



LSC TRANSPORTATION CONSULTANTS, INC.
2504 East Pikes Peak Avenue, Suite 304
Colorado Springs, CO 80909
(719) 633-2868
FAX (719) 633-5430
E-mail: lsc@lsctrans.com
Website: <http://www.lsctrans.com>

**Sterling Ranch Sketch Plan Amendment
Master Traffic Impact Study
SKP-22-004
(LSC #S224440)
December 22, 2022**

Traffic Engineer's Statement

This traffic report and supporting information were prepared under my responsible charge and they comport with the standard of care. So far as is consistent with the standard of care, said report was prepared in general conformance with the criteria established by the County for traffic reports.



Developer's Statement

I, the Developer, have read and will comply with all commitments made on my behalf within this report.

Date
provide signature and date

Sterling Ranch Sketch Plan Amendment Master Traffic Impact Study

Prepared for:
Loren J. Moreland
Vice President/ Project Manager
Classic SRJ
2138 Flying Horse Club Drive
Colorado Springs, CO 80921

DECEMBER 22, 2022

LSC Transportation Consultants
Prepared by: Kirstin D. Ferrin, P.E.
Reviewed by: Jeffrey C. Hodsdon, P.E.

LSC #S224440



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December 22, 2022

Loren J. Moreland
Vice President/ Project Manager
Classic SRJ
2138 Flying Horse Club Drive
Colorado Springs, CO 80921

RE: Sterling Ranch
Sketch Plan Amendment
Master Traffic Impact Study
El Paso County, Colorado
LSC #S224440

Dear Mr. Moreland:

LSC Transportation Consultants, Inc. has prepared this Master Traffic Impact Study for the proposed Sterling Ranch Sketch Plan Amendment. As shown in Figure 1, Sterling Ranch is located east of Vollmer Road near Lochwinnoch Lane between the future extensions of Marksheffel Road and Stapleton Drive in El Paso County, Colorado.

REPORT CONTENTS

The preparation of this report included the following:

- A list of previous Sterling Ranch traffic reports and the context of this project;
- A summary of the proposed land use and access plan;
- The existing roadway and traffic conditions in the site's vicinity including the roadway widths, surface conditions, lane geometries, traffic controls, and posted speed limits;
- Existing traffic volume data;
- Estimates of projected long-term baseline traffic volumes;
- The projected average weekday and peak-hour vehicle trips to be generated by the proposed future development within the sketch plan area;
- The assignment of the projected sketch-plan site-generated traffic volumes to the area roadways;
- The projected long-term total traffic volumes on the area roadways;
- The projected levels of service at the key intersections within the study area.;

- Master-study-level findings and recommendations for study area roadways and intersections, including number of lanes, auxiliary turn lanes, intersection traffic control, etc.
- The recommended street classifications;

RECENT TRAFFIC REPORTS

LSC prepared a previous master traffic impact study (TIS) for the entire Sterling Ranch development dated June 5, 2008. Since 2008 LSC and SM Rocha, LLC have completed multiple studies for individual filings and phases within Sterling Ranch. Appendix Table 1 contains a list of other traffic studies within Sterling Ranch and in the vicinity of area of study completed within the past five years (that LSC is aware of). This study accounts for the land use, trip generation, and the roadway network included in these studies.

Briargate-Stapleton Corridor Study/PPACG Model

The El Paso County Department of Public Works recently released a draft traffic report prepared by Wilson & Company (December 9, 2021) as part of Briargate-Stapleton Corridor Study. The forecast 2045 total traffic volumes in that study were developed using the PPACG 2045 fiscally constrained RTP model as well as reference studies including the *Black Forest Widening Project Traffic Impact Study* and traffic impact studies completed for the Wolf Ranch, The Ranch, Sterling Ranch, Highland Park, and Eagle Rising developments.

Sterling Ranch is included in the PPACG model as part of traffic analysis zones (TAZs) 238 and 842. These TAZs also include the areas planned to be developed as The Ranch and Percheron. The Sterling Ranch Sketch Plan is currently capped at 5,225 dwelling units, but this report has been based on an anticipated maximum of 4,800 dwelling units. The Ranch Sketch Plan, located east of Sterling Ranch, shows the potential for up to 2,144 future dwelling units. Percheron will be capped at 2,650 dwelling units and the section north of Woodmen Road will likely be developed with a maximum of 2,200 dwelling units.

These three developments include the potential for a total of 9,144 potential dwelling units within the areas shown as TAZs 238 and 842. The 2045 PPACG model includes 8,900 households within these two TAZs. This is about 669 fewer dwelling units than could be developed within the area containing Sterling Ranch, The Ranch and Percheron based on the respective traffic studies. However, the maximum density may not be achieved for each of these projects and/or they may not all be fully built out by 2045.

STUDY AREA

Sketch Plan

Figure 2 shows the proposed amendment to the Sketch Plan. The 1,444-acre Sterling Ranch Sketch Plan area is partially developed and planned to ultimately include a mix of residential, commercial, and educational land uses. The 2008 TIS divided the sketch plan area into 21 traffic analysis zones (TAZs). Figure 3 from that report showed the location and boundary of each TAZ. A copy of this TAZ figure is attached for reference. Table 1 shows a comparison of the land use assumed in the 2008 TIS and the land uses proposed as part of the current Sketch Plan Amendment. Figure 3 shows the location of the current TAZs. The number of residential dwelling units for Sterling Ranch is now proposed to be capped at 4,800. Please note that although the maximum number of dwelling units for the approved Sketch Plan was 5,225, the 2008 TIS assumed 5,500 residential dwelling units within Sterling Ranch.

Study-Area Access Plan

The access plan for the current Sketch Plan is generally consistent with the access plan shown in the 2008 Master TIS.

Figure 4 shows the current access plan for **Briargate Parkway**. The figure also highlights some minor changes to the access plan depicted in the 2008 Master TIS.

The following summarizes the minor changes:

- The access to Vollmer Road for TAZ 2 shown in the 2008 TIS report has since been shifted about 885 feet south (approximately halfway between the future locations of Marksheffel Road and Lochwinnoch Lane) and restricted to right-in/right-out only. This street connection to Vollmer is part of Sterling Ranch Filing No. 2 and is a public street called Alzada Drive. The Alzada Drive/Vollmer Road intersection is right-in/right-out only.
Note: The June 2008 TIS report showed a shared access (shared with the adjacent Barbarick Subdivision industrial development) aligning with the existing Vollmer Road/Lochwinnoch Lane intersection.
- The originally-proposed right-in/right-out access on Marksheffel Road to TAZ 2 is no longer proposed and is not shown on the existing plans.
- The Sterling Ranch access to Briargate Parkway just east of Vollmer Road (Wheatland Drive), previously shown as a right-in/right-out-only intersection for both the north and south sides of Briargate in the Sketch Plan, is now a three-quarter-movement (left-in/right-in/right-out-only) access for the south leg (the north side access will remain right-in/right-out). A deviation request for this access point was submitted and approved.

The Briargate Parkway-Stapleton Road Corridor Study Appendix D: Access Control Plan shows the access locations and intersection access restrictions along Briargate Parkway between Black Forest Road and Meridian Road. The currently proposed Sterling Ranch Sketch Plan Amendment has several access points that are not included in the access control plan.

- The access control plan shows a right-in/right-out access to the south side of Briargate Parkway at Wheatland Drive between Vollmer Road and Sterling Ranch Road. The currently proposed Sketch Plan Amendment shows a three-quarter movement access for the south leg and a right-in/right-out access on the north leg. A deviation request for this access point has been submitted and approved.
- The access control plan shows a right-in/right-out access point north and south of Briargate Parkway between Wheatland Drive and Sterling Ranch Road. The currently proposed sketch plan shows two offset three-quarter movement (left-in/right-in/right-out only) access points.
- The access control plan shows the intersection of Briargate Parkway/Sterling Ranch Road as a three-leg intersection. The currently proposed Sketch Plan includes a north leg at this future full-movement signal-controlled intersection.
- The currently proposed Sketch Plan Amendment shows a right-in/right-out access to the north side of Briargate Parkway about 1,230 feet east of Sterling Ranch Road that is not shown on the access control plan.
- The access control plan shows a right-in/right-out access to the south side of Briargate Parkway just west of Banning Lewis Parkway. The currently proposed Sketch Plan Amendment shows a right-in/right-out access to the north side of Briargate and a three-quarter movement access to the south side of Briargate at approximately the same location (1,085 feet west of Banning Lewis Parkway).
- The access control plan shows the intersection of Briargate/Banning Lewis as a three-leg intersection. The currently proposed Sketch Plan includes a north leg at this future full-movement signal-controlled intersection.

Deviation Requests

Any of the future proposed intersections that do not meet the intersection spacing criteria contained in the *El Paso County Engineering Criteria Manual* (ECM) will require deviation requests to those criteria be approved by El Paso County. These deviation requests (if not already submitted/approved) will be submitted with future preliminary plans and/or final plats.

EXISTING ROAD AND TRAFFIC CONDITIONS

The adjacent streets are shown in Figure 1 and are described below. Copies of the 2016 *El Paso County Major Transportation Corridors Plan (MTCP)*, 2040 *Roadway Plan*, and 2016 *MTCP 2060 Corridor Preservation Plan* with the site location identified on them have been attached to this report.

Vollmer Road is currently a five-lane urban street within the City of Colorado Springs limits between Black Forest Road and Cowpoke Road; and a two-lane, rural, paved roadway north of Cowpoke Road extending to north of Hodgen Road. In the southbound direction, Vollmer Road has a posted speed limit of 45 mph. South of Cowpoke Road, Vollmer Road has a 40-mph posted speed limit. The *2040 El Paso County Major Transportation Corridors Plan (MTCP)* and the prior Sterling Ranch master traffic study show Vollmer Road as a four-lane Urban Minor Arterial in the vicinity of the site.

Marksheffel Road is a Principal Arterial extending north from the City of Fountain to Woodmen Road. Marksheffel Road is planned to ultimately be widened to six lanes and extended north and west from Woodmen Road to connect to Research Parkway at Black Forest Road. Marksheffel Road is shown as a four-lane Principal Arterial through the site on the El Paso County *MTCP*. The City of Colorado Springs intends to take ownership and maintenance of Marksheffel Road when it is constructed from Vollmer to the east and south to where it will connect to the segment constructed north of Woodmen Road in the City.

The section of Marksheffel Road adjacent to Sterling Ranch is planned to be constructed on 107 feet of right-of-way to the City's required cross section(s) and criteria. The section of Marksheffel Road between Sterling Ranch Road and Vollmer Road will be constructed in the very short-term future and the section of Marksheffel Road southeast of Sterling Ranch Road (to connect to the segment recently constructed) will be completed in the short term and will open the connection to Woodmen Road. Marksheffel will be constructed as a four-lane roadway to the previously agreed upon cross section.

Briargate Parkway is a six-lane, Principal Arterial that extends east from I-25 to Grand Lawn Circle (about one-half mile east of Powers Boulevard). Briargate Parkway is planned ultimately to extend to Towner Drive. The segment of Briargate Parkway between Vollmer Road and Sterling Ranch Road is planned to be constructed in the short term.

Sterling Ranch Road is a planned Non-Residential Collector shown extending through the Sterling Ranch development between Marksheffel Road and the north end of the Sketch Plan area (Arroya Road). The segment south of Briargate Parkway will be constructed in the short term.

Tahiti Drive is a gravel road which extends for about 750 feet north from Vollmer Road. The intersection of Vollmer/Tahiti is located just south of the future location of the intersection of Vollmer/Marksheffel. This intersection is planned to be closed with the construction of Marksheffel Road between Vollmer Road and Sterling Ranch Road. Access for the existing home using this access will be relocated north to Loch Fyne Lane.

Existing Traffic Volumes

Figures 5a and 5b show the existing average weekday and peak-hour traffic volumes at the key study-area intersections. The peak-hour traffic volumes shown are based on manual

turning-movement counts by LSC Transportation Consultants and All Traffic Data Services. The date of each count is shown in Figure 5b. The average weekday traffic volumes shown in Figure 5a are estimates by LSC, based on the manual peak-hour traffic-count data. The traffic count sheets are attached.

Existing Levels of Service

Level of service (LOS) is a quantitative measure of the level of congestion or delay at an intersection. Level of service is indicated on a scale from "A" to "F." LOS A represents control delay of less than 10 seconds for unsignalized intersections. LOS F represents control delay of more than 50 seconds for unsignalized intersections. Table 2 shows the level of service delay ranges.

Table 2: Intersection Levels of Service Delay Ranges

Level of Service	Signalized Intersections	Unsignalized Intersections
	Average Control Delay (seconds per vehicle)	Average Control Delay (seconds per vehicle) ⁽¹⁾
A	10.0 sec or less	10.0 sec or less
B	10.1-20.0 sec	10.1-15.0 sec
C	20.1-35.0 sec	15.1-25.0 sec
D	35.1-55.0 sec	25.1-35.0 sec
E	55.1-80.0 sec	35.1-50.0 sec
F	80.1 sec or more	50.1 sec or more
(1) For unsignalized intersections, if V/C ratio is greater than 1.0 the level of service is LOS F, regardless of the projected average control delay per vehicle.		

The signalized intersections of Vollmer/Black Forest, Woodmen/Black Forest, and Woodmen/Marksheffel have been analyzed using Synchro. The intersections Burgess/Vollmer and Dines/Vollmer have been analyzed based on the unsignalized-intersection analysis procedures from the *Highway Capacity Manual, 6th Edition* by the Transportation Research Board.

Burgess/Vollmer

The stop-sign-controlled intersection of Burgess/Vollmer is currently operating at LOS E for the eastbound approach and LOS F for the westbound approach during the afternoon peak hour.

Dines/Vollmer

All movements at the stop-sign-controlled intersection of Dines/Vollmer are currently operating at LOS B or better during the peak hours.

Vollmer/Black Forest

The signal-controlled intersection of Vollmer/Black Forest is currently operating at an overall LOS C during the morning peak hour and LOS B during the afternoon peak hour.

Woodmen/Black Forest

The signal-controlled intersection of Woodmen/Black Forest is currently operating at an overall LOS C during the morning and afternoon peak hours. The northbound, eastbound, and westbound left-turn movements are currently operating at LOS E during the peak hours.

Woodmen/Marksheffel

Based on the existing signal-timing plan, the intersection of Woodmen/Marksheffel is currently operating at an overall LOS C during the morning and afternoon peak hours. The northbound left-turn movement is currently operating at LOS F and the eastbound left-turn, westbound left-turn, and southbound through movements are currently operating at LOS E during the peak hours.

Safety and Accident Analysis

The Colorado State Patrol (CSP) provided LSC with crash history data for Vollmer Road between Tahiti Drive and Burgess Road from September 2019 through September 2022. During the reported time period, there were twelve reported crashes. Of the twelve reports, ten were single-vehicle non-intersection-related crashes on Vollmer Road. One crash involved a southbound vehicle that turned right onto Poco Road and crashed into several cars parked on Poco Road partially in the lane. The only intersection related crash occurred in June 2022. A vehicle heading northbound on Vollmer Road was slowing to turn left at Lochwinnoch Road and the vehicle behind them attempted to pass on the left side. The crash history data has been attached.

BASELINE CONDITIONS

Baseline traffic is the traffic estimated to be on the adjacent roadways and at adjacent intersections without the proposed development's trip generation of site-generated traffic volumes. Baseline traffic (for a specified horizon year) includes the through traffic and the traffic generated by nearby developments (existing and planned) but assumes zero traffic generated by land uses within Sterling Ranch, including traffic generated by existing developments within Sterling Ranch.

Figure 6a shows the projected 2042 baseline daily traffic volumes on key street segments at the key area intersections and Figure 6b shows the projected 2042 peak-hour baseline traffic volumes at the key area intersections. These volumes assume buildout of the area street network, including the completion of Marksheffel Road between Vollmer Road and Black Forest Road, Briargate Parkway between Meridian Road and Black Forest Road, and Sterling Ranch Road between Marksheffel Road and Briargate Parkway.

The 2042 baseline traffic volumes are estimates by LSC, based on the traffic projections, the *Briargate-Stapleton Corridor Study (Draft)* by Wilson & Company dated December 9, 2021. This report indicates that the Pikes Peak Area Council of Governments' (PPACG) 2045 regional model was utilized as a basis for the projections. Previous reports completed in the area were also used to estimate the future baseline/background traffic (see Appendix Table 1).

Figure 6c shows the lane geometry, traffic control, and level of service at the key area intersections, based on the 2042 baseline volumes.

TRIP GENERATION

Please clarify what improvements will be in place in the baseline scenario. (State that it is anticipated that Sterling Ranch will build the improvements as development progresses if that is the case.)

The site-generated vehicle trips were estimated using the nationally-published trip-generation rates from *Trip Generation, 11th Edition, 2021* by the Institute of Transportation Engineers (ITE). Table 3 shows the trip-generation estimates. The trip generation estimate is based on the average rates for all land uses. This may result in conservative estimate, especially at intersections well removed from the site. The average weekday trip generation rate for Land Use 210: Single-Family Detached Housing is 9.43 trips per dwelling units. The weekday trip generation rate based on the fitted curve equation for a development with 4,800 dwelling units would be 7.40 trips per dwelling unit. Using the fitted rate equation for 4,800 dwelling units instead of the average rate would result in a trip generation estimate of 9,729 fewer trips per day.

The total number of vehicle trips generated by the land uses has been reduced to account for the internal vehicle trips made within Sterling Ranch between land uses, without use of the external streets surrounding the site. Table 3 shows the number of internal trips assumed for each land use. Based on the number of residential dwelling units and the number of students at each school about 60 percent of the school related trips were assumed to be internal to the Sterling Ranch development. Based on the number of dwelling units and the size of the mixed-use parcels about seven percent of the "shopping plaza" trips were assumed to be internal to the Sterling Ranch development. The residential internal trips were then balanced with the school and shopping plaza internal trips.

The total number of vehicle trips generated has also been reduced to take into account the "pass by" phenomena. A pass-by trip is made by a motorist who would already be on the adjacent roadways regardless of the proposed development, but who stops in at the site while passing by. The motorist would then continue on his or her way to a final destination in the original direction.

The pass-by percentages shown on Table 3 are from the Trip Generation Handbook - An ITE Proposed Recommended Practice, 3rd Edition, 2017 by ITE.

The Sterling Ranch Sketch Plan is projected to generate about 51,513 new external vehicle trips on the average weekday, with about half entering and half exiting the site during a 24-hour period. This is about 3,448 fewer daily trips than were estimated in the 2008 Master TIS. During the morning peak hour, which generally occurs for one hour between 6:30 and 8:30 a.m., about 1,185 vehicles would enter and 2,461 vehicles would exit the site. During the afternoon peak hour, which generally occurs for one hour between 4:15 and 6:15 p.m., about 3,189 vehicles would enter and 2,159 vehicles would exit the site.

TRIP DISTRIBUTION AND ASSIGNMENT

The directional distribution of the site-generated traffic volumes on the street and roadway system serving the site is one of the most important factors in determining the site's traffic impacts. The distribution estimates for residential related traffic and non-residential related traffic are shown in Figures 7 and 8, respectively. The directional-distribution estimates are based on the following factors: the location of the site with respect to the Colorado Springs metropolitan area, the planned access system for the site, the street and roadway system serving the site, and the land uses proposed for the site.

When the distribution percentages (from Figures 7 and 8) are applied to the new, external trip-generation estimates (from Table 3), the resulting site-generated traffic volumes can be determined. The internal trips were assigned separately based on the location of the residential dwelling units and school sites within Sterling Ranch. The pass-by trips for each of the mixed-use parcels were assigned separately based on the projected 2042 baseline traffic volumes on the adjacent Arterial roadways.

Figure 9a shows the sum of the new external, internal, and pass-by site-generated traffic generated average weekday traffic volumes on key street segments within the study area. Figure 9b shows the sum of the new external, internal, and pass-by site-generated peak hour traffic at key study-area intersections. Appendix Figure 2 show the site-generated traffic volumes at the minor (Local) Sterling Ranch access points to the adjacent Arterial roadways.

2042 TOTAL TRAFFIC

Figure 10a shows the projected 2042 total daily traffic volumes on key street segments and Figure 10b shows the projected 2042 total peak-hour traffic volumes at the key study-area intersections. These volumes are the sum of the 2042 baseline traffic volumes (from Figures 6a and 6b) and the site-generated traffic volumes (from Figures 9a and 9b).

Figure 10c shows the level of service analysis results for the key area intersections based on the projected 2042 total volumes. The figure also shows the general intersection lane geometry and intersection traffic control used in the analysis .

LEVEL OF SERVICE ANALYSIS

The key area future signalized intersections have been analyzed to determine the projected intersection levels of service for 2042 baseline and total traffic scenarios for the morning and afternoon peak-hour periods using Synchro. The key area future stop-sign-controlled and modern-roundabout-controlled intersections have been analyzed based on the unsignalized-intersection analysis procedures from the *Highway Capacity Manual 6th Edition*. Figures 6c and 10c show the level of service analysis results. The level of service reports are attached.

Intersection #1: Vollmer/Burgess

The stop-sign-controlled intersection of Burgess/Vollmer is currently operating at LOS E for the eastbound approach and LOS F for the westbound approach during the afternoon peak hour. By 2042, it was assumed that this intersection would be reconstructed as a modern one-lane roundabout with a northbound right-turn bypass lane. As a modern roundabout it is projected to operate at LOS C or better for all approaches during the peak hours based on the projected 2042 total traffic volumes.

Intersection #2: Vollmer/Arroya

All movements at the stop-sign-controlled intersection of Vollmer/Arroya are projected to operate at LOS C or better during the peak hours based on the projected 2042 total traffic volumes.

Intersection #3: Black Forest/Briargate

The intersection of Black Forest/Briargate is projected to operate at an overall LOS D or better during the peak hours as a signalized intersection based on the projected 2042 total traffic volumes shown in Figure 10b and the lane geometry shown in Figure 10c. The northbound left-turn movement is projected to operate at LOS E during the morning peak hour based on the projected 2042 baseline and total traffic volumes.

Intersection #4: Vollmer/Briargate

The intersection of Vollmer/Briargate is projected to operate at an overall LOS C during the peak hours as a signalized intersection based on the projected 2042 total traffic volumes shown in Figure 10b and the lane geometry shown in Figure 10c.

Intersection #5: Sterling Ranch/Briargate

The intersection of Sterling Ranch/Briargate is projected to operate at an overall LOS C during the peak hours as a signalized intersection based on the projected 2042 total traffic volumes shown in Figure 10b and the lane geometry shown in Figure 10c.

Intersection #6: Banning Lewis/Briargate

The intersection of Banning Lewis/Briargate is projected to operate at an overall LOS C during the peak hours as a signalized intersection based on the projected 2042 total traffic volumes shown in Figure 10b and the lane geometry shown in Figure 10c. The northbound left-turn movement is projected to operate at LOS E during the morning peak hour and LOS D during the afternoon peak hour and the westbound left-turn movement is projected to operate at LOS E during both the morning and afternoon peak hours.

Intersection #7: Dines/Vollmer

The stop-sign controlled intersection of Dines/Vollmer is projected to operate at LOS D or better for all movements based on the projected 2042 total traffic volumes shown in Figure 10b and the lane geometry shown in Figure 10c.

Intersection #8: E-W Collector/Sterling Ranch

The intersection of Sterling Ranch Road and the future east-west collector is projected to operate at LOS D or better for all movements as a stop-sign-controlled intersection based on the projected 2042 total traffic volumes shown in Figure 10b and the lane geometry shown in Figure 10c.

Intersection #9: E-W Collector/Banning Lewis

The intersection of Banning Lewis Parkway and the future east-west collector is projected to operate at an overall LOS B or better for all movements as a signal-controlled intersection based on the projected 2042 total traffic volumes shown in Figure 10b and the lane geometry shown in Figure 10c. The northbound left-turn movement is projected to operate at LOS E during the morning peak hour.

Intersection #10: Dines/Sterling Ranch

The intersection of Dines/Sterling Ranch is projected to operate at LOS D or better for all movements as a stop-sign controlled intersection based on the projected 2042 total traffic volumes shown in Figure 10b and the lane geometry shown in Figure 10c.

Intersection #11: Black Forest/Research/Marksheffel

The intersection of Black Forest/Research/Marksheffel is projected to operate at an overall LOS D or better during the peak hours as a signalized intersection based on the projected 2042 total traffic volumes shown in Figure 10b and the lane geometry shown in Figure 10c. The southbound left-turn movement is projected to operate at LOS E during the morning peak hour based on the projected 2042 baseline and total traffic volumes.

Intersection #12: Vollmer/Marksheffel

The intersection of Vollmer/Marksheffel is projected to operate at an overall LOS C or better during the peak hours as a signalized intersection based on the projected 2042 total traffic volumes shown in Figure 10b and the lane geometry shown in Figure 10c.

Intersection #13: Sterling Ranch/Marksheffel

The intersection of Sterling Ranch/Marksheffel is projected to operate at an overall LOS C or better during the peak hours as a signalized intersection based on the projected 2042 total traffic volumes shown in Figure 10b and the lane geometry shown in Figure 10c.

Intersection #14: Vollmer/Black Forest

The intersection of Vollmer/Black Forest is projected to operate at an overall LOS C or better during the peak hours as a signalized intersection based on the projected 2042 total traffic volumes shown in Figure 10b and the lane geometry shown in Figure 10c.

Intersection #15: Woodmen/Black Forest

The intersection of Woodmen/Black Forest is projected to operate at an overall LOS D during the peak hours as a signalized intersection based on the projected 2042 total traffic volumes shown in Figure 10b and the lane geometry shown in Figure 10c. During the morning peak hour, all of the left-turn movements are projected to operate at LOS E. During the afternoon peak hour, the eastbound left-turn movement, eastbound through movement, northbound left-turn movement, and southbound left-turn movement are projected to operate at LOS E and the westbound left-turn movement is projected to operate at LOS F.

Intersection #16: Woodmen/Marksheffel

The intersection of Woodmen/Marksheffel is projected to operate at an overall LOS D during the peak hours as a signalized intersection based on the projected 2042 total traffic volumes shown in Figure 10b and the lane geometry shown in Figure 10c. During the morning peak hour, the

eastbound and northbound left-turn movements are projected to operate at LOS E. During the afternoon peak hour, all of the left-turn movements and the northbound through movement are projected to operate at LOS E.

Intersection #17: Woodmen/Banning Lewis

The intersection of Woodmen/Banning Lewis is projected to operate at an overall LOS D during the peak hours as a signalized intersection based on the projected 2042 total traffic volumes shown in Figure 10b and the lane geometry shown in Figure 10c. The eastbound, westbound, and southbound left-turn movements projected to operate at LOS E during the morning and afternoon peak hours. The northbound left-turn movement is projected to operate at LOS F during the morning and afternoon peak hours.

ROADWAY FUNCTIONAL CLASSIFICATIONS AND LANEAGE

Figure 11 shows the recommended functional classifications and number of through lanes for the streets in the study area. Figure 11 also shows a comparison of the projected average weekday traffic volume (ADT) and the design ADT from the *ECM* for the key street segments in the vicinity of the site. All of the projected weekday traffic volumes are below the design ADT volumes.

MTCP ROADWAY CORRIDOR PRESERVATION

Figure 11 is consistent with the *MTCP Corridor Preservation Plan (CPP)*. Aside from the 2040 classifications and number of lanes, the *MTCP CPP* shows Woodmen Road expansion to six lanes east of Banning Lewis Parkway and Vollmer Road expansion to four lanes north to Burgess Road. The *CPP* also shows Black Forest Road expansion to four lanes north of Briargate Parkway between 2040 and 2060.

AREA MTCP 2040 ROADWAY IMPROVEMENT PROJECTS

The *El Paso County 2016 Major Transportation Corridors Plan Update* identified the following 2040 roadway improvement projects within the study area:

- C13: Vollmer Road from Marksheffel Road to Stapleton Drive as a Rural 4-Lane Minor Arterial;
- N5 Stapleton Drive [Briargate Parkway] from Towner Road to Black Forest Road as a 4-Lane Urban Principal Arterial;
- N12: Marksheffel Road from Woodman Road to Research Parkway as a 4-Lane Urban Principal Arterial; and
- M11: Vollmer Road Bicycle & Primary Regional Trail from Marksheffel Road to Shoup Road.

INTERSECTION APPROACH LANEAGE AND TRAFFIC CONTROL

Figure 10c shows the recommended general intersection approach laneage including preliminary recommendations for left and or right auxiliary turn lanes (or dual lanes where shown). The figure also shows the anticipated traffic-control device that will likely be needed at each key intersection (i.e., stop-sign control, traffic-signal control, roundabout-intersection control, etc.). These general, master-TIS-level recommendations are based primarily on the roadway corridor number of through lanes, the auxiliary turn lane thresholds in the *ECM*, and the 2042 capacity (LOS) analysis.

ROADWAY IMPROVEMENTS SUMMARY TABLE

A list of the roadway segment improvements is presented in Table 4. The location of each roadway segment is identified in Figure 12.

MULTI-MODAL AND TRANSPORTATION DEMAND MANAGEMENT (TDM) OPPORTUNITIES

The *El Paso County 2016 Major Transportation Corridors Plan Update* identified the following multi-modal improvement projects within the study area:

- M11: Bicycle & Primary Regional Trail along Vollmer Road between Marksheffel Road and Shoup Road.

The attached copy of the Sterling Ranch Sketch Plan Amendment shows the location of the planned major trails. This plan is consistent with the planned regional trail shown on Map 15: Bicycle and Pedestrian Network and Improvements from the 2016 *MTCP*.

Pedestrian plans will be part of preliminary plans. With urban development sidewalks will be required on all streets. A detached sidewalk will be provided along the east side of Vollmer Road adjacent to the development and along Sterling Ranch Road, Briargate Parkway and Marksheffel Road adjacent to the site. The county road cross sections in the *ECM* with shoulders generally accommodate bicycles. The section of Vollmer Road within the City of Colorado Springs (generally from Black Forest Road to Cowpoke Road) has existing bicycle lanes and future improvements on Vollmer Road should be consistent.

CONCLUSIONS AND RECOMMENDATIONS

Trip Generation

The Sterling Ranch Sketch Plan is projected to generate about 51,513 new external vehicle trips on the average weekday, with about half entering and half exiting the site during a 24-hour period. This is about 3,448 fewer daily trips than were estimated in the 2008 Master TIS. During the morning peak hour, which generally occurs for one hour between 6:30 and 8:30 a.m., about

1,185 vehicles would enter and 2,461 vehicles would exit the site. During the afternoon peak hour, which generally occurs for one hour between 4:15 and 6:15 p.m., about 3,189 vehicles would enter and 2,159 vehicles would exit the site.

Level of Service

All of the intersections analyzed are projected to operate at an overall satisfactory level of service (LOS D or better) during the peak hours, based on the projected 2042 total traffic volumes shown in Figure 10b and the lane geometry and traffic control shown in Figure 10c.

Some of the left-turn movements at the intersections of Black Forest/Briargate, Banning Lewis/Briargate, E-W Collector/Banning Lewis, Black Forest/Research/Marksheffel are projected to operate at LOS E during the peak hours. These movements have projected delays in the LOS E range simply because they arrive at the traffic signal at the beginning of the red phase at an intersection with many phases and a long cycle length. These movements would not be considered “failing” since their volume-to-capacity ratios are less than one. The justification is that to progress through traffic along an arterial corridor, the traffic signal offsets and left-turn phase times have been adjusted to favor the through band, which can result in higher delay for the left-turn movements, even though there is sufficient capacity for them.

Some of the left-turn movements and through movements at the intersections along Woodmen Road are projected to operate at LOS E or F during the peak hours. It may be necessary to provide additional laneage such as four through lanes on Woodmen Road or triple left-turn lanes to maintain an acceptable level of service in the future.

Recommended Improvements

Figure 10c shows the general/preliminary laneage requirements for the key study area intersections and Table 4 shows a list of the roadway segment improvements. These recommendations are consistent with the recently published *Briargate-Stapleton Corridor Study (Draft)* by Wilson & Company dated December 9, 2021. Detailed lane geometry will be provided at the preliminary plan stage for individual developments. Generally, turn lanes, right-of-way and cross sections of street segments will need to conform to *ECM* criteria. Right of Way preservation may also be needed per the *MTCP Corridor Preservation Plan*. For reference, a copy of Table 5 “Intersection Improvements” from the recently submitted *Sterling Ranch East Phase 1 Rezone and Preliminary Plan Traffic Impact Study* dated November 17, 2022 has been attached. Similar detailed recommendations for future intersections outside the study area of the Phase 1 TIS are anticipated to be provided with future preliminary plan and/or final plat submittals.

State that progression analyses will be addressed as appropriate in preliminary plan traffic studies and may also be included if needed with any deviation requests for partial turn access points on Briargate.

* * * * *

Please contact me if you have any questions regarding this report.

Sincerely,

LSC TRANSPORTATION CONSULTANTS, INC.

By Jeffrey C. Hodsdon, P.E.
Principal

KDF:JCH:jas

Enclosures: **Tables 1, 3, and 4**
Appendix Tables 1 and 2
Figures 1-12
2008 TIS TAZ Map
MTCP Maps
Table 5 Intersection Improvements from the *Sterling Ranch East Phase 1 Rezone*
& *Preliminary Plan TIS*
Traffic Count Reports
Level of Service Reports
Crash History
Sketch Plan Amendment

Tables 1, 3, and 4

<p style="text-align: center;">Table 1 Sterling Ranch Sketch Plan Land Use Comparison</p>	
---------------------------------------------------------------------------------------------------	--

2008 Traffic Analysis Zone ⁽¹⁾ (See Appendix Figure 1 for boundaries)						Sterling Ranch Sketch Plan Amendment Traffic Technical Memorandum, October 30, 2018										Currently Proposed Sketch Plan Amendment						Change from 2008	
Area (Acres)	Land Use	Quantity	Unit	Area (Acres)	Land Use	Quantity	Unit	for boundaries)	Name	Status	Land Use	Quantity	Unit	Quantity	Unit								
1	14 Shopping Center	152	KSF ⁽²⁾	11	Commercial	119.79	KSF	107	Mixed Use 11 Acres (South of Marksheffle)	Future	Mixed Use	120	KSF	-32.46	KSF								
2	63 Single-Family Detached Housing	234	DU ⁽⁴⁾	26	Single-Family Detached Housing	109	DU	6	Sterling Ranch Fil 2	Approved	Residential 3-5 DU/Ac	38	DU	3	DU								
				19	Single-Family Detached Housing	177	DU	10	Sterling Ranch Fil 4 (north)	Short-Term Future		61	DU										
3	12 Elementary School	500	Students	12	Elementary School	500	Students	5	Copper Chase	Under Review	Residential 5-8 DU/Ac	138	DU	-500	Students								
4	6 Apartment	89	DU	5	Apartment	74	DU	16	Sterling Ranch Future Filing (SW Sterling Ranch/Dines)	Future	Residential 5-8 DU/Ac	82	DU	82	DU								
5	22 Single-Family Detached Housing	82	DU	62	Single-Family Detached Housing	259	DU	108	Industrial 5 Acres	Future	Industrial (Lift Station)	- - -	- - -	-89	DU								
6	17 Single-Family Detached Housing	103	DU					10	Sterling Ranch Fil 4 (south)	Short-Term Future	Residential 3-5 DU/Ac	98	DU	16	DU								
7	101 Single-Family Detached Housing	611	DU	101	Single-Family Detached Housing	422	DU	7&8	Sterling Ranch Fil 3	Approved	Residential 3-5 DU/Ac	63	DU	-40	DU								
								1	Branding Iron Fil No. 1	Existing	Residential 3-5 DU/Ac	51	DU	-309	DU								
								2	Homestead Fil No. 1		Residential 3-5 DU/Ac	72	DU										
								4	Branding Iron Fil No. 2		Residential 3-5 DU/Ac	75	DU										
8	17 Shopping Center	185	KSF ⁽²⁾	14	Shopping Center	152.46	KSF	3	Homestead Fil No. 2		Residential 3-5 DU/Ac	104	DU										
								105	Mixed Use 14 AC (SE Briargate/Vollmer)	Future	Mixed Use	51 KSF 233 DU	-134.13 KSF 233 DU										
9	35 Middle School/Junior High School	1000	students					103	Sterling Ranch East Phase 1	Under Review	K-8 School	1100	students	100	Students								
10	94 Single-Family Detached Housing	350	DU					22 & 26			Residential 3-5 DU/Ac	294	DU	-56	DU								
11	68 Single-Family Detached Housing	253	DU					17, 23 & 24			Residential 3-5 DU/Ac	168	DU	-66	DU								
				38	Residential 2 DU/Ac	19	DU																
12	46 Single-Family Detached Housing	171	DU					102			Elementary School	600	students	600	Students								
13	70 Single-Family Detached Housing	260	DU					25, 27, 28, 29, 31, & 32	Sterling Ranch East Future Filings	Future	Residential 3-5 DU/Ac	603	DU										
17	72 Single-Family Detached Housing	268	DU					39	Sterling Ranch East Future Filings	Future	Residential 2 DU/Ac	18	DU	-78	DU								
14	10 Elementary School	500	Students					104	Future Elementary School	Future	Elementary School	600	students	100	Students								
15	32 Residential Condominium/Townhouse	298	DU					14, 15, 20 & 21	Village at Sterling Ranch East	Under Review	Midtown & ADU Townhomes & Duplexes	100 DU 146 DU	-52	DU									
				33	Sterling Ranch East Future Filings	Future	Residential 3-5 DU/Ac	106	DU	-415	DU												
16	35 Apartment	521	DU					106	Mixed Use 22 AC (SW Briargate/Banning Lewis)	Future	Mixed Use	80 KSF 367 DU	-192 KSF 367 DU										
18	25 Shopping Center	272	KSF					101	Sterling Ranch East Future Filings	Future	Residential 0.2 -5 DU/Ac	431	DU	-193	DU								
19	91 Single-Family Detached Housing	34	DU																				
20	314 Active Adult Residential	1,899	DU													18 & 37	Sterling Ranch East Phase 1	Under Review	Residential 3-5 DU/Ac	280	DU		
				19	Four Square at Sterling Ranch	Under Review	Residential 5-8 DU/Ac									158	DU						
				30, 34, 35 & 36		Future	Residential 3-5 DU/Ac	871	DU														
21	88 Single-Family Detached Housing	327	DU					9	Homestead North Fil 1	Approved	Residential 3-5 DU/Ac	73	DU	-103	DU								
				11	Homestead North Fil 2	74	DU																
				12	Homestead North Fil 3	77	DU																
TOTAL				TOTAL				TOTAL															
Residential	5,500	DU		Residential	4,800	DU		Residential	4,800	DU		-700	DU										
Commercial	610	KSF		Commercial	251	KSF		Commercial	251	KSF		-359	KSF										
School	2,000	Students		School	2,300	Students		School	2,300	Students		300	Students										

Notes

- (1) See Appendix Figure 1 for 2008 Traffic Analysis Zones boundaries
(2) See Figure 2 for Traffic Analysis Zone boundaries
(2) KSF = thousand square feet of floor area
(3) DU = dwelling unit

Source: LSC Transportation Consultants, Inc.

Table 3
Sterling Ranch Sketch Plan
Trip Generation Summary⁽¹⁾

		Sterling Ranch Sketch Plan Area Internal Trip Calculations (Long-Term Scenario Only)																																				
ITE Code	ITE Land Use	Quantity Unit	Trip Generation Rates ⁽²⁾				Raw ITE Trip Generation (Individual Driveway Trips)					Internal Trips (%)					Total Internal Trips Generated					Total External Trips Generated					New External Trips Generated											
			Daily	AM Peak Hour		PM Peak Hour		Daily	AM Peak Hour		PM Peak Hour		Daily	AM		PM		Daily	AM Peak Hour		PM Peak Hour		Daily	AM Peak Hour		PM Peak Hour		Passby ⁽³⁾ (%)	Daily									
				In	Out	In	Out		In	Out	In	Out		In	Out	In	Out		In	Out																		
Trip Generation Estimate Based on the Currently Proposed Sterling Ranch Sketch Plan Amendment																																						
Non-Residential Land Uses																																						
821	Shopping Plaza ⁽⁴⁾	251	KSF ⁽⁵⁾	67.52	1.07	0.66	2.54	2.65	16,948	269	165	638	664	7%	7%	7%	7%	7%	1,186	19	12	45	47	15,762	250	153	593	617	34%	10,403								
520	Elementary School	1,800	Students	2.27	0.40	0.34	0.07	0.09	4,086	719	613	132	156	60%	60%	30%	30%	60%	2,452	432	184	40	93	1,634	287	429	92	63	0%	1,634								
521	Middle School/Junior High	500	Students	2.10	0.36	0.31	0.07	0.08	1,050	181	154	36	39	60%	60%	30%	30%	60%	630	109	46	11	23	420	72	108	25	16	0%	420								
Total Non-Residential Land Uses									22,084	1,169	932	807	859						4,268	560	242	96	163	17,816	609	690	711	696	12,457									
Residential Land Uses																																						
210	Single-Family Detached Housing	4,052	DU ⁽⁶⁾	9.43	0.18	0.52	0.59	0.35	38,210	737	2,099	2,400	1,409	10%	30%	24%	6%	6%	3,765	219	504	148	87	34,445	518	1,595	2,252	1,322	0%	34,445								
215	Single Family Attached Housing	146	DU	7.20	0.15	0.33	0.32	0.25	1,051	22	48	47	36	10%	28%	25%	6%	6%	104	6	12	3	2	947	16	36	44	34	0%	947								
220	Multifamily Housing (Low-Rise)	600	DU	6.74	0.10	0.30	0.32	0.19	4,044	58	182	193	113	10%	30%	24%	6%	6%	399	17	44	12	7	3,645	41	138	181	106	0%	3,645								
4,798 DU									43,306	817	2,330	2,640	1,558						4,268	242	560	163	96	17,816	690	609	696	711	39,038									
Total									65,389	1,986	3,262	3,447	2,417						8,536	802	802	259	259	56,853	1,184	2,460	3,188	2,158	51,494									
Trip Generation Estimate From the Sterling Ranch Updated Traffic Impact Analysis, June 5, 2008									70,399	1,680	3,100	3,714	2,728											63,241	1,191	2,361	3,427	2,502	54,961									
Change in the Trip Generation Estimate									-5,010	306	162	-267	-311											-6,388	-7	99	-239	-344	-3,467									

Notes:

- (1) See Appendix Table 2 for detailed trip generation estimate by traffic analysis zone
 (2) Source: "Trip Generation, 11th Edition, 2021" by the Institute of Transportation Engineers (ITE)
 (3) Source: "Trip Generation Handbook - An ITE Proposed Recommended Practice 3rd Edition, September 2017" by ITE
 (4) Rates based on a shopping plaza with no supermarket
 (5) KSF = thousand square feet of floor area
 (6) DU = Dwelling Unit

Source: LSC Transportation Consultants, Inc.

Dec-22

Table 4					
(page 1 of 2)					
Sterling Ranch Sketch Plan Amendment					
Roadway Segment Improvements					
Segment ID ⁽¹⁾ (See Figure 12 for map)	Improvement Description	Timing	Design ADT (vpd)	Projected 2042 ADT (vpd)	Responsibility
V1 northbound	Restriping the 38' of pavement for two 11' southbound lanes (remove the bike lane), a 12' northbound lane and a 4' outside paved shoulder along the east edge ⁽²⁾ (Pending City Traffic Engineering Approval) <div>or combine bike and traffic lane and add speed limit sign? Verify with City.</div>	With Sterling Ranch Filing No. 4 (Need driven by anticipated traffic from each development?)	5,500 (Directional northbound)	13,080	Sterling Ranch
V1 southbound			10,000 (Directional southbound)		
V1	Improve Vollmer Road between Dry Needle Place and the Sterling Ranch south boundary to a standard 4-Lane Urban Minor Arterial Cross Section (Add a second northbound through lane and painted center median) ⁽²⁾	Intermediate-Term Future	20,000		Sterling Ranch, if necessary prior to construction by Others
V2	Improve Vollmer Road between the Sterling Ranch south boundary to Lochwinnoch Lane/Sterling property boundary to a standard 4-Lane Urban Minor Arterial Cross Section ⁽²⁾	Short-Term Future (With Sterling Ranch Fil No. 2 Or Sterling Ranch Phase 2)	20,000 (Note: Existing Capacity 8,000 ⁽³⁾)	14,385	Sterling Ranch
V3	Short Term: Improve Vollmer Road from Lochwinnoch Lane to Sterling Ranch boundary (northeast of Glider Loop) to provide 36' of pavement (existing pavement 1 approx. 23.38') and stripe for one through lane and plus a 6' paved, striped outside shoulder in each direction ⁽²⁾	Short-Term Future (With Homestead North)	11,000 (Note: Existing Capacity 8,000)	15,040	Sterling Ranch
	Long Term: Improve Vollmer Road from Lochwinnoch Lane to Sterling Ranch boundary (northeast of Glider Loop) to a standard 4-Lane Urban Minor Arterial Cross Section ⁽²⁾	Long-Term Future	20,000		Sterling Ranch with potential County assistance with ROW acquisition- pursuant to the recent development agreement between Sterling Ranch and EPC.
V4	Improve Vollmer Road from Sterling Ranch boundary (northeast of Glider Loop) to Briargate Parkway to a standard 4-Lane Urban Minor Arterial Cross Section ⁽²⁾	Short-Term Future— May 2024 Updated 10/15/2022 - Sections V4, V5, V6 to be constructed by May 2024 (prior note: With Homestead North Filing 1)	20,000	14,495	Sterling Ranch
V5	Improve Vollmer Road from Briargate Parkway to Jane Kirkham Drive to a standard 4-Lane Urban Minor Arterial Cross Section ⁽²⁾	Short-Term Future— May 2024 Updated 10/15/2022 - Sections V4, V5, v6 to be constructed by May 2024 (prior note: prior note: With Homestead North Filing 1)	20,000	11,690	Sterling Ranch
V6	Improve Vollmer Road from Jane Kirkham Drive to Sam Bass Drive to a standard 4-Lane Urban Minor Arterial Cross Section ⁽²⁾	Short-Term Future— May 2024 Updated 10/15/2022 - Sections V4, V5, v6 to be constructed by May 2024 (prior note: prior note: With Homestead North Filing 2)	20,000	11,425	Sterling Ranch
V7	Improve Vollmer Road between Sam Bass Drive and Poco Road to a 4-lane Urban Minor Arterial but with necessary lane transitions, redirect tapers, etc. south of Poco to adequately transition between the 4-Lane Urban Minor Arterial Cross Section and the 2-Lane Rural Arterial Cross Section north of Poco Road.	Short-Term Future – May 2024 Updated 10/15/2022 - Sections V4, V5, v6 to be constructed by May 2024 (prior note: With Homestead North Filing 3)	20,000	9,920	Sterling Ranch
V8	Improve Vollmer Road from Poco Road to Shoup Road to a Rural 2-Lane Arterial Cross Section ⁽²⁾	Long-Term Future	10,000	8,760	El Paso County Project ID U-12
Part 1/2 of this table (see Part 2 on next page)					
Notes:					
(1) See Figure 10					
(2) Adequate transition/redirect tapers would be needed between the various cross sections on Vollmer Road. Based on the criteria contained in Table 2-29 of the <i>El Paso Engineering Criteria Manual</i> an appropriate taper ratio for a roadway with a design speed of 40 mile per hour is 20:1					
(3) Source: Table 20 <i>Road Impact Fee Study Updated</i> November 16, 2016					
Source: LSC Transportation Consultants, Inc. (December 22, 2022)					

Table 4					
(page 2 of 2)					
Sterling Ranch Sketch Plan Amendment					
Roadway Segment Improvements					
Segment ID ⁽¹⁾ (See Figure 12 for map)	Improvement Description	Timing	Design ADT (vpd)	Projected 2042 ADT (vpd)	Responsibility
SR1	Construct Sterling Ranch Road as an Urban Non-Residential Collector from Marksheffel Road to Dines Boulevard	Short Term - with Sterling Ranch Fil No. 2	20,000	14,620	Sterling Ranch
SR2	Construct Sterling Ranch Road as an Urban Non-Residential Collector from Dines Boulevard to Briargate Parkway	Short-Term	20,000	10,055	Sterling Ranch
SR3	Construct Sterling Ranch Road as an Urban Collector from Briargate Parkway to Vancouver Street.	Short Term	10,000	9,045	Sterling Ranch
SR4	Construct Sterling Ranch Road from Vancouver Street north to Arroya (or ultimate north terminus)	Long-Term Future	10,000	4,260	Sterling Ranch
M1	Construct Marksheffel Road as an Urban Principal Arterial to City of Colorado Springs standards in 107' of right-of-way between Vollmer Road and Sterling Ranch Road	Updated 10/15/2022: to be completed by the end of 2022 (prior note: With Sterling Ranch Fil No. 2	40,000	23,790	Sterling Ranch
M2	Construct Marksheffel Road as an Urban Principal Arterial to City of Colorado Springs standards in 107' of right-of-way between Sterling Ranch Road and the south boundary of the Sterling Ranch Master Plan Area. 10/16/2022 NOTE: With the completion of M2 in 2023, the connection between Vollmer and Woodmen Road (via M3) will be completed.	Short Term Updated 10/15/2022: to be completed in 2023 (prior note: With Sterling Ranch Phase 2)	40,000	29,525	Sterling Ranch
M3	Construct Marksheffel Road between the south boundary of the Sterling Ranch Master Plan Area and Woodmen Road (Note this segment is located within the City of Colorado Springs) 10/16/2022 NOTE: With the completion of M2 in 2023, the connection between Vollmer and Woodmen Road (via M3) will be completed.	Updated 10/15/2022: Completed (by Others)	40,000	24,525	Others (Completed)
M4	Construct Marksheffel Road between Black Forest Road and Vollmer Road	Long-Term Future	40,000	27,910	Others
B1	Construct the south half section of Briargate Pkwy (4-Lane Principal Arterial) between Vollmer Road and Wheatland Drive [now full section by 2023]	Short-Term Future Updated 10/15/2022: Full section to be completed in 2023 with Homestead at Sterling Ranch Filing No. 1 (prior note: With Homestead at Sterling Ranch Fil 2)	20,000	24,685	Sterling Ranch
	Construct the north half section of Briargate Pkwy (4-Lane Principal Arterial) between Vollmer Road and Wheatland Drive [now full section by 2023]	Short-Term Future Updated 10/15/2022: Full section to be completed in 2023 with Homestead at Sterling Ranch Filing No. 1 (prior note: Long-Term Future)	40,000		Sterling Ranch
B2	Construct Briargate Pkwy (full section) as a 4-Lane Principal Arterial between Wheatland Dr and Sterling Ranch Road	Short-Term Future Updated 10/15/2022: Full section to be completed in 2023 or Spring 2024 (prior note: Long-Term Future)	40,000	26,310	Sterling Ranch
B3	Construct Briargate Pkwy as a 4-Lane Principal Arterial between Sterling Ranch Road and Banning Lewis Parkway	Intermediate Term	40,000	20,935	Sterling Ranch
B4	Construct Stapleton Road as a 4-Lane Principal Arterial between Banning Lewis Parkway and Meridian Road (including upgrade of existing rural two-lane segment between Towner and Meridian)	Long-Term Future	40,000	17,945	Others
B5	Construct Briargate Pkwy as a 4-Lane Principal Arterial between its current terminus and Black Forest Road and between Black Forest Road and Vollmer Road	Long-Term Future	40,000	23,320	Others
BL1	Construct Banning Lewis Parkway as a 4-Lane Principal Arterial between the south Sterling Ranch boundary and Briargate Pkwy	Long-Term Future	40,000	20,295	Financial assurances for half-section, Sterling Ranch half-section or full-section w/ cost recovery
BL2	Construct Banning Lewis Parkway as a 4-Lane Principal Arterial between Woodmen Road and the south Sterling Ranch boundary (Note this segment will be located within the City of Colorado Springs)	Long-Term Future	40,000	28,480	Others
W1	Widen Woodmen Road from 4-lane to 6-lane section from Powers Boulevard to US 24	Long-Term Future	72,000	66,690	Others
Part 2/2 of this table					
Notes:					
(1) See Figure 10					
(2) Adequate transition/redirect tapers would be needed between the various cross sections on Vollmer Road. Based on the criteria contained in Table 2-29 of the <i>El Paso Engineering Criteria Manual</i> an appropriate taper ratio for a roadway with a design speed of 40 mile per hour is 20:1					
(3) Source: Table 20 <i>Road Impact Fee Study Updated</i> November 16, 2016					
Source: LSC Transportation Consultants, Inc. (October 25, 2022)					

Address major intersections that will need improvements as well. See comments on Table 5 below.

Figures 1-12

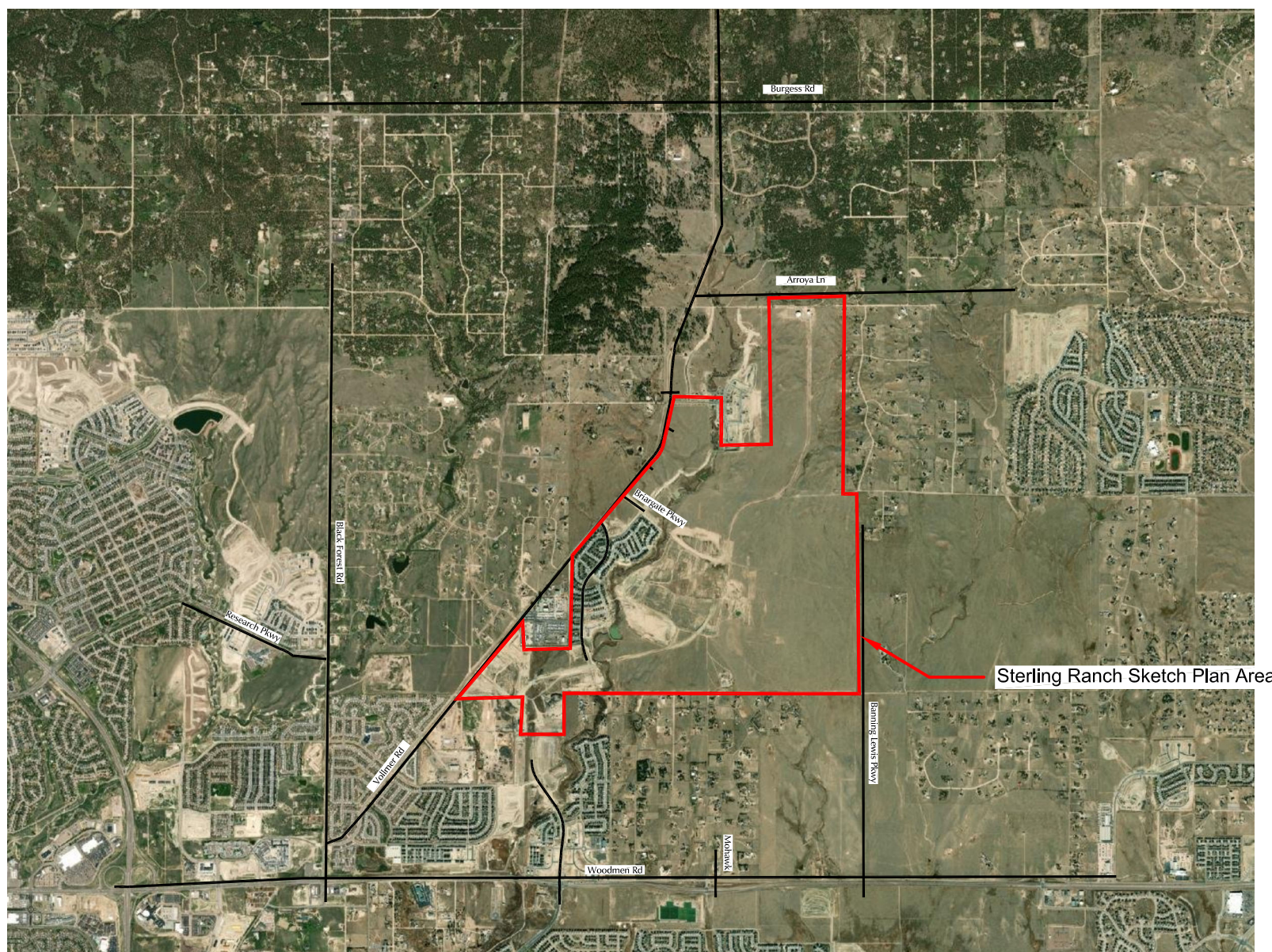
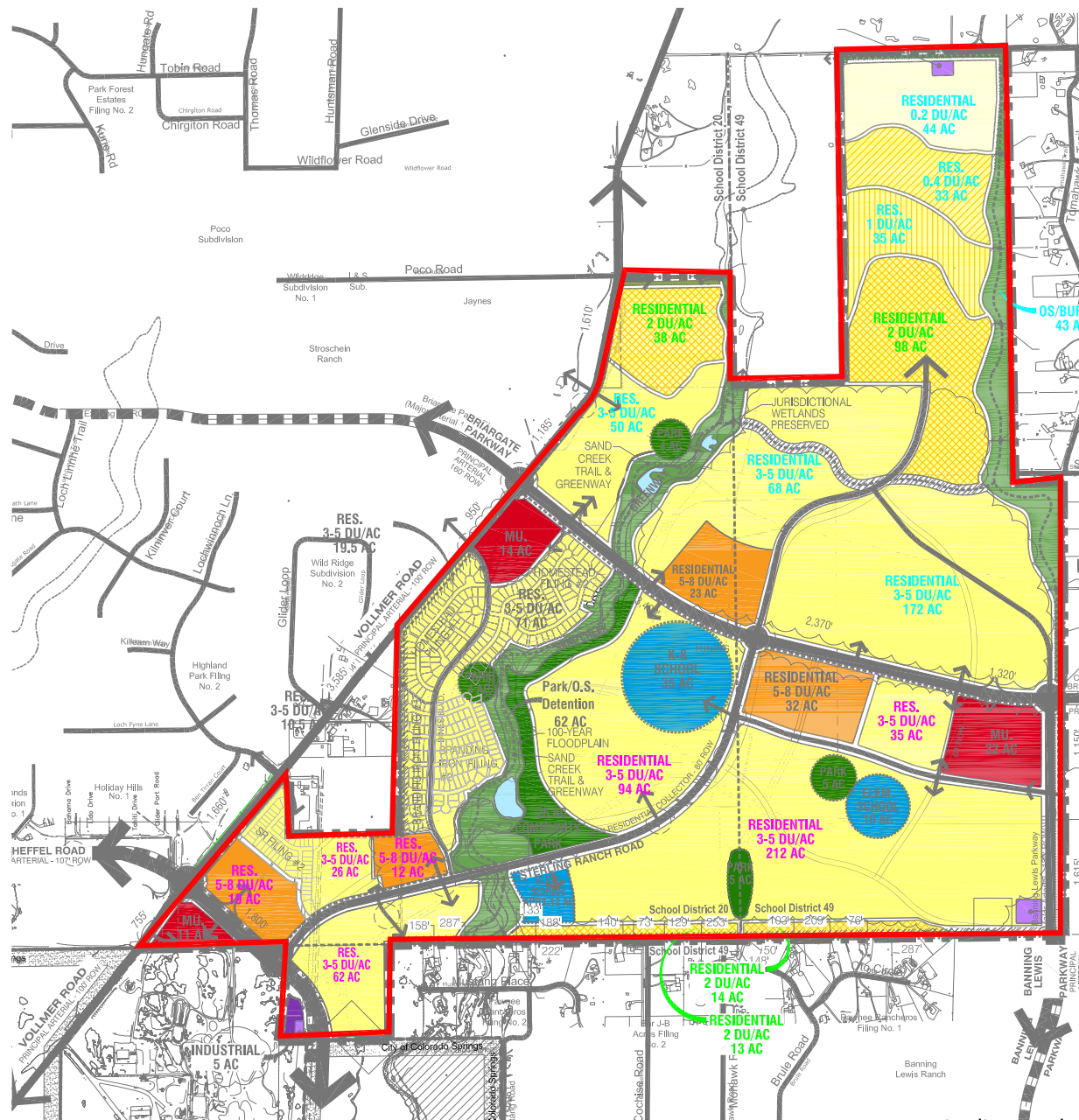


Figure 1

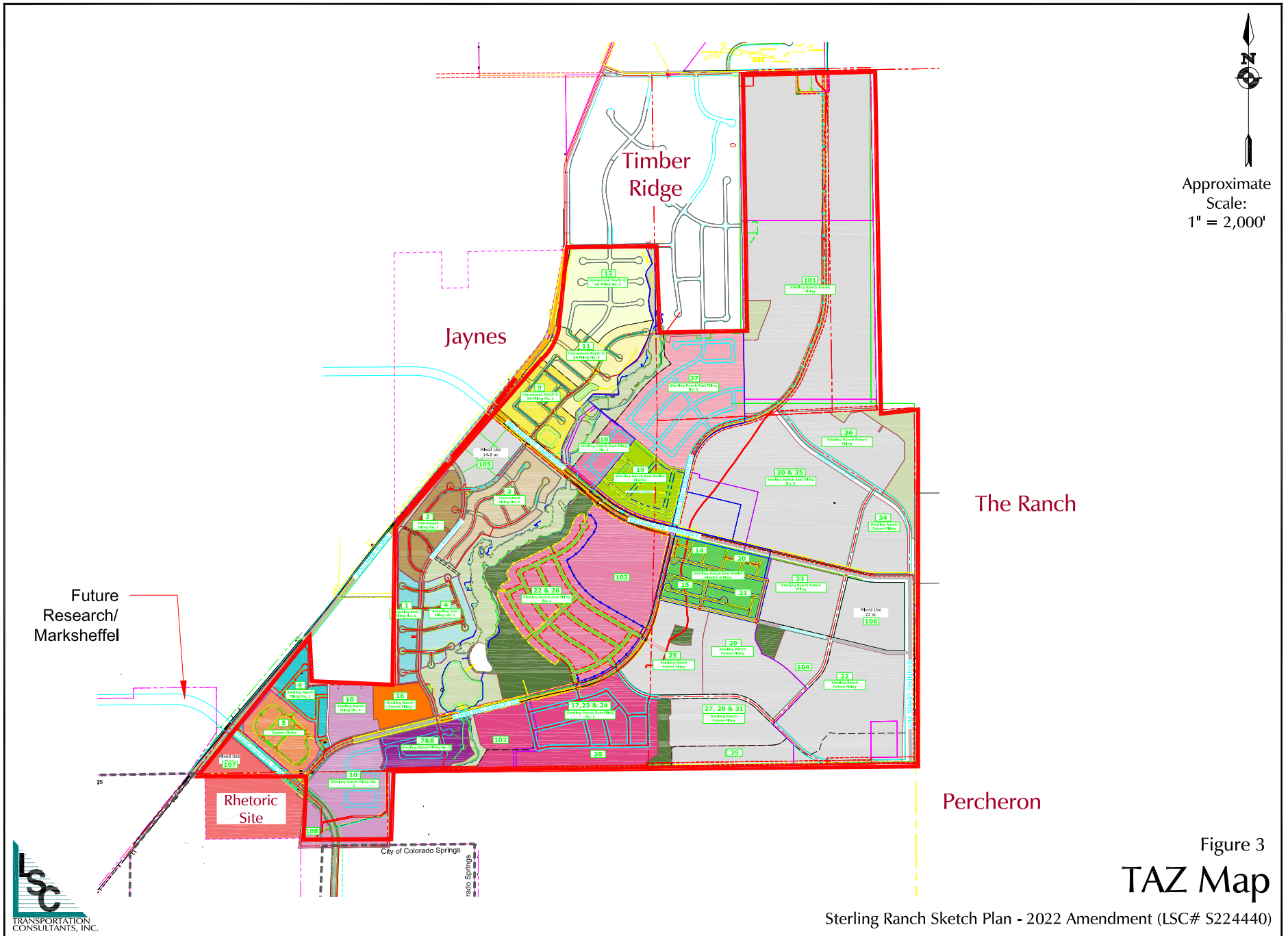
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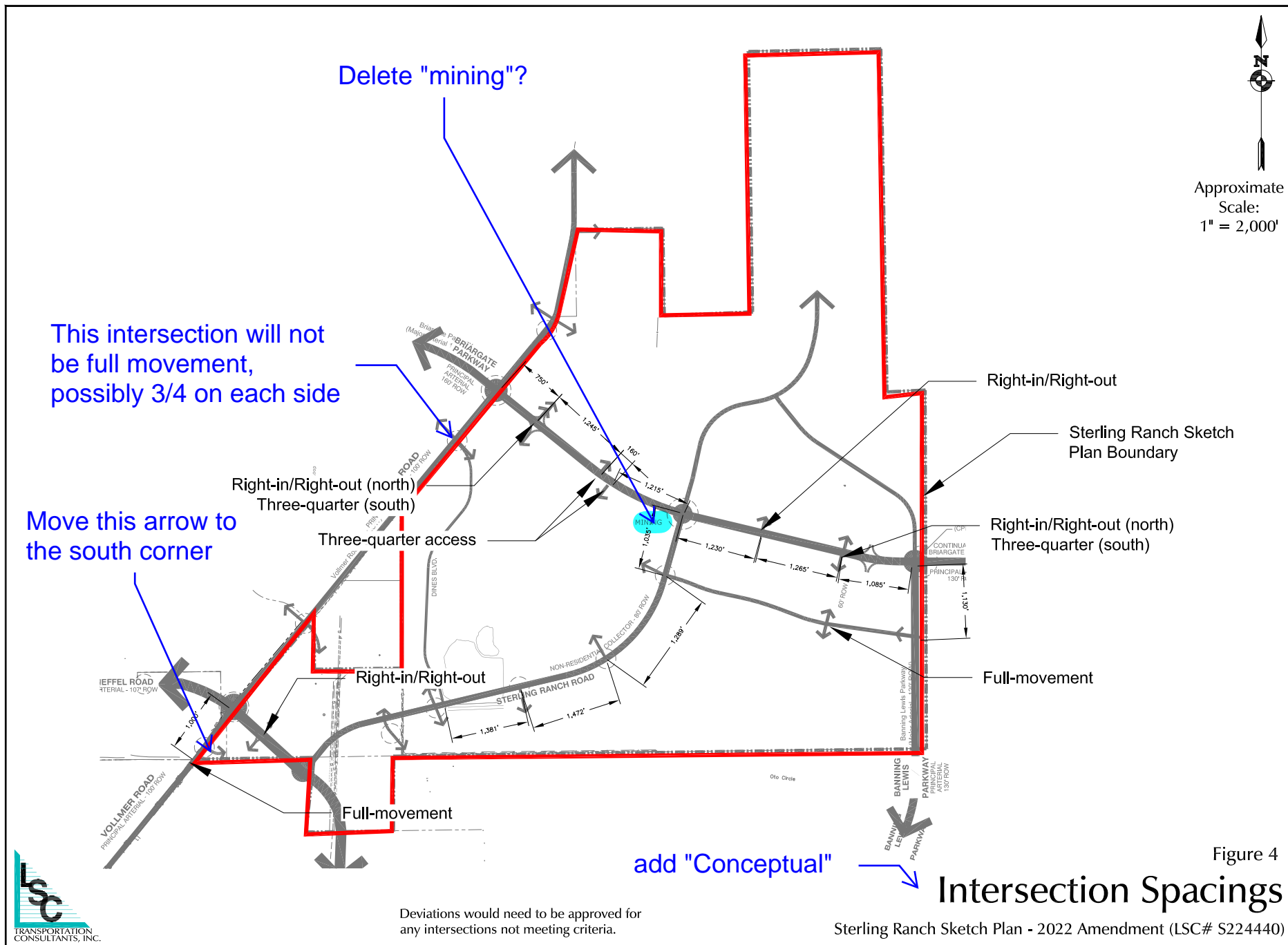
Sterling Ranch Sketch Plan - 2022 Amendment (LSC# S224440)

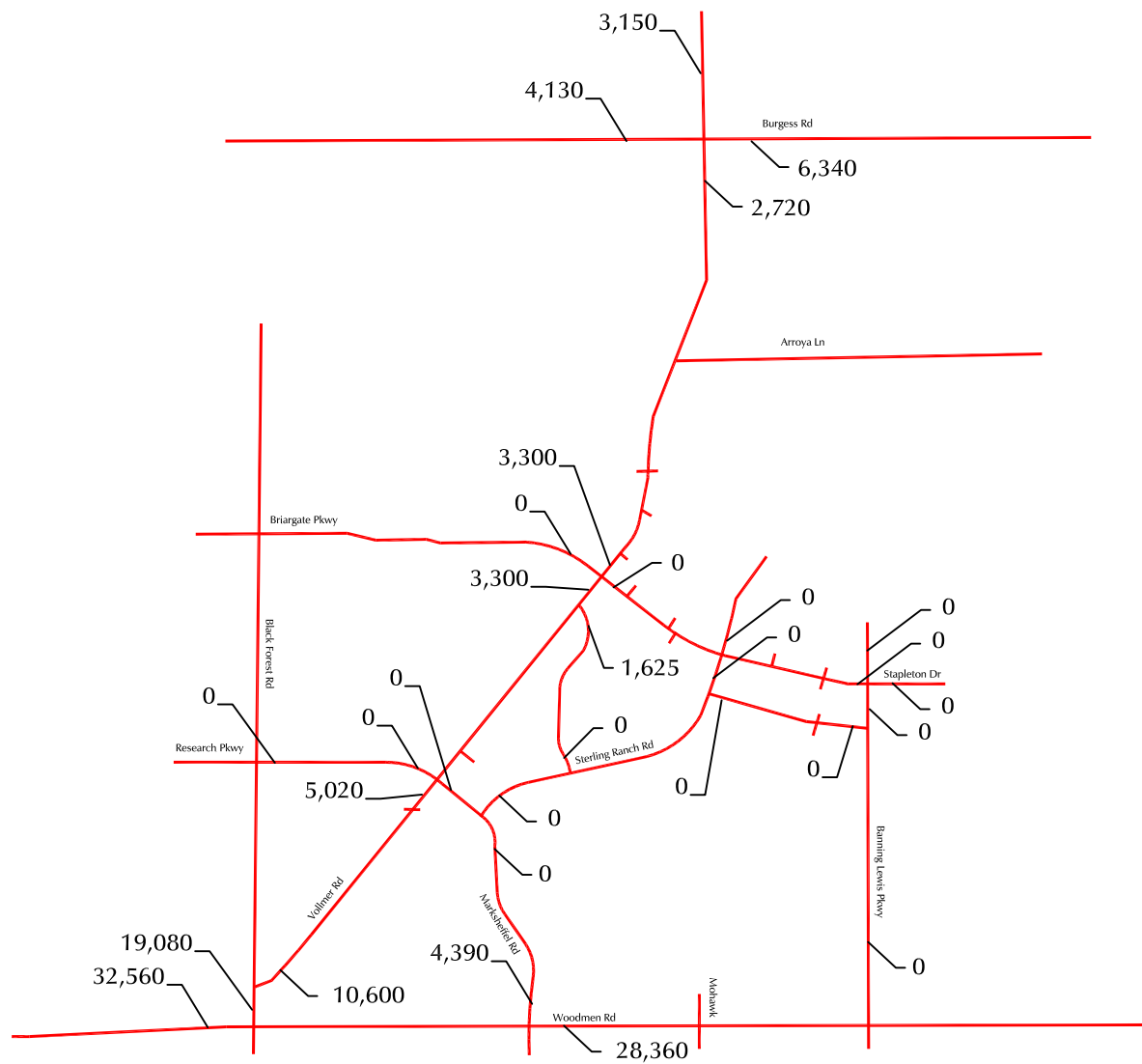


Approximate
Scale:
1" = 2,000'

Figure 2
Sketch Plan
Sterling Ranch Sketch Plan - 2022 Amendment (LSC# S224440)







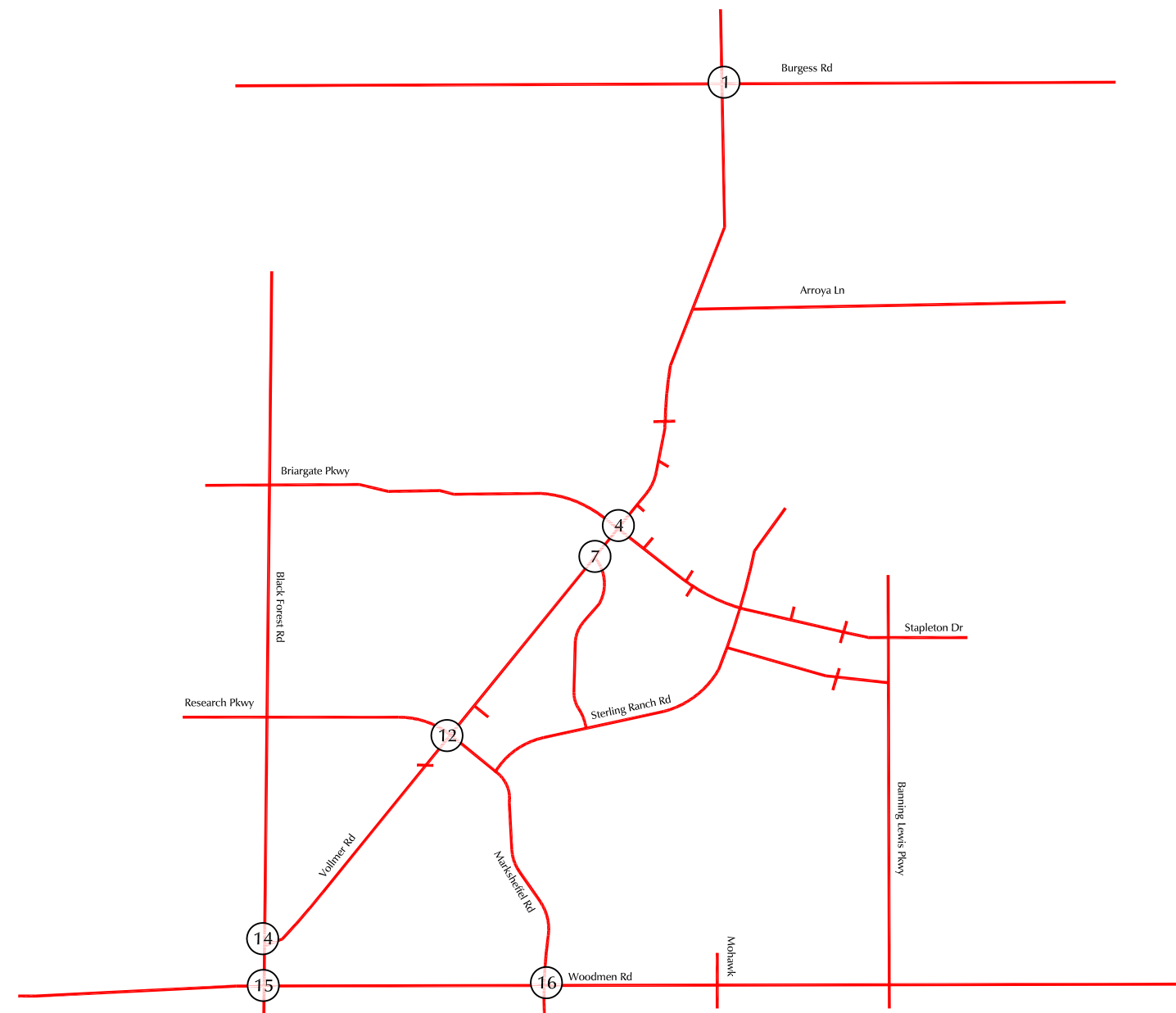
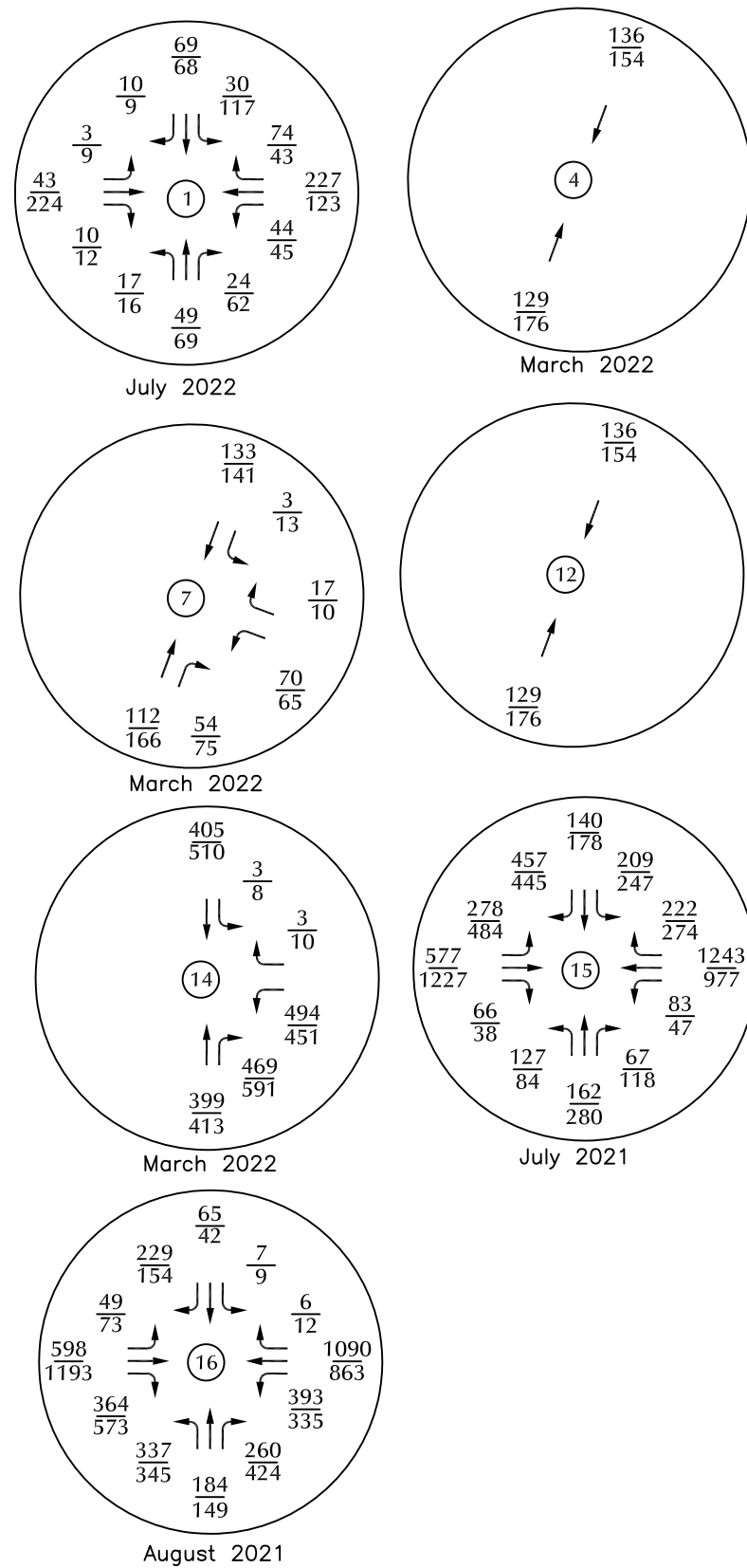
LEGEND:

XXX = Average Weekday Traffic (vehicles per day)

Counts are estimates by LSC based on factored turning movement count data shown on Figure 5b

Figure 5a
Existing ADTs

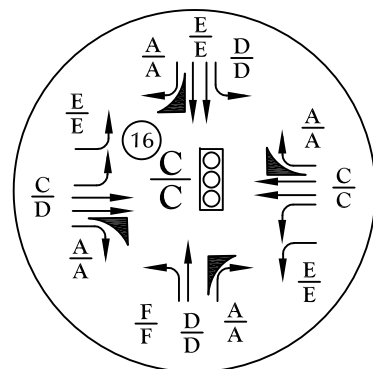
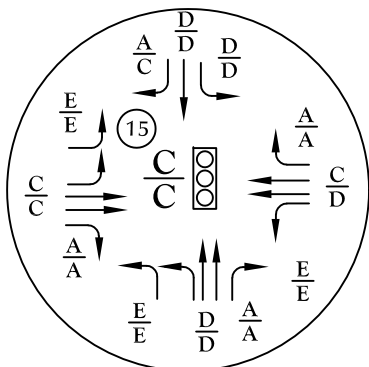
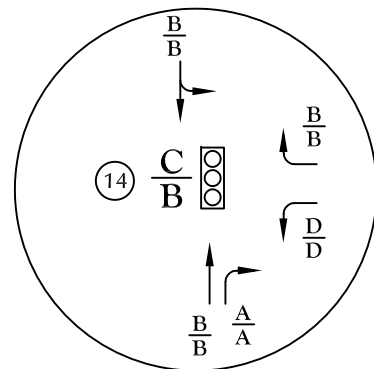
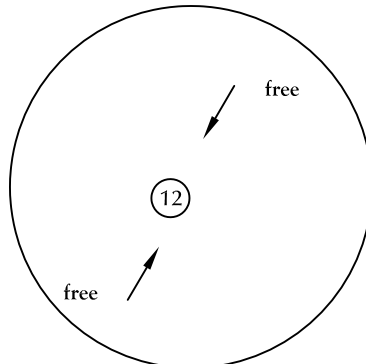
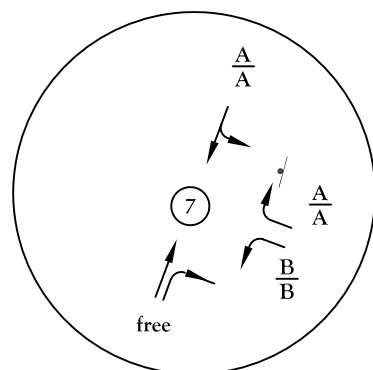
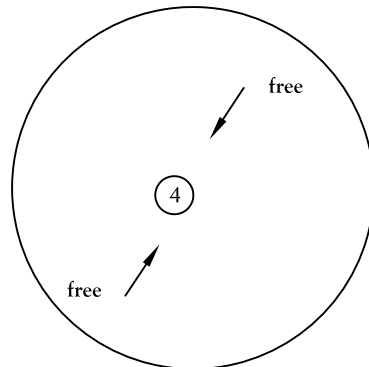
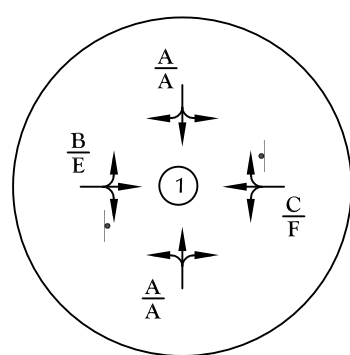
Sterling Ranch Sketch Plan - 2022 Amendment (LSC# S224440)



LEGEND: $\frac{XX}{XX} = \frac{\text{AM Peak-Hour Traffic (veh/hr)}}{\text{PM Peak-Hour Traffic (veh/hr)}}$

Figure 5b
Existing Peak-Hour Traffic

Sterling Ranch Sketch Plan - 2022 Amendment (LSC# S224440)



LEGEND:

$\frac{A}{B}$ = AM Individual Movement Peak-Hour Level of Service
 PM Individual Movement Peak-Hour Level of Service
 $\frac{C}{D}$ = AM Entire Intersection Peak-Hour Level of Service
 PM Entire Intersection Peak-Hour Level of Service

⊥ = Stop Sign

⬢ = Traffic Signal

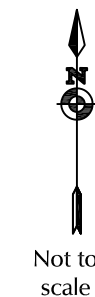
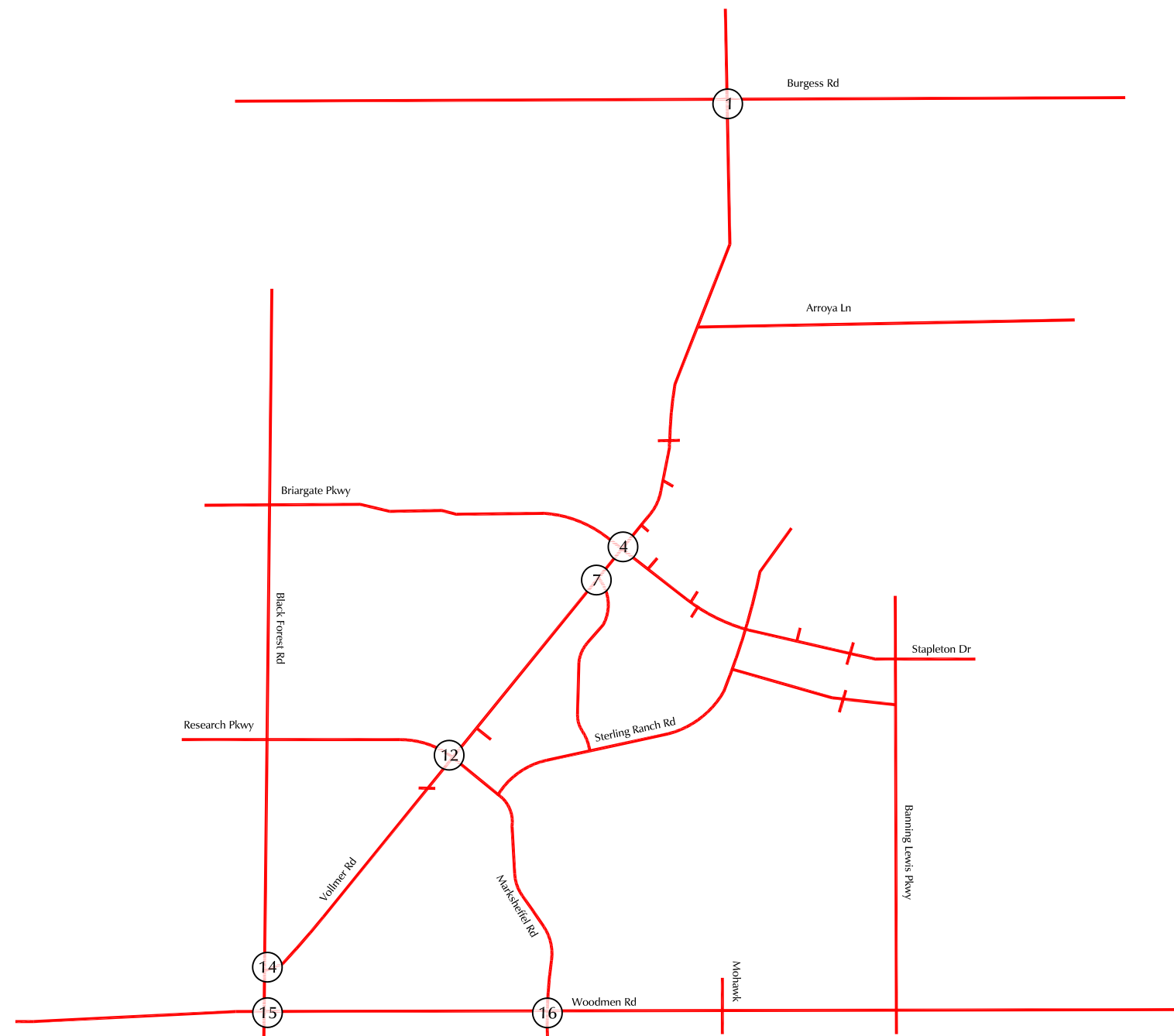
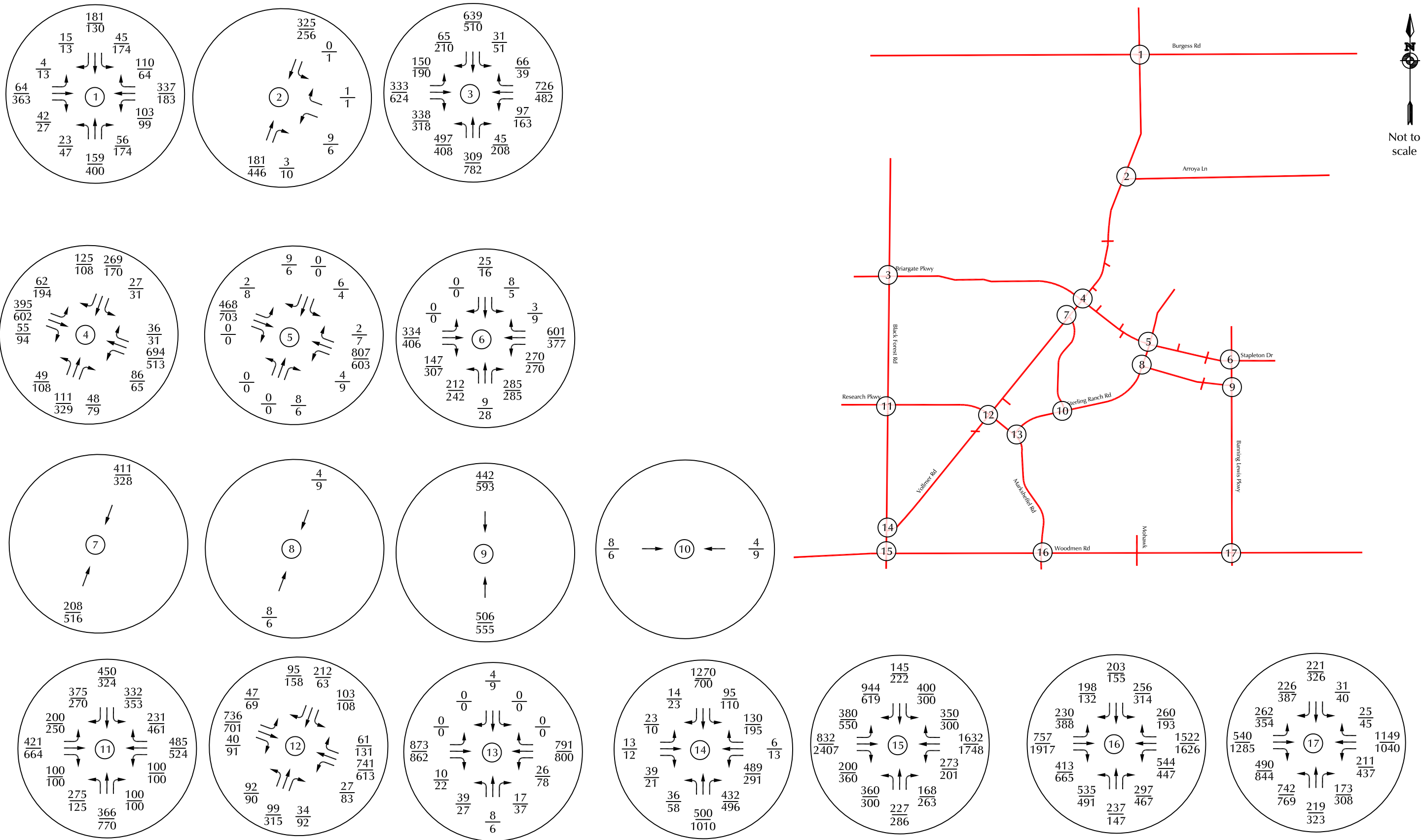
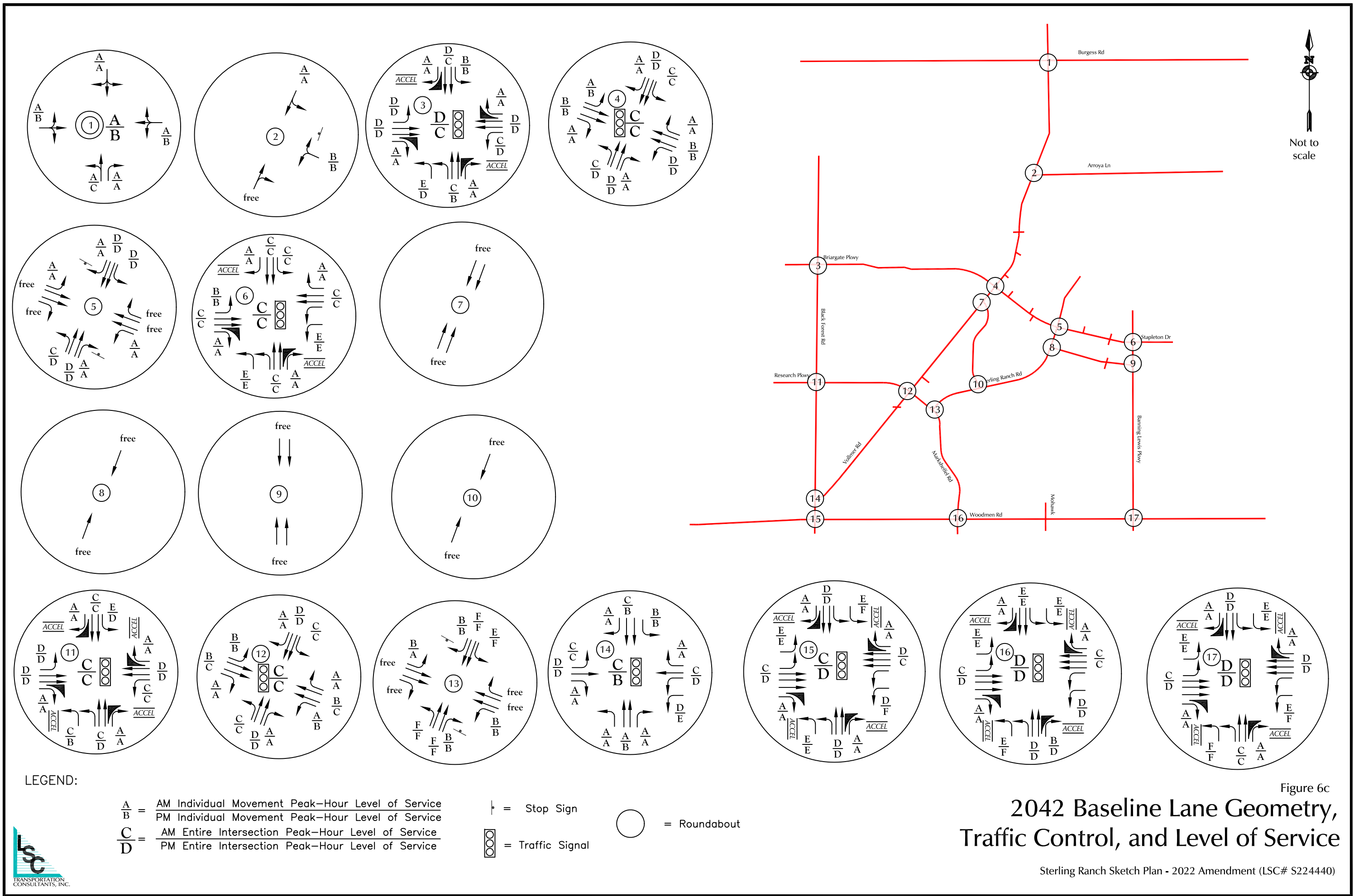


Figure 5c
Existing Lane Geometry,
Traffic Control, and Level of Service

Sterling Ranch Sketch Plan - 2022 Amendment (LSC# S224440)

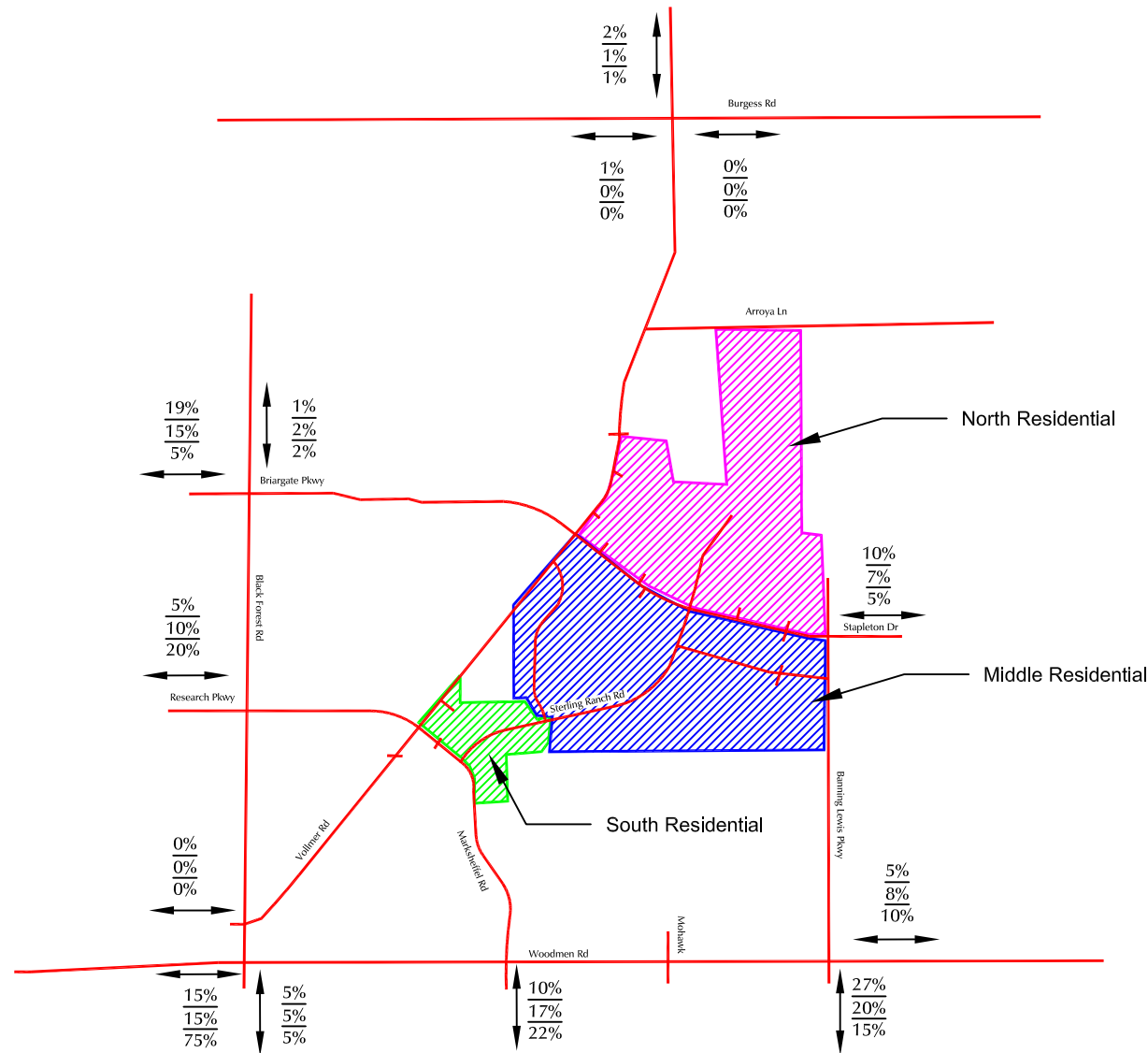








Not to
scale



LEGEND:

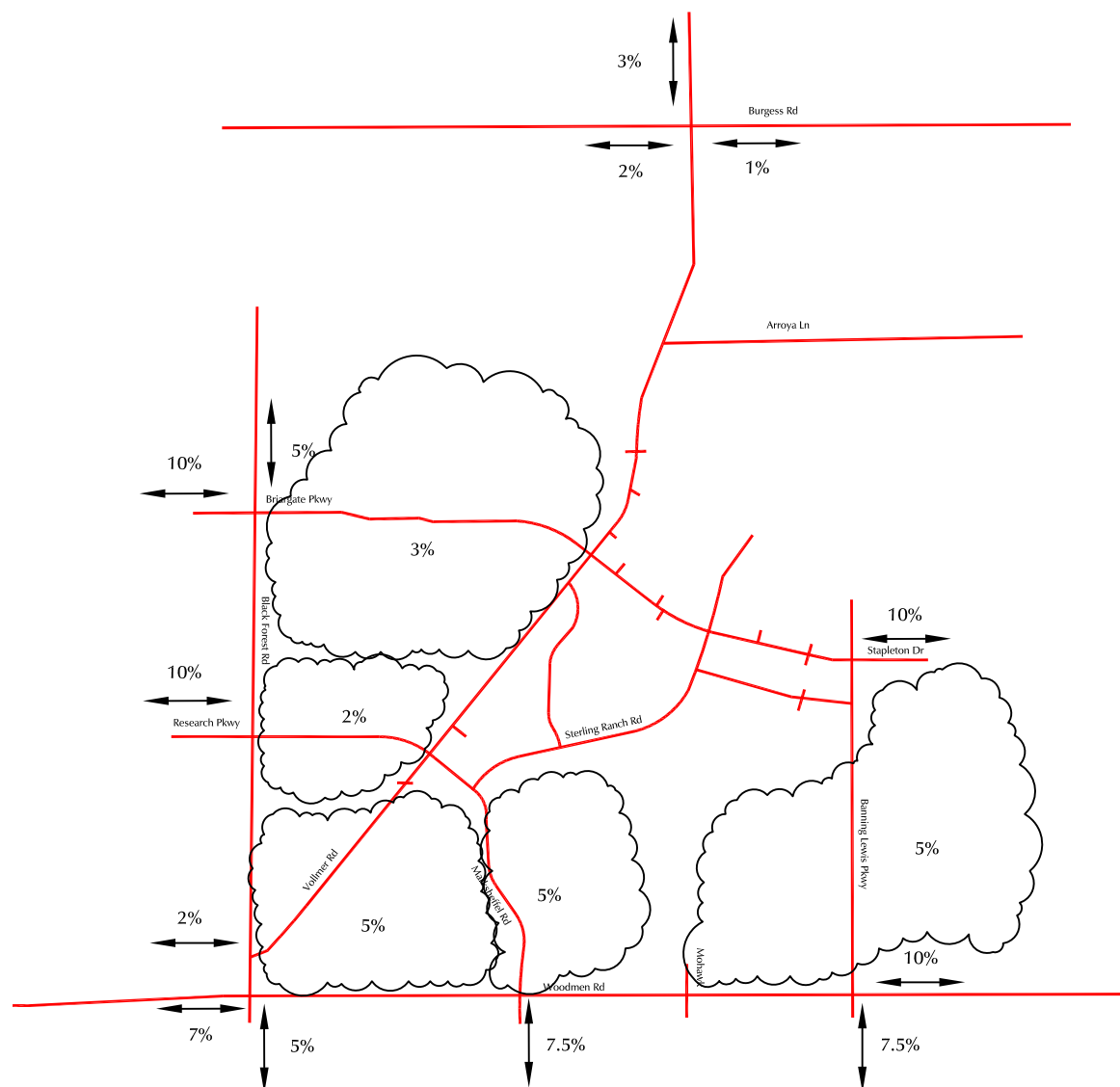


XX% = $\frac{\text{Percent of North-Residential Trips}}{\text{Percent of Middle-Residential Trips}}$
XX% = $\frac{\text{Percent of North-Residential Trips}}{\text{Percent of South-Residential Trips}}$

Buildout Long-Term Directional Distribution of Residential-Generated Traffic

Figure 7

Sterling Ranch Sketch Plan - 2022 Amendment (LSC# S224440)



Not to scale

LEGEND: \longleftrightarrow XX% = Percent of Non-Residential Trips

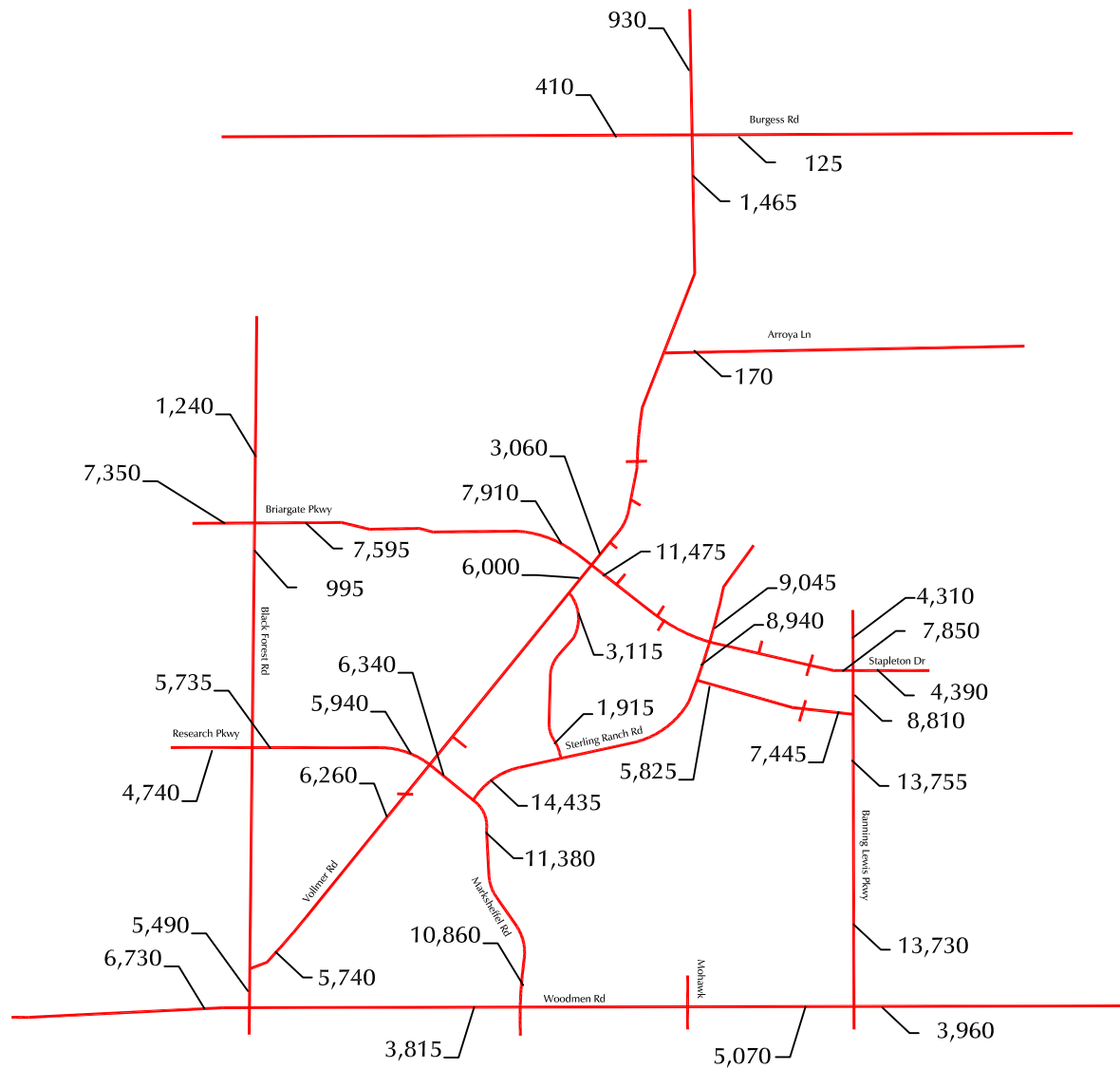
Buildout Long-Term Directional Distribution of Non-Residential-Generated Traffic

Figure 8

Sterling Ranch Sketch Plan - 2022 Amendment (LSC# S224440)



Not to
scale



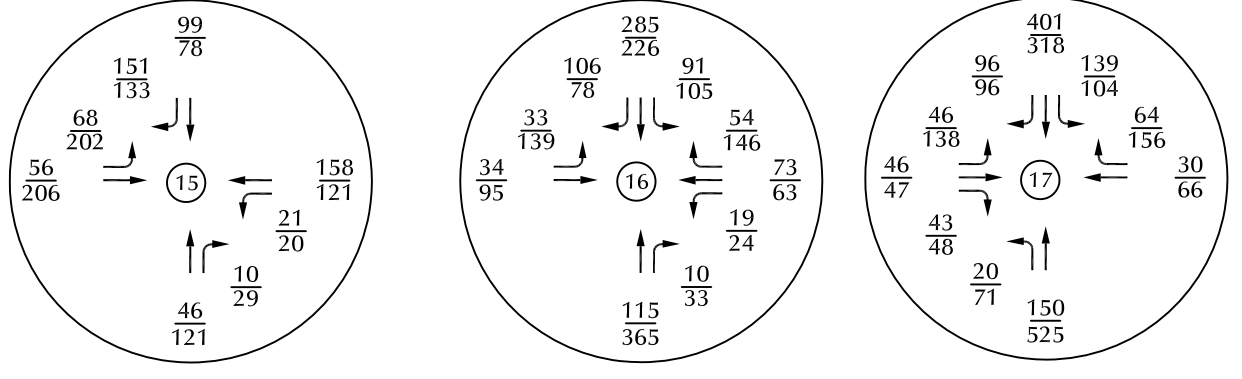
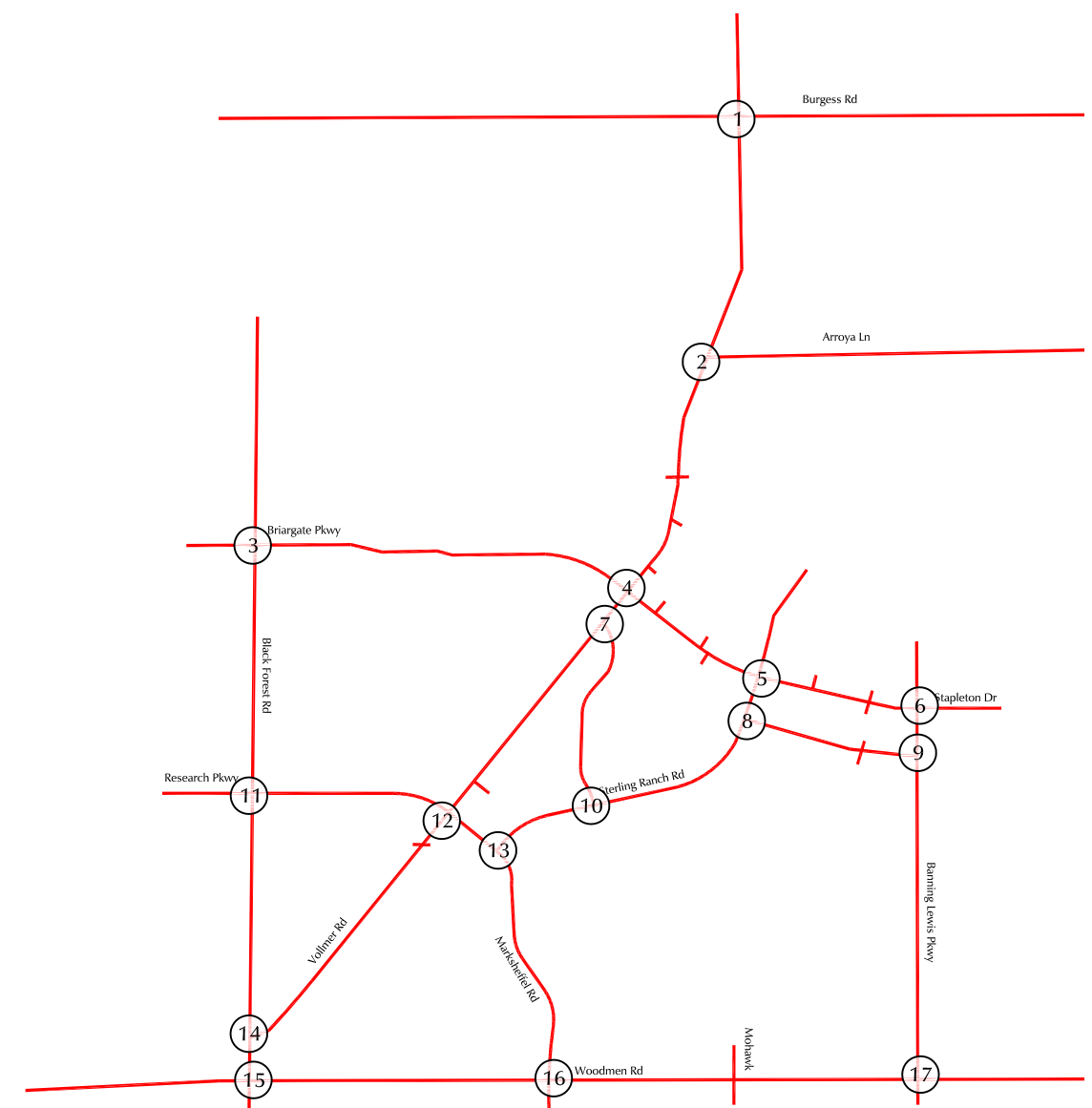
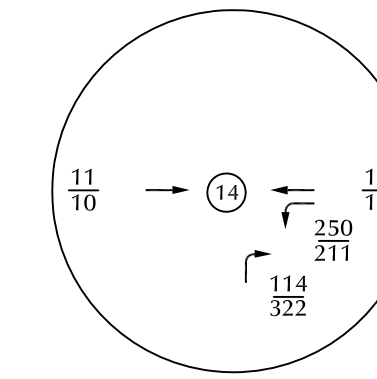
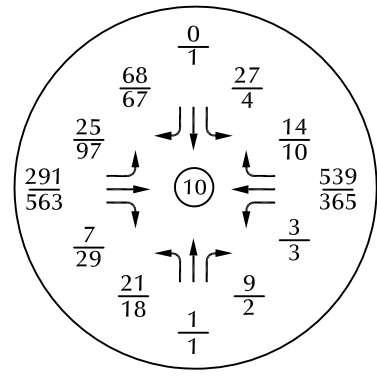
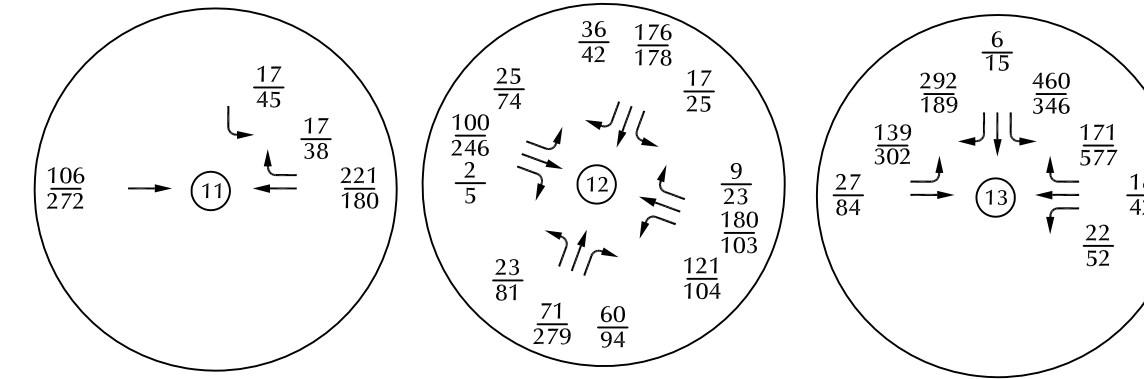
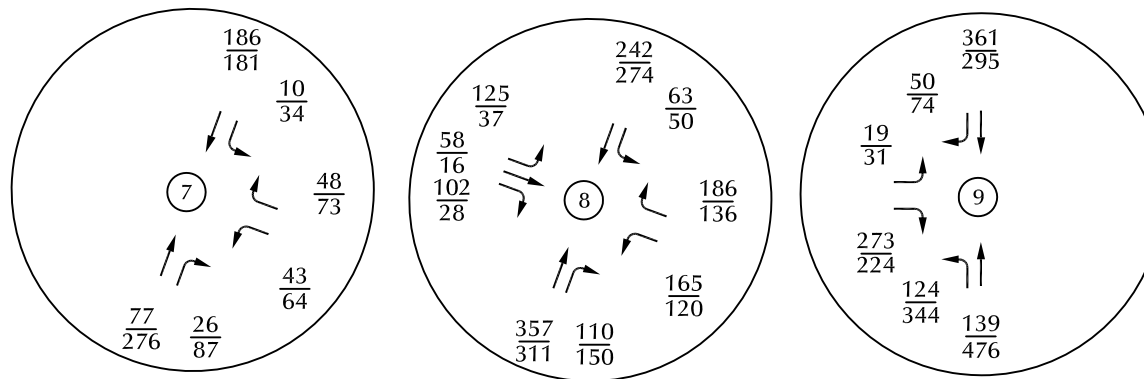
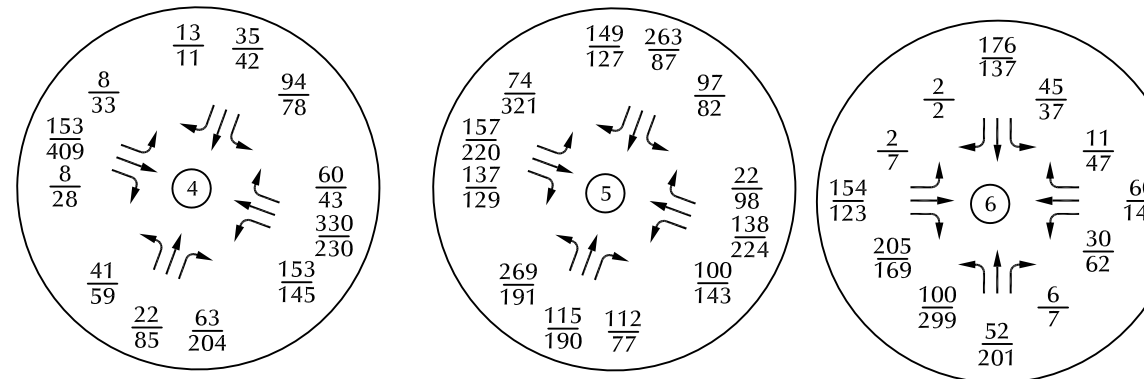
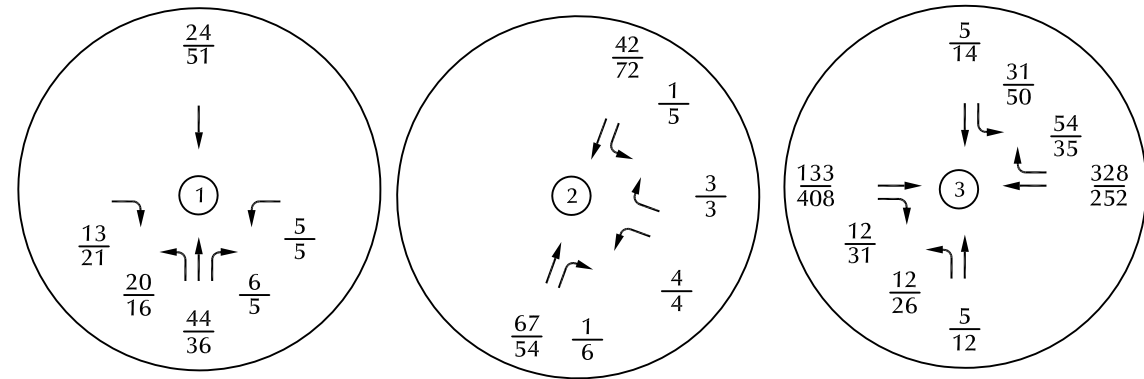
LEGEND:

XXX = Average Weekday Traffic (AWT)(vehicles per day)

Site-Generated Average Weekday Traffic

Sterling Ranch Sketch Plan - 2022 Amendment (LSC# S224440)

Figure 9a

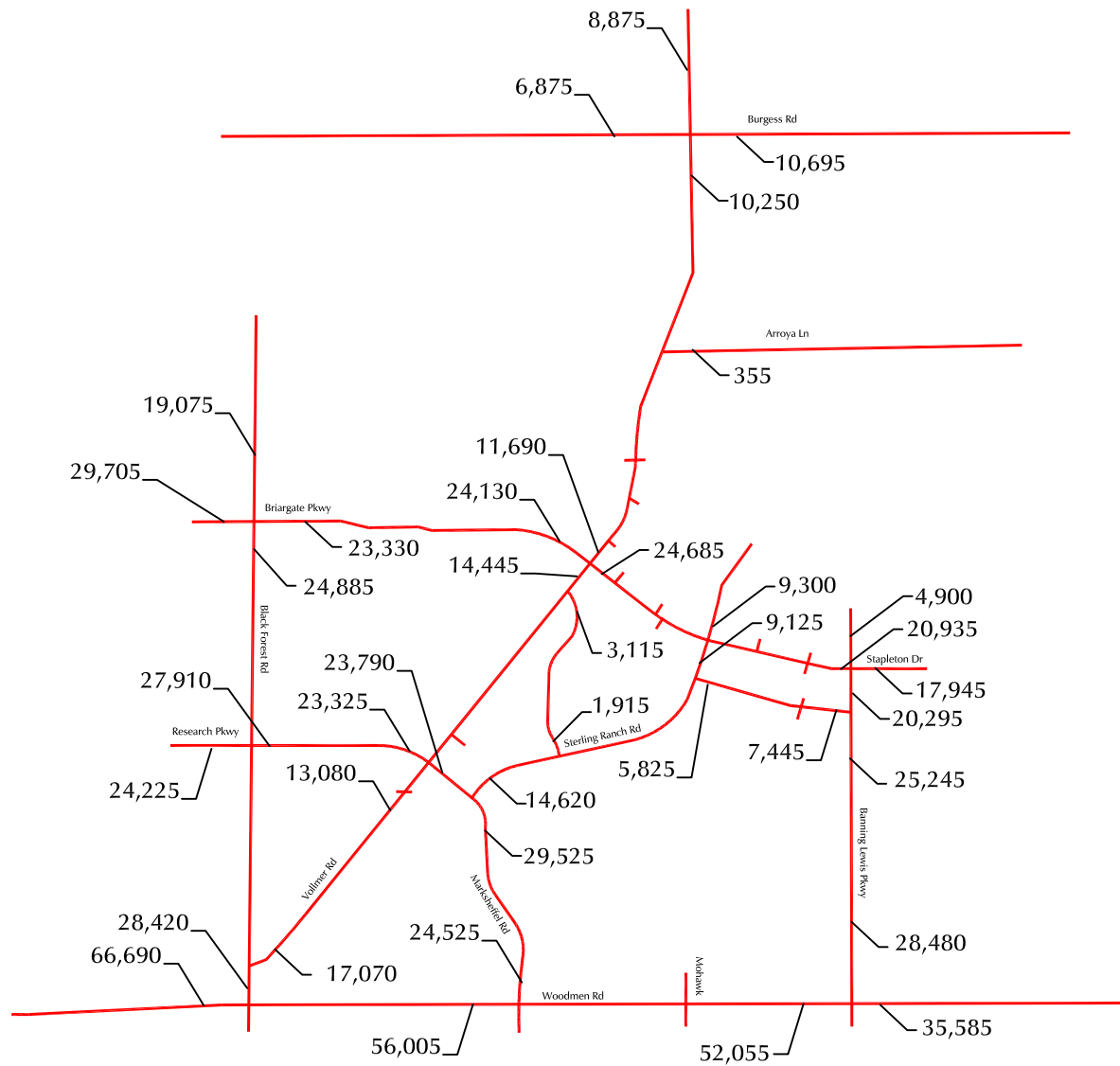


LEGEND: $\frac{XX}{XX} = \frac{\text{AM Peak-Hour Traffic (veh/hr)}}{\text{PM Peak-Hour Traffic (veh/hr)}}$

Figure 9b
Site-Generated Peak-Hour Traffic
 Sterling Ranch Sketch Plan - 2022 Amendment (LSC# S224440)



Not to
scale

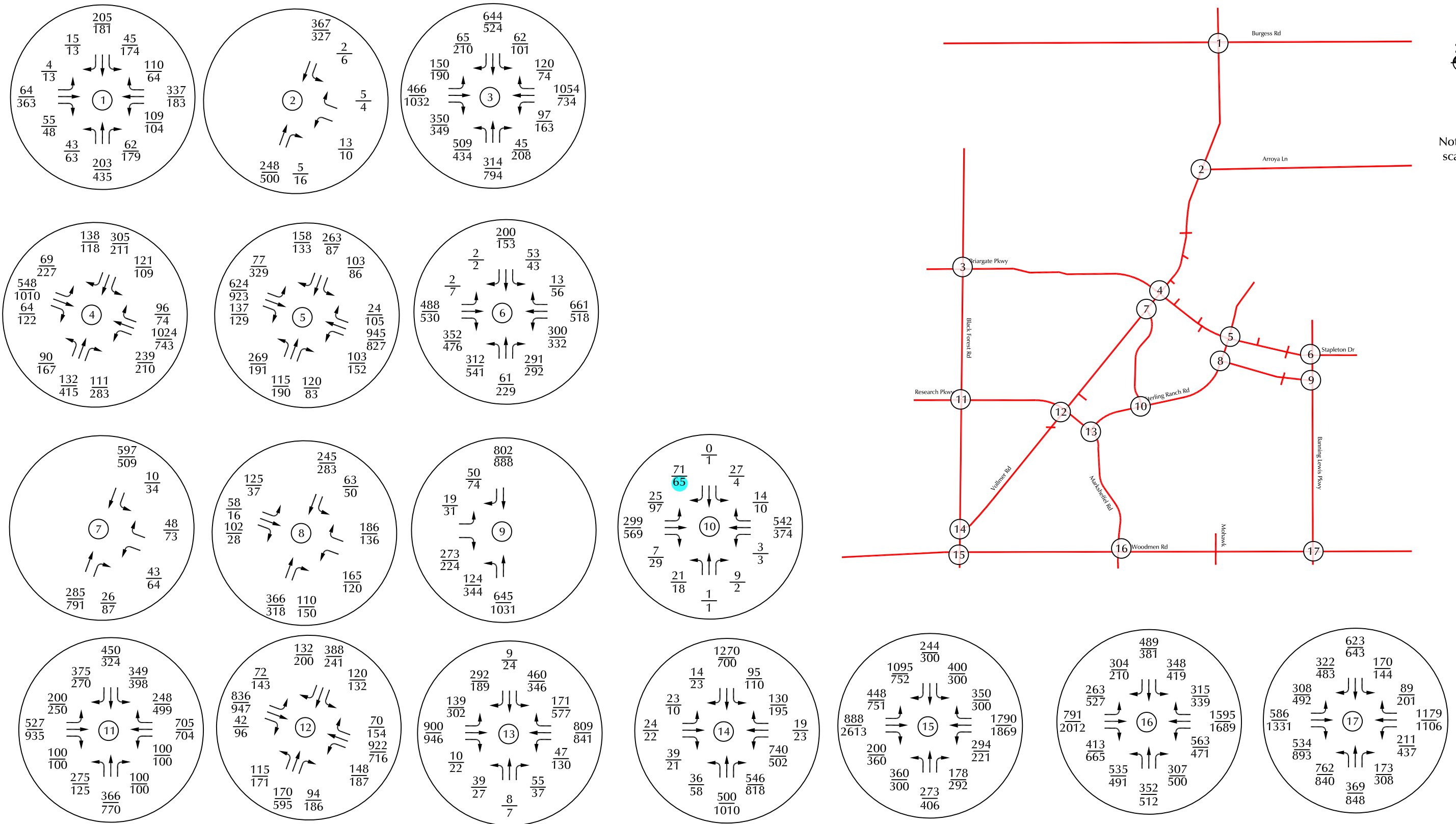


LEGEND:

XXX = Average Weekday Traffic (AWT)(vehicles per day)

2042 Total Average Weekday Traffic

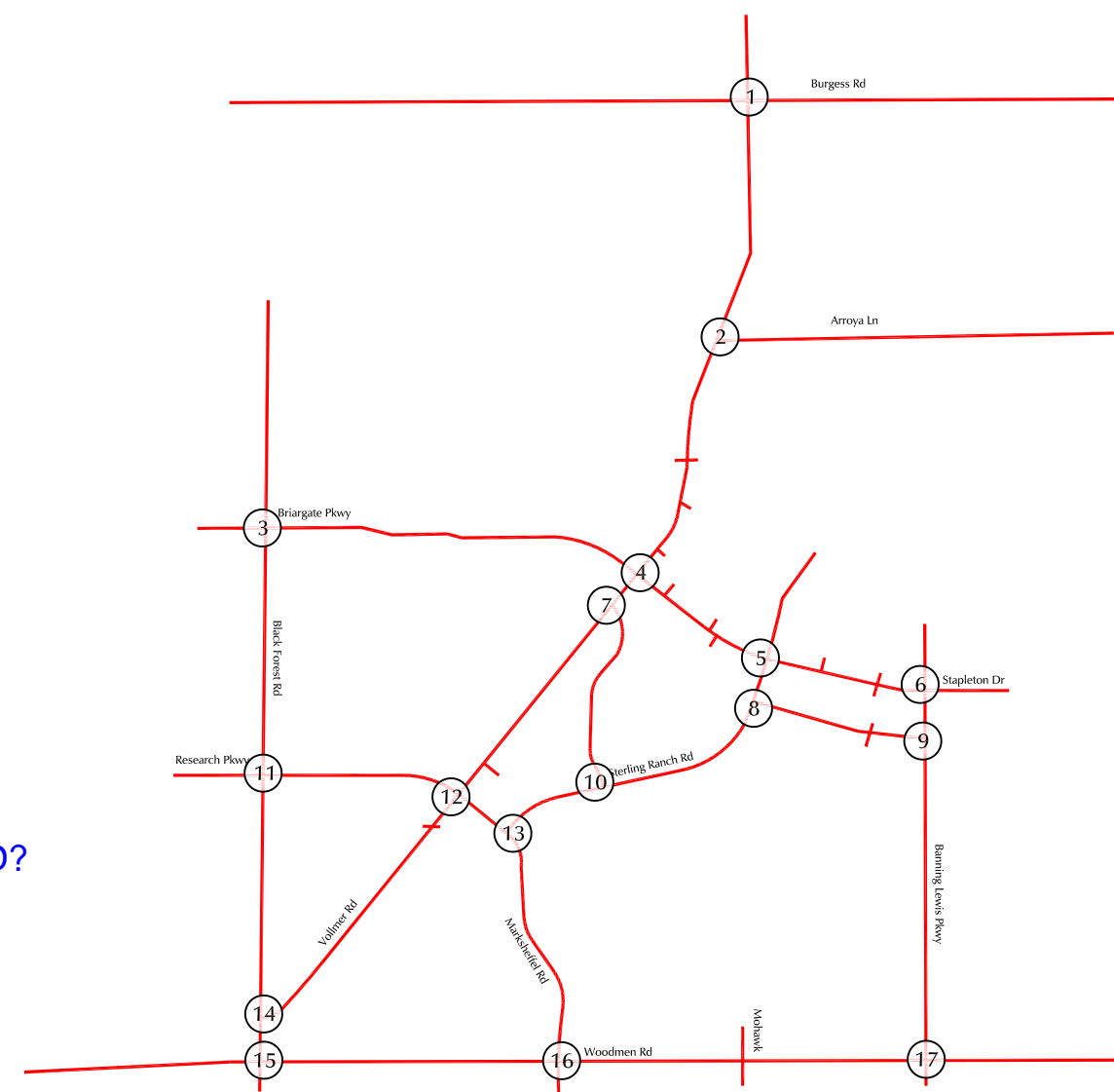
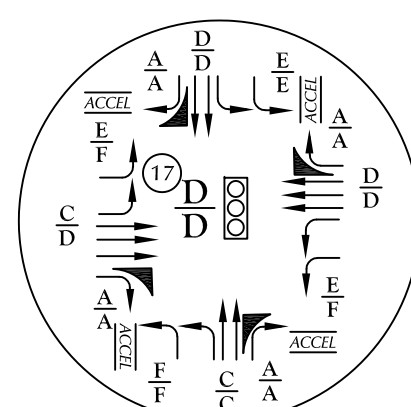
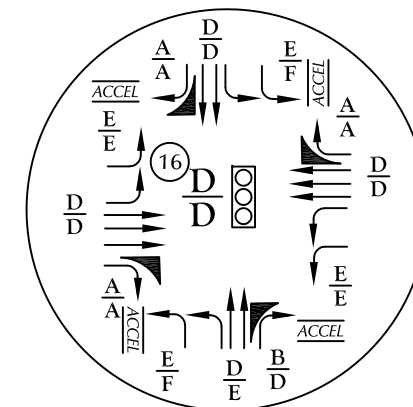
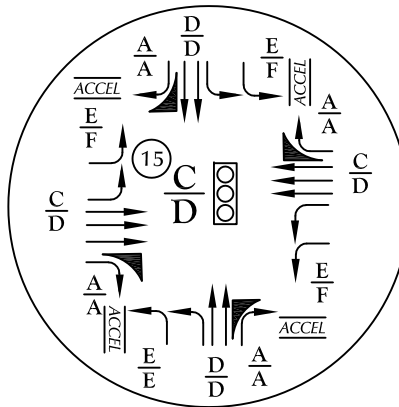
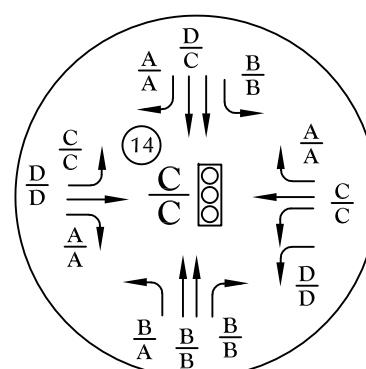
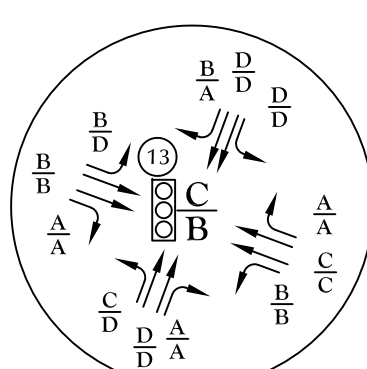
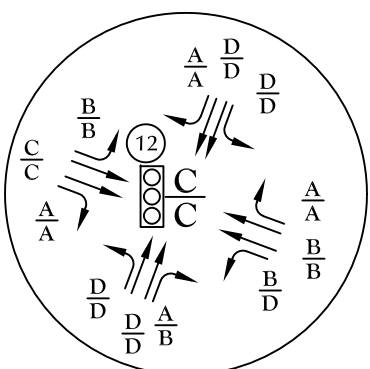
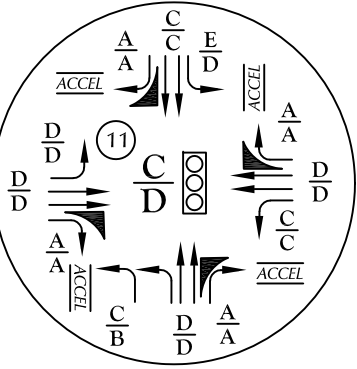
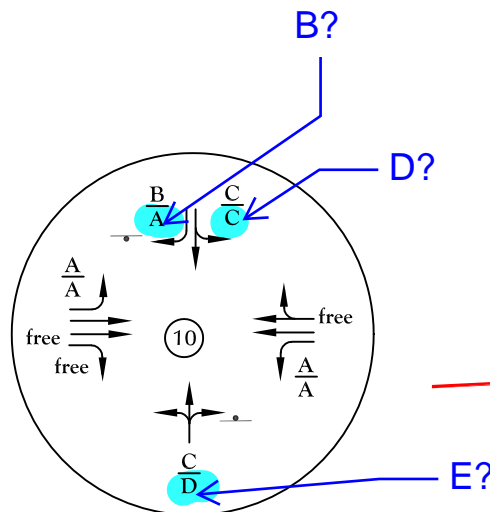
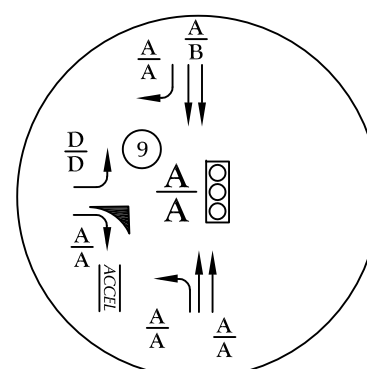
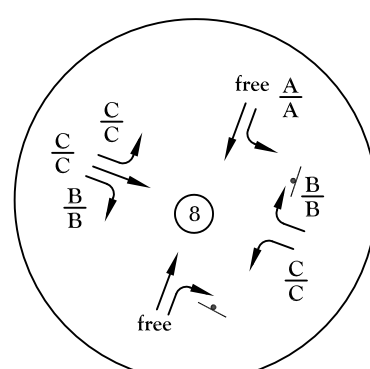
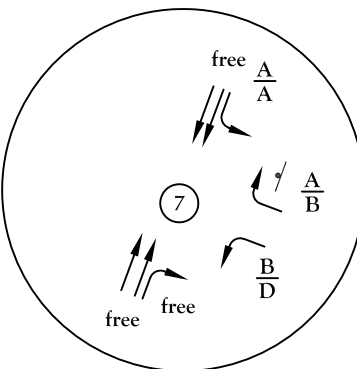
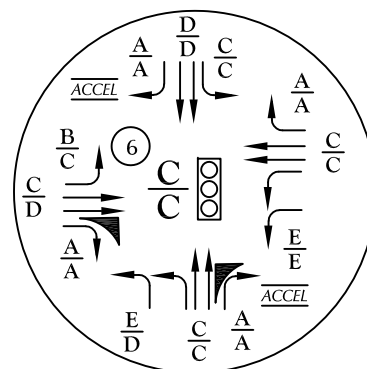
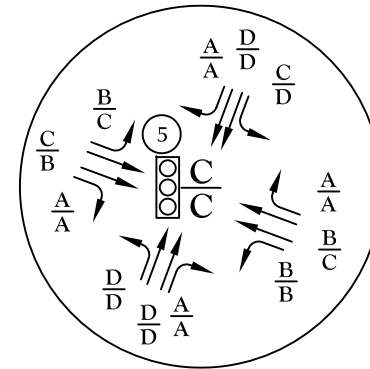
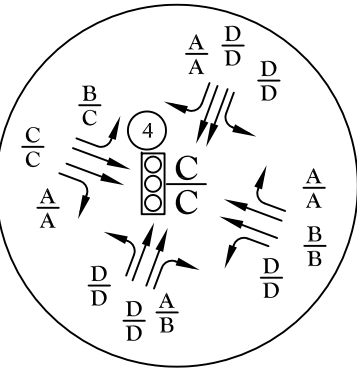
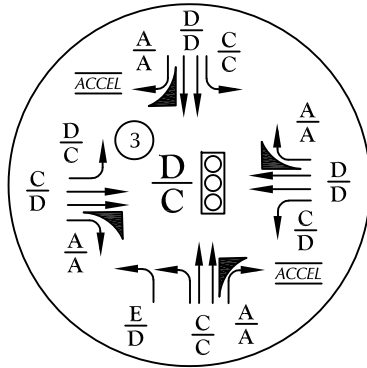
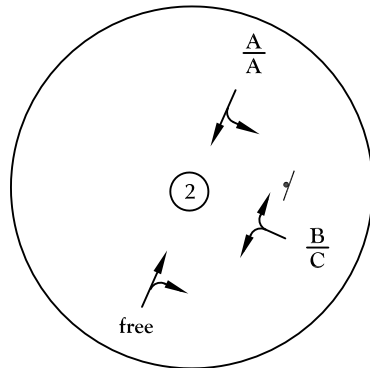
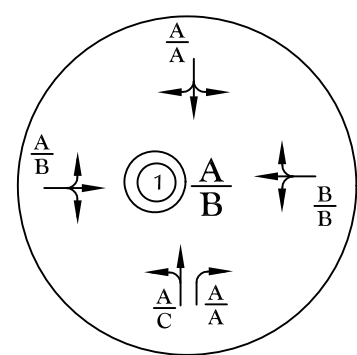
Sterling Ranch Sketch Plan - 2022 Amendment (LSC# S224440)



LEGEND: $\frac{XX}{XX} = \frac{\text{AM Peak-Hour Traffic (veh/hr)}}{\text{PM Peak-Hour Traffic (veh/hr)}}$



Figure 10b
2042 Total Peak-Hour Traffic
 Sterling Ranch Sketch Plan - 2022 Amendment (LSC# S224440)



LEGEND: $\frac{A}{B}$ = AM Individual Movement Peak-Hour Level of Service
 $\frac{C}{D}$ = PM Individual Movement Peak-Hour Level of Service
 $\frac{C}{D}$ = AM Entire Intersection Peak-Hour Level of Service
 $\frac{D}{D}$ = PM Entire Intersection Peak-Hour Level of Service

= Stop Sign
 = Traffic Signal
 = Roundabout

Figure 10c
**2042 Total Lane Geometry,
 Traffic Control, and Level of Service**

Sterling Ranch Sketch Plan - 2022 Amendment (LSC# S224440)



Not to
scale

LEGEND:

$\frac{XX,XXX}{XX,XXX}$ = $\frac{\text{Projected Average Daily Traffic}}{\text{Design Average Daily Traffic}}$

— 6-lane urban expressway

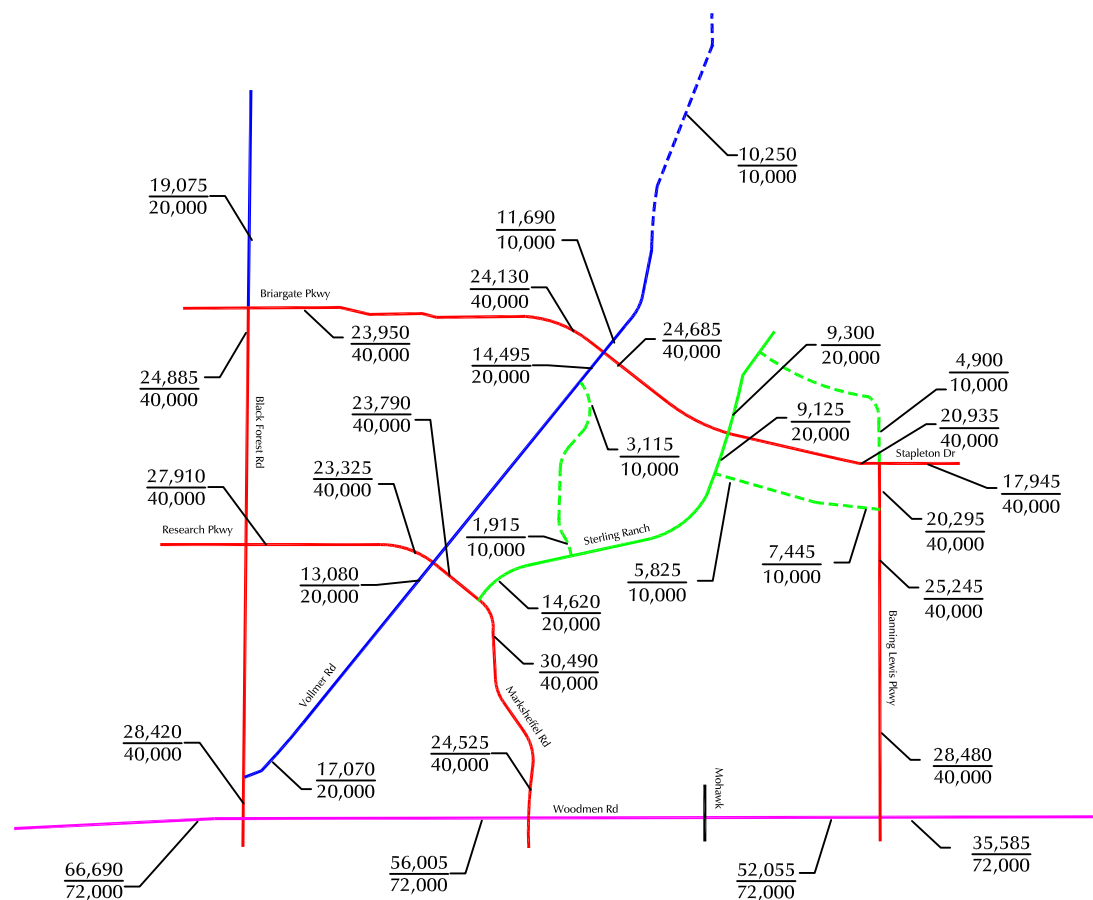
— 4-lane urban principal
arterial

— 4-lane urban minor
arterial

- - - 2-lane rural minor arterial

— urban non-residential
collector

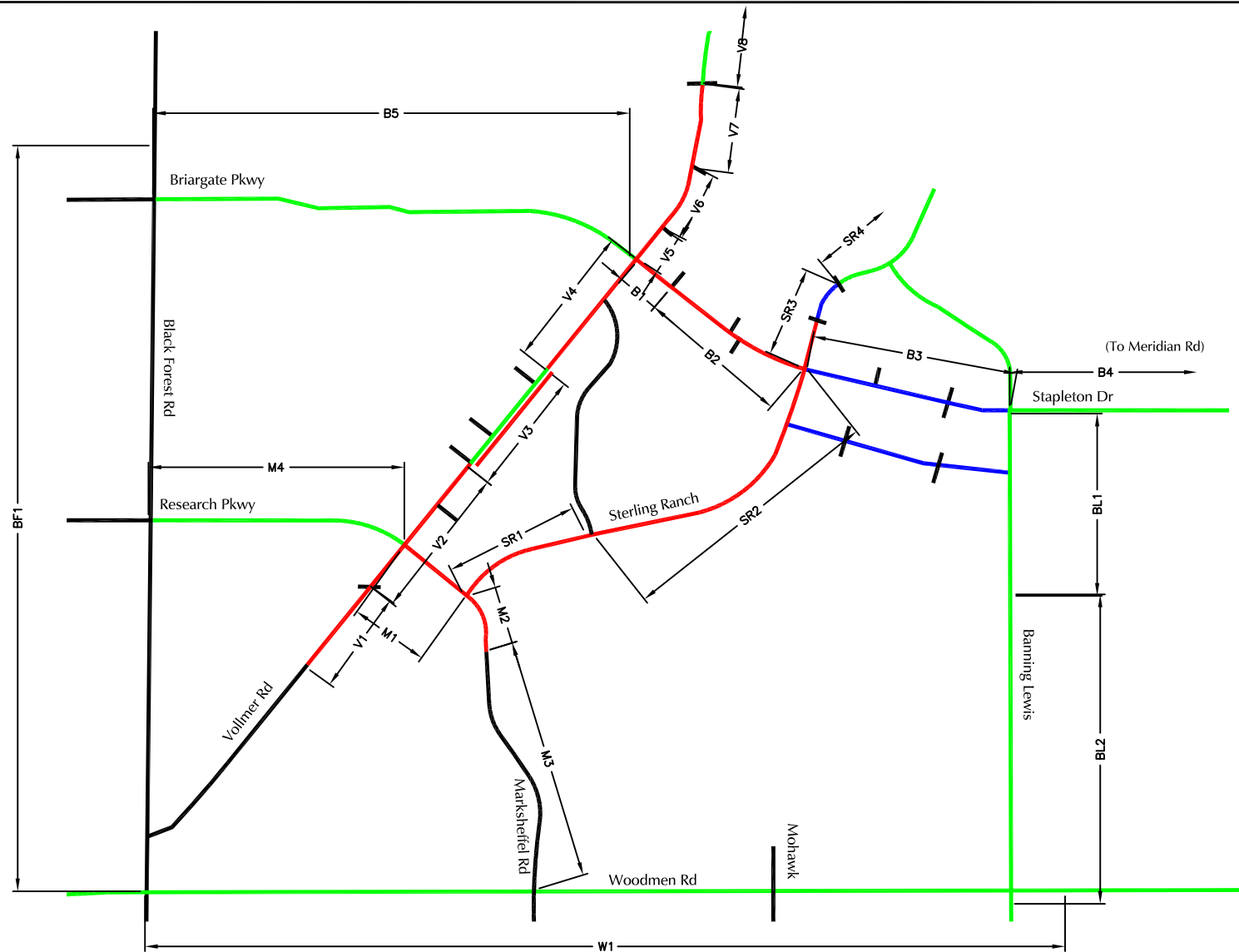
- - - urban residential
collector



Proposed Roadway Functional Classification

Sterling Ranch Sketch Plan - 2022 Amendment (LSC# S224440)

Figure 11



V1, B4, SR3, etc - Segment Identifier*

- Short-Term
- Intermediate-Term
- Long-Term

*See Table 4 for recommended roadway segment improvements for each segment.

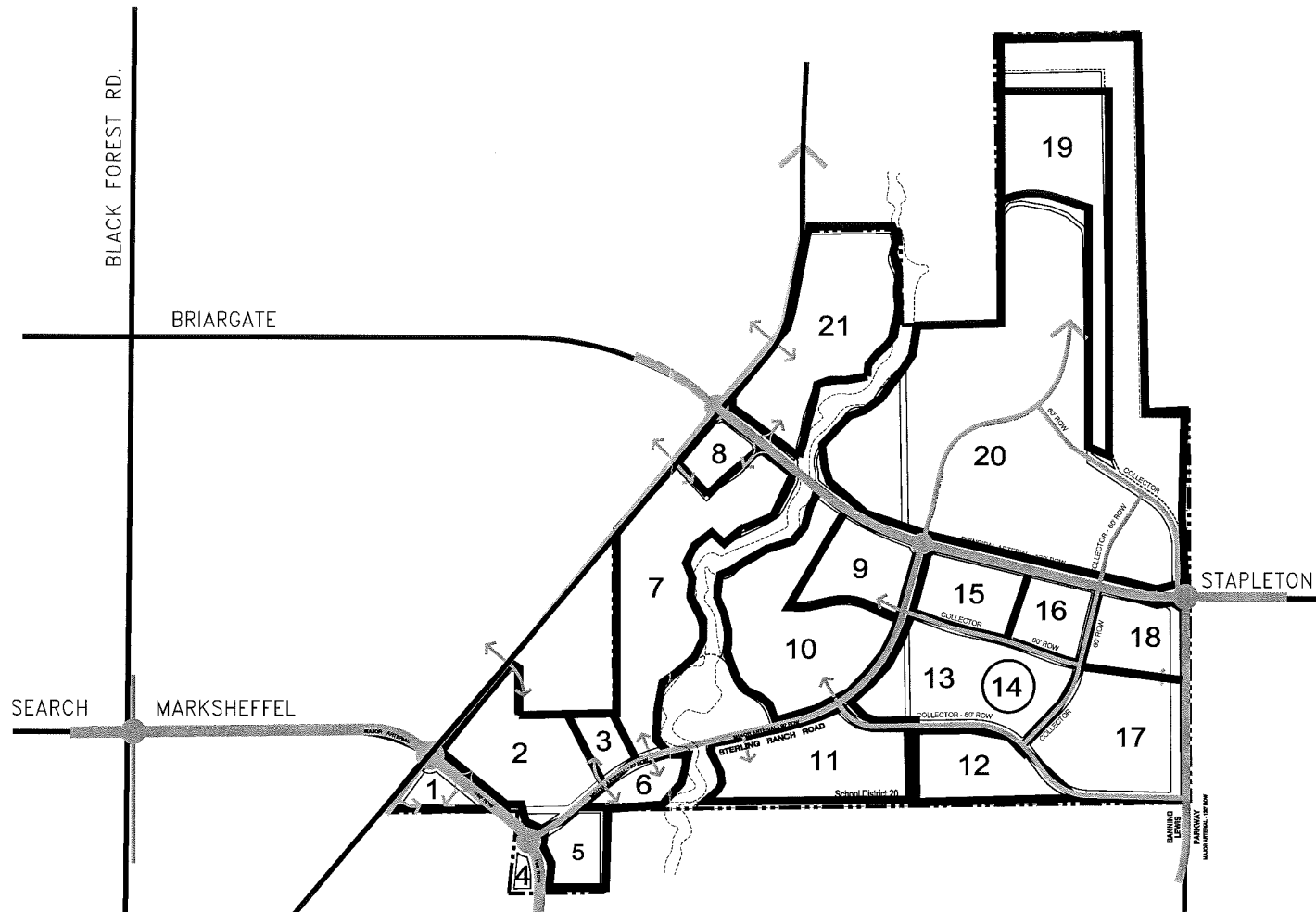
Roadway Improvement Segments*

Sterling Ranch Sketch Plan - 2022 Amendment (LSC# S224440)

Figure 12

2008 TIS TAZ Map





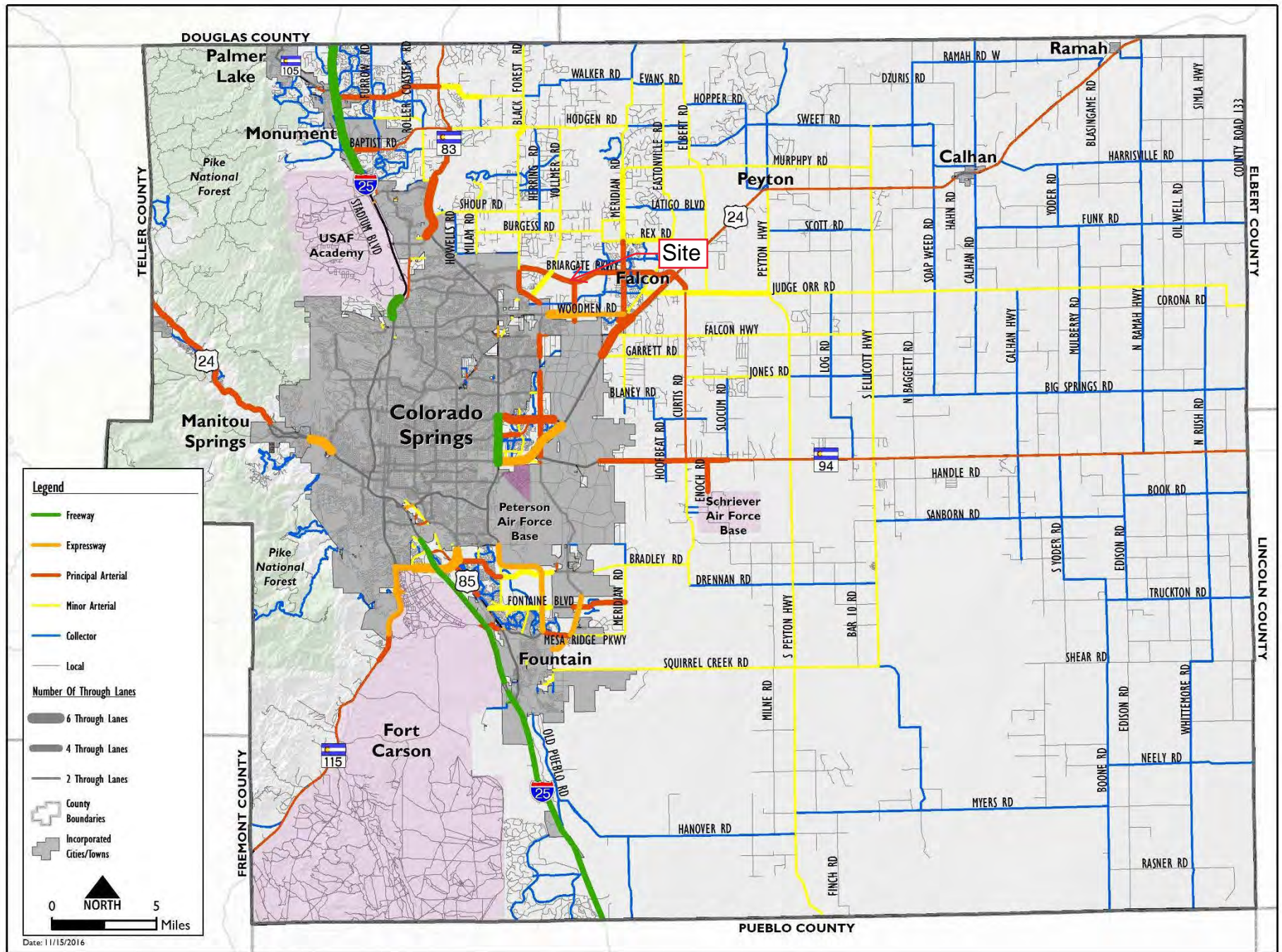
Traffic Analysis Zones
Sterling Ranch



Figure 3
LSC # 074230

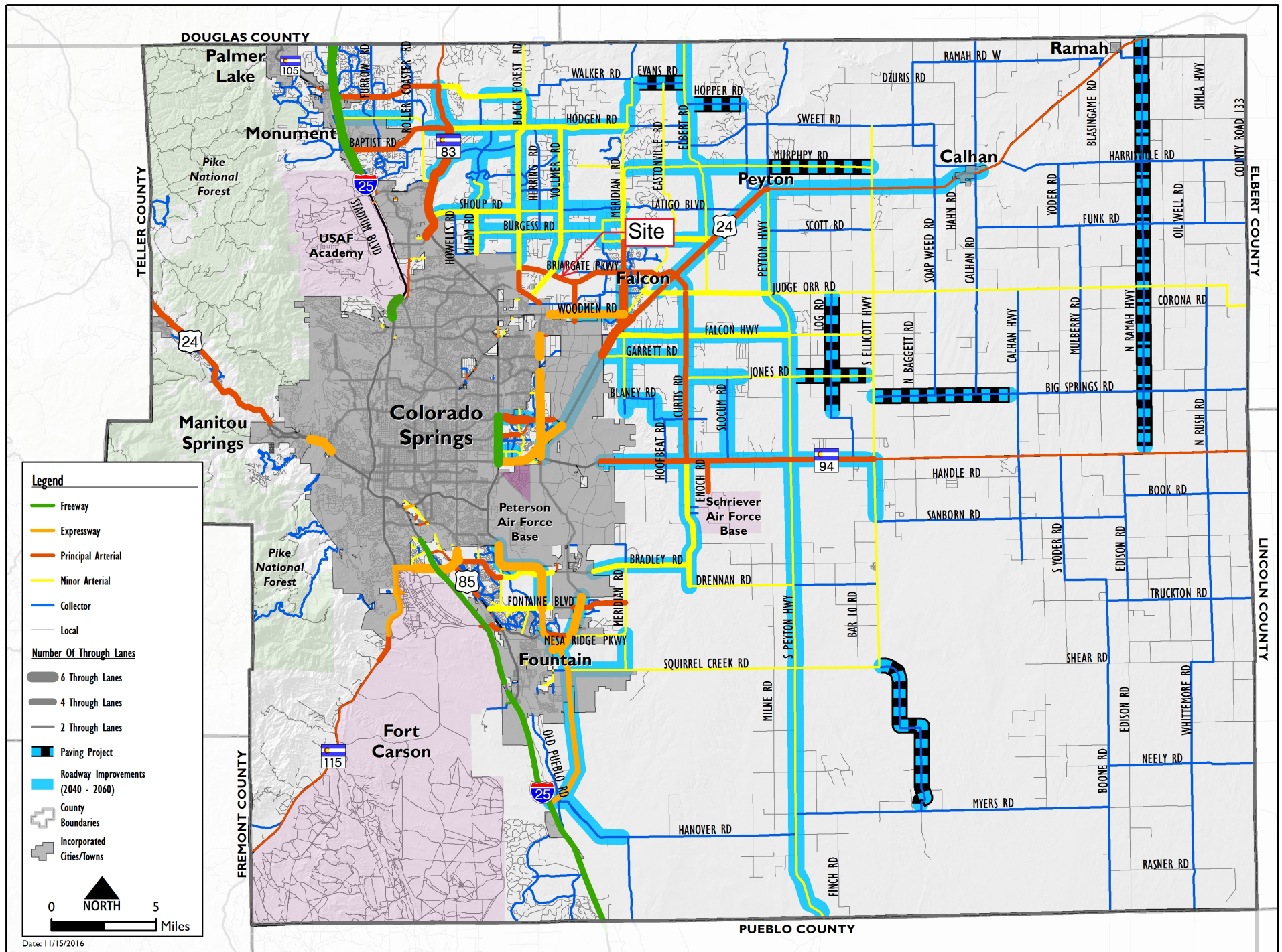
MTCP Maps

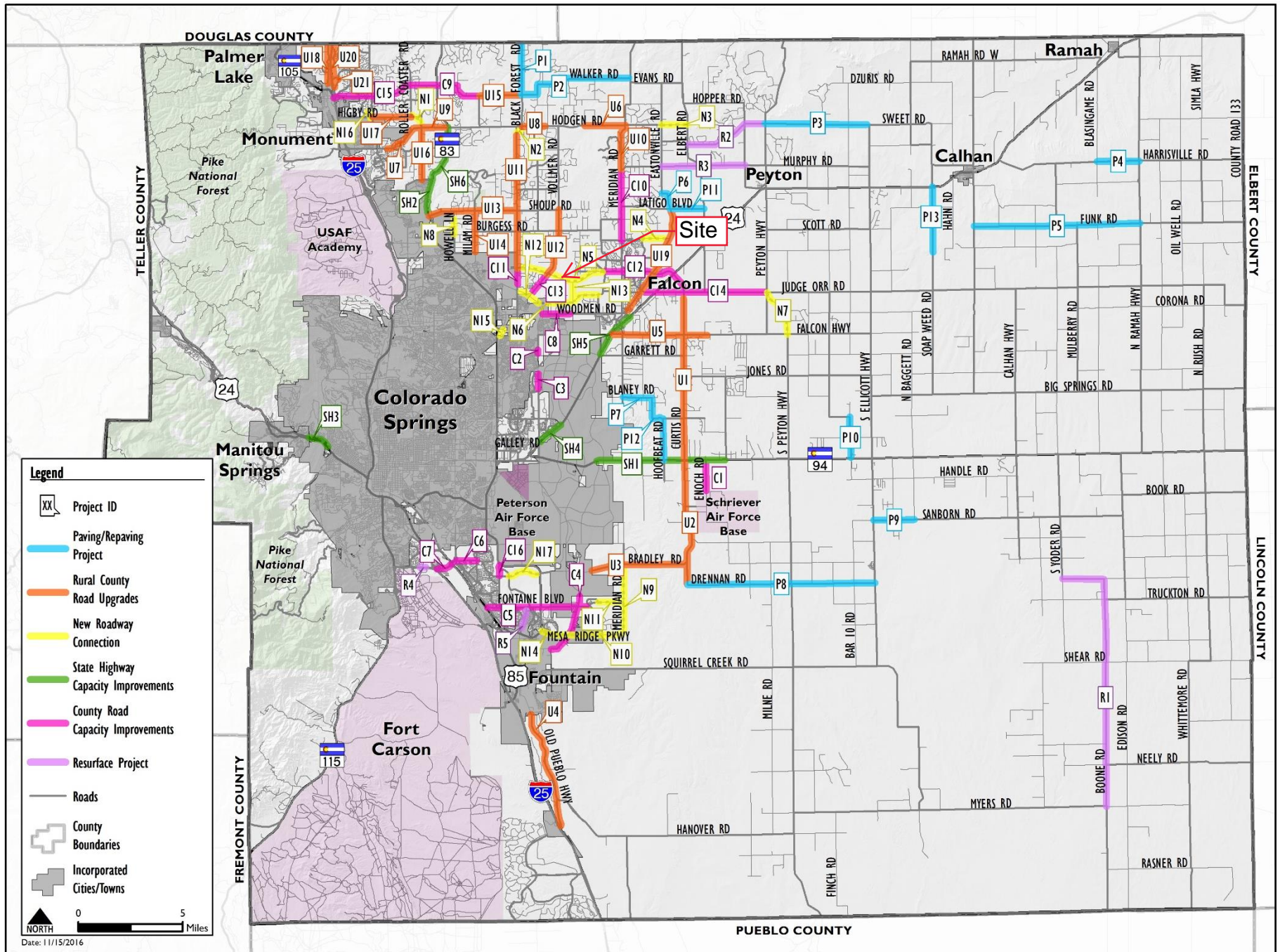
Replace Appendix Figure 2, add "Conceptual" in the title



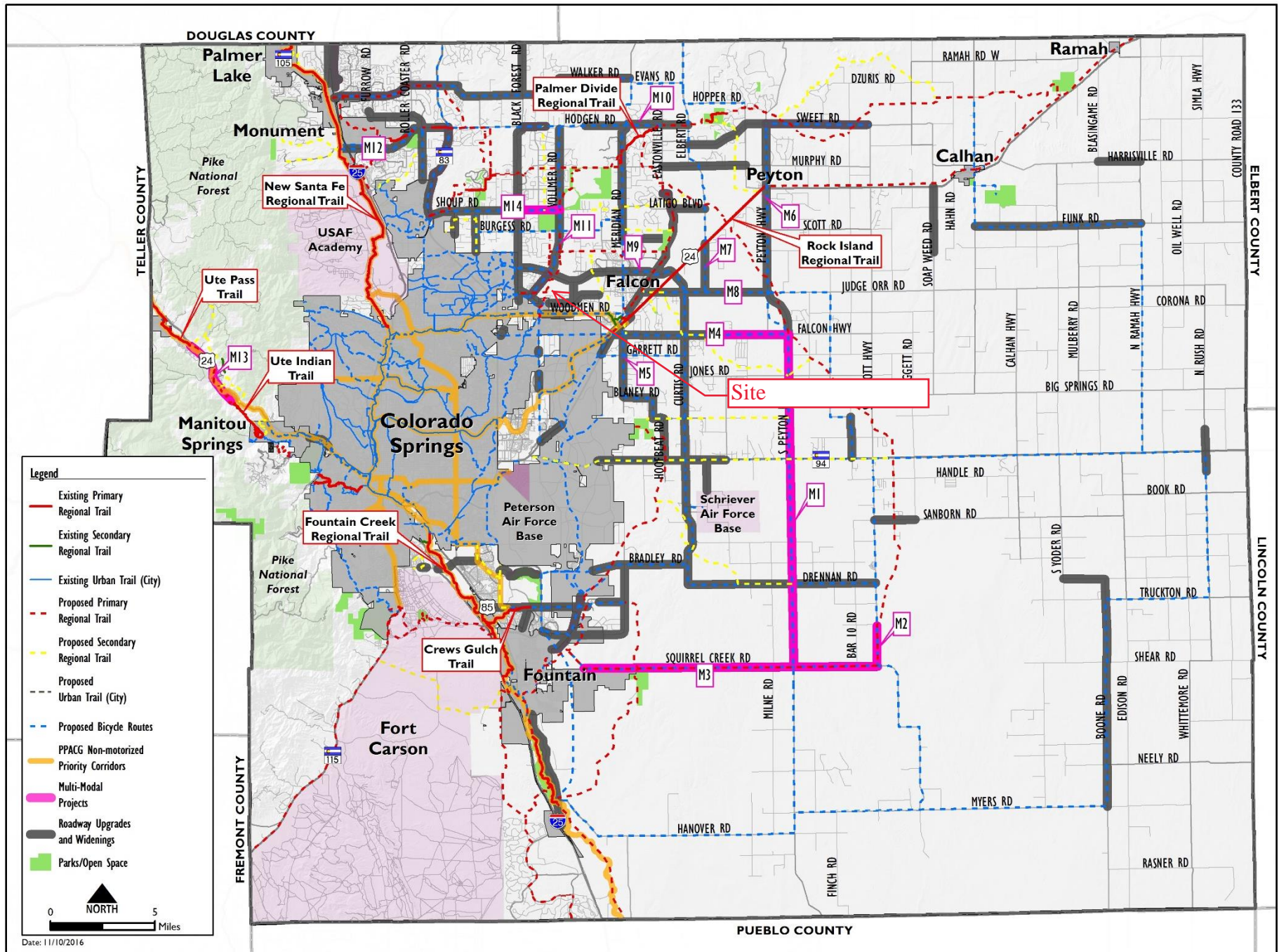
Map 14: 2040 Roadway Plan (Classification and Lanes)

Map 17: 2060 Corridor Preservation





Map 13: Roadway Improvement Projects



Map 15: Bicycle and Pedestrian Network and Improvements

Appendix Table 1
Area Traffic Impact Studies
Sterling Ranch Sketch Plan Amendment

Study	PCD File No ⁽¹⁾	Consultant	Date
Sterling Ranch Reports			
Sterling Ranch Updated Traffic Impact Analysis	SKP07007	LSC Transportation Consultants, Inc	June 5, 2008
Sterling Ranch Phase 1 Traffic Impact Study	P151	LSC Transportation Consultants, Inc	March 16, 2015
Sterling Ranch Phases 1-3 Transportation Memorandum	SP1415	LSC Transportation Consultants, Inc	October 2, 2017
Branding Iron at Sterling Ranch Filing No. 1 and Homestead at Sterling Ranch Filing No. 1 Transportation	SF1724 SF1725	LSC Transportation Consultants, Inc	December 19, 2017
Sterling Ranch Filing No. 2 Transportation Memorandum	SF1820	LSC Transportation Consultants, Inc	April 3, 2018
Sterling Ranch Phase 2 Preliminary Plan Traffic Impact Study	SP203	LSC Transportation Consultants, Inc	December 20, 2018
Homestead at Sterling Ranch Filing No. 2 Transportation Memorandum	SF194	LSC Transportation Consultants, Inc	March 3, 2020
Branding Iron at Sterling Ranch Filing No. 2 Transportation Memorandum	SF1918	LSC Transportation Consultants, Inc	May 6, 2020
Sterling Ranch Filing No. 2 and Phase 2 Traffic Impact Study	SF2015 SP191	LSC Transportation Consultants, Inc	June 23, 2021
Sterling Ranch Filing No. 3 Transportation Memorandum	SF2132	LSC Transportation Consultants, Inc	April 19, 2022
Copper Chase at Sterling Ranch Transportation Memorandum	PUDSP222	LSC Transportation Consultants, Inc	December 14, 2021
Homestead North Phase 1 Updated Transportation Memorandum	SP208	LSC Transportation Consultants, Inc	January 11, 2022
Homestead North Filing No. 1 Traffic Technical Memorandum	SF2213	LSC Transportation Consultants, Inc	February 2, 2022
Homestead North Filing No. 2 Traffic Technical Memorandum	SF2218	LSC Transportation Consultants, Inc	April 15, 2022
Homestead North Filing 3 Traffic Impact Study	SF2229	LSC Transportation Consultants, Inc	June 17, 2022
Foursquare at Sterling Ranch East Preliminary Plan/Traffic Generation Analysis	PUDSP227	LSC Transportation Consultants, Inc	November 22, 2022
The Villages at Sterling Ranch East Preliminary Plan/Traffic Generation Analysis	PUDSP226	SM Rocha, LLC	July 1, 2022
Sterling Ranch East - Phase 1 Rezoning & Preliminary Plan Traffic Impact Study	SP224	LSC Transportation Consultants, Inc	November 17, 2022
Retreat at TimberRidge Reports			
The Retreat at TimberRidge Traffic Impact Analysis	PUD173	LSC Transportation Consultants, Inc	January 25, 2018
The Retreat at TimberRidge Preliminary Plan Traffic Technical Memorandum	SP182	LSC Transportation Consultants, Inc	June 29, 2018
The Retreat at TimberRidge Filing No. 1 Traffic Technical Memorandum	SF199	LSC Transportation Consultants, Inc	April 3, 2020
The Retreat at TimberRidge Filing No. 2 Updated Traffic Technical Memorandum	SF2121	LSC Transportation Consultants, Inc	October 4, 2021
The Retreat at TimberRidge Filing No. 3 Traffic Technical Memorandum		LSC Transportation Consultants, Inc	July 1, 2022
Other Area Reports			
Wolf Ranch School Site Traffic Impact Study	OAR1720	Matrix Design Group, Inc.	5-May-17
The Ranch Sketch Plan Traffic Impact Analysis	SKP186	LSC Transportation Consultants, Inc	July 9, 2019
Lodge III Traffic Impact Study	OAR	LSC Transportation Consultants, Inc	December 13, 2019
Continental 613 Traffic Impact Study	OAR2177	LSC Transportation Consultants, Inc	July 16, 2021
Solace at Black Forest Traffic Impact and Access Analysis	OAR2134	LSC Transportation Consultants, Inc	August 13, 2021
Traffic Impact Study Addendum for Percheron	OAR2173	SM Rocha, LLC	October, 2021
Woodmen East Commercial Center Traffic Impact Analysis	OAR2191	LSC Transportation Consultants, Inc	December 8, 2021
Traffic Impact Study for Jaynes Property	SKP225	SM Rocha, LLC	May, 2022
Traffic Impact Study for Rhetoric Site	P2216	SM Rocha, LLC	June, 2022
Briargate-Stapleton Corridor Study (DRAFT)	briargate-stapleton.com	Wilson & Company	December 9, 2021
Notes:			
(1) Follow the links listed below to obtain the most recent version of each listed study. To obtain a copy of the version of each study used in preparing this report please contact LSC Transportation Consultants,			
Source: LSC Transportation Consultants, Inc.			

Appendix Table 2
Sterling Ranch Sketch Plan
Trip Generation Estimate by Traffic Analysis Zone

Traffic Analysis Zone (See Figure 2 for boundaries)	Name	Land Use Code	Land Use Description	Trip Generation Units Quantity Unit	Trip Generation Rates ⁽¹⁾					Total Trips					
					Average Weekday Traffic	Morning Peak Hour		Afternoon Peak Hour		Average Weekday Traffic	Morning Peak Hour		Afternoon Peak Hour		
						In	Out	In	Out		In	Out	In	Out	
Approved/Existing Sterling Ranch Phase 1															
1	Branding Iron Fil No. 1	210	Single Family Detached Housing	51 DU ⁽²⁾	9.43	0.18	0.52	0.59	0.35	481	9	26	30	18	
2	Homestead Fil 1	210	Single Family Detached Housing	72 DU	9.43	0.18	0.52	0.59	0.35	679	13	37	43	25	
3	Homestead Fil 2	210	Single Family Detached Housing	104 DU	9.43	0.18	0.52	0.59	0.35	981	19	54	62	36	
4	Branding Iron Fil No. 2	210	Single Family Detached Housing	75 DU	9.43	0.18	0.52	0.59	0.35	707	14	39	44	26	
6	Sterling Ranch Filing 2	210	Single Family Detached Housing	38 DU	9.43	0.18	0.52	0.59	0.35	358	7	20	23	13	
Future Sterling Ranch Phase 1															
16	Sterling Ranch Future Filing	210	Single Family Detached Housing	82 DU	9.43	0.18	0.52	0.59	0.35	773	15	42	49	29	
105	Mixed Use 14 Ac (SE Briargate/Vollmer)	821	Shopping Plaza	51 KSF ⁽³⁾	67.52	1.07	0.66	2.54	2.65	3,444	55	34	130	135	
		220	Multifamily Housing Low-Rise	233 DU	6.74	0.10	0.30	0.32	0.19	1,570	22	71	75	44	
107	Mixed Use 11 Acres (South of Marksheffel)	821	Shopping Plaza	120 KSF	67.52	1.07	0.66	2.54	2.65	8,102	129	79	305	318	
Sterling Ranch Phase 2															
10	Sterling Ranch Fil 4 (north)	210	Single Family Detached Housing	61 DU	9.43	0.18	0.52	0.59	0.35	575	11	32	36	21	
	Sterling Ranch Fil 4 (south)	210	Single Family Detached Housing	98 DU	9.43	0.18	0.52	0.59	0.35	924	18	51	58	34	
7&8	Sterling Ranch Fil 3	210	Single Family Detached Housing	63 DU	9.43	0.18	0.52	0.59	0.35	594	11	33	37	22	
5	Copper Chase	210	Single Family Detached Housing	138 DU	9.43	0.18	0.52	0.59	0.35	1,301	25	71	82	48	
Homestead North															
9	Homestead North Fil 1	210	Single Family Detached Housing	73 DU	9.43	0.18	0.52	0.59	0.35	688	13	38	43	25	
11	Homestead North Fil 2	210	Single Family Detached Housing	74 DU	9.43	0.18	0.52	0.59	0.35	698	13	38	44	26	
12	Homestead North Fil 3	210	Single Family Detached Housing	77 DU	9.43	0.18	0.52	0.59	0.35	726	14	40	46	27	
Sterling Ranch East Phase 1															
22 & 26	Sterling Ranch East Fil 1	210	Single Family Detached Housing	294 DU	9.43	0.18	0.52	0.59	0.35	2,772	54	152	174	102	
18	Sterling Ranch East Fil 2	210	Single Family Detached Housing	42 DU	9.43	0.18	0.52	0.59	0.35	396	8	22	25	15	
17, 24 & 38	Sterling Ranch East Future Filings	210	Single Family Detached Housing	187 DU	9.43	0.18	0.52	0.59	0.35	1,763	34	97	111	65	
37	Sterling Ranch East Future Filings	210	Single Family Detached Housing	238 DU	9.43	0.18	0.52	0.59	0.35	2,244	43	123	141	83	
103	K-8 School	520	Elementary School	600 Students	2.27	0.40	0.34	0.07	0.09	1,362	240	204	44	52	
		522	Middle School/Junior High School	500 Students	2.10	0.36	0.31	0.07	0.08	1,050	181	154	36	39	
102	Elementary School	520	Elementary School	600 Students	2.27	0.40	0.34	0.07	0.09	1,362	240	204	44	52	
Future Sterling Ranch East South of Briargate															
14, 15, 20 & 21	Village at Sterling Ranch East	210	Single Family Detached Housing	100 DU	9.43	0.18	0.52	0.59	0.35	943	18	52	59	35	
33		220	Single Family Attached Housing	146 DU	7.20	0.15	0.33	0.32	0.25	1,051	22	48	47	36	
		210	Single Family Detached Housing	106 DU	9.43	0.18	0.52	0.59	0.35	1,000	19	55	63	37	
25, 27, 28, 29, 31, & 32	Sterling Ranch East Future Filings	210	Single Family Detached Housing	603 DU	9.43	0.18	0.52	0.59	0.35	5,686	110	312	357	210	
39		210	Single Family Detached Housing	18 DU	9.43	0.18	0.52	0.59	0.35	170	3	9	11	6	
104	Future Elementary School	520	Elementary School	600 Students	2.27	0.40	0.34	0.07	0.09	1,362	240	204	44	52	
		821	Shopping Plaza	80 KSF	67.52	1.07	0.66	2.54	2.65	5,402	86	53	203	212	
105	Mixed Use 14 Ac(SE Briargate/Vollmer)	220	Multifamily Housing Low-Rise	367 DU	6.74	0.10	0.30	0.32	0.19	2,474	35	112	118	69	
Future Sterling Ranch East North of Briargate															
19	Four Square at Sterling Ranch	210	Single Family Detached Housing	158 DU	9.43	0.18	0.52	0.59	0.35	1,490	29	82	94	55	
30, 34,35 & 36	Future Sterling Ranch East Filings	210	Single Family Detached Housing	871 DU	9.43	0.18	0.52	0.59	0.35	8,214	159	451	516	303	
Future Sterling Ranch East East of TimberRidge															
101	Future Sterling Ranch East Filings	210	Single Family Detached Housing	431 DU	9.43	0.18	0.52	0.59	0.35	4,064	78	223	255	150	
										Sterling Ranch	65,406	1,987	3,262	3,449	2,420

23

← Add a note that 108 is only an existing lift station

← Add a note that 108 is only an existing lift station

Notes:
(1) Source: "Trip Generation, 11th Edition, 2021" by the Institute of Transportation Engineers (ITE)
(2) DU = dwelling unit
(3) KSF = 1000 square feet of floor space

Source: LSC Transportation Consultants, Inc.

Dec-22

Source: Sterling Ranch East Phase 1 Rezoning and Preliminary Plan TIS, November 17, 2022.

Table 5 Sterling Ranch East Phase 1 Preliminary Plan Intersection Improvements				
Item #	Improvement	Trigger	Timing	Responsibility
1) Burgess Road/Vollmer Road				
1	Reconstruct as a modern one-lane roundabout	When the LOS degrades below LOS F	Existing deficiency	This intersection may be eligible intersection under the fee impact program
12) Marksheffel Road/Vollmer Road				
2	Signalization of the intersection	Once warrants are met. The decision on timing of traffic signal installation rests with El Paso County Public Works.	Anticipated by buildout of Sterling Ranch East Phase 1 Preliminary Plan	This intersection may be eligible intersection under the fee impact program
14) Marksheffel Road/Sterling Ranch Road				
3	Signalization of the intersection	Once warrants are met. The decision on timing of traffic signal installation rests with El Paso County Public Works.	Anticipated by buildout of Sterling Ranch East Phase 1 Preliminary Plan	SRMD#3
102) Briargate Parkway/Boulder City Place				
4	Construct an eastbound left-turn lane on Briargate Parkway approaching Boulder City Place. The lane should be 285' long plus a 200' taper.	eastbound left-turn volume > 10 vph	With Sterling Ranch East Phase 1 Preliminary Plan or Foursquare at Sterling Ranch	Sterling Ranch
5	Construct a westbound right-turn deceleration lane on Briargate Parkway approaching Boulder City Place. The lane should be 235' long plus a 200' taper.	westbound right-turn volume > 25 vph	Long Term	Sterling Ranch
103) Briargate Parkway/Future School 3/4 Movement Access				
6	Construct a westbound left-turn lane on Briargate Parkway approaching the school access. The lane should be 285' long plus a 200' taper.	westbound left-turn volume > 10 vph	Long Term With development of the K-8 School Parcel (Tract M)	Sterling Ranch
7	Construct an eastbound right-turn deceleration lane on Briargate Parkway approaching the school access. The lane should be 235' long plus a 200' taper.	eastbound right-turn volume > 25 vph	Long Term With development of the K-8 School Parcel (Tract M)	Sterling Ranch
5) Briargate Parkway/Sterling Ranch Road				
8	Construct an eastbound left-turn lane on Briargate Parkway approaching Sterling Ranch Road. The lane should be 435' long plus a 200' taper.	eastbound left-turn volume > 10 vph	With Sterling Ranch East Phase 1 Preliminary Plan or Foursquare at Sterling Ranch	Sterling Ranch
9	Construct an eastbound right-turn deceleration lane on Briargate Parkway approaching Sterling Ranch Road. The lane should be 235' long plus a 200' taper.	eastbound right-turn volume > 25 vph	Long Term With development of the K-8 School Parcel (Tract M)	Sterling Ranch
10	Construct a northbound to eastbound right-turn acceleration lane on Briargate Parkway at Sterling Ranch Road. The lane should be 580' long plus a 180' taper.	northbound right-turn volume > 50 vph	Long Term With development of the K-8 School Parcel (Tract M)	Sterling Ranch
11	Construct a westbound left-turn lane on Briargate Parkway approaching Sterling Ranch Road. The lane should be 285' long plus a 200' taper.	westbound left-turn volume > 10 vph	Long Term	Sterling Ranch
12	Construct an eastbound right-turn deceleration lane on Briargate Parkway approaching Sterling Ranch Road. The lane should be 235' long plus a 200' taper.	eastbound right-turn volume > 25 vph	Long Term	Sterling Ranch
13	Construct a southbound to westbound right-turn acceleration lane on Briargate Parkway at Sterling Ranch Road. The lane should be 580' long plus a 180' taper.	southbound right-turn volume > 50 vph	With Sterling Ranch East Phase 1 Preliminary Plan	Sterling Ranch
303) Sterling Ranch Road/Lubbock Trail				
14	Construct an northeastbound right-turn deceleration lane on Sterling Ranch Road approaching Lubbock Trail. The lane should be 155' long plus a 160' taper.	northeastbound right-turn volume > 50 vph	Long Term With development of the Elementary School Parcel (Tract F)	Sterling Ranch
15	Construct a southwestbound left-turn lane on Sterling Ranch Road approaching Lubbock Trail. The lane should be 305' long plus a 200' taper.	southwestbound-turn volume > 25 vph	Long Term With development of the Elementary School Parcel (Tract F)	Sterling Ranch
304) Sterling Ranch Road/Bellflower Drive				
16	Construct an northeastbound left-turn deceleration lane on Sterling Ranch Road approaching Bellflower Drive. The lane should be 205' long plus a 160' taper.	northeastbound left-turn volume > 25 vph	With Sterling Ranch East Phase 1 Preliminary Plan	Sterling Ranch
17	Construct a southwestbound left-turn lane on Sterling Ranch Road approaching Bellflower Drive. The lane should be 205' long plus a 200' taper.	southwestbound-turn volume > 25 vph	Long Term (Needed with construction of a northeastbound left-turn lane)	Sterling Ranch
305) Sterling Ranch Road/Lake Tahoe Drive				
18	Construct an northeastbound left-turn deceleration lane on Sterling Ranch Road approaching Lake Tahoe Drive. The lane should be 225' long plus a 160' taper.	northeastbound left-turn volume > 25 vph	With Sterling Ranch East Phase 1 Preliminary Plan	Sterling Ranch
19	Construct a southwestbound left-turn lane on Sterling Ranch Road approaching Lake Tahoe Drive. The lane should be 205' long plus a 200' taper.	southwestbound-turn volume > 25 vph	Not Required (Needed with construction of a northeastbound left-turn lane)	Sterling Ranch
20	Construct an northeastbound right-turn deceleration lane on Sterling Ranch Road approaching Lake Tahoe Drive. The lane should be 155' long plus a 160' taper.	northeastbound right-turn volume > 50 vph	Long Term	Sterling Ranch
306) Sterling Ranch Road/Newport Beach Place				
21	Construct a northeastbound left-turn lane on Sterling Ranch Road approaching Newport Beach Place. The lane should be 205' long plus a 200' taper.	northeastbound left-turn volume > 25 vph	With Sterling Ranch East Phase 1 Preliminary Plan	Sterling Ranch
308) Sterling Ranch Road/Idaho Falls Drive				
22	Construct a northeastbound left-turn lane on Sterling Ranch Road approaching Idaho Falls Drive. The lane should be 240' long plus a 200' taper.	northeastbound left-turn volume > 25 vph	With Sterling Ranch East Phase 1 Preliminary Plan	Sterling Ranch
309) Sterling Ranch Road/Vancouver Street				
23	Construct a northeastbound left-turn lane on Sterling Ranch Road approaching Vancouver Street. The lane should be 265' long plus a 200' taper.	northeastbound left-turn volume > 25 vph	With Sterling Ranch East Phase 1 Preliminary Plan	Sterling Ranch
Notes: Source: LSC Transportation Consultants, Inc. (November 2022)				

Please add a Table 5 like this in the main report listing the 17 intersections on Figure 10c. Timing and responsibility (and possibly improvements) can be addressed as "TBD as development progresses" if not already in this table.

Traffic Counts



LSC Transportation Consultants, Inc.

2504 E. Pikes Peak Ave, Suite 304
Colorado Springs, CO 80909
719-633-2868

File Name : Vollmer Rd - Burgess Rd AM

Site Code : S224440

Start Date : 7/28/2022

Page No : 1

Groups Printed- Unshifted

	Vollmer Rd Southbound					Burgess Rd Westbound					Vollmer Rd Northbound					Burgess Rd Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:30	0	15	5	0	20	19	47	10	0	76	4	5	1	0	10	0	6	0	0	6	112
06:45	1	15	4	0	20	17	35	13	0	65	5	5	1	0	11	3	6	1	0	10	106
Total	1	30	9	0	40	36	82	23	0	141	9	10	2	0	21	3	12	1	0	16	218
07:00	2	20	9	0	31	15	51	14	0	80	6	9	1	0	16	2	10	0	0	12	139
07:15	2	14	8	0	24	21	57	12	0	90	4	11	5	0	20	1	8	0	0	9	143
07:30	2	17	7	0	26	19	58	12	0	89	4	19	5	0	28	3	13	1	0	17	160
07:45	3	16	10	0	29	17	51	8	0	76	9	11	3	0	23	0	8	2	0	10	138
Total	9	67	34	0	110	72	217	46	0	335	23	50	14	0	87	6	39	3	0	48	580
08:00	3	22	5	0	30	17	61	12	0	90	7	8	4	0	19	6	14	0	0	20	159
08:15	2	16	6	0	24	7	36	15	0	58	13	16	3	0	32	3	9	1	0	13	127
Grand Total	15	135	54	0	204	132	396	96	0	624	52	84	23	0	159	18	74	5	0	97	1084
Apprch %	7.4	66.2	26.5	0		21.2	63.5	15.4	0		32.7	52.8	14.5	0		18.6	76.3	5.2	0		
Total %	1.4	12.5	5	0	18.8	12.2	36.5	8.9	0	57.6	4.8	7.7	2.1	0	14.7	1.7	6.8	0.5	0	8.9	

LSC Transportation Consultants, Inc.

2504 E. Pikes Peak Ave, Suite 304
Colorado Springs, CO 80909
719-633-2868

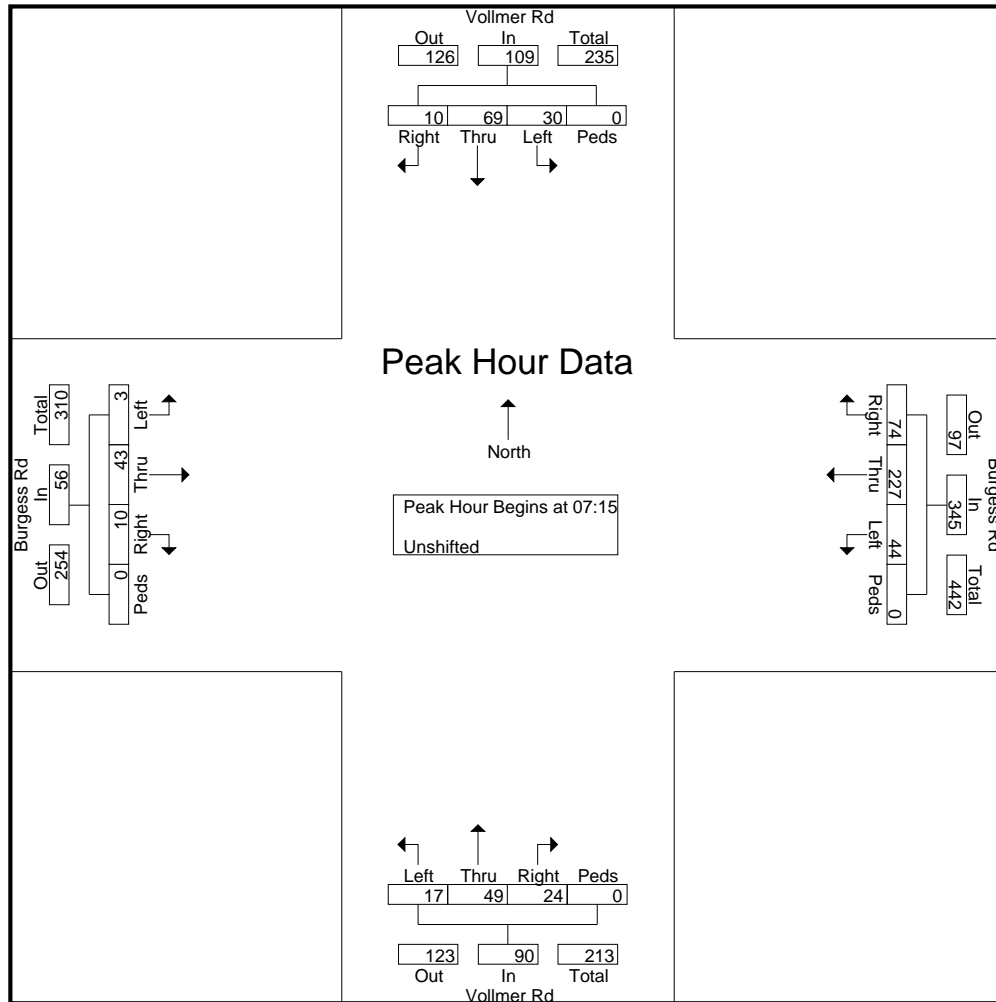
File Name : Vollmer Rd - Burgess Rd AM

Site Code : S224440

Start Date : 7/28/2022

Page No : 2

	Vollmer Rd Southbound					Burgess Rd Westbound					Vollmer Rd Northbound					Burgess Rd Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 6:30:00 AM to 8:15:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 7:15:00 AM																					
7:15:00 AM	2	14	8	0	24	21	57	12	0	90	4	11	5	0	20	1	8	0	0	9	143
7:30:00 AM	2	17	7	0	26	19	58	12	0	89	4	19	5	0	28	3	13	1	0	17	160
7:45:00 AM	3	16	10	0	29	17	51	8	0	76	9	11	3	0	23	0	8	2	0	10	138
8:00:00 AM	3	22	5	0	30	17	61	12	0	90	7	8	4	0	19	6	14	0	0	20	159
Total Volume	10	69	30	0	109	74	227	44	0	345	24	49	17	0	90	10	43	3	0	56	600
% App. Total	9.2	63.3	27.5	0		21.4	65.8	12.8	0		26.7	54.4	18.9	0		17.9	76.8	5.4	0		
PHF	.833	.784	.750	.000	.908	.881	.930	.917	.000	.958	.667	.645	.850	.000	.804	.417	.768	.375	.000	.700	.938



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2504 E. Pikes Peak Ave, Suite 304
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719-633-2868

File Name : Vollmer Rd - Burgess Rd PM

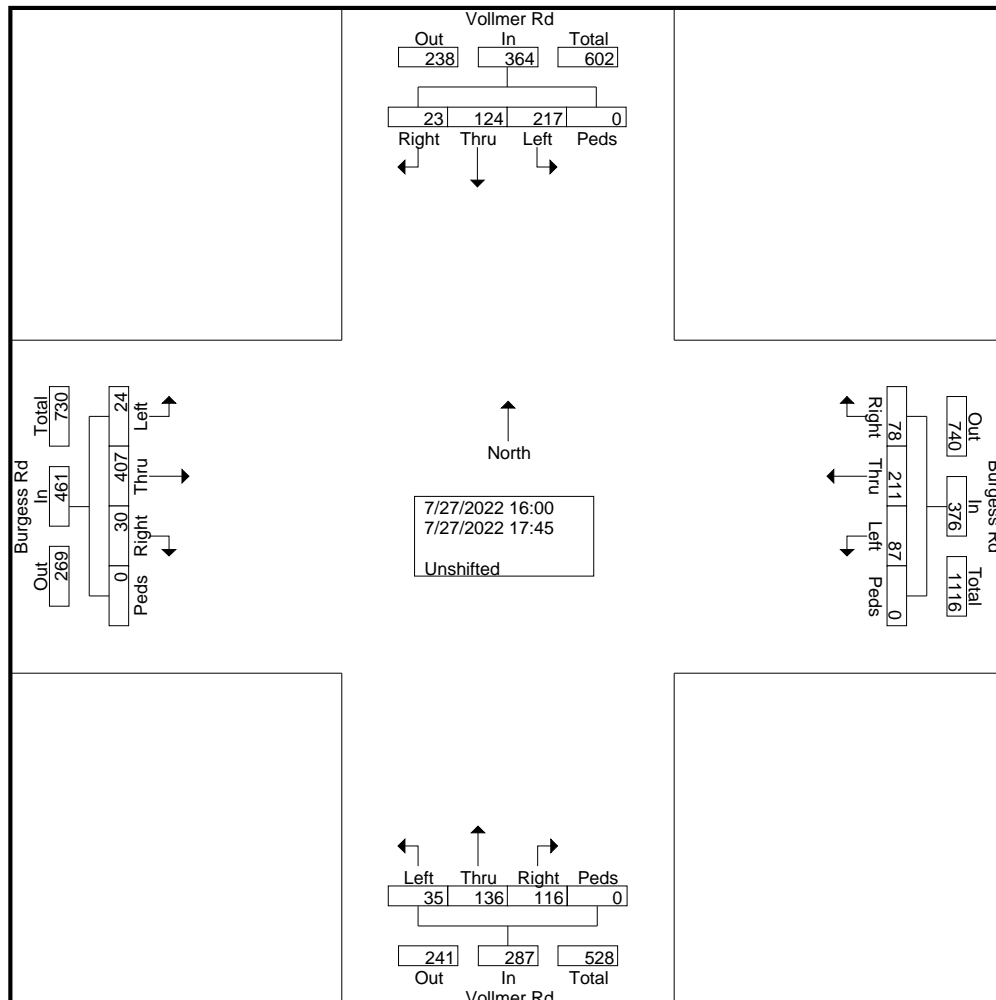
Site Code : S224440

Start Date : 7/27/2022

Page No : 1

Groups Printed- Unshifted

	Vollmer Rd Southbound					Burgess Rd Westbound					Vollmer Rd Northbound					Burgess Rd Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
16:00	2	19	22	0	43	7	21	7	0	35	9	17	6	0	32	3	37	3	0	43	153
16:15	5	13	29	0	47	6	23	11	0	40	18	11	8	0	37	4	37	5	0	46	170
16:30	2	19	31	0	52	10	30	9	0	49	12	19	4	0	35	5	46	3	0	54	190
16:45	1	8	20	0	29	8	33	17	0	58	16	14	5	0	35	1	65	0	0	66	188
Total	10	59	102	0	171	31	107	44	0	182	55	61	23	0	139	13	185	11	0	209	701
17:00	5	16	28	0	49	14	29	9	0	52	16	18	3	0	37	1	56	3	0	60	198
17:15	1	25	38	0	64	11	31	10	0	52	18	18	4	0	40	5	77	3	0	85	241
17:30	1	10	30	0	41	11	21	19	0	51	13	23	4	0	40	5	46	1	0	52	184
17:45	6	14	19	0	39	11	23	5	0	39	14	16	1	0	31	6	43	6	0	55	164
Total	13	65	115	0	193	47	104	43	0	194	61	75	12	0	148	17	222	13	0	252	787
Grand Total	23	124	217	0	364	78	211	87	0	376	116	136	35	0	287	30	407	24	0	461	1488
Apprch %	6.3	34.1	59.6	0		20.7	56.1	23.1	0		40.4	47.4	12.2	0		6.5	88.3	5.2	0		
Total %	1.5	8.3	14.6	0	24.5	5.2	14.2	5.8	0	25.3	7.8	9.1	2.4	0	19.3	2	27.4	1.6	0	31	



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2504 E. Pikes Peak Ave, Suite 304
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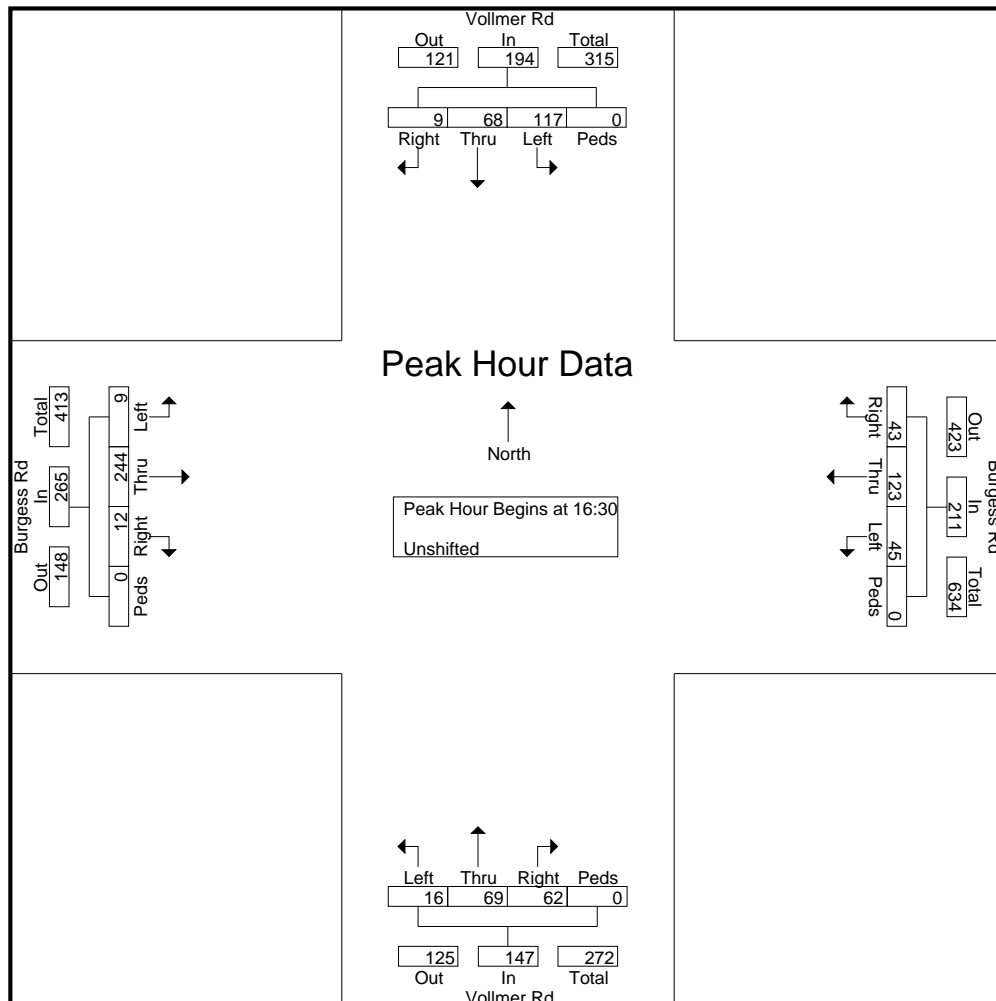
File Name : Vollmer Rd - Burgess Rd PM

Site Code : S224440

Start Date : 7/27/2022

Page No : 2

	Vollmer Rd Southbound					Burgess Rd Westbound					Vollmer Rd Northbound					Burgess Rd Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 4:00:00 PM to 5:45:00 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 4:30:00 PM																					
4:30:00 PM	2	19	31	0	52	10	30	9	0	49	12	19	4	0	35	5	46	3	0	54	190
4:45:00 PM	1	8	20	0	29	8	33	17	0	58	16	14	5	0	35	1	65	0	0	66	188
5:00:00 PM	5	16	28	0	49	14	29	9	0	52	16	18	3	0	37	1	56	3	0	60	198
5:15:00 PM	1	25	38	0	64	11	31	10	0	52	18	18	4	0	40	5	77	3	0	85	241
Total Volume	9	68	117	0	194	43	123	45	0	211	62	69	16	0	147	12	244	9	0	265	817
% App. Total	4.6	35.1	60.3	0		20.4	58.3	21.3	0		42.2	46.9	10.9	0		4.5	92.1	3.4	0		
PHF	.450	.680	.770	.000	.758	.768	.932	.662	.000	.909	.861	.908	.800	.000	.919	.600	.792	.750	.000	.779	.848





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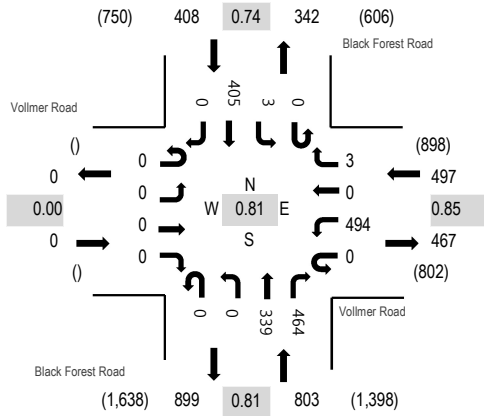
Location: 1 Black Forest Road & Vollmer Road AM

Date: Thursday, March 24, 2022

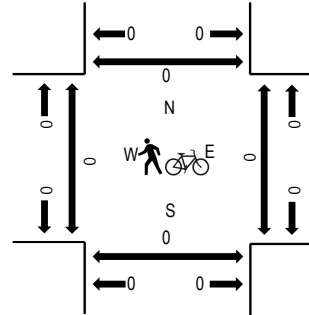
Peak Hour: 07:15 AM - 08:15 AM

Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	Vollmer Road Eastbound				Vollmer Road Westbound				Black Forest Road Northbound				Black Forest Road Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	0	0	0	0	88	0	0	0	0	46	75	0	2	85	0	296	1,630	0	0	0	0
7:15 AM	0	0	0	0	0	88	0	2	0	0	77	92	0	0	77	0	336	1,708	0	0	0	0
7:30 AM	0	0	0	0	0	118	0	0	0	0	86	162	0	0	104	0	470	1,708	0	0	0	0
7:45 AM	0	0	0	0	0	149	0	1	0	0	98	140	0	2	138	0	528	1,587	0	0	0	0
8:00 AM	0	0	0	0	0	139	0	0	0	0	78	70	0	1	86	0	374	1,416	0	0	0	0
8:15 AM	0	0	0	0	0	105	0	0	0	0	71	78	0	1	81	0	336		0	0	0	0
8:30 AM	0	0	0	0	0	111	0	0	0	0	63	81	0	0	94	0	349		0	0	0	0
8:45 AM	0	0	0	0	0	97	0	0	0	0	84	97	0	1	78	0	357		0	0	0	0
Count Total	0	0	0	0	0	895	0	3	0	0	603	795	0	7	743	0	3,046		0	0	0	0
Peak Hour	0	0	0	0	0	494	0	3	0	0	339	464	0	3	405	0	1,708		0	0	0	0



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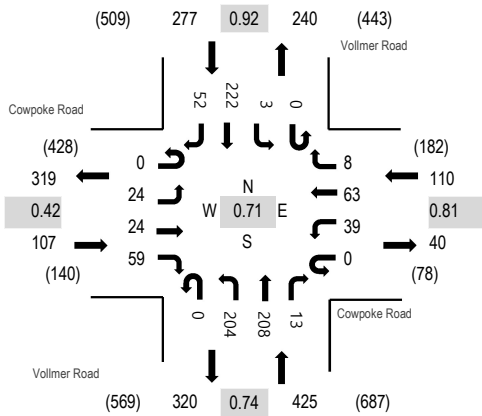
Location: 2 Vollmer Road & Cowpoke Road AM

Date: Thursday, March 24, 2022

Peak Hour: 07:15 AM - 08:15 AM

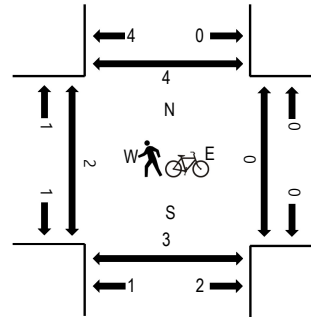
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	Cowpoke Road Eastbound				Cowpoke Road Westbound				Vollmer Road Northbound				Vollmer Road Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	1	1	0	0	6	7	1	0	5	52	5	0	0	36	6	120	851	0	0	0	0
7:15 AM	0	0	2	2	0	8	16	0	0	33	47	5	0	0	46	9	168	919	0	0	1	0
7:30 AM	0	3	5	5	0	11	15	1	0	73	57	2	0	0	50	16	238	907	0	0	0	1
7:45 AM	0	15	14	41	0	8	21	5	0	78	62	3	0	1	60	17	325	823	1	0	1	3
8:00 AM	0	6	3	11	0	12	11	2	0	20	42	3	0	2	66	10	188	667	0	0	0	0
8:15 AM	0	5	2	8	0	7	10	0	0	19	34	8	0	2	54	7	156		0	0	0	0
8:30 AM	0	3	4	1	0	13	6	1	0	3	51	5	0	2	59	6	154		1	0	1	0
8:45 AM	0	4	1	3	0	14	6	1	0	23	50	7	0	1	48	11	169		0	0	0	0
Count Total	0	37	32	71	0	79	92	11	0	254	395	38	0	8	419	82	1,518		2	0	3	4
Peak Hour	0	24	24	59	0	39	63	8	0	204	208	13	0	3	222	52	919		1	0	2	4



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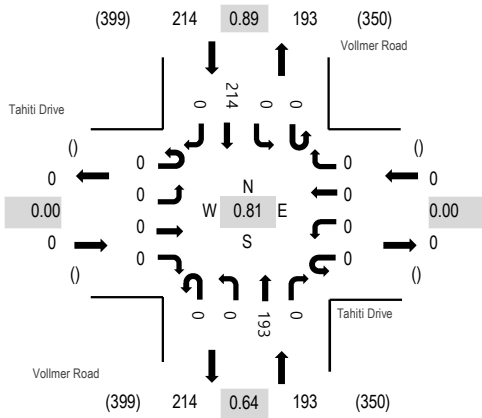
Location: 3 Vollmer Road & Tahiti Drive AM

Date: Thursday, March 24, 2022

Peak Hour: 07:45 AM - 08:45 AM

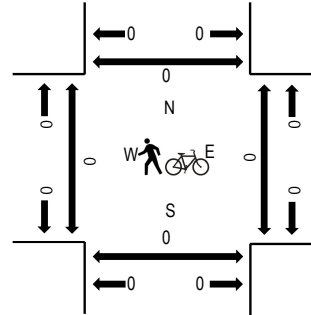
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	Tahiti Drive Eastbound				Tahiti Drive Westbound				Vollmer Road Northbound				Vollmer Road Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	0	0	0	0	0	0	0	0	0	42	0	0	0	30	0	72	374	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	33	0	0	0	47	0	80	400	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	41	0	0	0	55	0	96	400	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	75	0	0	0	51	0	126	407	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	37	0	0	0	61	0	98	375	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	34	0	0	0	46	0	80		0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	47	0	0	0	56	0	103		0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	41	0	0	0	53	0	94		0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	350	0	0	0	399	0	749		0	0	0	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	193	0	0	0	214	0	407		0	0	0	0



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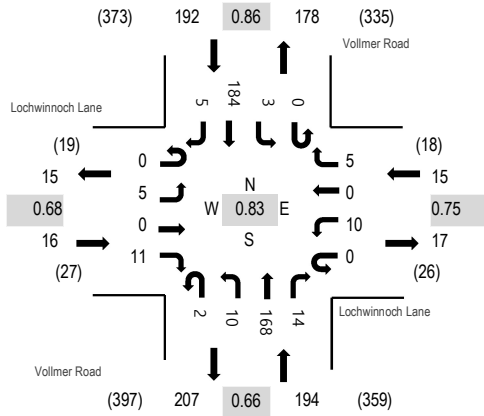
Location: 4 Vollmer Road & Lochwinnoch Lane AM

Date: Thursday, March 24, 2022

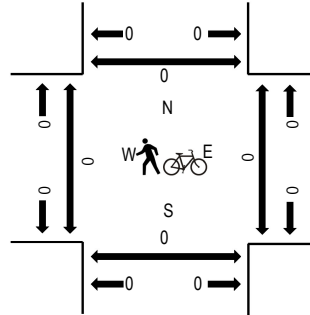
Peak Hour: 07:45 AM - 08:45 AM

Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	Lochwinnoch Lane Eastbound				Lochwinnoch Lane Westbound				Vollmer Road Northbound				Vollmer Road Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	0	0	2	0	1	0	0	0	0	43	0	0	0	28	0	74	389	0	0	0	0
7:15 AM	0	0	0	3	0	0	0	0	0	1	33	2	0	1	43	1	84	413	0	0	0	0
7:30 AM	0	0	0	1	0	2	0	0	0	1	40	3	0	1	57	1	106	416	0	0	0	0
7:45 AM	0	0	0	2	0	2	0	1	0	0	68	7	0	1	44	0	125	417	0	0	0	0
8:00 AM	0	1	0	1	0	4	0	0	2	1	33	3	0	0	52	1	98	388	0	0	0	0
8:15 AM	0	2	0	3	0	1	0	2	0	5	26	3	0	1	42	2	87		0	0	0	0
8:30 AM	0	2	0	5	0	3	0	2	0	4	41	1	0	1	46	2	107		0	0	0	0
8:45 AM	0	0	0	5	0	0	0	0	0	0	41	1	0	1	48	0	96		0	0	0	0
Count Total	0	5	0	22	0	13	0	5	2	12	325	20	0	6	360	7	777		0	0	0	0
Peak Hour	0	5	0	11	0	10	0	5	2	10	168	14	0	3	184	5	417		0	0	0	0



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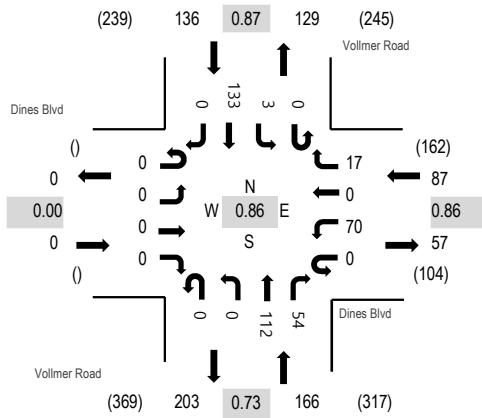
Location: 5 Vollmer Road & Dines Blvd AM

Date: Thursday, March 24, 2022

Peak Hour: 07:15 AM - 08:15 AM

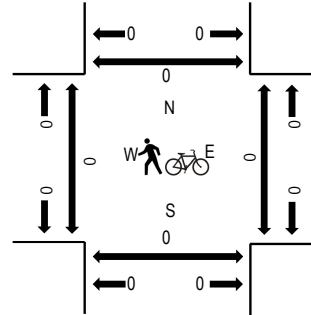
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	Dines Blvd Eastbound				Dines Blvd Westbound				Vollmer Road Northbound				Vollmer Road Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	0	0	0	0	11	0	1	0	0	25	14	0	2	16	0	69	370	0	0	0	0
7:15 AM	0	0	0	0	0	15	0	3	0	0	22	13	0	1	29	0	83	389	0	0	0	0
7:30 AM	0	0	0	0	0	21	0	5	0	0	27	13	0	0	39	0	105	381	0	0	0	0
7:45 AM	0	0	0	0	0	11	0	6	0	0	38	21	0	1	36	0	113	375	0	0	0	0
8:00 AM	0	0	0	0	0	23	0	3	0	0	25	7	0	1	29	0	88	348	0	0	0	0
8:15 AM	0	0	0	0	0	18	0	2	0	0	23	8	0	0	24	0	75		0	0	0	0
8:30 AM	0	0	0	0	0	23	0	1	1	0	28	13	1	2	30	0	99		0	0	0	0
8:45 AM	0	0	0	0	0	15	0	4	0	0	31	8	0	0	28	0	86		0	0	0	0
Count Total	0	0	0	0	0	137	0	25	1	0	219	97	1	7	231	0	718		0	0	0	0
Peak Hour	0	0	0	0	0	70	0	17	0	0	112	54	0	3	133	0	389		0	0	0	0



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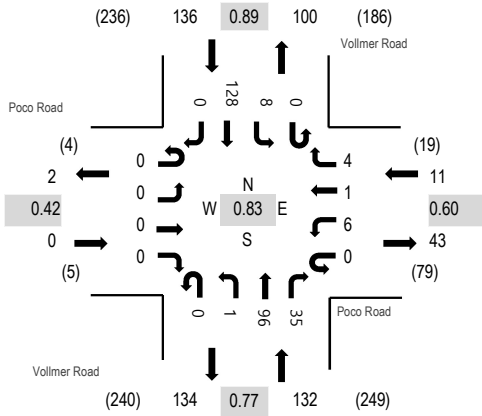
Location: 6 Vollmer Road & Poco Road AM

Date: Thursday, March 24, 2022

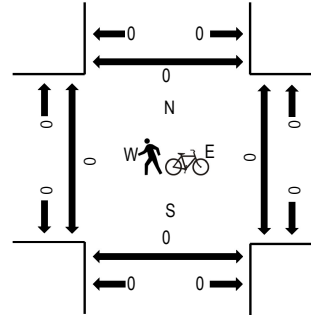
Peak Hour: 07:15 AM - 08:15 AM

Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	Poco Road Eastbound				Poco Road Westbound				Vollmer Road Northbound				Vollmer Road Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	0	0	0	0	0	0	0	0	0	10	15	0	1	20	0	46	264	0	0	0	0
7:15 AM	0	0	0	0	0	1	0	2	0	0	18	8	0	2	27	0	58	279	0	0	0	0
7:30 AM	0	0	0	0	0	1	0	2	0	1	26	8	0	2	36	0	76	273	0	0	0	0
7:45 AM	0	0	0	0	0	4	0	0	0	0	34	9	0	4	33	0	84	265	0	0	0	0
8:00 AM	0	0	0	0	0	0	1	0	0	0	18	10	0	0	32	0	61	245	0	0	0	0
8:15 AM	0	0	0	0	0	1	0	1	0	0	24	3	0	0	23	0	52		0	0	0	0
8:30 AM	0	0	0	2	0	3	0	2	0	1	24	6	0	1	29	0	68		0	0	0	0
8:45 AM	0	2	0	1	0	1	0	0	0	1	23	10	0	0	26	0	64		0	0	0	0
Count Total	0	2	0	3	0	11	1	7	0	3	177	69	0	10	226	0	509		0	0	0	0
Peak Hour	0	0	0	0	0	6	1	4	0	1	96	35	0	8	128	0	279		0	0	0	0



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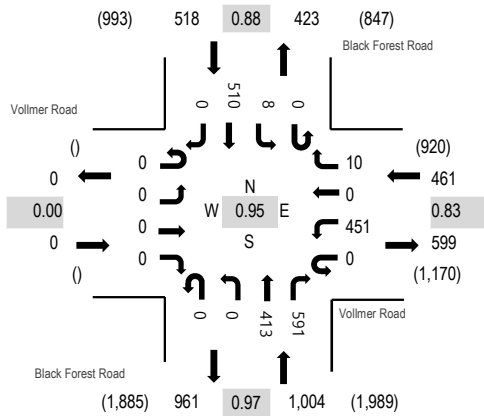
Location: 1 Black Forest Road & Vollmer Road PM

Date: Thursday, March 24, 2022

Peak Hour: 04:45 PM - 05:45 PM

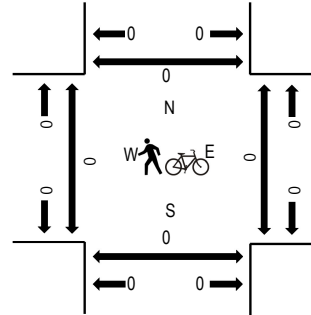
Peak 15-Minutes: 05:30 PM - 05:45 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	Vollmer Road Eastbound				Vollmer Road Westbound				Black Forest Road Northbound				Black Forest Road Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	0	0	0	0	120	0	0	0	0	102	140	0	1	140	0	503	1,927	0	0	0	0
4:15 PM	0	0	0	0	0	104	0	2	0	0	100	147	0	2	107	0	462	1,904	0	0	0	0
4:30 PM	0	0	0	0	0	139	0	2	0	0	100	135	0	1	116	0	493	1,955	0	0	0	0
4:45 PM	0	0	0	0	0	94	0	5	0	0	105	152	0	2	111	0	469	1,983	0	0	0	0
5:00 PM	0	0	0	0	0	113	0	1	0	0	108	137	0	1	120	0	480	1,975	0	0	0	0
5:15 PM	0	0	0	0	0	108	0	1	0	0	103	154	0	3	144	0	513		0	0	0	0
5:30 PM	0	0	0	0	0	136	0	3	0	0	97	148	0	2	135	0	521		0	0	0	0
5:45 PM	0	0	0	0	0	92	0	0	0	0	118	143	0	2	106	0	461		0	0	0	0
Count Total	0	0	0	0	0	906	0	14	0	0	833	1,156	0	14	979	0	3,902		0	0	0	0
Peak Hour	0	0	0	0	0	451	0	10	0	0	413	591	0	8	510	0	1,983		0	0	0	0



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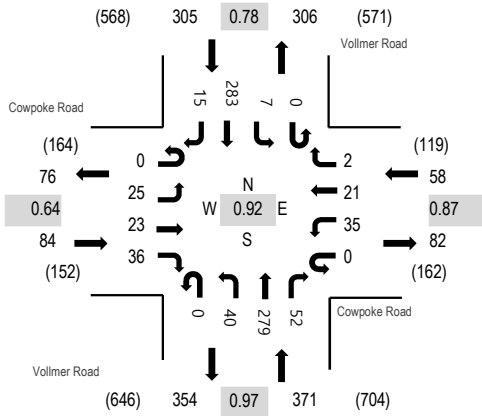
Location: 2 Vollmer Road & Cowpoke Road PM

Date: Thursday, March 24, 2022

Peak Hour: 04:00 PM - 05:00 PM

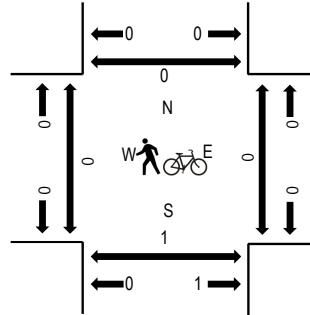
Peak 15-Minutes: 04:00 PM - 04:15 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	Cowpoke Road Eastbound				Cowpoke Road Westbound				Vollmer Road Northbound				Vollmer Road Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	8	1	7	0	7	5	1	0	12	64	20	0	3	91	4	223	818	0	0	0	0
4:15 PM	0	6	4	6	0	9	5	1	0	11	70	15	0	2	51	5	185	783	0	0	0	0
4:30 PM	0	4	7	8	0	5	6	0	0	4	74	10	0	0	76	2	196	762	0	0	0	0
4:45 PM	0	7	11	15	0	14	5	0	0	13	71	7	0	2	65	4	214	771	0	0	0	0
5:00 PM	0	5	8	3	0	9	4	1	0	12	61	14	0	2	63	6	188	725	0	0	3	0
5:15 PM	0	5	4	4	0	11	4	1	0	8	59	7	0	3	53	5	164		0	0	0	0
5:30 PM	0	5	9	9	0	11	6	0	0	16	62	10	0	1	68	8	205		0	0	0	0
5:45 PM	0	7	5	4	0	8	5	1	0	9	58	17	0	0	49	5	168		0	0	0	0
Count Total	0	47	49	56	0	74	40	5	0	85	519	100	0	13	516	39	1,543		0	0	3	0
Peak Hour	0	25	23	36	0	35	21	2	0	40	279	52	0	7	283	15	818		0	0	0	0



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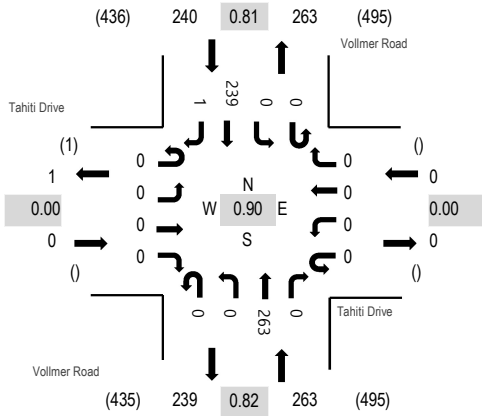
Location: 3 Vollmer Road & Tahiti Drive PM

Date: Thursday, March 24, 2022

Peak Hour: 04:00 PM - 05:00 PM

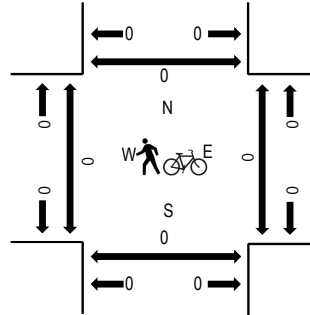
Peak 15-Minutes: 04:00 PM - 04:15 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	Tahiti Drive Eastbound				Tahiti Drive Westbound				Vollmer Road Northbound				Vollmer Road Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	0	0	0	0	0	0	0	0	0	66	0	0	0	73	1	140	503	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	68	0	0	0	52	0	120	467	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	49	0	0	0	63	0	112	463	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	80	0	0	0	51	0	131	453	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	55	0	0	0	49	0	104	428	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	62	0	0	0	54	0	116		0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	54	0	0	0	48	0	102		0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	61	0	0	0	45	0	106		0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	495	0	0	0	435	1	931		0	0	0	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	263	0	0	0	239	1	503		0	0	0	0



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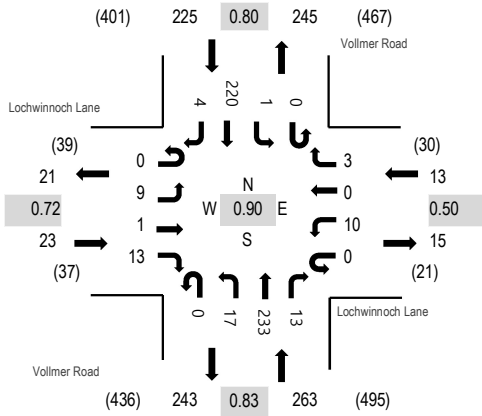
Location: 4 Vollmer Road & Lochwinnoch Lane PM

Date: Thursday, March 24, 2022

Peak Hour: 04:00 PM - 05:00 PM

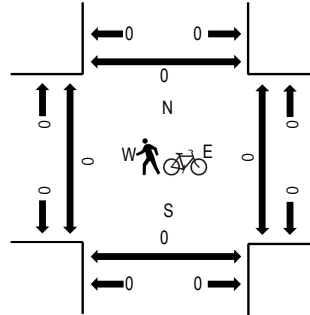
Peak 15-Minutes: 04:00 PM - 04:15 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	Lochwinnoch Lane Eastbound				Lochwinnoch Lane Westbound				Vollmer Road Northbound				Vollmer Road Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	4	0	4	0	2	0	0	0	6	56	4	0	0	70	0	146	524	0	0	0	0
4:15 PM	0	1	0	3	0	2	0	0	0	3	64	1	0	1	49	0	124	489	0	0	0	0
4:30 PM	0	1	0	2	0	5	0	1	0	3	45	2	0	0	55	2	116	484	0	0	0	0
4:45 PM	0	3	1	4	0	1	0	2	0	5	68	6	0	0	46	2	138	475	0	0	0	0
5:00 PM	0	2	0	3	0	8	1	2	0	2	52	2	0	2	37	0	111	439	0	0	0	0
5:15 PM	0	1	0	1	0	0	0	1	0	5	58	1	0	0	51	1	119		0	0	0	0
5:30 PM	0	0	0	4	0	4	0	0	0	2	53	0	0	1	42	1	107		0	0	0	0
5:45 PM	0	1	0	2	0	0	0	1	0	6	51	0	0	0	41	0	102		0	0	0	0
Count Total	0	13	1	23	0	22	1	7	0	32	447	16	0	4	391	6	963		0	0	0	0
Peak Hour	0	9	1	13	0	10	0	3	0	17	233	13	0	1	220	4	524		0	0	0	0



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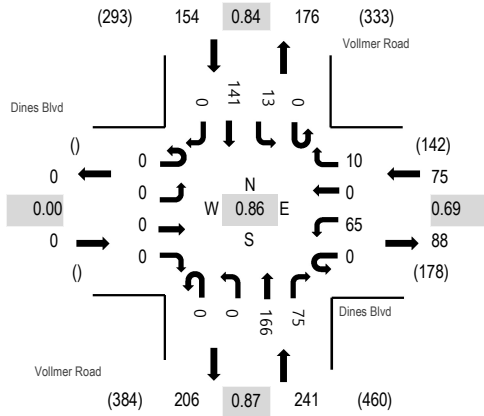
Location: 5 Vollmer Road & Dines Blvd PM

Date: Thursday, March 24, 2022

Peak Hour: 04:00 PM - 05:00 PM

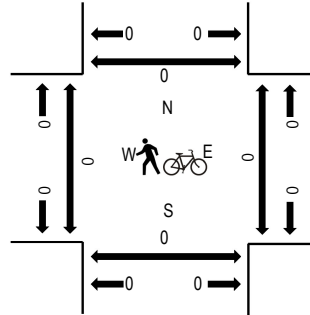
Peak 15-Minutes: 04:00 PM - 04:15 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	Dines Blvd Eastbound				Dines Blvd Westbound				Vollmer Road Northbound				Vollmer Road Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	0	0	0	0	24	0	3	0	0	46	18	0	2	44	0	137	470	0	0	0	0
4:15 PM	0	0	0	0	0	13	0	5	0	0	36	25	0	5	37	0	121	441	0	0	0	0
4:30 PM	0	0	0	0	0	12	0	2	0	0	35	11	0	3	30	0	93	436	0	0	0	0
4:45 PM	0	0	0	0	0	16	0	0	0	0	49	21	0	3	30	0	119	452	0	0	0	0
5:00 PM	0	0	0	0	0	14	0	5	0	0	42	18	0	2	27	0	108	425	0	0	0	0
5:15 PM	0	0	0	0	0	17	0	3	0	0	39	17	0	4	36	0	116		0	0	0	0
5:30 PM	0	0	0	0	0	12	0	1	0	0	36	21	0	8	31	0	109		0	0	0	0
5:45 PM	0	0	0	0	0	14	0	1	0	0	30	16	0	4	27	0	92		0	0	0	0
Count Total	0	0	0	0	0	122	0	20	0	0	313	147	0	31	262	0	895		0	0	0	0
Peak Hour	0	0	0	0	0	65	0	10	0	0	166	75	0	13	141	0	470		0	0	0	0



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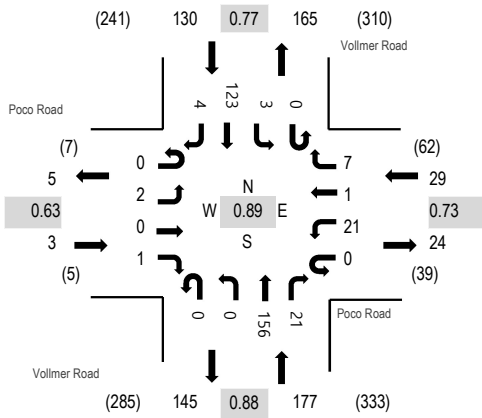
Location: 6 Vollmer Road & Poco Road PM

Date: Thursday, March 24, 2022

Peak Hour: 04:00 PM - 05:00 PM

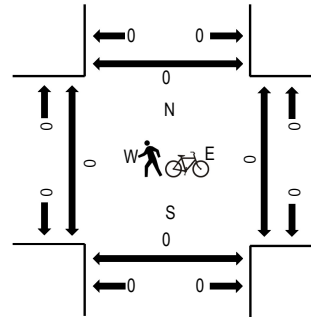
Peak 15-Minutes: 04:15 PM - 04:30 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	Poco Road Eastbound				Poco Road Westbound				Vollmer Road Northbound				Vollmer Road Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	0	0	0	0	8	1	4	0	0	41	4	0	1	29	2	90	339	0	0	0	0
4:15 PM	0	1	0	0	0	4	0	2	0	0	40	6	0	1	39	2	95	325	0	0	0	0
4:30 PM	0	0	0	0	0	2	0	0	0	0	32	3	0	1	28	0	66	313	0	0	0	0
4:45 PM	0	1	0	1	0	7	0	1	0	0	43	8	0	0	27	0	88	321	0	0	0	0
5:00 PM	0	0	0	2	0	6	0	1	0	0	44	3	0	0	20	0	76	302	0	0	0	0
5:15 PM	0	0	0	0	0	12	0	0	0	0	37	4	0	0	29	1	83		0	0	0	0
5:30 PM	0	0	0	0	0	6	0	2	0	0	33	3	0	1	29	0	74		0	0	0	0
5:45 PM	0	0	0	0	0	5	0	1	0	1	27	4	0	0	31	0	69		0	0	0	0
Count Total	0	2	0	3	0	50	1	11	0	1	297	35	0	4	232	5	641		0	0	0	0
Peak Hour	0	2	0	1	0	21	1	7	0	0	156	21	0	3	123	4	339		0	0	0	0

LSC Transportation Consultants, Inc.

545 E Pikes Peak Ave, Suite 210
Colorado Springs, CO 80905
719-633-2868

File Name : Blackforest Rd - Woodmen Rd AM
Site Code : S214590
Start Date : 7/6/2021
Page No : 1

Groups Printed- Unshifted

	Black Forest Rd Southbound					Woodmen Rd Westbound					Black Forest Rd Northbound					Woodmen Rd Eastbound					
Start Time	L	T	R	U	App. Total	L	T	R	U	App. Total	L	T	R	U	App. Total	L	T	R	U	App. Total	Int. Total
06:30 AM	45	28	96	0	169	9	306	35	0	350	14	14	10	0	38	45	87	17	0	149	706
06:45 AM	51	33	98	0	182	24	256	46	1	327	10	23	19	0	52	47	117	31	0	195	756
Total	96	61	194	0	351	33	562	81	1	677	24	37	29	0	90	92	204	48	0	344	1462
07:00 AM	55	23	99	1	178	23	283	50	0	356	31	21	12	0	64	70	101	8	0	179	777
07:15 AM	57	29	136	0	222	21	310	65	0	396	37	48	14	0	99	60	125	12	0	197	914
07:30 AM	56	31	115	0	202	25	350	50	1	426	29	30	18	0	77	95	150	17	1	263	968
07:45 AM	56	46	108	0	210	21	299	49	1	370	36	45	18	0	99	62	145	25	0	232	911
Total	224	129	458	1	812	90	1242	214	2	1548	133	144	62	0	339	287	521	62	1	871	3570
08:00 AM	40	34	98	0	172	16	284	58	2	360	25	39	17	0	81	61	157	12	0	230	843
08:15 AM	59	30	128	0	217	13	256	46	2	317	23	35	20	0	78	67	124	5	0	196	808
Grand Total	419	254	878	1	1552	152	2344	399	7	2902	205	255	128	0	588	507	1006	127	1	1641	6683
Apprch %	27	16.4	56.6	0.1		5.2	80.8	13.7	0.2		34.9	43.4	21.8	0		30.9	61.3	7.7	0.1		
Total %	6.3	3.8	13.1	0	23.2	2.3	35.1	6	0.1	43.4	3.1	3.8	1.9	0	8.8	7.6	15.1	1.9	0	24.6	

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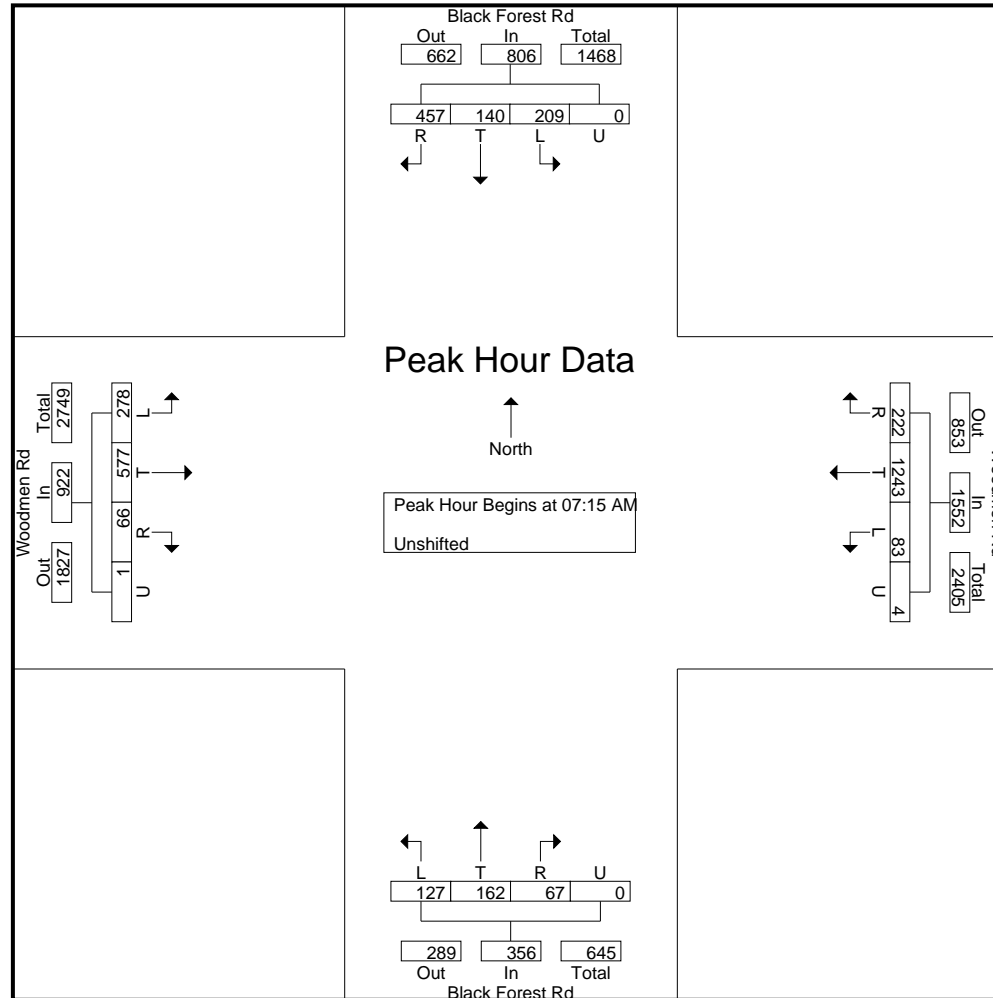
545 E Pikes Peak Ave, Suite 210
Colorado Springs, CO 80905
719-633-2868

File Name : Blackforest Rd - Woodmen Rd AM

Site Code : S214590

Start Date : 7/6/2021

Page No : 3



LSC Transportation Consultants, Inc.

545 E Pikes Peak Ave, Suite 210
Colorado Springs, CO 80905
719-633-2868

File Name : Blackforest Rd - Woodmen Rd PM
Site Code : S214590
Start Date : 7/6/2021
Page No : 1

Groups Printed- Unshifted

	Black Forest Rd Southbound					Woodmen Rd Westbound					Black Forest Rd Northbound					Woodmen Rd Eastbound					
Start Time	L	T	R	U	App. Total	L	T	R	U	App. Total	L	T	R	U	App. Total	L	T	R	U	App. Total	Int. Total
04:00 PM	54	29	105	0	188	16	231	54	1	302	26	62	35	0	123	125	241	10	0	376	989
04:15 PM	63	40	95	0	198	11	252	62	1	326	26	51	39	0	116	96	297	17	1	411	1051
04:30 PM	53	45	95	0	193	11	250	69	1	331	28	59	24	0	111	127	309	9	1	446	1081
04:45 PM	60	36	114	0	210	13	253	61	3	330	22	77	26	0	125	108	285	16	1	410	1075
Total	230	150	409	0	789	51	986	246	6	1289	102	249	124	0	475	456	1132	52	3	1643	4196
05:00 PM	67	50	134	0	251	10	249	76	0	335	17	68	43	0	128	149	286	8	0	443	1157
05:15 PM	67	47	102	0	216	13	225	68	1	307	18	76	25	0	119	100	347	5	0	452	1094
05:30 PM	50	37	103	0	190	15	227	59	2	303	15	68	37	0	120	130	324	14	0	468	1081
05:45 PM	66	38	113	0	217	17	188	47	2	254	18	69	30	0	117	116	295	13	1	425	1013
Total	250	172	452	0	874	55	889	250	5	1199	68	281	135	0	484	495	1252	40	1	1788	4345
Grand Total	480	322	861	0	1663	106	1875	496	11	2488	170	530	259	0	959	951	2384	92	4	3431	8541
Apprch %	28.9	19.4	51.8	0		4.3	75.4	19.9	0.4		17.7	55.3	27	0		27.7	69.5	2.7	0.1		
Total %	5.6	3.8	10.1	0	19.5	1.2	22	5.8	0.1	29.1	2	6.2	3	0	11.2	11.1	27.9	1.1	0	40.2	

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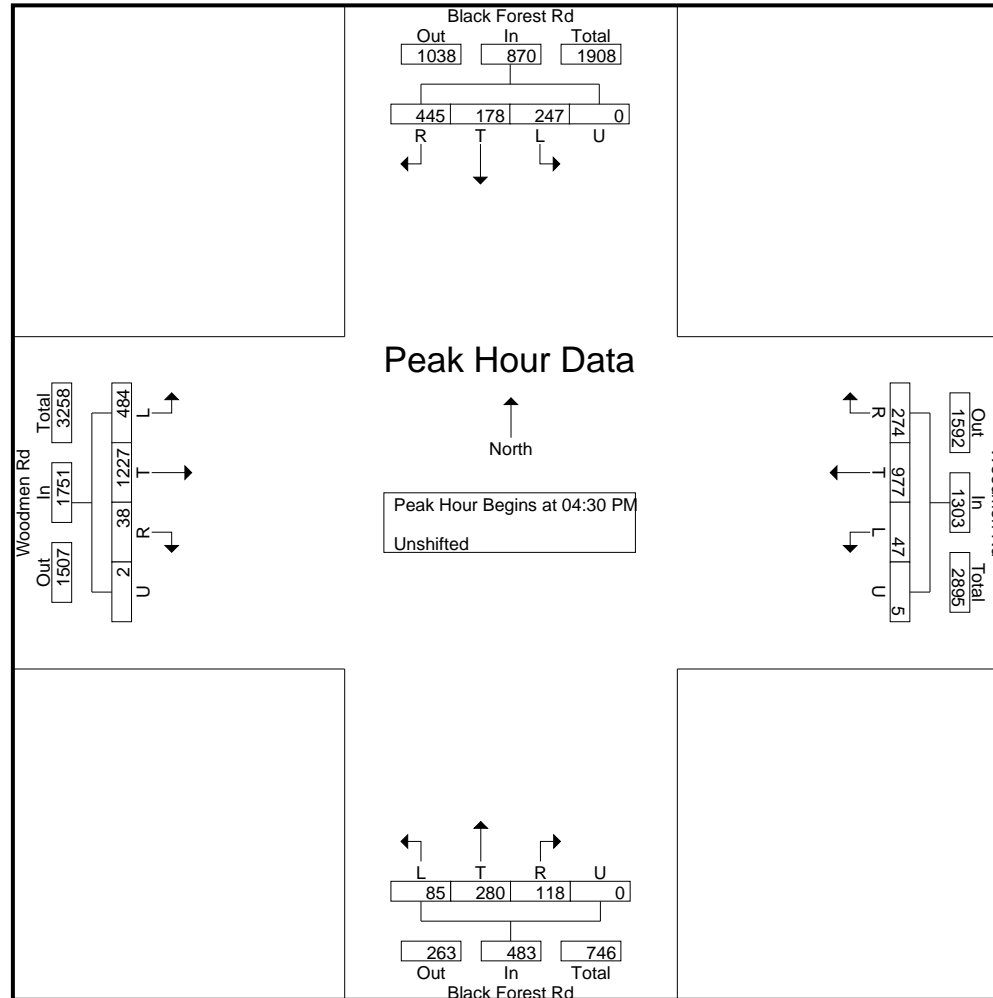
545 E Pikes Peak Ave, Suite 210
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719-633-2868

File Name : Blackforest Rd - Woodmen Rd PM

Site Code : S214590

Start Date : 7/6/2021

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545 E Pikes Peak Ave, Suite 210
Colorado Springs, CO 80905
719-633-2868

File Name : Marksheffel Rd - Woodmen Rd AM 8-21 AM

Site Code : S214630

Start Date : 8/3/2021

Page No : 1

Groups Printed- Unshifted

	Marksheffel Rd Southbound					Woodmen Rd Westbound					Marksheffel Rd Northbound					Woodmen Rd Eastbound					
Start Time	L	T	R	U	App. Total	L	T	R	U	App. Total	L	T	R	U	App. Total	L	T	R	U	App. Total	Int. Total
06:30 AM	1	12	14	0	27	52	251	0	0	303	90	6	34	0	130	2	109	86	2	199	659
06:45 AM	2	9	15	0	26	65	213	3	0	281	124	11	56	0	191	10	148	81	1	240	738
Total	3	21	29	0	53	117	464	3	0	584	214	17	90	0	321	12	257	167	3	439	1397
07:00 AM	2	16	14	0	32	88	269	4	0	361	106	5	54	0	165	2	121	93	1	217	775
07:15 AM	4	28	15	1	48	119	302	4	0	425	114	11	76	0	201	7	125	90	0	222	896
07:30 AM	1	17	25	0	43	135	334	1	0	470	119	13	69	1	202	7	154	98	2	261	976
07:45 AM	4	15	37	0	56	125	228	2	0	355	131	21	70	0	222	12	144	88	4	248	881
Total	11	76	91	1	179	467	1133	11	0	1611	470	50	269	1	790	28	544	369	7	948	3528
08:00 AM	0	7	23	0	30	54	238	3	0	295	120	13	70	0	203	8	140	78	1	227	755
08:15 AM	2	3	19	0	24	79	213	1	0	293	115	20	56	0	191	9	112	65	2	188	696
Grand Total	16	107	162	1	286	717	2048	18	0	2783	919	100	485	1	1505	57	1053	679	13	1802	6376
Apprch %	5.6	37.4	56.6	0.3		25.8	73.6	0.6	0		61.1	6.6	32.2	0.1		3.2	58.4	37.7	0.7		
Total %	0.3	1.7	2.5	0	4.5	11.2	32.1	0.3	0	43.6	14.4	1.6	7.6	0	23.6	0.9	16.5	10.6	0.2	28.3	

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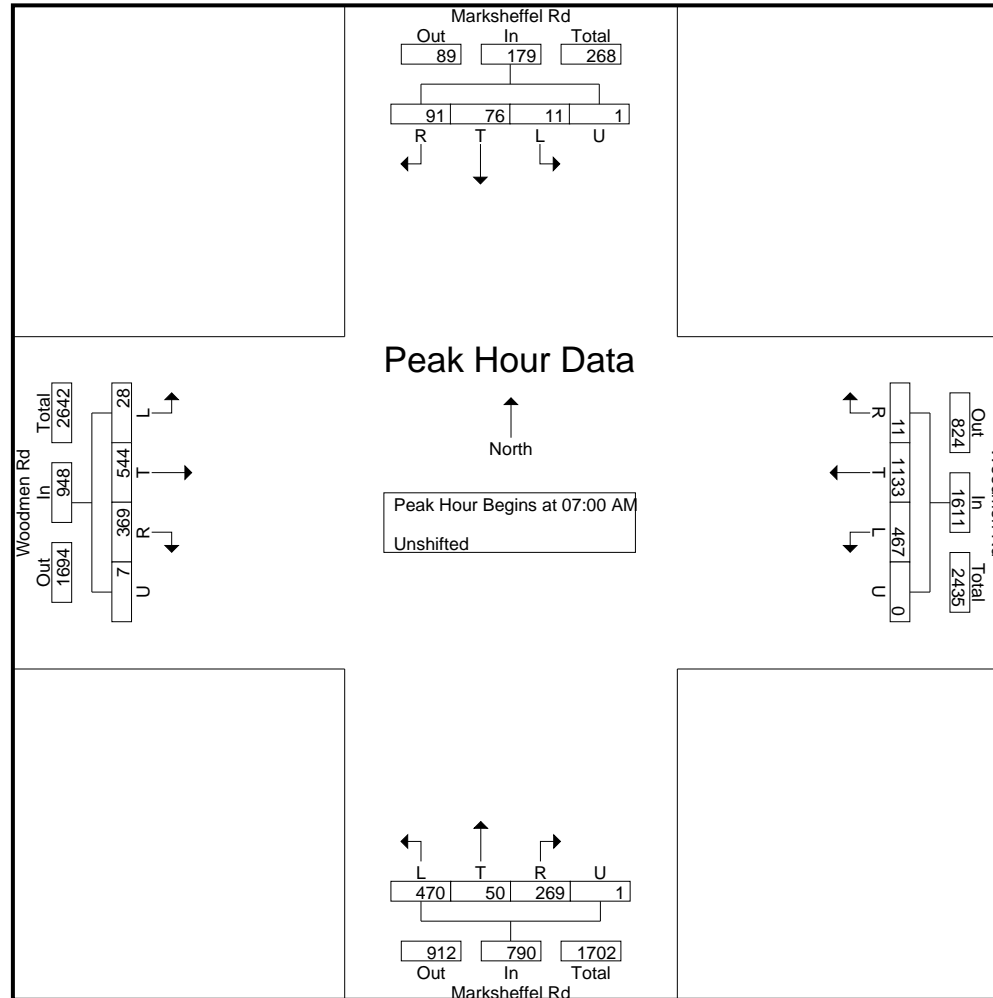
545 E Pikes Peak Ave, Suite 210
Colorado Springs, CO 80905
719-633-2868

File Name : Marksheffel Rd - Woodmen Rd AM 8-21 AM

Site Code : S214630

Start Date : 8/3/2021

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LSC Transportation Consultants, Inc.

545 E Pikes Peak Ave, Suite 210
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719-633-2868

File Name : Marksheffel Rd - Woodmen Rd AM 8-21 PM
Site Code : S214630
Start Date : 8/3/2021
Page No : 1

Groups Printed- Unshifted

	Marksheffel Rd Southbound					Woodmen Rd Westbound					Marksheffel Rd Northbound					Woodmen Rd Eastbound					
Start Time	L	T	R	U	App. Total	L	T	R	U	App. Total	L	T	R	U	App. Total	L	T	R	U	App. Total	Int. Total
04:00 PM	3	9	20	0	32	64	231	3	1	299	111	16	108	4	239	14	244	98	1	357	927
04:15 PM	3	11	12	0	26	92	208	1	0	301	124	9	104	0	237	15	295	114	0	424	988
04:30 PM	2	2	10	0	14	135	206	0	0	341	94	22	89	0	205	10	308	111	0	429	989
04:45 PM	2	10	17	0	29	65	179	3	0	247	143	17	141	0	301	16	278	94	2	390	967
Total	10	32	59	0	101	356	824	7	1	1188	472	64	442	4	982	55	1125	417	3	1600	3871
05:00 PM	1	7	14	0	22	126	191	3	0	320	110	11	100	0	221	27	265	133	2	427	990
05:15 PM	3	14	14	0	31	76	184	2	0	262	135	14	135	0	284	27	303	117	2	449	1026
05:30 PM	3	3	14	0	20	52	236	2	0	290	93	9	135	0	237	28	348	121	1	498	1045
05:45 PM	2	7	19	0	28	56	167	1	0	224	104	10	155	2	271	20	301	117	5	443	966
Total	9	31	61	0	101	310	778	8	0	1096	442	44	525	2	1013	102	1217	488	10	1817	4027
Grand Total	19	63	120	0	202	666	1602	15	1	2284	914	108	967	6	1995	157	2342	905	13	3417	7898
Apprch %	9.4	31.2	59.4	0		29.2	70.1	0.7	0		45.8	5.4	48.5	0.3		4.6	68.5	26.5	0.4		
Total %	0.2	0.8	1.5	0	2.6	8.4	20.3	0.2	0	28.9	11.6	1.4	12.2	0.1	25.3	2	29.7	11.5	0.2	43.3	

LSC Transportation Consultants, Inc.

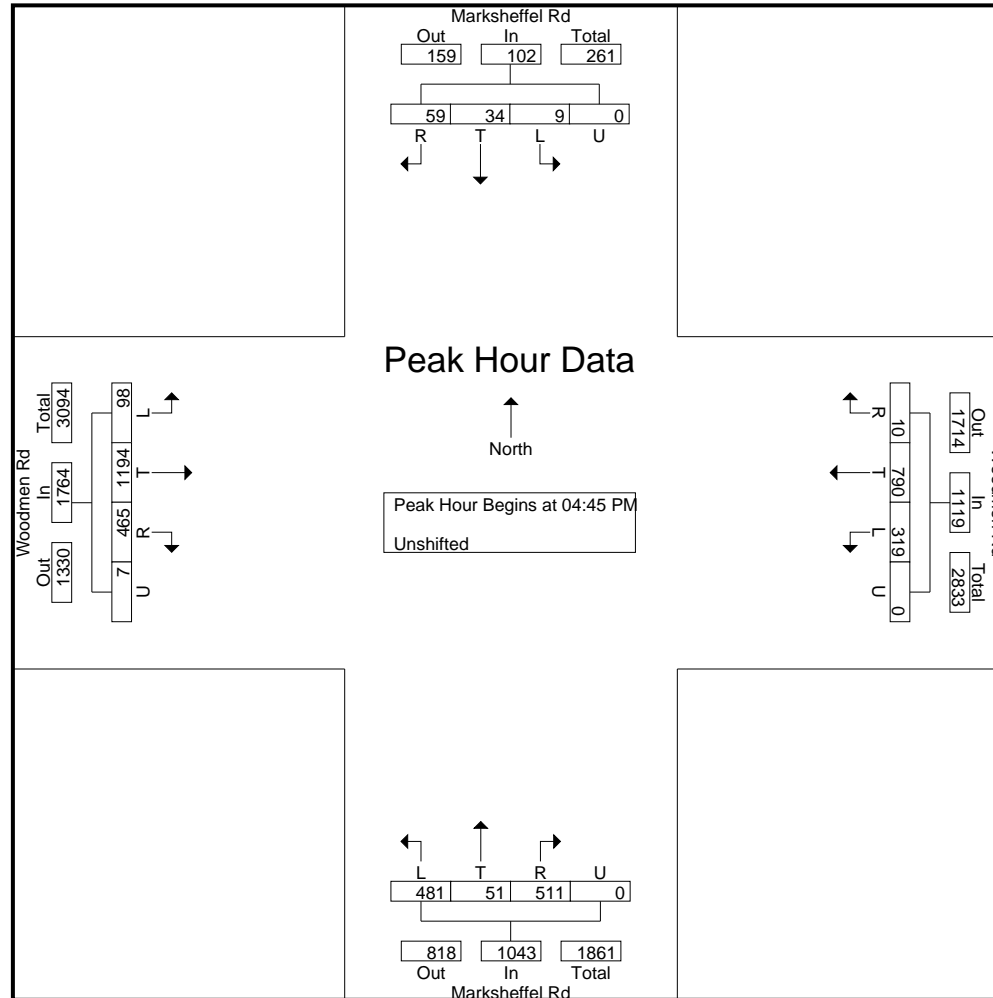
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Colorado Springs, CO 80905
719-633-2868

File Name : Marksheffel Rd - Woodmen Rd AM 8-21 PM

Site Code : S214630

Start Date : 8/3/2021





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Levels of Service

HCM 6th TWSC
1: Vollmer Rd & Burgess Rd












Existing Traffic
AM Peak Hour

Intersection												
Int Delay, s/veh	12.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	43	10	44	227	74	17	49	24	30	69	10
Future Vol, veh/h	3	43	10	44	227	74	17	49	24	30	69	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	Free	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	87	87	87	80	80	80	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	55	13	51	261	85	21	61	30	36	83	12
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	437	264	89	298	270	61	95	0	-	61	0	0
Stage 1	161	161	-	103	103	-	-	-	-	-	-	-
Stage 2	276	103	-	195	167	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	530	641	969	654	636	1004	1499	-	0	1542	-	-
Stage 1	841	765	-	903	810	-	-	-	0	-	-	-
Stage 2	730	810	-	807	760	-	-	-	0	-	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	314	615	969	583	611	1004	1499	-	-	1542	-	-
Mov Cap-2 Maneuver	314	615	-	583	611	-	-	-	-	-	-	-
Stage 1	828	746	-	889	798	-	-	-	-	-	-	-
Stage 2	443	798	-	719	741	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	11.5		18.2		1.9		2					
HCM LOS	B		C									
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1499	-	624	663	1542	-	-					
HCM Lane V/C Ratio	0.014	-	0.115	0.598	0.023	-	-					
HCM Control Delay (s)	7.4	0	11.5	18.2	7.4	0	-					
HCM Lane LOS	A	A	B	C	A	A	-					
HCM 95th %tile Q(veh)	0	-	0.4	4	0.1	-	-					

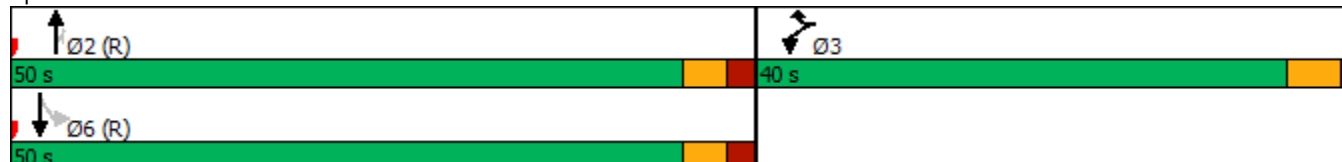
Intersection						
Int Delay, s/veh	2.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	70	17	112	54	3	133
Future Vol, veh/h	70	17	112	54	3	133
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	155	205	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	70	70	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	90	22	160	77	4	160
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	248	160	0	0	237	0
Stage 1	160	-	-	-	-	-
Stage 2	88	-	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	2.219	-
Pot Cap-1 Maneuver	730	884	-	-	1329	-
Stage 1	868	-	-	-	-	-
Stage 2	926	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	728	884	-	-	1329	-
Mov Cap-2 Maneuver	728	-	-	-	-	-
Stage 1	868	-	-	-	-	-
Stage 2	923	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	10.3	0		0.2		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	728	884	1329	-
HCM Lane V/C Ratio	-	-	0.123	0.025	0.003	-
HCM Control Delay (s)	-	-	10.6	9.2	7.7	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.4	0.1	0	-

Timings
14: Black Forest Rd & Vollmer Rd

Existing Traffic
AM Peak Hour

























						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	494	3	339	469	3	405
Future Volume (vph)	494	3	339	469	3	405
Turn Type	Prot	Prot	NA	Perm	Perm	NA
Protected Phases	3	3	2			6
Permitted Phases				2	6	
Detector Phase	3	3	2	2	6	6
Switch Phase						
Minimum Initial (s)	15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	19.5	19.5	20.0	20.0	20.0	20.0
Total Split (s)	40.0	40.0	50.0	50.0	50.0	50.0
Total Split (%)	44.4%	44.4%	55.6%	55.6%	55.6%	55.6%
Yellow Time (s)	3.5	3.5	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	4.5	4.5	5.0	5.0		5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	33.2	33.2	47.3	47.3		47.3
Actuated g/C Ratio	0.37	0.37	0.53	0.53		0.53
v/c Ratio	0.91	0.01	0.44	0.54		0.57
Control Delay	46.7	11.0	15.7	3.1		18.1
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	46.7	11.0	15.7	3.1		18.1
LOS	D	B	B	A		B
Approach Delay	46.4		8.4			18.1
Approach LOS	D		A			B
Intersection Summary						
Cycle Length: 90						
Actuated Cycle Length: 90						
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green						
Natural Cycle: 55						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.91						
Intersection Signal Delay: 21.3				Intersection LOS: C		
Intersection Capacity Utilization 59.0%				ICU Level of Service B		
Analysis Period (min) 15						

Splits and Phases: 14: Black Forest Rd & Vollmer Rd



Timings 15: Black Forest Rd & Woodmen Rd

Existing Traffic
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	278	577	66	83	1243	222	127	162	67	209	140	457
Future Volume (vph)	278	577	66	83	1243	222	127	162	67	209	140	457
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	8.0	15.0	15.0	8.0	15.0	15.0	8.0	10.0	10.0	8.0	10.0	10.0
Minimum Split (s)	13.0	20.0	20.0	13.0	20.0	20.0	13.0	15.0	15.0	13.0	15.0	15.0
Total Split (s)	25.0	55.0	55.0	25.0	55.0	55.0	15.0	25.0	25.0	15.0	25.0	25.0
Total Split (%)	20.8%	45.8%	45.8%	20.8%	45.8%	45.8%	12.5%	20.8%	20.8%	12.5%	20.8%	20.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	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 Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max	Max	None	Max	Max
Act Effect Green (s)	15.2	61.3	61.3	11.3	54.8	54.8	9.3	20.0	20.0	30.7	20.7	20.7
Actuated g/C Ratio	0.13	0.51	0.51	0.09	0.46	0.46	0.08	0.17	0.17	0.26	0.17	0.17
v/c Ratio	0.66	0.33	0.08	0.51	0.78	0.27	0.49	0.28	0.19	0.61	0.45	0.89
Control Delay	57.1	19.0	1.0	61.7	32.4	3.5	59.3	45.2	3.3	44.3	49.9	38.1
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	57.1	19.0	1.0	61.7	32.4	3.5	59.3	45.2	3.3	44.3	49.9	38.1
LOS	E	B	A	E	C	A	E	D	A	D	D	D
Approach Delay		29.2			29.9			42.4			41.8	
Approach LOS		C			C			D			D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 33.6

Intersection LOS: C

Intersection Capacity Utilization 81.8%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 15: Black Forest Rd & Woodmen Rd



























Timings

16: Marksheffel Rd & Woodmen Rd

Existing Traffic

AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	598	364	393	1090	6	337	184	260	7	65	229
Future Volume (vph)	49	598	364	393	1090	6	337	184	260	7	65	229
Turn Type	Prot	NA	Perm	Prot	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			Free	8		Free	4		Free
Detector Phase	5	2	2	1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	4.0	25.0	25.0	4.0	25.0		4.0	10.0		4.0	10.0	
Minimum Split (s)	9.0	32.5	32.5	9.0	32.5		9.0	17.5		9.0	17.5	
Total Split (s)	20.0	63.0	63.0	25.0	68.0		25.0	25.0		25.0	25.0	
Total Split (%)	14.5%	45.7%	45.7%	18.1%	49.3%		18.1%	18.1%		18.1%	18.1%	
Yellow Time (s)	3.0	5.5	5.5	3.0	5.5		3.0	5.5		3.0	5.5	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	7.5	7.5	5.0	7.5		5.0	7.5		5.0	7.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	C-Max	None	C-Max		None	None		None	None	
Act Effect Green (s)	6.6	60.1	60.1	26.0	81.5	138.0	34.3	29.6	138.0	15.4	10.3	138.0
Actuated g/C Ratio	0.05	0.44	0.44	0.19	0.59	1.00	0.25	0.21	1.00	0.11	0.07	1.00
v/c Ratio	0.33	0.42	0.43	0.77	0.66	0.01	1.05	0.50	0.18	0.05	0.28	0.17
Control Delay	68.4	29.0	4.0	61.9	22.8	0.0	108.1	52.2	0.2	38.4	63.1	0.2
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	68.4	29.0	4.0	61.9	22.8	0.0	108.1	52.2	0.2	38.4	63.1	0.2
LOS	E	C	A	E	C	A	F	D	A	D	E	A
Approach Delay		21.9			33.0			59.0			14.7	
Approach LOS		C			C			E			B	

Intersection Summary

Cycle Length: 138

Actuated Cycle Length: 138

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.05

Intersection Signal Delay: 33.9

Intersection LOS: C

Intersection Capacity Utilization 75.5%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 16: Marksheffel Rd & Woodmen Rd



HCM 6th TWSC
1: Vollmer Rd & Burgess Rd







Existing Traffic
PM Peak Hour

Intersection												
Int Delay, s/veh	31.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	9	244	12	45	123	43	16	69	62	117	68	9
Future Vol, veh/h	9	244	12	45	123	43	16	69	62	117	68	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	Free	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	87	87	87	92	92	92	76	76	76
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	313	15	52	141	49	17	75	67	154	89	12

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	607	512	95	676	518	75	101	0	-	75	0	0
Stage 1	403	403	-	109	109	-	-	-	-	-	-	-
Stage 2	204	109	-	567	409	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	408	465	962	367	462	986	1491	-	0	1524	-	-
Stage 1	624	600	-	896	805	-	-	-	0	-	-	-
Stage 2	798	805	-	508	596	-	-	-	0	-	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	259	410	962	125	407	986	1491	-	-	1524	-	-
Mov Cap-2 Maneuver	259	410	-	125	407	-	-	-	-	-	-	-
Stage 1	617	536	-	885	795	-	-	-	-	-	-	-
Stage 2	616	795	-	186	532	-	-	-	-	-	-	-












Approach	EB		WB		NB		SB	
HCM Control Delay, s	43.2		53.3		1.4		4.6	
HCM LOS	E		F					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1491	-	413	299	1524	-	-
HCM Lane V/C Ratio	0.012	-	0.823	0.811	0.101	-	-
HCM Control Delay (s)	7.4	0	43.2	53.3	7.6	0	-
HCM Lane LOS	A	A	E	F	A	A	-
HCM 95th %tile Q(veh)	0	-	7.6	6.6	0.3	-	-

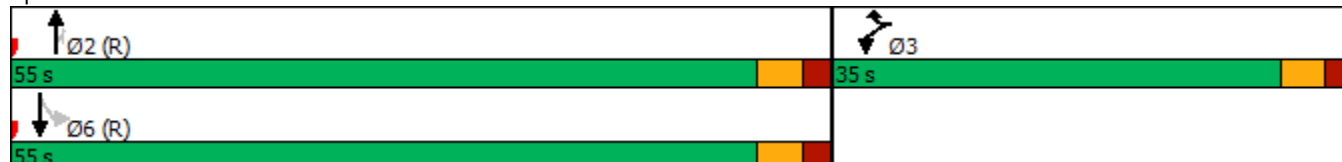
Intersection						
Int Delay, s/veh	2.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	65	10	166	75	13	141
Future Vol, veh/h	65	10	166	75	13	141
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	155	205	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	69	69	87	87	84	84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	94	14	191	86	15	168
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	305	191	0	0	277	0
Stage 1	191	-	-	-	-	-
Stage 2	114	-	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	2.219	-
Pot Cap-1 Maneuver	675	850	-	-	1284	-
Stage 1	841	-	-	-	-	-
Stage 2	899	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	667	850	-	-	1284	-
Mov Cap-2 Maneuver	667	-	-	-	-	-
Stage 1	841	-	-	-	-	-
Stage 2	888	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	11	0	0.7			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 667 850 1284	-	-		
HCM Lane V/C Ratio	-	- 0.141 0.017 0.012	-	-		
HCM Control Delay (s)	-	- 11.3 9.3 7.8	-	-		
HCM Lane LOS	-	- B A A	-	-		
HCM 95th %tile Q(veh)	-	- 0.5 0.1 0	-	-		

Timings
14: Black Forest Rd & Vollmer Rd

Existing Traffic
PM Peak Hour































						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	451	10	413	591	8	510
Future Volume (vph)	451	10	413	591	8	510
Turn Type	Prot	Prot	NA	Perm	Perm	NA
Protected Phases	3	3	2			6
Permitted Phases				2	6	
Detector Phase	3	3	2	2	6	6
Switch Phase						
Minimum Initial (s)	15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	35.0	35.0	55.0	55.0	55.0	55.0
Total Split (%)	38.9%	38.9%	61.1%	61.1%	61.1%	61.1%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	27.5	27.5	52.5	52.5		52.5
Actuated g/C Ratio	0.31	0.31	0.58	0.58		0.58
v/c Ratio	0.88	0.02	0.40	0.53		0.50
Control Delay	48.4	10.9	12.2	2.7		13.7
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	48.4	10.9	12.2	2.7		13.7
LOS	D	B	B	A		B
Approach Delay	47.5		6.6			13.7
Approach LOS	D		A			B
Intersection Summary						
Cycle Length: 90						
Actuated Cycle Length: 90						
Offset: 80 (89%), Referenced to phase 2:NBT and 6:SBTL, Start of Green						
Natural Cycle: 50						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.88						
Intersection Signal Delay: 18.0				Intersection LOS: B		
Intersection Capacity Utilization 72.2%				ICU Level of Service C		
Analysis Period (min) 15						

Splits and Phases: 14: Black Forest Rd & Vollmer Rd



Timings
15: Black Forest Rd & Woodmen Rd

Existing Traffic
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			 		 	 			 	
Traffic Volume (vph)	484	1227	38	47	977	274	85	280	118	247	178	445
Future Volume (vph)	484	1227	38	47	977	274	85	280	118	247	178	445
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	25.0	63.0	63.0	12.0	50.0	50.0	15.0	30.0	30.0	15.0	30.0	30.0
Total Split (%)	20.8%	52.5%	52.5%	10.0%	41.7%	41.7%	12.5%	25.0%	25.0%	12.5%	25.0%	25.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	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 Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max	Max	None	Max	Max
Act Effect Green (s)	19.5	60.4	60.4	6.7	45.5	45.5	8.3	25.0	25.0	36.7	26.7	26.7
Actuated g/C Ratio	0.16	0.50	0.50	0.06	0.38	0.38	0.07	0.21	0.21	0.31	0.22	0.22
v/c Ratio	0.88	0.70	0.05	0.48	0.74	0.36	0.37	0.39	0.27	0.75	0.44	0.78
Control Delay	67.5	26.3	0.1	71.6	36.5	4.3	57.4	42.8	4.1	48.3	44.6	26.1
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	67.5	26.3	0.1	71.6	36.5	4.3	57.4	42.8	4.1	48.3	44.6	26.1
LOS	E	C	A	E	D	A	E	D	A	D	D	C
Approach Delay		37.1			31.0			35.9			36.2	
Approach LOS		D			C			D			D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 35.0

Intersection LOS: C

Intersection Capacity Utilization 79.5%

ICU Level of Service D

























Analysis Period (min) 15

Splits and Phases: 15: Black Forest Rd & Woodmen Rd



Timings 16: Marksheffel Rd & Woodmen Rd

Existing Traffic
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	1193	573	335	863	12	345	149	424	9	42	154
Future Volume (vph)	73	1193	573	335	863	12	345	149	424	9	42	154
Turn Type	Prot	NA	Perm	Prot	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			Free	8		Free	4		Free
Detector Phase	5	2	2	1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	4.0	25.0	25.0	4.0	25.0		4.0	10.0		4.0	10.0	
Minimum Split (s)	9.0	32.5	32.5	9.0	32.5		9.0	17.5		9.0	17.5	
Total Split (s)	20.0	63.0	63.0	25.0	68.0		25.0	25.0		25.0	25.0	
Total Split (%)	14.5%	45.7%	45.7%	18.1%	49.3%		18.1%	18.1%		18.1%	18.1%	
Yellow Time (s)	3.0	5.5	5.5	3.0	5.5		3.0	5.5		3.0	5.5	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	7.5	7.5	5.0	7.5		5.0	7.5		5.0	7.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	C-Max	None	C-Max		None	None		None	None	
Act Effect Green (s)	7.5	63.8	63.8	22.7	79.0	138.0	34.0	29.3	138.0	15.2	10.0	138.0
Actuated g/C Ratio	0.05	0.46	0.46	0.16	0.57	1.00	0.25	0.21	1.00	0.11	0.07	1.00
v/c Ratio	0.42	0.78	0.58	0.78	0.56	0.01	1.07	0.41	0.29	0.06	0.19	0.11
Control Delay	69.5	37.3	4.4	65.2	21.0	0.0	115.8	50.3	0.5	39.2	62.1	0.1
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	69.5	37.3	4.4	65.2	21.0	0.0	115.8	50.3	0.5	39.2	62.1	0.1
LOS	E	D	A	E	C	A	F	D	A	D	E	A
Approach Delay		28.3			33.1			51.9			14.5	
Approach LOS		C			C			D			B	

Intersection Summary

Cycle Length: 138

Actuated Cycle Length: 138

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.07

Intersection Signal Delay: 34.1

Intersection LOS: C

Intersection Capacity Utilization 85.0%

ICU Level of Service E

Analysis Period (min) 15




Splits and Phases: 16: Marksheffel Rd & Woodmen Rd



Existing Traffic
PM Peak Hour

Synchro 11 Report
Page 5

Replace Vollmer and Burgess
and others?




Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	9	1	181	3	0	325
Future Vol, veh/h	9	1	181	3	0	325
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	1	191	3	0	342
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	535	193	0	0	194	0
Stage 1	193	-	-	-	-	-
Stage 2	342	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	506	849	-	-	1379	-
Stage 1	840	-	-	-	-	-
Stage 2	719	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	506	849	-	-	1379	-
Mov Cap-2 Maneuver	506	-	-	-	-	-
Stage 1	840	-	-	-	-	-
Stage 2	719	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	12	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	527	1379	-	
HCM Lane V/C Ratio	-	-	0.02	-	-	
HCM Control Delay (s)	-	-	12	0	-	
HCM Lane LOS	-	-	B	A	-	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	













HCM 6th TWSC
5: Sterling Ranch Rd & Briargate Pkwy

2042 Baseline Traffic
AM Peak Hour

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↗↗	↰	↰	↗↗	↰	↰	↗	↰	↰	↗	↰
Traffic Vol, veh/h	2	468	0	4	807	2	1	1	8	6	1	9
Future Vol, veh/h	2	468	0	4	807	2	1	1	8	6	1	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Free	-	-	Free
Storage Length	535	-	0	310	-	0	410	-	155	235	-	155
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	493	0	4	849	2	1	1	8	6	1	9
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	851	0	0	493	0	0	930	1356	-	1108	1354	-
Stage 1	-	-	-	-	-	-	497	497	-	857	857	-
Stage 2	-	-	-	-	-	-	433	859	-	251	497	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	-	7.54	6.54	-
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	-	3.52	4.02	-
Pot Cap-1 Maneuver	783	-	-	1067	-	-	222	148	0	164	148	0
Stage 1	-	-	-	-	-	-	523	543	0	318	372	0
Stage 2	-	-	-	-	-	-	571	371	0	731	543	0
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	783	-	-	1067	-	-	220	147	-	162	147	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	220	147	-	162	147	-
Stage 1	-	-	-	-	-	-	521	541	-	317	371	-
Stage 2	-	-	-	-	-	-	567	370	-	728	541	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0			25.5			28.3		
HCM LOS							D			D		
Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	220	147	-	783	-	-	1067	-	-	162	147	-
HCM Lane V/C Ratio	0.005	0.007	-	0.003	-	-	0.004	-	-	0.039	0.007	-
HCM Control Delay (s)	21.4	29.7	0	9.6	-	-	8.4	-	-	28.1	29.7	0
HCM Lane LOS	C	D	A	A	-	-	A	-	-	D	D	A
HCM 95th %tile Q(veh)	0	0	-	0	-	-	0	-	-	0.1	0	-

Intersection												
Int Delay, s/veh	2.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↗	↘	↰	↗	↘	↰	↗	↘	↰	↗	↘
Traffic Vol, veh/h	1	873	10	26	791	1	39	8	55	1	4	1
Future Vol, veh/h	1	873	10	26	791	1	39	8	55	1	4	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	0	0	-	205	0	-	0	155	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	919	11	27	833	1	41	8	58	1	4	1
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	834	0	0	930	0	0	1394	1809	460	1353	1819	417
Stage 1	-	-	-	-	-	-	921	921	-	887	887	-
Stage 2	-	-	-	-	-	-	473	888	-	466	932	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	795	-	-	731	-	-	101	78	548	108	77	585
Stage 1	-	-	-	-	-	-	291	347	-	305	360	-
Stage 2	-	-	-	-	-	-	541	360	-	546	343	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	795	-	-	731	-	-	94	75	548	86	74	585
Mov Cap-2 Maneuver	-	-	-	-	-	-	94	75	-	86	74	-
Stage 1	-	-	-	-	-	-	291	347	-	305	347	-
Stage 2	-	-	-	-	-	-	514	347	-	476	343	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.3			38.1			47.5		
HCM LOS							E			E		
Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	94	75	548	795	-	-	731	-	-	86	74	585
HCM Lane V/C Ratio	0.437	0.112	0.106	0.001	-	-	0.037	-	-	0.012	0.057	0.002
HCM Control Delay (s)	70.1	59	12.3	9.5	-	-	10.1	-	-	47.4	56.6	11.2
HCM Lane LOS	F	F	B	A	-	-	B	-	-	E	F	B
HCM 95th %tile Q(veh)	1.8	0.4	0.4	0	-	-	0.1	-	-	0	0.2	0













Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	1	446	10	1	256
Future Vol, veh/h	6	1	446	10	1	256
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	1	469	11	1	269
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	746	475	0	0	480	0
Stage 1	475	-	-	-	-	-
Stage 2	271	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	381	590	-	-	1082	-
Stage 1	626	-	-	-	-	-
Stage 2	775	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	381	590	-	-	1082	-
Mov Cap-2 Maneuver	381	-	-	-	-	-
Stage 1	626	-	-	-	-	-
Stage 2	774	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	14.1	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	401	1082	-	
HCM Lane V/C Ratio	-	-	0.018	0.001	-	
HCM Control Delay (s)	-	-	14.1	8.3	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

Intersection												
Int Delay, s/veh	0.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	703	0	9	603	7	10	1	6	4	1	6
Future Vol, veh/h	8	703	0	9	603	7	10	1	6	4	1	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Free	-	-	Free
Storage Length	535	-	0	310	-	0	410	-	155	235	-	155
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	740	0	9	635	7	11	1	6	4	1	6

Major/Minor	Major1			Major2			Minor1		Minor2			
Conflicting Flow All	642	0	0	740	0	0	1092	1416	-	1040	1409	-
Stage 1	-	-	-	-	-	-	756	756	-	653	653	-
Stage 2	-	-	-	-	-	-	336	660	-	387	756	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	-	7.54	6.54	-
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	-	3.52	4.02	-
Pot Cap-1 Maneuver	939	-	-	862	-	-	169	136	0	185	137	0
Stage 1	-	-	-	-	-	-	366	414	0	423	462	0
Stage 2	-	-	-	-	-	-	652	458	0	608	414	0
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	939	-	-	862	-	-	166	133	-	181	134	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	166	133	-	181	134	-
Stage 1	-	-	-	-	-	-	363	410	-	419	457	-
Stage 2	-	-	-	-	-	-	644	453	-	601	410	-

Approach	EB			WB			NB		SB			
HCM Control Delay, s	0.1	-	-	0.1	-	-	28.6	-	26.7	-	-	-
HCM LOS	-	-	-	-	-	-	D	-	D	-	-	-

Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	166	133	-	939	-	-	862	-	-	181	134	-
HCM Lane V/C Ratio	0.063	0.008	-	0.009	-	-	0.011	-	-	0.023	0.008	-
HCM Control Delay (s)	28.2	32.3	0	8.9	-	-	9.2	-	-	25.4	32.1	0
HCM Lane LOS	D	D	A	A	-	-	A	-	-	D	D	A
HCM 95th %tile Q(veh)	0.2	0	-	0	-	-	0	-	-	0.1	0	-

Intersection												
Int Delay, s/veh	2.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	862	22	78	800	0	27	6	37	1	9	1
Future Vol, veh/h	0	862	22	78	800	0	27	6	37	1	9	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	0	0	-	205	0	-	0	155	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	907	23	82	842	0	28	6	39	1	9	1
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	842	0	0	930	0	0	1497	1913	454	1463	1936	421
Stage 1	-	-	-	-	-	-	907	907	-	1006	1006	-
Stage 2	-	-	-	-	-	-	590	1006	-	457	930	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	789	-	-	731	-	-	85	67	553	90	65	581
Stage 1	-	-	-	-	-	-	297	353	-	258	317	-
Stage 2	-	-	-	-	-	-	461	317	-	553	344	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	789	-	-	731	-	-	68	59	553	70	58	581
Mov Cap-2 Maneuver	-	-	-	-	-	-	68	59	-	70	58	-
Stage 1	-	-	-	-	-	-	297	353	-	258	281	-
Stage 2	-	-	-	-	-	-	395	281	-	505	344	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.9			47.9			70.7		
HCM LOS							E			F		
Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	68	59	553	789	-	-	731	-	-	70	58	581
HCM Lane V/C Ratio	0.418	0.107	0.07	-	-	-	0.112	-	-	0.015	0.163	0.002
HCM Control Delay (s)	91.6	73.2	12	0	-	-	10.5	-	-	57.2	78.8	11.2
HCM Lane LOS	F	F	B	A	-	-	B	-	-	F	F	B
HCM 95th %tile Q(veh)	1.6	0.3	0.2	0	-	-	0.4	-	-	0	0.5	0




HCM 6th Roundabout
1: Vollmer Rd & Burgess Rd

2042 Total Traffic
AM Peak Hour

Intersection					
Intersection Delay, s/veh	8.2				
Intersection LOS	A				
Approach	EB	WB	NB	SB	
Entry Lanes	1	1	1	1	
Conflicting Circle Lanes	1	1	1	1	
Adj Approach Flow, veh/h	129	586	324	279	
Demand Flow Rate, veh/h	131	597	330	284	
Vehicles Circulating, veh/h	385	268	120	525	
Vehicles Exiting, veh/h	424	116	396	340	
Ped Vol Crossing Leg, #/h	0	0	0	0	
Ped Cap Adj	1.000	1.000	1.000	1.000	
Approach Delay, s/veh	5.3	10.8	3.9	8.7	
Approach LOS	A	B	A	A	
Lane	Left	Left	Left	Bypass	Left
Designated Moves	LTR	LTR	LT	R	LTR
Assumed Moves	LTR	LTR	LT	R	LTR
RT Channelized				Free	
Lane Util	1.000	1.000	1.000		1.000
Follow-Up Headway, s	2.609	2.609	2.609		2.609
Critical Headway, s	4.976	4.976	4.976	66	4.976
Entry Flow, veh/h	131	597	264	1938	284
Cap Entry Lane, veh/h	932	1050	1221	0.980	808
Entry HV Adj Factor	0.982	0.981	0.980	65	0.981
Flow Entry, veh/h	129	586	259	1900	279
Cap Entry, veh/h	915	1030	1197	0.034	793
V/C Ratio	0.141	0.569	0.216	0.0	0.352
Control Delay, s/veh	5.3	10.8	4.9	A	8.7
LOS	A	B	A	0	A
95th %tile Queue, veh	0	4	1		2

























HCM 6th TWSC
2: Vollmer Rd & Arroya Ln

2042 Total Traffic
AM Peak Hour

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	13	5	248	5	2	367
Future Vol, veh/h	13	5	248	5	2	367
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	5	261	5	2	386
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	654	264	0	0	266	0
Stage 1	264	-	-	-	-	-
Stage 2	390	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	431	775	-	-	1298	-
Stage 1	780	-	-	-	-	-
Stage 2	684	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	430	775	-	-	1298	-
Mov Cap-2 Maneuver	430	-	-	-	-	-
Stage 1	780	-	-	-	-	-
Stage 2	683	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	12.6	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt		NBT	NBRWBLn1	SBL	SBT	
Capacity (veh/h)		-	-	491	1298	-
HCM Lane V/C Ratio		-	-	0.039	0.002	-
HCM Control Delay (s)		-	-	12.6	7.8	0
HCM Lane LOS		-	-	B	A	A
HCM 95th %tile Q(veh)		-	-	0.1	0	-

Timings 3: Black Forest Rd & Briarate Pkwy

2042 Total Traffic
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	466	350	97	1054	120	509	314	45	62	644	65
Future Volume (vph)	150	466	350	97	1054	120	509	314	45	62	644	65
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Free	pm+pt	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		Free			Free	6		Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	8.0	15.0		8.0	15.0		8.0	15.0		8.0	15.0	
Minimum Split (s)	13.0	23.0		13.0	23.0		15.0	23.0		13.0	23.0	
Total Split (s)	15.0	40.0		22.0	47.0		25.0	46.0		13.0	33.0	
Total Split (%)	12.4%	33.1%		18.2%	38.8%		20.7%	38.0%		10.7%	27.3%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effect Green (s)	51.1	41.1	121.0	50.6	40.9	121.0	20.3	44.7	121.0	37.8	29.8	121.0
Actuated g/C Ratio	0.42	0.34	1.00	0.42	0.34	1.00	0.17	0.37	1.00	0.31	0.25	1.00
v/c Ratio	0.76	0.41	0.23	0.27	0.93	0.08	0.93	0.25	0.03	0.18	0.78	0.04
Control Delay	48.8	31.9	0.3	20.3	52.5	0.1	73.9	28.4	0.0	21.7	49.9	0.0
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	48.8	31.9	0.3	20.3	52.5	0.1	73.9	28.4	0.0	21.7	49.9	0.0
LOS	D	C	A	C	D	A	E	C	A	C	D	A
Approach Delay		23.1			45.1			53.6			43.4	
Approach LOS		C			D			D			D	

Intersection Summary

Cycle Length: 121

Actuated Cycle Length: 121

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 41.2

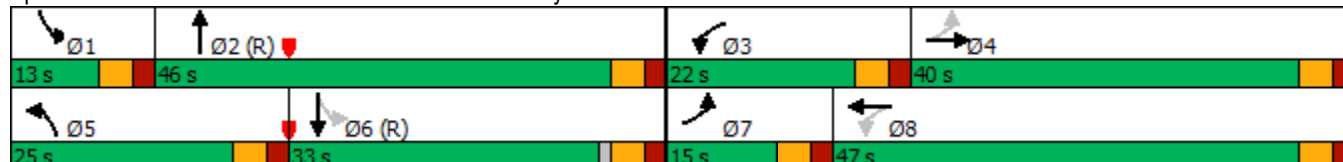
Intersection LOS: D

Intersection Capacity Utilization 86.4%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 3: Black Forest Rd & Briarate Pkwy



























Timings

4: Vollmer Rd & Briargate Pkwy

2042 Total Traffic

AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	548	64	239	1024	96	90	132	111	121	305	138
Future Volume (vph)	69	548	64	239	1024	96	90	132	111	121	305	138
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	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
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	15.0	15.0	15.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	20.0	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	12.0	57.0	57.0	20.0	65.0	65.0	17.0	28.0	28.0	15.0	26.0	26.0
Total Split (%)	10.0%	47.5%	47.5%	16.7%	54.2%	54.2%	14.2%	23.3%	23.3%	12.5%	21.7%	21.7%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	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 Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None	None
Act Effect Green (s)	58.8	52.1	52.1	15.0	62.8	62.8	25.7	16.0	16.0	25.3	15.7	15.7
Actuated g/C Ratio	0.52	0.46	0.46	0.13	0.56	0.56	0.23	0.14	0.14	0.22	0.14	0.14
v/c Ratio	0.25	0.34	0.08	0.55	0.55	0.11	0.38	0.27	0.33	0.39	0.65	0.41
Control Delay	11.8	20.8	0.2	51.7	18.7	2.8	35.6	44.0	5.1	35.9	52.5	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	0.0
Total Delay	11.8	20.8	0.2	51.7	18.7	2.8	35.6	44.0	5.1	35.9	52.5	9.4
LOS	B	C	A	D	B	A	D	D	A	D	D	A
Approach Delay		17.9			23.4			28.6			38.4	
Approach LOS		B			C			C			D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 112.7

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 25.6

Intersection LOS: C

Intersection Capacity Utilization 62.6%

ICU Level of Service B

























Analysis Period (min) 15

Splits and Phases: 4: Vollmer Rd & Briargate Pkwy



Timings 5: Sterling Ranch Rd & Briargate Pkwy

2042 Total Traffic
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	624	137	103	945	24	269	115	120	103	263	158
Future Volume (vph)	77	624	137	103	945	24	269	115	120	103	263	158
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		Free	4		Free
Detector Phase	5	2	2	1	6	6	3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0		5.0	20.0	
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	25.0		10.0	25.0	
Total Split (s)	12.0	56.0	56.0	12.0	56.0	56.0	20.0	32.0		20.0	32.0	
Total Split (%)	10.0%	46.7%	46.7%	10.0%	46.7%	46.7%	16.7%	26.7%		16.7%	26.7%	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max		None	Max	
Act Effect Green (s)	57.9	51.1	51.1	59.0	53.4	53.4	45.9	31.7	120.0	37.5	27.3	120.0
Actuated g/C Ratio	0.48	0.43	0.43	0.49	0.44	0.44	0.38	0.26	1.00	0.31	0.23	1.00
v/c Ratio	0.35	0.44	0.19	0.31	0.63	0.03	0.79	0.25	0.08	0.25	0.65	0.10
Control Delay	18.6	25.5	4.0	17.1	28.6	0.1	45.2	37.3	0.1	25.7	50.6	0.1
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	18.6	25.5	4.0	17.1	28.6	0.1	45.2	37.3	0.1	25.7	50.6	0.1
LOS	B	C	A	B	C	A	D	D	A	C	D	A
Approach Delay		21.3			26.9			32.7			30.5	
Approach LOS		C			C			C			C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 63 (53%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 26.9

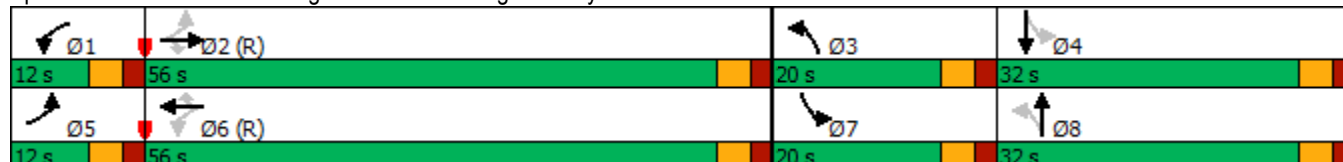
Intersection LOS: C

Intersection Capacity Utilization 78.6%

ICU Level of Service D

























Analysis Period (min) 15

Splits and Phases: 5: Sterling Ranch Rd & Briargate Pkwy



Timings 6: Banning Lewis Pkwy & Briargate Pkwy

2042 Total Traffic
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	488	352	300	661	13	312	61	291	53	200	2
Future Volume (vph)	2	488	352	300	661	13	312	61	291	53	200	2
Turn Type	pm+pt	NA	Free	Prot	NA	Perm	Prot	NA	Free	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		Free			6			Free	4		4
Detector Phase	5	2		1	6	6	3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	15.0		8.0	15.0	15.0	8.0	10.0		5.0	10.0	10.0
Minimum Split (s)	15.0	20.0		20.0	20.0	20.0	13.0	15.0		13.0	15.0	15.0
Total Split (s)	15.0	43.0		20.0	51.0	51.0	32.0	45.0		13.0	25.0	25.0
Total Split (%)	12.1%	34.7%		16.1%	41.1%	41.1%	25.8%	36.3%		10.5%	20.2%	20.2%
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	-2.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	3.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	C-Max		None	C-Max	C-Max	None	Max		None	Max	Max
Act Effect Green (s)	47.1	41.5	124.0	14.5	60.8	58.8	17.1	42.9	124.0	38.2	30.9	30.9
Actuated g/C Ratio	0.38	0.33	1.00	0.12	0.49	0.47	0.14	0.35	1.00	0.31	0.25	0.25
v/c Ratio	0.01	0.43	0.23	0.79	0.40	0.02	0.69	0.05	0.19	0.13	0.24	0.00
Control Delay	17.0	33.7	0.3	67.9	21.5	0.0	58.7	28.9	0.3	23.0	38.9	0.0
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	17.0	33.7	0.3	67.9	21.5	0.0	58.7	28.9	0.3	23.0	38.9	0.0
LOS	B	C	A	E	C	A	E	C	A	C	D	A
Approach Delay		19.7			35.5			30.3			35.3	
Approach LOS		B			D			C			D	

Intersection Summary

Cycle Length: 124

Actuated Cycle Length: 124

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 29.4

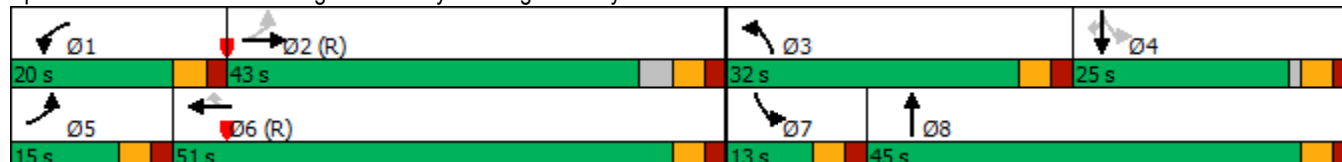
Intersection LOS: C







Intersection Capacity Utilization 55.9%

ICU Level of Service B

Analysis Period (min) 15










Splits and Phases: 6: Banning Lewis Pkwy & Briargate Pkwy



Intersection						
Int Delay, s/veh	1.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	43	48	285	26	10	597
Future Vol, veh/h	43	48	285	26	10	597
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	155	205	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	45	51	300	27	11	628
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	636	150	0	0	327	0
Stage 1	300	-	-	-	-	-
Stage 2	336	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	410	870	-	-	1229	-
Stage 1	725	-	-	-	-	-
Stage 2	696	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	406	870	-	-	1229	-
Mov Cap-2 Maneuver	508	-	-	-	-	-
Stage 1	725	-	-	-	-	-
Stage 2	690	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	11	0	0.1			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 508 870 1229	-	-		
HCM Lane V/C Ratio	-	- 0.089 0.058 0.009	-	-		
HCM Control Delay (s)	-	- 12.8 9.4 8	-	-		
HCM Lane LOS	-	- B A A	-	-		
HCM 95th %tile Q(veh)	-	- 0.3 0.2 0	-	-		

HCM 6th TWSC
8: Sterling Ranch Rd & School Access/E-W Collector

2042 Total Traffic
AM Peak Hour

Intersection												
Int Delay, s/veh	10.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	125	58	102	165	0	186	0	366	110	63	245	3
Future Vol, veh/h	125	58	102	165	0	186	0	366	110	63	245	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	0	-	0	-	-	205	205	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	132	61	107	174	0	196	0	385	116	66	258	3








Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	933	893	260	861	-	385	-	0	0	501	0	0
Stage 1	392	392	-	385	-	-	-	-	-	-	-	-
Stage 2	541	501	-	476	-	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	-	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	-	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	246	281	779	276	0	663	0	-	-	1063	-	-
Stage 1	633	606	-	638	0	-	0	-	-	-	-	-
Stage 2	525	543	-	570	0	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	165	264	779	197	-	663	-	-	-	1063	-	-
Mov Cap-2 Maneuver	248	355	-	311	-	-	-	-	-	-	-	-
Stage 1	633	568	-	638	-	-	-	-	-	-	-	-
Stage 2	370	543	-	411	-	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	22.5		21		0		1.7	
HCM LOS	C		C					

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	-	-	248	355	779	311	663	1063	-	-
HCM Lane V/C Ratio	-	-	0.531	0.172	0.138	0.558	0.295	0.062	-	-
HCM Control Delay (s)	-	-	34.8	17.2	10.4	30.3	12.7	8.6	-	-
HCM Lane LOS	-	-	D	C	B	D	B	A	-	-
HCM 95th %tile Q(veh)	-	-	2.8	0.6	0.5	3.2	1.2	0.2	-	-

Timings 9: Banning Lewis Pkwy & E-W Collector

2042 Total Traffic
AM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	19	273	124	645	802	50
Future Volume (vph)	19	273	124	645	802	50
Turn Type	Prot	Free	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		Free	2			6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	15.0		8.0	15.0	15.0	15.0
Minimum Split (s)	20.0		13.0	20.0	20.0	20.0
Total Split (s)	30.0		12.0	90.0	78.0	78.0
Total Split (%)	25.0%		10.0%	75.0%	65.0%	65.0%
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0	5.0	5.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None		None	C-Max	C-Max	C-Max
Act Effect Green (s)	15.0	120.0	107.0	110.0	93.8	93.8
Actuated g/C Ratio	0.12	1.00	0.89	0.92	0.78	0.78
v/c Ratio	0.09	0.18	0.23	0.21	0.31	0.04
Control Delay	47.7	0.3	2.6	1.8	5.2	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.7	0.3	2.6	1.8	5.2	1.8
LOS	D	A	A	A	A	A
Approach Delay	3.3			1.9	5.0	
Approach LOS	A			A	A	

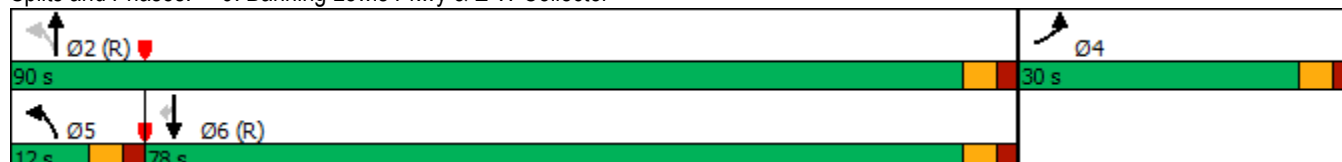
Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.31
Intersection Signal Delay: 3.5
Intersection Capacity Utilization 54.0%
Analysis Period (min) 15

Intersection LOS: A









ICU Level of Service A

Splits and Phases: 9: Banning Lewis Pkwy & E-W Collector



HCM 6th TWSC
10: Dines Blvd & Sterling Ranch Rd

2042 Total Traffic
AM Peak Hour

Intersection												
Int Delay, s/veh	2.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	299	7	3	542	14	21	1	9	27	0	68
Future Vol, veh/h	25	299	7	3	542	14	21	1	9	27	0	68
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	205	-	155	205	-	-	-	-	-	-	-	155
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	26	315	7	3	571	15	22	1	9	28	0	72

























Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	586	0	0	322	0	0	988	959	315	961	959	579
Stage 1	-	-	-	-	-	-	367	367	-	585	585	-
Stage 2	-	-	-	-	-	-	621	592	-	376	374	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	989	-	-	1238	-	-	226	257	725	236	257	515
Stage 1	-	-	-	-	-	-	653	622	-	497	498	-
Stage 2	-	-	-	-	-	-	475	494	-	645	618	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	989	-	-	1238	-	-	190	250	725	227	250	515
Mov Cap-2 Maneuver	-	-	-	-	-	-	190	250	-	227	250	-
Stage 1	-	-	-	-	-	-	636	606	-	484	497	-
Stage 2	-	-	-	-	-	-	408	493	-	619	602	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0	22	15.9
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	244	989	-	-	1238	-	-	227	515
HCM Lane V/C Ratio	0.134	0.027	-	-	0.003	-	-	0.125	0.139
HCM Control Delay (s)	22	8.7	-	-	7.9	-	-	23.1	13.1
HCM Lane LOS	C	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0	-	-	0.4	0.5

Timings
11: Black Forest Rd & Research Pkwy

2042 Total Traffic
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	200	527	100	100	705	248	275	366	100	349	450	375
Future Volume (vph)	200	527	100	100	705	248	275	366	100	349	450	375
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		Free	2		Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0		5.0	15.0		8.0	15.0	
Minimum Split (s)	10.0	23.0		10.0	23.0		10.0	23.0		15.0	23.0	
Total Split (s)	19.0	44.0		15.0	40.0		12.0	36.0		25.0	49.0	
Total Split (%)	15.8%	36.7%		12.5%	33.3%		10.0%	30.0%		20.8%	40.8%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effect Green (s)	47.8	34.3	120.0	39.2	30.0	120.0	50.0	39.0	120.0	17.5	45.5	120.0
Actuated g/C Ratio	0.40	0.29	1.00	0.33	0.25	1.00	0.42	0.32	1.00	0.15	0.38	1.00
v/c Ratio	0.81	0.55	0.07	0.36	0.84	0.16	0.64	0.33	0.07	0.74	0.35	0.25
Control Delay	50.8	38.1	0.1	25.5	51.8	0.2	33.4	36.2	0.1	58.1	28.1	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.8	38.1	0.1	25.5	51.8	0.2	33.4	36.2	0.1	58.1	28.1	0.4
LOS	D	D	A	C	D	A	C	D	A	E	C	A
Approach Delay		36.6			37.2			30.3			28.2	
Approach LOS		D			D			C			C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 32.9

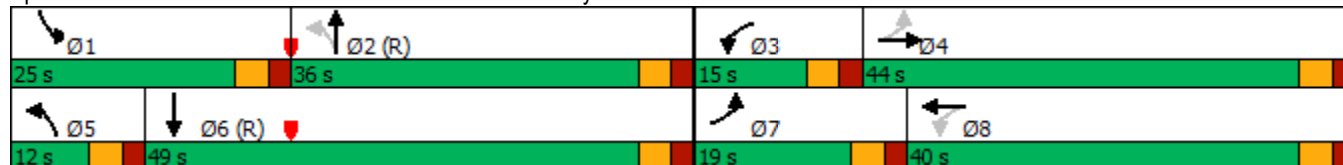
Intersection LOS: C

Intersection Capacity Utilization 75.0%

ICU Level of Service D

























Analysis Period (min) 15

Splits and Phases: 11: Black Forest Rd & Research Pkwy



Timings
12: Vollmer Rd & Marksheffel Rd

2042 Total Traffic
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	836	42	148	922	70	115	170	94	120	388	132
Future Volume (vph)	72	836	42	148	922	70	115	170	94	120	388	132
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	12.0	66.0	66.0	12.0	66.0	66.0	12.0	30.0	30.0	12.0	30.0	30.0
Total Split (%)	10.0%	55.0%	55.0%	10.0%	55.0%	55.0%	10.0%	25.0%	25.0%	10.0%	25.0%	25.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	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 Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max	Max	None	Max	Max
Act Effect Green (s)	67.7	61.0	61.0	69.0	63.4	63.4	32.0	25.0	25.0	32.0	25.0	25.0
Actuated g/C Ratio	0.56	0.51	0.51	0.58	0.53	0.53	0.27	0.21	0.21	0.27	0.21	0.21
v/c Ratio	0.25	0.49	0.05	0.47	0.52	0.08	0.51	0.24	0.24	0.36	0.55	0.32
Control Delay	11.9	20.5	0.1	13.2	9.3	0.2	39.9	40.7	7.6	35.1	45.8	8.5
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	11.9	20.5	0.1	13.2	9.3	0.2	39.9	40.7	7.6	35.1	45.8	8.5
LOS	B	C	A	B	A	A	D	D	A	D	D	A
Approach Delay		18.9			9.3			32.2			36.1	
Approach LOS		B			A			C			D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 20.5

Intersection LOS: C

Intersection Capacity Utilization 65.1%

ICU Level of Service C

























Analysis Period (min) 15

Splits and Phases: 12: Vollmer Rd & Marksheffel Rd



Timings
13: Sterling Ranch Rd & Marksheffel Rd

2042 Total Traffic
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	139	900	10	47	809	171	39	8	55	460	9	292
Future Volume (vph)	139	900	10	47	809	171	39	8	55	460	9	292
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	10.0	10.0	20.0	10.0	10.0
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0	20.0	10.0	15.0	15.0	25.0	20.0	20.0
Total Split (s)	12.0	51.0	51.0	12.0	51.0	51.0	12.0	25.0	25.0	32.0	45.0	45.0
Total Split (%)	10.0%	42.5%	42.5%	10.0%	42.5%	42.5%	10.0%	20.8%	20.8%	26.7%	37.5%	37.5%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	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 Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effect Green (s)	74.1	65.6	65.6	67.4	60.5	60.5	14.6	10.0	10.0	22.7	25.1	25.1
Actuated g/C Ratio	0.62	0.55	0.55	0.56	0.50	0.50	0.12	0.08	0.08	0.19	0.21	0.21
v/c Ratio	0.39	0.49	0.01	0.15	0.48	0.20	0.21	0.05	0.21	0.75	0.02	0.57
Control Delay	17.2	15.3	0.0	12.0	22.3	3.6	32.8	51.6	1.8	53.5	35.6	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.2	15.3	0.0	12.0	22.3	3.6	32.8	51.6	1.8	53.5	35.6	11.6
LOS	B	B	A	B	C	A	C	D	A	D	D	B
Approach Delay		15.4			18.7			17.4			37.2	
Approach LOS		B			B			B			D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 22.3

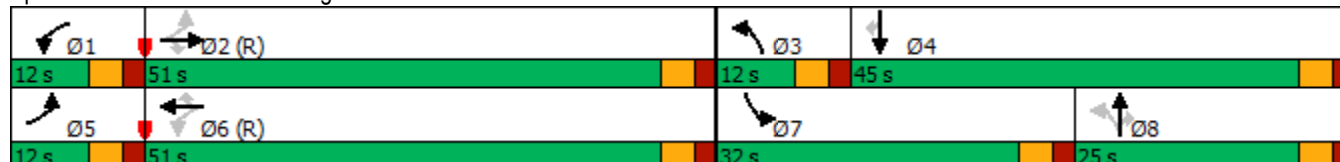
Intersection LOS: C

Intersection Capacity Utilization 62.4%

ICU Level of Service B

























Analysis Period (min) 15

Splits and Phases: 13: Sterling Ranch Rd & Marksheffel Rd



Timings
14: Black Forest Rd & Vollmer Rd

2042 Total Traffic
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	24	39	740	19	130	36	500	546	95	1270	14
Future Volume (vph)	23	24	39	740	19	130	36	500	546	95	1270	14
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4			8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	10.0	15.0	15.0	10.0	15.0	15.0	10.0	20.0	20.0	10.0	20.0	20.0
Total Split (s)	12.0	23.0	23.0	39.0	50.0	50.0	12.0	46.0	46.0	12.0	46.0	46.0
Total Split (%)	10.0%	19.2%	19.2%	32.5%	41.7%	41.7%	10.0%	38.3%	38.3%	10.0%	38.3%	38.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	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 Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	14.4	10.0	10.0	31.1	36.0	36.0	59.8	53.0	53.0	65.6	59.4	59.4
Actuated g/C Ratio	0.12	0.08	0.08	0.26	0.30	0.30	0.50	0.44	0.44	0.55	0.50	0.50
v/c Ratio	0.13	0.16	0.15	0.88	0.04	0.24	0.23	0.34	0.56	0.22	0.76	0.02
Control Delay	27.6	53.8	1.2	54.3	29.2	6.1	12.6	11.2	10.9	17.7	36.2	0.1
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	27.6	53.8	1.2	54.3	29.2	6.1	12.6	11.2	10.9	17.7	36.2	0.1
LOS	C	D	A	D	C	A	B	B	B	B	D	A
Approach Delay		22.8			46.7			11.1			34.6	
Approach LOS		C			D			B			C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 30.0

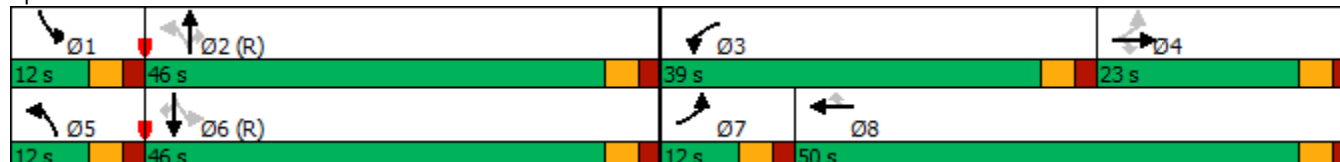
Intersection LOS: C

Intersection Capacity Utilization 79.6%

ICU Level of Service D

























Analysis Period (min) 15

Splits and Phases: 14: Black Forest Rd & Vollmer Rd



Timings
15: Black Forest Rd & Woodmen Rd

2042 Total Traffic
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	448	888	200	294	1790	350	360	273	178	400	244	1095
Future Volume (vph)	448	888	200	294	1790	350	360	273	178	400	244	1095
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free			Free			Free			Free
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	10.0	23.0		10.0	23.0		10.0	23.0		10.0	23.0	
Total Split (s)	23.0	56.0		20.0	53.0		20.0	24.0		20.0	24.0	
Total Split (%)	19.2%	46.7%		16.7%	44.2%		16.7%	20.0%		16.7%	20.0%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	
Act Effect Green (s)	17.8	51.9	120.0	14.1	48.2	120.0	14.8	19.0	120.0	15.0	19.2	120.0
Actuated g/C Ratio	0.15	0.43	1.00	0.12	0.40	1.00	0.12	0.16	1.00	0.12	0.16	1.00
v/c Ratio	0.90	0.41	0.13	0.74	0.89	0.23	0.87	0.50	0.11	0.95	0.31	0.71
Control Delay	71.7	24.4	0.2	51.0	34.7	0.2	72.4	49.6	0.1	75.4	35.9	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.7	24.4	0.2	51.0	34.7	0.2	72.4	49.6	0.1	75.4	35.9	6.4
LOS	E	C	A	D	C	A	E	D	A	E	D	A
Approach Delay		35.0			31.7			48.8			26.4	
Approach LOS		D			C			D			C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 33.2

Intersection LOS: C

Intersection Capacity Utilization 83.8%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 15: Black Forest Rd & Woodmen Rd



Timings
16: Marksheffel Rd & Woodmen Rd

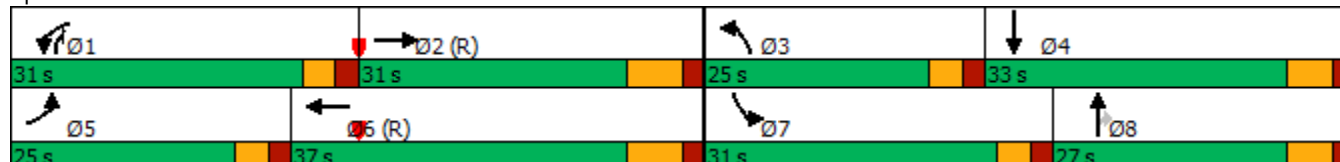
2042 Total Traffic
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	263	791	413	563	1595	315	535	352	307	348	489	304
Future Volume (vph)	263	791	413	563	1595	315	535	352	307	348	489	304
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	pm+ov	Prot	NA	Free
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases			Free			Free			8			Free
Detector Phase	5	2		1	6		3	8	1	7	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	9.0	11.0		9.0	11.0		9.0	10.0	9.0	9.0	10.0	
Total Split (s)	25.0	31.0		31.0	37.0		25.0	27.0	31.0	31.0	33.0	
Total Split (%)	20.8%	25.8%		25.8%	30.8%		20.8%	22.5%	25.8%	25.8%	27.5%	
Yellow Time (s)	3.0	5.0		3.0	5.0		3.0	4.0	3.0	3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	7.0		5.0	7.0		5.0	6.0	5.0	5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	None	None	None	None	
Act Effect Green (s)	14.6	30.5	120.0	24.4	40.4	120.0	20.0	24.4	54.8	17.7	22.0	120.0
Actuated g/C Ratio	0.12	0.25	1.00	0.20	0.34	1.00	0.17	0.20	0.46	0.15	0.18	1.00
v/c Ratio	0.64	0.62	0.27	0.82	0.95	0.20	0.95	0.50	0.40	0.70	0.77	0.20
Control Delay	71.6	40.7	0.4	56.1	52.7	0.3	77.8	45.1	13.4	56.2	54.7	0.3
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	71.6	40.7	0.4	56.1	52.7	0.3	77.8	45.1	13.4	56.2	54.7	0.3
LOS	E	D	A	E	D	A	E	D	B	E	D	A
Approach Delay		34.9			46.8			51.6			40.7	
Approach LOS		C			D			D			D	

Intersection Summary

























Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green, Master Intersection
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.95
 Intersection Signal Delay: 43.8
 Intersection LOS: D
 Intersection Capacity Utilization 86.3%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 16: Marksheffel Rd & Woodmen Rd



Timings
17: Banning Lewis Pkwy & Woodmen Rd

2042 Total Traffic
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	308	586	534	211	1179	89	762	369	173	170	623	322
Future Volume (vph)	308	586	534	211	1179	89	762	369	173	170	623	322
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free			Free			Free			Free
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	10.0	20.0		10.0	20.0		10.0	15.0		10.0	15.0	
Total Split (s)	19.0	41.0		15.0	37.0		30.0	47.0		17.0	34.0	
Total Split (%)	15.8%	34.2%		12.5%	30.8%		25.0%	39.2%		14.2%	28.3%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	
Act Effect Green (s)	13.7	36.0	120.0	10.0	32.3	120.0	25.0	43.2	120.0	10.8	29.0	120.0
Actuated g/C Ratio	0.11	0.30	1.00	0.08	0.27	1.00	0.21	0.36	1.00	0.09	0.24	1.00
v/c Ratio	0.83	0.40	0.36	0.78	0.91	0.06	1.12	0.31	0.11	0.58	0.77	0.21
Control Delay	70.0	34.4	0.6	73.1	53.1	0.1	115.9	28.7	0.2	59.9	49.3	0.3
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	70.0	34.4	0.6	73.1	53.1	0.1	115.9	28.7	0.2	59.9	49.3	0.3
LOS	E	C	A	E	D	A	F	C	A	E	D	A
Approach Delay		29.5			52.7			75.9			36.8	
Approach LOS		C			D			E			D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.12

Intersection Signal Delay: 48.8

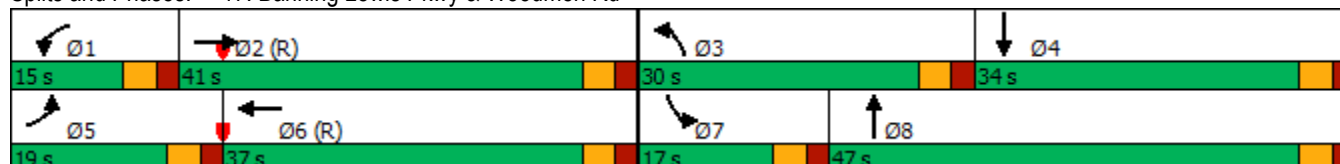
Intersection LOS: D

Intersection Capacity Utilization 87.2%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 17: Banning Lewis Pkwy & Woodmen Rd






HCM 6th Roundabout
1: Vollmer Rd & Burgess Rd

2042 Total Traffic
PM Peak Hour

Intersection					
Intersection Delay, s/veh	12.1				
Intersection LOS	B				
Approach	EB	WB	NB	SB	
Entry Lanes	1	1	1	1	
Conflicting Circle Lanes	1	1	1	1	
Adj Approach Flow, veh/h	447	369	712	388	
Demand Flow Rate, veh/h	456	376	726	396	
Vehicles Circulating, veh/h	493	548	591	375	
Vehicles Exiting, veh/h	278	577	358	549	
Ped Vol Crossing Leg, #/h	0	0	0	0	
Ped Cap Adj	1.000	1.000	1.000	1.000	
Approach Delay, s/veh	12.3	11.2	14.2	8.8	
Approach LOS	B	B	B	A	
Lane	Left	Left	Left	Bypass	Left
Designated Moves	LTR	LTR	LT	R	LTR
Assumed Moves	LTR	LTR	LT	R	LTR
RT Channelized				Free	
Lane Util	1.000	1.000	1.000		1.000
Follow-Up Headway, s	2.609	2.609	2.609		2.609
Critical Headway, s	4.976	4.976	4.976	192	4.976
Entry Flow, veh/h	456	376	534	1938	396
Cap Entry Lane, veh/h	835	789	755	0.980	941
Entry HV Adj Factor	0.981	0.982	0.981	188	0.980
Flow Entry, veh/h	447	369	524	1900	388
Cap Entry, veh/h	819	775	741	0.099	923
V/C Ratio	0.546	0.477	0.707	0.0	0.421
Control Delay, s/veh	12.3	11.2	19.2	A	8.8
LOS	B	B	C	0	A
95th %tile Queue, veh	3	3	6		2

























HCM 6th TWSC
2: Vollmer Rd & Arroya Ln

2042 Total Traffic
PM Peak Hour

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	4	500	16	6	327
Future Vol, veh/h	10	4	500	16	6	327
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	4	526	17	6	344
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	891	535	0	0	543	0
Stage 1	535	-	-	-	-	-
Stage 2	356	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	313	545	-	-	1026	-
Stage 1	587	-	-	-	-	-
Stage 2	709	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	311	545	-	-	1026	-
Mov Cap-2 Maneuver	311	-	-	-	-	-
Stage 1	587	-	-	-	-	-
Stage 2	704	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	15.6	0	0.2			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	354	1026	-	
HCM Lane V/C Ratio	-	-	0.042	0.006	-	
HCM Control Delay (s)	-	-	15.6	8.5	0	
HCM Lane LOS	-	-	C	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

Timings 3: Black Forest Rd & Briarate Pkwy

2042 Total Traffic
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	190	1032	349	163	734	74	434	794	208	101	524	210
Future Volume (vph)	190	1032	349	163	734	74	434	794	208	101	524	210
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Free	pm+pt	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		Free			Free	6		Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	8.0	15.0		8.0	15.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	13.0	23.0		13.0	23.0		10.0	23.0		10.0	23.0	
Total Split (s)	20.0	49.0		17.0	46.0		23.0	42.0		12.0	31.0	
Total Split (%)	16.7%	40.8%		14.2%	38.3%		19.2%	35.0%		10.0%	25.8%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effect Green (s)	54.1	41.2	120.0	51.1	39.7	120.0	18.5	39.9	120.0	36.4	28.9	120.0
Actuated g/C Ratio	0.45	0.34	1.00	0.43	0.33	1.00	0.15	0.33	1.00	0.30	0.24	1.00
v/c Ratio	0.65	0.89	0.23	0.75	0.66	0.05	0.86	0.71	0.14	0.51	0.65	0.14
Control Delay	28.1	47.5	0.3	45.7	37.3	0.1	50.2	29.9	0.1	32.5	46.0	0.2
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	28.1	47.5	0.3	45.7	37.3	0.1	50.2	29.9	0.1	32.5	46.0	0.2
LOS	C	D	A	D	D	A	D	C	A	C	D	A
Approach Delay		34.7			35.9			31.8			32.8	
Approach LOS		C			D			C			C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 33.7

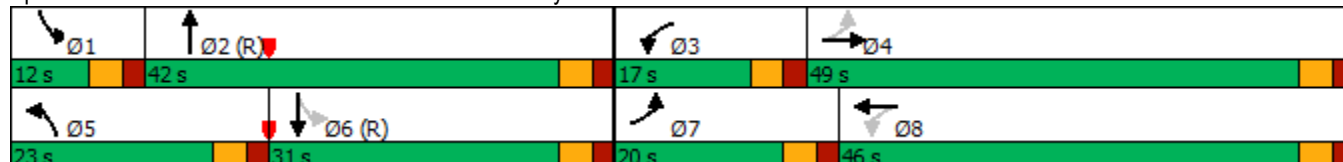
Intersection LOS: C

Intersection Capacity Utilization 81.8%

ICU Level of Service D

























Analysis Period (min) 15

Splits and Phases: 3: Black Forest Rd & Briarate Pkwy



Timings 4: Vollmer Rd & Briargate Pkwy

2042 Total Traffic
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	227	1010	122	210	743	74	167	415	283	109	211	118
Future Volume (vph)	227	1010	122	210	743	74	167	415	283	109	211	118
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	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
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	15.0	15.0	15.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	20.0	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	12.0	57.0	57.0	20.0	65.0	65.0	17.0	28.0	28.0	15.0	26.0	26.0
Total Split (%)	10.0%	47.5%	47.5%	16.7%	54.2%	54.2%	14.2%	23.3%	23.3%	12.5%	21.7%	21.7%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	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 Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None	None
Act Effect Green (s)	59.1	52.1	52.1	15.0	60.1	60.1	31.1	19.6	19.6	26.9	17.5	17.5
Actuated g/C Ratio	0.51	0.45	0.45	0.13	0.52	0.52	0.27	0.17	0.17	0.23	0.15	0.15
v/c Ratio	0.62	0.65	0.16	0.50	0.43	0.09	0.54	0.71	0.64	0.50	0.42	0.34
Control Delay	21.7	27.9	2.3	52.1	18.8	1.4	38.6	52.6	17.5	38.6	47.0	5.7
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	21.7	27.9	2.3	52.1	18.8	1.4	38.6	52.6	17.5	38.6	47.0	5.7
LOS	C	C	A	D	B	A	D	D	B	D	D	A
Approach Delay		24.5			24.3			38.2			33.8	
Approach LOS		C			C			D			C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 116.1

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 28.8

Intersection LOS: C

Intersection Capacity Utilization 74.6%

ICU Level of Service D

























Analysis Period (min) 15

Splits and Phases: 4: Vollmer Rd & Briargate Pkwy



Timings 5: Sterling Ranch Rd & Briargate Pkwy

2042 Total Traffic
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	329	923	129	152	827	105	191	190	83	86	87	133
Future Volume (vph)	329	923	129	152	827	105	191	190	83	86	87	133
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		Free	4		Free
Detector Phase	5	2	2	1	6	6	3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0		5.0	20.0	
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	23.0	10.0	25.0		10.0	25.0	
Total Split (s)	22.0	68.0	68.0	12.0	58.0	58.0	15.0	30.0		10.0	25.0	
Total Split (%)	18.3%	56.7%	56.7%	10.0%	48.3%	48.3%	12.5%	25.0%		8.3%	20.8%	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Act Effect Green (s)	75.0	63.0	63.0	61.2	54.2	54.2	35.0	25.0	120.0	25.0	20.0	120.0
Actuated g/C Ratio	0.62	0.52	0.52	0.51	0.45	0.45	0.29	0.21	1.00	0.21	0.17	1.00
v/c Ratio	0.83	0.52	0.15	0.51	0.55	0.14	0.56	0.52	0.05	0.36	0.30	0.09
Control Delay	30.8	19.9	2.8	18.4	25.8	5.5	41.1	47.6	0.1	38.3	46.8	0.1
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	30.8	19.9	2.8	18.4	25.8	5.5	41.1	47.6	0.1	38.3	46.8	0.1
LOS	C	B	A	B	C	A	D	D	A	D	D	A
Approach Delay		20.9			22.8			36.5			24.2	
Approach LOS		C			C			D			C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 24.1

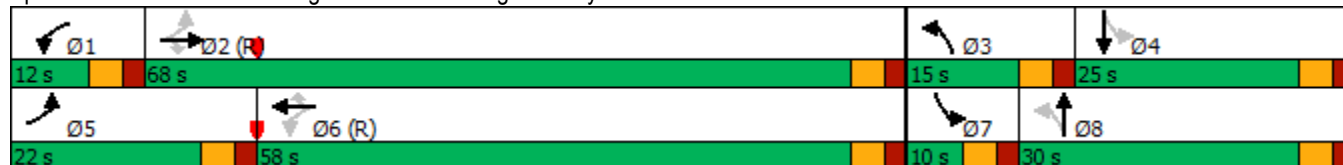
Intersection LOS: C

Intersection Capacity Utilization 85.0%

ICU Level of Service E

























Analysis Period (min) 15

Splits and Phases: 5: Sterling Ranch Rd & Briargate Pkwy



Timings 6: Banning Lewis Pkwy & Briargate Pkwy

2042 Total Traffic
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	530	476	332	518	56	541	229	292	43	153	2
Future Volume (vph)	7	530	476	332	518	56	541	229	292	43	153	2
Turn Type	pm+pt	NA	Free	Prot	NA	Perm	Prot	NA	Free	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		Free			6			Free	4		4
Detector Phase	5	2		1	6	6	3	8		7	4	4
Switch Phase												
Minimum Initial (s)	8.0	15.0		8.0	15.0	15.0	8.0	10.0		8.0	10.0	10.0
Minimum Split (s)	15.0	20.0		20.0	20.0	20.0	13.0	15.0		13.0	15.0	15.0
Total Split (s)	15.0	38.0		25.0	48.0	48.0	32.0	43.0		14.0	25.0	25.0
Total Split (%)	12.5%	31.7%		20.8%	40.0%	40.0%	26.7%	35.8%		11.7%	20.8%	20.8%
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	C-Max		None	C-Max	C-Max	None	Max		None	Max	Max
Act Effect Green (s)	44.0	36.0	120.0	17.0	55.4	55.4	24.2	41.4	120.0	31.0	22.8	22.8
Actuated g/C Ratio	0.37	0.30	1.00	0.14	0.46	0.46	0.20	0.34	1.00	0.26	0.19	0.19
v/c Ratio	0.02	0.53	0.32	0.72	0.33	0.07	0.82	0.20	0.19	0.13	0.24	0.00
Control Delay	25.3	54.1	0.6	57.8	22.0	0.2	54.4	32.8	0.3	23.1	43.3	0.0
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	25.3	54.1	0.6	57.8	22.0	0.2	54.4	32.8	0.3	23.1	43.3	0.0
LOS	C	D	A	E	C	A	D	C	A	C	D	A
Approach Delay		28.7			33.8			34.9			38.5	
Approach LOS		C			C			C			D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 32.8

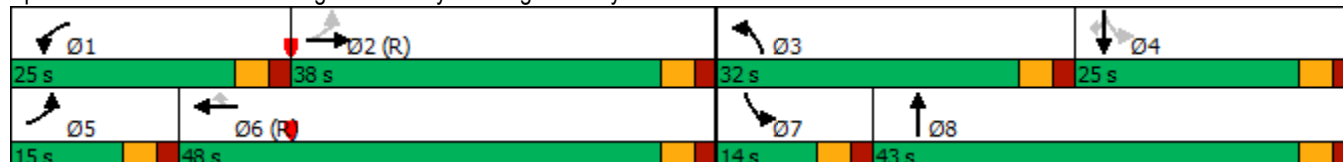
Intersection LOS: C







Intersection Capacity Utilization 64.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 6: Banning Lewis Pkwy & Briargate Pkwy



Intersection						
Int Delay, s/veh	1.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	64	73	791	87	34	509
Future Vol, veh/h	64	73	791	87	34	509
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	155	205	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	67	77	833	92	36	536
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1173	417	0	0	925	0
Stage 1	833	-	-	-	-	-
Stage 2	340	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	185	585	-	-	734	-
Stage 1	387	-	-	-	-	-
Stage 2	692	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	176	585	-	-	734	-
Mov Cap-2 Maneuver	295	-	-	-	-	-
Stage 1	387	-	-	-	-	-
Stage 2	658	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	16.2	0		0.6		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	295	585	734	-
HCM Lane V/C Ratio	-	-	0.228	0.131	0.049	-
HCM Control Delay (s)	-	-	20.8	12.1	10.2	-
HCM Lane LOS	-	-	C	B	B	-
HCM 95th %tile Q(veh)	-	-	0.9	0.5	0.2	-

HCM 6th TWSC
8: Sterling Ranch Rd & School Access/E-W Collector

2042 Total Traffic
PM Peak Hour

Intersection												
Int Delay, s/veh	4.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰		↱		↑	↱	↰	↑	
Traffic Vol, veh/h	37	16	28	120	0	136	0	318	150	50	283	0
Future Vol, veh/h	37	16	28	120	0	136	0	318	150	50	283	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	0	-	0	-	-	205	205	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	39	17	29	126	0	143	0	335	158	53	298	0

Major/Minor	Minor2		Minor1		Major1		Major2	
Conflicting Flow All	890	897	298	762	-	335	-	0
Stage 1	404	404	-	335	-	-	-	-
Stage 2	486	493	-	427	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	-	6.22	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	-	3.318	-	-
Pot Cap-1 Maneuver	264	279	741	322	0	707	0	-
Stage 1	623	599	-	679	0	-	0	-
Stage 2	563	547	-	606	0	-	0	-
Platoon blocked, %							-	-
Mov Cap-1 Maneuver	202	265	741	287	-	707	-	-
Mov Cap-2 Maneuver	306	361	-	401	-	-	-	-
Stage 1	623	570	-	679	-	-	-	-
Stage 2	449	547	-	537	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15	14.5	0	1.3
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	306	361	741	401	707	1071	-
HCM Lane V/C Ratio	-	-	0.127	0.047	0.04	0.315	0.202	0.049	-
HCM Control Delay (s)	-	-	18.5	15.5	10.1	18.1	11.4	8.5	-
HCM Lane LOS	-	-	C	C	B	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.4	0.1	0.1	1.3	0.8	0.2	-

Timings 9: Banning Lewis Pkwy & E-W Collector

2042 Total Traffic
PM Peak Hour

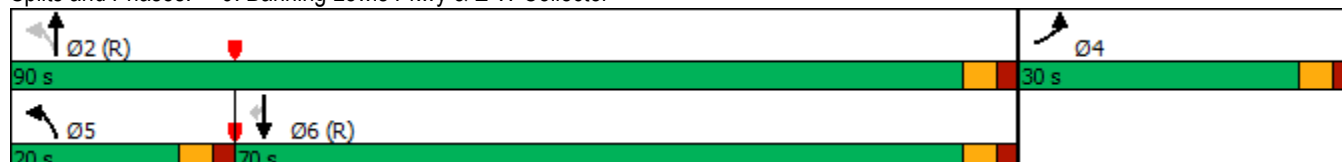
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	31	224	344	1031	888	74
Future Volume (vph)	31	224	344	1031	888	74
Turn Type	Prot	Free	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		Free	2			6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	15.0	15.0
Minimum Split (s)	20.0		10.0	20.0	20.0	20.0
Total Split (s)	30.0		20.0	90.0	70.0	70.0
Total Split (%)	25.0%		16.7%	75.0%	58.3%	58.3%
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0	5.0	5.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None		None	C-Max	C-Max	C-Max
Act Effect Green (s)	15.0	120.0	103.0	105.0	85.7	85.7
Actuated g/C Ratio	0.12	1.00	0.86	0.88	0.71	0.71
v/c Ratio	0.15	0.15	0.66	0.35	0.37	0.07
Control Delay	48.8	0.2	9.1	2.9	18.6	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.8	0.2	9.1	2.9	18.6	6.8
LOS	D	A	A	A	B	A
Approach Delay	6.2			4.5	17.7	
Approach LOS	A			A	B	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 9.5
 Intersection Capacity Utilization 68.6%
 Analysis Period (min) 15









Intersection LOS: A
 ICU Level of Service C

Splits and Phases: 9: Banning Lewis Pkwy & E-W Collector



HCM 6th TWSC
10: Dines Blvd & Sterling Ranch Rd

2042 Total Traffic
PM Peak Hour

Intersection												
Int Delay, s/veh	2.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	97	569	29	3	374	10	18	1	2	4	1	67
Future Vol, veh/h	97	569	29	3	374	10	18	1	2	4	1	67
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	205	-	155	205	-	-	-	-	-	-	-	155
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	102	599	31	3	394	11	19	1	2	4	1	71

























Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	405	0	0	630	0	0	1245	1214	599	1226	1240	400
Stage 1	-	-	-	-	-	-	803	803	-	406	406	-
Stage 2	-	-	-	-	-	-	442	411	-	820	834	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1154	-	-	952	-	-	151	182	502	155	175	650
Stage 1	-	-	-	-	-	-	377	396	-	622	598	-
Stage 2	-	-	-	-	-	-	594	595	-	369	383	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1154	-	-	952	-	-	125	165	502	143	159	650
Mov Cap-2 Maneuver	-	-	-	-	-	-	125	165	-	143	159	-
Stage 1	-	-	-	-	-	-	344	361	-	567	596	-
Stage 2	-	-	-	-	-	-	527	593	-	334	349	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.2			0.1			36.5			12.5		
HCM LOS							E			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	136	1154	-	-	952	-	-	146	650
HCM Lane V/C Ratio	0.163	0.088	-	-	0.003	-	-	0.036	0.109
HCM Control Delay (s)	36.5	8.4	-	-	8.8	-	-	30.6	11.2
HCM Lane LOS	E	A	-	-	A	-	-	D	B
HCM 95th %tile Q(veh)	0.6	0.3	-	-	0	-	-	0.1	0.4

Timings
11: Black Forest Rd & Research Pkwy

2042 Total Traffic
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	935	100	100	704	499	125	770	100	398	324	270
Future Volume (vph)	250	935	100	100	704	499	125	770	100	398	324	270
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		Free	2		Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	10.0	23.0		10.0	23.0		10.0	23.0		10.0	23.0	
Total Split (s)	23.0	44.0		15.0	36.0		12.0	39.0		22.0	49.0	
Total Split (%)	19.2%	36.7%		12.5%	30.0%		10.0%	32.5%		18.3%	40.8%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effect Green (s)	51.1	37.1	120.0	38.5	29.5	120.0	44.2	36.8	120.0	17.1	46.4	120.0
Actuated g/C Ratio	0.43	0.31	1.00	0.32	0.25	1.00	0.37	0.31	1.00	0.14	0.39	1.00
v/c Ratio	0.85	0.90	0.07	0.54	0.85	0.33	0.31	0.75	0.07	0.86	0.25	0.18
Control Delay	54.7	51.4	0.1	32.2	53.7	0.6	19.6	48.0	0.1	53.6	22.3	0.2
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	54.7	51.4	0.1	32.2	53.7	0.6	19.6	48.0	0.1	53.6	22.3	0.2
LOS	D	D	A	C	D	A	B	D	A	D	C	A
Approach Delay		48.1			31.7			39.6			28.8	
Approach LOS		D			C			D			C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 37.4

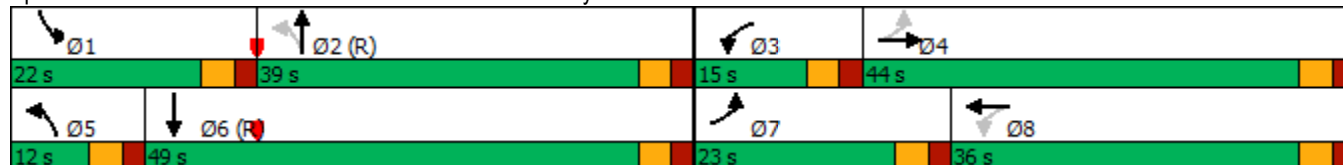
Intersection LOS: D

Intersection Capacity Utilization 82.6%

ICU Level of Service E

























Analysis Period (min) 15

Splits and Phases: 11: Black Forest Rd & Research Pkwy



Timings
12: Vollmer Rd & Marksheffel Rd

2042 Total Traffic
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	143	947	96	187	716	154	171	595	186	132	241	200
Future Volume (vph)	143	947	96	187	716	154	171	595	186	132	241	200
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	20.0	56.0	56.0	19.0	55.0	55.0	14.0	31.0	31.0	14.0	31.0	31.0
Total Split (%)	16.7%	46.7%	46.7%	15.8%	45.8%	45.8%	11.7%	25.8%	25.8%	11.7%	25.8%	25.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	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 Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max	Max	None	Max	Max
Act Effect Green (s)	63.7	53.5	53.5	66.3	54.8	54.8	35.1	26.1	26.1	34.9	26.0	26.0
Actuated g/C Ratio	0.53	0.45	0.45	0.55	0.46	0.46	0.29	0.22	0.22	0.29	0.22	0.22
v/c Ratio	0.39	0.63	0.13	0.64	0.47	0.20	0.52	0.81	0.42	0.71	0.33	0.42
Control Delay	14.8	28.3	3.8	38.7	15.5	1.7	36.7	54.3	12.1	50.7	41.1	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.8	28.3	3.8	38.7	15.5	1.7	36.7	54.3	12.1	50.7	41.1	7.8
LOS	B	C	A	D	B	A	D	D	B	D	D	A
Approach Delay		24.7			17.6			42.9			31.7	
Approach LOS		C			B			D			C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 28.4

Intersection LOS: C

Intersection Capacity Utilization 77.0%

ICU Level of Service D




























Analysis Period (min) 15

Splits and Phases: 12: Vollmer Rd & Marksheffel Rd



Timings
13: Sterling Ranch Rd & Marksheffel Rd

2042 Total Traffic
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 					 		
Traffic Volume (vph)	302	946	22	130	841	577	27	7	37	346	24	189
Future Volume (vph)	302	946	22	130	841	577	27	7	37	346	24	189
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	10.0	10.0	20.0	10.0	10.0
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0	20.0	10.0	15.0	15.0	25.0	20.0	20.0
Total Split (s)	20.0	68.0	68.0	12.0	60.0	60.0	10.0	15.0	15.0	25.0	30.0	30.0
Total Split (%)	16.7%	56.7%	56.7%	10.0%	50.0%	50.0%	8.3%	12.5%	12.5%	20.8%	25.0%	25.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	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 Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effect Green (s)	80.5	69.1	69.1	69.7	62.7	62.7	11.0	10.0	10.0	20.0	23.0	23.0
Actuated g/C Ratio	0.67	0.58	0.58	0.58	0.52	0.52	0.09	0.08	0.08	0.17	0.19	0.19
v/c Ratio	0.75	0.49	0.02	0.41	0.48	0.54	0.20	0.05	0.12	0.64	0.07	0.43
Control Delay	38.4	11.0	0.0	12.8	20.9	3.6	37.8	51.4	0.8	52.3	39.2	8.5
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	38.4	11.0	0.0	12.8	20.9	3.6	37.8	51.4	0.8	52.3	39.2	8.5
LOS	D	B	A	B	C	A	D	D	A	D	D	A
Approach Delay		17.4			13.7			19.6			36.9	
Approach LOS		B			B			B			D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 19.0

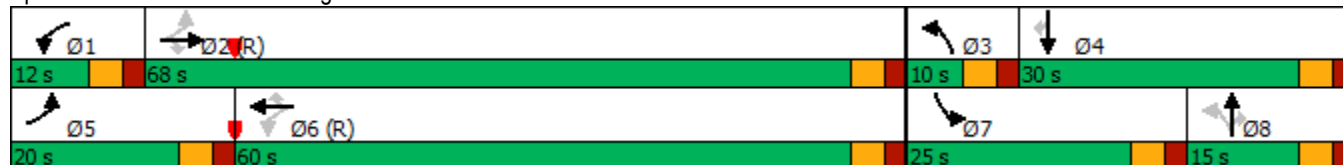
Intersection LOS: B

Intersection Capacity Utilization 73.3%

ICU Level of Service D

























Analysis Period (min) 15

Splits and Phases: 13: Sterling Ranch Rd & Marksheffel Rd



Timings
14: Black Forest Rd & Vollmer Rd

2042 Total Traffic
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	22	21	502	23	195	58	1010	818	110	700	23
Future Volume (vph)	10	22	21	502	23	195	58	1010	818	110	700	23
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4			8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	10.0	15.0	15.0	10.0	15.0	15.0	10.0	20.0	20.0	10.0	20.0	20.0
Total Split (s)	12.0	23.0	23.0	33.0	44.0	44.0	12.0	52.0	52.0	12.0	52.0	52.0
Total Split (%)	10.0%	19.2%	19.2%	27.5%	36.7%	36.7%	10.0%	43.3%	43.3%	10.0%	43.3%	43.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	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 Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	12.1	10.0	10.0	23.4	30.0	30.0	70.7	63.5	63.5	75.3	67.5	67.5
Actuated g/C Ratio	0.10	0.08	0.08	0.20	0.25	0.25	0.59	0.53	0.53	0.63	0.56	0.56
v/c Ratio	0.07	0.15	0.08	0.79	0.05	0.37	0.14	0.57	0.70	0.39	0.37	0.03
Control Delay	29.9	53.5	0.6	54.9	31.5	6.5	7.4	19.8	10.9	17.2	24.0	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Total Delay	29.9	53.5	0.6	54.9	31.5	6.5	7.4	19.8	11.1	17.2	24.0	0.4
LOS	C	D	A	D	C	A	A	B	B	B	C	A
Approach Delay		28.1			41.0			15.6			22.4	
Approach LOS		C			D			B			C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 22.7

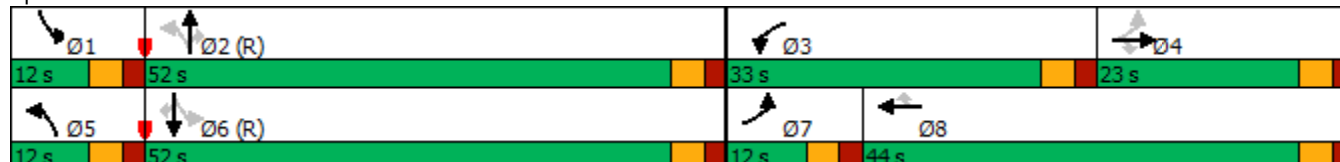
Intersection LOS: C

Intersection Capacity Utilization 77.6%

ICU Level of Service D

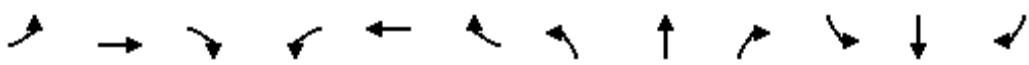
Analysis Period (min) 15

Splits and Phases: 14: Black Forest Rd & Vollmer Rd



Timings 15: Black Forest Rd & Woodmen Rd

2042 Total Traffic
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↱	↑↑↑	↱	↰↱	↑↑↑	↱	↰↱	↑↑	↱	↰↱	↑↑↑	↱
Traffic Volume (vph)	751	2613	360	221	1869	300	300	406	292	300	300	752
Future Volume (vph)	751	2613	360	221	1869	300	300	406	292	300	300	752
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free			Free			Free			Free
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	8.0	15.0		8.0	15.0		8.0	10.0		8.0	10.0	
Minimum Split (s)	13.0	20.0		13.0	20.0		13.0	15.0		13.0	15.0	
Total Split (s)	31.0	66.0		14.0	49.0		19.0	25.0		15.0	21.0	
Total Split (%)	25.8%	55.0%		11.7%	40.8%		15.8%	20.8%		12.5%	17.5%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	
Act Effect Green (s)	26.0	61.0	120.0	9.0	44.0	120.0	13.6	20.0	120.0	10.0	16.4	120.0
Actuated g/C Ratio	0.22	0.51	1.00	0.08	0.37	1.00	0.11	0.17	1.00	0.08	0.14	1.00
v/c Ratio	1.02	1.02	0.23	0.88	1.02	0.19	0.79	0.70	0.19	1.07	0.44	0.48
Control Delay	85.0	53.0	0.3	97.4	39.4	0.1	66.9	54.4	0.3	129.3	40.6	3.1
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	85.0	53.0	0.3	97.4	39.4	0.1	66.9	54.4	0.3	129.3	40.6	3.1
LOS	F	D	A	F	D	A	E	D	A	F	D	A
Approach Delay		54.3			39.8			42.3			39.4	
Approach LOS		D			D			D			D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.07

Intersection Signal Delay: 46.4

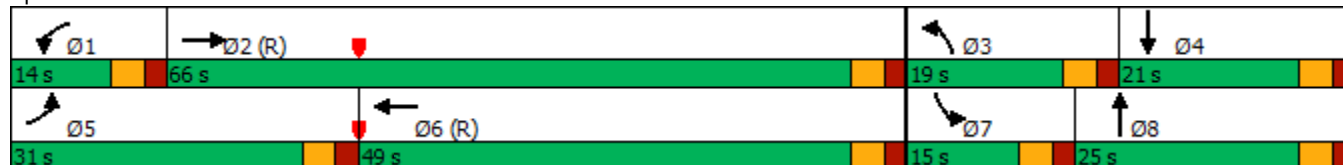
Intersection LOS: D

Intersection Capacity Utilization 94.0%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 15: Black Forest Rd & Woodmen Rd



























Timings

16: Marksheffel Rd & Woodmen Rd

2042 Total Traffic

PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	527	2012	665	471	1689	339	491	512	500	419	381	210
Future Volume (vph)	527	2012	665	471	1689	339	491	512	500	419	381	210
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	pm+ov	Prot	NA	Free
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases			Free			Free			8			Free
Detector Phase	5	2		1	6		3	8	1	7	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	9.0	11.0		9.0	11.0		9.0	10.0	9.0	9.0	10.0	
Total Split (s)	23.0	53.0		20.0	50.0		21.0	27.0	20.0	20.0	26.0	
Total Split (%)	19.2%	44.2%		16.7%	41.7%		17.5%	22.5%	16.7%	16.7%	21.7%	
Yellow Time (s)	3.0	5.0		3.0	5.0		3.0	4.0	3.0	3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	7.0		5.0	7.0		5.0	6.0	5.0	5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	None	None	None	None	
Act Effect Green (s)	18.7	46.0	120.0	15.7	43.0	120.0	16.0	20.3	42.0	15.0	19.3	120.0
Actuated g/C Ratio	0.16	0.38	1.00	0.13	0.36	1.00	0.13	0.17	0.35	0.12	0.16	1.00
v/c Ratio	1.00	1.04	0.42	1.07	0.94	0.22	1.09	0.86	0.83	1.00	0.68	0.14
Control Delay	72.3	50.6	0.3	113.2	48.1	0.3	115.6	63.8	43.1	95.6	54.1	0.2
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	72.3	50.6	0.3	113.2	48.1	0.3	115.6	63.8	43.1	95.6	54.1	0.2
LOS	E	D	A	F	D	A	F	E	D	F	D	A
Approach Delay		43.7			53.9			73.9			60.1	
Approach LOS		D			D			E			E	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green, Master Intersection

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.09

Intersection Signal Delay: 54.4

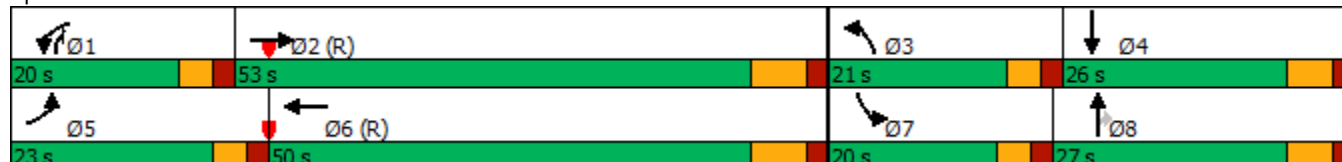
Intersection LOS: D

Intersection Capacity Utilization 97.6%

ICU Level of Service F

























Analysis Period (min) 15

Splits and Phases: 16: Marksheffel Rd & Woodmen Rd



Timings 17: Banning Lewis Pkwy & Woodmen Rd

2042 Total Traffic
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	492	1331	893	437	1106	201	840	848	308	144	643	483
Future Volume (vph)	492	1331	893	437	1106	201	840	848	308	144	643	483
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free			Free			Free			Free
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	10.0	20.0		10.0	20.0		10.0	15.0		10.0	15.0	
Total Split (s)	22.0	39.0		19.0	36.0		30.0	50.0		12.0	32.0	
Total Split (%)	18.3%	32.5%		15.8%	30.0%		25.0%	41.7%		10.0%	26.7%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	
Act Effect Green (s)	17.0	34.0	120.0	14.0	31.0	120.0	25.0	45.0	120.0	7.0	27.0	120.0
Actuated g/C Ratio	0.14	0.28	1.00	0.12	0.26	1.00	0.21	0.38	1.00	0.06	0.22	1.00
v/c Ratio	1.02	0.93	0.57	1.11	0.86	0.13	1.19	0.65	0.20	0.73	0.82	0.31
Control Delay	97.4	54.5	1.5	128.2	50.2	0.2	139.2	33.9	0.3	77.1	54.1	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	0.0
Total Delay	97.4	54.5	1.5	128.2	50.2	0.2	139.2	33.9	0.3	77.1	54.1	0.5
LOS	F	D	A	F	D	A	F	C	A	E	D	A
Approach Delay		44.9			64.0			72.7			36.3	
Approach LOS		D			E			E			D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.19

Intersection Signal Delay: 55.0

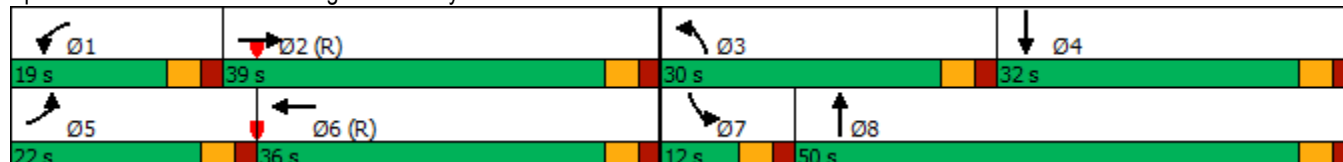
Intersection LOS: D

Intersection Capacity Utilization 96.6%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 17: Banning Lewis Pkwy & Woodmen Rd



Crash History

AccidentDate	TotalVehicles	ReferencePointName	ReferencePointAtName	AccidentNarrative
2019-09-29	1	VOLLMER RD	GLIDER LP	Vehicle # 1 was traveling northbound Vollmer Road .8 miles north of Glider Loop. Vehicle # 1's right side tires dropped off the right side of the roadway as it entered a sharp left curve. Vehicle #1 lost control on the roadway for approximately 131' before it traveled approximately 100' off the right side of the roadway. Vehicle # 1 collided its rear with a barbed-wire fence. Vehicle # 1 was moved prior to investigation.
2019-10-01	1	VOLLMER RD	S POCO RD	Vehicle #1 was northbound on Vollmer Road in a left hand curve. Vehicle #1 ran off the right side of the road for 107.3'. Vehicle over corrected, reentered the roadway, spinning counter clockwise. Vehicle #1 was out of control for 98.5'. Vehicle #1 ran off the left side of the road for 99.8', rolling 1 1/2 times. Vehicle #1 came to rest on its top facing west.
2019-11-14	1	VOLLMER RD	GLIDER PL	Vehicle 1 was southbound on Vollmer Road south of Burgess Road. Vehicle 1 was travelling in excessive speed, when it failed to negotiate a right hand bend in the roadway. Vehicle left heavy left side tire skids marks for 115.8 feet in the northbound lane, afterwhich it traveled for 59.4 across the southbound lane. Vehicle 1 ran off the right side of the road for 130.9 feet where it began to overturn, airborne for 20.7 feet, colliding with the ground, traveled another 25.9 feet and rolled another 52.2 feet where it came to final rest facing east on its right side 23.9 feet from the west road edge.
2020-04-23	1	VOLLMER RD	WILDFLOWER RD	Vehicle #1 was traveling south on Vollmer Rd approaching Wildflower Rd. Vehicle #1 failed to navigate the slight left curve in the roadway at which point it ran off the right side of the road. Vehicle #1 crashed through the fence on the right side of the road, traveled southwest into the yard of 8455 Wildflower Rd, rolled, crashed into a well, and came to rest on its wheels facing south.
2020-05-26	1	VOLLMER	WILD FLOWER	Vehicle #1 was southbound on Vollmer. Driver of vehicle #1 lost control and went off the right side of the road and overturned. Vehicle #1 was moved prior to investigation.
2020-07-25	1	VOLLMER RD	POCO RD	Vehicle 1 was traveling in an easterly direction on Vollmer Road approaching a left curve. Vehicle 1 drove on the wrong side of the road to avoid a deceased raccoon in the middle of its lane. Vehicle 1 returned to its lane while navigating the curve. Vehicle 1's right tires dropped off the right edge of the road. Driver 1 pulled the wheel to the left causing Vehicle 1 to spin out of control. Driver 1 overcorrected to the right and the vehicle rolled 3/4 times off the right side of the road. Vehicle 1 came to final rest on top of a fence facing south on its right side.
2021-03-24	1	VOLLMER RD	POCO RD	Vehicle #1 was southbound on Vollmer Road just south of Poco Road. Vehicle #1 lost control on the icy covered roadway and slid off of the west edge of the roadway for approximately 50 feet while rotating 1/4 times clockwise. Vehicle #1 then collided with a barbed wire fence approximately 15 feet west of the road edge and overturned 1/4 times onto it's left. Vehicle #1 came to final rest on its left side, approximately 15 feet west of the road edge facing west.
2021-09-13	3	VOLLMER RD	POCO RD	Vehicle #1 was traveling southbound on Vollmer Road. Vehicle #2 was parked on Poco Road, facing east, just west of the intersection of Vollmer Rd. and Poco Rd. Vehicle #2 was partially in the lane and partially on what would be a shoulder, as the entire road is dirt. Vehicle #3 was parked likewise, behind vehicle #2. Vehicle #1 made a right hand turn, to travel westbound on Poco Rd. The left front of vehicle #1 crashed into the left front of vehicle #2. Vehicle #2, being on dirt, slid backwards into the front of vehicle #3. Both vehicles #2 and #3 were unoccupied. Vehicle #1 pulled through and pulled over further down Poco Road to a safe location.
2021-11-11	1	VOLLMER RD	POCO RD	Vehicle #1 was travelling northbound on Vollmer Rd approaching Poco Rd. Vehicle #1 failed to negotiate a curve to the left and travelled off the right side of the road. Vehicle #1 overcorrected to the left, travelled across both lanes of traffic, and drove off the left side of the road. Vehicle #1 rotated counter-clockwise and hit a trip point in the soft dirt. Vehicle #1 rolled 1 and 3/4 times, coming to rest on its left side facing southwest approximately 30 feet off the road. The driver of the vehicle was ejected out of the passenger window during the rollover and came to rest in the field approximately 50 feet northwest of the vehicle.
2022-04-07	1	VOLLMER RD	WILDFLOWER RD	Vehicle 1 was traveling southbound on Vollmer Rd approaching the intersection of Wildflower Rd. Vehicle 1 failed to negotiate a curve and drove off the right side of the roadway at the intersection of Wildflower Rd. Vehicle 1 drove approximately 19 feet off of the right side of the roadway impacting an embankment and came to final rest 85 feet south of Wildflower Rd on the southwest side of the intersection facing south.
2022-06-19	2	VOLLMER RD	LOCHWINNOCH LN	VEHICLE 1 WAS NORTHBOUND ON VOLLMER ROAD. VEHICLE 2 WAS NORTHBOUND ON VOLLMER ROAD, IN FRONT OF VEHICLE 1. VEHICLE 2 BEGAN TO SLOW TO MAKE A LEFT TURN ONTO LOCHWINNOCH ROAD. VEHICLE 1 ATTEMPTED TO PASS VEHICLE 2 ON THE LEFT SIDE IN A MARKED NO PASSING ZONE. VEHICLE 2 BEGAN TO MAKE THE LEFT TURN WHERE VEHICLE 2 WAS STRUCK IN THE FRONT DRIVERS SIDE, BY THE FRONT PASSENGER SIDE OF VEHICLE 1. THE COLLISION OCCURRED WITHIN THE SOUTHBOUND LANE OF VOLLMER ROAD. VEHICLE 1 THEN ROTATED 1/2 TIME CLOCKWISE ACROSS THE NORTHBOUND LANE. VEHICLE 1 THEN DROVE OFF THE NORTHBOUND SIDE OF THE ROAD AND OVERTURNED 1/2 TIME, COMING TO FINAL REST ON ITS ROOF FACING SOUTH. VEHICLE 2 CAME TO A CONTROLLED FINAL REST ON LOCHWINNOCH LN.
2022-07-03	1	VOLLMER RD	POCO RD	Motorcycle was traveling on Vollmer Rd headed northbound. Motorcycle traveled off the right side of the road. Motorcycle lost control and rolled multiple times, the rider was ejected. Motorcycle came to rest on the left side. Rider came to rest on his back.

Sketch Plan Amendment



LAND USE LEGEND:

	44 AC. RESIDENTIAL: 0.2 DU/AC,	9 D.U.
	33 AC. RESIDENTIAL: 0.4 DU/AC,	13 D.U.
	35 AC. RESIDENTIAL: 1 DU/AC,	35 D.U.
	163 AC. RESIDENTIAL: 2 DU/AC,	326 D.U.
	790 AC. RESIDENTIAL: 3-5 DU/AC,	3,642 D.U.
	86 AC. RESIDENTIAL: 5-8 DU/AC,	600 D.U.
	47 AC. MIXED USE 8-25 DU/AC *	600 D.U.
	57 AC. ELEMENTARY / K-8 SCHOOL	
	18 AC. NEIGHBORHOOD PARK	
	25 AC. COMMUNITY PARK	
	62 AC. OPEN SPACE / PARK / GREENWAY	
	43 AC. OPEN SPACE / BUFFER	
	9 AC. UTILITY PARCEL	
	5 AC. INDUSTRIAL	

TOTAL: 1,444 AC. TOTAL: 4,800 D.U. Max
* COMMERCIAL/MULTIFAMILY UP TO 25 DU/AC

LEGAL DESCRIPTION:

THE WEST HALF OF THE WEST HALF OF THE EAST HALF AND EAST HALF OF THE WEST HALF AND THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 27; THE EAST HALF OF THE SOUTHEAST QUARTER AND THAT PORTION OF THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER LYING SOUTH AND EAST OF THE COUNTY ROAD KNOWN AS VOLLMER ROAD, OF SECTION 28; THE WEST HALF OF THE EAST HALF AND THE WEST HALF OF SECTION 34; THE EAST HALF AND THE EAST HALF OF THE SOUTHWEST QUARTER AND THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 33, AND ALL THAT PART OF THE NORTHWEST QUARTER OF SECTION 33 LYING SOUTH AND EAST OF THE COUNTY ROAD KNOWN AS VOLLMER ROAD, EXCEPT THAT PORTION OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SAID SECTION 33 LYING SOUTH AND EAST OF SAID COUNTY ROAD AS DEEDED TO COLORADO INTERSTATE GAS COMPANY BY WARRANTY DEED RECORDED IN BOOK 1173 AT PAGE 359; AND THAT PORTION OF THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER AND THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER LYING SOUTHEAST OF THE COUNTY ROAD KNOWN AS VOLLMER ROAD, OF SECTION 32, EXCEPT THAT PORTION OF THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION 32 DEEDED TO J. MARCUS BROWN BY TRUSTEES' DEED RECORDED IN BOOK 3292 AT PAGE 168; ALL IN TOWNSHIP 12 SOUTH, RANGE 65 WEST OF THE 6TH P.M., EL PASO COUNTY, COLORADO. ALL THAT PORTION OF THE NORTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 28, TOWNSHIP 12 SOUTH, RANGE 65 WEST OF THE 6TH P.M., EL PASO COUNTY, COLORADO LYING SOUTH AND EAST OF THE COUNTY ROAD (VOLLMER ROAD), ALSO: THE NORTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 4, TOWNSHIP 13 SOUTH, RANGE 65 WEST OF THE SIXTH PRINCIPAL MERIDIAN, LYING SOUTHERLY OF AN EXISTING EAST-WEST FENCE AS DESCRIBED IN SPECIAL WARRANTY DEED RECORDED DECEMBER 23, 2004 AT RECEPTION NO. 204209417, COUNTY OF EL PASO, STATE OF COLORADO, ALSO: THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 32, TOWNSHIP 12 SOUTH, RANGE 65 WEST OF THE 6TH P.M., LYING SOUTHEASTERLY OF THE PUBLIC ROAD KNOWN AS VOLLMER ROAD, EL PASO COUNTY, COLORADO, AND CONTAINING 1443.695 ACRES MORE OR LESS.

OWNERS:

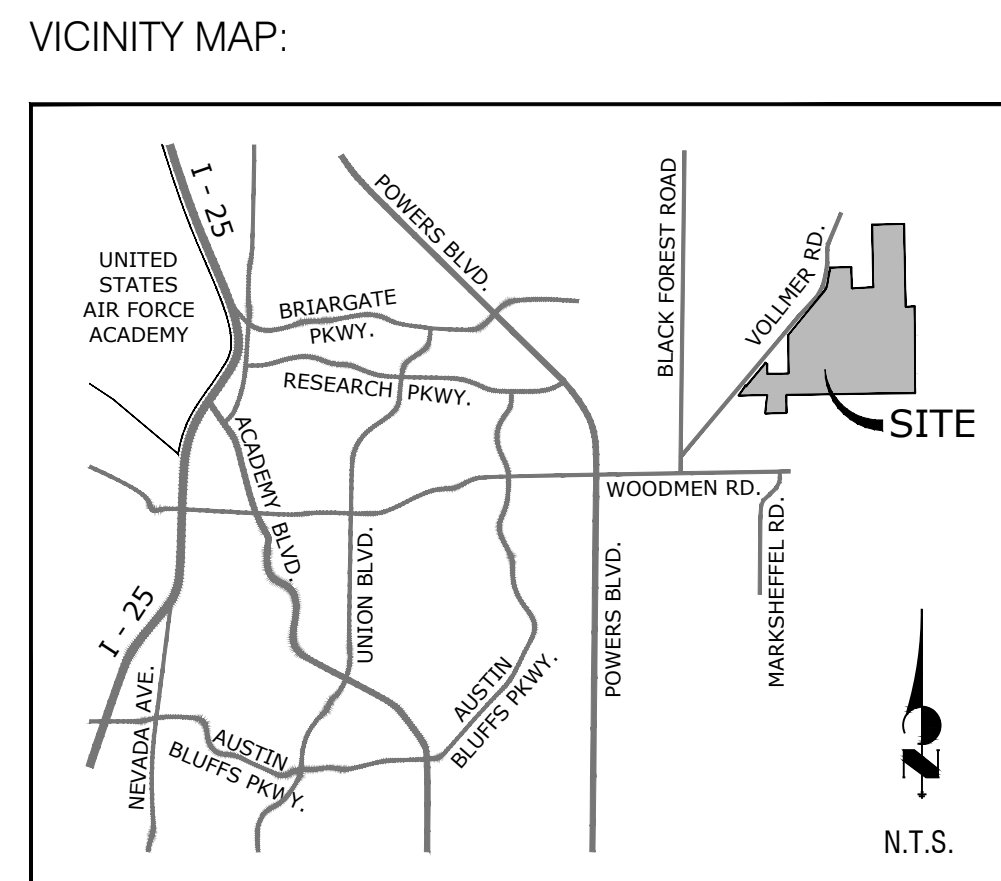
SR LAND, LLC.
20 BOULDER CRESCENT STREET, SUITE 102
COLORADO SPRINGS, CO 80903-3300

CLASSIC SRJ LAND, LLC
2138 FLYING HORSE CLUB DRIVE
COLORADO SPRINGS, CO 80921

CHALLENGER COMMUNITIES, LLC.
8605 EXPLORER DRIVE, SUITE 250
COLORADO SPRINGS, CO 80920-1013

SYMBOL LEGEND:

- ROAD
- FULL MOVEMENT ACCESS POINT
- 3/4 MOVEMENT
- R/O
- 100-YEAR FLOODPLAIN
- TRAIL
- BUFFER / OS TRAIL CORRIDOR / EASEMENT
- NEIGHBORHOOD PARK
- ACCESS SPACING (FEET)



Overall Development Dwelling Unit Table

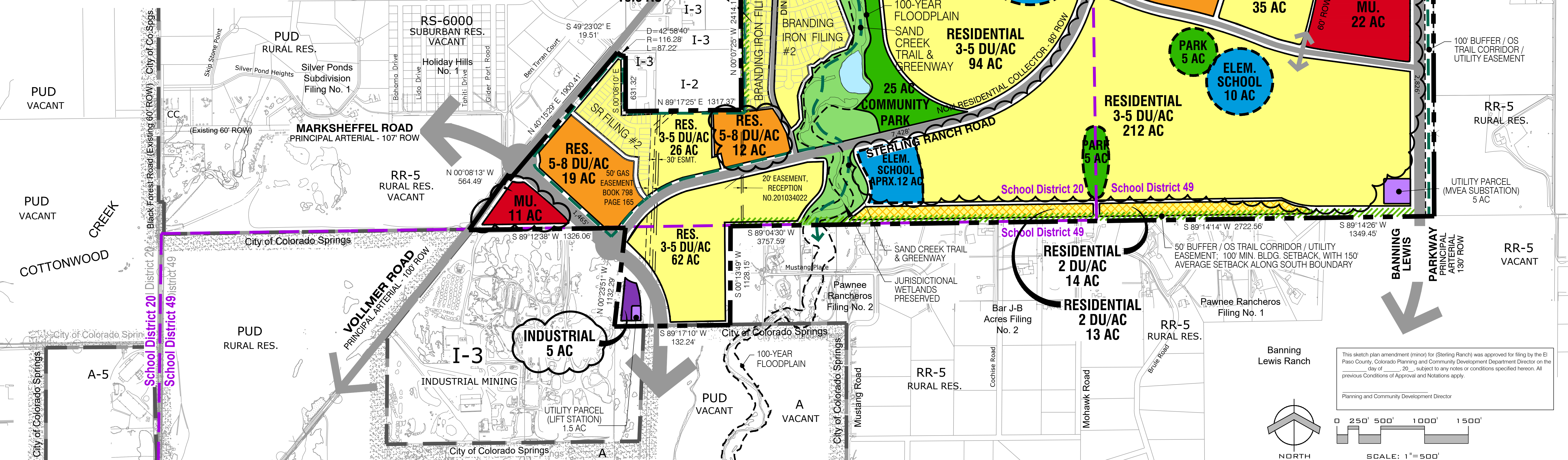
	Homestead Fil 1 SF 04-029	Banding Iron Fil 1 SF-06-017	Homestead Fil 2 SF 19-004	Banding Iron Fil 2 SF-19-018	Sterling Ranch Fil 2 SF-20-015	Total Entitled Units	Remaining Developable Units	Maximum Dwelling Units
Dwelling Units	72	51	104	75	49	351	4449	4800

ROAD CLASSIFICATION TABLE

Roadway	Existing	2040 MTCPP	2050 MTCPP/CPP	Sterling Ranch Proposed
Vollmer Road	2 lane Collector - 60'	4 lane Minor - 100'	4 lane Minor - 100'	4 lane Minor - 100'
Briargate Parkway	4 lane Principal - 130'	4 lane Principal - 130'	4 lane Principal - 130'	4 lane Principal - 130'
Banning Lewis Ranch Parkway	4 lane Principal - 130'	4 lane Principal - 130'	4 lane Principal - 130'	4 lane Principal - 130'
Wicksfield Road	2 lane Principal - 130'	4 lane Principal - 130'	4 lane Principal - 130'	4 lane Principal - 130'

*A deviation is approved for Marksheffel Road to be built to the City of Colorado Springs standards.

STERLING RANCH SKETCH PLAN AMENDMENT



Land Planning
Landscape
Architecture
Urban Design

NES

N.E.S. Inc.
619 N. Cascade Avenue, Suite 200
Colorado Springs, CO 80903

Tel. 719.471.0073
Fax 719.471.0267

www.nescolorado.com

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STERLING RANCH

SKETCH PLAN AMENDMENT

MORLEY-BENTLEY INVESTMENTS, LLC.

DATE: OCTOBER 29, 2007
PROJECT: J. MAYNARD/J. ROBERTO
PREPARED BY: J. KUHNEL/M. SWIFT

AMENDMENT

DATE	BY	DESCRIPTION
05.22.2009	JLK	APPROVED SKETCH PLAN PER COUNTY - NOV. 2008
12.05.2018	BE	APPROVED SKETCH PLAN AMENDMENT - DEC. 2018
07.01.2022	BE	SKETCH PLAN AMEND 2022
08.30.2022	AL	SKETCH PLAN AMEND 2022
12.22.2022	JS	SKETCH PLAN AMEND 2022

1
OF 1

SKP 22-004