

FORT COLLINS CBD HOTEL
TRANSPORTATION IMPACT STUDY

FORT COLLINS, COLORADO

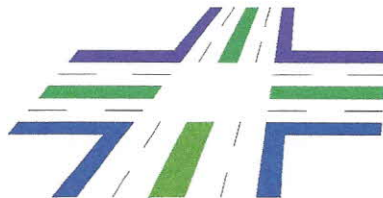
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Project #1502



TABLE OF CONTENTS

I. INTRODUCTION	1
II. EXISTING CONDITIONS	2
Land Use.....	2
Roads.....	2
Existing Traffic.....	5
Existing Operation.....	7
Pedestrians Facilities	7
Bicycle Facilities	7
Transit Facilities	7
III. PROPOSED DEVELOPMENT	10
Trip Generation	10
Trip Distribution	10
Background Traffic Projections	10
Trip Assignment	15
Signal Warrants.....	15
Geometry	15
Operation Analysis	22
Pedestrian Level of Service.....	33
Bicycle Level of Service	33
Transit Level of Service.....	33
IV. CONCLUSIONS/RECOMMENDATIONS	38

LIST OF TABLES

1. Current Peak Hour Operation.....	8
2. Trip Generation	10
3. Short Range (2020) Background Peak Hour Operation	25
4. Long Range (2035) Background Peak Hour Operation.....	27
5. Short Range (2020) Total Peak Hour Operation With Roundabout Control at Mountain/Mathews-Walnut-Chestnut Intersection	29
6. Short Range (2020) Total Peak Hour Operation With RT-in/RT-out Control at Mountain-Walnut/Chestnut Intersection	31
7. Long Range (2035) Total Peak Hour Operation With Roundabout Control at Mountain/Mathews-Walnut-Chestnut Intersection	34
8. Long Range (2035) Total Peak Hour Operation With RT-in/RT-out Control at Mountain-Walnut/Chestnut Intersection	36

LIST OF FIGURES

1. Site Location	3
2. Existing Intersection Geometry.....	4
3. Recent Peak Hour Traffic.....	6
4. Site Plan.....	11
5. Trip Distribution	12
6. Short Range (2020) Background Peak Hour Traffic.....	13
7. Long Range (2035) Background Peak Hour Traffic.....	14
8. Site Generated Peak Hour Traffic With Roundabout at Walnut Street.....	16
9. Site Generated Peak Hour Traffic With RT-in/RT-out at Walnut Street.....	17
10. Short Range (2020) Total Peak Hour Traffic With Roundabout at Walnut Street....	18
11. Short Range (2020) Total Peak Hour Traffic With RT-in/RT-out at Walnut Street...	19
12. Long Range (2035) Total Peak Hour Traffic With Roundabout at Walnut Street	20
13. Long Range (2035) Total Peak Hour Traffic With RT-in/RT-out at Walnut Street ...	21
14. Short Range (2020) and Long Range (2035) Geometry With Roundabout at Walnut Street.....	23
15. Short Range (2020) and Long Range (2035) Geometry With RT-in/RT-out at Walnut Street.....	24

APPENDICES

- A. Base Assumptions Packet
- B. Recent Peak Hour Traffic
- C. Current Peak Hour Operation/Level of Service Descriptions/Fort Collins LOS Standards
- D. Short Range (2020) Background Peak Hour Operation
- E. Long Range (2035) Background Peak Hour Operation
- F. Short Range (2020) Total Peak Hour Operation with Roundabout at Walnut Street
- G. Short Range (2020) Total Peak Hour Operation with RT-in/RT-out at Walnut Street
- H. Long Range (2035) Total Peak Hour Operation with Roundabout at Walnut Street
- I. Long Range (2035) Total Peak Hour Operation with RT-in/RT-out at Walnut Street
- J. Pedestrian/Bicycle Level of Service

I. INTRODUCTION

This transportation impact study (TIS) addresses the capacity, geometric, and control requirements at and near the proposed Fort Collins CBD Hotel. The Fort Collins CBD Hotel site is located in the western quadrant of the Jefferson/Chestnut intersection in Fort Collins, Colorado.

During the course of the analysis, numerous contacts were made with the project developer (McWhinney) and the Fort Collins Traffic Engineering staff. This study generally conforms to the format set forth in the Fort Collins transportation impact study guidelines contained in the "Larimer County Urban Area Street Standards" (LCUASS). Appendix A contains the Transportation Impact Study Base Assumptions form and related attachments for the Fort Collins CBD Hotel. The study involved the following steps:

- Collect physical, traffic, and development data;
- Perform trip generation, trip distribution, and trip assignment;
- Determine morning and afternoon peak hour traffic volumes;
- Conduct capacity and operational level of service analyses on key intersections;
- Analyze signal warrants;
- Conduct level of service evaluation of pedestrian, bicycle, and transit modes of transportation.

This TIS is a revision of the "Fort Collins CBD Hotel Transportation Impact Study," dated March 2015. The revised TIS addresses City staff comments.

II. EXISTING CONDITIONS

The location of the Fort Collins CBD Hotel site is shown in Figure 1. It is important that a thorough understanding of the existing conditions be presented.

Land Use

Land uses in the area are primarily commercial. Land adjacent to the site is flat (<2% grade) from a traffic operations perspective. The site is in the Fort Collins Central Business District (CBD).

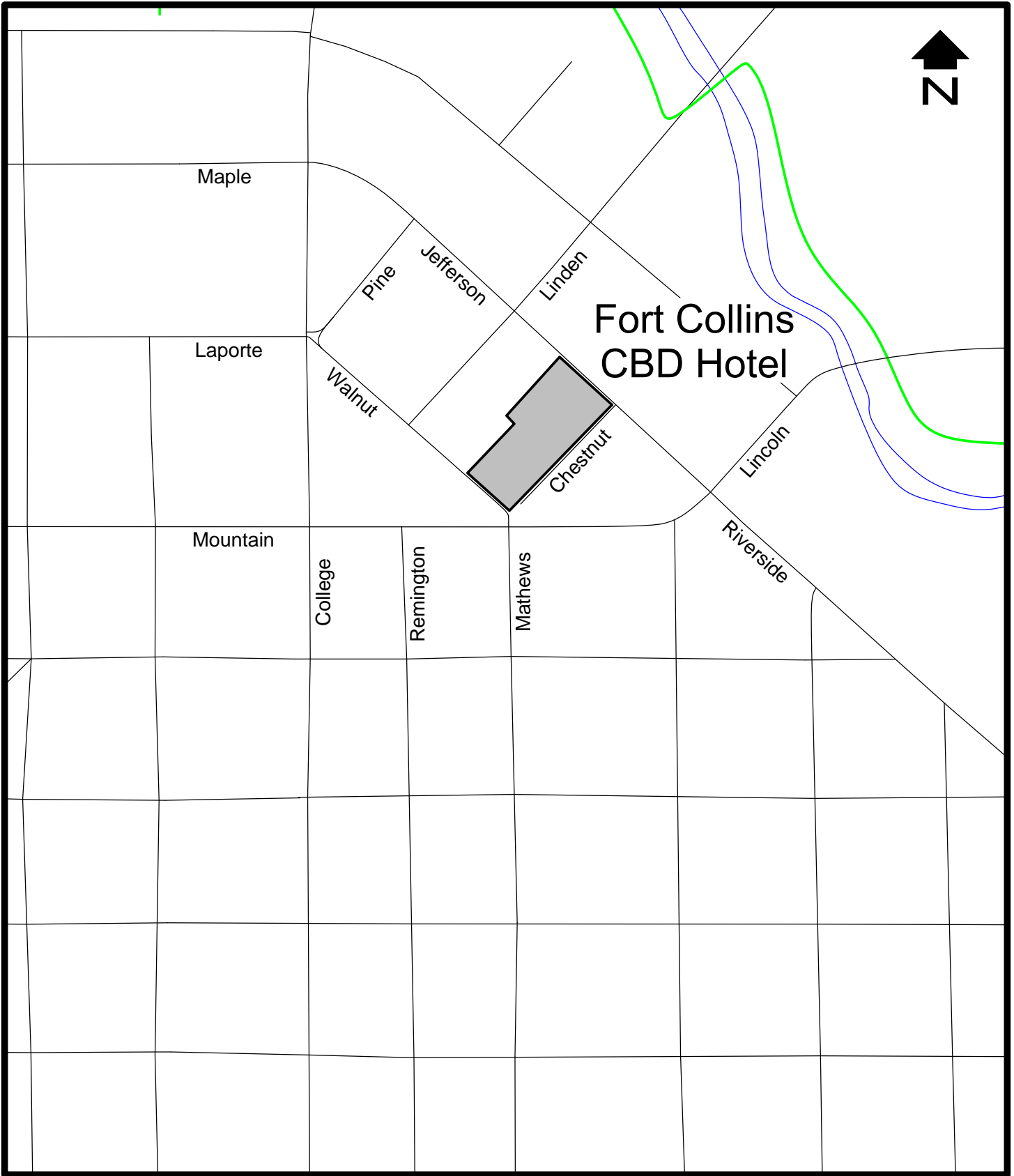
Roads

The primary streets near the Fort Collins CBD Hotel site are College Avenue, Mountain Avenue, Jefferson Street, Linden Street, Walnut Street, and Chestnut Street. The existing geometry at the College/Mountain, Mountain/Mathews-Walnut, Jefferson-Riverside/Mountain-Lincoln, Jefferson/Linden, and Jefferson/Chestnut-Driveway intersections is shown in Figure 2.

College Avenue is to the west of the Fort Collins CBD Hotel site. College Avenue is a north-south street designated as a four-lane arterial street on the Fort Collins Master Street Plan. College Avenue is also US287 (CDOT), categorized as a NRC highway in this area. Currently, College Avenue has a four-lane cross section. At the College/Mountain intersection, College Avenue has two through lanes in each direction. Northbound left turns to westbound Mountain Avenue are prohibited. The College/Mountain intersection has signal control. The existing speed limit in this area is 25 mph.

Mountain Avenue is to the south of the Fort Collins CBD Hotel site. Mountain Avenue is an east-west street designated as a four-lane arterial street on the Fort Collins Master Street Plan. Currently, Mountain Avenue has a four-lane cross section in this area. The existing speed limit in this area is 25 mph. At the College/Mountain intersection, Mountain Avenue has eastbound and westbound left-turn lanes and two through lanes in each direction. At the Mountain/Mathews-Walnut intersection, Mountain Avenue has eastbound and westbound left-turn lanes and two through lanes in each direction. At the Jefferson-Riverside/Mountain-Lincoln intersection, Mountain Avenue-Lincoln Avenue has eastbound and westbound left-turn lanes, one eastbound through lane, two westbound through lanes, and an eastbound right-turn lane. The Mountain/Mathews-Walnut and Jefferson-Riverside/Mountain-Lincoln intersections are signalized.

Jefferson Street is to the northeast of (adjacent to) the Fort Collins CBD Hotel site. Jefferson Street is a diagonal street running northwest-southeast. It is designated as a four-lane arterial street on the Fort Collins Master Street Plan. Jefferson Street is



SCALE: 1"=500'

SITE LOCATION

Figure 1

also SH14 (CDOT), categorized as a NRB highway in this area. Currently, Jefferson Street has a four-lane cross section. There is no center median lane on Jefferson Street. The existing speed limit in this area is 30 mph. At the Jefferson-Riverside/Mountain-Lincoln intersection, Jefferson Street-Riverside Avenue has northbound and southbound left-turn lanes and two through lanes in each direction. At the Jefferson/Chestnut-Driveway intersection, Jefferson Street has two through lanes in each direction. The Jefferson/Chestnut-Driveway intersection has stop sign control on Chestnut Street. At the Jefferson/Linden intersection, Jefferson Street has northbound and southbound left-turn lanes and two through lanes in each direction. The Jefferson/Linden intersection is signalized.

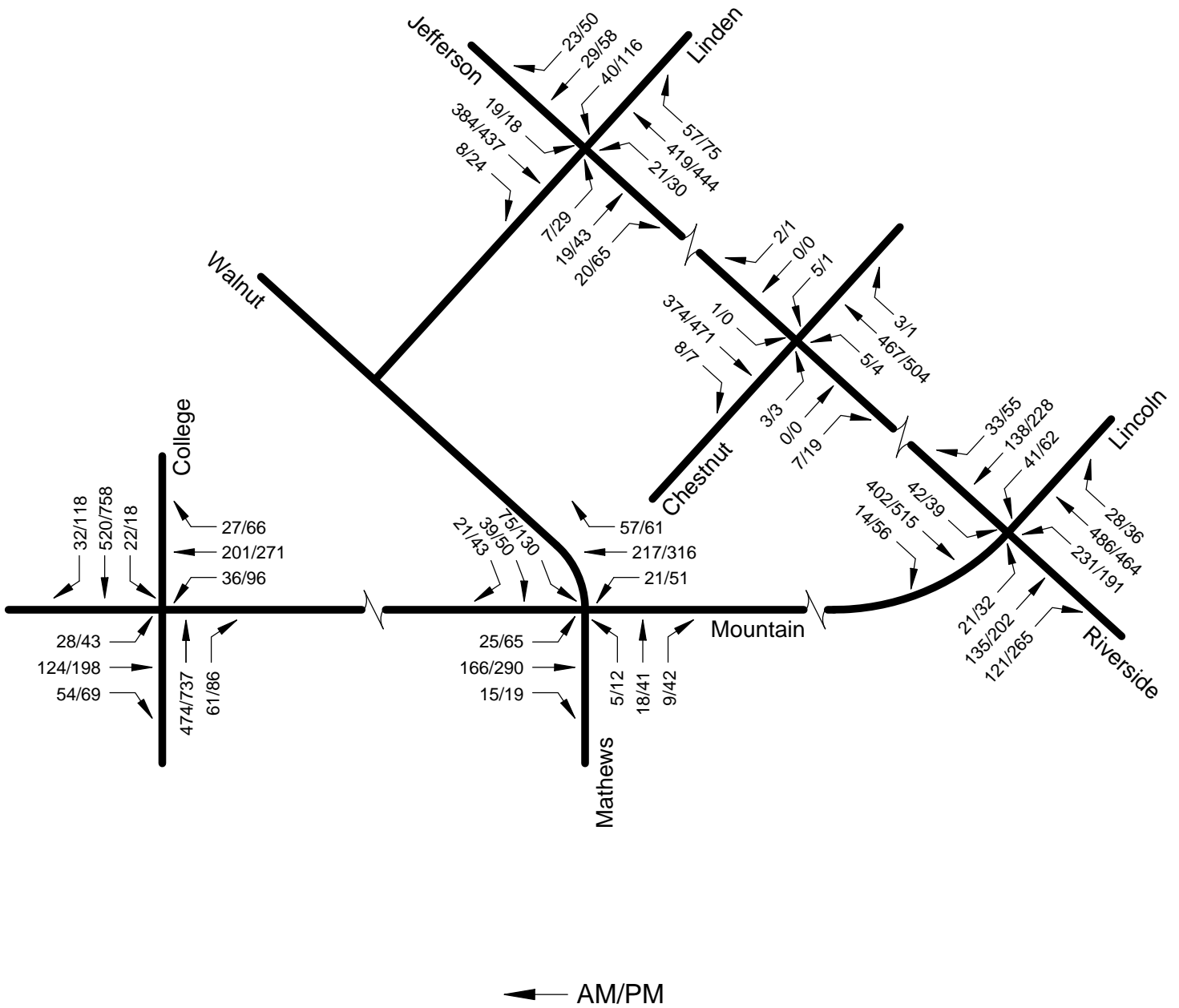
Linden Street is to the northwest of the Fort Collins CBD Hotel site. Linden Street is a diagonal street running northeast-southwest. North of Jefferson Street, Linden Street is designated as a two-lane collector street on the Fort Collins Master Street Plan. Currently, Linden Street has a two-lane cross section. The existing speed limit in this area is 30 mph. At the Jefferson/Linden intersection, Linden Street has all eastbound movements combined in a single lane. It also has a westbound left-turn lane, one westbound through lane, and a westbound right-turn lane.

Walnut Street is to the southwest of (adjacent to) the Fort Collins CBD Hotel site. Walnut Street is a diagonal street running northwest-southeast. Walnut Street is designated as a two-lane collector street on the Fort Collins Master Street Plan. Currently, Walnut Street has a two-lane cross section. There is no posted speed on Walnut Street. At the Mountain/Mathews-Walnut intersection, Walnut Street has a southbound left-turn lane and one southbound through lane. Mathews Street has all northbound movements combined in a single lane.

Chestnut Street is to the southeast of (adjacent to) the Fort Collins CBD Hotel site. Chestnut Street is a diagonal street running northeast-southwest. Chestnut Street is designated as a local street on the Fort Collins Master Street Plan. Currently, Chestnut Street has a two-lane cross section. Chestnut Street currently terminates just east of Mountain Avenue-Walnut Street. At the Jefferson/Chestnut-Driveway intersection, Chestnut Street has all eastbound movements combined in a single lane.

Existing Traffic

Figure 3 shows recent morning and afternoon peak hour traffic counts at the College/Mountain, Mountain/Mathews-Walnut, Jefferson-Riverside/Mountain-Lincoln, Jefferson/Linden, and Jefferson/Chestnut-Driveway intersections. Recent morning and afternoon count data at the College/Mountain intersection was obtained in March 2014. Recent peak hour count data at the Mountain/Mathews-Walnut intersection was obtained in June 2014. Recent peak hour count data at the Jefferson-Riverside/Mountain-Lincoln intersection was obtained in June 2013. Recent peak hour count data at the Jefferson/Linden intersection was obtained in July 2014. Recent peak hour count data at the Jefferson/Chestnut-Driveway intersection was obtained in January 2015. Raw count data is provided in Appendix B.



RECENT PEAK HOUR TRAFFIC

Figure 3

Existing Operation

Using the volumes shown in Figure 3, the College/Mountain, Mountain/Mathews-Walnut, Jefferson-Riverside/Mountain-Lincoln, Jefferson/Linden, and Jefferson/Chestnut-Driveway intersections were evaluated and the morning and afternoon peak hour operation is displayed in Table 1. At the diagonal intersections, Jefferson Street and Riverside Avenue are considered to be north-south streets. Calculation forms are provided in Appendix C. Currently, the key intersections operate at acceptable levels of service using existing geometry and control. The intersections were evaluated using techniques provided in the 2010 Highway Capacity Manual (2010HCM). A description of level of service for signalized and unsignalized intersections from the 2010 Highway Capacity Manual is provided in Appendix C. Table 4-3 (revised per staff comments regarding type of intersection) showing the Fort Collins Motor Vehicle LOS Standards (Intersections) is also provided in Appendix C. This area of Fort Collins is considered to be the Central Business District (CBD). Therefore, according to Table 4-3, the CBD is considered to be a "Mixed Use District." In areas termed "Mixed Use District," acceptable operation at signalized intersections during the peak hours is defined as level of service E or better for the overall intersection, and level of service E or better for any leg or movement. The level of service threshold for arterial/arterial and arterial/collector or local stop sign controlled intersections is level of service F or better for any approach leg. The level of service threshold for a collector/local stop sign controlled intersection is level of service C or better for any approach leg.

Pedestrian Facilities

There are sidewalks along both sides of all the streets in the Fort Collins CBD.

Bicycle Facilities

Bicycle lanes do not exist on most of streets in the Fort Collins CBD.

Transit Facilities

Currently, this area of the Fort Collins CBD is served by Transfort routes 5 and 14. Routes 1, 8, 18, 81, and Flex run along this section of College Avenue. The Downtown Transit Center is to the west of the Fort Collins CBD Hotel site.

**TABLE 1
Current Peak Hour Operation**

Intersection	Movement	Level of Service	
		AM	PM
College/Mountain (signal)	EB LT	C	C
	EB T/RT	C	C
	EB APPROACH	C	C
	WB LT	C	C
	WB T/RT	C	C
	WB APPROACH	C	C
	NB T/RT	B	B
	SB LT/T	A	A
	SB T/RT	A	A
	SB APPROACH	A	A
	OVERALL	B	B
Mountain/Mathews-Walnut (signal)	EB LT	A	A
	EB T/RT	A	A
	EB APPROACH	A	A
	WB LT	A	A
	WB T/RT	B	A
	WB APPROACH	B	A
	NB LT/T/RT	B	B
	SB LT	B	C
	SB T/RT	B	B
	SB APPROACH	B	C
	OVERALL	A	A
Jefferson-Riverside/Mountain- Lincoln (signal)	NB LT	A	B
	NB T/RT	A	A
	NB APPROACH	A	A
	SB LT	A	A
	SB T/RT	A	A
	SB APPROACH	A	A
	EB LT	C	C
	EB T	C	C
	EB RT	C	C
	EB APPROACH	C	C
	WB LT	C	C
	WB T/RT	C	C
	WB APPROACH	C	C
	OVERALL	B	B

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TABLE 1			
Current Peak Hour Operation			
Intersection	Movement	Level of Service	
		AM	PM
Jefferson/Chestnut-Driveway (stop sign)	EB LT/T/RT	B	B
	WB LT/T/RT	C	C
	NB LT/T	A	A
	SB LT/T	A	A
Jefferson/Linden (signal)	NB LT	A	A
	NB T/RT	A	A
	NB APPROACH	A	A
	SB LT	A	A
	SB T/RT	A	A
	SB APPROACH	A	A
	EB LT/T/RT	C	C
	WB LT	C	C
	WB T	C	C
	WB RT	A	C
	WB APPROACH	C	C
	OVERALL	A	B

III. PROPOSED DEVELOPMENT

The Fort Collins CBD Hotel is a proposed commercial development. Figure 4 shows the site plan of the Fort Collins CBD Hotel site. Access to the site will be via Chestnut Street. The short range analysis (Year 2020) includes development of the Fort Collins CBD Hotel and an appropriate increase in background traffic, due to normal growth, and other approved developments in the area. The long range future is considered to be 2035. There are two plans for extending Chestnut Street to the Mountain/Mathews-Walnut intersection. The first one has a right-turn ingress only from Mountain Avenue to Chestnut Street and a right-turn egress only from Chestnut Street to Walnut Street. The second design is a five-legged roundabout that will replace the existing signal at the Mountain/Mathews-Walnut intersection at the request of the City. This study will analyze both scenarios.

Trip Generation

Trip generation is important in considering the impact of a development such as this upon the existing and proposed street system. A compilation of trip generation information contained in Trip Generation, 9th Edition, ITE was used to estimate trips that would be generated by the proposed/expected use at this site. Table 2 shows the weekday daily, morning, and afternoon peak hour trip generation for the Fort Collins CBD Hotel. At full development, the Fort Collins CBD Hotel will generate the following traffic: 1,194 weekday vehicle trip ends, 93 morning peak hour vehicle trip ends, and 105 afternoon peak hour vehicle trip ends.

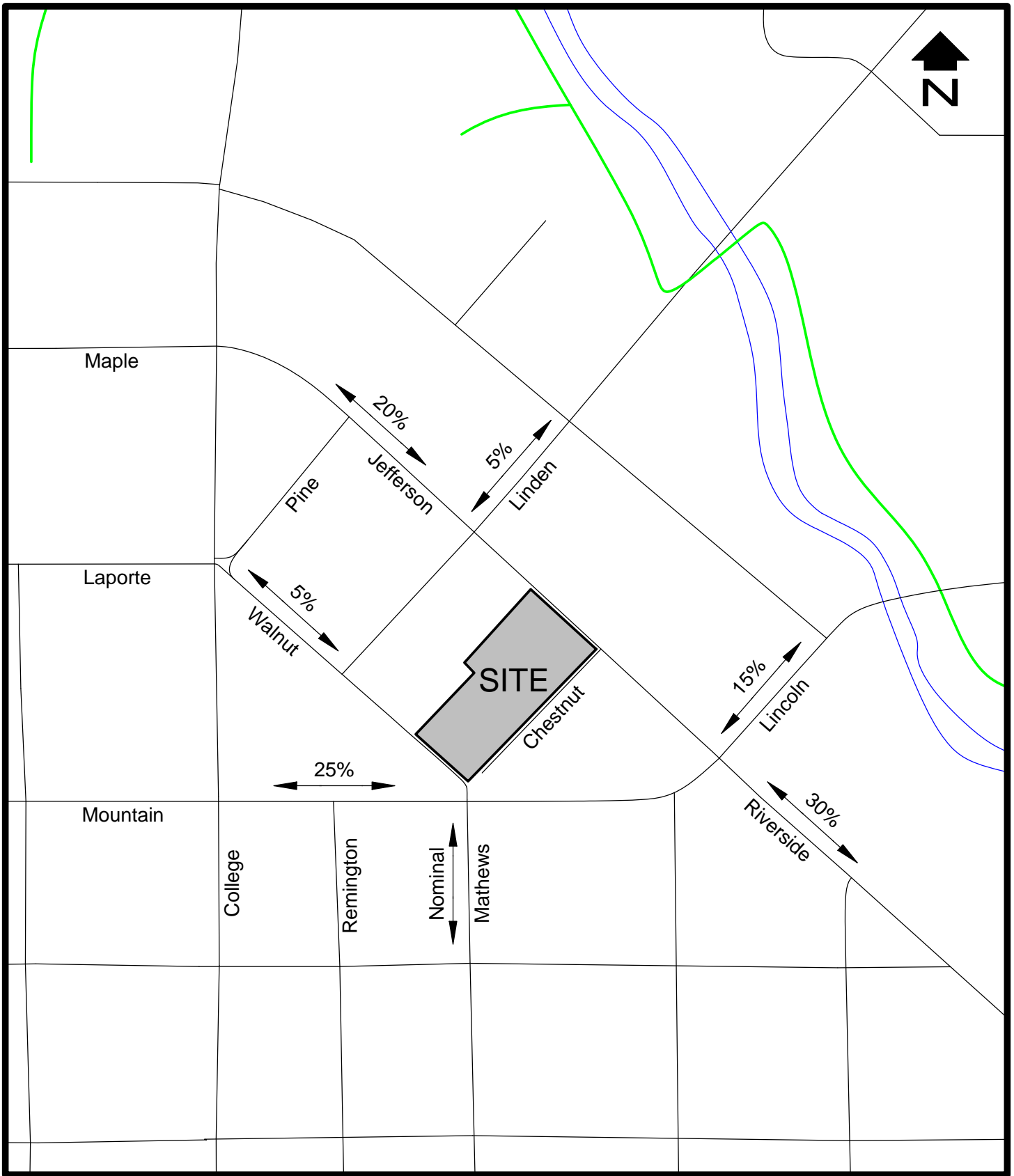
Code	Use	Size	AWDTE		AM Peak Hour			PM Peak Hour				
			Rate	Trips	Rate	In	Rate	Out	Rate	In	Rate	Out
310	Hotel	175 Rooms	EQ	1194	0.31	54	0.22	39	0.31	54	0.29	51

Trip Distribution

Directional distribution of the generated trips was determined for the Fort Collins CBD Hotel site. Figure 5 shows the vehicle trip distribution used for the Fort Collins CBD Hotel site. The trip distribution was discussed and agreed to in the scoping exercise.

Background Traffic Projections

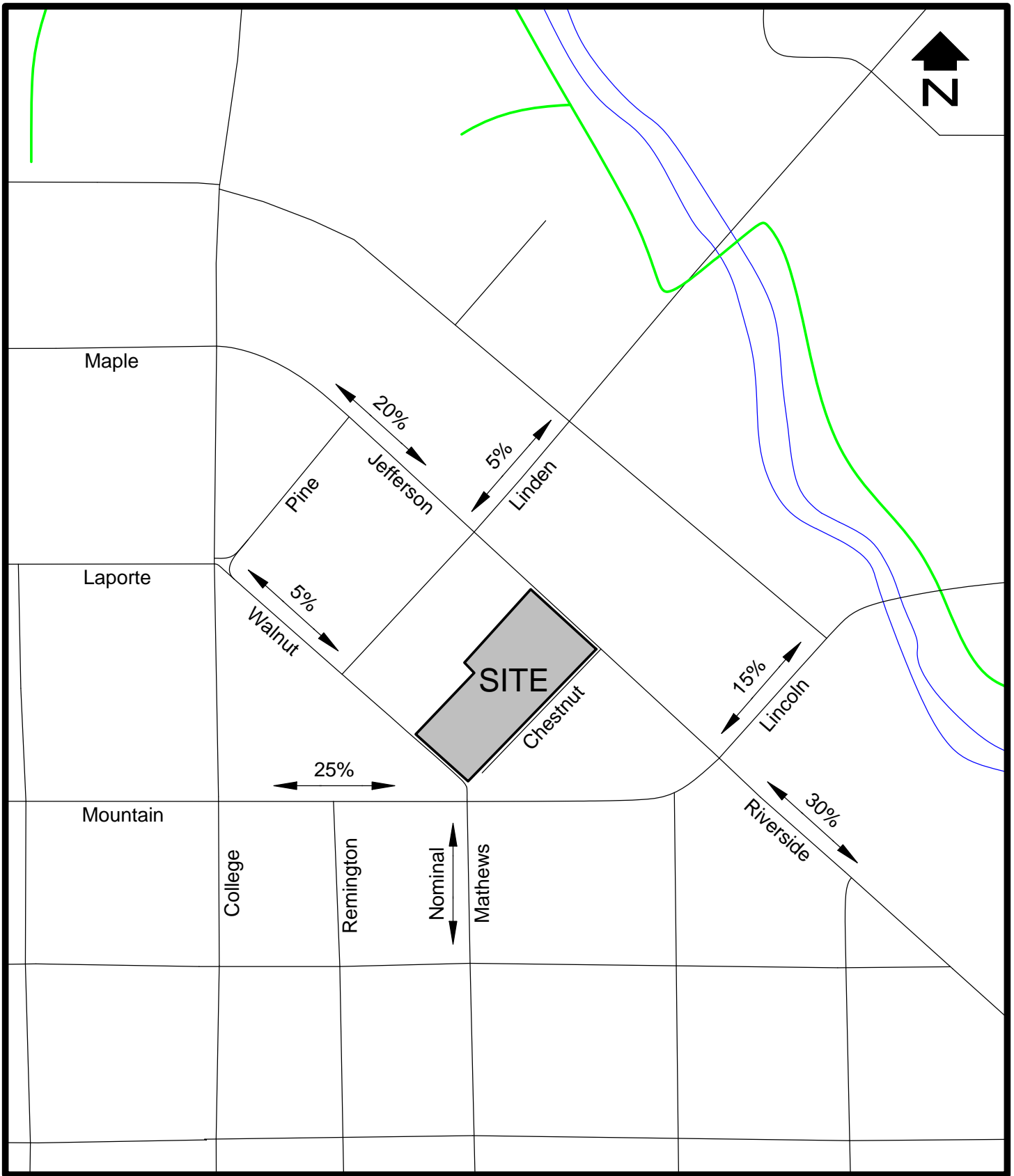
Figures 6 and 7 show the short range (2020) and long range (2035) background morning and afternoon peak hour vehicle traffic projections at the key intersections, respectively. Short range (2020) and long range (2035) background traffic forecasts were developed by factoring the existing traffic by one percent per year. It is important



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TRIP DISTRIBUTION

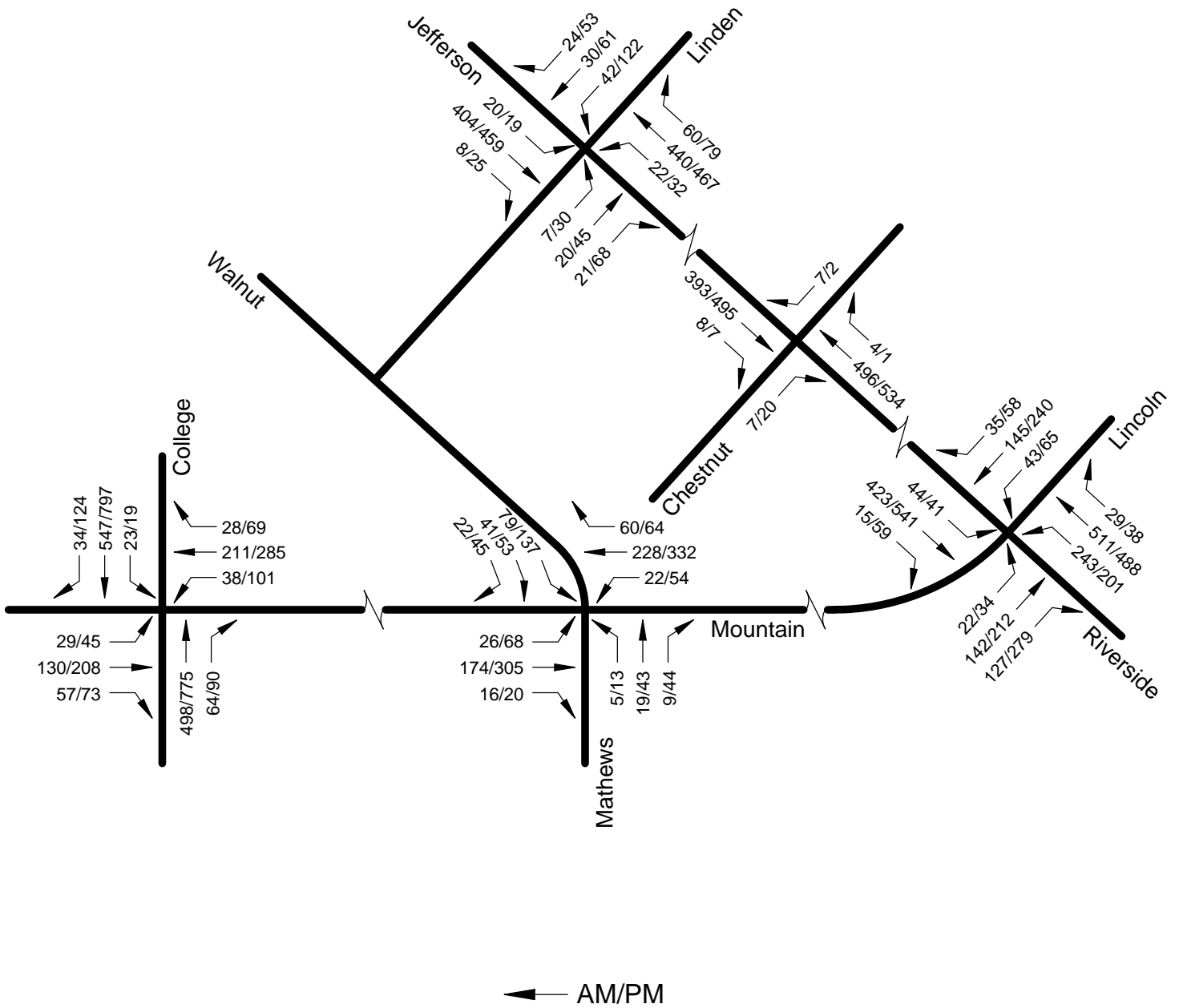
Figure 5



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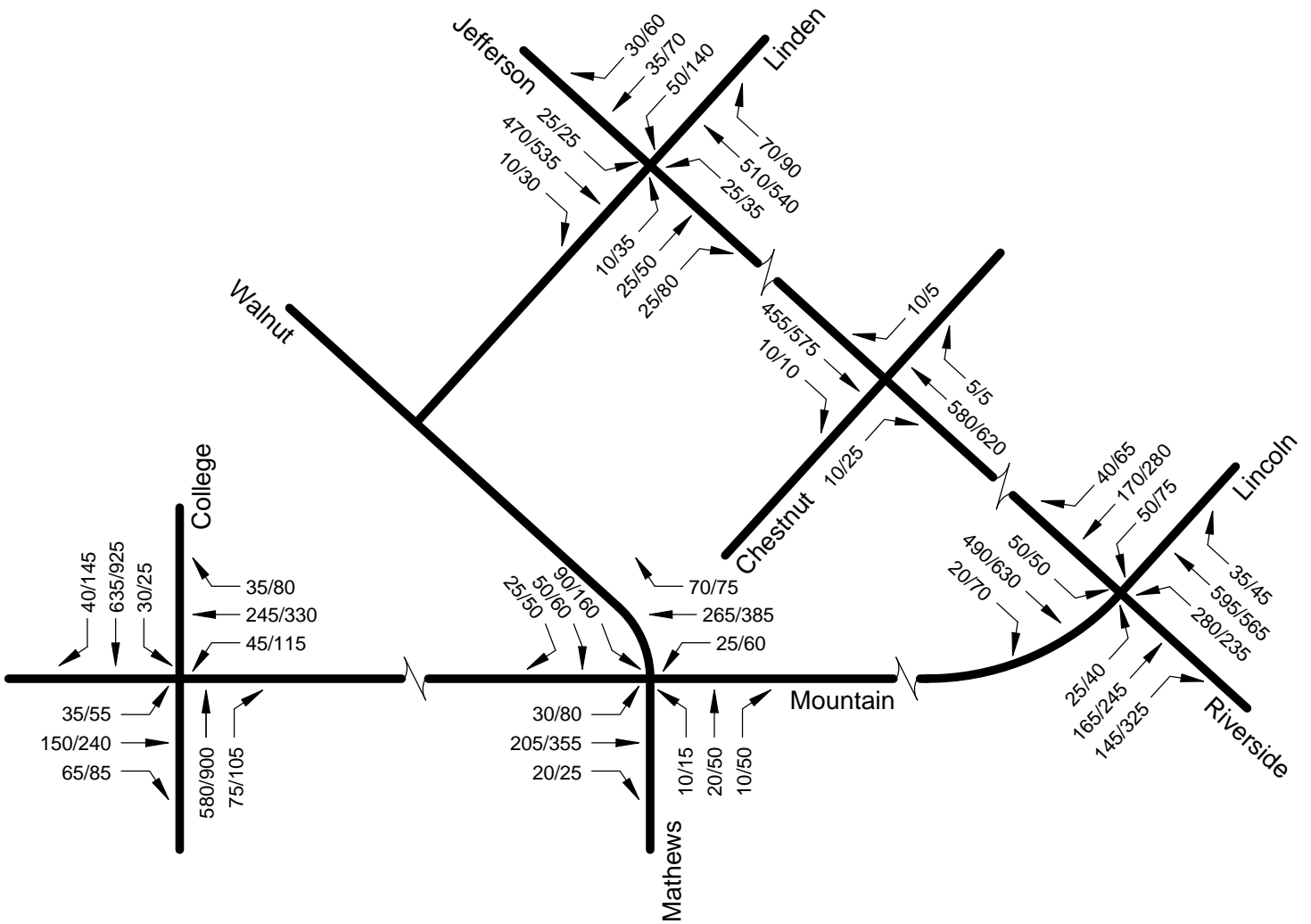
TRIP DISTRIBUTION

Figure 5



SHORT RANGE (2020) BACKGROUND PEAK HOUR TRAFFIC

Figure 6



← AM/PM
Rounded to Nearest
5 Vehicles

LONG RANGE (2035) BACKGROUND PEAK HOUR TRAFFIC

Figure 7

to note that there are approved design plans for Jefferson Street, north of Mountain Avenue, which will impact the number of lanes and the allowed turning movements. These plans introduce a raised median in Jefferson Street. There will be one eastbound through lane west of Chestnut Street, with parallel parking allowed on the west side of Jefferson Street. The background traffic forecasts and total traffic forecasts reflect these design plans.

Trip Assignment

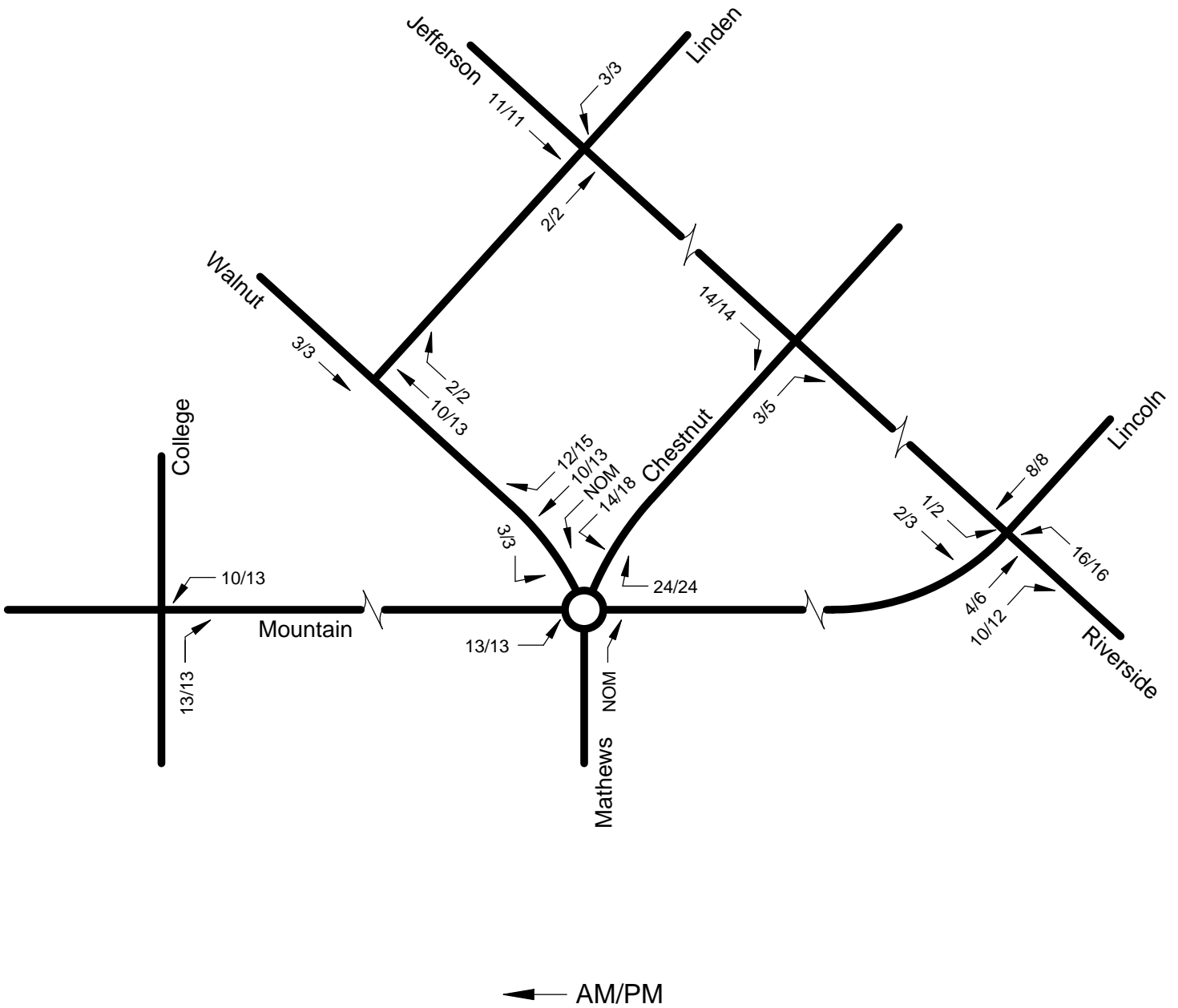
Trip assignment is how the generated and distributed trips are expected to be loaded on the street system. The assigned trips are the resultant of the trip distribution process. Using the trip distribution shown in Figure 5, Figure 8 shows the assignment of the site generated peak hour traffic with roundabout control at the Mountain/Mathews-Walnut-Chestnut intersection. Figure 9 shows the assignment of the site generated peak hour traffic with the existing signal control at the Mountain/Mathews-Walnut intersection and right-in/right-out at the Mountain-Walnut/Chestnut intersection. The traffic assignment in Figure 9 depicts making legal movements at all intersections. The right-in from westbound Mountain Avenue and the right-out to northbound Walnut Street may be violated. In order to avoid circuitous travel, entering traffic from the south and west may attempt to enter Chestnut Street from eastbound Mountain Avenue. In addition, exiting traffic to the south and west may attempt to turn south on Walnut Street to reach the signal at the Mountain/Mathews-Walnut intersection. Roundabout control at the Mountain/Mathews-Walnut intersection will eliminate these potential movements and provide safe, efficient access to the hotel. The site generated vehicle traffic was combined with the background traffic to determine the total forecasted vehicle traffic at the key intersections. Figures 10 and 11 show the short range (2020) total peak hour traffic at the key intersections with roundabout control and right-in/right-out control at Walnut Street, respectively. Figures 12 and 13 show the long range (2035) total peak hour traffic at the key intersections with roundabout control and right-in/right-out control at Walnut Street, respectively.

Signal Warrants

As a matter of policy, traffic signals are not installed at any location unless warrants are met according to the Manual on Uniform Traffic Control Devices (MUTCD). The only stop sign controlled key intersection in the analysis area is the Jefferson/Chestnut-Driveway intersection. This intersection will be limited to right-in/right-out movements in the future, as shown in the Jefferson Street Roadway Plans provided by the City.

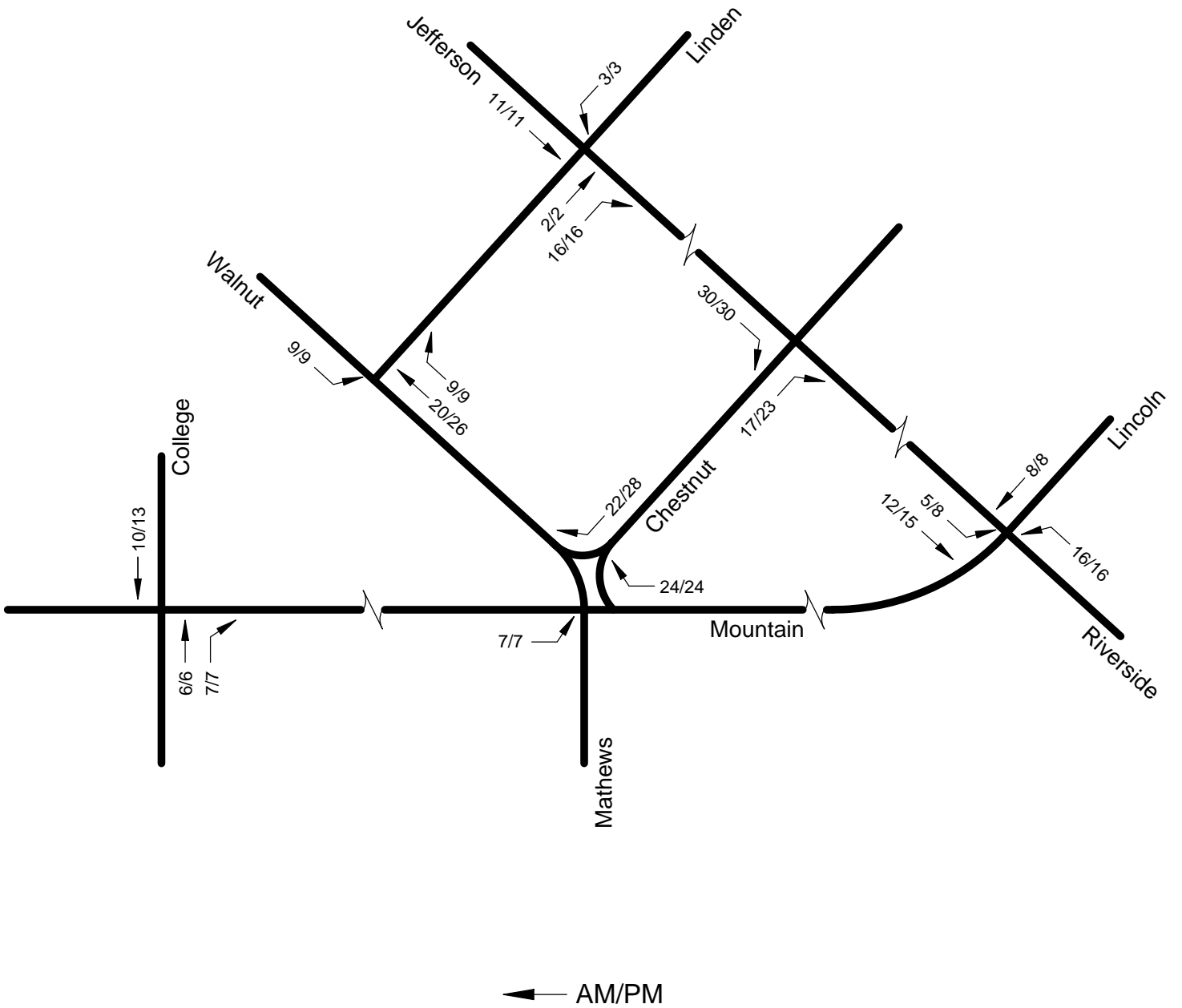
Geometry

College Avenue and Jefferson Street were evaluated using the State Highway Access Code (SHAC). All other streets were evaluated using criteria in LCUASS. At the respective posted speeds, the threshold for requiring a left-turn deceleration lane is greater



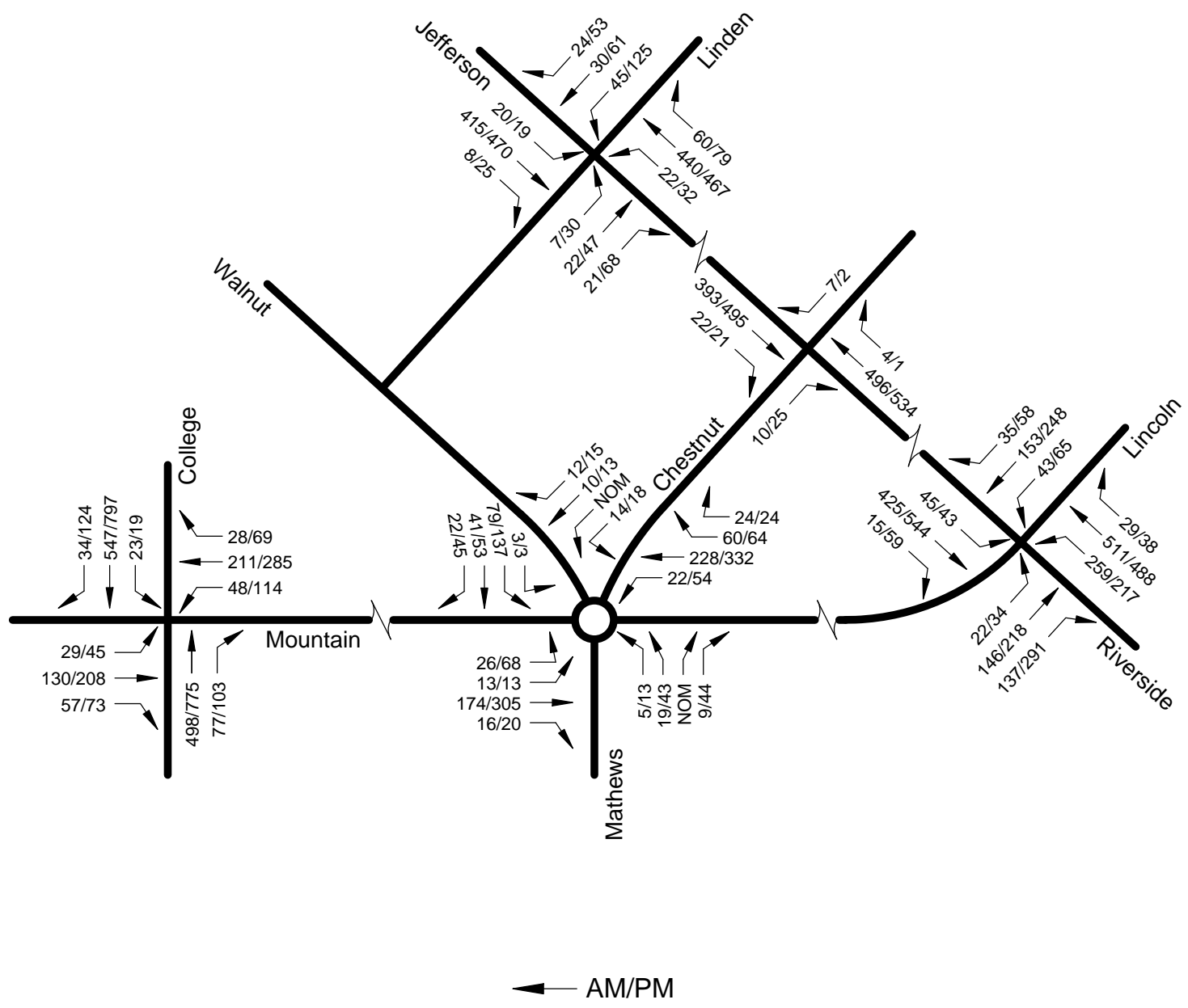
SITE GENERATED PEAK HOUR TRAFFIC WITH ROUNDABOUT AT WALNUT STREET

Figure 8



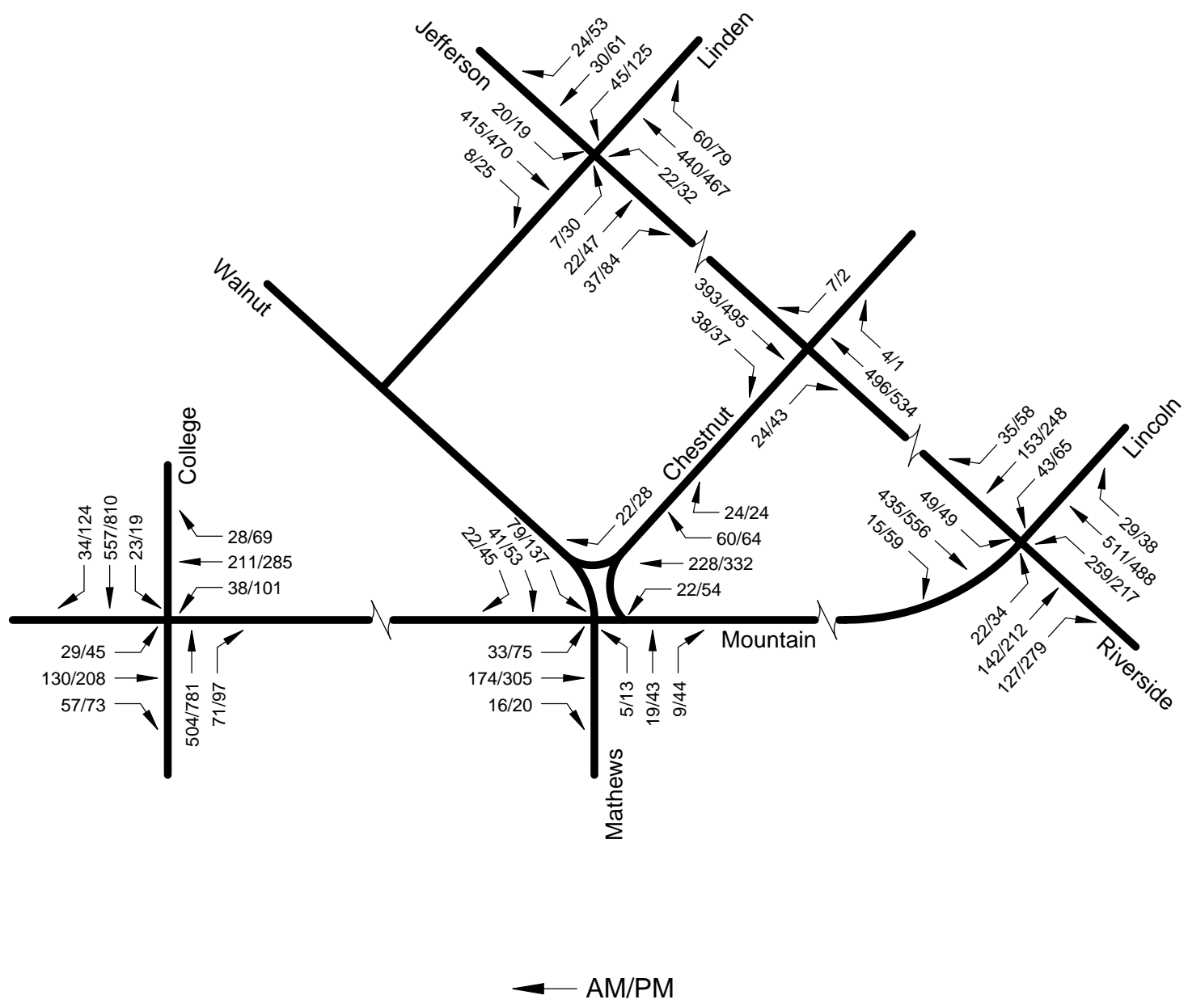
SITE GENERATED PEAK HOUR TRAFFIC
WITH RT-IN/RT-OUT AT WALNUT STREET

Figure 9



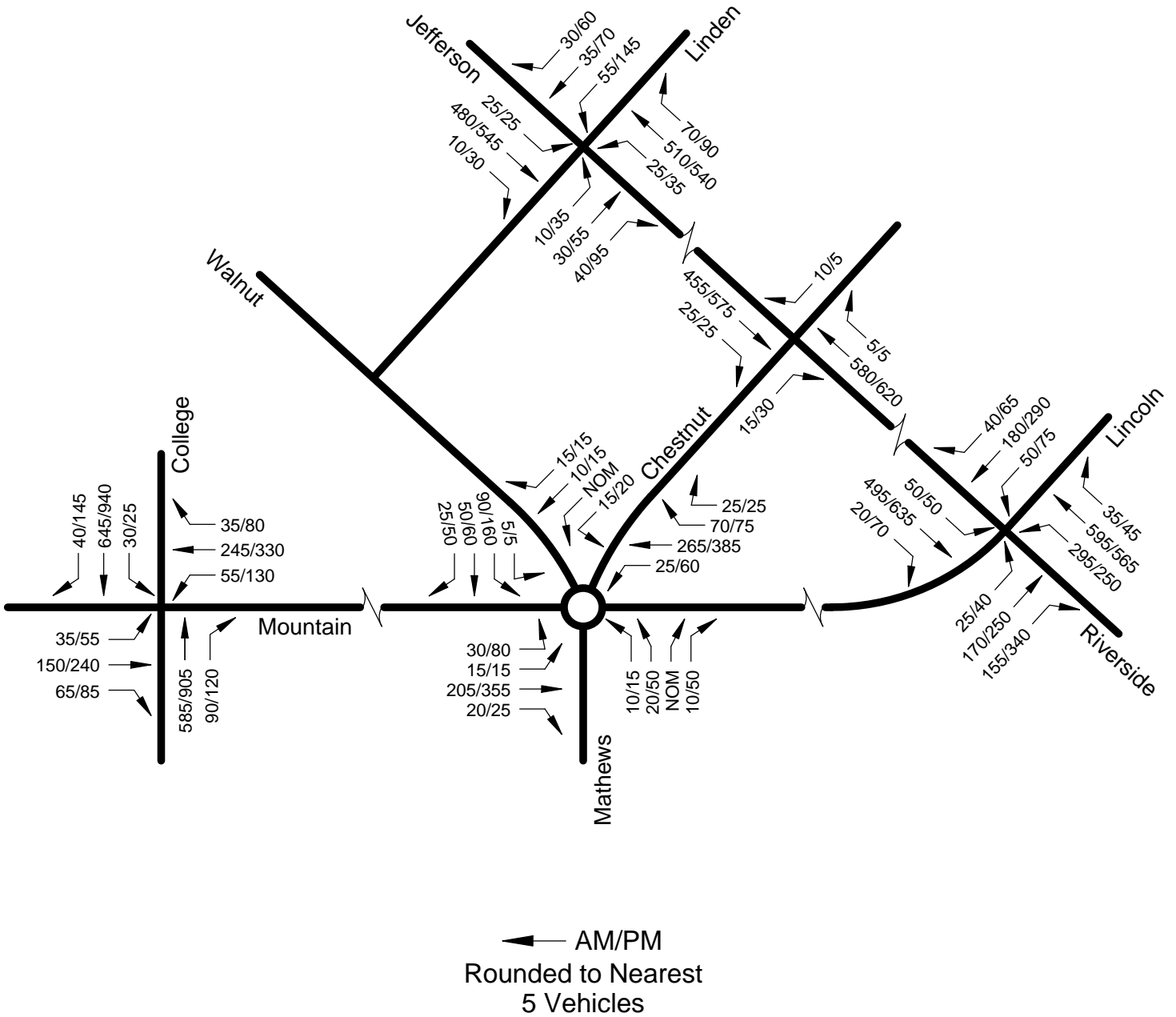
SHORT RANGE (2020) TOTAL PEAK HOUR TRAFFIC WITH ROUNDABOUT AT WALNUT STREET

Figure 10



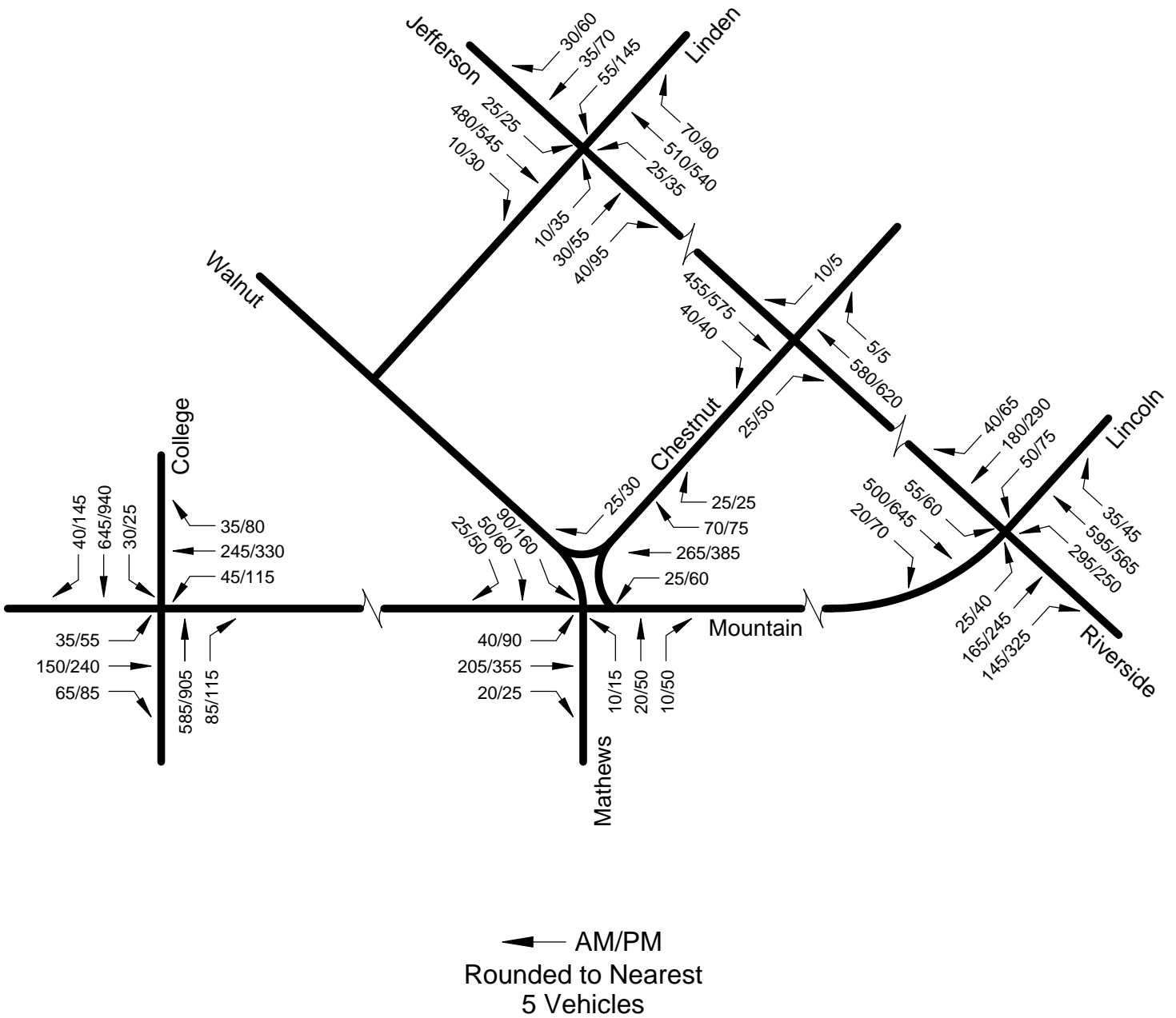
SHORT RANGE (2020) TOTAL PEAK HOUR TRAFFIC WITH RT-IN/RT-OUT AT WALNUT STREET

Figure 11



LONG RANGE (2035) TOTAL PEAK HOUR TRAFFIC WITH ROUNDBOUT AT WALNUT STREET

Figure 12



LONG RANGE (2035) TOTAL PEAK HOUR TRAFFIC WITH RT-IN/RT-OUT AT WALNUT STREET

Figure 13

than 25 vehicles per hour and the threshold for requiring a right-turn deceleration lane is greater than 50 vehicles per hour. The short range (2020) and long range (2035) geometry with roundabout control at Walnut Street is shown in Figure 14. The short range (2020) and long range (2035) geometry with right-in/right-out at Walnut Street is shown in Figure 15. As mentioned earlier, the Jefferson/Chestnut-Driveway intersection will be limited to right-in/right-out movements in the future. While existing and forecasted traffic indicates the need for a northbound right-turn lane at the Jefferson/Lincoln intersection and a southbound right-turn lane at the Jefferson-Riverside/Mountain-Lincoln intersection, it is assumed they were purposefully not included in the design plans. Existing and forecasted traffic indicates the need for northbound and southbound right-turn lanes at the College/Mountain intersection. Given its location in the central business district, it is doubtful that these lanes would be implemented.

Operation Analysis

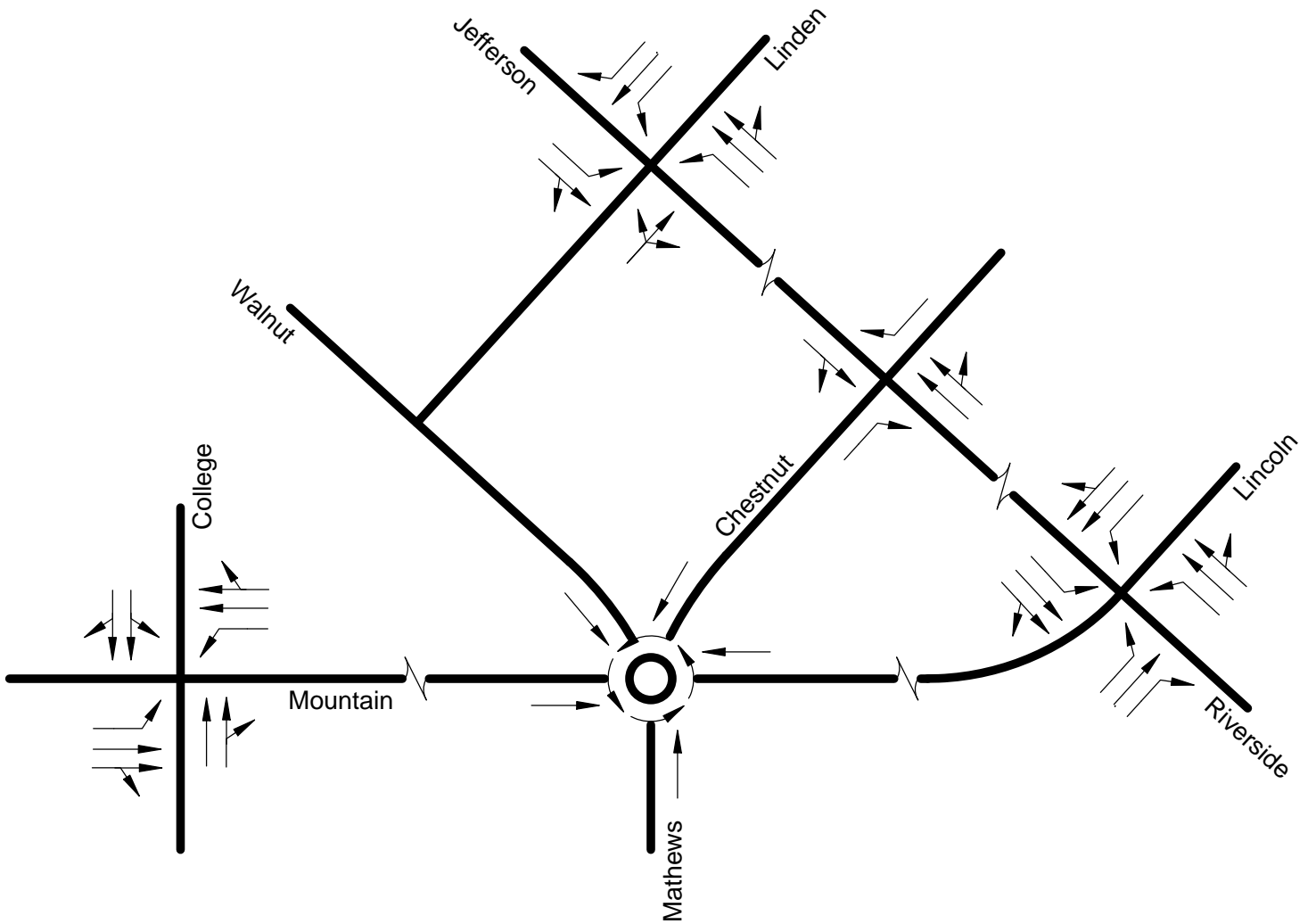
Operation analyses were performed at the key intersections. The operation analyses were conducted for the short range analysis, reflecting a year 2020 condition, and for the long range analysis, reflecting a year 2035 condition.

Using the short range (2020) background morning and afternoon peak hour traffic volumes, the key intersections operate as indicated in Table 3. The short range (2020) operation analyses were conducted with the existing control and geometry at all intersections (except for the Jefferson/Chestnut-Driveway intersection). Calculation forms for these analyses are provided in Appendix D. All of the key intersections operate acceptably.

Using the long range (2035) background morning and afternoon peak hour traffic volumes, the key intersections operate as indicated in Table 4. Calculation forms for these analyses are provided in Appendix E. The long range (2035) operation analyses were conducted with the existing control and geometry at all intersections (except for the Jefferson/Chestnut-Driveway intersection). All of the key intersections operate acceptably.

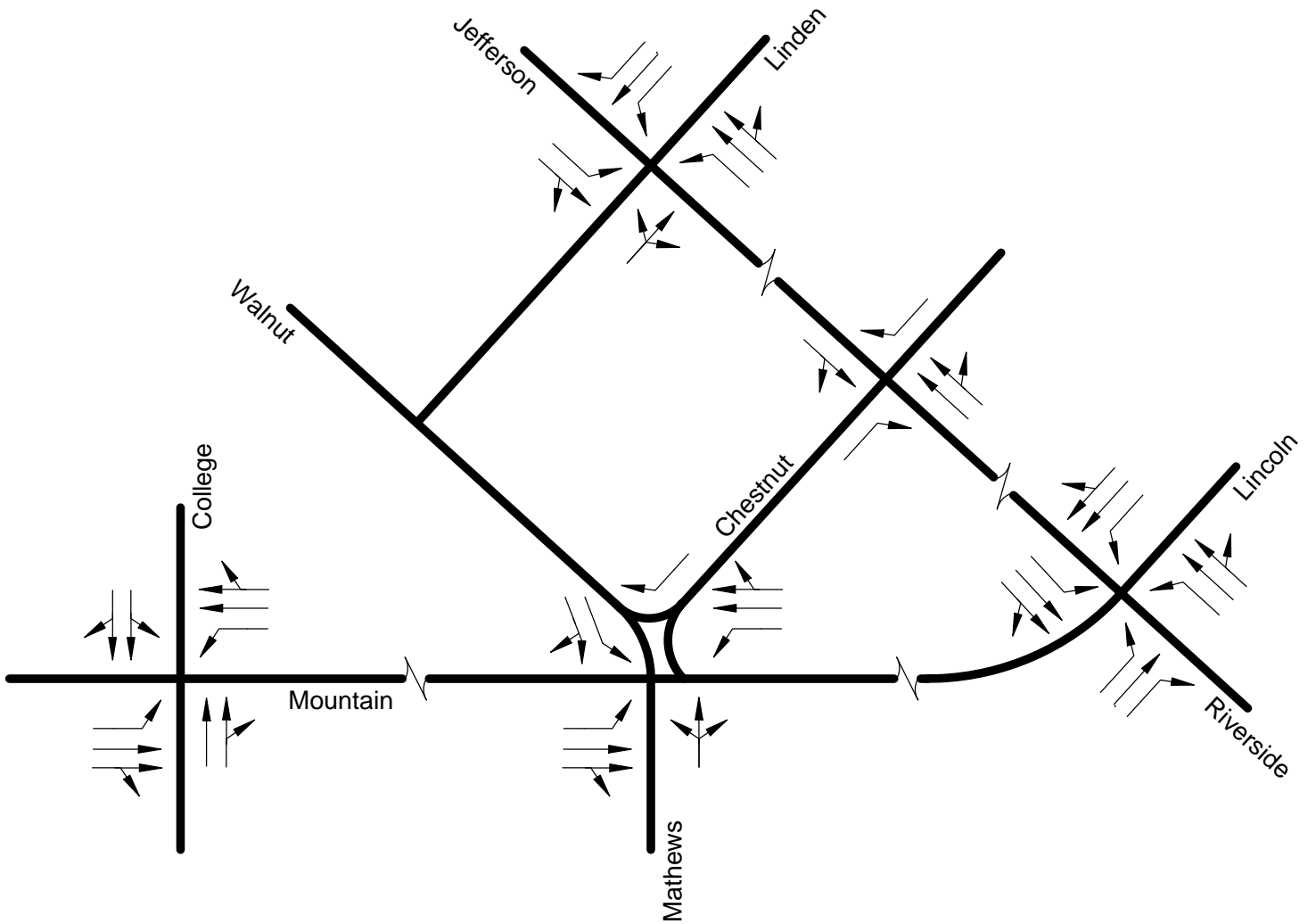
Using the traffic volumes shown in Figure 10, the key intersections operate in the short range (2020) total condition with roundabout control at Walnut Street as indicated in Table 5. Calculation forms for these analyses are provided in Appendix F. The key intersections will meet the Fort Collins operational criteria with the geometry shown in Figure 14.

Using the traffic volumes shown in Figure 11, the key intersections operate in the short range (2020) total condition with right-in/right-out at Walnut Street as indicated in Table 6. Calculation forms for these analyses are provided in Appendix G. The key intersections will meet the Fort Collins operational criteria with the geometry shown in Figure 15.



SHORT RANGE (2020) AND LONG RANGE (2035) GEOMETRY WITH ROUNDABOUT AT WALNUT STREET

Figure 14



SHORT RANGE (2020) AND LONG RANGE (2035) GEOMETRY WITH RT-IN/RT-OUT AT WALNUT STREET

Figure 15

**TABLE 3
Short Range (2020) Background Peak Hour Operation**

Intersection	Movement	Level of Service	
		AM	PM
College/Mountain (signal)	EB LT	C	C
	EB T/RT	C	C
	EB APPROACH	C	C
	WB LT	C	C
	WB T/RT	C	C
	WB APPROACH	C	C
	NB T/RT	B	B
	SB LT/T	A	A
	SB T/RT	A	A
	SB APPROACH	A	A
	OVERALL	B	B
Mountain/Mathews-Walnut (signal)	EB LT	A	A
	EB T/RT	A	A
	EB APPROACH	A	A
	WB LT	A	A
	WB T/RT	B	A
	WB APPROACH	B	A
	NB LT/T/RT	B	B
	SB LT	B	C
	SB T/RT	B	B
	SB APPROACH	B	C
	OVERALL	A	A
Jefferson-Riverside/Mountain- Lincoln (signal)	NB LT	B	B
	NB T/RT	A	A
	NB APPROACH	A	B
	SB LT	A	A
	SB T/RT	A	A
	SB APPROACH	A	A
	EB LT	C	C
	EB T	C	C
	EB RT	C	C
	EB APPROACH	C	C
	WB LT	C	C
	WB T/RT	C	C
	WB APPROACH	C	C
	OVERALL	B	B

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TABLE 3			
Short Range (2020) Background Peak Hour Operation			
Intersection	Movement	Level of Service	
		AM	PM
Jefferson/Chestnut-Driveway (RT-in/RT-out)	EB RT	B	B
	WB RT	B	B
Jefferson/Linden (signal)	NB LT	A	A
	NB T/RT	A	A
	NB APPROACH	A	A
	SB LT	A	A
	SB T/RT	A	A
	SB APPROACH	A	A
	EB LT/T/RT	C	C
	WB LT	C	C
	WB T	C	C
	WB RT	A	A
	WB APPROACH	C	C
	OVERALL	A	B

**TABLE 4
Long Range (2035) Background Peak Hour Operation**

Intersection	Movement	Level of Service	
		AM	PM
College/Mountain (signal)	EB LT	C	C
	EB T/RT	C	C
	EB APPROACH	C	C
	WB LT	C	C
	WB T/RT	C	C
	WB APPROACH	C	C
	NB T/RT	B	B
	SB LT/T	A	A
	SB T/RT	A	A
	SB APPROACH	A	A
	OVERALL	B	B
Mountain/Mathews-Walnut (signal)	EB LT	A	A
	EB T/RT	A	A
	EB APPROACH	A	A
	WB LT	A	A
	WB T/RT	B	A
	WB APPROACH	B	A
	NB LT/T/RT	B	C
	SB LT	B	C
	SB T/RT	B	C
	SB APPROACH	B	C
	OVERALL	A	A
Jefferson-Riverside/Mountain- Lincoln (signal)	NB LT	B	C
	NB T/RT	A	A
	NB APPROACH	A	B
	SB LT	A	B
	SB T/RT	A	A
	SB APPROACH	A	A
	EB LT	C	C
	EB T	C	C
	EB RT	C	C
	EB APPROACH	C	C
	WB LT	C	C
	WB T/RT	C	C
	WB APPROACH	C	C
	OVERALL	B	B

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TABLE 4			
Long Range (2035) Background Peak Hour Operation			
Intersection	Movement	Level of Service	
		AM	PM
Jefferson/Chestnut-Driveway (RT-in/RT-out)	EB RT	B	B
	WB RT	B	B
Jefferson/Linden (signal)	NB LT	A	A
	NB T/RT	A	A
	NB APPROACH	A	A
	SB LT	A	B
	SB T/RT	A	A
	SB APPROACH	A	A
	EB LT/T/RT	C	C
	WB LT	C	C
	WB T	C	C
	WB RT	C	C
	WB APPROACH	C	C
	OVERALL	A	B

TABLE 5
Short Range (2020) Total Peak Hour Operation With Roundabout
Control at Mountain/Mathews-Walnut-Chestnut Intersection

Intersection	Movement	Level of Service	
		AM	PM
College/Mountain (signal)	EB LT	C	C
	EB T/RT	C	C
	EB APPROACH	C	C
	WB LT	C	C
	WB T/RT	C	C
	WB APPROACH	C	C
	NB T/RT	B	B
	SB LT/T	A	A
	SB T/RT	A	A
	SB APPROACH	A	A
	OVERALL	B	B
Mountain/Mathews-Walnut- Chestnut (roundabout)	EB	A	B
	WB	A	B
	NB	A	A
	SB	A	B
	OVERALL	A	B
Jefferson-Riverside/Mountain- Lincoln (signal)	NB LT	B	B
	NB T/RT	A	A
	NB APPROACH	A	B
	SB LT	A	A
	SB T/RT	A	A
	SB APPROACH	A	A
	EB LT	C	C
	EB T	C	C
	EB RT	C	C
	EB APPROACH	C	C
	WB LT	C	C
	WB T/RT	C	C
	WB APPROACH	C	C
		OVERALL	B

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TABLE 5			
Short Range (2020) Total Peak Hour Operation With Roundabout Control at Mountain/Mathews-Walnut-Chestnut Intersection			
Intersection	Movement	Level of Service	
		AM	PM
Jefferson/Chestnut-Driveway (RT-in/RT-out)	EB RT	B	B
	WB RT	B	B
Jefferson/Linden (signal)	NB LT	A	A
	NB T/RT	A	A
	NB APPROACH	A	A
	SB LT	A	B
	SB T/RT	A	A
	SB APPROACH	A	A
	EB LT/T/RT	C	C
	WB LT	C	C
	WB T	C	C
	WB RT	A	C
	WB APPROACH	C	C
	OVERALL	A	B

TABLE 6
Short Range (2020) Total Peak Hour Operation With RT-in/RT-out
Control at Mountain-Walnut/Chestnut Intersection

Intersection	Movement	Level of Service	
		AM	PM
College/Mountain (signal)	EB LT	C	C
	EB T/RT	C	C
	EB APPROACH	C	C
	WB LT	C	C
	WB T/RT	C	C
	WB APPROACH	C	C
	NB T/RT	B	B
	SB LT/T	A	A
	SB T/RT	A	A
	SB APPROACH	A	A
	OVERALL	B	B
Mountain/Mathews-Walnut (signal)	EB LT	A	A
	EB T/RT	A	A
	EB APPROACH	A	A
	WB LT	A	A
	WB T/RT	B	A
	WB APPROACH	B	A
	NB LT/T/RT	B	B
	SB LT	B	C
	SB T/RT	B	B
	SB APPROACH	B	C
	OVERALL	A	A
Mountain-Walnut/Chestnut (RT-in/RT-out)	WB RT out	A	A

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TABLE 6
Short Range (2020) Total Peak Hour Operation With RT-in/RT-out
Control at Mountain-Walnut/Chestnut Intersection

Intersection	Movement	Level of Service	
		AM	PM
Jefferson-Riverside/Mountain-Lincoln (signal)	NB LT	B	B
	NB T/RT	A	A
	NB APPROACH	A	B
	SB LT	A	A
	SB T/RT	A	A
	SB APPROACH	A	A
	EB LT	C	C
	EB T	C	C
	EB RT	C	C
	EB APPROACH	C	C
	WB LT	C	C
	WB T/RT	C	C
	WB APPROACH	C	C
	OVERALL	B	B
Jefferson/Chestnut-Driveway (RT-in/RT-out)	EB RT	B	B
	WB RT	B	B
Jefferson/Linden (signal)	NB LT	A	A
	NB T/RT	A	A
	NB APPROACH	A	A
	SB LT	A	B
	SB T/RT	A	A
	SB APPROACH	A	A
	EB LT/T/RT	C	C
	WB LT	C	C
	WB T	C	C
	WB RT	A	C
	WB APPROACH	C	C
OVERALL	A	B	

Using the traffic volumes shown in Figure 12, the key intersections operate in the long range (2035) total condition with roundabout control at Walnut Street as indicated in Table 7. Calculation forms for these analyses are provided in Appendix H. The key intersections will meet the Fort Collins operational criteria with the geometry shown in Figure 14.

Using the traffic volumes shown in Figure 13, the key intersections operate in the long range (2035) total condition with right-in/right-out at Walnut Street as indicated in Table 8. Calculation forms for these analyses are provided in Appendix I. The key intersections will meet the Fort Collins operational criteria with the geometry shown in Figure 15.

Both plans (roundabout at the Mountain/Walnut-Mathews intersection and signal at the Mountain/Walnut-Mathews intersection with right-in/right-out access to/from the site [Chestnut]) meet the Fort Collins operational criteria. The calculated delay and level of service are not significantly different with regard to the two plans connecting Chestnut Street to Mountain Avenue and Walnut Street. The roundabout will have a single circulating lane with an inscribed circle diameter of 100-130 feet. With the existing signal at the Mountain/Walnut-Mathews intersection, there will be circuitous travel for some of the site generated traffic. The decision with regard to this intersection will be the subject of conversations between the developer and the City of Fort Collins.

Pedestrian Level of Service

Appendix J shows a map of the area that is within 1320 feet of the Fort Collins CBD Hotel site. The Fort Collins CBD Hotel site is located within an area termed as a “pedestrian district,” which sets the level of service threshold at LOS A & B for all measured factors. There are five destination areas within 1320 feet of the proposed The Fort Collins CBD Hotel: 1) the commercial area north of the site; 2) the commercial area adjacent to the site; 3) the commercial area west of the site; 4) the commercial area south of the site; and 5) the residential area southwest of the site. There are sidewalks along both sides of all the streets in the Fort Collins CBD. Appendix J contains the Pedestrian LOS Worksheet.

Bicycle Level of Service

Based upon Fort Collins bicycle LOS criteria, there are no destination areas within 1320 feet of the Fort Collins CBD Hotel.

Transit Level of Service

Currently, this area of the Fort Collins CBD is served by Transfort routes 5 and 14. Routes 1, 8, 18, 81, and Flex run along this section of College Avenue. The Downtown Transit Center is to the west of the Fort Collins CBD Hotel site.

TABLE 7
Long Range (2035) Total Peak Hour Operation With Roundabout
Control at Mountain/Mathews-Walnut-Chestnut Intersection

Intersection	Movement	Level of Service	
		AM	PM
College/Mountain (signal)	EB LT	C	C
	EB T/RT	C	C
	EB APPROACH	C	C
	WB LT	C	C
	WB T/RT	C	C
	WB APPROACH	C	C
	NB T/RT	B	B
	SB LT/T	A	A
	SB T/RT	A	A
	SB APPROACH	A	A
OVERALL	B	B	
Mountain/Mathews-Walnut- Chestnut (roundabout)	EB	A	B
	WB	A	B
	NB	A	A
	SB	A	B
	OVERALL	A	B
Jefferson-Riverside/Mountain- Lincoln (signal)	NB LT	B	C
	NB T/RT	A	A
	NB APPROACH	A	B
	SB LT	A	B
	SB T/RT	A	A
	SB APPROACH	A	B
	EB LT	C	C
	EB T	C	C
	EB RT	C	C
	EB APPROACH	C	C
	WB LT	C	C
	WB T/RT	C	C
	WB APPROACH	C	C
OVERALL	B	B	

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TABLE 7			
Long Range (2035) Total Peak Hour Operation With Roundabout Control at Mountain/Mathews-Walnut-Chestnut Intersection			
Intersection	Movement	Level of Service	
		AM	PM
Jefferson/Chestnut-Driveway (RT-in/RT-out)	EB RT	B	B
	WB RT	B	B
Jefferson/Linden (signal)	NB LT	A	A
	NB T/RT	A	A
	NB APPROACH	A	A
	SB LT	A	B
	SB T/RT	A	A
	SB APPROACH	A	A
	EB LT/T/RT	C	C
	WB LT	C	C
	WB T	C	C
	WB RT	C	C
	WB APPROACH	C	C
	OVERALL	A	B

TABLE 8
Long Range (2035) Total Peak Hour Operation With RT-in/RT-out
Control at Mountain-Walnut/Chestnut Intersection

Intersection	Movement	Level of Service	
		AM	PM
College/Mountain (signal)	EB LT	C	C
	EB T/RT	C	C
	EB APPROACH	C	C
	WB LT	C	C
	WB T/RT	C	C
	WB APPROACH	C	C
	NB T/RT	B	B
	SB LT/T	A	A
	SB T/RT	A	A
	SB APPROACH	A	A
	OVERALL	B	B
Mountain/Mathews-Walnut (signal)	EB LT	A	A
	EB T/RT	A	A
	EB APPROACH	A	A
	WB LT	A	A
	WB T/RT	B	A
	WB APPROACH	B	A
	NB LT/T/RT	B	C
	SB LT	B	C
	SB T/RT	B	C
	SB APPROACH	B	C
	OVERALL	A	A
Mountain-Walnut/Chestnut (RT-in/RT-out)	WB RT out	A	A

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TABLE 8			
Long Range (2035) Total Peak Hour Operation With RT-in/RT-out Control at Mountain-Walnut/Chestnut Intersection			
Intersection	Movement	Level of Service	
		AM	PM
Jefferson-Riverside/Mountain-Lincoln (signal)	NB LT	B	C
	NB T/RT	A	A
	NB APPROACH	A	B
	SB LT	A	B
	SB T/RT	A	A
	SB APPROACH	A	A
	EB LT	C	C
	EB T	C	C
	EB RT	C	C
	EB APPROACH	C	C
	WB LT	C	C
	WB T/RT	C	C
	WB APPROACH	C	C
	OVERALL	B	B
Jefferson/Chestnut-Driveway (RT-in/RT-out)	EB RT	B	B
	WB RT	B	B
Jefferson/Linden (signal)	NB LT	A	A
	NB T/RT	A	A
	NB APPROACH	A	A
	SB LT	A	B
	SB T/RT	A	A
	SB APPROACH	A	A
	EB LT/T/RT	C	C
	WB LT	C	C
	WB T	C	C
	WB RT	C	C
	WB APPROACH	C	C
OVERALL	A	B	

IV. CONCLUSIONS/RECOMMENDATIONS

This study assessed the impacts of the Fort Collins CBD Hotel development on the short range (2020) and long range (2035) street system in the vicinity of the proposed development. As a result of this analysis, the following is concluded:

- The development of the Fort Collins CBD Hotel site is feasible from a traffic engineering standpoint. At full development, the Fort Collins CBD Hotel will generate the following traffic: 1,194 weekday vehicle trip ends, 93 morning peak hour vehicle trip ends, and 105 afternoon peak hour vehicle trip ends.
- Currently, the College/Mountain, Mountain/Mathews-Walnut, Jefferson-Riverside/Mountain-Lincoln, Jefferson/Linden, and Jefferson/Chestnut-Driveway intersections operate at acceptable levels of service with existing control and geometry.
- The only stop sign controlled intersection in the analysis area is the Jefferson/Chestnut-Driveway intersection. This intersection will be limited to right-in/right-out movements in the future, based upon approved design plans for Jefferson Street.
- The short range (2020) and long range (2035) geometry with roundabout control and with right-in/right-out at Walnut Street is shown in Figures 14 and 15, respectively. An eastbound right-turn lane will not be required at the Jefferson/Chestnut intersection based upon CDOT auxiliary lane criteria. The geometry at the Jefferson/Linden intersection is the geometry reflected in the approved design plans. Given its location in the central business district, it is doubtful that the College/Mountain intersection will be modified.
- In the short range (2020) and long range (2035) futures, given development of the Fort Collins CBD Hotel and an increase in background traffic, the key intersections operate acceptably during the peak hours. The Mountain/Mathews-Walnut-Chestnut intersection will operate acceptably with a roundabout or with a right-in/right-out at Chestnut Street.
- Acceptable level of service is achieved for pedestrian, bicycle, and transit modes based upon the measures in the multi-modal transportation guidelines.