

Final Project Study Report

to

Evaluate Potential Build Alternatives and Determine a Preferred Alternative for Replacing and Relocating the County Road (CR) 32A Railroad Crossing with a New Crossing.

On Route County Road 32A

Between 1.15 Miles East of the City of Davis

And 5.97 Miles West of the City of Sacramento


PREPARED FOR:
THE COUNTY OF YOLO

APPROVAL RECOMMENDED:



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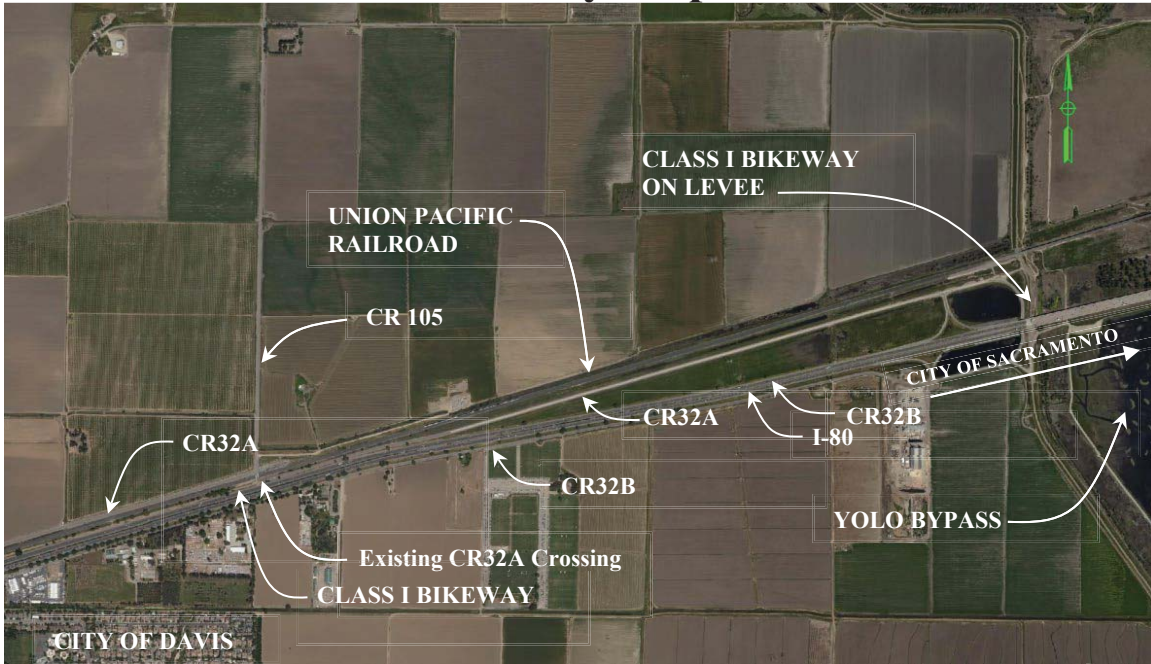
APPROVED:



Nicolas Burton, Director of Yolo County Public Works

10/21/21
Date

Vicinity Map



This project study 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.

10-21-21

REGISTERED CIVIL ENGINEER

DATE



Executive Summary

CR 32A is a two-way, two-lane frontage road located on the north side of I-80 between the City of Davis and the Yolo Causeway in Yolo County. CR 32A connects to CR 105 through an at-grade crossing of Union Pacific Railroad's (UPRR) tracks on an extremely sharp "S" curve. The crossing is the site of numerous collisions including 13 incidents between September 1982 and March 2018. Of these 13 incidents, 4 resulted in fatalities with 3 fatalities occurring between 2005 and 2015. For years local residents, the County, and the California Highway Patrol have experienced, are familiar with, or have documented incidents immediately south of the tracks on the CR32A curve. Many efforts have been made by the County to improve the safety of the crossing. Although these improvements were intended to enhance the safety at the crossing, the measures have been largely ineffective in reducing the number of incidents.

Existing CR 32A is comprised of 11-foot travel lanes with 4-foot-wide shoulders. The shoulders also serve as a Class II bikeway facility between the Class I bikeway from the City of Davis and the Class I bikeway along I-80 over the Yolo Causeway on the east end of CR 32A. This route therefore serves as the only practical route for bicycle access between this Cities of Davis and Sacramento. Additionally, CR 32A is a critical route for local over-sized farm equipment as it allows the equipment to access land north and south of I-80 without having to navigate through City of Davis or I-80 urban traffic. Preservation of this crossing is paramount to the viability of the local agricultural community and the farm-to-market connections in the area as well as to provide access to the Yolo County Landfill.

The existing roadway geometry has resulted in a non-standard vehicle crossing of the railroad tracks and an challenging route for cyclists to travel. The change in elevation of the roadway to cross the railroad does not support 90 degree turns over the tracks at high automotive speeds. This challenging alignment in its current configuration cannot be improved using standard roadway geometric design because the roadway is confined between I-80 and the UPRR rail right-of-way.

In 2015, UPRR initiated the Crossing Assessment Process (CAP). CAP draws on data to enhance grade crossing safety in the communities in which UPRR operates. CAP is based on a regression model that uses data from over 20,000 public crossings over UPRR's 23 state network to find characteristics that are statistically significant in crossings that have had incidents. These statistically significant characteristics include: unsafe motorist reports, vehicle on track events, average daily traffic count, average daily train count, etc. The model categorizes crossings in three tiers. A Tier 1 or Tier 2 crossing has several statistically significant characteristics; a Tier 3 crossing does not have several statistically significant characteristics. This crossing is a Tier 1. On February 2, 2015 UPRR recommended closing the crossing based on the crossing assessment. The California Public Utilities Commission (CPUC) is the state regulatory agency with statutory authority over grade crossings. The removal, reduction, addition, or change in the type of warning devices at each public grade crossing must be authorized by the CPUC. On October 5, 2017 UPRR filed an application with the

CPUC to alter, close, or relocate the crossing. This application was opposed by a variety of parties and interest groups including the City of Davis, Yolo County, Yolo County Farm Bureau, and the Sacramento Area Council of Governments (SACOG). Bike Davis, a local advocacy group and Safety and Enforcement Division of the CPUC joined the proceedings as well. In December of 2017, the parties, collectively through CPUC’s alternative dispute resolution process, agreed to study alternatives to the crossing that would “reasonably address” the concerns of all parties involved. A SACOG grant to the City of Davis and to the County of Yolo provided funding for a study. This project study report (PSR) is the first step in looking at alternatives which relocate the crossing to improve its safety.

As part of the study, a number of different crossing alternatives were developed. After eliminating alternatives that had fatal flaws, three alternatives are looked at in more detail—two relocated at-grade crossings, and one grade separated crossing. Public meetings and stakeholder meetings were held to present the alternatives and collect comments and as a result, a second grade separated alternative was added. Multiple drafts of the PSR were distributed to stakeholders for review and comments from all interested parties were incorporated into the final document.

The alternatives were evaluated and compared using a number of different factors including safety, impacts to cyclists, right-of-way needs, development and traffic impacts, agricultural impacts, UPRR acceptance, capital cost, future maintenance costs and potential grant funding. Based on a weighting of these factors Alternative 8, a grade separated crossing, was the highest scoring alternative. A consensus was also reached among the stakeholders recommending Alternative 8 as the preferred alternative to move forward with. The 5-year escalated capital costs for planning, environmental approval and final design for Alternative 8 are approximately \$4.0 Million and \$27 Million for right-of-way acquisition and construction costs.

The next step is for the County (and City) to apply for grant funding for the project approval and environmental document (PA&ED) and plans, specifications and estimate (PS&E) phases. Grade separation projects provide an opportunity to receive grant funding from various sources. Various grant funding possibilities are included in the body of this report.

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1. INTRODUCTION

Project Description:

The Project proposes to relocate the existing at-grade Union Pacific Railroad (UPRR) crossing currently located on County Road (CR) 32A at CR 105. CR32A is a two-way, two-lane rural, east-west frontage road located on the north side of Interstate 80 (I-80) between the City of Davis and the Yolo Causeway. The existing roadway geometry, which is physically constrained at the railroad crossing, has contributed to many roadway collisions including automobile - train collisions and conflicts between automobiles and bicycles. In response to frequent incidents, Yolo County Public Works Division has made many improvements including adding guardrail, striping, illumination, rumble strips, warning signs, flashing beacons, and implementing a full stop for those traveling south bound on CR 105. Although these improvements were intended to enhance the safety at the crossing, the measures have been largely ineffective.

Proposed Project alternatives include relocating the crossing to a location within the 2-mile stretch between CR105 and the westbound I-80 ramp intersection.

Currently, four (4) project build alternatives are being considered:

- Build Alternative 1: Overhead Crossing
- Build Alternative 2: Perpendicular At-Grade Crossing
- Build Alternative 3: Skewed At-Grade crossing
- Build Alternative 8: Near Perpendicular Overhead Crossing

In addition to the proposed roadway improvements, each build alternative provides consideration of a possible extension of the existing Class I Bikeway between CR 105 and the Yolo Causeway to promote the safety of cyclists and enhance the regional bicycle network. This is depicted in Attachment A and shown in further detail in Attachment C and discussed in the following sections.

The Project area is constrained between the east-west running UPRR tracks to the north and I-80 to the south. The landscape further north of the UPRR right-of-way and east of the City of Davis is primarily agricultural. I-80 off and on-ramps are located on the east end of the Project area, adjacent to the Yolo Causeway, where I-80 is elevated over the Sacramento River Bypass and Yolo Bypass Wildlife Refuge. A Class I bicycle path, coming west from City of Davis, ends at CR105 and restarts at the Yolo Causeway, but is restricted to the shoulders of CR 32A in between. During the PM peak congestion hour, local and regional traffic tend to divert from I-80 onto the frontage road couplet made up of CR32A paralleling north of I-80 and CR 32B on the southside of I-80. Caltrans recently installed a ramp metering light at the east bound I-80 on ramp (located on CR 32B). When traffic is heavy on east bound I-80, and the metering light is operating, traffic builds up on CR32B which extends and affects travel flow on CR32A. Both Alternatives 2 and 3 have an at-grade crossing, so queues could potentially be an issue for the railroad crossing. One option for alleviating this issue would be to use the

queue detection function of the ramp meter. While this typically worsens freeway congestion, this is the approach Caltrans has used in other locations and Caltrans has suggested they would agree to consider such a detector to reduce queuing along CR32A that might cause interference with an at grade crossing (Jonathan Ho/Caltrans). Caltrans also pointed out that adding a storage lane to the EB on-ramp could help and a two lane on-ramp has a higher minimum release rate than a single lane system. However, Caltrans would like to release vehicles at the lowest rate possible to discourage drivers from using Chiles Road and CR32A as detours to the freeway. This frontage road couplet facilitates access to and from adjacent farms and between north and south sides of I-80 for farm equipment so that they do not have to navigate through the City of Davis or I-80 urban traffic. CR32A is also a major route for trucks and vehicles heading to the Yolo County Landfill.

| | | |
|--|---|---|
| Number of Alternatives | 4 | |
| | Current Cost Estimate: | Escalated Cost Estimate(Note 3): |
| Capital Outlay Support(Note 1) | \$1.1-\$3.9 Million | \$1.3-\$4.8 Million |
| Capital Outlay Construction(Note 2) | \$6.1-\$22.5Million | \$7.4-\$27.0Million |
| Funding Source | Build Alternatives 1 and 8: State Section 190 funding or Federal Build Grant. | |
| Funding Year | TBD | |
| Type of Facility | <i>2-Lane Rural Frontage Road</i> | |
| Anticipated Environmental Determination or Document | IS/MND and EA | |
| Legal Description | <i>CR32A at CR105 Railroad Grade crossing Relocation</i> | |

Notes:

1. Capital Outlay support costs for PA&ED and PS&E are estimated at 20% of construction cost(w/out escalation)
2. Construction costs (as shown in Attachment B) have been increased by 15% for construction management and administrative costs to determine the Capital Outlay Construction cost.
3. For the escalated cost, 5 years at 4% inflation is assumed

2. BACKGROUND

CR 32A is a two-way, two-lane frontage road located on the north side of I-80 between the City of Davis and the Yolo Causeway in Yolo County. CR 32A connects to CR 105 through an at-grade crossing of UPRR tracks on an extremely sharp “S” curve. Existing CR 32A, within the project limits, is comprised of 11-foot travel lanes and 4-foot shoulders. The shoulders serve as a Class II bikeway facility between the Class I bikeway from the City of Davis to the west and the Class I bikeway along I-80 over the Yolo Causeway on the east end of CR 32A. This route therefore serves as the only practical route for bicycle access between this Cities of Davis and Sacramento. Other routes through Woodland or Rio Vista are available, but much longer and impractical to bicycling commuters. Additionally, CR 32A is a critical route for local over-sized

farm equipment as it allows the equipment to access land north and south of I-80 without having to navigate through City of Davis or I-80 urban traffic. The preservation of this crossing is paramount to the viability of the local agricultural community and the farm-to-market connections in the area as well as to provide access to the Yolo County Landfill.

Numerous underground and overhead facilities are located within the project area. Utilities include overhead power lines that run along the north side of CR32A a fiber optic line that runs along the south side of CR32A, a sewer force main along CR 105, and both an underground petroleum pipeline and underground fiber optic lines run along the UPRR tracks within their right of way.

The inadequate roadway geometry has resulted in a non-standard vehicle crossing of the railroad tracks and a challenging route for cyclists to travel. The change in elevation of the roadway to cross the railroad does not support 90 degree turns over the tracks at high automotive speeds. Advisory speed signs are posted at 10 miles per hour (mph) in the vicinity of the crossing, but frequent incidents involve vehicles moving too fast and thereby sliding off the roadway into metal beam guard rail or onto the active railroad corridor. This alignment in its current configuration cannot be improved using standard roadway geometric design because the roadway is confined between I-80 and the UPRR rail right-of-way.

Additional development within the study area is planned in the near future including the proposed Davis Innovation Sustainability Campus. The additional traffic generated by this and other future developments will directly impact operations at the CR 32A railroad crossing and the surrounding intersections. Some intersections within the study area are projected to operate at LOS E and F under cumulative conditions (See Section 8 of Attachment F). According to the *Federal Railroad Administrations (FRA) Highway-Rail Grade Crossing Incident* reports, the crossing has experienced 13 incidents between September 1982 to March 2018. Of these 13 incidents, 4 resulted in fatalities with 3 occurring between 2005 and 2015. For years local residents, the County, and the California Highway Patrol have experienced, are familiar with, or have documented incidents immediately south of the tracks on the CR32A curve. Over the years, efforts have been made by the County to improve the safety of the crossing. These efforts included: trimming of trees to improve sight distance, illumination, installation of advanced warning signs and guardrail, placing flashing lights on signs, placement of rumble strips in advance of the sharp crossing turn, and signing the sharp turn at 10 mph. These efforts have not made a significant impact at improving safety at the location. According to incident reports and local concerns, a significant portion of crashes are a result of westbound drivers failing to slow to an appropriate speed to navigate the sharp curve resulting in collisions with the guard rails that line the roadway leading up to the tracks. In addition, incident reports reflect a significant number of crashes resulting from eastbound vehicles as well.

UPRR's Crossing Assessment Process (CAP) is an initiative started in 2015 which draws on data to enhance grade crossing safety in the communities in which UPRR

operates. This initiative is based on a regression model that uses data from over 20,000 public crossings over UPRR’s 23 state network to identify characteristics that are statistically significant in crossings that have had incidents. These statistically significant characteristics include: unsafe motorist reports, vehicle on track events, average daily traffic count, average daily train count, and others. The model categorizes crossings in three tiers. A Tier 1 or Tier 2 crossing has several statistically significant characteristics; a Tier 3 crossing does not have several statistically significant characteristics. UPRR conducted a crossing assessment at the site and recommendations for improvements were made and presented to the County for consideration to mitigate the statistically significant characteristics, including but not limited to the number of vehicle on track events. Their recommendations from February 2, 2015 are shown below:

| RECOMMENDATIONS: | |
|-------------------------|--|
| 1 | Recommend for Closure |
| 2 | Add STOP SB County Road 105 |
| 3 | Remove/replace signage NE quadrant (intersection sign and double arrow sign) |
| 4 | Refresh Edge line markings NB, SB |
| 5 | Referesh Median line markings NB, SB |
| 6 | Replace delineators / markers (edge line and median) |
| 7 | Add road guard rail NW |
| 8 | Add street lighting |

The California Public Utilities Commission (CPUC) is the state regulatory agency with statutory authority over grade crossings. The removal, reduction, addition, or change in the type of warning devices at each public grade crossing must be authorized by the CPUC. Refer to Public Utilities Code Sections 1201 through 1205, 7537, 99152 and CPUC General Orders 75 and 88, as amended. In addition, FHWA, FRA, CPUC, and UPRR have instituted policies for the elimination of at-grade crossings. On October 5, 2017 UPRR filed an application with the CPUC to alter, close, or relocate the crossing out of safety concerns. This application was opposed by a variety of parties and interest groups including the City of Davis, Yolo County, Yolo County Farm Bureau, and the Sacramento Area Council of Governments (SACOG). Bike Davis, a local advocacy group and Safety and Enforcement Division of the CPUC joined the proceedings as well. In December of 2017, the parties, collectively through CPUC’s alternative dispute resolution process, agreed to study alternatives to the crossing that would “reasonably address” the concerns of all parties involved. This project study report collects relevant information into one document, develops preliminary engineering concepts for the alternatives, documents the collective thoughts of this group and the public with regard to the proposed alternatives, weighs the pros and cons of viable alternatives, and makes recommendations for a proposed path forward.

3. PURPOSE AND NEED

Purpose:

- Investigate alternatives to relocate the CR 32A railroad crossing to improve crossing safety and address the current conflicts experienced between trains, vehicles, and bicycles.

- Maintain the viability of the route for oversized agricultural vehicles

Need:

- Current location prohibits standard roadway geometric design
- Non-standard and outdated roadway geometry has resulted in a high number of vehicular crashes. Some vehicles in these crashes end up disabled on the railroad tracks, and, ultimately, this has resulted in train and vehicular incidents which have affected freight and passenger operations.
- Installation of traffic safety measures has not improved the frequency or altered the nature of the crashes
- Reduce maintenance costs of railroad and roadway traffic control devices
- Traffic is expected to increase on CR 32A due to anticipated development in the City of Davis and in the County. Recent Environmental Impact Studies have also recommended a grade separated crossing to support additional traffic in this corridor.
- Some intersections within the study area are projected to operate at LOS E & F under cumulative conditions
- Existing vehicle queue during peak traffic hours from the I-80 eastbound on-ramp metering light extends more than a mile along CR32A
- Maintaining a CR 32A railroad crossing provides a critical route for oversized farm equipment to access land north and south of I-80, for bicycle access between Davis and Sacramento, and for waste hauling to the landfill
- Existing roadway section has narrow paved shoulder widths for the speed of the traffic on the roadway, resulting in a difficult route for cyclists to navigate.

4. DEFICIENCIES

4.1 Existing At-Grade Crossing Geometry

The primary impediment to improving operations of the crossing is the geometry of the roadway curves immediately preceding the railroad crossing. Motorists exiting I-80 and heading westbound on CR 32A typically travel at high speeds. Recent speed measurements recorded that 85th percentile of westbound traffic averages 69 mph and eastbound traffic averages 63 mph (August 2019 Traffic Speed Study performed by Yolo County). From the I-80 Causeway to shortly before the UPRR railroad crossing, CR 32A is straight with ample visibility which lends an expectation that motorist speeds over the signed 55 mph are predictable. However, the sharp turn immediately

before the railroad crossing betrays driver's expectations, making it difficult to suddenly reduce to 10-mph to navigate the turn successfully and safely. This situation continues to result in repeated impacts to the guardrails on the crossing approaches and other nearby structures or worse.

4.2 Existing Roadway Cross Section

CR 32A includes a Class II Bikeway with four-foot paved shoulders as part of the only bike route between the Cities of Davis and Sacramento. The four-foot shoulders on CR32A do not meet the most current (July 2020) Highway Design Manual Class II minimum width of 6 feet for posted speeds exceeding 40mph. This Class II serves as a link between the existing Class I bike route from the City of Davis to the west and the connecting Class I bike route on I-80 over the Yolo Causeway. CR32A's westbound route has been utilized by motorists seeking to bypass I-80 traffic congestion. Motorists on CR32A frequently exceed the posted 55-mph speed limit and perform illegal passing maneuvers. Additionally, a frequent complaint from the local cycling community is the accumulation of debris in the shoulder reducing the usable pavement width. Due to these conditions, cyclists have been sideswiped, run off the road or blown off the road by passing vehicles. The new crossing and roadway approach would include six-foot wide shoulders and consider traffic calming measures to improve safety for all users of the route.

4.3 Traffic

Congestion is often measured in terms of level of service (LOS), which is an indicator of driving conditions on a roadway segment or at an intersection. LOS are defined in categories ranging from "A" to "F" for two-lane highways, intersections with traffic signals, and two-way stop intersections. A level "A" indicates free-flowing traffic with no to driving speed caused by traffic conditions. A level "F" indicates substantial congestion with slow-moving, stop-and go traffic.

Fehr and Peers analyzed existing intersection operations for the project site and several adjacent intersections that the project might impact (see Table 1). This traffic memorandum is included as Attachment F. Cumulative traffic conditions under the build alternatives are discussed in Section 8 of this report.

Table 1. Intersection Operations - Existing (2019) Conditions

| Intersection | Traffic Control | LOS/Delay | |
|---|-------------------------------|----------------|----------------------|
| | | AM | PM |
| 1. Second Street/County Road 32A/Mace Boulevard | Signal | C / 33 | C / 22 |
| 2. I-80 Westbound Ramps/Mace Boulevard | Signal | B / 17 | B / 16 |
| 3. County Road 32A/County Road 105 | Side Street Stop ¹ | A / 7 (SB) | A / 8 (EB) |
| 4. County Road 32A/I-80 Westbound Ramps | Side Street Stop | A / 10 (NB LT) | B / 11 (NB LT) |
| 5. Chiles Road/Mace Boulevard | Signal | D / 38 | C / 28 |
| 6. County Road 32B/I-80 Eastbound Ramps | Side Street Stop | B / 12 (SB LT) | <u>F</u> / *2 |

Source: Fehr & Peers (2020)

Notes: Delay is reported in seconds per vehicle. Bold and underline font indicates LOS E or F conditions.

1. The intersection has stop control for the eastbound and southbound approaches, but the northbound approach is uncontrolled. Since the HCM methodology does not account for this configuration, the intersection was modeled with all-way stop control, and the highest delay for the stopped approaches was reported.
2. Although the HCM method reports LOS C (SB LT), field observations showed congested conditions (LOS F) on the eastbound and westbound approaches due to queuing from the ramp meter on the I-80 eastbound on-ramp.

5. CORRIDOR AND SYSTEM COORDINATION

Yolo County Public Works, with the support of Caltrans, the City of Davis, and Bike Davis, submitted an Active Transportation Program (ATP) application for the funding of a separate project that would build a Class I bikeway that would extend throughout CR 32A. Unfortunately, the ATP application was not selected for funding. The build alternatives include consideration of a potential Class I bike path option.

Caltrans is currently studying alternatives to widen the I-80 Corridor south of the project area to relieve traffic congestion. The current design direction is to expand traffic lanes to the inside using the inside median. However, a bus shoulder option, consisting of outside widening is also being explored. Therefore, build alternatives need to avoid encroaching Caltrans Right-of-Way (ROW).

As a part of the Yolo I-80 Corridor Improvement Project, Caltrans is examining options aimed at accommodating bicyclists. I-80 has an existing Class I path east of the I-80 off-ramp. This Class I currently diverts north to the Yolo Bypass, cyclists are then able to either continue on the levee, go west on the existing CR32A shoulder or cross lanes of traffic to go east/south to CR32B. Based on discussions with Caltrans, it is understood that as a part of the lane expansion project Caltrans may build a new stretch of Class I bike path(see Figure 1 below) that would extend from the existing I-80 Class I terminus and conform at the south portion of CR32A where the I-80 offramp ends.



Figure 1: Caltrans CI 1 Ramp Extension

6. DESIGN CRITERIA

The selection of the appropriate design criteria is dependent on the functional classification of the roadway under design. Table 1 lists the functional classification of CR 32A.

| County Road 32A | | |
|-----------------|----------------|---------|
| Designation | Classification | Terrain |
| Rural | Local/Frontage | Level |

The following criteria were utilized in the development of the project’s design criteria:

1. Design Speed
2. Lane Width
3. Shoulder Width
4. Horizontal Curve Radius
5. Superelevation Rate
6. Stopping Sight Distance
7. Maximum Grade
8. Cross Slope

9. Vertical Clearance
10. Design Loading Structural Capacity

The following comparison table lists the requirements for the geometric criteria as designated by AASHTO's *A Policy on Geometric Design of Highways and Streets, 2018*, Caltrans's *Highway Design Manual, 2018*, and Yolo County's *Improvement standards, 2018*.

Table 2: General Roadway Design Criteria Comparison

| | | AASHTO | HDM | Yolo County | Proposed* |
|----|--|------------|-----------|----------------|--------------------|
| 1 | <i>Design Speed (Alt 1) (mph)</i> | 55 | 45 | 65 | 50 |
| | <i>Design Speed (Alt 2, 8) (mph)</i> | 55 | 45 | 65 | 40 |
| | <i>Design Speed (Alt 3) (mph)</i> | 55 | 45 | 65 | 45 |
| 2 | <i>Lane Width (ft)</i> | 12 | 12 | 12 | 12 |
| 3 | <i>Shoulder Width (ft)</i> | 6 | 4 | 4 | 6 |
| 4 | <i>Horizontal Curve Radius</i> | | | | |
| | Minimum Radius (ft) (Alt 1) | 960(8% SE) | 587 | HDM | 758(8% SE) |
| | Minimum Radius (ft) (Alt 2, 8) | 960(8% SE) | 587 | HDM | 444 (8% SE) |
| | Minimum Radius (ft) (Alt 3) | 960(8% SE) | 587 | HDM | 587 (8% SE) |
| | Minimum Radius without Superelevation (Alt 1) | 9720 | 6710 | HDM | 8150 |
| | Minimum Radius without Superelevation (Alt 2, 8) | 9720 | 6710 | HDM | 5410 |
| | Minimum Radius without Superelevation (Alt 3) | 9720 | 6710 | HDM | 6710 |
| 5 | Superelevation Rate | Method 5 | | | Method 5 |
| | | 8% | 8% | | 8% |
| 6 | <i>Stopping Sight Distance (Alt 1) (ft)</i> | 495 | 360 | 660 | 425 |
| | <i>Stopping Sight Distance (Alt 2, 8) (ft)</i> | 495 | 360 | 660 | 305 |
| | <i>Stopping Sight Distance (Alt 3) (ft)</i> | 495 | 360 | 660 | 360 |
| 7 | <i>Maximum Grade</i> | | | | |
| | Profile Grade, Max. (%) | 6% | AASHTO | | 6% |
| 8 | <i>Cross Slope (%)</i> | 1.5%-2% | 2% | 2% | 2% |
| 9 | <i>Vertical Clearance (UPRR min.)</i> | 23' 4" OC | 23' 4" OC | | 23' 4" OC |
| 10 | <i>Design Loading</i> | HL-93 | HL-93 | HL-93 | HL-93 |

*Values calculated at specified design speed for each alternative.

7. ALTERNATIVES

7A. Alternatives Constraints

Utilities

There are overhead and underground utilities present through the project area. There are two sets of overhead power lines. One set is located north of the UPRR tracks and runs parallel to the tracks to CR105. The other is located just north of CR32A and runs parallel to CR32A. There are underground fiber optic lines that run parallel to the UPRR tracks and parallel to CR32A. Underground natural gas lines are located north of the tracks and run parallel to them. There is a Kinder Morgan petroleum line located near the tracks as well. CR 105 features a sewer force main that runs North-South along the west portion of the roadway. None of the proposed alternatives are expected to affect the sewer line.

In general, any road construction around buried utilities that involves changes to grade or depth of cover over the line(s) will require safe construction methods during construction, wheel loading analysis of the existing line(s), checks that new underground structures do not conflict with the existing lines or relocation of the lines. PG&E believes there may be some load limits specifically on the southeast side of the crossing and possible PG&E line re-routing may be required.

Some utilities are on reoccurring inspection cycles, and the utility has to be able to excavate their lines to perform inspections and repairs as necessary. Some utilities may be concerned with sections of their lines that may become inaccessible.

Yolo Track Relocation

The City of Davis, along with City of West Sacramento, City of Woodland and Yolo County were awarded a grant from Economic Development Administration for technical assistance in preparing a rail line relocation economic impact study and strategic implementation plan in 2014. The report is available at the following location: <https://www.yolocounty.org/government/general-government-departments/county-administrator/county-administrator-divisions/intergovernmental-affairs/yolo-rail-relocation>. The results of this study and any future rail plans (by UPRR and/or other railroad operators) along the UPRR rail corridor should be incorporated into the future crossing relocation project.

Drainage Features

Two drainage ditches run parallel to the UPRR tracks. These ditches lead into larger culverts that pass flows eastward and under CR105. Where alternatives are designed to cross these ditches, culverts will be installed to continue the existing flow pattern.

Right of Way

The site is situated north of I-80. CR 32A has a 60-foot right-of-way within the immediate vicinity of the railroad crossing. The area north of the tracks consists of

agricultural parcels owned by the City of Davis and a local PG&E substation located just north of the UPRR rail corridor approximately 1/3 mile east of the railroad crossing. Several privately owned parcels are located south of CR32A between CR32A and the Caltrans right-of-way to the south. A total of four (4) alternatives were identified for the project. All four build alternatives will require partial property acquisition to complete the roadway right-of-way.



Figure 2: Yolo Land Trust/NRCS Easement

The Yolo Land Trust co-holds an easement with the City of Davis on the property west of Howat Ranch (see Figure 2), where the “Optional 32A west extension” is shown for the various alternatives. The National Resource Conservation Service (“NRCS”) was a co-funder of this conservation easement. As such, any road construction is subject to the written approval of NRCS. Per the conservation easement, any paving would need the written approval of the Yolo Land Trust and the City of Davis and is subject to an impervious surface limitation. Also, per the conservation easement, any eminent domain action will also need the approval of the Secretary of the United States Department of Agriculture. Based on experience with previous projects, changes to NRCS Conservation Easements are possible and can be negotiated with the agency, but typically require mitigation at a 1.5:1 ratio for the affected area.

The City of Davis owns most of the farmed properties immediately north of the railroad along the project area, as shown in Figure 3 below. These fields are leased to farmers and the City receives substantial annual income from the lease of the fields. The income

depends on whether the fields are irrigated or not. All but Field 11) have the ability to be irrigated. Fields 5,6,7,8,9,10 are the easiest to irrigate. The limiting factor is the quantity of water than can be pumped from the City’s well. Field 11 can be irrigated but the water must be double pumped. The entirety of Alternative 1 impacts City of Davis land that is irrigated by well water and has a higher crop value as a result. Alternatives 2,3 and 8 all have about 2000 lineal feet of new roadway in non-irrigated land and all the rest of the impacts to City of Davis land is through irrigated farmland. The City reports that revenue for irrigated acres is about \$250/acre/year and for the non-irrigated land it is about \$100/acre/year. The present value of the annual income to the City, per acre, over a 75-year term using a 3% interest rate would be between \$7,425 and \$2,970, for irrigated and non-irrigated farmland, respectively. The City’s Open Space and Habitat Commission as well as the City Council will likely have input into the acquisition of City owned land.



Figure 3 City of Davis owned and farmed properties with acreages

The area south of CR32A and north of I-80, as shown in Figure 4, consists of eight smaller parcels owned by companies that in name, appear to be developers. Each of the various alternatives would require acquisitions from these properties, in part or in whole. Based on observation, these private properties are currently used for periodic hay production and do not appear to be irrigated for agricultural purposes. The zoning for the parcels appears to be agricultural intensive or public open space.



Figure 4 Private properties south of CR32A

Other Constraints

Several other project area constraints are shown in Figure 5 below.



Figure 5: Project Area Constraints

7B. Build Alternative 1 – Overhead Grade Separation – 50 MPH

Build alternative 1, shown in Attachment A, consists of an overhead crossing structure approximately 0.5 miles to the east of the current crossing. Howat, a local private road which provides access between CR 105 and the local PG&E substation, would be used as the west approach to the structure. This roadway alternative would be elevated and curve over the UPRR Tracks and then descend and conform onto the existing CR32A approximately 1 mile east of the existing crossing. The existing CR 105/CR 32A railroad crossing would be closed to all traffic. A new driveway off of Howat would restore access to the private property including the PG&E substation.

This alternative crosses PG&E’s 12” transmission pipeline at two locations, one of which appears to be in the road overhead crossing section.

Key Benefits of Alternative 1:

- Minimal rail involvement/impacts & coordination requirements
- Eliminates the existing UPRR/Roadway intersection conflict
- Additional grant funding resources may be available versus non-grade separated alternatives.
- The curvilinear alignment will act as a form of traffic calming for motorists, encouraging them to drive at a speed (speed limit) necessary to safely navigate the curvature.
- Vertical curves will limit sight distance compared to the existing at-grade configuration, encouraging slower traveling speeds.
- UPRR Strongly recommends an overhead crossing structure. Also see current BNSF/UPRR Grade Separation Guidelines available at https://www.up.com/cs/groups/public/documents/document/pdf_rr_grade_sep_projects.pdf
- Supports FHWA (MUTCD, Part 8A.05), FRA and CPUC (General Order 75D) policy for the elimination of at-grade crossings
- Long term resolution allows for development of area and better traffic operations.
- Less intrusive from a farming perspective.
- Reduced maintenance and repair costs from damage to railroad and roadway traffic control devices.

Disadvantages of Alternative 1:

- Higher construction costs and construction time compared to the at-grade and undercrossing options
- In order to meet the required vertical clearances, longer approaches than the at-grade alternatives will be required.
- Retaining walls will be required to minimize footprint, where feasible.
- Skewed structure needed to cross the railroad increases the span lengths and thus, the bridge cost.
- Higher Right-of-Way (ROW) costs than At-Grade options.
- Culverts will need to be installed beneath realigned CR32A where the existing Howat is to continue the existing drainage pattern.
- This alternative crosses PG&E's 12" transmission pipeline at two locations, one of which appears to be in the road overhead crossing section.
- The access road to PG&E's substation needs to be relocated.
- Higher 50mph design speed is less safe for cyclists using the roadway compared to other lower speed alternatives

Oversized Vehicle Option:

CR32A serves as a main route for the local farm community who typically utilize large, slow moving, and oversized farm vehicles. Typically, the unpaved backing beyond the shoulders provides extra width for farm equipment using County roads. One of the concerns raised by the Yolo County Farm Bureau was that the proposed clear width (12' TW + 6' Shoulder) on the overhead would not be wide

enough to accommodate the larger farm vehicles used in the area, particularly if the shoulder is not available to the farm vehicle, for example, passing of a slower cyclist. There are a few options to help better accommodate farm vehicles and passing. The first option would be to widen the overhead structure to a wider clear width (from 36' to an assumed 40'), and according to Farm Bureau would better accommodate the larger vehicles. The approximate addition project cost for this expansion of the bridge, including foundation work, is \$1.23 million.

The second option would require that farmers with slow moving and/or oversized agricultural vehicles utilize flaggers at the overhead crossing, stopping traffic while the agricultural vehicles make the passage. It should be noted that the alignment and profile for Alternative 1 are conservatively designed for typical vehicle highway stopping sight distances and sightlines, which will be conservative for taller farm vehicles traveling at slower speeds.

7C. Build Alternative 2 – Perpendicular At-Grade Option – 40 MPH

Build Alternative 2 shown in Attachment A, would realign CR 32A to provide a perpendicular at-grade UPRR crossing. Due to limited right of way (ROW), the crossing location was shifted 1.4 miles to the east and designed to a lower design speed in order to accommodate the curves necessary to align CR 32A to a perpendicular crossing. Continuing west, past the track crossing, the CR 32A alignment would curve again, following a southwest bearing to connect to CR 105. An option would be to continue the realigned CR 32A past CR 105 to provide a more direct continuous access to existing CR 32A as shown with the dashed line at the west end of the alignment.

Key Benefits of Alternative 2:

- Eliminates the existing UPRR/Roadway crossing
- Aligns North of the PG&E Substation and does not conflict with existing utilities
- The curvilinear alignment will act as a form of traffic calming for motorists encouraging them to drive at lower speeds (reduced speed limit) to navigate the curvature.
- Slower 40mph design speed is safer for cyclists using the roadway compared to higher speed alternatives.
- Lower construction costs and construction duration compared to the grade-separated options.
- Large embankments and retaining walls will not be needed.
- Oversized Vehicles can utilize the unpaved shoulder to allow for crossing of faster vehicles.
- Slightly less impactful from a farming perspective.

Disadvantages of Alternative 2:

- Does not support FHWA (MUTCD, Part 8A.05), FRA and CPUC (General Order 75D) policy for the elimination of at-grade crossings
- UPRR strongly prefers the grade separated options in conformance with

FHWA, FRA and CPUC policy.

- Maintenance reimbursement will be required for UPRR rail infrastructure maintenance costs for a new at-grade crossing (signal and surface) at the County cost.
- Culverts will need to be installed on both sides of the UPRR Tracks due to embankment placement in the existing drainage ditches.
- Requires extensive ROW acquisition. The current configuration leaves several remnant parcels that may be difficult to irrigate or are too small for efficient farming practice. Remnant parcels may need to be acquired if they are no longer economical as farmland.
- Due to the proximity of I-80 to the south, the crossing is required to be shifted further east than Alternative 1.
- Does not align with the west portion of CR 32A. Drivers will need to navigate 2 intersections to reach the western length.
- Roadway geometry may result in similar incidents resulting in later reassessment for a grade separated facility.
- PG&E has multiple lines that may be impacted. Under this alternative, there is another 20" pipeline that enters PG&E's regulator station from the north that is not shown on the drawings. The alignment would cross this line. PG&E also has a 2" line running south, crossing 32A and Hwy 80, feeding a customer off of Chiles Rd. This line is also not shown on the drawings.
- On the east side of the tracks, the alignment would cross three pipelines (one 12" and two 16").
- Relating to the queuing from the Caltrans metering light on the EB I-80 On-Ramp, queue prevention measures will need to be implemented based on an updated traffic study and queuing analysis.

7D. Build Alternative 3 – Skewed At-Grade Crossing-45mph

This build option, shown in Attachment A, would shift the crossing approximately 1.3 miles to the east. CR 32A will be realigned to curve South towards I-80, then curve North and cross the Railroad tracks at a 15° skew. The roadway will then curve to the west and align with a local farming road before intersecting with CR 105.

Key Benefits

- Lower construction costs and construction duration as compared to the overhead alternative.
- The curvilinear alignment will act as a form of traffic calming for motorists encouraging them to drive at the speed limit to navigate the curvature.
- Lower ROW impacts compared to the grade separation alternatives
- Lowest, or no utility relocation costs.
- Eliminates the current crossing and provides a crossing with improved geometry for motorists.
- Large embankments and retaining walls will not be needed.

- Minimizes the impact to farming parcels by aligning with the local farm road

Disadvantages

- Does not support FHWA (MUTCD, Part 8A.05), FRA and CPUC (General Order 75D) policy for the elimination of at-grade crossings.
- UPRR strongly prefers the grade separated options in conformance with FHWA, FRA and CPUC policy.
- Skewed crossings are less desirable to UPRR, CPUC, FRA, and FHWA. Placement of railroad traffic control devices (RRTCD) requires additional clearance time for a design vehicle and presents other design challenges. In addition, they present unique difficulties for cyclists (discussed further below)
- Maintenance reimbursement will be required for UPRR rail infrastructure maintenance costs for a new at-grade crossing (signal and surface) at the County cost.
- Culverts will need to be installed on both sides of the UPRR rail corridor due to embankment placement in the existing drainage ditches.
- Requires extensive ROW acquisition.
- Due to the proximity of I-80 to the south, the crossing is required to shift further east than Alternative 1
- Conforms farther North on CR 105 than Alternative 2. Extending this realigned CR 32A to conform with the western length of CR 32A would be costly and require large amounts of ROW acquisition and additional roadway.
- Roadway geometry may result in similar incidents resulting in later reassessment for a grade separated facility.
- While this alternative requires less farmland acquisition, splitting the parcels may cause water supply and drainage issues. Additionally, equipment and farm vehicles will have to cross the road more often to traverse between the separated parcels.
- PG&E has multiple lines that may be impacted. Under this alternative, there is another 20" pipeline that enters PG&E's regulator station from the north that is not shown on the drawings. The alignment would cross this line. PG&E also has a 2" line running south, crossing 32A and Hwy 80, feeding a customer off of Chiles Rd. This line is also not shown on the drawings. PG&E also has a 2" line running south, crossing 32A and Hwy 80, feeding a customer off of Chiles Rd. This line is also not shown on the drawings. On the east side of the tracks, the alignment would cross three pipelines (one 12" and two 16").
- Higher 45 mph design speed is less safe for cyclists using the roadway compared to other lower speed alternatives
- Relating to the queuing from the Caltrans metering light on the EB I-80 On-Ramp, queue prevention measures will need to be implemented based on an updated traffic study and queuing analysis. Most impactful to farming since it causes irrigation and drainage issues for the farmed areas south of the

relocated CR32A. Also, farm vehicles will have to cross the road more often to traverse between parcels

7E. Build Alternative 8 – Perpendicular Overhead Crossing-40MPH

Build Alternative 8 shown in Attachment A, follows a similar crossing horizontal alignment to Alternative 2. Due to limited space between the railroad tracks and Interstate 80, the crossing location was shifted 1.4 miles to the east and designed to a lower design speed in order to accommodate the curves necessary to align CR 32A to a near perpendicular crossing. Continuing west, past the track crossing, the CR 32A alignment would curve again, following a southwest bearing to connect to CR 105.

Key Benefits of Alternative 8:

- Minimal rail involvement/impacts & coordination requirements
- Eliminates the existing UPRR/Roadway intersection conflict
- Additional grant funding resources may be available versus non-grade separated alternatives.
- The curvilinear alignment will act as a form of traffic calming for motorists, encouraging them to drive at a speed (speed limit) necessary to safely navigate the curvature.
- Vertical curves will limit sight distance compared to the existing at-grade configuration, encouraging slower traveling speeds.
- UPRR Strongly recommends an overhead crossing structure. Also see current BNSF/UPRR Grade Separation Guidelines available at https://www.up.com/cs/groups/public/documents/document/pdf_rr_grade_sep_projects.pdf.
- Supports FHWA (MUTCD, Part 8A.05), FRA and CPUC (General Order 75D) policy for the elimination of at-grade crossings
- Long term resolution allows for development of area and better traffic operations.
- Crosses the tracks almost perpendicularly, resulting in a shorter structure length than Alternative 1
- Slower 40mph design speed is safer for cyclists using the roadway compared to higher speed alternatives.
- Slightly less impactful from a farming perspective.
- Reduced maintenance and repair costs from damage to railroad and roadway traffic control devices.

Disadvantages of Alternative 8:

- Higher construction costs and construction time compared to the at-grade and undercrossing options
- In order to attain a perpendicular overhead crossing, the crossing location was relocated further East than Alt 1. This will result in longer approach lengths.
- In order to meet the required vertical clearances, longer approaches than the at-grade alternatives will be required.

- Retaining walls will be required to minimize footprint, where feasible.
- Highest Right-of-Way (ROW) costs due to largest footprint.
- This alternative crosses PG&E's 12" transmission pipeline at two locations, one of which appears to be in the road overhead crossing section.

Oversized Vehicle Option:

CR32A serves as a main route for the local farm community who typically utilize large, slow moving, and oversized farm vehicles. Typically, the unpaved backing beyond the shoulders provides extra width for farm equipment using County roads. One of the concerns raised by the Yolo County Farm Bureau was that the proposed clear width (12' TW + 6' Shoulder) on the overhead would not be wide enough to accommodate the larger farm vehicles used in the area, particularly if the shoulder is not available to the farm vehicle, for example, passing of a slower cyclist. There are a few options to help better accommodate farm vehicles and passing. The first option would be to widen the overhead structure to a wider clear width (from 36' to an assumed 40'), and according to Farm Bureau would better accommodate the larger vehicles. The approximate additional project cost for this expansion of the bridge, including foundation work, is \$1.15 million.

The second option would require that farmers with slow and/or oversized agricultural vehicles utilize flaggers at the overhead crossing, stopping traffic while the agricultural vehicles make the passage. It should be noted that the alignment and profile for Alternative 8 are conservatively designed for typical highway stopping sight distances and sightlines, which will be conservative for taller farm vehicles traveling at slower speeds.

7F. Bicycle Considerations:

The proposed typical road section for each build alternative is 12-foot lanes and 6-foot shoulders. Realigned CR 32A includes Class II bike facilities to connect bicycle travel between CR 105 and CR 32A. The remnant portion of CR 32A would be left in place for bicyclists to use as an extension of the Class I Bikeway. Designs are proposed to connect this remnant CR 32A converted to bike path with the shoulders of the newly aligned and remaining portions of CR32A beyond the project footprint.

A concern raised during early meetings was whether a cycling solution for the entirety of CR32A within the 2-mile project area could be achieved and how the connectivity between CR105 and the remnant CR32A would work.

There are a few approaches that these build alternatives can take for addressing this concern and providing an improvement to the existing condition.

A Class I bike path could be constructed to extend from the existing remnant of CR32A onto the north side of CR32A and continue to the Class I at the Yolo Causeway. Connections from relocated CR 32A onto the Class I would also be made.

Another option would be to explore widening the remaining existing CR32A shoulders from the existing approximate four-foot width to six feet wide all the way to the Yolo Causeway. A preliminary estimate for this type of widening is approximately \$200,000 for Alternative 1 and \$60,000 for Alternatives 2, 3 and 8. Widening the existing roadway suggests there would be a small cost savings compared to constructing a separate Class I bike path.

The last option would be to tie-in the new crossing into the existing bike lanes on CR 32A. In this scenario no extension of the Class I would be constructed, and cyclists would utilize short connection trails that would tie to the remnant CR32A to the rest of CR32A. From there, cyclists would use the existing shoulders of the rest of CR32A as they do today. For all alternatives, widening of the existing Class II bike lanes on any portions of CR32A open to vehicular traffic, should be considered to bring the bike lanes up to current width standards.

Recent discussion with Caltrans District 3 suggests that they might also be willing to construct an extension of the Causeway bike path adjacent to the motor vehicle off ramp down to its intersection with CR 32A. This small approximately 1500 ft long path would provide significant improvements to cyclist safety by eliminating the need for eastbound cyclists to cross 32A to get to the levee and the Causeway bike path.

With Build Alternative 3, a commenter noted that the skewed at-grade crossing can be difficult for cyclists to navigate. Crossing tracks at a skew can result in a cyclist's bike wheel becoming caught in the railroad's flangeway. In order to address this concern, the design now includes a widened paved area in the vicinity of the tracks to allow for a perpendicular crossing for cyclists, as shown on the plan sheet in Attachment A.

Other possible improvements for cyclists in all the alternatives is to incorporate different pavement markings and use of buffers. The Manual on Uniform Traffic Control Devices (MUTCD) Section 9C addresses standard bike lane markings. The stripe between the bicycle lane and the adjacent motor vehicle lane should be a 4-inch minimum wide white line but six- to eight-inch-wide lines provide an even clearer division of space and are highly recommended. The City of Davis Streets Standards is currently using 2-foot to 3-foot wide striped buffers for Class II bike lanes, see Figure 6 below, for an example. A preliminary estimate for widening the existing remaining CR32A shoulders by 5 feet, to provide the six-foot-wide shoulders with 3-foot-wide striped buffers is approximately \$500,000 for Alternative 1 and \$150,000 for Alternatives 2, 3 and 8. These costs are comparable

to constructing a separate Class I path, which would probably be preferred by cyclists. Another consideration brought up by the City of Davis bicycle coordinator is that when roadway speeds exceed 30mph, which is the case for all alternatives, then FHWA recommends separated bike paths rather than shared or buffered bike lanes.



Figure 6-Example of a buffered Class II bike lane on Covell Blvd in Davis, Ca

Thermo applied acoustic striping at the shoulder line can also be used to separate the vehicular travel lanes from the bike lanes where the bike lanes are in the roadway shoulder. This newer technology is superior to using rumble strips carved into the pavement since it is supposedly safer for cyclists, however, there do not appear to be any national design standards for these types of devices nor any reports on their effectiveness or safety for cyclists. Utilization of these thermoplastic acoustic stripes was discussed with the Bike Davis community that took place on November 10th, 2020. The general opinion was that the use of the acoustic striping was not acceptable. Members of the public cited negative experience on other bicycle paths that utilized this and similar technology.

The various connectivity options for cyclists for the three build alternatives are illustrated in Attachment C.

7G. Rejected Alternatives

Additional alternatives have been studied and reviewed by the project development team, including a variety of undercrossing and overhead alternatives. Table 3 shows a summary of alternatives that was presented during the initial public meetings.

The undercrossing options were discarded early in discussion. Undercrossing options require extensive and expensive utility relocations or a large amount of excavation to realigned roadway deep enough to meet required overhead clearance of the existing underground utilities. Expensive shooflies would be needed to temporarily relocate the tracks during construction of any underpass alternatives. Additionally, drainage for the uncrossing options would require a pumping station to handle runoff that would coalesce at the undercrossing low points and drainage siphons to continue the existing flow patterns from the ditches that run along the UPRR tracks.

Alternative 8, another overhead crossing, was developed as a result of stakeholder feedback. The remaining overhead options were discarded for high-cost and potential conflicts with the UPRR rail corridor. These featured longer structures on more extreme skew angles. The columns for these alternatives included high potential to impact the UPRR ROW and/or impact underground fiber optic lines and gas lines.

Table 3: Alternative Summary Table

| Alternative | Design Speed | Separates Roadway From Railroad | Potential Utility conflicts | Approximate right-of-way needed | Additional feet of Class I Bike path | Long-term maintenance issues | Estimated Cost (\$Millions) |
|--|--------------|---------------------------------|---|---------------------------------|--------------------------------------|------------------------------|-----------------------------|
| Alternatives 1 – 3 are Carried Forward for Further Study | | | | | | | |
| 1: Overhead Crossing | 50 | Yes | Overhead power poles, gas pipeline | 5.6 acres | 0.5 mile | Low to none | \$18.5 |
| 2: At-grade Crossing | 40 | No | None | 13.8 acres* | 1.5 miles | Low to none | \$6.35 |
| 3: At-grade Crossing | 45 | No | None | 12.1 acres | 1.5 miles | Low to none | \$5.85 |
| Alternatives 4 – 7 are Removed from Further Consideration | | | | | | | |
| 4: Underpass Crossing | 55 | Yes | Gas pipeline | 4.0 acres | 0.5 mile | Drainage pump and siphons | |
| 5: Overhead Crossing | 55 | Yes | Overhead power poles, gas pipeline | 5.0 acres | 0.5 mile | Low to none | |
| 6: Overhead Crossing | 55 | Yes | Relocate overhead power poles, gas pipeline | 5.6 acres* | 0 mile | Low to none | |
| 7: Underpass Crossing | 55 | Yes | Gas pipeline | 13.8 acres | 2.0 miles | Drainage pump and siphons | |

* Indicates alignment results in potentially unformable remnant lands

8. TRAFFIC ANALYSIS

Intersection operations were analyzed by Fehr and Peers (See Attachment F) for cumulative conditions under the AM and PM peak hour scenarios using the Synchro Software and the results are shown below in Table 4.

Table 4: Intersection Operations – Cumulative Conditions

| Intersection | Traffic Control | LOS/Delay | |
|---|-------------------------------|-----------------------|-----------------------|
| | | AM | PM |
| 1. Second Street/County Road 32A/Mace Boulevard | Signalized | <u>F / 121</u> | <u>F / 140</u> |
| 2. I-80 Westbound Ramps/Mace Boulevard | Signalized | C / 28 | <u>E / 55</u> |
| 3. County Road 32A/County Road 105 | Side Street Stop ¹ | A / 9 (EB) | D / 35 (EB) |
| | All Way Stop ² | B / 11 | D / 26 |
| 4. County Road 32A/I-80 Westbound Ramps | Side Street Stop | B / 14 (NB LT) | D / 34 (NB LT) |
| 5. Chiles Road/Mace Boulevard | Signalized | <u>F / 273</u> | <u>F / 92</u> |
| 6. County Road 32B/I-80 Eastbound Ramps | Side Street Stop | B / 13 (SB LT) | <u>F / *3</u> |

Source: Fehr & Peers (2020)

Notes: Delay is reported in seconds per vehicle. Bold and underline font indicates LOS E or F conditions.

1. The intersection has stop control for the eastbound and southbound approaches, but the northbound approach is uncontrolled. Since the HCM methodology does not account for this configuration, the intersection was modeled with all-way stop control, and the highest delay for the stopped approaches was reported.
2. Although the HCM method reports LOS C (SB LT), field observations showed congested conditions (LOS F) on the eastbound and westbound approaches due to queuing from the ramp meter on the I-80 eastbound on-ramp.

The CR 32A/CR 105 intersection is the only study intersection that would be affected by the build alternatives. With all-way stop control, the intersection would operate at LOS B during the AM peak hours and LOS D during the PM peak hours if one-lane approaches were provided. Adding a pocket lane for higher volume movements (westbound left turn and northbound right turn) would reduce the average intersection delay.

The project build alternatives primarily affect traffic operations in the following three areas: The CR 105 intersection, the bike path realignment, and queuing from the CR 32B on-ramp ramp meter. These issues are discussed below.

The four build alternatives would each construct a new T-intersection on CR 105 north of the existing intersection. The location of the new intersection ranges from 120' to 2,170' to the north. Given the lack of alternate routes, the intersection traffic volumes are expected to be the same for the three alternatives. The farther north that the intersection is located, the more total vehicle travel would occur since the high-volume movements parallel to I-80 would have a longer path. The lower volume movements to and from the north on CR 105 would have shorter paths. The new intersection was analyzed with all-way stop control for cumulative conditions. Given the lower existing

conditions volumes, intersection control in the opening year may operate acceptably with side street stop control.

The build alternatives would all extend the Class I bike path to the east using the abandoned alignment of CR 32A and provide a grade-separated crossing of CR 32A at the relocated railroad crossing. All three alternatives should provide a connection from the bike path to the eastbound Class II bike lane on CR 32A so that eastbound bicyclists do not need to cross CR 32A.

9. COMMUNITY INVOLVEMENT

The key project stakeholders include UPRR, The City of Davis, Bike Davis, Yolo County, The Yolo County Farm Bureau, and the California Public Utilities Commission. Project stakeholders have participated in the project development discussions at the Project Development Team (PDT) meetings.

Public comments for the project were received via email and during the public meeting held on August 31st, 2020. The Project team provided a short overview of the project and the alternatives under consideration and those that have been considered and removed from consideration. Following the project overview, the attendees were provided the option to raise questions and/or issues or suggestions to the project development team. A total of 8 persons provided comments during the meeting and 38 comments were received via email through September 6th (see Attachment G).

A bicyclist focus meeting was held on November 10, 2020 to explain bicycle connectivity aspects of the various alternatives in more detail. The project was explained in more detail, questions were responded to and comments were collected for consideration. Meeting notes were issued to Bike Davis for distribution to attendees. As a result of the meeting an additional build alternative was developed, that being Alternative 8.

10. ENVIRONMENTAL COMPLIANCE

A Preliminary Environmental Study (PES) form (Attachment E), was prepared to provide an environmental scan for the project. The environmental scan included a review of habitat, wetlands, trees and listing of trees that may require removal. Additionally, the scan identified potential property acquisition and whether lands would affect Farmlands of State, regional or local importance. In order to fully understand the extent of the potential impacts, the following reports/studies have been identified in the PES as being potentially required during the subsequent phases of this project:

- Visual Technical Memorandum
- Floodplain Evaluation Report
- Floodplain Evaluation Report

- Water Quality Discussion
- Farmland Technical Memorandum
- Air Quality Assessment/Greenhouse Gas Technical Memorandum
- Noise Discussion
- Traffic Technical Memorandum
- Biological Technical Memorandum
- Phase I Initial Site Assessment
- Phase II Preliminary Site Assessment
- Wetland Delineation and Assessment

11. PREFERRED ALTERNATIVE AND RANKING

Decision makers approve a preferred project alternative using input from stakeholders, planning partners, and detailed information about potential impacts. Analysis of alternatives often includes definition of the evaluation criteria, creation of screening processes and documentation for multiple types of solutions. Identified improvements can relate to mobility, safety, multimodal use, geometric design, water quality, land use, utilities, etc. Solutions can be either interim or long term, and may involve capacity improvements as well as operational elements or strategies. It is necessary to evaluate trade-offs between solutions as part of the decision making process. Any preferred alternative must also meet the purpose and need for the project, as described in Section 3.

Several stakeholders have weighed-in on the four Alternatives considered in this report.

UPRR strongly recommends an overhead crossing structure, with Alternative 8 being the preferred alignment.

Bike Davis: decided that Alternative 8 is their preferred alternative, but should funding be too constrained, Alternative 2, the at-grade perpendicular crossing is acceptable to them.

The Farm Bureau: prefers Alternative 8 with Alternative 1 as a second choice.

Other Commenters included:

Caltrans: The grade separated alternatives (Alternatives 1 and 8) are the preferred choices.

An Alternatives Comparison Matrix was prepared by the design team as included in Attachment H. The scoring concluded that Alternative 8 was the highest ranked alternative followed closely by Alternative 1. Alternatives 2 and 3 both scored well behind the grade separated alternatives.

Based on the input from the project stakeholders and the results of the alternative comparison scoring, the design team recommends Alternative 8 as the preferred alternative.

12. FUNDING, PROGRAMMING AND ESTIMATE

The County does not have funds available for allocation to the environmental, design or construction phases of the relocated crossing. The current study is being used to determine the order of magnitude costs for the different project alternatives, which will then help to decide how to move the project forward. There are a number of different grant funding opportunities the County could apply for which are summarized below:

Regional Funding

Sacramento Area Council of Governments (SACOG)

SACOG’s Regional Program can serve as an excellent source of funding to support this project. This project should compete well in the next round of SACOG funding when the project has been further developed because SACOG tends to award Regional Program funding for the construction phase of projects. Improving safety and active transportation accessibility is a focus of the Regional Program and the project costs are well aligned with the typical range of grant awards.

State Funding

California Transportation Commission

This project would be eligible for two programs that are funded with a combination of SB 1 and federal-aid highway program funds – the Active Transportation Program (ATP) and Trade Corridor Enhancement Program (TCEP).

- ATP

The ATP program is split into statewide and regional competitions, with the CTC selecting projects from the statewide portion of the program and SACOG utilizing their regional funding from this program and includes in their ‘Regional Program’, see above. Thus, Yolo County could compete for statewide ATP funds during the next round of ATP applications, Cycle 6, which will likely not occur until late 2021 at the earliest. Due to weighting factors used by the CTC, in particular with the importance placed on location within a Disadvantaged Community as defined by the state, it would be difficult to secure a statewide ATP grant for this project.

- TCEP

Although technically eligible for TCEP funding, it would likely not be as competitive as other projects in the state with a purpose and need of enhancing goods movement. Strong advocacy and justification by UPRR that these improvements will not only improve safety, but goods movement would be critical to a TCEP application. The CTC selected projects in December, 2020 and the next TCEP application round will likely not occur until 2022.

California Public Utilities Commission (CPUC)

Section 190

The Section 190 program provides funding to grade-separate vehicular roadways-rail crossings. This highly competitive program receives \$15 million each year to be allocated to projects based on a prioritization list. Factors critical to be considered for the prioritization process including the weighing of vehicular and train volumes at crossings, as well as project costs, number of collisions, the angle of tracks, traffic counts, etc. Grant awards are capped at \$5 million per year and thus, only a handful of projects are year are typically awarded Section 190 funds. It is possible for a larger project to get multiple-year awards of \$5 million. Caltrans distributes the funding according to a project's compliance with the program regulations, readiness and the priority ranking established annually by the CPUC. The CPUC has encouraged the County to apply for this program to get it on the list. More info on the Section 190 program can be found here:

https://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Safety/Rail/Rail_Crossings/190GradeSepOverview-v201708.pdf

Section 130

Another CPUC program, Section 130, can be used to help with funding for abandonment or closure of at-grade crossings. This program could assist with construction of physical barriers that prevent roadway users from crossing the tracks and/or the removal of the vehicular roadway, i.e., pavement from the crossing. The estimated program funding level for the Railroad/Highway Grade Crossing Program is approximately \$16 million per year and is also very competitive. More info on the Section 130 program can be found here:

<https://dot.ca.gov/programs/rail-and-mass-transportation/railroad-highway-at-grade-crossings-section-130-guidelines>

U.S. Department of Transportation (USDOT) Discretionary Grant Programs

There are four primary sources of grant funding available at USDOT that could help fund this project.

RAISE Program

- The RAISE program provides grants with a maximum award of \$25 million for a wide range of surface transportation projects. This program is not authorized in federal law but has been funded through the congressional appropriations process

since the 2009 stimulus bill. This program is extremely competitive and highly oversubscribed.

- Multi-modal, rail safety, and grade separation projects are eligible for this program and grants have been made for such projects in the past.
- Under the Obama Administration, USDOT prioritized multi-modal, transit, and active transportation projects with this program. The Trump Administration prioritized rural and economic development projects. The Biden Administration is prioritizing racial equity, safety, and climate change.
- \$1 billion in funding was available for the FY 2020 round, and it is expected that future rounds of this program will range from \$850 million to \$1 billion.
- The next round of RAISE funding will likely begin in the spring of 2022. USDOT prefers to provide funding for the construction phase, or to be the ‘last dollar in’. Projects that have not received NEPA clearance are eligible to receive funding but USDOT will ensure that there is certainty that the project will be able to move forward and receive all necessary clearances. More information on build grants can be found here:

<https://www.transportation.gov/sites/dot.gov/files/2021-06/FR%20NOFO%20RAISE.pdf>

INFRA Program

- The INFRA program was authorized in the FAST Act, the surface transportation authorization bill enacted in 2015. This program primarily provides larger discretionary grants than the BUILD program, primarily for highway and bridge projects with an emphasis on goods movement and major highways. Grade separation projects are also explicitly eligible and separate from the limited cap on funding for rail projects within this program.
- The INFRA program has a minimum grant award of \$50 million, and projects have a minimum project size of \$100 million. However, it also includes a ‘small projects’ category, for which this project would compete.
- This program is funded at \$1 billion for FY 2020. It is anticipated that this program will continue to be funded under the next surface transportation authorization.
- A grade separation project or at-grade crossing safety improvements could be eligible for the INFRA program, but it would likely not compete well due to the focus of the program.
- The next round of INFRA funding will likely be made available in the spring of 2022

Consolidated Rail Infrastructure and Safety Improvements (CRISI) Program

Administered by the Federal Railroad Administration (FRA), CRISI funds are intended for rail safety improvements, including highway-rail at-grade crossings and grade separations. The program was last authorized in 2015 at \$65 million per year but it has

received substantially more funding in recent years. For example, it received \$375 million in FY 2021.

The CRISI program is focused on projects that upgrade rail infrastructure and enhance safety on tracks and at railroad crossings. Funding is eligible for a broad range of capital projects and improving safety at highway-rail crossings is a priority for the program. Both at-grade safety improvements or a grade separation projects are eligible.

A few highlights of the program:

- Track 1 – Planning (For higher-level planning. Project specific planning is not an eligible Track 1 project)
- Track 2 – PE/NEPA (Projects funded under this track must be sufficiently developed to support Final Design or Construction activities)
- Track 3 – Final Design/Construction (An applicant for this track must have NEPA and PE completed, as well as signed agreements with all key partners, and a project management plan in-place)

Just like BUILD and INFRA, a critical component of a CRISI application is the Benefit-Cost Analysis (BCA). Benefits may apply to rail users, as well as users of other modes of transportation, including populations in the vicinity of the project area. Benefits may be quantified for savings in safety costs, reduced costs from disruption of service, maintenance costs, reduced travel time, emissions reductions, and increases in capacity or ability to offer new types of freight or passenger services.

Grant awards can range greatly, from a couple hundred thousand dollars to over \$25 million.

The next round of CRISI funding will likely commence in the spring of 2022. After USDOT release a Notice of Funding Opportunity (NOFO) there will likely be 60-90 days to complete an application, which requires a project narrative, BCA, and the gathering of strong community, stakeholder, railroad, and political support.

Programming

The project is not currently programmed and is unfunded.

Estimate

Estimates for the four build alternatives are shown in Attachment B.

13. DELIVERY SCHEDULE


| Project Milestones | Milestone Date (Month/Day/Year) |
|---|---------------------------------|
| 30% Draft PSR Submittal | October 2020 |
| 60% Draft PSR Submittal | January 2021 |
| 90% Draft PSR Submittal | April 2021 |
| Final PSR Submittal | September 2021 |
| Board of Supervisors Approval | September 2021 |
| Apply for Grant Funding | TBD |
| Begin Environmental ,Project Approval and Environmental Document, (PA & ED) | TBD |
| Circulate Draft Project Report & Draft Environmental Document Externally | TBD |
| PA & ED Approval | TBD |

14. EXTERNAL AGENCY COORDINATION

Coordination and consistency of the proposed project purpose-and-need with statewide, regional, and local planning efforts should also be looked at during the PA&ED phase of the project. Caltrans’ proposed managed lanes project for I-80, which runs parallel to the project site, received an \$86 Million federal grant towards design and construction on June 30, 2021. At the time of this writing, the Caltrans project is currently under environmental review and final design has not started. The Caltrans project may significantly change the bike facilities along the Yolo Causeway and continued coordination with their project is recommended.

15. PROJECT REVIEWS

The following representatives have reviewed and approved of the contents of this project study report:

County of Yolo review  Date 10/21/21
 Nicholas Burton, Director of Yolo County Public Works

16. PROJECT PERSONNEL AND ACKNOWLEDGEMENTS

This project study report was prepared by T.Y.Lin International under contract to the County of Yolo. The principal preparers included:

| | | |
|------------------|--|--------------|
| Hans Strandgaard | hans.strandgaard@tylin.com | 916-349-4263 |
| Jeffrey Hoge | jeffrey.hoge@tylin.com | 916-349-4264 |
| Jodi Ketelsen | jodi.ketelsen@tylin.com | 916-349-4259 |

| | | |
|-----------------|--|--------------|
| Todd Riddiough | Todd.Riddiough@yolocounty.org | 530-666-8039 |
| Andrew Dohrmann | Andrew.Dohrmann@tylin.com | 510-457-3043 |

The preparers also acknowledge the significant contributions to the project study report by the stakeholder group including: UPRR, the CPUC, Bike Davis, the City of Davis and the Yolo County Farm Bureau.

17. ATTACHMENTS

- A. Build Alternatives 1-3, 8**
- B. Build Alternatives 1-3, 8 Estimates**
- C. Bicycle connections for Build Alternatives 1-3, 8**
- D. Rejected Alternatives**
- E. Preliminary Environmental Study Form**
- F. County Road 32A Railroad Crossing Traffic Analysis**
- G. Summary of Public Comments Received**
- H. Alternatives Comparison Matrix**

ATTACHMENT A -Build Alternatives 1-3, 8

| | | | | |
|------|--------|-------|--------------------------|--------------------|
| DB#4 | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET TOTAL SHEETS |
| 3 | Yol | CR32A | | X |

| | | |
|---------------------------|------|-----------|
| REGISTERED CIVIL ENGINEER | DATE | REVISIONS |
| | | |

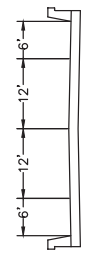
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|---------------------|----------------------------------|
| PLANS APPROVAL DATE | REGISTERED PROFESSIONAL ENGINEER |
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| | Exp. XXXXXX |
| | CIVIL |
| | STATE OF CALIFORNIA |

PLANS APPROVED BY ITS OFFICERS OR SUPERVISORS OF THE PUBLIC WORKS DEPARTMENT. THE OFFICERS OR SUPERVISORS SHALL NOT BE RESPONSIBLE FOR THE CORRECTNESS OF THIS PLAN SHEET.

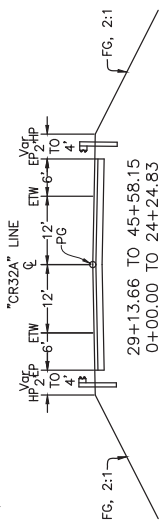
TKALIN INTERNATIONAL
1601 RESPONSE ROAD, SUITE 260
SACRAMENTO, CA 95815

CURVE DATA

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| 2 | 800.00 | 42° 33' 59" | 311.64 | 594.34 |
| 3 | 850.00 | 39° 34' 10" | 305.76 | 587.02 |
| 4 | 7500.00 | 04° 16' 15" | 279.65 | 559.03 |

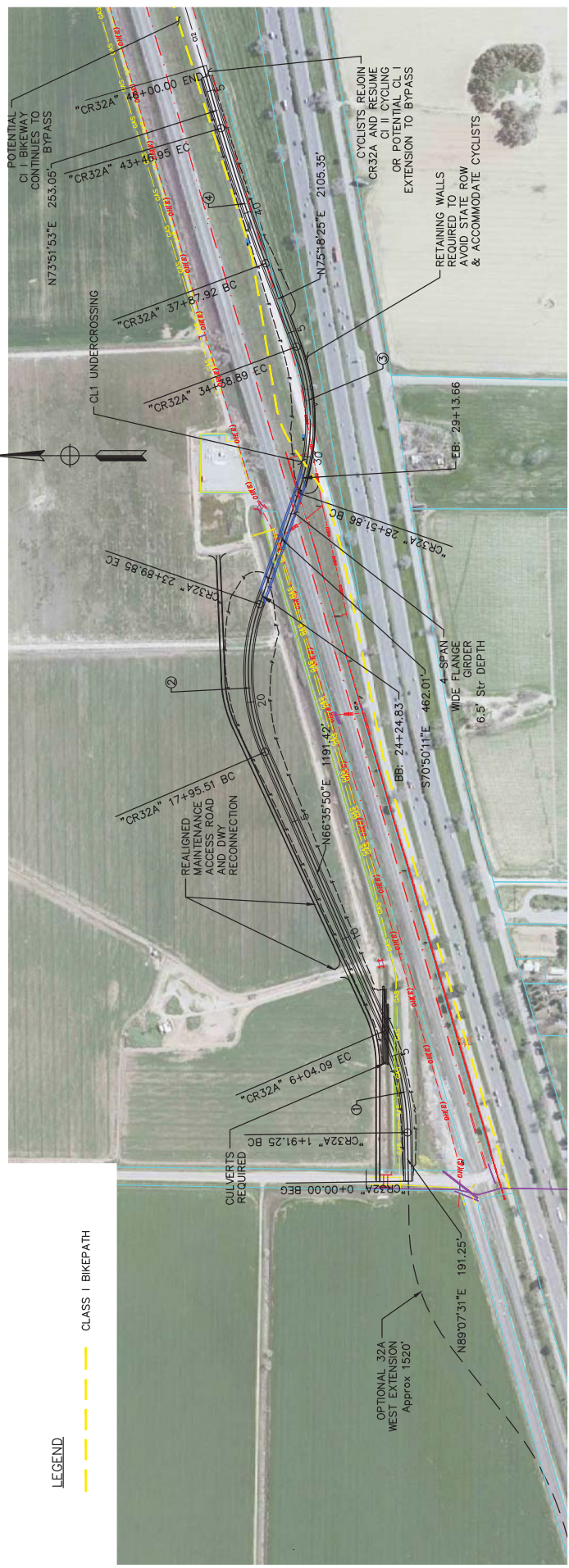


24+24.83 TO 29+13.66
CR32A OVERHEAD BRIDGE SECTION



29+13.66 TO 45+58.15
0+00.00 TO 24+24.83
CR32A OVERHEAD TYPICAL SECTION

LEGEND
--- CLASS I BIKEPATH



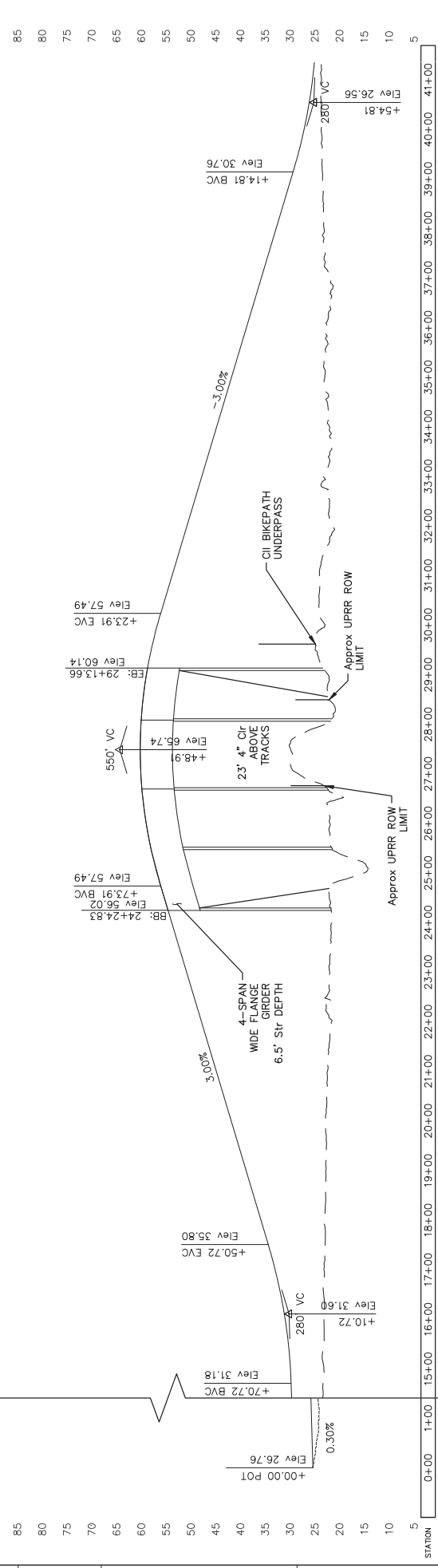
PROJECTED ROW ACQUISITION
TOTAL : 21.63 ACRES

ISSUES CONSIDERED

- AVOIDS THE GAS SUBSTATION.
- RESULTS IN MINIMAL NEED OF NEW RIGHT-OF-WAY ACQUISITION.
- AVOIDS IMPACTING MOST UTILITIES, EXCEPT MAY REQUIRE RELOCATING OVERHEAD POWER LINES.
- SKWEDED CROSSING IS ON A RELATIVELY SHORT BRIDGE STRUCTURE BUT STILL MAY CONFLICT WITH GAS PIPELINE AND RAILROAD RIGHT-OF-WAY.
- CLASS I BIKE PATH WILL BE EXTENDED APPROXIMATELY 1.5 MILES UP TO THE NEW CROSSING LOCATION USING THE EXISTING CR32A THAT WILL BE ABANDONED. THE PATH WOULD PASS UNDER THE NEW CR32A ALIGNMENT, AND THE REMAINDER OF THE BIKE PATH FROM THE OVERHEAD CROSSING TO THE CAUSEWAY WILL REMAIN A CLASS II UNTIL FURTHER DEVELOPMENT.
- SHIFTS THE CR32A INTERSECTION WITH CR105 SLIGHTLY NORTH.

**ALTERNATIVE 1
OVERHEAD
LAYOUT**
DS = 50 MPH
SCALE: 1" = 200'

**ALTERNATIVE 1
 OVERHEAD
 PROFILE
 DS = 50 MPH
 SCALE: HORIZ: 1" = 100'
 VERT: 1" = 10'**



| | | | | |
|------|--------|-------|-----------------------------|-----------------------|
| Dist | County | Route | Post Miles Total Project | Sheet Total Sheets |
| 3 | Yol | CR32A | | X |

| | | |
|---------------------------|------|-----------|
| REGISTERED CIVIL ENGINEER | DATE | REVISIONS |
| | | |

PLANS APPROVAL DATE: _____
 REGISTERED PROFESSIONAL ENGINEER
 No. XXXXXX
 Exp. XXXXXX
 CIVIL
 STATE OF CALIFORNIA

SUTTER COUNTY OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS OF SCANNED COPIES OF THIS PLAN SHEET.

TALMIN INTERNATIONAL
 1601 RESPONSE ROAD, SUITE 260
 SACRAMENTO, CA 95815

| | | | | |
|-----------------------------------|-------------|---------------|---------------|--|
| Yolo County Public Works Division | DESIGNED BY | JEFFREY HOGE | DATE REVISION | |
| CONSULTANT DESIGN MANAGER | CHECKED BY | RASHOD GIBSON | | |
| | DESIGNED BY | JEFFREY HOGE | | |
| | CHECKED BY | RASHOD GIBSON | | |

| | | | | |
|------|--------|-------|--------------------------|--------------------|
| DB#1 | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET TOTAL SHEETS |
| 3 | Yol | CR32A | | X |

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|---------------------------|------|-------------|
| REGISTERED CIVIL ENGINEER | DATE | REVISIONS |
| | | NO. DATE BY |

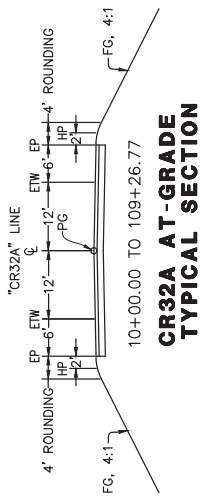
PLANS APPROVAL DATE: _____
 SUTTER COUNTY OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ANY PART OF THIS PLAN SHEET.

TALIN INTERNATIONAL
 1601 RESPONSE ROAD, SUITE 260
 SACRAMENTO, CA 95815



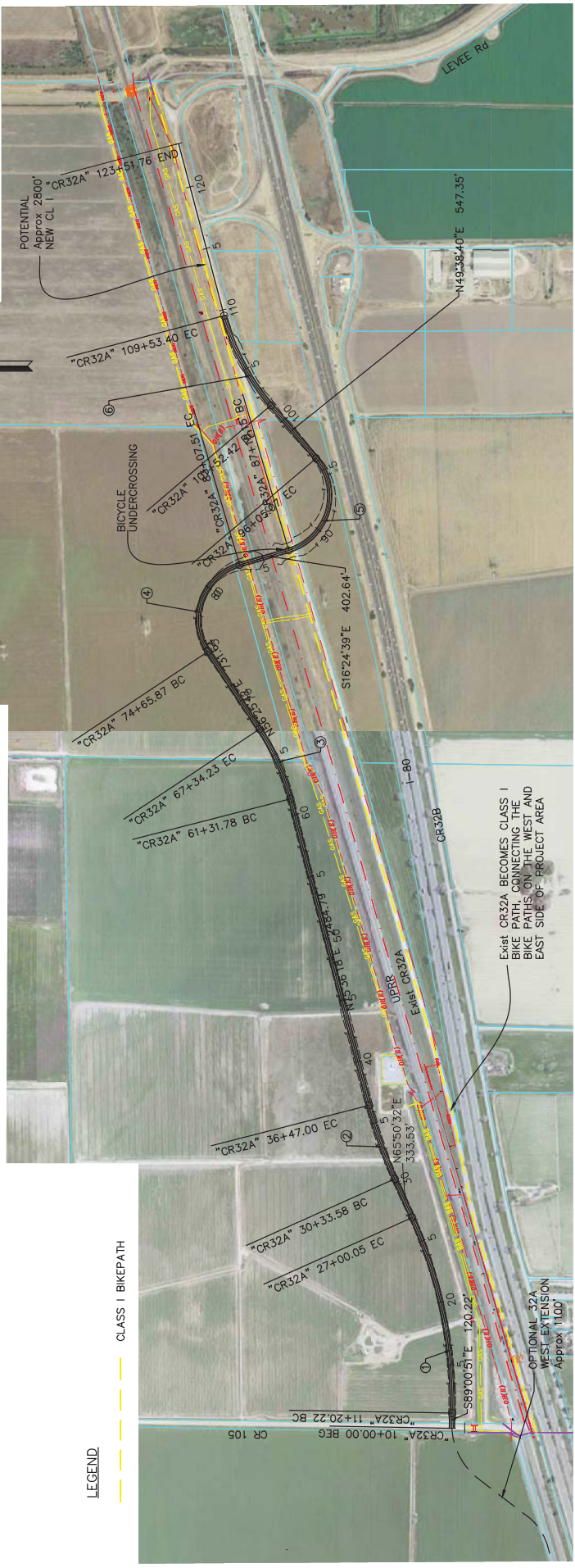
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| 2 | 3600.00 | 09° 45' 46" | 307.45 | 613.42 |
| 3 | 1800.00 | 19° 10' 35" | 304.07 | 602.45 |
| 4 | 450.00 | 107° 09' 39" | 609.93 | 841.64 |
| 5 | 450.00 | 113° 56' 41" | 692.21 | 894.92 |
| 6 | 1800.00 | 25° 29' 46" | 407.24 | 800.99 |



LEGEND

CLASS I BIKEPATH



PROJECTED ROW ACQUISITION

TOTAL : 66.2 ACRES
 ASSUMES FULL ACQUISITION OF REMNANT AREAS.

ISSUES CONSIDERED

1. ALIGNS NORTH OF THE GAS SUBSTATION AND DOES NOT CONFLICT WITH UTILITIES.
2. ROADWAY WOULD BE RAISED APPROXIMATELY 7.5 FEET USING RETAINING WALLS TO CROSS THE RAILROAD AT-GRADE.
3. REQUIRES EXTENSIVE RIGHT-OF-WAY ACQUISITION AND WOULD LEAVE REMNANT FARMLANDS BETWEEN NEW CR32A AND UPRR THAT WOULD BE DIFFICULT TO CONTINUE FARMING.
4. QUEUING DISTANCE IS APPROXIMATELY 5,500 FEET TO THE EASTBOUND I-80 ON-RAMP.
5. CLASS I BIKE PATH WOULD BE EXTENDED APPROXIMATELY 2.1 MILES LONGER USING THE EXISTING CR32A ROADWAY AND THE PATH WOULD PASS UNDER THE NEW CR32A ALIGNMENT THROUGH A LARGE CULVERT PIPE.
6. SHIFTS THE CR32A INTERSECTION WITH CR105 SLIGHTLY NORTH.

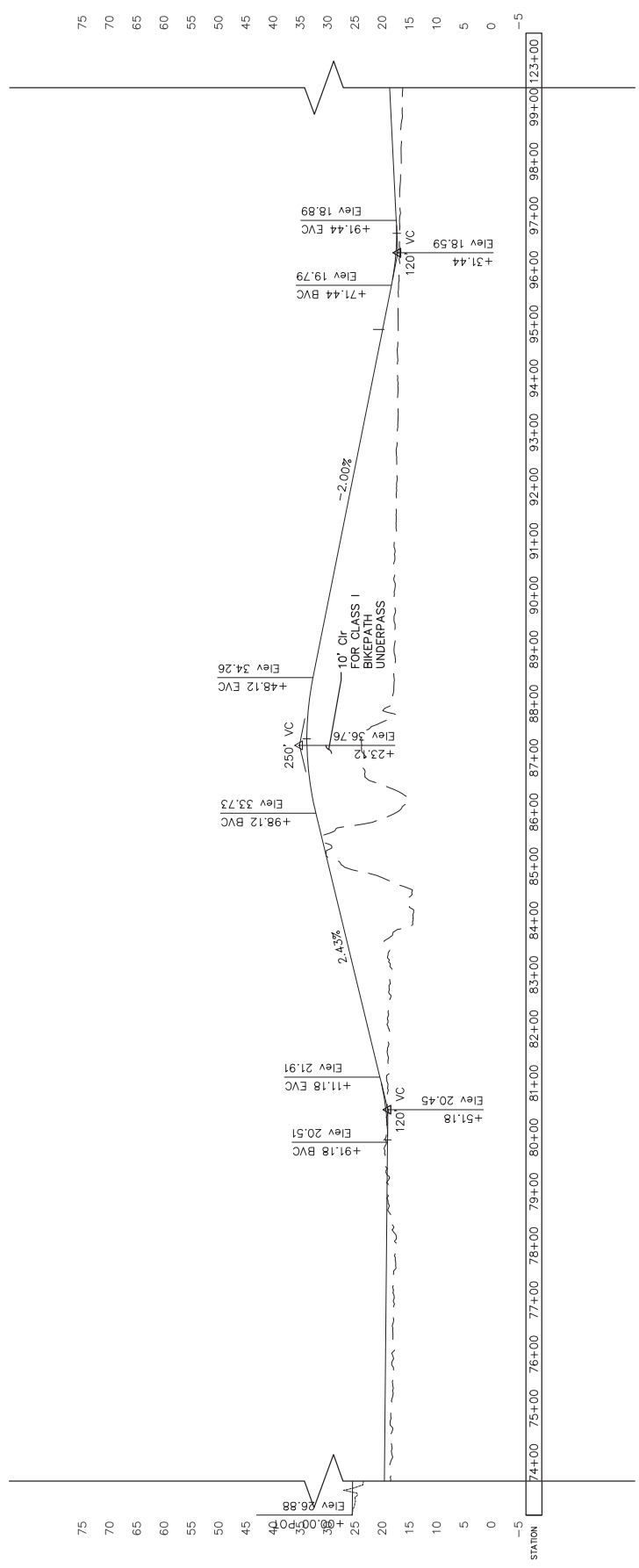
EXIST CR32A BECOMES CLASS I BIKE PATH CONNECTING THE BIKE PATHS ON THE WEST AND EAST SIDE OF PROJECT AREA

OPTIONAL 52A WEST EXTENSION APPROX 1100'

ALTERNATIVE 2
AT-GRADE
CROSSING
DS = 40 MPH
 SCALE: 1" = 400'

| | | | | | |
|-----------------------------------|---------------------------|-----------------|-------------|---------------|--------------|
| YOLO COUNTY PUBLIC WORKS DIVISION | CONSULTANT DESIGN MANAGER | HANS STRANDGARD | CHECKED BY | RASHOD GIBSON | DATE REVISED |
| | | | DESIGNED BY | JEFFREY HOGE | |

**ALTERNATIVE 2
 AT-GRADE
 CROSSING
 DS = 40 MPH**
 SCALE: HORIZ: 1" = 100'
 VERT: 1" = 10'



| | | | | |
|------|--------|-------|--------------------------|--------------------|
| DIR# | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET TOTAL SHEETS |
| 3 | Yol | CR32A | | X |

REGISTERED CIVIL ENGINEER _____ DATE _____
 PROFESSIONAL ENGINEER

PLANS APPROVAL DATE _____
 SUTTER COUNTY OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS OF ANY KIND OR CONSEQUENCES OF THIS PLAN SHEET.

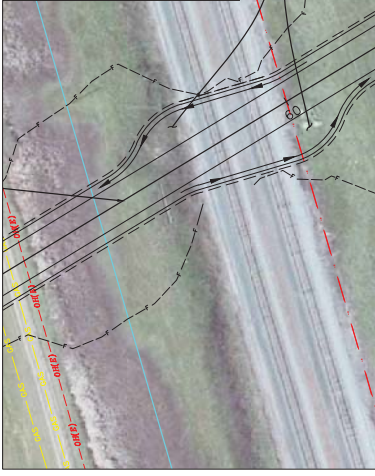
TKALIN INTERNATIONAL
 1601 RESPONSE ROAD, SUITE 260
 SACRAMENTO, CA 95815

| | |
|---------------------------|------------------|
| DESIGNED BY | JEFFREY HOGE |
| CHECKED BY | RASHOD GIBSON |
| DATE REVISED | |
| REVISY | |
| CONSULTANT DESIGN MANAGER | HANS STRANDGAARD |
| DESIGNED BY | JEFFREY HOGE |
| CHECKED BY | RASHOD GIBSON |
| DATE REVISED | |
| REVISY | |

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|------|--------|-------|--------------------------|--------------------|
| DB#4 | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET TOTAL SHEETS |
| 3 | Yol | CR32A | | X |

REGISTERED CIVIL ENGINEER DATE _____
 PLANS APPROVAL DATE _____
 SUTTER COUNTY OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR CORRECTNESS OF THIS PLAN SHEET.

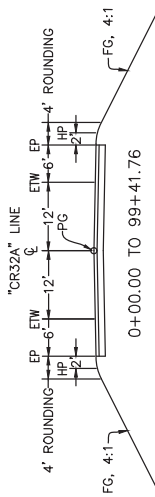
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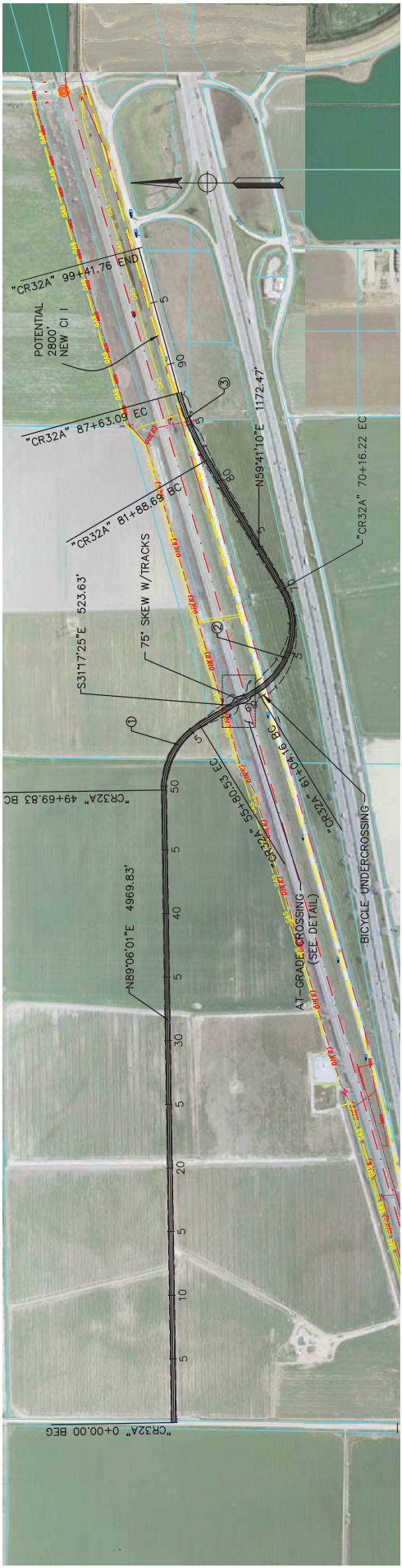
CROSSING DETAIL
 1" = 50'

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| 2 | 587.00 | 89° 01' 25" | 577.08 | 912.05 |
| 3 | 2220.00 | 14° 49' 29" | 286.81 | 574.40 |



LEGEND
 ——— CLASS I BIKEPATH



PROJECTED ROW ACQUISITION
 TOTAL : 14.5 ACRES

ISSUES CONSIDERED

- ROADWAY WOULD BE RAISED 7.5 FEET USING RETAINING WALL NEAR I-80 AND WOULD CROSS THE RAILROAD AT-GRADE WHICH COULD BE PHASED INTO A GRADE SEPARATED OVERHEAD.
- AVOIDS IMPACTING UTILITIES.
- REQUIRES NEW RIGHT-OF-WAY, BUT ALIGNMENT WILL ALLOW FOR FARMING OF THE REMNANT PARCELS ON EITHER SIDE OF CR32A.
- QUEUING DISTANCE IS APPROXIMATELY 7,000 FEET TO THE EASTBOUND I-80 ON-RAMP.
- CLASS I BIKE PATH WOULD BE EXTENDED APPROXIMATELY 2.1 MILES LONGER USING THE EXISTING CR32A ROADWAY AND THE PATH WOULD PASS UNDER THE NEW CR32A ALIGNMENT.
- NEW INTERSECTION WITH CR105 WOULD BE ABOUT 0.4 MILES NORTH OF THE CURRENT CROSSING.

ALTERNATIVE 3
AT-GRADE
CROSSING
DS = 45 MPH
 SCALE: 1" = 400'

| | | | | |
|------|--------|-------|--------------------------|--------------------|
| DIR# | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET TOTAL SHEETS |
| 3 | Yol | CR32A | | X |

REGISTERED CIVIL ENGINEER _____ DATE _____

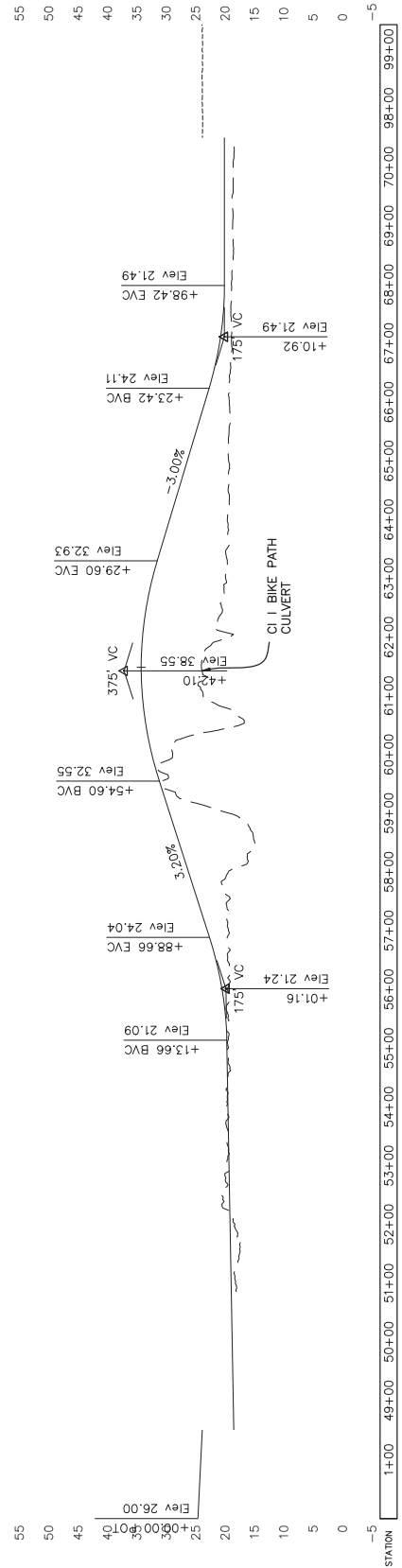
PLANS APPROVAL DATE _____

SUTTER COUNTY OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS OF ANY KIND OR TYPE OF ORIGIN.

TPALIN INTERNATIONAL
1601 RESPONSE ROAD, SUITE 260
SACRAMENTO, CA 95815



ALTERNATIVE 3
AT-GRADE CROSSING
DS = 45 MPH
SCALE: HORIZ: 1" = 100'
VERT: 1" = 10'



| | | | | | |
|-----------------------------------|---------------------------|-------------|---------------|--------------|--|
| YOLO COUNTY PUBLIC WORKS DIVISION | CONSULTANT DESIGN MANAGER | DESIGNED BY | JEFFREY HOGE | REVISD BY | |
| | HANS STRANDGARD | CHECKED BY | RASHOD GIBSON | DATE REVISED | |



USERNAME => JEFFREY HOGE
DWG FILE => AL_3-Skewed At-Grade.dwg

| | | | | |
|------|--------|-------|--------------------------|--------------------|
| DB#1 | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET TOTAL SHEETS |
| 3 | Yol | CR32A | | X |

| | | |
|---------------------------|------|-----------------------|
| REGISTERED CIVIL ENGINEER | DATE | REVISIONS |
| | | PROFESSIONAL ENGINEER |

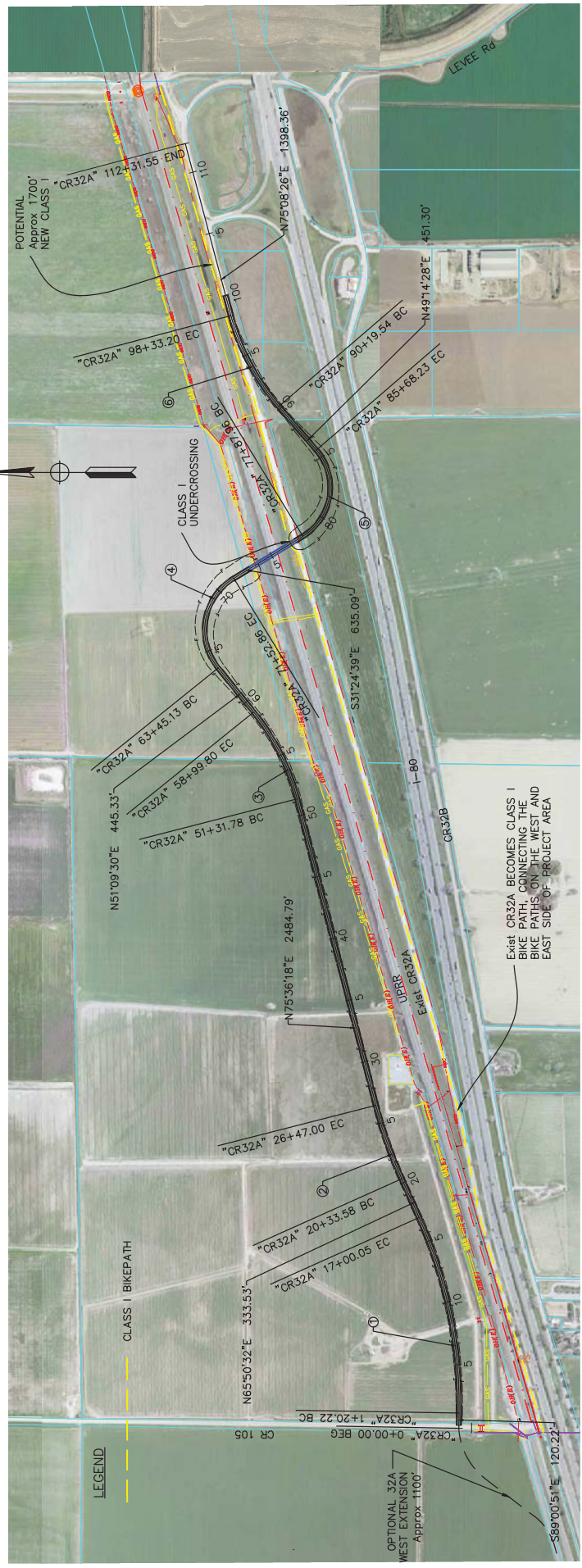
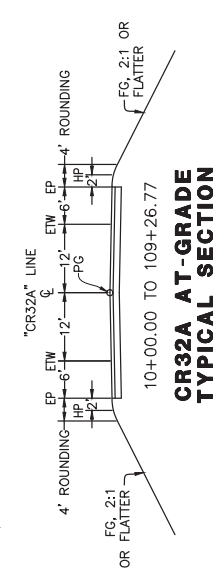
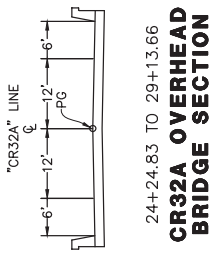
PLANS APPROVAL DATE _____

SUTTER COUNTY OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR CORRECTNESS OF THIS PLAN SHEET.

TALMIN INTERNATIONAL
SACRAMENTO, CA 95815

CURVE DATA

| No. @ | R | Δ | T | L |
|-------|---------|-------------|--------|---------|
| 1 | 3600.00 | 25° 08' 37" | 802.84 | 1579.83 |
| 2 | 3600.00 | 09° 45' 46" | 307.45 | 613.42 |
| 3 | 1800.00 | 24° 26' 48" | 389.94 | 768.01 |
| 4 | 475.00 | 97° 25' 51" | 540.98 | 807.73 |
| 5 | 450.00 | 99° 20' 54" | 530.14 | 780.28 |
| 6 | 1800.00 | 25° 53' 58" | 413.90 | 813.66 |



PROJECTED ROW ACQUISITION
TOTAL : 68.9 ACRES
ASSUMES FULL ACQUISITION OF REMNANT AREAS.

ISSUES CONSIDERED

1. ALIGNS NORTH OF THE GAS SUBSTATION AND DOES NOT CONFLICT WITH UTILITIES.
2. AVOIDS IMPACTING MOST UTILITIES, EXCEPT MAY REQUIRE RELOCATING OVERHEAD POWER LINES.
3. SHIFTS THE CR32A INTERSECTION SLIGHTLY NORTH.
4. CROSSING IS LOCATED EAST TO ALLOW FOR A SMALL SKEW CROSSING. THIS RESULTS IN A SHORTER STRUCTURE LENGTH THAN AIT 1, BUT MORE ROADWAY.
5. CLASS I BIKE PATH WILL BE EXTENDED APPROXIMATELY 1.8 MILES UP TO THE NEW CROSSING LOCATION USING THE EXISTING CR32A THAT WILL BE ABANDONED. THE PATH WOULD THEN PASS UNDER THE NEW CR32A ALIGNMENT AND THE REMAINDER OF THE BIKE PATH FROM THE OVERHEAD CROSSING TO THE CAUSEWAY WILL REMAIN A CLASS II UNTIL FURTHER DEVELOPMENT.

EXIST CR32A BECOMES CLASS I BIKE PATH CONNECTING THE BIKE PATHS ON THE WEST AND EAST SIDE OF PROJECT AREA

LEGEND
CLASS I BIKEPATH

POTENTIAL
Approx 1700' NEW CLASS I

OPTIONAL 32A WEST EXTENSION
Approx. 1100'

SCALE: 1" = 400'

ATTACHMENT B-Build Alternatives 1-3, 8 Estimates

YOLO COUNTY
PRELIMINARY ESTIMATE

CR32A RELOCATION - Build Alternative 1 OVERHEAD CROSSING DS = 50 MPH

LAST UPDATED: 6/30/2021

| ITEM NO. | (P)(F) | ITEM CODE | ITEM DESCRIPTION | UNIT OF MEASURE | ESTIMATED QUANTITY | UNIT PRICE | ITEM TOTAL |
|--|--------|-----------|--|-----------------|--------------------|--------------|----------------------|
| ROADWAY ITEMS | | | | | | | |
| 1 | | 190101 | ROADWAY EXCAVATION | CY | 880 | \$120.00 | \$ 105,600.00 |
| 2 | | 198010 | IMPORTED BORROW | CY | 119500 | \$10.00 | \$ 1,195,000.00 |
| 3 | | 260203 | CLASS 2 AGGREGATE BASE | CY | 4850 | \$70.00 | \$ 339,500.00 |
| 4 | | 390132 | HOT MIX ASPHALT (TYPE A) | TON | 3260 | \$125.00 | \$ 407,500.00 |
| 5 | | XXXXXX | NEW CLASS I BIKEWAY COSTS | LF | 7930 | \$53.00 | \$ 420,290.00 |
| 6 | | XXXXXX | MINOR ITEMS | LS | | \$246,789.00 | \$ 246,789.00 |
| 7 | | XXXXXX | RIGHT-OF-WAY ACQUISITION | AC | 13.3 | \$5,000.00 | \$ 66,250.00 |
| 8 | | XXXXXX | RIGHT-OF-WAY ACQUISITION (IRRIGABLE AREA) | AC | 8.4 | \$10,000.00 | \$ 83,800.00 |
| 9 | | XXXXXX | RIGHT-OF-WAY ACQUISITION (OPEN SPACE AND AGRICULTURAL-INTENSIVE) | AC | 1.1 | \$10,000.00 | \$ 11,000.00 |
| 10 | | XXXXXX | PG&E MAINTENANCE ACCESS ROAD | LS | | \$70,000.00 | \$ 70,000.00 |
| SUBTOTAL ROADWAY CONTRACT ITEMS | | | | | | | \$ 2,945,729 |
| 9 | | XXXXXX | OVERHEAD STRUCTURE | SQFT | 19560 | \$450.00 | \$ 8,802,000 |
| 10 | | XXXXXX | RETAINING WALL | SQFT | 18200 | \$75.00 | \$ 1,365,000 |
| SUBTOTAL BRIDGE CONTRACT ITEMS | | | | | | | \$ 10,167,000 |
| 11 | | 999990 | MOBILIZATION (10%) | LS | LS | \$ 1,442,430 | \$ 1,442,430 |
| TOTAL CONTRACT ITEMS | | | | | | | \$ 14,556,000 |
| CONTINGENCIES(25%) | | | | | | | \$ 3,639,000 |
| PROJECT TOTAL | | | | | | | \$ 18,195,000 |
| FOR BUDGET PURPOSES USE | | | | | | | \$ 18,195,000 |

YOLO COUNTY
PRELIMINARY ESTIMATE

CR32A RELOCATION - Build Alternative 2 Perpendicular At-Grade Crossing DS = 40 MPH

LAST UPDATED: 6/30/2021

| ITEM NO. | (P)(F) | ITEM CODE | ITEM DESCRIPTION | UNIT OF MEASURE | ESTIMATED QUANTITY | UNIT PRICE | ITEM TOTAL |
|--|--------|-----------|--|-----------------|--------------------|--------------|---------------------|
| ROADWAY ITEMS | | | | | | | |
| 1 | | 190101 | ROADWAY EXCAVATION | CY | 4380 | \$120.00 | \$ 525,600.00 |
| 2 | | 198010 | IMPORTED BORROW | CY | 39900 | \$10.00 | \$ 399,000.00 |
| 3 | | 260203 | CLASS 2 AGGREGATE BASE | CY | 13250 | \$70.00 | \$ 927,500.00 |
| 4 | | 390132 | HOT MIX ASPHALT (TYPE A) | TON | 8900 | \$125.00 | \$ 1,112,500.00 |
| 5 | | XXXXXX | NEW CLASS I BIKEWAY COSTS | LF | 2430 | \$53.00 | \$ 128,790.00 |
| 6 | | XXXXXX | MINOR ITEMS | LS | LS | \$309,339.00 | \$ 309,339.00 |
| 7 | | XXXXXX | AT-GRADE RAILROAD CROSSING | LS | LS | \$520,000.00 | \$ 520,000.00 |
| 8 | | XXXXXX | RIGHT-OF-WAY ACQUISITION | AC | 21.7 | \$5,000.00 | \$ 108,500.00 |
| 9 | | XXXXXX | RIGHT-OF-WAY ACQUISITION (IRRIGABLE AREA) | AC | 44.6 | \$10,000.00 | \$ 446,000.00 |
| 10 | | XXXXXX | RIGHT-OF-WAY ACQUISITION (OPEN SPACE AND AGRICULTURAL-INTENSIVE) | AC | 5.1 | \$10,000.00 | \$ 51,000.00 |
| SUBTOTAL ROADWAY CONTRACT ITEMS | | | | | | | \$ 4,528,229 |

| | | | | | | | |
|--------------------------------|--|--------|--------------------|----|---|-----------|---------------------|
| 9 | | 999990 | MOBILIZATION (10%) | LS | 1 | \$452,900 | \$452,900 |
| TOTAL CONTRACT ITEMS | | | | | | | \$ 4,982,000 |
| CONTINGENCIES (25%) | | | | | | | \$ 1,246,000 |
| PROJECT TOTAL | | | | | | | \$ 6,228,000 |
| FOR BUDGET PURPOSES USE | | | | | | | \$ 6,228,000 |

YOLO COUNTY
PRELIMINARY ESTIMATE

CR32A RELOCATION - Build Alternative 3 Skewed At-Grade Crossing DS = 45 MPH

LAST UPDATED: 6/30/2021

| ITEM NO. | (P)(F) | ITEM CODE | ITEM DESCRIPTION | UNIT OF ESTIMATED | | UNIT PRICE | ITEM TOTAL |
|--|--------|-----------|--|-------------------|----------|--------------|---------------------|
| | | | | MEASURE | QUANTITY | | |
| ROADWAY ITEMS | | | | | | | |
| 1 | | 190101 | ROADWAY EXCAVATION | CY | 4120 | \$120.00 | \$ 494,400.00 |
| 2 | | 198010 | IMPORTED BORROW | CY | 40100 | \$10.00 | \$ 401,000.00 |
| 3 | | 260203 | CLASS 2 AGGREGATE BASE | CY | 11700 | \$70.00 | \$ 819,000.00 |
| 4 | | 390132 | HOT MIX ASPHALT (TYPE A) | TON | 7810 | \$125.00 | \$ 976,250.00 |
| 5 | | XXXXXX | NEW CLASS I BIKEWAY COSTS | LF | 2860 | \$53.00 | \$ 151,580.00 |
| 6 | | XXXXXX | MINOR ITEMS | LS | LS | \$284,223.00 | \$ 284,223.00 |
| 7 | | XXXXXX | AT-GRADE RAILROAD CROSSING | LS | LS | \$520,000.00 | \$ 520,000.00 |
| 8 | | XXXXXX | RIGHT-OF-WAY ACQUISITION | AC | 4 | \$10,000.00 | \$ 40,400.00 |
| 9 | | XXXXXX | RIGHT-OF-WAY ACQUISITION (IRRIGABLE AREA) | AC | 10 | \$10,000.00 | \$ 104,600.00 |
| 10 | | XXXXXX | RIGHT-OF-WAY ACQUISITION (OPEN SPACE AND AGRICULTURAL-INTENSIVE) | AC | 4.6 | \$10,000.00 | \$ 46,100.00 |
| SUBTOTAL ROADWAY CONTRACT ITEMS | | | | | | | \$ 3,837,553 |

| | | | | | | | |
|--------------------------------|--|--------|--------------------|----|----|-----------|---------------------|
| 7 | | 999990 | MOBILIZATION (10%) | LS | LS | \$383,800 | \$383,800 |
| TOTAL CONTRACT ITEMS | | | | | | | \$ 4,222,000 |
| CONTINGENCIES (25%) | | | | | | | \$ 1,056,000 |
| PROJECT TOTAL | | | | | | | \$ 5,278,000 |
| FOR BUDGET PURPOSES USE | | | | | | | \$ 5,278,000 |

YOLO COUNTY

PRELIMINARY ESTIMATE

CR32A RELOCATION - Build Alternative 8 OVERHEAD CROSSING DS = 40 MPH

LAST UPDATED: 08/27/2021

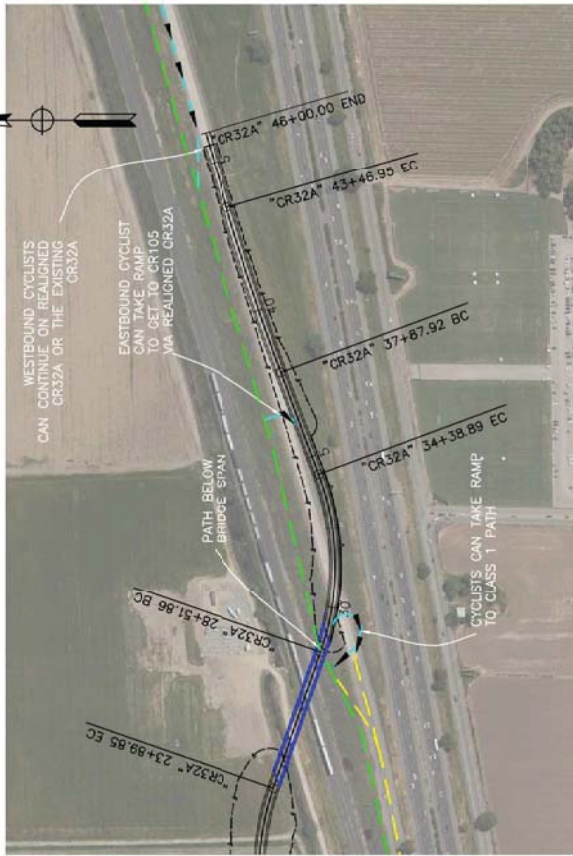
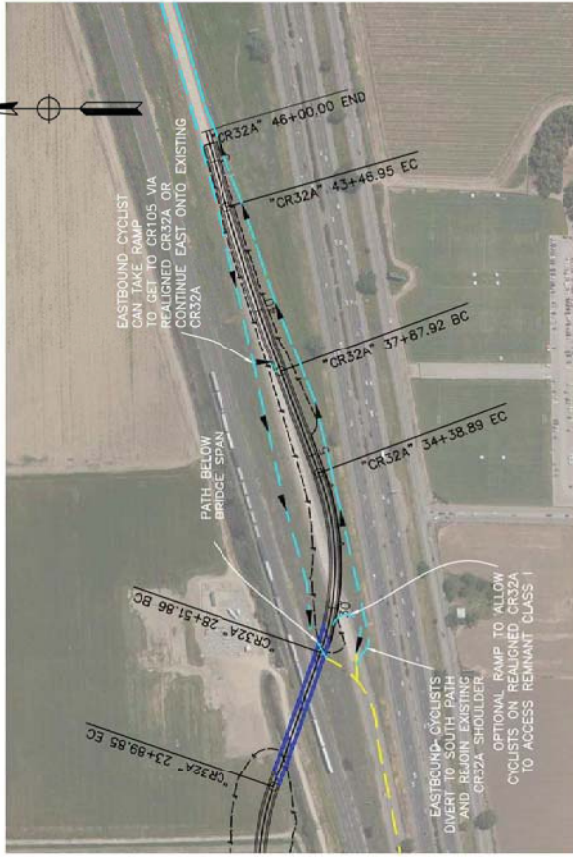
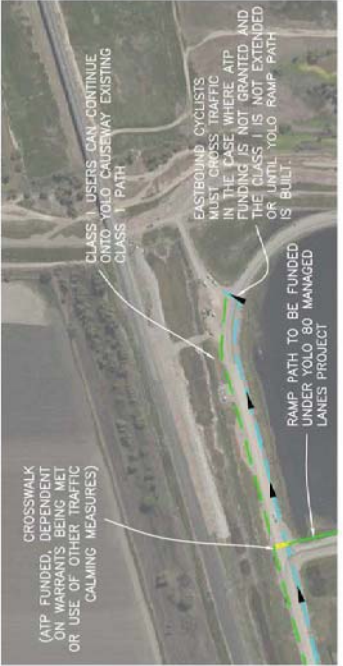
| ITEM NO. | (P)(F) | ITEM CODE | ITEM DESCRIPTION | UNIT OF MEASURE | ESTIMATED QUANTITY | UNIT PRICE | ITEM TOTAL |
|--|--------|-----------|--|-----------------|--------------------|--------------|----------------------|
| ROADWAY ITEMS | | | | | | | |
| 1 | | 190101 | ROADWAY EXCAVATION | CY | 295 | \$120.00 | \$ 35,400.00 |
| 2 | | 198010 | IMPORTED BORROW | CY | 260560 | \$10.00 | \$ 2,605,600.00 |
| 3 | | 260203 | CLASS 2 AGGREGATE BASE | CY | 12800 | \$70.00 | \$ 896,000.00 |
| 4 | | 390132 | HOT MIX ASPHALT (TYPE A) | TON | 8560 | \$125.00 | \$ 1,070,000.00 |
| 5 | | XXXXXX | NEW CLASS 1 BIKEWAY COSTS | LF | 1750 | \$53.00 | \$ 92,750.00 |
| 6 | | XXXXXX | MINOR ITEMS | LS | LS | \$469,975.00 | \$ 469,975.00 |
| 7 | | XXXXXX | RIGHT-OF-WAY ACQUISITION | AC | 22 | \$5,000.00 | \$ 111,050.00 |
| 8 | | XXXXXX | RIGHT-OF-WAY ACQUISITION (IRRIGABLE AREA) | AC | 47 | \$10,000.00 | \$ 466,900.00 |
| 9 | | XXXXXX | RIGHT-OF-WAY ACQUISITION (OPEN SPACE AND AGRICULTURAL-INTENSIVE) | AC | 5.1 | \$10,000.00 | \$ 51,000.00 |
| SUBTOTAL ROADWAY CONTRACT ITEMS | | | | | | | \$ 5,798,675 |
| | | | | | | | |
| 8 | | XXXXXX | OVERHEAD STRUCTURE | SQFT | 16600 | \$500.00 | \$ 8,300,000 |
| SUBTOTAL BRIDGE CONTRACT ITEMS | | | | | | | \$ 8,300,000 |
| | | | | | | | |
| 9 | | 999990 | MOBILIZATION (10%) | LS | LS | \$ 1,550,890 | \$ 1,550,890 |
| TOTAL CONTRACT ITEMS | | | | | | | \$ 15,650,000 |
| CONTINGENCIES(25%) | | | | | | | \$ 3,913,000 |
| PROJECT TOTAL | | | | | | | \$ 19,563,000 |
| FOR BUDGET PURPOSES USE | | | | | | | \$ 19,563,000 |

ATTACHMENT C -Bicycle connections for Build Alternatives 1-3, 8

| | | | | |
|------|--------|-------|--------------------------|--------------------|
| DATE | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET TOTAL SHEETS |
| 3 | Yol | CR32A | | X |

REGISTERED CIVIL ENGINEER DATE _____
 PLANS APPROVAL DATE _____
 SUITE COUNTY OR ITS OFFICERS OF HIGHWAY SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF THE PLAN SHEET.

TYLINTNINTERNATIONAL
 1800 RESPONSE ROAD, SUITE 260
 SACRAMENTO, CA 95815



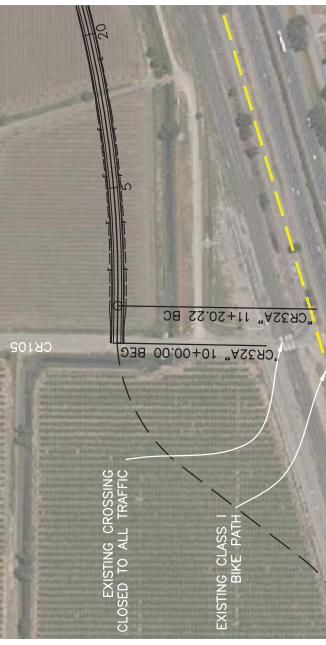
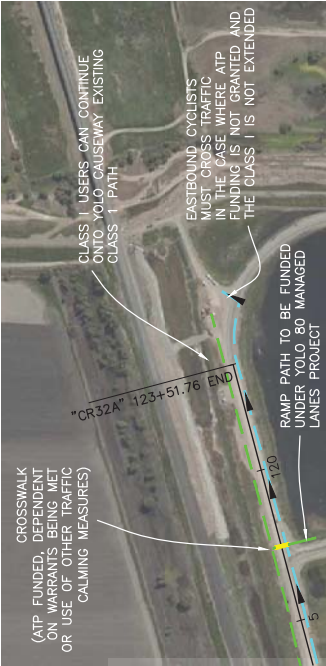
**OPTION 1 CLASS I BIKE PATH
 ATP FUNDED OR EXTENSION**

- LEGEND:**
- FILL
 - HINGE
 - POTENTIAL ATP FUNDED CLASS I PATH
 - REMNANT CR32A CLASS I PATH/OPTIONAL CLASS I EXTENSION
 - POSSIBLE BIKE CONNECTIVITY PATH OPTIONS
 - YOLO RAMP BIKE PATH

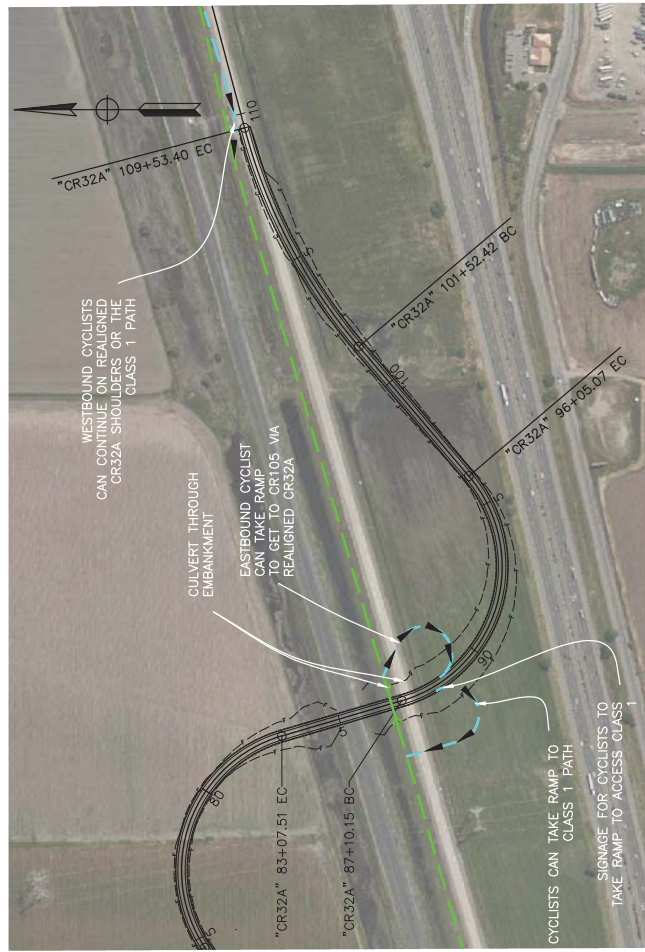
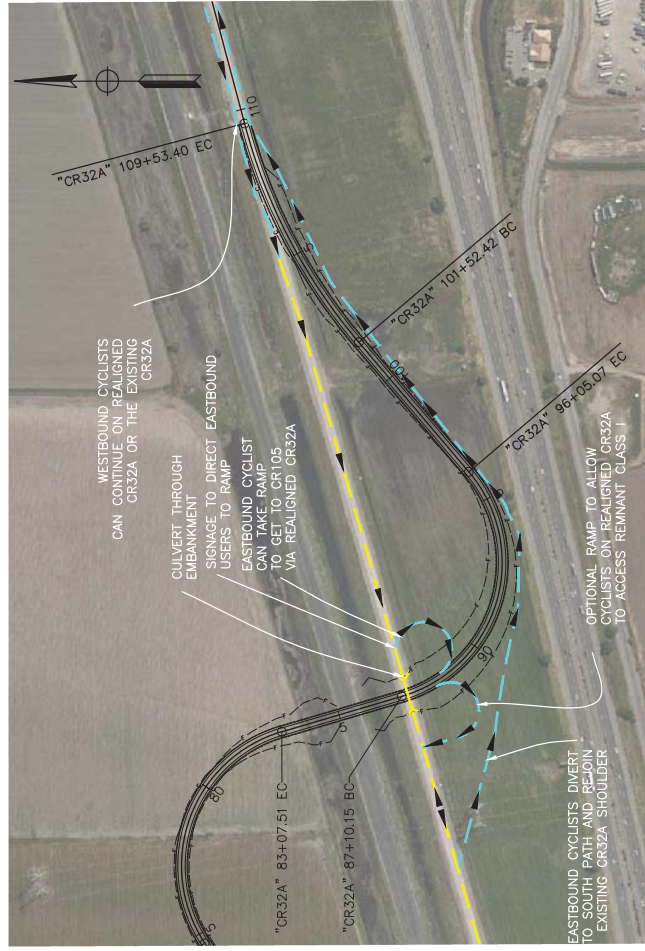
OPTION 2: NO CLASS I BIKE PATH

**ALTERNATIVE 1
 OVERHEAD
 LAYOUT
 BIKE CONNECTIVITY
 SCALE: 1" = 200'**

| | | | | | |
|------|--------|-------|------------|--------------|-------------|
| DB#4 | COUNTY | ROUTE | POST MILES | TOTAL SHEETS | SHEET TOTAL |
| 3 | Yol | CR32A | | | X |



| | |
|--------------|---------------|
| DESIGNED BY | JEFFREY HOGE |
| DATE REVISED | RASHOD GIBSON |



| | |
|--------------|---------------|
| DESIGNED BY | JEFFREY HOGE |
| DATE REVISED | RASHOD GIBSON |

OPTION 1 CLASS 1 BIKE PATH ATP FUNDED OR EXTENSION

LEGEND

- FILL
- HINGE
- POTENTIAL ATP FUNDED CLASS 1 PATH
- REMNANT CR32A CLASS 1 PATH/OPTIONAL CLASS 1 EXTENSION
- POSSIBLE BIKE CONNECTIVITY PATH OPTIONS
- CULVERT THROUGH EMBANKMENT

OPTION 2: NO CLASS 1 BIKE PATH ALTERNATIVE 2 AT-GRADE CROSSING BIKE CONNECTIVITY

SCALE: 1" = 200'

YOLO COUNTY PUBLIC WORKS DIVISION

CONSULTANT DESIGN MANAGER

HANS STRANDGAARD

CHECKED BY

RASHOD GIBSON

DATE REVISED

JEFFREY HOGE

USERNAME => JEFFREY HOGE

DWG FILE => AL_2-Perpendicular At-Crossing

RELATIVE BORDER SCALE

1/8" IN. INCHES

0 1 2 3

LAST REVISION

DATE PLOTTED < 4/15/2021

TIME PLOTTED < 1:44 PM

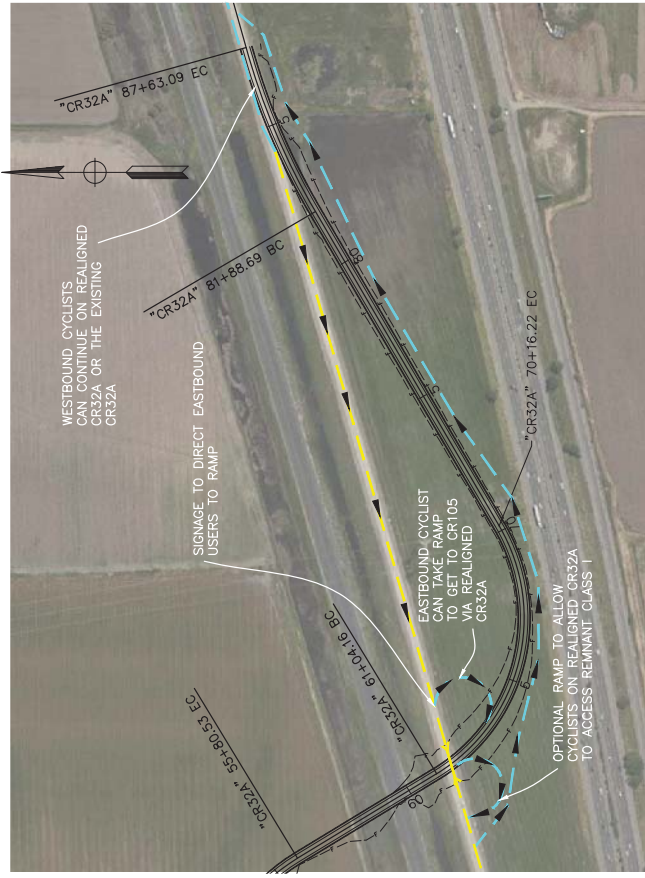
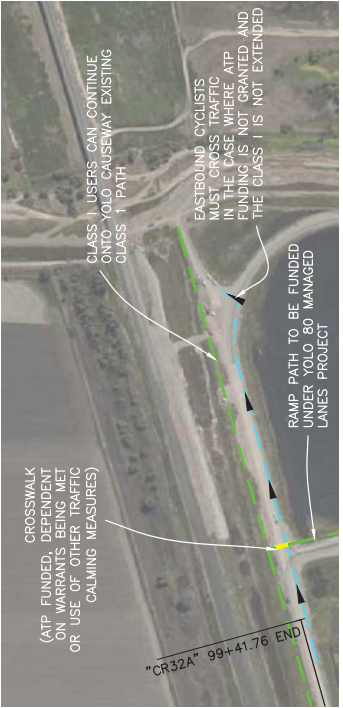
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|------|--------|-------|--------------------------|--------------------|
| DB#4 | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET TOTAL SHEETS |
| 3 | Yol | CR32A | | X |

REGISTERED CIVIL ENGINEER DATE _____

PLANS APPROVAL DATE _____

SUTTER COUNTY OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF THIS PLAN SHEET.

TRALIN INTERNATIONAL
1601 RESPONSE ROAD, SUITE 260
SACRAMENTO, CA 95815



**OPTION 1 CLASS 1 BIKE PATH
ATP FUNDED OR EXTENSION**

LEGEND

- FILL
- HINGE
- POTENTIAL ATP FUNDED CLASS 1 PATH
- REMANENT CR32A CLASS 1 PATH/OPTIONAL CLASS 1 EXTENSION
- POSSIBLE BIKE CONNECTIVITY PATH OPTIONS
- CULVERT THROUGH EMBANKMENT

**OPTION 2: NO CLASS 1 BIKE PATH
ALTERNATIVE 3
SKEWED AT-GRADE
CROSSING
BIKE CONNECTIVITY**

SCALE: 1" = 200'

| | | | | | |
|-----------------------------------|---------------------------|-------------|---------------|---------|--------------|
| YOLO COUNTY PUBLIC WORKS DIVISION | CONSULTANT DESIGN MANAGER | DESIGNED BY | JEFFREY HOGE | REVISOR | DATE REVISED |
| | HANS STRANDGAARD | CHECKED BY | RASHOD GIBSON | | |

USERNAME => JEFFREY HOGE
DWG FILE => AL_3-Skewed At-Grade.dwg

RELATIVE BORDER SCALE
1/8" IN. INCHES

0 1 2 3

DATE PLOTTED => 4/15/2021
LAST REVISION

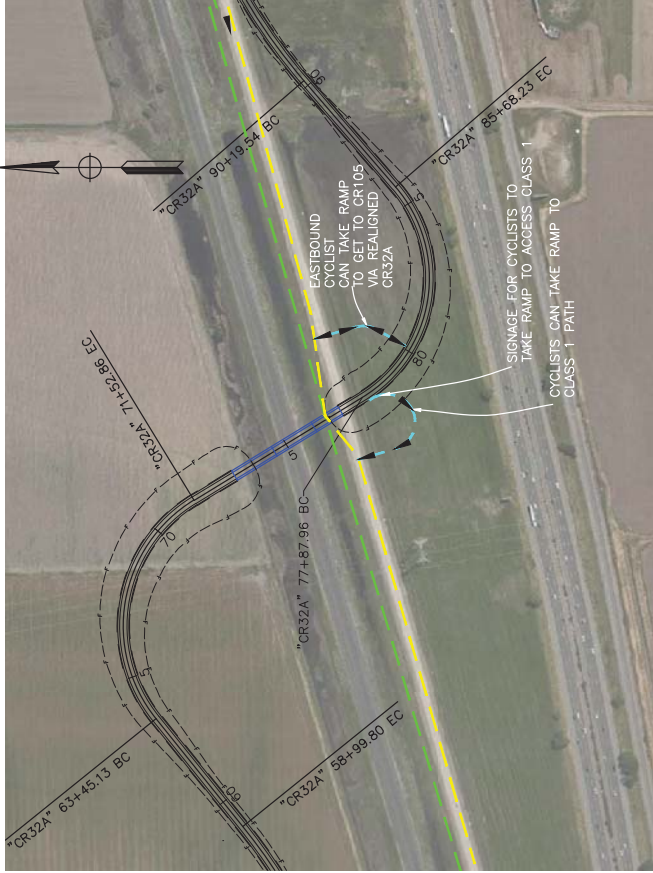
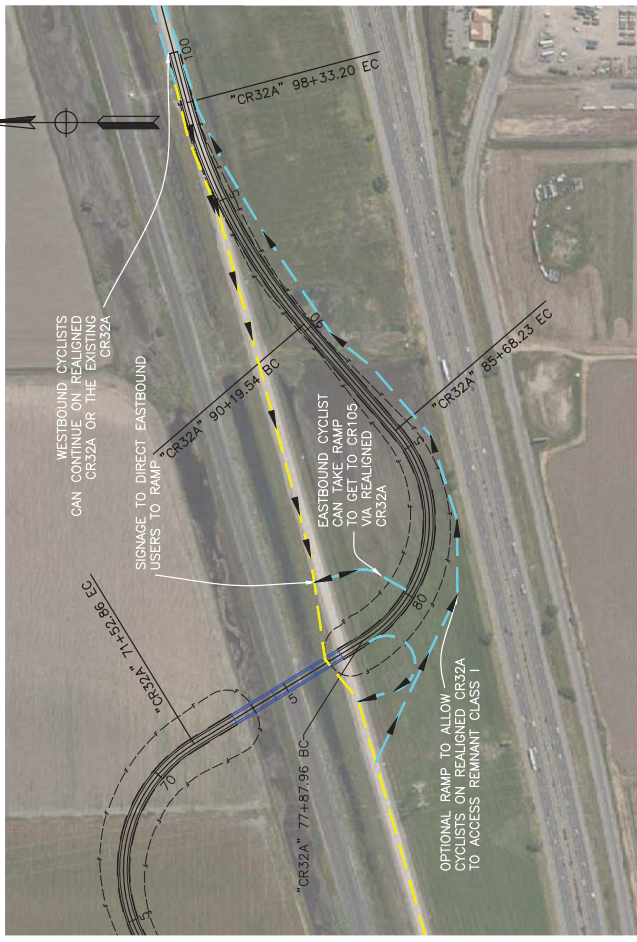
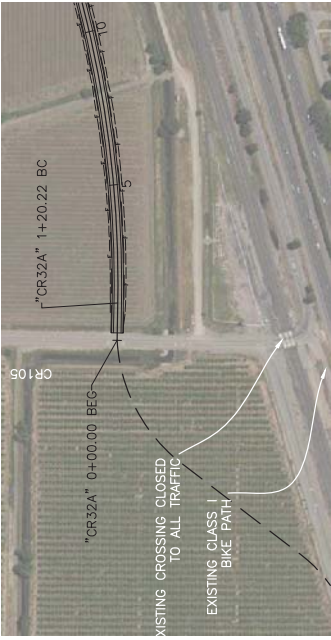
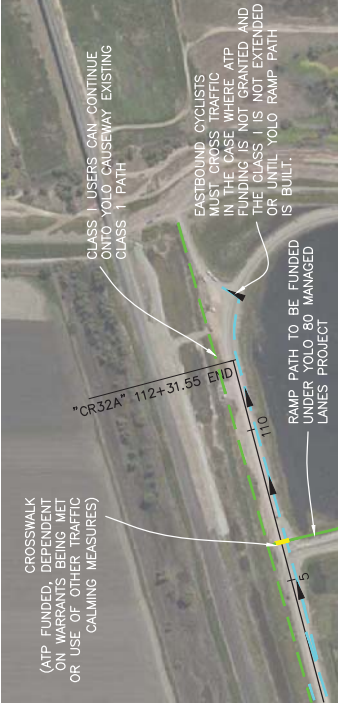
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|------|--------|-------|--------------------------|--------------------|
| DB#4 | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET TOTAL SHEETS |
| 3 | Yol | CR32A | | X |

| | | |
|---------------------------|------|-----------|
| REGISTERED CIVIL ENGINEER | DATE | REVISIONS |
| PLANS APPROVAL DATE | | |

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

SUTTER COUNTY OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF THESE PLANS UNLESS THEY ARE MADE A PART OF THESE PLANS BY REFERENCE TO THIS PLAN SHEET.

TALMIN INTERNATIONAL
 1601 RESPONSE ROAD, SUITE 260
 SACRAMENTO, CA 95815



**OPTION 1 CLASS 1 BIKE PATH
 ATP FUNDED OR EXTENSION**

- LEGEND**
- FILL
 - - - HINGE
 - POTENTIAL ATP FUNDED CLASS 1 PATH
 - REMNANT CR32A CLASS 1 PATH/OPTIONAL CLASS 1 EXTENSION
 - POSSIBLE BIKE CONNECTIVITY PATH OPTIONS
 - YOLO RAMP BIKE PATH

OPTION 2: NO CLASS 1 BIKE PATH

**ALTERNATIVE 8
 OVERHEAD
 BIKE CONNECTIVITY**
 SCALE: 1" = 200'

ATTACHMENT D -Rejected Alternatives

| | | | | |
|------|--------|-------|--------------------------|--------------------|
| DISK | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET TOTAL SHEETS |
| 3 | Yol | CR32A | | X |

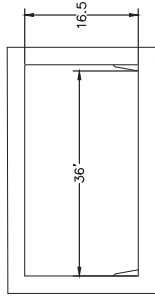
REGISTERED CIVIL ENGINEER _____ DATE _____

PLANS APPROVAL DATE _____

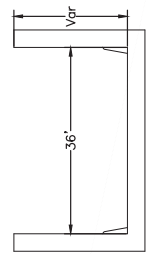
SUTTER COUNTY OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF THIS PLAN SHEET.

TALIN INTERNATIONAL
1601 RESPONSE ROAD, SUITE 260
SACRAMENTO, CA 95815

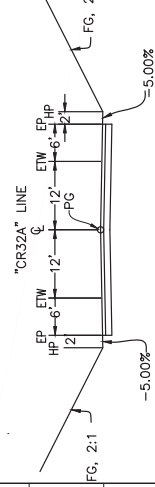
| No. @ | R | Δ | T | L |
|-------|---------|-------------|--------|--------|
| 1 | 1920.00 | 28° 26' 32" | 486.59 | 953.11 |
| 2 | 960.00 | 40° 29' 43" | 354.12 | 678.50 |
| 3 | 1920.00 | 27° 39' 51" | 472.74 | 927.04 |



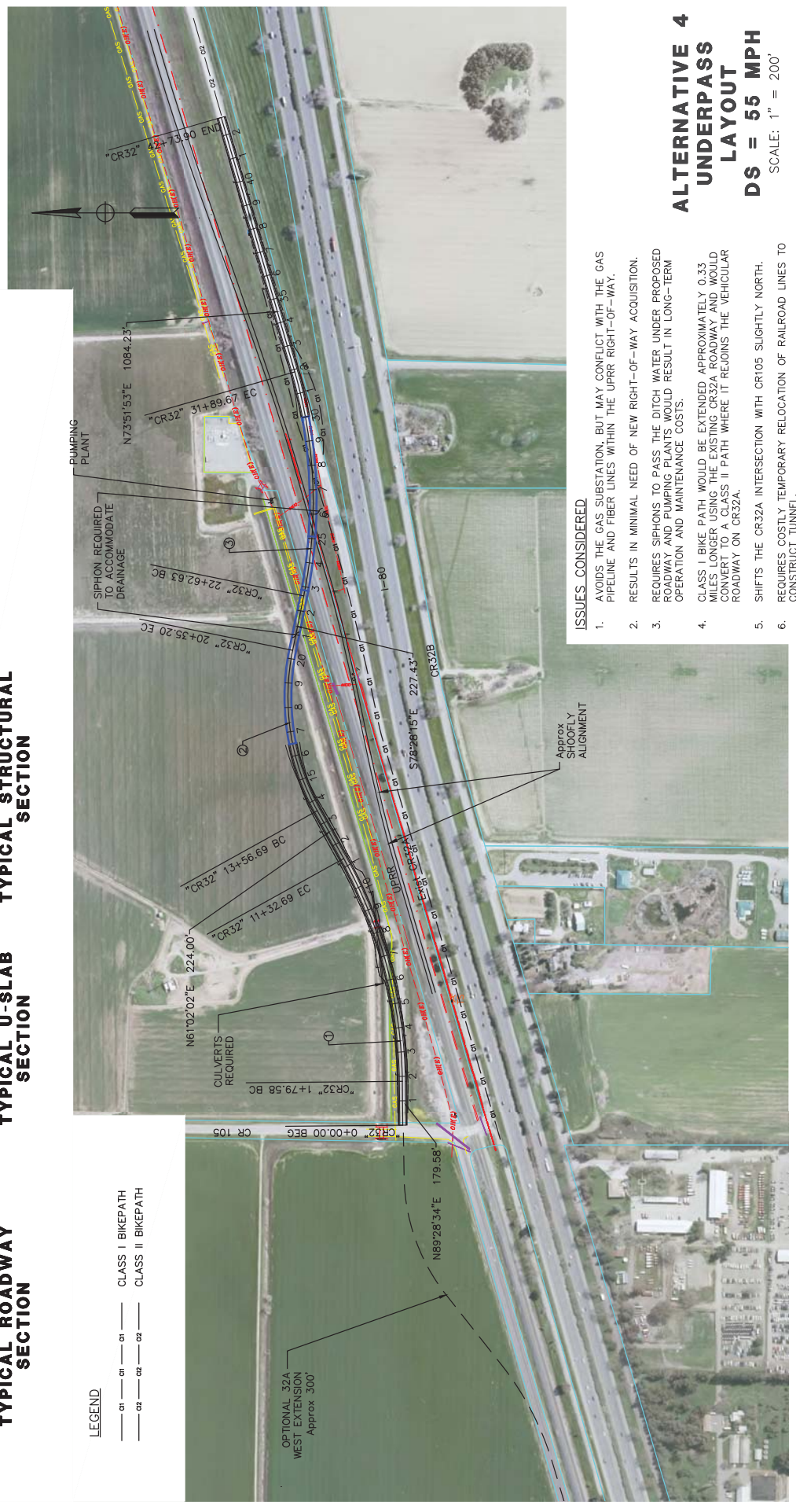
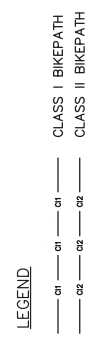
22+85.52 TO 25+08.30
**CR32A UNDERPASS
TYPICAL STRUCTURAL
SECTION**



25+08.30 TO 30+00.00
16+50.00 TO 22+85.52
**CR32A UNDERPASS
TYPICAL U-SLAB
SECTION**



30+00.00 TO 42+73.90
0+00.00 TO 16+50.00
**CR32A UNDERPASS
TYPICAL ROADWAY
SECTION**



ISSUES CONSIDERED

1. AVOIDS THE GAS SUBSTATION, BUT MAY CONFLICT WITH THE GAS PIPELINE AND FIBER LINES WITHIN THE UPRR RIGHT-OF-WAY.
2. RESULTS IN MINIMAL NEED OF NEW RIGHT-OF-WAY ACQUISITION.
3. REQUIRES SIPHONS TO PASS THE DITCH WATER UNDER PROPOSED ROADWAY AND PUMPING PLANTS WOULD RESULT IN LONG-TERM OPERATION AND MAINTENANCE COSTS.
4. CLASS I BIKE PATH WOULD BE EXTENDED APPROXIMATELY 0.33 MILES LONGER USING THE EXISTING CR32A ROADWAY AND WOULD CONVERT TO A CLASS II PATH WHERE IT REJOINS THE VEHICULAR ROADWAY ON CR32A.
5. SHIFTS THE CR32A INTERSECTION WITH CR105 SLIGHTLY NORTH.
6. REQUIRES COSTLY TEMPORARY RELOCATION OF RAILROAD LINES TO CONSTRUCT TUNNEL.

**ALTERNATIVE 4
UNDERPASS
LAYOUT
DS = 55 MPH**
SCALE: 1" = 200'



USERNAME => JEFFREY HOGE
DWG FILE => AL 4-Undercrossing.dwg

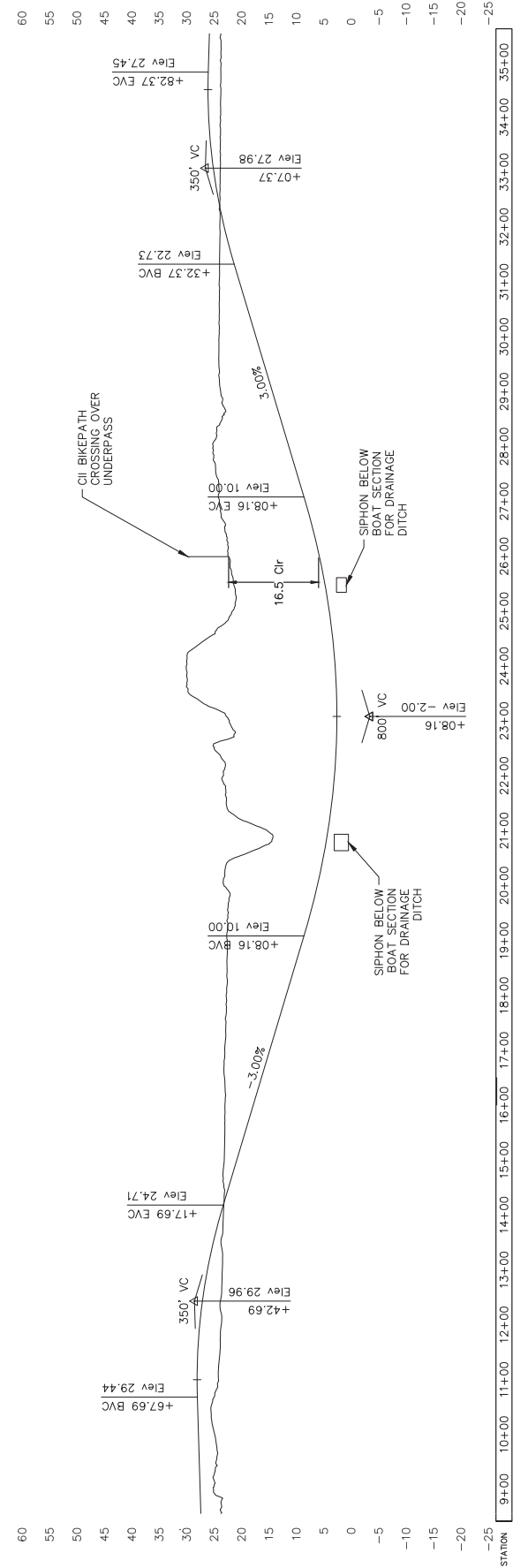
| | | | |
|-----------------------------------|---------------------------|---------------|--------------|
| YOLO COUNTY PUBLIC WORKS DIVISION | CONSULTANT DESIGN MANAGER | RASHAD GIBSON | DATE REVISED |
| | DESIGNED BY | JEFFREY HOGE | |
| | CHECKED BY | RASHAD GIBSON | |
| | CALCULATED BY | JEFFREY HOGE | |

ALTERNATIVE 4 UNDERPASS PROFILE DS = 55 MPH SCALE: 1" = 100'

RELATIVE BORDER SCALE
 IS IN INCHES

USERNAME => JEFFREY HOGE
 DWG FILE => AL_4-Undercrossing.dwg

Yolo County Public Works Division



| | | | | |
|------|--------|-------|--------------------------|--------------------|
| Dist | County | Route | Post Miles Total Project | SHEET TOTAL SHEETS |
| 3 | Yol | CR32A | | X |

REGISTERED CIVIL ENGINEER DATE _____

PLANS APPROVAL DATE _____

SUTTER COUNTY OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS OF SCANNED COPIES OF THIS PLAN SHEET.

TALIN INTERNATIONAL
 1601 RESPONSE ROAD, SUITE 260
 SACRAMENTO, CA 95815

REGISTERED PROFESSIONAL ENGINEER
 No. XXXXXX
 Exp. XXXXX
 CIVIL
 State of California

| | |
|--------------|---------------|
| DESIGNED BY | JEFFREY HOGE |
| CHECKED BY | RASHOD GIBSON |
| DATE REVISED | |
| REVISOR | |
| DESIGNED BY | JEFFREY HOGE |
| CHECKED BY | RASHOD GIBSON |
| DATE REVISED | |
| REVISOR | |

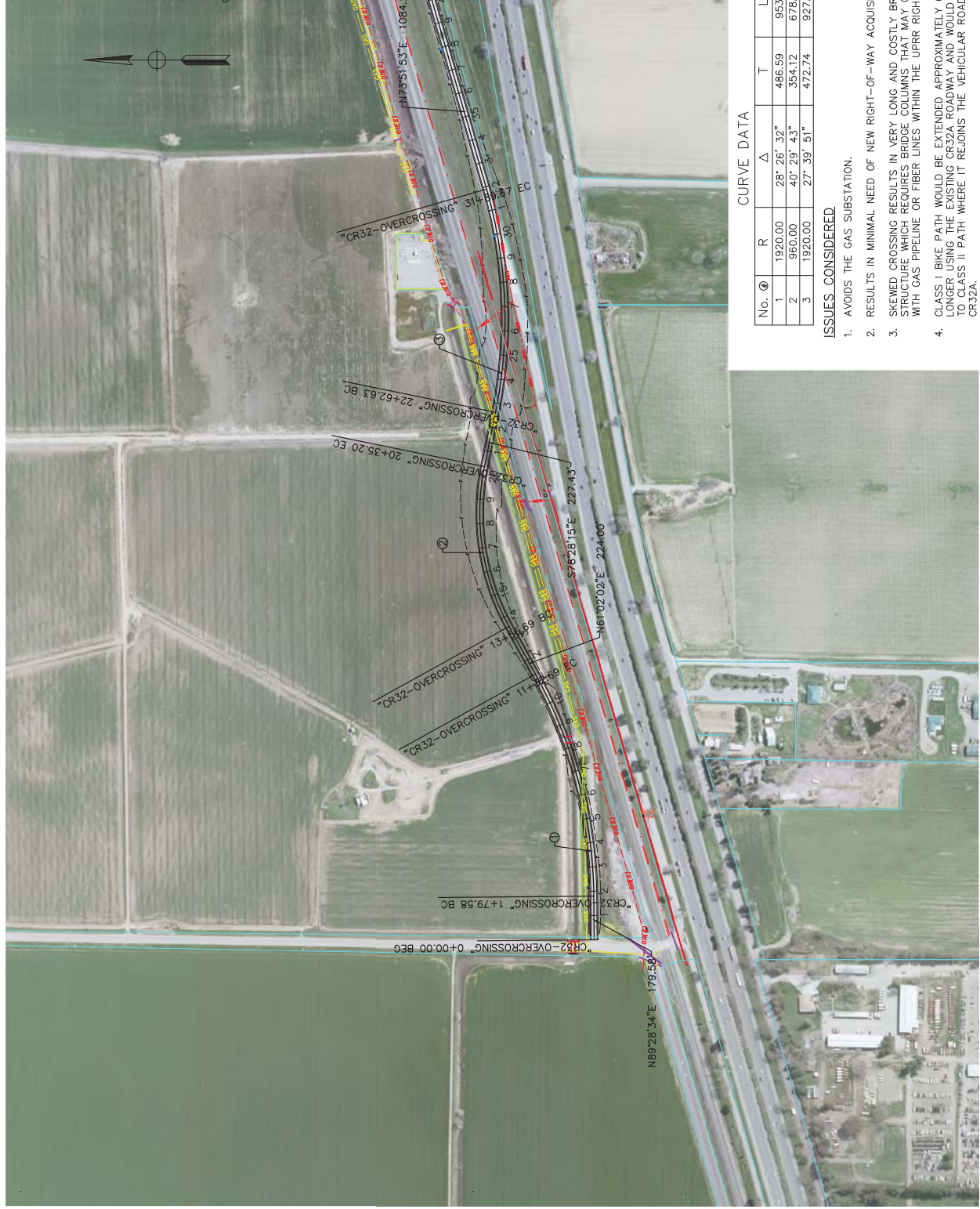
| | | | | |
|------|--------|-------|--------------------------|--------------------|
| DISK | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET TOTAL SHEETS |
| 3 | Yol | CR32A | | X |

REGISTERED CIVIL ENGINEER DATE _____

PLANS APPROVAL DATE _____

SUTTER COUNTY OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS OF ANY KIND OR TYPE OR ON THESE PLANS.

TRALIN INTERNATIONAL
1601 RESPONSE ROAD, SUITE 260
SACRAMENTO, CA 95815



CURVE DATA

| No. | R | Δ | T | L |
|-----|---------|-------------|--------|--------|
| 1 | 1920.00 | 28° 26' 32" | 486.59 | 953.11 |
| 2 | 960.00 | 40° 29' 43" | 354.12 | 678.50 |
| 3 | 1920.00 | 27° 39' 51" | 472.74 | 927.04 |

ISSUES CONSIDERED

1. AVOIDS THE GAS SUBSTATION.
2. RESULTS IN MINIMAL NEED OF NEW RIGHT-OF-WAY ACQUISITION.
3. SKEWED CROSSING RESULTS IN VERY LONG AND COSTLY BRIDGE STRUCTURE WHICH REQUIRES BRIDGE COLUMNS THAT MAY CONFLICT WITH GAS PIPELINE OR FIBER LINES WITHIN THE UPRR RIGHT-OF-WAY.
4. CLASS I BIKE PATH WOULD BE EXTENDED APPROXIMATELY 0.44 MILES LONGER USING THE EXISTING CR32A ROADWAY AND WOULD CONVERT TO CLASS II PATH WHERE IT REJOINS THE VEHICULAR ROADWAY ON CR32A.
5. SHIFTS THE CR32A INTERSECTION WITH CR105 SLIGHTLY NORTH.

**ALTERNATIVE 5
OVERHEAD
DS = 55 MPH**
SCALE: 1" = 200'

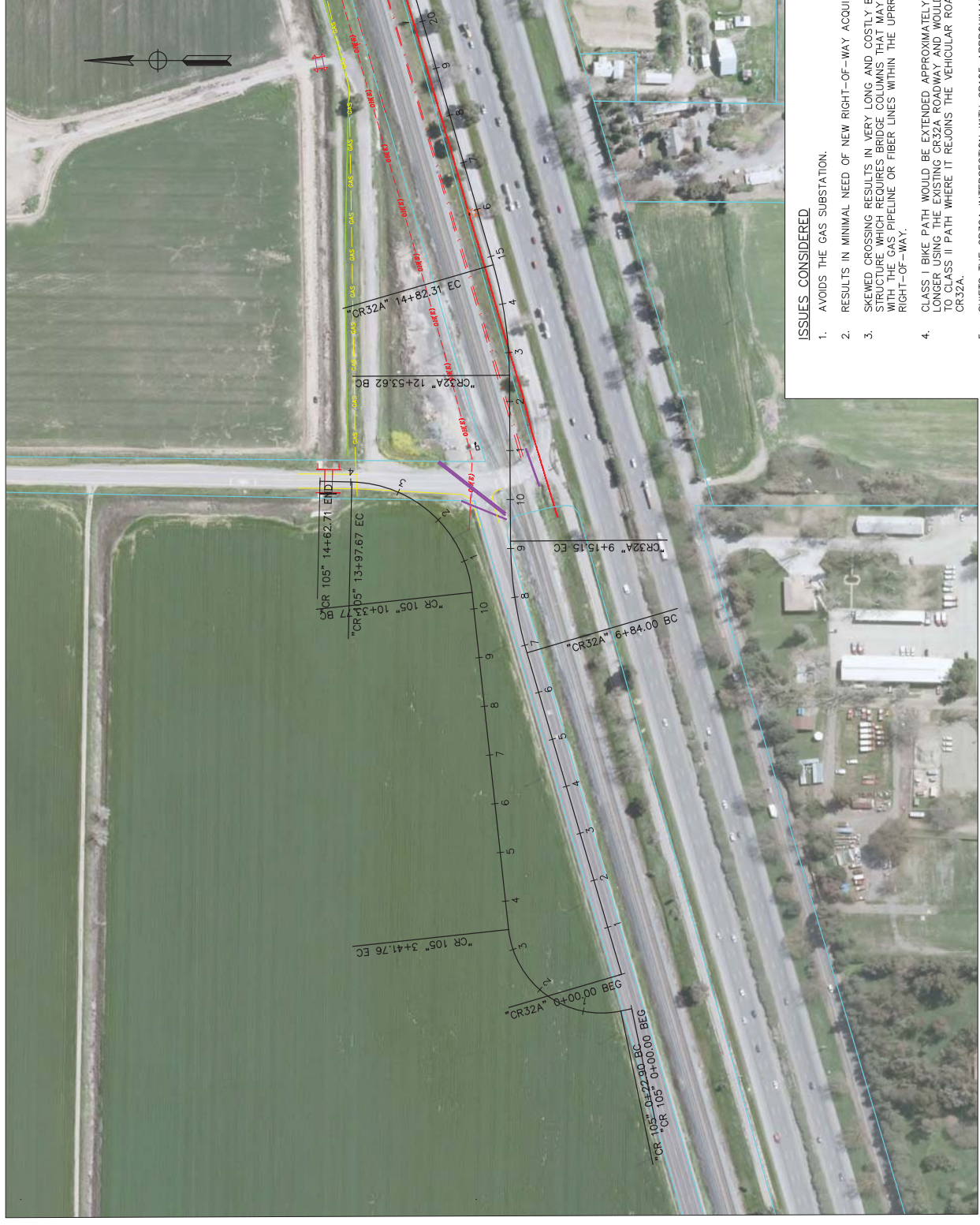
| | | | | | | |
|-----------------------------------|---------------------------|---------------|-------------|---------------|--------------|--|
| YOLO COUNTY PUBLIC WORKS DIVISION | CONSULTANT DESIGN MANAGER | RASHOD GIBSON | DESIGNED BY | JEFFREY HOGE | REVISD BY | |
| | | RASHOD GIBSON | CHECKED BY | RASHOD GIBSON | DATE REVISED | |

| | | | | |
|------|--------|-------|--------------------------|--------------------|
| DISK | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET TOTAL SHEETS |
| 3 | Yol | CR32A | | X |

REGISTERED CIVIL ENGINEER DATE _____ DATE OF EXPIRATION _____
 PROFESSIONAL ENGINEER
 No. XXXXXX Exp. XXXXXX
 CIVIL
 STATE OF CALIFORNIA

PLANS APPROVAL DATE _____
 SUTTER COUNTY OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS OF ANY KIND OR TYPE OF THIS PLAN SHEET.

TALIN INTERNATIONAL
 1601 RESPONSE ROAD, SUITE 260
 SACRAMENTO, CA 95815



**ALTERNATIVE 6
 OVERHEAD
 CROSSING
 DS = 55 MPH**
 SCALE: 1" = 200'

- ISSUES CONSIDERED**
1. AVOIDS THE GAS SUBSTATION.
 2. RESULTS IN MINIMAL NEED OF NEW RIGHT-OF-WAY ACQUISITION.
 3. SKEWED CROSSING RESULTS IN VERY LONG AND COSTLY BRIDGE STRUCTURE WHICH REQUIRES BRIDGE COLUMNS THAT MAY CONFLICT WITH THE GAS PIPELINE OR FIBER LINES WITHIN THE UPRR RIGHT-OF-WAY.
 4. CLASS I BIKE PATH WOULD BE EXTENDED APPROXIMATELY 0.44 MILES LONGER USING THE EXISTING CR32A ROADWAY AND WOULD CONVERT TO CLASS II PATH WHERE IT REJOINS THE VEHICULAR ROADWAY ON CR32A.
 5. SHIFTS THE CR32A INTERSECTION WITH CR105 APPROXIMATELY 2. MILES TO THE WEST.

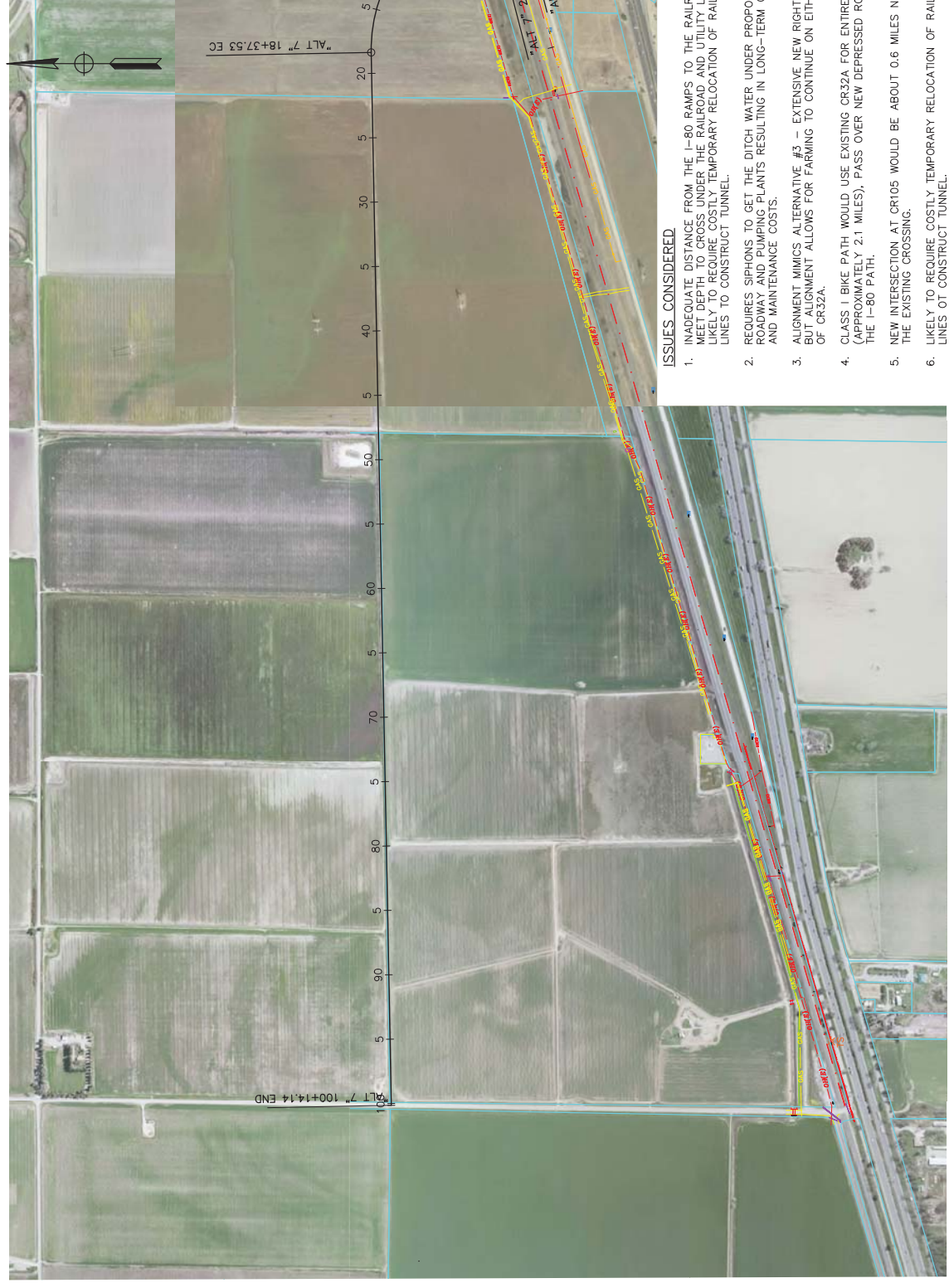
| | | | | | | | | |
|------------------------------------|---------------------------|---------------|------------|---------------|--------------|--------------|-------------|--------------|
| YOLCO COUNTY PUBLIC WORKS DIVISION | CONSULTANT DESIGN MANAGER | RASHOD GIBSON | CHECKED BY | RASHOD GIBSON | DATE REVISED | JEFFREY HOGE | DESIGNED BY | JEFFREY HOGE |
|------------------------------------|---------------------------|---------------|------------|---------------|--------------|--------------|-------------|--------------|

| | | | | | | | | | | | | | |
|-----------------------------------|--|---------------------------|--|---------------|------------|---------------|--------------|--------------|-------------|--------------|---------|--------------|--------------|
| YOLO COUNTY PUBLIC WORKS DIVISION | | CONSULTANT DESIGN MANAGER | | RASHOD GIBSON | CHECKED BY | RASHOD GIBSON | DATE REVISED | JEFFREY HOGE | DESIGNED BY | JEFFREY HOGE | REVISOR | DATE REVISED | JEFFREY HOGE |
|-----------------------------------|--|---------------------------|--|---------------|------------|---------------|--------------|--------------|-------------|--------------|---------|--------------|--------------|

| | | | | |
|------|--------|-------|--------------------------|--------------------|
| DISK | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET TOTAL SHEETS |
| 3 | Yol | CR32A | | X |



T. MALIN INTERNATIONAL
 1601 RESPONSE ROAD, SUITE 260
 SACRAMENTO, CA 95815



ISSUES CONSIDERED

1. INADEQUATE DISTANCE FROM THE I-80 RAMPS TO THE RAILROAD TO MEET DEPTH TO CROSS UNDER THE RAILROAD AND UTILITY LINES AND LIKELY TO REQUIRE COSTLY TEMPORARY RELOCATION OF RAILROAD LINES TO CONSTRUCT TUNNEL.
2. REQUIRES SIPHONS TO GET THE DITCH WATER UNDER PROPOSED NEW ROADWAY AND PUMPING PLANTS RESULTING IN LONG-TERM OPERATION AND MAINTENANCE COSTS.
3. ALIGNMENT MIMICS ALTERNATIVE #3 - EXTENSIVE NEW RIGHT-OF-WAY, BUT ALIGNMENT ALLOWS FOR FARMING TO CONTINUE ON EITHER SIDE OF CR32A.
4. CLASS 1 BIKE PATH WOULD USE EXISTING CR32A FOR ENTIRE LENGTH (APPROXIMATELY 2.1 MILES), PASS OVER NEW DEPRESSED ROADWAY TO THE I-80 PATH.
5. NEW INTERSECTION AT CR105 WOULD BE ABOUT 0.6 MILES NORTH OF THE EXISTING CROSSING.
6. LIKELY TO REQUIRE COSTLY TEMPORARY RELOCATION OF RAILROAD LINES TO CONSTRUCT TUNNEL.

**ALTERNATIVE 7
 UNDERCROSSING
 CROSSING
 DS = 55 MPH
 SCALE: 1" = 400'**



USERNAME => JEFFREY HOGE
 DWG FILE => AL 7-Long Undercrossing.dwg

ATTACHMENT E-Preliminary Environmental Study Form

EXHIBIT 6-A PRELIMINARY ENVIRONMENTAL STUDY (PES)

Federal Project No.:

(Federal Program Prefix-Project No., Agreement No.)

Final Design:

(Expected Start Date)

To: _____
(District Local Assistance Engineer)

_____ *(District)*

_____ *(Address)*

_____ *(Email Address)*

From: Yolo County, Public Works Department
(Local Agency)

Todd Riddiough
(Project Manager's Name and Telephone No.)

292 West Beamer Street, Woodland, CA 95695
(Address)

Todd.Riddiough@yolocounty.org
(Email Address)

Is this Project "ON" the State Highway System? Yes
 No

IF YES, STOP HERE and contact the District Local Assistance Engineer regarding the completion of other environmental documentation.

Federal State Transportation Improvement Program (FSTIP)

_____ *(Currently Adopted Plan Date)*

_____ *(Page No. ___ attach to this form)*

<http://www.dot.ca.gov/hq/transprog/oftmp.htm>

Programming for FSTIP:

Preliminary Engineering

Right of Way

Construction

| | | | |
|----------------------|------------------|----------------------|------------------|
| | \$ _____ | \$ _____ | \$ _____ |
| <i>(Fiscal Year)</i> | <i>(Dollars)</i> | <i>(Fiscal Year)</i> | <i>(Dollars)</i> |

| | | | |
|----------------------|------------------|----------------------|------------------------|
| | | Unknown | \$ 5.9 to 18.5 million |
| <i>(Fiscal Year)</i> | <i>(Dollars)</i> | <i>(Fiscal Year)</i> | <i>(Dollars)</i> |

Project Description as Shown in RTP and FSTIP:

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

Yolo County is proposing a relocation of the County Road (CR) 32A railroad crossing at CR 105 to improve safety due to a history of accidents at the existing crossing, despite the implementation of many safety countermeasures over the years. CR 32A is a frontage road on the north side of Interstate 80 between the City of Davis and the Yolo Causeway.

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

Preliminary Design Information:

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

- | Yes | No | Yes | No | Yes | No |
|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Required Attachments:

- Regional map Project location map Project footprint map (existing/proposed right of way)
- Engineering drawings (existing and proposed cross sections), if available Borrow/disposal site location map, if applicable
(Note: all maps (except project location map and regional maps) should be consistent with the project description (minimum scale: 1" = 200').)
- GeoTracker Printout for Hazardous Materials (<http://geotracker.waterboards.ca.gov/>).
- Federal Threatened and Endangered Species List from USFWS (<http://ecos.fws.gov/ipac/>).
- Federal Threatened and Endangered Species List from NMFS (<http://www.westcoast.fisheries.noaa.gov/maps/data/california-species-listtools.html>).
- Current Photos of Project Site FEMA map VIA Questionnaire

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

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

| A. Potential Environmental Effects | Yes | To Be Determined | No |
|--|-------------------------------------|-------------------------------------|-------------------------------------|
| General | | | |
| 1. Will the project require future construction to fully utilize the design capabilities included in the proposed project? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Will the project generate public controversy? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Noise | | | |
| 3. Is the project a Type I project as defined in 23 CFR 772.5(h); “construction on new location or the physical alteration of an existing highway, which significantly changes either the horizontal or vertical alignment or increases the number of through-traffic lanes”? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Does the project have the potential for adverse construction-related noise impact (such as related to pile driving)? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Air Quality | | | |
| 5. Is the project in a NAAQS non-attainment or maintenance area? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Is the project exempt from the requirement that a conformity determination be made? (If “Yes,” state which conformity exemption in 40 CFR 93.126, or 40 CFR 93.128 (check one box below and identify the project type if applicable): <input type="checkbox"/> 40 CFR 93.126 <input type="checkbox"/> 40 CFR 93.128 Project type: _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 7. Is the project exempt from regional conformity? (If “Yes,” state which conformity exemption in 40 CFR 93.127, Table 3 applies): _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 8. If project is not exempt from regional conformity, (If “No” on Question #7) Is project in a metropolitan non-attainment/maintenance area? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Is project in an isolated rural non-attainment area? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Is project in a CO, PM10 and/or PM2.5 non-attainment/maintenance area? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Hazardous Materials/Hazardous Waste | | | |
| 9. Is there potential for hazardous materials (including underground or aboveground tanks, etc.) or hazardous waste (including oil/water separators, waste oil, asbestos-containing material, lead-based paint, ADL, etc.) within or immediately adjacent to the construction area? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Water Quality/Resources | | | |
| 10. Does the project have the potential to impact water resources (rivers, streams, bays, inlets, lakes, drainage sloughs) within or immediately adjacent to the project area? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

| | | | |
|--|-------------------------------------|-------------------------------------|-------------------------------------|
| 11. Is the project within a designated sole-source aquifer? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Coastal Zone | | | |
| 12. Is the project within the State Coastal Zone, San Francisco Bay, or Suisun Marsh? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Floodplain | | | |
| 13. Is the construction area located within a regulatory floodway or within the base floodplain (100-year elevation of a watercourse or lake)? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Wild and Scenic Rivers | | | |
| 14. Is the project within or immediately adjacent to a Wild and Scenic River System? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Biological Resources | | | |
| 15. Is there a potential for federally listed threatened or endangered species, or their critical habitat or essential fish habitat to occur within or adjacent to the construction area? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 16. Does the project have the potential to directly or indirectly affect migratory birds, or their nests or eggs (such as vegetation removal, box culvert replacement/repair, bridge work, etc.)? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 17. Is there a potential for wetlands to occur within or adjacent to the construction area? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 18. Is there a potential for agricultural wetlands to occur within or adjacent to the construction area? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 19. Is there a potential for the introduction or spread of invasive plant species? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Sections 4(f) and 6(f) | | | |
| 20. Are there any historic sites or publicly owned public parks, recreation areas, wildlife or waterfowl refuges (Section 4[f]) within or immediately adjacent to the construction area? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 21. Does the project have the potential to affect properties acquired or improved with Land and Water Conservation Fund Act (Section 6[f]) funds? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Visual Resources | | | |
| 22. Does the project have the potential to affect any visual or scenic resources? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Relocation Impacts | | | |
| 23. Will the project require the relocation of residential or business properties? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Land Use, Community, and Farmland Impacts | | | |
| 24. Will the project require any right of way, including partial or full takes? Consider construction easements and utility relocations. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 25. Is the project inconsistent with plans and goals adopted by the community? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 26. Does the project have the potential to divide or disrupt neighborhoods/communities? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 27. Does the project have the potential to disproportionately affect low-income and minority populations? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 28. Will the project require the relocation of public utilities? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 29. Will the project affect access to properties or roadways? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 30. Will the project involve changes in access control to the State Highway System (SHS)? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 31. Will the project involve the use of a temporary road, detour, or ramp closure? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 32. Will the project reduce available parking? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 33. Will the project construction encroach on state or federal lands? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 34. Will the project convert any farmland to a different use or impact any farmlands? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Cultural Resources | | | |
| 35. Is there National Register listed, or potentially eligible historic properties, or archaeological resources within or immediately adjacent to the construction area? (Note: Caltrans PQS answers question #35) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 36. Is the project adjacent to, or would it encroach on Tribal land? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

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

| B. Required Technical Studies and Analyses | C. Coordination | D. Anticipated Actions/Permits/Approvals |
|---|---|---|
| <input type="checkbox"/> Traffic <i>Check one:</i> <input type="checkbox"/> Traffic Study <input checked="" type="checkbox"/> Technical Memorandum <input type="checkbox"/> Discussion in ED Only | <input type="checkbox"/> Caltrans <input type="checkbox"/> Caltrans <input type="checkbox"/> Caltrans | <input type="checkbox"/> Approval <input type="checkbox"/> Approval <input type="checkbox"/> Approval |
| <input checked="" type="checkbox"/> Noise <i>Check as applicable:</i> <input type="checkbox"/> Traffic Related <input type="checkbox"/> Construction Related <i>Check one:</i> <input type="checkbox"/> Noise Study Report <input type="checkbox"/> NADR <input type="checkbox"/> Technical Memorandum <input checked="" type="checkbox"/> Discussion in ED Only | <input type="checkbox"/> Caltrans <input type="checkbox"/> Caltrans <input type="checkbox"/> Caltrans <input type="checkbox"/> Caltrans | <input type="checkbox"/> Approval <input type="checkbox"/> Approval <input type="checkbox"/> Approval <input type="checkbox"/> Approval |
| <input checked="" type="checkbox"/> Air Quality <i>Check as applicable:</i> <input type="checkbox"/> Traffic Related <input checked="" type="checkbox"/> Construction Related <i>Check one:</i> <input type="checkbox"/> Air Quality Report <input checked="" type="checkbox"/> Technical Memorandum <input type="checkbox"/> Discussion in ED Only | <input type="checkbox"/> Caltrans <input type="checkbox"/> Caltrans <input type="checkbox"/> Caltrans <input type="checkbox"/> FHWA <input type="checkbox"/> Caltrans <input type="checkbox"/> Regional Agency | <input type="checkbox"/> Approval <input type="checkbox"/> Approval <input type="checkbox"/> Approval <input type="checkbox"/> Conformity Finding (23 USC 327 CEs, EAs, EISs) <input type="checkbox"/> Conformity Finding (23 USC 326 CEs) <input type="checkbox"/> PM10/PM2.5 Interagency Consultation |
| <input checked="" type="checkbox"/> Hazardous Materials/ Hazardous Waste <i>Check as applicable:</i> <input checked="" type="checkbox"/> Initial Site Assessment (Phase 1) <input checked="" type="checkbox"/> Preliminary Site Assessment (Phase 2) <input type="checkbox"/> Discussion in ED Only | <input type="checkbox"/> Caltrans <input type="checkbox"/> Caltrans <input type="checkbox"/> Cal EPA DTSC <input type="checkbox"/> Local Agency | <input type="checkbox"/> Approval <input type="checkbox"/> Approval <input type="checkbox"/> Approval <input type="checkbox"/> Review Database <input type="checkbox"/> Review Database |
| <input checked="" type="checkbox"/> Water Quality/Resources <i>Check as applicable:</i> <input type="checkbox"/> Water Quality Assess. Report <input type="checkbox"/> Technical Memorandum <input checked="" type="checkbox"/> Discussion in ED Only | <input type="checkbox"/> Caltrans <input type="checkbox"/> Caltrans <input type="checkbox"/> Caltrans | <input type="checkbox"/> Approval <input type="checkbox"/> Approval <input type="checkbox"/> Approval |
| <input type="checkbox"/> Sole-Source Aquifer (Districts 5, 6 and 11) | <input type="checkbox"/> EPA (S.F. Regional Office) | <input type="checkbox"/> Approval of Analysis in ED |
| <input type="checkbox"/> Coastal Zone | <input type="checkbox"/> CCC | <input type="checkbox"/> Coastal Zone Consistency Determination |

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

| B. Required Technical Studies and Analyses | C. Coordination | D. Anticipated Actions/Permits/Approvals |
|--|-----------------|--|
|--|-----------------|--|

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

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

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

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

E. Preliminary Environmental Document Classification (NEPA)

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

Check one:

- Environmental Impact Statement *(Note: Engagement with participating agencies in accordance with 23 USC 139 required)*
 - Compliance with 23 USC 139 regarding Participating Agencies required
- Complex Environmental Assessment
- Routine Environmental Assessment
- Categorical Exclusion without required technical studies.
- Categorical Exclusion with required technical studies

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

- Section 23 USC 326
 - 23 CFR 771 activity (c)(____)
 - 23 CFR 771 activity (d) (____)
 - Activity ____ listed in the Section 23 USC 326
- Section 23 USC 327

F. Public Availability and Public Hearing

Check as applicable:

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

G. Signatures

Local Agency Staff and/or Consultant Signature

_____ (Signature of Preparer) _____ (Date) _____ (Telephone No.)

_____ (Name)

Local Agency Project Engineer Signature

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

_____ (Signature of Local Agency) _____ (Date) _____ (Telephone No.)

Preliminary Environmental Investigation
Notes to Support the Conclusions of the PES Form
(May Also Include Continuation of Detailed Project Description)

Brief Explanation of How Project Complies, or Will Comply with Applicable Federal Mandate (Part A):

1. Yes. The project is a realignment of an existing roadway intended to replace an existing railroad crossing along Yolo County Road 32A north of I-80 approaching the City of Davis. The Project would involve construction of a new roadway and vacating an existing roadway.
2. Public Controversy is not expected. A public meeting was held August 31, 2020 from 5:30 - 7pm. Persons commenting were supportive of the County investigating solutions to the current crossing. The only contrary opinion concerned cost associated with a new alignment. Most commenters supported a new alignment option.
3. Yes. the project is a Type I project as defined in 23 CFR 772.5(h); "construction on new location or the physical alteration of an existing highway, which significantly changes either the horizontal or vertical alignment or increases the number of through-traffic lanes"?
4. No noise impacts are anticipated because no sensitive receptors are within 200 feet of the anticipated project location.
5. According to https://www3.epa.gov/airquality/greenbook/anayo_ca.html (accessed October 5, 2020), Yolo County is within a moderate classification for 8-hour Ozone Nonattainment Area (2015 standard) and PM2.5 non-attainment
6. No. The Project is not exempt from the requirement of a conformity determination.
7. No. Please see above.
8. See answer for #5 above.
9. Unknown. The Geotracker 10,000 foot radius search results map and list of sites (Source: <https://geotracker.waterboards.ca.gov/map/?CMD=runreport&myaddress=County+Road+32+a>) indicates that all known sites are opposite I-80 from this location (Attachment #4). However, due to the presence of Interstate 80, the UPRR railroad traffic and long history of agricultural production, the soils may have potential aerially deposited lead (ADL) along the exposed soil in the Project area from auto emissions before leaded fuel was banned, various metals from railroad use and pesticides present. In addition, a gas pipeline is present along the UPRR right-of-way which poses a potential for hazardous materials incidents.
10. New water quality threats are not anticipated from this project as it would merely redirect existing traffic within agricultural areas that are located distant from local watercourses. The nearest body of water that passes within ½ mile of the site, is the Yolo Bypass which carries overflows from the Sacramento River (and Cache Creek) during high flow events. This area is separated from the project area with a levee approximately 15-18 feet high. Storm drainage and sheet flows are directed toward agricultural ditches that typical allow waters to seep into the ground, but occasionally do drain into the Bypass areas. The Project would not create new sources of contamination.
11. No. The Project is not located near a designated sole-source aquifer.
12. No. The Project is not located within the State Coastal Zone.
13. Yes. The Project is located within the base floodplain (100-year) elevation, were it not behind the Yolo Bypass levee. FEMA maps still consider this area to be within the 100-year floodplain (FEMA map located in attachment #8).

14. No. The Project is not located within or adjacent to a Wild and Scenic River System.
15. Yes, the area contains federal and state protected species. For instance, agricultural ditches are considered critical habitat for the Giant Garter Snake, which is federal and state protected. Please see the Threatened and Endangered list of potential species in the attachment #6.
16. It is unknown whether this project would directly or indirectly affect migratory birds, or their nests. Although, it is not anticipated that nearby trees (very sparse presence) would be removed. However, agricultural fields are common migratory bird foraging habitat.
17. Yes. Wetlands occur in nearby drainage ditches – which would need to be crossed with a realignment of the roadway.
18. Yes. The wetlands are likely to be considered agricultural wetlands.
19. Yes. The project and construction has the potential to introduce invasive plant species since the project is surrounded by open fields/lands.
20. The potential for Section 4(f) resources is unlikely – since there are not park or recreational resources within the immediate Project area. The Yolo Bypass does contain a wildlife or waterfowl refuges, but this is located far enough away as to avoid ‘use’ or constructive use determinations. There does not appear to be any historic properties within the vicinity and significant archaeological resources significant for preservation in place are unlikely due to the long history of tiling the agricultural fields, however this would need to be determined through an archaeological survey and literature research.
21. No. There are no park or recreational resources nor lands acquired with LWCFs.
22. The Project area does not include a designated scenic resources and viewer groups (drivers, passengers in cars, bicyclists) are not likely to be highly sensitive to changes in this vicinity. See attachment #9,
23. No. While the Project has a high potential to require property acquisition, majority of the lands are owned by the City of Davis and farmed through contracts with the City. The roadway would not result in relocating a business or residential property.
24. Yes. The Project has a high potential to require property acquisition and majority of the lands affected are owned by the City of Davis.
25. No. The Project would not be inconsistent with plans or goals adopted by Yolo County.
26. No. The Project would not divide or disrupt a community because it is located agricultural area.
27. No. See answer to 26.
28. Unknown. Utilities include overhead power lines, fiber optics and a gas pipeline. Most utilities parallel the Union Pacific Railroad and/or the County Road 32A. The Project is designed to avoid most utilities but may involve relocating a few poles for the overhead power lines.
29. The Project is not anticipated to affect current access points. A realignment of the roadway would divert traffic and potential change the route of access, but where necessary the existing roadway would be preserved to maintain existing access.
30. No. The Project would not change access control to the SHS. The Project has been designed to avoid impacting queuing at the I-80 on and offramps.
31. Not likely. The Project would allow continued use of the existing roadway until the new alignment is ready to redirect traffic permanently. Temporary traffic management may be necessary for the new roadway construction to be connected to the old roadway, which would likely be planned for periods of low traffic volume, such as during a weekend or evening periods.

32. No parking would be affected.
33. No. The Project would only affect UPRR and City of Davis or privately owned agricultural lands.
34. Yes. The Project is likely to result in converting farmlands to transportation use.
35. Assigned to Caltrans to address.

Continuation of Detailed Project Description and Purpose and Need Statement:

County Road (CR) 32A Railroad Crossing Relocation Project

The County Road (CR) 32A Railroad Crossing Relocation Project is located in Yolo County (See attachment #1). CR 32A acts as a frontage road on the north side of Interstate 80 (I-80) between the City of Davis and the Yolo Causeway (see attachment #3). The Project location map in attachment #2, illustrates where CR 32A crosses the Union Pacific Railroad (UPRR) in two tight radii turns which coincides with the transition of a Class I bicycle path to shoulders along CR 32A. Yolo County is considering three alternatives (provided in attachment #5) to relocate the current County Road (CR) 32A crossing of the UPRR which currently aligns with the north-south CR 105 intersection (see attachment #3). CR 32A connects with Chiles Road (CR 32B) at the Yolo Causeway, where it crosses under I-80 which, combined, provide access for farming activities on the north and south sides of I-80.

The relocated CR 32A cross section would include two 12-foot lanes, 6-foot shoulders. The shoulder would include a Class II Bikeway (bikes and vehicles share the roadway with bicycles using the paved shoulder). The existing frontage road that would be vacated would come available to lengthen the existing Class I Bikeway (bike path separated from the roadway) from the City of Davis, which ends at the CR 32A and CR 105 intersection for the distance to the new crossing. The relocated UPRR crossing is proposed to be shifted 0.5 to 1.5 miles east to support either an at-grade or a grade separated (overhead crossing) of the UPRR. The crossing would maintain existing drainage ditches on either side of the UPRR and avoid majority of the existing utilities. The overhead crossing alternative would likely involve relocated overhead power lines.

*More detailed project description for each alternative is included in the **Project Study Report**. The Draft Purpose and Need is provided for additional context.*

DRAFT Purpose and Need statement

The purpose of the Project is to relocate the CR 32A railroad crossing to improve safety and address the current conflicts experienced between trains, vehicles, and bicycles.

The Project is needed because:

- Current location prohibits standard roadway geometric design
- Westbound incidents have resulted in some vehicles sliding off the roadway into the active railroad corridor
- Traffic safety measures have not reduced the occurrence of incidents at this crossing
- Traffic is expected to increase on CR 32A due to anticipated development within a mile of the existing crossing
- Maintaining a CR 32A railroad crossing provides a critical route for over-sized farm equipment to access land north and south of Interstate 80, for bicycle access between Davis and Sacramento, and for waste hauling to the landfill

The CR 32A involves a sharp right turn for westbound traffic, before crossing the railroad tracks onto CR 105, and then a sharp left turn to continue onto CR 32A westbound. Additionally, a Class I bike lane from Davis ends at this crossing location where bikers must continue eastward using CR 32A's paved shoulder toward the causeway of I-80. The change in elevation of the roadway to cross the railroad does not support 90 degree turns over the tracks at high automotive speeds. Speed limit signs are posted at 10 miles per hour, but frequent incidents involve vehicles moving too fast and thereby sliding off the roadway into crash barriers or onto the active railroad corridor. This challenging alignment cannot be improved using standard roadway geometric design in its current configuration because the roadway is confined between Interstate 80 (I-80) and the UPRR rail right-of-way.

During the 2014-2017 period, the County received 19 accidents reports at this location from the California Highway Patrol. UPRR has reported to the County that they are aware of 27 additional incidents involving vehicles and UPRR facilities during the same time period and the Bike Davis group has provided information on additional incidents their membership have observed that have not been formally documented. Incidents have included excessive delays to rail and motorized traffic, major damage to motor vehicles and bicyclists, destruction of safety guardrails and signage, and even resulted in fatalities – as recent as September 2019. The California Public Utilities Commission and the UPRR find that incident rates at this crossing warrant closing the crossing. In efforts to improve the safety of this crossing, Yolo County and UPRR have made several improvements to counter the frequency of accidents. These improvements have included installing guardrail, striping, rumble strips, and warning signs, posting flashing beacons and additional warning signs, installing crash barriers, and implementing a full stop for those traveling south bound on CR 105. Since these improvements have been placed, incidents have continued with similar frequency.

The safety concerns may increase with the expectations for an increase in traffic volumes on CR 32A due to nearby, proposed development projects. About one half mile northwest of the CR 32A crossing, the planned Aggie Research Campus (ARC) is projected to include 2,654,000 square feet of a mixture of office, light manufacturing, hotel and retail land uses and 850 new dwelling units. The ARC is planned to have full access onto CR 32A and only right-in and right-outs to and from Mace Boulevard. In addition, adjacent to the ARC, the planned Mace Triangle development is anticipated to include 46,000 square feet of office/R&D and 25,000 square feet of ancillary retail. The Mace Triangle would also depend on CR 32A for access to their site plan. Collectively, at full build out (year 2045), these developments would have a net increase of 24,650 vehicle trips per day, before trip management plans are implemented (*Fehr&Peers, Aggie Research Campus, Volume 1 – Transportation Impact Study, March 2020*). While not all of these trips would pass through the CR 32A-UPRR crossing, this does represent an increase in traffic on CR 32A.

CR 32A is vital transportation link for both agricultural equipment movement and a frequent secondary transportation arterial to the I-80 freeway. In addition, private lands between I-80 and CR 32A use this roadway for access. County Road 32A provides a critical route for over-sized farm equipment to access land north and south of Interstate 80 without having to drive through and negotiate the urban traffic of the City of Davis. Maintaining this route embodies SACOG's Blueprint Principles of Natural Resource Conservation and Transportation Choice. Furthermore, this route is the primary route for bicycle access between the cities of Davis and Sacramento. Relocation of the crossing would provide an opportunity to examine bike safety at the crossing, and possibly consider bicycling facility safety enhancements.

Yolo County is working with the City of Davis, Union Pacific Railroad, the Yolo County Farm Bureau, the Bike Davis group, the California Public Utilities Commission and the Sacramento Area Council of Government to investigate alternatives to relocate and improve the design of the CR 32A crossing.

Distribution 1) Original - DLAE, 2) Local Agency Project Manager, 3) DLA Environmental Coordinator 4) Senior Environmental Planner (or designee), 5) District PQS

CR 32A County Road (CR) 32A Railroad Crossing Relocation Project Attachments and Maps

Attachment #1: Regional Map



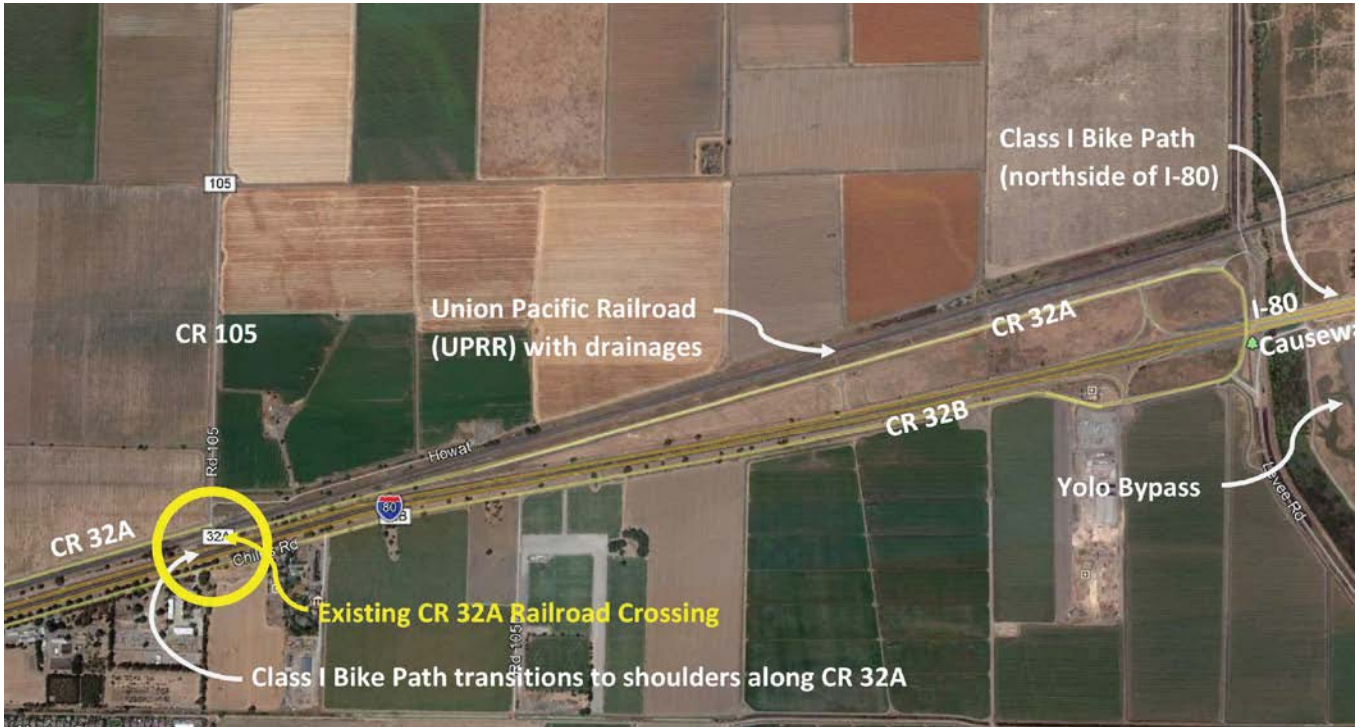
Attachment #2: Project Location Map



Legend for Project Location Map:

1. **Current UPRR Crossing.** Existing crossing includes change in roadway elevation within two sharp 90-degree turns
2. Roadway modifications are constrained by I-80 right-of-way to the south.
3. Large drainage ditches on both sides of UPRR trackway.
4. Crossing is signed as 10 miles per hour for the westbound direction curve, but many motorists exceed this speed.
5. Class I bike path transitions into a class II bike path on CR 32A frontage road at this crossing. Cyclists travel east along the paved road shoulder of CR 32 A to access the I-80 causeway Class I bicycle route.
6. The railroad grade gradually rises in elevation eastward of this crossing. The railroad corridor includes the following utilities: a major gas pipeline, overhead power lines, utility poles and fiber optic lines.

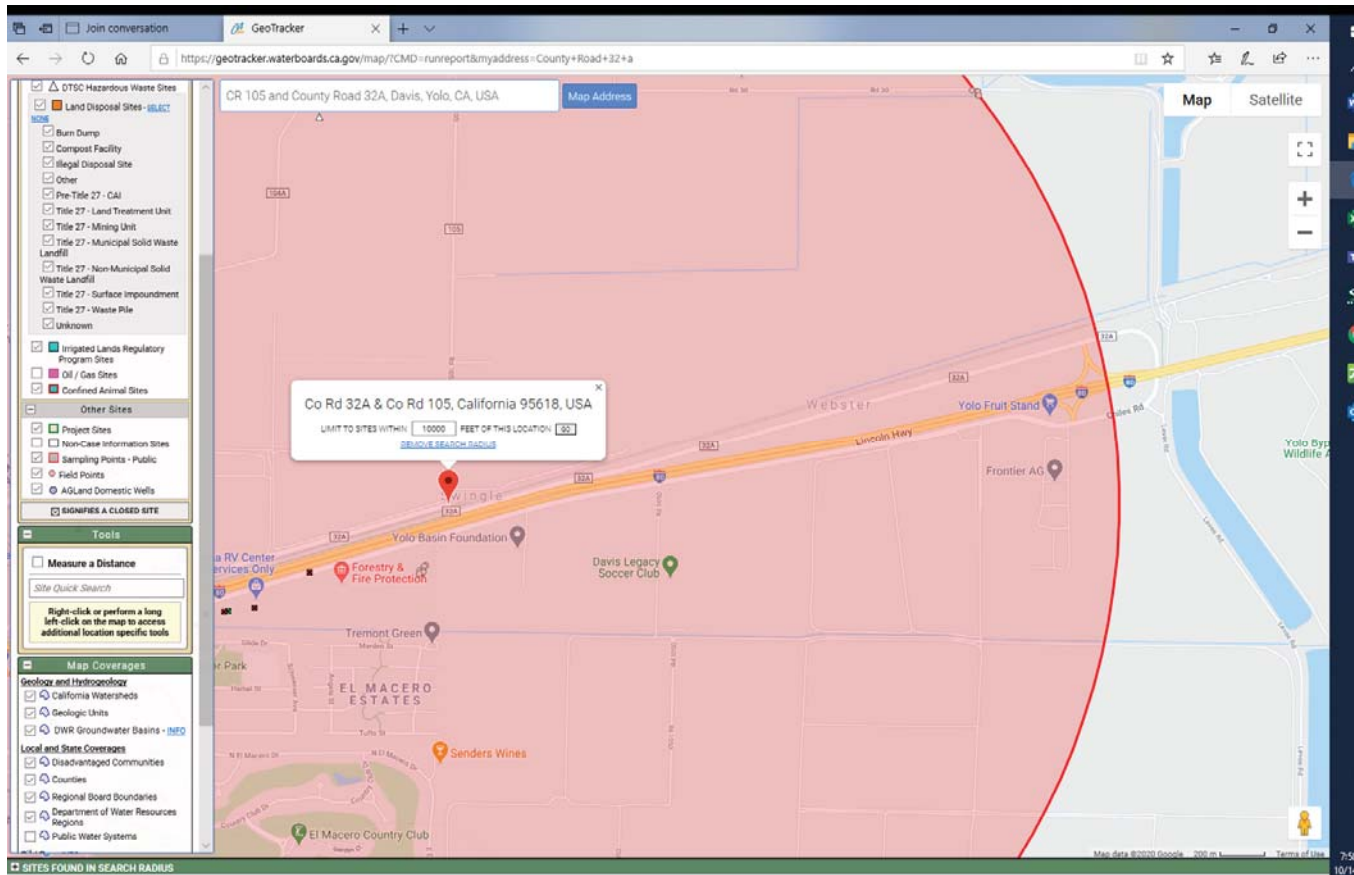
CR 32A County Road (CR) 32A Railroad Crossing Relocation Project Attachments and Maps
Attachment #3: Project Area (Area covering range of alternatives under consideration)



CR 32A County Road (CR) 32A Railroad Crossing Relocation Project Attachments and Maps

Attachment #4: Geotracker Hazardous Site Search (10,000 feet radius search)

(<https://geotracker.waterboards.ca.gov/map/?CMD=runreport&myaddress=County+Road+32+a>)

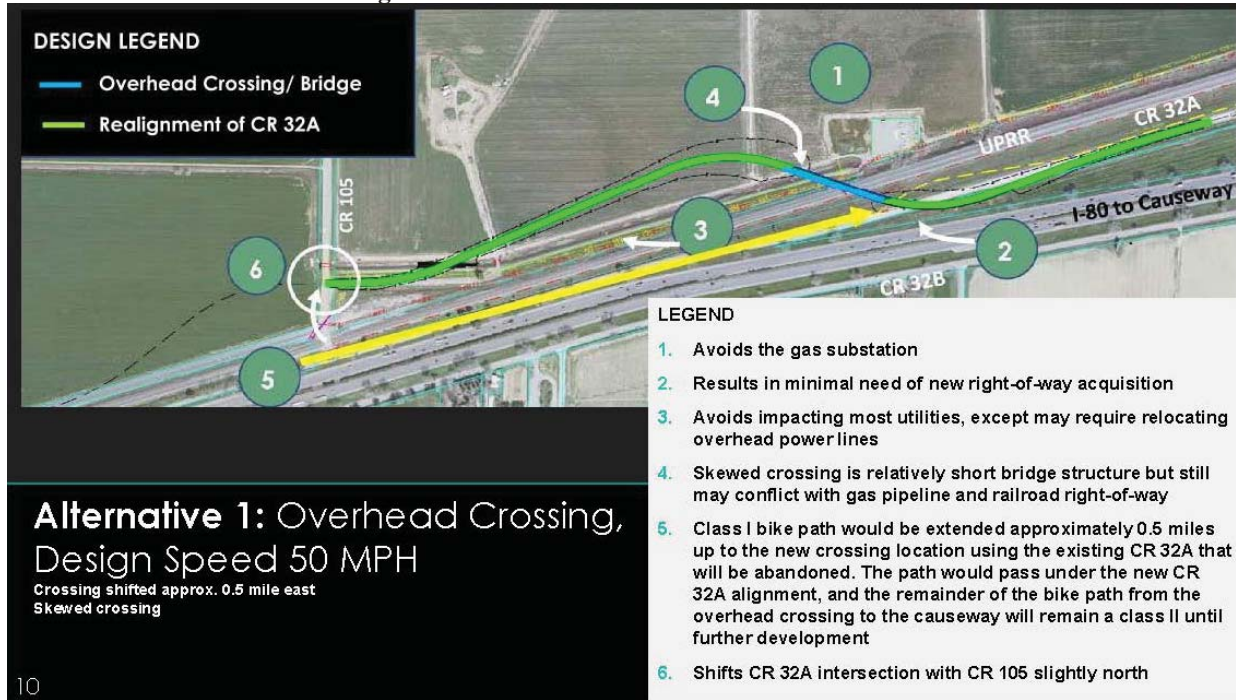


| SITE NAME | SITE_TYPE | STATUS | ADDRESS | CITY |
|--|----------------------|------------|----------------------|-------|
| A E HARTER INC | LUST CLEANUP SITE | CLOSED | 5100 CHILES RD | DAVIS |
| BP (FORMER EXXON) | LUST CLEANUP SITE | CLOSED | 400 MACE BLVD | DAVIS |
| CA DEPT OF FORESTRY & FIRE | LUST CLEANUP SITE | CLOSED | 5950 CHILES RD | DAVIS |
| CHEVRON #9-9148 | LUST CLEANUP SITE | CLOSED | 4475 CHILES RD | DAVIS |
| CHILES ROAD CHEVRON | | | 4475 CHILES RD | DAVIS |
| DAVIS LIQUOR & FOOD | LUST CLEANUP SITE | CLOSED | 4810 CHILES RD | DAVIS |
| DAVIS PETROLEUM LLC DBA BASSI SHELL | | | 400 MACE BLVD | DAVIS |
| DAVIS VALERO | | | 4810 CHILES RD | DAVIS |
| EL MACERO CLEANERS | CLEANUP PROGRAM SITE | REMEDIATED | 417 MACE BLVD. | DAVIS |
| FREEWAY FORD MERCURY | LUST CLEANUP SITE | CLOSED | 5080 CHILES RD | DAVIS |
| FRONTIER FERTILIZER | CLEANUP PROGRAM SITE | REMEDIATED | 3901 2ND ST | DAVIS |
| GAS AND SHOP | | | 4480 CHILES RD | DAVIS |
| HOLT FACILITY | LUST CLEANUP SITE | CLOSED | 5200 CHILES RD | DAVIS |
| LEWIS A MORAN REFORESTATION | LUST CLEANUP SITE | CLOSED | 5800 CHILES RD | DAVIS |
| PG&E TODHUNTER LAKE DEHYDRATOR STATION | CLEANUP PROGRAM SITE | CLOSED | 46999 COUNTY ROAD 30 | DAVIS |
| SAFETY-KLEEN OF CALIFORNIA INC - DAVIS | STANDARDIZED | OPERATING | 44561 ROAD 30-B | DAVIS |
| SHELL SS | LUST CLEANUP SITE | CLOSED | 4480 CHILES RD | DAVIS |
| SWIFT JEEP - CHRYSLER - PLYMOUTH - DODGE | CLEANUP PROGRAM SITE | CLOSED | 5100 CHILES RD | DAVIS |
| TRAMNUSS INC | | | 333 MACE BLVD | DAVIS |
| VAN WERT MOTORS | CLEANUP PROGRAM SITE | CLOSED | 5100 CHILES ROAD | DAVIS |

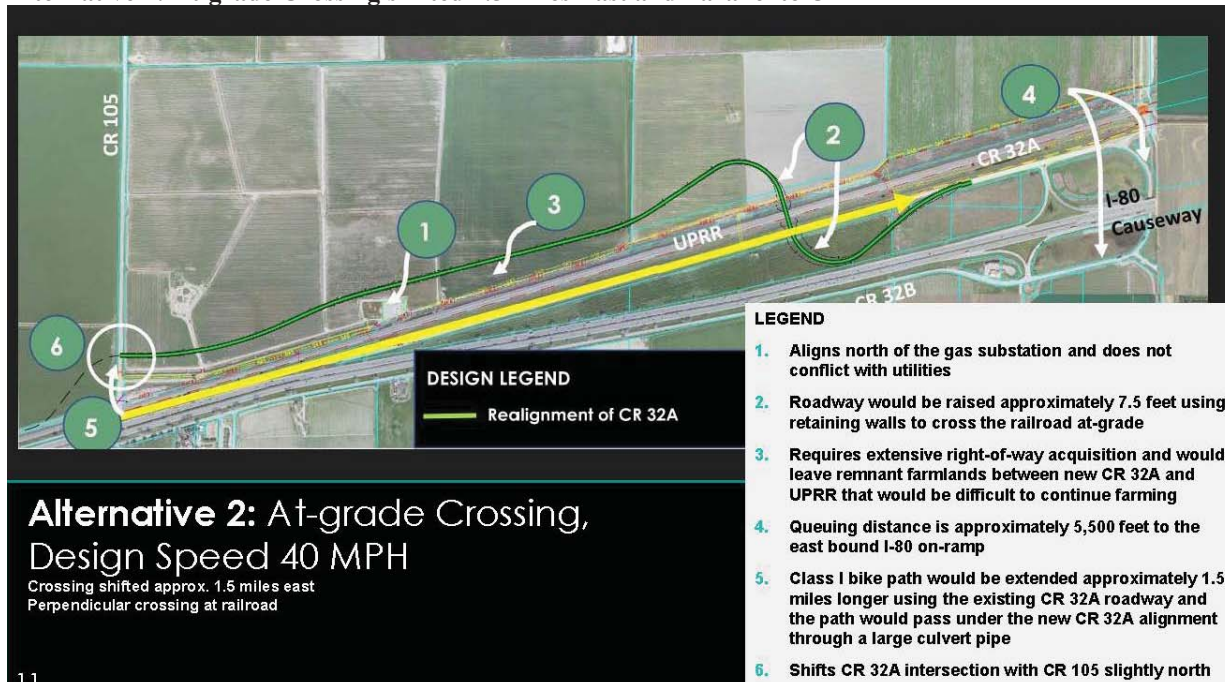
CR 32A County Road (CR) 32A Railroad Crossing Relocation Project Attachments and Maps

Attachment #5: Project Conceptual Footprints for Three Alternatives under Consideration

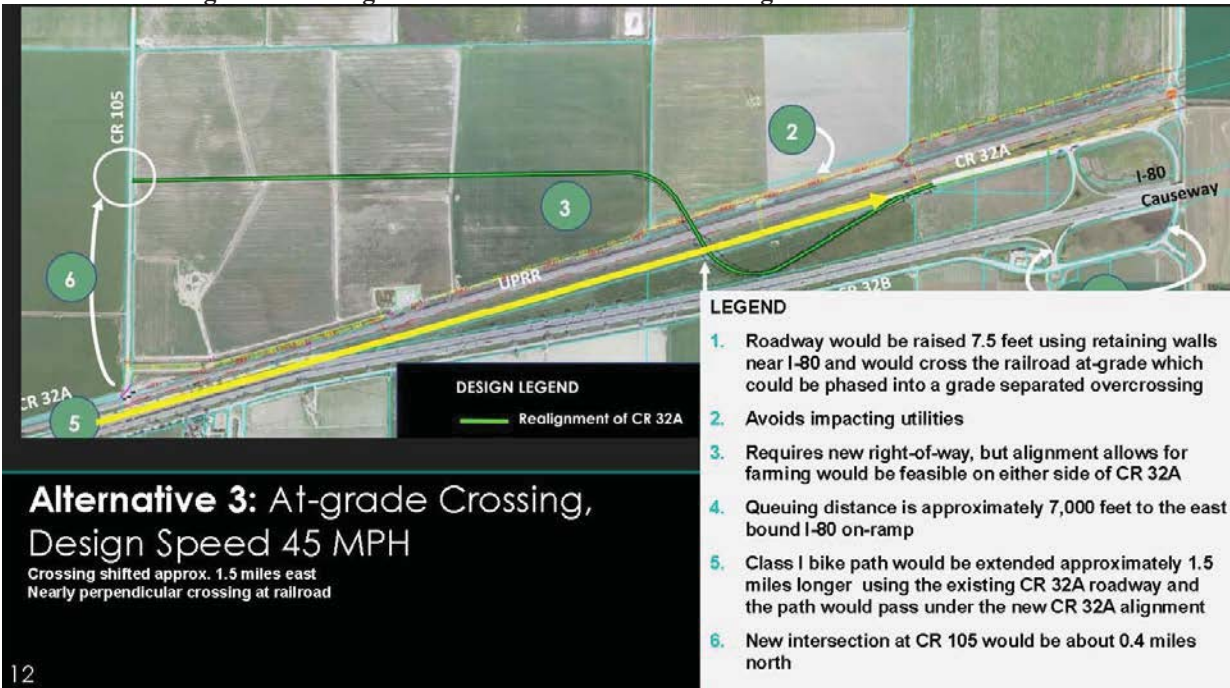
Alternative 1: Overhead Crossing shifted 0.5 mile East



Alternative 2: At-grade Crossing shifted 1.5 miles East and Parallel to UPRR



CR 32A County Road (CR) 32A Railroad Crossing Relocation Project Attachments and Maps
Alternative 3: At-grade Crossing shifted 1.5 East and Mid-field Alignment



**Alternative 3: At-grade Crossing,
 Design Speed 45 MPH**

Crossing shifted approx. 1.5 miles east
 Nearly perpendicular crossing at railroad

CR 32A County Road (CR) 32A Railroad Crossing Relocation Project Attachments and Maps
Attachment 6: Federally listed Threatened and Endangered Species list from USFWS

Federally Protected Wildlife Species

The following attachment is from the USFWS Information for Planning and Consultation only website: <https://ecos.fws.gov/ipac/location/PFAZMIMJHZCA7N5YEFXVNG7DS4/resources> (Accessed on October 7, 2020 by Jodi Ketelsen). It is not an official species list for consultation purposes.

According to this website, this area overlaps with the Critical habitat for Delta Smelt (*Hypomesus transpacificus*). However, this species requires waterways and the Project area does not include waters, beyond agricultural or storm drainages that are not connected to perennial waters.

In addition, the Project area is associated with 21 migratory bird species.

Endangered species

Listed species and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries).

Birds



Threatened : Western Snowy Plover, *Charadrius nivosus nivosus*

Reptiles



Threatened: Giant Garter Snake, *Thamnophis gigas*

Amphibians



Threatened: California Red-legged Frog, *Rana draytonii*



Threatened: California Tiger Salamander, *Ambystoma californiense*

Insects



Threatened: Delta Green Ground Beetle, *Elaphrus viridis*



Threatened: Valley Elderberry Longhorn Beetle, *Desmocerus californicus dimorphus*

Crustaceans (no photos available)

Endangered :Conservancy Fairy Shrimp, *Branchinecta conservatio*

Threatened: Vernal Pool Fairy Shrimp, *Branchinecta lynchi*

Endangered: Vernal Pool Tadpole Shrimp, *Lepidurus packardi*

CR 32A County Road (CR) 32A Railroad Crossing Relocation Project Attachments and Maps

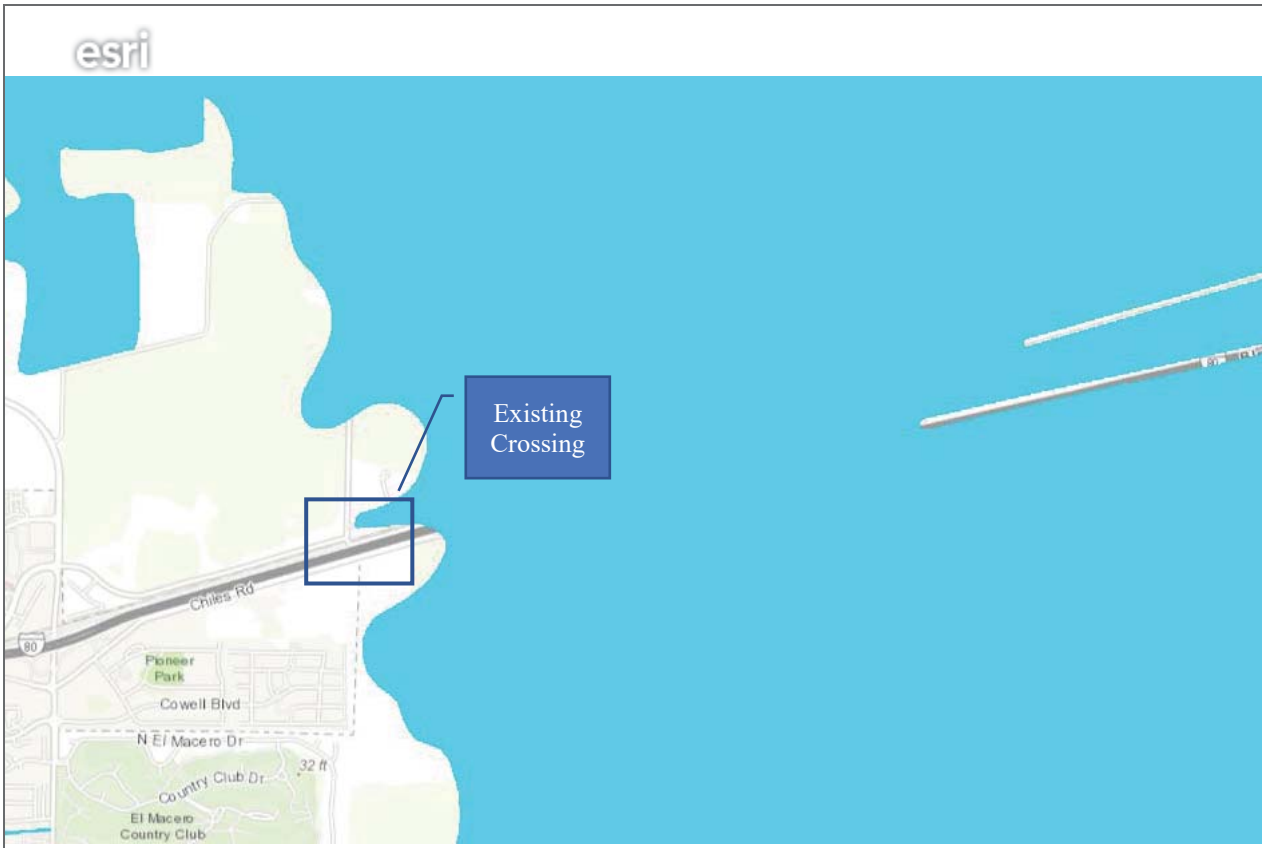
Attachment #7: Current Photos of the Project Site



Photo of the at-grade UPRR crossing at CR 32A and CR 105

CR 32A County Road (CR) 32A Railroad Crossing Relocation Project Attachments and Maps

Attachment #8: FEMA Map - FEMA National Flood Hazard Layer (NFHL)



FEMA 100-year flood layer

0.4mi

County of Sacramento, Bureau of Land Management, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA

CR 32A County Road (CR) 32A Railroad Crossing Relocation Project Attachments and Maps

Attachment #9: VIA Questionnaire

Calculate VIA Level Score

Project Information

Project Name Project Identification

Preparer Name

Caltrans District Landscape

Architect (DLA)

For projects on State Highway System Only, Name of Caltrans District Landscape Architect (DLA) providing VIA Questionnaire Score Concurrence - if different than above.

Change to Visual Environment

1. Will the project result in a noticeable change in the physical characteristics of the existing environment?

Consider all project components and construction impacts - both permanent and temporary, including landform changes, structures, noise barriers, vegetation removal, railing, signage, and contractor activities.

2. Will the project complement or contrast with the visual character desired by the community?

Evaluate the scale and extent of the project features compared to the surrounding scale of the community. Is the project likely to give an urban appearance to an existing rural or suburban community? Do you anticipate that the change will be viewed by the public as positive or negative? Research planning documents, or talk with local planners and community representatives to understand the type of visual environment local residents envision for their community.

3. What level of local concern is there for the types of project features (e.g., bridge structures, large excavations, sound barriers, or median planting removal) and construction impacts that are proposed?

Certain project improvements can be of special interest to local citizens, causing a heightened level of public concern, and requiring a more focused visual analysis.

Low Concern (1 point)

4. Will the project require redesign or realignment to minimize adverse change or will mitigation, such as landscape or architectural treatment, likely be necessary?

Consider the type of changes caused by the project, i.e., can undesirable views be screened or will desirable views be permanently obscured so a redesign should be considered?

No Mitigation Likely (0 points)

5. Will this project, when seen collectively with other projects, result in an aggregate adverse change (cumulative impacts) in overall visual quality or character?

Identify any projects (both Caltrans and local) in the area that have been constructed in recent years and those currently planned for future construction. The window of time and the extent of area applicable to possible cumulative impacts should be based on a reasonable anticipation of the viewing public's perception.

Cumulative Impacts Unlikely to Occur (1 point)

Viewer Sensitivity

1. What is the potential that the project proposal will be controversial within the community, or opposed by any organized group?

This can be researched initially by talking with Caltrans and local agency management and staff familiar with the affected community's sentiments as evidenced by past projects and/or current information.

Low Potential (1 point)

2. How sensitive are potential viewer-groups likely to be regarding visible changes proposed by the project?

Consider among other factors the number of viewers within the group, probable viewer expectations, activities, viewing duration, and orientation. The expected viewer sensitivity level may be scoped by applying professional judgment, and by soliciting information from other Caltrans staff, local agencies and community representatives familiar with the affected community's sentiments and demonstrated concerns.

Low Sensitivity (1 point)

3. To what degree does the project's aesthetic approach appear to be consistent with applicable laws, ordinances, regulations, policies or standards?

Although the State is not always required to comply with local planning ordinances, these documents are critical in understanding the importance that communities place on aesthetic issues. The Caltrans Environmental Planning branch may have copies of the planning documents that pertain to the project. If not, this information can be obtained by contacting the local planning department. Also, many local and state planning documents can be found online at the California Land Use Planning Network.

4. Are permits going to be required by outside regulatory agencies (i.e., Federal, State, or local)?

Permit requirements can have an unintended consequence on the visual environment. Anticipated permits, as well as specific permit requirements - which are defined by the permitted, may be determined by talking with the project Environmental Planner and Project Engineer. Note: coordinate with the Caltrans representative responsible for obtaining the permit prior to communicating directly with any permitting agency.

5. Will the project sponsor or public benefit from a more detailed visual analysis in order to help reach consensus on a course of action to address potential visual impacts?

Consider the proposed project features, possible visual impacts, and probable mitigation recommendations.

Calculate Total

[It is recommended that you print a copy of these calculations for the project file.](#)

Project Score: 11

Select An Outline Based Upon Project Score

The total score will indicate the recommended VIA level for the project. In addition to considering circumstances relating to any one of the ten questions-areas that would justify

elevating the VIA level, also consider any other project factors that would have an effect on level selection.

Score 6-9

No noticeable visual changes to the environment are proposed and no further analysis is required. Print out a copy of this completed questionnaire for your project file or Preliminary Environmental Study (PES).

Score 10-14

Negligible visual changes to the environment are proposed. A [brief Memorandum\(see sample\)](#) addressing visual issues providing a rationale why a technical study is not required.

Score 15-19

Noticeable visual changes to the environment are proposed. An abbreviated VIA is appropriate in this case. The assessment would briefly describe project features, impacts and any avoidance and minimization measures. Visual simulations would be optional. Go to the [Directions for using and accessing the Minor VIA Annotated Outline](#).

Score 20-24

Noticeable visual changes to the environment are proposed. A fully developed VIA is appropriate. This technical study will likely receive public review. Go to the [Directions for using and accessing the Moderate VIA Annotated Outline](#).

Score 25-30

Noticeable visual changes to the environment are proposed. A fully developed VIA is appropriate that includes photo simulations. It is appropriate to alert the Project Development Team to the potential for highly adverse impacts and to consider project alternatives to avoid those impacts. Go to the [Directions for using and accessing the Advanced/Complex VIA Annotated Outline](#).

ATTACHMENT F -County Road 32A Railroad Crossing Traffic Analysis

Memorandum

Date: December 15, 2020
To: Hans Strandgaard, TYLIN
From: Dave Stanek and Simon Zhang, Fehr & Peers
Subject: **County Road 32A Railroad Crossing Traffic Analysis**

RS19-3847

Fehr & Peers has analyzed existing conditions and the proposed alternatives for the County Road 32A Railroad Crossing project in Yolo County.

Study Area

The proposed alternatives were estimated to affect traffic operations at adjacent intersections of the I-80 interchanges at Mace Boulevard and County Road 32A/County Road 32B (Chiles Road). Therefore, the following intersections were studied:

1. Second Street/County Road 32A/Mace Boulevard
2. I-80 Westbound Ramps/Mace Boulevard
3. County Road 32A/County Road 105
4. County Road 32A/I-80 Westbound Ramps
5. Chiles Road/Mace Boulevard
6. County Road 32B/I-80 Eastbound Ramps

Data Collection

Existing and forecasted intersection turning movement volumes at the study intersections came from a previous study prepared for the Davis Innovation Sustainability Campus (DISC) Environmental Impact Report. Weekday AM and PM peak hour intersection turning movement counts were collected in October 2019 (that is, prior to COVID-19 pandemic). The forecasted volumes represent cumulative conditions in 2036 and include traffic generated by the proposed DISC project. Project approval is on the City of Davis ballot for the November 3, 2020 general



election. Forecasted volumes were modified for alternatives with new or closed roadway connections.

Inrix speed data for County Road 32A near the I-80 interchange was provided by Caltrans for October 2019. The speed data shows when queues for traffic entering eastbound I-80 extend upstream on County Road 32A towards the I-80 Westbound Ramps intersection.

Analysis Methodology

The study intersections were analyzed using the performance measures of intersection delay and level of service (LOS). LOS is a qualitative measure of traffic operating conditions that assigns a letter rating, from A (the best) to F (the worst). These ratings represent the perspective of drivers and are an indication of the comfort and convenience associated with driving. The descriptions of letter ratings and the delay thresholds for signalized and unsignalized intersections are provided in Table 1. For unsignalized intersections with some movements uncontrolled, the intersection LOS is determined by the controlled movement with the highest delay.

Table 1. Intersection LOS Thresholds

| LOS | Description | Delay ¹ | |
|-----|--|---------------------------|---------------------------|
| | | Signalized | Unsignalized |
| A | Operations with very low delay occurring with favorable progression and/or short cycle length. | ≤10 | ≤10 |
| B | Operations with low delay occurring with good progression and/or short cycle lengths. | >10 to 20 | >10 to 15 |
| C | Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear. | >20 to 35 | >15 to 25 |
| D | Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop, and individual cycle failures are noticeable. | >35 to 55 | >25 to 35 |
| E | Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. | >55 to 80 | >35 to 50 |
| F | Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths. | >80 or v/c>1 ² | >50 or v/c>1 ² |

Source: *Highway Capacity Manual, 6th Edition* (Transportation Research Board, 2016)

- Notes:
1. Delay is reported in seconds per vehicle.
 2. Volume-to-capacity ratio is greater than 1 (demand exceeds capacity).



Intersection operations were analyzed under AM and PM peak hour conditions using the Synchro (version 10) traffic analysis software, which provides average control delay and LOS performance measures consistent with the *Highway Capacity Manual 6th Edition* procedures.

Existing Conditions

County Road 32A crosses the Union Pacific railroad tracks just south of the County Road 105 intersection (see Exhibit 1). Although the at-grade crossing is perpendicular, the road makes a 90 degree turn to the east on the south side of the crossing. Drivers can have difficulty navigating the sharp right turn when approaching from the east. The Class I bike path that runs to the west along I-80 intersects with County Road 32A on the south side of the crossing. Bicyclists traveling west must leave the Class II bike lane and cross the motor vehicle travel lanes to access the bike path.



Exhibit 1 – County Road 32A Railroad Crossing Looking West

(Source: Google Maps, February 2020)

Figure 1 shows the existing peak hour vehicle turning movement volumes, traffic control, and lane configurations for the study intersections. Basic traffic characteristics along the corridor that are used in the traffic analysis are summarized as follows:

- The peak hour factor (PHF) was set to 0.94 for AM and 0.95 for PM for the whole network.
- Along Mace Boulevard, truck percentages are 2% for AM and 1% for PM.
- Truck percentages for other intersections are 11% for AM and 2% for PM.

The average PHF was calculated across all study intersections since the values were similar. In contrast, the truck percentage was noticeably higher during the AM peak hour at the County Road 32A intersections due to trips to and from the Yolo County Central Landfill located on County Road 28H west of County Road 105.

Intersection operations were analyzed for existing (2019) conditions under AM and PM peak hour conditions using the Synchro (version 10) software. Table 2 shows the intersection LOS and average delay under existing (2019) conditions (see attachment for detailed analysis results).



Table 2. Intersection Operations - Existing (2019) Conditions

| Intersection | Traffic Control | LOS/Delay | |
|---|-------------------------------|----------------|----------------------------------|
| | | AM | PM |
| 1. Second Street/County Road 32A/Mace Boulevard | Signal | C / 33 | C / 22 |
| 2. I-80 Westbound Ramps/Mace Boulevard | Signal | B / 17 | B / 16 |
| 3. County Road 32A/County Road 105 | Side Street Stop ¹ | A / 7 (SB) | A / 8 (EB) |
| 4. County Road 32A/I-80 Westbound Ramps | Side Street Stop | A / 10 (NB LT) | B / 11 (NB LT) |
| 5. Chiles Road/Mace Boulevard | Signal | D / 38 | C / 28 |
| 6. County Road 32B/I-80 Eastbound Ramps | Side Street Stop | B / 12 (SB LT) | <u>F</u> / * ² |

Source: Fehr & Peers (2020)

Notes: Delay is reported in seconds per vehicle. Bold and underline font indicates LOS E or F conditions.

1. The intersection has stop control for the eastbound and southbound approaches, but the northbound approach is uncontrolled. Since the HCM methodology does not account for this configuration, the intersection was modeled with all-way stop control, and the highest delay for the stopped approaches was reported.
2. Although the HCM method reports LOS C (SB LT), field observations showed congested conditions (LOS F) on the eastbound and westbound approaches due to queuing from the ramp meter on the I-80 eastbound on-ramp.

Under existing (2019) conditions, all study intersections operate at LOS D and better during the AM peak hour. During the PM peak hour, all but one study intersections operate at LOS C or better. The County Road 32B/I-80 Eastbound I-80 Ramps intersection was observed to have LOS F conditions due to queuing from the ramp meter. The ramp meter is operated in this manner to reduce eastbound I-80 congestion, which is described further below.

Local and regional traffic diverts onto study area roadways (County Road 32A, Chiles Road/County Road 32B, and Mace Boulevard) due to extended periods of very low travel speeds during the PM peak hour on eastbound I-80. As a result, diverting from I-80 onto local roadways often provides a faster alternative to remaining on the freeway through Davis. Similarly, locally generated traffic from Davis and Yolo County utilizing eastbound I-80 can experience faster travel times by accessing I-80 as far east as possible (for example, motorists departing Downtown Davis for Sacramento accessing I-80 at Mace Boulevard or County Road 32A instead of Richards Boulevard). Moreover, the increased prevalence and use of navigation apps (such as Google Maps, Waze, etc.) in recent years provides motorists with real-time and predictive travel time information that can influence route selection.

To manage freeway operations, Caltrans operates ramp meters on the eastbound I-80 on-ramps at Mace Boulevard and County Road 32B to control the study area vehicles that can enter the freeway.



The ramp meters are designed to improve operating conditions on eastbound I-80 by restricting on-ramp flow rates according to mainline traffic volumes. Therefore, when congested conditions occur on eastbound I-80, flow rates decrease for the Mace Boulevard and County Road 32B on-ramps, causing additional delays and queuing on Mace Boulevard and County Roads 32A and 32B. During peak times, the queue from the County Road 32B on-ramp can extend upstream on the westbound approach to the County Road 32B/I-80 Eastbound Ramps intersection underneath the freeway to west of the County Road 32A/I-80 Westbound Ramps intersection.

Inrix, a transportation data company, provides speed data from mobile sources and GPS-equipped vehicles. The average speed for segments of eastbound County Road 32A on weekdays (Monday-Friday) in October 2019 is shown in Exhibit 1 below. Segments 1 and 2 are located west of the I-80 Westbound Ramps intersection and are each about 3,300 feet long. Segment 3 goes from the I-80 Westbound Ramps to the I-80 Eastbound Ramps intersection. During the AM peak period (6 to 10 AM), eastbound I-80 is typically not congested, and the eastbound on-ramp ramp meter is not active. As a result, at the average speed between the ramp terminal intersections is about 42 mph. During the PM peak period, the average speeds drop to less than 25 mph due to queues that extend back from congestion on eastbound I-80 and the ramp meter. The speeds are lowest from 4:00 to 5:15 PM. In this period, the average speed also drops below 50 mph east of the I-80 Westbound Ramps intersection indicating that the queue extends upstream on some days.

| | 1 | 2 | 3 | | 1 | 2 | 3 |
|---------|----|----|----|---------|----|----|----|
| 6:00 AM | 49 | 48 | 41 | 3:00 PM | 57 | 54 | 38 |
| 6:15 AM | 48 | 47 | 42 | 3:15 PM | 58 | 54 | 34 |
| 6:30 AM | 49 | 49 | 42 | 3:30 PM | 58 | 53 | 31 |
| 6:45 AM | 50 | 49 | 43 | 3:45 PM | 57 | 50 | 25 |
| 7:00 AM | 54 | 51 | 44 | 4:00 PM | 56 | 44 | 15 |
| 7:15 AM | 56 | 53 | 42 | 4:15 PM | 53 | 43 | 13 |
| 7:30 AM | 56 | 55 | 43 | 4:30 PM | 57 | 47 | 15 |
| 7:45 AM | 55 | 52 | 42 | 4:45 PM | 58 | 49 | 17 |
| 8:00 AM | 53 | 51 | 41 | 5:00 PM | 57 | 47 | 19 |
| 8:15 AM | 57 | 55 | 42 | 5:15 PM | 58 | 49 | 21 |
| 8:30 AM | 58 | 55 | 43 | 5:30 PM | 56 | 50 | 24 |
| 8:45 AM | 56 | 53 | 43 | 5:45 PM | 57 | 51 | 26 |
| 9:00 AM | 52 | 51 | 42 | 6:00 PM | 58 | 54 | 30 |
| 9:15 AM | 53 | 53 | 43 | 6:15 PM | 58 | 54 | 34 |
| 9:30 AM | 55 | 54 | 44 | 6:30 PM | 57 | 52 | 35 |
| 9:45 AM | 53 | 52 | 44 | 6:45 PM | 56 | 50 | 34 |
| | | | | 7:00 PM | 56 | 53 | 37 |
| | | | | 7:15 PM | 53 | 51 | 39 |
| | | | | 7:30 PM | 49 | 48 | 39 |
| | | | | 7:45 PM | 49 | 48 | 39 |

Exhibit 1. Average Weekday Speed on Eastbound County Road 32A in October 2019



Project Alternatives

To improve safety at the County Road 32A railroad crossing at County Road 105, the project team developed the following four alternatives and provided them for the traffic analysis (see attachment for alternative concept drawings).

Alternative 1 – Overhead Crossing, Design Speed 50 mph

Alternative 1 would replace the existing at-grade crossing with an overhead grade separation located approximately 2,500 feet to the east. The Class I bike path that currently ends at County Road 105 would be extended east to the new crossing location using the existing County Road 32A alignment that will be abandoned. The bike path would pass under the new overhead and connect to the existing Class II bike lanes on County Road 32A. The realigned County Road 32A would intersect County Road 105 approximately 120 feet north of the current intersection.

Alternative 2 – Perpendicular At-grade Crossing, Design Speed 40 mph

Alternative 2 would replace the existing at-grade crossing with a new, perpendicular at-grade crossing located approximately 1.35 miles to the east. The new at-grade crossing would be about 3,200 feet west of the County Road 32A/I-80 Westbound Ramps intersection. The Class I bike path that currently ends at County Road 105 would be extended east to the new crossing location using the existing County Road 32A alignment that will be abandoned. At the crossing location, a large culvert pipe will be installed so that the bike path can pass under the new County Road 32A alignment. The realigned County Road 32A would intersect County Road 105 approximately 400 feet north of the current intersection.

Alternative 3 – Skewed At-grade Crossing, Design Speed 45 mph

Alternative 3 would replace the existing at-grade crossing with a new, skewed at-grade crossing located approximately 1.13 miles to the east. The new at-grade crossing would be about 4,200 feet west of the County Road 32A/I-80 Westbound Ramps intersection. The Class I bike path that currently ends at County Road 105 would be extended east to the new crossing location using the existing County Road 32A that will be abandoned. At the crossing location, a large culvert pipe will be installed so that the bike path can pass under the new County Road 32A alignment. The realigned County Road 32A would intersect County Road 105 approximately 2,170 feet north of the current intersection.

Alternative 8 – Overhead Crossing, Design Speed 40 mph

Alternative 1 would replace the existing at-grade crossing with an overhead grade separation located approximately 1.35 miles to the east. The Class I bike path that currently ends at County Road 105 would be extended east to the new crossing location using the existing County Road 32A alignment that will be abandoned. The bike path would pass under the new overhead and connect



to the existing Class II bike lanes on County Road 32A. The realigned County Road 32A would intersect County Road 105 approximately 420 feet north of the current intersection.

Cumulative Conditions

The study area intersections were analyzed under cumulative conditions for the no build and the three build alternatives. Figure 2 shows the cumulative peak hour vehicle turning movement volumes, traffic control, and lane configurations for the study intersections under the no build alternative. With the build alternatives, the County Road 32A/County Road 105 intersection changes orientation so that the south leg becomes the west leg, and the east leg becomes the south leg. Otherwise, the traffic volumes are the same among the project alternatives.

Intersection operations were analyzed for cumulative conditions under AM and PM peak hour conditions using the Synchro software. Table 3 shows the intersection LOS and average delay under cumulative conditions (see attachment for detailed analysis results).

Table 3. Intersection Operations – Cumulative Conditions

| Intersection | Traffic Control | LOS/Delay | |
|---|-------------------------------|-----------------------|-----------------------|
| | | AM | PM |
| 1. Second Street/County Road 32A/Mace Boulevard | Signalized | <u>F / 121</u> | <u>F / 140</u> |
| 2. I-80 Westbound Ramps/Mace Boulevard | Signalized | C / 28 | <u>E / 55</u> |
| 3. County Road 32A/County Road 105 | Side Street Stop ¹ | A / 9 (EB) | D / 35 (EB) |
| | All Way Stop ² | B / 11 | D / 26 |
| 4. County Road 32A/I-80 Westbound Ramps | Side Street Stop | B / 14 (NB LT) | D / 34 (NB LT) |
| 5. Chiles Road/Mace Boulevard | Signalized | <u>F / 273</u> | <u>F / 92</u> |
| 6. County Road 32B/I-80 Eastbound Ramps | Side Street Stop | B / 13 (SB LT) | <u>F / *3</u> |

Source: Fehr & Peers (2020)

Note: Delay is reported in seconds per vehicle. Bold and underline font indicates LOS E or F conditions.

- Under the no build alternative, the intersection would have stop control for the eastbound and southbound approaches, but the northbound approach is uncontrolled. Since the HCM methodology does not account for this configuration, the intersection was modeled with all-way stop control, and the highest delay for the stopped approaches was reported.
- Under the build alternatives, the intersection is assumed to have all way stop control.
- Although the HCM method reports LOS B (EB LT), congested conditions (LOS F) on the eastbound and westbound approaches are expected to exist due to queuing from the ramp meter on the I-80 eastbound on-ramp.



Under cumulative conditions, Second Street/Mace Boulevard and Chiles Road/Mace Boulevard would be congested operating at LOS F during the AM and PM peak hours. Delays would increase at the County Road 32A/County Road 32B ramp terminal intersections, but the LOS would mostly be acceptable at LOS D or better with the current traffic control. The exception would be the Eastbound I-80 Ramps intersection, which is expected to continue to operate at LOS F due to the ramp meter. Although I-80 is planned for improvements, some eastbound congestion will likely remain during the PM peak period under cumulative conditions such that County Road 32A and 32B would continue to be an attractive option for some travelers. As a result, the ramp meter will likely be needed to manage demand for eastbound I-80 and will cause queues to extend into the ramp terminal intersection.

The County Road 32A/County Road 105 intersection is the only study intersection that would be affected by the build alternatives. With all-way stop control, the intersection would operate with LOS B during the AM peak hour and LOS D during the PM peak hour if one-lane approaches were provided. Adding a pocket lane for higher volume movements (westbound left turn and northbound right turn) would reduce the average intersection delay.

Alternatives Assessment

The project build alternatives primarily affect traffic operations in the following three areas: the County Road 105 intersection, the bike path realignment, and queuing from the County Road 32B on-ramp ramp meter. These issues are discussed below.

The build alternatives would each construct a new T-intersection on County Road 105 north of the existing intersection. The location of the new intersection ranges from 120 to 2,170 to the north. Given the lack of alternate routes, the intersection traffic volumes are expected to be the same for the build alternatives. The farther north that the intersection is located, the more total vehicle travel would occur since the high-volume movements parallel to I-80 would have a longer path. The lower volume movements to and from the north on County Road 105 would have shorter paths. The new intersection was analyzed with all-way stop control for cumulative conditions. Given the lower existing conditions volumes, intersection control in the opening year may operate acceptably with side street stop control.

The build alternatives would all extend the Class I bike path to the east using the abandoned alignment of County Road 32A and provide a grade-separated crossing of County Road 32A at the relocated railroad crossing. The bike path grade separation in Alternatives 1 and 8 would provide a better perception of personal safety than the culvert proposed in Alternatives 2 and 3. The culvert would have a shorter height and be less visible to approaching bicyclists and other travelers. All build alternatives should provide a connection from the bike path to the eastbound Class II bike lane on County Road 32A so that eastbound bicyclists do not need to cross County Road 32A.



Although Caltrans is planning to improve operations on I-80 (widening to provide HOV lanes or other improvements), the eastbound congestion is expected to continue to exist both before and after the planned improvements are constructed. As a result, queues from the eastbound I-80 on-ramp on County Road 32B may extend to County Road 32A at the railroad crossing. Alternatives 1 and 8 would provide a grade separation, so any queues on County Road 32A would not affect the railroad. Both Alternatives 2 and 3 have an at-grade crossing, so queues could potentially be an issue for the railroad crossing. The railroad crossing under Alternative 3 is located farther west, which would provide an additional 1,000 feet or so of queue storage compared to Alternative 2.

To minimize the risk of queues extending to the railroad crossing, additional storage lanes could be constructed at the ramp meter. This would involve reconstruction of the County Road 32B on-ramp and widening of the westbound (and potentially eastbound) approach to the County Road 32B/I-80 Eastbound Ramps intersection. Another option would be to use the queue detection function of the ramp meter. When a long queue is detected, the ramp meter can increase the ramp flow rate to reduce the queue. While this would negatively affect freeway operations, it would prevent safety concerns with vehicles queued at the railroad crossing.

Source: \\Fpsa03\painsc.local\Data\2019 Projects\3847_00_CR32A_Railroad_Crossing_Relocation\Graphics\QuickFigure

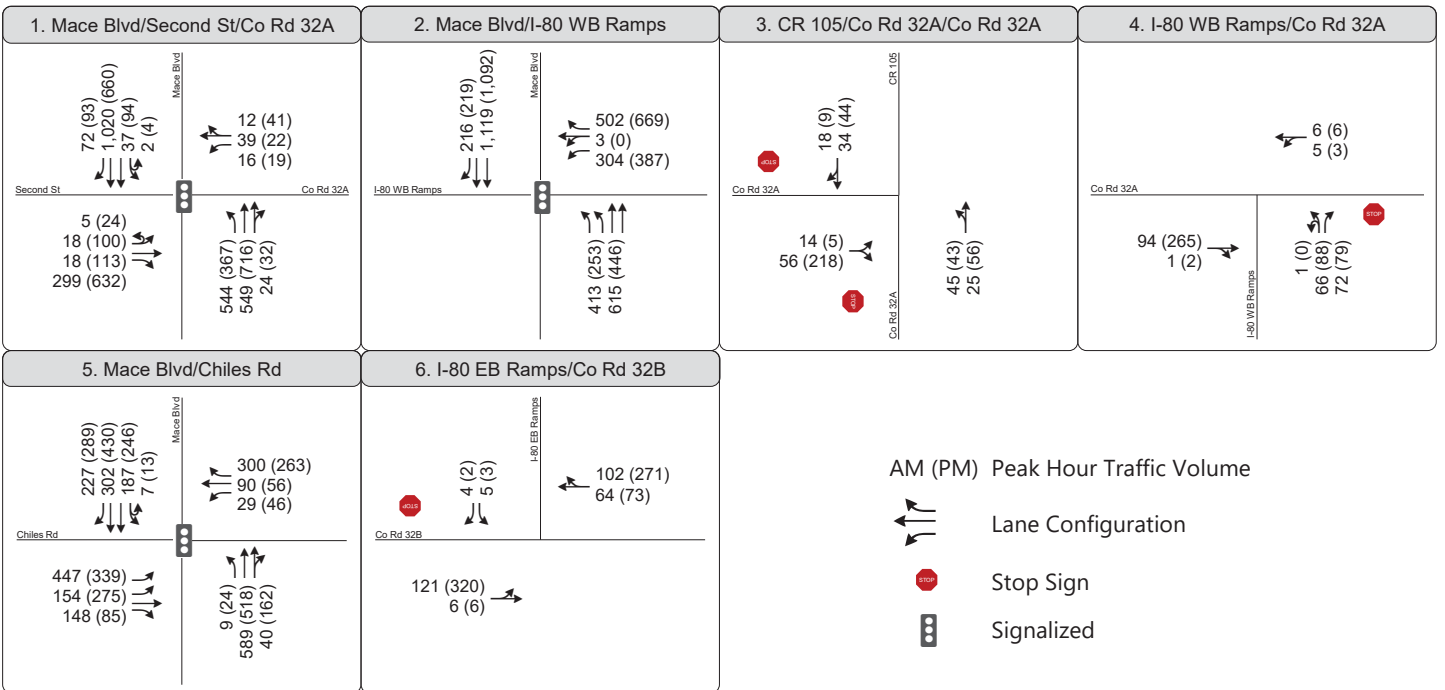
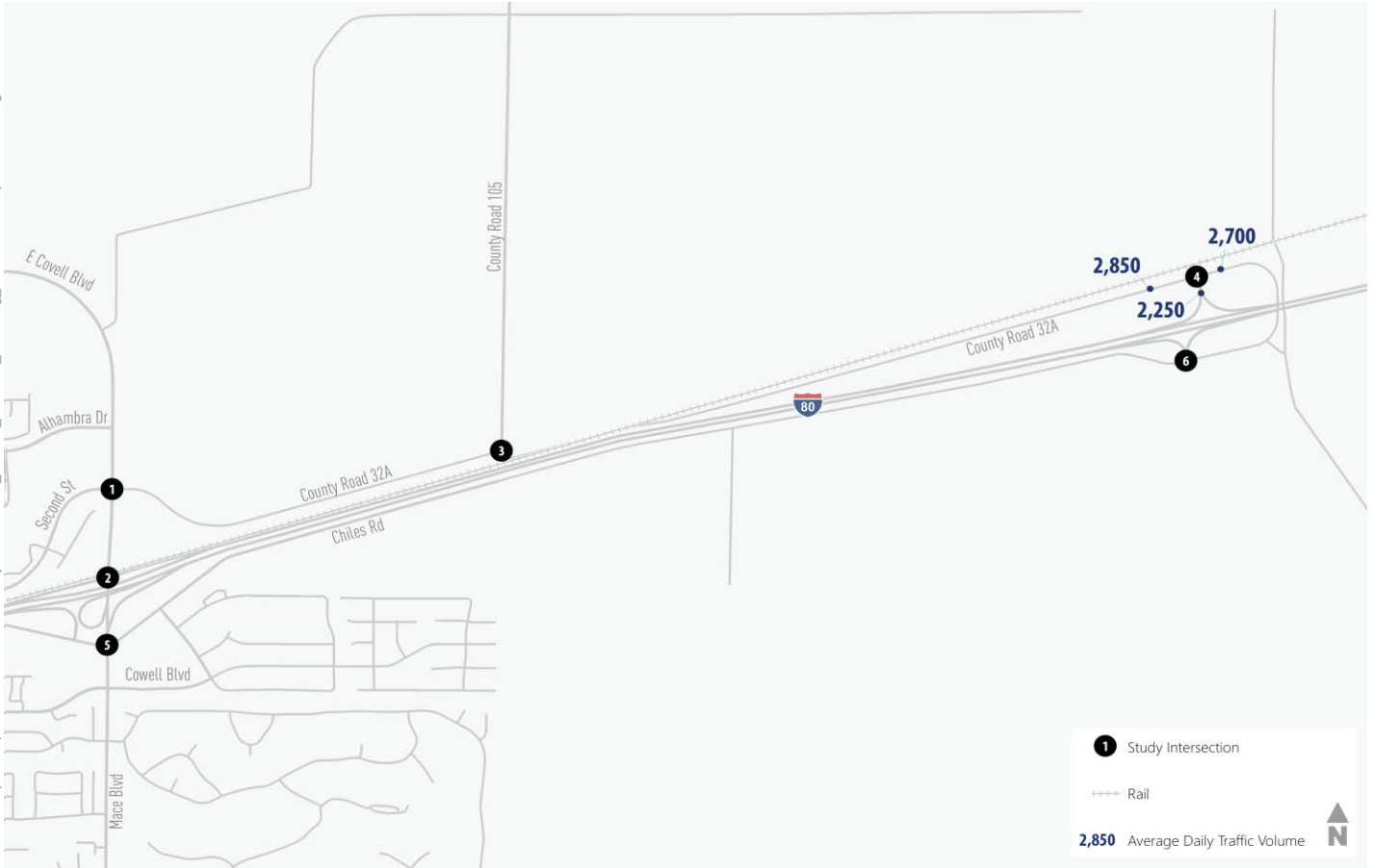


Figure 1
Peak Hour Traffic Volumes and Lane Configurations - Existing Conditions



Source: \\fpsa03\painsc\local\2019 Projects\3847.00_CR32A_Railroad_Crossing\Relocation\Graphics\QuickFigure

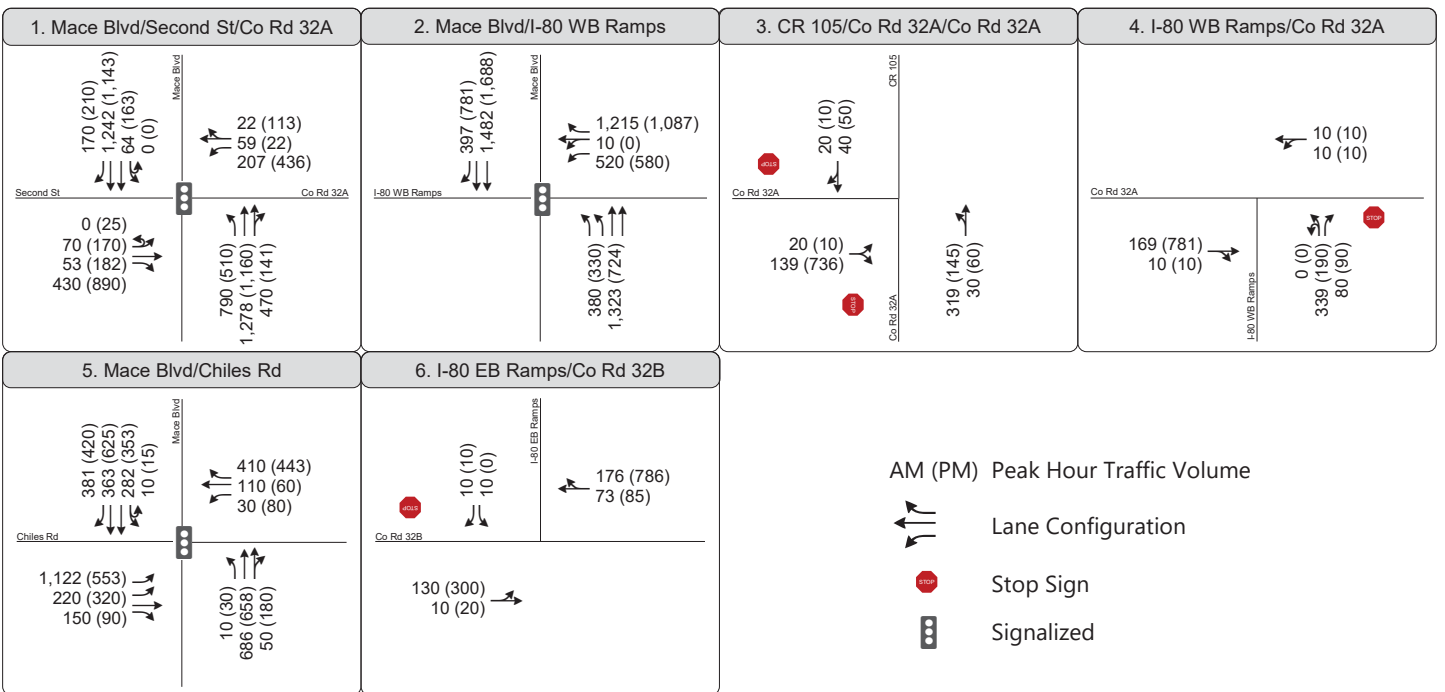
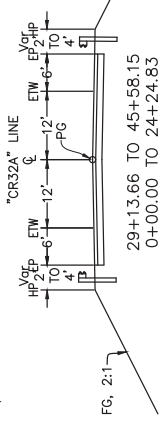


Figure 2
Peak Hour Traffic Volumes and Lane Configurations - Cumulative Conditions

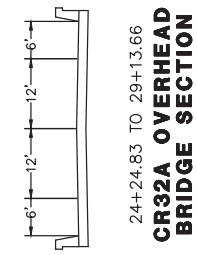


| | | | |
|-----------------------------------|---------------------------|---------------|---------------|
| YOLO COUNTY PUBLIC WORKS DIVISION | CONSULTANT DESIGN MANAGER | RASHOD GIBSON | DATE REVISION |
| DESIGNED BY | CHECKED BY | RASHOD GIBSON | DATE REVISION |
| JEFFREY HOGE | RASHOD GIBSON | JEFFREY HOGE | DATE REVISION |

| | | | | |
|---|------|-------|--------------------------|--------------------|
| 3 | Yolo | CR32A | POST MILES TOTAL PROJECT | SHEET TOTAL SHEETS |
| | | | | X |



29+13.66 TO 45+58.15
0+00.00 TO 24+24.83
**CR32A OVERHEAD
TYPICAL SECTION**



24+24.83 TO 29+13.66
**CR32A OVERHEAD
BRIDGE SECTION**

CURVE DATA

| No. @ | R | Δ | T | L |
|-------|---------|-------------|--------|--------|
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| 2 | 800.00 | 42° 33' 59" | 311.64 | 594.34 |
| 3 | 850.00 | 39° 34' 10" | 305.76 | 587.02 |
| 4 | 7500.00 | 04° 16' 15" | 279.65 | 559.03 |

REGISTERED CIVIL ENGINEER DATE _____

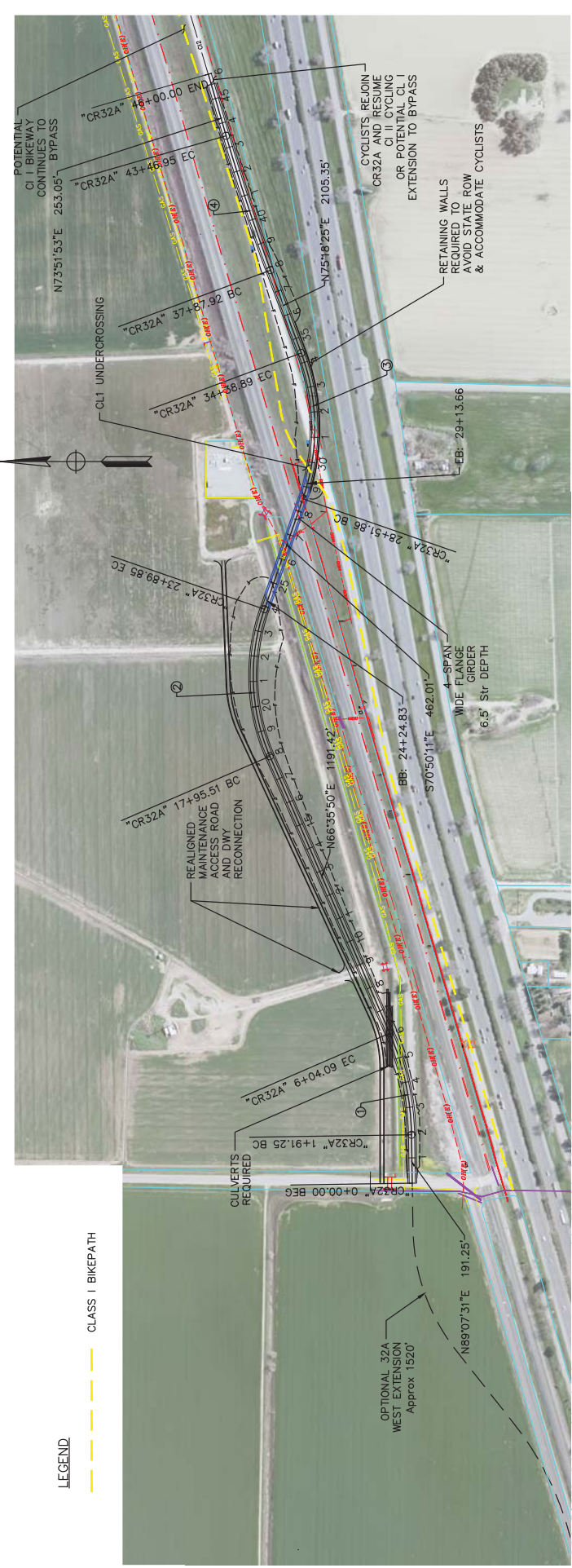
PLANS APPROVAL DATE _____

SUTTER COUNTY OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR CORRECTNESS OF THIS PLAN SHEET.

TALIN INTERNATIONAL
1601 RESPONSE ROAD, SUITE 260
SACRAMENTO, CA 95815

REGISTERED PROFESSIONAL ENGINEER
No. XXXXXX
Exp. XXXXX
Civil
State of California

DIR# COUNTY ROUTE POST MILES TOTAL PROJECT SHEET TOTAL SHEETS
3 Yolo CR32A _____ X



- ISSUES CONSIDERED**
1. AVOIDS THE GAS SUBSTATION.
 2. RESULTS IN MINIMAL NEED OF NEW RIGHT-OF-WAY ACQUISITION.
 3. AVOIDS IMPACTING MOST UTILITIES, EXCEPT MAY REQUIRE RELOCATING OVERHEAD POWER LINES.
 4. SKEWED CROSSING IS ON A RELATIVELY SHORT BRIDGE STRUCTURE BUT STILL MAY CONFLICT WITH GAS PIPELINE AND RAILROAD RIGHT-OF-WAY.
 5. CLASS I BIKE PATH WILL BE EXTENDED APPROXIMATELY 1.5 MILES UP TO THE NEW CROSSING LOCATION USING THE EXISTING CR32A THAT WILL BE ABANDONED. THE PATH WOULD PASS UNDER THE NEW CR32A ALIGNMENT, AND THE REMAINDER OF BIKE PATH FROM THE OVERHEAD CROSSING TO THE CAUSEWAY WILL REMAIN A CLASS II UNTIL FURTHER DEVELOPMENT.
 6. SHIFTS THE CR32A INTERSECTION WITH CR105 SLIGHTLY NORTH.

PROJECTED ROW ACQUISITION
TOTAL : 21.1 ACRES

**ALTERNATIVE 1
OVERHEAD
LAYOUT**
DS = 50 MPH
SCALE: 1" = 200'

| | | | | |
|-----|--------|-------|--------------------------|--------------------|
| DBK | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET TOTAL SHEETS |
| 3 | Yol | CR32A | | X |

| | | |
|---------------------------|------|-----------|
| REGISTERED CIVIL ENGINEER | DATE | REVISIONS |
| | | |

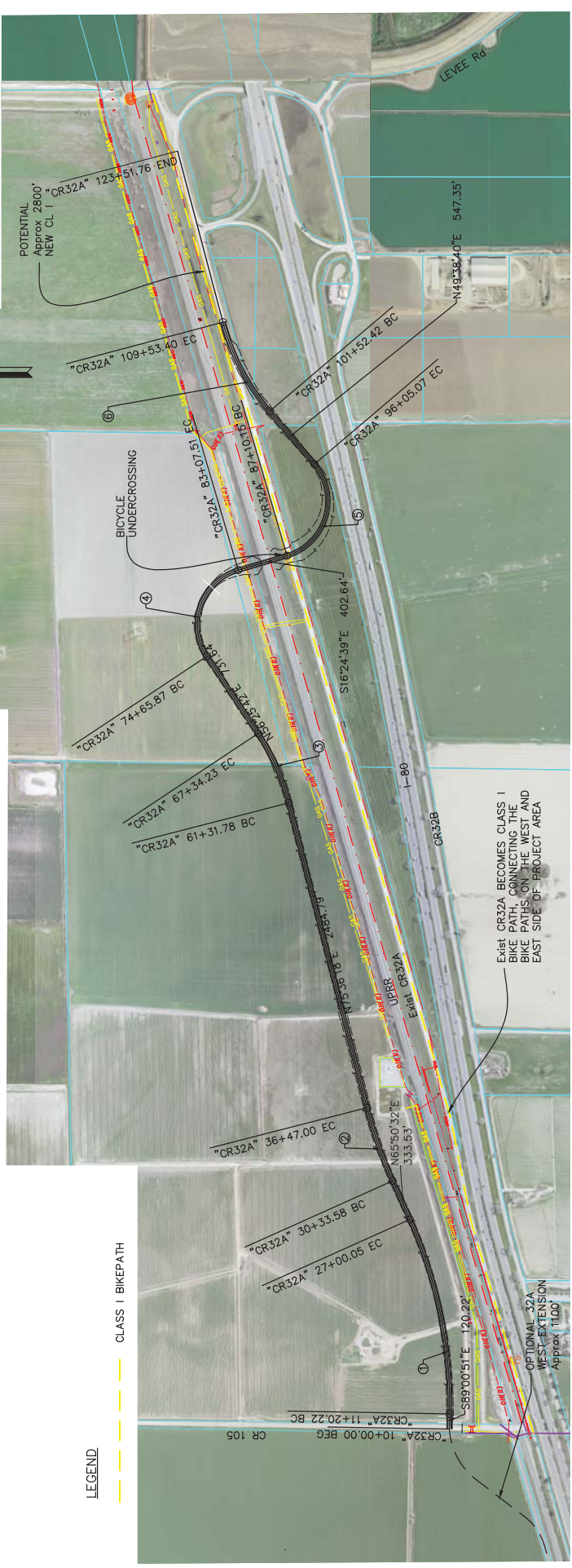
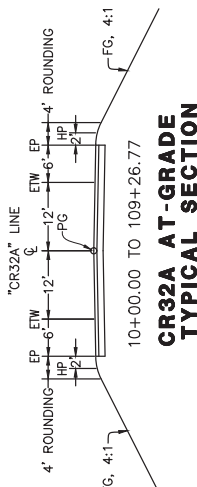
| | |
|---------------------|-------------------|
| PLANS APPROVAL DATE | PLANS APPROVAL BY |
| | |

SUTTER COUNTY OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS OF ANY KIND OR TYPE OR ON ANY OF THE COPIES OF THIS PLAN SHEET.

TALIN INTERNATIONAL
1601 RESPONSE ROAD, SUITE 260
SACRAMENTO, CA 95815

CURVE DATA

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|-------|---------|--------------|--------|---------|
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| 2 | 3600.00 | 09° 45' 46" | 307.45 | 613.42 |
| 3 | 1800.00 | 19° 10' 35" | 304.07 | 602.45 |
| 4 | 450.00 | 107° 09' 39" | 609.93 | 841.64 |
| 5 | 450.00 | 113° 56' 41" | 692.21 | 894.92 |
| 6 | 1800.00 | 25° 29' 46" | 407.24 | 800.99 |

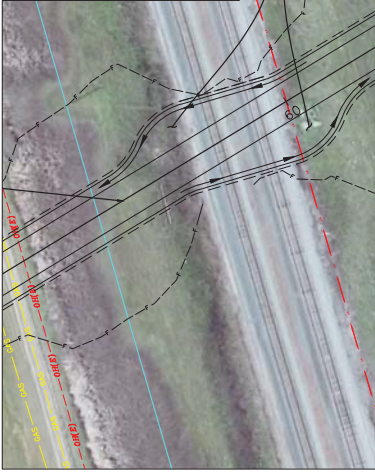


ALTERNATIVE 2
AT-GRADE
CROSSING
DS = 40 MPH
SCALE: 1" = 400'

| | | | | |
|------|--------|-------|--------------------------|--------------------|
| DIR# | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET TOTAL SHEETS |
| 3 | Yol | CR32A | | X |

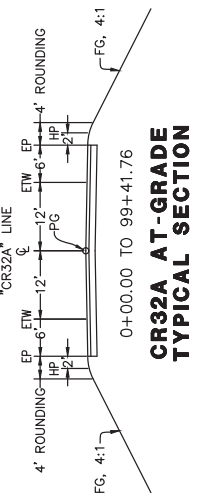
REGISTERED CIVIL ENGINEER DATE _____ DATE _____
 REVISIONS PROFESSIONAL ENGINEER
 No. XXXXXX
 Exp. XXXXX
 CIVIL
 STATE OF CALIFORNIA
 PLANS APPROVAL DATE _____
 SUTTER COUNTY OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS OF ANY KIND OR TYPE OF OR ON THESE PLANS OR THE ACCURACY OR COMPLETENESS OF THE PLAN SHEET.

TALMIN INTERNATIONAL
 1601 RESPONSE ROAD, SUITE 260
 SACRAMENTO, CA 95815



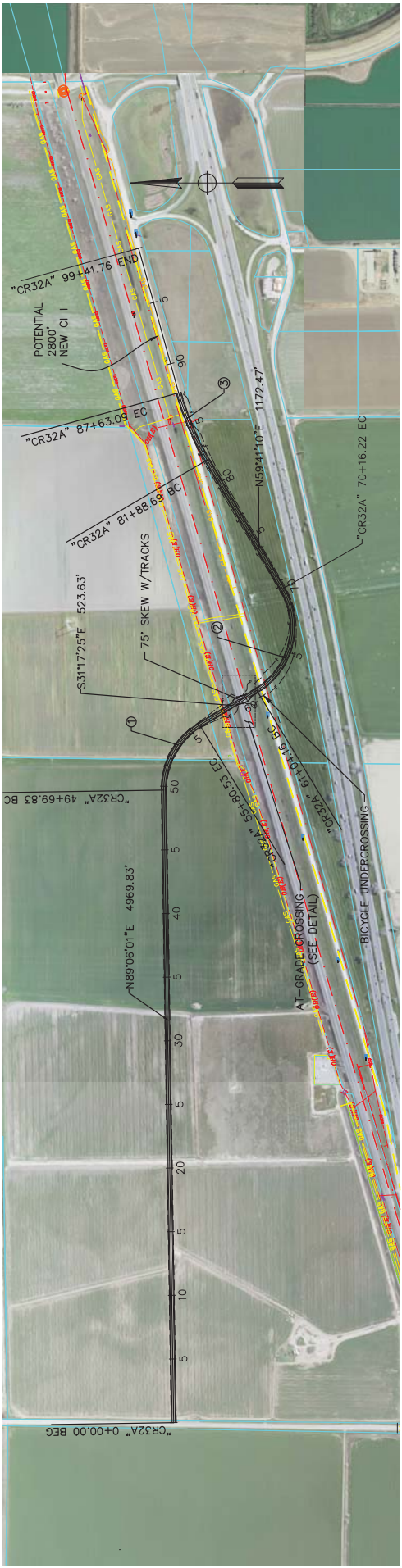
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|-------|---------|-------------|--------|--------|
| 1 | 587.00 | 59° 36' 33" | 336.24 | 610.70 |
| 2 | 587.00 | 89° 01' 25" | 577.08 | 912.05 |
| 3 | 2220.00 | 14° 49' 29" | 286.81 | 574.40 |



PAVEMENT BULBOUT TO ALLOW PERPENDICULAR BICYCLE CROSSING

CROSSING DETAIL
 1" = 50'



- ISSUES CONSIDERED**
- ROADWAY WOULD BE RAISED 7.5 FEET USING RETAINING WALL NEAR I-80 AND WOULD CROSS THE RAILROAD AT-GRADE WHICH COULD BE PHASED INTO A GRADE SEPARATED OVERHEAD.
 - AVOIDS IMPACTING UTILITIES.
 - REQUIRES NEW RIGHT-OF-WAY, BUT ALIGNMENT WILL ALLOW FOR FARMING OF THE REMNANT PARCELS ON EITHER SIDE OF CR32A.
 - QUEUING DISTANCE IS APPROXIMATELY 7,000 FEET TO THE EASTBOUND I-80 ON-RAMP.
 - CLASS I BIKE PATH WOULD BE EXTENDED APPROXIMATELY 2.1 MILES LONGER USING THE EXISTING CR32A ROADWAY AND THE PATH WOULD PASS UNDER THE NEW CR32A ALIGNMENT.
 - NEW INTERSECTION WITH CR105 WOULD BE ABOUT 0.4 MILES NORTH OF THE CURRENT CROSSING.

PROJECTED ROW ACQUISITION
 TOTAL : 14.5 ACRES

ALTERNATIVE 3
AT-GRADE
CROSSING
DS = 45 MPH
 SCALE: 1" = 400'

HCM 6th Signalized Intersection Summary
1: Mace Blvd & Second St/County Rd 32A

County Road 32A Railroad Crossing
Existing AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 23 | 18 | 299 | 16 | 39 | 12 | 544 | 549 | 24 | 39 | 1020 | 72 |
| Future Volume (veh/h) | 23 | 18 | 299 | 16 | 39 | 12 | 544 | 549 | 24 | 39 | 1020 | 72 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 0.95 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 24 | 19 | 0 | 17 | 41 | 13 | 579 | 584 | 26 | 41 | 1085 | 0 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 46 | 132 | | 35 | 86 | 27 | 656 | 2254 | 100 | 52 | 1132 | |
| Arrive On Green | 0.03 | 0.07 | 0.00 | 0.02 | 0.06 | 0.06 | 0.37 | 0.66 | 0.66 | 0.03 | 0.32 | 0.00 |
| Sat Flow, veh/h | 1781 | 1870 | 1585 | 1781 | 1340 | 425 | 1781 | 3430 | 153 | 1781 | 3554 | 1585 |
| Grp Volume(v), veh/h | 24 | 19 | 0 | 17 | 0 | 54 | 579 | 302 | 308 | 41 | 1085 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1870 | 1585 | 1781 | 0 | 1765 | 1781 | 1777 | 1805 | 1781 | 1777 | 1585 |
| Q Serve(g_s), s | 1.0 | 0.7 | 0.0 | 0.7 | 0.0 | 2.3 | 23.9 | 5.5 | 5.5 | 1.8 | 23.5 | 0.0 |
| Cycle Q Clear(g_c), s | 1.0 | 0.7 | 0.0 | 0.7 | 0.0 | 2.3 | 23.9 | 5.5 | 5.5 | 1.8 | 23.5 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.24 | 1.00 | | 0.08 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 46 | 132 | | 35 | 0 | 114 | 656 | 1168 | 1187 | 52 | 1132 | |
| V/C Ratio(X) | 0.52 | 0.14 | | 0.48 | 0.00 | 0.47 | 0.88 | 0.26 | 0.26 | 0.78 | 0.96 | |
| Avail Cap(c_a), veh/h | 318 | 572 | | 227 | 0 | 517 | 681 | 1168 | 1187 | 227 | 1132 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 37.8 | 34.3 | 0.0 | 38.1 | 0.0 | 35.4 | 23.2 | 5.6 | 5.6 | 37.8 | 26.2 | 0.0 |
| Incr Delay (d2), s/veh | 12.3 | 0.7 | 0.0 | 13.9 | 0.0 | 4.3 | 13.7 | 0.2 | 0.2 | 40.4 | 17.8 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.6 | 0.4 | 0.0 | 0.4 | 0.0 | 1.1 | 11.6 | 1.6 | 1.7 | 1.3 | 12.0 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 50.0 | 35.0 | 0.0 | 52.0 | 0.0 | 39.8 | 36.9 | 5.7 | 5.7 | 78.2 | 44.1 | 0.0 |
| LnGrp LOS | D | C | | D | A | D | D | A | A | E | D | |
| Approach Vol, veh/h | | 43 | A | | 71 | | | 1189 | | | 1126 | A |
| Approach Delay, s/veh | | 43.4 | | | 42.7 | | | 20.9 | | | 45.3 | |
| Approach LOS | | D | | | D | | | C | | | D | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 6.3 | 57.1 | 5.5 | 9.5 | 32.9 | 30.5 | 6.0 | 9.1 | | | | |
| Change Period (Y+Rc), s | 4.0 | 5.5 | 4.0 | 4.0 | 4.0 | 5.5 | 4.0 | 4.0 | | | | |
| Max Green Setting (Gmax), s | 10.0 | 35.0 | 10.0 | 24.0 | 30.0 | 25.0 | 14.0 | 23.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 3.8 | 7.5 | 2.7 | 2.7 | 25.9 | 25.5 | 3.0 | 4.3 | | | | |
| Green Ext Time (p_c), s | 0.1 | 12.7 | 0.0 | 0.1 | 3.0 | 0.0 | 0.1 | 0.6 | | | | |

Intersection Summary

| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 33.3 |
| HCM 6th LOS | C |

Notes

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

2: Mace Blvd & I-80 WB Ramps

County Road 32A Railroad Crossing
Existing AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|-----|------|-----|------|-------|------|------|------|------|------|------|------|
| Lane Configurations | | | | ↖ ↗ | ↖ ↗ | ↖ ↗ | ↖ ↗ | ↖ ↗ | | | ↖ ↗ | ↖ ↗ |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 304 | 3 | 502 | 413 | 615 | 0 | 0 | 1119 | 216 |
| Future Volume (veh/h) | 0 | 0 | 0 | 304 | 3 | 502 | 413 | 615 | 0 | 0 | 1119 | 216 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.99 |
| Parking Bus, Adj | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | | | No | | No | | No | | | | |
| Adj Sat Flow, veh/h/ln | | | | 1870 | 1870 | 1870 | 1870 | 1870 | 0 | 0 | 1870 | 1870 |
| Adj Flow Rate, veh/h | | | | 325 | 0 | 0 | 439 | 654 | 0 | 0 | 1190 | 230 |
| Peak Hour Factor | | | | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | | | | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 2 | 2 |
| Cap, veh/h | | | | 567 | 0 | | 586 | 2537 | 0 | 0 | 1719 | 757 |
| Arrive On Green | | | | 0.16 | 0.00 | 0.00 | 0.17 | 0.71 | 0.00 | 0.00 | 0.48 | 0.48 |
| Sat Flow, veh/h | | | | 3563 | 0 | 1585 | 3456 | 3647 | 0 | 0 | 3647 | 1564 |
| Grp Volume(v), veh/h | | | | 325 | 0 | 0 | 439 | 654 | 0 | 0 | 1190 | 230 |
| Grp Sat Flow(s),veh/h/ln | | | | 1781 | 0 | 1585 | 1728 | 1777 | 0 | 0 | 1777 | 1564 |
| Q Serve(g_s), s | | | | 6.5 | 0.0 | 0.0 | 9.3 | 5.0 | 0.0 | 0.0 | 20.1 | 6.9 |
| Cycle Q Clear(g_c), s | | | | 6.5 | 0.0 | 0.0 | 9.3 | 5.0 | 0.0 | 0.0 | 20.1 | 6.9 |
| Prop In Lane | | | | 1.00 | | 1.00 | 1.00 | | 0.00 | 0.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | | | | 567 | 0 | | 586 | 2537 | 0 | 0 | 1719 | 757 |
| V/C Ratio(X) | | | | 0.57 | 0.00 | | 0.75 | 0.26 | 0.00 | 0.00 | 0.69 | 0.30 |
| Avail Cap(c_a), veh/h | | | | 1888 | 0 | | 1072 | 2537 | 0 | 0 | 2159 | 951 |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | | | | 30.1 | 0.0 | 0.0 | 30.6 | 3.9 | 0.0 | 0.0 | 15.5 | 12.1 |
| Incr Delay (d2), s/veh | | | | 0.3 | 0.0 | 0.0 | 0.7 | 0.0 | 0.0 | 0.0 | 0.4 | 0.1 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 2.6 | 0.0 | 0.0 | 3.8 | 1.2 | 0.0 | 0.0 | 7.2 | 2.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 30.4 | 0.0 | 0.0 | 31.3 | 3.9 | 0.0 | 0.0 | 15.9 | 12.2 |
| LnGrp LOS | | | | C | A | | C | A | A | A | B | B |
| Approach Vol, veh/h | | | | | 325 | A | | 1093 | | | 1420 | |
| Approach Delay, s/veh | | | | | 30.4 | | | 14.9 | | | 15.3 | |
| Approach LOS | | | | | C | | | B | | | B | |
| Timer - Assigned Phs | | 2 | | | 5 | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | 60.3 | | | 17.8 | 42.5 | | 17.0 | | | | |
| Change Period (Y+Rc), s | | 5.1 | | | * 4.7 | 5.1 | | 4.7 | | | | |
| Max Green Setting (Gmax), s | | 47.0 | | | * 24 | 47.0 | | 41.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | 7.0 | | | 11.3 | 22.1 | | 8.5 | | | | |
| Green Ext Time (p_c), s | | 9.5 | | | 1.8 | 15.3 | | 3.8 | | | | |

Intersection Summary

| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 16.9 |
| HCM 6th LOS | B |

Notes

- User approved volume balancing among the lanes for turning movement.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
- Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection

| | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.5 |
| Intersection LOS | A |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 14 | 56 | 45 | 25 | 34 | 18 |
| Future Vol, veh/h | 14 | 56 | 45 | 25 | 34 | 18 |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Heavy Vehicles, % | 11 | 11 | 11 | 11 | 11 | 11 |
| Mvmt Flow | 16 | 62 | 50 | 28 | 38 | 20 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | NB | SB |
|-------------------------------|-----|-----|-----|
| Opposing Approach | | SB | NB |
| Opposing Lanes | 0 | 1 | 1 |
| Conflicting Approach Left SB | | EB | |
| Conflicting Lanes Left | 1 | 1 | 0 |
| Conflicting Approach Right NB | | | EB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.3 | 7.9 | 7.4 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | SBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 64% | 20% | 0% |
| Vol Thru, % | 36% | 0% | 65% |
| Vol Right, % | 0% | 80% | 35% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 70 | 70 | 52 |
| LT Vol | 45 | 14 | 0 |
| Through Vol | 25 | 0 | 34 |
| RT Vol | 0 | 56 | 18 |
| Lane Flow Rate | 78 | 78 | 58 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.095 | 0.084 | 0.065 |
| Departure Headway (Hd) | 4.396 | 3.878 | 4.075 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 812 | 912 | 873 |
| Service Time | 2.438 | 1.955 | 2.127 |
| HCM Lane V/C Ratio | 0.096 | 0.086 | 0.066 |
| HCM Control Delay | 7.9 | 7.3 | 7.4 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.3 | 0.3 | 0.2 |

Intersection

Int Delay, s/veh 5.5

Movement EBT EBR WBL WBT NBL NBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 94 | 1 | 5 | 6 | 67 | 72 |
| Future Vol, veh/h | 94 | 1 | 5 | 6 | 67 | 72 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | 25 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 90 | 90 | 90 | 90 | 90 | 90 |
| Heavy Vehicles, % | 11 | 11 | 11 | 11 | 11 | 11 |
| Mvmt Flow | 104 | 1 | 6 | 7 | 74 | 80 |

Major/Minor Major1 Major2 Minor1

| | | | | | | |
|----------------------|---|---|-------|---|-------|-------|
| Conflicting Flow All | 0 | 0 | 105 | 0 | 124 | 105 |
| Stage 1 | - | - | - | - | 105 | - |
| Stage 2 | - | - | - | - | 19 | - |
| Critical Hdwy | - | - | 4.21 | - | 6.51 | 6.31 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.51 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.51 | - |
| Follow-up Hdwy | - | - | 2.299 | - | 3.599 | 3.399 |
| Pot Cap-1 Maneuver | - | - | 1432 | - | 850 | 925 |
| Stage 1 | - | - | - | - | 897 | - |
| Stage 2 | - | - | - | - | 981 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1432 | - | 847 | 925 |
| Mov Cap-2 Maneuver | - | - | - | - | 847 | - |
| Stage 1 | - | - | - | - | 897 | - |
| Stage 2 | - | - | - | - | 977 | - |

Approach EB WB NB

HCM Control Delay, s 0 3.4 9.5
HCM LOS A

Minor Lane/Major Mvmt NBLn1 NBLn2 EBT EBR WBL WBT

| | | | | | | |
|-----------------------|-------|-------|---|---|-------|---|
| Capacity (veh/h) | 847 | 925 | - | - | 1432 | - |
| HCM Lane V/C Ratio | 0.088 | 0.086 | - | - | 0.004 | - |
| HCM Control Delay (s) | 9.7 | 9.3 | - | - | 7.5 | 0 |
| HCM Lane LOS | A | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.3 | 0.3 | - | - | 0 | - |

HCM 6th Signalized Intersection Summary

5: Mace Blvd & Chiles Rd

County Road 32A Railroad Crossing

Existing AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|-------|------|------|------|------|------|------|------|------|
| Lane Configurations | ↖↗ | ↑ | ↖ | ↖ | ↑ | ↖ | ↖ | ↑↔ | | ↖ | ↑↑ | ↖ |
| Traffic Volume (veh/h) | 447 | 154 | 148 | 29 | 90 | 300 | 9 | 596 | 40 | 194 | 302 | 227 |
| Future Volume (veh/h) | 447 | 154 | 148 | 29 | 90 | 300 | 9 | 596 | 40 | 194 | 302 | 227 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 0.99 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 476 | 164 | 0 | 31 | 96 | 319 | 10 | 634 | 0 | 206 | 321 | 0 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 551 | 648 | | 54 | 436 | 365 | 18 | 896 | | 250 | 1360 | |
| Arrive On Green | 0.16 | 0.35 | 0.00 | 0.03 | 0.23 | 0.23 | 0.01 | 0.25 | 0.00 | 0.14 | 0.38 | 0.00 |
| Sat Flow, veh/h | 3456 | 1870 | 1585 | 1781 | 1870 | 1563 | 1781 | 3647 | 0 | 1781 | 3554 | 1585 |
| Grp Volume(v), veh/h | 476 | 164 | 0 | 31 | 96 | 319 | 10 | 634 | 0 | 206 | 321 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1728 | 1870 | 1585 | 1781 | 1870 | 1563 | 1781 | 1777 | 0 | 1781 | 1777 | 1585 |
| Q Serve(g_s), s | 11.7 | 5.5 | 0.0 | 1.5 | 3.6 | 17.1 | 0.5 | 14.1 | 0.0 | 9.8 | 5.3 | 0.0 |
| Cycle Q Clear(g_c), s | 11.7 | 5.5 | 0.0 | 1.5 | 3.6 | 17.1 | 0.5 | 14.1 | 0.0 | 9.8 | 5.3 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 551 | 648 | | 54 | 436 | 365 | 18 | 896 | | 250 | 1360 | |
| V/C Ratio(X) | 0.86 | 0.25 | | 0.57 | 0.22 | 0.87 | 0.57 | 0.71 | | 0.82 | 0.24 | |
| Avail Cap(c_a), veh/h | 555 | 687 | | 204 | 472 | 395 | 286 | 1020 | | 307 | 1360 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 35.7 | 20.4 | 0.0 | 41.7 | 27.0 | 32.2 | 43.0 | 29.7 | 0.0 | 36.4 | 18.2 | 0.0 |
| Incr Delay (d2), s/veh | 13.7 | 0.3 | 0.0 | 13.0 | 0.4 | 19.0 | 35.2 | 2.3 | 0.0 | 15.3 | 0.1 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 5.7 | 2.3 | 0.0 | 0.8 | 1.6 | 8.1 | 0.4 | 6.1 | 0.0 | 5.2 | 2.1 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 49.4 | 20.7 | 0.0 | 54.7 | 27.3 | 51.1 | 78.2 | 31.9 | 0.0 | 51.7 | 18.4 | 0.0 |
| LnGrp LOS | D | C | | D | C | D | E | C | | D | B | |
| Approach Vol, veh/h | | 640 | A | | 446 | | | 644 | A | | 527 | A |
| Approach Delay, s/veh | | 42.0 | | | 46.3 | | | 32.6 | | | 31.4 | |
| Approach LOS | | D | | | D | | | C | | | C | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 16.2 | 27.3 | 8.0 | 35.6 | 4.9 | 38.7 | 17.9 | 25.7 | | | | |
| Change Period (Y+Rc), s | 4.0 | 5.3 | 5.4 | * 5.4 | 4.0 | 5.3 | 4.0 | 5.4 | | | | |
| Max Green Setting (Gmax), s | 15.0 | 25.0 | 10.0 | * 32 | 14.0 | 25.0 | 14.0 | 22.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 11.8 | 16.1 | 3.5 | 7.5 | 2.5 | 7.3 | 13.7 | 19.1 | | | | |
| Green Ext Time (p_c), s | 0.5 | 5.8 | 0.1 | 2.7 | 0.0 | 4.5 | 0.2 | 1.2 | | | | |

Intersection Summary

| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 37.7 |
| HCM 6th LOS | D |

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [NBR, EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th TWSC
6: County Rd 32B & I-80 EB Ramps

County Road 32A Railroad Crossing
Existing AM

Intersection

Int Delay, s/veh 3.5

Movement EBL EBT WBT WBR SBL SBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↕ | ↕ | | ↕ | ↕ |
| Traffic Vol, veh/h | 121 | 6 | 64 | 102 | 5 | 4 |
| Future Vol, veh/h | 121 | 6 | 64 | 102 | 5 | 4 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | 30 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 90 | 90 | 90 | 90 | 90 | 90 |
| Heavy Vehicles, % | 11 | 11 | 11 | 11 | 11 | 11 |
| Mvmt Flow | 134 | 7 | 71 | 113 | 6 | 4 |

Major/Minor Major1 Major2 Minor2

| | | | | | | |
|----------------------|-------|---|---|---|-------|-------|
| Conflicting Flow All | 184 | 0 | - | 0 | 403 | 128 |
| Stage 1 | - | - | - | - | 128 | - |
| Stage 2 | - | - | - | - | 275 | - |
| Critical Hdwy | 4.21 | - | - | - | 6.51 | 6.31 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.51 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.51 | - |
| Follow-up Hdwy | 2.299 | - | - | - | 3.599 | 3.399 |
| Pot Cap-1 Maneuver | 1338 | - | - | - | 586 | 898 |
| Stage 1 | - | - | - | - | 876 | - |
| Stage 2 | - | - | - | - | 751 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1338 | - | - | - | 527 | 898 |
| Mov Cap-2 Maneuver | - | - | - | - | 527 | - |
| Stage 1 | - | - | - | - | 788 | - |
| Stage 2 | - | - | - | - | 751 | - |

Approach EB WB SB

| | | | |
|----------------------|-----|---|------|
| HCM Control Delay, s | 7.6 | 0 | 10.6 |
| HCM LOS | | | B |

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1 SBLn2

| | | | | | | |
|-----------------------|------|---|---|---|-------|-------|
| Capacity (veh/h) | 1338 | - | - | - | 527 | 898 |
| HCM Lane V/C Ratio | 0.1 | - | - | - | 0.011 | 0.005 |
| HCM Control Delay (s) | 8 | 0 | - | - | 11.9 | 9 |
| HCM Lane LOS | A | A | - | - | B | A |
| HCM 95th %tile Q(veh) | 0.3 | - | - | - | 0 | 0 |

HCM 6th Signalized Intersection Summary
1: Mace Blvd & Second St/County Rd 32A

County Road 32A Railroad Crossing
Existing PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | ↔ | ↑ | ↗ | ↖ | ↔ | | ↖ | ↑↔ | | ↗ | ↑↑ | ↗ |
| Traffic Volume (veh/h) | 124 | 113 | 632 | 19 | 22 | 41 | 367 | 716 | 32 | 98 | 660 | 93 |
| Future Volume (veh/h) | 124 | 113 | 632 | 19 | 22 | 41 | 367 | 716 | 32 | 98 | 660 | 93 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 0.93 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1885 | 1885 | 1885 | 1885 | 1885 | 1885 | 1885 | 1885 | 1885 | 1885 | 1885 | 1885 |
| Adj Flow Rate, veh/h | 131 | 119 | 0 | 20 | 23 | 8 | 386 | 754 | 30 | 103 | 695 | 0 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Cap, veh/h | 178 | 230 | | 41 | 60 | 21 | 552 | 1849 | 74 | 138 | 1080 | |
| Arrive On Green | 0.10 | 0.12 | 0.00 | 0.02 | 0.05 | 0.05 | 0.31 | 0.53 | 0.53 | 0.08 | 0.30 | 0.00 |
| Sat Flow, veh/h | 1795 | 1885 | 1598 | 1795 | 1307 | 455 | 1795 | 3475 | 138 | 1795 | 3582 | 1598 |
| Grp Volume(v), veh/h | 131 | 119 | 0 | 20 | 0 | 31 | 386 | 388 | 396 | 103 | 695 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1795 | 1885 | 1598 | 1795 | 0 | 1762 | 1795 | 1791 | 1822 | 1795 | 1791 | 1598 |
| Q Serve(g_s), s | 5.0 | 4.2 | 0.0 | 0.8 | 0.0 | 1.2 | 13.5 | 9.2 | 9.2 | 4.0 | 12.0 | 0.0 |
| Cycle Q Clear(g_c), s | 5.0 | 4.2 | 0.0 | 0.8 | 0.0 | 1.2 | 13.5 | 9.2 | 9.2 | 4.0 | 12.0 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.26 | 1.00 | | 0.08 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 178 | 230 | | 41 | 0 | 81 | 552 | 953 | 970 | 138 | 1080 | |
| V/C Ratio(X) | 0.74 | 0.52 | | 0.49 | 0.00 | 0.38 | 0.70 | 0.41 | 0.41 | 0.74 | 0.64 | |
| Avail Cap(c_a), veh/h | 354 | 637 | | 253 | 0 | 570 | 758 | 953 | 970 | 253 | 1260 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 31.1 | 29.3 | 0.0 | 34.3 | 0.0 | 32.9 | 21.7 | 9.9 | 9.9 | 32.1 | 21.5 | 0.0 |
| Incr Delay (d2), s/veh | 8.2 | 2.6 | 0.0 | 12.1 | 0.0 | 4.2 | 3.5 | 0.4 | 0.4 | 15.5 | 1.1 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.5 | 2.0 | 0.0 | 0.5 | 0.0 | 0.6 | 5.7 | 3.1 | 3.2 | 2.2 | 4.8 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 39.3 | 31.8 | 0.0 | 46.4 | 0.0 | 37.2 | 25.2 | 10.3 | 10.3 | 47.6 | 22.7 | 0.0 |
| LnGrp LOS | D | C | | D | A | D | C | B | B | D | C | |
| Approach Vol, veh/h | | 250 | A | | 51 | | | 1170 | | | 798 | A |
| Approach Delay, s/veh | | 35.7 | | | 40.8 | | | 15.2 | | | 25.9 | |
| Approach LOS | | D | | | D | | | B | | | C | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 9.5 | 43.3 | 5.6 | 12.7 | 25.9 | 26.9 | 11.0 | 7.3 | | | | |
| Change Period (Y+Rc), s | 4.0 | 5.5 | 4.0 | 4.0 | 4.0 | 5.5 | 4.0 | 4.0 | | | | |
| Max Green Setting (Gmax), s | 10.0 | 35.0 | 10.0 | 24.0 | 30.0 | 25.0 | 14.0 | 23.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 6.0 | 11.2 | 2.8 | 6.2 | 15.5 | 14.0 | 7.0 | 3.2 | | | | |
| Green Ext Time (p_c), s | 0.3 | 14.7 | 0.0 | 1.6 | 6.4 | 7.5 | 0.6 | 0.3 | | | | |

Intersection Summary

| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 21.8 |
| HCM 6th LOS | C |

Notes

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

2: Mace Blvd & I-80 WB Ramps

County Road 32A Railroad Crossing
Existing PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|-----|------|-----|------|-------|------|------|------|------|------|------|------|
| Lane Configurations | | | | ↖ | ↗ | ↖ | ↖ | ↖ | ↖ | | ↖ | ↖ |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 387 | 0 | 669 | 253 | 446 | 0 | 0 | 1092 | 219 |
| Future Volume (veh/h) | 0 | 0 | 0 | 387 | 0 | 669 | 253 | 446 | 0 | 0 | 1092 | 219 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.99 |
| Parking Bus, Adj | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | | | No | | No | | No | | No | | |
| Adj Sat Flow, veh/h/ln | | | | 1885 | 1885 | 1885 | 1885 | 1885 | 0 | 0 | 1885 | 1885 |
| Adj Flow Rate, veh/h | | | | 407 | 0 | 0 | 266 | 469 | 0 | 0 | 1149 | 115 |
| Peak Hour Factor | | | | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | | | | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 |
| Cap, veh/h | | | | 708 | 0 | | 402 | 2391 | 0 | 0 | 1745 | 768 |
| Arrive On Green | | | | 0.20 | 0.00 | 0.00 | 0.12 | 0.67 | 0.00 | 0.00 | 0.49 | 0.49 |
| Sat Flow, veh/h | | | | 3591 | 0 | 1598 | 3483 | 3676 | 0 | 0 | 3676 | 1577 |
| Grp Volume(v), veh/h | | | | 407 | 0 | 0 | 266 | 469 | 0 | 0 | 1149 | 115 |
| Grp Sat Flow(s),veh/h/ln | | | | 1795 | 0 | 1598 | 1742 | 1791 | 0 | 0 | 1791 | 1577 |
| Q Serve(g_s), s | | | | 7.4 | 0.0 | 0.0 | 5.3 | 3.6 | 0.0 | 0.0 | 17.5 | 2.9 |
| Cycle Q Clear(g_c), s | | | | 7.4 | 0.0 | 0.0 | 5.3 | 3.6 | 0.0 | 0.0 | 17.5 | 2.9 |
| Prop In Lane | | | | 1.00 | | 1.00 | 1.00 | | 0.00 | 0.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | | | | 708 | 0 | | 402 | 2391 | 0 | 0 | 1745 | 768 |
| V/C Ratio(X) | | | | 0.57 | 0.00 | | 0.66 | 0.20 | 0.00 | 0.00 | 0.66 | 0.15 |
| Avail Cap(c_a), veh/h | | | | 2032 | 0 | | 1154 | 2391 | 0 | 0 | 2324 | 1023 |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | | | | 26.3 | 0.0 | 0.0 | 30.7 | 4.6 | 0.0 | 0.0 | 14.0 | 10.3 |
| Incr Delay (d2), s/veh | | | | 0.3 | 0.0 | 0.0 | 0.7 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 2.9 | 0.0 | 0.0 | 2.2 | 1.0 | 0.0 | 0.0 | 6.1 | 0.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 26.6 | 0.0 | 0.0 | 31.4 | 4.6 | 0.0 | 0.0 | 14.2 | 10.3 |
| LnGrp LOS | | | | C | A | | C | A | A | A | B | B |
| Approach Vol, veh/h | | | | 407 | | A | | 735 | | | 1264 | |
| Approach Delay, s/veh | | | | 26.6 | | | | 14.3 | | | 13.8 | |
| Approach LOS | | | | C | | | | B | | | B | |
| Timer - Assigned Phs | | 2 | | | 5 | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | 53.5 | | | 13.1 | 40.4 | | 19.0 | | | | |
| Change Period (Y+Rc), s | | 5.1 | | | * 4.7 | 5.1 | | 4.7 | | | | |
| Max Green Setting (Gmax), s | | 47.0 | | | * 24 | 47.0 | | 41.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | 5.6 | | | 7.3 | 19.5 | | 9.4 | | | | |
| Green Ext Time (p_c), s | | 6.4 | | | 1.1 | 15.8 | | 4.9 | | | | |

Intersection Summary

| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 16.1 |
| HCM 6th LOS | B |

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection

| | |
|---------------------------|-----|
| Intersection Delay, s/veh | 8.1 |
| Intersection LOS | A |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 5 | 218 | 43 | 56 | 44 | 9 |
| Future Vol, veh/h | 5 | 218 | 43 | 56 | 44 | 9 |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 6 | 245 | 48 | 63 | 49 | 10 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | NB | SB |
|----------------------------|-----|-----|-----|
| Opposing Approach | | SB | NB |
| Opposing Lanes | 0 | 1 | 1 |
| Conflicting Approach Left | SB | EB | |
| Conflicting Lanes Left | 1 | 1 | 0 |
| Conflicting Approach Right | NB | EB | |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 8.1 | 8.3 | 7.8 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | SBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 43% | 2% | 0% |
| Vol Thru, % | 57% | 0% | 83% |
| Vol Right, % | 0% | 98% | 17% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 99 | 223 | 53 |
| LT Vol | 43 | 5 | 0 |
| Through Vol | 56 | 0 | 44 |
| RT Vol | 0 | 218 | 9 |
| Lane Flow Rate | 111 | 251 | 60 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.139 | 0.261 | 0.074 |
| Departure Headway (Hd) | 4.51 | 3.755 | 4.478 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 783 | 962 | 805 |
| Service Time | 2.606 | 1.759 | 2.478 |
| HCM Lane V/C Ratio | 0.142 | 0.261 | 0.075 |
| HCM Control Delay | 8.3 | 8.1 | 7.8 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.5 | 1 | 0.2 |

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 4.2 | | | | | |
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 265 | 2 | 3 | 6 | 88 | 79 |
| Future Vol, veh/h | 265 | 2 | 3 | 6 | 88 | 79 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | 25 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 298 | 2 | 3 | 7 | 99 | 89 |

| Major/Minor | Major1 | Major2 | Minor1 | Minor2 |
|----------------------|--------|--------|--------|--------|
| Conflicting Flow All | 0 | 0 | 300 | 0 |
| Stage 1 | - | - | - | - |
| Stage 2 | - | - | - | - |
| Critical Hdwy | - | - | 4.12 | - |
| Critical Hdwy Stg 1 | - | - | - | - |
| Critical Hdwy Stg 2 | - | - | - | - |
| Follow-up Hdwy | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | - | - | 1261 | - |
| Stage 1 | - | - | - | - |
| Stage 2 | - | - | - | - |
| Platoon blocked, % | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1261 | - |
| Mov Cap-2 Maneuver | - | - | - | - |
| Stage 1 | - | - | - | - |
| Stage 2 | - | - | - | - |

| Approach | EB | WB | NB |
|----------------------|----|-----|------|
| HCM Control Delay, s | 0 | 2.6 | 10.9 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | NBLn1 | NBLn2 | EBT | EBR | WBL | WBT |
|-----------------------|-------|-------|-----|-----|-------|-----|
| Capacity (veh/h) | 680 | 741 | - | - | 1261 | - |
| HCM Lane V/C Ratio | 0.145 | 0.12 | - | - | 0.003 | - |
| HCM Control Delay (s) | 11.2 | 10.5 | - | - | 7.9 | 0 |
| HCM Lane LOS | B | B | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.5 | 0.4 | - | - | 0 | - |

HCM 6th Signalized Intersection Summary
5: Mace Blvd & Chiles Rd

County Road 32A Railroad Crossing
Existing PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|-------|------|------|------|------|------|------|------|------|
| Lane Configurations | ↖↗ | ↑ | ↖ | ↖ | ↑ | ↖ | ↖ | ↕↔ | | ↖ | ↕↕ | ↖ |
| Traffic Volume (veh/h) | 339 | 275 | 85 | 46 | 56 | 263 | 24 | 531 | 162 | 259 | 430 | 289 |
| Future Volume (veh/h) | 339 | 275 | 85 | 46 | 56 | 263 | 24 | 531 | 162 | 259 | 430 | 289 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 0.98 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1885 | 1885 | 1885 | 1885 | 1885 | 1885 | 1885 | 1885 | 1885 | 1885 | 1885 | 1885 |
| Adj Flow Rate, veh/h | 357 | 289 | 0 | 48 | 59 | 71 | 25 | 559 | 0 | 273 | 453 | 0 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Cap, veh/h | 525 | 470 | | 76 | 301 | 251 | 39 | 929 | | 323 | 1496 | |
| Arrive On Green | 0.15 | 0.25 | 0.00 | 0.04 | 0.16 | 0.16 | 0.02 | 0.26 | 0.00 | 0.18 | 0.42 | 0.00 |
| Sat Flow, veh/h | 3483 | 1885 | 1598 | 1795 | 1885 | 1573 | 1795 | 3676 | 0 | 1795 | 3582 | 1598 |
| Grp Volume(v), veh/h | 357 | 289 | 0 | 48 | 59 | 71 | 25 | 559 | 0 | 273 | 453 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1742 | 1885 | 1598 | 1795 | 1885 | 1573 | 1795 | 1791 | 0 | 1795 | 1791 | 1598 |
| Q Serve(g_s), s | 7.2 | 10.2 | 0.0 | 2.0 | 2.0 | 3.0 | 1.0 | 10.2 | 0.0 | 11.0 | 6.3 | 0.0 |
| Cycle Q Clear(g_c), s | 7.2 | 10.2 | 0.0 | 2.0 | 2.0 | 3.0 | 1.0 | 10.2 | 0.0 | 11.0 | 6.3 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 525 | 470 | | 76 | 301 | 251 | 39 | 929 | | 323 | 1496 | |
| V/C Ratio(X) | 0.68 | 0.61 | | 0.63 | 0.20 | 0.28 | 0.64 | 0.60 | | 0.85 | 0.30 | |
| Avail Cap(c_a), veh/h | 653 | 807 | | 240 | 555 | 463 | 336 | 1199 | | 360 | 1496 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 30.0 | 24.9 | 0.0 | 35.2 | 27.2 | 27.6 | 36.3 | 24.3 | 0.0 | 29.6 | 14.5 | 0.0 |
| Incr Delay (d2), s/veh | 2.7 | 1.9 | 0.0 | 11.8 | 0.4 | 0.9 | 22.5 | 0.9 | 0.0 | 16.4 | 0.2 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 3.0 | 4.4 | 0.0 | 1.1 | 0.9 | 1.1 | 0.7 | 4.2 | 0.0 | 5.9 | 2.4 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 32.7 | 26.7 | 0.0 | 47.0 | 27.7 | 28.5 | 58.7 | 25.2 | 0.0 | 46.0 | 14.7 | 0.0 |
| LnGrp LOS | C | C | | D | C | C | E | C | | D | B | |
| Approach Vol, veh/h | | 646 | A | | 178 | | | 584 | A | | 726 | A |
| Approach Delay, s/veh | | 30.0 | | | 33.2 | | | 26.6 | | | 26.5 | |
| Approach LOS | | C | | | C | | | C | | | C | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 17.4 | 24.7 | 8.6 | 24.0 | 5.6 | 36.5 | 15.3 | 17.3 | | | | |
| Change Period (Y+Rc), s | 4.0 | 5.3 | 5.4 | * 5.4 | 4.0 | 5.3 | 4.0 | 5.4 | | | | |
| Max Green Setting (Gmax), s | 15.0 | 25.0 | 10.0 | * 32 | 14.0 | 25.0 | 14.0 | 22.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 13.0 | 12.2 | 4.0 | 12.2 | 3.0 | 8.3 | 9.2 | 5.0 | | | | |
| Green Ext Time (p_c), s | 0.5 | 7.1 | 0.1 | 4.7 | 0.1 | 6.2 | 2.0 | 1.3 | | | | |

Intersection Summary

| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 28.1 |
| HCM 6th LOS | C |

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR, EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th TWSC
6: County Rd 32B & I-80 EB Ramps

County Road 32A Railroad Crossing
Existing PM

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 4.6 | | | | | |
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations | | ↕ | ↕ | | ↕ | ↕ |
| Traffic Vol, veh/h | 320 | 6 | 73 | 271 | 3 | 2 |
| Future Vol, veh/h | 320 | 6 | 73 | 271 | 3 | 2 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | 30 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 360 | 7 | 82 | 304 | 3 | 2 |

| Major/Minor | Major1 | Major2 | Minor2 | | |
|----------------------|--------|--------|--------|---|-------------|
| Conflicting Flow All | 386 | 0 | - | 0 | 961 234 |
| Stage 1 | - | - | - | - | 234 - |
| Stage 2 | - | - | - | - | 727 - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 3.318 |
| Pot Cap-1 Maneuver | 1172 | - | - | - | 284 805 |
| Stage 1 | - | - | - | - | 805 - |
| Stage 2 | - | - | - | - | 478 - |
| Platoon blocked, % | | - | - | - | |
| Mov Cap-1 Maneuver | 1172 | - | - | - | 197 805 |
| Mov Cap-2 Maneuver | - | - | - | - | 197 - |
| Stage 1 | - | - | - | - | 557 - |
| Stage 2 | - | - | - | - | 478 - |

| Approach | EB | WB | SB |
|----------------------|-----|----|----|
| HCM Control Delay, s | 9.3 | 0 | 18 |
| HCM LOS | | | C |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|-----------------------|-------|-----|-----|-----|-------|-------|
| Capacity (veh/h) | 1172 | - | - | - | 197 | 805 |
| HCM Lane V/C Ratio | 0.307 | - | - | - | 0.017 | 0.003 |
| HCM Control Delay (s) | 9.4 | 0 | - | - | 23.6 | 9.5 |
| HCM Lane LOS | A | A | - | - | C | A |
| HCM 95th %tile Q(veh) | 1.3 | - | - | - | 0.1 | 0 |

HCM 6th Signalized Intersection Summary
1: Mace Blvd & Second St/County Rd 32A

County Road 32A Railroad Crossing
Cumulative No Build AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|-------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 70 | 53 | 430 | 207 | 59 | 22 | 790 | 1278 | 470 | 64 | 1242 | 170 |
| Future Volume (veh/h) | 70 | 53 | 430 | 207 | 59 | 22 | 790 | 1278 | 470 | 64 | 1242 | 170 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 0.98 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 76 | 58 | 0 | 225 | 64 | 24 | 859 | 1389 | 511 | 70 | 1350 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 104 | 90 | | 258 | 173 | 65 | 625 | 1481 | 515 | 94 | 998 | |
| Arrive On Green | 0.06 | 0.05 | 0.00 | 0.14 | 0.13 | 0.13 | 0.35 | 0.58 | 0.58 | 0.05 | 0.28 | 0.00 |
| Sat Flow, veh/h | 1781 | 1870 | 1585 | 1781 | 1288 | 483 | 1781 | 2559 | 889 | 1781 | 3554 | 1585 |
| Grp Volume(v), veh/h | 76 | 58 | 0 | 225 | 0 | 88 | 859 | 939 | 961 | 70 | 1350 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1870 | 1585 | 1781 | 0 | 1771 | 1781 | 1777 | 1672 | 1781 | 1777 | 1585 |
| Q Serve(g_s), s | 4.2 | 3.0 | 0.0 | 12.3 | 0.0 | 4.5 | 35.0 | 47.1 | 56.7 | 3.9 | 28.0 | 0.0 |
| Cycle Q Clear(g_c), s | 4.2 | 3.0 | 0.0 | 12.3 | 0.0 | 4.5 | 35.0 | 47.1 | 56.7 | 3.9 | 28.0 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.27 | 1.00 | | 0.53 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 104 | 90 | | 258 | 0 | 238 | 625 | 1028 | 968 | 94 | 998 | |
| V/C Ratio(X) | 0.73 | 0.64 | | 0.87 | 0.00 | 0.37 | 1.37 | 0.91 | 0.99 | 0.74 | 1.35 | |
| Avail Cap(c_a), veh/h | 357 | 450 | | 268 | 0 | 408 | 625 | 1028 | 968 | 232 | 998 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 46.2 | 46.6 | 0.0 | 41.8 | 0.0 | 39.3 | 32.4 | 18.8 | 20.8 | 46.6 | 35.9 | 0.0 |
| Incr Delay (d2), s/veh | 13.0 | 10.4 | 0.0 | 25.7 | 0.0 | 1.4 | 178.4 | 12.4 | 27.1 | 21.6 | 165.6 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.2 | 1.7 | 0.0 | 7.1 | 0.0 | 2.0 | 45.3 | 20.6 | 26.6 | 2.3 | 34.6 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 59.2 | 57.0 | 0.0 | 67.5 | 0.0 | 40.7 | 210.8 | 31.1 | 47.9 | 68.2 | 201.5 | 0.0 |
| LnGrp LOS | E | E | | E | A | D | F | C | D | E | F | |
| Approach Vol, veh/h | | 134 | A | | 313 | | | 2759 | | | 1420 | A |
| Approach Delay, s/veh | | 58.3 | | | 59.9 | | | 92.9 | | | 194.9 | |
| Approach LOS | | E | | | E | | | F | | | F | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 9.3 | 63.2 | 18.4 | 8.8 | 39.0 | 33.5 | 9.8 | 17.4 | | | | |
| Change Period (Y+Rc), s | 4.0 | 5.5 | 4.0 | 4.0 | 4.0 | 5.5 | 4.0 | 4.0 | | | | |
| Max Green Setting (Gmax), s | 13.0 | 38.0 | 15.0 | 24.0 | 35.0 | 28.0 | 20.0 | 23.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 5.9 | 58.7 | 14.3 | 5.0 | 37.0 | 30.0 | 6.2 | 6.5 | | | | |
| Green Ext Time (p_c), s | 0.3 | 0.0 | 0.1 | 0.6 | 0.0 | 0.0 | 0.5 | 1.0 | | | | |

Intersection Summary

| | |
|--------------------|-------|
| HCM 6th Ctrl Delay | 121.0 |
| HCM 6th LOS | F |

Notes

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

2: Mace Blvd & I-80 WB Ramps

County Road 32A Railroad Crossing
Cumulative No Build AM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|-----|------|-----|------|-------|------|------|------|------|------|------|------|
| Lane Configurations | | | | ↶ | ↷ | ↶ | ↶↷ | ↶↷ | | | ↶↷ | ↶ |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 520 | 10 | 1215 | 380 | 1323 | 0 | 0 | 1482 | 397 |
| Future Volume (veh/h) | 0 | 0 | 0 | 520 | 10 | 1215 | 380 | 1323 | 0 | 0 | 1482 | 397 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | | | No | | No | | No | | | | |
| Adj Sat Flow, veh/h/ln | | | | 1870 | 1870 | 1870 | 1870 | 1870 | 0 | 0 | 1870 | 1870 |
| Adj Flow Rate, veh/h | | | | 573 | 0 | 0 | 413 | 1438 | 0 | 0 | 1611 | 432 |
| Peak Hour Factor | | | | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | | | | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 2 | 2 |
| Cap, veh/h | | | | 830 | 0 | | 520 | 2376 | 0 | 0 | 1674 | 746 |
| Arrive On Green | | | | 0.23 | 0.00 | 0.00 | 0.15 | 0.67 | 0.00 | 0.00 | 0.47 | 0.47 |
| Sat Flow, veh/h | | | | 3563 | 0 | 1585 | 3456 | 3647 | 0 | 0 | 3647 | 1584 |
| Grp Volume(v), veh/h | | | | 573 | 0 | 0 | 413 | 1438 | 0 | 0 | 1611 | 432 |
| Grp Sat Flow(s),veh/h/ln | | | | 1781 | 0 | 1585 | 1728 | 1777 | 0 | 0 | 1777 | 1584 |
| Q Serve(g_s), s | | | | 14.6 | 0.0 | 0.0 | 11.5 | 22.4 | 0.0 | 0.0 | 43.7 | 19.8 |
| Cycle Q Clear(g_c), s | | | | 14.6 | 0.0 | 0.0 | 11.5 | 22.4 | 0.0 | 0.0 | 43.7 | 19.8 |
| Prop In Lane | | | | 1.00 | | 1.00 | 1.00 | | 0.00 | 0.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | | | | 830 | 0 | | 520 | 2376 | 0 | 0 | 1674 | 746 |
| V/C Ratio(X) | | | | 0.69 | 0.00 | | 0.79 | 0.61 | 0.00 | 0.00 | 0.96 | 0.58 |
| Avail Cap(c_a), veh/h | | | | 1466 | 0 | | 832 | 2376 | 0 | 0 | 1676 | 747 |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | | | | 34.9 | 0.0 | 0.0 | 40.8 | 9.2 | 0.0 | 0.0 | 25.5 | 19.2 |
| Incr Delay (d2), s/veh | | | | 0.4 | 0.0 | 0.0 | 1.1 | 0.3 | 0.0 | 0.0 | 14.0 | 0.7 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 6.1 | 0.0 | 0.0 | 4.9 | 7.4 | 0.0 | 0.0 | 20.3 | 7.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 35.3 | 0.0 | 0.0 | 41.9 | 9.5 | 0.0 | 0.0 | 39.5 | 19.9 |
| LnGrp LOS | | | | D | A | | D | A | A | A | D | B |
| Approach Vol, veh/h | | | | | 573 | A | | 1851 | | | 2043 | |
| Approach Delay, s/veh | | | | | 35.3 | | | 16.7 | | | 35.4 | |
| Approach LOS | | | | | D | | | B | | | D | |
| Timer - Assigned Phs | | 2 | | | 5 | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | 71.7 | | | 19.7 | 52.0 | | 27.9 | | | | |
| Change Period (Y+Rc), s | | 5.1 | | | * 4.7 | 5.1 | | 4.7 | | | | |
| Max Green Setting (Gmax), s | | 47.0 | | | * 24 | 47.0 | | 41.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | 24.4 | | | 13.5 | 45.7 | | 16.6 | | | | |
| Green Ext Time (p_c), s | | 17.0 | | | 1.5 | 1.2 | | 6.6 | | | | |

Intersection Summary

| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 27.6 |
| HCM 6th LOS | C |

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection

Intersection Delay, s/veh 10.6
 Intersection LOS B

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | T | | | T | | T |
| Traffic Vol, veh/h | 20 | 139 | 319 | 30 | 40 | 20 |
| Future Vol, veh/h | 20 | 139 | 319 | 30 | 40 | 20 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 22 | 151 | 347 | 33 | 43 | 22 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | NB | SB |
|-------------------------------|-----|------|----|
| Opposing Approach | | SB | NB |
| Opposing Lanes | 0 | 1 | 1 |
| Conflicting Approach Left SB | | EB | |
| Conflicting Lanes Left | 1 | 1 | 0 |
| Conflicting Approach Right NB | | | EB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 8.7 | 11.9 | 8 |
| HCM LOS | A | B | A |

| Lane | NBLn1 | EBLn1 | SBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 91% | 13% | 0% |
| Vol Thru, % | 9% | 0% | 67% |
| Vol Right, % | 0% | 87% | 33% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 349 | 159 | 60 |
| LT Vol | 319 | 20 | 0 |
| Through Vol | 30 | 0 | 40 |
| RT Vol | 0 | 139 | 20 |
| Lane Flow Rate | 379 | 173 | 65 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.483 | 0.215 | 0.083 |
| Departure Headway (Hd) | 4.587 | 4.479 | 4.561 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 785 | 800 | 783 |
| Service Time | 2.619 | 2.509 | 2.603 |
| HCM Lane V/C Ratio | 0.483 | 0.216 | 0.083 |
| HCM Control Delay | 11.9 | 8.7 | 8 |
| HCM Lane LOS | B | A | A |
| HCM 95th-tile Q | 2.7 | 0.8 | 0.3 |

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 9.1 | | | | | |
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 169 | 10 | 10 | 10 | 339 | 80 |
| Future Vol, veh/h | 169 | 10 | 10 | 10 | 339 | 80 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | 25 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 184 | 11 | 11 | 11 | 368 | 87 |



























| Major/Minor | Major1 | Major2 | Minor1 | Minor2 | Minor3 |
|----------------------|--------|--------|--------|--------|--------|
| Conflicting Flow All | 0 | 0 | 195 | 0 | 223 |
| Stage 1 | - | - | - | - | 190 |
| Stage 2 | - | - | - | - | 33 |
| Critical Hdwy | - | - | 4.12 | - | 6.42 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 |
| Pot Cap-1 Maneuver | - | - | 1378 | - | 765 |
| Stage 1 | - | - | - | - | 842 |
| Stage 2 | - | - | - | - | 989 |
| Platoon blocked, % | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1378 | - | 759 |
| Mov Cap-2 Maneuver | - | - | - | - | 759 |
| Stage 1 | - | - | - | - | 842 |
| Stage 2 | - | - | - | - | 981 |

| Approach | EB | WB | NB |
|----------------------|----|-----|------|
| HCM Control Delay, s | 0 | 3.8 | 13.3 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | NBLn1 | NBLn2 | EBT | EBR | WBL | WBT |
|-----------------------|-------|-------|-----|-----|-------|-----|
| Capacity (veh/h) | 759 | 852 | - | - | 1378 | - |
| HCM Lane V/C Ratio | 0.485 | 0.102 | - | - | 0.008 | - |
| HCM Control Delay (s) | 14.1 | 9.7 | - | - | 7.6 | 0 |
| HCM Lane LOS | B | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 2.7 | 0.3 | - | - | 0 | - |

HCM 6th Signalized Intersection Summary
5: Mace Blvd & Chiles Rd

County Road 32A Railroad Crossing
Cumulative No Build AM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |   |  |  |  |  |  |  |   | |  |   |  |
| Traffic Volume (veh/h) | 1122 | 220 | 150 | 30 | 110 | 420 | 10 | 686 | 50 | 292 | 363 | 381 |
| Future Volume (veh/h) | 1122 | 220 | 150 | 30 | 110 | 420 | 10 | 686 | 50 | 292 | 363 | 381 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 1220 | 239 | 0 | 33 | 120 | 457 | 11 | 746 | 0 | 317 | 395 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 516 | 633 | | 55 | 439 | 372 | 19 | 910 | | 285 | 1441 | |
| Arrive On Green | 0.15 | 0.34 | 0.00 | 0.03 | 0.23 | 0.23 | 0.01 | 0.26 | 0.00 | 0.16 | 0.41 | 0.00 |
| Sat Flow, veh/h | 3456 | 1870 | 1585 | 1781 | 1870 | 1585 | 1781 | 3647 | 0 | 1781 | 3554 | 1585 |
| Grp Volume(v), veh/h | 1220 | 239 | 0 | 33 | 120 | 457 | 11 | 746 | 0 | 317 | 395 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1728 | 1870 | 1585 | 1781 | 1870 | 1585 | 1781 | 1777 | 0 | 1781 | 1777 | 1585 |
| Q Serve(g_s), s | 14.0 | 9.1 | 0.0 | 1.7 | 4.9 | 22.0 | 0.6 | 18.5 | 0.0 | 15.0 | 7.0 | 0.0 |
| Cycle Q Clear(g_c), s | 14.0 | 9.1 | 0.0 | 1.7 | 4.9 | 22.0 | 0.6 | 18.5 | 0.0 | 15.0 | 7.0 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 516 | 633 | | 55 | 439 | 372 | 19 | 910 | | 285 | 1441 | |
| V/C Ratio(X) | 2.36 | 0.38 | | 0.60 | 0.27 | 1.23 | 0.58 | 0.82 | | 1.11 | 0.27 | |
| Avail Cap(c_a), veh/h | 516 | 639 | | 190 | 439 | 372 | 266 | 948 | | 285 | 1441 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 39.8 | 23.5 | 0.0 | 44.8 | 29.3 | 35.8 | 46.1 | 32.8 | 0.0 | 39.3 | 18.6 | 0.0 |
| Incr Delay (d2), s/veh | 619.1 | 0.5 | 0.0 | 14.2 | 0.5 | 124.0 | 34.3 | 5.9 | 0.0 | 86.6 | 0.1 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 50.1 | 3.9 | 0.0 | 1.0 | 2.2 | 21.0 | 0.4 | 8.4 | 0.0 | 13.2 | 2.8 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 658.9 | 24.0 | 0.0 | 59.0 | 29.8 | 159.9 | 80.5 | 38.7 | 0.0 | 126.0 | 18.8 | 0.0 |
| LnGrp LOS | F | C | | E | C | F | F | D | | F | B | |
| Approach Vol, veh/h | | 1459 | A | | 610 | | | 757 | A | | 712 | A |
| Approach Delay, s/veh | | 554.9 | | | 128.8 | | | 39.3 | | | 66.5 | |
| Approach LOS | | F | | | F | | | D | | | E | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 19.0 | 29.3 | 8.3 | 37.1 | 5.0 | 43.3 | 18.0 | 27.4 | | | | |
| Change Period (Y+Rc), s | 4.0 | 5.3 | 5.4 | * 5.4 | 4.0 | 5.3 | 4.0 | 5.4 | | | | |
| Max Green Setting (Gmax), s | 15.0 | 25.0 | 10.0 | * 32 | 14.0 | 25.0 | 14.0 | 22.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 17.0 | 20.5 | 3.7 | 11.1 | 2.6 | 9.0 | 16.0 | 24.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 3.5 | 0.1 | 3.9 | 0.0 | 5.2 | 0.0 | 0.0 | | | | |

| Intersection Summary | | | | | | | | | | | | |
|----------------------|-------|--|--|--|--|--|--|--|--|--|--|--|
| HCM 6th Ctrl Delay | 272.9 | | | | | | | | | | | |
| HCM 6th LOS | F | | | | | | | | | | | |

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR, EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 3.1 | | | | | |
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations | | ↔ | ↔ | | ↔ | ↔ |
| Traffic Vol, veh/h | 130 | 10 | 73 | 176 | 10 | 10 |
| Future Vol, veh/h | 130 | 10 | 73 | 176 | 10 | 10 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | 30 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 141 | 11 | 79 | 191 | 11 | 11 |

| Major/Minor | Major1 | Major2 | Minor2 | | |
|----------------------|--------|--------|--------|---|-------------|
| Conflicting Flow All | 270 | 0 | - | 0 | 468 175 |
| Stage 1 | - | - | - | - | 175 - |
| Stage 2 | - | - | - | - | 293 - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 3.318 |
| Pot Cap-1 Maneuver | 1293 | - | - | - | 553 868 |
| Stage 1 | - | - | - | - | 855 - |
| Stage 2 | - | - | - | - | 757 - |
| Platoon blocked, % | | - | - | - | |
| Mov Cap-1 Maneuver | 1293 | - | - | - | 492 868 |
| Mov Cap-2 Maneuver | - | - | - | - | 492 - |
| Stage 1 | - | - | - | - | 761 - |
| Stage 2 | - | - | - | - | 757 - |

| Approach | EB | WB | SB |
|----------------------|-----|----|------|
| HCM Control Delay, s | 7.5 | 0 | 10.9 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|-----------------------|-------|-----|-----|-----|-------|-------|
| Capacity (veh/h) | 1293 | - | - | - | 492 | 868 |
| HCM Lane V/C Ratio | 0.109 | - | - | - | 0.022 | 0.013 |
| HCM Control Delay (s) | 8.1 | 0 | - | - | 12.5 | 9.2 |
| HCM Lane LOS | A | A | - | - | B | A |
| HCM 95th %tile Q(veh) | 0.4 | - | - | - | 0.1 | 0 |

HCM 6th Signalized Intersection Summary
1: Mace Blvd & Second St/County Rd 32A

County Road 32A Railroad Crossing
Cumulative No Build PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|-------|-------|------|------|------|------|------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 195 | 182 | 890 | 436 | 22 | 113 | 510 | 1160 | 141 | 163 | 1143 | 235 |
| Future Volume (veh/h) | 195 | 182 | 890 | 436 | 22 | 113 | 510 | 1160 | 141 | 163 | 1143 | 235 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 0.97 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 207 | 194 | 0 | 464 | 23 | 120 | 543 | 1234 | 150 | 173 | 1216 | 0 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 247 | 257 | | 241 | 34 | 178 | 563 | 1438 | 174 | 202 | 899 | |
| Arrive On Green | 0.14 | 0.14 | 0.00 | 0.14 | 0.13 | 0.13 | 0.32 | 0.46 | 0.46 | 0.11 | 0.25 | 0.00 |
| Sat Flow, veh/h | 1781 | 1870 | 1585 | 1781 | 254 | 1324 | 1781 | 3158 | 382 | 1781 | 3554 | 1585 |
| Grp Volume(v), veh/h | 207 | 194 | 0 | 464 | 0 | 143 | 543 | 692 | 692 | 173 | 1216 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1870 | 1585 | 1781 | 0 | 1578 | 1781 | 1777 | 1764 | 1781 | 1777 | 1585 |
| Q Serve(g_s), s | 12.5 | 11.1 | 0.0 | 15.0 | 0.0 | 9.6 | 33.2 | 38.5 | 38.9 | 10.6 | 28.0 | 0.0 |
| Cycle Q Clear(g_c), s | 12.5 | 11.1 | 0.0 | 15.0 | 0.0 | 9.6 | 33.2 | 38.5 | 38.9 | 10.6 | 28.0 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.84 | 1.00 | | 0.22 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 247 | 257 | | 241 | 0 | 212 | 563 | 809 | 803 | 202 | 899 | |
| V/C Ratio(X) | 0.84 | 0.75 | | 1.92 | 0.00 | 0.67 | 0.96 | 0.86 | 0.86 | 0.86 | 1.35 | |
| Avail Cap(c_a), veh/h | 322 | 405 | | 241 | 0 | 328 | 563 | 809 | 803 | 209 | 899 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 46.5 | 45.9 | 0.0 | 47.9 | 0.0 | 45.6 | 37.3 | 26.9 | 27.0 | 48.2 | 41.4 | 0.0 |
| Incr Delay (d2), s/veh | 15.6 | 6.2 | 0.0 | 430.3 | 0.0 | 5.2 | 29.4 | 9.2 | 9.7 | 29.5 | 166.3 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 6.5 | 5.5 | 0.0 | 35.4 | 0.0 | 4.0 | 18.6 | 17.6 | 17.7 | 6.3 | 32.7 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 62.1 | 52.2 | 0.0 | 478.2 | 0.0 | 50.9 | 66.7 | 36.1 | 36.8 | 77.7 | 207.7 | 0.0 |
| LnGrp LOS | E | D | | F | A | D | E | D | D | E | F | |
| Approach Vol, veh/h | | 401 | A | | 607 | | | 1927 | | | 1389 | A |
| Approach Delay, s/veh | | 57.3 | | | 377.5 | | | 45.0 | | | 191.5 | |
| Approach LOS | | E | | | F | | | D | | | F | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 16.6 | 55.9 | 19.0 | 19.2 | 39.0 | 33.5 | 19.4 | 18.9 | | | | |
| Change Period (Y+Rc), s | 4.0 | 5.5 | 4.0 | 4.0 | 4.0 | 5.5 | 4.0 | 4.0 | | | | |
| Max Green Setting (Gmax), s | 13.0 | 38.0 | 15.0 | 24.0 | 35.0 | 28.0 | 20.0 | 23.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 12.6 | 40.9 | 17.0 | 13.1 | 35.2 | 30.0 | 14.5 | 11.6 | | | | |
| Green Ext Time (p_c), s | 0.1 | 0.0 | 0.0 | 2.1 | 0.0 | 0.0 | 0.9 | 1.6 | | | | |

Intersection Summary

| | |
|--------------------|-------|
| HCM 6th Ctrl Delay | 139.9 |
| HCM 6th LOS | F |

Notes

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

2: Mace Blvd & I-80 WB Ramps

County Road 32A Railroad Crossing
Cumulative No Build PM



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|-----|------|-----|------|-------|------|------|------|------|------|------|------|
| Lane Configurations | | | | ↘ | ↙ | ↗ | ↘↙ | ↗↘ | | | ↗↘ | ↙ |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 580 | 0 | 1087 | 330 | 724 | 0 | 0 | 1688 | 781 |
| Future Volume (veh/h) | 0 | 0 | 0 | 580 | 0 | 1087 | 330 | 724 | 0 | 0 | 1688 | 781 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | | | No | | No | | No | | | | No |
| Adj Sat Flow, veh/h/ln | | | | 1870 | 1870 | 1870 | 1870 | 1870 | 0 | 0 | 1870 | 1870 |
| Adj Flow Rate, veh/h | | | | 617 | 0 | 0 | 351 | 770 | 0 | 0 | 1796 | 831 |
| Peak Hour Factor | | | | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | | | | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 2 | 2 |
| Cap, veh/h | | | | 885 | 0 | | 455 | 2320 | 0 | 0 | 1683 | 750 |
| Arrive On Green | | | | 0.25 | 0.00 | 0.00 | 0.13 | 0.65 | 0.00 | 0.00 | 0.47 | 0.47 |
| Sat Flow, veh/h | | | | 3563 | 0 | 1585 | 3456 | 3647 | 0 | 0 | 3647 | 1584 |
| Grp Volume(v), veh/h | | | | 617 | 0 | 0 | 351 | 770 | 0 | 0 | 1796 | 831 |
| Grp Sat Flow(s),veh/h/ln | | | | 1781 | 0 | 1585 | 1728 | 1777 | 0 | 0 | 1777 | 1584 |
| Q Serve(g_s), s | | | | 15.6 | 0.0 | 0.0 | 9.7 | 9.5 | 0.0 | 0.0 | 47.0 | 47.0 |
| Cycle Q Clear(g_c), s | | | | 15.6 | 0.0 | 0.0 | 9.7 | 9.5 | 0.0 | 0.0 | 47.0 | 47.0 |
| Prop In Lane | | | | 1.00 | | 1.00 | 1.00 | | 0.00 | 0.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | | | | 885 | 0 | | 455 | 2320 | 0 | 0 | 1683 | 750 |
| V/C Ratio(X) | | | | 0.70 | 0.00 | | 0.77 | 0.33 | 0.00 | 0.00 | 1.07 | 1.11 |
| Avail Cap(c_a), veh/h | | | | 1472 | 0 | | 836 | 2320 | 0 | 0 | 1683 | 750 |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | | | | 33.9 | 0.0 | 0.0 | 41.6 | 7.6 | 0.0 | 0.0 | 26.1 | 26.1 |
| Incr Delay (d2), s/veh | | | | 0.4 | 0.0 | 0.0 | 1.1 | 0.0 | 0.0 | 0.0 | 42.2 | 66.4 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 6.4 | 0.0 | 0.0 | 4.1 | 3.2 | 0.0 | 0.0 | 28.1 | 30.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 34.3 | 0.0 | 0.0 | 42.7 | 7.7 | 0.0 | 0.0 | 68.4 | 92.5 |
| LnGrp LOS | | | | C | A | | D | A | A | A | F | F |
| Approach Vol, veh/h | | | | | 617 | A | | 1121 | | | 2627 | |
| Approach Delay, s/veh | | | | | 34.3 | | | 18.6 | | | 76.0 | |
| Approach LOS | | | | | C | | | B | | | E | |
| Timer - Assigned Phs | | 2 | | | 5 | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | 69.9 | | | 17.8 | 52.1 | | 29.3 | | | | |
| Change Period (Y+Rc), s | | 5.1 | | | * 4.7 | 5.1 | | 4.7 | | | | |
| Max Green Setting (Gmax), s | | 47.0 | | | * 24 | 47.0 | | 41.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | 11.5 | | | 11.7 | 49.0 | | 17.6 | | | | |
| Green Ext Time (p_c), s | | 11.2 | | | 1.3 | 0.0 | | 7.0 | | | | |

Intersection Summary

| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 55.4 |
| HCM 6th LOS | E |

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection

| | |
|---------------------------|------|
| Intersection Delay, s/veh | 28.6 |
| Intersection LOS | D |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | T | | | T | | T |
| Traffic Vol, veh/h | 10 | 736 | 145 | 60 | 50 | 10 |
| Future Vol, veh/h | 10 | 736 | 145 | 60 | 50 | 10 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 11 | 783 | 154 | 64 | 53 | 11 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | NB | SB |
|-------------------------------|------|------|-----|
| Opposing Approach | | SB | NB |
| Opposing Lanes | 0 | 1 | 1 |
| Conflicting Approach Left SB | | EB | |
| Conflicting Lanes Left | 1 | 1 | 0 |
| Conflicting Approach Right NB | | | EB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 34.5 | 12.4 | 9.8 |
| HCM LOS | D | B | A |

| Lane | NBLn1 | EBLn1 | SBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 71% | 1% | 0% |
| Vol Thru, % | 29% | 0% | 83% |
| Vol Right, % | 0% | 99% | 17% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 205 | 746 | 60 |
| LT Vol | 145 | 10 | 0 |
| Through Vol | 60 | 0 | 50 |
| RT Vol | 0 | 736 | 10 |
| Lane Flow Rate | 218 | 794 | 64 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.365 | 0.918 | 0.108 |
| Departure Headway (Hd) | 6.018 | 4.162 | 6.078 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 602 | 865 | 592 |
| Service Time | 4.022 | 2.237 | 4.09 |
| HCM Lane V/C Ratio | 0.362 | 0.918 | 0.108 |
| HCM Control Delay | 12.4 | 34.5 | 9.8 |
| HCM Lane LOS | B | D | A |
| HCM 95th-tile Q | 1.7 | 13.3 | 0.4 |

Intersection

Int Delay, s/veh 7.6

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 781 | 10 | 10 | 10 | 190 | 90 |
| Future Vol, veh/h | 781 | 10 | 10 | 10 | 190 | 90 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | 25 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 94 | 94 | 94 | 94 | 94 | 94 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 831 | 11 | 11 | 11 | 202 | 96 |

Major/Minor

| | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0 | 0 | 842 |
| Stage 1 | - | - | - |
| Stage 2 | - | - | - |
| Critical Hdwy | - | 4.12 | - |
| Critical Hdwy Stg 1 | - | - | - |
| Critical Hdwy Stg 2 | - | - | - |
| Follow-up Hdwy | - | 2.218 | - |
| Pot Cap-1 Maneuver | - | 794 | - |
| Stage 1 | - | - | - |
| Stage 2 | - | - | - |
| Platoon blocked, % | - | - | - |
| Mov Cap-1 Maneuver | - | 794 | - |
| Mov Cap-2 Maneuver | - | - | - |
| Stage 1 | - | - | - |
| Stage 2 | - | - | - |

Approach



























| | EB | WB | NB |
|----------------------|----|-----|------|
| HCM Control Delay, s | 0 | 4.8 | 29.2 |
| HCM LOS | | | D |

Minor Lane/Major Mvmt

| | NBLn1 | NBLn2 | EBT | EBR | WBL | WBT |
|-----------------------|-------|-------|-----|-----|-------|-----|
| Capacity (veh/h) | 317 | 367 | - | - | 794 | - |
| HCM Lane V/C Ratio | 0.638 | 0.261 | - | - | 0.013 | - |
| HCM Control Delay (s) | 34.4 | 18.2 | - | - | 9.6 | 0 |
| HCM Lane LOS | D | C | - | - | A | A |
| HCM 95th %tile Q(veh) | 4.1 | 1 | - | - | 0 | - |

HCM 6th Signalized Intersection Summary
5: Mace Blvd & Chiles Rd

County Road 32A Railroad Crossing
Cumulative No Build PM

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |   |  |  |  |  |  |  |   | |  |   |  |
| Traffic Volume (veh/h) | 553 | 320 | 90 | 80 | 60 | 458 | 30 | 658 | 180 | 368 | 625 | 420 |
| Future Volume (veh/h) | 553 | 320 | 90 | 80 | 60 | 458 | 30 | 658 | 180 | 368 | 625 | 420 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 588 | 340 | 0 | 85 | 64 | 487 | 32 | 700 | 0 | 391 | 665 | 0 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 520 | 578 | | 111 | 442 | 375 | 43 | 893 | | 287 | 1380 | |
| Arrive On Green | 0.15 | 0.31 | 0.00 | 0.06 | 0.24 | 0.24 | 0.02 | 0.25 | 0.00 | 0.16 | 0.39 | 0.00 |
| Sat Flow, veh/h | 3456 | 1870 | 1585 | 1781 | 1870 | 1585 | 1781 | 3647 | 0 | 1781 | 3554 | 1585 |
| Grp Volume(v), veh/h | 588 | 340 | 0 | 85 | 64 | 487 | 32 | 700 | 0 | 391 | 665 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1728 | 1870 | 1585 | 1781 | 1870 | 1585 | 1781 | 1777 | 0 | 1781 | 1777 | 1585 |
| Q Serve(g_s), s | 14.0 | 14.3 | 0.0 | 4.4 | 2.5 | 22.0 | 1.7 | 17.1 | 0.0 | 15.0 | 13.1 | 0.0 |
| Cycle Q Clear(g_c), s | 14.0 | 14.3 | 0.0 | 4.4 | 2.5 | 22.0 | 1.7 | 17.1 | 0.0 | 15.0 | 13.1 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 520 | 578 | | 111 | 442 | 375 | 43 | 893 | | 287 | 1380 | |
| V/C Ratio(X) | 1.13 | 0.59 | | 0.76 | 0.14 | 1.30 | 0.74 | 0.78 | | 1.36 | 0.48 | |
| Avail Cap(c_a), veh/h | 520 | 643 | | 191 | 442 | 375 | 268 | 954 | | 287 | 1380 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 39.6 | 27.2 | 0.0 | 43.0 | 28.1 | 35.6 | 45.1 | 32.5 | 0.0 | 39.1 | 21.4 | 0.0 |
| Incr Delay (d2), s/veh | 81.0 | 1.5 | 0.0 | 14.2 | 0.2 | 153.5 | 29.6 | 4.4 | 0.0 | 184.0 | 0.4 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 11.5 | 6.3 | 0.0 | 2.3 | 1.1 | 24.1 | 1.1 | 7.6 | 0.0 | 21.0 | 5.3 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 120.6 | 28.7 | 0.0 | 57.2 | 28.3 | 189.0 | 74.7 | 36.9 | 0.0 | 223.1 | 21.8 | 0.0 |
| LnGrp LOS | F | C | | E | C | F | E | D | | F | C | |
| Approach Vol, veh/h | | 928 | A | | 636 | | | 732 | A | | 1056 | A |
| Approach Delay, s/veh | | 86.9 | | | 155.2 | | | 38.5 | | | 96.3 | |
| Approach LOS | | F | | | F | | | D | | | F | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 19.0 | 28.7 | 11.2 | 34.2 | 6.3 | 41.5 | 18.0 | 27.4 | | | | |
| Change Period (Y+Rc), s | 4.0 | 5.3 | 5.4 | * 5.4 | 4.0 | 5.3 | 4.0 | 5.4 | | | | |
| Max Green Setting (Gmax), s | 15.0 | 25.0 | 10.0 | * 32 | 14.0 | 25.0 | 14.0 | 22.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 17.0 | 19.1 | 6.4 | 16.3 | 3.7 | 15.1 | 16.0 | 24.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 4.3 | 0.2 | 4.9 | 0.1 | 6.0 | 0.0 | 0.0 | | | | |

Intersection Summary

| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 92.3 |
| HCM 6th LOS | F |

Notes

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR, EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th TWSC
6: County Rd 32B & I-80 EB Ramps

County Road 32A Railroad Crossing
Cumulative No Build PM

Intersection

Int Delay, s/veh 3.5

Movement EBL EBT WBT WBR SBL SBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↔ | ↔ | | ↔ | ↔ |
| Traffic Vol, veh/h | 300 | 20 | 85 | 786 | 0 | 10 |
| Future Vol, veh/h | 300 | 20 | 85 | 786 | 0 | 10 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | 30 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 94 | 94 | 94 | 94 | 94 | 94 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 319 | 21 | 90 | 836 | 0 | 11 |

Major/Minor Major1 Major2 Minor2

| | | | | | | |
|----------------------|-------|---|---|---|-------|-------|
| Conflicting Flow All | 926 | 0 | - | 0 | 1167 | 508 |
| Stage 1 | - | - | - | - | 508 | - |
| Stage 2 | - | - | - | - | 659 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 738 | - | - | - | 214 | 565 |
| Stage 1 | - | - | - | - | 604 | - |
| Stage 2 | - | - | - | - | 515 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 738 | - | - | - | 120 | 565 |
| Mov Cap-2 Maneuver | - | - | - | - | 120 | - |
| Stage 1 | - | - | - | - | 340 | - |
| Stage 2 | - | - | - | - | 515 | - |




Approach EB WB SB

| | | | |
|----------------------|------|---|------|
| HCM Control Delay, s | 12.7 | 0 | 11.5 |
| HCM LOS | | | B |

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1 SBLn2

| | | | | | | |
|-----------------------|-------|---|---|---|---|-------|
| Capacity (veh/h) | 738 | - | - | - | - | 565 |
| HCM Lane V/C Ratio | 0.432 | - | - | - | - | 0.019 |
| HCM Control Delay (s) | 13.5 | 0 | - | - | 0 | 11.5 |
| HCM Lane LOS | B | A | - | - | A | B |
| HCM 95th %tile Q(veh) | 2.2 | - | - | - | - | 0.1 |




| Intersection | |
|---------------------------|------|
| Intersection Delay, s/veh | 10.7 |
| Intersection LOS | B |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---------------------|---|------|---|------|------|---|
| Lane Configurations |  | |  | | |  |
| Traffic Vol, veh/h | 319 | 30 | 20 | 139 | 40 | 20 |
| Future Vol, veh/h | 319 | 30 | 20 | 139 | 40 | 20 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 347 | 33 | 22 | 151 | 43 | 22 |
| Number of Lanes | 1 | 0 | 1 | 0 | 0 | 1 |

| Approach | WB | NB | SB |
|----------------------------|----|-----|-----|
| Opposing Approach | | SB | NB |
| Opposing Lanes | 0 | 1 | 1 |
| Conflicting Approach Left | NB | | WB |
| Conflicting Lanes Left | 1 | 0 | 1 |
| Conflicting Approach Right | SB | WB | |
| Conflicting Lanes Right | 1 | 1 | 0 |
| HCM Control Delay | 12 | 8.7 | 8.8 |
| HCM LOS | B | A | A |

| Lane | NBLn1 | WBLn1 | SBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 0% | 91% | 67% |
| Vol Thru, % | 13% | 0% | 33% |
| Vol Right, % | 87% | 9% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 159 | 349 | 60 |
| LT Vol | 0 | 319 | 40 |
| Through Vol | 20 | 0 | 20 |
| RT Vol | 139 | 30 | 0 |
| Lane Flow Rate | 173 | 379 | 65 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.212 | 0.486 | 0.094 |
| Departure Headway (Hd) | 4.424 | 4.613 | 5.203 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 809 | 781 | 687 |
| Service Time | 2.461 | 2.65 | 3.248 |
| HCM Lane V/C Ratio | 0.214 | 0.485 | 0.095 |
| HCM Control Delay | 8.7 | 12 | 8.8 |
| HCM Lane LOS | A | B | A |
| HCM 95th-tile Q | 0.8 | 2.7 | 0.3 |

| Intersection | |
|---------------------------|------|
| Intersection Delay, s/veh | 25.8 |
| Intersection LOS | D |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---------------------|---|------|---|------|------|---|
| Lane Configurations |  | |  | | |  |
| Traffic Vol, veh/h | 145 | 60 | 10 | 736 | 50 | 10 |
| Future Vol, veh/h | 145 | 60 | 10 | 736 | 50 | 10 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 154 | 64 | 11 | 783 | 53 | 11 |
| Number of Lanes | 1 | 0 | 1 | 0 | 0 | 1 |

| Approach | WB | NB | SB |
|----------------------------|------|------|-----|
| Opposing Approach | | SB | NB |
| Opposing Lanes | 0 | 1 | 1 |
| Conflicting Approach Left | NB | | WB |
| Conflicting Lanes Left | 1 | 0 | 1 |
| Conflicting Approach Right | SB | WB | |
| Conflicting Lanes Right | 1 | 1 | 0 |
| HCM Control Delay | 11.9 | 30.9 | 9.3 |
| HCM LOS | B | D | A |

| Lane | NBLn1 | WBLn1 | SBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 0% | 71% | 83% |
| Vol Thru, % | 1% | 0% | 17% |
| Vol Right, % | 99% | 29% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 746 | 205 | 60 |
| LT Vol | 0 | 145 | 50 |
| Through Vol | 10 | 0 | 10 |
| RT Vol | 736 | 60 | 0 |
| Lane Flow Rate | 794 | 218 | 64 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.897 | 0.35 | 0.1 |
| Departure Headway (Hd) | 4.067 | 5.783 | 5.656 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 881 | 626 | 635 |
| Service Time | 2.126 | 3.786 | 3.675 |
| HCM Lane V/C Ratio | 0.901 | 0.348 | 0.101 |
| HCM Control Delay | 30.9 | 11.9 | 9.3 |
| HCM Lane LOS | D | B | A |
| HCM 95th-tile Q | 12.4 | 1.6 | 0.3 |

ATTACHMENT G -Summary of Public Comments Received

APPENDIX A: Table of Public Comments Received on the CR32A Railroad Crossing Relocation Study

| Date of Receipt | Name of Submitter | Affiliation | Comment |
|-----------------|-----------------------|-------------|---|
| 08/03/2020 | Marc Friedheim | Self | <p>I am a frequent bike commuter on this route. (I) agree that it is dangerous especially transitioning WB Road 32A to the Class 1 bike path. No comments (about the project purpose or need). (I prefer) Alt. 3 because it is least costly and extends the class 1 path much further. This alt. may discourage drivers from using frontage rd to get off fwy. To bypass traffic which actually makes it worse. I'm concerned about how Alt.3 will transition bikes heading EB from the extended class 1 to Cty Rd 32A since it opposes oncoming traffic. I also want to highlight that the current county Rd 32A bike shoulder is dangerous. It is not nearly wide enough, and the speed differential is high. So, an alternative that extends the class 1 bike path is preferable to me. We really should be talking about connecting this class 1 path all the way to the causeway. Seems short-sighted to stop short of doing that with both Alt.2 and Alt.3. I also want to make a comment about the existing Class 1 bike lane adjacent to I-80. This path is not well maintained and is used heavily by the homeless. I've encountered the homeless sleeping on the path and almost ran over them multiple times. Trash and debris are frequently present. I also recommend access control or policing the area. Some homeless have dug into the side of the RR embankment which undermines the foundation of the RR tracks. Hopefully some method to discourage homeless encampments here could be considered. Although I'm a bridge engineer, I am opposed to Alt. 1 because of the cost and it would encourage more drivers to get off the fwy at Mace and bypass the freeway traffic and cause congestion when they merge back on at the causeway. Thanks for considering this project. I would be happy to assist any way that I can.</p> |
| 8/12/2020 | Dr. J. Daniel Ragland | Bike Davis | <p>As a member of Bike Davis I want to express my gratitude for you keeping cyclists in mind as you prepare this crossing relocation. As a faculty member in the School of Medicine at UC Davis and a resident of Davis, I utilized this route to ride my bike to work on a daily basis (pre-COVID). The part of the route along the frontage road prior to getting on the causeway was always the scariest part of the 20 mile commute as the bike lane there is very narrow (often with debris) and autos and frequent garbage trucks would often pass very closely at highway speeds. I am part of a large community of people who use this route to commute between Davis and Sacramento and know that we will all appreciate any and all efforts to make this a safer route for Davis cyclists. My name is Alex Kenefick and I live at in Davis, CA, 95618.</p> |
| 08/13/2020 | Alex Kenefick | Self | <p>I have viewed the analysis of the County Road 32A options and I am writing in support of option 3 based on the advantages described in the engineering report.</p> <p>Option 3:</p> <ul style="list-style-type: none"> • is cost effective |

| Date of Receipt | Name of Submitter | Affiliation | Comment |
|-----------------|-------------------|-------------|--|
| 8/14/2020 | George Faithorn | Self | <ul style="list-style-type: none"> • supports easily farmable acreage • provides a disincentive to short-cut traffic from East Davis • lengthens the protected bikeway • can be further improved to provide a grade-separated crossing in the future. <p>Retired Union Pacific Locomotive engineer residing in Davis. I agree with UP, a very bad situation. I live in Davis and came across a high centered vehicle on the RR tracks this crossing on my way home from work a few years ago. The victim happened to be a Professor on his way to a conference in Sacramento. I've known other victims and observed several other trains stopped after striking vehicles. Contrary to a comment in the Enterprise these were not intoxicated people. Merely distracted drivers that fell into a trap. It's also a stressful situation for the crews involved.</p> <p>Alternative 1 very similar to the Midway Road Overcrossing about a mile south of Chico. Works very well. https://goo.gl/maps/a3bAMegXsbFprFxi6</p> |
| 8/14/2020 | Angela Stathos | self | <p>I commute from Sacramento to Davis and occasionally use CR 32A as either a bike route, or alternative entry to 180-E. I've largely stopped bike commuting because it's just unpleasant. The stretch along CR 32A feels most dangerous as most drivers are speeding, and it's obvious to see that multiple drivers have crashed into the guard rail at the entry to the bike path. I support any remodeling of this route to separate car and bike traffic and reduce speed limits.</p> <p>Of the proposed models, #3 looks simplest.</p> <p>I'm not clear on whether #1 separates cars/bikes on the eastern end of the area pictured. It looks like not and still maintains high speed limits, so I don't favor that option.</p> <p>It looks like all options remove the need for bikes to cross traffic going to 180-W, which would be great.</p> <p>Now, if only something could be done about the passage through West Sac, I might get back on my bike...wishful thinking?</p> <p>I have a comment regarding the County Road 32A Railroad Crossing Realignment Project. I have commuted by bicycle along that route between Sacramento and Davis every workday for the past 15 years. I know it well. I do not have a preference among the alternatives, but I do have a comment.</p> <p>My comment is to please include a Class II bike lane on any new roadway built for this project. Because of the</p> |
| 8/15/2020 | Mel Melvin | Self | |

| Date of Receipt | Name of Submitter | Affiliation | Comment |
|-----------------|-------------------|------------------------------|--|
| 8/15/2020 | Bill Dendy | self | <p>limited on/off access of the Class I bike path west of the current railroad crossing and through Davis, it is not a viable route for many bicyclists, myself included. The Mace Boulevard bicycle access points are extremely dangerous and to force cyclists to use it is putting their lives in peril. The bicycle access points at Mace are dangerous because they are on top of the freeway overpass and this location forces cyclists into heavy traffic and traffic merging onto, or off of the freeway. These are locations where motorists are traveling at high speeds and are in a freeway state of mind. Ride your bike over the Mace overpass sometime, you'll see what I mean. Freeway overpasses are inherently dangerous for cyclists. Please add a few more feet of width to any new roadway for cyclists. Thank you for considering my comment.</p> |
| 8/16/2020 | Mike Hart | CEO, Sierra Railroad Company | <p>Todd - In the brief online presentation I didn't see any mention of it, but I assume you know that the sewer force main from SLS1, serving South Davis and El Macero, crosses under I80, the RR, 32A and the bike path at that intersection and empties into a gravity main at a manhole there.</p> <p>I appreciate the work that has gone into finding public safety solutions to the problems crossing the UP tracks at Swingle (Road 105 and 32A). In reviewing the slides on various alternatives I was alarmed to find that one very significant constraint has not been addressed at the proposed crossing. The current railroad and road configuration of Road 105 and 32A has been a starting assumption of the Yolo Regional Freight Rail Improvement Project led by Yolo County. Please see the attached letters of support for the project and map. Any kind of road, bike path etc. that comes to the north of the existing UP tracks will add millions of dollars to the proposed public project to reroute the railroad which has billions of dollars in local economic impact. The first phase of this project began work this year. Millions of dollars have been spent already as well as significant ROW acquisition to connect to the Union Pacific. We are a very interested party and would appreciate being kept informed of how this will be addressed in future discussions. As long as a railroad connection is contemplated to the UP to the north in any plans there is every reason that a public safety improvement could be done- but please include that alignment in your planning!</p> |
| 8/17/2020 | Carl Jones | self | <p>The details for the planning are in Yolo County records here: https://www.yolocounty.org/general-government/general-government-departments/county-administrator/county-administrator-divisions/intergovernmental-affairs/yolo-rail-relocation</p> <p>(I use the CR 32A roadway for) daily year-round bike commuting. I have concerns if not done correctly it could result in increased dangerous crossings for bikes. (The Project) seems to be needed. Certainly, the existing setup is not optimal for cyclists. (I prefer) alternative 2. (None of the proposed alternatives are unfavorable to me). I am a daily year-round bike commuter from Sacramento to Davis, hence I have a lot of interest in the CR32A railroad crossing project. I am highly supportive of making a change to the current situation. Primarily for two reasons. 1) The 32A portion of the commute is one of the most dangerous parts of my journey due to</p> |

| Date of Receipt | Name of Submitter | Affiliation | Comment |
|-----------------|-------------------|-------------|---|
| | | | <p>limited shoulder, poor maintenance and cleaning of the shoulder, and the high speed of two-way traffic and large trucks, particularly garbage trucks. 2) the 32A crossing when headed eastbound to the Class 1 bike path is dangerous, there is no sheltered left turn lane for bikes and little space to wait on the right-hand shoulder. Visibility to westbound traffic is also somewhat impaired. I prefer Alternative 2 because it provides the longest amount of additional bike path. Many cyclists tell me that it is this section of 32A which dissuades them from making the bike trip between Davis and Sacramento. One question I have about this alternative (though this comment applies equally to alternatives 1 and 3) is how eastbound bike traffic would be handled. Would they go under the northbound alignment of 32A which would then require a crossing of 32A again to get on the correct side of the road, then they would need to cross the freeway entrance and exit followed by a third crossing to access the bike path over the causeway. Three unnecessary dangerous crossings in Red. Or would eastbound bikes not enter the culvert underpass and follow around to the right-hand side of 32A. The they would still need to cross the freeway entrance and exit followed by a second crossing to access the bike path over the causeway. Two unnecessary dangerous crossings. Alternatively, and ideally, east bound bikes after crossing under the northbound alignment of 32A headed towards the causeway would remain on a separate class 1 bikeway until reaching the entrance to the causeway path. This would eliminate all three crossings particularly the very dangerous left hand turn across 32A that bikes must currently make as they head onto the causeway. This would be a great outcome. The impact on farming operations is less than ideal but that ground could be used for habitat and other ecosystem services. Can you make intersection with CR105 a roundabout? Simpler's better.</p> |
| 8/17/2020 | John E. Moren | Self | <p>Dunning's ideal's simpler: Put up flashing red lights from all directions. Cost's a whole bunch less. Effective. Compare flashing red light at "T" intersection of 2nd and (street from police station down to 2nd. No accidents since lights installed.</p> |
| 8/20/2020 | Maureen Driscoll | Self | <p>There are lots of people for whom the 32A RR crossing is essential to go about their daily business. I am an infrequent user - mostly to go to Vic Fazio Wildlife area. But, as a frequent AMTRAK long-distance train rider, I am very suspicious of the motives of Union Pacific, especially when the discussions always start with "we need to shut this crossing down." Every time I'm on 32A, I think "why is there only a stop sign on one side of the crossing?" Why is that? They seem to work just fine all over the rest of the county. Makes me think that UP needed some stats to force the road change, and how convenient that the majority of the fatalities have occurred on the side of the tracks that - you guessed it - lacks a stop sign! I wonder what this planned change is really about. So, I have no opinion about the proposed road changes, as long as there continues to be access to the other side of the tracks, and as long as we post a stop sign right now - today - at the current crossing. Wouldn't it be amazing if the fatality rate dropped?</p> |

| Date of Receipt | Name of Submitter | Affiliation | Comment |
|-----------------|-------------------|-------------|---|
| 8/21/2020 | Mick Klasson | self | <p>Hi, and thank you for the opportunity to comment on the County Road 32A Railroad Crossing Relocation Project Study Report. I think it is vital for any improvement in this area to improve the safety of bicyclists in the area because:</p> <ul style="list-style-type: none"> • This is a key travel corridor for cyclists between Davis and Sacramento, used by a large number of cyclists each day. • Road 32A is already subject to periodic congestion due to commute traffic, and development of the Davis Innovation and Sustainability Campus (DISC), if it occurs, will add to that congestion. • Much of the congestion is from long-distance commuters seeking to “cut in line” on traffic queues on I-80, and the drivers are more likely to be driving excessively fast to justify their decision to get off the freeway, or are frustrated or angry because of the duration of their commute and their cumulative traffic exposure by the time they get on this road. • Deaths among cyclists and pedestrians increase every year while vehicle occupant deaths decline (Smart Growth America, 2020 Dangerous by Design). • Cyclist and pedestrian death trends are linked to vehicle speed (this will be a 40+ mph road), size (vehicles keep getting bigger), and distracted driving (these are long-distance commuters who will be maxing out infotainment for their long drive). <p>Given all of that:1. I favor Alternative 3. The cost of Alternative 1 is not justified.2. Alternative 2 or 3, if built, should include a 2-way class IV separated bikeway on the north side of County Road 32 from the connection with the Class 1 Bikeway east to the Class 1 Bikeway alongside the Yolo Causeway. For very little right-of-way and construction cost, we can avoid forcing eastbound cyclists to cross the high-speed traffic on CR32A. It is essential that the bikeway be protected with inflexible physical demarcations to avoid it being taken over by erratic drivers or being used for parking or as a breakdown lane.3. Alternatives 2 or 3, notwithstanding the Class IV bike lane, should also allow cyclists to move from the eastbound Class 1 bikeway onto the eastbound County Road shoulder at the overcrossing. This is to allow cyclists to, for example, continue under I-80 and access the Yolo Wildlife Area.4. The public should be provided an opportunity to review the design features, particularly the cyclist and pedestrian features, at the earliest opportunity, preferably at the 30% design level.I applaud the County’s efforts to improve this crossing. I would like for the end result to be as good as it reasonably can. Thank you for the opportunity to comment.</p> |
| 8/21/2020 | Dave Hart | Self | <p>I’ve been looking at the county’s alternatives and offer these comments:</p> <ol style="list-style-type: none"> 1. Extending the Class I bike path from CR 105 to the causeway levee MUST include a bicycle only access point at CR105. I rarely see anyone using the Class I path between CR105 and downtown Davis because one is a prisoner on that stretch. An access point at CR105 would make it a much more viable bike facility and without it, it becomes even more of a stretch to avoid for any kind of routine riding. |

| Date of Receipt | Name of Submitter | Affiliation | Comment |
|-----------------|-------------------------|-------------|---|
| | | | <p>2. If an access point to the Class I bike path does become part of the project, there need to be big, ginormous concrete barriers parallel to the tracks on the north side of the tracks. The same crazoids that routinely demonstrate their inability to keep their vehicles on the roadway can be counted on to run straight through the intersection heading south on CR105 and will end up in the bike path.</p> <p>3. The Class I bike path needs to be continuous between CR105 and the bypass levee to finally eliminate the risky and adrenaline enhancing experience of merging from the east bound bike lane across all traffic lanes to access the levee path. While I savor the experience of living on the edge of terror, there are few others who enjoy this experience of having to use eyes and ears in 360 degrees to safely cross CR32A especially during rush hour when motorists are not typically at their most patient.</p> <p>4. Alternative 3, unfortunately, intersects CR105 at what appears to be a ¼ or maybe ½ mile north of CR32A. Most commuters won't like that at all. If you're in a car, not much of an issue, but when you're on a bike it seems like you are going way out of your way. Also it requires a left turn, south on to CR105 since there is no decent route west into Davis. Okay if one is heading to Woodland from Sacto but not good otherwise.</p> <p>5. If the county plans to sweep a Class I bike path no less than once a month, it works. If there is no plan to sweep the Class I bike path between CR105 and the levee routinely, I would prefer a wide bike lane (8 foot) on both sides of the new auto route. That is where I will end up riding. The existing 2-foot-wide Class II lane is swept by traffic but is horribly narrow.</p> |
| 8/23/2020 | Lee Ann Kelly | Self | <p>In reviewing the alternatives proposed, I would like to recommend the County adopt proposal #3. Not only is it the least expensive option, but it would also permit farming along the sides of the road. I use this road frequently and note that it is also heavily used by farmers moving farm equipment. It should remain open as a route for them.</p> |
| 8/25/2020 | Natalya Eagan-Rosenberg | Self | <p>-Thank you for the opportunity to comment on the CR 32A RR Xing relocation project. My comments are pretty aligned with Diane Swann's so I pasted hers here and added my support.</p> <p>I'm a 50 year old woman who bike commutes between Davis and Sacramento daily, when not at home due to COVID. Currently 32A is the most dreaded part of my ride.</p> <p>Details aside, I have two main concerns:</p> <ol style="list-style-type: none"> 1) the shoulder is too small and the bike path that takes me off that shoulder for the longest period of time is best. I get blown sideways by the vehicle wind, and I get really nervous when two cars pass along side me. 2) crossing over 32A from South to North at the levy is very scary. I often get off my bike and wait till it is |

| Date of Receipt | Name of Submitter | Affiliation | Comment |
|-----------------|-------------------------|-------------|---|
| | | | <p>totally clear. Please don't make a bike path that dumps us out on the south side and makes us cross the road to get to the levy.</p> <p>I understand the bike infrastructure details will be made available later. I think it's imperative that public comment be allowed at the 30% design stage when the bike infrastructure is shown. I do not go to Sacramento via the Old highway 40 Class I path and would not be using the abandoned section of CR 32A. Based on my observation and survey data the large majority of other cyclists don't either. (YES!)</p> <p>Either entry point on CR 105 is fine, but six-foot shoulders along CR 105 are needed to allow cyclists to reach the entry. The new CR 32A alignment should also have 6-foot shoulders for bicyclists. (YES!)</p> |
| 8/25/2020 | Natalya Eagan-Rosenberg | Self | <p>(Continued)</p> <p>A class I path along the north side of the existing CR 32A between the new RR Xing and the levee is needed to eliminate the hazardous bike crossing at the east end of the road near the levee. This Class I path needs to be built before or concurrently with the rest of the project, otherwise the bike tunnel or bike undercrossing sets up the condition for wrong-way cyclists on the north side of the existing road. Cyclists will be disinclined to cross to the south side of the road in heavy traffic conditions only to have to cross to the north side soon afterward. (YES!)</p> <p>If Alternative 1 is built, it should have a barrier on the overcrossing between bicyclists and vehicles and the width of the bike lane on the overcrossing should be 8 feet to allow for the barrier. The Pole Line Overcrossing in Davis offers is a good example. (YES!)</p> <p>Instead of putting bicycles on Class II lanes on the newly aligned road, a Class I bi-directional bikeway could be installed on the north side of the road as an extension to the Class I between the levee and new crossing. Providing an access point at the existing RR Xing crossing for bicycles only (not motor vehicles) would eliminate the need for a bike facility on the new alignment. - (YES!)</p> |
| 8/25/2020 | Terry Palmere | Self | <p>I currently use Road 32A to cycle to Sacramento a few times a month. I have long been concerned about the dangers of riding on Road 32A between the crossing and the Causeway, with high-speed traffic and a very narrow shoulder.</p> |

| Date of Receipt | Name of Submitter | Affiliation | Comment |
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| 8/28/2020 | Diane Swann | Bike Davis | <p>Of the three options, my least favorite is the overcrossing, because the Class 1 bike path is the shortest and the cost is the highest.</p> <p>I have a slight preference for option 3 over option 2 because it's cheaper. Another advantage of option 3 is that requiring the I-80 avoiders to travel further out of their way might provide a small deterrent to them and keep more traffic on I-80, while not harming the waste removal and farming trucks who are traveling on CR 105, so I prefer the 32A/105 intersection to be .4 miles to the north.</p> <p>If the farmers would prefer a single-but-slightly-smaller fields to the larger-but-chopped-in-two fields, that would make option 2 slightly preferable and possibly worth the additional cost.</p> <p>Thank you for the opportunity to comment on the CR 32A RR Xing relocation alternatives and for the upcoming bike element when it comes out.</p> <p>My interest in the project is primarily as a bicycle commuter who rides between Davis and Sacramento. I do not go to Sacramento via the Old highway 40 Class 1 path and so would not be using the abandoned section of CR 32A. Based on my observation and survey data, about three-quarters of other cyclists don't use Old Highway 40.</p> <p>Any of the alternatives, 1-3, would work as long as the bike infrastructure is well designed. The location is not an issue for me, but there are some things to consider:</p> <p>If Alternative 1 is chosen,</p> <ul style="list-style-type: none"> • It would be reasonable to ask UP to keep the existing crossing open for bicycles only, meaning it would be closed to vehicles and the crossing narrowed to allow for bikes. Doing this would provide bike access to the abandoned CR 32A, making it far more useful to bicyclists. • If there is no such access point, the overcrossing should have a barrier separating bicyclists from vehicles. The bike facility on west side of the Pole Line overcrossing is a good example. <p>Alternative 2 is good in that it provides a perpendicular line across the RR tracks.</p> <p>On Alternative 3, the skewed at-grade crossing, the bike crossing itself should be perpendicular to the tracks, even if the vehicles cross at a skewed angle. Skewed crossings are hazardous because bikes wheels can slip on the tracks.</p> <p>For all the alternatives:</p> <ul style="list-style-type: none"> • A Class 1 separated path should be built on the north side of the existing CR 32A from the new RR Xing to the levee. |

| Date of Receipt | Name of Submitter | Affiliation | Comment |
|-----------------|-------------------|-------------|---|
| 8/28/2020 | Marla Stuart | Self | <ul style="list-style-type: none"> • CR 105 should be widened so there is a six-foot shoulder before the intersection with the newly aligned CR 32A. • The shoulders on the realignment should be 6 feet wide or, better yet, there could be a separated Class I bi-directional path along the north side of the road, which could extend from CR 105 to the levee. <p>During my years of commuting from North Davis to Rancho Cordova, I used public transit to get to work in the morning with my bike and rode back home in the evening. I used CR 32A to get from the causeway to either the Old Highway 40 bike path or Mace Blvd. (I retired in 2016 so I no longer commute.) In the earlier years of my bike commuting, I chose to use the bike path as the safer alternative. However, sometime in 2011 I reached the conclusion that using the Old Highway 40 bike path was not as safe as using CR 32A/Mace/Covell Blvd.</p> <p>One safety issue was that for most of the year, by the time I reached the bike path it was already dusk or past dark. The bike path is poorly maintained and avoiding the ruts and crevasses in the pavement in the dark was a challenge.</p> <p>Another safety issue is the isolation of the path. For many of my rides, I did not see another person anywhere between entering the east end of the path and exiting at Olive Dr. In case of any mishap with the bike causing serious injury, it would be a long time before a solo rider would be found.</p> <p>The isolation is also an issue for a solo rider who may be vulnerable to attack. I remember reading an article in the Davis Enterprise after I had given up on riding the Old Highway 40 bike path that some of the homeless living along the path had been robbed there.</p> <p>Beyond the isolation of the path, there is also the issue of its not having any easy escape opportunities. My commute also included quite a few miles on the American River Bike Trail, and I was always mindful of spurs I could use to bail out from the Trail to an alternate route if needed. However, on the Old Highway 40 path, if someone were intent on perpetrating mayhem on a rider, a team of two could easily trap a cyclist between them.</p> <p>The issue of bike infrastructure on CR 32A is pretty much a moot point for me since I no longer commute. However, for the cyclists who will be riding CR 32A, I urge you to consider that some people will not regard the Old Highway 40 bike path as a safe route. The entire length of CR 32A needs a safe bike route.</p> |
| 8/31/2020 | Al Miller | Self | <p>I was wondering if you could briefly talk about 4 options that were deleted and why. If you could just show it on a map and say “we rejected it because...”</p> |

| Date of Receipt | Name of Submitter | Affiliation | Comment |
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| | | | <p>I have multiple questions and comments. One question, on alt 1 are you allowing for bicycles to go over the overpass along with cars?</p> <p>Having worked with UP, I doubt they would allow 32A to stay open. It's just the way they are. I was convinced by your rejection of all 4 other alternatives. 7 was one I proposed informally years ago before seeing the drainage problems. I think you made a good choice there. Have you considered at all tying this into Caltrans I-80 rebuild project and proposing having an overpass at that point and tying it into an expressway that would tie into shortcut between 113 and 80 by going past the landfill? it's not in (the alternatives) but possibly by bringing it all together that would be a way to find a crossing for alt. 7 if it was put in there as a public comment.</p> <p>With alt 2 it takes a fair bit of farmland which is a concern besides the farmland the acquisition and cost. It also reminds me of the former Caltrans engineer mentioned that the approach looks like that of the highway 87 accident in Nevada... killed several people. The design makes me nervous. There will not be as many people getting on the tracks, but it still is risky.</p> <p>Just wanted to mention that section 190 is underfunded and it is a shame. Legislature should increase that 10 fold. Someone mentioned access to the highway 40 bike path. It will be a bit easier to access it when the pole line to Olive has a bike and pedestrian connection is put in. People from either south Davis or middle of east Davis can go east enough to go down and turn around and come back to the path.</p> |
| 8/31/2020 | Al Miller | Self | <p>(Continued)</p> <p>About the bike path being somewhat dangerous and people not wanting to use it because of homeless people, that's really something that the bicycle community needs to get on the case of the city about. It is a bike path, not for people to live on. There was a lot of pushback on the Santa Rosa trail until many bicyclists were harmed by campers there and I don't think we need to get to that point. I did want to say that I really strongly feel that it is important to do it right and wait a few years than to do a job that still presents problems. The fact that bicycles can get over the overcrossing, that a short amount of land needs to be taken, that it provides a grade separation, there are so many advantages to the overcrossing that I hope 18M for an overcrossing is not outrageous. It is expensive but I would like to strongly encourage that we pursue this alternative. That is my preference.</p> <p>(In reference to concern for skewed bike crossing) This is not far off from perpendicular and with width you can make the bike crossing itself go across perpendicular, which can be done locally at the crossing with good design. Kind of pie in the sky, to elaborate on what I said earlier, sometimes you can get something you want that doesn't look fundable if you hang on the coattails of a mega project. One thing i-80 is trying to do is get rid of traffic that is building up between the causeway and 113. One of the traffic flows that people take advantage</p> |

| Date of Receipt | Name of Submitter | Affiliation | Comment |
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| 8/31/2020 | Payam | Self | <p>of is they take this route and go up 105 to 29 and go west towards 113. Possibly if this route could be improved a bit better where there is a slightly wider road, 2 lane expressways with a few curves like from 105 to 29... maybe the bridge could be funded as part of the I-80 project.</p> <p>Has UPRR agreed on one of the three alternatives? Do we know what percentage of people (at the intersection) are going to the landfill or commuting from woodland?</p> |
| 8/31/2020 | Diane Swann | Self | <p>I'm with Bike Davis. We recently did a survey about 60 people answered, about 18% preferred the old highway 40 bike path. 77% did not prefer it. No matter what you do there will be bicyclists on the road. I just wanted to make that comment. If UPRR could be talked into opening an access point at the existing crossing just for bicycles, the abandoned 32 A section would be much more useful. It would be a huge help so that we could get onto 32A. There are some real problems with the old bike path. One of the major problems is it is an established homeless encampment and people are going back and forth after dark. This isn't the only problem, but access is a huge problem. There are only 2 points where you can get on right now. Does the higher cost mean it will take a longer time to build?</p> <p>Alt 3 is a skewed crossing. I think if it were the one chosen; the cyclists need to go more perpendicular across the railroad crossing because we fall on the tracks if it is skewed.</p> |
| 8/31/2020 | John Steele | Self | <p>A little background I worked for Caltrans for 30 years plus, almost all of it in design. I worked as a project engineer with the railroads before. The difficulty in going under the railroad has been understated. The railroad despises undercrossings. I had the Lincoln bypass project and one of our alternatives was an undercrossing and they never even responded and finally told me to drop it. My concern with the at grade crossings is a term used "we are going to make this crossing better." We are starting with a low standard crossing. Looking at alternative 2, the reversing curves on that means that as you approach the crossing it is nowhere in line of sight until you go around the curve where people are going 55 mph. The warning signs are after the fact things used. I don't disagree that that's probably better, but you are talking about at least 6M for something that you are crossing your fingers on. I can relate projects to you, one in District 1 where they went in 3 times, once with a 2M dollar project, once with a 3M dollar project and once with a 3.5M dollar project, and none of the projects worked. I'm concerned that that's what I see here. A thought comes to mind that looking at an overcrossing variation of alt 1 located east of the substation, you've got a little more room on the south side to swing out and shorten the bridge, 50 mph on an alignment like this is ok. It's not my first choice, but the fact that it's all in front of you, you've got a road that's going up, the curve stands out in both directions, so it's not as likely to surprise someone as the 45 coming to a grade crossing and a possible stopping at a train track. My goal would be to shorten the bridge and save some money. I can't say for sure if that works or not, you may have already looked at it. It is painful to have a project that is very expensive, but we've had a bunch of accidents already including vehicle hits. Without actually coming to a square location with more conventional crossing, I'm gun-shy that the word better will not equate to the word good. That's my thoughts on it. I actually thought that the undercrossing version that you laid out (alt 7) if changed to an overcrossing makes a clean...</p> |

| Date of Receipt | Name of Submitter | Affiliation | Comment |
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| 8/31/2020 | Blain Morgan | Self | <p>Just wanted to thank the county for the early opportunity to review the project. This has been needed for a long time and I would like to reiterate my support for alt. 1. It is a bunch of money, but you want to do good first.</p> <p>I live in Davis and work in Sacramento and usually take Amtrak but also use my bike. I voice my support for your consideration of bike safety. I like the Bike Davis suggestion of using the old 32A path. Otherwise I was curious about alt 1,2 and 3. Is there a consideration of physical barriers for the shoulder bike path?</p> |
| 8/31/2020 | Mary Anne | Self | <p>I'm a cyclist that has been riding 32A for 25 years. Any way we can keep that open and reduce car speeds would be great. To answer the first person's question there is so much traffic you would not believe, going 80 or 90 an hour.</p> <p>What are the next steps?</p> |
| 8/31/2020 | Kriss Higgens | Self | <p>I am another cyclist. One of my questions is tractors using these roads. I was wondering what the grade on alt 1 for the bridge is and will it be an issue for visibility with tractors going slowly and drivers being able to see the tractors far enough ahead to slow down. The same thing if you are allowing cyclists on the shoulder area, will that be an issue with tractors? How wide are the lanes?</p> <p>Assuming you have bicycles going down the bridge east bound that would be assuming you continue on 32A with vehicle traffic, is there a way to accommodate getting cyclists at the bottom of the bridge onto the separated bike path?</p> |
| 8/31/2020 | Kathy | Self | <p>How can the public assist in motivating funding for the project?</p> |
| 9/2/2020 | Caryn Holmes | Self | <p>For what purpose do you use the CR 32A roadway? Commuting, recreation</p> <p>What concerns do you have for this roadway and railway crossing? Crossing and riding along Rd 32A are really dangerous, given the speed of the traffic on the road.</p> <p>Do you have any comments about the project purpose or need for relocating this crossing? I am less worried about crossing the railroad than riding on and crossing 32A, but Alternative A successfully addresses both concerns.</p> <p>Which alternative do you prefer and why? I prefer Alternative A because it provides the greatest safety for cyclists.</p> <p>Are any of the proposed alternatives unfavorable to you, and why? Alternatives 2 and 3 are unfavorable as they don't do much for cyclist safety.</p> |
| 9/2/2020 | Amy F | Self | <p>I frequently use the 32A route when commuting by bicycle from my home in West Sacramento to my work at UC Davis, since Davis is too expensive to live in. I would prefer a route with minimal traffic, since there are sometimes trucks and cars that pass much too closely while I'm bicycling on the shoulder.</p> |

| Date of Receipt | Name of Submitter | Affiliation | Comment |
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| 9/3/2020 | John Daniel Ragland | Self | As a cyclist and regular bicycle commuter from Davis to my job at the UCD med school in Sacramento, I support Alternative I of your current plan as it provides the best cycling infrastructure. |
| 9/4/2020 | Chris Higgins | Self | <p>For what purpose do you use the CR 32A roadway? As a Davis resident, I dominantly use it for daily weekday commutes by bicycle between Davis and Sacramento. Also for an occasional recreational ride to Sacramento.</p> <p>What concerns do you have for this roadway and railway crossing? Mainly the safety of cyclists, largely because of 1) exposure to heavy vehicular commuter traffic (many of whom speed excessively), 2) garbage trucks that sometimes don't give enough clearance to cyclists, 3) on-coming motorists who pass other vehicles when abreast of on-coming cyclists, 4) narrowness of shoulders that cyclists have to ride on, 5) the need for eastbound cyclists having to cross 32A at the Webster curve to access the levee and causeway, and 6) having to negotiate vehicle traffic at the 105 intersection when turning west to continue on 32A to Mace Boulevard; many southbound drivers at the 105 stop-sign do not yield to westbound cyclists who have the right-of-way continuing from the tracks to 32A.</p> <p>Do you have any comments about the project purpose or need for relocating this crossing? It is an essential, long overdue need, especially in the last several years since vehicle traffic has increased substantially during the eastbound afternoon commute. Vehicle accidents at the 105 crossing appear to have not decreased despite installation of more warning structures.</p> <p>Which alternative do you prefer and why? I'm probably leaning to Alternative 1 if bicycles are allowed on the bridge overcrossing, with sufficient protection from vehicles and <u>there is a way on the descent to then immediately</u> access the proposed bike path that continues eastward from the bridge to the levee without having to share 32A with motor vehicles as it continues to the Webster interchange. Most cyclists do not use the Old 40 bike path for several reasons. Instead, they use 32A between Mace and 105. My main concern with Alternative 1, however, is the much higher cost and the possibly longer period of time to construct the bridge relative to construction of Alternatives 2 and 3. If these concerns are justified, I probably favor Alternative 3 because it avoids condemning farmland next to the RR and is less expensive than Alternative 2. One main advantage of Alternative 1 is the at-grade crossing issue would finally be resolved.</p> |
| 9/4/2020 | Chris Higgins | Self | (Continued) |

| Date of Receipt | Name of Submitter | Affiliation | Comment |
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| | | | <p>The recent Caltrans proposal for an interim improvement of bicycle infrastructure along 32A can integrate best with this alternative, although I have some concerns about the need for eastbound cyclists having to cross 32A if they want to use the proposed class 1 bike path on the north side of 32A, especially during the evening commute.</p> <p>Are any of the proposed alternatives unfavorable to you, and why? None of the three is unfavorable <u>with the caveat</u> that once the current RR crossing is closed, all three need to have infrastructure for bicycles on the new roadway because most cyclists will not want to use the Old 40 bike path, mainly because of its poor and limited points of access as well as some safety issues. Also, we don't like riding immediately next to the freeway unless there is no alternative; the noise and pollution as well as the visual distraction of speeding vehicles do not make riding pleasant. Of course, if UPRR still allowed bicycles to cross at the current 105 site (through a safe narrow mechanical crossing gate), that would make all three alternatives feasible to keep cyclists completely separated between 105 and the causeway.</p> |
| 9/4/2020 | Diane Swann | Bike Davis | <p>In light of the recent open house on the RR Ring Relocation Project and the news about the Caltrans CR 32A ATP project, Bike Davis would like to express its support for Alternative 1. It is safer and more convenient for all modes of transportation that will be using this corridor.</p> |
| 9/4/2020 | John Swann | Davis Bike Club President | <p>DBC Board Position Statement on CR 32A RR Relocation Project</p> <p>1) <u>The grade separated crossing of Alternative 1 is our preferred solution.</u></p> <p>On Monday Aug 31 Caltrans announced a proposal to install bike specific infrastructure on CR 32A independent of the RR Relocation Project. The most significant component is a Class I (separated) bike path from the Causeway to the future location of the relocated RR crossing. With Alternative 1 the length of the Class I bike path would be ~1.5 miles. For Alternatives 2 & 3 the bike path would be only ~0.5 miles. The DBC board prefers Alternative 1 because of the increased length of the protected bike path. Also, Alternative 1 is the only solution where there is a hope of convincing UP to leave the existing crossing open to bicycles only.</p> <p>2) <u>A Class I (separated) bike path should be installed between the levee and the relocated crossing.</u></p> <p>The slide explaining Alternative 1 of the Relocation Study states that the bike route from the "... crossing to the causeway will remain class II until further development". This is contrary to what Alex Tengolics of the County told John Swann in 2019. The recent Caltrans proposal to install bicycle infrastructure on CR 32A pretty much assures that this will be installed, but the DBC Board states this</p> |

| Date of Receipt | Name of Submitter | Affiliation | Comment |
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| | | | <p>to reaffirm its position on it.</p> <p>3) <u>The bicycle infrastructure portion of the project should be installed prior to or concurrently with the relocation project.</u></p> <p>The Alternative 1 slide states that the route “... will remain class II until further development”. Again, if the Caltrans proposal is approved, the bicycle infrastructure should be installed before the relocation of the RR Crossing, but we state this to reaffirm our position on it.</p> |
| 9/4/2020 | Denise Sagara | Yolo County Farm Bureau | <p>After last night’s call I have major concerns about the proposals. We’ve been very upfront that this road is used by farmers to move farm equipment, rather than using Mace Blvd or even I-80. And that a lot of the equipment is wider than 12 feet. This was supposed to be addressed in the proposal and it is not. I brought it up last fall after the consultant was chosen as their proposal didn’t even mention moving farm equipment.</p> <ul style="list-style-type: none"> • As you know, this is the route the farmers use to move their farm equipment (this was mentioned). I was very surprised that the planner said farm use is “occasional” and didn’t get into the oversized equipment that is moved. This has been a very important part of the project as far as ag is concerned – from day 1. This concern was discussed last fall (see email chain below). • Road 32A currently works for moving farm equipment because it is flat and wide allowing wide equipment to extend over the six foot shoulders when necessary. Because it is flat, both bicyclists and the equipment operators can see each other far in advance so each can safely pass each other. • A 12 foot lane with a 6 foot shoulder should accommodate moving wide equipment. However, if a curb is installed to separate the 6 foot bicycle lane then a 12 foot wide lane won’t work and the wide equipment will extend into the opposite traffic lane which is an unacceptable safety issue. • I’m not sure what will extend beyond the six foot shoulder – will it be more flat ground? A retaining wall was mentioned – is it planned to be level with the road, or higher? It can make a difference. • If the overpass option is chosen - FB board directors discussed ways they handle moving their equipment over a 12 foot wide lane overpass - they have employees stop traffic on both side of the overpass while the equipment is moved across the overpass. • The current project proposal is for auto and bicycle traffic = not moving farm equipment. <p>I would be more than happy to discuss this more with you at any time.</p> |
| 9/5/2020 | Joe Bolte | Self, Davis BTSSC | <p>I’m a member of the city of Davis BTSSC. I submit the following comments on the County Road 32A Railroad Crossing Relocation Study in my personal capacity.</p> <p>The RR crossing is a very dangerous section of a critical route for cyclists, garbage trucks and farm machinery. Long-term safety upgrades are needed urgently.</p> <p>The project webpage states "Environmental, engineering, safety, and cost considerations will be evaluated for the alternatives." The meaning of 'Engineering considerations' should be specified. Will projects be evaluated</p> |

| Date of Receipt | Name of Submitter | Affiliation | Comment |
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| | | | <p>by disruption during construction, risk of non-completion, road capacity or other factors?</p> <p>The project webpage states, "Traffic volumes on CR 32A are expected to increase due to I-80 east-west overflow traffic and general planned growth in the project vicinity". The PSR should forecast the project's effect on California and SACOG targets for VMT and GHG emissions, including induced demand.</p> <p>The PSR should comment on differences in safety between the project alternatives for train passengers, motorists, bicyclists and pedestrians. Are the less expensive options less safe?</p> <p>The PSR should comment on any long-term maintenance costs of the alternatives, and corresponding funding sources.</p> <p>The project webpage states, "Traffic safety measures have not reduced the occurrence of incidents at this crossing." This statement should be supported by evidence in the PSR.</p> <p>The PSR should discuss the feasibility of standard traffic speed control devices, including speed tables, larger rumble strips, etc. on the WB approach to the current rail crossing. Any such devices must not interfere with bicycle traffic crossing 32A to the Old Hwy 40 path, or with progress toward the longer-lasting plans already considered. Deaths and injuries at this location are likely before the crossing relocation is complete.</p> |
| 9/8/2020 | Cameron Foster | Self | <p>Firstly, I do support the proposed plans for the bike path improvements for CR 32A connecting the existing crossing to the causeway. The proposal looks good. The plans also intimated a study for re-working the rail crossing at CR 32A / CR 105. I know the comment period was for Friday; but, please consider this point: The proposed plans 1-3 do not indicate if bicycle crossing at the existing point will be abandoned or if a new bicycle/pedestrian only crossing will be placed (easy and pretty safe) or if CR 32A cyclists will be forced to enter/exit the class I bike path at the mace overpass or by way of the new proposed CR 32A route (the latter two options are not ideal for safety and/or ease of access). Would you please comment / update the plans to reflect this question?</p> |

NEWS > AGRICULTURE

County seeks guidance on CR32A railroad crossing relocation

By **WOODLAND DAILY DEMOCRAT** |

PUBLISHED: August 12, 2020 at 11:08 a.m. | UPDATED: August 12, 2020 at 11:08 a.m.

Yolo County is requesting interested people offer advice on the preparation of the County Road 32A Railroad Crossing Relocation Project Study Report.

The county is working with the city of Davis, Union Pacific Railroad, the Bike Davis group, the Yolo County Farm Bureau, the California Public Utilities Commission and the Sacramento Area Council of Governments to consider a relocation of the CR32A railroad crossing at CR105 to improve safety.

CR32A is located north of Interstate 80 and east of the Mace Boulevard interchange and acts as a frontage road to the Yolo Bypass where I-80 becomes a causeway.

This crossing has a history of accidents, despite the implementation of many safety countermeasures over many years, according to the county.

The current study being prepared by T.Y. Lin International will result in a Project Study Report to establish alternatives and a preferred option for replacing the CR32A railroad crossing at CR105, with a new crossing within two miles east of the current crossing.

At-grade and grade-separated crossings will be considered in the report. Environmental, engineering, safety, and cost considerations will be evaluated for the alternatives. Funding opportunities will be reviewed for subsequent, future construction of the selected, viable alternatives.



In addition, the study will consider the need for improved bikeway connectivity between the existing Class I Bikeway from the city of Davis, which ends at the CR32A and CR105 intersection, and the Class I Bikeway on I-80 over the Yolo Causeway.

For more information on this project, including recorded PowerPoint project presentation, downloadable site plans of alternatives under consideration, and directions on how to provide comments to the county on the study preparation, visit: <https://www.yolocounty.org/community-services/public-works-division/project-updates>. Written comments from the public will be received by the County until 5 p.m. on Sept. 4, via email to: Todd.Riddiough@yolocounty.org or mail to: Yolo County Department of Community Services, Public Works Division ATTN: Todd Riddiough, 292 W. Beamer Street, Woodland, 95695.

Due to precautions concerning the spread of COVID-19, an in-person public meeting will not be held. Instead, the county will hold an online “open house” on Aug. 31, from 5:30 to 7 p.m. Participants can join at any time during this online meeting to provide verbal feedback and ask questions of the project team. A link to this Zoom meeting can be found on the project webpage.

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Woodland Daily Democrat



The Davis Enterprise - August 14, 2020

Davis Enterprise
County takes input on Road 32A railroad crossing

By Anne Ternus-Bellamy
Enterprise staff writer

Nearly three years after safety concerns prompted the Union Pacific Railroad to ask the state to close the railroad crossing on County Road 32A just east of the city of Davis, designs have been drawn up for moving the crossing further east and the county is seeking the public's input on those options.

On the table are three preliminary alternatives, two of which are at-grade crossings moved closer to the Yolo Causeway and one of which is an overcrossing that would be located a half-mile east of the current crossing.

Estimated construction costs range from \$5.35 million for a new at-grade crossing to \$18.5 million for the bridge crossing.

The county will host an online open house on Monday, Aug. 31, where participants can ask questions of the project team and provide feedback on the various alternatives. Written comments will be accepted through Sept. 4.

The road to this point began back in October 2017 when Union Pacific filed an application with the state Public Utilities Commission seeking to alter, close or relocate the crossing on Road 32A.

In its application to the PUC,

See RAILROAD, Page A5

THE DAVIS ENTERPRISE

RAILROAD: Three alternatives to pick

From Page A1

Union Pacific argued that the road configuration at the location — where Road 32A and a bike path meet Road 105 — is the primary cause of accidents there.

Road 32A runs parallel to I-80 on the freeway's north side, connecting Mace Boulevard to the Yolo Causeway. But at the Road 105 intersection, drivers traveling in either direction on the frontage road must make a right turn, cross the railroad tracks, then make a left turn to continue along.

Union Pacific contended that too often, motorists overshoot the turn in the road because of speed, inattention or failure to comply with traffic signs. They lose control, leave the road and come to rest on the right-of-way near, and sometimes on, the tracks.

The city of Davis and the Yolo County Board of Supervisors opposed Union Pacific's request, however, arguing that closing the crossing would essentially close the road to vehicular traffic, including farm equipment and garbage trucks which frequently use the road, as well as commuter traffic between Davis and West Sacramento. The roadway is heavily traveled during peak commute times as drivers seek to bypass traffic on I-80.

Joined by the Sacramento Area Council of Governments and the Yolo County Farm Bureau, the city and county filed protests against Union Pacific's

consultants, the grade-separated crossing would result in minimal need for new right-of-way acquisition and avoid impacting most utilities, though overhead power lines might need to be relocated.

Meanwhile, the Class I bike path would be extended approximately 1.5 miles up to the new crossing location using the existing Road 32A which would otherwise be abandoned. The bike path would run under the new overcrossing and the remainder of the path from the crossing to the causeway would remain a Class II path until further development.

The second alternative would relocate the at-grade crossing 1.7 miles to the east at an estimated construction cost of \$6.35 million.

This alternative would require extensive right-of-way acquisition and would leave remnant farmland between the new Road 32A and the railroad tracks that would be difficult to continue farming.

The roadway would be raised approximately 7.5 feet using retaining walls to cross the railroad at grade and the Class I bike path would be extended approximately 2.1 miles using the existing Road 32A roadway. The bike path would pass under the new Road 32A alignment through a large culvert pipe.

The third alternative would relocate the at-grade crossing approximately 1.6 miles east with

West Sacramento. The roadway is heavily traveled during peak commute times as drivers seek to bypass traffic on I-80.

Joined by the Sacramento Area Council of Governments and the Yolo County Farm Bureau, the city and county filed protests against Union Pacific's application and the two sides ended up in alternative dispute resolution in early 2018.

Also a party to the proceedings was Bike Davis, which was granted status in the case. The nonprofit cycling advocacy group wanted to represent the interests of cyclists — as well as drivers and train passengers — that the group contends are endangered by the current crossing.

That alternative dispute resolution process ultimately resulted in a memorandum of understanding reached in June 2018 in which Union Pacific agreed to withdraw its application in order to allow time to seek a long-term solution that might involve moving the crossing.

The railroad retained the right to refile the application with the PUC if no solution was found.

Later that year, SACOG announced a \$200,000 grant, which along with \$10,000 each from the city and county, would fund a relocation study.

The goal: to establish alternatives and a preferred option for replacing the existing railroad crossing with a new crossing within two miles to the east.

Now three preliminary alternatives have been drawn up.

The first is the grade-separated overcrossing, about a half-mile east of the current crossing, with an estimated construction cost of \$18.5 million.

According to the

second alternative would be extended approximately 2.1 miles using the existing Road 32A roadway. The bike path would pass under the new Road 32A alignment through a large culvert pipe.

The third alternative would relocate the at-grade crossing approximately 1.6 miles east with an estimated construction cost of \$5.35 million.

This option requires a new right-of-way but allows for farming to be feasible on either side of Road 32A. As with the second alternative, the bike path would be extended 2.1 miles using the existing Road 32A and the path would pass under the new Road 32A.

The intersection with Road 105 would move about a mile north of the current crossing.

All of the design alternatives, as well as additional information, are available at <https://www.yolocounty.org/community-services/public-works-division/project-updates>.

Written comments about the alternatives may be submitted until 5 p.m. on Sept. 4 by emailing Todd.Riddiough@yolocounty.org or mailed to Yolo County Department of Community Services, Public Works Division, Attention: Todd Riddiough, 292 W. Beamer Street, Woodland, CA 95695.

The county will hold an online open house on Aug. 31 from 5:30 to 7 p.m. where participants can provide verbal feedback and ask questions of the project team. A link to the Zoom meeting will be available on the project webpage (<https://www.yolocounty.org/community-services/public-works-division/project-updates>).

—Reach Anne Ternus-Bellamy at ataternus@davisenterprise.net. Follow her on Twitter at [@ATernusBellamy](https://twitter.com/ATernusBellamy).

Heading down that road again

You can put this one in the file labeled "Here We Go Again."

The news came in a "Media Alert" from Yolo County public information officer Jenny Tan with the headline "Yolo County Requests Input on County Road 32A Railroad Crossing Relocation Project Study Report."

Like I said, here we go again. Input, of course, is what we common folks are supposed to provide our elected representatives so they can advance the common good.

"Yolo County is requesting interested members of the public to offer input regarding the preparation of the County Road 32A Railroad Crossing Relocation Project Study Report," which is a heck of a lot better than disinterested members of the public providing input.

"Yolo County is working with the city of Davis, Union Pacific Railroad, the Bike Davis group, the Yolo County Farm Bureau, the California Public Utilities Commission and the Sacramento Area Council of Governments to consider a relocation of the County Road 32A railroad crossing at



County Road 105 to improve safety."

That's a lot of chefs working on this stew and let's just hope when they all put their heads together that everyone is properly socially distanced.

"This crossing has a history of accidents, despite the implementation of many safety countermeasures over many years."

Yep, they tried just about everything. Everything, that is, but a good old-fashioned, tried-and-true, easy-to-install sign featuring the most well-known four-letter word in the English language: STOP.

"The current study being prepared by T.Y. Lin International will result in a Project Study Report to establish alternatives and a preferred option for replacing the CR

32A railroad crossing at CR 105 with a new crossing within two miles east of the current crossing."

Now wait a minute. That sounds like a decision has already been made.

I don't see "leave well enough alone" or "if it ain't broke, don't fix it" among the alternatives being considered.

While back, a friendly critic slammed my stop sign suggestion by noting that "audible rumble strips, flashing beacons, 10 mph speed signs, RR Xing paint on the pavement, RR Xing signs, numerous large reflective signs and reflective guardrails" had not improved this spot to his satisfaction.

He asked me "What would compel a driver to ignore all the warnings that are already in place and suddenly comply with a stop sign?"

Well, I noted, stop signs are compelling. People obey them. They've been obeying them since before Davis was Davisville. That's why they're still in use at most all of our county's intersections. In fact, even the intersection of 32A and 105 has stop signs at two of the intersection's three

approaches. If they don't work, why would they be there at all?

My kind critic then suggested a stop sign was a "flippant suggestion," which is flipping crazy.

Maybe we could resurrect some of those old Burma-Shave signs that had a clever message spread out on half a dozen billboards along many of our rural roadways.

"STOP in the name of love, before you break my heart" might just do the trick.

"Funding opportunities will be reviewed for subsequent future construction of the selected viable alternatives."

Ah yes, funding opportunities. Like maybe they plan to sell advertising signage along the new route to the highest bidder.

Trust me, when you add up what this suspect project will eventually cost, we could have denied California's unemployment rate by hiring several dozen full-time crossing guards to man the intersection 24 hours a day, seven days a week.

And that includes the cost of their fancy orange vests.

— Reach Bob Dunning at bdunning@davisenterprise.net.

ATTACHMENT H -Alternatives Comparison Matrix

Alternatives Comparison Matrix

Project: CR32A Project Study Report

Project Element Comparison of Alts 1,2,3 and 8

Performance Criteria Weighting Factors

| | B | | C | | D | | E | | F | | G | | H | | Performance Criteria Overall Score | | Calculated Weighting | Adjusted Weighting |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------------------------------------|-----|----------------------|--------------------|
| | A | 3 | A | 3 | A | 2 | A | 3 | A | 2 | A | 3 | A | 3 | Safety Improvement | 19 | | |
| A | B | 1 | B | 1 | D | 1 | B | 2 | F | 2 | G | 2 | H | 1 | Bicycle Alignment | 3 | 6 | 5 |
| | C | 1 | C | 1 | C | 1 | C | 1 | F | 2 | G | 1 | H | 1 | | | | |
| B | D | 1 | D | 1 | D | 1 | D | 2 | F | 3 | G | 2 | H | 2 | ROW Cost | 2 | 4 | 5 |
| | E | 2 | E | 2 | E | 2 | E | 2 | F | 3 | G | 2 | H | 2 | | | | |
| C | F | 2 | F | 2 | F | 2 | F | 3 | F | 3 | G | 2 | H | 1 | Agricultural Impacts | 3 | 6 | 10 |
| | G | 2 | G | 2 | G | 2 | G | 2 | F | 3 | G | 2 | H | 1 | | | | |
| D | H | 1 | H | 1 | H | 1 | H | 2 | F | 3 | G | 2 | H | 1 | Maintenance | 0 | 0 | 5 |
| | A | 3 | A | 3 | A | 3 | A | 3 | F | 3 | G | 2 | H | 1 | | | | |
| E | B | 3 | B | 3 | B | 3 | B | 3 | F | 3 | G | 2 | H | 1 | RR Acceptance | 12 | 23 | 15 |
| | C | 3 | C | 3 | C | 3 | C | 3 | F | 3 | G | 2 | H | 1 | | | | |
| F | D | 3 | D | 3 | D | 3 | D | 3 | F | 3 | G | 2 | H | 1 | Capital Cost | 8 | 15 | 15 |
| | E | 3 | E | 3 | E | 3 | E | 3 | F | 3 | G | 2 | H | 1 | | | | |
| G | F | 3 | F | 3 | F | 3 | F | 3 | F | 3 | G | 2 | H | 1 | Grant Funding | 5 | 10 | 10 |
| | G | 3 | G | 3 | G | 3 | G | 3 | F | 3 | G | 2 | H | 1 | | | | |
| H | H | 3 | H | 3 | H | 3 | H | 3 | F | 3 | G | 2 | H | 1 | Total | 100 | 100 | 100 |
| | A | 3 | A | 3 | A | 3 | A | 3 | F | 3 | G | 2 | H | 1 | | | | |

Relative Importance Score:

- 1 = Slightly more important
- 2 = Moderately more important
- 3 = Much more important

Alternatives Ranking

| | |
|---------------------|--|
| Performance Scoring | |
|---------------------|--|

Alternatives Comparison Matrix

Project: CR32A Project Study Report

Project Element Comparison of Alts 1,2,3 and 8

| Scores: 1 = Low 2 = Low-Medium 3 = Medium 4 = Medium-High 5 = High | | | | | | | | | | | Score | Rank |
|--|----------------------|-------------------|----------|----------------------|-------------|---------------|--------------|---------------|-----|----|--------------|-------------|
| | Weighting: 35 | 5 | 5 | 5 | 10 | 5 | 15 | 15 | 10 | 10 | | |
| Alternatives | Safety Improvement | Bicycle Alignment | ROW Cost | Agricultural Impacts | Maintenance | RR Acceptance | Capital Cost | Grant Funding | | | | |
| Alt 1 | 4 | 2 | 3 | 3 | 2 | 4 | 1 | 3 | 310 | 2 | | |
| Alt 2 | 2 | 4 | 1 | 1 | 2 | 1 | 2 | 1 | 170 | 3 | | |
| Alt 3 | 1 | 3 | 3 | 2 | 3 | 1 | 3 | 1 | 170 | 3 | | |
| Alt 8 | 5 | 3 | 1 | 1 | 1 | 5 | 1 | 2 | 320 | 1 | | |