HCAOG
2024 REGIONAL TRANSPORTATION IMPROVEMENT PROGRAM (RTIP) – PROJECT CANDIDATE FORM

RTIP programming background:
If the project is on a State Highway, a Project Study Report (PSR) is required. If not, a PSR equivalent is required. The PSR equivalent at a minimum must be adequate to define and justify the project scope, cost and schedule. The PSR or PSR equivalent must be submitted with this programming request.

Applicant Agency: City of Fortuna

Project Title: Kenmar Interchange Improvement Project

Total Funding Requested: $3-Million

Of the total funding, amount for active transportation components of project:$400,000

Project Purpose: What transportation deficiency will this project address (safety, congestion, operations, plan implementation, etc.)? If a safety project, will the project reduce fatalities or number and severity of injuries?

Reduce congestion and improve level of service at existing interchange that currently operates at level of service F at Southbound off ramp, and Level of Service E at Eel River Drive and is projected to operate at a future level of service F at most ramps and cross streets. The project also would provide pedestrian facilities to connect the Fortuna Boulevard with the Riverwalk area that is currently bisected by Highway 101, where no pedestrian facilities current exist. Pedestrian improvements would include a separated path that would provide and accessible walking and biking path.

Project Location (community name, corridor, street name, etc.):

Interchange between Kenmar Road and Highway 101

Project Description:

Install “dog bone” roundabouts on each side of US 101. The westerly roundabout accommodates traffic to and from the US 101 southbound offramp, Kenmar Road, and the southbound US 101 onramp. The easterly roundabout manages traffic from Kenmar Road, the southerly reach of Eel River Drive, and northbound US 101 on and offramps. The northern portion of Eel River Drive is realigned to cross the railroad and connect directly into the new roundabout located east of US 101. This project includes a separated bike and walking path with connections to potential trails (Strongs Creek Trail and Great Redwood Trail), as well as pedestrian facilities throughout the system. Project includes reconfiguring the park and ride facility to allow for a future bus stop.

Is the project in the 2022 RTP?

☑ Yes ☐ No

Are you requesting State only funding?

☐ Yes ☑ No

What community engagement activities have been conducted for this project so far?

There was an extensive community engagement and workshop phase for this project as part of the City's 2016 complete streets connectivity study. The project has also gone through the CEQA process and associated noticing and public hearings.

To the maximum extent feasible, have complete streets elements been included in the project? Explain.

The project includes a number of complete streets elements. Specifically, the upgrade will remove arguably the largest barrier to non-motorized travel across the freeway in Fortuna. The project will include bike lanes, several hundred yards of class I bikeway (with retaining walls below the overpass to allow for construction), a new area for a bus stop, and planned future connections to the great redwood trail.

If a rehabilitation project, is it located on a federal-aid eligible road (higher than a local or minor collector road? Link to Caltrans maps: http://www.dot.ca.gov/hq/tsip/hseb/crs_maps

☐ Yes ☐ No

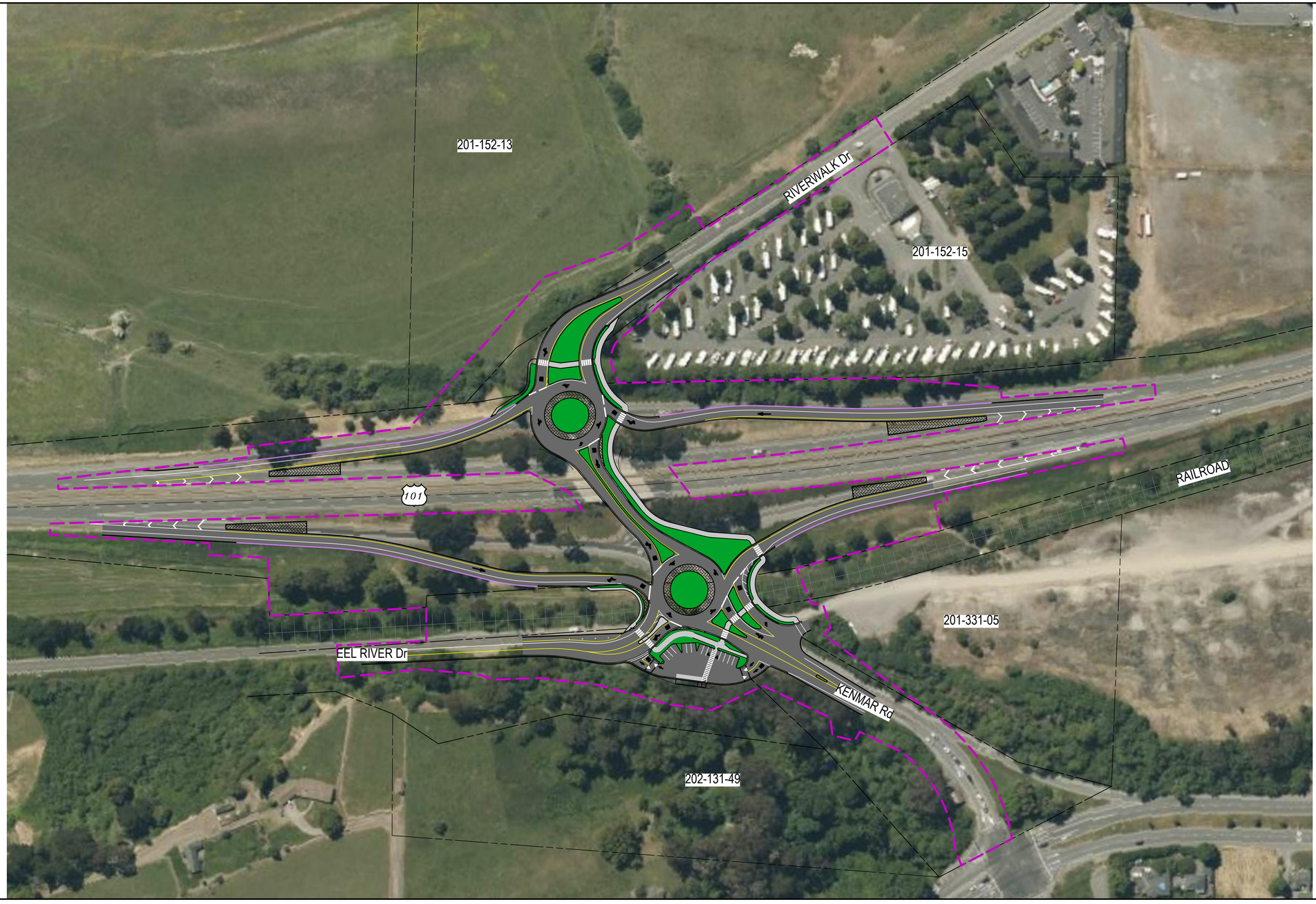
Provide Project Component funding needs:

Project Component	**Cost Estimate**	**STIP Funding Request**	**Other fund contribution**	**Allocation Schedule**
Environmental Studies & Permits	$	$	$	
Plans, Specifications & Estimates	$	$ 2,000,000	$	
Right of Way	$	$ 600,000	$	
Construction	$	$ 400,000	$	
Total	$	$ 3,000,000	$	

Please describe any other relevant information about this project you feel will be useful in project selection. Additional attachments (i.e. maps, photos) may also be included with the submittal.

This project was developed of a sustainable communities grant administered by Caltrans. Subsequently, the City produced a project study report (attached), and is nearly complete with the PA&ED phase of work, which was funded through the City's allocation of the 2018 STIP. Also included as an attachment are the updated project delivery costs, which are currently in draft form in the City's project report which will close out the PA&ED phase of work.

The City is actively pursuing grant funding for construction implementation, however, programming sufficient funding to keep the City moving through the design process is critical.



MARK ARSENAULT CALTRANS DISTRICT 1 NORTH REGION ARCHAEOLOGIST	DATE	RUSSELL HANSEN CALTRANS DISTRICT 1 PROJECT LOCAL ASSISTANCE	DATE	BRENDAN BYRD CITY OF FORTUNA CITY ENGINEER	10/13/2022 DATE

LEGEND:

AREA OF POTENTIAL EFFECTS

0 100' 200'

N

781 3rd St
Eureka, CA 95501 USA
T 1 707 443 8326 **W** www.ghd.com

CITY OF FORTUNA
KENMAR Rd/US 101 IC PROJECT

PROJECT FOOTPRINT

Project No. **11214735**
Comp No. **2132**
Date **Aug 2022**

FIGURE 2

Filename: N:\US\Eureka\Projects\561\11214735\Digital_Design\ACAD 2020\Figures\2132EX025.dwg
Plot Date: 30 August 2022 - 12:58 PM

Project Study Report-Project Development Support (PSR-PDS)

To

Request Programming for Capital Support (Project Approval and Environmental Document Phase) in the 2018 STIP

On Route Kenmar Road

Between 500 Feet West of Kenmar Road US 101 Undercrossing

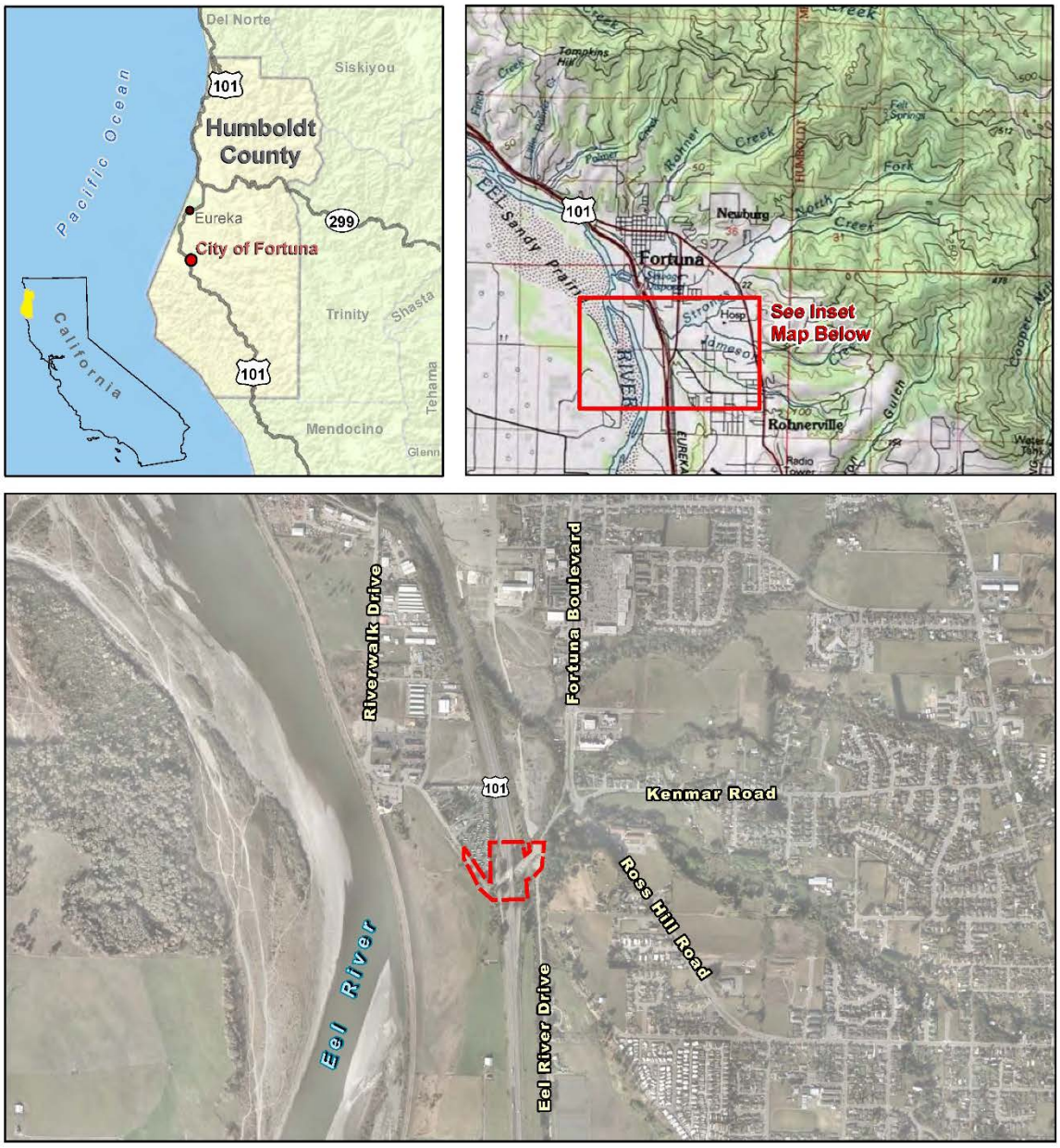
And 800 Feet East of Kenmar Road US 101 Undercrossing

APPROVED:

Merritt Perry, Director of Public Works/City Engineer

12/11/17
Date

Vicinity Map



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Feet
Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

N

City of Fortuna
Kenmar Road Interchange Improvements

Vicinity Map

Job Number	11109149
Revision	A
Date	06 Dec 2017

Figure 1

This project study report-project development support 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.

12/8/2017

REGISTERED CIVIL ENGINEER *DATE*

Table of Contents

Attachments

1. INTRODUCTION

Project Description:
The project proposes to improve traffic, pedestrian, and bicycle operations at the Kenmar Road interchange with US 101 in Fortuna in Humboldt County. The existing intersection controls, roadway geometry, and the high volumes of local and regional traffic on Kenmar Road result in poor traffic operation at and near the interchange. Proposed project components include two roundabouts ("dog bone") on Kenmar Road at the intersections with the US 101 interchange, modifications to the US 101 on- and off-ramps, and the realignment of Eel River Drive. In addition to the proposed roadway improvements, the project includes a segment of Class I bike path through the project area in additional to other at-grade pedestrian and bicycle improvements to enhance pedestrian connections and promote regional bicycle network continuity.

This PSR-PDS was developed in conjunction with the Highway 101, Fortuna Downtown and Riverwalk Area Complete Streets and Connectivity Planning Study Study (GHD, 2016) which provides a detailed evaluation of interchange alternatives.

Table 1: Project Summary

Project Limits	Kenmar between 500 feet west and 800 feet east of the Kenmar Road US 101 Undercrossing (BR 04 0128, PM 59.50).
Number of Alternatives	5
Current Capital Outlay Support Estimate for PA&ED	$550K
Current Capital Outlay Support Estimate for PS&E	$800K - $1.1M
Current Capital Outlay Construction Cost Range	$4M – $5.4M
Current Capital Outlay Right-of-Way Cost Range	$200K-$300K
Funding Source	RTIP/STIP
Type of Facility	Kenmar Road: 2-lane Other Principal Arterial/Major Collector Riverwalk Drive: 2-lane Major Collector Eel River Drive: 2-lane Major Collector US 101: 4-lane expressway/freeway
Number of Structures	1 (US 101 Kenmar Road UC)
Anticipated Environmental Determination or Document	CEQA Mitigated Negative Declaration NEPA CE
Legal Description	On Kenmar Road In Humboldt County in Fortuna between 500 feet west of US 101 Undercrossing and 800 feet east of US 101 Undercrossing.
Project Development Category	3

2. BACKGROUND

The project need originates from desires expressed in the City's 2010 General Plan, user-based experiences and public request for improvements.

In 2016, a planning study was conducted to identify ways to improve access to the Riverwalk area and improve safety for all users (motorized & non-motorized), improve operations, apply Complete Streets concepts and create an entry statement/gateway, and ready the project for next steps in project development. The study was focused on US 101 interchanges at 12th Street and Kenmar Road and was funded by a 2015-2016 Sustainable Communities Planning Grant awarded to the Humboldt County Association of Governments (HCAOG) and the City of Fortuna as a sub-recipient.

The study process included researching and evaluating existing conditions, including right-of-way boundaries and ownership, maintenance responsibilities, identifying potentially sensitive environmental areas and potential permits, and obtaining traffic counts (motorized and non-motorized). Community meetings and stakeholder outreach were used to understand concerns with the existing facilities, solicit ideas for improvements, and obtain comments on preliminary design concepts. A deficiency analysis was performed to identify existing facilities which do not conform to current design standards or City goals. Traffic modeling showed that many of the intersections were operating below a level of service (LOS) C (Fortuna's standard) for current conditions, with the LOS expected to significantly decline for full buildout over 20-years with no improvements to the intersections.

Existing Conditions

The project study area is focused on Kenmar Road from around 500 feet west and 800 feet east of Kenmar Road/US 101 undercrossing. Kenmar Road crosses under US 101, where the highway occupies parallel SB and NB bridges above grade. Within a short distance (approximately 600 feet), Kenmar Road has three intersections: at the SB on and off-ramps, the NB on and off-ramps, and at Eel River Drive. The Fortuna Park and Ride, which includes a bus stop for the Redwood Transit Main Line, is off Eel River Drive. A railroad crosses the road on the east side of US 101 between the NB on-ramp and off-ramp, and Eel River Drive intersection.

Kenmar Road consists of one vehicular travel lane in each direction with paved shoulders. The road varies in right-of-way and geometry due to intersections with Eel River Drive and South Fortuna Boulevard within 900 feet east of the Kenmar interchange. The current roadway configuration of the underpass consists of two 12 foot lanes, with eight foot shoulders, and a guard rail.

The intersection of Kenmar Road and US 101 SB Ramps is stop-controlled for the US 101 SB off-ramp and the eastbound approach of Kenmar Road. Left turns at the US 101 NB off ramp at Kenmar Road are stop controlled, with yield control only for the right turn. The existing intersection geometrics and control are shown in **Figure 1**.

There is a significant grade differential between Kenmar Road and the agricultural field to the south around the horizontal curve; guardrail is currently provided at the edge of travel way.

There are no designated pedestrian or bicycle facilities through the Kenmar Road corridor. However, there is a well-worn path behind the guardrail on the north side of the Kenmar Road underpass.

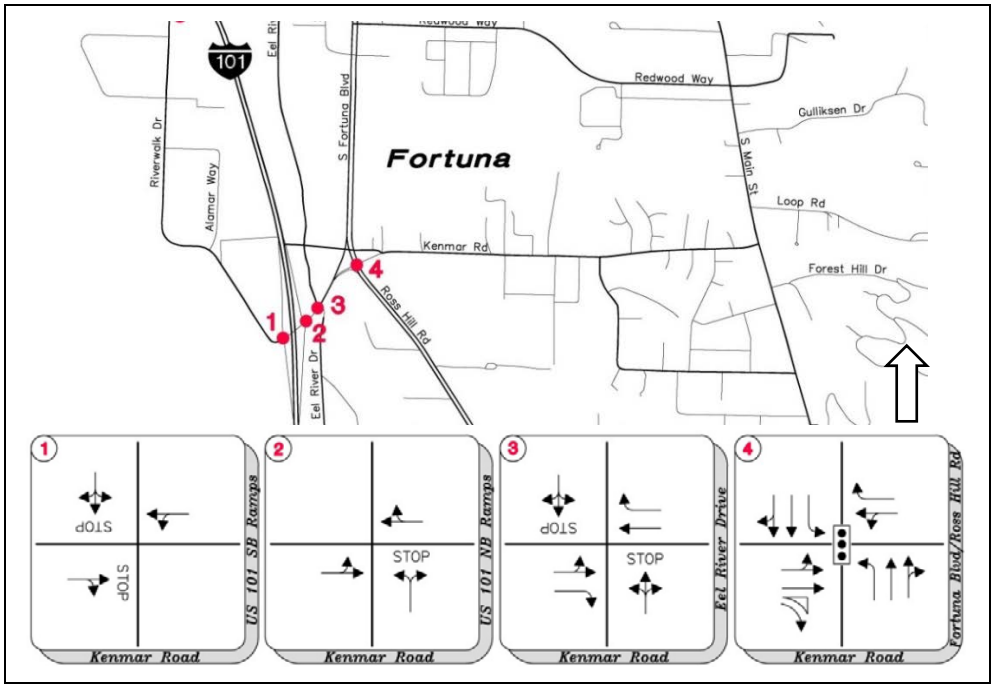


Figure 1: Existing Intersection Geometrics and Control

3. PURPOSE AND NEED

Purpose:

- Simplify and improve navigation and traffic operations on Kenmar Road between Riverwalk Drive and Eel River Drive, including the Kenmar Road/US 101 interchange;
- Improve operations, reduce congestion, and minimize conflicts at the Kenmar Road intersections;
- Improve safety at Kenmar Road intersections;
- Improve the local and regional bicycle and pedestrian facilities through the Kenmar Road/US 101 interchange area; and
- Create a Gateway into south Fortuna.

Need:

- Existing and future poor Level of Service (LOS) at the Kenmar Road intersections during peak hours as a result of stop-controlled intersections;
- Existing vehicle queue spillback from the Kenmar Road/US 101 ramp intersections onto the freeway off-ramps, especially in the southbound US 101 direction;
- No existing bicycle or pedestrian facilities resulting in a barrier to bicycle and pedestrian circulation and connectivity; and
- Intersections lack directional legibility, making it difficult for visitors to access the City's existing amenities.

Humboldt County's most significant regional thoroughfare for economic, tourist, recreational and commuting activity is US 101. The City of Fortuna is divided by US 101, which parallels the Eel River, and separates the Eel River and the Riverwalk Area from the majority of the City. Safer transportation alternatives, wayfinding signage, and improved traffic operations will support active living, provide better service to users, and support economic development and land use goals of the City.

4. TRAFFIC ENGINEERING PERFORMANCE ASSESSMENT

The information contained in this section is based on the findings from a preliminary traffic assessment conducted for the intersection at the Kenmar Road/US 101 interchange. The preliminary assessment include an Access Strategy and Configuration Assessment/Screening in accordance to the Intersection Control Evaluation (ICE) process outlined in Caltrans Traffic Operations Policy Directive 13-02. Refer to **Attachment B** for traffic counts and the LOS analysis. A Traffic Analysis Report will be developed during the PA&ED phase to further define the scope of work, and more accurately analyze and identify the forecasted operational impacts of the proposed improvements.

Existing Conditions

Traffic Counts: The AM and PM peak hour intersection turn movement traffic counts were collected in March 2016. The AM peak hour is defined as one-hour of peak traffic flow counted between 7:00 am and 9:00 AM. The PM peak hour is defined as one-hour of peak traffic flow counted between 4:00 pm and 6:00 PM. The existing peak hour traffic volumes are presented in **Figure 2**.

Bicycle and Pedestrian Counts: HCAOG obtained bicycle and pedestrian counts for the project area in May 2016. The existing bicycle and pedestrian daily counts are presented in **Table 1**.

Table 1: Average Totally Daily Bicycle and Pedestrian Counts

Intersection Name	Ave. Daily Bicycle Count	Ave. Daily Pedestrian Count
Kenmar Road/US 101 SB	22	20
Kenmar Road/US 101 NB	23	18

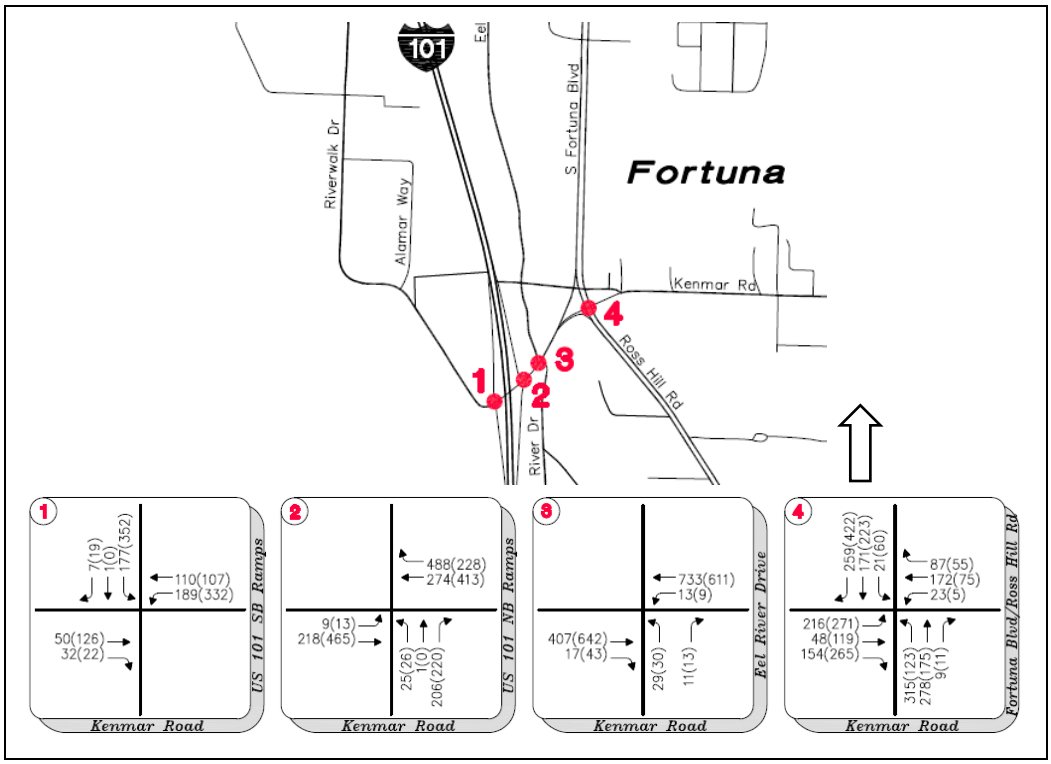


Figure 2: Existing Peak Hour Traffic Counts (2016)

Modeling Tools and Methodologies

Operational deficiencies were estimated using future traffic volumes estimated using the travel demand model (TRAFFIX) prepared for the City's General Plan update. The cumulative condition was established by adding additional trips to the traffic counts obtained in 2016, by assuming full buildout over 20 years in accordance to the City's General Plan.

The existing, no build and signal alternatives were analyzed using Synchro/SimTraffic traffic analysis software. Roundabout alternatives were analyzed using Signalized and Unsignalized Intersection Design and Research Aid (SIDRA) analysis software. The LOS for all intersection control types were calculated using the methods documented in the Transportation Research Board Publication Highway Capacity Manual, 2010.

Synchro/SimTraffic was used to provide the queuing analysis. SimTraffic data was seeded into the network for 15 simulated minutes, and then recorded five runs of 60 simulated minutes. The 95th-percentile queue lengths were determined for each lane group based on an average of the five recorded runs. The 95th-percentile queue was defined to be the queue length (in feet) that has a 5-percent probability of being exceeded during the analysis time period. The 95th-percentile queue was utilized to determine the appropriate length of turn pockets.

Summary of Existing Conditions Analysis and Findings

Existing weekday AM and PM peak hour intersection traffic operations were quantified utilizing the exiting traffic volumes and existing intersection lane geometrics and control. **Table 2** provides a summary of the existing vehicular AM and PM peak hour intersection delay and LOS. The following intersections were found to currently operate below the LOS C target:

- Kenmar Road and US 101 SB Ramps
- Kenmar Road and Eel River Drive

Table 2: Existing Levels of Service

Intersection	Control Type[1,2]	Target LOS	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
Kenmar Road and US 101 SB Ramps	TWSC	**C**	17.6	C	189	F
Kenmar Road and US 101 NB Ramps	TWSC	C	10.8	B	14.4	B
Kenmar Road and Eel River Drive	OWSC	C	37.9	E	37.7	E
Kenmar Road and South Fortuna Boulevard/Ross Hill Road	Signal	C	30.8	C	19.2	B
Notes: 1. OWSC = One Way Stop Control; TWSC = Two Way Stop Control 2. LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC and Signal						

Summary of No Build Operation Analysis and Findings

Table 3 provides a summary of the No Build intersection LOS for cumulative conditions. All intersections are expected to operate below an acceptable LOS for the No Build alternative with all operating at a LOS of F for PM peak hour conditions.

Table 3: No Build Levels of Service

Intersection	Control Type[1,2]	Target LOS	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
Kenmar Road and US 101 SB Ramps	TWSC	C	94.5	F	>300	F
Kenmar Road and US 101 NB Ramps	TWSC	C	14.9	B	136.9	F
Kenmar Road and Eel River Drive	TWSC	C	181.2	F	>300	F
Kenmar Road and South Fortuna Boulevard/Ross Hill Road	Signal	C	67.8	E	168.5	F
Notes: 1. TWSC = Two Way Stop Control 2. LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC and Signal						

Summary of Traffic Signal Operation Analysis and Findings

Table 4 provides a summary of the intersection LOS for the signal intersections. All intersections are projected to operate at or above the threshold LOS for the signal alternative. **Figure 3** presents the cumulative peak hour volumes at the signalized intersections.

Table 4: Signalized Intersection Levels of Service

Intersection	Control Type[1]	Target LOS	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
Kenmar Road and US 101 SB Ramps	Signal	C	21.8	C	31.2	C
Kenmar Road and US 101 NB Ramps	Signal	C	14.5	B	13.9	B
Kenmar Road and Eel River Drive	Signal	C	3.0	A	13.0	B
Kenmar Road and South Fortuna Boulevard/Ross Hill Road	Signal	C	30.8	C	23.1	B
Notes: 1. LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC and Signal						

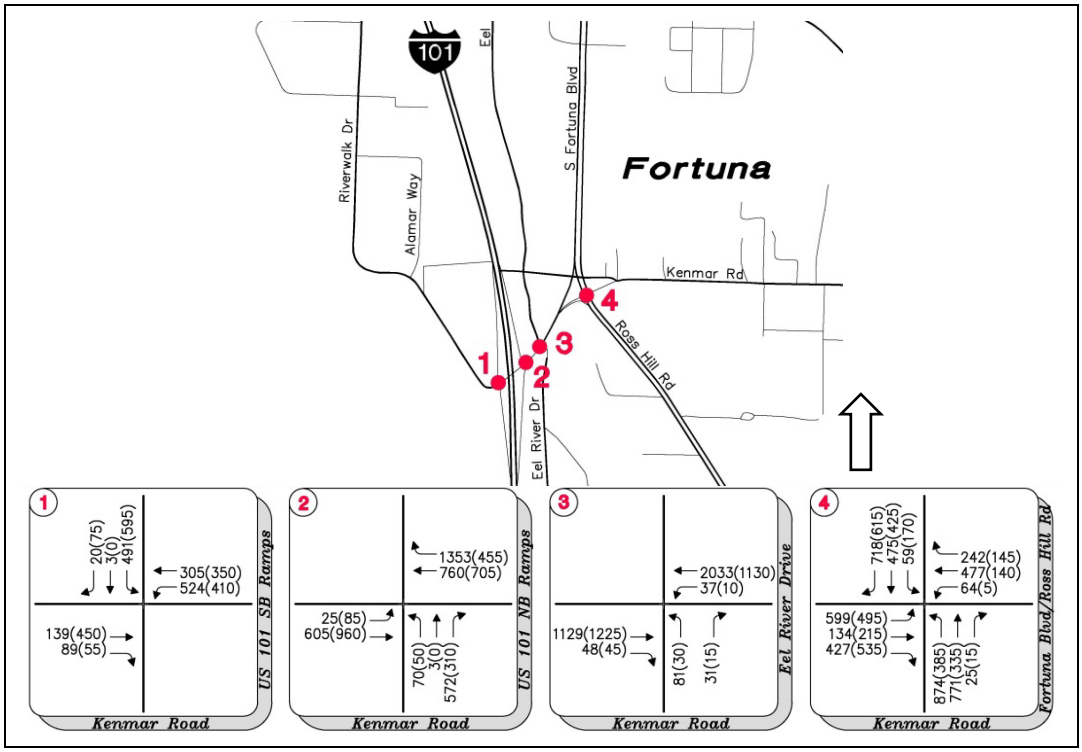


Figure 3: Cumulative Peak Volumes - Signalized Intersections

Summary of Roundabout Operation Analysis and Findings

Table 5 provides a summary of the intersection LOS for the roundabout intersections. All intersections are projected to operate at or above the threshold LOS for the roundabout alternatives. **Figure 4** presents the cumulative peak hour volumes at the roundabout intersections.

Table 5: Roundabout Intersections Levels of Service

Intersection	Control Type[1,2]	Target LOS	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
Kenmar Road and US 101 SB Ramps	RNDBT	C	8.4	A	16.6	B
Kenmar Road and US 101 NB Ramps	RNDBT	C	5.3	A	8.3	A
Kenmar Road and Eel River Drive	RNDBT	C	5.4	A	8.3	A
Kenmar Road and South Fortuna Boulevard/Ross Hill Road	RNDBT	C	11.0	B	18.0	B
Notes: 1. RNDBT = Roundbout 2. LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC and Signal						

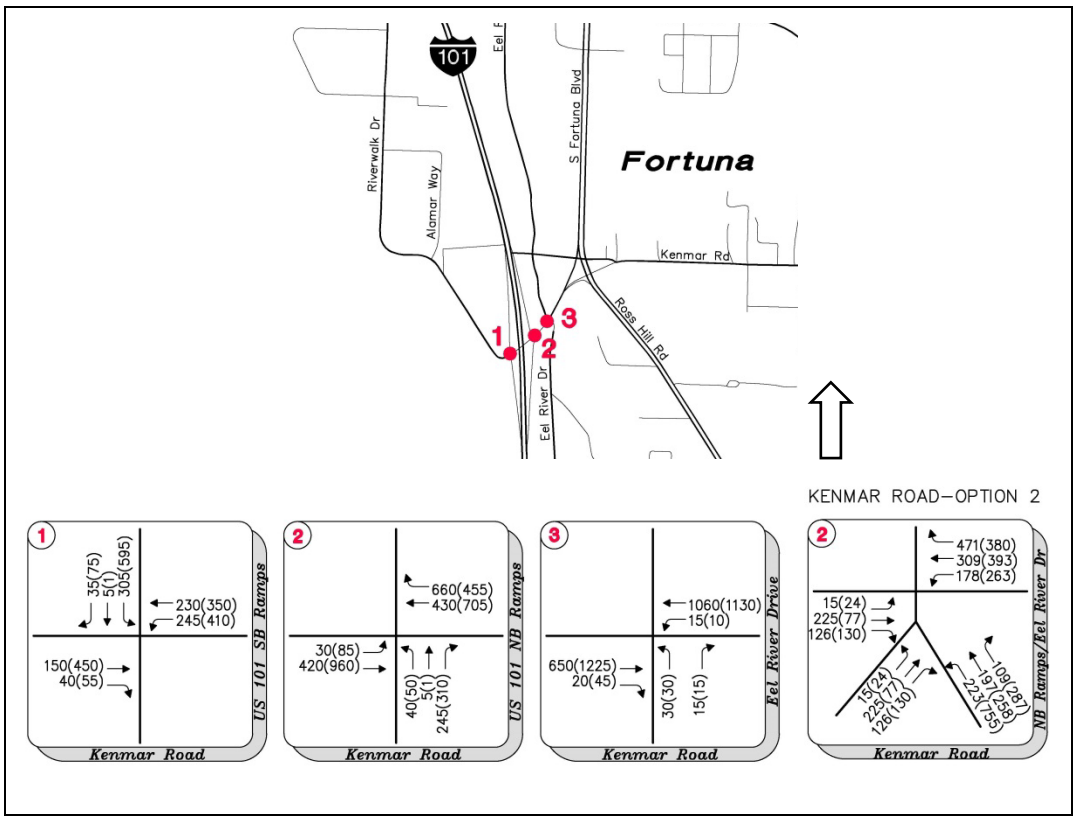


Figure 4: Cumulative Peak Volumes – Roundabout Intersections

Scope of Future Traffic Engineering Studies, Activities, & Tasks

The following discussion highlights the scope of traffic engineering studies, activities and tasks to be completed during the PA&ED phase.

Project Study Limits: The existing interchange study area includes the following intersections:

- Kenmar Road and US 101 Southbound Ramps
- Kenmar Road and US 101 Northbound Ramps
- Kenmar Road and Eel River Drive
- Kenmar Road and South Fortuna Boulevard/Ross Hill Road

Traffic Data Collection: The preliminary traffic assessment was prepared using existing AM and PM peak hour intersection traffic counts collected in March 2016 and bicycle/pedestrian counts collected in May 2016 for a preliminary study. Future traffic engineering studies may obtain new vehicle, pedestrian and bicycle traffic counts or may rely on the data already collected. Future traffic data obtained may include origin-destination surveys to gauge the movements and to observe driver behavior upon entry to the intersection.

Traffic Forecasting: In the PA&ED phase, the Project Development Team (PDT) may update the future design year forecasting of traffic volumes and movements for the Kenmar Road intersections within the project area based on new data or assumptions, if available.

Traffic Safety Analysis: A detailed study of the collision history will be developed during the PA&ED phase. The analysis will include the most recent collision data available for the project intersections.

Intersection Control Evaluation: An ICE Engineering Analysis (Step Two) will be prepared which may include intersection traffic control warrant studies, a capacity, operations and safety analysis, design performance checks, an economic analysis, and consultations with the District ICE Coordinator.

Traffic Impacts during Construction: The traffic impacts during construction will be evaluated and mitigation strategy identified. Special attention will be paid to the performance of non-standard geometric features, if any.

Pedestrian and Bicycles Improvement Analysis: During the PA&ED phase, additional analysis will be prepared to ensure the inclusion of context sensitive bicycle and pedestrian improvements, such as dedicated bike lanes, shared-use paths and crosswalks, some of which are included in the conceptual layouts of the alternatives. Preliminary designs will be analyzed to ensure adequate facilities are included to support bicyclists and pedestrians.

Traffic Index for Pavement Design: The traffic index (TI) required for the pavement design for the new pavement at the roundabout alternatives will be completed during the PA&ED Phase.

5. DEFICIENCIES

US 101 bisects the community cutting off the Riverwalk area from other areas of the City. The existing Kenmar interchange creates a significant barrier to bicycle and pedestrian movement, do not conform to current design standards, and will not accommodate future projected traffic volumes or the needs of roadway users. The interchanges also lack directional legibility, making it difficult for visitors to access the City's existing amenities.

Existing and Forecasted (No Build) Operational Deficiencies

Traffic modeling conducted in 2016 showed that 2 of the 4 intersections analyzed are currently operating below a LOS C (Fortuna's standard). For full buildout over 20-years with no improvements to the intersections (No Build), all 4 intersections are expected to operate below a LOS C. Refer to **Table 6** for a summary of LOS for existing and no build future conditions.

Table 6: Existing Levels of Service

Intersection	Control Type[1,2]	Target LOS	Existing LOS		Future No Build LOS	
			AM Peak	PM Peak	AM Peak	PM Peak
Kenmar Road and US 101 SB Ramps	TWSC	**C**	C	F	F	F
Kenmar Road and US 101 NB Ramps	TWSC	C	B	B	B	F
Kenmar Road and Eel River Drive	TWSC	C	E	E	F	F
Kenmar Road and South Fortuna Boulevard/Ross Hill Road	Signal	C	C	B	F	F
Notes: 1. TWSC = Two Way Stop Control 2. LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC and Signal						

Geometric Design Deficiencies

The following summarizes the non-standard features and geometric deficiencies identified for existing conditions in the project area:

Kenmar Road:

- Curve Radii per HDM Index 203.2
- Decision Sight Distance per HDM Index 201.7
- Vertical Clearance per HDM 309.2

Eel River Drive:

- Curve Radii per HDM Index 203.2
- Decision Sight Distance per HDM Index 201.7
- Intersection Spacing per HDM Index 504.3
- Stopping Sight Distance per HDM Index 201.1

Refer to **Attachment C** for a more comprehensive review of existing conditions and project design standards.

Pedestrian and Bicycle Deficiencies

The existing Kenmar Road interchange lacks ADA-compliant pedestrian facilities. Bicycle infrastructure are absent from project area, except for bike lanes at the Kenmar Road underpass. The bike lanes at this location have no signage, control or connection to continuing facilities.

6. CORRIDOR AND SYSTEM COORDINATION

The following discussion highlights the state, regional and local planning considerations for the proposed project improvements.

State Planning

Complete Streets

Caltrans Deputy Directive 64-Revision (DD-64R) provides for the needs of travelers of all ages and abilities in all planning, programming, design, construction, operations, and maintenance activities on the State Highway System. The Department views all transportation improvements (new and retrofit) as opportunities to improve safety, access, and mobility for all travelers and recognizes bicycle, pedestrian, and transit modes as integral elements of the transportation system.

Regional Planning

The Kenmar Road Interchange Improvement Project was prioritized in HCAOG's 2017 Regional Transportation Plan (RTP) Update.

Local Planning

General Plan

The City of Fortuna General Plan 2030 (General Plan) formalizes a long-term vision for the City's physical development. The Kenmar Road Interchange Improvement Project fulfils or meets many policies set forth in the General Plan, including specific direction to improve interchanges within the study area. These policies are detailed below.

Roadways and Highways

Policy TC-1.1 Reducing Mode Conflicts. The City shall seek to minimize conflicts between pedestrians, automobiles, and bicycles.

Policy TC-1.2 New Roadway Improvements. The City shall design and phase roadway improvements so that a level of service (LOS) C or better is maintained on all City streets, except that LOS D or better shall be maintained on Main Street.

Policy TC-1.3 Balanced Transportation System. The City shall strive to meet the level of service standard through a balanced transportation system that provides alternatives to the automobile and by promoting pedestrian, bicycle, and transit connections between employment areas and major residential and commercial areas.

Policy TC-1.4 Improved LOS. The City shall identify economic, design, and planning solutions to improve levels of service currently below LOS C. Where physical mitigation is infeasible, the City shall consider developing programs that enhance alternative access or otherwise reduce automobile travel demand.

Policy TC-1.15 Interchange Improvements. The City, through HCAOG in cooperation with Caltrans, shall allocate the costs for funding interchange improvements to areas of benefit and assign proportionate share costs to individual projects.

Bicycle and Trail Facilities

Policy TC-5.2 Bicycle System. The City shall develop and maintain a safe, convenient, and effective bicycle system that encourages increased bicycle use.

Policy TC-5.5 Rails-to-Trails. The City shall explore the concept of converting any abandoned railroad rights-of-way into multi-use bike and pedestrian paths for local and regional use per Sections 2540 through 2549 of the Streets and Highways Code.

The General Plan proposes a Class I bike path on Kenmar Road/Riverwalk Drive west of the interchange, a trail along the existing rail corridor, and a Class I bike path near Eel River Drive (refer to **Figure 5**).

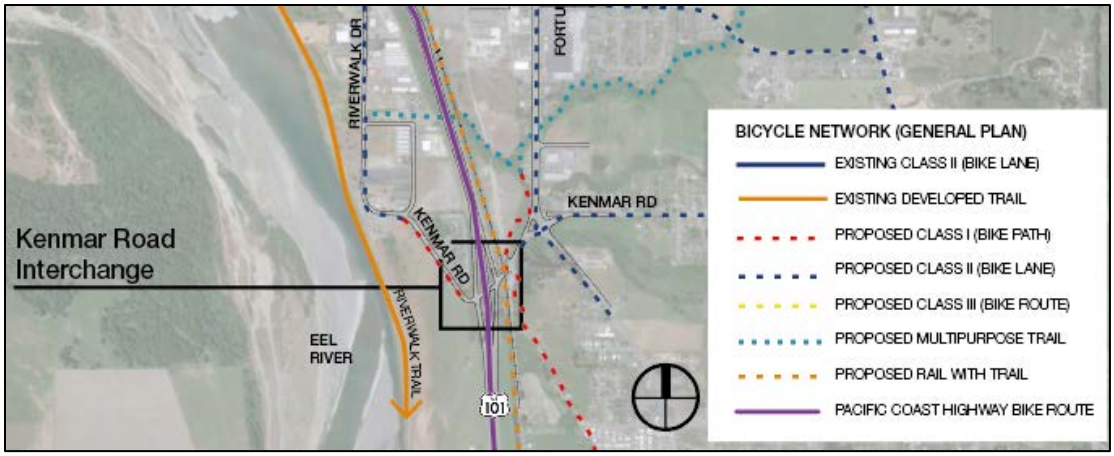


Figure 5: Bicycle Network in Fortuna General Plan

Pedestrian Facilities

Policy TC-4.2 New Developments. The City shall continue to require new development to finance and install sidewalks and pedestrian pathways connecting them to existing sidewalks or widening the right-of-way fronting the development to accommodate new sidewalks.

Policy TC-4.3 Specific Plans. The City shall encourage specific development plans to include design continuity of pedestrian access that enables residents to walk from their homes to places of work, recreation, and shopping.

Policy TC-4.7 Pedestrian Trails Interconnection. Where feasible, the City shall loop and interconnect pedestrian trails.

7. ALTERNATIVES

Intersection Alternatives

Unless noted otherwise, the alternatives identified below address the purpose and need of the project. Although the signal alternative does meet the projects purpose and need, its high estimated cost makes it infeasible for the City to implement, and therefore it is rejected from further consideration during the PA&ED phase. Only the roundabout are recommended to be carried forward in the PA&ED Phase of the project.

Based on the preliminary conceptual layouts, none of the build alternatives are anticipated to contain non-standard geometries with respect to both Caltrans Design Standards and City of Fortuna Design Standards. Further refinements to the proposed alternatives will be conducted during the PA&ED phase of the project.

Refer to **Attachment D** for conceptual design drawings, **Attachment E** for truck turning analysis, and **Attachment F** for roundabout fast path exhibits.

The "No Build" Alternative

This is the "No Build" condition, where the study intersections would remain unaltered with respect to intersection geometrics and stop control. This alternative does not meet the purpose and need of the proposed project.

Traffic Signal Alternative

This signalized intersection concept proposes three signals in close succession on Kenmar Road at the northbound on/offramp, southbound on/offramp, and at Eel River Drive. This alternative proposes

a mix of Class I and Class II bike facilities and a 7' wide sidewalk on the north side with connections to the three planned paths.

After analyzing the forecasted traffic volumes with Synchro, the lane geometry was determined for each intersection as shown conceptual design. Left-turn and right-turn pocket lengths were based on the 95th-percentile queue lengths.

For the signal alternative, the Kenmar Road corridor would require widening from the intersection of Kenmar Road and US 101 SB Ramps to the intersection of Kenmar Road and Fortuna Boulevard/Ross Hill Road. The current two lane roadway would require expansion to five lanes throughout the corridor to accommodate the projected growth. Widening of Kenmar Road and addition of bike lanes and sidewalks would require replacement of US 101 overcrossing bridge structure.

The signal alternative accommodates pedestrians and bicycles with standard Class II bike lanes, sidewalks, and intersection crossings along Kenmar Road and US 101 ramps. Each crossing is 10' wide and extends across the entire intersection length. Due to the number of lanes at each approach, long crosswalks would increase pedestrian crossing times and would affect the traffic signal timing to ensure that pedestrians can safely cross the roadway.

Roundabout Alternative 1 (a & b)

Roundabout alternative 1 uses roundabouts at the southbound and northbound on/off-ramps and two different options for the intersection with Eel River Drive:

- Option 1a: A third roundabout is included at the intersection with Eel River Drive.
- Option 1b: Eel River Drive is stop controlled with left turn movements onto and off Kenmar Road prohibited. Drivers desiring to make this movement would need to make a u-turn at the down-system intersections.

Both Option 1a and 1b include a 10' wide shared use path on the north side with connections to the three planned paths. In order to accommodate the path the Kenmar Road travel lanes would be reduced to 14 feet (with no shoulders).

Traffic modeling indicates that the NB Ramps intersection would operate at acceptable levels of service as a single lane roundabout with a westbound right-turn only lane. The SB off-ramp and EB Kenmar Road approaches the SB ramps intersection need a dedicated right-turn lane to operate at an acceptable level of service.

Roundabout Alternative 2

Roundabout alternative 2 uses a double ("dog bone") roundabout concept would place roundabouts on each side of US 101. The westerly roundabout accommodates traffic to and from the US 101 southbound offramp, Kenmar Road, and the southbound US 101 onramp. The easterly roundabout would manage traffic from Kenmar Road, the southerly reach of Eel River Drive, and northbound US 101 on and offramps. The northern portion of Eel River Drive would be realigned to cross the railroad and connect directly into the new roundabout located east of US 101.

Traffic modeling indicates that that the five-leg intersection would operate at an acceptable level of service as a single lane roundabout with a westbound right-turn only lane. The SB off-ramp and EB Kenmar Road approaches to the SB ramps intersection needed a dedicated right-turn lane to operate at an acceptable level of service. The concept includes 8' shoulders on each side of Kenmar Road under the existing freeway structure.

This design alternative includes a separated bike and walking path with connections to planned future trails, as well as pedestrian facilities throughout the system. The 10' wide shared use path on the north side would be located behind the existing structure columns. A retaining wall would be required beneath the structure to retain the highway/bridge embankment.

The realignment of Eel River Drive may allow for additional parking to be added to the park and ride lot, and access could be provided via a driveway on the realigned Eel River Drive or on Kenmar Road.

Structure Alternatives

A preliminary structures analysis was prepared to determine preliminary scope, feasibility, rough cost range, and a list of potential project risks for the proposed structures work. The full analysis and associated costs estimate are included in **Attachment G**.

US 101 spans over Kenmar Road on a bridge (Kenmar Road Undercrossing, BR. No. 04-0128). The bridge is skewed approximately 34 degrees to the right and is a 3-span, 133-foot-long, concrete tee-beam structure, with a span arrangement of 34, 64, and 34 feet. The structure was constructed in 1962. End supports are diaphragm abutments on concrete pile foundations, and intermediate supports are 4-column bents on concrete pile foundations. The structure is in good condition with sufficiency rating equal to 98 and health index equal to 100. Kenmar Road currently passes under the 65 foot main span with a 14-foot 10-inch vertical clearance. The 40-foot-width of Kenmar Road currently accommodates two 12 foot travel lanes and two 8-foot shoulders. There are no sidewalks along either side of Kenmar Road.

In order to accommodate the proposed lane configurations and bicycle and connectivity on Kenmar Road at the US 101 interchange, the following structural alternatives were considered:

Signal Alternative

The signal alternative will add traffic signals and improve Kenmar Road in the City of Fortuna by widening the roadway, maintain profile grade, and adding a pedestrian sidewalk along the north side of the roadway. The widening would accommodate five 12-foot traffic-lanes, 5-foot shoulders each side of the roadway and a 7-foot-wide sidewalk along the north side of the road. The overall width of Kenmar Road improvement is approximately 77 feet including the sidewalk. In order to provide for widening and improving Kenmar Road to this extent, it will be necessary to replace the existing 3-span undercrossing. The existing bridge is in fair condition, however its' main span is insufficient dimension to accommodate the Kenmore Road improvements.

Based on the conditions at the site and the interchange geometrics, the new undercrossing will be a single-span, approximately 114 feet in length. The most economical structure type will likely be a precast, prestressed, concrete girder structure with a 6-foot structure depth. Supports would be high-cantilever wall type abutments founded on concrete piling. An increase in elevation of U.S. 101 on the order of 2 feet will be necessary to allow for a minimum 15 feet vertical clear distance from the bottom of soffit to Kenmar Road. The undercrossing will be designed to accommodate a Type 742 concrete left barrier, a minimum 10-foot left shoulder, two 12-foot lanes of southbound traffic, 5-foot southbound median shoulder, a Type 60 median barrier, a 5-foot northbound median shoulder, two 12-foot lanes northbound traffic, a 10-foot right shoulder, and a Type 742 concrete right barrier. Falsework would not necessary to erect this type of girder structure.

The new undercrossing can be constructed in two phases. The initial phase would likely be to remove and construct approximately the west half of the new bridge, while U.S. 101 traffic utilizes the east half of the existing bridge. The final phase would be to reroute U.S. 101 traffic to the new west half and remove and construct the east half of the new structure and a 3-foot wide deck closure pour.

Roundabout Alternatives

Roundabout alternative 2 will require a permanent retaining wall parallel to and in front of the north abutment of the existing Kenmar Road Undercrossing (Abutment 4) and to add traffic roundabouts each side of the interchange on Kenmar Road. The retaining wall in front of the abutment is to accommodate a 10-foot-wide pedestrian/bicycle facility under the structure. The total length of proposed wall will be approximately 180 feet.

The proposed wall layout line is 15 feet from the face of the existing columns; however, the layout line could be located as close as 10 feet from the face of existing columns. A Caltrans Type 7 retaining wall was considered for the proposed structure for the layout line 10 feet from the existing columns and the excavation for a Type 7 wall would likely be outside the influence zone of the Abutment 1 diaphragm. If the wall layout line is located more than 10 feet from the existing column face, then the new wall would need to be a permanent tie-back (ground anchor) diaphragm wall constructed from top

down in a minimum of three lifts. The maximum wall height above the pedestrian surface wouldbe approximately 12 feet depending on layout. The wall foundations would extend approximately 2 to 3 feet below finish grade. Cable railing will be mounted on top of the wall. Permanent tie-backs wjould require a permanent construction easement.

Pedestrian and Bike Facilities and Connectivity

Signal Alternative

The signal alternative accommodates pedestrians and bicycles with standard Class II bike lanes, sidewalks, and intersection crossings along Kenmar Road and US 101 ramps. Each crossing is 10' wide and extends across the entire intersection length. Due to the number of lanes at each approach, long crosswalks will increase pedestrian crossing times and will affect the traffic signal timing to ensure that pedestrians can safely cross the roadway.

Roundabout Alternatives

Pedestrian crossings are provided along Kenmar Road and US 101 ramps for Kenmar Road Interchange roundabout alternatives. Crossings are 10 feet in width and set back a minimum of 20 feet from the roundabouts' circulating roadways. Where crosswalks intersect splitter islands or medians, a 6 foot long minimum paved pathway is provided between the travel lanes for safety and refuge when waiting to cross. Shared-use pathways, 10 feet in width and located outside of the roundabouts, are setback a minimum of 5 feet from the circulatory road with a landscape strip to increase accessibility and discourage pedestrians from crossing into the central traveled way.

Bicycles are accommodated by navigating through the roundabouts in two possible ways. Cyclists may choose to take the travel lane and travel through the roundabouts as a vehicle or may choose to take the separated bike ramp/shared use path and travel through the corridor as a pedestrian.

Gateway and Landscaping

Wayfinding, gateway aesthetics and plantings can be featured in each alternative in undeveloped open space along or within each intersection. Roundabouts, with their central landscape areas, lend themselves to focal points with artistic gateway treatments. Refer to **Attachment H** for preliminary landscape and gateway concepts.

Cost Estimates

Capital, support, and total estimated costs for each alternative are summarized in **Table 7**. The total capital costs include traffic control, mobilization, right-of-way, utility relocation, and contingencies. The total support costs include costs for environmental clearance, plans, specifications, and estimates (PS&E), right-of-way engineering and acquisition, and construction support and management. Refer to **Attachment I** for detailed costs estimates for each alternative.

Table 7: Cost Estimate Summary

Alternative	Total Capital Cost	Total Support Cost	Total Estimated Cost (Rounded)
Signal	$15.0M	$6.7M	$21.7
Roundabout 1a	$4.4M	$2.0M	$6.4M
Roundabout 1b	$4.2M	$2.0M	$6.2M
Roundabout 2	$5.6M	$2.4M	$8.0M

Alternatives Comparison

A preliminary alternatives analysis was conducted to identify a preferred alternative. The analysis considered the following: cost, truck accommodation, safety, local access, complete streets, environmental impacts, right-of-way impacts, public input, and the purpose and need.

As previously stated, the signal alternative does meet the projects purpose and need, however, its high estimated cost makes it infeasible for the City to implement, and therefore it is rejected from further consideration.

The roundabout alternatives were generally considered comparable in terms of meeting the performance criteria, however roundabout alternative 2 was identified as the preferred alternative as it as it best met the performance criteria and was preferred by the public and stakeholders.

No design exceptions have been identified as at this point. However as the project is further developed, the need for exceptions to design standards should be analyzed.

8. RIGHT-OF-WAY

Initial research was conducted to determine road widths, rights-of-way, adjacent parcel ownerships and maintenance responsibilities, as these factors can affect feasible design solutions or preferred alternatives. Refer to **Attachment J** for additional information on right-of-way and ownership. Right-of-way data sheets will be prepared during the PA&ED phase of the project.

Ownership

Generally, the property in the immediate vicinity of the Kenmar interchanges is owned by public entities: Caltrans, the County of Humboldt, and the City of Fortuna. The underpass is owned by Caltrans and maintained by the County. The undeveloped Mill District Parcel is privately owned and accessed from the northern leg of Eel River Drive. Commercial land use (Riverwalk RV Park) is located southwest of the interchange. The railroad corridor is owned by the North Coast Railroad Authority (NCRA). Caltrans owns a small park and ride lot on the corner of Kenmar Road and Eel River Drive.

Right-of-Way Widths

The width of Riverwalk Drive right-of-way west of US 101 has been determined to be 50-feet between the back of the walk on the east side and top of slope on the west side. Additional research and surveying will be needed to determine the right-of-way limits for Kenmar Road and Eel River Drive.

Table 8 summarizes the approximate anticipated right-of-way impacts for each project alternative. Only roundabout alternative 1a is expected to require right-of-way acquisition (less than a tenth of an acre) to construct the northern leg of the Eel River Drive roundabout.

In addition to permanent acquisitions, temporary permissions/easements and/or encroachment permits will need to be obtained during the Right-of-Way phase of the project.

Table 8: Right-of-way Impacts

Alternative	APN #	Right-of-Way Acquisition	
		SQFT	Acre
Signal	N/A	N/A	N/A
Roundabout Option 1a	201-331-005	3,772.58	0.09
Roundabout Option 1b	N/A	N/A	N/A
Roundabout Option 2	N/A	N/A	N/A

Utilities

Existing underground and above ground utilities in the vicinity of the Kenmar Road interchange will need to be modified or relocated to accommodate the proposed improvements. Utility ownership is presented in **Table 9**.

Table 9: Utilities in Vicinity of Kenmar Road Interchange

Utility	Owner
Storm Drain	Caltrans/City of Fortuna
Cable Television	Suddenlink
Telephone	AT&T
Electrical	PG&E
Water	City of Fortuna
RR Signal	NCAR

Railroad

The railroad corridor roughly parallels the east side of US 101 and crosses through the Kenmar Road project area. The NCRA is the public agency that owns right-of-way and the Northwestern Pacific Railroad (NWPRR) is the contract operator of the railroad. Together they have the responsibility for the safety, operation and maintenance of the railroad. Although there is currently not active rail service, any modifications to railroad crossings at roadway intersections will require the approval of the California Public Utilities Commission (CPUC) under General Order 88-B. As the project moves forward to project development, close coordination with the NCRA, NWPRR and the CPUC will be required to ensure that railroad operations are not impeded by interchange improvements.

9. STAKEHOLDER INVOLVEMENT

The project concepts were developed and vetted through a public process that included regular meetings of a Technical Advisory Group (TAG), the general public, and specific project stakeholders. This section discusses the results of the public and stakeholder engagement during the design development process.

Technical Advisory Group (TAG)

A TAG was convened in January 2016 to support initial project planning and the development of project alternatives. The TAG met on five different occasions provide technical information relevant to the project, to coordinate with local agencies, and to act as the “eyes and ears” of the community to guide the project. Group members included representatives from HCAOG, the City of Fortuna, the Humboldt County Department Public Work, and Caltrans District 1.

Community Meetings

Two workshops were held in March and July of 2016 to obtain public input into the project assessment and design. Outreach for the project was conducted with flyers, emails, radio public service announcements on six or more stations, social media posts, and targeted in-person outreach to colleagues and residents. In order to encourage participation, each workshop offered food, a child-friendly space with activities, and Spanish-English interpretation. Both workshops resulted in specific and helpful feedback from stakeholders that was utilized during the development and evaluation of design alternatives.

First Community Meeting (March 2016)

The goals of this first workshop was to understand how residents and visitors currently navigate Kenmar interchange area, to identify specific concerns related to safety, operations, and connectivity, and to discuss potential design treatments that could be implements

The attendees identified many challenges for pedestrians and bicyclists, including dark areas under crossings, narrow or virtually non-existent shoulders, and challenging road crossings. Meeting participants showed a preference for design alternatives involving roundabouts. Signalized intersection alternative comments were mostly mildly negative. Roundabout options with fewer roundabouts, and fewer bicycle/pedestrian crossings were preferred.

Second Community Meeting (July 2016)

The second workshop, conducted on July 20, 2016, was primarily focused on presenting design alternatives, answering questions and soliciting community feedback. There was a clear preference for the roundabout alternative 2 for Kenmar Road.

Public Presentations

The results of the 2016 Highway 101, Fortuna Downtown and Riverwalk Area Complete Streets and Connectivity Study was presented at the following public meetings:

- Fortuna City Council Meeting – November 8, 2016
- HCAOG Board Meeting – November 17, 2016
- HCAOG Technical Advisory Committee (TAC) Meeting – December 1, 2016

In addition, the results of the study were presented to the Caltrans District 1 Executive Committee on January 3, 2017.

10. ENVIRONMENTAL COMPLIANCE

Preliminary Environmental Analysis

In 2016, an initial environmental evaluation of the project and alternatives was conducted to help anticipate potential environmental constraints that may affect project design, alternatives, cost, schedule, and delivery. The evaluation included a reconnaissance-level site investigation of existing conditions in the project area to identify the presence or potential presence of biological resources listed under the Federal Endangered Species Act (ESA), the presence of wetlands and Waters of the US as regulated by the US Army Corps of Engineers (USACE), the presence or potential presence of species listed as endangered or threatened under the California Endangered Species Act (CESA) or considered a species of special concern (SSC) by the California Department of Fish and Wildlife (CDFW), or the potential for special-status plant species having a rare plant ranking as determined by the California Native Plant Society (CNPS) rare plant inventory, and to present the potential of sensitive habitats as listed by the CDFW. Refer to **Attachment K** for more information on the initial environmental evaluation that was prepared. During the PA&ED phase of the project, a formal Preliminary Environmental Analysis Report (PEAR) may be completed to satisfy Caltrans if required.

NEPA, CEQA and Permitting

During the PA&ED phase, the project will be evaluated for potential impacts on the environment in compliance with the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA). Feasible opportunities to avoid or reduce impacts will be pursued and mitigation measures will be developed to reduce potentially significant impacts as appropriate. The draft CEQA document will be made available to the public for review and comment.

Based on the information currently available, the expected compliance pathways are a Mitigated Negative Declaration of environmental impact for CEQA and a Categorical Exclusion for NEPA in conformance with the Federal Highways Administration/Caltrans programmatic process.

The wetland and riparian habitats in the project area have a moderate to high likelihood of supporting listed reptile, frog and fish species including Western Pond Turtle *Emys (Actinymys) marmorata*, Northern Red-legged Frog Rana aurora, and Foothill Yellow-legged Frog *Rana boylii*. Several sensitive plant species also have a moderate likelihood of occurring in the study area.

Subsequent environmental investigations including a wetland delineation will be needed to address potential sensitive species identified and address any impacts to protected habitats. Additionally, a variety of permits and related environmental review will be necessary for project planning and design.

Anticipated Environmental Permitting and Compliance Requirements are presented in **Table 10**.

Table 10. Anticipated Environmental Permitting and Compliance Requirements

Law/Regulation	Permit/Approval	Authority
CEQA	Mitigated Negative Declaration	Lead Agency
NEPA	Categorical Exclusion	Caltrans on behalf of Federal Highways Administration
Clean Water Act Section 404	Nationwide Permit	US Army Corps of Engineers
Porter-Cologne/Clean Water Act Section 401	401 Certification and/or Waste Discharge Requirements (WDR)	North Coast Regional Water Quality Control Board
National Historic Preservation Act	Letter of Concurrence	State Historic Preservation Office & Tribal Historic Preservation Office

A Preliminary Environmental Study (PES) Form will be developed during the PA&ED phase of the project. The following technical studies and plans are anticipated to be required:

- Natural Environmental Study (NES) of Biological Resources
- Wetland Delineation and Rare Plant Survey
- Initial Site Assessment (ISA)
- Visual Impact Assessment
- Floodplain Evaluation & Location Hydraulic Study
- Geotechnical Investigation
- Historic Property Survey Report (HPSR) and Archeological Survey Report (ARS)
- Stormwater Data Report

11. FUNDING

In 2017, HCAOG prepared its 2018 Regional Transportation Improvement Program (RTIP) for incorporation into the 2018 State Transportation Improvement Program (STIP) cycle. The RTIP identifies state highway and local agency projects proposed for funding from Fiscal Year (FY) 2018-19 through 2022-23 based on the amount of funding available to the region. In addition, HCAOG requested an advance of $550,000 of funding for the US 101/Kenmar Road Interchange Project through the Advanced Project Development Element (APDE). The APDE is an advancement of future

regular regional RTIP funds which provides funding for environmental, permits, plans, specifications and estimates. The advanced funds were requested to be programmed in FY 2019-20. The California Transportation Commission will make a decision on HCAOG's RTIP at its meeting on March 21/22, 2018.

Funding for PS&E, right-of-way and construction has not been programmed. Potential funding sources for PS&E, right-of-way and construction include: the state Active Transportation Program (ATP), the federal TIGER program, future STIP cycles, and local funds.

It has been determined that this project is eligible for Federal-aid funding.

Capital Outlay Project Estimate

Table 11 presents a summary of the capital outlay estimates for the proposed alternatives. Detailed estimates for the various alternatives are presented in **Attachment I**.

Table 11: Summary of Capital Outlay Estimate

	Range of Estimate		Federal Funds		Local Funds	
Alternative	**Construction**	**Right-of-Way**	**Construction**	**Right-of-Way**	**Construction**	**Right-of-Way**
Signal	$14.8M	$200K	TBD	TBD	TBD	TBD
Roundabout 1a	$4.1M	$300K	TBD	TBD	TBD	TBD
Roundabout 1b	$4.0M	$200K	TBD	TBD	TBD	TBD
Roundabout 2	$5.4M	$200K	TBD	TBD	TBD	TBD

The level of detail available to develop these capital outlay project estimates is only accurate to within the above ranges and is useful for long-range planning purposes only. The capital outlay project estimates should not be used to program or commit State-programmed capital outlay funds.

Capital Outlay Support Estimate

Capital outlay support estimate for programming PA&ED in the 2018 STIP for this project: $550,000.

12. DELIVERY SCHEDULE

The following section outlines the delivery schedule for the proposed alternative.

Table 10: Project Delivery Schedule

Project Milestones	Scheduled Delivery Date
Program Project	12/15/2017
Begin Environmental (PA&ED) Phase	07/01/2019
Circulate Draft Environmental Document	07/01/2020
Draft Project Report	12/1/2020
End Environmental Milestone	6/30/2021

The anticipated funding fiscal year for construction is 2025/26.

13. RISKS

A risk register and risk analysis will be complete for the project during the PA&ED phase of the project.

14. EXTERNAL AGENCY COORDINATION

This project does not anticipate coordination with the Federal Highway Administration (FHWA).

Coordination between the City of Fortuna, County of Humboldt and Caltrans will be required throughout all phases of this project. In addition, the project will require the following coordination:

Caltrans
Encroachment Permit

US Army Corps of Engineers
Department of the Army Permit for:
Clean Water Act Section 404

California Department of Fish and Wildlife
California Fish and Game Code Section 1602
Lake or Streambed Alteration Agreement

California Coastal Commission and/or Local Coastal Program
California Public Resources Code Division 20 (California Coastal Act)
Coastal Development Permit

Regional Water Quality Control Board
Clean Water Act Section 401
Water Quality Certification

Railroads
North Coast Railroad Authority

California Public Utilities Commission
Modification to an Existing Rail Crossing, GO-88B

15. PROJECT REVIEWS

Caltrans District 1 has indicated that a formal review of this PSR is not required at this time. The City will engage Caltrans prior to proceeding with PA&ED at which time formal Caltrans reviews can occur, if requested.

16. PROJECT PERSONNEL

City of Fortuna
Merritt Perry, Director of Public Works/City Engineer, 707-725-1469
Kevin Carter, Deputy Director of Public Works, 707-725-1472
Mike Johnson, General Services Superintendent, 707-725-1466

Caltrans District 1
Kevin Tucker, Advanced Planning, 707-441-5770
Jesse Roberts, Transportation Planning, 707-441-4693

Humboldt County Association of Governments
Marcella Clem, Director, 707-444-8208

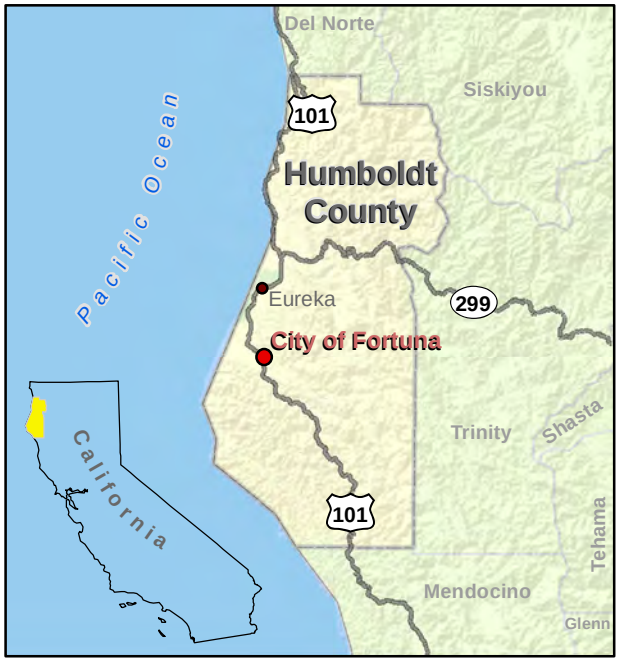
County of Humboldt
Tony Seghetti, Deputy Director Engineering, 707-445-7377
Tom Mattson, Director of Public Works, 707-445-7491

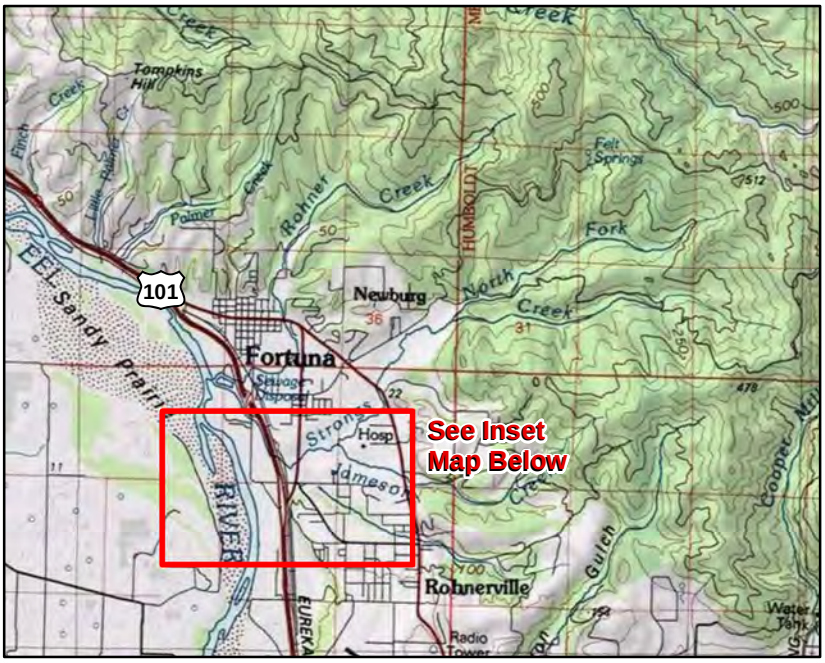
GHD (Consultant)
Josh Wolf, Project Manager, 707-443-8326

17. ATTACHMENTS

L. Location map
M. Traffic Counts and LOS Analysis
N. Review of Geometric Design Standards
O. Conceptual Design Drawings
P. Truck Turning Analysis
Q. Fast Path Exhibits
R. Preliminary Structures Analysis
S. Landscaping/Gateway Concepts
T. Cost Estimates
U. Right-of-Way and Property Ownership
V. Environmental Constraints Analysis

Attachment A - Location map





Project Area

Paper Size 8.5" x 11" (ANSI A)
0 200 400 600 800 1,000
Feet
Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

N

City of Fortuna
Kenmar Road Interchange Improvements

Job Number 11109149
Revision A
Date 06 Dec 2017

Vicinity Map

Figure 1

718 Third Street Eureka CA 95501 USA T 707 443 8326 F 707 444 8330 E eureka@ghd.com W www.ghd.com

G:\111\11109149 HCAOG Hwy 101 Fortuna Downtown-Riverwalk\08-GIS\Maps\Figures\Recon_WetlandsHabitat\F1_Vicinity_171206.mxd

Data source: City of Fortuna Aerial, 2010; GHD data, 2013; USA Topo Maps; Streetmap USA. Created by:gldavidson

Attachment B - Traffic Counts and LOS Analysis

Existing Conditions

Intersection	
Int Delay, s/veh	6.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	50	32	189	110	0	0	0	0	177	1	7
Future Vol, veh/h	0	50	32	189	110	0	0	0	0	177	1	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	53	34	199	116	0	0	0	0	186	1	7

Major/Minor	Major2			Minor2		
Conflicting Flow All	0	0	0	514	514	116
Stage 1	-	-	-	514	514	-
Stage 2	-	-	-	0	0	-
Critical Hdwy	4.13	-	-	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.227	-	-	3.527	4.027	3.327
Pot Cap-1 Maneuver	-	-	0	469	463	934
Stage 1	-	-	0	541	534	-
Stage 2	-	-	0	-	-	-
Platoon blocked, %		-				
Mov Cap-1 Maneuver	-	-	-	469	463	934
Mov Cap-2 Maneuver	-	-	-	469	463	-
Stage 1	-	-	-	541	534	-
Stage 2	-	-	-	-	-	-

Approach	WB	SB
HCM Control Delay, s		17.6
HCM LOS		C

Minor Lane/Major Mvmt	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	478
HCM Lane V/C Ratio	-	-	0.407
HCM Control Delay (s)	-	-	17.6
HCM Lane LOS	-	-	C
HCM 95th %tile Q(veh)	-	-	2

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	9	218	0	0	274	488	25	1	206	0	0	0
Future Vol, veh/h	9	218	0	0	274	488	25	1	206	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	Yield	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	251	0	0	315	561	29	1	237	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	315	0	-	-	-	0	586	586	251
Stage 1	-	-	-	-	-	-	271	271	-
Stage 2	-	-	-	-	-	-	315	315	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1245	-	0	0	-	0	473	422	788
Stage 1	-	-	0	0	-	0	775	685	-
Stage 2	-	-	0	0	-	0	740	656	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	1245	-	-	-	-	-	469	0	788
Mov Cap-2 Maneuver	-	-	-	-	-	-	469	0	-
Stage 1	-	-	-	-	-	-	768	0	-
Stage 2	-	-	-	-	-	-	740	0	-

Approach	EB	WB	NB
HCM Control Delay, s	0.3	0	10.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT
Capacity (veh/h)	887	1245	-	-
HCM Lane V/C Ratio	0.301	0.008	-	-
HCM Control Delay (s)	10.8	7.9	0	-
HCM Lane LOS	B	A	A	-
HCM 95th %tile Q(veh)	1.3	0	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	407	17	13	733	0	29	0	11	0	0	0
Future Vol, veh/h	0	407	17	13	733	0	29	0	11	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	473	20	15	852	0	34	0	13	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	852	0	0	493	0	0	1366	1366	483	1373	1376	852
Stage 1	-	-	-	-	-	-	483	483	-	883	883	-
Stage 2	-	-	-	-	-	-	883	883	-	490	493	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	787	-	-	1071	-	-	124	147	584	123	145	359
Stage 1	-	-	-	-	-	-	565	553	-	340	364	-
Stage 2	-	-	-	-	-	-	340	364	-	560	547	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	787	-	-	1071	-	-	121	143	584	118	141	359
Mov Cap-2 Maneuver	-	-	-	-	-	-	121	143	-	118	141	-
Stage 1	-	-	-	-	-	-	565	553	-	340	354	-
Stage 2	-	-	-	-	-	-	331	354	-	548	547	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	37.9	0
HCM LOS			E	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	155	787	-	-	1071	-	-	-
HCM Lane V/C Ratio	0.3	-	-	-	0.014	-	-	-
HCM Control Delay (s)	37.9	0	-	-	8.4	0	-	0
HCM Lane LOS	E	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	1.2	0	-	-	0	-	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	216	48	154	23	172	87	315	278	9	21	171	259
Future Volume (veh/h)	216	48	154	23	172	87	315	278	9	21	171	259
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	257	57	183	27	205	104	375	331	11	25	204	0
Adj No. of Lanes	0	1	1	0	1	1	1	2	0	1	2	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	312	69	337	35	268	259	420	1160	38	49	434	0
Arrive On Green	0.21	0.21	0.21	0.16	0.16	0.16	0.24	0.33	0.33	0.03	0.12	0.00
Sat Flow, veh/h	1465	325	1583	216	1636	1583	1774	3496	116	1774	3632	0
Grp Volume(v), veh/h	314	0	183	232	0	104	375	167	175	25	204	0
Grp Sat Flow(s),veh/h/ln	1790	0	1583	1852	0	1583	1774	1770	1842	1774	1770	0
Q Serve(g_s), s	11.4	0.0	7.0	8.2	0.0	4.0	13.9	4.8	4.8	0.9	3.7	0.0
Cycle Q Clear(g_c), s	11.4	0.0	7.0	8.2	0.0	4.0	13.9	4.8	4.8	0.9	3.7	0.0
Prop In Lane	0.82		1.00	0.12		1.00	1.00		0.06	1.00		0.00
Lane Grp Cap(c), veh/h	381	0	337	303	0	259	420	587	611	49	434	0
V/C Ratio(X)	0.82	0.00	0.54	0.77	0.00	0.40	0.89	0.28	0.29	0.51	0.47	0.00
Avail Cap(c_a), veh/h	472	0	418	489	0	418	455	794	827	140	960	0
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	25.6	0.0	23.9	27.3	0.0	25.5	25.2	16.8	16.8	32.7	27.8	0.0
Incr Delay (d2), s/veh	9.4	0.0	1.4	4.0	0.0	1.0	18.6	0.3	0.3	7.9	0.8	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	6.6	0.0	3.2	4.5	0.0	1.8	8.9	2.4	2.5	0.6	1.8	0.0
LnGrp Delay(d),s/veh	35.0	0.0	25.2	31.3	0.0	26.5	43.8	17.1	17.1	40.6	28.6	0.0
LnGrp LOS	D		C	C		C	D	B	B	D	C	
Approach Vol, veh/h		497			336			717			229	
Approach Delay, s/veh		31.4			29.8			31.0			29.9	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.4	27.1		19.0	20.7	12.9		15.7
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s	5.4	30.6		18.0	17.5	18.5		18.0
Max Q Clear Time (g_c+I1), s	2.9	6.8		13.4	15.9	5.7		10.2
Green Ext Time (p_c), s	0.0	3.4		1.1	0.2	2.7		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	30.8
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	86.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	126	22	332	107	0	0	0	0	352	0	19
Future Vol, veh/h	0	126	22	332	107	0	0	0	0	352	0	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	134	23	353	114	0	0	0	0	374	0	20

Major/Minor	Major2			Minor2		
Conflicting Flow All	0	0	0	820	820	114
Stage 1	-	-	-	820	820	-
Stage 2	-	-	-	0	0	-
Critical Hdwy	4.12	-	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	-	-	0	~ 294	310	939
Stage 1	-	-	0	~ 369	389	-
Stage 2	-	-	0	-	-	-
Platoon blocked, %		-				
Mov Cap-1 Maneuver	-	-	-	~ 294	310	939
Mov Cap-2 Maneuver	-	-	-	~ 294	310	-
Stage 1	-	-	-	~ 369	389	-
Stage 2	-	-	-	-	-	-

Approach	WB	SB
HCM Control Delay, s		189
HCM LOS		F

Minor Lane/Major Mvmt	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	305
HCM Lane V/C Ratio	-	-	1.294
HCM Control Delay (s)	-	-	189
HCM Lane LOS	-	-	F
HCM 95th %tile Q(veh)	-	-	19

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	13	465	0	0	413	228	26	0	220	0	0	0
Future Vol, veh/h	13	465	0	0	413	228	26	0	220	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	Yield	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	14	495	0	0	439	243	28	0	234	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	439	0	-	-	-	0	961	961	495
Stage 1	-	-	-	-	-	-	522	522	-
Stage 2	-	-	-	-	-	-	439	439	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1121	-	0	0	-	0	284	256	575
Stage 1	-	-	0	0	-	0	595	531	-
Stage 2	-	-	0	0	-	0	650	578	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	1121	-	-	-	-	-	279	0	575
Mov Cap-2 Maneuver	-	-	-	-	-	-	279	0	-
Stage 1	-	-	-	-	-	-	585	0	-
Stage 2	-	-	-	-	-	-	650	0	-

Approach	EB	WB	NB
HCM Control Delay, s	0.2	0	14.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT
Capacity (veh/h)	643	1121	-	-
HCM Lane V/C Ratio	0.407	0.012	-	-
HCM Control Delay (s)	14.4	8.3	0	-
HCM Lane LOS	B	A	A	-
HCM 95th %tile Q(veh)	2	0	-	-

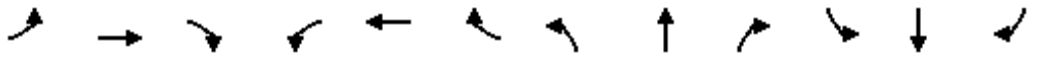
Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	642	43	9	611	0	30	0	13	0	0	0
Future Vol, veh/h	0	642	43	9	611	0	30	0	13	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	0	683	46	10	650	0	32	0	14	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	650	0	0	729	0	0	1375	1375	706	1382	1398	650
Stage 1	-	-	-	-	-	-	706	706	-	669	669	-
Stage 2	-	-	-	-	-	-	669	669	-	713	729	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.11	6.51	6.21	7.11	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.509	4.009	3.309	3.509	4.009	3.309
Pot Cap-1 Maneuver	941	-	-	879	-	-	123	146	438	122	141	471
Stage 1	-	-	-	-	-	-	428	440	-	449	457	-
Stage 2	-	-	-	-	-	-	449	457	-	424	430	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	941	-	-	879	-	-	121	143	438	117	138	471
Mov Cap-2 Maneuver	-	-	-	-	-	-	121	143	-	117	138	-
Stage 1	-	-	-	-	-	-	428	440	-	449	449	-
Stage 2	-	-	-	-	-	-	441	449	-	411	430	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	37.7	0
HCM LOS			E	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	155	941	-	-	879	-	-	-
HCM Lane V/C Ratio	0.295	-	-	-	0.011	-	-	-
HCM Control Delay (s)	37.7	0	-	-	9.1	0	-	0
HCM Lane LOS	E	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	1.2	0	-	-	0	-	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	271	119	265	5	75	55	123	175	11	60	223	422
Future Volume (veh/h)	271	119	265	5	75	55	123	175	11	60	223	422
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1881	1881	1900	1881	1881	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	274	120	268	5	76	56	124	177	11	61	225	0
Adj No. of Lanes	0	1	1	0	1	1	1	2	0	1	2	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	359	157	454	10	157	143	165	612	38	105	520	0
Arrive On Green	0.28	0.28	0.28	0.09	0.09	0.09	0.09	0.18	0.18	0.06	0.15	0.00
Sat Flow, veh/h	1264	554	1599	116	1760	1599	1792	3420	211	1792	3668	0
Grp Volume(v), veh/h	394	0	268	81	0	56	124	92	96	61	225	0
Grp Sat Flow(s),veh/h/ln	1818	0	1599	1875	0	1599	1792	1787	1844	1792	1787	0
Q Serve(g_s), s	9.2	0.0	6.7	1.9	0.0	1.5	3.1	2.1	2.1	1.5	2.7	0.0
Cycle Q Clear(g_c), s	9.2	0.0	6.7	1.9	0.0	1.5	3.1	2.1	2.1	1.5	2.7	0.0
Prop In Lane	0.70		1.00	0.06		1.00	1.00		0.11	1.00		0.00
Lane Grp Cap(c), veh/h	517	0	454	168	0	143	165	320	330	105	520	0
V/C Ratio(X)	0.76	0.00	0.59	0.48	0.00	0.39	0.75	0.29	0.29	0.58	0.43	0.00
Avail Cap(c_a), veh/h	707	0	622	729	0	622	677	1181	1219	209	1428	0
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	15.1	0.0	14.2	20.1	0.0	19.9	20.5	16.5	16.5	21.2	18.0	0.0
Incr Delay (d2), s/veh	3.3	0.0	1.2	2.1	0.0	1.7	6.7	0.5	0.5	5.0	0.6	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	5.1	0.0	3.1	1.1	0.0	0.7	1.9	1.1	1.1	0.9	1.4	0.0
LnGrp Delay(d),s/veh	18.5	0.0	15.5	22.2	0.0	21.6	27.2	16.9	16.9	26.2	18.6	0.0
LnGrp LOS	B		B	C		C	C	B	B	C	B	
Approach Vol, veh/h		662			137			312			286	
Approach Delay, s/veh		17.3			22.0			21.0			20.2	
Approach LOS		B			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.2	12.8		17.7	8.8	11.2		8.6
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s	5.4	30.6		18.0	17.5	18.5		18.0
Max Q Clear Time (g_c+I1), s	3.5	4.1		11.2	5.1	4.7		3.9
Green Ext Time (p_c), s	0.0	2.6		2.0	0.2	2.1		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	19.2
HCM 2010 LOS	B

Cumulative No Build Alternative

Intersection	
Int Delay, s/veh	40

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	150	40	240	230	0	0	0	0	305	5	35
Future Vol, veh/h	0	150	40	240	230	0	0	0	0	305	5	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	158	42	253	242	0	0	0	0	321	5	37

Major/Minor	Major2			Minor2		
Conflicting Flow All	0	0	0	747	747	242
Stage 1	-	-	-	747	747	-
Stage 2	-	-	-	0	0	-
Critical Hdwy	4.13	-	-	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.227	-	-	3.527	4.027	3.327
Pot Cap-1 Maneuver	-	-	0	328	340	794
Stage 1	-	-	0	403	419	-
Stage 2	-	-	0	-	-	-
Platoon blocked, %		-				
Mov Cap-1 Maneuver	-	-	-	328	340	794
Mov Cap-2 Maneuver	-	-	-	328	340	-
Stage 1	-	-	-	403	419	-
Stage 2	-	-	-	-	-	-

Approach	WB	SB
HCM Control Delay, s		94.5
HCM LOS		F

Minor Lane/Major Mvmt	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	349
HCM Lane V/C Ratio	-	-	1.041
HCM Control Delay (s)	-	-	94.5
HCM Lane LOS	-	-	F
HCM 95th %tile Q(veh)	-	-	12.6

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	30	425	0	0	430	660	40	5	245	0	0	0
Future Vol, veh/h	30	425	0	0	430	660	40	5	245	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	Yield	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	34	483	0	0	489	750	45	6	278	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	489	0	-	-	-	0	1040	1040	483
Stage 1	-	-	-	-	-	-	551	551	-
Stage 2	-	-	-	-	-	-	489	489	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1074	-	0	0	-	0	255	230	584
Stage 1	-	-	0	0	-	0	577	515	-
Stage 2	-	-	0	0	-	0	616	549	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	1074	-	-	-	-	-	244	0	584
Mov Cap-2 Maneuver	-	-	-	-	-	-	244	0	-
Stage 1	-	-	-	-	-	-	552	0	-
Stage 2	-	-	-	-	-	-	616	0	-

Approach	EB	WB	NB
HCM Control Delay, s	0.6	0	14.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT
Capacity (veh/h)	691	1074	-	-
HCM Lane V/C Ratio	0.477	0.032	-	-
HCM Control Delay (s)	14.9	8.5	0	-
HCM Lane LOS	B	A	A	-
HCM 95th %tile Q(veh)	2.6	0.1	-	-

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	650	20	15	1060	0	30	0	15	0	0	0
Future Vol, veh/h	0	650	20	15	1060	0	30	0	15	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	739	23	17	1205	0	34	0	17	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1205	0	0	761	0	0	1989	1989	750	1998	2000	1205
Stage 1	-	-	-	-	-	-	750	750	-	1239	1239	-
Stage 2	-	-	-	-	-	-	1239	1239	-	759	761	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	579	-	-	851	-	-	45	61	411	45	60	224
Stage 1	-	-	-	-	-	-	403	419	-	215	247	-
Stage 2	-	-	-	-	-	-	215	247	-	399	414	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	579	-	-	851	-	-	43	57	411	41	56	224
Mov Cap-2 Maneuver	-	-	-	-	-	-	43	57	-	41	56	-
Stage 1	-	-	-	-	-	-	403	419	-	215	232	-
Stage 2	-	-	-	-	-	-	202	232	-	382	414	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	181.2	0
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	61	579	-	-	851	-	-	-
HCM Lane V/C Ratio	0.838	-	-	-	0.02	-	-	-
HCM Control Delay (s)	181.2	0	-	-	9.3	0	-	0
HCM Lane LOS	F	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	3.8	0	-	-	0.1	-	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	280	75	305	25	230	242	485	415	10	55	245	360
Future Volume (veh/h)	280	75	305	25	230	242	485	415	10	55	245	360
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	318	85	347	28	261	275	551	472	11	62	278	0
Adj No. of Lanes	0	1	1	0	1	1	1	2	0	1	2	0
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	333	89	373	30	284	268	565	1418	33	80	453	0
Arrive On Green	0.24	0.24	0.24	0.17	0.17	0.17	0.32	0.40	0.40	0.05	0.13	0.00
Sat Flow, veh/h	1414	378	1583	180	1674	1583	1774	3536	82	1774	3632	0
Grp Volume(v), veh/h	403	0	347	289	0	275	551	236	247	62	278	0
Grp Sat Flow(s),veh/h/ln	1792	0	1583	1854	0	1583	1774	1770	1848	1774	1770	0
Q Serve(g_s), s	26.8	0.0	26.0	18.6	0.0	20.5	37.2	11.1	11.2	4.2	9.0	0.0
Cycle Q Clear(g_c), s	26.8	0.0	26.0	18.6	0.0	20.5	37.2	11.1	11.2	4.2	9.0	0.0
Prop In Lane	0.79		1.00	0.10		1.00	1.00		0.04	1.00		0.00
Lane Grp Cap(c), veh/h	422	0	373	314	0	268	565	710	741	80	453	0
V/C Ratio(X)	0.95	0.00	0.93	0.92	0.00	1.02	0.98	0.33	0.33	0.78	0.61	0.00
Avail Cap(c_a), veh/h	422	0	373	314	0	268	565	826	863	154	834	0
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	45.6	0.0	45.3	49.4	0.0	50.2	40.8	25.0	25.0	57.2	49.9	0.0
Incr Delay (d2), s/veh	32.3	0.0	29.5	31.0	0.0	61.5	31.7	0.3	0.3	14.8	1.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.1	0.0	14.4	12.2	0.0	13.6	23.2	5.5	5.7	2.4	4.5	0.0
LnGrp Delay(d),s/veh	77.9	0.0	74.8	80.4	0.0	111.8	72.5	25.3	25.3	71.9	51.3	0.0
LnGrp LOS	E		E	F		F	E	C	C	E	D	
Approach Vol, veh/h		750			564			1034			340	
Approach Delay, s/veh		76.4			95.7			50.4			55.0	
Approach LOS		E			F			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.9	53.0		33.0	43.0	20.0		25.0
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s	10.5	56.5		28.5	38.5	28.5		20.5
Max Q Clear Time (g_c+I1), s	6.2	13.2		28.8	39.2	11.0		22.5
Green Ext Time (p_c), s	0.0	5.5		0.0	0.0	4.5		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	67.8
HCM 2010 LOS	E

Intersection: 1: US 101 SB On/US 101 NB Off & Kenmar Road

Movement	EB	WB	SB
Directions Served	TR	LT	LTR
Maximum Queue (ft)	130	4	251
Average Queue (ft)	59	0	134
95th Queue (ft)	102	2	238
Link Distance (ft)	191	222	214
Upstream Blk Time (%)			8
Queuing Penalty (veh)			0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: US 101 NB Off/US 101 NB One & Kenmar Road/Kenmar Drive

Movement	EB	WB	NB
Directions Served	LT	TR	LTR
Maximum Queue (ft)	178	271	307
Average Queue (ft)	49	69	83
95th Queue (ft)	162	225	231
Link Distance (ft)	222	248	302
Upstream Blk Time (%)	1	1	2
Queuing Penalty (veh)	4	12	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Atterberry lane/Eel River Drive & Kenmar Drive

Movement	EB	WB	NB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	318	594	313
Average Queue (ft)	86	106	141
95th Queue (ft)	317	411	322
Link Distance (ft)	248	513	346
Upstream Blk Time (%)	8	3	5
Queuing Penalty (veh)	55	30	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection	
Int Delay, s/veh	694.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	450	55	410	350	0	0	0	0	595	0	75
Future Vol, veh/h	0	450	55	410	350	0	0	0	0	595	0	75
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	474	58	432	368	0	0	0	0	626	0	79

Major/Minor	Major2			Minor2		
Conflicting Flow All	0	0	0	1232	1232	368
Stage 1	-	-	-	1232	1232	-
Stage 2	-	-	-	0	0	-
Critical Hdwy	4.12	-	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	-	-	0	~ 154	177	677
Stage 1	-	-	0	~ 217	249	-
Stage 2	-	-	0	-	-	-
Platoon blocked, %		-				
Mov Cap-1 Maneuver	-	-	-	~ 154	177	677
Mov Cap-2 Maneuver	-	-	-	~ 154	177	-
Stage 1	-	-	-	~ 217	249	-
Stage 2	-	-	-	-	-	-

Approach	WB	SB
HCM Control Delay, s		$ 1481.7
HCM LOS		F

Minor Lane/Major Mvmt	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	169
HCM Lane V/C Ratio	-	-	4.173
HCM Control Delay (s)	-	-	$ 1481.7
HCM Lane LOS	-	-	F
HCM 95th %tile Q(veh)	-	-	70.8

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	23.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	85	960	0	0	705	455	50	0	310	0	0	0
Future Vol, veh/h	85	960	0	0	705	455	50	0	310	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	Yield	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	89	1011	0	0	742	479	53	0	326	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	742	0	-	-	-	0	1931	1931	1011
Stage 1	-	-	-	-	-	-	1189	1189	-
Stage 2	-	-	-	-	-	-	742	742	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	865	-	0	0	-	0	73	66	~ 291
Stage 1	-	-	0	0	-	0	289	261	-
Stage 2	-	-	0	0	-	0	471	422	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	865	-	-	-	-	-	56	0	~ 291
Mov Cap-2 Maneuver	-	-	-	-	-	-	56	0	-
Stage 1	-	-	-	-	-	-	221	0	-
Stage 2	-	-	-	-	-	-	471	0	-

Approach	EB	WB	NB
HCM Control Delay, s	0.8	0	136.9
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT
Capacity (veh/h)	326	865	-	-
HCM Lane V/C Ratio	1.162	0.103	-	-
HCM Control Delay (s)	136.9	9.6	0	-
HCM Lane LOS	F	A	A	-
HCM 95th %tile Q(veh)	15.7	0.3	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	13.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	1225	45	10	1130	0	30	0	15	0	0	0
Future Vol, veh/h	0	1225	45	10	1130	0	30	0	15	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1289	47	11	1189	0	32	0	16	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1189	0	0	1337	0	0	2524	2524	1313	2532	2548	1189
Stage 1	-	-	-	-	-	-	1313	1313	-	1211	1211	-
Stage 2	-	-	-	-	-	-	1211	1211	-	1321	1337	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	587	-	-	516	-	-	~ 19	28	194	18	27	229
Stage 1	-	-	-	-	-	-	195	228	-	223	255	-
Stage 2	-	-	-	-	-	-	223	255	-	193	222	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	587	-	-	516	-	-	~ 18	26	194	16	25	229
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 18	26	-	16	25	-
Stage 1	-	-	-	-	-	-	195	228	-	223	239	-
Stage 2	-	-	-	-	-	-	209	239	-	177	222	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	$ 712.7	0
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	26	587	-	-	516	-	-	-
HCM Lane V/C Ratio	1.822	-	-	-	0.02	-	-	-
HCM Control Delay (s)	$ 712.7	0	-	-	12.1	0	-	0
HCM Lane LOS	F	A	-	-	B	A	-	A
HCM 95th %tile Q(veh)	5.8	0	-	-	0.1	-	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	495	215	535	5	140	145	385	335	15	170	425	615
Future Volume (veh/h)	495	215	535	5	140	145	385	335	15	170	425	615
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	500	217	540	5	141	146	389	338	15	172	429	0
Adj No. of Lanes	0	1	1	0	1	1	1	2	0	1	2	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	294	128	371	8	226	199	404	1159	51	125	631	0
Arrive On Green	0.23	0.23	0.23	0.13	0.13	0.13	0.23	0.34	0.34	0.07	0.18	0.00
Sat Flow, veh/h	1255	545	1583	64	1796	1583	1774	3453	153	1774	3632	0
Grp Volume(v), veh/h	717	0	540	146	0	146	389	173	180	172	429	0
Grp Sat Flow(s),veh/h/ln	1800	0	1583	1860	0	1583	1774	1770	1836	1774	1770	0
Q Serve(g_s), s	18.0	0.0	18.0	5.7	0.0	6.8	16.7	5.5	5.6	5.4	8.7	0.0
Cycle Q Clear(g_c), s	18.0	0.0	18.0	5.7	0.0	6.8	16.7	5.5	5.6	5.4	8.7	0.0
Prop In Lane	0.70		1.00	0.03		1.00	1.00		0.08	1.00		0.00
Lane Grp Cap(c), veh/h	422	0	371	234	0	199	404	594	616	125	631	0
V/C Ratio(X)	1.70	0.00	1.46	0.62	0.00	0.73	0.96	0.29	0.29	1.38	0.68	0.00
Avail Cap(c_a), veh/h	422	0	371	436	0	371	404	705	731	125	852	0
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.4	0.0	29.4	31.9	0.0	32.4	29.4	18.8	18.8	35.7	29.5	0.0
Incr Delay (d2), s/veh	325.4	0.0	219.7	2.7	0.0	5.2	35.1	0.3	0.3	213.0	1.3	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	46.9	0.0	30.4	3.1	0.0	3.3	12.0	2.7	2.8	10.0	4.3	0.0
LnGrp Delay(d),s/veh	354.8	0.0	249.2	34.6	0.0	37.5	64.5	19.1	19.1	248.7	30.9	0.0
LnGrp LOS	F		F	C		D	E	B	B	F	C	
Approach Vol, veh/h		1257			292			742			601	
Approach Delay, s/veh		309.4			36.1			42.9			93.2	
Approach LOS		F			D			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.9	30.3		22.5	22.0	18.2		14.2
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s	5.4	30.6		18.0	17.5	18.5		18.0
Max Q Clear Time (g_c+I1), s	7.4	7.6		20.0	18.7	10.7		8.8
Green Ext Time (p_c), s	0.0	5.2		0.0	0.0	3.0		0.8

Intersection Summary		
HCM 2010 Ctrl Delay		168.5
HCM 2010 LOS		F

Intersection: 1: US 101 SB On/US 101 NB Off & Kenmar Road

Movement	EB	WB	SB
Directions Served	TR	LT	LTR
Maximum Queue (ft)	236	76	258
Average Queue (ft)	211	3	232
95th Queue (ft)	227	45	247
Link Distance (ft)	191	222	214
Upstream Blk Time (%)	100		100
Queuing Penalty (veh)	0		0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

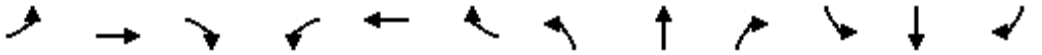
Intersection: 2: US 101 NB Off/US 101 NB One & Kenmar Road/Kenmar Drive

Movement	EB	WB	NB
Directions Served	LT	TR	LTR
Maximum Queue (ft)	245	225	358
Average Queue (ft)	149	42	315
95th Queue (ft)	296	148	381
Link Distance (ft)	222	248	302
Upstream Blk Time (%)	14	0	93
Queuing Penalty (veh)	144	1	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Atterberry lane/Eel River Drive & Kenmar Drive

Movement	EB	WB	NB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	401	404	336
Average Queue (ft)	298	61	177
95th Queue (ft)	510	316	380
Link Distance (ft)	248	512	346
Upstream Blk Time (%)	40	2	20
Queuing Penalty (veh)	512	21	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Cumulative Signal Alternative



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	150	40	240	230	0	0	0	0	305	5	35
Future Volume (veh/h)	0	150	40	240	230	0	0	0	0	305	5	35
Number	7	4	14	3	8	18				1	6	16
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
Adj Sat Flow, veh/h/ln	0	1845	1900	1845	1845	0				1845	1845	1900
Adj Flow Rate, veh/h	0	158	42	253	242	0				359	0	0
Adj No. of Lanes	0	1	0	2	1	0				2	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	3	3	3	3	0				3	3	3
Cap, veh/h	0	220	58	1843	1390	0				468	246	0
Arrive On Green	0.00	0.16	0.16	0.90	1.00	0.00				0.13	0.00	0.00
Sat Flow, veh/h	0	1405	374	3408	1845	0				3514	1845	0
Grp Volume(v), veh/h	0	0	200	253	242	0				359	0	0
Grp Sat Flow(s),veh/h/ln	0	0	1779	1704	1845	0				1757	1845	0
Q Serve(g_s), s	0.0	0.0	9.6	0.7	0.0	0.0				8.9	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	9.6	0.7	0.0	0.0				8.9	0.0	0.0
Prop In Lane	0.00		0.21	1.00		0.00				1.00		0.00
Lane Grp Cap(c), veh/h	0	0	278	1843	1390	0				468	246	0
V/C Ratio(X)	0.00	0.00	0.72	0.14	0.17	0.00				0.77	0.00	0.00
Avail Cap(c_a), veh/h	0	0	579	1843	1390	0				996	523	0
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.99	0.99	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	36.1	2.0	0.0	0.0				37.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	3.5	0.0	0.3	0.0				2.7	0.0	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	0.0	0.0	5.0	0.4	0.1	0.0				4.5	0.0	0.0
LnGrp Delay(d),s/veh	0.0	0.0	39.6	2.1	0.3	0.0				40.3	0.0	0.0
LnGrp LOS			D	A	A					D		
Approach Vol, veh/h		200			495						359	
Approach Delay, s/veh		39.6			1.2						40.3	
Approach LOS		D			A						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			53.8	19.2		17.1		72.9
Change Period (Y+Rc), s			5.1	5.1		5.1		5.1
Max Green Setting (Gmax), s			19.9	29.3		25.5		47.7
Max Q Clear Time (g_c+I1), s			2.7	11.6		10.9		2.0
Green Ext Time (p_c), s			0.8	2.4		1.1		2.9

Intersection Summary	
HCM 2010 Ctrl Delay	21.8
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	425	0	0	430	660	40	5	245	0	0	0
Future Volume (veh/h)	30	425	0	0	430	660	40	5	245	0	0	0
Number	7	4	14	3	8	18	5	2	12			
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			
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1863	1900	1863	1863			
Adj Flow Rate, veh/h	34	483	0	0	489	0	45	6	278			
Adj No. of Lanes	1	2	0	0	2	1	0	1	1			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	56	2428	0	0	2138	956	316	42	318			
Arrive On Green	0.03	0.69	0.00	0.00	1.00	0.00	0.20	0.20	0.20			
Sat Flow, veh/h	1774	3632	0	0	3632	1583	1574	210	1583			
Grp Volume(v), veh/h	34	483	0	0	489	0	51	0	278			
Grp Sat Flow(s),veh/h/ln	1774	1770	0	0	1770	1583	1784	0	1583			
Q Serve(g_s), s	1.7	4.5	0.0	0.0	0.0	0.0	2.1	0.0	15.3			
Cycle Q Clear(g_c), s	1.7	4.5	0.0	0.0	0.0	0.0	2.1	0.0	15.3			
Prop In Lane	1.00		0.00	0.00		1.00	0.88		1.00			
Lane Grp Cap(c), veh/h	56	2428	0	0	2138	956	358	0	318			
V/C Ratio(X)	0.60	0.20	0.00	0.00	0.23	0.00	0.14	0.00	0.87			
Avail Cap(c_a), veh/h	187	2428	0	0	2138	956	494	0	438			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.67	1.67	1.00	1.00	1.00			
Upstream Filter(I)	0.72	0.72	0.00	0.00	0.93	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	43.0	5.1	0.0	0.0	0.0	0.0	29.6	0.0	34.9			
Incr Delay (d2), s/veh	7.2	0.1	0.0	0.0	0.2	0.0	0.2	0.0	13.6			
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	0.9	2.2	0.0	0.0	0.1	0.0	1.1	0.0	7.9			
LnGrp Delay(d),s/veh	50.3	5.3	0.0	0.0	0.2	0.0	29.8	0.0	48.5			
LnGrp LOS	D	A			A		C		D			
Approach Vol, veh/h		517			489			329				
Approach Delay, s/veh		8.2			0.2			45.6				
Approach LOS		A			A			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		23.2		66.8			7.4	59.5
Change Period (Y+Rc), s		5.1		5.1			4.5	5.1
Max Green Setting (Gmax), s		24.9		54.9			9.5	40.9
Max Q Clear Time (g_c+I1), s		17.3		6.5			3.7	2.0
Green Ext Time (p_c), s		0.8		8.2			0.0	8.0

Intersection Summary		
HCM 2010 Ctrl Delay		14.5
HCM 2010 LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	650	20	15	1060	0	30	0	15	0	0	0
Future Volume (veh/h)	0	650	20	15	1060	0	30	0	15	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	0	739	23	17	1205	0	34	0	17	0	0	0
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	2	2744	85	34	3020	0	46	0	23	0	2	0
Arrive On Green	0.00	1.00	1.00	0.02	0.85	0.00	0.04	0.00	0.04	0.00	0.00	0.00
Sat Flow, veh/h	1774	3504	109	1774	3632	0	1137	0	569	0	1863	0
Grp Volume(v), veh/h	0	373	389	17	1205	0	51	0	0	0	0	0
Grp Sat Flow(s),veh/h/ln	1774	1770	1844	1774	1770	0	1706	0	0	0	1863	0
Q Serve(g_s), s	0.0	0.0	0.0	0.9	6.8	0.0	2.7	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.9	6.8	0.0	2.7	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.00	0.67		0.33	0.00		0.00
Lane Grp Cap(c), veh/h	2	1386	1443	34	3020	0	68	0	0	0	2	0
V/C Ratio(X)	0.00	0.27	0.27	0.50	0.40	0.00	0.75	0.00	0.00	0.00	0.00	0.00
Avail Cap(c_a), veh/h	99	1386	1443	106	3020	0	104	0	0	0	103	0
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.95	0.95	0.43	0.43	0.00	1.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	43.7	1.5	0.0	42.7	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.4	4.8	0.2	0.0	14.9	0.0	0.0	0.0	0.0	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	0.0	0.2	0.2	0.5	3.3	0.0	1.5	0.0	0.0	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	0.5	0.4	48.5	1.6	0.0	57.6	0.0	0.0	0.0	0.0	0.0
LnGrp LOS		A	A	D	A		E					
Approach Vol, veh/h		762			1222			51			0	
Approach Delay, s/veh		0.4			2.3			57.6			0.0	
Approach LOS		A			A			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.3	75.6		0.0	0.0	81.9		8.1
Change Period (Y+Rc), s	4.6	5.1		4.5	4.5	* 5.1		4.5
Max Green Setting (Gmax), s	5.4	55.4		5.0	5.0	* 57		5.5
Max Q Clear Time (g_c+I1), s	2.9	2.0		0.0	0.0	8.8		4.7
Green Ext Time (p_c), s	0.0	23.7		0.0	0.0	22.7		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	3.0
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	280	75	305	25	230	242	485	415	10	55	245	360
Future Volume (veh/h)	280	75	305	25	230	242	485	415	10	55	245	360
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	318	85	347	28	261	275	551	472	11	62	278	409
Adj No. of Lanes	2	1	1	1	1	1	2	2	0	1	2	1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	413	436	672	119	337	286	654	1450	34	86	950	425
Arrive On Green	0.12	0.23	0.23	0.07	0.18	0.18	0.19	0.41	0.41	0.05	0.27	0.27
Sat Flow, veh/h	3442	1863	1583	1774	1863	1583	3442	3536	82	1774	3539	1583
Grp Volume(v), veh/h	318	85	347	28	261	275	551	236	247	62	278	409
Grp Sat Flow(s),veh/h/ln	1721	1863	1583	1774	1863	1583	1721	1770	1848	1774	1770	1583
Q Serve(g_s), s	6.7	2.7	12.1	1.1	10.0	10.2	11.6	6.8	6.8	2.6	4.7	12.8
Cycle Q Clear(g_c), s	6.7	2.7	12.1	1.1	10.0	10.2	11.6	6.8	6.8	2.6	4.7	12.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	413	436	672	119	337	286	654	726	758	86	950	425
V/C Ratio(X)	0.77	0.19	0.52	0.24	0.77	0.96	0.84	0.33	0.33	0.72	0.29	0.96
Avail Cap(c_a), veh/h	437	543	762	135	448	381	759	844	882	209	1324	592
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.9	23.0	15.9	33.1	29.2	19.2	29.2	15.0	15.0	35.1	21.7	12.2
Incr Delay (d2), s/veh	7.7	0.2	0.6	1.0	6.0	31.2	7.6	0.3	0.2	10.8	0.2	23.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	1.4	5.3	0.6	5.7	7.1	6.2	3.3	3.5	1.5	2.3	8.8
LnGrp Delay(d),s/veh	39.7	23.2	16.5	34.1	35.2	50.4	36.8	15.3	15.3	45.9	21.9	35.6
LnGrp LOS	D	C	B	C	D	D	D	B	B	D	C	D
Approach Vol, veh/h		750			564			1034			749	
Approach Delay, s/veh		27.1			42.5			26.7			31.4	
Approach LOS		C			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.1	35.2	9.5	22.0	18.7	24.6	13.5	18.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	3.6	35.7	5.7	21.8	16.5	28.0	9.5	18.0
Max Q Clear Time (g_c+I1), s	4.6	8.8	3.1	14.1	13.6	14.8	8.7	12.2
Green Ext Time (p_c), s	0.0	7.0	0.0	1.9	0.7	5.3	0.3	1.3

Intersection Summary	
HCM 2010 Ctrl Delay	30.8
HCM 2010 LOS	C

Intersection: 1: US 101 SB On/US 101 NB Off & Kenmar Road

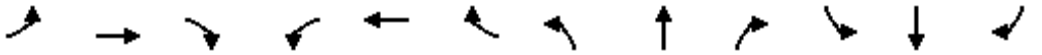
Movement	EB	WB	WB	WB	SB	SB
Directions Served	TR	L	L	T	L	LTR
Maximum Queue (ft)	182	57	96	160	168	207
Average Queue (ft)	111	11	45	42	93	101
95th Queue (ft)	178	35	82	107	154	180
Link Distance (ft)	169		213	213		256
Upstream Blk Time (%)	2			0		0
Queuing Penalty (veh)	0			0		0
Storage Bay Dist (ft)		80			120	
Storage Blk Time (%)		0	1		4	5
Queuing Penalty (veh)		0	1		8	8

Intersection: 2: US 101 NB Off/US 101 NB One & Kenmar Road/Kenmar Drive

Movement	EB	EB	EB	WB	WB	WB	NB	NB
Directions Served	L	T	T	T	T	R	LT	R
Maximum Queue (ft)	122	145	137	97	112	204	80	109
Average Queue (ft)	24	55	44	26	32	11	28	45
95th Queue (ft)	67	120	103	67	83	84	64	81
Link Distance (ft)		213	213	236	236	236	289	
Upstream Blk Time (%)						0		
Queuing Penalty (veh)						0		
Storage Bay Dist (ft)	75							150
Storage Blk Time (%)	0	2						
Queuing Penalty (veh)	0	1						

Intersection: 3: Atterberry lane/Eel River Drive & Kenmar Drive

Movement	EB	EB	WB	WB	WB	NB
Directions Served	T	TR	L	T	TR	LTR
Maximum Queue (ft)	147	149	36	112	184	85
Average Queue (ft)	31	25	10	13	40	32
95th Queue (ft)	104	87	30	60	131	67
Link Distance (ft)	236	236		498	498	322
Upstream Blk Time (%)	0	0				
Queuing Penalty (veh)	0	0				
Storage Bay Dist (ft)			75			
Storage Blk Time (%)	1		0	0		
Queuing Penalty (veh)	0		0	0		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	450	55	410	350	0	0	0	0	595	0	75
Future Volume (veh/h)	0	450	55	410	350	0	0	0	0	595	0	75
Number	7	4	14	3	8	18				1	6	16
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
Adj Sat Flow, veh/h/ln	0	1845	1900	1845	1845	0				1845	1845	1900
Adj Flow Rate, veh/h	0	474	58	432	368	0				700	0	0
Adj No. of Lanes	0	1	0	2	1	0				2	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	3	3	3	3	0				3	3	3
Cap, veh/h	0	512	63	960	1209	0				812	426	0
Arrive On Green	0.00	0.32	0.32	0.47	1.00	0.00				0.23	0.00	0.00
Sat Flow, veh/h	0	1613	197	3408	1845	0				3514	1845	0
Grp Volume(v), veh/h	0	0	532	432	368	0				700	0	0
Grp Sat Flow(s),veh/h/ln	0	0	1810	1704	1845	0				1757	1845	0
Q Serve(g_s), s	0.0	0.0	25.6	7.7	0.0	0.0				17.2	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	25.6	7.7	0.0	0.0				17.2	0.0	0.0
Prop In Lane	0.00		0.11	1.00		0.00				1.00		0.00
Lane Grp Cap(c), veh/h	0	0	574	960	1209	0				812	426	0
V/C Ratio(X)	0.00	0.00	0.93	0.45	0.30	0.00				0.86	0.00	0.00
Avail Cap(c_a), veh/h	0	0	589	960	1209	0				996	523	0
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.93	0.93	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	29.7	19.1	0.0	0.0				33.2	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	20.6	0.3	0.6	0.0				6.7	0.0	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	0.0	0.0	16.0	3.6	0.2	0.0				9.1	0.0	0.0
LnGrp Delay(d),s/veh	0.0	0.0	50.4	19.5	0.6	0.0				39.9	0.0	0.0
LnGrp LOS			D	B	A					D		
Approach Vol, veh/h		532			800						700	
Approach Delay, s/veh		50.4			10.8						39.9	
Approach LOS		D			B						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			30.5	33.7		25.9		64.1
Change Period (Y+Rc), s			5.1	5.1		5.1		5.1
Max Green Setting (Gmax), s			19.9	29.3		25.5		47.7
Max Q Clear Time (g_c+I1), s			9.7	27.6		19.2		2.0
Green Ext Time (p_c), s			1.2	1.0		1.6		7.1

Intersection Summary	
HCM 2010 Ctrl Delay	31.2
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	960	0	0	705	455	50	0	310	0	0	0
Future Volume (veh/h)	85	960	0	0	705	455	50	0	310	0	0	0
Number	7	4	14	3	8	18	5	2	12			
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			
Adj Sat Flow, veh/h/ln	1845	1845	0	0	1845	1845	1900	1845	1845			
Adj Flow Rate, veh/h	89	1011	0	0	742	0	53	0	326			
Adj No. of Lanes	1	2	0	0	2	1	0	1	1			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	3	3	0	0	3	3	3	3	3			
Cap, veh/h	114	2297	0	0	1895	848	406	0	363			
Arrive On Green	0.06	0.66	0.00	0.00	1.00	0.00	0.23	0.00	0.23			
Sat Flow, veh/h	1757	3597	0	0	3597	1568	1757	0	1568			
Grp Volume(v), veh/h	89	1011	0	0	742	0	53	0	326			
Grp Sat Flow(s),veh/h/ln	1757	1752	0	0	1752	1568	1757	0	1568			
Q Serve(g_s), s	4.5	12.6	0.0	0.0	0.0	0.0	2.2	0.0	18.2			
Cycle Q Clear(g_c), s	4.5	12.6	0.0	0.0	0.0	0.0	2.2	0.0	18.2			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	114	2297	0	0	1895	848	406	0	363			
V/C Ratio(X)	0.78	0.44	0.00	0.00	0.39	0.00	0.13	0.00	0.90			
Avail Cap(c_a), veh/h	185	2297	0	0	1895	848	486	0	434			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	0.34	0.34	0.00	0.00	0.93	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	41.5	7.5	0.0	0.0	0.0	0.0	27.4	0.0	33.6			
Incr Delay (d2), s/veh	4.0	0.2	0.0	0.0	0.6	0.0	0.1	0.0	19.0			
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	2.3	6.1	0.0	0.0	0.1	0.0	1.1	0.0	9.8			
LnGrp Delay(d),s/veh	45.4	7.7	0.0	0.0	0.6	0.0	27.6	0.0	52.6			
LnGrp LOS	D	A			A		C		D			
Approach Vol, veh/h		1100			742			379				
Approach Delay, s/veh		10.8			0.6			49.1				
Approach LOS		B			A			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		25.9		64.1			10.3	53.8
Change Period (Y+Rc), s		5.1		5.1			4.5	5.1
Max Green Setting (Gmax), s		24.9		54.9			9.5	40.9
Max Q Clear Time (g_c+I1), s		20.2		14.6			6.5	2.0
Green Ext Time (p_c), s		0.7		18.5			0.0	18.2

Intersection Summary	
HCM 2010 Ctrl Delay	13.9
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1225	45	10	1130	0	30	0	15	0	0	0
Future Volume (veh/h)	0	1225	45	10	1130	0	30	0	15	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1845	1845	1900	1845	1845	1900	1900	1845	1900	1900	1845	1900
Adj Flow Rate, veh/h	0	1289	47	11	1189	0	32	0	16	0	0	0
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	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, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	2	1421	52	687	3014	0	44	0	22	0	2	0
Arrive On Green	0.00	0.82	0.82	0.39	0.86	0.00	0.04	0.00	0.04	0.00	0.00	0.00
Sat Flow, veh/h	1757	3449	126	1757	3597	0	1126	0	563	0	1845	0
Grp Volume(v), veh/h	0	654	682	11	1189	0	48	0	0	0	0	0
Grp Sat Flow(s),veh/h/ln	1757	1752	1822	1757	1752	0	1689	0	0	0	1845	0
Q Serve(g_s), s	0.0	23.3	23.5	0.3	6.5	0.0	2.5	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	23.3	23.5	0.3	6.5	0.0	2.5	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.07	1.00		0.00	0.67		0.33	0.00		0.00
Lane Grp Cap(c), veh/h	2	722	751	687	3014	0	66	0	0	0	2	0
V/C Ratio(X)	0.00	0.91	0.91	0.02	0.39	0.00	0.73	0.00	0.00	0.00	0.00	0.00
Avail Cap(c_a), veh/h	98	1079	1122	687	3014	0	103	0	0	0	102	0
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.85	0.85	0.54	0.54	0.00	1.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	6.7	6.7	16.8	1.3	0.0	42.8	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	15.1	14.8	0.0	0.2	0.0	14.5	0.0	0.0	0.0	0.0	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	0.0	13.2	13.7	0.2	3.1	0.0	1.5	0.0	0.0	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	21.8	21.5	16.8	1.5	0.0	57.3	0.0	0.0	0.0	0.0	0.0
LnGrp LOS		C	C	B	A		E					
Approach Vol, veh/h		1336			1200			48			0	
Approach Delay, s/veh		21.6			1.7			57.3			0.0	
Approach LOS		C			A			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	39.8	42.2		0.0	0.0	82.0		8.0
Change Period (Y+Rc), s	4.6	5.1		4.5	4.5	* 4.6		4.5
Max Green Setting (Gmax), s	5.4	55.4		5.0	5.0	* 57		5.5
Max Q Clear Time (g_c+I1), s	2.3	25.5		0.0	0.0	8.5		4.5
Green Ext Time (p_c), s	2.1	11.6		0.0	0.0	12.2		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	13.0
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	495	215	535	5	140	145	385	335	15	170	425	615
Future Volume (veh/h)	495	215	535	5	140	145	385	335	15	170	425	615
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	500	217	540	5	141	146	389	338	15	172	429	621
Adj No. of Lanes	2	1	1	1	1	1	2	2	0	1	2	1
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	865	548	695	125	212	180	498	868	38	214	804	757
Arrive On Green	0.25	0.30	0.30	0.07	0.11	0.11	0.15	0.25	0.25	0.12	0.23	0.23
Sat Flow, veh/h	3408	1845	1568	1757	1845	1568	3408	3419	151	1757	3505	1568
Grp Volume(v), veh/h	500	217	540	5	141	146	389	173	180	172	429	621
Grp Sat Flow(s),veh/h/ln	1704	1845	1568	1757	1845	1568	1704	1752	1818	1757	1752	1568
Q Serve(g_s), s	9.0	6.6	20.6	0.2	5.2	4.6	7.7	5.7	5.8	6.7	7.6	9.7
Cycle Q Clear(g_c), s	9.0	6.6	20.6	0.2	5.2	4.6	7.7	5.7	5.8	6.7	7.6	9.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.08	1.00		1.00
Lane Grp Cap(c), veh/h	865	548	695	125	212	180	498	445	462	214	804	757
V/C Ratio(X)	0.58	0.40	0.78	0.04	0.67	0.81	0.78	0.39	0.39	0.81	0.53	0.82
Avail Cap(c_a), veh/h	1013	548	695	450	472	401	659	511	530	315	972	833
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.9	19.7	16.6	30.4	29.8	15.7	28.9	21.7	21.7	30.1	23.8	4.4
Incr Delay (d2), s/veh	0.6	0.5	5.5	0.1	3.6	8.5	4.4	0.6	0.5	9.1	0.6	6.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	3.4	9.9	0.1	2.8	2.9	3.9	2.9	3.0	3.8	3.7	5.4
LnGrp Delay(d),s/veh	23.6	20.1	22.1	30.5	33.4	24.1	33.3	22.3	22.3	39.2	24.3	10.5
LnGrp LOS	C	C	C	C	C	C	C	C	C	D	C	B
Approach Vol, veh/h		1257			292			742			1222	
Approach Delay, s/veh		22.4			28.7			28.1			19.4	
Approach LOS		C			C			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	22.3	9.5	25.4	14.8	20.6	22.3	12.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	12.6	20.5	18.0	20.9	13.6	19.5	20.9	18.0
Max Q Clear Time (g_c+I1), s	8.7	7.8	2.2	22.6	9.7	11.7	11.0	7.2
Green Ext Time (p_c), s	0.2	6.1	0.0	0.0	0.5	4.4	4.0	0.9

Intersection Summary	
HCM 2010 Ctrl Delay	23.1
HCM 2010 LOS	C

Intersection: 1: US 101 SB On/US 101 NB Off & Kenmar Road

Movement	EB	WB	WB	WB	SB	SB
Directions Served	TR	L	L	T	L	LTR
Maximum Queue (ft)	342	140	225	220	273	296
Average Queue (ft)	275	87	111	103	173	170
95th Queue (ft)	373	155	187	199	261	259
Link Distance (ft)	303		214	214		446
Upstream Blk Time (%)	18		1	0		
Queuing Penalty (veh)	0		3	1		
Storage Bay Dist (ft)		80			275	
Storage Blk Time (%)		4	16		0	0
Queuing Penalty (veh)		9	32		0	1

Intersection: 2: US 101 NB Off/US 101 NB One & Kenmar Road/Kenmar Drive

Movement	EB	EB	EB	WB	WB	WB	NB	NB
Directions Served	L	T	T	T	T	R	LT	R
Maximum Queue (ft)	123	220	209	193	196	105	102	226
Average Queue (ft)	51	90	79	86	72	6	31	83
95th Queue (ft)	103	188	160	173	149	64	76	163
Link Distance (ft)		214	214	236	236		289	
Upstream Blk Time (%)		1	0		0			
Queuing Penalty (veh)		3	0		0			
Storage Bay Dist (ft)	75					150		150
Storage Blk Time (%)	3	5			1	0		2
Queuing Penalty (veh)	14	4			3	1		1

Intersection: 3: Atterberry lane/Eel River Drive & Kenmar Drive

Movement	EB	EB	WB	WB	WB	NB
Directions Served	T	TR	L	T	TR	LTR
Maximum Queue (ft)	240	223	36	73	165	64
Average Queue (ft)	51	39	7	22	49	29
95th Queue (ft)	149	130	24	64	129	60
Link Distance (ft)	236	236		498	498	322
Upstream Blk Time (%)	0	0				
Queuing Penalty (veh)	2	1				
Storage Bay Dist (ft)			75			
Storage Blk Time (%)	1			0		
Queuing Penalty (veh)	0			0		

Cumulative Roundabout Alternative

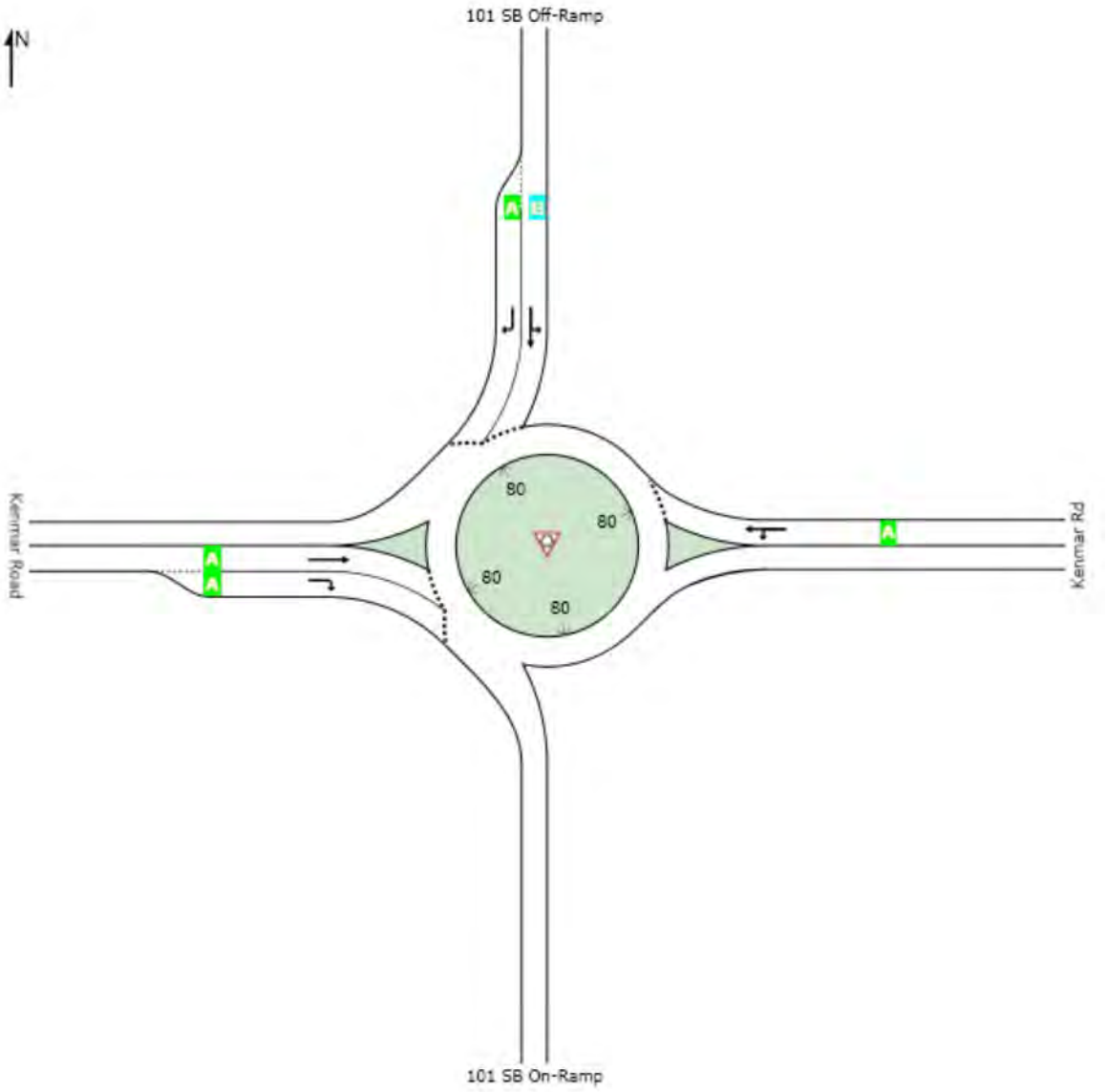
LEVEL OF SERVICE

Site: Kenmar Road/ SB Ramps

Kenmar Road Interchange Roundabout Concept - Option 1a, 1b, & 2
Cumulative AM
Roundabout

All Movement Classes

	East	North	West	Intersection
LOS	A	B	A	A



Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

LANE SUMMARY

Site: Kenmar Road/ SB Ramps

Kenmar Road Interchange Roundabout Concept - Option 1a, 1b, & 2
Cumulative AM
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
East: Kenmar Rd													
Lane 1[d]	500	3.0	1377	0.363	100	6.9	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	500	3.0		0.363		6.9	LOS A	0.0	0.0				
North: 101 SB Off-Ramp													
Lane 1[d]	326	3.0	1196	0.273	100	11.7	LOS B	1.6	40.9	Full	1600	0.0	0.0
Lane 2	37	3.0	786	0.047	100	7.4	LOS A	0.2	5.5	Short	200	0.0	NA
Approach	363	3.0		0.273		11.2	LOS B	1.6	40.9				
West: Kenmar Road													
Lane 1[d]	158	3.0	1073	0.147	100	6.7	LOS A	0.9	22.9	Full	1600	0.0	0.0
Lane 2	42	3.0	719	0.059	100	7.9	LOS A	0.3	7.6	Short	200	0.0	NA
Approach	200	3.0		0.147		7.0	LOS A	0.9	22.9				
Intersection	1063	3.0		0.363		8.4	LOS A	1.6	40.9				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

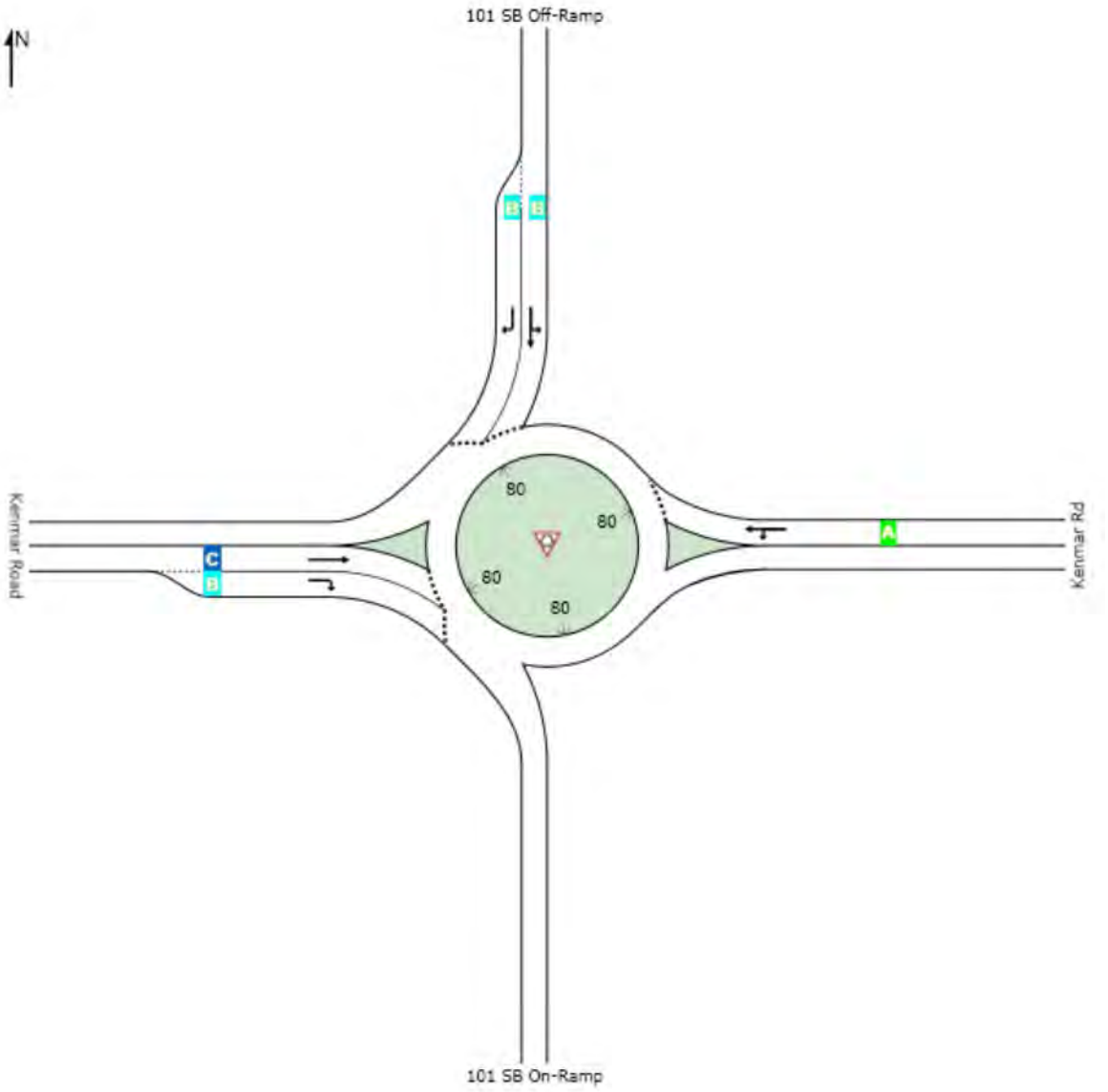
LEVEL OF SERVICE

Site: Kenmar Road/SB Ramps PM

Kenmar Road Interchange Roundabout Concept - Option 1a & 1b
Cumulative PM
Roundabout

All Movement Classes

	East	North	West	Intersection
LOS	A	B	C	B



Level of Service (LOS) Method: Delay & v/c (HCM 2010).
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Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

LANE SUMMARY

Site: Kenmar Road/SB Ramps PM

Kenmar Road Interchange Roundabout Concept - Option 1a & 1b
Cumulative PM
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
East: Kenmar Rd													
Lane 1[d]	800	3.0	1377	0.581	100	7.1	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	800	3.0		0.581		7.1	LOS A	0.0	0.0				
North: 101 SB Off-Ramp													
Lane 1[d]	627	3.0	985	0.637	100	19.0	LOS B	7.3	187.2	Full	1600	0.0	0.0
Lane 2	79	3.0	661	0.119	100	10.2	LOS B	0.6	16.0	Short	200	0.0	NA
Approach	706	3.0		0.637		18.0	LOS B	7.3	187.2				
West: Kenmar Road													
Lane 1[d]	474	3.0	607	0.781	100	31.0	LOS C	12.7	324.1	Full	1600	0.0	0.0
Lane 2	58	3.0	422	0.137	100	14.0	LOS B	0.9	23.0	Short	200	0.0	NA
Approach	532	3.0		0.781		29.2	LOS C	12.7	324.1				
Intersection	2038	3.0		0.781		16.6	LOS B	12.7	324.1				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

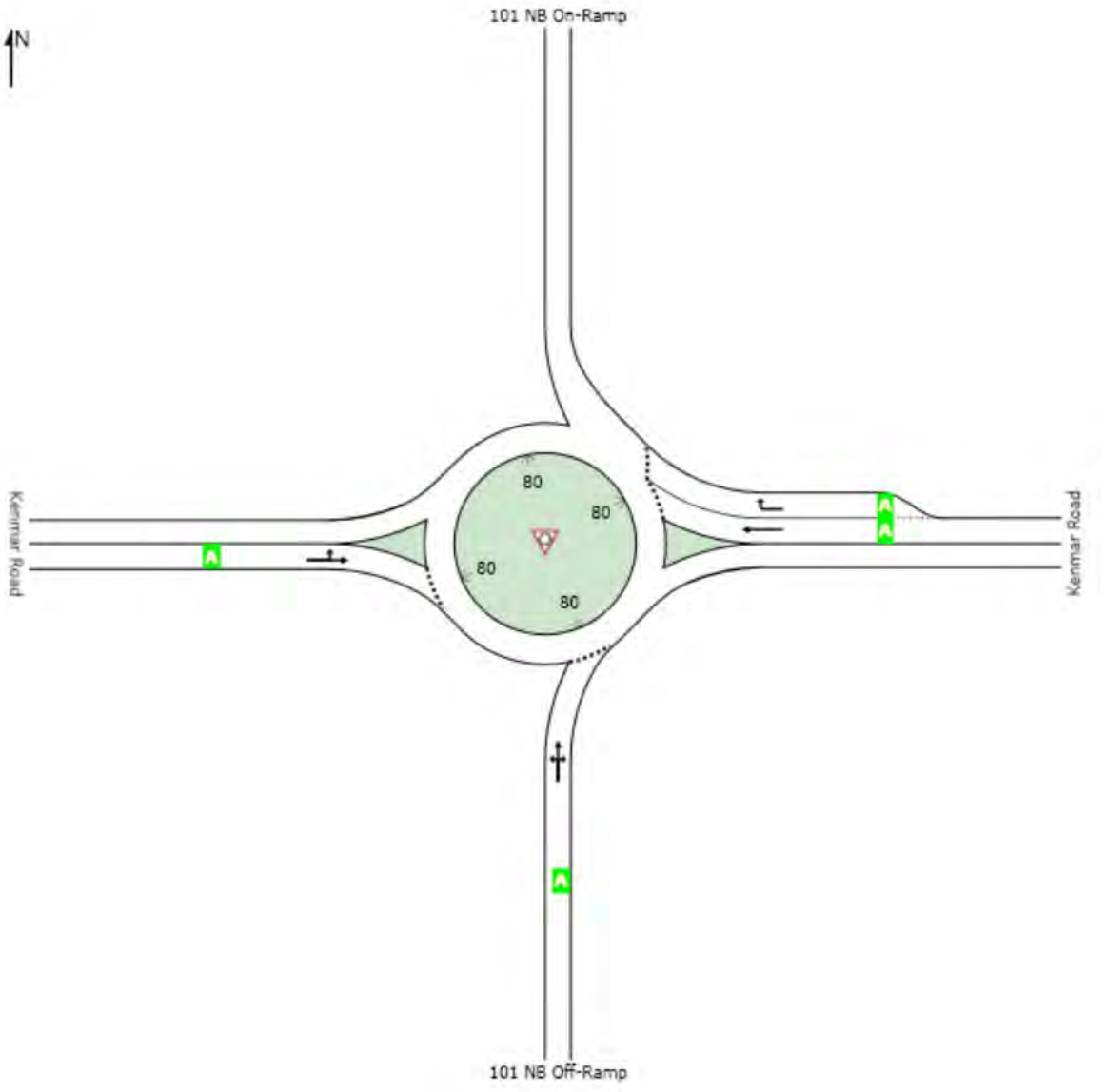
LEVEL OF SERVICE

Site: Kenmar Road/ NB Ramps

Kenmar Road Interchange Roundabout Concept - Option 1a & 1b
Cumulative AM
Roundabout

All Movement Classes

	South	East	West	Intersection
LOS	A	A	A	A



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Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
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LANE SUMMARY

Site: Kenmar Road/ NB Ramps

Kenmar Road Interchange Roundabout Concept - Option 1a & 1b
Cumulative AM
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: 101 NB Off-Ramp													
Lane 1[d]	330	3.0	952	0.346	100	8.1	LOS A	2.0	51.6	Full	1600	0.0	0.0
Approach	330	3.0		0.346		8.1	LOS A	2.0	51.6				
East: Kenmar Road													
Lane 1	489	3.0	1276	0.383	100	4.8	LOS A	2.6	66.4	Full	1600	0.0	0.0
Lane 2[d]	750	3.0	1506	0.498	100	4.9	LOS A	4.0	102.4	Short	200	0.0	NA
Approach	1239	3.0		0.498		4.8	LOS A	4.0	102.4				
West: Kenmar Road													
Lane 1[d]	511	3.0	1377	0.371	100	4.6	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	511	3.0		0.371		4.6	LOS A	0.0	0.0				
Intersection	2080	3.0		0.498		5.3	LOS A	4.0	102.4				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
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Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

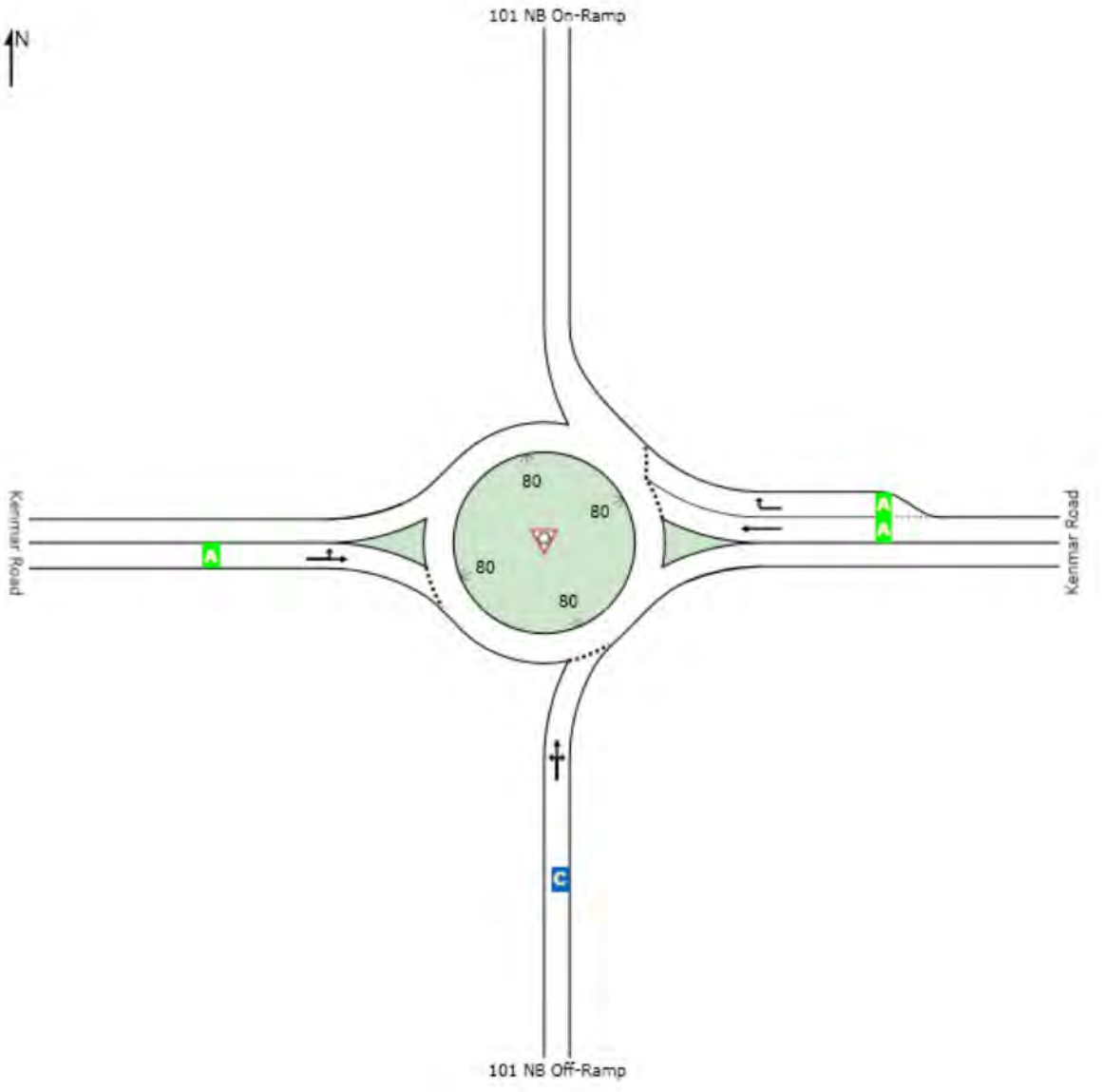
LEVEL OF SERVICE

Site: Kenmar Road/NB Ramps PM

Kenmar Road Interchange Roundabout Concept - Option 1a & 1b
Cumulative PM
Roundabout

All Movement Classes

	South	East	West	Intersection
LOS	C	A	A	A



Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
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Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

LANE SUMMARY

Site: Kenmar Road/NB Ramps PM

Kenmar Road Interchange Roundabout Concept - Option 1a & 1b
Cumulative PM
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: 101 NB Off-Ramp													
Lane 1[d]	380	3.0	569	0.668	100	28.8	LOS C	8.0	204.8	Full	1600	0.0	0.0
Approach	380	3.0		0.668		28.8	LOS C	8.0	204.8				
East: Kenmar Road													
Lane 1[d]	742	3.0	1445	0.514	100	5.1	LOS A	4.1	104.5	Full	1600	0.0	0.0
Lane 2	479	3.0	1210	0.396	100	5.3	LOS A	2.7	67.8	Short	200	0.0	NA
Approach	1221	3.0		0.514		5.2	LOS A	4.1	104.5				
West: Kenmar Road													
Lane 1[d]	1100	3.0	1377	0.799	100	4.7	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	1100	3.0		0.799		4.7	LOS A	0.0	0.0				
Intersection	2701	3.0		0.799		8.3	LOS A	8.0	204.8				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

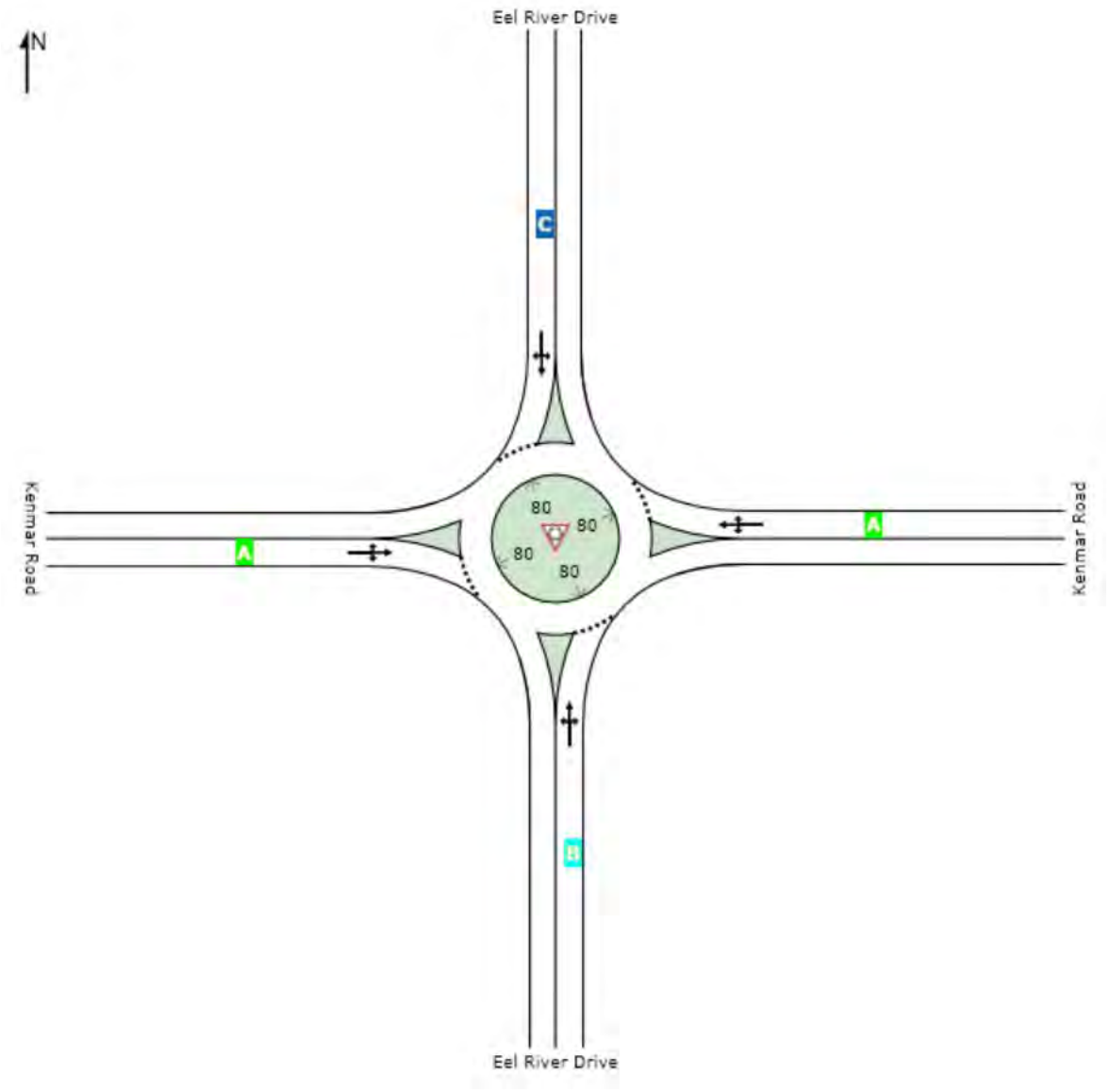
LEVEL OF SERVICE

Site: Kenmar Road/Eel River Drive AM

Kenmar Road Interchange Roundabout Concept - Option 1a
Cumulative AM
Roundabout

All Movement Classes

	South	East	North	West	Intersection
LOS	B	A	C	A	A



Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
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Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

LANE SUMMARY

Site: Kenmar Road/Eel River Drive AM

Kenmar Road Interchange Roundabout Concept - Option 1a
Cumulative AM
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Eel River Drive													
Lane 1[d]	52	3.0	763	0.069	100	11.8	LOS B	0.4	9.8	Full	1600	0.0	0.0
Approach	52	3.0		0.069		11.8	LOS B	0.4	9.8				
East: Kenmar Road													
Lane 1[d]	1223	3.0	1324	0.924	100	5.7	LOS A	33.2	848.7	Full	1600	0.0	0.0
Approach	1223	3.0		0.924		5.7	LOS A	33.2	848.7				
North: Eel River Drive													
Lane 1[d]	3	3.0	248	0.014	100	21.6	LOS C	0.1	2.6	Full	1600	0.0	0.0
Approach	3	3.0		0.014		21.6	LOS C	0.1	2.6				
West: Kenmar Road													
Lane 1[d]	762	3.0	1346	0.566	100	4.4	LOS A	6.2	157.9	Full	1600	0.0	0.0
Approach	762	3.0		0.566		4.4	LOS A	6.2	157.9				
Intersection	2041	3.0		0.924		5.4	LOS A	33.2	848.7				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
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Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

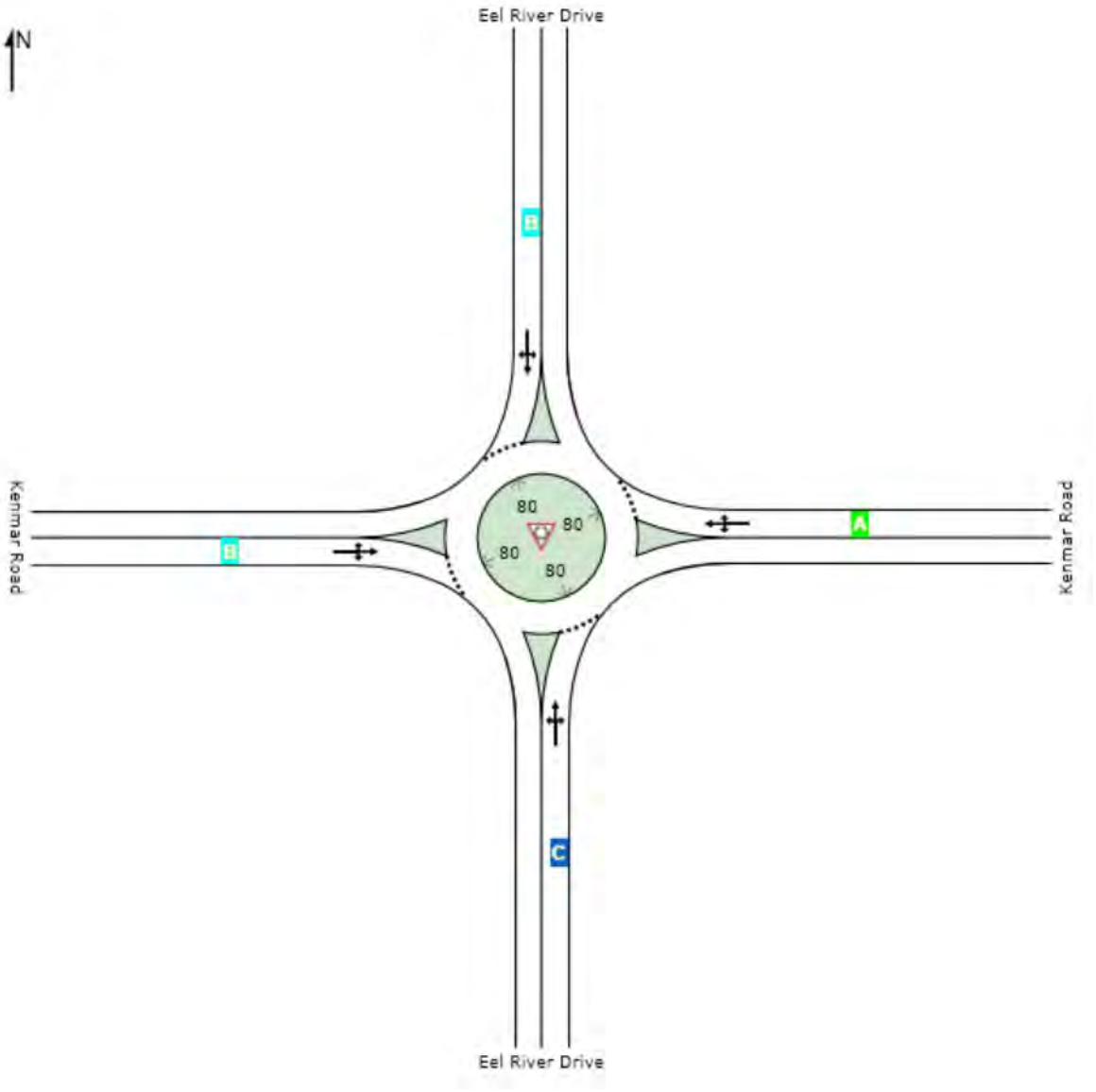
LEVEL OF SERVICE

Site: Kenmar Road/Eel River Drive PM

Kenmar Road Interchange Roundabout Concept - Option 1a
Cumulative PM
Roundabout

All Movement Classes

	South	East	North	West	Intersection
LOS	C	A	B	B	A



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LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

LANE SUMMARY

Site: Kenmar Road/Eel River Drive PM

Kenmar Road Interchange Roundabout Concept - Option 1a
Cumulative PM
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Eel River Drive													
Lane 1[d]	48	3.0	216	0.225	100	26.8	LOS C	1.8	45.0	Full	1600	0.0	0.0
Approach	48	3.0		0.225		26.8	LOS C	1.8	45.0				
East: Kenmar Road													
Lane 1[d]	1201	3.0	1323	0.908	100	5.4	LOS A	31.4	803.7	Full	1600	0.0	0.0
Approach	1201	3.0		0.908		5.4	LOS A	31.4	803.7				
North: Eel River Drive													
Lane 1[d]	3	3.0	275	0.011	100	19.6	LOS B	0.1	2.2	Full	1600	0.0	0.0
Approach	3	3.0		0.011		19.6	LOS B	0.1	2.2				
West: Kenmar Road													
Lane 1[d]	1338	3.0	1358	0.986	100	10.2	LOS B	148.8	3810.3	Full	1600	0.0	45.4
Approach	1338	3.0		0.986		10.2	LOS B	148.8	3810.3				
Intersection	2591	3.0		0.986		8.3	LOS A	148.8	3810.3				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
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Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

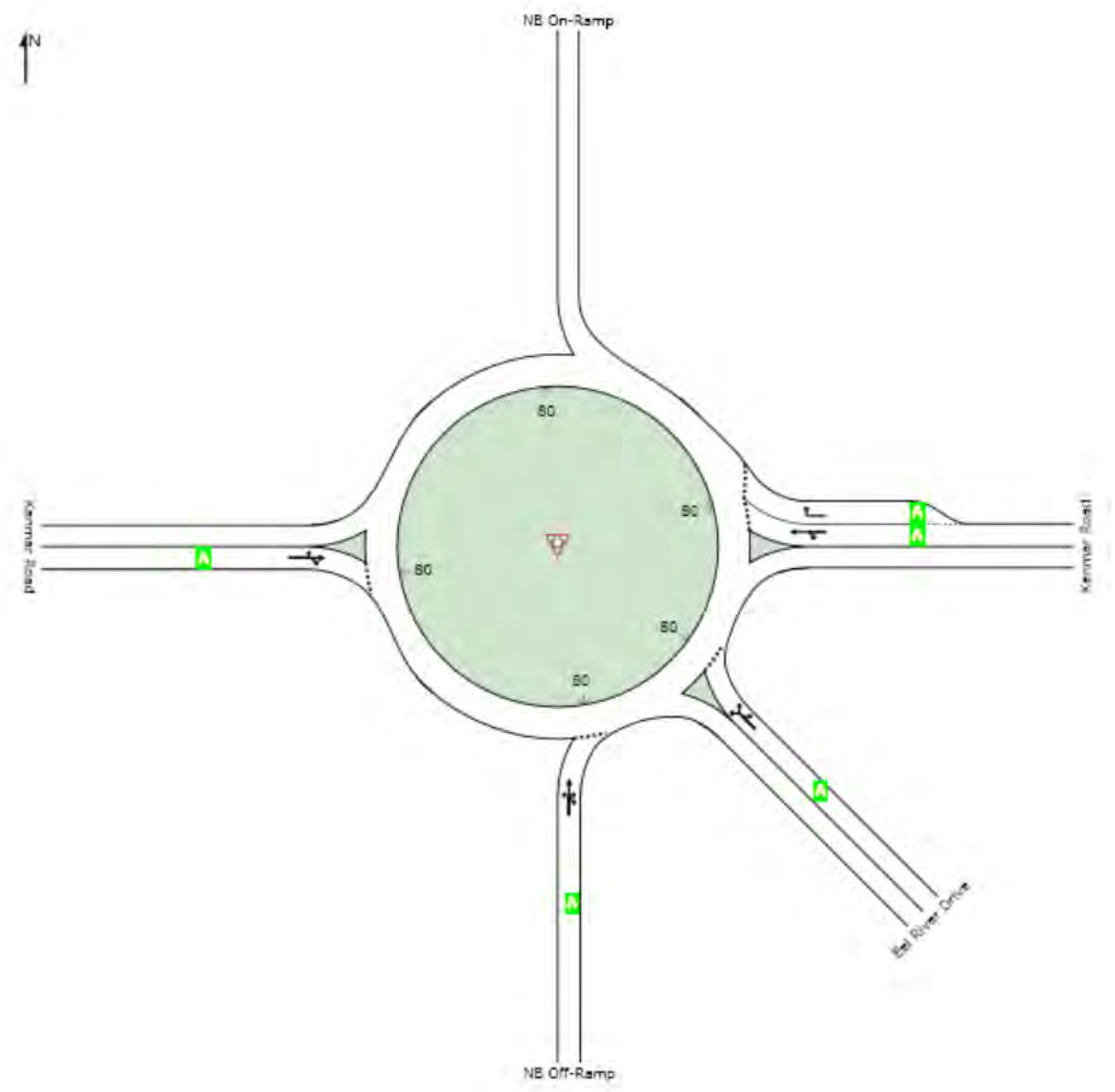
LEVEL OF SERVICE

Site: Kenmar Road/Eel River Drive/NB Ramps AM

Kenmar Road Interchange Roundabout Concept - Option 2
Cumulative AM
Roundabout

All Movement Classes

	South	Southeast	East	West	Intersection
LOS	A	A	A	A	A



Level of Service (LOS) Method: Delay & v/c (HCM 2010).
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Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

LANE SUMMARY

Site: Kenmar Road/Eel River Drive/NB Ramps AM

Kenmar Road Interchange Roundabout Concept - Option 2
Cumulative AM
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NB Off-Ramp													
Lane 1[d]	305	3.0	951	0.321	100	7.8	LOS A	1.9	48.0	Full	1600	0.0	0.0
Approach	305	3.0		0.321		7.8	LOS A	1.9	48.0				
SouthEast: Eel River Drive													
Lane 1[d]	47	3.0	720	0.066	100	9.9	LOS A	0.4	9.8	Full	1600	0.0	0.0
Approach	47	3.0		0.066		9.9	LOS A	0.4	9.8				
East: Kenmar Road													
Lane 1	468	3.0	1258	0.372	100	5.1	LOS A	2.4	61.3	Full	1600	0.0	0.0
Lane 2[d]	695	3.0	1484	0.468	100	5.0	LOS A	3.5	88.3	Short	200	0.0	NA
Approach	1163	3.0		0.468		5.0	LOS A	3.5	88.3				
West: Kenmar Road													
Lane 1[d]	474	3.0	1356	0.349	100	4.7	LOS A	2.3	59.8	Full	1600	0.0	0.0
Approach	474	3.0		0.349		4.7	LOS A	2.3	59.8				
Intersection	1989	3.0		0.468		5.5	LOS A	3.5	88.3				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

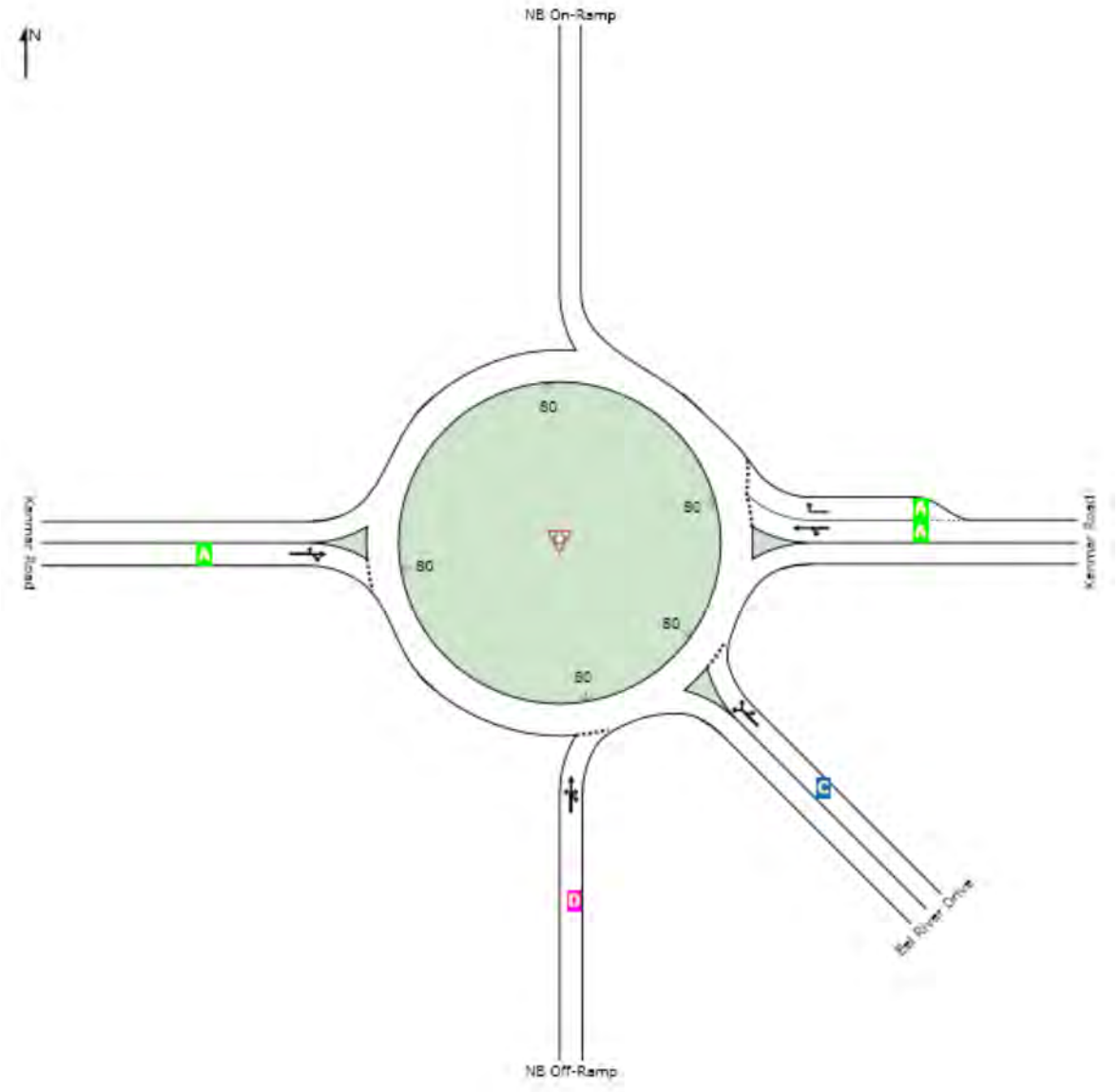
LEVEL OF SERVICE

Site: Kenmar/Eel River Drive/NB Ramps PM

Kenmar Road Interchange Roundabout Concept - Option 2
Cumulative PM
Roundabout

All Movement Classes

	South	Southeast	East	West	Intersection
LOS	D	C	A	A	B



Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

LANE SUMMARY

Site: Kenmar/Eel River Drive/NB Ramps PM

Kenmar Road Interchange Roundabout Concept - Option 2
Cumulative PM
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NB Off-Ramp													
Lane 1[d]	380	3.0	495	0.768	100	37.3	LOS D	10.8	276.2	Full	1600	0.0	0.0
Approach	380	3.0		0.768		37.3	LOS D	10.8	276.2				
SouthEast: Eel River Drive													
Lane 1[d]	47	3.0	250	0.189	100	32.1	LOS C	1.3	33.6	Full	1600	0.0	0.0
Approach	47	3.0		0.189		32.1	LOS C	1.3	33.6				
East: Kenmar Road													
Lane 1[d]	753	3.0	1418	0.531	100	5.4	LOS A	4.2	107.2	Full	1600	0.0	0.0
Lane 2	479	3.0	1179	0.406	100	5.5	LOS A	2.7	68.7	Short	200	0.0	NA
Approach	1232	3.0		0.531		5.4	LOS A	4.2	107.2				
West: Kenmar Road													
Lane 1[d]	1100	3.0	1362	0.808	100	4.9	LOS A	16.1	413.2	Full	1600	0.0	0.0
Approach	1100	3.0		0.808		4.9	LOS A	16.1	413.2				
Intersection	2759	3.0		0.808		10.0	LOS B	16.1	413.2				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

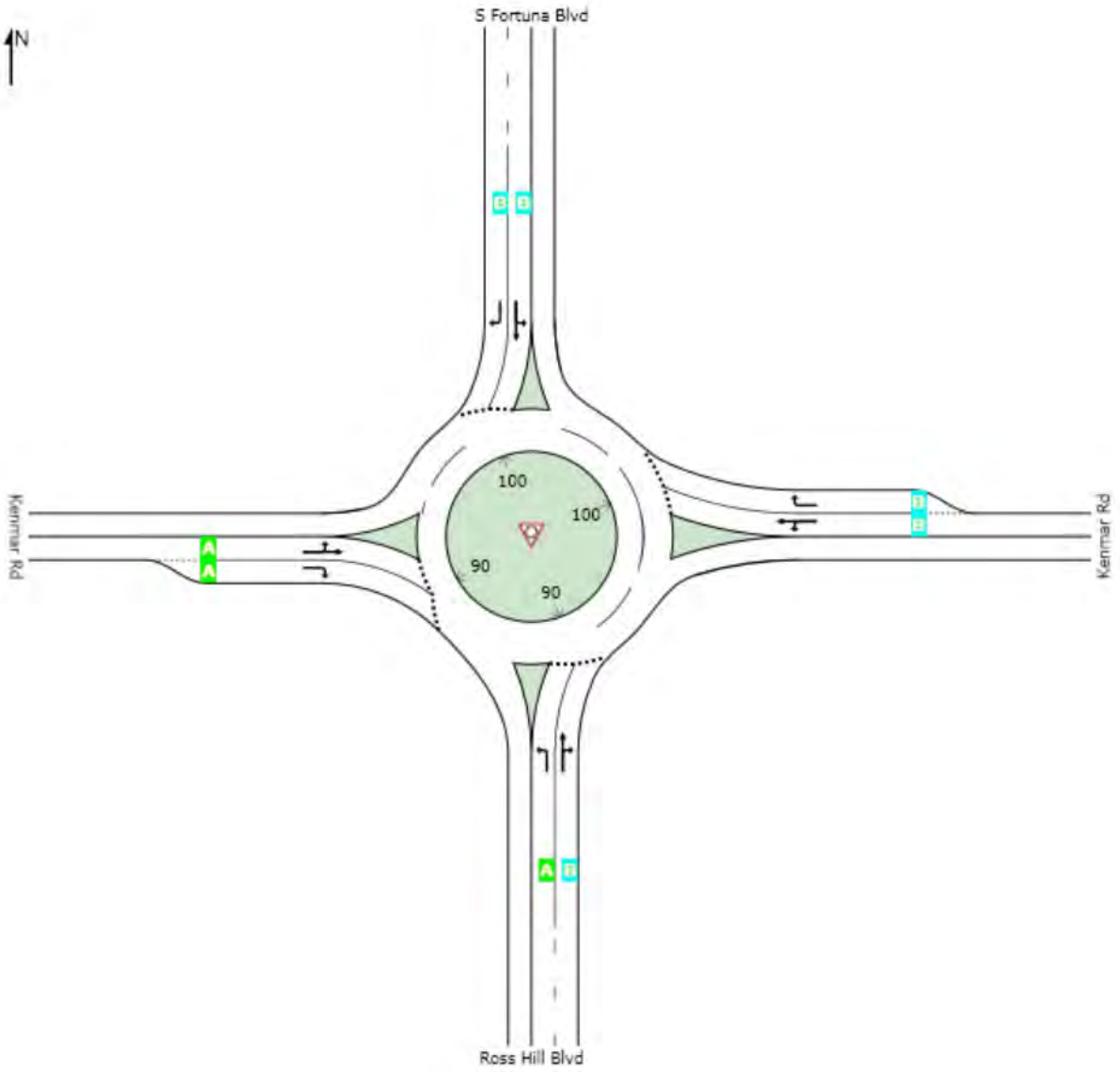
LEVEL OF SERVICE

Site: Kenmar Road/Ross Hill Road/Fortuna Boulevard AM

Kenmar Road Interchange Roundabout Concept
Cumulative AM
Roundabout

All Movement Classes

	South	East	North	West	Intersection
LOS	A	B	B	A	B



Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

LANE SUMMARY

Site: Kenmar Road/Ross Hill Road/Fortuna Boulevard AM

Kenmar Road Interchange Roundabout Concept
Cumulative AM
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Ross Hill Blvd													
Lane 1[d]	551	2.0	1121	0.492	100	8.7	LOS A	4.0	100.5	Full	1600	0.0	0.0
Lane 2	483	2.0	922	0.524	100	10.7	LOS B	4.4	111.7	Full	1600	0.0	0.0
Approach	1034	2.0		0.524		9.7	LOS A	4.4	111.7				
East: Kenmar Rd													
Lane 1[d]	290	2.0	675	0.429	100	11.4	LOS B	2.6	64.9	Full	1600	0.0	0.0
Lane 2	275	2.0	525	0.524	100	16.8	LOS B	3.1	79.1	Short	200	0.0	NA
Approach	565	2.0		0.524		14.0	LOS B	3.1	79.1				
North: S Fortuna Blvd													
Lane 1	341	2.0	635	0.536	100	14.7	LOS B	4.9	125.1	Full	1600	0.0	0.0
Lane 2[d]	409	2.0	860	0.476	100	10.3	LOS B	4.4	111.8	Full	1600	0.0	0.0
Approach	750	2.0		0.536		12.3	LOS B	4.9	125.1				
West: Kenmar Rd													
Lane 1[d]	403	2.0	1172	0.344	100	6.4	LOS A	2.6	66.3	Full	1600	0.0	0.0
Lane 2	347	2.0	979	0.354	100	7.5	LOS A	2.5	64.6	Short	200	0.0	NA
Approach	750	2.0		0.354		6.9	LOS A	2.6	66.3				
Intersection	3099	2.0		0.536		10.4	LOS B	4.9	125.1				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

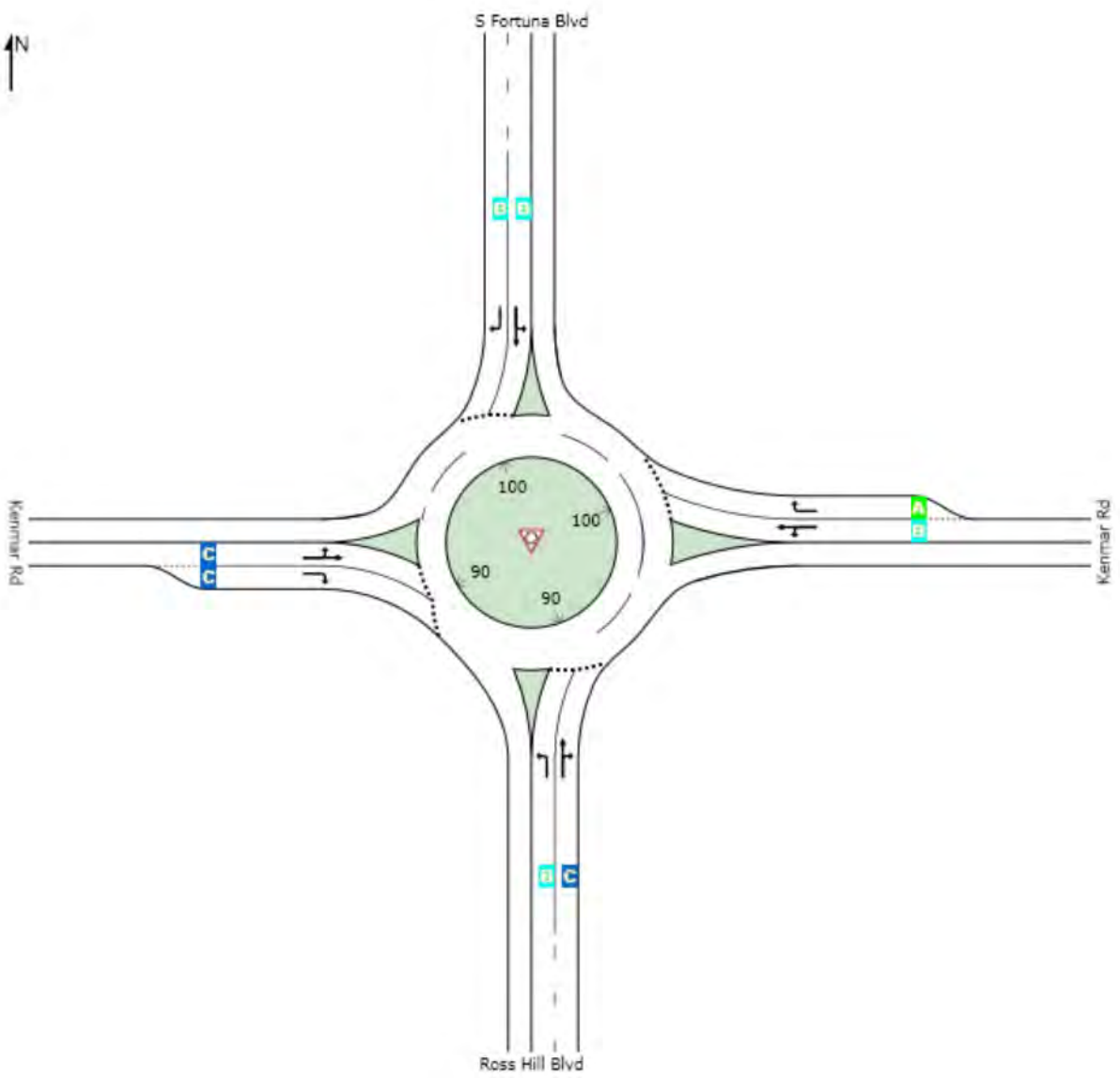
LEVEL OF SERVICE

Site: Kenmar Road/Ross Hill Road/Fortuna Boulevard PM

Kenmar Road Interchange Roundabout Concept
Cumulative AM
Roundabout

All Movement Classes

	South	East	North	West	Intersection
LOS	C	A	B	C	B



Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

LANE SUMMARY

Site: Kenmar Road/Ross Hill Road/Fortuna Boulevard PM

Kenmar Road Interchange Roundabout Concept
Cumulative AM
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Ross Hill Blvd													
Lane 1[d]	389	2.0	652	0.596	100	16.3	LOS B	6.7	169.4	Full	1600	0.0	0.0
Lane 2	354	2.0	501	0.706	100	26.2	LOS C	8.2	207.2	Full	1600	0.0	0.0
Approach	742	2.0		0.706		21.0	LOS C	8.2	207.2				
East: Kenmar Rd													
Lane 1	146	2.0	539	0.272	100	10.5	LOS B	1.4	34.9	Full	1600	0.0	0.0
Lane 2[d]	146	2.0	673	0.217	100	7.9	LOS A	1.2	29.8	Short	200	0.0	NA
Approach	293	2.0		0.272		9.2	LOS A	1.4	34.9				
North: S Fortuna Blvd													
Lane 1	601	2.0	849	0.708	100	17.4	LOS B	8.7	221.9	Full	1600	0.0	0.0
Lane 2[d]	621	2.0	1045	0.594	100	11.3	LOS B	6.2	157.9	Full	1600	0.0	0.0
Approach	1222	2.0		0.708		14.3	LOS B	8.7	221.9				
West: Kenmar Rd													
Lane 1[d]	717	2.0	903	0.794	100	21.4	LOS C	12.8	324.5	Full	1600	0.0	0.0
Lane 2	540	2.0	717	0.754	100	22.5	LOS C	10.0	253.5	Short	200	0.0	NA
Approach	1258	2.0		0.794		21.9	LOS C	12.8	324.5				
Intersection	3515	2.0		0.794		18.0	LOS B	12.8	324.5				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Attachment C - Review of Geometric Design Standards

Memorandum

June 22, 2016

Project:	Fortuna Highway 101/Riverwalk Connectivity Study		
Subject:	***Review of Safety and Design Standards***		
Client:	Humboldt County Association of Governments	Job no.:	11109149
Prepared by:	David Caisse, P.E and Josh Wolf, P.E.	Tel:	(707) 443-8326

Introduction / Objective

This memo is intended to provide a brief summary of the existing conditions and identify potential non-standard features for the Highway 101 interchanges at 12th Street and Kenmar Road. Existing facilities were compared against the applicable standards and guidelines for the roadway being analyzed. For example, standards for the Highway 101 on and off ramps and other State owned facilities are based on the Caltrans Highway Design Manual. Local facilities are based on the local agency or Federal guidance or standards (generally whichever are more stringent). Local facilities located within the State right-of-way crossing over or under a freeway or expressway and connecting to the state facility are based on the State's design standards. Below is a list of public standards which are commonly used.

Common Public Design Standards and Guidelines

State of California

Caltrans Highway Design Manual – This manual was developed by the California Department of Transportation (Caltrans) to establish uniform policies and procedures to carry out the State highway design functions of the department. Design standards include items such as roadway geometry, pavement engineering, drainage, bicycle transportation and other miscellaneous design standards.

California Manual on Uniform Traffic Control Devices (CA MUTCD) – This manual provides uniform standards and specifications for all official traffic control devices in California. Design standards include items such as signs, markings, signal and temporary traffic control for vehicular, rail and bicycle facilities. The CA MUTCD is based on Federal Highway Administrations (FHWA) *2009 National Manual on Uniform Traffic Control Devices* with California revisions and amendments.

Federal

AASHTO Geometric Design of Highways and Streets – Similar to the Highway Design Manual, these guidelines are intended to provide roadway design standards with operational efficiency, comfort, safety and convenience of the motorist in mind. Design standards include items such as highway function, design controls and elements of design for various functional classifications of roadways (freeways, arterials, collectors, local roads, etc.).

GHD Inc.
718 Third Street Eureka CA 95501 USA
T 1 707 443 8326 F 1 707 444 8330 E eureka@ghd.com W www.ghd.com

US Department of Justice's ADA Standards for Accessible Design – These standards are based on the Americans with Disabilities Act of 1990 (ADA) and provide standards to prohibit discrimination and ensure equal opportunity for persons with disabilities. Design elements include standards for accessible routes, general site and building elements (residential and commercial) and recreational facilities.

AASHTO Guide for the Development of Bicycle Facilities – This manual was developed to provide an overview of planning and design considerations, as well as recommendations for operation and maintenance of various types of bicycle facilities.

NACTO Urban Bikeway Design Guide – Similar to the AASHTO Guide for the Development of Bicycle Facilities, this manual was developed to provide guidance for the planning and design of bicycle facilities. This manual however, was developed by cities for cities based on the experience of the best cycling cities in the world.

As discussed later in this memo, there are currently no pedestrian or bicycle facilities in the immediate vicinity of the interchanges, therefore the later three of the manuals identified above were not used when evaluating the existing conditions.

Condition Assessment

A reconnaissance level condition assessment was performed and used to identify fundamental deficiencies as compared to the current design standards. The results presented below are based on a preliminary level characterization to provide background information and guidance for evaluating the existing conditions. For example, the characterization is based on notable qualitative characteristics visually observed and/or measured during a site walk, rather than a detailed investigation or survey of the existing conditions.

The characteristics noted are based on observable features that are relevant to the evaluation of the current layout. The characterization is intended to serve as a planning tool to provide additional information to be considered when recommending improvement alternatives. The primary factors being investigated are items such as horizontal alignment, geometric cross section, design vehicles, clearances, and sight distance.

Results

The results of the condition assessment for each segment of roadway can be found on the following pages.

~~12th Street and US Highway 101 Interchange~~

~~12th Street/Riverwalk Drive~~

Roadway Segment: Riverwalk Dr/12th St

	Existing Roadway Characteristics	Design Standards	Meets Standards (√ = yes)	Reference to Standard
Facility Type	Local Facility			
Functional Classification	Minor Arterial / Major Collector			
No. of Lanes	2			
Rural/Urban	Rural			
Bike Facilities (Y/N)	N			
Pedestrian Facilities (Y/N)	N			
Posted Speed/Design Speed (mph)	30/35	45 [1]		HDM Index 101.1
Lane Width (ft)	12	12	√	HDM Index 301.1 / AASHTO
Overcrossing Width (ft)	28	32		HDM Index 308.1
Right Shoulder Width (ft)	Var. 2' - 8' (between NB and SB ramps)	4		HDM Index 302.1 & 308.1 / AASHTO
Curve Radii (ft)	300+/-	425		HDM Index 203.2
Decision Sight Distance (ft)	400 [2]	525		HDM Index 201.7
Intersection Spacing (ft)	0' (Between SB ramps and Dinsmore Dr) & 300' (between NB ramps and Newburg Rd)	500		HDM Index 504.3
Horizontal Clearance (ft)	4'+ (w/out curb) & 1.5'+ (w/ curb)	4' (w/out curb) & 1.5' (w/ curb)	√	HDM Index 309.1
Vertical Clearance (ft - in)	15' - 5" [3]	16' - 6"		HDM Index 309.2
Stopping Sight Distance (ft)	250+	250	√	HDM Index 201.1
Design Vehicle	Cal Legal - 50 [4]	Cal Legal - 50		HDM Index 404.4

1 Design Standard applies to connections to freeways or expressways

[2] The roadway geometry could probably accommodate the minimum Decision Sight Distance, but some trees might need trimming or be removed.

[3] This location is an overcrossing so the vertical clearance shown here is for US Hwy 101.

[4] A Cal Legal - 50 Truck could probably navigate the turns, but may be required to travel outside the lane slightly and use the gore area or adjacent shoulder.

- ~~Posted Speed/Design Speed – When feasible, the design speed of local facilities connecting to a freeway or expressway should be 45 mph, but shall be a minimum of 35 mph.~~

- ~~Overcrossing Width – The adjacent sections of roadway approaching the overcrossing are urban in nature and contain 12' travel lanes with 8' shoulders. At the overcrossing, the section narrows to 12' travel lanes, 2' paved shoulders and a concrete curb/vehicular railing which begins at the edge of the shoulder.~~

- Right Shoulder Width – The shoulder width decreases to only 2' within the overcrossing area and again on the Strongs Creek Bridge (which is located at the southern extents of this segment). All other portions of this segment have shoulders which meet the minimum design standard of 4' wide. The widths vary, but are generally around 8' in width.

- Intersection Spacing –

    - At the southern extent of this segment, Dinsmore Road intersects Riverwalk Drive immediately adjacent to the SB ramps. Due to its proximity and configuration, Dinsmore Road appears more like a 5th leg of the Riverwalk Drive and SB ramp intersection rather than its own. Drivers appear to be confused and have been observed traveling directly from Dinsmore Drive to the SB ramp or northward towards the downtown area.

    - At the northern extent of the segment, the NB on and off ramps are located approximately 300' south of the Newburg Road and 12th Street intersection. The preferred distance between intersections (from curb return to curb return) is 500', but shall be a minimum of 400'.

- Curve Radii - 12th Street is a relatively straight section of road, but contains a few curves near the interchange. The first curve heading south towards Highway 101 is slightly smaller than recommended based on the speed of the roadway through that section.

- Decision Sight Distance - Near the overcrossing, there are a number of large conifers that restrict visibility. The sight distance could be improved and would likely meet the standards if the trees were trimmed or removed.

- Vertical Clearance – Since this is an overcrossing, the vertical clearance described here is for the vehicles on Highway 101.

- Design Vehicle – In all cases, it appears as though a Cal Legal-50 truck could navigate the turns and stay within the paved roadway area; however, due to the tight radii entering and exiting the ramps and turning on and off the side streets (Dinsmore Drive and Newburg Road), large trucks would need to encroach slightly into the oncoming travel lane and or gore area.

Newburg Road

Roadway Segment: Newburg Rd

	Existing Roadway Characteristics	Design Standards	Meets Standards (√ = yes)	Reference to Standard
Facility Type	Local Facility			
Functional Classification	Major Collector			
No. of Lanes	2			
Rural/Urban	Rural			
Bike Facilities (Y/N)	N			
Pedestrian Facilities (Y/N)	Y (north side only)			
Posted Speed/Design Speed (mph)	25/30	25	√	AASHTO
Lane Width (ft)	12	12	√	HDM Index 301.1 / AASHTO
Right Shoulder Width (ft)	8 / 4	2	√	HDM Index 302.1 & 308.1 / AASHTO
Curve Radii (ft)	300+	300	√	HDM Index 203.2
Decision Sight Distance (ft)	450+	450	√	HDM Index 201.7
Angle of Intersection (Degree)	45	75		HDM Index 403.3
Horizontal Clearance (ft)	3'+/- (in areas w/out curb)	4' (w/out curb) & 1.5' (w/ curb)		HDM Index 309.1
Stopping Sight Distance (ft)	200+	200	√	HDM Index 201.1
Design Vehicle	Cal Legal - 50 [1]	Cal Legal - 50		HDM Index 404.4

[1] A Cal Legal - 50 Truck could probably navigate the turns, but would be required travel outside its lane.

- Angle of Intersection – Newberg Intersects 12th Street at a 45 degree angle. Provided there are no physical constraints, the interior angle should be 90 degrees or as close to 90 degrees as practical, but should not be less than 75 degrees.
- Horizontal Clearance – The southern half of the roadway contains a number of utility poles that are very close to the edge of the travel lane.
- Design Vehicle – Newberg Road intersects 12th Street at an acute angle. Due to the angle and tight radii, large trucks need to encroach into oncoming travel lane to navigate the turns and stay within the existing pavement.

~~Dinsmore Drive~~

Roadway Segment: Dinsmore Dr

	Existing Roadway Characteristics	Design Standards	Meets Standards (√ = yes)	Reference to Standard
Facility Type	Local Facility			
Functional Classification	Local Road			
No. of Lanes	2			
Rural/Urban	Rural			
Bike Facilities (Y/N)	N			
Pedestrian Facilities (Y/N)	N			
Posted Speed/Design Speed (mph)	25/30	25	√	AASHTO
Lane Width (ft)	12	12	√	HDM Index 301.1 / AASHTO
Right Shoulder Width (ft)	2	2	√	HDM Index 302.1 & 308.1 / AASHTO
Curve Radii (ft)	300+	300	√	HDM Index 203.2
Decision Sight Distance (ft)	450+	450	√	HDM Index 201.7
Horizontal Clearance (ft)	4'+/- [1]	4'	√	HDM Index 309.1
Stopping Sight Distance (ft)	200+	200	√	HDM Index 201.1
Design Vehicle	Cal Legal - 50 [2]	Cal Legal - 50		HDM Index 404.4

[1] Power poles are very close to the edge of the pavement.

[2] A Cal Legal - 50 Truck could probably navigate the turns, but would be required travel outside its lane.

- ~~Design Vehicle – Dinsmore Drive intersects 12th Street as one of the five legs of this intersection. As a result, the intersection is tight and confusing. Due to the tight radius and close proximity of the bridge to the intersection, large trucks heading or coming from the south leg of the intersection are required to swing wide and encroach into oncoming travel lanes.~~

US Highway 101 Northbound Ramp

Roadway Segment: US Hwy 101 Northbound (On and off ramps)

	Existing Roadway Characteristics	Design Standards	Meets Standards (√ = yes)	Reference to Standard
Facility Type	Freeway / Expressway			
Functional Classification	Freeway / Expressway			
No. of Lanes	1			
Rural/Urban	Rural			
Bike Facilities (Y/N)	N			
Pedestrian Facilities (Y/N)	N			
Posted Speed/Design Speed (mph)	35/40	25/50 [1]		HDM Index 504.3
Lane Width (ft)	12	12	√	HDM Index 301.1
Right Shoulder Width (ft)	8	8	√	HDM Index 302.1 & 308.1 / AASHTO
Curve Radii (ft)	400 / 600	550		HDM Index 203.2
Decision Sight Distance (ft)	425+/-	600		HDM Index 201.7
Horizontal Clearance (ft)	4'+ (w/out curb) & 1.5'+ (w/ curb)	4' (w/out curb) & 1.5' (w/ curb)	√	HDM Index 309.1
Stopping Sight Distance (ft)	300+	300	√	HDM Index 201.1
Design Vehicle	STAA [2]	STAA		HDM Index 404.4

[1] Design speed should be 25 mph when traffic is expected to make a turning movement at the terminus and 50 mph when entering, exiting a ramp or when a "through" movement is provided at the terminus.

[2] An STAA truck could probably navigate the turns, but would be required travel outside its lane.

- Posted Speed/Design Speed – The design speed of ramp can vary depending on the alignment and controls at each end. An acceptable approach is to set 25 mph and 50 mph design speeds for the ramp terminus and exit nose, respectively. The NB off ramp terminates at an intersection where traffic is expected to make a turning movement; therefore, the design speed should be 25 mph nearing this portion of the ramp.

- Curve Radii – The design standard for the minimum curve radius of the northbound on and off ramps are based on the posted speed limit entering the on ramp from Highway 101. The curve radius identified below as not meeting the standard are is located on the northbound on ramp just before entering Highway 101. This particular section of road has no posted speed limit, but traffic entering Highway 101 at this location is accelerating and approaching speeds in excess of 40 mph. If considerations are made for improvements to this interchange, this radius should be increased to meet the current design standards.

- Decision Sight Distance – Similar to the 12th Street overcrossing, there are a number of large

conifers (Redwoods) along the right side of the off ramp that restrict visibility. The sight distance could be improved and would likely meet the standards if the trees were trimmed or removed.

- Design Vehicle – In all cases, it appears as though an STAA truck could navigate the turns and stay within the pavement; however, due to the tight radii entering and exiting the ramps and turning on and off 12th Street, large trucks would need to encroach slightly into the oncoming travel lane or gore area.

US Highway 101 Southbound Ramp

Roadway Segment: US Hwy 101 Southbound (On and off ramps)

	Existing Roadway Characteristics	Design Standards	Meets Standards (√ = yes)	Reference to Standard
Facility Type	Freeway / Expressway			
Functional Classification	Freeway / Expressway			
No. of Lanes	1			
Rural/Urban	Rural			
Bike Facilities (Y/N)	N			
Pedestrian Facilities (Y/N)	N			
Posted Speed/Design Speed (mph)	25/30	25/50 [1]		HDM Index 504.3
Lane Width (ft)	12	12	√	HDM Index 301.1
Right Shoulder Width (ft)	8	8	√	HDM Index 302.1 & 308.1 / AASHTO
Curve Radii (ft)	300 / 650	300	√	HDM Index 203.2
Decision Sight Distance (ft)	450+	450	√	HDM Index 201.7
Horizontal Clearance (ft)	4'+ (w/out curb) & 1.5'+ (w/ curb)	4' (w/out curb) & 1.5' (w/ curb)	√	HDM Index 309.1
Stopping Sight Distance (ft)	200+	200	√	HDM Index 201.1
Design Vehicle	STAA [2]	STAA		HDM Index 404.4

[1] Design speed should be 25 mph when traffic is expected to make a turning movement at the terminus and 50 mph when entering, exiting a ramp or when a "through" movement is provided at the terminus.

[2] An STAA truck could probably navigate the turns, but would be required travel outside its lane.

- Posted Speed/Design Speed - The design speed of ramp can vary depending on the alignment and controls at each end. An acceptable approach is to set 25 mph and 50 mph design speeds for the ramp terminus and exit nose, respectively. The SB off ramp terminates at an intersection where traffic is expected to make a turning movement; therefore, the design speed should be 25 mph nearing this portion of the ramp.

- Design Vehicle – In all cases, it appears as though an STAA truck could navigate the turns and stay within the pavement; however, due to the tight radii entering and exiting the ramps and turning on and off 12th Street or Dinsmore Drive, large trucks would need to encroach slightly into the oncoming travel lanes or gore area.

Kenmar Road and US Highway 101 Interchange

Kenmar Road

Roadway Segment: Kenmar Rd

	Existing Roadway Characteristics	Design Standards	Meets Standards (√ = yes)	Reference to Standard
Facility Type	Local Facility			
Functional Classification	Other Principal Arterial / Major Collector			
No. of Lanes	2			
Rural/Urban	Rural			
Bike Facilities (Y/N)	N			
Pedestrian Facilities (Y/N)	N			
Posted Speed/Design Speed (mph)	35/40	45 [1]		HDM Index 101.1
Lane Width (ft)	12	12	√	HDM Index 301.1 / AASHTO
Right Shoulder Width (ft)	8	4	√	HDM Index 302.1 & 308.1 / AASHTO
Curve Radii (ft)	600 / 75	550		HDM Index 203.2
Decision Sight Distance (ft)	230+/-	600		HDM Index 201.7
Horizontal Clearance (ft)	4'+ (w/out curb) & 1.5'+ (w/ curb) or shielded	4' (w/out curb) & 1.5' (w/ curb)	√	HDM Index 309.1
Vertical Clearance (ft - in)	14' - 10" [2]	15		HDM Index 309.2
Stopping Sight Distance (ft)	125+/-	300		HDM Index 201.1
Design Vehicle	Cal Legal - 50 [3]	Cal Legal - 50		HDM Index 404.4

[1] Design Standard applies to connections to freeways or expressways

[2] This location is an undercrossing so the vertical clearance shown here is for Kenmar Rd.

[3] A Cal Legal - 50 Truck could probably navigate the turns, but would be required travel outside its lane.

- Posted Speed/Design Speed - When feasible, the design speed of local facilities connecting to a freeway or expressway should be 45 mph, but shall be a minimum of 35 mph.
- Curve Radii – Most of Kenmar is relatively straight, but near the southern portion of the interchange there is a tight radius. The curve radius here is significantly smaller than recommended based on the speed of the roadway through that section.
- Decision Sight Distance – As a result of the tight radius identified above and dense vegetation growing outside of the right of way, visibility is obstructed.
- Vertical Clearance – Kenmar Road is an undercrossing at this location so the vertical clearance described here is for the vehicles on Kenmar Road.
- Stopping Sight Distance – Similar to Decision Sight Distance, the tight radius and dense vegetation obstructs visibility reducing the available stopping sight distance.

- Design Vehicle – In all cases, it appears as though a Cal Legal-50 truck could navigate the turns and stay within the paved roadway area; however, due to the tight radii entering and exiting the ramps and small curve radius identified above, large trucks would need to make wide turns and encroach slightly into the oncoming travel lane or gore area.

Eel River Drive

Roadway Segment: Eel River Dr

	Existing Roadway Characteristics	Design Standards	Meets Standards (√ = yes)	Reference to Standard
Facility Type	Local Facility			
Functional Classification	Major Collector			
No. of Lanes	2			
Rural/Urban	Rural			
Bike Facilities (Y/N)	N			
Pedestrian Facilities (Y/N)	N			
Posted Speed/Design Speed (mph)	30/35	30	√	AASHTO
Lane Width (ft)	11	9	√	HDM Index 301.1 / AASHTO
Right Shoulder Width (ft)	2+	2	√	HDM Index 302.1 & 308.1 / AASHTO
Curve Radii (ft)	85	425		HDM Index 203.2
Decision Sight Distance (ft)	525+	525	√	HDM Index 201.7
Intersection Spacing (ft)	150' (Between NB ramps and Eel River Dr)	500'		HDM Index 504.3
Horizontal Clearance (ft)	4'+/-	4' (w/out curb) & 1.5' (w/ curb)	√	HDM Index 309.1
Stopping Sight Distance (ft)	250+	250	√	HDM Index 201.1
Design Vehicle	Cal Legal - 50 [1]	Cal Legal - 50		HDM Index 404.4

- Curve Radii – Most of Eel River Drive is relatively straight, but near its intersection with Kenmar Road there is a tight radius. The curve radius here is significantly smaller than recommended based on the speed of the roadway through that section; however, at this point the road is approaching the STOP sign so speeds would be lower. If considerations are made for improvements to this interchange, the curve radius or approach angle should be evaluated.

- Intersection Spacing – The SB on and off ramps are located approximately 150’ south of the Eel River Drive and Kenmar Road intersection. The preferred distance between intersections (from curb return to curb return) is 500’, but shall be a minimum of 400’.

- Design Vehicle – Eel River Drive intersects Kenmar Road at an acute angle. Due to the angle and tight radii, large trucks need to encroach into the oncoming travel lane to navigate the turns and stay within the existing paved roadway.

US Highway 101 Northbound Ramp

Roadway Segment: US Hwy 101 Northbound (On and off ramps)

	Existing Roadway Characteristics	Design Standards	Meets Standards (√ = yes)	Reference to Standard
Facility Type	Freeway / Expressway			
Functional Classification	Freeway / Expressway			
No. of Lanes	1			
Rural/Urban	Rural			
Bike Facilities (Y/N)	N			
Pedestrian Facilities (Y/N)	N			
Posted Speed/Design Speed (mph)	35/40	25/50 [1]		HDM Index 504.3
Lane Width (ft)	12	12	√	HDM Index 301.1
Right Shoulder Width (ft)	8	8	√	HDM Index 302.1 & 308.1 / AASHTO
Curve Radii (ft)	N/A	550	√	HDM Index 203.2
Decision Sight Distance (ft)	600+	600	√	HDM Index 201.7
Horizontal Clearance (ft)	4'+ (w/out curb) & 1.5'+ (w/ curb)	4' (w/out curb) & 1.5' (w/ curb)	√	HDM Index 309.1
Stopping Sight Distance (ft)	300+	300	√	HDM Index 201.1
Design Vehicle	STAA [2]	STAA		HDM Index 404.4

[1] Design speed should be 25 mph when traffic is expected to make a turning movement at the terminus and 50 mph when entering, exiting a ramp or when a "through" movement is provided at the terminus.

[2] An STAA truck could probably navigate the turns, but would be required travel outside its lane.

- Posted Speed/Design Speed - The design speed of ramp can vary depending on the alignment and controls at each end. An acceptable approach is to set 25 mph and 50 mph design speeds for the ramp terminus and exit nose, respectively. The NB off ramp terminates at an intersection where traffic is expected to make a turning movement; therefore, the design speed should be 25 mph nearing this portion of the ramp.

- Design Vehicle – In all cases, it appears as though an STAA truck could navigate the turns and stay within the pavement; however, due to the tight radii entering and exiting the ramps and turning on and off Kenmar Road, large trucks would need to encroach slightly into the oncoming travel lane or gore area.

US Highway 101 Southbound Ramp

Roadway Segment: US Hwy 101 Southbound (On and off ramps)

	Existing Roadway Characteristics	Design Standards	Meets Standards (√ = yes)	Reference to Standard
Facility Type	Freeway / Expressway			
Functional Classification	Freeway / Expressway			
No. of Lanes	1			
Rural/Urban	Rural			
Bike Facilities (Y/N)	N			
Pedestrian Facilities (Y/N)	N			
Posted Speed/Design Speed (mph)	35/40 [1]	25/50 [2]		HDM Index 504.3
Lane Width (ft)	12	12	√	HDM Index 301.1
Right Shoulder Width (ft)	8	8	√	HDM Index 302.1 & 308.1 / AASHTO
Curve Radii (ft)	N/A	550	√	HDM Index 203.2
Decision Sight Distance (ft)	600+	600	√	HDM Index 201.7
Horizontal Clearance (ft)	4'+ (w/out curb) & 1.5'+ (w/ curb)	4' (w/out curb) & 1.5' (w/ curb)	√	HDM Index 309.1
Stopping Sight Distance (ft)	300+	300	√	HDM Index 201.1
Design Vehicle	STAA [3]	STAA		HDM Index 404.4

[1] The southbound on ramp didn't have a speed limit sign, but was assumed to be 35 mph based on the northbound on ramp and ramp geometry.

[2] Design speed should be 25 mph when traffic is expected to make a turning movement at the terminus and 50 mph when entering, exiting a ramp or when a "through" movement is provided at the terminus.

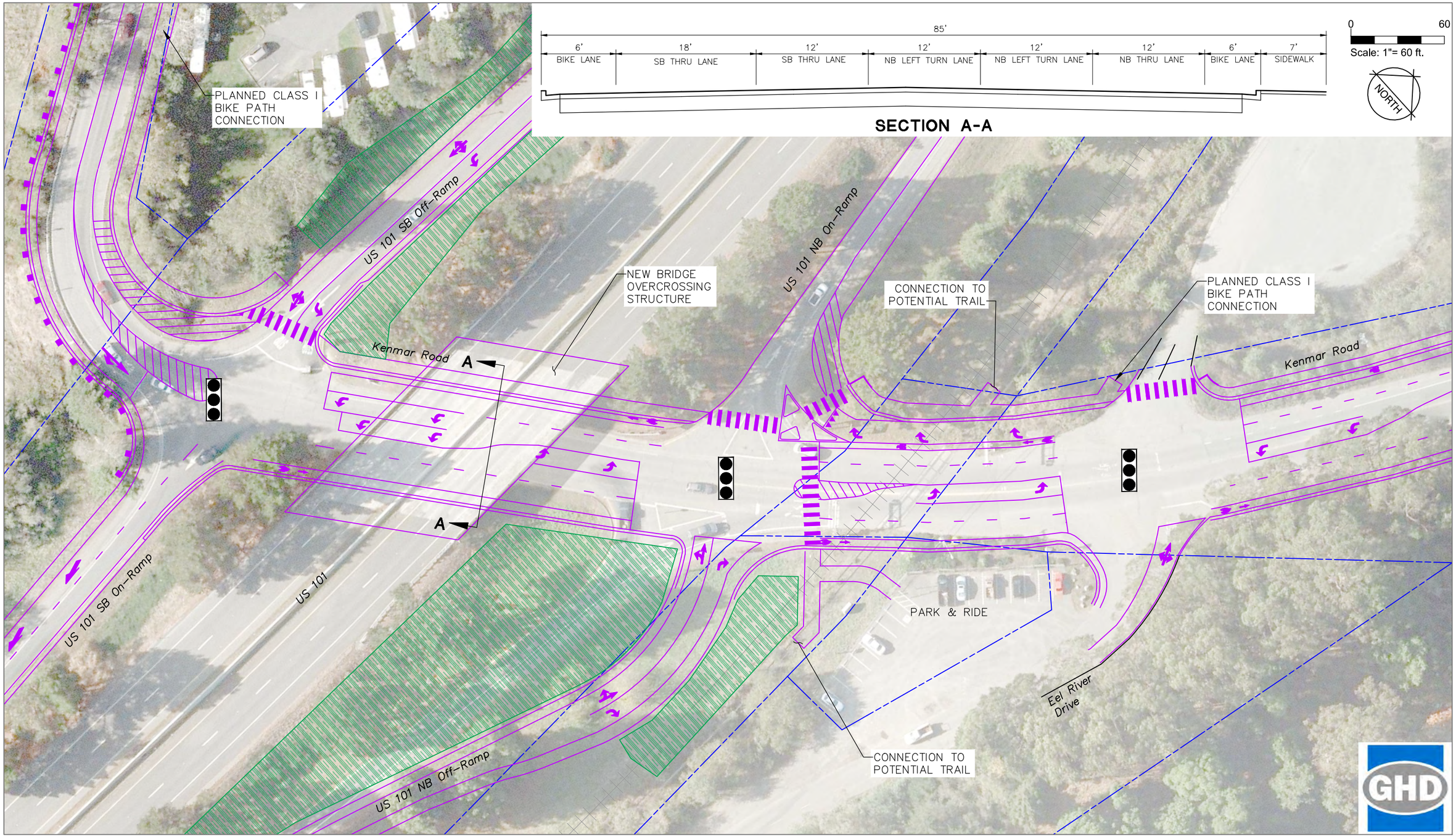
[3] An STAA truck could probably navigate the turns, but would be required travel outside its lane.

- Posted Speed/Design Speed - The design speed of ramp can vary depending on the alignment and controls at each end. An acceptable approach is to set 25 mph and 50 mph design speeds for the ramp terminus and exit nose, respectively. The SB off ramp terminates at an intersection where traffic is expected to make a turning movement; therefore, the design speed should be 25 mph nearing this portion of the ramp.

- Design Vehicle – In all cases, it appears as though an STAA truck could navigate the turns and stay within the pavement; however, due to the tight radii entering and exiting the ramps and turning on and off Kenmar Road, large trucks would need to encroach into the oncoming travel lane or gore area.

Attachment D - Conceptual Design Drawings

KENMAR Road INTERCHANGE SIGNAL CONCEPT



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US 101/RIVERWALK AREA CONNECTIVITY PROJECT

Figure 7.1

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KENMAR Rd. INTERCHANGE ROUNDABOUT CONCEPTS - Option 1a

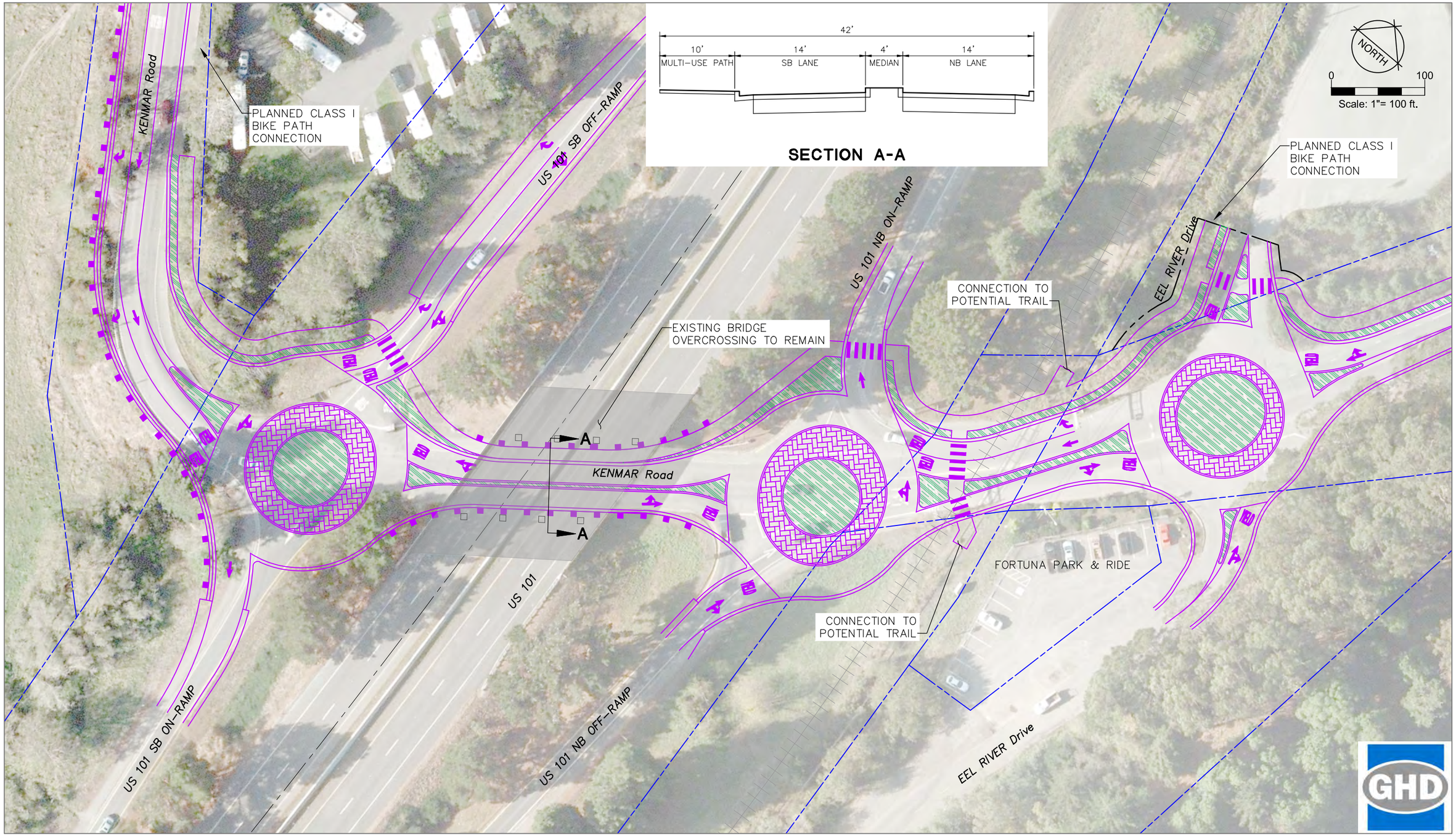

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Figure 7.4

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KENMAR Rd. INTERCHANGE ROUNDABOUT CONCEPTS - Option 1b

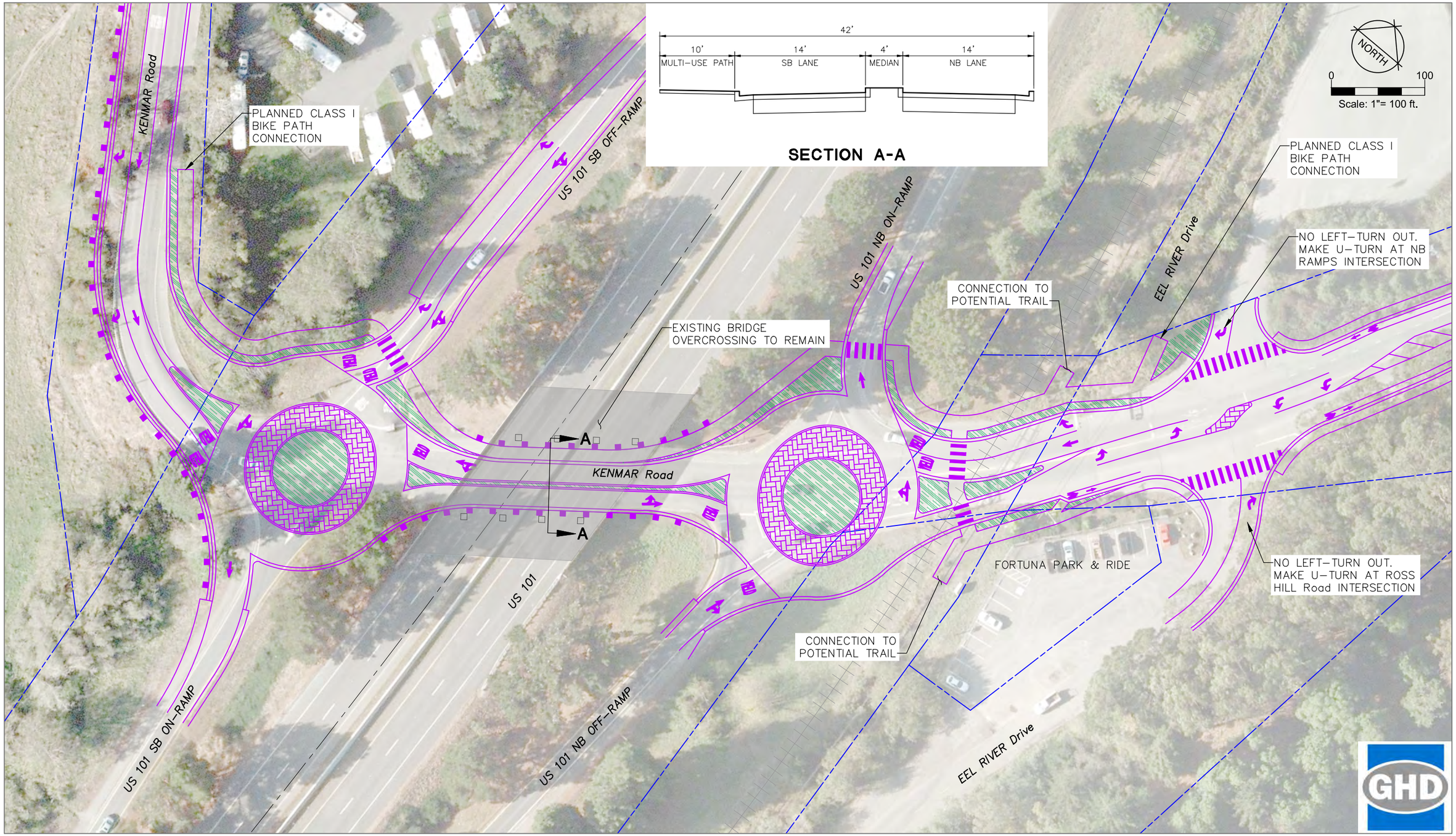

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Figure 7.5

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KENMAR Rd. INTERCHANGE ROUNDABOUT CONCEPTS - Option 2

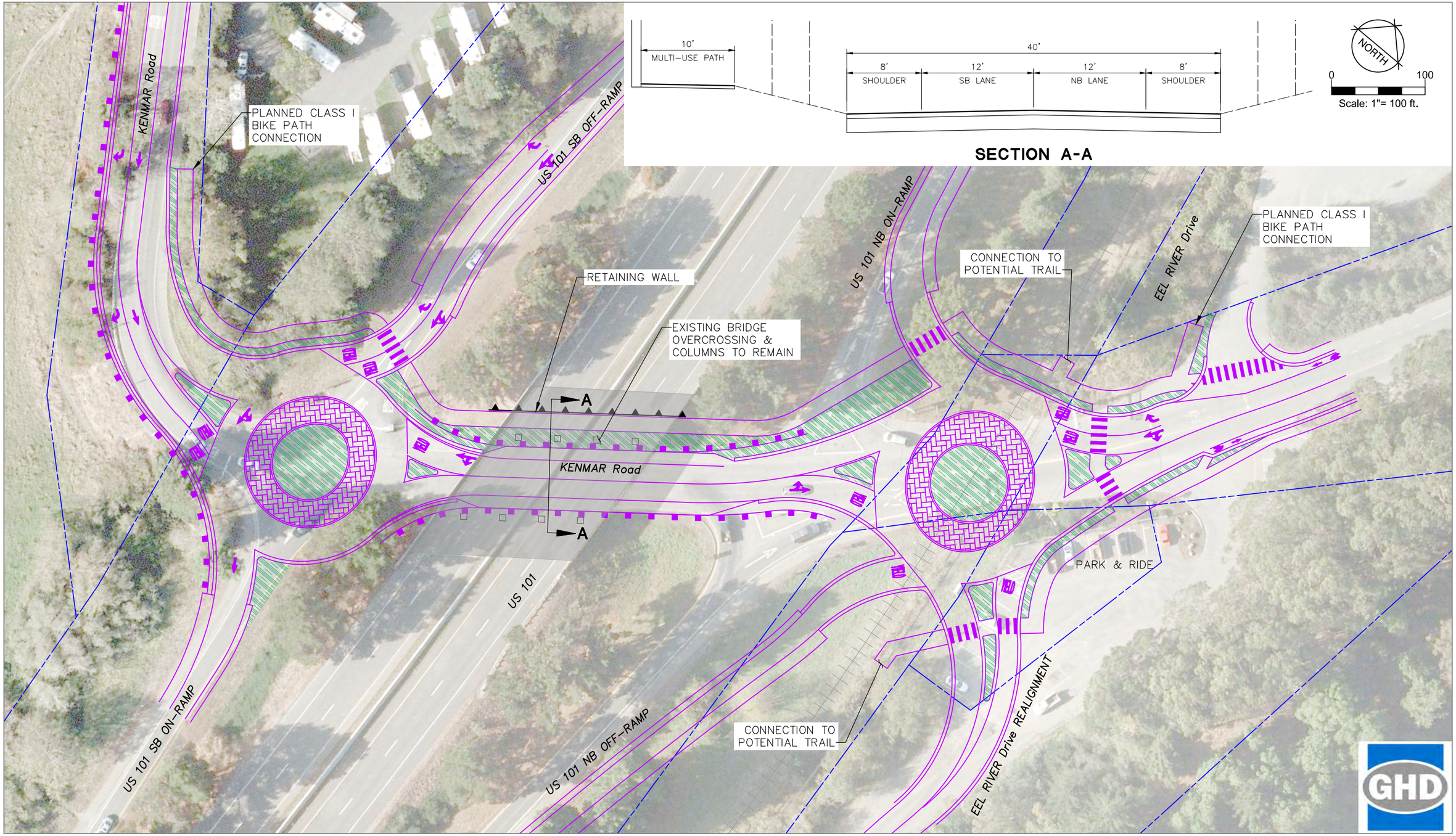

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Figure 7.6

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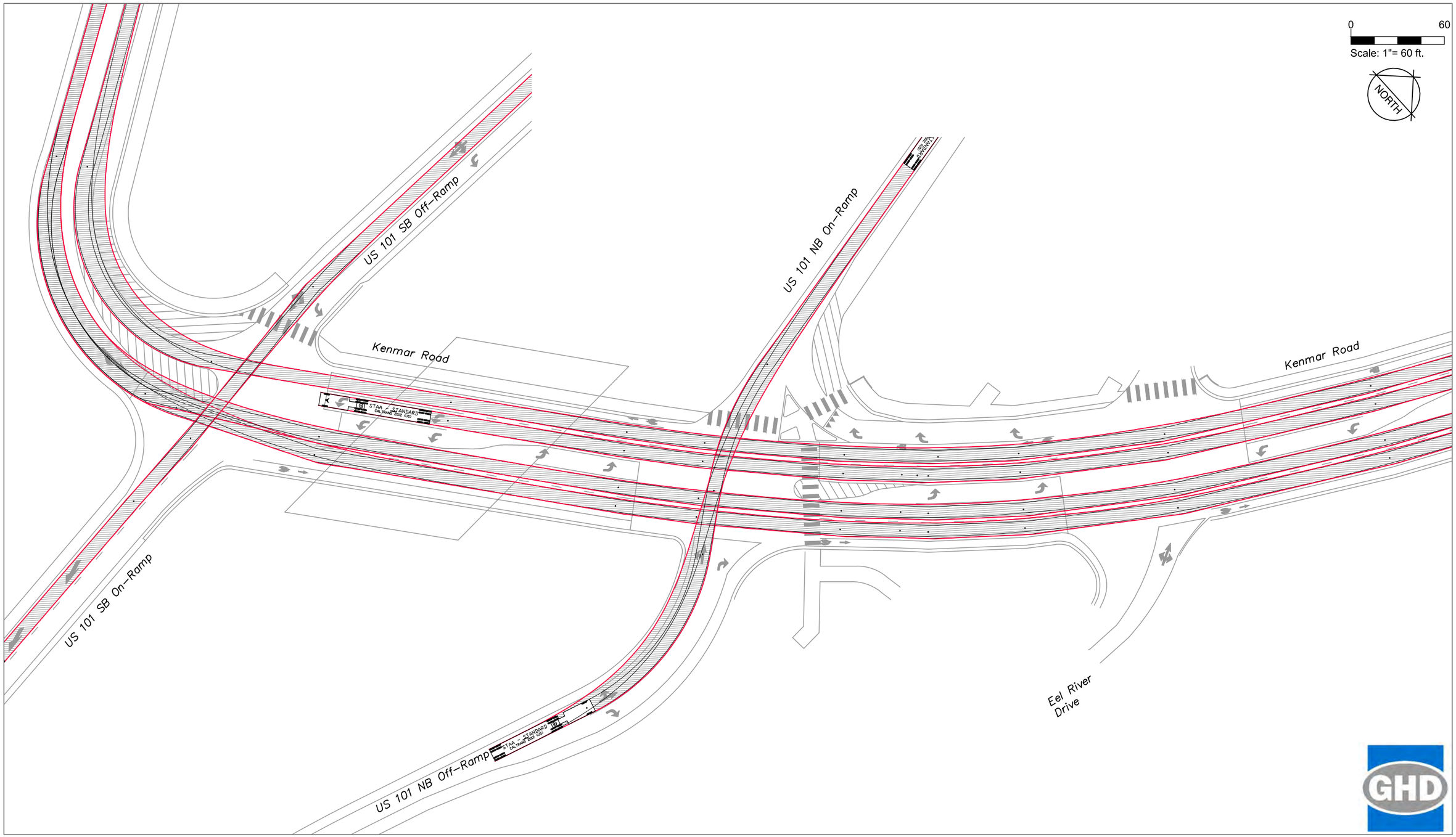
Attachment E - Truck Turning Analysis

KENMAR Road STAA (THROUGH MOVEMENT ONLY)



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US 101/RIVERWALK AREA CONNECTIVITY PROJECT

Figure B1

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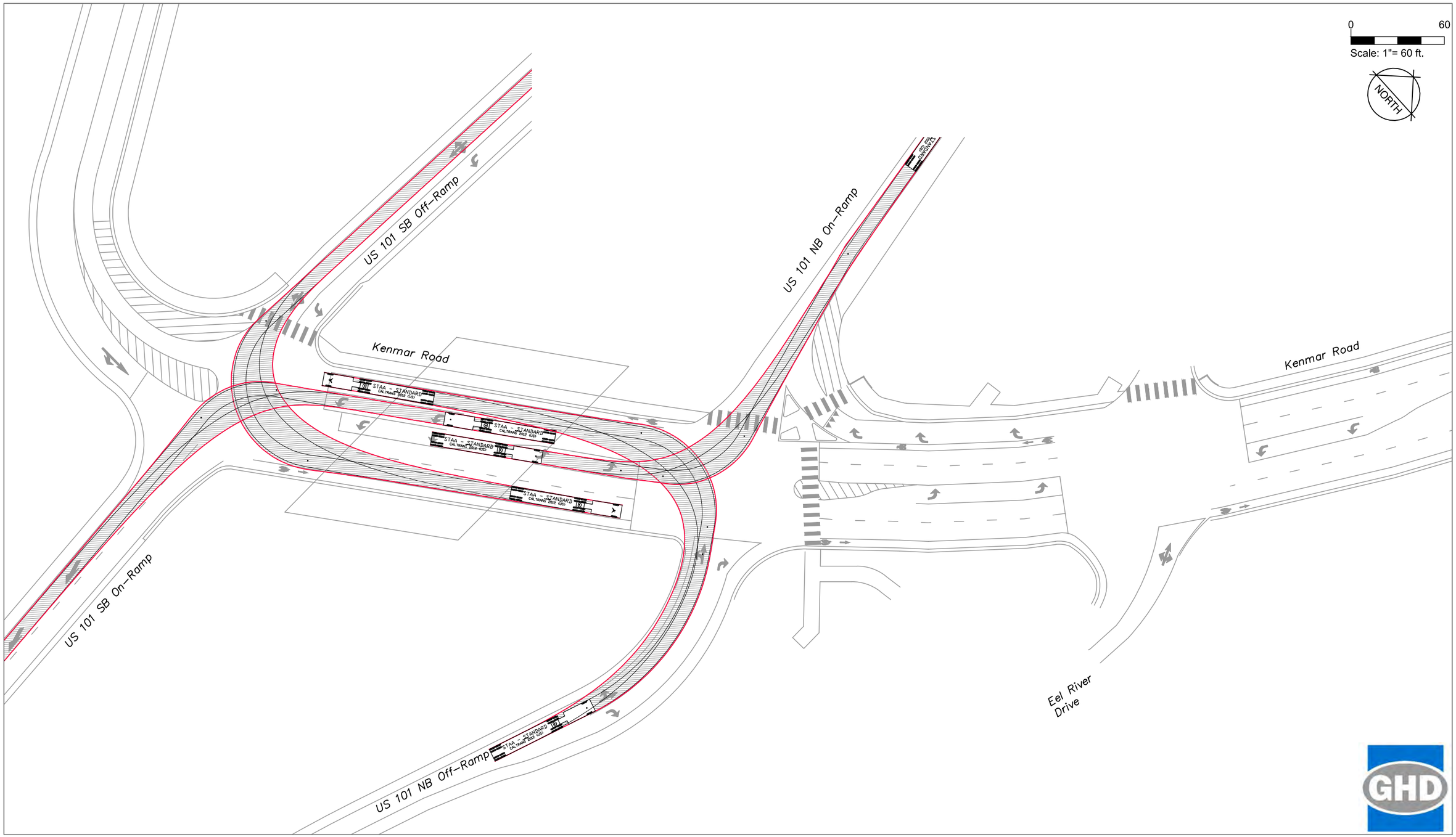
KENMAR Road STAA (LEFT-TURN MOVEMENT ONLY)



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US 101/RIVERWALK AREA CONNECTIVITY PROJECT

Figure B2

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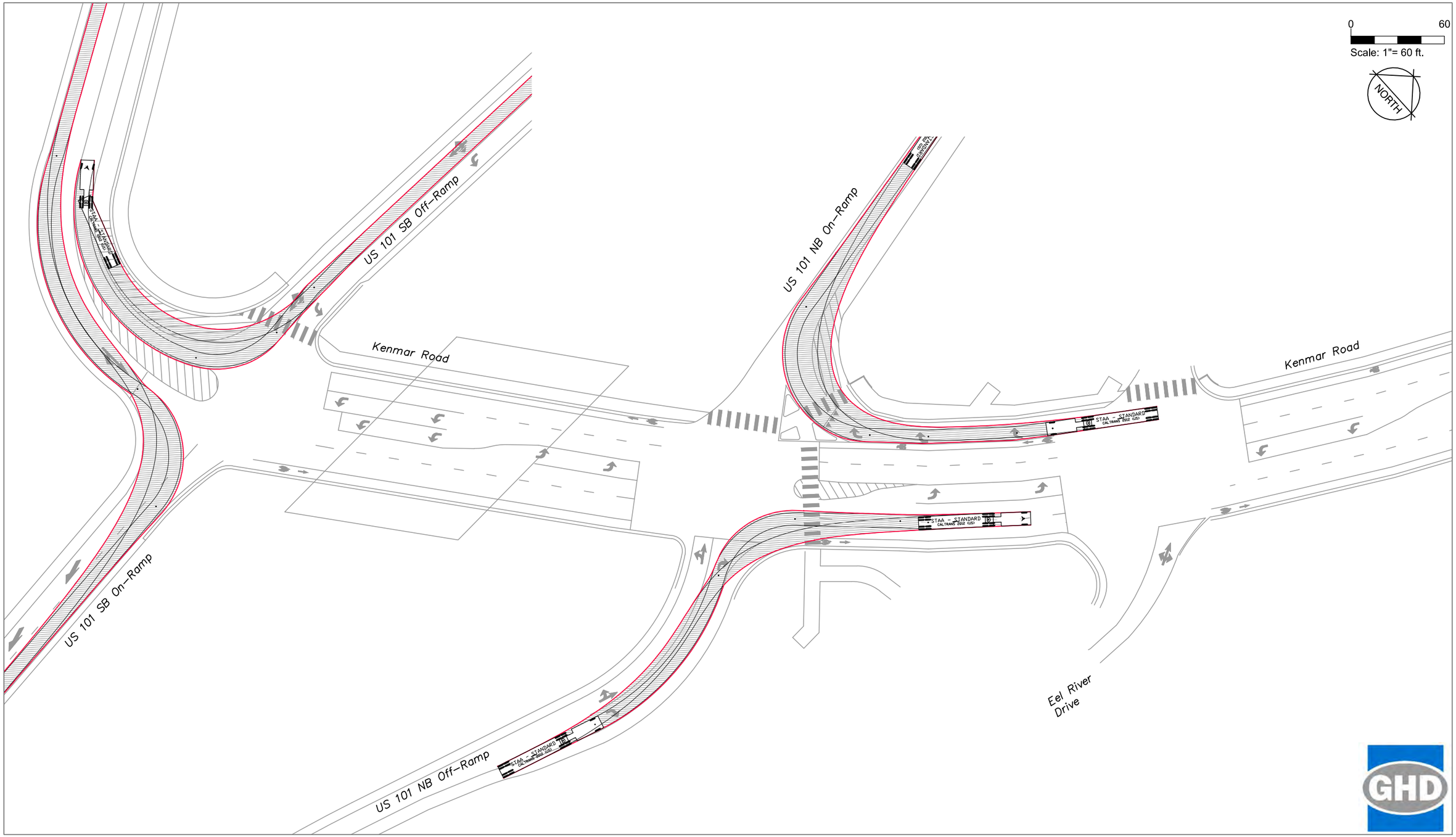
KENMAR Road STAA (RIGHT-TURN MOVEMENT ONLY)



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US 101/RIVERWALK AREA CONNECTIVITY PROJECT **Figure B3**

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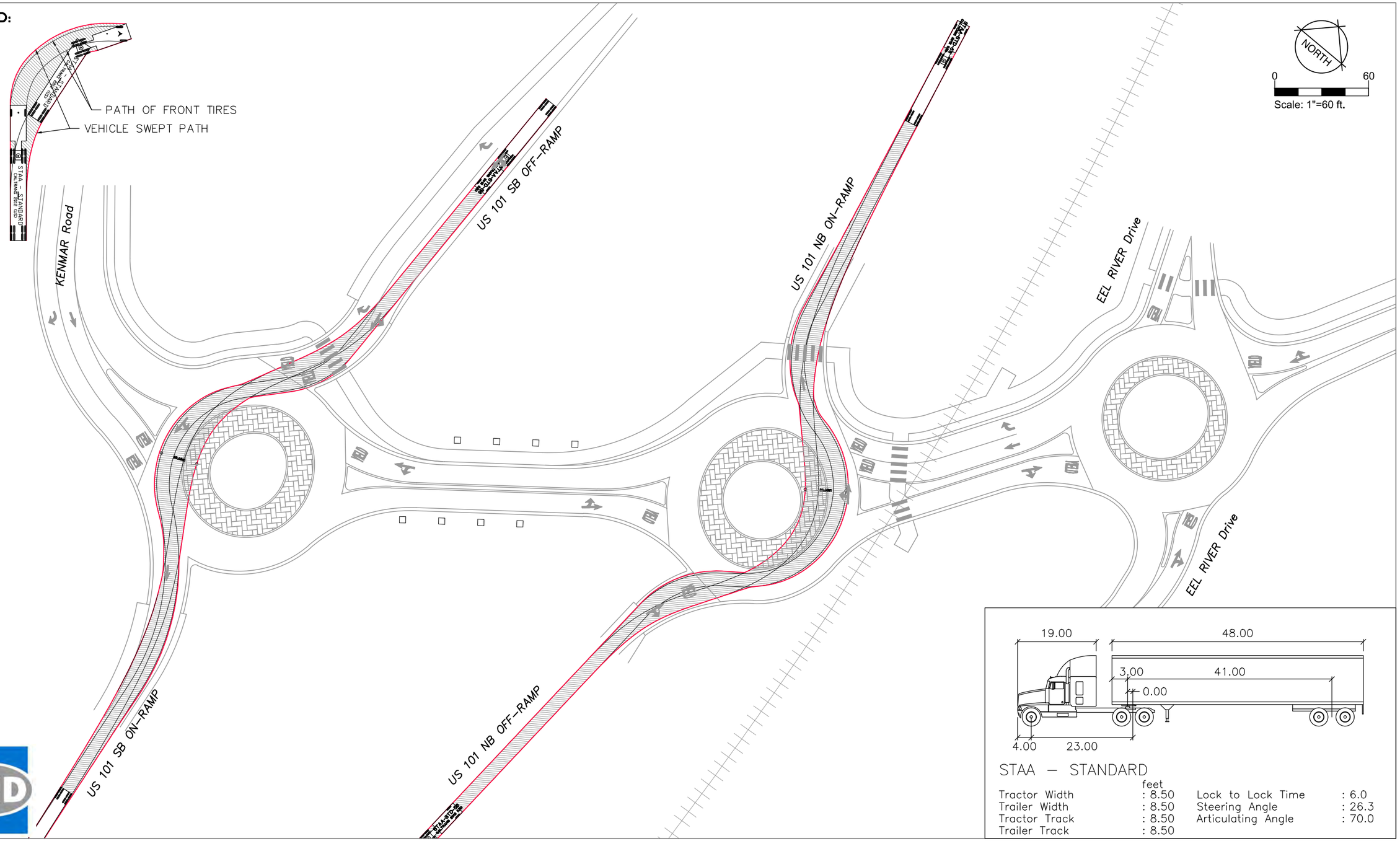
KENMAR Rd. Opt. 1a STAA (THROUGH MOVEMENT ONLY)

LEGEND:

PATH OF FRONT TIRES

VEHICLE SWEPT PATH



STAA – STANDARD

	feet		
Tractor Width	: 8.50	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 26.3
Tractor Track	: 8.50	Articulating Angle	: 70.0
Trailer Track	: 8.50		

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US 101/RIVERWALK AREA CONNECTIVITY PROJECT Figure B4

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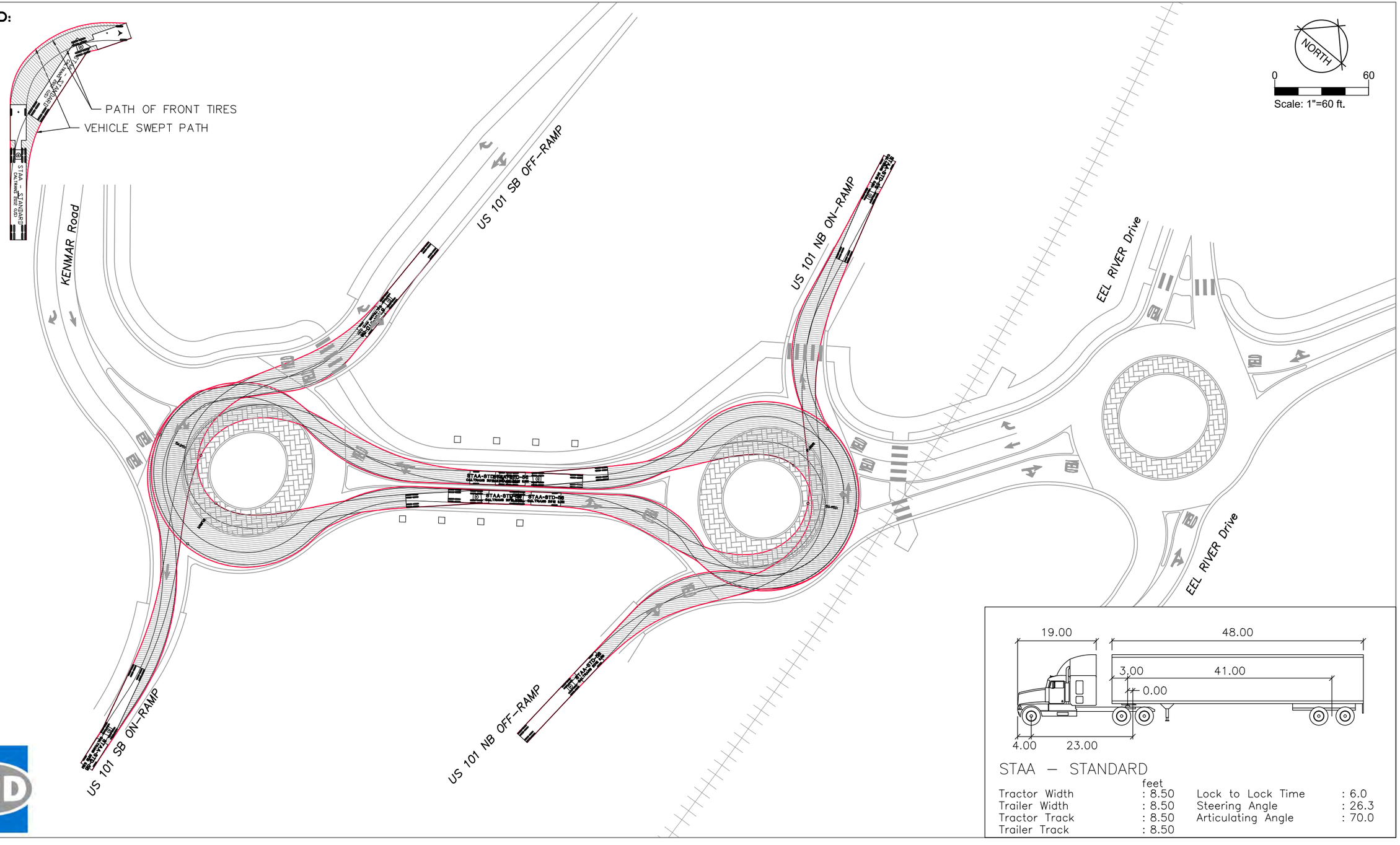
KENMAR Rd. Opt. 1a STAA (LEFT-TURN MOVEMENT ONLY)

LEGEND:

PATH OF FRONT TIRES

VEHICLE SWEPT PATH



STAA – STANDARD

	feet		
Tractor Width	: 8.50	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 26.3
Tractor Track	: 8.50	Articulating Angle	: 70.0
Trailer Track	: 8.50		

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US 101/RIVERWALK AREA CONNECTIVITY PROJECT

Figure B5

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KENMAR Rd. Opt. 1a STAA (RIGHT-TURN MOVEMENT ONLY)

LEGEND:

PATH OF FRONT TIRES

VEHICLE SWEPT PATH

KENMAR Road

US 101 SB OFF-RAMP

US 101 NB ON-RAMP

EEL RIVER Drive

EEL RIVER Drive

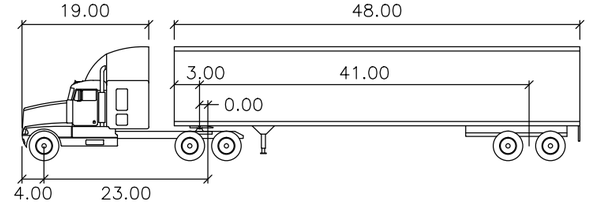
US 101 SB ON-RAMP

US 101 NB OFF-RAMP

NORTH

0 60

Scale: 1"=60 ft.



STAA – STANDARD

	feet		
Tractor Width	: 8.50	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 26.3
Tractor Track	: 8.50	Articulating Angle	: 70.0
Trailer Track	: 8.50		

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US 101/RIVERWALK AREA CONNECTIVITY PROJECT Figure B6

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KENMAR Rd. Opt. 1a CA LEGAL (THROUGH MOVEMENT ONLY)

LEGEND:

PATH OF FRONT TIRES

VEHICLE SWEPT PATH

KENMAR Road

US 101 SB OFF-RAMP

US 101 NB ON-RAMP

EEL RIVER Drive

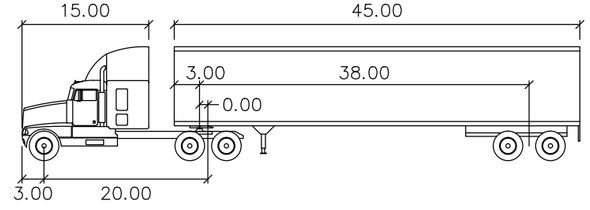
US 101 SB ON-RAMP

US 101 NB OFF-RAMP

NORTH

0 60

Scale: 1"= 60 ft.



CA LEGAL – 65 FT

	feet		
Tractor Width	: 8.50	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 26.3
Tractor Track	: 8.50	Articulating Angle	: 70.0
Trailer Track	: 8.50		

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US 101/RIVERWALK AREA CONNECTIVITY PROJECT Figure B7

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KENMAR Rd. Opt. 1a CA LEGAL (LEFT-TURN MOVEMENT ONLY)

LEGEND:

PATH OF FRONT TIRES

VEHICLE SWEPT PATH

NORTH

0 60

Scale: 1"= 60 ft.

KENMAR Road

US 101 SB OFF-RAMP

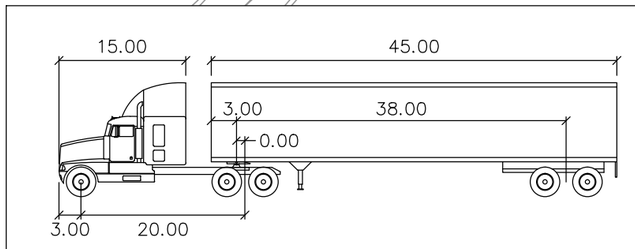
US 101 NB ON-RAMP

EEL RIVER Drive

EEL RIVER Drive

US 101 SB ON-RAMP

US 101 NB OFF-RAMP



CA LEGAL – 65 FT

	feet		
Tractor Width	: 8.50	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 26.3
Tractor Track	: 8.50	Articulating Angle	: 70.0
Trailer Track	: 8.50		

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US 101/RIVERWALK AREA CONNECTIVITY PROJECT Figure B8

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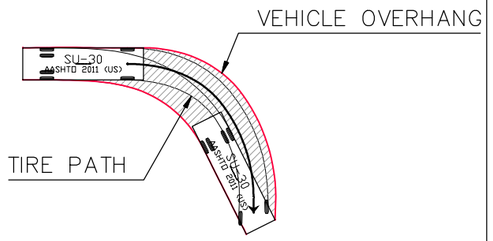
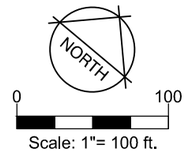
KENMAR Rd. Opt. 1a DELIVERY (RIGHT-TURN MOVEMENT ONLY)

LEGEND:





KENMAR Road

US 101 SB OFF-RAMP

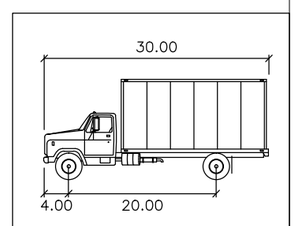
US 101 NB ON-RAMP

EEL RIVER Drive

EEL RIVER Drive

US 101 SB ON-RAMP

US 101 NB OFF-RAMP



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US 101/RIVERWALK AREA CONNECTIVITY PROJECT **Figure B9**

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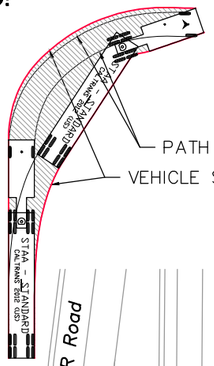
KENMAR Rd. Opt. 1a STAA (THROUGH MOVEMENT ONLY)

LEGEND:

PATH OF FRONT TIRES

VEHICLE SWEPT PATH



STAA – STANDARD

	feet		
Tractor Width	: 8.50	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 26.3
Tractor Track	: 8.50	Articulating Angle	: 70.0
Trailer Track	: 8.50		

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US 101/RIVERWALK AREA CONNECTIVITY PROJECT **Figure B10**

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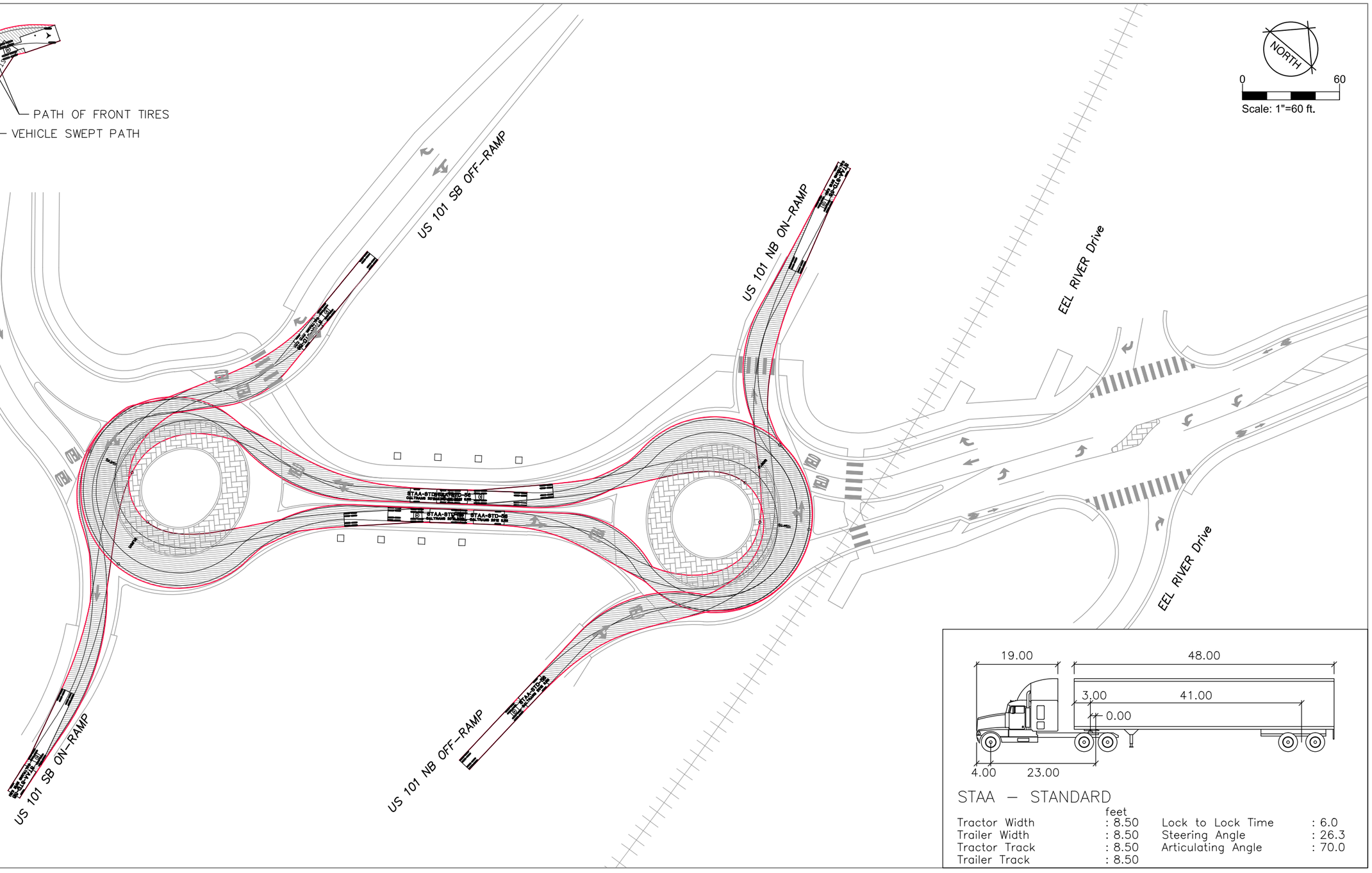
KENMAR Rd. Opt. 1a STAA (LEFT-TURN MOVEMENT ONLY)

LEGEND:

PATH OF FRONT TIRES

VEHICLE SWEPT PATH



STAA – STANDARD

	feet		
Tractor Width	: 8.50	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 26.3
Tractor Track	: 8.50	Articulating Angle	: 70.0
Trailer Track	: 8.50		

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US 101/RIVERWALK AREA CONNECTIVITY PROJECT **Figure B11**

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2132EX007.dwg

KENMAR Rd. Opt. 1a STAA (RIGHT-TURN MOVEMENT ONLY)

LEGEND:

PATH OF FRONT TIRES

VEHICLE SWEPT PATH

KENMAR Road

US 101 SB OFF-RAMP

US 101 NB ON-RAMP

EEL RIVER Drive

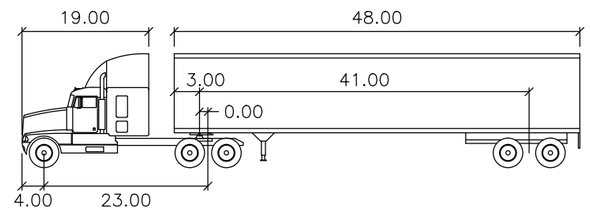
US 101 SB ON-RAMP

US 101 NB OFF-RAMP

NORTH

0 60

Scale: 1"=60 ft.



STAA – STANDARD

	feet		
Tractor Width	: 8.50	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 26.3
Tractor Track	: 8.50	Articulating Angle	: 70.0
Trailer Track	: 8.50		

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US 101/RIVERWALK AREA CONNECTIVITY PROJECT **Figure B12**

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KENMAR Rd. Opt. 1a CA LEGAL (THROUGH MOVEMENT ONLY)

LEGEND:

PATH OF FRONT TIRES

VEHICLE SWEPT PATH

KENMAR Road

US 101 SB OFF-RAMP

US 101 NB ON-RAMP

EEL RIVER Drive

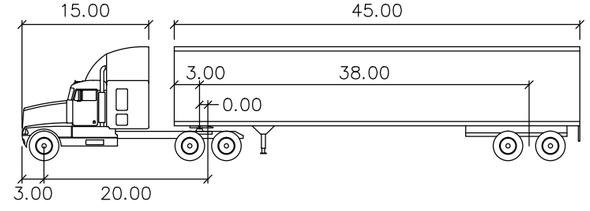
US 101 SB ON-RAMP

US 101 NB OFF-RAMP

NORTH

0 60

Scale: 1"=60 ft.



CA LEGAL – 65 FT

	feet		
Tractor Width	: 8.50	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 26.3
Tractor Track	: 8.50	Articulating Angle	: 70.0
Trailer Track	: 8.50		

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US 101/RIVERWALK AREA CONNECTIVITY PROJECT **Figure B13**

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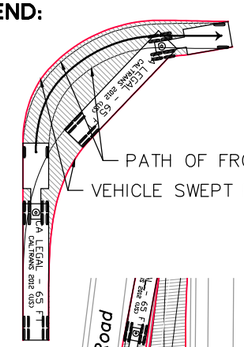
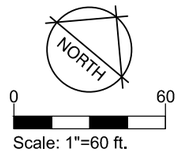
August 26, 2016
2132EX007.dwg

KENMAR Rd. Opt. 1a CA LEGAL (LEFT-TURN MOVEMENT ONLY)

LEGEND:





KENMAR Road

US 101 SB OFF-RAMP

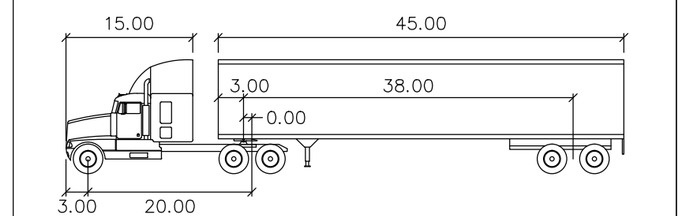
US 101 NB ON-RAMP

EEL RIVER Drive

EEL RIVER Drive

US 101 SB ON-RAMP

US 101 NB OFF-RAMP



CA LEGAL – 65 FT

	feet		
Tractor Width	: 8.50	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 26.3
Tractor Track	: 8.50	Articulating Angle	: 70.0
Trailer Track	: 8.50		

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GHD

US 101/RIVERWALK AREA CONNECTIVITY PROJECT **Figure B14**

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August 26, 2016
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KENMAR Rd. Opt. 1a CA LEGAL (RIGHT-TURN MOVEMENT ONLY)

LEGEND:

PATH OF FRONT TIRES

VEHICLE SWEPT PATH

KENMAR Road

US 101 SB OFF-RAMP

US 101 SB ON-RAMP

US 101 NB ON-RAMP

US 101 NB OFF-RAMP

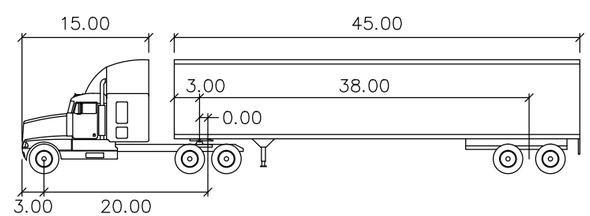
EEL RIVER Drive

EEL RIVER Drive

NORTH

0 60

Scale: 1"=60 ft.



CA LEGAL – 65 FT

	feet		
Tractor Width	: 8.50	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 26.3
Tractor Track	: 8.50	Articulating Angle	: 70.0
Trailer Track	: 8.50		

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US 101/RIVERWALK AREA CONNECTIVITY PROJECT **Figure B15**

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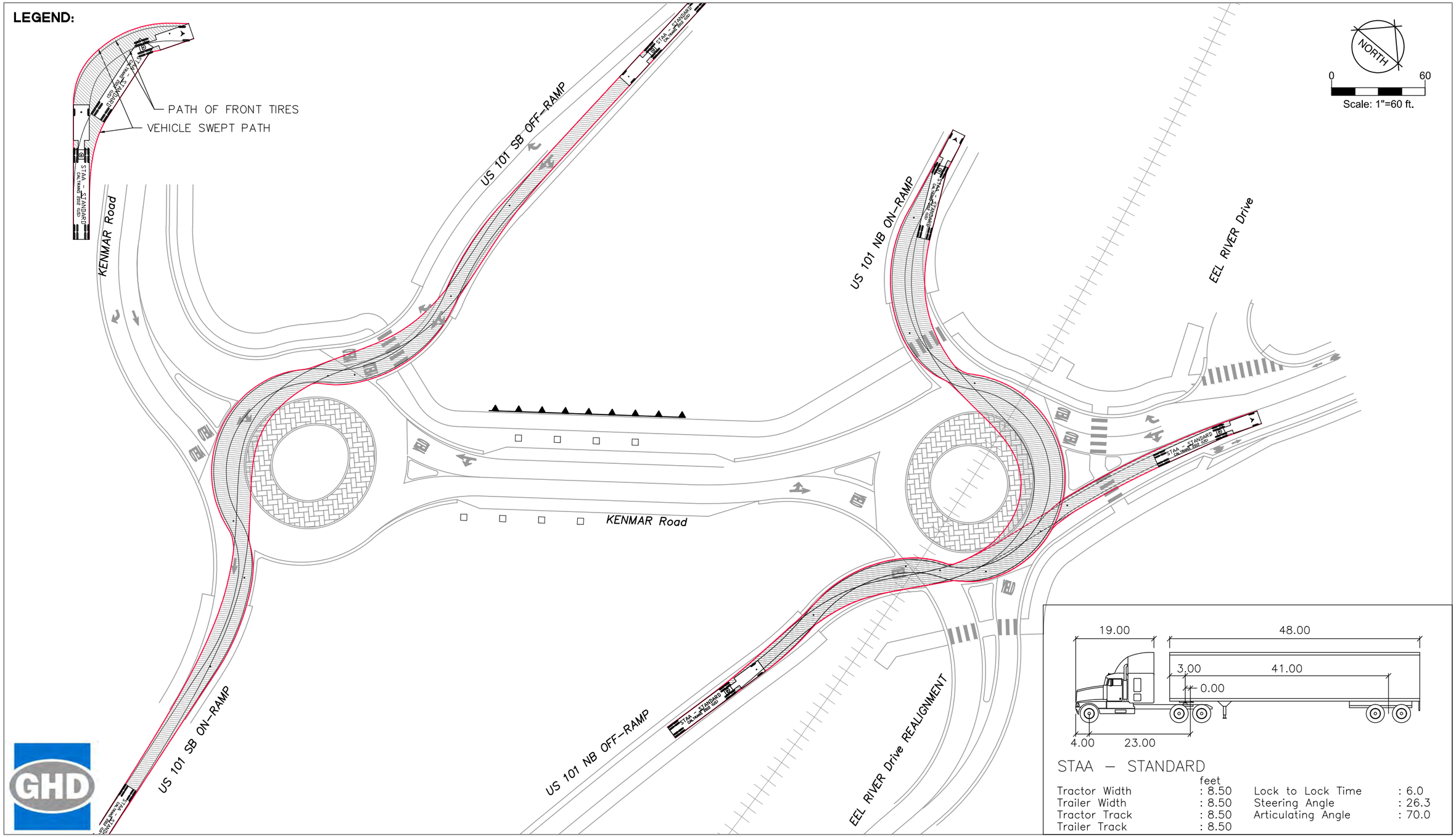
2132EX007.dwg

KENMAR Rd. Opt. 2 STAA (THROUGH MOVEMENT ONLY)



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US 101/RIVERWALK AREA CONNECTIVITY PROJECT **Figure B16**

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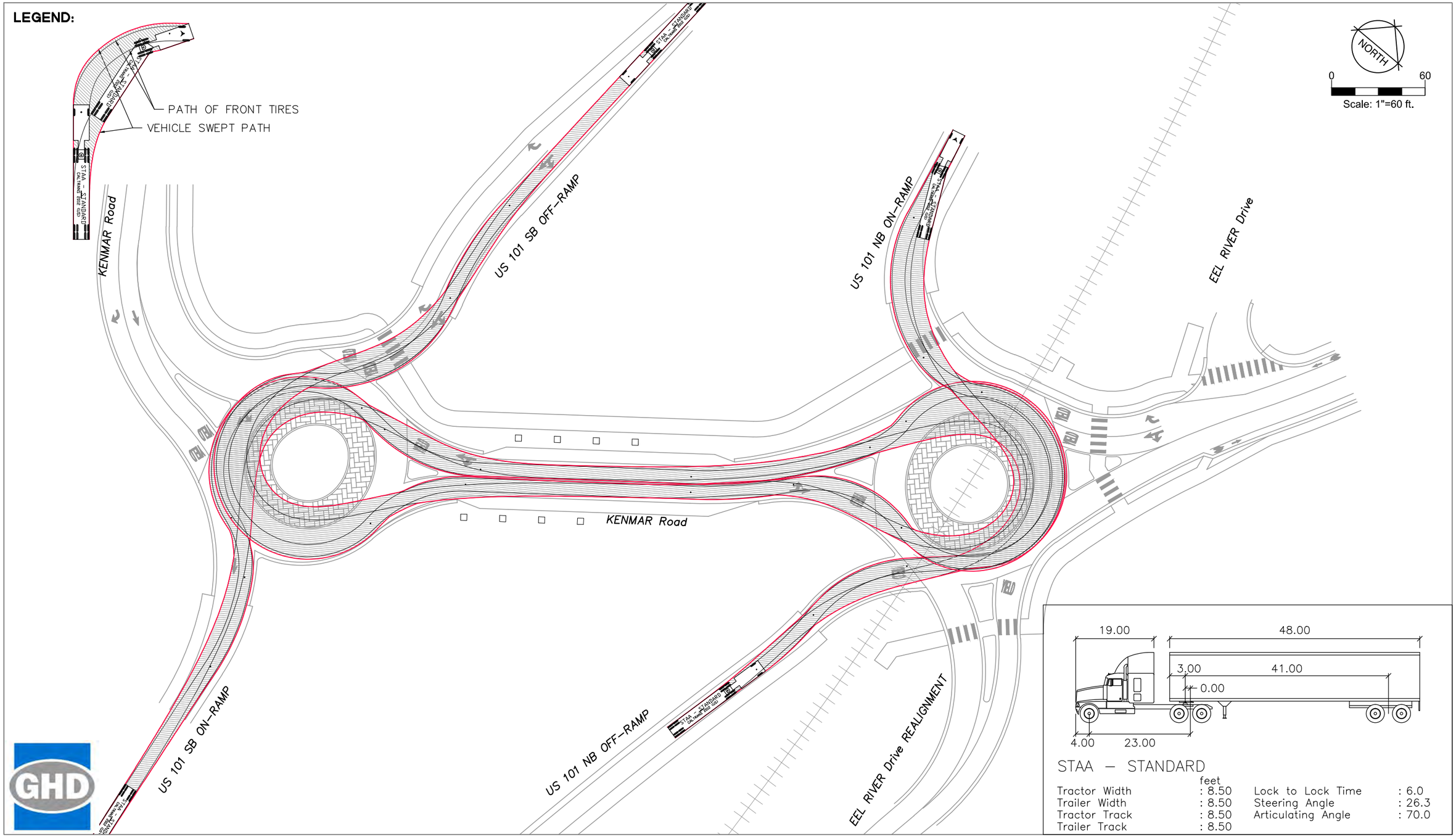
August 26, 2016
2132EX003.dwg

KENMAR Rd. Opt. 2 STAA (LEFT-TURN MOVEMENT ONLY)



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US 101/RIVERWALK AREA CONNECTIVITY PROJECT **Figure B17**

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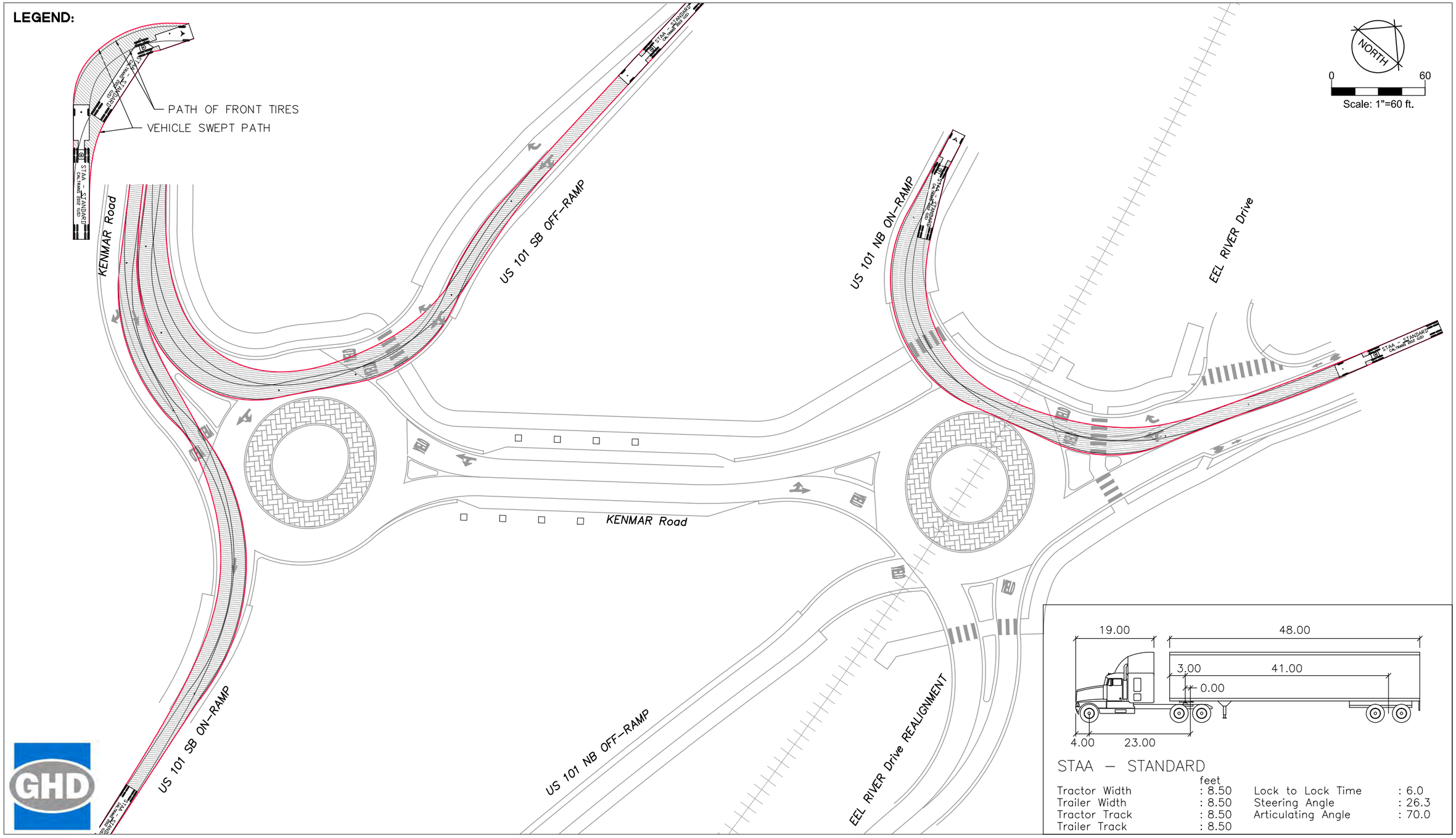
KENMAR Rd. Opt. 2 STAA (RIGHT-TURN MOVEMENT ONLY)



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US 101/RIVERWALK AREA CONNECTIVITY PROJECT Figure B18

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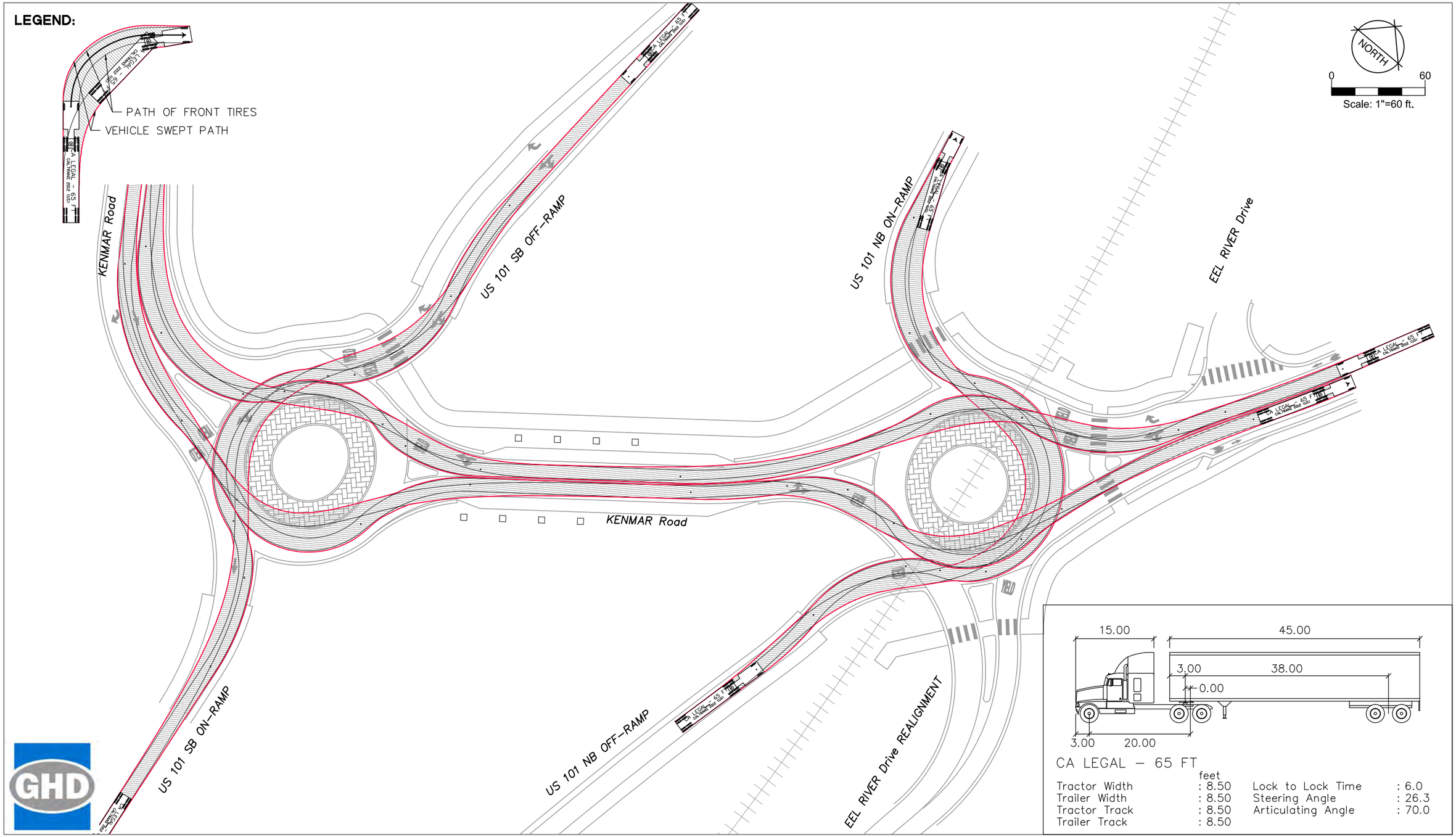
KENMAR Rd. Opt. 2 CA LEGAL (THROUGH MOVEMENT ONLY)



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US 101/RIVERWALK AREA CONNECTIVITY PROJECT **Figure B19**

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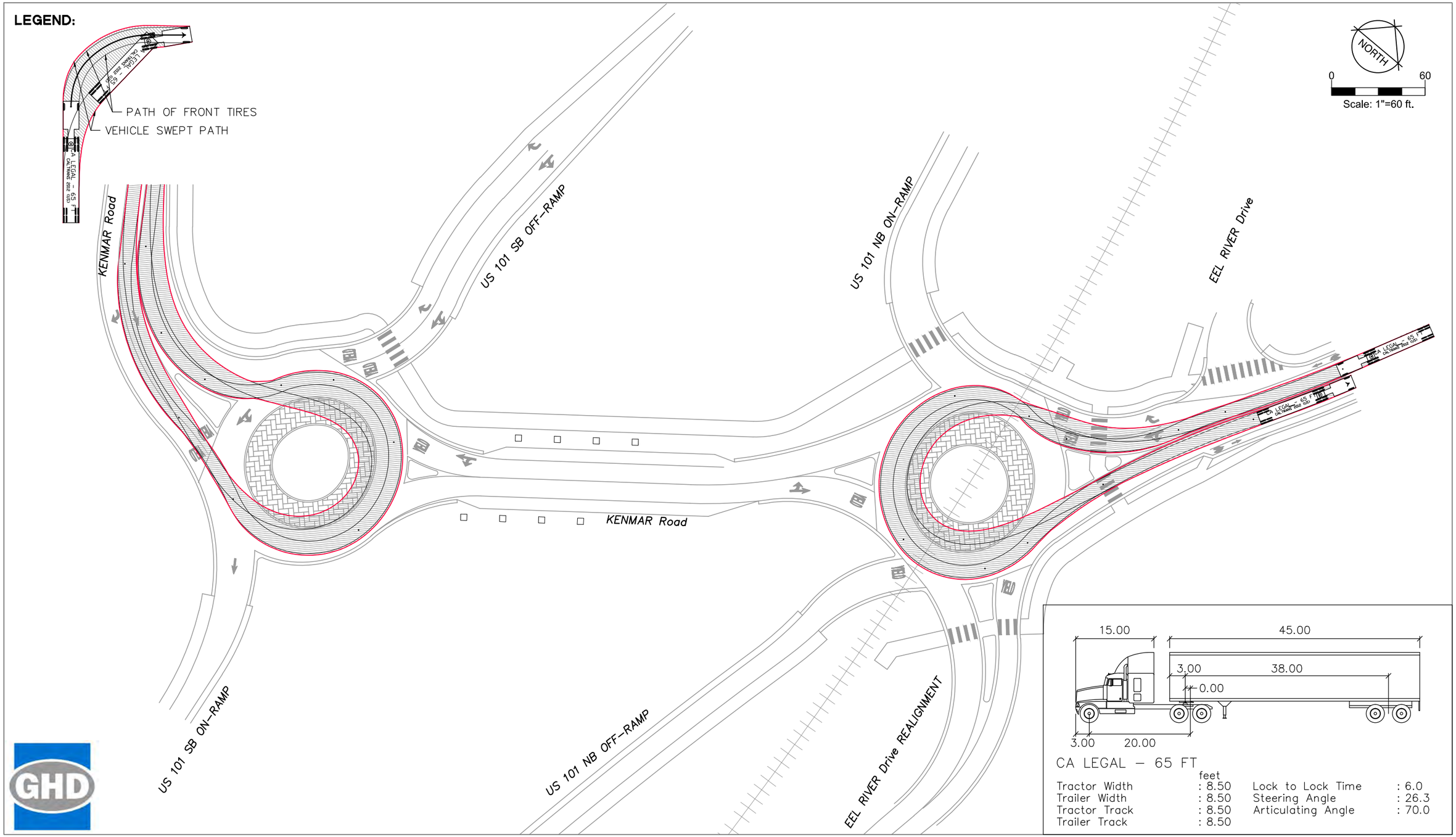
KENMAR Rd. Opt. 2 CA LEGAL (LEFT-TURN MOVEMENT ONLY)



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US 101/RIVERWALK AREA CONNECTIVITY PROJECT

Figure B20

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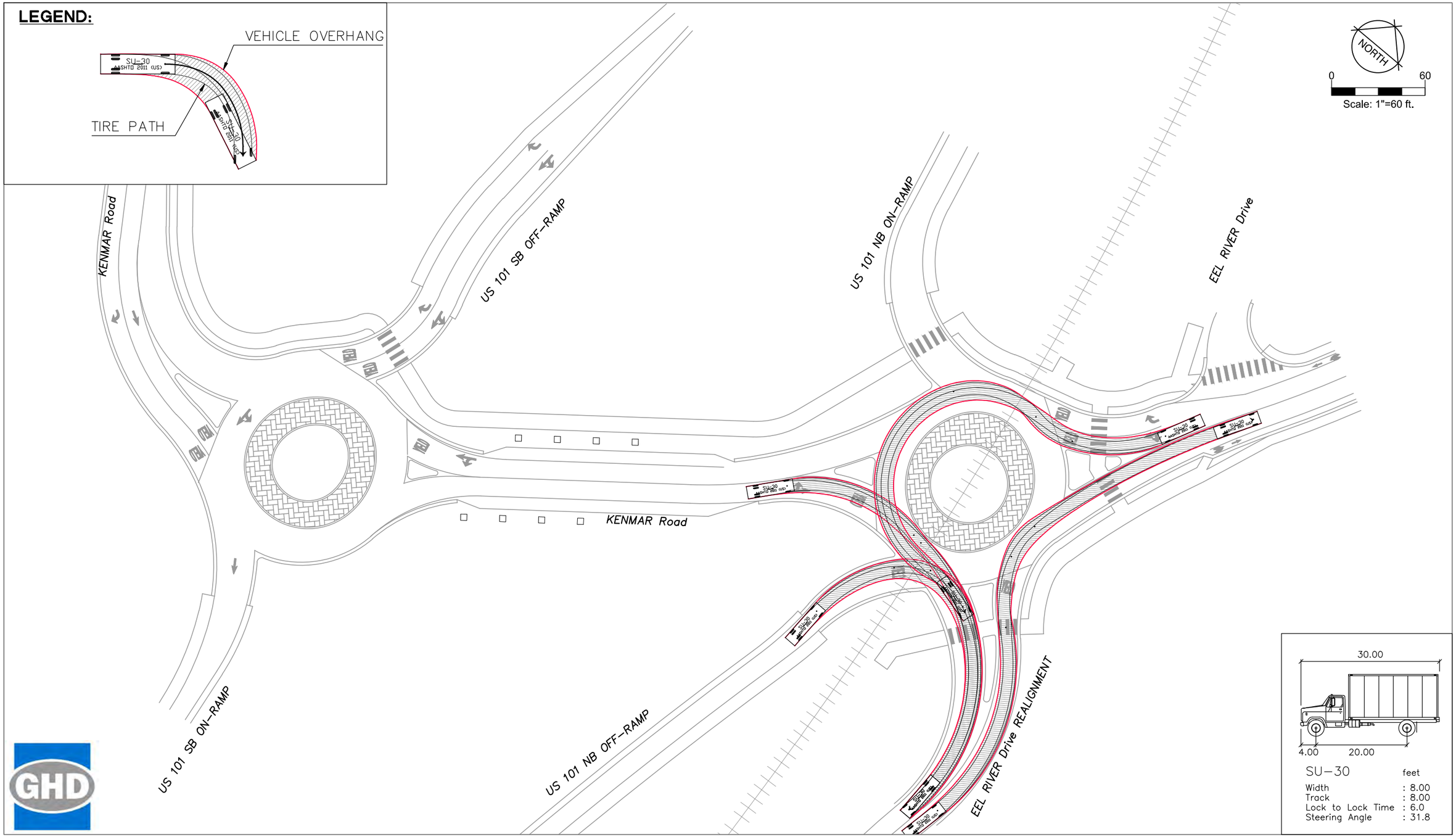
KENMAR Rd. Opt. 2 DELIVERY TRUCK (EEL RIVER Drive ONLY)



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US 101/RIVERWALK AREA CONNECTIVITY PROJECT **Figure B21**

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Attachment F - Fast Path Exhibits

KENMAR Road Opt. 1a FASTEST PATH

FASTEST PATH RADIUS (FT)

MOVEMENT	Northbound SB ON-RAMP (N#)	SOUTHBOUND SB OFF-RAMP (S#)	EASTBOUND KENMAR ROAD (E#)	WESTBOUND KENMAR ROAD (W#)
ENTERING (R1)		257.8	131.7	154.5
CIRCULATING (R2)		52.0	46.9	111.1
EXITING (R3)		219.3	237.6	69.8
LEFT TURN (R4)		46.0		51.8
RIGHT TURN (R5)		119.0	110.5	

FASTEST PATH SPEED (MPH)

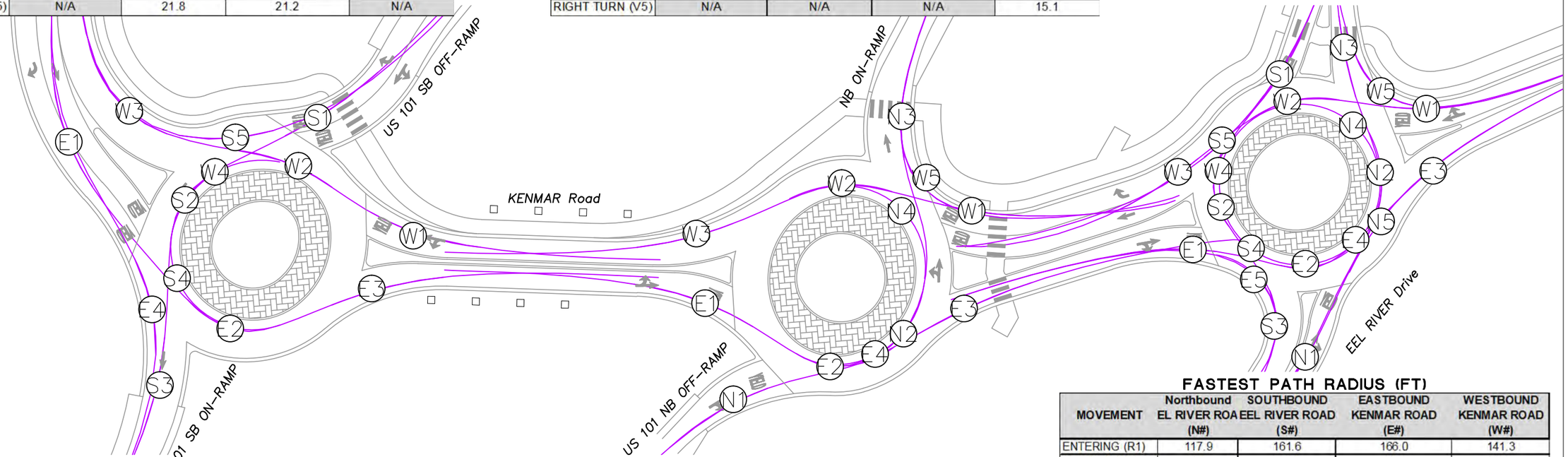
MOVEMENT	Northbound SB ON-RAMP (N#)	Southbound SB OFF-RAMP (S#)	Eastbound KENMAR ROAD (E#)	Westbound KENMAR ROAD (W#)
ENTERING (V1)	N/A	29.4	22.7	24.1
CIRCULATING (V2	N/A	14.8	14.2	19.5
EXITING (V3)	N/A	27.6	28.4	17.7
LEFT TURN (V4)	N/A	14.1	N/A	14.8
RIGHT TURN (V5)	N/A	21.8	21.2	N/A

FASTEST PATH RADIUS (FT)

MOVEMENT	Northbound NB OFF-RAMP (N#)	SOUTHBOUND NB ON-RAMP (S#)	EASTBOUND KENMAR ROAD (E#)	WESTBOUND KENMAR ROAD (W#)
ENTERING (R1)	163.0		168.7	219.8
CIRCULATING (R2	55.5		48.0	74.6
EXITING (R3)	120.4		305.7	211.0
LEFT TURN (R4)	45.3		50.2	
RIGHT TURN (R5)				45.9

FASTEST PATH SPEED (MPH)

MOVEMENT	Northbound NB OFF-RAMP (N#)	Southbound NB ON-RAMP (S#)	Eastbound KENMAR ROAD (E#)	Westbound KENMAR ROAD (W#)
ENTERING (V1)	24.6	N/A	24.9	27.6
CIRCULATING (V2	15.1	N/A	14.3	16.9
EXITING (V3)	21.9	N/A	29.1	27.2
LEFT TURN (V4)	14.0	N/A	14.6	N/A
RIGHT TURN (V5)	N/A	N/A	N/A	15.1



FASTEST PATH RADIUS (FT)

MOVEMENT	Northbound EL RIVER ROA (N#)	SOUTHBOUND EEL RIVER ROAD (S#)	EASTBOUND KENMAR ROAD (E#)	WESTBOUND KENMAR ROAD (W#)
ENTERING (R1)	117.9	161.6	166.0	141.3
CIRCULATING (R2	59.1	37.4	44.2	63.2
EXITING (R3)	283.1	48.7	247.1	223.0
LEFT TURN (R4)	45.0	45.0	45.0	45.0
RIGHT TURN (R5)	161.6	156.9	40.1	41.9

FASTEST PATH SPEED (MPH)

MOVEMENT	Northbound EEL RIVER ROAD (N#)	Southbound EEL RIVER ROAD (S#)	Eastbound KENMAR ROAD (E#)	Westbound KENMAR ROAD (W#)
ENTERING (V1)	21.7	24.5	24.8	23.3
CIRCULATING (V2	15.5	13.1	13.9	15.9
EXITING (V3)	29.6	15.4	28.9	27.8
LEFT TURN (V4)	14.0	14.0	14.0	14.0
RIGHT TURN (V5)	24.5	24.2	14.3	14.6

NOTES:

1. EXITING SPEEDS ARE DIRECTLY CORRELATED TO CIRCULATING SPEEDS AND DERIVED AS FOLLOWS:

   R3 SPEED = (R2 SPEED) + (ACCELERATION RATE X DISTANCE TO EXIT LEG CROSSWALK)

2. N/A=FASTEST PATH SPEED DOES NOT EXIST FOR THIS APPROACH
3. 2% CROSS SLOPE ASSUMED FOR DETERMINING FASTEST PATH

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US 101/RIVERWALK AREA CONNECTIVITY PROJECT Figure C1

Fortuna, California

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KENMAR Road Opt. 1b FASTEST PATH

FASTEST PATH RADIUS (FT)

MOVEMENT	Northbound SB ON-RAMP (N#)	SOUTHBOUND SB OFF-RAMP (S#)	EASTBOUND KENMAR ROAD (E#)	WESTBOUND KENMAR ROAD (W#)
ENTERING (R1)		257.0	131.7	124.0
CIRCULATING (R2)		50.8	45.6	112.8
EXITING (R3)		210.7	233.5	69.3
LEFT TURN (R4)		46.0		52.8
RIGHT TURN (R5)		119.0	135.0	

FASTEST PATH SPEED (MPH)

MOVEMENT	Northbound SB ON-RAMP (N#)	Southbound SB OFF-RAMP (S#)	Eastbound KENMAR ROAD (E#)	Westbound KENMAR ROAD (W#)
ENTERING (V1)	N/A	29.3	22.7	22.1
CIRCULATING (V2)	N/A	14.6	14.1	19.6
EXITING (V3)	N/A	27.2	28.3	17.7
LEFT TURN (V4)	N/A	14.1	N/A	14.9
RIGHT TURN (V5)	N/A	21.8	22.9	N/A

FASTEST PATH RADIUS (FT)

MOVEMENT	Northbound NB OFF-RAMP (N#)	SOUTHBOUND NB ON-RAMP (S#)	EASTBOUND KENMAR ROAD (E#)	WESTBOUND KENMAR ROAD (W#)
ENTERING (R1)	163.0		168.7	219.8
CIRCULATING (R2)	55.5		48.0	74.6
EXITING (R3)	120.4		566.0	211.0
LEFT TURN (R4)	45.3		50.2	
RIGHT TURN (R5)				47.4

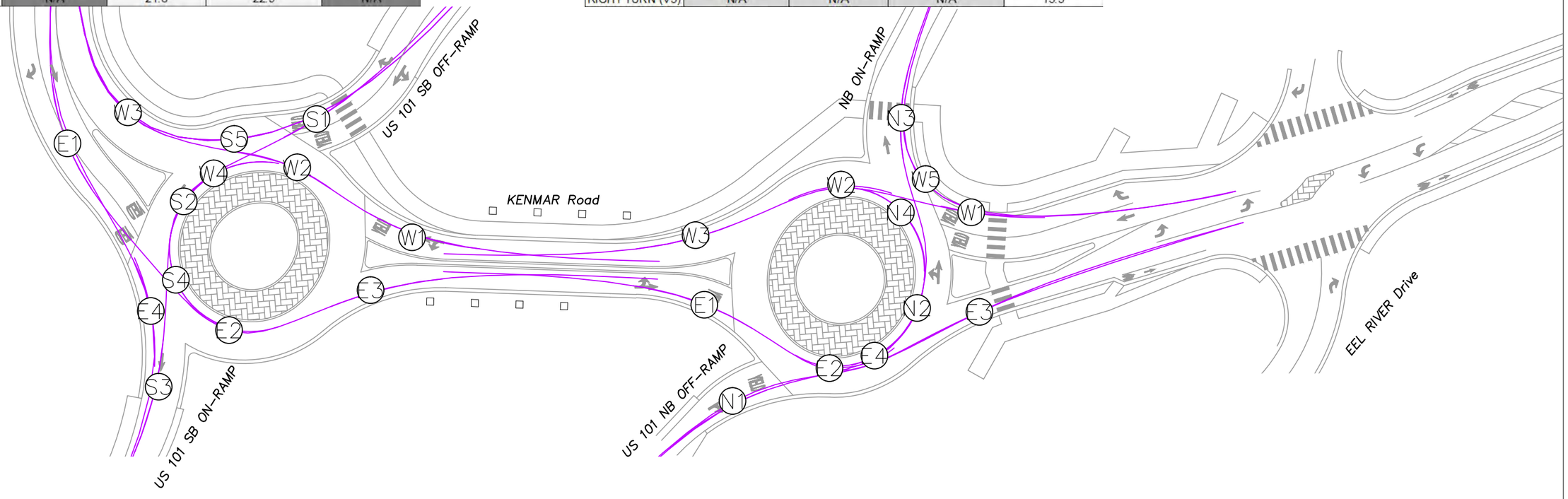
FASTEST PATH SPEED (MPH)

MOVEMENT	Northbound NB OFF-RAMP (N#)	Southbound NB ON-RAMP (S#)	Eastbound KENMAR ROAD (E#)	Westbound KENMAR ROAD (W#)
ENTERING (V1)	24.6	N/A	24.9	27.6
CIRCULATING (V2)	15.1	N/A	14.3	16.9
EXITING (V3)	21.9	N/A	29.1	27.2
LEFT TURN (V4)	14.0	N/A	14.6	N/A
RIGHT TURN (V5)	N/A	N/A	N/A	15.3

NORTH

0 60

Scale: 1"=60 ft.



NOTES:

1. EXITING SPEEDS ARE DIRECTLY CORRELATED TO CIRCULATING SPEEDS AND DERIVED AS FOLLOWS:

   R3 SPEED = (R2 SPEED) + (ACCELERATION RATE X DISTANCE TO EXIT LEG CROSSWALK)

2. N/A=FASTEST PATH SPEED DOES NOT EXIST FOR THIS APPROACH
3. 2% CROSS SLOPE ASSUMED FOR DETERMINING FASTEST PATH

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US 101/RIVERWALK AREA CONNECTIVITY PROJECT Figure C2

Fortuna, California

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KENMAR Road Opt. 2 FASTEST PATH

FASTEST PATH RADIUS (FT)

MOVEMENT	Northbound SB ON-RAMP (N#)	SOUTHBOUND SB OFF-RAMP (S#)	EASTBOUND KENMAR ROAD (E#)	WESTBOUND KENMAR ROAD (W#)
ENTERING (R1)		197.4	131.7	131.3
CIRCULATING (R2)		54.9	45.6	119.9
EXITING (R3)		239.1	233.5	64.7
LEFT TURN (R4)		46.0		51.9
RIGHT TURN (R5)		91.9	133.2	

FASTEST PATH SPEED (MPH)

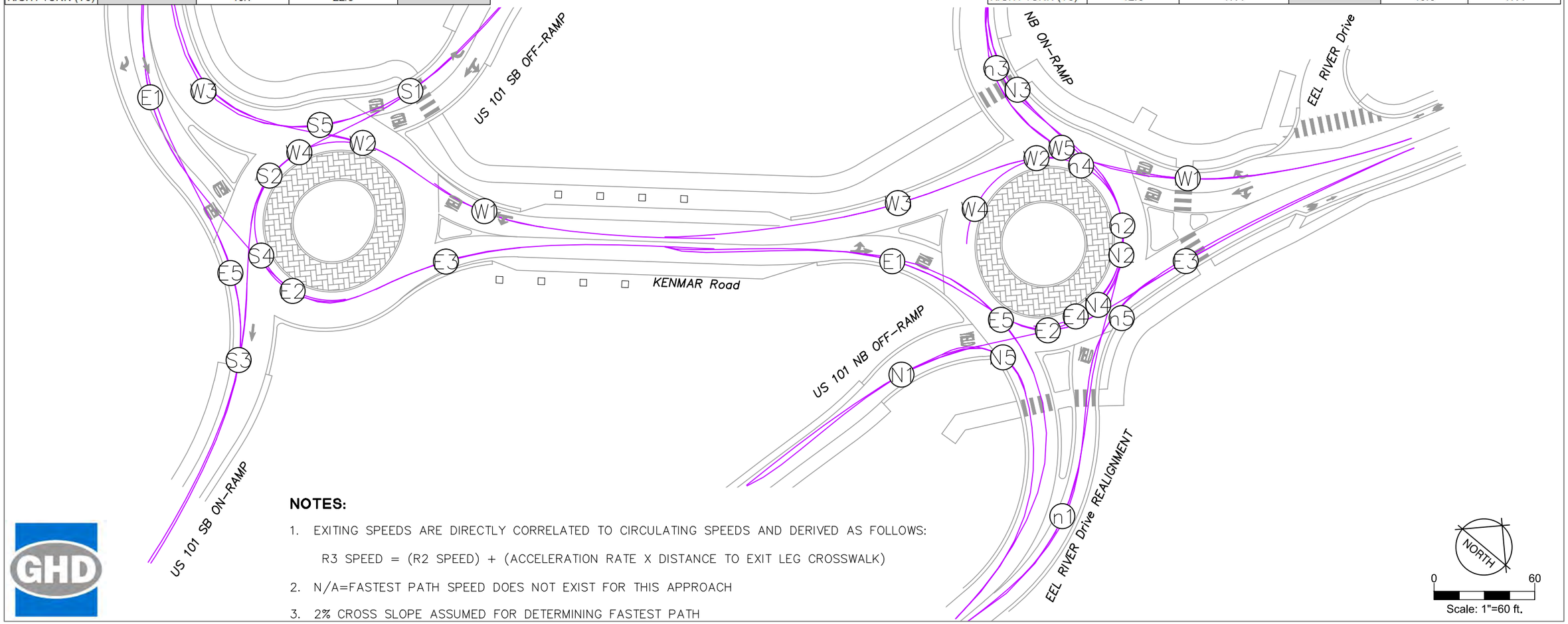
MOVEMENT	Northbound SB ON-RAMP (N#)	Southbound SB OFF-RAMP (S#)	Eastbound KENMAR ROAD (E#)	Westbound KENMAR ROAD (W#)
ENTERING (V1)		26.5	22.7	22.6
CIRCULATING (V2)		15.1	14.1	20.1
EXITING (V3)		28.5	28.3	17.2
LEFT TURN (V4)		14.1		14.8
RIGHT TURN (V5)		19.7	22.8	

FASTEST PATH RADIUS (FT)

MOVEMENT	NORTHBOUND NB OFF-RAMP (N#)	ORTHWESTBOUN EEL RIVER DRIVE (n#)	SOUTHBOUND NB ON-RAMP (S#)	EASTBOUND KENMAR ROAD (E#)	WESTBOUND KENMAR ROAD (W#)
ENTERING (R1)	164.0	127.6		153.0	195.5
CIRCULATING (R2)	63.2	63.2		50.5	98.1
EXITING (R3)	68.1	79.5		1000.0	381.5
LEFT TURN (R4)	53.2	63.7		49.4	53.0
RIGHT TURN (R5)	33.4	81.6		112.0	81.1

FASTEST PATH SPEED (MPH)

MOVEMENT	NORTHBOUND NB OFF-RAMP (N#)	NORTHWESTBOUND EEL RIVER DRIVE (n#)	Southbound NB ON-RAMP (S#)	Eastbound KENMAR ROAD (E#)	Westbound KENMAR ROAD (W#)
ENTERING (V1)	24.7	22.4		24.0	26.4
CIRCULATING (V2)	15.9	15.9		14.6	18.7
EXITING (V3)	17.6	18.6		29.2	31.4
LEFT TURN (V4)	14.9	15.9		14.5	14.9
RIGHT TURN (V5)	12.6	17.4		19.6	17.4



NOTES:

1. EXITING SPEEDS ARE DIRECTLY CORRELATED TO CIRCULATING SPEEDS AND DERIVED AS FOLLOWS:
   R3 SPEED = (R2 SPEED) + (ACCELERATION RATE X DISTANCE TO EXIT LEG CROSSWALK)
2. N/A=FASTEST PATH SPEED DOES NOT EXIST FOR THIS APPROACH
3. 2% CROSS SLOPE ASSUMED FOR DETERMINING FASTEST PATH

NORTH

0 60

Scale: 1"=60 ft.

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US 101/RIVERWALK AREA CONNECTIVITY PROJECT Figure C3

Fortuna, California

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August 26, 2016
2132EX003.dwg

Attachment G - Preliminary Structures Analysis

Morrison Structures
1890 Park Marina Drive, Ste 104
Redding, CA 96001

Structure Memorandum

From: Bob Morrison, Jr., S.E., Morrison Structures, Redding, California

To: Josh Wolf, P.E, GHD, Eureka, California

Date: September 15, 2016

Re: Highway 101 Fortuna Downtown and Riverwalk Area Complete Streets and Connectivity Planning Study
U.S. 101/Kenmar Road Undercrossing
HUM-101-59.50

General

The purpose of this memorandum is to provide structure information for the proposed alternatives for the Fortuna-Kenmar Road Undercrossing Interchange Improvements. The level of study we have conducted is a Project Study Report-Project Development Support (PSR-PDS) Cost Estimate. The purpose of our study was to determine preliminary scope, feasibility, rough cost range, and a list of potential project risks for the proposed structures work.

The Route U.S. 101 spans over Kenmar Road on a bridge (Kenmar Road Undercrossing, Br. No. 04-0128) at the interchange. The bridge is skewed approximately 34 degrees to the right and is a 3-span, 133-foot-long, concrete tee-beam structure, with a span arrangement of 34, 64, and 34 feet. The structure was constructed in 1962. End supports are diaphragm abutments on concrete pile foundations, and intermediate supports are 4-column bents on concrete pile foundations. The structure is in good condition with sufficiency rating equal to 98 and health index equal to 100. Kenmar Road currently passes under the 65 foot main span with a 14-foot 10-inch vertical clearance. The 40-foot-width of Kenmar Road currently accommodates two 12 foot travel lanes and two 8-foot shoulders. There are no sidewalks along either side of Kenmar Road.

Kenmar Road Undercrossing Looking West

Alternative 1 – Signal Concept for Kenmar Corridor (*Replace Kenmar Road Undercrossing at US 101/Kenmar Road Interchange*)

The proposed Alternative 1 improvement intends to add traffic signals and improve Kenmar Road in the City of Fortuna by widening the roadway, maintain profile grade, and adding a pedestrian sidewalk along the north side of the roadway. The widening would accommodate five 12-foot traffic-lanes, 5-foot shoulders each side of the roadway and a 7-foot-wide sidewalk along the north side of the road. The overall width of Kenmar Road improvement is approximately 77 feet including the sidewalk. In order to provide for widening and improving Kenmar Road to this extent, it will be necessary to replace the existing 3-span undercrossing. The existing bridge is in fair condition, however its' main span is insufficient dimension to accommodate the Kenmore Road improvements.

Based on the conditions at the site and the interchange geometrics, the new undercrossing will be a single-span, approximately 114 feet in length. The most economical structure type will likely be a precast, prestressed, concrete girder structure with a 6-foot structure depth. Supports would be high-cantilever wall type abutments founded on concrete piling. An increase in elevation of U.S. 101 on the order of 2 feet will be necessary to allow for a minimum 15 feet vertical clear distance from the bottom of soffit to Kenmar Road. The undercrossing will be designed to accommodate a Type 742 concrete left barrier, a minimum 10-foot left shoulder, two 12-foot lanes of southbound traffic, 5-foot southbound median shoulder, a Type 60 median barrier, a 5-foot northbound median shoulder, two 12-foot lanes northbound traffic, a 10-foot right shoulder, and a Type 742 concrete right barrier. Falsework is not necessary to erect this type of girder structure.

The new undercrossing can be constructed in two phases. The initial phase would likely be to remove and construct approximately the west half of the new bridge, while U.S. 101 traffic utilizes the east half of the existing bridge. The final phase would be to reroute U.S. 101 traffic to the new west half and remove and construct the east half of the new structure and a 3-foot wide deck closure pour. The anticipated structure cost is $4,700,000 not including costs for mobilization or contingencies. Bridge removal costs represent $180,000 of this figure.

Alternative 2 –Kenmar Road Interchange Roundabout Concepts Option 2 (*Add Retaining Wall at US 101/Kenmar Road Interchange for new Multi-use Path*)

The proposed Alternative 2 intends to construct a permanent retaining wall parallel to and in front of the north abutment of the existing Kenmar Road Undercrossing (Abutment 4) and to add traffic roundabouts each side of the interchange on Kenmar Road. The retaining wall in front of the abutment is to accommodate a 10-foot-wide pedestrian/bicycle facility under the structure. The total length of proposed wall will be approximately 180 feet.

The proposed wall layout line is 15 feet from the face of the existing columns; however, the layout line could be located as close as 10 feet from the face of existing columns. We considered using a Caltrans Type 7 retaining wall for the proposed structure for the layout line 10 feet from the existing columns and the excavation for a Type 7 wall would likely be outside the influence zone of the Abutment 1 diaphragm. If the wall layout line is located more than 10 feet from the existing column face, then the new wall will need to be a permanent tie-back (ground anchor) diaphragm wall constructed from top down in a minimum of three lifts. The maximum wall height above the pedestrian surface will be approximately 12 feet depending on layout. The wall foundations will extend 2 to 3 feet below finish grade. Cable railing will be mounted on top of the wall. Permanent tie-backs will require a permanent construction easement. The anticipated structure cost is $635,000 not including costs for mobilization or contingencies. The estimate does not include cost for traffic control or temporary K-railing that will be needed during the work.

MORRISON STRUCTURES, INC.

1890 Park Marina Dr., Ste 104

Redding, CA 96001

BRIDGE GENERAL PLAN ESTIMATE ☐				OR PLANNING ESTIMATE ☒			
STRUCTURE	Kenmar Rd Ret Wall RW@US101			COUNTY HUM		RCVD. BY	
TYPE	TYPE 1 & GRND ANCHOR	DIST.	1	ROUTE US101		P.M.	
LENGTH	180 X WIDTH	14.5	=	2610 SF		EST. NO.	1
PROJECT INCLUDES	1 ret wall STRUCTURES			QUANTITIES BY	RLM	DATE	9/2/2016
AND $	ROADWORK			CHECKED BY		DATE	

	CONTRACT ITEMS	UNIT	QUANTITY	PRICE	AMOUNT
1	STRUCTURE EXCAVATION (RETAINING WALL)	CY	260	$ 125.00	$ 32,500.00
2	STRUCTURE EXCAVATION (GROUND ANCHOR WALL)	CY	106	$ 125.00	$ 13,250.00
3	STRUCTURE BACKFILL (RETAINING WALL)	CY	200	$ 125.00	$ 25,000.00
4	STRUCTURE BACKFILL (GROUND ANCHOR WALL)	CY	10	$ 275.00	$ 2,750.00
5	PERVIOUS BACKFILL MATERIAL (RETAINING WALL)	CY	14	$ 205.00	$ 2,870.00
6	GROUND ANCHOR	EA	60	$ 5,450.00	$ 327,000.00
7	STRUCTURAL CONCRETE, RETAINING WALL	CY	125	$ 825.00	$ 103,125.00
8	BAR REINFORCING STEEL (RETAINING WALL)	LB	27150	$ 1.35	$ 36,652.50
9	STRUCTURAL SHOTCRETE	CY	56	$ 1,125.00	$ 63,000.00
10	3" PLASTIC PIPE (RETAINING WALL)	LF	96	$ 32.00	$ 3,072.00
11	GEOCOMPOSITE DRAIN	LS	1	$ 6,000.00	$ 6,000.00
12	MINOR CONCRETE (GUTTER)	CY	6	$ 1,350.00	$ 8,100.00
13	CABLE RAILING	LF	180	$ 63.00	$ 11,340.00
14				$ -	$ -
15				$ -	$ -
16				$ -	$ -
17				$ -	$ -
18				$ -	$ -
19				$ -	$ -
20				$ -	$ -
21				$ -	$ -
22				$ -	$ -
23				$ -	$ -
26				$ -	$ -
27				$ -	$ -
28				$ -	$ -
29				$ -	$ -
30				$ -	$ -
31				$ -	$ -

SUBTOTAL		$ 634,659.50
MOBILIZATION	(10 %)	$ 70,517.72
SUBTOTAL STRUCTURE ITEMS		$ 705,177.22
CONTINGENCIES	(25 %)	$ 176,294.31
TOTAL	($ 338 / SF	$ 881,471.53
BRIDGE REMOVAL (CONTINGENCIES INCL)		$ -
WORK BY RAILROAD OR UTILITY FORCES		$ -
GRAND TOTAL		$ 881,471.53
FOR BUDGET PURPOSES - USE		$ 881,000.00

COMMENTS: _____

COST ESTIM FOR 2016 CONSTRUCTION

COMMENTS:

MORRISON STRUCTURES, INC.

1890 Park Marina Drive, Suite 104

Redding, CA 96001

BRIDGE GENERAL PLAN ESTIMATE ☐				**OR PLANNING ESTIMATE** [x]			
STRUCTURE	KENMAR RD UC/HWY 101 (04-0128)		Replace	COUNTY	HUM	RCVD. BY	
TYPE	PC PS I-GIRDER	DIST.	1	ROUTE	101	P.M.	
LENGTH	114 X WIDTH	86.33	=	9842 SF		EST. NO.	1
PROJECT INCLUDES	1 STRUCTURES			QUANTITIES BY	RLM	DATE	9/2/2016
AND $	ROADWORK			CHECKED BY		DATE	

	CONTRACT ITEMS	UNIT	QUANTITY	PRICE	AMOUNT
1	TEMPORARY RAILING (TYPE K)	LF	1480	$ 45.00	$ 66,600.00
2	STRUCTURE EXCAVATION (BRIDGE)	CY	3235	$ 80.00	$ 258,800.00
3	STRUCTURE EXCAVATION (RET WALL)	CY	1320	$ 80.00	$ 105,600.00
4	STRUCTURE BACKFILL (BRIDGE)	CY	1623	$ 80.00	$ 129,840.00
5	STRUCTURE BACKFILL (RET WALL)	CY	700	$ 70.00	$ 49,000.00
6	FURNISH PILING(CLASS 90)(ALT "V")	LF	12342	$ 40.00	$ 493,680.00
7	DRIVE PILING (CLASS 90)(ALT "V")	EA	308	$ 1,275.00	$ 392,700.00
8	STRUCTURAL CONCRETE APPROACH SLAB	CY	211	$ 1,150.00	$ 242,650.00
9	STRUCTURAL CONCRETE, BRIDGE FOOTING	CY	363	$ 450.00	$ 163,350.00
10	STRUCTURAL CONCRETE, BRIDGE	CY	875	$ 1,200.00	$ 1,050,000.00
11	STRUCTURAL CONCRETE, RETAINING WALL	CY	600	$ 1,000.00	$ 600,000.00
12	FURNISH PC PS CONC GIRDER (110'-120')	EA	13	$ 30,420.00	$ 395,460.00
13	ERECT PC PS CONC GIRDER	EA	13	$ 6,425.00	$ 83,525.00
14	JOINT SEAL (MR=1")	LF	180	$ 75.00	$ 13,500.00
15	BAR REINFORCING STEEL (BRIDGE)	LB	206000	$ 1.35	$ 278,100.00
16	BAR REINFORCING STEEL (RETAINING WALL)	LB	71000	$ 1.35	$ 95,850.00
17	CONCRETE BARRIER (TYPE 742)	LF	348	$ 230.00	$ 80,040.00
				$ -	$ -
				$ -	$ -
				$ -	$ -
				$ -	$ -
				$ -	$ -
				$ -	$ -
				$ -	$ -
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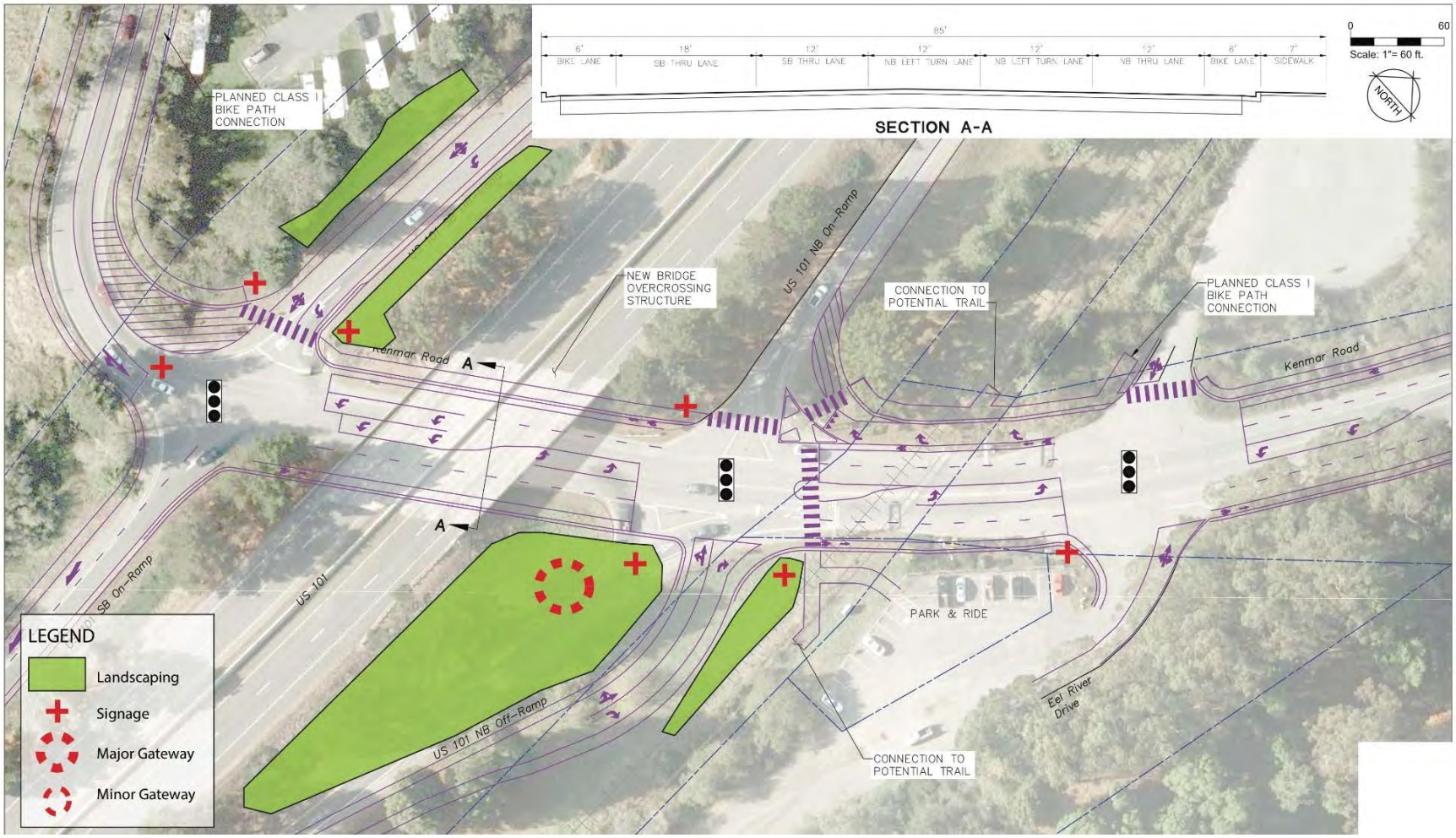
				$ -	$ -
				$ -	$ -
				$ -	$ -
				$ -	$ -
				$ -	$ -
				$ -	$ -

COMMENTS: 2-STAGE REMOVE AND REPLACE
Ret Wall type Wing Walls on Piles
COSTS ESTIM FOR 2016 CONSTRUCTION

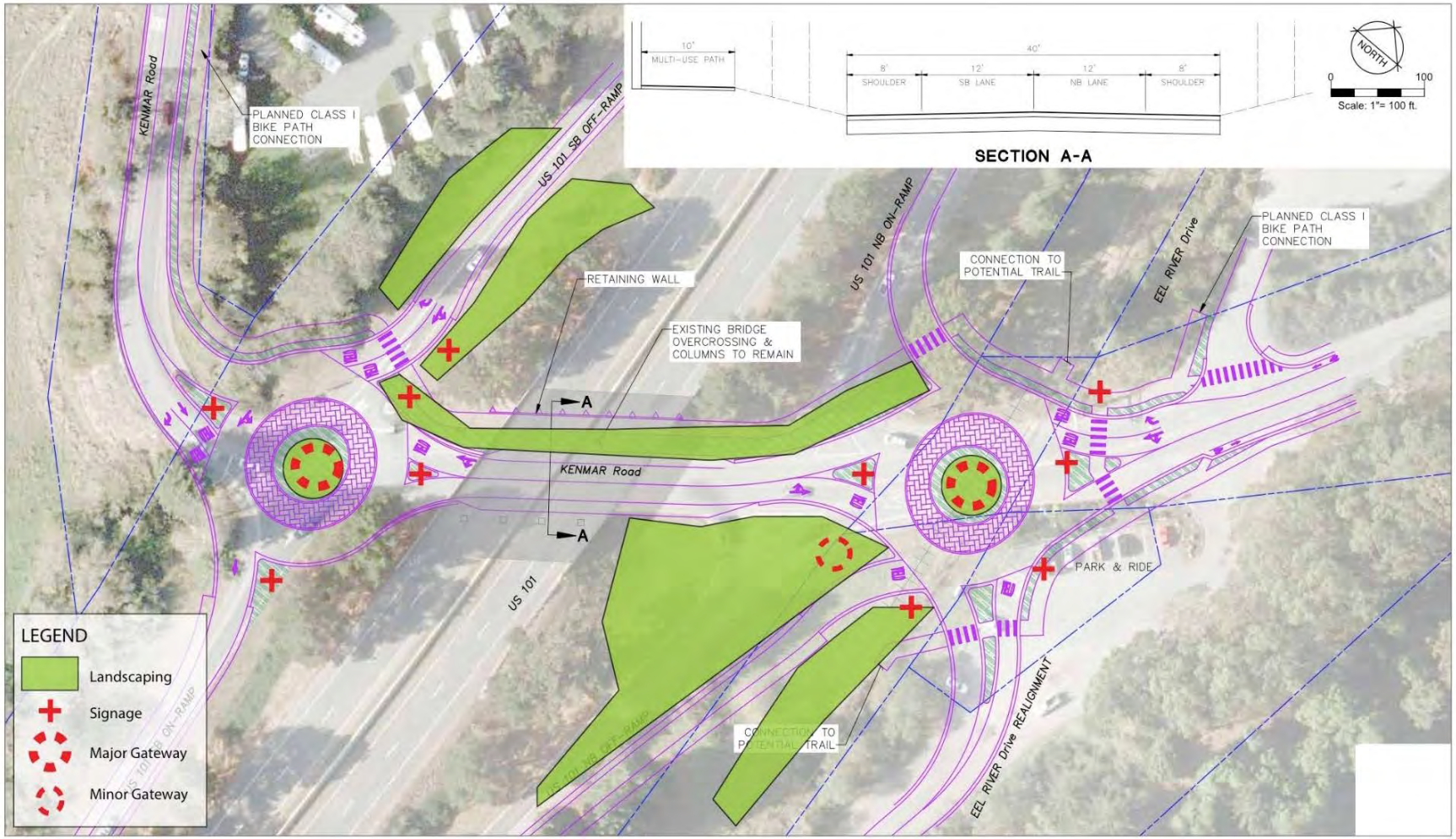
SUBTOTAL		$ 4,498,695.00
MOBILIZATION	(10 %)	$ 499,855.00
SUBTOTAL STRUCTURE ITEMS		$ 4,998,550.00
CONTINGENCIES	(25 %)	$ 1,249,637.50
BRIDGE TOTAL	($ 635 / SF	$ 6,248,187.50
BRIDGE REMOVAL (CONTINGENCIES INCL)		$ 180,000.00
WORK BY RAILROAD OR UTILITY FORCES		$ -
GRAND TOTAL		$ 6,428,187.50
FOR BUDGET PURPOSES - USE		$ 6,429,000.00

COMMENTS: _____

Attachment H - Landscaping/Gateway Concepts



Kenmare Road Interchange Traffic Signal Concept – Landscaping Options



Kenmare Road Interchange Roundabout Concept – Landscaping Options

Attachment I - Cost Estimates

Preliminary Opinion of Costs (Capital & Support)

Kenmar Road Interchange Signal Concept

City of Fortuna

12/8/2017

25-3247-03/2132

Construction Costs

No.	*Item Description*	*Units*	*Quantity*	*Unit Cost*	*Total*
1	Traffic Control	LS	1	$497,000.00	$497,000.00
2	Remove Metal Beam Guard Railing	LF	600	$16.00	$9,600.00
3	Remove Roadside Sign	EA	29	$102.00	$2,958.00
4	Remove Asphalt Concrete Dike	LF	4140	$4.00	$16,560.00
5	Remove Concrete (Curb & Gutter)	LF	2400	$10.00	$24,000.00
6	Remove Tree	EA	7	$1,400.00	$9,800.00
7	Roadway Excavation	CY	7370	$67.00	$493,790.00
8	Class 2 Aggregate Base	CY	11350	$70.00	$794,500.00
9	Hot Mix Asphalt (Type A)	TON	6790	$140.00	$950,600.00
10	Bridge (US 101 Over Kenmar Road)	LS	1	$4,700,000.00	$4,700,000.00
11	Detectable Warning Surface	SQFT	300	$35.00	$10,500.00
12	Minor Concrete (Curb)	CY	4	$1,320.00	$5,280.00
13	Minor Concrete (Curb and Gutter)	CY	149	$806.00	$120,427.99
14	Minor Concrete (Sidewalk)	CY	130	$680.00	$88,400.00
15	Storm Drain System	LS	1	$100,000.00	$100,000.00
16	Midwest Guard Rail System (Wood Post)	LF	440	$80.00	$35,200.00
17	Thermoplastic Traffic Stripe	LF	10520	$1.25	$13,150.00
18	Thermoplastic Pavement Marking	SQFT	1684	$6.00	$10,101.00
19	Signs	EA	45	$350.00	$15,750.00
20	Signal and Lighting	LS	3	$225,000.00	$675,000.00
21	Lighting & Electrical	LS	1	$100,000.00	$100,000.00
22	Planting and Irrigation	SQFT	39500	$5.00	$197,500.00
23	Mobilization	LS	1	$837,400.00	$837,400.00
24	Minor/ Supplemental Items	%	25%	$8,373,116.99	$2,093,279.25
	Subtotal (Construction Costs)				$ 11,800,796.23
	Construction Contingency			25%	$ 2,950,199.06
	Total Construction Costs				**$ 14,750,995.29**
	Total Construction Budget (Rounded)				**$ 14,751,000.00**
Right of Way (Capital) and Utility Relocation Costs:					
1	Right Of Way	SQFT	0	$20.00	$0.00
2	Utility Relocation (TBD)	LS	1	$200,000.00	$200,000.00
	Total Right of Way (Capital) and Utility Relocation Costs				**$ 200,000.00**
	Total Project Capital Cost				**$ 14,951,000.00**
Project Support Costs					
1	Environmental Clearance (CEQA/NEPA)		Capital Costs	10%	$ 1,495,100.00
2	PS&E		Con. Costs	20%	$ 2,950,200.00
3	Right of Way Engineering & Acquisition		0-Parcels	$25k/EA	$ -
4	Construction Support and Management		Con. Costs	15%	$ 2,212,700.00
	Total Project Support Costs				**$ 6,658,000.00**
	Total Estimated Project Costs				**$ 21,609,000.00**
	Rounded				**$ 21,610,000.00**

Assuptions

1. All new paving.
2. Only R/W costs are for private properties (not County, City, or State).
3. Bridge removal included in the cost for each bridge.

Preliminary Opinion of Costs (Capital & Support)

Kenmar Road Interchange Roundabout Concept - Option 1a

City of Fortuna

12/8/2017

25-3247-03/2132

Construction Costs

No.	*Item Description*	*Units*	*Quantity*	*Unit Cost*	*Total*
1	Traffic Control	LS	1	$140,000.00	$140,000.00
2	Remove Metal Beam Guard Railing	LF	850	$16.00	$13,600.00
3	Remove Roadside Sign	EA	29	$102.00	$2,958.00
4	Remove Asphalt Concrete Dike	LF	2460	$4.00	$9,840.00
5	Remove Concrete (Curb & Gutter)	LF	1210	$10.00	$12,100.00
6	Remove Tree	EA	7	$1,400.00	$9,800.00
7	Roadway Excavation	CY	5060	$67.00	$339,020.00
8	Class 2 Aggregate Base	CY	5510	$70.00	$385,700.00
9	Hot Mix Asphalt (Type A)	TON	3060	$140.00	$428,400.00
10	Detectable Warning Surface	SQFT	300	$35.00	$10,500.00
11	Minor Concrete (Curb)	CY	36	$1,320.00	$47,520.00
12	Minor Concrete (Curb - Truck Apron)	CY	47	$1,160.00	$54,520.00
13	Minor Concrete (Curb and Gutter)	CY	187	$806.00	$150,722.00
14	Minor Concrete (Stamped Concrete - Truck Apron)	CY	230	$615.00	$141,450.00
15	Minor Concrete (Sidewalk)	CY	125	$680.00	$85,000.00
16	Storm Drain System	LS	1	$180,000.00	$180,000.00
17	Midwest Guard Rail System (Wood Post)	LF	820	$80.00	$65,600.00
18	Thermoplastic Traffic Stripe	LF	4650	$1.25	$5,812.50
19	Thermoplastic Pavement Marking	SQFT	1276	$6.00	$7,656.00
20	Signs	EA	55	$350.00	$19,250.00
21	Lighting & Electrical	LS	1	$260,000.00	$260,000.00
22	Planting and Irrigation	SQFT	13900	$5.00	$69,500.00
23	Mobilization	LS	1	$229,900.00	$229,900.00
24	Minor/ Supplemental Items	%	25%	$2,298,948.50	$574,737.13
	Subtotal (Construction Costs)				$ 3,243,585.63
	Construction Contingency			25%	$ 810,896.41
	Total Construction Costs				**$ 4,054,482.03**
	Total Construction Budget (Rounded)				**$ 4,054,500.00**
Right of Way (Capital) and Utility Relocation Costs:					
1	Right Of Way	SQFT	3800	$20.00	$76,000.00
2	Utility Relocation	ALLOW	1	$200,000.00	$200,000.00
	Total Right of Way (Capital) and Utility Relocation Costs				**$ 276,000.00**
	Total Project Capital Cost				**$ 4,330,500.00**
Project Support Costs					
1	PA&ED		Capital Costs		$ 550,000.00
2	PS&E		Con. Costs	20%	$ 810,900.00
3	Right of Way Engineering & Acquisition		1-Parcels	$25k/EA	$ 25,000.00
4	Construction Support and Management		Con. Costs	15%	$ 608,200.00
	Total Project Support Costs				**$ 1,994,100.00**
	Total Estimated Project Costs				**$ 6,324,600.00**
	Rounded				**$ 6,330,000.00**

Assuptions

1. All new paving.
2. Only R/W costs are for private properties (not County, City, or State).
3. Removing railroad tracks and equipment not included.

Preliminary Opinion of Costs (Capital & Support)

Kenmar Road Interchange Roundabout Concept - Option 1b

City of Fortuna

12/8/2017

25-3247-03/2132

Construction Costs

No.	*Item Description*	*Units*	*Quantity*	*Unit Cost*	*Total*
1	Traffic Control	LS	1	$140,000.00	$140,000.00
2	Remove Metal Beam Guard Railing	LF	850	$16.00	$13,600.00
3	Remove Roadside Sign	EA	29	$102.00	$2,958.00
4	Remove Asphalt Concrete Dike	LF	2460	$4.00	$9,840.00
5	Remove Concrete (Curb & Gutter)	LF	1210	$10.00	$12,100.00
6	Remove Tree	EA	6	$1,400.00	$8,400.00
7	Roadway Excavation	CY	5160	$67.00	$345,720.00
8	Class 2 Aggregate Base	CY	5860	$70.00	$410,200.00
9	Hot Mix Asphalt (Type A)	TON	3270	$140.00	$457,800.00
10	Detectable Warning Surface	SQFT	360	$35.00	$12,600.00
11	Minor Concrete (Curb)	CY	26	$1,320.00	$34,320.00
12	Minor Concrete (Curb - Truck Apron)	CY	32	$1,160.00	$37,120.00
13	Minor Concrete (Curb and Gutter)	CY	192	$806.00	$154,752.00
14	Minor Concrete (Stamped Concrete - Truck Apron)	CY	170	$615.00	$104,550.00
15	Minor Concrete (Sidewalk)	CY	153	$680.00	$104,040.00
16	Storm Drain System	LS	1	$180,000.00	$180,000.00
17	Midwest Guard Rail System (Wood Post)	LF	820	$80.00	$65,600.00
18	Thermoplastic Traffic Stripe	LF	5000	$1.25	$6,250.00
19	Thermoplastic Pavement Marking	SQFT	1578	$6.00	$9,468.00
20	Signs	EA	40	$350.00	$14,000.00
21	Lighting & Electrical	LS	1	$220,000.00	$220,000.00
22	Planting and Irrigation	SQFT	10300	$5.00	$51,500.00
23	Mobilization	LS	1	$225,500.00	$225,500.00
24	Minor/ Supplemental Items	%	25%	$2,254,818.00	$563,704.50
	Subtotal (Construction Costs)				$ 3,184,022.50
	Construction Contingency			25%	$ 796,005.63
	Total Construction Costs				**$ 3,980,028.13**
	Total Construction Budget (Rounded)				**$ 3,980,100.00**
Right of Way (Capital) and Utility Relocation Costs:					
1	Right Of Way	SQFT	0	$20.00	$0.00
2	Utility Relocation	ALLOW	1	$200,000.00	$200,000.00
	Total Right of Way (Capital) and Utility Relocation Costs				**$ 200,000.00**
	Total Project Capital Cost				**$ 4,180,100.00**
Project Support Costs					
1	PA&ED		Capital Costs		$ 550,000.00
2	PS&E		Con. Costs	20%	$ 796,100.00
3	Right of Way Engineering & Acquisition		0-Parcels	$25k/EA	$ -
4	Construction Support and Management		Con. Costs	15%	$ 597,100.00
	Total Project Support Costs				**$ 1,943,200.00**
	Total Estimated Project Costs				**$ 6,123,300.00**
	Rounded				**$ 6,130,000.00**

Assuptions

1. All new paving.
2. Only R/W costs are for private properties (not County, City, or State).
3. Removing railroad tracks and equipment not included.

Preliminary Opinion of Costs (Capital & Support)

Kenmar Road Interchange Roundabout Concept - Option 2

City of Fortuna

12/8/2017

25-3247-03/2132

Construction Costs

No.	*Item Description*	*Units*	*Quantity*	*Unit Cost*	*Total*
1	Traffic Control	LS	1	$182,000.00	$182,000.00
2	Remove Metal Beam Guard Railing	LF	850	$16.00	$13,600.00
3	Remove Roadside Sign	EA	29	$102.00	$2,958.00
4	Remove Asphalt Concrete Dike	LF	2450	$4.00	$9,800.00
5	Remove Concrete (Curb & Gutter)	LF	1200	$10.00	$12,000.00
6	Remove Tree	EA	7	$1,400.00	$9,800.00
7	Roadway Excavation	CY	5510	$67.00	$369,170.00
8	Class 2 Aggregate Base	CY	6590	$70.00	$461,300.00
9	Hot Mix Asphalt (Type A)	TON	3770	$140.00	$527,800.00
10	Retaining Wall	LS	1	$635,000.00	$635,000.00
11	Detectable Warning Surface	SQFT	420	$35.00	$14,700.00
12	Minor Concrete (Curb)	CY	16	$1,320.00	$21,120.00
13	Minor Concrete (Curb - Truck Apron)	CY	32	$1,160.00	$37,120.00
14	Minor Concrete (Curb and Gutter)	CY	133	$806.00	$107,198.00
15	Minor Concrete (Stamped Concrete - Truck Apron)	CY	170	$615.00	$104,550.00
16	Minor Concrete (Sidewalk)	CY	139	$680.00	$94,520.00
17	Storm Drain System	LS	1	$180,000.00	$180,000.00
18	Midwest Guard Rail System (Wood Post)	LF	990	$80.00	$79,200.00
19	Thermoplastic Traffic Stripe	LF	6180	$1.25	$7,725.00
20	Thermoplastic Pavement Marking	SQFT	1151	$6.00	$6,906.24
21	Signs	EA	50	$350.00	$17,500.00
22	Lighting & Electrical	LS	1	$260,000.00	$260,000.00
23	Planting and Irrigation	SQFT	14100	$5.00	$70,500.00
24	Mobilization	LS	1	$304,300.00	$304,300.00
25	Minor/ Supplemental Items	%	25%	$3,042,467.24	$760,616.81
	Subtotal (Construction Costs)				$ 4,289,384.05
	Construction Contingency			25%	$ 1,072,346.01
	Total Construction Costs				**$ 5,361,730.06**
	Total Construction Budget (Rounded)				**$ 5,361,800.00**
Right of Way (Capital) and Utility Relocation Costs:					
1	Right Of Way	SQFT	0	$20.00	$0.00
2	Utility Relocation	ALLOW	1	$200,000.00	$200,000.00
	Total Right of Way (Capital) and Utility Relocation Costs				**$ 200,000.00**
	Total Project Capital Cost				**$ 5,561,800.00**
Project Support Costs					
1	PA&ED		Capital Costs		$ 550,000.00
2	PS&E		Con. Costs	20%	$ 1,072,400.00
3	Right of Way Engineering & Acquisition		0-Parcels	$25k/EA	$ -
4	Construction Support and Management		Con. Costs	15%	$ 804,300.00
	Total Project Support Costs				**$ 2,426,700.00**
	Total Estimated Project Costs				**$ 7,988,500.00**
	Rounded				**$ 7,990,000.00**

Assuptions

1. All new paving.
2. Only R/W costs are for private properties (not County, City, or State).
3. Removing railroad tracks and equipment not included.

Attachment J - Right-of-Way and Property Ownership

ONTIVEROS & ASSOCIATES
INC
CONSULTING ENGINEERS AND SURVEYORS

RIGHT OF WAY MEMORANDUM

May 25, 2016

Base Mapping

The base map consists of the Caltrans highway map 1 HUM-1-F coordinated on the California Coordinate System, Zone 1. This developed the centerline of Hwy 101 and the right of way lines through the project area. Parcels relinquished by Caltrans as part of the Hwy 101 Project are also shown on this map. The eastern Caltrans right of way line is the western line of the railroad right of way through most of this area.

~~12th Street Interchange~~

~~**Newburg Road** - Book P of Deeds, Page 428 HCR describes the width of Newburg as 50 feet wide. Multiple tract maps were prepared on the North side of Newburg, however, no map references Book P of deeds or any other documentation for Newburg Road is listed on the maps. The Beacom subdivision map, recorded in Book 12 of Maps, page 138, lists the width for Newburg as 40 feet. The south side of Newburg in this area is all under one ownership by the Town of Scotia. Ground shots of existing improvements (back of walk to fence) indicate a width of 50 feet.~~

~~**12th Street south of railroad crossing and north of the overpass** - the area south of the railroad right of way is owned by Caltrans, and has a width of 75 feet based on the Caltrans mapping. The Caltrans map shows the railroad crossing being relinquished to the County of Humboldt in 1978 per 1487 OR 184. The Caltrans map 1-HUM-1-F does not clearly delineate the transition from Caltrans to City of Fortuna ownership immediately south of the rail road crossing. This was at one time Sandy Prairie Road so the right of way was already existing before the Hwy 101 project. The County of Humboldt has a pavement maintenance agreement with Caltrans for the County roads carried over, under, or to the connecting freeway dated April 15th 1963. The exhibit attached to this agreement shows the County area of responsibility to be from a line approximately 50 feet south of the rail road tracks across the overpass to Dinsmore Drive on the south side of the overpass. Clendenen is the owner of the parcel to the west of 12th St., and Sequia Gas/ McWhorter owns the multiple parcels to the east of 12th St., including the abandoned Pond street.~~

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12th Street north of the railroad right of way, Parcel Map 1828 Book 16, page 28 shows a half width of 12th street as 30 feet, and Parcel Map 2817 Book 25, page 103 shows a full width of 12th street as 60 feet.

Dinsmore Drive/North end Riverwalk Drive – Caltrans relinquished this road to Humboldt County in 1963 per Book 760 Deeds, Page 517. The configuration shown is based on the Caltrans right of way map 1-HUM-1-F. In a letter dated January 10, 2005 between the City of Fortuna and the County of Humboldt, discusses the annexation & maintenance of Strongs Creek Road (Dinsmore Drive) by the City of Fortuna. The letter does not specifically describe the limits of maintenance. The bridge located on the north end of Riverwalk drive (over Strong's Creek) is shown to be in this Caltrans relinquishment area, however, the bridge itself does not appear to be listed in the County bridge maintenance logs. The specific location of the City/County change of ownership will need to be determined.

Kenmar Road Interchange

Kenmar Road east of the Freeway - No documentation could be found for this portion of Kenmar Road. The south right of way line shown is based upon the survey for the park and ride (see key note 6), and the County's Eel River Drive overlay project #213500. The north line is based upon field ties to features and said County overlay project. The State Park and Ride location is based on a survey for Caltrans. However, the survey has no recorder stamp, and the book and page referenced do not refer to this survey at the recorder's office. This map was provided by Caltrans.

In general this area has a complex right of way situation due to the multiple highways and roads that were here at one time. Additional research and surveying will be needed to determine the right of way location. The County of Humboldt has a pavement maintenance agreement with Caltrans for the County roads carried over, under, or to the connecting freeway dated April 15th 1963. The exhibit attached to this agreement shows the County area of responsibility to be from the west line of the railroad tracks to west line of Hwy 101 at the intersection with Riverwalk Drive.

Eel River Drive - The east line of Eel River Drive was mapped to some extent by the County during the overlay survey, however, the County surveyor's office also discusses the complexity of the right of way in the area, and the need for more surveying to determine the true location.

Riverwalk Drive – Riverwalk Drive west of Hwy 101 was relinquished to the County in 1963 per 760 OR 517. The east side of the right of way has been delineated in a survey from 1992 recorded in Book 53 surveys, page 34. There have not been any surveys filed on the west side of Riverwalk drive at this location. Ground shots indicate a distance of 50' between back of walk on the east side and top of slope on the west side.

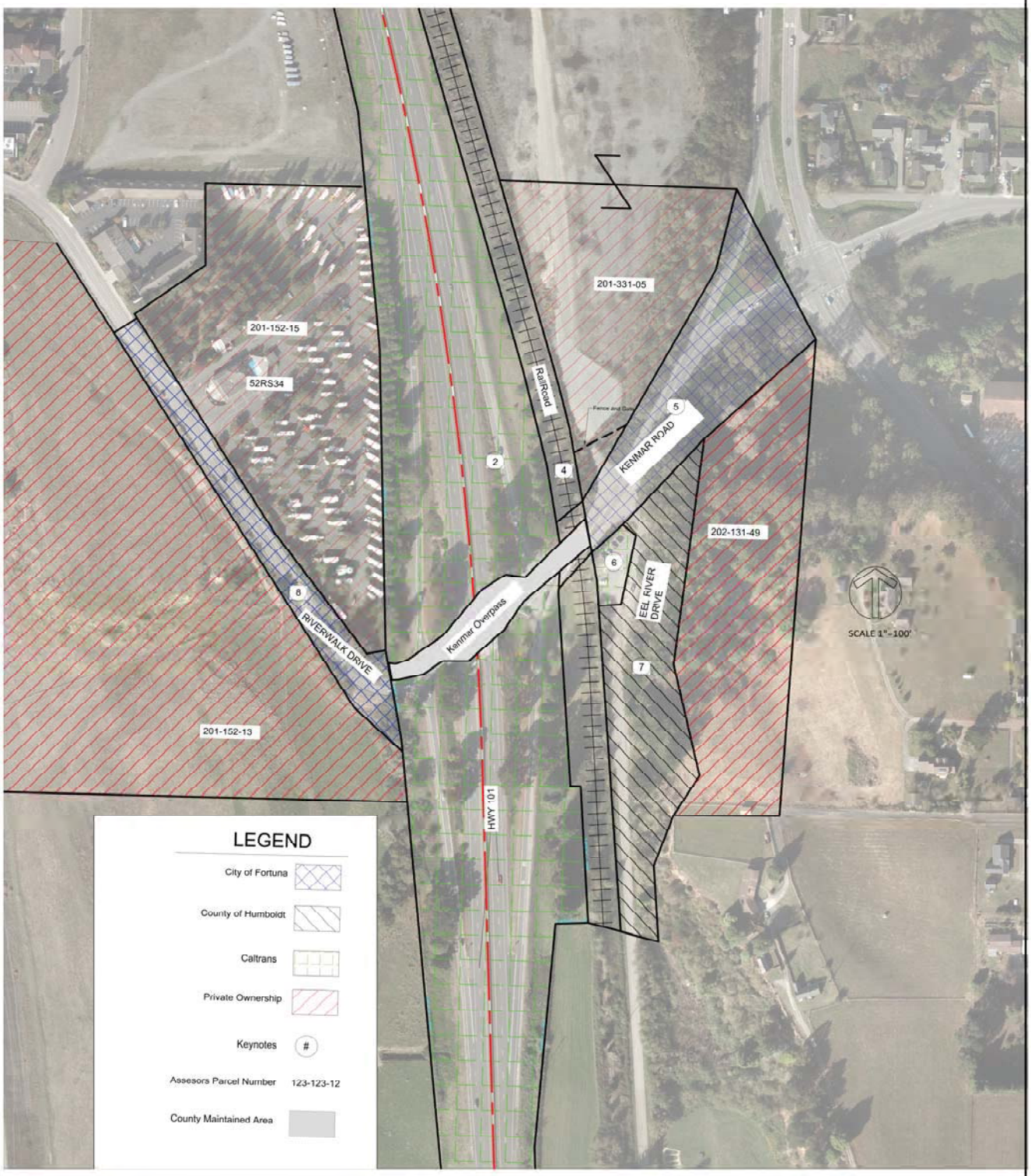
Attachments used per Area:

~~12th Street Interchange~~:

~~Book P of Deeds, Page 428~~
~~1 HUM-1-F Cal Trans Mapping~~
~~1705 Official Records 484~~
~~Parcel Map 2817 Book 25, page 103~~
~~Parcel Map 1828 Book 16, page 28~~
~~Book 12 of Maps, page 138~~
~~Book 29 Parcel Maps, Page 32~~
~~Book 13 Maps, Page 15~~
~~North Pacific Railroad Maps~~
~~Book 13 Maps, Page 16~~
~~County Letter dated January 10,~~
~~2005 Book 13 Maps, page 35~~
~~Deed 1999-8138-4~~

Kenmar Road Interchange:

1 HUM-1-F Cal Trans Mapping
North Pacific Railroad Maps
Book 53 surveys, Page 34
Book 29 Surveys, Page 104
Book 38 Surveys, Page 59
Book 68 Surveys, Page 28
Book 67 Surveys, Page 56
County Letter dated January 10, 2005 County
Project files Eel River Drive Overlay
Old Rohnerville Map



KENMAR ROAD

GHD FORTUNA INTERCHANGE PLANNING STUDY

2 2

SCHEDULE

CASE	GRANTOR	GRANTEE	INSTRUMENT	DATE	RECORD	REMARKS
1767-c	Inez C. Newell	State of California	Grant Deed	July 23 1945	Book 518 Deeds Pg 36	
1768	Lillie B. East	" " "	(Grant Deed	June 11 1945	Book 84 O.R. Pg 198	
306	Chris Diedrichsen		Easement	June 21, 1911	Bk 140, Deeds, Pg 9	
307	Harold A Dinsmoreeu.			Jul 17, 1917	Bk 140, Deeds, Pg 8	
799	John Matthiesen etux			Feb 18, 1931	Bk 202, Deeds, Pg 93	
2217	K. C Newell et al		Grant Deed	Dec 11 1950	Book 195, O.R. Pg 200	3rd Access right

T. 2 N., R. 1 W., H. B. & M.

SEC. 11

SEC. 14

Section Line

Prop. Line

Lillie B. East

Kenneth C. Newell et al

2217

PARCEL 1

PARCEL 2

1768

1767

307

306

799

N. 7° 33' W.

S. 7° 33' E.

2421.71'

2439.31'

2676.16'

1637.36'

530.53'

240

230

220

65'

N. W. P. R. R. Co.

Prop. Line

1210 FILED

JAN 24, 1956

Recorder

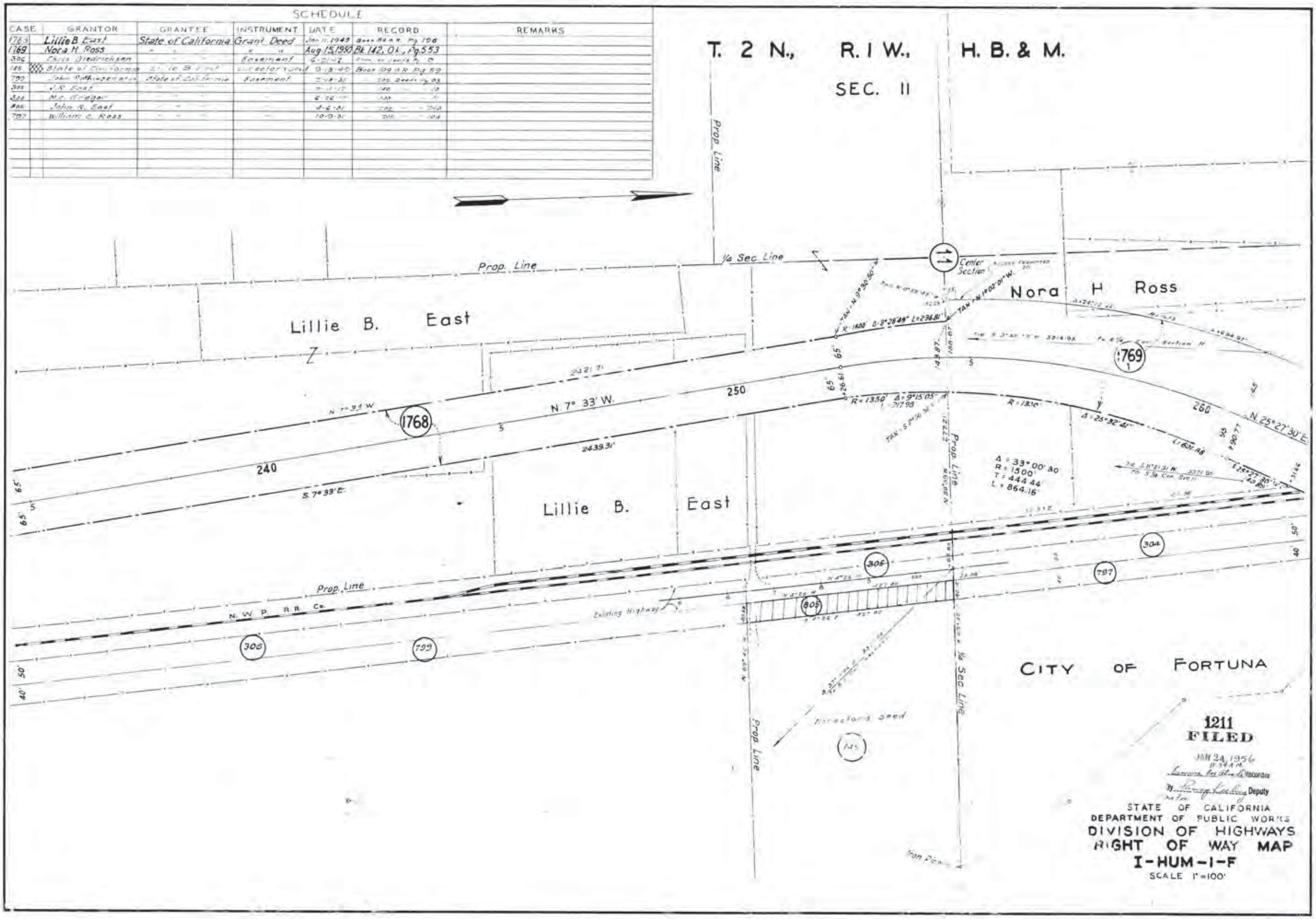
Deputy

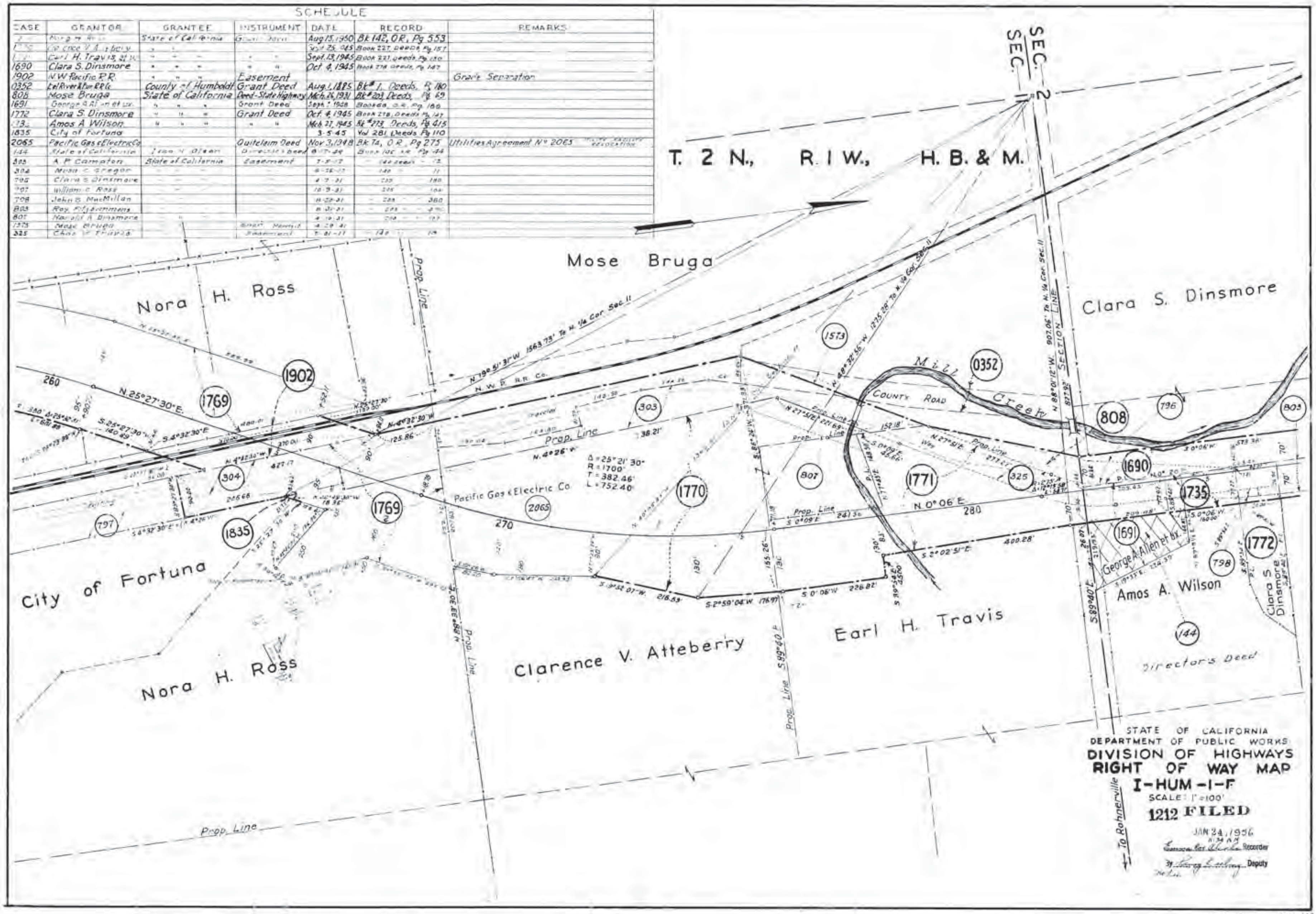
STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS
RIGHT OF WAY MAP
1-HUM-1-F
SCALE 1"=100'

HIGHWAY MAPS # 3, PAGE 19-7

SCHEDULE

CASE	GRANTOR	GRANTEE	INSTRUMENT	DATE	RECORD	REMARKS
1768	Lillie B. East	State of California	Grant Deed	Jan 11, 1949	Book 84 O.R. Pg 196	
1769	Nora H. Ross	" "	" "	Aug 15, 1950	Bk. 142, O.R., Pg 553	
306	Chris Diedrichsen	[illegible]	Easement	[illegible]	[illegible]	
145	State of California	Lillie B. East	Director's Deed	9-13-40	Book 39 O.R. Pg 59	
799	John [illegible]	State of California	Easement	[illegible]	202 Deeds Pg 93	
305	J.R. East	[illegible]	[illegible]	[illegible]	140 [illegible] 10	
304	M.C. Greger	[illegible]	[illegible]	6-26 [illegible]	[illegible]	
805	John R. East	"	[illegible]	4-6-31	202 [illegible] 248	
797	William C. Ross	"	"	10-9-31	215 [illegible] 104	



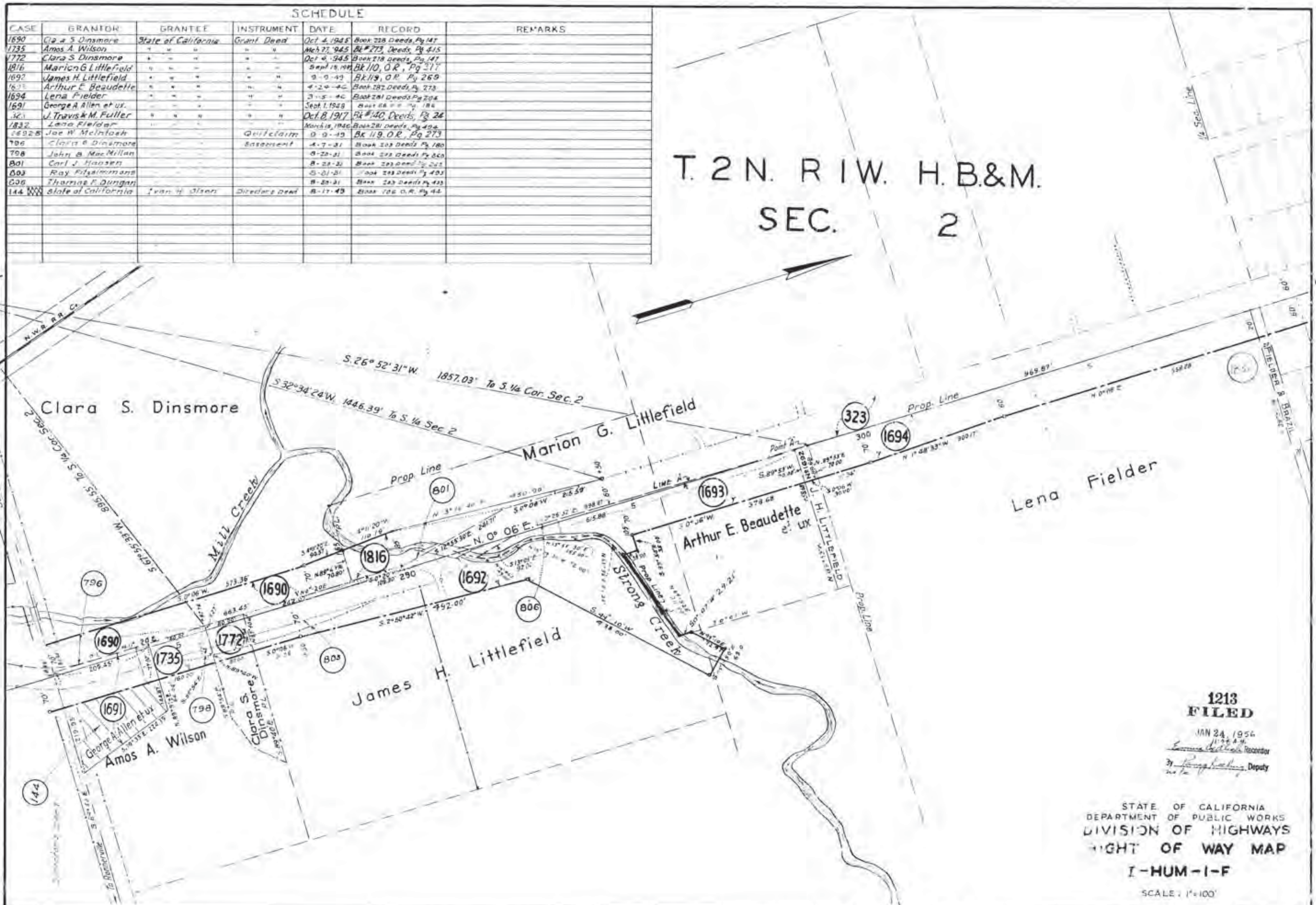


SCHEDULE

CASE	GRANTOR	GRANTEE	INSTRUMENT	DATE	RECORD	REMARKS
[illegible]	Mose Brugo	State of California	Grant Deed	Aug 15, 1950	Bk 142, O.R., Pg 553	
[illegible]	Clarence V. Atteberry	" "		Sept 25, 1945	Book 227, Deeds, Pg 157	
[illegible]	Earl H. Travis, et ux.	" " "	" "	Sept. 13, 1945	Book 227, Deeds, Pg 150	
1690	Clara S. Dinsmore	" " "	" "	Oct. 4, 1945	Book 278, Deeds, Pg 147	
1902	N.W. Pacific R.R.	" " "	Easement			Grade Separation
0352	Eel River & Eur. R.R. Co.	County of Humboldt	Grant Deed	Aug. 1, 1885	Bk # 1, Deeds, Pg 180	
808	Mose Bruga	State of California	Deed-State Highway	Mch. 26, 1931	Bk # 203, Deeds, Pg 69	
1691	George A. Allen et ux.	" " "	Grant Deed	Sept. 1, 1948	Book 68, O.R., Pg 186	
1772	Clara S. Dinsmore	" " "	Grant Deed	Oct. 4, 1945	Book 278, Deeds, Pg 147	
[illegible]	Amos A. Wilson	" " "	" "	Mch. 27, 1945	Bk # 273, Deeds, Pg 415	
1835	City of Fortuna			3-5-45	Vol 281, Deeds, Pg 110	
2065	Pacific Gas & Electric Co.		Quitclaim Deed	Nov 3, 1948	Bk. 74, O.R., Pg 275	Utilities Agreement Nº 2065 [illegible]
144	State of California	[illegible]	Director's Deed	[illegible]	Book 10[illegible], O.R., Pg 44	
303	A. P. Campton	State of California	Easement	7-5-17	— 144 Deeds — 12	
304	[illegible]	— — —	—	6-26-17	— 140 — 11	
796	Clara S. Dinsmore	— — —		4-7-31	— 235 — 180	
797	William C. Ross	— —		10-3-31	205 — 104	
798	John B. MacMillan	— —		8-20-31	— 235 — 360	
803	Roy Fitzsimmons	— —		8-31-31	— 235 — [illegible]	
807	Harold A. Dinsmore	— " —		4-10-31	— 238 — 137	
1573	Mose Bruga		Grant Permit	4-28-41		
325	Chas. W. Travis		Easement	7-31-17	— 140 — 19	

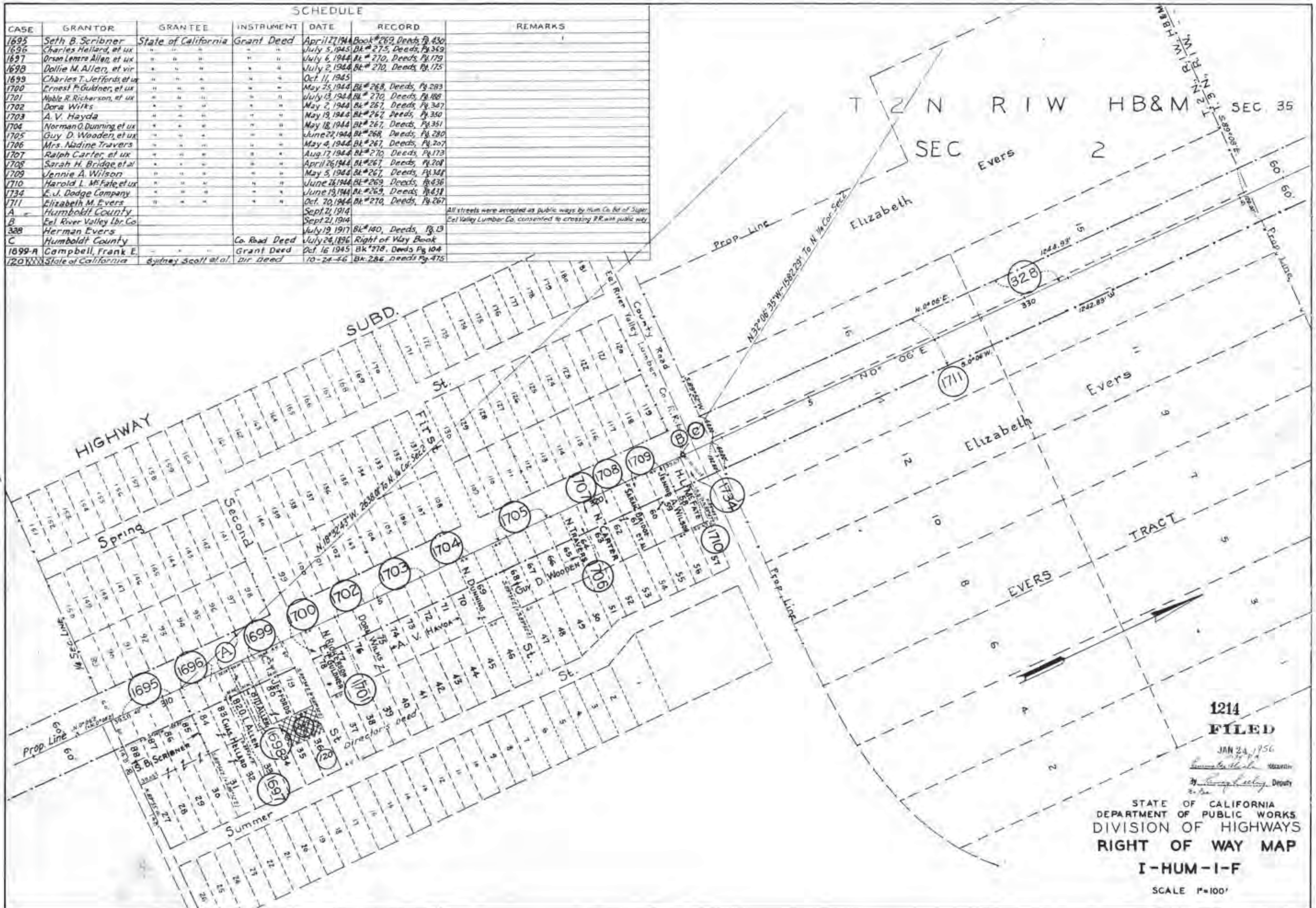
SCHEDULE

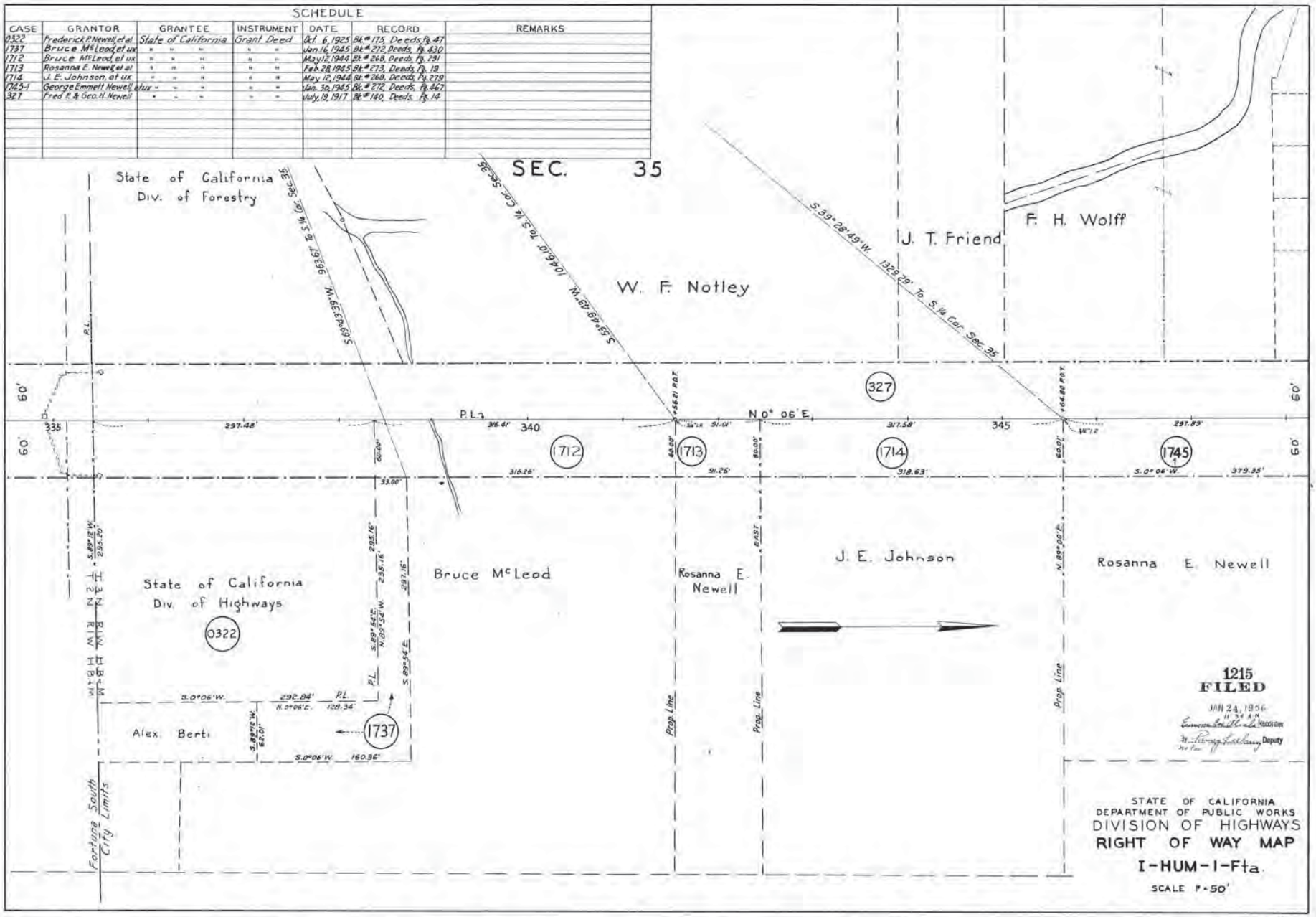
CASE	GRANTOR	GRANTEE	INSTRUMENT	DATE	RECORD	REMARKS
1690	Clara S Dinsmore	State of California	Grant Deed	Oct 4, 1945	Book 228 Deeds, Pg 147	
1735	Amos A. Wilson	" " "	" "	Mch 27, 1945	Bk #273, Deeds, Pg 415	
1772	Clara S Dinsmore	" " "	" "	Oct 4, 1945	Book 218 Deeds, Pg 147	
1816	Marion G Littlefield	" " "	" "	Sept 19, 1949	Bk 110, O.R., Pg 217	
1692	James H. Littlefield	" " "	" "	9-9-49	Bk 119, O.R. Pg 269	
1693	Arthur E. Beaudette	" " "	" "	4-24-46	Book 282 Deeds, Pg 273	
1694	Lena Fielder	" " "	" "	3-5-46	Book 281 Deeds Pg 204	
1691	George A. Allen et ux.	" " "	" "	Sept 1, 1948	Book 68 O.R. Pg 186	
323	J. Travis & M. Fuller	" " "	" "	Oct. 8, 1917	Bk #140, Deeds, Pg 24	
1832	Lena Fielder	" " "	" "	March 18, 1946	Book 281 Deeds, Pg 494	
1692B	Joe W. McIntosh		Quitclaim	9-9-49	Bk 119, O.R., Pg 273	
796	Clara S Dinsmore		Easement	4-7-31	Book 203 Deeds Pg 180	
798	John B. MacMillan			8-20-31	Book 203 Deeds Pg 360	
801	Carl J. Hansen			8-28-31	Book 203 Deeds Pg 265	
803	Ray Fitzsimmons			8-21-31	Book 203 Deeds Pg 403	
806	Thomas F. Dungan			8-28-31	Book 203 Deeds Pg 433	
144	State of California	Ivan H. Olsen	Director's Deed	8-17-49	Book 106 O.R. Pg 44	



SCHEDULE

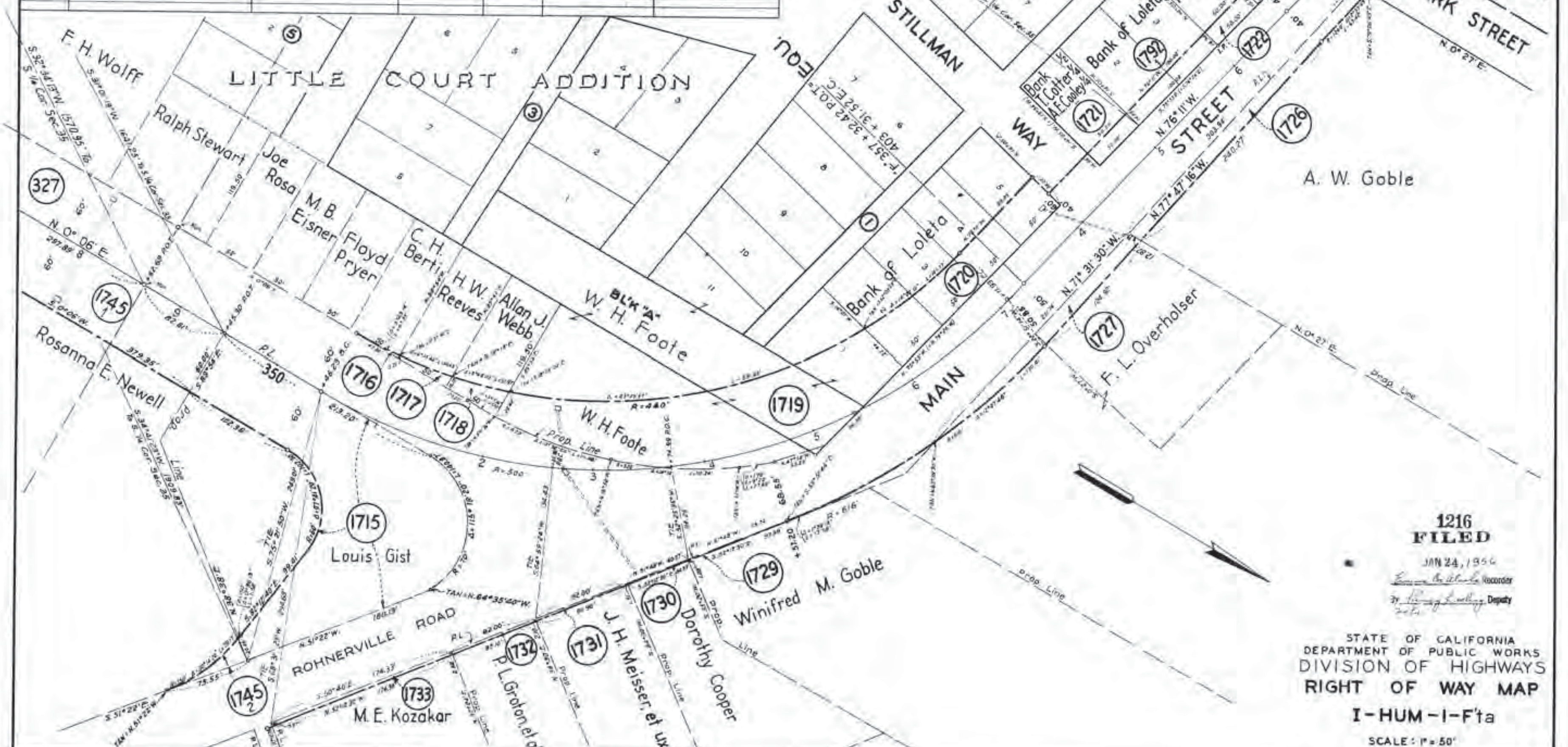
CASE	GRANTOR	GRANTEE	INSTRUMENT	DATE	RECORD	REMARKS
1695	Seth B. Scribner	State of California	Grant Deed	April 27, 1944	Book #269, Deeds, Pg. 430	
1696	Charles Hellard, et ux	" " "	" "	July 5, 1945	Bk. # 275, Deeds, Pg. 369	
1697	Orson Lenore Allen, et ux	" " "	" "	July 6, 1944	Bk. # 270, Deeds, Pg. 179	
1698	Dollie M. Allen, et vir	" " "	" "	July 2, 1944	Bk. # 270, Deeds, Pg. 175	
1699	Charles T. Jeffords, et ux	" " "	" "	Oct. 11, 1945		
1700	Ernest F. Guldner, et ux	" " "	" "	May 25, 1944	Bk. # 268, Deeds, Pg. 283	
1701	Noble R. Richerson, et ux	" " "	" "	July 13, 1944	Bk. # 270, Deeds, Pg. 188	
1702	Dora Wilks	" " "	" "	May 2, 1944	Bk. # 267, Deeds, Pg. 347	
1703	A. V. Hayda	" " "	" "	May 19, 1944	Bk. # 267, Deeds, Pg. 350	
1704	Norman O. Dunning, et ux	" " "	" "	May 18, 1944	Bk. # 267, Deeds, Pg. 351	
1705	Guy D. Wooden, et ux	" " "	" "	June 22, 1944	Bk. # 268, Deeds, Pg. 280	
1706	Mrs. Nadine Travers	" " "	" "	May 4, 1944	Bk. # 267, Deeds, Pg. 207	
1707	Ralph Carter, et ux	" " "	" "	Aug. 17, 1944	Bk. # 270, Deeds, Pg. 173	
1708	Sarah H. Bridge, et al	" " "	" "	April 26, 1944	Bk. # 267, Deeds, Pg. 208	
1709	Jennie A. Wilson	" " "	" "	May 5, 1944	Bk. # 267, Deeds, Pg. 348	
1710	Harold L. McFate, et ux	" " "	" "	June 26, 1944	Bk. # 269, Deeds, Pg. 436	
1734	E. J. Dodge Company	" " "	" "	June 19, 1944	Bk. # 269, Deeds, Pg. 438	
1711	Elizabeth M. Evers	" " "	" "	Oct. 20, 1944	Bk. # 270, Deeds, Pg. 267	
A	Humboldt County			Sept. 21, 1914		All streets were accepted as public ways by Hum. Co. Bd. of Super.
B	Eel River Valley Lbr. Co.			Sept. 21, 1914		Eel Valley Lumber Co. consented to crossing R.R. with public way
328	Herman Evers			July 19, 1917	Bk. # 140, Deeds, Pg. 13	
C	Humboldt County		Co. Road Deed	July 24, 1896	Right of Way Book	
1699-A	Campbell, Frank E.	" " "	Grant Deed	Oct. 16, 1945	Bk. # 278, Deeds Pg. 104	
120XXX	State of California	Sydney Scott et al.	Dir Deed	10-24-46	Bk. 286 Deeds Pg. 475	





HIGHWAY MAPS #3, PAGE 154

CASE	GRANTOR	GRANTEE	INSTRUMENT	DATE	RECORD	REMARKS
1745-1&2	George Emmet Newell, et ux	State of California	Grant Deed	Jan. 30, 1945	Bk#272, Deeds, Pg. 467	
1715	Louis Gist, et ux	" " "	" "	Feb. 4, 1945	Bk#272, Deeds, Pg. 464	
1716	Charles H. Berti, et ux	" " "	" "	Jan. 26, 1945	Bk#272, Deeds, Pg. 491	
1717	Harry W. Reeves, et ux	" " "	" "	Feb. 15, 1945	Bk#272, Deeds, Pg. 493	
1718	Allan J. Webb, et ux	" " "	" "	Sept. 14, 1945	Book 277 Deeds, Pg. 135	
1719	William H. Foote, et ux	" " "	" "	Jan. 26, 1945	Bk#272, Deeds, Pg. 445	
1720	Bank of Loleta	" " "	" "	Sept. 26, 1945	Book 277 Deeds, Pg. 183	
1721	Bank of Loleta	" " "	" "	April 4, 1945	Book 280 Deeds, Pg. 430	
1722	Joseph I. Pracy, et ux	" " "	" "	Jan. 23, 1945	Bk#272, Deeds, Pg. 439	
1723	B.F. Morgan, et al	" " "	" "	Mch. 27, 1945	Bk#273, Deeds, Pg. 421	
1724	J. F. Hieronymus et ux	" " "	" "	Feb. 15, 1946	Book 280 Deeds, Pg. 468	
1725	Elizabeth Barcus	" " "	" "	Mch. 8, 1945	Bk 274, Deeds, Pg. 7	
1792-1&2	Bank of Loleta	" " "	" "	Mch. 23, 1945	Bk#273, Deeds, Pg. 418	
1726	Albert W. Goble	" " "	" "	Feb. 23, 1945	Bk#273, Deeds, Pg. 4	
1727	Free L. Overholser	" " "	" "	Jan. 29, 1945	Bk#273, Deeds, Pg. 8	
1729	Winifred M. Goble, et al	" " "	" "	Mch. 5, 1945	Bk#273, Deeds, Pg. 429	
1730	Dorothy Cooper	" " "	" "	Feb. 16, 1945	Bk#272, Deeds, Pg. 471	
1731	J. H. Meisser, et ux	" " "	" "	April 9, 1945	Bk#273, Deeds, Pg. 425	
1732	Pearl L. Groton, et al	" " "	" "	Feb. 16, 1945	Bk#276, Deeds, Pg. 135	
1733	Michael E. Kozakar, et ux	" " "	" "	Feb. 2, 1945	Bk#272, Deeds, Pg. 485	
327	Fred P. & Geo. H. Newell	" " "	" "	July 19, 1917	Bk#140, Deeds, Pg. 14	
1721-A	Thomas Cotter et ux	" " "	" "	Jan. 28, 1948	Bk. 40, O.R., Pg. 92	
189	State of California	Frank Rohner	Direc. Deed	Nov. 24, 1954	Bk 318, O.R., Pg. 68	

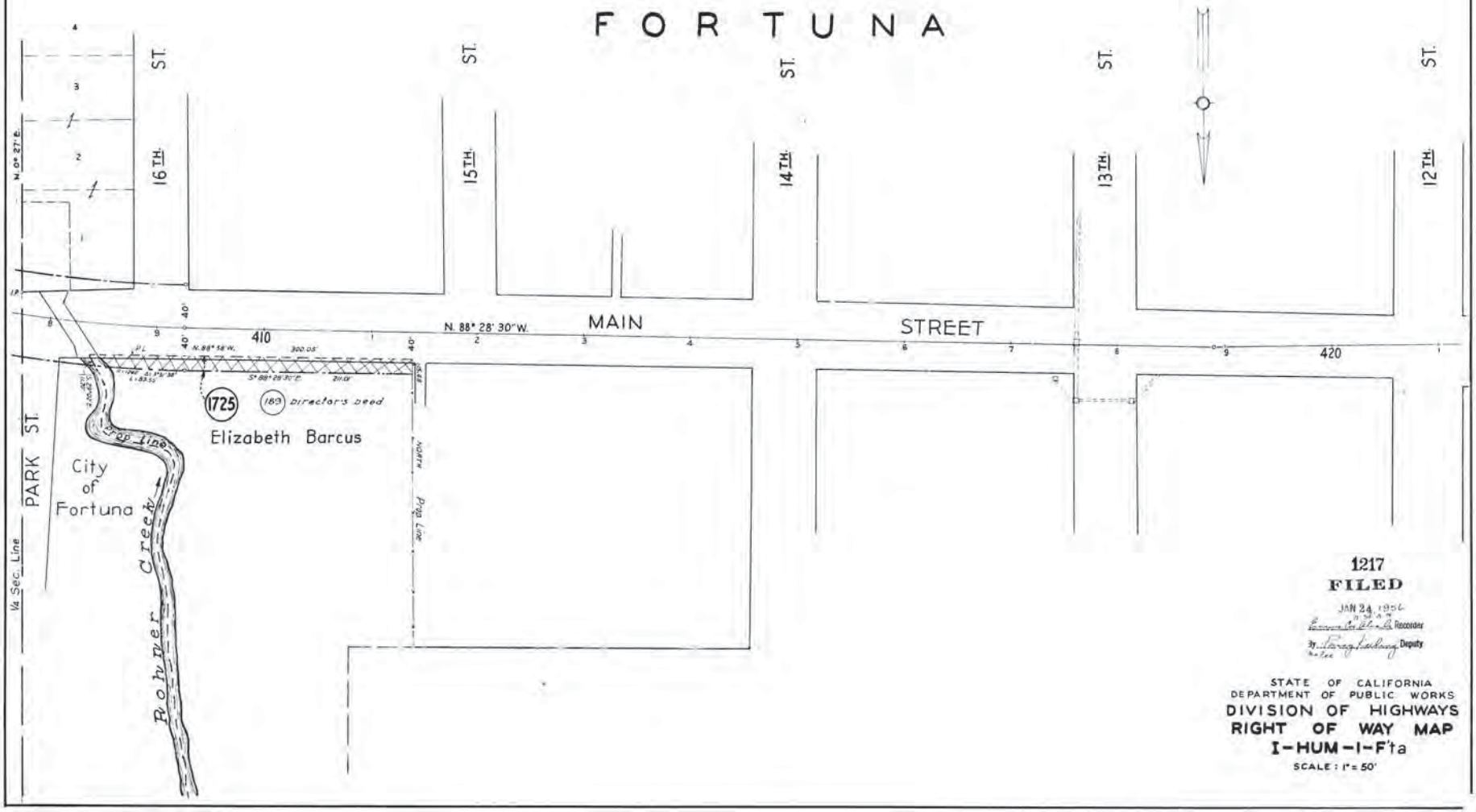


1216
FILED
JAN 24, 1956

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS
RIGHT OF WAY MAP
I-HUM-1-F'ta
SCALE: 1" = 50'

HIGHWAY MAPS #3 PAGE 159

SCHEDULE						
CASE	GRANTOR	GRANTEE	INSTRUMENT	DATE	RECORD	REMARKS
1725	Elizabeth Barcus	State of California	Grant Deed	Mch 8, 1945	Bk 274, Deeds Pg 7	
189 RW	State of California	Frank Rohner	Direc Deed	Nov 24, 1954	Bk 314, O.R. Pg 68	



1217
FILED
JAN 24 1956
Recorder
By Deputy

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS
RIGHT OF WAY MAP
I-HUM-1-F'ta
SCALE: 1" = 50'

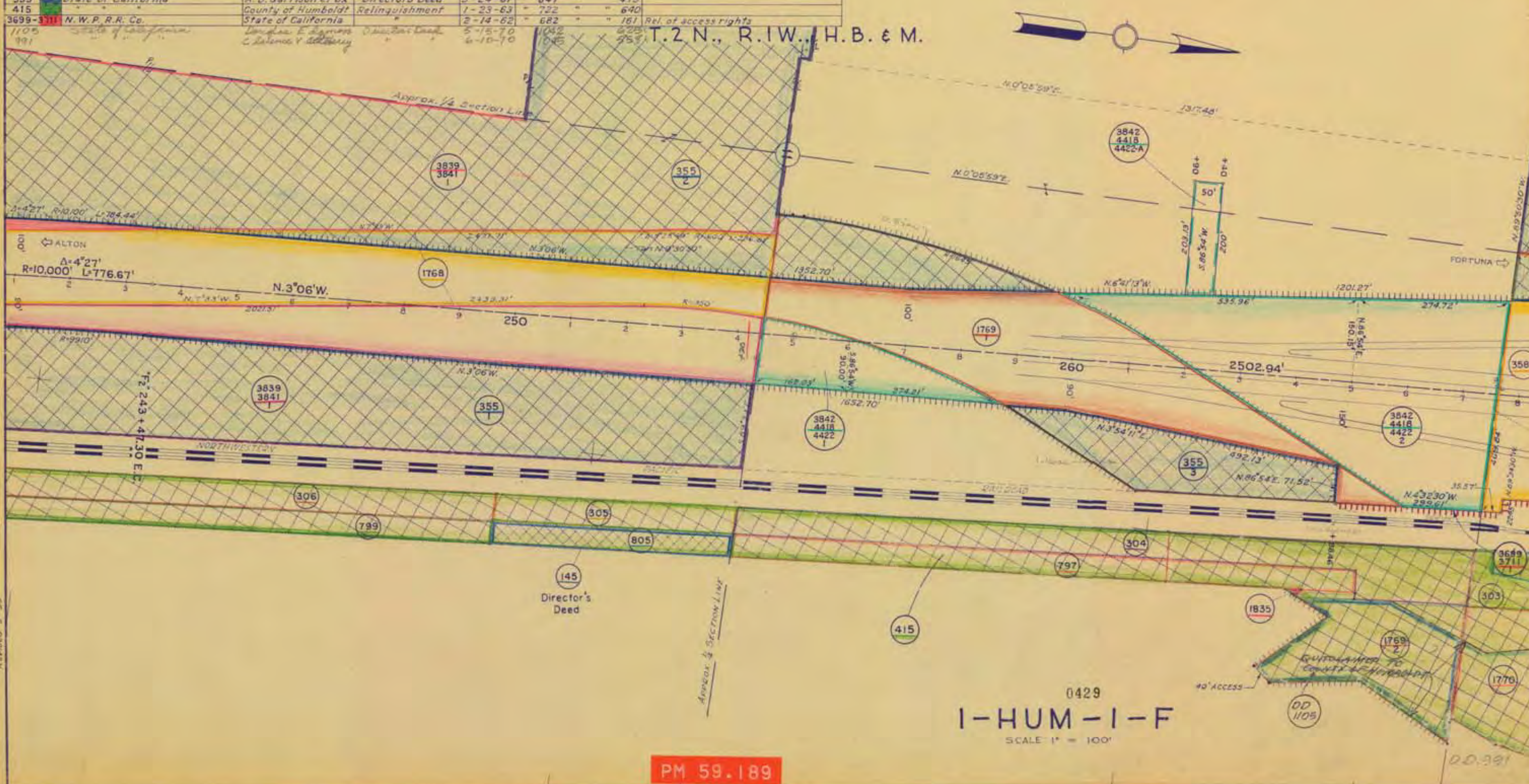
HIGHWAY MAPS #3, PAGE 159

Map Filed

SCHEDULE

CASE	GRANTOR	GRANTEE	INSTRUMENT	DATE	RECORD	REMARKS
303	A. P. Campton	State of California	Easement	7-5-17	Bk. 140 Deeds, Pg. 12	
304	Musa C. Gregor	" " "	"	6-26-17	" 140 " " 11	
305	J. R. East	" " "	"	7-11-17	" 140 " " 10	
306	Chris Diedrichsen	" " "	"	6-21-17	" 140 " " 9	
797	William C. Ross	" " "	"	10-9-31	" 205 " " 104	
799	John Matthiesen et ux	" " "	"	2-18-31	" 202 " " 93	
805	John R. East	" " "	"	4-6-31	" 202 " " 243	
145	State of California	Lillie B. East	Directors Deed	9-13-49	" 109 O.R. " 59	
1768	Lillie B. East	State of California	Grant Deed	1-11-49	" 84 " " 196	State G.T. claimed to County of Humboldt. Bk 1010? Pg 596?
1769	Nora H. Ross	" " "	" "	8-15-50	" 142 " " 553	and access rights
1770	Clarence V. Attebery	" " "	" "	9-25-45	" 227 Deeds " 157	
1835	City of Fortuna	" " "	" "	3-5-45	" 261 " " 110	
3589	Clement V. Bruga	" " "	" "	4-30-56	" 395 O.R. " 12	and access rights
3839 3841	Amelia G. Alward	" " "	" "	6-27-55	" 501 O.R. " 433	
3842 4418 4422	Alexander B. Garrison et ux	" " "	Grant Deed	11-2-60	" 622 " " 578	
3842 4418 4422-A	Alexander B. Garrison et ux	" " "	Easement	6-16-61	" 655 " " 625	
355	State of California	A. B. Garrison et ux	Director's Deed	5-24-61	" 647 " " 479	
415	" " "	County of Humboldt	Relinquishment	1-23-63	" 722 " " 640	
3699-3711	N. W. P. R.R. Co.	State of California	"	2-14-62	" 682 " " 161	Rel. of access rights
1105	State of California	Douglas E. Lemon?	Director Deed	5-15-70	1042 625	
991	" " "	C. Selence? V. Attebery	" "	6-10-70	1045 953	

T.2N., R.1W., H.B. & M.



PM 59.189

Revised 3-59

OD 991

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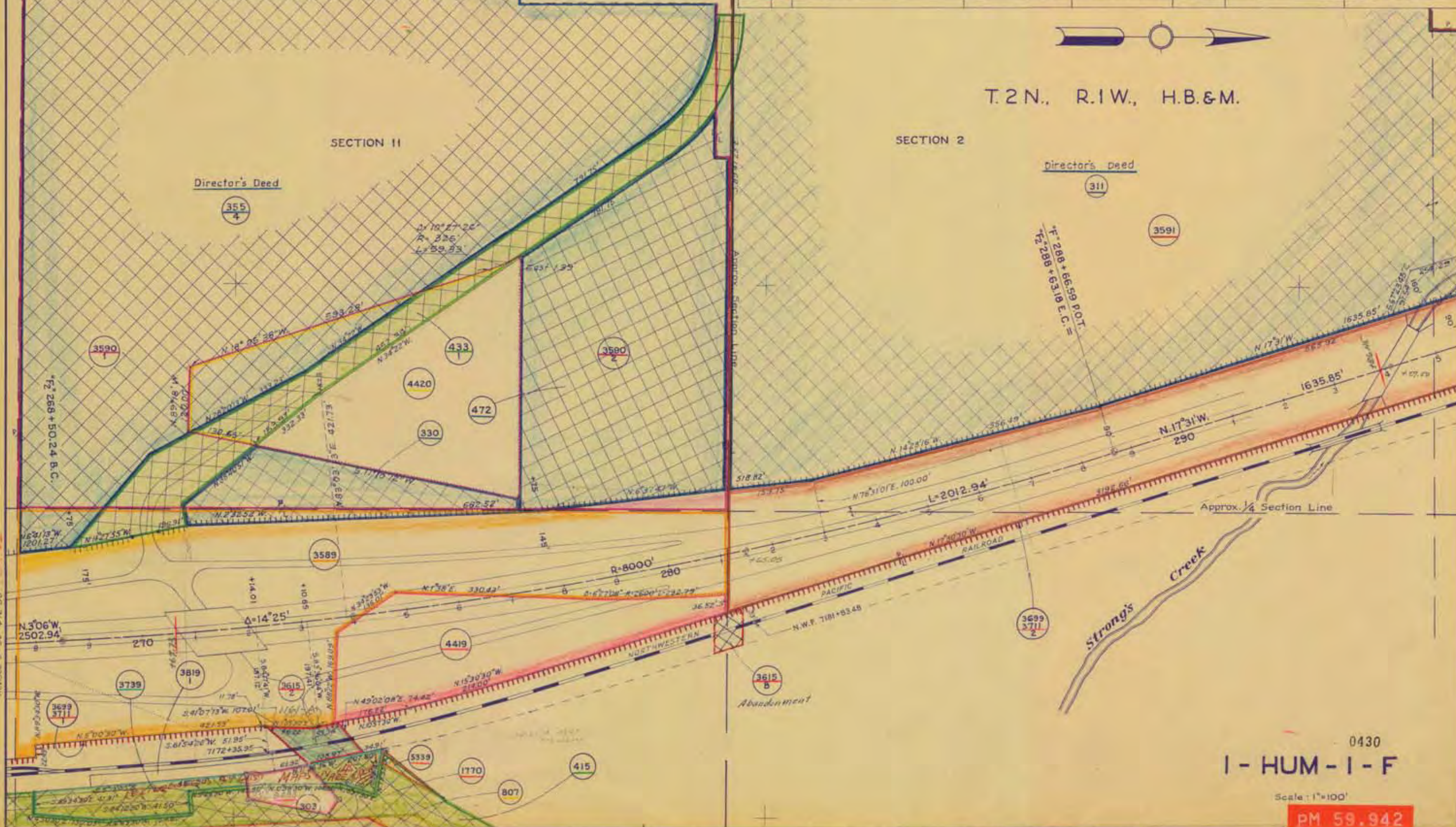
SCHEDULE

CASE	GRANTOR	GRANTEE	INSTRUMENT	DATE	RECORD	REMARKS
303	A. P. Campton	State of California	Easement	7-5-17	Book 140 Deeds, Page 12	
807	Harold A. Dinsmore	" " "	"	4-10-31	" 203 " " 107	
1770	Clarence V. Attebery	" " "	Grant Deed	9-25-45	" 227 " " 157	
3589	Clement V. Bruga	" " "	" "	4-30-56	" 395 O.R. " 12	+ access rights
3590	Leland Hymas et ux	" " "	" "	6-1-56	" 403 " " 303	" " "
3591	Calif. Institute For Cancer Research	" " "	" "	6-2-59	" 543 " " 182	Quitclaims 3591-A,B,C&D
3738	Northwestern Pacific Railroad	" " "	See Case 3615—Parcel 2			
3819	" " "	" " "	Easement		" " "	
4419	C.V. Bruga	" " "	Grant Deed	10-15-59	" 563 " " 437	And Access Rights
4420	Leland Hymas	" " "	" "	5-11-60	" 598 " " 553	" Temp. Easement

CASE	GRANTOR	GRANTEE	INSTRUMENT	DATE	RECORD	REMARKS
3739	Northwestern Pacific Railroad	State of California	Grant Deed	8-30-60	Book 609 O.R., Page 52	
311	State of California	Fortuna Plywood Co.	Director's Deed	3-24-60	" 582 " " 325	
330	" " "	Leland Hymas et ux	" "	10-25-60	" 603 " " 284	
3615	Northwestern Pacific R.R. Co.	State of California	Easement	7-25-60	" 600 " " 351	Parcel 2 264.6
	" " " " "	" " "	"	"	" " " " "	Parcel B 5-264.7 Aban.
355	State of California	A.B. Garrison et ux	Director's Deed	5-24-61	" 647 " " 479	
3699-3711	Northwestern Pacific R.R. Co.	State of California	Relinquishment	2-14-62	" 682 " " 161	Access rights
5339	C. V. Bruga	" " "	Easement	9-26-62	" 707 " " 469	For slopes
415	State of California	County of Humboldt	Relinquishment	1-23-63	" 722 " " 640	
433	" " "	" " "	"	10-30-63	" 760 " " 517	
472	" " "	Eel River Investments	Director's Deed	8-21-63	" 753 " " 520	
1161-A	State	Co. of Humboldt	Relinquishment	5-5-78	" 1497 " " 194	R.R. Xing
9883	County of Humboldt	State of California	Quitclaim Deed	6-18-80	" 1614 " " 760	Park & Ride



0430

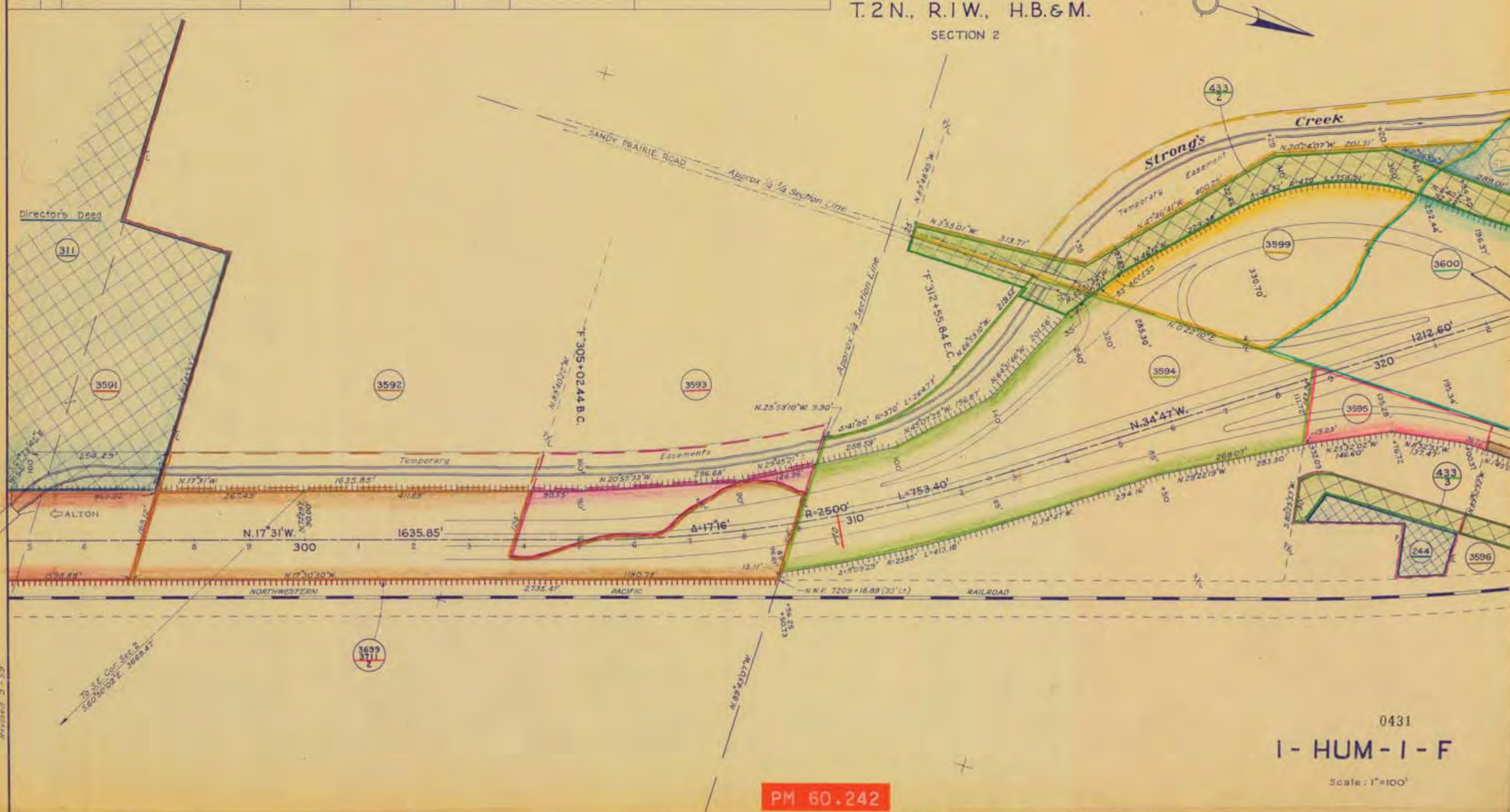
I - HUM - I - F

Scale: 1"=100'

PM 59.942

SCHEDULE

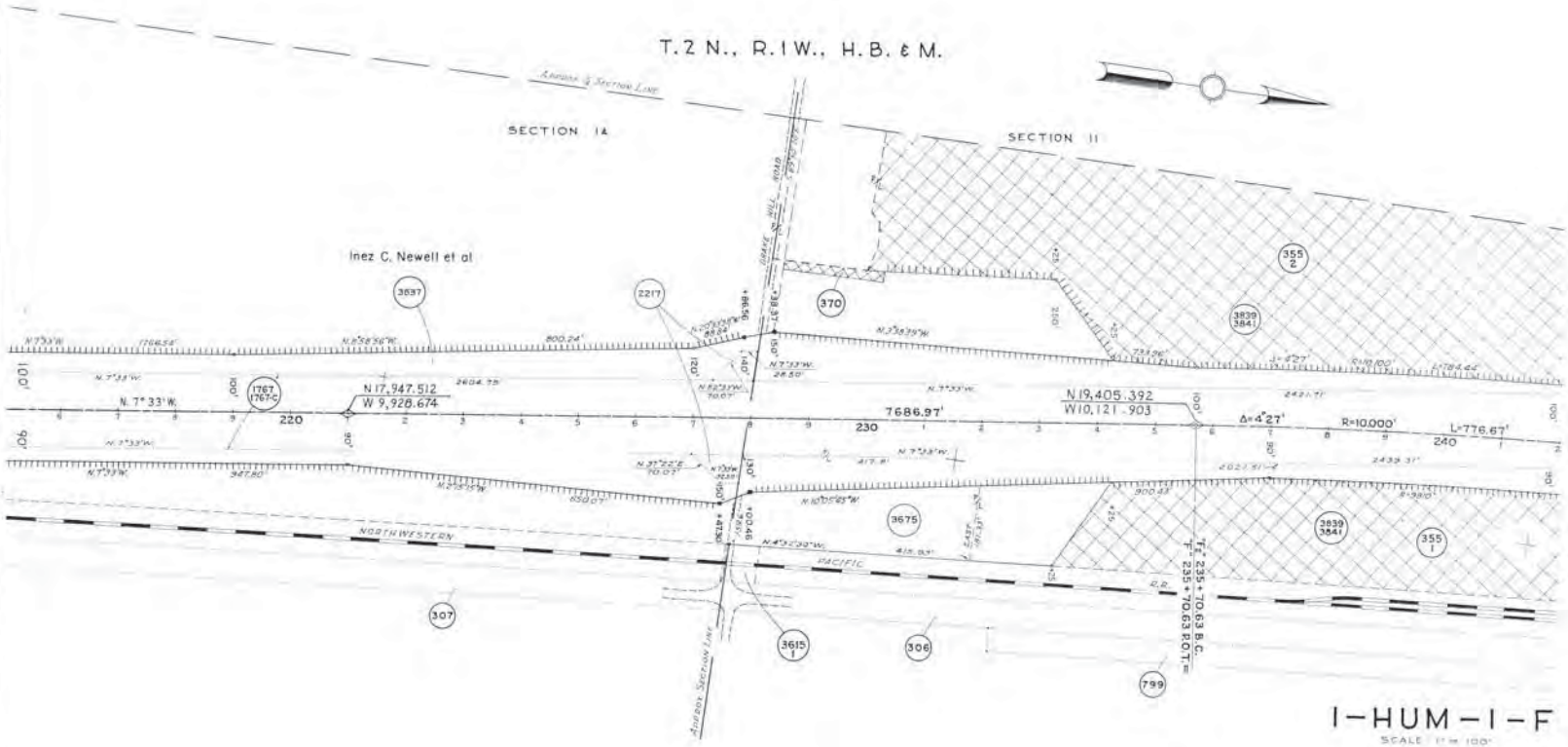
CASE		GRANTOR	GRANTEE	INSTRUMENT	DATE	RECORD	REMARKS
3591		Calif. Institute for Cancer Research	State of California	Grant Deed	6-2-59	Book 543 O.R., Page 182	Quitclaims 3591-A, B, C & D
3592		Renus Oman et ux	" " "	" "	9-28-56	" 418 " " 343	
3593		Ruth Schroder	" " "	" "	10-9-56	" 420 " " 86	
3594		Charlie A. Jenks et ux	" " "		11-17-59	" 567 " " 377	and Access Rights
3595		Henry V. Belisle et al	" " "	" "	10-20-56	" 427 " " 501	
3596		Benjamin A. McWhorter et ux	" " "	" "	2-19-57	" 439 " " 51	
3599		Jacob Sering et ux	" " "	" "	10-24-56	" 425 " " 47	
3600		Rosa Perenin	" " "	" "	7-25-60	" 602 " " 386	
244		State of California	Ben A. McWhorter	Director's Deed	6-19-57	" 451 " " 277	
311		" " "	Fortuna Plywood Co.	" "	3-24-60	" 582 " " 325	
3699-3711		Northwestern Pacific R.R. Co.	State of California	Relinquishment	2-14-62	" 682 " " 161	Access rights
433		State of California	County of Humboldt	"	10-30-63	" 760 " " 517	



DIST.	STATE	FEDERAL PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	CALIF.				

Edd Von Zandt CE 8436

T.2 N., R.1W., H.B. & M.



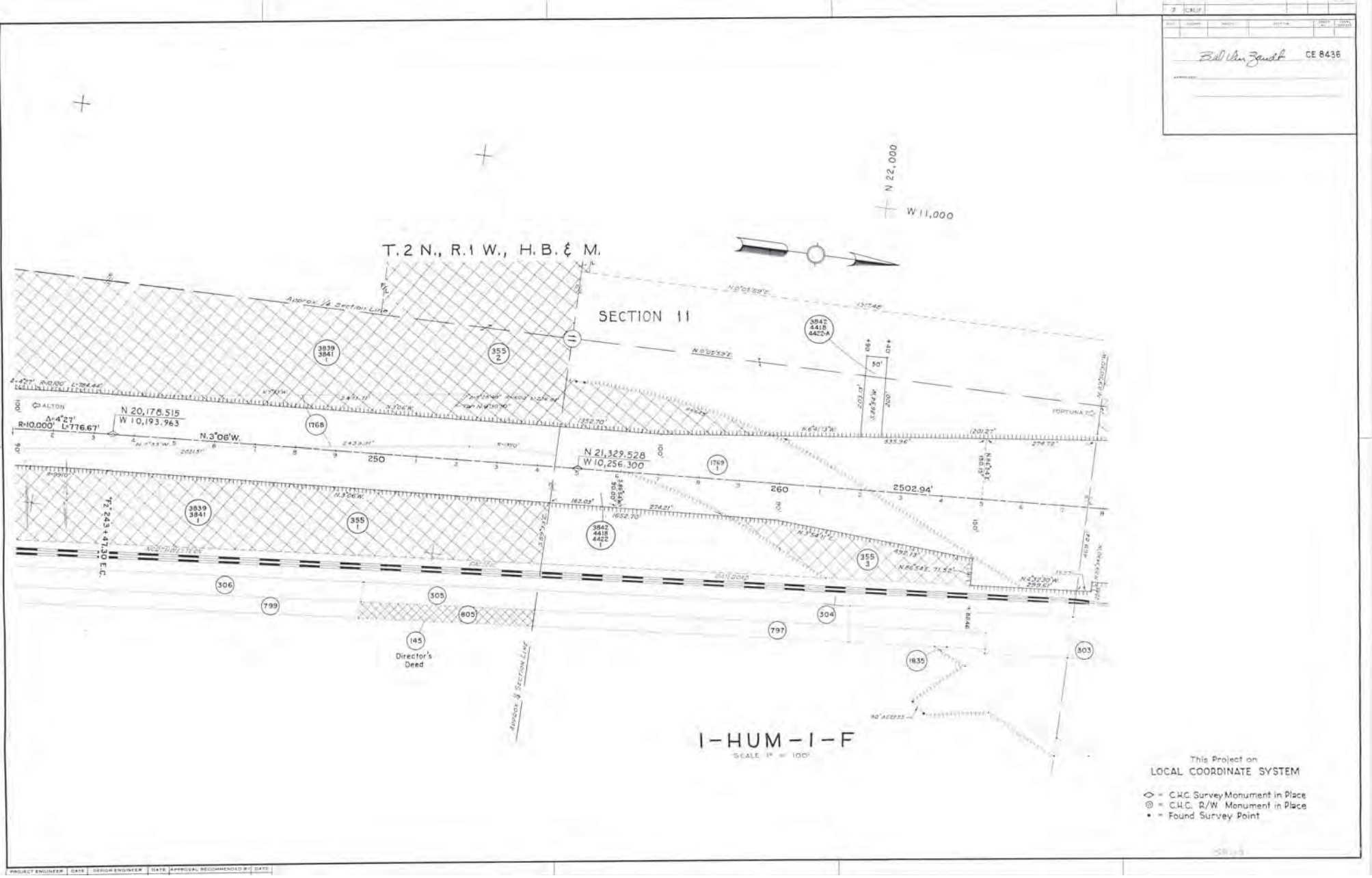
I-HUM-1-F

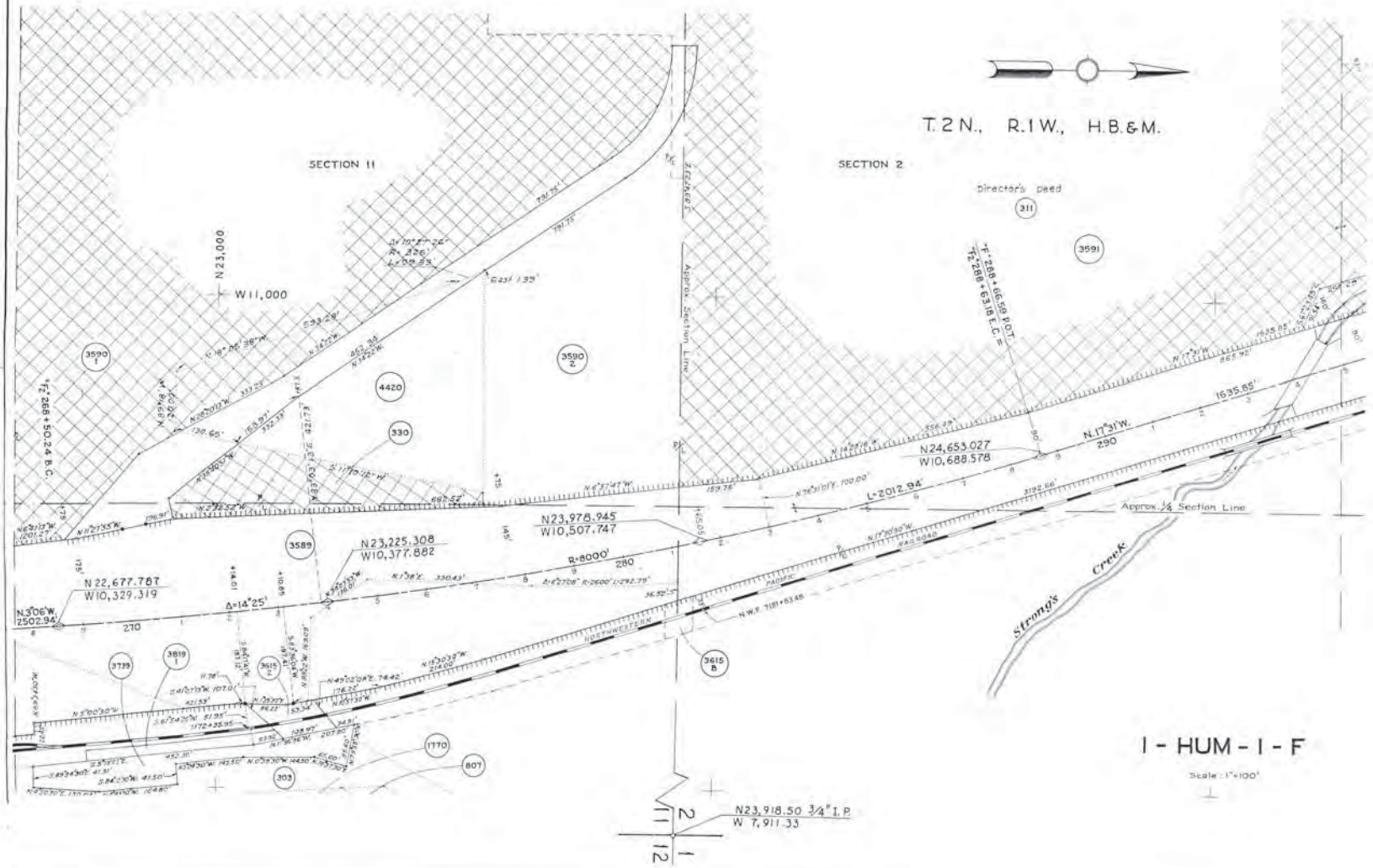
SCALE: 1" = 100'

This Project on
LOCAL COORDINATE SYSTEM

◇ = C.H.C. Survey Monument in Place
◎ = C.H.C. R/W Monument in Place
• = Found Survey Point

PROJECT ENGINEER	DATE	DESIGN ENGINEER	DATE	APPROVAL RECOMMENDED BY	DATE

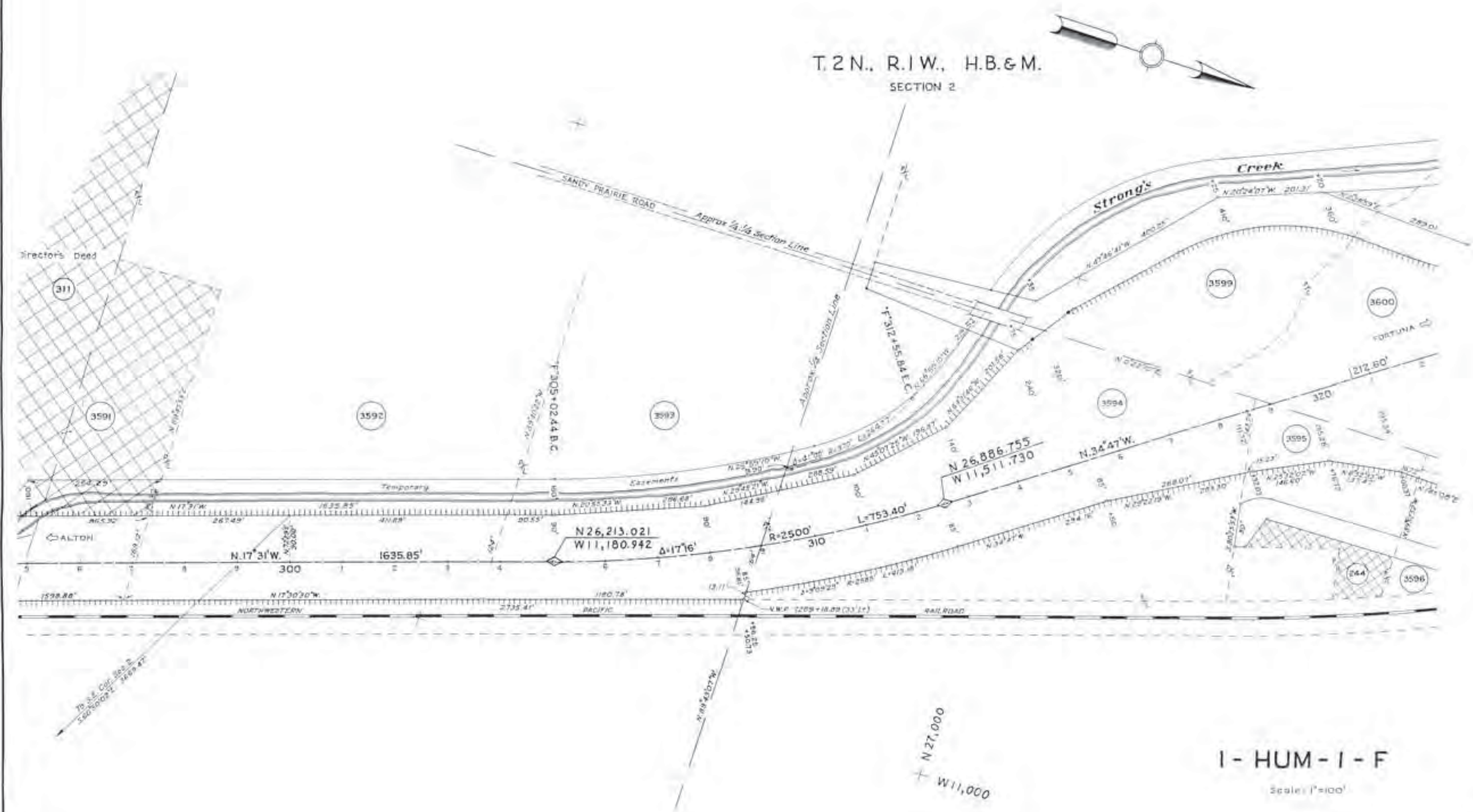

T. 2 N., R. 1 W., H. B. & M.
SECTION 11
N 22,000
W 11,000
Approx. 1/4 Section Line
N 20,178.515
W 10,193.963
N 21,329.528
W 10,256.300
N.3°06'W.
2502.94'
250
260
ALTON
FORTUNA
Δ=4°27'
R=10,000'
L=776.67'
T2 243+47.30 E.C.
SOUTHERN PACIFIC
Director's Deed
Approx. 1/4 SECTION LINE
40' ACCESS
1-HUM-1-F
SCALE 1" = 100'
This Project on
LOCAL COORDINATE SYSTEM
◇ = C.H.C. Survey Monument in Place
◎ = C.H.C. R/W Monument in Place
• = Found Survey Point
Bill Van Zandt
CE 8436



CALIF.

Bill Van Zandt CE 8436

PROJECT ENGINEER | DATE | CHIEF ENGINEER | DATE | APPROVAL RECOMMENDED BY | DATE



I - HUM - I - F

Scale: 1"=100'

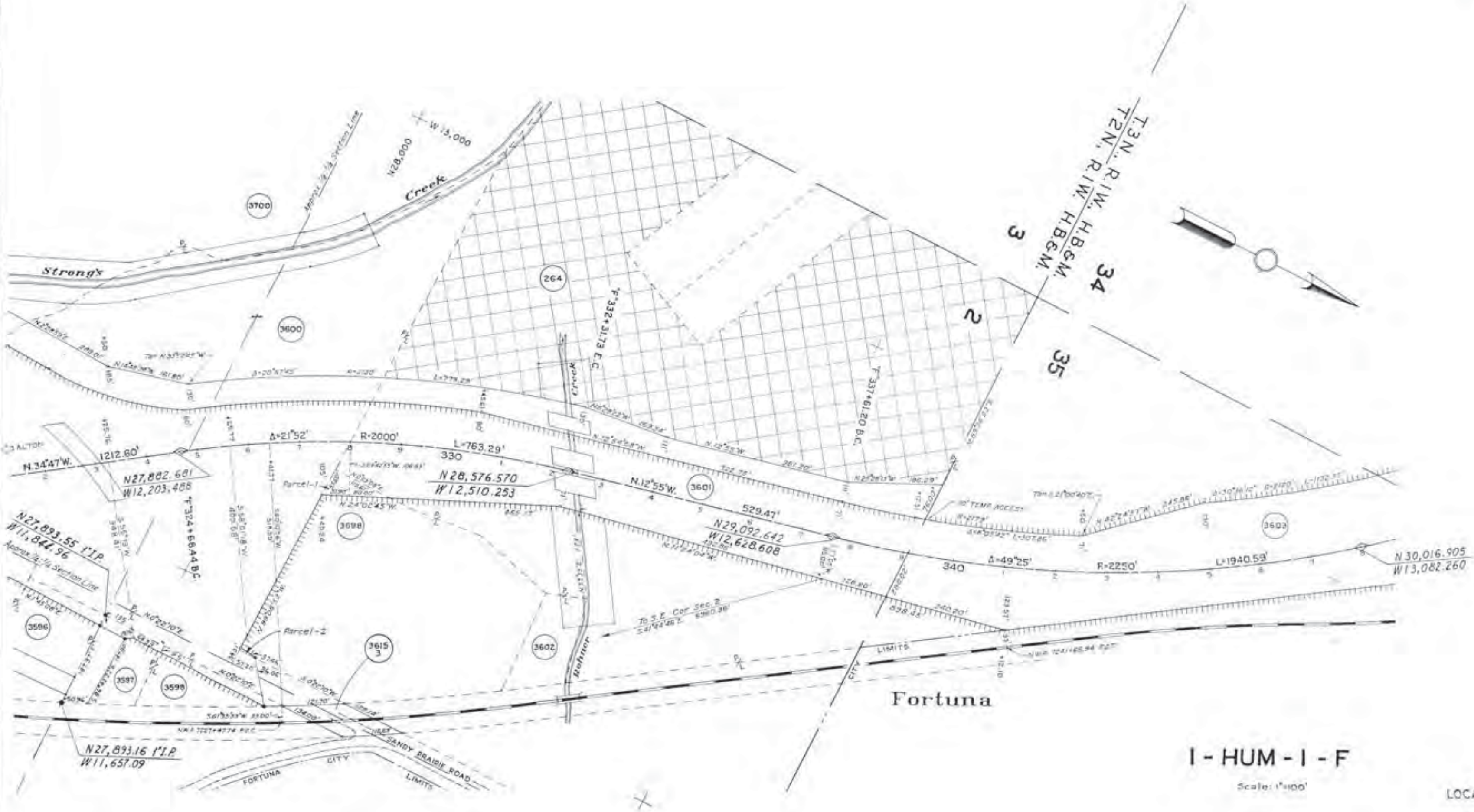
This Project on
LOCAL COORDINATE SYSTEM

◇ = C.H.C. Survey Monument in Place
◎ = C.H.C. R/W Monument in Place
• = Found Survey Point

B.D. Van Zandt CE 8436

7	CALIF					

B.A. Van Zandt CE 8436



I - HUM - I - F

Scale: 1"=100'

This Project on
LOCAL COORDINATE SYSTEM

◇ = C.H.C. Survey Monument in Place
◎ = C.H.C. R/W Monument in Place
• = Found Survey Point

MAP FILED

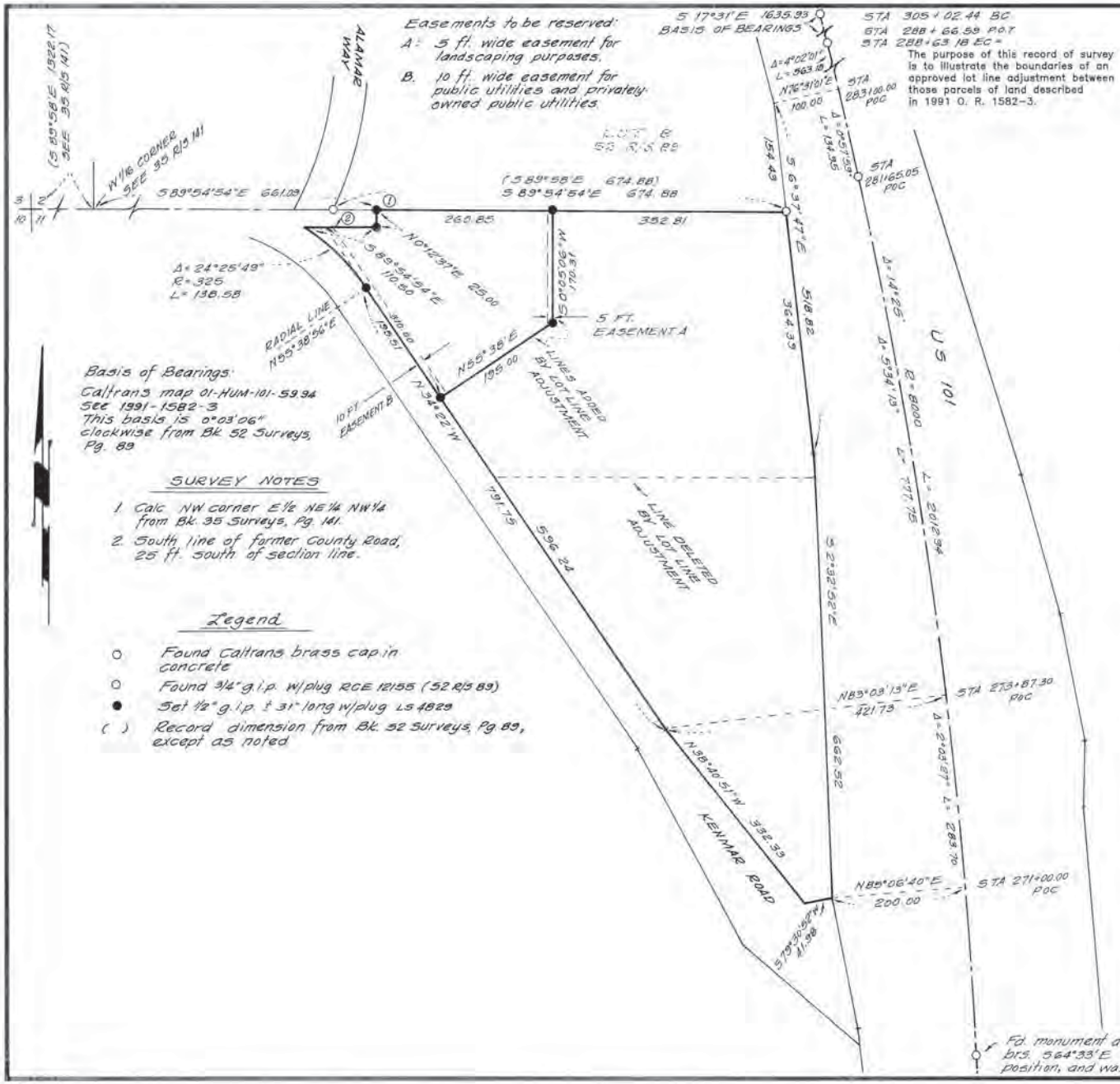
SCHEDULE

CASE	GRANTOR	GRANTEE	INSTRUMENT	DATE	RECORD	REMARKS
1769	Nora H. Ross	State of California	Grant Deed	Aug. 15, 1950	Bk. 142 O.R., Pg. 553	
1770	Clarence V. Atteberry	" " "	" "	Sept. 25, 1945	Bk. 221 Deeds, Pg. 137	
1771	Earl H. Travis et ux	" " "	" "	Sept. 13, 1945	Bk. 221 Deeds, Pg. 100	
1690	Clara S. Dinsmore	" " "	" "	Oct. 8, 1945	Bk. 228, Deeds Pg. 197	
1902	N.W. Pacific R.R.	" " "	Easement			Grade Separation EASEMENT
0352	Eel River & Eureka R.R. Co.	County of Humboldt	Grant Deed	Aug. 1, 1895	Bk. 17, Deeds, Pg. 180	
808	Mose Bruga	State of California	Deed - State Highway	Mch. 26, 1931	Bk. 201 Deeds, Pg. 69	
1691	G. A. Allen	" " "	Grant Deed	Sept. 1, 1948	Bk. 68, O.R. Pg. 188	
1772	Clara S. Dinsmore	" " "	Grant Deed	Oct. 4, 1945	Bk. 228, Deeds Pg. 117	
1735	Amos A. Wilson	" " "	" "	Mch. 27, 1945	Bk. 212, Deeds, Pg. 415	
1835	City of Fortuna		" "	3-5-45	Vol. 281 Deeds Pg. 110	
2065	Pacific Gas & Electric Co.	" " "	Quitclaim Deed	Nov. 3, 1948	Bk. 74, O.R., Pg. 275	Utilities Agreement No. 2065.
144	State of California	Ivan H. Olsen	Director's Deed	8-17-44	Book 106 O.R. Pg. 44	
303	A. P. Campton	State of California	Easement	7-6-17	" 140 Deeds " 12	
304	Musa C. Gregor	" " "	"	6-26-17	" 140 " " 11	
796	Clara S. Dinsmore	" " "	"	4-7-31	" 203 " " 180	
797	William C. Ross	" " "	"	10-9-31	" 205 " " [illegible]	
798	John B. MacMillan	" " "	"	8-20-31	" 203 " " 360	
803	Roy Fitzsimmons	" " "	"	8-31-31	" 203 " " 495	
807	Harold A. Dinsmore	" " "	"	4-14-31	" 203 " " 107	
1573	Mose Bruga	" " "	Encr. Permit	4-30-41	"	
325	Chas. W. Travis	" " "	Easement	7-31-23	" 140 " " 18	
[illegible]			Relinquishment	[illegible]	" [illegible] " " 640	

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS
RIGHT OF WAY MAP
I-HUM-1-F
SCALE: 1"=100'

801 - 806 STAPLED TOGETHER

0801



Basis of Bearings:
Caltrans map 01-HUM-101-59.94
See 1991-1582-3
This basis is 0°03'06" clockwise from Bk. 52 Surveys, Pg. 89

SURVEY NOTES

1. Calc. NW corner E½ NE¼ NW¼ from Bk. 35 Surveys, Pg. 141.
2. South line of former County Road, 25 ft. South of section line.

Legend

- ○ Found Caltrans brass cap in concrete
- ○ Found ¾" g.i.p. w/plug RCE 12155 (52 R/5 89)
- ● Set ½" g.i.p. ± 31" long w/plug LS 4829
- ( ) Record dimension from Bk. 52 Surveys, Pg. 89, except as noted

COUNTY SURVEYOR'S STATEMENT

This map has been examined in accordance with section 8766 of the Land Surveyor's Act this 29th day of May, 1992.

County Surveyor

R.C.E. 11980

License expires 3/31/93

SURVEYOR'S STATEMENT

This map correctly represents a survey made by me or under my direction in conformance with the requirements of the Land Surveyor's Act at the request of Ronald J. Harris, in March, 1992.

LICENSED LAND SURVEYOR MICHAEL J. O'HERN No. 4829 STATE OF CALIFORNIA

Michael J. O'Hern

Michael J. O'Hern L.S. 4829
License expires 9/30/92

1992-15647-1

RECORDER'S STATEMENT

Filed this 2nd day of June 1992 at 2:39 PM in Book 53 of Surveys at page 34 Humboldt County Records at the request of Kelly-O'Hern Associates.

Carolyn Crnich
County Recorder

By [illegible]
Deputy

Fee $6.00

RECORD OF SURVEY
for
RONALD J. HARRIS
in the CITY OF FORTUNA
N 1/2 SECTION 11 T2N R1W H.M.
Humboldt County
State of California

Kelly-O'Hern Associates
Eureka, California
May, 1992 Scale: 1"=100'

PAGE 1 OF 1

BOOK 53 OF SURVEYS, PAGE 34

BOARD OF SUPERVISORS, COUNTY OF HUMBOLDT, STATE OF CALIFORNIA

Certified copy of portion of proceedings, Meetings of June 8, 1960

IN THE MATTER OF EXECUTING INDENTURE WITH NORTHWESTERN PACIFIC RAILROAD COMPANY CONCERNING NEWBURG DRAINAGE STRUCTURE.

12 w 1 ct

Upon the motion of Supervisor Barsellus, seconded by Supervisor Roberison, Sam B. Merryman, Jr., Chairman of this Board of Supervisors, is hereby authorized to execute on behalf of the County of Humboldt an indenture, dated this date, by and between the County of Humboldt and the Northwestern Pacific Railroad Company. Said indenture grants to the County the right to construct, reconstruct, maintain and operate a drainage structure beneath that certain property of said Railroad as referred to therein and related to the Newburg drainage structure in accordance with the terms and conditions of said indenture. The Auditor is hereby authorized and directed to draw a warrant payable to the Northwestern Pacific Railroad Company in the amount of fifty dollars ($50.00) as consideration in full for the signing of said indenture.

AYES: Supervisors— Lindley, Barsellus, Roberison, Petterson, Merryman
NOES: Supervisors— None
ABSENT: Supervisors— None

STATE OF CALIFORNIA, }
County of Humboldt } ss.

I, FRED J. MOORE, JR., County Clerk of the County of Humboldt, State of California, and ex-officio Clerk of the Board of Supervisors of the County of Humboldt, do hereby certify the foregoing to be full, true and correct copies of the original orders made in the above entitled matters by said Board of Supervisors, at a meeting held in Eureka, California, on June 8, 1960 and as the same now appears of record in my office.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the Seal of said Board of Supervisors this 9th day of June, 1960

FRED J. MOORE, JR.
County Clerk and ex-officio Clerk of the Board of Supervisors of the County of Humboldt, State of California

By [signature]
Deputy Clerk.

L&M

THIS INDENTURE, made this _____ day of _____, 1959, by and between NORTHWESTERN PACIFIC RAILROAD COMPANY, a corporation of the State of California, herein termed "Railroad", and COUNTY OF HUMBOLDT, a political subdivision of the State of California, herein termed "Grantee".

WITNESSETH:

1. Railroad, for and in consideration of the faithful performance by Grantee of all the terms, covenants and conditions herein contained, hereby grants to Grantee the right to construct, reconstruct, maintain and operate a 42-inch reinforced concrete drainage pipe, hereinafter termed "structure" beneath the property of Railroad, at or near Fortuna, in the County of Humboldt, State of California, in the location shown enclosed within red lines upon the print of Railroad's San Rafael Drawing X-6778, revised October 23, 1959, hereto attached and made a part hereof.

This indenture will be supplemented to include a legal description of the property if requested by either party in writing.

limiting right and obligation of Railroad, its successors and assigns, to use all the property described herein in the performance of its duty as a common carrier, and, for that purpose, there is reserved unto Railroad, its successors and assigns, the right (consistent with the rights herein granted) to construct, reconstruct, maintain and use existing and future railroad tracks, facilities and appurtenances and existing and future transportation, communication and pipe line facilities and appurtenances in, upon, over, under, across and along said property.

3. This grant is made subject to all licenses, leases, easements, restrictions, conditions, covenants, encumbrances, liens and claims of title which may affect said property and the word GRANT as used herein shall not be construed as a covenant against the existence of any thereof.

4. The rights herein granted to Grantee shall lapse and become void if the construction of said structure upon said property is not commenced within one (1) year from the date first herein written.

5. Grantee shall bear the entire cost and expense of constructing, reconstructing and maintaining said structure upon said property. Grantee agrees that all work upon or in connection with said structure shall be done at such times and in such manner as not to interfere in any way whatsoever with the operations of Railroad. The plans for and the construction of said structure shall be subject to the approval of Railroad.

Grantee agrees to reimburse Railroad for the cost and expense to Railroad of furnishing any materials or performing any labor in connection with the construction, reconstruction, maintenance and removal of said structure, including, but not limited to, the installation and removal of such falsework and other protection beneath or along Railroad's tracks, and the furnishing of such watchmen, flagmen and inspectors as Railroad deems necessary.

[redacted]

6. [redacted]

7. Grantee, its agents and employees, shall have the privilege of entry on said property for the purpose of constructing, reconstructing, maintaining and making necessary repairs to said structure. Grantee agrees to keep said property in a good and safe condition free from waste, so far as affected by Grantee's operations, to the satisfaction of Railroad. If Grantee fails to keep said property in a good and safe condition free from waste, then Railroad may perform the necessary work at the expense of Grantee, which expense Grantee agrees to pay to Railroad upon demand.

8. In the event any work upon or in connection with said structure or its appurtenances, to be done upon or adjacent to the tracks and property of Railroad, should be let to a contractor by Grantee, such work shall not be begun until such contractor [redacted] entered into an agreement with the railroad company [redacted] said property, satisfactory to said company and indemnify [redacted] and against all claims, liability, cost and expense [redacted] the performance of the work to be done by such contractor.

Such contractor shall furnish, at the option of and without expense to Railroad, a reliable surety bond, in the amount and in a form satisfactory to said company, guaranteeing [redacted] performance of

all the terms, covenants and conditions contained in said agreement, and a certified copy of a policy of Public Liability and Property Damage Insurance, within limits specified by, and in a form satisfactory to, said company, covering the contractual liability assumed by contractor in said agreement to be entered into with said company by such contractor.

9. Should Grantee, its successors or assigns, at any time abandon the use of said property or any part thereof, or fail at any time to use the same for the purpose contemplated herein for a continuous period of one (1) year, the right hereby given shall cease to the extent of the use so abandoned or discontinued, and Railroad shall at once have the right, in addition to but not in qualification of the rights hereinabove reserved, to resume exclusive possession of said property or the part thereof the use of which is so discontinued or abandoned.

Upon termination of the rights and privileges hereby granted, Grantee, at its own cost and expense, agrees to remove said structure from said property and restore said property as nearly as practicable to the same state and condition in which it existed prior to the construction of said structure. Should Grantee in such event fail, neglect or refuse to remove said structure and restore said property, such removal and restoration may be performed by Railroad at the expense of Grantee, which expense Grantee agrees to pay to Railroad upon demand.

10. This indenture shall inure to the benefit of and be binding upon the successors and assigns of the parties hereto.

11. For the rights herein given, Grantee shall pay to Railroad the sum of Fifty (50) Dollars.

IN WITNESS WHEREOF, the parties hereto have caused these presents to be executed as of the day and year first herein written. (In duplicate)

NORTHWESTERN PACIFIC RAILROAD COMPANY

By_____
(Title)

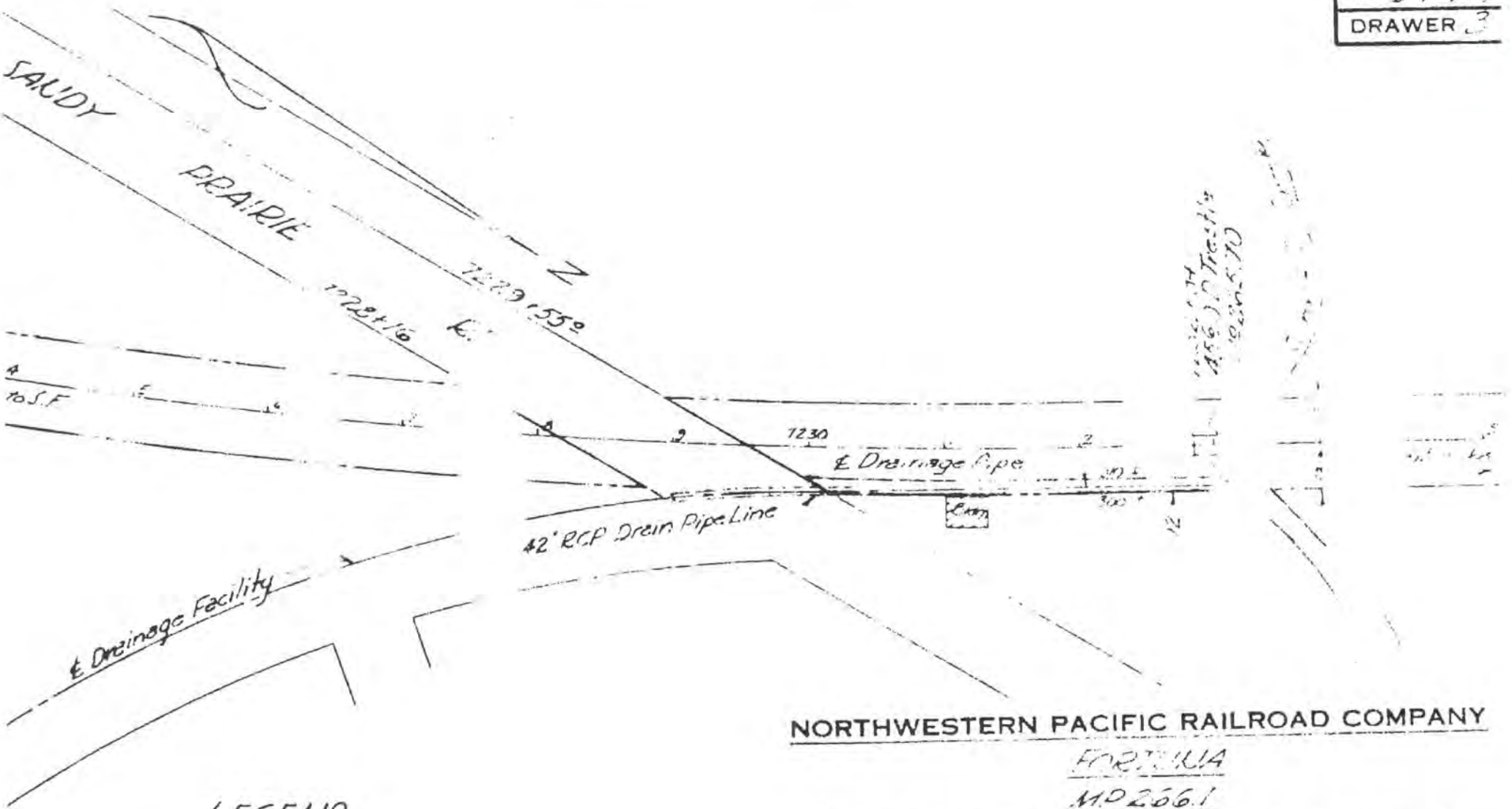
Attest:_____
(Assistant Secretary)

COUNTY OF HUMBOLDT

By_____
Chairman, Board of Supervisors

_____
Clerk, Board of Supervisors

SAN RAFAEL
X- 6775
DRAWER 3



LEGEND

---——U.W.P. Property Lines

———Red - Pipe Line to be covered by Agmt.

NORTHWESTERN PACIFIC RAILROAD COMPANY

FORTUNA

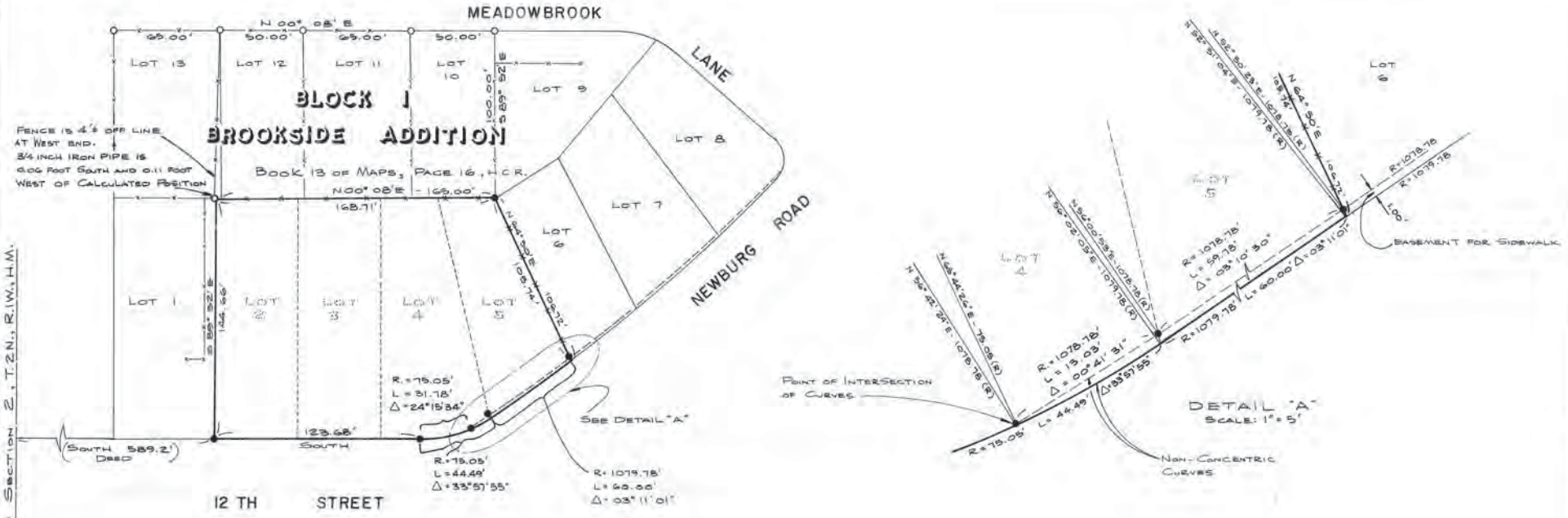
MP 266.1

AGREEMENT WITH COUNTY OF HUMBOLDT TO CONSTRUCT & MAINTAIN 42 INCH RCP DRAINAGE PIPE LINE

Scale 1" = 100'

Sept 1, 1953

Rev: Oct 23, 1953



LEGEND

- ○ Found 3/4 inch iron pipe as shown in Book 13 of Maps, Page 16, H.C.R.
- ● 5/8 inch re-bar and aluminum cap stamped "LS 3945 PC 1974", set by this survey.

REFERENCES

Book 281 of Official Records, Page 148
Book 521 of Official Records, Page 234
Book 568 of Official Records, Page 47

Basis of Bearing is Book 13 of Maps, Page 16, Humboldt County Records.

SURVEYOR'S CERTIFICATE

This map correctly represents a survey made by me or under my direction in conformance with the requirements of the Land Surveyor's Act at the request of Murchison Construction Company in February 19 74

Michael R. McGee
Michael R. McGee LS 3945

RECORDER'S CERTIFICATE

3679
Filed this 1st day of March 19 74 at 10:51 A.M. in Book 29 of Surveys at page 104 Humboldt County Records, at the request of Gerald H. Griffith and Associates

Emma Lee Meade
County Recorder
By Grace Jackson
Fee $5.00

COUNTY SURVEYOR'S CERTIFICATE

This map has been examined for conformance with the requirements of the Land Surveyor's Act this 26th day of February 19 74

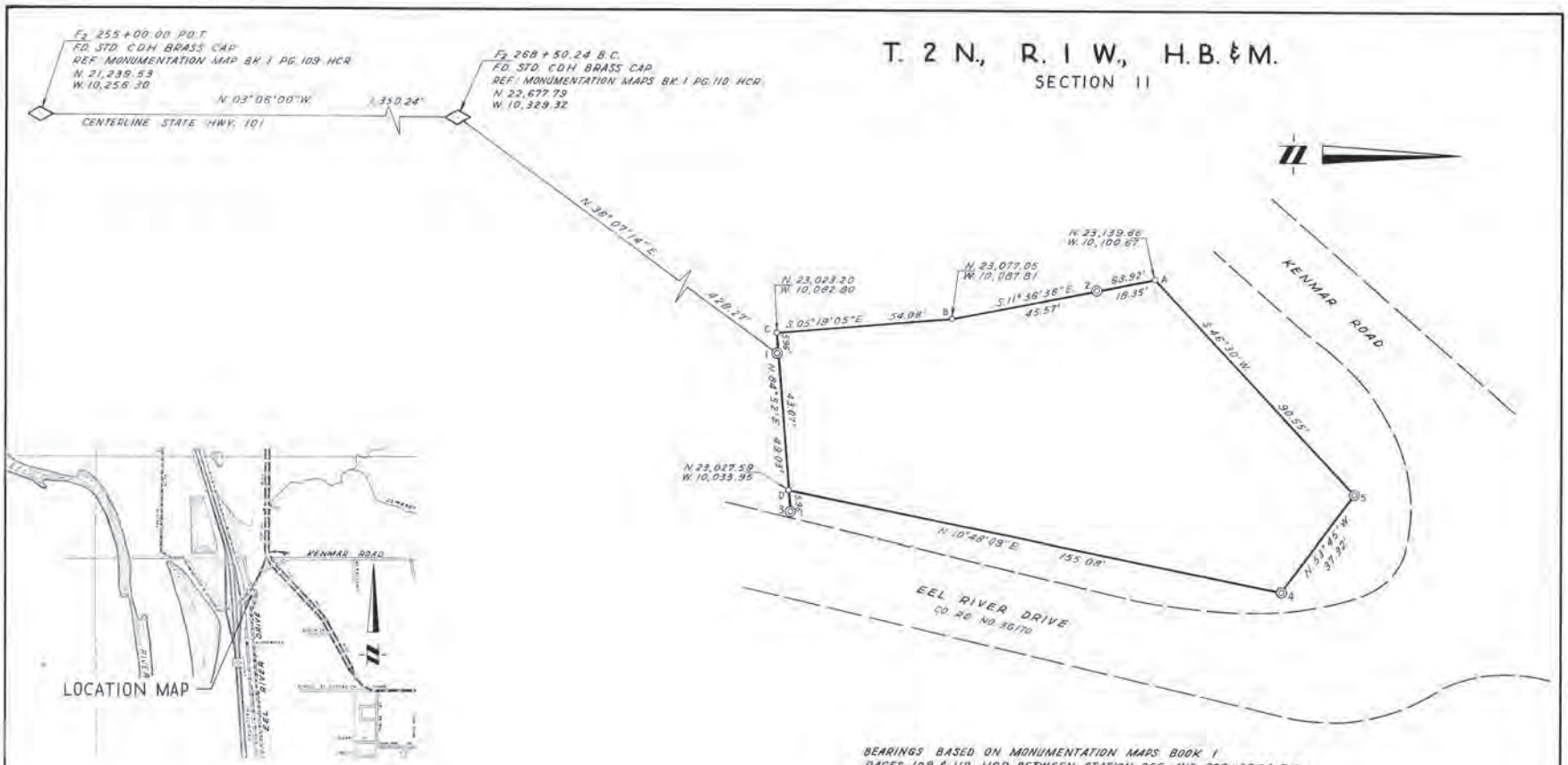
Gary C. Mitchell
County Surveyor

RECORD OF SURVEY
FOR
MURCHISON CONSTRUCTION COMPANY
IN
NW 1/4 SECTION 2, T.2N., R.1W., H.M.
COUNTY OF HUMBOLDT STATE OF CALIFORNIA
SCALE 1" = 40' FEBRUARY 19 74
GERALD H. GRIFFITH & ASSOCIATES

Sheet 1 of 1
193-400-1

T. 2 N., R. 1 W., H.B. & M.

SECTION 11



BEARINGS BASED ON MONUMENTATION MAPS BOOK 1 PAGES 109 & 110 HCR BETWEEN STATION 255 AND 268+50.24 B.C.

CONTACT CALTRANS SURVEY DEPT. FOR CONTROL POINT DESCRIPTIONS

LEGEND

◇ = DOT SURVEY MONUMENT IN PLACE

◎ = 1" DIA IRON PIPE WITH DOT PLUG & TACK

○ = UNMONUMENTED ANGLE POINT

SURVEYOR'S CERTIFICATE

THIS MAP CORRECTLY REPRESENTS A SURVEY MADE BY ME OR UNDER MY DIRECTION IN CONFORMANCE WITH THE REQUIREMENTS OF THE LAND SURVEYOR'S ACT AT THE REQUEST OF DEPARTMENT OF TRANSPORTATION IN AUGUST, 1980

SIGNED George P. Otterbeck

GEORGE P. OTTERBECK
CE 29557

REGISTERED PROFESSIONAL ENGINEER
GEORGE P. OTTERBECK
No. 29557
CIVIL
STATE OF CALIFORNIA

RECORDER'S CERTIFICATE

FILED FOR RECORD THIS _____

DAY OF _____, 19___

AT _____ M. IN BOOK _____

OF _____, AT PAGE _____, AT THE

REQUEST OF DEPARTMENT OF TRANSPORTATION

SIGNED _____
COUNTY RECORDER

COUNTY SURVEYOR'S CERTIFICATE

This map has been examined for conformance with the requirements of the Land Surveyor's Act this ____ day of _____, 19___

_____
County Surveyor

RECORD OF SURVEY

OF STATE HIGHWAY LANDS IN HUMBOLDT COUNTY, CALIFORNIA

FOR

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

1656 UNION STREET EUREKA

IN SEC 11 T. 2 N., R. 1 W., H.B. & M.

SCALE: 1" = 20' DATE AUGUST 1980

CO	ROUTE	POST MILE	SHEET 1 OF 1
HUM	101	59.5	

BK. 38 OF SURVEYS PG. 59

RECORD OF SURVEY
CONTROL MONUMENTATION MAP

LOCATED WITHIN
SECTIONS 29 & 32, T4N, R1W,
SECTIONS 5,8,17,20,28 & 29, T3N, R1W,
SECTIONS 2 & 11, T2N, R1W,
HUMBOLDT MERIDIAN,
HUMBOLDT COUNTY, CALIFORNIA
AUGUST 2007

SURVEYOR'S NOTES

1. THE PURPOSE OF THIS SURVEY IS TO DOCUMENT NEWLY ESTABLISHED CONTROL AND TO PERPETUATE THE LOCATIONS OF EXISTING CENTERLINE REFERENCE MONUMENTS WHICH WERE DESTROYED IN 2007 DURING THE CALTRANS MEDIAN PROJECT ON HIGHWAY 101 BETWEEN POST MILES 58.9 - 60.5 AND 63.2 - 70.0.

2. HORIZONTAL CONTROL FOR THIS SURVEY WAS CONSTRAINED TO THE FOLLOWING CCS83(1991.35), ZONE 1, (METRIC) GEODETIC CONTROL MONUMENTS AS PUBLISHED BY THE NATIONAL GEODETIC SURVEY. COMBINED GRID FACTOR FOR THIS PROJECT IS 0.999893228 AT "HUM 101 66.42 GPS" WITH A CONVERGENCE ANGLE OF - 01°26'39".

STATION	LATITUDE	LONGITUDE	ELLIP HEIGHT	ELEVATION
HPGN D CA 01 PA	40°35'20.25799"	124°15'20.10610"	-22.10	9.08
HPGN D CA 01 QB	40°44'40.52926"	124°11'57.65351"	-18.71	12.03
HPGN D CA 01 PB	40°38'21.21783"	124°12'11.85946"	79.92	10.85*

* = ESTABLISHED BY DIGITAL LEVELS IN JANUARY 2004

3. NGS CONTROL MONUMENT "ROHNPORT" WAS OCCUPIED DURING THIS SURVEY. ANY ATTEMPT TO HOLD THE PUBLISHED VALUES FOR THIS POINT RESULTED IN UNSATISFACTORY RESULTS AND WAS THEREFORE ALLOWED TO FLOAT. COORDINATES SHOWN FOR THIS MONUMENT ARE THE "UPDATED" VALUES ESTABLISHED BY THIS SURVEY.

4. STATIC GPS OBSERVATIONS PERFORMED IN JANUARY 2004 USING TRIMBLE 4700 AND 5700 DUAL FREQUENCY RECEIVERS WITH FIXED HEIGHT TRIPODS. BASELINE PROCESSING AND LEAST SQUARES ADJUSTMENT WAS PERFORMED USING TRIMBLE GEOMATICS OFFICE VERSION 1.63.

5. GPS AND CONVENTIONAL CONTROL MONUMENTS WERE SET IN NOVEMBER 2003.

6. DIFFERENTIAL LEVELS WERE PERFORMED IN JANUARY 2004 USING A TOPCON DL-102C DIGITAL LEVEL. THE FOLLOWING NAVD88 BENCHMARKS PUBLISHED BY THE NATIONAL GEODETIC SURVEY WERE USED DURING THIS SURVEY.

STATION	ELEVATION (METRIC)
M 1401	(PID LV0660) 15.783
M 1086	(PID LV0234) 15.573
X 1086	(PID LV0236) 14.841
C 1087 RESET	(PID LV0243) 32.909
L 1401	(PID LV0659) 62.416
F 1087	(PID LV0248) 72.145
G 1087 RESET	(PID LV0250) 85.838
K 1087	(PID LV0255) 1.695 * (1.652)
K 1401	(PID LV0657) 1.741 * (1.729)
L 1087	(PID LV0259) 1.657 * (1.631)
M 1087	(PID LV0260) 12.364 * (12.352)
N 1087 RESET	(PID LV0258) 6.657

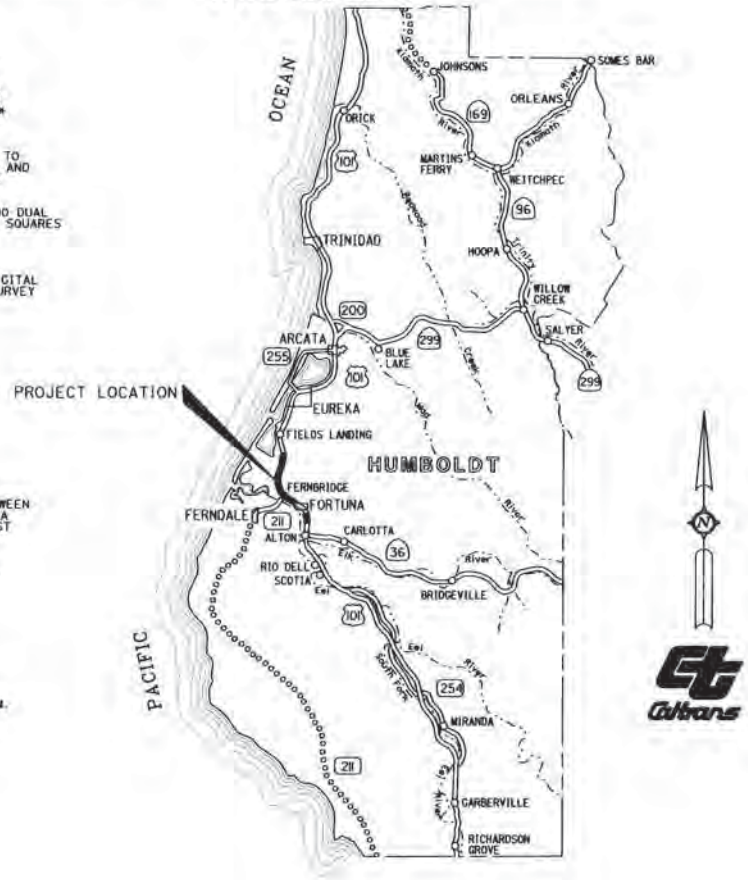
* DENOTES SETTLEMENT (ELEVATION ESTABLISHED BY THIS SURVEY)

7. CONVENTIONAL CONTROL AND RECOVERY OF CENTERLINE MONUMENTS WAS PERFORMED BETWEEN NOVEMBER 2003 AND JUNE 2004 USING A LEICA TCRA 1103-PLUS TOTAL STATION AND A TRIMBLE TSCE DATA COLLECTOR WITH SURVEY CONTROLLER VER 10.70. THE FINAL LEAST SQUARES ADJUSTMENT WAS PROCESSED USING TRIMBLE GEOMATICS OFFICE VER 1.63.

8. A PROJECT REPORT IS AVAILABLE AT THE CALTRANS DISTRICT OFFICE LOCATED AT 1656 UNION STREET, EUREKA, CA 95501. REFERENCE EA IS 43840 SR 03175 & 03187.

BASIS OF BEARINGS

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE NORTH AMERICAN DATUM OF 1983, CALIFORNIA COORDINATE SYSTEM, ZONE 1, HOLDING THE PUBLISHED VALUES FOR MONUMENTS HPGN D CA 01 PA, HPGN D CA 01 PB AND HPGN D CA 01 QB AS PUBLISHED BY THE NATIONAL GEODETIC SURVEY USING A COMBINED GRID FACTOR OF 0.999893228 AND CONVERGENCE ANGLE OF -1°26'39" AT 66.42 GPS. HAVING AN ELEVATION OF 80.127 M.



LOCATION MAP
NO SCALE

SURVEYOR'S STATEMENT

THIS MAP CORRECTLY REPRESENTS A SURVEY MADE BY ME OR UNDER MY DIRECTION IN CONFORMANCE WITH THE REQUIREMENTS OF THE PROFESSIONAL LAND SURVEYORS' ACT AT THE REQUEST OF THE STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION (CALTRANS) IN AUGUST 2007.

Richard E Beale — 9/22/10
RICHARD EARL BEALE — DATE

RICHARD EARL BEALE No. 7861 Exp. 12/31/10 PROFESSIONAL LAND SURVEYOR STATE OF CALIFORNIA

NORTH REGION OFFICE OF SURVEYORS
DISTRICT 1 SURVEY SUPPORT, EUREKA

COUNTY SURVEYOR'S STATEMENT

THIS MAP HAS BEEN EXAMINED IN ACCORDANCE WITH SECTION 8766 OF THE PROFESSIONAL LAND SURVEYORS' ACT THIS 1ST DAY OF OCTOBER, 2010.

BY: David J. Ryan
DAVID J. RYAN LS 6212 COUNTY SURVEYOR

LICENSED LAND SURVEYOR DAVID J RYAN 6212 STATE OF CALIFORNIA

RECORDER'S STATEMENT

FILED THIS 1st DAY OF October, 2010
AT 1:33 P.M.
IN BOOK 68 OF SURVEYS AT PAGES 25,26,27+28
AT THE REQUEST OF CALTRANS.

BY: CAROLYN CRNICH, HUMBOLDT COUNTY RECORDER
FILE # 2010-21578-4
BY: DEPUTY COUNTY RECORDER

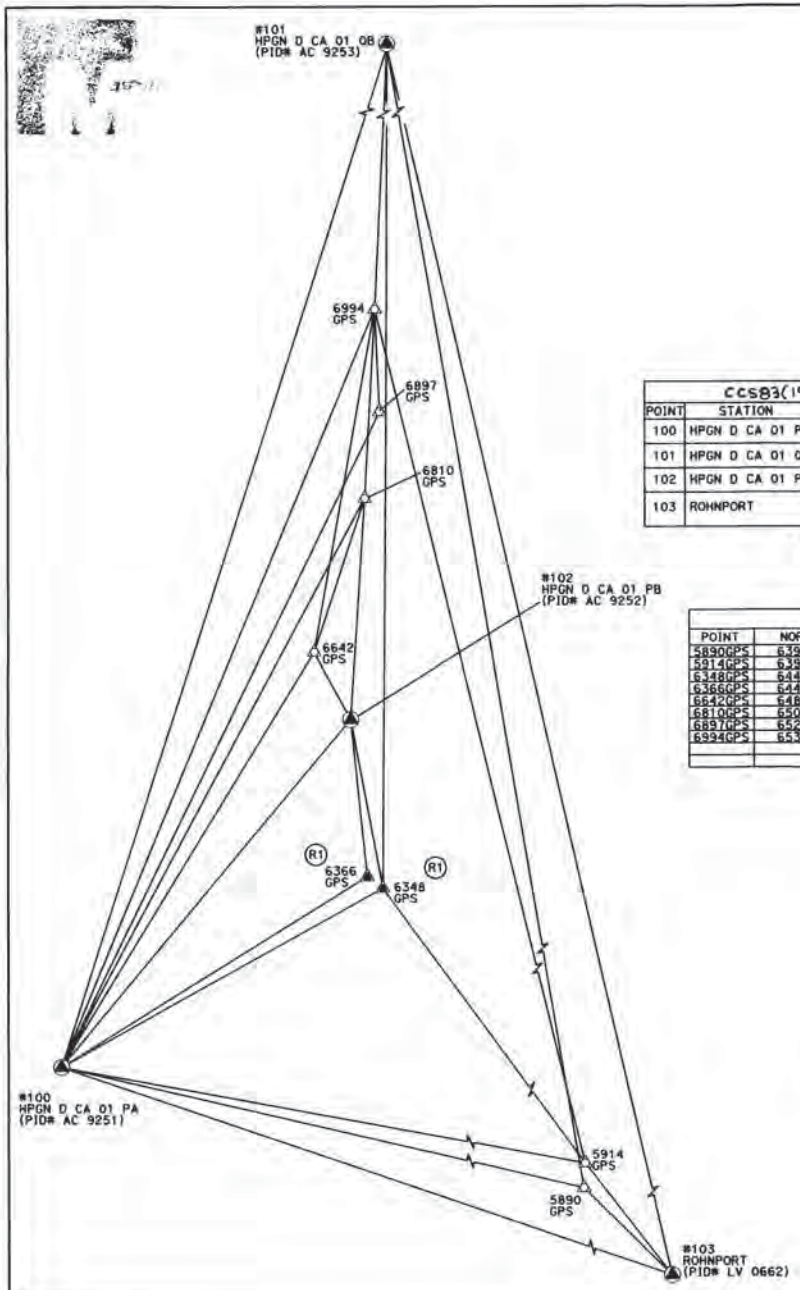
NO FEE REQUIRED PER GOVERNMENT CODE 6103

STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION (CALTRANS)
NORTH REGION
OFFICE OF SURVEYORS

ALONG HIGHWAY 101 BETWEEN ALTON AND FIELDS LANDING IN THE UNINCORPORATED AREA OF HUMBOLDT COUNTY AND THE CITY OF FORTUNA

DIST	COUNTY	ROUTE	POST MILES	SHEET NO.	TOTAL SHEETS
01	HUM	101	58.9/70.1	1	4

BOOK 68 OF SURVEYS, PAGE 25



LOCATED WITHIN
SECTIONS 29 & 32, T4N, R1W,
SECTIONS 5,8,17,20, 28, & 29, T3N, R1W,
SECTIONS 2 & 11, T2N, R1W,
HUMBOLDT MERIDIAN,
HUMBOLDT COUNTY, CALIFORNIA
AUGUST 2007

CCS83(1991.35), ZONE 1, NAVD88, METRIC — FOUND GEODETIC CONTROL

POINT	STATION	NORTHING	EASTING	ELEVATION	DESCRIPTION
100	HPGN D CA 01 PA	641878.612	1819091.350	9.08	3.25" ALUMINUM SURVEY DISK ON ALUMINUM ALLOY ROD ENCASED IN PVC IN CONCRETE STAMPED "CA HPGN DENSIFICATION STA 01 PA 1993".
101	HPGN D CA 01 08	659032.849	1814283.820	12.03	3.25" ALUMINUM SURVEY DISK ON ALUMINUM ALLOY ROD ENCASED IN PVC IN CONCRETE STAMPED "CA HPGN DENSIFICATION STA 01 08 1993".
102	HPGN D CA 01 PB	647345.625	1813656.529	110.85	3.25" ALUMINUM SURVEY DISK ON ALUMINUM ALLOY ROD ENCASED IN PVC IN CONCRETE STAMPED "CA HPGN DENSIFICATION STA 01 PB 1993".
103	ROHNPORT	637731.965 637732.002*	1819470.277 1819470.423*	112.753*	ROD ENCASED IN PVC IN CONCRETE STAMPED "ROHNPORT 1987", NOT HELD FOR CONTROL

* AS PUBLISHED BY THE NATION GEODETIC SURVEY

GPS CONTROL ESTABLISHED BY THIS SURVEY

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
5890GPS	639095.408	1818084.450	16.578	1" GIP WITH 2.25" BRASS DISK STAMPED "58.90 GPS 2003"
5914GPS	639482.457	1818104.356	16.247	1" GIP WITH 2.25" BRASS DISK STAMPED "59.14 GPS 2003"
6348GPS	644695.261	1814161.770	36.998	0.75" REBAR WITH 1.5" ALUMINUM CAP STAMPED "HUM 101 63.48", R1
6366GPS	644876.935	1813916.854	35.771	0.75" REBAR WITH 1.5" ALUMINUM CAP STAMPED "HUM 101 63.66", R1
6642GPS	648397.474	1813080.575	80.127	1" GIP WITH 2.25" BRASS DISK STAMPED "66.42 GPS 2003"
6810GPS	650807.989	1813877.982	6.095	1" GIP WITH 2.25" BRASS DISK STAMPED "68.10 GPS 2003"
6897GPS	652167.735	1814110.979	3.174	1" GIP WITH 2.25" BRASS DISK STAMPED "HUM 101 68.97 GPS"
6994GPS	653777.294	1814042.416	4.149	1" GIP WITH 2.25" BRASS DISK STAMPED "HUM 101 69.94 GPS"

ROTATE GRID BEARINGS
1°26'39" COUNTERCLOCKWISE TO
OBTAIN GEODETIC (TRUE) BEARINGS

CONVERGENCE ANGLE
1°26'39" AT
66.42 GPS

SCALE 1:50000
0 1000 2000

LEGEND

- FOUND GEODETIC CONTROL MONUMENT
- SET CALTRANS GPS MONUMENT
- FOUND CALTRANS GPS MONUMENT (R1)
- (R1) BOOK 64 OF SURVEYS, PAGES 146 & 147

NOTES

1. SOME MONUMENT SYMBOLS HAVE BEEN MOVED GRAPHICALLY TO ALLOW FOR CLAIRITY.
2. NOT ALL BASELINES USED IN THE ADJUSTMENT ARE SHOWN.

STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION (CALTRANS)

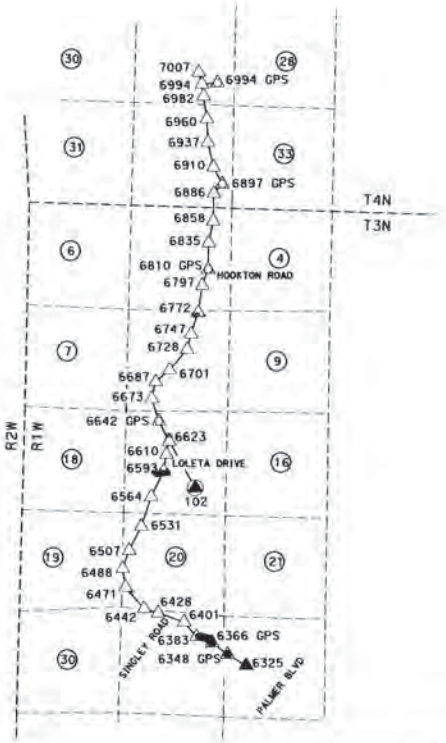
NORTH REGION
OFFICE OF SURVEYORS

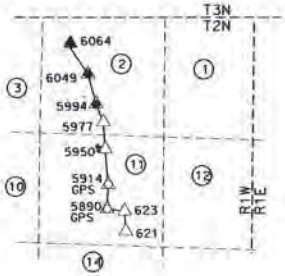
ALONG HIGHWAY 101 BETWEEN
ALTON AND FIELDS LANDING
IN THE UNINCORPORATED AREA
OF HUMBOLDT COUNTY AND
THE CITY OF FORTUNA

DIST	COUNTY	ROUTE	POST MILES	SHEET NO.	TOTAL SHEETS
01	HUM	101	58.9/70.1	2	4

BOOK 68 OF SURVEYS, PAGE 26

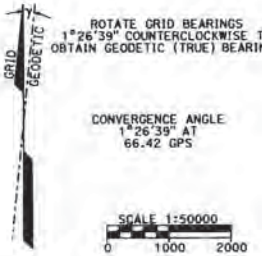
LOCATED WITHIN
SECTIONS 29 & 32, T4N, R1W,
SECTIONS 5,8,17,20, 28 & 29, T3N, R1W,
SECTIONS 2 & 11, T2N, R1W,
HUMBOLDT MERIDIAN,
HUMBOLDT COUNTY, CALIFORNIA
AUGUST 2007





CONVENTIONAL CONTROL
CCS83(1991.35), ZONE 1, NAVD88, METRIC

STATION	NORTHING	EASTING	ELEVATION	DESCRIPTION
621	638760.198	1818215.300	16.628	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "02002-621"
623	639081.887	1818197.812	16.545	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "02002-623"
5890GPS	639095.408	1818084.450	16.578	SET 1" GIP WITH 2.25" WITH CONCRETE COLLAR BRASS DISK STAMPED "58.90 GPS 2003"
5914GPS	639482.457	1818104.356	16.247	SET 1" GIP WITH 2.25" WITH CONCRETE COLLAR BRASS DISK STAMPED "59.14 GPS 2003"
5950	640048.662	1818057.189	20.830	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "59.50 2003"
5977	640478.536	1818031.999	15.365	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "59.77 2003"
5994GPS	640764.725	1817916.843	15.212	FOUND ¾" REBAR WITH 1.5" ALUMINUM CAP STAMPED "HUM 101 59.94" (R1, R2)
6049GPS	641243.774	1817790.489	14.391	FOUND ¾" REBAR WITH 1.5" ALUMINUM CAP STAMPED "HUM 101 60.49" (R1, R2)
6064	641736.254	1817459.174	14.680	FOUND ¾" REBAR WITH 1.5" ALUMINUM CAP STAMPED "HUM 101 60.64" (R2)
6325	644512.521	1814456.488	29.500	FOUND ¾" REBAR WITH 1.5" ALUMINUM CAP STAMPED "HUM 101 63.25" (R2)
6348GPS	644695.261	1814161.770	36.998	FOUND ¾" REBAR WITH 1.5" ALUMINUM CAP STAMPED "HUM 101 63.48" (R1, R2)
6366GPS	644876.935	1813916.854	35.771	FOUND ¾" REBAR WITH 1.5" ALUMINUM CAP STAMPED "HUM 101 63.66" (R1, R2)
6383	644976.941	1813669.003	34.172	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "63.83 2003"
6401	645207.057	1813473.861	29.385	SET ¾" IRON PIPE WITH 2.25" BRASS DISK STAMPED "SINGLEY 1 64.01 2003"
6428	645356.801	1813057.663	23.612	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "64.28 2003"
6442	645424.222	1812834.897	26.838	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "64.42 2003"
6471	645764.986	1812539.414	50.614	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "64.71 2003"
6488	646063.662	1812496.391	62.605	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "64.88 2003"
6507	646349.960	1812601.275	65.727	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "65.07 2003"
6531	646731.811	1812795.579	59.384	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "65.31 2003"
6564	647206.140	1812956.764	66.069	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "65.64 2003"
102	647345.625	1813656.529	110.85	FOUND 3.25" ALUMINUM SURVEY DISK ON ALUMINUM ALLOY ROD ENCASED IN PVC IN CONCRETE STAMPED "CA HPGN DENSIFICATION STA 01 PID 1993"
6593	647616.208	1813157.768	71.513	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "65.93 2003"
6610	647902.952	1813203.998	78.609	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "66.10 2003"
6623	648082.740	1813246.893	78.545	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "66.23 2003"
6642GPS	648397.474	1813080.575	80.127	SET 1" GIP WITH 2.25" BRASS DISK WITH CONCRETE COLLAR STAMPED "66.42 GPS 2003"
6673	648758.842	1812920.494	87.445	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "66.73 2003"
6687	649024.716	1813034.350	92.100	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "66.87 2003"
6701	649212.844	1813255.520	85.535	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "67.01 2003"
6728	649537.428	1813538.671	69.917	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "67.28 2003"
6747	649783.818	1813599.732	55.484	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "67.47 2003"
6772	650122.442	1813716.012	33.920	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "67.72 2003"
6797	650551.665	1813784.699	8.606	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "67.97 2003"
6810GPS	650807.989	1813877.982	6.095	SET 1" GIP WITH 2.25" BRASS DISK WITH CONCRETE COLLAR STAMPED "68.10 GPS 2003"
6835	651229.581	1813888.458	3.709	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "68.35 2003"
6858	651576.060	1813963.094	2.456	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "68.58 2003"
6886	652014.778	1813974.406	2.186	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "68.86 2003"
6897GPS	652167.739	1814110.979	3.174	SET 1" GIP WITH 2.25" BRASS DISK WITH CONCRETE COLLAR STAMPED "HUM 101 68.97 GPS"
6910	652435.854	1813969.742	1.621	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "69.10 2003"
6937	652829.477	1813887.032	2.043	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "69.37 2003"
6960	653200.778	1813869.650	1.995	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "69.60 2003"
6982	653562.945	1813820.785	2.358	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "PC 69.82"
6994	653755.051	1813795.901	3.348	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "PC 69.94"
6994GPS	653777.294	1814042.416	4.149	SET 1" GIP WITH 2.25" BRASS DISK WITH CONCRETE COLLAR STAMPED "HUM 101 69.94 GPS"
7007	653946.755	1813744.951	4.630	SET ⅜" REBAR WITH 1.5" ALUMINUM CAP STAMPED "PC 70.07"



LEGEND

- FOUND GEODETIC CONTROL MONUMENT
- SET CALTRANS GPS MONUMENT
- FOUND CALTRANS GPS MONUMENT (R1)
- SET CALTRANS CONTROL MONUMENT
- FOUND CALTRANS CONTROL MONUMENT (R2)
- (R1) BOOK 64 OF SURVEYS, PAGES 146 & 147
- (R2) BOOK 67 OF SURVEYS, PAGES 56 - 64
- (XX) SECTION NUMBER

NOTE

SOME MONUMENT SYMBOLS HAVE BEEN MOVED GRAPHICALLY TO ALLOW FOR CLAIRITY.

STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION (CALTRANS)

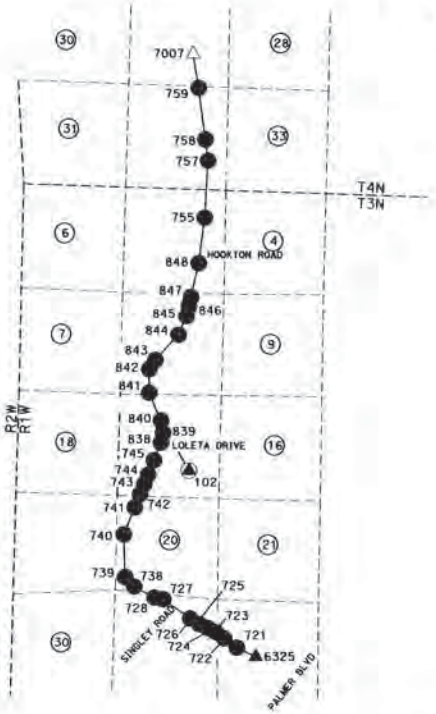
NORTH REGION
OFFICE OF SURVEYORS

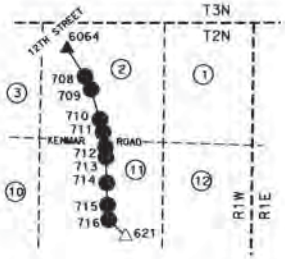
ALONG HIGHWAY 101 BETWEEN ALTON AND FIELDS LANDING IN THE UNINCORPORATED AREA OF HUMBOLDT COUNTY AND THE CITY OF FORTUNA

DIST	COUNTY	ROUTE	POST MILES	SHEET NO.	TOTAL SHEETS
01	HUM	101	58.9/70.1	3	4

BOOK 68 OF SURVEYS, PAGE 27

LOCATED WITHIN
SECTIONS 29 & 32, T4N, R1W,
SECTIONS 5,8,17,20,28 & 29, T3N, R1W,
SECTIONS 2 & 11, T2N, R1W,
HUMBOLDT MERIDIAN,
HUMBOLDT COUNTY, CALIFORNIA
AUGUST 2007





CONVENTIONAL CONTROL
CCS83(1991.35), ZONE 1, NAVD88, METRIC

STATION	NORTHING	EASTING	ELEVATION	DESCRIPTION
6064	641736.254	1817459.174	14.680	FOUND ¾" REBAR WITH 1.5" ALUMINUM CAP STAMPED "HUM 101 60.64" (R2)
708	641291.600	1817744.875	13.883	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 312+55.84 (R6)
709	641083.792	1817840.502	14.168	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 305+42.44 (R6)
710	640604.723	1817978.587	15.465	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 288+66.59/288+63.18 (R6)
711	640397.864	1818028.542	16.025	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 281+65.05 (R6)
712	640167.226	1818062.442	20.202	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION BCIC 274+00.00 (R6)
713	640000.096	1818073.112	20.116	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 268+50.24 (R6)
714	639588.754	1818085.086	16.979	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 255+00.00 (R6)
715	639237.889	1818095.334	16.858	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 243+47.30 (R6)
716	639001.751	1818111.402	17.329	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 235+70.63 (R6)
621	638760.198	1818215.300	16.628	SET ⅝" REBAR WITH 1.5" ALUMINUM CAP STAMPED "02002-621"
6325	644512.521	1814456.488	29.50	FOUND ¾" REBAR WITH 1.5" ALUMINUM CAP STAMPED "HUM 101 63.25" (R2)
721	644527.177	1814413.721	30.151	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 93+76.77 (R3)
722	644676.402	1814217.074	36.574	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 102+00.00 (R3)
723	644774.387	1814079.668	37.379	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 107+40.38 (R3)
724	644849.817	1813944.765	36.048	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 112+48.85 (R3)
725	644901.232	1813817.241	34.472	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 116+83.12 (R3)
726	644995.148	1813671.645	33.545	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 122+72.09 (R3)
727	645302.266	1813239.856	25.039	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 140+36.17 (R4)
728	645329.736	1813101.169	24.308	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 145+00.00 (R4)
738	645507.061	1812778.383	28.318	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 157+27.55 (R4)
739	645659.388	1812633.133	39.678	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 164+18.17 (R4)
740	646333.398	1812616.537	60.849	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 188+00.00 (R4)
741	646760.115	1812790.831	59.662	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 203+14.12 (R4)
742	646968.494	1812875.606	62.592	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 210+50.00 (R4)
743	647137.786	1812944.652	64.669	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 216+50.00 (R4)
744	647285.529	1813004.893	66.888	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 221+73.59 (R4)
745	647514.091	1813098.163	70.210	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 229+83.69 (R5)
102	647345.625	1813656.529	110.85	FOUND 3.25" ALUMINUM SURVEY DISK ON ALUMINUM ALLOY ROD ENCASED IN PVC IN CONCRETE STAMPED "CA HPGN DENSIFICATION STA 01 PID 1993"
838	647793.347	1813212.092	72.285	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 239+73.74 (R5)
839	647949.322	1813245.671	73.184	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 245+00.00 (R5)
840	648143.649	1813210.037	75.012	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 251+53.58 (R5)
841	648586.771	1813023.217	83.057	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 267+31.28 (R5)
842	648962.741	1813027.077	89.600	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 280+00.00 (R5)
843	649104.178	1813174.256	88.379	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 285+66.35 (R5)
844	649500.576	1813494.964	70.697	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 303+50.00 (R5)
845	649795.949	1813623.238	54.460	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 314+12.19 (R5)
846	649955.647	1813661.017	44.469	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 319+50.38 (R5)
847	650103.387	1813696.018	35.514	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 324+48.68 (R5)
848	650634.457	1813823.843	6.765	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 342+38.78 (R5)
755	651346.903	1813919.944	3.736	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 366+00.00 (R5)
757	652253.764	1813977.231	2.274	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 395+88.75 (R5)
758	652589.575	1813933.398	2.273	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 407+00.00 (R5)
759	653405.672	1813826.972	2.084	FOUND 2.25" BRASS DISK IN CONCRETE, CENTERLINE STATION 434+00.00 (R5)
7007	655946.755	1813744.951	4.630	SET ⅝" REBAR WITH 1.5" ALUMINUM CAP STAMPED "PC 70.07"

R1 BOOK 64 OF SURVEYS, PAGES 146 & 147
R2 BOOK 67 OF SURVEYS, PAGES 56 - 64
R3 CALTRANS AS-BUILTS 59-1TC7-F
R4 CALTRANS AS-BUILTS 57-1TC6 + 58-1TC5
R5 CALTRANS AS-BUILTS 61-1T13C10-F
R6 CALTRANS AS-BUILTS 61-1T13C16-F

NOTE: ALL MONUMENTS REFERENCED BY R3, R4, R5 AND R6 WERE DESTROYED DURING CONSTRUCTION IN 2007.

ROTATE GRID BEARINGS 1°26'39" COUNTERCLOCKWISE TO OBTAIN GEODETIC (TRUE) BEARINGS

CONVERGENCE ANGLE 1°26'39" AT 66.42 GPS

SCALE 1:50000
0 1000 2000

LEGEND
- ▲ FOUND GEODETIC CONTROL MONUMENT
- △ SET CALTRANS CONTROL MONUMENT
- ▲ FOUND CALTRANS CONTROL MONUMENT
- ● FOUND CENTERLINE MONUMENT

NOTE
SOME MONUMENT SYMBOLS HAVE BEEN MOVED GRAPHICALLY TO ALLOW FOR CLAIRITY.

STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION (CALTRANS)

NORTH REGION
OFFICE OF SURVEYORS

ALONG HIGHWAY 101 BETWEEN ALTON AND FIELDS LANDING IN THE UNINCORPORATED AREA OF HUMBOLDT COUNTY AND THE CITY OF FORTUNA

DIST	COUNTY	ROUTE	POST MILES	SHEET NO.	TOTAL SHEETS
01	HUM	101	58.9/70.1	4	4

BOOK 68 OF SURVEYS, PAGE 98

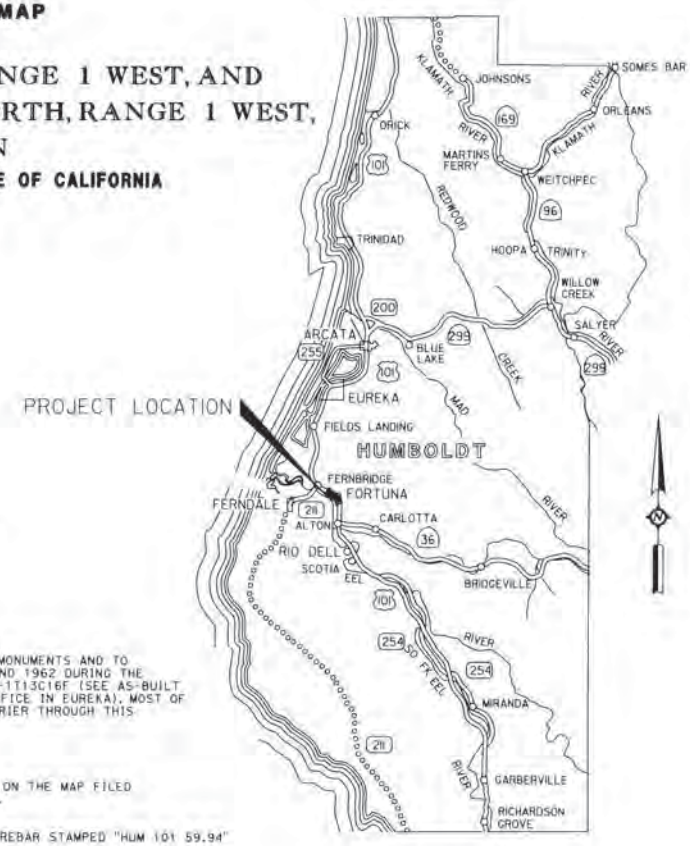
RECORD OF SURVEY

CONTROL MONUMENTATION AND MONUMENT PERPETUATION MAP STATE HIGHWAY 101

IN SECTION 2, TOWNSHIP 2 NORTH, RANGE 1 WEST, AND SECTIONS 28, 29, 33, 34 & 35, TOWNSHIP 3 NORTH, RANGE 1 WEST, HUMBOLDT MERIDIAN

CITY OF FORTUNA, COUNTY OF HUMBOLDT, STATE OF CALIFORNIA

OCTOBER 1999



LOCATION MAP

NOT TO SCALE

BASIS OF BEARINGS

THE BASIS OF BEARING FOR THIS SURVEY IS THE NORTH AMERICAN DATUM OF 1983, EPOCH 1991.35, HOLDING THE CCS83 ZONE 1 GRID COORDINATES AS PUBLISHED BY THE NATIONAL GEODETIC SURVEY AS SHOWN IN THE "PRIMARY CONTROL" TABLE HEREON.

PURPOSE OF SURVEY

THE PURPOSE OF THIS SURVEY IS TO SHOW THE RELATIONSHIP BETWEEN THE NEW CONTROL MONUMENTS AND TO PERPETUATE THE LOCATIONS OF CENTERLINE MONUMENTS WHICH WERE SET BETWEEN 1958 AND 1962 DURING THE CONSTRUCTION OF THIS SECTION OF HIGHWAY 101 UNDER CONTRACT NUMBERS 59-1TC7 & 61-1T13C16F (SEE AS-BUILT PLANS IN DRAWERS 10-32-03 (R3) & 10-93-11 (R2) ON FILE AT THE CALTRANS DISTICT OFFICE IN EUREKA). MOST OF THESE MONUMENTS WERE DESTROYED DURING THE CONSTRUCTION OF A CONCRETE MEDIAN BARRIER THROUGH THIS PORTION OF STATE HIGHWAY 101 IN 2002.

SURVEYOR'S NOTES

1. HORIZONTAL CONTROL FOR THIS SURVEY WAS CONSTRAINED TO THE MONUMENTS AS SHOWN ON THE MAP FILED IN BOOK 64 OF SURVEYS, PAGES 146 AND 147 (A SURVEY PERFORMED USING METRIC UNITS).

STATION	NORTHING	EASTING	ELEVATION	DESCRIPTION
HUM 101 59.94	2102242.269	5964282.176	49.92	1 ½" ALUM CAP ON ¾" REBAR STAMPED "HUM 101 59.94"
HUM 101 60.49	2103813.948	5963867.629	47.21	1 ½" ALUM CAP ON ¾" REBAR STAMPED "HUM 101 60.49"
HUM 101 63.48	2115137.840	5951962.519	121.34	1 ½" ALUM CAP ON ¾" REBAR STAMPED "HUM 101 63.48"
HUM 101 63.66	2115733.846	5951158.983	117.35	1 ½" ALUM CAP ON ¾" REBAR STAMPED "HUM 101 63.66"

2. COMBINED GRID FACTOR FOR THIS PROJECT IS 0.9999030 AT "HUM 101 61.68" WITH A CONVERGENCE ANGLE OF - 01°25'06".

3. CONTROL MONUMENTS WERE SET IN DECEMBER, 1999.

4. FIELDWORK WAS PERFORMED UNDER THE DIRECTION OF BARTON FLOYD CREWS, PLS 6744 IN DECEMBER, 1999, USING A LEICA TCA 1103 TOTAL STATION AND HEWLETT PACKARD 200LX DATA COLLECTOR WITH CALTRANS DATA COLLECTION SOFTWARE.

5. LEAST SQUARES ADJUSTMENT WAS PERFORMED USING CALTRANS POST PROCESSING SOFTWARE (CTDAP, RELEASE 8).

6. ALL ELEVATIONS WERE ESTABLISHED USING TRIGONOMETRIC PROCEDURES.

7. A PROJECT REPORT IS AVAILABLE AT THE CALTRANS DISTRICT OFFICE LOCATED AT 1656 UNION STREET, EUREKA, CA 95501. THE REFERENCE E.A. IS 40270 SR 99158.

SURVEYOR'S STATEMENT

THIS MAP CORRECTLY REPRESENTS A SURVEY MADE BY ME OR UNDER MY DIRECTION IN CONFORMANCE WITH THE REQUIREMENTS OF THE PROFESSIONAL LAND SURVEYORS' ACT AT THE REQUEST OF THE STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION - CALTRANS IN JANUARY 2008.

PROFESSIONAL LAND SURVEYOR — PATRICK WARD MORRILL — Exp. 3/31/2010 — No. 6191 — STATE OF CALIFORNIA

Patrick W Morrill

PATRICK WARD MORRILL PLS 6191
LICENSE EXPIRATION DATE: 3-31-2010
NORTH REGION OFFICE OF SURVEYORS

COUNTY SURVEYOR'S STATEMENT

THIS MAP HAS BEEN EXAMINED IN ACCORDANCE WITH SECTION 8766 OF THE PROFESSIONAL LAND SURVEYORS' ACT THIS 30TH DAY OF OCTOBER, 2009.

David J. LeRoy

DAVID JAMES RYAN, PLS 6212 — DATE
HUMBOLDT COUNTY SURVEYOR

LICENSE EXPIRATION DATE: MARCH 31, 2010

LICENSED LAND SURVEYOR — DAVID J. RYAN — 6212 — STATE OF CALIFORNIA

RECORDER'S STATEMENT

FILED THIS 2ND DAY OF NOVEMBER, 2009 AT 2:50 P.M. IN BOOK 67 OF SURVEYS AT PAGES 56-64, AT THE REQUEST OF CALTRANS.

CAROLYN CRNICH
HUMBOLDT COUNTY RECORDER

FILE # 2009-24342-9

BY: L Holman
DEPUTY COUNTY RECORDER

NO FEE REQUIRED PER GOVERNMENT CODE 6103

STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION (CALTRANS)

NORTH REGION
OFFICE OF SURVEYORS

RECORD OF SURVEY
CONTROL MONUMENTATION AND MONUMENT PERPETUATION MAP
IN THE CITY OF FORTUNA, HUMBOLDT COUNTY
STATE HIGHWAY 101

CO.	RTE.	P.M.	SHEET NUMBER
HUM	101	59.9/63.1	1 OF 9

SURVEYS BOOK 67 PAGE 56

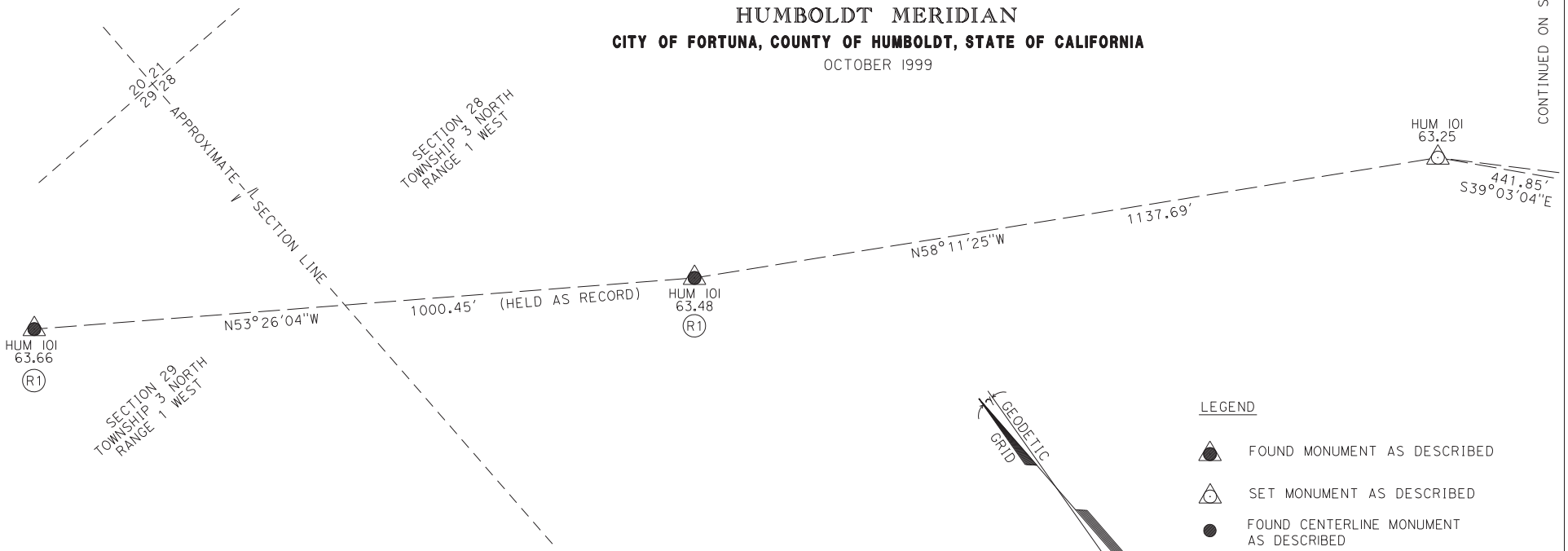
RECORD OF SURVEY

CONTROL MONUMENTATION AND MONUMENT PERPETUATION MAP
STATE HIGHWAY 101

IN SECTION 2, TOWNSHIP 2 NORTH, RANGE 1 WEST, AND
SECTIONS 28, 29, 33, 34 & 35, TOWNSHIP 3 NORTH, RANGE 1 WEST,
HUMBOLDT MERIDIAN

CITY OF FORTUNA, COUNTY OF HUMBOLDT, STATE OF CALIFORNIA

OCTOBER 1999



LEGEND

- FOUND MONUMENT AS DESCRIBED
- SET MONUMENT AS DESCRIBED
- FOUND CENTERLINE MONUMENT AS DESCRIBED
- (R1) BOOK 64, PAGES 146 & 147

FOUND GPS PROJECT CONTROL CCS83 (1991.35), ZONE 1, NAVD88 (SEE BOOK 64 OF SURVEYS, PAGES 146 & 147)

STATION	NORTHING	EASTING	ELEVATION	DESCRIPTION
HUM 101 63.48	2115137.840	5951962.519	121.34	*FOUND 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "HUM 101 63.48" (R1)*
HUM 101 63.66	2115733.846	5951158.983	117.35	*FOUND 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "HUM 101 63.66" (R1)*

PROJECT CONTROL ESTABLISHED BY THIS SURVEY

	STATION	NORTHING	EASTING	ELEVATION	DESCRIPTION
	HUM 101 63.01	2113518.768	5953845.025	69.06	*SET 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "HUM 101 63.01"*
	HUM 101 63.25	2114538.163	5952929.328	96.79	*SET 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "HUM 101 63.25"*

SCALE 1" = 100'

0 100 200

CONVERGENCE ANGLE
-1°25'06"
AT HUM 101 61.68

NOTE: ROTATE GRID BEARINGS 1°25'06" COUNTER CLOCKWISE TO OBTAIN GEODETIC (TRUE) BEARINGS.

STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION (CALTRANS)

NORTH REGION
OFFICE OF SURVEYORS

RECORD OF SURVEY
CONTROL MONUMENTATION AND MONUMENT PERPETUATION MAP
IN THE CITY OF FORTUNA,
HUMBOLDT COUNTY
STATE HIGHWAY 101

CO.	RTE.	P.M.	SHEET NUMBER
HUM	101	59.9/63.1	2 OF 9

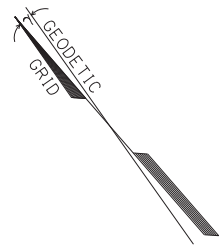
RECORD OF SURVEY

CONTROL MONUMENTATION AND MONUMENT PERPETUATION MAP
STATE HIGHWAY 101

IN SECTION 2, TOWNSHIP 2 NORTH, RANGE 1 WEST, AND SECTIONS 28, 29, 33, 34 & 35, TOWNSHIP 3 NORTH, RANGE 1 WEST, HUMBOLDT MERIDIAN

CITY OF FORTUNA, COUNTY OF HUMBOLDT, STATE OF CALIFORNIA

OCTOBER 1999



SCALE 1" = 100'

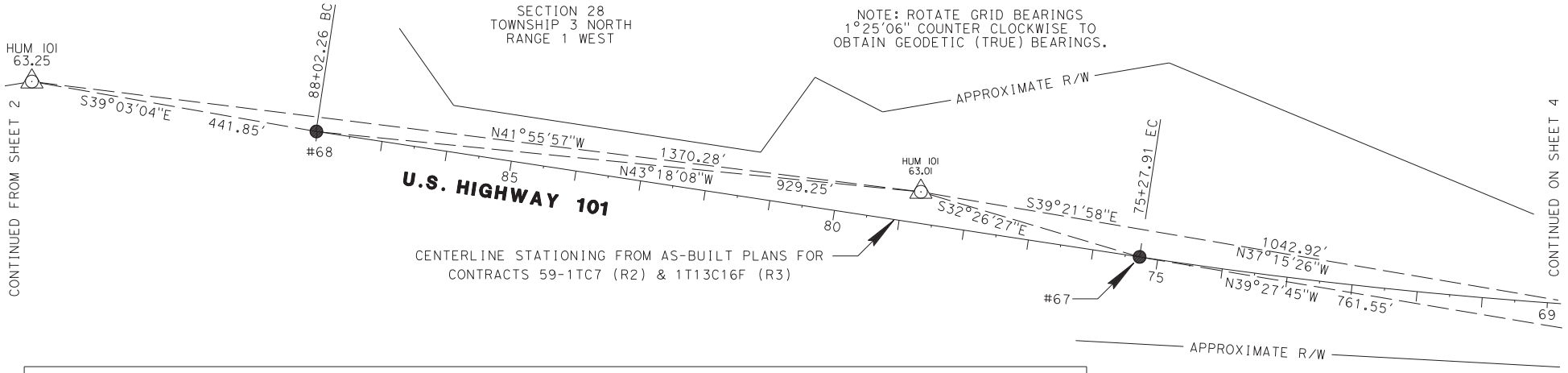
0 100 200

CONVERGENCE ANGLE
-1°25'06"
AT HUM 101 61.68

NOTE: ROTATE GRID BEARINGS 1°25'06" COUNTER CLOCKWISE TO OBTAIN GEODETIC (TRUE) BEARINGS.

LEGEND

- FOUND MONUMENT AS DESCRIBED
- SET MONUMENT AS DESCRIBED
- FOUND CENTERLINE MONUMENT AS DESCRIBED
- (R2) AS BUILT PLANS FOR CONTRACT 59-1TC7 IN DRAWER 10-93-11 CALTRANS DISTRICT 1 OFFICE.
- (R3) AS BUILT PLANS FOR CONTRACT 61-1T13C16F IN DRAWER 10-32-03 CALTRANS DISTRICT 1 OFFICE.



PROJECT CONTROL ESTABLISHED BY THIS SURVEY (CCS83 (1991.35), ZONE 1, NAVD88, US SURVEY FEET)

STATION	NORTHING	EASTING	ELEVATION	DESCRIPTION
HUM 101 62.79	2112636.283	5954516.260	74.65	*SET 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "CALTRANS HUM 101 62.79"*
HUM 101 63.01	2113518.768	5953845.025	69.06	*SET 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "CALTRANS HUM 101 63.01"*
HUM 101 63.25	2114538.163	5952929.328	96.79	*SET 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "CALTRANS HUM 101 63.25"*

CENTERLINE MONUMENTS FOUND BY THIS SURVEY

STATION	NORTHING	EASTING	ELEVATION	DESCRIPTION
#66	2112712.474	5954506.523	74.30	*FOUND 2 ¼" BRASS DISK IN CONCRETE CENTERLINE STATION "68+29.78 BC" (R2), DESTROYED 2002*
#67	2113224.231	5954032.239	72.43	*FOUND 2 ¼" BRASS DISK IN CONCRETE CENTERLINE SATATION "75+27.91 EC" (R2), DESTROYED 2002*
#68	2114195.027	5953207.700	81.75	*FOUND 2 ¼" BRASS DISK IN CONCRETE CENTERLINE STATION "88+02.26 BC" (R2), DESTROYED 2002*

STATE OF CALIFORNIA
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DEPARTMENT OF TRANSPORTATION (CALTRANS)

NORTH REGION
OFFICE OF SURVEYORS

RECORD OF SURVEY
CONTROL MONUMENTATION AND
MONUMENT PERPETUATION MAP
IN THE CITY OF FORTUNA,
HUMBOLDT COUNTY
STATE HIGHWAY 101

CO.	RTE.	P.M.	SHEET NUMBER
HUM	101	59.9/63.1	3 OF 9

SURVEYS BOOK 67 PAGE 58

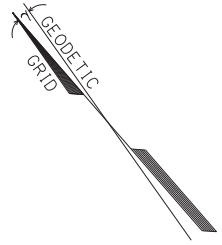
RECORD OF SURVEY

CONTROL MONUMENTATION AND MONUMENT PERPETUATION MAP
STATE HIGHWAY 101

IN SECTION 2, TOWNSHIP 2 NORTH, RANGE 1 WEST, AND SECTIONS 28, 29, 33, 34 & 35, TOWNSHIP 3 NORTH, RANGE 1 WEST, HUMBOLDT MERIDIAN

CITY OF FORTUNA, COUNTY OF HUMBOLDT, STATE OF CALIFORNIA

OCTOBER 1999



LEGEND

- FOUND MONUMENT AS DESCRIBED
- SET MONUMENT AS DESCRIBED
- FOUND CENTERLINE MONUMENT AS DESCRIBED
- (R2) AS BUILT PLANS FOR CONTRACT 59-1TC7 IN DRAWER 10-93-11 CALTRANS DISTRICT 1 OFFICE.
- (R3) AS BUILT PLANS FOR CONTRACT 61-1T13C16F IN DRAWER 10-32-03 CALTRANS DISTRICT 1 OFFICE.

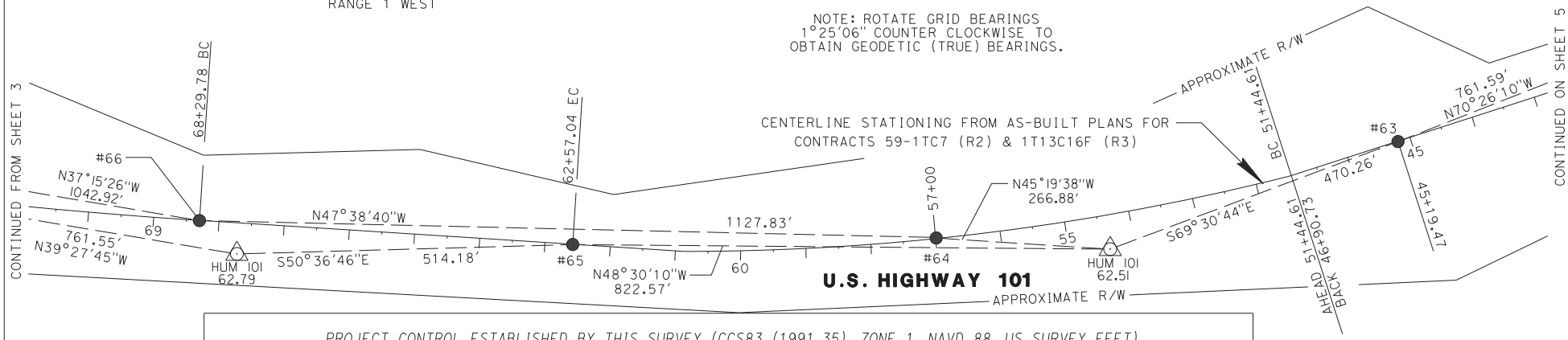
SCALE 1" = 100'

0 100 200

CONVERGENCE ANGLE
-1°25'06"
AT HUM 101 61.68

NOTE: ROTATE GRID BEARINGS 1°25'06" COUNTER CLOCKWISE TO OBTAIN GEODETIC (TRUE) BEARINGS.

SECTION 28
TOWNSHIP 3 NORTH
RANGE 1 WEST



PROJECT CONTROL ESTABLISHED BY THIS SURVEY (CCS83 (1991.35), ZONE 1, NAVD 88, US SURVEY FEET)

STATION	NORTHING	EASTING	ELEVATION	DESCRIPTION
HUM 101 62.31	2111345.370	5956687.887	70.55	*SET 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "HUM 101 62.31"*
HUM 101 62.51	2111764.989	5955529.749	82.11	*SET 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "HUM 101 62.51"*
HUM 101 62.79	2112636.283	5954516.260	74.65	*SET 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "HUM 101 62.79"*
HUM 101 63.01	2113518.768	5953845.025	69.06	*SET 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "HUM 101 63.01"*

CENTERLINE MONUMENTS FOUND BY THIS SURVEY

STATION	NORTHING	EASTING	ELEVATION	DESCRIPTION
#63	2111600.396	5955970.260	76.64	*FOUND 2 ¼" BRASS DISK IN CONCRETE CENTERLINE STATION 45+19.47 (R2), DESTROYED 2002*
#64	2111952.620	5955339.963	78.04	*FOUND 2 ¼" BRASS DISK IN CONCRETE CENTERLINE STATION 57+00 (R2), DESTROYED 2002*
#65	2112310.008	5954913.655	73.01	*FOUND 2 ¼" BRASS DISK IN CONCRETE CENTERLINE STATION 62+57.04 EC (R2), DESTROYED 2002*
#66	2112712.474	5954506.523	74.30	*FOUND 2 ¼" BRASS DISK IN CONCRETE CENTERLINE STATION 68+29.78 BC (R2), DESTROYED 2002*

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RECORD OF SURVEY
CONTROL MONUMENTATION AND MONUMENT PERPETUATION MAP
IN THE CITY OF FORTUNA, HUMBOLDT COUNTY
STATE HIGHWAY 101

CO.	RTE.	P.M.	SHEET NUMBER
HUM	101	59.9/63.1	4 OF 9

SURVEYS BOOK 67 PAGE 59

RECORD OF SURVEY

CONTROL MONUMENTATION AND MONUMENT PERPETUATION MAP

STATE HIGHWAY 101

IN SECTION 2, TOWNSHIP 2 NORTH, RANGE 1 WEST, AND
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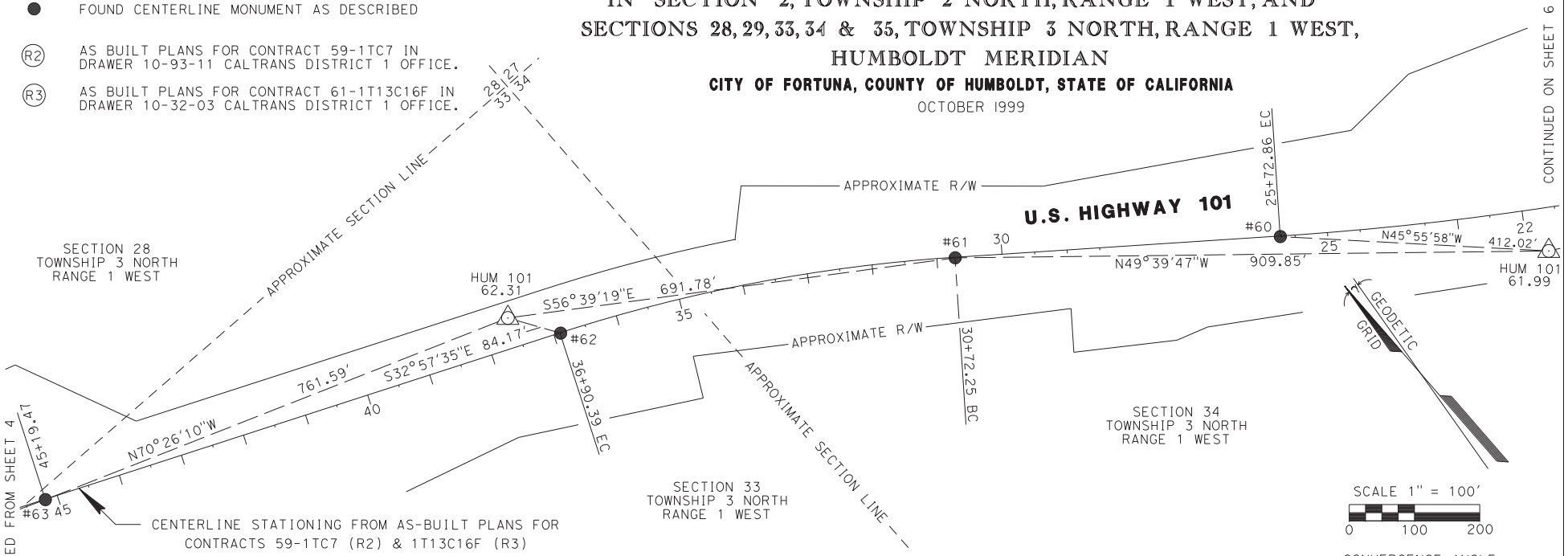
HUMBOLDT MERIDIAN

CITY OF FORTUNA, COUNTY OF HUMBOLDT, STATE OF CALIFORNIA

OCTOBER 1999

LEGEND

- FOUND MONUMENT AS DESCRIBED
- SET MONUMENT AS DESCRIBED
- FOUND CENTERLINE MONUMENT AS DESCRIBED
- (R2) AS BUILT PLANS FOR CONTRACT 59-1TC7 IN DRAWER 10-93-11 CALTRANS DISTRICT 1 OFFICE.
- (R3) AS BUILT PLANS FOR CONTRACT 61-1T13C16F IN DRAWER 10-32-03 CALTRANS DISTRICT 1 OFFICE.



SCALE 1" = 100'

0 100 200

CONVERGENCE ANGLE
-1°25'06"
AT HUM 101 61.68

NOTE: ROTATE GRID BEARINGS 1°25'06" COUNTER CLOCKWISE TO OBTAIN GEODETIC (TRUE) BEARINGS.

PROJECT CONTROL ESTABLISHED BY THIS SURVEY (CCS83 (1991.35), ZONE 1, NAVD 88, US SURVEY FEET)

STATION	NORTHING	EASTING	ELEVATION	DESCRIPTION
HUM 101 61.68	2109580.538	5959447.149	72.13	*SET 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "HUM 101 61.68"*
HUM 101 61.99	2110376.193	5957959.314	74.56	*SET 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "HUM 101 61.99"*
HUM 101 62.31	2111345.370	5956687.887	70.55	*SET 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "HUM 101 62.31"*
HUM 101 62.51	2111764.989	5955529.749	82.11	*SET 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "HUM 101 62.51"*

CENTERLINE MONUMENTS FOUND BY THIS SURVEY

STATION	NORTHING	EASTING	ELEVATION	DESCRIPTION
#60	2110662.757	5957663.265	72.67	*FOUND 2 ¼" BRASS DISK IN CONCRETE 25+72.86 EC (R2), DESTROYED 2002*
#61	2110965.119	5957265.782	70.98	*FOUND 2 ¼" BRASS DISK IN CONCRETE 30+72.25 BC (R2), DESTROYED 2002*
#62	2111274.750	5956733.677	69.34	*FOUND 2 ¼" BRASS DISK IN CONCRETE 36+90.39 EC (R2), DESTROYED 2002*
#63	2111600.396	5955970.260	76.64	*FOUND 2 ¼" BRASS DISK IN CONCRETE 45+19.47 (R2), DESTROYED 2002*

STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION (CALTRANS)

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OFFICE OF SURVEYORS

RECORD OF SURVEY
CONTROL MONUMENTATION AND
MONUMENT PERPETUATION MAP

IN THE CITY OF FORTUNA,
HUMBOLDT COUNTY
STATE HIGHWAY 101

CO.	RTE.	P.M.	SHEET NUMBER
HUM	101	59.9/63.1	5 OF 9

SURVEYS BOOK 67 PAGE 60

RECORD OF SURVEY

CONTROL MONUMENTATION AND MONUMENT PERPETUATION MAP
STATE HIGHWAY 101

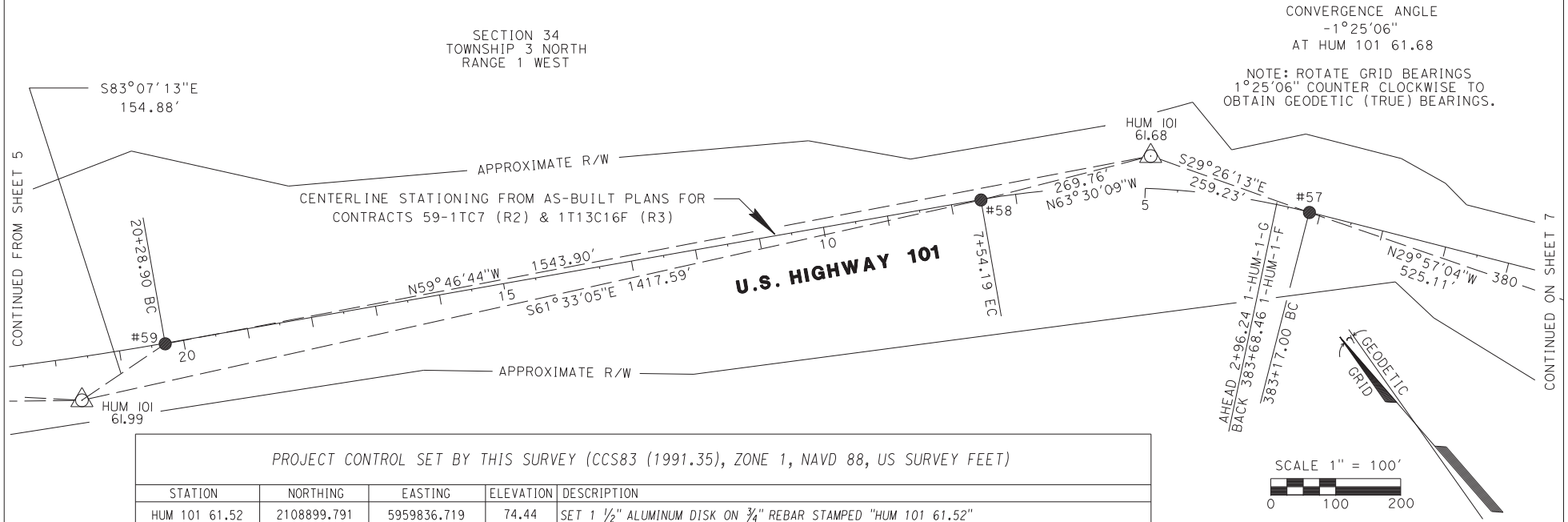
IN SECTION 2, TOWNSHIP 2 NORTH, RANGE 1 WEST, AND SECTIONS 28, 29, 33, 34 & 35, TOWNSHIP 3 NORTH, RANGE 1 WEST, HUMBOLDT MERIDIAN

CITY OF FORTUNA, COUNTY OF HUMBOLDT, STATE OF CALIFORNIA

OCTOBER 1999

LEGEND

- FOUND MONUMENT AS DESCRIBED
- SET MONUMENT AS DESCRIBED
- FOUND CENTERLINE MONUMENT AS DESCRIBED
- (R2) AS BUILT PLANS FOR CONTRACT 59-1TC7 IN DRAWER 10-93-11 CALTRANS DISTRICT 1 OFFICE.
- (R3) AS BUILT PLANS FOR CONTRACT 61-1T13C16F IN DRAWER 10-32-03 CALTRANS DISTRICT 1 OFFICE.



PROJECT CONTROL SET BY THIS SURVEY (CCS83 (1991.35), ZONE 1, NAVD 88, US SURVEY FEET)

STATION	NORTHING	EASTING	ELEVATION	DESCRIPTION
HUM 101 61.52	2108899.791	5959836.719	74.44	*SET 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "HUM 101 61.52"*
HUM 101 61.68	2109580.538	5959447.149	72.13	*SET 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "HUM 101 61.68"*
HUM 101 61.99	2110376.193	5957959.314	74.56	*SET 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "HUM 101 61.99"*
HUM 101 62.31	2111345.370	5956687.887	70.55	*SET 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "HUM 101 62.31"*

CENTERLINE MONUMENTS FOUND BY THIS SURVEY

STATION	NORTHING	EASTING	ELEVATION	DESCRIPTION
#57	2109354.777	5959574.550	73.01	*FOUND 2 ¼" BRASS DISK IN CONCRETE "383+17.00 BC" (R3), DESTROYED 2002*
#58	2109700.895	5959205.723	67.55	*FOUND 2 ¼" BRASS DISK IN CONCRETE "7+54.19 EC" (R3), DESTROYED 2002*
#59	2110357.639	5958113.084	74.68	*FOUND 2 ¼" BRASS DISK IN CONCRETE "20+28.90 BC" (R2), DESTROYED 2002*

STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION (CALTRANS)

NORTH REGION
OFFICE OF SURVEYORS

RECORD OF SURVEY
CONTROL MONUMENTATION AND
MONUMENT PERPETUATION MAP
IN THE CITY OF FORTUNA,
HUMBOLDT COUNTY
STATE HIGHWAY 101

CO.	RTE.	P.M.	SHEET NUMBER
HUM	101	59.9/63.1	6 OF 9

SURVEYS BOOK 67 PAGE 61

RECORD OF SURVEY

CONTROL MONUMENTATION AND MONUMENT PERPETUATION MAP
STATE HIGHWAY 101

IN SECTION 2, TOWNSHIP 2 NORTH, RANGE 1 WEST, AND
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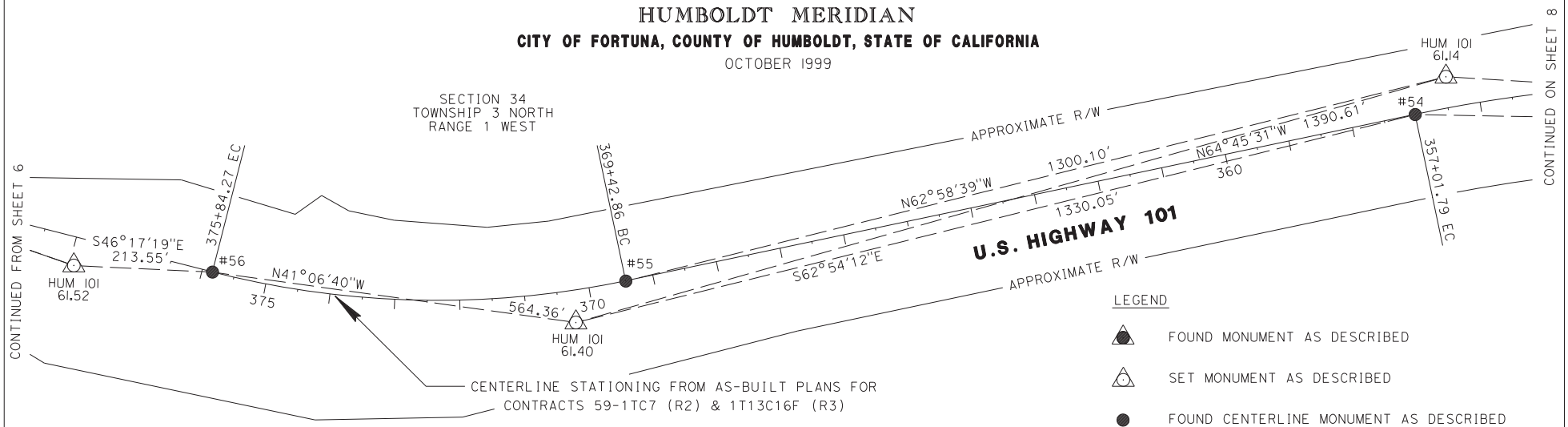
HUMBOLDT MERIDIAN

CITY OF FORTUNA, COUNTY OF HUMBOLDT, STATE OF CALIFORNIA

OCTOBER 1999



LEGEND

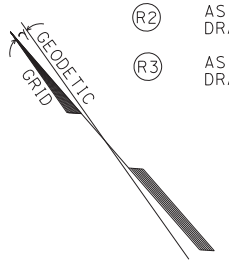
- FOUND MONUMENT AS DESCRIBED
- SET MONUMENT AS DESCRIBED
- FOUND CENTERLINE MONUMENT AS DESCRIBED
- (R2) AS BUILT PLANS FOR CONTRACT 59-1TC7 IN DRAWER 10-93-11 CALTRANS DISTRICT 1 OFFICE.
- (R3) AS BUILT PLANS FOR CONTRACT 61-1T13C16F IN DRAWER 10-32-03 CALTRANS DISTRICT 1 OFFICE.

PROJECT CONTROL ESTABLISHED BY THIS SURVEY (CCS83 (1991.35), ZONE 1, NAVD 88, US SURVEY FEET)

STATION	NORTHING	EASTING	ELEVATION	DESCRIPTION
HUM 101 61.14	2107734.013	5961619.989	46.64	*SET 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "CALTRANS HUM 101 61.14"*
HUM 101 61.40	2108327.017	5960362.154	55.17	*SET 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "CALTRANS HUM 101 61.40"*
HUM 101 61.52	2108899.791	5959836.719	74.44	*SET 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "CALTRANS HUM 101 61.52"*
HUM 101 61.68	2109580.538	5959447.149	72.13	*SET 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "CALTRANS HUM 101 61.68"*

CENTERLINE MONUMENTS FOUND BY THIS SURVEY

STATION	NORTHING	EASTING	ELEVATION	DESCRIPTION
#54	2107721.188	5961546.220	44.20	*FOUND 2 ¼" BRASS DISK IN CONCRETE "357+01.79 EC" (R3), DESTROYED 2002*
#55	2108324.704	5960461.822	49.03	*FOUND 2 ¼" BRASS DISK IN CONCRETE "369+42.86 BC" (R3), DESTROYED 2002*
#56	2108752.223	5959991.079	68.88	*FOUND 2 ¼" BRASS DISK IN CONCRETE "375+84.27 EC" (R3), DESTROYED 2002*



CONVERGENCE ANGLE
-1°25'06"
AT HUM 101 61.68

NOTE: ROTATE GRID BEARINGS 1°25'06" COUNTER CLOCKWISE TO OBTAIN GEODETIC (TRUE) BEARINGS.

SCALE 1" = 100'

0 100 200

STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION (CALTRANS)

NORTH REGION
OFFICE OF SURVEYORS

RECORD OF SURVEY
CONTROL MONUMENTATION AND MONUMENT PERPETUATION MAP
IN THE CITY OF FORTUNA,
HUMBOLDT COUNTY
STATE HIGHWAY 101

CO.	RTE.	P.M.	SHEET NUMBER
HUM	101	59.9/63.1	7 OF 9

SURVEYS BOOK 67 PAGE 62

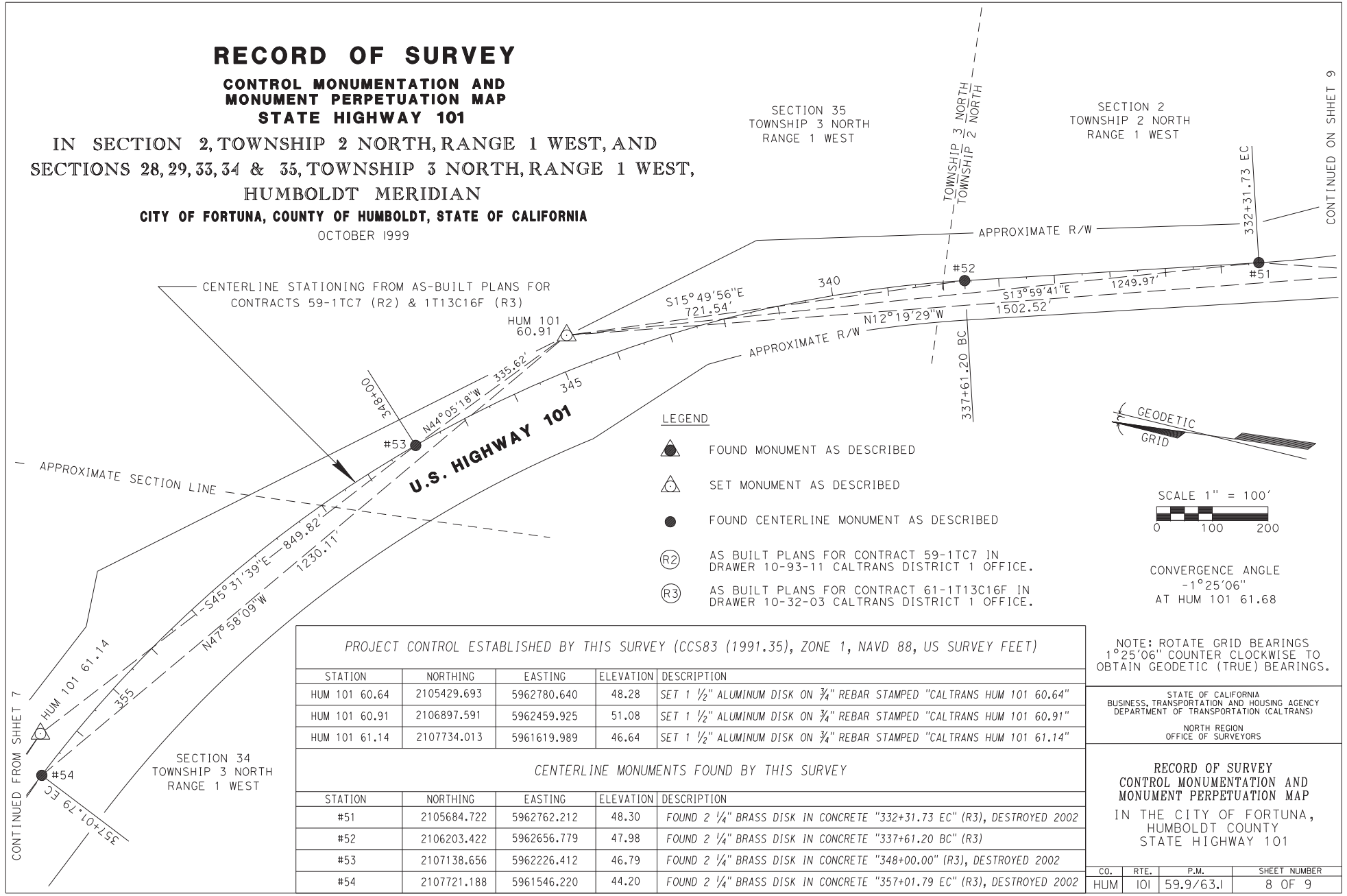
RECORD OF SURVEY

CONTROL MONUMENTATION AND MONUMENT PERPETUATION MAP
STATE HIGHWAY 101

IN SECTION 2, TOWNSHIP 2 NORTH, RANGE 1 WEST, AND SECTIONS 28, 29, 33, 34 & 35, TOWNSHIP 3 NORTH, RANGE 1 WEST, HUMBOLDT MERIDIAN

CITY OF FORTUNA, COUNTY OF HUMBOLDT, STATE OF CALIFORNIA

OCTOBER 1999



PROJECT CONTROL ESTABLISHED BY THIS SURVEY (CCS83 (1991.35), ZONE 1, NAVD 88, US SURVEY FEET)

STATION	NORTHING	EASTING	ELEVATION	DESCRIPTION
HUM 101 60.64	2105429.693	5962780.640	48.28	*SET 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "CALTRANS HUM 101 60.64"*
HUM 101 60.91	2106897.591	5962459.925	51.08	*SET 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "CALTRANS HUM 101 60.91"*
HUM 101 61.14	2107734.013	5961619.989	46.64	*SET 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "CALTRANS HUM 101 61.14"*

CENTERLINE MONUMENTS FOUND BY THIS SURVEY

STATION	NORTHING	EASTING	ELEVATION	DESCRIPTION
#51	2105684.722	5962762.212	48.30	*FOUND 2 ¼" BRASS DISK IN CONCRETE "332+31.73 EC" (R3), DESTROYED 2002*
#52	2106203.422	5962656.779	47.98	*FOUND 2 ¼" BRASS DISK IN CONCRETE "337+61.20 BC" (R3)*
#53	2107138.656	5962226.412	46.79	*FOUND 2 ¼" BRASS DISK IN CONCRETE "348+00.00" (R3), DESTROYED 2002*
#54	2107721.188	5961546.220	44.20	*FOUND 2 ¼" BRASS DISK IN CONCRETE "357+01.79 EC" (R3), DESTROYED 2002*

NOTE: ROTATE GRID BEARINGS 1°25'06" COUNTER CLOCKWISE TO OBTAIN GEODETIC (TRUE) BEARINGS.

STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION (CALTRANS)

NORTH REGION
OFFICE OF SURVEYORS

RECORD OF SURVEY
CONTROL MONUMENTATION AND MONUMENT PERPETUATION MAP
IN THE CITY OF FORTUNA, HUMBOLDT COUNTY
STATE HIGHWAY 101

CO.	RTE.	P.M.	SHEET NUMBER
HUM	101	59.9/63.1	8 OF 9

SURVEYS BOOK 67 PAGE 63

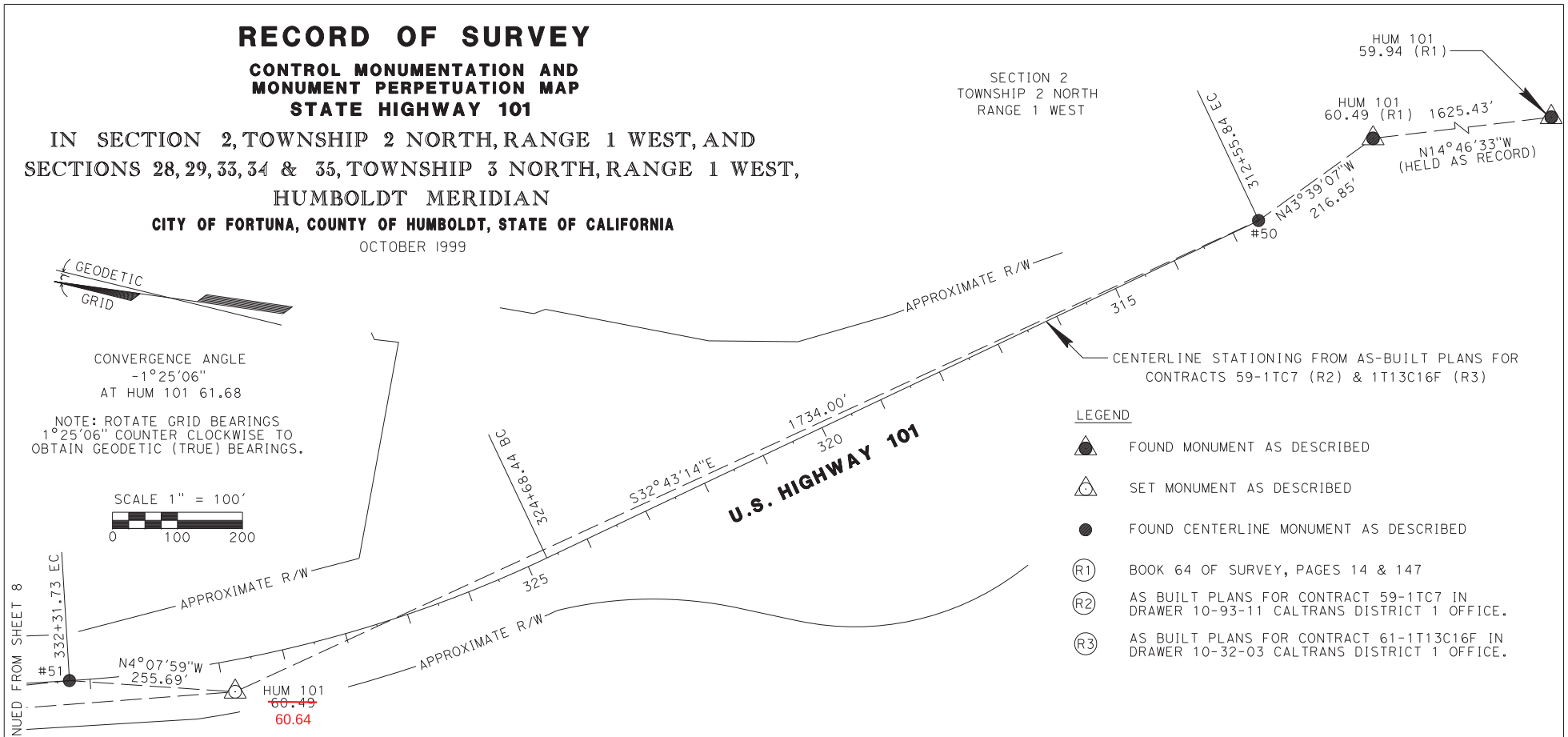
RECORD OF SURVEY

CONTROL MONUMENTATION AND MONUMENT PERPETUATION MAP
STATE HIGHWAY 101

IN SECTION 2, TOWNSHIP 2 NORTH, RANGE 1 WEST, AND SECTIONS 28, 29, 33, 34 & 35, TOWNSHIP 3 NORTH, RANGE 1 WEST, HUMBOLDT MERIDIAN

CITY OF FORTUNA, COUNTY OF HUMBOLDT, STATE OF CALIFORNIA

OCTOBER 1999



FOUND GPS PROJECT CONTROL CCS83 (1991.35), ZONE 1, NAVD88, US SURVEY FEET (SEE BOOK 64 OF SURVEYS, PAGES 146 & 147)

STATION	NORTHING	EASTING	ELEVATION	DESCRIPTION
HUM 101 59.94	2102242.269	5964282.176	49.91	*FOUND 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "HUM 101 59.94" (R1)*
HUM 101 60.49	2103813.948	5963687.629	47.21	*FOUND 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "HUM 101 60.49" (R1)*

PROJECT CONTROL ESTABLISHED BY THIS SURVEY

STATION	NORTHING	EASTING	ELEVATION	DESCRIPTION
HUM 101 60.64	2105429.693	5962780.640	48.28	*SET 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "HUM 101 60.64"*
HUM 101 60.91	2106897.591	5962459.925	51.08	*SET 1 ½" ALUMINUM DISK ON ¾" REBAR STAMPED "HUM 101 60.91"*

CENTERLINE MONUMENTS FOUND BY THIS SURVEY

STATION	NORTHING	EASTING	ELEVATION	DESCRIPTION
#50	2103970.848	5963717.945	44.72	*FOUND 2 ¼" BRASS DISK IN CONCRETE "312+55.84 EC" (R3), DESTROYED 2002*
#51	2105684.722	5962762.212	48.30	*FOUND 2 ¼" BRASS DISK IN CONCRETE "332+31.73 EC" (R3)*

STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION (CALTRANS)

NORTH REGION
OFFICE OF SURVEYORS

RECORD OF SURVEY
CONTROL MONUMENTATION AND
MONUMENT PERPETUATION MAP
IN THE CITY OF FORTUNA,
HUMBOLDT COUNTY
STATE HIGHWAY 101

CO.	RTE.	P.M.	SHEET NUMBER
HUM	101	59.9/63.1	9 OF 9

SURVEYS BOOK 67 PAGE 64

200-353-021

DEPARTMENT OF PUBLIC WORKS
COUNTY OF HUMBOLDT
MAILING ADDRESS: 1106 SECOND STREET, EUREKA, CA 95501-0579
AREA CODE 707/FAX 445-7409

ARCATA-EUREKA AIRPORT TERMINAL
McKINLEYVILLE
AVIATION 839-5401

PUBLIC WORKS BUILDING
SECOND & L ST., EUREKA
ADMINISTRATION 445-7491
BUSINESS 445-7652
ENGINEERING 445-7377
NATURAL RESOURCES 445-7741
PARKS 445-7651
ROADS & EQUIPMENT MAINT. 445-7421
ARCHITECT 445-7493

CLARK COMPLEX
HARRIS & H ST., EUREKA
LAND USE 445-7205

January 10, 2005

Duane Rigge, City Manager
City of Fortuna
POB 545
Fortuna CA 95540

RE: ANNEXATION BY THE CITY OF FORTUNA OF COUNTY ROADS ADJACENT TO THE CITY OF FORTUNA

Allen Campbell, Director, Humboldt County Department of Public Works, has requested that I provide you some information. It is in response to a request by you associated with roads proposed for annexation that were discussed in our previous letters. The previous letters discussed the annexation of Strongs Creek Road (known by the City as Dinsmore Drive), Twelfth Street, a portion of Rohnerville Road, a portion of Eel River Drive, and Drake Hill Road.

The information requested was regarding the County's cost of maintenance of the roads over the last five years and what it would cost if the County was to perform the desired future maintenance of the surface of the roads. The following is a description of the road, the County's past cost of the maintenance of the road, and an estimate of the cost to maintain the roads to the desired standard. The desired standard of maintenance consists of sealing the roads at a 12 to 14 year period and resurfacing the roads every 25 years. The County cost for sealing a road is estimated to be $0.12 per square foot and a $1.30 per square foot for resurfacing a road. These are the prices used currently by the County in the estimation of costs for maintenance of new subdivision roads.

STRONGS CREEK ROAD

This portion of road lies south of the city limits of Fortuna to the intersection of Riverwalk Drive. The County has not spent any funds on this road for the last 5 years or longer. When the City annexed the portion of land at the end of the road, the then city manager of Fortuna provided a letter to LAFCO and the County indicating that they would maintain this portion of Strongs Creek Road for the County as consideration of approval of the annexation.

The portion of Strongs Creek Road in the County is approximately 640 feet in length and has an average width of 26 feet. The cost of sealing the road would be estimated at $2,000 and $21,632 for resurfacing the road at today's cost.

TWELFTH STREET

This portion of road lies within the limits of the CalTrans right of way for State Highway 101. It lies between the railroad tracks, over the overpass, to the intersection of Strongs Creek Road and Riverwalk Drive. The County entered into an agreement with CalTrans to be responsible for the surface of the road. CalTrans is responsible for the overpass structure.

The County has spent $37 over the last five years on this portion of road. The length of road is approximately 1,530 feet and has an average width of 30 feet. The cost of resealing the road is estimated at $5,500 and $69,670 for resurfacing the road.

ROHNERVILLE ROAD

This portion of road lies north of Loop Road to the south line of the park. The road has been presumed by the City to be located in the City. The Campton Heights and Fortuna High School annexations by the City appear to have not included this portion of road. The County has not been providing maintenance of the road. The road was presumed by the City to be within the city limits of Fortuna and has been maintained by the City for a number of years.

EEL RIVER DRIVE

This portion of road lies between Drake Hill Road and Kenmar Road. It does not front any developable property located in the County. CalTrans and NWP Railroad front the west side of the road. The entire east side of the road serves lands located in the City. It is approximately 0.93 mile in length and has an average width of 24 feet. The County has spent approximately $26,000 on this road in the last 5 years. The majority of the cost was associated with clean up of the movement of earth off of property owned by the City. The slide occurred in 2002.

The cost of resealing the road is estimated to be approximately $14,142 and $153,205 for resurfacing the road.

DRAKE HILL ROAD

This portion of road is located between Rohnerville Road and Eel River Drive. The City is located along the entire north side of the road. The north side of the road is zoned and planned for residential development. The south side of the road located in the County is mainly zoned and planned for agricultural use. The road is 1.25 miles in length and is approximately 22 feet in width. The County has spent approximately $79,000 in maintenance of this road in the last 5 years. Approximately $67,000 of the maintenance cost was associated with resurfacing Drake Hill Road between Thelma Drive and Rohnerville Road in 2002. This stretch of road is where the heaviest density of residential property is located within the City.

The cost of resealing the road is estimated to be approximately $17,424 and $188,760 is estimated for resurfacing the road.

If you have any additional questions regarding the roads or this letter, please don't hesitate to contact this office.

Sincerely,

Harless McKinley
Land Use Division
445-7205

US-101 PM 60.5
Vicinity of 12th St Overcrossing
R/W Boundries with City of Fortuna

Aerial.dgn 1/23/2007 11:30:53 AM

FREEWAY MAINTENANCE AGREEMENT

THIS AGREEMENT, made and entered into, in duplicate, this 15th day of April, 1963, by and between the State of California, acting by and through the Department of Public Works, Division of Highways, hereinafter for convenience referred to as "the State", and the County of Humboldt, hereinafter for convenience referred to as "the County", witnesseth:

WHEREAS, on November 6, 1958, a Freeway Agreement was executed between the County and the State relating to the development of that portion of State Highway Route 1 in the County of Humboldt between 0.6 mile north of Route 35 and 0.3 mile north of Fortuna as a freeway, and

WHEREAS, under the provisions of said Freeway Agreement, the County agreed to certain adjustments in the County road system, and for the carrying of certain County roads over or under or to a connection with the freeway, and

WHEREAS, said freeway has now been completed or is nearing completion, and the parties mutually desire to clarify the division of maintenance responsibility as to separation structures, and County roads or portions thereof, within the freeway limits.

NOW, THEREFORE, IT IS AGREED:

1. ROADWAY SECTIONS

The County will maintain, at County expense, all portions of County roads and appurtenant structures and bordering areas, colored in yellow on the attached map marked Exhibit "A" and made a part hereof by this reference.

2. VEHICULAR OVERCROSSINGS

The State will maintain, at State expense, the entire structure below the top of the concrete deck surface, exclusive of any bituminous surface treatment thereof. The County will maintain, at County expense, the top of the concrete deck surface, together with any bituminous surface treatment thereon, and all portions of the structure above the concrete deck surface, and shall perform such other work as may be necessary to insure an impervious and otherwise suitable surface. The County will also maintain all traffic service facilities provided for the benefit or control of County road traffic.

3. VEHICULAR UNDERCROSSINGS

The State will maintain the structure proper. The roadway section, including the traveled way, shoulders, curbs, sidewalks, walls, drainage installations and traffic service facilities, will be maintained by the County.

4. EFFECTIVE DATE

This agreement shall be effective upon the date of its execution by the State; it being understood and agreed, however, that the execution of this agreement shall not affect any pre-existing obligations of the County to maintain designated areas pursuant to prior written notice from the State that work in such areas, which the County has agreed to maintain pursuant to the terms of the Freeway Agreement, has been completed.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

J. C. WOMACK
STATE HIGHWAY ENGINEER

Approval Recommended

By CHAS. E. WAITE
Deputy State Highway Engineer

SAM HELWER
District Engineer

APR 15 1963

EDWARD L. TINNEY
Maintenance Engineer

COUNTY OF HUMBOLDT

Approved as to form:

By NORMAN R. ROBERTSON
Chairman, Board of Supervisors

RICHARD C. EAST
Attorney for Department

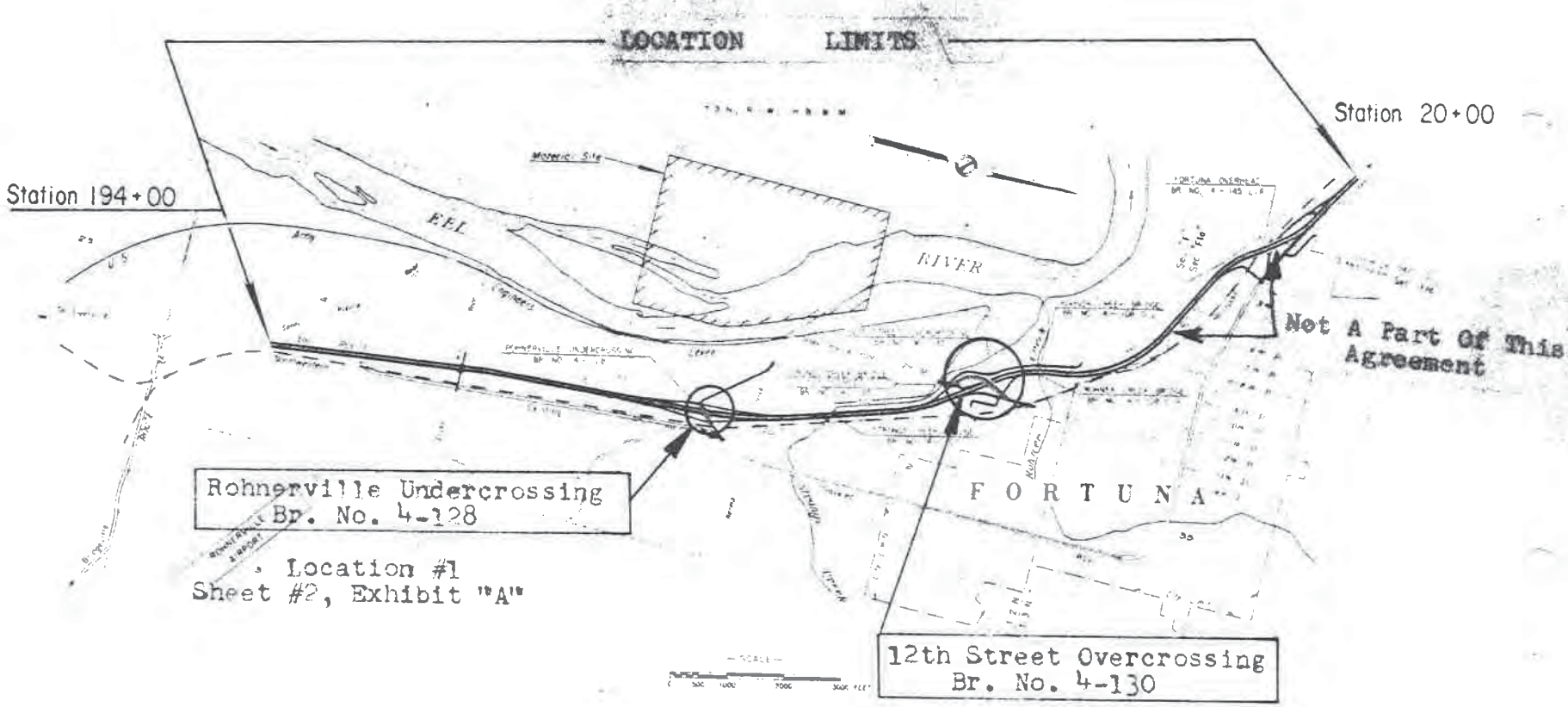
By FRED J. MOORE, Jr. (SEAL)
County Clerk

Attorney

By W. E. SCHUSSMAN

EXHIBIT "A"

In Humboldt County
between 0.4 mile north of Route 35 and 0.3 mile north of Fortuna
Road I-Hum-1-F,G
FREEWAY



Location #1
Sheet #2, Exhibit "A"

Location #2
Sheet #3, Exhibit "A"

AREA TO BE MAINTAINED BY COUNTY

VICINITY MAP
SHEET 1 OF 3

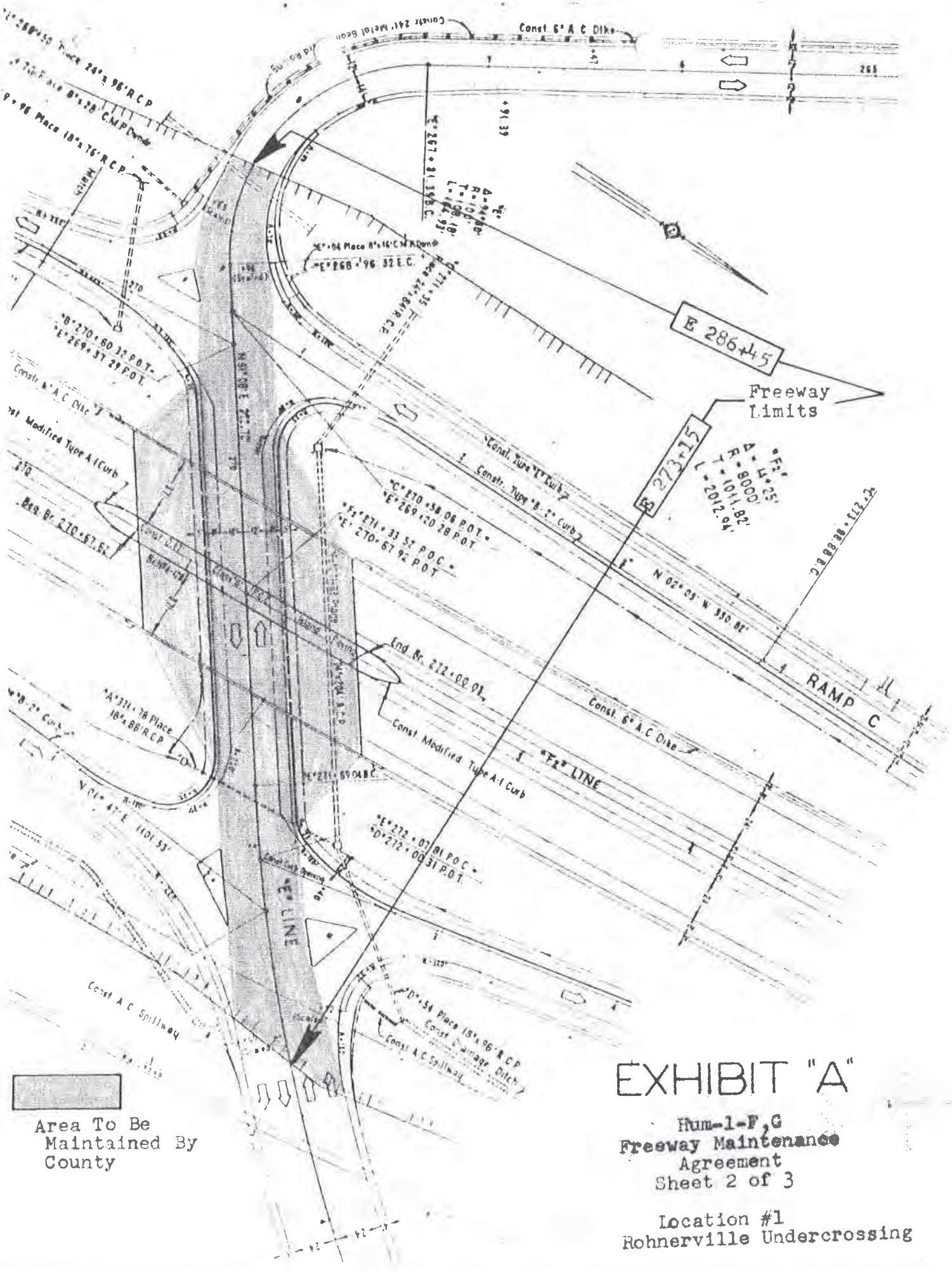
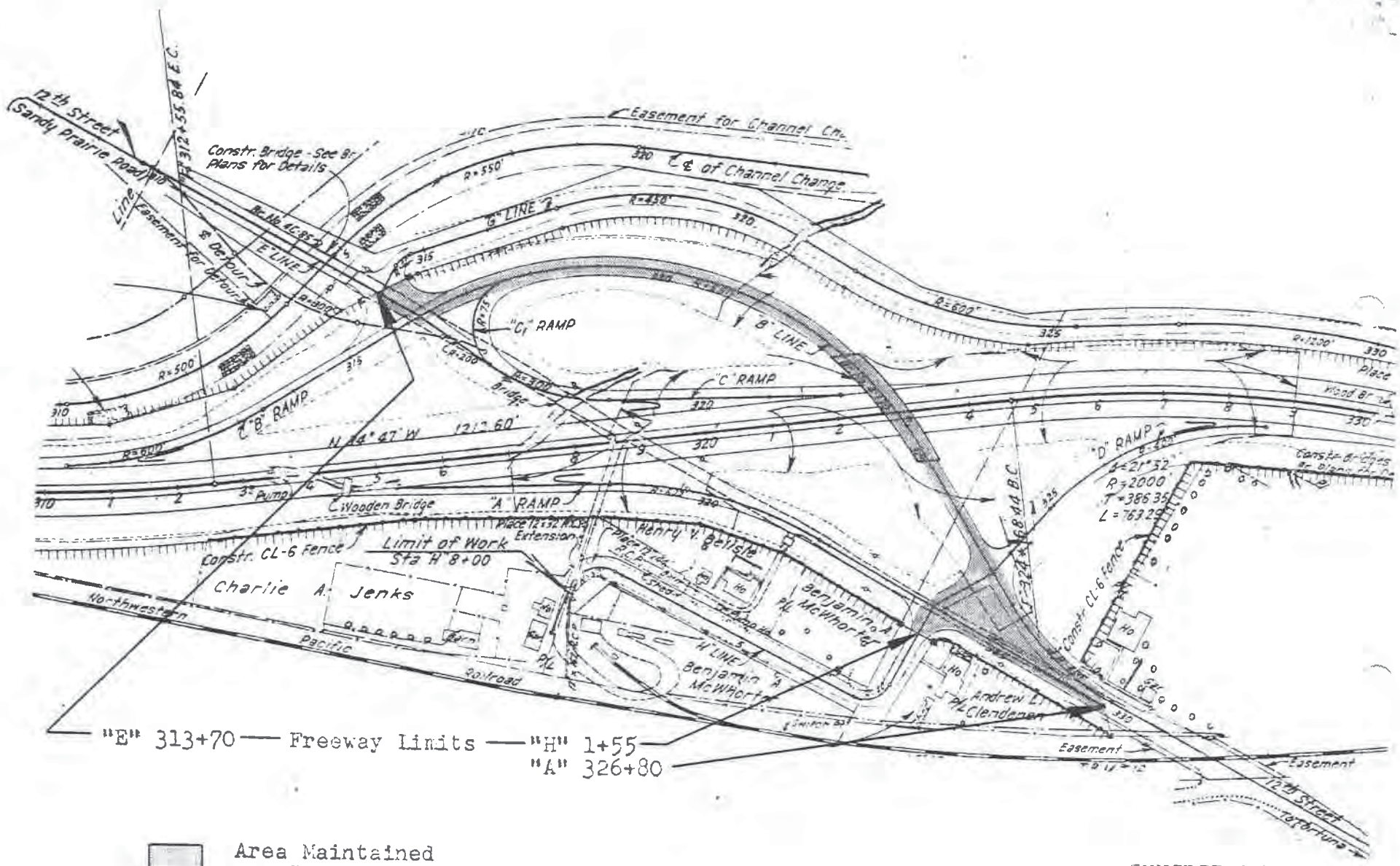


EXHIBIT "A"

Hum-1-F,G
Freeway Maintenance
Agreement
Sheet 2 of 3

Location #1
Rohnerville Undercrossing



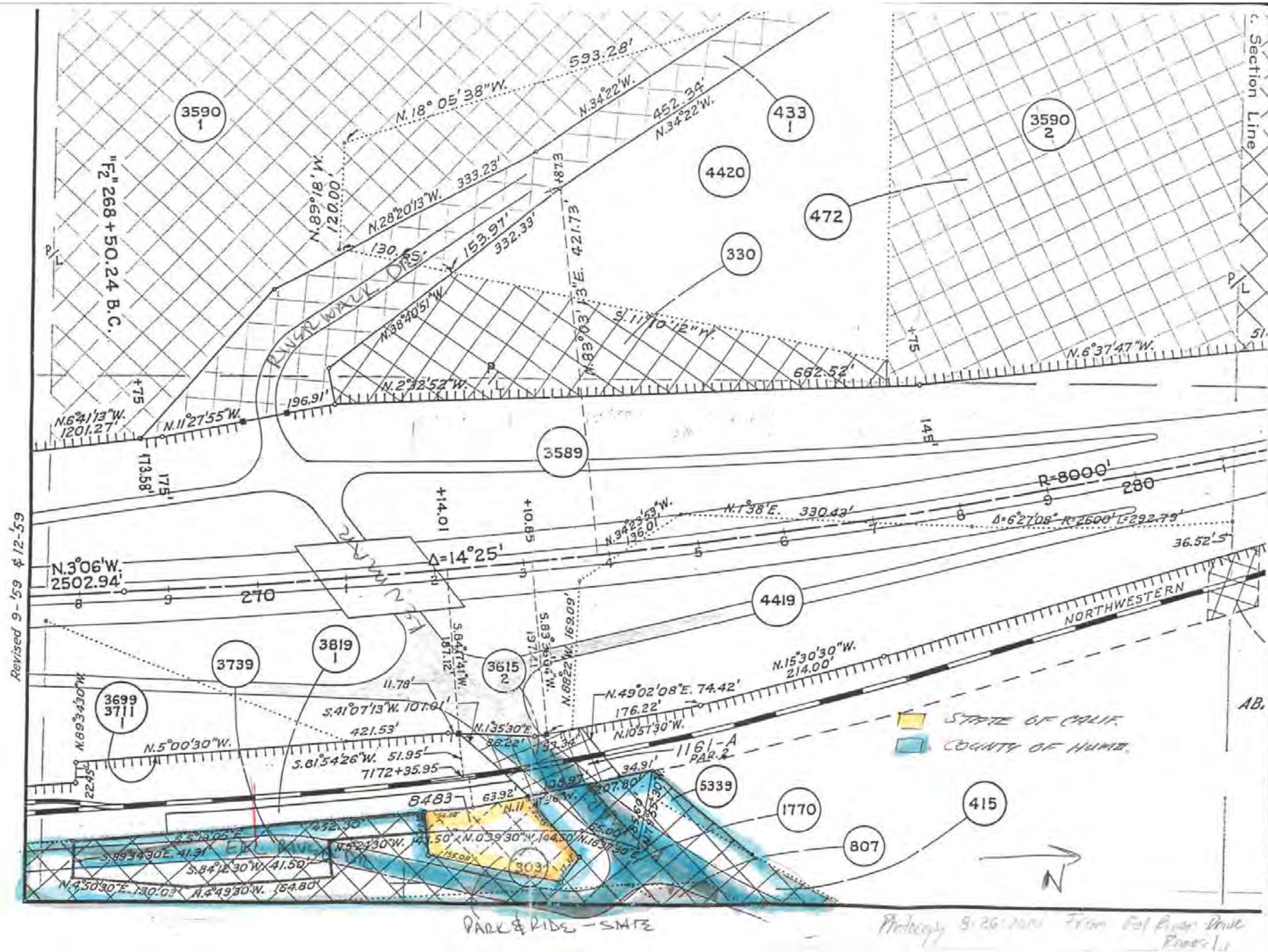
Area Maintained By County

EXHIBIT "A"
Hum-1-F,G
Freeway Maintenance
Agreement
Sheet 3 of 3

Location #2
12th Street Overcrossing


20035204
20035328
20035315
20101106
20101113
20035305
20035326
20035312
20035325
20035324
20035311
20035202
20038101
20038102
20038103
20038107
20038109
20038104
20038108
20133105
20103116
04033222
04033219
04033218
04033215
04033214
04033211
04033210
04033206
04033207
04033201
04033312
04033311
04033319
04033303
04033302
04033301
04033137
04033136
04033135
04033134
04033133
04033132
04033131
04033130
04033129
04033128
road
road
road
Hwy 101

WYATT HARRIS - CALTRANS WARRANTIES
725-4131



Photocopy 9.26.2001 From Eel River Drive

Bisiar, Jim

From: Ryan, Dave
Sent: Friday, December 05, 2014 4:27 PM
To: Bisiar, Jim
Subject: Eel River Drive R/W

Jim,

I couldn't find any more ways to check or calc the north ¼ corner and I didn't find any references in deeds to the NE corner of Sec. 2, so I gave up on that.

For what you send to Jill, I say skip the PC-Survey plot and tape together the highway maps that you put pt. nos. on, scan it and send that. I drew our R/W with a blueish/green marker. A plot may not even be necessary-pt. nos. just get jumbled. Craig could scan it-or if he's not around, Jason or I could help you do that. I want to see it anyways before we scan it.

added pts 361 - 366

As we talked about, recalc the south end of 202 Deeds 93 to be at sta. 279~ rather than using the acreage calc. Calc the west side of this R/W up to just south of where the RR starts to curve-to your box for pt. no. 359. Also calc the little strip that got left out near your pt. nos. 308 & 317. Calc area 145- that's the notch the State granted back to East along the easterly R/W, that is not now R/W.

281 D110

I need to look at the road register for Drake Hill Rd, but haven't done that yet.

Add the following note:

R/W for Eel River Drive in the area of this project (Drake Hill Road to Kenmar) is per Relinquishment No. 15 to County of Humboldt from Caltrans per 722 OR 640*, recorded 2/7/1963. The right-of-way was initially state highway (1917 alignment and 1931 widening). The southerly end of the project consists of uniform width strips, so both sides of the County R/W have been calculated for this area. The northerly end is variable and complex where it approaches Caltrans highway 101 R/W, so we therefor did not calculate the westerly limits of the R/W for this area. Further work would be required if this location is deemed necessary by Design engineers.

The R/W as shown is preliminary as more field ties to controlling monuments would be necessary to depict it with greater accuracy. If work is contemplated in close proximity to any existing R/W lines shown, Surveys should be notified in order to verify accuracy. Proposed acquisitions for any new easements will require additional survey work.

Additional information regarding R/W
Initial fieldwork did not entail making any ties for determining R/W. After the topographic survey was done, minimal additional fieldwork was done to attempt to locate R/W. In the course of R/W research and analysis, it was ultimately determined certain section and quarter corners, plus other monuments cited within R/W deeds needed to be located. Many of these are either destroyed or could not be found through quick searches. Positions have been calculated primarily through data contained in the 1917 and 1931 alignments noted in deeds and highway maps, originating near the Alton interchange using Caltrans control. R/W analysis required analyzing approximately 20 deeds and obtaining old maps and other data from Caltrans archives, most of which was not on file in County RW records.

Dave

ROHNERVILLE
HYDESVILLE
Alton
Waddington
Grizzly Bluff
Pleasant Point Sch.
Salt River
RIVER
VAN
SANDY PRAIRIE
STATE HIGHWAY
Jameson Cr.
Newberg Cr.
Coffee Cr.
East Fork
Gulch
E. J. Dodge Co.
Watson R.R.
East's Ferry
Goose Lake
2 N 1 W
El. 1540
El. 65

Attachment K - Environmental Constraints Analysis

Environmental Constraints Analysis

Fortuna Highway 101/Riverwalk Area Connectivity Project

May 2016

Table of Contents

Table Index

Figure Index

Appendices

1. Introduction

1.1 Project Summary

The Fortuna Highway 101/Riverwalk Connectivity Planning Study focuses on the 12th Street and Kenmar Road crossings of Highway 101, and includes an evaluation of the existing conditions, identification of deficiencies from Caltrans standards, and the development of conceptual alternatives intended to provide multi-modal mobility and accessibility for all users through both interchanges, with the goal of improving safety and ensuring the continued commercial viability of the Riverwalk Area. The results of the study will provide the foundation for future project development phases with the goal of implementation of improvement projects at the 12th Street and Kenmar Interchanges.

The overall objectives of the project are to:

- Provide improved accessibility and connectivity between the Downtown and the Riverwalk Area for all users
- Support growth of business in the Riverwalk and Downtown areas by increasing the capacity of the 12th Street and Kenmar Interchanges while considering planned commercial growth
- Support economic growth by developing strategies to improve access to the Riverwalk and Downtown areas
- Improve the safety at the Kenmar and 12th Street Interchanges

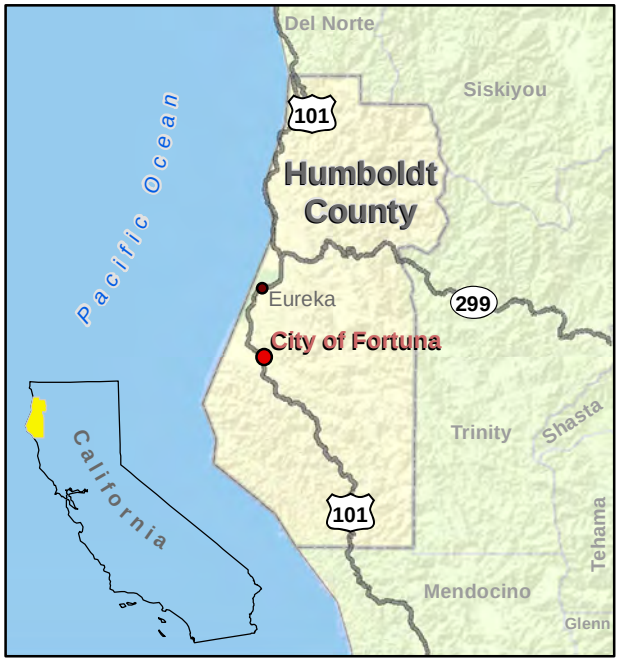
1.2 Purpose of the Report

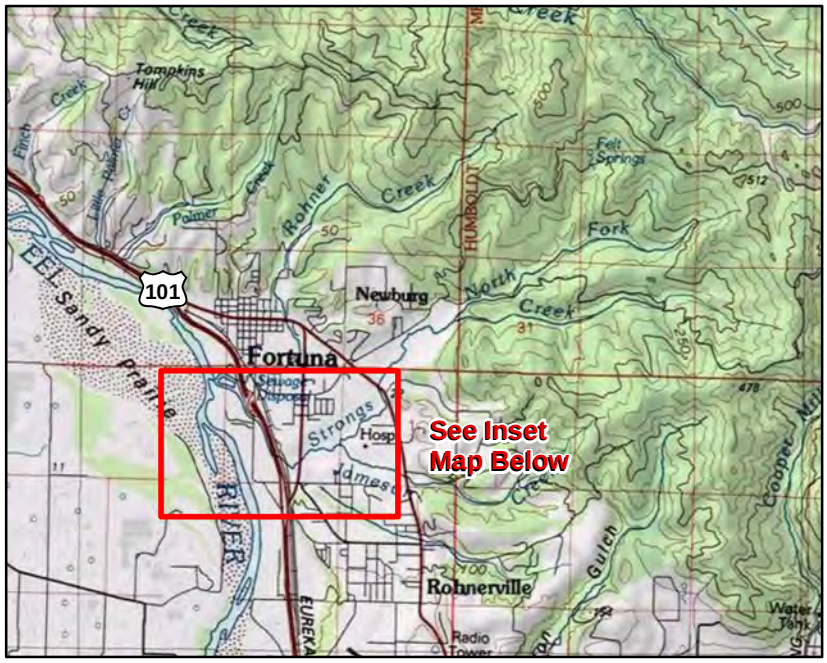
This Environmental Constraints Analysis is intended to document the biological conditions/constraints within the Study Area. A reconnaissance-level site investigation of existing conditions was conducted throughout the study area in February 2016, to identify the presence or potential presence of biological resources listed under the Federal Endangered Species Act (ESA), the presence of wetlands and Waters of the US as regulated by the US Army Corps of Engineers (USACE), the presence or potential presence of species listed as endangered or threatened under the California Endangered Species Act (CESA) or considered a species of special concern (SSC) by the California Department of Fish and Wildlife (CDFW), or the potential for special-status plant species having a rare plant ranking as determined by the California Native Plant Society (CNPS) rare plant inventory, and to present the potential of sensitive habitats as listed by the CDFW. This report also discusses the necessary steps required for the project to comply with federal, state, and local regulatory environmental compliance requirements and provides basic permit information. No permits or environmental compliance documents were collected, initiated, or completed for this effort, nor were regulatory agencies contacted for additional information.

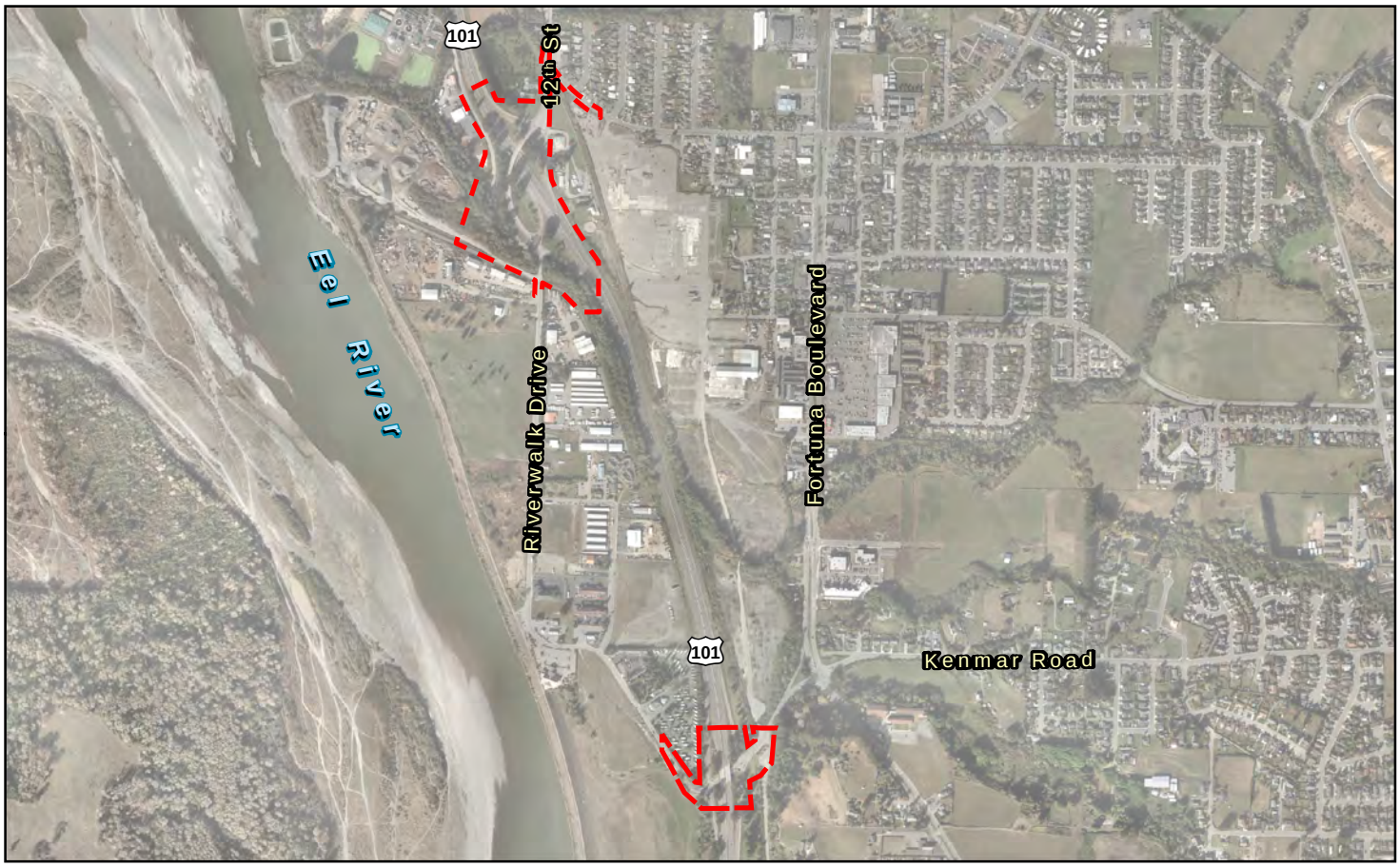
1.3 Location

This Environmental Constraints Analysis is being undertaken in Fortuna, Humboldt County, California. Fortuna is approximately 14 miles south of Eureka and can be accessed from Highway 101. A vicinity map is included as Figure 1.

The project study boundary (PSB) covers approximately 35 acres around the Kenmar Road and 12th Street interchanges for Highway 101. The PSB is depicted in Figures 2a and 2b and 3, and these areas were analyzed to evaluate the likeliness of environmental features and potential project constraints or likelihood of permitting requirements.







Project Areas

Paper Size 8.5" x 11" (ANSI A)
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Feet
Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 10N

N

GHD

HCAOG
Highway 101, Fortuna Downtown and Riverwalk Area
Complete Streets and Connectivity Planning Study

Job Number 11109149
Revision A
Date 07 Apr 2016

Vicinity Map

Figure 1

718 Third Street Eureka CA 95501 USA T 707 443 8326 F 707 444 8330 E eureka@ghd.com W www.ghd.com

G:\111\11109149 HCAOG Hwy 101 Fortuna Downtown-Riverwalk\08-GIS\Maps\Figures\Recon_WetlandsHabitat\F1_Vicinity.mxd

Data source: City of Fortuna Aerial, 2010; GHD data, 2013; USA Topo Maps; Streetmap USA. Created by:gldavidson

Study Boundary
Potential Wetland
Riparian
Strongs Creek
FH Valves
Water Valves
Hydrant
Water Mains
Drain Inlet; Curb Inlet
Headwall
Storm Water Mains
SS MH
SS Cleanout
SS Gravity Main
SS Pressurized Main

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Feet
Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

N

HCAOG
Highway 101, Fortuna Downtown and Riverwalk Area
Complete Streets and Connectivity Planning Study
Reconnaissance Level
Biological Investigation

Job Number 11109149
Revision A
Date 17 May 2016

Figure 2a

718 Third Street Eureka CA 95501 USA T 707 443 8326 F 707 444 8330 E eureka@ghd.com W www.ghd.com

G:\111\11109149 HCAOG Hwy 101 Fortuna Downtown-Riverwalk\08-GIS\Maps\Figures\Recon_WetlandsHabitat\F2a_12th_Street_South.mxd

Study Boundary
Creek
FH Valves
Water Valves
Hydrant
Water Mains
Drain Inlet; Curb Inlet
Headwall
Storm Water Mains
SS MH
SS Cleanout
SS Gravity Main
SS Pressurized Main

Paper Size 8.5" x 11" (ANSI A)
0 25 50 75 100 125 150
Feet
Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

N

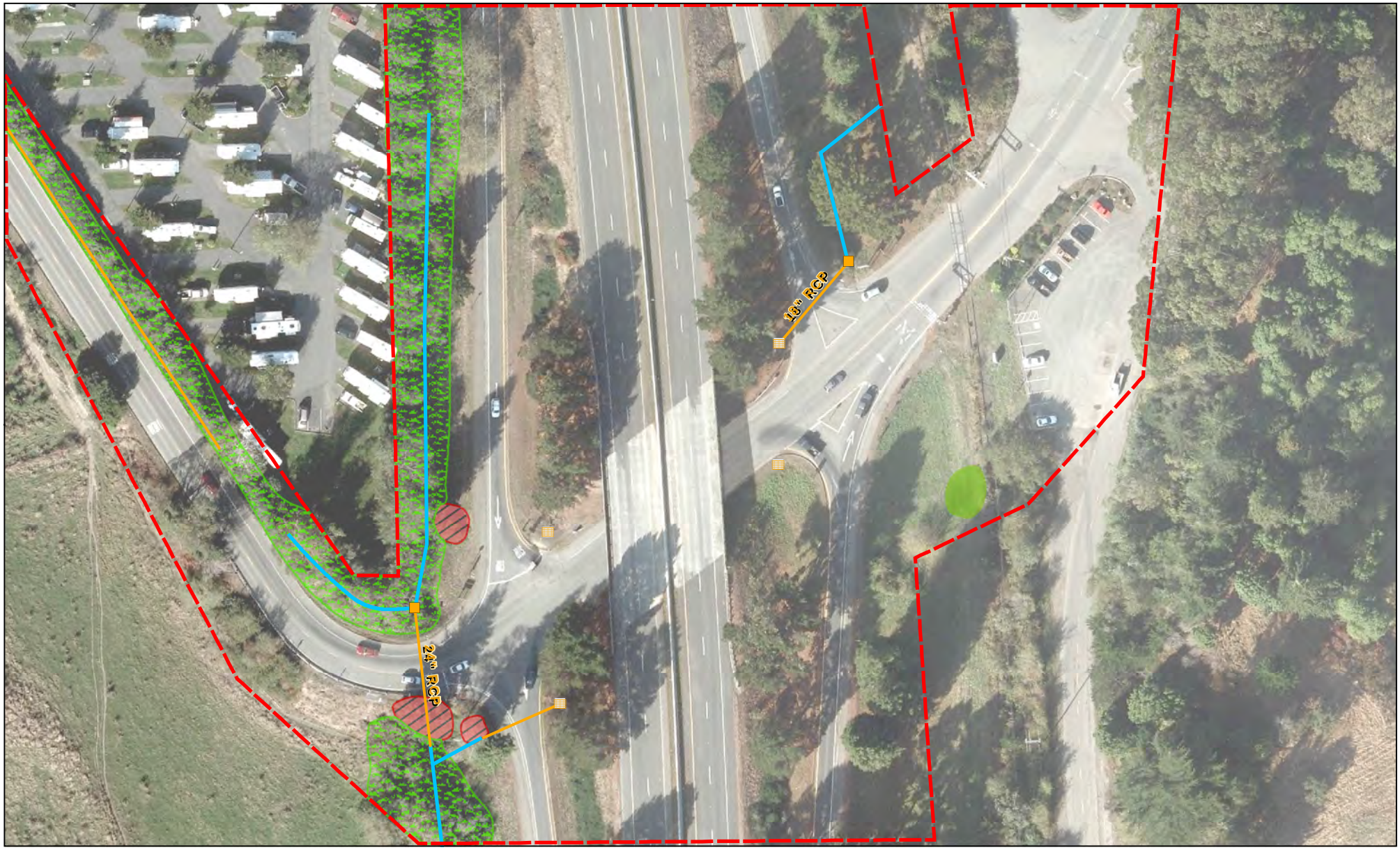
HCAOG
Highway 101, Fortuna Downtown and Riverwalk Area
Complete Streets and Connectivity Planning Study
Reconnaissance Level
Biological Investigation

Job Number 11109149
Revision A
Date 07 Apr 2016

Figure 2b

718 Third Street Eureka CA 95501 USA T 707 443 8326 F 707 444 8330 E eureka@ghd.com W www.ghd.com

G:\111\11109149 HCAOG Hwy 101 Fortuna Downtown-Riverwalk\08-GIS\Maps\Figures\Recon_WetlandsHabitat\F2b_12th_Street_North.mxd



Paper Size 8.5" x 11" (ANSI A)

0 25 50 75 100

Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

N

Drain Inlet; Curb Inlet
Headwall
Storm Water Mains
Potential Wetland Ditch
Study Boundary
Potential Wetland
Redwoods
Riparian

HCAOG
Highway 101, Fortuna Downtown and Riverwalk Area
Complete Streets and Connectivity Planning Study

Job Number 11109149
Revision A
Date 07 Apr 2016

Reconnaissance Level Biological Investigation

Figure 3

G:\111\11109149 HCAOG Hwy 101 Fortuna Downtown-Riverwalk\08-GIS\Maps\Figures\Recon_WetlandsHabitat\F3_Kenmar.mxd

718 Third Street Eureka CA 95501 USA **T** 707 443 8326 **F** 707 444 8330 **E** eureka@ghd.com **W** www.ghd.com

Data source: City of Fortuna GIS: Storm Drain, aerial imagery; GHD: wetland/habitat reconnaissance 2-29-2016 Created by:gldavidson

1.4 Overview of Study Area

The Study Areas are located in the western part of Fortuna, a city with a population of 11,926 as of the 2010 census. There are two distinct Study Areas located approximately one mile apart, and these are described in greater detail below.

The 12th Street PSB is an elongated irregularly shaped area oriented along the north-south centerline of 12th Street and Riverwalk Drive, and bisected by Highway 101 (Figure 2a and 2b). The area north of Highway 101 consists of paved roads and maintained grassy right of way with a few scattered ornamental trees, and is bordered by residential and commercial development. There are few natural feastures remaining in this section. South of Highway 101, Strong's Creek and associated riparian habitat makes up the southern end of the PSB, with a narrow area of shrubs and trees just to the north between Dinsmore Drive and 12th Street, and grassy swales with scattered Monterey cypress between the southern arc of 12th Street and Highway 101.

The Kenmar PSB is oriented generally northeast/southwest (Figure 3). The larger portion east of Highway 101 includes a steep slope with non-native eucalyptus at the extreme east end, with a parking lot immediately to the west. Continuing west, an inactive rail line runs through a series of mostly open areas of low herbaceous growth with scattered Monterey cypress. West of Highway 101 and associated ramps is an ephemeral ditch which has developed a riparian-like area dominated by dense shrub and sapling cover, and which includes a few redwoods of moderate size near the intersection of Riverwalk Drive and the Highway 101 ramps. The southwest limit of the PSB coincides with the top of a grade dropping down to the adjacent Eel River floodplain, which is not included in the PSB.

Wetland and riparian habitats are discussed in further detail below.

2. Methods

2.1 Research Methods

The initial analysis consisted of review of existing environmental literature and data results from database queries of potential on-site sensitive species which were evaluated using the Fortuna United States Geoligical Survey (USGS) 7.5 quadrangle. The database queries include the California Natural Diversity Database (CNDDB) [CDFW February 2016]; the California Native Plant Society's (CNPS) Inventory of Rare and Endangered Vascular Plants [CNPS February 2016]; and lists of special-status species and natural communities that may occur in the project area as provided by the U.S. Fish and Wildlife Service (USFWS) [USFWS, 2016].

Additional existing data was reviewed when available, such as soil and ecological maps and descriptions generated by the Natural Resources Conservation Service (NRCS) and wetlands mapping from USFWS National Wetlands Inventory (NWI) [USFWS 1987]. NWI maps are compiled using a variety of remote sensing data sources, including aerial photographs, infrared photography, and soils data. NWI maps do not necessarily represent an accurate extent of jurisdictional wetlands in the Study Area. Finally, the CalFlora database in conjunction with the Jepson Herbarium database was consulted for site specific species cross referencing for potential rare plants in the project vicinity. When available, Geographic Information System (GIS) data was overlaid with the PSB.

2.2 Environmental Reconnaissance Survey Methods

On February 20, 2016, GHD field staff performed a reconnaissance level investigation of environmental and biological resources within the two PSB's. The survey was meant to identify the potential for environmental impacts and to identify potential permits that would result from implementing the project. This field reconnaissance effort, focused on identifying the potential presence of wetland, riparian, and special-status plant species (listed as rare, threatened, endangered, or candidate for rare, threatened, or endangered species listing under the state or federal Endangered Species Acts, CNPS rare plant ranking, or of local importance) or habitats present within the proposed project trail segments. The project area topographic maps, aerial photography maps, the California Department of Fish and Wildlife CNDDB and CNPS Rare Plant Inventory were consulted using the Fortuna quadrangle prior to and during the survey to determine potential sensitive species or habitat occurrence.

Field work was conducted by walking each of the proposed PSB units and visually documenting findings through photographs and notes. Each location with a potential wetland or areas potentially containing special status species and/or habitats, was noted. These areas would then be recommended for further investigations or protocol level surveys in order to fulfill potential permit requirements as described in further detail in Section 3 of this report.

The likelihood of certain permits increases in locations in which the project intersects certain features. For instance, the likelihood of a USACE Clean Water Act 404 and CDFW 1600 permit increases in locations in which the project crosses a blue line stream. Section 4 considers each permit, discusses the nature of the permit, and identifies the threshold triggers for each permit.

3. Results

3.1 Special Status Plants, Animals, & Habitats Literature Results

A compilation of flora and fauna obtained from the literature search can be found in Table 1 below. The combined list identifies six animal species and three plant species with a moderate or high potential to be present in the PSB. A list of federal endangered, threatened and candidate species for the Fortuna USGS quadrangle was downloaded from the web site of the USFWS Arcata Field Office on March 4, 2016 (Appendix A). The USFWS lists are often of a general nature and do not indicate presence, merely the need for further review. The CNDDB Occurrence Report Rare Find 4 lists species potentially present in the project vicinity, and includes the Fortuna quadrangle (Appendix B). Several of these were subsequently excluded because of an absence of suitable habitat.

Table 1. Listed/Proposed Rare, Threatened and Endangered Species

Scientific Name	Common Name	Status	Habitat	Potential to Occur
Antrozous pallidus	Pallid bat	SSC	Dry rocky woodlands	Low, no suitable habitat
Arborimus pomo	Sonoma tree vole	SSC	Conifer forest	Low, no large stands of suitable habitat
Pekania (Martes) pennanti	Fisher	FC	Mature forest	None; no suitable habitat present
Ardea herodius	Great Blue Heron	None	Colonial nester, tall trees, marshes	Low, several miles to nearest known rookeries
Charadrius alexandrinus nivosus	Western Snowy Plover	FT	Beaches and dunes above high tide line, river gravel bars	None; no suitable habitat present
Coccyzus americanus	Yellow-billed Cuckoo	FT	Dense extensive riparian forest	Low; nearest documented recent records near Cock Robin Island
Brachyramphus marmorata	Marbled Murrelet	FT	Old-growth redwood and Douglas fir forest	None; no suitable habitat present
Riparia riparia	Bank Swallow	ST	Nests in vertical banks/cliffs along rivers	Low for nesting; known from the Eel near Fernbridge so nearby foraging

				is possible
Strix occidentalis caurina	Northern Spotted Owl	FT	Mature forest	None; no suitable habitat present
Emys (Actinymys) marmorata	Western pond turtle	SSC	Ponds, rivers, marshes	Moderate
Rana aurora	Northern Red-legged Frog	SSC	Emergent wetlands and stream margins, and nearby wet meadows and woods	High especially in riparian areas
Rana boylii	Foothill Yellow-legged Frog	SSC, federal proposed	Margins of shallow rocky streams and riffles	High; known to occur in the Eel and tributaries
Oncorhynchus kisutch	S. OR/N. CA Coho Salmon	FT	Rivers and tributaries	Moderate; historic records from Strong's Creek
Oncorhynchus mykiss	N. CA Steelhead	FT	Rivers and tributaries	High; recent records from the lower Strong's Creek watershed
Oncorhynchus tshawytscha	CA Coastal Chinook	FT	Rivers and larger tributaries	Moderate; present in Eel near Fortuna
Spirinchus thalyichthys	Longfin Smelt	FC, ST	Estuaries, may enter freshwater to spawn	Low; present in lower 4.5 miles of Eel, historic (1956) seasonal occurrence up to Van Duzen mouth

Important habitat features include Strong's Creek and an associated riparian corridor in the south and southwest portion of the 12th Street PSB, and several large individual redwoods in the western part of the Kenmar PSB. While these habitat features are not extensive, they could harbor sensitive animals or plants and have habitat and aesthetic value.

A number of plant species identified as rare by the CNPS occur in the Fortuna quadrangle; CEQA requires that these species be considered in the planning process, thus a protocol level study is recommended during the appropriate bloom period (Table 2). Appendix B contains the CNDDB occurance report. If rare species are located mitigation measures may be required. At least one of these species (Siskiyou checkerbloom) sometimes grows within maintained road right-of-way.

Table 2. Potential Rare Plant Occurrence and Bloom Periods

Scientific Name	Common Name	Rare Plant Rank	Bloom Time	Habitat	Liklihood to Occur
Fissidens pauperculus	Minute pocket moss	1B.2	n/a	Damp soil in dry stream beds and banks	Moderate
Sidalcia malviflora ssp. *patula*	Siskiyou checkerbloom	1B.2	May-August	Coastal scrub, coastal prairie, road cuts	Moderate
Clarkia amoena ssp. *whitneyi*	Whitney's farewell-to-spring	1B.1	June-August	Coastal bluff, coastal scrub	Moderate, based on a 1955 record from "west of Fortuna."
Gilia capitata ssp. *pacifica*	Pacific gilia	1B.2	April-August	Coastal scrub, coastal prairie	Low

4. Environmental Permits and Processes Discussion

4.1 California Environmental Quality Act

Review under the California Environmental Quality Act (CEQA) is required whenever a state or local government entity initiates a project, funds a project, or issues a permit decision. The CEQA document is prepared or overseen by a designated lead agency. An Initial Study determines the appropriate level of environmental review; for a project such as this one limited to relatively small portions of an urban fringe area but including a salmonid stream and associated riparian areas, there is a possibility that an Environmental Impact Report (EIR) would be required. However, if all identified impacts can be avoided or adequately mitigated, a Mitigated Negative Declaration (MND) may be adequate. The City of Fortuna would most likely be the CEQA lead agency for the project. Other likely agencies include the Humboldt County Association of Governments, Caltransor other non-federal agencies with permitting authority over the project.

Compliance with the National Environmental Policy Act (NEPA) is required whenever there is federal involvement in the project. If the ultimate project includes federal funding, it would trigger NEPA analysis; in addition, federal involvement may also include approval or issuance of permits. If the project does not qualify for a Categorical Exclusion (CE) or Programmatic Categorical Exclusion (PCE), additional environmental documentation under NEPA may be necessary prior to project approval of funding by a federal agency. Caltrans would most likely be the NEPA lead agency for the project.

4.2 Other CEQA/NEPA Considerations:

From a CEQA/NEPA perspective, project segmentation may occur when the project as described and analyzed in a single CEQA or NEPA process does not encompass the entire project. Segmentation can occur when portions of a project that are dependent on other portions of the project to make them functional are evaluated in separate documents. An example would be if each interchange were analyzed in separate CEQA documents but then constructed simultaneously. In this example, the “entire project” would consist of both interchanges, even though the project was analyzed in two separate documents and therefore “segmented.” However, if the components could not function without the other, then these projects must be analyzed in the same document. Alternatively, if the projects are analyzed in separate documents, they must be analyzed in the cumulative impacts section of the document. Therefore, if the two interchanges are considered a single project, then the document should address all project components.

If a project has reasonably foreseeable additional components, they must be analyzed concurrently as part of a single project. The flaw of segmentation is that it can divide larger projects into smaller components, which, when viewed independently, may not lead to the identification of the full range and intensity of impacts resulting from the entire project when viewed as a whole. Linear infrastructure network projects (e.g. transmission lines, pipe networks, roads, trails) may present a special challenge when considering whether a project is in danger of being segmented, as there may be no clear cut method of determining where an individual project starts and ends - and

whether it should be analyzed as part of a larger project or as an individual action simply occurring on a larger network. Following court decisions, the standard for determining whether a road project is an individual action warranting individual CEQA/NEPA analysis is if it is: of substantial length; and is between logical termini, such as population centers or major crossroads, etc; and has independent utility.

4.2.1 Cultural Resources

Preparation of CEQA/NEPA documents would trigger a need for cultural resources studies in at least some portions of the PSB. Reconnaissance level studies and inclusion of reasonable mitigation measures would likely be suitable for most areas, unless those studies identify concentrations of cultural resources.

4.2.2 Other Special Studies for CEQA/NEPA

CEQA and NEPA require special studies for key resources that may be impacted by the project. For instance, the Protocol level surveys for special-status plants and animals would serve as special studies. Other special studies that could be required include aesthetic studies, air quality studies, geologic studies, hazardous materials studies, noise studies, and traffic studies. At this time, it is unknown if any of these studies would be required. However, it is possible that special studies could be required for parts of the project. For example, geotechnical surveys may be required in the creek crossing locations.

4.3 Permits

4.3.1 U.S. Army Corps of Engineers (USACE) Section 404 Nationwide Permit

The USACE regulates discharges of dredged or fill material into Waters of the United States under Section 404 of the Clean Water Act (CWA). The project may result in unavoidable fill of some jurisdictional wetlands or Waters of the U.S. during project implementation. There are also potential stream crossings, although the project will likely be designed to avoid or minimize impacts to wetlands or waters of the U.S. However, if filling of wetlands or waters of the U.S. are unavoidable, the project will require a USACE Section 404 Permit. The project may qualify for a streamlined USACE Nationwide Permit. Prior to authorizing wetland fill under Section 404, a wetland delineation must be submitted and verified by the USACE. Impacts that cause a loss of jurisdictional wetland will require an approved wetland mitigation and monitoring plan (MMP), accompanied by an adaptive management plan and long term maintenance plan.

A formal wetland delineation is recommended during the planning phase of any segment which crosses a potential wetland identified in this report, and for those areas where ditches (potential Waters of the U.S.) occur adjacent to the roads, in order to verify potential wetlands or Waters of the U.S. and to request a jurisdictional determination. Wherever ground disturbing work would occur below the ordinary high water mark (OHWM) of a stream crossing, a delineation and 404 permit would also be required. Potential wetlands and waters of the U.S. are shown on Figures 2a and 2b and 3, and include Strong's Creek, several drainage ditches, and a few small degraded wet depressions and swales.

4.3.2 Regional Water Quality Control Board (RWQCB)

Section 401 Water Quality Certification and National Pollutant Discharge Elimination System (NPDES) Requirements: Pursuant to section 401 of the federal CWA, projects that require a

USACE permit for discharge of dredge or fill material must obtain water quality certification to confirm compliance with state water quality requirements. If the project results in unavoidable fill of wetlands or Waters of the U.S., Section 401 Certification from the RWQCB will be required. The RWQCB may encourage a CRAM evaluation of impacted habitats and mitigation for compensation of impacts.

The CWA requires that any discharge of pollutants to waters of the United States from any point source is unlawful unless the discharge complies with a NPDES permit. These regulations require that discharges of stormwater from construction projects that cause one or more acres of soil disturbance must be in compliance with an NPDES permit. If the project disturbs more than one acre of soil, it must comply with the construction general stormwater permit issued by the State Water Resource Control Board. The construction general permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP).

Additionally, the RWQCB may take jurisdiction on a variety of drainage ditches and swales identified in the PSB and a formal delineation of the features will be required throughout the PSB.

4.3.3 California Department of Fish & Wildlife Section 1602

Under Fish and Game Code Section 1602 (Streambed Alteration), the CDFW has jurisdiction over proposed activities that may substantially modify a river, stream, or lake. The PSB includes portions of Strong's Creek and several shallow ditches, and depending on final design direct or indirect impacts could occur in some of these locations. Additionally, CDFW jurisdiction extends at least to the top of bank and may sometimes include adjacent riparian zones. As a result, a 1600 Lake and Streambed Alteration Agreement including special conditions to avoid or minimize impacts is anticipated.

4.3.4 Federal Endangered Species Act Compliance (Protocol Level Surveys and Biological Assessments)

Based on available knowledge at this time, the project is not expected to result in any adverse impacts to federally threatened or endangered species or habitats, and GHD does not anticipate the need for formal Section 7 ESA consultation (this assumes no instream work). However, when a USACE permit is required for impacts to jurisdictional wetlands or other waters and the project has the potential to cause adverse impacts to federally-listed threatened or endangered species, the USACE must initiate consultation with the USFWS and/or the National Marine Fisheries Service (NMFS) pursuant to Section 7 of the ESA. Although unlikely for the proposed project, because no impacts to threatened, or endangered species are currently anticipated, if future studies determine that a listed species is present or if a species is added to the list and is present in the area, and if adverse effects are possible, then informal or formal consultation, including preparation of a Biological Assessment, may be required.

Potential issues include salmonids (steelhead, coho, chinook) which occur in the Eel River and tributaries including Strong's Creek. If project activities require dewatering of any portion of the creek, of if there is a possibility of sediment input to the stream or any other potential instream impact, then Section 7 consultation including preparation of a Biological Assessment may be necessary.

There is no documentation of terrestrial listed species in the project study boundary; however, if they are found to occur near the PSB, a variety of requirements ranging from pre-construction protocol surveys to seasonal noise and visual buffers during construction would be triggered, depending on distance to the nest.

4.3.5 California Endangered Species Act (Protocol Level Surveys and Biological Assessments):

The California Endangered Species Act (CESA) requires consultation with the CDFW when preparing CEQA documents to ensure that the lead agency actions do not jeopardize the existence of listed species.

A number of state listed or state sensitive species could potentially occur close to the PSB including bank swallow, northern red-legged frog, foothill yellow-legged frog, western pond turtle, and others. However no site-specific surveys are available at this time.

By incorporating the development of reasonable avoidance or mitigation measures in the CEQA document, such as seasonal work windows and buffer zones around bird and bat habitats and native migratory bird nests during the nesting season and pre-construction surveys for other species impacts can likely be reduced to less than significant. However, a thorough review is recommended, especially where wetland, stream, drainage ditches, or riparian impacts may occur.

4.3.6 Migratory Bird Treaty Act (Avian Surveys)

The Migratory Bird Treaty Act (MBTA) protects all native species of birds. USFWS has statutory authority to enforce the MBTA. To avoid impacts to nesting birds it is recommended that to the extent practical, construction activity occur outside the nesting season (approximately March 15 to August 15 in Humboldt County). This will be most crucial near riparian areas and large trees. If it is not possible to avoid the nesting season then avian surveys should occur within seven days prior to disturbance, and if active nests are identified then the biologist shall establish appropriate buffers. For common species typical of urban sites these are often very small, although buffers for raptors or special-status birds can be much larger (100 to 500 feet). Additonal protections for birds or requirements for avoidance are found in the Fish and Game Code and are often a part of CEQA compliance and mitigation measures.

4.3.7 California Department of Transportation (Caltrans)

Encroachment Permits (EP) and/or other agreements may be required for use of or alterations to any area within a Caltrans right-of-way.

A Humboldt County EP will be required if any work encroaches into County right-of-way. Additionally, a Humboldt County grading permit will need to be obtained for grading work in the County right-of-way which exceeds the thresholds identified in the County Grading Ordinance.

4.3.8 California State Lands Commission

The State Lands Commission (SLC) has jurisdiction over sovereign public lands, including the beds of California's naturally navigable rivers, lakes and streams, as well as the state's tide and submerged lands along the state's more than 1,100 miles of coastline, extending from the shoreline to three miles offshore. The location and extent of sovereign lands are generally defined by reference to the ordinary high and low water marks of tidal and navigable waterways. Because the boundaries of these lands are often legally based upon the last natural extent and location of the subject water body, they are not necessarily apparent from a present day site inspection, and substantial research is needed to define the extent of the state's ownership interests. Because the project crosses tributaries associated with the Eel River, further inquiry regarding the extent of SLC's jurisdiction should be conducted.

4.3.9 Permit Summary

In summary, a variety of permits and related environmental review would be necessary for project planning and design. In general, agencies are more supportive of projects when they are a part of the early planning and collaboration process. Currently, the proposed project would occur mostly within already disturbed areas, and environmental impacts are most likely if design features cross wetland or riparian areas. Any work within the identified creek crossings or wetlands would also trigger various permit requirements. The present document is intended to identify potential permits and environmental planning considerations at a project-wide scale.

5. Conclusions

5.1 Potential Permits and Environmental Constraints

The project area is shown on Figures 1 through 3. Appendix C contains representative photographs of the different habitats or constraints observed during the field reconnaissance effort.

The project will require a formal wetland delineation following USACE protocol to identify impacts to wetland habitat or waters of the U.S.; particularly in the areas identified as potential wetland, ditch, and stream crossings. Parts of the PSB contains what appear to be drainage ditches that could fall under either the USACE and/or RWQCB jurisdiction. The types of ditches identified in Figures 2a and 2b and 3 and shown in photographs in Appendix C include drainage ditches with evident flow paths connected by culverts, drainages comprised of hydrophytic vegetation, and swales.

Potential biological surveys required for implementing this proposed project include, at a minimum, a protocol level intensive botanical site inventory of vascular plant species, with emphasis on species identified in the database queries. This survey will need to be conducted at the appropriate season(s) to locate flowering individuals of listed species.

A few state special concern wildlife species have been reported within the general project vicinity, and others could occur although no recent field data is available for the PSB. Federally listed salmonids have been reported in other parts of Strong's Creek in the past and are presumed to be present. The PSB also contains several large redwoods and other large trees and other viable habitat for migratory nesting birds as well as riparian habitat. Therefore, these areas may need to be further assessed with CEQA special studies in order to identify and offset adverse impacts to the potential fauna along these routes. Additional non-biological studies may be required by CEQA/NEPA.

6. References

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Appendices

Appendix A (USFWS Listed/Proposed Threatened and Endangered Species for the Fortuna Quad)

Candidate species included

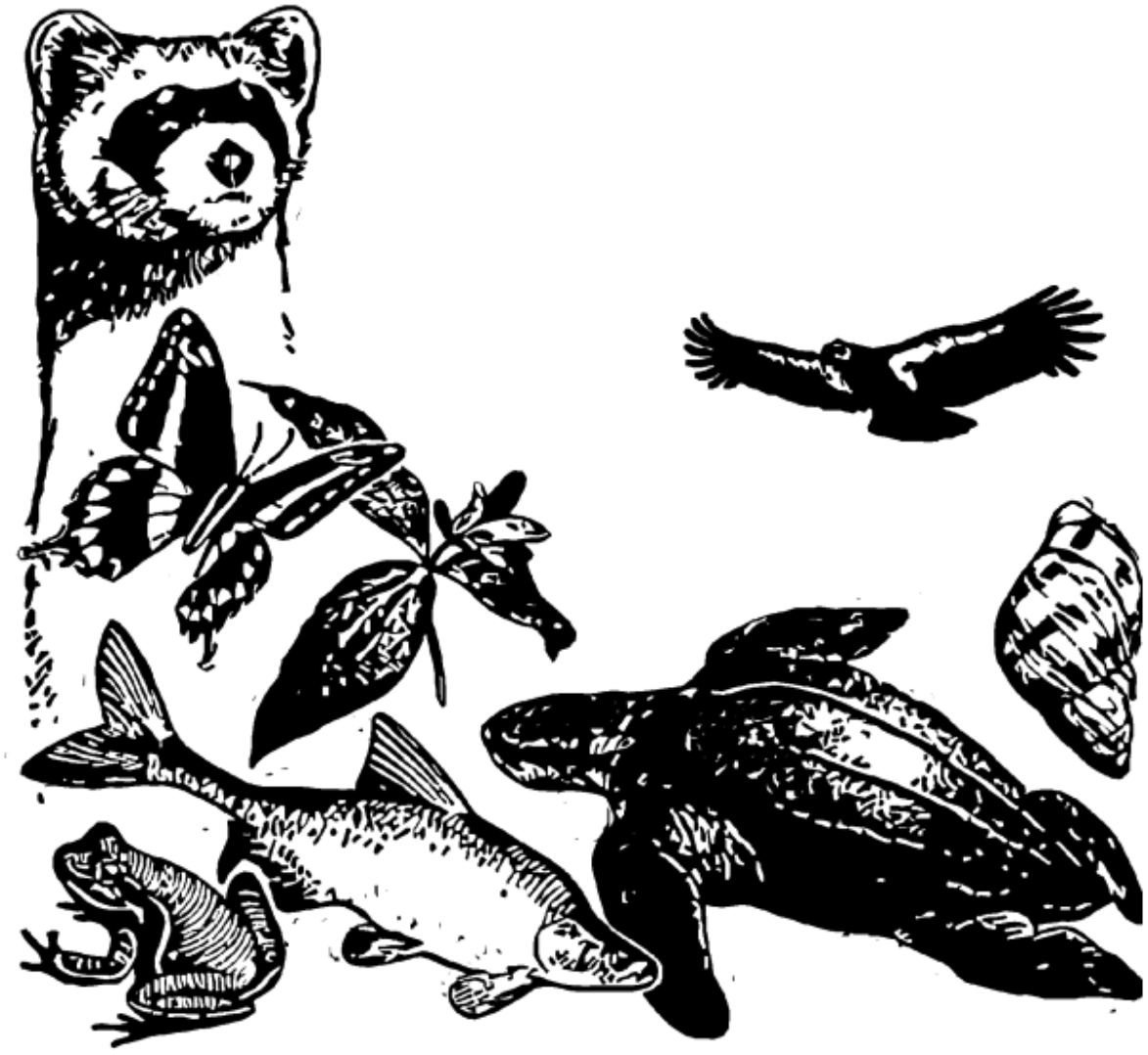
U.S. Fish & Wildlife Service

12th Street Interchange

IPaC Trust Resources Report

Generated March 04, 2016 03:19 PM MST, IPaC v3.0.0

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



IPaC - Information for Planning and Conservation (http://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

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U.S. Fish & Wildlife Service

IPaC Trust Resources Report

NAME

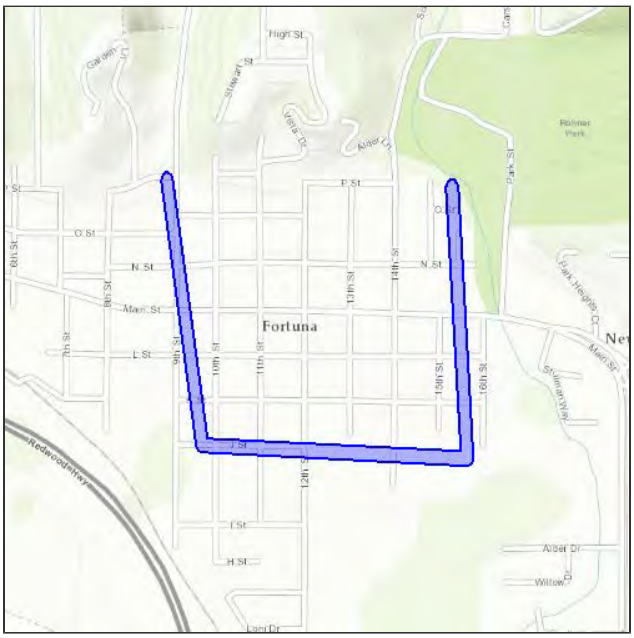
12th Street Interchange

LOCATION

Humboldt County, California

IPAC LINK

http://ecos.fws.gov/ipac/project/3IDEK-YDXKJ-BBLBW-TO465-QKA2Y4



U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

Arcata Fish And Wildlife Office
1655 Heindon Road
Arcata, CA 95521-4573
(707) 822-7201

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Birds

Marbled Murrelet Brachyramphus marmoratus — Threatened

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B08C

Northern Spotted Owl Strix occidentalis caurina — Threatened

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B08B

Western Snowy Plover Charadrius alexandrinus nivosus — Threatened

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B07C

Yellow-billed Cuckoo Coccyzus americanus — Threatened

CRITICAL HABITAT
There is **proposed** critical habitat designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B06R

Flowering Plants

Beach Layia Layia carnosa — Endangered

CRITICAL HABITAT

No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q34T

Menzies' Wallflower Erysimum menziesii — Endangered

CRITICAL HABITAT

No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q29W

Western Lily Lilium occidentale — Endangered

CRITICAL HABITAT

No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q1Y0

Mammals

Fisher Martes pennanti — Proposed Threatened

CRITICAL HABITAT

No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A0HS

Critical Habitats

This location overlaps all or part of the critical habitat for the following species:

Steelhead Critical Habitat Final designated

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E08D#crithab

Migratory Birds

Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish & Wildlife Service.[1] There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

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1. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern
  http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Conservation measures for birds
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/akn-histogram-tools.php

The following species of migratory birds could potentially be affected by activities in this location:

Allen's Hummingbird Selasphorus sasin — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0LI

Bald Eagle Haliaeetus leucocephalus — Bird of conservation concern
Year-round
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008

Burrowing Owl Athene cunicularia — Bird of conservation concern
Year-round
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0NC

Calliope Hummingbird Stellula calliope — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0K3

Fox Sparrow Passerella iliaca — Bird of conservation concern
Season: Wintering

Lewis's Woodpecker Melanerpes lewis — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HQ

Long-billed Curlew Numenius americanus — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B06S

Marbled Godwit Limosa fedoa — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0JL

Olive-sided Flycatcher Contopus cooperi — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0AN

Peregrine Falcon Falco peregrinus — Bird of conservation concern
Year-round
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FU

Purple Finch Carpodacus purpureus — Bird of conservation concern
Year-round

Short-billed Dowitcher Limnodromus griseus — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0JK

Short-eared Owl Asio flammeus — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD

Snowy Plover Charadrius alexandrinus — Bird of conservation concern
Season: Breeding

Western Grebe aechmophorus occidentalis — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0EA

Whimbrel Numenius phaeopus — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0JN

Willow Flycatcher Empidonax traillii — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F6

Yellow Warbler dendroica petechia ssp. brewsteri — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0EN

Red Knot Calidris canutus ssp. roselaari Bird of conservation concern

Season: Wintering
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0G6

Wildlife refuges and fish hatcheries

There are no refuges or fish hatcheries in this location

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

There are no wetlands in this location

Appendix B (CNDDB Occurrence Report)

Fortuna Quad

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad is (Fortuna (4012452))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Agelaius tricolor tricolored blackbird	ABPBXB0020	None	None	G2G3	S1S2	SSC
Antrozous pallidus pallid bat	AMACC10010	None	None	G5	S3	SSC
Arborimus pomo Sonoma tree vole	AMAFF23030	None	None	G3	S3	SSC
Ardea herodias great blue heron	ABNGA04010	None	None	G5	S4	
Bombus caliginosus obscure bumble bee	IIHYM24380	None	None	G4?	S1S2	
Bombus occidentalis western bumble bee	IIHYM24250	None	None	G2G3	S1	
Clarkia amoena ssp. whitneyi Whitney's farewell-to-spring	PDONA05025	None	None	G5T1	S1	1B.1
Emys marmorata western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
Fissidens pauperculus minute pocket moss	NBMUS2W0U0	None	None	G3?	S2	1B.2
Gilia capitata ssp. pacifica Pacific gilia	PDPLM040B6	None	None	G5T3T4	S2	1B.2
Lasiurus cinereus hoary bat	AMACC05030	None	None	G5	S4	
Montia howellii Howell's montia	PDPOR05070	None	None	G3G4	S3	2B.2
Oncorhynchus clarkii clarkii coast cutthroat trout	AFCHA0208A	None	None	G4T4	S3	SSC
Polemonium carneum Oregon polemonium	PDPLM0E050	None	None	G3G4	S2	2B.2
Rana aurora northern red-legged frog	AAABH01021	None	None	G4	S3	SSC
Rana boylii foothill yellow-legged frog	AAABH01050	None	None	G3	S3	SSC
Riparia riparia bank swallow	ABPAU08010	None	Threatened	G5	S2	
Sidalcea malviflora ssp. patula Siskiyou checkerbloom	PDMAL110F9	None	None	G5T2	S2	1B.2
Spirinchus thaleichthys longfin smelt	AFCHB03010	Candidate	Threatened	G5	S1	SSC

Record Count: 19

Appendix C (Site Photographs)

Strong’s Creek and associated riparian area

Riverwalk Drive bridge, looking east toward Hwy 101

Dinsmore Drive north of bridge, with riparian edge on left

Dinsmore Drive north of Riverwalk Drive, looking north. Riparian on left, willow and Monterey cypress on right

Southbound Hwy 101 exit ramp at 12th Street, looking NE

Potential wetland swale within area shown in photo above, looking NW with 12th Street in background

Eucalyptus on slope east of Kenmar Rd. interchange and parking lot

Parking lot, looking west toward Hwy 101 with inactive rail line in middle ground

Potential wetland south of Kenmar, between rail line and Hwy 101 ramp, looking south

Ditch/potential wetland north of Kenmar and east of Hwy 101, looking north

Ephemeral ditch north of Kenmar and west of Hwy 101, with adjacent riparian area

Degraded riparian habitat north of Kenmar/Riverwalk and west of Hwy 101

Redwood west of Hwy 101 and north of Kenmar/Riverwalk

Ephemeral ditch flowing toward Eel River floodplain, south of Kenmar/Riverwalk and west of Hwy 101. Note redwood in top right.

www.ghd.com

PROJECT

PRELIMINARY COST ESTIMATE©

EA: 01-0K300 PID: 120000056

EA: 01-0K300

PID: 120000056

District-County-Route: 01-HUM-101

PM: 59.2/59.8

Type of Estimate : Project Report

Program Code : Local

Project Limits : Kenmar Road Undercrossing

Project Description: Improve traffic operations at the US101 Kenmar Road Interchange

Scope : Construct two single-lane roundabouts and reconstruct ramps

Alternative : Alternative No. 1

SUMMARY OF PROJECT COST ESTIMATE

	Current Year Cost	Escalated Cost
TOTAL ROADWAY COST	$ 13,047,100	$ 16,027,013
TOTAL STRUCTURES COST	$ 2,686,063	$ 3,299,550
SUBTOTAL CONSTRUCTION COST	$ 15,733,163	$ 19,326,563
TOTAL RIGHT OF WAY COST	$ 450,000	$ 500,000
TOTAL CAPITAL OUTLAY COSTS	$ 16,184,000	$ 19,827,000
PA/ED SUPPORT	$ 550,000	$ 550,000
PS&E SUPPORT	$ 2,000,000	$ 2,000,000
RIGHT OF WAY SUPPORT	$ 100,000	$ 100,000
CONSTRUCTION SUPPORT	$ 2,500,000	$ 2,500,000
TOTAL SUPPORT COST	$ 5,150,000	$ 5,150,000
TOTAL PROJECT COST	$ 21,350,000	$ 25,000,000

Programmed Amount

	Month	/	Year
Date of Estimate (Month/Year)	12	/	22
Estimated Construction Start (Month/Year)	7	/	25
Number of Working Days =	180		
Estimated Mid-Point of Construction (Month/Year)	1	/	26
Estimated Construction End (Month/Year)	6	/	26
Number of Plant Establishment Days	260		

Estimated Project Schedule

PID Approval	2017 (Local PSR)
PA/ED Approval	TBD
PS&E	12/1/2025
RTL	1/1/2025
Begin Construction	7/1/2025

Reviewed by District O.E. or Cost Estimate Certifier

Office Engineer / Cost Estimate Certifier	Date	Phone
	xx/xx/xxxx	(xxx) xxx-xxxx

Approved by Project Manager

Project Manager	Date	Phone
	xx/xx/xxxx	(xxx) xxx-xxxx

I. ROADWAY ITEMS SUMMARY

	Section		Cost
1	**Earthwork**	$	1,457,000
2	**Pavement Structural Section**	$	3,846,100
3	**Drainage**	$	678,300
4	**Specialty Items**	$	482,200
5	**Environmental**	$	1,357,000
6	**Traffic Items**	$	1,309,900
7	**Detours**	$	100,000
8	**Minor Items**	$	369,300
9	**Roadway Mobilization**	$	960,000
10	**Supplemental Work**	$	270,500
11	**State Furnished**	$	152,200
12	**Time-Related Overhead**	$	362,800
13	**Roadway Contingency**	$	1,701,800
	TOTAL ROADWAY ITEMS	**$**	**13,047,100**

Estimate Prepared By :

Russ Wenham, Sr. Technical Dir.	Date	530-953-6486
GHD Inc.		

Estimate Reviewed By :

Josh Wolf, Project Manager	Date	707-267-2264
GHD Inc.		

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

SECTION 1: EARTHWORK

Item code		Unit	Quantity		Unit Price ($)			Cost
190101	Roadway Excavation	CY	16,000	x	50.00	=	$	800,000
152320	Lead Compliance Plan	LS	1	x	4,000.00	=	$	4,000
198010	Imported Borrow	CY	9,200	x	65.00	=	$	598,000
16010X	Clearing & Grubbing	LS	1	x	40,000.00	=	$	40,000
170101	Develop Water Supply	LS	1	x	15,000.00	=	$	15,000
210130	Duff	ACRE	0	x	0.00	=	$	-

TOTAL EARTHWORK SECTION ITEMS $ 1,457,000

SECTION 2: PAVEMENT STRUCTURAL SECTION

Item code		Unit	Quantity		Unit Price ($)			Cost
401050	Jointed Plain Concrete Pavement	CY	500	x	750.00	=	$	375,000
390132	Hot Mix Asphalt (Type A)	TON	12,800	x	130.00	=	$	1,664,000
198209A	Subgrade Enhancement Geotextile, Class TBD (B2 or B3)	SQYD	14,500	x	10.00	=	$	145,000
260203	Class 2 Aggregate Base	CY	14,300	x	85.00	=	$	1,215,500
397005	Tack Coat	TON	16	x	1,200.00	=	$	19,200
731521	Minor Concrete (Sidewalk)	CY	150	x	800.00	=	$	120,000
731502	Minor Concrete (Miscellaneous Construction)	CY	510	x	750.00	=	$	382,500
731504	Minor Concrete (Curb and Gutter)	CY	225	x	800.00	=	$	180,000
730020	Minor Concrete (Curb)	CY	95	x	750.00	=	$	71,250
39407X	Place Hot Mix Asphalt Dike (Type TBD)	LF	2,800	x	12.00	=	$	33,600
394090	Place Hot Mix Asphalt (Miscellaneous Area)	SQYD	100	x	75.00	=	$	7,500
153103	Cold Plane Asphalt Concrete Pavement	SQYD	500	x	15.00	=	$	7,500

TOTAL PAVEMENT STRUCTURAL SECTION ITEMS $ 3,846,100

SECTION 3: DRAINAGE

Item code		Unit	Quantity		Unit Price ($)			Cost
710136	Remove Pipe	LF	800	x	20.00	=	$	16,000
710152	Remove Headwall	EA	4	x	500.00	=	$	2,000
710150	Remove Inlet	EA	1	x	500.00	=	$	500
152430	Adjust Inlet	EA	3	x	3,000.00	=	$	9,000
510502	Minor Concrete (Minor Structure)	CY	70	x	3,000.00	=	$	210,000
610108	18" Alternative Pipe Culvert	LF	1,720	x	190.00	=	$	326,800
610112	24" Alternative Pipe Culvert	LF	250	x	260.00	=	$	65,000
705311	18" Alternative Flared End Section	EA	7	x	1,000.00	=	$	7,000
721XXX	Rock Slope Protection (TBD, Method B)	CY	45	x	300.00	=	$	13,500
72901X	Rock Slope Protection Fabric (Class TBD)	SQYD	140	x	30.00	=	$	4,200
750001	Miscellaneous Iron and Steel	LB	8,100	x	3.00	=	$	24,300

TOTAL DRAINAGE ITEMS	**$**	**678,300**

SECTION 4: SPECIALTY ITEMS

Item code		Unit	Quantity		Unit Price ($)			Cost
141120	Treated Wood Waste	LB	13,000	x	1.00	=	$	13,000
839752	Remove Guardrail	LF	1,200	x	2.50	=	$	3,000
800302	Chain Link Fence (Type CL-4)	LF	700	x	100.00	=	$	70,000
80XXXX	Chain Link Fence (Abutment Security Fencing)	LS	1	x	30,000.00	=	$	30,000
832055	Midwest Guardrail System	LF	120	x	60.00	=	$	7,200
839584	Alternative In-line Terminal System	EA	2	x	3,500.00	=	$	7,000
83964X	Concrete Barrier (Type TBD)	LF	260	x	300.00	=	$	78,000
511035	Architectural Treatment	SQFT	5,598	x	40.00	=	$	223,920
XXXXXX	Remove Railroad Facilities	LS	1	x	50,000.00	=	$	50,000

TOTAL SPECIALTY ITEMS	**$**	**482,200**

SECTION 5: ENVIRONMENTAL

5A - ENVIRONMENTAL MITIGATION

Item code		Unit	Quantity		Unit Price ($)			Cost		
XXXXXX	Biological Mitigation	LS	1	x	40,000.00	=	$	40,000		
								Subtotal Environmental Mitigation	*$*	*40,000*

5B - LANDSCAPE AND IRRIGATION

Item code		Unit	Quantity		Unit Price ($)			Cost		
20XXXX	Landscaping and Irrigation System	LS	1	x	1,000,000.00	=	$	1,000,000		
								Subtotal Landscape and Irrigation	*$*	*1,000,000*

5C - EROSION CONTROL

Item code		Unit	Quantity		Unit Price ($)			Cost		
210010	Move In/Move Out (Erosion Control)	EA	3	x	2000.00	=	$	6,000		
210350	Fiber Rolls	LF	6,000	x	6.00	=	$	36,000		
210430	Hydroseed	SQFT	85,000	x	0.20	=	$	17,000		
211111	Permanent Erosion Control Establishment Work	LS	1	x	20000.00	=	$	20,000		
								Subtotal Erosion Control	*$*	*79,000*

5D - NPDES

Item code		Unit	Quantity		Unit Price ($)			Cost		
130300	Prepare SWPPP	LS	1	x	5,000.00	=	$	5,000		
130100	Job Site Management	LS	1	x	40,000.00	=	$	40,000		
130330	Storm Water Annual Report	EA	2	x	2,000.00	=	$	4,000		
130310	Rain Event Action Plan (REAP)	EA	25	x	500.00	=	$	12,500		
130320	Storm Water Sampling and Analysis Day	EA	30	x	700.00	=	$	21,000		
130520	Temporary Hydraulic Mulch	SQYD	10,000	x	1.00	=	$	10,000		
130505	Move-In/Move-Out (Temporary Erosion Control)	EA	12	x	1,000.00	=	$	12,000		
130640	Temporary Fiber Roll	LF	4,000	x	10.00	=	$	40,000		
130900	Temporary Concrete Washout	LS	1	x	10,000.00	=	$	10,000		
130710	Temporary Construction Entrance	EA	4	x	5,000.00	=	$	20,000		
130610	Temporary Check Dam	LF	300	x	20.00	=	$	6,000		
130620	Temporary Drainage Inlet Protection	EA	30	x	250.00	=	$	7,500		
130730	Street Sweeping	LS	1	x	50,000.00	=	$	50,000		
								Subtotal NPDES	*$*	*238,000*
								TOTAL ENVIRONMENTAL	**$**	**1,357,000**

Supplemental Work for NPDES

066595	Water Pollution Control Maintenance Sharing*	LS	1	x	10,000.00	=	$	10,000		
066596	Additional Water Pollution Control**	LS	1	x	10,000.00	=	$	10,000		
066597	Storm Water Sampling and Analysis***	LS	1	x	5,000.00	=	$	5,000		
								Subtotal Supplemental Work for NDPS	*$*	*25,000*

SECTION 6: TRAFFIC ITEMS

6A - Traffic Electrical

Item code		Unit	Quantity		Unit Price ($)			Cost
770090	Lighting (City Street)	LS	1	x	350,000.00	=	$	350,000
77009X	Lighting (Trail)	LS	1	x	25,000.00	=	$	25,000
870600	Traffic Monitoring Station System	LS	1	x	100,000.00	=	$	100,000
872001A	Temporary Lighting Systems (Freeway)	LS	1	x	25,000.00	=	$	25,000
872131A	Modify Lighting Systems (Freeway)	LS	1	x	40,000.00	=	$	40,000

Subtotal Traffic Electrical *$* *540,000*

6B - Traffic Signing and Striping

Item code		Unit	Quantity		Unit Price ($)			Cost
56601X	Roadside Sign (Type TBD)	EA	80	x	300.00	=	$	24,000
810170	Delineator (Class 1)	EA	60	x	50.00	=	$	3,000
82013X	Object Marker (Type TBD)	EA	12		50.00	=	$	600
8207XX	Furnish Single Sheet Aluminum Sign (Thick TBD)	SQFT	1,000	x	30.00	=	$	30,000
8202XX	Remove Roadside Sign	EA	30	x	100.00	=	$	3,000
820XXX	Relocate Roadside Sign	EA	10	x	250.00	=	$	2,500
820860	Install Sign (Strap and Saddle Bracket Method)	EA	5		150.00		$	750
84XXXX	Permanent Pavement Delineation (EWNV + RPMs	LS	1	x	180,000.00	=	$	180,000

Subtotal Traffic Signing and Striping *$* *243,850*

6C - Traffic Management Plan

Item code		Unit	Quantity		Unit Price ($)			Cost
12865X	Portable Changeable Message Signs	EA	5	x	$ 10,000.00	=	$	50,000
129152	Temporary Radar Speed Feedback	EA	4	x	$ 6,000.00	=	$	24,000

Subtotal Traffic Management Plan *$* *74,000*

6C - Stage Construction and Traffic Handling

Item code		Unit	Quantity		Unit Price ($)			Cost
01XXXX	Alternative Temporary Crash Cushion	EA	5	x	5,000.00	=	$	25,000
120XXX	Channelizing Devices (Various)	LS	1	x	10,000.00	=	$	10,000
120100	Traffic Control System	LS	1	x	350,000.00	=	$	350,000
120320	Temporary Barrier System	LF	700	x	60.00	=	$	42,000
1201XX	Temporary Pavement Delineation	LS	1	x	25,000.00	=	$	25,000

Subtotal Stage Construction and Traffic Handling *$* *452,000*

TOTAL TRAFFIC ITEMS **$** **1,309,900**

SECTION 7: DETOURS

Includes constructing, maintaining, and removal

Item code		Unit	Quantity		Unit Price ($)		Cost
XXXXXX	Temporary Road Widening & Removal	LS	1	x	100,000.00	= $	100,000

TOTAL DETOURS $ 100,000

SUBTOTAL SECTIONS 1 through 7 $ 9,230,500

SECTION 8: MINOR ITEMS

8A - Americans with Disabilities Act Items							
	ADA Items				1.0%	$	92,305
8B - Bike Path Items							
	Bike Path Items (Included in items)				0.0%	$	-
8C - Other Minor Items							
	Other Minor Items				3.0%	$	276,915
	Total of Section 1-7	$	9,230,500	x	4.0%	$	369,220

TOTAL MINOR ITEMS $ 369,300

SECTIONS 9: ROADWAY MOBILIZATION

Item code							
999990	Total Section 1-8	$	9,599,800	x	10%	$	959,980

TOTAL ROADWAY MOBILIZATION $ 960,000

SECTION 10: SUPPLEMENTAL WORK

Item code		Unit	Quantity		Unit Price ($)		Cost
066670	Payment Adjustments For Price Index Fluctuations	LS	1	x	52,800.00	= $	52,800
066070	Maintain Traffic	LS	1	x	50,000.00	= $	50,000
066094	Value Analysis	LS	1	x	10,000.00	= $	10,000
066919	Dispute Resolution Board	LS	1	x	7,500.00	= $	7,500
066015	Federal Trainee Program	LS	1	x	7,200.00	= $	7,200
066610	Partnering	LS	1	x	20,000.00	= $	20,000
XXXXXX	Additional Earthwork	LS	1	x	50,000.00	= $	50,000
	*Cost of **NPDES** Supplemental Work specified in Section 5D*					= $	25,000
	Total Section 1-8	$	9,599,800		0.5%	= $	47,999

TOTAL SUPPLEMENTAL WORK $ 270,500

SECTION 11: STATE FURNISHED MATERIALS AND EXPENSES

Item code		Unit	Quantity		Unit Price ($)		Cost
066062	COZEEP Contract	LS	1	x	100,000.00	=	$100,000
066063	Traffic Management Plan - Public Information	LS	1	x	10,000.00	=	$10,000
066105	Resident Engineers Office	LS	1	x	83,200.00	=	$83,200
066901	Water Expenses	LS	1	x	1,000.00	=	$1,000
066871	Electrical Service Connections	LS	1	x	20,000.00	=	$20,000

Total Section 1-8	$	9,599,800	0.50%	=	$	47,999

TOTAL STATE FURNISHED	**$152,200**

SECTION 12: TIME-RELATED OVERHEAD

Total of Roadway and Structures Contract Items excluding Mobilization	$12,090,513	(used to calculate TRO)
Total Construction Cost (excluding TRO and Contingency)	$13,668,563	(used to check if project is greater than $5 million excluding contingency)

Estimated Time-Related Overhead (TRO) Percentage (0% to 10%) = **3.00%**

Item code		Unit	Quantity		Unit Price ($)		Cost
090100	Time-Related Overhead (WDAY)	WDAY	180	X	$2,016	=	$362,800

TOTAL TIME-RELATED OVERHEAD	**$362,800**

SECTION 13: ROADWAY CONTINGENCY

Total Section 1-12	$	11,345,300	x	**15%**	=	$1,701,795	

TOTAL CONTINGENCY	**$1,701,800**

II. STRUCTURE ITEMS

	Retaining Walls Ground Anchor Walls	Retaining Walls Soil Nail Walls	-
DATE OF ESTIMATE	08/03/22	06/30/22	
Bridge Name	N/A	N/A	
Bridge Number	N/A	N/A	
Structure Type	Ground Anchor	Soil Nail	
Width (Feet) [out to out]	0 LF	0 LF	0 LF
Total Bridge Length (Feet)	0 LF	0 LF	0 LF
Total Area (Square Feet)	2150 SQFT	6220 SQFT	0 SQFT
Structure Depth (Feet)	0 LF	0 LF	0 LF
Footing Type (pile or spread)			
Cost Per Square Foot	$330	$200	$0
COST OF EACH	**$709,500**	**$1,244,000**	**$0**

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

TOTAL COST OF BRIDGES		**$1,953,500**
TOTAL COST OF BUILDINGS		**$0**
STRUCTURES MOBILIZATION	10%	**$195,350**

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

STRUCTURES CONTINGENCY	25%	**$537,213**
TOTAL COST OF STRUCTURES		**$2,686,063**

Estimate Prepared By:

Anthony Richardson, Biggs Cardosa Associates, Inc. Date

EA: 01-0K300 PID: 120000056

III. RIGHT OF WAY

Fill in all of the available information from the Right of Way Data Sheet.

A)	A1)	Acquisition, including Excess Land Purchases, Damages & Goodwill, Fees		$	250,000
	A2)	SB-1210		$	0
B)	Acquisition of Offsite Mitigation			$	0
C)	C1)	Utility Relocation (State Share)		$	200,000
	C2)	Potholing (Design Phase)		$	0
D)	Railroad Acquisition			$	0
E)	Clearance / Demolition			$	0
F)	Relocation Assistance (RAP and/or Last Resort Housing Costs)			$	0
G)	Title and Escrow			$	0
H)	Environmental Review			$	0
I)	Condemnation Settlements		0%	$	0
J)	Design Appreciation Factor		0%	$	0
K)	Utility Relocation (Construction Cost)			$	0

L)	**TOTAL RIGHT OF WAY ESTIMATE**	**$450,000**
M)	**TOTAL R/W ESTIMATE: Escalated**	**$500,000**
N)	**RIGHT OF WAY SUPPORT**	**$100,000**

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

Utility Estimate Prepared By _____ Utility Coordinator[2] Phone

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

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

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

DO NOT PRINT THIS SHEET AS PART OF COST ESTIMATE ATTACHMENT TO PROJECT INITIATION OR APPROVAL DOCUMENTS.

EA: 01-0K300 PID: 120000056

IV. SUPPORT COST ESTIMATE SUMMARY

Run a Support Cost Estimate Summary report (D11 Project Management Support onramp) for component data.

		Unescalated-Risk Loaded					Escalated (4.2% per year for ETC, effective 1/2/2018)				
Total by FY		PA&ED	PS&E	RW	CON	Total $	PA&ED	PS&E	RW	CON	Total $
<2016	Expended										
	ETC										
2017	Expended										
	ETC										
2018	Expended										
	ETC										
2019	Expended										
	ETC										
2020	Expended										
	ETC										
2021	Expended										
	ETC										
2022	Expended										
	ETC										
2023	Expended										
	ETC										
2024	Expended										
	ETC										
2025	Expended										
	ETC										
2026	Expended										
	ETC										
2027	Expended										
	ETC										
2028	Expended										
	ETC										
2029	Expended										
	ETC										
>2030	Expended										
	ETC										
EAC (Expended + ETC)		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Risk Amount from Risk Register		$0	$0	$0	$0	Escalated Risk Amo	$0	$0	$0	$0	$0
Support Escalation Rate		0.0%	0.0%	0.0%	0.0%						
Duration to mid-point component		0.00	0.00	0.00	0.00						
Total including Risk Amount		$0	$0	$0	$0	Total Esc. Support (	$0	$0	$0	$0	$0
Approved Budget (PRSM)											
Difference (Budget - EAC)		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Support Ratio (EAC / Cap Cost)		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Note: If you have al

Total Capital Cost:	**$16,184,000**
Total Capital Outlay Support Cost:	**$0**
Overall Percent Support Cost:	**0.00%**

PRSM workplan hours/costs verified against approved MWA:

Office Chief - Date

Approved by:

Project Control - Date