08 - SBd - 10 – PM 29.2/29.4
EA 1H160 – Project No. 0816000168
Program Code 800.100 (HE11)
May/2019

Project Report
For Project Approval

On Route Interstate 10 at Alabama Street

Between California Street Interchange

And Junction Route 210

I have reviewed the right of way information contained in this report and the right of way data sheet attached hereto, and find the data to be complete, current and accurate:

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Vicinity Map

On Interstate 10 from 0.1 mile west to 0.1 mile east of Alabama Street Overcrossing in the County of San Bernardino

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

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1. INTRODUCTION

Interstate 10 (I-10), is a major east-west freeway serving both local and interregional traffic. In an effort to improve traffic operations at the I-10/Alabama Street Interchange, the City of Redlands (City), in cooperation with the California Department of Transportation (Caltrans) District 8 and the San Bernardino County Transportation Authority (SBCTA), is proposing improvements to Alabama Street between Orange Tree Lane and Industrial Park Avenue at I-10 PM 29.2 to 29.4, and improvements to the off-ramps. This project proposes improvements to enhance traffic operations and alleviate traffic congestion, leading to an improved Level of Service (LOS). Future developments planned for this area will generate additional traffic. The proposed improvements are expected to relieve congestion and accommodate the projected traffic.

Table 1: Project Summary

Project Limits	08-SBd-10 29.2/29.4	
Number of Alternatives	2 (1 Build and 1 No Build)	
	Current Cost Estimate:	**Escalated Cost Estimate:**
Capital Outlay Support	$2.55 M	$2.55 M
Capital Outlay Construction	$9.86 M	$12.89 M
Capital Outlay Right of Way	$0	$0
Funding Source	San Bernardino County Measure I and Nexus Development Impact Fee	
Funding Year	2019/2020	
Type of Facility	Interchange	
Number of Structures	1 (Existing)	
Environmental Determination or Document	Categorical Exemption (CE) - CEQA	
Legal Description	On Interstate 10 from 0.1 mile west to 0.1 mile east of Alabama Street Overcrossing in the County of San Bernardino	
Project Development Category	5	

The project limits are shown in the location map provided in Attachment A. The project has a development category 5 as outlined in Attachment B, Project Development Category Letter and noted in Table 1.

The proposed improvements include widening Alabama Street in the northbound (NB) direction to accommodate a right turn pocket at the I-10 eastbound (EB) on-ramp. In addition, shoulders, sidewalks, and curb ramps will be brought to current Americans with Disabilities Act (ADA) standards along Alabama Street in the NB direction. Alabama Street is also proposed be widened in the southbound (SB) direction to accommodate a right turn pocket at the I-10 westbound (WB) on-ramp. The project also proposes to widen and reconstruct the WB and EB I-10 off-ramps to provide a total of four lanes at the terminus; one (1) dedicated left turn lane, one (1) dedicated right turn lane, one (1) shared left/through lane, and one (1) shared right/through lane. Retaining walls are proposed along the WB off-ramp, EB off-ramp, and along the right-turn pocket on NB Alabama Street. Boring for geotechnical investigation and potholing will be required for construction of the proposed improvements. The existing bridge

railing on the Alabama Street Overcrossing is not up to current standards, upgrading it is outside the project scope.

2. RECOMMENDATION

It is recommended that the proposed project be approved using the Build Alternative and that the project proceed to the design phase. The affected local agencies have been consulted with respect to the recommended plan, their views have been considered, and the local agencies are in general accord with the plan as presented.

3. BACKGROUND

Project History

A Project Study Report-Project Development Support (PSR-PDS) was initiated to request approval for the project to proceed to the Project Approval and Environmental Document phase (PA&ED) and was approved by Caltrans in December 2017. The PSR-PDS proposed improvements to Alabama Street between Orange Tree Lane and Industrial Park Avenue, and improvements to the off-ramps to enhance traffic operations at the I-10/Alabama Street. A total of two alternatives were analyzed during the PSR-PDS phase, which included the No Build alternative.

The proposed project is currently listed in SBCTA's Measure I Local Street Capital Improvement Plan and is a part of the City of Redlands Nexus Development Impact Fee. The improvement project has $10,968,000 programmed shared by both agencies. SBCTA and the City of Redlands have attended all pertinent project meetings including the monthly Project Development Team (PDT) meetings since the kickoff of the project and fully support the Build Alternative.

Community Interaction

Since the project has been identified as categorically exempt under the California Environmental Quality Act (CEQA), it does not require the preparation and circulation of a draft environmental document. As a result, a formal public meeting has not been held.

A Project Development Team (PDT) was identified to ensure collaborative communication among the stakeholders which includes representatives from SBCTA, Caltrans, and the City. The representatives have actively participated in the engineering and environmental studies leading up to the development of this Project Report (PR).

Existing Facility

I-10 serves as a major east-west freeway that originates in the City of Santa Monica in Los Angeles County, extends easterly through the Los Angeles metropolitan area and terminates at the east coast in the state of Florida. East of the junction with State Route 60, I-10 has been identified in the 2015 Interregional Transportation Strategic Plan (ITSP) as a Priority Interregional Highway. Furthermore, the I-10 is included in the State Freeway and Expressway System with the Federal Functional Classification of Interstate. The I-10 is listed in the National Highway System, Department of Defense Rural Interstates and Single Routing in

Urban Areas, and the Strategic Highway Corridor Network. I-10 is a major corridor for interstate and interregional movement of people and goods and is one of the major commuter routes between Los Angeles and the Inland Empire (San Bernardino and Riverside Counties). Moreover, I-10 serves recreational traffic from Los Angeles to resorts in the Coachella Valley, Colorado River, and other recreational facilities to the east. In the vicinity of the project, the posted speed limit is 65 miles per hour and there are four lanes in each direction.

Alabama Street, a major arterial, originates at Barton Road in the City of Redlands, continuing to 3rd Street in the City of San Bernardino where it changes name to Palm Avenue and continues north. Alabama Street within the project limits has a posted speed limit of 35 mph. Currently, the Alabama Street overcrossing between the freeway ramps consists of two through lanes and back-to-back left turn lanes in the NB and SB direction, with a sidewalk only on the east side. There are existing nonstandard 2:1 fill side slope along both sides of Alabama Street between Orange Tree Lane and Industrial Park. Other nonstandard features include a 58-foot access control to the north of the WB off-ramp on eastside of Alabama Street. Alabama Street serves as a major access point for commercial, business, and industrial sites, while also providing access to the San Bernardino International Airport. Much of Alabama Street is within the limits of the City of Redlands, except for a portion at the north end, referred to as the "Donut Hole", that is within County unincorporated area.

The Alabama Street Overcrossing (PM 29.3, Bridge Number 54-0593) was built in 1962. The structure consists of four spans of 10 cell reinforced concrete box girders with reinforced concrete open-end diaphragm abutments and three column bents, all founded on concrete piles. The west side of the bridge has a Type 1 barrier railing and the east side has a Type 5 barrier railing. The structure measures approximately 78 feet in width and 286 feet in length. The existing condition includes back-to-back, 12-foot left-turn lanes, 12-foot through lanes, five-foot outside shoulders, and a five-foot sidewalk on the east side. The existing bridge railing and sidewalk are nonstandard. Sidewalk and bridge railing upgrades are not part of the project scope.

Currently, there are no striped bicycle lanes on Alabama Street within the project limits for existing bicycle traffic. The sidewalk on the east side of street is the only available path for pedestrian traffic, there is no pedestrian access available on the west side of the street. The City of Redlands Bicycle Master Plan (January 2015) identifies planned on-street bicycle facilities on the east and west sides of Alabama Street in the project area. The SBCTA Non-Motorized Transportation Plan (2018) proposes future Class II striped bike lanes along Alabama Street.

The existing ramp intersections are signal controlled. The EB off-ramp is a single lane configuration that transitions into a dual lane at the terminus. The EB on-ramp is a dual lane configuration that transitions into a single lane. This lane merges with the Tennessee Street off-ramp towards the Tennessee Street intersection resulting in two lanes, then the dual lanes cross over Tennessee Street transitioning to a single lane prior to merging onto I-10. The WB on-ramp is a dual lane configuration that starts transitioning into a single lane at the ramp meter. The WB off-ramp is single lane configuration that merges with the Tennessee Street off-ramp towards the Alabama Street intersection resulting in two lanes. There are existing nonstandard side slopes (2:1) between the I-10 mainline and the EB off-ramp.

4. PURPOSE AND NEED

4A. PROBLEM, DEFICIENCIES, JUSTIFICATION

Purpose:

The purpose of the proposed project is to:

- Relieve existing and forecast congestion and improve traffic operations on the I-10 EB and WB off-ramps at Alabama Street;
- Improve circulation to the I-10 EB and WB on-ramps on Alabama Street;
- Address deteriorating pavement conditions along Alabama Street;
- Bring Alabama Street to ADA compliance in the NB direction.

Need:

The proposed project is needed to address the following deficiencies:

- The I-10 EB and WB off-ramps at Alabama Street experience excessive queueing and congestion, increasing the potential for vehicles to queue back to the freeway mainline. This condition is expected to worsen as forecasted volumes increase in the study area.
- Alabama Street is experiencing excessive queueing due to the lack of an exclusive right-turn lane on the I-10 EB and WB entrance ramps.
- Pavement conditions on Alabama Street are deteriorating and require treatment.
- Existing curb ramps on Alabama Street are not ADA compliant.

4B. REGIONAL AND SYSTEM PLANNING

Identify Systems

I-10 is listed in the National Highway System, Department of Defense Rural Interstates and Single Routing in Urban Areas, and the Strategic Highway Corridor Network. I-10 is a major corridor for interstate and interregional movement of people and goods and is one of the major commuter routes between Los Angeles and the Inland Empire (San Bernardino and Riverside Counties).

State Planning

Per the Caltrans District 8 Transportation Concept Report (TCR), I-10 is classified as an urbanized interstate in the proposed project area. The 2040 concept for this segment is 10 mixed flow lanes and four High Occupancy Toll (HOT) lanes per the 2016-2040 SCAG RTP/SCS, while a minimum of 12 total lanes would be needed to maintain a Level of Service (LOS D) through 2040. The project is within the jurisdiction of the I-10 Corridor Master Plan for San Bernardino County (April 2011) prepared by the Landscape Architecture Program.

Regional Planning

The 2016 Regional Transportation Plan (RTP), 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy prepared by the Southern California Association of Governments (SCAG), and the 2017 Federal Transportation Improvement Program

(FTIP) adopted by SCAG's Executive/Administration Committee include improvements to I-10 and the Alabama Street (Project ID No. 20159907). Per Amendment 10 to the FTIP, the project description has been updated to be consistent with the current project, no further updates are required at this time. The amended FTIP describes the project as "I-10 and Alabama Street intersection improvements with ramp widening."

Local Planning

The October 2016 City of Redlands General Plan designates Alabama Street as a Major arterial. The City of Redlands Bicycle Master Plan (January 2015) identifies planned on-street bicycle facilities on the east and west sides of Alabama Street in the project area. The City of Redlands Bicycle Master Plan does not designate a bicycle lane classification for proposed project area. However, in the SBCTA Non-Motorized Transportation Plan (2018), Alabama Street is identified as a future Class II bike lane. This project proposes Class II bike lanes to the north and south of the Alabama Street Overcrossing, which is consistent with the SBCTA Non-Motorized Transportation Plan.

Transit Operator Planning

The City of Redlands 2035 General Plan designates the proposed project area within a planned Transit Village. Coordination with the City of Redlands will take place in the Plans, Specifications & Estimate (PS&E) phase to ensure that the proposed project does not impact future transit planning.

4C. TRAFFIC

Current and Forecasted Traffic

A Traffic Operations Analysis Report (TOAR) for this project was approved on September 20th, 2018. The TOAR analyzed traffic forecasts at the intersections and ramps within the project limits and detailed findings. A summary of the TOAR findings is included in this section.

Existing intersection volumes for this project were collected during the AM peak period (7AM-9AM) and the PM peak period (4PM-6PM) consistent with Caltrans guidelines. Traffic volume counts were collected on November 15, 2017 (Wednesday), while schools were in session and in clear weather.

Traffic forecasts at the study intersections for Opening Year (2022) and Design Year (2042) were developed utilizing SBTAM and adjusted using the methodologies described in the National Cooperative Highway Research Program Report (NCHRP) 765 published by the Transportation Research Board (TRB). Base Year (2012) and Future Year (2040) SBTAM models were used to determine growth in the study area. Growth assumed in the model represents 28 years; however, for the purpose of this project, only 25 years of growth is required to reach the Design Year (2042). To achieve the Design Year forecast, growth was interpolated and the Difference Method (Existing Counts + Model Growth) was applied to arrive at the result. The adjusted forecasts were then balanced along the corridor to ensure that vehicles do not "disappear" in the simulation model. To balance the volumes,

conservation of flow was applied beginning with the upstream volumes and accounting for any trips entering or exiting the corridor through the study area. Minimal imbalances were observed between intersections on Alabama Street, due to driveways with access from Orange Tree Lane and Lugonia Avenue. For this reason, driveways were not included in the analysis as a conservative approach to ensure moderate operations at the study intersections.

Current Traffic

The Average Daily Traffic for the project area is shown in Table 2. The Annual Average Daily Traffic for the I-10 mainline is 182,500, based on the data from the Division of Traffic Operations website, which was extrapolated using the growth rate to be 191,700 in the construction year (2020) and 289,300 in the future year (2042).

Table 2: Average Daily Traffic

Segment Number	Roadway Segment	Existing (2017)	Opening Year (2022)	Design Year (2042)
1	Alabama Street north of Lugonia Avenue	17,900	19,300	24,900
2	Alabama Street between Lugonia Avenue and Orange Tree Lane	22,400	24,300	31,800
3	Alabama Street between Orange Tree Lane and I-10 WB Ramps	25,700	27,400	34,200
4	Alabama Street between Westbound Ramp and I-10 EB Ramps	26,900	28,500	34,900
5	Alabama Street between Eastbound Ramp and Industrial Park Avenue	29,600	31,200	37,300
6	Alabama Street between Industrial Park Avenue and Redlands Boulevard	25,800	27,300	33,200
7	Alabama Street south of Redlands Boulevard	19,700	20,800	25,300
8	Westbound On-Ramp	10,700	10,900	12,000
9	Westbound Off-Ramp	14,200	14,700	16,700
10	Eastbound On-Ramp	5,700	5,900	6,900
11	Eastbound Off-Ramp	11,200	12,300	16,900

Source: Fehr & Peers, 2018

The 2017 peak hour volumes for the ramp intersections are shown in Table **3**.

Table 3: 2017 Peak Hour Traffic Volumes

Location	AM Peak Hour	PM Peak Hour
I-10 WB Off-Ramp to Alabama Street	873	626
I-10 WB On-Ramp from Alabama Street	867	1,136
I-10 EB Off-Ramp to Alabama Street	776	796
I-10 EB On-Ramp from Alabama Street	222	578

Source: Fehr & Peers, 2018

The intersection operations results based on Existing Conditions (2017) are shown in Table 4. Level of Service (LOS) and delay are reported for all study intersections.

The following intersections were found to operate unacceptably under Existing Conditions (2017):

- Alabama Street & Lugonia Avenue – LOS D (PM Peak Hour)
- Alabama Street & I-10 EB Ramps – LOS E (AM Peak Hour)
- Alabama Street & Industrial Park Avenue – LOS D (AM Peak Hour)
- Alabama Street & Redlands Boulevard – LOS D (AM Peak Hour)

Table 4: Existing (2017) Intersection Analysis Summary

	Intersection	Control	Peak Hour	Existing (2017) Delay	Existing (2017) LOS
1	Alabama Street & Lugonia Avenue	Signal	AM	15.1	B
			PM	**53.4**	**D**
2	Alabama Street & Orange Tree Lane	Signal	AM	6.4	A
			PM	19.6	C
3	Alabama Street & I-10 WB Ramps	Signal	AM	54.8	D
			PM	35.7	D
4	Alabama Street & I-10 EB Ramps	Signal	AM	**64.0**	**E**
			PM	38.0	D
5	Alabama Street & Industrial Park Avenue	Signal	AM	**45.5**	**D**
			PM	28.8	C
6	Alabama Street & Redlands Boulevard	Signal	AM	**51.2**	**D**
			PM	31.9	C

Bold text indicates unacceptable operations
Source: Fehr & Peers, 2018

The maximum observed queues for Existing (2017) Conditions are reported in Table 5. Queueing is reported for all movements at the ramp terminal intersections.

The following existing turning movements exceed available storage at these ramp termini intersections during AM and PM Peak Hours:

- Alabama Street & I-10 WB Ramps
  - NB Left Turn (AM and PM Peak Hour)
  - NB Through (AM and PM Peak Hour)

- Alabama Street & I-10 EB Ramps
  - NB Through (AM and PM Peak Hour)
  - SB Through (PM Peak Hour)
  - SB Left Turn (PM Peak Hour)

Table 5: Existing (2017) Conditions Queuing Analysis Summary

Intersection	Movement	No Build		
		Storage (ft)	AM Queue (ft)	PM Queue (ft)
Alabama Street & Orange Tree Lane	NBT	550	120	190
	SBT	550	160	460
Alabama Street & I-10 WB Ramps	NBL	150	**210**	**210**
	NBT	405	**430**	**430**
	SBR[1]	-	-	-
	SBT	500	250	250
	WBL	1,300	520	540
	WBR	1,300	530	530
Alabama Street & I-10 EB Ramps	NBT	505	**540**	**540**
	NBR[1]	-	-	-
	SBL	155	130	**220**
	SBT	405	160	**430**
	EBL	450	410	410
	EBR	1,100	460	440
Alabama Street & Industrial Park Avenue	NBT	560	520	510
	SBT	560	310	310

Note: [1]Dedicated storage for this movement does not exist under the No Build Alternative.
Worst-case scenario is reported for movements with more than one lane.
Source: Fehr & Peers, 2018.

The systemwide performance measures used to evaluate this project include delay, density, and queuing. Travel time for the corridor was measured from Lugonia Avenue to Redlands Boulevard, where the total length of the corridor is 0.5 miles. Measures of effectiveness (MOEs) for existing (2017) conditions are shown in Table 6.

Table 6: Existing (2017) Systemwide Performance Measures

Systemwide MOE	Existing (2017)	
	AM	PM
Vehicle hours of delay (vhrs)	143	264
Delay per vehicle (sec/veh)	108	130.4
Demand Served (%)	98.1	98.0
Travel time: Alabama Street NB (min)	4.9	3.2
Travel time: Alabama Street SB (min)	2.2	3.9

Source: Fehr & Peers, 2018.

Forecasted Traffic

The operational analysis addresses the ramps and intersections on the local street system. Operational performance is based on measures such as delay, density, and queuing. The analysis results for LOS and queuing values for the No Build Alternative in the opening year (2022) and future year (2042) are provided in Table 7 and Table 8.

Table 7: No Build Intersection Analysis Summary

	Intersection	Control	Peak Hour	Opening Year (2022)		Design Year (2042)	
				Delay	LOS	Delay	LOS
1	Alabama Street & Lugonia Avenue	Signal	AM	20.9	C	**46.7**	**D**
			PM	**69.3**	**E**	**164.9**	**F**
2	Alabama Street & Orange Tree Lane	Signal	AM	12.1	B	9.1	A
			PM	23.1	C	**44.0**	**D**
3	Alabama Street & I-10 WB Ramps	Signal	AM	23.7	C	**83.8**	**F**
			PM	28.1	C	42.1	D
4	Alabama Street & I-10 EB Ramps	Signal	AM	21.0	C	43.9	D
			PM	30.2	C	**57.1**	**E**
5	Alabama Street & Industrial Park Avenue	Signal	AM	18.8	B	19.6	B
			PM	27.3	C	**57.4**	**E**
6	Alabama Street & Redlands Boulevard	Signal	AM	26.5	C	**40.2**	**D**
			PM	**42.0**	**D**	**90.5**	**F**

Bold text indicates unacceptable operations
Source: Fehr & Peers, 2018

Table 8: No Build Queuing Analysis Summary

Intersection	Movement	Opening Year (2022)			Design Year (2042)		
		Storage (ft)	AM Queue (ft)	PM Queue (ft)	Storage (ft)	AM Queue (ft)	PM Queue (ft)
Alabama Street & Orange Tree Lane	NBT	550	210	120	550	170	220
	SBT	550	180	460	550	220	470
Alabama Street & I-10 WB Ramps	NBL	150	**180**	**180**	150	**210**	**180**
	NBT	400	**420**	**410**	400	**420**	**430**
	SBR[1]	-	-	-	-	-	-
	SBT	500	250	320	500	240	390
	WBL[1]	-	-	-	-	-	-
	WBLT	1,100	430	370	1,100	**1,170**	620
	WBRT	1,100	450	340	1,100	**1,170**	550
	WBR[1]	-	-	-	-	-	-
Alabama Street & I-10 EB Ramps	NBT	500	**540**	**560**	500	**550**	**570**
	NBR[1]	-	-	-	-	-	-
	SBL	160	120	**180**	160	130	**180**
	SBT	410	150	340	410	150	400
	EBL[1]	-	-	-	-	-	-
	EBLT	450	330	390	450	**600**	**480**
	EBRT	1,100	290	390	1,100	1,050	**1,120**
	EBR[1]	-	-	-	-	-	-
Alabama Street & Industrial Park Avenue	NBT	560	310	360	560	310	360
	SBT	560	260	300	560	230	480

Note: [1]Dedicated storage for this movement does not exist under the No Build Alternative.
Worst-case scenario is reported for movements with more than one lane.
Source: Fehr & Peers, 2018.

The analysis results for LOS and queuing values for the Build Alternative in the opening year (2022) and future year (2042) are provided in Section 5A, Viable Alternatives.

Collision Analysis

Table 9 summarizes the average collision rates on similar facilities and the comparison to the average for the study facilities. Table 10 shows the accident types found to occur on the study facilities.

Collision rates on the study facilities exceed the rates for similar facilities. It should be noted that the WB and EB off-ramps have higher collision rates than the average of similar facilities across all categories.

Table 9: Facility Collision Rate for Ramps & Ramp Terminal Intersections

Location	Actual Rates			Average Rates		
	Fat	F+I	Tot	Fat	F+I	Tot
I-10 WB Off-Ramp to Alabama Street	0.000	**3.93**	**5.02**	0.002	0.08	0.25
I-10 EB Off-Ramp to Alabama Street	0.000	**0.82**	**1.55**	0.004	0.32	0.92

F+I = Fatality and injury
Accident rates expressed as number of accidents per million vehicles
Source: Caltrans TASAS, July 1, 2015 to June 30, 2018

The primary collision type in the study area is rear-end, followed by broadside for the EB off-ramp and hit object for the WB off-ramp. A major contributor to rear-end collisions on freeway ramps is queueing. In the existing condition, the maximum queue on the WB off-ramp is 540 feet, while the queue on the EB off-ramp is 460 feet. Queueing on the ramps is expected to increase with future traffic volumes in the area. An increase in queueing creates the potential for spillback to the freeway mainline creating a safety concern. As the proposed project will widen both the EB and WB off-ramps and provide additional storage, the project will improve this condition by eliminating the potential for spillback to the mainline and enhancing safety for off-ramps to Alabama Street and at ramp terminal intersections.

Table 10: Collision Type for Ramps & Ramp Terminal Intersections

Location	Sideswipe	Rear End	Broadside	Hit Object	Overturn	Auto-Pedestrian
I-10 WB Off-Ramp to Alabama Street	0.0%	56.5%	8.7%	26.1%	4.3%	0%
I-10 EB Off-Ramp to Alabama Street	5.9%	76.5%	17.6%	0%	0.0	0%

Source: Caltrans TASAS, July 1, 2015 to June 30, 2018

5. ALTERNATIVES

5A. VIABLE ALTERNATIVES

The PDT has developed a single Build Alternative that is deemed viable for the PA&ED phase. The Build Alternative proposes the widening of Alabama Street and widening and reconstruction of the I-10 off-ramps with the addition of dedicated left and right turn lanes. A No Build alternative was also analyzed for the proposed project. Under the No Build alternative, no reconstruction or improvements would be made to the existing Alabama Street or to the existing I-10/Alabama Street interchange other than routine roadway

maintenance. This alternative does not meet the Project Purpose and Need. Rather, this alternative provides a basis for the analysis and evaluation of the Build Alternative.

Proposed Engineering Features

The Build Alternative proposes the following improvements to Alabama Street and the I-10 ramps.

Alabama Street Improvements

The proposed improvements include widening Alabama Street in the NB direction to provide a right turn pocket to serve the I-10 EB on-ramp, a four-foot bike lane, and a four-foot shoulder (at the right turn pocket). The project also proposes to upgrade sidewalks and curb ramps to current ADA standards in the NB direction (except on the Alabama Street overcrossing, where the existing sidewalk will be maintained). Street widening in the SB direction proposes to provide a right turn pocket to serve the I-10 WB on-ramp, with a four-foot bike lane and a four-foot shoulder at the right turn pocket. Alabama Street is proposed to have standard access control in the southwest, southeast, and northwest quadrants of the project. However, a nonstandard access control of 44 feet is proposed on NB Alabama Street from the WB off-ramp as noted in the Nonstandard Design Features section of this report.

The Alabama Street overcrossing is proposed to be restriped to have three 11-foot lanes and two 12-foot outside lanes. The shoulders at the overcrossing are proposed to vary from five feet and eight feet.

I-10 and Alabama Street Ramp Improvements

The existing two-lane I-10 EB and WB off-ramps are proposed to be widened and reconstructed to provide a total of four lanes each at the ramp terminus. Each ramp intersection approach is proposed to have a lane configuration consisting of dedicated left and right turn lanes, shared left/through lane, and a shared right/through lanes. Mill and overlay and a minor widening are proposed for the I-10 EB on-ramp. Other proposed improvements include upgrading curb ramps to ADA standards and providing maintenance vehicle pullouts. Below is a description of the proposed typical sections for the I-10 ramps and Alabama Street.

- The EB off-ramp is proposed to have a four-foot inside shoulder, 12-foot left turn lane, 14-foot shared left through lane, 12-foot shared right through lane, 12-foot right turn lane, and an eight-foot outside shoulder.
- The EB on-ramp will be maintained at two 12-foot lanes. A 10-foot pedestrian crosswalk is proposed across the ramp.
- NB Alabama Street at the I-10 EB ramp intersection is proposed to have two 12-foot through lanes, a four-foot bike lane, a 16-foot right turn lane, and a 6-foot wide sidewalk.
- SB Alabama Street at the I-10 EB ramp intersection is proposed to have an outside shoulder of five-feet, 12-foot through lane, 11-foot through lane, and 11-foot left turn lane.

- The WB off-ramp is proposed to have a four-foot inside shoulder, 12-foot left turn lane, 14-foot shared left through lane, 12-foot shared right through lane, 12-foot right turn lane, and an 8-foot outside shoulder.
- The WB on-ramp will be maintained as existing with two 12-foot lanes.
- NB Alabama Street at the I-10 WB ramp intersection is proposed to have an outside shoulder of five-feet, 12-foot through lane, 11-foot through lane, and 11-foot left turn lane.
- SB Alabama Street at the I-10 WB ramp intersection is proposed to have two 12-foot through lanes, a four-foot bike lane, and a 16-foot right lane.

The proposed improvements are shown in the layouts and typical sections provided in Attachment D.

Traffic Analysis

The analysis results for LOS and queuing values for the Build Alternative for future year (2042) are provided in Table 11 and Table 12. As can be seen, the Build Alternative results in improved LOS and queuing.

Table 11: Build Alternative Intersection Analysis Summary

	Intersection	Control	Peak Hour	Opening Year (2022)		Design Year (2042)	
				Delay	LOS	Delay	LOS
1	Alabama Street & Lugonia Avenue	Signal	AM	21.6	C	**46.0**	**D**
			PM	**56.2**	**E**	**98.3**	**F**
2	Alabama Street & Orange Tree Lane	Signal	AM	13.6	B	10.0	B
			PM	12.7	B	**52.9**	**D**
3	Alabama Street & I-10 WB Ramps	Signal	AM	19.4	B	23.8	C
			PM	19.0	C	50.5	D
4	Alabama Street & I-10 EB Ramps	Signal	AM	17.0	B	30.6	C
			PM	23.0	C	**57.8**	**E**
5	Alabama Street & Industrial Park Avenue	Signal	AM	15.9	B	24.9	C
			PM	25.2	C	**77.3**	**E**
6	Alabama Street & Redlands Boulevard	Signal	AM	27.2	C	**41.4**	**D**
			PM	**36.7**	**D**	**85.8**	**F**

Bold text indicates unacceptable operations
Source: Fehr & Peers, 2018

Table 12: Build Alternative Queuing Analysis Summary

Intersection	Movement	Opening Year (2022)			Design Year (2042)		
		Storage (ft)	AM Queue (ft)	PM Queue (ft)	Storage (ft)	AM Queue (ft)	PM Queue (ft)
Alabama Street & Orange Tree Lane	NBT	550	210	130	550	240	490
	SBT	550	160	180	550	140	460
	NBL	120	**210**	**180**	120	**180**	**180**
	NBT	400	**420**	**420**	400	**430**	**420**
	SBR[1]	490	130	220	500	110	**550**
Alabama Street & I-10 WB Ramps	SBT	500	140	270	500	140	**540**
	WBL[1]	720	230	210	720	230	290
	WBLT	1,100	280	270	1,100	280	330
	WBRT	1,100	290	220	1,100	310	290
	WBR[1]	720	250	140	720	260	240
	NBT	500	**520**	**540**	500	**530**	**560**
	NBR[1]	350	120	260	350	320	**380**
	SBL	120	**150**	**180**	120	160	180
Alabama Street & I-10 EB Ramps	SBT	410	140	350	410	180	**450**
	EBL[1]	450	170	220	450	280	330
	EBLT	450	200	260	450	290	390
	EBRT	1,100	210	260	1,100	380	390
	EBR[1]	450	170	220	450	230	330
Alabama Street & Industrial Park Avenue	NBT	560	300	350	560	330	350
	SBT	560	270	270	560	390	550

Note: [1]Dedicated storage for this movement does not exist under the No Build Alternative.
Worst-case scenario is reported for movements with more than one lane.
Source: Fehr & Peers, 2018.

Under the Opening Year (2022) scenario, the Build Alternative would improve traffic operations at both the WB and EB ramp terminal intersections during the AM and PM peak hours. Both ramp intersections would improve from LOS C to B during the AM peak hour and continue to operate at LOS C with reduced delay during the PM peak hour. In addition, the intersections of Alabama Street & Lugonia Avenue, Alabama Street & Orange Street, Alabama Street & Industrial Park Avenue, and Alabama Street & Redlands Boulevard, which operate deficiently under the No Build Alternative during the PM peak hour, would also experience improved operations with reduced delay under the Build Alternative. The improvements on the EB and WB off-ramps would reduce queuing on the off-ramps by approximately 100 feet or more for all movements during both peak hours. This is expected to improve operations on the off-ramps as well as safety, as rear-end collisions are the main collision type on the off-ramps.

Under the Design Year (2042) scenario, the project improvements will contribute to decreased delay at most study locations. Study locations that do not experience a decrease in delay will see an increase in demand served. No study locations are degraded from acceptable LOS to unacceptable LOS as a result of the project improvements.

Queueing on the off-ramps is decreased under both the AM and PM peak hours. In the Design Year under the No Build Alternative, queueing is expected to exceed 1,000 feet on the EB off-ramp, leaving less than 100 feet between the gore-point and the end of the queue. With the project improvements in place, queuing is reduced to less than 400 feet for the EB off-ramp. Queueing is also decreased on the WB off-ramp under both the AM and PM peak hours from over 1,000 feet to less than 350 feet. For both off-ramps the reduced queueing is both an operational improvement and a safety improvement due to the limited storage on the EB off-ramp and the connector-distributer and connections to the SR-210 ramps and Tennessee Street.

Since the EB ramp intersection does not meet the Caltrans minimum 20-year design life based on the LOS criteria required by Caltrans, an analysis was conducted to identify what the expected design life is for this intersection (commonly referred to as a failure year assessment).

The analysis indicate that the intersection would continue to operate at an acceptable LOS of D or better for 19 years (or a failure year of 2041). The operations results for the PM peak hour are summarized in Table 13.

Table 13: PM Peak Hour Failure Year LOS Summary

	Intersection	Control	Build	
			Delay	LOS
1	Alabama Street & Lugonia Avenue	Signal	**73.0**	**F**
2	Alabama Street & Orange Tree Lane	Signal	53.2	D
3	Alabama Street & I-10 WB Ramps	Signal	49.3	D
4	Alabama Street & I-10 EB Ramps	Signal	53.1	D
5	Alabama Street & Industrial Park Avenue	Signal	**73.3**	**E**
6	Alabama Street & Redlands Boulevard	Signal	**85.0**	**E**

Bold text indicates unacceptable operations
Source: Fehr & Peers, 2018

A horizon year exception letter has been approved and signed by Caltrans, SBCTA, the County of San Bernardino, and the City of Redlands. This letter is included as Attachment C.

Retaining Walls

Three retaining walls are proposed for the project. The approximate locations of the retaining walls are shown in Attachment D, Layouts and Typical sections. Based on a review of preliminary geometric drawings and discussions with the PDT, the retaining walls are proposed to be constructed as modified Caltrans Type 1 (2018a) cast-in-place retaining walls. The maximum retained heights of the walls is anticipated to be approximately 17 feet or less. Based on the need for overhead signs near the termini of the WB and EB off-ramps, the retaining walls at these locations may require modification to accommodate cast-in-drilled-hole (CIDH) pile foundations for overhead signs. It is anticipated that shallow foundations are suitable for the Caltrans Type 1 (2018) walls. However, based on the descending slopes as part of the I-10 Alabama Street Interchange embankments and the possible need to incorporate overhead sign foundations, subsurface exploration,

laboratory testing, and additional analysis will be required to confirm this conclusion.

Structural Section
A Life-Cycle Cost Analysis (LCCA) was developed for the proposed project to evaluate pavement investment. The structural sections proposed for the Build Alternative are identified in the LCCA, Attachment E. It should be noted that the existing EB and WB off-ramps will be removed to the subgrade and will be constructed without a drainage layer (ATPB).

Drainage
Per the Drainage Report approved on September 25, 2018, the proposed project will construct new drainage inlets at the edge of the ramps, as well as provide piping to accommodate the ramp widening. Furthermore, impacted drainage inlets along Alabama Street will be replaced.

Nonstandard Design Features

A Design Standard Decision Document (DSDD) has been prepared for the design features that deviate from the design standards in the Highway Design Manual. There are two existing nonstandard features that will be perpetuated under the proposed project:

- An existing 250-foot nonstandard sag vertical curve along Alabama Street south of I-10 with a stopping sight distance of 306 feet.
- An existing 300-foot nonstandard sag vertical curve along Alabama Street north of I-10 with a stopping sight distance of 399 feet.

The DSDD has identified three (3) nonstandard design features associated with the Build Alternative. The DSDD was approved on March 12, 2019. The following summarizes each deviation:

Boldface Standard - Feature #1 - Access Control

Nonstandard feature:
The access control for the westbound off-ramp to Alabama Street does not extend the standard 50 feet beyond the ramp curb return at the intersection. The existing access control is 58 feet and the proposed distance is 44 feet.

Standard for which documentation is required:
Index 504.8 of the HDM states that **access control shall extend at least 50 feet beyond the end of the curb return, ramp radius, or taper.**

Underlined Standard - Feature #1 - Corner Sight Distance

Nonstandard feature:
The intersection of the I-10 EB off-ramp with Alabama Street does not meet the minimum corner sight distance (CSD) required for the given design speed.

Standard for which documentation is required:
HDM Index 405.1(2)(b) states that the minimum value for corner sight distance at signalized intersections should be equal to the stopping sight distance as given in Table 201.1, measured as previously described. This includes an urban driveway that forms a leg of the signalized intersection

Underlined Standard – Feature #2 - Side Slope Standards

Nonstandard feature:
The existing 2:1 slope will be maintained in the proposed condition along the north side of the EB off-ramp ("AL-R1" Sta 21+70 to Sta 27+26) and any further grading to the inside will cause impacts to the I-10 mainline. Additionally, the existing 2:1 slope will be maintained in the proposed condition along SB Alabama Street between Orange Tree Lane and the WB on-ramp ("AL" Sta 350+94 to Sta 356+26) and along NB Alabama Street from the WB off-ramp to the end of the proposed sidewalk reconstruction ("AL" Sta 351+23 to Sta 352+70).

Standard for which documentation is required:
Index 304.1 of the HDM states that slopes should be designed as flat as is reasonable. For new construction, widening, or where slopes are otherwise being modified, embankment (fill) slopes should be 4:1 or flatter.

Interim Features

There are no proposed interim improvements within the project limits.

High-Occupancy Vehicle (Bus and Carpool) Lanes

There are no High-Occupancy Vehicle (HOV) lanes within the project limits. HOV preferential lanes are not provided on the I-10 Alabama on-ramps.

Ramp Metering

There are no ramp metering services for the I-10 Alabama EB on-ramp. However, the I-10 Alabama WB on-ramp does have a ramp metering system, which will not be impacted by the proposed project.

California Highway Patrol (CHP) Enforcement Areas

Because there are no HOV preferential lanes on the I-10 on-ramps, there are no CHP Enforcement Areas within the project limits.

Park-and-Ride Facilities

There are no existing Park-and-Ride facilities located within the project limits. Additional Park-and-Ride facilities are not proposed for construction as part of this project.

Utility and Other Owner Involvement

A utility search was completed using the Dig Alert website to determine the list of potential utility companies in and around the proposed project area. As-built plans were also used to determine the utilities within the project limits. Identified utility companies were contacted for verification and facility map requests were mailed. These facilities have been plotted and visually verified where possible at the project site. A list of utilities that fall within the project limits include:

Utility	Owner
Electrical (OH)	Southern California Edison
Gas	Southern California Gas Company
Television	Frontier Communications
Water	City of Redlands

A utility base map was developed based on the facility maps received from the utility companies. All existing utilities are proposed to be protected in place under the project. Formal notices will be provided to affected utility owners indicating the need to pothole and protect their utility facilities to accommodate the proposed project during PS&E. Protective measures may be required for the utilities that are to be protected in place. These measures, if necessary, will be defined during the PS&E phase after potholing of the utilities is complete.

Railroad Involvement

Currently there are no railroad involvements in this project.

The Redlands Passenger Rail Project (RPRP) is a planned passenger rail project that will provide service between the City of San Bernardino and the City of Redlands. The passenger rail service plans to utilize nine miles of existing railroad right of way and add four new transit stations. The project is expected to be in operation by the middle of 2021. The RPRP will provide access to the San Bernardino Transit Center, which will also provide passengers access to Riverside, Orange, Los Angeles, and San Diego County via Metrolink.

The closest station to the study area will be the New York Street Rail Station. This station is approximately three quarters of a mile away from the intersection of Alabama Street and Redlands Boulevard. An at-grade railroad crossing using the existing railroad right of way is planned between the intersections of Alabama Street & Redlands Boulevard and Alabama Street & Industrial Park Avenue. According to the Redlands Passenger Rail Project Traffic Report, December 2013, the train is expected to operate with 30-minute headways during the AM and PM peak period. For this project, it is assumed that the train will pass through the crossing in the study area four times an hour during the peak hour with two trains traveling in each direction.

RPRP funded improvements at the intersection of Alabama Street & Redlands Boulevard. These improvements were as follows:

- The addition of a dedicated left turn lane and right turn lane in the SB direction on Alabama Street.
- The addition of a dedicated left turn lane and additional through lane in the NB direction on Alabama Street.
- The addition of a left turn lane, through lane, and right turn lane in the WB direction on Redlands Boulevard.
- The addition of a left turn lane, through lane, and right turn lane in the EB direction on Redlands Boulevard.

These improvements on Redlands Boulevard are reflected in all analysis scenarios, including existing conditions, as construction of these improvements has been completed.

As the RPRP is planned to be operational by 2021, this project has been assumed in both the No Build and Build Alternative analysis for Opening Year (2022) and Design Year (2042). To include the rail pre-emption in the assessment, a dummy intersection was coded into the network to account for the train crossing during the peak hour.

Highway Planting

An allowance for replacement planting has been included in the project cost estimate. Planting and irrigation systems removed during roadway construction will be replaced in accordance with Caltrans current design standards and replacement ratio for trees will be evaluated during the PS&E phase. Planting design will consider safety, maintainability, and aesthetic compatibility with the adjacent urban community. Irrigation systems will utilize smart irrigation controllers.

Erosion Control

Erosion control and sediment transport prevention from State right of way are mandated by the National Pollutant Discharge Elimination System (NPDES) Construction General Permit and the Caltrans Statewide Permit. Caltrans has developed the following types of Best Management Practices (BMPs) to ensure compliance with these permits, described in the following paragraphs.

Temporary erosion and sediment transport control will be implemented during the construction phase through the selection and use of approved Temporary Construction Site BMPs, as described in the project's Storm Water Data Report (SWDR) and ultimately in the Storm Water Pollution Prevention Plan (SWPPP). Potential temporary construction site BMPs include soil binders, temporary cover, drainage inlet protection, gravel bags, fiber rolls, silt fence, construction entrance, and others listed in the Caltrans Storm Water Quality Handbooks, specifically the Project Planning and Design Guide (PPDG) and the Construction Site Best Management Practices Reference Manual. Costs for temporary erosion control have been included in the project cost estimate.

Design Pollution Prevention (DPP) BMPs will be incorporated into the final design to meet the following objectives:

- Conserve natural areas
- Minimize the impervious footprint
- Minimize disturbances to natural drainages
- Design pervious areas to reduce runoff from impervious areas
- Implement landscape and soil-based BMPs
- Use climate-appropriate landscaping to minimize irrigation, pesticides, and fertilizers
- Design landscapes to comply with the DWR's Model Water Efficient Landscape Ordinance (MWELO)

DPP BMPs such as those listed in PPDG Table 5-1 are appropriate for this project and will be designed at the PS&E phase. The project will modify existing slopes and construct new impervious areas. Existing slopes within the project site are generally 2:1 or flatter. The project is not expected to generate slopes steeper than 2:1. New landscaping and permanent erosion control will be provided for disturbed soil areas.

Treatment BMPs are to be incorporated into the proposed project to address storm water runoff from the I-10 ramps and its existing and proposed drainage systems. These are necessary due to a net increase of impervious surfaces by more than one acre. The water bodies listed in Section 303(d) of the Clean Water Act are indirect receiving water bodies with associated pollutants of concern and established Total Maximum Daily Loads (TMDLs). There are no special Caltrans requirements for these water bodies. Temporary BMPs are proposed for implementation to address temporary water quality impacts during construction. Trash collection policy will be incorporated and implemented during the PS&E stage of this project.

Design Pollution Prevention Infiltration Areas (DPPIAs) are feasible and may be incorporated into the project. All DPPIAs will be designed to follow existing or new slopes with minimal excavation required. The DPPIAs will prove to be cost efficient due to the fact that very minimal maintenance is required.

The SWDR cover sheet for the PA&ED phase is included as Attachment F.

Noise Barriers

This project has been identified as a Type III project. Per Federal Regulation (23 CFR 772) requirements, it has been determined that this project will not require a Noise Study Report (NSR). Requirements state that NSRs are prepared for Type I and Type II projects. This project does not impact a federal facility and is not federally funded; therefore, it is not considered a Type I or Type II project.

Nonmotorized and Pedestrian Features

Shoulders, sidewalks, and curb ramps are proposed to be improved to current ADA standards along Alabama Street in the NB direction (except on the Alabama Street overcrossing, where the existing sidewalk will be maintained). The City of Redlands Bicycle Master Plan (January 2015) identifies planned on-street bicycle facilities on the east and west sides of Alabama Street in the project area. Four-foot bicycle lanes will be added to the left side of proposed right turn lanes.

Needed Roadway Rehabilitation and Upgrading

Existing asphalt concrete (AC) pavement (surface course) will be removed and replaced on Alabama Street between stations 340+50 to 346+80 and between stations 349+60 to 356+20. A mill and overlay will also be done on the I-10 EB on-ramp between station 8+50 to station 10+50 and on the I-10 WB on-ramp at the entrance, so that ramps align with new Alabama Street right turn pockets.

Needed Structure Rehabilitation and Upgrading

There are no bridges being impacted by the proposed project.

Cost Estimates

A detailed cost breakdown for the Build Alternative is included in Attachment G, Preliminary Project Cost Estimate. The total support cost for the proposed project is estimated to be $2,551,000. Table 14 summarizes the construction capital costs (current year):

Table 14: Build Alternative – Construction Capital Costs

Roadway	Structures	Right of Way	Total
$9,863,000	$0	$0	$9,863,000

Right of Way Data

A Right of Way Data Sheet has been prepared for the Build Alternative and is included as Attachment H.

Effect of Projects-Funded-by-Others on State Highway

The proposed project will be completely funded by SBCTA using Measure I and the City of Redlands using Nexus Development Impact Fee as their source. The proposed project is a non-capacity enhancing project that will not add traffic capacity to the I-10 mainline.

There are currently three (3) planned projects within the proposed project limits:

- Project EA 1F970 proposed to mill and overlay the I-10 on- and off-ramps at Alabama Street. Mill and overlay of ramps was completed in December 2018 and the remainder of the project is currently under construction.

- Project EA 1C29U proposes roadway safety improvements along I-10. Construction of this project is anticipated to begin in July 2019. The PDT had identified that in addition to the MVP location proposed by this project, EA 1C29U will also be constructing an MVP on the EB on-ramp. Further coordination may be needed during the PS&E phase to determine the final location of the MVP on the EB on-ramp proposed by this project.
- Project EA 38423, currently in the PS&E phase, proposes the installation of fiber optic cable and TMS Elements on I-10, including fiber optic conduit and data node at the Alabama WB off-ramp. The Alabama Street at I-10 Project proposes widening of the WB off-ramp and curb ramp work at the Alabama Street intersection that will relocate the existing traffic signal cabinet. Because of the cabinet relocation, the new fiber optic and data node conduits proposed by project EA 38423 will be required to connect to the new traffic signal cabinet. A conflict resolution meeting will be held during the PS&E phase to address these conditions.

5B. REJECTED ALTERNATIVES

No alternatives were eliminated during the preparation and approval of the Project Initiation Document for the proposed project. Caltrans approved the PSR-PDS on December 21, 2017. A single build alternative was discussed in the PSR-PDS. No additional alternatives were proposed in PA&ED phase of the project.

6. CONSIDERATIONS REQUIRING DISCUSSION

6A. HAZARDOUS WASTE

An Initial Site Assessment (ISA) and a visual reconnaissance of the project area were completed. Based on the results of the visual reconnaissance and ISA, the following were noted:

- The site consists of Alabama Street, on-ramps, and associated right of way along the roadways and ramps.
- Utility-related infrastructure, including electrical and street lighting, is present at the site. Storm drains and concrete drainage channels are also present at the site. Above ground utility/electrical lines extend along the east side of Alabama Street on wooden poles. One pole-mounted transformer was observed at the southeast corner of Alabama Street and the I-10 EB on-ramp.
- Yellow thermoplastic paint striping was observed on the inside shoulders of existing on-ramps, and along the center of Alabama Street.
- Household trash is present at various locations throughout the site. No evidence of discarded hazardous materials or petroleum products was observed.
- No off-site facilities were observed to represent a hazardous waste impact to the site.

During the preparation of the ISA, the following information was found to potentially affect environmental conditions:

- Lead chromate was used in yellow traffic paint and thermoplastic material prior to being banned in 1997 and 2004, respectively. Thus, yellow traffic paint and thermoplastic material located on the pavement may potentially contain hazardous levels of lead chromate. If yellow traffic markings are removed separately from the adjacent pavement, the markings should be removed and sampled for lead chromate prior to construction, consistent with the current Caltrans' Standard Special Provision (SSP).
- Although not anticipated in areas of the site, should impacted soil (as evidenced by staining and/or orders) be encountered during construction activities, the Resident Engineer overseeing construction should stop work until a hazardous waste specialist is able to assess the soil for proper handling.
- Private properties are not anticipated to be affected by the project. No properties or facilities were revealed during the conduct of the ISA that are considered a hazardous waste impact to the project. Therefore, no properties or facilities will require a Phase II investigation.
- An aerially-deposited lead (ADL) investigation was performed as part of a separate project, I-10 Corridor Project in San Bernardino County, California, to assess the lead content of unpaved soil along the I-10 freeway and associated on- and off-ramps from the City of Pomona to the City of Redlands. The work was conducted between July 26, 2016 and August 15, 2016 and included sampling along I-10 near the I-10 Alabama Street interchange. Results of that investigation indicated that soil was non-Resource Conservation and Recovery Act (RCRA) hazardous waste as follows:

    - At the WB I-10 on-ramp from Alabama Street, near the freeway merge area, total lead detected was between 6.67 milligrams per kilogram (mg/kg) and 21.1 mg/kg collected in three samples and one duplicate.
    - At the EB I-10 off-ramp to Alabama Street, near the freeway divergence area, the total lead detected in the 0.5-foot sample was at a concentration of 50.9 mg/kg, and soluble lead detected in the same sample was at 5.31 milligrams per liter (mg/L). Thus, the sample collected from 0.5-foot was considered a California non-RCRA hazardous waste.
    - Between WB I-10 and the WB I-10 off-ramp to Alabama Street, the total lead detected was at concentrations of 3.42 mg/kg, 3.60 mg/kg, and 2.67 mg/kg at depths of 0.5-foot, 1.5 feet, and 3.0 feet respectively. Results indicated non-hazardous soil.
    - Between EB I-10 and the EB I-10 on-ramp, the total lead detected was at concentrations of 10.0 mg/kg (duplicate 10.4 mg/kg), 6.64 mg/kg, and 15.3 mg/kg at depths of 0.5-foot, 1.5 feet, and 3.0 feet respectively. Results indicated non-hazardous soil.

Non-RCRA soil was recommended to be reused pursuant to the Department of Toxic Substances Control (DTSC) Guidance or disposed as non-RCRA hazardous waste. In accordance with the current DTSC Agreement (DTSC, 2016), the non-RCRA soil identified in the ADL investigation, completed for the I-10 Corridor Project, is soil type "R1". This soil type may be reused on Site under one-foot of soil or disposed at a Class I disposal facility. The

DTSC must be notified and detailed plans provided as to where the soil will be reused or disposed of. Based on the ADL investigation report reviewed for the I-10 Corridor Project, no further assessment for the presence of ADL is recommended associated with the current proposed Alabama Street Improvements Project.

6B. VALUE ANALYSIS

A Value Analysis (VA) study was not required for this project because the total cost is anticipated to be less than $25 million.

6C. RESOURCE CONSERVATION

The proposed project would not require the use of water, except for minor amounts during construction. Therefore, the proposed project will not have a significant impact to the public water supply.

The existing asphalt concrete pavement to be removed would be crushed to aggregate base material and incorporated into the new pavement structural section of the proposed project. The proposed project intends to maximize the use of the existing hardware items as well. This can be achieved by relocating any usable existing signs and lighting. The signs identified for removal would be available for recycling.

Operations of the proposed project would not require additional supplies of energy or fuel. Minor amounts of energy and fuel would be used during construction. Long-term energy consumption will be reduced upon relieving traffic congestion through this project by providing additional lanes and improving traffic operations.

6D. RIGHT OF WAY ISSUES

Right of Way Required

Based on available right of way maps, the Build Alternative is proposed entirely within Caltrans right of way. The dealership at the southeast quadrant of the project was encroaching into Caltrans right of way. The dealership was contacted and the encroachment removed on March 5th, 2019. All utilities were reviewed and will be protected in place. A Right of Way Data Sheet was prepared and included is Attachment H for the improvements proposed in the Build Alternative.

Relocation Impact Studies

A Relocation Impact Study was not required for this project because no relocation is required. All proposed work will be done within Caltrans right of way.

Airspace Lease Areas

Airspace lease areas were not considered as part of this project.

6E. ENVIRONMENTAL COMPLIANCE

The proposed project is Categorically Exempt under 14 CCR 15300 et seq., Class 1 (Existing Facilities) of the State CEQA Guidelines. A Categorical Exemption has been prepared for the proposed project. There is no federal action associated with the proposed project and compliance with the National Environmental Policy Act (NEPA) is not required.

Refer to Attachment I, Categorical Exemption Determination Form, for further information.

6F. AIR QUALITY CONFORMITY

The proposed project is listed in the 2019 Federal Transportation Improvement Program (FTIP) under Project ID No. 20159907. The FTIP describes the project as "I-10 and Alabama Street intersection improvements with ramp widening (No Capacity Enhancements)." Federal funds are not proposed for the design or construction of the proposed project. According to FTIP, the proposed project is exempt from air quality regional conformity under Section 93.127.

As shown in the Air Quality Report (AQR) Chapter 4, criteria pollutants and Mobile Source Air Toxics (MSAT) and Greenhouse Gas (GHG) emissions analyses were conducted in order to make some comparison with the existing (2017) condition and the proposed project Opening Year (2022) and Design Year (2042) scenarios. As shown in the tables in the AQR Chapter 4, criteria pollutants and MSAT and GHG emissions are less for the proposed project compared to the Existing (2017) condition. Thus, the proposed project would not result in increases in the emissions. The Regulatory Compliance measures and Standard Conditions presented in the AQR Chapter 5 would further ensure that short-term construction impacts, and long-term operational impacts would not exceed applicable air quality, MSAT, and GHG emissions standards.

6G. TITLE VI CONSIDERATIONS

Caltrans and FHWA policies demonstrate a commitment to Title VI of the Civil Rights Act, which provides that no person in the United States shall, on the grounds of race, color, national origin, sex, disability, or age be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity receiving federal financial assistance. Implementation of the Build Alternative would not result in any adverse impacts on minority or low-income neighborhoods or communities.

6H. NOISE ABATEMENT DECISION REPORT

The project area is surrounded by general commercial and regional commercial land uses. The proposed project is not a Type I project; therefore, a noise study is not required. Because a noise study report is not required, a Noise Abatement Decision Report was not prepared.

6I. LIFE-CYCLE COST ANALYSIS

As part of the LCCA process, pavement design alternatives were developed and compared to each other in order to identify the lowest cost alternative over the anticipated design and maintenance life. The LCCA process not only considers the initial cost of construction but also factors in the cost of future maintenance as well as the impact on the roadway users (user costs) from maintenance activities in the overall determination of the life-cycle cost. The preferred design alternative has the lowest present value (PV) or total life-cycle cost of all alternatives. The alternatives for each pavement feature of this project are described in Table 3 of the LCCA. For the purpose of the LCCA, it is assumed that the pavement is laterally supported. A preferred design alternative is identified in Section 5 of the LCCA. The LCCA is included as Attachment E to this report.

6J. REVERSIBLE LANES

This project does not qualify as capacity increasing or major street or highway realignment project and reversible lanes were not considered.

7. OTHER CONSIDERATIONS AS APPROPRIATE

Public Hearing Process

A public hearing was not required because the project is categorically exempt.

Route Matters

Freeway Agreements and New Connections
No new connection approval or new freeway agreements will be required for this project.

Route Adoptions
No route adoption measures are required for the proposed project.

Relinquishments
No relinquishments will be required for the proposed project.

Permits

An encroachment permit from the City of Redlands for construction is anticipated for the proposed project.

Prior to commencement of construction activities, the contractor shall obtain coverage under the State Water Resources Control Board's NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Contraction General Permit), Order No. 2009-0009-DWQ, as amended by 2010-0014-DWG and 2012-0006-DWQ, NPDES No. CAS000002, or any other subsequent permit. This shall include submission of Permit Registration Documents (PRDs), including a Notice of Intent (NOI) for coverage under the permit to the State Water Resources Control Board via the Stormwater Multiple Application and Report Tracking System (SMARTS). Construction activities shall

not commence until a Waste Discharge Identification Number (WDID) is obtained from SMARTS. A Storm Water Pollution Prevention Plan (SWPPP) shall be prepared and implemented to address all construction-related activities, equipment, and materials that have the potential to impact water quality. The SWPPP shall identify the sources of pollutants that may affect the quality of stormwater and include Best Management Practices (BMPs) to ensure that the potential for soil erosion, sedimentation, and spills is minimized and to control the discharge of pollutants in stormwater runoff as a result of construction activities. Upon completion of construction activities and stabilization of the site, a Notice of Termination (NOT) shall be via SMARTS.

Caltrans shall comply with the provisions of the National Pollutant Discharge Elimination System (NPDES) Permit, Statewide Storm Water Permit, Waste Discharge Requirements (WDRs) for the State of California, Department of Transportation Order No. 2012-0011-DWQ (Caltrans MS4 Permit), as amended by Order No. 2014-0006-EXEC, Order No. 2014-0077-DWQ, and Order No. 2015-0036-EXEC, NPDES No. CAS000003, or any subsequent permit. Caltrans-approved Design Pollution Prevention BMPs and Treatment BMPs shall be implemented to the maximum extent practicable (MEP) consistent with the requirements of the Caltrans MS4 Permit.

Cooperative Agreements

Cooperative Agreement Number 08-1663, which was executed on October 8th, 2017, sets forth the terms and conditions for Caltrans and SBCTA, outlining responsibilities for the PA&ED, and PS&E phases of the project.

Cooperative Agreement Number 17-001603, which was executed on November 17th, 2016, sets forth the terms and conditions for City of Redlands and SBCTA, outlining responsibilities for the PSR-PDS, PA&ED, and PS&E phases of the project.

Other Agreements

No additional agreements are anticipated in this phase of the project.

Report on Feasibility of Providing Access to Navigable Rivers

There are no navigable rivers within the proposed project limits.

Public Boat Ramps

There are no public boat ramps within the proposed project limits.

Transportation Management Plan

A Transportation Management Plan (TMP) Data Sheet has been prepared for this project (Attachment J). The objective of the TMP is to minimize project-related traffic delay and maximize safety for all users of the transportation network (including motorists, bicyclists, pedestrians, and those with disabilities) during construction without compromising the quality of work being performed. A project-specific TMP Report will be prepared during the PS&E phase of this project.

TMP elements to be considered for this project include, but not be limited to, the following:

- A public information campaign, implemented through different media outlets including, but not limited to brochures, mailers, press releases/media alerts, and project websites to inform residents and motorists.
- Motorist information strategies, including Portable Changeable Message Signs, and Ground Mounted Signs, to allow motorists to make decisions to avoid potential congestions.
- Incident management, including a Traffic Management Team, surveillance through closed-circuit television, a Construction Zone Enhanced Enforcement Program, and Freeway Service Patrol (FSP), for the effective management of traffic incidents and timely restoration of normal traveled way. It is not anticipated that any ramps will be closed for more than 10 days. Lane Closure Requirements will be provided in the standard special provisions prepared in the PS&E phase. No ramp closures would occur during peak periods, and no adjacent interchange ramps would be closed at the same time.
- No long-term full roadway or ramp closures are anticipated during construction. Planned detour requirements will be re-assessed during detailed construction staging development in the PS&E phase.

Stage Construction

The proposed project improvements are anticipated to be constructed in two stages.

Stage 1 is for construction of the outside ramp widening and retaining walls at the I-10 WB and EB off-ramps and construction of the outside widening for the right turn pockets on the Alabama Street approach to the I-10 on-ramp intersections. No traffic shifts are anticipated for this stage, however temporary signing, striping, and K-rail will be necessary to delineate construction zones.

Stage 2 proposes two substages: Stage 2A for construction of the inside ramp widening at both off-ramps, including the ramp terminal section that is currently the #1 lane. To maintain the existing two lanes of traffic, off-ramp traffic will be shifted to the right and will utilize the pavement constructed in Stage 1. Temporary striping, signing, and K-rail will be necessary to delineate transitions and direct traffic to the right of the construction area.

Stage 2B will construct the terminal section of the off-ramps in the existing #2 lane area. Two lanes of traffic will be maintained by shifting traffic to the left of the construction area over the pavement sections constructed in Stage 2A. Temporary striping, signing, and K-rail will

be necessary to delineate transitions and direct traffic to the left of the construction area. Construction Staging and Traffic Handling Plans will be developed during the PS&E phase to detail the above concept.

Accommodation of Oversize Loads

The aspects of the proposed project such as lane widening, and curb return radii will be designed to accommodate standard STAA truck movements for all turning movements along Alabama Street and the I-10 ramps.

Graffiti Control

The project is within a graffiti prone area and, where the wall heights are proposed to be greater than six feet, vandalism may occur. To discourage graffiti and minimize the visual impact, a fractured fin treatment will be used on retaining walls.

Asset Management

A Transportation Asset Management Plan and State Highway Operations and Protection Program (SHOPP) plan were not developed because this project is not part of the Caltrans SHOPP.

Complete-Streets

The project proposes to add a four-foot bike lane and a four-foot shoulder at the right turn pockets. Furthermore, the existing sidewalk and curb ramps will be upgraded in the NB direction to current standards for ADA compliance. Sidewalk is not proposed on SB Alabama Street because the existing Alabama Street bridge over I-10 does not have pedestrian access. Widening of the Alabama Street bridge is outside of the project scope.

Climate Change Considerations

Climate change considerations were analyzed during the development of the Air Quality Report approved on January 25th, 2019. Section 3 of the Air Quality Report details the anticipated climate change to the region and the effects of Green House Gas.

Broadband and Advance Technologies

The proposed improvements will not impact accommodation of wired broadband facilities, fueling opportunities for zero-emission vehicles, or provisions for infrastructure-to-vehicle communications for transitional or full autonomous vehicles.

8. FUNDING, PROGRAMMING AND ESTIMATE

Funding

It has been determined that this project is not eligible for Federal-aid funding. The City and SBCTA Measure I will fund the proposed project: Public Share (Measure I) (49.5%) and Nexus Development Impact Fee share (City) (50.5%).

Programming

The proposed project is programmed in the 2016 RTP and 2017 FTIP (Amendment 10). Refer to Section 4 – Regional Planning for project description. The proposed funding for the project is from the City of Redlands Nexus Development Impact Fee (Fiscal Year 2018/2019), and the SBCTA Measure I (2010-2040 Expenditure Plan and SBCTA Nexus Study).

The current funding breakdown is as follows:

- Nexus Development funding - $5,702,190
- Measure I funding - $5,265,810

Table 15: Programming

Fund Source	Fiscal Year Estimate								
Nexus Development and Measure I	Prior	18/19	19/20	20/21	21/22	22/23	23/24	Future	Total
Component	In thousands of dollars ($1,000)								
PA&ED Support		$922							$922
PS&E Support			$462						$462
Right-of-Way Support			$10						$10
Construction Support			$1,157						$1,157
Right-of-Way									
Construction			$8,417						$8,417
Total		$922	$10,046						$10,968

The support cost ratio is 30.31%

Estimate

The total fully escalated project cost estimate for the Build Alternative is $15,450,000 and can be found in Attachment G – Preliminary Project Cost Estimate. The PDT recognizes that the current Project Report estimate exceeds the programmed amount and will have to consider various options to address this difference at later phases of the project.

9. DELIVERY SCHEDULE

Table 16 identifies the tentative project schedule.

Table 16: Project Schedule

Project Milestones		Milestone Date (Month/Day/Year)	Milestone Designation (Target/Actual)
PROGRAM PROJECT	M015	02/16/2017	Actual
BEGIN ENVIRONMENTAL	M020	11/01/2017	Actual
PA&ED	M200	05/31/2019	Target
PROJECT PS&E	M377	11/11/2019	Target
RIGHT OF WAY CERTIFICATION	M410	1/02/2020	Target
READY TO LIST	M460	02/07/2020	Target
AWARD	M495	05/08/2020	Target
APPROVE CONTRACT	M500	06/05/2020	Target
CONTRACT ACCEPTANCE	M600	06/01/2021	Target
END PROJECT EXPENDITURES	M800	06/01/2023	Target

10. RISKS

The PDT has identified two active risks to be carried forward from the PSR-PDS phase of the project. Active risks will be monitored and updated during the PS&E phase effort. A strategy to avoid, accept or manage each risk will be developed and updated as more information is gained throughout the life of the proposed project. Table 17 below provides a summary of identified risks. Refer to Attachment K for the full Risk Register.

Table 17: Risk Register Summary

Category	Title	Priority Rating
Right of Way	Right of Way Impacts	Low
Right of Way	Utility Impacts	Moderate

11. EXTERNAL AGENCY COORDINATION

Federal Highway Administration (FHWA)

This PR has been reviewed by Caltrans' FHWA Liaison, Sergio Avila on February 6, 2019 and there will not be federal aid funding involvement. However, should any future situation/circumstance that will potentially classify the project as a Project of Division Interest (PoDI) arises, Caltrans shall notify FHWA and reassess this project using the PoDI selection criteria outlined in the Agreement.

Local Agency

A cooperative agreement is currently in place between SBCTA and Caltrans. Furthermore, there is currently a cooperative agreement between SBCTA and the City of Redlands.

12. PROJECT REVIEWS

Headquarters Project Delivery Coordinator	*Luis Betancourt*	Date	May 2019
District Design Liaison / FHWA / ADA	*Sergio Avilla*	Date	May 2019
District Environmental Planning	*Antonia Toledo*	Date	May 2019
District Right of Way Agent	*Paul C. Mim Mack*	Date	May 2019
District Traffic Ops Region B	*Haissam Yahya*	Date	May 2019
District Design Oversight Engineer	Samandra Benjamin	Date	May 2019

13. PROJECT PERSONNEL

Heng Chow
Project Manager
SBCTA
Phone # 909.884.8276

Elaheh Hadipour
Project Manager
Caltrans District 8
Phone # 909.383.6723

Aysha Habib
Branch Chief Design H Oversight
Caltrans District 8
Phone # 909.806.2554

Antonia Toledo
Office Chief Environmental Planning
Caltrans District 8
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Jamal Salman
Project Manager
Advanced Civil Technologies
Phone # 714.662.2288

Joseph Sawtelle
Project Engineer
TranSystems
Phone # 714.708.6881

Deborah Pracilio
Environmental Studies
LSA Associates
Phone # 949.553.0666

14. ATTACHMENTS (Number of Pages)

A. Location Map (1)

B. Project Development Category Agreement (1)

C. Design Year Exception Letter (5)

D. Layouts and Typical Sections (5)

E. Life-Cycle Cost Analysis (53)

F. Storm Water Data Report (Cover Sheet) (1)

G. Preliminary Project Cost Estimate (10)

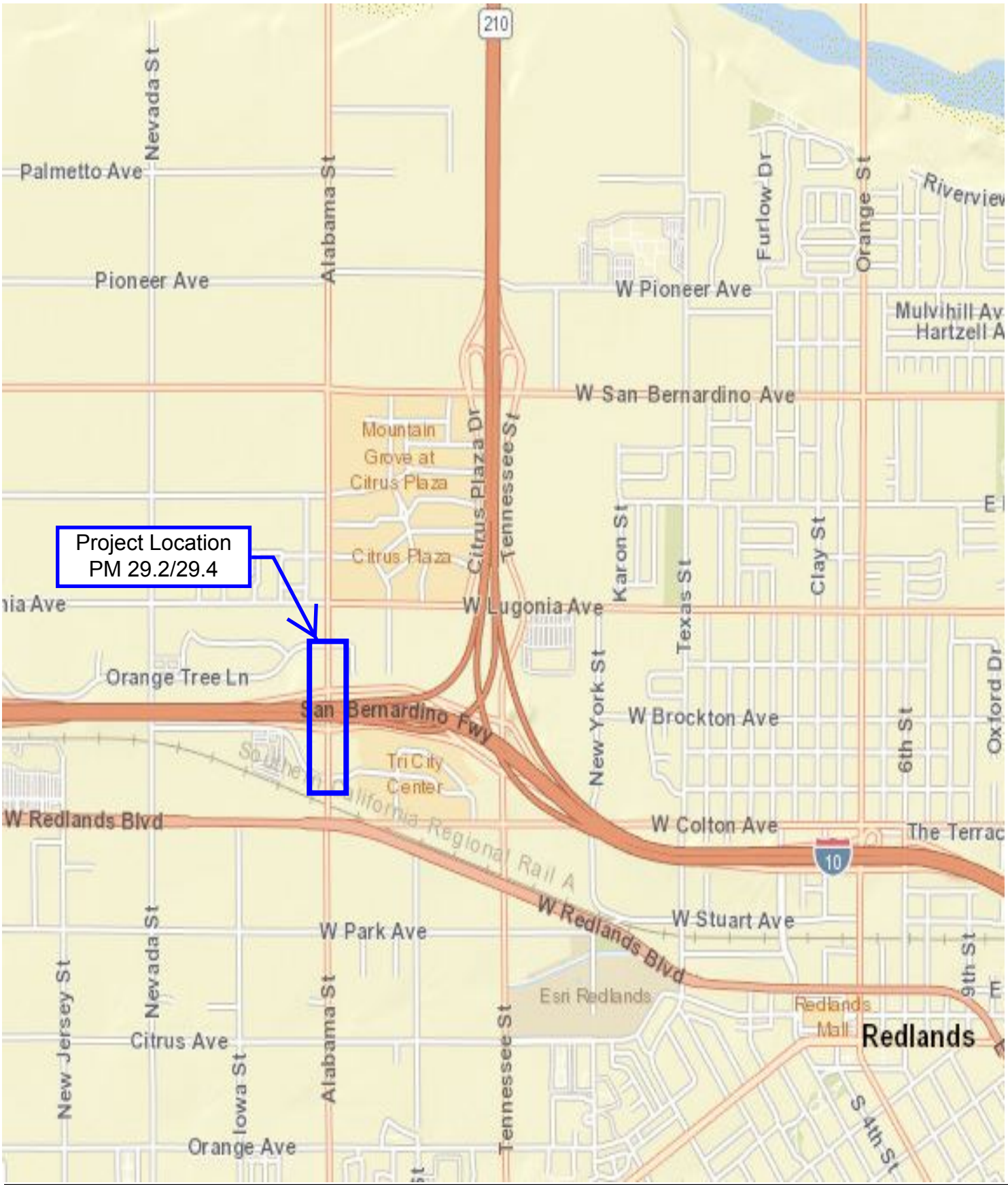
H. Right of Way Data Sheet (5)

I. Categorical Exemption Determination Form (4)

J. Transportation Management Plan Data Sheet (5)

K. Risk Register (1)

Attachment A
Project Location Map



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SOURCE: ArcGIS Streets View: City of Redlands, CA 2014

Attachment A

Location Map

Attachment B
Project Development Category Agreement

January 2, 2019

Christy Connors
Deputy District Director, Design
Caltrans, District 8
464 W. 4th Street
San Bernardino, CA 92401

Dear Ms. Connors,

Subject: Alabama Street Improvement Project (EA 1H160) - Project Category Assignment

The San Bernardino County Transportation Authority (SBCTA) is seeking approval for assignment of the Alabama Street Improvement Project to **Category 5** in accordance with requirements in Chapter 8, Section 5 of the Caltrans Project Development Procedures Manual.

The project proposes modifications to the existing tight diamond interchange, including the following improvements to Alabama Street and the Interstate 10 (I-10) ramps:

- Additional left and right turn lanes on the I-10 off-ramps
- Additional right-turn pockets approaching the eastbound and westbound I-10 on-ramps
- Standard sidewalk widths and ADA compliant curb ramps on northbound Alabama Street

The Category 5 is recommended based on the following project considerations:

1. This project will not require additional right of way.
2. This project will not increase traffic capacity to the I-10 freeway.
3. This project will not require route adoption or freeway agreement.
4. The project is of minimal economic, social or environmental significance.
5. The project is determined to be Categorically Exempt under the California Environmental Quality Act.

Should you need any additional information, please contact Heng Chow, Project Manager, at (909) 884-8267.

Sincerely,

FOR
Paula Beauchamp
Director of Project Delivery

CC: Justine Niu, Caltrans
Elaheh Hadipour, Caltrans
Patrick Safari, City of Redlands

Approved:

01/15/19
Christy Connors Date
Deputy District Director
Design

Attachment C
Design Year Exception Letter

December 7, 2018

08-SBd-10-PM 29.2/29.4
EA 1H160

Janice Benton
Interim District Director
464 W. 4th Street
San Bernardino, CA 92401

Subject: **Request for Design Year Exception for EA 1H160: Alabama Street Improvements Project**

Dear Mrs. Benton,

The County of San Bernardino, the San Bernardino County Transportation Authority and the City of Redlands would like to request an exception to the *Highway Design Manual (HDM), 6th Edition November 2017, Section 103.2 Design Period* be approved for this project. The section recommends that the geometric design of reconstruction projects should normally be based on estimated traffic 20 years after completion of construction.

The proposed project improvements consist of the following:

1. Alabama Street: Improvements include widening Alabama Street in the NB direction to provide a right turn pocket to serve the Interstate 10 (I-10) Eastbound (EB) on-ramp, a 4-foot bike lane, and a 4-foot shoulder (at the right turn pocket). In addition, sidewalks and Americans with Disabilities Act (ADA) ramps will be provided in the Northbound (NB) direction. Alabama Street will also be widened in the Southbound (SB) direction to provide a right turn pocket to serve the I-10 Westbound (WB) on-ramp. The widening in the SB direction will also add a 4-foot bike lane and a 4-foot shoulder at the right turn pocket.

2. EB I-10 Ramps: The EB I-10 off-ramp will be widened by two lanes to provide a total of four lanes at the terminus; dedicated left and right lanes, and shared left/through and shared right/through lanes. Grind and overlay, as well as a minor widening will be done to the I-10 EB On-ramp, to upgrade curb ramps to standards and provide a maintenance vehicle pullout.

3. WB I-10 Ramps: The WB I-10 off-ramp will be widened by two lanes to provide a total of four lanes at the terminus; dedicated left and right lanes, shared left/through and shared right/through lanes.

Alabama Street currently experiences queuing and congestion at the ingress and egress at I-10, resulting in delay in travel time and queuing into the I-10 mainline. This project will improve traffic operations on Alabama Street between Orange Tree Lane and Industrial Park Avenue, while eliminating any potential queuing into the I-10 mainline.

The purpose of this letter is to justify the use of 2041 as the design year on the I-10/Alabama Street improvement project (EA 1H160).

Project History

Currently, the project is in the Project Approval and Environmental Document (PA&ED) phase. As part of the PA&ED phase a Traffic Operations Analysis Report (TOAR) was prepared to evaluate current and future traffic conditions with the proposed project in place. The TOAR found that with the project in place a greater demand will be served within the corridor and queuing into the I-10 mainline will be avoided. However, the traffic study also found that the project will provide a service life of 19 years, which does not satisfy the 20-year design standard requirement.

Justification for Utilizing Design Year of 2041

The following justifications are noted in support of utilizing a design year of 2041 for the project:

- At the 20-year design period, the Alabama Street and I-10 EB ramps intersection will operate at Level of Service (LOS) E (57.8 seconds), missing the required LOS D (>35.0 to 55.0 seconds) by 2.8 seconds.
- Any further improvements to accommodate the 20-year design requirement will result in the impacts listed below:
    - Increase in cost: To meet the 20-year design requirement, it is anticipated that additional lanes must be added to the I-10 Alabama Street off-ramps, the increase to cost is estimated to be around $2M. However, future studies may show that Alabama Street overcrossing (Bridge No. 59-0592) widening may also be required, which will increase project cost by $10M.
    - Right of Way impacts: Due to additional lanes to ramps or bridge widening, right of way takes as well as temporary traffic easements may be required. It is estimated additional right of way cost will be $100,000.
    - Inconvenience to the community: Additional work done to the interchange will require longer closure times as well as right of way takes. No right of way takes are proposed with current project alternative.

The No Build and Build AM and PM peak hour queues for the design year for I-10 and Alabama St intersections are shown in Table 1 below.

Table 1
Design Year (2042) I-10 Off-ramps/Alabama Street Peak Hour Queues

Intersection	Movement	No Build			Build Alternative		
		Storage (ft)	AM Queue (ft)	PM Queue (ft)	Storage (ft)	AM Queue (ft)	PM Queue (ft)
2. Alabama Street & Orange Tree Lane	NBT	550	170	220	550	240	490
	SBT	550	220	470	550	140	460
3. Alabama Street & I-10 WB Ramps	NBL	150	**210**	**180**	120	**180**	**180**
	NBT	400	**420**	**430**	400	**430**	**420**
	SBR[1]	-	-	-	500	110	**550**
	SBT	500	240	390	500	140	**540**
	WBL[1]	-	-	-	720	230	290
	WBLT	1110	**1,170**	620	1,110	280	330
	WBRT	1,110	**1,170**	550	1,110	310	290
	WBR [1]	-	-	-	720	260	240
4. Alabama Street & I-10 EB Ramps	NBT	500	**550**	**570**	500	**530**	**560**
	NBR[1]	-	-	-	350	320	**380**
	SBL	160	130	**180**	120	**160**	**180**
	SBT	410	150	400	410	180	**450**
	EBL[1]	-	-	-	450	280	330
	EBLT	450	**600**	**480**	450	290	390
	EBRT	1,100	1,050	**1,120**	1,100	380	390
	EBR[1]	-	-	-	450	230	330
5. Alabama Street & Industrial Park Avenue	NBT	560	310	360	560	330	350
	SBT	560	320	480	560	390	550

Note: [1]Dedicated storage for this movement does not exist under the No Build Alternative.
Worst-case scenario is reported for movements with more than one lane.
Source: Fehr & Peers, 2018

Based on the data presented in Table 1, queueing is significantly reduced on the off-ramp movements with the proposed project in place. Queueing on the westbound off-ramp is reduced by approximately 900 feet, while queueing on the eastbound off-ramp is reduced by approximately 700 feet during the AM peak hour. This will prevent backup into the I-10, reducing impact to the mainline traffic and possibility of accidents occurring due to excess queuing. The increase in queueing for the southbound through movement for the Alabama Street and the I-10 WB and EB ramp intersections is a result of an increase in volume served along the corridor under the Build Alternative.

Table 2
Design Year (2042) Intersection Analysis Summary

	Intersection	Control	Peak Hour	No Build		Build	
				Delay	LOS	Delay	LOS
1	Alabama Street & Lugonia Avenue	Signal	AM	**46.7**	**D**	**46.0**	**D**
			PM	**164.9**	**F**	**98.3**	**F**
2	Alabama Street & Orange Tree Lane	Signal	AM	9.1	A	10.0	B
			PM	**44.0**	**D**	**52.9**	**D**
3	Alabama Street & I-10 WB Ramps	Signal	AM	**83.8**	**F**	23.8	C
			PM	42.1	D	50.5	D
4	Alabama Street & I-10 EB Ramps	Signal	AM	43.9	D	30.6	C
			PM	**57.1**	**E**	**57.8**	**E**
5	Alabama Street & Industrial Park Avenue	Signal	AM	19.6	B	24.9	C
			PM	**57.4**	**E**	**77.3**	**E**
6	Alabama Street & Redlands Boulevard	Signal	AM	**40.2**	**D**	**41.4**	**D**
			PM	**90.5**	**F**	**85.8**	**F**

Bold text indicates unacceptable operations
Source: Fehr & Peers, 2018

Based on the data presented in Table 2, the delay at the intersection of Alabama Street and the I-10 WB Ramps is reduced significantly in the AM, and the proposed project will not degrade the LOS of either the WB or EB ramp intersections. The level of service in the AM peak hour for the Alabama Street & WB off-ramp improves from an F to a C with a 60 second reduction in delay. Many of the other intersections will also experience a reduction in delay. Any increased delay at intersections under the Build Alternative is due to an increase in volume served along the corridor.

Table 3
Design Year (2041) PM Peak Hour Year 19 LOS Summary

	Intersection	Control	Build	
			Delay	LOS
1	Alabama Street & Lugonia Avenue	Signal	**73.0**	**F**
2	Alabama Street & Orange Tree Lane	Signal	**53.2**	**D**
3	Alabama Street & I-10 WB Ramps	Signal	49.3	D
4	Alabama Street & I-10 EB Ramps	Signal	53.1	D
5	Alabama Street & Industrial Park Avenue	Signal	**73.3**	**E**
6	Alabama Street & Redlands Boulevard	Signal	**85.0**	**E**

Bold text indicates unacceptable operations
Source: Fehr & Peers, 2018

Table 3 provides the results for the 19-year design life of the project. As shown the LOS for I-10 EB ramp will meet the standard requirement of LOS D. The project will provide a 19-year design life with acceptable level of service, after reaching the 20-year design life, LOS for the I-10 EB ramp will be below standard. However, delay for the intersection with the Build Alternative is improved as compared to the No Build Alternative.

This project will eliminate queuing into the I-10 mainline and will improve overall intersection operations. Utilizing a design year of 2041 is the most practical option regarding moving this important project forward.

Requested By:

12/10/18

Paula Beauchamp, PE Date
Director of Project Delivery
SBCTA

12-10-2018

Mazin Kasey, PE Date
Deputy Director
Department of Public Works
County of San Bernardino

12/10/18

Savat Khamphou Date
Deputy Director
Municipal Utilities & Engineering Department
City of Redlands

Concurred:

12/19/18

Luis Betancourt Date
HQ Project Delivery
Coordinator
Caltrans District 8

Approved:

12/20/2018

Janice Benton Date
Interim District Director
Caltrans District 8

Attachment D
Layouts and Typical Sections

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
08	SBd	10	29.2/29.4		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. Exp. CIVIL — STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

TRANSYSTEMS
6 HUTTON CENTRE DRIVE,
SUITE 1250
SANTA ANA, CA 92707

SAN BERNARDINO COUNTY
TRANSPORTATION AUTHORITY
1170 W. 3RD ST. 2ND FLOOR,
SAN BERNARDINO, CA 92410

TYPICAL PAVEMENT STRUCTURE SECTIONS

[X] NEW PAVEMENT

[1]
0.95' JPCP
0.25' HMA (TYPE A)
0.70' CLASS 2 AS

[2]
0.20' RHMA-G
0.55' HMA (TYPE A)
1.35' CLASS 2 AB

[3]
0.20' RHMA-G
0.10' HMA-A
(Restore the existing base if loosened during removal of AC pavement)

(X) EXISTING PAVEMENT

ALABAMA STREET

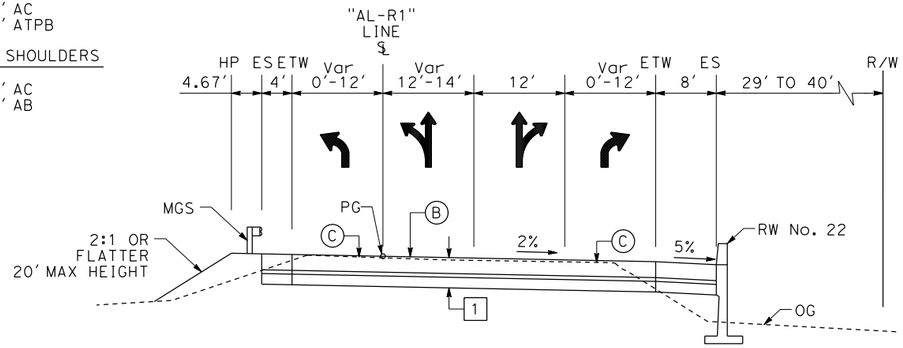
(A)
0.29' AC
0.67' AB
0.67' AS

RAMP LANES

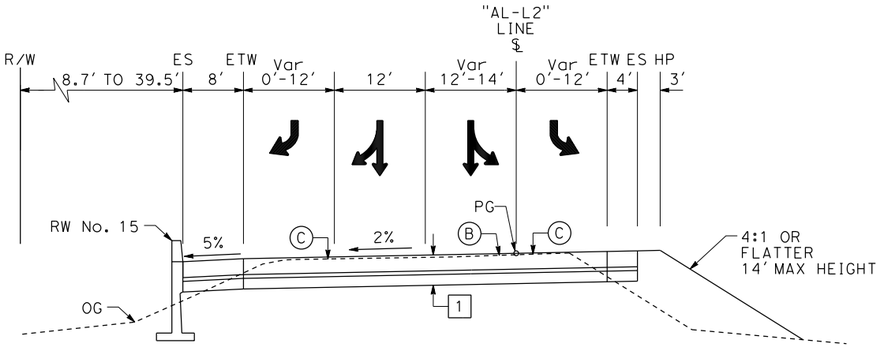
(B)
0.45' AC
0.25' ATPB

RAMP SHOULDERS

(C)
0.30' AC
0.45' AB



ALABAMA EB OFF-RAMP
LINE "AL-R1"
"AL-R1" 21+70 TO "AL-R1" 26+77



ALABAMA WB OFF-RAMP
LINE "AL-L2"
"AL-L2" 13+32 TO "AL-L2" 20+20

DESIGN DESIGNATION

	ALABAMA STREET	EB OFF-RAMP	EB ON-RAMP	WB OFF-RAMP	WB ON-RAMP
ADT (2022)	28,500	12,300	5,900	14,700	10,900
ADT (2042)	34,900	16,900	6,900	16,700	12,000
DHV	2,830	1,000	1,340	1,220	680
ESAL	13,101,580	5,579,780	5,579,780	13,684,780	10,057,240
D	50.10%	100%	100%	100%	100%
T	4.90%	12.00%	12.00%	12.00%	12.00%
TI	12	13.5	13.5	13.5	13.5
DESIGN SPEED	45 MPH	25-50 MPH	25-50 MPH	25-50 MPH	25-50 MPH

CLIMATE REGION

INLAND VALLEY

TYPICAL CROSS SECTIONS

NO SCALE

X-1

CALCULATED-DESIGNED BY
CHECKED BY
CARL SOSA
TRIET DANG
REVISED BY
DATE REVISED
CONSULTANT FUNCTIONAL SUPERVISOR
JOSEPH SAWTELLE
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

LAST REVISION | DATE PLOTTED => 4/12/2019
00-00-00 | TIME PLOTTED => 7:28:43 PM

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UNIT
PROJECT NUMBER & PHASE 08160001681

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
08	SBd	10	29.2/29.4		

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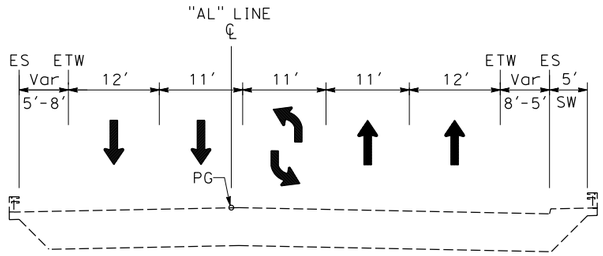

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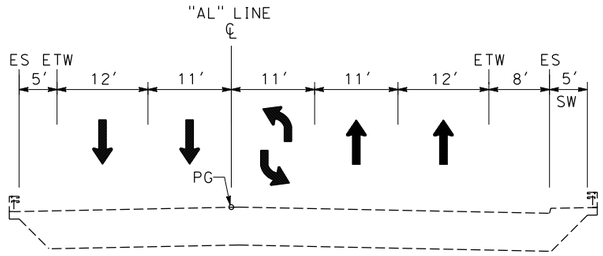

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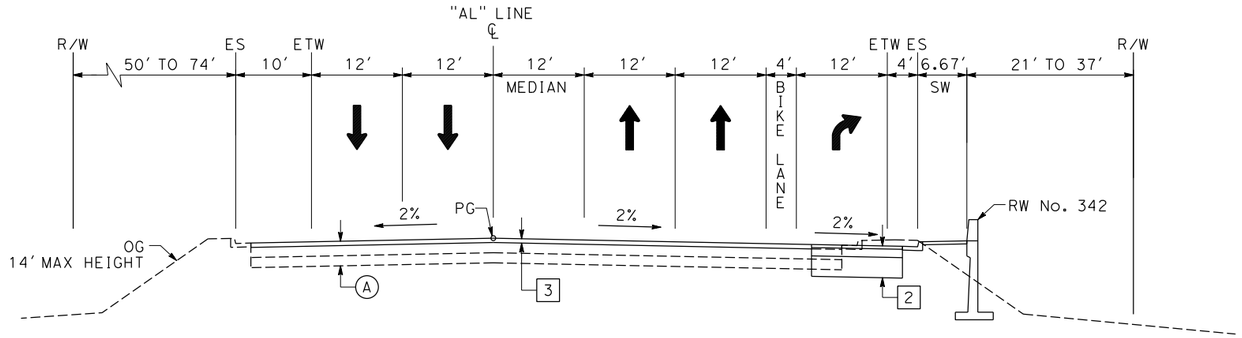

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TYPICAL CROSS SECTIONS
NO SCALE

X-2

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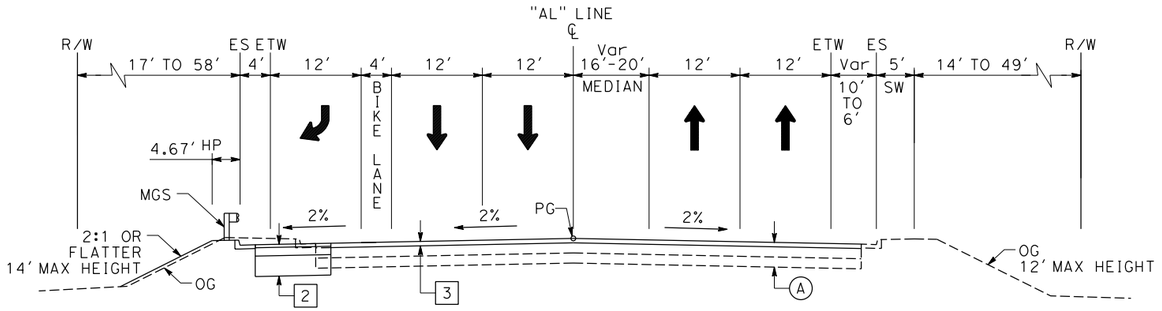

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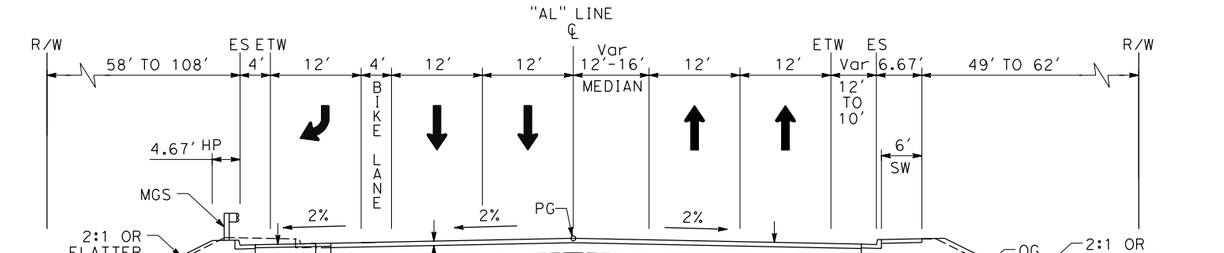

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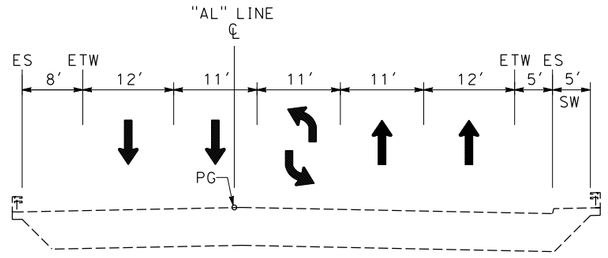

ALABAMA STREET

LINE "AL"
"AL" 349+18 TO "AL" 350+55

TYPICAL CROSS SECTIONS

NO SCALE

X-3

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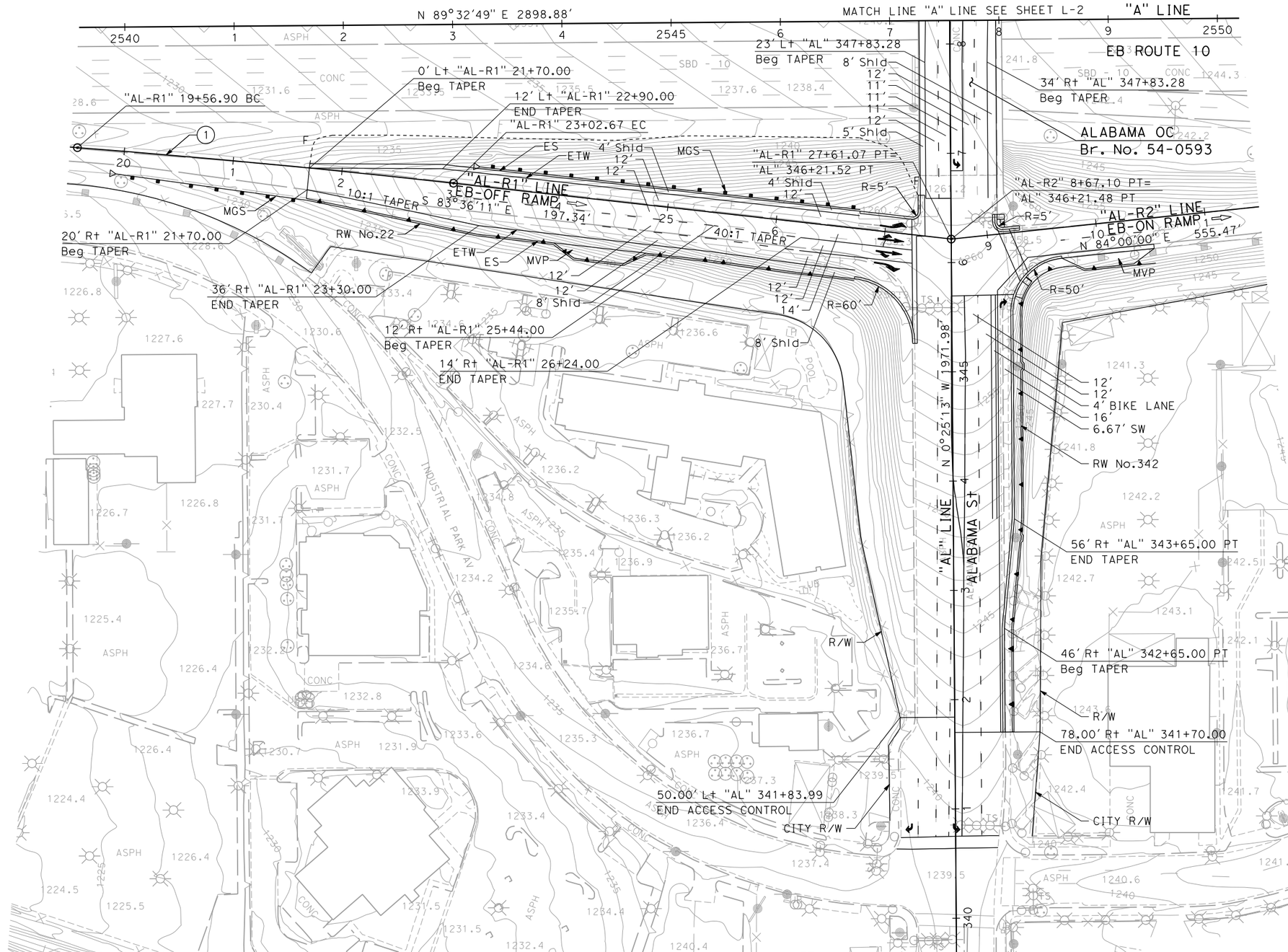

CURVE DATA

No.	R	△	T	L
(1)	10000.00'	1°58'52"	172.90'	345.77'

LAYOUT

SCALE 1" = 100'

L-1

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08	SBd	10	29.2/29.4		

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SAN BERNARDINO, CA 92410

ORANGE TREE Ln
ORANGE TREE LN
COULSTON AV
INDIANA CT
ARIZONA ST
ALABAMA St
N 0°25'13" W 1971.98'
"AL" LINE
CITY R/W
R=30'
12'
12'
20'
10'
10'
12'
18'
86.79' Lt "AL" 354+32.39
END ACCESS CONTROL
12'
12'
4' BIKE LANE
16'
104.43' Rt "AL" 352+15.10
END ACCESS CONTROL
14' Lt "AL-L2" 13+84.00
Beg TAPER
R/W
8' Shld
12'
12'
MGS
R=50'
Conc BARRIER
"AL-L2" 12+28.48 PT=
"AL" 350+71.49 PT
R=5'
5' Shld
12'
11'
14'
12'
4' Shld
37' Rt "AL" 349+18.28
END TAPER
20' Lt "AL" 349+18.28
END TAPER
11'
11'
12'
8' Shld
45:1 TAPER
45:1 TAPER
ALABAMA OC
Br. No. 54-0593
WB ROUTE 10
"A" LINE
N 89°32'49" E 2898.88'
MVP
ES
ETW
RW No.15
40:1 TAPER
WB-OFF RAMP
"AL-L2" LINE
6 N 87°17'16" E 7 1009.53' 8
12' Lt "AL-L2" 14+64.00
END TAPER
ES
ETW
10:1 TAPER
36' Rt "AL-L1" 19+00.00
Beg TAPER
24' Lt "AL-L2" 20+20.00
END TAPER
MGS
0' Rt "AL-L2" 20+20.00 PT
END TAPER
12' Rt "AL-L1" 19+00.00 PT
Beg TAPER
"AL" 22+38.01 BC
"A" 2557+87.66 BC
POOL
2545
2550
2555
MATCH LINE "A"LINE
SEE SHEET L-1
EB ROUTE 10

LAYOUT
SCALE 1" = 100'

L-2

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UNIT
PROJECT NUMBER & PHASE 08160001681

Attachment E
Life Cycle Cost Analysis

Life Cycle Cost Analysis (LCCA) Report

I-10/Alabama Street Ramps Replacement Project Between Orange Tree Lane and Industrial Park Avenue PA/ED

San Bernardino County, CA

8-SBd-10-PM 29.2/29.4
Caltrans EA No. 1H160
EFIS 08160000168

Prepared for:
San Bernardino County Transportation Authority

Prepared by:
Advanced Civil Technologies
6 Hutton Centre Drive, Suite 450
Santa Ana, CA 92707
Phone: (714) 662-2288

February 2019

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1. INTRODUCTION

The San Bernardino County Transportation Authority (SBCTA), in cooperation with the California Department of Transportation (Caltrans) and the City of Redlands, is proposing improvements to Alabama Street between Orange Tree Lane and Industrial Park Avenue, and improvements to the off-ramps. The proposed improvements include widening Alabama Street and the eastbound (EB) and westbound (WB) off-ramps from Interstate 10 (I-10).

1.1.Project Description

Two alternatives will be analyzed, as described below:

Alternative 1 – No Build
The no-build alternative proposes no improvements to the existing Alabama Street or the existing I-10/Alabama Street interchange. All freeway facilities would remain as-is with the exception of proposed projects that are under development or currently in construction.

Alternative 2 – Alabama Street and I-10 off-ramps improvements
Alternative 2 proposes widening Alabama Street in the northbound (NB) direction to provide a right turn pocket to serve the I-10 EB on-ramp, a 4-foot bike lane, and a 4-foot shoulder (at the right turn pocket). In addition, sidewalks and Americans with Disabilities Act (ADA) ramps will be provided in the NB direction. Alabama Street will also be widened in the southbound (SB) direction to provide a right turn pocket to serve the I-10 WB on-ramp. The widening in the SB direction will also add a 4-foot bike lane and a 4-foot shoulder at the right turn pocket. The WB and EB I-10 off-ramps will be widened by two lanes to provide a total of four lanes at the terminus; dedicated left and right lanes, and shared left/through and shared right/through lanes. In addition to widening the off-ramps, the existing pavement of the WB and EB I-10 off-ramps will be reconstructed. Retaining walls are proposed along the WB off-ramp, EB off-ramp, and along the right-turn pocket on NB Alabama Street.

2. EXISTING HIGHWAY

The project is located on Alabama Street between Orange Tree Lane and Industrial Park Avenue in the City of San Bernardino. The northern terminus of the project is at Orange Tree Lane and the southern terminus is at Industrial Park Avenue. The total project length is approximately 0.45 miles.

Currently, the Alabama Street overcrossing between the freeway ramps consists of two through lanes and back-to-back left turn lanes in the northbound and southbound direction, with a sidewalk only on the east side.

The Alabama Street overcrossing at I-10, Post Mile (PM) 29.3, was built in 1962 and spans the I-10 WB and EB traffic. The EB off-ramp is a single lane configuration that transitions into a dual lane at the terminus. The EB on-ramp is a dual lane configuration that transitions into a single lane, that merges with the Tennessee Street off-ramp towards the Tennessee Street intersection resulting in two lanes. The dual lanes cross over Tennessee Street transitioning, to a single lane prior to merging onto I-10. The WB on-ramp is a dual lane configuration that transitions into a single lane at the ramp meter. The WB off-ramp is single lane configuration that merges with the Tennessee Street off-ramp towards the Alabama Street intersection resulting in two lanes. The Remaining

Service Life Value (RSV) for the existing ramp pavement is not applicable because the pavement is proposed to be entirely replaced. The Maintenance Service Level (MSL) is Class 1 since the project is proposed on ramps on the interstate system. The existing pavement sections within the project limits are shown in Table 1.

Table 1: Existing Pavement Sections

Location	Pavement Section (feet)[1]
Alabama Street	0.29 AC 0.67 AB 0.67 AS 1.63 Total
Alabama Street On- and Off-Ramps	0.45 AC (Type B) 0.25 ATPB[2] 0.70 Total
Alabama Street On- and Off-Ramp Shoulders	0.30 AC (Type B) 0.45 AB 0.75 Total

[1] Based on available 1960 as-builts for Alabama Street and 1989 as-builts for ramps. Existing pavement section may vary.
[2] The as-builts for the on- and off-ramps indicate an edge drain located underneath the existing pavement section.

Alabama Street at the project's location has no bicycle facilities and has no pedestrian access on the west side of the street. However, on the east side, there is full pedestrian access via sidewalks, crosswalks, and curb ramps.

3. TRAFFIC

The initial parameters for the projected traffic distribution, growth rate, maintenance service level and other required traffic assumptions for the LCCA are shown in Appendix D (Traffic Data). Traffic distribution and projections used in the analysis were based on the I-10 2017 AADT traffic and 2016 truck traffic data from the Division of Traffic Operations website (http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/index.htm). The Added Time and Vehicle Stopping Costs were calculated by the RealCost software, Version 2.5.4CA (California version) in the LCCA analysis. The year of construction is assumed to be 2020 and the opening year is 2022. Table 2 (on the following page) shows the Traffic Data Parameters used for the analysis of each pavement feature.

Average daily traffic was used from the traffic report provided by Fehr & Peers (Fehr & Peers, 2018) to calculate the growth rate of traffic. The 20-year and 40-year Traffic Indices (TIs) were calculated and provided by Caltrans.

Table 2: Traffic Data Parameters

	Existing Year ADT[1] (Max)	Opening Year (2022) ADT (Max)	Future Year (2042) ADT (Max)	20-Year TI	40-Year TI
WB Off-Ramp	14,200	14,700	16,700	12.0	13.5
EB Off-Ramp	11,200	12,300	16,900	12.0	13.5

[1] Data was taken from the Average Daily Traffic (ADT) Summary from Appendix D.

The AADT for the I-10 mainline is 182,500, based on the data from the Division of Traffic Operations website, which was extrapolated using the growth rate to be 191,700 in the construction year (2020) and 289,300 in the future year (2042).

4. PAVEMENT ALTERNATIVES

Caltrans requires that a life-cycle cost analysis (LCCA) be performed for all new pavement features to be maintained by Caltrans. The LCCA process allows an agency to use economic principles to evaluate long-term alternative investment options for maintaining roadway pavements. Advanced Civil Technologies (ACT) performed the life-cycle cost analysis for the off ramps of this project in accordance with Caltrans' Life-Cycle Cost Analysis Procedures Manual (Version 2), dated August 2013, and using the software program, RealCost, Version 2.5.4 CA Edition.

As part of the LCCA process, pavement design alternatives were developed and compared to each other in order to identify the lowest cost alternative over the anticipated design and maintenance life. The LCCA process not only considers the initial cost of construction but also factors in the cost of future maintenance as well as the impact on the roadway users (user costs) from maintenance activities in the overall determination of the life-cycle cost. The preferred design alternative has the lowest present value (PV) or total life-cycle cost of all alternatives. The alternatives for each pavement feature of this project are described in Table 2. For the purpose of the LCCA, it is assumed that the pavement is laterally supported. A preferred design alternative is identified in Section 5.

For each type of the pavement features (ramps with ramp termini), rigid and flexible pavement alternatives were chosen for the LCCA. Based on the Caltrans Highway Design Manual (HDM) Table 612.2, a 40-year design life was considered because the ramp pavement is proposed to be completely reconstructed. All information regarding design traffic indices (TI) for each pavement feature, subgrade soils and other information used for the design is stated in the project Preliminary Materials Report prepared by Kleinfelder (Kleinfelder, 2018). Based on the TIs and the Caltrans LCCA Procedures Manual *Figure 2-1: LCCA New Construction and Reconstruction Pavement Type Selection Flowchart*, the following pavement alternatives (shown in Table 3) were used for the LCCA analysis.

4.1.Ramps

Table 3: Ramp Pavement Alternatives

Alternative	Design TI	R-Value	PDL (Years)[1]	Type	Section (feet)[2,3,4]
A1	13.5	25	40	Rigid	0.95 JPCP 0.25 HMA-A 0.70 AS 1.90 Total[5]
A2	13.5	25	40	Flexible	0.20 RHMA-G 1.45 HMA-A 0.50 AB 2.15 Total

1 PDL: Pavement Design Life.
2 JPCP: Jointed Plain Concrete Pavement, HMA-A: Hot Mix Asphalt-Type A, AB: Class 2 Aggregate Base, AS: Class 2 Aggregate Subbase, RHMA-G: Gap-graded Rubberized Hot-Mix Asphalt.
3 Type II Subgrade
4 Off-ramp termini will be constructed with rigid pavement in accordance with Sections 626.1 and 636.1 of the Highway Design Manual.
5 Because the ramps are proposed to be reconstructed with the same pavement structural section for the entire width (including the shoulder), the rigid pavement is considered to be laterally supported.

4.2.Shoulders

Per HDM Index 504.3(2)(f), the ramp shoulders are proposed to be the same pavement type and thickness as the ramp traveled way pavement structure. The shoulder costs have been included as part of the LCCA for the ramps.

5. ANALYSIS

Analysis was performed using the RealCost software, Version 2.5.4CA (California version) to obtain the deterministic results as specified in Caltrans LCCA Procedures Manual. An analysis period of 55 years was used, from Table 2-1, LCCA Manual. A Caltrans recommended discount rate of 4% was used in the LCCA. Maintenance service level used in the analysis as per the guidelines was MSL 1. The maintenance and rehabilitation sequences followed Table F-2(c) and Table R-1(a) for Inland Valley Climate Regions of the Caltrans LCCA Procedures Manual and are shown in Appendix E for each alternative. The initial construction costs (included in Appendix F) were identified based on the engineer's estimates specific to this project. The engineer's estimates were developed based on the pavement sections specified in the project Preliminary Materials Report prepared by Kleinfelder. (Kleinfelder, 2018).

A life-cycle cost analysis was performed on both eastbound and westbound off-ramps. Rigid and flexible alternatives with a 40-year design life were considered in this analysis. Conclusions and recommendations for each pavement feature based on the results provided by RealCost v2.5.4CA are discussed in the following sections.

The summary of costs associated with each alternative for the eastbound and westbound off-ramps are shown in Table 4.

Table 4: Summary of Costs by Alternative

Feature	Alternative	Initial Construction Cost (in $1,000s)	Future Maintenance and Rehabilitation Costs (in $1,000s)	Total Agency Cost (in $1,000s)	User Cost (in $1,000s)	Total Life Cycle Cost (in $1,000s)
EB Off Ramp	A1*	860	21	881	11	892
	A2	856	180	1,036	10	1,046
WB Off Ramp	A1*	1,050	25	1,075	6	1,081
	A2	1,041	197	1,238	6	1,244

Table 5 shows the total cost for each alternative. The total cost represents the Present Value of the Agency and the User cost for each alternative.

Table 5: Total Cost By Alternative

Feature	Alternative	Total Cost (Agency + User) (in $1,000s)	Difference with respect to the preferred alternative (in $1,000s)	% Difference with respect to the preferred alternative
EB Off Ramp	A1*	892	-	-
	A2	1,046	154	17.3%
WB Off Ramp	A1*	1,081	-	-
	A2	1,244	163	15.1%

* Represents preferred alternative

6. CONCLUSIONS AND RECOMMENDATIONS

The deterministic analysis for both the eastbound and westbound off-ramps identifies Alternative A1, JPCP for 40-year design, as the most cost-efficient alternative over the 55-year analysis period. Both alternatives A1 and A2 have three programmed maintenance events, but Alternative A1 has less maintenance cost over the 55-year analysis period. This led to Alternative A1 having the lowest present value cost, making it the preferred alternative as it will have less impact on the facility.

Table 6 lists the preferred alternative, pavement section, agency, and user cost based on our current understanding of the project and the results obtained from RealCost v2.5.4CA.

Table 6: Preferred Ramp Alternative

Preferred Alternative	Pavement Section[1]	Agency Cost (in $1,000s)	User Cost (in $1,000s)	Total Cost (Agency + User) (in $1,000s)
A1	0.95 JPCP 0.25 HMA-A 0.70 AS 1.90 Total[2]	$1,956	$17	$1,973

[1] JPCP: Jointed Plain Concrete Pavement, HMA-A: Hot Mix Asphalt-Type A, AS: Class 2 Aggregate Subbase

[2] Because the ramps are proposed to be reconstructed with the same pavement structural section for the entire width (including the shoulder), the rigid pavement is considered to be laterally supported.

7. REFERENCES

Caltrans, Highway Design Manual, July 2018.

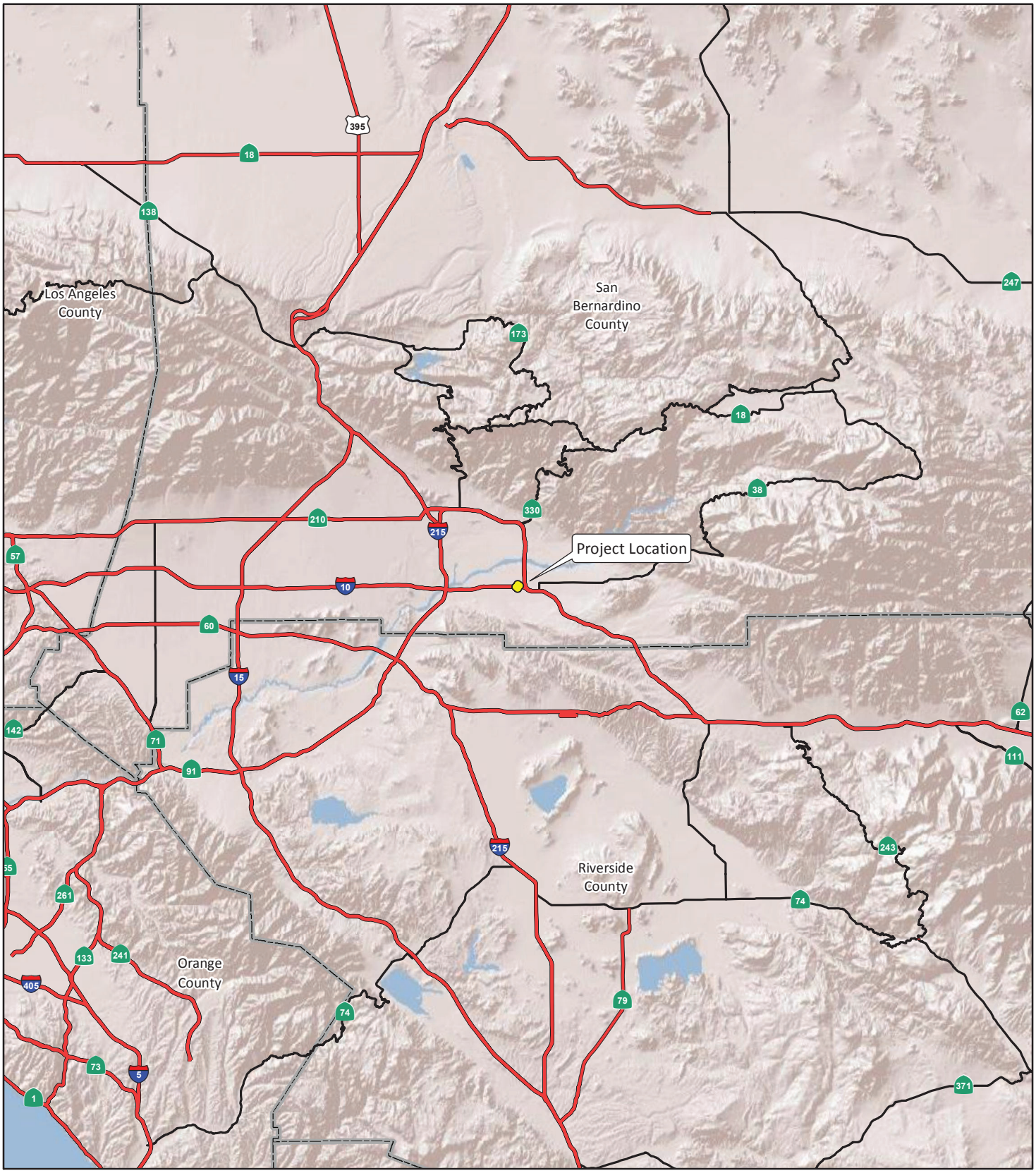
Caltrans, Life-Cycle Cost Analysis Procedures Manual (Version 2), August 2013.

Kleinfelder, 2018, Preliminary Materials Report.

Fehr & Peers, Alabama Street Improvements Project, Traffic Engineering Performance Assessment, April 2017.

RealCost, Version 2.5.4CA (California Edition), Life-Cycle Cost Analysis Software.

Appendix A
Site Vicinity Map and Post Mile Exhibit



LEGEND

Project Area

MAP 1

N

0 25000 50000

FEET

SOURCE: USGS 7.5' Quad - Redlands (1988)

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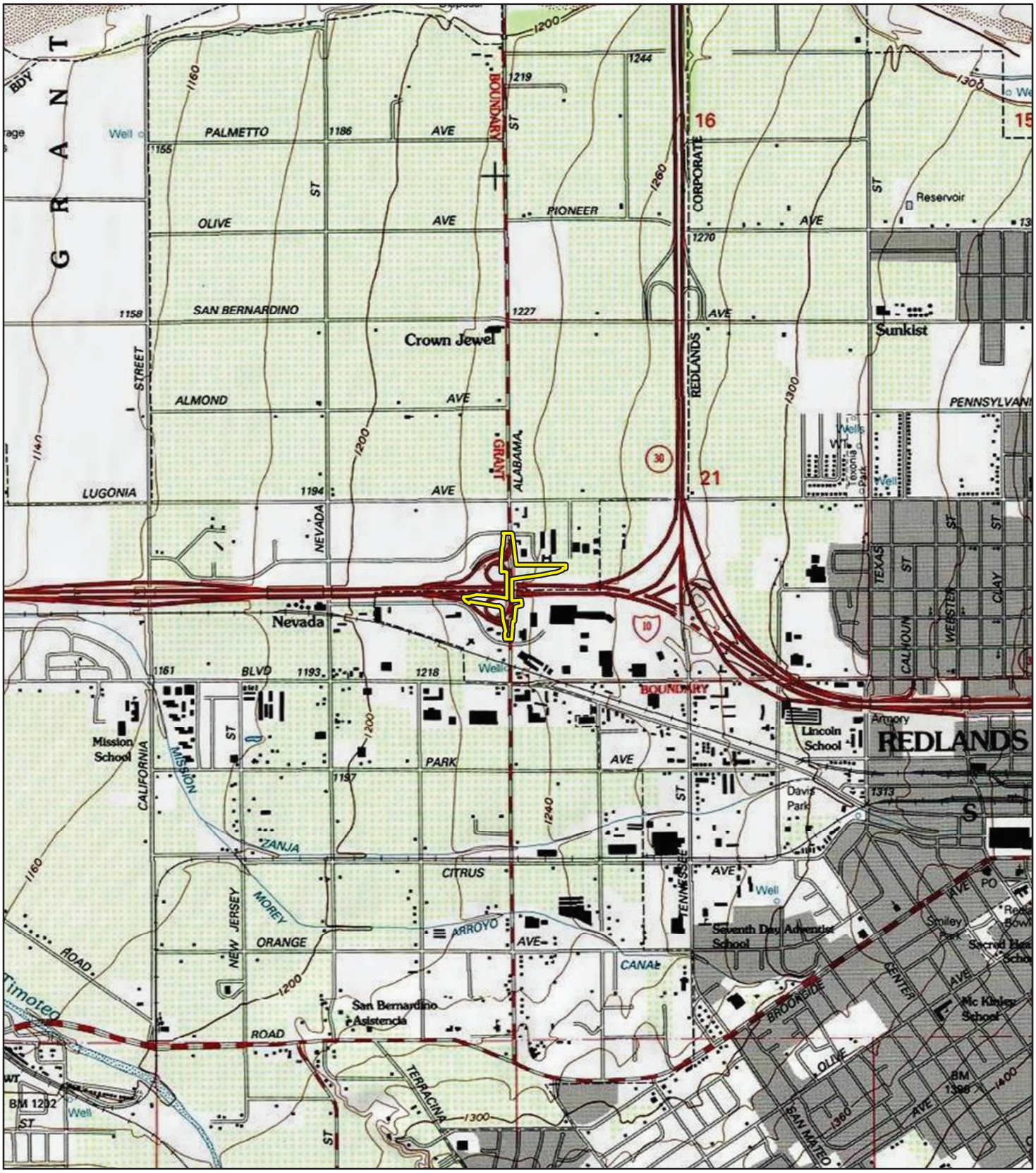
Alabama Street Improvement Project

Regional Project Location

PM 29.2 (I-10)/29.4 (I-10)

EA 1H160



LEGEND

Project Area

MAP 2

N

0 1000 2000

FEET

SOURCE: USGS 7.5' Quad - Redlands (1988)

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Alabama Street Improvement Project

Project Location

PM 29.2 (I-10)/29.4 (I-10)

EA 1H160

Appendix B

Life Cycle Cost Analysis Forms

Life Cycle Cost Analysis Form
EB Off Ramp

Alternative A1 (Preferred Alternative)

0.95' Jointed Plain Concrete Pavement (JPCP) over 0.25' Type-A Hot Mix Asphalt (HMA-A) over 0.70' Class 2 Aggregate Subbase (AS)

Pavement Design Life:	40 Years		
Initial Construction Costs :		$ 859,707	
Future Maintenance & Rehabilitation Costs:**		$ 21,293	
TOTAL AGENCY COSTS:			$ 881,000
USER COSTS:			$ 11,000
TOTAL LIFE-CYCLE COSTS:			$ 892,000

Alternative A2:*
Briefly describe the pavement strategy and differences in scope from Alternative 2.

0.20' Gap-Graded Rubberized Hot Mix Asphalt over 1.45' Type-A Hot Mix Asphalt (HMA-A) over 0.50' Class 2 Aggregate Base (AB).

Pavement Design Life:	40 Years		
Initial Construction Costs :		$ 855,582	
Future Maintenance & Rehabilitation Costs:**		$ 180,418	
TOTAL AGENCY COSTS:			$ 1,036,000
USER COSTS:			$ 10,000
TOTAL LIFE-CYCLE COSTS:			$ 1,046,000

Reason that this is not a Preferred Alternative:
It has a higher total Life-Cycle cost.

*Repeat as often as needed, with appropriate numbering, to cover all pavement alternatives investigated.
**Includes both future maintenance, construction, and project support costs.

Life Cycle Cost Analysis Form
WB Off Ramp

Alternative A1 (Preferred Alternative)

0.95' Jointed Plain Concrete Pavement (JPCP) over 0.25' Type-A Hot Mix Asphalt (HMA-A) over 0.70' Class 2 Aggregate Subbase (AS)

Pavement Design Life:	40 Years		
Initial Construction Costs :		$ 1,049,612	
Future Maintenance & Rehabilitation Costs:**		$ 25,388	
TOTAL AGENCY COSTS:			$ 1,075,000
USER COSTS:			$ 6,000
TOTAL LIFE-CYCLE COSTS:			$ 1,081,000

Alternative A2:*
Briefly describe the pavement strategy and differences in scope from Alternative 2.

0.20' Gap-Graded Rubberized Hot Mix Asphalt over 1.45' Type-A Hot Mix Asphalt (HMA-A) over 0.50' Class 2 Aggregate Base (AB).

Pavement Design Life:	40 Years		
Initial Construction Costs :		$ 1,040,504	
Future Maintenance & Rehabilitation Costs:**		$ 197,496	
TOTAL AGENCY COSTS:			$ 1,238,000
USER COSTS:			$ 6,000
TOTAL LIFE-CYCLE COSTS:			$ 1,244,000

Reason that this is not a Preferred Alternative:
It has a higher total Life-Cycle cost.

*Repeat as often as needed, with appropriate numbering, to cover all pavement alternatives investigated.
**Includes both future maintenance, construction, and project support costs.

Appendix C
Structural Sections from Materials Report

State of California
DEPARTMENT OF TRANSPORTATION

California State Transportation Agency

Memorandum

Making Conservation
A California Way of Life.

To: JAMAL SALMAN
Office Chief
Project Manager

Date: October 5, 2018

File: SBd-10-PM 29.2/29.4
PN 0816000198
EA 1H160

From: RENA TANG
Branch Chief
System Planning and Traffic Forecasting Analysis, MS 726

Subject: Ramp TI Request

This project proposes to widen the I-10 WB and EB off ramps at Alabama Street to allow for additional intersection improvements. Widen and re-stripe Alabama Street between Orange Tree Lane and Industrial Park Avenue to improve traffic operations.

Alabama Street Ramps TI* Traffic Indices are based on Construction Completion Acceptance (CCA) year 2022		
Traffic Index Year	**Mainline**	**Shoulder**
10 Year (ESAL)	4,743,472	94,869
10 Year TI	**11.0**	**7.0**
20 Year (ESAL)	10,172,110	203,442
20 Year TI	**12.0**	**7.5**
40 Year (ESAL)	25,950,707	519,014
40 Year TI	**13.5**	**8.5**

* TI was calculated based on data sources from Alabama Street Improvement Project TOAR (2018).

Table 3
Preliminary Ramp Pavement Sections For Estimating Purposes

Location	Design Subgrade for Rigid Pavement	R-Value for Flexible Pavement	Design Life (years)	Design Traffic Index[3]	New Pavement Section [1,2] (Feet)			
					Rigid Pavement [4,5]			Flexible Pavement [6,7]
Mainline I-10 WB and EB off ramps	Type II Subgrade	25	40	13.5	**Without Lateral Support**			0.20 RHMA-G 1.45 HMA-A 0.50 AB 2.15 Total
					1.05 JPCP BB 0.35 LCB 0.70 AS 2.10 Total	1.05 JPCP 0.25 HMA-A 0.70 AS 2.00 Total	0.95 CRCP 0.25 HMA-A 0.70 AS 1.90 Total	
					With Lateral Support			
					0.95 JPCP BB 0.35 LCB 0.70 AS 2.00 Total	0.95 JPCP 0.25 HMA-A 0.70 AS 1.90 Total	0.85 CRCP 0.25 HMA-A 0.70 AS 1.80 Total	
Shoulders [9] I-10 WB and EB off ramps	Type II Subgrade	25	40	8.5	**Without Lateral Support** 0.80 JPCP 1.00 AB [8] 1.80 Total			0.20 RHMA-G 0.30 HMA-A 0.95 AB 0.70 AS [8] 2.15 Total
					With Lateral Support 0.75 JPCP 1.00 AB [8] 1.75 Total			

Notes:
1. JPCP: Jointed Plain Concrete Pavement, CRCP: Continuously Reinforced Concrete Pavement, LCB: Lean Concrete Base, HMA-A: Hot Mix Asphalt-Type A, AB: Class 2 Aggregate Base, AS: Class 2 Aggregate Subbase, BB: Base Bond Breaker, RHMA-G: Gap-graded Rubberized Hot-Mix Asphalt.
2. The first 2 feet of the shoulder width measured from the edge of the traveled way should match the structural section of the adjacent traffic lane.
3. TI values were provided by Caltrans in memo dated October 5, 2018.
4. Rigid pavement design assumes no lateral support.
5. Rigid pavement sections may be used for ramp termini. Rapid Strength Concrete (RSC) JPCP and rapid setting Lean Concrete Base (LCBRS) may be used as necessary to limit traffic closures during construction of the proposed ramps.
6. RHMA-G used for surface course to comply with Public Resources Code 42703 requiring Caltrans to use crumb rubber modifier (CRM) in approximately 35 percent of total HMA placed statewide, as outlined in Caltrans Memorandum dated February 10, 2015.
7. Flexible pavement section for 40 year design life for the mainline follows Caltrans Highway Design Manual Chapter 630 requirements for pavement design life greater than 20 years. If the final design subgrade R-value is less than 40, subgrade enhancement geotextile (SEGT) will be required.
8. The total depth of the shoulder pavement structure should match the pavement structure grading plane of the adjacent traffic lane in accordance with Highway Design Manual Topic 613.5 (2) (b). Adjustments to the thickness of the AB layer (or an additional AS layer) may be required once the traffic lane pavement section has been finalized.
9. The same pavement type and section thickness as the travel lanes may be used for the ramp shoulders for constructability and to allow for the possibility of future widening as noted in the Caltrans Highway Design Manual Section 504.3 (2) (f).

Appendix D
Traffic Data

TRAFFIC DATA CALCULATIONS

I-10/Alabama EB Off Ramp

Current Year	2017
Construction Year	2020
Horizon Year	2042
ADT (2017): ADT Data (Fehr & Peer)	11200
ADT (2042): ADT Data (Fehr & Peer)	16900

T: CT Website	12 %
TA: CT Website	40.3 %
V	45
TI_{20}: Project Memo	12.0
TI_{40}: Project Memo	13.5

Annual Growth Rate of Traffic

$$A = \left[\left(\frac{FT}{CT} \right)^{\frac{1}{FY-CY}} - 1 \right] \times 100$$

FT(2042)	16,900
CT(2017)	11,200
FY	2042
CY	2017
A=	**1.66**

Initial Construction Year AADT

ADT (2017): ADT Data (Fehr & Peer)	11,200

$$I_{AADT} = MT \times \left(1 + \frac{A}{100} \right)^{(IY-MY)}$$

MT	11,200
A	1.66
IY	2020
MY	2017
I_{AADT}=	**11,767**

I-10 Mainline AADT

AADT (2017): CT Website	182,500
AADT (2020): Calculated	191,736
AADT (2042): Calculated	289,316
Combined AADT (2020)	215,269

Single Unit Trucks as Percentage of AADT (%)

$$SUT = T \times \left(\frac{TA}{100} \right)$$

T: CT Website	12.0 %
TA: CT Website	40.3 %
SUT=	**4.8** %

TRAFFIC DATA CALCULATIONS

I-10/Alabama WB Off Ramp

Current Year	2018
Construction Year	2020
Horizon Year	2042
ADT (2017): ADT Data (Fehr & Peer)	14200
ADT (2042): ADT Data (Fehr & Peer)	16700

T: CT Website	12 %
TA: CT Website	40.3 %
V	45
TI_{20}: Project Memo	12.0
TI_{40}: Project Memo	13.5

Annual Growth Rate of Traffic

$$A = \left[\left(\frac{FT}{CT} \right)^{\frac{1}{FY-CY}} - 1 \right] \times 100$$

FT(2042)	16,700
CT(2017)	14,200
FY	2042
CY	2017
A=	**0.65**

Initial Construction Year AADT

ADT (2017): ADT Data (Fehr & Peer)	14,200

$$I_{AADT} = MT \times \left(1 + \frac{A}{100} \right)^{(IY-MY)}$$

MT	14,200
A	0.65
IY	2020
MY	2017
I_{AADT}=	**14,479**

I-10 Mainline AADT

AADT (2017): CT Website	182,500
AADT (2020): Calculated	186,086
AADT (2042): Calculated	218,848
Combined AADT (2020)	215,044

Single Unit Trucks as Percentage of AADT (%)

$$SUT = T \times \left(\frac{TA}{100} \right)$$

T: CT Website	12.0 %
TA: CT Website	40.3 %
SUT=	**4.8** %

DIS	RTE	RTE	CNTY	PM	PM	PM	DESCRIPTION	BACK_PEAK_HOUR	BACK_PEAK_MADT	BACK_AADT	AHEAD_PEAK_HOUR	AHEAD_PEAK_MADT	AHEAD_AADT
08	010		SBD		29.313		ALABAMA STREET OC	12900	193000	189000	12000	180000	176000

Average Daily Traffic (ADT) Summary

Segment Number	Roadway Segment	Existing (2017)	Opening Year (2022)	Design Year (2042)
1	Alabama Street north of Lugonia Avenue	17,900	19,300	24,900
2	Alabama Street between Lugonia Avenue and Orange Tree Lane	22,400	24,300	31,800
3	Alabama Street between Orange Tree Lane and I-10 WB Ramps	25,700	27,400	34,200
4	Alabama Street between Westbound Ramp and I-10 EB Ramps	26,900	28,500	34,900
5	Alabama Street between Eastbound Ramp and Industrial Park Avenue	29,600	31,200	37,300
6	Alabama Street between Industrial Park Avenue and Redlands Boulevard	25,800	27,300	33,200
7	Alabama Street south of Redlands Boulevard	19,700	20,800	25,300
8	Westbound On Ramp	10,700	10,900	12,000
9	Westbound Off Ramp	14,200	14,700	16,700
10	Eastbound On Ramp	5,700	5,900	6,900
11	Eastbound Off Ramp	11,200	12,300	16,900

Source: Fehr & Peers, 2018

RTE	DIST	CNTY	POST MILE	LEG	DESCRIPTION	VEHICLE AADT TOTAL	TRUCK AADT TOTAL	TRUCK % TOT VEH	TRUCK By Axle 2	TRUCK By Axle 3	AADT By Axle 4	TOTAL By Axle 5+	% By Axle 2	TRUCK By Axle 3	AADT By Axle 4	By Axle 5+	EAL 2-WAY (1000)	YEAR VER/ EST
10	08	SBD	29.313	B	ALABAMA ST OC	189000	22680	12.00	9140	2064	1179	10297	40.30	9	5	45	4236	89E
10	08	SBD	29.313	A	ALABAMA ST OC	176000	21119	12.00	8511	1922	1098	9588	40.30	9	5	45	3944	89E
10	08	SBD	30.899	B	REDLANDS, JCT. RTE. 38 NORTH	176000	18304	10.40	7889	1739	915	7761	43.10	10	5	42	3248	85V
10	08	SBD	30.899	A	REDLANDS, JCT. RTE. 38 NORTH	148000	17760	12.00	7157	1616	924	8063	40.30	9	5	45	3317	86E
10	08	SBD	35.5	B	YUCAIPA BLVD	145000	18850	13.00	6993	1753	566	9538	37.10	9	3	51	3780	86E
10	08	SBD	35.5	A	YUCAIPA BLVD	118000	18880	16.00	6419	1133	378	10950	34.00	6	2	58	4162	86V
10	08	RIV	R3.048	A	CHERRY VALLEY BLVD	102000	13362	13.10	4049	735	294	8284	30.30	6	2	62	3111	91V
10	08	RIV	6.67	B	JCT. RTE. 60 WEST	99000	13365	13.50	3782	762	695	8126	28.30	6	5	61	3108	85V
10	08	RIV	6.67	A	JCT. RTE. 60 WEST	128000	17280	13.50	6929	1002	726	8623	40.10	6	4	50	3416	85E
10	08	RIV	7.574	A	BEAUMONT, JCT. RTE. 79 SOUTH	132000	19139	14.50	6737	1378	861	10163	35.20	7	5	53	3995	85E
10	08	RIV	11.333	B	BANNING, SUNSET AVE	134000	19162	14.30	5979	1571	881	10731	31.20	8	5	56	4185	85V
10	08	RIV	R14.76	B	EAST RAMSEY ST	121000	19359	16.00	3678	1529	968	13184	19.00	8	5	68	4960	86E
10	08	RIV	R14.76	A	EAST RAMSEY ST	124000	22692	18.30	3177	1815	1362	16338	14.00	8	6	72	6115	86V
10	08	RIV	R25.201	B	JCT. RTE. 111	105000	19950	19.00	3192	1596	1197	13965	16.00	8	6	70	5252	86E
10	08	RIV	R25.201	A	JCT. RTE. 111	88000	19272	21.90	5396	1156	771	11949	28.00	6	4	62	4531	86E
10	08	RIV	29.691	B	JCT. RTE. 62 NORTH	88000	19272	21.90	5589	1002	501	12180	29.00	5	3	63	4564	84E
10	08	RIV	29.691	A	JCT. RTE. 62 NORTH	86000	22532	26.20	5926	856	608	15142	26.30	4	3	67	5600	84E

Appendix E
Maintenance and Rehabilitation

TABLE R-1 (a)

Inland Valley, Dessert, Low Mountain, South Mountain, and all Coastal Climate Regions

RIGID AND COMPOSITE PAVEMENT MAINTENANCE AND REHABILITATION SCHEDULE

Final Pavement Type	Pvmt Design Life	Maint. Service Level	Year	Begin Alternative Construction	5	10	15	20	25	30	35	40	45	50	55
New Construction/Reconstruction															
Composite	20	1,2,3	Year of Action	0						30		38	45	Select a lane replace option listed under the rigid and composite pavement M&R table and follow the strategy sequence	
			Activity Description	**New / Reconstruct**						CAPM (FO+ JPCP SR)		CAPM (FO+ JPCP SR)	Lane Replace		
			Activity Service Life (years) / Annual Maint. Cost ($/lane-mile) over Activity Service Life	30 / 4,100						8 / 700		7 / 800			
	40	1,2,3	Year of Action	0										50	
			Activity Description	**New / Reconstruct**										CAPM (FO+ JPCP SR)	
			Activity Service Life (years) / Annual Maint. Cost ($/lane-mile) over Activity Service Life	50 / 4,800										8 / 700	
Rigid - Jointed Plain	20	1,2,3	Year of Action	0					25	30		40	45	Select a rehabilitation option listed under the rigid and composite pavement M&R table and follow the strategy sequence	
			Activity Description	**New / Reconstruct**					CAPM (CPR C^3)	CAPM (CPR B^2)		CAPM (CPR A^1)	Roadway Rehab		
			Activity Service Life (years) / Annual Maint. Cost ($/lane-mile) over Activity Service Life	25 / 700					5 / 3,000	10 / 1,500		5 / 3,100			
Concrete Pavement (JPCP)	40	1,2,3	Year of Action	0									45	50	
			Activity Description	**New / Reconstruct**									CAPM (CPR C^3)	CAPM (CPR B^2)	
			Activity Service Life (years) / Annual Maint. Cost ($/lane-mile) over Activity Service Life	45 / 800									5 / 3,000	10 / 1,500	
Rigid - Continuously Reinforced Concrete Pavement (CRCP)	20	1,2,3	Year of Action	0						30	35		45		
			Activity Description	**New / Reconstruct**						CAPM (PR C^7)	CAPM (PR B^6)		CAPM (PR A^5)		
			Activity Service Life (years) / Annual Maint. Cost ($/lane-mile) over Activity Service Life	30 / 200						5 / 1,400	10 / 600		10 / 600		
	40	1,2,3	Year of Action	0											
			Activity Description	**New / Reconstruct**											
			Activity Service Life (years) / Annual Maint. Cost ($/lane-mile) over Activity Service Life	55 / 200											

CPR = Concrete Pavement Rehabilitation, CSFOL = Crack, Seat, and Flexible Overlay, FO = Flexible Overlay, MSRO = Mill, Slab Replacement & Overlay, PR = Punchout Repair, SR = Slab Replacement

Notes:

1. Concrete Pavement Rehabilitation A involves pavement grinding, **significant** slab replacement, spall repair, & joint seal repair. It is for **JPCP** projects with a total number of slabs that were replaced or exhibit third stage Rigid Cracking greater than or equal to 5% and less than or equal to 7%. For greater than 7%, the project should be scoped and analyzed as a roadway rehabilitation project.
2. Concrete Pavement Rehabilitation B involves pavement grinding, **moderate** slab replacement, spall repair, & joint seal repair. It is for **JPCP** projects with a total number of slabs in the lane that were replaced or exhibit third stage Rigid Cracking between 2 and 5%.
3. Concrete Pavement Rehabilitation C involves pavement grinding, **minor** slab replacement, spall repair, & joint seal repair. It is for **JPCP** projects with a total number of slabs in the lane that were replaced or exhibit third stage Rigid Cracking 2% or less.
4. The schedule for this strategy is based on pavement that has previously been cracked, seated and overlaid. It should not be used as an alternative on rigid JPCP pavements with cracking or faulting near or above the threshold for roadway rehabilitation.
5. Punchout Repair A involves **significant** punchout repairs & 0.15' of flexible overlay. It applies to **continuously reinforced concrete pavements** that had previous punchout repairs and a flexible overlay.
6. Punchout Repair B involves **moderate** punchout repairs & 0.15' of flexible overlay. It applies to **continuously reinforced concrete pavements** where the total number of current & previous punchout repairs exceed 4 per mile.
7. Punchout Repair C involves **minor** punchout repairs & limited diamond grinding around the punchout repair area. It applies to **continuously reinforced concrete pavements** where the total number of punchout repairs do not exceed 4 per mile.

TABLE F-2 (c)
Inland Valley Climate Region
HOT MIX ASPHALT W/ RHMA PAVEMENT MAINTENANCE AND REHABILITATION SCHEDULE

Final Surface Type	Pvmt Design Life	Maint. Service Level	Year	Begin Alternative Construction	5	10	15	20	25	30	35	40	45	50	55
New Construction/Reconstruction															
HMA w/ RHMA	20	1,2	Year of Action	0					21		31				52
			Activity Description	**New / Reconstruct**					CAPM HMA w/ RHMA		Rehab HMA w/ RHMA (20 yr)				CAPM HMA w/ RHMA
			Activity Service Life (years)	21					10		21				10
			Annual Maint. Cost ($/lane-mile) over Activity Service Life	3,000					3,700		2,000				3,700
		3	Year of Action	0					21		31		41		51
			Activity Description	**New / Reconstruct**					CAPM HMA w/ RHMA		CAPM HMA w/ RHMA		CAPM HMA w/ RHMA		Rehab HMA w/ RHMA (20 yr)
			Activity Service Life (years)	21					10		10		10		21
			Annual Maint. Cost ($/lane-mile) over Activity Service Life	3,000					3,700		6,800		6,800		2,000
	40	1,2	Year of Action	0								40		50	
			Activity Description	**New / Reconstruct**								CAPM HMA w/ RHMA		Rehab HMA w/ RHMA (20 yr)	
			Activity Service Life (years)	40								10		21	
			Annual Maint. Cost ($/lane-mile) over Activity Service Life	7,200								3,700		3,400	
		3	Year of Action	0								40		50	
			Activity Description	**New / Reconstruct**								CAPM HMA w/ RHMA		CAPM HMA w/ RHMA	
			Activity Service Life (years)	40								10		10	
			Annual Maint. Cost ($/lane-mile) over Activity Service Life	7,200								3,700		3,700	
CAPM															
HMA w/ RHMA	5+	1,2	Year of Action	0		10				31		41			
			Activity Description	**CAPM HMA w/ RHMA**		Rehab HMA w/ RHMA (20 yr)				CAPM HMA w/ RHMA		Rehab HMA w/ RHMA (20 yr)			
			Activity Service Life (years)	10		21				10		21			
			Annual Maint. Cost ($/lane-mile) over Activity Service Life	3,700		3,400				3,700		3,400			
		3	Year of Action	0		10		20		30				51	
			Activity Description	**CAPM HMA w/ RHMA**		CAPM HMA w/ RHMA		CAPM HMA w/ RHMA		Rehab HMA w/ RHMA (20 yr)				CAPM HMA w/ RHMA	
			Activity Service Life (years)	10		10		10		21				10	
			Annual Maint. Cost ($/lane-mile) over Activity Service Life	3,700		6,800		6,800		2,000				3,700	
Rehabilitation															
HMA w/ RHMA	20	1,2,3	Year of Action	0					21		31				52
			Activity Description	**Rehab HMA w/ RHMA (20 yr)**					CAPM HMA w/ RHMA		Rehab HMA w/ RHMA (20 yr)				CAPM HMA w/ RHMA
			Activity Service Life (years)	21					10		21				10
			Annual Maint. Cost ($/lane-mile) over Activity Service Life	3,400					3,700		3,400				3,700
	40	1,2,3	Year of Action	0								40		50	
			Activity Description	**Rehab HMA w/ RHMA (40 yr)**								CAPM HMA w/ RHMA		Rehab HMA w/ RHMA (40 yr)	
			Activity Service Life (years)	40								10		40	
			Annual Maint. Cost ($/lane-mile) over Activity Service Life	7,000								3,700		7,000	

Table 3-7 Productivity Estimates of Typical Future Ramp Rehabilitation for Rigid and Composite Pavements

Final Surface Type	Future M&R Alternative		Pavement Design Life (years)	Maintenance Service Level	Average Lane-mile Completed Per Closure				
					Daily Closure		Continuous Closure		
					5 to 7-Hour Closure	8 to 12-Hour Closure	16 hour/day Operation	24 hour/day Operation	Weekend Closure (55-Hour)
CAPM									
Flexible/ Composite	Flexible Overlay		5+	1,2,3	0.27	0.54	0.85	1.61	3.78
	Flexible Overlay w/Salb Replacements (FO+JPCP SR)	4-hr RSC	5+	1,2,3	0.20	0.43	0.71		
		12-hr RSC					0.52	1.16	3.06
Rigid-Jointed Plain Concrete Pavement (JPCP)	Concrete Pavement Rehab A	4-hr RSC	5+	1,2,3	0.28	0.60	1.26		
		12-hr RSC					0.39	1.21	4.63
	Concrete Pavement Rehab B	4-hr RSC	5+	1,2,3	0.40	0.84	1.76		
		12-hr RSC					0.54	1.68	6.43
	Concrete Pavement Rehab C	4-hr RSC	5+	1,2,3	0.99	2.10	4.41		
		12-hr RSC					1.35	4.20	16.08
Rigid-Continuously Reinforced Concrete Pavement (CRCP)	Punchout Repair A	4-hr RSC	5+	1,2,3	0.06	0.13	0.54		
		12-hr RSC					0.27	0.54	3.40
	Punchout Repair B	4-hr RSC	5+	1,2,3	0.08	0.18	0.76		
		12-hr RSC					0.26	0.76	4.76
	Punchout Repair C	4-hr RSC	5+	1,2,3	0.21	0.45	1.89		
		12-hr RSC					0.93	1.89	11.91
Rehabilitation									
Flexible / Composite	Flexible Overlay w/ Slab Replacement **(FO + JPCP SR)**	4-hr RSC	10	1,2,3	0.03	0.07	0.13		
	Flexible Overlay w/ Slab Replacement **(FO + JPCP SR)**	12-hr RSC					0.04	0.13	0.49
	Mill, Slab Replacement & Overlay **(MSRO)**	4-hr RSC	10	1,2,3	0.03	0.06	0.12		
	Mill, Slab Replacement & Overlay **(MSRO)**	12-hr RSC					0.04	0.12	0.45
	Mill, Slab Replacement & Overlay **(MSRO)**	4-hr RSC	20	1,2,3	0.03	0.06	0.11		
	Mill, Slab Replacement & Overlay **(MSRO)**	12-hr RSC					0.04	0.12	0.42
	Crack, Seat, & Flexible Overlay (CSFOL)		10	1,2,3	0.28	0.57	0.96	1.61	4.13
			20		0.21	0.43	0.73	1.24	3.19
	Replace with Flexible		20	1,2,3	0.12	0.26	0.43	0.74	1.91
			40		0.08	0.18	0.31	0.52	1.37
	Replace with Composite	4-hr RSC	20	1,2,3	0.01	0.05	0.11		
		12-hr RSC					0.04	0.10	0.39
		4-hr RSC	40	1,2,3	0.01	0.04	0.10		
		12-hr RSC					0.04	0.09	0.36
Jointed Plain Concrete Pavement (JPCP)	Lane Replacement	4-hr RSC	20	1,2,3	0.01	0.04	0.10		
		12-hr RSC					0.04	0.09	0.37
		4-hr RSC	40	1,2,3	0.01	0.04	0.09		
		12-hr RSC					0.03	0.08	0.33
Continuously Reinforced Concrete Pavement	Lane Replacement	4-hr RSC	20	1,2,3	0.01	0.02	0.06		
		12-hr RSC					0.03	0.06	0.40
		4-hr RSC	40	1,2,3	0.01	0.02	0.06		
		12-hr RSC					0.03	0.06	0.38

FO = Flexible Overlay JPCP = Jointed Plain Concrete Pavement SR = Slab Replacement RSC = Rapid Set Concrete
CRCP = Continuously Reinforced Concrete Pavement

Notes:

(1) Refer to Appendix 1, "Glossary and list of Acronyms" for definitions of terms used in the table.
(2) Production rates are based on the lower end of the representative assumptions for the range and are applied consistently throughout the table.
These rates are only for calculating future user costs for the procedures in this manual and not for any other purpose.
More project specifics user cost for some freeway situations can be obtained from the CA4PRS software.
(3) 24-hour continuous closure with 16 hours of operation per day
(4) 24-hour continuous closure with 24 hours of operation per day
(5) 55-hour extended closure over the weekend
(6) Punchout Repair A involves **significant** punchout repairs and 0.15' of flexible overlay. It applies to continuously reinforced concrete pavement that had previous punchout repairs and a flexible overlay.
(7) Punchout Repair B involves **moderate** punchout repair and 0.15' of flexible overlay. It applies to continuously reinforced concrete pavement where the total number of current and previous punchout repairs exceed 4 per mile.
(8) Punchout Repair C involves **minor** punchout repairs and 0.15' of flexible overlay. It applies to continuously reinforced concrete pavement where the total number of current and previous punchout repairs do not exceed 4 per mile.
(9) Precast panel concrete pavement is under development. See HQ LCCA Coordinator for assistance.

Table 3-5 Productivity Estimates of Typical Future Rehabilitation Ramp Strategies for Flexible Pavements

Final Surface Type	Future M&R Alternative	Pavement Design Life (years)	Maintenance Service Level	Average Lane-mile Completed Per Closure				
				Daily Closure (Weekday)		Continuous Closure		
				5 to 7-Hour Closure	8 to 12-Hour Closure	16 hour/Day Operation	24 hour/day Operation	55-hour Weekend Closure
CAPM								
HMA	Overlay	5+	1,2,3	0.51	1.02	1.71	2.85	7.29
	Mill & Overlay	5+	1,2,3	0.22	0.44	0.70	1.32	3.10
HMA w/OGFC	Overlay	5+	1,2,3	0.32	0.66	1.11	1.87	4.81
	Mill & Overlay	5+	1,2,3	0.17	0.36	0.57	1.10	2.60
HMA w/ RHMA	Overlay	5+	1,2,3	0.32	0.66	1.11	1.87	4.81
	Mill & Overlay	5+	1,2,3	0.17	0.36	0.57	1.10	2.60
RHMA-G	Overlay	5+	1,2,3	0.68	1.36	2.28	3.79	9.69
	Mill & Overlay	5+	1,2,3	0.29	0.59	0.93	1.75	4.10
RHMA-G w/RHMA-O	Overlay	5+	1,2,3	0.51	1.02	1.71	2.85	7.29
	Mill & Overlay	5+	1,2,3	0.20	0.42	0.67	1.29	3.05
Rehabilitation								
HMA	Overlay	10	1,2,3	0.28	0.57	0.96	1.61	4.13
		20	1,2,3	0.19	0.40	0.68	1.13	2.90
	Mill & Overlay	10	1,2,3	0.13	0.26	0.43	0.81	1.92
		20	1,2,3	0.09	0.18	0.29	0.55	1.30
HMA w/OGFC	Overlay	10	1,2,3	0.21	0.43	0.73	1.24	3.19
		20	1,2,3	0.15	0.33	0.55	0.93	2.40
	Mill & Overlay	10	1,2,3	0.11	0.23	0.37	0.72	1.72
		20	1,2,3	0.08	0.16	0.26	0.51	1.19
HMA w/RHMA	Overlay	10	1,2,3	0.21	0.43	0.73	1.24	3.19
		20	1,2,3	0.15	0.33	0.55	0.93	2.40
	Mill & Overlay	10	1,2,3	0.11	0.23	0.37	0.72	1.72
		20	1,2,3	0.08	0.16	0.26	0.51	1.19
RHMA-G	Overlay	10	1,2,3	0.51	1.02	1.71	2.85	7.29
		20	1,2,3	0.32	0.66	1.11	1.87	4.81
	Mill & Overlay	10	1,2,3	0.22	0.44	0.70	1.32	3.10
		20	1,2,3	0.15	0.31	0.50	0.94	2.22
RHMA-G w/RHMA-O	Overlay	10	1,2,3	0.32	0.66	1.11	1.87	4.81
		20	1,2,3	0.23	0.49	0.82	1.39	3.58
	Mill & Overlay	10	1,2,3	0.17	0.36	0.57	1.10	2.60
		20	1,2,3	0.12	0.26	0.42	0.82	1.95

Notes:

(1) Refer to Appendix 1, "Glossary and list of Acronyms" for definitions of terms used in the table.
(2) Production rates in the table are based on representative assumptions that are applied consistently throughout the table. These rates are only for calculating future user costs for the procedures in this manual and not for any other purpose. More project specific user costs for some freeway situations can be obtained from the CA4PRS software.
(3) 24-hour continuous closure with 16 hours of operation per day
(4) 24-hour continuous closure with 24 hours of operation per day
(5) 55-hour extended closure over the weekend

Appendix F
Cost Related Items

I-10 Alabama Street Ramp Replacement
EB Off Ramp
PAVEMENT COST SUMMARY

Alternative	Initial Construction Cost
A1	$859,707
A2	$855,582

I-10 Alabama Street Ramp Replacement
EB Off Ramp
COST SUMMARY

	40 Year Design Life Rigid Pavement Replacement (JPCP)	40 Year Design Life Flexible Pavement Replacement
Ramp Structural Section	0.95' JPCP, 0.25' HMA-A, 0.70' AS	0.20' RHMA-G, 1.45' HMA-A, 0.50' AB
Ramp Pavement Area (sf)	27,400	27,400
Shoulder Structural Section	Same as ramp travel lane	Same as ramp travel lane
Shoulder Pavement Area (sf)	6,900	6,900

I. ROADWAY ITEMS

Pavement Items	40 Year Design Life Rigid Pavement Replacement (JPCP)				40 Year Design Life Flexible Pavement Replacement			
	Quantity	Unit	Unit Price	Item Cost	Quantity	Unit	Unit Price	Item Cost
RHMA	0	Ton	$150	$0	268	Ton	$150	$40,129
HMA	621	Ton	$115	$71,390	2,226	Ton	$115	$255,982
AS	888	CY	$45	$39,958	410	CY	$45	$18,433
JPCP	1,205	CY	$365	$439,859	556	CY	$365	$202,913
AB	0	CY	$75	$0	342	CY	$75	$25,625
	Subtotal			$551,207	Subtotal			$543,082
	Drainage			$12,500	Drainage			$12,500
	Earthwork			$150,000	Earthwork			$150,000
	Traffic Control			$10,000	Traffic Control			$10,000
	Time Related Overhead			$125,000	Time Related Overhead			$125,000
	Maintenance Costs			$11,000	Maintenance Costs			$15,000
	Total Cost			**$859,707**	**Total Cost**			**$855,582**
	Total Pavement Area (sf)			**34,300**	**Total Pavement Area (sf)**			**34,300**
	Average Unit Price of Unit-Area ($/sf)			$25.06	Average Unit Price of Unit-Area ($/sf)			$24.94

I-10 ALABAMA STREET PA/ED
EB Off Ramp
Alternative 1
40 Year Design Life Rigid JPCP Mainline

ROADWAY PAVEMENT QUANTITIES

LINE	DIRECTION	STATION		AREA	STRUCTURAL SECTION	HMA-A			CLASS 2 AS		JPCP		AB	
						THICKNESS	VOL		THICKNESS	VOL	THICKNESS	VOL	THICKNESS	VOL
		from	to	ft^2		ft	ft^3	ton	ft	ft^3	ft	ft^3	ft	ft^3
AL-R1	EB	25+00	27+61	13575	M1	0.25	3393.8	246.0	0.7	9502.5	0.95	12896.3	0	0.0
AL-R1	EB	25+00	27+61	2225	S1	0.25	556.3	40.3	0.7	1557.5	0.95	2113.8	0	0.0
AL-R1	EB	21+70	25+00	13820	M1	0.25	3455.0	250.5	0.7	9674.0	0.95	13129.0	0	0.0
AL-R1	EB	21+70	25+00	4630	S1	0.25	1157.5	83.9	0.7	3241.0	0.95	4398.5	0	0.0
TOTAL				**34250 ft2**		**621 ton**			**23975 ft3**		**32538 ft3**		**ft3**	
Total in Cubic Yards									**888**		**1205**		**0**	

Note: Pavement areas were measured directly from CADD files in Microstation. Station limits are provided to reference locations only and were not used to calculate areas.

I-10 ALABAMA STREET PA/ED
EB Off Ramp
Alternative 2
40 Year Design Life Replacement Flexible pavement

ROADWAY PAVEMENT QUANTITIES

LINE	DIRECTION	STATION		AREA	STRUCTURAL SECTION	RHMA-G			HMA-A			CLASS 2 AS		JPCP		AB	
						THICKNESS	VOL		THICKNESS	VOL		THICKNESS	VOL	THICKNESS	VOL	THICKNESS	VOL
		from	to	ft^2		ft	ft^3	ton	ft	ft^3	ton	ft	ft^3	ft	ft^3	ft	ft^3
AL-R1	EB	25+00	27+61	13575	M1	0	0.0	0.0	0.25	3393.8	246.0	0.7	9502.5	0.95	12896.3	0	0.0
AL-R1	EB	25+00	27+61	2225	S1	0	0.0	0.0	0.25	556.3	40.3	0.7	1557.5	0.95	2113.8	0	0.0
AL-R1	EB	21+70	25+00	13820	M2	0.2	2764.0	200.4	1.45	20039.0	1452.8	0	0.0	0	0.0	0.5	6910.0
AL-R1	EB	21+70	25+00	4630	S2	0.2	926.0	67.1	1.45	6713.5	486.7	0	0.0	0	0.0	0.5	2315.0
TOTAL				**34250 ft2**		**268 ton**			**2226 ton**			**11060 ft3**		**15010 ft3**		**9225 ft3**	
Total in Cubic Yards												**410**		**556**		**342**	

Note: Pavement areas were measured directly from CADD files in Microstation. Station limits are provided to reference locations only and were not used to calculate areas.

40 Year Design Life Mainline and Shoulder

STRUCTURAL SECTION	RHMA-G	HMA-A	CLASS 2 AS	JPCP	AB
M1		0.25	0.70	0.95	
M2	0.20	1.45			0.50
S1		0.25	0.70	0.95	
S2	0.20	1.45			0.50

I-10 Alabama Street Ramp Replacement
WB Off Ramp
PAVEMENT COST SUMMARY

Alternative	Initial Construction Cost
A1	$1,049,612
A2	$1,040,504

I-10 Alabama Street Ramp Replacement
WB Off Ramp
COST SUMMARY

	40 Year Design Life Rigid Pavement Replacement (JPCP)	40 Year Design Life Flexible Pavement Replacement
Ramp Structural Section	0.95' JPCP, 0.25' HMA-A, 0.70' AS	0.20' RHMA-G, 1.45' HMA-A, 0.50' AB
Ramp Pavement Area (sf)	36,900	36,900
Shoulder Structural Section	Same as ramp travel lane	Same as ramp travel lane
Shoulder Pavement Area (sf)	9,200	9,200

I. ROADWAY ITEMS

Pavement Items	40 Year Design Life Rigid Pavement Replacement (JPCP)				40 Year Design Life Flexible Pavement Replacement			
	Quantity	Unit	Unit Price	Item Cost	Quantity	Unit	Unit Price	Item Cost
RHMA	0	Ton	$150	$0	432	Ton	$150	$64,739
HMA	835	Ton	$115	$95,985	3,424	Ton	$115	$393,784
AS	1,194	CY	$45	$53,725	422	CY	$45	$18,999
JPCP	1,620	CY	$365	$591,401.39	573	CY	$365	$209,142
AB	0	CY	$75	$0	551	CY	$75	$41,340
	Subtotal			$741,112	Subtotal			$728,004
	Drainage			$12,500	Drainage			$12,500
	Earthwork			$150,000	Earthwork			$150,000
	Traffic Control			$10,000	Traffic Control			$10,000
	Time Related Overhead			$125,000	Time Related Overhead			$125,000
	Maintenance Costs			$11,000	Maintenance Costs			$15,000
	Total Cost			**$1,049,612**	**Total Cost**			**$1,040,504**
	Total Pavement Area (sf)			**46,100**	**Total Pavement Area (sf)**			**46,100**
	Average Unit Price of Unit-Area ($/sf)			$22.77	Average Unit Price of Unit-Area ($/sf)			$22.57

I-10 ALABAMA STREET PA/ED
WB Off Ramp
Alternative 1
40 Year Design Life Rigid JPCP Mainline

ROADWAY PAVEMENT QUANTITIES

LINE	DIRECTION	STATION		AREA	STRUCTURAL SECTION	HMA-A			CLASS 2 AS		JPCP		AB	
						THICKNESS	VOL		THICKNESS	VOL	THICKNESS	VOL	THICKNESS	VOL
		from	to	ft^2		ft	ft^3	ton	ft	ft^3	ft	ft^3	ft	ft^3
AL-L2	WB	12+70	15+00	13360	M1	0.25	3340.0	242.2	0.7	9352.0	0.95	12692.0	0	0.0
AL-L2	WB	12+70	15+00	2925	S1	0.25	731.3	53.0	0.7	2047.5	0.95	2778.8	0	0.0
AL-L2	WB	15+00	20+21	23510	M1	0.25	5877.5	426.1	0.7	16457.0	0.95	22334.5	0	0.0
AL-L2	WB	15+00	20+21	6255	S1	0.25	1563.8	113.4	0.7	4378.5	0.95	5942.3	0	0.0
TOTAL				**46050 ft2**		**835 ton**			**32235 ft3**		**43748 ft3**		**ft3**	
Total in Cubic Yards									**1194**		**1620**		**0**	

Note: Pavement areas were measured directly from CADD files in Microstation. Station limits are provided to reference locations only and were not used to calculate areas.

I-10 ALABAMA STREET PA/ED
WB Off Ramp
Alternative 2
40 Year Design Life Replacement Flexible pavement

ROADWAY PAVEMENT QUANTITIES

LINE	DIRECTION	STATION		AREA	STRUCTURAL SECTION	RHMA-G			HMA-A			CLASS 2 AS		JPCP		AB	
						THICKNESS	VOL		THICKNESS	VOL		THICKNESS	VOL	THICKNESS	VOL	THICKNESS	VOL
		from	to	ft^2		ft	ft^3	ton	ft	ft^3	ton	ft	ft^3	ft	ft^3	ft	ft^3
AL-L2	WB	12+70	15+00	13360	M1	0	0.0	0.0	0.25	3340.0	242.2	0.7	9352.0	0.95	12692.0	0	0.0
AL-L2	WB	12+70	15+00	2925	S1	0	0.0	0.0	0.25	731.3	53.0	0.7	2047.5	0.95	2778.8	0	0.0
AL-L2	WB	15+00	20+21	23510	M2	0.2	4702.0	340.9	1.45	34089.5	2471.5	0	0.0	0	0.0	0.5	11755.0
AL-L2	WB	15+00	20+21	6255	S2	0.2	1251.0	90.7	1.45	9069.8	657.6	0	0.0	0	0.0	0.5	3127.5
TOTAL				**46050 ft2**		**432 ton**			**3424 ton**			**11400 ft3**		**15471 ft3**		**14883 ft3**	
Total in Cubic Yards												**422**		**573**		**551**	

Note: Pavement areas were measured directly from CADD files in Microstation. Station limits are provided to reference locations only and were not used to calculate areas.

40 Year Design Life Mainline and Shoulder

STRUCTURAL SECTION	RHMA-G	HMA-A	CLASS 2 AS	JPCP	AB
M1		0.25	0.70	0.95	
M2	0.20	1.45			0.50
S1		0.25	0.70	0.95	
S2	0.20	1.45			0.50

Appendix G
RealCost v2.5CA Reports

RealCost Input Data

1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$13.65
Value of Time for Single Unit Trucks ($/hour)	$31.40
Value of Time for Combination Trucks ($/hour)	$31.40

2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Service Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Service Life Value	Yes
Traffic Direction	Outbound
Analysis Period (Years)	55
Beginning of Analysis Period	2020
Discount Rate (%)	4.0
Number of Alternatives	2

3. Project Details and Quantity Calculations	
State Route	I-10
Project Type	New/Reconstruction/Widen
Project Name	I-10/Alabama Interchange
Maintenance Service Level	1
Local Region	District 8
County	San Bernardino / 29.2
Climate Region	Inland Valley
Analyzed By	Advanced Civil Technologies
Mileposts	
Begin	
End	
Length of Project (miles)	0.15
Comments	EB Off-Ramp: I-10/Alabama Interchange Project Between Orange Tree Lane and Industrial Park Avenue

4. Traffic Data	
AADT Construction Year (total for both directions)	215,269
Cars as Percentage of AADT (%)	88.0
Single Unit Trucks as Percentage of AADT (%)	4.8
Combination Trucks as Percentage of AADT (%)	7.2
Annual Growth Rate of Traffic (%)	1.7
Speed Limit Under Normal Operating Conditions (mph)	65
No of Lanes in Each Direction During Normal Conditions	5
Free Flow Capacity (vphpl)	2170
Queue Dissipation Capacity (vphpl)	1700
Maximum AADT (total for both directions)	430,184
Maximum Queue Length (miles)	1
5. Maintenance and Rehabilitation Sequence	

Alternative 1	
Final Pavement Surface	
Design Life	
Activity 1 Name	NEW/RECONST JPCP (40YR)
Activity 1 Year of Action	2020
Activity 1 Annual Maintenance Cost ($1000)	0.6
Activity 1 Activity Service Life (Year)	45
Activity 2 Name	CAPM (CPR C)
Activity 2 Year of Action	2065
Activity 2 Annual Maintenance Cost ($1000)	2.25
Activity 2 Activity Service Life (Year)	5
Activity 3 Name	CAPM (CPR B)
Activity 3 Year of Action	2070
Activity 3 Annual Maintenance Cost ($1000)	1.125
Activity 3 Activity Service Life (Year)	10
Activity 4 Name	CAPM HMA
Activity 4 Year of Action	2080
Activity 4 Annual Maintenance Cost ($1000)	8.8
Activity 4 Activity Service Life (Year)	5
Activity 5 Name	REHAB HMA (20YR)
Activity 5 Year of Action	2085
Activity 5 Annual Maintenance Cost ($1000)	23.2
Activity 5 Activity Service Life (Year)	5
Activity 6 Name	
Activity 6 Year of Action	2090
Activity 6 Annual Maintenance Cost ($1000)	0
Activity 6 Activity Service Life (Year)	0
Alternative 2	
Final Pavement Surface	
Design Life	
Activity 1 Name	NEW/RECONST HMA W/RHMA (40YR)
Activity 1 Year of Action	2020
Activity 1 Annual Maintenance Cost ($1000)	5.4
Activity 1 Activity Service Life (Year)	40.0
Activity 2 Name	CAPM HMA W/ RHMA
Activity 2 Year of Action	2060
Activity 2 Annual Maintenance Cost ($1000)	2.775
Activity 2 Activity Service Life (Year)	10.0
Activity 3 Name	REHAB HMA W/ RHMA (20YR)
Activity 3 Year of Action	2070
Activity 3 Annual Maintenance Cost ($1000)	2.55
Activity 3 Activity Service Life (Year)	21
Activity 4 Name	
Activity 4 Year of Action	2091
Activity 4 Annual Maintenance Cost ($1000)	0
Activity 4 Activity Service Life (Year)	0
Activity 5 Name	
Activity 5 Year of Action	2091
Activity 5 Annual Maintenance Cost ($1000)	1
Activity 5 Activity Service Life (Year)	0
Activity 6 Name	

Activity 6 Year of Action	2091
Activity 6 Annual Maintenance Cost ($1000)	0
Activity 6 Activity Service Life (Year)	0
Alternative 3	
Final Pavement Surface	
Design Life	
Activity 1 Name	NEW/RECONST CRCP (40YR)
Activity 1 Year of Action	2020
Activity 1 Annual Maintenance Cost ($1000)	0.12
Activity 1 Activity Service Life (Year)	55
Activity 2 Name	CAPM HMA W/ RHMA
Activity 2 Year of Action	2075
Activity 2 Annual Maintenance Cost ($1000)	0
Activity 2 Activity Service Life (Year)	10
Activity 3 Name	REHAB HMA W/ RHMA (20YR)
Activity 3 Year of Action	2085
Activity 3 Annual Maintenance Cost ($1000)	0
Activity 3 Activity Service Life (Year)	23
Activity 4 Name	CAPM (PR A)
Activity 4 Year of Action	2108
Activity 4 Annual Maintenance Cost ($1000)	5
Activity 4 Activity Service Life (Year)	10
Activity 5 Name	
Activity 5 Year of Action	2118
Activity 5 Annual Maintenance Cost ($1000)	0
Activity 5 Activity Service Life (Year)	0
Activity 6 Name	
Activity 6 Year of Action	2118
Activity 6 Annual Maintenance Cost ($1000)	0
Activity 6 Activity Service Life (Year)	0
Alternative 4	
Final Pavement Surface	
Design Life	
Activity 1 Name	NEW/RECONST CRCP (20YR)
Activity 1 Year of Action	2020
Activity 1 Annual Maintenance Cost ($1000)	0
Activity 1 Activity Service Life (Year)	30
Activity 2 Name	CAPM (PR C)
Activity 2 Year of Action	2050
Activity 2 Annual Maintenance Cost ($1000)	0
Activity 2 Activity Service Life (Year)	5
Activity 3 Name	CAPM (PR B)
Activity 3 Year of Action	2055
Activity 3 Annual Maintenance Cost ($1000)	0
Activity 3 Activity Service Life (Year)	10
Activity 4 Name	CAPM (PR A)
Activity 4 Year of Action	2065
Activity 4 Annual Maintenance Cost ($1000)	0
Activity 4 Activity Service Life (Year)	10
Activity 5 Name	20
Activity 5 Year of Action	2075
Activity 5 Annual Maintenance Cost ($1000)	0

Activity 5 Activity Service Life (Year)	0
Activity 6 Name	
Activity 6 Year of Action	2075
Activity 6 Annual Maintenance Cost ($1000)	0
Activity 6 Activity Service Life (Year)	0

Alternative 1	Rigid Pavement (JPCP)
Number of Activities	3

Activity 1	NEW/RECONST JPCP (40YR)	
Agency Construction Cost ($1000)	$859.71	
User Work Zone Costs ($1000)		
Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work Zone	4	
Activity Service Life (years)	45.0	
Activity Structural Life (years)		
Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	0.6	
Work Zone Length (miles)	0.15	
Work Zone Speed Limit (mph)	60	
Work Zone Capacity (vphpl)	1510	
Traffic Hourly Distribution	Weekday Single-Peak	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End
First period of lane closure	0	6
Second period of lane closure	20	24
Third period of lane closure		
Outbound	Start	End
First period of lane closure	0	6
Second period of lane closure	20	24
Third period of lane closure		

Activity 2	CAPM (CPR C)	
Agency Construction Cost ($1000)	$22.00	
User Work Zone Costs ($1000)		
Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work Zone	4	
Activity Service Life (years)	5.0	
Activity Structural Life (years)		
Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	2.25	
Work Zone Length (miles)	0.15	
Work Zone Speed Limit (mph)	60	
Work Zone Capacity (vphpl)	1510	
Traffic Hourly Distribution	Weekday Single-Peak	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End
First period of lane closure	0	6
Second period of lane closure	20	24
Third period of lane closure		

Outbound	Start	End
First period of lane closure	0	6
Second period of lane closure	20	24
Third period of lane closure		

Activity 3	CAPM (CPR B)	
Agency Construction Cost ($1000)	$41.00	
User Work Zone Costs ($1000)		
Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work Zone	4	
Activity Service Life (years)	10.0	
Activity Structural Life (years)		
Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	1.125	
Work Zone Length (miles)	0.15	
Work Zone Speed Limit (mph)	60	
Work Zone Capacity (vphpl)	1510	
Traffic Hourly Distribution	Weekday Single-Peak	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End
First period of lane closure	0	6
Second period of lane closure	20	24
Third period of lane closure		
Outbound	Start	End
First period of lane closure	0	6
Second period of lane closure	20	24
Third period of lane closure		

Alternative 2	Flexible Pavement
Number of Activities	3

Activity 1	NEW/RECONST HMA W/RHMA (40YR)	
Agency Construction Cost ($1000)	$855.58	
User Work Zone Costs ($1000)		
Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work Zone	4	
Activity Service Life (years)	40.0	
Activity Structural Life (years)		
Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	5.4	
Work Zone Length (miles)	0.15	
Work Zone Speed Limit (mph)	60	
Work Zone Capacity (vphpl)	1510	
Traffic Hourly Distribution	Weekday Single-Peak	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End
First period of lane closure	0	6
Second period of lane closure	20	24
Third period of lane closure		

Outbound	Start	End
First period of lane closure	0	6
Second period of lane closure	20	24
Third period of lane closure		

Activity 2	CAPM HMA W/ RHMA	
Agency Construction Cost ($1000)	$200.00	
User Work Zone Costs ($1000)		
Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work Zone	4	
Activity Service Life (years)	10.0	
Activity Structural Life (years)		
Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	2.775	
Work Zone Length (miles)	0.15	
Work Zone Speed Limit (mph)	60	
Work Zone Capacity (vphpl)	1510	
Traffic Hourly Distribution	Weekday Single-Peak	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End
First period of lane closure	0	6
Second period of lane closure	20	24
Third period of lane closure		
Outbound	Start	End
First period of lane closure	0	6
Second period of lane closure	20	24
Third period of lane closure		

Activity 3	REHAB HMA W/ RHMA (20YR)	
Agency Construction Cost ($1000)	$526.00	
User Work Zone Costs ($1000)		
Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work Zone	4	
Activity Service Life (years)	21.0	
Activity Structural Life (years)		
Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	2.55	
Work Zone Length (miles)	0.15	
Work Zone Speed Limit (mph)	60	
Work Zone Capacity (vphpl)	1510	
Traffic Hourly Distribution	Weekday Single-Peak	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End
First period of lane closure	0	6
Second period of lane closure	20	24
Third period of lane closure		
Outbound	Start	End
First period of lane closure	0	6
Second period of lane closure	20	24
Third period of lane closure		

Deterministic Results

Total Cost	Alternative 1: Rigid Pavement (JPCP)		Alternative 2: Flexible Pavement	
	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	$942	$65	$1,427	$49
Present Value	$881	$11	$1,036	$10
EUAC	$40	$0	$47	$0

RealCost Input Data

1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$13.65
Value of Time for Single Unit Trucks ($/hour)	$31.40
Value of Time for Combination Trucks ($/hour)	$31.40

2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Service Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Service Life Value	Yes
Traffic Direction	Outbound
Analysis Period (Years)	55
Beginning of Analysis Period	2020
Discount Rate (%)	4.0
Number of Alternatives	2

3. Project Details and Quantity Calculations	
State Route	I-10
Project Type	New/Reconstruction/Widen
Project Name	I-10/Alabama Interchange
Maintenance Service Level	1
Local Region	District 8
County	San Bernardino / 29.2
Climate Region	Inland Valley
Analyzed By	Advanced Civil Technologies
Mileposts	
Begin	
End	
Length of Project (miles)	0.15
Comments	WB Off-Ramp: I-10/Alabama Interchange Project Between Orange Tree Lane and Industrial Park Avenue.

4. Traffic Data	
AADT Construction Year (total for both directions)	215,044
Cars as Percentage of AADT (%)	88.0
Single Unit Trucks as Percentage of AADT (%)	4.8
Combination Trucks as Percentage of AADT (%)	7.2
Annual Growth Rate of Traffic (%)	0.7
Speed Limit Under Normal Operating Conditions (mph)	65
No of Lanes in Each Direction During Normal Conditions	5
Free Flow Capacity (vphpl)	2170
Queue Dissipation Capacity (vphpl)	1700
Maximum AADT (total for both directions)	430,184
Maximum Queue Length (miles)	1
5. Maintenance and Rehabilitation Sequence	

Alternative 1	
Final Pavement Surface	
Design Life	
Activity 1 Name	NEW/RECONST JPCP (40YR)
Activity 1 Year of Action	2020
Activity 1 Annual Maintenance Cost ($1000)	0.6
Activity 1 Activity Service Life (Year)	45
Activity 2 Name	CAPM (CPR C)
Activity 2 Year of Action	2065
Activity 2 Annual Maintenance Cost ($1000)	2.25
Activity 2 Activity Service Life (Year)	5
Activity 3 Name	CAPM (CPR B)
Activity 3 Year of Action	2070
Activity 3 Annual Maintenance Cost ($1000)	1.125
Activity 3 Activity Service Life (Year)	10
Activity 4 Name	CAPM HMA
Activity 4 Year of Action	2080
Activity 4 Annual Maintenance Cost ($1000)	8.8
Activity 4 Activity Service Life (Year)	5
Activity 5 Name	REHAB HMA (20YR)
Activity 5 Year of Action	2085
Activity 5 Annual Maintenance Cost ($1000)	23.2
Activity 5 Activity Service Life (Year)	5
Activity 6 Name	
Activity 6 Year of Action	2090
Activity 6 Annual Maintenance Cost ($1000)	0
Activity 6 Activity Service Life (Year)	0
Alternative 2	
Final Pavement Surface	
Design Life	
Activity 1 Name	NEW/RECONST HMA W/RHMA (40YR)
Activity 1 Year of Action	2020
Activity 1 Annual Maintenance Cost ($1000)	5.4
Activity 1 Activity Service Life (Year)	40.0
Activity 2 Name	CAPM HMA W/ RHMA
Activity 2 Year of Action	2060
Activity 2 Annual Maintenance Cost ($1000)	2.775
Activity 2 Activity Service Life (Year)	10.0
Activity 3 Name	REHAB HMA W/ RHMA (20YR)
Activity 3 Year of Action	2070
Activity 3 Annual Maintenance Cost ($1000)	2.55
Activity 3 Activity Service Life (Year)	21
Activity 4 Name	
Activity 4 Year of Action	2091
Activity 4 Annual Maintenance Cost ($1000)	0
Activity 4 Activity Service Life (Year)	0
Activity 5 Name	
Activity 5 Year of Action	2091
Activity 5 Annual Maintenance Cost ($1000)	1
Activity 5 Activity Service Life (Year)	0
Activity 6 Name	

Activity 6 Year of Action	2091
Activity 6 Annual Maintenance Cost ($1000)	0
Activity 6 Activity Service Life (Year)	0
Alternative 3	
Final Pavement Surface	
Design Life	
Activity 1 Name	NEW/RECONST CRCP (40YR)
Activity 1 Year of Action	2020
Activity 1 Annual Maintenance Cost ($1000)	0.06
Activity 1 Activity Service Life (Year)	55
Activity 2 Name	CAPM HMA W/ RHMA
Activity 2 Year of Action	2075
Activity 2 Annual Maintenance Cost ($1000)	0
Activity 2 Activity Service Life (Year)	10
Activity 3 Name	REHAB HMA W/ RHMA (20YR)
Activity 3 Year of Action	2085
Activity 3 Annual Maintenance Cost ($1000)	0
Activity 3 Activity Service Life (Year)	23
Activity 4 Name	CAPM (PR A)
Activity 4 Year of Action	2108
Activity 4 Annual Maintenance Cost ($1000)	5
Activity 4 Activity Service Life (Year)	10
Activity 5 Name	
Activity 5 Year of Action	2118
Activity 5 Annual Maintenance Cost ($1000)	0
Activity 5 Activity Service Life (Year)	0
Activity 6 Name	
Activity 6 Year of Action	2118
Activity 6 Annual Maintenance Cost ($1000)	0
Activity 6 Activity Service Life (Year)	0
Alternative 4	
Final Pavement Surface	
Design Life	
Activity 1 Name	NEW/RECONST CRCP (20YR)
Activity 1 Year of Action	2020
Activity 1 Annual Maintenance Cost ($1000)	0
Activity 1 Activity Service Life (Year)	30
Activity 2 Name	CAPM (PR C)
Activity 2 Year of Action	2050
Activity 2 Annual Maintenance Cost ($1000)	0
Activity 2 Activity Service Life (Year)	5
Activity 3 Name	CAPM (PR B)
Activity 3 Year of Action	2055
Activity 3 Annual Maintenance Cost ($1000)	0
Activity 3 Activity Service Life (Year)	10
Activity 4 Name	CAPM (PR A)
Activity 4 Year of Action	2065
Activity 4 Annual Maintenance Cost ($1000)	0
Activity 4 Activity Service Life (Year)	10
Activity 5 Name	20
Activity 5 Year of Action	2075
Activity 5 Annual Maintenance Cost ($1000)	0

Activity 5 Activity Service Life (Year)	0
Activity 6 Name	
Activity 6 Year of Action	2075
Activity 6 Annual Maintenance Cost ($1000)	0
Activity 6 Activity Service Life (Year)	0

Alternative 1	Rigid Pavement (JPCP)
Number of Activities	3

Activity 1	NEW/RECONST JPCP (40YR)	
Agency Construction Cost ($1000)	$1,049.61	
User Work Zone Costs ($1000)		
Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work Zone	4	
Activity Service Life (years)	45.0	
Activity Structural Life (years)		
Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	0.6	
Work Zone Length (miles)	0.15	
Work Zone Speed Limit (mph)	60	
Work Zone Capacity (vphpl)	1510	
Traffic Hourly Distribution	Weekday Single-Peak	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End
First period of lane closure	0	6
Second period of lane closure	20	24
Third period of lane closure		
Outbound	Start	End
First period of lane closure	0	6
Second period of lane closure	20	24
Third period of lane closure		

Activity 2	CAPM (CPR C)	
Agency Construction Cost ($1000)	$31.00	
User Work Zone Costs ($1000)		
Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work Zone	4	
Activity Service Life (years)	5.0	
Activity Structural Life (years)		
Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	2.25	
Work Zone Length (miles)	0.15	
Work Zone Speed Limit (mph)	60	
Work Zone Capacity (vphpl)	1510	
Traffic Hourly Distribution	Weekday Single-Peak	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End
First period of lane closure	0	6
Second period of lane closure	20	24
Third period of lane closure		

Outbound	Start	End
First period of lane closure	0	6
Second period of lane closure	20	24
Third period of lane closure		

Activity 3	CAPM (CPR B)	
Agency Construction Cost ($1000)	$70.00	
User Work Zone Costs ($1000)		
Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work Zone	4	
Activity Service Life (years)	10.0	
Activity Structural Life (years)		
Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	1.125	
Work Zone Length (miles)	0.15	
Work Zone Speed Limit (mph)	60	
Work Zone Capacity (vphpl)	1510	
Traffic Hourly Distribution	Weekday Single-Peak	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End
First period of lane closure	0	6
Second period of lane closure	20	24
Third period of lane closure		
Outbound	Start	End
First period of lane closure	0	6
Second period of lane closure	20	24
Third period of lane closure		

Alternative 2	Flexible Pavement
Number of Activities	3

Activity 1	NEW/RECONST HMA W/RHMA (40YR)	
Agency Construction Cost ($1000)	$1,040.50	
User Work Zone Costs ($1000)		
Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work Zone	4	
Activity Service Life (years)	40.0	
Activity Structural Life (years)		
Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	5.4	
Work Zone Length (miles)	0.15	
Work Zone Speed Limit (mph)	60	
Work Zone Capacity (vphpl)	1510	
Traffic Hourly Distribution	Weekday Single-Peak	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End
First period of lane closure	0	6
Second period of lane closure	20	24
Third period of lane closure		

Outbound	Start	End
First period of lane closure	0	6
Second period of lane closure	20	24
Third period of lane closure		

Activity 2	CAPM HMA W/ RHMA	
Agency Construction Cost ($1000)	$273.00	
User Work Zone Costs ($1000)		
Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work Zone	4	
Activity Service Life (years)	10.0	
Activity Structural Life (years)		
Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	2.775	
Work Zone Length (miles)	0.15	
Work Zone Speed Limit (mph)	60	
Work Zone Capacity (vphpl)	1510	
Traffic Hourly Distribution	Weekday Single-Peak	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End
First period of lane closure	0	6
Second period of lane closure	20	24
Third period of lane closure		
Outbound	Start	End
First period of lane closure	0	6
Second period of lane closure	20	24
Third period of lane closure		

Activity 3	REHAB HMA W/ RHMA (20YR)	
Agency Construction Cost ($1000)	$564.00	
User Work Zone Costs ($1000)		
Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work Zone	4	
Activity Service Life (years)	21.0	
Activity Structural Life (years)		
Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	2.55	
Work Zone Length (miles)	0.15	
Work Zone Speed Limit (mph)	60	
Work Zone Capacity (vphpl)	1510	
Traffic Hourly Distribution	Weekday Single-Peak	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End
First period of lane closure	0	6
Second period of lane closure	20	24
Third period of lane closure		
Outbound	Start	End
First period of lane closure	0	6
Second period of lane closure	20	24
Third period of lane closure		

Deterministic Results

Total Cost	Alternative 1: Rigid Pavement (JPCP)		Alternative 2: Flexible Pavement	
	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	$1,156	$37	$1,694	$30
Present Value	$1,075	$6	$1,238	$6
EUAC	$49	$0	$56	$0

Appendix H
Preliminary Materials Report

Attachment F
Storm Water Data Report
(Cover Sheet)

Dist-County-Route: 08-SBd-10
Post Mile Limits: 29.2 to 29.4
Type of Work: Ramp Widening
Project ID (EA): 0816000168 (EA 1H160)
Program Identification: 800.100 (HE11)
Phase: ☐ PID ☒ PA/ED ☐ PS&E

Regional Water Quality Control Board(s): Santa Ana (Region 8)
Total Disturbed Soil Area: 4.20 ac PCTA: 2.34 ac
Alternative Compliance (acres): 0.15 ac ATA 2 (50% Rule)? Yes ☐ No ☒
Estimated Const. Start Date: Jan 2020 Estimated Const. Completion Date: Sep 2020
Risk Level: RL 1 ☒ RL 2 ☐ RL 3 ☐ WPCP ☐ Other: _____
Is MWELO applicable? Yes ☒ No ☐
Is the Project within a TMDL watershed? Yes ☐ No ☒
TMDL Compliance Units (acres): _____
Notification of ADL reuse (if yes, provide date): Yes ☐ Date: TBD @ PS&E No ☐

This Report has been prepared under the direction of the following Licensed Person. The Licensed Person attests to the technical information contained herein and the date upon which recommendations, conclusions, and decisions are based. Professional Engineer or Landscape Architect stamp required at PS&E only.

Ziyin Shen — 4/23/2019
Ziyin (David) Shen, PE, Registered Project Engineer — Date

I have reviewed the stormwater quality design issues and find this report to be complete, current and accurate:

Elaheh Hadipour — 4/26/19
Elaheh Hadipour, Project Manager — *Date*

Leonard Estrella — 4/26/2019
Leonard Estrella, Designated Maintenance Representative — *Date*

Rose Bishop — 4/26/19
Rose Bishop, District Landscape Architect — *Date*

[Stamp Required at PS&E only]
Jon Bumps — 4/30/19
Jon Bumps, District SW Coordinator — *Date*

NB
4/30/19

Attachment G
Preliminary Project Cost Estimate

PROJECT

PRELIMINARY COST ESTIMATE

EA: 08-1H160 PID: 08-0816000168

EA: 08-1H160

PID: 08-0816000168

District-County-Route: 08-SBd-10

PM: 29.2 - 29.4

Type of Estimate : Project Report

Program Code : Measure I and Nexus Development Impact Fee

Project Limits : In San Bernardino County from 0.2 Mile North of Interstate 10 to 0.2 Mile South of Interstate 10

Project Description: Intersection improvement - Ramp widening, street widening and restriping

Scope : The proposed project will widen and restripe Alabama Street between Orange Tree Lane and Industrial Park Avenue to improve traffic operation, the I-10 WB and EB off ramps will also be widened to allow for additional intersection movements.

Alternative : Build Alternative

SUMMARY OF PROJECT COST ESTIMATE

	Current Year Cost	Escalated Cost
TOTAL ROADWAY COST	$ 9,863,000	$ 12,889,649
TOTAL STRUCTURES COST	$ -	$ -
SUBTOTAL CONSTRUCTION COST	$ 9,863,000	$ 12,889,649
TOTAL RIGHT OF WAY COST	$ -	$ -
TOTAL CAPITAL OUTLAY COSTS	$ 9,863,000	$ 12,890,000
PA/ED SUPPORT	$ 922,000	$ 922,000
PS&E SUPPORT	$ 462,000	$ 462,000
RIGHT OF WAY SUPPORT	$ 10,000	$ 10,000
CONSTRUCTION SUPPORT	$ 1,157,000	$ 1,157,000
TOTAL SUPPORT COST	$ 2,551,000	$ 2,551,000
TOTAL PROJECT COST	$ 12,450,000	$ 15,450,000

If Project has been programmed enter Programmed Amount

	Month	/	Year
Date of Estimate (Month/Year)	12	/	2018
Estimated Construction Start (Month/Year)	6	/	2020
Number of Working Days =	240		
Estimated Mid-Point of Construction (Month/Year)	6	/	2021
Estimated Construction End (Month/Year)	1	/	2022
Number of Plant Establishment Days	240		

Estimated Project Schedule

PID Approval	12/1/2017
PA/ED Approval	4/26/2019
PS&E	11/11/2019
RTL	2/7/2020
Begin Construction	6/5/2020

Reviewed by District O.E. or Cost Estimate Certifier

Office Engineer / Cost Estimate Certifier **Date** **Phone**

Approved by Project Manager

909-383-6723

Elaheh Hadipour, Project Manager **Date** **Phone**

I. ROADWAY ITEMS SUMMARY

	Section		Cost
1	**Earthwork**	$	410,000
2	**Pavement Structural Section**	$	2,008,200
3	**Drainage**	$	474,200
4	**Specialty Items**	$	2,159,300
5	**Environmental**	$	383,900
6	**Traffic Items**	$	1,326,000
7	**Detours**	$	-
8	**Minor Items**	$	405,700
9	**Roadway Mobilization**	$	358,400
10	**Supplemental Work**	$	305,500
11	**State Furnished**	$	386,900
12	**Time-Related Overhead**	$	358,400
13	**Roadway Contingency**	$	1,286,500
	TOTAL ROADWAY ITEMS	**$**	**9,863,000**

Estimate Prepared By : Ali Salman, Staff Engineer — 4/22/2019 (Date) — 714-662-2288 (Phone)

Estimate Reviewed By : Jamal Salman, Project Manager — 4/22/2019 (Date) — 714-662-2288 (Phone)

By signing this estimate you are attesting that you have discussed your project with all functional units and have incorporated all their comments or have discussed with them why they will not be incorporated.

SECTION 1: EARTHWORK

Item code		Unit	Quantity		Unit Price ($)			Cost
190101	Roadway Excavation	CY	5,000	x	62.00	=	$	310,000
19801X	Imported Borrow	CY	1,000	x	40.00	=	$	40,000
16010X	Clearing & Grubbing	LS	1	x	50,000.00	=	$	50,000
170101	Develop Water Supply	LS	1	x	10,000.00	=	$	10,000

TOTAL EARTHWORK SECTION ITEMS $ 410,000

SECTION 2: PAVEMENT STRUCTURAL SECTION

Item code		Unit	Quantity		Unit Price ($)			Cost
401050	Jointed Plain Concrete Pavement	CY	2,825	x	365.00	=	$	1,031,125
414202	Joint Seal (Preformed Compression)	LF	1,500	x	13.00	=	$	19,500
414241	Isolation Joint Seal (Silicone)	LF	1,500	x	19.00	=	$	28,500
390132	Hot Mix Asphalt (Type A)	TON	2,846	x	115.00	=	$	327,290
390137	Rubberized Hot Mix Asphalt (Gap Graded)	TON	1,686	x	150.00	=	$	252,900
260203	Class 2 Aggregate Base	CY	744	x	75.00	=	$	55,800
250201	Class 2 Aggregate Subbase	CY	2,083	x	45.00	=	$	93,735
390100	Prime Coat	TON	12	x	1,273.32	=	$	15,280
397005	Tack Coat	TON	12	x	1,209.90	=	$	14,519
731502	Minor Concrete (Miscellaneous Construction)	CY	125	x	700.00	=	$	87,500
394073	Place Hot Mix Asphalt Dike (Type A)	LF	300	x	16.09	=	$	4,827
398100	Remove Asphalt Concrete Dike	LF	300	x	8.57	=	$	2,571
731850	Remove Concrete (curb, gutter, and sidewalk)	CY	125	x	200.00	=	$	25,000
398200	Cold Plane Asphalt Concrete Pavement	SQYD	11,270	x	4.40	=	$	49,588

TOTAL PAVEMENT STRUCTURAL SECTION ITEMS $ 2,008,200

SECTION 3: DRAINAGE

Item code		Unit	Quantity		Unit Price ($)			Cost
510102	Drainage Inlet	EA	8	x	7,000.00	=	$	56,000
15020X	Abandon Culvert	LF	100	x	65.00	=	$	6,500
620XXX	24" Alternative Pipe Culvert	LF	600	x	150.00	=	$	90,000
7050XX	24" Alternative Flared End Section	EA	1	x	1,500.00	=	$	1,500
72XXXX	Rock Slope Protection (Light, Method B)	CY	12	x	350.00	=	$	4,200
710150	Remove Inlet	EA	3	x	2,000.00	=	$	6,000
XXXXXX	Permanent BMP	LS	1	x	310,000.00	=	$	310,000

TOTAL DRAINAGE ITEMS $ 474,200

SECTION 4: SPECIALTY ITEMS

Item code		Unit	Quantity		Unit Price ($)			Cost
150662	Remove Metal Beam Guard Railing	LF	300	x	30.00	=	$	9,000
832005	Midwest Guardrail System	LF	1,000	x	70.00	=	$	70,000
510060	Structural Concrete, Retaining Wall	SQFT	15,300	x	125.00	=	$	1,912,500
511035	Architectural Treatment	SQFT	13,690	x	12.00	=	$	164,280
839581	End Anchor Assembly (Type SFT)	EA	3	x	1,150.00	=	$	3,450

TOTAL SPECIALTY ITEMS $ 2,159,300

SECTION 5: ENVIRONMENTAL

5A - ENVIRONMENTAL MITIGATION

Item code		Unit	Quantity		Unit Price ($)		Cost	
						Subtotal Environmental Mitigation	*$*	*-*

5B - LANDSCAPE AND IRRIGATION

Item code		Unit	Quantity		Unit Price ($)		Cost	
20XXXX	Highway Planting	LS	1	x	75,000.00	= $	75,000	
20XXXX	Irrigation System	LS	1	x	75,000.00	= $	75,000	
204099	Plant Establishment Work	LS	1	x	50,000.00	= $	50,000	
						Subtotal Landscape and Irrigation	*$*	*200,000*

5C - EROSION CONTROL

Item code		Unit	Quantity		Unit Price ($)		Cost	
210430	Hydroseed	SQFT	189,200	x	0.19	= $	35,948	
						Subtotal Erosion Control	*$*	*35,948*

5D - NPDES

Item code		Unit	Quantity		Unit Price ($)		Cost	
	Total Sections 1-8	$	9,858,000	x	1.5%	= $	147,870	
						Subtotal NPDES	*$*	*147,900*

TOTAL ENVIRONMENTAL	**$**	**383,900**

SECTION 6: TRAFFIC ITEMS

6A - Traffic Electrical

Item code		Unit	Quantity		Unit Price ($)			Cost
860460	Lighting and Sign Illumination	LS	1	x	25,000.00	=	$	25,000
860201	Signal and Lighting	LS	2	x	300,000.00	=	$	600,000
86070X	Interconnection Conduit and Cable	LS	1	x	5,000.00	=	$	5,000
86080X	Inductive Loop Detectors	EA	50	x	440.00	=	$	22,000
15075X	Remove Traffic Signal	EA	2	x	12,000.00	=	$	24,000
860090	Maintain Existing Traffic Management System Elements During Construction	LS	1	x	10,000.00	=	$	10,000

Subtotal Traffic Electrical $ *686,000*

6B - Traffic Signing and Striping

Item code		Unit	Quantity		Unit Price ($)			Cost
XXXXXX	Traffic Signs	LS	1	x	300,000.00	=	$	300,000
84XXXX	Permanent Pavement Delineation	LS	1	x	75,000.00	=	$	75,000

Subtotal Traffic Signing and Striping $ *375,000*

6C - Traffic Management Plan

Item code		Unit	Quantity		Unit Price ($)			Cost
12865X	Portable Changeable Message Signs	EA	2	x	$ 12,500	=	$	25,000

Subtotal Traffic Management Plan $ *25,000*

6C - Stage Construction and Traffic Handling

Item code		Unit	Quantity		Unit Price ($)			Cost
XXXXXX	Traffic Handling	LS	1	x	200,000.00	=	$	200,000
XXXXXX	Maintain Traffic	LS	1	x	40,000.00	=	$	40,000

Subtotal Stage Construction and Traffic Handling $ *240,000*

TOTAL TRAFFIC ITEMS **$ 1,326,000**

SECTION 7: DETOURS

Includes constructing, maintaining, and removal

Item code		Unit	Quantity	Unit Price ($)	Cost
* Includes constructing, maintaining, and removal				**TOTAL DETOURS**	**$ -**

SUBTOTAL SECTIONS 1 through 7 $ 6,761,600

SECTION 8: MINOR ITEMS

8A - Americans with Disabilities Act Items							
	ADA Items			1.0%	$	67,616	
8B - Bike Path Items							
	Bike Path Items			0.0%	$	-	
8C - Other Minor Items							
	Other Minor Items			5.0%	$	338,080	
	Total of Section 1-7	$	6,761,600	x 6.0%	= $	405,696	
				TOTAL MINOR ITEMS			**$ 405,700**

SECTIONS 9: MOBILIZATION

Item code							
999990	Total Section 1-8	$	7,167,300	x 5%	= $	358,365	
				TOTAL MOBILIZATION			**$ 358,400**

SECTION 10: SUPPLEMENTAL WORK

Item code		Unit	Quantity		Unit Price ($)		Cost
066070	Maintain Traffic	LS	1	x	25,000.00	= $	25,000
066919	Dispute Resolution Board	LS	1	x	5,000.00	= $	5,000
066921	Dispute Resolution Advisor	LS	1	x	15,000.00	= $	15,000
066610	Partnering	LS	1	x	35,000.00	= $	35,000
066596	Additional Water Pollution Control	LS	1	x	3,200.00	= $	3,200
066595	Water Pollution Control Maintenance Sharing	LS	1	x	7,200.00	= $	7,200
	*Cost of **NPDES** Supplemental Work specified in Section 5D*					= $	-
	Total Section 1-8	$	7,167,300		3%	= $	215,019
					TOTAL SUPPLEMENTAL WORK		**$ 305,500**

SECTION 11: STATE FURNISHED MATERIALS AND EXPENSES

Item code		Unit	Quantity		Unit Price ($)		Cost
066105	Resident Engineers Office	LS	1	x	244,150.00	=	$244,150
066063	Traffic Management Plan - Public Information	LS	1	x	32,000.00	=	$32,000
066062	COZEEP Contract	LS	1	x	36,000.00	=	$36,000
066916	Annual Construction General Permit Fee	LS	1	x	3,000.00	=	$3,000

Total Section 1-8	$	7,167,300	1%	=	$	71,673

TOTAL STATE FURNISHED	**$386,900**

SECTION 12: TIME-RELATED OVERHEAD

Total of Roadway and Structures Contract Items excluding Mobilization	$7,167,300	(used to calculate TRO)
Total Construction Cost (excluding TRO and Contingency)	$8,218,100	(used to check if project is greater than $5 million excluding contingency)

Estimated Time-Related Overhead (TRO) Percentage (0% to 10%) = **5%**

Item code		Unit	Quantity		Unit Price ($)		Cost
090100	Time-Related Overhead	WD	240	X	$1,493	=	$358,400

TOTAL TIME-RELATED OVERHEAD	**$358,400**

Note: If the building portion of the project is greater than 50% of the total project cost, then TRO is not included.

SECTION 13: ROADWAY CONTINGENCY

Recommended Contingency: (Pre-PSR 30%-50%, PSR 25%, Draft PR 20%, PR 15%, after PR approval 10%, Final PS&E 5%)
Total recommended percentages includes any quantified risk based contingency from the risk register.

Total Section 1-12	$	8,576,500	x	**15%**	=	$1,286,475	

TOTAL CONTINGENCY	**$1,286,500**

II. STRUCTURE ITEMS

	Bridge 1		Bridge 2		
DATE OF ESTIMATE	00/00/00		00/00/00		00/00/00
Bridge Name	xxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxx
Bridge Number	57-XXX		57-XXX		57-XXX
Structure Type	xxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxx
Width (Feet) [out to out]	0 LF		0 LF		0 LF
Total Bridge Length (Feet)	0 LF		0 LF		0 LF
Total Area (Square Feet)	0 SQFT		0 SQFT		0 SQFT
Structure Depth (Feet)	0 LF		0 LF		0 LF
Footing Type (pile or spread)	xxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxx
Cost Per Square Foot	$0		$0		$0
COST OF EACH	**$0**		**$0**		**$0**

	Building 1		Bridge 2		
DATE OF ESTIMATE	00/00/00		00/00/00		00/00/00
Building Name	xxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxx
Bridge Number	57-XXX		57-XXX		57-XXX
Structure Type	xxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxx
Width (Feet) [out to out]	0 LF		0 LF		0 LF
Total Building Length (Feet)	0 LF		0 LF		0 LF
Total Area (Square Feet)	0 SQFT		0 SQFT		0 SQFT
Structure Depth (Feet)	0 LF		0 LF		0 LF
Footing Type (pile or spread)	xxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxx
Cost Per Square Foot	$0		$0		$0
COST OF EACH	**$0**		**$0**		**$0**

TOTAL COST OF BRIDGES		**$0**
TOTAL COST OF BUILDINGS		**$0**
Structures Mobilization Percentage	10%	**$0**

Recommended Contingency: (Pre-PSR 30%-50%, PSR 25%, Draft PR 20%, PR 15%, after PR approval 10%, Final PS&E 5%)

Total recommended percentages includes any quantified risk based contingency from the risk register.

Structures Contingency Percentage	10%	**$0**
TOTAL COST OF STRUCTURES		**$0**

Estimate Prepared By: _____ _____

XXXXXXXXXXXXXXXX ------ Division of Structures — Date

EA: 08-1H160 PID: 08-0816000168

III. RIGHT OF WAY

Fill in all of the available information from the Right of Way data sheet.

A)	A1)	Acquisition, including Excess Land Purchases, Damages & Goodwill, Fees		$	
	A2)	SB-1210		$	0
B)		Acquisition of Offsite Mitigation		$	0
C)	C1)	Utility Relocation (State Share)		$	0
	C2)	Potholing (Design Phase)		$	0
D)		Railroad Acquisition		$	0
E)		Clearance / Demolition		$	0
F)		Relocation Assistance (RAP and/or Last Resort Housing Costs)		$	0
G)		Title and Escrow		$	0
H)		Environmental Review		$	0
I)		Condemnation Settlements	0%	$	0
J)		Design Appreciation Factor	0%	$	0
K)		Utility Relocation (Construction Cost)		$	0

L)	**TOTAL RIGHT OF WAY ESTIMATE**	**$0**
M)	**TOTAL R/W ESTIMATE: Escalated**	**$0**
N)	**RIGHT OF WAY SUPPORT**	**$10,000**

Support Cost Estimate Prepared By _____ Project Coordinator[1] Phone

Utility Estimate Prepared By _____ Utility Coordinator[2] Phone

R/W Acquisition Estimate Prepared By _____ Right of Way Estimator[3] Phone

Note: Items G & H applied to items A + B

[1] When estimate has Support Costs only [2] When estimate has Utility Relocation [3] When R/W Acquisition is required

Attachment H
Right of Way Data Sheet

To: Rebecca Guirado
District Division Chief
Division of Right of Way

Date: 2/19/2019

Co. SBd Rte. 10
Expense Authorization 1H160

Attn: Jackie Williams
District Branch Chief
R/W Local Programs

Subject: **RIGHT OF WAY DATA SHEET – LOCAL PUBLIC AGENCIES**

Project Description: I-10/Alabama Street Improvement Project (Build Alternative)

Right of way necessary for the subject project will be the responsibility of the **San Bernardino County Transportation Authority (SBCTA)**

The information in this data sheet was developed by **Overland, Pacific & Cutler, Inc. (in collaboration with Advanced Civil Technologies)**

I. Right of Way Engineering

Will Right of Way Engineering be required for this project?

- No ☒
- Yes ☐ (If yes, submit a copy of the *Right of Way Engineering Surveys and Mapping Services checklist for Locally Funded Projects.* This checklist includes, but is not limited to, the following items.)

  - Hard copy (base map) ☐
  - Appraisal map ☐
  - Acquisition documents ☐
  - Property Transfer Documents ☐
  - R/W Record Map ☐
  - Record of Survey ☐

II. *Engineering Surveys*

1. Is any surveying or photogrammetric mapping required?
   No ☐ Yes ☒ if yes, complete the following:

   Photogrammetric mapping was completed during the PA&ED phase based on control established by Caltrans. In addition, the photogrammetric mapping has been through the ABC Caltrans process. Milestones A, B and C are still currently under review. Photogrammetric mapping and engineering surveying will be once again initiated during the PS&E phase.

2. Datum Requirements

   Yes ☒ Project will adhere to the following criteria:
   - Horizontal - datum policy is NAD 83, CA HPGN, EPOCH 1991.35 and English system of units and measures.
   - Vertical - datum policy is NAVD 88.

- Units – FeetUS.

3. Will land survey monument perpetuation be scoped into the project, if required?

Yes ☒
No ☐ Provide explanation on additional page.

III. *Parcel Information (Land and Improvements)*

Are there any property rights required within the proposed project limits?

No ☒ Yes ☐ (Complete the following.)

	Part Take	Full Take	Estimate $
A. Number of Vacant Land Parcels			0
B. Number of Single Family Residential Units			0
C. Number of Multifamily Residential Units			0
D. Number of Commercial/Industrial Parcels			0
E. Number of Farm/Agricultural Parcels			0
F. Permanent and/or Temporary Easements			0
G. Other Parcels (define in "Remarks" section)			0
Totals*			**0**

Provide a general description of the right of way and excess lands required (zoning, use, improvements, critical, or sensitive parcels, etc.).

The proposed Build Alternative would not require any new right of way. All improvements and staging activities are proposed to be constructed within existing State or City right of way.

IV. *Dedications*

Are there any property rights which have been acquired, or anticipate will be acquired, through the "dedication" process for the Project?

No ☒ Yes ☐ (Complete the following.)

Number of dedicated parcels 0

Have the dedication parcel(s) been accepted by the municipality involved?

There are no dedications anticipated by surrounding developers / property owners.

V. *Excess Lands/Relinquishments*

Are there Caltrans property rights which may become excess lands or potential relinquishment areas?

No ☒ Yes ☐ (Provide an explanation on additional page.)

VI. *Relocation Information*

Are relocation displacements anticipated?

No ☒ Yes ☐ (Complete the Following.)

A. Number of Single Family Residential Units
Estimated RAP Payments _____ _____
B. Number of Multifamily Residential Units
Estimated RAP Payments _____ _____
C. Number of Business/Nonprofit
Estimated RAP Payments _____ _____
D. Number of Farms
Estimated RAP Payments _____ _____
E. Other (define in the "Remarks" section)
Estimated RAP Payments _____ _____
Total _____ _____

No property relocation is anticipated for this project.

VII. *Utility Relocation Information*

Do you anticipate any utility facilities or utility rights of way to be affected?

No ☒ Yes ☐ (Complete the following.)

	Facility	Owner	Estimated Relocation Expense: State Obligation	Local Obligation	Utility Owner Obligation
A					
B					
C					
D					
E					
F					
	Totals		0		
	Number of Facilities		0		

*This amount reflects the estimated total financial obligation by the State.

Any additional information concerning utility involvement on this project?

All utilities have been reviewed and will be protected in place under the Build Alternative.

VIII. *Rail Information*

Are railroad facilities or railroad rights of way affected?

No ☒ Yes ☐ (Complete the following.)

Describe the railroad facilities to be affected.

Owner's Name	Transverse Crossing	Longitudinal Encroachment
A.		
B.		
C.		
D.		

Discuss types of agreements and rights required from railroads. Are grade crossings that require services contracts, or grade separations that require construction and maintenance agreements involved?

IX. *Clearance Information*

Are there improvements that require clearance?

No ☒ Yes ☐ (Complete the following.)

A.	Number of structures to be Demolished	0
	Estimated Cost of Demolition	$0

Demolition of structures within proposed right of way is not anticipated as part of this project.

X. *Hazardous Materials/Waste*

Are there any site(s) and/or improvements(s) in the Project Limits that are known to contain

hazardous materials? None ☒ Yes ☐ (Explain in the "Remarks" section.)

Are there any site(s) and or improvement(s) in the Project Limits that are suspected to contain

hazardous waste? None ☒ Yes ☐ (Explain in the "Remarks" section.)

XI. *Project Scheduling*

	Proposed lead time		Completion Date
* Preliminary Engineering Surveys	3	months	3/2019
* R/W Engineering Submittals	N/A	months	N/A
* R/W Appraisals/Acquisition	N/A	months	N/A
Proposed Environmental Clearance	N/A	months	N/A
Proposed R/W Certification	N/A	months	N/A

XII. *Proposed Funding*

	Local	State	Federal	Other
Acquisition	$0			
Utilities	$0			
Relocation Assistance Program	$0			
Loss of Business Goodwill	$0			
Structures Testing + Demolition	$0			
Condemnation	$0			
R/W Support Cost*	$10,000			
TOTAL	$0			
COMBINED TOTAL	**$10,000**			

*The R/W Support Costs may change based on who will perform these services and the costs for their services.

XIII. *Remarks*

None.

Project Sponsor Consultant
Prepared by:

Whitney Kelcher
Right of Way Agent / Analyst
Overland, Pacific & Cutler, Inc.

4/23/19
Date

Project Sponsor
Reviewed and Approved by:

Paula Beauchamp
SBCTA

4/23/19
Date

Caltrans
Reviewed and approved based on information provided to date:

Jackie Williams
Senior Right of Way Agent
Local Programs

5-2-19
Date

Attachment I

Categorial Exemption/Categorical Exclusion Determination Form

CATEGORICAL EXEMPTION/CATEGORICAL EXCLUSION DETERMINATION FORM

08-SBd-10	29.2(I-10)/29.4	1H1600	
Dist.-Co.-Rte. (or Local Agency)	P.M./P.M.	E.A/Project No.	Federal-Aid Project No. (Local Project)/Project No.

PROJECT DESCRIPTION: (Briefly describe project including need, purpose, location, limits, right-of-way requirements, and activities involved in this box. *Use Continuation Sheet, if necessary.)*

Interstate 10 (I-10), is a major east-west freeway serving both local and interregional traffic. In an effort to improve traffic operations at the I-10/Alabama Street, the City of Redlands (City), in cooperation with California Department of Transportation (Caltrans) District 8, and the San Bernardino County Transportation Authority (SBCTA), is proposing improvements to Alabama Street between Orange Tree Lane and Industrial Park Avenue, and improvements to the off-ramps. This project proposes improvements to enhance traffic operation and alleviate traffic congestion, leading to an improved Level of Service (LOS). *(See Continuation Sheet)*

CALTRANS CEQA DETERMINATION (Check one)

☐ **Not Applicable – Caltrans is not the CEQA Lead Agency**

☐ **Not Applicable – Caltrans has prepared an Initial Study or Environmental Impact Report under CEQA**

Based on an examination of this proposal, supporting information, and the above statements, the project is:

☐ **Exempt by Statute.** (PRC 21080[b]; 14 CCR 15260 et seq.)

☒ **Categorically Exempt. Class 1. Existing Facilities.** (PRC 21084; 14 CCR 15300 et seq.)
Based on an examination of this proposal and supporting information, the following statements are true and exceptions do not apply:

- If this project falls within exempt class 3, 4, 5, 6 or 11, it does not impact an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law.
- There will not be a significant cumulative effect by this project and successive projects of the same type in the same place, over time.
- There is not a reasonable possibility that the project will have a significant effect on the environment due to unusual circumstances.
- This project does not damage a scenic resource within an officially designated state scenic highway.
- This project is not located on a site included on any list compiled pursuant to Govt. Code § 65962.5 ("Cortese List").
- This project does not cause a substantial adverse change in the significance of a historical resource.

☐ **Common Sense Exemption.** [This project does not fall within an exempt class, but it can be seen with certainty that there is no possibility that the activity may have a significant effect on the environment (14 CCR 15061[b][3].)

Antonia Toledo		Elaheh Hadipour	
Print Name: Senior Environmental Planner or Environmental Branch Chief		Print Name: Project Manager	
A Toledo	2/15/19	Elaheh Hadipour	2-15-19
Signature	Date	Signature	Date

NEPA COMPLIANCE

In accordance with 23 CFR 771.117, and based on an examination of this proposal and supporting information, the State has determined that this project:

- does not individually or cumulatively have a significant impact on the environment as defined by NEPA, and is excluded from the requirements to prepare an Environmental Assessment (EA) or Environmental Impact Statement (EIS), and
- has considered unusual circumstances pursuant to 23 CFR 771.117(b).

CALTRANS NEPA DETERMINATION (Check one)

☐ **23 USC 326:** The State has determined that this project has no significant impacts on the environment as defined by NEPA, and that there are no unusual circumstances as described in 23 CFR 771.117(b). As such, the project is categorically excluded from the requirements to prepare an EA or EIS under the National Environmental Policy Act. The State has been assigned, and hereby certifies that it has carried out the responsibility to make this determination pursuant to Chapter 3 of Title 23, United States Code, Section 326 and a Memorandum of Understanding dated May 31, 2016, executed between the FHWA and the State. The State has determined that the project is a Categorical Exclusion under:

- ☐ **23 CFR 771.117(c): activity (c)(___)**
- ☐ **23 CFR 771.117(d): activity (d)(___)**
- ☐ **Activity ___ listed in Appendix A of the MOU between FHWA and the State**

☐ **23 USC 327:** Based on an examination of this proposal and supporting information, the State has determined that the project is a Categorical Exclusion under 23 USC 327. The environmental review, consultation, and any other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by Caltrans pursuant to 23 USC 327 and the Memorandum of Understanding dated December 23, 2016 and executed by FHWA and Caltrans.

Print Name: Senior Environmental Planner or Environmental Branch Chief	Print Name: Project Manager/DLA Engineer
Signature / Date	Signature / Date

Date of Categorical Exclusion Checklist completion: 2/13/2019

Date of ECR or equivalent : 2/13/2019

Briefly list environmental commitments on continuation sheet. Reference additional information, as appropriate (e.g., CE checklist, additional studies and design conditions).

CATEGORICAL EXEMPTION/CATEGORICAL EXCLUSION DETERMINATION FORM
Continuation Sheet

Continued from page 1:

Project Description:

The proposed improvements (Proposed Project) include widening Alabama Street in the northbound (NB) direction to accommodate a right turn pocket at the I-10 eastbound (EB) on-ramp. In addition, shoulders, sidewalks, and curb ramps will be brought to current Americans with Disabilities Act (ADA) standards along Alabama Street in the NB direction. Alabama Street will also be widened in the southbound (SB) direction to accommodate a right turn pocket at the I-10 westbound (WB) on-ramp. The project will also widen the WB and EB I-10 off-ramps by two lanes to provide a total of four lanes at the terminus; dedicated left and right lanes, and shared left/through and shared right/through lanes. Retaining walls are proposed along the WB off-ramp, EB off-ramp, and along the right-turn pocket on NB Alabama Street. Boring for geotechnical investigation and potholing will also be required for construction of the proposed improvements.

The purpose of the proposed project is to:

- Relieve existing and forecast congestion and improve traffic operations on the I-10 eastbound and westbound off-ramps at Alabama Street.
- Improve circulation to the I-10 eastbound and westbound on-ramps at Alabama Street.
- Address deteriorating pavement conditions along Alabama Street.
- Bring Alabama Street to ADA compliance along the northbound direction.

The proposed project is needed to address the following deficiencies:

- The I-10 eastbound and westbound off-ramps at Alabama Street experience excessive queuing and congestion, increasing the potential for vehicles to queue back to the freeway mainline. This condition is expected to worsen as forecasted volumes increase in the study area.
- Alabama Street is experiencing excessive queuing due to the lack of an exclusive right turn lane onto the I-10 eastbound and westbound entrance ramps.
- Pavement conditions on Alabama Street are deteriorating and require treatment.
- Existing curb ramps on Alabama Street are not ADA compliant.

Environmental Commitments:

Air Quality

An *Air Quality Report for the Alabama Street Improvement Project CEQA Compliance Review Only* was completed in January 2019 in conjunction with this environmental document.

AQ-1 During clearing, grading, earthmoving, or excavation operations, excessive fugitive dust emissions will be controlled by regular watering or other dust preventive measures using the following procedures, as specified in South Coast Air Quality Management District (SCAQMD) Rule 403. All material excavated or graded will be sufficiently watered to prevent excessive amounts of dust. Watering will occur at least twice daily with complete coverage, preferably in the late morning and after work is done for the day. All material transported on site or off site shall be either sufficiently watered or securely covered to prevent excessive amounts of dust. The area disturbed by clearing, grading, earthmoving, or excavation operations will be minimized to prevent excessive amounts of dust. These control techniques will be indicated in the project specifications. Visible dust beyond the property line emanating from the project will be prevented to the maximum extent feasible.

AQ-2 All trucks that are to haul excavated or graded material on site will comply with State Vehicle Code Section 23114, with special attention to Sections 23114(b)(F), (e)(2), and (e)(4), as amended, regarding the prevention of such material spilling onto public streets and roads.

AQ-3 The contractor will adhere to the California Department of Transportation (Caltrans) Standard Specifications for Construction, Sections 14.9-02 and 14-9.03.

AQ-4 Project grading plans will show the duration of construction. Ozone precursor emissions from construction equipment vehicles will be controlled by maintaining equipment engines in good condition and in proper tune per manufacturers' specifications.

AQ-5 Should the project geologist determine that asbestos-containing materials (ACMs) are present at the project study area during final inspection prior to construction, the appropriate methods will be implemented to remove ACMs.

AQ-6 All construction vehicles both on and off site shall be prohibited from idling in excess of 5 minutes. No idle areas shall be identified within 500 feet of the residences to the south of the project site.

Biological Resources

A *Natural Environment Study Minimal Impacts (NES)* was completed in October 2018 in conjunction with this environmental document.

BIO-1 Prior to construction, a Caltrans-approved bat biologist shall conduct a bat assessment survey to determine the presence or absence of bat species that may occur within the project limits. Should the presence of bat species be determined during this assessment the following measures shall be implemented to address potential impacts to bats.

BIO-2 If the presence of bat species is determined, project-related construction activities shall occur outside of the bat maternity roosting season (April 1 through August 31), if feasible. Should such activities occur during the maternity roosting season, the following measures shall be implemented to minimize potential impacts to day-roosting bats (including maternity colonies) from project construction.

- Nighttime exit counts and acoustic surveys shall be performed by a qualified bat biologist at all structures that may be subject to project-related impacts. These surveys shall be performed during the recognized bat maternity season (April 1 through August 31, but preferably in June or July), and as far in advance of construction as possible in order to provide adequate time for mitigation planning.

- Construction activities at structures housing maternity colonies shall be coordinated with a Caltrans-approved bat biologist and the CDFW.

- If direct impacts to bat-roosting habitat are anticipated, humane evictions and exclusions of roosting bats should be performed under the supervision of a Caltrans-approved bat biologist after August 31 in the fall (September or October) prior to any work activities that would result in direct impacts or direct mortality to roosting bats. This action will be performed in coordination with the CDFW. To avoid potential mortality of flightless juvenile bats, evictions and exclusions of bats cannot be performed during the maternity season (April 1 through August 31). Winter months are also inappropriate for bat eviction because not all individuals in a roost will emerge on any given night. In addition, long-distance movements to other roost sites are more difficult during the winter when prey availability is scarce, resulting in high mortality rates of evicted bats.

- Alternate bat-roosting habitat structures should be installed on the structure prior to the eviction/exclusion of bats from that structure. The design, numbers, and locations of these roost structures should be determined in consultation with a Caltrans-approved bat biologist.

- If permanent, direct impacts to bat-roosting habitat are anticipated and a humane eviction/exclusion is performed, alternative permanent roosting habitat shall be provided to ensure no net loss of bat-roosting habitat. This action shall be coordinated with the CDFW, and locations of these roost structures should be determined in consultation with a Caltrans-approved bat biologist to ensure that the installed habitat will provide adequate mitigation for impacts.

- The loss of a night roost can negatively affect the use of a foraging area, and consequently may result in reduced fecundity in species that are already slow to reproduce. If night roosting is confirmed at any of the structures within the proposed project area the following measures to minimize potential impacts to night-roosting and foraging bats shall be implemented:

    - At structures where night roosting is suspected or confirmed, work shall be limited to daylight hours to the greatest extent feasible to avoid potential disruption to foraging. If night work cannot be avoided, night lighting shall be focused only on the area of direct work, airspace access to and from the roost features of the structure shall not be obstructed, and light spillover into the adjacent foraging areas shall be minimized to the greatest extent feasible.

BIO-3 If feasible, project construction and any vegetation removal should begin outside of bird breeding season (typically between September 1 and February 14). In the event that project construction cannot be conducted outside the bird breeding season, and vegetation will be removed, focused surveys will be conducted by a qualified biologist prior to ground-disturbing activities. Should nesting birds be found, an exclusionary buffer will be established by a qualified biologist. The buffer may be up to 500 feet in diameter depending on the species of nesting bird found. This buffer will be clearly marked in the field by construction personnel under guidance of the qualified biologist, and construction or clearing will not be conducted within this zone until the qualified biologist determines that the young have fledged or the nest is no longer active.

Nesting bird habitat within the BSA will be resurveyed during bird breeding season if there is a lapse in construction activities longer than seven days.

BIO-4 Prior to clearing or construction, highly visible barriers (such as orange construction fencing) will be installed along the boundaries of potential jurisdictional waters to designate Environmentally Sensitive Areas (ESAs) to be avoided. No grading or fill activity of any type will be permitted within these ESAs. In addition, no construction activities, material, or equipment will be allowed within the ESAs. All construction equipment should be operated in a manner so as to prevent accidental dredge or fill into potential jurisdictional waters. No structure of any kind, or incidental storage of equipment or supplies, will be allowed within the ESAs.

BIO-5 All equipment maintenance, staging, and dispensing of fuel, oil, or any other such activities will occur in developed or designated non-sensitive habitat areas. The designated areas will be located in such a manner as to prevent any spill runoff from entering potentially jurisdictional waters.

Cultural Resources

A *Historical Resources Compliance Report (HRCR)* was completed in October 2018 in conjunction with this environmental document.

CR-1 If previously unidentified cultural materials are unearthed during construction, it is Caltrans policy that work be halted in that area until a qualified archaeologist can assess the significance of the find.

CR-2 In the event that human remains are found, the county coroner shall be notified and ALL construction activities within 60 feet of the discovery shall stop. Pursuant to Public Resources Code Section 5097.98, if the remains are thought to be Native American, the coroner will notify the Native American Heritage Commission (NAHC) who will then notify the Most Likely Descendent (MLD). The person who discovered the remains will contact the District 8 Division of Environmental Planning;

Andrew Walters, DEBC: (909)383-2647 and Gary Jones, DNAC: (909)383-7505. Further provisions of PRC 5097.98 are to be followed as applicable.

Hazardous Materials

A *Hazardous Waste Initial Site Assessment (ISA)* was revised and completed in October 2018 in conjunction with this environmental document.

HAZ-1 Lead chromate was used in yellow traffic paint and thermoplastic material prior to being banned in 1997 and 2004, respectively. Thus, yellow traffic paint and thermoplastic material located on the pavement may potentially contain hazardous levels of lead chromate. If yellow traffic markings are removed separately from the adjacent pavement, the markings should be removed and sampled for lead chromate prior to construction, consistent with the current Caltrans' SSP.

HAZ-2 Although not anticipated in other areas of the Site, should impacted soil (as evidenced by staining and/or odors) be encountered during construction activities, the Resident Engineer overseeing construction should stop work until a hazardous waste specialist is able to assess the soil for proper handling.

HAZ-3 As indicated by the results of the Aerially Deposited Lead (ADL) report, the resident engineer would notify the DTSC of the hazardous concentration areas of ADL; the location will be indicated and the soil will be classified.

Noise

N-1 To minimize the construction noise impact for sensitive land uses adjacent to the Project area, construction activities will comply with Caltrans Standard Specifications Section 14-8.02, "Noise Control" or local noise ordinances, whichever is more stringent.

Paleontological Resources

A *Combined Paleontological Identification Report and Paleontological Evaluation Report (PIR-PER)* was completed in December 2018 in conjunction with this environmental document.

PAL-1 Preparation of a Paleontological Mitigation Plan (PMP) is recommended. The PMP shall be developed concurrently with the final design plans and shall follow the Caltrans guidelines in the SER Environmental Handbook, Volume 1, Chapter 8 (Caltrans, 2017), as well as guidelines from the SVP. Following these guidelines, the PMP shall be prepared by a qualified paleontologist and shall include the following elements:

- Required one hour preconstruction paleontological sensitivity training for earthmoving personnel;
- A signed repository agreement;
- Field and laboratory methods proposed (must be consistent with repository requirements);
- All elements included in the PMP format (Caltrans, 2017); and
- Required Paleontological Mitigation Report upon completion of project earthmoving.

Traffic

A *Traffic Operations Analysis Report (TOAR)* was completed in September 2018 in conjunction with this environmental document.

TRA-1 Construction of the Proposed Project would not require full lane or ramp closures through the Project area. Temporary lane closures may be required during construction, but at least one lane would remain open for traffic to access the Project area.

TRA-2 Access for emergency services would be maintained during construction of the Project, including access to the I-10 ramps.

Water Quality

A *Stormwater Data Report (SWDR)* was completed in December 2018 in conjunction with this environmental document.

WQ-1 Prior to commencement of construction activities, the contractor shall obtain coverage under the State Water Resources Control Board's National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Contraction General Permit), Order No. 2009-0009-DWQ, as amended by 2010-0014-DWG and 2012-0006-DWQ, NPDES No. CAS000002, or any other subsequent permit.

WQ-2 Caltrans MS4 Permit. Caltrans shall comply with the provisions of the National Pollutant Discharge Elimination System (NPDES) Permit, Statewide Storm Water Permit, Waste Discharge Requirements (WDRs) for the State of California, Department of Transportation Order No. 2012-0011-DWQ (Caltrans MS4 Permit), as amended by Order No. 2014-0006-EXEC, Order No. 2014-0077-DWQ, and Order No. 2015-0036-EXEC, NPDES No. CAS000003, or any subsequent permit. Caltrans-approved Design Pollution Prevention BMPs and Treatment BMPs shall be implemented to the maximum extent practicable (MEP) consistent with the requirements of the Caltrans MS4 Permit.

Attachment J
Transportation Management Plan Data Sheet

For DTM use		Caltrans District 8 (Riverside & San Bernardino)	
Developer		TMP Data Sheet (Ver. Sept. 2017)	

Transportation Management Plan (TMP) Data Sheet is for PID, PSR, PR and PS&E considering DTM's requirements. The validity of this TMP expires at the same time the associated LRCs expires.

The TMP Data Sheet includes background & signature, TMP elements & TMP estimate

Requester: *Complete section (A) & (B) of this page only*

Requester: Submit separate request for each roadway (Type the information in the cells below with yellow background ONLY)

TMP receiver: Please note that

Project shall not be certified without the approval of the Lane Requirement Charts (LRCs) & the TMP by the DTM

(A) Requester's info.			
1 - Date of request	12/10/2018	**2 -** Department	Construction
3 - Full name	Jamal Salman	**4 -** Phone No.	714-662-2288
5 - email address	jsalman@advancedciviltech.com		
6 - Project Manager's name	Elaheh Hadipour		
7 - Project Manager's email	elaheh.hadipour@dot.ca.gov		

(B) Project information		**1-**EA#/ID#	08-1H160/0816000168
2-County/Route	SBd/10	**3-**phase/sub object	PA/ED
4-Post mile (From-To)	29.2-29.4		
5-Short description of job	**Intersection improvement - Ramp widening, street widening and restriping (Build Alt)**		

Construction period per WPS			
6-Estimated start date	06/01/20	**8-**# of working days	240
7-Estimated end date	01/01/22	**9-**Estimated Proj. cost	$ 11,900,000

10- Requester: Use section (H), in the bottom of the page, to add any other information that helps developing the TMP

11- Documents to send → *Requester: Please attach the location map in jpeg/pdf format to your E-mail*

12- If hard copies are requested, Send or bring them to the DTM office located on the south side of 11th. Floor, Attn: Al Afaneh. Questions: call 383-6262

13- E-mail the request to: al_afaneh@dot.ca.gov

Following is for DTM use >>>>>>>>>>> Developer: Fill info in green cells only

C) BACKGROUND INFORMATION		Date request received		Job assigned to	
# of working days	240				
Estimated Project cost ($)	11,900,000	Per E-mail dated			
TMP estimate($)	**$109,200**	Equal to **0.92%**	Of the project cost		

D) IMPACT	High	Medium	Low	N/A	Developer: (*Briefly, explain the high impact/mitigation):*
State Hwy.					
Local road					
Ramp/connector					

E) Developer: Complete the info					
Developed by		Original signed by:	Ali Salman	Date	12/7/2018
Title					
E-mail					
Phone/Fax					

F) Approved by		Original signed by:	Al Afaneh	Date	12/07/18
Name:	Al Afaneh				
Title	District Traffic Manager				
E-mail	al.afaneh@dot.ca.gov				
Phone/Fax	909-383-6262				

G) District's info:	
Department of Transportation	
District:	8
Address:	464 W. Fourth St., San Bernardino, Ca., 92401-1400
Operations, DTM, MS >>>>	711

DTM is located on the North side of 7th. Fl. Enter from the open door & turn left. MS: 711

H) Remarks

TMP Elements	EA #/ID#	08-1H160/0816000168	Date	12/7/2018

Note: A checkmark in the box means you need to include this in the project unless staging, material, or work hour changes eliminate the need for the item. A ? in front means TMP anticipates this - please check into this. A blank box means the item is not needed at this time based on the information received.

Public Affairs officer's 1st. & last name		Phone number

1 Public Information/Public Awareness Campaign (PAC).

Developer: Remember to obtain the estimate from Public affairs by contacting Terri Kasinga. Procedure is in the file under 3- TMP matters

Estimated Cost

BEES 066063 (Traffic Management Plan-Public Information). Cost to be reduced by Public Affairs (PA) and Construction Liaison (CL) only. Show under **State Furnished** as the **total** of PA+CL.

1.1	☐	Include Rideshare information in PA/CL project material to encourage vehicles reduction in work area	
1.2	☑	Brochures and Mailers	$ 10,000
1.3	☑	Media Releases (& minority media sources)	$ 1,000
1.4	☐	Paid Advertising	
1.5	☑	Public Meetings/PAC Mtgs./Speakers Bureau (show cost also for room rental)	$ 10,000
1.6	☑	Hand deliver notices to vicinity	$ 1,000
1.7	☐	Broadcast fax service	
1.8	☐	Telephone Hotline OR	
1.9	☑	1-800-COMMUTE (The telephone number is shown on CS-Info signs) -	
1.10	☐	Visual Information (videos, slide shows, etc.)	
1.11	☐	Local cable TV and News	
1.12	☐	Traveler Information System (Internet)	
1.13	☑	Internet, E-mail, Social Media	$ 10,000
1.14	☐	Notification to targeted groups:	
	☐	Revised Transit Schedules/maps	
	☐	Rideshare organizations	
	☐	schools	
	☐	organizations representing people with disabilities	
	☐	bicycle organizations	
1.15	☐	Include PA/CL/Consultant resources in WPS	
1.16	☑	Commercial traffic reporters/feeds - e.g. brief Traffic Information people (TIP) group	
1.17	☐	Insert SSP's	

"A representative of the Contractor, at Superintendent level or higher, and authorized to commit the Contractor, shall attend and participate in all Public Awareness Campaign meetings. Time commitment for the meeting(s) varies from two to four hours per month."

1.18	☐	Other

Section 1 Total	$ 32,000

2 Traveler Information Strategies

Project team needs to coordinate with Traffic Design!

2.1	☐	Existing Overhead Changeable Message Signs (Stationary)	
	☐	New Installation (Stationary) - BEES 860532 CHANGEABLE MESSAGE SIGN SYSTEM - list locations	
2.2	☑	Portable Changeable Message Signs (PCMS) - BEES 066578	

This strategy is in addition to Traffic Design's PCMS for regular traffic handling within the project limits and is used for advising motorists to divert at remote advance decision points - outside the usual project limits. This also allows for advanced motorist information - e.g. a week ahead. Their placement may need to be cleared **environmentally.** Placement should be of sufficient distance prior to decision points as determined by the Resident Engineer.

# of PCMS	2	Unit cost/month	$ 1,000.00	Months needed	12	$ 24,000

2.3	☐	Lane Closure System Website	
2.4	☑	Caltrans Highway Information Network (CHIN)	
2.5	☐	Radar Speed Message Sign (Specter sign) BEES 066064 (approx. EA @ $30,000)	
2.6	☑	Bicycle and pedestrian information, e.g. Detour maps	
2.7	☐	Automated Workzone Information System (AWIS) BEES 120105	

- consult with TMP Developer prior to updating SSP 12-3.35A(1) for AWIS
- refer to Section 12-3.35, page 156 to 158 of the 2015 Standard Spec.

2.8 ☐ Other

Section 2 Total	$ 24,000

3 Incident Management

3.1 CHP's Construction or Maintenance Zone Enhanced Enforcement Program – COZEEP or MAZEEP. BEES 066062 - show under "State or Agency furnished" in the Cost Estimate.

Make sure to consider the LC hours and add CHP driving time to/from their office

Day COZEEP: To protect active closures

	hours/day	CHP vehicles	# of officers.	Rate/Hr.		
10	4	1	1	$ 100	$	4,000

Night COZEEP: To protect active closures

# of nights		hours/night	CHP vehicles	# of officers. Nights need 2 per car	Rate/Hr.		
12		8	1	2	$ 100	$	19,200

3.2 **Freeway Service Patrol (FSP) for Construction (CFSP)** $/hr./truck $55

BEES 066065 - show under "State or Agency furnished" in the Cost Estimate

Short duration or remote area CFSP usually is bid with much higher hourly rates. If enhancement of program FSP feasible, CFSP could tie into the lower long-term FSP rates.

	# of trucks	# of days	Hours per day	
A For service within the regular FSP hours				$0
For service outside the regular FSP hours				
B Extended Peak hour coverage				$0
C Support during night closures				$0
D Weekend support				$0

Local agency (SAFE) support 8% $0

8% of truck cost

CFSP CHP support 5% $0

5% of truck cost only if within regular FSP and area

Equipment/Supplies 10% $0

% of truck cost unless more detail available

Consult with the Inland Empire division of CHP or the border division in the southern Riverside county to select the method which is acceptable for the B,C,D that are outside the regular FSP hours or area.

Method 1

CFSP/CHP support 20% $0

20% of truck cost or

CFSP Dispatcher @

# of days		# of nights	hours	# of FSP	Rate	# of FSP vehicles		
			0		$ 45.00		$	-
			0					

CFSP CHP Officers (See Cozeep rate)

# of days		# of nights	hours	# of officers	Rate	# of CHP vehicles		
0		0	0	1	$ 45.00	0	$	-
0		0	0	2	0	0	$	-

☐ Cooperative Agreement or Task Order with SAFE for $0

☐ Task Order with CHP (State-wide Master Agreement for FSP support). for $0

☐ Contact District FSP Coordinator for task orders.

☐ Service Contract

☐ Local Agency will arrange CFSP with SAFE

☐ Local Agency will arrange CFSP administration with CHP

3.2 Total $0

3.3 ☐ Other

Section 3 Total $ 23,200

4 Construction Strategies

Contact DTM, at 909-383-6262, to get Delay Calculations, Lane Requirement Charts (LRC), Table Z and Special events list. Inform DTM of any concerns/commitments regarding special LC days, times, seasons, events; environmental restrictions; if work may be affected by snow and low or high temperatures. E.g. excessive heat may delay HMA operations lane openings which may increase traffic impact when vehicles overheat in the queue; etc. If traffic volumes vary significantly between seasons, consider 2 sets of LRCs to avoid CCOs.

4.1 This TMP presumes that work is planned as below. If different, TMP needs to be revised. The Project Engineer shall ensure all appropriate lane requirement charts are included.

- ☑ Off peak
- ☑ Night
- ☑ Weekend

4.2 Expected facility closures and requirements

- ☐ Flagging
- ☑ Shoulder
- ☑ Lane
- ☑ Street
- ☑ Ramp
- ☐ Connector*
- ☐ Extended Weekend Closures*
- ☐ Total Facility Closures*

*Consult with TMP developer and the DTM regarding COZEEP & other costs. Provide proposed detour and traffic diversion plans for review.

CAUTION: If the Lane Requirement Chart (LRC) for full mainline closures, of one or both directions on a highway or freeway, does not show the maximum number of allowable closures, the PS&E shall not be certified by DTM/TMP.

4.3 ☑ Coordinate with adjacent ongoing and planned construction projects - also on detour routes.

4.4 ☐ BEES 066008 Incentives

4.5 ☐ Strictly enforce construction CPM schedule

4.6 ☐ 10-Min. Delay Penalty — Contact DTM at 909-838-6262 for 10 Min. Delay Penalty Calculations.

4.7 ☐ Other

Section 4 Total $ -

5 Demand Management (DM)

Project team needs to coordinate with RCTC/SANBAG/CVAG

Traffic diversion may increase available work hours.

5.1 ☐ A co-op will be executed - mentioned in PSR or PR.

☐ Instead of a co-op, 15% is added to the cost of DM elements since the payment to the local agency will be routed through the contractor.

Instead of a co-op, the local agency will make their own arrangements with RCTC/SANBAG/CVAG.

PA/CL or local agency need to inform commuters through RCTC/SANBAG. Funds part of PA/CL.

5.2 ☐ HOV Lanes/Ramps (New or Convert)

5.3 ☐ Park-and-Ride Lots

5.4 ☐ Parking Management/Pricing (Coordination with local agency is required)

5.5 ☐ BEES 066067 Rideshare Promotion

5.6 ☐ Other

Section 5 Total $ -

6 Alternate Route Strategies

Caution - signed detours may require environmental clearance. Traffic diversion may increase available work hours. Please work with Traffic Design. BEES 066060 - ADITIONAL TRAFFIC CONTROL

6.1 ☐ Add Capacity to Freeway connector

6.2 ☐ Ramp Closures

6.3 ☐ Temporary Highway Lanes or Shoulder Use

6.4 ☐ Parking Restrictions

6.5 ☑ Street Improvements

- ☑ State R/W - Signals, Widen, etc.
- ☑ Local R/W - Signals, Widen, etc. co-op or permit may be needed

6.6 ☐ Local Street USE - co-op or Permit may be needed

6.7 ☐ Traffic Control Officers (see 3.1 COZEEP)

6.8 ☐ Signed detour - using State routes

6.9 ☐ Signed detour - using local streets and roads. Coordinate with corresponding local agency.

6.10 ☑ Adjust signals $ 30,000

6.11 ☐ Temporary bicycle or pedestrian facilities

6.12 ☐ Other

Section 6 Total $ 30,000

TMP Estimate

Developed by	0	EA#/ID#	08-1H160/0816000168	Date	12/7/2018

TMP developer: Amounts under the cost column will automatically be copied from the TMP elements

TMP Elements	Cost
1. Public Information	$32,000
2. Motorist Information Strategies	$24,000
3. Incident Management	$23,200
4. Construction Strategies	$0
5. Demand Management (DM)	$0
6. Alternate Route Strategies	$30,000
Total TMP Estimate	$ 109,200

Attachment K
Risk Register

LEVEL 2 - RISK REGISTER		Project Name:	Alabama Street Improvements Project		DIST- EA	08-1H160	Project Manager	Elaheh Hadipour						
Risk Identification						Risk Assessment						Risk Response		
Status	ID #	Type	Category	Title	Risk Statement	Current status/assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Risk Owner	Updated
Active	3	Threat	ROW	Right of Way Impacts	As a result of limited widening, ROW acquisition in the form of TCEs along Alabama might occur, which could lead to project delay.	Currently and based on available data there is no need for R/W acquisition, this could change once PTRs are obtained and verified	2-Low	2 -Low	4	2 -Low	4	This risk has a low to moderate level due to the fact the team will not have the PTRs plotted until the next phase.	Mitigate	Obtain R/W maps and land net as soon as feasible to develop accurate R/W needs.	Consultant Team	1/16/2019
Active	4	Threat	ROW	Utility Impacts	As a result of verifying conflicts with existing utilities, potential relocation might be needed. This could have cost and schedule impact that will have to be addressed during the PS&E phase.	Currently the assumption is there is no need for utility relocation. This will be further analyzed, once potholing is complete.	3-Moderate	4 -Moderate	12	4 -Moderate	12	This risk is moderate since most of the available facility maps are dated and potholing might be required to positively identify conflicts.	Mitigate	Proactively coordinate with utility agencies to find solution and/or agreement, if relocation is needed	Consultant Team	1/16/2019
Retired	9	Threat	Design	Design Exceptions	As a result of preparing DSDD during the PA/ED phase, design exceptions are not approved, which would lead to increase to overall project cost and schedule.	Currently DSDD are in the final review and approval phase.	2-Low	2 -Low	4	4 -Moderate	8	This risk is a low to moderate level due to the fact that the requested exceptions are existing features.	Avoid	Work closely with project team to identify and minimize design exceptions. If needed, obtain early concurrence from appropriate reviewer.	Consultant PM	3/12/2019
Retired	10	Threat	Design	Design Year	As a result of not achieving the 20 year design criteria, project approval could be delayed, which will impact both cost and schedule.	The design year exception letter was approved by Caltrans, SBCTA, City of Redlands, and County of San Bernardino on December 20th, 2018.	2-Low	2 -Low	4	4 -Moderate	8	This risk is a low to moderate level due to the fact that the proposed design is one year below required design year standard	Avoid	Coordinate with Caltrans to ensure support for proposed alternative.	Consultant PM	1/16/2019
Retired	11	Threat	Design	Bridge Railing	As a result of a non standard bridge railing within project area, the project reviewers might request to upgrade the railing to current standards, which will lead to scope and cost impacts.	No work will be done on the bridge railing, per	2-Low	4 -Moderate	8	4 -Moderate	8	This risk is a low to moderate level due to the fact that there are no bridge impacts proposed in this project.	Avoid	Work closely with project team to ensure support for the proposed alternative. If needed, obtain early concurrence from appropriate reviewer.	Consultant PM	1/16/2019
Retired	12	Threat	Construction	Retaining Wall conflict with adjacent property	As a result of dealership (Tom Bell Chevrolet) encroachment into state right of way, in the south east quadrant of Alabama Street, widening of Alabama and proposed retaining wall cannot be constructed.	Currently assuming that Caltrans right of way will work on removing conflict prior to construction.	3-Moderate	4 -Moderate	12	8 -High	24	This risk is a moderate to high level due to the fact that the widening of Alabama St in the northbound direction cannot be complete until conflict is eliminated.	Avoid	Work closely with Caltrans right of way and SBCTA to ensure conflict is removed prior to construction.	Consultant PM	3/5/2019