. The trench would extend to approximately 1,350' south of the Birmingham trench at STA 123+00. Therefore, the Chesterfield option would require an additional 2,010' of trench length, and an additional 9' of trench wall height at its maximum.

Constructability

The construction for the Chesterfield trench would be identical and have similar issues to those discussed for the Birmingham option. However, the Birmingham option stopped short of Chesterfield Drive; for the trench to continue through Chesterfield several gas, sewer, electrical, water, and telecommunication lines will require relocation. Therefore, the Chesterfield grade separation will see additional closures to Chesterfield and more complex and difficult construction phasing than the Birmingham option. Additionally, the trench required for Chesterfield extends much further south to STA 123+00. At this location San Elijo Avenue is higher than the existing track, which will require additional trench wall height. Additionally, south of Chesterfield the space between San Elijo Ave and the existing track narrows. This will make the trench installation extremely difficult without temporarily shifting the existing track west during construction. This temporary shifting may also push into the San Elijo Lagoon Inlet Channel.

Chesterfield Grade Separation Feasibility

The Grade Separation at Chesterfield is not as viable as the grade separation of Birmingham. Raising of the railroad track over Chesterfield would require 23' tall retaining walls that would block ocean views of the Cardiff Community. This alternative would likely not be approved by the Local and State agencies or local community.

Lowering of the railroad in a trench under Chesterfield Drive would be significantly more expensive than the Birmingham option. The Chesterfield Grade separation would include additional trench length, trench height, utility relocation, environmental impacts, closures to Chesterfield during construction, and track closures/ shoofly during construction. The limited usable right-of-way at the southern tie in would add construction complications and may impact the San Elijo Lagoon inlet channel. Therefore, the Birmingham Grade Separation location is more feasible than the Chesterfield location.

San Elijo Lagoon Double Track

The San Elijo Lagoon Double Track (SELDT) Project is located on the San Diego Coaster Subdivision of NCTD's San Diego Northern Railroad from Control Point (CP) Cardiff (Mile Post (MP) 239.6) to CP Craven (MP 241.1) in the cities of Encinitas and Solana Beach. The north limits of this project would overlap with the Birmingham Grade Separation Trench. The SELDT Project has similar objectives as the LOSSAN EIR/EIS, which is to increase capacity through a double track alignment in Encinitas. The double track will also facilitate the replacement of an aging timber trestle Bridge 240.4, and coincide with the I-5 widening and San Elijo Lagoon Restoration. Any planned construction projects within lagoon limits must occur concurrently, as required by law in the Senate Bill 468 (Kehoe). Therefore, these three projects are currently being designed and are funded for construction to begin in 2016. The San Elijo Lagoon Double Track project 30% alignment has been used as the existing condition for this trench study; the trench alignment and staging was designed to accommodate features of the SELDT project. Therefore, the SELDT project would not preclude the Birmingham grade separation and trench from being constructed in the future.

7 PROJECT CONSTRUCTION COST ESTIMATE

The engineer's estimate of probable construction cost for this project is \$101.6 million in 2014 dollars. A summary of construction cost for key project elements is presented below. The detailed conceptual estimate with contingency and additional agency costs is attached in Appendix D.

Site Civil: \$1,269,908

Track: \$3,343,120

Signal: \$4,000,000

Structures: \$29,396,400

Culverts and Drainage: \$4,339,430

Site Mitigation: \$190,000

Utilities: \$500,000

Traffic: \$820,000

APPENDIX A

Rail Grade Crossing Evaluation Summary Ranking

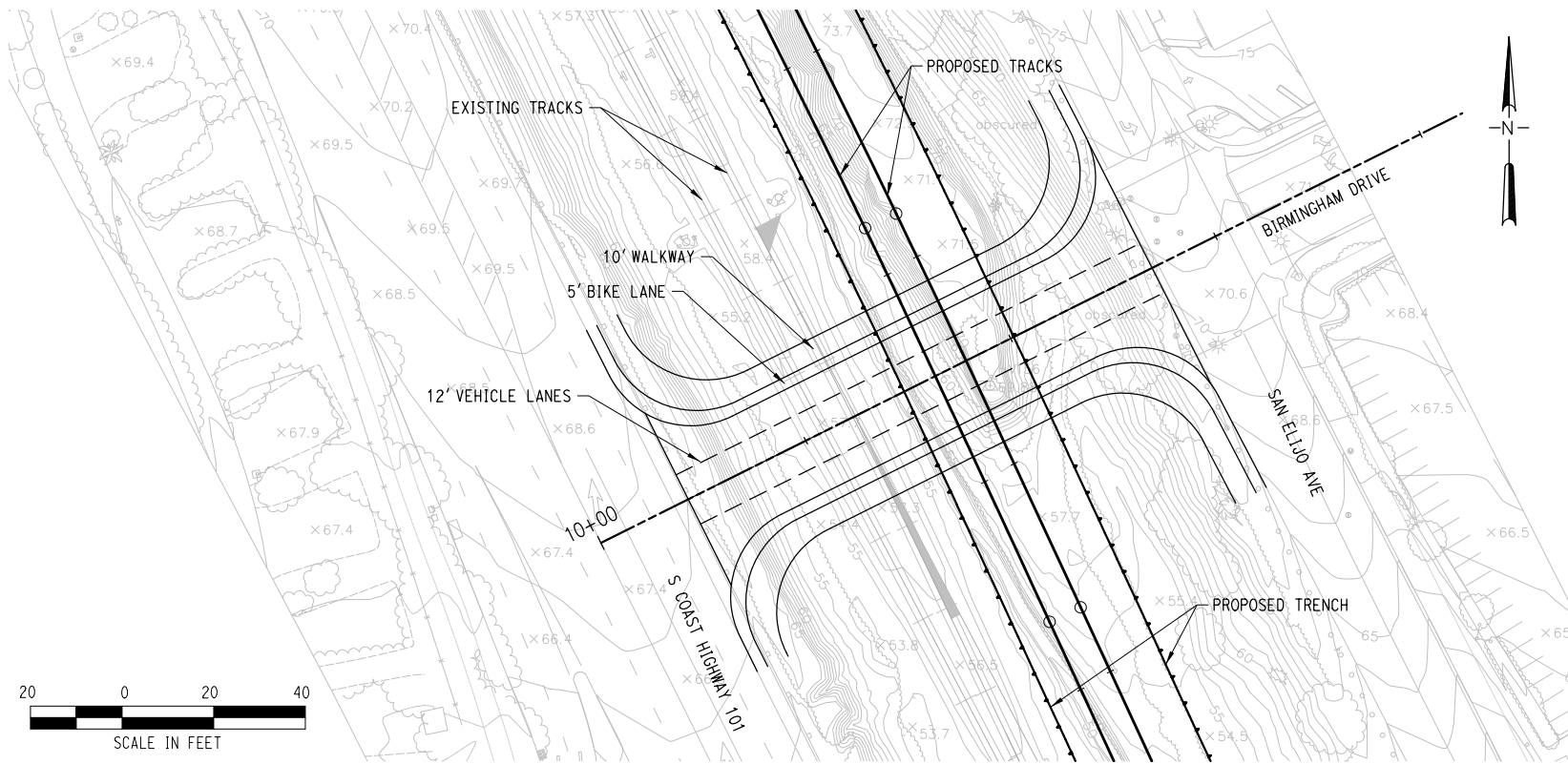
DRAFT RAIL GRADE CROSSING EVALUATION SUMMARY

Points based on Rail Grade Separation Evaluation Criteria
approved by the SANDAG Transportation Committee on October 16, 2009

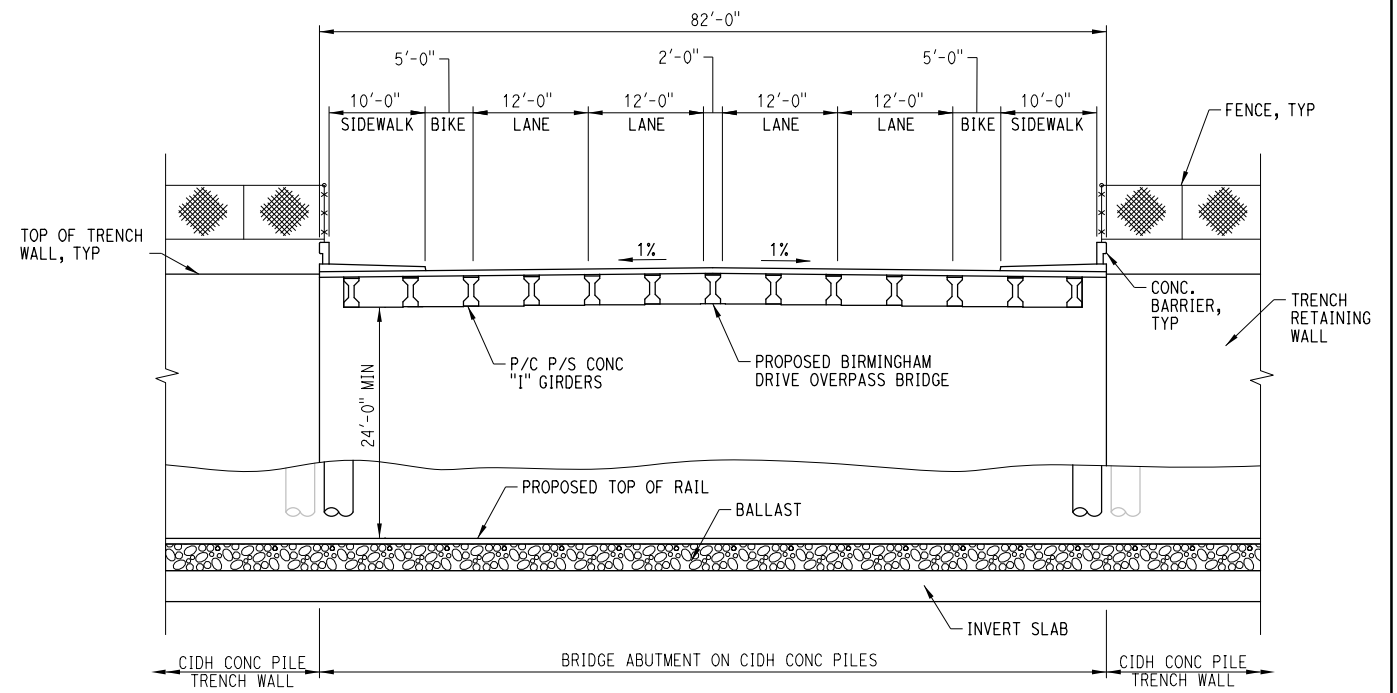
At Grade Crossing Location	Rank	Veh. per Day ADT	Trains per Day	Accidents	Total Points	Estimated Cost to Grade Separate (2010) (mill)	Assumptions
Washington, Laurel, Hawthorn, Grape, Ash, and Broadway Streets, San Diego	1	263,945	137	8	80.8	\$2,200	see note (1)
Taylor Street, San Diego	2	42,670	195	4	62.8	\$110	see note (4)
Broadway/Lemon Grove Avenue, Lemon Grove	3	40,403	144	2	57.8	\$80	light rail only (4)
Palomar Street, Chula Vista	4	59,337	206	0	55.5	\$40	light rail only (4)
H Street, Chula Vista	5	47,596	206	0	53.3	\$40	light rail only (4)
E Street, Chula Vista	6	45,658	206	1	50.3	\$40	light rail only (4)
Euclid Avenue, San Diego	7	37,000	144	0	46.3	\$40	light rail only (4)
Washington St./Sassafras St., San Diego	8	30,345	206	0	46.3	\$150	light rail only (4)
Vista Village Drive/Main Street, Vista	9	61,698	67	0	46.0	\$60	light rail only (2)
Civic Center Drive, Vista	10	40,782	67	0	46.0	\$40	light rail only
28th Street, San Diego	11	33,225	206	0	44.8	\$40	light rail only (4)
Ash Street, San Diego	12	30,575	206	0	44.0	\$100	light rail only
Broadway, San Diego	13	27,845	144	0	43.3	\$110	light rail only
32nd Street, San Diego	14	32,470	206	0	42.5	\$40	light rail only (4)
Allison Ave/University Ave/La Mesa Blvd, La Mesa	15	24,700	144	0	40.3	\$100	light rail only (4)
Severin Drive, La Mesa	16	13,611	288	2	40.3	\$40	light rail only (4)
Sorrento Valley Blvd., San Diego	17	37,990	51	1	39.5	\$130	
Melrose Drive, Vista	18	25,921	67	0	31.8	\$40	light rail only (2)
El Camino Real, Oceanside	19	35,911	67	0	31.7	\$40	light rail only (2)
North Drive, Vista	20	8,793	67	0	29.5	\$30	light rail only
Mar Vista Drive, Vista	21	9,665	67	0	28.8	\$30	light rail only
Los Angeles Drive, Vista	22	4,291	67	0	28.8	\$30	light rail only
Grand Avenue/Carlsbad Village Drive, Carlsbad	23	21,113	51	0	28.3	\$110	
Guajome Street, Vista	24	4,152	67	0	28.0	\$30	light rail only
Tamarack Avenue, Carlsbad	25	10,568	51	0	23.8	\$90	
Cannon Road, Carlsbad	26	12,434	51	0	22.3	\$90	
Leucadia Blvd., Encinitas	27	34,000	51	1	22.0	\$90	see note (3)
Total						\$3,940	
(1) Heavy rail trench only from Washington St. to Downtown San Diego estimated at \$1.9 billion							
(2) Included in the SPRINTER double track project (West Mission Rd, San Marcos also is included at estimated cost of \$40 million)							
(3) Included in the COASTER double track project							
(4) Included in Blue/Orange Lines frequency enhancements							

APPENDIX B

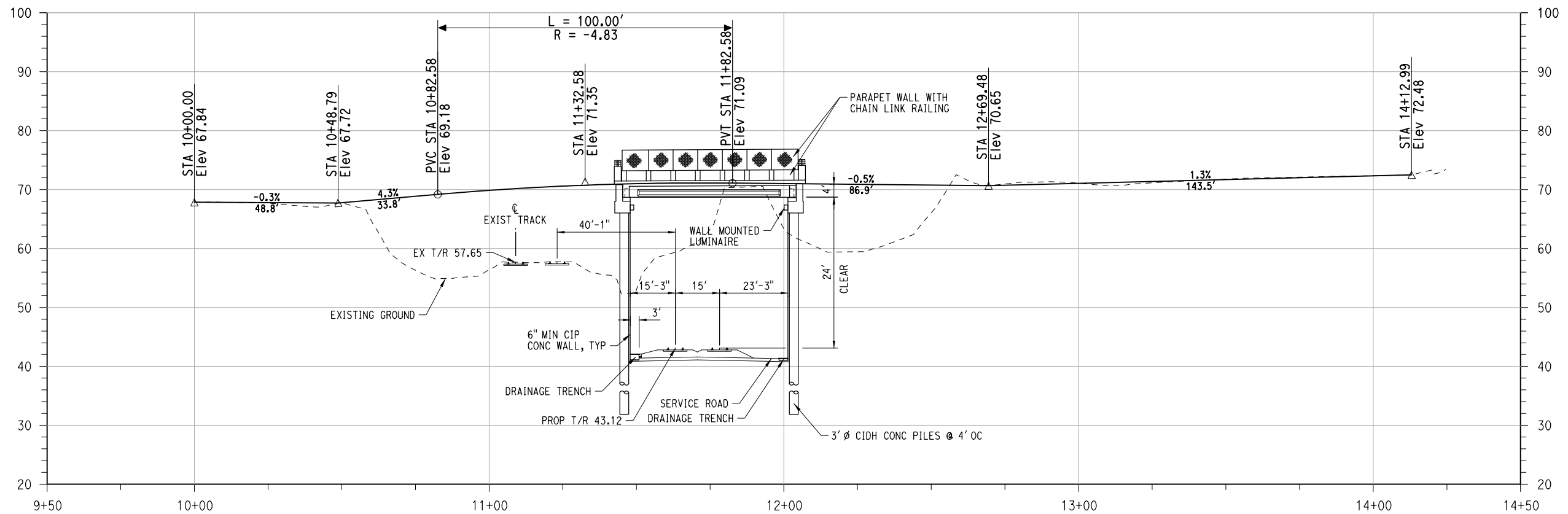
Birmingham Drive Overpass Plan and Profile



PLAN



TYPICAL SECTION
NTS



ELEVATION

REVISIONS

REV.	DATE	DESCRIPTION	BY	SUB	APP.

Information confidential
all plans, drawings, speci-
fications, and/or information
furnished herewith shall
remain the property of the
San Diego Association of
Governments and shall
be held confidential
and shall not be used for
any purpose not provided
for in agreements with the
San Diego Association of
Governments.

DESIGNED BY
DRAWN BY
CHECKED BY
APPROVED BY
DATE MONTH 2013

HDR
HDR Engineering, Inc.
3230 El Camino Real, Suite 200
Irvine CA 92614

SANDAG
San Diego's Regional Planning Agency

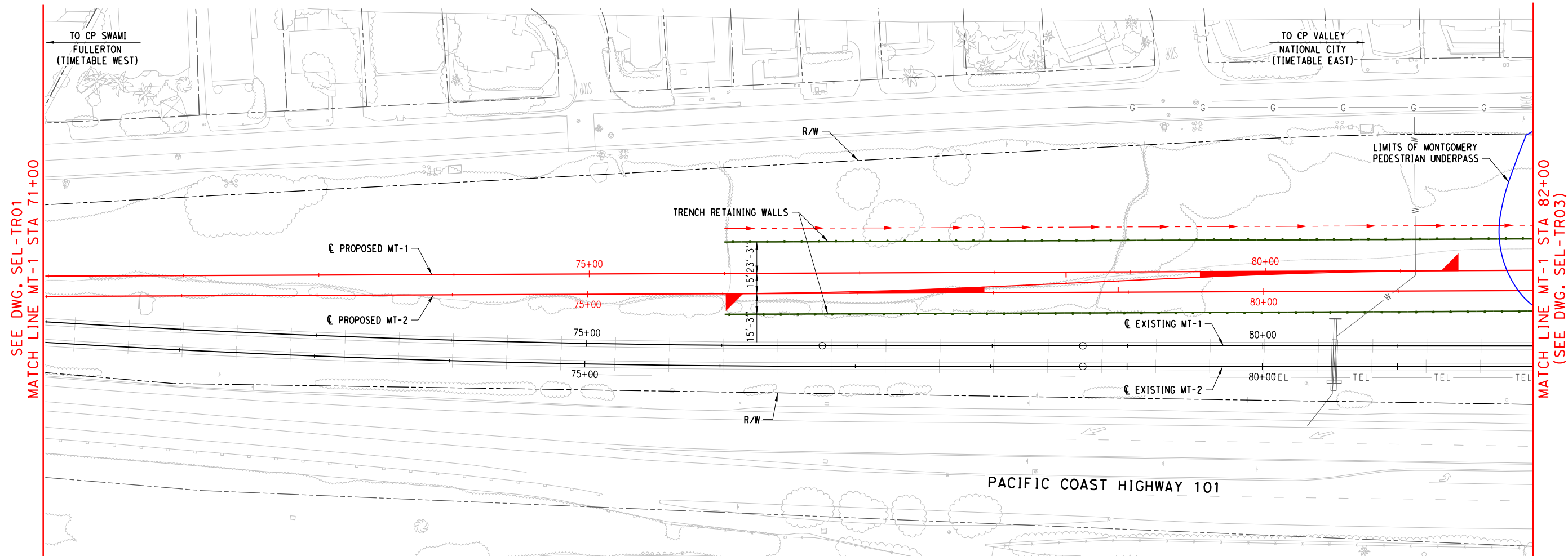
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BIRMINGHAM DRIVE GRADE SEPARATION
BIRMINGHAM BRIDGE EXHIBIT

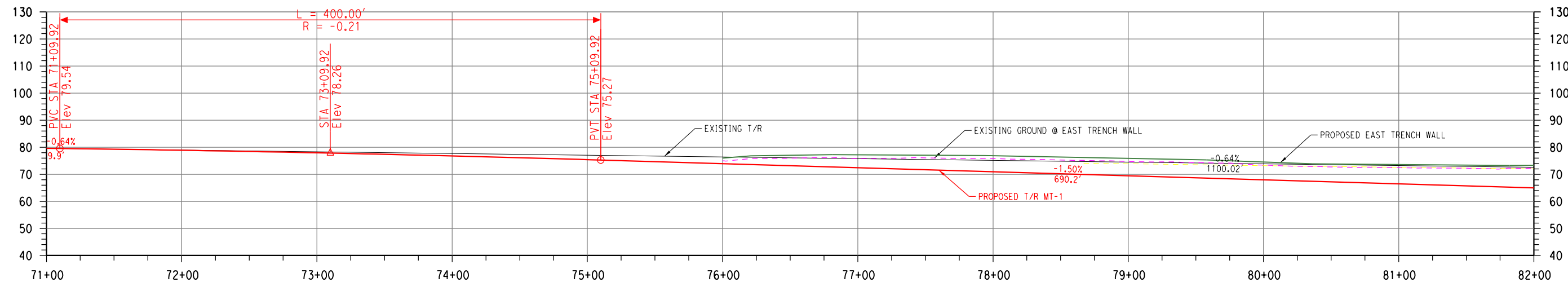
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REVISION	SHEET NO.
SCALE	

APPENDIX C

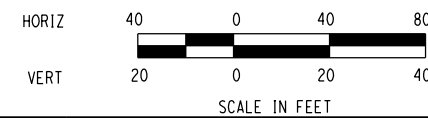
Grade Separation Trench Plan and Profile



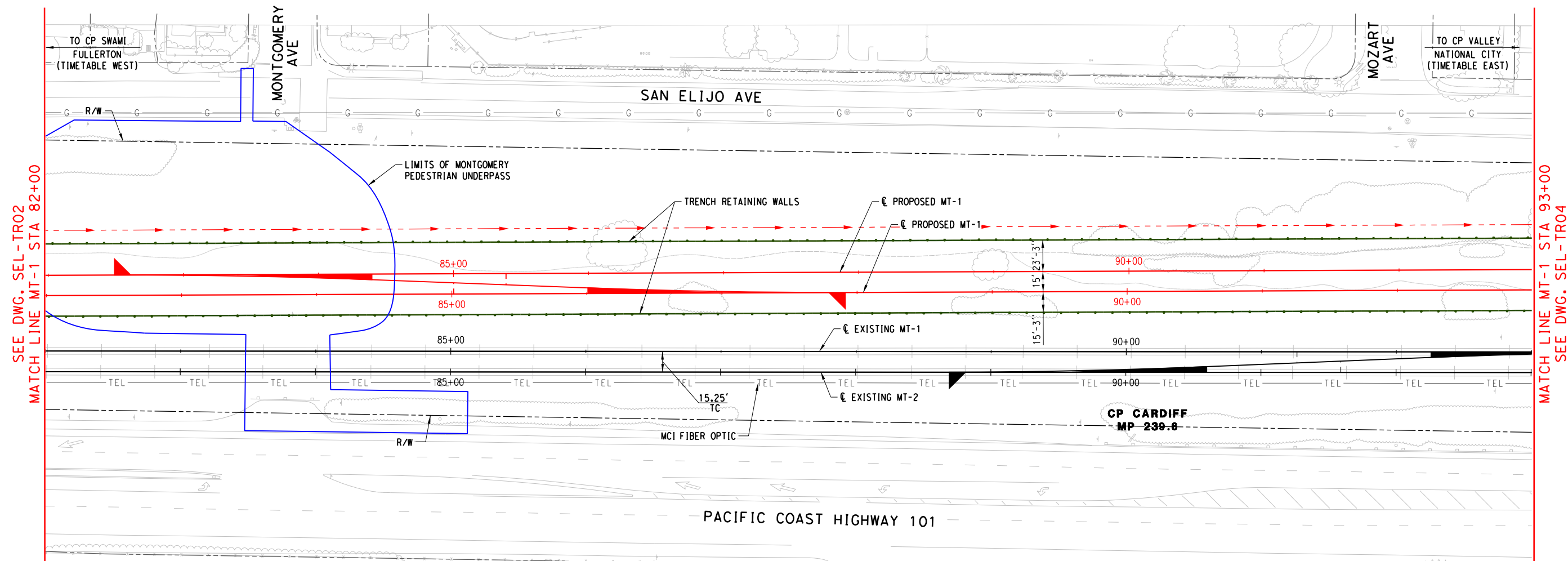
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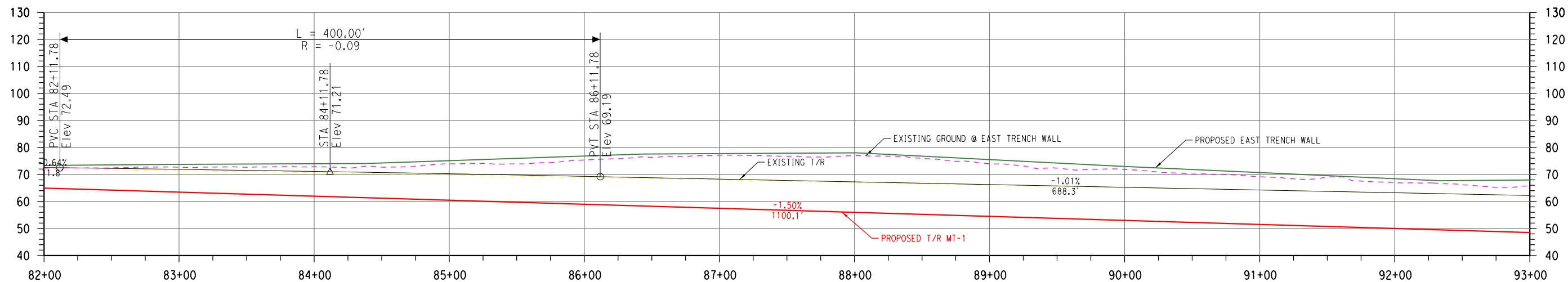
PROFILE VIEW



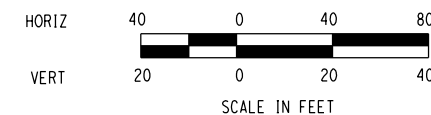
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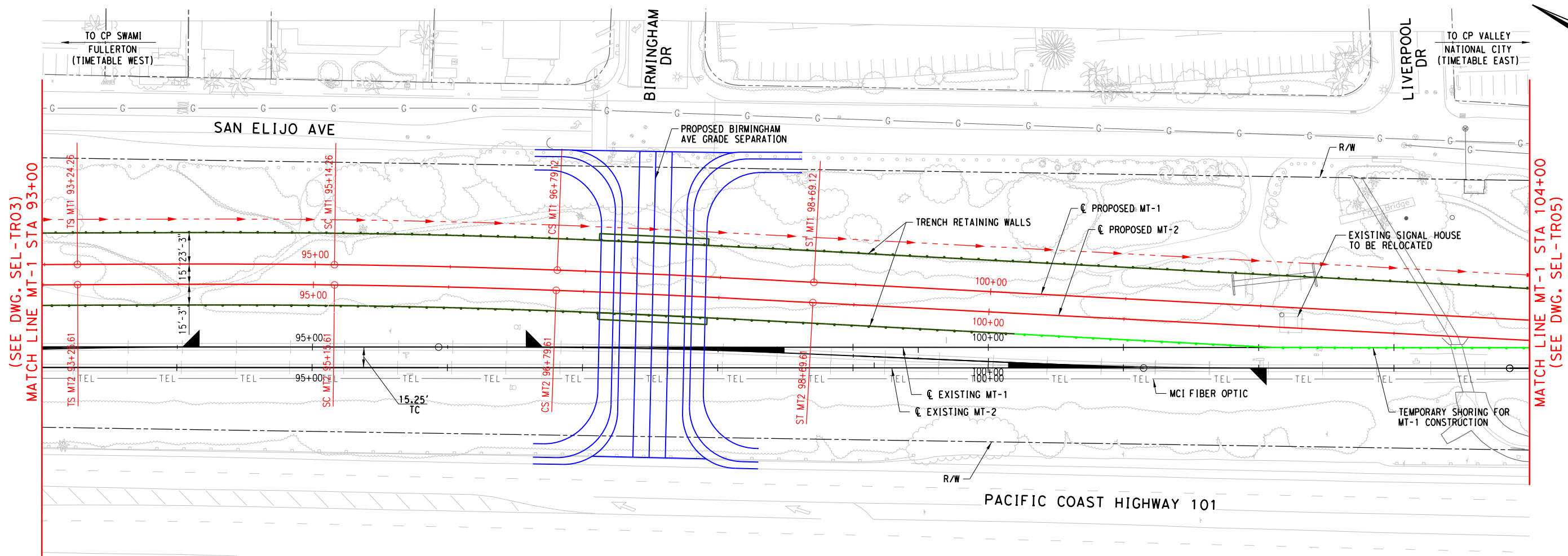
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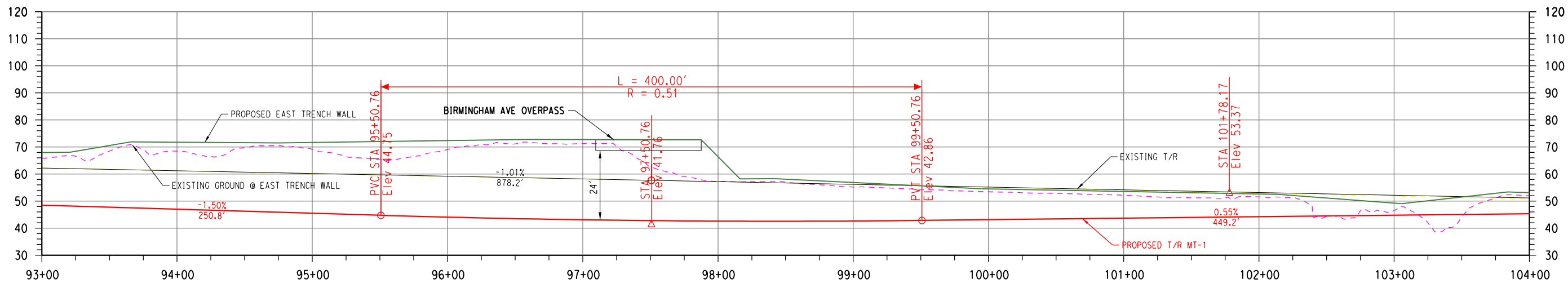
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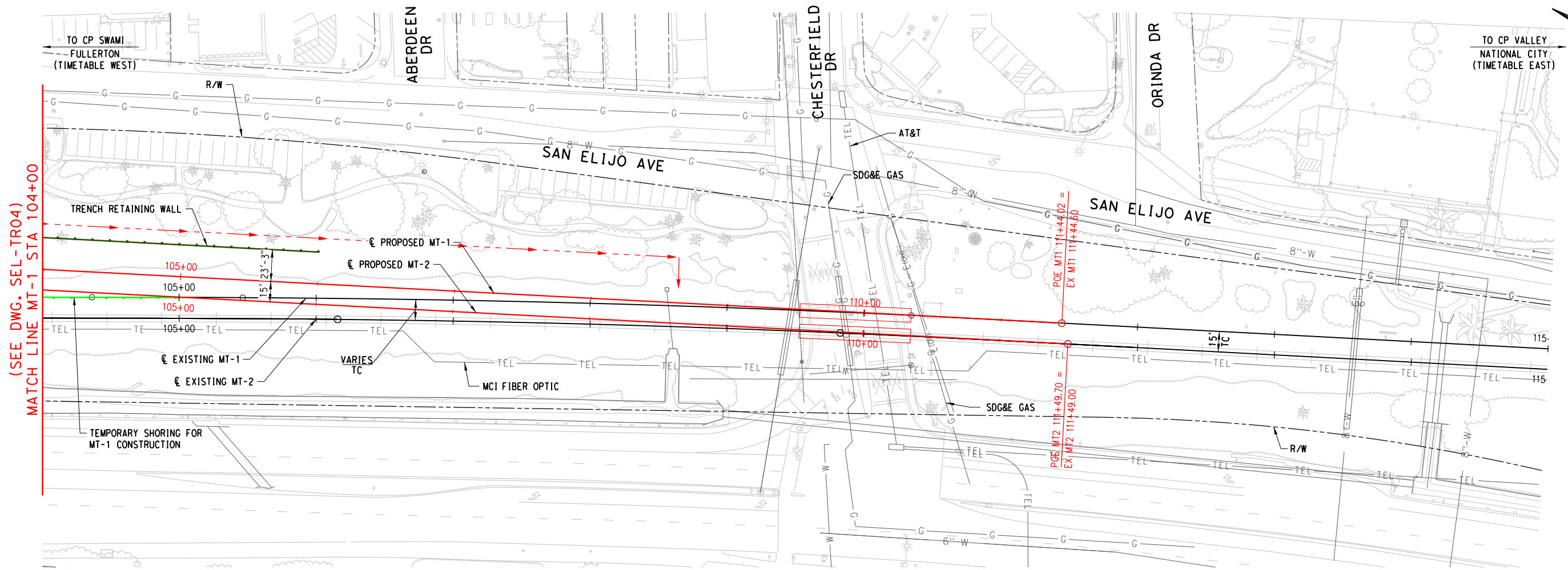


PLAN VIEW

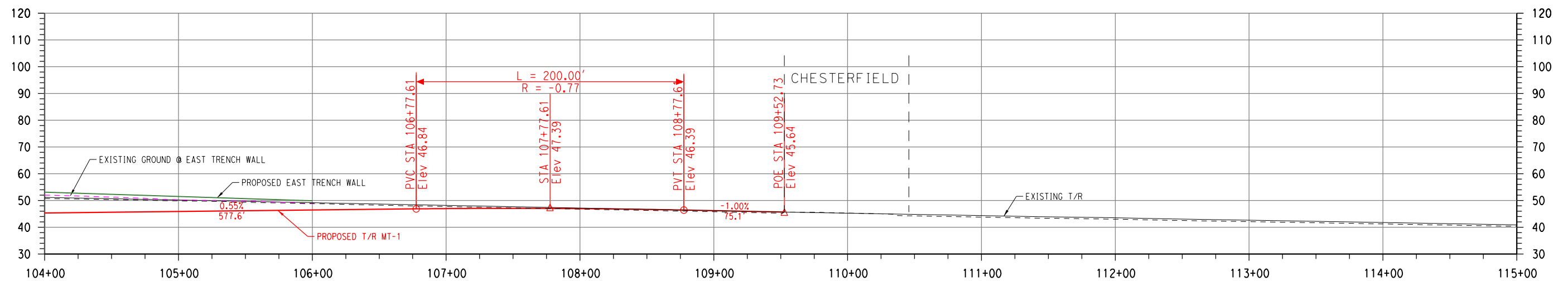


PROFILE VIEW

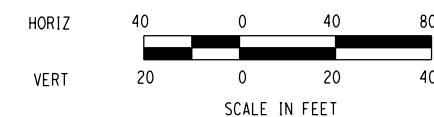
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PLAN VIEW



PROFILE VIEW



REVISIONS

REV.	DATE	DESCRIPTION	BY	SUB	APP.

Information confidential
all plans, drawings, speci-
fications, and/or information
furnished herewith shall
remain the property of the
San Diego Association of
Governments and shall
be held confidential
and shall not be used for
any purpose not provided
for in agreements with the
San Diego Association of
Governments.

DESIGNED BY
ACR
DRAWN BY
MRC
CHECKED BY
JRC
APPROVED BY
G. ROSCA
DATE
MONTH 2013

HDR
HDR Engineering, Inc.
3230 El Camino Real, Suite 200
Irvine CA 92614

SANDAG
San Diego's Regional Planning Agency

APPROVED: _____ DATE: _____

BIRMINGHAM DRIVE GRADE SEPARATION

TRACK PLAN AND PROFILE
MT-1 STA 104+00 TO STA 115+00

CONTRACT NO.
DRAWING NO. SEL-TR05
REVISION SHEET NO.
- OF
SCALE AS NOTED

APPENDIX D

Cost Estimate

Birmingham Drive Grade Separation PSR

PROJECT COST ESTIMATE

Revised: February 27, 2014

Design Level: **Conceptual Design**

Estimated By: **HDR**

Item	Quantity	Unit	Unit Price	Amount	Subtotal
DESIGN					
Agency Design Admin. (SANDAG)	3.11%	x	CCE	\$ 2,100,400	
Agency Program Management (SANDAG)	1.85%	x	CCE	\$ 1,248,700	
Agency Design Admin.(NCTD/MTS)	0.55%	x	CCE	\$ 368,200	
Alternative Analysis & Environmental	2.77%	x	CCE	\$ 1,870,500	
Design - Preliminary to 30%	2.77%	x	CCE	\$ 1,870,500	
Design - 30% to 60% and Permits	3.00%	x	CCE	\$ 2,027,000	
Design - 60% to Final PS&E	3.00%	x	CCE	\$ 2,027,000	
Independent Peer Reviews	0.67%	x	CCE	\$ 453,200	
DESIGN TOTAL					\$ 11,965,500
RIGHT OF WAY					
Temporary R/W, Easements	1	Acre	\$25,000	\$ 25,000	
Slope Easements	0	Acre	\$6,250	\$ -	
Footing/Utility Easements	0	Acre	\$25,000	\$ -	
Property Acquisition	0	Acre	\$100,000	\$ -	
Appraisals & ROW Consultant	25	%	R.O.W Costs	\$ 6,300	
Right-of-way Contingency (10% to 35%)	30	%	R.O.W Costs	\$ 7,500	
RIGHT OF WAY TOTAL					\$ 38,800
CONSTRUCTION CONTRACT ESTIMATE					
CONSTRUCTION CONTRACT ESTIMATE (CCE)					\$ 67,542,544
ANCILLARY CONSTRUCTION COSTS					
Agency Construction Admin. (SANDAG)	1.83%	x	CCE	\$ 1,237,200	
Agency Construction Prog. Mgmt. (SANDAG)	0.83%	x	CCE	\$ 563,900	
Agency Construction Admin. (NCTD/MTS)	0.34%	x	CCE	\$ 230,100	
Design Support During Construction	2.77%	x	CCE	\$ 1,870,500	
Construction Management	10.95%	x	CCE	\$ 7,397,500	
NCTD Signal & Maintenance Support & Testing	1.37%	x	CCE	\$ 923,600	
Flagging Services	2,000	Hr	\$65	\$ 130,000	
Busing Passengers	2	AWW	\$75,000	\$ 150,000	
ANCILLARY CONSTRUCTION COSTS					\$12,502,800
OFF-SITE ENVIRONMENTAL MITIGATION					
Tidal Wetlands Permanent Impact Mitigation	0	Acre	\$610,000	\$ -	
Tidal Wetlands Temporary Impact Mitigation	0	Acre	\$310,000	\$ -	
Other Wetlands Permanent Impact Mitigation	0.15	Acre	\$185,000	\$ 27,750	
Other Wetlands Temporary Impact Mitigation	0	Acre	\$135,000	\$ -	
Uplands Permanent Impact Mitigation	0.14	Acre	\$125,000	\$ 17,500	
Uplands Temporary Impact Mitigation	0	Acre	\$65,000	\$ -	
Other	0	Acre		\$ -	
Subtotal					\$45,250
TOTAL PROJECT COST ESTIMATE					\$92,094,894
COST ESCALATION					
Year of Expenditure	Annual %	Cumulative	Estimated	Escalation	
2012 (7/11 through 6/12)	0.0%	0.0%	\$ -	\$ -	
2013 (7/12 through 6/13)	0.0%	0.0%	\$ -	\$ -	
2014 (7/13 through 6/14)	0.0%	0.0%	\$ -	\$ -	

Birmingham Drive Grade Separation PSR**PROJECT COST ESTIMATE**

Revised: February 27, 2014

Design Level: **Conceptual Design**Estimated By: **HDR**

Item	Quantity	Unit	Unit Price	Amount	Subtotal
2015 (7/14 through 6/15)	1.0%		1.0%	\$ -	\$ -
2016 (7/15 through 6/16)	2.0%		3.0%	\$ -	\$ -
2017 (7/16 through 6/17)	2.8%		5.8%	\$ -	\$ -
2018 (7/17 through 6/18)	2.8%		8.6%	\$ 46,047,447	\$ 3,960,080
2019 (7/18 through 6/19)	2.8%		11.4%	\$ 46,047,447	\$ 5,249,409
2020 (7/19 through 6/20)	2.8%		14.2%	\$ -	\$ -
TOTAL EXPENDITURES IN 2011 DOLLARS				\$92,094,894	
TOTAL COST ESCALATION					\$ 9,209,489
PROJECT COST IN YEAR OF EXPENDITURE DOLLARS					\$101,304,383

Note: Project Risk Category based upon the SANDAG Design Procedures Manual is: Medium Risk

Birmingham Drive Grade Separation PSR

Construction Cost Estimate

Revised: February 27, 2014

Design Level: **Conceptual Design**

Estimated By: **HDR**

Item	Quantity	Unit	Unit Price	Amount	Subtotal
CONSTRUCTION					
1. Site Civil					
Clearing and Grubbing	6	AC	\$9,000	\$ 54,000	
Earth Embankment (FILL)	5,624	CY	\$9.00	\$ 50,616	
Excavation (CUT)	81,861	CY	\$12.00	\$ 982,332	
Construct pavement section	10,498	SF	\$5.00	\$ 52,490	
Minor Concrete (Sidewalk)	4,470	SF	\$5.00	\$ 22,350	
Minor Concrete (Curb and Gutter)	406	LF	\$20.00	\$ 8,120	
Removals	1	LS	\$100,000.00	\$ 100,000	
Subtotal					\$1,269,908
2. Track					
New Track	6,320	TF	\$260	\$ 1,643,200	
Remove Track	6,320	TF	\$40	\$ 252,800	
Shift Track	2,214	TF	\$80	\$ 177,120	
Crossover - No. 24	2	EA	\$575,000	\$ 1,150,000	
Turnout Removal	4	EA	\$30,000	\$ 120,000	
Subtotal					\$3,343,120
3. Signal					
Permanent / Temporary Signal Work	1	LS	\$4,000,000	\$ 4,000,000	
Subtotal					\$4,000,000
4. Structures					
Birmingham Overpass Bridge	1,000	SF	\$4,954	\$ 4,954,000	
Soldier Pile Retaining Wall (Trench)	91,400	SF	\$260	\$ 23,764,000	
Cable Railing for Retaining Walls	5,600	LF	\$14	\$ 78,400	
Temporary Shoring Wall	4,000	LF	\$150	\$ 600,000	
Subtotal					\$29,396,400
5. Culverts and Drainage					
Pump Station	1	LS	\$2,000,000	\$ 2,000,000	
Concrete Lined Ditch	3,265	LF	\$672	\$ 2,194,080	
72" Storm Drain	510	LF	\$285	\$ 145,350	
Subtotal					\$4,339,430
6. Site Mitigation					
SWPPP	1	LS	\$60,000.00	\$ 60,000	
On-site Uplands	2.00	Acre	\$65,000	\$ 130,000	
Subtotal					\$190,000
7. Utilities					
Misc Utilities Protection and Relocation	1	LS	\$500,000	\$ 500,000	
Subtotal					\$500,000
8. Traffic					
Traffic Management Plan	1	LS	\$50,000	\$ 50,000	
Traffic Delineation Items	1	LS	\$100,000	\$ 100,000	
Traffic Signal Modification	2	EA	\$150,000	\$ 300,000	
Traffic Signal	1	EA	\$200,000	\$ 200,000	
Traffic Signal Removal	1	EA	\$50,000	\$ 50,000	
Temporary Traffic Control	1	LS	\$100,000	\$ 100,000	
Roadside Signs/Overhead Signs	1	LS	\$20,000	\$ 20,000	

Birmingham Drive Grade Separation PSR

Construction Cost Estimate

Revised: February 27, 2014

Design Level: **Conceptual Design**

Estimated By: **HDR**

Item	Quantity	Unit	Unit Price	Amount	Subtotal
Subtotal					\$820,000
9. Minor Items (10% of 1-8)					\$4,385,886
Base Construction Estimate (BCE)				\$ 48,244,744	
Contractor Mobilization	7.50%	x	BCE	\$ 3,618,300	
Contractor Demobilization	2.50%	x	BCE	\$ 1,206,100	
Contingency	30%	x	BCE	\$ 14,473,400	
Subtotal					\$19,297,800
CONSTRUCTION COST ESTIMATE (CCE)					\$ 67,542,544