RASOR PARK MIXED USE CENTER CONCEPT PLAN

Eugene, Oregon

TECHNICAL MEMORANDUM
OPERATIONAL & SAFETY ANALYSIS
PEDESTRIAN & BICYCLIST SURVEY

November 20, 2006, Revised January 4, 2007

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OPERATIONS AND SAFETY ANALYSIS

Introduction

The purpose of the Operations and Safety Analysis is to examine traffic operating conditions (determine existing and future p.m. peak hour level of service) at selected study intersections, to assess traffic safety conditions on River Road through the study area, and to analyze the effect of gaps in traffic on the ability of pedestrians and bicycles to cross River Road.

Street and Traffic Control Inventory

The study area street network and traffic controls are shown in **Figure 1**. River Road is a five-lane, 40-mph arterial through the study area. The street cross-section comprises two travel lanes in each direction, a center continuous two-way left turn lane (CTWLTL) – which becomes an exclusive left turn lane at sidestreet intersections – and striped bicycle lanes on both sides. There is no on-street parking, but there are bus pull-outs in several locations. The River Road intersections at Hilliard Lane and Park Avenue are signalized; all other sidestreets are stop-controlled at River Road.

Analysis Procedures

The methodologies and assumptions used to prepare traffic forecasts and traffic operations analyses for this report are described in this section.

Traffic Operations Analysis

Intersection traffic operations were analyzed using "Level of Service" (LOS), on which the City of Eugene standards are based. LOS and average delays were determined for each study intersection. (LOS methodology is described in **Attachment A**.)

Figure 1: Study Area Traffic Control

Traffic Assignments and Forecasts

The traffic assignments and forecasts used for the Future Baseline Conditions analyses were prepared using the Lane Council of Governments (LCOG) traffic forecasting model. The model is based on adopted land use plans, population/employment forecasts, and transportation plans; as a result the traffic forecasts are consistent and compatible with adopted plans and with other on-going planning efforts in the region.

The model uses a base year of 2002 and a forecast year of 2025. The traffic forecasting process is described in **Attachment D** and summarized below:

- The traffic forecasting model comprises four steps, starting from a given population and employment forecast: (1) *trip generation* (numbers of trips), (2) *trip distribution* (origins and destinations of trips), (3) *mode split* (number of trips via auto, carpool, transit, etc), and (4) *traffic assignment* (traffic volumes on the road network).
- To prepare the traffic assignments and forecasts for the Future Conditions analysis, only the fourth step – traffic assignment – was employed. Travel demands (trip generation), travel patterns (trip distribution), and mode splits that provide the inputs to the traffic assignment process come directly from the LCOG model.
- The Forecast Year 2029 volumes used in the traffic analyses were determined by first subtracting 2002 model volumes from 2025 model volumes to determine a 23-year traffic volume growth/change, and then adding that volume growth to the 2006 volume counts.

The traffic forecasting model and the way the model was applied are consistent with state-of-the-art traffic forecasting practices in general and with specific state and federal requirements in particular.

Traffic Data Collection

Three types of traffic data were collected for the Operations and Safety Analysis:

- P.M. peak period intersection turning/through movement counts were made on Wednesday, October 25, 2006, at the three River Road intersections selected

by the project Technical Advisory Committee (TAC): Stults Avenue, Knoop Lane, and Fir Lane.
- 24-hour traffic counts were made by on River Road near the three study intersections on Thursday, October 26, 2006.
- Gap data was acquired at the 24-hour count locations for northbound River Road and for southbound River Road.

Data reports are compiled in **Attachment B**.

Existing Conditions Analysis

Traffic Volumes

The 24-hour traffic counts made on River Road are summarized in **Figure 2**, and the p.m. peak hour intersection turning/through movement counts made at the three study intersections are compiled in **Figure 3**. A time-of-day distribution of River Road traffic, extracted from the 24-hour count data, is provided in **Figure 4**.

As shown in the Figures, River Road is a heavily-traveled arterial with daily traffic volumes in the 18,000-19,000 range. The River Road volumes vary little from one end of the study corridor to the other, indicating that much of the corridor traffic is "through traffic," and that the sidestreets connecting to River Road do not add or extract much traffic.

The peak intersection counts found moderately heavy peak hour peak direction volumes on River Road (1,150-1,200 northbound in the p.m. peak). The peak intersection counts also confirm the conclusion that most River Road sidestreets are low-volume.

The time-of-day traffic distribution shows that although there are noticeable peak period commuter flows on River Road, traffic volumes remain fairly high throughout the day:

- Southbound River Road volumes are 700 per hour from 7am to 9am, but then remain in the 500-600 per hour range through 7pm.

- Northbound River Road volumes are over 1,000 in the p.m. peak hour, having gradually increased from 700 per hour at 11am.

Figure 2: 2006 Daily Traffic Volumes

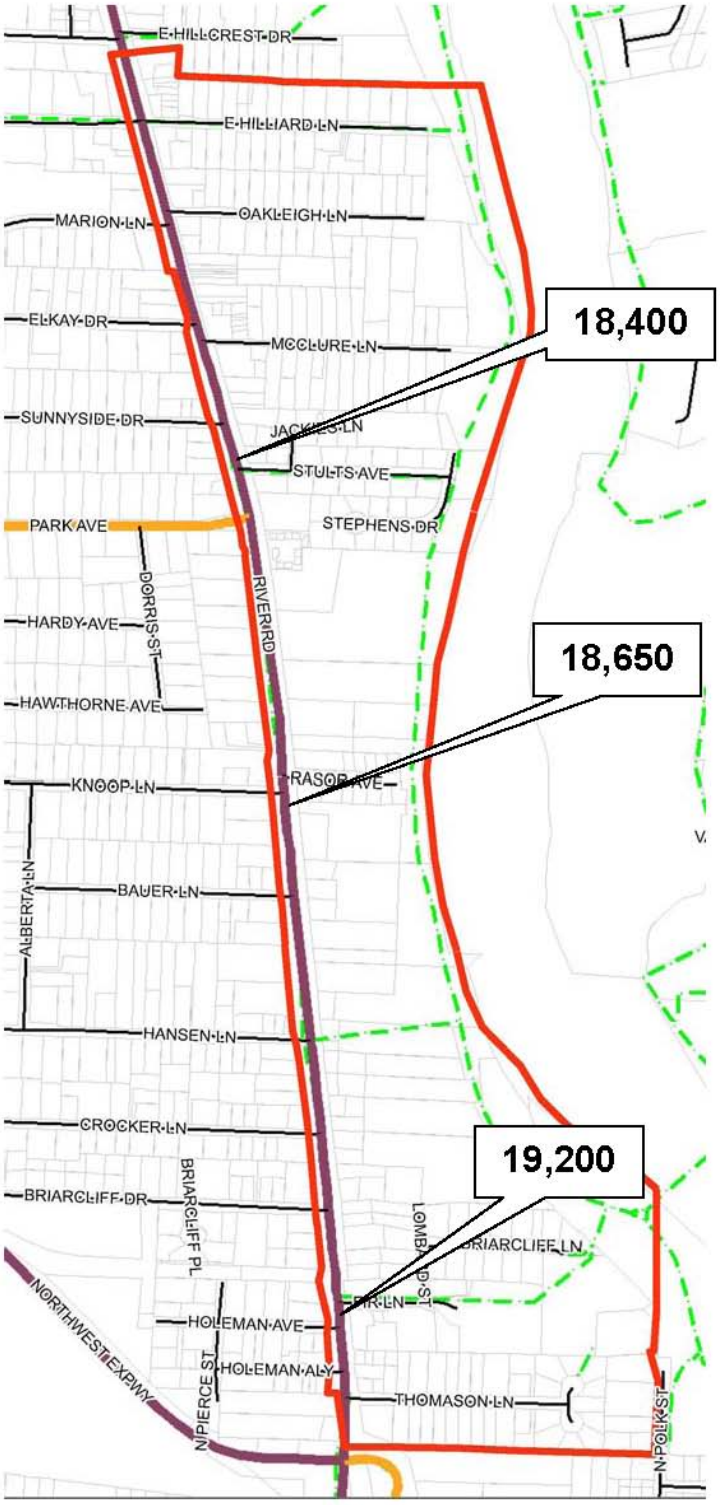
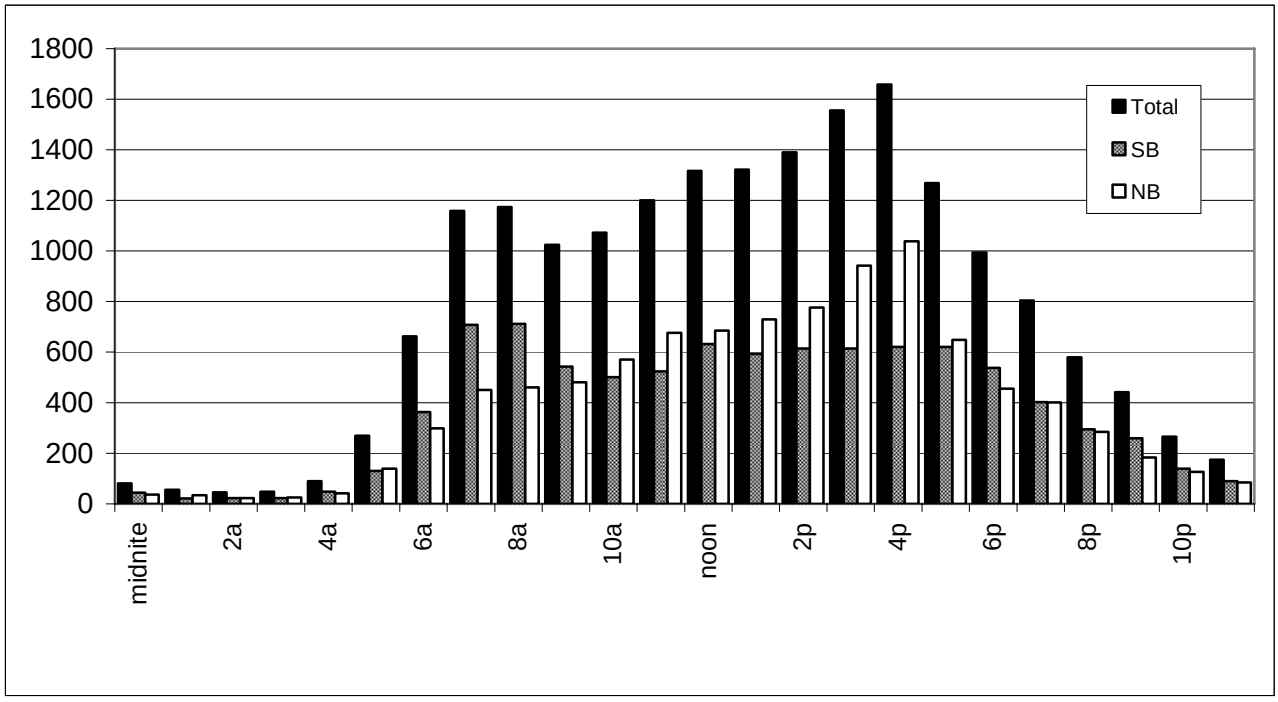


Figure 3: 2006 P.M. Peak Hour Traffic Volumes

Figure 4: River Road 2006 Time-of-Day Traffic Distribution



Traffic Operations

The traffic operational analysis focused on three River Road intersections selected by the Project TAC. The operational analyses were performed for weekday p.m. peak hour conditions, when traffic volumes are greatest and operating conditions are the most difficult. Intersection Level of Service (LOS) for the 2006 weekday p.m. peak hour are compiled in **Table 1** (analysis worksheets are compiled in **Attachment C**).

Attachment A includes a discussion on LOS and overall traffic operational analysis methodology used in this report. In general, LOS A represents the best operating conditions and LOS F the worst.

As shown in the table, even though sidestreet volumes are low at the three two-way stop-controlled (TWSC) study intersections, traffic volumes on River Road create significant delays and LOS F conditions for left turns out of the sidestreets onto River Road.

Gap Analysis

Gap analysis results are compiled in **Table 2**. As illustrated by the analysis results, existing traffic volumes significantly limit pedestrians' and bicyclists' ability to cross River Rd at unsignalized locations (i.e., everywhere other than Park Ave and Hilliard Lane).

Table 1: 2006 P.M. Peak Hour Intersection Level of Service (LOS)

River Road Intersection	LOS	average delay (sec/veh)
Stults Ave		
westbound Stults	D	27.3[a)]
southbound River Rd left turn	B	11.9
Knoop Ln-commercial driveway		
eastbound Knoop left turn	**F**	**74.4**
eastbound Knoop right turn	B	11.3
westbound commercial driveway	**F**	**52.8**
southbound River Rd left turn	B	11.8
northbound River Rd left turn	A	9.5
Fir Ln		
westbound Fir	**F**	**58.9**
southbound River Rd left turn	B	12.2

a) Westbound Stults Ave has a shared left turn/right turn lane at River Road. The delay reported in this table is the average delay for left-turning and right-turning vehicles; the delay for the left-turning traffic is significantly higher than the average.

Table 2: Gap Availability for Pedestrians

(River Road at Knoop Ln)

Time Period	Southbound River Road		Northbound River Road	
	number of usable gaps[a)]	total usable gap time[b)]	number of usable gaps[a)]	total usable gap time[b)]
4 – 5 p.m.	67	27.0 min	46	15.4 min
noon – 1 p.m.	76	27.7 min	76	26.8 min
8 – 9 a.m.	68	23.9 min	70	26.5 min

a) "Usable Gap" is a gap that exceeds the time required for a pedestrian to decide to cross the roadway and then make it to the other side. For this analysis, the minimum usable gap was

computed to be 12 sec: 3 sec of perception/reaction time, plus 9 sec needed to cross one bike lane and two travel lanes at an average walk speed of 3.5 fps (feet per second)

[b] "Total Usable Gap Time" is the sum of all the usable gaps, as defined above.

Even with the assumption that River Road can be crossed one direction at a time – taking refuge in the center lane – usable gaps are limited in both directions throughout the day, and traffic prevents safe crossing 50%-75% of the time.

Traffic Accidents

Traffic accident records for River Road through the study area were provided by the City of Eugene for the five-year period from 2001 through 2005. Those accident records are compiled and summarized in **Table 3**. Review and evaluation of the 2001–2005 accident records yielded the following set of findings applicable to development of the Rasor Park Mixed Use Center Concept Plan:

- Over half (51%) of the accidents were rear-enders, virtually all on River Road.
- 28% of all accidents involved injuries;
- 31% of all accidents involved turning or crossing movements on River Road;
- There has been an annual average of 1.2 pedestrian-vehicle or bicycle-vehicle accidents on River Road in the study area;
- Several low-volume unsignalized sidestreet intersections have accident experiences similar to the higher-volume signalized intersections (the Hilliard and Park intersections had 2.5-3.0 accidents/year in 2004-05, as did the Elkay, Hansen, and Briarcliff intersections); and finally,
- Neither the number of accidents throughout the corridor nor the number at individual locations are excessive, and remediation/mitigation is not required.

In considering these technical findings, however, it is important to recognize that the less-than-dire accident experience on River Road is due in large part to the fact that there is limited friction and conflict for the moderately heavy and fairly high-speed River Road traffic: through the study area there is no on-street parking on River Road, there is not a lot of sidestreet traffic turning onto or off of River Road, there is not a lot of bicycle and pedestrian traffic crossing River Road, there is not a lot of commercial traffic turning onto or off of River Road.

For this reason, it should be anticipated that pedestrian, bicycle, and traffic safety could rapidly and significantly degrade with increasing River Road traffic volumes, with increasing sidestreet volumes, and particularly with increased turning

and crossing traffic (auto, pedestrian and bicycle) generated by expanded commercial activity along River Road as would be anticipated from development in a MUC, and increasing travel to/from the park and the river.

Table 3: Accident History, 2001-2005

(River Road, Hilliard Ln to Thomason St)

River Rd Intersection	TOTAL	Rear-End	Broadside, Angle, Side-swipe	Turn, U-turn	Ped,-Bike	Fixed Object, Parked Vehicle
Hilliard Ln	18	11	1	4	2	
Marion Ln	5	2	1	1		1
Elkay Dr	12	8	1	1		2
Stults Ave	6	3	1	1		1
Park Ave	13	5	2	4	1	1
Knoop Ave	5	3		2		
Hansen Ln	8	4	1	1	1	1
Briarcliff Ln	14	5	2	2	2	3
Thomason St	0					
TOTAL	81	41 51%	9 11%	16 20%	6 7%	9 11%

River Rd Intersection	Total	Injury	Injury % of total	pre-2004	2001-03 annual	2004-05 annual
Hilliard Ln	18	5	28%	12	4.0	3.0
Marion Ln	5	2	40%	2	0.7	1.5
Elkay Dr	12	1	9%	6	2.0	3.0
Stults Ave	6	1	17%	4	1.3	1.0
Park Ave	13	3	23%	8	2.7	2.5
Knoop Ave	5	1	20%	2	0.7	1.5
Hansen Ln	8	2	25%	2	0.7	3.0
Briarcliff Ln	14	8	57%	9	3.0	2.5
Thomason St	0				0	0
TOTAL	**81**	**23**	**28%**	**45**	**15.0**	**18.0**

Source: City of Eugene, October, 2006

Future Baseline Traffic Conditions

The analysis of future conditions on River Road through the study area was based on traffic produced by the LCOG traffic model (see **Attachment D**).

Traffic Volumes

Forecasted daily volumes on River Road are summarized in **Figure 5**, and forecasted p.m. peak hour intersection volumes at the three study intersections are compiled in **Figure 6**. As shown in the Figures, River Road traffic volumes increase significantly over the next 23 years, rising by about 7,000-8,000 vehicles per day throughout the study corridor (this translates to a healthy annual increase rate of 1.8%). The forecasted River Road volumes vary little from one end of the study corridor to the other, indicating that in the future much of the corridor traffic continues to be "through traffic" as it is today. Little or no traffic growth is forecasted for the sidestreets. The forecasted p.m. peak intersection volumes exhibit characteristics similar to those of the daily traffic forecasts.

Traffic Operations

Intersection LOS for the 2029 weekday p.m. peak hour are compiled in **Table 4** (analysis worksheets are compiled in **Attachment C**). As shown in the table, increased traffic volumes on River Road significantly increase the already-excessive delays and significantly degrade the already-LOS F conditions for left turns out of the low-volume sidestreets onto River Road.

Guidelines and Recommendations for Concept Plan Development

The Operations and Safety Analysis has clearly shown that although River Road is functioning well as a main thoroughfare for significant volumes of traffic, and will continue to do so in the future, access onto, off of and across River Road for local auto, pedestrian, and bicycle traffic is difficult and worsening. Vehicular, pedestrian and bicycle travel to, from, and between residential neighborhoods in the River Road corridor, businesses on River Road, and the park and river will grow increasingly more difficult in the future with increasing River Road traffic volumes.

Consequently, the Rasor Park Mixed Use Concept Plan must include street and traffic control improvements and traffic calming/traffic management measures necessary to safely and conveniently accommodate the increased local pedestrian, and bicycle traffic generated by the Plan.

Figure 5: 2029 Daily Traffic Volumes

2029 volume *(2006 volume)*

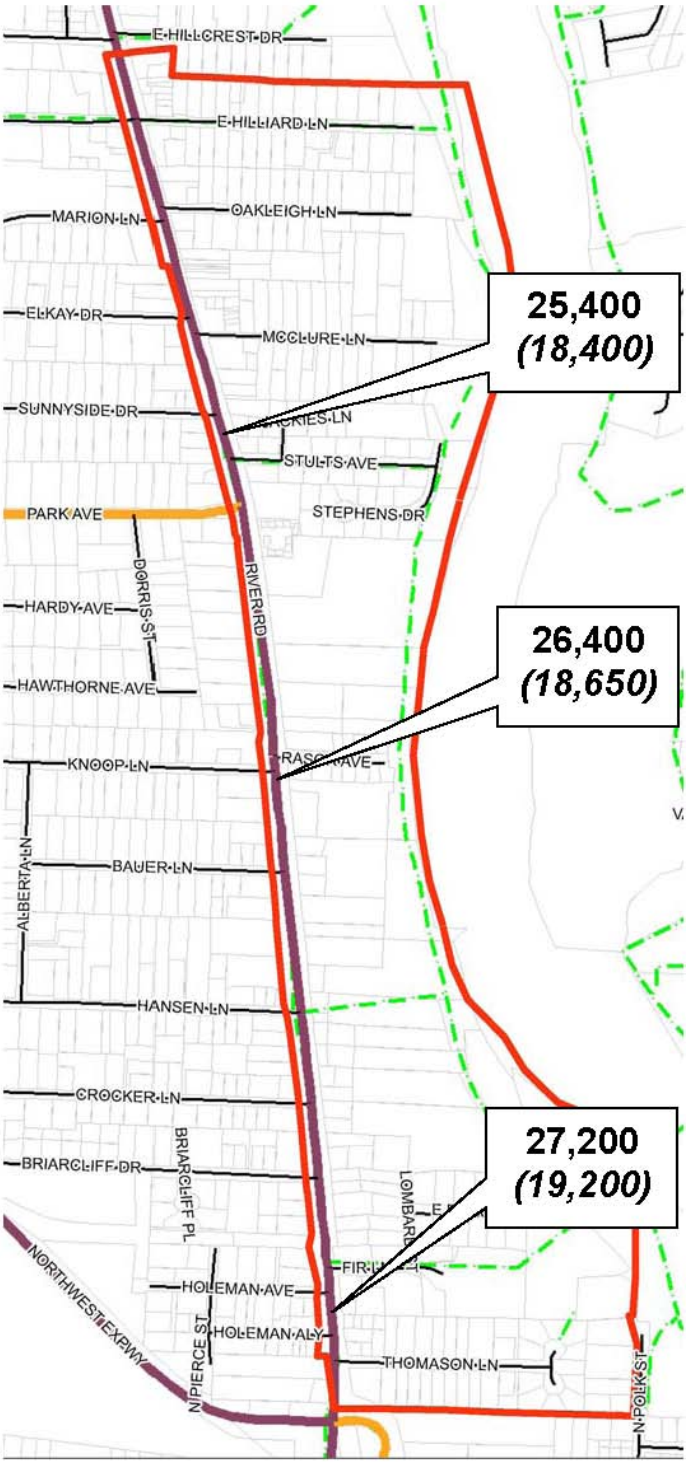


Figure 6: 2029 P.M. Peak Hour Traffic Volumes

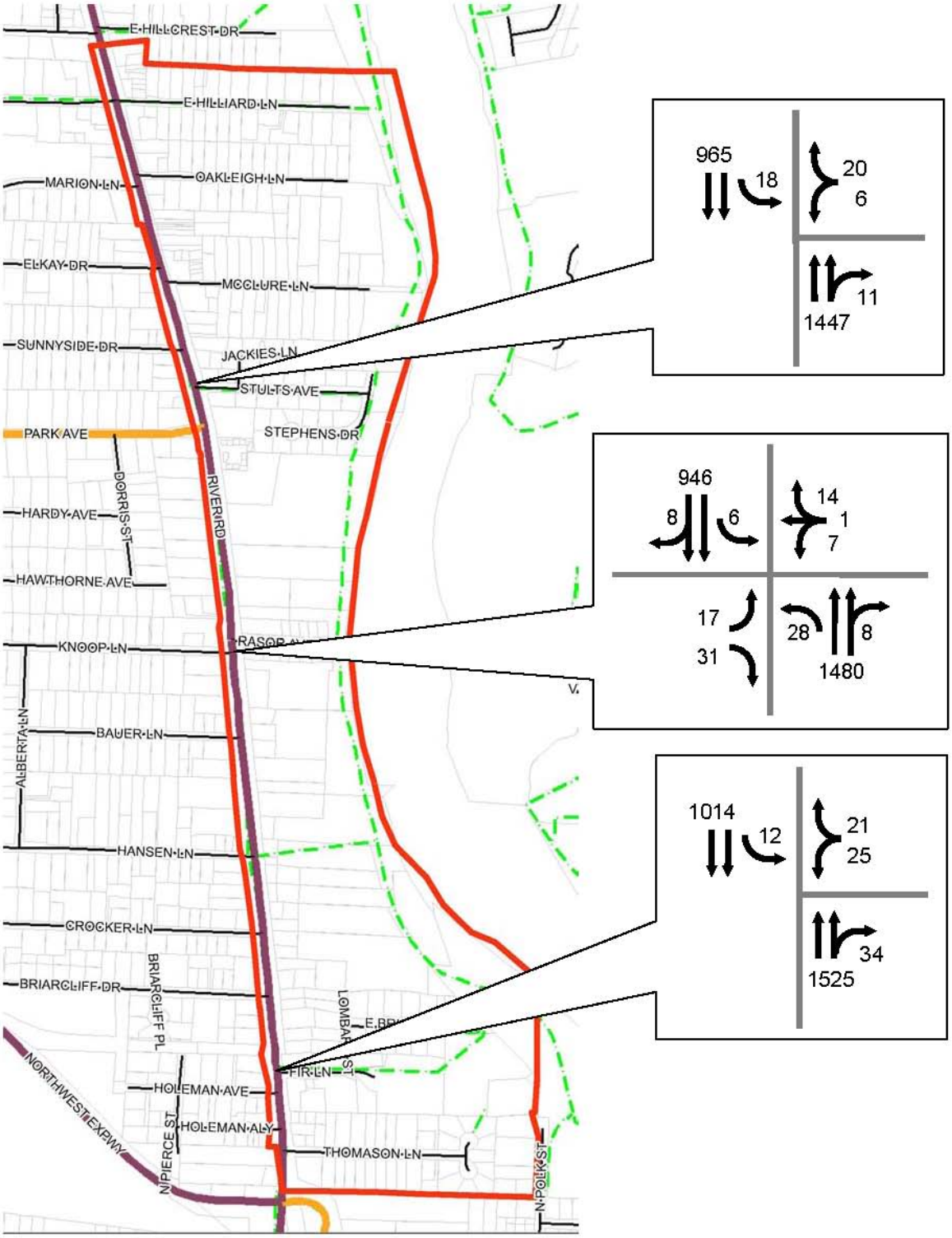


Table 4: 2029 P.M. Peak Hour Intersection Level of Service (LOS)

River Road Intersection	2029		2006	
	LOS	average delay (sec/veh)	LOS	average delay (sec/veh)
Stults Ave				
westbound Stults	**F**	**53.1**	*D*	*27.3*
southbound River Rd left turn	B	14.3	*B*	*11.9*
Knoop Ln-commercial driveway				
eastbound Knoop left turn	**F**	**321.7**	***F***	***74.4***
eastbound Knoop right turn	B	13.4	*B*	*11.3*
westbound commercial driveway	**F**	**210.9**	***F***	***52.8***
southbound River Rd left turn	B	14.4	*B*	*11.8*
northbound River Rd left turn	B	11.2	*A*	*9.5*
Fir Ln				
westbound Fir	**F**	**242.1**	***F***	***58.9***
southbound River Rd left turn	B	14.9	*B*	*12.2*

PEDESTRIAN & BICYCLIST SURVEY

Results of Bike and Pedestrian Intercept Survey

On Monday, November 13 from 3 PM to 6 PM the consultant team conducted an intercept survey of pedestrians and bicyclists on River Road to determine preferred crossing locations and other perceived issues related to the safety and convenience of crossing River Road. See **Attachment E** for the survey questionnaire. In spite of the heavy rain, the surveyors who stationed themselves at Park Ave and at Rasor Avenue were able to interview 15 walkers. They were not able to locate any bikers, however.

Of these 15 walkers, five were of K-12 age, four were college age and the rest were adults. When asked what their trip purpose was, three said it was recreation, four said they were running errands, five said they were coming from school (K-12) and three said their trip purpose was work.

When asked how often they made this trip, most (9) said at least five times a week while two said they hardly ever make this trip. When asked if they felt safe

making this trip, four said no. One of these was concerned about the street at night, while the other three were uncomfortable about people on the street.

Of those questioned 11 said they crossed River Road on their trip. They either crossed at Park Avenue or at Knoop, but that seems to be more of an artifact of where they were questioned than any preference. While two people said they chose to cross where they did because they wanted to go by a specific location, equal numbers (6) said they crossed where they did because it was convenient or because it was near where they were going. No one voiced any concerns about safety at intersections

When asked how to improve River Road for bikes and walkers, two people suggested improved night time lighting while several suggested improved cross walks such as a zebra stripe. One suggested a pedestrian bridge.