

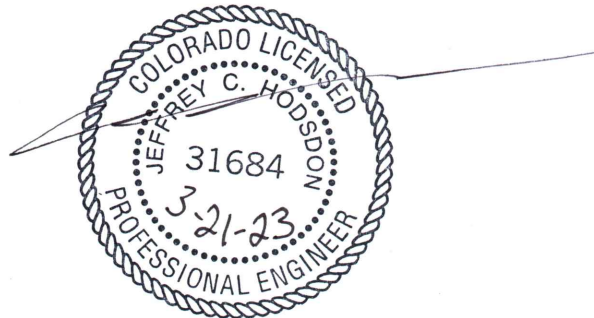


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**Waterview East Commercial  
Traffic Impact and Access Analysis  
PUDSP-22-009  
(LSC #S214970)  
March 21, 2023**

**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

# **Waterview East Commercial Traffic Impact and Access Analysis**

Prepared for:  
Waterview Commercial Investors, LLC  
2727 Glen Arbor Drive  
Colorado Springs, CO 80920

Contact: Mr. Heath Herber

**MARCH 21, 2023**

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

LSC #S214970  
PUDSP-22-009



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March 21, 2023

Heath Herber  
Waterview Commercial Investors, LLC  
2727 Glen Arbor Drive  
Colorado Springs, CO 80920

RE: Waterview East Commercial  
Traffic Impact and Access Analysis  
El Paso County, CO  
PUDSP-22-009  
LSC #S214970

Dear Mr. Herber,

In response to your request, LSC Transportation Consultants, Inc. has prepared this traffic impact and access analysis for proposed Waterview East Commercial development. As shown in Figure 1, the site is located southeast of the intersection of Powers Boulevard and Bradley Road in El Paso County, Colorado.

## **REPORT CONTENTS**

This report has been prepared to address the project's traffic impact at the proposed access points and adjacent intersections.

This report contains the following:

- The existing street and traffic conditions in the site's vicinity including the street widths, lane geometries, traffic controls, and existing traffic counts at key area intersections;
- The projected future background traffic volumes, which include estimates of traffic from other area development projects and increases in through traffic on the adjacent arterial streets;
- The estimated average weekday and peak-hour trip generation;
- The estimated directional distribution of site-generated trips and the projected site-generated traffic volumes;
- Estimates of the resulting total traffic volumes on the adjacent streets and intersections; and
- The projected levels of service at the site access point and adjacent intersections.

## **PREVIOUS TRAFFIC REPORTS COMPLETED IN THE AREA**

The site was included as part of the *Springs at Waterview East Preliminary Traffic Impact Analysis* dated August 24, 2018.

Appendix Table 1: Area Traffic Impact Studies includes a list of other traffic studies in the area of study completed within the past five years (that LSC is aware of) and is attached for reference. This study accounts for the land use, trip generation, and the roadway network included in these studies. Figure 2 shows the location of the other known developments in the area.

## **LAND USE AND ACCESS**

The site location is shown in Figure 1. Figure 2 presents a context map showing other area developments. The site plan for Waterview East Commercial is shown in Figure 3.

### **Land Use**

Figure 3 shows the proposed site plan for the 22-acre Waterview East Commercial development. The 2018 Springs at Waterview East TIS assumed the site would be developed with about 148,000 square feet of general-retail floor space. The site is now planned to be developed with about 174,000 square feet of floor space including a mix of general retail, fast food restaurant, gas station, and mini storage uses.

### **Access**

Two full-movement access points are proposed to Frontside Drive, an Urban Non-Residential Collector. As shown on Figure 3, the proposed access spacing exceeds 330 feet, which is the allowed spacing for Urban Non-Residential Collectors when intersecting local roadways. An additional right-in-only access is proposed to Legacy Hill Drive about 325 feet south of Bradley Road. This access will require a deviation to the El Paso County Access Code. Figure 4 shows the location of the proposed right-in only access.

### **Pedestrian and Bicycle Accommodations**

The El Paso County 2016 Major Transportation Corridors Plan Update shows Bradley Road as a future bicycle route.

As shown in Figure 2, sidewalks will be provided on Legacy Hill Drive and Frontside Drive adjacent to the site. Frontside Drive will have multi-use paved shoulders which are suitable for bicycles.

## **Public Transportation**

Per the El Paso County 2016 Major Transportation Corridors Plan Update:

*The Pikes Peak Region's principal transit service provider is Mountain Metropolitan Transit, a department of the City of Colorado Springs. Mountain Metro currently provides fixed route bus service focused in Colorado Springs, and the 2040 Regional Transportation Plan – Transit (Appendix E of the 2040 Moving Forward Regional Transportation Plan) calls for the agency to continue with this service focus area. So, there are currently no plans to provide fixed route transit service to the unincorporated parts of El Paso County.*

The 2045 Regional Transportation Plan – Transit Mountain Metropolitan Transit also does not show any future plans to provide transit service to the area. The 2045 plan does suggest consideration of adding service to the nearby Colorado Springs Airport. However, the report also recommends that any airport service not be integrated with other traditional routes.

## **Sight Distance**

Figure 5 shows the sight distance analysis for the proposed access points to Frontside Drive. Based on a design speed of 40 miles per hour (mph) and the criteria contained in Table 2-21 of the *Engineering Criteria Manual (ECM)*, the required intersection sight distance at these intersections is 445 feet. The required stopping sight distance from *ECM* Table 2-17 is 305 feet. As shown in Figure 5, the intersection sight-distance requirement can be met at both intersections. In order for the stopping sight distance requirement to be met for northbound traffic approaching the southwest access, the area between the curb and the sight line will need to be kept free of other obstructions (such as rear privacy fencing, landscaping, and backyard/patio amenities) that would restrict the drivers' line of sight. Landscaping should be low — about 18 inches or lower in height — to the east of the passenger vehicle lines of sight shown. Please refer to *ECM* Sections 2.3.6.G.1 and 2.

Figure 6 shows the sight-distance analysis for the proposed right-in-only access to Legacy Hill Drive. Based on a turning speed of 25 mph or less, the required stopping sight distance from Table 2-17 of the *ECM* is 155 feet. This requirement can be met with the proposed spacing.

## **STREET AND TRAFFIC CONDITIONS**

### **Area Streets**

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.

- **Powers Boulevard** (State Highway 21) is classified as a Freeway (FW). Powers Boulevard is one of the region's main north/south corridors. Powers Boulevard has a center median and a posted speed limit of 60 miles per hour (mph) north of Crestera Parkway. South of this point, the posted speed limit is 65 mph. Powers Boulevard is ultimately planned to be converted to a Freeway with grade-separated intersections.
- **Bradley Road** is shown with a Minor Arterial classification east of Grinnell Boulevard on the 2016 2040 El Paso County *Major Transportation Corridors Plan (MTCP)*. Adjacent to the site, Bradley Road is a four-lane roadway with a 50-mph posted speed limit and has an edge-of-asphalt median, left-turn lanes, and rural paved shoulders. There is a short existing section of raised median approaching Powers Boulevard. The 2040 *MTCP* includes the construction of Bradley Road between Grinnell Boulevard and Powers Boulevard in the 2040 roadway improvement B-list projects.
- **Marksheffel Road** extends north from the Link Road/C&S Road intersection in Fountain, Colorado to north of Woodmen Road. It has recently been upgraded north and south of Bradley Road with a PPRTA project and is shown as a four-lane Expressway on the *MTCP*. The posted speed limit on Marksheffel Road in the vicinity of Bradley Road is 55 mph.

### Existing Traffic Volumes

Figure 7 shows the traffic volumes at the intersections of Powers Boulevard/Bradley Road, Legacy Hill Drive/Bradley Road, and Marksheffel Road/Bradley Road, based on the attached traffic counts conducted by LSC in March 2021 and February 2023. The 2021 traffic-count data for the intersections of Powers/Bradley and Marksheffel/Bradley have been adjusted based on the more recent counts conducted at Legacy Hill/Bradley in February 2023.

Figure 7 also shows the 2021 Colorado Department of Transportation (CDOT) Average Annual Daily Traffic Volume (AADT) on Powers Boulevard and estimates of the average daily traffic volume on Bradley Road based on the peak-hour traffic counts.

### 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 and signalized intersections. LOS F represents control delay of more than 50 seconds for unsignalized intersections and more than 80 seconds for signalized intersections. Table 1 shows the level of service delay ranges.

**Table 1: 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) <sup>(1)</sup>
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 intersections of Powers/Bradley and Marksheffel/Bradley have been analyzed using Synchro. Figure 7 shows the level of service analysis results. The intersection of Legacy Hill Drive/Bradley Road has been analyzed based on the unsignalized method of analysis from the *Highway Capacity Manual, 6th Edition* by the Transportation Research Board.

All movements at the signalized intersections of Powers/Bradley and Marksheffel/Bradley are currently operating at LOS D or better during the peak hours.

The northbound left-turn movement at the stop-sign-controlled intersection of Legacy Hill/Bradley is currently operating at LOS D during the morning peak hours and LOS E during the afternoon peak hour.

## **BACKGROUND TRAFFIC**

Background 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. Background traffic includes the through traffic and the traffic generated by nearby developments but assumes zero traffic generated by the site.

Figure 8 shows the projected short-term (Year 2026) background traffic volumes. These traffic volumes are based on the existing traffic volumes shown in Figure 7, assuming a growth rate of 1 percent per year. The short-term background traffic volumes also include additional traffic projected to be generated by development of The Trails at Aspen Ridge Filing Nos. 1 and 2 taken from the *Trails at Aspen Ridge Filing No. 2 Traffic Impact and Access Analysis* by Matrix dated May 7, 2021

Figure 9 shows the projected 2043 background traffic volumes. The 2043 background traffic volumes were based on recent traffic studies completed by LSC in the vicinity of the site. These volumes assume buildout of The Trails at Aspen Ridge Filing No. 1, the Trails at Aspen Ridge PUD, Villages at Waterview North located north of Bradley Road, the Waterview North RM-12 rezone

located on the southeast corner of Bradley/Legacy Hill (P-21), and Bradley Heights. The 2043 background traffic volumes do not include any traffic projected to be generated by Waterview East Commercial. The long-term background volumes assume Bradley Road has been constructed between Goldfield Drive and Powers Boulevard.

## **TRIP GENERATION**

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 2 shows the average weekday and peak-hour trip-generation estimates. Table 2 also shows a comparison to the trip-generation estimate assumed in the Waterview North Sketch Plan Master TIS.

The total number of external vehicle trips generated by the land uses has been reduced to account for the internal vehicle trips made within the site between land uses, without use of the external streets surrounding the site. The percentage of internal trips was estimated based on the NCHRP 684 Internal Trip Capture Estimation Tool. As shown on the attached output from the estimation tool based on the NCHRP 684 procedure, the percentage of internal trips is 13%. To be conservative LSC has assumed an internal trip reduction of 10%

The total number of vehicle trips generated has also been reduced to account for 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 in Table 2 are from the *Trip Generation Handbook - An ITE Proposed Recommended Practice, 3rd Edition, 2017* by ITE. When considering the ITE definitions of “pass-by” vs. “diverted” trips, pass-by trips from Bradley Road are technically considered “diverted” trips. However, this analysis treats the Legacy Hill Drive connection to Bradley Road as “the access” and treats diverted trips from Bradley Road as pass-by trips. This analysis assumes all pass-by trips will come from traffic on Bradley Road. This is likely conservative, as there will be some component of pass-by traffic turning in and out of the site from Legacy Hill Drive.

As there are limited existing mass-transit options in the vicinity of the site, no reductions were assumed to account for multimodal travel.

At buildout, Waterview East Commercial is projected to generate about 6,695 new external vehicle trips on the average weekday, with about half entering and half exiting the site. This is about 1,954 more trips than were assumed for the same area in the recent traffic studies completed by LSC in the area, including studies for the Trails at Aspen Ridge and Waterview North. During the morning peak hour, which generally occurs for one hour between 6:30 and 8:30 a.m., about 425 vehicles would enter and 375 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 500 vehicles would enter and 514 vehicles would exit the site.

## TRIP DISTRIBUTION AND ASSIGNMENT

The directional distribution of the site-generated traffic volumes on the adjacent roadway system is one of the most important factors in determining the traffic impacts of the site. Figure 10a shows the short-term and long-term directional distributions of new, external traffic projected to be generated site. Figure 10b shows the directional distribution at the site-access points to Frontside Drive and Legacy Hill Drive by trip type.

The short-term directional-distribution estimates were based on the existing area roadway system and the traffic counts. The long-term directional-distribution estimates were based on the anticipated regional development and future roadway networks including the construction of Bradley Road between Grinnell Street and Powers Boulevard.

This distribution was estimated with a focus on peak-hour trip assignment, as the intersection analysis is based on peak-hour volumes.

- The distribution percentages to/from the east account for:
  - o Some longer trip lengths by commuters;
  - o The proximity of this development to Marksheffel Road;
  - o Anticipated use of Marksheffel Road north as a viable alternative to Powers to/from many destinations east of and within the Powers Boulevard corridor. Powers Boulevard intersections experience congestion during peak hours. Marksheffel has recently been upgraded north and south of Bradley with a PPRTA project, which has increased its attractiveness as a north/south travel route;
  - o Bradley to/from the east being the route to Schriever Air Force Base and the improved east gate of Peterson Air Force Base; and
  - o Development occurring in the Marksheffel corridor and, over time, the number of trip destinations continuing to increase.
- The distribution percentages to/from the Bradley Heights connection account for:
  - o Planned alternative street connections within Bradley Heights to Bradley Road and Marksheffel Road (south);
  - o Future trip destinations within Bradley Heights;
  - o The school and some potential future commercial within Lorson Ranch to the southeast;
  - o The long-term distribution split accounts for a north-south road connection between Bradley Heights and Fontaine Boulevard, as shown on the Banning Lewis Master Plan and the City of Colorado Springs Intermodal Transportation Plan. This includes trips oriented to the south and southeast.
- The percentages to/from the south on Powers account for trips from the south and southwest, paired with destinations primarily in Fountain and Fort Carson, as well as the south connection to Interstate 25.
- The percentages to/from the north on Powers primarily account for trips using Milton Proby Parkway and the Powers Boulevard corridor for travel.

The pass-by trips were assigned separately based on the existing traffic volumes on Bradley Road adjacent to the site shown in Figure 7 and the pass-by trips shown in Table 2. Figure 11 shows the assignment of pass-by trips estimated to be generated by the site.

When the distribution percentages (from Figure 10a and 10b) are applied to the trip-generation estimates (from Table 2), the resulting new-external site-generated traffic volumes can be determined. Figure 12a show the projected short-term new, external site-generated traffic volumes. Figure 12b shows the projected short-term total external site-generated traffic volumes. These volumes are the sum of the pass-by trips from Figure 11 plus the new, external site-generated trips from Figure 12a. Figure 13a shows the projected long-term new, external site-generated traffic volumes. Figure 13b shows the projected long-term total, external site-generated traffic volumes. These volumes are the sum of the pass-by trips from Figure 11 plus the new, external site-generated trips from Figure 12a.

### **BUILDOUT TOTAL TRAFFIC**

Figure 14 shows the projected short-term total traffic volumes. The short-term total traffic volumes are the sum of the short-term background traffic volumes (from Figure 8) plus the short-term total, external site-generated traffic volumes (from Figure 12b).

Figure 15 shows the projected 2043 total traffic volumes. The 2043 total traffic volumes are the sum of the 2043 background traffic volumes (from Figure 9) plus the long-term total, external site-generated traffic volumes (from Figure 13b).

### **SIGNAL WARRANT ANALYSIS**

The intersection of Bradley Road/Legacy Hill Drive was analyzed to determine when Four-Hour and/or Eight-Hour Vehicular-Volume Traffic-Signal Warrant thresholds would be reached or exceeded, based on the projected traffic volumes. The satisfaction of warrants does not indicate that a signal must be installed. The decision to require a signal to be installed rests with the City of Colorado Springs

Table 3 shows the results of the analysis. The off-peak traffic volumes were based on traffic counts conducted by LSC in February 2023 and vehicle time of day distribution data for gas station, shopping center, and mini-warehouse land uses published by the Institute of Transportation Engineers.

As shown in Table 3, based on traffic counts conducted in February 2023, none of the hours analyzed currently meet the thresholds for either a Four-Hour or an Eight-Hour Vehicular-Volume Traffic-Signal Warrant. Both of these warrants are projected to be met with **either** full buildout of Trails at Aspen Ridge Filing Nos. 1 and 2 **or** once about 14,254 square feet of retail floor space is developed within the currently proposed Waterview East Commercial site. As development of these two sites is anticipated to occur concurrently, signal warrants will likely be met with some



combination of the buildout of these two developments. LSC recommends the traffic-signal warrant analysis be updated with each final plat within Waterview East Commercial that is submitted prior to construction of the signal.

## PROJECTED LEVELS OF SERVICE

The key area intersections have been analyzed to determine the projected levels of service for the short-term and 2040 background and short-term and 2040 total traffic volumes. The signalized intersections of Powers/Bradley, Legacy Hill/Bradley, and Marksheffel/Bradley were analyzed using Synchro. The site access points to Frontside Drive and the intersection of Legacy Hill/Frontside were analyzed based on the unsignalized method of analysis from the *Highway Capacity Manual, 6th Edition* by the Transportation Research Board. Figures 8, 9, 13 and 14 show the results of the level of service analysis. The level of service reports are attached!

### Powers/Bradley

The intersection of Powers/Bradley is currently signalized and is operating at a satisfactory level of service. All movements at this intersection are projected to operate at LOS D or better during the peak hours, based on the short-term total traffic volumes. The short-term analysis assumes the addition of a second southbound left-turn lane. By 2040, it was assumed that the section of Bradley Road between Goldfield Drive and Powers Boulevard would be constructed. Based on the 2040 total traffic volumes shown and the lane geometry shown in Figure 13, the intersection is projected to operate at an overall LOS D during the peak hours. However, some of the minor movements are projected to operate at LOS E during the peak hours. It is common for left-turn and side-street through movements to have projected delays in the LOS E or F range, as signal-coordination timing plans generally give priority to moving through traffic. This often results in higher delay for left-turn and side-street movements and can result in movement/approach delays in the E or F range even though they are projected to have sufficient capacity for the projected traffic volumes. Note: This intersection is planned to be converted to a grade-separated interchange in the long-term future.

### Legacy Hill/Bradley

The intersection of Bradley Road/Legacy Hill Drive is projected to operate at LOS D or better during the peak hours for all movements as a signal-controlled intersection, based on the projected short-term and 2040 total traffic volumes. By 2040, the eastbound left-turn movement is projected to operate at LOS E during the morning peak hour.

### Legacy Hill/Right-in only Access

The access to Legacy Hill is planned to be restricted to right-in only and will operate freely.

### **Marksheffel/Bradley**

The intersection of Marksheffel/Bradley is currently signalized and is operating at a satisfactory level of service. All movements are projected to continue to operate at an acceptable level of service (LOS D or better), based on the projected short-term total traffic volumes. By 2040, the eastbound left-turn movement is projected to operate at LOS E during the peak hours, even with the addition of dual eastbound left-turn lanes and protected phasing.

### **Legacy Hill/Frontside**

The intersection of Legacy Hill/Frontside is a one-lane modern roundabout. All approaches are projected to operate at LOS C or better during the peak hours, based on the projected short-term and 2040 total traffic volumes.

### **Frontside Access Points**

All of the proposed access points to Frontside Drive are projected to operate at an acceptable level of service (LOS B or better for all movements) as stop-sign-controlled intersections.

### **QUEUING ANALYSIS**

A queuing analysis was performed using Synchro/SimTraffic to determine the storage length needed to accommodate the projected northbound queues on Legacy Hill Drive approaching Bradley Road, based on the 2040 total morning and afternoon peak-hour traffic volumes were entered into the Synchro model. The simulation was run five times. The queuing reports are attached.

The projected maximum northbound left-turn queue on Legacy Hill Drive approaching Bradley Road is about 302 feet during the morning peak hour and 292 feet in the afternoon peak hour.

### **FUTURE SH 21A (POWERS BOULEVARD)/BRADLEY ROAD INTERCHANGE ESCROW AND R.O.W.**

A CDOT access permit will be required as part of this application. As part of that access permit, CDOT has indicated in comments dated August 3, 2020 (for an adjacent project), that escrow funds will be required as a term and condition of access permit for a portion of the future SH 21A (Powers Boulevard)/Bradley Road interchange, based on a pro-rata share. An escrow analysis will be part of the requirements of the access permit process.

It is our understanding, based on information provided by the applicant, that the request for ROW dedication/preservation for a future interchange at Powers/Bradley has been resolved with CDOT and the land dedication will not be required.

Update. This is unresolved. CDOT has expressed that ROW dedication for the future interchange is required.

## DEVIATIONS

A deviation to the El Paso County *Engineering Criteria Manual* will be required for the proposed right-in-only access to Legacy Hill Drive about 305 feet south of Bradley Road. Indicate that deviation was submitted as part of this application

## LEGACY HILL/BRADLEY SIGNAL ESCROW

The intersection of Legacy Hill/Bradley has recently been transferred to the City of Colorado Springs. The City will require the applicant to escrow \$200,000 towards the future signal at the intersection of Legacy Hill/Bradley prior to construction plan approval. LSC recommends that the escrow amount called out by the City for the southeast and southwest corners (one half of the signal cost), should be shared by this development, Aspen Ridge, and the future multi-family development on the SE corner. The cost sharing could be based on peak-hour trips creating the need for a signal at this intersection (generally, traffic on the northbound approach) this cost-sharing agreement should consider any amount already escrowed by the Aspen Ridge Development. Since this intersection was approved as an eligible intersection by the El Paso County Roadway Improvement Fee program, amounts escrowed by county developments on the south side of Bradley should be eligible for credit, based on fee program unit costs for signals once the signal is installed.

## COUNTY ROAD IMPACT FEE PROGRAM

The applicant will be required to participate in the County Road Impact Fee Program. The PID option will be identified with a future Preliminary Plan/Plat submittal.

## ROADWAY IMPROVEMENTS

A list of area roadway system improvements in the vicinity of the site is presented in Table 4. Figure 15 shows the recommended improvements to the northbound right-turn deceleration lane on Powers Boulevard approaching Bradley Road, based on a memorandum from CDOT dated July 2, 2021 regarding Trails at Aspen ridge - Access Submittal Planning Comments. A copy of this memorandum has been attached.

Would now be Figure 16 and is missing from appendix. Please add back in

\* \* \* \* \*

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

Respectfully Submitted,

LSC TRANSPORTATION CONSULTANTS, INC.

By Jeffrey C. Hodsdon, P.E.  
Principal

JCH/KDF:jas

Enclosures: Tables 2-4  
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## Tables 2-4

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Table 2 Trip Generation Estimate Waterview East																																		
Land Use Code	Land Use Description	Trip Generation Units	Trip Generation Rates <sup>(1)</sup>					Total Trips Generated				Internal Trips <sup>(2)</sup>	Total Internal Trips Generated					Total External Trips Generated					Pass-by Trip Percent <sup>(2)</sup>	Total Passby Trips Generated					Total New "External" Trips Generated					
			Average Weekday Traffic	Morning Peak-Hour In	Afternoon Peak-Hour Out	Average Weekday Traffic	Morning Peak-Hour In	Afternoon Peak-Hour Out	Average Weekday Traffic	Morning Peak-Hour In	Afternoon Peak-Hour Out		Average Weekday Traffic	Morning Peak-Hour In	Afternoon Peak-Hour Out	Average Weekday Traffic	Morning Peak-Hour In	Afternoon Peak-Hour Out	Average Weekday Traffic	Morning Peak-Hour In	Afternoon Peak-Hour Out	Average Weekday Traffic		Morning Peak-Hour In	Afternoon Peak-Hour Out	Average Weekday Traffic	Morning Peak-Hour In	Afternoon Peak-Hour Out	Average Weekday Traffic	Morning Peak-Hour In	Afternoon Peak-Hour Out			
Trip Generation Estimate For Waterview East																																		
821	Shopping Plaza (40-150 KSF With Supermarket)	59,392 KSF <sup>(3)</sup>	100.75	2.19	1.34	4.64	5.03	5,984	130	80	276	299	10%	598	13	8	28	30	5,386	117	72	248	269	34%	1,831	32	32	88	88	3,555	85	40	160	181
934	Fast-Food Restaurant with Drive-Through Window	6.5 KSF	467.48	22.75	21.86	17.18	15.85	3,039	148	142	112	103	10%	304	15	14	11	10	2,735	133	128	101	93	50%	1,368	65	65	49	49	1,367	68	63	52	44
945	Gasoline/Service Station with Convenience Market <sup>(4)</sup>	12 VFP	345.75	15.80	15.80	13.45	13.45	4,149	190	190	161	161	10%	415	19	19	16	16	3,734	171	171	145	145	56%	2,091	96	96	81	81	1,643	75	75	64	64
151	Mini-Warehouse	100 KSF	1.45	0.05	0.04	0.07	0.08	145	5	4	7	8	10%	15	1	0	1	1	130	4	4	6	7	0%	0	0	0	0	0	130	4	4	6	7
Total Trip Generation Estimate for P-14, P15, and P-19 (Waterview North)								13,317	473	416	556	571		1,332	48	41	56	57	11,985	425	375	500	514		5,290	193	193	218	218	6,695	232	182	282	296
Trip Generation Estimate for the Waterview North RM-12 Rezone Site (Not a part of the currently proposed development)																																		
220	Multifamily Housing Low-Rise	60 DU <sup>(5)</sup>	7.32	0.11	0.35	0.35	0.21	439	6	21	21	12	0%	0	0	0	0	0	439	6	21	21	12	0%	0	0	0	0	0	439	6	21	21	12
Total Trip Generation Estimate for P-17 & P-21								13,756	479	437	577	583		1,332	48	41	56	57	12,424	431	396	521	526		5,290	193	193	218	218	7,134	238	203	303	308
Waterview Sketch Plan Updated Master Traffic Impact Study dated January 9, 2018 (PCD Project No. SKP 16-002)																																		
820	Shopping Center	148 KSF	59.20	0.83	0.51	2.53	2.85	8,762	123	75	374	422	0%	0	0	0	0	0	8,762	123	75	374	422	34%	2,979	34	34	135	135	5,783	89	42	239	286
Change in Trip Generation Estimate								4,995	357	362	203	162							3,663	309	321	147	105		2,311	159	159	83	83	1,352	149	161	64	22
Notes:																																		
(1) Source: based on <i>Trip Generation</i> , 11th Edition, 2021 by the Institute of Transportation Engineers (ITE)																																		
(2) Source: "Trip Generation Handbook - An ITE Proposed Recommended Practice 3rd Edition, September 2017" by ITE																																		
(3) KSF = 1,000 square feet																																		
(4) The trip generation rates used are for Convenience Store/Gas Stations with a 5,500 to 10,000 square foot convenience store																																		
(5) DU = dwelling unit																																		
Source: LSC Transportation Consultants, Inc.																																		
Feb-23																																		

**Table 3**  
**Traffic Signal Warrant Analysis**  
Bradley Road & Legacy Hill Drive  
Waterview East Commercial

**Warrant Analysis<sup>(1)</sup>**

Hour	Existing Traffic Volumes (vehicles per hour) <sup>(2)</sup>		Warrant 1: Eight Hour Vehicular Volume Evaluation						Warrant 2: Four Hour Vehicular Volume	
			Warrant Thresholds				Warrant Threshold Met?		70% Warrant Threshold Minor	Warrant Threshold Met?
	Major <sup>(3)</sup>	Minor Leg <sup>(4)</sup>	Condition A (70%)		Condition B (70%)		Met?		Minimum	
			Major	Minor	Major	Minor	A	B		

**Existing Traffic**

6:30 AM	1367	48	350	105	525	53	No	No	60	No
7:30 AM	1237	44	350	105	525	53	No	No	60	No
11:30 AM	577	42	350	105	525	53	No	No	125	No
12:30 PM	567	31	350	105	525	53	No	No	125	No
1:30 PM	686	30	350	105	525	53	No	No	90	No
3:00 PM	1131	48	350	105	525	53	No	No	60	No
4:00 PM	1455	43	350	105	525	53	No	No	60	No
5:00 PM	1131	46	350	105	525	53	No	No	60	No

Numbers of Hours the Warrant Thresholds Are Met

0      0

0

Warrant Met?

No

No

**Existing + Buildout of Aspen Ridge Fil Nos. 1 & 2 Traffic<sup>(5)</sup>**

6:30 AM	1370	100	350	105	525	53	No	Yes	60	Yes
7:30 AM	1242	110	350	105	525	53	Yes	Yes	60	Yes
11:30 AM	637	65	350	105	525	53	No	Yes	90	No
12:30 PM	631	57	350	105	525	53	No	Yes	90	No
1:30 PM	752	57	350	105	525	53	No	Yes	70	No
3:00 PM	1222	76	350	105	525	53	No	Yes	60	Yes
4:00 PM	1565	76	350	105	525	53	No	Yes	60	Yes
5:00 PM	1235	79	350	105	525	53	No	Yes	60	Yes

Numbers of Hours the Warrant Thresholds Are Met

1      8

5

Warrant Met?

Yes

Yes

**Existing + 14254 square feet of retail floor space within the Waterview East Commercial development**

6:30 AM	1376	52	350	105	525	53	No	No	60	No
7:30 AM	1257	55	350	105	525	53	No	Yes	60	No
11:30 AM	614	76	350	105	525	53	No	Yes	90	No
12:30 PM	609	72	350	105	525	53	No	Yes	90	No
1:30 PM	724	72	350	105	525	53	No	Yes	70	Yes
3:00 PM	1167	88	350	105	525	53	No	Yes	60	Yes
4:00 PM	1493	84	350	105	525	53	No	Yes	60	Yes
5:00 PM	1169	88	350	105	525	53	No	Yes	60	Yes

Numbers of Hours the Warrant Thresholds Are Met

0      7

4

Warrant Met?

Approaching

Yes

**Existing + Buildout of Waterview East Commercial**

6:30 AM	1442	228	350	105	525	53	Yes	Yes	60	Yes
7:30 AM	1365	216	350	105	525	53	Yes	Yes	60	Yes
11:30 AM	789	279	350	105	525	53	Yes	Yes	70	Yes
12:30 PM	806	365	350	105	525	53	Yes	Yes	60	Yes
1:30 PM	911	369	350	105	525	53	Yes	Yes	60	Yes
3:00 PM	1353	359	350	105	525	53	Yes	Yes	60	Yes
4:00 PM	1692	335	350	105	525	53	Yes	Yes	60	Yes
5:00 PM	1376	335	350	105	525	53	Yes	Yes	60	Yes

Numbers of Hours the Warrant Thresholds Are Met

8      8

8

Warrant Met?

Yes

Yes

**Notes:**

(1) Thresholds are based on 1 lane on the major approach and 1 lane on the minor approach with the 70% factor applied for a posted speed limit above 40 mph

(2) Based on traffic counts by LSC Transportation Consultants, Inc February 2023

(3) The major street traffic includes all movements (left, through, and right) on Bradley Road

(4) The minor street traffic includes only the northbound left volume from Legacy Hill Drive

(5) Source: *Trails at Apen Ridge Filing No. 2 - Traffic Impact and Access Analysis* by Matrix Design Group, Inc. May 7, 2021

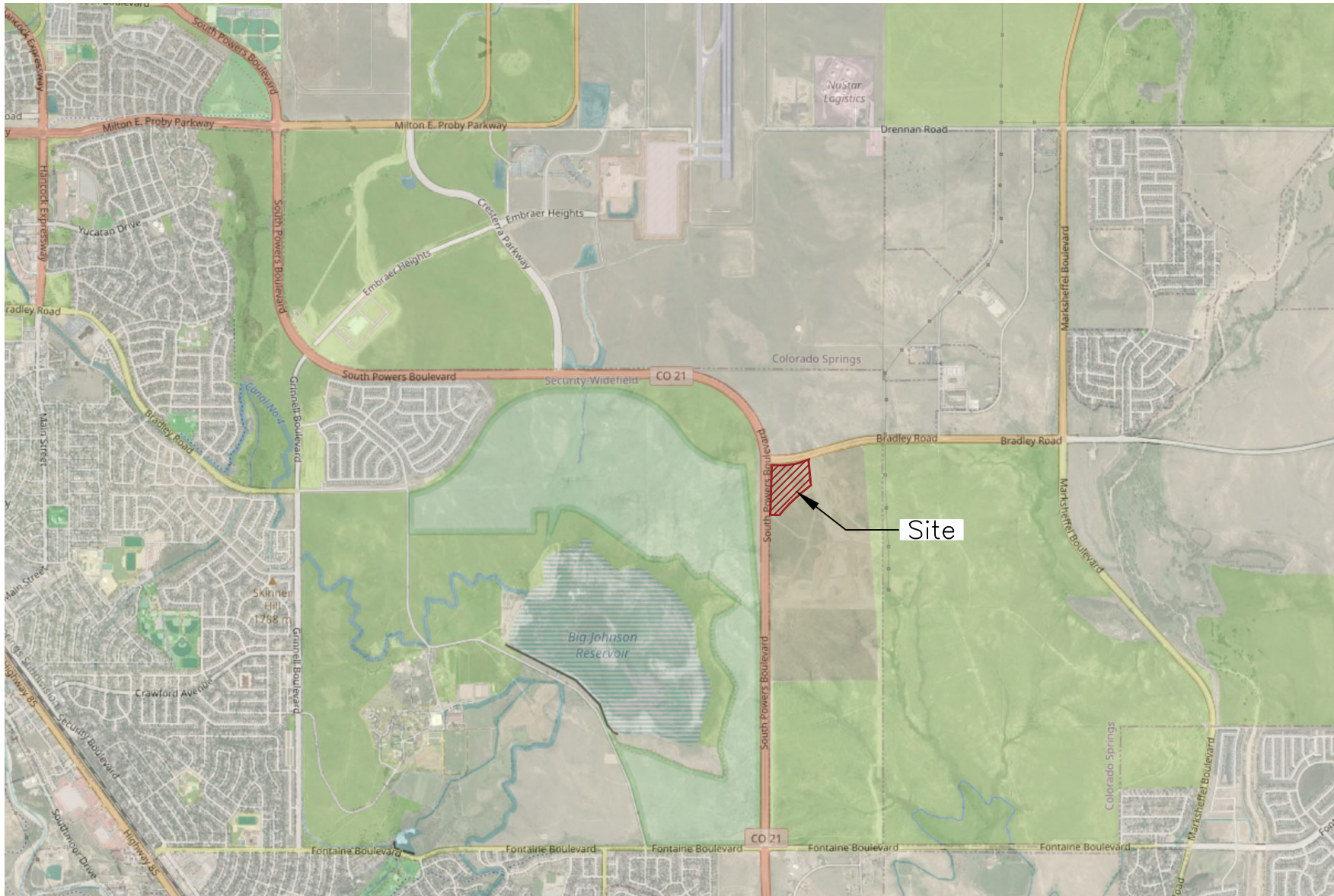
Source: LSC Transportation Consultants, Inc.

<div>Table 4</div> <div>Improvements Table</div> <div>Waterview East Commercial</div>				
Improvement	Timing /"Trigger Point(s)"	Required Length	Proposed Length	Responsibility <sup>(1)</sup>
Traffic Signals				
Traffic Signal Installation - Installation of the traffic signal at Legacy Hill Drive/Bradley Road.	<p>As determined by The City of Colorado Springs - typically this is when traffic signal warrants are met, however traffic signal warrants are guidelines and the actual timing of installation is at the discretion of The City of Colorado Springs.</p> <p>Eight-Hour and Four-Hour Vehicular Volume Traffic Signal Warrants are projected to be met with <b>either</b> full buildout of Trails at Aspen Ridge Filing Nos. 1 and 2 or once about 14,254 square feet of retail floor space is developed within the currently proposed Waterview East Commercial site. As development of these two sites is anticipated to occur concurrently, signal warrants will likely be met with some combination of the buildout of these two developments. LSC recommends the traffic-signal warrant analysis be updated with each final plat within Waterview East Commercial that is submitted prior to construction of the signal.</p>	- - -	- - -	The City will require the applicant to escrow \$200,000 towards the future signal at the intersection of Legacy Hill/Bradley prior to construction plan approval. LSC recommends that the escrow amount called out by the City for the southeast and southwest corners (one half of the signal cost), should be shared by this development, Aspen Ridge, and the future multi-family development on the SE corner. The cost sharing could be based on peak-hour trips creating the need for a signal at this intersection (generally, traffic on the northbound approach) this cost-sharing agreement should consider any amount already escrowed by the Aspen Ridge Development. Since this intersection was approved as an eligible intersection by the El Paso County Roadway Improvement Fee program, amounts escrowed by county developments on the south side of Bradley should be eligible for credit, based on fee program unit costs for signals once the signal is installed.
Auxiliary Turn Lanes				
Powers/Bradley				
Reconstruct the Powers Boulevard median north of Bradley Road to provide dual southbound left-turn lanes. The existing mast arm will need to be lengthened for the second left turn.	With this development if not completed by other development(s) as part of the CDOT access permit process.	- - -	- - -	Applicant and other area developments; also, this could potentially be considered a "regional improvement (potentially eligible for credit within the fee program) ." To be evaluated with each final plat if not completed sooner by another development
Northbound dual right-turn deceleration and acceleration lane improvements as noted in a memo from CDOT dated July 2, 2021 regarding Trails at Aspen Ridge - Access Submittal Planning Comments <sup>(1)</sup>	With this development if not completed by other development(s) as part of the CDOT access permit process.	- - -	- - -	Applicant and other area developments; also, this could potentially be considered a "regional improvement (potentially eligible for credit within the fee program) ." To be evaluated with each final plat if not completed sooner by another development
The CDOT comment letter dated July 2, 2021 regarding the Trails at Aspen Ridge indicates the following requirement: CDOT requests additional right of way dedication for the required improvements and the future interchange from the SE quadrant, the SW quadrant and the NW quadrant of the development	It is our understanding based on information provided by the applicant that this request has been resolved with CDOT and the land dedication will not be required.	- - -	- - -	N/A
Bradley/Marksheffel				
Potential (if required) fair-share contribution or reconstruction to provide dual eastbound left-turn lanes on Bradley Road approaching Marksheffel Road	The timing of this improvement could be evaluated with each final plat.	- - -	- - -	Applicant and potentially other area developments; also, this could potentially be considered a "regional improvement (potentially eligible for credit within the fee program) ."
Legacy Hill/Right-in Only Access				
Southbound right-turn deceleration lane on Legacy Hill Drive approaching the right-in only access	southboundbound right-turn volume of 50 vehicles per hour	205' plus 160' taper	100' plus 77' taper	Applicant
Frontside/Northeast Access				
Northbound left-turn lane on Frontside Drive approaching the northeast access	northboundbound left-turn volume of 25 vehicles per hour	205' plus 160' taper	Construct Frontside Drive a center two-way, left-turn west of Legacy Hill Drive	Applicant
Southbound right-turn decleration lane on Frontside Drive approaching the northeast access	southboundbound right-turn volume of 50 vehicles per hour	155' plus 160' taper	155' plus 160' taper	Applicant
Frontside/Southwest Access				
Northbound left-turn lane on Frontside Drive approaching the southwest access	northboundbound left-turn volume of 25 vehicles per hour	205' plus 160' taper	Construct Frontside Drive a center two-way, left-turn west of Legacy Hill Drive	Applicant
Southbound right-turn decleration lane on Frontside Drive approaching the southwest access	southboundbound right-turn volume of 50 vehicles per hour	Not required	none	Applicant
Notes:				
(1) A copy of this memorandum has been attached				
Source: LSC Transportation Consultants, Inc.				
Mar-23				

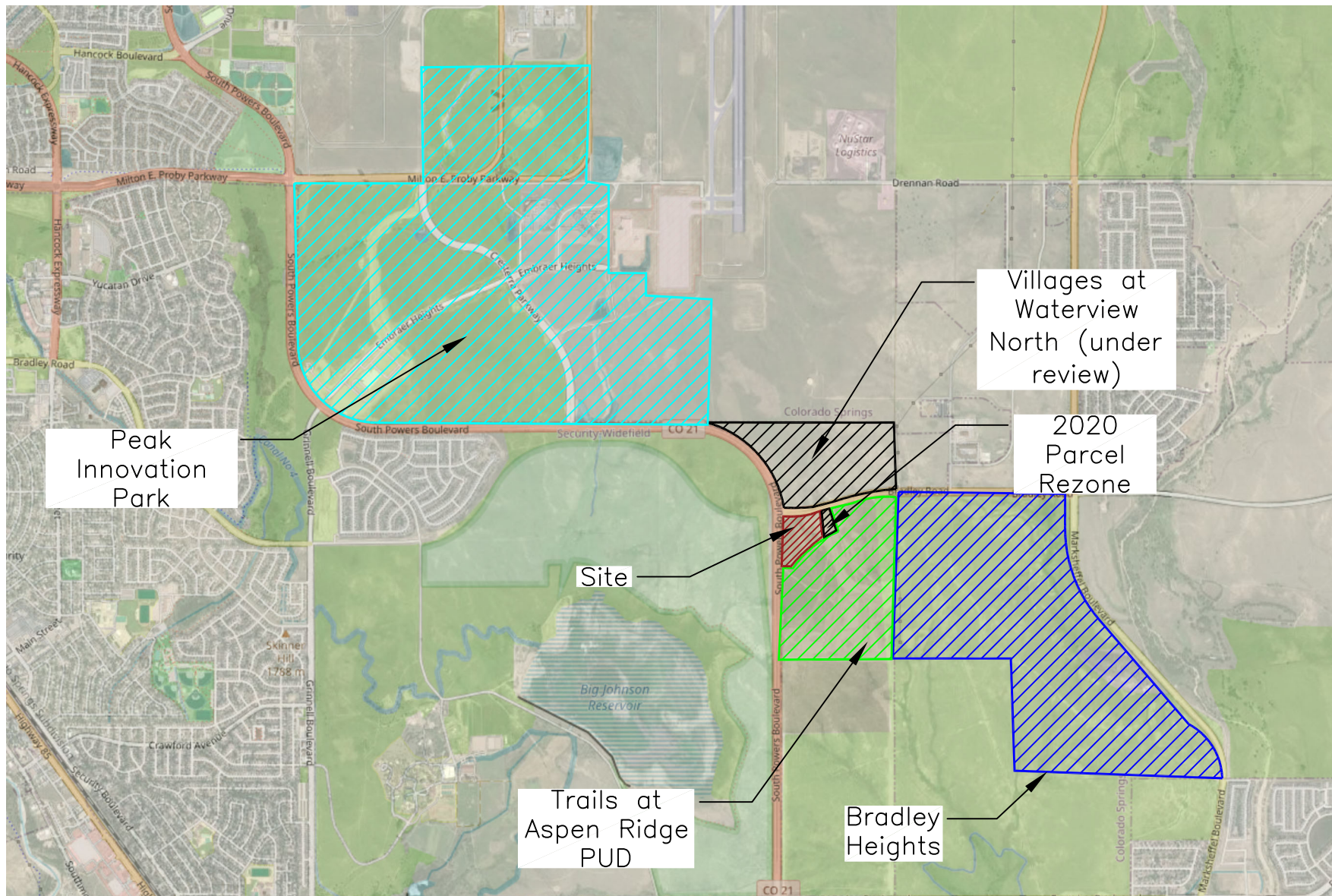


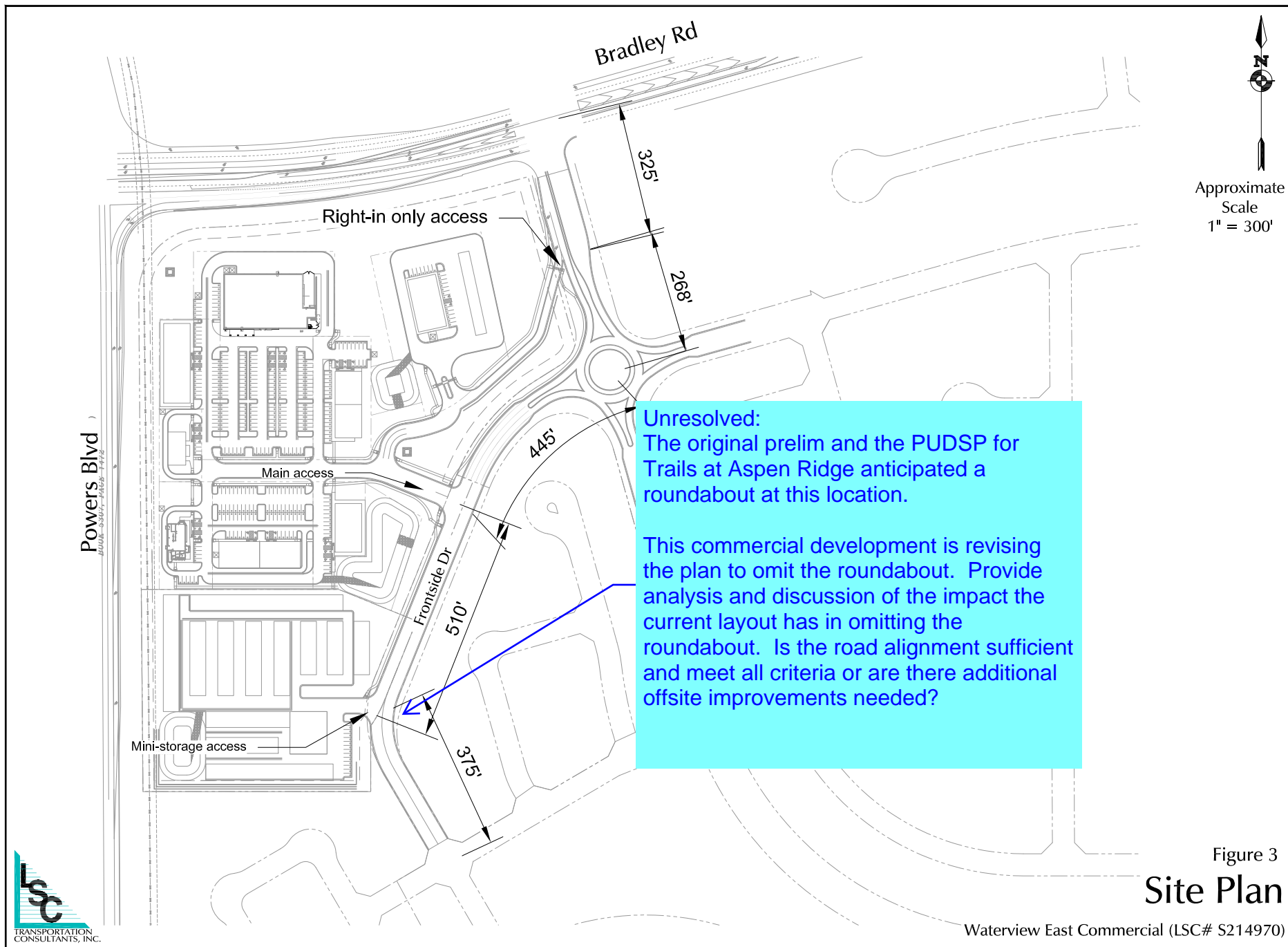
## Figures 1-15

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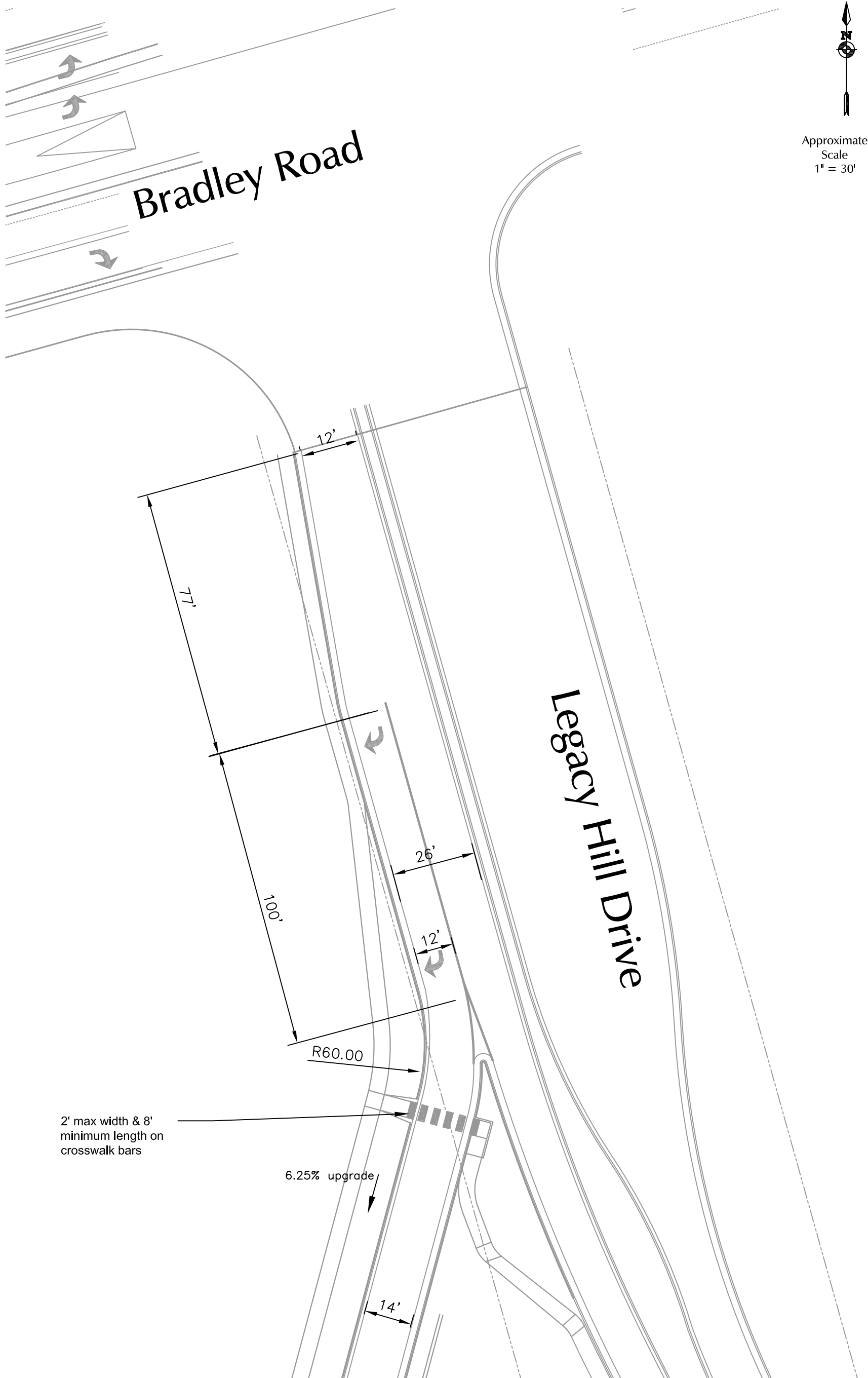
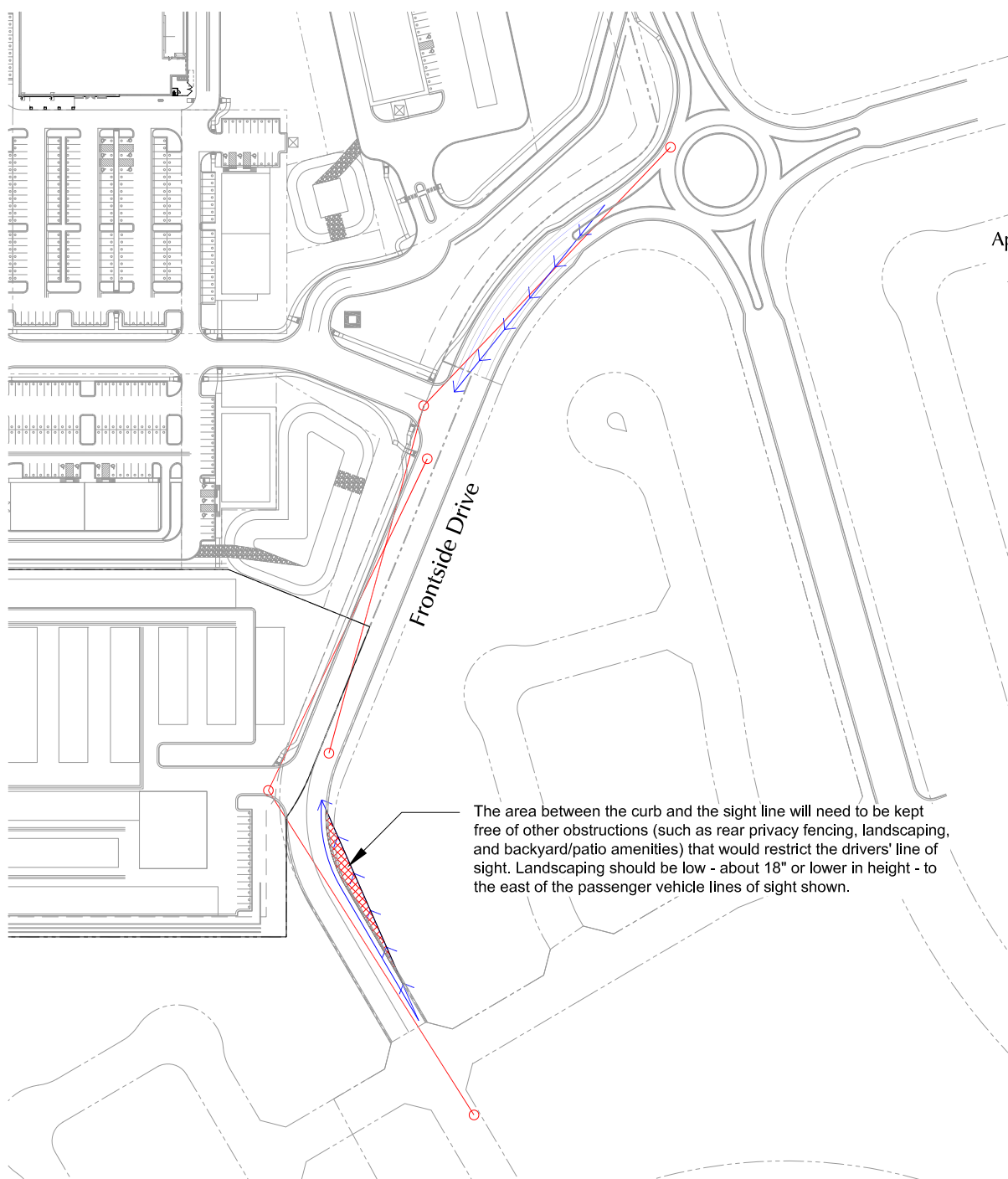


Figure 4  
**Right-in Only Access Design**  
Waterview East Commercial (LSC# S214970)



Approximate  
Scale  
1" = 200'



— = 445' intersection sight distance  
(based on a design speed of  
40mph)

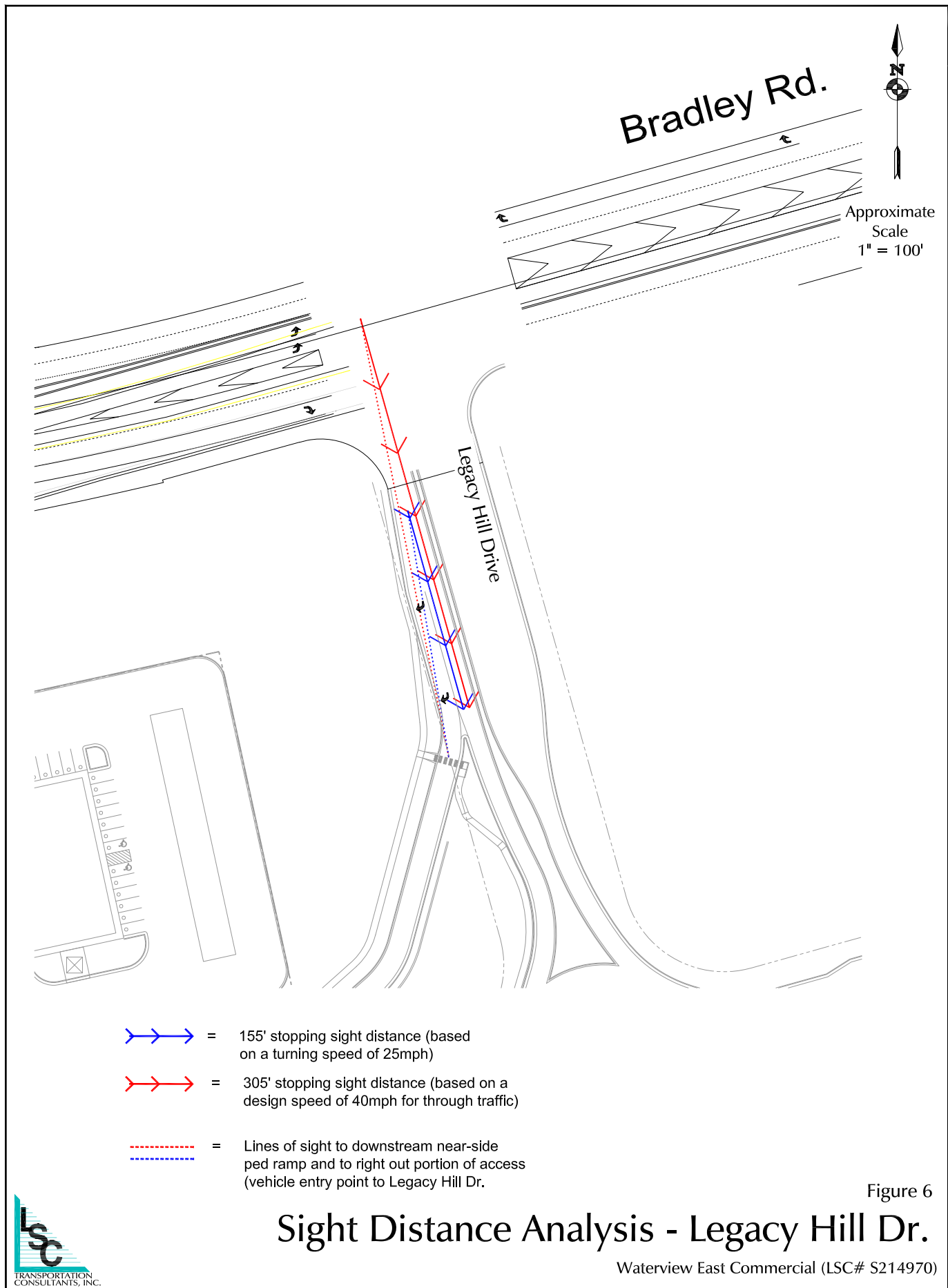
→ = 305' stopping sight distance (based  
on a design speed of 40mph)

Figure 5

## Sight Distance Analysis - Frontside Dr.

Waterview East Commercial (LSC# S214970)





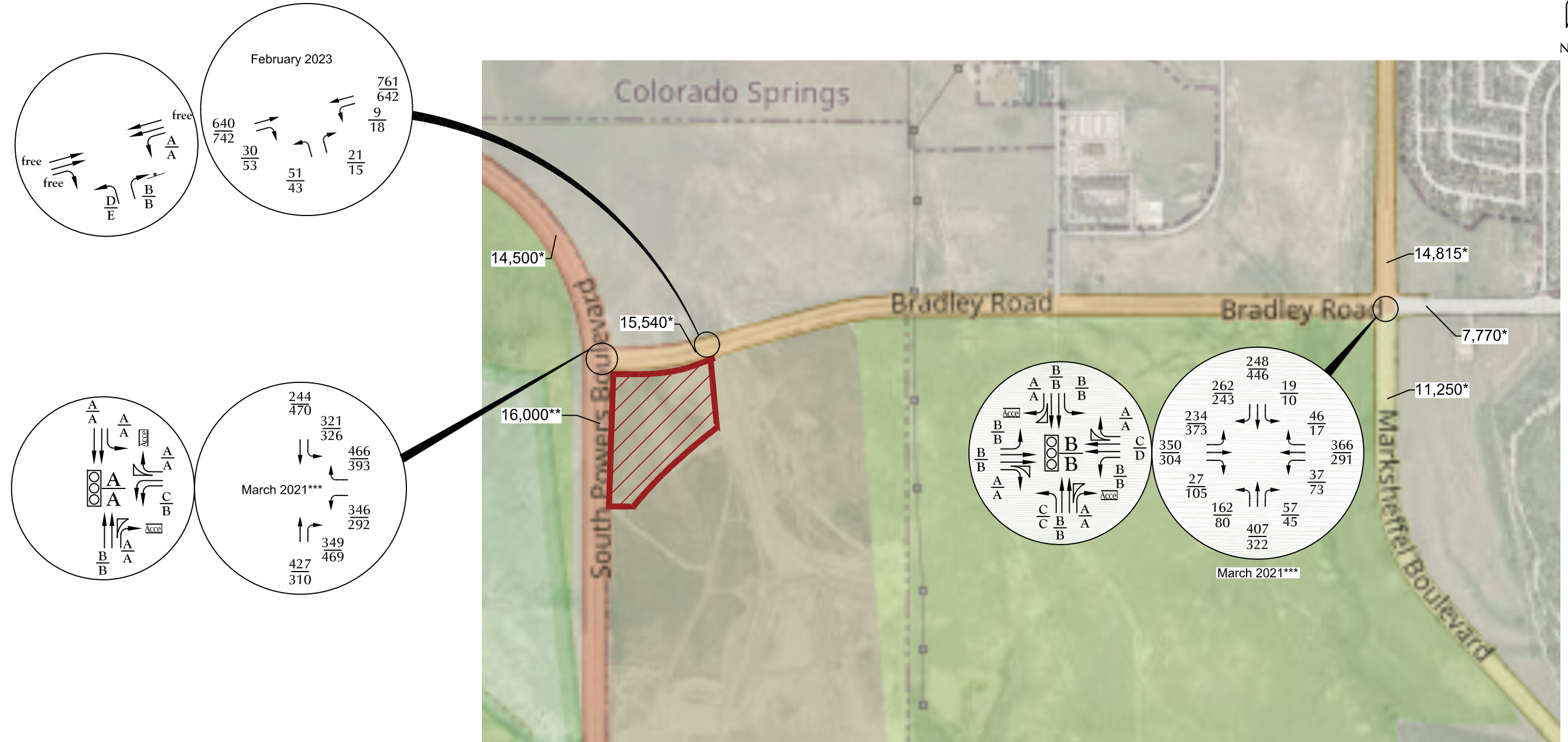
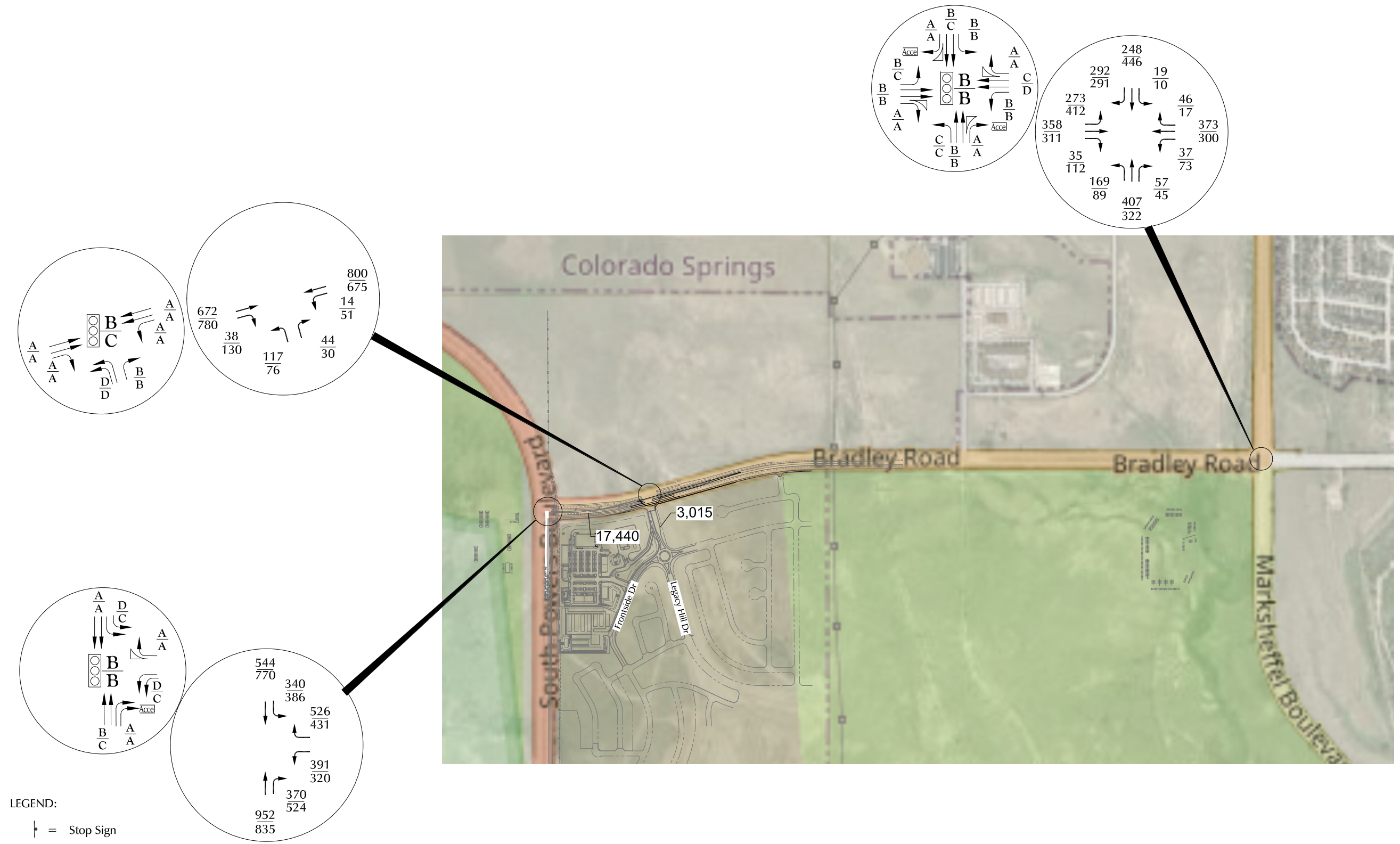


Figure 7  
Existing Traffic, Lane Geometry,  
Traffic Control, and Level of Service





LEGEND:

⊥ = Stop Sign

⬢ = Traffic Signal

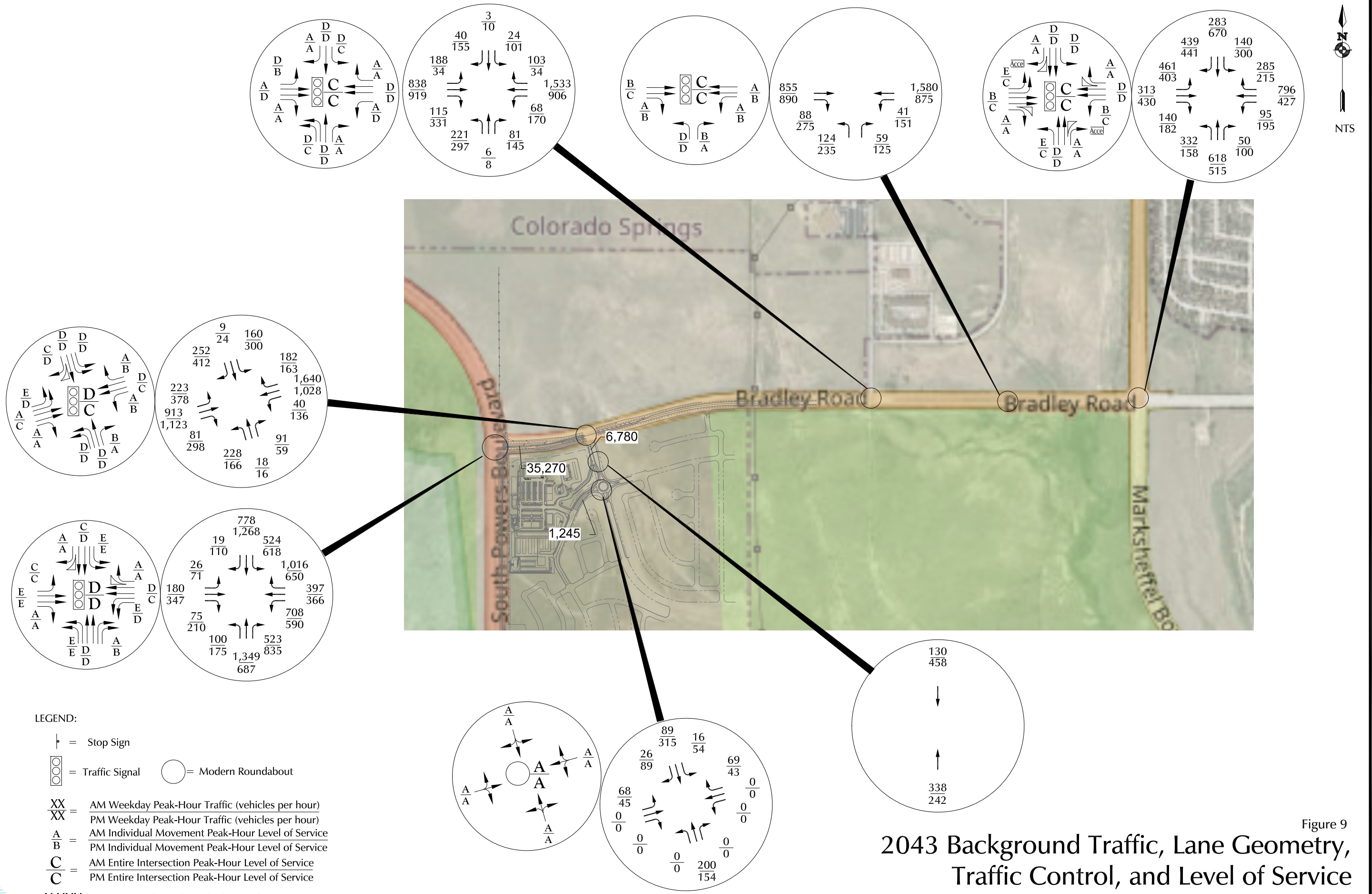
XX = AM Weekday Peak-Hour Traffic (vehicles per hour)  
XX = PM Weekday Peak-Hour Traffic (vehicles per hour)  
A = AM Individual Movement Peak-Hour Level of Service  
B = PM Individual Movement Peak-Hour Level of Service  
C = AM Entire Intersection Peak-Hour Level of Service  
C = PM Entire Intersection Peak-Hour Level of Service

X,XXX= Average Daily Traffic (vehicles per day)



Figure 8  
Short-Term Background Traffic, Lane Geometry,  
Traffic Control, and Level of Service

Waterview East Commercial (LSC# S214970)





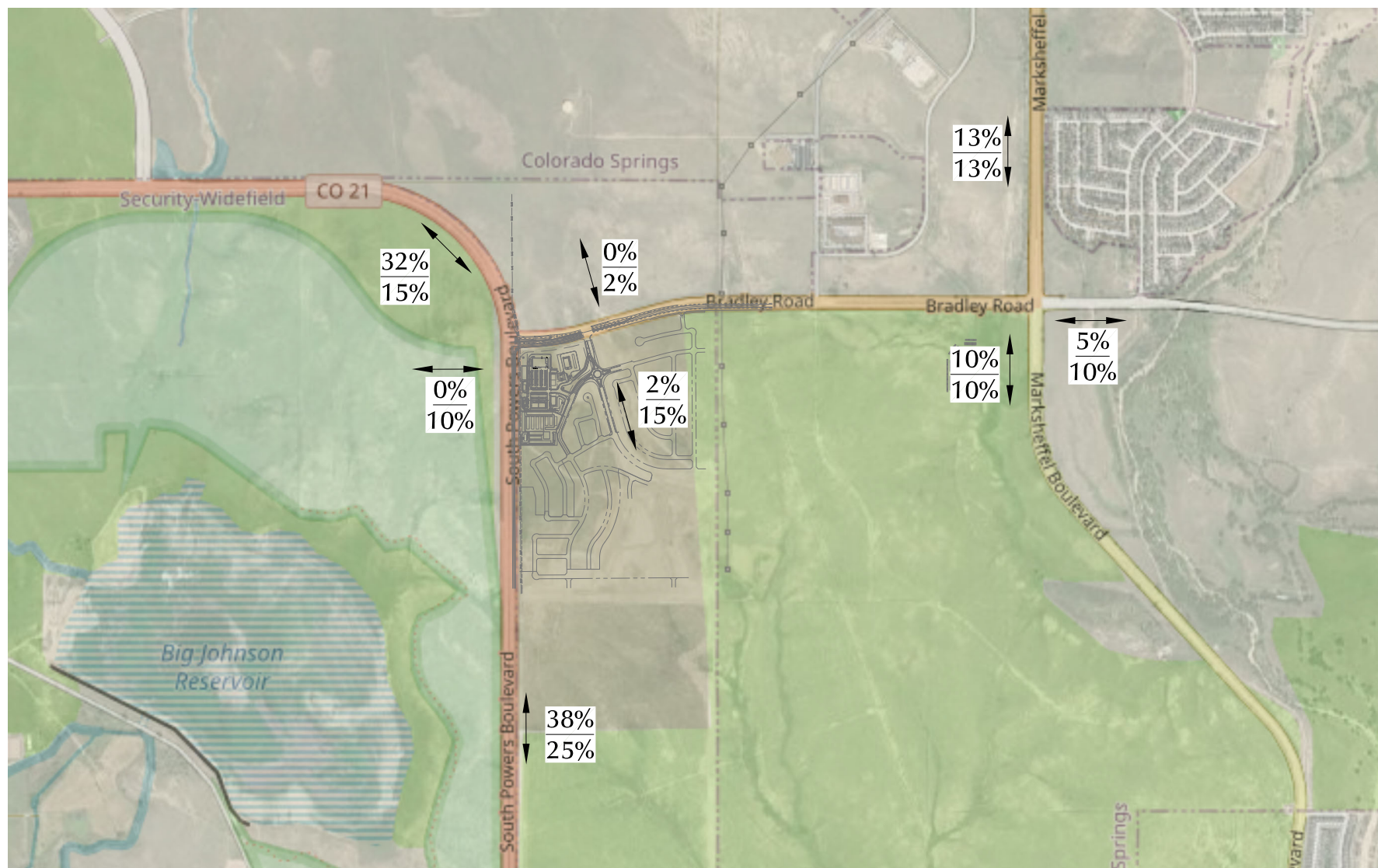


Figure 10a



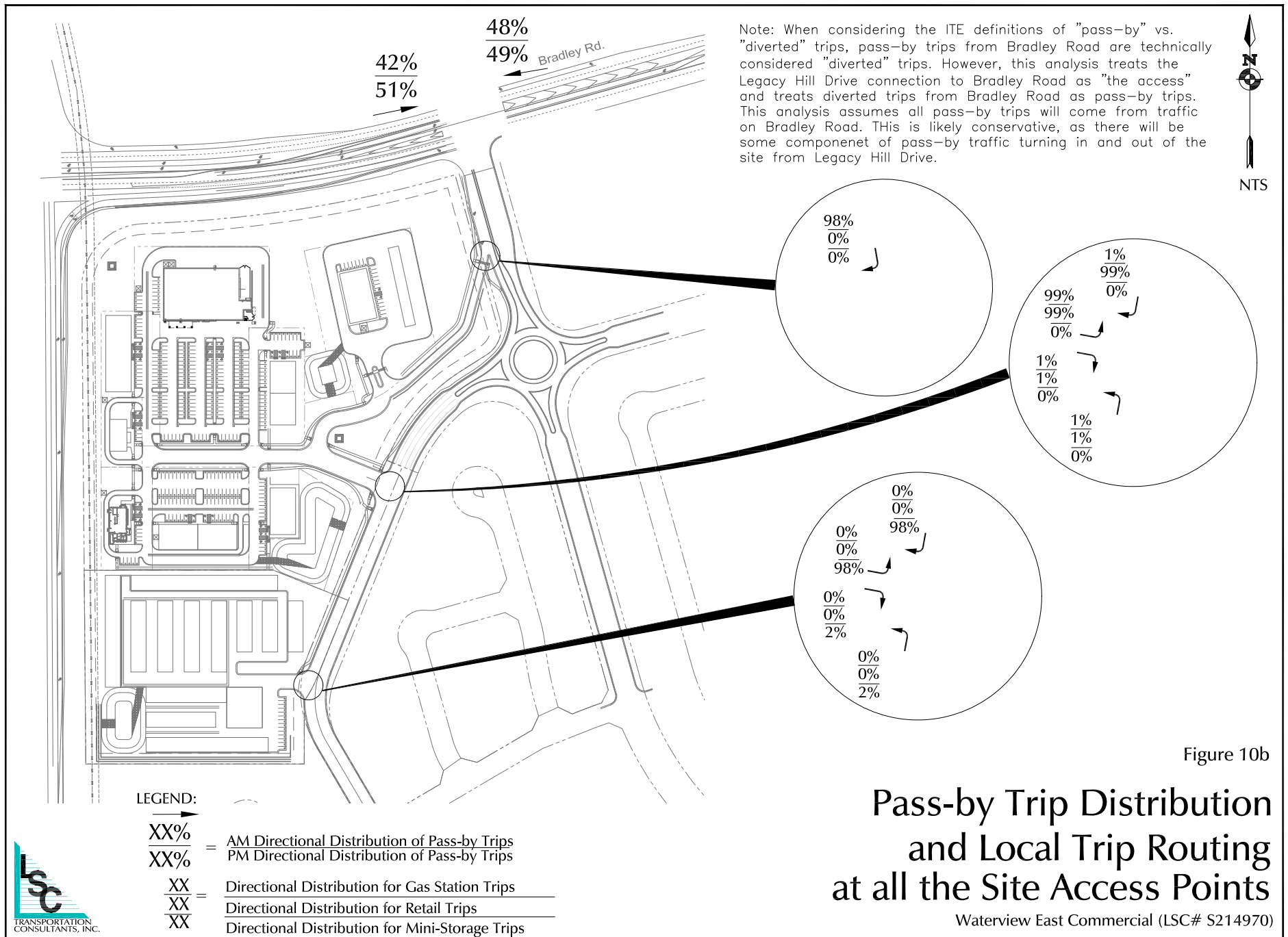
LEGEND:

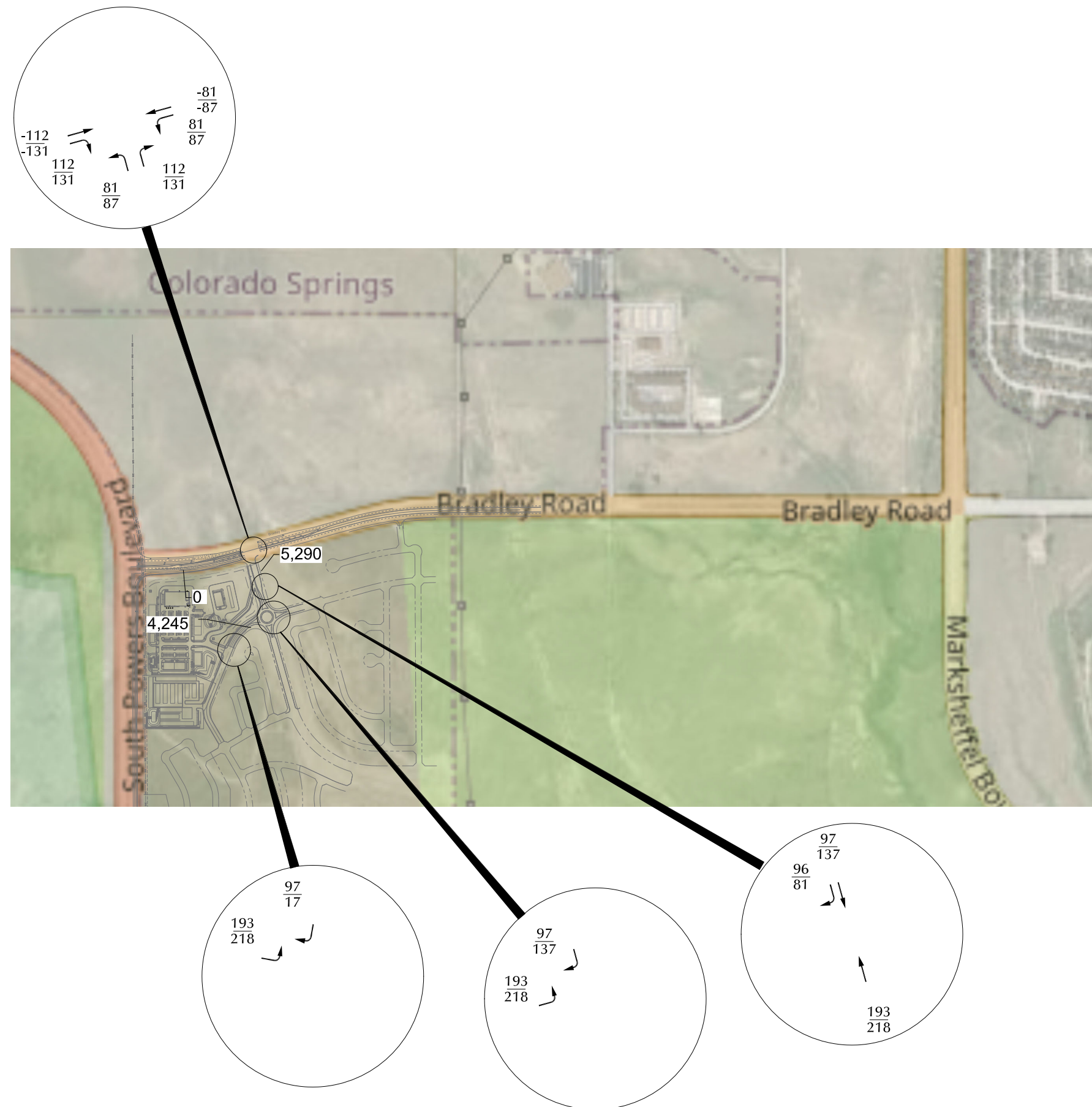
$\frac{XX\%}{XX\%}$

= Short-Term Percent Directional Distribution  
 Long-Term Percent Directional Distribution

## Directional Distribution of Non-Passby, External Site-Generated Traffic

Waterview East Commercial (LSC# S214970)



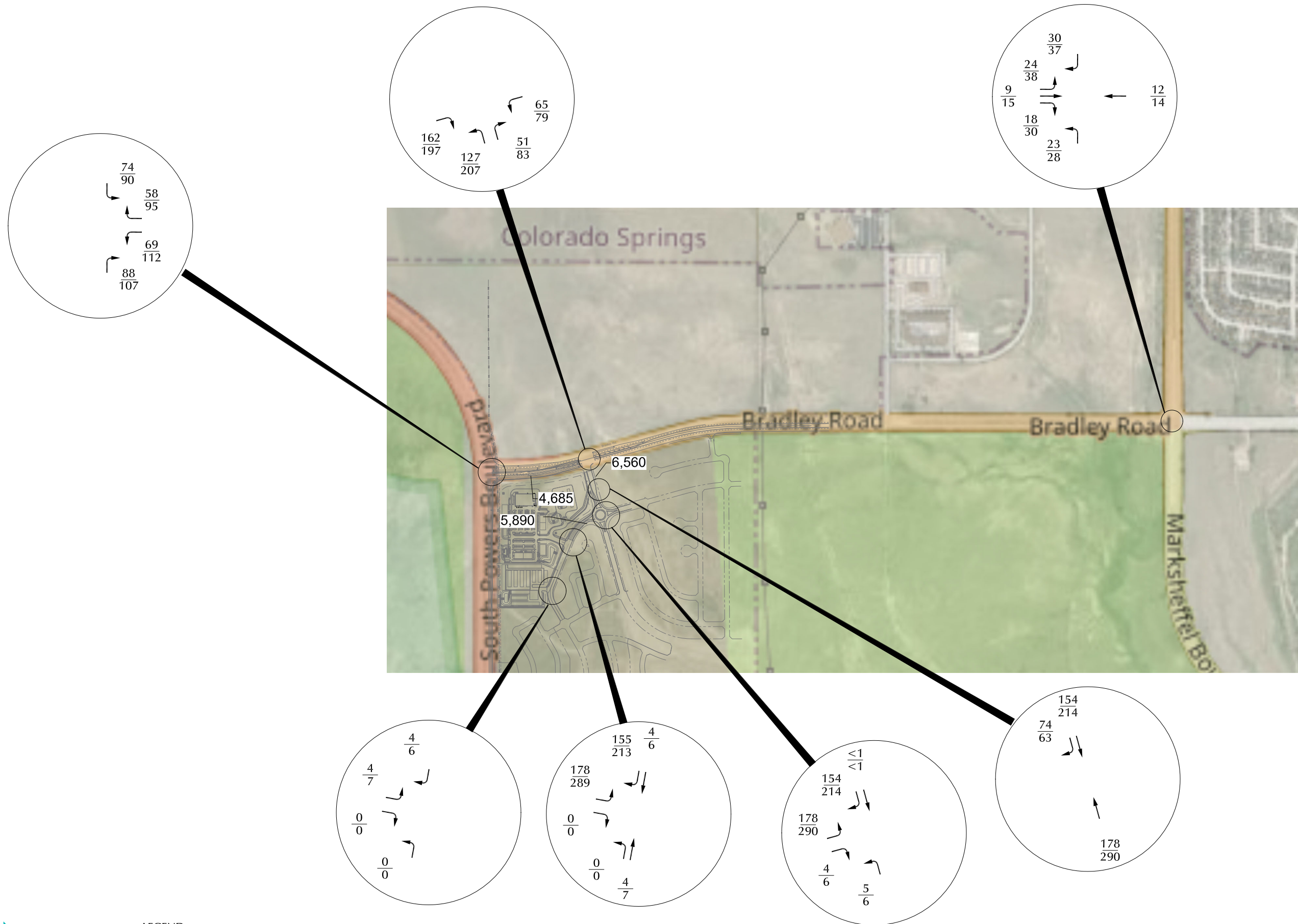


LEGEND:

$\frac{XX}{XX}$  = AM Weekday Peak-Hour Traffic (vehicles per hour)  
 $\frac{XX}{XX}$  = PM Weekday Peak-Hour Traffic (vehicles per hour)

X,XXX= Average Daily Traffic (vehicles per day)





LEGEND:

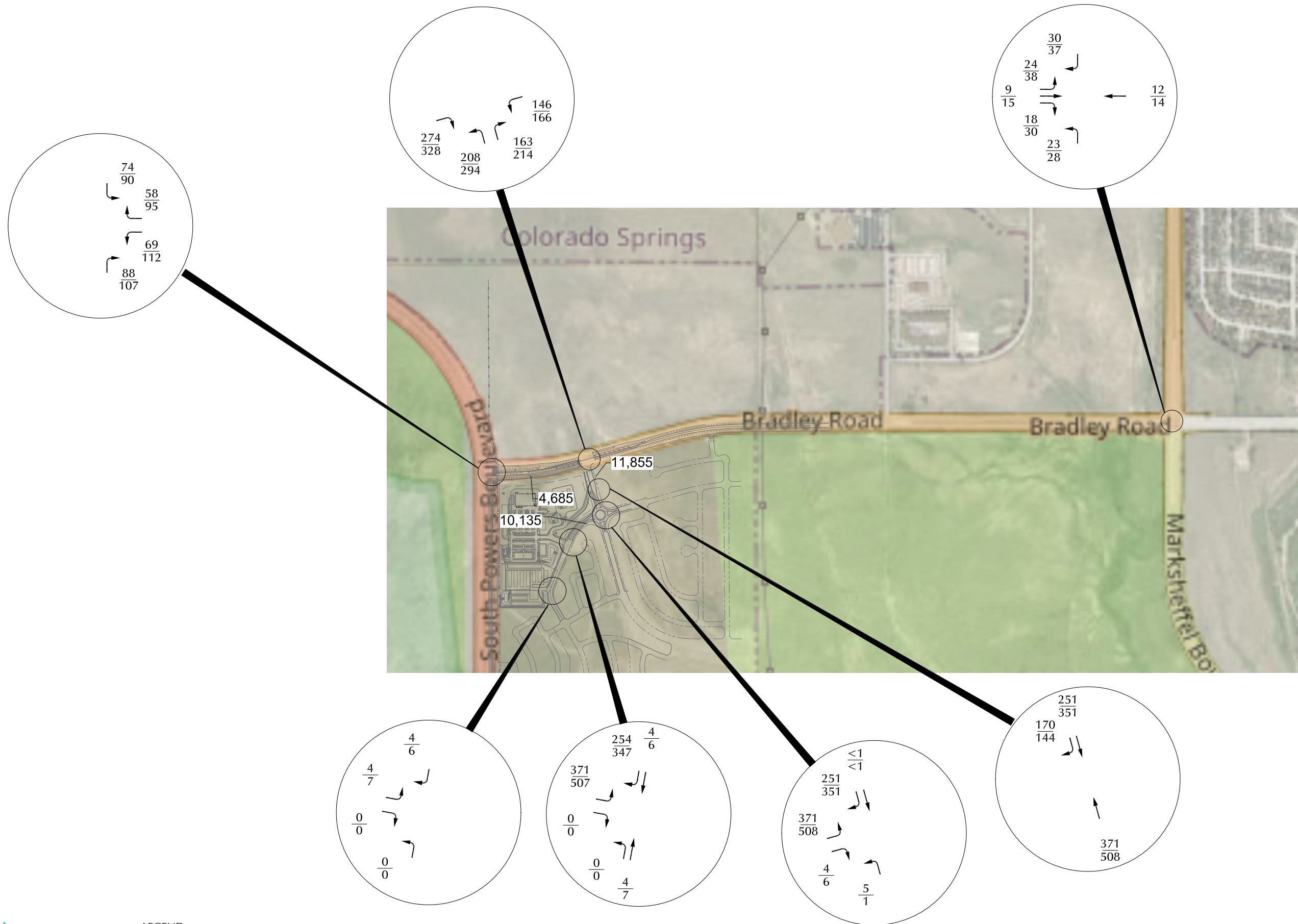
$\frac{XX}{XX}$  = AM Weekday Peak-Hour Traffic (vehicles per hour)  
PM Weekday Peak-Hour Traffic (vehicles per hour)

X,XXX = Average Daily Traffic (vehicles per day)

Short-Term Non-Pass-by, External Site-Generated Traffic

Figure 12a

Waterview East Commercial (LSC# S214970)



LEGEND:

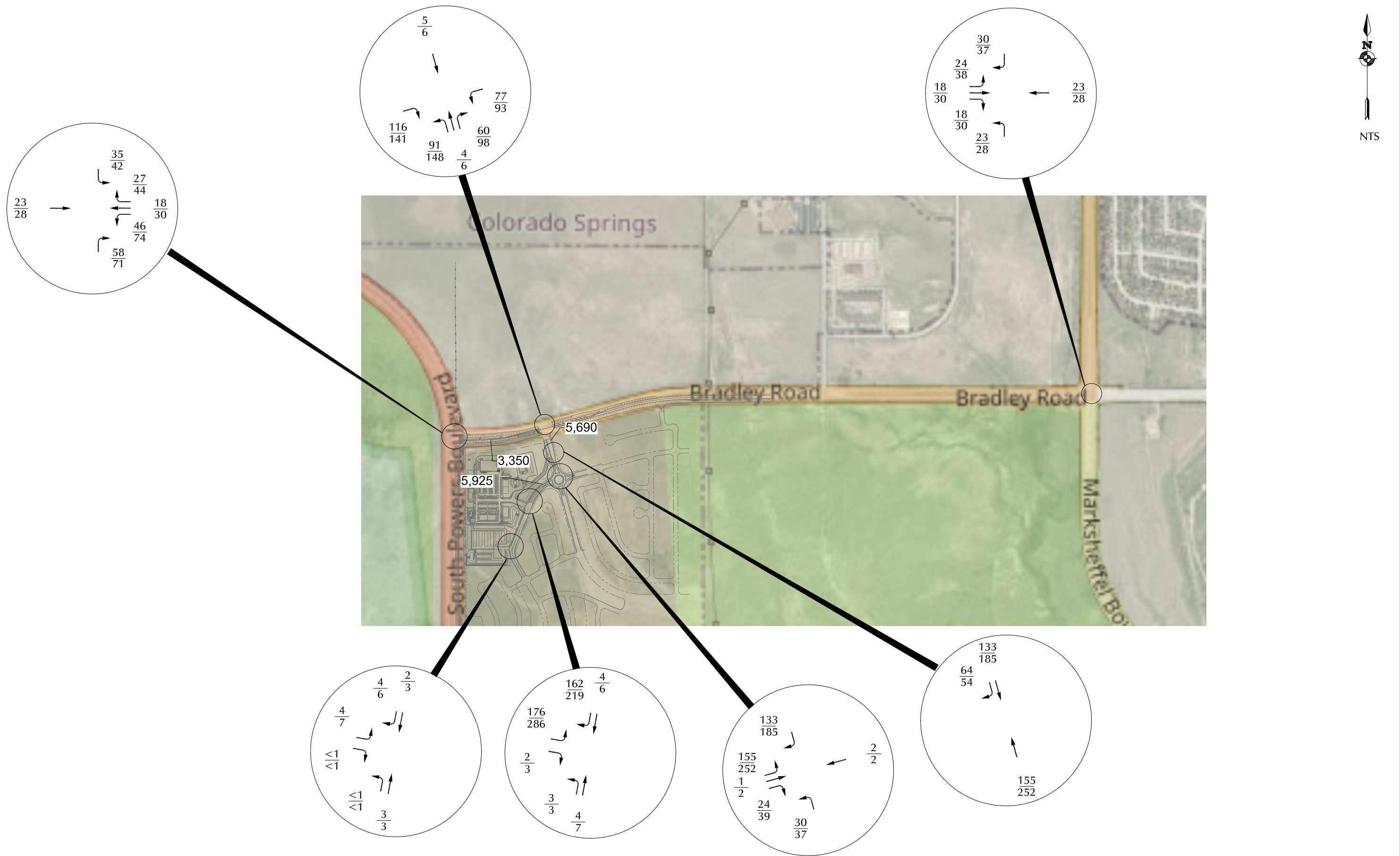
$\frac{XX}{XX}$  = AM Weekday Peak-Hour Traffic (vehicles per hour)  
 $\frac{XX}{XX}$  = PM Weekday Peak-Hour Traffic (vehicles per hour)

X,XXX = Average Daily Traffic (vehicles per day)

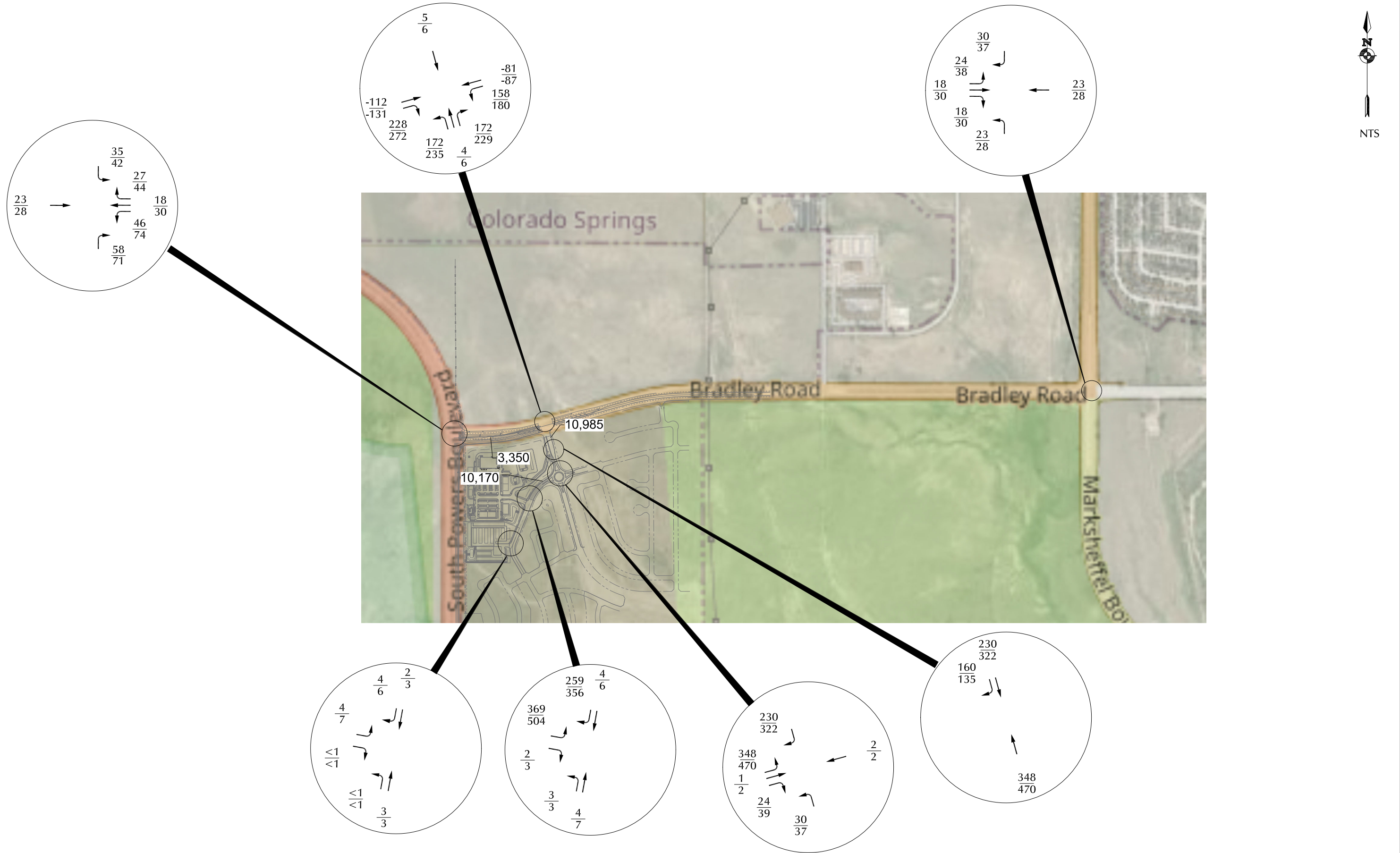
## Short-Term Total, External Site-Generated Traffic

Figure 12b

Waterview East Commercial (LSC# S214970)







LEGEND:

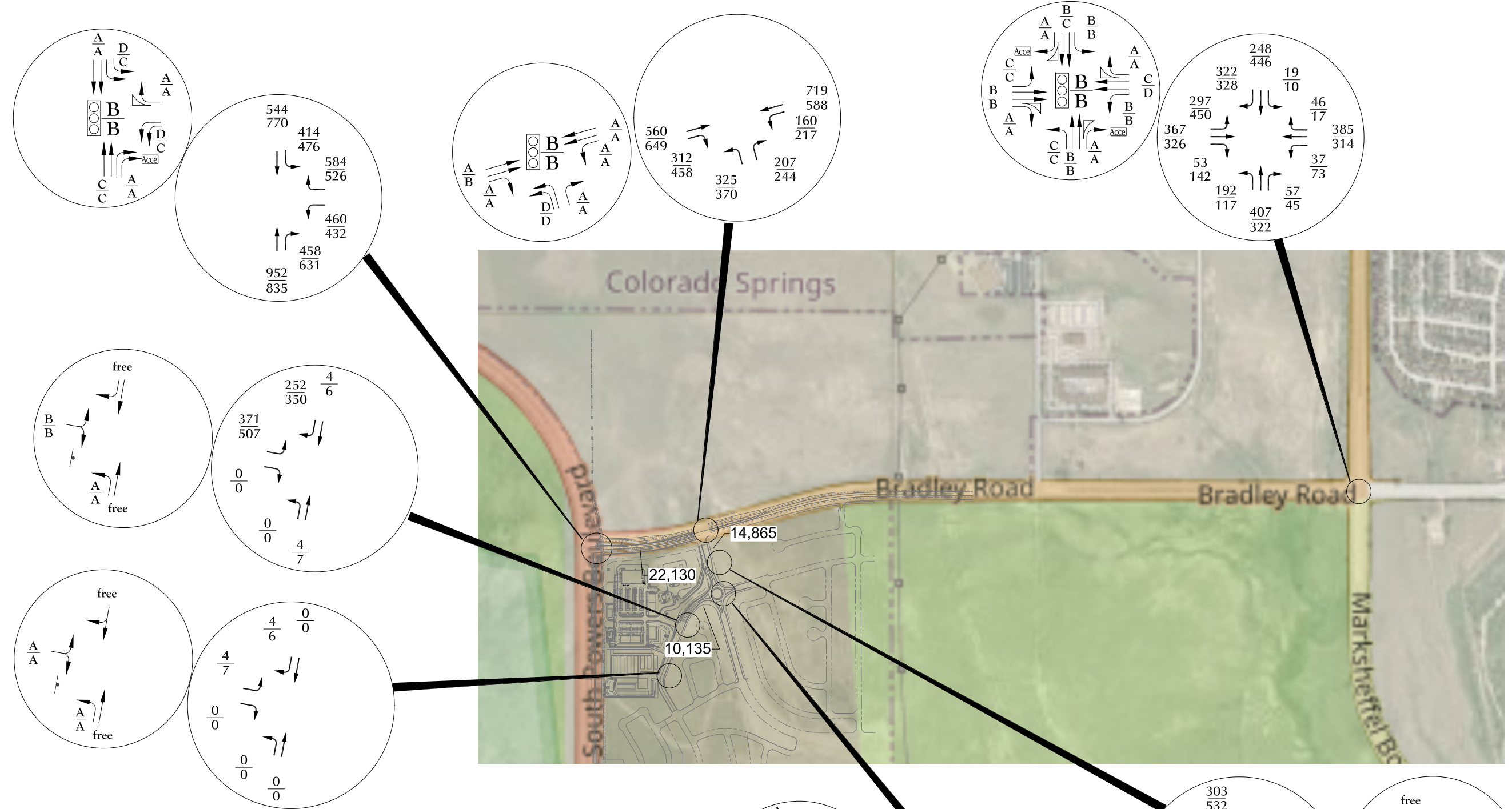
$\frac{XX}{XX}$  = AM Weekday Peak-Hour Traffic (vehicles per hour)  
 $\frac{XX}{XX}$  = PM Weekday Peak-Hour Traffic (vehicles per hour)

X,XXX = Average Daily Traffic (vehicles per day)



Figure 13b  
 Long-Term Total, External Site-Generated Traffic

Waterview East Commercial (LSC# S214970)



**LEGEND:**

⊥ = Stop Sign

⬢ = Traffic Signal    ○ = Modern Roundabout

$\frac{XX}{XX}$  = AM Weekday Peak-Hour Traffic (vehicles per hour)  
 PM Weekday Peak-Hour Traffic (vehicles per hour)

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

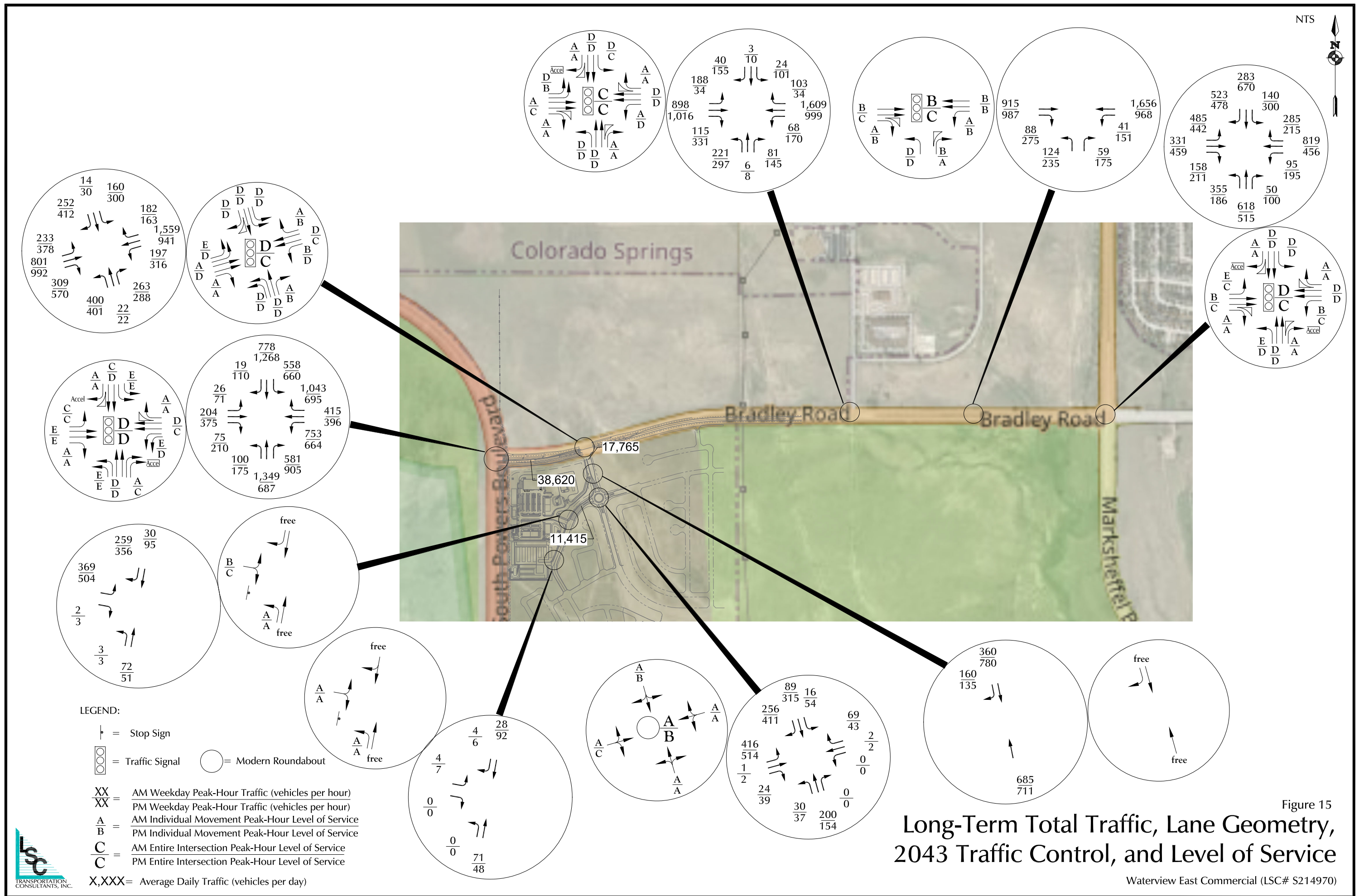
$\frac{C}{C}$  = AM Entire Intersection Peak-Hour Level of Service  
 PM Entire Intersection Peak-Hour Level of Service

X,XXX = Average Daily Traffic (vehicles per day)

Figure 14  
**Short-Term Total Traffic, Lane Geometry,  
 Traffic Control, and Level of Service**  
 Waterview East Commercial (LSC# S214970)







# Traffic Counts

---

# LSC Transportation Consultants, Inc.

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

File Name : Legacy Hill Dr - Bradley Rd AM SW

Site Code : S214630

Start Date : 2/8/2023

Page No : 1

## Groups Printed- Unshifted

	Southbound					Westbound					Northbound					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	0	0	0	0	0	143	5	0	148	5	0	12	0	17	11	131	0	0	142	307
06:45	0	0	0	0	0	0	190	2	0	192	5	0	11	0	16	2	146	0	0	148	356
Total	0	0	0	0	0	0	333	7	0	340	10	0	23	0	33	13	277	0	0	290	663
07:00	0	0	0	0	0	0	185	2	0	187	6	0	10	0	16	8	167	0	0	175	378
07:15	0	0	0	0	0	0	207	4	0	211	4	0	15	0	19	10	154	0	0	164	394
07:30	0	0	0	0	0	0	179	1	0	180	6	0	15	0	21	10	173	0	0	183	384
07:45	0	0	0	0	0	0	155	8	0	163	5	0	8	0	13	9	132	0	1	142	318
Total	0	0	0	0	0	0	726	15	0	741	21	0	48	0	69	37	626	0	1	664	1474
08:00	0	0	0	0	0	0	172	7	0	179	4	0	9	0	13	15	95	0	0	110	302
08:15	0	0	0	0	0	0	150	6	1	157	4	0	12	0	16	16	109	0	0	125	298
Grand Total	0	0	0	0	0	0	1381	35	1	1417	39	0	92	0	131	81	1107	0	1	1189	2737
Apprch %	0	0	0	0		0	97.5	2.5	0.1		29.8	0	70.2	0		6.8	93.1	0	0.1		
Total %	0	0	0	0	0	0	50.5	1.3	0	51.8	1.4	0	3.4	0	4.8	3	40.4	0	0	43.4	

# LSC Transportation Consultants, Inc.

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

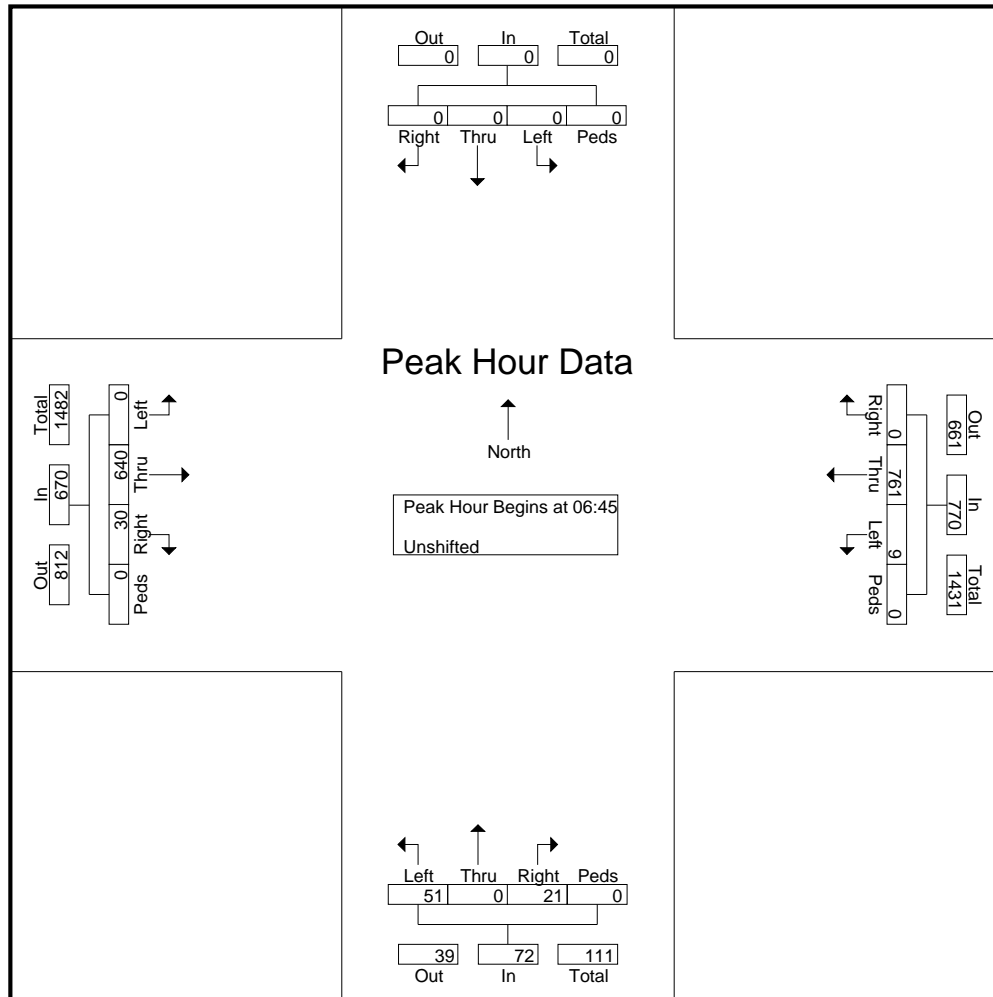
File Name : Legacy Hill Dr - Bradley Rd AM SW

Site Code : S214630

Start Date : 2/8/2023

Page No : 2

	Southbound					Westbound					Northbound					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 6:45:00 AM																					
6:45:00 AM	0	0	0	0	0	0	190	2	0	192	5	0	11	0	16	2	146	0	0	148	356
7:00:00 AM	0	0	0	0	0	0	185	2	0	187	6	0	10	0	16	8	167	0	0	175	378
7:15:00 AM	0	0	0	0	0	0	<b>207</b>	<b>4</b>	0	<b>211</b>	4	0	<b>15</b>	0	19	<b>10</b>	154	0	0	164	<b>394</b>
7:30:00 AM	0	0	0	0	0	0	179	1	0	180	6	0	15	0	<b>21</b>	10	<b>173</b>	0	0	<b>183</b>	384
Total Volume	0	0	0	0	0	0	761	9	0	770	21	0	51	0	72	30	640	0	0	670	1512
% App. Total	0	0	0	0	0	0	98.8	1.2	0		29.2	0	70.8	0		4.5	95.5	0	0		
PHF	.000	.000	.000	.000	.000	.000	.919	.563	.000	.912	.875	.000	.850	.000	.857	.750	.925	.000	.000	.915	.959



# LSC Transportation Consultants, Inc.

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

File Name : Legacy Hill Dr - Bradley Rd Mid SW

Site Code : S214630

Start Date : 2/8/2023

Page No : 1

## Groups Printed- Unshifted

	Southbound					Bradley Rd Westbound					Legacy Hill Dr Northbound					Bradley 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
11:30	0	0	0	0	0	0	59	3	0	62	5	0	10	0	15	12	71	0	0	83	160
11:45	0	0	0	0	0	0	50	1	0	51	8	0	9	0	17	10	69	0	0	79	147
Total	0	0	0	0	0	0	109	4	0	113	13	0	19	0	32	22	140	0	0	162	307
12:00	0	0	0	0	0	0	80	8	0	88	3	0	9	0	12	6	53	0	1	60	160
12:15	0	0	0	0	0	0	66	2	1	69	4	0	14	0	18	9	78	0	0	87	174
12:30	0	0	0	0	0	0	66	0	0	66	1	0	6	0	7	13	63	0	0	76	149
12:45	0	0	0	0	0	0	58	2	0	60	3	0	9	0	12	12	59	0	0	71	143
Total	0	0	0	0	0	0	270	12	1	283	11	0	38	0	49	40	253	0	1	294	626
13:00	0	0	0	0	0	0	54	3	0	57	3	0	9	0	12	2	65	0	0	67	136
13:15	0	0	0	0	0	0	66	3	0	69	2	0	7	0	9	13	88	0	0	101	179
13:30	0	0	0	0	0	0	49	4	0	53	2	0	9	0	11	11	61	0	0	72	136
13:45	0	0	0	0	0	0	59	9	0	68	2	0	8	0	10	11	92	0	0	103	181
Total	0	0	0	0	0	0	228	19	0	247	9	0	33	0	42	37	306	0	0	343	632
14:00	0	0	0	0	0	0	86	4	0	90	6	0	6	0	12	22	70	0	0	92	194
14:15	0	0	0	0	0	0	110	2	0	112	5	0	7	0	12	9	87	0	0	96	220
Grand Total	0	0	0	0	0	0	803	41	1	845	44	0	103	0	147	130	856	0	1	987	1979
Apprch %	0	0	0	0	0	0	95	4.9	0.1		29.9	0	70.1	0		13.2	86.7	0	0.1		
Total %	0	0	0	0	0	0	40.6	2.1	0.1	42.7	2.2	0	5.2	0	7.4	6.6	43.3	0	0.1	49.9	

# LSC Transportation Consultants, Inc.

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

File Name : Legacy Hill Dr - Bradley Rd PM SW

Site Code : S214630

Start Date : 2/8/2023

Page No : 1

## Groups Printed- Unshifted

	Southbound					Bradley Rd Westbound					Legacy Hill Dr Northbound					Bradley 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
15:00	0	0	0	0	0	0	117	3	0	120	7	0	14	0	21	10	121	0	0	131	272
15:15	0	0	0	0	0	0	134	4	0	138	5	0	17	0	22	7	116	0	0	123	283
15:30	0	0	0	0	0	0	123	4	0	127	4	0	4	0	8	15	150	0	1	166	301
15:45	0	0	0	0	0	0	137	5	0	142	4	0	13	0	17	7	178	0	0	185	344
Total	0	0	0	0	0	0	511	16	0	527	20	0	48	0	68	39	565	0	1	605	1200
16:00	0	0	0	0	0	0	157	4	0	161	5	0	13	0	18	9	195	0	0	204	383
16:15	0	0	0	0	0	0	160	4	0	164	3	0	5	0	8	17	193	0	0	210	382
16:30	0	0	0	0	0	0	174	7	1	182	3	0	10	0	13	19	172	0	0	191	386
16:45	0	0	0	0	0	0	151	3	0	154	4	0	15	0	19	8	182	0	0	190	363
Total	0	0	0	0	0	0	642	18	1	661	15	0	43	0	58	53	742	0	0	795	1514
17:00	0	0	0	0	0	0	110	2	1	113	3	0	21	0	24	17	170	0	0	187	324
17:15	0	0	0	0	0	0	119	3	0	122	0	0	10	0	10	13	171	0	0	184	316
17:30	0	0	0	0	0	0	121	2	0	123	5	0	9	0	14	16	145	0	0	161	298
17:45	0	0	0	0	0	0	89	4	0	93	0	0	6	0	6	3	146	0	1	150	249
Total	0	0	0	0	0	0	439	11	1	451	8	0	46	0	54	49	632	0	1	682	1187
Grand Total	0	0	0	0	0	0	1592	45	2	1639	43	0	137	0	180	141	1939	0	2	2082	3901
Apprch %	0	0	0	0	0	0	97.1	2.7	0.1		23.9	0	76.1	0		6.8	93.1	0	0.1		
Total %	0	0	0	0	0	0	40.8	1.2	0.1	42	1.1	0	3.5	0	4.6	3.6	49.7	0	0.1	53.4	



# LSC Transportation Consultants, Inc.

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

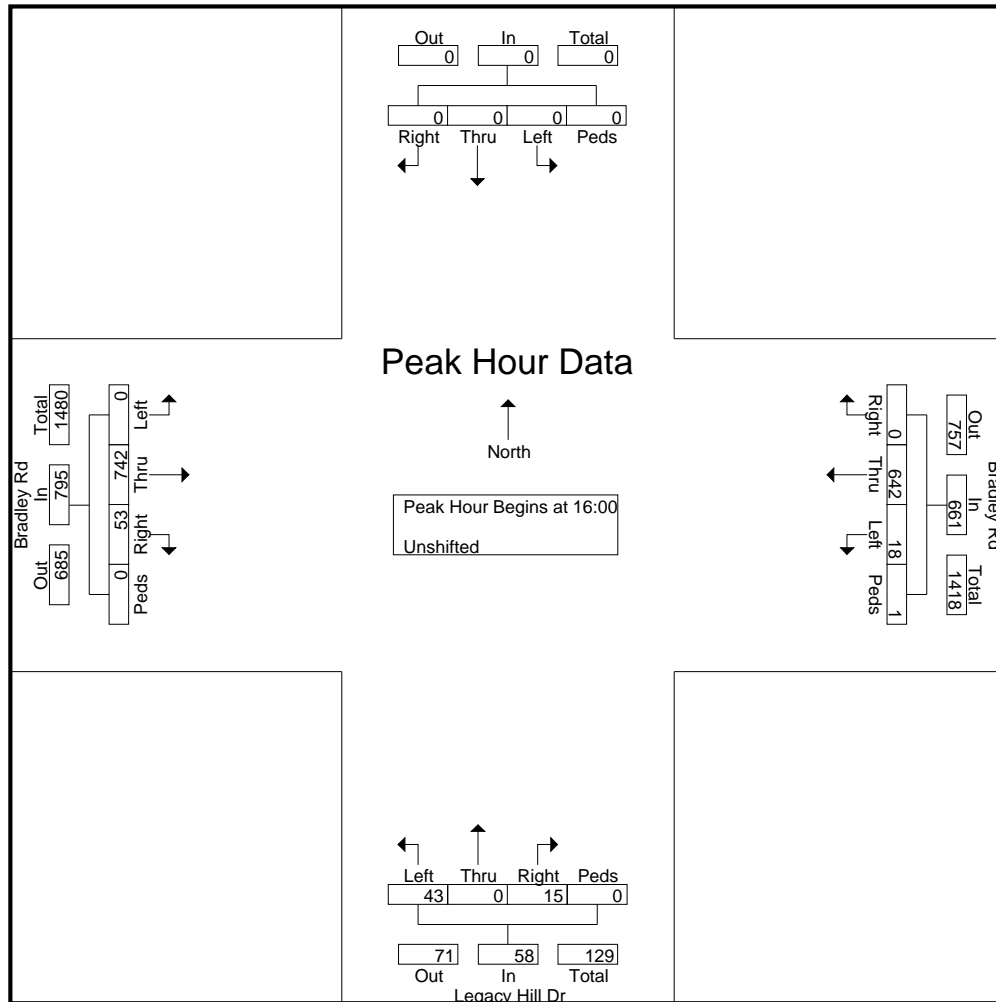
File Name : Legacy Hill Dr - Bradley Rd PM SW

Site Code : S214630

Start Date : 2/8/2023

Page No : 2

	Southbound					Bradley Rd Westbound					Legacy Hill Dr Northbound					Bradley 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 3:00:00 PM to 5:45:00 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 4:00:00 PM																					
4:00:00 PM	0	0	0	0	0	0	157	4	0	161	5	0	13	0	18	9	195	0	0	204	383
4:15:00 PM	0	0	0	0	0	0	160	4	0	164	3	0	5	0	8	17	193	0	0	210	382
4:30:00 PM	0	0	0	0	0	0	174	7	1	182	3	0	10	0	13	19	172	0	0	191	386
4:45:00 PM	0	0	0	0	0	0	151	3	0	154	4	0	15	0	19	8	182	0	0	190	363
Total Volume	0	0	0	0	0	0	642	18	1	661	15	0	43	0	58	53	742	0	0	795	1514
% App. Total	0	0	0	0	0	0	97.1	2.7	0.2		25.9	0	74.1	0		6.7	93.3	0	0		
PHF	.000	.000	.000	.000	.000	.000	.922	.643	.250	.908	.750	.000	.717	.000	.763	.697	.951	.000	.000	.946	.981



# LSC Transportation Consultants, Inc.

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

File Name : Powers Blvd - Bradley Rd AM  
Site Code : S214180  
Start Date : 3/16/2021  
Page No : 1

## Groups Printed- Unshifted

	Powers Blvd Southbound					Bradley Rd Westbound					Powers Blvd Northbound					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
07:00 AM	65	72	0	0	137	62	0	89	0	151	0	117	67	0	184	0	0	0	0	0	472
07:15 AM	60	45	0	1	106	71	0	99	0	170	0	115	58	0	173	0	0	0	0	0	449
07:30 AM	64	60	0	0	124	64	0	89	1	154	0	101	70	0	171	0	0	0	0	0	449
07:45 AM	56	67	0	0	123	67	0	79	0	146	0	94	47	0	141	0	0	0	0	0	410
Total	245	244	0	1	490	264	0	356	1	621	0	427	242	0	669	0	0	0	0	0	1780
08:00 AM	55	57	0	0	112	92	0	53	0	145	0	104	57	0	161	0	0	0	0	0	418
08:15 AM	60	67	0	0	127	74	0	46	2	122	0	97	55	0	152	0	0	0	0	0	401
08:30 AM	62	59	0	1	122	67	0	55	0	122	0	71	56	0	127	0	0	0	0	0	371
08:45 AM	59	74	0	0	133	48	0	48	0	96	0	63	38	1	102	0	0	0	0	0	331
Total	236	257	0	1	494	281	0	202	2	485	0	335	206	1	542	0	0	0	0	0	1521
Grand Total	481	501	0	2	984	545	0	558	3	1106	0	762	448	1	1211	0	0	0	0	0	3301
Apprch %	48.9	50.9	0	0.2		49.3	0	50.5	0.3		0	62.9	37	0.1		0	0	0	0		
Total %	14.6	15.2	0	0.1	29.8	16.5	0	16.9	0.1	33.5	0	23.1	13.6	0	36.7	0	0	0	0	0	

# LSC Transportation Consultants, Inc.

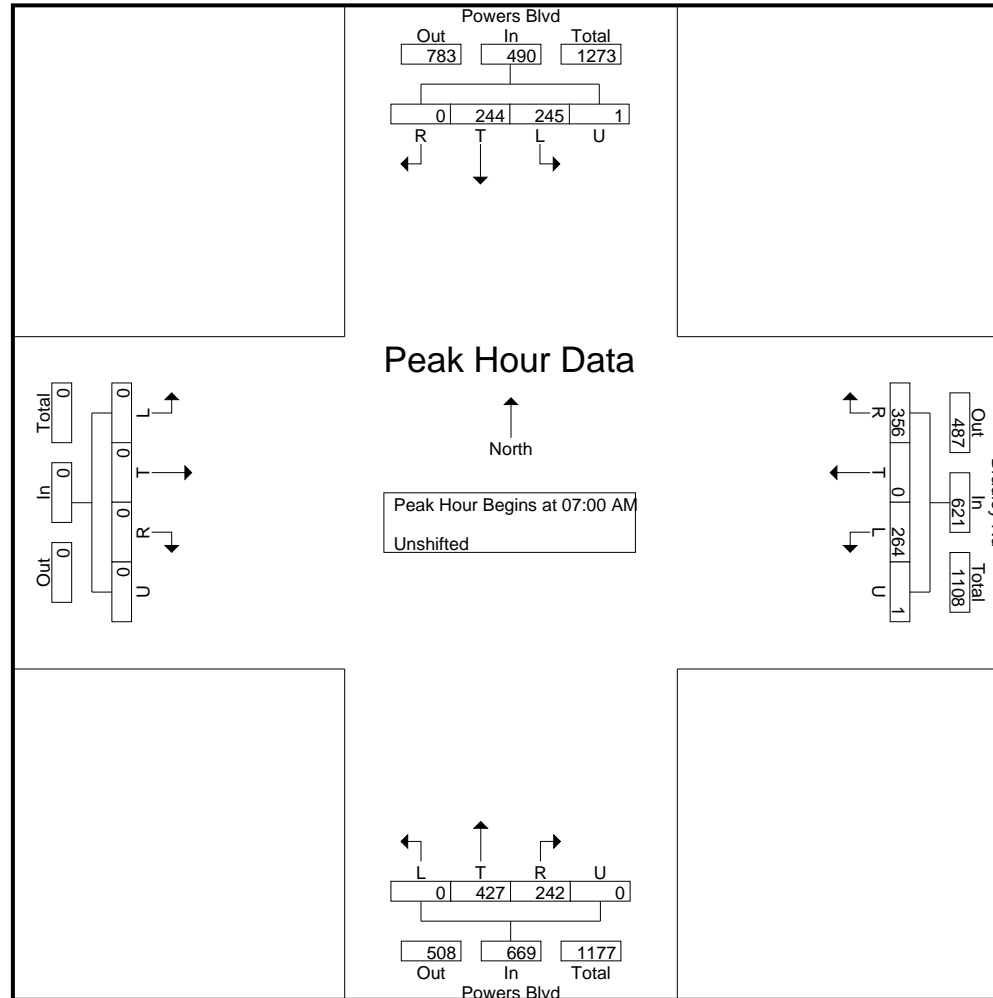
2504 E Pikes Peak Ave, Suite 304  
Colorado Springs, CO 80909  
719-633-2868

File Name : Powers Blvd - Bradley Rd AM

Site Code : S214180

Start Date : 3/16/2021

Page No : 3



# LSC Transportation Consultants, Inc.

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

File Name : Powers Blvd - Bradley Rd PM  
Site Code : S214180  
Start Date : 3/16/2021  
Page No : 1

## Groups Printed- Unshifted

	Powers Blvd Southbound					Bradley Rd Westbound					Powers Blvd Northbound					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	72	109	0	0	181	54	0	75	0	129	0	72	75	0	147	0	0	0	0	0	457
04:15 PM	68	105	0	0	173	74	0	82	0	156	0	85	102	0	187	0	0	0	0	0	516
04:30 PM	87	110	0	0	197	72	0	73	1	146	0	78	111	0	189	0	0	0	0	0	532
04:45 PM	69	128	0	0	197	71	0	60	0	131	0	73	100	0	173	0	0	0	0	0	501
Total	296	452	0	0	748	271	0	290	1	562	0	308	388	0	696	0	0	0	0	0	2006
05:00 PM	83	127	0	0	210	60	0	63	0	123	0	74	78	0	152	0	0	0	0	0	485
05:15 PM	75	110	0	0	185	58	0	45	0	103	0	76	102	0	178	0	0	0	0	0	466
05:30 PM	61	111	0	0	172	55	0	49	0	104	0	69	106	0	175	0	0	0	0	0	451
05:45 PM	59	97	0	0	156	52	0	44	0	96	0	86	73	0	159	0	0	0	0	0	411
Total	278	445	0	0	723	225	0	201	0	426	0	305	359	0	664	0	0	0	0	0	1813
Grand Total	574	897	0	0	1471	496	0	491	1	988	0	613	747	0	1360	0	0	0	0	0	3819
Apprch %	39	61	0	0		50.2	0	49.7	0.1		0	45.1	54.9	0		0	0	0	0		
Total %	15	23.5	0	0	38.5	13	0	12.9	0	25.9	0	16.1	19.6	0	35.6	0	0	0	0	0	

# LSC Transportation Consultants, Inc.

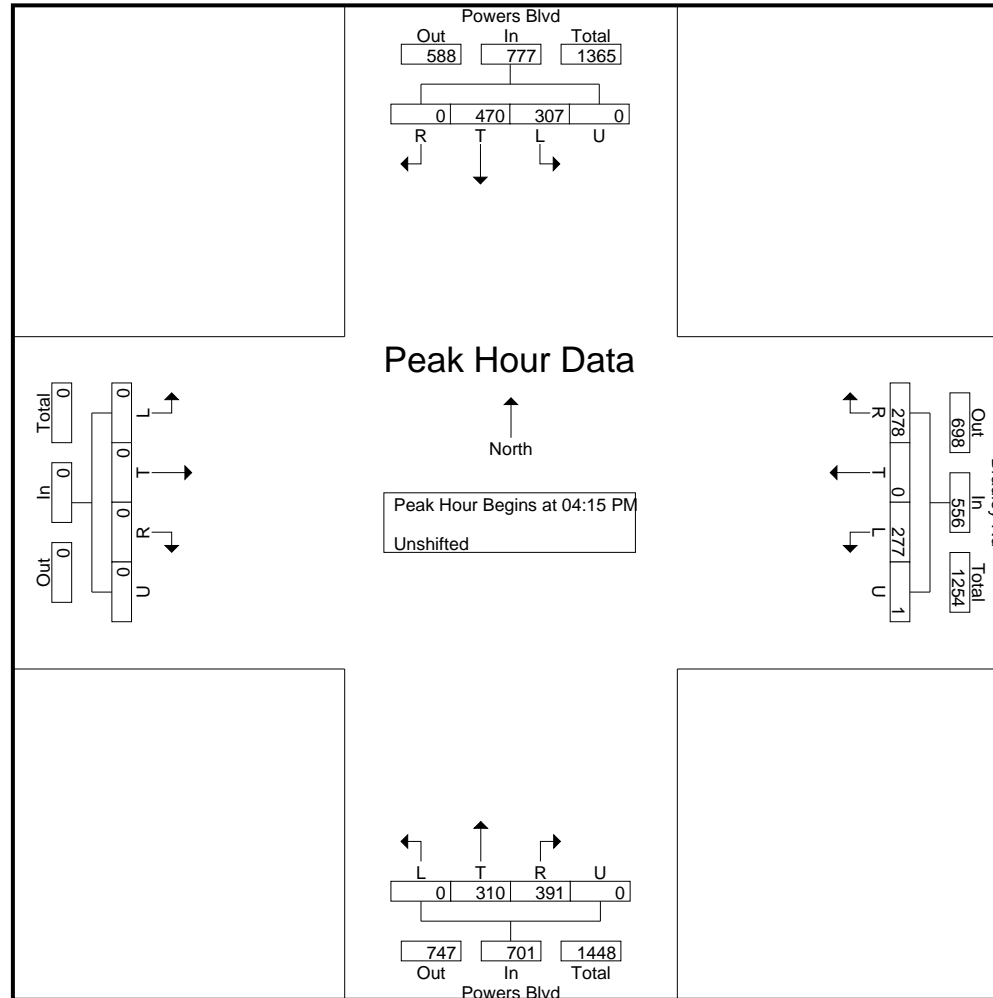
2504 E Pikes Peak Ave, Suite 304  
Colorado Springs, CO 80909  
719-633-2868

File Name : Powers Blvd - Bradley Rd PM

Site Code : S214180

Start Date : 3/16/2021

Page No : 3



# LSC Transportation Consultants, Inc.

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

File Name : Marksheffel Rd - Bradley Rd AM  
Site Code : S214180  
Start Date : 3/11/2021  
Page No : 1

## Groups Printed- Unshifted

	Marksheffel Rd Southbound					Bradley Rd Westbound					Marksheffel Rd Northbound					Bradley 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
07:00 AM	9	55	30	0	94	8	82	21	1	112	27	103	20	0	150	25	63	4	0	92	448
07:15 AM	7	57	54	2	120	8	49	7	0	64	27	96	14	0	137	47	73	4	0	124	445
07:30 AM	0	71	58	0	129	8	55	7	0	70	43	106	12	0	161	62	86	3	0	151	511
07:45 AM	3	65	60	0	128	13	97	11	0	121	28	102	11	0	141	67	78	12	0	157	547
Total	19	248	202	2	471	37	283	46	1	367	125	407	57	0	589	201	300	23	0	524	1951
08:00 AM	6	53	63	0	122	10	60	3	0	73	16	67	8	0	91	39	67	4	0	110	396
08:15 AM	1	47	52	0	100	4	42	3	0	49	14	63	8	1	86	38	44	5	0	87	322
08:30 AM	3	44	60	1	108	1	46	2	1	50	21	74	9	1	105	32	63	8	0	103	366
08:45 AM	0	30	36	0	66	3	47	9	1	60	14	64	4	1	83	28	70	6	0	104	313
Total	10	174	211	1	396	18	195	17	2	232	65	268	29	3	365	137	244	23	0	404	1397
09:00 AM	0	14	39	0	53	4	34	1	0	39	9	48	1	0	58	19	35	8	0	62	212
Grand Total	29	436	452	3	920	59	512	64	3	638	199	723	87	3	1012	357	579	54	0	990	3560
Apprch %	3.2	47.4	49.1	0.3		9.2	80.3	10	0.5		19.7	71.4	8.6	0.3		36.1	58.5	5.5	0		
Total %	0.8	12.2	12.7	0.1	25.8	1.7	14.4	1.8	0.1	17.9	5.6	20.3	2.4	0.1	28.4	10	16.3	1.5	0	27.8	

# LSC Transportation Consultants, Inc.

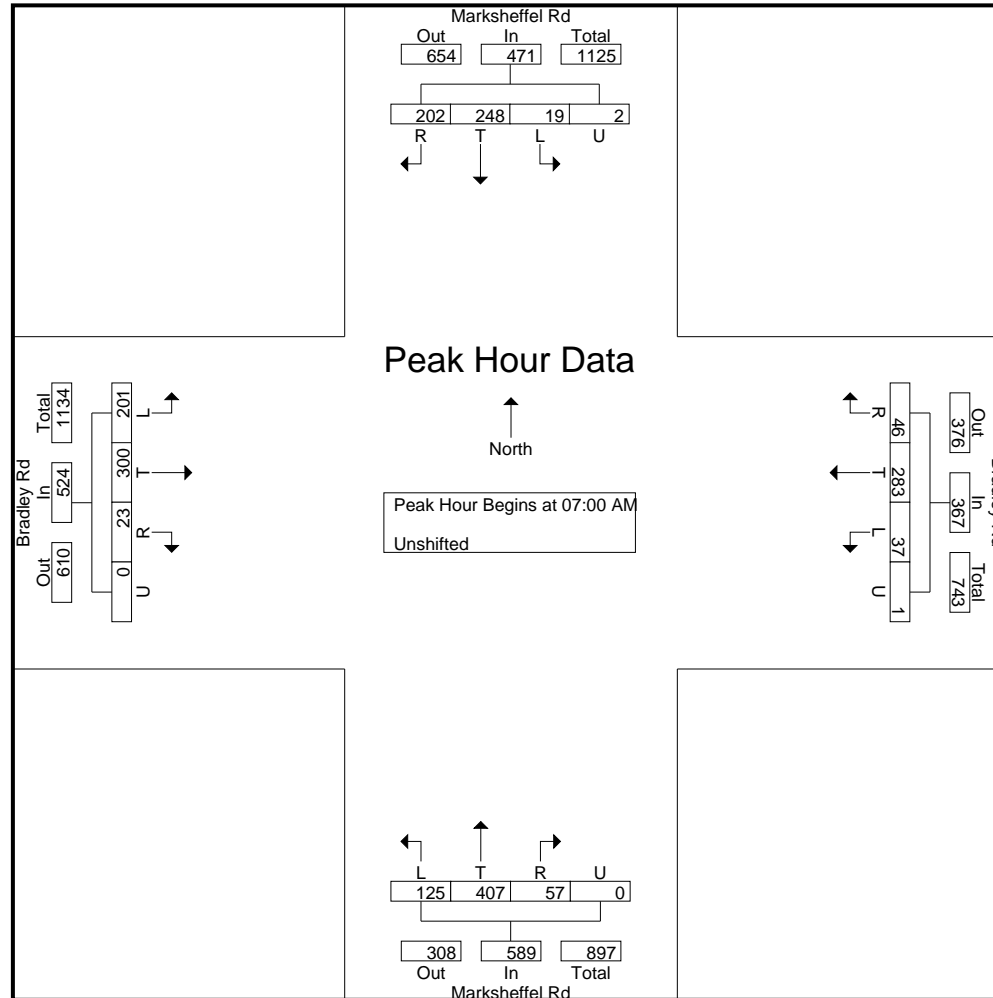
2504 E Pikes Peak Ave, Suite 304  
Colorado Springs, CO 80909  
719-633-2868

File Name : Marksheffel Rd - Bradley Rd AM

Site Code : S214180

Start Date : 3/11/2021

Page No : 3



# LSC Transportation Consultants, Inc.

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

File Name : Marksheffel Rd - Bradley Rd PM  
Site Code : S214180  
Start Date : 3/18/2021  
Page No : 1

## Groups Printed- Unshifted

	Marksheffel Rd Southbound					Bradley Rd Westbound					Marksheffel Rd Northbound					Bradley 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	83	50	3	139	13	52	4	0	69	17	89	12	0	118	75	69	22	0	166	492
04:15 PM	1	110	34	2	147	32	66	4	0	102	27	93	16	0	136	90	68	26	1	185	570
04:30 PM	2	108	66	1	177	13	47	5	0	65	16	55	6	0	77	104	80	28	0	212	531
04:45 PM	4	100	59	0	163	20	69	6	0	95	16	92	15	0	123	88	78	23	0	189	570
Total	10	401	209	6	626	78	234	19	0	331	76	329	49	0	454	357	295	99	1	752	2163
05:00 PM	3	128	45	0	176	8	63	2	0	73	8	82	8	2	100	88	76	27	0	191	540
05:15 PM	4	113	65	0	182	12	42	3	0	57	18	95	10	0	123	102	59	16	0	177	539
05:30 PM	5	97	47	0	149	9	45	4	0	58	8	79	11	1	99	69	53	19	0	141	447
05:45 PM	5	119	36	0	160	7	38	5	0	50	15	78	15	1	109	50	66	19	1	136	455
Total	17	457	193	0	667	36	188	14	0	238	49	334	44	4	431	309	254	81	1	645	1981
Grand Total	27	858	402	6	1293	114	422	33	0	569	125	663	93	4	885	666	549	180	2	1397	4144
Apprch %	2.1	66.4	31.1	0.5		20	74.2	5.8	0		14.1	74.9	10.5	0.5		47.7	39.3	12.9	0.1		
Total %	0.7	20.7	9.7	0.1	31.2	2.8	10.2	0.8	0	13.7	3	16	2.2	0.1	21.4	16.1	13.2	4.3	0	33.7	



# LSC Transportation Consultants, Inc.

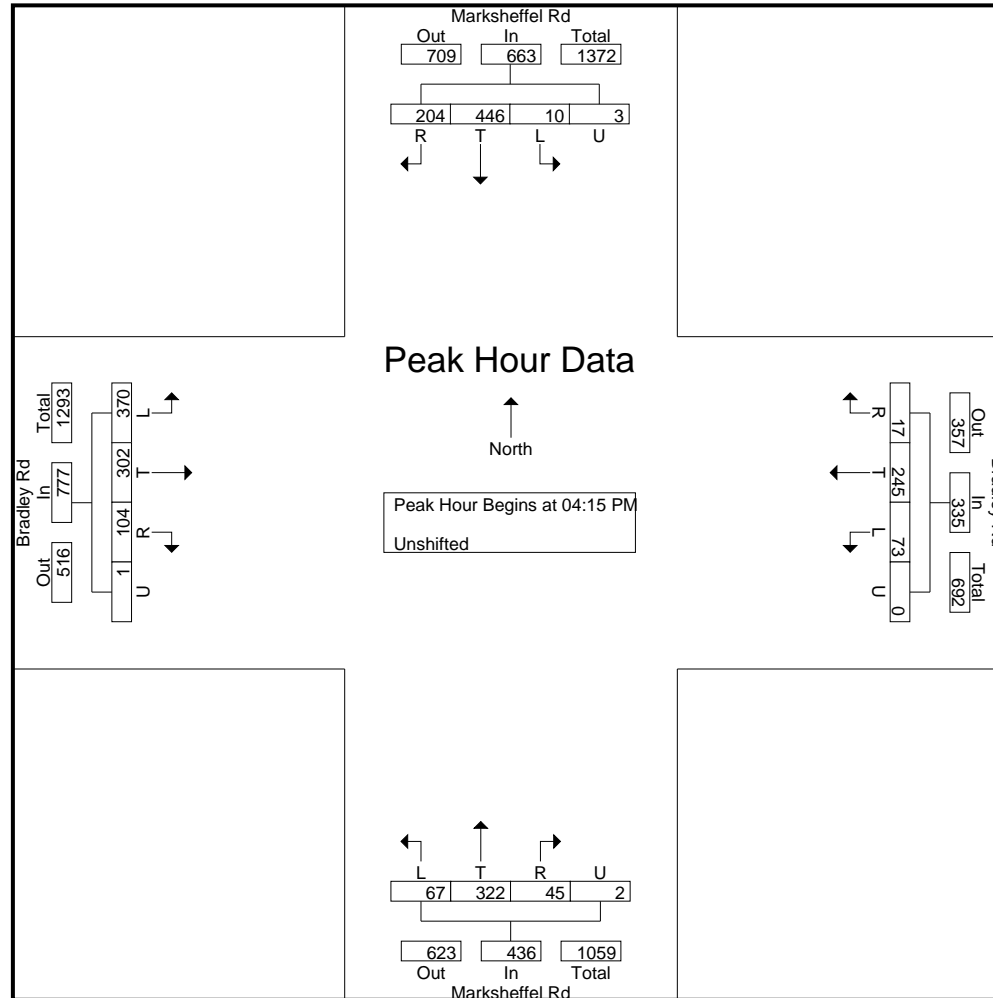
2504 E Pikes Peak Ave, Suite 304  
Colorado Springs, CO 80909  
719-633-2868

File Name : Marksheffel Rd - Bradley Rd PM

Site Code : S214180

Start Date : 3/18/2021

Page No : 3



# Levels of Service

---

# Timings

## 1: Powers Blvd & Bradley Rd.

# Existing Traffic

AM Peak Hour

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖↗	↖	↕↕	↖	↖	↕↕
Traffic Volume (vph)	346	466	427	349	321	244
Future Volume (vph)	346	466	427	349	321	244
Turn Type	Prot	Free	NA	Free	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		Free		Free	6	
Detector Phase	8		2		1	6
Switch Phase						
Minimum Initial (s)	4.0		4.0		4.0	4.0
Minimum Split (s)	9.0		9.0		9.0	9.0
Total Split (s)	20.0		60.0		20.0	80.0
Total Split (%)	20.0%		60.0%		20.0%	80.0%
Yellow Time (s)	3.0		3.0		3.0	3.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	5.0		5.0		5.0	5.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None		None		None	None
Act Effect Green (s)	10.9	50.3	12.4	50.3	29.2	29.2
Actuated g/C Ratio	0.22	1.00	0.25	1.00	0.58	0.58
v/c Ratio	0.51	0.32	0.54	0.24	0.58	0.13
Control Delay	20.9	0.5	19.6	0.4	9.9	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.9	0.5	19.6	0.4	9.9	5.1
LOS	C	A	B	A	A	A
Approach Delay	9.2		11.0			7.8
Approach LOS	A		B			A

## Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 50.3

Natural Cycle: 40

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.58

Intersection Signal Delay: 9.5

Intersection LOS: A

Intersection Capacity Utilization 52.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: Powers Blvd & Bradley Rd.



























HCM 6th TWSC  
2: Legacy Hill Dr & Bradley Rd.

Existing Traffic  
AM Peak Hour

Intersection						
Int Delay, s/veh	1.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↖	↑↑	↖	↗
Traffic Vol, veh/h	640	30	9	761	51	21
Future Vol, veh/h	640	30	9	761	51	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	415	-	300	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	91	91	78	78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	696	33	10	836	65	27
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	729	0	1134	348
Stage 1	-	-	-	-	696	-
Stage 2	-	-	-	-	438	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	871	-	196	648
Stage 1	-	-	-	-	456	-
Stage 2	-	-	-	-	618	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	871	-	194	648
Mov Cap-2 Maneuver	-	-	-	-	194	-
Stage 1	-	-	-	-	456	-
Stage 2	-	-	-	-	611	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.1		26.3	
HCM LOS	D					
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	194	648	-	-	871	-
HCM Lane V/C Ratio	0.337	0.042	-	-	0.011	-
HCM Control Delay (s)	32.7	10.8	-	-	9.2	-
HCM Lane LOS	D	B	-	-	A	-
HCM 95th %tile Q(veh)	1.4	0.1	-	-	0	-

Timings  
101: Marksheffel Rd & Bradley 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)	234	350	27	37	366	46	162	407	57	19	248	262
Future Volume (vph)	234	350	27	37	366	46	162	407	57	19	248	262
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Perm	NA	Free	Perm	NA	Free
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		Free	8		Free	2		Free	6		Free
Detector Phase	7	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	4.0		5.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	11.0	21.0		10.0	21.0		21.0	21.0		21.0	21.0	
Total Split (s)	24.0	50.0		15.0	41.0		35.0	35.0		35.0	35.0	
Total Split (%)	24.0%	50.0%		15.0%	41.0%		35.0%	35.0%		35.0%	35.0%	
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 Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Act Effect Green (s)	35.5	28.5	75.7	21.9	15.3	75.7	30.2	30.2	75.7	30.2	30.2	75.7
Actuated g/C Ratio	0.47	0.38	1.00	0.29	0.20	1.00	0.40	0.40	1.00	0.40	0.40	1.00
v/c Ratio	0.58	0.32	0.02	0.14	0.68	0.04	0.41	0.31	0.04	0.06	0.19	0.18
Control Delay	17.5	18.5	0.0	12.9	33.3	0.0	21.8	17.6	0.1	17.4	16.6	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.5	18.5	0.0	12.9	33.3	0.0	21.8	17.6	0.1	17.4	16.6	0.2
LOS	B	B	A	B	C	A	C	B	A	B	B	A
Approach Delay		17.3			28.2			17.1			8.5	
Approach LOS		B			C			B			A	

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 75.7

Natural Cycle: 55

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 17.8

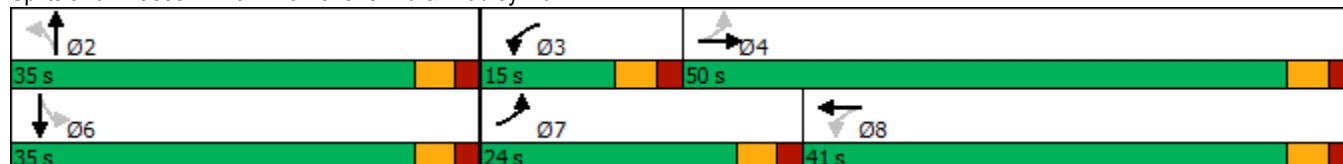
Intersection LOS: B

Intersection Capacity Utilization 55.6%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 101: Marksheffel Rd & Bradley Rd



# Timings

## 1: Powers Blvd & Bradley Rd.

# Existing Traffic

PM Peak Hour

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖↖	↗	↑↑	↘	↙	↑↑
Traffic Volume (vph)	292	393	310	469	326	470
Future Volume (vph)	292	393	310	469	326	470
Turn Type	Prot	Free	NA	Free	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		Free		Free	6	
Detector Phase	8		2		1	6
Switch Phase						
Minimum Initial (s)	4.0		4.0		4.0	4.0
Minimum Split (s)	9.0		9.0		9.0	9.0
Total Split (s)	30.0		37.0		33.0	70.0
Total Split (%)	30.0%		37.0%		33.0%	70.0%
Yellow Time (s)	3.0		3.0		3.0	3.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	5.0		5.0		5.0	5.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None		None		None	None
Act Effect Green (s)	10.2	47.3	10.3	47.3	26.9	26.9
Actuated g/C Ratio	0.22	1.00	0.22	1.00	0.57	0.57
v/c Ratio	0.43	0.27	0.43	0.32	0.54	0.25
Control Delay	19.0	0.4	18.8	0.5	9.0	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.0	0.4	18.8	0.5	9.0	5.6
LOS	B	A	B	A	A	A
Approach Delay	8.3		7.8			7.0
Approach LOS	A		A			A

## Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 47.3

Natural Cycle: 40

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 7.7

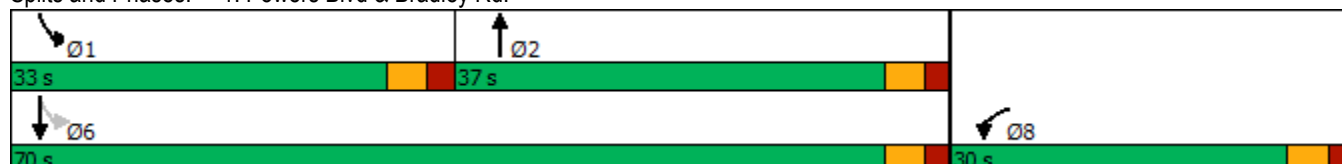
Intersection LOS: A

Intersection Capacity Utilization 47.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: Powers Blvd & Bradley Rd.



























HCM 6th TWSC  
2: Legacy Hill Dr & Bradley Rd.

Existing Traffic  
PM Peak Hour

Intersection						
Int Delay, s/veh	1.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Vol, veh/h	742	53	18	642	43	15
Future Vol, veh/h	742	53	18	642	43	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	415	-	300	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	91	91	78	78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	807	58	20	705	55	19
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	865	0	1200	404
Stage 1	-	-	-	-	807	-
Stage 2	-	-	-	-	393	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	774	-	178	596
Stage 1	-	-	-	-	399	-
Stage 2	-	-	-	-	651	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	774	-	173	596
Mov Cap-2 Maneuver	-	-	-	-	173	-
Stage 1	-	-	-	-	399	-
Stage 2	-	-	-	-	634	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.3		29.1	
HCM LOS	D					
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	173	596	-	-	774	-
HCM Lane V/C Ratio	0.319	0.032	-	-	0.026	-
HCM Control Delay (s)	35.3	11.2	-	-	9.8	-
HCM Lane LOS	E	B	-	-	A	-
HCM 95th %tile Q(veh)	1.3	0.1	-	-	0.1	-

Timings  
101: Marksheffel Rd & Bradley 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)	373	304	105	73	291	17	80	322	45	10	446	243
Future Volume (vph)	373	304	105	73	291	17	80	322	45	10	446	243
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Perm	NA	Free	Perm	NA	Free
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		Free	8		Free	2		Free	6		Free
Detector Phase	7	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	4.0		5.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	21.0		10.0	21.0		21.0	21.0		21.0	21.0	
Total Split (s)	30.0	53.0		12.0	35.0		35.0	35.0		35.0	35.0	
Total Split (%)	30.0%	53.0%		12.0%	35.0%		35.0%	35.0%		35.0%	35.0%	
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 Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Act Effect Green (s)	38.6	29.3	78.8	19.1	12.4	78.8	30.2	30.2	78.8	30.2	30.2	78.8
Actuated g/C Ratio	0.49	0.37	1.00	0.24	0.16	1.00	0.38	0.38	1.00	0.38	0.38	1.00
v/c Ratio	0.70	0.27	0.08	0.27	0.60	0.01	0.30	0.26	0.03	0.03	0.38	0.18
Control Delay	20.0	18.4	0.1	15.7	36.2	0.0	23.0	18.5	0.0	18.4	19.7	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	20.0	18.4	0.1	15.7	36.2	0.0	23.0	18.5	0.0	18.4	19.7	0.2
LOS	B	B	A	B	D	A	C	B	A	B	B	A
Approach Delay		16.7			30.6			17.4			12.9	
Approach LOS		B			C			B			B	

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 78.8

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 18.0

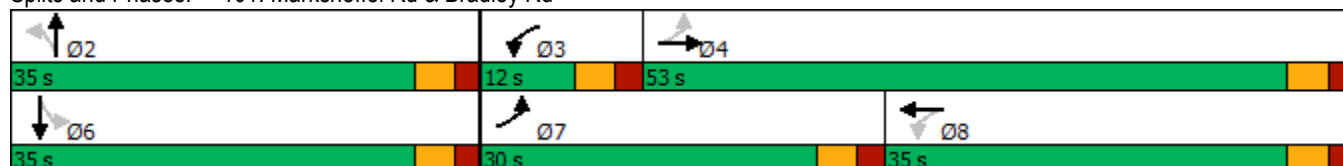
Intersection LOS: B

Intersection Capacity Utilization 62.1%

ICU Level of Service B

Analysis Period (min) 15


Splits and Phases: 101: Marksheffel Rd & Bradley Rd





Timings  
1: Powers & Bradley Rd.

Short-Term Background Traffic  
AM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↰	↰	↕↕	↰↰	↰↰	↕↕
Traffic Volume (vph)	391	526	952	370	340	544
Future Volume (vph)	391	526	952	370	340	544
Turn Type	Prot	Free	NA	pt+ov	Prot	NA
Protected Phases	8		2	2 8	1	6
Permitted Phases		Free				
Detector Phase	8		2	2 8	1	6
Switch Phase						
Minimum Initial (s)	4.0		4.0		4.0	4.0
Minimum Split (s)	9.0		9.0		9.0	9.0
Total Split (s)	20.0		60.0		20.0	80.0
Total Split (%)	20.0%		60.0%		20.0%	80.0%
Yellow Time (s)	3.0		3.0		3.0	3.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	5.0		5.0		5.0	5.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None		None		None	None
Act Effect Green (s)	13.7	74.3	32.2	51.0	13.0	50.3
Actuated g/C Ratio	0.18	1.00	0.43	0.69	0.17	0.68
v/c Ratio	0.67	0.36	0.68	0.21	0.64	0.26
Control Delay	36.0	0.6	19.5	3.8	35.6	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.0	0.6	19.5	3.8	35.6	4.9
LOS	D	A	B	A	D	A
Approach Delay	15.7		15.1			16.7
Approach LOS	B		B			B

Intersection Summary

Cycle Length: 100  
 Actuated Cycle Length: 74.3  
 Natural Cycle: 55  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.68  
 Intersection Signal Delay: 15.7  
 Intersection LOS: B  
 Intersection Capacity Utilization 59.7%  
 ICU Level of Service B  
 Analysis Period (min) 15

Splits and Phases: 1: Powers & Bradley Rd.



# Timings 2: Legacy Hill Dr & Bradley Rd.

Short-Term Background Traffic  
AM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘↘	↘
Traffic Volume (vph)	672	38	14	800	117	44
Future Volume (vph)	672	38	14	800	117	44
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.0	23.0	10.0	23.0	23.0	23.0
Total Split (s)	63.0	63.0	12.0	75.0	25.0	25.0
Total Split (%)	63.0%	63.0%	12.0%	75.0%	25.0%	25.0%
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	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effect Green (s)	76.6	76.6	80.9	80.9	9.1	9.1
Actuated g/C Ratio	0.77	0.77	0.81	0.81	0.09	0.09
v/c Ratio	0.27	0.03	0.03	0.31	0.41	0.26
Control Delay	4.5	1.8	2.2	2.8	46.4	15.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.5	1.8	2.2	2.8	46.4	15.8
LOS	A	A	A	A	D	B
Approach Delay	4.4			2.8	38.0	
Approach LOS	A			A	D	

## Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.41

Intersection Signal Delay: 6.8

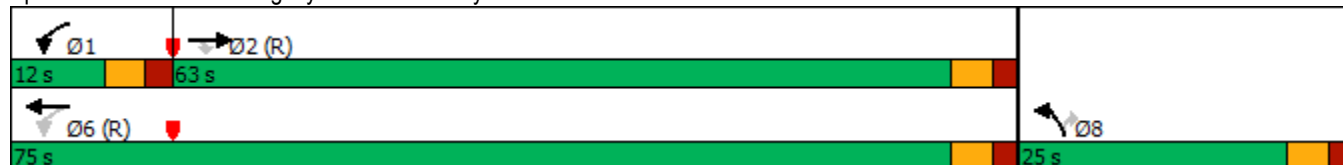
Intersection LOS: A

Intersection Capacity Utilization 34.6%

ICU Level of Service A

























Analysis Period (min) 15

Splits and Phases: 2: Legacy Hill Dr & Bradley Rd.



Timings  
101: Marksheffel Rd & Bradley Rd

Short-Term Background Traffic  
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	273	358	35	37	373	46	169	407	57	19	248	292
Future Volume (vph)	273	358	35	37	373	46	169	407	57	19	248	292
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Perm	NA	Free	Perm	NA	Free
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		Free	8		Free	2		Free	6		Free
Detector Phase	7	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	4.0		5.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	11.0	21.0		10.0	21.0		21.0	21.0		21.0	21.0	
Total Split (s)	24.0	50.0		15.0	41.0		35.0	35.0		35.0	35.0	
Total Split (%)	24.0%	50.0%		15.0%	41.0%		35.0%	35.0%		35.0%	35.0%	
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 Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Act Effect Green (s)	37.5	30.5	77.7	22.3	15.7	77.7	30.2	30.2	77.7	30.2	30.2	77.7
Actuated g/C Ratio	0.48	0.39	1.00	0.29	0.20	1.00	0.39	0.39	1.00	0.39	0.39	1.00
v/c Ratio	0.65	0.31	0.03	0.14	0.69	0.04	0.43	0.32	0.04	0.06	0.20	0.20
Control Delay	18.9	18.0	0.0	12.9	34.2	0.0	23.3	18.5	0.1	18.1	17.4	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.9	18.0	0.0	12.9	34.2	0.0	23.3	18.5	0.1	18.1	17.4	0.3
LOS	B	B	A	B	C	A	C	B	A	B	B	A
Approach Delay		17.5			29.0			18.1			8.5	
Approach LOS		B			C			B			A	

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 77.7

Natural Cycle: 55

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 18.2

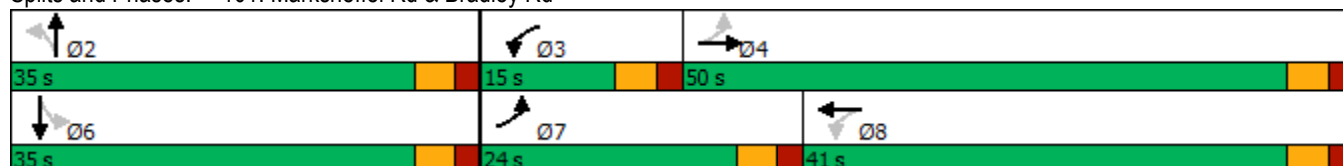
Intersection LOS: B

Intersection Capacity Utilization 58.3%

ICU Level of Service B








Analysis Period (min) 15

Splits and Phases: 101: Marksheffel Rd & Bradley Rd



Timings  
1: Powers & Bradley Rd.

Short-Term Background Traffic  
PM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	320	431	835	524	386	770
Future Volume (vph)	320	431	835	524	386	770
Turn Type	Prot	Free	NA	pt+ov	Prot	NA
Protected Phases	8		2	2 8	1	6
Permitted Phases		Free				
Detector Phase	8		2	2 8	1	6
Switch Phase						
Minimum Initial (s)	4.0		4.0		4.0	4.0
Minimum Split (s)	9.0		9.0		9.0	9.0
Total Split (s)	30.0		37.0		33.0	70.0
Total Split (%)	30.0%		37.0%		33.0%	70.0%
Yellow Time (s)	3.0		3.0		3.0	3.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	5.0		5.0		5.0	5.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None		None		None	None
Act Effect Green (s)	13.7	70.3	26.7	45.5	14.4	46.3
Actuated g/C Ratio	0.19	1.00	0.38	0.65	0.20	0.66
v/c Ratio	0.52	0.30	0.67	0.30	0.60	0.36
Control Delay	29.7	0.5	21.7	3.1	30.5	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.7	0.5	21.7	3.1	30.5	6.0
LOS	C	A	C	A	C	A
Approach Delay	12.9		14.5			14.2
Approach LOS	B		B			B

Intersection Summary

Cycle Length: 100  
 Actuated Cycle Length: 70.3  
 Natural Cycle: 50  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.67  
 Intersection Signal Delay: 14.0  
 Intersection LOS: B  
 Intersection Capacity Utilization 55.7%  
 ICU Level of Service B  
 Analysis Period (min) 15

Splits and Phases: 1: Powers & Bradley Rd.



Timings  
2: Legacy Hill Dr & Bradley Rd.

Short-Term Background Traffic  
PM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘↘	↘
Traffic Volume (vph)	780	130	51	675	76	30
Future Volume (vph)	780	130	51	675	76	30
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	3	
Permitted Phases		2	6			3
Detector Phase	2	2	1	6	3	3
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.0	23.0	10.0	23.0	10.0	10.0
Total Split (s)	63.0	63.0	12.0	75.0	25.0	25.0
Total Split (%)	63.0%	63.0%	12.0%	75.0%	25.0%	25.0%
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	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effect Green (s)	76.4	76.4	84.4	85.4	7.8	7.8
Actuated g/C Ratio	0.76	0.76	0.84	0.85	0.08	0.08
v/c Ratio	0.31	0.11	0.10	0.25	0.31	0.22
Control Delay	5.4	1.1	2.2	2.1	46.1	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.4	1.1	2.2	2.1	46.1	18.0
LOS	A	A	A	A	D	B
Approach Delay	4.8			2.1	38.1	
Approach LOS	A			A	D	

Intersection Summary

Cycle Length: 100  
 Actuated Cycle Length: 100  
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 45  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.31  
 Intersection Signal Delay: 5.7  
 Intersection Capacity Utilization 42.4%  
 Analysis Period (min) 15

Intersection LOS: A  
 ICU Level of Service A

Splits and Phases: 2: Legacy Hill Dr & Bradley Rd.



























# Timings

## 101: Marksheffel Rd & Bradley Rd

# Short-Term Background Traffic

PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	412	311	112	73	300	17	89	322	45	10	446	291
Future Volume (vph)	412	311	112	73	300	17	89	322	45	10	446	291
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Perm	NA	Free	Perm	NA	Free
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		Free	8		Free	2		Free	6		Free
Detector Phase	7	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	4.0		5.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	21.0		10.0	21.0		21.0	21.0		21.0	21.0	
Total Split (s)	30.0	53.0		12.0	35.0		35.0	35.0		35.0	35.0	
Total Split (%)	30.0%	53.0%		12.0%	35.0%		35.0%	35.0%		35.0%	35.0%	
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 Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Act Effect Green (s)	40.4	31.1	80.6	19.5	12.8	80.6	30.1	30.1	80.6	30.1	30.1	80.6
Actuated g/C Ratio	0.50	0.39	1.00	0.24	0.16	1.00	0.37	0.37	1.00	0.37	0.37	1.00
v/c Ratio	0.75	0.26	0.08	0.27	0.61	0.01	0.35	0.26	0.03	0.03	0.39	0.21
Control Delay	22.2	18.1	0.1	15.8	36.9	0.0	24.7	19.2	0.0	18.7	20.5	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.2	18.1	0.1	15.8	36.9	0.0	24.7	19.2	0.0	18.7	20.5	0.3
LOS	C	B	A	B	D	A	C	B	A	B	C	A
Approach Delay		17.7			31.3			18.4			12.6	
Approach LOS		B			C			B			B	

### Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 80.6

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 18.5

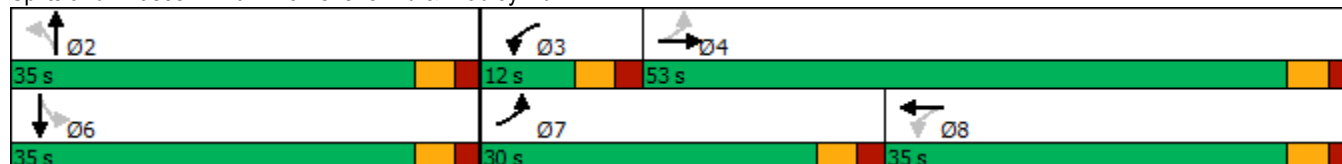
Intersection LOS: B

Intersection Capacity Utilization 65.0%

ICU Level of Service C













Analysis Period (min) 15

Splits and Phases: 101: Marksheffel Rd & Bradley Rd



Timings  
1: Powers & Bradley Rd.

Short-Term Total Traffic  
AM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	460	584	952	458	414	544
Future Volume (vph)	460	584	952	458	414	544
Turn Type	Prot	Free	NA	pt+ov	Prot	NA
Protected Phases	8		2	2 8	1	6
Permitted Phases		Free				
Detector Phase	8		2	2 8	1	6
Switch Phase						
Minimum Initial (s)	4.0		4.0		4.0	4.0
Minimum Split (s)	9.0		9.0		9.0	9.0
Total Split (s)	20.0		60.0		20.0	80.0
Total Split (%)	20.0%		60.0%		20.0%	80.0%
Yellow Time (s)	3.0		3.0		3.0	3.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	5.0		5.0		5.0	5.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None		None		None	None
Act Effect Green (s)	15.2	78.7	33.8	54.1	14.5	53.4
Actuated g/C Ratio	0.19	1.00	0.43	0.69	0.18	0.68
v/c Ratio	0.75	0.40	0.69	0.26	0.74	0.25
Control Delay	40.6	0.8	20.4	4.7	40.0	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.6	0.8	20.4	4.7	40.0	5.0
LOS	D	A	C	A	D	A
Approach Delay	18.3		15.3			20.1
Approach LOS	B		B			C

Intersection Summary

Cycle Length: 100  
 Actuated Cycle Length: 78.7  
 Natural Cycle: 55  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.75  
 Intersection Signal Delay: 17.6  
 Intersection Capacity Utilization 63.7%  
 Analysis Period (min) 15

Intersection LOS: B  
 ICU Level of Service B

Splits and Phases: 1: Powers & Bradley Rd.





# Timings 2: Legacy Hill Dr & Bradley Rd.

Short-Term Total Traffic  
AM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘↘	↘
Traffic Volume (vph)	560	312	160	719	325	207
Future Volume (vph)	560	312	160	719	325	207
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.0	23.0	10.0	23.0	23.0	23.0
Total Split (s)	63.0	63.0	12.0	75.0	25.0	25.0
Total Split (%)	63.0%	63.0%	12.0%	75.0%	25.0%	25.0%
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	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effect Green (s)	61.7	61.7	74.4	74.4	15.6	15.6
Actuated g/C Ratio	0.62	0.62	0.74	0.74	0.16	0.16
v/c Ratio	0.28	0.31	0.30	0.30	0.66	0.52
Control Delay	9.7	1.9	5.4	4.8	45.6	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.7	1.9	5.4	4.8	45.6	9.4
LOS	A	A	A	A	D	A
Approach Delay	6.9			4.9	31.5	
Approach LOS	A			A	C	

## Intersection Summary

Cycle Length: 100  
 Actuated Cycle Length: 100  
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.66  
 Intersection Signal Delay: 11.8  
 Intersection Capacity Utilization 46.1%  
 Analysis Period (min) 15

Intersection LOS: B

ICU Level of Service A

Splits and Phases: 2: Legacy Hill Dr & Bradley Rd.








HCM 6th Roundabout  
5: Legacy Hill Dr & Frontside Dr

Short-Term Total Traffic  
AM Peak Hour

Intersection				
Intersection Delay, s/veh	5.4			
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	407	0	180	330
Demand Flow Rate, veh/h	415	0	183	336
Vehicles Circulating, veh/h	58	594	411	5
Vehicles Exiting, veh/h	283	0	62	589
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	5.7	0.0	6.1	4.8
Approach LOS	A	-	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
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	4.976
Entry Flow, veh/h	415	0	183	336
Cap Entry Lane, veh/h	1301	753	907	1373
Entry HV Adj Factor	0.981	1.000	0.981	0.982
Flow Entry, veh/h	407	0	180	330
Cap Entry, veh/h	1276	753	890	1348
V/C Ratio	0.319	0.000	0.202	0.245
Control Delay, s/veh	5.7	4.8	6.1	4.8
LOS	A	A	A	A
95th %tile Queue, veh	1	0	1	1

HCM 6th TWSC  
10: Frontside Dr & Lot 4 Access

Short-Term Total Traffic  
AM Peak Hour






Intersection						
Int Delay, s/veh	4.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	0	0	0	0	4
Future Vol, veh/h	4	0	0	0	0	4
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	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	0	0	0	0	4
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	2	2	4	0	-	0
Stage 1	2	-	-	-	-	-
Stage 2	0	-	-	-	-	-
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	1021	1082	1618	-	-	-
Stage 1	1021	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	1021	1082	1618	-	-	-
Mov Cap-2 Maneuver	932	-	-	-	-	-
Stage 1	1021	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	8.9	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1618	-	932	-	-	
HCM Lane V/C Ratio	-	-	0.005	-	-	
HCM Control Delay (s)	0	-	8.9	-	-	
HCM Lane LOS	A	-	A	-	-	
HCM 95th %tile Q(veh)	0	-	0	-	-	

HCM 6th TWSC  
11: Frontside Dr & Lot 1 Access

Short-Term Total Traffic  
AM Peak Hour

Intersection

Int Delay, s/veh 6.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	371	0	0	4	4	252
Future Vol, veh/h	371	0	0	4	4	252
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	-	100	-	-	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	403	0	0	4	4	274

























Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	8	4	278
Stage 1	4	-	-
Stage 2	4	-	-
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	1013	1080	1285
Stage 1	1019	-	-
Stage 2	1019	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	1013	1080	1285
Mov Cap-2 Maneuver	927	-	-
Stage 1	1019	-	-
Stage 2	1019	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1285	-	927	-	-
HCM Lane V/C Ratio	-	-	0.435	-	-
HCM Control Delay (s)	0	-	11.8	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	2.2	-	-

Timings  
101: Marksheffel Rd & Bradley Rd

Short-Term Total Traffic  
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	297	367	53	37	385	46	192	407	57	19	248	322
Future Volume (vph)	297	367	53	37	385	46	192	407	57	19	248	322
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Perm	NA	Free	Perm	NA	Free
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		Free	8		Free	2		Free	6		Free
Detector Phase	7	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	4.0		5.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	11.0	21.0		10.0	21.0		21.0	21.0		21.0	21.0	
Total Split (s)	24.0	50.0		15.0	41.0		35.0	35.0		35.0	35.0	
Total Split (%)	24.0%	50.0%		15.0%	41.0%		35.0%	35.0%		35.0%	35.0%	
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 Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Act Effect Green (s)	39.1	32.1	79.3	23.0	16.4	79.3	30.2	30.2	79.3	30.2	30.2	79.3
Actuated g/C Ratio	0.49	0.40	1.00	0.29	0.21	1.00	0.38	0.38	1.00	0.38	0.38	1.00
v/c Ratio	0.69	0.31	0.04	0.14	0.69	0.04	0.50	0.33	0.04	0.07	0.20	0.22
Control Delay	20.7	17.8	0.1	12.8	34.5	0.0	25.7	19.2	0.1	18.6	18.1	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	20.7	17.8	0.1	12.8	34.5	0.0	25.7	19.2	0.1	18.6	18.1	0.3
LOS	C	B	A	B	C	A	C	B	A	B	B	A
Approach Delay		17.6			29.4			19.5			8.4	
Approach LOS		B			C			B			A	

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 79.3

Natural Cycle: 55

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 18.6

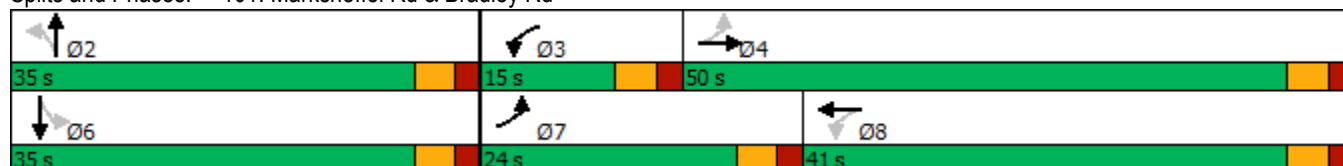
Intersection LOS: B

Intersection Capacity Utilization 61.3%

ICU Level of Service B








Analysis Period (min) 15

Splits and Phases: 101: Marksheffel Rd & Bradley Rd



Timings  
1: Powers & Bradley Rd.

Short-Term Total Traffic  
PM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	432	526	835	631	476	770
Future Volume (vph)	432	526	835	631	476	770
Turn Type	Prot	Free	NA	pt+ov	Prot	NA
Protected Phases	8		2	2 8	1	6
Permitted Phases		Free				
Detector Phase	8		2	2 8	1	6
Switch Phase						
Minimum Initial (s)	4.0		4.0		4.0	4.0
Minimum Split (s)	9.0		9.0		9.0	9.0
Total Split (s)	30.0		37.0		33.0	70.0
Total Split (%)	30.0%		37.0%		33.0%	70.0%
Yellow Time (s)	3.0		3.0		3.0	3.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	5.0		5.0		5.0	5.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None		None		None	None
Act Effect Green (s)	18.2	79.8	28.5	51.8	17.7	51.3
Actuated g/C Ratio	0.23	1.00	0.36	0.65	0.22	0.64
v/c Ratio	0.60	0.36	0.71	0.36	0.68	0.37
Control Delay	32.1	0.6	26.9	5.5	34.5	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.1	0.6	26.9	5.5	34.5	7.4
LOS	C	A	C	A	C	A
Approach Delay	14.8		17.7			17.8
Approach LOS	B		B			B

Intersection Summary

Cycle Length: 100  
 Actuated Cycle Length: 79.8  
 Natural Cycle: 55  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.71  
 Intersection Signal Delay: 17.0  
 Intersection LOS: B  
 Intersection Capacity Utilization 61.5%  
 ICU Level of Service B  
 Analysis Period (min) 15

Splits and Phases: 1: Powers & Bradley Rd.



Timings  
2: Legacy Hill Dr & Bradley Rd.

Short-Term Total Traffic  
PM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘↘	↘
Traffic Volume (vph)	649	458	217	588	370	244
Future Volume (vph)	649	458	217	588	370	244
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	3	
Permitted Phases		2	6			3
Detector Phase	2	2	1	6	3	3
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.0	23.0	10.0	23.0	10.0	10.0
Total Split (s)	63.0	63.0	12.0	75.0	25.0	25.0
Total Split (%)	63.0%	63.0%	12.0%	75.0%	25.0%	25.0%
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	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effect Green (s)	60.3	60.3	73.2	73.2	16.8	16.8
Actuated g/C Ratio	0.60	0.60	0.73	0.73	0.17	0.17
v/c Ratio	0.33	0.43	0.45	0.25	0.70	0.55
Control Delay	10.7	2.2	7.3	4.9	45.7	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.7	2.2	7.3	4.9	45.7	9.0
LOS	B	A	A	A	D	A
Approach Delay	7.2			5.6	31.1	
Approach LOS	A			A	C	

Intersection Summary

Cycle Length: 100  
 Actuated Cycle Length: 100  
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green  
 Natural Cycle: 45  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.70  
 Intersection Signal Delay: 12.5  
 Intersection LOS: B  
 Intersection Capacity Utilization 53.0%  
 ICU Level of Service A  
 Analysis Period (min) 15

Splits and Phases: 2: Legacy Hill Dr & Bradley Rd.





HCM 6th Roundabout  
5: Legacy Hill Dr & Frontside Dr

Short-Term Total Traffic  
PM Peak Hour





Intersection				
Intersection Delay, s/veh 7.8				
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	559	0	122	579
Demand Flow Rate, veh/h	570	0	124	591
Vehicles Circulating, veh/h	201	687	563	7
Vehicles Exiting, veh/h	397	0	208	680
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	9.1	0.0	6.4	6.9
Approach LOS	A	-	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
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	4.976
Entry Flow, veh/h	570	0	124	591
Cap Entry Lane, veh/h	1124	685	777	1370
Entry HV Adj Factor	0.981	1.000	0.981	0.980
Flow Entry, veh/h	559	0	122	579
Cap Entry, veh/h	1102	685	763	1342
V/C Ratio	0.507	0.000	0.160	0.431
Control Delay, s/veh	9.1	5.3	6.4	6.9
LOS	A	A	A	A
95th %tile Queue, veh	3	0	1	2

HCM 6th TWSC  
10: Frontside Dr & Lot 4 Access

Short-Term Total Traffic  
PM Peak Hour

Intersection

Int Delay, s/veh 4.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	0	0	0	0	6
Future Vol, veh/h	7	0	0	0	0	6
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	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	0	0	0	0	7

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	4	4	7
Stage 1	4	-	-
Stage 2	0	-	-
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	1018	1080	1614
Stage 1	1019	-	-
Stage 2	-	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	1018	1080	1614
Mov Cap-2 Maneuver	930	-	-
Stage 1	1019	-	-
Stage 2	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.9	0	0
HCM LOS	A		






Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1614	-	930	-	-
HCM Lane V/C Ratio	-	-	0.008	-	-
HCM Control Delay (s)	0	-	8.9	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

HCM 6th TWSC  
11: Frontside Dr & Lot 1 Access

Short-Term Total Traffic  
PM Peak Hour

Intersection

Int Delay, s/veh 8.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	507	0	0	7	6	350
Future Vol, veh/h	507	0	0	7	6	350
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	-	100	-	-	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	551	0	0	8	7	380

























Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	15	7	387
Stage 1	7	-	-
Stage 2	8	-	-
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	1004	1075	1171
Stage 1	1016	-	-
Stage 2	1015	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	1004	1075	1171
Mov Cap-2 Maneuver	922	-	-
Stage 1	1016	-	-
Stage 2	1015	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.5	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1171	-	922	-	-
HCM Lane V/C Ratio	-	-	0.598	-	-
HCM Control Delay (s)	0	-	14.5	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	4.1	-	-

Timings  
101: Marksheffel Rd & Bradley Rd

Short-Term Total Traffic  
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	450	326	142	73	314	17	117	322	45	10	446	328
Future Volume (vph)	450	326	142	73	314	17	117	322	45	10	446	328
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Perm	NA	Free	Perm	NA	Free
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		Free	8		Free	2		Free	6		Free
Detector Phase	7	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	4.0		5.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	21.0		10.0	21.0		21.0	21.0		21.0	21.0	
Total Split (s)	30.0	53.0		12.0	35.0		35.0	35.0		35.0	35.0	
Total Split (%)	30.0%	53.0%		12.0%	35.0%		35.0%	35.0%		35.0%	35.0%	
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 Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Act Effect Green (s)	41.8	32.5	82.0	20.0	13.3	82.0	30.1	30.1	82.0	30.1	30.1	82.0
Actuated g/C Ratio	0.51	0.40	1.00	0.24	0.16	1.00	0.37	0.37	1.00	0.37	0.37	1.00
v/c Ratio	0.81	0.27	0.10	0.28	0.63	0.01	0.47	0.27	0.03	0.03	0.39	0.24
Control Delay	26.2	17.9	0.1	15.8	37.4	0.0	28.5	19.8	0.0	19.0	21.1	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	26.2	17.9	0.1	15.8	37.4	0.0	28.5	19.8	0.0	19.0	21.1	0.4
LOS	C	B	A	B	D	A	C	B	A	B	C	A
Approach Delay		19.2			31.9			20.1			12.4	
Approach LOS		B			C			C			B	

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 82

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 19.3

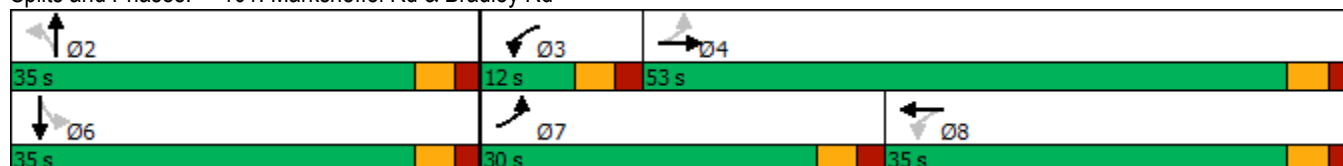
Intersection LOS: B

Intersection Capacity Utilization 69.1%

ICU Level of Service C

Analysis Period (min) 15

























Splits and Phases: 101: Marksheffel Rd & Bradley Rd



# Timings

## 1: Powers & Bradley Rd

2043 Background Traffic  
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	180	75	708	397	1016	100	1349	523	524	778	19
Future Volume (vph)	26	180	75	708	397	1016	100	1349	523	524	778	19
Turn Type	pm+pt	NA	Free	Prot	NA	Free	Prot	NA	pt+ov	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2	2 3	1	6	
Permitted Phases	4		Free			Free						6
Detector Phase	7	4		3	8		5	2	2 3	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	10.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	9.0	15.0		9.0	9.0		9.0	9.0		9.0	9.0	9.0
Total Split (s)	10.0	15.0		33.0	38.0		15.0	56.0		26.0	67.0	67.0
Total Split (%)	7.7%	11.5%		25.4%	29.2%		11.5%	43.1%		20.0%	51.5%	51.5%
Yellow Time (s)	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
Lost Time Adjust (s)	-1.0	-1.0		-2.0	-1.0		-1.0	-2.0		-2.0	-2.0	-1.0
Total Lost Time (s)	4.0	4.0		3.0	4.0		4.0	3.0		3.0	3.0	4.0
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	None		None	None		None	None		C-Max	None	None
Act Effect Green (s)	17.0	11.0	130.0	30.0	38.0	130.0	9.9	53.0	84.0	23.0	65.2	64.2
Actuated g/C Ratio	0.13	0.08	1.00	0.23	0.29	1.00	0.08	0.41	0.65	0.18	0.50	0.49
v/c Ratio	0.17	0.63	0.05	0.91	0.39	0.66	0.40	0.95	0.29	0.88	0.45	0.02
Control Delay	34.3	67.7	0.1	56.5	46.8	7.0	61.7	51.2	8.4	69.0	22.0	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	34.3	67.7	0.1	56.5	46.8	7.0	61.7	51.2	8.4	69.0	22.0	0.1
LOS	C	E	A	E	D	A	E	D	A	E	C	A
Approach Delay		46.5			30.9			40.3			40.3	
Approach LOS		D			C			D			D	

### Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 125 (96%), Referenced to phase 1:SBL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 37.1

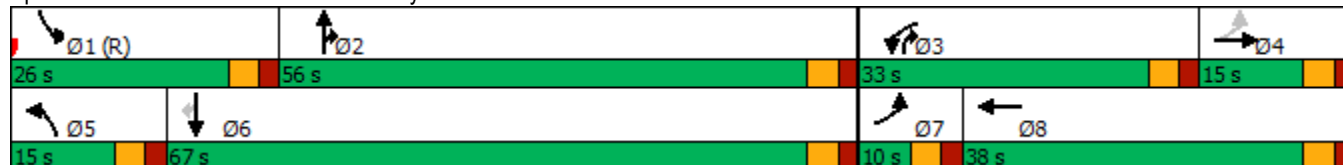
Intersection LOS: D

Intersection Capacity Utilization 94.1%

ICU Level of Service F

























Analysis Period (min) 15

Splits and Phases: 1: Powers & Bradley Rd



# Timings 2: Legacy Dr & Bradley Rd

2043 Background Traffic  
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	233	913	81	40	1640	182	228	18	91	160	9	252
Future Volume (vph)	233	913	81	40	1640	182	228	18	91	160	9	252
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	6		6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	15.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	15.0	5.0	5.0
Minimum Split (s)	20.0	10.0	10.0	10.0	10.0	10.0	30.0	10.0	10.0	30.0	15.0	15.0
Total Split (s)	20.0	65.0	65.0	15.0	60.0	60.0	30.0	20.0	20.0	30.0	20.0	20.0
Total Split (%)	15.4%	50.0%	50.0%	11.5%	46.2%	46.2%	23.1%	15.4%	15.4%	23.1%	15.4%	15.4%
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)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-2.0	-1.0	-1.0	-2.0	-1.0	-1.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
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)	16.2	73.8	73.8	70.8	63.1	63.1	22.0	18.6	18.6	17.0	13.6	13.6
Actuated g/C Ratio	0.12	0.57	0.57	0.54	0.49	0.49	0.17	0.14	0.14	0.13	0.10	0.10
v/c Ratio	0.57	0.48	0.09	0.12	1.00	0.23	0.41	0.07	0.31	0.38	0.05	0.79
Control Delay	78.7	7.5	0.2	7.0	53.0	7.7	50.7	45.5	10.1	54.4	48.8	33.3
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	78.7	7.5	0.2	7.0	53.0	7.7	50.7	45.5	10.1	54.4	48.8	33.3
LOS	E	A	A	A	D	A	D	D	B	D	D	C
Approach Delay		20.5			47.6			39.5			41.6	
Approach LOS		C			D			D			D	

## Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

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

Natural Cycle: 130

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.00

Intersection Signal Delay: 37.6

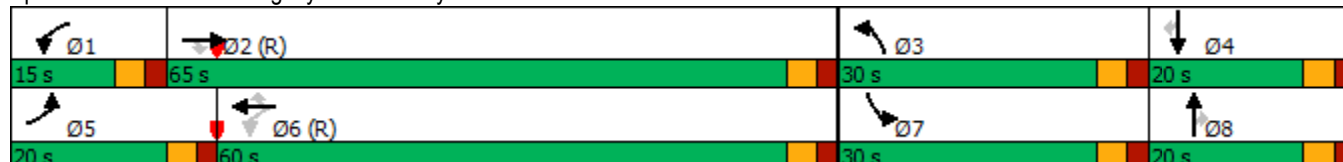
Intersection LOS: D

Intersection Capacity Utilization 81.0%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 2: Legacy Dr & Bradley Rd



























Intersection				
Intersection Delay, s/veh	4.0			
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	74	75	217	142
Demand Flow Rate, veh/h	75	76	221	145
Vehicles Circulating, veh/h	116	296	92	0
Vehicles Exiting, veh/h	29	17	99	372
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.5	4.2	4.4	3.5
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
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	4.976
Entry Flow, veh/h	75	76	221	145
Cap Entry Lane, veh/h	1226	1020	1256	1380
Entry HV Adj Factor	0.987	0.987	0.980	0.980
Flow Entry, veh/h	74	75	217	142
Cap Entry, veh/h	1210	1007	1232	1352
V/C Ratio	0.061	0.074	0.176	0.105
Control Delay, s/veh	3.5	4.2	4.4	3.5
LOS	A	A	A	A
95th %tile Queue, veh	0	0	1	0



Timings  
101: Marksheffel Rd & Bradley Rd

2043 Background Traffic  
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	461	313	140	95	796	285	332	618	50	140	283	493
Future Volume (vph)	461	313	140	95	796	285	332	618	50	140	283	493
Turn Type	Prot	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free	6		Free	8		Free	4		Free
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	4.0		5.0	4.0		5.0	4.0		5.0	4.0	
Minimum Split (s)	10.0	21.0		10.0	21.0		10.0	21.0		10.0	21.0	
Total Split (s)	27.0	64.4		10.0	47.4		15.0	40.6		15.0	40.6	
Total Split (%)	20.8%	49.5%		7.7%	36.5%		11.5%	31.2%		11.5%	31.2%	
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)	21.2	59.4	130.0	48.2	43.2	130.0	45.9	35.9	130.0	45.3	35.6	130.0
Actuated g/C Ratio	0.16	0.46	1.00	0.37	0.33	1.00	0.35	0.28	1.00	0.35	0.27	1.00
v/c Ratio	0.87	0.20	0.09	0.24	0.71	0.19	0.89	0.67	0.03	0.61	0.31	0.33
Control Delay	72.1	17.8	0.1	19.5	42.3	0.3	60.4	45.8	0.0	38.7	38.5	0.6
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	72.1	17.8	0.1	19.5	42.3	0.3	60.4	45.8	0.0	38.7	38.5	0.6
LOS	E	B	A	B	D	A	E	D	A	D	D	A
Approach Delay		42.5			30.2			48.3			18.1	
Approach LOS		D			C			D			B	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

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

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 34.8

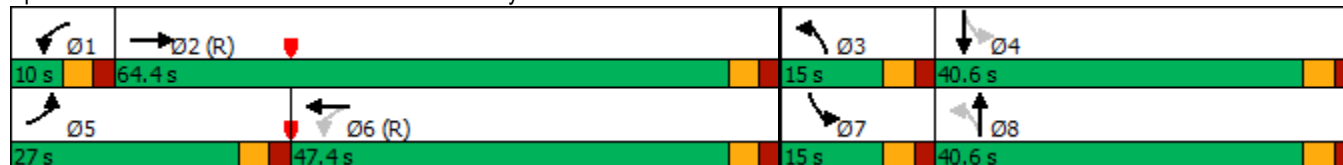
Intersection LOS: C

Intersection Capacity Utilization 78.0%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 101: Marksheffel Rd & Bradley Rd



























# Timings

2043 Background Traffic

105: Bradley Landing Blvd/Foreign Trade Zone Blvd & Bradley Rd

AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	188	838	115	68	1533	103	221	6	81	24	3	40
Future Volume (vph)	188	838	115	68	1533	103	221	6	81	24	3	40
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	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	25.0	80.0	80.0	10.0	65.0	65.0	15.0	25.0	25.0	15.0	25.0	25.0
Total Split (%)	19.2%	61.5%	61.5%	7.7%	50.0%	50.0%	11.5%	19.2%	19.2%	11.5%	19.2%	19.2%
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)	85.0	77.0	77.0	67.5	62.5	62.5	33.3	27.3	27.3	27.0	20.0	20.0
Actuated g/C Ratio	0.65	0.59	0.59	0.52	0.48	0.48	0.26	0.21	0.21	0.21	0.15	0.15
v/c Ratio	0.69	0.43	0.13	0.22	0.98	0.13	0.71	0.02	0.20	0.08	0.01	0.12
Control Delay	50.5	6.0	0.5	6.1	42.0	2.6	55.0	45.5	1.8	36.3	47.0	0.7
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	50.5	6.0	0.5	6.1	42.0	2.6	55.0	45.5	1.8	36.3	47.0	0.7
LOS	D	A	A	A	D	A	D	D	A	D	D	A
Approach Delay		12.8			38.2			40.8			15.5	
Approach LOS		B			D			D			B	

## Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 29.0

Intersection LOS: C

Intersection Capacity Utilization 84.2%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 105: Bradley Landing Blvd/Foreign Trade Zone Blvd & Bradley Rd



Timings  
139: Bliss Rd & Bradley Rd

2043 Background Traffic  
AM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘	↗
Traffic Volume (vph)	855	88	41	1580	124	59
Future Volume (vph)	855	88	41	1580	124	59
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4	8			2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	9.5	22.5	22.5	22.5
Total Split (s)	83.0	83.0	14.0	97.0	33.0	33.0
Total Split (%)	63.8%	63.8%	10.8%	74.6%	25.4%	25.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	Max	Max
Act Effect Green (s)	83.5	83.5	92.5	92.5	28.5	28.5
Actuated g/C Ratio	0.64	0.64	0.71	0.71	0.22	0.22
v/c Ratio	0.41	0.09	0.12	0.68	0.35	0.16
Control Delay	14.8	4.3	4.6	8.1	45.9	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.8	4.3	4.6	8.1	45.9	10.6
LOS	B	A	A	A	D	B
Approach Delay	13.9			8.0	34.5	
Approach LOS	B			A	C	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 11.8

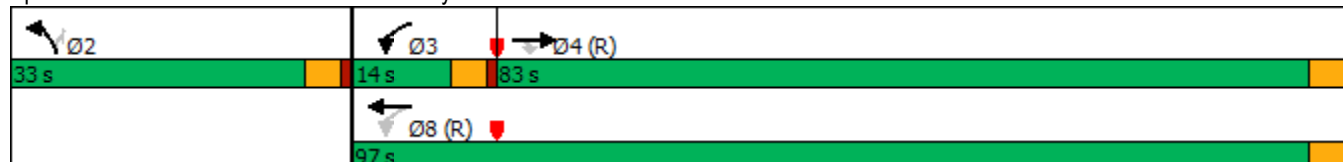
Intersection LOS: B

Intersection Capacity Utilization 58.0%

ICU Level of Service B

























Analysis Period (min) 15

Splits and Phases: 139: Bliss Rd & Bradley Rd



Timings  
1: Powers & Bradley Rd

2043 Background Traffic  
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	347	210	590	366	650	175	687	835	618	1268	110
Future Volume (vph)	71	347	210	590	366	650	175	687	835	618	1268	110
Turn Type	pm+pt	NA	Free	Prot	NA	Free	Prot	NA	pt+ov	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2	2 3	1	6	
Permitted Phases	4		Free			Free						6
Detector Phase	7	4		3	8		5	2	2 3	1	6	6
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	9.0		9.0	9.0		9.0	9.0		9.0	9.0	9.0
Total Split (s)	10.0	25.0		35.0	50.0		15.0	40.0		30.0	55.0	55.0
Total Split (%)	7.7%	19.2%		26.9%	38.5%		11.5%	30.8%		23.1%	42.3%	42.3%
Yellow Time (s)	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
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
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	None		None	None		None	Max		C-Max	Max	Max
Act Effect Green (s)	24.9	18.9	130.0	29.3	44.2	130.0	11.2	36.0	68.3	29.8	54.6	54.6
Actuated g/C Ratio	0.19	0.15	1.00	0.23	0.34	1.00	0.09	0.28	0.53	0.23	0.42	0.42
v/c Ratio	0.33	0.71	0.14	0.79	0.31	0.42	0.61	0.72	0.57	0.81	0.88	0.15
Control Delay	30.7	61.0	0.2	48.7	20.8	0.7	66.8	47.5	19.6	57.3	43.5	2.3
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	30.7	61.0	0.2	48.7	20.8	0.7	66.8	47.5	19.6	57.3	43.5	2.3
LOS	C	E	A	D	C	A	E	D	B	E	D	A
Approach Delay		37.2			22.9			35.7			45.5	
Approach LOS		D			C			D			D	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 1 (1%), Referenced to phase 1:SBL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 35.7

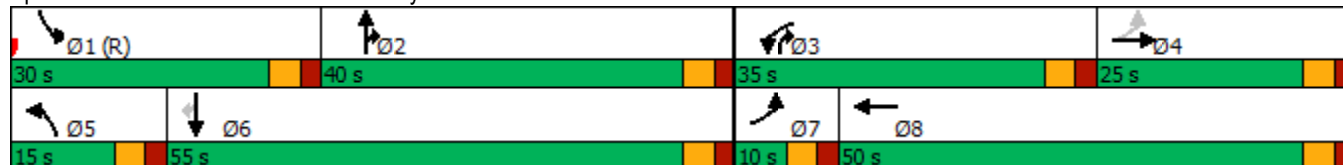
Intersection LOS: D

Intersection Capacity Utilization 79.8%

ICU Level of Service D

























Analysis Period (min) 15

Splits and Phases: 1: Powers & Bradley Rd



# Timings 2: Legacy Dr & Bradley Rd

2043 Background Traffic  
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	378	1123	298	136	1028	163	166	16	59	300	24	412
Future Volume (vph)	378	1123	298	136	1028	163	166	16	59	300	24	412
Turn Type	Prot	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	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	10.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0	10.0	10.0	15.0	15.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	25.0	65.0	65.0	20.0	60.0	60.0	19.0	25.0	25.0	20.0	26.0	26.0
Total Split (%)	19.2%	50.0%	50.0%	15.4%	46.2%	46.2%	14.6%	19.2%	19.2%	15.4%	20.0%	20.0%
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)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	19.7	72.5	72.5	74.5	63.7	63.7	26.0	15.8	15.8	34.2	19.0	19.0
Actuated g/C Ratio	0.15	0.56	0.56	0.57	0.49	0.49	0.20	0.12	0.12	0.26	0.15	0.15
v/c Ratio	0.77	0.60	0.31	0.47	0.62	0.20	0.29	0.08	0.22	0.43	0.09	0.91
Control Delay	54.0	30.9	8.8	12.4	30.4	10.2	37.9	48.1	3.9	39.3	45.8	40.8
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	54.0	30.9	8.8	12.4	30.4	10.2	37.9	48.1	3.9	39.3	45.8	40.8
LOS	D	C	A	B	C	B	D	D	A	D	D	D
Approach Delay		32.1			26.1			30.3			40.4	
Approach LOS		C			C			C			D	

## Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 67 (52%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 31.5

Intersection LOS: C

Intersection Capacity Utilization 68.7%

ICU Level of Service C

Analysis Period (min) 15

























Splits and Phases: 2: Legacy Dr & Bradley Rd



Intersection				
Intersection Delay, s/veh	5.4			
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	49	47	167	498
Demand Flow Rate, veh/h	50	48	170	508
Vehicles Circulating, veh/h	409	220	110	0
Vehicles Exiting, veh/h	99	60	349	268
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	4.6	3.7	4.1	6.0
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
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	4.976
Entry Flow, veh/h	50	48	170	508
Cap Entry Lane, veh/h	909	1103	1233	1380
Entry HV Adj Factor	0.980	0.979	0.980	0.981
Flow Entry, veh/h	49	47	167	498
Cap Entry, veh/h	891	1080	1209	1353
V/C Ratio	0.055	0.044	0.138	0.368
Control Delay, s/veh	4.6	3.7	4.1	6.0
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	2

Timings  
101: Marksheffel Rd & Bradley Rd

2043 Background Traffic  
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	403	430	182	195	427	215	158	515	100	300	670	441
Future Volume (vph)	403	430	182	195	427	215	158	515	100	300	670	441
Turn Type	Prot	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free	6		Free	8		Free	4		Free
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	4.0		5.0	4.0		5.0	4.0		5.0	4.0	
Minimum Split (s)	10.0	21.0		10.0	21.0		10.0	21.0		10.0	21.0	
Total Split (s)	35.0	55.0		15.0	35.0		30.0	30.0		30.0	30.0	
Total Split (%)	26.9%	42.3%		11.5%	26.9%		23.1%	23.1%		23.1%	23.1%	
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)	21.3	50.1	130.0	48.7	38.7	130.0	42.4	28.6	130.0	55.0	36.2	130.0
Actuated g/C Ratio	0.16	0.39	1.00	0.37	0.30	1.00	0.33	0.22	1.00	0.42	0.28	1.00
v/c Ratio	0.75	0.33	0.12	0.50	0.43	0.14	0.59	0.70	0.07	0.82	0.72	0.29
Control Delay	33.8	29.3	0.1	26.1	39.0	0.2	34.3	53.0	0.1	45.8	47.8	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	33.8	29.3	0.1	26.1	39.0	0.2	34.3	53.0	0.1	45.8	47.8	0.5
LOS	C	C	A	C	D	A	C	D	A	D	D	A
Approach Delay		25.9			26.0			42.4			32.6	
Approach LOS		C			C			D			C	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

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

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 31.4

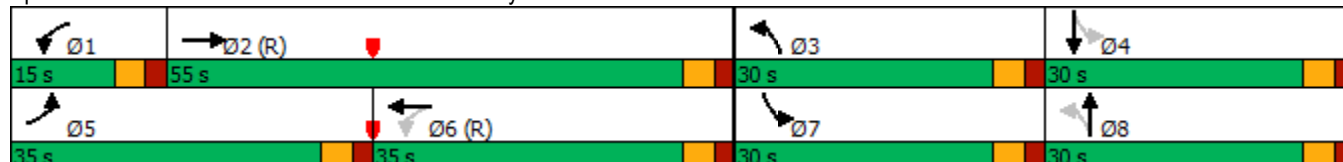
Intersection LOS: C

Intersection Capacity Utilization 70.8%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 101: Marksheffel Rd & Bradley Rd





























# Timings

## 105: Bradley Landing Blvd/Foreign Trade Zone Blvd & Bradley Rd

2043 Background Traffic

PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	919	331	170	906	34	297	8	145	101	10	155
Future Volume (vph)	34	919	331	170	906	34	297	8	145	101	10	155
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	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	15.0	74.0	74.0	16.0	75.0	75.0	15.0	25.0	25.0	15.0	25.0	25.0
Total Split (%)	11.5%	56.9%	56.9%	12.3%	57.7%	57.7%	11.5%	19.2%	19.2%	11.5%	19.2%	19.2%
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)	55.7	48.9	48.9	64.0	55.2	55.2	55.1	39.5	39.5	38.7	28.0	28.0
Actuated g/C Ratio	0.43	0.38	0.38	0.49	0.42	0.42	0.42	0.30	0.30	0.30	0.22	0.22
v/c Ratio	0.17	0.75	0.44	0.79	0.66	0.05	0.54	0.02	0.27	0.25	0.03	0.36
Control Delay	13.4	36.8	4.1	49.8	44.0	4.7	32.3	39.0	7.6	28.0	46.4	9.3
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	13.4	36.8	4.1	49.8	44.0	4.7	32.3	39.0	7.6	28.0	46.4	9.3
LOS	B	D	A	D	D	A	C	D	A	C	D	A
Approach Delay		27.7			43.7			24.5			17.8	
Approach LOS		C			D			C			B	

### Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 75 (58%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 32.1

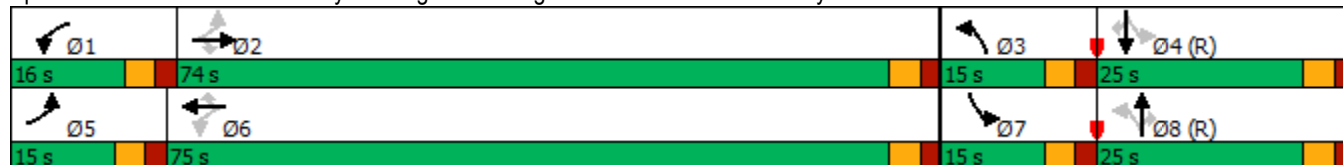
Intersection LOS: C

Intersection Capacity Utilization 70.4%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 105: Bradley Landing Blvd/Foreign Trade Zone Blvd & Bradley Rd



Timings  
139: Bliss Rd & Bradley Rd

2043 Background Traffic  
PM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘	↗
Traffic Volume (vph)	890	275	151	875	235	125
Future Volume (vph)	890	275	151	875	235	125
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4	8			2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	9.5	22.5	22.5	22.5
Total Split (s)	75.0	75.0	20.0	95.0	35.0	35.0
Total Split (%)	57.7%	57.7%	15.4%	73.1%	26.9%	26.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	Max	Max
Act Effect Green (s)	76.4	76.4	90.5	90.5	30.5	30.5
Actuated g/C Ratio	0.59	0.59	0.70	0.70	0.23	0.23
v/c Ratio	0.46	0.28	0.43	0.39	0.61	0.29
Control Delay	27.7	12.9	12.7	14.0	51.9	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.7	12.9	12.7	14.0	51.9	8.0
LOS	C	B	B	B	D	A
Approach Delay	24.2			13.9	36.6	
Approach LOS	C			B	D	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 55 (42%), Referenced to phase 4:EBT and 8:WBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 21.8

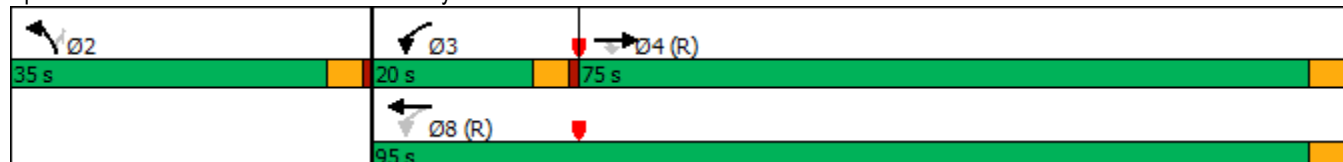
Intersection LOS: C

Intersection Capacity Utilization 57.2%

ICU Level of Service B

























Analysis Period (min) 15

Splits and Phases: 139: Bliss Rd & Bradley Rd



Timings  
1: Powers & Bradley Rd

2043 Total Traffic  
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	204	75	753	415	1043	100	1349	581	558	778	19
Future Volume (vph)	26	204	75	753	415	1043	100	1349	581	558	778	19
Turn Type	pm+pt	NA	Free	Prot	NA	Free	Prot	NA	pt+ov	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2	2 3	1	6	
Permitted Phases	4		Free			Free						6
Detector Phase	7	4		3	8		5	2	2 3	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	10.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	9.0	15.0		9.0	9.0		9.0	9.0		9.0	9.0	9.0
Total Split (s)	10.0	15.0		33.0	38.0		15.0	56.0		26.0	67.0	67.0
Total Split (%)	7.7%	11.5%		25.4%	29.2%		11.5%	43.1%		20.0%	51.5%	51.5%
Yellow Time (s)	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
Lost Time Adjust (s)	-1.0	-1.0		-2.0	-1.0		-1.0	-2.0		-2.0	-2.0	-1.0
Total Lost Time (s)	4.0	4.0		3.0	4.0		4.0	3.0		3.0	3.0	4.0
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	None		None	None		None	None		C-Max	None	None
Act Effect Green (s)	17.0	11.0	130.0	30.0	38.0	130.0	9.9	53.0	84.0	23.0	65.1	64.1
Actuated g/C Ratio	0.13	0.08	1.00	0.23	0.29	1.00	0.08	0.41	0.65	0.18	0.50	0.49
v/c Ratio	0.17	0.72	0.05	0.97	0.41	0.67	0.40	0.95	0.32	0.94	0.45	0.02
Control Delay	34.3	72.2	0.1	59.6	41.9	5.9	61.7	51.2	8.8	76.8	22.1	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	34.3	72.2	0.1	59.6	41.9	5.9	61.7	51.2	8.8	76.8	22.1	0.1
LOS	C	E	A	E	D	A	E	D	A	E	C	A
Approach Delay		51.2			30.9			39.5			44.3	
Approach LOS		D			C			D			D	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 125 (96%), Referenced to phase 1:SBL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 38.0

Intersection LOS: D

Intersection Capacity Utilization 96.4%

ICU Level of Service F

























Analysis Period (min) 15

Splits and Phases: 1: Powers & Bradley Rd



# Timings 2: Legacy Dr & Bradley Rd

2043 Total Traffic  
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	233	801	309	197	1559	182	400	22	263	160	14	252
Future Volume (vph)	233	801	309	197	1559	182	400	22	263	160	14	252
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	6		6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	15.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	15.0	5.0	5.0
Minimum Split (s)	20.0	10.0	10.0	10.0	10.0	10.0	30.0	10.0	10.0	30.0	15.0	15.0
Total Split (s)	20.0	65.0	65.0	15.0	60.0	60.0	30.0	20.0	20.0	30.0	20.0	20.0
Total Split (%)	15.4%	50.0%	50.0%	11.5%	46.2%	46.2%	23.1%	15.4%	15.4%	23.1%	15.4%	15.4%
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)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-2.0	-1.0	-1.0	-2.0	-1.0	-1.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
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)	16.0	65.1	65.1	71.2	60.1	60.1	23.9	21.9	21.9	17.0	15.0	15.0
Actuated g/C Ratio	0.12	0.50	0.50	0.55	0.46	0.46	0.18	0.17	0.17	0.13	0.12	0.12
v/c Ratio	0.58	0.48	0.34	0.55	1.00	0.24	0.67	0.07	0.56	0.38	0.07	0.85
Control Delay	79.4	9.6	0.8	13.1	54.6	8.6	54.9	43.6	9.6	54.4	50.6	49.6
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	79.4	9.6	0.8	13.1	54.6	8.6	54.9	43.6	9.6	54.4	50.6	49.6
LOS	E	A	A	B	D	A	D	D	A	D	D	D
Approach Delay		19.7			46.1			37.1			51.4	
Approach LOS		B			D			D			D	

## Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

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

Natural Cycle: 120

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.00

Intersection Signal Delay: 37.1

Intersection LOS: D

Intersection Capacity Utilization 83.7%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 2: Legacy Dr & Bradley Rd








HCM 6th Roundabout  
5: Legacy Hill Dr & Frontside Dr

2043 Total Traffic  
AM Peak Hour

Intersection				
Intersection Delay, s/veh 6.6				
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	479	77	250	392
Demand Flow Rate, veh/h	489	78	255	400
Vehicles Circulating, veh/h	116	716	479	36
Vehicles Exiting, veh/h	320	18	126	758
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.0	6.8	7.7	5.4
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
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	4.976
Entry Flow, veh/h	489	78	255	400
Cap Entry Lane, veh/h	1226	665	847	1330
Entry HV Adj Factor	0.980	0.987	0.979	0.980
Flow Entry, veh/h	479	77	250	392
Cap Entry, veh/h	1201	656	829	1304
V/C Ratio	0.399	0.117	0.301	0.301
Control Delay, s/veh	7.0	6.8	7.7	5.4
LOS	A	A	A	A
95th %tile Queue, veh	2	0	1	1

HCM 6th TWSC  
10: Frontside Dr & Lot 4 Access

2043 Total Traffic  
AM Peak Hour

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	0	0	71	28	4
Future Vol, veh/h	4	0	0	71	28	4
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	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	0	0	77	30	4






Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	109	32	34	0	-	0
Stage 1	32	-	-	-	-	-
Stage 2	77	-	-	-	-	-
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	888	1042	1578	-	-	-
Stage 1	991	-	-	-	-	-
Stage 2	946	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	888	1042	1578	-	-	-
Mov Cap-2 Maneuver	844	-	-	-	-	-
Stage 1	991	-	-	-	-	-
Stage 2	946	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.3	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1578	-	844	-	-
HCM Lane V/C Ratio	-	-	0.005	-	-
HCM Control Delay (s)	0	-	9.3	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

























HCM 6th TWSC  
11: Frontside Dr & Lot 1 Access

2043 Total Traffic  
AM Peak Hour

Intersection						
Int Delay, s/veh	6.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	369	2	3	72	30	259
Future Vol, veh/h	369	2	3	72	30	259
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	-	100	-	-	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	401	2	3	78	33	282
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	117	33	315	0	-	0
Stage 1	33	-	-	-	-	-
Stage 2	84	-	-	-	-	-
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	879	1041	1245	-	-	-
Stage 1	989	-	-	-	-	-
Stage 2	939	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	877	1041	1245	-	-	-
Mov Cap-2 Maneuver	837	-	-	-	-	-
Stage 1	987	-	-	-	-	-
Stage 2	939	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	13.2	0.3		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1245	-	838	-	-	
HCM Lane V/C Ratio	0.003	-	0.481	-	-	
HCM Control Delay (s)	7.9	-	13.2	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	2.7	-	-	

Timings  
101: Marksheffel Rd & Bradley Rd

2043 Total Traffic  
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	485	331	158	95	819	285	355	618	50	140	283	523
Future Volume (vph)	485	331	158	95	819	285	355	618	50	140	283	523
Turn Type	Prot	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free	6		Free	8		Free	4		Free
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	4.0		5.0	4.0		5.0	4.0		5.0	4.0	
Minimum Split (s)	10.0	21.0		10.0	21.0		10.0	21.0		10.0	21.0	
Total Split (s)	27.0	64.4		10.0	47.4		15.0	40.6		15.0	40.6	
Total Split (%)	20.8%	49.5%		7.7%	36.5%		11.5%	31.2%		11.5%	31.2%	
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)	21.5	59.4	130.0	47.9	42.9	130.0	45.9	35.9	130.0	45.3	35.6	130.0
Actuated g/C Ratio	0.17	0.46	1.00	0.37	0.33	1.00	0.35	0.28	1.00	0.35	0.27	1.00
v/c Ratio	0.90	0.22	0.10	0.25	0.74	0.19	0.95	0.67	0.03	0.61	0.31	0.35
Control Delay	69.2	17.1	0.1	19.6	43.4	0.3	71.8	45.8	0.0	38.7	38.5	0.6
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	69.2	17.1	0.1	19.6	43.4	0.3	71.8	45.8	0.0	38.7	38.5	0.6
LOS	E	B	A	B	D	A	E	D	A	D	D	A
Approach Delay		40.3			31.2			52.6			17.6	
Approach LOS		D			C			D			B	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

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

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 35.5

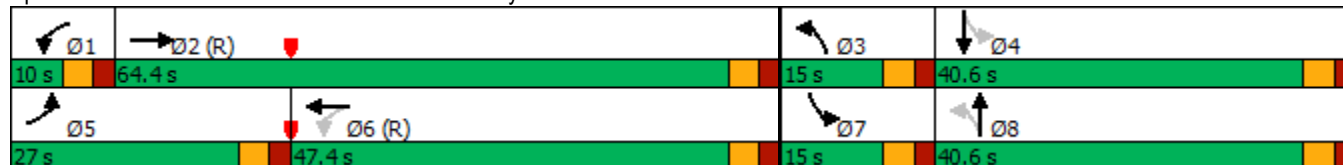
Intersection LOS: D

Intersection Capacity Utilization 80.6%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 101: Marksheffel Rd & Bradley Rd





























# Timings

## 105: Bradley Landing Blvd/Foreign Trade Zone Blvd & Bradley Rd

2043 Total Traffic

AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	188	898	115	68	1609	103	221	6	81	24	3	40
Future Volume (vph)	188	898	115	68	1609	103	221	6	81	24	3	40
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	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	25.0	80.0	80.0	10.0	65.0	65.0	15.0	25.0	25.0	15.0	25.0	25.0
Total Split (%)	19.2%	61.5%	61.5%	7.7%	50.0%	50.0%	11.5%	19.2%	19.2%	11.5%	19.2%	19.2%
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)	85.0	77.0	77.0	67.6	62.6	62.6	33.3	27.3	27.3	27.0	20.0	20.0
Actuated g/C Ratio	0.65	0.59	0.59	0.52	0.48	0.48	0.26	0.21	0.21	0.21	0.15	0.15
v/c Ratio	0.70	0.47	0.13	0.23	1.03	0.13	0.71	0.02	0.20	0.08	0.01	0.12
Control Delay	51.7	6.5	0.3	5.8	53.8	3.0	55.0	45.5	1.8	36.3	47.0	0.7
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	51.7	6.5	0.3	5.8	53.8	3.0	55.0	45.5	1.8	36.3	47.0	0.7
LOS	D	A	A	A	D	A	D	D	A	D	D	A
Approach Delay		13.0			49.0			40.8			15.5	
Approach LOS		B			D			D			B	

### Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.03

Intersection Signal Delay: 34.7

Intersection LOS: C

Intersection Capacity Utilization 86.3%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 105: Bradley Landing Blvd/Foreign Trade Zone Blvd & Bradley Rd



Timings  
139: Bliss Rd & Bradley Rd

2043 Total Traffic  
AM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘	↑
Traffic Volume (vph)	915	88	41	1656	124	59
Future Volume (vph)	915	88	41	1656	124	59
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4	8			2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	9.5	22.5	22.5	22.5
Total Split (s)	83.0	83.0	14.0	97.0	33.0	33.0
Total Split (%)	63.8%	63.8%	10.8%	74.6%	25.4%	25.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	Max	Max
Act Effect Green (s)	83.5	83.5	92.5	92.5	28.5	28.5
Actuated g/C Ratio	0.64	0.64	0.71	0.71	0.22	0.22
v/c Ratio	0.44	0.09	0.12	0.71	0.35	0.16
Control Delay	14.7	3.7	5.5	10.5	45.9	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.7	3.7	5.5	10.5	45.9	10.6
LOS	B	A	A	B	D	B
Approach Delay	13.7			10.4	34.5	
Approach LOS	B			B	C	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 13.1

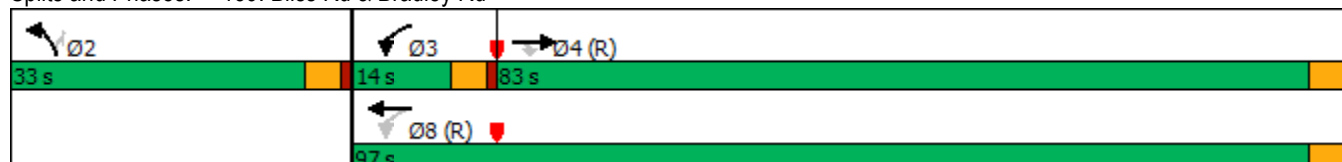
Intersection LOS: B

Intersection Capacity Utilization 60.1%

ICU Level of Service B

Analysis Period (min) 15

























Splits and Phases: 139: Bliss Rd & Bradley Rd



# Timings

## 1: Powers & Bradley Rd

2043 Total Traffic  
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	375	210	664	396	695	175	687	905	660	1268	110
Future Volume (vph)	71	375	210	664	396	695	175	687	905	660	1268	110
Turn Type	pm+pt	NA	Free	Prot	NA	Free	Prot	NA	pt+ov	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2	2 3	1	6	
Permitted Phases	4		Free			Free						6
Detector Phase	7	4		3	8		5	2	2 3	1	6	6
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	9.0		9.0	9.0		9.0	9.0		9.0	9.0	9.0
Total Split (s)	10.0	25.0		35.0	50.0		15.0	40.0		30.0	55.0	55.0
Total Split (%)	7.7%	19.2%		26.9%	38.5%		11.5%	30.8%		23.1%	42.3%	42.3%
Yellow Time (s)	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
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
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	None		None	None		None	Max		C-Max	Max	Max
Act Effect Green (s)	25.4	19.4	130.0	30.3	45.7	130.0	11.0	36.0	69.3	28.3	53.3	53.3
Actuated g/C Ratio	0.20	0.15	1.00	0.23	0.35	1.00	0.08	0.28	0.53	0.22	0.41	0.41
v/c Ratio	0.33	0.75	0.14	0.86	0.33	0.45	0.62	0.72	0.61	0.91	0.90	0.15
Control Delay	30.3	62.2	0.2	54.1	25.8	0.7	67.5	47.5	20.3	67.5	46.1	2.3
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	30.3	62.2	0.2	54.1	25.8	0.7	67.5	47.5	20.3	67.5	46.1	2.3
LOS	C	E	A	D	C	A	E	D	C	E	D	A
Approach Delay		38.9			26.6			35.5			50.7	
Approach LOS		D			C			D			D	

### Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 1 (1%), Referenced to phase 1:SBL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 38.3

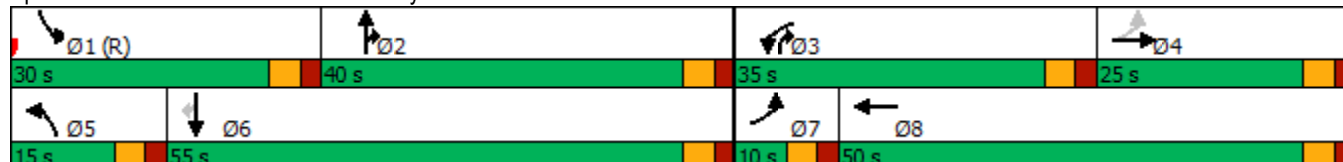
Intersection LOS: D

Intersection Capacity Utilization 82.7%

ICU Level of Service E

























Analysis Period (min) 15

Splits and Phases: 1: Powers & Bradley Rd



# Timings 2: Legacy Dr & Bradley Rd

2043 Total Traffic  
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	378	992	570	316	941	163	401	22	288	300	30	412
Future Volume (vph)	378	992	570	316	941	163	401	22	288	300	30	412
Turn Type	Prot	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	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	10.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0	10.0	10.0	15.0	15.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	25.0	65.0	65.0	20.0	60.0	60.0	19.0	25.0	25.0	20.0	26.0	26.0
Total Split (%)	19.2%	50.0%	50.0%	15.4%	46.2%	46.2%	14.6%	19.2%	19.2%	15.4%	20.0%	20.0%
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)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	19.7	62.2	62.2	74.8	58.7	58.7	35.9	20.9	20.9	35.4	20.7	20.7
Actuated g/C Ratio	0.15	0.48	0.48	0.58	0.45	0.45	0.28	0.16	0.16	0.27	0.16	0.16
v/c Ratio	0.77	0.62	0.56	0.92	0.62	0.22	0.52	0.08	0.63	0.39	0.11	0.95
Control Delay	52.8	36.8	9.7	43.6	32.7	10.5	38.3	47.0	15.3	35.9	46.8	54.6
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	52.8	36.8	9.7	43.6	32.7	10.5	38.3	47.0	15.3	35.9	46.8	54.6
LOS	D	D	A	D	C	B	D	D	B	D	D	D
Approach Delay		31.9			32.6			29.2			46.7	
Approach LOS		C			C			C			D	

## Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 67 (52%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 34.0

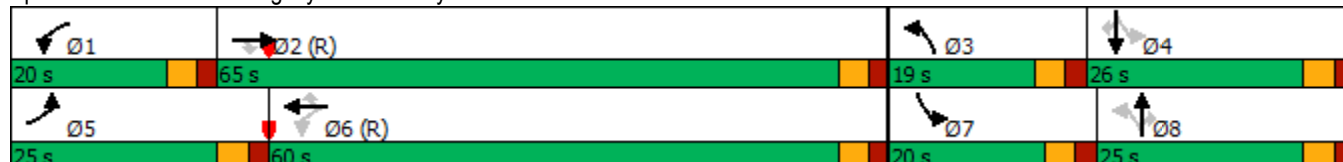
Intersection LOS: C

Intersection Capacity Utilization 73.0%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 2: Legacy Dr & Bradley Rd








HCM 6th Roundabout  
5: Legacy Hill Dr & Frontside Dr

2043 Total Traffic  
PM Peak Hour

Intersection				
Intersection Delay, s/veh12.2				
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	603	49	207	848
Demand Flow Rate, veh/h	615	50	211	865
Vehicles Circulating, veh/h	409	781	632	43
Vehicles Exiting, veh/h	499	62	392	788
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	15.4	6.8	8.6	11.2
Approach LOS	C	A	A	B
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
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	4.976
Entry Flow, veh/h	615	50	211	865
Cap Entry Lane, veh/h	909	622	724	1321
Entry HV Adj Factor	0.980	0.979	0.979	0.981
Flow Entry, veh/h	603	49	207	848
Cap Entry, veh/h	891	609	709	1295
V/C Ratio	0.676	0.080	0.291	0.655
Control Delay, s/veh	15.4	6.8	8.6	11.2
LOS	C	A	A	B
95th %tile Queue, veh	5	0	1	5

HCM 6th TWSC  
10: Frontside Dr & Lot 4 Access

2043 Total Traffic  
PM Peak Hour

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	0	0	48	92	6
Future Vol, veh/h	7	0	0	48	92	6
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	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	0	0	52	100	7






Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	156	104	107	0	-	0
Stage 1	104	-	-	-	-	-
Stage 2	52	-	-	-	-	-
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	835	951	1484	-	-	-
Stage 1	920	-	-	-	-	-
Stage 2	970	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	835	951	1484	-	-	-
Mov Cap-2 Maneuver	810	-	-	-	-	-
Stage 1	920	-	-	-	-	-
Stage 2	970	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.5	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1484	-	810	-	-
HCM Lane V/C Ratio	-	-	0.009	-	-
HCM Control Delay (s)	0	-	9.5	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

























HCM 6th TWSC  
11: Frontside Dr & Lot 1 Access

2043 Total Traffic  
PM Peak Hour

Intersection						
Int Delay, s/veh	9.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	504	3	3	51	95	356
Future Vol, veh/h	504	3	3	51	95	356
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	-	100	-	-	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	548	3	3	55	103	387
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	164	103	490	0	-	0
Stage 1	103	-	-	-	-	-
Stage 2	61	-	-	-	-	-
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	827	952	1073	-	-	-
Stage 1	921	-	-	-	-	-
Stage 2	962	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	825	952	1073	-	-	-
Mov Cap-2 Maneuver	804	-	-	-	-	-
Stage 1	918	-	-	-	-	-
Stage 2	962	-	-	-	-	-
Approach	EB		NB		SB	
HCM Control Delay, s	18.6		0.5		0	
HCM LOS	C					
Minor Lane/Major Mvmt	NBL		NBT EBLn1		SBT	SBR
Capacity (veh/h)	1073		-		805	-
HCM Lane V/C Ratio	0.003		-		0.685	-
HCM Control Delay (s)	8.4		-		18.6	-
HCM Lane LOS	A		-		C	-
HCM 95th %tile Q(veh)	0		-		5.5	-

Timings  
101: Marksheffel Rd & Bradley Rd

2043 Total Traffic  
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	442	459	211	195	455	215	186	515	100	300	670	478
Future Volume (vph)	442	459	211	195	455	215	186	515	100	300	670	478
Turn Type	Prot	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free	6		Free	8		Free	4		Free
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	4.0		5.0	4.0		5.0	4.0		5.0	4.0	
Minimum Split (s)	10.0	21.0		10.0	21.0		10.0	21.0		10.0	21.0	
Total Split (s)	35.0	55.0		15.0	35.0		30.0	30.0		30.0	30.0	
Total Split (%)	26.9%	42.3%		11.5%	26.9%		23.1%	23.1%		23.1%	23.1%	
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)	22.8	50.1	130.0	47.2	37.2	130.0	44.2	28.6	130.0	54.6	34.3	130.0
Actuated g/C Ratio	0.18	0.39	1.00	0.36	0.29	1.00	0.34	0.22	1.00	0.42	0.26	1.00
v/c Ratio	0.77	0.35	0.14	0.53	0.47	0.14	0.67	0.70	0.07	0.83	0.75	0.32
Control Delay	32.3	28.5	0.2	27.3	41.0	0.2	37.8	53.0	0.1	46.5	50.7	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	32.3	28.5	0.2	27.3	41.0	0.2	37.8	53.0	0.1	46.5	50.7	0.5
LOS	C	C	A	C	D	A	D	D	A	D	D	A
Approach Delay		24.6			27.8			42.9			33.3	
Approach LOS		C			C			D			C	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

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

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 31.7

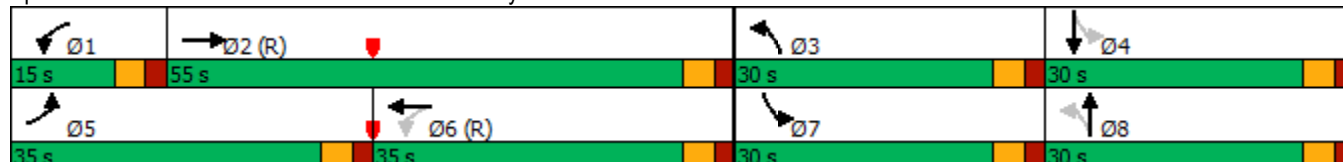
Intersection LOS: C

Intersection Capacity Utilization 72.7%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 101: Marksheffel Rd & Bradley Rd





























# Timings

## 105: Bradley Landing Blvd/Foreign Trade Zone Blvd & Bradley Rd

2043 Total Traffic

PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	1016	331	170	999	34	297	8	145	101	10	155
Future Volume (vph)	34	1016	331	170	999	34	297	8	145	101	10	155
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	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	15.0	75.0	75.0	15.0	75.0	75.0	15.0	25.0	25.0	15.0	25.0	25.0
Total Split (%)	11.5%	57.7%	57.7%	11.5%	57.7%	57.7%	11.5%	19.2%	19.2%	11.5%	19.2%	19.2%
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)	60.5	53.8	53.8	67.2	59.2	59.2	50.3	35.2	35.2	36.3	25.3	25.3
Actuated g/C Ratio	0.47	0.41	0.41	0.52	0.46	0.46	0.39	0.27	0.27	0.28	0.19	0.19
v/c Ratio	0.18	0.75	0.42	0.83	0.67	0.05	0.59	0.02	0.29	0.26	0.03	0.38
Control Delay	12.1	31.8	2.6	53.5	41.0	4.3	37.3	42.5	8.4	30.6	47.1	9.6
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	12.1	31.8	2.6	53.5	41.0	4.3	37.3	42.5	8.4	30.6	47.1	9.6
LOS	B	C	A	D	D	A	D	D	A	C	D	A
Approach Delay		24.3			41.8			28.1			19.0	
Approach LOS		C			D			C			B	

### Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 75 (58%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 30.8

Intersection LOS: C

Intersection Capacity Utilization 73.1%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 105: Bradley Landing Blvd/Foreign Trade Zone Blvd & Bradley Rd



Timings  
139: Bliss Rd & Bradley Rd

2043 Total Traffic  
PM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘	↗
Traffic Volume (vph)	987	275	151	968	235	125
Future Volume (vph)	987	275	151	968	235	125
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4	8			2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	9.5	22.5	22.5	22.5
Total Split (s)	75.0	75.0	20.0	95.0	35.0	35.0
Total Split (%)	57.7%	57.7%	15.4%	73.1%	26.9%	26.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	Max	Max
Act Effect Green (s)	76.4	76.4	90.5	90.5	30.5	30.5
Actuated g/C Ratio	0.59	0.59	0.70	0.70	0.23	0.23
v/c Ratio	0.52	0.28	0.48	0.43	0.61	0.29
Control Delay	28.7	11.9	12.9	13.9	51.9	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.7	11.9	12.9	13.9	51.9	8.0
LOS	C	B	B	B	D	A
Approach Delay	25.0			13.8	36.6	
Approach LOS	C			B	D	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 55 (42%), Referenced to phase 4:EBT and 8:WBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 22.0

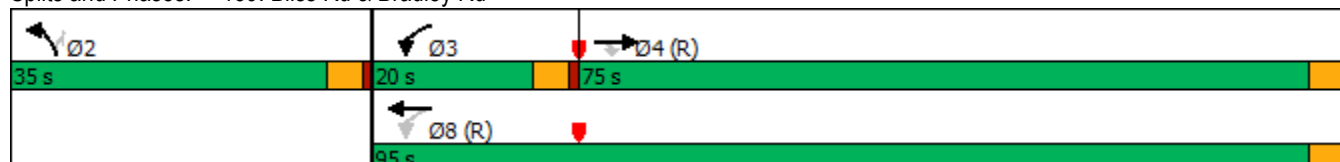
Intersection LOS: C

Intersection Capacity Utilization 59.9%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 139: Bliss Rd & Bradley Rd



# Queuing Reports

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## Queuing and Blocking Report

## Intersection: 2: Legacy Dr &amp; Bradley Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	R	L	T	T	R	L	L	T
Maximum Queue (ft)	194	183	168	155	203	325	1282	1258	225	274	302	73
Average Queue (ft)	115	93	78	72	51	226	1060	1092	138	131	178	23
95th Queue (ft)	176	156	137	118	146	409	1564	1536	293	225	264	56
Link Distance (ft)			926	926	926		1231	1231				436
Upstream Blk Time (%)							6	11				
Queuing Penalty (veh)							59	105				
Storage Bay Dist (ft)	450	450				300			200	300	300	
Storage Blk Time (%)						0	38	50	0	0	0	
Queuing Penalty (veh)						0	75	91	1	0	0	

## Intersection: 2: Legacy Dr &amp; Bradley Rd

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	L	T	R
Maximum Queue (ft)	156	114	130	62	304
Average Queue (ft)	45	49	60	23	166
95th Queue (ft)	116	96	105	53	265
Link Distance (ft)				601	601
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	300	300	300		
Storage Blk Time (%)					
Queuing Penalty (veh)					

## Queuing and Blocking Report

## Intersection: 2: Legacy Dr &amp; Bradley Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	R	L	T	T	R	L	L	T
Maximum Queue (ft)	336	345	436	426	450	324	471	497	225	282	292	280
Average Queue (ft)	177	213	301	303	215	184	261	283	122	147	188	47
95th Queue (ft)	269	322	395	405	417	330	416	416	275	278	307	218
Link Distance (ft)			926	926	926		1231	1231				436
Upstream Blk Time (%)												2
Queuing Penalty (veh)												12
Storage Bay Dist (ft)	450	450				300			200	300	300	
Storage Blk Time (%)			0			4	2	16	0	0	5	
Queuing Penalty (veh)			0			17	7	26	0	1	15	

## Intersection: 2: Legacy Dr &amp; Bradley Rd

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	L	T	R
Maximum Queue (ft)	162	154	172	83	533
Average Queue (ft)	65	78	98	27	324
95th Queue (ft)	145	131	148	69	570
Link Distance (ft)				601	601
Upstream Blk Time (%)					0
Queuing Penalty (veh)					0
Storage Bay Dist (ft)	300	300	300		
Storage Blk Time (%)					
Queuing Penalty (veh)					

## Appendix Table 1

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**Appendix Table 1  
Area Traffic Impact Studies  
Waterview East Commercial**

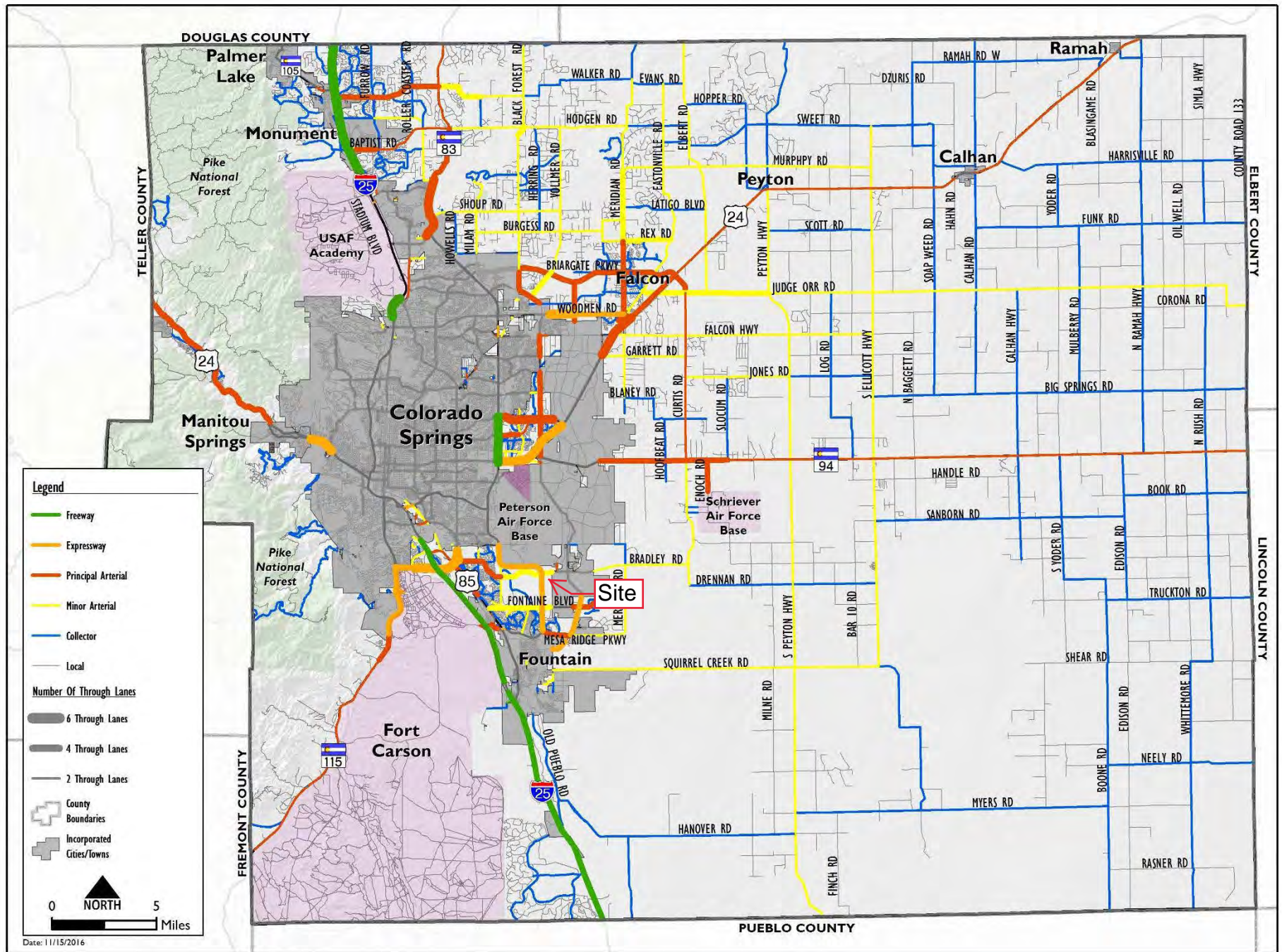
<b>Study</b>	<b>Consultant</b>	<b>Date</b>
Bradley Heights Trip Generation Letter	LSC Transportation Consultants, Inc.	September 11, 2014
Springs at Waterview East Preliminary Plan Traffic Impact and Access Analysis	LSC Transportation Consultants, Inc.	August 24, 2018
Trails at Aspen Ridge Filing No. 1 and PUD Updated Traffic Impact and Access Analysis	LSC Transportation Consultants, Inc.	December 12, 2019
Redemption Hill Church Traffic Impact Study	LSC Transportation Consultants, Inc.	April 13, 2020
Peak Innovation Park	Kimley Horn and Associates, Inc.	April 2020
Waterview North Sketch Plan Amendment and RM-12 Rezone Master Traffic Impact Analysis	LSC Transportation Consultants, Inc.	November 17, 2020
Bradley Heights Filing #1 Traffic Impact Analysis	LSC Transportation Consultants, Inc.	May 19, 2021
Trails at Aspen Ridge Planned Unit Development and Site Plan Major Amendment Traffic Impact Study	Matrix	April 16, 2021
Trails at Aspen Ridge Filing No. 2 - Traffic Impact and Access Analysis	Matrix	May 7, 2021
Villages at Waterview North Preliminary Plan Traffic Impact Analysis	LSC Transportation Consultants, Inc.	October 27, 2022
<i>Source: LSC Transportation Consultants, Inc. (February 2023)</i>		

# MTCP Maps

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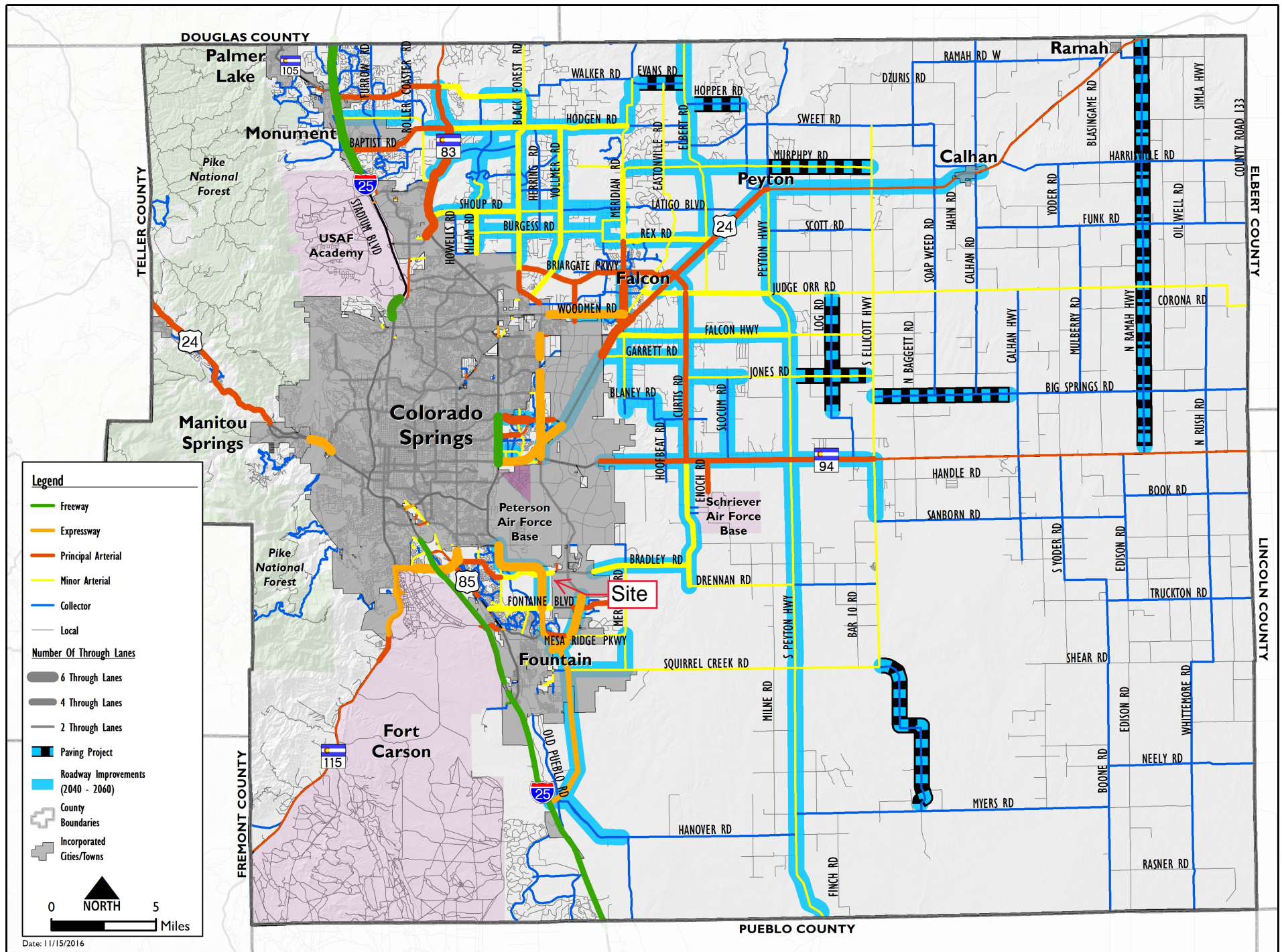




Map 14: 2040 Roadway Plan (Classification and Lanes)



# Map 17: 2060 Corridor Preservation



# Road Impact Fee Advisory Committee Meeting Minutes

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Department of Public Works  
Engineering ~ Highway Division ~ Fleet Services

**ROAD IMPACT FEE ADVISORY COMMITTEE**  
**MEETING MINUTES**

**Date:** April 23, 2019 (1:30 PM – 3:30 PM)

**Where:** Remote meeting

Members Present: Jeff Mark, Jennifer Irvine, Craig Dossey, Ryan Watson, Randy Case, Steve Hicks, Joan Lucia-Treese, Jerry Novak, Nikki Simmons

Others Present: Victoria Chavez, Lori Seago, Jason Alwine, Tim Buschar, Jeff Hodsdon, Matt Dunston, Duncan Bremer, Brian Long

1. Call to order

Mr. Case called the meeting to order at 1:39 PM.

2. Introductions

3. Fee Advisory Committee Approved the Agenda

The Fee Committee unanimously approved the agenda with the date corrected for the meeting notes.

4. Approval of minutes, January 30 Meeting – Vote

Mr. Dossey moved, and Ms. Irvine seconded the motion to approve the January meeting minutes as amended. The vote was unanimous.

5. Eligible Improvements Requests – Discussion/Vote

It was determined that the Furrow Road extension was already included in the fee program as potentially eligible. There may or may not be potentially eligible improvements at the intersection of Furrow and Higby. There may be potentially eligible improvements on Walker Road. However, it is likely that the roundabout as the access to the school is not eligible. As listed improvements, there is no role for the committee at this time. The applicants and staff should work together to develop a preliminary credit agreement. After construction and acceptance of the improvements by EPC, the applicant can apply for credits per the process outlined in the Implementation Document.

6. Signal Request for Bradley Road and Legacy Hill Drive – Discussion/Vote



Mr. Alwine described the Trails at Aspen Ridge Filing 2. As part of the filing is built, it is likely that a signal will be needed on Bradley Road and Legacy Hill Drive. There are many acres of vacant land both north and south of Bradley Roads that may develop. Mr. Alwine presented the percent of traffic from nearby developments that will contribute to the need for the signal at this location. Mr. Dossey moved that the signal meets the criteria in the Implementation Document and recommends that the signal be included as an eligible improvement. Ms. Lucia-Treese seconded the motion and it passed unanimously.

7. Public comments on items not on the agenda  
There were no public comments.

8. Items for Future Agendas  
The committee would like to discuss a format for presentation of improvement requests to the committee, reimbursement requests, bringing credit agreements to the committee as an information item and reevaluating the unit cost prices.

9. Adjourn  
Mr. Case closed the meeting.

# CDOT Memorandum

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## COLORADO

### Department of Transportation

Region 2 Permits  
5615 Wills Blvd.  
Pueblo, CO 81008-2349

July 2, 2021

SH 21A/Bradley Rd.  
El Paso County

Gilbert LaForce  
El Paso County Planning & Community  
Development - Engineering  
2880 International Circle, Suite 110  
Colorado Springs, CO 80910

Victoria Chavez  
El Paso County Planning & Community  
Development  
2880 International Circle, Suite 110  
Colorado Springs, CO 80910

RE: Trails at Aspen Ridge - Access Permit Submittal Planning Comments

Dear Gilbert and Victoria,

I am in receipt of an access permit application for The Trails at Aspen Ridge formerly Springs East at Waterview and is located to the east of the development of Waterview East Preliminary Plan, but still within the existing boundary of that development. Vehicular access to the development is from the intersection and future interchange at SH21/Powers Blvd. and Bradley Rd. and then east approximately 550-feet from the curvature touchdown point to the new signalized full movement intersection of Bradley Rd and Legacy Hill Dr.

This mixed use, multi phased development is on a total of approximately 195.25-acres with proposed 852-single-family residential lots within six different filings. There are 166.89-acres of residential lots and 28.36-acres of commercial parcels. The development is located east of SH21/Powers Blvd between the intersection with Bradley Rd. and Fontaine Blvd. on the southeast portion of the Waterview East Preliminary Plan area in El Paso County. CDOT staff comments are as follows;

#### Traffic Operations:

Previous planning comments were never addressed and the roadway improvements listed below are required at the intersection of SH21/Power Blvd. and Bradley Rd intersection and future interchange.

- a) An additional left turn lane from southbound SH21A/Powers Blvd. to eastbound Bradley Rd. shall be required. This requirement creates a southbound dual left traffic movement. The construction plans will require adjustment to the existing traffic signal, extending the arm to cover the additional southbound left turn lane. The Engineer will need to confirm that the existing traffic signal pole and caisson can support a longer arm. Otherwise, the entire signal pole will need replaced with the access permit.
- b) Once the forth leg of the intersection is introduced, additional right and left turn lanes/aux lanes and through lanes eastbound will be required and roadway widening in mainline SH21 may be required.



- c) An additional right turn lane from northbound SH21/Powers Blvd. to eastbound Bradley Rd. shall be required. This requirement creates a northbound dual right turn traffic movement.
- d) Both northbound right turning traffic lanes from SH21/Powers Blvd onto eastbound Bradley Rd. shall be signalized controlled.
- e) Highway widening shall be required to add the additional auxiliary lane along SH21/Powers Blvd. and on Bradley Rd.
- f) The northbound right turn lane shall be extended further south to allow for additional queuing for the dual right turn movement onto eastbound Bradley Rd. from SH21a/Powers Blvd.
- g) The eastbound to northbound free right turn acceleration lane from Bradley Rd. onto SH21/Powers Blvd. shall be extended to the north to allow for additional merging traffic; refer to CDOT access code for proper acceleration lane length and taper.
- h) Additional traffic controlling devices shall be installed while the roadway improvements are being constructed. This may require additional signal heads, longer mast arms, updated traffic controller.
- i) CDOT requests additional right of way dedication for the required improvements and the future interchange from the SE quadrant, the SW quadrant and the NW quadrant of the development.

Hydraulics:

The Master Development Drainage Report for Trails at Aspen Ridge dated September 2020 has been reviewed by a CDOT Hydraulics Engineer. Their comments follow:

- a) No impacts to CDOT infrastructure.

Access:

I have reviewed the submitted access application packet and have the following comments.

- a) Section 2.6(3) of the State Highway Access Code, states that if the proposed vehicle volumes increase by 20 percent or more a State Highway Access Permit will be required for the connection of Bradley Road east to SH21A between Developer, El Paso County and CDOT. El Paso County will be the Permittee and the Development will be the Applicant as directed by EPC. **An Access Permit has been submitted to CDOT on 04/15/2021 and the Department has deemed the submittal acceptable.**
- b) There will be no direct access from the north/south traveling roadways section of SH21 to the western boundary of the Trails at Aspen Ridge development. The only access points will be from local roadways off of Bradley Rd. and Fontaine Blvd. onto Legacy Hills Blvd. a proposed signalized intersection.
- c) The Bradley Rd. and Legacy Hill Drive intersection may be converted to RI/RO in the future if traffic issues arise or future traffic warrants are met to close this proposed full movement intersection.
- d) Escrow funds will be required for a portion of the future SH21A/Powers Blvd. and Bradley Rd. interchange based on a pro-rata share determined by the traffic impact study. Please add Excel spreadsheet to view and track the escrow required.
- e) Intersection improvements will be required of the development and recorded as part of the Access Permit.
- f) Right of Way donations shall be recorded as part of the Access Permitting process in coordination with CDOT Right of Way.

Additionally,






- a) On-premise and off-premise signing shall comply with the current Colorado Outdoor Advertising Act, sections 43-1-401 to 421, C.R.S., and all rules and regulations pertaining to outdoor advertising. Please contact Mr. Todd Ausbun at (719) 696-1403 for any questions regarding advertising devices.
- b) Any utility work within the state highway right of way will require a utility permit from the CDOT. Information for obtaining a utility permit can also be obtained by contacting Mr. Ausbun.

Please contact me in Pueblo at (719) 546-5732 or (719) 248-0905 with any questions.

Sincerely,

  
Arthur Gonzalez  
CDOT R2 - Access Manager

Xc: Victoria Chavez - El Paso County  
Elizabeth Nijkamp/Jeff Rice  
Ferguson  
Bauer  
Stecklein  
Whitleff/Biren  
Ausbun  
Vigil/Regalado/file



# NCHRP Report 684 Internal Trip Capture Estimation Tool

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NCHRP 684 Internal Trip Capture Estimation Tool					
<b>Project Name:</b>	Waterview East	<b>Organization:</b>	LSC Transportation Consultants, Inc.		
<b>Project Location:</b>	El Paso County, CO	<b>Performed By:</b>	KDF		
<b>Scenario Description:</b>	Buildout	<b>Date:</b>	44964		
<b>Analysis Year:</b>	2043	<b>Checked By:</b>			
<b>Analysis Period:</b>	AM Street Peak Hour	<b>Date:</b>			

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips <sup>3</sup>		
	ITE LUCs <sup>1</sup>	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail				590	320	270
Restaurant				290	148	142
Cinema/Entertainment				0		
Residential				0		
Hotel				0		
All Other Land Uses <sup>2</sup>				13	5	8
				893	473	420

Table 2-A: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. <sup>4</sup>	% Transit	% Non-Motorized	Veh. Occ. <sup>4</sup>	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses <sup>2</sup>						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		35	0	0	0
Restaurant	0	20		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	893	473	420
Internal Capture Percentage	12%	12%	13%
External Vehicle-Trips <sup>5</sup>	783	418	365
External Transit-Trips <sup>6</sup>	0	0	0
External Non-Motorized Trips <sup>6</sup>	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	6%	13%
Restaurant	24%	14%
Cinema/Entertainment	N/A	N/A
Residential	N/A	N/A
Hotel	N/A	N/A

<sup>1</sup>Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

<sup>2</sup>Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

<sup>3</sup>Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

<sup>4</sup>Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

<sup>5</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

<sup>6</sup>Person-Trips

\*Indicates computation that has been rounded to the nearest whole number.

<b>Project Name:</b>	Waterview East
<b>Analysis Period:</b>	AM Street Peak Hour

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	320	320	1.00	270	270
Restaurant	1.00	148	148	1.00	142	142
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	0	0	1.00	0	0
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	78		35	0	38	0
Restaurant	44	20		0	6	4
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		102	34	0	0	0
Retail	0		74	0	0	0
Restaurant	0	26		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	54	30	0		0
Hotel	0	13	9	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	0	0	0	0	0	0
Retail	20	300	320	300	0	0
Restaurant	35	113	148	113	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses <sup>3</sup>	0	5	5	5	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	0	0	0	0	0	0
Retail	35	235	270	235	0	0
Restaurant	20	122	142	122	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses <sup>3</sup>	0	8	8	8	0	0

<sup>1</sup> Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A
<sup>2</sup> Person-Trips
<sup>3</sup> Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator
*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	Waterview East			Organization:	LSC Transportation Consultants, Inc.
Project Location:	El Paso County, CO			Performed By:	KDF
Scenario Description:	Buildout			Date:	2/7/2023
Analysis Year:	2043			Checked By:	
Analysis Period:	PM Street Peak Hour			Date:	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips <sup>3</sup>		
	ITE LUCs <sup>1</sup>	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail				897	437	460
Restaurant				215	112	103
Cinema/Entertainment				0		
Residential				0		
Hotel				0		
All Other Land Uses <sup>2</sup>				15	7	8
				1,127	556	571

Table 2-P: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. <sup>4</sup>	% Transit	% Non-Motorized	Veh. Occ. <sup>4</sup>	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses <sup>2</sup>						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		32	0	0	0
Restaurant	0	42		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	1,127	556	571
Internal Capture Percentage	13%	13%	13%
External Vehicle-Trips <sup>5</sup>	979	482	497
External Transit-Trips <sup>6</sup>	0	0	0
External Non-Motorized Trips <sup>6</sup>	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	10%	7%
Restaurant	29%	41%
Cinema/Entertainment	N/A	N/A
Residential	N/A	N/A
Hotel	N/A	N/A

<sup>1</sup> Land Use Codes (LUCs) from <i>Trip Generation Manual</i> , published by the Institute of Transportation Engineers.
<sup>2</sup> Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.
<sup>3</sup> Enter trips assuming no transit or non-motorized trips (as assumed in ITE <i>Trip Generation Manual</i> ).
<sup>4</sup> Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-P, 6-P, 7-P, and 8-P. Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.
<sup>5</sup> Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.
<sup>6</sup> Person-Trips
*Indicates computation that has been rounded to the nearest whole number.
Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

<b>Project Name:</b>	Waterview East
<b>Analysis Period:</b>	PM Street Peak Hour

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	437	437	1.00	460	460
Restaurant	1.00	112	112	1.00	103	103
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	0	0	1.00	0	0
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	9		133	18	120	23
Restaurant	3	42		8	19	7
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		35	2	0	0	0
Retail	0		32	0	0	0
Restaurant	0	219		0	0	0
Cinema/Entertainment	0	17	3		0	0
Residential	0	44	16	0		0
Hotel	0	9	6	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	0	0	0	0	0	0
Retail	42	395	437	395	0	0
Restaurant	32	80	112	80	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses <sup>3</sup>	0	7	7	7	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	0	0	0	0	0	0
Retail	32	428	460	428	0	0
Restaurant	42	61	103	61	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses <sup>3</sup>	0	8	8	8	0	0

<sup>1</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

<sup>2</sup>Person-Trips

<sup>3</sup>Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

\*Indicates computation that has been rounded to the nearest whole number.

# TIS\_V2.pdf Markup Summary

## Callout (9)


	<p><b>Subject:</b> Callout <b>Page Label:</b> 14 <b>Author:</b> dsdlaforce <b>Date:</b> 4/20/2023 2:48:09 PM <b>Status:</b> <b>Color:</b> <span style="background-color: blue; color: white;"> </span> <b>Layer:</b> <b>Space:</b></p>	<p>Update. This is unresolved. CDOT has expressed that ROW dedication for the future interchange is required.</p>
<p>analysis from the rightw gures 8, 9, 13 and 14 sh are attached!</p>	<p><b>Subject:</b> Callout <b>Page Label:</b> 13 <b>Author:</b> CDurham <b>Date:</b> 4/20/2023 3:18:52 PM <b>Status:</b> <b>Color:</b> <span style="background-color: blue; color: white;"> </span> <b>Layer:</b> <b>Space:</b></p>	<p>14 &amp; 15</p>
	<p><b>Subject:</b> Callout <b>Page Label:</b> 13 <b>Author:</b> CDurham <b>Date:</b> 4/20/2023 3:19:09 PM <b>Status:</b> <b>Color:</b> <span style="background-color: blue; color: white;"> </span> <b>Layer:</b> <b>Space:</b></p>	<p>Figure 14</p>
	<p><b>Subject:</b> Callout <b>Page Label:</b> 13 <b>Author:</b> CDurham <b>Date:</b> 4/20/2023 3:19:19 PM <b>Status:</b> <b>Color:</b> <span style="background-color: blue; color: white;"> </span> <b>Layer:</b> <b>Space:</b></p>	<p>2043</p>
	<p><b>Subject:</b> Callout <b>Page Label:</b> 14 <b>Author:</b> CDurham <b>Date:</b> 4/20/2023 3:20:42 PM <b>Status:</b> <b>Color:</b> <span style="background-color: blue; color: white;"> </span> <b>Layer:</b> <b>Space:</b></p>	<p>2043</p>
<p>cted to operate at 040 total traffic v side Access Point</p>	<p><b>Subject:</b> Callout <b>Page Label:</b> 14 <b>Author:</b> CDurham <b>Date:</b> 4/20/2023 3:21:17 PM <b>Status:</b> <b>Color:</b> <span style="background-color: blue; color: white;"> </span> <b>Layer:</b> <b>Space:</b></p>	<p>2043</p>

set access points to Frontside Drive are projected to 1200 ft or better for all movements) as stop-sign control.

YSIS 2040


YSIS was performed using Synchro 8.00 Traffic to determine the projected northbound queue on Legacy Hill Road on the 2040 total traffic volumes. The 2040 total traffic volumes were entered into the Synchro model. The resulting reports are attached.

Maximum northbound left-turn queue on Legacy Hill Road

**Subject:** Callout  
**Page Label:** 14  
**Author:** CDurham  
**Date:** 4/20/2023 3:21:55 PM  
**Status:**  
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2043

A list of area roadway system improvement projects is shown in the recommended improvement list on the 2040 map. The 2040 map is a map of the area around the intersection of Legacy Hill Road and Frontside Drive. The map shows the proposed improvements to the roadway system, including the addition of a roundabout at the intersection of Legacy Hill Road and Frontside Drive. The map also shows the proposed improvements to the surrounding area, including the addition of a new road and the widening of existing roads.

**Subject:** Callout  
**Page Label:** 15  
**Author:** CDurham  
**Date:** 4/20/2023 4:10:11 PM  
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Would now be Figure 16 and is missing from appendix. Please add back in




**Subject:** Callout  
**Page Label:** 24  
**Author:** CDurham  
**Date:** 4/20/2023 4:17:23 PM  
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Unresolved:  
The original prelim and the PUDSP for Trails at Aspen Ridge anticipated a roundabout at this location.

This commercial development is revising the plan to omit the roundabout. Provide analysis and discussion of the impact the current layout has in omitting the roundabout. Is the road alignment sufficient and meet all criteria or are there additional offsite improvements needed?


### Highlight (3)

Bradley Road  
the 2040 total  
is projected

**Subject:** Highlight  
**Page Label:** 13  
**Author:** CDurham  
**Date:** 4/20/2023 3:08:20 PM  
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2040

c volumes.  
By 2040, it  
Boulevard

**Subject:** Highlight  
**Page Label:** 13  
**Author:** CDurham  
**Date:** 4/20/2023 3:08:26 PM  
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2040

as assumed that  
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. However, some  
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**Author:** CDurham  
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Figure 13



aired for the proposed  
aid. [Indicate that deviation was  
submitted as part of this  
application](#)

the City of Colorado  
the future signal at the

**Subject:** Text Box  
**Page Label:** 15  
**Author:** CDurham  
**Date:** 4/20/2023 4:04:20 PM  
**Status:**  
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Indicate that deviation was submitted as part of  
this application