



MEMORANDUM

Date: May 5, 2016
To: Jim Ramey, Managing Partner, Ragged Point Inn and Resort, LLP
From: Joe Fernandez and Krista Purser, CCTC
Subject: **Ragged Point Inn and Resort Transportation Analysis**

This memorandum summarizes our review of transportation issues related to the proposed Ragged Point Inn expansion located at 19019 California State Route 1 in unincorporated San Luis Obispo County. The proposed project consists of an additional 35 hotel rooms, expansion of a convenience store, expansion of food service, addition of an on-site spa facility, and employee housing units for 6 employees.

SUMMARY

During the weekend peak hour, the project would generate 248 trips, a net increase of 81 trips over existing peak hour conditions. This corresponds to a 49% increase. Vegetation currently obscures sight lines between the northern driveway and southbound Highway 1 traffic. Similarly, parking along the shoulder near the driveways blocks sight lines for multiple driveways. We recommend vegetation trimming and measures to prevent parking along the curb lines as shown on Figure 1. The project would not warrant installation of a left-turn lane based on the AASHTO Green Book or Fukutome's *Guidelines for Reconstruction of Intersections*.

FIELD OBSERVATIONS AND DATA COLLECTION

Caltrans maintains a count station on Highway 1 at San Carpoforo Creek, approximately 1.5 miles south of the Ragged Point Inn. Detailed count information from 2011 and 2012 (the most recent available) was obtained from Caltrans for this count station. The highest peak hour traffic occurred in July on a Sunday, with 526 vehicles at 1:00 PM.

The Ragged Point Inn hosts live music and barbeques during summer weekends, which are typically the busiest time for the site. Field observations and driveway counts were therefore collected on a Sunday afternoon when live music and barbeques were underway. The parking lot was effectively full, with numerous vehicles parking along the shoulder of Highway 1 and driveway throats. These observations were intended to capture the worst-case operations at the site.

TRIP GENERATION

Trip generation estimates for the project were developed using a combination of standard rates provided by the Institute of Transportation Engineers (ITE) and peak hour driveway counts collected at the site. The driveway counts were factored based on the increase in trips projected using the ITE rates as detailed below.

Table 1 summarizes the project's trip generation estimates using ITE rates for Resort Hotels, Quality Restaurants, Gas Stations, Convenience Stores, and Fast Food land uses. Employee housing units were assumed to have negligible impact to the trip generation, as trips would be internally captured. The ITE trip generation estimates reflect the following assumptions:

- Each land use's peak hour coincides with the existing site's peak hour of Sunday at 1:00 PM.
- Where weekend trip generation rates were not provided, weekday PM trip generation rates were used.
- The net growth ratio of the ITE land uses reflects the net growth the project will experience.

These assumptions lead to a worst-case estimate of new project trips; the site would generate fewer peak hour trips during typical weekday operations and during non-peak months. Table 1 shows the ITE Trip Generation by land use for the existing and proposed project.

Table 1: Project Trip Generation (ITE)					
Land Use	Size	Number of Trips			
		Daily	Sunday Peak Hour		Total
<i>Existing Project</i>					
Resort Hotel ¹	39 rooms	200	9	11	20
Restaurant ²	4,626 sf	334	26	13	39
Gas Station ³	4 pumps	668	34	33	67
Convenience Store ⁴	870 sf	300	15	15	30
Existing Trip Generation		1,502	84	72	156
<i>Proposed Project</i>					
Resort Hotel ¹	74 rooms	380	17	21	38
Restaurant ²	5,500 sf	397	31	15	46
Gas Station ³	4 pumps	668	34	33	67
Convenience Store ⁴	1,970 sf	680	34	34	68
Fast Food ⁵	500 sf	130	7	6	13
Proposed Project Trip Generation		2,255	123	109	232
Net New Trip Generation		753	39	37	76
% Increase		50%	46%	51%	49%
1. ITE Land Use Code 330, Resort Hotel. Average rate used for peak hour. Daily rate assumed to be ten times the peak hour rate. 2. ITE Land Use Code 931, Quality Restaurant. Average rate used. 3. ITE Land Use Code 944, Gasoline/Service Station. Average rate used. 4. ITE Land Use Code 852, Convenience Market (Open 15-16 Hours). Average rate used. 5. ITE Land Use Code 933, Fast-Food Restaurant without Drive-Through Window. Average rate used. Source: Trip Generation, 9th Edition, ITE (2012) and CCTC, 2016					

The ITE trip generation estimate shows that the proposed project would increase the peak hour trips by approximately 49%.

Field observations showed 70 inbound trips and 97 outbound trips at the project driveways in the peak hour on a summer Sunday afternoon, with 45% heading from and to the north, and 55% heading from and to the south. The total peak hour trip estimate using ITE's Trip Generation is 7% lower than the observed trip generation, which indicates a relatively good fit to the field observed conditions. There was also variation in the in/out split between the ITE trips and the field observations. The total peak hour growth was applied to the existing counts, given that future trip patterns are expected to be similar to existing trip patterns observed on the site. Table 2 summarizes the project trip estimate using the ITE growth to factor the field collected counts.

Table 2: Project Trip Generation Estimate				
Source		Sunday Peak Hour		
		In	Out	Total
ITE	Existing Project	84	72	156
	Proposed Project	123	109	232
		<i>Percent Growth</i>		<i>49%</i>
Observed	Existing Project	70	97	167
	Percent Growth	49%	49%	49%
	New Trips ¹	34	47	81
<i>Proposed Project Estimate</i>		<i>104</i>	<i>144</i>	<i>248</i>
1. Calculated by factoring observed counts by total growth predicted using ITE Trip Generation.				

The adjusted trip estimate shows that the proposed project would add 81 new trips to the project driveways during a weekend peak hour, which represents the worst case scenario for traffic conditions.

It is important to note that a substantial portion of these trips would be pass-by trips, where drivers stop at the site on their way to another destination. Therefore the net new vehicle trips traveling on Highway 1 would be substantially lower than the peak hour trips estimated in Table 2.

SITE ACCESS AND CIRCULATION

Four driveways provide access to the Ragged Point Inn. Each driveway provides two-way traffic flow and some include expanded shoulder width for approaching and departing vehicles.

The Caltrans Highway Design Manual (HDM) provides intersection and driveway sight distance standards based on the minimum stopping sight distance. There are 30 mph advisory speed limit signs at curves both north and south of the project. A 40 mph design speed was selected to present a conservative analysis of likely speeds along the project frontage, which corresponds to a stopping sight distance of 300 feet per the HDM.

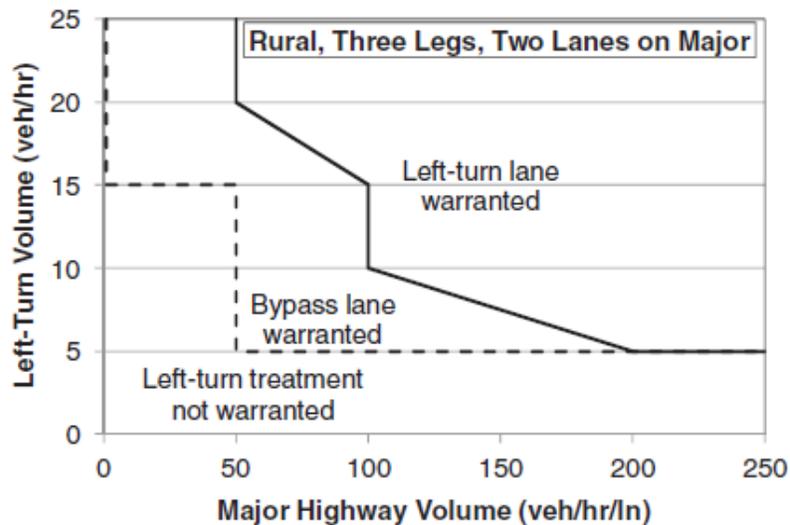
Sight lines for the northernmost driveway are obscured by vegetation. Vehicles exiting this driveway do not see southbound traffic until they are less than 300 feet away. Vegetation removal would increase sight lines for this driveway. The remaining driveways have clear sight lines in excess of 300 feet.

The following recommendations would improve site access and on-site circulation.

- Remove vegetation impeding sight lines between the northern driveway and southbound Highway 1. See Figure 1 for details.
- Employees should park away from the primary parking lot adjacent to Highway 1. This parking area experiences the highest demand, therefore employees should park in spaces with lower utilization such as those near the west-end of the site.
- Prohibit parking along the driveway throats to maintain clear sight lines as shown in Figure 1. During peak periods, patrons were observed to park along the shoulder of the flared entries, blocking clear sight lines. Signage and red curbs should be installed and enforced by staff.

LEFT-TURN LANE EVALUATION

The need for left-turn lanes was evaluated based on three different approaches. The first is recommended in the NCHRP Report 745, *Left-Turn Accommodations at Unsignalized Intersections*. This document provides recommended thresholds for determining if a left-turn lane is warranted. The thresholds are an important element of the decision making process, but must be considered with other factors such as design consistency within a corridor and site specific constraints. The relevant thresholds are summarized in the figure below.



(a) Three Legs

Source: NCHRP Report 745

Caltrans provided count data on Highway 1 near San Carpojo (Carpoforo) Creek, approximately 1.5 miles south of the Ragged Point Inn driveways. The peak traffic volumes occurred on Sunday, with 264 vphpl for northbound traffic, and 262 vphpl for southbound traffic. A count summary is provided as Attachment A.

The project-generated trips were distributed with 45% to and from the north and 55% to and from the south, consistent with existing traffic patterns. This corresponds to a northbound left turning volume of 55 inbound vehicles during the Sunday peak (100 inbound trips*55%). Note that this assumes all left turns would occur at a single driveway, where in reality left turns are split among the project's three driveways.

The figure above shows that a left-turn lane is warranted when there are more than five vehicles per hour turning left and over 200 vehicles per hour per lane on the major street. This is an extremely conservative threshold level, far more restrictive than the other thresholds evaluated below.

The need for a left-turn lane was also evaluated using the AASHTO *Green Book's* Table 9-23, the Guide for Left-Turn Lanes on Two-Lane Highways. Left and right turns from the minor road must be equal to or less than the table's output. The relevant table is shown below.

U.S. Customary				
Opposing Volume (veh/h)	Advancing Volume (veh/h)			
	5% Left Turns	10% Left Turns	20% Left Turns	30% Left Turns
40-mph Operating Speed				
800	330	240	180	160
600	410	305	225	200
400	510	380	275	245
200	640	470	350	305
100	720	515	390	340
50-mph Operating Speed				
800	280	210	165	135
600	350	260	195	170
400	430	320	240	210
200	550	400	300	270
100	615	445	335	295
60-mph Operating Speed				
800	230	170	125	115
600	290	210	160	140
400	365	270	200	175
200	450	330	250	215
100	505	370	275	240

Source: AASHTO Green Book Table 9-23

A 40 mph operating speed provides a conservative analysis for the left-turn lane. In the existing plus project Sunday peak hour, the opposing southbound traffic on Highway 1 is 368 vehicles per hour (vph). The northbound advancing volume consists of 262 vph through and 57 vph turning left. This translates to 18% left turns. Rounding opposing traffic to 400 vph and left turns to 20%, the maximum minor road traffic is 275 vph. The minor road traffic is 144 vph, as seen in Table 2's outbound traffic result. Therefore, the forecast volumes do not warrant a left-turn lane according to the AASHTO *Green Book*.

The need for left-turn lanes were also evaluated using the approach in Fukutome's *Guidelines for Reconstruction of Intersections*. This document uses the same volume thresholds as the AASHTO Green Book described above, but also calls for a left-turn lane when collisions reach certain thresholds. For a two-lane, unsignalized intersection, four or more left turn related collisions in one year, or six or more left turn related collisions in two years would warrant a left-turn lane. Only one left turn related collision occurred at the driveways from June 2011 to June 2014. A left-turn lane is not warranted based on the collision history.

Two of the three methodologies do not show the need for a left-turn lane. The third suggests that a left-turn lane would be supported with as low as five left turning vehicles. Based on these findings, a left-turn lane is not recommended.

COLLISION REVIEW

Three years of collision data from June 2011 through June 2014 were obtained for Highway 1 for ¼ mile north and south of the project site from the Statewide Integrated Traffic Records System (SWITRS) database. Two collisions were noted in this period within ¼ mile of the project site. The ADT on Highway 1 is reported as 2,630 daily vehicles, which corresponds to a collision rate of 1.39 collisions per million vehicle miles. This is above the Statewide average of 0.98 collisions per million vehicle miles as well as the Countywide average of 1.09 collisions per million vehicle miles for 2-lane rural highways.

One of the reported collisions was between a driver and a fixed object while passing. The other collision was a sideswipe during a passing maneuver. The portion of Highway 1 near the project prohibits passing, so both of the reported collisions occurred when drivers performed an unpermitted maneuver. No further action is recommended.

Please let us know if you have any questions.

Enclosures:

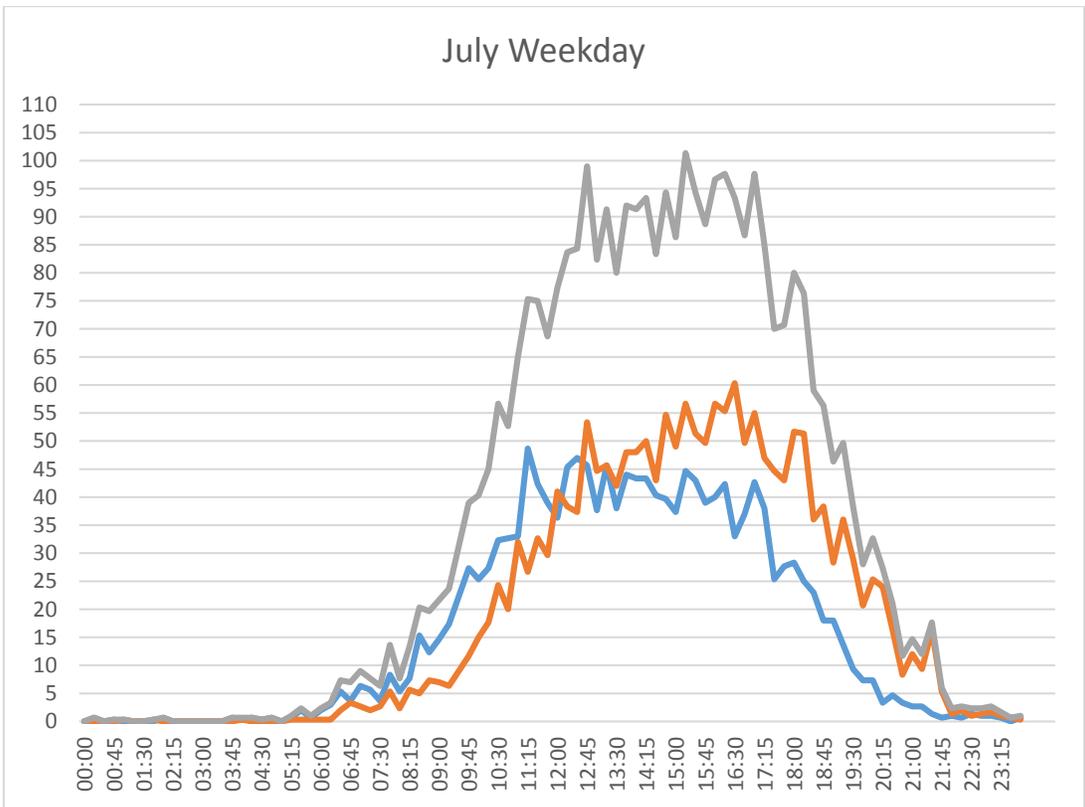
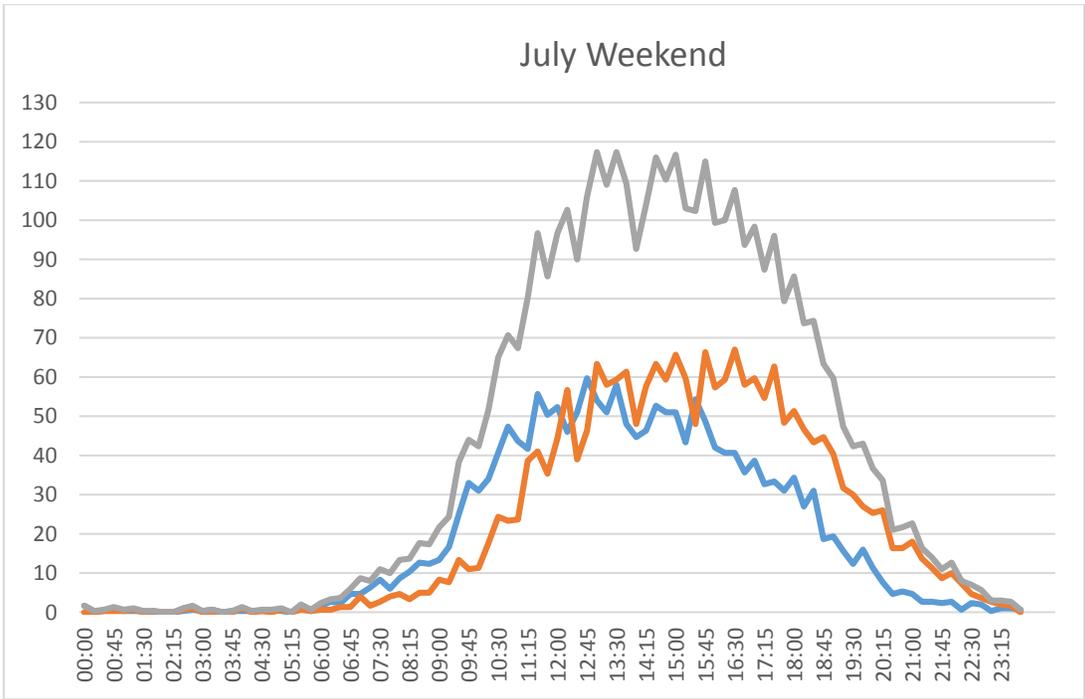
Figure 1: Site Plan Comments

Attachment A: Traffic Count Summary

Figure 1: Site Plan Recommendations



Appendix A: Traffic Count Data



Hour Starting at	Sunday					
	July			August		
	NB	SB	Combined	NB	SB	Combined
1:00 PM	262	264	526	185	193	378
1:15 PM	234	263	497	182	203	385
1:30 PM	237	242	479	183	233	416
1:45 PM	230	248	478	177	257	434
2:00 PM	222	248	470	167	272	439
2:15 PM	231	277	508	182	279	461
2:30 PM	217	287	504	176	279	455
2:45 PM	202	257	459	173	306	479
3:00 PM	201	259	460	168	312	480