

Technical Supplement

DELL RANGE BOULEVARD CORRIDOR STUDY

POWDERHOUSE ROAD TO COLLEGE DRIVE



Prepared for:
**Cheyenne Metropolitan
Planning Organization**

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AYRES
ASSOCIATES



Dell Range Boulevard Traffic Operation Supplement

(Powderhouse Road to College Drive)

Cheyenne, WY



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Traffic Operating Conditions – Existing and Short-Term Improvements

The following document serves as a traffic operation and data supplement to the *Dell Range Boulevard Corridor Study* and provides greater detail on the average weekday evening and midday peak hour traffic operating conditions at the twelve signalized study intersections along Dell Range Boulevard between Powderhouse Road and College Drive. This document also contains appendices with further details supporting the safety and traffic volume information with data on corridor crashes, existing year 2012 traffic volumes and year 2040 traffic volume projections. With respect to the analysis of traffic operating conditions, the weekday evening peak hour occurs during the 4:30 to 5:30 PM time period with the midday peak hour occurring during the 12:00 to 1:00 PM time period. The summary information in this supplement identifies existing peak period intersection traffic operation, overall corridor operation with adjusted signal timings, and corridor operation with geometric improvements at select intersections in addition to the signal timing adjustments.

The general corridor traffic operation and safety improvements include the following signal timing recommendations at all study intersections:

1. Pedestrian ‘walk’ times increased from 4 seconds to 7 seconds.
2. Pedestrian ‘flashing don’t walk’ times increased from 4.0 feet per second to reflect a pedestrian walking speed of 3.5 ft/sec.
3. Pedestrian walk times include yellow clearance interval.
4. Actuated pedestrian push buttons located at all crossings.

In addition to the above intersection signal timing changes, the following corridor operation analysis modifications were made:

1. Traffic signal progression coordination was created using an “actuated-coordinated” system.
2. Two coordinated signal systems were developed:
 - a. Powderhouse Road to Walmart Drive – 90 second cycle length
 - b. Converse Avenue to College Drive – 100 second cycle length during midday peak hour and 110 second cycle length during evening peak hour
(Existing full corridor operates at a 100 second cycle length)

The analysis was conducted with the traffic signal operation recommendations described above with eastbound and westbound left turns operating under permissive/protected lagging left-turn phasing for all intersections except at the Converse and College Drive intersections.

The twelve corridor study intersections include:

1. Powderhouse Road
2. Stillwater Avenue
3. Driftwood Drive
4. Frontier Mall Drive
5. Prairie Avenue
6. Rue Terre
7. Walmart Drive
8. Converse Avenue
9. Windmill Road

10. Ridge Road
11. Marble Avenue
12. College Drive

Existing Traffic

Year 2012 Evening and Midday Peak Hour Traffic Operating Conditions Summary

The following traffic operation summaries look at both the evening and midday peak hours. Synchro 8.0 output sheets reporting the 2000 Highway Capacity Manual (HCM) are included in Appendix A.

1. Powderhouse Road Intersection

Evening Peak Hour

a. Existing Operation

- Overall intersection delay is 17.6 seconds.
- Southbound left-turn lane operates at LOS 'E' with a 150' queue.

Table 1: Existing Year 2012 Year 2012 PM Peak Hour – Powderhouse Road

Existing Conditions - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersectio
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	9.0	15.3	15.3	9.8	10.2	0.1	31.6	31.0	30.6	56.8	30.8	30.4	17.6
LOS	A	B	B	A	B	A	C	C	C	E	C	C	B
Queue (ft)	25	350	350	25	200	25	50	50	25	150	50	25	N/A

b. Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB

- Overall intersection delay decreased to 14.5 seconds.
- All traffic movements operate at LOS 'D' or better with a maximum queue of 350' for the eastbound through/right-turn movements.

Table 2: Existing Year 2012 PM Peak Hour with Modified Signal Timings - Powderhouse Road

Existing Volumes with Modified Signal Timings - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersectio
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	8.7	14.4	14.4	5.2	4.8	0.1	27.8	27.4	27.0	48.2	27.1	26.8	14.5
LOS	A	B	B	A	A	A	C	C	C	D	C	C	B
Queue (ft)	25	350	350	25	100	25	50	25	25	150	25	25	N/A
Notes	Additional pedestrian 'walk' and clearance time added. EB/WB left-turn movements allowed under permissive/protected lagging left-turn phasing. No geometric changes. Yellow time included in pedestrian flashing don't walk clearance calculation.												

** Traffic operating conditions do not change due to geometric improvements at other intersections.

Midday Peak Hour

a. Existing Operation

- Overall intersection delay is 13.6 seconds.
- All traffic movements operate at LOS 'D' or better with a maximum queue of 250' for the eastbound through/right-turn movements.

Table 3: Existing Year 2012 MD Peak Hour – Powderhouse Road

Existing Conditions - Midday Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	9.1	10.9	10.9	6.2	9.4	0.2	31.0	29.6	29.4	45.9	30.0	29.1	13.6
LOS	A	B	B	A	A	A	C	C	C	D	C	C	B
Queue (ft)	25	250	250	25	175	25	75	50	25	125	50	25	N/A

b. Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB

- Overall intersection delay reduced to 11.6 seconds.
- All traffic movements operate at LOS 'D' or better with a maximum queue of 250' for the eastbound through/right-turn movements.

Table 4: Existing Year 2012 MD Peak Hour with Modified Signal Timings – Powderhouse Road

Existing Volumes with Modified Signal Timings - MD Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	9.4	11.2	11.2	3.4	3.9	0.2	31.5	30.1	29.8	45.4	30.5	29.6	11.6
LOS	A	B	B	A	A	A	C	C	C	D	C	C	B
Queue (ft)	25	250	250	25	100	25	75	50	25	125	50	25	N/A
Notes	Additional pedestrian 'walk' and clearance time added. EB/WB left-turn movements allowed under permissive/protected lagging left-turn phasing. No geometric changes. Yellow time included in pedestrian flashing don't walk clearance calculation.												

** Traffic operating conditions do not change due to geometric improvements at other intersections.

2. Stillwater Avenue Intersection

Evening Peak Hour

a. Existing Operation

- Overall intersection delay is 10.1 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 125' for the eastbound through and northbound left-turn movements.

Table 5: Existing Year 2012 PM Peak Hour – Stillwater Avenue

Existing Conditions - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	3.4	6.4	1.1	2.1	4.5	0.0	53.6	31.2	31.2	32.0	32.0	0.1	10.1
LOS	A	A	A	A	A	A	D	C	C	C	C	A	B
Queue (ft)	25	125	25	25	75	25	125	25	25	50	50	25	N/A

b. Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB

- Overall intersection delay increased to 15.1 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 275' for the westbound through movement.

Table 6: Existing Year 2012 PM Peak Hour with Modified Signal Timings – Stillwater Avenue

Existing Volumes with Modified Signal Timings - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	3.0	7.7	3.5	31.5	18.7	0.0	49.5	28.0	28.0	28.7	28.7	0.1	15.1
LOS	A	A	A	C	B	A	D	C	C	C	C	A	B
Queue (ft)	25	150	25	75	275	25	125	25	25	50	50	25	N/A
Notes	Additional pedestrian 'walk' and clearance time added. EB/WB left-turn movements allowed under permissive/protected lagging left-turn phasing. No geometric changes. Yellow time included in pedestrian flashing don't walk clearance calculation.												

** Traffic operating conditions do not change due to geometric improvements at other intersections.

Midday Peak Hour

a. Existing Operation

- Overall intersection delay is 8.7 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 150' for the northbound left-turn movement.

Table 7: Existing Year 2012 MD Peak Hour – Stillwater Avenue

Existing Conditions - Midday Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	4.6	5.6	2.0	2.9	5.1	0.1	46.4	28.0	28.0	29.7	29.7	0.3	8.7
LOS	A	A	A	A	A	A	D	C	C	C	C	A	A
Queue (ft)	50	100	25	25	50	25	150	50	50	75	75	25	N/A

b. Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB

- Overall intersection delay increased to 9.3 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 150' for the northbound left-turn movement.

Table 8: Existing Year 2012 MD Peak Hour with Modified Signal Timings – Stillwater Avenue

Existing Volumes with Modified Signal Timings - MD Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	4.2	5.7	2.1	5.5	6.6	0.1	47.6	28.8	28.8	30.4	30.4	0.3	9.3
LOS	A	A	A	A	A	A	D	C	C	C	C	A	A
Queue (ft)	50	100	25	25	75	25	150	50	50	75	75	25	N/A
Notes	Additional pedestrian 'walk' and clearance time added. EB/WB left-turn movements allowed under permissive/protected lagging left-turn phasing. No geometric changes. Yellow time included in pedestrian flashing don't walk clearance calculation.												

** Traffic operating conditions do not change due to geometric improvements at other intersections.

3. Driftwood Drive Intersection

Evening Peak Hour

a. Existing Operation

- Overall intersection delay is 6.4 seconds.
- Southbound shared through/left-turn lane operates at LOS 'F' with a maximum queue of 50'.

Table 9: Existing Year 2012 PM Peak Hour – Driftwood Drive

Existing Conditions - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersectio
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	2.3	2.8	2.8	0.5	0.4	0.1	44.3	44.3	44.3	89.9	89.9	0.1	6.4
LOS	A	A	A	A	A	A	D	D	D	F	F	A	A
Queue (ft)	25	150	150	25	25	25	50	50	50	50	50	25	N/A

b. Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB

- Overall intersection delay reduced to 5.9 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 200' for the eastbound through/right-turn movement.

Table 10: Existing Year 2012 PM Peak Hour with Modified Signal Timings – Driftwood Drive

Existing Volumes with Modified Signal Timings - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersectio
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	1.8	5.0	5.0	0.6	0.5	0.1	38.3	38.3	38.3	46.8	46.8	0.1	5.9
LOS	A	A	A	A	A	A	D	D	D	D	D	A	A
Queue (ft)	25	200	200	25	25	25	50	50	50	50	50	25	N/A
Notes	Additional pedestrian 'walk' and clearance time added. EB/WB left-turn movements allowed under permissive left-turn phasing. No geometric changes. Yellow time included in pedestrian flashing don't walk clearance calculation.												

** Traffic operating conditions do not change due to geometric improvements at other intersections.

Midday Peak Hour

a. Existing Operation

- Overall intersection delay is 6.9 seconds.
- Southbound shared through/left-turn lane operates at LOS 'E' with a maximum queue of 75'.

Table 11: Existing Year 2012 MD Peak Hour – Driftwood Drive

Existing Conditions - Midday Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	2.2	2.4	2.4	1.4	1.5	0.1	34.1	34.1	34.1	63.5	63.5	0.1	6.9
LOS	A	A	A	A	A	A	C	C	C	E	E	A	A
Queue (ft)	25	75	75	25	50	25	25	25	25	75	75	25	N/A

b. Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB

- Overall intersection delay increased to 10.2 seconds.
- Southbound shared through/left-turn lane operates at LOS 'E' with a maximum queue of 75'.

Table 12: Existing Year 2012 MD Peak Hour with Modified Signal Timings – Driftwood Drive

Existing Volumes with Modified Signal Timings - MD Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	1.3	1.6	1.6	7.3	9.6	0.1	35.2	35.2	35.2	72.2	72.2	0.1	10.2
LOS	A	A	A	A	A	A	D	D	D	E	E	A	B
Queue (ft)	25	50	50	50	250	25	25	25	25	75	75	25	N/A
Notes	Additional pedestrian 'walk' and clearance time added. EB/WB left-turn movements allowed under permissive left-turn phasing. No geometric changes. Yellow time included in pedestrian flashing don't walk clearance calculation.												

** Traffic operating conditions do not change due to geometric improvements at other intersections.

4. Frontier Mall Drive Intersection

Evening Peak Hour

a. Existing Operation

- Overall intersection delay is 15.2 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 300' for the westbound through movement.

Table 13: Existing Year 2012 PM Peak – Frontier Mall Drive

Existing Conditions - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersectio
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	4.7	11.1	11.1	21.3	11.6	0.2	34.7	34.6	34.6	51.4	35.0	35.0	15.2
LOS	A	B	B	C	B	A	C	C	C	D	C	C	B
Queue (ft)	25	275	275	50	300	25	25	25	25	150	50	50	N/A

b. Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB

- Overall intersection delay reduced to 9.3 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 350' for the eastbound through/right-turn movement.

Table 14: Existing Year 2012 PM Peak Hour with Modified Signal Timings – Frontier Mall Drive

Existing Volumes with Modified Signal Timings - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersectio
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	2.8	5.6	5.6	5.3	3.5	0.2	30.9	30.8	30.8	44.8	31.2	31.2	9.3
LOS	A	A	A	A	A	A	C	C	C	D	C	C	A
Queue (ft)	25	350	350	25	150	25	25	25	25	125	50	50	N/A
Notes	Additional pedestrian 'walk' and clearance time added. EB/WB left-turn movements allowed under permissive/protected lagging left-turn phasing. No geometric changes. Yellow time included in pedestrian flashing don't walk clearance calculation.												

** Traffic operating conditions do not change due to geometric improvements at other intersections.

Midday Peak Hour

a. Existing Operation

- Overall intersection delay is 9.5 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 225' for the eastbound through/right-turn movements.

Table 15: Existing Year 2012 MD Peak Hour – Frontier Mall Drive

Existing Conditions - Midday Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	5.9	8.9	8.9	0.9	1.6	0.2	33.4	32.3	32.3	43.0	32.8	32.8	9.5
LOS	A	A	A	A	A	A	C	C	C	D	C	C	A
Queue (ft)	50	225	225	25	50	25	50	50	50	100	25	25	N/A

b. Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB

- Overall intersection delay decreased to 9.3 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 225' for the eastbound through/right-turn movement.

Table 16: Existing Year 2012 MD Peak Hour with Modified Signal Timings – Frontier Mall Drive

Existing Volumes with Modified Signal Timings - MD Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	6.6	8.8	8.8	1.1	1.4	0.2	33.7	32.6	32.6	41.5	33.2	33.2	9.3
LOS	A	A	A	A	A	A	C	C	C	D	C	C	A
Queue (ft)	25	225	225	25	50	25	50	50	50	100	25	25	N/A
Notes	Additional pedestrian 'walk' and clearance time added. EB/WB left-turn movements allowed under permissive/protected lagging left-turn phasing. No geometric changes. Yellow time included in pedestrian flashing don't walk clearance calculation.												

** Traffic operating conditions do not change due to geometric improvements at other intersections.

5. Prairie Avenue Intersection

Evening Peak Hour

a. Existing Operation

- Overall intersection delay is 29.3 seconds.
- Northbound left-turn lane operates at LOS 'E' with a maximum queue of 75'.
- The maximum intersection queue is 450' for the eastbound through/right-turn movements.

Table 17: Existing Year 2012 PM Peak Hour – Prairie Avenue

Existing Conditions - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersectio
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	18.7	24.6	24.6	42.7	30.8	0.3	55.1	54.1	54.1	48.6	48.6	33.7	29.3
LOS	B	C	C	D	C	A	E	D	D	D	D	C	C
Queue (ft)	75	450	450	50	300	25	75	75	75	200	200	25	N/A

b. Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB

- Overall intersection delay reduced to 28.3 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 525' for the eastbound through/right-turn movements.

Table 18: Existing Year 2012 PM Peak Hour with Modified Signal Timings – Prairie Avenue

Existing Volumes with Modified Signal Timings - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersectio
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	25.5	29.8	29.8	35.2	27.9	0.3	39.5	39.2	39.2	39.4	39.4	29.1	28.3
LOS	C	C	C	D	C	A	D	D	D	D	D	C	C
Queue (ft)	75	525	525	50	325	25	50	50	50	175	175	25	N/A
Notes	Additional pedestrian 'walk' and clearance time added. EB/WB left-turn movements allowed under permissive/protected lagging left-turn phasing. Yellow time included in pedestrian flashing don't walk clearance calculation.												

** Traffic operating conditions do not change due to geometric improvements at other intersections.

Midday Peak Hour

a. Existing Operation

- Overall intersection delay is 20.4 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 325' for the eastbound through/right-turn movement.

Table 19: Existing Year 2012 MD Peak Hour – Prairie Avenue

Existing Conditions - Midday Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	18.3	19.5	19.5	5.6	13.9	0.3	39.8	44.7	44.7	43.5	43.5	30.0	20.4
LOS	B	B	B	A	B	A	D	D	D	D	D	C	C
Queue (ft)	75	325	325	25	175	25	75	75	75	200	200	25	N/A

b. Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB

- Overall intersection delay increased to 24.4 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 375' for the eastbound through/right-turn movements.

Table 20: Existing Year 2012 MD Peak Hour with Signal Timing Modifications – Prairie Avenue

Existing Volumes with Modified Signal Timings & Lane Designation Improvements - MD Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	25.4	24.4	24.4	20.0	23.3	0.3	38.6	39.2	39.2	38.5	38.5	29.3	24.4
LOS	C	C	C	B	C	A	D	D	D	D	D	C	C
Queue (ft)	100	375	375	25	350	25	75	75	75	175	175	25	N/A
Notes	Additional pedestrian 'walk' and clearance time added. EB/WB left-turn movements allowed under permissive/protected lagging left-turn phasing. Yellow time included in pedestrian flashing don't walk clearance calculation.												

** Traffic operating conditions do not change due to geometric improvements at other intersections.

6. Rue Terre Intersection

Evening Peak Hour

a. Existing Operation

- Overall intersection delay is 14.3 seconds.
- Southbound left-turn lane operates at LOS 'E' with a maximum queue of 125'.
- The maximum intersection queue is 525' for the eastbound through/right-turn movements.

Table 21: Existing Year 2012 PM Peak Hour – Rue Terre

Existing Conditions - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	5.2	13.6	13.6	5.8	6.3	4.3	35.7	35.7	35.7	61.9	34.2	34.4	14.3
LOS	A	B	B	A	A	A	D	D	D	E	C	C	B
Queue (ft)	25	525	525	25	125	25	50	50	50	125	25	50	N/A

b. Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB

- Overall intersection delay is reduced to 14.2 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 475' for the eastbound through and right-turn movements.

Table 22: Existing Year 2012 PM Peak Hour with Modified Signal Timings – Rue Terre

Existing Volumes with Modified Signal Timings - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	4.2	11.0	11.0	11.1	11.2	14.9	32.6	32.6	32.6	46.7	31.0	31.2	14.2
LOS	A	B	B	B	B	B	C	C	C	D	C	C	B
Queue (ft)	25	475	475	25	250	50	50	50	50	125	25	50	N/A
Notes	Additional pedestrian 'walk' and clearance time added. EB/WB left-turn movements allowed under permissive/protected lagging left-turn phasing. No geometric changes. Yellow time included in pedestrian flashing don't walk clearance calculation.												

** Traffic operating conditions do not change due to geometric improvements at other intersections.

Midday Peak Hour

a. Existing Operation

- Overall intersection delay is 14.0 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 275' for the eastbound through/right-turn movements.

Table 23: Existing Year 2012 MD Peak Hour – Rue Terre

Existing Conditions - Midday Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	7.8	10.7	10.7	7.4	10.0	15.8	33.9	33.9	33.9	47.4	30.3	30.3	14.0
LOS	A	B	B	A	B	B	C	C	C	D	C	C	B
Queue (ft)	25	275	275	25	225	25	100	100	100	100	25	50	N/A

b. Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB

- Overall intersection delay is reduced to 9.7 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 150' for the eastbound through/right-turn movements.

Table 24: Existing Year 2012 MD Peak Hour with Modified Signal Timings – Rue Terre

Existing Volumes with Modified Signal Timings - MD Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	11.4	7.6	7.6	3.7	3.0	0.5	34.5	34.5	34.5	47.7	30.8	30.9	9.7
LOS	B	A	A	A	A	A	C	C	C	D	C	C	A
Queue (ft)	50	150	150	25	75	25	100	100	100	100	25	50	N/A
Notes	Additional pedestrian 'walk' and clearance time added. EB/WB left-turn movements allowed under permissive/protected lagging left-turn phasing. No geometric changes. Yellow time included in pedestrian flashing don't walk clearance calculation.												

** Traffic operating conditions do not change due to geometric improvements at other intersections.

7. Walmart Drive Intersection

Evening Peak Hour

a. Existing Operation

- Overall intersection delay is 24.8 seconds.
- Westbound right-turn lane operates at LOS 'E' with a maximum queue of 100'.

Table 25: Existing Year 2012 PM Peak Hour – Walmart Drive

Existing Conditions - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	26.9	10.2	10.2	17.8	27.5	57.1	41.5	46.0	46.0	34.7	40.6	40.6	24.8
LOS	C	B	B	B	C	E	D	D	D	C	D	D	C
Queue (ft)	125	275	275	25	350	100	50	25	25	100	25	25	N/A

b. Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB

- Southbound left-turn phasing revised from existing permissive/protected phasing to protected only left-turn phasing.
- Overall intersection delay reduced to 20.7 seconds.
- Northbound left-turn lane operates at LOS 'E' with a maximum queue of 50'.
- The maximum intersection queue is 600' for the eastbound through/right-turn movements.

Table 26: Existing Year 2012 PM Peak Hour with Modified Signal Timings – Walmart Drive

Existing Volumes with Modified Signal Timings - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	17.0	16.1	16.1	27.1	20.4	13.8	60.8	37.0	37.0	38.6	24.6	24.6	20.7
LOS	B	B	B	C	C	B	E	D	D	D	C	C	C
Queue (ft)	75	600	600	25	350	75	50	25	25	100	25	25	N/A
Notes	Additional pedestrian 'walk' and clearance time added. EB/WB left-turn movements allowed under permissive/protected lagging left-turn phasing. SB lane designation of two left-turn lanes and a shared through/right-turn lane previously allowed permitted left turns for two lanes. This southbound dual left-turn was revised to provide for protected only left-turn phasing. Yellow time included in pedestrian flashing don't walk clearance calculation.												

** Traffic operating conditions do not change due to geometric improvements at other intersections.

Midday Peak Hour

a. Existing Operation

- Overall intersection delay is 16.1 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 425' for the westbound through movement.

Table 27: Existing Year 2012 MD Peak Hour - Walmart Drive

Existing Conditions - Midday Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	21.1	8.2	8.2	4.6	14.8	19.3	36.0	39.3	39.3	29.2	34.6	34.6	16.1
LOS	C	A	A	A	B	B	D	D	D	C	C	C	B
Queue (ft)	125	150	150	25	425	50	50	25	25	75	25	25	N/A

b. Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB

- Southbound left-turn phasing revised from existing permissive/protected phasing to protected only left-turn phasing.
- Overall intersection delay increased to 20.4 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 350' for the westbound through movement.

Table 28: Existing Year 2012 MD Peak Hour with Modified Signal Timings – Walmart Drive

Existing Volumes with Modified Signal Timings & Lane Designation Improvements - MD Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	19.0	14.9	14.9	19.0	21.1	13.3	47.8	37.7	37.7	38.0	25.1	25.1	20.4
LOS	B	B	B	B	C	B	D	D	D	D	C	C	C
Queue (ft)	100	300	300	25	350	50	50	25	25	100	25	25	N/A
Notes	Additional pedestrian 'walk' and clearance time added. EB/WB left-turn movements allowed under permissive/protected lagging left-turn phasing. SB lane designation of two left-turn lanes and a shared through/right-turn lane previously allowed permitted left turns for two lanes. This southbound dual left-turn was revised to provide for protected only left-turn phasing. Yellow time included in pedestrian flashing don't walk clearance calculation.												

** Traffic operating conditions do not change due to geometric improvements at other intersections.

8. Converse Avenue Intersection

Evening Peak Hour

a. Existing Operation

- Overall intersection delay is 50.4 seconds.
- Northbound left-turn lane operates at LOS 'F' with a maximum queue of 300'.
- Northbound through lane operates at LOS 'F' with a maximum queue of 450'.
- Northbound right-turn lane operates at LOS 'E' with a maximum queue of 225'.
- Southbound left-turn lane operates at LOS 'F' with a maximum queue of 350'.

Table 29: Existing Year 2012 PM Peak Hour – Converse Avenue

Existing Conditions - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersectio
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	21.2	34.4	0.6	33.0	24.6	30.0	89.6	157.9	65.6	99.1	42.3	35.9	50.4
LOS	C	C	A	C	C	C	F	F	E	F	D	D	D
Queue (ft)	50	450	25	100	250	75	300	450	225	350	175	25	N/A

b. Operation with Protected Only Lagging Left Phasing for all Left-Turn Movements

- Overall intersection delay increased to 50.6 seconds.
- Westbound left-turn lane operates at LOS 'F' with a maximum queue of 300'.
- Northbound through lane operates at LOS 'E' with a maximum queue of 350'.
- Southbound left-turn lane operates at LOS 'F' with a maximum queue of 400'.

Table 30: Existing Year 2012 PM Peak Hour with Modified Signal Timings – Converse Avenue

Existing Volumes with Modified Signal Timings - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersectio
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	54.1	53.2	0.8	180.4	24.3	13.9	47.5	57.8	38.7	168.7	47.9	40.1	50.6
LOS	D	D	A	F	C	B	D	E	D	F	D	D	D
Queue (ft)	125	475	25	300	200	50	325	350	150	400	150	25	N/A
Notes	Additional pedestrian 'walk' and clearance time added. All left-turn movements restricted to protected only lagging left-turn phasing. Yellow time included in pedestrian flashing don't walk clearance calculation. No geometric changes. Removed 'split' timings for NB/SB approaches.												

c. Operation with Protected Only Lagging Left Phasing for all Left-Turn Movements, WB Dual Left-Turn Lanes and SB Dual Left-Turn Lanes and Spot Intersection Geometric Improvements

- Overall intersection delay reduced to 38.3 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 475' for the eastbound through movement.
- WB single left-turn lane expanded to dual left-turn lanes.
- SB single left-turn lane expanded to dual left-turn lanes.

Table 31: Existing Year 2012 PM Peak Hour with Modified Signal Timings & Short-Term Geometric Improvements – Converse Avenue

Existing Vol with Modified Signal Timings & Short Term Geometric Improvements - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	54.1	53.2	0.8	42.0	26.7	16.3	46.2	54.4	37.7	48.1	47.9	40.1	38.3
LOS	D	D	A	D	C	B	D	D	D	D	D	D	D
Queue (ft)	125	475	25	100	200	50	325	325	150	175	150	25	N/A
Notes	WB left-turn movement reconstructed from single lane to dual lanes. SB left-turn movement reconstructed from single lane to dual lanes.												

Midday Peak Hour

a. Existing Operation

- Overall intersection delay is 30.7 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 300' for the westbound through movement.

Table 32: Existing Year 2012 MD Peak Hour – Converse Avenue

Existing Conditions - Midday Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	35.7	24.9	0.5	34.7	25.7	17.9*	50.3	45.6	30.9	53.1	38.3	33.5	30.7
LOS	D	C	A	C	C	B	D	D	C	D	D	C	C
Queue (ft)	50	275	25	125	300	50	200	225	50	200	125	25	N/A

b. Operation with Protected Only Lagging Left Phasing for all Left-Turn Movements

- Overall intersection delay increased to 36.4 seconds.
- Eastbound left-turn movement operates at LOS 'E' with a maximum queue of 75'.
- Westbound left-turn movement operates at LOS 'E' with a maximum queue of 200'.

Table 33: Existing Year 2012 MD Peak Hour with Modified Signal Timings – Converse Avenue

Existing Volumes with Modified Signal Timings - MD Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	69.0	38.6	0.6	68.0	32.4	22.1*	38.2	48.1	34.8	40.6	42.8	37.9	36.4
LOS	E	D	A	E	C	C	D	D	C	D	D	D	D
Queue (ft)	75	300	25	200	350	75	225	200	50	250	125	25	N/A
Notes	Additional pedestrian 'walk' and clearance time added. All left-turn movements restricted to protected only lagging left-turn phasing. Yellow time included in pedestrian flashing don't walk clearance calculation. No geometric changes. Removed 'split' timings for NB/SB approaches.												

c. Operation with Protected Only Lagging Left Phasing for all Left-Turn Movements, WB Dual Left-Turn Lanes and SB Dual Left-Turn Lanes and Spot Intersection Geometric Improvements

- Overall intersection delay increased to 37.4 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 400' for the westbound through movement.
- WB single left-turn lane expanded to dual left-turn lanes.
- SB single left-turn lane expanded to dual left-turn lanes.

Table 34: Existing Year 2012 MD Peak Hour with Modified Signal Timings & Short-Term Geometric Improvements – Converse Avenue

Existing Vol with Modified Signal Timings & Short Term Geometric Improvements - MD Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	51.5	28.2	0.6	44.4	30.9	21.3*	45.1	47.8	34.7	38.7	42.8	37.9	37.4
LOS	D	C	A	D	C	C	D	D	C	D	D	D	D
Queue (ft)	75	300	25	75	400	50	200	200	50	100	125	25	N/A
Notes	WB left-turn movement reconstructed from single lane to dual lanes. SB left-turn movement reconstructed from single lane to dual lanes.												

9. Windmill Road Intersection

Evening Peak Hour

a. Existing Operation

- Overall intersection delay is 13.3 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 225' for the eastbound through/right-turn movements.

Table 35: Existing Year 2012 PM Peak Hour – Windmill Road

Existing Conditions - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	5.3	10.0	10.0	6.0	6.2	6.2	35.0	34.7	32.6	44.0	44.0	44.0	13.3
LOS	A	B	B	A	A	A	C	C	C	D	D	D	B
Queue (ft)	25	225	225	25	75	75	75	75	25	50	50	50	N/A

b. Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB

- Overall intersection delay increased to 15.1 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 225' for the eastbound through/right-turn movements.

Table 36: Existing Year 2012 PM Peak Hour with Modified Signal Timings – Windmill Road

Existing Volumes with Modified Signal Timings - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	3.5	11.3	11.3	14.2	8.4	8.4	43.2	39.3	38.0	47.3	47.3	47.3	15.1
LOS	A	B	B	B	A	A	D	D	D	D	D	D	B
Queue (ft)	25	225	225	25	125	125	100	100	50	50	50	50	N/A
Notes	Additional pedestrian 'walk' and clearance time added. EB/WB left-turn movements allowed under permissive/protected lagging left-turn phasing. No geometric changes. Yellow time included in pedestrian flashing don't walk clearance calculation.												

** Traffic operating conditions do not change due to geometric improvements at other intersections.

Midday Peak Hour

a. Existing Operation

- Overall intersection delay is 19.8 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 375' for the eastbound through/right-turn movements.

Table 37: Existing Year 2012 MD Peak Hour – Windmill Road

Existing Conditions - Midday Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	6.2	12.8	12.8	17.1	23.4	23.4	25.9	24.0	23.6	39.7	39.7	39.7	19.8
LOS	A	B	B	B	C	C	C	C	D	D	D	D	B
Queue (ft)	25	375	375	50	275	275	75	50	25	50	50	50	N/A

b. Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB

- Overall intersection delay reduced to 11.3 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 125' for the westbound through/right-turn movements.

Table 38: Existing Year 2012 MD Peak Hour with Modified Signal Timings – Windmill Road

Existing Volumes with Modified Signal Timings - MD Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	3.1	3.3	3.3	8.2	8.4	8.4	35.3	31.1	30.4	42.3	42.3	42.3	11.3
LOS	A	A	A	A	A	A	D	C	C	D	D	D	B
Queue (ft)	25	75	75	25	125	125	75	50	25	50	50	50	N/A
Notes	Additional pedestrian 'walk' and clearance time added. EB/WB left-turn movements allowed under permissive/protected lagging left-turn phasing. No geometric changes. Yellow time included in pedestrian flashing don't walk clearance calculation.												

** Traffic operating conditions do not change due to geometric improvements at other intersections.

10. Ridge Road Intersection

Evening Peak Hour

a. Existing Operation

- Overall intersection delay is 28.9 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 325' for the westbound through/right-turn movements.

Table 39: Existing Year 2012 PM Peak Hour – Ridge Road

Existing Conditions - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	17.0	20.7	18.1	23.3	30.4	30.4	31.1	54.0	32.0	34.1	39.9	34.4	28.9
LOS	B	C	B	C	C	C	C	D	C	C	D	C	C
Queue (ft)	75	175	75	75	325	325	150	250	25	100	175	25	N/A

b. Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB

- Overall intersection delay reduced to 24.3 seconds.
- Northbound through lane operates at LOS 'E' with a maximum queue of 275'.
- Southbound left-turn lane operates at LOS 'E' with a maximum queue of 100 feet.

Table 40: Existing Year 2012 PM Peak Hour with Modified Signal Timings – Ridge Road

Existing Volumes with Modified Signal Timings - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	11.9	13.8	7.0	11.2	13.0	13.0	37.3	60.9	35.5	69.6	54.1	40.8	24.3
LOS	B	B	A	B	B	B	D	E	D	E	D	D	C
Queue (ft)	25	225	25	25	175	175	175	275	50	100	175	25	N/A
Notes	Additional pedestrian 'walk' and clearance time added. All left-turn movements allowed under permissive/protected lagging left-turn phasing. No geometric changes. Yellow time included in pedestrian flashing don't walk clearance calculation.												

** Traffic operating conditions do not change due to geometric improvements at other intersections.

Midday Peak Hour

a. Existing Operation

- Overall intersection delay is 20.7 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 225' for the westbound through/right-turn movement.

Table 41: Existing Year 2012 MD Peak Hour – Ridge Road

Existing Conditions - Midday Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	5.3	7.4	7.1	6.7	16.7	16.7	40.0	49.9	31.5	31.3	40.9	31.8	20.7
LOS	A	A	A	A	B	B	D	D	C	C	D	C	C
Queue (ft)	25	175	50	25	225	225	125	175	25	100	125	25	N/A

b. Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB

- Overall intersection delay reduced to 19.6 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 175' for the northbound through movement.

Table 42: Existing Year 2012 MD Peak Hour with Modified Signal Timings – Ridge Road

Existing Volumes with Modified Signal Timings - MD Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	4.7	3.5	0.9	5.2	8.9	8.9	49.3	49.2	35.0	53.3	47.2	36.5	19.6
LOS	A	A	A	A	A	A	D	D	C	D	D	D	B
Queue (ft)	25	50	25	25	125	125	125	175	25	100	150	50	N/A
Notes	Additional pedestrian 'walk' and clearance time added. All left-turn movements allowed under permissive/protected lagging left-turn phasing. No geometric changes. Yellow time included in pedestrian flashing don't walk clearance calculation.												

** Traffic operating conditions do not change due to geometric improvements at other intersections.

11. Marble Avenue Intersection

Evening Peak Hour

a. Existing Operation

- Overall intersection delay is 20.8 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 350' for the eastbound through/right-turn movement.

Table 43: Existing Year 2012 PM Peak Hour – Marble Avenue

Existing Conditions - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	7.6	8.0	8.0	26.2	23.0	40.1	28.4	28.4	28.4	50.7	28.7	28.7	20.8
LOS	A	A	A	C	C	D	C	C	C	D	C	C	C
Queue (ft)	50	350	350	25	250	50	25	25	25	225	25	25	N/A

b. Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB

- Overall intersection delay reduced to 16.1 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 225' for the southbound left-turn movement.

Table 44: Existing Year 2012 PM Peak Hour with Modified Signal Timings – Marble Avenue

Existing Volumes with Modified Signal Timings - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	7.0	8.8	8.8	7.4	13.0	11.4	31.3	31.3	31.3	54.9	31.6	31.6	16.1
LOS	A	A	A	A	B	B	C	C	C	D	C	C	B
Queue (ft)	25	150	150	25	125	25	25	25	25	225	25	25	N/A
Notes	Additional pedestrian 'walk' and clearance time added. EB/WB left-turn movements allowed under permissive/protected lagging left-turn phasing. No geometric changes. Yellow time included in pedestrian flashing don't walk clearance calculation.												

** Traffic operating conditions do not change due to geometric improvements at other intersections.

Midday Peak Hour

a. Existing Operation

- Overall intersection delay is 14.8 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 225' for the eastbound through/right-turn movement.

Table 45: Existing Year 2012 MD Peak Hour – Marble Avenue

Existing Conditions - Midday Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	10.8	14.4	14.4	6.7	8.7	7.2	32.3	32.3	32.3	43.2	32.4	32.4	14.8
LOS	B	B	B	A	A	A	C	C	C	D	C	C	B
Queue (ft)	75	225	225	25	150	25	25	25	25	100	25	25	N/A

b. Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB

- Overall intersection delay reduced to 9.2 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 150' for the westbound through movement.

Table 46: Existing Year 2012 MD Peak Hour with Modified Signal Timings – Marble Avenue

Existing Volumes with Modified Signal Timings - MD Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	1.1	2.4	2.4	6.1	4.8	8.2	36.7	36.7	36.7	47.5	36.8	36.8	9.2
LOS	A	A	A	A	A	A	D	D	D	D	D	D	A
Queue (ft)	25	75	75	25	150	25	25	25	25	125	25	25	N/A
Notes	Additional pedestrian 'walk' and clearance time added. EB/WB left-turn movements allowed under permissive/protected lagging left-turn phasing. No geometric changes. Yellow time included in pedestrian flashing don't walk clearance calculation.												

** Traffic operating conditions do not change due to geometric improvements at other intersections.

12. College Drive Intersection

Evening Peak Hour

a. Existing Operation

- Overall intersection delay is 69.9 seconds.
- Eastbound through lane operates at LOS 'E' with a maximum queue of 525'.
- Eastbound right-turn lane operates at LOS 'F' with a maximum queue of 225'.
- Westbound left-turn lane operates at LOS 'F' with a maximum queue of 100'.
- Westbound shared through/right-turn lanes operate at LOS 'E' with a maximum queue of 200'.
- Northbound left-turn lane operates at LOS 'F' with a maximum queue of 600'.

Table 47: Existing Year 2012 PM Peak Hour – College Drive

Existing Conditions - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	27.3	65.9	99.4	90.2	58.5	58.5	116.2	43.5	43.5	35.0	41.7	41.7	69.9
LOS	C	E	F	F	E	E	F	D	D	D	D	D	E
Queue (ft)	125	525	225	100	200	200	600	200	200	100	150	150	N/A

b. Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB

- Overall intersection delay reduced to 60.2 seconds.
- Westbound left-turn lane operates at LOS 'F' with a maximum queue of 175'.
- Northbound left-turn lane operates at LOS 'F' with a maximum queue of 650'.

Table 48: Existing Year 2012 PM Peak Hour with Modified Signal Timings – College Drive

Existing Volumes with Modified Signal Timings - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	41.6	49.2	16.9	129.8	30.7	30.7	146.0	47.9	47.9	40.7	47.9	47.9	60.2
LOS	D	D	B	F	C	C	F	D	D	D	D	D	E
Queue (ft)	150	550	75	175	175	175	650	200	200	100	150	150	N/A
Notes	Additional pedestrian 'walk' and clearance time added. EB/WB left-turn movements restricted to protected only lagging left-turn phasing. Yellow time included in pedestrian flashing don't walk clearance calculation. No geometric changes.												

c. Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB and NB Dual Left-Turn Lanes

- Overall intersection delay reduced to 48.6 seconds.
- Westbound left-turn lane operates at LOS 'F' with a maximum queue of 175'.
- Northbound left-turn lane operates at LOS 'E' with a maximum queue of 300'.
- NB single left-turn lane reconstructed to provide dual left-turn lanes.

Table 49: Existing Year 2012 PM Peak Hour with Modified Signal Timings & Short-Term Geometric Improvements – College Drive

Existing Vol with Modified Signal Timings & Short Term Geometric Improvements - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	40.6	49.2	17.7	129.8	30.7	30.7	62.1	49.6	49.6	48.3	48.9	48.9	48.6
LOS	D	D	B	F	C	C	E	D	D	D	D	D	D
Queue (ft)	150	550	75	175	175	175	300	225	225	200	150	150	N/A
Notes	NB left-turn movement reconstructed from single lane to dual lanes.												

Midday Peak Hour

a. Existing Operation

- Overall intersection delay is 22.6 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 275' for the northbound left-turn movement.

Table 50: Existing Year 2012 MD Peak Hour – College Drive

Existing Conditions - Midday Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	15.7	27.2	19.8	24.0	24.5	24.5	20.5	19.5	19.5	20.7	26.5	26.5	22.6
LOS	B	C	B	C	C	C	C	B	B	C	C	C	C
Queue (ft)	50	200	50	50	150	150	275	100	100	50	125	125	N/A

b. Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB

- Overall intersection delay increased to 37.9 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 475' for the northbound left-turn movement.

Table 51: Existing Year 2012 MD Peak Hour with Modified Signal Timings – College Drive

Existing Volumes with Modified Signal Timings - MD Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	47.2	30.5	49.0	53.7	22.2	22.2	44.5	34.0	34.0	32.4	42.7	42.7	37.9
LOS	D	C	D	D	C	C	D	C	C	C	D	D	D
Queue (ft)	100	175	75	75	125	125	475	125	125	50	125	125	N/A
Notes	Additional pedestrian 'walk' and clearance time added. EB/WB left-turn movements restricted to protected only lagging left-turn phasing. Yellow time included in pedestrian flashing don't walk clearance calculation. No geometric changes.												

c. Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB and NB Dual Left-Turn Lanes and Spot Intersection Geometric Improvements

- Overall intersection delay reduced to 35.6 seconds.
- All movements operate at LOS 'D' or better with a maximum queue of 250' for the northbound left-turn movement.
- NB single left-turn lane reconstructed to provide dual left-turn lanes.

Table 52: Existing Year 2012 MD Peak Hour with Modified Signal Timings & Short-Term Geometric Improvements – College Drive

Existing Vol with Modified Signal Timings & Short Term Geometric Improvements - MD Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	49.0	26.3	38.6	51.3	20.9	20.9	43.5	35.0	35.0	41.8	42.7	42.7	35.6
LOS	D	C	D	D	C	C	D	C	C	D	D	D	D
Queue (ft)	100	175	75	75	125	125	250	125	125	75	125	125	N/A
Notes	NB left-turn movement reconstructed from single lane to dual lanes.												

Dell Range Corridor Traffic Progression

Intersection traffic signal coordination is analyzed to improve traffic operation and potentially reduce the percentage of corridor wide rear-end crashes in the Dell Range Boulevard corridor. The recommended corridor improvements includes a coordinated signal system between Powderhouse Road to Walmart Drive and a second coordinated system between Converse Avenue to College Drive. This split traffic progression system is a result of the need for higher cycle lengths on the east end of the corridor due to traffic congestion levels and intersection spacing. The initial progression analysis attempted to provide a maximized corridor bandwidth for the predominant direction of travel along the entire at the expense of traffic in the non-peak direction. It was determined from this initial analysis that intersection delay could be reduced by improving coordination between adjacent intersections with consideration to minimize traffic delays in both the peak and non-peak directions of traffic flow. Therefore, a corridor-long progression bandwidth was not recommended, but instead a traffic progression model was analyzed to improve the arrival pattern between adjacent intersections for both directions of peak hour traffic. The following section summarizes the estimated travel speeds and number of total stopped vehicles expected for the existing and proposed intersection improvement conditions.

Year 2012 Evening Peak Hour

Existing Operation

- The corridor currently operates with an estimated number of 6,934 eastbound stops and 5,223 westbound stops for a total of 12,157 stops.
- The estimated average speed is 23 mph in the eastbound direction and 22 mph in the westbound direction.
- There is no signal progression bandwidth along the corridor in either direction.
- There are a total of 8 intersection movements operating at LOS 'E' and 8 intersection movements operating at LOS 'F'.

Table 53: Existing PM Peak Hour – Corridor Statistics

Existing Conditions - PM Peak Hour		
	EB	WB
Total Stops	6,934	5,223
Average Speed (mph)	23	22
Signal Progression Bandwidth (sec)	0	0

Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB and Other Recommendations

- The corridor is expected to operate with an estimated number of 6,704 eastbound stops and 4,700 westbound stops for a total of 11,404 stops.
- The estimated average speed of the modified corridor is 23 mph in the eastbound direction and 22 mph in the westbound direction.
- No progression bandwidth is provided in the eastbound or westbound direction along Dell Range.
- Intersection movements operating at LOS 'F' are decreased from 8 to 4 and movements operating at LOS 'E' are decreased from 8 to 4.

Table 54: Existing PM Peak Hour with Modified Signal Timings – Corridor Statistics

Existing Volumes with Modified Signal Timings & Existing Geometrics - PM Peak Hour		
	EB	WB
Stops	6,704	4,700
Average Speed (mph)	23	22
Signal Progression Bandwidth		
Powderhouse Rd to Walmart Dr	0	0
Converse Ave to College Ave	0	0
Notes	Additional pedestrian 'walk' and clearance time added. EB/WB left turn movements restricted to protected only left-turn phasing. Yellow time included in pedestrian flashing don't walk clearance calculation. Progression based on Synchro optimization.	

Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB and Left-Turn Lane additions at Converse Avenue and College Drive

- The corridor is expected to operate with an estimated number of 6,730 eastbound stops and 4,675 westbound stops for a total of 11,405 stops.
- The estimated average speed of the modified corridor is 23 mph in the eastbound direction and 24 mph in the westbound direction.
- No progression bandwidth is provided in the eastbound or westbound direction along Dell Range.
- Intersection movements operating at LOS 'F' are reduced from 8 to 1 and movements operating at LOS 'E' are reduced from 8 to 4.

Table 55: Existing PM Peak Hour with Modified Signal Timings & Short-Term Geometric Improvements – Corridor Statistics

Existing Volumes with Modified Signal Timings & Short Term Geometric Changes - PM Peak Hour		
	EB	WB
Stops	6,730	4,675
Average Speed (mph)	23	24
Signal Progression Bandwidth		
Powderhouse Rd to Rue Terre	0	0
Walmart Dr to College Ave	0	0
Notes	Left-turn lane additions at Converse Avenue and College	

Midday Peak Hour

Existing Operation

- The corridor currently operates with an estimated number of 4,942 eastbound stops and 4,732 westbound stops for a total of 9,674 stops.
- The estimated average speed is 26 mph in the eastbound direction and 25 mph in the westbound direction.
- There is no signal progression bandwidth along the corridor in either direction.
- There are a total of 2 intersection movements operating at LOS 'E'.

Table 56: Existing MD Peak Hour Traffic – Corridor Statistics

Existing Conditions - Midday Peak Hour		
	EB	WB
Total Stops	4,942	4,732
Average Speed (mph)	26	25
Signal Progression Bandwidth (sec)	0	0

Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB and Other Recommendations

- The corridor is expected to operate with an estimated number of 4,048 eastbound stops and 3,885 westbound stops for a total of 7,933 stops.
- The estimated average speed of the modified corridor is 26 mph in the eastbound direction and 25 mph in the westbound direction.
- The coordinated signal system is expected to provide a 4 second eastbound progression bandwidth between Converse Avenue and College Drive and a 3 second westbound progression bandwidth Between Powderhouse Road and Walmart Drive. No progression bandwidth is provided in the eastbound direction between Powderhouse Road and Walmart Drive or in the westbound direction between Converse Avenue and College Drive.
- Intersection movements operating at LOS 'E' are increased from 2 to 4.

Table 57: Existing MD Peak Hour with Modified Signal Timings – Corridor Statistics

Existing Volumes with Modified Signal Timings & Existing Geometrics - PM Peak Hour		
	EB	WB
Stops	4,048	3,885
Average Speed (mph)	26	25
Signal Progression Bandwidth		
Powderhouse Rd to Walmart Dr	0	3
Converse Ave to College Ave	4	0
Notes	Additional pedestrian 'walk' and clearance time added. EB/WB left turn movements restricted to protected only left-turn phasing. Yellow time included in pedestrian flashing don't walk clearance calculation. Progression based on Synchro optimization.	

Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB and Left-Turn Lane additions at Converse Avenue and College Drive

- The corridor is expected to operate with an estimated number of 4,062 eastbound stops and 3,765 westbound stops for a total of 7,827 stops.
- The estimated average speed of the modified corridor is 26 mph in the eastbound direction and 26 mph in the westbound direction.
- The coordinated signal system is expected to provide a 3 second westbound progression bandwidth between Powderhouse Road and Rue Terre and no progression bandwidth is provided between Walmart Drive and College Drive. No progression bandwidth is provided in the eastbound direction.
- Intersection movements operating at LOS 'E' remain unchanged at 2.

Table 58: Existing MD Peak Hour with Modified Signal Timings & Short-Term Geometric Improvements – Corridor Statistics

Existing Volumes with Modified Signal Timings & Short Term Geometric Changes - PM Peak Hour		
	EB	WB
Stops	4,062	3,765
Average Speed (mph)	26	26
Signal Progression Bandwidth		
Powderhouse Rd to Rue Terre	0	3
Walmart Dr to College Ave	0	0
Notes	Left-turn lane additions at Converse Avenue and College	

Future Traffic

Year 2040 Traffic Operation – Signal Timing Modifications & Short-Term Geometric Improvements

A traffic analysis was completed for future year 2040 on Dell Range Boulevard between Powderhouse Road and College Drive with both signal timing and intersection geometric improvements previously recommended under the existing traffic operating conditions section of this supplement. Traffic on Dell Range Boulevard during the evening peak hour is expected to reach capacity and provide poor operating conditions throughout the corridor by the year 2040. An analysis was not conducted of the year 2040 midday peak hour traffic projections since the evening peak hour traffic congestion problems significantly exceed the midday congestion levels. Experience would indicate, in general, that if the higher year 2040 evening peak hour volumes operate at acceptable levels, the lower midday volumes will also operate acceptably.

1. Powderhouse Road Intersection

Evening Peak Hour

- Overall intersection delay is 79.1 seconds.
- Eastbound through/right-turn movement operates at LOS ‘F’ with a maximum queue of 800’.
- Southbound left-turn lane movement at LOS ‘E’ with a maximum queue of 275’.

Table 59: Year 2040 PM Peak Hour – Powderhouse Road

Future Conditions - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	26.0	152.6	152.6	17.3	12.8	0.2	21.9	21.3	21.0	58.2	21.0	20.7	79.1
LOS	C	F	F	B	B	A	C	C	C	E	C	C	E
Queue (ft)	25	800	800	25	225	25	75	50	25	275	50	25	N/A

2. Stillwater Avenue Intersection

Evening Peak Hour

- Overall intersection delay is 28.5 seconds.
- Westbound left-turn movement operates at LOS ‘E’ with a maximum queue of 100’.
- Northbound left-turn movement at LOS ‘F’ with a maximum queue of 225’.

Table 60: Year 2040 PM Peak Hour – Stillwater Avenue

Future Conditions - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	12.4	20.9	9.0	58.1	32.3	0.0	88.6	23.8	23.8	24.7	24.7	0.2	28.5
LOS	B	C	A	E	C	A	F	C	C	C	C	A	C
Queue (ft)	50	200	25	100	425	25	225	25	25	50	50	25	N/A

3. Driftwood Drive Intersection

Evening Peak Hour

- Overall intersection delay is 12.0 seconds.
- Southbound left-turn/through movement operates at LOS 'E' with a maximum queue of 75'.

Table 61: Year 2040 PM Peak Hour – Driftwood Drive

Future Conditions - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersectio
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	8.6	15.4	15.4	5.6	1.8	0.1	37.6	37.6	37.6	62.5	62.5	0.1	12.0
LOS	A	B	B	A	A	A	D	D	D	E	E	A	B
Queue (ft)	50	475	475	25	50	25	75	75	75	75	75	25	N/A

4. Frontier Mall Drive Intersection

Evening Peak Hour

- Overall intersection delay is 20.6 seconds.
- Southbound left-turn movement operates at LOS 'E' with a maximum queue of 250'.

Table 62: Year 2040 PM Peak Hour – Frontier Mall Drive

Future Conditions - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersectio
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	10.1	23.4	23.4	42.8	11.3	0.0	26.7	26.4	26.4	56.7	27.0	27.0	20.6
LOS	B	C	C	D	B	A	C	C	C	E	C	C	B
Queue (ft)	50	650	650	25	350	25	25	25	25	250	50	50	N/A

5. Prairie Avenue Intersection

Evening Peak Hour

- Overall intersection delay is 175.5 seconds.
- Eastbound through/right-turn movement operates at LOS 'F' with a maximum queue of 250'.
- Southbound left-turn movement operates at LOS 'E' with a maximum queue of 50'.
- Southbound through movement operates at LOS 'F' with a maximum queue of 625'.

Table 63: Year 2040 PM Peak Hour – Prairie Avenue

	Future Conditions - PM Peak Hour												Overall Intersection
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	52.1	311.1	311.1	59.6	165.1	0.3	37.2	38.1	38.1	50.8	50.8	25.9	175.5
LOS	D	F	F	E	F	A	D	D	D	D	D	C	F
Queue (ft)	75	950	950	50	625	25	75	75	75	325	325	25	N/A

6. Rue Terre Intersection

Evening Peak Hour

- Overall intersection delay is 103.7 seconds.
- Eastbound through/right-turn movement operates at LOS 'F' with a maximum queue of 875'.
- Southbound left-turn movement operates at LOS 'F' with a maximum queue of 225'.

Table 64: Year 2040 PM Peak Hour – Rue Terre

	Future Conditions - PM Peak Hour												Overall Intersection
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	29.4	197.9	197.9	19.5	20.7	4.6	29.9	29.9	29.9	80.7	26.7	27.9	103.7
LOS	C	F	F	B	C	A	C	C	C	F	C	C	F
Queue (ft)	50	875	875	75	225	25	100	100	100	225	25	50	N/A

7. Walmart Drive Intersection

Evening Peak Hour

- Overall intersection delay is 271.6 seconds.
- Eastbound left-turn movement operates at LOS 'F' with a maximum queue of 175'.
- Eastbound through/right-turn movement operates at LOS 'F' with a maximum queue of 1,000'.
- Westbound through movement operates at LOS 'F' with a maximum queue of 875'.
- Northbound left-turn movement operates at LOS 'F' with a maximum queue of 100'.

Table 65: Year 2040 PM Peak Hour – Walmart Drive

	Future Conditions - PM Peak Hour												Overall Intersection
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	423.3	422.5	422.5	38.9	238.9	25.5	180.6	31.8	31.8	36.4	18.9	18.9	271.6
LOS	F	F	F	D	F	C	F	C	C	D	B	B	F
Queue (ft)	275	1000	1000	50	875	200	100	25	25	150	75	75	N/A

8. Converse Avenue Intersection

Evening Peak Hour

- Overall intersection delay is 177.4 seconds.
- All movements operate at LOS 'F' except for the eastbound right-turn, westbound right-turn, southbound through, and southbound right-turn movements.
- Maximum queue of 950' for the eastbound through movement.

Table 66: Year 2040 PM Peak Hour – Converse Avenue

	Future Conditions - PM Peak Hour												Overall Intersection
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	63.7	258.1	2.1	113.9	148.1	37.1	419.2	125.9	114.5	353.9	45.5	34.8	177.4
LOS	F	F	A	F	F	D	F	F	F	F	D	C	F
Queue (ft)	200	950	25	175	700	125	625	675	475	300	225	50	N/A

9. Windmill Road Intersection

Evening Peak Hour

- Overall intersection delay is 64.9 seconds.
- Eastbound through/right-turn movements operate at LOS 'F' with a maximum queue of 925'.
- Northbound left-turn movement operates at LOS 'E' with a maximum queue of 125'.

Table 67: Year 2040 PM Peak Hour – Windmill Road

	Future Conditions - PM Peak Hour												Overall Intersection
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	15.4	114.9	114.9	45.5	11.4	11.4	56.5	36.1	35.4	51.3	51.3	51.3	64.9
LOS	B	F	F	D	B	B	E	D	C	D	D	D	E
Queue (ft)	50	925	925	50	600	600	125	125	50	75	75	75	N/A

10. Ridge Road Intersection

Evening Peak Hour

- Overall intersection delay is 72.0 seconds.
- Eastbound left-turn movement operates at LOS 'F' with a maximum queue of 175'.
- Westbound left-turn movement operates at LOS 'F' with a maximum queue of 125'.
- Westbound through/right-turn movement operates at LOS 'E' with a maximum queue of 600'.
- Northbound left-turn movement operates at LOS 'F' with a maximum queue of 475'.

- Northbound through movement operates at LOS 'F' with a maximum queue of 525'.
- Southbound left-turn movement operates at LOS 'F' with a maximum queue of 225'.
- Southbound through movement operates at LOS 'E' with a maximum queue of 300'.

Table 68: Year 2040 PM Peak Hour – Ridge Road

Future Conditions - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	168.6	21.9	5.8	127.5	56.6	56.6	146.1	186.4	34.8	168.5	65.0	37.3	72.0
LOS	F	C	A	F	E	E	F	F	C	F	E	D	E
Queue (ft)	175	375	25	125	600	600	475	525	75	225	300	25	N/A

11. Marble Avenue Intersection

Evening Peak Hour

- Overall intersection delay is 13.0 seconds.
- Southbound left-turn movement operates at LOS 'E' with a maximum queue of 350'.

Table 69: Year 2040 PM Peak Hour – Marble Avenue

Future Conditions - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	14.4	7.5	7.5	13.1	7.2	1.9	30.1	30.1	30.1	67.3	30.7	30.7	13.0
LOS	B	A	A	B	A	A	C	C	C	E	C	C	B
Queue (ft)	25	125	125	25	300	25	25	25	25	350	25	25	N/A

12. College Drive Intersection

Evening Peak Hour

- Overall intersection delay is 178.6 seconds.
- All movements operate at LOS 'E' or 'F' except for the westbound through/right-turn movement which operates at LOS 'D'.
- Maximum queue is 975' for the eastbound through movement.

Table 70: Year 2040 PM Peak Hour – College Drive

Future Conditions - PM Peak Hour													
	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			Overall Intersection
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Delay (sec)	63.5	259.5	110.8	385.2	42.2	42.2	344.3	143.9	143.9	201.5	84.7	84.7	178.6
LOS	E	F	F	F	D	D	F	F	F	F	F	F	F
Queue (ft)	175	975	600	375	300	300	525	450	450	325	300	300	N/A

Year 2040 Dell Range Corridor Traffic Progression

The Dell Range Boulevard corridor was analyzed in the future year with consideration of traffic progression based on the approach described in the existing analysis. A summary of the corridor statistics for the future year is provided below.

Operation with Permissive/Protected Lagging Left-Turn Phasing for EB/WB and Left-Turn Lane additions at Converse Avenue and College Drive

- The corridor is expected to operate with an estimated number of 13,026 eastbound stops and 9,799 westbound stops for a total of 22,825 stops.
- The estimated average speed of the modified corridor is 5 mph in the eastbound direction and 10 mph in the westbound direction.
- No progression bandwidth is provided in the eastbound or westbound direction along Dell Range.
- Every intersection along the corridor has at least one movement that operates at LOS 'E' or LOS 'F' during the evening peak hour.

Table 71: Year 2040 PM Peak Hour with Modified Signal Timings & Short-Term Geometric Improvements – Corridor Statistics

Existing Volumes with Modified Signal Timings & Short Term Geometric Changes - PM Peak Hour		
	EB	WB
Stops	13,026	9,799
Average Speed (mph)	5	10
Signal Progression Bandwidth		
Powderhouse Rd to Rue Terre	0	0
Walmart Dr to College Ave	0	0
Notes	Left-turn lane additions at Converse Avenue and College	

Appendix A

Traffic Operational Analysis Output Sheets

2012 Existing Conditions Intersection Analysis

Queues

Timing Plan: Midday

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	36	926	80	913	176	64	32	85	163	48	24
V/c Ratio	0.10	0.50	0.23	0.48	0.13	0.30	0.11	0.27	0.75	0.16	0.08
Control Delay	6.5	11.6	6.0	10.5	0.2	32.1	27.5	8.4	53.6	28.5	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.5	11.6	6.0	10.5	0.2	32.1	27.5	8.4	53.6	28.5	0.5
Queue Length 50th (ft)	5	139	9	138	0	31	15	0	86	22	0
Queue Length 95th (ft)	12	238	17	155	0	56	32	18	119	37	0
Internal Link Dist (ft)	1929			687			421			1527	
Turn Bay Length (ft)	171	195									
Base Capacity (vph)	384	1867	380	1932	1333	277	382	388	282	382	382
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.50	0.21	0.47	0.13	0.23	0.08	0.22	0.58	0.13	0.06

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: Powderhouse Rd & Dell Range Blvd

Timing Plan: Midday

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	809	42	59	867	132	54	26	60	129	34	18
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9		4.2	4.9	4.0	4.2	4.2	4.2	4.2	4.2	4.2
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1490	2953		1490	2980	1333	1490	1569	1333	1490	1569	1333
Flt Permitted	0.27	1.00		0.26	1.00	1.00	0.73	1.00	1.00	0.74	1.00	1.00
Satd. Flow (perm)	425	2953		414	2980	1333	1138	1569	1333	1155	1569	1333
Peak-hour factor, PHF	0.64	0.93	0.75	0.74	0.95	0.75	0.84	0.81	0.71	0.79	0.71	0.75
Adj. Flow (vph)	36	870	56	80	913	176	64	32	85	163	48	24
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	69	0	0	19
Lane Group Flow (vph)	36	922	0	80	913	176	64	32	16	163	48	5
Turn Type	pm+pt	NA		pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		Free	8		8	4		4
Actuated Green, G (s)	56.7	53.5		59.5	54.9	88.0	16.6	16.6	16.6	16.6	16.6	16.6
Effective Green, g (s)	56.7	53.5		59.5	54.9	88.0	16.6	16.6	16.6	16.6	16.6	16.6
Actuated g/C Ratio	0.64	0.61		0.68	0.62	1.00	0.19	0.19	0.19	0.19	0.19	0.19
Clearance Time (s)	4.2	4.9		4.2	4.9		4.2	4.2	4.2	4.2	4.2	4.2
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	312	1795		336	1859	1333	214	295	251	217	295	251
v/s Ratio Prot	0.00	c0.31		c0.01	0.31			0.02			0.03	
v/s Ratio Perm	0.07			0.15		c0.13	0.06		0.01	c0.14		0.00
v/c Ratio	0.12	0.51		0.24	0.49	0.13	0.30	0.11	0.06	0.75	0.16	0.02
Uniform Delay, d1	9.1	9.8		9.0	9.0	0.0	30.7	29.6	29.3	33.7	29.9	29.1
Progression Factor	1.00	1.00		0.68	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.1		0.1	0.9	0.2	0.3	0.1	0.0	12.2	0.1	0.0
Delay (s)	9.1	10.9		6.2	9.4	0.2	31.0	29.6	29.4	45.9	30.0	29.1
Level of Service	A	B		A	A	C	C	C	D	C	C	
Approach Delay (s)		10.8			7.8			30.0			41.0	
Approach LOS		B			A			C			D	

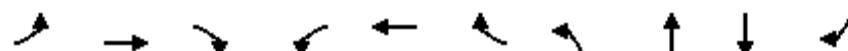
Intersection Summary			
HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	88.0	Sum of lost time (s)	13.3
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

Timing Plan: Midday

6/3/2014

3: Stillwater Ave & Dell Range Blvd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	172	758	248	48	782	52	180	84	84	223
v/c Ratio	0.44	0.41	0.27	0.12	0.47	0.04	0.77	0.24	0.32	0.17
Control Delay	7.9	6.3	1.0	2.9	5.7	0.1	53.1	10.5	30.5	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.9	6.3	1.0	2.9	5.7	0.1	53.1	10.5	30.5	0.3
Queue Length 50th (ft)	13	69	1	4	47	0	94	7	40	0
Queue Length 95th (ft)	37	95	0	5	32	0	141	27	52	0
Internal Link Dist (ft)		687			705			916	424	
Turn Bay Length (ft)	170		156	190			30			75
Base Capacity (vph)	393	1846	920	411	1658	1333	325	455	361	1333
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.41	0.27	0.12	0.47	0.04	0.55	0.18	0.23	0.17

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Stillwater Ave & Dell Range Blvd

Timing Plan: Midday

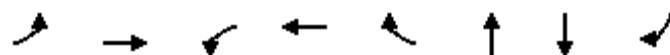
6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑	↑	↑	↑	↑	↑
Volume (vph)	150	690	171	40	712	36	155	12	40	38	19	176
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9	4.9	4.2	4.9	4.0	4.2	4.2			4.2	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Fr _t	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1490	2980	1333	1490	2980	1333	1490	1378			1518	1333
Flt Permitted	0.28	1.00	1.00	0.35	1.00	1.00	0.70	1.00			0.78	1.00
Satd. Flow (perm)	445	2980	1333	557	2980	1333	1102	1378			1223	1333
Peak-hour factor, PHF	0.87	0.91	0.69	0.83	0.91	0.69	0.86	0.75	0.59	0.68	0.68	0.79
Adj. Flow (vph)	172	758	248	48	782	52	180	16	68	56	28	223
RTOR Reduction (vph)	0	0	99	0	0	0	0	54	0	0	0	0
Lane Group Flow (vph)	172	758	149	48	782	52	180	30	0	0	84	223
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Free	Perm	NA		Perm	NA	Free
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		Free	8			4		Free
Actuated Green, G (s)	60.0	52.7	52.7	52.2	48.8	88.0	18.6	18.6			18.6	88.0
Effective Green, g (s)	60.0	52.7	52.7	52.2	48.8	88.0	18.6	18.6			18.6	88.0
Actuated g/C Ratio	0.68	0.60	0.60	0.59	0.55	1.00	0.21	0.21			0.21	1.00
Clearance Time (s)	4.2	4.9	4.9	4.2	4.9		4.2	4.2			4.2	
Vehicle Extension (s)	2.0	4.0	4.0	2.0	4.0		2.0	2.0			2.0	
Lane Grp Cap (vph)	390	1784	798	366	1652	1333	232	291			258	1333
v/s Ratio Prot	c0.04	0.25		0.01	c0.26			0.02				
v/s Ratio Perm	0.26		0.11	0.07		0.04	c0.16				0.07	0.17
v/c Ratio	0.44	0.42	0.19	0.13	0.47	0.04	0.78	0.10			0.33	0.17
Uniform Delay, d1	6.0	9.5	8.0	7.5	11.8	0.0	32.7	28.0			29.4	0.0
Progression Factor	0.74	0.51	0.20	0.38	0.35	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	0.3	0.7	0.5	0.1	0.9	0.1	13.7	0.1			0.3	0.3
Delay (s)	4.6	5.6	2.0	2.9	5.1	0.1	46.4	28.0			29.7	0.3
Level of Service	A	A	A	A	A	A	D	C			C	A
Approach Delay (s)					4.7			40.6			8.3	
Approach LOS					A			D			A	
Intersection Summary												
HCM 2000 Control Delay				8.7								
HCM 2000 Volume to Capacity ratio				0.55								
Actuated Cycle Length (s)				88.0								
Intersection Capacity Utilization				61.2%								
Analysis Period (min)				15								
c Critical Lane Group												

Queues
4: Driftwood Dr & Dell Range Blvd

Timing Plan: Midday

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	36	858	32	757	107	108	116	60
V/c Ratio	0.08	0.38	0.08	0.33	0.08	0.44	0.73	0.05
Control Delay	3.3	2.7	2.1	1.8	0.1	21.0	60.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.3	2.7	2.1	1.8	0.1	21.0	60.0	0.1
Queue Length 50th (ft)	3	32	1	20	0	24	62	0
Queue Length 95th (ft)	m10	64	5	35	0	22	65	0
Internal Link Dist (ft)		705		569		917	428	
Turn Bay Length (ft)	180		190		180			75
Base Capacity (vph)	434	2293	387	2313	1333	337	226	1333
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.37	0.08	0.33	0.08	0.32	0.51	0.05

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: Driftwood Dr & Dell Range Blvd

Timing Plan: Midday

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	33	715	45	24	719	87	30	8	47	70	7	47
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9		4.9	4.9	4.0		4.2			4.2	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Fr _t	1.00	0.99		1.00	1.00	0.85		0.93			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.96	1.00
Satd. Flow (prot)	1490	2947		1490	2980	1333		1430			1501	1333
Flt Permitted	0.36	1.00		0.32	1.00	1.00		0.88			0.63	1.00
Satd. Flow (perm)	561	2947		499	2980	1333		1276			993	1333
Peak-hour factor, PHF	0.92	0.90	0.70	0.75	0.95	0.81	0.94	0.50	0.78	0.67	0.58	0.78
Adj. Flow (vph)	36	794	64	32	757	107	32	16	60	104	12	60
RTOR Reduction (vph)	0	5	0	0	0	0	0	51	0	0	0	0
Lane Group Flow (vph)	36	853	0	32	757	107	0	57	0	0	116	60
Turn Type	Perm	NA		Perm	NA	Free	Perm	NA		Perm	NA	Free
Protected Phases		2				6			8			4
Permitted Phases	2				6		Free	8			4	
Actuated Green, G (s)	66.2	66.2		66.2	66.2	88.0		12.7			12.7	88.0
Effective Green, g (s)	66.2	66.2		66.2	66.2	88.0		12.7			12.7	88.0
Actuated g/C Ratio	0.75	0.75		0.75	0.75	1.00		0.14			0.14	1.00
Clearance Time (s)	4.9	4.9		4.9	4.9			4.2			4.2	
Vehicle Extension (s)	4.0	4.0		4.0	4.0			2.0			2.0	
Lane Grp Cap (vph)	422	2216		375	2241	1333		184			143	1333
v/s Ratio Prot	c0.29				0.25							
v/s Ratio Perm	0.06			0.06		0.08		0.04			c0.12	0.05
v/c Ratio	0.09	0.38		0.09	0.34	0.08		0.31			0.81	0.05
Uniform Delay, d1	2.9	3.8		2.9	3.6	0.0		33.7			36.5	0.0
Progression Factor	0.62	0.49		0.35	0.31	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.4	0.5		0.4	0.4	0.1		0.3			27.0	0.1
Delay (s)	2.2	2.4		1.4	1.5	0.1		34.1			63.5	0.1
Level of Service	A	A		A	A	A		C			E	A
Approach Delay (s)		2.3			1.3			34.1			41.9	
Approach LOS		A			A			C			D	
Intersection Summary												
HCM 2000 Control Delay		6.9			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.45										
Actuated Cycle Length (s)		88.0			Sum of lost time (s)			9.1				
Intersection Capacity Utilization		52.7%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

Queues
5: Frontier Mall Dr & Dell Range Blvd

Timing Plan: Midday

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	100	792	32	760	159	40	40	116	116
V/c Ratio	0.22	0.39	0.08	0.39	0.12	0.27	0.17	0.67	0.41
Control Delay	6.0	9.9	0.9	1.7	0.2	35.2	19.8	52.9	15.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.0	9.9	0.9	1.7	0.2	35.2	19.8	52.9	15.0
Queue Length 50th (ft)	8	71	0	6	0	20	10	62	14
Queue Length 95th (ft)	31	213	m3	31	0	34	27	98	12
Internal Link Dist (ft)		569		1110			911		1473
Turn Bay Length (ft)	185		140		140	75			
Base Capacity (vph)	477	2037	442	1970	1333	291	439	336	469
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.39	0.07	0.39	0.12	0.14	0.09	0.35	0.25

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

5: Frontier Mall Dr & Dell Range Blvd

Timing Plan: Midday

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	749	13	23	737	129	27	15	15	96	14	70
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9		4.2	4.9	4.0	4.2	4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Fr _t	1.00	1.00		1.00	1.00	0.85	1.00	0.93		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1490	2969		1490	2980	1333	1490	1451		1490	1390	
Flt Permitted	0.34	1.00		0.33	1.00	1.00	0.63	1.00		0.73	1.00	
Satd. Flow (perm)	530	2969		514	2980	1333	994	1451		1147	1390	
Peak-hour factor, PHF	0.75	0.97	0.65	0.72	0.97	0.81	0.68	0.75	0.75	0.83	0.50	0.80
Adj. Flow (vph)	100	772	20	32	760	159	40	20	20	116	28	88
RTOR Reduction (vph)	0	1	0	0	0	0	0	17	0	0	75	0
Lane Group Flow (vph)	100	791	0	32	760	159	40	23	0	116	41	0
Turn Type	pm+pt	NA		pm+pt	NA	Free	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		Free	8				4	
Actuated Green, G (s)	63.6	58.7		59.2	56.5	88.0	13.3	13.3		13.3	13.3	
Effective Green, g (s)	63.6	58.7		59.2	56.5	88.0	13.3	13.3		13.3	13.3	
Actuated g/C Ratio	0.72	0.67		0.67	0.64	1.00	0.15	0.15		0.15	0.15	
Clearance Time (s)	4.2	4.9		4.2	4.9		4.2	4.2		4.2	4.2	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	436	1980		375	1913	1333	150	219		173	210	
v/s Ratio Prot	c0.01	c0.27		0.00	0.26			0.02			0.03	
v/s Ratio Perm	0.15			0.05		c0.12	0.04			c0.10		
v/c Ratio	0.23	0.40		0.09	0.40	0.12	0.27	0.11		0.67	0.20	
Uniform Delay, d1	5.6	6.6		6.5	7.6	0.0	33.0	32.2		35.3	32.7	
Progression Factor	1.03	1.26		0.14	0.14	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.6		0.0	0.5	0.2	0.3	0.1		7.8	0.2	
Delay (s)	5.9	8.9		0.9	1.6	0.2	33.4	32.3		43.0	32.8	
Level of Service	A	A		A	A	C	C		D	C		
Approach Delay (s)					1.4			32.8			37.9	
Approach LOS				A				C			D	
Intersection Summary												
HCM 2000 Control Delay		9.5				HCM 2000 Level of Service			A			
HCM 2000 Volume to Capacity ratio		0.45										
Actuated Cycle Length (s)		88.0				Sum of lost time (s)			13.3			
Intersection Capacity Utilization		53.2%				ICU Level of Service			A			
Analysis Period (min)		15										
c Critical Lane Group												

Queues
6: Prairie Ave & Dell Range Blvd

Timing Plan: Midday

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	84	875	32	850	280	52	100	181	186	96
V/c Ratio	0.28	0.55	0.12	0.56	0.21	0.40	0.62	0.71	0.72	0.27
Control Delay	16.6	20.4	4.2	14.3	0.3	46.2	42.3	49.3	49.9	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.6	20.4	4.2	14.3	0.3	46.2	42.3	49.3	49.9	4.4
Queue Length 50th (ft)	22	143	2	158	0	28	34	95	98	0
Queue Length 95th (ft)	56	320	m4	154	0	62	62	#188	97	12
Internal Link Dist (ft)		1110		710			916		1682	
Turn Bay Length (ft)	250		250		205	120				100
Base Capacity (vph)	311	1586	282	1511	1333	165	195	280	283	373
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.55	0.11	0.56	0.21	0.32	0.51	0.65	0.66	0.26

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
6: Prairie Ave & Dell Range Blvd

Timing Plan: Midday

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↓		↑	↑↑	↑	↑	↑↓		↑	↑↓	↑
Volume (vph)	78	798	36	26	799	272	47	41	37	294	24	78
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9		4.9	4.9	4.0	4.2	4.2		4.2	4.2	4.2
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	1.00
Fr _t	1.00	0.99		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00
Satd. Flow (prot)	1490	2958		1490	2980	1333	1490	1465		1416	1435	1333
Flt Permitted	0.25	1.00		0.25	1.00	1.00	0.95	1.00		0.95	0.96	1.00
Satd. Flow (perm)	399	2958		385	2980	1333	1490	1465		1416	1435	1333
Peak-hour factor, PHF	0.93	0.96	0.82	0.81	0.94	0.97	0.90	0.73	0.84	0.91	0.55	0.81
Adj. Flow (vph)	84	831	44	32	850	280	52	56	44	323	44	96
RTOR Reduction (vph)	0	4	0	0	0	0	0	33	0	0	0	79
Lane Group Flow (vph)	84	871	0	32	850	280	52	67	0	181	186	17
Turn Type	pm+pt	NA		pm+pt	NA	Free	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	2			6		Free						4
Actuated Green, G (s)	49.4	44.2		44.6	41.8	88.0	6.8	6.8		16.0	16.0	16.0
Effective Green, g (s)	49.4	44.2		44.6	41.8	88.0	6.8	6.8		16.0	16.0	16.0
Actuated g/C Ratio	0.56	0.50		0.51	0.47	1.00	0.08	0.08		0.18	0.18	0.18
Clearance Time (s)	4.9	4.9		4.9	4.9		4.2	4.2		4.2	4.2	4.2
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0		4.0	4.0	4.0
Lane Grp Cap (vph)	288	1485		230	1415	1333	115	113		257	260	242
v/s Ratio Prot	0.02	c0.29		0.00	0.29		0.03	c0.05		0.13	c0.13	
v/s Ratio Perm	0.15			0.07		c0.21						0.01
v/c Ratio	0.29	0.59		0.14	0.60	0.21	0.45	0.59		0.70	0.72	0.07
Uniform Delay, d1	16.2	15.5		17.4	17.0	0.0	38.8	39.3		33.8	33.9	29.8
Progression Factor	1.12	1.15		0.32	0.72	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	1.6		0.1	1.6	0.3	1.0	5.4		9.1	9.6	0.2
Delay (s)	18.3	19.5		5.6	13.9	0.3	39.8	44.7		42.8	43.5	30.0
Level of Service	B	B		A	B	A	D	D		D	D	C
Approach Delay (s)		19.4			10.4			43.0			40.4	
Approach LOS		B			B			D			D	
Intersection Summary												
HCM 2000 Control Delay		20.4			HCM 2000 Level of Service				C			
HCM 2000 Volume to Capacity ratio		0.62										
Actuated Cycle Length (s)		88.0			Sum of lost time (s)				18.2			
Intersection Capacity Utilization		60.1%			ICU Level of Service				B			
Analysis Period (min)		15										
c Critical Lane Group												

Queues
7: Rue Terre & Dell Range Blvd

Timing Plan: Midday

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	117	1128	49	1040	137	133	125	20	100
V/c Ratio	0.37	0.58	0.18	0.56	0.16	0.52	0.72	0.07	0.32
Control Delay	8.5	11.7	5.0	10.7	4.7	29.6	55.8	27.8	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.5	11.7	5.0	10.7	4.7	29.6	55.8	27.8	8.8
Queue Length 50th (ft)	5	176	2	64	1	48	66	9	0
Queue Length 95th (ft)	15	262	m9	211	24	96	93	15	38
Internal Link Dist (ft)		710		830		892		916	
Turn Bay Length (ft)	250		250		150				120
Base Capacity (vph)	344	1930	297	1855	881	342	243	388	405
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.58	0.16	0.56	0.16	0.39	0.51	0.05	0.25

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

7: Rue Terre & Dell Range Blvd

Timing Plan: Midday

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	88	977	36	48	967	97	41	18	50	94	10	90
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9		4.9	4.9	4.9		4.2		4.2	4.2	4.2
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00		1.00	1.00	1.00
Fr _t	1.00	0.99		1.00	1.00	0.85		0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98		0.95	1.00	1.00
Satd. Flow (prot)	1490	2959		1490	2980	1333		1450		1490	1569	1333
Flt Permitted	0.22	1.00		0.20	1.00	1.00		0.86		0.63	1.00	1.00
Satd. Flow (perm)	350	2959		312	2980	1333		1273		983	1569	1333
Peak-hour factor, PHF	0.75	0.91	0.67	0.97	0.93	0.71	0.69	0.90	0.93	0.75	0.50	0.90
Adj. Flow (vph)	117	1074	54	49	1040	137	59	20	54	125	20	100
RTOR Reduction (vph)	0	3	0	0	0	55	0	30	0	0	0	82
Lane Group Flow (vph)	117	1125	0	49	1040	82	0	103	0	125	20	18
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	60.9	55.3		55.9	52.8	52.8		15.6		15.6	15.6	15.6
Effective Green, g (s)	60.9	55.3		55.9	52.8	52.8		15.6		15.6	15.6	15.6
Actuated g/C Ratio	0.69	0.63		0.64	0.60	0.60		0.18		0.18	0.18	0.18
Clearance Time (s)	4.9	4.9		4.9	4.9	4.9		4.2		4.2	4.2	4.2
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	314	1859		239	1788	799		225		174	278	236
v/s Ratio Prot	c0.02	c0.38		0.01	0.35						0.01	
v/s Ratio Perm	0.23			0.12		0.06		0.08		c0.13		0.01
v/c Ratio	0.37	0.60		0.21	0.58	0.10		0.46		0.72	0.07	0.08
Uniform Delay, d1	11.0	9.8		12.2	10.8	7.5		32.4		34.1	30.2	30.2
Progression Factor	0.68	0.96		0.60	0.82	2.08		1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	1.2		0.1	1.1	0.2		1.5		13.2	0.1	0.1
Delay (s)	7.8	10.7		7.4	10.0	15.8		33.9		47.4	30.3	30.3
Level of Service	A	B		A	B	B		C		D	C	C
Approach Delay (s)		10.4			10.6			33.9			39.0	
Approach LOS		B			B			C			D	

Intersection Summary

HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	88.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues
8: Walmart & Dell Range Blvd

Timing Plan: Midday

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	200	1051	28	1054	192	41	68	203	172
V/c Ratio	0.63	0.55	0.09	0.64	0.23	0.25	0.49	0.49	0.56
Control Delay	21.9	7.7	3.3	15.3	4.4	30.8	29.4	33.2	15.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.9	7.7	3.3	15.3	4.4	30.8	29.4	33.2	15.1
Queue Length 50th (ft)	27	52	1	321	14	18	11	48	6
Queue Length 95th (ft)	102	128	m5	m401	m31	36	16	75	10
Internal Link Dist (ft)		830		1324			423		927
Turn Bay Length (ft)	250		250		180			125	
Base Capacity (vph)	344	1926	316	1640	819	175	168	434	324
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.55	0.09	0.64	0.23	0.23	0.40	0.47	0.53

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
8: Walmart & Dell Range Blvd

Timing Plan: Midday

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑	↑	↑	↑		↑↑	↑	
Volume (vph)	174	928	53	24	991	163	31	10	44	181	7	139
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9		4.2	4.9	4.9	4.2	4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	
Fr _t	1.00	0.99		1.00	1.00	0.85	1.00	0.89		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1490	2945		1490	2980	1333	1490	1403		2891	1350	
Flt Permitted	0.18	1.00		0.25	1.00	1.00	0.67	1.00		0.42	1.00	
Satd. Flow (perm)	278	2945		390	2980	1333	1046	1403		1276	1350	
Peak-hour factor, PHF	0.87	0.96	0.63	0.86	0.94	0.85	0.75	0.50	0.92	0.89	0.58	0.87
Adj. Flow (vph)	200	967	84	28	1054	192	41	20	48	203	12	160
RTOR Reduction (vph)	0	6	0	0	0	90	0	45	0	0	140	0
Lane Group Flow (vph)	200	1045	0	28	1054	102	41	23	0	203	32	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	59.6	53.2		48.9	46.7	46.7	10.0	6.0		19.3	11.1	
Effective Green, g (s)	59.6	53.2		48.9	46.7	46.7	10.0	6.0		19.3	11.1	
Actuated g/C Ratio	0.68	0.60		0.56	0.53	0.53	0.11	0.07		0.22	0.13	
Clearance Time (s)	4.2	4.9		4.2	4.9	4.9	4.2	4.2		4.2	4.2	
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	308	1780		244	1581	707	139	95		446	170	
v/s Ratio Prot	c0.06	0.35		0.00	0.35		0.01	0.02		c0.05	0.02	
v/s Ratio Perm	c0.38			0.06		0.08	0.02			c0.05		
v/c Ratio	0.65	0.59		0.11	0.67	0.14	0.29	0.24		0.46	0.19	
Uniform Delay, d1	8.6	10.7		9.0	15.0	10.5	35.5	38.9		29.0	34.4	
Progression Factor	2.11	0.66		0.51	0.88	1.81	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.9	1.2		0.1	1.7	0.3	0.4	0.5		0.3	0.2	
Delay (s)	21.1	8.2		4.6	14.8	19.3	36.0	39.3		29.2	34.6	
Level of Service	C	A		A	B	B	D	D		C	C	
Approach Delay (s)		10.3			15.3			38.1			31.7	
Approach LOS		B			B			D			C	
Intersection Summary												
HCM 2000 Control Delay		16.1									B	
HCM 2000 Volume to Capacity ratio		0.65										
Actuated Cycle Length (s)		88.0									17.5	
Intersection Capacity Utilization		72.5%									C	
Analysis Period (min)		15										
c Critical Lane Group												

Queues
9: Converse Ave & Dell Range Blvd

Timing Plan: Midday

6/3/2014



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	80	737	416	199	810	92	438	208	195	152	235	84
V/c Ratio	0.33	0.61	0.31	0.64	0.61	0.14	0.87	0.76	0.50	0.77	0.59	0.28
Control Delay	24.0	24.9	0.5	37.4	26.4	6.3	54.9	54.2	9.8	63.5	42.7	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	24.9	0.5	37.4	26.4	6.3	54.9	54.2	9.8	63.5	42.7	4.3
Queue Length 50th (ft)	21	192	0	92	239	14	122	110	0	81	64	0
Queue Length 95th (ft)	45	251	0	108	300	m36	#196	#206	42	#190	102	0
Internal Link Dist (ft)		1324			1462			927			928	
Turn Bay Length (ft)	250		180	250		100	400			150		150
Base Capacity (vph)	273	1208	1333	343	1326	664	519	281	399	200	402	297
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.61	0.31	0.58	0.61	0.14	0.84	0.74	0.49	0.76	0.58	0.28

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

9: Converse Ave & Dell Range Blvd

Timing Plan: Midday

6/3/2014

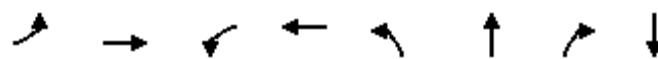
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑↑	↑
Volume (vph)	53	693	383	149	753	83	390	183	160	137	207	63
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9	4.0	4.9	4.9	4.9	4.2	4.2	4.2	4.2	4.2	4.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	0.95	1.00
Fr _t	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1490	2980	1333	1490	2980	1333	2891	1569	1333	1490	2980	1333
Flt Permitted	0.24	1.00	1.00	0.28	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	378	2980	1333	434	2980	1333	2891	1569	1333	1490	2980	1333
Peak-hour factor, PHF	0.66	0.94	0.92	0.75	0.93	0.90	0.89	0.88	0.82	0.90	0.88	0.75
Adj. Flow (vph)	80	737	416	199	810	92	438	208	195	152	235	84
RTOR Reduction (vph)	0	0	0	0	0	52	0	0	161	0	0	73
Lane Group Flow (vph)	80	737	416	199	810	40	438	208	34	152	235	11
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases	2		Free	6		6			8			7
Actuated Green, G (s)	39.3	34.7	88.0	46.3	38.2	38.2	15.3	15.3	15.3	11.7	11.7	11.7
Effective Green, g (s)	39.3	34.7	88.0	46.3	38.2	38.2	15.3	15.3	15.3	11.7	11.7	11.7
Actuated g/C Ratio	0.45	0.39	1.00	0.53	0.43	0.43	0.17	0.17	0.17	0.13	0.13	0.13
Clearance Time (s)	4.9	4.9		4.9	4.9	4.9	4.2	4.2	4.2	4.2	4.2	4.2
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0	2.0	3.0	3.0	3.0
Lane Grp Cap (vph)	226	1175	1333	325	1293	578	502	272	231	198	396	177
v/s Ratio Prot	0.02	0.25		c0.06	c0.27		c0.15	0.13		c0.10	0.08	
v/s Ratio Perm	0.14		c0.31	0.27		0.03			0.03			0.01
v/c Ratio	0.35	0.63	0.31	0.61	0.63	0.07	0.87	0.76	0.15	0.77	0.59	0.06
Uniform Delay, d1	23.4	21.4	0.0	22.8	19.4	14.5	35.4	34.6	30.8	36.8	35.9	33.4
Progression Factor	1.51	1.06	1.00	1.43	1.22	4.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	2.2	0.5	2.1	2.0	0.2	14.9	10.9	0.1	16.2	2.4	0.2
Delay (s)	35.7	24.9	0.5	34.7	25.7	58.4	50.3	45.6	30.9	53.1	38.3	33.5
Level of Service	D	C	A	C	C	E	D	D	C	D	D	C
Approach Delay (s)		17.4			30.1			44.6		42.2		
Approach LOS		B			C			D		D		

Intersection Summary												
HCM 2000 Control Delay	30.7	HCM 2000 Level of Service									C	
HCM 2000 Volume to Capacity ratio	0.73											
Actuated Cycle Length (s)	88.0	Sum of lost time (s)									18.2	
Intersection Capacity Utilization	68.2%	ICU Level of Service									C	
Analysis Period (min)	15											
c Critical Lane Group												

Queues
10: Windmill Rd & Dell Range Blvd

Timing Plan: Midday

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	68	942	104	860	131	52	87	168
V/c Ratio	0.22	0.61	0.36	0.55	0.44	0.12	0.20	0.63
Control Delay	6.7	13.9	17.5	26.0	28.8	22.3	6.1	35.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	13.9	17.5	26.0	28.8	22.3	6.1	35.7
Queue Length 50th (ft)	8	68	36	225	57	21	0	30
Queue Length 95th (ft)	m14	358	m43	254	51	39	11	37
Internal Link Dist (ft)		1464		3132		927		928
Turn Bay Length (ft)	250		250		175		175	
Base Capacity (vph)	329	1541	301	1565	362	531	508	277
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.61	0.35	0.55	0.36	0.10	0.17	0.61

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
10: Windmill Rd & Dell Range Blvd

Timing Plan: Midday

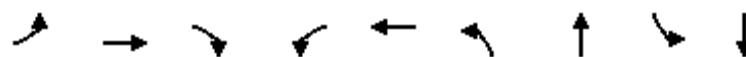
6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	42	777	60	72	782	19	67	41	55	27	38	44
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9		4.2	4.9		4.2	4.2	4.2		4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00		0.95	
Fr _t	1.00	0.99		1.00	1.00		1.00	1.00	0.85		0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00		0.99	
Satd. Flow (prot)	1490	2939		1490	2966		1490	1569	1333		2781	
Flt Permitted	0.26	1.00		0.22	1.00		0.42	1.00	1.00		0.86	
Satd. Flow (perm)	415	2939		352	2966		655	1569	1333		2426	
Peak-hour factor, PHF	0.62	0.91	0.68	0.69	0.94	0.68	0.51	0.79	0.63	0.56	0.63	0.73
Adj. Flow (vph)	68	854	88	104	832	28	131	52	87	48	60	60
RTOR Reduction (vph)	0	8	0	0	2	0	0	0	63	0	55	0
Lane Group Flow (vph)	68	934	0	104	858	0	131	52	24	0	113	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6		7	4			8	
Permitted Phases	2			6			4		4		8	
Actuated Green, G (s)	50.1	45.1		51.1	45.6		24.1	24.1	24.1		7.7	
Effective Green, g (s)	50.1	45.1		51.1	45.6		24.1	24.1	24.1		7.7	
Actuated g/C Ratio	0.57	0.51		0.58	0.52		0.27	0.27	0.27		0.09	
Clearance Time (s)	4.2	4.9		4.2	4.9		4.2	4.2	4.2		4.2	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0	2.0		2.0	
Lane Grp Cap (vph)	297	1506		275	1536		295	429	365		212	
v/s Ratio Prot	0.01	c0.32		c0.02	0.29		c0.06	0.03				
v/s Ratio Perm	0.12			0.20			c0.06		0.02		0.05	
v/c Ratio	0.23	0.62		0.38	0.56		0.44	0.12	0.07		0.53	
Uniform Delay, d1	9.1	15.3		9.3	14.4		25.6	24.0	23.6		38.4	
Progression Factor	0.67	0.74		1.80	1.54		1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.1	1.5		0.3	1.3		0.4	0.0	0.0		1.3	
Delay (s)	6.2	12.8		17.1	23.4		25.9	24.0	23.6		39.7	
Level of Service	A	B		B	C		C	C	C		D	
Approach Delay (s)		12.4			22.7			24.8			39.7	
Approach LOS		B			C			C			D	
Intersection Summary												
HCM 2000 Control Delay		19.8				HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio		0.57										
Actuated Cycle Length (s)		88.0			Sum of lost time (s)			17.5				
Intersection Capacity Utilization		54.7%				ICU Level of Service			A			
Analysis Period (min)		15										
c Critical Lane Group												

Queues
14: N College Ave & Dell Range Blvd

Timing Plan: Midday

6/3/2014



Lane Group	EBL	EBT	EBC	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	72	317	405	76	391	359	345	60	312
V/c Ratio	0.18	0.67	0.59	0.29	0.52	0.83	0.37	0.18	0.52
Control Delay	13.6	29.1	6.2	16.9	23.8	42.9	20.2	17.1	24.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	29.1	6.2	16.9	23.8	42.9	20.2	17.1	24.5
Queue Length 50th (ft)	17	113	0	18	67	111	53	15	50
Queue Length 95th (ft)	43	191	45	36	127	#273	98	30	103
Internal Link Dist (ft)		649			1940		931		925
Turn Bay Length (ft)	250			250		330		150	
Base Capacity (vph)	466	874	921	385	1626	432	1181	404	1171
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.36	0.44	0.20	0.24	0.83	0.29	0.15	0.27

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
14: N College Ave & Dell Range Blvd

Timing Plan: Midday

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑ ↗	↑ ↘	↑ ↙	↑ ↖	↑ ↗ ↖	↑ ↖	↑ ↗	↑ ↗ ↖	↑ ↗	↑ ↗	↑ ↗ ↖	↑ ↗
Volume (vph)	65	260	344	56	297	54	330	193	77	38	208	70
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9	4.9	4.9	4.9		4.9	4.9		4.9	4.9	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Fr _t	1.00	1.00	0.85	1.00	0.97		1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1490	1569	1333	1490	2898		1490	2835		1490	2854	
Flt Permitted	0.47	1.00	1.00	0.37	1.00		0.54	1.00		0.52	1.00	
Satd. Flow (perm)	738	1569	1333	585	2898		843	2835		815	2854	
Peak-hour factor, PHF	0.90	0.82	0.85	0.74	0.93	0.75	0.92	0.83	0.69	0.63	0.93	0.80
Adj. Flow (vph)	72	317	405	76	319	72	359	233	112	60	224	88
RTOR Reduction (vph)	0	0	289	0	23	0	0	54	0	0	46	0
Lane Group Flow (vph)	72	317	116	76	368	0	359	291	0	60	266	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6			8			4		
Actuated Green, G (s)	27.0	19.9	19.9	20.4	16.6		31.1	20.5		18.6	12.9	
Effective Green, g (s)	27.0	19.9	19.9	20.4	16.6		31.1	20.5		18.6	12.9	
Actuated g/C Ratio	0.39	0.29	0.29	0.29	0.24		0.45	0.29		0.27	0.19	
Clearance Time (s)	4.9	4.9	4.9	4.9	4.9		4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.0	3.0	3.0	2.0	5.0		2.0	3.0		2.0	4.0	
Lane Grp Cap (vph)	363	449	381	221	692		501	836		273	529	
v/s Ratio Prot	c0.02	c0.20		c0.02	0.13		c0.14	0.10		0.02	0.09	
v/s Ratio Perm	0.06		0.09	0.08			c0.18			0.04		
v/c Ratio	0.20	0.71	0.30	0.34	0.53		0.72	0.35		0.22	0.50	
Uniform Delay, d1	15.6	22.2	19.4	23.6	23.1		16.4	19.2		20.5	25.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	5.0	0.5	0.3	1.4		4.0	0.3		0.1	1.0	
Delay (s)	15.7	27.2	19.8	24.0	24.5		20.5	19.5		20.7	26.5	
Level of Service	B	C	B	C	C		C	B		C	C	
Approach Delay (s)		22.4			24.4			20.0			25.5	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay		22.6			HCM 2000 Level of Service			C				
HCM 2000 Volume to Capacity ratio		0.73										
Actuated Cycle Length (s)		69.5			Sum of lost time (s)			19.6				
Intersection Capacity Utilization		67.5%			ICU Level of Service			C				
Analysis Period (min)		15										
c Critical Lane Group												

Queues
34: Ridge Rd & Dell Range Blvd

Timing Plan: Midday

6/3/2014



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	136	572	156	72	723	189	195	60	139	164	88
V/c Ratio	0.39	0.38	0.21	0.17	0.51	0.75	0.79	0.19	0.60	0.68	0.28
Control Delay	7.1	7.9	2.0	6.3	17.1	46.1	58.1	1.3	36.1	49.0	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.1	7.9	2.0	6.3	17.1	46.1	58.1	1.3	36.1	49.0	4.8
Queue Length 50th (ft)	9	164	26	22	180	82	103	0	58	84	0
Queue Length 95th (ft)	9	59	m5	7	211	121	#175	0	81	124	19
Internal Link Dist (ft)		3132			1170		929			920	
Turn Bay Length (ft)	250		75	250		200		215	150		200
Base Capacity (vph)	354	1518	755	432	1427	252	281	344	235	281	344
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.38	0.21	0.17	0.51	0.75	0.69	0.17	0.59	0.58	0.26

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

34: Ridge Rd & Dell Range Blvd

Timing Plan: Midday

6/3/2014

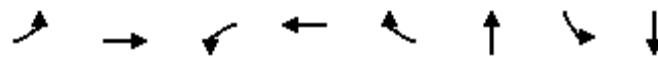
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑		↑	↑	↑	↑	↑	↑
Volume (vph)	101	532	140	56	591	58	149	166	50	99	126	80
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9	4.9	4.2	4.9		4.2	4.2	4.2	4.2	4.2	4.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1490	2980	1333	1490	2926		1490	1569	1333	1490	1569	1333
Flt Permitted	0.30	1.00	1.00	0.41	1.00		0.49	1.00	1.00	0.42	1.00	1.00
Satd. Flow (perm)	475	2980	1333	645	2926		762	1569	1333	666	1569	1333
Peak-hour factor, PHF	0.74	0.93	0.90	0.78	0.93	0.66	0.79	0.85	0.83	0.71	0.77	0.91
Adj. Flow (vph)	136	572	156	72	635	88	189	195	60	139	164	88
RTOR Reduction (vph)	0	0	78	0	12	0	0	0	51	0	0	74
Lane Group Flow (vph)	136	572	78	72	711	0	189	195	9	139	164	14
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6			8		8	4		4
Actuated Green, G (s)	50.5	44.0	44.0	47.7	42.6		21.7	13.9	13.9	21.1	13.6	13.6
Effective Green, g (s)	50.5	44.0	44.0	47.7	42.6		21.7	13.9	13.9	21.1	13.6	13.6
Actuated g/C Ratio	0.57	0.50	0.50	0.54	0.48		0.25	0.16	0.16	0.24	0.15	0.15
Clearance Time (s)	4.2	4.9	4.9	4.2	4.9		4.2	4.2	4.2	4.2	4.2	4.2
Vehicle Extension (s)	2.0	4.0	4.0	2.0	4.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	347	1490	666	398	1416		252	247	210	229	242	206
v/s Ratio Prot	c0.03	0.19		0.01	c0.24		c0.07	c0.12		0.05	0.10	
v/s Ratio Perm	0.20		0.06	0.09			0.12		0.01	0.09		0.01
v/c Ratio	0.39	0.38	0.12	0.18	0.50		0.75	0.79	0.05	0.61	0.68	0.07
Uniform Delay, d1	9.3	13.6	11.7	9.7	15.5		29.4	35.6	31.4	28.2	35.1	31.8
Progression Factor	0.54	0.50	0.58	0.68	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.6	0.3	0.1	1.2		10.6	14.3	0.0	3.1	5.8	0.0
Delay (s)	5.3	7.4	7.1	6.7	16.7		40.0	49.9	31.5	31.3	40.9	31.8
Level of Service	A	A	A	A	B		D	D	C	C	D	C
Approach Delay (s)					15.8			43.2			35.5	
Approach LOS					B			D			D	

Intersection Summary												
HCM 2000 Control Delay	20.7	HCM 2000 Level of Service									C	
HCM 2000 Volume to Capacity ratio	0.58											
Actuated Cycle Length (s)	88.0	Sum of lost time (s)									17.5	
Intersection Capacity Utilization	60.5%	ICU Level of Service									B	
Analysis Period (min)	15											
c Critical Lane Group												

Queues
37: Marble Ave & Dell Range Blvd

Timing Plan: Midday

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	79	635	4	619	127	12	116	108
V/c Ratio	0.15	0.30	0.01	0.32	0.14	0.06	0.67	0.22
Control Delay	12.9	14.0	5.0	8.2	2.1	29.8	53.1	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.9	14.0	5.0	8.2	2.1	29.8	53.1	1.0
Queue Length 50th (ft)	29	152	1	73	0	6	62	0
Queue Length 95th (ft)	m52	204	2	128	19	16	97	0
Internal Link Dist (ft)		1170		606		928		914
Turn Bay Length (ft)	250		250		150			
Base Capacity (vph)	535	2148	516	1964	922	297	264	566
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.30	0.01	0.32	0.14	0.04	0.44	0.19

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
37: Marble Ave & Dell Range Blvd

Timing Plan: Midday

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	62	584	11	2	607	107	5	3	0	95	0	96
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9		4.9	4.9	4.9		4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00		1.00	1.00	
Fr _t	1.00	1.00		1.00	1.00	0.85		1.00		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97		0.95	1.00	
Satd. Flow (prot)	1490	2966		1490	2980	1333		1518		1490	1333	
Flt Permitted	0.40	1.00		0.40	1.00	1.00		0.84		0.75	1.00	
Satd. Flow (perm)	626	2966		626	2980	1333		1323		1176	1333	
Peak-hour factor, PHF	0.78	0.95	0.55	0.50	0.98	0.84	0.63	0.75	0.25	0.82	0.25	0.89
Adj. Flow (vph)	79	615	20	4	619	127	8	4	0	116	0	108
RTOR Reduction (vph)	0	2	0	0	0	49	0	0	0	0	92	0
Lane Group Flow (vph)	79	633	0	4	619	78	0	12	0	116	16	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	65.9	59.8		55.3	54.1	54.1		13.0		13.0	13.0	
Effective Green, g (s)	65.9	59.8		55.3	54.1	54.1		13.0		13.0	13.0	
Actuated g/C Ratio	0.75	0.68		0.63	0.61	0.61		0.15		0.15	0.15	
Clearance Time (s)	4.9	4.9		4.9	4.9	4.9		4.2		4.2	4.2	
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0		2.0		2.0	2.0	
Lane Grp Cap (vph)	536	2015		405	1832	819		195		173	196	
v/s Ratio Prot	c0.01	c0.21		0.00	c0.21						0.01	
v/s Ratio Perm	0.10			0.01		0.06		0.01		c0.10		
v/c Ratio	0.15	0.31		0.01	0.34	0.10		0.06		0.67	0.08	
Uniform Delay, d1	3.9	5.7		6.7	8.2	6.9		32.3		35.5	32.3	
Progression Factor	2.73	2.43		1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.4		0.0	0.5	0.2		0.0		7.8	0.1	
Delay (s)	10.8	14.4		6.7	8.7	7.2		32.3		43.2	32.4	
Level of Service	B	B		A	A	A		C		D	C	
Approach Delay (s)		14.0			8.5			32.3			38.0	
Approach LOS		B			A			C			D	
Intersection Summary												
HCM 2000 Control Delay		14.8			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.39										
Actuated Cycle Length (s)		88.0			Sum of lost time (s)			14.0				
Intersection Capacity Utilization		44.7%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

Dell Range Blvd

Direction	EB	WB	All
Total Delay (hr)	34	36	70
Stops (#)	4942	4732	9674
Average Speed (mph)	26	25	26
Total Travel Time (hr)	98	98	196
Distance Traveled (mi)	2545	2477	5022
Fuel Consumed (gal)	165	161	326
Fuel Economy (mpg)	15.4	15.3	15.4
Unserved Vehicles (#)	0	0	0
Vehicles in dilemma zone (#)	458	468	926
Performance Index	48.1	48.9	97.0

Network Totals

Number of Intersections	15
Total Delay (hr)	132
Stops (#)	14562
Average Speed (mph)	22
Total Travel Time (hr)	309
Distance Traveled (mi)	6736
Fuel Consumed (gal)	472
Fuel Economy (mpg)	14.3
Unserved Vehicles (#)	0
Vehicles in dilemma zone (#)	1084
Performance Index	172.0

Queues
2: Powderhouse Rd & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	28	1082	52	730	136	44	36	60	213	24	32
V/c Ratio	0.06	0.60	0.20	0.41	0.10	0.17	0.10	0.17	0.84	0.07	0.09
Control Delay	7.7	15.3	7.4	11.8	0.1	30.8	29.2	7.5	62.9	28.5	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.7	15.3	7.4	11.8	0.1	30.8	29.2	7.5	62.9	28.5	1.9
Queue Length 50th (ft)	7	220	8	65	0	22	18	0	128	12	0
Queue Length 95th (ft)	11	328	m13	195	0	38	28	18	150	27	2
Internal Link Dist (ft)		1929		687			421			1527	
Turn Bay Length (ft)	171		195								100
Base Capacity (vph)	461	1805	300	1920	1333	306	413	400	303	413	400
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.60	0.17	0.38	0.10	0.14	0.09	0.15	0.70	0.06	0.08

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: Powderhouse Rd & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014

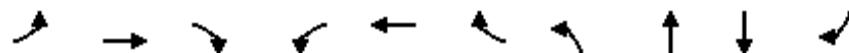
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑	↑	↑	↑	↑	↑	↑	↑
Volume (vph)	18	971	45	40	686	113	31	22	46	151	19	26
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9		4.2	4.9	4.0	4.2	4.2	4.2	4.2	4.2	4.2
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1490	2951		1490	2980	1333	1490	1569	1333	1490	1569	1333
Flt Permitted	0.33	1.00		0.20	1.00	1.00	0.74	1.00	1.00	0.73	1.00	1.00
Satd. Flow (perm)	521	2951		312	2980	1333	1163	1569	1333	1151	1569	1333
Peak-hour factor, PHF	0.64	0.96	0.63	0.77	0.94	0.83	0.71	0.61	0.77	0.71	0.79	0.81
Adj. Flow (vph)	28	1011	71	52	730	136	44	36	60	213	24	32
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	47	0	0	25
Lane Group Flow (vph)	28	1077	0	52	730	136	44	36	13	213	24	7
Turn Type	pm+pt	NA		pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		Free	8		8	4		4
Actuated Green, G (s)	65.2	58.5		63.8	57.8	100.0	22.2	22.2	22.2	22.2	22.2	22.2
Effective Green, g (s)	65.2	58.5		63.8	57.8	100.0	22.2	22.2	22.2	22.2	22.2	22.2
Actuated g/C Ratio	0.65	0.58		0.64	0.58	1.00	0.22	0.22	0.22	0.22	0.22	0.22
Clearance Time (s)	4.2	4.9		4.2	4.9		4.2	4.2	4.2	4.2	4.2	4.2
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	404	1726		269	1722	1333	258	348	295	255	348	295
v/s Ratio Prot	0.00	c0.37		c0.01	0.24			0.02			0.02	
v/s Ratio Perm	0.04			0.11		c0.10	0.04		0.01	c0.19		0.01
v/c Ratio	0.07	0.62		0.19	0.42	0.10	0.17	0.10	0.05	0.84	0.07	0.02
Uniform Delay, d1	9.0	13.6		14.6	11.8	0.0	31.5	31.0	30.6	37.2	30.7	30.4
Progression Factor	1.00	1.00		0.66	0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	1.7		0.1	0.7	0.1	0.1	0.0	0.0	19.6	0.0	0.0
Delay (s)	9.0	15.3		9.8	10.2	0.1	31.6	31.0	30.6	56.8	30.8	30.4
Level of Service	A	B		A	B	A	C	C	C	E	C	C
Approach Delay (s)		15.1			8.7			31.0			51.3	
Approach LOS		B			A			C			D	
Intersection Summary												
HCM 2000 Control Delay		17.6				HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio		0.65										
Actuated Cycle Length (s)		100.0				Sum of lost time (s)			13.3			
Intersection Capacity Utilization		63.7%				ICU Level of Service			B			
Analysis Period (min)		15										
c Critical Lane Group												

Queues

3: Stillwater Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014



Lane Group	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	145	877	196	79	670	24	200	80	60	104
V/c Ratio	0.33	0.49	0.22	0.23	0.39	0.02	0.81	0.23	0.21	0.08
Control Delay	4.9	7.2	0.7	3.2	5.0	0.0	59.8	12.1	30.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.9	7.2	0.7	3.2	5.0	0.0	59.8	12.1	30.7	0.1
Queue Length 50th (ft)	12	87	0	3	33	0	121	10	31	0
Queue Length 95th (ft)	23	109	m3	11	54	0	123	19	29	0
Internal Link Dist (ft)		687			705			916	424	
Turn Bay Length (ft)	170		156	190			30			75
Base Capacity (vph)	452	1794	880	374	1703	1333	346	469	408	1333
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.49	0.22	0.21	0.39	0.02	0.58	0.17	0.15	0.08

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
3: Stillwater Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

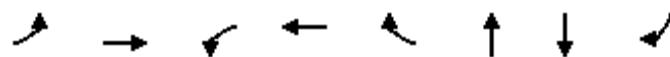
6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑	↑	↑	↑	↑	↑
Volume (vph)	110	851	176	62	616	17	132	12	36	22	13	77
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9	4.9	4.2	4.9	4.0	4.2	4.2			4.2	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Fr _t	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.89			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1490	2980	1333	1490	2980	1333	1490	1392			1528	1333
Flt Permitted	0.35	1.00	1.00	0.28	1.00	1.00	0.72	1.00			0.84	1.00
Satd. Flow (perm)	542	2980	1333	447	2980	1333	1126	1392			1325	1333
Peak-hour factor, PHF	0.76	0.97	0.90	0.78	0.92	0.71	0.66	0.60	0.60	0.69	0.46	0.74
Adj. Flow (vph)	145	877	196	79	670	24	200	20	60	32	28	104
RTOR Reduction (vph)	0	0	80	0	0	0	0	47	0	0	0	0
Lane Group Flow (vph)	145	877	116	79	670	24	200	33	0	0	60	104
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Free	Perm	NA		Perm	NA	Free
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		Free	8			4		Free
Actuated Green, G (s)	66.9	59.4	59.4	62.5	57.2	100.0	22.0	22.0			22.0	100.0
Effective Green, g (s)	66.9	59.4	59.4	62.5	57.2	100.0	22.0	22.0			22.0	100.0
Actuated g/C Ratio	0.67	0.59	0.59	0.62	0.57	1.00	0.22	0.22			0.22	1.00
Clearance Time (s)	4.2	4.9	4.9	4.2	4.9		4.2	4.2			4.2	
Vehicle Extension (s)	2.0	4.0	4.0	2.0	4.0		2.0	2.0			2.0	
Lane Grp Cap (vph)	433	1770	791	334	1704	1333	247	306			291	1333
v/s Ratio Prot	c0.03	c0.29		0.01	0.22			0.02				
v/s Ratio Perm	0.20		0.09	0.14		0.02	c0.18				0.05	c0.08
v/c Ratio	0.33	0.50	0.15	0.24	0.39	0.02	0.81	0.11			0.21	0.08
Uniform Delay, d1	6.5	11.7	9.0	7.7	11.8	0.0	37.0	31.2			31.9	0.0
Progression Factor	0.50	0.48	0.09	0.26	0.32	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	0.1	0.8	0.3	0.1	0.7	0.0	16.6	0.1			0.1	0.1
Delay (s)	3.4	6.4	1.1	2.1	4.5	0.0	53.6	31.2			32.0	0.1
Level of Service	A	A	A	A	A	A	D	C			C	A
Approach Delay (s)					4.1			47.2			11.8	
Approach LOS					A			D			B	
Intersection Summary												
HCM 2000 Control Delay				10.1							B	
HCM 2000 Volume to Capacity ratio				0.57								
Actuated Cycle Length (s)				100.0							13.3	
Intersection Capacity Utilization				58.4%							B	
Analysis Period (min)				15								
c Critical Lane Group												

Queues
4: Driftwood Dr & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	36	981	28	683	80	96	60	48
v/c Ratio	0.07	0.39	0.07	0.27	0.06	0.56	0.73	0.04
Control Delay	3.4	3.2	0.6	0.5	0.1	32.6	87.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.4	3.2	0.6	0.5	0.1	32.6	87.9	0.1
Queue Length 50th (ft)	2	34	0	3	0	24	38	0
Queue Length 95th (ft)	12	134	0	3	0	30	41	0
Internal Link Dist (ft)		705		569		917	428	
Turn Bay Length (ft)	180		190		180			75
Base Capacity (vph)	517	2494	374	2509	1333	351	207	1333
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.39	0.07	0.27	0.06	0.27	0.29	0.04

Intersection Summary

HCM Signalized Intersection Capacity Analysis

4: Driftwood Dr & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑	↑		↔		↑	↑	↑
Volume (vph)	24	871	24	16	656	57	17	9	37	53	2	35
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9		4.9	4.9	4.0		4.2			4.2	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Fr _t	1.00	0.99		1.00	1.00	0.85		0.92			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.96	1.00
Satd. Flow (prot)	1490	2960		1490	2980	1333		1427			1499	1333
Flt Permitted	0.39	1.00		0.28	1.00	1.00		0.90			0.56	1.00
Satd. Flow (perm)	615	2960		446	2980	1333		1297			872	1333
Peak-hour factor, PHF	0.67	0.93	0.55	0.57	0.96	0.71	0.71	0.56	0.66	0.95	0.50	0.73
Adj. Flow (vph)	36	937	44	28	683	80	24	16	56	56	4	48
RTOR Reduction (vph)	0	2	0	0	0	0	0	51	0	0	0	0
Lane Group Flow (vph)	36	979	0	28	683	80	0	45	0	0	60	48
Turn Type	Perm	NA		Perm	NA	Free	Perm	NA		Perm	NA	Free
Protected Phases		2				6			8			4
Permitted Phases	2			6		Free	8			4		Free
Actuated Green, G (s)	82.4	82.4		82.4	82.4	100.0		8.5			8.5	100.0
Effective Green, g (s)	82.4	82.4		82.4	82.4	100.0		8.5			8.5	100.0
Actuated g/C Ratio	0.82	0.82		0.82	0.82	1.00		0.08			0.08	1.00
Clearance Time (s)	4.9	4.9		4.9	4.9			4.2			4.2	
Vehicle Extension (s)	4.0	4.0		4.0	4.0			2.0			2.0	
Lane Grp Cap (vph)	506	2439		367	2455	1333		110			74	1333
v/s Ratio Prot	c0.33			0.23								
v/s Ratio Perm	0.06			0.06		0.06		0.03			c0.07	0.04
v/c Ratio	0.07	0.40		0.08	0.28	0.06		0.41			0.81	0.04
Uniform Delay, d1	1.6	2.3		1.7	2.0	0.0		43.4			45.0	0.0
Progression Factor	1.24	1.02		0.08	0.09	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.2	0.5		0.4	0.3	0.1		0.9			44.9	0.1
Delay (s)	2.3	2.8		0.5	0.4	0.1		44.3			89.9	0.1
Level of Service	A	A		A	A	A		D			F	A
Approach Delay (s)		2.8			0.4			44.3			49.9	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay		6.4										
HCM 2000 Volume to Capacity ratio		0.44										
Actuated Cycle Length (s)		100.0										
Intersection Capacity Utilization		48.1%										
Analysis Period (min)		15										
c Critical Lane Group												

Queues

5: Frontier Mall Dr & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	88	962	48	673	156	20	56	149	124
v/c Ratio	0.17	0.49	0.15	0.37	0.12	0.12	0.20	0.75	0.38
Control Delay	5.3	12.5	13.3	13.9	0.2	32.8	17.1	60.3	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.3	12.5	13.3	13.9	0.2	32.8	17.1	60.3	12.4
Queue Length 50th (ft)	9	162	5	141	0	11	11	91	11
Queue Length 95th (ft)	20	272	39	300	0	19	18	130	36
Internal Link Dist (ft)		569		1110			911		1473
Turn Bay Length (ft)	185		140		140	75			
Base Capacity (vph)	528	1954	361	1826	1333	301	475	359	506
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.49	0.13	0.37	0.12	0.07	0.12	0.42	0.25

Intersection Summary

HCM Signalized Intersection Capacity Analysis

5: Frontier Mall Dr & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑	↑	↑	↑		↑	↑	
Volume (vph)	65	870	27	32	646	134	12	11	27	122	15	77
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9		4.2	4.9	4.0	4.2	4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Fr _t	1.00	0.99		1.00	1.00	0.85	1.00	0.90		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1490	2964		1490	2980	1333	1490	1417		1490	1371	
Flt Permitted	0.37	1.00		0.25	1.00	1.00	0.61	1.00		0.72	1.00	
Satd. Flow (perm)	574	2964		398	2980	1333	949	1417		1130	1371	
Peak-hour factor, PHF	0.74	0.94	0.75	0.67	0.96	0.86	0.60	0.55	0.75	0.82	0.75	0.74
Adj. Flow (vph)	88	926	36	48	673	156	20	20	36	149	20	104
RTOR Reduction (vph)	0	2	0	0	0	0	0	30	0	0	86	0
Lane Group Flow (vph)	88	960	0	48	673	156	20	26	0	149	38	0
Turn Type	pm+pt	NA		pm+pt	NA	Free	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6				8			4
Permitted Phases	2			6		Free	8				4	
Actuated Green, G (s)	73.9	65.0		64.0	60.0	100.0	17.7	17.7		17.7	17.7	
Effective Green, g (s)	73.9	65.0		64.0	60.0	100.0	17.7	17.7		17.7	17.7	
Actuated g/C Ratio	0.74	0.65		0.64	0.60	1.00	0.18	0.18		0.18	0.18	
Clearance Time (s)	4.2	4.9		4.2	4.9		4.2	4.2		4.2	4.2	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	506	1926		298	1788	1333	167	250		200	242	
v/s Ratio Prot	c0.02	c0.32		0.01	0.23			0.02			0.03	
v/s Ratio Perm	0.11			0.10		0.12	0.02			c0.13		
v/c Ratio	0.17	0.50		0.16	0.38	0.12	0.12	0.11		0.74	0.16	
Uniform Delay, d1	5.6	9.1		11.2	10.3	0.0	34.6	34.5		39.0	34.8	
Progression Factor	0.82	1.13		1.90	1.07	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.9		0.1	0.5	0.2	0.1	0.1		12.3	0.1	
Delay (s)	4.7	11.1		21.3	11.6	0.2	34.7	34.6		51.4	35.0	
Level of Service	A	B		C	B	A	C	C		D	C	
Approach Delay (s)		10.5			10.1			34.6			43.9	
Approach LOS		B			B			C			D	
Intersection Summary												
HCM 2000 Control Delay		15.2			HCM 2000 Level of Service				B			
HCM 2000 Volume to Capacity ratio		0.54										
Actuated Cycle Length (s)		100.0			Sum of lost time (s)				13.3			
Intersection Capacity Utilization		58.7%			ICU Level of Service				B			
Analysis Period (min)		15										
c Critical Lane Group												

Queues
6: Prairie Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	72	1089	52	801	263	68	88	188	190	64
V/c Ratio	0.19	0.68	0.26	0.55	0.20	0.57	0.62	0.72	0.73	0.19
Control Delay	17.0	26.6	27.5	33.8	0.3	61.8	52.5	54.1	54.1	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.0	26.6	27.5	33.8	0.3	61.8	52.5	54.1	54.1	1.8
Queue Length 50th (ft)	19	335	20	247	0	42	40	116	117	0
Queue Length 95th (ft)	51	442	42	293	0	57	60	193	135	0
Internal Link Dist (ft)		1110		710			916		1682	
Turn Bay Length (ft)	250		250		205	120				100
Base Capacity (vph)	376	1604	218	1549	1333	146	165	299	302	376
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.68	0.24	0.52	0.20	0.47	0.53	0.63	0.63	0.17

Intersection Summary

HCM Signalized Intersection Capacity Analysis
6: Prairie Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	57	979	29	39	777	234	42	37	24	319	16	46
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9		4.9	4.9	4.0	4.2	4.2		4.2	4.2	4.2
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	1.00
Fr _t	1.00	1.00		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00
Satd. Flow (prot)	1490	2966		1490	2980	1333	1490	1483		1416	1428	1333
Flt Permitted	0.27	1.00		0.17	1.00	1.00	0.95	1.00		0.95	0.96	1.00
Satd. Flow (perm)	429	2966		259	2980	1333	1490	1483		1416	1428	1333
Peak-hour factor, PHF	0.79	0.93	0.81	0.75	0.97	0.89	0.62	0.66	0.75	0.90	0.67	0.72
Adj. Flow (vph)	72	1053	36	52	801	263	68	56	32	354	24	64
RTOR Reduction (vph)	0	2	0	0	0	0	0	21	0	0	0	52
Lane Group Flow (vph)	72	1087	0	52	801	263	68	67	0	188	190	12
Turn Type	pm+pt	NA		pm+pt	NA	Free	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	2			6		Free						4
Actuated Green, G (s)	61.2	52.2		51.3	47.2	100.0	7.1	7.1		18.4	18.4	18.4
Effective Green, g (s)	61.2	52.2		51.3	47.2	100.0	7.1	7.1		18.4	18.4	18.4
Actuated g/C Ratio	0.61	0.52		0.51	0.47	1.00	0.07	0.07		0.18	0.18	0.18
Clearance Time (s)	4.9	4.9		4.9	4.9		4.2	4.2		4.2	4.2	4.2
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0		4.0	4.0	4.0
Lane Grp Cap (vph)	359	1548		183	1406	1333	105	105		260	262	245
v/s Ratio Prot	0.02	c0.37		0.01	0.27		c0.05	0.04		0.13	c0.13	
v/s Ratio Perm	0.10			0.13		c0.20						0.01
v/c Ratio	0.20	0.70		0.28	0.57	0.20	0.65	0.63		0.72	0.73	0.05
Uniform Delay, d1	14.4	18.0		25.0	19.1	0.0	45.2	45.2		38.4	38.4	33.6
Progression Factor	1.29	1.23		1.70	1.54	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	2.4		0.3	1.5	0.3	9.8	8.9		10.2	10.2	0.1
Delay (s)	18.7	24.6		42.7	30.8	0.3	55.1	54.1		48.6	48.6	33.7
Level of Service	B	C		D	C	A	E	D		D	D	C
Approach Delay (s)		24.3			24.2			54.5			46.4	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay		29.3										C
HCM 2000 Volume to Capacity ratio		0.69										
Actuated Cycle Length (s)		100.0										18.2
Intersection Capacity Utilization		65.9%										C
Analysis Period (min)		15										
c Critical Lane Group												

Queues

7: Rue Terre & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	71	1333	68	985	124	120	133	16	104
V/c Ratio	0.22	0.69	0.30	0.51	0.14	0.40	0.79	0.06	0.32
Control Delay	4.4	15.1	5.9	7.0	1.4	17.4	69.4	31.4	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.4	15.1	5.9	7.0	1.4	17.4	69.4	31.4	9.2
Queue Length 50th (ft)	1	428	4	81	1	22	81	9	0
Queue Length 95th (ft)	m11	519	m10	116	2	48	118	12	35
Internal Link Dist (ft)		710		830		892		916	
Turn Bay Length (ft)	250		250		150				120
Base Capacity (vph)	342	1932	242	1941	911	377	223	374	396
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.69	0.28	0.51	0.14	0.32	0.60	0.04	0.26

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

7: Rue Terre & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑	↑		↔		↑	↑	↑
Volume (vph)	53	1181	36	67	936	87	26	9	57	104	7	87
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9		4.9	4.9	4.9		4.2		4.2	4.2	4.2
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00		1.00	1.00	1.00
Fr _t	1.00	0.99		1.00	1.00	0.85		0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	1.00	1.00
Satd. Flow (prot)	1490	2964		1490	2980	1333		1412		1490	1569	1333
Flt Permitted	0.25	1.00		0.15	1.00	1.00		0.93		0.60	1.00	1.00
Satd. Flow (perm)	388	2964		232	2980	1333		1333		941	1569	1333
Peak-hour factor, PHF	0.75	0.92	0.74	0.99	0.95	0.70	0.89	0.75	0.72	0.78	0.44	0.84
Adj. Flow (vph)	71	1284	49	68	985	124	29	12	79	133	16	104
RTOR Reduction (vph)	0	2	0	0	0	44	0	65	0	0	0	85
Lane Group Flow (vph)	71	1331	0	68	985	80	0	55	0	133	16	19
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	68.2	64.2		68.2	64.2	64.2		17.8		17.8	17.8	17.8
Effective Green, g (s)	68.2	64.2		68.2	64.2	64.2		17.8		17.8	17.8	17.8
Actuated g/C Ratio	0.68	0.64		0.68	0.64	0.64		0.18		0.18	0.18	0.18
Clearance Time (s)	4.9	4.9		4.9	4.9	4.9		4.2		4.2	4.2	4.2
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	308	1902		208	1913	855		237		167	279	237
v/s Ratio Prot	0.01	c0.45		c0.01	0.33						0.01	
v/s Ratio Perm	0.15			0.21		0.06		0.04		c0.14		0.01
v/c Ratio	0.23	0.70		0.33	0.51	0.09		0.23		0.80	0.06	0.08
Uniform Delay, d1	10.1	11.6		15.7	9.6	6.8		35.2		39.4	34.1	34.3
Progression Factor	0.51	1.03		0.35	0.58	0.60		1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	1.6		0.3	0.8	0.2		0.5		22.5	0.1	0.1
Delay (s)	5.2	13.6		5.8	6.3	4.3		35.7		61.9	34.2	34.4
Level of Service	A	B		A	A	A		D		E	C	C
Approach Delay (s)		13.1			6.1			35.7			48.8	
Approach LOS		B			A			D			D	
Intersection Summary												
HCM 2000 Control Delay		14.3									B	
HCM 2000 Volume to Capacity ratio		0.70										
Actuated Cycle Length (s)		100.0									14.0	
Intersection Capacity Utilization		69.7%									C	
Analysis Period (min)		15										
c Critical Lane Group												

Queues
8: Walmart & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	264	1337	33	992	247	50	93	256	197
V/c Ratio	0.73	0.70	0.15	0.62	0.30	0.31	0.58	0.56	0.63
Control Delay	28.7	10.8	12.8	30.6	11.6	35.3	28.0	38.2	17.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.7	10.8	12.8	30.6	11.6	35.3	28.0	38.2	17.9
Queue Length 50th (ft)	74	86	11	304	33	26	7	72	12
Queue Length 95th (ft)	117	264	m17	m332	m77	42	8	87	14
Internal Link Dist (ft)		830		1324			423		927
Turn Bay Length (ft)	250		250		180				125
Base Capacity (vph)	407	1908	240	1598	829	178	193	498	351
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.70	0.14	0.62	0.30	0.28	0.48	0.51	0.56

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
8: Walmart & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑	↑	↑	↑		↑↑	↑	
Volume (vph)	193	1190	41	31	962	212	35	6	59	200	12	152
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9		4.2	4.9	4.9	4.2	4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	
Fr _t	1.00	1.00		1.00	1.00	0.85	1.00	0.87		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1490	2966		1490	2980	1333	1490	1364		2891	1357	
Flt Permitted	0.19	1.00		0.16	1.00	1.00	0.75	1.00		0.42	1.00	
Satd. Flow (perm)	305	2966		256	2980	1333	1184	1364		1281	1357	
Peak-hour factor, PHF	0.73	0.92	0.93	0.93	0.97	0.86	0.70	0.50	0.73	0.78	0.60	0.86
Adj. Flow (vph)	264	1293	44	33	992	247	50	12	81	256	20	177
RTOR Reduction (vph)	0	2	0	0	0	117	0	77	0	0	156	0
Lane Group Flow (vph)	264	1335	0	33	992	130	50	16	0	256	41	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	69.4	61.8		56.2	52.8	52.8	11.0	5.3		21.5	11.6	
Effective Green, g (s)	69.4	61.8		56.2	52.8	52.8	11.0	5.3		21.5	11.6	
Actuated g/C Ratio	0.69	0.62		0.56	0.53	0.53	0.11	0.05		0.22	0.12	
Clearance Time (s)	4.2	4.9		4.2	4.9	4.9	4.2	4.2		4.2	4.2	
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	358	1832		185	1573	703	147	72		468	157	
v/s Ratio Prot	c0.09	0.45		0.01	0.33		0.02	0.01		c0.07	0.03	
v/s Ratio Perm	c0.42			0.09		0.10	0.02			c0.05		
v/c Ratio	0.74	0.73		0.18	0.63	0.19	0.34	0.23		0.55	0.26	
Uniform Delay, d1	9.8	13.3		10.4	16.7	12.3	41.0	45.4		34.0	40.3	
Progression Factor	2.20	0.62		1.69	1.57	4.60	1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.3	2.0		0.1	1.3	0.4	0.5	0.6		0.7	0.3	
Delay (s)	26.9	10.2		17.8	27.5	57.1	41.5	46.0		34.7	40.6	
Level of Service	C	B		B	C	E	D	D		C	D	
Approach Delay (s)		13.0			33.0			44.4			37.2	
Approach LOS		B			C			D			D	
Intersection Summary												
HCM 2000 Control Delay		24.8			HCM 2000 Level of Service				C			
HCM 2000 Volume to Capacity ratio		0.74										
Actuated Cycle Length (s)		100.0			Sum of lost time (s)				17.5			
Intersection Capacity Utilization		74.1%			ICU Level of Service				D			
Analysis Period (min)		15										
c Critical Lane Group												

Queues

9: Converse Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	84	980	505	200	773	164	531	333	367	235	303	84
V/c Ratio	0.38	0.89	0.38	0.78	0.58	0.25	1.03	1.19	0.92	1.00	0.64	0.24
Control Delay	14.5	32.5	0.6	43.4	24.2	9.4	89.8	154.3	48.9	102.2	47.3	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.5	32.5	0.6	43.4	24.2	9.4	89.8	154.3	48.9	102.2	47.3	1.5
Queue Length 50th (ft)	0	296	0	48	127	1	~188	~258	113	~167	97	0
Queue Length 95th (ft)	m27	#434	0	84	233	60	#281	#430	#223	#326	#156	0
Internal Link Dist (ft)			1324			1462			927			928
Turn Bay Length (ft)	250		180	250		100	400			150		150
Base Capacity (vph)	232	1105	1333	290	1329	666	514	279	399	236	474	357
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.89	0.38	0.69	0.58	0.25	1.03	1.19	0.92	1.00	0.64	0.24

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

9: Converse Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014

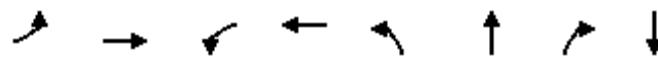
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑↑	↑
Volume (vph)	73	872	460	164	719	146	467	300	297	230	285	69
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9	4.0	4.9	4.9	4.9	4.2	4.2	4.2	4.2	4.2	4.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	0.95	1.00
Fr _t	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1490	2980	1333	1490	2980	1333	2891	1569	1333	1490	2980	1333
Flt Permitted	0.24	1.00	1.00	0.14	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	382	2980	1333	226	2980	1333	2891	1569	1333	1490	2980	1333
Peak-hour factor, PHF	0.87	0.89	0.91	0.82	0.93	0.89	0.88	0.90	0.81	0.98	0.94	0.82
Adj. Flow (vph)	84	980	505	200	773	164	531	333	367	235	303	84
RTOR Reduction (vph)	0	0	0	0	0	73	0	0	162	0	0	71
Lane Group Flow (vph)	84	980	505	200	773	91	531	333	205	235	303	13
Turn Type	pm+pt	NA	Free	pm+pt	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases	2		Free	6		6			8			7
Actuated Green, G (s)	40.6	36.1	100.0	53.0	43.6	43.6	17.8	17.8	17.8	15.9	15.9	15.9
Effective Green, g (s)	40.6	36.1	100.0	53.0	43.6	43.6	17.8	17.8	17.8	15.9	15.9	15.9
Actuated g/C Ratio	0.41	0.36	1.00	0.53	0.44	0.44	0.18	0.18	0.18	0.16	0.16	0.16
Clearance Time (s)	4.9	4.9		4.9	4.9	4.9	4.2	4.2	4.2	4.2	4.2	4.2
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0	2.0	3.0	3.0	3.0
Lane Grp Cap (vph)	204	1075	1333	271	1299	581	514	279	237	236	473	211
v/s Ratio Prot	0.02	c0.33		c0.09	0.26		0.18	c0.21		c0.16	0.10	
v/s Ratio Perm	0.15		0.38	0.30		0.07			0.15			0.01
v/c Ratio	0.41	0.91	0.38	0.74	0.60	0.16	1.03	1.19	0.87	1.00	0.64	0.06
Uniform Delay, d1	29.6	30.4	0.0	31.3	21.5	17.1	41.1	41.1	39.9	42.0	39.4	35.7
Progression Factor	0.70	0.79	1.00	0.80	1.06	1.73	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	10.2	0.6	7.9	1.8	0.5	48.5	116.8	25.6	57.0	3.0	0.1
Delay (s)	21.2	34.4	0.6	33.0	24.6	30.0	89.6	157.9	65.6	99.1	42.3	35.9
Level of Service	C	C	A	C	C	C	F	F	E	F	D	D
Approach Delay (s)		22.8			26.9			100.9			62.9	
Approach LOS		C			C			F			E	

Intersection Summary												
HCM 2000 Control Delay	50.4	HCM 2000 Level of Service										D
HCM 2000 Volume to Capacity ratio	0.97											
Actuated Cycle Length (s)	100.0	Sum of lost time (s)										18.2
Intersection Capacity Utilization	88.5%	ICU Level of Service										E
Analysis Period (min)	15											
c Critical Lane Group												

Queues
10: Windmill Rd & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	100	1295	68	938	92	113	124	180
v/c Ratio	0.29	0.69	0.29	0.51	0.49	0.37	0.35	0.62
Control Delay	5.1	10.9	6.3	6.7	42.1	37.0	8.7	35.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.1	10.9	6.3	6.7	42.1	37.0	8.7	35.3
Queue Length 50th (ft)	11	166	7	61	48	60	0	35
Queue Length 95th (ft)	m11	m211	m12	73	72	63	17	33
Internal Link Dist (ft)		1464		3132		927		928
Turn Bay Length (ft)	250		250		175		175	
Base Capacity (vph)	365	1864	250	1854	189	420	448	434
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.69	0.27	0.51	0.49	0.27	0.28	0.41

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
10: Windmill Rd & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑		↑	↑	↑		↑↑	
Volume (vph)	78	1068	86	52	821	29	66	62	84	29	35	55
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9		4.2	4.9		4.2	4.2	4.2		4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00		0.95	
Fr _t	1.00	0.99		1.00	0.99		1.00	1.00	0.85		0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00		0.99	
Satd. Flow (prot)	1490	2943		1490	2963		1490	1569	1333		2765	
Flt Permitted	0.25	1.00		0.15	1.00		0.40	1.00	1.00		0.85	
Satd. Flow (perm)	396	2943		236	2963		631	1569	1333		2368	
Peak-hour factor, PHF	0.78	0.90	0.80	0.77	0.91	0.81	0.72	0.55	0.68	0.60	0.58	0.76
Adj. Flow (vph)	100	1187	108	68	902	36	92	113	124	48	60	72
RTOR Reduction (vph)	0	5	0	0	2	0	0	0	99	0	65	0
Lane Group Flow (vph)	100	1290	0	68	936	0	92	113	25	0	115	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6		7	4			8	
Permitted Phases	2			6			4		4		8	
Actuated Green, G (s)	67.3	61.5		65.9	60.8		20.1	20.1	20.1		9.4	
Effective Green, g (s)	67.3	61.5		65.9	60.8		20.1	20.1	20.1		9.4	
Actuated g/C Ratio	0.67	0.62		0.66	0.61		0.20	0.20	0.20		0.09	
Clearance Time (s)	4.2	4.9		4.2	4.9		4.2	4.2	4.2		4.2	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0	2.0		2.0	
Lane Grp Cap (vph)	329	1809		219	1801		182	315	267		222	
v/s Ratio Prot	c0.02	c0.44		0.02	0.32		c0.03	0.07				
v/s Ratio Perm	0.19			0.19			c0.07		0.02		0.05	
v/c Ratio	0.30	0.71		0.31	0.52		0.51	0.36	0.09		0.52	
Uniform Delay, d1	6.4	13.2		8.1	11.2		34.2	34.4	32.5		43.1	
Progression Factor	0.80	0.68		0.71	0.48		1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.1	1.0		0.2	0.9		0.8	0.3	0.1		0.8	
Delay (s)	5.3	10.0		6.0	6.2		35.0	34.7	32.6		44.0	
Level of Service	A	B		A	A		C	C	C		D	
Approach Delay (s)		9.7			6.2			34.0			44.0	
Approach LOS		A			A			C			D	

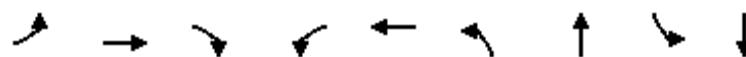
Intersection Summary

HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues
14: N College Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	120	506	467	218	544	487	539	116	329
V/c Ratio	0.25	0.94	0.62	0.96	0.90	1.15	0.80	0.43	0.65
Control Delay	24.9	66.0	15.8	88.5	57.4	122.8	40.2	34.9	39.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.9	66.0	15.8	88.5	57.4	122.8	40.2	34.9	39.3
Queue Length 50th (ft)	35	332	105	~81	171	~322	142	47	90
Queue Length 95th (ft)	m109	#504	213	49	186	#585	181	86	126
Internal Link Dist (ft)		649			1940		931		925
Turn Bay Length (ft)	250			250		330		150	
Base Capacity (vph)	478	550	757	226	602	425	778	271	753
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.92	0.62	0.96	0.90	1.15	0.69	0.43	0.44

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
14: N College Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑	↑↑		↑	↑↑		↑	↑↑	
Volume (vph)	114	450	411	87	329	67	433	299	127	104	218	67
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9	4.9	4.9	4.9		4.9	4.9		4.9	4.9	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Fr _t	1.00	1.00	0.85	1.00	0.97		1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1490	1569	1333	1490	2894		1490	2825		1490	2866	
Flt Permitted	0.27	1.00	1.00	0.20	1.00		0.45	1.00		0.24	1.00	
Satd. Flow (perm)	417	1569	1333	312	2894		704	2825		383	2866	
Peak-hour factor, PHF	0.95	0.89	0.88	0.40	0.75	0.64	0.89	0.85	0.68	0.90	0.89	0.80
Adj. Flow (vph)	120	506	467	218	439	105	487	352	187	116	245	84
RTOR Reduction (vph)	0	0	293	0	21	0	0	73	0	0	38	0
Lane Group Flow (vph)	120	506	174	218	523	0	487	466	0	116	291	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6			8			4		
Actuated Green, G (s)	50.1	34.2	34.2	31.1	20.1		40.0	21.2		30.4	16.4	
Effective Green, g (s)	50.1	34.2	34.2	31.1	20.1		40.0	21.2		30.4	16.4	
Actuated g/C Ratio	0.50	0.34	0.34	0.31	0.20		0.40	0.21		0.30	0.16	
Clearance Time (s)	4.9	4.9	4.9	4.9	4.9		4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.0	3.0	3.0	2.0	5.0		2.0	3.0		2.0	4.0	
Lane Grp Cap (vph)	478	536	455	226	581		429	598		271	470	
v/s Ratio Prot	0.06	c0.32		c0.11	0.18		c0.21	0.16		0.06	0.10	
v/s Ratio Perm	0.06		0.13	0.19			c0.24			0.07		
v/c Ratio	0.25	0.94	0.38	0.96	0.90		1.14	0.78		0.43	0.62	
Uniform Delay, d1	21.8	32.0	24.9	41.0	39.0		30.4	37.2		34.6	38.9	
Progression Factor	1.25	1.31	3.91	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	24.1	2.0	49.2	19.5		85.8	6.4		0.4	2.8	
Delay (s)	27.3	65.9	99.4	90.2	58.5		116.2	43.5		35.0	41.7	
Level of Service	C	E	F	F	E		F	D		D	D	
Approach Delay (s)		76.0			67.6			78.0			40.0	
Approach LOS		E			E			E			D	
Intersection Summary												
HCM 2000 Control Delay		69.9			HCM 2000 Level of Service			E				
HCM 2000 Volume to Capacity ratio		1.08										
Actuated Cycle Length (s)		100.0			Sum of lost time (s)			19.6				
Intersection Capacity Utilization		88.4%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

Queues
34: Ridge Rd & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	144	863	200	123	877	191	269	84	129	163	112
V/c Ratio	0.50	0.61	0.29	0.43	0.64	0.65	0.84	0.23	0.61	0.59	0.34
Control Delay	18.6	22.1	10.2	23.8	32.4	36.5	59.5	4.5	37.5	46.0	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.6	22.1	10.2	23.8	32.4	36.5	59.5	4.5	37.5	46.0	9.4
Queue Length 50th (ft)	35	127	26	50	244	92	164	0	59	95	0
Queue Length 95th (ft)	m61	170	m54	55	324	146	226	22	85	156	13
Internal Link Dist (ft)		3132			1170		929			920	
Turn Bay Length (ft)	250		75	250		200		215	150		200
Base Capacity (vph)	312	1416	691	288	1361	301	389	414	217	342	378
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.61	0.29	0.43	0.64	0.63	0.69	0.20	0.59	0.48	0.30

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

34: Ridge Rd & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014

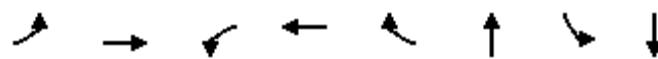
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑		↑	↑	↑	↑	↑	↑
Volume (vph)	115	803	176	64	668	58	174	226	80	99	155	72
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9	4.9	4.2	4.9		4.2	4.2	4.2	4.2	4.2	4.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1490	2980	1333	1490	2944		1490	1569	1333	1490	1569	1333
Flt Permitted	0.22	1.00	1.00	0.25	1.00		0.43	1.00	1.00	0.36	1.00	1.00
Satd. Flow (perm)	345	2980	1333	388	2944		682	1569	1333	571	1569	1333
Peak-hour factor, PHF	0.80	0.93	0.88	0.52	0.83	0.81	0.91	0.84	0.95	0.77	0.95	0.64
Adj. Flow (vph)	144	863	200	123	805	72	191	269	84	129	163	112
RTOR Reduction (vph)	0	0	58	0	6	0	0	0	67	0	0	92
Lane Group Flow (vph)	144	863	142	123	871	0	191	269	17	129	163	20
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6			8		8	4		4
Actuated Green, G (s)	55.8	47.5	47.5	52.8	46.0		31.1	20.6	20.6	25.3	17.7	17.7
Effective Green, g (s)	55.8	47.5	47.5	52.8	46.0		31.1	20.6	20.6	25.3	17.7	17.7
Actuated g/C Ratio	0.56	0.48	0.48	0.53	0.46		0.31	0.21	0.21	0.25	0.18	0.18
Clearance Time (s)	4.2	4.9	4.9	4.2	4.9		4.2	4.2	4.2	4.2	4.2	4.2
Vehicle Extension (s)	2.0	4.0	4.0	2.0	4.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	287	1415	633	279	1354		296	323	274	214	277	235
v/s Ratio Prot	c0.04	0.29		0.03	c0.30		c0.07	c0.17		0.05	0.10	
v/s Ratio Perm	0.24		0.11	0.20			0.13		0.01	0.11		0.01
v/c Ratio	0.50	0.61	0.22	0.44	0.64		0.65	0.83	0.06	0.60	0.59	0.08
Uniform Delay, d1	12.4	19.4	15.4	13.0	20.7		27.5	38.0	31.9	30.8	37.8	34.4
Progression Factor	1.34	0.99	1.13	1.77	1.36		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	1.5	0.6	0.4	2.2		3.6	15.9	0.0	3.3	2.1	0.1
Delay (s)	17.0	20.7	18.1	23.3	30.4		31.1	54.0	32.0	34.1	39.9	34.4
Level of Service	B	C	B	C	C		C	D	C	C	D	C
Approach Delay (s)					29.5			42.5			36.5	
Approach LOS					B		C		D		D	

Intersection Summary												
HCM 2000 Control Delay	28.9	HCM 2000 Level of Service										C
HCM 2000 Volume to Capacity ratio	0.70											
Actuated Cycle Length (s)	100.0	Sum of lost time (s)										17.5
Intersection Capacity Utilization	67.4%	ICU Level of Service										C
Analysis Period (min)	15											
c Critical Lane Group												

Queues
37: Marble Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	95	978	8	762	204	20	241	112
V/c Ratio	0.25	0.52	0.03	0.45	0.24	0.06	0.82	0.27
Control Delay	7.5	7.3	12.0	22.2	7.5	23.0	57.3	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.5	7.3	12.0	22.2	7.5	23.0	57.3	7.6
Queue Length 50th (ft)	3	19	2	243	14	8	141	2
Queue Length 95th (ft)	m49	342	m3	m191	m40	13	#220	0
Internal Link Dist (ft)		1170		606		928		914
Turn Bay Length (ft)	250		250		150			
Base Capacity (vph)	411	1909	311	1768	874	356	310	435
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.51	0.03	0.43	0.23	0.06	0.78	0.26

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
37: Marble Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	83	808	10	5	648	163	8	2	3	205	2	81
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9		4.9	4.9	4.9		4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00		1.00	1.00	
Fr _t	1.00	1.00		1.00	1.00	0.85		0.97		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97		0.95	1.00	
Satd. Flow (prot)	1490	2973		1490	2980	1333		1482		1490	1342	
Flt Permitted	0.31	1.00		0.23	1.00	1.00		0.87		0.74	1.00	
Satd. Flow (perm)	484	2973		362	2980	1333		1331		1168	1342	
Peak-hour factor, PHF	0.87	0.84	0.63	0.63	0.85	0.80	0.67	0.50	0.75	0.85	0.50	0.75
Adj. Flow (vph)	95	962	16	8	762	204	12	4	4	241	4	108
RTOR Reduction (vph)	0	1	0	0	0	96	0	3	0	0	81	0
Lane Group Flow (vph)	95	977	0	8	762	108	0	17	0	241	31	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	65.7	59.8		53.9	52.9	52.9		25.2		25.2	25.2	
Effective Green, g (s)	65.7	59.8		53.9	52.9	52.9		25.2		25.2	25.2	
Actuated g/C Ratio	0.66	0.60		0.54	0.53	0.53		0.25		0.25	0.25	
Clearance Time (s)	4.9	4.9		4.9	4.9	4.9		4.2		4.2	4.2	
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0		2.0		2.0	2.0	
Lane Grp Cap (vph)	397	1777		206	1576	705		335		294	338	
v/s Ratio Prot	c0.02	c0.33		0.00	0.26						0.02	
v/s Ratio Perm	0.14			0.02		0.08		0.01		c0.21		
v/c Ratio	0.24	0.55		0.04	0.48	0.15		0.05		0.82	0.09	
Uniform Delay, d1	11.0	12.0		16.7	14.9	12.1		28.3		35.3	28.6	
Progression Factor	0.68	0.58		1.57	1.52	3.32		1.00		1.00	1.00	
Incremental Delay, d2	0.1	1.0		0.0	0.3	0.1		0.0		15.4	0.0	
Delay (s)	7.6	8.0		26.2	23.0	40.1		28.4		50.7	28.7	
Level of Service	A	A		C	C	D		C		D	C	
Approach Delay (s)		8.0			26.6			28.4			43.7	
Approach LOS		A			C			C			D	
Intersection Summary												
HCM 2000 Control Delay		20.8			HCM 2000 Level of Service			C				
HCM 2000 Volume to Capacity ratio		0.63										
Actuated Cycle Length (s)		100.0			Sum of lost time (s)			14.0				
Intersection Capacity Utilization		61.7%			ICU Level of Service			B				
Analysis Period (min)		15										
c Critical Lane Group												

Dell Range Blvd

Direction	EB	WB	All
Total Delay (hr)	59	53	112
Stops / Veh	0.52	0.50	0.51
Stops (#)	6934	5223	12157
Average Speed (mph)	23	22	22
Total Travel Time (hr)	140	115	255
Distance Traveled (mi)	3236	2490	5727
Fuel Consumed (gal)	227	179	407
Fuel Economy (mpg)	14.2	13.9	14.1
Unserved Vehicles (#)	0	0	0
Vehicles in dilemma zone (#)	666	474	1140
Performance Index	78.2	67.7	145.9

Network Totals

Number of Intersections	15
Total Delay (hr)	220
Stops / Veh	0.54
Stops (#)	17851
Average Speed (mph)	18
Total Travel Time (hr)	421
Distance Traveled (mi)	7651
Fuel Consumed (gal)	601
Fuel Economy (mpg)	12.7
Unserved Vehicles (#)	117
Vehicles in dilemma zone (#)	1297
Performance Index	269.5

2012 Signal Timing Adjustments Intersection Analysis

Queues
2: Powderhouse Rd & Dell Range Blvd

Timing Plan: MD Peak Hour

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	36	926	80	913	176	64	32	85	163	48	24
V/c Ratio	0.10	0.50	0.23	0.48	0.13	0.29	0.11	0.26	0.74	0.16	0.08
Control Delay	6.6	11.8	3.9	4.2	0.2	32.5	28.0	8.4	53.1	29.0	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.6	11.8	3.9	4.2	0.2	32.5	28.0	8.4	53.1	29.0	0.5
Queue Length 50th (ft)	5	143	4	51	0	32	15	0	88	23	0
Queue Length 95th (ft)	12	242	11	93	0	57	32	19	121	37	0
Internal Link Dist (ft)		1929		687			421			1527	
Turn Bay Length (ft)	171		195								100
Base Capacity (vph)	397	1853	393	1915	1333	313	432	428	318	432	420
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.50	0.20	0.48	0.13	0.20	0.07	0.20	0.51	0.11	0.06

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Powderhouse Rd & Dell Range Blvd

Timing Plan: MD Peak Hour

6/3/2014

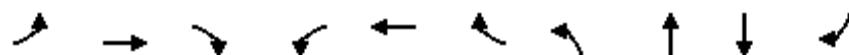
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑	↑	↑	↑	↑	↑	↑	↑
Volume (vph)	23	809	42	59	867	132	54	26	60	129	34	18
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9		4.2	4.9	4.0	4.2	4.2	4.2	4.2	4.2	4.2
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1490	2953		1490	2980	1333	1490	1569	1333	1490	1569	1333
Flt Permitted	0.27	1.00		0.26	1.00	1.00	0.73	1.00	1.00	0.74	1.00	1.00
Satd. Flow (perm)	424	2953		413	2980	1333	1138	1569	1333	1155	1569	1333
Peak-hour factor, PHF	0.64	0.93	0.75	0.74	0.95	0.75	0.84	0.81	0.71	0.79	0.71	0.75
Adj. Flow (vph)	36	870	56	80	913	176	64	32	85	163	48	24
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	69	0	0	19
Lane Group Flow (vph)	36	922	0	80	913	176	64	32	16	163	48	5
Turn Type	pm+pt	NA		pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6				8			4
Permitted Phases	2			6		Free	8		8	4		4
Actuated Green, G (s)	57.9	54.6		61.1	56.2	90.0	17.2	17.2	17.2	17.2	17.2	17.2
Effective Green, g (s)	57.9	54.6		61.1	56.2	90.0	17.2	17.2	17.2	17.2	17.2	17.2
Actuated g/C Ratio	0.64	0.61		0.68	0.62	1.00	0.19	0.19	0.19	0.19	0.19	0.19
Clearance Time (s)	4.2	4.9		4.2	4.9		4.2	4.2	4.2	4.2	4.2	4.2
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	311	1791		339	1860	1333	217	299	254	220	299	254
v/s Ratio Prot	0.00	c0.31		c0.01	0.31			0.02			0.03	
v/s Ratio Perm	0.07			0.15		c0.13	0.06		0.01	c0.14		0.00
v/c Ratio	0.12	0.51		0.24	0.49	0.13	0.29	0.11	0.06	0.74	0.16	0.02
Uniform Delay, d1	9.4	10.1		9.2	9.2	0.0	31.2	30.1	29.8	34.3	30.4	29.5
Progression Factor	1.00	1.00		0.36	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.1		0.1	0.9	0.2	0.3	0.1	0.0	11.1	0.1	0.0
Delay (s)	9.4	11.2		3.4	3.9	0.2	31.5	30.1	29.8	45.4	30.5	29.6
Level of Service	A	B		A	A	A	C	C	C	D	C	C
Approach Delay (s)		11.1			3.3			30.5			40.7	
Approach LOS		B			A			C			D	
Intersection Summary												
HCM 2000 Control Delay		11.6										B
HCM 2000 Volume to Capacity ratio		0.55										
Actuated Cycle Length (s)		90.0										13.3
Intersection Capacity Utilization		58.9%										B
Analysis Period (min)		15										
c Critical Lane Group												

Queues

3: Stillwater Ave & Dell Range Blvd

Timing Plan: MD Peak Hour

6/3/2014



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	172	758	248	48	782	52	180	84	84	223
V/c Ratio	0.42	0.41	0.27	0.12	0.46	0.04	0.78	0.24	0.33	0.17
Control Delay	7.1	6.4	1.0	4.1	6.8	0.1	55.1	10.7	31.4	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.1	6.4	1.0	4.1	6.8	0.1	55.1	10.7	31.4	0.3
Queue Length 50th (ft)	13	72	1	4	46	0	97	7	41	0
Queue Length 95th (ft)	32	98	0	10	70	0	145	27	54	0
Internal Link Dist (ft)	687			705			916			424
Turn Bay Length (ft)	170	156			190			30		
Base Capacity (vph)	421	1850	921	421	1702	1333	309	436	343	1333
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.41	0.27	0.11	0.46	0.04	0.58	0.19	0.24	0.17

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Stillwater Ave & Dell Range Blvd

Timing Plan: MD Peak Hour

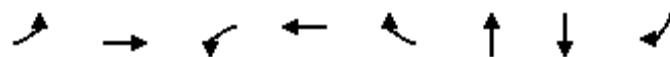
6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑	↑	↑	↑	↑	↑
Volume (vph)	150	690	171	40	712	36	155	12	40	38	19	176
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9	4.9	4.2	4.9	4.0	4.2	4.2			4.2	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Fr _t	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1490	2980	1333	1490	2980	1333	1490	1378			1518	1333
Flt Permitted	0.31	1.00	1.00	0.32	1.00	1.00	0.70	1.00			0.78	1.00
Satd. Flow (perm)	484	2980	1333	509	2980	1333	1102	1378			1223	1333
Peak-hour factor, PHF	0.87	0.91	0.69	0.83	0.91	0.69	0.86	0.75	0.59	0.68	0.68	0.79
Adj. Flow (vph)	172	758	248	48	782	52	180	16	68	56	28	223
RTOR Reduction (vph)	0	0	99	0	0	0	0	54	0	0	0	0
Lane Group Flow (vph)	172	758	149	48	782	52	180	30	0	0	84	223
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Free	Perm	NA		Perm	NA	Free
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		Free	8			4		Free
Actuated Green, G (s)	62.6	54.0	54.0	53.0	49.2	90.0	18.9	18.9			18.9	90.0
Effective Green, g (s)	62.6	54.0	54.0	53.0	49.2	90.0	18.9	18.9			18.9	90.0
Actuated g/C Ratio	0.70	0.60	0.60	0.59	0.55	1.00	0.21	0.21			0.21	1.00
Clearance Time (s)	4.2	4.9	4.9	4.2	4.9		4.2	4.2			4.2	
Vehicle Extension (s)	2.0	4.0	4.0	2.0	4.0		2.0	2.0			2.0	
Lane Grp Cap (vph)	432	1788	799	341	1629	1333	231	289			256	1333
v/s Ratio Prot	c0.04	0.25		0.01	c0.26			0.02				
v/s Ratio Perm	0.24		0.11	0.08		0.04	c0.16				0.07	0.17
v/c Ratio	0.40	0.42	0.19	0.14	0.48	0.04	0.78	0.10			0.33	0.17
Uniform Delay, d1	9.6	9.7	8.1	10.9	12.5	0.0	33.6	28.7			30.2	0.0
Progression Factor	0.42	0.52	0.20	0.50	0.45	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	0.2	0.7	0.5	0.1	1.0	0.1	14.0	0.1			0.3	0.3
Delay (s)	4.2	5.7	2.1	5.5	6.6	0.1	47.6	28.8			30.4	0.3
Level of Service	A	A	A	A	A	A	D	C			C	A
Approach Delay (s)					6.2			41.6			8.5	
Approach LOS					A			D			A	
Intersection Summary												
HCM 2000 Control Delay				9.3								
HCM 2000 Volume to Capacity ratio				0.55								
Actuated Cycle Length (s)				90.0								
Intersection Capacity Utilization				61.2%								
Analysis Period (min)				15								
c Critical Lane Group												

Queues
4: Driftwood Dr & Dell Range Blvd

Timing Plan: MD Peak Hour

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	36	858	32	757	107	108	116	60
v/c Ratio	0.08	0.37	0.08	0.33	0.08	0.42	0.73	0.05
Control Delay	1.9	1.8	11.9	12.0	0.1	20.9	60.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.9	1.8	11.9	12.0	0.1	20.9	60.3	0.1
Queue Length 50th (ft)	1	14	9	144	0	24	64	0
Queue Length 95th (ft)	m7	44	32	235	0	22	67	0
Internal Link Dist (ft)		705		569		917	428	
Turn Bay Length (ft)	180		190		180			75
Base Capacity (vph)	437	2300	388	2321	1333	367	248	1333
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.37	0.08	0.33	0.08	0.29	0.47	0.05

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: Driftwood Dr & Dell Range Blvd

Timing Plan: MD Peak Hour

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	33	715	45	24	719	87	30	8	47	70	7	47
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9		4.9	4.9	4.0		4.2			4.2	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Fr _t	1.00	0.99		1.00	1.00	0.85		0.93			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.96	1.00
Satd. Flow (prot)	1490	2947		1490	2980	1333		1430			1501	1333
Flt Permitted	0.36	1.00		0.32	1.00	1.00		0.88			0.63	1.00
Satd. Flow (perm)	561	2947		500	2980	1333		1275			981	1333
Peak-hour factor, PHF	0.92	0.90	0.70	0.75	0.95	0.81	0.94	0.50	0.78	0.67	0.58	0.78
Adj. Flow (vph)	36	794	64	32	757	107	32	16	60	104	12	60
RTOR Reduction (vph)	0	5	0	0	0	0	0	52	0	0	0	0
Lane Group Flow (vph)	36	853	0	32	757	107	0	56	0	0	116	60
Turn Type	Perm	NA		Perm	NA	Free	Perm	NA		Perm	NA	Free
Protected Phases		2				6			8			4
Permitted Phases	2			6		Free	8			4		Free
Actuated Green, G (s)	68.3	68.3		68.3	68.3	90.0		12.6			12.6	90.0
Effective Green, g (s)	68.3	68.3		68.3	68.3	90.0		12.6			12.6	90.0
Actuated g/C Ratio	0.76	0.76		0.76	0.76	1.00		0.14			0.14	1.00
Clearance Time (s)	4.9	4.9		4.9	4.9			4.2			4.2	
Vehicle Extension (s)	4.0	4.0		4.0	4.0			2.0			2.0	
Lane Grp Cap (vph)	425	2236		379	2261	1333		178			137	1333
v/s Ratio Prot		c0.29				0.25						
v/s Ratio Perm	0.06			0.06		0.08		0.04			c0.12	0.05
v/c Ratio	0.08	0.38		0.08	0.33	0.08		0.32			0.85	0.05
Uniform Delay, d1	2.8	3.7		2.8	3.5	0.0		34.8			37.8	0.0
Progression Factor	0.34	0.29		2.47	2.63	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.4	0.5		0.4	0.4	0.1		0.4			34.5	0.1
Delay (s)	1.3	1.6		7.3	9.6	0.1		35.2			72.2	0.1
Level of Service	A	A		A	A	A		D			E	A
Approach Delay (s)		1.5			8.4			35.2			47.6	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay		10.2									B	
HCM 2000 Volume to Capacity ratio		0.45										
Actuated Cycle Length (s)		90.0									9.1	
Intersection Capacity Utilization		52.7%									A	
Analysis Period (min)		15										
c Critical Lane Group												

Queues
5: Frontier Mall Dr & Dell Range Blvd

Timing Plan: MD Peak Hour

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	100	792	32	760	159	40	40	116	116
V/c Ratio	0.23	0.39	0.08	0.39	0.12	0.26	0.16	0.64	0.40
Control Delay	6.3	9.6	1.0	1.4	0.2	35.8	20.2	51.4	15.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	9.6	1.0	1.4	0.2	35.8	20.2	51.4	15.0
Queue Length 50th (ft)	20	150	1	7	0	20	10	63	14
Queue Length 95th (ft)	19	204	m2	26	0	34	28	100	12
Internal Link Dist (ft)		569		1110			911		1473
Turn Bay Length (ft)	185		140		140	75			
Base Capacity (vph)	486	2021	468	1957	1333	251	382	290	417
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.39	0.07	0.39	0.12	0.16	0.10	0.40	0.28

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

5: Frontier Mall Dr & Dell Range Blvd

Timing Plan: MD Peak Hour

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	749	13	23	737	129	27	15	15	96	14	70
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9		4.2	4.9	4.0	4.2	4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Fr _t	1.00	1.00		1.00	1.00	0.85	1.00	0.93		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1490	2969		1490	2980	1333	1490	1451		1490	1390	
Flt Permitted	0.34	1.00		0.33	1.00	1.00	0.63	1.00		0.73	1.00	
Satd. Flow (perm)	528	2969		511	2980	1333	992	1451		1147	1390	
Peak-hour factor, PHF	0.75	0.97	0.65	0.72	0.97	0.81	0.68	0.75	0.75	0.83	0.50	0.80
Adj. Flow (vph)	100	772	20	32	760	159	40	20	20	116	28	88
RTOR Reduction (vph)	0	1	0	0	0	0	0	17	0	0	74	0
Lane Group Flow (vph)	100	791	0	32	760	159	40	23	0	116	42	0
Turn Type	pm+pt	NA		pm+pt	NA	Free	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		Free	8				4	
Actuated Green, G (s)	64.8	59.6		60.4	57.4	90.0	14.1	14.1		14.1	14.1	
Effective Green, g (s)	64.8	59.6		60.4	57.4	90.0	14.1	14.1		14.1	14.1	
Actuated g/C Ratio	0.72	0.66		0.67	0.64	1.00	0.16	0.16		0.16	0.16	
Clearance Time (s)	4.2	4.9		4.2	4.9		4.2	4.2		4.2	4.2	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	435	1966		375	1900	1333	155	227		179	217	
v/s Ratio Prot	c0.01	c0.27		0.00	0.26			0.02			0.03	
v/s Ratio Perm	0.15			0.05		c0.12	0.04			c0.10		
v/c Ratio	0.23	0.40		0.09	0.40	0.12	0.26	0.10		0.65	0.19	
Uniform Delay, d1	5.9	7.0		6.8	7.9	0.0	33.4	32.5		35.6	33.0	
Progression Factor	1.10	1.18		0.16	0.10	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.6		0.0	0.5	0.2	0.3	0.1		5.9	0.2	
Delay (s)	6.6	8.8		1.1	1.4	0.2	33.7	32.6		41.5	33.2	
Level of Service	A	A		A	A	C	C		D	C		
Approach Delay (s)					1.2			33.1			37.4	
Approach LOS					A			C			D	
Intersection Summary												
HCM 2000 Control Delay		9.3				HCM 2000 Level of Service			A			
HCM 2000 Volume to Capacity ratio		0.45										
Actuated Cycle Length (s)		90.0				Sum of lost time (s)			13.3			
Intersection Capacity Utilization		53.3%				ICU Level of Service			A			
Analysis Period (min)		15										
c Critical Lane Group												

Queues
6: Prairie Ave & Dell Range Blvd

Timing Plan: MD Peak Hour

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	84	875	32	850	280	52	100	181	186	96
V/c Ratio	0.32	0.59	0.13	0.60	0.21	0.30	0.48	0.64	0.65	0.26
Control Delay	25.2	26.6	15.3	25.2	0.3	40.5	31.0	42.4	42.7	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.2	26.6	15.3	25.2	0.3	40.5	31.0	42.4	42.7	3.9
Queue Length 50th (ft)	15	140	5	143	0	28	32	98	102	0
Queue Length 95th (ft)	80	#369	m18	#333	0	61	57	160	90	12
Internal Link Dist (ft)		1110		710			916		1682	
Turn Bay Length (ft)	250		250		205	120				100
Base Capacity (vph)	267	1474	256	1419	1333	360	385	374	379	450
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.59	0.13	0.60	0.21	0.14	0.26	0.48	0.49	0.21

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
6: Prairie Ave & Dell Range Blvd

Timing Plan: MD Peak Hour

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑	↑	↑	↑		↑	↑	↑
Volume (vph)	78	798	36	26	799	272	47	41	37	294	24	78
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9		4.9	4.9	4.0	4.2	4.2		4.2	4.2	4.2
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	1.00
Fr _t	1.00	0.99		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00
Satd. Flow (prot)	1490	2958		1490	2980	1333	1490	1465		1416	1435	1333
Flt Permitted	0.24	1.00		0.23	1.00	1.00	0.95	1.00		0.95	0.96	1.00
Satd. Flow (perm)	377	2958		361	2980	1333	1490	1465		1416	1435	1333
Peak-hour factor, PHF	0.93	0.96	0.82	0.81	0.94	0.97	0.90	0.73	0.84	0.91	0.55	0.81
Adj. Flow (vph)	84	831	44	32	850	280	52	56	44	323	44	96
RTOR Reduction (vph)	0	3	0	0	0	0	0	37	0	0	0	77
Lane Group Flow (vph)	84	872	0	32	850	280	52	63	0	181	186	19
Turn Type	pm+pt	NA		pm+pt	NA	Free	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	2			6		Free						4
Actuated Green, G (s)	46.9	41.9		43.1	40.0	90.0	8.7	8.7		18.1	18.1	18.1
Effective Green, g (s)	46.9	41.9		43.1	40.0	90.0	8.7	8.7		18.1	18.1	18.1
Actuated g/C Ratio	0.52	0.47		0.48	0.44	1.00	0.10	0.10		0.20	0.20	0.20
Clearance Time (s)	4.9	4.9		4.9	4.9		4.2	4.2		4.2	4.2	4.2
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0		4.0	4.0	4.0
Lane Grp Cap (vph)	258	1377		211	1324	1333	144	141		284	288	268
v/s Ratio Prot	0.02	c0.29		0.01	0.29		0.03	c0.04		0.13	c0.13	
v/s Ratio Perm	0.15			0.07		c0.21						0.01
v/c Ratio	0.33	0.63		0.15	0.64	0.21	0.36	0.45		0.64	0.65	0.07
Uniform Delay, d1	19.8	18.2		20.3	19.4	0.0	38.0	38.4		32.9	33.0	29.1
Progression Factor	1.27	1.22		0.98	1.09	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.3	2.1		0.1	2.1	0.3	0.6	0.8		5.2	5.5	0.2
Delay (s)	25.4	24.4		20.0	23.3	0.3	38.6	39.2		38.1	38.5	29.3
Level of Service	C	C		B	C	A	D	D		D	D	C
Approach Delay (s)		24.5			17.7			39.0			36.4	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay		24.4			HCM 2000 Level of Service				C			
HCM 2000 Volume to Capacity ratio		0.61										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)				18.2			
Intersection Capacity Utilization		60.1%			ICU Level of Service				B			
Analysis Period (min)		15										
c Critical Lane Group												

Queues
7: Rue Terre & Dell Range Blvd

Timing Plan: MD Peak Hour

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	117	1128	49	1040	137	133	125	20	100
V/c Ratio	0.37	0.59	0.17	0.56	0.15	0.52	0.71	0.07	0.31
Control Delay	11.0	8.2	2.9	3.0	0.4	30.3	56.1	28.6	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.0	8.2	2.9	3.0	0.4	30.3	56.1	28.6	8.9
Queue Length 50th (ft)	20	112	2	30	0	49	67	10	0
Queue Length 95th (ft)	29	135	m5	52	1	99	96	15	39
Internal Link Dist (ft)		710		830		892		916	
Turn Bay Length (ft)	250		250		150				120
Base Capacity (vph)	341	1925	313	1870	887	335	237	380	398
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.59	0.16	0.56	0.15	0.40	0.53	0.05	0.25

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
7: Rue Terre & Dell Range Blvd

Timing Plan: MD Peak Hour

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑	↑		↑		↑	↑	↑
Volume (vph)	88	977	36	48	967	97	41	18	50	94	10	90
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9		4.9	4.9	4.9		4.2		4.2	4.2	4.2
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00		1.00	1.00	1.00
Fr _t	1.00	0.99		1.00	1.00	0.85		0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98		0.95	1.00	1.00
Satd. Flow (prot)	1490	2959		1490	2980	1333		1450		1490	1569	1333
Flt Permitted	0.22	1.00		0.20	1.00	1.00		0.86		0.63	1.00	1.00
Satd. Flow (perm)	351	2959		312	2980	1333		1273		980	1569	1333
Peak-hour factor, PHF	0.75	0.91	0.67	0.97	0.93	0.71	0.69	0.90	0.93	0.75	0.50	0.90
Adj. Flow (vph)	117	1074	54	49	1040	137	59	20	54	125	20	100
RTOR Reduction (vph)	0	3	0	0	0	54	0	30	0	0	0	82
Lane Group Flow (vph)	117	1125	0	49	1040	83	0	103	0	125	20	18
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	61.9	56.5		57.9	54.5	54.5		16.1		16.1	16.1	16.1
Effective Green, g (s)	61.9	56.5		57.9	54.5	54.5		16.1		16.1	16.1	16.1
Actuated g/C Ratio	0.69	0.63		0.64	0.61	0.61		0.18		0.18	0.18	0.18
Clearance Time (s)	4.9	4.9		4.9	4.9	4.9		4.2		4.2	4.2	4.2
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	309	1857		245	1804	807		227		175	280	238
v/s Ratio Prot	c0.02	c0.38		0.01	0.35						0.01	
v/s Ratio Perm	0.24			0.12		0.06		0.08		c0.13		0.01
v/c Ratio	0.38	0.61		0.20	0.58	0.10		0.46		0.71	0.07	0.08
Uniform Delay, d1	11.4	10.1		12.1	10.8	7.5		33.0		34.8	30.7	30.8
Progression Factor	0.98	0.63		0.30	0.18	0.03		1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	1.3		0.1	1.1	0.2		1.5		12.9	0.1	0.1
Delay (s)	11.4	7.6		3.7	3.0	0.5		34.5		47.7	30.8	30.9
Level of Service	B	A		A	A			C		D	C	C
Approach Delay (s)		7.9			2.8			34.5			39.5	
Approach LOS		A			A			C			D	
Intersection Summary												
HCM 2000 Control Delay		9.7										A
HCM 2000 Volume to Capacity ratio		0.63										
Actuated Cycle Length (s)		90.0										14.0
Intersection Capacity Utilization		63.4%										B
Analysis Period (min)		15										
c Critical Lane Group												

Queues
8: Walmart & Dell Range Blvd

Timing Plan: MD Peak Hour

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	200	1051	28	1054	192	41	68	203	172
V/c Ratio	0.77	0.60	0.11	0.67	0.25	0.48	0.33	0.56	0.37
Control Delay	33.9	15.3	10.2	19.7	4.6	56.1	20.5	42.9	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.9	15.3	10.2	19.7	4.6	56.1	20.5	42.9	7.0
Queue Length 50th (ft)	28	77	6	226	9	22	10	57	5
Queue Length 95th (ft)	#94	276	17	349	44	45	15	87	7
Internal Link Dist (ft)		830		1324			423		927
Turn Bay Length (ft)	250		250		180			125	
Base Capacity (vph)	260	1758	259	1576	779	241	496	395	765
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.60	0.11	0.67	0.25	0.17	0.14	0.51	0.22

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
8: Walmart & Dell Range Blvd

Timing Plan: MD Peak Hour

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑	↑	↑	↑		↑↑	↑	
Volume (vph)	174	928	53	24	991	163	31	10	44	181	7	139
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9		4.2	4.9	4.9	4.2	4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	
Fr _t	1.00	0.99		1.00	1.00	0.85	1.00	0.89		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1490	2945		1490	2980	1333	1490	1403		2891	1350	
Flt Permitted	0.19	1.00		0.19	1.00	1.00	0.47	1.00		0.95	1.00	
Satd. Flow (perm)	292	2945		304	2980	1333	730	1403		2891	1350	
Peak-hour factor, PHF	0.87	0.96	0.63	0.86	0.94	0.85	0.75	0.50	0.92	0.89	0.58	0.87
Adj. Flow (vph)	200	967	84	28	1054	192	41	20	48	203	12	160
RTOR Reduction (vph)	0	4	0	0	0	80	0	43	0	0	117	0
Lane Group Flow (vph)	200	1047	0	28	1054	112	41	25	0	203	55	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Prot	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2			6		6	8					
Actuated Green, G (s)	57.4	50.2		46.5	44.2	44.2	8.6	8.6		11.4	24.2	
Effective Green, g (s)	57.4	50.2		46.5	44.2	44.2	8.6	8.6		11.4	24.2	
Actuated g/C Ratio	0.64	0.56		0.52	0.49	0.49	0.10	0.10		0.13	0.27	
Clearance Time (s)	4.2	4.9		4.2	4.9	4.9	4.2	4.2		4.2	4.2	
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	296	1642		187	1463	654	69	134		366	363	
v/s Ratio Prot	c0.06	0.36		0.00	c0.35			0.02		c0.07	0.04	
v/s Ratio Perm	0.37			0.07		0.08	c0.06					
v/c Ratio	0.68	0.64		0.15	0.72	0.17	0.59	0.18		0.55	0.15	
Uniform Delay, d1	22.1	13.7		18.8	18.0	12.7	39.0	37.5		36.9	25.1	
Progression Factor	0.68	0.98		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.9	1.6		0.1	3.1	0.6	8.8	0.2		1.0	0.1	
Delay (s)	19.0	14.9		19.0	21.1	13.3	47.8	37.7		38.0	25.1	
Level of Service	B	B		B	C	B	D	D		D	C	
Approach Delay (s)		15.6			19.9			41.5			32.1	
Approach LOS		B			B			D			C	
Intersection Summary												
HCM 2000 Control Delay		20.4			HCM 2000 Level of Service				C			
HCM 2000 Volume to Capacity ratio		0.68										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)				17.5			
Intersection Capacity Utilization		77.5%			ICU Level of Service				D			
Analysis Period (min)		15										
c Critical Lane Group												

Queues
9: Converse Ave & Dell Range Blvd

Timing Plan: MD Peak Hour

6/3/2014



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	80	737	416	199	810	92	438	208	195	152	235	84
V/c Ratio	0.63	0.77	0.31	0.95	0.68	0.15	0.69	0.75	0.49	0.57	0.58	0.26
Control Delay	66.3	37.1	0.6	88.8	32.7	9.8	43.2	54.7	9.2	50.4	46.2	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.3	37.1	0.6	88.8	32.7	9.8	43.2	54.7	9.2	50.4	46.2	1.9
Queue Length 50th (ft)	50	222	0	128	198	1	132	127	0	89	75	0
Queue Length 95th (ft)	71	294	0	#192	340	53	#218	183	39	#228	106	0
Internal Link Dist (ft)		1324			1462			927			928	
Turn Bay Length (ft)	250		180	250		100	400			150		150
Base Capacity (vph)	135	956	1333	210	1188	598	638	436	511	265	709	449
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.77	0.31	0.95	0.68	0.15	0.69	0.48	0.38	0.57	0.33	0.19

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
9: Converse Ave & Dell Range Blvd

Timing Plan: MD Peak Hour

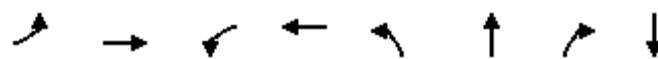
6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑↑	↑
Volume (vph)	53	693	383	149	753	83	390	183	160	137	207	63
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9	4.0	4.9	4.9	4.9	4.2	4.2	4.2	4.2	4.2	4.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	0.95	1.00
Fr _t	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1490	2980	1333	1490	2980	1333	2891	1569	1333	1490	2980	1333
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1490	2980	1333	1490	2980	1333	2891	1569	1333	1490	2980	1333
Peak-hour factor, PHF	0.66	0.94	0.92	0.75	0.93	0.90	0.89	0.88	0.82	0.90	0.88	0.75
Adj. Flow (vph)	80	737	416	199	810	92	438	208	195	152	235	84
RTOR Reduction (vph)	0	0	0	0	0	56	0	0	160	0	0	73
Lane Group Flow (vph)	80	737	416	199	810	36	438	208	35	152	235	11
Turn Type	Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free			6			8			4
Actuated Green, G (s)	7.3	31.1	100.0	15.1	38.9	38.9	22.1	17.8	17.8	17.8	13.5	13.5
Effective Green, g (s)	7.3	31.1	100.0	15.1	38.9	38.9	22.1	17.8	17.8	17.8	13.5	13.5
Actuated g/C Ratio	0.07	0.31	1.00	0.15	0.39	0.39	0.22	0.18	0.18	0.18	0.14	0.14
Clearance Time (s)	4.9	4.9		4.9	4.9	4.9	4.2	4.2	4.2	4.2	4.2	4.2
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	2.0	2.0	2.0	3.0	3.0	3.0
Lane Grp Cap (vph)	108	926	1333	224	1159	518	638	279	237	265	402	179
v/s Ratio Prot	0.05	c0.25		c0.13	0.27		c0.15	c0.13		0.10	0.08	
v/s Ratio Perm			0.31			0.03			0.03			0.01
v/c Ratio	0.74	0.80	0.31	0.89	0.70	0.07	0.69	0.75	0.15	0.57	0.58	0.06
Uniform Delay, d1	45.4	31.5	0.0	41.6	25.6	19.2	35.8	39.0	34.7	37.6	40.6	37.7
Progression Factor	1.00	1.00	1.00	0.92	1.14	3.27	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	23.6	7.0	0.6	29.7	3.2	0.2	2.5	9.1	0.1	3.0	2.2	0.1
Delay (s)	69.0	38.6	0.6	68.0	32.4	62.9	38.2	48.1	34.8	40.6	42.8	37.9
Level of Service	E	D	A	E	C	E	D	D	C	D	D	D
Approach Delay (s)		27.7			41.4			39.9		41.2		
Approach LOS		C			D			D		D		
Intersection Summary												
HCM 2000 Control Delay		36.4										
HCM 2000 Volume to Capacity ratio		0.80										
Actuated Cycle Length (s)		100.0										
Intersection Capacity Utilization		69.3%										
Analysis Period (min)		15										
c Critical Lane Group												

Queues
10: Windmill Rd & Dell Range Blvd

Timing Plan: MD Peak Hour

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	68	942	104	860	131	52	87	168
V/c Ratio	0.18	0.52	0.34	0.49	0.50	0.15	0.24	0.54
Control Delay	2.8	3.3	7.3	8.9	41.3	30.8	8.2	33.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.8	3.3	7.3	8.9	41.3	30.8	8.2	33.5
Queue Length 50th (ft)	2	21	11	117	71	27	0	34
Queue Length 95th (ft)	m6	68	20	116	64	49	13	39
Internal Link Dist (ft)		1464		3132		927		928
Turn Bay Length (ft)	250		250		175		175	
Base Capacity (vph)	388	1796	351	1756	278	561	533	619
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.52	0.30	0.49	0.47	0.09	0.16	0.27

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
10: Windmill Rd & Dell Range Blvd

Timing Plan: MD Peak Hour

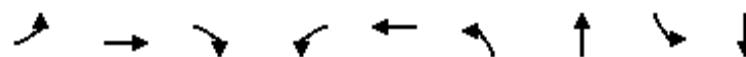
6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	42	777	60	72	782	19	67	41	55	27	38	44
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9		4.2	4.9		4.2	4.2	4.2		4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00		0.95	
Fr _t	1.00	0.99		1.00	1.00		1.00	1.00	0.85		0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00		0.99	
Satd. Flow (prot)	1490	2939		1490	2966		1490	1569	1333		2781	
Flt Permitted	0.28	1.00		0.25	1.00		0.63	1.00	1.00		0.86	
Satd. Flow (perm)	438	2939		392	2966		985	1569	1333		2412	
Peak-hour factor, PHF	0.62	0.91	0.68	0.69	0.94	0.68	0.51	0.79	0.63	0.56	0.63	0.73
Adj. Flow (vph)	68	854	88	104	832	28	131	52	87	48	60	60
RTOR Reduction (vph)	0	6	0	0	2	0	0	0	67	0	54	0
Lane Group Flow (vph)	68	936	0	104	858	0	131	52	20	0	114	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2			6			8		8		4	
Actuated Green, G (s)	65.8	60.0		62.4	58.3		22.6	22.6	22.6		10.7	
Effective Green, g (s)	65.8	60.0		62.4	58.3		22.6	22.6	22.6		10.7	
Actuated g/C Ratio	0.66	0.60		0.62	0.58		0.23	0.23	0.23		0.11	
Clearance Time (s)	4.2	4.9		4.2	4.9		4.2	4.2	4.2		4.2	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0	2.0		2.0	
Lane Grp Cap (vph)	349	1763		289	1729		261	354	301		258	
v/s Ratio Prot	0.01	c0.32		c0.01	0.29		c0.04	0.03				
v/s Ratio Perm	0.12			0.21			c0.07		0.01		0.05	
v/c Ratio	0.19	0.53		0.36	0.50		0.50	0.15	0.07		0.44	
Uniform Delay, d1	10.8	11.7		14.7	12.2		34.8	31.0	30.4		41.9	
Progression Factor	0.28	0.21		0.54	0.61		1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.1	0.8		0.3	0.9		0.6	0.1	0.0		0.4	
Delay (s)	3.1	3.3		8.2	8.4		35.3	31.1	30.4		42.3	
Level of Service	A	A		A	A		D	C	C		D	
Approach Delay (s)		3.2			8.4			32.9			42.3	
Approach LOS		A			A			C			D	
Intersection Summary												
HCM 2000 Control Delay		11.3				HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio		0.54										
Actuated Cycle Length (s)		100.0				Sum of lost time (s)			17.5			
Intersection Capacity Utilization		55.5%				ICU Level of Service			B			
Analysis Period (min)		15										
c Critical Lane Group												

Queues
14: N College Ave & Dell Range Blvd

Timing Plan: MD Peak Hour

6/3/2014



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	72	317	405	76	391	359	345	60	312
V/c Ratio	0.54	0.50	0.52	0.54	0.33	0.95	0.50	0.22	0.65
Control Delay	54.1	29.4	7.4	57.0	19.6	74.0	31.5	26.7	39.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.1	29.4	7.4	57.0	19.6	74.0	31.5	26.7	39.4
Queue Length 50th (ft)	41	159	38	47	81	~209	87	25	82
Queue Length 95th (ft)	86	154	51	75	118	#458	114	38	123
Internal Link Dist (ft)			649		1940		931		925
Turn Bay Length (ft)	250			250		330		150	
Base Capacity (vph)	165	640	783	165	1200	377	819	285	587
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.50	0.52	0.46	0.33	0.95	0.42	0.21	0.53

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
14: N College Ave & Dell Range Blvd

Timing Plan: MD Peak Hour

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑ ↗	↑ ↘	↑ ↙	↑ ↖	↑ ↗ ↖	↑ ↖	↑ ↗	↑ ↗ ↖	↑ ↖	↑ ↗	↑ ↗ ↖	↑ ↖
Volume (vph)	65	260	344	56	297	54	330	193	77	38	208	70
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9	4.9	4.9	4.9		4.9	4.9		4.9	4.9	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Fr _t	1.00	1.00	0.85	1.00	0.97		1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1490	1569	1333	1490	2898		1490	2835		1490	2854	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.46	1.00		0.41	1.00	
Satd. Flow (perm)	1490	1569	1333	1490	2898		723	2835		640	2854	
Peak-hour factor, PHF	0.90	0.82	0.85	0.74	0.93	0.75	0.92	0.83	0.69	0.63	0.93	0.80
Adj. Flow (vph)	72	317	405	76	319	72	359	233	112	60	224	88
RTOR Reduction (vph)	0	0	247	0	20	0	0	57	0	0	44	0
Lane Group Flow (vph)	72	317	158	76	371	0	359	288	0	60	268	0
Turn Type	Prot	NA	Perm	Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2				8			4		
Actuated Green, G (s)	7.9	38.9	38.9	7.9	38.9		38.5	22.4		26.4	15.2	
Effective Green, g (s)	7.9	38.9	38.9	7.9	38.9		38.5	22.4		26.4	15.2	
Actuated g/C Ratio	0.08	0.39	0.39	0.08	0.39		0.38	0.22		0.26	0.15	
Clearance Time (s)	4.9	4.9	4.9	4.9	4.9		4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.0	3.0	3.0	2.0	5.0		2.0	3.0		2.0	4.0	
Lane Grp Cap (vph)	117	610	518	117	1127		419	635		264	433	
v/s Ratio Prot	0.05	c0.20		c0.05	0.13		c0.16	0.10		0.03	0.09	
v/s Ratio Perm			0.12				c0.17			0.03		
v/c Ratio	0.62	0.52	0.30	0.65	0.33		0.86	0.45		0.23	0.62	
Uniform Delay, d1	44.6	23.4	21.2	44.7	21.4		29.3	33.5		32.2	39.7	
Progression Factor	0.91	1.17	2.25	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.4	3.1	1.5	9.0	0.8		15.2	0.5		0.2	3.0	
Delay (s)	47.2	30.5	49.0	53.7	22.2		44.5	34.0		32.4	42.7	
Level of Service	D	C	D	D	C		D	C		C	D	
Approach Delay (s)		41.4			27.3			39.4			41.0	
Approach LOS		D			C			D			D	
Intersection Summary												
HCM 2000 Control Delay		37.9										D
HCM 2000 Volume to Capacity ratio		0.71										
Actuated Cycle Length (s)		100.0										19.6
Intersection Capacity Utilization		70.4%										C
Analysis Period (min)		15										
c Critical Lane Group												

Queues
34: Ridge Rd & Dell Range Blvd

Timing Plan: MD Peak Hour

6/3/2014



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	136	572	156	72	723	189	195	60	139	164	88
V/c Ratio	0.37	0.34	0.19	0.17	0.45	0.77	0.74	0.19	0.75	0.69	0.30
Control Delay	6.5	3.9	0.7	4.9	9.2	54.7	56.1	2.1	58.8	55.2	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.5	3.9	0.7	4.9	9.2	54.7	56.1	2.1	58.8	55.2	6.6
Queue Length 50th (ft)	6	23	0	6	57	101	120	0	71	101	0
Queue Length 95th (ft)	14	33	3	14	103	124	169	1	82	132	27
Internal Link Dist (ft)	3132			1170			929			920	
Turn Bay Length (ft)	250		75	250		200		215	150		200
Base Capacity (vph)	399	1665	802	462	1591	277	373	402	222	357	390
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.34	0.19	0.16	0.45	0.68	0.52	0.15	0.63	0.46	0.23

Intersection Summary

HCM Signalized Intersection Capacity Analysis
34: Ridge Rd & Dell Range Blvd

Timing Plan: MD Peak Hour

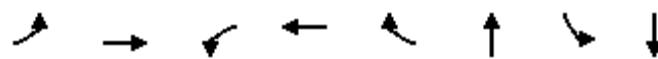
6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑		↑	↑	↑	↑	↑	↑
Volume (vph)	101	532	140	56	591	58	149	166	50	99	126	80
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9	4.9	4.2	4.9		4.2	4.2	4.2	4.2	4.2	4.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1490	2980	1333	1490	2926		1490	1569	1333	1490	1569	1333
Flt Permitted	0.32	1.00	1.00	0.40	1.00		0.48	1.00	1.00	0.39	1.00	1.00
Satd. Flow (perm)	509	2980	1333	632	2926		760	1569	1333	606	1569	1333
Peak-hour factor, PHF	0.74	0.93	0.90	0.78	0.93	0.66	0.79	0.85	0.83	0.71	0.77	0.91
Adj. Flow (vph)	136	572	156	72	635	88	189	195	60	139	164	88
RTOR Reduction (vph)	0	0	58	0	9	0	0	0	50	0	0	75
Lane Group Flow (vph)	136	572	98	72	714	0	189	195	10	139	164	13
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6			8		8	4		4
Actuated Green, G (s)	61.2	55.1	55.1	57.6	53.3		24.7	16.7	16.7	21.5	15.1	15.1
Effective Green, g (s)	61.2	55.1	55.1	57.6	53.3		24.7	16.7	16.7	21.5	15.1	15.1
Actuated g/C Ratio	0.61	0.55	0.55	0.58	0.53		0.25	0.17	0.17	0.22	0.15	0.15
Clearance Time (s)	4.2	4.9	4.9	4.2	4.9		4.2	4.2	4.2	4.2	4.2	4.2
Vehicle Extension (s)	2.0	4.0	4.0	2.0	4.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	371	1641	734	400	1559		246	262	222	186	236	201
v/s Ratio Prot	c0.02	0.19		0.01	c0.24		c0.06	0.12		0.05	0.10	
v/s Ratio Perm	0.20		0.07	0.10			c0.13		0.01	0.11		0.01
v/c Ratio	0.37	0.35	0.13	0.18	0.46		0.77	0.74	0.05	0.75	0.69	0.07
Uniform Delay, d1	14.0	12.5	10.9	12.1	14.4		37.1	39.6	35.0	40.0	40.3	36.4
Progression Factor	0.32	0.24	0.05	0.43	0.55		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.5	0.3	0.1	1.0		12.2	9.6	0.0	13.3	7.0	0.1
Delay (s)	4.7	3.5	0.9	5.2	8.9		49.3	49.2	35.0	53.3	47.2	36.5
Level of Service	A	A	A	A	A		D	D	C	D	D	D
Approach Delay (s)					8.5			47.3			47.0	
Approach LOS					A			D			D	
Intersection Summary												
HCM 2000 Control Delay				19.6						B		
HCM 2000 Volume to Capacity ratio				0.55								
Actuated Cycle Length (s)				100.0					Sum of lost time (s)		17.5	
Intersection Capacity Utilization				61.0%					ICU Level of Service		B	
Analysis Period (min)				15								
c Critical Lane Group												

Queues
37: Marble Ave & Dell Range Blvd

Timing Plan: MD Peak Hour

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	79	635	4	619	127	12	116	108
v/c Ratio	0.15	0.29	0.01	0.31	0.13	0.06	0.67	0.22
Control Delay	1.7	2.3	4.5	4.5	2.1	34.2	57.8	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.7	2.3	4.5	4.5	2.1	34.2	57.8	1.1
Queue Length 50th (ft)	2	7	0	42	4	7	71	0
Queue Length 95th (ft)	m8	54	m2	m137	m20	18	109	0
Internal Link Dist (ft)		1170		606		928		914
Turn Bay Length (ft)	250		250		150			
Base Capacity (vph)	549	2191	530	2028	948	356	315	601
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.29	0.01	0.31	0.13	0.03	0.37	0.18

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
37: Marble Ave & Dell Range Blvd

Timing Plan: MD Peak Hour

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	62	584	11	2	607	107	5	3	0	95	0	96
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9		4.9	4.9	4.9		4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00		1.00	1.00	
Fr _t	1.00	1.00		1.00	1.00	0.85		1.00		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97		0.95	1.00	
Satd. Flow (prot)	1490	2966		1490	2980	1333		1518		1490	1333	
Flt Permitted	0.40	1.00		0.40	1.00	1.00		0.85		0.75	1.00	
Satd. Flow (perm)	626	2966		625	2980	1333		1332		1176	1333	
Peak-hour factor, PHF	0.78	0.95	0.55	0.50	0.98	0.84	0.63	0.75	0.25	0.82	0.25	0.89
Adj. Flow (vph)	79	615	20	4	619	127	8	4	0	116	0	108
RTOR Reduction (vph)	0	2	0	0	0	45	0	0	0	0	92	0
Lane Group Flow (vph)	79	634	0	4	619	82	0	12	0	116	16	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	76.1	70.0		65.4	64.2	64.2		14.8		14.8	14.8	
Effective Green, g (s)	76.1	70.0		65.4	64.2	64.2		14.8		14.8	14.8	
Actuated g/C Ratio	0.76	0.70		0.65	0.64	0.64		0.15		0.15	0.15	
Clearance Time (s)	4.9	4.9		4.9	4.9	4.9		4.2		4.2	4.2	
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0		2.0		2.0	2.0	
Lane Grp Cap (vph)	536	2076		419	1913	855		197		174	197	
v/s Ratio Prot	c0.01	c0.21		0.00	c0.21						0.01	
v/s Ratio Perm	0.10			0.01		0.06		0.01		c0.10		
v/c Ratio	0.15	0.31		0.01	0.32	0.10		0.06		0.67	0.08	
Uniform Delay, d1	4.1	5.7		6.7	8.1	6.8		36.6		40.3	36.7	
Progression Factor	0.26	0.35		0.90	0.55	1.18		1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.4		0.0	0.3	0.2		0.0		7.3	0.1	
Delay (s)	1.1	2.4		6.1	4.8	8.2		36.7		47.5	36.8	
Level of Service	A	A		A	A	A		D		D	D	
Approach Delay (s)		2.2			5.4			36.7			42.4	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay		9.2			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.37										
Actuated Cycle Length (s)		100.0			Sum of lost time (s)			14.0				
Intersection Capacity Utilization		44.8%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

Measures of Effectiveness

Timing Plan: MD Peak Hour

6/3/2014

Dell Range Blvd

Direction	EB	WB	All
Total Delay (hr)	36	36	72
Stops (#)	4048	3885	7933
Average Speed (mph)	26	25	25
Total Travel Time (hr)	100	98	197
Distance Traveled (mi)	2545	2477	5022
Fuel Consumed (gal)	157	153	310
Fuel Economy (mpg)	16.2	16.2	16.2
Unserved Vehicles (#)	0	0	0
Vehicles in dilemma zone (#)	413	447	860
Performance Index	47.3	46.5	93.8

Network Totals

Number of Intersections	15
Total Delay (hr)	136
Stops (#)	12921
Average Speed (mph)	21
Total Travel Time (hr)	314
Distance Traveled (mi)	6736
Fuel Consumed (gal)	460
Fuel Economy (mpg)	14.7
Unserved Vehicles (#)	0
Vehicles in dilemma zone (#)	998
Performance Index	172.4

Queues
2: Powderhouse Rd & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	28	1082	52	730	136	44	36	60	213	24	32
V/c Ratio	0.06	0.60	0.19	0.41	0.10	0.16	0.10	0.16	0.80	0.07	0.09
Control Delay	8.0	15.1	4.6	5.4	0.1	26.5	25.0	5.5	54.1	24.4	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.0	15.1	4.6	5.4	0.1	26.5	25.0	5.5	54.1	24.4	1.0
Queue Length 50th (ft)	7	206	7	56	0	20	16	0	114	11	0
Queue Length 95th (ft)	12	336	m8	81	0	33	24	14	130	24	0
Internal Link Dist (ft)		1929		687			421			1527	
Turn Bay Length (ft)	171		195								100
Base Capacity (vph)	468	1789	328	1841	1333	329	443	429	325	443	429
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.60	0.16	0.40	0.10	0.13	0.08	0.14	0.66	0.05	0.07

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
2: Powderhouse Rd & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014

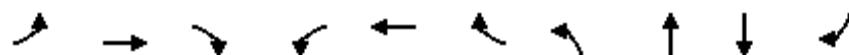
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑	↑	↑	↑	↑	↑	↑	↑
Volume (vph)	18	971	45	40	686	113	31	22	46	151	19	26
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9		4.2	4.9	4.0	4.2	4.2	4.2	4.2	4.2	4.2
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1490	2951		1490	2980	1333	1490	1569	1333	1490	1569	1333
Flt Permitted	0.33	1.00		0.20	1.00	1.00	0.74	1.00	1.00	0.73	1.00	1.00
Satd. Flow (perm)	522	2951		311	2980	1333	1163	1569	1333	1151	1569	1333
Peak-hour factor, PHF	0.64	0.96	0.63	0.77	0.94	0.83	0.71	0.61	0.77	0.71	0.79	0.81
Adj. Flow (vph)	28	1011	71	52	730	136	44	36	60	213	24	32
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	46	0	0	25
Lane Group Flow (vph)	28	1077	0	52	730	136	44	36	14	213	24	7
Turn Type	pm+pt	NA		pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		Free	8		8	4		4
Actuated Green, G (s)	57.2	52.0		54.8	50.8	90.0	20.7	20.7	20.7	20.7	20.7	20.7
Effective Green, g (s)	57.2	52.0		54.8	50.8	90.0	20.7	20.7	20.7	20.7	20.7	20.7
Actuated g/C Ratio	0.64	0.58		0.61	0.56	1.00	0.23	0.23	0.23	0.23	0.23	0.23
Clearance Time (s)	4.2	4.9		4.2	4.9		4.2	4.2	4.2	4.2	4.2	4.2
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	387	1705		241	1682	1333	267	360	306	264	360	306
v/s Ratio Prot	0.00	c0.37		c0.01	0.24			0.02			0.02	
v/s Ratio Perm	0.04			0.12		c0.10	0.04		0.01	c0.19		0.01
v/c Ratio	0.07	0.63		0.22	0.43	0.10	0.16	0.10	0.05	0.81	0.07	0.02
Uniform Delay, d1	8.7	12.6		14.6	11.3	0.0	27.7	27.3	27.0	32.8	27.1	26.8
Progression Factor	1.00	1.00		0.35	0.35	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	1.8		0.2	0.8	0.1	0.1	0.0	0.0	15.5	0.0	0.0
Delay (s)	8.7	14.4		5.2	4.8	0.1	27.8	27.4	27.0	48.2	27.1	26.8
Level of Service	A	B		A	A	A	C	C	C	D	C	C
Approach Delay (s)		14.3			4.1			27.3			43.8	
Approach LOS		B			A			C			D	
Intersection Summary												
HCM 2000 Control Delay		14.5				HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio		0.66										
Actuated Cycle Length (s)		90.0				Sum of lost time (s)			13.3			
Intersection Capacity Utilization		63.7%				ICU Level of Service			B			
Analysis Period (min)		15										
c Critical Lane Group												

Queues

3: Stillwater Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	145	877	196	79	670	24	200	71	60	104
V/c Ratio	0.30	0.50	0.23	0.26	0.44	0.02	0.80	0.20	0.20	0.08
Control Delay	4.2	8.7	1.3	19.9	20.7	0.0	55.6	12.0	27.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.2	8.7	1.3	19.9	20.7	0.0	55.6	12.0	27.7	0.1
Queue Length 50th (ft)	9	72	0	27	165	0	107	9	28	0
Queue Length 95th (ft)	18	137	m19	67	262	0	113	18	27	0
Internal Link Dist (ft)		687			705			916	424	
Turn Bay Length (ft)	170		156	190			30			75
Base Capacity (vph)	501	1762	868	362	1596	1333	316	429	374	1333
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.50	0.23	0.22	0.42	0.02	0.63	0.17	0.16	0.08

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
3: Stillwater Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

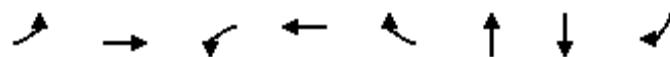
6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑	↑	↑	↑	↑	↑
Volume (vph)	110	851	176	62	616	17	132	12	36	22	13	77
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9	4.9	4.2	4.9	4.0	4.2	4.2			4.2	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Fr _t	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.89			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1490	2980	1333	1490	2980	1333	1490	1400			1528	1333
Flt Permitted	0.35	1.00	1.00	0.27	1.00	1.00	0.72	1.00			0.85	1.00
Satd. Flow (perm)	548	2980	1333	417	2980	1333	1126	1400			1331	1333
Peak-hour factor, PHF	0.76	0.97	0.90	0.78	0.92	0.71	0.66	0.60	0.71	0.69	0.46	0.74
Adj. Flow (vph)	145	877	196	79	670	24	200	20	51	32	28	104
RTOR Reduction (vph)	0	0	82	0	0	0	0	40	0	0	0	0
Lane Group Flow (vph)	145	877	114	79	670	24	200	31	0	0	60	104
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Free	Perm	NA	Perm	NA	Free	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		Free	8			4		Free
Actuated Green, G (s)	61.7	52.4	52.4	49.7	45.3	90.0	19.9	19.9			19.9	90.0
Effective Green, g (s)	61.7	52.4	52.4	49.7	45.3	90.0	19.9	19.9			19.9	90.0
Actuated g/C Ratio	0.69	0.58	0.58	0.55	0.50	1.00	0.22	0.22			0.22	1.00
Clearance Time (s)	4.2	4.9	4.9	4.2	4.9		4.2	4.2			4.2	
Vehicle Extension (s)	2.0	4.0	4.0	2.0	4.0		2.0	2.0			2.0	
Lane Grp Cap (vph)	496	1735	776	282	1499	1333	248	309			294	1333
v/s Ratio Prot	c0.04	c0.29		0.01	0.22			0.02				
v/s Ratio Perm	0.16		0.09	0.14		0.02	c0.18				0.05	0.08
v/c Ratio	0.29	0.51	0.15	0.28	0.45	0.02	0.81	0.10			0.20	0.08
Uniform Delay, d1	8.5	11.1	8.6	15.4	14.3	0.0	33.2	27.9			28.6	0.0
Progression Factor	0.34	0.62	0.37	2.04	1.24	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	0.1	0.9	0.3	0.2	0.9	0.0	16.3	0.1			0.1	0.1
Delay (s)	3.0	7.7	3.5	31.5	18.7	0.0	49.5	28.0			28.7	0.1
Level of Service	A	A	A	C	B	A	D	C			C	A
Approach Delay (s)					19.4			43.9			10.6	
Approach LOS					A	B		D			B	
Intersection Summary												
HCM 2000 Control Delay				15.1							B	
HCM 2000 Volume to Capacity ratio				0.58								
Actuated Cycle Length (s)				90.0							13.3	
Intersection Capacity Utilization				58.5%							B	
Analysis Period (min)				15								
c Critical Lane Group												

Queues
4: Driftwood Dr & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	36	981	28	683	80	96	60	48
v/c Ratio	0.07	0.40	0.08	0.28	0.06	0.46	0.51	0.04
Control Delay	2.5	5.7	0.6	0.5	0.1	25.0	52.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.5	5.7	0.6	0.5	0.1	25.0	52.3	0.1
Queue Length 50th (ft)	7	111	0	3	0	21	33	0
Queue Length 95th (ft)	4	194	0	3	0	28	37	0
Internal Link Dist (ft)		705		569		917	428	
Turn Bay Length (ft)	180		190		180			75
Base Capacity (vph)	503	2424	362	2438	1333	372	243	1333
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.40	0.08	0.28	0.06	0.26	0.25	0.04

Intersection Summary

HCM Signalized Intersection Capacity Analysis

4: Driftwood Dr & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑	↑		↔		↑	↑	↑
Volume (vph)	24	871	24	16	656	57	17	9	37	53	2	35
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9		4.9	4.9	4.0		4.2			4.2	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Fr _t	1.00	0.99		1.00	1.00	0.85		0.92			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.96	1.00
Satd. Flow (prot)	1490	2960		1490	2980	1333		1427			1499	1333
Flt Permitted	0.39	1.00		0.28	1.00	1.00		0.90			0.61	1.00
Satd. Flow (perm)	615	2960		443	2980	1333		1305			961	1333
Peak-hour factor, PHF	0.67	0.93	0.55	0.57	0.96	0.71	0.71	0.56	0.66	0.95	0.50	0.73
Adj. Flow (vph)	36	937	44	28	683	80	24	16	56	56	4	48
RTOR Reduction (vph)	0	2	0	0	0	0	0	50	0	0	0	0
Lane Group Flow (vph)	36	979	0	28	683	80	0	46	0	0	60	48
Turn Type	Perm	NA		Perm	NA	Free	Perm	NA		Perm	NA	Free
Protected Phases		2				6			8			4
Permitted Phases	2			6		Free	8			4		Free
Actuated Green, G (s)	71.8	71.8		71.8	71.8	90.0		9.1			9.1	90.0
Effective Green, g (s)	71.8	71.8		71.8	71.8	90.0		9.1			9.1	90.0
Actuated g/C Ratio	0.80	0.80		0.80	0.80	1.00		0.10			0.10	1.00
Clearance Time (s)	4.9	4.9		4.9	4.9			4.2			4.2	
Vehicle Extension (s)	4.0	4.0		4.0	4.0			2.0			2.0	
Lane Grp Cap (vph)	490	2361		353	2377	1333		131			97	1333
v/s Ratio Prot	c0.33			0.23								
v/s Ratio Perm	0.06			0.06		0.06		0.03			c0.06	0.04
v/c Ratio	0.07	0.41		0.08	0.29	0.06		0.35			0.62	0.04
Uniform Delay, d1	2.0	2.7		2.0	2.4	0.0		37.7			38.8	0.0
Progression Factor	0.78	1.64		0.08	0.09	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.3	0.5		0.4	0.3	0.1		0.6			8.0	0.1
Delay (s)	1.8	5.0		0.6	0.5	0.1		38.3			46.8	0.1
Level of Service	A	A		A	A	A		D			D	A
Approach Delay (s)		4.9			0.5			38.3			26.0	
Approach LOS		A			A			D			C	
Intersection Summary												
HCM 2000 Control Delay		5.9										
HCM 2000 Volume to Capacity ratio		0.44										
Actuated Cycle Length (s)		90.0										
Intersection Capacity Utilization		48.1%										
Analysis Period (min)		15										
c Critical Lane Group												

Queues

5: Frontier Mall Dr & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	88	962	48	673	156	20	56	147	124
V/c Ratio	0.17	0.50	0.15	0.39	0.12	0.11	0.20	0.72	0.37
Control Delay	3.4	6.1	3.7	4.0	0.2	29.3	15.6	53.3	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.4	6.1	3.7	4.0	0.2	29.3	15.6	53.3	11.6
Queue Length 50th (ft)	5	37	0	5	0	10	10	80	10
Queue Length 95th (ft)	13	346	6	142	0	18	16	119	34
Internal Link Dist (ft)		569		1110			911		1473
Turn Bay Length (ft)	185		140		140	75			
Base Capacity (vph)	543	1939	378	1785	1333	249	388	288	426
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.50	0.13	0.38	0.12	0.08	0.14	0.51	0.29

Intersection Summary

HCM Signalized Intersection Capacity Analysis

5: Frontier Mall Dr & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑	↑	↑	↑		↑	↑	
Volume (vph)	65	870	27	32	646	134	12	11	27	122	15	77
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9		4.2	4.9	4.0	4.2	4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Fr _t	1.00	0.99		1.00	1.00	0.85	1.00	0.90		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1490	2964		1490	2980	1333	1490	1417		1490	1371	
Flt Permitted	0.36	1.00		0.25	1.00	1.00	0.63	1.00		0.72	1.00	
Satd. Flow (perm)	568	2964		394	2980	1333	981	1417		1130	1371	
Peak-hour factor, PHF	0.74	0.94	0.75	0.67	0.96	0.86	0.60	0.55	0.75	0.83	0.75	0.74
Adj. Flow (vph)	88	926	36	48	673	156	20	20	36	147	20	104
RTOR Reduction (vph)	0	2	0	0	0	0	0	29	0	0	85	0
Lane Group Flow (vph)	88	960	0	48	673	156	20	27	0	147	39	0
Turn Type	pm+pt	NA		pm+pt	NA	Free	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6				8			4
Permitted Phases	2			6		Free	8				4	
Actuated Green, G (s)	65.3	57.2		54.0	50.8	90.0	16.3	16.3		16.3	16.3	
Effective Green, g (s)	65.3	57.2		54.0	50.8	90.0	16.3	16.3		16.3	16.3	
Actuated g/C Ratio	0.73	0.64		0.60	0.56	1.00	0.18	0.18		0.18	0.18	
Clearance Time (s)	4.2	4.9		4.2	4.9		4.2	4.2		4.2	4.2	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	510	1883		275	1682	1333	177	256		204	248	
v/s Ratio Prot	c0.02	c0.32		0.01	0.23			0.02			0.03	
v/s Ratio Perm	0.11			0.10		0.12	0.02			c0.13		
v/c Ratio	0.17	0.51		0.17	0.40	0.12	0.11	0.10		0.72	0.16	
Uniform Delay, d1	5.6	8.8		12.0	11.0	0.0	30.8	30.8		34.7	31.1	
Progression Factor	0.49	0.52		0.44	0.26	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.9		0.1	0.6	0.2	0.1	0.1		10.1	0.1	
Delay (s)	2.8	5.6		5.3	3.5	0.2	30.9	30.8		44.8	31.2	
Level of Service	A	A		A	A	A	C	C		D	C	
Approach Delay (s)		5.3			3.0			30.8			38.6	
Approach LOS		A			A			C			D	
Intersection Summary												
HCM 2000 Control Delay		9.3				HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio		0.55										
Actuated Cycle Length (s)		90.0				Sum of lost time (s)				13.3		
Intersection Capacity Utilization		59.5%				ICU Level of Service				B		
Analysis Period (min)		15										
c Critical Lane Group												

Queues
6: Prairie Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	72	1089	52	801	263	68	88	188	190	64
V/c Ratio	0.26	0.74	0.27	0.56	0.20	0.39	0.44	0.66	0.66	0.17
Control Delay	24.2	31.2	28.4	29.9	0.3	43.5	32.8	43.6	43.6	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.2	31.2	28.4	29.9	0.3	43.5	32.8	43.6	43.6	1.0
Queue Length 50th (ft)	16	261	20	208	0	37	31	103	104	0
Queue Length 95th (ft)	64	#506	45	321	0	50	49	166	115	0
Internal Link Dist (ft)		1110		710			916		1682	
Turn Bay Length (ft)	250		250		205	120				100
Base Capacity (vph)	286	1481	195	1424	1333	360	381	374	377	450
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.74	0.27	0.56	0.20	0.19	0.23	0.50	0.50	0.14

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
6: Prairie Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	57	979	29	39	777	234	42	37	24	319	16	46
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9		4.9	4.9	4.0	4.2	4.2		4.2	4.2	4.2
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	1.00
Fr _t	1.00	1.00		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00
Satd. Flow (prot)	1490	2966		1490	2980	1333	1490	1483		1416	1428	1333
Flt Permitted	0.26	1.00		0.15	1.00	1.00	0.95	1.00		0.95	0.96	1.00
Satd. Flow (perm)	413	2966		233	2980	1333	1490	1483		1416	1428	1333
Peak-hour factor, PHF	0.79	0.93	0.81	0.75	0.97	0.89	0.62	0.66	0.75	0.90	0.67	0.72
Adj. Flow (vph)	72	1053	36	52	801	263	68	56	32	354	24	64
RTOR Reduction (vph)	0	2	0	0	0	0	0	27	0	0	0	51
Lane Group Flow (vph)	72	1087	0	52	801	263	68	61	0	188	190	13
Turn Type	pm+pt	NA		pm+pt	NA	Free	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	2			6		Free						4
Actuated Green, G (s)	47.0	42.1		43.2	40.2	90.0	8.6	8.6		18.1	18.1	18.1
Effective Green, g (s)	47.0	42.1		43.2	40.2	90.0	8.6	8.6		18.1	18.1	18.1
Actuated g/C Ratio	0.52	0.47		0.48	0.45	1.00	0.10	0.10		0.20	0.20	0.20
Clearance Time (s)	4.9	4.9		4.9	4.9		4.2	4.2		4.2	4.2	4.2
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0		4.0	4.0	4.0
Lane Grp Cap (vph)	274	1387		153	1331	1333	142	141		284	287	268
v/s Ratio Prot	0.01	c0.37		0.01	0.27		c0.05	0.04		0.13	c0.13	
v/s Ratio Perm	0.12			0.15		c0.20						0.01
v/c Ratio	0.26	0.78		0.34	0.60	0.20	0.48	0.43		0.66	0.66	0.05
Uniform Delay, d1	18.2	20.1		26.3	18.8	0.0	38.6	38.4		33.1	33.1	29.0
Progression Factor	1.39	1.28		1.32	1.38	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	4.1		0.4	1.8	0.3	0.9	0.8		6.2	6.2	0.1
Delay (s)	25.5	29.8		35.2	27.9	0.3	39.5	39.2		39.4	39.3	29.1
Level of Service	C	C		D	C	A	D	D		D	D	C
Approach Delay (s)		29.5			21.7			39.3			37.9	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay		28.3			HCM 2000 Level of Service				C			
HCM 2000 Volume to Capacity ratio		0.71										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)				18.2			
Intersection Capacity Utilization		66.1%			ICU Level of Service				C			
Analysis Period (min)		15										
c Critical Lane Group												

Queues
7: Rue Terre & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	72	1332	96	985	88	112	124	16	112
V/c Ratio	0.21	0.72	0.41	0.53	0.10	0.40	0.70	0.06	0.34
Control Delay	3.6	12.7	11.5	12.7	5.7	19.0	54.6	28.6	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.6	12.7	11.5	12.7	5.7	19.0	54.6	28.6	8.9
Queue Length 50th (ft)	1	291	8	81	0	24	67	8	0
Queue Length 95th (ft)	m3	#462	21	244	m26	48	109	11	28
Internal Link Dist (ft)		710		830		892		916	
Turn Bay Length (ft)	250		250		150				120
Base Capacity (vph)	372	1854	272	1861	865	366	244	380	407
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.72	0.35	0.53	0.10	0.31	0.51	0.04	0.28

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

7: Rue Terre & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	53	1181	36	67	936	87	26	9	57	104	7	87
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9		4.9	4.9	4.9		4.2		4.2	4.2	4.2
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00		1.00	1.00	1.00
Fr _t	1.00	0.99		1.00	1.00	0.85		0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98		0.95	1.00	1.00
Satd. Flow (prot)	1490	2964		1490	2980	1333		1425		1490	1569	1333
Flt Permitted	0.24	1.00		0.14	1.00	1.00		0.91		0.64	1.00	1.00
Satd. Flow (perm)	381	2964		222	2980	1333		1313		1009	1569	1333
Peak-hour factor, PHF	0.74	0.92	0.75	0.70	0.95	0.99	0.72	0.75	0.89	0.84	0.44	0.78
Adj. Flow (vph)	72	1284	48	96	985	88	36	12	64	124	16	112
RTOR Reduction (vph)	0	2	0	0	0	34	0	53	0	0	0	92
Lane Group Flow (vph)	72	1330	0	96	985	54	0	59	0	124	16	20
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	60.2	55.3		60.2	55.3	55.3		15.8		15.8	15.8	15.8
Effective Green, g (s)	60.2	55.3		60.2	55.3	55.3		15.8		15.8	15.8	15.8
Actuated g/C Ratio	0.67	0.61		0.67	0.61	0.61		0.18		0.18	0.18	0.18
Clearance Time (s)	4.9	4.9		4.9	4.9	4.9		4.2		4.2	4.2	4.2
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	315	1821		217	1831	819		230		177	275	234
v/s Ratio Prot	0.01	c0.45		c0.02	0.33						0.01	
v/s Ratio Perm	0.14			0.27		0.04		0.05		c0.12		0.01
v/c Ratio	0.23	0.73		0.44	0.54	0.07		0.26		0.70	0.06	0.08
Uniform Delay, d1	10.0	12.1		17.5	10.0	7.0		32.0		34.9	30.9	31.0
Progression Factor	0.41	0.74		0.61	1.03	2.12		1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	1.9		0.4	0.9	0.1		0.6		11.8	0.1	0.2
Delay (s)	4.2	11.0		11.1	11.2	14.9		32.6		46.7	31.0	31.2
Level of Service	A	B		B	B	B		C		D	C	C
Approach Delay (s)		10.6			11.5			32.6			38.8	
Approach LOS		B			B			C			D	
Intersection Summary												
HCM 2000 Control Delay		14.2									B	
HCM 2000 Volume to Capacity ratio		0.71										
Actuated Cycle Length (s)		90.0									14.0	
Intersection Capacity Utilization		69.7%									C	
Analysis Period (min)		15										
c Critical Lane Group												

Queues
8: Walmart & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	208	1349	36	992	228	48	96	233	215
V/c Ratio	0.77	0.81	0.21	0.65	0.29	0.57	0.40	0.61	0.42
Control Delay	30.6	18.1	18.3	20.4	4.6	62.6	15.4	43.4	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.6	18.1	18.3	20.4	4.6	62.6	15.4	43.4	6.9
Queue Length 50th (ft)	35	438	7	211	8	27	6	65	8
Queue Length 95th (ft)	m#75	#588	23	341	55	49	7	93	9
Internal Link Dist (ft)		830		1324			423		927
Turn Bay Length (ft)	250		250		180				125
Base Capacity (vph)	269	1658	176	1533	782	225	507	410	785
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.81	0.20	0.65	0.29	0.21	0.19	0.57	0.27

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
8: Walmart & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑	↑	↑	↑		↑↑	↑	
Volume (vph)	193	1190	41	31	962	212	35	6	59	200	12	152
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9		4.2	4.9	4.9	4.2	4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	
Fr _t	1.00	0.99		1.00	1.00	0.85	1.00	0.87		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1490	2962		1490	2980	1333	1490	1363		2891	1355	
Flt Permitted	0.20	1.00		0.10	1.00	1.00	0.43	1.00		0.95	1.00	
Satd. Flow (perm)	321	2962		153	2980	1333	682	1363		2891	1355	
Peak-hour factor, PHF	0.93	0.92	0.73	0.86	0.97	0.93	0.73	0.50	0.70	0.86	0.60	0.78
Adj. Flow (vph)	208	1293	56	36	992	228	48	12	84	233	20	195
RTOR Reduction (vph)	0	2	0	0	0	102	0	75	0	0	140	0
Lane Group Flow (vph)	208	1347	0	36	992	126	48	21	0	233	75	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Prot	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2			6		6	8					
Actuated Green, G (s)	55.3	47.8		47.3	43.8	43.8	9.2	9.2		12.0	25.4	
Effective Green, g (s)	55.3	47.8		47.3	43.8	43.8	9.2	9.2		12.0	25.4	
Actuated g/C Ratio	0.61	0.53		0.53	0.49	0.49	0.10	0.10		0.13	0.28	
Clearance Time (s)	4.2	4.9		4.2	4.9	4.9	4.2	4.2		4.2	4.2	
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	294	1573		132	1450	648	69	139		385	382	
v/s Ratio Prot	c0.06	c0.45		0.01	0.33			0.02		c0.08	0.06	
v/s Ratio Perm	0.38			0.13		0.09	c0.07					
v/c Ratio	0.71	0.86		0.27	0.68	0.19	0.70	0.15		0.61	0.20	
Uniform Delay, d1	22.6	18.1		26.7	17.8	13.1	39.0	36.8		36.8	24.5	
Progression Factor	0.54	0.62		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.8	4.8		0.4	2.6	0.7	21.7	0.2		1.8	0.1	
Delay (s)	17.0	16.1		27.1	20.4	13.8	60.8	37.0		38.6	24.6	
Level of Service	B	B		C	C	B	E	D		D	C	
Approach Delay (s)					16.2		19.4		44.9		31.9	
Approach LOS				B		B		D			C	
Intersection Summary												
HCM 2000 Control Delay				20.7						C		
HCM 2000 Volume to Capacity ratio				0.81								
Actuated Cycle Length (s)				90.0					17.5			
Intersection Capacity Utilization				79.6%						D		
Analysis Period (min)				15								
c Critical Lane Group												

Queues

9: Converse Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	84	980	505	200	773	164	531	333	367	235	303	84
V/c Ratio	0.53	0.93	0.38	1.33	0.70	0.29	0.81	0.87	0.74	1.18	0.67	0.29
Control Delay	58.2	49.4	0.8	219.1	24.5	7.2	52.2	62.2	22.9	164.8	51.3	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.2	49.4	0.8	219.1	24.5	7.2	52.2	62.2	22.9	164.8	51.3	6.3
Queue Length 50th (ft)	56	346	0	~184	114	6	184	221	86	~218	107	0
Queue Length 95th (ft)	104	#469	0	#290	193	45	#304	#347	149	#395	146	18
Internal Link Dist (ft)			1324			1462			927			928
Turn Bay Length (ft)	250		180	250		100	400			150		150
Base Capacity (vph)	177	1059	1333	150	1102	557	655	439	538	199	780	429
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.93	0.38	1.33	0.70	0.29	0.81	0.76	0.68	1.18	0.39	0.20

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

9: Converse Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014

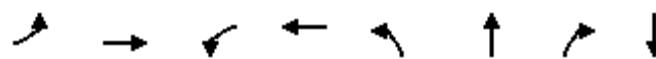
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑↑	↑
Volume (vph)	73	872	460	164	719	146	467	300	297	230	285	69
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9	4.0	4.9	4.9	4.9	4.2	4.2	4.2	4.2	4.2	4.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	0.95	1.00
Fr _t	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1490	2980	1333	1490	2980	1333	2891	1569	1333	1490	2980	1333
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1490	2980	1333	1490	2980	1333	2891	1569	1333	1490	2980	1333
Peak-hour factor, PHF	0.87	0.89	0.91	0.82	0.93	0.89	0.88	0.90	0.81	0.98	0.94	0.82
Adj. Flow (vph)	84	980	505	200	773	164	531	333	367	235	303	84
RTOR Reduction (vph)	0	0	0	0	0	65	0	0	173	0	0	71
Lane Group Flow (vph)	84	980	505	200	773	99	531	333	194	235	303	13
Turn Type	Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free			6			8			4
Actuated Green, G (s)	10.5	38.1	110.0	12.1	39.7	39.7	24.9	26.9	26.9	14.7	16.7	16.7
Effective Green, g (s)	10.5	38.1	110.0	12.1	39.7	39.7	24.9	26.9	26.9	14.7	16.7	16.7
Actuated g/C Ratio	0.10	0.35	1.00	0.11	0.36	0.36	0.23	0.24	0.24	0.13	0.15	0.15
Clearance Time (s)	4.9	4.9		4.9	4.9	4.9	4.2	4.2	4.2	4.2	4.2	4.2
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	2.0	2.0	2.0	3.0	3.0	3.0
Lane Grp Cap (vph)	142	1032	1333	163	1075	481	654	383	325	199	452	202
v/s Ratio Prot	0.06	c0.33		c0.13	0.26		0.18	c0.21		c0.16	0.10	
v/s Ratio Perm			c0.38			0.07			0.15			0.01
v/c Ratio	0.59	0.95	0.38	1.23	0.72	0.21	0.81	0.87	0.60	1.18	0.67	0.06
Uniform Delay, d1	47.7	35.0	0.0	49.0	30.3	24.3	40.3	39.9	36.8	47.6	44.1	40.0
Progression Factor	1.00	1.00	1.00	0.81	0.68	0.54	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.5	18.2	0.8	140.6	3.7	0.9	7.2	17.9	2.0	121.1	3.9	0.1
Delay (s)	54.1	53.2	0.8	180.4	24.3	13.9	47.5	57.8	38.7	168.7	47.9	40.1
Level of Service	D	D	A	F	C	B	D	E	D	F	D	D
Approach Delay (s)			36.4		50.3			47.7			92.5	
Approach LOS			D		D			D			F	

Intersection Summary												
HCM 2000 Control Delay	50.6	HCM 2000 Level of Service										D
HCM 2000 Volume to Capacity ratio	1.00											
Actuated Cycle Length (s)	110.0	Sum of lost time (s)										18.2
Intersection Capacity Utilization	88.5%	ICU Level of Service										E
Analysis Period (min)	15											
c Critical Lane Group												

Queues
10: Windmill Rd & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	100	1295	68	938	92	68	104	180
V/c Ratio	0.23	0.65	0.32	0.55	0.48	0.26	0.34	0.59
Control Delay	2.6	11.9	8.5	8.5	50.0	40.8	10.4	36.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.6	11.9	8.5	8.5	50.0	40.8	10.4	36.2
Queue Length 50th (ft)	4	170	8	110	58	42	0	38
Queue Length 95th (ft)	m6	m210	13	108	81	80	34	36
Internal Link Dist (ft)		1464		3132		927		928
Turn Bay Length (ft)	250		250		175		175	
Base Capacity (vph)	452	1995	256	1696	239	524	515	575
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.65	0.27	0.55	0.38	0.13	0.20	0.31

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
10: Windmill Rd & Dell Range Blvd

Timing Plan: PM Peak Hour

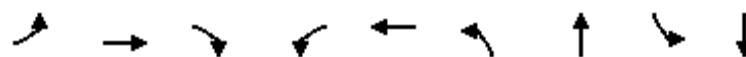
6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↓		↑	↑↓		↑	↑	↑		↑↓	
Volume (vph)	78	1068	86	52	821	29	66	62	84	29	35	55
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9		4.2	4.9		4.2	4.2	4.2		4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00		0.95	
Fr _t	1.00	0.99		1.00	0.99		1.00	1.00	0.85		0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00		0.99	
Satd. Flow (prot)	1490	2943		1490	2963		1490	1569	1333		2765	
Flt Permitted	0.24	1.00		0.15	1.00		0.58	1.00	1.00		0.86	
Satd. Flow (perm)	380	2943		237	2963		917	1569	1333		2397	
Peak-hour factor, PHF	0.78	0.90	0.80	0.77	0.91	0.81	0.72	0.91	0.81	0.60	0.58	0.76
Adj. Flow (vph)	100	1187	108	68	902	36	92	68	104	48	60	72
RTOR Reduction (vph)	0	4	0	0	2	0	0	0	86	0	65	0
Lane Group Flow (vph)	100	1291	0	68	936	0	92	68	18	0	115	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2			6			8		8		4	
Actuated Green, G (s)	82.3	72.7		65.8	61.1		19.3	19.3	19.3		11.1	
Effective Green, g (s)	82.3	72.7		65.8	61.1		19.3	19.3	19.3		11.1	
Actuated g/C Ratio	0.75	0.66		0.60	0.56		0.18	0.18	0.18		0.10	
Clearance Time (s)	4.2	4.9		4.2	4.9		4.2	4.2	4.2		4.2	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0	2.0		2.0	
Lane Grp Cap (vph)	448	1945		195	1645		181	275	233		241	
v/s Ratio Prot	0.03	c0.44		c0.01	0.32		c0.02	0.04				
v/s Ratio Perm	0.13			0.19			c0.07		0.01		0.05	
v/c Ratio	0.22	0.66		0.35	0.57		0.51	0.25	0.08		0.48	
Uniform Delay, d1	9.8	11.3		22.0	15.9		42.4	39.1	37.9		46.7	
Progression Factor	0.35	0.94		0.63	0.46		1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.0	0.7		0.3	1.2		0.8	0.2	0.1		0.5	
Delay (s)	3.5	11.3		14.2	8.4		43.2	39.3	38.0		47.3	
Level of Service	A	B		B	A		D	D	D		D	
Approach Delay (s)		10.8			8.8			40.1			47.3	
Approach LOS		B			A			D			D	
Intersection Summary												
HCM 2000 Control Delay		15.1					HCM 2000 Level of Service		B			
HCM 2000 Volume to Capacity ratio		0.64										
Actuated Cycle Length (s)		110.0					Sum of lost time (s)		17.5			
Intersection Capacity Utilization		66.1%					ICU Level of Service		C			
Analysis Period (min)		15										
c Critical Lane Group												

Queues
14: N College Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	120	506	467	218	544	487	539	116	329
V/c Ratio	0.59	0.93	0.65	1.07	0.53	1.20	0.81	0.47	0.69
Control Delay	50.1	50.9	6.8	128.4	29.5	147.5	44.5	41.9	46.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.1	50.9	6.8	128.4	29.5	147.5	44.5	41.9	46.1
Queue Length 50th (ft)	81	357	68	~170	152	~397	161	54	103
Queue Length 95th (ft)	m137	#531	14	98	162	#634	198	#98	145
Internal Link Dist (ft)		649			1940		931		925
Turn Bay Length (ft)	250			250		330		150	
Base Capacity (vph)	204	543	717	204	1021	405	784	245	580
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.93	0.65	1.07	0.53	1.20	0.69	0.47	0.57

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
14: N College Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑ ↗	↑ ↘	↑ ↙	↑ ↖	↑ ↗ ↖	↑ ↖	↑ ↙	↑ ↗ ↖	↑ ↖	↑ ↙	↑ ↗ ↖	↑ ↖
Volume (vph)	114	450	411	87	329	67	433	299	127	104	218	67
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9	4.9	4.9	4.9		4.9	4.9		4.9	4.9	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Fr _t	1.00	1.00	0.85	1.00	0.97		1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1490	1569	1333	1490	2894		1490	2825		1490	2866	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.43	1.00		0.23	1.00	
Satd. Flow (perm)	1490	1569	1333	1490	2894		671	2825		367	2866	
Peak-hour factor, PHF	0.95	0.89	0.88	0.40	0.75	0.64	0.89	0.85	0.68	0.90	0.89	0.80
Adj. Flow (vph)	120	506	467	218	439	105	487	352	187	116	245	84
RTOR Reduction (vph)	0	0	256	0	19	0	0	67	0	0	32	0
Lane Group Flow (vph)	120	506	211	218	525	0	487	472	0	116	297	0
Turn Type	Prot	NA	Perm	Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2				8			4		
Actuated Green, G (s)	15.1	38.1	38.1	15.1	38.1		42.1	23.3		31.0	17.1	
Effective Green, g (s)	15.1	38.1	38.1	15.1	38.1		42.1	23.3		31.0	17.1	
Actuated g/C Ratio	0.14	0.35	0.35	0.14	0.35		0.38	0.21		0.28	0.16	
Clearance Time (s)	4.9	4.9	4.9	4.9	4.9		4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.0	3.0	3.0	2.0	5.0		2.0	3.0		2.0	4.0	
Lane Grp Cap (vph)	204	543	461	204	1002		406	598		245	445	
v/s Ratio Prot	0.08	c0.32		c0.15	0.18		c0.22	0.17		0.06	0.10	
v/s Ratio Perm			0.16				c0.24			0.07		
v/c Ratio	0.59	0.93	0.46	1.07	0.52		1.20	0.79		0.47	0.67	
Uniform Delay, d1	44.5	34.7	27.9	47.5	28.7		34.7	41.0		40.2	43.8	
Progression Factor	0.88	0.78	0.51	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.3	22.1	2.8	82.4	2.0		111.3	6.9		0.5	4.1	
Delay (s)	41.6	49.2	16.9	129.8	30.7		146.0	47.9		40.7	47.9	
Level of Service	D	D	B	F	C		F	D		D	D	
Approach Delay (s)		34.5			59.0			94.5			46.0	
Approach LOS		C			E			F			D	
Intersection Summary												
HCM 2000 Control Delay		60.2										E
HCM 2000 Volume to Capacity ratio		1.11										
Actuated Cycle Length (s)		110.0										19.6
Intersection Capacity Utilization		89.3%										E
Analysis Period (min)		15										
c Critical Lane Group												

Queues
34: Ridge Rd & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	144	863	200	123	877	191	269	84	129	163	112
V/c Ratio	0.51	0.56	0.27	0.43	0.58	0.59	0.85	0.24	0.80	0.72	0.39
Control Delay	13.8	14.8	4.3	12.1	13.7	42.4	66.3	6.5	73.4	62.1	11.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.8	14.8	4.3	12.1	13.7	42.4	66.3	6.5	73.4	62.1	11.4
Queue Length 50th (ft)	17	178	10	9	90	102	181	0	66	111	0
Queue Length 95th (ft)	19	221	14	24	174	168	#273	30	97	173	14
Internal Link Dist (ft)		3132			1170		929			920	
Turn Bay Length (ft)	250		75	250		200		215	150		200
Base Capacity (vph)	321	1538	740	326	1525	325	348	375	177	339	376
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.56	0.27	0.38	0.58	0.59	0.77	0.22	0.73	0.48	0.30

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
34: Ridge Rd & Dell Range Blvd

Timing Plan: PM Peak Hour

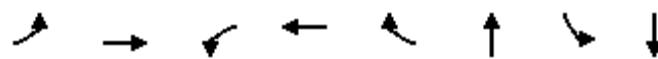
6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑		↑	↑	↑	↑	↑	↑
Volume (vph)	115	803	176	64	668	58	174	226	80	99	155	72
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9	4.9	4.2	4.9		4.2	4.2	4.2	4.2	4.2	4.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1490	2980	1333	1490	2944		1490	1569	1333	1490	1569	1333
Flt Permitted	0.25	1.00	1.00	0.25	1.00		0.49	1.00	1.00	0.25	1.00	1.00
Satd. Flow (perm)	388	2980	1333	397	2944		762	1569	1333	395	1569	1333
Peak-hour factor, PHF	0.80	0.93	0.88	0.52	0.83	0.81	0.91	0.84	0.95	0.77	0.95	0.64
Adj. Flow (vph)	144	863	200	123	805	72	191	269	84	129	163	112
RTOR Reduction (vph)	0	0	52	0	5	0	0	0	67	0	0	96
Lane Group Flow (vph)	144	863	148	123	872	0	191	269	17	129	163	16
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6			8		8	4		4
Actuated Green, G (s)	62.6	56.8	56.8	62.6	56.8		34.1	22.2	22.2	23.6	15.9	15.9
Effective Green, g (s)	62.6	56.8	56.8	62.6	56.8		34.1	22.2	22.2	23.6	15.9	15.9
Actuated g/C Ratio	0.57	0.52	0.52	0.57	0.52		0.31	0.20	0.20	0.21	0.14	0.14
Clearance Time (s)	4.2	4.9	4.9	4.2	4.9		4.2	4.2	4.2	4.2	4.2	4.2
Vehicle Extension (s)	2.0	4.0	4.0	2.0	4.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	278	1538	688	283	1520		328	316	269	161	226	192
v/s Ratio Prot	c0.03	0.29		0.02	c0.30		0.07	c0.17		c0.06	0.10	
v/s Ratio Perm	0.27		0.11	0.22			0.11		0.01	0.12		0.01
v/c Ratio	0.52	0.56	0.21	0.43	0.57		0.58	0.85	0.06	0.80	0.72	0.08
Uniform Delay, d1	23.5	18.1	14.5	21.8	18.3		35.6	42.3	35.5	46.7	44.9	40.7
Progression Factor	0.48	0.70	0.45	0.50	0.63		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	1.2	0.6	0.4	1.5		1.7	18.6	0.0	23.0	9.2	0.1
Delay (s)	11.9	13.8	7.0	11.2	13.0		37.3	60.9	35.5	69.6	54.1	40.8
Level of Service	B	B	A	B	B		D	E	D	E	D	D
Approach Delay (s)						12.7		48.7			55.4	
Approach LOS						B		D			E	
Intersection Summary												
HCM 2000 Control Delay				24.3						C		
HCM 2000 Volume to Capacity ratio				0.65								
Actuated Cycle Length (s)				110.0					Sum of lost time (s)		17.5	
Intersection Capacity Utilization				67.4%					ICU Level of Service		C	
Analysis Period (min)				15								
c Critical Lane Group												

Queues
37: Marble Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	95	978	8	762	204	20	241	112
V/c Ratio	0.25	0.51	0.03	0.45	0.24	0.06	0.82	0.27
Control Delay	7.1	8.4	3.4	12.3	2.3	24.6	60.7	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.1	8.4	3.4	12.3	2.3	24.6	60.7	7.8
Queue Length 50th (ft)	22	129	1	103	13	8	158	2
Queue Length 95th (ft)	m11	85	m2	m102	m11	14	224	0
Internal Link Dist (ft)		1170		606		928		914
Turn Bay Length (ft)	250		250		150			
Base Capacity (vph)	410	1947	314	1748	866	361	314	440
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.50	0.03	0.44	0.24	0.06	0.77	0.25

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
37: Marble Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	83	808	10	5	648	163	8	2	3	205	2	81
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9		4.9	4.9	4.9		4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00		1.00	1.00	
Fr _t	1.00	1.00		1.00	1.00	0.85		0.97		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97		0.95	1.00	
Satd. Flow (prot)	1490	2973		1490	2980	1333		1482		1490	1342	
Flt Permitted	0.31	1.00		0.23	1.00	1.00		0.87		0.74	1.00	
Satd. Flow (perm)	479	2973		363	2980	1333		1330		1168	1342	
Peak-hour factor, PHF	0.87	0.84	0.63	0.63	0.85	0.80	0.67	0.50	0.75	0.85	0.50	0.75
Adj. Flow (vph)	95	962	16	8	762	204	12	4	4	241	4	108
RTOR Reduction (vph)	0	1	0	0	0	96	0	3	0	0	81	0
Lane Group Flow (vph)	95	977	0	8	762	108	0	17	0	241	31	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	73.3	67.4		59.1	58.1	58.1		27.6		27.6	27.6	
Effective Green, g (s)	73.3	67.4		59.1	58.1	58.1		27.6		27.6	27.6	
Actuated g/C Ratio	0.67	0.61		0.54	0.53	0.53		0.25		0.25	0.25	
Clearance Time (s)	4.9	4.9		4.9	4.9	4.9		4.2		4.2	4.2	
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0		2.0		2.0	2.0	
Lane Grp Cap (vph)	413	1821		205	1573	704		333		293	336	
v/s Ratio Prot	c0.02	c0.33		0.00	0.26						0.02	
v/s Ratio Perm	0.13			0.02		0.08		0.01		c0.21		
v/c Ratio	0.23	0.54		0.04	0.48	0.15		0.05		0.82	0.09	
Uniform Delay, d1	11.9	12.3		18.4	16.5	13.3		31.3		38.9	31.6	
Progression Factor	0.58	0.64		0.40	0.76	0.84		1.00		1.00	1.00	
Incremental Delay, d2	0.1	1.0		0.0	0.5	0.2		0.0		16.0	0.0	
Delay (s)	7.0	8.8		7.4	13.0	11.4		31.3		54.9	31.6	
Level of Service	A	A		A	B	B		C		D	C	
Approach Delay (s)		8.7			12.6			31.3			47.5	
Approach LOS		A			B			C			D	
Intersection Summary												
HCM 2000 Control Delay		16.1			HCM 2000 Level of Service				B			
HCM 2000 Volume to Capacity ratio		0.62										
Actuated Cycle Length (s)		110.0			Sum of lost time (s)				14.0			
Intersection Capacity Utilization		62.5%			ICU Level of Service				B			
Analysis Period (min)		15										
c Critical Lane Group												

Dell Range Blvd

Direction	EB	WB	All
Total Delay (hr)	63	51	114
Stops (#)	6704	4700	11404
Average Speed (mph)	23	22	22
Total Travel Time (hr)	144	113	257
Distance Traveled (mi)	3236	2490	5726
Fuel Consumed (gal)	228	173	401
Fuel Economy (mpg)	14.2	14.4	14.3
Unserved Vehicles (#)	0	46	46
Vehicles in dilemma zone (#)	661	401	1062
Performance Index	81.3	64.1	145.5

Network Totals

Number of Intersections	15
Total Delay (hr)	214
Stops (#)	17220
Average Speed (mph)	18
Total Travel Time (hr)	415
Distance Traveled (mi)	7651
Fuel Consumed (gal)	590
Fuel Economy (mpg)	13.0
Unserved Vehicles (#)	154
Vehicles in dilemma zone (#)	1216
Performance Index	262.1

2012 Signal Timing & Geometric Adjustments Intersection Analysis

Queues
9: Converse Ave & Dell Range Blvd

Timing Plan: MD Peak Hour

6/3/2014



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	80	737	416	199	810	92	438	208	195	152	235	84
V/c Ratio	0.53	0.63	0.31	0.71	0.66	0.14	0.79	0.74	0.49	0.35	0.59	0.26
Control Delay	55.5	29.1	0.6	54.6	33.3	5.9	48.8	54.1	9.1	40.7	46.3	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.5	29.1	0.6	54.6	33.3	5.9	48.8	54.1	9.1	40.7	46.3	2.0
Queue Length 50th (ft)	49	197	0	62	198	1	137	127	0	45	75	0
Queue Length 95th (ft)	69	298	0	73	#388	31	182	182	39	76	106	0
Internal Link Dist (ft)		1324			1462			927			928	
Turn Bay Length (ft)	250		180	250		100	400			150		150
Base Capacity (vph)	165	1169	1333	291	1225	641	589	498	556	429	649	420
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.63	0.31	0.68	0.66	0.14	0.74	0.42	0.35	0.35	0.36	0.20

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

9: Converse Ave & Dell Range Blvd

Timing Plan: MD Peak Hour

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑↑	↑↑	↑	↑↑	↑	↑	↑↑	↑↑	↑
Volume (vph)	53	693	383	149	753	83	390	183	160	137	207	63
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9	4.0	4.9	4.9	4.9	4.2	4.2	4.2	4.2	4.2	4.2
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	1.00	1.00	0.97	0.95	1.00
Fr _t	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1490	2980	1333	2891	2980	1333	2891	1569	1333	2891	2980	1333
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1490	2980	1333	2891	2980	1333	2891	1569	1333	2891	2980	1333
Peak-hour factor, PHF	0.66	0.94	0.92	0.75	0.93	0.90	0.89	0.88	0.82	0.90	0.88	0.75
Adj. Flow (vph)	80	737	416	199	810	92	438	208	195	152	235	84
RTOR Reduction (vph)	0	0	0	0	0	55	0	0	160	0	0	73
Lane Group Flow (vph)	80	737	416	199	810	37	438	208	35	152	235	11
Turn Type	Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free			6			8			4
Actuated Green, G (s)	8.9	38.2	100.0	10.8	40.1	40.1	19.3	17.9	17.9	14.9	13.5	13.5
Effective Green, g (s)	8.9	38.2	100.0	10.8	40.1	40.1	19.3	17.9	17.9	14.9	13.5	13.5
Actuated g/C Ratio	0.09	0.38	1.00	0.11	0.40	0.40	0.19	0.18	0.18	0.15	0.14	0.14
Clearance Time (s)	4.9	4.9		4.9	4.9	4.9	4.2	4.2	4.2	4.2	4.2	4.2
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	2.0	2.0	2.0	3.0	3.0	3.0
Lane Grp Cap (vph)	132	1138	1333	312	1194	534	557	280	238	430	402	179
v/s Ratio Prot	0.05	0.25		c0.07	c0.27		c0.15	c0.13		0.05	0.08	
v/s Ratio Perm			c0.31			0.03			0.03			0.01
v/c Ratio	0.61	0.65	0.31	0.64	0.68	0.07	0.79	0.74	0.15	0.35	0.58	0.06
Uniform Delay, d1	43.9	25.4	0.0	42.7	24.6	18.5	38.4	38.9	34.6	38.2	40.6	37.7
Progression Factor	1.00	1.00	1.00	0.95	1.14	12.82	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.6	2.9	0.6	3.9	2.8	0.2	6.7	9.0	0.1	0.5	2.2	0.1
Delay (s)	51.5	28.2	0.6	44.4	30.9	236.7	45.1	47.8	34.7	38.7	42.8	37.9
Level of Service	D	C	A	D	C	F	D	D	C	D	D	D
Approach Delay (s)		20.4			50.6			43.3		40.6		
Approach LOS		C			D			D		D		

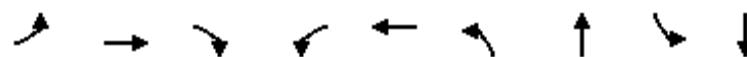
Intersection Summary

HCM 2000 Control Delay	37.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.2
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues
14: N College Ave & Dell Range Blvd

Timing Plan: MD Peak Hour

6/3/2014



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	72	317	405	76	391	359	345	60	312
V/c Ratio	0.58	0.48	0.51	0.52	0.31	0.77	0.52	0.34	0.65
Control Delay	55.9	25.7	6.3	55.9	18.6	54.8	32.0	46.0	39.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.9	25.7	6.3	55.9	18.6	54.8	32.0	46.0	39.4
Queue Length 50th (ft)	41	145	26	47	79	116	87	34	82
Queue Length 95th (ft)	87	154	51	75	115	#237	114	54	123
Internal Link Dist (ft)			649		1940		931		925
Turn Bay Length (ft)	250			250		330		150	
Base Capacity (vph)	150	656	793	165	1253	468	791	185	587
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.48	0.51	0.46	0.31	0.77	0.44	0.32	0.53

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
14: N College Ave & Dell Range Blvd

Timing Plan: MD Peak Hour

6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑ ↗	↑ ↘	↑ ↙	↑ ↖	↑ ↗ ↖	↑ ↖	↑ ↗	↑ ↖	↑ ↗	↑ ↖	↑ ↗	↑ ↖
Volume (vph)	65	260	344	56	297	54	330	193	77	38	208	70
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9	4.9	4.9	4.9		4.9	4.9		4.9	4.9	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		0.97	0.95		1.00	0.95	
Fr _t	1.00	1.00	0.85	1.00	0.97		1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1490	1569	1333	1490	2898		2891	2835		1490	2854	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1490	1569	1333	1490	2898		2891	2835		1490	2854	
Peak-hour factor, PHF	0.90	0.82	0.85	0.74	0.93	0.75	0.92	0.83	0.69	0.63	0.93	0.80
Adj. Flow (vph)	72	317	405	76	319	72	359	233	112	60	224	88
RTOR Reduction (vph)	0	0	244	0	20	0	0	58	0	0	44	0
Lane Group Flow (vph)	72	317	161	76	371	0	359	287	0	60	268	0
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2									
Actuated Green, G (s)	7.4	39.8	39.8	8.2	40.6		17.2	21.4		11.0	15.2	
Effective Green, g (s)	7.4	39.8	39.8	8.2	40.6		17.2	21.4		11.0	15.2	
Actuated g/C Ratio	0.07	0.40	0.40	0.08	0.41		0.17	0.21		0.11	0.15	
Clearance Time (s)	4.9	4.9	4.9	4.9	4.9		4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.0	3.0	3.0	2.0	5.0		2.0	3.0		2.0	4.0	
Lane Grp Cap (vph)	110	624	530	122	1176		497	606		163	433	
v/s Ratio Prot	0.05	c0.20		c0.05	0.13		c0.12	0.10		0.04	c0.09	
v/s Ratio Perm			0.12									
v/c Ratio	0.65	0.51	0.30	0.62	0.32		0.72	0.47		0.37	0.62	
Uniform Delay, d1	45.1	22.7	20.6	44.4	20.2		39.1	34.4		41.3	39.7	
Progression Factor	0.87	1.03	1.80	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.9	2.9	1.4	6.9	0.7		4.4	0.6		0.5	3.0	
Delay (s)	49.0	26.3	38.6	51.3	20.9		43.5	35.0		41.8	42.7	
Level of Service	D	C	D	D	C		D	C		D	D	
Approach Delay (s)		34.6			25.9			39.3			42.6	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay		35.6										
HCM 2000 Volume to Capacity ratio		0.59										
Actuated Cycle Length (s)		100.0										
Intersection Capacity Utilization		59.9%										
Analysis Period (min)		15										
c Critical Lane Group												

Dell Range Blvd

Direction	EB	WB	All
Total Delay (hr)	34	34	68
Stops (#)	4062	3765	7827
Average Speed (mph)	26	26	26
Total Travel Time (hr)	98	96	194
Distance Traveled (mi)	2545	2477	5022
Fuel Consumed (gal)	156	151	307
Fuel Economy (mpg)	16.3	16.5	16.4
Unserved Vehicles (#)	0	0	0
Vehicles in dilemma zone (#)	421	444	865
Performance Index	45.8	44.3	90.1

Network Totals

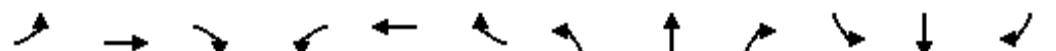
Number of Intersections	15
Total Delay (hr)	132
Stops (#)	12842
Average Speed (mph)	22
Total Travel Time (hr)	309
Distance Traveled (mi)	6736
Fuel Consumed (gal)	455
Fuel Economy (mpg)	14.8
Unserved Vehicles (#)	0
Vehicles in dilemma zone (#)	1002
Performance Index	167.5

Queues

9: Converse Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	84	980	505	200	773	164	531	333	367	235	303	84
V/c Ratio	0.53	0.93	0.38	0.71	0.71	0.30	0.80	0.85	0.72	0.62	0.67	0.29
Control Delay	58.2	49.4	0.8	51.7	26.8	8.2	51.2	59.0	21.6	55.2	51.3	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.2	49.4	0.8	51.7	26.8	8.2	51.2	59.0	21.6	55.2	51.3	6.3
Queue Length 50th (ft)	56	346	0	66	170	15	184	222	84	83	107	0
Queue Length 95th (ft)	104	#469	0	95	193	45	#304	317	142	#171	146	18
Internal Link Dist (ft)			1324			1462			927			928
Turn Bay Length (ft)	250		180	250		100	400			150		150
Base Capacity (vph)	177	1059	1333	291	1092	553	665	467	560	382	780	429
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.93	0.38	0.69	0.71	0.30	0.80	0.71	0.66	0.62	0.39	0.20

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

9: Converse Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

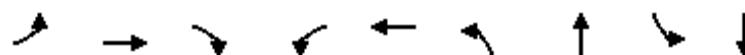
6/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑↑	↑↑	↑	↑↑	↑	↑	↑↑	↑↑	↑
Volume (vph)	73	872	460	164	719	146	467	300	297	230	285	69
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9	4.0	4.9	4.9	4.9	4.2	4.2	4.2	4.2	4.2	4.2
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	1.00	1.00	0.97	0.95	1.00
Fr _t	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1490	2980	1333	2891	2980	1333	2891	1569	1333	2891	2980	1333
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1490	2980	1333	2891	2980	1333	2891	1569	1333	2891	2980	1333
Peak-hour factor, PHF	0.87	0.89	0.91	0.82	0.93	0.89	0.88	0.90	0.81	0.98	0.94	0.82
Adj. Flow (vph)	84	980	505	200	773	164	531	333	367	235	303	84
RTOR Reduction (vph)	0	0	0	0	0	66	0	0	174	0	0	71
Lane Group Flow (vph)	84	980	505	200	773	98	531	333	193	235	303	13
Turn Type	Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free			6			8			4
Actuated Green, G (s)	10.5	38.1	110.0	11.7	39.3	39.3	25.3	27.5	27.5	14.5	16.7	16.7
Effective Green, g (s)	10.5	38.1	110.0	11.7	39.3	39.3	25.3	27.5	27.5	14.5	16.7	16.7
Actuated g/C Ratio	0.10	0.35	1.00	0.11	0.36	0.36	0.23	0.25	0.25	0.13	0.15	0.15
Clearance Time (s)	4.9	4.9		4.9	4.9	4.9	4.2	4.2	4.2	4.2	4.2	4.2
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	2.0	2.0	2.0	3.0	3.0	3.0
Lane Grp Cap (vph)	142	1032	1333	307	1064	476	664	392	333	381	452	202
v/s Ratio Prot	0.06	c0.33		c0.07	0.26		c0.18	c0.21		0.08	0.10	
v/s Ratio Perm			c0.38			0.07			0.14			0.01
v/c Ratio	0.59	0.95	0.38	0.65	0.73	0.21	0.80	0.85	0.58	0.62	0.67	0.06
Uniform Delay, d1	47.7	35.0	0.0	47.2	30.7	24.5	40.0	39.3	36.2	45.1	44.1	40.0
Progression Factor	1.00	1.00	1.00	0.80	0.74	0.63	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.5	18.2	0.8	4.3	3.9	0.9	6.3	15.1	1.5	3.0	3.9	0.1
Delay (s)	54.1	53.2	0.8	42.0	26.7	16.3	46.2	54.4	37.7	48.1	47.9	40.1
Level of Service	D	D	A	D	C	B	D	D	D	D	D	D
Approach Delay (s)					27.9			45.9			46.9	
Approach LOS					D	C		D			D	
Intersection Summary												
HCM 2000 Control Delay				38.3								D
HCM 2000 Volume to Capacity ratio				0.88								
Actuated Cycle Length (s)				110.0								18.2
Intersection Capacity Utilization				77.0%								D
Analysis Period (min)				15								
c Critical Lane Group												

Queues
14: N College Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	120	506	467	218	544	487	539	116	329
V/c Ratio	0.59	0.93	0.64	1.07	0.53	0.91	0.83	0.60	0.71
Control Delay	49.1	50.6	6.1	128.4	29.4	66.7	46.6	60.6	47.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.1	50.6	6.1	128.4	29.4	66.7	46.6	60.6	47.7
Queue Length 50th (ft)	82	295	58	~170	152	176	162	80	103
Queue Length 95th (ft)	m136	#531	30	98	162	#289	204	#177	148
Internal Link Dist (ft)		649			1940		931		925
Turn Bay Length (ft)	250			250		330			150
Base Capacity (vph)	204	544	733	204	1023	537	733	194	528
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.93	0.64	1.07	0.53	0.91	0.74	0.60	0.62

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
14: N College Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/3/2014

Movement	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑ ↗	↑ ↘	↗ ↙	↑ ↗	↑ ↘	↑ ↙	↗ ↗	↑ ↘	↗ ↙	↑ ↗	↑ ↘	↗ ↙
Volume (vph)	114	450	411	87	329	67	433	299	127	104	218	67
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9	4.9	4.9	4.9		4.9	4.9		4.9	4.9	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		0.97	0.95		1.00	0.95	
Fr _t	1.00	1.00	0.85	1.00	0.97		1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1490	1569	1333	1490	2894		2891	2825		1490	2866	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1490	1569	1333	1490	2894		2891	2825		1490	2866	
Peak-hour factor, PHF	0.95	0.89	0.88	0.40	0.75	0.64	0.89	0.85	0.68	0.90	0.89	0.80
Adj. Flow (vph)	120	506	467	218	439	105	487	352	187	116	245	84
RTOR Reduction (vph)	0	0	271	0	19	0	0	66	0	0	31	0
Lane Group Flow (vph)	120	506	196	218	525	0	487	473	0	116	298	0
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2									
Actuated Green, G (s)	15.1	38.1	38.1	15.1	38.1		20.5	22.8		14.4	16.7	
Effective Green, g (s)	15.1	38.1	38.1	15.1	38.1		20.5	22.8		14.4	16.7	
Actuated g/C Ratio	0.14	0.35	0.35	0.14	0.35		0.19	0.21		0.13	0.15	
Clearance Time (s)	4.9	4.9	4.9	4.9	4.9		4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.0	3.0	3.0	2.0	5.0		2.0	3.0		2.0	4.0	
Lane Grp Cap (vph)	204	543	461	204	1002		538	585		195	435	
v/s Ratio Prot	0.08	c0.32		c0.15	0.18		c0.17	c0.17		0.08	0.10	
v/s Ratio Perm			0.15									
v/c Ratio	0.59	0.93	0.42	1.07	0.52		0.91	0.81		0.59	0.68	
Uniform Delay, d1	44.5	34.7	27.5	47.5	28.7		43.8	41.5		45.1	44.2	
Progression Factor	0.86	0.78	0.55	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.3	22.1	2.4	82.4	2.0		18.3	8.1		3.2	4.8	
Delay (s)	40.6	49.2	17.7	129.8	30.7		62.1	49.6		48.3	48.9	
Level of Service	D	D	B	F	C		E	D		D	D	
Approach Delay (s)		34.8			59.0			55.6			48.8	
Approach LOS		C			E			E			D	
Intersection Summary												
HCM 2000 Control Delay		48.6										D
HCM 2000 Volume to Capacity ratio		0.95										
Actuated Cycle Length (s)		110.0										19.6
Intersection Capacity Utilization		75.5%										D
Analysis Period (min)		15										
c Critical Lane Group												

Dell Range Blvd

Direction	EB	WB	All
Total Delay (hr)	62	43	106
Stops (#)	6730	4675	11405
Average Speed (mph)	23	24	23
Total Travel Time (hr)	143	106	249
Distance Traveled (mi)	3236	2490	5726
Fuel Consumed (gal)	228	167	395
Fuel Economy (mpg)	14.2	14.9	14.5
Unserved Vehicles (#)	0	5	5
Vehicles in dilemma zone (#)	652	420	1072
Performance Index	81.1	56.4	137.6

Network Totals

Number of Intersections	15
Total Delay (hr)	190
Stops (#)	17311
Average Speed (mph)	20
Total Travel Time (hr)	391
Distance Traveled (mi)	7651
Fuel Consumed (gal)	573
Fuel Economy (mpg)	13.3
Unserved Vehicles (#)	5
Vehicles in dilemma zone (#)	1227
Performance Index	238.2

2040 Signal Timing & Geometric Adjustments Intersection Analysis

Queues

2: Powderhouse Rd & Dell Range Blvd

Timing Plan: PM Peak Hour

6/4/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	45	1736	83	1170	218	70	57	96	341	38	52
V/c Ratio	0.23	1.22	0.48	0.79	0.16	0.19	0.11	0.19	0.93	0.07	0.11
Control Delay	14.0	131.9	15.7	12.0	0.2	25.6	24.2	6.6	65.4	23.7	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.0	131.9	15.7	12.0	0.2	25.6	24.2	6.6	65.4	23.7	3.9
Queue Length 50th (ft)	10	~648	6	112	0	29	23	0	188	15	0
Queue Length 95th (ft)	15	#787	m10	m205	m0	51	36	24	#266	35	12
Internal Link Dist (ft)		1929		687			421			1527	
Turn Bay Length (ft)	171		195								100
Base Capacity (vph)	238	1418	216	1488	1333	373	510	498	367	510	483
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	1.22	0.38	0.79	0.16	0.19	0.11	0.19	0.93	0.07	0.11

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
- Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
- Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: Powderhouse Rd & Dell Range Blvd

Timing Plan: PM Peak Hour

6/4/2014

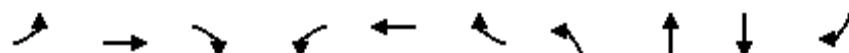
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑	↑	↑	↑	↑	↑	↑	↑
Volume (vph)	29	1557	72	64	1100	181	50	35	74	242	30	42
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9		4.2	4.9	4.0	4.2	4.2	4.2	4.2	4.2	4.2
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1490	2951		1490	2980	1333	1490	1569	1333	1490	1569	1333
Flt Permitted	0.13	1.00		0.09	1.00	1.00	0.73	1.00	1.00	0.72	1.00	1.00
Satd. Flow (perm)	202	2951		145	2980	1333	1149	1569	1333	1129	1569	1333
Peak-hour factor, PHF	0.64	0.96	0.63	0.77	0.94	0.83	0.71	0.61	0.77	0.71	0.79	0.81
Adj. Flow (vph)	45	1622	114	83	1170	218	70	57	96	341	38	52
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	65	0	0	35
Lane Group Flow (vph)	45	1730	0	83	1170	218	70	57	31	341	38	17
Turn Type	pm+pt	NA		pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		Free	8		8	4		4
Actuated Green, G (s)	45.6	41.5		49.2	43.3	90.0	29.3	29.3	29.3	29.3	29.3	29.3
Effective Green, g (s)	45.6	41.5		49.2	43.3	90.0	29.3	29.3	29.3	29.3	29.3	29.3
Actuated g/C Ratio	0.51	0.46		0.55	0.48	1.00	0.33	0.33	0.33	0.33	0.33	0.33
Clearance Time (s)	4.2	4.9		4.2	4.9		4.2	4.2	4.2	4.2	4.2	4.2
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	161	1360		167	1433	1333	374	510	433	367	510	433
v/s Ratio Prot	0.01	c0.59		c0.03	0.39			0.04			0.02	
v/s Ratio Perm	0.13			0.24		c0.16	0.06		0.02	c0.30		0.01
v/c Ratio	0.28	1.27		0.50	0.82	0.16	0.19	0.11	0.07	0.93	0.07	0.04
Uniform Delay, d1	25.6	24.2		37.5	20.0	0.0	21.8	21.2	21.0	29.3	21.0	20.7
Progression Factor	1.00	1.00		0.45	0.47	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	128.4		0.6	3.5	0.2	0.1	0.0	0.0	28.9	0.0	0.0
Delay (s)	26.0	152.6		17.3	12.8	0.2	21.9	21.3	21.0	58.2	21.0	20.7
Level of Service	C	F		B	B	A	C	C	C	E	C	C
Approach Delay (s)		149.4			11.2			21.3			50.4	
Approach LOS		F			B			C			D	
Intersection Summary												
HCM 2000 Control Delay		79.1									E	
HCM 2000 Volume to Capacity ratio		1.08										
Actuated Cycle Length (s)		90.0									13.3	
Intersection Capacity Utilization		91.7%									F	
Analysis Period (min)		15										
c Critical Lane Group												

Queues

3: Stillwater Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/4/2014



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	232	1406	313	127	1074	38	321	114	97	166
V/c Ratio	0.80	0.99	0.41	0.65	0.81	0.03	1.02	0.25	0.26	0.12
Control Delay	17.5	22.7	2.8	53.0	32.1	0.0	90.7	11.0	27.6	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.5	22.7	2.8	53.0	32.1	0.0	90.7	11.0	27.6	0.2
Queue Length 50th (ft)	44	194	16	58	339	0	~204	14	43	0
Queue Length 95th (ft)	m29	m173	m12	92	411	0	#221	23	41	0
Internal Link Dist (ft)				687		705		916	424	
Turn Bay Length (ft)	170		156	190			30			75
Base Capacity (vph)	289	1427	760	217	1427	1333	315	462	372	1333
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.99	0.41	0.59	0.75	0.03	1.02	0.25	0.26	0.12

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
- Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
- Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
3: Stillwater Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/4/2014

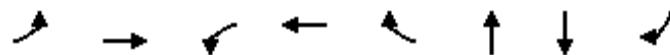
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑	↑↑	↑	↑	↑↑	↑
Volume (vph)	176	1364	282	99	988	27	212	19	58	35	21	123
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9	4.9	4.2	4.9	4.0	4.2	4.2			4.2	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Fr _t	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.89			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1490	2980	1333	1490	2980	1333	1490	1399			1528	1333
Flt Permitted	0.16	1.00	1.00	0.10	1.00	1.00	0.69	1.00			0.82	1.00
Satd. Flow (perm)	244	2980	1333	156	2980	1333	1089	1399			1288	1333
Peak-hour factor, PHF	0.76	0.97	0.90	0.78	0.92	0.71	0.66	0.60	0.71	0.69	0.46	0.74
Adj. Flow (vph)	232	1406	313	127	1074	38	321	32	82	51	46	166
RTOR Reduction (vph)	0	0	122	0	0	0	0	58	0	0	0	0
Lane Group Flow (vph)	232	1406	191	127	1074	38	321	56	0	0	97	166
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Free	Perm	NA		Perm	NA	Free
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		Free	8			4		Free
Actuated Green, G (s)	53.7	43.1	43.1	47.7	40.1	90.0	26.0	26.0			26.0	90.0
Effective Green, g (s)	53.7	43.1	43.1	47.7	40.1	90.0	26.0	26.0			26.0	90.0
Actuated g/C Ratio	0.60	0.48	0.48	0.53	0.45	1.00	0.29	0.29			0.29	1.00
Clearance Time (s)	4.2	4.9	4.9	4.2	4.9		4.2	4.2			4.2	
Vehicle Extension (s)	2.0	4.0	4.0	2.0	4.0		2.0	2.0			2.0	
Lane Grp Cap (vph)	292	1427	638	195	1327	1333	314	404			372	1333
v/s Ratio Prot	c0.09	c0.47		0.05	0.36			0.04				
v/s Ratio Perm	0.38		0.14	0.29		0.03	c0.29				0.08	0.12
v/c Ratio	0.79	0.99	0.30	0.65	0.81	0.03	1.02	0.14			0.26	0.12
Uniform Delay, d1	25.3	23.1	14.3	32.7	21.6	0.0	32.0	23.7			24.6	0.0
Progression Factor	0.44	0.71	0.63	1.61	1.26	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	1.3	4.5	0.1	5.3	4.9	0.0	56.6	0.1			0.1	0.2
Delay (s)	12.4	20.9	9.0	58.1	32.3	0.0	88.6	23.8			24.7	0.2
Level of Service	B	C	A	E	C	A	F	C			C	A
Approach Delay (s)	18.0				33.9			71.6			9.2	
Approach LOS	B				C			E			A	
Intersection Summary												
HCM 2000 Control Delay	28.5					HCM 2000 Level of Service		C				
HCM 2000 Volume to Capacity ratio	1.00											
Actuated Cycle Length (s)	90.0					Sum of lost time (s)		13.3				
Intersection Capacity Utilization	83.0%					ICU Level of Service		E				
Analysis Period (min)	15											
c Critical Lane Group												

Queues

4: Driftwood Dr & Dell Range Blvd

Timing Plan: PM Peak Hour

6/4/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	57	1570	46	1096	128	152	95	77
V/c Ratio	0.21	0.71	0.31	0.49	0.10	0.64	0.79	0.06
Control Delay	12.1	18.0	6.7	1.9	0.1	35.9	74.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.1	18.0	6.7	1.9	0.1	35.9	74.9	0.1
Queue Length 50th (ft)	17	462	2	22	0	56	53	0
Queue Length 95th (ft)	m28	m434	m4	45	0	53	50	0
Internal Link Dist (ft)		705		569		917	428	
Turn Bay Length (ft)	180		190		180			75
Base Capacity (vph)	278	2211	148	2224	1333	364	202	1333
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.71	0.31	0.49	0.10	0.42	0.47	0.06

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: Driftwood Dr & Dell Range Blvd

Timing Plan: PM Peak Hour

6/4/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	1396	38	26	1052	91	27	14	59	85	3	56
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9		4.9	4.9	4.0		4.2			4.2	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Fr _t	1.00	0.99		1.00	1.00	0.85		0.92			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.96	1.00
Satd. Flow (prot)	1490	2961		1490	2980	1333		1427			1498	1333
Flt Permitted	0.24	1.00		0.13	1.00	1.00		0.90			0.51	1.00
Satd. Flow (perm)	373	2961		199	2980	1333		1299			801	1333
Peak-hour factor, PHF	0.67	0.93	0.55	0.57	0.96	0.71	0.71	0.56	0.66	0.95	0.50	0.73
Adj. Flow (vph)	57	1501	69	46	1096	128	38	25	89	89	6	77
RTOR Reduction (vph)	0	3	0	0	0	0	0	41	0	0	0	0
Lane Group Flow (vph)	57	1567	0	46	1096	128	0	111	0	0	95	77
Turn Type	Perm	NA		Perm	NA	Free	Perm	NA		Perm	NA	Free
Protected Phases		2				6			8			4
Permitted Phases	2				6		Free	8			4	
Actuated Green, G (s)	67.2	67.2		67.2	67.2	90.0		13.7			13.7	90.0
Effective Green, g (s)	67.2	67.2		67.2	67.2	90.0		13.7			13.7	90.0
Actuated g/C Ratio	0.75	0.75		0.75	0.75	1.00		0.15			0.15	1.00
Clearance Time (s)	4.9	4.9		4.9	4.9			4.2			4.2	
Vehicle Extension (s)	4.0	4.0		4.0	4.0			2.0			2.0	
Lane Grp Cap (vph)	278	2210		148	2225	1333		197			121	1333
v/s Ratio Prot	c0.53				0.37							
v/s Ratio Perm	0.15			0.23		0.10		0.09			c0.12	0.06
v/c Ratio	0.21	0.71		0.31	0.49	0.10		0.57			0.79	0.06
Uniform Delay, d1	3.4	6.1		3.8	4.6	0.0		35.4			36.7	0.0
Progression Factor	2.31	2.36		0.41	0.26	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.8	0.9		4.0	0.6	0.1		2.2			25.8	0.1
Delay (s)	8.6	15.4		5.6	1.8	0.1		37.6			62.5	0.1
Level of Service	A	B		A	A	A		D			E	A
Approach Delay (s)		15.2			1.7			37.6			34.5	
Approach LOS		B			A			D			C	
Intersection Summary												
HCM 2000 Control Delay		12.0									B	
HCM 2000 Volume to Capacity ratio		0.72										
Actuated Cycle Length (s)		90.0									9.1	
Intersection Capacity Utilization		68.5%									C	
Analysis Period (min)		15										
c Critical Lane Group												

Queues
5: Frontier Mall Dr & Dell Range Blvd

Timing Plan: PM Peak Hour

6/4/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	141	1541	76	1079	250	32	90	236	198
V/c Ratio	0.45	0.93	0.44	0.74	0.19	0.16	0.23	0.87	0.43
Control Delay	11.8	24.6	24.8	11.1	0.0	27.9	13.4	63.7	9.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.8	24.6	24.8	11.1	0.0	27.9	13.4	63.7	9.8
Queue Length 50th (ft)	9	~202	23	350	0	14	14	122	13
Queue Length 95th (ft)	37	#627	m19	m300	m0	25	21	#227	42
Internal Link Dist (ft)		569		1110			911		1473
Turn Bay Length (ft)	185		140		140	75			
Base Capacity (vph)	321	1652	217	1499	1333	213	417	289	484
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.93	0.35	0.72	0.19	0.15	0.22	0.82	0.41

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

5: Frontier Mall Dr & Dell Range Blvd

Timing Plan: PM Peak Hour

6/4/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	104	1395	43	51	1036	215	19	18	43	196	24	123
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9		4.2	4.9	4.0	4.2	4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Fr _t	1.00	0.99		1.00	1.00	0.85	1.00	0.91		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1490	2964		1490	2980	1333	1490	1420		1490	1371	
Flt Permitted	0.17	1.00		0.09	1.00	1.00	0.51	1.00		0.70	1.00	
Satd. Flow (perm)	273	2964		145	2980	1333	808	1420		1096	1371	
Peak-hour factor, PHF	0.74	0.94	0.75	0.67	0.96	0.86	0.60	0.55	0.75	0.83	0.75	0.74
Adj. Flow (vph)	141	1484	57	76	1079	250	32	33	57	236	32	166
RTOR Reduction (vph)	0	3	0	0	0	0	0	43	0	0	125	0
Lane Group Flow (vph)	141	1538	0	76	1079	250	32	47	0	236	73	0
Turn Type	pm+pt	NA		pm+pt	NA	Free	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6				8			4
Permitted Phases	2			6		Free	8				4	
Actuated Green, G (s)	59.3	49.2		48.6	43.4	90.0	22.3	22.3		22.3	22.3	
Effective Green, g (s)	59.3	49.2		48.6	43.4	90.0	22.3	22.3		22.3	22.3	
Actuated g/C Ratio	0.66	0.55		0.54	0.48	1.00	0.25	0.25		0.25	0.25	
Clearance Time (s)	4.2	4.9		4.2	4.9		4.2	4.2		4.2	4.2	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	328	1620		156	1437	1333	200	351		271	339	
v/s Ratio Prot	c0.05	c0.52		0.03	0.36			0.03			0.05	
v/s Ratio Perm	0.23			0.24		0.19	0.04			c0.22		
v/c Ratio	0.43	0.95		0.49	0.75	0.19	0.16	0.13		0.87	0.22	
Uniform Delay, d1	18.8	19.2		33.0	18.9	0.0	26.5	26.3		32.5	26.9	
Progression Factor	0.53	0.68		1.29	0.58	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	10.4		0.1	0.3	0.0	0.1	0.1		24.2	0.1	
Delay (s)	10.1	23.4		42.8	11.3	0.0	26.7	26.4		56.7	27.0	
Level of Service	B	C		D	B	A	C	C		E	C	
Approach Delay (s)		22.3			11.0			26.5			43.1	
Approach LOS		C			B			C			D	
Intersection Summary												
HCM 2000 Control Delay		20.6				HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio		0.90										
Actuated Cycle Length (s)		90.0				Sum of lost time (s)			13.3			
Intersection Capacity Utilization		82.2%				ICU Level of Service			E			
Analysis Period (min)		15										
c Critical Lane Group												

Queues
6: Prairie Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/4/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	115	1745	84	1285	421	108	140	301	306	103
V/c Ratio	0.75	1.56	0.55	1.22	0.32	0.53	0.61	0.85	0.86	0.24
Control Delay	55.1	282.8	46.4	140.7	0.3	45.0	39.7	55.1	55.9	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.1	282.8	46.4	140.7	0.3	45.0	39.7	55.1	55.9	4.1
Queue Length 50th (ft)	51	~787	42	~498	0	59	60	168	171	0
Queue Length 95th (ft)	m69	m#944	m46	m#603	m0	68	74	#310	186	7
Internal Link Dist (ft)								916		1682
Turn Bay Length (ft)	250		250		205	120				100
Base Capacity (vph)	154	1116	156	1053	1333	360	381	374	377	450
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	1.56	0.54	1.22	0.32	0.30	0.37	0.80	0.81	0.23

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
6: Prairie Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/4/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑	↑	↑	↑		↑	↑	↑
Volume (vph)	91	1570	46	63	1246	375	67	59	38	511	26	74
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9		4.9	4.9	4.0	4.2	4.2		4.2	4.2	4.2
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	1.00
Fr _t	1.00	1.00		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00
Satd. Flow (prot)	1490	2966		1490	2980	1333	1490	1483		1416	1428	1333
Flt Permitted	0.12	1.00		0.13	1.00	1.00	0.95	1.00		0.95	0.96	1.00
Satd. Flow (perm)	191	2966		204	2980	1333	1490	1483		1416	1428	1333
Peak-hour factor, PHF	0.79	0.93	0.81	0.75	0.97	0.89	0.62	0.66	0.75	0.90	0.67	0.72
Adj. Flow (vph)	115	1688	57	84	1285	421	108	89	51	568	39	103
RTOR Reduction (vph)	0	2	0	0	0	0	0	26	0	0	0	77
Lane Group Flow (vph)	115	1743	0	84	1285	421	108	114	0	301	306	26
Turn Type	pm+pt	NA		pm+pt	NA	Free	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	2			6		Free						4
Actuated Green, G (s)	38.9	32.8		34.9	30.8	90.0	12.4	12.4		22.5	22.5	22.5
Effective Green, g (s)	38.9	32.8		34.9	30.8	90.0	12.4	12.4		22.5	22.5	22.5
Actuated g/C Ratio	0.43	0.36		0.39	0.34	1.00	0.14	0.14		0.25	0.25	0.25
Clearance Time (s)	4.9	4.9		4.9	4.9		4.2	4.2		4.2	4.2	4.2
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0		4.0	4.0	4.0
Lane Grp Cap (vph)	170	1080		137	1019	1333	205	204		354	357	333
v/s Ratio Prot	c0.05	c0.59		0.03	0.43		0.07	c0.08		0.21	c0.21	
v/s Ratio Perm	0.25			0.21		c0.32						0.02
v/c Ratio	0.68	1.61		0.61	1.26	0.32	0.53	0.56		0.85	0.86	0.08
Uniform Delay, d1	37.7	28.6		39.1	29.6	0.0	36.1	36.2		32.1	32.2	25.8
Progression Factor	1.28	1.14		1.46	1.49	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.1	278.4		2.4	121.0	0.3	1.1	1.9		18.0	18.5	0.1
Delay (s)	52.1	311.1		59.6	165.1	0.3	37.2	38.1		50.1	50.8	25.9
Level of Service	D	F		E	F	A	D	D		D	D	C
Approach Delay (s)		295.1			121.4			37.7			46.9	
Approach LOS		F			F			D			D	

Intersection Summary

HCM 2000 Control Delay	175.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.2
Intersection Capacity Utilization	93.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues
7: Rue Terre & Dell Range Blvd

Timing Plan: PM Peak Hour

6/4/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	115	2135	153	1580	140	179	199	25	200
V/c Ratio	0.60	1.37	0.79	0.97	0.18	0.49	0.95	0.07	0.44
Control Delay	22.3	188.5	19.6	21.3	2.0	22.9	85.9	27.0	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.3	188.5	19.6	21.3	2.0	22.9	85.9	27.0	9.7
Queue Length 50th (ft)	30	~867	53	~213	0	51	111	11	10
Queue Length 95th (ft)	m21	m#549	m42	m176	m0	86	#219	15	44
Internal Link Dist (ft)		710		830		892		916	
Turn Bay Length (ft)	250		250		150				120
Base Capacity (vph)	205	1557	203	1630	773	369	216	381	458
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	1.37	0.75	0.97	0.18	0.49	0.92	0.07	0.44

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

7: Rue Terre & Dell Range Blvd

Timing Plan: PM Peak Hour

6/4/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑	↑	↓	↓		↑	↑	↑
Volume (vph)	85	1893	58	107	1501	139	42	14	91	167	11	156
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9		4.9	4.9	4.9		4.2		4.2	4.2	4.2
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00		1.00	1.00	1.00
Fr _t	1.00	0.99		1.00	1.00	0.85		0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98		0.95	1.00	1.00
Satd. Flow (prot)	1490	2964		1490	2980	1333		1425		1490	1569	1333
Flt Permitted	0.09	1.00		0.08	1.00	1.00		0.90		0.57	1.00	1.00
Satd. Flow (perm)	136	2964		130	2980	1333		1301		890	1569	1333
Peak-hour factor, PHF	0.74	0.92	0.75	0.70	0.95	0.99	0.72	0.75	0.89	0.84	0.44	0.78
Adj. Flow (vph)	115	2058	77	153	1580	140	58	19	102	199	25	200
RTOR Reduction (vph)	0	3	0	0	0	45	0	53	0	0	0	135
Lane Group Flow (vph)	115	2132	0	153	1580	95	0	126	0	199	25	65
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	52.7	46.3		56.7	48.3	48.3		21.3		21.3	21.3	21.3
Effective Green, g (s)	52.7	46.3		56.7	48.3	48.3		21.3		21.3	21.3	21.3
Actuated g/C Ratio	0.59	0.51		0.63	0.54	0.54		0.24		0.24	0.24	0.24
Clearance Time (s)	4.9	4.9		4.9	4.9	4.9		4.2		4.2	4.2	4.2
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	175	1524		208	1599	715		307		210	371	315
v/s Ratio Prot	0.05	c0.72		c0.07	0.53						0.02	
v/s Ratio Perm	0.34			0.39		0.07		0.10		c0.22		0.05
v/c Ratio	0.66	1.40		0.74	0.99	0.13		0.41		0.95	0.07	0.21
Uniform Delay, d1	32.2	21.9		36.2	20.6	10.4		29.0		33.8	26.6	27.6
Progression Factor	0.90	0.82		0.51	0.79	0.44		1.00		1.00	1.00	1.00
Incremental Delay, d2	0.6	179.9		1.1	4.6	0.0		0.9		46.9	0.1	0.3
Delay (s)	29.4	197.9		19.5	20.7	4.6		29.9		80.7	26.7	27.9
Level of Service	C	F		B	C	A		C		F	C	C
Approach Delay (s)		189.3			19.4			29.9			52.6	
Approach LOS		F			B			C			D	

Intersection Summary

HCM 2000 Control Delay	103.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	100.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Queues
8: Walmart & Dell Range Blvd

Timing Plan: PM Peak Hour

6/4/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	332	2164	58	1590	366	77	156	373	353
V/c Ratio	2.00	1.83	0.35	1.42	0.59	1.10	0.45	0.68	0.52
Control Delay	474.6	398.3	30.5	221.8	15.9	176.4	11.3	40.5	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	474.6	398.3	30.5	221.8	15.9	176.4	11.3	40.5	9.7
Queue Length 50th (ft)	~253	~1000	16	~645	69	~53	10	101	55
Queue Length 95th (ft)	m#206	m#814	43	#874	192	#82	3	142	36
Internal Link Dist (ft)			830		1324		423		927
Turn Bay Length (ft)	250		250		180				125
Base Capacity (vph)	166	1180	168	1118	624	132	542	552	792
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	2.00	1.83	0.35	1.42	0.59	0.58	0.29	0.68	0.45

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
8: Walmart & Dell Range Blvd

Timing Plan: PM Peak Hour

6/4/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	309	1908	66	50	1542	340	56	10	95	321	24	244
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9		4.2	4.9	4.9	4.2	4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	
Fr _t	1.00	0.99		1.00	1.00	0.85	1.00	0.87		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1490	2962		1490	2980	1333	1490	1363		2891	1360	
Flt Permitted	0.11	1.00		0.12	1.00	1.00	0.25	1.00		0.95	1.00	
Satd. Flow (perm)	179	2962		190	2980	1333	400	1363		2891	1360	
Peak-hour factor, PHF	0.93	0.92	0.73	0.86	0.97	0.93	0.73	0.50	0.70	0.86	0.60	0.78
Adj. Flow (vph)	332	2074	90	58	1590	366	77	20	136	373	40	313
RTOR Reduction (vph)	0	3	0	0	0	126	0	112	0	0	120	0
Lane Group Flow (vph)	332	2161	0	58	1590	240	77	44	0	373	233	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Prot	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2			6		6	8					
Actuated Green, G (s)	41.6	35.0		37.6	33.0	33.0	15.7	15.7		17.2	37.1	
Effective Green, g (s)	41.6	35.0		37.6	33.0	33.0	15.7	15.7		17.2	37.1	
Actuated g/C Ratio	0.46	0.39		0.42	0.37	0.37	0.17	0.17		0.19	0.41	
Clearance Time (s)	4.2	4.9		4.2	4.9	4.9	4.2	4.2		4.2	4.2	
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	178	1151		145	1092	488	69	237		552	560	
v/s Ratio Prot	c0.14	c0.73		0.02	0.53			0.03		c0.13	0.17	
v/s Ratio Perm	0.72			0.15		0.18	c0.19					
v/c Ratio	1.87	1.88		0.40	1.46	0.49	1.12	0.18		0.68	0.42	
Uniform Delay, d1	38.6	27.5		38.2	28.5	22.0	37.1	31.7		33.8	18.8	
Progression Factor	0.83	0.99		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	391.3	395.2		0.7	210.4	3.5	143.5	0.1		2.6	0.2	
Delay (s)	423.3	422.5		38.9	238.9	25.5	180.6	31.8		36.4	18.9	
Level of Service	F	F		D	F	C	F	C		D	B	
Approach Delay (s)		422.6			194.3			81.0			27.9	
Approach LOS		F			F			F			C	
Intersection Summary												
HCM 2000 Control Delay		271.6			HCM 2000 Level of Service				F			
HCM 2000 Volume to Capacity ratio		1.47										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)				17.5			
Intersection Capacity Utilization		113.3%			ICU Level of Service				H			
Analysis Period (min)		15										
c Critical Lane Group												

Queues

9: Converse Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/4/2014



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	134	1571	810	321	1240	263	851	534	588	377	486	135
V/c Ratio	0.76	1.48	0.61	1.10	1.23	0.51	1.81	1.14	1.07	1.63	0.76	0.34
Control Delay	73.7	251.9	2.1	112.6	144.4	24.2	402.9	123.7	85.0	336.5	48.1	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.7	251.9	2.1	112.6	144.4	24.2	402.9	123.7	85.0	336.5	48.1	8.1
Queue Length 50th (ft)	93	~807	0	~130	~564	72	~469	~442	~349	~198	170	0
Queue Length 95th (ft)	#180	#930	0	m#171	#698	m124	#624	#651	#459	#294	216	36
Internal Link Dist (ft)			1324			1462			927			928
Turn Bay Length (ft)	250		180	250		100	400			150		150
Base Capacity (vph)	177	1059	1333	291	1005	517	469	467	547	231	780	448
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.76	1.48	0.61	1.10	1.23	0.51	1.81	1.14	1.07	1.63	0.62	0.30

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
- Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
- Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

9: Converse Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/4/2014

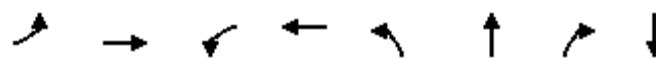
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑↑	↑↑	↑	↑↑	↑↑	↑	↑↑	↑↑	↑
Volume (vph)	117	1398	737	263	1153	234	749	481	476	369	457	111
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9	4.0	4.9	4.9	4.9	4.2	4.2	4.2	4.2	4.2	4.2
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	1.00	1.00	0.97	0.95	1.00
Fr _t	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1490	2980	1333	2891	2980	1333	2891	1569	1333	2891	2980	1333
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1490	2980	1333	2891	2980	1333	2891	1569	1333	2891	2980	1333
Peak-hour factor, PHF	0.87	0.89	0.91	0.82	0.93	0.89	0.88	0.90	0.81	0.98	0.94	0.82
Adj. Flow (vph)	134	1571	810	321	1240	263	851	534	588	377	486	135
RTOR Reduction (vph)	0	0	0	0	0	68	0	0	150	0	0	106
Lane Group Flow (vph)	134	1571	810	321	1240	195	851	534	438	377	486	29
Turn Type	Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free			6			8			4
Actuated Green, G (s)	13.1	39.1	110.0	11.1	37.1	37.1	17.9	32.8	32.8	8.8	23.7	23.7
Effective Green, g (s)	13.1	39.1	110.0	11.1	37.1	37.1	17.9	32.8	32.8	8.8	23.7	23.7
Actuated g/C Ratio	0.12	0.36	1.00	0.10	0.34	0.34	0.16	0.30	0.30	0.08	0.22	0.22
Clearance Time (s)	4.9	4.9		4.9	4.9	4.9	4.2	4.2	4.2	4.2	4.2	4.2
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	2.0	2.0	2.0	3.0	3.0	3.0
Lane Grp Cap (vph)	177	1059	1333	291	1005	449	470	467	397	231	642	287
v/s Ratio Prot	0.09	c0.53		c0.11	0.42		c0.29	c0.34		0.13	0.16	
v/s Ratio Perm			c0.61			0.15			0.33			0.02
v/c Ratio	0.76	1.48	0.61	1.10	1.23	0.44	1.81	1.14	1.10	1.63	0.76	0.10
Uniform Delay, d1	46.9	35.5	0.0	49.5	36.5	28.3	46.0	38.6	38.6	50.6	40.5	34.6
Progression Factor	1.00	1.00	1.00	0.85	1.03	1.24	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	16.8	222.7	2.1	72.1	110.7	1.9	373.1	87.3	75.9	303.3	5.1	0.2
Delay (s)	63.7	258.1	2.1	113.9	148.1	37.1	419.2	125.9	114.5	353.9	45.5	34.8
Level of Service	E	F	A	F	F	D	F	F	F	F	D	C
Approach Delay (s)		165.3			126.0			249.0			160.6	
Approach LOS		F			F			F			F	

Intersection Summary												
HCM 2000 Control Delay	177.4	HCM 2000 Level of Service										F
HCM 2000 Volume to Capacity ratio	1.45											
Actuated Cycle Length (s)	110.0	Sum of lost time (s)										18.2
Intersection Capacity Utilization	112.5%	ICU Level of Service										H
Analysis Period (min)	15											
c Critical Lane Group												

Queues
10: Windmill Rd & Dell Range Blvd

Timing Plan: PM Peak Hour

6/4/2014



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	160	2074	108	1503	147	109	167	290
V/c Ratio	0.81	1.21	0.62	0.88	0.75	0.31	0.40	0.77
Control Delay	18.8	117.3	34.0	13.4	65.3	36.9	8.1	41.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.8	117.3	34.0	13.4	65.3	36.9	8.1	41.0
Queue Length 50th (ft)	39	~915	39	212	91	66	2	63
Queue Length 95th (ft)	m16	m#357	m47	m583	107	105	37	47
Internal Link Dist (ft)		1464		3132		927		928
Turn Bay Length (ft)	250		250		175		175	
Base Capacity (vph)	200	1710	177	1717	227	524	554	576
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	1.21	0.61	0.88	0.65	0.21	0.30	0.50

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
10: Windmill Rd & Dell Range Blvd

Timing Plan: PM Peak Hour

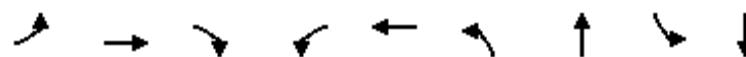
6/4/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	1712	138	83	1316	46	106	99	135	46	56	88
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9		4.2	4.9		4.2	4.2	4.2		4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00		0.95	
Fr _t	1.00	0.99		1.00	0.99		1.00	1.00	0.85		0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00		0.99	
Satd. Flow (prot)	1490	2943		1490	2963		1490	1569	1333		2765	
Flt Permitted	0.09	1.00		0.06	1.00		0.42	1.00	1.00		0.80	
Satd. Flow (perm)	137	2943		99	2963		661	1569	1333		2243	
Peak-hour factor, PHF	0.78	0.90	0.80	0.77	0.91	0.81	0.72	0.91	0.81	0.60	0.58	0.76
Adj. Flow (vph)	160	1902	172	108	1446	57	147	109	167	77	97	116
RTOR Reduction (vph)	0	5	0	0	2	0	0	0	127	0	102	0
Lane Group Flow (vph)	160	2069	0	108	1501	0	147	109	40	0	188	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2			6			8		8		4	
Actuated Green, G (s)	72.4	63.7		72.4	63.7		24.3	24.3	24.3		13.6	
Effective Green, g (s)	72.4	63.7		72.4	63.7		24.3	24.3	24.3		13.6	
Actuated g/C Ratio	0.66	0.58		0.66	0.58		0.22	0.22	0.22		0.12	
Clearance Time (s)	4.2	4.9		4.2	4.9		4.2	4.2	4.2		4.2	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0	2.0		2.0	
Lane Grp Cap (vph)	197	1704		175	1715		195	346	294		277	
v/s Ratio Prot	c0.06	c0.70		0.05	0.51		c0.04	0.07				
v/s Ratio Perm	0.47			0.36			c0.12		0.03		0.08	
v/c Ratio	0.81	1.21		0.62	0.88		0.75	0.32	0.14		0.68	
Uniform Delay, d1	33.1	23.1		45.5	19.8		42.9	35.9	34.4		46.1	
Progression Factor	0.40	0.77		0.97	0.49		1.00	1.00	1.00		1.00	
Incremental Delay, d2	2.3	97.0		1.1	1.8		13.6	0.2	0.1		5.1	
Delay (s)	15.4	114.9		45.5	11.4		56.5	36.1	34.5		51.3	
Level of Service	B	F		D	B		E	D	C		D	
Approach Delay (s)		107.8			13.7			42.5			51.3	
Approach LOS		F			B			D			D	
Intersection Summary												
HCM 2000 Control Delay		64.9					HCM 2000 Level of Service		E			
HCM 2000 Volume to Capacity ratio		1.10										
Actuated Cycle Length (s)		110.0					Sum of lost time (s)		17.5			
Intersection Capacity Utilization		98.1%					ICU Level of Service		F			
Analysis Period (min)		15										
c Critical Lane Group												

Queues
14: N College Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/4/2014



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	193	810	749	348	870	780	864	186	526
V/c Ratio	0.95	1.49	1.10	1.71	0.85	1.64	1.18	1.24	1.00
Control Delay	68.5	254.2	74.8	368.5	41.7	329.6	128.8	194.0	81.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.5	254.2	74.8	368.5	41.7	329.6	128.8	194.0	81.2
Queue Length 50th (ft)	130	~789	~436	~362	288	~411	~362	~163	184
Queue Length 95th (ft)	m#171	m#954	m#579	#159	284	#524	#445	#306	#296
Internal Link Dist (ft)		649			1940		931		925
Turn Bay Length (ft)	250			250		330		150	
Base Capacity (vph)	204	543	681	204	1021	475	733	150	528
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.95	1.49	1.10	1.71	0.85	1.64	1.18	1.24	1.00

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
14: N College Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/4/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑	↑↑		↑↑	↑↑		↑	↑↑	
Volume (vph)	183	721	659	139	527	107	694	479	204	167	349	107
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9	4.9	4.9	4.9		4.9	4.9		4.9	4.9	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		0.97	0.95		1.00	0.95	
Fr _t	1.00	1.00	0.85	1.00	0.97		1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1490	1569	1333	1490	2895		2891	2825		1490	2867	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1490	1569	1333	1490	2895		2891	2825		1490	2867	
Peak-hour factor, PHF	0.95	0.89	0.88	0.40	0.75	0.64	0.89	0.85	0.68	0.90	0.89	0.80
Adj. Flow (vph)	193	810	749	348	703	167	780	564	300	186	392	134
RTOR Reduction (vph)	0	0	220	0	19	0	0	63	0	0	31	0
Lane Group Flow (vph)	193	810	529	348	851	0	780	801	0	186	495	0
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2									
Actuated Green, G (s)	15.1	38.1	38.1	15.1	38.1		18.1	26.1		11.1	19.1	
Effective Green, g (s)	15.1	38.1	38.1	15.1	38.1		18.1	26.1		11.1	19.1	
Actuated g/C Ratio	0.14	0.35	0.35	0.14	0.35		0.16	0.24		0.10	0.17	
Clearance Time (s)	4.9	4.9	4.9	4.9	4.9		4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.0	3.0	3.0	2.0	5.0		2.0	3.0		2.0	4.0	
Lane Grp Cap (vph)	204	543	461	204	1002		475	670		150	497	
v/s Ratio Prot	0.13	c0.52		c0.23	0.29		c0.27	c0.28		0.12	0.17	
v/s Ratio Perm			0.40									
v/c Ratio	0.95	1.49	1.15	1.71	0.85		1.64	1.20		1.24	1.00	
Uniform Delay, d1	47.0	36.0	36.0	47.5	33.3		46.0	42.0		49.5	45.4	
Progression Factor	0.74	0.94	0.90	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	28.7	225.7	78.4	337.7	8.9		298.3	102.0		152.0	39.3	
Delay (s)	63.5	259.5	110.8	385.2	42.2		344.3	143.9		201.5	84.7	
Level of Service	E	F	F	F	D		F	F		F	F	
Approach Delay (s)		174.3			140.2			239.0			115.2	
Approach LOS		F			F			F			F	
Intersection Summary												
HCM 2000 Control Delay		178.6					HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio		1.52										
Actuated Cycle Length (s)		110.0					Sum of lost time (s)			19.6		
Intersection Capacity Utilization		109.6%					ICU Level of Service			H		
Analysis Period (min)		15										
c Critical Lane Group												

Queues
34: Ridge Rd & Dell Range Blvd

Timing Plan: PM Peak Hour

6/4/2014



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	230	1384	320	198	1405	307	431	135	206	261	180
V/c Ratio	1.31	1.00	0.47	1.12	1.02	1.18	1.27	0.35	1.17	0.87	0.46
Control Delay	168.2	23.9	4.0	128.0	56.9	150.2	180.2	10.3	160.8	70.0	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	168.2	23.9	4.0	128.0	56.9	150.2	180.2	10.3	160.8	70.0	10.9
Queue Length 50th (ft)	~172	~371	13	~115	~338	~241	~385	5	~131	176	7
Queue Length 95th (ft)	m#129	m104	m7	71	#583	#457	#525	56	#217	#298	16
Internal Link Dist (ft)		3132			1170			929			920
Turn Bay Length (ft)	250		75	250		200		215	150		200
Base Capacity (vph)	176	1384	676	176	1373	261	339	387	176	339	420
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.31	1.00	0.47	1.13	1.02	1.18	1.27	0.35	1.17	0.77	0.43

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

34: Ridge Rd & Dell Range Blvd

Timing Plan: PM Peak Hour

6/4/2014

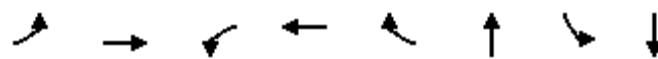
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑		↑	↑	↑	↑	↑	↑
Volume (vph)	184	1287	282	103	1071	93	279	362	128	159	248	115
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.2	4.9	4.9	4.2	4.9		4.2	4.2	4.2	4.2	4.2	4.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1490	2980	1333	1490	2944		1490	1569	1333	1490	1569	1333
Flt Permitted	0.08	1.00	1.00	0.08	1.00		0.32	1.00	1.00	0.19	1.00	1.00
Satd. Flow (perm)	123	2980	1333	123	2944		509	1569	1333	297	1569	1333
Peak-hour factor, PHF	0.80	0.93	0.88	0.52	0.83	0.81	0.91	0.84	0.95	0.77	0.95	0.64
Adj. Flow (vph)	230	1384	320	198	1290	115	307	431	135	206	261	180
RTOR Reduction (vph)	0	0	57	0	6	0	0	0	99	0	0	136
Lane Group Flow (vph)	230	1384	263	198	1399	0	307	431	36	206	261	44
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6			8		8	4		4
Actuated Green, G (s)	59.9	51.1	51.1	59.9	51.1		35.3	23.8	23.8	29.9	21.1	21.1
Effective Green, g (s)	59.9	51.1	51.1	59.9	51.1		35.3	23.8	23.8	29.9	21.1	21.1
Actuated g/C Ratio	0.54	0.46	0.46	0.54	0.46		0.32	0.22	0.22	0.27	0.19	0.19
Clearance Time (s)	4.2	4.9	4.9	4.2	4.9		4.2	4.2	4.2	4.2	4.2	4.2
Vehicle Extension (s)	2.0	4.0	4.0	2.0	4.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	176	1384	619	176	1367		265	339	288	176	300	255
v/s Ratio Prot	c0.10	0.46		0.09	0.48		c0.12	c0.27		0.09	0.17	
v/s Ratio Perm	c0.61		0.20	0.52			0.25		0.03	0.22		0.03
v/c Ratio	1.31	1.00	0.42	1.12	1.02		1.16	1.27	0.13	1.17	0.87	0.17
Uniform Delay, d1	42.4	29.4	19.6	41.9	29.4		41.1	43.1	34.7	47.3	43.1	37.2
Progression Factor	0.63	0.50	0.29	0.70	0.97		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	141.9	7.3	0.2	98.3	27.9		105.0	143.3	0.1	121.2	21.9	0.1
Delay (s)	168.6	21.9	5.8	127.5	56.6		146.1	186.4	34.8	168.5	65.0	37.3
Level of Service	F	C	A	F	E		F	F	C	F	E	D
Approach Delay (s)		36.7			65.4			148.8			90.2	
Approach LOS		D			E			F			F	

Intersection Summary												
HCM 2000 Control Delay	72.0	HCM 2000 Level of Service										E
HCM 2000 Volume to Capacity ratio	1.31											
Actuated Cycle Length (s)	110.0	Sum of lost time (s)										17.5
Intersection Capacity Utilization	99.2%	ICU Level of Service										F
Analysis Period (min)	15											
c Critical Lane Group												

Queues
37: Marble Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/4/2014



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	153	1567	13	1222	326	32	281	179
V/c Ratio	0.72	0.88	0.09	0.75	0.39	0.09	0.91	0.37
Control Delay	17.8	7.7	3.4	6.5	0.5	27.3	73.1	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.8	7.7	3.4	6.5	0.5	27.3	73.1	8.0
Queue Length 50th (ft)	19	44	1	281	0	13	192	3
Queue Length 95th (ft)	m23	m117	m1	m237	m0	20	#342	0
Internal Link Dist (ft)		1170		606		928		914
Turn Bay Length (ft)	250		250		150			
Base Capacity (vph)	234	1789	169	1655	856	344	310	486
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.88	0.08	0.74	0.38	0.09	0.91	0.37

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
37: Marble Ave & Dell Range Blvd

Timing Plan: PM Peak Hour

6/4/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑	↑		↔		↑	↑↑	
Volume (vph)	133	1295	16	8	1039	261	13	3	5	239	3	130
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.9	4.9		4.9	4.9	4.9		4.2		4.2	4.2	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00		1.00	1.00	
Fr _t	1.00	1.00		1.00	1.00	0.85		0.97		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97		0.95	1.00	
Satd. Flow (prot)	1490	2973		1490	2980	1333		1478		1490	1341	
Flt Permitted	0.14	1.00		0.07	1.00	1.00		0.83		0.74	1.00	
Satd. Flow (perm)	218	2973		110	2980	1333		1265		1155	1341	
Peak-hour factor, PHF	0.87	0.84	0.63	0.63	0.85	0.80	0.67	0.50	0.75	0.85	0.50	0.75
Adj. Flow (vph)	153	1542	25	13	1222	326	19	6	7	281	6	173
RTOR Reduction (vph)	0	1	0	0	0	126	0	5	0	0	127	0
Lane Group Flow (vph)	153	1566	0	13	1222	200	0	27	0	281	52	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	71.4	63.3		60.3	57.1	57.1		29.5		29.5	29.5	
Effective Green, g (s)	71.4	63.3		60.3	57.1	57.1		29.5		29.5	29.5	
Actuated g/C Ratio	0.65	0.58		0.55	0.52	0.52		0.27		0.27	0.27	
Clearance Time (s)	4.9	4.9		4.9	4.9	4.9		4.2		4.2	4.2	
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0		2.0		2.0	2.0	
Lane Grp Cap (vph)	250	1710		100	1546	691		339		309	359	
v/s Ratio Prot	c0.05	c0.53		0.00	0.41						0.04	
v/s Ratio Perm	0.35			0.07		0.15		0.02		c0.24		
v/c Ratio	0.61	0.92		0.13	0.79	0.29		0.08		0.91	0.15	
Uniform Delay, d1	29.1	21.0		33.9	21.6	15.0		30.1		39.0	30.7	
Progression Factor	0.46	0.21		0.39	0.32	0.12		1.00		1.00	1.00	
Incremental Delay, d2	0.9	3.0		0.0	0.4	0.1		0.0		28.3	0.1	
Delay (s)	14.4	7.5		13.1	7.2	1.9		30.1		67.3	30.7	
Level of Service	B	A		B	A	A		C		E	C	
Approach Delay (s)					6.2			30.1			53.0	
Approach LOS					A			C			D	
Intersection Summary												
HCM 2000 Control Delay		13.0					HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio		0.92										
Actuated Cycle Length (s)		110.0					Sum of lost time (s)			14.0		
Intersection Capacity Utilization		81.3%					ICU Level of Service			D		
Analysis Period (min)		15										
c Critical Lane Group												

Dell Range Blvd

Direction	EB	WB	All
Total Delay (hr)	828	282	1110
Stops (#)	13026	9799	22825
Average Speed (mph)	5	10	7
Total Travel Time (hr)	957	382	1339
Distance Traveled (mi)	5187	3991	9178
Fuel Consumed (gal)	920	446	1366
Fuel Economy (mpg)	5.6	9.0	6.7
Unserved Vehicles (#)	3579	1018	4597
Vehicles in dilemma zone (#)	985	550	1535
Performance Index	863.9	309.1	1173.0

Network Totals

Number of Intersections	15
Total Delay (hr)	1470
Stops (#)	31096
Average Speed (mph)	7
Total Travel Time (hr)	1781
Distance Traveled (mi)	11882
Fuel Consumed (gal)	1794
Fuel Economy (mpg)	6.6
Unserved Vehicles (#)	5719
Vehicles in dilemma zone (#)	1722
Performance Index	1556.4

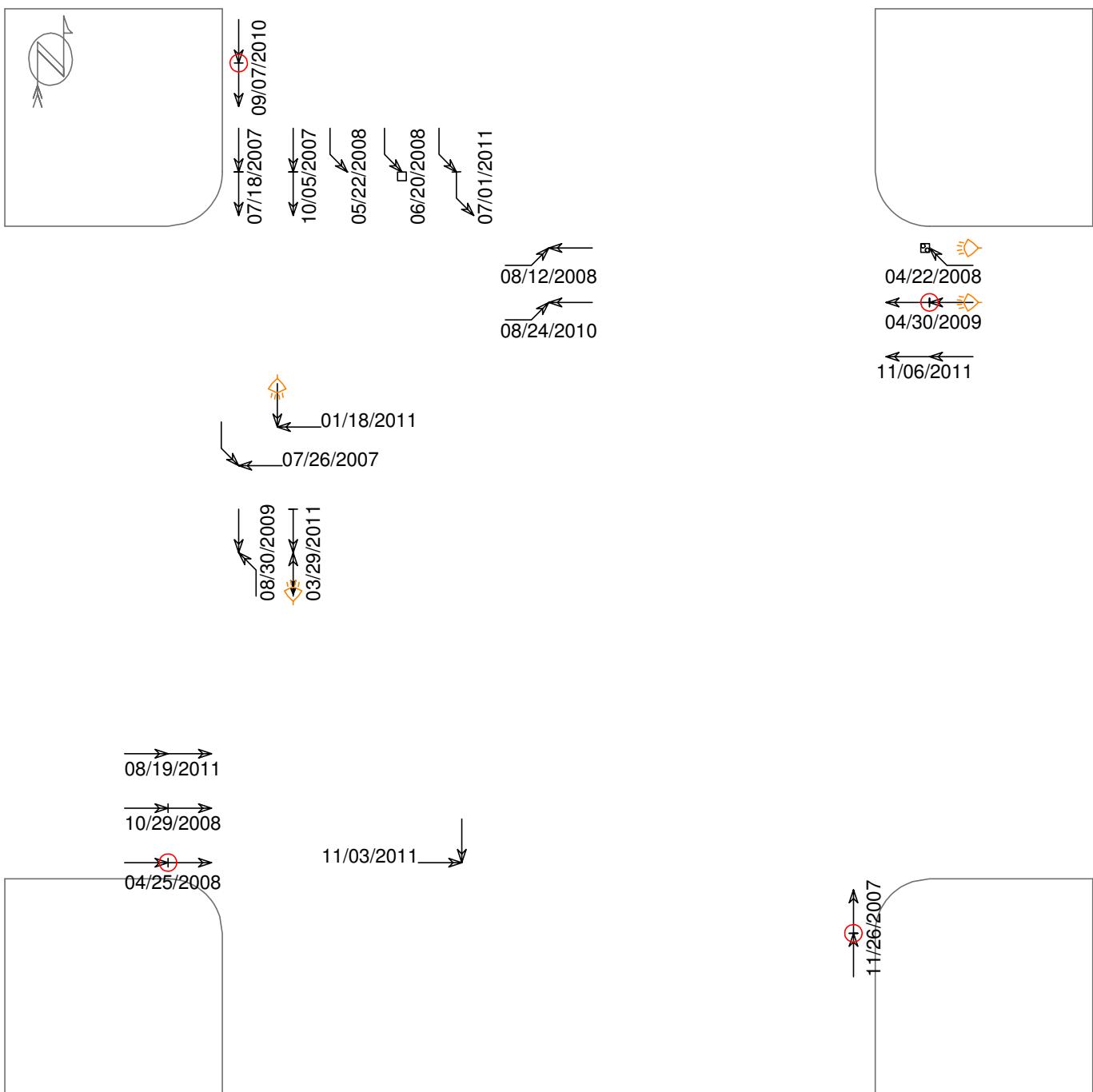
Appendix B

Intersection Crash Diagrams

Dell Range Blvd & Powderhouse Rd

20 Accidents

01/01/07 - 12/31/11



(clear filter), (0) accidents with insufficient data for display

- ← Straight
- ↔ Stopped
- ← Unknown
- ↔ Backing
- ↔ Overtaking
- ↔ Sideswipe

- Parked
- ↔ Erratic
- ↔ Out of control
- Right turn
- Left turn
- U-turn

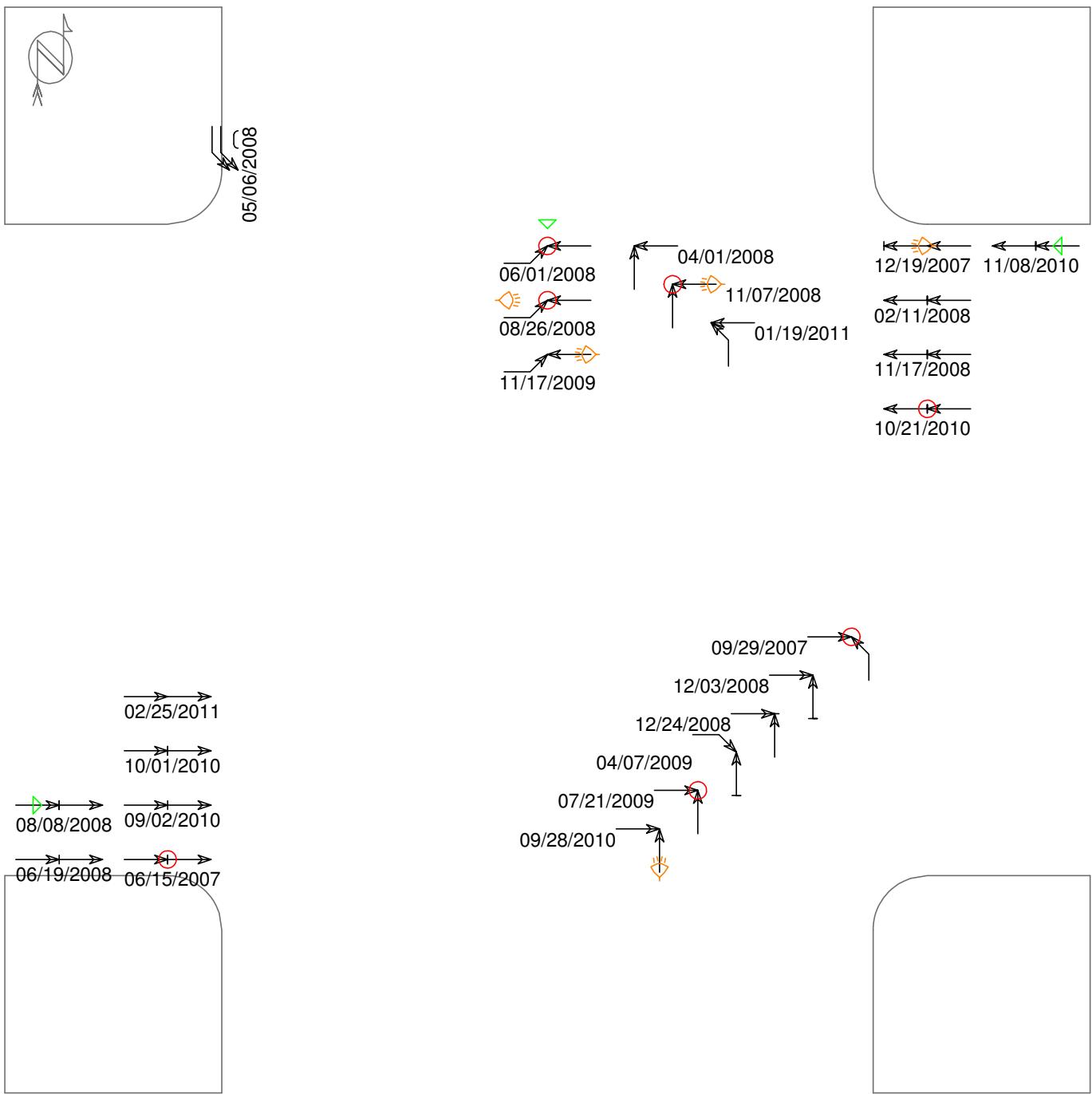
- ✗ Pedestrian
- ✗ Bicycle
- Injury
- Fatality
- ⚡ Nighttime
- ▷ DUI

- Fixed objects:
- General
- Signal
- Tree
- Pole
- Curb
- ☒ Animal
- ◁ 3rd vehicle
- * Extra data

Dell Range Blvd & Stillwater Ave

24 Accidents

01/01/07 - 12/31/11

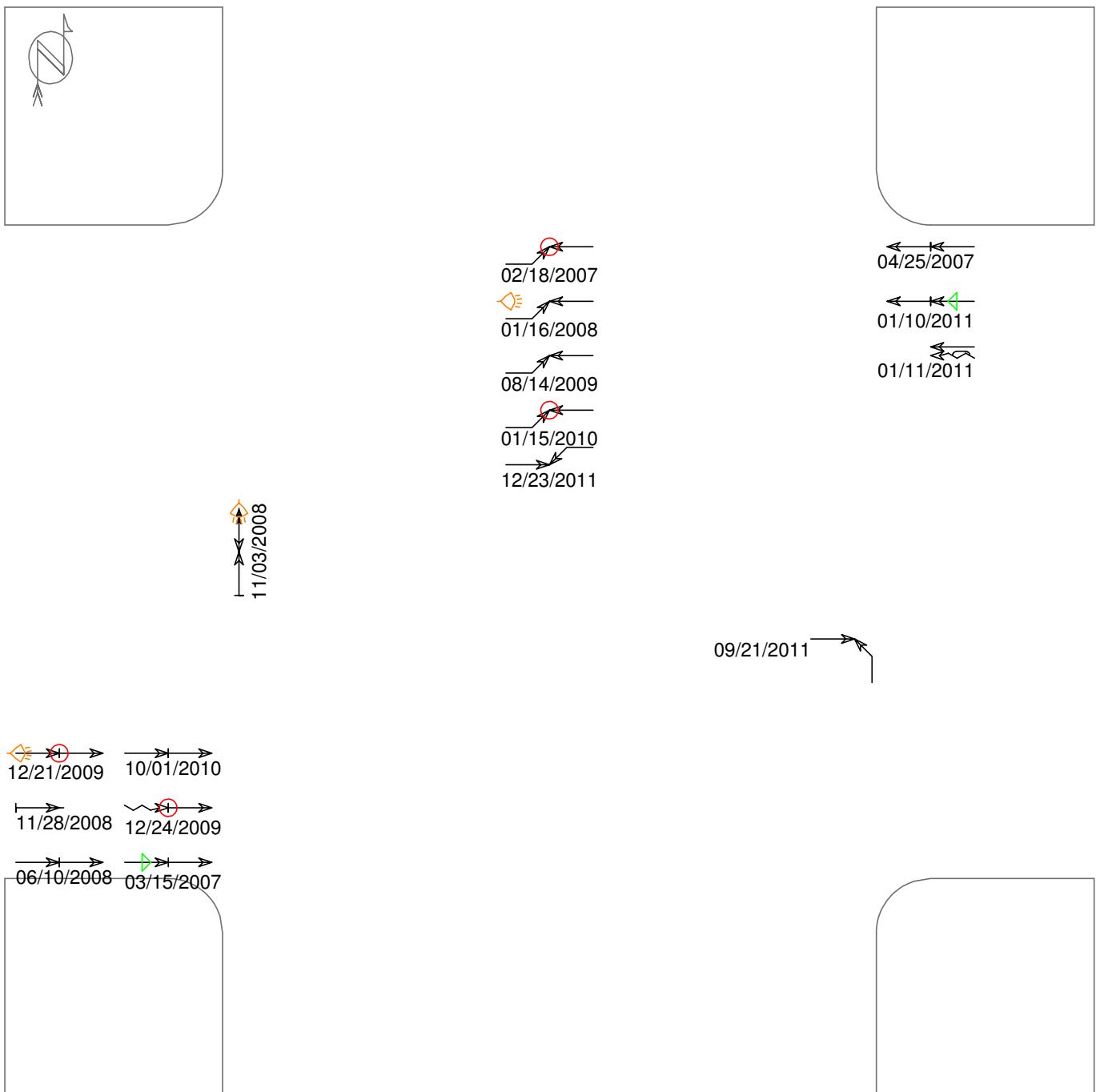


= Signal) | (Veh_1_Traf_Cntrl = Signal_Ped) | (Veh_2_Traf_Cntrl = Signal) | (Veh_2_Traf_Cntrl = Signal_Ped)), (0) accidents with insufficient information

←→ Straight	↔ Parked	✗ Pedestrian	Fixed objects:
←→ Stopped	↔ Erratic	✗ Bicycile	□ General
←→ Unknown	↔ Out of control	○ Injury	■ Signal
←→ Backing	↗ Right turn	● Fatality	□ Curb
←→ Overtaking	↘ Left turn	◇ Nighttime	■ Tree
←→ Sideswipe	↔ U-turn	▷ DUI	✗ Animal
			△ 3rd vehicle
			* Extra data

Dell Range Blvd & Driftwood Dr

16 Accidents 01/01/07 - 12/31/11



(clear filter), (0) accidents with insufficient data for display

- ← Straight
- ↔ Stopped
- ↖ Unknown
- ↔ Backing
- ↔ Overtaking
- ↖ Sideswipe

- ↔ Parked
- ↖ Erratic
- ↖ Out of control
- ↗ Right turn
- ↖ Left turn
- ↗ U-turn

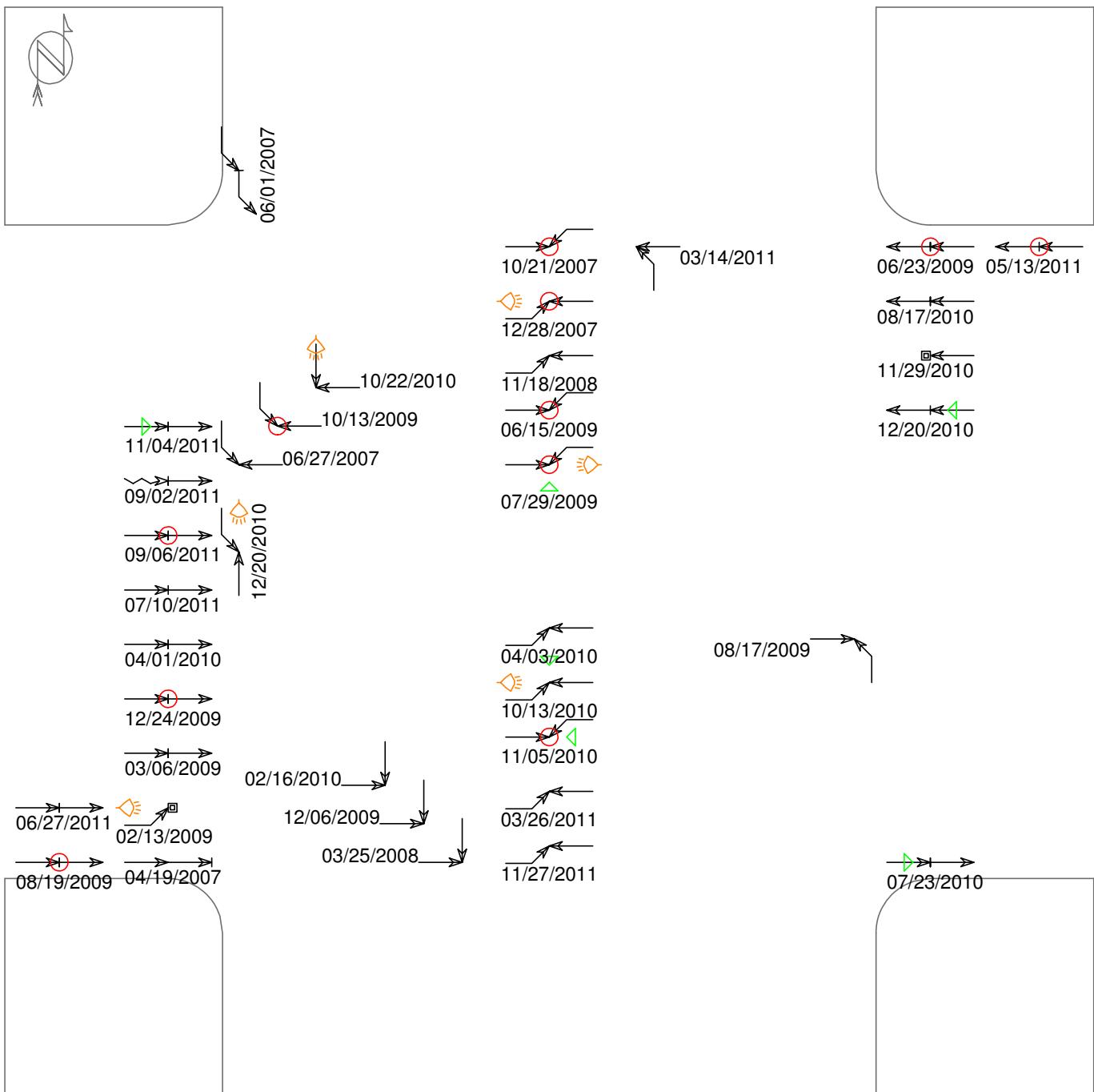
- ✗ Pedestrian
- ✗ Bicycle
- Injury
- Fatality
- ◇ Nighttime
- ▷ DUI

- Fixed objects:
- General
- Signal
- Tree
- Pole
- Curb
- ✗ Animal
- ◇ 3rd vehicle
- * Extra data

Dell Range Blvd & Frontier Mall Dr

37 Accidents

01/01/07 - 12/31/11



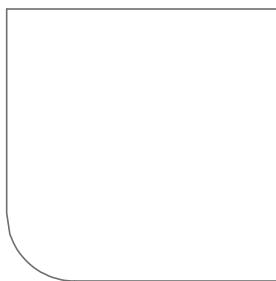
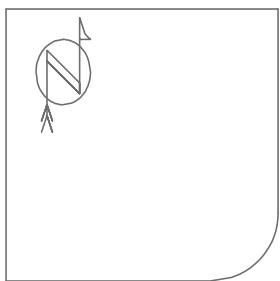
(clear filter), (0) accidents with insufficient data for display

← Straight	↔ Parked	✗ Pedestrian	Fixed objects:
↔ Stopped	↔ Erratic	✗ Bicyclist	□ General
↔ Unknown	↔ Out of control	○ Injury	□ Signal
↔ Backing	→ Right turn	◎ Fatality	□ Curb
↔ Overtaking	→ Left turn	◇ Nighttime	☒ Tree
↔ Sideswipe	→ U-turn	▷ DUI	☒ Animal
			◁ 3rd vehicle
			* Extra data

Dell Range Blvd & Stillwater Ave

9 Accidents

01/01/07 - 12/31/11

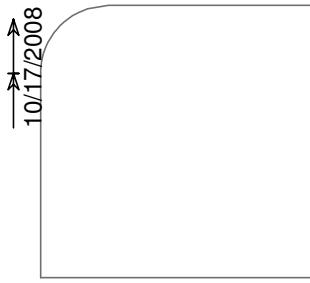
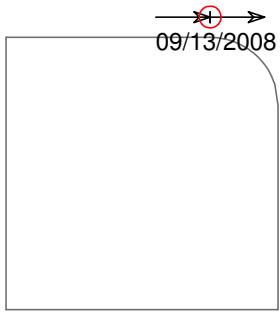


08/06/2010

08/01/2011

07/16/2011

04/12/2008
05/14/2008
03/06/2009
07/26/2011



Signal) & (Veh_1_Traf_Cntrl <> Signal_Ped) & (Veh_2_Traf_Cntrl <> Signal) & (Veh_2_Traf_Cntrl <> Signal_Ped)), (0) accidents with i

- ← Straight
- ← Stopped
- ← Unknown
- ↔ Backing
- ↔ Overtaking
- ↔ Sideswipe

- Parked
- ↔ Erratic
- ↔ Out of control
- ↗ Right turn
- ↘ Left turn
- U-turn

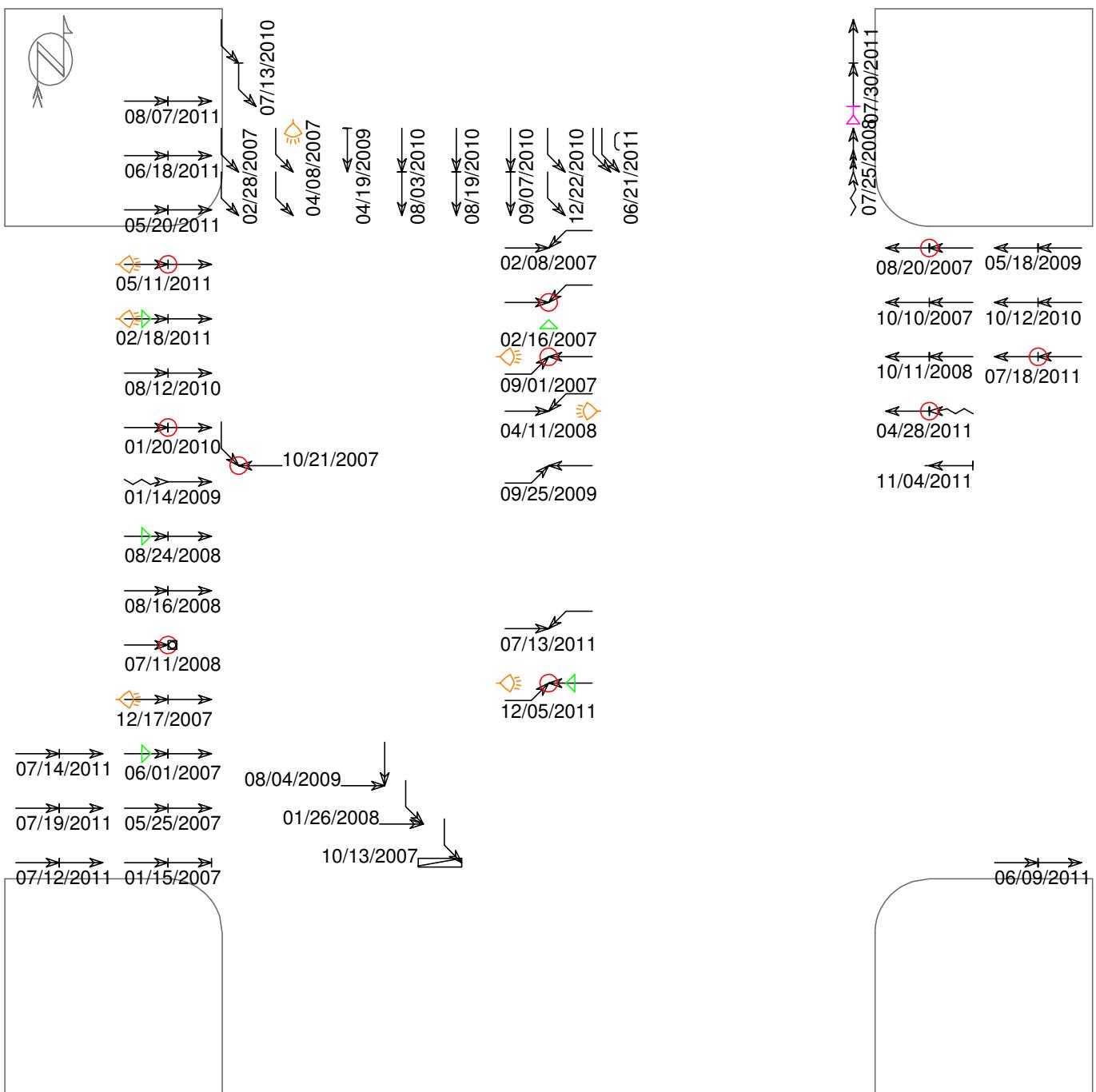
- ✗ Pedestrian
- ✗ Bicycle
- Injury
- Fatality
- ⚡ Nighttime
- ▷ DUI

- Fixed objects:
- General
- Signal
- Tree
- Pole
- Curb
- ☒ Animal
- ◁ 3rd vehicle
- * Extra data

50 Accidents

Dell Range Blvd & Prairie Ave

01/01/07 - 12/31/11



(clear filter), (1) accidents with insufficient data for display

- ← Straight
- ↔ Stopped
- ↔ Unknown
- ↔ Backing
- ↔ Overtaking
- ↔ Sideswipe

- ↔ Parked
- ↔ Erratic
- ↔ Out of control
- Right turn
- Left turn
- U-turn

- ✗ Pedestrian
- ✗ Bicycle
- Injury
- Fatality
- ◇ Nighttime
- ▷ DUI

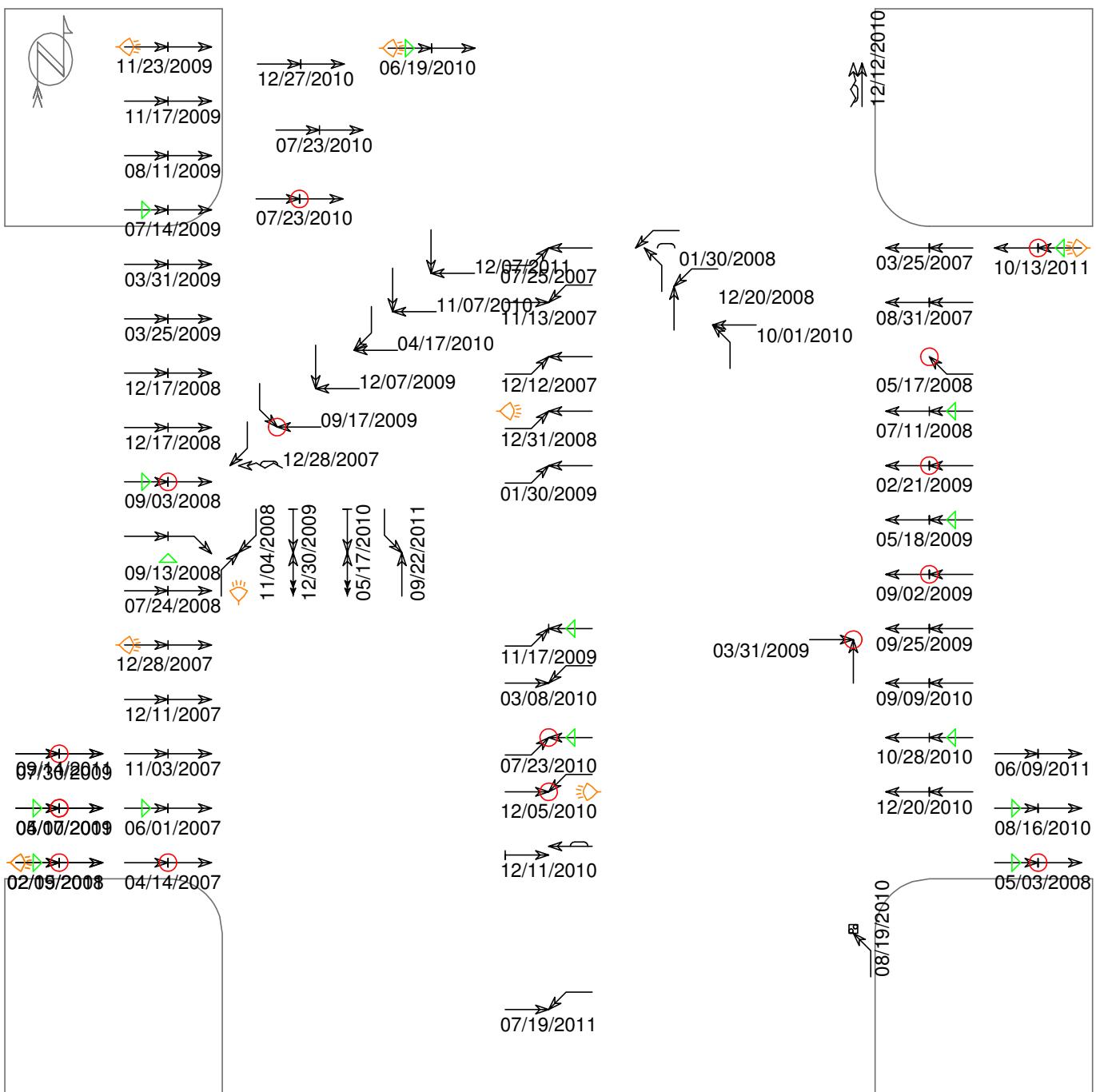
Fixed objects:

- | | |
|---------------|----------|
| □ General | □ Pole |
| ▣ Signal | ▣ Curb |
| ▣ Tree | ▣ Animal |
| ◀ 3rd vehicle | |
| * Extra data | |

68 Accidents

Dell Range Blvd & Rue Terre

01/01/07 - 12/31/11



(clear filter), (0) accidents with insufficient data for display

- ← Straight
- ↔ Stopped
- ↔ Unknown
- ↔ Backing
- ↔ Overtaking
- ↔ Sideswipe

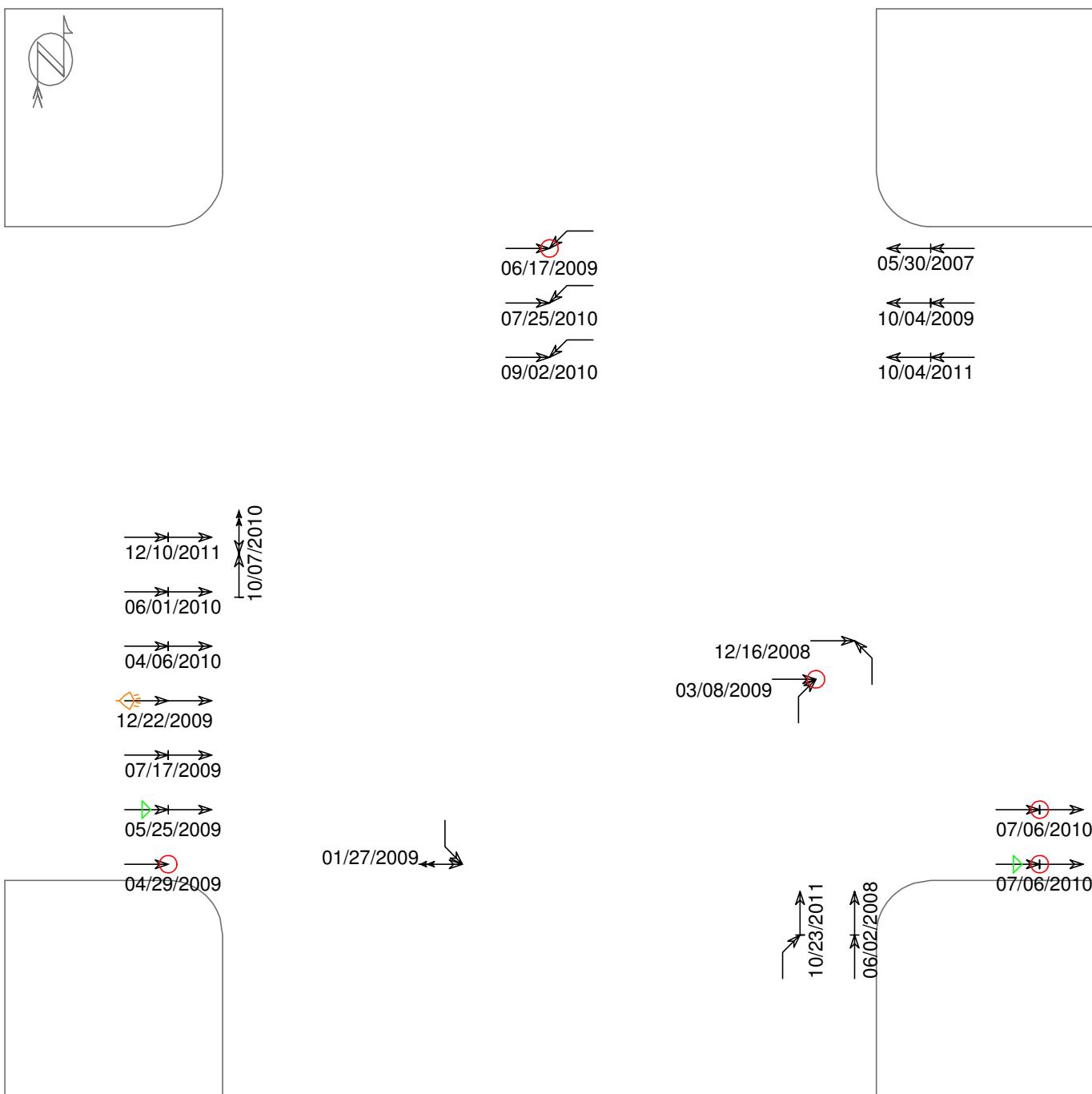
- Parked
- ↔ Erratic
- ↔ Out of control
- ↗ Right turn
- ↘ Left turn
- U-turn

- ✗ Pedestrian
- ✗ Bicycle
- Injury
- Fatality
- ⚡ Nighttime
- ▷ DUI

- Fixed objects:
- General
- Pole
- ▣ Signal
- Curb
- ▣ Tree
- ☒ Animal
- ◁ 3rd vehicle
- * Extra data

21 Accidents

Dell Range Blvd & Bluegrass
01/01/07 - 12/31/11



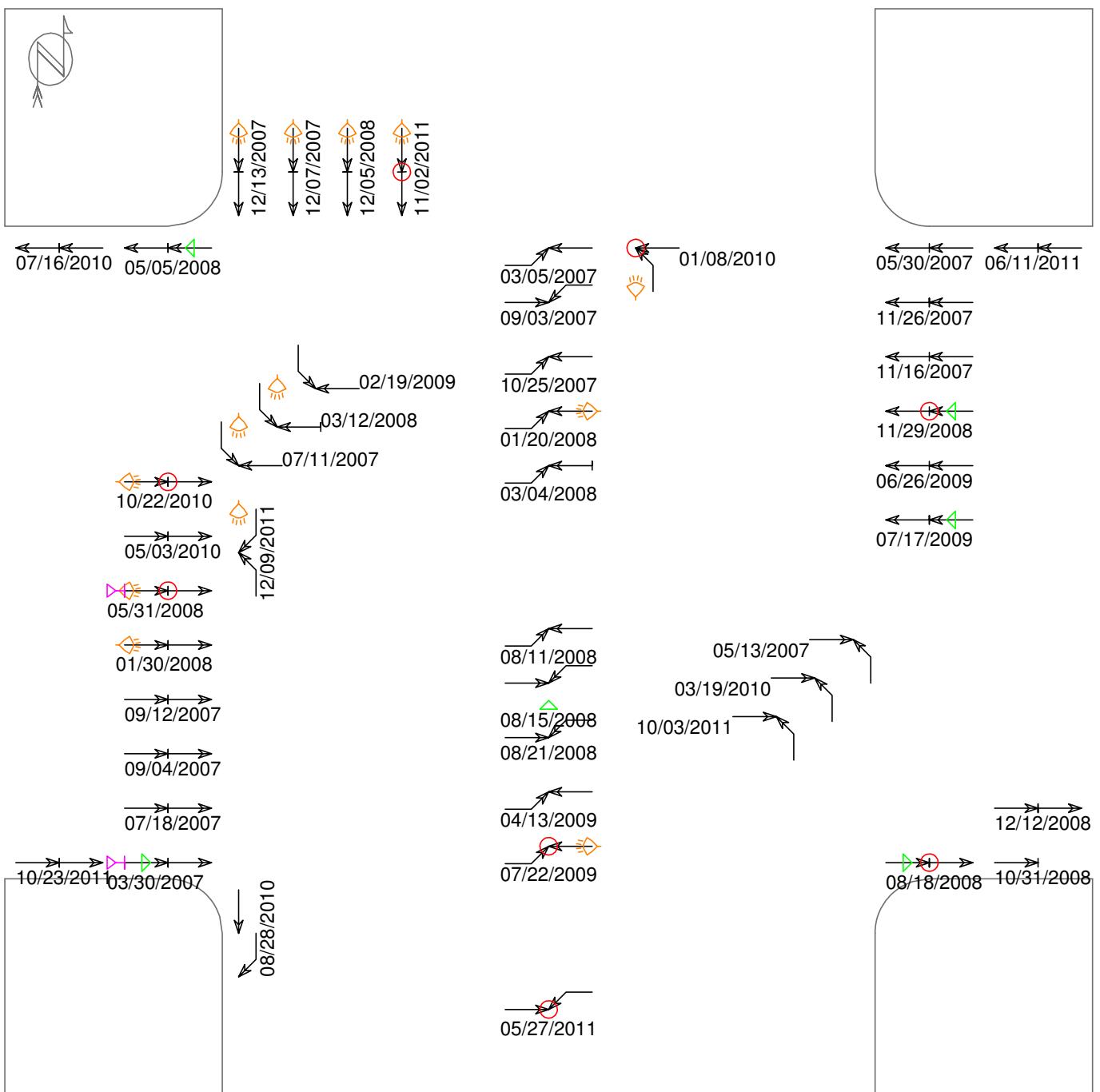
(clear filter), (0) accidents with insufficient data for display

- | | | | |
|--------------|------------------|--------------|----------------|
| ← Straight | ↔ Parked | ✗ Pedestrian | Fixed objects: |
| ↔ Stopped | ↔ Erratic | ✗ Bicycle | □ General |
| ↔ Unknown | ↔ Out of control | ○ Injury | □ Signal |
| ↔ Backing | → Right turn | ◎ Fatality | □ Curb |
| ↔ Overtaking | → Left turn | ⚡ Nighttime | □ Tree |
| ↔ Sideswipe | → U-turn | ▷ DUI | ✗ Animal |

Dell Range Blvd & Wal Mart

45 Accidents

01/01/07 - 12/31/11

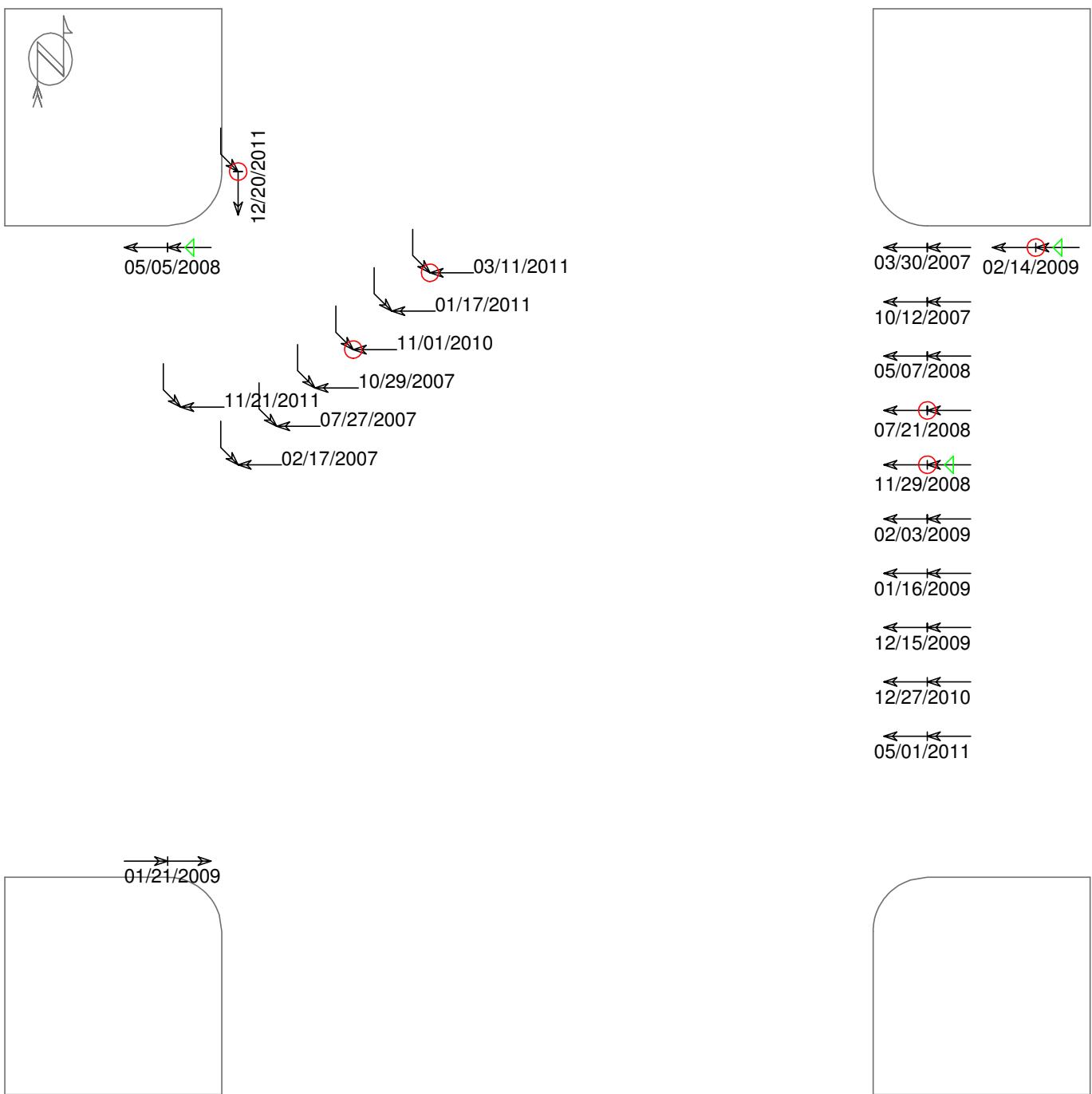


(clear filter), (0) accidents with insufficient data for display

← Straight	↔ Parked	✗ Pedestrian	Fixed objects:
← Stopped	↔ Erratic	✗ Bicyclist	□ General
← Unknown	↔ Out of control	○ Injury	□ Signal
↔ Backing	→ Right turn	◎ Fatality	□ Curb
↔ Overtaking	→ Left turn	◇ Nighttime	□ Tree
↔ Sideswipe	→ U-turn	▷ DUI	✗ Animal
			◁ 3rd vehicle
			* Extra data

Dell Range Blvd & Grandview

21 Accidents 01/01/07 - 12/31/11



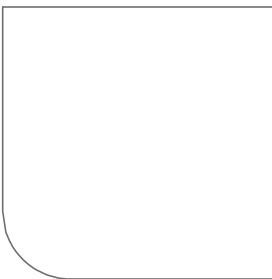
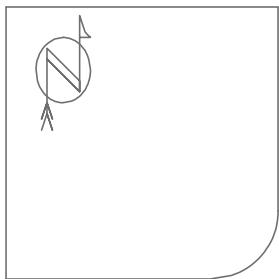
(clear filter), (0) accidents with insufficient data for display

← Straight	↔ Parked	✗ Pedestrian	Fixed objects:
← Stopped	↔ Erratic	✗ Bicycle	□ General □ Pole
← Unknown	↔ Out of control	○ Injury	▣ Signal □ Curb
↔ Backing	→ Right turn	◎ Fatality	▣ Tree ╳ Animal
↔ Overtaking	→ Left turn	⚡ Nighttime	⟨ 3rd vehicle
↔ Sideswipe	→ U-turn	▷ DUI	* Extra data

Converse Ave & Dell Range Blvd

34 Accidents

01/01/07 - 12/31/07



12/01/2007
 11/27/2007
 11/24/2007
 09/17/2007
 08/30/2007
 07/30/2007
 07/30/2007
 06/11/2007
 06/01/2007
 05/09/2007
 01/23/2007
 01/17/2007

01/04/2007
 02/26/2007
 03/04/2007
 03/10/2007
 05/02/2007
 05/19/2007
 05/25/2007
 06/22/2007
 07/01/2007
 08/11/2007
 09/12/2007
 09/24/2007
 03/06/2007
 01/02/2007
 01/26/2007
 04/03/2007
 06/18/2007
 10/07/2007
 10/15/2007
 11/09/2007
 12/26/2007

(clear filter), (0) accidents with insufficient data for display

← Straight
 ← Stopped
 ← Unknown
 ← Backing
 ← Overtaking
 ← Sideswipe

└─ Parked
 ↙ Erratic
 ↙ Out of control
 ↗ Right turn
 ↘ Left turn
 ↘ U-turn

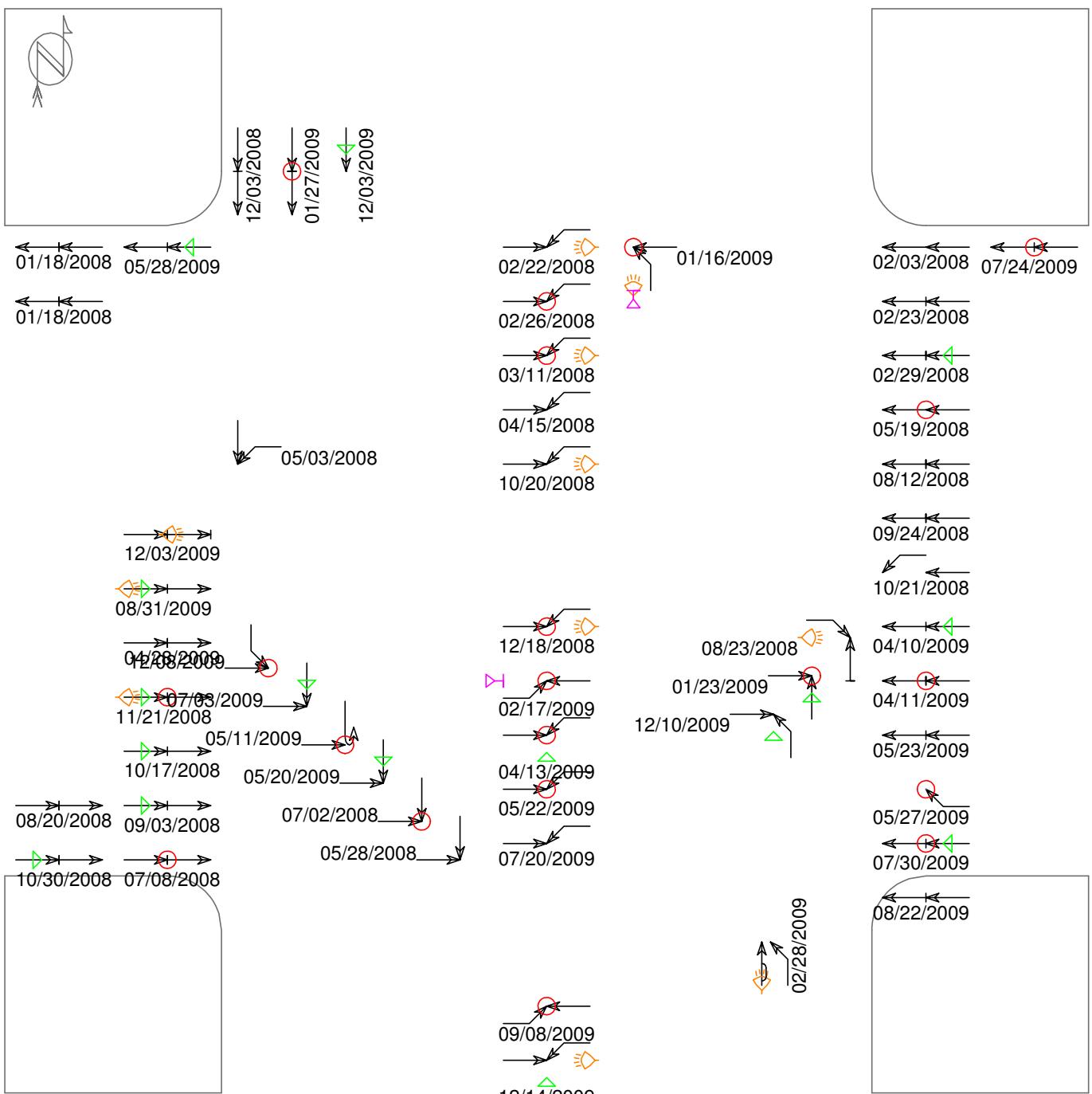
✕ Pedestrian
 ✕ Bicycle
 ○ Injury
 ○ Fatality
 ⚡ Nighttime
 ✕ DUI

Fixed objects:
 □ General
 □ Signal
 □ Tree
 □ Pole
 □ Curb
 ✕ Animal
 < 3rd vehicle
 * Extra data

Converse Ave & Dell Range Blvd

54 Accidents

01/01/08 - 12/31/09



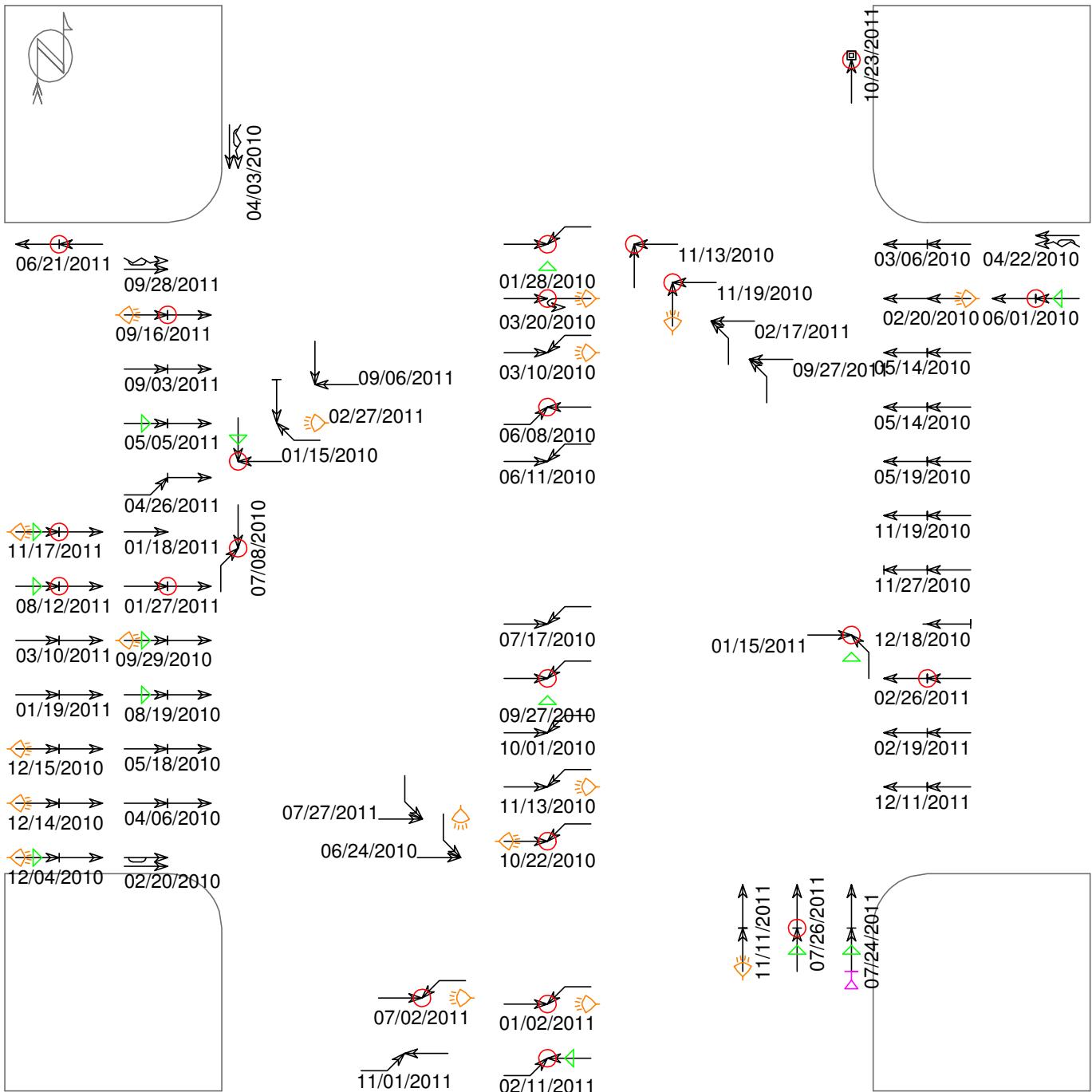
(clear filter), (1) accidents with insufficient data for display

- | | | | | |
|--|--|---|---|--|
| <ul style="list-style-type: none"> ← Straight ← Stopped ← Unknown ↔ Backing ↔ Overtaking ↔ Sideswipe | <ul style="list-style-type: none"> — Parked ↔ Erratic ↔ Out of control → Right turn ← Left turn → U-turn | <ul style="list-style-type: none"> ✗ Pedestrian ✗ Bicycle ○ Injury ○ Fatality ◊ Nighttime ✗ DUI | Fixed objects: <ul style="list-style-type: none"> □ General □ Signal □ Tree | <ul style="list-style-type: none"> □ Pole □ Curb ✗ Animal |
|--|--|---|---|--|

Converse Ave & Dell Range Blvd

63 Accidents

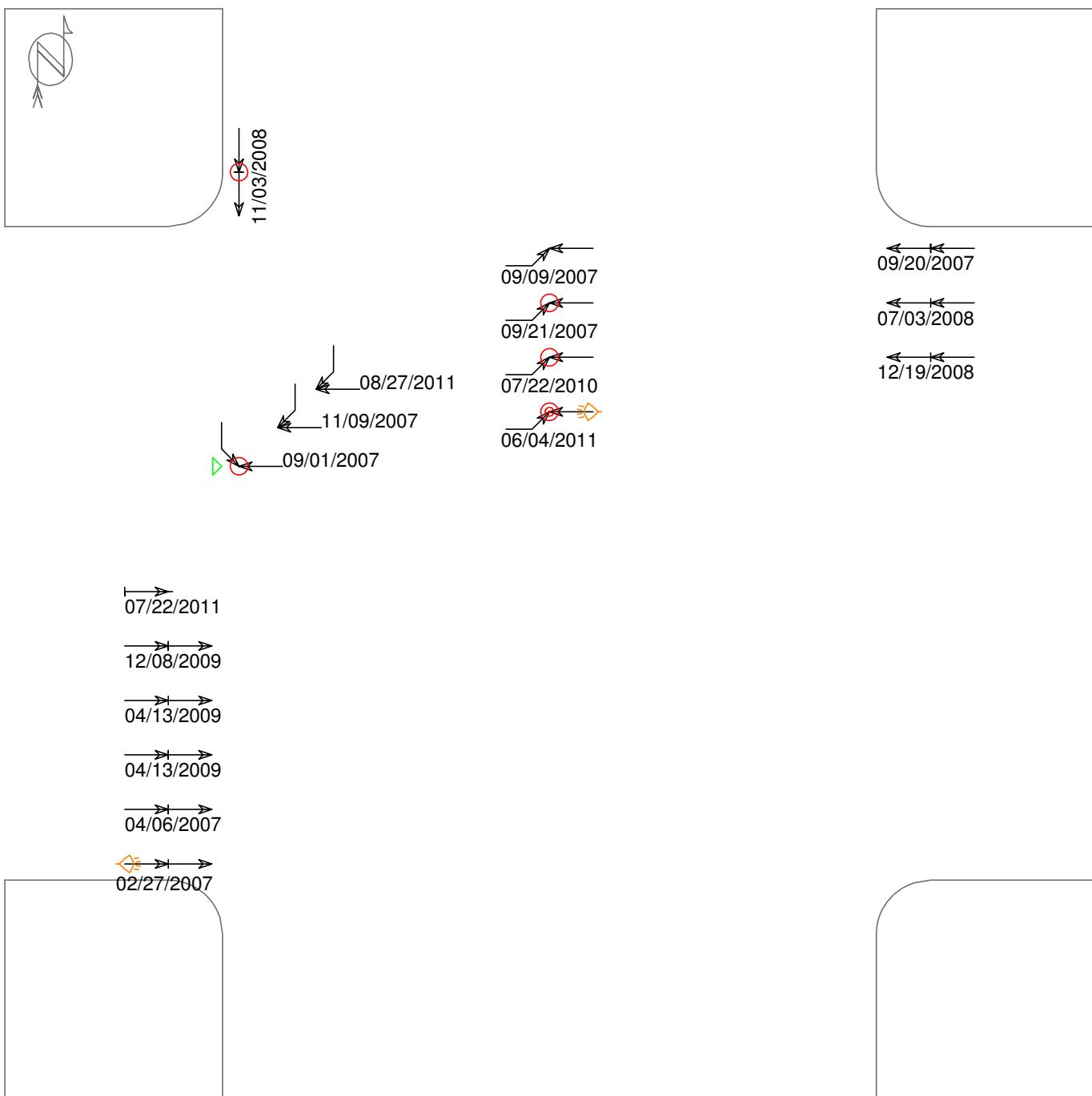
01/01/10 - 12/31/11



17 Accidents

Dell Range Blvd & Mountain Rd

01/01/07 - 12/31/11



(clear filter), (0) accidents with insufficient data for display

- ← Straight
- ↔ Stopped
- ← Unknown
- ↔ Backing
- ↔ Overtaking
- ↔ Sideswipe

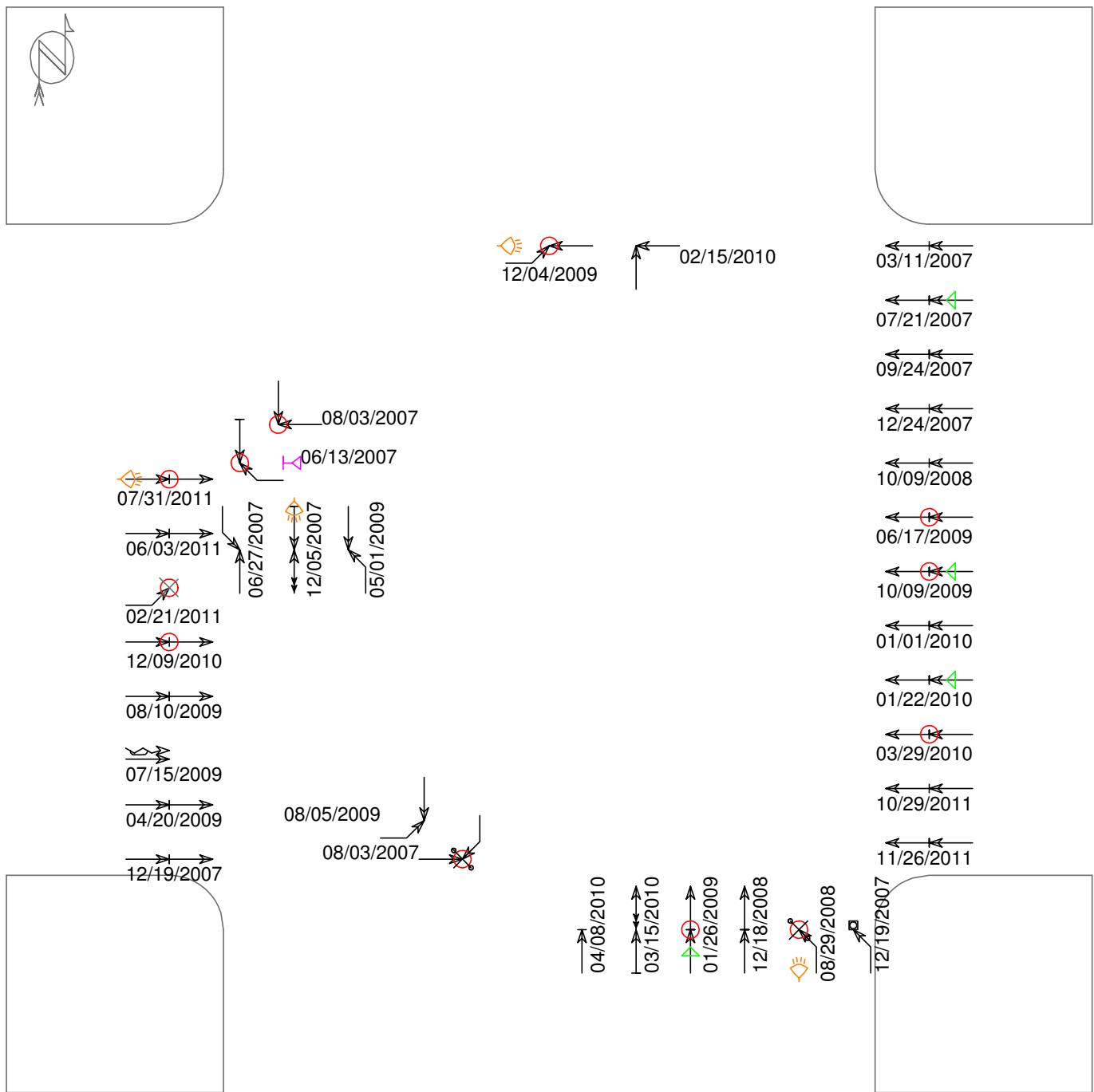
- Parked
- ↔ Erratic
- ↔ Out of control
- ↗ Right turn
- ↘ Left turn
- U-turn

- ✗ Pedestrian
- ✗ Bicycle
- Injury
- ◎ Fatality
- ◊ Nighttime
- ▷ DUI

- Fixed objects:
- General
- Signal
- Tree
- Pole
- Curb
- ☒ Animal
- ◇ 3rd vehicle
- * Extra data

Dell Range Blvd & Windmill Rd

36 Accidents 01/01/07 - 12/31/11



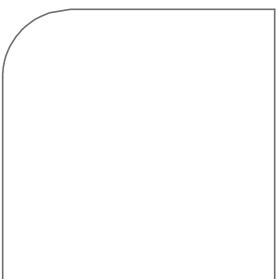
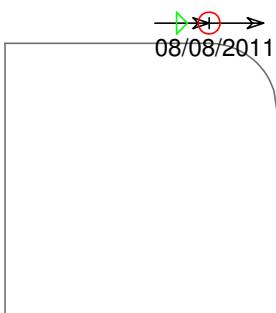
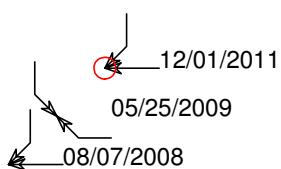
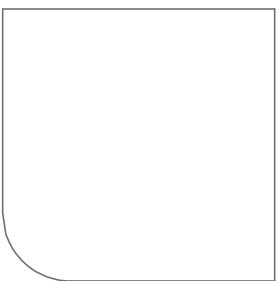
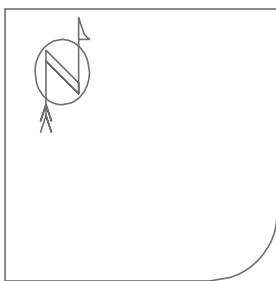
(clear filter), (1) accidents with insufficient data for display

- | | | | |
|--------------|------------------|--------------|----------------|
| ← Straight | ↔ Parked | ✗ Pedestrian | Fixed objects: |
| ↔ Stopped | ↔ Erratic | ✗ Bicycle | □ General |
| ↔ Unknown | ↔ Out of control | ○ Injury | □ Signal |
| ↔ Backing | → Right turn | ◎ Fatality | □ Curb |
| ↔ Overtaking | → Left turn | ◇ Nighttime | □ Tree |
| ↔ Sideswipe | → U-turn | ✗ DUI | ✗ Animal |
- 3rd vehicle * Extra data

6 Accidents

Dell Range Blvd & Hilltop Ave

01/01/07 - 12/31/11



(clear filter), (1) accidents with insufficient data for display

- ← Straight
- ← Stopped
- ← Unknown
- ↔ Backing
- ↔ Overtaking
- ↔ Sideswipe

- Parked
- ↔ Erratic
- ↔ Out of control
- ↗ Right turn
- ↘ Left turn
- U-turn

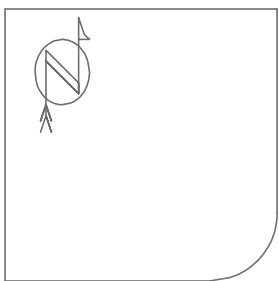
- ✗ Pedestrian
- ✗ Bicycle
- Injury
- Fatality
- ⚡ Nighttime
- ▷ DUI

- Fixed objects:
- General
- Signal
- Tree
- Pole
- Curb
- ☒ Animal
- ⬧ 3rd vehicle
- * Extra data

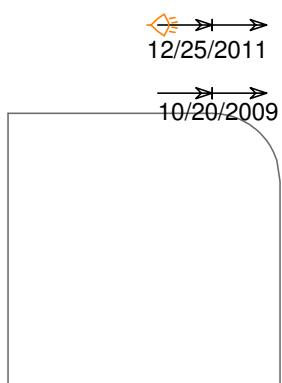
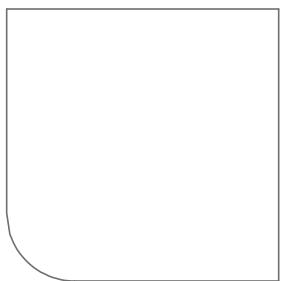
3 Accidents

Darnell Pl & Dell Range Blvd

01/01/07 - 12/31/11

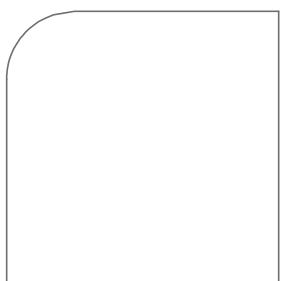


11/05/2009



12/25/2011

10/20/2009



(clear filter), (0) accidents with insufficient data for display

- ← Straight
- ← Stopped
- ← Unknown
- ↔ Backing
- ↔ Overtaking
- ↔ Sideswipe

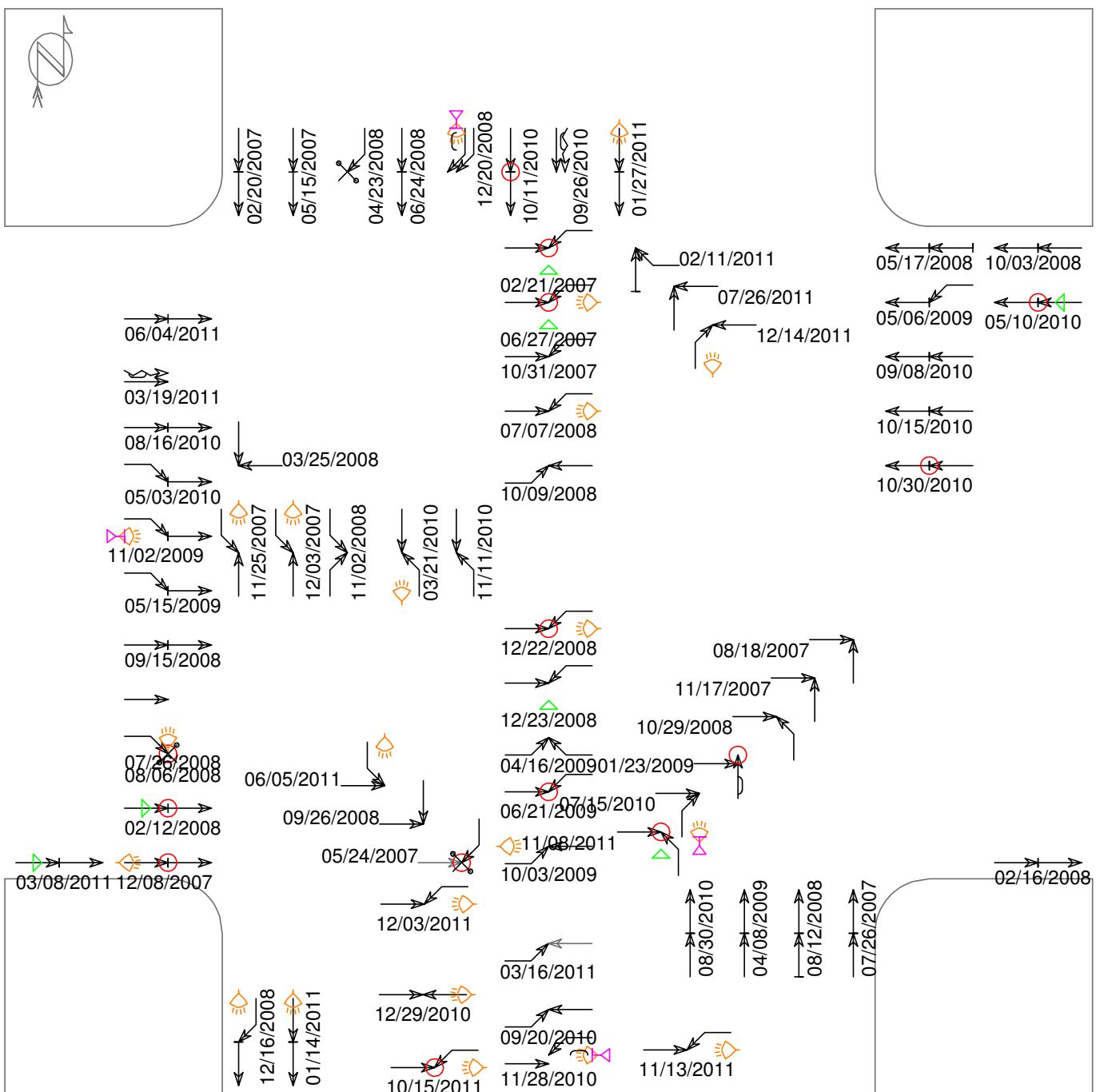
- Parked
- ↔ Erratic
- ↔ Out of control
- ↗ Right turn
- ↘ Left turn
- U-turn

- ✗ Pedestrian
- ✗ Bicycle
- Injury
- Fatality
- ⚡ Nighttime
- ▷ DUI

- Fixed objects:
- General
- Signal
- Tree
- Pole
- Curb
- ☒ Animal
- ◁ 3rd vehicle
- * Extra data

70 Accidents

Dell Range Blvd & Ridge Rd
01/01/07 - 12/31/11



← Straight
↔ Stopped
→ Unknown
↔ Backing
↔ Overtaking
↔ Sideswipe

↔ Parked
↔ Erratic
↔ Out of control
→ Right turn
→ Left turn
→ U-turn

✗ Pedestrian
✗ Bicycle
○ Injury
○ Fatality
◇ Nighttime
✗ DUI

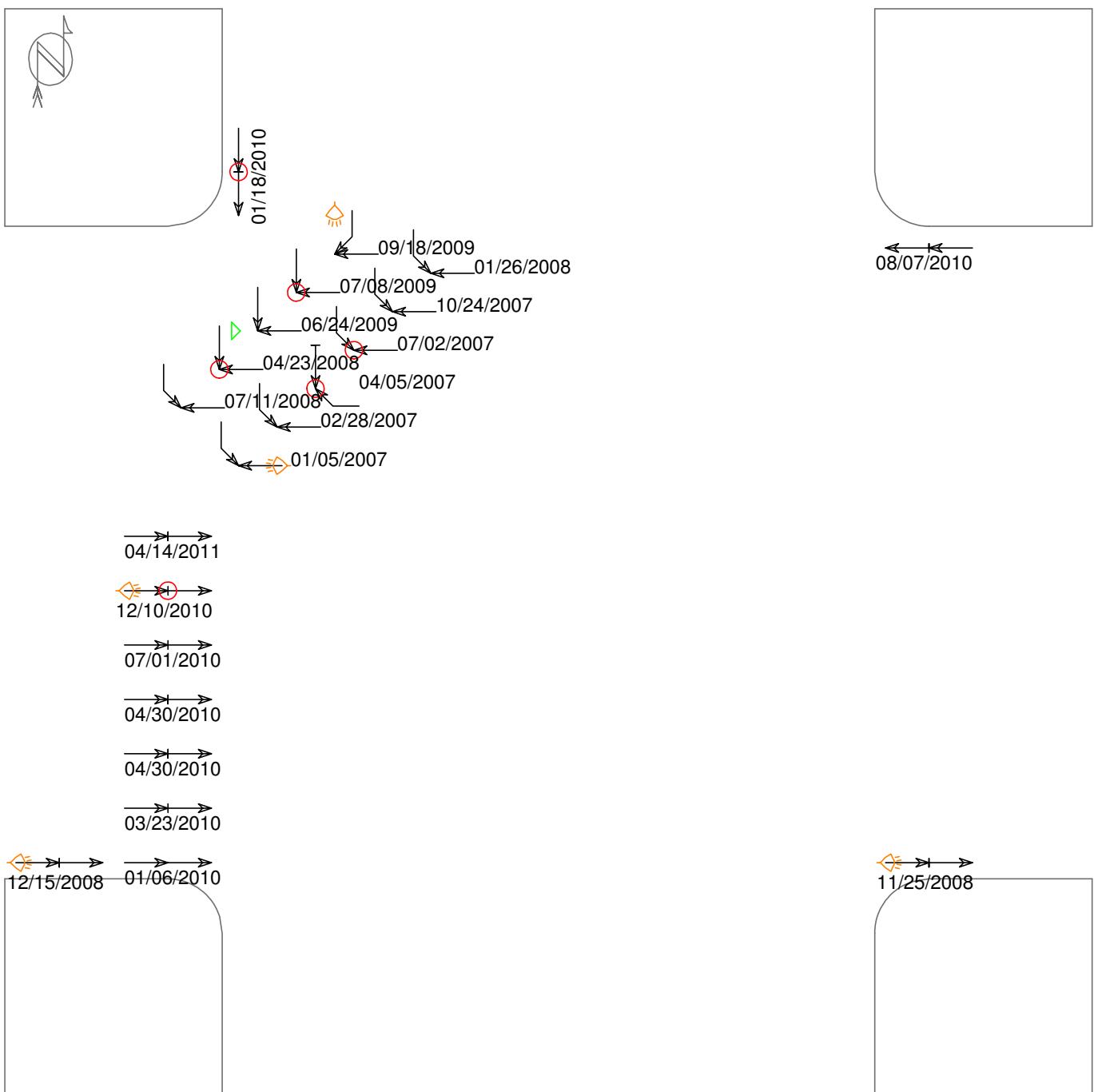
Fixed objects:
□ General
▣ Signal
▣ Tree
□ Pole
▣ Curb
☒ Animal

◇ 3rd vehicle
* Extra data

22 Accidents

Dell Range Blvd & Marble Ave

01/01/07 - 12/31/11



(clear filter), (0) accidents with insufficient data for display

- ← Straight
- ← Stopped
- ← Unknown
- ↔ Backing
- ↔ Overtaking
- ↔ Sideswipe

- Parked
- ↔ Erratic
- ↔ Out of control
- ↗ Right turn
- ↘ Left turn
- U-turn

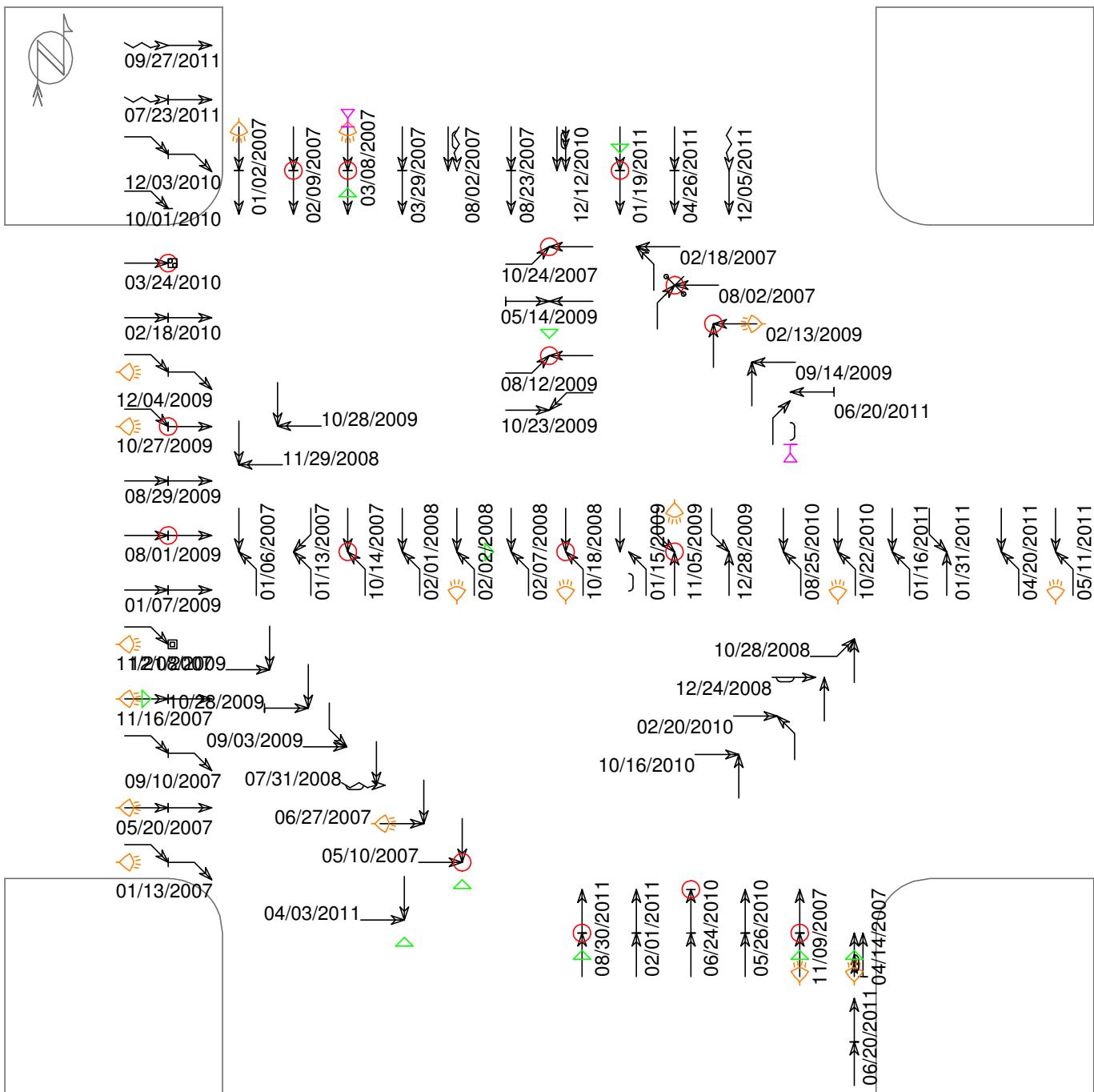
- ✗ Pedestrian
- ✗ Bicycle
- Injury
- Fatality
- ◆ Nighttime
- ▷ DUI

- Fixed objects:
- General
- Signal
- Tree
- Pole
- Curb
- ☒ Animal
- ◁ 3rd vehicle
- * Extra data

College Dr & Dell Range Blvd

71 Accidents

01/01/07 - 12/31/11



(clear filter), (0) accidents with insufficient data for display

- ← Straight
- ↔ Stopped
- ← Unknown
- ↔ Backing
- ↔ Overtaking
- ↔ Sideswipe

- Parked
- ↔ Erratic
- ↔ Out of control
- ↗ Right turn
- ↘ Left turn
- ↪ U-turn

- ✗ Pedestrian
- ✗ Bicyclist
- Injury
- Fatality
- ⚡ Nighttime
- ▷ DUI

- Fixed objects:
- General
- ▣ Signal
- ▢ Tree
- Pole
- ▣ Curb
- ▢ Animal
- ◁ 3rd vehicle
- * Extra data

Appendix C

Road Safety Audit Report

Road Safety Audit Report

**Dell Range Boulevard from
Powderhouse Road to College Drive
&
Prairie Avenue from Powderhouse Road to
Dell Range Boulevard**

prepared for:



Cheyenne Metropolitan Planning Organization
2101 O'Neil Avenue, Room 205,
Cheyenne, WY 82001

June 2013



**Dell Range Boulevard from
Powderhouse Road to College Drive
&
Prairie Avenue from Powderhouse Road to
Dell Range Boulevard**

Field Review Date: April 23 to 24, 2013

Participants:

John R. Freeman, Jr., P.E., PTOE - Kittelson and Associates, Inc. – Team Leader
Jennifer Valentine, Cheyenne MPO (Project Manager)
Tom Mason, Cheyenne MPO (Director)
Jeff Wiggins, City of Cheyenne (Greenway Coordinator)
Kevin McCoy, Wyoming Department of Transportation (Planning)
Ann Smith, Wyoming Department of Transportation (Safety)
Jeff Purdy, FHWA (Planning and Right-of-Way)
Nathan Beauheim, PE, City of Cheyenne (Assistant City Engineer)
Casey Bergh, PE, Kittelson & Associates, Inc. (Senior Engineer)
Sgt. Tom Hood, Cheyenne Police Department

Project Characteristics:

Audit Type: Existing Road
Adjacent Land Use: Suburban; Commercial
Posted Speed Limit: 35 on Prairie Avenue and 40 MPH on Dell Range Boulevard
Opposite Flow Separation: Divided by Two-Way Left-Turn Lane (Dell Range Boulevard) or Raised Median (Prairie Avenue)
Service Function (Urban): Arterial
Terrain: Flat
Climatic Conditions: Sunny, Cold



Background

The study area is a highly-traversed commercial corridor that is a primary destination for shopping and dining. Commercial giants such as Walmart, Sam's Club, Kmart and Target are housed along this corridor along with Cheyenne's Frontier Mall. Other numerous retail establishments dot the entire stretch of the corridor. Commercial property fronts the western section between Powderhouse Drive and Converse Avenue. Near Converse Avenue and east, the intensity of commercial activity reduces slightly. Several special flood hazard areas exist along Dell Range Boulevard. Development on the north side of Dell Range Boulevard is constrained by the Dry Creek Channel. Recent flood control improvements restrict the flood waters to the channel; however, it still carries a significant amount of water. The south side is dedicated to recreational uses. This is changing slightly with the Menards' construction in the southeast corner of the Dell Range Boulevard/Windmill Road intersection. East of Converse Avenue, strip commercial developments front the north side of the corridor.

The Dell Range Boulevard corridor feels unsafe and uncomfortable for modes of travel other than automobiles and poses a barrier for bicyclists and pedestrians. The greenway system runs parallel to the corridor, however there is no good way to go across the corridor at intersections to access the various businesses. The sidewalk along the corridor is attached in most places and exposed to high volumes and high speed traffic. The Bicycle Advisory Committee has determined that providing a bike lane on Dell Range Boulevard for the near term is too dangerous. Instead, providing opportunities for safe crossing of the corridor and access to businesses are more critical in the short term. However, long term solutions should be identified for safe mobility of all modes that can be incorporated during potential reconstruction of this corridor, if and when possible in the future.

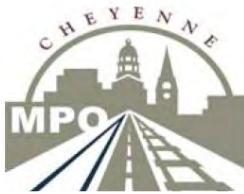
The Dell Range Boulevard Corridor is one of the most heavily used roads in Wyoming. It is also perceived to be unsafe by most drivers. Data supports that Dell Range Boulevard does have higher crash frequency in comparison to other areas in the city. Per the 2010 Annual Crash Report for Cheyenne, the crash rate for the Dell Range Boulevard/Converse Avenue intersection was highest in 2010 and during the 10-years from 2001 to 2010. Three of the five intersections with the highest frequency of crashes were within this stretch of Dell Range Boulevard. Also, the Stillwater Avenue/Dell Range Boulevard intersection was ranked as having the fifth highest number of fatal and incapacitating crashes from 2001 to 2010.

Project Scope and Objectives

The purpose of this Road Safety Audit is to evaluate safety issues and other areas of concern along the segment of Dell Range Boulevard between Powderhouse Road and North College Drive, as well as along Prairie Avenue.

Specific Roadway components and issues to be studied include:

- Areas of concern for vehicular safety, and pinch points for capacity and congestion.
- Pedestrian crossing opportunities and safety considerations, with an emphasis on business access.
- Opportunities to improve motor vehicle and pedestrian connectivity between adjacent businesses.
- Scenarios to improve bicycle accommodation along parallel corridors, including better connectivity between the Storey Avenue/Converse Avenue and Dry Creek Greenways.



Schedule

The RSA team generally adhered to the following schedule during the week the audit was conducted.

Tuesday, April 23, 2013 – Room 307

9:00 – 10:30 am RSA Training
10:30 – 11:15 am Project Objectives Overview (MPO)
11:15 – noon RSA Team Materials Review
Noon – 1:30 pm Travel to Corridor + Lunch
1:30 – 6:00 pm Field Review + PM Peak Observation
7:30 – 8:30 pm Night Field Review

Wednesday, April 24, 2013 – Dell Range Boulevard Corridor

7:00 – noon Observe AM Peak + Continue Field Review
Noon – 1:30 pm Lunch
1:30 – 4:30 pm Complete Field Review

Thursday, April 25, 2013 – Room 307

9:00 – noon RSA Team Analysis + Initial Report Preparation
Noon – 1:30 pm Lunch
1:30 – 5:00 pm RSA Team Analysis + Initial Report Preparation

Friday, April 26, 2013 – Room 307

8:00 – 10:00 am Post Audit Briefing Preparation
10:00 – noon Post Audit Briefing



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SUMMARY OF SAFETY ISSUES AND SUGGESTIONS

The RSA Team identified and categorized intersection and corridor segment safety issues based on a qualitative risk scale. For the purposes of this RSA, risk is defined as a function of exposure, probability, and consequence. Exposure reflects the number of users (vehicles, pedestrians, or bicyclists) potentially influenced by the issue. Probability reflects the likelihood of a crash influenced by the identified issue and can be quantified by the crash history. The consequence reflects the severity of a crash, if one occurs.

The qualitative risk rating of safety issues identified along Dell Range Boulevard and Prairie Avenue within the study segments are assigned relative to other issues observed. Category III issues have potentially the greatest risk compared to the other observed issues; they are associated with higher frequency and higher severity potential than other issues. Category I issues indicate the least risk compared to the other observed issues; they are associated with low crash severity and low crash frequency potential. Category II issues indicate higher risk than some issues and lower risk relative to other observed safety issues.

Where an issue was identified as Category II or III an explanation is provided in to support the categorization; no explanation is provided for Category I issues.

The RSA Team identified four Category III issues and eleven Category II issues. Many Category I issues were identified, but are not summarized here. Category II and Category III issues, and the RSA Team's suggestions for addressing these issues are summarized in Table 1.

**Table 1** Summary of Category II and III Issues and Suggestions

Issue	Location	Risk Classification	Suggestion
East-west connectivity north of Dell Range Boulevard	Entire Dell Range Boulevard Corridor	Category III	Provide additional east-west collector roadway connections within ½ mile north of Dell Range Boulevard, from Powderhouse Road to Converse Avenue.
Existing median two-way left-turn lane	Entire Dell Range Boulevard Corridor	Category III	Consider changing the existing two-way left turn lane to provide raised median access control. Consider strategically located u-turn bulb outs at full or directional intersections.
East-west left-turn crashes	Dell Range Boulevard/Converse Avenue	Category III	Consider making the EB and WB left turn signalized movements protected only.
Angle crashes at intersection	Dell Range Boulevard/Converse Avenue	Category III	Consider increasing the all-red clearance interval to 2 seconds for all movements.
Travel speed	Entire Dell Range Boulevard Corridor	Category II	Conduct a speed study to document existing 85 th percentile travel speed. Reduce posted speed limit to 35 mph, if supported by speed study.
Red light running	Entire Dell Range Boulevard Corridor	Category II	Check yellow clearance intervals as compared to the WYDOT procedure. Enhance the ability for law enforcement to enforce red-light running. This could include white or blue lights directly wired into the red signal lens illuminating at the same time as the red signal.
Accessible pedestrian facilities	Entire Dell Range Boulevard Corridor	Category II	As part of other improvements to the overall corridor, pedestrian facilities can be updated to meet ADA requirements.
No crosswalk provided on west leg of intersection	Dell Range Boulevard/Stillwater Avenue (W)	Category II	Stripe crosswalk on west leg and provide pedestrian signal equipment in NW and SW corners of intersection.
Offset intersection	Dell Range Boulevard/Rue Terre	Category II	Mount sign "KEEP RIGHT" on signal pole in north approach median facing northbound through lane approach.
No crosswalk provided on east leg of intersection	Dell Range Boulevard/Rue Terre	Category II	Stripe crosswalk on east leg and provide pedestrian signal equipment in NE and SE corners of intersection.
Left-turn crashes	Dell Range Boulevard/Mountain Road	Category II	Consider restricting access to right-in and right-out only.
Dry Creek box culvert needs rail	Dell Range Boulevard: Darnell Place to Ridge Road	Category II	Consider adding a pedestrian rail or guardrail on the top of the box culvert.
Northbound left-turn capacity	Dell Range Boulevard/College Way	Category II	Provide more green time for northbound left-turn or construct dual left-turn lanes.
Excess pavement width	Entire Prairie Avenue Corridor	Category II	Restripe corridor to include buffered bike lanes, as part of a corridor-wide bike connectivity plan. If feasible, implement road diet to reduce curb-to-curb width in widest segments. Provide striping channelization in open areas of shoulder to direct vehicles into travel lane.
Lane channelization	Prairie Avenue/Frontier Mall Drive	Category II	Short-term: realign eastbound approach to provide short tangent section that aligns drivers into their respective lanes on the downstream side of intersection. Long-term: reconstruct median and curb to improve channelization and provide consistent cross-section on east and west legs.
Intersection skew	Prairie Avenue/Frontier Mall Drive	Category II	Re-align Frontier Mall Drive approaches to intersect Prairie Avenue closer to 90-degrees (reduce skew).

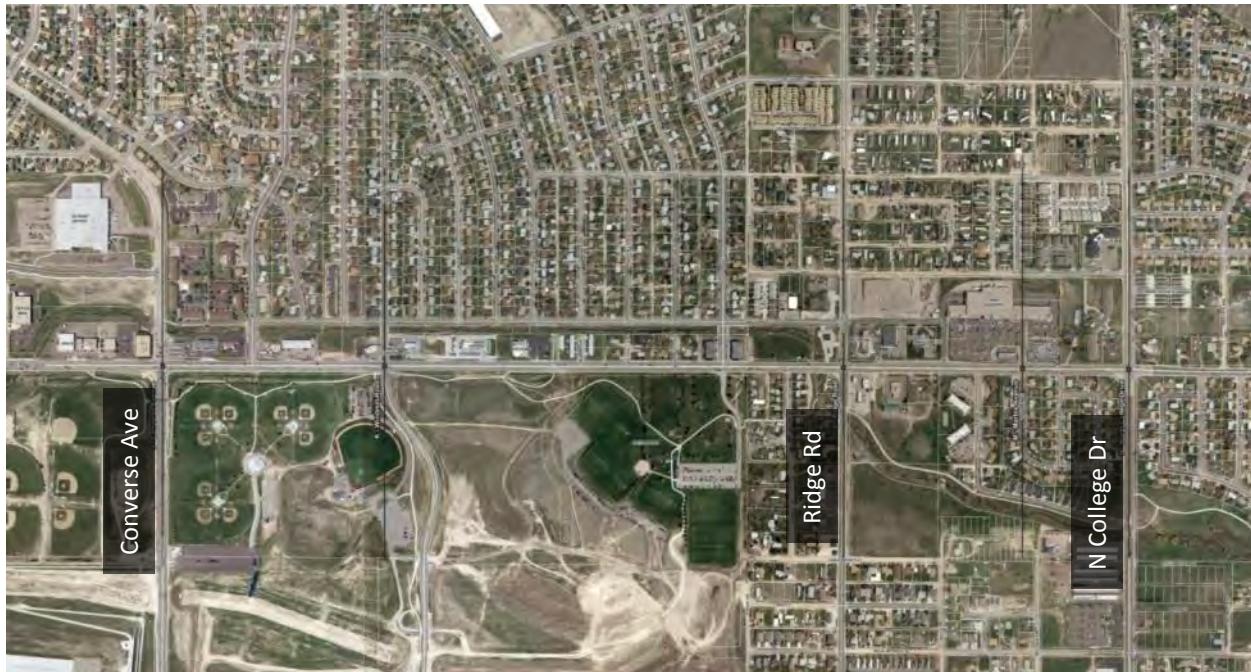


DELL RANGE BOULEVARD CORRIDOR: POWDERHOUSE ROAD TO COLLEGE DRIVE

Dell Range Boulevard – Entire Corridor



Dell Range Boulevard: Powderhouse Road to Converse Avenue



Dell Range Boulevard: Converse Avenue to College Drive



Issue: East-west Connectivity North of Dell Range Boulevard



Exhibit 1 General Area North of Dell Range Boulevard

Description of Safety Issue:

Existing daily traffic volumes on Dell Range Boulevard between Prairie Avenue and Converse Avenue average 29,000 vehicles/day. To accommodate future growth on the corridor, additional through lanes may be required resulting in six travel lanes. Additional lanes will reduce delay at intersections and increase capacity for motorized vehicles. However, additional lanes make non-motorized travel more difficult by increasing pedestrian crossing distance at intersections.

An alternative to increasing the number of lanes (and overall width) on Dell Range Boulevard is to provide alternative parallel routes. Due to existing congestion on Dell Range Boulevard, drivers use alternative routes to avoid using Dell Range Boulevard for east-west travel. This is evident by the number of vehicles that cut through the back of the Kmart property to travel between Prairie Avenue and Rue Terre. However, there are no connections for east-west travel between Prairie Avenue and Converse Avenue within 0.5 miles of Dell Range Boulevard.

Function	Classification	Reasoning
Exposure	Category III	ADT of 29,000 veh/day
Probability	Category III	Corridor history
Consequence	Category II	History of low severity crashes, but potential for increased severity in future
<i>Overall</i>	<i>Category III</i>	-

Suggestion for Improvement:

Provide additional east-west collector roadway connections within ½ mile north of Dell Range Boulevard, from Powderhouse Road to Converse Avenue.



Issue: Travel Speed



Exhibit 2 Posted Speed Limit Sign

Description of Safety Issue:

In order to reach the posted speed limit of 40 mph between signalized intersections, drivers must accelerate rapidly. Given the limited distances between signals (many are spaced less than 1,000 feet apart), most drivers cannot obtain the posted speed before decelerating at a downstream signal.

At each point of access to the corridor, drivers turning onto and off of the corridor are accelerating and decelerating, which leads to inconsistent travel speeds. Speed inconsistency can be associated with increased potential for rear-end crashes. Approximately 65 percent of all crashes on the corridor have been rear-end crashes from 2007 through 2011.

At 40 mph, 155 feet is required for stopping sight distance. By reducing posted speed to 35 mph, the required stopping distance is 115 feet for passenger cars. The difference in stopping distance between 40 and 35 mph is similar for trucks, although they require greater distances at both speeds.

Function	Classification	Reasoning
Exposure	Category II	Speed varies by lane
Probability	Category III	Speed is a contributing factor in most crashes
Consequence	Category II	Potential for rear-end crash
<i>Overall</i>	<i>Category II</i>	-

Suggestion for Improvement:

Conduct a speed study to document existing 85th percentile travel speed. Reduce posted speed limit to 35 mph, if supported by speed study.



Issue: Existing Median Two-Way Left-Turn Lane



Exhibit 3 Existing Two-Way Left-Turn Lane



Exhibit 4 Pedestrian Crossing Through Existing Two-Way Left-Turn Lane

Description of Safety Issue:

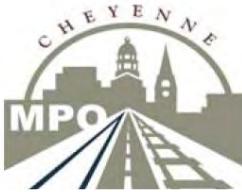
The existing cross-section includes a 12-foot wide, two-way left-turn lane. Over the study period multiple angle and turn crashes have been reported throughout the corridor. Enhancement of access management could reduce the number of conflict points along the corridor and reduce the number of crashes. The *Highway Safety Manual* (HSM) provides crash prediction models based on empirical studies showing five-lane roadways have approximately twice the number of crashes compared to four-lane divided urban roadways when the corridor carries approximately 30,000 vehicles/day. The addition of a median also provides better refuge for pedestrians crossing along the corridor.

The addition of a raised median would increase the number of u-turn movements and u-turn bulb outs would be needed to accommodate these movements.

Function	Classification	Reasoning
Exposure	Category III	Every driver is exposed to multiple conflicts
Probability	Category III	Existing left-turn and angle crashes
Consequence	Category III	Typically angle and left-turn crashes are injury producing crashes
<i>Overall</i>	<i>Category III</i>	-

Suggestion for Improvement:

Consider changing the existing two-way left turn lane to provide raised median access control. Consider strategically located u-turn bulb outs at full intersections. These could have the dual use of being future bus bays for transit operations along the corridor. The RSA Team discussed the potential of narrowing the through lanes to 11-ft and providing a 16-ft median within the existing 60-ft of pavement.



Issue: Red Light Running



Exhibit 5 Vehicle Entering Intersection on Red Signal

Description of Safety Issue:

The RSA team observed multiple drivers entering the intersection after the red indication had occurred. Over the study period, 203 angle crashes have been reported at signalized intersections. The proportion of those angle crashes that involved a red-light running vehicle are not identified in the crash data, but red-light running is a contributing factor in angle crashes. The RSA team measured the yellow clearance intervals to be 3- to 3.5-seconds at some intersections. Most locations have a one second all red interval.

Function	Classification	Reasoning
Exposure	Category II	RSA team observed this behavior at multiple locations
Probability	Category II	Angle crashes at intersections
Consequence	Category III	Angle crashes typically have injuries
Overall	Category II	-



Exhibit 6 Example of Blue Light Mounted Above Signal Head

Suggestion for Improvement:

Check yellow clearance intervals as compared to the WYDOT procedure. Enhance the ability for law enforcement to enforce red light running. This could include white or blue lights directly wired into the red lens signal illuminating at the same time as the red signal (See example in Exhibit 6). Law enforcement can see the signal turn red from behind and pull over a driver. Also, law enforcement needs locations to safely monitor drivers for enforcement.



Issue: Signalized Left-Turn Phase Sequences

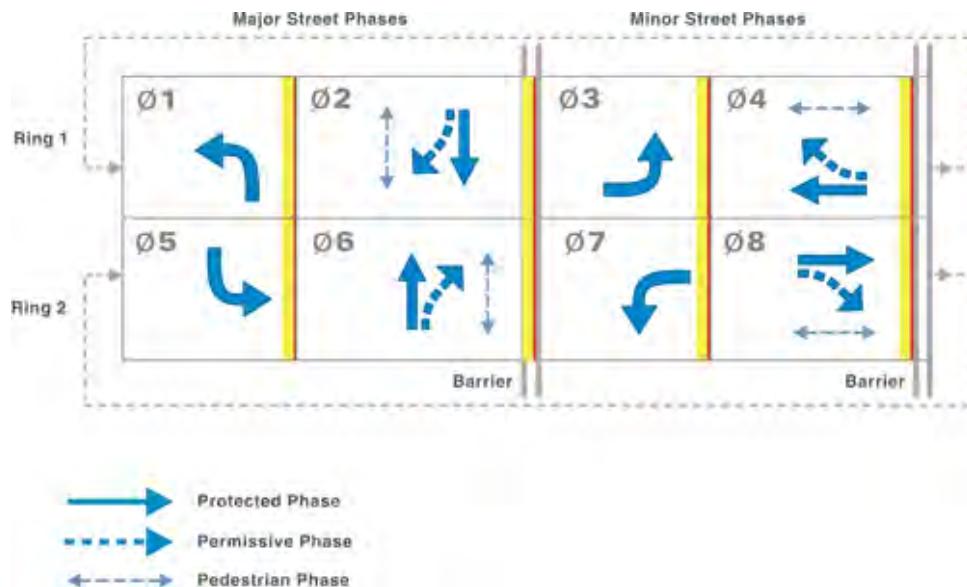


Exhibit 7 Example Ring-and-Barrier Diagram Showing Protected Lead-Lag Left Turns (source: FHWA Signal Timing Guide)

Description of Safety Issue:

Existing signal timing provides inconsistent use of left-turn phase sequences along the corridor. At some signals the east-west protected left-turn phase occurs before the permitted phase, but at other signals the protected phase “lags” behind the permitted phase. There are three potential issues associated with left-turn signal phasing: 1) inconsistency violates driver expectations and can increase driver error, 2) providing a leading protected left-turn phase reduces the demand during the permitted phase and reduces the potential for driver error during the permitted phase, and 3) permitted left-turns may increase potential conflicts between pedestrians in the crosswalk. These issues may have contributed to the 203 angle crashes reported at signals within the study corridor.

Allowing variations in the phasing sequence throughout a corridor is a common strategy for improving signal coordination and reducing delay, but inconsistent left-turn phasing may increase driver error. Drivers accustomed to one left-turn phasing sequence may assume other signals on the corridor have the same phase sequence.

When the protected left-turn phase “leads” and is followed by the permitted left-turn, more vehicles proceed through the intersection during the protected phase and additional vehicles can proceed on the permitted phase if there is a gap in oncoming traffic. The protected left-turn phase follows (or “lags”) the permitted phase at many of the signals on Dell Range Boulevard, which increases the number of vehicles that are exposed to making an error when making the left turn against the flow of oncoming traffic.

A recent study indicates that relatively few (4-9 percent) of left-turn drivers turning during a permitted phase look for pedestrians in the conflicting crosswalk. Most drivers in this situation are only watching for



a gap in oncoming traffic.¹ This trend provides additional incentive to provide protected left-turn phasing for a majority of left-turn vehicles through a leading protected left-turn phase.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category II	Permissive phase introduces potential for human error.
Consequence	Category III	Contributes to left-turn and angle crashes
<i>Overall</i>	<i>Category II</i>	-

Suggestion for Improvement:

Consider providing leading protected left-turn phasing to promote consistency along the corridor, minimize potential for driver error, and minimize potential conflicts with pedestrians.

Issue: Countdown Pedestrian Signals

Exhibit 8 Example of Pedestrian Countdown Signal at Ridge Road



Exhibit 9 Example of Pedestrian Push Button and Sign

¹ Hurwitz, D. and Monsere. *Pedestrian Safety at Signalized Intersections Operating the Flushing Yellow Arrow*. OTREC. April 2013.



ROAD SAFETY AUDIT REPORT
Dell Range Boulevard and Prairie Avenue Corridors
CHEYENNE, WYOMING

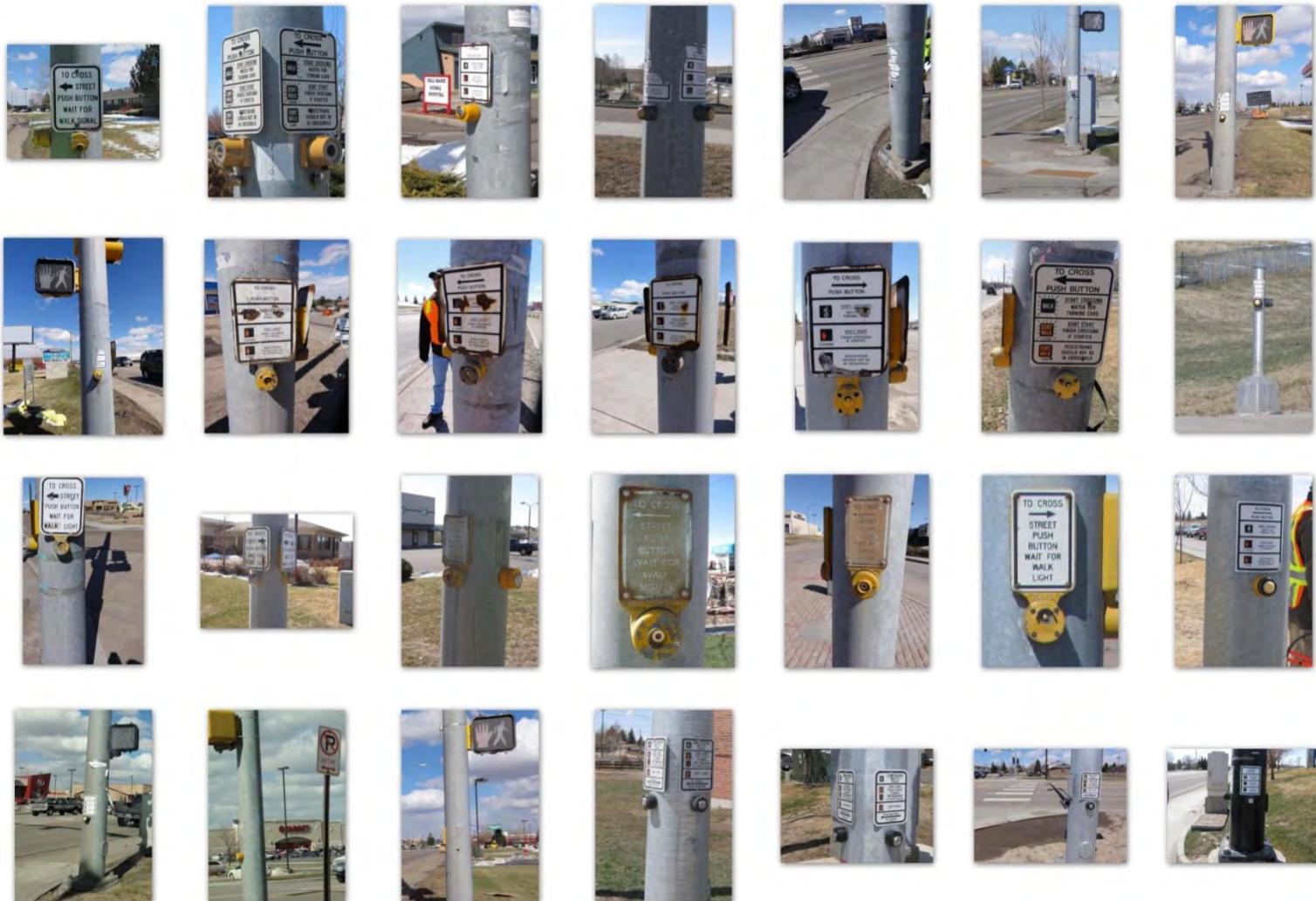


Exhibit 10 Example of Pedestrian Signal Equipment Variation along Dell Range Boulevard Corridor



Description of Safety Issue:

The newer signals at Moran Avenue and Ridge Road have countdown signals on all approaches. The other signalized intersections have the older style pedestrian signal indications without countdown (See Exhibit 10. The RSA team also noted many of the pedestrian push button detectors and the pedestrian actuation signs are aged and some are not legible.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Upgrade the other signalized intersections with countdown pedestrian signals and upgrade the pedestrian push button detectors and pedestrian actuation signs for all signalized crosswalks as part of the overall corridor improvement project.

Issue: Pedestrian Walk Times

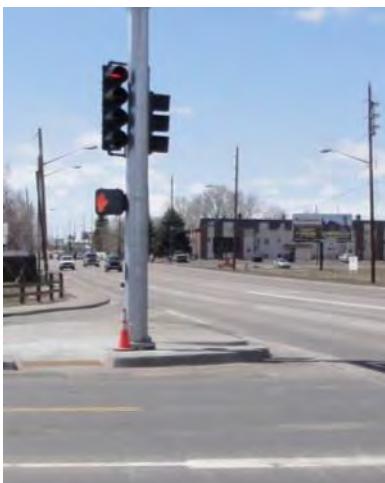


Exhibit 11 **Pedestrian Signal**

Description of Safety Issue:

The RSA team measured the Walk signal time to typically be 5 seconds and the Flashing Do Not Walk signal time to be 12 seconds for crossing Dell Range Boulevard. This roadway is typically 60 feet wide. The 2009 MUTCD (Section 4E.06) notes the pedestrian Flashing Do Not Walk time should be established "at a walking speed of 3.5 feet per second to at least the far side of the traveled way." This would require approximately 17 seconds of Flashing Do Not Walk time. The 2009 MUTCD also notes the Walk interval time should be a minimum of 7 seconds.



Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Consider increasing the Flashing Do Not Walk time for the Dell Range Boulevard crosswalks to provide for a 3.5 feet per second walking speed and the Walk interval time to be a minimum of 7 seconds. This could be done as part of an overall corridor retiming project done with the previous speed limit reduction consideration.

Issue: Accessible Pedestrian Facilities



Exhibit 12 Pedestrian Push Button in NE Corner of Dell Range/Converse Intersection

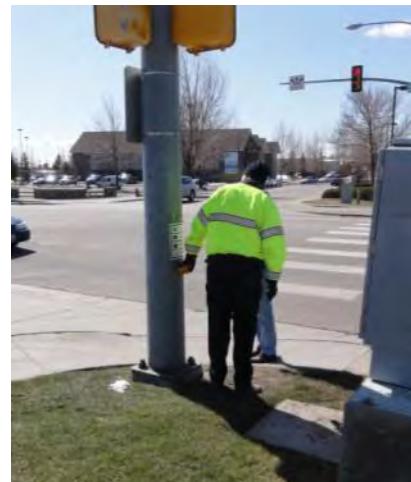


Exhibit 13 Pedestrian Push Button in NW Corner of Dell Range/Rue Terre Intersection

Description of Safety Issue:

Multiple design elements do not meet ADA requirements. Observed design elements that do not meet ADA requirements include:

- Clear width of pedestrian ramps and sidewalks less than 4 feet in many locations. Width limited by signal poles or other obstructions located in pedestrian path
- Slope of pedestrian ramps exceed maximum of 8.3 percent
- Cross-slope of sidewalk exceeds 2 percent at driveways
- Lack of truncated domes or tactile surface on pedestrian ramps
- Pedestrian ramps not aligned with crosswalk
- Inaccessible pedestrian push button locations (i.e. back of signal pole, or hard surface not provided up to base of button)



Function	Classification	Reasoning
Exposure	Category I	
Probability	Category II	Issues noted frequently throughout corridor
Consequence	Category III	Vulnerable user
<i>Overall</i>	<i>Category II</i>	-

Suggestion for Improvement:

As part of other improvements to the overall corridor, pedestrian facilities can be updated to meet ADA requirements.

Dell Range Boulevard/Powderhouse Road

Issue: Southbound Channelization Sign – Poor Retro-Reflectivity



**Exhibit 14 Southbound Approach at
Powderhouse Road/Dell Range
Boulevard Intersection**

Description of Safety Issue:

The post-mounted channelization sign has poor retro-reflectivity and is difficult to see at night.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Replace sign.



Issue: SB Right Turn Lane



Exhibit 15 Southbound Right-Turn Lane at Dell Range Boulevard/Powderhouse Road

Description of Safety Issue:

The southbound right turn to westbound Dell Range Boulevard has a separate lane with a large radius to enter Dell Range Boulevard. There is no acceleration lane or taper at Dell Range Boulevard. This turning movement is currently controlled by a yield sign. The right-turn volumes are relatively low being highest in the PM peak at 77 vehicles per hour (VPH). The corresponding through movement is also low at 54 VPH. There is no crash history for this movement.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Consider combining the right turn and through movements to make the right turn movement to be under signal control and eliminate the merge. This would remove the free right turn movement and island.

Powderhouse Road to Stillwater Avenue (W)

No issues identified.



Dell Range Boulevard/Stillwater Avenue (W)

Issue: Narrow Sidewalk Width in SE Corner



Exhibit 16 Sidewalk in SE Corner of Intersection

Description of Safety Issue:

Sidewalk width in SE corner is less than 4 feet.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category II	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Widen sidewalk to provide minimum clear width of 4 feet.

**Issue: Signal Pole Located in Pedestrian Path****Exhibit 17 Pedestrian Path in Northeast Corner of Dell Range/Stillwater Avenue Intersection****Description of Safety Issue:**

Existing pedestrian path through the splitter island in the northeast corner of the intersection is limited to 3.5 feet width due to signal pole obstruction.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category II	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Realign concrete curb to provide minimum clear width of 4 feet.



Issue: No Pedestrian Crossing on West Leg

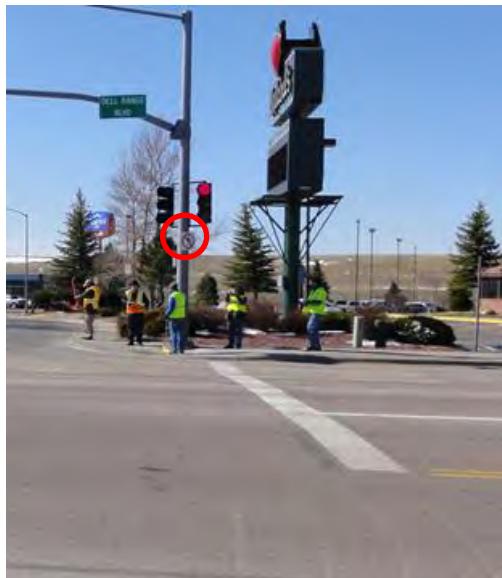


Exhibit 18 Looking South on West Leg of Intersection

Description of Safety Issue:

Pedestrian crossing prohibited with signage and no crosswalk provided on west leg of intersection.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category II	
Consequence	Category II	
<i>Overall</i>	<i>Category II</i>	-

Suggestion for Improvement:

- Stripe crosswalk on west leg
- Install pedestrian signal heads and pedestrian push buttons in NW and SW corners of intersection.

**Issue: Inaccessible Pedestrian Push Button****Exhibit 19 Existing Pedestrian Push Button in SE Corner of Intersection****Description of Safety Issue:**

Push button in SE corner is located behind curb on a soft surface. The current location does not meet ADA Guidelines.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category II	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Provide hard surface access to the pedestrian push buttons, extend the push button off the existing pole or relocate the push buttons to a separate pole having hard surface access.



Issue: Cracked Sidewalk in SW Corner



Exhibit 20 **Cracked Sidewalk in SW Corner**
Looking South



Exhibit 21 **Cracked Sidewalk in SW Corner**
Looking North

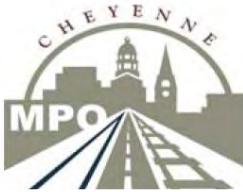
Description of Safety Issue:

The concrete sidewalk in the southwest corner of the intersection is cracked due to trucks making a right turn not having adequate curb radius and tracking across the sidewalk. The cracked sidewalk makes it difficult for a person in a wheelchair to traverse.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

In the short term, replace this section of concrete sidewalk. In the long term, enhance the curb radius to accommodate the typical truck using Stillwater Avenue.



Stillwater Avenue (W) to Driftwood Drive

Issue: Cracked Sidewalk



Exhibit 22 **Cracked Asphalt Sidewalk – South Side**



Exhibit 23 **Pot Hole in Asphalt Sidewalk**

Description of Safety Issue:

Asphalt sidewalk has pot hole and cracking allowing for water to pond. Similar conditions were seen in two other locations in this segment. This can make it difficult for wheelchair and visually impaired persons to traverse.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Replace these sections of the sidewalk.



Dell Range Boulevard/Driftwood Drive

Issue: Intersection Volume May Not Warrant Signal

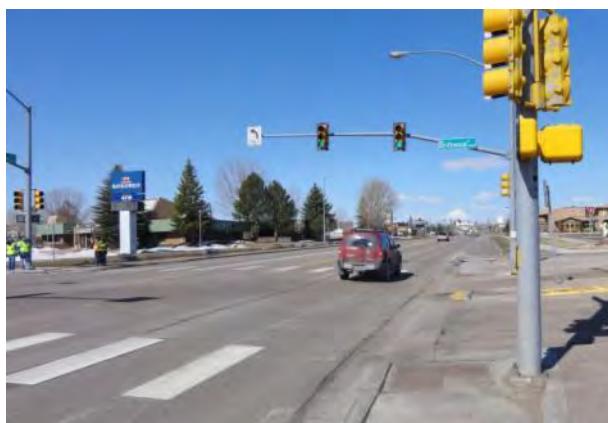


Exhibit 24 **Looking West from the Northeast Corner at Driftwood**

Description of Safety Issue:

The volume counts for the north-south approaches are generally less than 100 VPH for the five hours counted. These volumes may not meet signal warrants. The removal of the signal may reduce potential for rear-end crashes on east-west approaches.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Conduct signal warrant study to determine if the signal should be removed.

**Issue: No Overhead Signal for NB Approach****Exhibit 25 Looking North from Northbound Approach****Description of Safety Issue:**

The northbound approach has two side mounted signals, but no overhead signal. Table 4D-1 of the MUTCD requires a minimum of one overhead signal where there is through traffic.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Add an overhead signal face for the NB approach



Issue: Pedestrian Push Buttons Accessibility



Exhibit 26 Pedestrian Push Button in SE Corner of Intersection

Description of Safety Issue:

The pedestrian push buttons are on the mast arm support pole located in the SE corner behind a curb with a grassy strip. There is no hard surface access to the push button.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Provide hard surface access to the pedestrian push buttons, extend the push button off the existing pole or relocate the push buttons to a separate pole having hard surface access.



Issue: Sidewalk Width in SW Corner



Exhibit 27 **Sidewalk Between Signal Pole and Curb**



Exhibit 28 **Intersection SW Corner**

Description of Safety Issue:

The sidewalk width is reduced to less than 4-ft for the short section between the signal pole and the curb at the back of sidewalk. This minimum should be 4-ft for traversing by a wheelchair.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Widen sidewalk.



Issue: Sidewalk Width in SE and NE Corners



Exhibit 29 Sidewalk in SE Corner



Exhibit 30 Sidewalk in NE Corner

Description of Safety Issue:

Sidewalk width is 3'-6" from back of curb to the face of the curb at the back of sidewalk. This minimum should be 4-ft for traversing by a wheelchair.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Widen sidewalk.

Driftwood Drive to Frontier Mall Drive

No Issues Identified.



Dell Range Boulevard/Frontier Mall Drive

Issue: Sidewalk Width Near Signal Pole – SW Corner



Exhibit 31 **Sidewalk Width Near Signal Pole
is 3'-6"**



Exhibit 32 **Sidewalk Width Near Signal Pole
is 3'-6"**

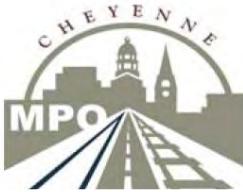
Description of Safety Issue:

Sidewalk width is 3'-6" from back of curb to the face of the signal pole foundation. This minimum should be 4-ft for traversing by a wheelchair.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

When intersection is reconstructed, relocate signal pole to provide proper sidewalk width.



Issue: Dirt Blocking Sidewalk



Exhibit 33 **Dirt Blocking Sidewalk – SW Corner**

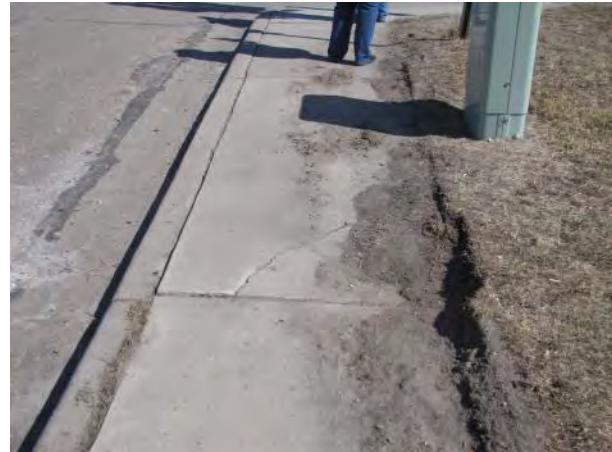


Exhibit 34 **Dirt Blocking Sidewalk – SW Corner**

Description of Safety Issue:

Dirt has spilled into the sidewalk reducing the effective width to less than 4-ft and creating a potential tripping hazard for pedestrians.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Coordinate with the adjacent property owner to remove the dirt. Consider options with property owner to place a curb at the back of sidewalk to keep this from being continual maintenance problem.



Issue: Accessible Ramp Slopes



Exhibit 35 **Slope of Pedestrian Ramp in SW Corner**



Exhibit 36 **Slope of Pedestrian Ramp in SW Corner**

Description of Safety Issue:

The pedestrian ramp in the southwest corner has slopes measuring between 8% and 12%. It also does not have detectable warning devices/truncated domes.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Upgrade ramp to provide slopes less than 8.3% and detectable warning devices/truncated domes.



Issue: Westbound Right-Turn Lane Width

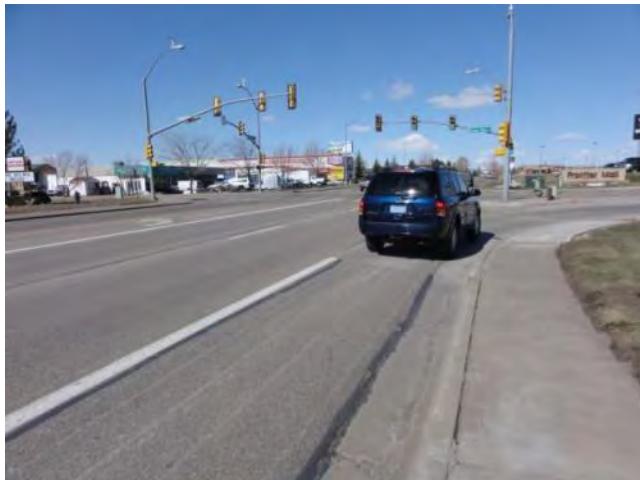


Exhibit 37 **Looking Westbound from North Sidewalk**



Exhibit 38 **Google Maps Aerial Photo of Westbound Right-Turn Lane**

Description of Safety Issue:

Westbound right-turn lane is less than 8 feet wide. The City's design standard is 12 feet lane width. Narrow lane width can accommodate passenger cars, but large trucks will not be able to stop in the lane without partially blocking the outside through lane.

The westbound right-turn volumes do not exceed 150 vehicles/hour in the midday or p.m. peak periods.



Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

In the short-term, consider striping diagonal markings that slant away from the flow of traffic in the narrow turn lane to indicate that the lane is not adequate to accommodate all sizes of turning vehicles. In the long-term, when redevelopment of adjacent parcel occurs, widen the turn lane to accommodate truck widths and turning paths, consistent with City design standards. See Section 3B.24 of the Manual on Uniform Traffic Control Devices for reference to the striping suggestion.

Frontier Mall Drive to Stillwater Avenue (E)

No issues identified.

Dell Range Boulevard/Stillwater Avenue (E)

Issue: Sidewalk Width and Slope – SW corner



Exhibit 39 Sidewalk in SW Corner



Exhibit 40 Sidewalk in SW Corner

Description of Safety Issue:

The sidewalk in the southwest corner is 3-ft wide at the accessible pedestrian ramp and slopes to the ramp measure to be 10%. Both the width and slope can make it difficult for a person in a wheelchair to traverse. It also does not have detectable warning devices/truncated domes.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-



Suggestion for Improvement:

Upgrade ramp to provide slopes less than 8.3%, a minimum of 4-ft width and detectable warning devices/truncated domes.

Issue: Accessible Pedestrian Ramp Sloped Toward ROW Line



Exhibit 41 Accessible Pedestrian Ramp in SW Corner



Exhibit 42 Accessible Pedestrian Ramp in SW Corner

Description of Safety Issue:

This ramp is nearly flat with a slight slope toward the right-of-way (ROW) line. There are two apparent issues with this ramp:

1. Drainage can pond on the sidewalk after a rainfall event blocking the sidewalk; and,
2. The flatness of the radius allows vehicles to travel over the sidewalk, as seen from the tire marks in the photos above. This poses a risk to pedestrians.

It also does not have detectable warning devices/truncated domes.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Upgrade ramp to provide appropriate slopes and detectable warning devices/truncated domes.



Stillwater Avenue (E) to Prairie Avenue/ Bluegrass Circle (W)

Issue: Water Ponding on Asphalt Sidewalk



Exhibit 43 South Asphalt Sidewalk



Exhibit 44 Water Ponding on Sidewalk

Description of Safety Issue:

Water was ponded in a depression in the sidewalk that is difficult for a visually impaired or disabled person to traverse or avoid.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Repair sidewalk to remove depression and drain to street.



Dell Range Boulevard/Prairie Avenue/ Bluegrass Circle (W)

Issue: Low Reflectivity on Southbound Approach Signage



Exhibit 45 **Southbound Approach – Channelization Sign between Signal Heads**



Exhibit 46 **Southbound Approach – Channelization Sign between Signal Heads**

Description of Safety Issue:

The lane channelization sign mounted to the mast arm between the signals has poor retro-reflectivity and is difficult to see at night. Further, the brilliance of the two LED signal heads makes the sign difficult to see at night.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Replace the sign with a ground-mounted sign in advance of the intersection.



Issue: Inaccessible Pedestrian Push Button



Exhibit 47 SW Corner – Pedestrian Push Buttons



Exhibit 48 SW Corner – Pedestrian Push Buttons

Description of Safety Issue:

The southwest corner pedestrian push buttons do not have hard surface accessibility. This could make it difficult for a physically impaired person to access.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Provide hard surface access to the pedestrian push buttons, extend the push button off the existing pole or relocate the push buttons to a separate pole having hard surface access.

**Issue: South Approach - Crosswalk**Exhibit 49 **Looking East from South Sidewalk**Exhibit 50 **Looking West from North Sidewalk****Description of Safety Issue:**

The north and south approaches provide pedestrian signals for crossing, but do not provide either a painted crosswalk for pedestrians or a stop bar to guide vehicles to stop.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Add pedestrian crosswalk pavement markings.

Prairie Avenue/ Bluegrass Circle (W) to Rue Terre

No Issues Noted.



Dell Range Boulevard/Rue Terre

Issue: Offset Intersection



Exhibit 51 Looking North from Northbound Approach

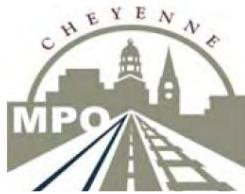
Description of Safety Issue:

Northbound approach aligns with drainage ditch on north side of Dell Range Boulevard. No guidance to avoid signal pole and ditch.

Function	Classification	Reasoning
Exposure	Category II	Moderate volume on approach
Probability	Category I	
Consequence	Category II	Head-on or off-road crash potential
<i>Overall</i>	<i>Category II</i>	-

Suggestion for Improvement:

A short term suggestion is to mount sign "Keep Right" on signal pole or separate post in north approach median facing northbound through lane approach. A longer term suggestion is to redesign the intersection's southbound approach by narrowing the median to better align with the northbound approach.



Issue: Railing Bent by Truck



Exhibit 52 North Sidewalk Looking West

Description of Safety Issue:

Southbound left-turn vehicle snagged railing and bent it into the sidewalk. It is ineffective in shielding pedestrians from the drop-off to the north.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Replace or repair railing. As noted in the previous issue, a longer term solution would be to narrow the median. Doing so would require the median drainage be accommodated in another manner eliminating the need for the railing.



Issue: Missing Crosswalk on East Leg



Exhibit 53 **Looking North from SE Corner**

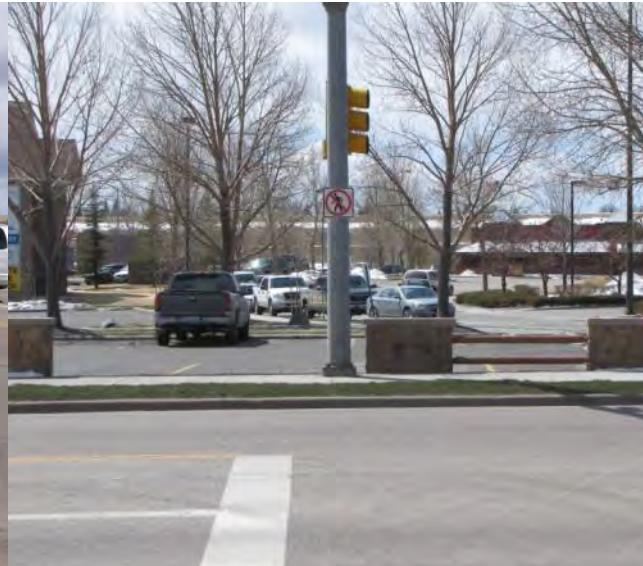


Exhibit 54 **Looking South from NE Corner**

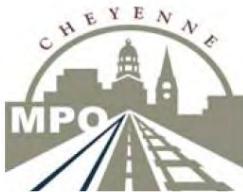
Description of Safety Issue:

Pedestrian crossing prohibited with signage and no crosswalk provided on east leg of intersection.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category II	Users not likely to travel out of direction to use crosswalk
Consequence	Category II	Vulnerable users
<i>Overall</i>	<i>Category II</i>	-

Suggestion for Improvement:

- Stripe crosswalk on east leg
- Install pedestrian signal heads and pedestrian push buttons in NE and SE corners of intersection.

**Issue: Inaccessible Pedestrian Push Button****Exhibit 55 NW Corner – Pedestrian Push Button Accessibility****Description of Safety Issue:**

The northwest corner pedestrian push buttons do not have hard surface accessibility. This could make it difficult for a physically impaired person to access.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Provide hard surface access to the pedestrian push buttons, extend the push button off the existing pole or relocate the push buttons to a separate pole having hard surface access.

**Issue: Poor Sign Retro-Reflectivity****Exhibit 56 Low Reflectivity of Channelization Sign Mounted to Mast Arm Signal Pole****Description of Safety Issue:**

The channelization sign has minimal retro-reflectivity.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Replace sign.



Rue Terre to Bluegrass Circle (E)/Fire Station

Issue: Enbankment narrows sidewalk



Exhibit 57 North Side Looking East



Exhibit 58 At EB Right Turn Lane Taper to Rue Terre

Description of Safety Issue:

The embankment of the adjacent property is encroaching onto the sidewalk narrowing the traversable width to be less than 4-ft. This can make it difficult for persons in wheelchairs to traverse.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Have maintenance crews remove grass and dirt from the sidewalk. Due to the slope of the embankment, a toe wall or curbing may be needed at the back of sidewalk to prevent continual maintenance.



Issue: Sidewalk/Driveway Surface Condition



Exhibit 59 Driveway/Sidewalk north side



Exhibit 60 Driveway/Sidewalk west of Fire Station

Description of Safety Issue:

The driveway serving a dirt road to the north and behind the fire station also serves as a sidewalk. This driveway/sidewalk has become cracked and is ponding water. The joints have become uneven. Crossing this area as a pedestrian could be difficult especially if in a wheelchair.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Repair cracked concrete driveway/sidewalk. Consider extending driveway paving to the north to minimize the dirt getting onto the sidewalk.



Dell Range Boulevard/Bluegrass Circle (E)

Issue: Sidewalk curb lip to Fire Station driveway



Exhibit 61 Northwest Side of Fire Station Driveway

Description of Safety Issue:

The sidewalk terminates into the Fire Station driveway with a curb having an approximate 1" lip between the sidewalk and the driveway. This can be difficult for a person in a wheelchair to traverse.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Remove the lip in the curb between the sidewalk and the driveway.

Bluegrass Circle (E) to Walmart

No issues



Dell Range Boulevard/Walmart Access

Issue: Inaccessible Pedestrian Ramp



Exhibit 62 Northwest Corner Pedestrian Ramps



Exhibit 63 Northwest Corner Pedestrian Ramps

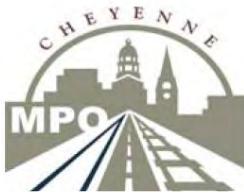
Description of Safety Issue:

The handicapped ramps have a curb between the roadway and the ramp. There is an approximate one inch lip between the back of curb and the ramp. This can be difficult for a person in a wheelchair to traverse. Further, some slopes to the handicapped ramp measured 10 percent exceeding the maximum of 8.3 percent. This pedestrian ramp also does not have detectable warning devices/truncated domes.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Upgrade ramp to remove the lip between the ramp and curb, provide slopes not exceeding the 8.3% maximum and provide detectable warning devices/truncated domes.



Issue: STOP Pavement Markings SB Approach



Exhibit 64 Looking South from North Approach

Description of Safety Issue:

The three lanes of the SB approach all have STOP pavement markings. These conflict with the signal indications and should be removed.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Remove STOP pavement markings.

**Issue: Crosswalk on South Leg****Exhibit 65 Looking West from SE Corner of Intersection****Description of Safety Issue:**

No crosswalk striping provided on south leg.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Stripe crosswalk for east-west crossing of the south leg of intersection.

Walmart Access to Grandview Avenue

No issues



Dell Range Boulevard/Grandview Avenue

Issue: Wal-Mart Westbound Queue Blocks Intersection



Exhibit 66 Google Earth Aerial of Grandview Avenue Area

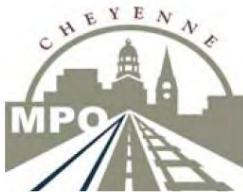
Description of Safety Issue:

Grandview Avenue is a full, unsignalized intersection approximately 400 feet east of the signalized Wal-Mart entrance. It is also served by Mason Way to the north having access to the Wal-Mart entrance to the west and Converse Avenue to the east. The full access to and from this intersection is frequently blocked by queuing traffic at the Wal-Mart intersection during the mid-day and PM peak hour. Crash data shows eight SB LT crashes with WB vehicles.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Limit access at this intersection to right-in and right-out.



Grandview Avenue to Converse Avenue

Issue: North Side Sidewalk Drop-Off



Exhibit 67 North side – sidewalk drop-off at
box culvert – west of culvert



Exhibit 68 North side – sidewalk drop-off at
box culvert – east of culvert

Description of Safety Issue:

The sidewalk is protected from a drop-off in the immediate area of the box culvert by a chain link fence. However erosion of the soil has extended beyond the east and west limits of the fence. There is an unprotected drop-off of 4" to 6". Further, the fence has started to pull away from the posts.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
Overall	Category I	-

Suggestion for Improvement:

Extend the limits of the fence and repair fence.



Dell Range Boulevard/Converse Avenue

Issue: East-West Left Turn Crashes



Exhibit 69 **Eastbound Left-turn Vehicle**

Exhibit 70 **Crash Diagram for 2010-2011**

Description of Safety Issue:

There have been 39 left turn crashes with 20 being injury crashes over the past five years. A majority of these crashes have been for the WB LT – 27 crashes. The WB LT movement is the higher volume of the two. Further, EB traffic has a good opportunity to be at or higher than the 40 MPH speed limit with no side friction in the EB direction. Both movements have the flashing yellow initially followed by a protected green turn signal. The protected green turn time is 15 seconds.

Function	Classification	Reasoning
Exposure	Category III	Highest volume intersection in Wyoming
Probability	Category III	High proportion of left-turn crashes in last 4 years
Consequence	Category II	Moderate to severe crashes have occurred
Overall	<i>Category III</i>	-

Suggestion for Improvement:

Consider making the EB and WB left turn movements protected only.



Issue: Angle crashes at intersection



Exhibit 71 Looking North from South Leg of Intersection

Description of Safety Issue:

The southbound movement has had 13 angle crashes over the past five years. This movement is the lag part of a lead/lag signal operation. The all-red clearance interval at this intersection is 1 second for all movements.

Function	Classification	Reasoning
Exposure	Category III	Highest volume intersection in Wyoming
Probability	Category III	High proportion of angle crashes in last 4 years
Consequence	Category II	Moderate to severe crashes have occurred
<i>Overall</i>	<i>Category III</i>	-

Suggestion for Improvement:

Consider increasing the all red time to 2 seconds for all movements.



Issue: North approach crosswalk



Exhibit 72 Looking at North Crosswalk from NE Corner

Description of Safety Issue:

The crosswalk on the north approach no longer has any pavement markings.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Repaint crosswalk.



Issue: Pedestrian Signal Not Operative



Exhibit 73 Signal Pole in NE Corner

Description of Safety Issue:

The pedestrian signal in the NE corner is not operative.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Repair

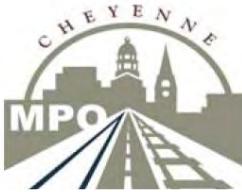
**Issue: Corner Turn Radii – NE and NW corners****Exhibit 74 Looking East at Intersection from NW Corner****Description of Safety Issue:**

Turn radius in the NE corner of the intersection is small, prompting trucks to use the through lane to make the westbound right-turn movement. The US Postal Service and other businesses to the north induce heavy truck traffic at this intersection.

Function	Classification	Reasoning
Exposure	Category 1	
Probability	Category 1	
Consequence	Category 1	
<i>Overall</i>	<i>Category 1</i>	-

Suggestion for Improvement:

Enhance the turn radius of the NE corner.



Issue: Northwest Corner Pedestrian Ramp Slopes



Exhibit 75 Northwest Corner Pedestrian Ramp

Exhibit 76 Northwest Corner Pedestrian Ramp

Description of Safety Issue:

The northwest corner handicapped ramp has some slopes being 9 to 10 percent. These exceed the maximum of 8.3% for a disabled or elderly person to safely traverse. It also does not have detectable warning devices/truncated domes.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Upgrade pedestrian ramp to provide slopes of 8.3% or less and provide detectable warning devices/truncated domes for all users.

Converse Avenue to Mountain Road

No issues identified.



Dell Range Boulevard/Mountain Road

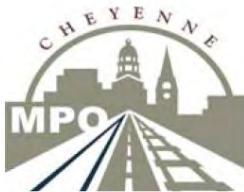
Issue: Left-Turn Movements at Mountain Road



Exhibit 77 General Area around Mountain Road

Description of Safety Issue:

Mountain Road has full, unsignalized access to Dell Range Boulevard. The RSA team observed westbound traffic queuing from Converse Avenue to east of Mountain Road in the mid-afternoon. The approximate 625-foot spacing between intersections also limits the deceleration and queue storage for the westbound left turn to Converse Avenue. This intersection has had a fatal crash involving an eastbound left-turn vehicle and three other injury crashes involving left-turns to/from Mountain Road. Left turns from Mountain Road to eastbound Dell Range Boulevard frequently required a two stage movement into the center two-way left-turn lane. As shown in Exhibit 77, there are alternatives in the existing street network for traffic to use to access Mountain Road, including Converse Ave or Windmill Road.



Function	Classification	Reasoning
Exposure	Category II	Daily queues from Converse Ave past Mountain Road.
Probability	Category I	Low frequency relative to other intersections
Consequence	Category II	One fatal crash at this location.
<i>Overall</i>	<i>Category II</i>	-

Suggestion for Improvement:

Consider making access to Mountain Road to be right-in and right-out.

Mountain Road to Windmill Road

No issues identified.

Dell Range Boulevard/Windmill Road

Issue: Signal Pole Located in Pedestrian Path



Exhibit 78 Signal Pole in NW Corner of Intersection

Description of Safety Issue:

The signal pole and foundation intrudes into the sidewalk. The distance from the back of curb to the foundation is 3-ft. This limits the ability of a person in a wheelchair to traverse this area.



Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

When the intersection is reconstructed, relocate the signal pole to provide a minimum of 4-ft clearance from the back curb.

Issue: Pedestrian Push Button Inoperative

Description of Safety Issue:

Pedestrian push button in SW corner is inoperative.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Replace or repair.



Issue: No Crosswalk Striping on North Leg



Exhibit 79 North Leg of Intersection from NW Corner

Description of Safety Issue:

No striping where pedestrian signals exist on north leg of intersection.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Stripe Crosswalk



Windmill Road to Moran Avenue

Issue: Curb Higher than Sidewalk



Exhibit 80 North Side Sidewalk

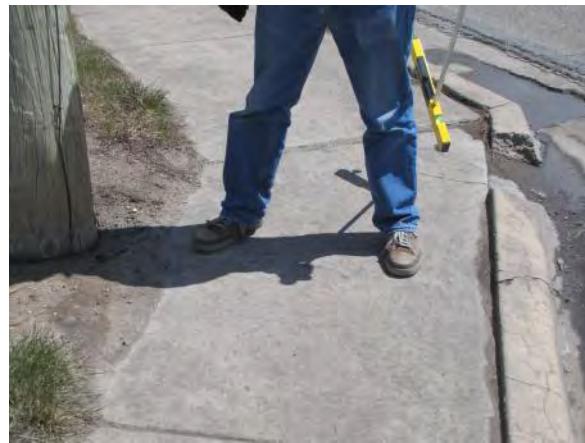


Exhibit 81 North Side Sidewalk

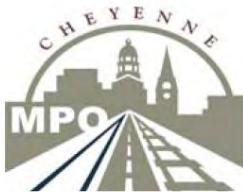
Description of Safety Issue:

The sidewalk in front of the “New Concept – Optical & Eyecare” has the curb higher than the sidewalk. In some locations, this separation was over 1”. This can cause pedestrians to trip.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Repair sidewalk to match back of curb.



Dell Range Boulevard/Moran Avenue

Issue: Inaccessible Push Button



Exhibit 82 **Inaccessible Pedestrian Push Button in NW Corner – Looking East**



Exhibit 83 **Inaccessible Pedestrian Push Button in NW Corner – Looking West**

Description of Safety Issue:

Push button in northwest corner is located approximately 20 feet from pedestrian ramp for east-west crossing on north leg of intersection.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Relocate pedestrian push button to a location within 10 feet of the pedestrian ramp and mount in a location accessible to all users.

**Issue: Sidewalk Width Limited to 3 feet****Exhibit 84 Fire Hydrant Limiting Clear Sidewalk Width****Description of Safety Issue:**

Sidewalk in northwest corner is 3 feet wide where fire hydrant limits width.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Relocate fire hydrant or construct sidewalk around the back side of the hydrant to provide a pathway with 4-foot clear width.



Issue: Cross Slope of Moran Avenue



Exhibit 85 Looking East from NW Corner at Moran Avenue

Description of Safety Issue:

On north leg of intersection, the pedestrian crossing of Moran Avenue has a cross-slope that exceeds ADA guideline of 2 percent.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Reconstruct Moran Avenue approach to provide 2 percent or less cross-slope within pedestrian crossing.



Moran Avenue to Hilltop Avenue/Friendship Circle

Issue: Cross Slope at Public Streets



Exhibit 86 **Looking East at Driveway Cross-Slope at Greybull Avenue**



Exhibit 87 **Looking West at Driveway Cross-Slope at Sagebrush Avenue**

Description of Safety Issue:

On north side of Dell Range Boulevard, the crossings at Greybull Avenue and Sagebrush Avenue have cross-slopes exceeding ADA guideline of 2 percent.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Reconstruct sidewalk to reduce cross slope to less than 2 percent.



Dell Range Boulevard/Hilltop Avenue/Friendship Circle

Issue: No Pavement Markings on Southbound Approach



Exhibit 88 Hilltop Avenue looking south



Exhibit 89 Looking east at Hilltop Avenue north approach

Description of Safety Issue:

There are no visible pavement markings at the Hilltop Avenue north approach at night. The pavement is approximately 55-ft wide with parking allowed on both sides. It is difficult to determine proper lane alignment at night.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Provide pavement markings for the north approach.



Issue: No Left Turn Sign Not Effective



Exhibit 90 Looking Northbound at Friendship Circle

Description of Safety Issue:

Drivers were observed making a northbound left-turn from Friendship Circle although a “No Left-turn” sign is posted below the stop sign.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Consider a raised median or increase law enforcement of the turn restriction.



Hilltop Avenue to Darnell Place

Issue: Low Reflectivity Speed Limit Signs



Exhibit 91 Speed Limit sign



Exhibit 92 Panel to change speed limit

Description of Safety Issue:

Several speed limit signs on Dell Range Boulevard in the westbound direction between Greybull Avenue and Ridge Road have panels riveted for the "40" on the sign. These panels have poor retro-reflectivity.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

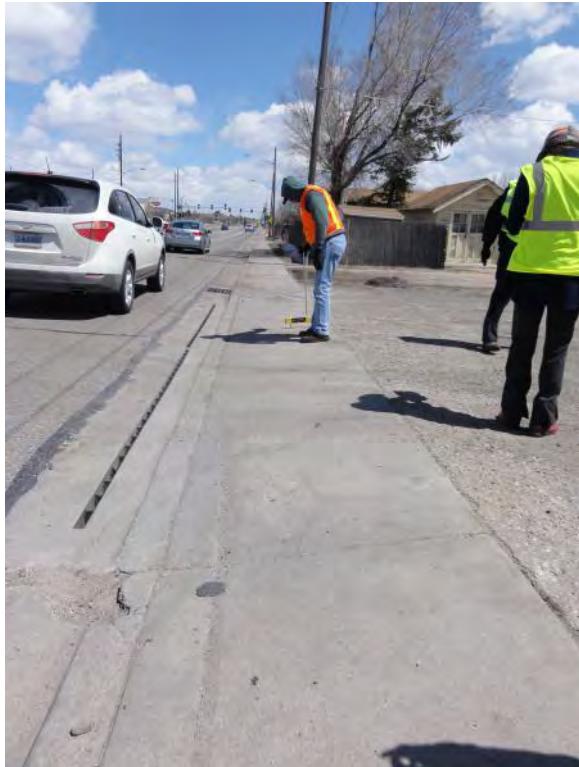
Replace signs

Dell Range Boulevard/Darnell Place

No issues identified.



Darnell Place to Ridge Road

Issue: Sidewalk Cross-Slope**Exhibit 93 Sidewalk Slope on South Side of Dell Range Boulevard****Description of Safety Issue:**

Multiple driveways with cross-slope of greater than 2 percent on south side of Dell Range Boulevard, exceeding ADA guidelines.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Reconstruct sidewalk through driveways.



Issue: Dry Creek Box Culvert



Exhibit 94 **North Side Box Culvert**

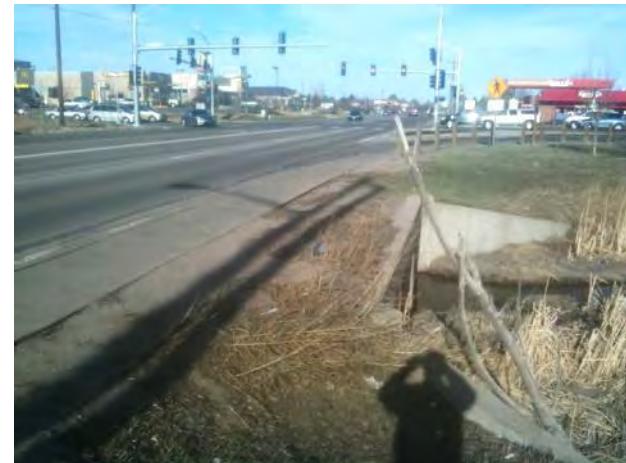


Exhibit 95 **South Side Box Culvert**

Description of Safety Issue:

The edge of the box culvert has an approximate 5 ft drop off and is not protected on the north or south sides of Dell Range Boulevard. It sits 7 and 8 feet from the back of sidewalk on the north and south sides of the road, respectively.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category III	Fall into creek
<i>Overall</i>	<i>Category II</i>	-

Suggestion for Improvement:

Consider adding a pedestrian rail or guardrail on the top of the box culvert.



Dell Range Boulevard/Ridge Road

Issue: No Crosswalks on North and South Approaches



Exhibit 96 Looking West at South Approach

Description of Safety Issue:

No crosswalks are striped on north and south approaches.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Stripe Crosswalk

Issue: Short Clearance Intervals

Description of Safety Issue:

North and south approach signal phases have 3 seconds of yellow time.



Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Consider extending yellow time for all movements.

Issue: Southbound Right Turn Only sign



Exhibit 97 Southbound Ridge Road at Dell Range Blvd

Description of Safety Issue:

Sign has poor retro-reflectivity.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Replace sign.



Ridge Road to Marble Avenue

Issue: Sidewalk Cross-Slope



Exhibit 98 Sidewalk Slope on South Side of Dell Range Boulevard

Description of Safety Issue:

Multiple driveways on south side of Dell Range Boulevard have the sidewalk as part of the driveway with a cross-slope of greater than 2 percent exceeding ADA guidelines.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Reconstruct sidewalk through driveways.



Dell Range Boulevard/Marble Avenue

Issue: Extended RT lane from King Soopers Entrance to McDonalds Entrance



Exhibit 99 Looking East at McDonalds Entrance

Description of Safety Issue:

The right turn lane beginning to the east of the King Soopers entrance ending at the McDonalds entrance is approximately 700 feet. There are no pavement markings or signage indicating this lane to be right turn only.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Provide pavement markings and signage indicating a right-turn only lane for westbound traffic.



Marble Avenue to College Drive

Issue: Queue Conflicts at Boysen Avenue



Exhibit 100 Dell Range Boulevard from Marble Avenue to College Drive

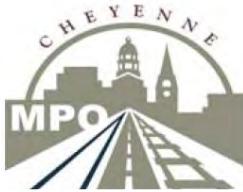
Description of Safety Issue:

Dell Range Boulevard at College Drive drops and adds a lane in the eastbound and westbound directions respectively. In the PM peak hour, the RSA team observed the eastbound queue at College Avenue to back through the Marble Avenue signal a distance of approximately 725 ft. The queue blocks the full, unsignalized intersection of Boysen Avenue. The residential subdivision has access to Dell Range Boulevard at both Boysen Avenue and the signal at Marble Avenue.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Consider changing the access to Boysen Avenue to be right-in and right-out.



Dell Range Boulevard/College Drive

Issue: Northbound Left-turn Capacity



Exhibit 101 Looking South at Northbound Left-turn Lane Queue

Description of Safety Issue:

16 of 26 angle crashes from 2007 through 2011 involved northbound left-turn vehicles. During the weekday p.m. peak hour, the northbound left-turn volume is the second highest volume movement (highest volume is eastbound through). During peak periods this movement queues for several hundred feet. When long queues persist, drivers are more likely to traverse intersection on yellow or run the red.

Function	Classification	Reasoning
Exposure	Category III	Second highest movement at intersection
Probability	Category II	Queues regularly back >300 feet
Consequence	Category II	Angle or turning crash potential
<i>Overall</i>	<i>Category II</i>	-

Suggestion for Improvement:

Provide more green time for northbound left-turn or construct dual left-turn lanes.



Issue: Pedestrian Signal Push Button Inoperative



Exhibit 102 Looking North on West Leg

Description of Safety Issue:

Pedestrian signal pushbuttons in SW and NW corners do not activate the pedestrian crossing phase for the west leg.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Repair or replace pedestrian signal pushbuttons in SW and NW corners of intersection.

**Issue: Curb Radius Too Small****Exhibit 103 Curb in SE Corner****Description of Safety Issue:**

Northbound right-turning trucks have tracked over the curb in the SE corner of the intersection and curb is in disrepair.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Reconstruct SE corner curb and increase curb radius.

**Issue: Westbound Lane Striping Missing****Exhibit 104 Looking West Toward College Drive****Description of Safety Issue:**

Lane striping is worn and not visible between lanes on westbound approach.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Restripe lane lines on east approach.



PRAIRIE AVENUE CORRIDOR: POWDERHOUSE ROAD TO DELL RANGE BOULEVARD

Prairie Avenue – Entire Corridor

Issue: Excess Pavement Width



Exhibit 105 West of Frontier Mall Drive
Looking East



Exhibit 106 Eastbound Lanes Looking East
Near Frontier Mall Entrance
(West)

Description of Safety Issue:

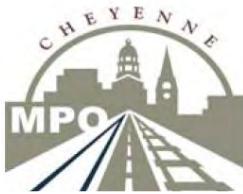
Wide shoulders are confused for travel lanes, particularly when turning right from a minor street onto Prairie Avenue. Near Frontier Mall Drive the full width of asphalt pavement is 103 feet.

Excess travel lane and shoulder width increases crossing time for minor-street vehicles turning onto or crossing Prairie Avenue. Increased crossing time requires increased minor-street approach stopping sight distance.

Function	Classification	Reasoning
Exposure	Category II	Moderate volume
Probability	Category I	
Consequence	Category II	Low for autos, high for pedestrians and bikes
Overall	Category II	-

Suggestion for Improvement:

- Restripe corridor to include buffered bike lanes, as part of a corridor-wide bike connectivity plan.
- If feasible, implement road diet to reduce curb-to-curb width in widest segments.
- Provide striping channelization in open areas of shoulder to direct vehicles into travel lane.



Issue: Curb Higher Than Sidewalk



Exhibit 107 South Side of Prairie Ave West of Transit Stop



Exhibit 108 South Side of Prairie Ave East of Lowes Access

Description of Safety Issue:

There are multiple locations along the corridor where the curb is higher than the sidewalk by as much as 1" to 2". This can create a tripping situation for persons stepping off the curb.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

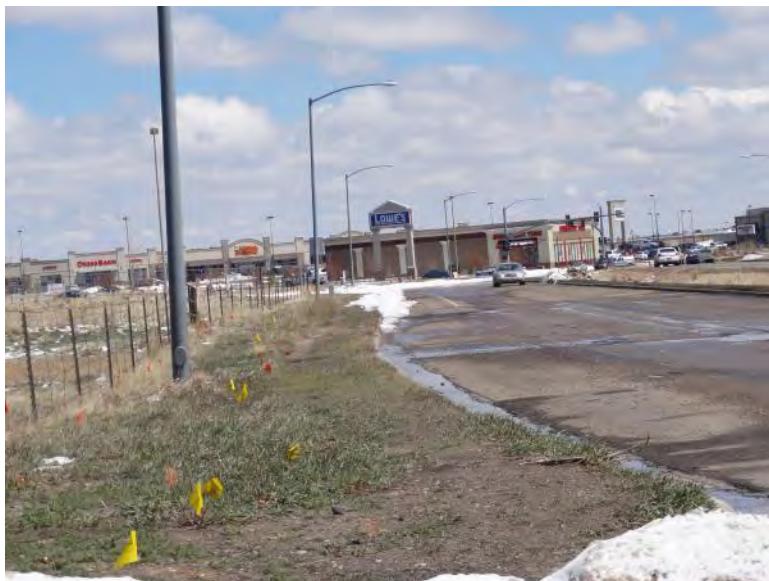
As part of other improvements along the corridor, raise the sidewalk to the elevation to match the back of curb.

Prairie Avenue/Powderhouse Road

No issues identified.



Powderhouse Road to Lowes Access

Issue: Missing Sidewalk Segment**Exhibit 109 Looking East on North Side of Prairie Avenue****Description of Safety Issue:**

No sidewalk is provided on the north side of Prairie Avenue between the Lowes access west to the Point Frontier development.

Function	Classification	Reasoning
Exposure	Category I	Sidewalk provided on south side
Probability	Category I	Requires pedestrians to cross Prairie to stay on sidewalk
Consequence	Category II	Vulnerable user
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

As these vacant parcels north and east of Prairie Avenue develop, construct sidewalk on north side of Prairie Avenue from Lowes access west to the Point Frontier development.



Issue: Pedestrian Access to Transit Stop



Exhibit 110 Worn pathway across median



Exhibit 111 Sidewalk and transit stop on south side of Prairie Avenue

Description of Safety Issue:

There is a transit stop on the south side of Prairie Avenue and apartments on the north side. There is an identified worn pedestrian foot path across the median of Prairie Avenue. There is not a handicapped ramp at the transit stop nor provisions for handicapped accessibility across the median.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Provide accessible pedestrian ramps with hard surface connections at the sidewalk and across the median.



Prairie Avenue/Lowes Access

Issue: Street Name Sign Missing



Exhibit 112 **Looking North from the South Approach at Lowes Access**

Description of Safety Issue:

Street name signs are not provided on signal mast arm to indicate Prairie Avenue for drivers on the north and south approaches.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Install street name signs on south and north approach signal mast arms, consistent with those provided at adjacent signalized intersections on Prairie Avenue.



Issue: Painted Crosswalk into Median



Exhibit 113 West Approach Crosswalk



Exhibit 114 Median at West Approach Crosswalk

Description of Safety Issue:

The west approach has a painted crosswalk crossing a raised median with 6" curb. There are no ramps or hard surface extending the crosswalk through the median. An elderly or disabled person would likely need to walk around the median nose when using the crosswalk.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

Provide accessible ramps with a connecting hard surface extending the crosswalk through the median.



Prairie Avenue/Frontier Mall Drive

Issue: Eastbound Lane Channelization



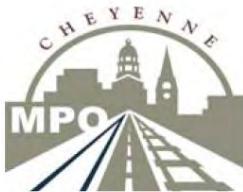
Exhibit 115 Eastbound Approach at Frontier Mall Drive



Exhibit 116 Google Maps Aerial Photo at the Frontier Mall Drive/Prairie Avenue Intersection

Description of Safety Issue:

Lane alignment at the Frontier Mall Drive intersection results in vehicle path conflicts when travelling at posted speed limit. Vehicles in the outside through travel lane on the eastbound approach may end up to the inside travel lane on the downstream side of the intersection.

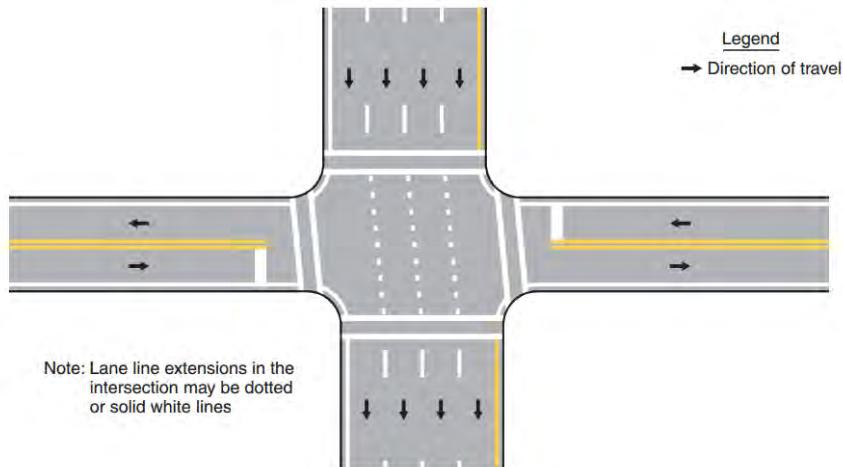


Southbound left-turn vehicles turning into the inside eastbound lane may conflict with eastbound through vehicles, even if eastbound through vehicles start in the outside lane upstream of the intersection. Potential for side-swipe or rear-end type crashes.

Function	Classification	Reasoning
Exposure	Category II	Moderate eastbound volume
Probability	Category II	9 of 11 crashes in study period are angle or left-turn crashes
Consequence	Category I	
<i>Overall</i>	<i>Category II</i>	-

Suggestion for Improvement:

In the near-term consider adding lane line extensions through the intersection (see Exhibit 117) and/or realigning eastbound approach to provide short tangent section aligning drivers into their respective lanes on the downstream side of intersection. In the long-term consider reconstructing median and curb to reinforce the approach alignment.



**Exhibit 117 Example of Lane Line Extensions through Intersection
(from MUTCD, Figure 3B-13)**

**Issue: Intersection geometry****Exhibit 118 Westbound Lanes at Frontier Mall Drive****Description of Safety Issue:**

Intersection skew and transition of cross-section from divided to undivided (see Exhibit 118) results in wide paved area and long crossing distance.

9 crashes out of 11 reported during the study period resulted in angle or left-turn crashes. Northbound and southbound left-turns require greater gaps in major street traffic due to wide roadway.

Major-street vehicles arrive randomly due to limited access control upstream.

Function	Classification	Reasoning
Exposure	Category I	Low turning volume
Probability	Category III	Every turning movement is negatively impacted by existing geometry
Consequence	Category II	Left-turn, angle crash types
<i>Overall</i>	<i>Category II</i>	-

Suggestion for Improvement:

Suggestions include improving intersection horizontal geometry (reduce skew), reducing roadway width to reduce crossing distance, and restriping east-west lane alignment through intersection.



Frontier Mall Drive to Dell Range Boulevard

Issue: Access Management



Exhibit 119 PETCO driveway – View to left
limited w/curve and parked
vehicles



Exhibit 120 Multiple driveways on Prairie Avenue north of Dell Range Blvd.

Description of Safety Issue:

Horizontal curvature and multiple access points within 800 feet from Dell Range Boulevard increase



potential for turning movement and rear-end crashes. Parking and horizontal curvature along the east side of PETCO limits sight distance for drivers attempting to exit the parking lot.

Function	Classification	Reasoning
Exposure	Category I	
Probability	Category I	
Consequence	Category I	
<i>Overall</i>	<i>Category I</i>	-

Suggestion for Improvement:

To address the issues identified above, consider one or more of the following:

- providing additional cross-parcel connections;
- closing or restricting turning movements at existing access points on west side of Prairie Avenue between Kmart access and Dell Range Boulevard;
- restricting Wendy's access to right-in-right-out, if new connection can be made to Kmart parking lot; and,
- if driveway access to PETCO is kept, consider not allowing parking immediately east of the store and north of the driveway (this involves six parking spaces).

SUMMARY OF RECOMMENDATIONS

A summary of issues and suggestions is provided in Table 2.

APPENDIX

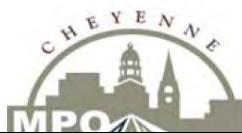
- A - Crash Diagrams
- B - Volume Data
- C - Crash Data

**Table 2** Summary of Issues and Suggestions

Issue	Location	Risk Classification	Suggestion
East-west connectivity north of Dell Range Boulevard	Entire Dell Range Boulevard Corridor	Category III	Provide additional east-west collector roadway connections within $\frac{1}{2}$ mile north of Dell Range Boulevard, from Powderhouse Road to Converse Avenue.
Existing median two-way left-turn lane	Entire Dell Range Boulevard Corridor	Category III	Consider changing the existing two-way left turn lane to provide raised median access control. Consider strategically located u-turn bulb outs at full or directional intersections.
East-west left-turn crashes	Dell Range Boulevard/Converse Avenue	Category III	Consider making the EB and WB left turn signalized movements protected only.
Angle crashes at intersection	Dell Range Boulevard/Converse Avenue	Category III	Consider increasing the all-red clearance interval to 2 seconds for all movements.
Travel speed	Entire Dell Range Boulevard Corridor	Category II	Conduct a speed study to document existing 85 th percentile travel speed. Reduce posted speed limit to 35 mph, if supported by speed study.
Red light running	Entire Dell Range Boulevard Corridor	Category II	Check yellow clearance intervals as compared to the WYDOT procedure. Enhance the ability for law enforcement to enforce red-light running. This could include white or blue lights directly wired into the red signal lens illuminating at the same time as the red signal.
Signalized left-turn phase sequences	Entire Dell Range Boulevard Corridor	Category II	Consider providing leading protected left-turn phasing to promote consistency along the corridor, minimize potential for driver error, and minimize potential conflicts with pedestrians.
Accessible pedestrian facilities	Entire Dell Range Boulevard Corridor	Category II	As part of other improvements to the overall corridor, pedestrian facilities can be updated to meet ADA requirements.
No crosswalk provided on west leg of intersection	Dell Range Boulevard/Stillwater Avenue (W)	Category II	Stripe crosswalk on west leg and provide pedestrian signal equipment in NW & SW intersection corners.
Offset intersection	Dell Range Boulevard/Rue Terre	Category II	Mount sign "KEEP RIGHT" on signal pole in north approach median facing northbound through lane approach. A longer term suggestion is to redesign the intersection's southbound approach by narrowing the median to better align with the northbound approach.
No crosswalk provided on east leg of intersection	Dell Range Boulevard/Rue Terre	Category II	Stripe crosswalk on east leg and provide pedestrian signal equipment in NE & SE intersection corners.
Left-turn crashes	Dell Range Boulevard/Mountain Road	Category II	Consider restricting access to right-in and right-out only.
Dry Creek box culvert needs rail	Dell Range Boulevard: Darnell Place to Ridge Road	Category II	Consider adding a pedestrian rail or guardrail on the top of the box culvert.
Northbound left-turn capacity	Dell Range Boulevard/College Way	Category II	Provide more green time for northbound left-turn or construct dual left-turn lanes.
Excess pavement width	Entire Prairie Avenue Corridor	Category II	Restripe corridor to include buffered bike lanes, as part of a corridor-wide bike connectivity plan. If feasible, implement road diet to reduce curb-to-curb width in widest segments. Provide striping channelization in open areas of shoulder to direct vehicles into travel lane.
Lane channelization	Prairie Avenue/Frontier Mall Drive	Category II	Short-term: realign eastbound approach to provide short tangent section that aligns drivers into their respective lanes on the downstream side of intersection. Long-term: reconstruct median and curb to improve channelization and provide consistent cross-section on east and west legs.
Intersection skew	Prairie Avenue/Frontier Mall Drive	Category II	Re-align Frontier Mall Drive approaches to intersect Prairie Avenue closer to 90-degrees (reduce skew).



Issue	Location	Risk Classification	Suggestion
Countdown pedestrian signals	Entire Dell Range Boulevard Corridor	Category I	Upgrade the other signalized intersections with countdown pedestrian signals and upgrade the pedestrian push button detectors and pedestrian actuation signs for all signalized crosswalks as part of the overall corridor improvement project.
Pedestrian walk times	Entire Dell Range Boulevard Corridor	Category I	Consider increasing the Flashing Do Not Walk time for the Dell Range Boulevard crosswalks to provide for walking speed at 3.5 feet per second and a minimum of 7 second walk interval. This could be done as part of an overall corridor retiming project done with the previous speed limit reduction consideration.
Southbound channelization sign – poor retro-reflectivity	Dell Range Boulevard/Powderhouse Road	Category I	Replace sign.
SB right turn lane	Dell Range Boulevard/Powderhouse Road	Category I	Consider combining the right turn and through movements to make the right turn movement to be under signal control and eliminate the merge.
Narrow sidewalk width in SE corner	Powderhouse Road to Stillwater Avenue (W)	Category I	Widen sidewalk to provide minimum clear width of 4 feet.
Signal pole located in pedestrian path	Powderhouse Road to Stillwater Avenue (W)	Category I	Realign concrete curb to provide minimum clear width of 4 feet.
Inaccessible pedestrian push button	Powderhouse Road to Stillwater Avenue (W)	Category I	Provide hard surface access to the pedestrian push buttons, extend the push button off the existing pole or relocate the push buttons to a separate pole having hard surface access.
Cracked sidewalk in SW corner	Powderhouse Road to Stillwater Avenue (W)	Category I	Replace section of concrete sidewalk. In the long term, enhance the curb radius to accommodate the typical truck using Stillwater Avenue.
Cracked sidewalk in south	Stillwater Avenue (W) to Driftwood Drive	Category I	Replace section of concrete sidewalk.
Intersection volumes may not warrant signal	Dell Range Boulevard/Driftwood Drive	Category I	Conduct signal warrant study to determine if the signal should be removed.
No overhead signal for NB approach	Dell Range Boulevard/Driftwood Drive	Category I	Add an overhead signal face for the NB approach.
Inaccessible pedestrian push button	Dell Range Boulevard/Driftwood Drive	Category I	Provide hard surface access to the pedestrian push buttons, extend the push button off the existing pole or relocate the push buttons to a separate pole having hard surface access.
Sidewalk width in SW corner	Dell Range Boulevard/Driftwood Drive	Category I	Widen sidewalk
Sidewalk width in SW corner – near signal pole	Dell Range Boulevard/Frontier Mall Drive	Category I	When intersection is reconstructed, relocate signal pole to provide proper sidewalk width.
Dirt blocks sidewalk	Dell Range Boulevard/Frontier Mall Drive	Category I	Coordinate with the adjacent property owner to remove the dirt. Consider options with property owner to place a curb at the back of sidewalk to keep this from being continual maintenance problem.
Pedestrian ramp slope	Dell Range Boulevard/Frontier Mall Drive	Category I	Upgrade ramp to provide slopes less than 8.3% and detectable warning devices/truncated domes.



Issue	Location	Risk Classification	Suggestion
Narrow westbound right-turn lane	Dell Range Boulevard/Frontier Mall Drive	Category I	Short-term: consider striping diagonal markings in the narrow turn lane to indicate that the lane is not adequate to accommodate all sizes of turning vehicles. Long-term: when redevelopment of adjacent parcel occurs, widen the turn lane to accommodate truck widths and turning paths, consistent with City design standards. See Section 3B.24 of the Manual on Uniform Traffic Control Devices for reference to the striping suggestion.
Sidewalk width and slope – SW corner	Dell Range Boulevard/Frontier Mall Drive	Category I	Upgrade ramp to provide slopes less than 8.3%, a minimum of 4-ft width and detectable warning devices/truncated domes.
Accessible pedestrian ramp sloped toward ROW line	Dell Range Boulevard/Frontier Mall Drive	Category I	Upgrade ramp to provide appropriate slopes and detectable warning devices/truncated domes.
Water ponding on asphalt sidewalk	Stillwater Avenue (E) to Prairie Avenue/Bluegrass Circle (W)	Category I	Repair sidewalk to remove depression and drain to street.
Low reflectivity on southbound approach signage	Dell Range Boulevard/Prairie Avenue/Bluegrass Circle (W)	Category I	Replace the sign with a ground mounted sign in advance of the intersection.
Inaccessible pedestrian push button	Dell Range Boulevard/Prairie Avenue/Bluegrass Circle (W)	Category I	Provide hard surface access to the pedestrian push buttons, extend the push button off the existing pole or relocate the push buttons to a separate pole having hard surface access.
South approach crosswalk	Dell Range Boulevard/Prairie Avenue/Bluegrass Circle (W)	Category I	Add pedestrian crosswalk pavement markings.
Bend Railing on sidewalk	Dell Range Boulevard/Rue Terre	Category I	Replace or repair railing. A longer term solution would be to narrow the median. Doing so would require the median drainage be accommodated in another manner eliminating the need for the railing.
Inaccessible pedestrian push button	Dell Range Boulevard/Rue Terre	Category I	Provide hard surface access to the pedestrian push buttons, extend the push button off the existing pole or relocate the push buttons to a separate pole having hard surface access.
Low reflectivity on southbound approach signage	Dell Range Boulevard/Rue Terre	Category I	Replace channelization sign on southbound approach.
Enbankment narrows sidewalk	Rue Terre to Bluegrass Circle (E)/Fire Station	Category I	Have maintenance crews remove grass and dirt from the sidewalk. Consider toe wall or curbing at the back of sidewalk to prevent continual maintenance.
Sidewalk/driveway surface condition	Rue Terre to Bluegrass Circle (E)/Fire Station	Category I	Repair cracked concrete driveway/sidewalk. Consider extending driveway paving to the north to minimize the dirt getting onto the sidewalk.
Crosswalk on south leg	Dell Range Boulevard/Bluegrass Circle (E)	Category I	Stripe crosswalk for east-west crossing of the south leg of intersection (Bluegrass Circle).
Sidewalk curb lip to fire station driveway	Dell Range Boulevard/Bluegrass Circle (E)	Category I	Remove the lip in the curb between the sidewalk and the driveway.
Inaccessible pedestrian ramp	Dell Range Boulevard/Walmart Access	Category I	Upgrade ramp to remove the lip between the ramp and curb, provide slopes not exceeding the 8.3% maximum and provide detectable warning devices/truncated domes.
STOP pavement markings SB approach	Dell Range Boulevard/Walmart Access	Category I	Remove STOP pavement markings.
Crosswalk on south leg	Dell Range Boulevard/Walmart Access	Category I	Stripe crosswalk for east-west crossing of the south leg of intersection.
Wal-Mart Westbound Queue Blocks Intersection	Dell Range Boulevard/Grandview Avenue	Category I	Limit access at this intersection to right-in and right-out.
North Side Sidewalk Drop-Off	Grandview Avenue to Converse Avenue	Category I	Extend the limits of the fence and repair fence.



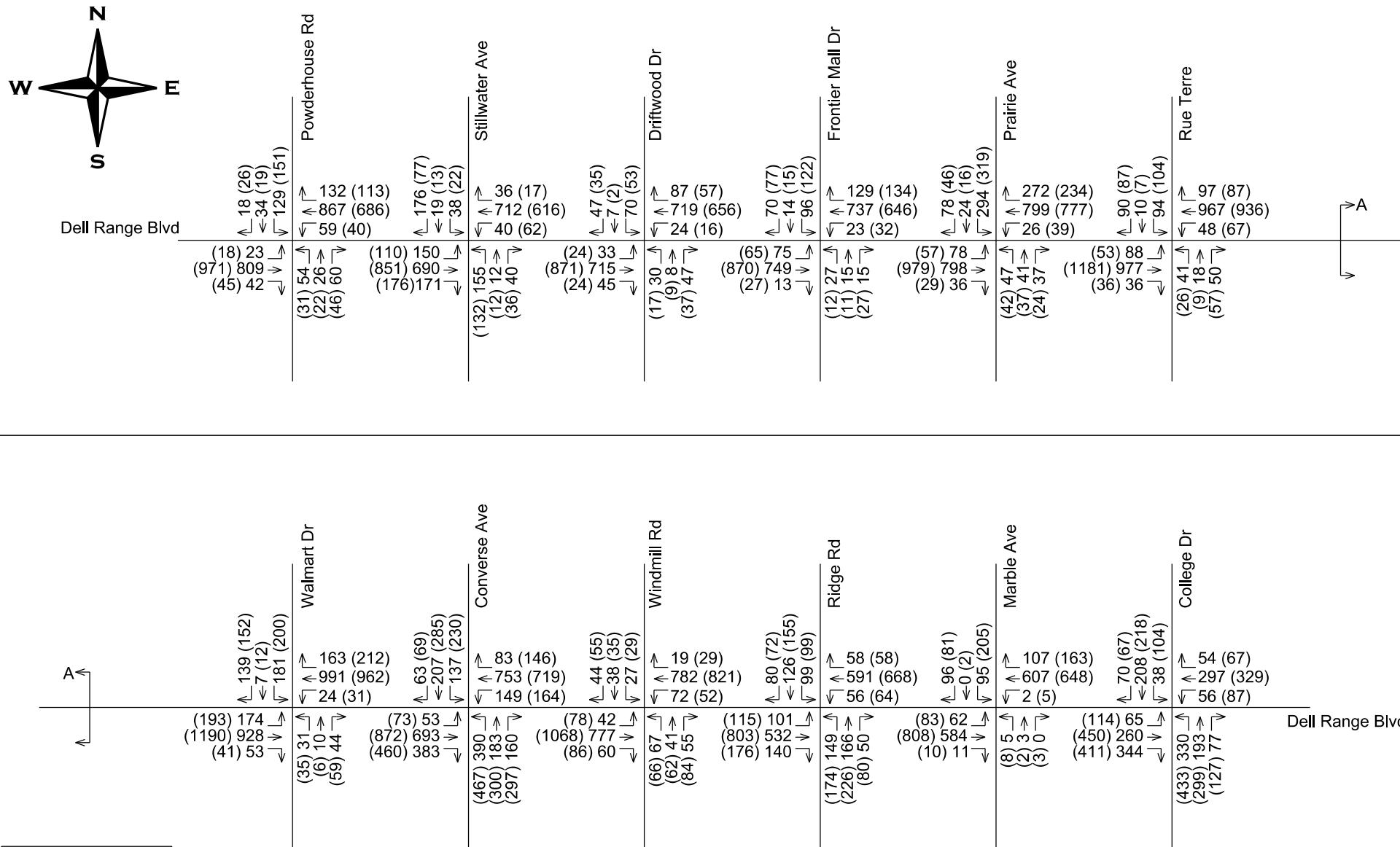
Issue	Location	Risk Classification	Suggestion
North approach crosswalk	Dell Range Boulevard/Converse Avenue	Category I	Restripe crosswalk.
Pedestrian signal not operative	Dell Range Boulevard/Converse Avenue	Category I	Repair inoperative pedestrian signal in NE corner.
Corner turn radii – NE and NW corners	Dell Range Boulevard/Converse Avenue	Category I	Enhance the turn radius of the NE corner.
Northwest corner pedestrian ramp slopes	Dell Range Boulevard/Converse Avenue	Category I	Upgrade pedestrian ramp to provide slopes of 8.3% or less and provide detectable warning Category I devices/truncated domes for all users.
Signal pole located in pedestrian path	Dell Range Boulevard/Windmill Road	Category I	When the intersection is reconstructed, relocate the signal pole to provide a minimum of 4-ft clearance from the back curb.
Pedestrian push button inoperative	Dell Range Boulevard/Windmill Road	Category I	Replace or repair.
No crosswalk striping on north leg	Dell Range Boulevard/Windmill Road	Category I	Stripe crosswalk.
Curb higher than sidewalk	Windmill Road to Moran Avenue	Category I	Repair sidewalk to match back of curb.
Inaccessible push button	Dell Range Boulevard/Moran Avenue	Category I	Relocate pedestrian push button to a location within 10 feet of the pedestrian ramp and mount in a location accessible to all users.
Sidewalk width limited to 3 feet	Dell Range Boulevard/Moran Avenue	Category I	Relocate fire hydrant or construct sidewalk around the back side of the hydrant to provide a pathway with 4-foot clear width.
Cross slope of moran avenue	Dell Range Boulevard/Moran Avenue	Category I	Reconstruct Moran Avenue approach to provide 2 percent or less cross-slope within pedestrian crossing.
Cross slope at public streets	Moran Avenue to Hilltop Avenue/Friendship Circle	Category I	Reconstruct sidewalk to reduce cross slope to less than 2 percent.
No pavement markings on southbound approach	Dell Range Boulevard/Hilltop Avenue/Friendship Circle	Category I	Provide pavement markings for the north approach.
No left turn sign not effective	Dell Range Boulevard/Hilltop Avenue/Friendship Circle	Category I	Consider a raised median or increase law enforcement of the turn restriction.
Low reflectivity speed limit signs	Hilltop Avenue to Darnell Place	Category I	Replace signs.
Sidewalk cross-slope	Darnell Place to Ridge Road	Category I	Reconstruct sidewalk through driveways.
No crosswalks on north and south approaches	Dell Range Boulevard/Ridge Road	Category I	Stripe Crosswalk.
Short clearance intervals	Dell Range Boulevard/Ridge Road	Category I	Consider extending yellow time for all movements.
Southbound right turn only sign	Dell Range Boulevard/Ridge Road	Category I	Replace sign.
Sidewalk cross-slope	Ridge Road to Marble Avenue	Category I	Reconstruct sidewalk through driveways.
Extended RT lane from King Soopers entrance to McDonalds entrance	Dell Range Boulevard/Marble Avenue	Category I	Provide pavement markings and signage indicating a right-turn only lane for westbound traffic.
Queue conflicts at Boysen Avenue	Marble Avenue to College Drive	Category I	Consider changing the access to Boysen Avenue to be right-in and right-out.
Pedestrian signal push button inoperative	Dell Range Boulevard/College Drive	Category I	Repair or replace pedestrian signal pushbuttons in SW and NW corners of intersection.



Issue	Location	Risk Classification	Suggestion
Curb radius too small	Dell Range Boulevard/College Drive	Category I	Reconstruct SE corner curb and increase curb radius.
Westbound lane striping missing	Dell Range Boulevard/College Drive	Category I	Restripe lane lines on east approach.
Curb higher than sidewalk	Prairie Avenue – Entire Corridor	Category I	As part of other improvements along the corridor, raise the sidewalk to the elevation to match the back of curb.
Missing sidewalk segment	Powderhouse Road to Lowes Access	Category I	As these vacant parcels north and east of Prairie Avenue develop, construct sidewalk on north side of Prairie Avenue from Lowes access west to the Point Frontier development.
Pedestrian access to transit stop	Powderhouse Road to Lowes Access	Category I	Provide accessible pedestrian ramps with hard surface connections at the sidewalk and across the median. Provide accessible pedestrian ramps with hard surface connections at the sidewalk and across the median.
Street name sign missing	Prairie Avenue/Lowes Access	Category I	Install street name signs on south and north approach signal mast arms, consistent with those provided at adjacent signalized intersections on Prairie Avenue.
Painted crosswalk into median	Prairie Avenue/Lowes Access	Category I	Provide accessible ramps with a connecting hard surface extending the crosswalk through the median.
Access Management	Frontier Mall Drive to Dell Range Boulevard	Category I	To address the issues identified above, consider one or more of the following: 1) providing additional cross-parcel connections; 2) closing or restricting turning movements at existing access points on west side of Prairie Avenue between Kmart access and Dell Range Boulevard; 3) restricting Wendy's access to right-in-right-out, if new connection can be made to Kmart parking lot; and, 4) if driveway access to PETCO is kept, consider not allowing parking immediately east of the store and north of the driveway (this involves six parking spaces).

Appendix D

Existing Year 2012 Peak Hour Traffic Count Data



Dell Range Boulevard Corridor Study
(Powderhouse Road to College Drive)

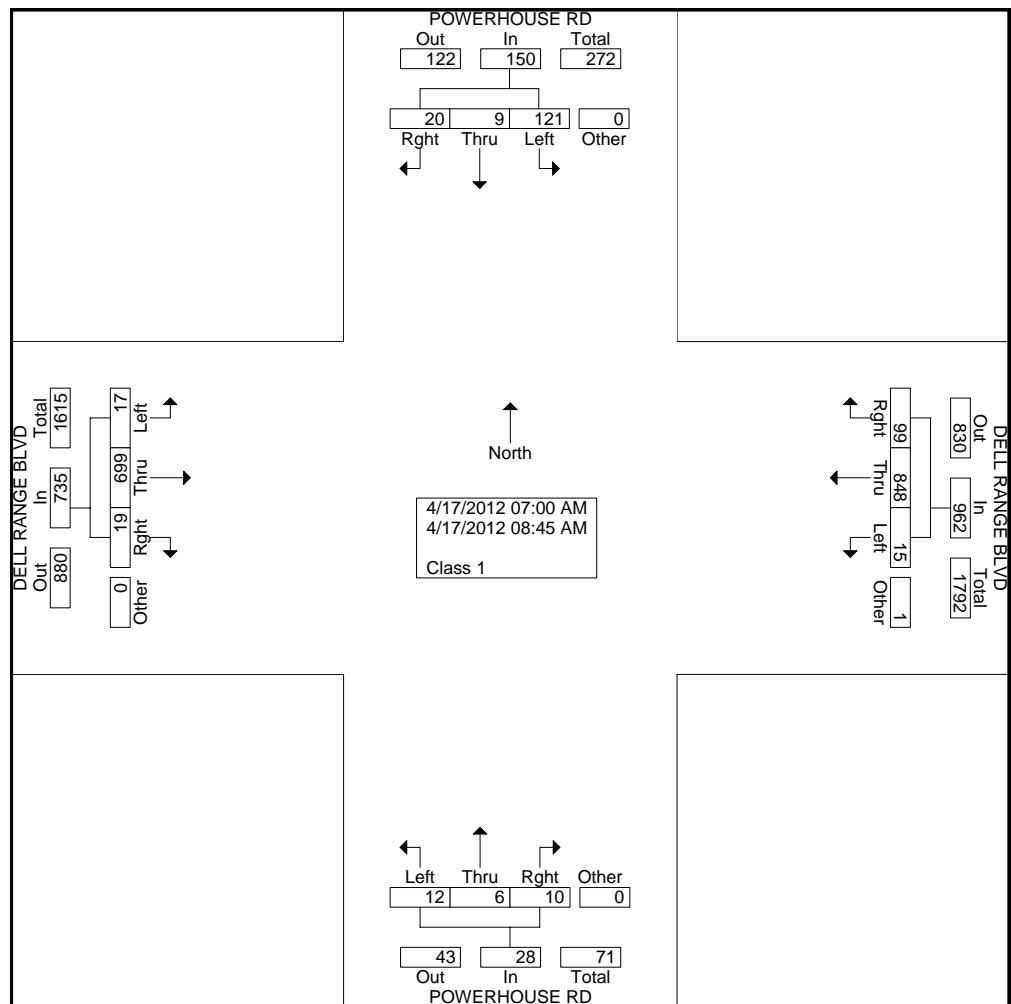
2012 Peak Hour Turning Movement Volumes
Midday & PM Peak Hour



File Name : #20 POWDERHOUSE&DELLRANGEAM
 Site Code : 00000000
 Start Date : 4/17/2012
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Groups Printed- Class 1

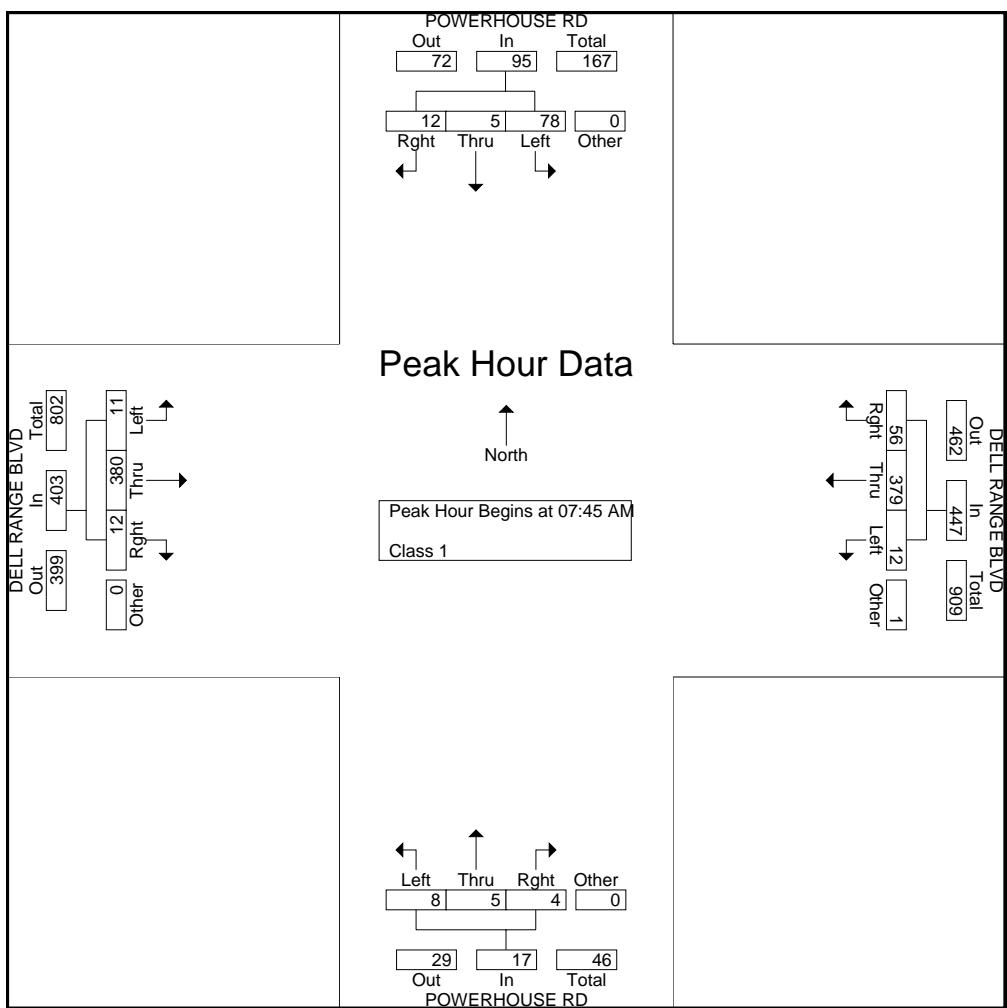
Start Time	POWERHOUSE RD Southbound				DELL RANGE BLVD Westbound				POWERHOUSE RD Northbound				DELL RANGE BLVD Eastbound				Int. Total
	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	
07:00 AM	6	0	2	0	1	130	7	0	0	0	1	0	1	55	2	0	205
07:15 AM	9	1	0	0	1	124	17	0	1	0	0	0	1	65	2	0	221
07:30 AM	13	1	2	0	1	121	7	0	1	1	1	0	2	83	1	0	234
07:45 AM	27	1	2	0	5	115	11	1	0	0	2	0	6	107	3	0	280
Total	55	3	6	0	8	490	42	1	2	1	4	0	10	310	8	0	940
08:00 AM	13	0	2	0	1	84	6	0	3	0	0	0	1	94	3	0	207
08:15 AM	16	1	4	0	4	92	19	0	2	0	1	0	2	84	2	0	227
08:30 AM	22	3	4	0	2	88	20	0	3	5	1	0	2	95	4	0	249
08:45 AM	15	2	4	0	0	94	12	0	2	0	4	0	2	116	2	0	253
Total	66	6	14	0	7	358	57	0	10	5	6	0	7	389	11	0	936
Grand Total	121	9	20	0	15	848	99	1	12	6	10	0	17	699	19	0	1876
Apprch %	80.7	6	13.3	0	1.6	88.1	10.3	0.1	42.9	21.4	35.7	0	2.3	95.1	2.6	0	
Total %	6.4	0.5	1.1	0	0.8	45.2	5.3	0.1	0.6	0.3	0.5	0	0.9	37.3	1	0	





File Name : #20 POWDERHOUSE&DELLRANGEAM
 Site Code : 00000000
 Start Date : 4/17/2012
 Page No : 2

	POWERHOUSE RD Southbound					DELL RANGE BLVD Westbound					POWERHOUSE RD Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	27	1	2	0	30	5	115	11	1	132	0	0	2	0	2	6	107	3	0	116	280
08:00 AM	13	0	2	0	15	1	84	6	0	91	3	0	0	0	3	1	94	3	0	98	207
08:15 AM	16	1	4	0	21	4	92	19	0	115	2	0	1	0	3	2	84	2	0	88	227
08:30 AM	22	3	4	0	29	2	88	20	0	110	3	5	1	0	9	2	95	4	0	101	249
Total Volume	78	5	12	0	95	12	379	56	1	448	8	5	4	0	17	11	380	12	0	403	963
% App. Total	82.1	5.3	12.6	0		2.7	84.6	12.5	0.2		47.1	29.4	23.5	0		2.7	94.3	3	0		
PHF	.722	.417	.750	.000	.792	.600	.824	.700	.250	.848	.667	.250	.500	.000	.472	.458	.888	.750	.000	.869	.860

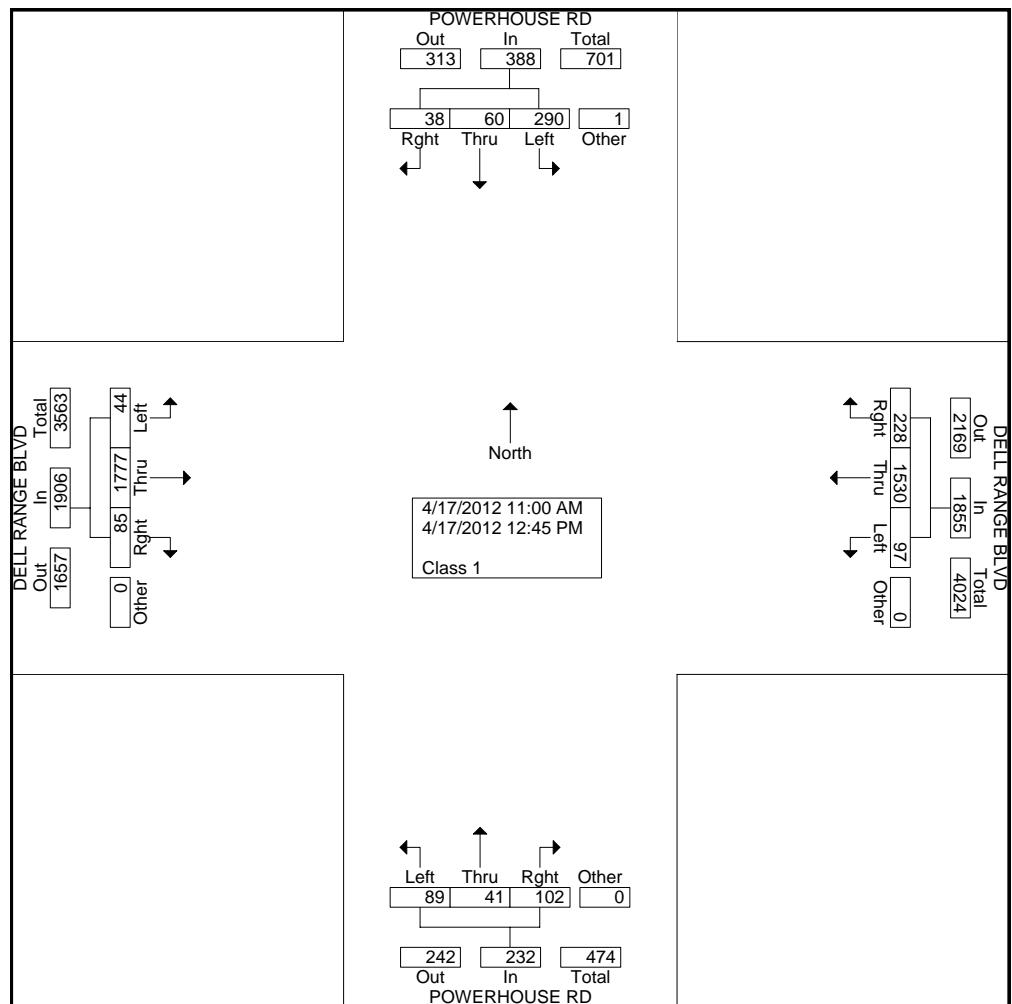




File Name : #20 POWDERHOUSE&DELLRANGEMD
 Site Code : 00000000
 Start Date : 4/17/2012
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Groups Printed- Class 1

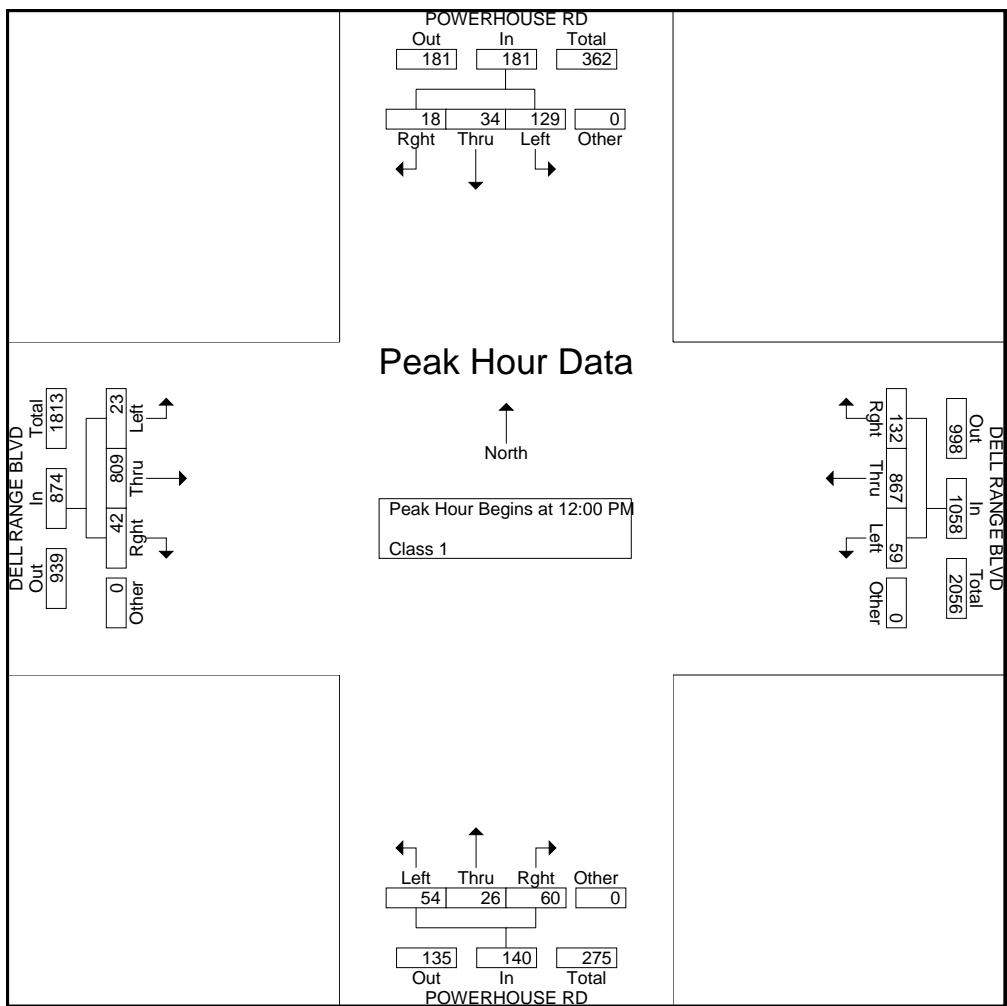
Start Time	POWERHOUSE RD Southbound				DELL RANGE BLVD Westbound				POWERHOUSE RD Northbound				DELL RANGE BLVD Eastbound				Int. Total
	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	
11:00 AM	37	7	2	0	3	133	20	0	5	5	9	0	5	250	4	0	480
11:15 AM	45	5	5	0	12	162	20	0	4	4	7	0	8	243	10	0	525
11:30 AM	39	9	7	1	11	165	27	0	14	5	11	0	2	247	11	0	549
11:45 AM	40	5	6	0	12	203	29	0	12	1	15	0	6	228	18	0	575
Total	161	26	20	1	38	663	96	0	35	15	42	0	21	968	43	0	2129
12:00 PM	41	5	2	0	14	187	31	0	10	8	15	0	9	217	14	0	553
12:15 PM	24	9	6	0	10	229	22	0	15	6	10	0	1	214	6	0	552
12:30 PM	32	12	6	0	20	223	44	0	13	4	14	0	6	181	10	0	565
12:45 PM	32	8	4	0	15	228	35	0	16	8	21	0	7	197	12	0	583
Total	129	34	18	0	59	867	132	0	54	26	60	0	23	809	42	0	2253
Grand Total	290	60	38	1	97	1530	228	0	89	41	102	0	44	1777	85	0	4382
Apprch %	74.6	15.4	9.8	0.3	5.2	82.5	12.3	0	38.4	17.7	44	0	2.3	93.2	4.5	0	
Total %	6.6	1.4	0.9	0	2.2	34.9	5.2	0	2	0.9	2.3	0	1	40.6	1.9	0	





File Name : #20 POWDERHOUSE&DELLRANGEMD
 Site Code : 00000000
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	POWERHOUSE RD Southbound					DELL RANGE BLVD Westbound					POWERHOUSE RD Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	41	5	2	0	48	14	187	31	0	232	10	8	15	0	33	9	217	14	0	240	553
12:15 PM	24	9	6	0	39	10	229	22	0	261	15	6	10	0	31	1	214	6	0	221	552
12:30 PM	32	12	6	0	50	20	223	44	0	287	13	4	14	0	31	6	181	10	0	197	565
12:45 PM	32	8	4	0	44	15	228	35	0	278	16	8	21	0	45	7	197	12	0	216	583
Total Volume	129	34	18	0	181	59	867	132	0	1058	54	26	60	0	140	23	809	42	0	874	2253
% App. Total	71.3	18.8	9.9	0		5.6	81.9	12.5	0		38.6	18.6	42.9	0		2.6	92.6	4.8	0		
PHF	.787	.708	.750	.000	.905	.738	.947	.750	.000	.922	.844	.813	.714	.000	.778	.639	.932	.750	.000	.910	.966

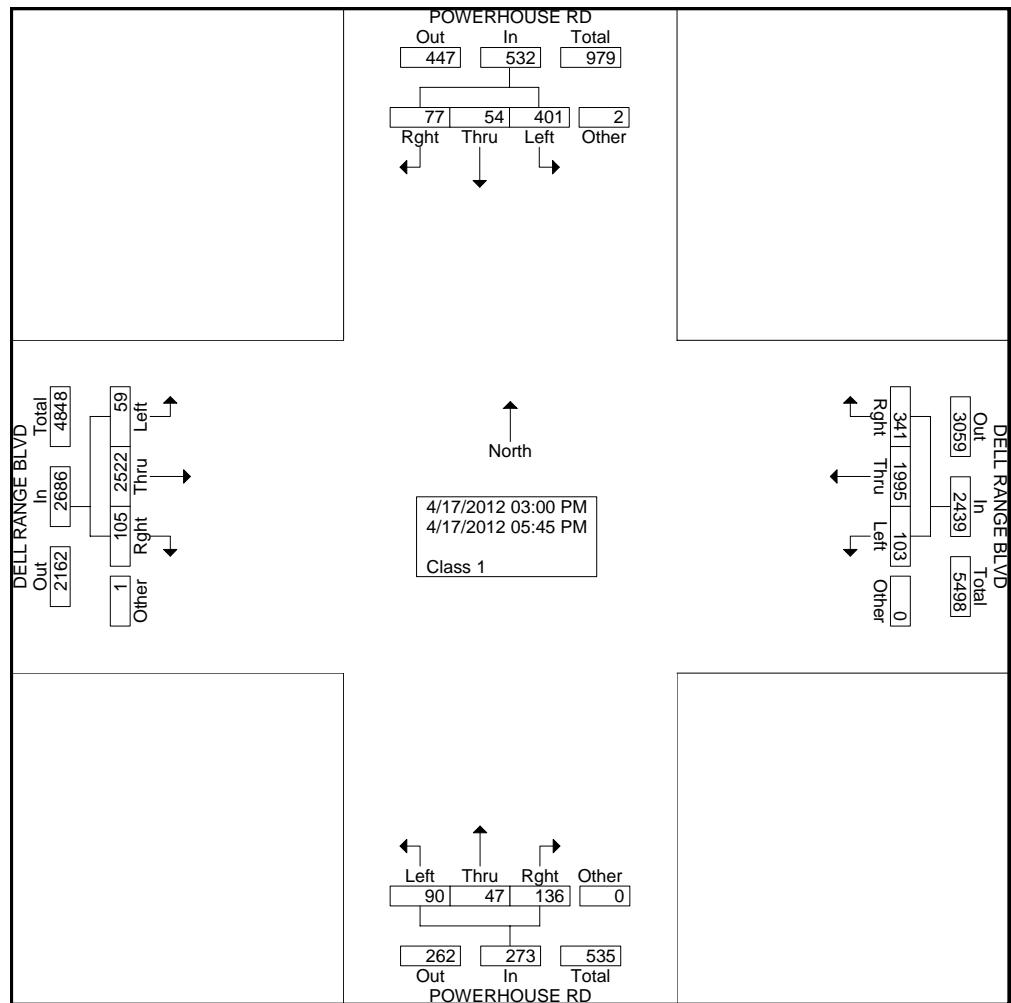




File Name : #20 POWDERHOUSE&DELLRANGEPM
 Site Code : 00000000
 Start Date : 4/17/2012
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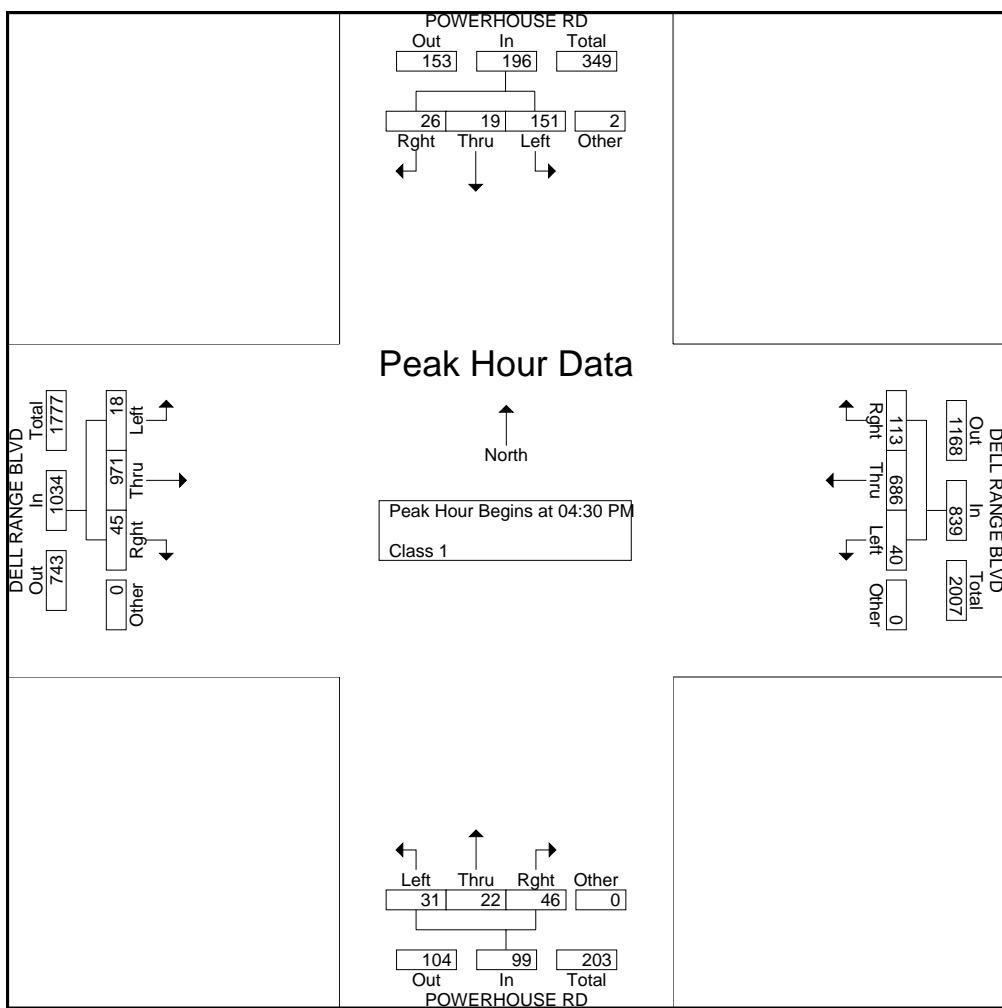
Start Time	POWERHOUSE RD Southbound				DELL RANGE BLVD Westbound				POWERHOUSE RD Northbound				DELL RANGE BLVD Eastbound				Int. Total
	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	
03:00 PM	40	10	7	0	6	178	25	0	9	2	11	0	7	164	6	0	465
03:15 PM	29	2	8	0	6	155	21	0	12	3	11	0	3	159	5	0	414
03:30 PM	23	2	4	0	9	185	23	0	5	2	11	0	5	176	11	1	457
03:45 PM	27	3	8	0	11	146	30	0	9	4	12	0	3	226	7	0	486
Total	119	17	27	0	32	664	99	0	35	11	45	0	18	725	29	1	1822
04:00 PM	49	0	6	0	8	169	27	0	6	5	13	0	6	228	9	0	526
04:15 PM	26	8	4	0	6	158	29	0	4	2	12	0	3	219	6	0	477
04:30 PM	34	6	5	0	10	157	24	0	11	2	9	0	4	230	11	0	503
04:45 PM	31	6	8	1	10	178	24	0	7	9	15	0	7	254	18	0	568
Total	140	20	23	1	34	662	104	0	28	18	49	0	20	931	44	0	2074
05:00 PM	53	3	7	1	13	182	31	0	8	4	7	0	5	249	10	0	573
05:15 PM	33	4	6	0	7	169	34	0	5	7	15	0	2	238	6	0	526
05:30 PM	34	2	5	0	5	151	39	0	8	5	9	0	7	194	6	0	465
05:45 PM	22	8	9	0	12	167	34	0	6	2	11	0	7	185	10	0	473
Total	142	17	27	1	37	669	138	0	27	18	42	0	21	866	32	0	2037
Grand Total	401	54	77	2	103	1995	341	0	90	47	136	0	59	2522	105	1	5933
Apprch %	75.1	10.1	14.4	0.4	4.2	81.8	14	0	33	17.2	49.8	0	2.2	93.9	3.9	0	
Total %	6.8	0.9	1.3	0	1.7	33.6	5.7	0	1.5	0.8	2.3	0	1	42.5	1.8	0	





File Name : #20 POWDERHOUSE&DELLRANGEPM
 Site Code : 00000000
 Start Date : 4/17/2012
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	POWERHOUSE RD Southbound					DELL RANGE BLVD Westbound					POWERHOUSE RD Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	34	6	5	0	45	10	157	24	0	191	11	2	9	0	22	4	230	11	0	245	503
04:45 PM	31	6	8	1	46	10	178	24	0	212	7	9	15	0	31	7	254	18	0	279	568
05:00 PM	53	3	7	1	64	13	182	31	0	226	8	4	7	0	19	5	249	10	0	264	573
05:15 PM	33	4	6	0	43	7	169	34	0	210	5	7	15	0	27	2	238	6	0	246	526
Total Volume	151	19	26	2	198	40	686	113	0	839	31	22	46	0	99	18	971	45	0	1034	2170
% App. Total	76.3	9.6	13.1	1		4.8	81.8	13.5	0		31.3	22.2	46.5	0		1.7	93.9	4.4	0		
PHF	.712	.792	.813	.500	.773	.769	.942	.831	.000	.928	.705	.611	.767	.000	.798	.643	.956	.625	.000	.927	.947

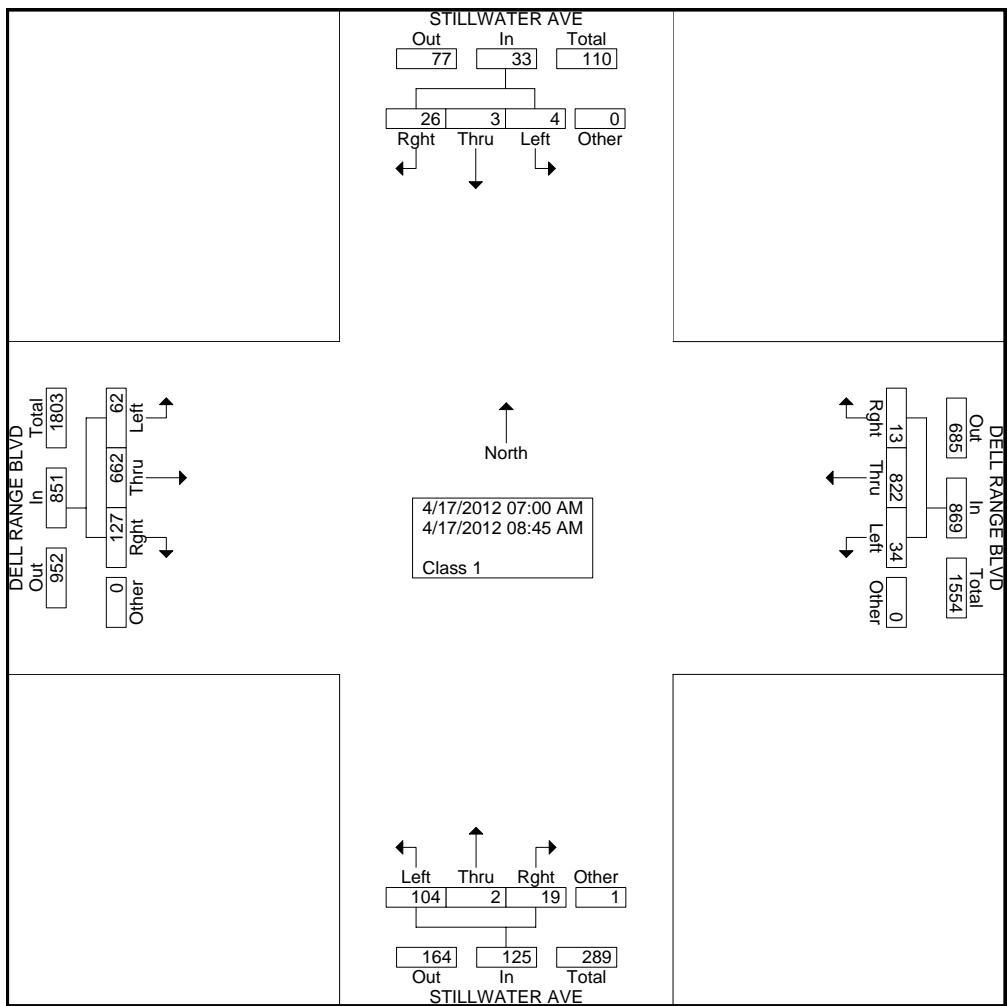




File Name : #60 STILLWATER&DELLRANGEAM
 Site Code : 00000000
 Start Date : 4/17/2012
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Groups Printed- Class 1

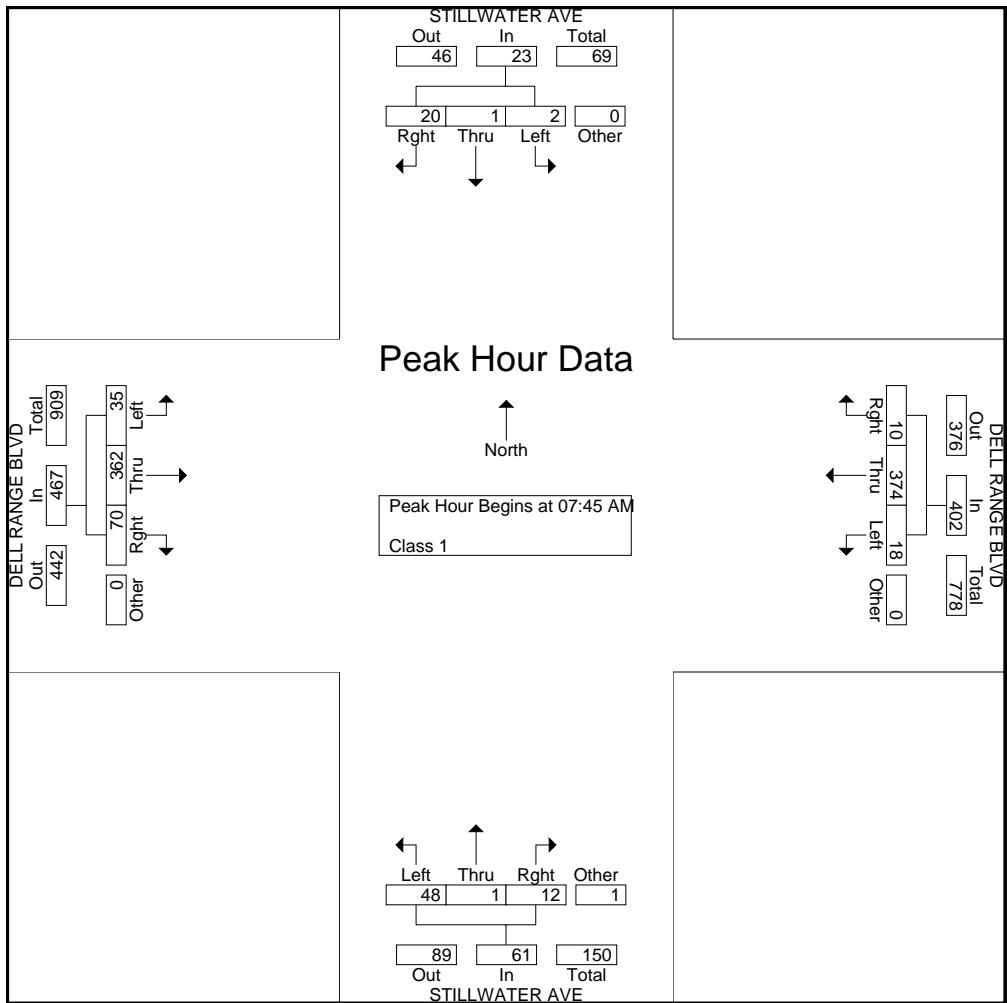
	STILLWATER AVE Southbound				DELL RANGE BLVD Westbound				STILLWATER AVE Northbound				DELL RANGE BLVD Eastbound				
Start Time	Left	Thru	Rght	Other	Int. Total												
07:00 AM	0	0	1	0	1	133	0	0	12	0	1	0	4	56	6	0	214
07:15 AM	1	0	1	0	5	124	1	0	12	0	1	0	1	66	15	0	227
07:30 AM	0	0	1	0	6	110	1	0	17	0	2	0	5	86	20	0	248
07:45 AM	1	0	1	0	4	102	5	0	14	0	2	0	16	92	25	0	262
Total	2	0	4	0	16	469	7	0	55	0	6	0	26	300	66	0	951
08:00 AM	0	0	2	0	2	94	0	0	8	0	3	0	6	86	11	0	212
08:15 AM	1	1	7	0	8	89	3	0	14	0	1	0	7	75	14	0	220
08:30 AM	0	0	10	0	4	89	2	0	12	1	6	1	6	109	20	0	260
08:45 AM	1	2	3	0	4	81	1	0	15	1	3	0	17	92	16	0	236
Total	2	3	22	0	18	353	6	0	49	2	13	1	36	362	61	0	928
Grand Total	4	3	26	0	34	822	13	0	104	2	19	1	62	662	127	0	1879
Apprch %	12.1	9.1	78.8	0	3.9	94.6	1.5	0	82.5	1.6	15.1	0.8	7.3	77.8	14.9	0	
Total %	0.2	0.2	1.4	0	1.8	43.7	0.7	0	5.5	0.1	1	0.1	3.3	35.2	6.8	0	





File Name : #60 STILLWATER&DELLRANGEAM
 Site Code : 00000000
 Start Date : 4/17/2012
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	STILLWATER AVE Southbound					DELL RANGE BLVD Westbound					STILLWATER AVE Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	1	0	1	0	2	4	102	5	0	111	14	0	2	0	16	16	92	25	0	133	262
08:00 AM	0	0	2	0	2	2	94	0	0	96	8	0	3	0	11	6	86	11	0	103	212
08:15 AM	1	1	7	0	9	8	89	3	0	100	14	0	1	0	15	7	75	14	0	96	220
08:30 AM	0	0	10	0	10	4	89	2	0	95	12	1	6	1	20	6	109	20	0	135	260
Total Volume	2	1	20	0	23	18	374	10	0	402	48	1	12	1	62	35	362	70	0	467	954
% App. Total	8.7	4.3	87	0		4.5	93	2.5	0		77.4	1.6	19.4	1.6		7.5	77.5	15	0		
PHF	.500	.250	.500	.000	.575	.563	.917	.500	.000	.905	.857	.250	.500	.250	.775	.547	.830	.700	.000	.865	.910

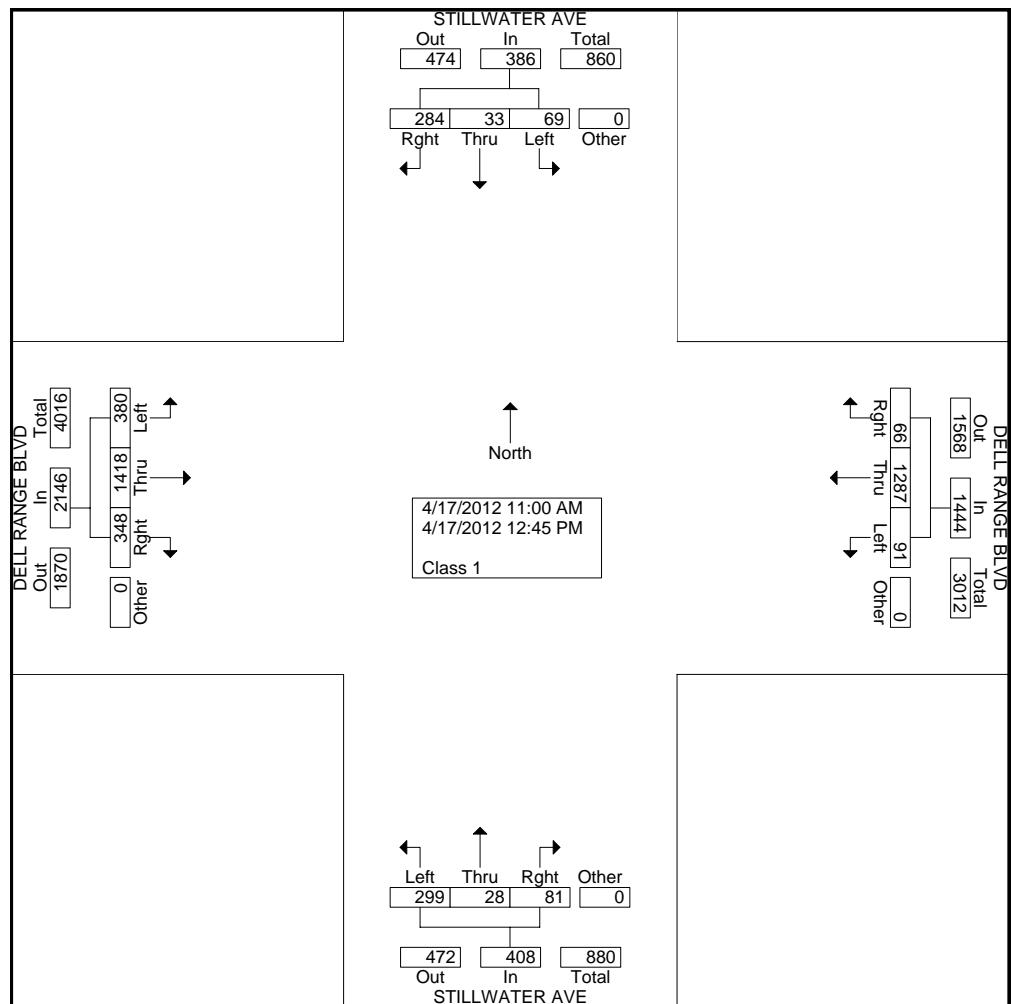




File Name : #60 STILLWATER&DELLRANGEMD
 Site Code : 00000000
 Start Date : 4/17/2012
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Groups Printed- Class 1

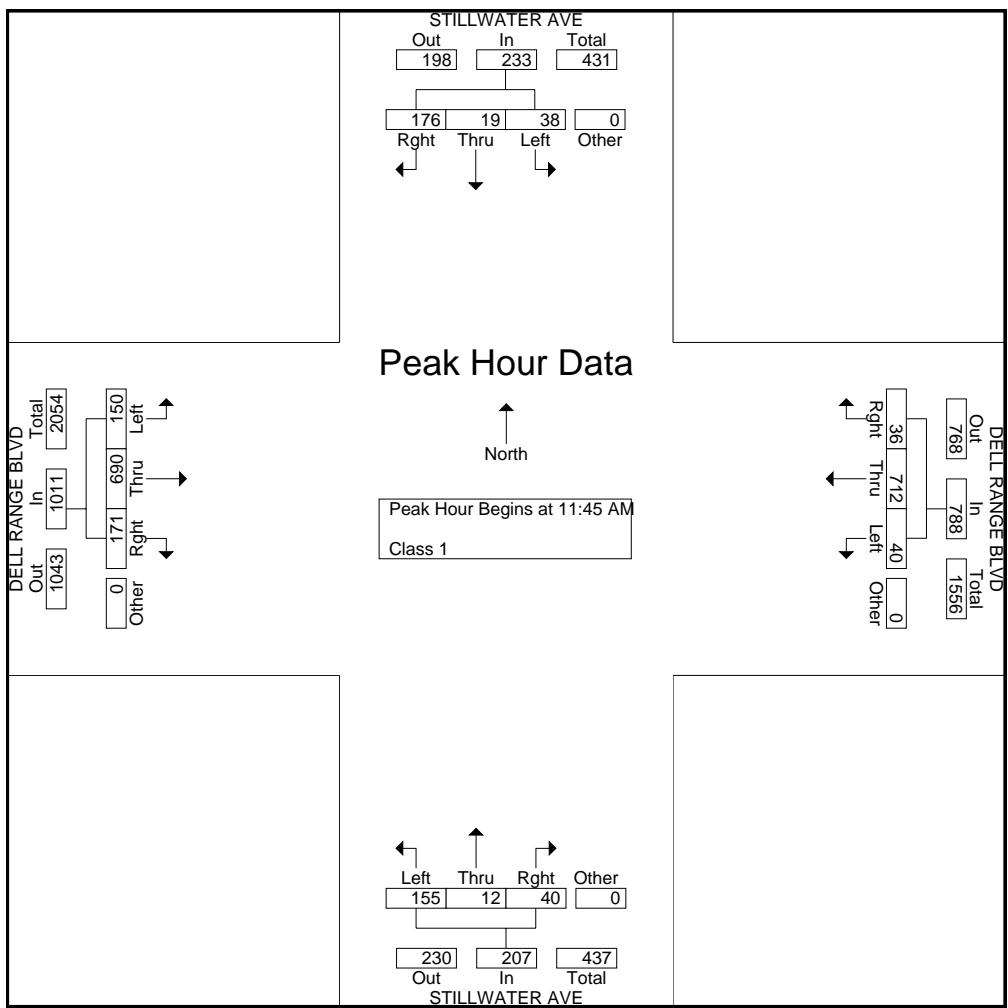
	STILLWATER AVE Southbound				DELL RANGE BLVD Westbound				STILLWATER AVE Northbound				DELL RANGE BLVD Eastbound				
Start Time	Left	Thru	Rght	Other	Int. Total												
11:00 AM	11	4	13	0	14	127	11	0	29	5	13	0	66	186	46	0	525
11:15 AM	4	1	21	0	13	144	7	0	35	5	12	0	67	167	57	0	533
11:30 AM	7	8	34	0	11	132	7	0	34	4	7	0	62	182	53	0	541
11:45 AM	7	3	34	0	11	161	9	0	39	4	9	0	38	170	62	0	547
Total	29	16	102	0	49	564	34	0	137	18	41	0	233	705	218	0	2146
12:00 PM	8	7	45	0	8	162	13	0	34	3	6	0	43	176	38	0	543
12:15 PM	9	4	56	0	9	194	9	0	45	1	8	0	32	190	27	0	584
12:30 PM	14	5	41	0	12	195	5	0	37	4	17	0	37	154	44	0	565
12:45 PM	9	1	40	0	13	172	5	0	46	2	9	0	35	193	21	0	546
Total	40	17	182	0	42	723	32	0	162	10	40	0	147	713	130	0	2238
Grand Total	69	33	284	0	91	1287	66	0	299	28	81	0	380	1418	348	0	4384
Apprch %	17.9	8.5	73.6	0	6.3	89.1	4.6	0	73.3	6.9	19.9	0	17.7	66.1	16.2	0	0
Total %	1.6	0.8	6.5	0	2.1	29.4	1.5	0	6.8	0.6	1.8	0	8.7	32.3	7.9	0	0





File Name : #60 STILLWATER&DELLRANGEMD
 Site Code : 00000000
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	STILLWATER AVE Southbound					DELL RANGE BLVD Westbound					STILLWATER AVE Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:45 AM																					
11:45 AM	7	3	34	0	44	11	161	9	0	181	39	4	9	0	52	38	170	62	0	270	547
12:00 PM	8	7	45	0	60	8	162	13	0	183	34	3	6	0	43	43	176	38	0	257	543
12:15 PM	9	4	56	0	69	9	194	9	0	212	45	1	8	0	54	32	190	27	0	249	584
12:30 PM	14	5	41	0	60	12	195	5	0	212	37	4	17	0	58	37	154	44	0	235	565
Total Volume	38	19	176	0	233	40	712	36	0	788	155	12	40	0	207	150	690	171	0	1011	2239
% App. Total	16.3	8.2	75.5	0		5.1	90.4	4.6	0		74.9	5.8	19.3	0		14.8	68.2	16.9	0		
PHF	.679	.679	.786	.000	.844	.833	.913	.692	.000	.929	.861	.750	.588	.000	.892	.872	.908	.690	.000	.936	.958

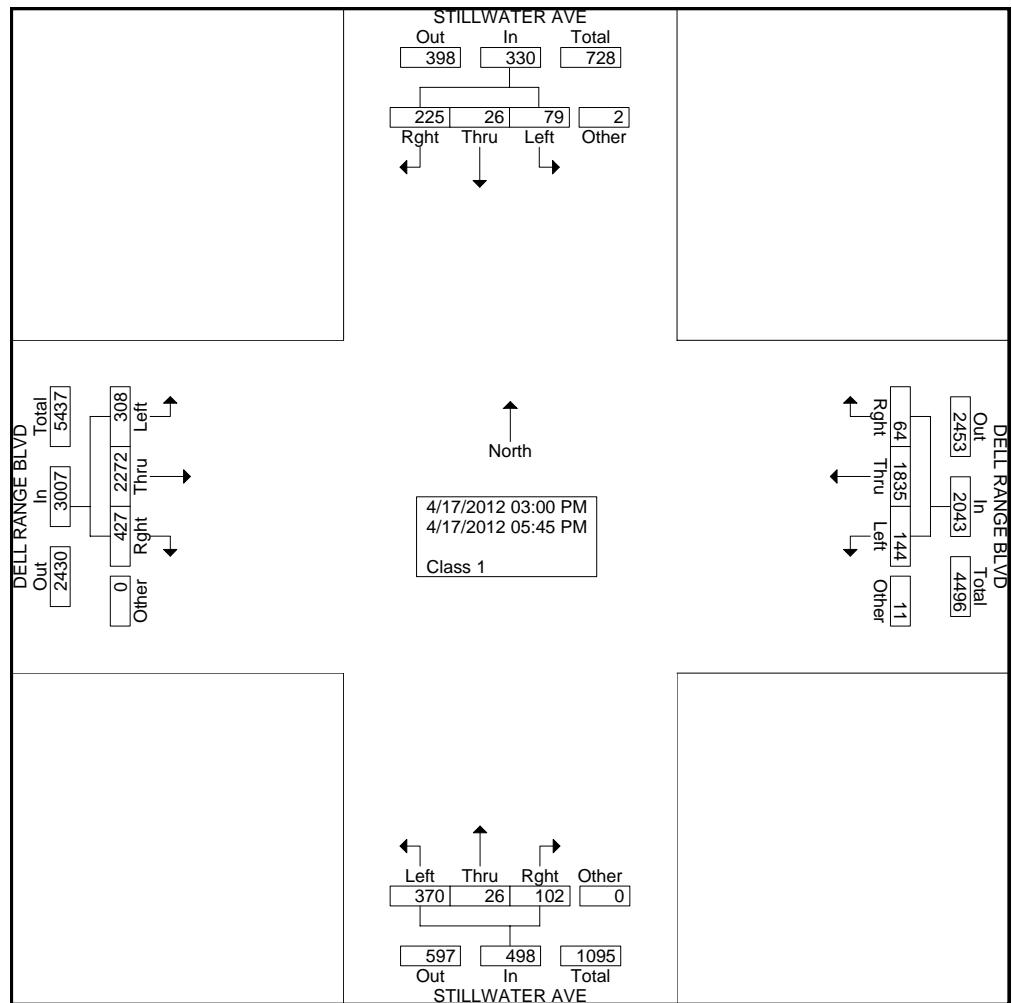




File Name : #60 STILLWATER&DELLRANGEPM
 Site Code : 00000000
 Start Date : 4/17/2012
 Page No : 1

Groups Printed- Class 1

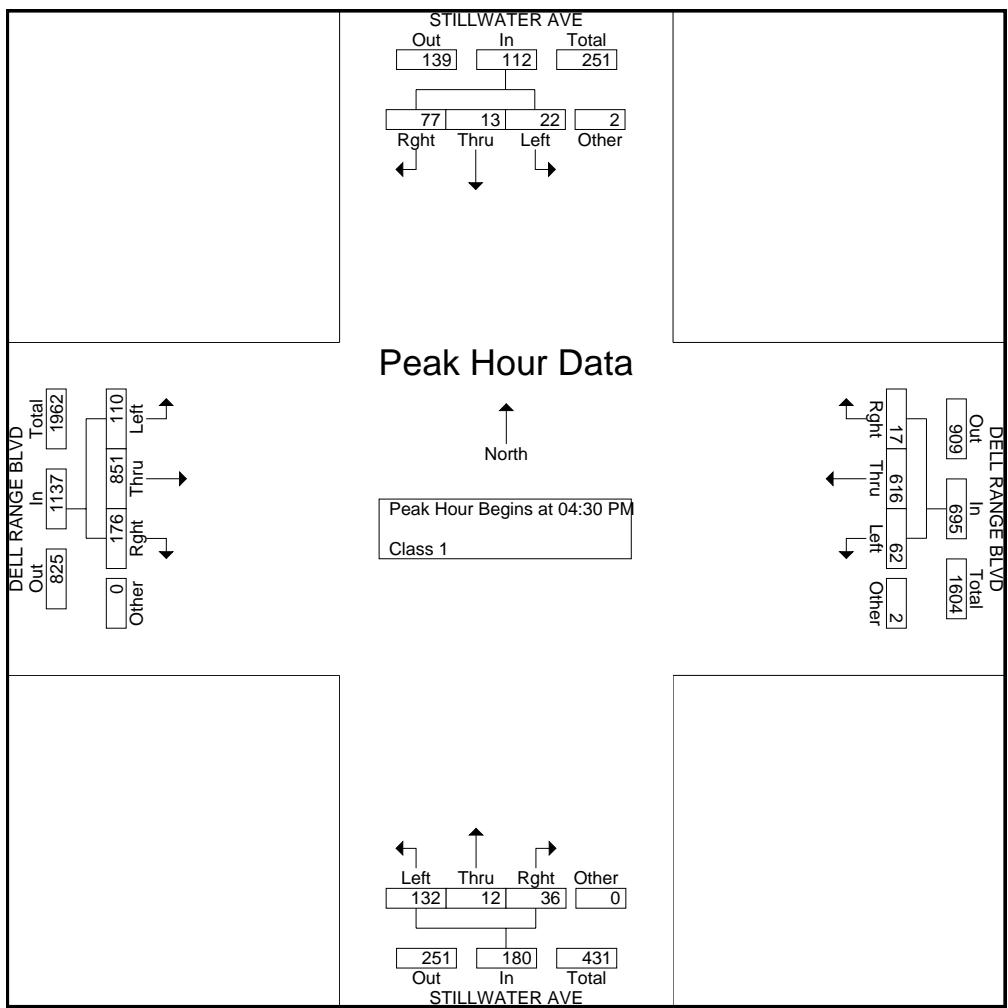
Start Time	STILLWATER AVE Southbound				DELL RANGE BLVD Westbound				STILLWATER AVE Northbound				DELL RANGE BLVD Eastbound				Int. Total
	Left	Thru	Rght	Other													
03:00 PM	12	0	21	0	7	167	6	0	23	0	3	0	17	169	26	0	451
03:15 PM	5	3	15	0	6	156	6	1	33	0	11	0	16	173	38	0	463
03:30 PM	7	3	15	0	9	143	3	0	26	1	6	0	17	179	24	0	433
03:45 PM	7	3	22	0	11	148	4	0	36	6	8	0	31	191	46	0	513
Total	31	9	73	0	33	614	19	1	118	7	28	0	81	712	134	0	1860
04:00 PM	7	1	12	0	14	154	5	0	24	2	15	0	31	218	33	0	516
04:15 PM	6	0	19	0	10	152	7	0	29	2	6	0	19	181	26	0	457
04:30 PM	6	2	19	0	9	154	3	0	24	0	9	0	25	215	49	0	515
04:45 PM	6	7	11	2	20	159	4	2	35	3	6	0	24	219	37	0	535
Total	25	10	61	2	53	619	19	2	112	7	36	0	99	833	145	0	2023
05:00 PM	8	3	21	0	13	168	4	0	50	4	15	0	36	208	49	0	579
05:15 PM	2	1	26	0	20	135	6	0	23	5	6	0	25	209	41	0	499
05:30 PM	6	2	25	0	12	145	6	7	30	2	11	0	39	159	37	0	481
05:45 PM	7	1	19	0	13	154	10	1	37	1	6	0	28	151	21	0	449
Total	23	7	91	0	58	602	26	8	140	12	38	0	128	727	148	0	2008
Grand Total	79	26	225	2	144	1835	64	11	370	26	102	0	308	2272	427	0	5891
Apprch %	23.8	7.8	67.8	0.6	7	89.3	3.1	0.5	74.3	5.2	20.5	0	10.2	75.6	14.2	0	
Total %	1.3	0.4	3.8	0	2.4	31.1	1.1	0.2	6.3	0.4	1.7	0	5.2	38.6	7.2	0	





File Name : #60 STILLWATER&DELLRANGEPM
 Site Code : 00000000
 Start Date : 4/17/2012
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	STILLWATER AVE Southbound					DELL RANGE BLVD Westbound					STILLWATER AVE Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	6	2	19	0	27	9	154	3	0	166	24	0	9	0	33	25	215	49	0	289	515
04:45 PM	6	7	11	2	26	20	159	4	2	185	35	3	6	0	44	24	219	37	0	280	535
05:00 PM	8	3	21	0	32	13	168	4	0	185	50	4	15	0	69	36	208	49	0	293	579
05:15 PM	2	1	26	0	29	20	135	6	0	161	23	5	6	0	34	25	209	41	0	275	499
Total Volume	22	13	77	2	114	62	616	17	2	697	132	12	36	0	180	110	851	176	0	1137	2128
% App. Total	19.3	11.4	67.5	1.8		8.9	88.4	2.4	0.3		73.3	6.7	20	0		9.7	74.8	15.5	0		
PHF	.688	.464	.740	.250	.891	.775	.917	.708	.250	.942	.660	.600	.600	.000	.652	.764	.971	.898	.000	.970	.919

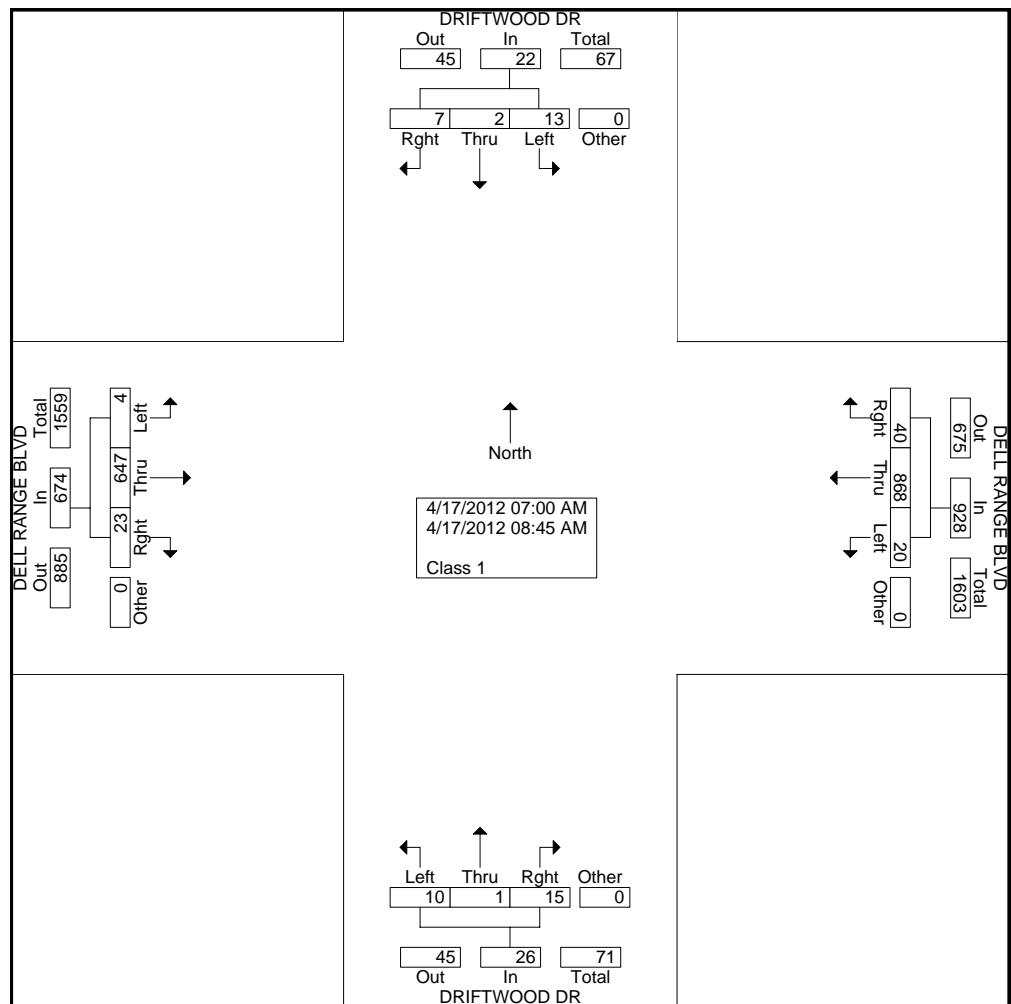




File Name : #21 DRIFTWOOD&DELLRANGEAM
 Site Code : 00000000
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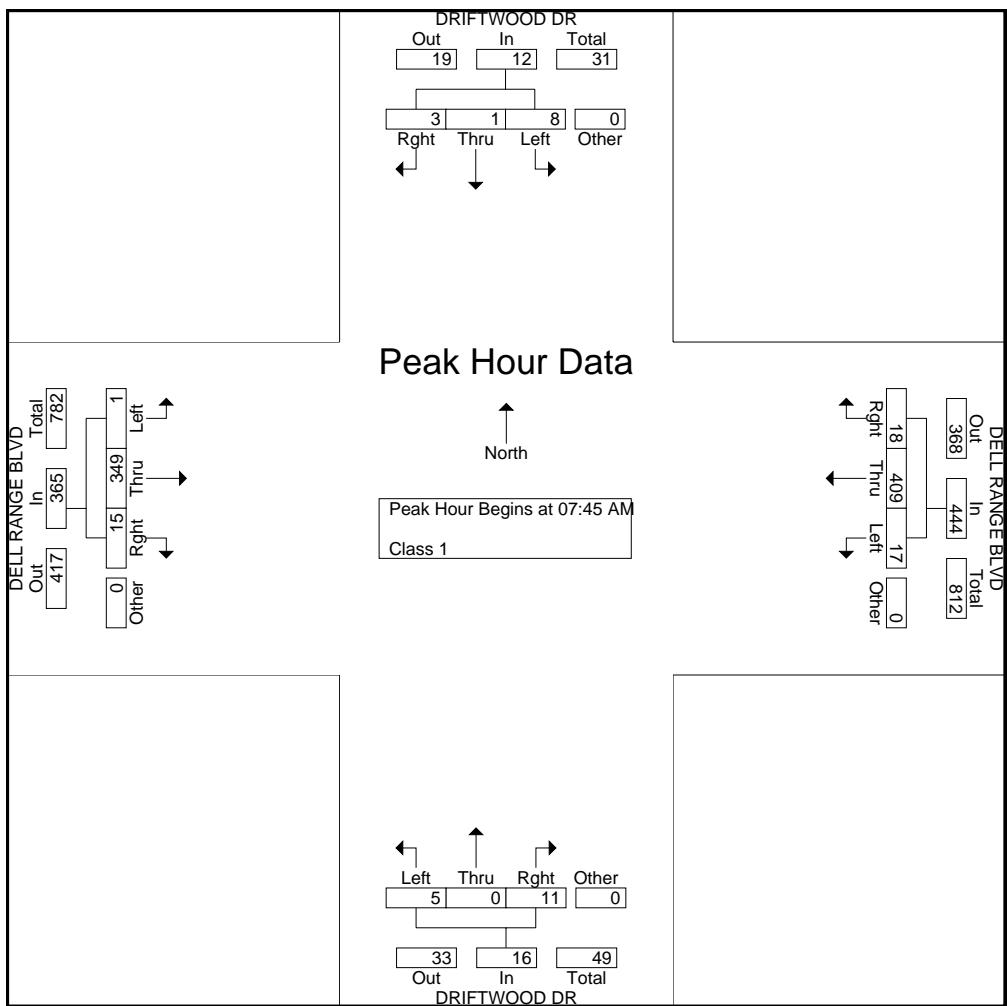
Start Time	DRIFTWOOD DR Southbound				DELL RANGE BLVD Westbound				DRIFTWOOD DR Northbound				DELL RANGE BLVD Eastbound				Int. Total
	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	
07:00 AM	2	0	0	0	0	126	5	0	2	0	0	0	0	57	1	0	193
07:15 AM	1	0	1	0	1	135	3	0	1	0	0	0	0	62	1	0	205
07:30 AM	1	1	2	0	0	108	5	0	1	1	2	0	0	78	1	0	200
07:45 AM	4	0	1	0	5	122	6	0	1	0	0	0	1	92	3	0	235
Total	8	1	4	0	6	491	19	0	5	1	2	0	1	289	6	0	833
08:00 AM	2	0	0	0	3	90	3	0	1	0	4	0	0	89	4	0	196
08:15 AM	1	0	0	0	4	108	5	0	1	0	4	0	0	79	2	0	204
08:30 AM	1	1	2	0	5	89	4	0	2	0	3	0	0	89	6	0	202
08:45 AM	1	0	1	0	2	90	9	0	1	0	2	0	3	101	5	0	215
Total	5	1	3	0	14	377	21	0	5	0	13	0	3	358	17	0	817
Grand Total	13	2	7	0	20	868	40	0	10	1	15	0	4	647	23	0	1650
Apprch %	59.1	9.1	31.8	0	2.2	93.5	4.3	0	38.5	3.8	57.7	0	0.6	96	3.4	0	
Total %	0.8	0.1	0.4	0	1.2	52.6	2.4	0	0.6	0.1	0.9	0	0.2	39.2	1.4	0	





File Name : #21 DRIFTWOOD&DELLRANGEAM
 Site Code : 00000000
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	DRIFTWOOD DR Southbound					DELL RANGE BLVD Westbound					DRIFTWOOD DR Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	4	0	1	0	5	5	122	6	0	133	1	0	0	0	1	1	92	3	0	96	235
08:00 AM	2	0	0	0	2	3	90	3	0	96	1	0	4	0	5	0	89	4	0	93	196
08:15 AM	1	0	0	0	1	4	108	5	0	117	1	0	4	0	5	0	79	2	0	81	204
08:30 AM	1	1	2	0	4	5	89	4	0	98	2	0	3	0	5	0	89	6	0	95	202
Total Volume	8	1	3	0	12	17	409	18	0	444	5	0	11	0	16	1	349	15	0	365	837
% App. Total	66.7	8.3	25	0		3.8	92.1	4.1	0		31.2	0	68.8	0		0.3	95.6	4.1	0		
PHF	.500	.250	.375	.000	.600	.850	.838	.750	.000	.835	.625	.000	.688	.000	.800	.250	.948	.625	.000	.951	.890

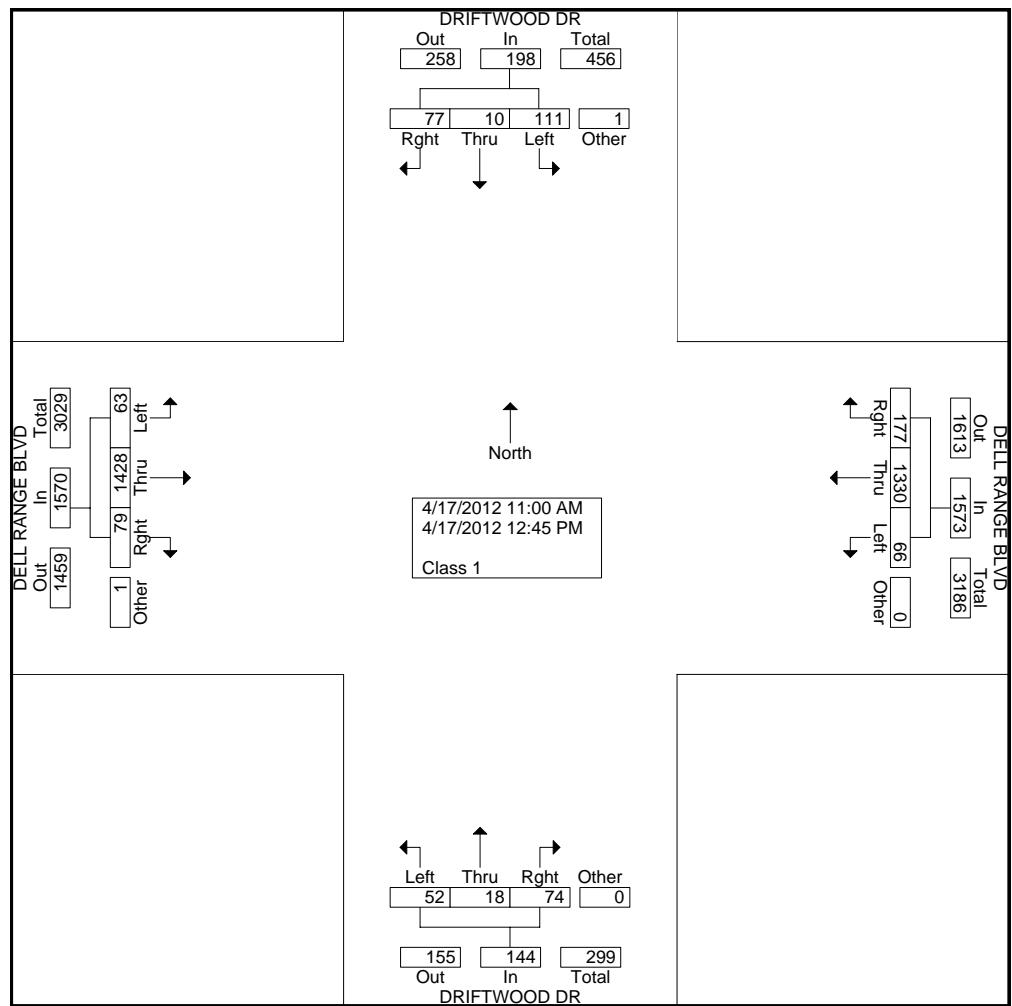




File Name : #21 DRIFTWOOD&DELLRANGEMD
 Site Code : 00000000
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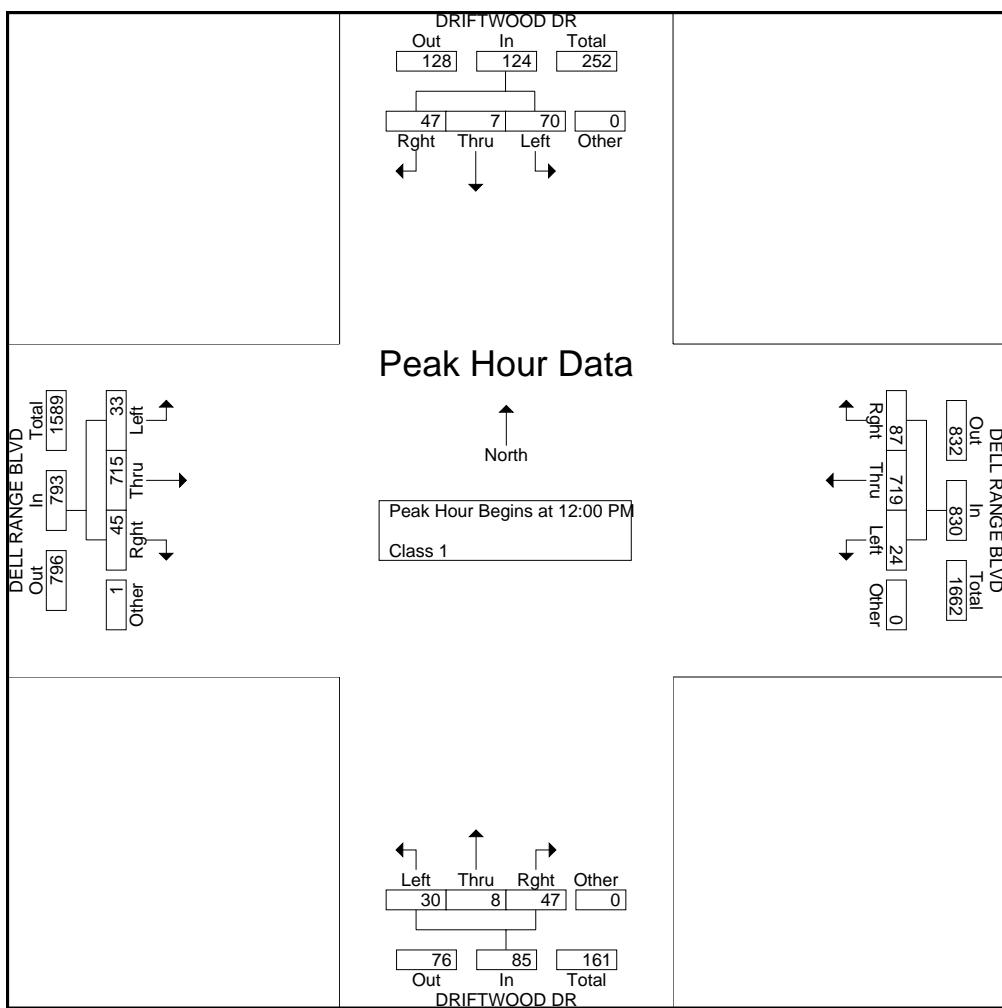
Start Time	DRIFTWOOD DR Southbound				DELL RANGE BLVD Westbound				DRIFTWOOD DR Northbound				DELL RANGE BLVD Eastbound				Int. Total
	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	
11:00 AM	3	1	9	0	8	135	19	0	5	3	6	0	4	196	9	0	398
11:15 AM	9	0	9	1	10	151	21	0	6	2	8	0	5	172	8	0	402
11:30 AM	14	2	5	0	8	151	32	0	4	5	5	0	8	180	6	0	420
11:45 AM	15	0	7	0	16	174	18	0	7	0	8	0	13	165	11	0	434
Total	41	3	30	1	42	611	90	0	22	10	27	0	30	713	34	0	1654
12:00 PM	10	1	8	0	4	163	16	0	8	0	14	0	7	187	16	1	435
12:15 PM	26	3	13	0	5	189	19	0	8	2	11	0	9	168	10	0	463
12:30 PM	17	3	15	0	7	181	27	0	7	2	15	0	9	162	11	0	456
12:45 PM	17	0	11	0	8	186	25	0	7	4	7	0	8	198	8	0	479
Total	70	7	47	0	24	719	87	0	30	8	47	0	33	715	45	1	1833
Grand Total	111	10	77	1	66	1330	177	0	52	18	74	0	63	1428	79	1	3487
Apprch %	55.8	5	38.7	0.5	4.2	84.6	11.3	0	36.1	12.5	51.4	0	4	90.9	5	0.1	
Total %	3.2	0.3	2.2	0	1.9	38.1	5.1	0	1.5	0.5	2.1	0	1.8	41	2.3	0	





File Name : #21 DRIFTWOOD&DELLRANGEMD
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	DRIFTWOOD DR Southbound					DELL RANGE BLVD Westbound					DRIFTWOOD DR Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	10	1	8	0	19	4	163	16	0	183	8	0	14	0	22	7	187	16	1	211	435
12:15 PM	26	3	13	0	42	5	189	19	0	213	8	2	11	0	21	9	168	10	0	187	463
12:30 PM	17	3	15	0	35	7	181	27	0	215	7	2	15	0	24	9	162	11	0	182	456
12:45 PM	17	0	11	0	28	8	186	25	0	219	7	4	7	0	18	8	198	8	0	214	479
Total Volume	70	7	47	0	124	24	719	87	0	830	30	8	47	0	85	33	715	45	1	794	1833
% App. Total	56.5	5.6	37.9	0		2.9	86.6	10.5	0		35.3	9.4	55.3	0		4.2	90.1	5.7	0.1		
PHF	.673	.583	.783	.000	.738	.750	.951	.806	.000	.947	.938	.500	.783	.000	.885	.917	.903	.703	.250	.928	.957

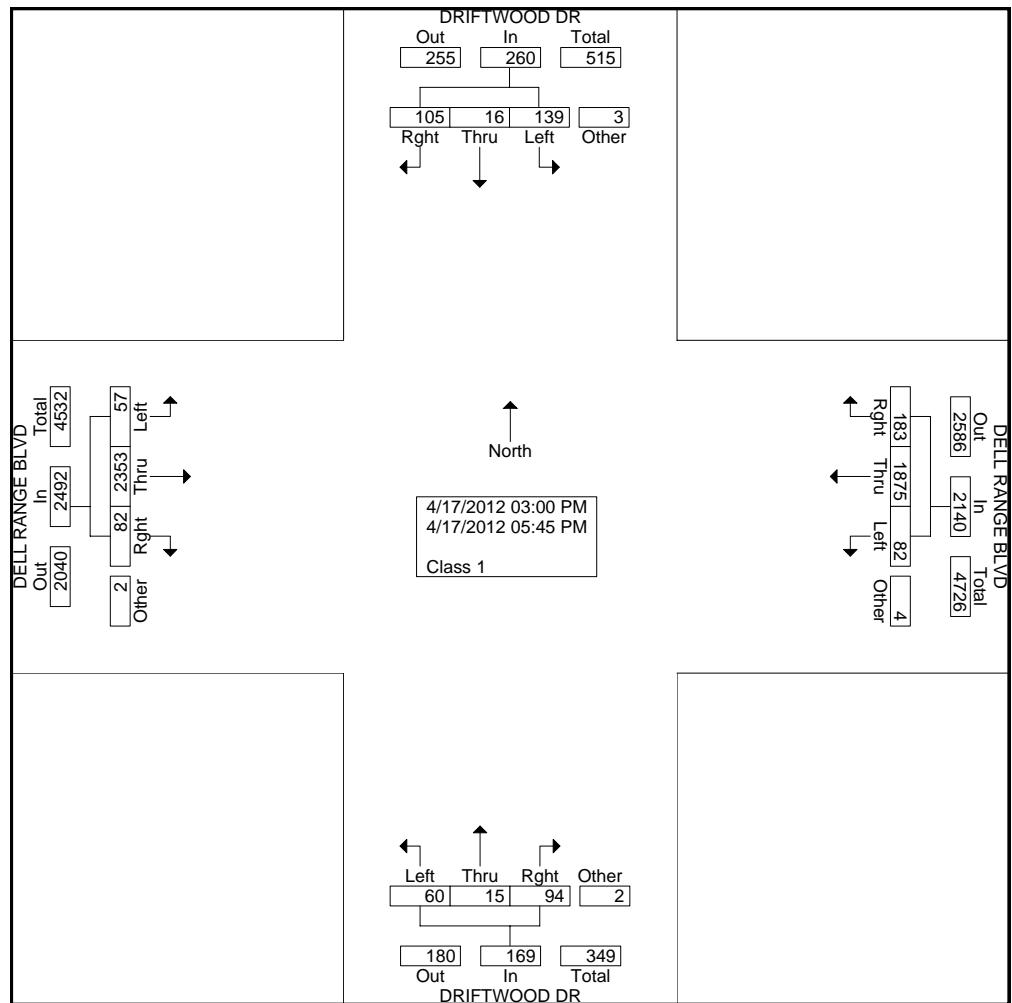




File Name : #21 DRIFTWOOD&DELLRANGEPM
 Site Code : 00000000
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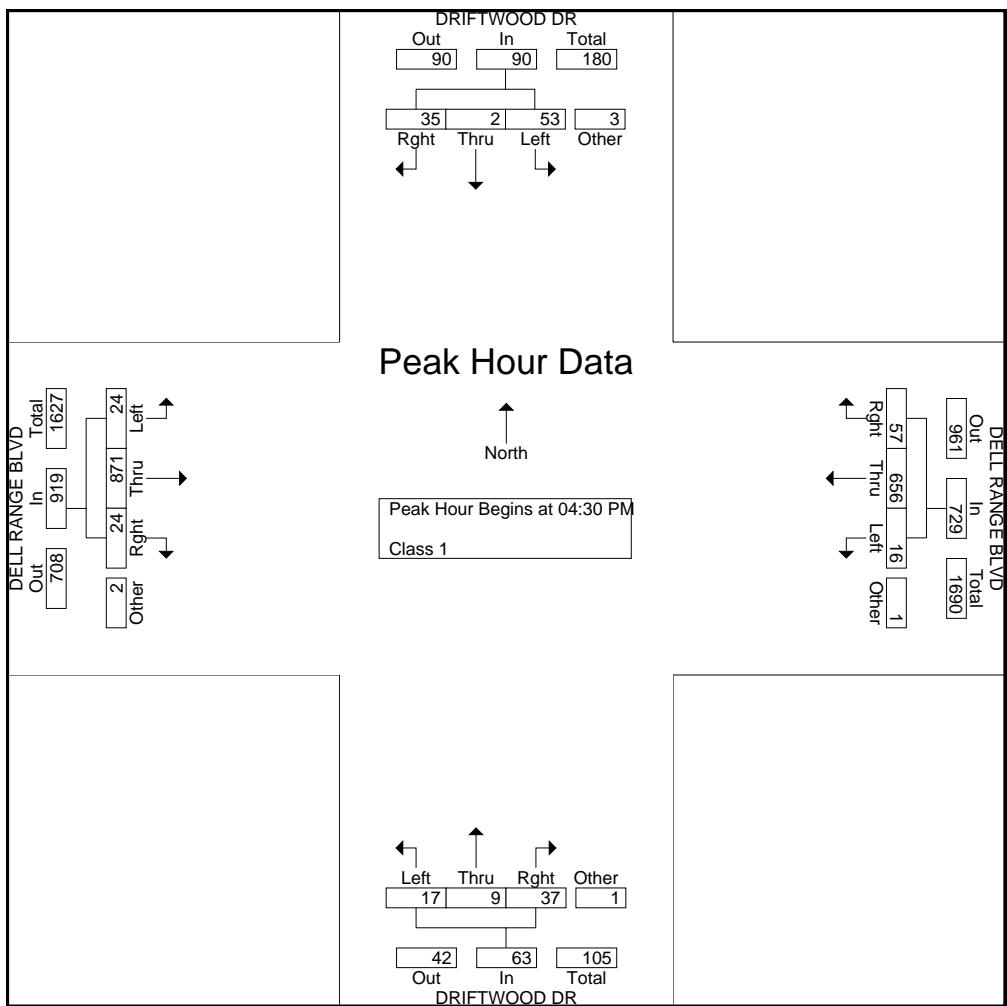
	DRIFTWOOD DR Southbound				DELL RANGE BLVD Westbound				DRIFTWOOD DR Northbound				DELL RANGE BLVD Eastbound				
Start Time	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Int. Total
03:00 PM	9	1	8	0	10	160	19	2	9	1	10	0	7	171	11	0	418
03:15 PM	8	1	6	0	4	148	16	0	7	2	2	0	2	166	8	0	370
03:30 PM	11	4	13	0	10	163	9	0	4	1	9	1	3	178	11	0	417
03:45 PM	5	1	3	0	11	141	17	1	4	0	6	0	6	203	5	0	403
Total	33	7	30	0	35	612	61	3	24	4	27	1	18	718	35	0	1608
04:00 PM	10	1	10	0	11	152	11	0	7	2	12	0	6	220	8	0	450
04:15 PM	14	1	10	0	9	143	14	0	9	0	3	0	4	203	5	0	415
04:30 PM	13	1	12	0	4	158	12	0	3	1	9	1	2	210	6	2	434
04:45 PM	14	0	3	1	5	171	14	1	5	3	9	0	6	215	5	0	452
Total	51	3	35	1	29	624	51	1	24	6	33	1	18	848	24	2	1751
05:00 PM	12	1	9	1	7	165	11	0	6	1	5	0	9	234	11	0	472
05:15 PM	14	0	11	1	0	162	20	0	3	4	14	0	7	212	2	0	450
05:30 PM	12	5	9	0	4	147	15	0	2	0	8	0	3	172	5	0	382
05:45 PM	17	0	11	0	7	165	25	0	1	0	7	0	2	169	5	0	409
Total	55	6	40	2	18	639	71	0	12	5	34	0	21	787	23	0	1713
Grand Total	139	16	105	3	82	1875	183	4	60	15	94	2	57	2353	82	2	5072
Apprch %	52.9	6.1	39.9	1.1	3.8	87.5	8.5	0.2	35.1	8.8	55	1.2	2.3	94.3	3.3	0.1	
Total %	2.7	0.3	2.1	0.1	1.6	37	3.6	0.1	1.2	0.3	1.9	0	1.1	46.4	1.6	0	





File Name : #21 DRIFTWOOD&DELLRANGEPM
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	DRIFTWOOD DR Southbound					DELL RANGE BLVD Westbound					DRIFTWOOD DR Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	13	1	12	0	26	4	158	12	0	174	3	1	9	1	14	2	210	6	2	220	434
04:45 PM	14	0	3	1	18	5	171	14	1	191	5	3	9	0	17	6	215	5	0	226	452
05:00 PM	12	1	9	1	23	7	165	11	0	183	6	1	5	0	12	9	234	11	0	254	472
05:15 PM	14	0	11	1	26	0	162	20	0	182	3	4	14	0	21	7	212	2	0	221	450
Total Volume	53	2	35	3	93	16	656	57	1	730	17	9	37	1	64	24	871	24	2	921	1808
% App. Total	57	2.2	37.6	3.2		2.2	89.9	7.8	0.1		26.6	14.1	57.8	1.6		2.6	94.6	2.6	0.2		
PHF	.946	.500	.729	.750	.894	.571	.959	.713	.250	.955	.708	.563	.661	.250	.762	.667	.931	.545	.250	.906	.958

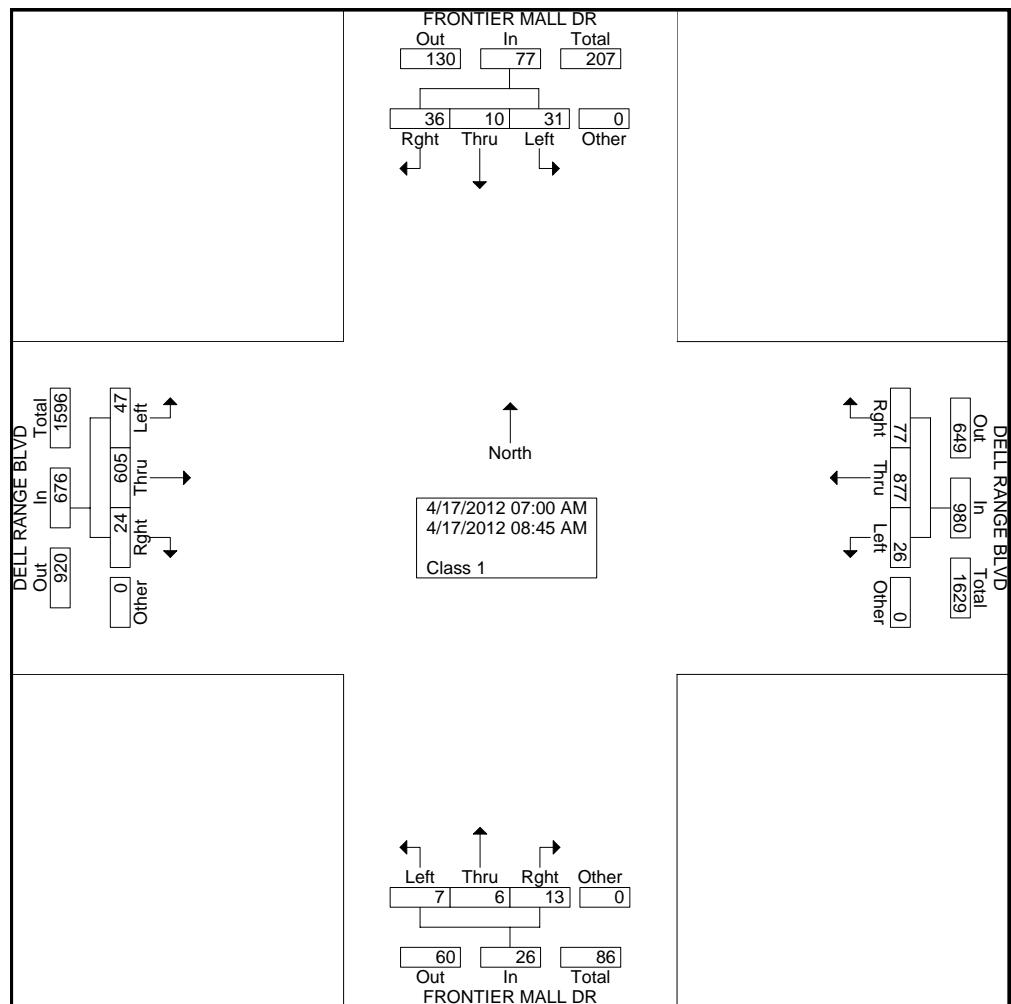




File Name : #45 FRONTIERMALL&DELLRANGEAM
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Groups Printed- Class 1

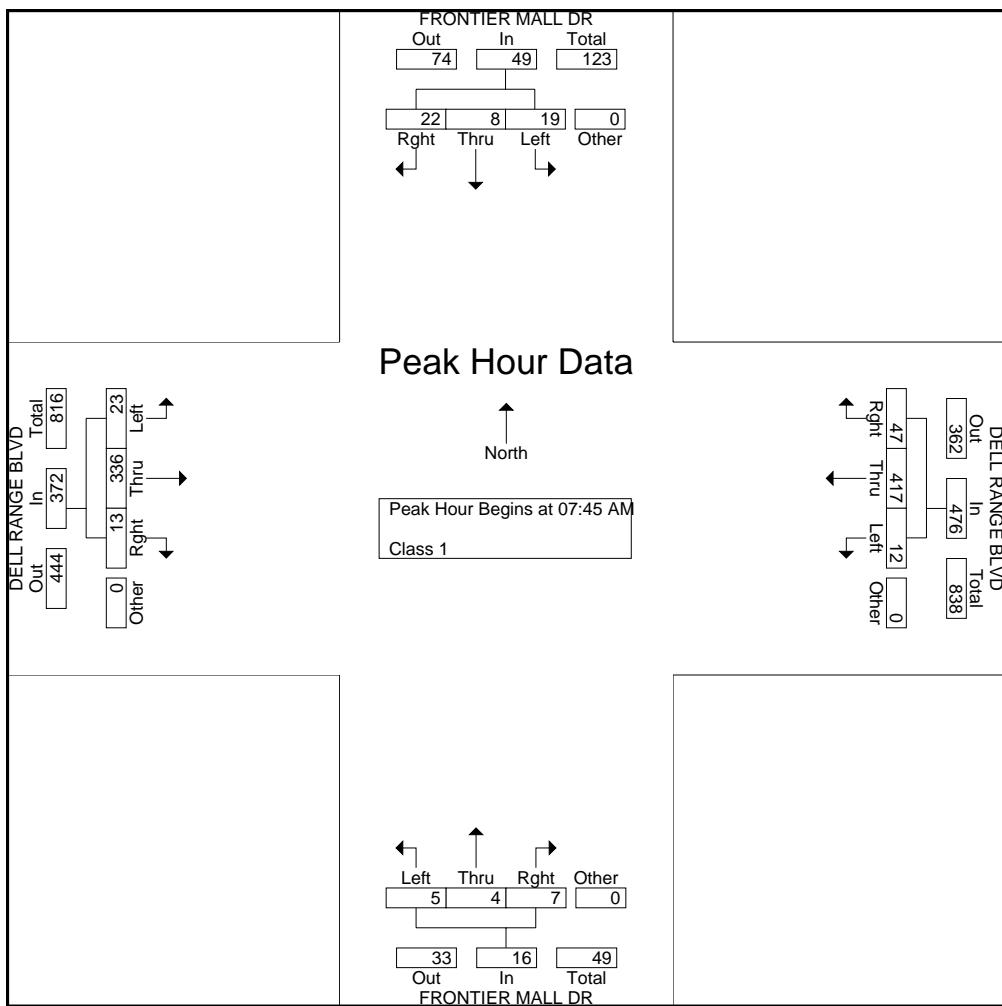
Start Time	FRONTIER MALL DR Southbound				DELL RANGE BLVD Westbound				FRONTIER MALL DR Northbound				DELL RANGE BLVD Eastbound				Int. Total
	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	
07:00 AM	3	1	0	0	2	124	5	0	0	1	0	0	3	57	1	0	197
07:15 AM	0	0	0	0	3	135	6	0	1	0	0	0	8	52	4	0	209
07:30 AM	1	0	6	0	3	108	4	0	1	0	5	0	6	75	2	0	211
07:45 AM	5	0	2	0	3	127	10	0	1	2	2	0	5	88	4	0	249
Total	9	1	8	0	11	494	25	0	3	3	7	0	22	272	11	0	866
08:00 AM	4	2	5	0	1	98	13	0	2	1	0	0	6	86	2	0	220
08:15 AM	8	1	11	0	2	97	10	0	2	0	0	0	4	74	5	0	214
08:30 AM	2	5	4	0	6	95	14	0	0	1	5	0	8	88	2	0	230
08:45 AM	8	1	8	0	6	93	15	0	0	1	1	0	7	85	4	0	229
Total	22	9	28	0	15	383	52	0	4	3	6	0	25	333	13	0	893
Grand Total	31	10	36	0	26	877	77	0	7	6	13	0	47	605	24	0	1759
Apprch %	40.3	13	46.8	0	2.7	89.5	7.9	0	26.9	23.1	50	0	7	89.5	3.6	0	
Total %	1.8	0.6	2	0	1.5	49.9	4.4	0	0.4	0.3	0.7	0	2.7	34.4	1.4	0	





File Name : #45 FRONTIERMALL&DELLRANGEAM
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	FRONTIER MALL DR Southbound					DELL RANGE BLVD Westbound					FRONTIER MALL DR Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	5	0	2	0	7	3	127	10	0	140	1	2	2	0	5	5	88	4	0	97	249
08:00 AM	4	2	5	0	11	1	98	13	0	112	2	1	0	0	3	6	86	2	0	94	220
08:15 AM	8	1	11	0	20	2	97	10	0	109	2	0	0	0	2	4	74	5	0	83	214
08:30 AM	2	5	4	0	11	6	95	14	0	115	0	1	5	0	6	8	88	2	0	98	230
Total Volume	19	8	22	0	49	12	417	47	0	476	5	4	7	0	16	23	336	13	0	372	913
% App. Total	38.8	16.3	44.9	0		2.5	87.6	9.9	0		31.2	25	43.8	0		6.2	90.3	3.5	0		
PHF	.594	.400	.500	.000	.613	.500	.821	.839	.000	.850	.625	.500	.350	.000	.667	.719	.955	.650	.000	.949	.917

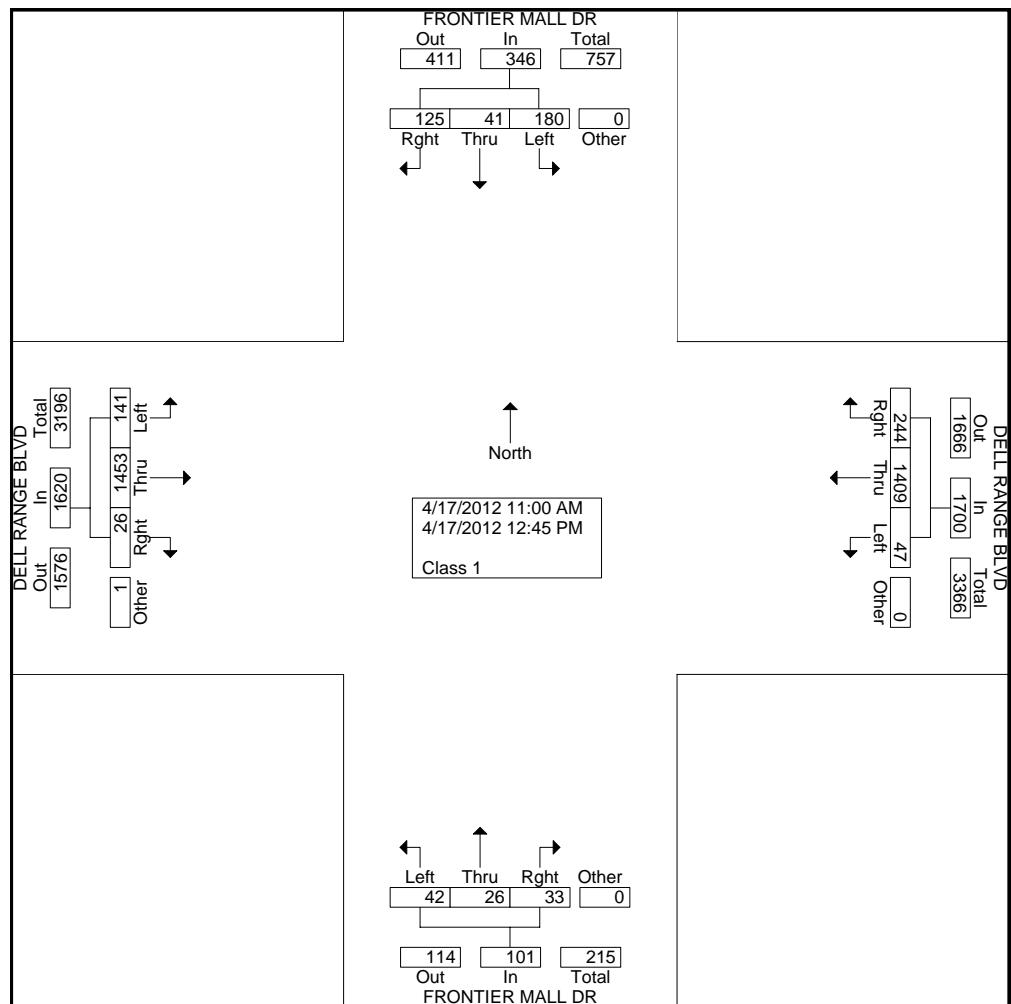




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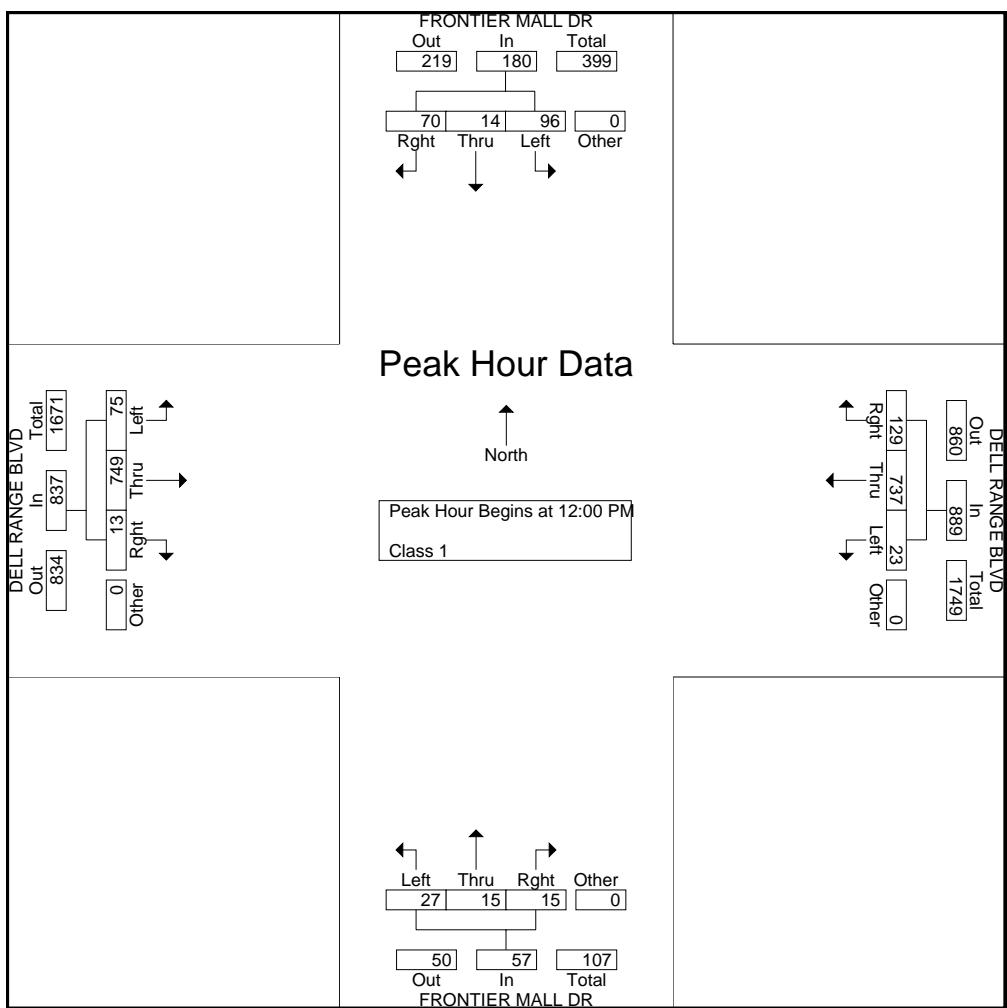
Start Time	FRONTIER MALL DR Southbound				DELL RANGE BLVD Westbound				FRONTIER MALL DR Northbound				DELL RANGE BLVD Eastbound				Int. Total
	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	
11:00 AM	18	5	12	0	9	151	25	0	3	0	2	0	19	188	3	0	435
11:15 AM	26	6	15	0	7	168	40	0	3	3	8	0	24	156	4	0	460
11:30 AM	20	5	13	0	4	174	22	0	2	5	1	0	12	189	2	0	449
11:45 AM	20	11	15	0	4	179	28	0	7	3	7	0	11	171	4	1	461
Total	84	27	55	0	24	672	115	0	15	11	18	0	66	704	13	1	1805
12:00 PM	21	7	13	0	8	175	33	0	5	2	5	0	20	193	2	0	484
12:15 PM	22	4	15	0	6	191	31	0	6	5	5	0	25	183	1	0	494
12:30 PM	29	2	22	0	6	182	25	0	10	5	2	0	14	179	5	0	481
12:45 PM	24	1	20	0	3	189	40	0	6	3	3	0	16	194	5	0	504
Total	96	14	70	0	23	737	129	0	27	15	15	0	75	749	13	0	1963
Grand Total	180	41	125	0	47	1409	244	0	42	26	33	0	141	1453	26	1	3768
Apprch %	52	11.8	36.1	0	2.8	82.9	14.4	0	41.6	25.7	32.7	0	8.7	89.6	1.6	0.1	
Total %	4.8	1.1	3.3	0	1.2	37.4	6.5	0	1.1	0.7	0.9	0	3.7	38.6	0.7	0	





File Name : #45 FRONTIERMALL&DELLRANGEMD
 Site Code : 00000000
 Start Date : 4/17/2012
 Page No : 2

	FRONTIER MALL DR Southbound					DELL RANGE BLVD Westbound					FRONTIER MALL DR Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	21	7	13	0	41	8	175	33	0	216	5	2	5	0	12	20	193	2	0	215	484
12:15 PM	22	4	15	0	41	6	191	31	0	228	6	5	5	0	16	25	183	1	0	209	494
12:30 PM	29	2	22	0	53	6	182	25	0	213	10	5	2	0	17	14	179	5	0	198	481
12:45 PM	24	1	20	0	45	3	189	40	0	232	6	3	3	0	12	16	194	5	0	215	504
Total Volume	96	14	70	0	180	23	737	129	0	889	27	15	15	0	57	75	749	13	0	837	1963
% App. Total	53.3	7.8	38.9	0		2.6	82.9	14.5	0		47.4	26.3	26.3	0		9	89.5	1.6	0		
PHF	.828	.500	.795	.000	.849	.719	.965	.806	.000	.958	.675	.750	.750	.000	.838	.750	.965	.650	.000	.973	.974

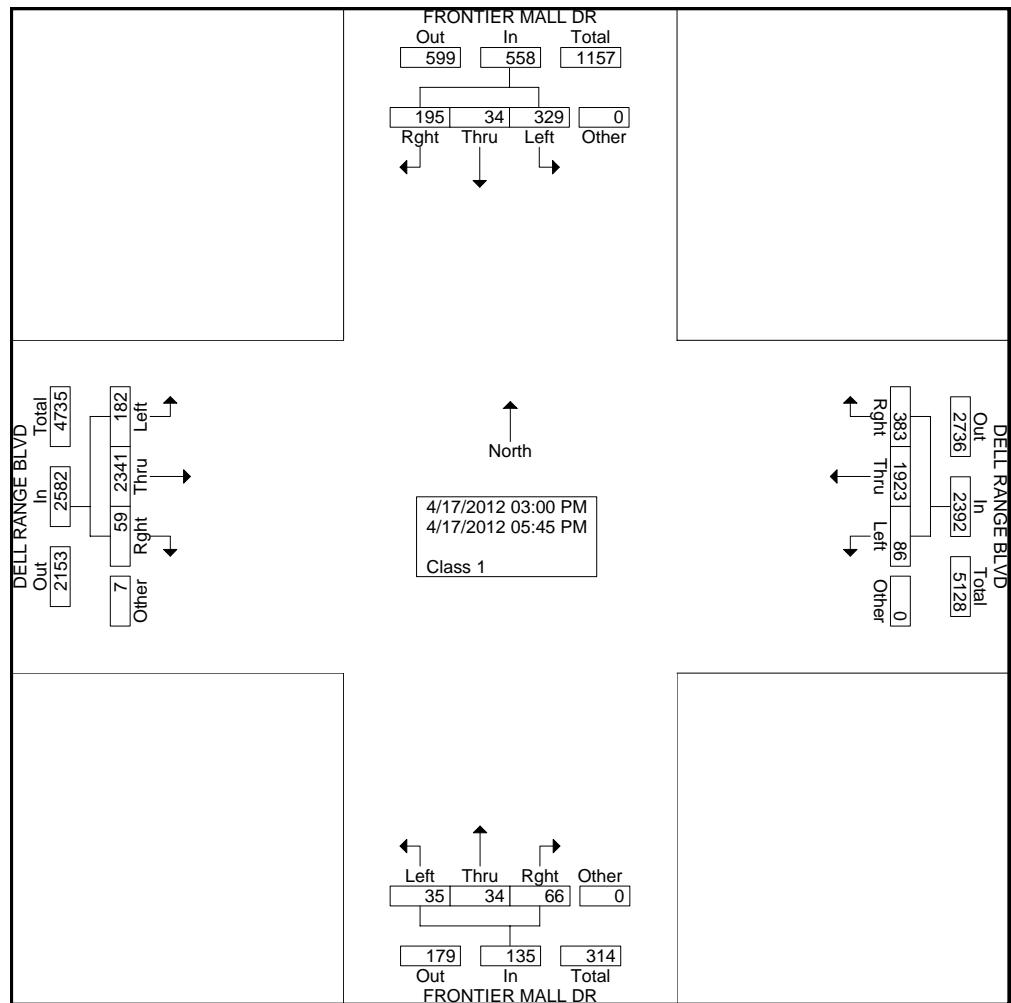




File Name : #45 FRONTIERMALL&DELLRANGEPM
 Site Code : 00000000
 Start Date : 4/17/2012
 Page No : 1

Groups Printed- Class 1

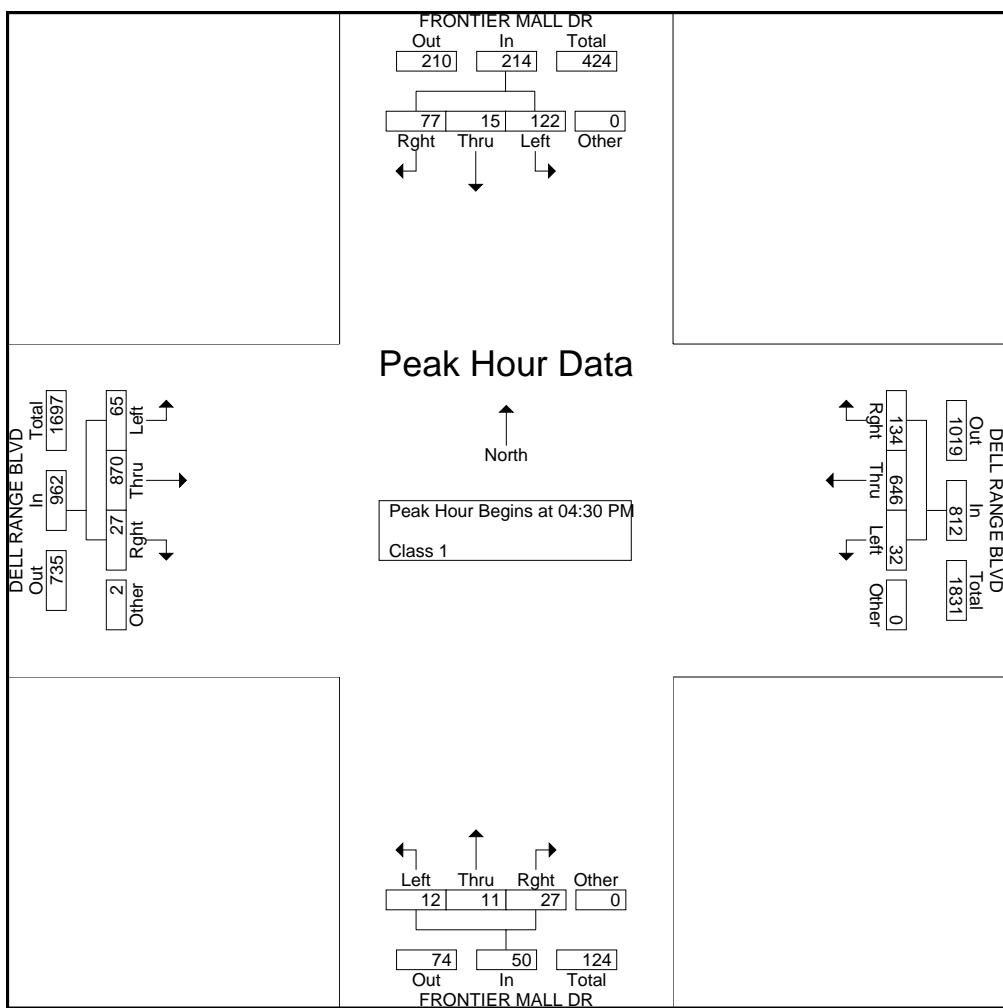
Start Time	FRONTIER MALL DR Southbound				DELL RANGE BLVD Westbound				FRONTIER MALL DR Northbound				DELL RANGE BLVD Eastbound				Int. Total
	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	
03:00 PM	27	1	14	0	6	173	26	0	6	0	6	0	16	176	4	0	455
03:15 PM	19	1	12	0	6	152	20	0	1	2	3	0	9	158	8	0	391
03:30 PM	22	1	21	0	7	158	21	0	1	3	1	0	17	180	1	1	434
03:45 PM	21	4	13	0	12	159	38	0	3	3	2	0	16	195	1	0	467
Total	89	7	60	0	31	642	105	0	11	8	12	0	58	709	14	1	1747
04:00 PM	22	5	17	0	11	163	43	0	1	6	4	0	13	223	3	2	513
04:15 PM	40	1	12	0	7	146	29	0	2	4	2	0	18	193	8	1	463
04:30 PM	37	5	18	0	10	158	32	0	1	5	8	0	17	213	7	0	511
04:45 PM	23	1	26	0	3	160	39	0	5	3	6	0	11	218	3	1	499
Total	122	12	73	0	31	627	143	0	9	18	20	0	59	847	21	4	1986
05:00 PM	32	4	21	0	12	168	31	0	1	2	4	0	22	232	8	1	538
05:15 PM	30	5	12	0	7	160	32	0	5	1	9	0	15	207	9	0	492
05:30 PM	36	3	18	0	4	145	35	0	5	3	10	0	13	181	2	1	456
05:45 PM	20	3	11	0	1	181	37	0	4	2	11	0	15	165	5	0	455
Total	118	15	62	0	24	654	135	0	15	8	34	0	65	785	24	2	1941
Grand Total	329	34	195	0	86	1923	383	0	35	34	66	0	182	2341	59	7	5674
Apprch %	59	6.1	34.9	0	3.6	80.4	16	0	25.9	25.2	48.9	0	7	90.4	2.3	0.3	
Total %	5.8	0.6	3.4	0	1.5	33.9	6.8	0	0.6	0.6	1.2	0	3.2	41.3	1	0.1	





File Name : #45 FRONTIERMALL&DELLRANGEPM
 Site Code : 00000000
 Start Date : 4/17/2012
 Page No : 2

	FRONTIER MALL DR Southbound					DELL RANGE BLVD Westbound					FRONTIER MALL DR Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	37	5	18	0	60	10	158	32	0	200	1	5	8	0	14	17	213	7	0	237	511
04:45 PM	23	1	26	0	50	3	160	39	0	202	5	3	6	0	14	11	218	3	1	233	499
05:00 PM	32	4	21	0	57	12	168	31	0	211	1	2	4	0	7	22	232	8	1	263	538
05:15 PM	30	5	12	0	47	7	160	32	0	199	5	1	9	0	15	15	207	9	0	231	492
Total Volume	122	15	77	0	214	32	646	134	0	812	12	11	27	0	50	65	870	27	2	964	2040
% App. Total	57	7	36	0		3.9	79.6	16.5	0		24	22	54	0		6.7	90.2	2.8	0.2		
PHF	.824	.750	.740	.000	.892	.667	.961	.859	.000	.962	.600	.550	.750	.000	.833	.739	.938	.750	.500	.916	.948

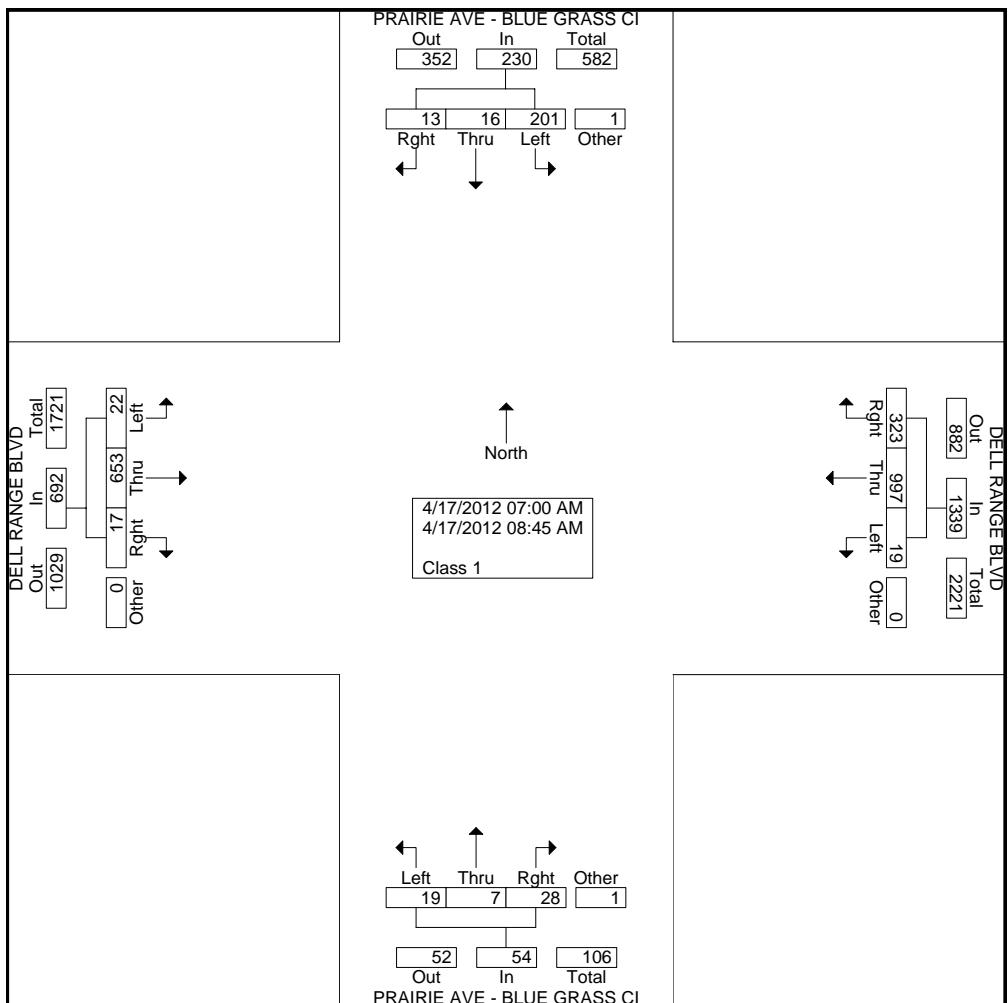




File Name : #46 PRAIRIE&DELLRANGEAM
 Site Code : 00000000
 Start Date : 4/17/2012
 Page No : 1

Groups Printed- Class 1

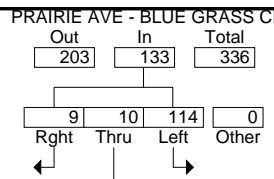
	PRAIRIE AVE - BLUE GRASS CI Southbound				DELL RANGE BLVD Westbound				PRAIRIE AVE - BLUE GRASS CI Northbound				DELL RANGE BLVD Eastbound				
Start Time	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Int. Total
07:00 AM	14	0	0	0	1	131	22	0	2	1	1	0	2	61	2	0	237
07:15 AM	14	3	1	0	1	142	23	0	0	0	5	0	2	54	0	0	245
07:30 AM	26	2	0	1	2	125	36	0	1	2	6	0	3	78	1	0	283
07:45 AM	29	4	1	0	3	153	50	0	2	1	6	0	3	89	5	0	346
Total	83	9	2	1	7	551	131	0	5	4	18	0	10	282	8	0	1111
08:00 AM	29	3	1	0	3	108	47	0	5	0	3	0	3	89	2	0	293
08:15 AM	25	2	3	0	4	109	40	0	3	3	1	0	1	81	4	0	276
08:30 AM	31	1	4	0	1	116	51	0	3	0	6	0	4	96	2	0	315
08:45 AM	33	1	3	0	4	113	54	0	3	0	0	1	4	105	1	0	322
Total	118	7	11	0	12	446	192	0	14	3	10	1	12	371	9	0	1206
Grand Total	201	16	13	1	19	997	323	0	19	7	28	1	22	653	17	0	2317
Apprch %	87	6.9	5.6	0.4	1.4	74.5	24.1	0	34.5	12.7	50.9	1.8	3.2	94.4	2.5	0	
Total %	8.7	0.7	0.6	0	0.8	43	13.9	0	0.8	0.3	1.2	0	0.9	28.2	0.7	0	



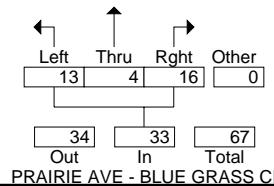
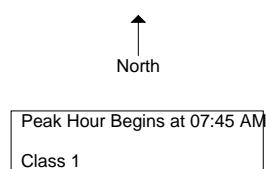
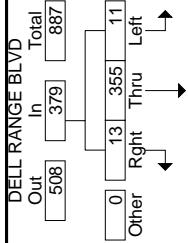


File Name : #46 PRAIRIE&DELLRANGEAM
 Site Code : 00000000
 Start Date : 4/17/2012
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	PRAIRIE AVE - BLUE GRASS CI Southbound					DELL RANGE BLVD Westbound					PRAIRIE AVE - BLUE GRASS CI Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Right	Other	App. Total	Left	Thru	Right	Other	App. Total	Left	Thru	Right	Other	App. Total	Left	Thru	Right	Other	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	29	4	1	0	34	3	153	50	0	206	2	1	6	0	9	3	89	5	0	97	346
08:00 AM	29	3	1	0	33	3	108	47	0	158	5	0	3	0	8	3	89	2	0	94	293
08:15 AM	25	2	3	0	30	4	109	40	0	153	3	3	1	0	7	1	81	4	0	86	276
08:30 AM	31	1	4	0	36	1	116	51	0	168	3	0	6	0	9	4	96	2	0	102	315
Total Volume	114	10	9	0	133	11	486	188	0	685	13	4	16	0	33	11	355	13	0	379	1230
% App. Total	85.7	7.5	6.8	0		1.6	70.9	27.4	0		39.4	12.1	48.5	0		2.9	93.7	3.4	0		
PHF	.919	.625	.563	.000	.924	.688	.794	.922	.000	.831	.650	.333	.667	.000	.917	.688	.924	.650	.000	.929	.889



Peak Hour Data

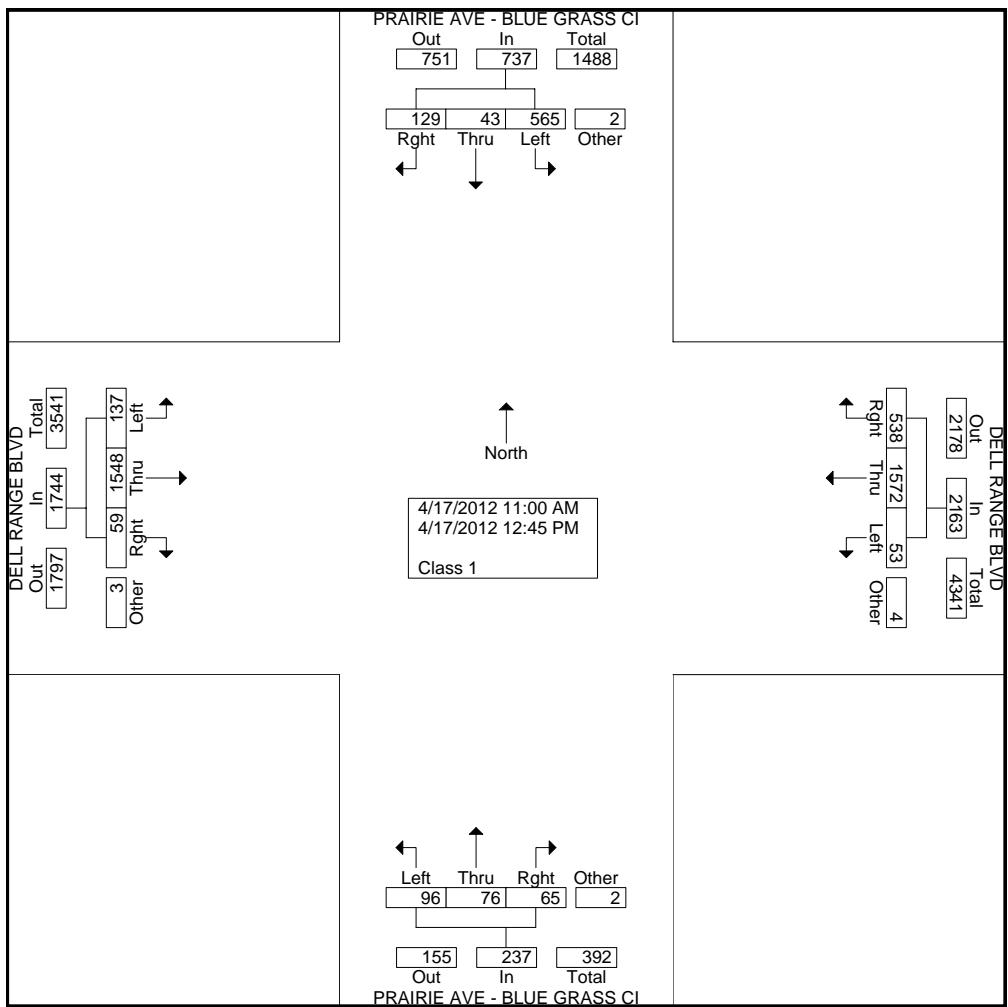




File Name : #46 PRAIRIE&DELLRANGEMD
 Site Code : 00000000
 Start Date : 4/17/2012
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Groups Printed- Class 1

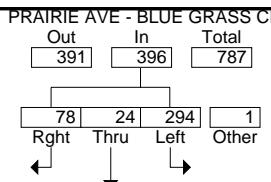
	PRAIRIE AVE - BLUE GRASS CI Southbound				DELL RANGE BLVD Westbound				PRAIRIE AVE - BLUE GRASS CI Northbound				DELL RANGE BLVD Eastbound				
Start Time	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Int. Total
11:00 AM	70	4	6	0	7	174	67	0	10	6	5	1	11	194	4	1	560
11:15 AM	68	3	20	0	4	194	72	0	9	9	7	0	10	174	7	0	577
11:30 AM	67	8	13	1	7	198	66	2	14	9	4	0	17	192	9	1	608
11:45 AM	66	4	12	0	9	207	61	0	16	11	12	0	21	190	3	0	612
Total	271	19	51	1	27	773	266	2	49	35	28	1	59	750	23	2	2357
12:00 PM	81	8	20	1	8	190	69	2	13	14	11	1	18	203	6	1	646
12:15 PM	60	2	14	0	5	212	68	0	13	8	6	0	21	202	8	0	619
12:30 PM	76	3	20	0	7	194	65	0	12	9	9	0	20	185	11	0	611
12:45 PM	77	11	24	0	6	203	70	0	9	10	11	0	19	208	11	0	659
Total	294	24	78	1	26	799	272	2	47	41	37	1	78	798	36	1	2535
Grand Total	565	43	129	2	53	1572	538	4	96	76	65	2	137	1548	59	3	4892
Apprch %	76.5	5.8	17.5	0.3	2.4	72.5	24.8	0.2	40.2	31.8	27.2	0.8	7.8	88.6	3.4	0.2	
Total %	11.5	0.9	2.6	0	1.1	32.1	11	0.1	2	1.6	1.3	0	2.8	31.6	1.2	0.1	



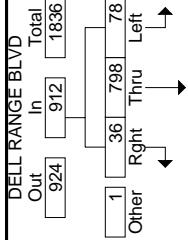


File Name : #46 PRAIRIE&DELLRANGEMD
 Site Code : 00000000
 Start Date : 4/17/2012
 Page No : 2

	PRAIRIE AVE - BLUE GRASS CI Southbound					DELL RANGE BLVD Westbound					PRAIRIE AVE - BLUE GRASS CI Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Right	Other	App. Total	Left	Thru	Right	Other	App. Total	Left	Thru	Right	Other	App. Total	Left	Thru	Right	Other	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	81	8	20	1	110	8	190	69	2	269	13	14	11	1	39	18	203	6	1	228	646
12:15 PM	60	2	14	0	76	5	212	68	0	285	13	8	6	0	27	21	202	8	0	231	619
12:30 PM	76	3	20	0	99	7	194	65	0	266	12	9	9	0	30	20	185	11	0	216	611
12:45 PM	77	11	24	0	112	6	203	70	0	279	9	10	11	0	30	19	208	11	0	238	659
Total Volume	294	24	78	1	397	26	799	272	2	1099	47	41	37	1	126	78	798	36	1	913	2535
% App. Total	74.1	6	19.6	0.3		2.4	72.7	24.7	0.2		37.3	32.5	29.4	0.8		8.5	87.4	3.9	0.1		
PHF	.907	.545	.813	.250	.886	.813	.942	.971	.250	.964	.904	.732	.841	.250	.808	.929	.959	.818	.250	.959	.962

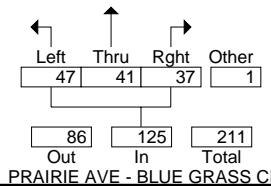
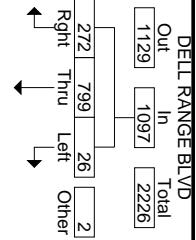


Peak Hour Data



Peak Hour Begins at 12:00 PM
 Class 1

North



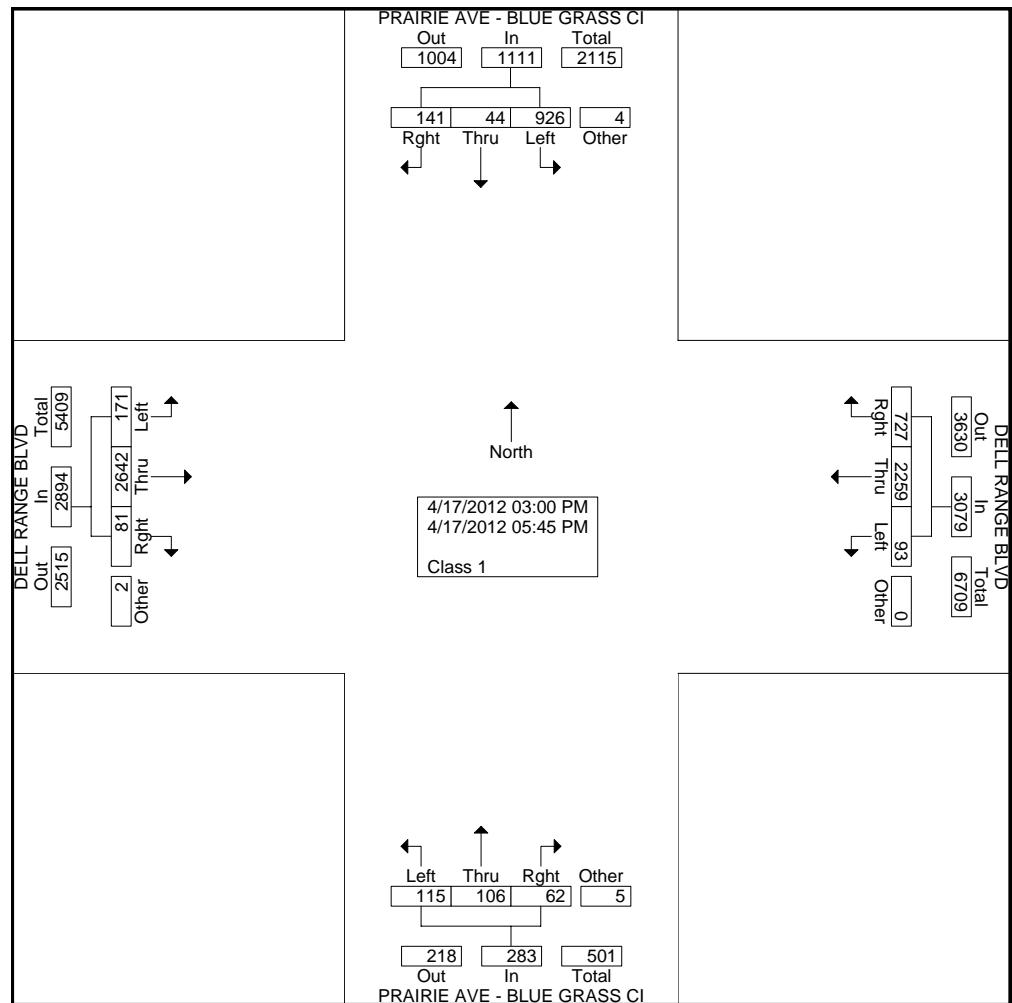
86 [Out]
 125 [In]
 211 [Total]



File Name : #46 PRAIRIE&DELLRANGEPM
 Site Code : 00000000
 Start Date : 4/17/2012
 Page No : 1

Groups Printed- Class 1

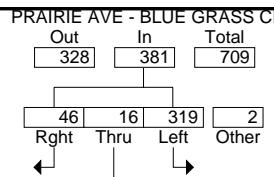
	PRAIRIE AVE - BLUE GRASS CI Southbound				DELL RANGE BLVD Westbound				PRAIRIE AVE - BLUE GRASS CI Northbound				DELL RANGE BLVD Eastbound				
Start Time	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Int. Total
03:00 PM	82	4	14	0	3	193	49	0	9	5	4	2	9	214	7	1	596
03:15 PM	71	3	9	0	7	167	48	0	11	11	3	0	13	180	6	1	530
03:30 PM	75	1	11	0	3	169	70	0	7	8	6	1	9	196	4	0	560
03:45 PM	74	3	10	0	8	196	60	0	7	7	5	0	21	201	5	0	597
Total	302	11	44	0	21	725	227	0	34	31	18	3	52	791	22	2	2283
04:00 PM	83	6	17	2	5	205	72	0	8	13	3	0	15	237	9	0	675
04:15 PM	76	3	8	0	9	170	59	0	6	4	9	0	19	214	12	0	589
04:30 PM	82	2	9	0	13	195	63	0	9	4	6	0	10	247	9	0	649
04:45 PM	64	4	11	2	10	193	66	0	6	7	6	2	15	245	4	0	635
Total	305	15	45	4	37	763	260	0	29	28	24	2	59	943	34	0	2548
05:00 PM	84	4	16	0	9	201	45	0	10	14	4	0	18	263	8	0	676
05:15 PM	89	6	10	0	7	188	60	0	17	12	8	0	14	224	8	0	643
05:30 PM	74	4	9	0	13	185	70	0	8	9	7	0	13	226	2	0	620
05:45 PM	72	4	17	0	6	197	65	0	17	12	1	0	15	195	7	0	608
Total	319	18	52	0	35	771	240	0	52	47	20	0	60	908	25	0	2547
Grand Total	926	44	141	4	93	2259	727	0	115	106	62	5	171	2642	81	2	7378
Apprch %	83	3.9	12.6	0.4	3	73.4	23.6	0	39.9	36.8	21.5	1.7	5.9	91.2	2.8	0.1	
Total %	12.6	0.6	1.9	0.1	1.3	30.6	9.9	0	1.6	1.4	0.8	0.1	2.3	35.8	1.1	0	



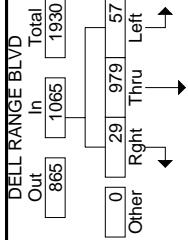


File Name : #46 PRAIRIE&DELLRANGEPM
 Site Code : 00000000
 Start Date : 4/17/2012
 Page No : 2

	PRAIRIE AVE - BLUE GRASS CI Southbound					DELL RANGE BLVD Westbound					PRAIRIE AVE - BLUE GRASS CI Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	82	2	9	0	93	13	195	63	0	271	9	4	6	0	19	10	247	9	0	266	649
04:45 PM	64	4	11	2	81	10	193	66	0	269	6	7	6	2	21	15	245	4	0	264	635
05:00 PM	84	4	16	0	104	9	201	45	0	255	10	14	4	0	28	18	263	8	0	289	676
05:15 PM	89	6	10	0	105	7	188	60	0	255	17	12	8	0	37	14	224	8	0	246	643
Total Volume	319	16	46	2	383	39	777	234	0	1050	42	37	24	2	105	57	979	29	0	1065	2603
% App. Total	83.3	4.2	12	0.5		3.7	74	22.3	0		40	35.2	22.9	1.9		5.4	91.9	2.7	0		
PHF	.896	.667	.719	.250	.912	.750	.966	.886	.000	.969	.618	.661	.750	.250	.709	.792	.931	.806	.000	.921	.963

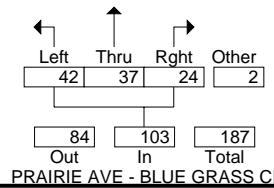
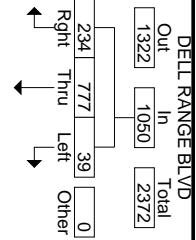


Peak Hour Data



Peak Hour Begins at 04:30 PM
 Class 1

North

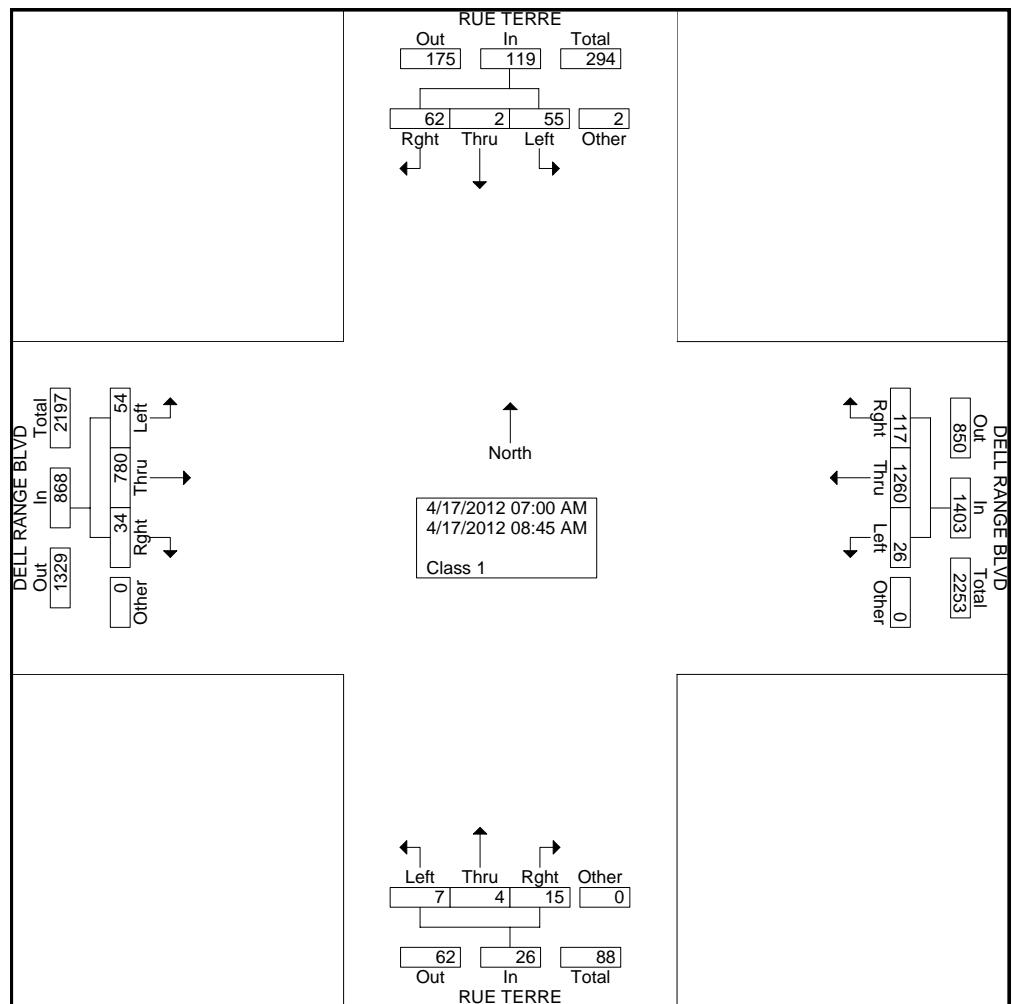




File Name : #54 DELLRANGE&RUETERREAM
 Site Code : 00000000
 Start Date : 4/17/2012
 Page No : 1

Groups Printed- Class 1

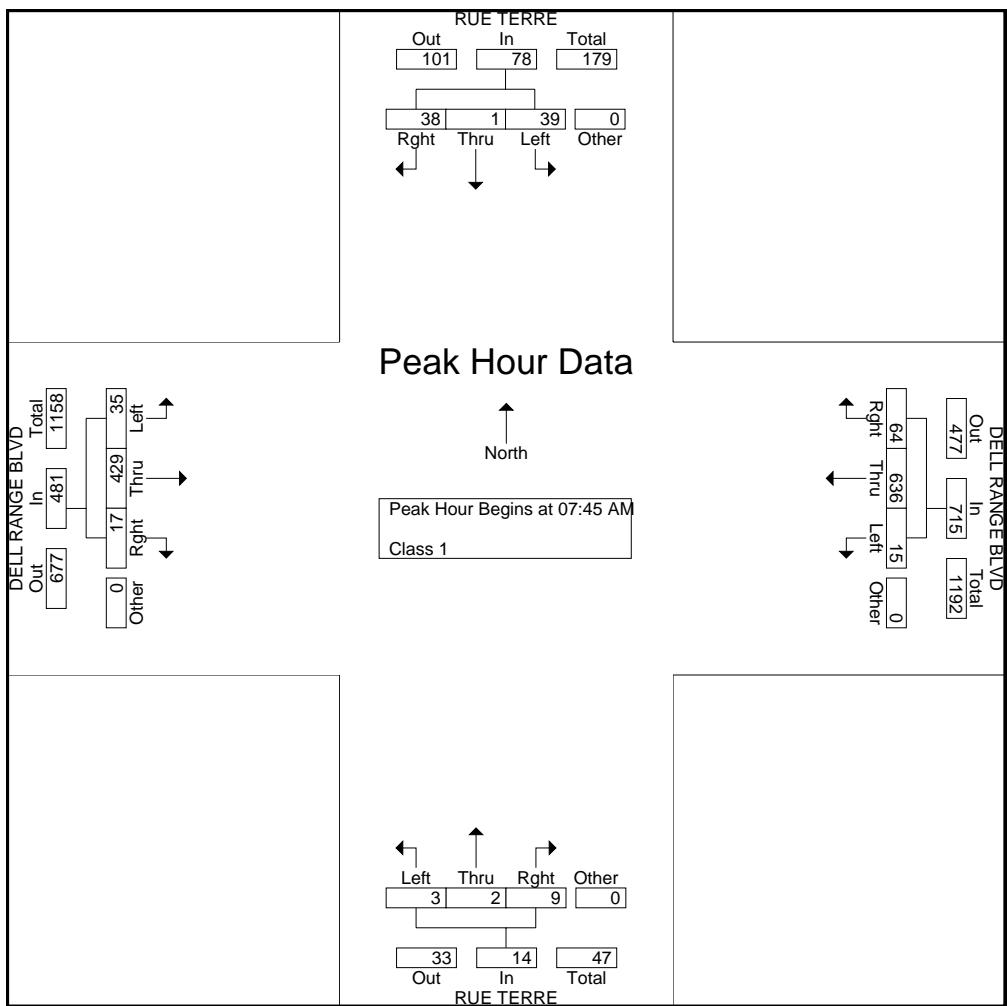
Start Time	RUE TERRE Southbound				DELL RANGE BLVD Westbound				RUE TERRE Northbound				DELL RANGE BLVD Eastbound				Int. Total
	Rght	Thru	Left	Other	Rght	Thru	Left	Other	Rght	Thru	Left	Other	Rght	Thru	Left	Other	
07:00 AM	3	0	0	0	11	150	1	0	0	1	0	0	6	65	3	0	240
07:15 AM	6	0	2	2	10	162	1	0	0	0	1	0	2	63	6	0	255
07:30 AM	3	1	5	0	20	157	3	0	2	0	1	0	3	99	3	0	297
07:45 AM	12	0	13	0	25	192	7	0	2	0	0	0	5	112	7	0	375
Total	24	1	20	2	66	661	12	0	4	1	2	0	16	339	19	0	1167
08:00 AM	6	0	10	0	14	153	3	0	1	1	0	0	6	113	9	0	316
08:15 AM	10	1	7	0	8	135	2	0	4	1	1	0	5	90	5	0	269
08:30 AM	10	0	9	0	17	156	3	0	2	0	2	0	1	114	14	0	328
08:45 AM	12	0	9	0	12	155	6	0	4	1	2	0	6	124	7	0	338
Total	38	1	35	0	51	599	14	0	11	3	5	0	18	441	35	0	1251
Grand Total	62	2	55	2	117	1260	26	0	15	4	7	0	34	780	54	0	2418
Apprch %	51.2	1.7	45.5	1.7	8.3	89.8	1.9	0	57.7	15.4	26.9	0	3.9	89.9	6.2	0	
Total %	2.6	0.1	2.3	0.1	4.8	52.1	1.1	0	0.6	0.2	0.3	0	1.4	32.3	2.2	0	





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	RUE TERRE Southbound					DELL RANGE BLVD Westbound					RUE TERRE Northbound					DELL RANGE BLVD Eastbound					
Start Time	Rght	Thru	Left	Other	App. Total	Rght	Thru	Left	Other	App. Total	Rght	Thru	Left	Other	App. Total	Rght	Thru	Left	Other	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	12	0	13	0	25	25	192	7	0	224	2	0	0	0	2	5	112	7	0	124	375
08:00 AM	6	0	10	0	16	14	153	3	0	170	1	1	0	0	2	6	113	9	0	128	316
08:15 AM	10	1	7	0	18	8	135	2	0	145	4	1	1	0	6	5	90	5	0	100	269
08:30 AM	10	0	9	0	19	17	156	3	0	176	2	0	2	0	4	1	114	14	0	129	328
Total Volume	38	1	39	0	78	64	636	15	0	715	9	2	3	0	14	17	429	35	0	481	1288
% App. Total	48.7	1.3	50	0		9	89	2.1	0		64.3	14.3	21.4	0		3.5	89.2	7.3	0		
PHF	.792	.250	.750	.000	.780	.640	.828	.536	.000	.798	.563	.500	.375	.000	.583	.708	.941	.625	.000	.932	.859

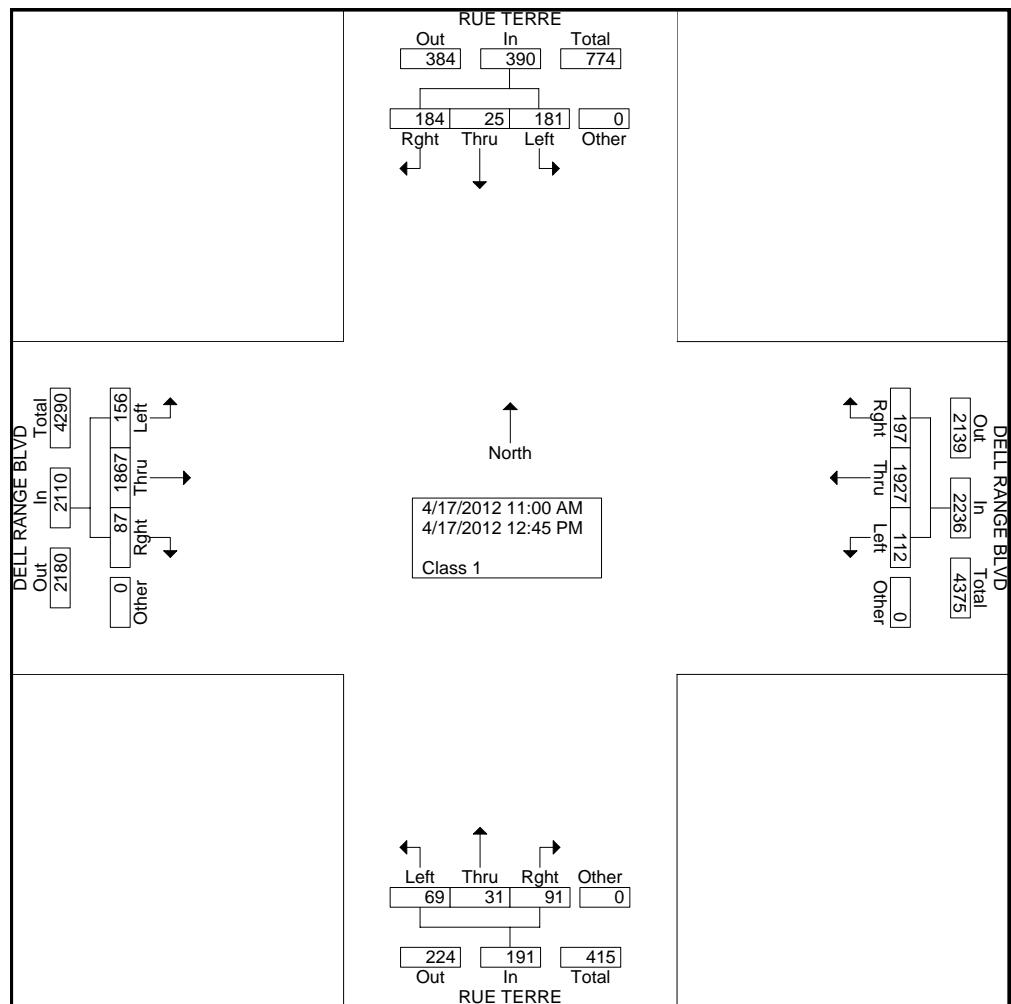




File Name : #54 DELLRANGE&RUETERREM
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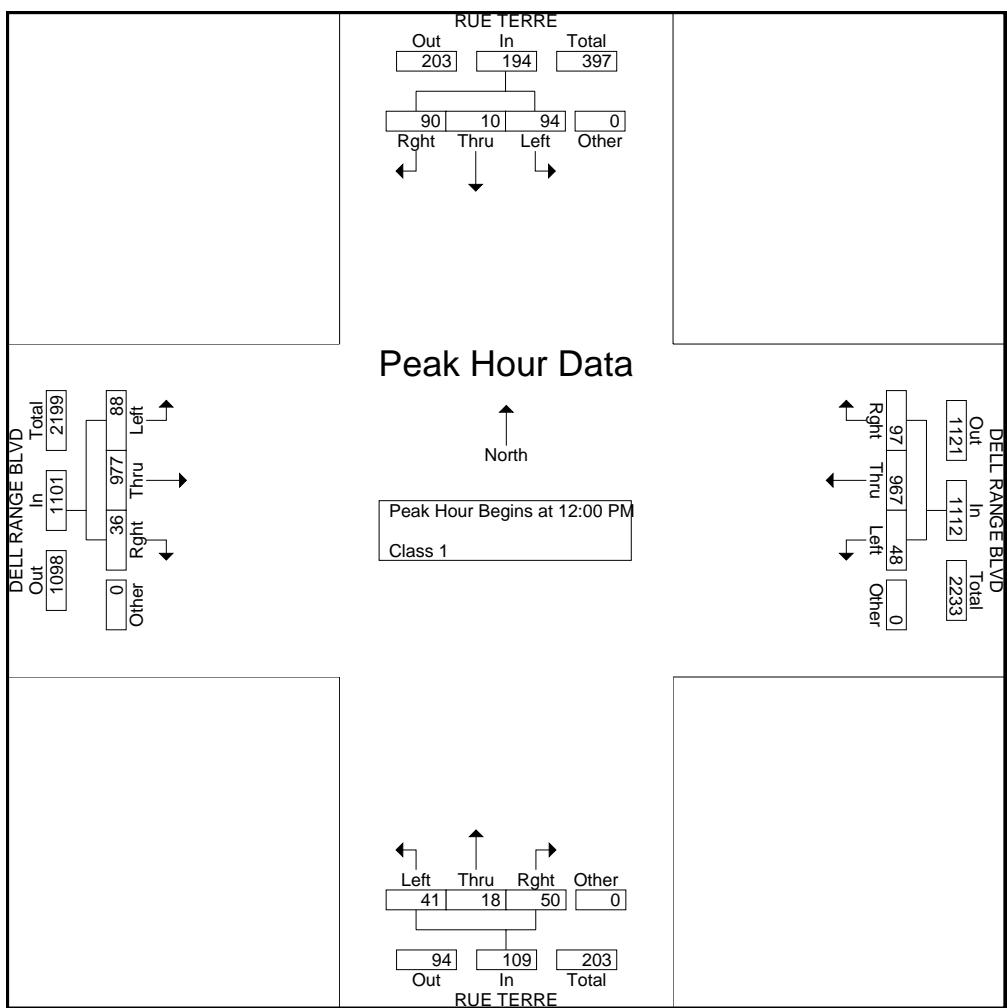
	RUE TERRE Southbound				DELL RANGE BLVD Westbound				RUE TERRE Northbound				DELL RANGE BLVD Eastbound				
Start Time	Rght	Thru	Left	Other	Rght	Thru	Left	Other	Rght	Thru	Left	Other	Rght	Thru	Left	Other	Int. Total
11:00 AM	11	4	25	0	23	242	17	0	7	4	5	0	17	230	24	0	609
11:15 AM	26	3	16	0	22	233	12	0	8	3	8	0	10	214	13	0	568
11:30 AM	28	3	18	0	27	241	15	0	12	3	7	0	10	212	22	0	598
11:45 AM	29	5	28	0	28	244	20	0	14	3	8	0	14	234	9	0	636
Total	94	15	87	0	100	960	64	0	41	13	28	0	51	890	68	0	2411
12:00 PM	24	1	22	0	25	236	8	0	9	5	9	0	11	246	33	0	629
12:15 PM	14	2	24	0	25	261	10	0	10	5	11	0	12	220	23	0	617
12:30 PM	30	5	26	0	22	227	17	0	18	5	10	0	7	242	17	0	626
12:45 PM	22	2	22	0	25	243	13	0	13	3	11	0	6	269	15	0	644
Total	90	10	94	0	97	967	48	0	50	18	41	0	36	977	88	0	2516
Grand Total	184	25	181	0	197	1927	112	0	91	31	69	0	87	1867	156	0	4927
Apprch %	47.2	6.4	46.4	0	8.8	86.2	5	0	47.6	16.2	36.1	0	4.1	88.5	7.4	0	
Total %	3.7	0.5	3.7	0	4	39.1	2.3	0	1.8	0.6	1.4	0	1.8	37.9	3.2	0	





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	RUE TERRE Southbound					DELL RANGE BLVD Westbound					RUE TERRE Northbound					DELL RANGE BLVD Eastbound					
Start Time	Rght	Thru	Left	Other	App.Total	Rght	Thru	Left	Other	App.Total	Rght	Thru	Left	Other	App.Total	Rght	Thru	Left	Other	App.Total	Int. Total
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	24	1	22	0	47	25	236	8	0	269	9	5	9	0	23	11	246	33	0	290	629
12:15 PM	14	2	24	0	40	25	261	10	0	296	10	5	11	0	26	12	220	23	0	255	617
12:30 PM	30	5	26	0	61	22	227	17	0	266	18	5	10	0	33	7	242	17	0	266	626
12:45 PM	22	2	22	0	46	25	243	13	0	281	13	3	11	0	27	6	269	15	0	290	644
Total Volume	90	10	94	0	194	97	967	48	0	1112	50	18	41	0	109	36	977	88	0	1101	2516
% App. Total	46.4	5.2	48.5	0		8.7	87	4.3	0		45.9	16.5	37.6	0		3.3	88.7	8	0		
PHF	.750	.500	.904	.000	.795	.970	.926	.706	.000	.939	.694	.900	.932	.000	.826	.750	.908	.667	.000	.949	.977

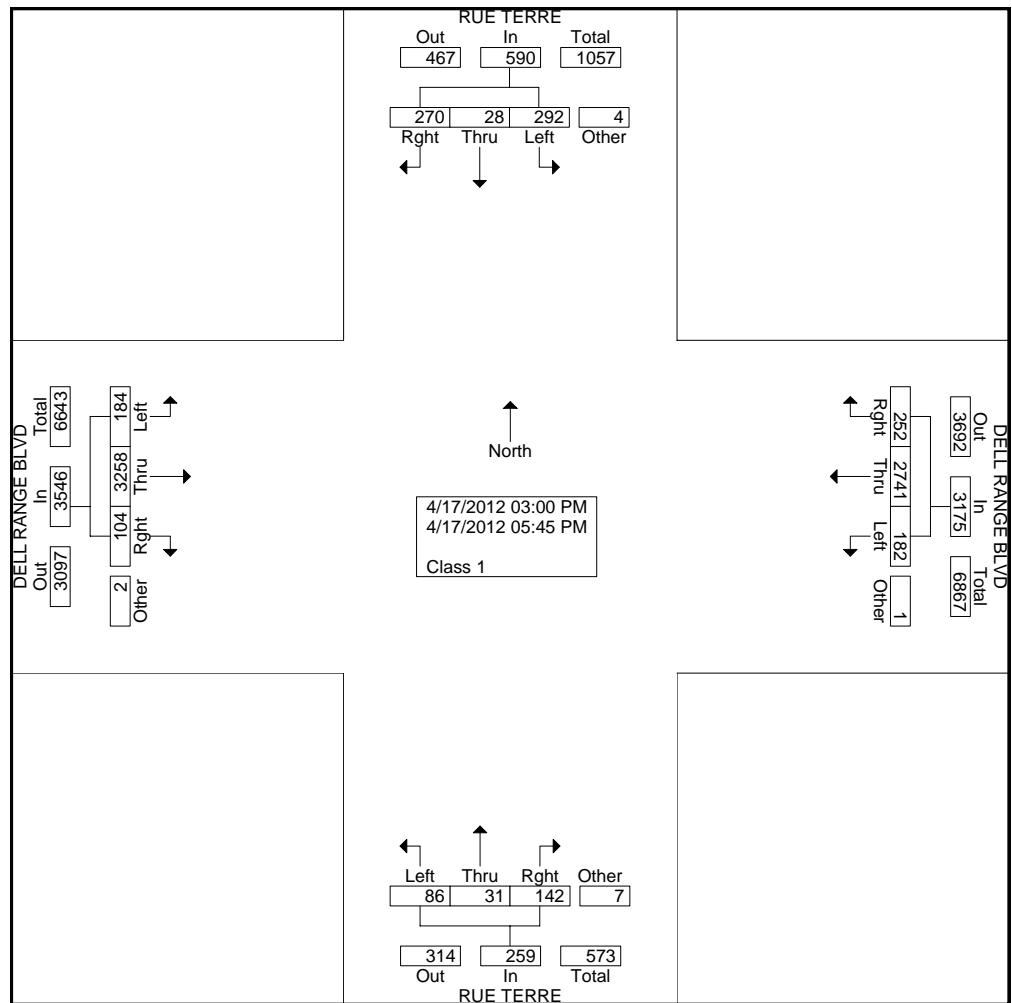




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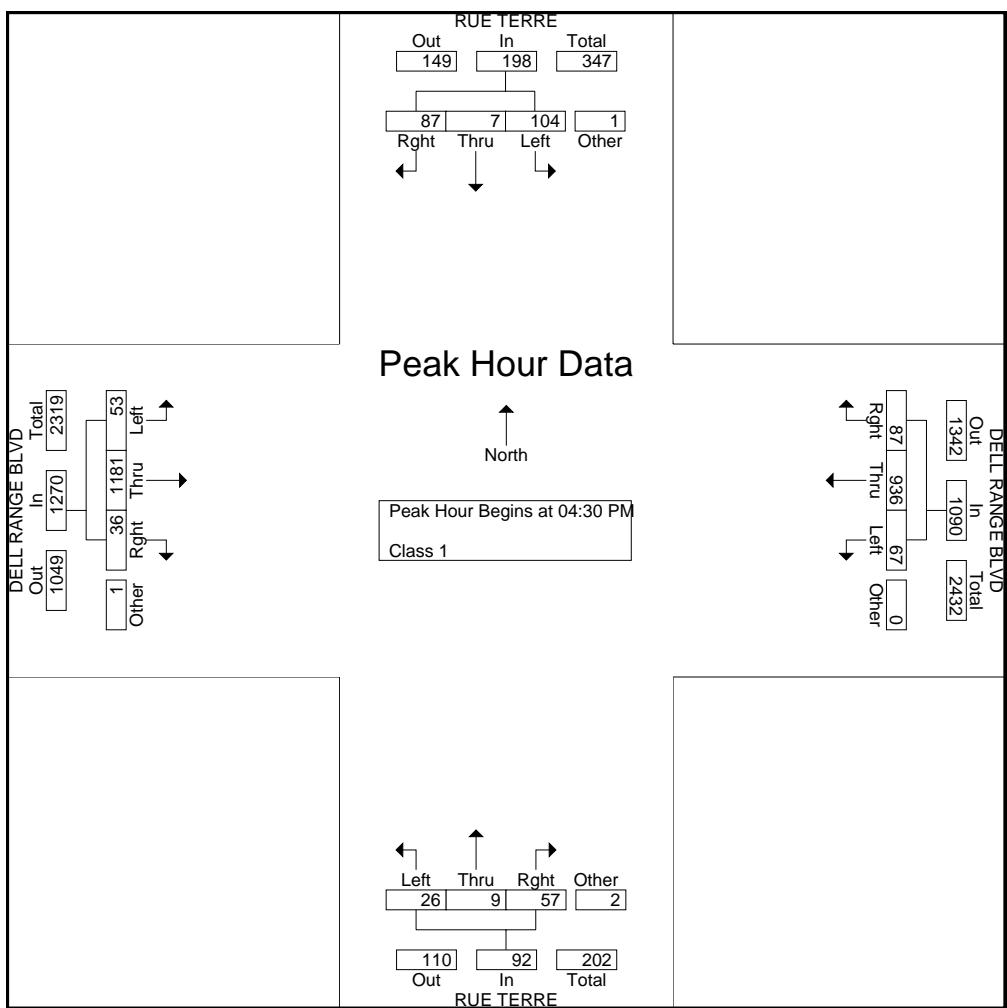
	RUE TERRE Southbound				DELL RANGE BLVD Westbound				RUE TERRE Northbound				DELL RANGE BLVD Eastbound				
Start Time	Rght	Thru	Left	Other	Rght	Thru	Left	Other	Rght	Thru	Left	Other	Rght	Thru	Left	Other	Int. Total
03:00 PM	24	2	23	0	24	221	9	0	11	3	7	1	7	260	14	0	606
03:15 PM	22	3	24	1	18	193	15	1	11	2	6	1	11	229	12	1	550
03:30 PM	23	6	25	0	24	213	9	0	12	1	8	1	5	243	17	0	587
03:45 PM	20	2	17	0	20	235	23	0	13	1	12	1	8	250	16	0	618
Total	89	13	89	1	86	862	56	1	47	7	33	4	31	982	59	1	2361
04:00 PM	20	2	27	2	28	258	13	0	6	3	4	1	6	290	20	0	680
04:15 PM	26	3	26	0	18	209	20	0	4	4	7	0	5	285	19	0	626
04:30 PM	19	4	31	0	22	246	11	0	16	3	5	0	9	282	13	1	662
04:45 PM	28	3	31	1	22	238	24	0	14	3	6	2	8	283	18	0	681
Total	93	12	115	3	90	951	68	0	40	13	22	3	28	1140	70	1	2649
05:00 PM	27	0	23	0	21	218	19	0	12	2	9	0	12	321	11	0	675
05:15 PM	13	0	19	0	22	234	13	0	15	1	6	0	7	295	11	0	636
05:30 PM	28	1	25	0	16	233	14	0	16	5	5	0	11	273	18	0	645
05:45 PM	20	2	21	0	17	243	12	0	12	3	11	0	15	247	15	0	618
Total	88	3	88	0	76	928	58	0	55	11	31	0	45	1136	55	0	2574
Grand Total	270	28	292	4	252	2741	182	1	142	31	86	7	104	3258	184	2	7584
Apprch %	45.5	4.7	49.2	0.7	7.9	86.3	5.7	0	53.4	11.7	32.3	2.6	2.9	91.8	5.2	0.1	
Total %	3.6	0.4	3.9	0.1	3.3	36.1	2.4	0	1.9	0.4	1.1	0.1	1.4	43	2.4	0	





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	RUE TERRE Southbound					DELL RANGE BLVD Westbound					RUE TERRE Northbound					DELL RANGE BLVD Eastbound					
Start Time	Rght	Thru	Left	Other	App. Total	Rght	Thru	Left	Other	App. Total	Rght	Thru	Left	Other	App. Total	Rght	Thru	Left	Other	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	19	4	31	0	54	22	246	11	0	279	16	3	5	0	24	9	282	13	1	305	662
04:45 PM	28	3	31	1	63	22	238	24	0	284	14	3	6	2	25	8	283	18	0	309	681
05:00 PM	27	0	23	0	50	21	218	19	0	258	12	2	9	0	23	12	321	11	0	344	675
05:15 PM	13	0	19	0	32	22	234	13	0	269	15	1	6	0	22	7	295	11	0	313	636
Total Volume	87	7	104	1	199	87	936	67	0	1090	57	9	26	2	94	36	1181	53	1	1271	2654
% App. Total	43.7	3.5	52.3	0.5		8	85.9	6.1	0		60.6	9.6	27.7	2.1		2.8	92.9	4.2	0.1		
PHF	.777	.438	.839	.250	.790	.989	.951	.698	.000	.960	.891	.750	.722	.250	.940	.750	.920	.736	.250	.924	.974

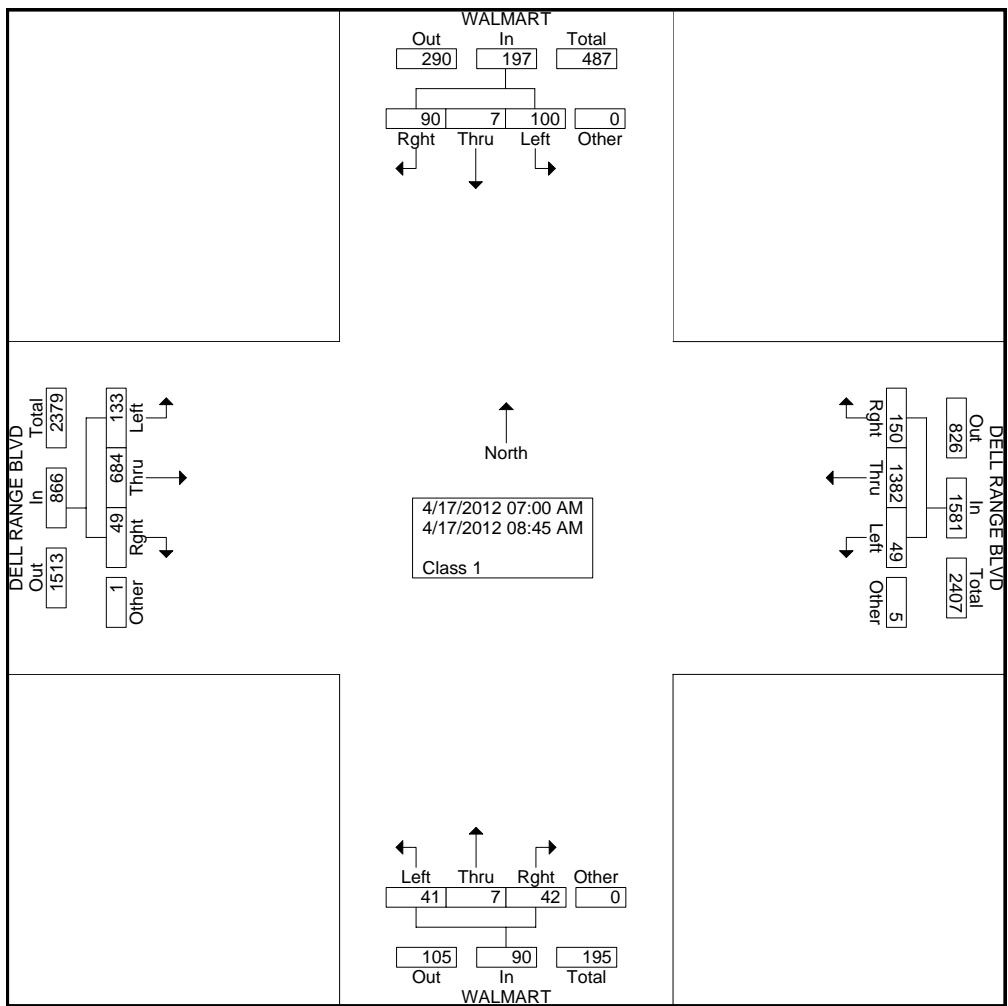




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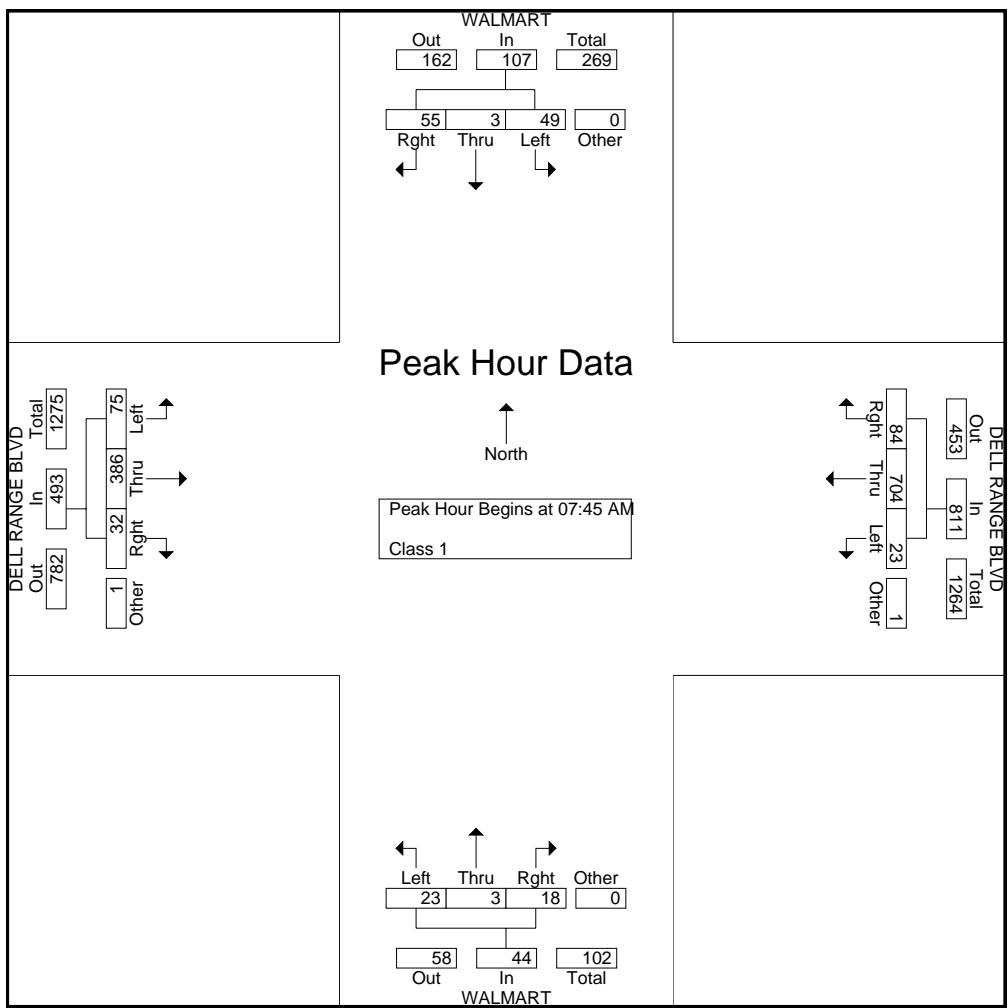
	WALMART Southbound				DELL RANGE BLVD Westbound				WALMART Northbound				DELL RANGE BLVD Eastbound				
Start Time	Rght	Thru	Left	Other	Rght	Thru	Left	Other	Rght	Thru	Left	Other	Rght	Thru	Left	Other	Int. Total
07:00 AM	5	1	9	0	12	160	5	1	0	1	3	0	1	61	6	0	265
07:15 AM	10	1	9	0	12	178	1	0	7	0	1	0	6	47	9	0	281
07:30 AM	9	2	12	0	24	170	10	1	10	1	6	0	6	78	17	0	346
07:45 AM	8	1	16	0	17	228	6	0	4	0	5	0	7	118	9	0	419
Total	32	5	46	0	65	736	22	2	21	2	15	0	20	304	41	0	1311
08:00 AM	12	0	6	0	15	167	5	0	5	0	7	0	6	101	18	0	342
08:15 AM	13	2	9	0	25	151	5	1	3	1	3	0	9	74	21	1	318
08:30 AM	22	0	18	0	27	158	7	0	6	2	8	0	10	93	27	0	378
08:45 AM	11	0	21	0	18	170	10	2	7	2	8	0	4	112	26	0	391
Total	58	2	54	0	85	646	27	3	21	5	26	0	29	380	92	1	1429
Grand Total	90	7	100	0	150	1382	49	5	42	7	41	0	49	684	133	1	2740
Apprch %	45.7	3.6	50.8	0	9.5	87.1	3.1	0.3	46.7	7.8	45.6	0	5.7	78.9	15.3	0.1	
Total %	3.3	0.3	3.6	0	5.5	50.4	1.8	0.2	1.5	0.3	1.5	0	1.8	25	4.9	0	





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	WALMART Southbound					DELL RANGE BLVD Westbound					WALMART Northbound					DELL RANGE BLVD Eastbound					
Start Time	Rght	Thru	Left	Other	App.Total	Rght	Thru	Left	Other	App.Total	Rght	Thru	Left	Other	App.Total	Rght	Thru	Left	Other	App.Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	8	1	16	0	25	17	228	6	0	251	4	0	5	0	9	7	118	9	0	134	419
08:00 AM	12	0	6	0	18	15	167	5	0	187	5	0	7	0	12	6	101	18	0	125	342
08:15 AM	13	2	9	0	24	25	151	5	1	182	3	1	3	0	7	9	74	21	1	105	318
08:30 AM	22	0	18	0	40	27	158	7	0	192	6	2	8	0	16	10	93	27	0	130	378
Total Volume	55	3	49	0	107	84	704	23	1	812	18	3	23	0	44	32	386	75	1	494	1457
% App. Total	51.4	2.8	45.8	0		10.3	86.7	2.8	0.1		40.9	6.8	52.3	0		6.5	78.1	15.2	0.2		
PHF	.625	.375	.681	.000	.669	.778	.772	.821	.250	.809	.750	.375	.719	.000	.688	.800	.818	.694	.250	.922	.869

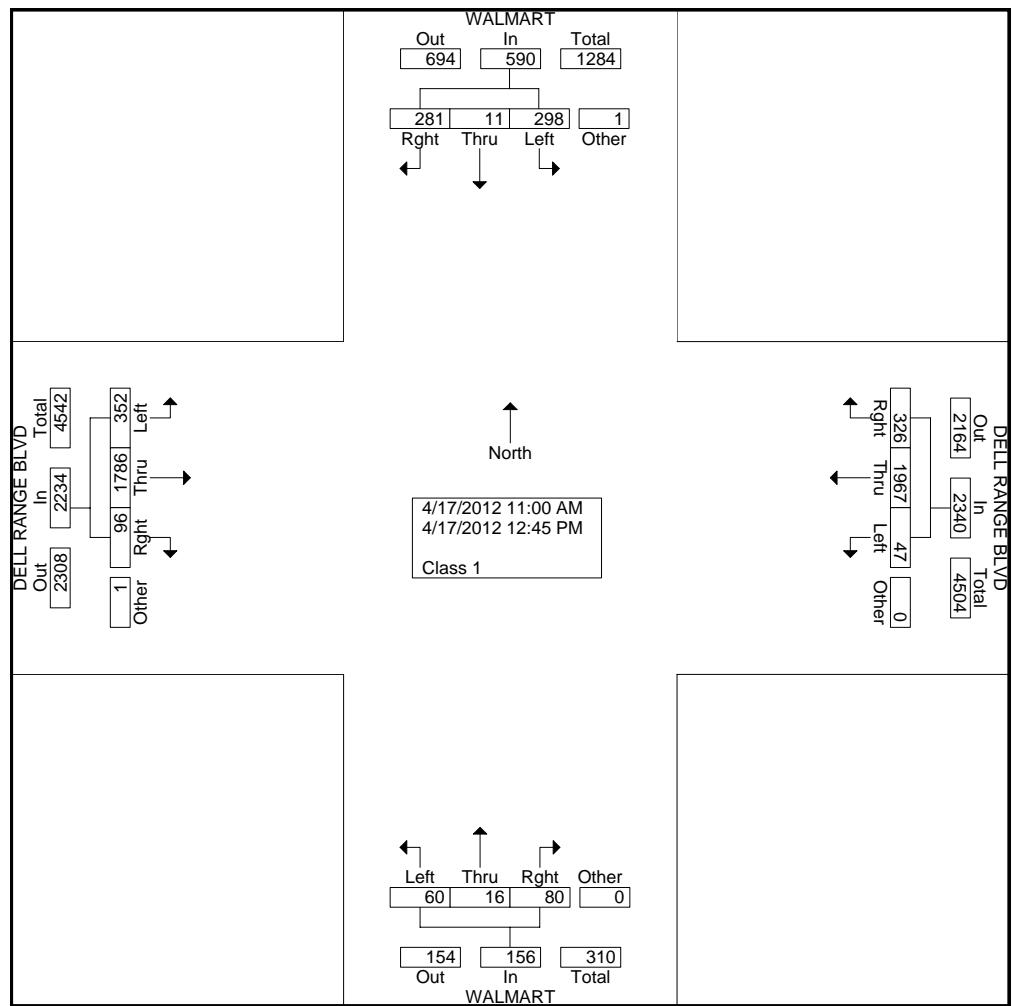




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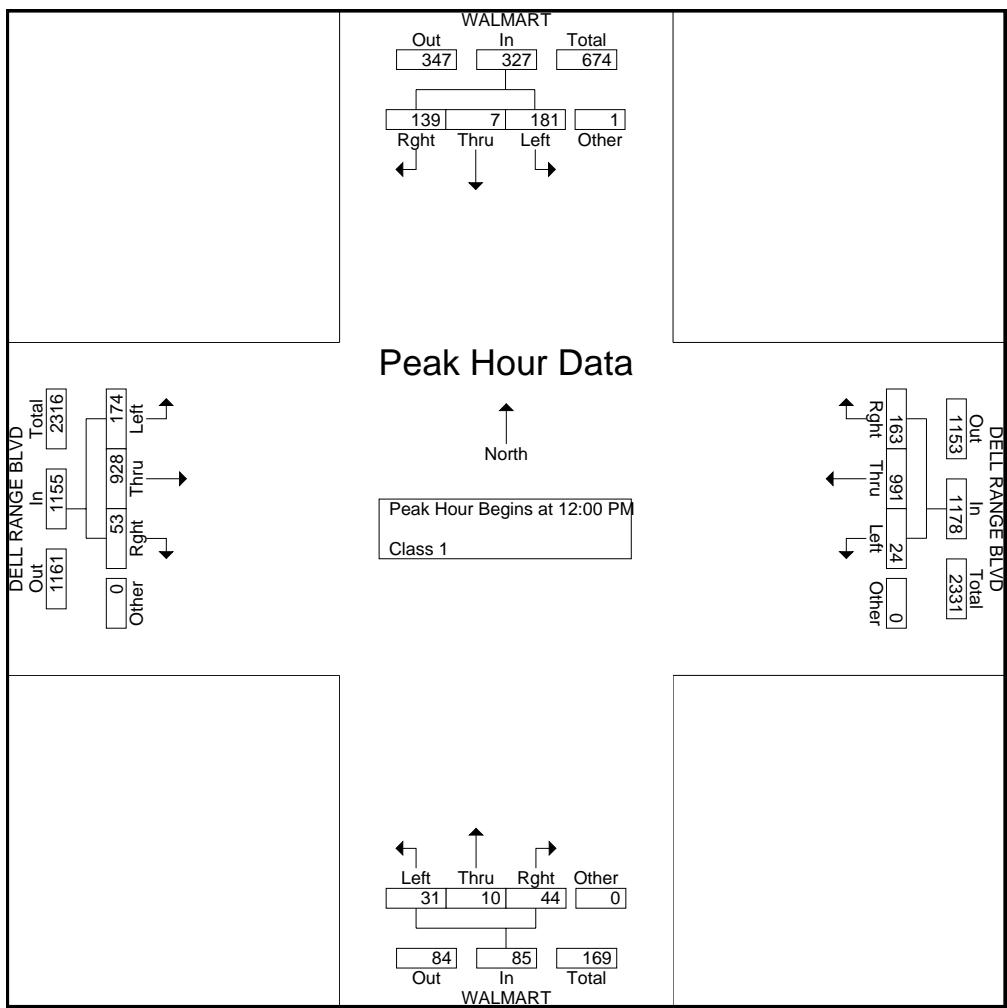
Start Time	WALMART Southbound				DELL RANGE BLVD Westbound				WALMART Northbound				DELL RANGE BLVD Eastbound				Int. Total
	Rght	Thru	Left	Other	Rght	Thru	Left	Other	Rght	Thru	Left	Other	Rght	Thru	Left	Other	
11:00 AM	37	0	27	0	25	243	8	0	12	2	6	0	16	209	43	0	628
11:15 AM	34	1	35	0	39	243	3	0	6	3	5	0	11	194	40	1	615
11:30 AM	39	2	25	0	45	248	6	0	5	1	3	0	4	224	40	0	642
11:45 AM	32	1	30	0	54	242	6	0	13	0	15	0	12	231	55	0	691
Total	142	4	117	0	163	976	23	0	36	6	29	0	43	858	178	1	2576
12:00 PM	37	0	51	0	48	242	7	0	11	5	10	0	21	229	37	0	698
12:15 PM	40	2	51	0	34	263	6	0	10	2	5	0	5	235	50	0	703
12:30 PM	28	2	36	0	37	233	5	0	11	1	8	0	12	221	43	0	637
12:45 PM	34	3	43	1	44	253	6	0	12	2	8	0	15	243	44	0	708
Total	139	7	181	1	163	991	24	0	44	10	31	0	53	928	174	0	2746
Grand Total	281	11	298	1	326	1967	47	0	80	16	60	0	96	1786	352	1	5322
Apprch %	47.5	1.9	50.4	0.2	13.9	84.1	2	0	51.3	10.3	38.5	0	4.3	79.9	15.7	0	
Total %	5.3	0.2	5.6	0	6.1	37	0.9	0	1.5	0.3	1.1	0	1.8	33.6	6.6	0	





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	WALMART Southbound					DELL RANGE BLVD Westbound					WALMART Northbound					DELL RANGE BLVD Eastbound					
Start Time	Rght	Thru	Left	Other	App.Total	Rght	Thru	Left	Other	App.Total	Rght	Thru	Left	Other	App.Total	Rght	Thru	Left	Other	App.Total	Int. Total
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	37	0	51	0	88	48	242	7	0	297	11	5	10	0	26	21	229	37	0	287	698
12:15 PM	40	2	51	0	93	34	263	6	0	303	10	2	5	0	17	5	235	50	0	290	703
12:30 PM	28	2	36	0	66	37	233	5	0	275	11	1	8	0	20	12	221	43	0	276	637
12:45 PM	34	3	43	1	81	44	253	6	0	303	12	2	8	0	22	15	243	44	0	302	708
Total Volume	139	7	181	1	328	163	991	24	0	1178	44	10	31	0	85	53	928	174	0	1155	2746
% App. Total	42.4	2.1	55.2	0.3		13.8	84.1	2	0		51.8	11.8	36.5	0		4.6	80.3	15.1	0		
PHF	.869	.583	.887	.250	.882	.849	.942	.857	.000	.972	.917	.500	.775	.000	.817	.631	.955	.870	.000	.956	.970

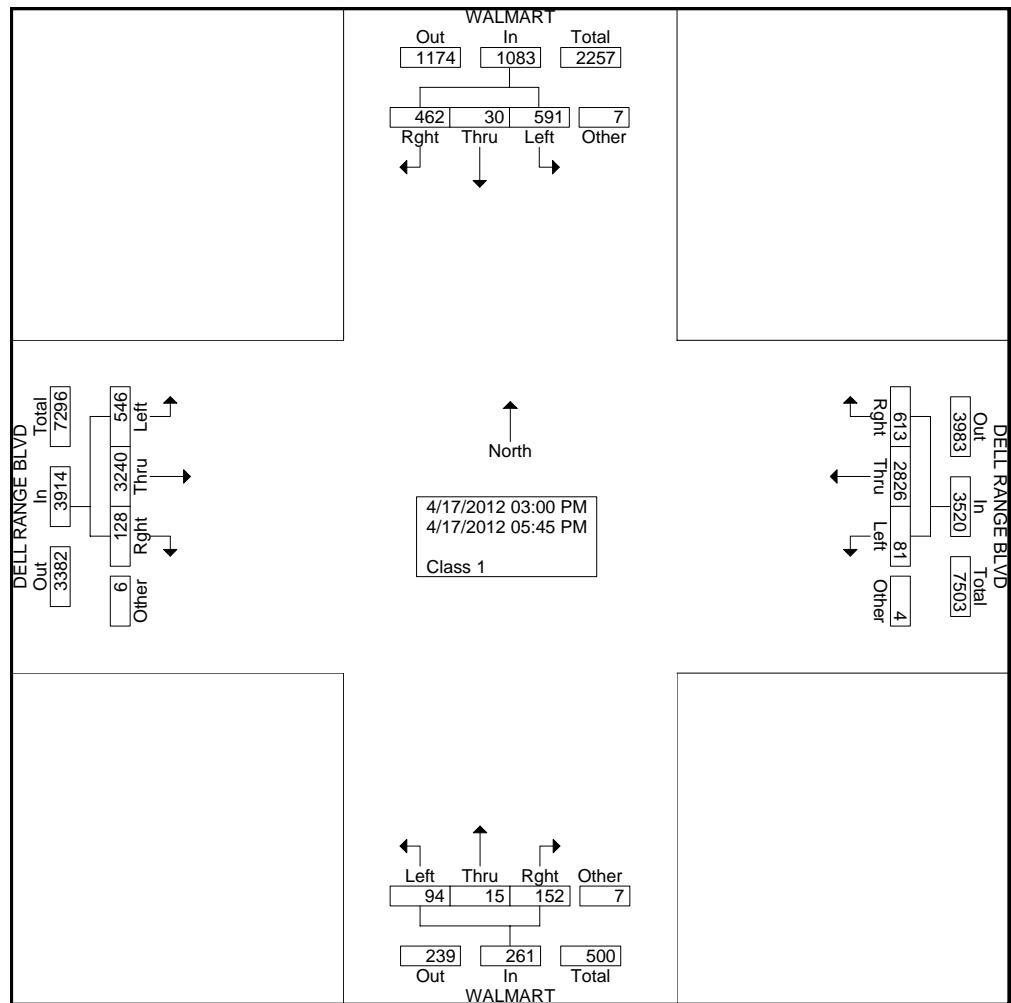




File Name : #53 DELLRANGE&WALMARTPM
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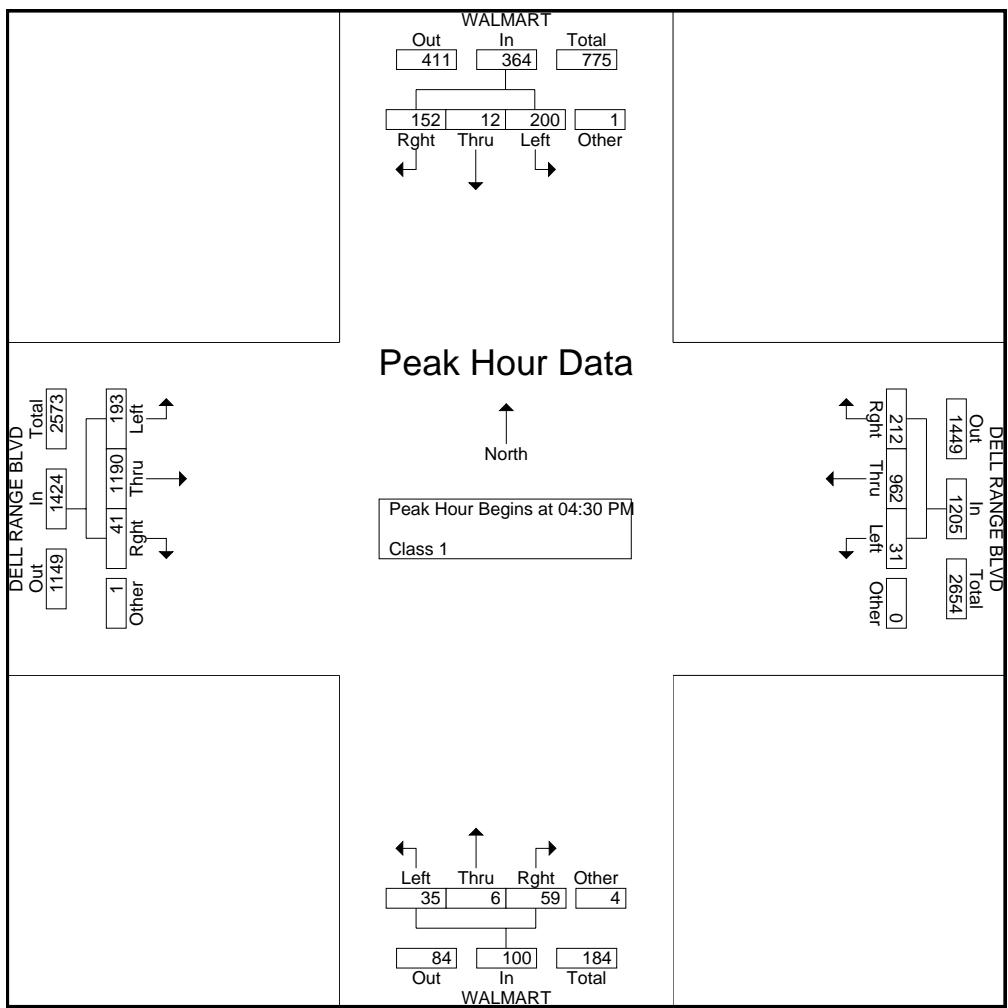
Start Time	WALMART Southbound				DELL RANGE BLVD Westbound				WALMART Northbound				DELL RANGE BLVD Eastbound				Int. Total
	Rght	Thru	Left	Other	Rght	Thru	Left	Other	Rght	Thru	Left	Other	Rght	Thru	Left	Other	
03:00 PM	39	0	35	1	53	231	6	0	22	1	12	0	15	245	49	0	709
03:15 PM	36	0	54	0	53	199	4	0	5	2	8	0	13	231	39	0	644
03:30 PM	32	4	41	1	43	220	6	0	9	2	6	0	7	239	44	1	655
03:45 PM	25	3	44	0	59	266	6	3	6	0	7	1	9	251	47	0	727
Total	132	7	174	2	208	916	22	3	42	5	33	1	44	966	179	1	2735
04:00 PM	53	1	58	2	66	254	8	1	13	1	8	0	13	300	34	2	814
04:15 PM	37	5	40	0	45	219	5	0	15	1	6	0	10	271	47	0	701
04:30 PM	35	1	52	1	48	249	9	0	15	1	8	0	14	291	49	0	773
04:45 PM	49	1	53	0	51	249	5	0	6	1	6	4	8	286	46	0	765
Total	174	8	203	3	210	971	27	1	49	4	28	4	45	1148	176	2	3053
05:00 PM	33	5	37	0	56	228	9	0	17	1	9	0	11	325	52	0	783
05:15 PM	35	5	58	0	57	236	8	0	21	3	12	0	8	288	46	1	778
05:30 PM	48	3	62	2	41	224	10	0	15	1	6	2	13	269	50	2	748
05:45 PM	40	2	57	0	41	251	5	0	8	1	6	0	7	244	43	0	705
Total	156	15	214	2	195	939	32	0	61	6	33	2	39	1126	191	3	3014
Grand Total	462	30	591	7	613	2826	81	4	152	15	94	7	128	3240	546	6	8802
Apprch %	42.4	2.8	54.2	0.6	17.4	80.2	2.3	0.1	56.7	5.6	35.1	2.6	3.3	82.7	13.9	0.2	
Total %	5.2	0.3	6.7	0.1	7	32.1	0.9	0	1.7	0.2	1.1	0.1	1.5	36.8	6.2	0.1	





File Name : #53 DELLRANGE&WALMARTPM
 Site Code : 00000000
 Start Date : 4/17/2012
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	WALMART Southbound					DELL RANGE BLVD Westbound					WALMART Northbound					DELL RANGE BLVD Eastbound					
Start Time	Rght	Thru	Left	Other	App. Total	Rght	Thru	Left	Other	App. Total	Rght	Thru	Left	Other	App. Total	Rght	Thru	Left	Other	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	35	1	52	1	89	48	249	9	0	306	15	1	8	0	24	14	291	49	0	354	773
04:45 PM	49	1	53	0	103	51	249	5	0	305	6	1	6	4	17	8	286	46	0	340	765
05:00 PM	33	5	37	0	75	56	228	9	0	293	17	1	9	0	27	11	325	52	0	388	783
05:15 PM	35	5	58	0	98	57	236	8	0	301	21	3	12	0	36	8	288	46	1	343	778
Total Volume	152	12	200	1	365	212	962	31	0	1205	59	6	35	4	104	41	1190	193	1	1425	3099
% App. Total	41.6	3.3	54.8	0.3		17.6	79.8	2.6	0		56.7	5.8	33.7	3.8		2.9	83.5	13.5	0.1		
PHF	.776	.600	.862	.250	.886	.930	.966	.861	.000	.984	.702	.500	.729	.250	.722	.732	.915	.928	.250	.918	.989

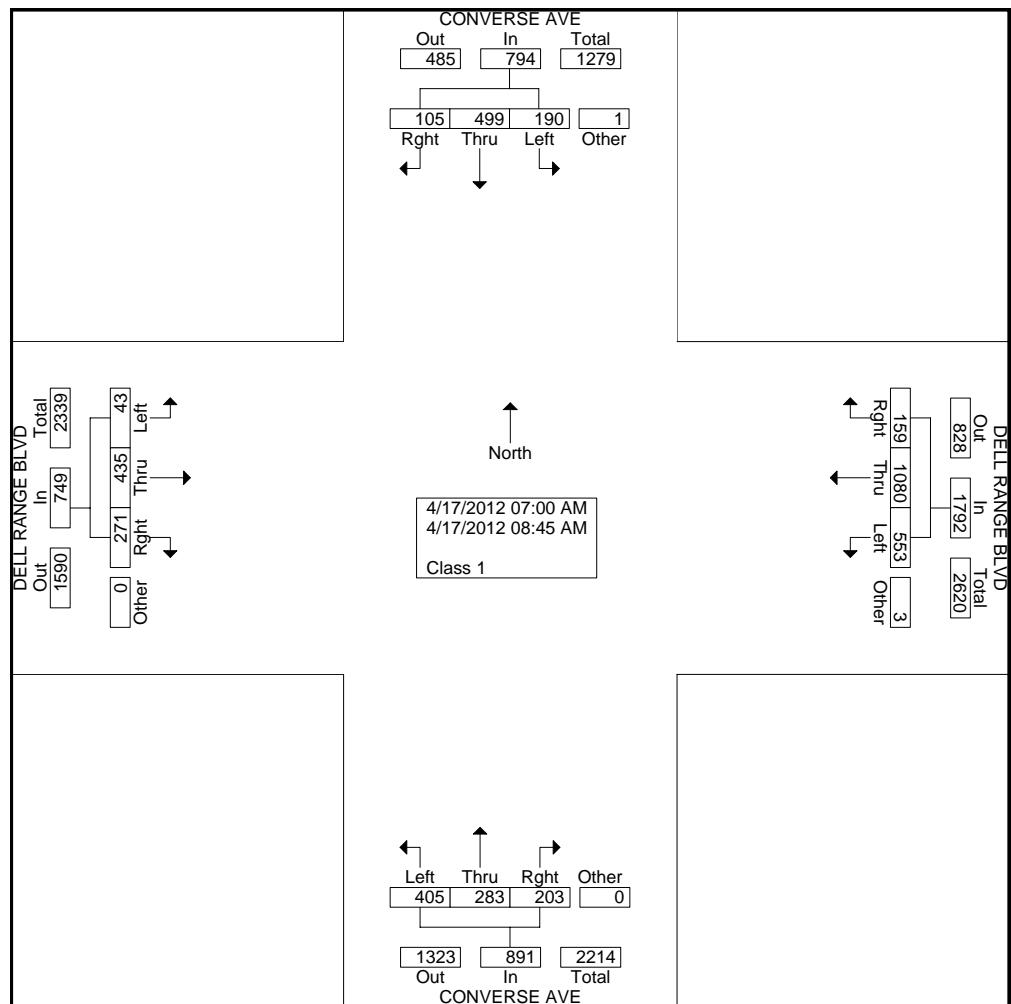




File Name : #22 CONVERSE&DELLRANGEAM
 Site Code : 00000000
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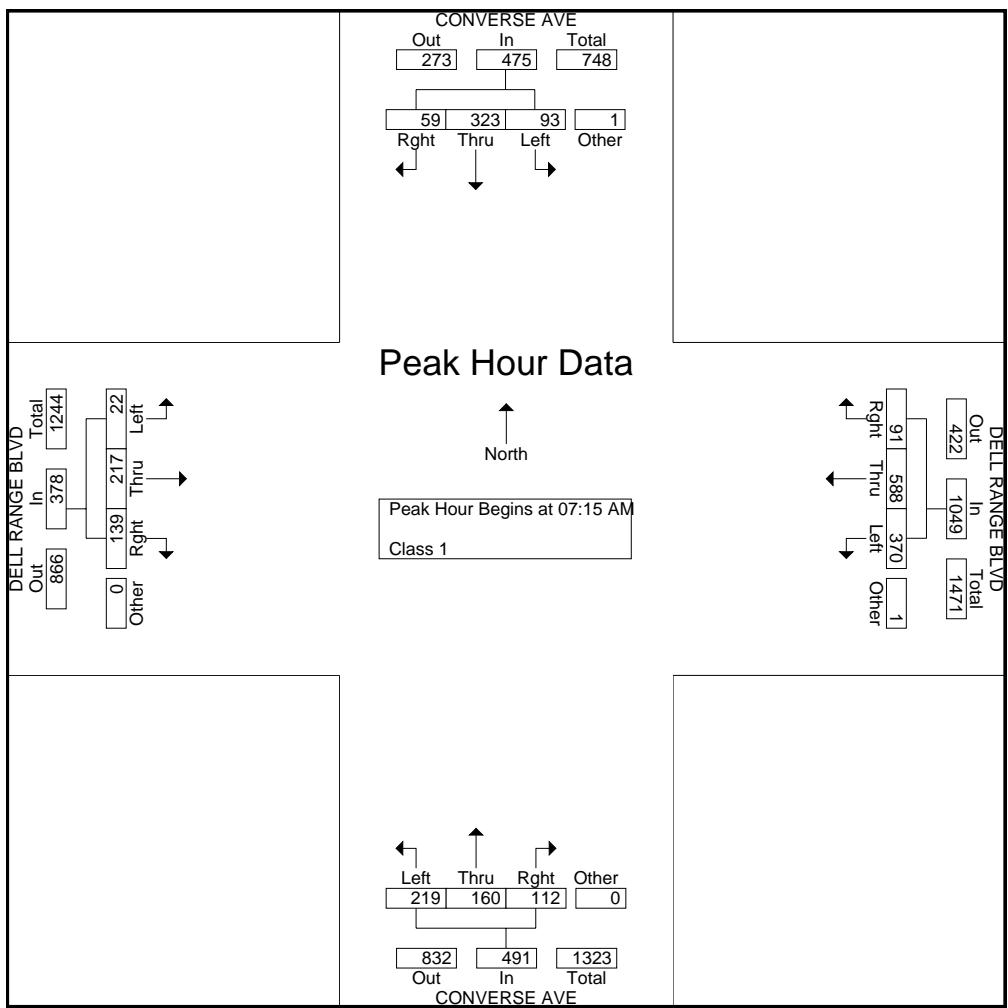
	CONVERSE AVE Southbound				DELL RANGE BLVD Westbound				CONVERSE AVE Northbound				DELL RANGE BLVD Eastbound				
Start Time	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Int. Total
07:00 AM	21	47	9	0	71	118	12	0	21	19	19	0	1	41	28	0	407
07:15 AM	26	81	13	0	106	156	21	0	32	33	26	0	2	55	24	0	575
07:30 AM	19	101	13	0	104	137	25	1	57	38	34	0	7	57	33	0	626
07:45 AM	28	85	11	1	112	174	34	0	80	54	32	0	4	47	51	0	713
Total	94	314	46	1	393	585	92	1	190	144	111	0	14	200	136	0	2321
08:00 AM	20	56	22	0	48	121	11	0	50	35	20	0	9	58	31	0	481
08:15 AM	21	49	14	0	51	130	15	1	45	45	28	0	10	41	31	0	481
08:30 AM	33	47	11	0	43	110	20	1	39	33	20	0	5	76	43	0	481
08:45 AM	22	33	12	0	18	134	21	0	81	26	24	0	5	60	30	0	466
Total	96	185	59	0	160	495	67	2	215	139	92	0	29	235	135	0	1909
Grand Total	190	499	105	1	553	1080	159	3	405	283	203	0	43	435	271	0	4230
Apprch %	23.9	62.8	13.2	0.1	30.8	60.2	8.9	0.2	45.5	31.8	22.8	0	5.7	58.1	36.2	0	
Total %	4.5	11.8	2.5	0	13.1	25.5	3.8	0.1	9.6	6.7	4.8	0	1	10.3	6.4	0	





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	CONVERSE AVE Southbound					DELL RANGE BLVD Westbound					CONVERSE AVE Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	26	81	13	0	120	106	156	21	0	283	32	33	26	0	91	2	55	24	0	81	575
07:30 AM	19	101	13	0	133	104	137	25	1	267	57	38	34	0	129	7	57	33	0	97	626
07:45 AM	28	85	11	1	125	112	174	34	0	320	80	54	32	0	166	4	47	51	0	102	713
08:00 AM	20	56	22	0	98	48	121	11	0	180	50	35	20	0	105	9	58	31	0	98	481
Total Volume	93	323	59	1	476	370	588	91	1	1050	219	160	112	0	491	22	217	139	0	378	2395
% App. Total	19.5	67.9	12.4	0.2		35.2	56	8.7	0.1		44.6	32.6	22.8	0		5.8	57.4	36.8	0		
PHF	.830	.800	.670	.250	.895	.826	.845	.669	.250	.820	.684	.741	.824	.000	.739	.611	.935	.681	.000	.926	.840

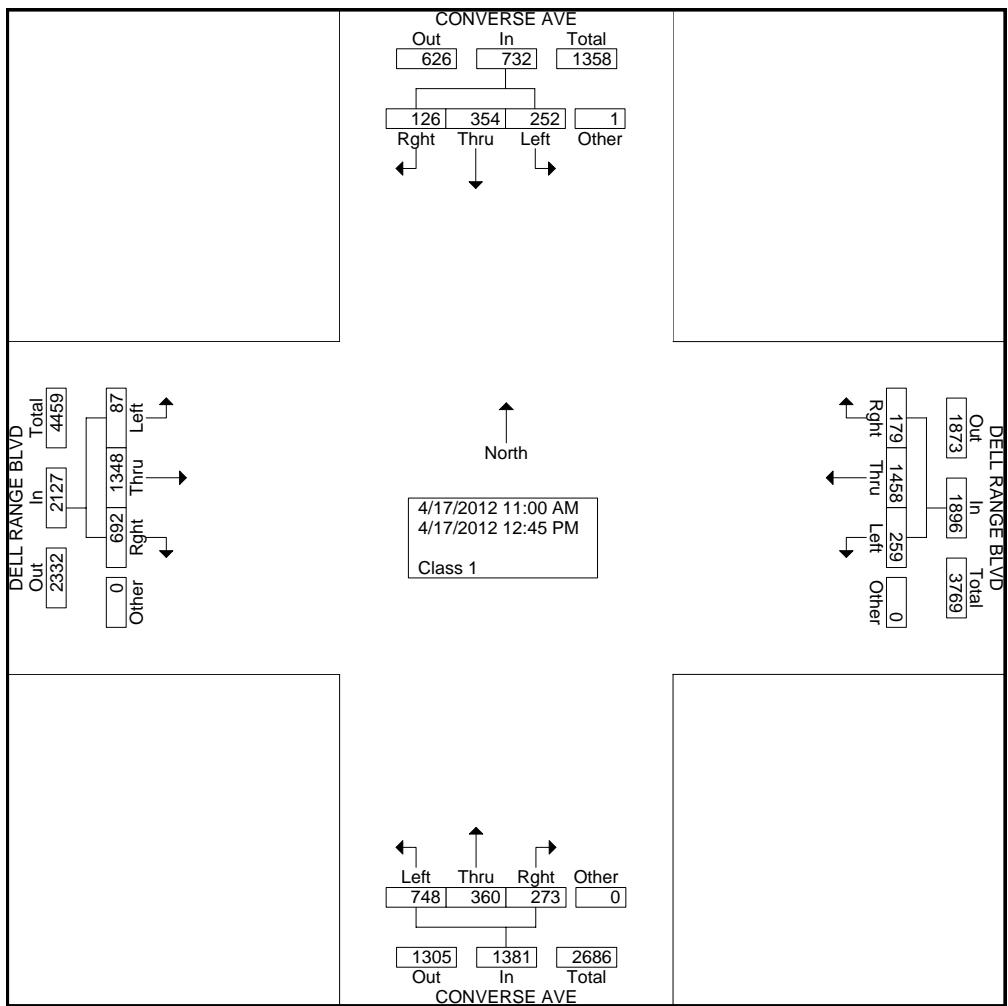




File Name : #22 CONVERSE&DELLRANGEMD
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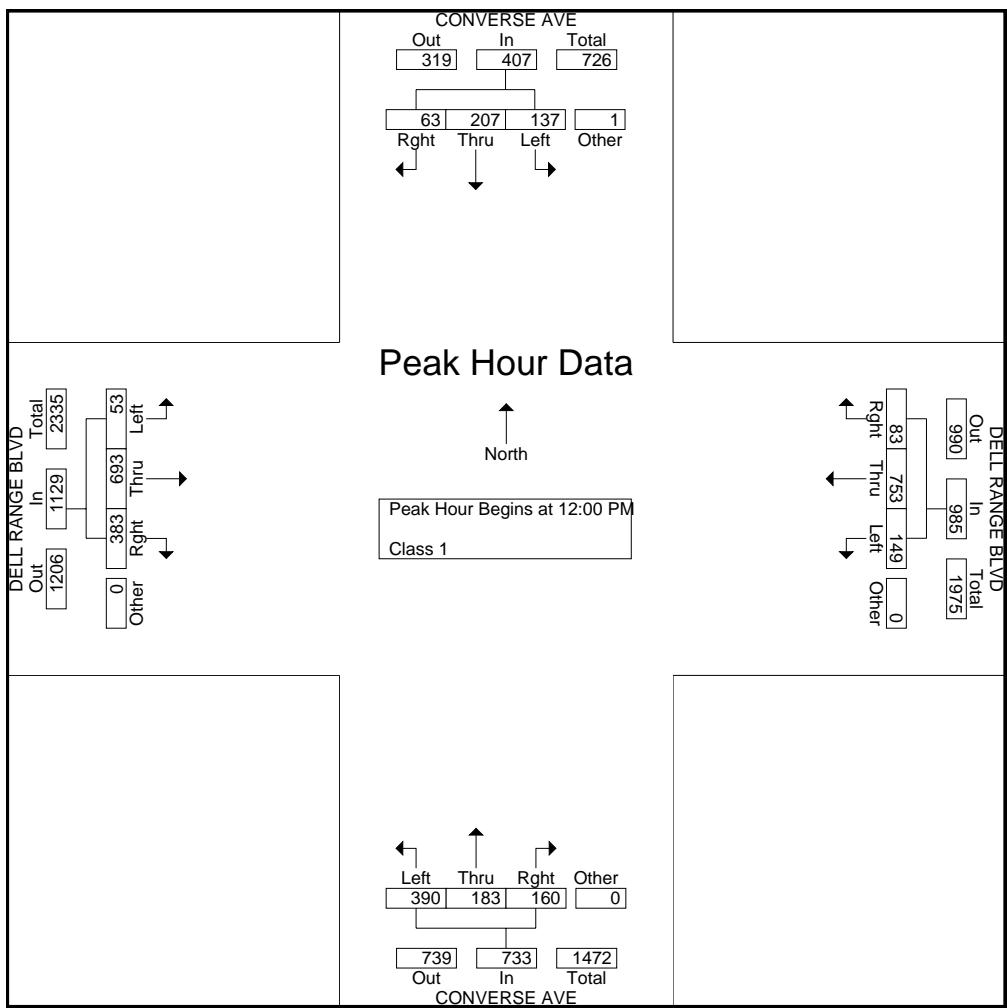
	CONVERSE AVE Southbound				DELL RANGE BLVD Westbound				CONVERSE AVE Northbound				DELL RANGE BLVD Eastbound				
Start Time	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Int. Total
11:00 AM	24	36	10	0	25	203	27	0	93	39	23	0	7	164	66	0	717
11:15 AM	31	41	16	0	28	165	24	0	85	40	31	0	11	150	86	0	708
11:30 AM	26	34	18	0	27	172	21	0	97	51	28	0	10	172	72	0	728
11:45 AM	34	36	19	0	30	165	24	0	83	47	31	0	6	169	85	0	729
Total	115	147	63	0	110	705	96	0	358	177	113	0	34	655	309	0	2882
12:00 PM	34	41	17	0	28	175	23	0	109	42	40	0	20	184	87	0	800
12:15 PM	34	52	16	0	30	180	16	0	93	48	38	0	11	171	95	0	784
12:30 PM	38	55	21	1	41	195	21	0	91	52	49	0	12	171	97	0	844
12:45 PM	31	59	9	0	50	203	23	0	97	41	33	0	10	167	104	0	827
Total	137	207	63	1	149	753	83	0	390	183	160	0	53	693	383	0	3255
Grand Total	252	354	126	1	259	1458	179	0	748	360	273	0	87	1348	692	0	6137
Apprch %	34.4	48.3	17.2	0.1	13.7	76.9	9.4	0	54.2	26.1	19.8	0	4.1	63.4	32.5	0	0
Total %	4.1	5.8	2.1	0	4.2	23.8	2.9	0	12.2	5.9	4.4	0	1.4	22	11.3	0	0





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	CONVERSE AVE Southbound					DELL RANGE BLVD Westbound					CONVERSE AVE Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	34	41	17	0	92	28	175	23	0	226	109	42	40	0	191	20	184	87	0	291	800
12:15 PM	34	52	16	0	102	30	180	16	0	226	93	48	38	0	179	11	171	95	0	277	784
12:30 PM	38	55	21	1	115	41	195	21	0	257	91	52	49	0	192	12	171	97	0	280	844
12:45 PM	31	59	9	0	99	50	203	23	0	276	97	41	33	0	171	10	167	104	0	281	827
Total Volume	137	207	63	1	408	149	753	83	0	985	390	183	160	0	733	53	693	383	0	1129	3255
% App. Total	33.6	50.7	15.4	0.2		15.1	76.4	8.4	0		53.2	25	21.8	0		4.7	61.4	33.9	0		
PHF	.901	.877	.750	.250	.887	.745	.927	.902	.000	.892	.894	.880	.816	.000	.954	.663	.942	.921	.000	.970	.964

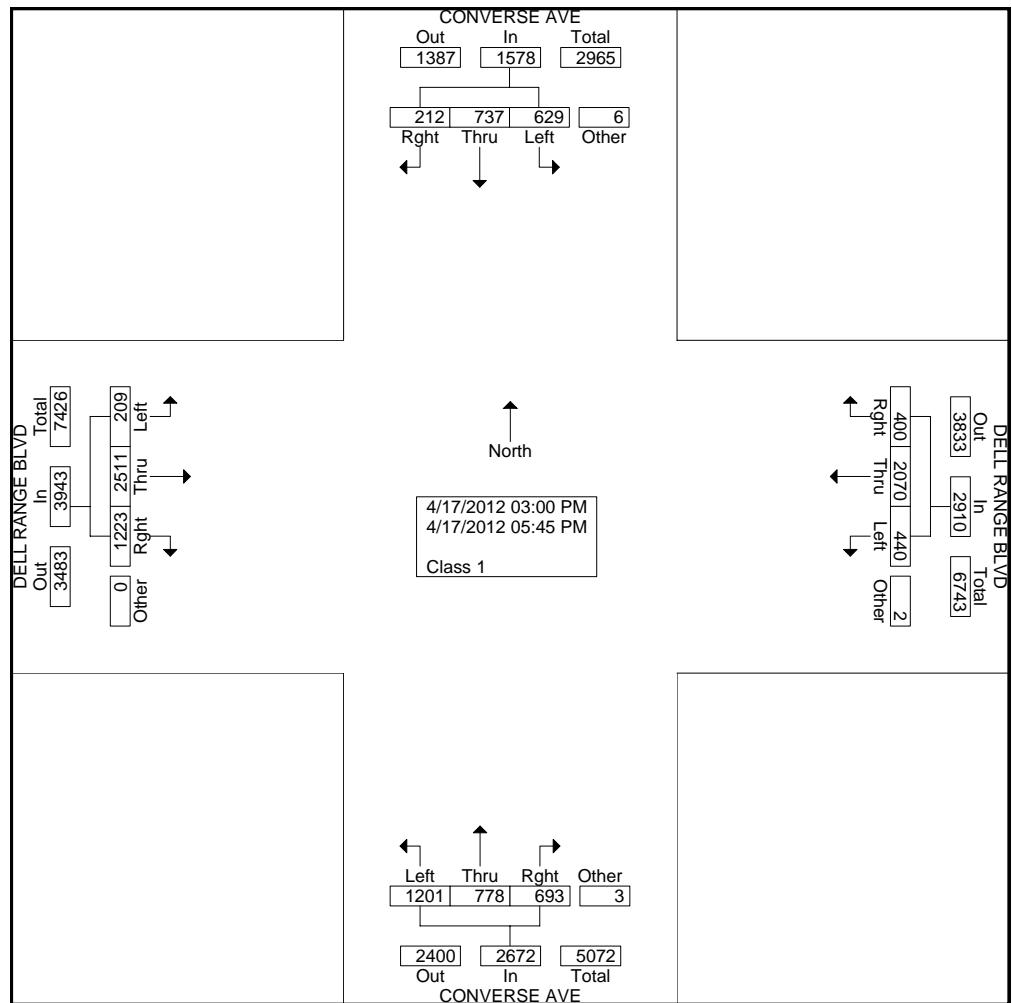




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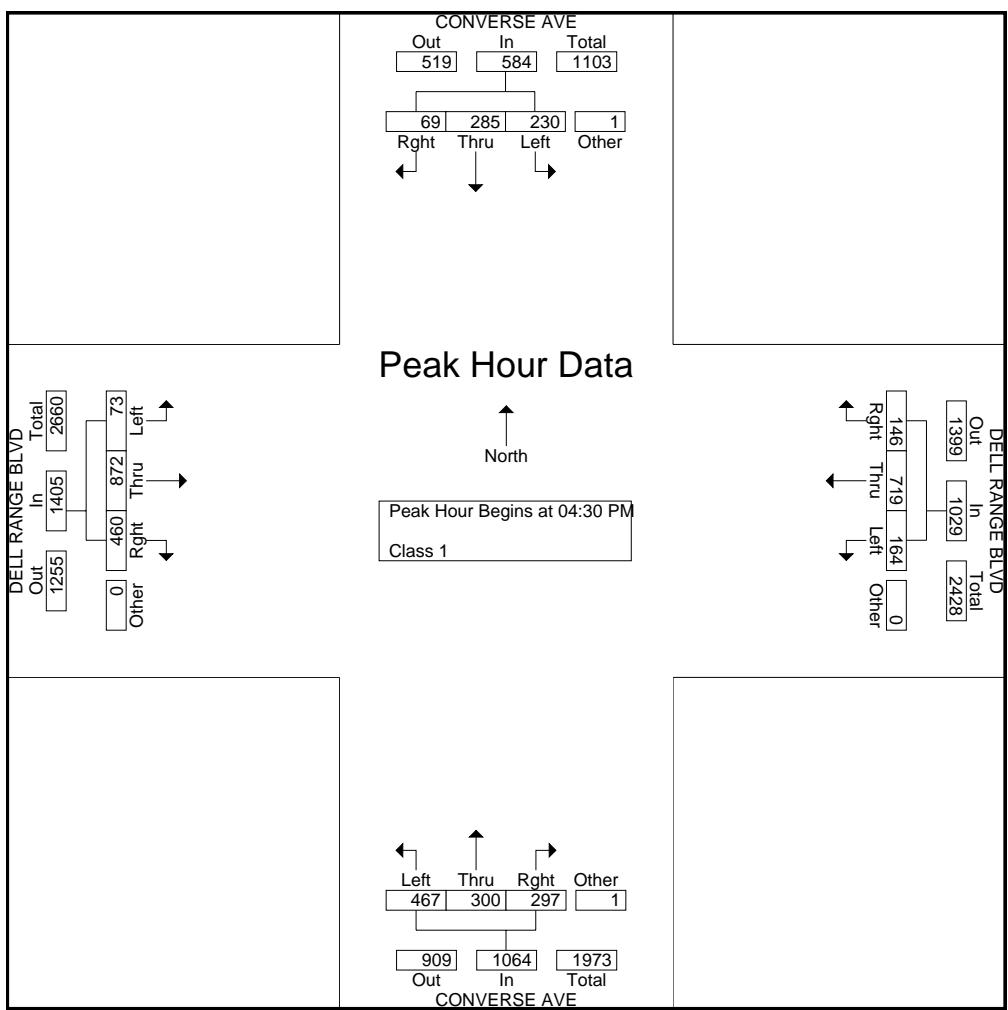
	CONVERSE AVE Southbound				DELL RANGE BLVD Westbound				CONVERSE AVE Northbound				DELL RANGE BLVD Eastbound				
Start Time	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Int. Total
03:00 PM	56	48	14	0	35	150	31	0	92	49	53	1	11	200	107	0	847
03:15 PM	48	41	10	2	32	142	30	0	56	57	53	0	25	187	90	0	773
03:30 PM	55	74	24	3	36	164	34	1	84	58	48	0	19	194	82	0	876
03:45 PM	43	56	23	0	44	188	53	0	95	69	63	0	16	181	88	0	919
Total	202	219	71	5	147	644	148	1	327	233	217	1	71	762	367	0	3415
04:00 PM	46	64	17	0	29	183	30	0	110	60	53	0	16	225	118	0	951
04:15 PM	57	55	26	0	30	194	28	0	94	71	49	0	18	195	107	0	924
04:30 PM	53	71	21	0	50	190	31	0	109	68	50	1	12	209	113	0	978
04:45 PM	59	63	16	0	44	160	35	0	117	77	69	0	21	196	127	0	984
Total	215	253	80	0	153	727	124	0	430	276	221	1	67	825	465	0	3837
05:00 PM	59	76	11	1	32	175	39	0	109	72	86	0	20	244	117	0	1041
05:15 PM	59	75	21	0	38	194	41	0	132	83	92	0	20	223	103	0	1081
05:30 PM	52	58	17	0	32	160	29	1	106	57	46	0	12	242	89	0	901
05:45 PM	42	56	12	0	38	170	19	0	97	57	31	1	19	215	82	0	839
Total	212	265	61	1	140	699	128	1	444	269	255	1	71	924	391	0	3862
Grand Total	629	737	212	6	440	2070	400	2	1201	778	693	3	209	2511	1223	0	11114
Apprch %	39.7	46.5	13.4	0.4	15.1	71.1	13.7	0.1	44.9	29.1	25.9	0.1	5.3	63.7	31	0	0
Total %	5.7	6.6	1.9	0.1	4	18.6	3.6	0	10.8	7	6.2	0	1.9	22.6	11	0	0





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	CONVERSE AVE Southbound					DELL RANGE BLVD Westbound					CONVERSE AVE Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	53	71	21	0	145	50	190	31	0	271	109	68	50	1	228	12	209	113	0	334	978
04:45 PM	59	63	16	0	138	44	160	35	0	239	117	77	69	0	263	21	196	127	0	344	984
05:00 PM	59	76	11	1	147	32	175	39	0	246	109	72	86	0	267	20	244	117	0	381	1041
05:15 PM	59	75	21	0	155	38	194	41	0	273	132	83	92	0	307	20	223	103	0	346	1081
Total Volume	230	285	69	1	585	164	719	146	0	1029	467	300	297	1	1065	73	872	460	0	1405	4084
% App. Total	39.3	48.7	11.8	0.2		15.9	69.9	14.2	0		43.8	28.2	27.9	0.1		5.2	62.1	32.7	0		
PHF	.975	.938	.821	.250	.944	.820	.927	.890	.000	.942	.884	.904	.807	.250	.867	.869	.893	.906	.000	.922	.944

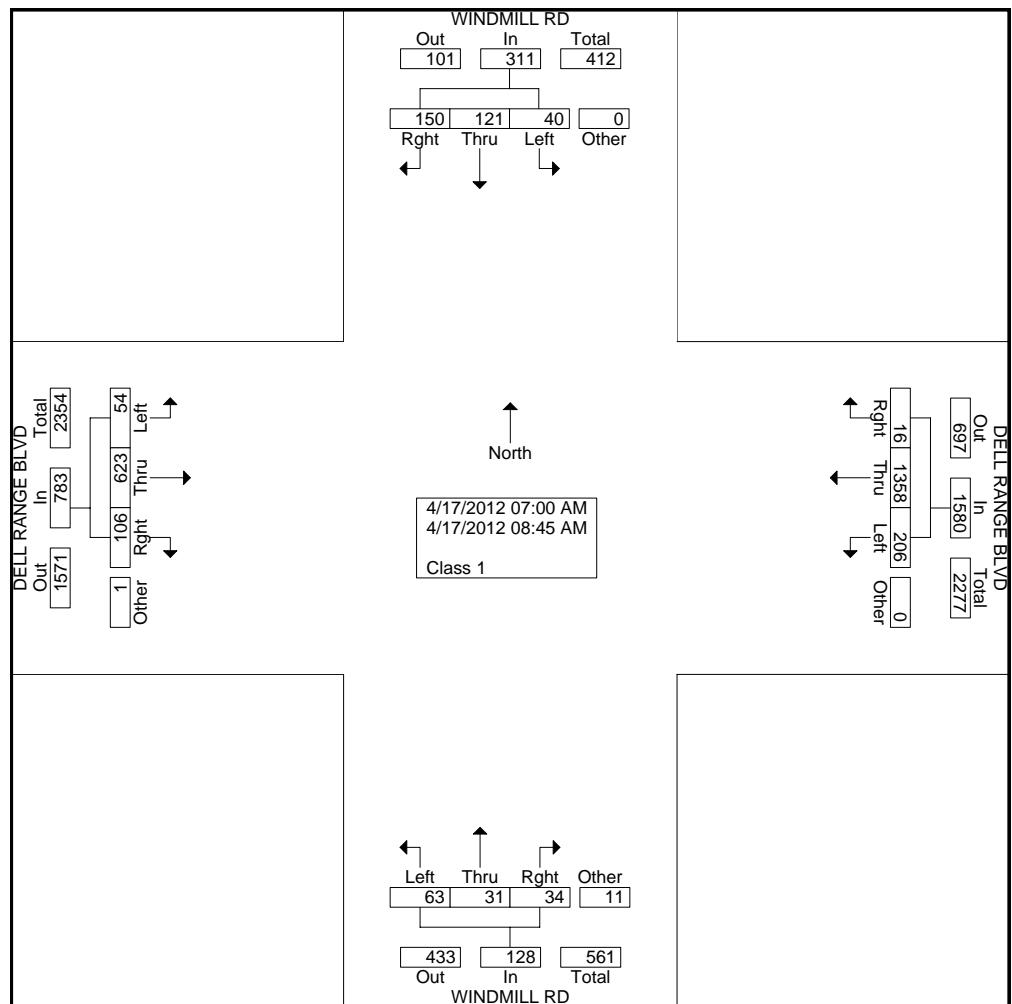




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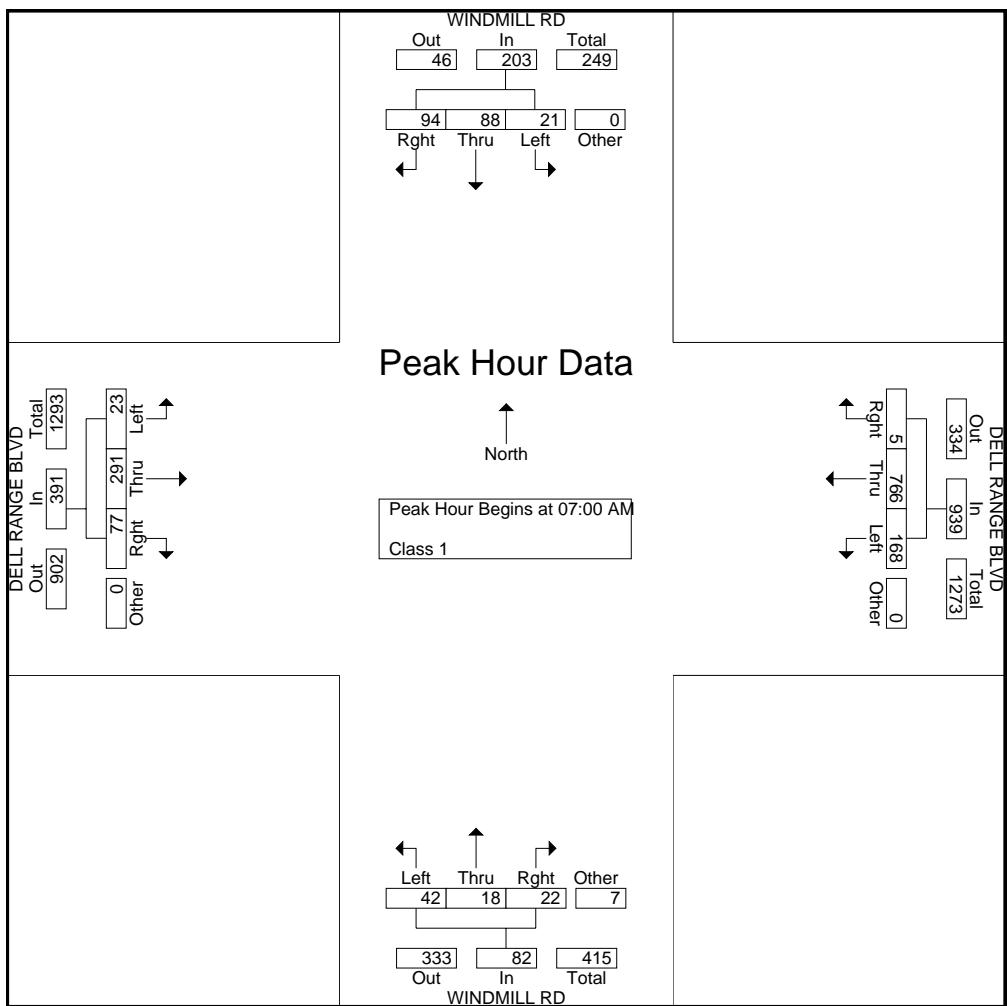
Start Time	WINDMILL RD Southbound				DELL RANGE BLVD Westbound				WINDMILL RD Northbound				DELL RANGE BLVD Eastbound				Int. Total
	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	
07:00 AM	1	18	20	0	45	164	2	0	7	2	1	4	1	59	35	0	359
07:15 AM	6	38	31	0	63	205	1	0	14	7	4	1	8	81	21	0	480
07:30 AM	6	19	22	0	47	222	2	0	15	3	8	1	9	76	14	0	444
07:45 AM	8	13	21	0	13	175	0	0	6	6	9	1	5	75	7	0	339
Total	21	88	94	0	168	766	5	0	42	18	22	7	23	291	77	0	1622
08:00 AM	5	9	16	0	7	147	3	0	5	7	4	1	6	75	11	0	296
08:15 AM	8	10	18	0	13	167	3	0	2	2	3	1	11	75	3	0	316
08:30 AM	4	8	11	0	7	123	2	0	5	0	2	1	6	93	7	1	270
08:45 AM	2	6	11	0	11	155	3	0	9	4	3	1	8	89	8	0	310
Total	19	33	56	0	38	592	11	0	21	13	12	4	31	332	29	1	1192
Grand Total	40	121	150	0	206	1358	16	0	63	31	34	11	54	623	106	1	2814
Apprch %	12.9	38.9	48.2	0	13	85.9	1	0	45.3	22.3	24.5	7.9	6.9	79.5	13.5	0.1	
Total %	1.4	4.3	5.3	0	7.3	48.3	0.6	0	2.2	1.1	1.2	0.4	1.9	22.1	3.8	0	





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	WINDMILL RD Southbound					DELL RANGE BLVD Westbound					WINDMILL RD Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	1	18	20	0	39	45	164	2	0	211	7	2	1	4	14	1	59	35	0	95	359
07:15 AM	6	38	31	0	75	63	205	1	0	269	14	7	4	1	26	8	81	21	0	110	480
07:30 AM	6	19	22	0	47	47	222	2	0	271	15	3	8	1	27	9	76	14	0	99	444
07:45 AM	8	13	21	0	42	13	175	0	0	188	6	6	9	1	22	5	75	7	0	87	339
Total Volume	21	88	94	0	203	168	766	5	0	939	42	18	22	7	89	23	291	77	0	391	1622
% App. Total	10.3	43.3	46.3	0		17.9	81.6	0.5	0		47.2	20.2	24.7	7.9		5.9	74.4	19.7	0		
PHF	.656	.579	.758	.000	.677	.667	.863	.625	.000	.866	.700	.643	.611	.438	.824	.639	.898	.550	.000	.889	.845

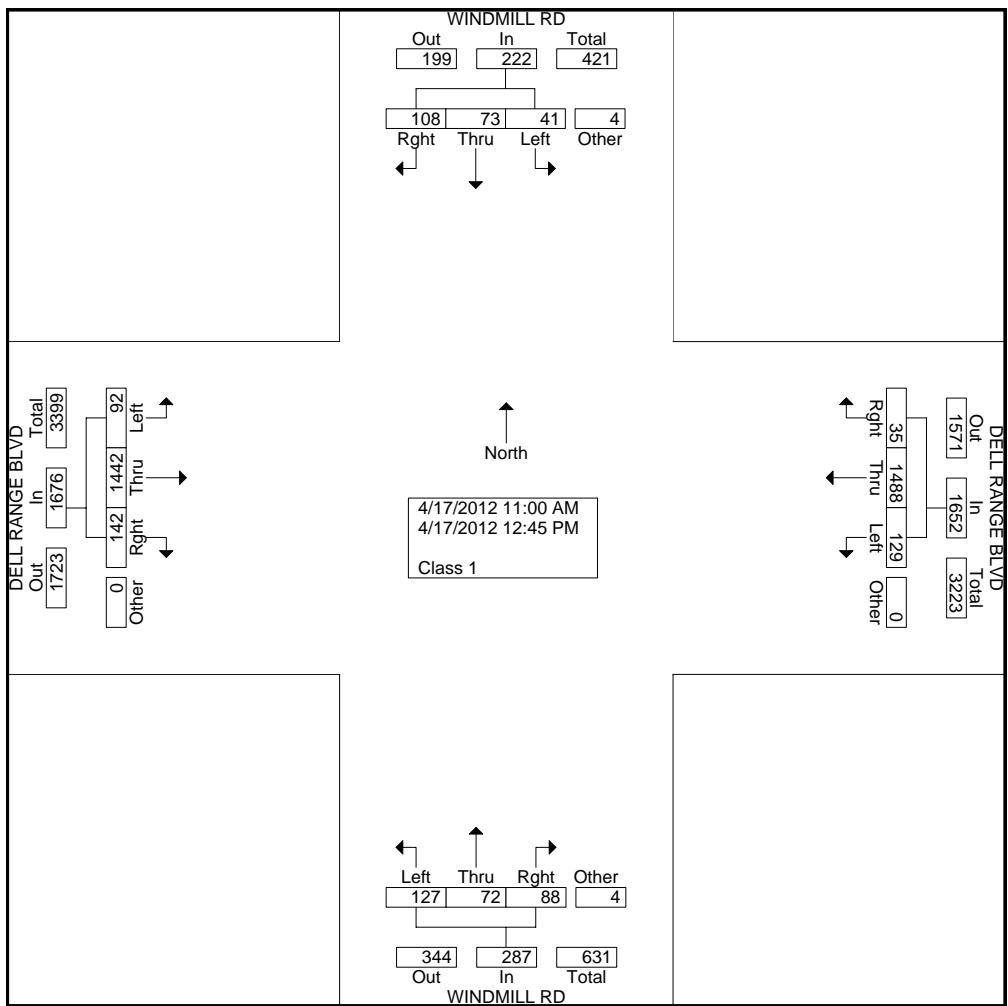




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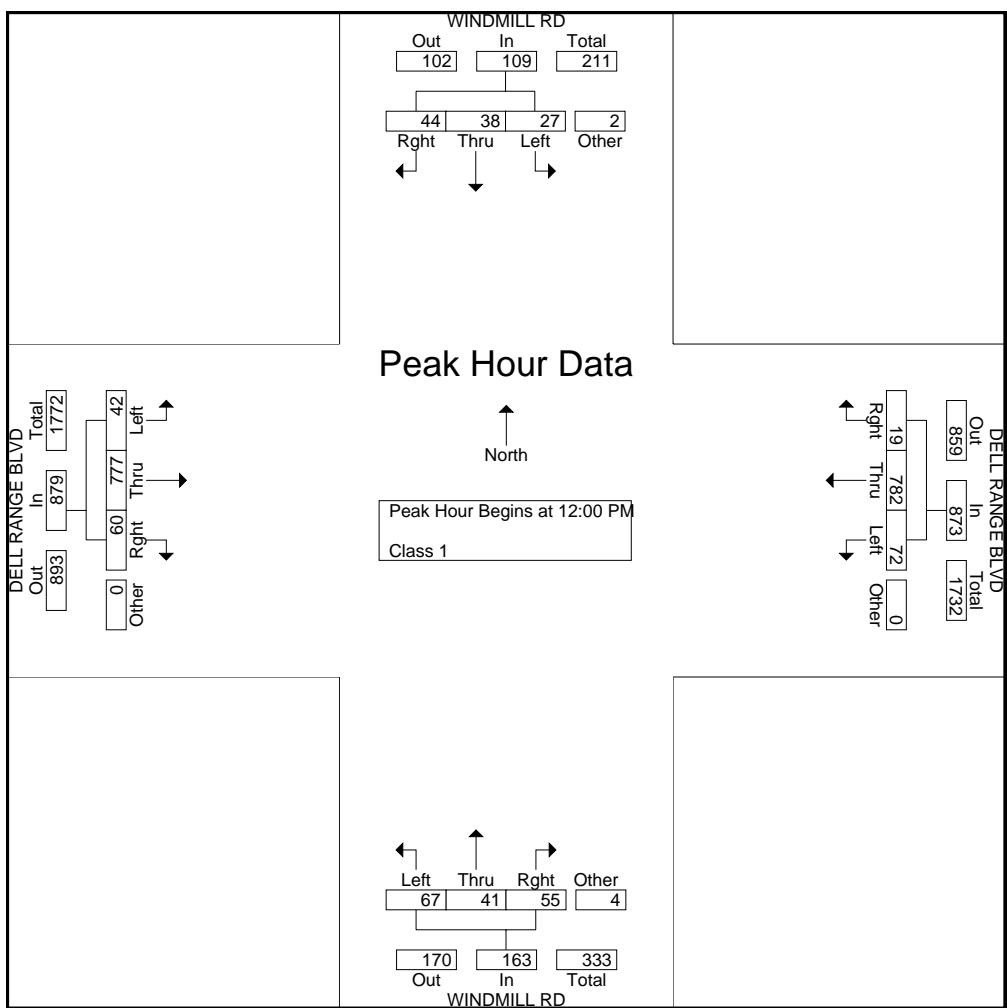
	WINDMILL RD Southbound				DELL RANGE BLVD Westbound				WINDMILL RD Northbound				DELL RANGE BLVD Eastbound				
Start Time	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Int. Total
11:00 AM	5	4	12	0	7	179	4	0	18	7	11	0	13	165	16	0	441
11:15 AM	3	17	20	0	30	156	4	0	13	4	10	0	12	165	31	0	465
11:30 AM	2	8	13	1	12	189	1	0	13	13	7	0	15	156	19	0	449
11:45 AM	4	6	19	1	8	182	7	0	16	7	5	0	10	179	16	0	460
Total	14	35	64	2	57	706	16	0	60	31	33	0	50	665	82	0	1815
12:00 PM	6	9	4	0	26	199	6	0	14	13	10	1	10	214	6	0	518
12:15 PM	4	2	10	1	10	185	4	0	33	7	22	0	17	179	13	0	487
12:30 PM	12	15	15	1	17	208	7	0	11	13	9	2	8	190	19	0	527
12:45 PM	5	12	15	0	19	190	2	0	9	8	14	1	7	194	22	0	498
Total	27	38	44	2	72	782	19	0	67	41	55	4	42	777	60	0	2030
Grand Total	41	73	108	4	129	1488	35	0	127	72	88	4	92	1442	142	0	3845
Apprch %	18.1	32.3	47.8	1.8	7.8	90.1	2.1	0	43.6	24.7	30.2	1.4	5.5	86	8.5	0	
Total %	1.1	1.9	2.8	0.1	3.4	38.7	0.9	0	3.3	1.9	2.3	0.1	2.4	37.5	3.7	0	





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	WINDMILL RD Southbound					DELL RANGE BLVD Westbound					WINDMILL RD Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	6	9	4	0	19	26	199	6	0	231	14	13	10	1	38	10	214	6	0	230	518
12:15 PM	4	2	10	1	17	10	185	4	0	199	33	7	22	0	62	17	179	13	0	209	487
12:30 PM	12	15	15	1	43	17	208	7	0	232	11	13	9	2	35	8	190	19	0	217	527
12:45 PM	5	12	15	0	32	19	190	2	0	211	9	8	14	1	32	7	194	22	0	223	498
Total Volume	27	38	44	2	111	72	782	19	0	873	67	41	55	4	167	42	777	60	0	879	2030
% App. Total	24.3	34.2	39.6	1.8		8.2	89.6	2.2	0		40.1	24.6	32.9	2.4		4.8	88.4	6.8	0		
PHF	.563	.633	.733	.500	.645	.692	.940	.679	.000	.941	.508	.788	.625	.500	.673	.618	.908	.682	.000	.955	.963

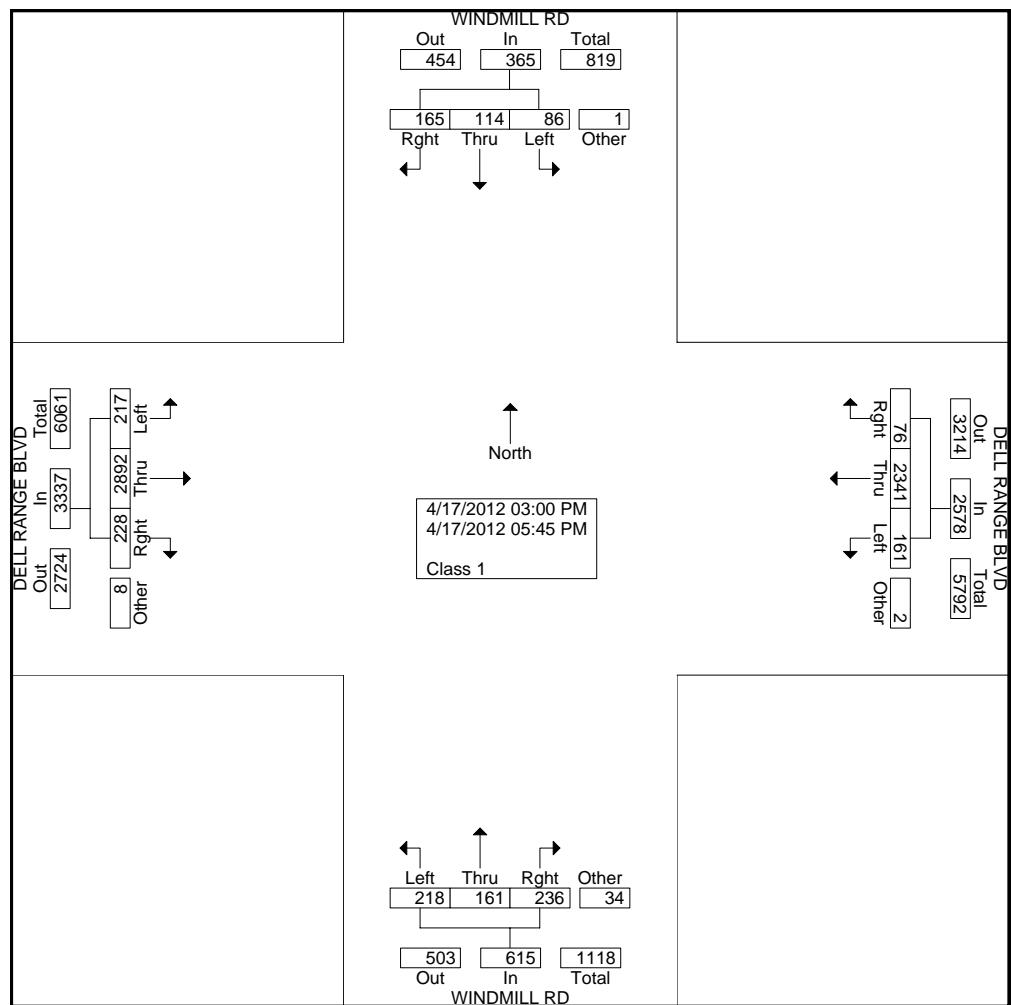




File Name : #23 WINDMILL&DELLRANGEPM
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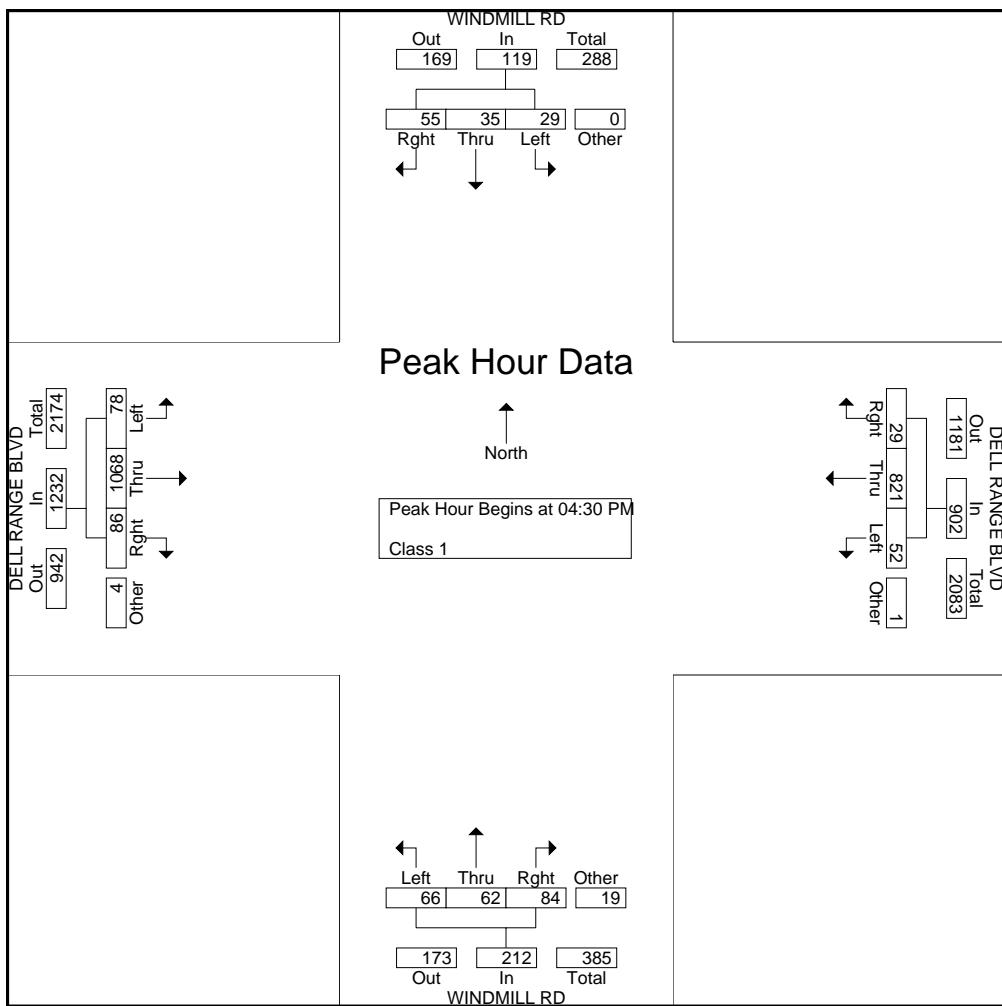
	WINDMILL RD Southbound				DELL RANGE BLVD Westbound				WINDMILL RD Northbound				DELL RANGE BLVD Eastbound				
Start Time	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Int. Total
03:00 PM	5	6	4	0	12	158	4	1	19	7	20	1	20	229	19	3	508
03:15 PM	10	10	11	1	12	170	4	0	15	18	17	2	16	216	15	0	517
03:30 PM	9	12	27	0	14	200	4	0	23	9	22	1	14	231	17	1	584
03:45 PM	6	12	14	0	12	212	10	0	24	14	27	0	21	212	17	0	581
Total	30	40	56	1	50	740	22	1	81	48	86	4	71	888	68	4	2190
04:00 PM	8	5	12	0	9	236	8	0	10	14	15	2	24	245	16	0	604
04:15 PM	4	12	20	0	14	192	7	0	15	12	17	4	20	220	15	0	552
04:30 PM	6	7	14	0	9	226	5	1	16	14	15	3	17	260	16	1	610
04:45 PM	12	15	12	0	17	190	7	0	15	14	23	4	20	245	27	0	601
Total	30	39	58	0	49	844	27	1	56	54	70	13	81	970	74	1	2367
05:00 PM	9	6	11	0	14	205	9	0	23	28	31	6	25	297	27	1	692
05:15 PM	2	7	18	0	12	200	8	0	12	6	15	6	16	266	16	2	586
05:30 PM	5	10	10	0	21	165	6	0	32	17	17	4	11	241	26	0	565
05:45 PM	10	12	12	0	15	187	4	0	14	8	17	1	13	230	17	0	540
Total	26	35	51	0	62	757	27	0	81	59	80	17	65	1034	86	3	2383
Grand Total	86	114	165	1	161	2341	76	2	218	161	236	34	217	2892	228	8	6940
Apprch %	23.5	31.1	45.1	0.3	6.2	90.7	2.9	0.1	33.6	24.8	36.4	5.2	6.5	86.5	6.8	0.2	
Total %	1.2	1.6	2.4	0	2.3	33.7	1.1	0	3.1	2.3	3.4	0.5	3.1	41.7	3.3	0.1	





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	WINDMILL RD Southbound					DELL RANGE BLVD Westbound					WINDMILL RD Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	6	7	14	0	27	9	226	5	1	241	16	14	15	3	48	17	260	16	1	294	610
04:45 PM	12	15	12	0	39	17	190	7	0	214	15	14	23	4	56	20	245	27	0	292	601
05:00 PM	9	6	11	0	26	14	205	9	0	228	23	28	31	6	88	25	297	27	1	350	692
05:15 PM	2	7	18	0	27	12	200	8	0	220	12	6	15	6	39	16	266	16	2	300	586
Total Volume	29	35	55	0	119	52	821	29	1	903	66	62	84	19	231	78	1068	86	4	1236	2489
% App. Total	24.4	29.4	46.2	0		5.8	90.9	3.2	0.1		28.6	26.8	36.4	8.2		6.3	86.4	7	0.3		
PHF	.604	.583	.764	.000	.763	.765	.908	.806	.250	.937	.717	.554	.677	.792	.656	.780	.899	.796	.500	.883	.899

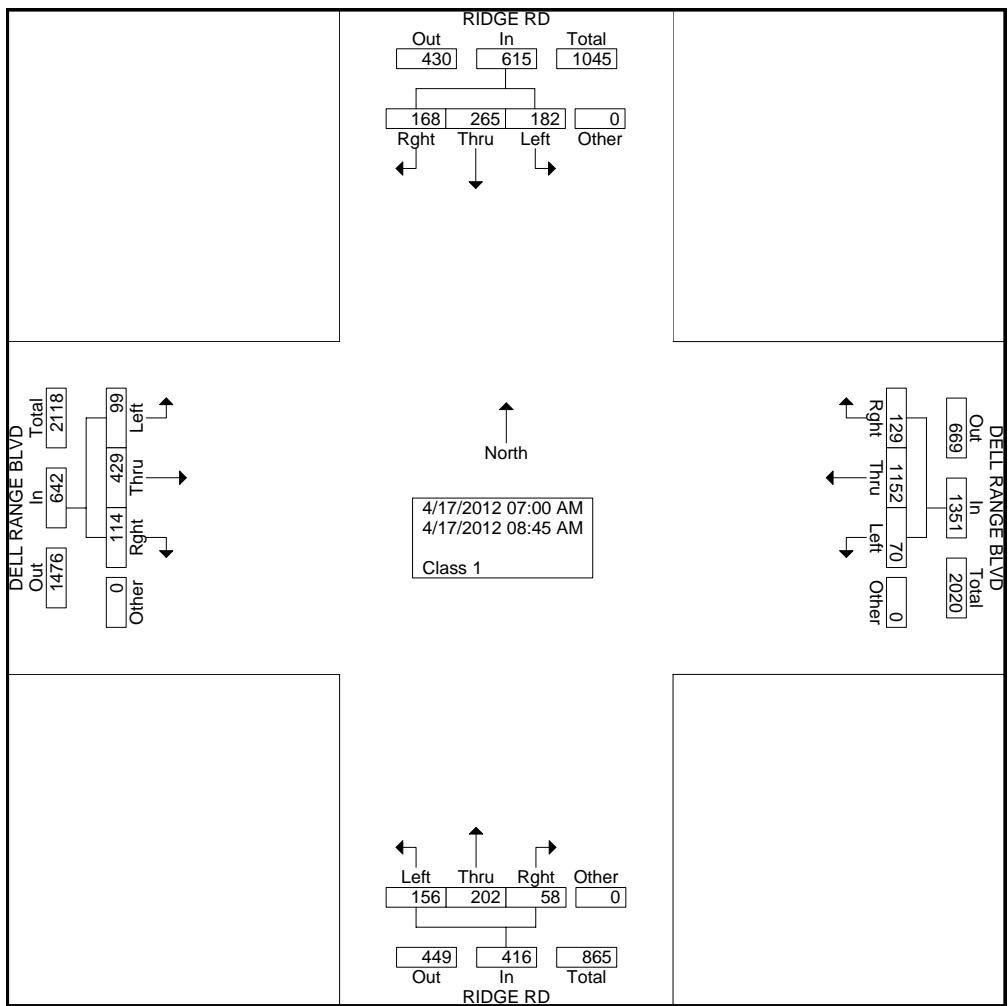




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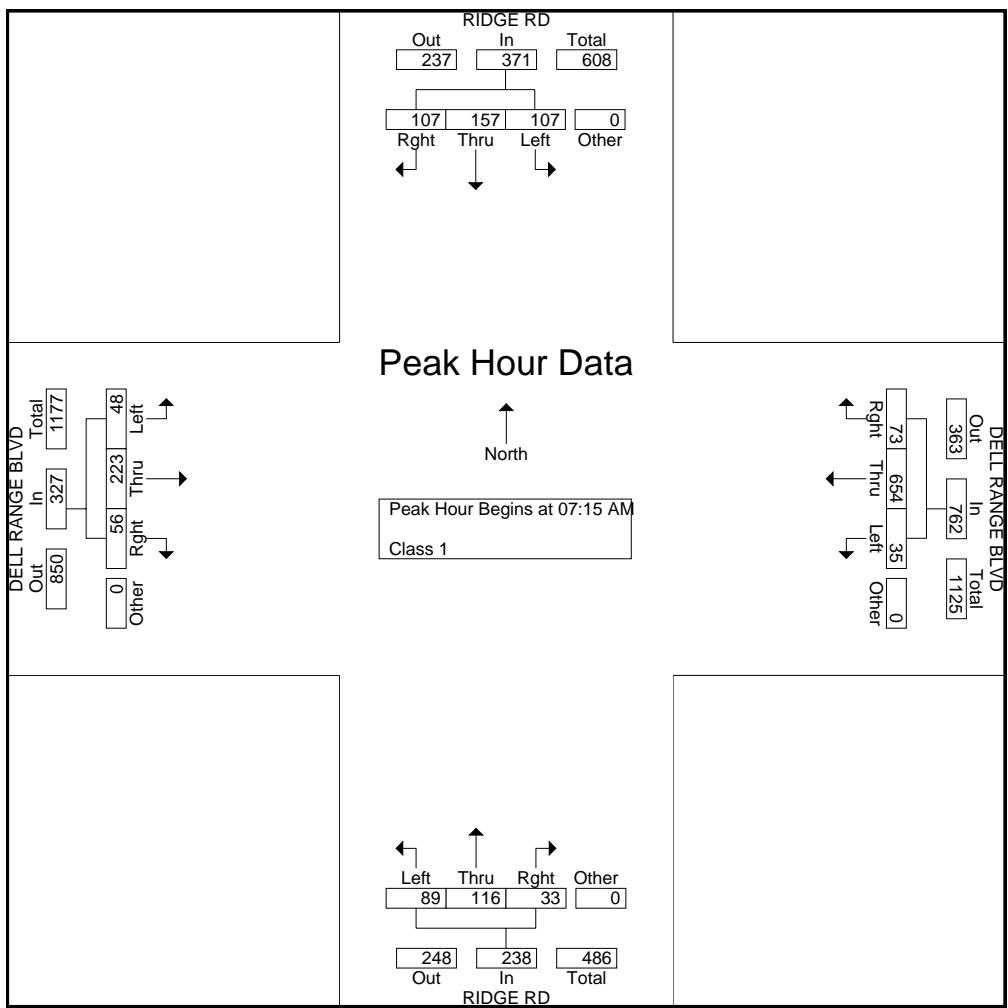
Start Time	RIDGE RD Southbound				DELL RANGE BLVD Westbound				RIDGE RD Northbound				DELL RANGE BLVD Eastbound				Int. Total
	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	
07:00 AM	15	20	20	0	10	135	9	0	15	10	3	0	9	31	7	0	284
07:15 AM	22	35	33	0	6	182	12	0	18	21	5	0	8	44	14	0	400
07:30 AM	26	31	29	0	11	177	14	0	28	31	6	0	14	67	14	0	448
07:45 AM	21	43	30	0	9	169	28	0	22	34	8	0	14	63	13	0	454
Total	84	129	112	0	36	663	63	0	83	96	22	0	45	205	48	0	1586
08:00 AM	38	48	15	0	9	126	19	0	21	30	14	0	12	49	15	0	396
08:15 AM	29	34	11	0	8	154	17	0	19	27	5	0	15	45	15	0	379
08:30 AM	17	30	15	0	8	92	17	0	11	23	7	0	12	74	20	0	326
08:45 AM	14	24	15	0	9	117	13	0	22	26	10	0	15	56	16	0	337
Total	98	136	56	0	34	489	66	0	73	106	36	0	54	224	66	0	1438
Grand Total	182	265	168	0	70	1152	129	0	156	202	58	0	99	429	114	0	3024
Apprch %	29.6	43.1	27.3	0	5.2	85.3	9.5	0	37.5	48.6	13.9	0	15.4	66.8	17.8	0	
Total %	6	8.8	5.6	0	2.3	38.1	4.3	0	5.2	6.7	1.9	0	3.3	14.2	3.8	0	





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	RIDGE RD Southbound					DELL RANGE BLVD Westbound					RIDGE RD Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	22	35	33	0	90	6	182	12	0	200	18	21	5	0	44	8	44	14	0	66	400
07:30 AM	26	31	29	0	86	11	177	14	0	202	28	31	6	0	65	14	67	14	0	95	448
07:45 AM	21	43	30	0	94	9	169	28	0	206	22	34	8	0	64	14	63	13	0	90	454
08:00 AM	38	48	15	0	101	9	126	19	0	154	21	30	14	0	65	12	49	15	0	76	396
Total Volume	107	157	107	0	371	35	654	73	0	762	89	116	33	0	238	48	223	56	0	327	1698
% App. Total	28.8	42.3	28.8	0		4.6	85.8	9.6	0		37.4	48.7	13.9	0		14.7	68.2	17.1	0		
PHF	.704	.818	.811	.000	.918	.795	.898	.652	.000	.925	.795	.853	.589	.000	.915	.857	.832	.933	.000	.861	.935

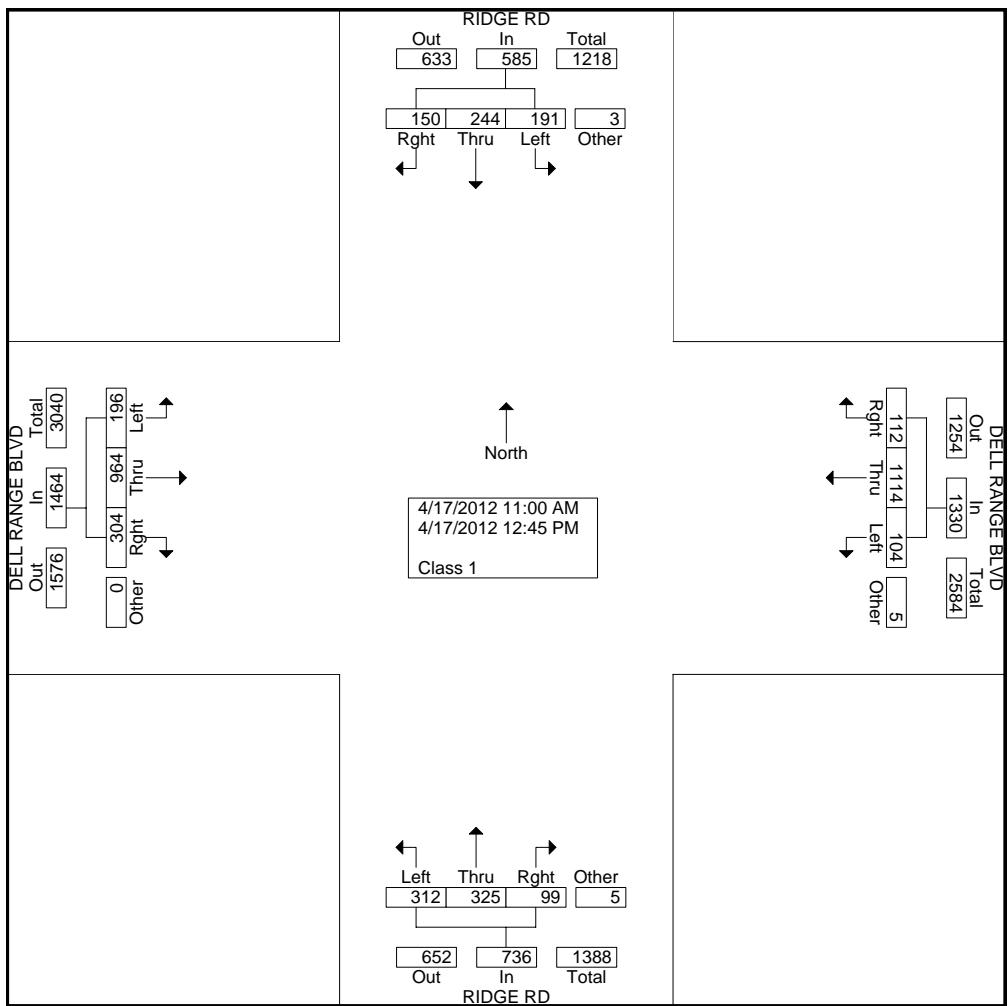




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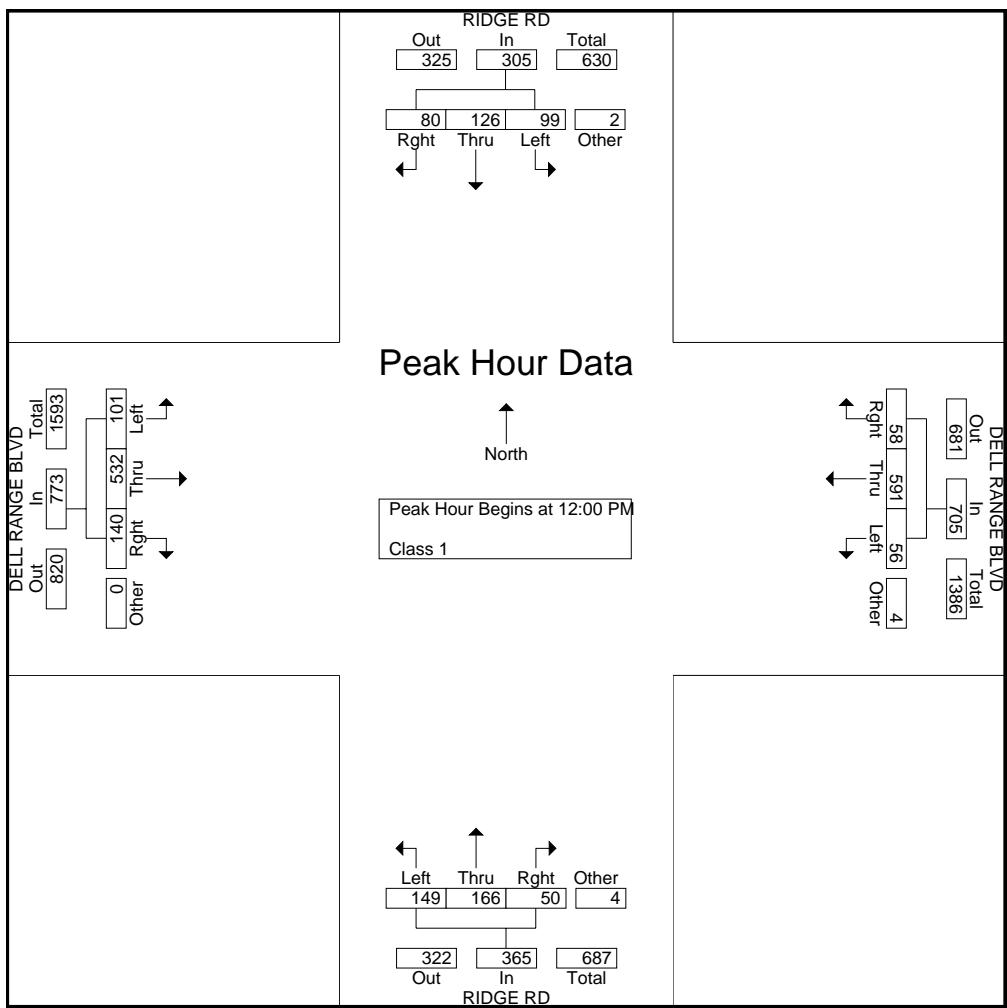
Start Time	RIDGE RD Southbound				DELL RANGE BLVD Westbound				RIDGE RD Northbound				DELL RANGE BLVD Eastbound				Int. Total
	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	
11:00 AM	25	30	19	0	9	120	13	0	43	43	7	0	23	114	49	0	495
11:15 AM	14	19	17	0	12	140	13	0	41	31	15	0	26	95	39	0	462
11:30 AM	27	39	18	1	13	131	19	0	43	42	16	0	18	107	31	0	505
11:45 AM	26	30	16	0	14	132	9	1	36	43	11	1	28	116	45	0	508
Total	92	118	70	1	48	523	54	1	163	159	49	1	95	432	164	0	1970
12:00 PM	21	35	20	1	18	137	13	2	47	40	14	2	27	131	39	0	547
12:15 PM	17	29	17	1	14	147	22	2	35	39	15	2	15	143	28	0	526
12:30 PM	35	41	22	0	9	148	8	0	31	38	12	0	34	127	39	0	544
12:45 PM	26	21	21	0	15	159	15	0	36	49	9	0	25	131	34	0	541
Total	99	126	80	2	56	591	58	4	149	166	50	4	101	532	140	0	2158
Grand Total	191	244	150	3	104	1114	112	5	312	325	99	5	196	964	304	0	4128
Apprch %	32.5	41.5	25.5	0.5	7.8	83.4	8.4	0.4	42.1	43.9	13.4	0.7	13.4	65.8	20.8	0	
Total %	4.6	5.9	3.6	0.1	2.5	27	2.7	0.1	7.6	7.9	2.4	0.1	4.7	23.4	7.4	0	





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	RIDGE RD Southbound					DELL RANGE BLVD Westbound					RIDGE RD Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	21	35	20	1	77	18	137	13	2	170	47	40	14	2	103	27	131	39	0	197	547
12:15 PM	17	29	17	1	64	14	147	22	2	185	35	39	15	2	91	15	143	28	0	186	526
12:30 PM	35	41	22	0	98	9	148	8	0	165	31	38	12	0	81	34	127	39	0	200	544
12:45 PM	26	21	21	0	68	15	159	15	0	189	36	49	9	0	94	25	131	34	0	190	541
Total Volume	99	126	80	2	307	56	591	58	4	709	149	166	50	4	369	101	532	140	0	773	2158
% App. Total	32.2	41	26.1	0.7		7.9	83.4	8.2	0.6		40.4	45	13.6	1.1		13.1	68.8	18.1	0		
PHF	.707	.768	.909	.500	.783	.778	.929	.659	.500	.938	.793	.847	.833	.500	.896	.743	.930	.897	.000	.966	.986

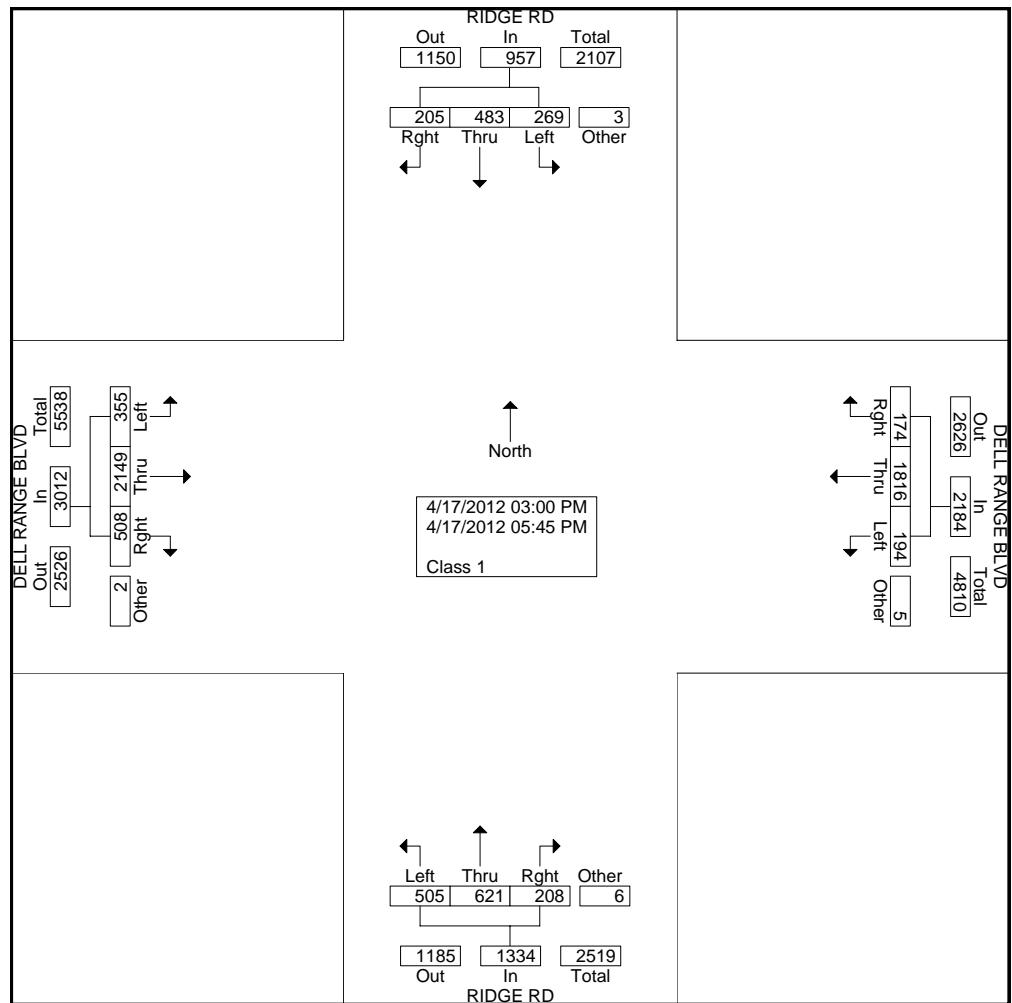




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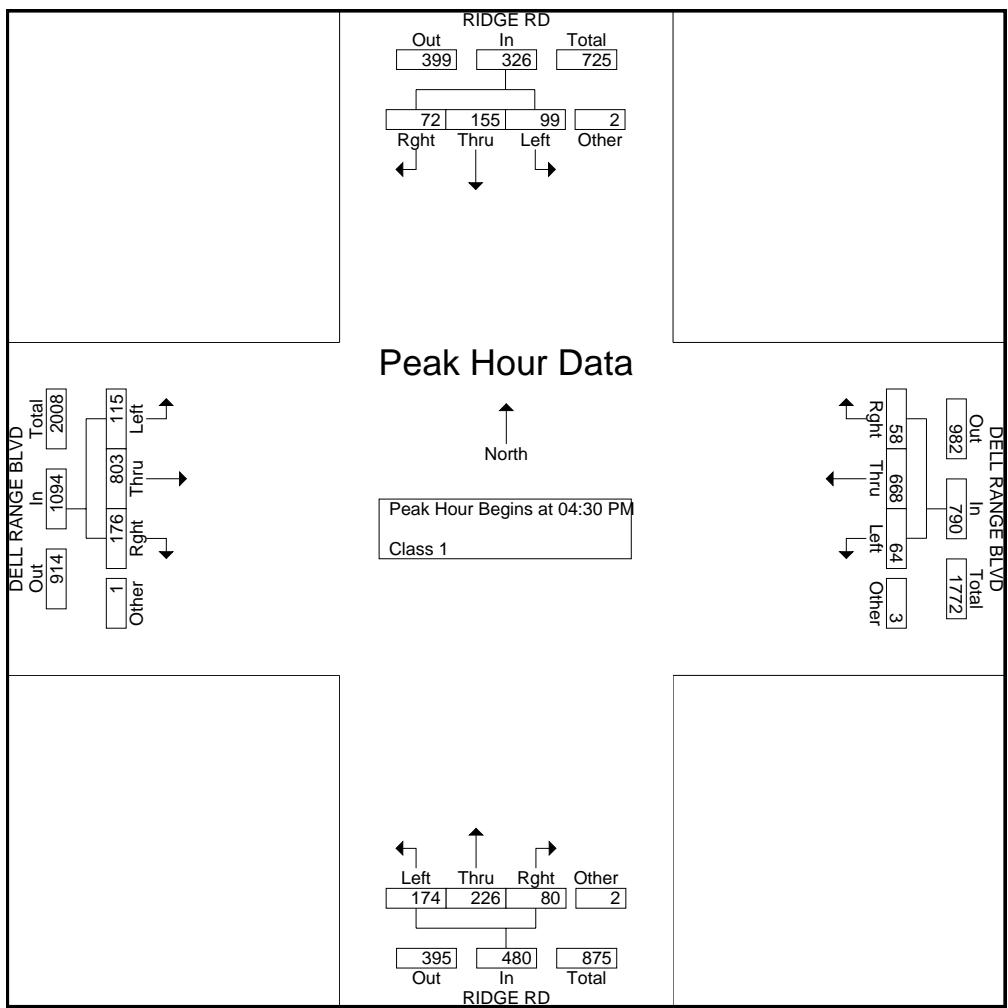
Start Time	RIDGE RD Southbound				DELL RANGE BLVD Westbound				RIDGE RD Northbound				DELL RANGE BLVD Eastbound				Int. Total
	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	
03:00 PM	15	34	11	0	11	124	13	0	39	45	17	0	28	167	41	0	545
03:15 PM	24	35	16	0	13	131	20	0	31	47	13	1	28	167	37	0	563
03:30 PM	16	41	15	0	18	139	7	0	44	55	18	2	29	170	53	0	607
03:45 PM	21	45	21	0	12	153	18	0	46	56	16	0	36	151	41	0	616
Total	76	155	63	0	54	547	58	0	160	203	64	3	121	655	172	0	2331
04:00 PM	18	52	18	0	15	164	13	1	46	41	24	0	29	179	45	0	645
04:15 PM	24	47	16	1	24	139	17	1	45	40	15	0	25	151	47	0	592
04:30 PM	21	41	18	1	31	201	12	3	37	52	19	1	20	185	47	0	689
04:45 PM	20	38	28	0	6	150	13	0	46	41	21	1	28	186	46	0	624
Total	83	178	80	2	76	654	55	5	174	174	79	2	102	701	185	0	2550
05:00 PM	32	41	16	0	14	146	18	0	48	67	20	0	31	215	50	0	698
05:15 PM	26	35	10	1	13	171	15	0	43	66	20	0	36	217	33	1	687
05:30 PM	29	41	13	0	21	150	12	0	35	63	13	0	29	185	35	1	627
05:45 PM	23	33	23	0	16	148	16	0	45	48	12	1	36	176	33	0	610
Total	110	150	62	1	64	615	61	0	171	244	65	1	132	793	151	2	2622
Grand Total	269	483	205	3	194	1816	174	5	505	621	208	6	355	2149	508	2	7503
Apprch %	28	50.3	21.4	0.3	8.9	83	7.9	0.2	37.7	46.3	15.5	0.4	11.8	71.3	16.9	0.1	
Total %	3.6	6.4	2.7	0	2.6	24.2	2.3	0.1	6.7	8.3	2.8	0.1	4.7	28.6	6.8	0	





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	RIDGE RD Southbound					DELL RANGE BLVD Westbound					RIDGE RD Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	21	41	18	1	81	31	201	12	3	247	37	52	19	1	109	20	185	47	0	252	689
04:45 PM	20	38	28	0	86	6	150	13	0	169	46	41	21	1	109	28	186	46	0	260	624
05:00 PM	32	41	16	0	89	14	146	18	0	178	48	67	20	0	135	31	215	50	0	296	698
05:15 PM	26	35	10	1	72	13	171	15	0	199	43	66	20	0	129	36	217	33	1	287	687
Total Volume	99	155	72	2	328	64	668	58	3	793	174	226	80	2	482	115	803	176	1	1095	2698
% App. Total	30.2	47.3	22	0.6		8.1	84.2	7.3	0.4		36.1	46.9	16.6	0.4		10.5	73.3	16.1	0.1		
PHF	.773	.945	.643	.500	.921	.516	.831	.806	.250	.803	.906	.843	.952	.500	.893	.799	.925	.880	.250	.925	.966

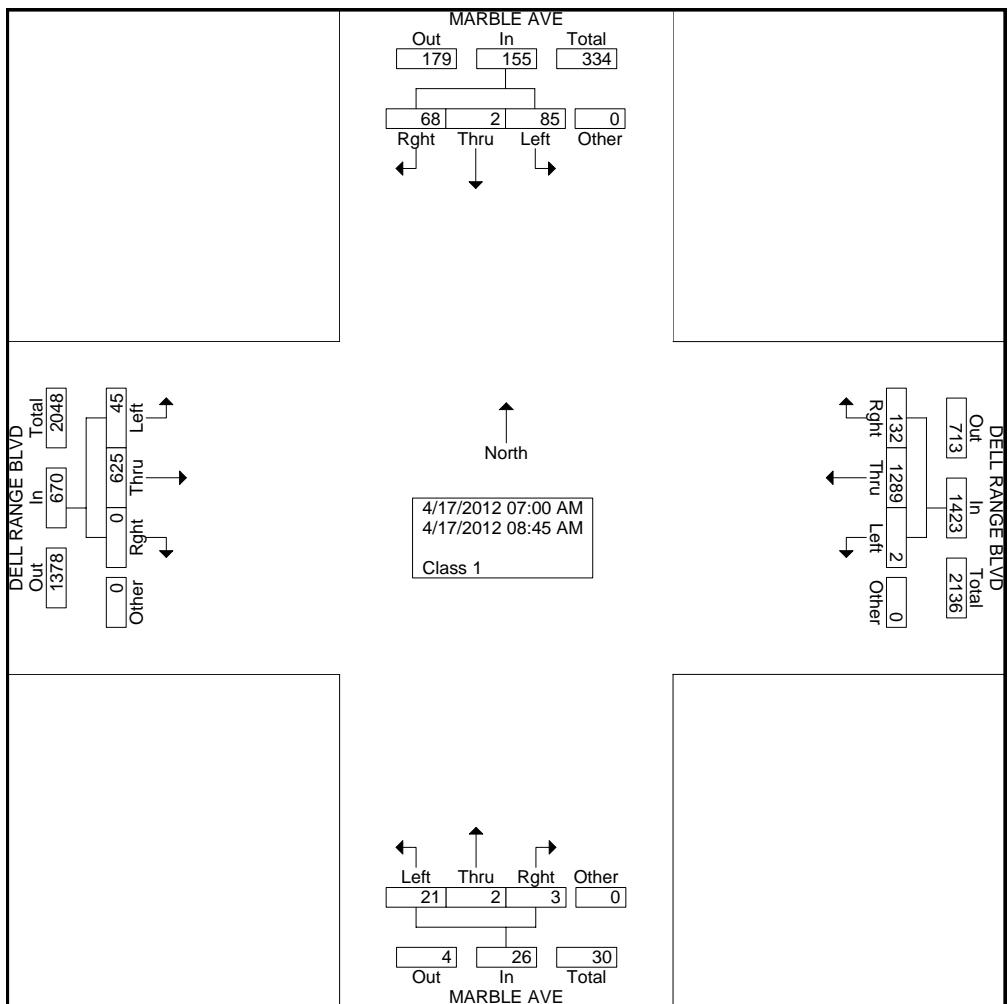




File Name : #66 MARBLE&DELLRANGEAM
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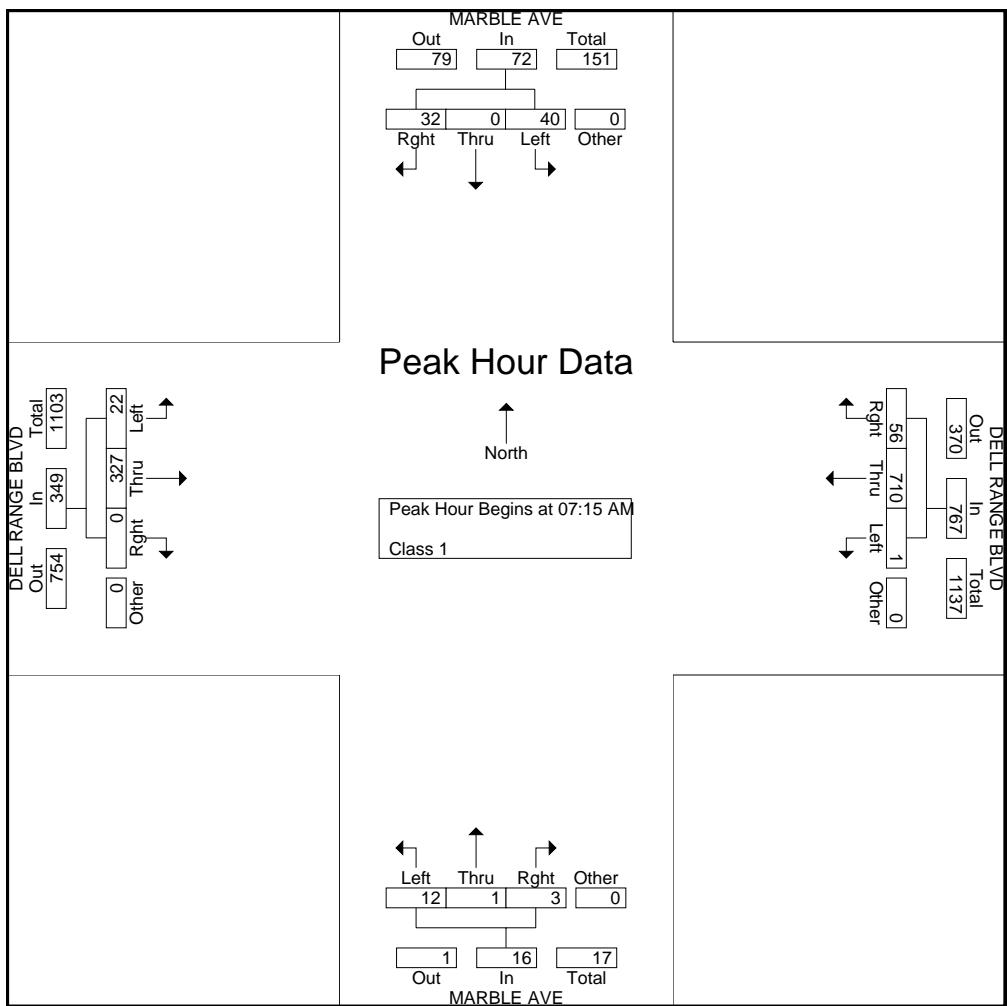
	MARBLE AVE Southbound				DELL RANGE BLVD Westbound				MARBLE AVE Northbound				DELL RANGE BLVD Eastbound				
Start Time	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Int. Total
07:00 AM	5	1	7	0	1	157	23	0	4	0	0	0	4	54	0	0	256
07:15 AM	9	0	8	0	0	183	16	0	3	0	0	0	5	78	0	0	302
07:30 AM	6	0	10	0	1	209	14	0	4	1	0	0	8	88	0	0	341
07:45 AM	13	0	7	0	0	169	16	0	4	0	3	0	5	82	0	0	299
Total	33	1	32	0	2	718	69	0	15	1	3	0	22	302	0	0	1198
08:00 AM	12	0	7	0	0	149	10	0	1	0	0	0	4	79	0	0	262
08:15 AM	9	0	10	0	0	162	18	0	1	0	0	0	7	81	0	0	288
08:30 AM	21	1	8	0	0	122	22	0	3	1	0	0	8	87	0	0	273
08:45 AM	10	0	11	0	0	138	13	0	1	0	0	0	4	76	0	0	253
Total	52	1	36	0	0	571	63	0	6	1	0	0	23	323	0	0	1076
Grand Total	85	2	68	0	2	1289	132	0	21	2	3	0	45	625	0	0	2274
Apprch %	54.8	1.3	43.9	0	0.1	90.6	9.3	0	80.8	7.7	11.5	0	6.7	93.3	0	0	
Total %	3.7	0.1	3	0	0.1	56.7	5.8	0	0.9	0.1	0.1	0	2	27.5	0	0	





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	MARBLE AVE Southbound					DELL RANGE BLVD Westbound					MARBLE AVE Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	9	0	8	0	17	0	183	16	0	199	3	0	0	0	3	5	78	0	0	83	302
07:30 AM	6	0	10	0	16	1	209	14	0	224	4	1	0	0	5	8	88	0	0	96	341
07:45 AM	13	0	7	0	20	0	169	16	0	185	4	0	3	0	7	5	82	0	0	87	299
08:00 AM	12	0	7	0	19	0	149	10	0	159	1	0	0	0	1	4	79	0	0	83	262
Total Volume	40	0	32	0	72	1	710	56	0	767	12	1	3	0	16	22	327	0	0	349	1204
% App. Total	55.6	0	44.4	0	0	0.1	92.6	7.3	0	0	75	6.2	18.8	0	0	6.3	93.7	0	0	0	0
PHF	.769	.000	.800	.000	.900	.250	.849	.875	.000	.856	.750	.250	.250	.000	.571	.688	.929	.000	.000	.909	.883

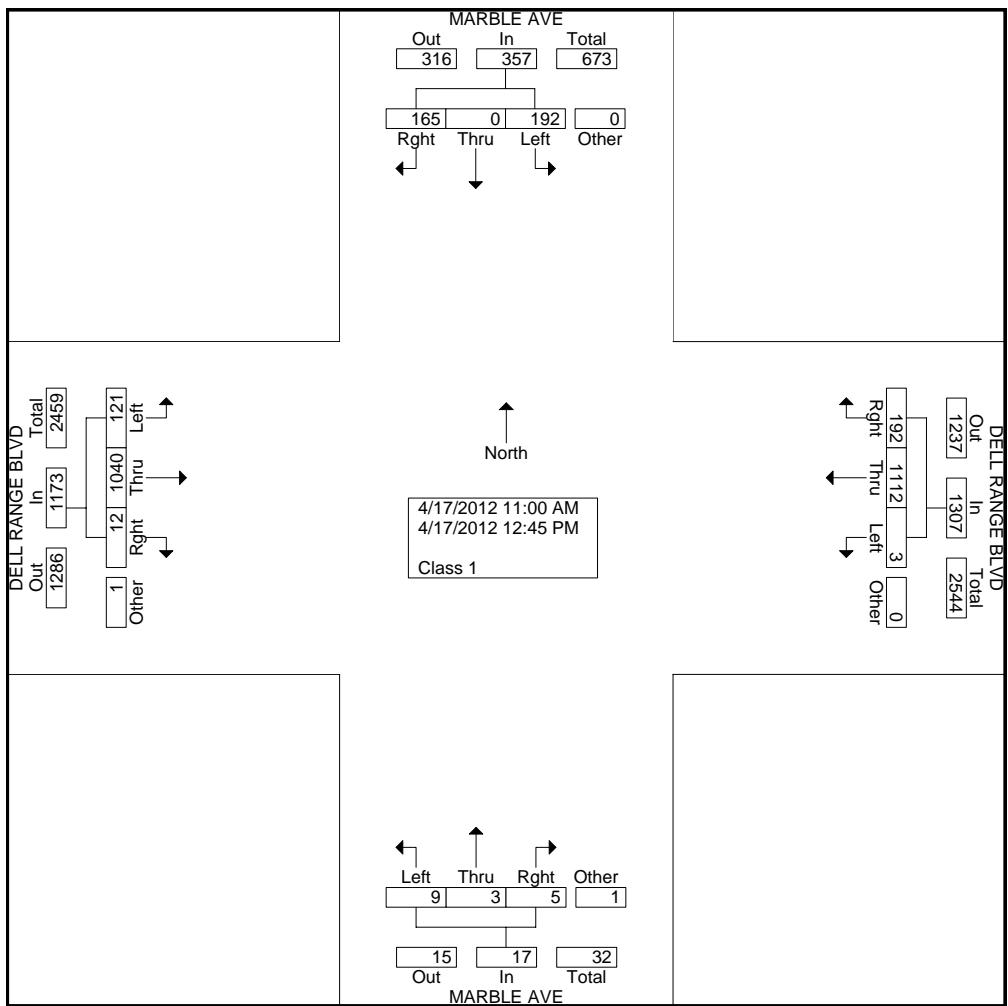




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Groups Printed- Class 1

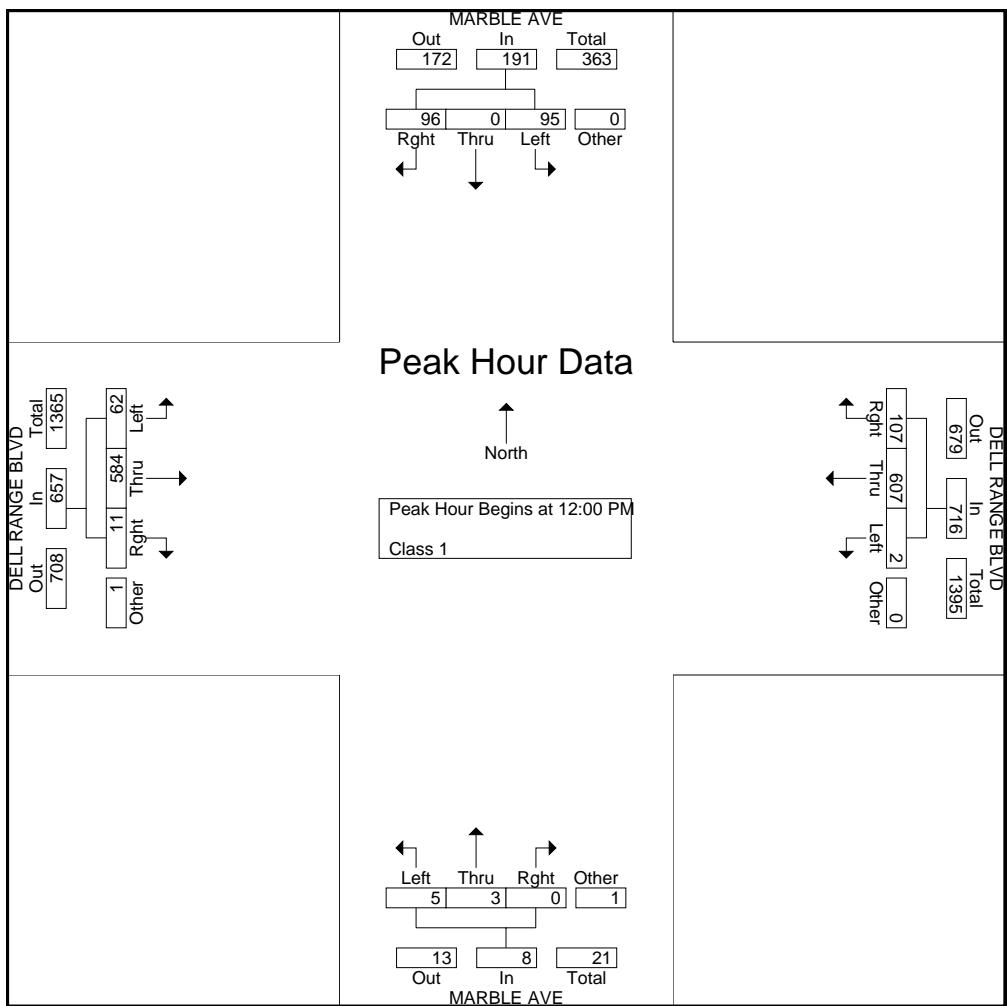
	MARBLE AVE Southbound				DELL RANGE BLVD Westbound				MARBLE AVE Northbound				DELL RANGE BLVD Eastbound				
Start Time	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Int. Total
11:00 AM	22	0	17	0	0	105	21	0	4	0	2	0	13	126	0	0	310
11:15 AM	19	0	19	0	0	122	16	0	0	0	0	0	17	90	0	0	283
11:30 AM	30	0	17	0	0	137	26	0	0	0	2	0	13	128	0	0	353
11:45 AM	26	0	16	0	1	141	22	0	0	0	1	0	16	112	1	0	336
Total	97	0	69	0	1	505	85	0	4	0	5	0	59	456	1	0	1282
12:00 PM	14	0	27	0	0	155	28	0	1	1	0	0	16	137	5	0	384
12:15 PM	26	0	23	0	1	154	28	0	2	0	0	0	20	150	1	0	405
12:30 PM	29	0	22	0	1	148	32	0	1	1	0	0	13	154	3	0	404
12:45 PM	26	0	24	0	0	150	19	0	1	1	0	1	13	143	2	1	381
Total	95	0	96	0	2	607	107	0	5	3	0	1	62	584	11	1	1574
Grand Total	192	0	165	0	3	1112	192	0	9	3	5	1	121	1040	12	1	2856
Apprch %	53.8	0	46.2	0	0.2	85.1	14.7	0	50	16.7	27.8	5.6	10.3	88.6	1	0.1	
Total %	6.7	0	5.8	0	0.1	38.9	6.7	0	0.3	0.1	0.2	0	4.2	36.4	0.4	0	





File Name : #66 MARBLE&DELLRANGEMD
 Site Code : 00000000
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	MARBLE AVE Southbound					DELL RANGE BLVD Westbound					MARBLE AVE Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	14	0	27	0	41	0	155	28	0	183	1	1	0	0	2	16	137	5	0	158	384
12:15 PM	26	0	23	0	49	1	154	28	0	183	2	0	0	0	2	20	150	1	0	171	405
12:30 PM	29	0	22	0	51	1	148	32	0	181	1	1	0	0	2	13	154	3	0	170	404
12:45 PM	26	0	24	0	50	0	150	19	0	169	1	1	0	1	3	13	143	2	1	159	381
Total Volume	95	0	96	0	191	2	607	107	0	716	5	3	0	1	9	62	584	11	1	658	1574
% App. Total	49.7	0	50.3	0		0.3	84.8	14.9	0		55.6	33.3	0	11.1		9.4	88.8	1.7	0.2		
PHF	.819	.000	.889	.000	.936	.500	.979	.836	.000	.978	.625	.750	.000	.250	.750	.775	.948	.550	.250	.962	.972

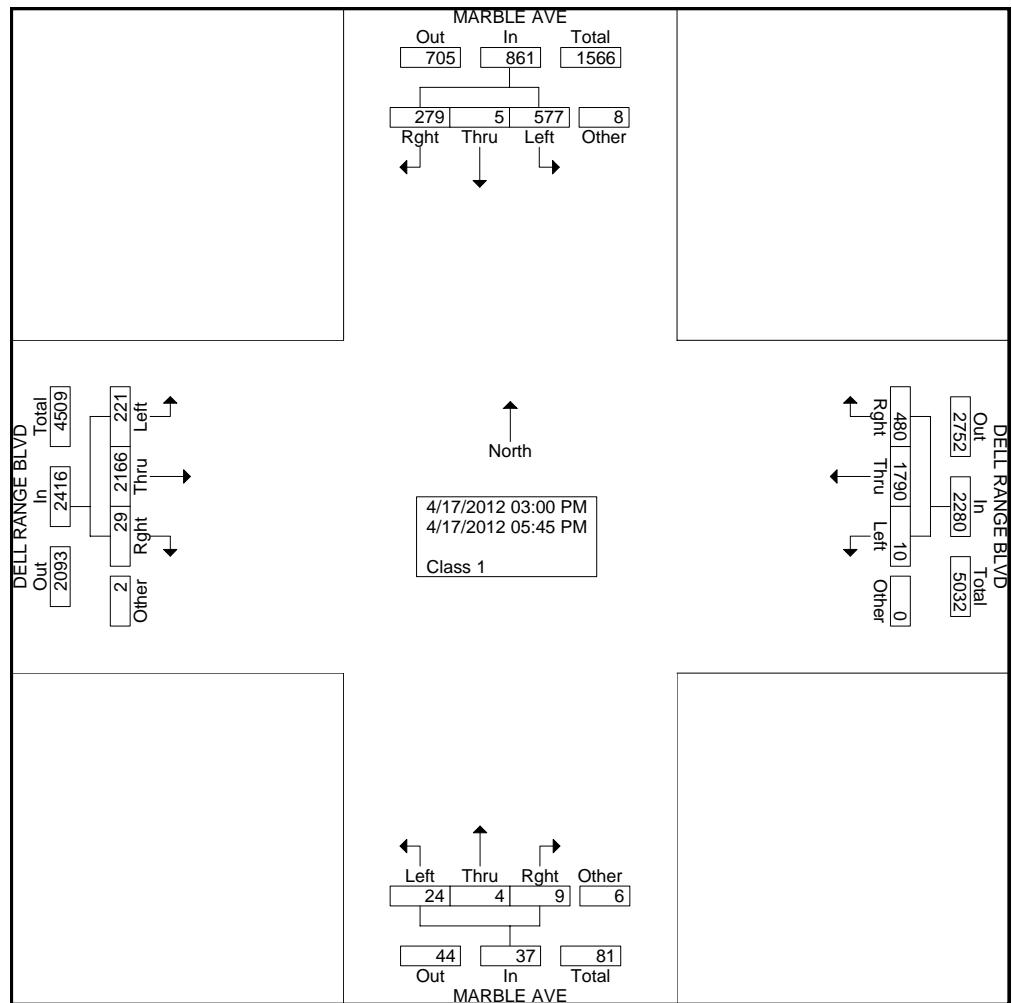




File Name : #66 MARBLE&DELLRANGEPM
 Site Code : 00000000
 Start Date : 4/17/2012
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Groups Printed- Class 1

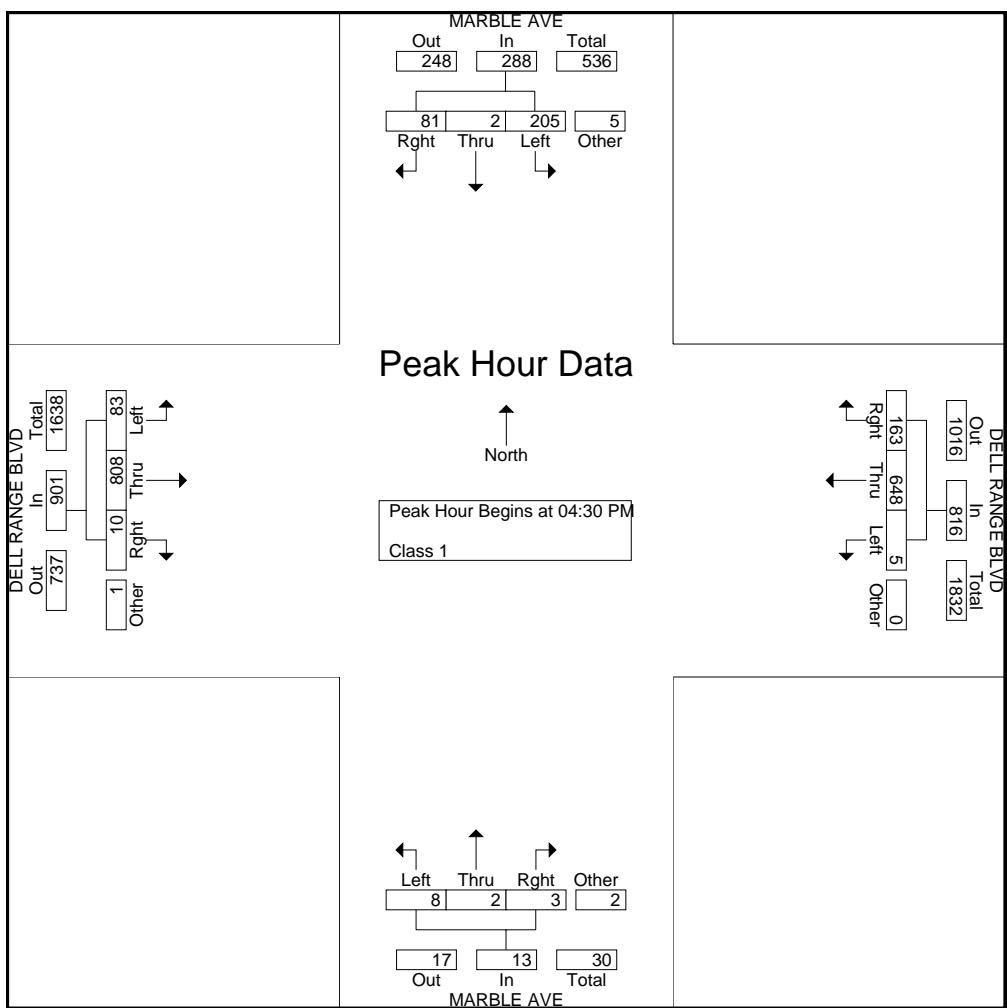
	MARBLE AVE Southbound				DELL RANGE BLVD Westbound				MARBLE AVE Northbound				DELL RANGE BLVD Eastbound				
Start Time	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Int. Total
03:00 PM	43	0	20	0	0	118	34	0	4	0	2	0	16	175	1	0	413
03:15 PM	30	0	25	0	1	124	33	0	2	0	1	1	12	163	1	0	393
03:30 PM	39	2	18	0	0	155	37	0	2	0	1	0	18	148	2	0	422
03:45 PM	43	0	20	0	1	166	44	0	0	0	1	0	20	143	3	0	441
Total	155	2	83	0	2	563	148	0	8	0	5	1	66	629	7	0	1669
04:00 PM	62	0	40	0	0	154	50	0	2	1	0	0	25	185	1	0	520
04:15 PM	50	1	22	1	2	154	45	0	2	1	1	3	16	165	6	0	469
04:30 PM	42	0	18	1	2	190	51	0	2	1	1	1	23	185	4	0	521
04:45 PM	59	1	15	4	1	142	33	0	1	0	1	1	19	178	1	0	456
Total	213	2	95	6	5	640	179	0	7	3	3	5	83	713	12	0	1966
05:00 PM	60	1	21	0	1	153	37	0	2	0	0	0	24	242	3	1	545
05:15 PM	44	0	27	0	1	163	42	0	3	1	1	0	17	203	2	0	504
05:30 PM	50	0	30	2	1	137	38	0	2	0	0	0	13	204	5	1	483
05:45 PM	55	0	23	0	0	134	36	0	2	0	0	0	18	175	0	0	443
Total	209	1	101	2	3	587	153	0	9	1	1	0	72	824	10	2	1975
Grand Total	577	5	279	8	10	1790	480	0	24	4	9	6	221	2166	29	2	5610
Apprch %	66.4	0.6	32.1	0.9	0.4	78.5	21.1	0	55.8	9.3	20.9	14	9.1	89.6	1.2	0.1	
Total %	10.3	0.1	5	0.1	0.2	31.9	8.6	0	0.4	0.1	0.2	0.1	3.9	38.6	0.5	0	





File Name : #66 MARBLE&DELLRANGEPM
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 Start Date : 4/17/2012
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	MARBLE AVE Southbound					DELL RANGE BLVD Westbound					MARBLE AVE Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	42	0	18	1	61	2	190	51	0	243	2	1	1	1	5	23	185	4	0	212	521
04:45 PM	59	1	15	4	79	1	142	33	0	176	1	0	1	1	3	19	178	1	0	198	456
05:00 PM	60	1	21	0	82	1	153	37	0	191	2	0	0	0	2	24	242	3	1	270	545
05:15 PM	44	0	27	0	71	1	163	42	0	206	3	1	1	0	5	17	203	2	0	222	504
Total Volume	205	2	81	5	293	5	648	163	0	816	8	2	3	2	15	83	808	10	1	902	2026
% App. Total	70	0.7	27.6	1.7		0.6	79.4	20	0		53.3	13.3	20	13.3		9.2	89.6	1.1	0.1		
PHF	.854	.500	.750	.313	.893	.625	.853	.799	.000	.840	.667	.500	.750	.500	.750	.865	.835	.625	.250	.835	.929

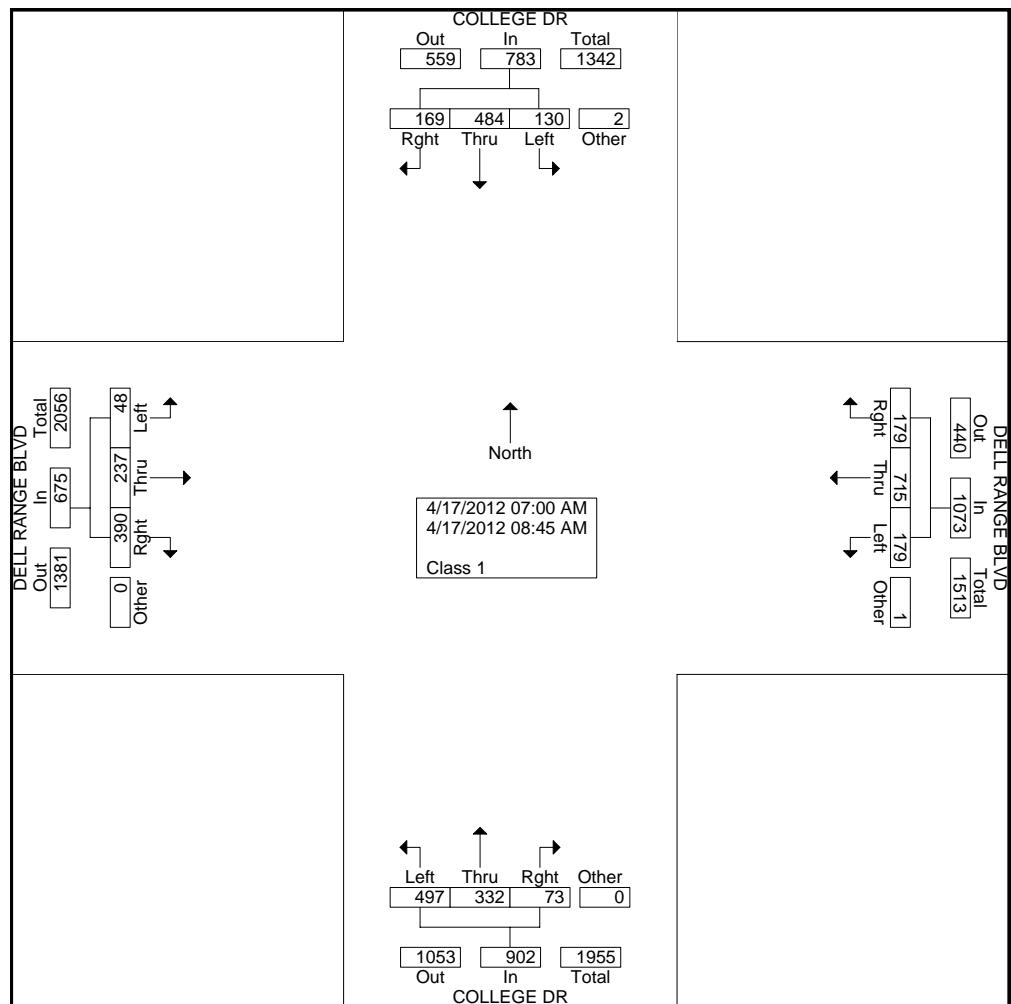




File Name : #112 COLLEGE&DELLRANGEAM
 Site Code : 00000000
 Start Date : 4/17/2012
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Groups Printed- Class 1

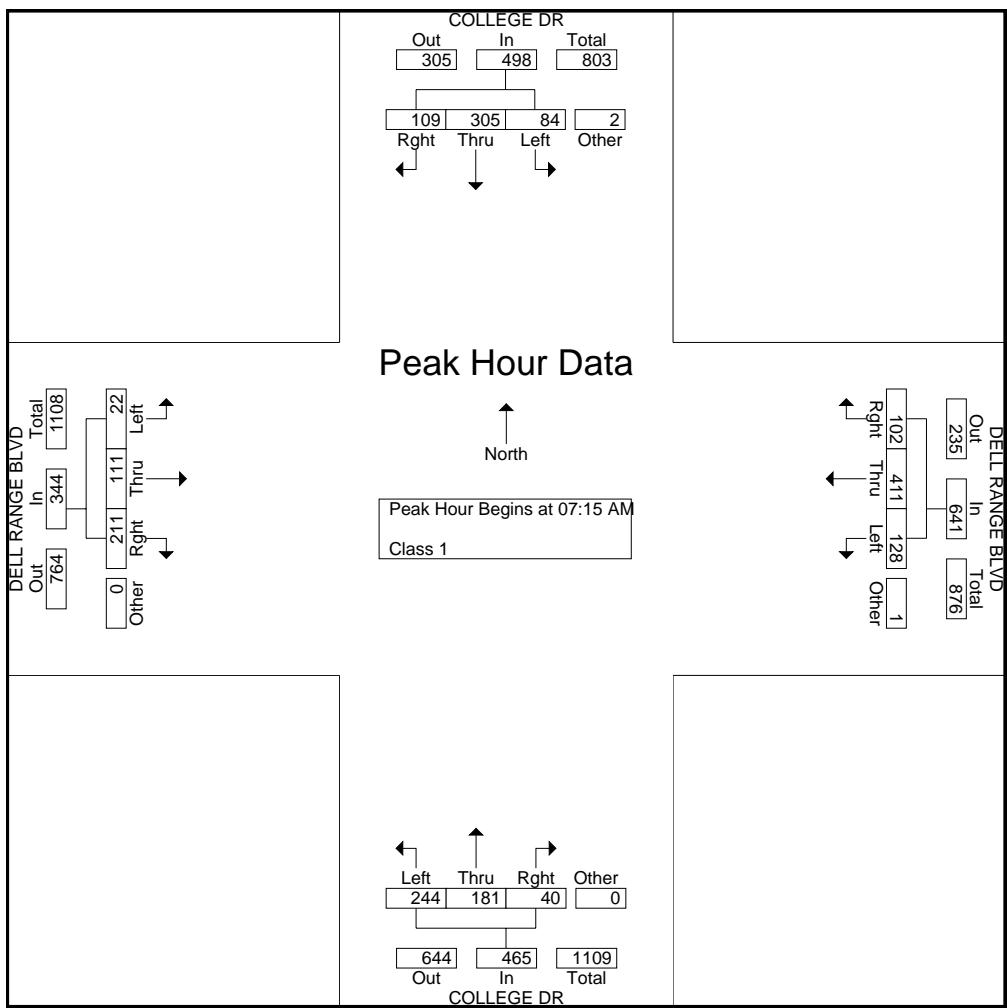
Start Time	COLLEGE DR Southbound				DELL RANGE BLVD Westbound				COLLEGE DR Northbound				DELL RANGE BLVD Eastbound				Int. Total
	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	
07:00 AM	12	38	28	0	14	93	21	0	33	31	5	0	4	24	17	0	320
07:15 AM	17	67	44	0	21	117	30	0	49	35	7	0	5	15	44	0	451
07:30 AM	22	78	29	0	41	119	28	0	53	47	5	0	6	34	55	0	517
07:45 AM	20	95	17	2	33	102	25	1	73	60	8	0	6	26	60	0	528
Total	71	278	118	2	109	431	104	1	208	173	25	0	21	99	176	0	1816
08:00 AM	25	65	19	0	33	73	19	0	69	39	20	0	5	36	52	0	455
08:15 AM	12	56	12	0	11	85	18	0	89	34	4	0	7	33	51	0	412
08:30 AM	12	47	9	0	12	71	23	0	58	40	11	0	9	33	61	0	386
08:45 AM	10	38	11	0	14	55	15	0	73	46	13	0	6	36	50	0	367
Total	59	206	51	0	70	284	75	0	289	159	48	0	27	138	214	0	1620
Grand Total	130	484	169	2	179	715	179	1	497	332	73	0	48	237	390	0	3436
Apprch %	16.6	61.7	21.5	0.3	16.7	66.6	16.7	0.1	55.1	36.8	8.1	0	7.1	35.1	57.8	0	
Total %	3.8	14.1	4.9	0.1	5.2	20.8	5.2	0	14.5	9.7	2.1	0	1.4	6.9	11.4	0	





File Name : #112 COLLEGE&DELLRANGEAM
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	COLLEGE DR Southbound					DELL RANGE BLVD Westbound					COLLEGE DR Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	17	67	44	0	128	21	117	30	0	168	49	35	7	0	91	5	15	44	0	64	451
07:30 AM	22	78	29	0	129	41	119	28	0	188	53	47	5	0	105	6	34	55	0	95	517
07:45 AM	20	95	17	2	134	33	102	25	1	161	73	60	8	0	141	6	26	60	0	92	528
08:00 AM	25	65	19	0	109	33	73	19	0	125	69	39	20	0	128	5	36	52	0	93	455
Total Volume	84	305	109	2	500	128	411	102	1	642	244	181	40	0	465	22	111	211	0	344	1951
% App. Total	16.8	61	21.8	0.4		19.9	64	15.9	0.2		52.5	38.9	8.6	0		6.4	32.3	61.3	0		
PHF	.840	.803	.619	.250	.933	.780	.863	.850	.250	.854	.836	.754	.500	.000	.824	.917	.771	.879	.000	.905	.924

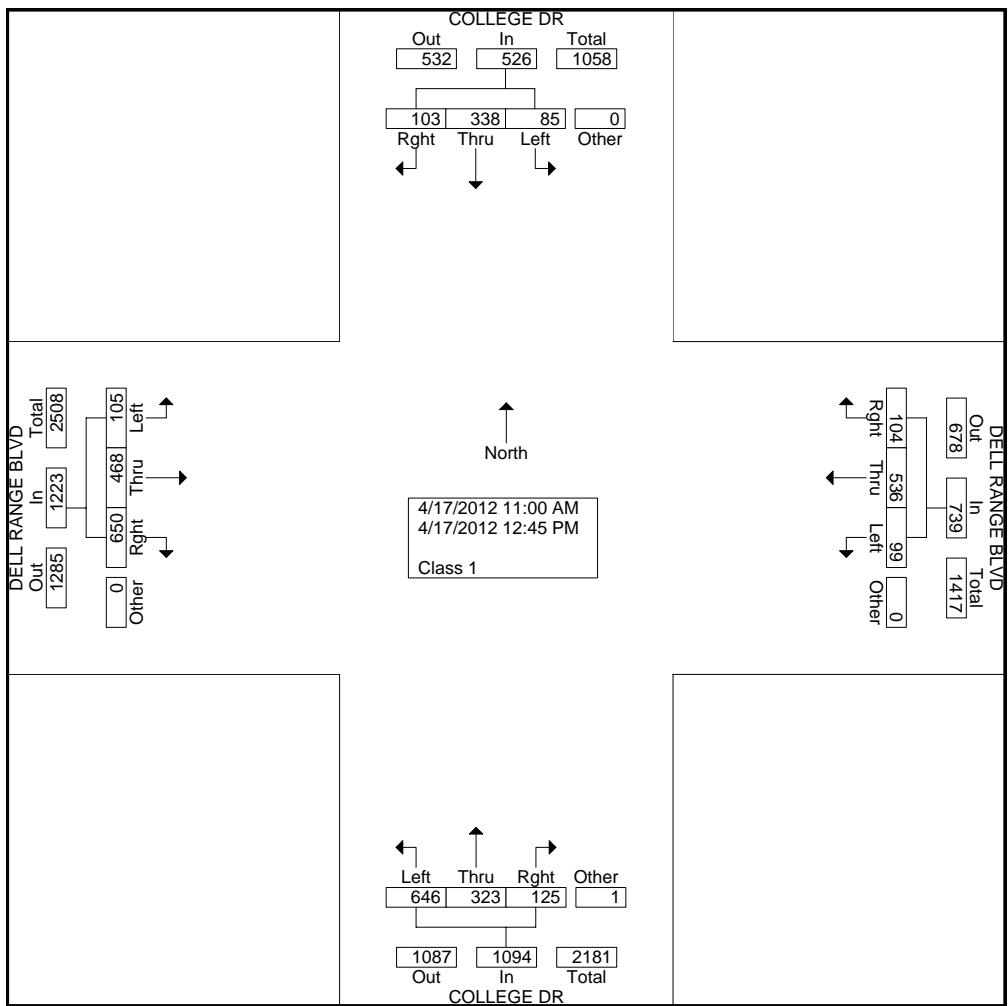




File Name : #112 COLLEGE&DELLRANGEMD
 Site Code : 00000000
 Start Date : 4/17/2012
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Groups Printed- Class 1

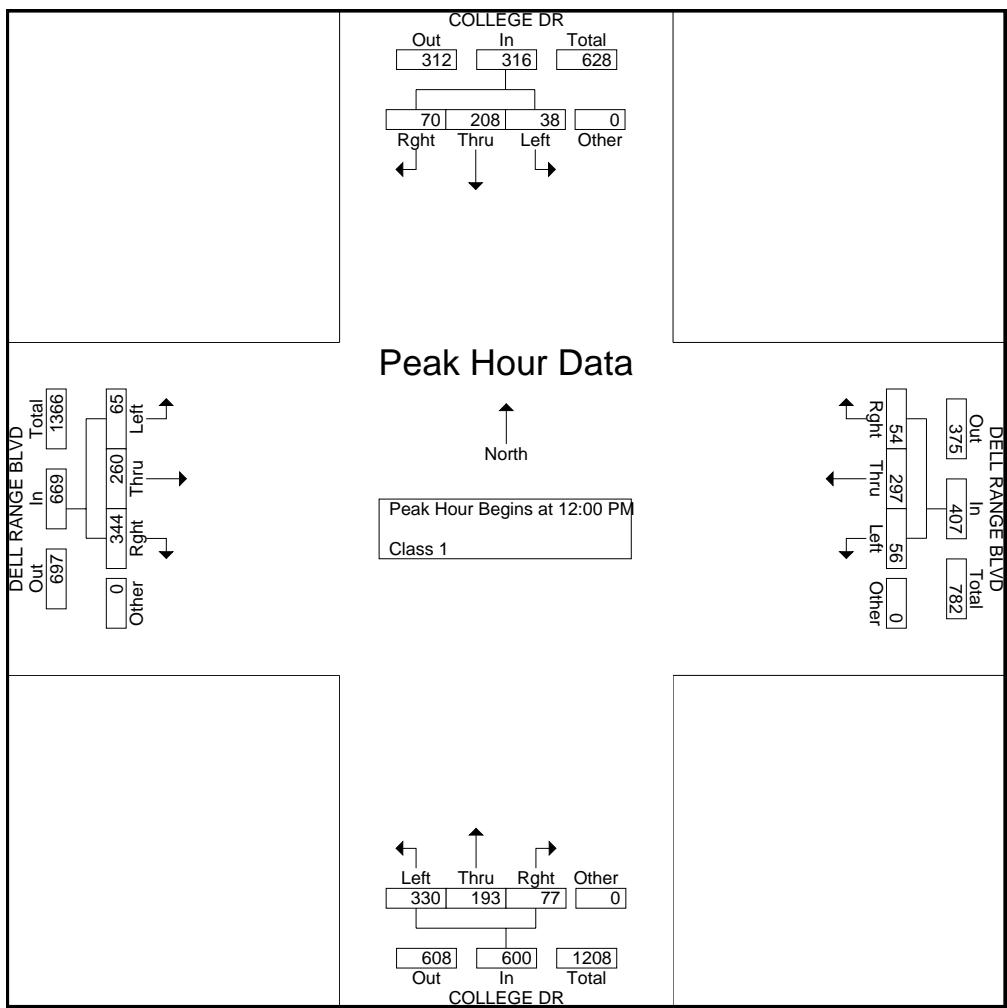
Start Time	COLLEGE DR Southbound				DELL RANGE BLVD Westbound				COLLEGE DR Northbound				DELL RANGE BLVD Eastbound				Int. Total
	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	
11:00 AM	15	37	7	0	9	46	14	0	67	25	13	0	9	49	81	0	372
11:15 AM	11	30	8	0	11	57	14	0	76	23	11	0	5	46	65	0	357
11:30 AM	9	28	8	0	8	61	15	0	93	34	15	0	17	57	79	0	424
11:45 AM	12	35	10	0	15	75	7	0	80	48	9	1	9	56	81	0	438
Total	47	130	33	0	43	239	50	0	316	130	48	1	40	208	306	0	1591
12:00 PM	7	56	12	0	10	66	9	0	81	58	28	0	17	56	69	0	469
12:15 PM	10	43	22	0	19	79	18	0	90	41	18	0	18	57	89	0	504
12:30 PM	6	54	18	0	17	72	14	0	78	46	13	0	12	79	85	0	494
12:45 PM	15	55	18	0	10	80	13	0	81	48	18	0	18	68	101	0	525
Total	38	208	70	0	56	297	54	0	330	193	77	0	65	260	344	0	1992
Grand Total	85	338	103	0	99	536	104	0	646	323	125	1	105	468	650	0	3583
Apprch %	16.2	64.3	19.6	0	13.4	72.5	14.1	0	59	29.5	11.4	0.1	8.6	38.3	53.1	0	0
Total %	2.4	9.4	2.9	0	2.8	15	2.9	0	18	9	3.5	0	2.9	13.1	18.1	0	0





File Name : #112 COLLEGE&DELLRANGEMD
 Site Code : 00000000
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	COLLEGE DR Southbound					DELL RANGE BLVD Westbound					COLLEGE DR Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	7	56	12	0	75	10	66	9	0	85	81	58	28	0	167	17	56	69	0	142	469
12:15 PM	10	43	22	0	75	19	79	18	0	116	90	41	18	0	149	18	57	89	0	164	504
12:30 PM	6	54	18	0	78	17	72	14	0	103	78	46	13	0	137	12	79	85	0	176	494
12:45 PM	15	55	18	0	88	10	80	13	0	103	81	48	18	0	147	18	68	101	0	187	525
Total Volume	38	208	70	0	316	56	297	54	0	407	330	193	77	0	600	65	260	344	0	669	1992
% App. Total	12	65.8	22.2	0		13.8	73	13.3	0		55	32.2	12.8	0		9.7	38.9	51.4	0		
PHF	.633	.929	.795	.000	.898	.737	.928	.750	.000	.877	.917	.832	.688	.000	.898	.903	.823	.851	.000	.894	.949

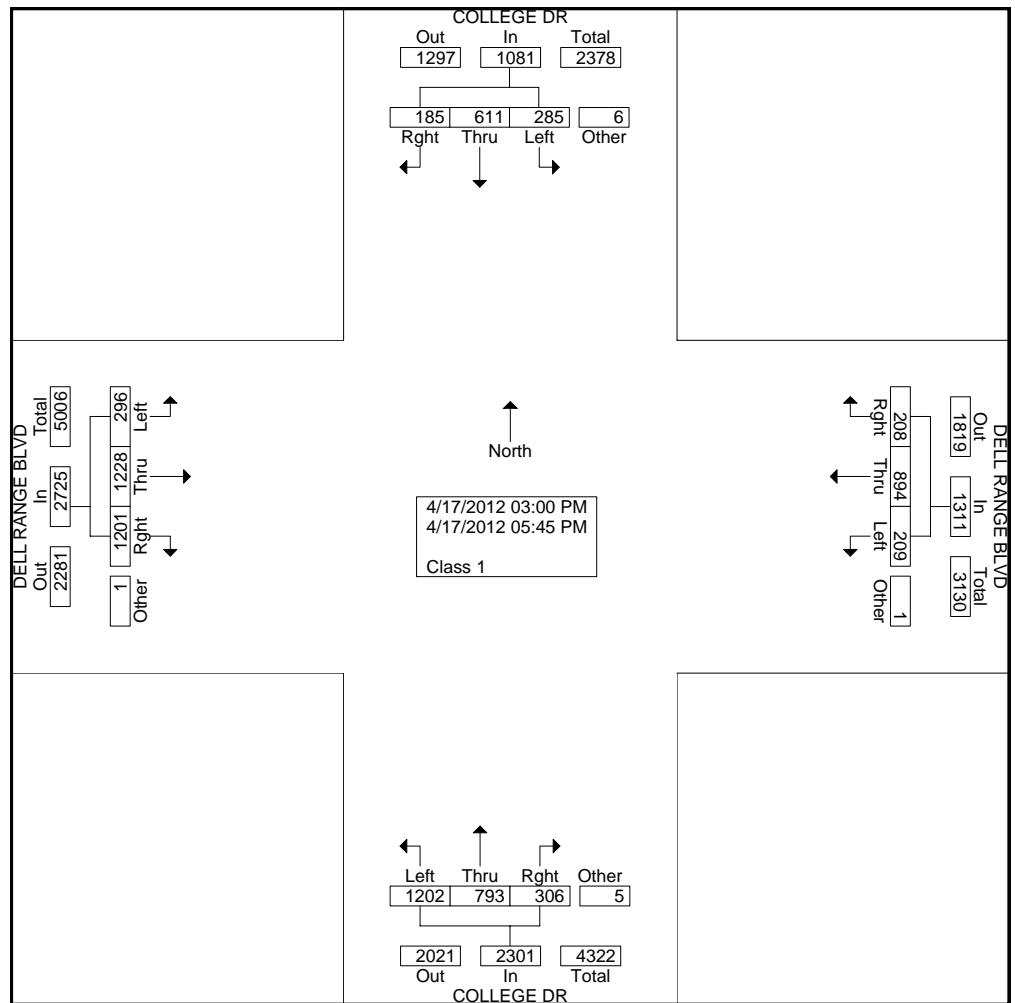




File Name : #112 COLLEGE&DELLRANGEPM
 Site Code : 00000000
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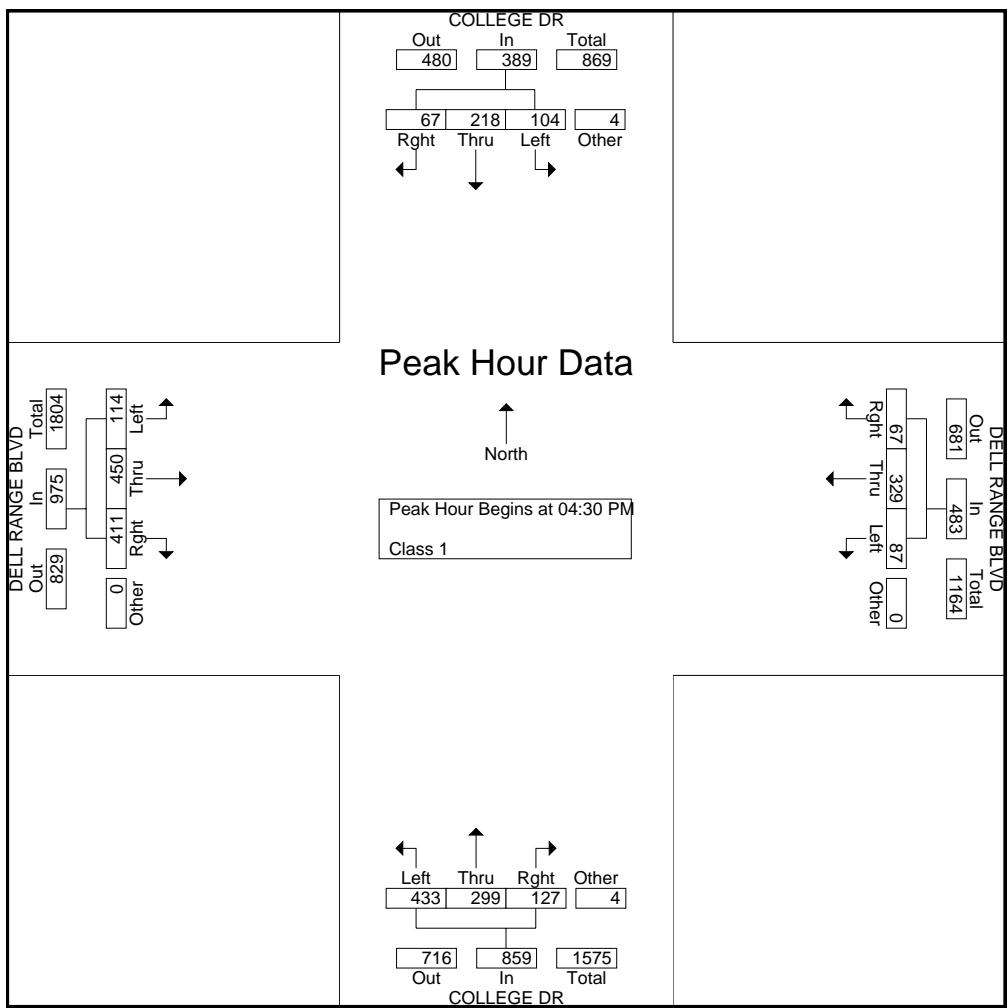
Start Time	COLLEGE DR Southbound				DELL RANGE BLVD Westbound				COLLEGE DR Northbound				DELL RANGE BLVD Eastbound				Int. Total
	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	Left	Thru	Rght	Other	
03:00 PM	20	50	21	0	15	51	5	0	86	56	18	0	18	89	101	0	530
03:15 PM	16	57	15	0	23	56	13	0	76	52	19	1	16	84	100	0	528
03:30 PM	18	34	13	0	21	83	22	0	91	58	23	0	20	73	94	0	550
03:45 PM	30	48	10	0	20	101	21	1	107	59	22	0	21	87	88	1	616
Total	84	189	59	0	79	291	61	1	360	225	82	1	75	333	383	1	2224
04:00 PM	21	59	15	0	5	61	21	0	140	71	24	0	26	90	104	0	637
04:15 PM	24	47	13	0	17	69	22	0	95	88	26	0	29	112	91	0	633
04:30 PM	24	43	21	4	55	110	13	0	122	60	24	3	30	96	83	0	688
04:45 PM	29	60	16	0	9	77	21	0	96	68	18	1	27	104	103	0	629
Total	98	209	65	4	86	317	77	0	453	287	92	4	112	402	381	0	2587
05:00 PM	25	54	14	0	9	59	7	0	100	88	38	0	27	123	117	0	661
05:15 PM	26	61	16	0	14	83	26	0	115	83	47	0	30	127	108	0	736
05:30 PM	31	49	9	2	13	76	22	0	85	53	29	0	24	137	115	0	645
05:45 PM	21	49	22	0	8	68	15	0	89	57	18	0	28	106	97	0	578
Total	103	213	61	2	44	286	70	0	389	281	132	0	109	493	437	0	2620
Grand Total	285	611	185	6	209	894	208	1	1202	793	306	5	296	1228	1201	1	7431
Apprch %	26.2	56.2	17	0.6	15.9	68.1	15.9	0.1	52.1	34.4	13.3	0.2	10.9	45	44.1	0	0
Total %	3.8	8.2	2.5	0.1	2.8	12	2.8	0	16.2	10.7	4.1	0.1	4	16.5	16.2	0	0





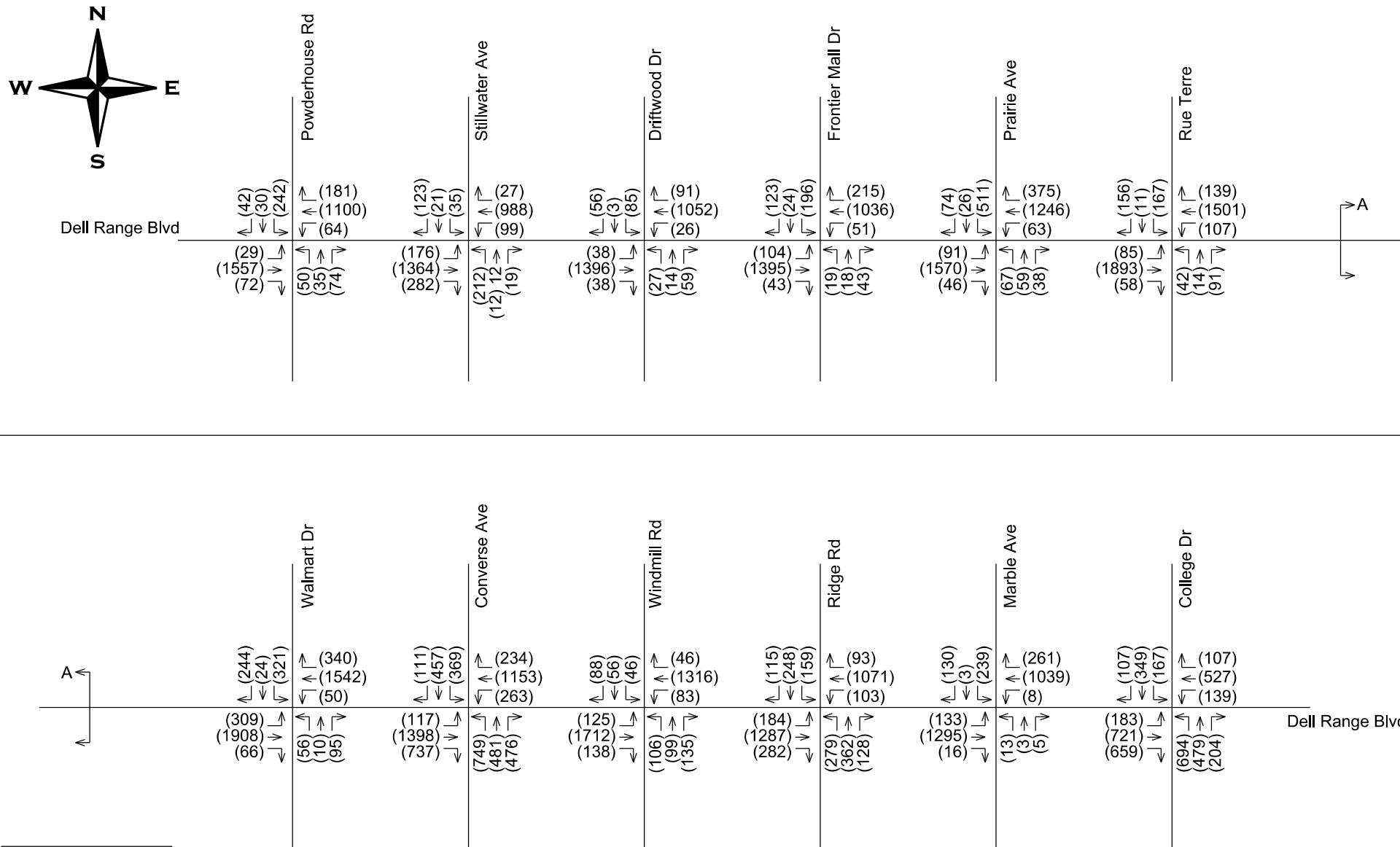
File Name : #112 COLLEGE&DELLRANGEPM
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	COLLEGE DR Southbound					DELL RANGE BLVD Westbound					COLLEGE DR Northbound					DELL RANGE BLVD Eastbound					
Start Time	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Left	Thru	Rght	Other	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	24	43	21	4	92	55	110	13	0	178	122	60	24	3	209	30	96	83	0	209	688
04:45 PM	29	60	16	0	105	9	77	21	0	107	96	68	18	1	183	27	104	103	0	234	629
05:00 PM	25	54	14	0	93	9	59	7	0	75	100	88	38	0	226	27	123	117	0	267	661
05:15 PM	26	61	16	0	103	14	83	26	0	123	115	83	47	0	245	30	127	108	0	265	736
Total Volume	104	218	67	4	393	87	329	67	0	483	433	299	127	4	863	114	450	411	0	975	2714
% App. Total	26.5	55.5	17	1		18	68.1	13.9	0		50.2	34.6	14.7	0.5		11.7	46.2	42.2	0		
PHF	.897	.893	.798	.250	.936	.395	.748	.644	.000	.678	.887	.849	.676	.333	.881	.950	.886	.878	.000	.913	.922



Appendix E

Year 2040 Peak Hour Traffic Projections



Dell Range Boulevard Corridor Study
(Powderhouse Road to College Drive)

2040 Peak Hour Turning Movement Volumes
PM Peak Hour