

Revised
Traffic Impact Analysis
Mildred Ln at Liberty Rd Apartments

Salem, Oregon

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Appendices

Turning Movement Counts

ODOT Crash Data

Printout of Computer Modeling

Revised Traffic Impact Analysis Mildred Ln at Liberty Rd Apartments Salem, Oregon



Introduction:

The developer intends to develop 309 apartment units on tax lot 600 of tax map 8S 3W Sec 16C in Salem, Oregon. The 15.8 acre site is north of Mildred Ln and west of Liberty Road. The intent of this analysis is to provide a traffic impact analysis for the proposed Mildred Ln at Liberty Rd Apartments.

The site will be developed with connections to Joynack St and Mildred Ln. Residents of the Mildred Ln at Liberty Rd Apartments will use the City of Salem transportation system and add traffic to the roadways. This analysis will consider the traffic impacts at the intersections of Davis Rd at Skyline Rd, Davis Rd at Redleaf St, Davis Rd at Joynak St, Davis Rd at Liberty Rd, Liberty Rd at Mildred Ln and Mildred Ln Rd at Skyline Rd. Crash data was provided by the ODOT



Figure 1 - Aerial View of the Site

Crash Data Unit for the most recent 5 years for which data is available. Turning movement counts were completed by Quality Counts on September 27, 2018 and January 8, 2019 while Crossler Middle School was in session. Planning data was provided by MWVCOG to establish growth rates and trip distributions.

Summary of Findings:

The parcel is zoned for single family homes and the intent of this TIA is to provide information to the City to approve the requested zone change from RS1 to RM2. Davis Rd is a Collector, Mildred Ln is a Minor Arterial and Liberty Rd is a Major Arterial in the City of Salem TSP. They carry large volumes of traffic and are affected by the Crossler Middle School in the NW quadrant of the intersection of Davis Rd at Liberty Rd in the AM Peak hour. Traffic from development of the planned parcel will also affect the performance metrics at the studied intersection. Traffic signal warrants are currently met and will continue to be met at the intersections of Davis Rd at Liberty Rd and Davis Rd at Joynak St after development of the parcel. Signalization of both intersections would mitigate the congestion that is presently being experienced.

Because a zone change is being requested, a traffic impact analysis of the studied intersections is required for the planning horizon year (2035). Turning movement counts were adjusted up to estimate future

traffic volumes. The factors used to estimate trip distribution and traffic growth were calculated from the SKATS model provided by MWVCOG for TAZ 383. Traffic volumes are projected to increase 3.4% per year in the near future. The analysis will compare the impacts of developing with the greatest number of single family homes on the site (79 homes ITE 210) to the greatest number of apartments on the site (442 apartments ITE 221).

Intersection sight distance at the studied intersections is adequate. There have been 5 crashes reported to the ODOT Crash Data Unit in the past 5 years at the intersection of Mildred Ln at Liberty Rd and 4 crashes at Davis at Liberty. There were no fatal crashes. There do not appear to be unusual safety issues at the studied intersections.

History and Existing Conditions:

The site is a vacant. This area of the City has been growing with residential communities. North of the site are apartments in RM2 zoning. South of the site the land is zoned RS1. Many of the children from the neighborhood attend Crossler Middle School and adults commute to jobs in Salem. The intersection of Davis Rd at Liberty Rd is a 3-legged intersection with the eastbound approach of Davis Rd controlled with a stop sign. The intersection is operating over capacity for TWSC and meets warrants for signalization in the AM peak hour. The entrance to the school at Joynak St is also at capacity in the AM Peak hour and meets warrants for signalization.

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Liberty Rd at Davis Rd	Two-way stop	HCM 6th Edition	EB Left	0.990	101.2	F
2	Davis Rd at Joynak St	Two-way stop	HCM 6th Edition	SB Left	1.094	124.8	F
3	Liberty Rd at Mildred Rd	Two-way stop	HCM 6th Edition	EB Left	0.012	15.9	C
5	Davis Rd at Redleaf Rd	Two-way stop	HCM 6th Edition	SB Left	0.133	13.9	B
6	Skyline Rd at Davis Rd	Two-way stop	HCM 6th Edition	WB Left	0.104	16.9	C

Existing AM Peak Hour Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Liberty Rd at Davis Rd	Two-way stop	HCM 6th Edition	EB Left	0.375	24.5	C
2	Davis Rd at Joynak St	Two-way stop	HCM 6th Edition	SB Left	0.119	12.0	B
3	Liberty Rd at Mildred Rd	Two-way stop	HCM 6th Edition	EB Left	0.006	16.7	C
5	Davis Rd at Redleaf Rd	Two-way stop	HCM 6th Edition	NB Thru	0.002	11.1	B
6	Skyline Rd at Davis Rd	Two-way stop	HCM 6th Edition	WB Left	0.093	14.4	B

Existing PM Peak Hour Summary

Figure 2 - Existing Traffic Conditions

The intersections of Davis Rd at Liberty Rd and at Joynak St are failing with the existing traffic in the AM Peak hour. The v/c ratio is greater than the accepted standard and delays are longer than acceptable. Both intersections meet current signal warrants and signalization will bring the performance metrics within accepted standards. The other studied intersections are performing with accepted performance standards in the City of Salem. Computer analysis of signalizing both intersections can be found in the appendix.

Traffic Conditions when Mildred Ln at Liberty Rd Apartments are Complete:

The site is zoned for RS1 and could be developed with 79 single family homes without a change in the zoning. The homes would add 58 AM Peak hour trips and 79 PM Peak hour trips if the site were developed with existing zoning. If the requested zone change is approved, the site could be developed with 442 apartment units. The 442 apartment units would add 159 trips to the AM Peak hour traffic and 194 trips to the PM Peak hour traffic. This study will find the performance metrics at the studied intersections for both 79 single family homes and for 442 apartment units. Using data provided by MWVCOG, this study will assume that 5% of the traffic from the homes or apartments will travel north of Davis Rd on Redleaf Rd, 60% north of Davis Rd on Liberty Rd, 10% of will travel south of the Liberty Rd at Mildred Ln intersection and 25% will travel east on Mildred Ln. The study assumes that traffic volumes will increase linearly 3.4% per year to find 2035 (the horizon year) performance metrics. The trip distribution and trip growth factors were calculated from SKATS data provided by MWVCOG for the east half of TAZ 383 in Salem. Factors were also be used to adjust the peak hour traffic and the impact of heavy vehicles on traffic.

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Liberty Rd at Davis Rd	Two-way stop	HCM 6th Edition	EB Left	1.143	154.3	F
2	Davis Rd at Joynak St	Two-way stop	HCM 6th Edition	SB Left	1.177	155.2	F
3	Liberty Rd at Mildred Rd	Two-way stop	HCM 6th Edition	EB Left	0.115	18.0	C
5	Davis Rd at Redleaf Rd	Two-way stop	HCM 6th Edition	SB Left	0.143	14.3	B
6	Skyline Rd at Davis Rd	Two-way stop	HCM 6th Edition	WB Left	0.110	17.4	C
7	Skyline Rd at Mildred Ln	Two-way stop	HCM 6th Edition	NB Thru	0.003	0.0	A

2019 AM Peak Hour Summary with 79 Homes

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Liberty Rd at Davis Rd	Two-way stop	HCM 6th Edition	EB Left	0.432	28.8	D
2	Davis Rd at Joynak St	Two-way stop	HCM 6th Edition	SB Left	0.127	12.1	B
3	Liberty Rd at Mildred Rd	Two-way stop	HCM 6th Edition	EB Left	0.082	19.0	C
5	Davis Rd at Redleaf Rd	Two-way stop	HCM 6th Edition	NB Thru	0.002	11.2	B
6	Skyline Rd at Davis Rd	Two-way stop	HCM 6th Edition	WB Left	0.098	14.7	B
7	Skyline Rd at Mildred Ln	Two-way stop	HCM 6th Edition	SB Thru	0.003	0.0	A

2019 PM Peak Hour Summary with 79 Homes

Figure 3 – 2019 Traffic Conditions with 79 Homes

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Liberty Rd at Davis Rd	Two-way stop	HCM 6th Edition	EB Left	1.276	208.7	F
2	Davis Rd at Joynak St	Two-way stop	HCM 6th Edition	SB Left	1.178	155.6	F
3	Liberty Rd at Mildred Rd	Two-way stop	HCM 6th Edition	EB Left	0.288	21.7	C
5	Davis Rd at Redleaf Rd	Two-way stop	HCM 6th Edition	SB Left	0.146	14.3	B
6	Skyline Rd at Davis Rd	Two-way stop	HCM 6th Edition	WB Left	0.110	17.4	C
7	Skyline Rd at Mildred Ln	Two-way stop	HCM 6th Edition	NB Thru	0.003	0.0	A

2019 AM Peak Hour Summary with 442 Apartments

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Liberty Rd at Davis Rd	Two-way stop	HCM 6th Edition	EB Left	0.481	33.8	D
2	Davis Rd at Joynak St	Two-way stop	HCM 6th Edition	SB Left	0.127	12.2	B
3	Liberty Rd at Mildred Rd	Two-way stop	HCM 6th Edition	EB Left	0.215	23.2	C
5	Davis Rd at Redleaf Rd	Two-way stop	HCM 6th Edition	SB Thru	0.007	11.2	B
6	Skyline Rd at Davis Rd	Two-way stop	HCM 6th Edition	WB Left	0.098	14.7	B
7	Skyline Rd at Mildred Ln	Two-way stop	HCM 6th Edition	SB Thru	0.003	0.0	A

2019 PM Peak Hour Summary with 442 Apartments

Figure 4 – 2019 Traffic Conditions with 442 Apts

The intersections of Davis Rd at Liberty Rd and Davis Rd at Joynak St have v/c ratios above 1.0 during the AM Peak hour. Traffic to the school appears to create the bottlenecks. The City has planned to signalize the intersection of Davis Rd at Liberty Rd for several years. Signalization of both intersections will mitigate the congestion and handle traffic during the AM Peak hour.

Planning Horizon Year (2035) conditions w 79 Homes or 442 Apts

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Liberty Rd at Davis Rd	Two-way stop	HCM 6th Edition	EB Left	4.690	1,769.5	F
2	Davis Rd at Joynak St	Two-way stop	HCM 6th Edition	SB Left	4.306	1,570.9	F
3	Liberty Rd at Mildred Rd	Two-way stop	HCM 6th Edition	EB Left	1.826	542.3	F
5	Davis Rd at Redleaf Rd	Two-way stop	HCM 6th Edition	SB Left	0.344	24.1	C
6	Skyline Rd at Davis Rd	Two-way stop	HCM 6th Edition	WB Left	0.284	42.8	E
7	Skyline Rd at Mildred Ln	Two-way stop	HCM 6th Edition	NB Thru	0.005	0.0	A

2035 AM Peak Hour Summary with 79 Homes

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Liberty Rd at Davis Rd	Two-way stop	HCM 6th Edition	EB Left	1.399	286.2	F
2	Davis Rd at Joynak St	Two-way stop	HCM 6th Edition	SB Left	0.261	16.5	C
3	Liberty Rd at Mildred Rd	Two-way stop	HCM 6th Edition	EB Left	5.193	2,358.7	F
5	Davis Rd at Redleaf Rd	Two-way stop	HCM 6th Edition	SB Left	0.081	13.2	B
6	Skyline Rd at Davis Rd	Two-way stop	HCM 6th Edition	WB Left	0.246	23.7	C
7	Skyline Rd at Mildred Ln	Two-way stop	HCM 6th Edition	SB Thru	0.005	0.0	A

2035 PM Peak Hour Summary with 79 Homes**Figure 5 – 2035 Traffic Conditions with 79 Homes**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Liberty Rd at Davis Rd	Two-way stop	HCM 6th Edition	EB Left	5.285	2,048.4	F
2	Davis Rd at Joynak St	Two-way stop	HCM 6th Edition	SB Left	4.310	1,573.0	F
3	Liberty Rd at Mildred Rd	Two-way stop	HCM 6th Edition	EB Left	3.017	1,072.9	F
5	Davis Rd at Redleaf Rd	Two-way stop	HCM 6th Edition	SB Left	0.349	24.3	C
6	Skyline Rd at Davis Rd	Two-way stop	HCM 6th Edition	WB Left	0.284	42.8	E
7	Skyline Rd at Mildred Ln	Two-way stop	HCM 6th Edition	NB Thru	0.005	0.0	A

2035 AM Peak Hour Summary with 442 Apts

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Liberty Rd at Davis Rd	Two-way stop	HCM 6th Edition	EB Left	1.568	364.0	F
2	Davis Rd at Joynak St	Two-way stop	HCM 6th Edition	SB Left	0.262	16.6	C
3	Liberty Rd at Mildred Rd	Two-way stop	HCM 6th Edition	EB Left	1.544	520.5	F
5	Davis Rd at Redleaf Rd	Two-way stop	HCM 6th Edition	SB Left	0.091	13.4	B
6	Skyline Rd at Davis Rd	Two-way stop	HCM 6th Edition	WB Left	0.246	23.7	C
7	Skyline Rd at Mildred Ln	Two-way stop	HCM 6th Edition	SB Thru	0.005	0.0	A

2035 PM Peak Hour Summary with 442 Apts

Figure 6 – 2035 Traffic Conditions with 442 Apts

The City of Salem has adopted LOS E as the maximum operational standard for intersection performance. The intersection of Liberty Rd at Davis Rd is currently experiencing LOS F in the AM Peak hour during periods when school is in session. Signal warrants are met. The City has been planning to signalize this intersection for several years and signalization is the optimal mitigation measure.

The intersection of Joynak St at Davis Rd is currently experiencing LOS F in the AM Peak hour during periods when school is in session. The intersection is failing and is the primary access for the Crossler Middle School. Signal Warrants are met. Constraints needing study will be the spacing between the Davis at Liberty and Davis at Joynak intersections and the available right of way to construct travel lanes and the signal at the intersections.

The intersection of Mildred Ln at Liberty Rd will be experiencing LOS F in the AM and PM Peak hours by 2035 with either single family homes or apartments.

In the horizon year (2035) the intersections of Liberty Rd at Mildred Ln, Liberty Rd at Davis Rd and Davis Rd at Joynak St will all need improvements to carry the planned traffic regardless of whether there are apartments on the site or single family homes. Signalization of Liberty Rd at Mildred Ln is a mitigation option if warrants are met.

Crash Data:

The ODOT Crash Data Unit provided information about reported crashes at the shown intersections for the past 5 years. The crash rates do not seem unexpectedly high or of significant concern.

Intersection	Fatal	Injury	Property Damage	Total Crashes
Davis Rd. at Liberty Rd	0	2	2	4
Davis Rd at Joynak St	0	1	0	1
Liberty Rd at Mildred Ln	0	3	2	5
Davis Rd at Redleaf St	0	0	0	0
Davis Rd at Skyline Rd	0	1	1	2

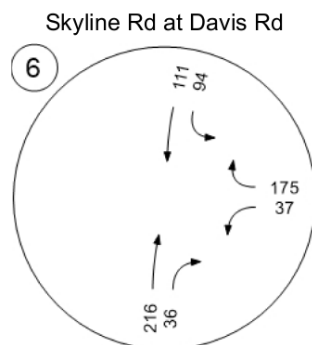
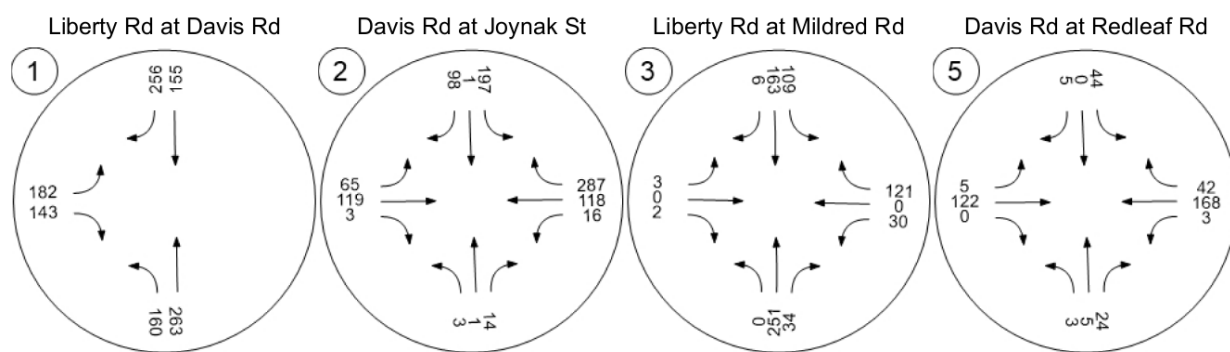
Figure 7 – Reported Crashes in 2012-2016

The crash data does not point to serious concerns at the studied intersections.

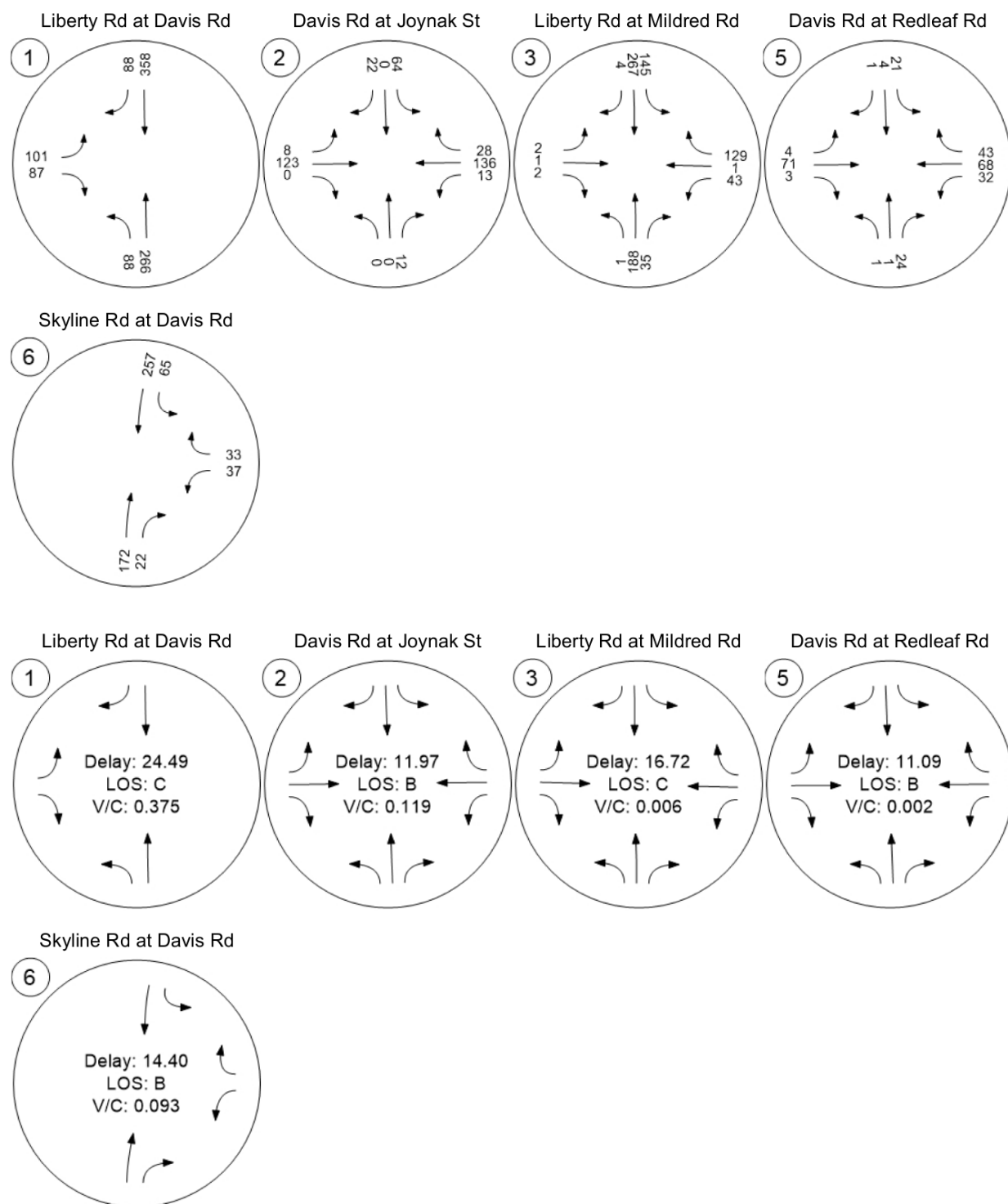
Summary:

If 442 apartments are built in the study site, they will generate an estimated 159 trips in the AM Peak hour and 194 trips in the PM Peak hour. Davis Rd is a Collector, Mildred Ln is a Minor Arterial and Liberty Rd is a Major Arterial in the City of Salem TSP. They carry large volumes of traffic and are impacted by the Crossler Middle School in the NW quadrant of the intersection of Davis Rd at Liberty Rd. Traffic signal warrants are currently met and will continue to be met at the intersections of Davis Rd at Liberty Rd and Davis Rd at Joynak St after the proposed apartments are built. Signalization of both intersections would mitigate the congestion that is being experienced.

Intersection sight distance at the studied intersections is adequate. There have been 4 crashes reported to the ODOT Crash Data Unit in the past 5 years at the intersection of Davis Rd at Liberty Rd. There were no fatal crashes. There do not appear to be unusual safety issues at the studied intersections.

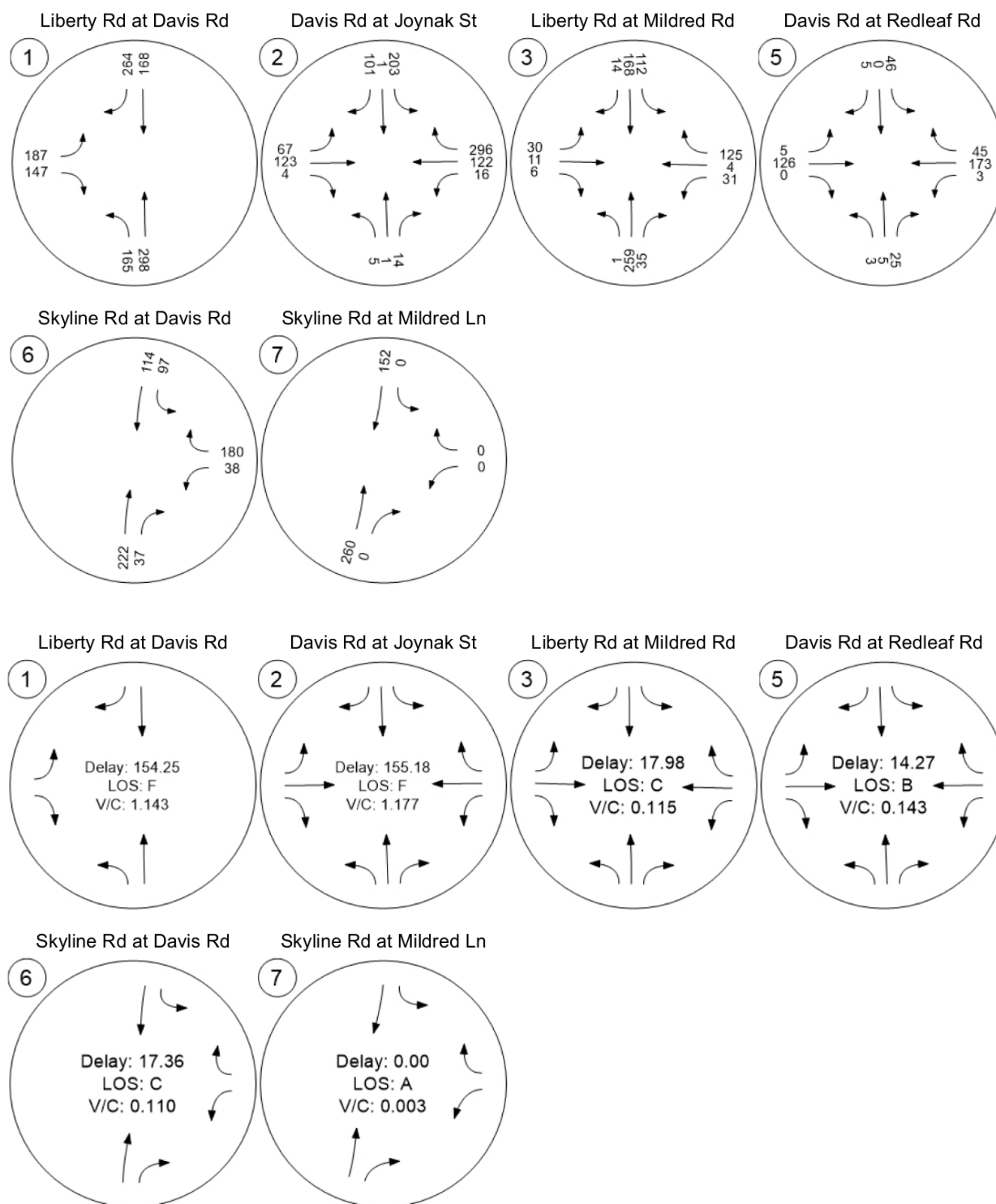


Existing AM Peak hour Counts and Metrics

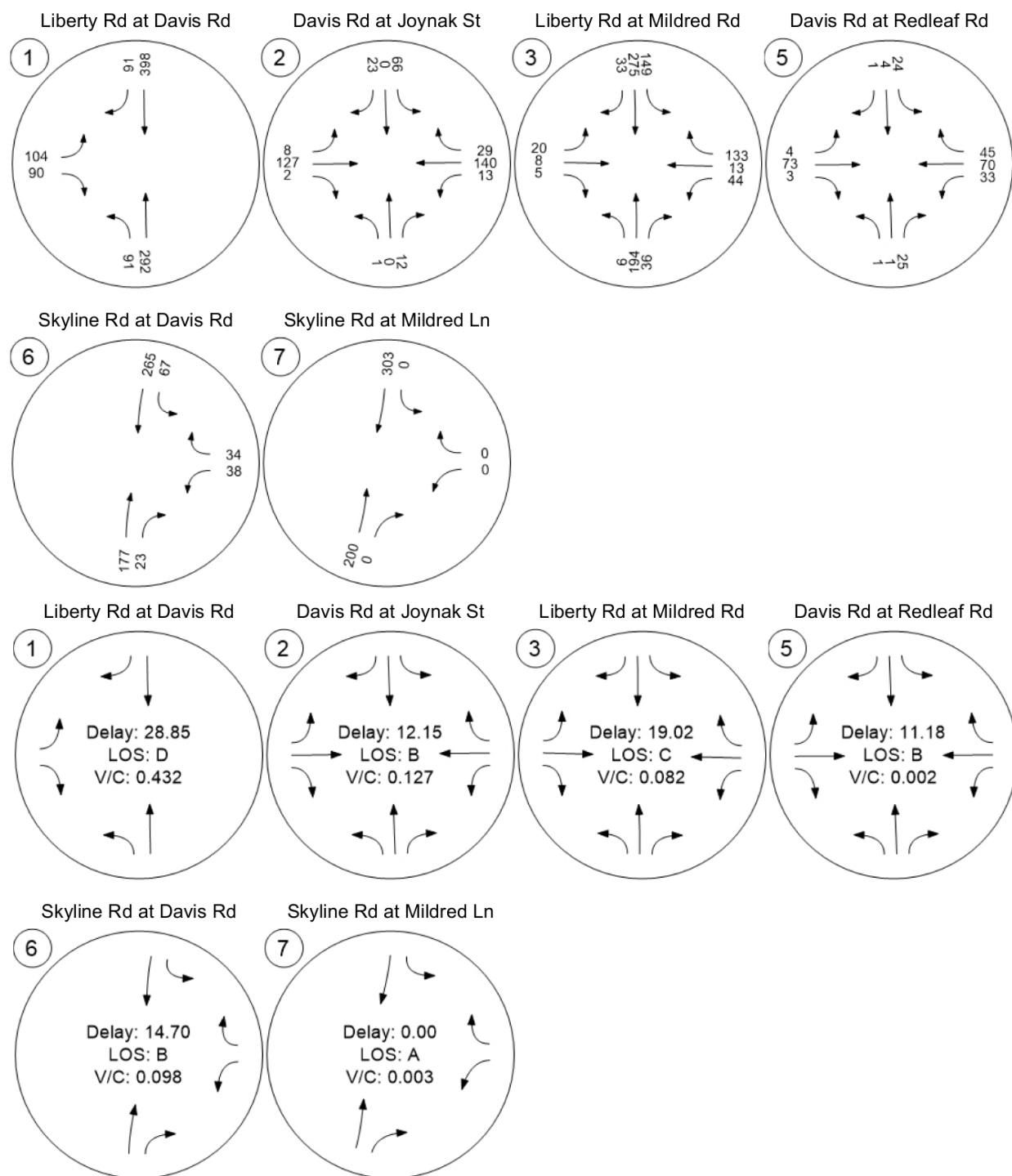


Existing PM Peak hour Counts and Metrics

Figure 8- Existing Peak hour Counts and Metrics

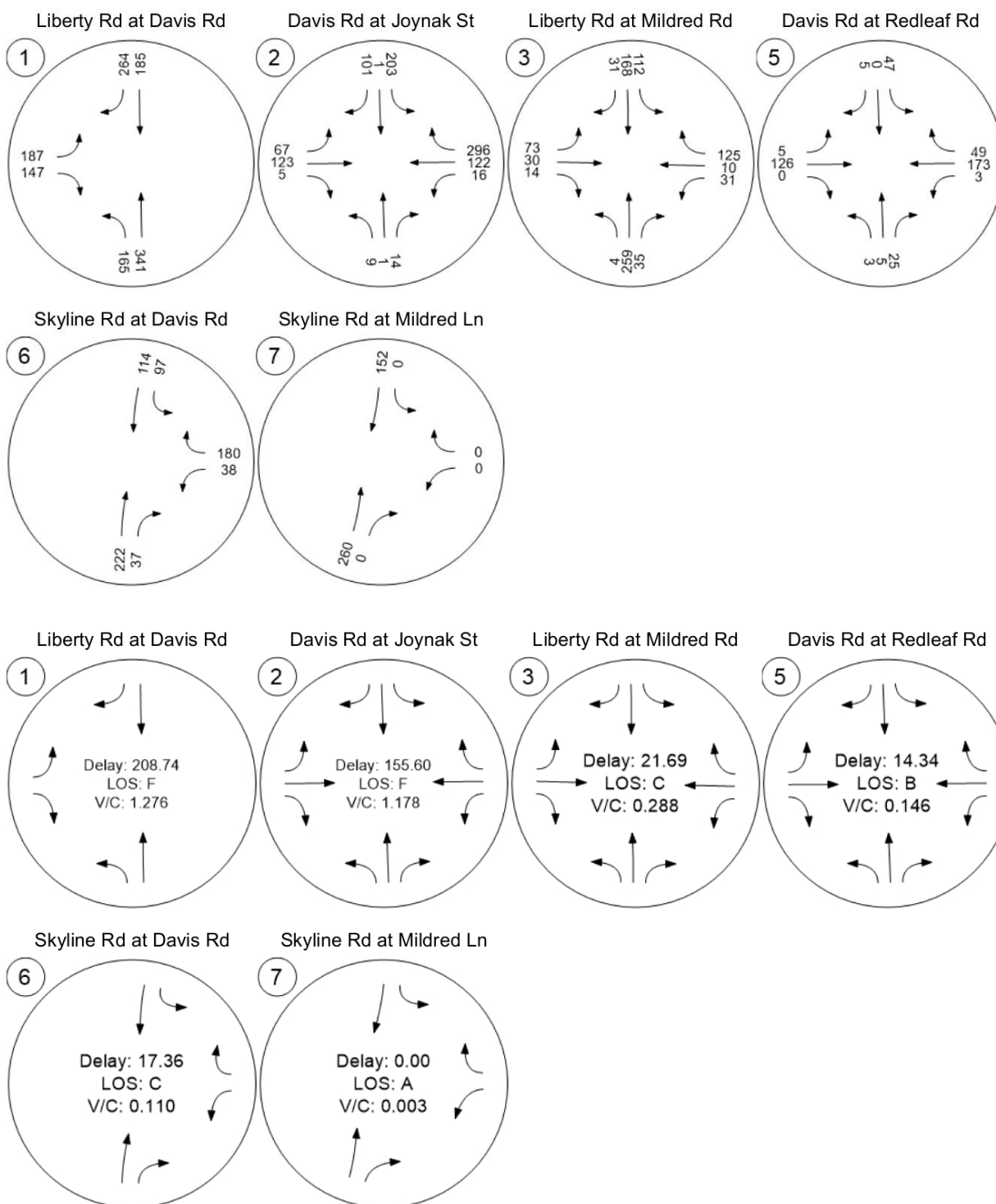


2019 AM Peak hour Counts and Metrics w 79 Homes

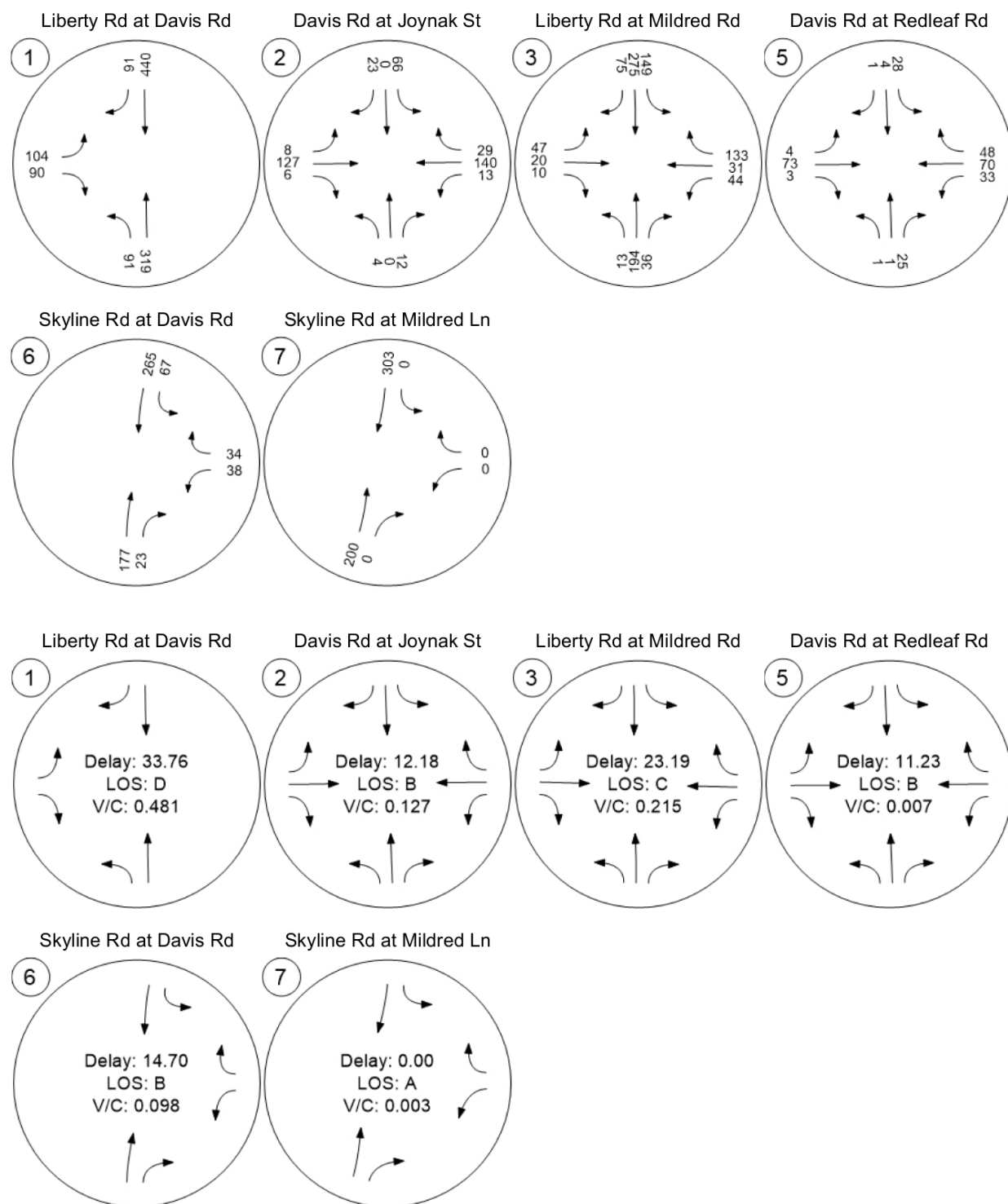


2019 PM Peak hour Counts and Metrics w 79 Homes

Figure 9 - 2019 Peak hour Counts and Metrics w 79 Homes

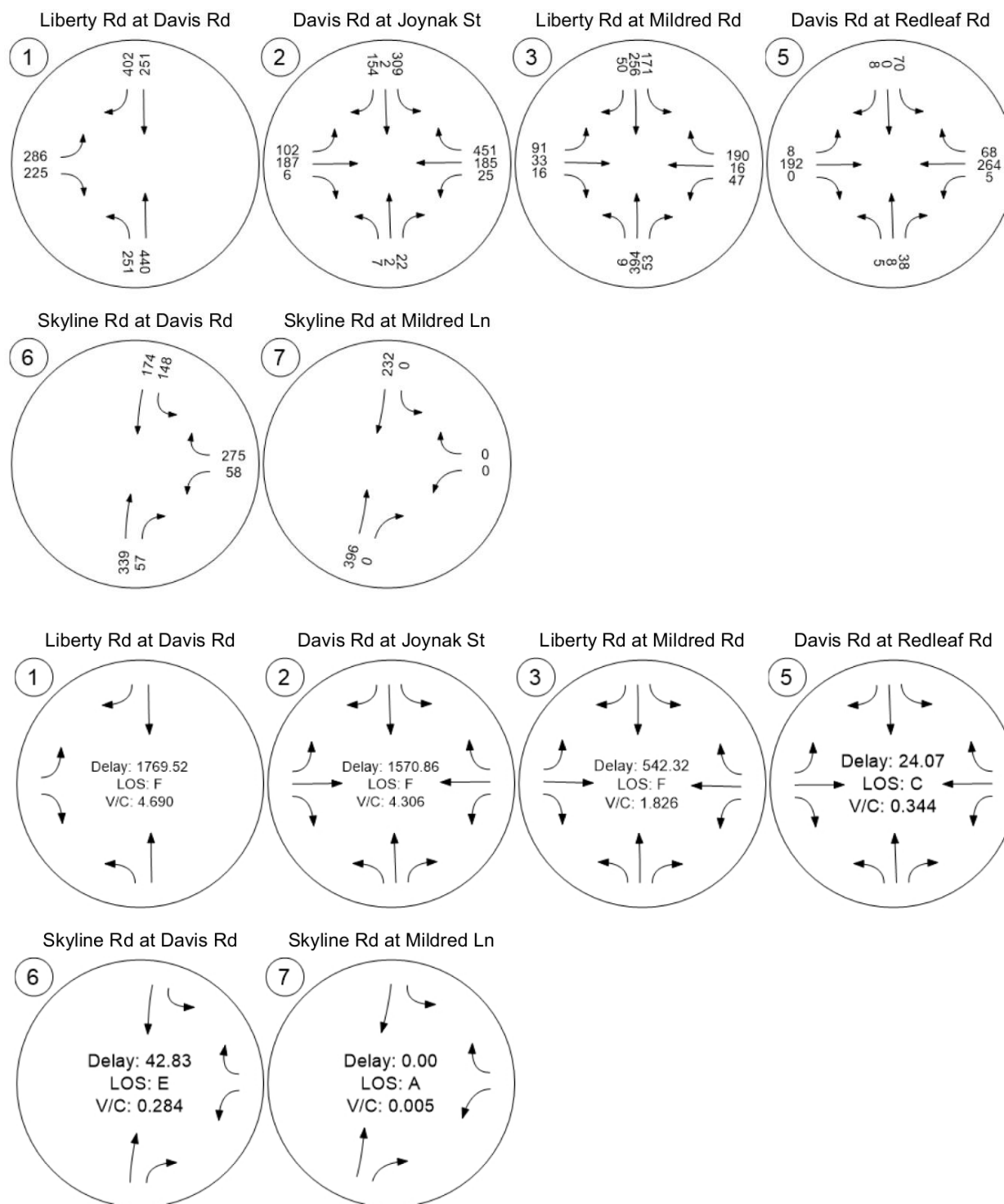


2019 AM Peak hour Counts and Metrics w 442 Apts

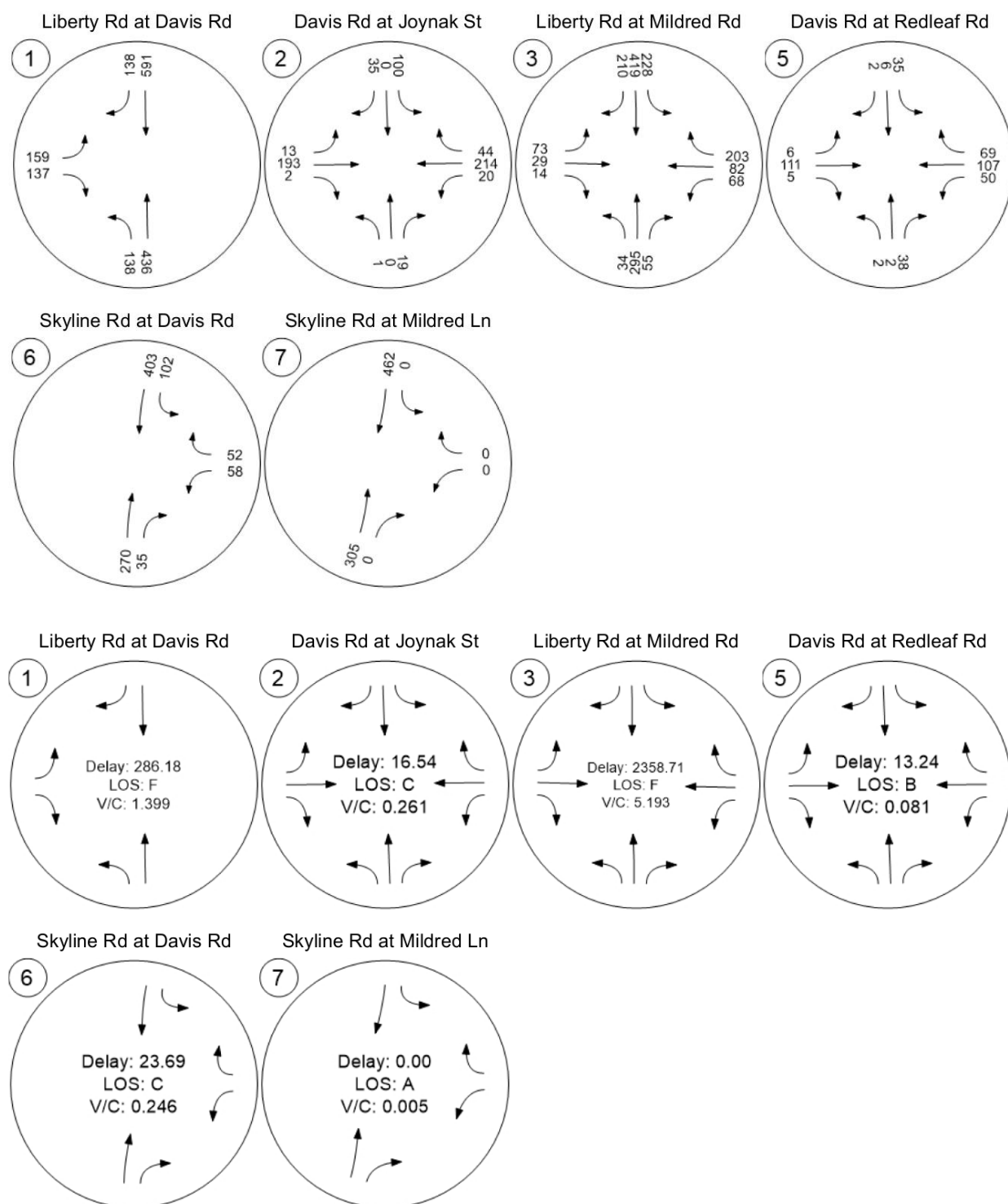


2019 PM Peak hour Counts and Metrics w 442 Apts

Figure 10 - 2019 Peak hour Counts and Metrics w 442 Apts

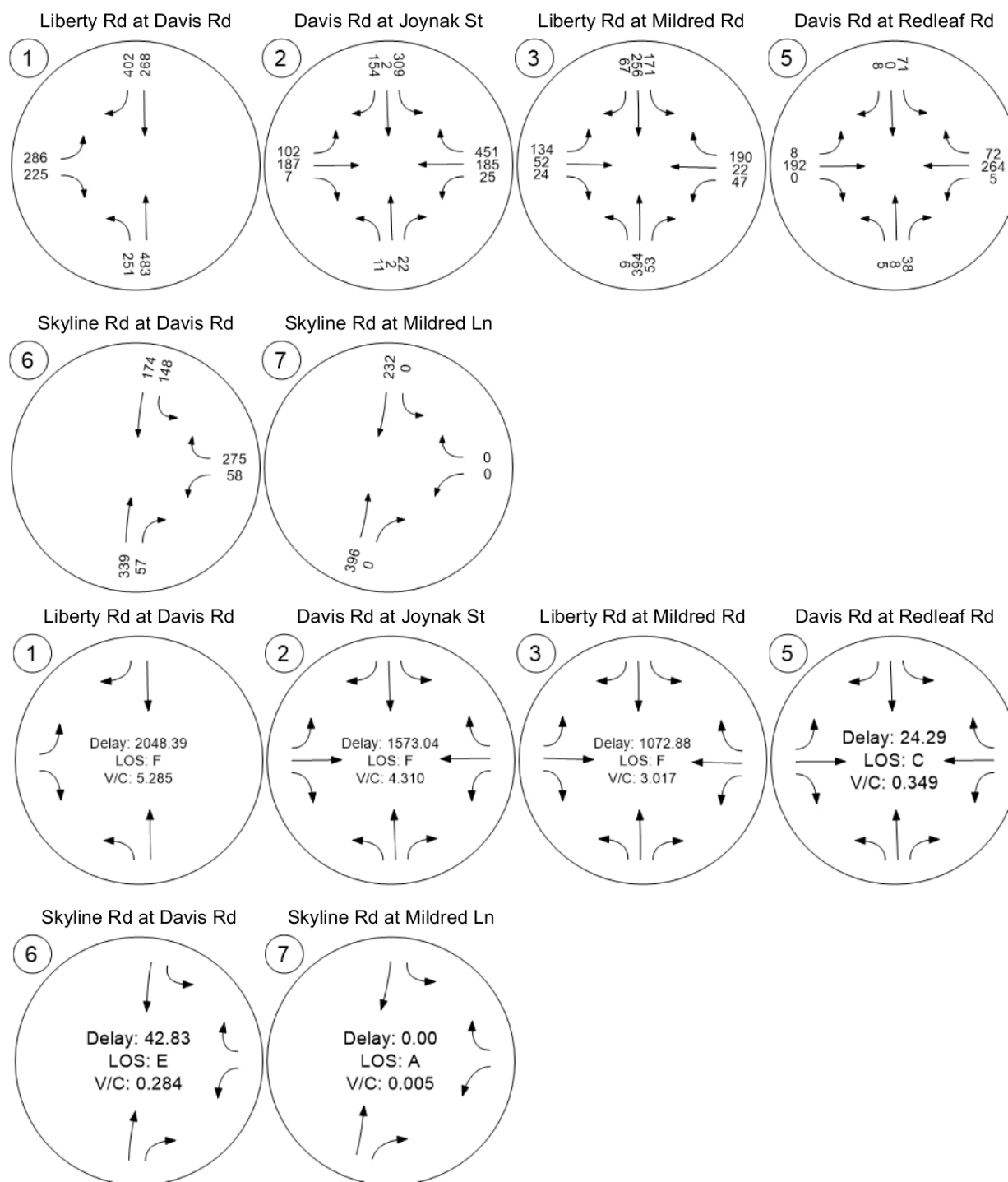


2035 AM Peak hour Counts and Metrics w 79 Homes

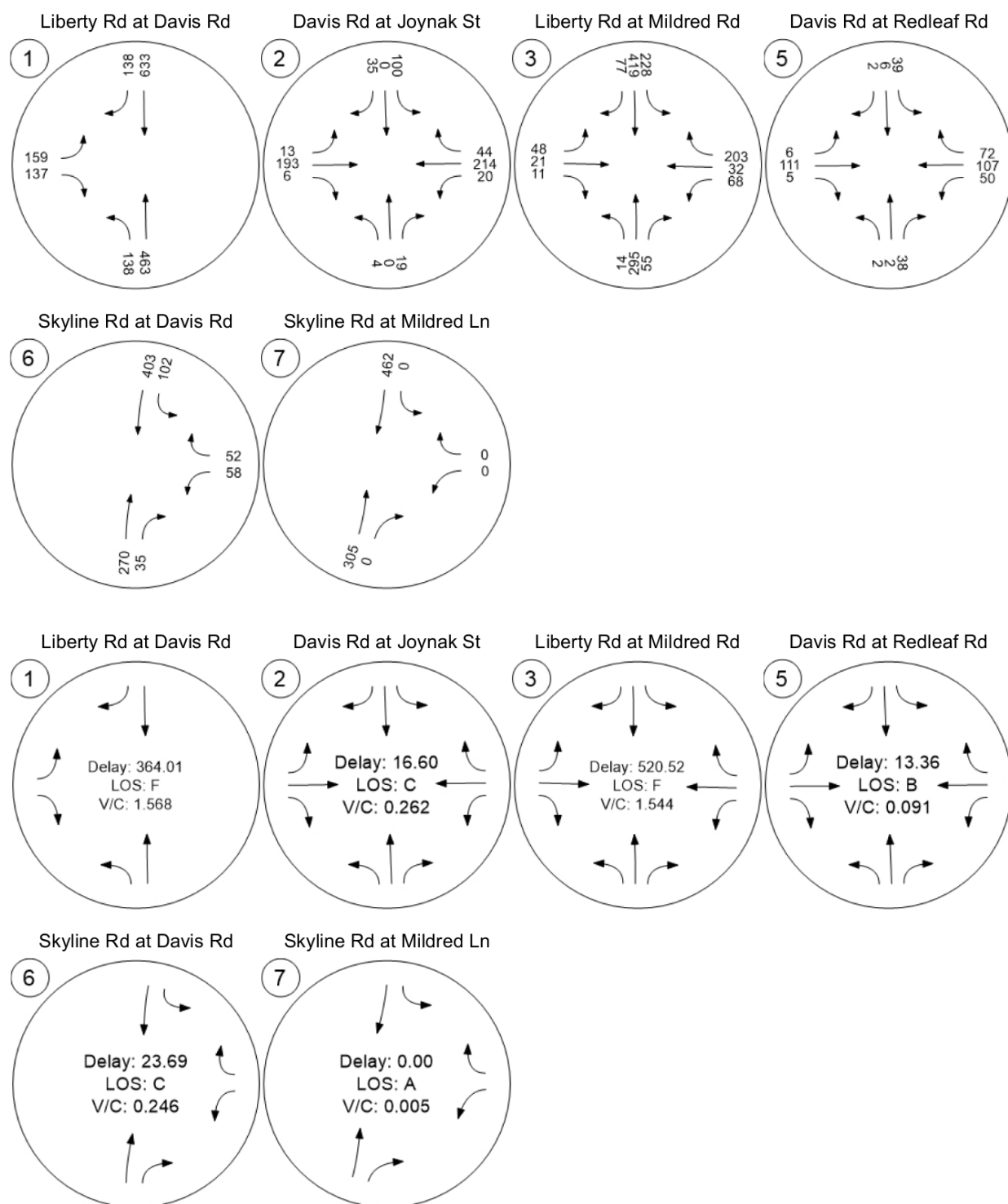


2035 PM Peak hour Counts and Metrics w 79 Homes

Figure 11 - 2035 Peak hour Counts and Metrics w 79 Homes



2035 AM Peak hour Counts and Metrics w 442 Apts



2035 PM Peak hour Counts and Metrics w 442 Apts

Figure 12 - 2035 Peak hour Counts and Metrics w 442 Apts