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Springs at Waterview East
Preliminary Plan
Traffic Impact and Access Analysis
PCD File No: SP-17-010
(LSC #184360)
June 22, 2018
(August 24, 2018 Revision)

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.

A blue ink signature of the developer, written over a horizontal line.

8/23/18



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June 22, 2018
(Rev. August 24, 2018)

Mr. Charles Cothorn, P.E
Dakota Springs Engineering
31 North Tejon, Suite 311
Colorado Springs, CO 80903

RE: The Springs at Waterview East Preliminary Plan
Traffic Impact and Access Analysis
El Paso County, Colorado
LSC #184360

Dear Mr. Cothorn:

In response to your request, LSC Transportation Consultants, Inc. has prepared this traffic impact and access analysis for The Springs at Waterview East Preliminary Plan. As shown in Figure 1, the site is located southeast of the intersection of Powers Boulevard and Bradley Road in El Paso County, Colorado. This parcel was included in the *Waterview Sketch Plan Updated Master Traffic Impact Study* dated January 9, 2018. This report contains the following:

- This August 24, 2018 minor revision contains updated Figures 2, 3, and 4; no other revisions.
- A determination of the existing traffic and roadway conditions in the vicinity of the site including the lane geometries and traffic controls.
- The projected average weekday and peak-hour vehicle-trips to be generated by the Springs at Waterview East development.
- The assignment of the projected trips on the area roadways.
- Projections of the future background and resulting total traffic volumes on the area roadways.
- Level of service analysis at key intersections adjacent to and in the vicinity of the site.
- Recommendations for intersection laneage and traffic control.
- Recommendations for street functional classifications for streets within the Springs at Waterview East.
- The required Countywide Road Impact Fees.

LAND USE AND ACCESS

Land Use

Figure 2 shows the currently proposed Springs at Waterview East Preliminary Plan. This area was included in the *Waterview Sketch Plan Updated Master Traffic Impact Study* (Master TIS) dated

January 9, 2018 as Parcels P-17 and P18. A 26-acre parcel located on the northwest area of the site is to be developed for commercial uses. This is consistent with the land use assumed for Parcel P-17 in the Master TIS. The remaining site is planned to be developed with about 714 lots for single-family homes. The Master TIS assumed this area would be developed with about 865 lots for single family homes plus a potential community recreation center and school site.

Access

Access to Bradley Road is proposed via a full-movement intersection 1,030 feet east of Powers Boulevard and an additional right-in/right-out-only access about 1,310 feet east of the full-movement access. These access points are consistent with the access assumed in the Master TIS and deviations to the El Paso County *Engineering Criteria Manual (ECM)* for these access points have been approved. The approved deviation forms have been attached.

Internal access for the proposed land uses within the site are proposed to a north/south Non-Residential Urban Collector ("A" Street) and an east/west Non-Residential Urban Collector ("K" Street west of "A" Street and "C" Street east of "A" Street). Access for the commercial portion of the development is proposed via two full-movement access points to "K" Street west of "A" Street and one full-movement access point east of "A" Street. The location and spacing of the proposed commercial access points are shown in Figure 2.

Commercial Access Intersection Sight Distance

The commercial access for the east-side commercial area would have adequate horizontal intersection sight distance in both directions.

The design of the westernmost commercial site will need to allow for acceptable stopping sight distance and intersection sight distance to the north from the intersection of the Non-Residential Collector and the north/south local street on the west side of the project. This access will be designed with the commercial site plan and final plat for that parcel. The submitted plans should include a sight distance evaluation.

The commercial access in the center of the west-side commercial area would have adequate horizontal intersection sight distance in both directions. With the commercial site plan a "sight distance" easement may be needed along the site frontage to "K" street west of this access due to the horizontal curve to the west. However, the intersection sight distance could be based on a reduced approach vehicle speed due to the curve radius and the proximity of the beginning of the street.

Roundabout Design

The intersection of the two Non-Residential Urban Collector Streets ("A" Street and "K" Street) is planned to be constructed a modern one-lane roundabout. The approximate recommended size for the roundabout's inscribed circle diameter is 150 feet, however the final dimensions and

other roundabout details will be determined with the roundabout design – which will likely be with the first final plat. A roundabout design report will be prepared and submitted at that time. Figure 3 depicts a roundabout concept of approximately the appropriate size to accommodate truck traffic demonstrating that sufficient space is being provided for the roundabout. Minor lot line adjustments may be needed on the corners at the roundabout design stage and platting.

Currently Approved Deviations

- Full-movement, future public street signalized intersection with Bradley Road approximately 1,030 feet east of Powers Boulevard (DSD File No. SKP 16-002 approved 3/28/2018).
- Right-in/right-out access point to both the westbound and eastbound directions of Bradley Road approximately 2,340 feet east of Powers Boulevard (DSD File No. SKP 16-002 approved 3/28/2018).

New Deviation Requests

The following new deviation requests are shown on Figure 4.

1. Intersection spacing along a Non-Residential Collector for “A” Street between Bradley Road and the roundabout and for proposed commercial access to “C” street just east of “A” Street.
2. Intersection spacing along an Urban Local Streets “L”, “O”, “U”, “E”, “F”, and “N” to the first local street intersection back from a Collector don't meet criteria - 2.2.5.E On an urban local roadway, the closest intersection to a collector roadway shall be at least 200 feet (centerline to centerline).
3. Centerline radius on “K” street less than the 565-foot minimum for a Non-Residential Collector
4. Reduction in auxiliary lane lengths for the northbound left-turn lane on “A” Street approaching Bradley Road
5. Reduction in auxiliary lane lengths for the eastbound left-turn lane on “C” Street at the proposed commercial access east of the roundabout.

ROADWAY AND TRAFFIC CONDITIONS

Area Roadways

Figure 1 shows the roadways in the vicinity of the two sites. The major roadways are identified below, followed by a brief description.

- **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 update to the DRAFT 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 a raised median, left-turn lanes, and rural paved shoulders.

Existing Traffic Conditions

Figure 5 shows the existing traffic volumes at the intersection of Powers Boulevard/Bradley Road. The traffic volumes are based on the attached traffic counts conducted by LSC in April 2018. Figure 5 also shows the 2016 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. Figure 5 also shows the daily traffic volume on Bradley Road shown in the El Paso County *2016 Major Transportation Corridors Plan Update*.

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)	V/C ⁽¹⁾	Average Control Delay (seconds per vehicle) ⁽²⁾
A	10.0 sec or less	less than 0.60	10.0 sec or less
B	10.1-20.0 sec	0.60-0.69	10.1-15.0 sec
C	20.1-35.0 sec	0.70-0.79	15.1-25.0 sec
D	35.1-55.0 sec	0.80-0.89	25.1-35.0 sec
E	55.1-80.0 sec	0.90-0.99	35.1-50.0 sec
F	80.1 sec or more	1.00 and greater	50.1 sec or more
⁽¹⁾ Source: <i>Transportation Research Circular 212</i> ⁽²⁾ For unsignalized intersections if V/C ratio is greater than 1.0 the level of service is LOS F regardless of the projected average control delay per vehicle.			

The signalized intersection of Powers/Bradley has been analyzed to determine the existing levels of service using Synchro. All movements at this intersection are currently operating at LOS C or better during the peak hours.

2040 BACKGROUND TRAFFIC

The background traffic volumes for the year 2040 are shown on Figure 6. The 2040 background traffic volumes were based on the *Waterview Sketch Plan Updated Master Traffic Impact Study* dated January 9, 2018

TRIP GENERATION

The traffic volumes to be generated by the land uses within the currently proposed preliminary plan have been estimated using the nationally published trip generation rates from *Trip Generation, 10th Edition*, by the Institute of Transportation Engineers (ITE). Table 2 shows the average weekday and weekday morning and afternoon peak hour. Table 2 also shows the trip generation estimate for this same area assumed in the Master TIS for comparison.

The total number of vehicle-trips generated by the commercial parcels was reduced to account for the pass-by phenomenon. A pass-by trip is made by a motorist who would already be on the roadway system regardless of the 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 for each use were taken from *Trip Generation Handbook, 3rd Edition*, June 2004, by ITE.

The site is projected to generate about 11,660 new external vehicle-trips on the average weekday, with about half entering and half exiting the site during a 24-hour period. This is about 2,357 fewer trips than was estimated in the Master TIS. During the morning peak hour, which generally occurs for one hour between 6:30 and 8:30 a.m., about 267 vehicles would enter and 477 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 779 vehicles would enter and 624 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 7 shows the short-term and long-term directional distributions of traffic projected to be generated by the residential uses. 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. Figure 8 shows the short-term and long-term directional distribution of the primary commercial generated traffic. Figure 9 shows the directional distribution of the commercial pass-by generated trips. Pass-by trips were assigned based primarily on the existing traffic volumes on the major streets adjacent to the site

When the distribution percentages (from Figures 7 through 9) are applied to the trip generation estimates (from Table 2), the resulting site-generated traffic volumes can be determined. Figures 10 and 11 show the projected short-term and long-term site-generated traffic volume due to the residential portion of the site. Figures 12 and 13 show the projected short-term and long-term site-generated traffic volume due to the commercial portion of the site

TOTAL TRAFFIC

Figure 14 shows the sum of the existing traffic volumes from Figure 5 plus the short-term residential site-generated traffic volumes from Figure 10. These figures represent the short-term impacts following buildout of the residential portion of the site only.

Figure 15 shows the sum of the existing traffic volumes from Figure 5 plus the short-term residential site-generated traffic volumes from Figure 10 plus the short-term commercial generated traffic volumes from Figure 12. These figures represent the short-term impacts following buildout of the entire Springs at Waterview East Preliminary Plan.

Figure 16 shows the sum of the 2040 background traffic volumes from Figure 6 plus the long-term residential site-generated traffic volumes from Figure 11 plus the long-term commercial generated traffic volumes from Figure 13.

PROJECTED LEVELS OF SERVICE

The site access points are key area intersections have been analyzed to determine the projected levels of service for the 2040 background, existing plus residential generated traffic volumes, existing plus buildout site-generated traffic volumes, and 2040 total traffic volumes based on the signalized and unsignalized method of analysis procedures found in Synchro and the *Highway Capacity Manual, 6th Edition* by the Transportation Research Board. Figures 6, 14, 15, and 16 show the level of service analysis results. 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 with the addition of the residential generated traffic. It was assumed that Powers Boulevard would be restriped to provide dual southbound left-turn lanes approaching Bradley Road and Bradley Road would be restriped to provide dual westbound left-turn lanes approaching Powers Boulevard with development of the retail portion of the Springs at Waterview East. Based on the short-term total traffic volumes and the lane geometry shown in Figure 15 all movements at the intersection of Powers/Bradley are projected to operate at LOS D or better with the addition of both the residential and commercial generated trips.

By 2040 it was assumed that the section of Bradley Road between Goldfield Drive and Powers Boulevard would be constructed. It was also assumed that Powers Boulevard would be widened

to provide three through lanes in each direction by 2040. Based on the 2040 total traffic volumes shown and the lane geometry shown in Figure 16, 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 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 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.

Full-Movement Site Access/Bradley

The northbound left-turn movement at the full-movement intersection to Bradley Road is projected to operate at LOS F during the peak hours if this intersection is two-way stop-sign controlled. If this intersection is signalized, all movements are projected to operate at LOS D or better during the peak hours based on the existing plus residential generated traffic, existing plus buildout site-generated traffic, and 2040 total traffic volumes.

Right-in/Right-out Site Access/Bradley

All movements at the proposed right-in/right-out site access to Bradley Road are projected to operate at LOS C or better during the peak hours based on the projected existing plus residential generated traffic, existing plus buildout site-generated traffic, and 2040 total traffic volumes.

“A” Street/“K” Street

The intersection of the north/south Non-Residential Urban Collector (“A” Street) and the east/west Non-Residential Urban Collector (“K” Street) is proposed to be constructed as a modern one-lane roundabout. All movements at this intersection are projected to operate at LOS A during the peak hours based on the projected existing plus residential generated traffic, existing plus buildout site-generated traffic, and 2040 total traffic volumes.

Commercial Site Access Points

The commercial site access points to the Urban Non-Residential Collector streets within the Springs at Waterview East Preliminary Plan area are projected to operate at LOS B or better for all movements during the peak hours as stop-sign-controlled intersections.

VEHICLE QUEUING ANALYSIS

A queuing analysis was performed using Synchro/SimTraffic to determine if the proposed intersection spacing will be sufficient to accommodate the projected queues based on the total traffic volumes. The 2040 total afternoon peak-hour traffic volumes were entered into the Synchro model. The simulation was run five times. The queuing reports are attached.

Figure 3 shows the preliminary lane concept for the street segments north and east of the proposed roundabout. This figure identifies the preliminary stacking lengths for the northbound left-turn lanes on “A” Street approaching Bradley Road and on eastbound “C” Street approaching the retail access.

The projected maximum northbound left-turn queue on “A” Street approaching Bradley Road is 204 feet during the afternoon peak hour.

The projected maximum eastbound left-turn queue on “C” Street approaching the retail access just east of “A” Street is 31 feet during the afternoon peak hour.

TRAFFIC SIGNAL WARRANT ANALYSIS

The full-movement intersection to Bradley Road was analyzed to determine when either an Eight-Hour or a Four-Hour Vehicular Volume Traffic Signal Warrant would be met or be close to being met. The lower threshold volume for an Eight-Hour Vehicular Volume Traffic Signal Warrant for Condition B - Interruption of Continuous Traffic for a major street with two or more lanes and a posted speed limit greater than 40 mph and a minor street approach with one lane is 53 vehicles per hour. This lower threshold is applicable when the major street volumes (northbound and southbound left, through, and right movements) exceeds 630 vehicles per hour. The lower threshold volume for a Four-Hour Vehicular Volume Traffic Signal Warrant for a major street with two or more lanes and a posted speed limit greater than 40 mph and a minor street approach with one lane is 60 vehicles per hour. This lower threshold is applicable when the major street volumes (northbound and southbound left, through, and right movements) exceeds 1,000 vehicles per hour. The existing through volumes on Bradley Road adjacent to the site currently exceeds 1,000 vehicles per hour during both the morning and afternoon peak hours.

Table 2 shows the existing and the projected site-generated traffic volumes. The off-peak through volumes on Bradley Road were estimated based on 24-hour counts conducted by CDOT on Powers Boulevard just south of Bradley Road. The off-peak site-generated volumes were based on the short-term site-generated traffic volumes shown in Figures 10 and 12 and the hourly variation data found in *Trip Generation, 10th Edition* by the Institute of Transportation Engineers (ITE).

Detailed analyses are presented in Table 3. Table 3 shows that a Four-Hour Vehicular Volume Traffic Signal Warrant is projected to be met once about 34 percent of the residential portion of the site is developed (about 242 dwelling units). If the retail portion of the site is developed first an Eight-Hour Vehicular Volume Traffic Signal Warrant is projected to be met once about 23 percent of the commercial area is built out. A traffic signal warrant may be met earlier if the residential and commercial parcels are developed concurrently. The satisfaction of warrants does not indicate that a signal must be installed. The decision to require a signal to be installed at this location rests with the County.

TRAFFIC SIGNAL ESCROW PERCENTAGES/AMOUNTS

Table 4 shows the projected total traffic volumes on the minor approach volumes at the intersection of "A" Street and Bradley Road by development based on the 2040 total traffic volumes (from Figure 16). The minor approach volumes were assumed to include the northbound and southbound left-turn and through movements. As shown in Table 4, the residential portion of the Springs at Waterview East development is projected to contribute about 32.8 percent of the traffic on the northbound and southbound approaches at this intersection. The commercial portion of the Springs at Waterview East development is projected to contribute about 23.2 percent of the traffic on the northbound and southbound approaches at this intersection. Assuming a total signal cost of \$500,000, a fair share contribution towards a future signal at this intersection would be \$163,883.09 for the residential portion (\$230.17 per dwelling unit) and \$114,866.39 for the commercial portion. Table 5 presents a template that should be used with each final plat for keeping track of the running escrow amount. If an IGA is established between the County and the Waterview II Metro District, whereby the district is responsible for signal installation once warranted/directed by the County Public Works Department, escrow of funds may not be necessary. It is our understanding that the intent is to have the district responsible for the collecting fees and mills and the signal installation.

Should a traffic signal be installed prior to the development of the parcel north of Bradley Road the Springs at Waterview East would be responsible for the entire cost of the signal. Table 4 shows the fair share contribution for the commercial and residential portions of The Springs at Waterview assuming no development north of Bradley Road. The developers could potentially then file for cost recovery with the County against that parcel(s) to the north, so they would provide fair share reimbursement for their relative impact on the intersection and benefit from the signal. If an IGA is established between the County and the Waterview II Metro District, whereby the district is responsible for signal installation once warranted/directed by the County Public Works Department, cost recovery may not apply as the property on the north side of Bradley Road would be in the district as well.

ROADWAY CLASSIFICATIONS

Figure 17 shows the recommended street classification for all streets within the Springs at Waterview East Preliminary Plan based on the projected 2040 weekday traffic volumes shown in Figure 16.

RECOMMENDED IMPROVEMENTS

- Table 6 contains a summary of the needed improvements.
- Table 7 contains a summary of the auxiliary turn lanes required at the intersections of Powers/Bradley and "A" Street/Bradley based on the criteria contained in the ECM and the *Colorado State Highway Access Code*. Deviations to the ECM will be submitted for the shortened continuous right-turn acceleration lane on Bradley Road between Powers

Boulevard and "A" Street and for shortened northbound left-turn lanes on "A" Street approaching Bradley Road. Deviation requests will likely be needed for the back-to-back left-turn lanes between Powers Boulevard and Bradley Road and for a continuous westbound right-turn acceleration/deceleration lane between these two intersections with the development of the parcel(s) to the north. Improvements that may be needed to Powers Boulevard/Bradley Road to be in compliance with the ECM include widening to provide dual southbound left-turn lanes.

- Figures 18 and 19 present to-scale conceptual lane exhibits for Bradley Road adjacent to the site. These exhibits have been prepared to depict the recommended short- and long-term auxiliary turn lane and center median configuration at the full-movement access point and between this access and Powers.
- Figure 3 shows the preliminary lane concept for the street segments north and east of the proposed roundabout. This figure identifies the preliminary stacking lengths for the northbound left-turn lanes on "A" Street approaching Bradley Road and on eastbound "C" Street approaching the retail access.
- Based on the criteria contained in the ECM, an eastbound right-turn deceleration lane would be required on Bradley Road approaching the full-movement site access point with the addition of the site-generated traffic due to the residential portion of the Springs at Waterview East. The northbound right-turn lane on Powers at Bradley Road is currently a channelized right-turn lane into an acceleration lane on eastbound Bradley Road. Figure 18 shows no changes to this current configuration except the right-turn acceleration lane would end as an eastbound right-turn lane at the proposed site access instead of the current transition taper.
- Based on the criteria contained in the ECM, an eastbound right-turn deceleration lane would be required on Bradley Road approaching the right-in/right-out site access point with the addition of the site-generated traffic due to the residential portion of the Springs at Waterview East. Although the ECM generally does not require right-turn acceleration lanes on Minor Arterial, LSC recommends a continuous right-turn acceleration/deceleration lane be constructed on Bradley Road between the full-movement and right-in/right-out site access points.
- Based on the criteria contained in the ECM a westbound left-turn lane would be required on Bradley Road approaching the full-movement site access point with the addition of the site-generated traffic due to the residential portion of the Springs at Waterview East. Based on the posted speed limit of 50 miles per hour and the projected 2040 total traffic volumes, this lane should be 495 feet (235 feet of deceleration length plus 260 feet of storage) plus a 200-foot taper.
- **Commercial Site Access Auxiliary Turn Lane Requirements:** Left-turn lanes at the commercial access points will be provided as the Non-Residential Collector cross section includes a

striped, center, two-way left-turn lane (TWLTL). The taper for the eastbound left-turn lane for the east commercial access on "C" Street would be shorter than the ECM standard length. This taper is proposed to be a reverse-curve-type taper of approximately 90 feet. The stacking distance would be included within the standard 155-foot deceleration distance. A deviation is being submitted for this. A right-turn lane will be required at the central/main commercial access west of the roundabout. A right-turn lane will not be required at the commercial access east of the roundabout.


- **County Road Impact Fee Program:** This residential portion of this project will be required to participate in the El Paso County Road Improvement Fee Program. The Springs at Waterview East is likely to join the ten-mil PID, however this has yet to be determined. A final determination will be at the final plat stage the ten-mil PID building permit fee portion associated with this option is \$923 per single-family dwelling unit. Based on 714 lots, the total building permit fee would be \$659,022.
- **Improvements Relative to the current MTCP:** The 2040 MTCP does not call for any improvement projects in the immediate vicinity of the site except for the Bradley Road extension west of Powers Boulevard. Although this project would not be responsible for that improvement, this is addressed in the improvements table. No improvements identified herein would be reimbursable through the MTCP-based Roadway Improvements program.
- **Special Districts:** This project will be part of the Waterview II Metropolitan District

* * * * *

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

Sincerely,

LSC TRANSPORTATION CONSULTANTS, INC.

By 
Jeffrey C. Hodsdon, P.E., PTOE
Principal

JCH:KDF:bjwb

Enclosures: Tables 2-7
Figures 1-19
Approved Deviation Forms
Traffic Count Reports
Level of Service Reports

Table 2
Trip Generation Estimate
Springs at Waterview East Preliminary Plan

Land Use Code	Land Use Description	Trip Generation Units	Trip Generation Rates ⁽¹⁾						Total Future Trips Generated					Internal Trips	Total External Future Trips Generated					Pass-by Trip Percent ⁽²⁾	Total Future "External" Trips Generated	
			Average Weekday Traffic	Morning		Afternoon		Average Weekday Traffic	Morning		Afternoon		Average Weekday Traffic		Morning		Afternoon		Average Weekday			
				In	Out	In	Out		In	Out	In	Out			In	Out						
Trip Generation Estimate Based on The Currently Proposed Preliminary Plan																						
820	Shopping Center	148	KSF ⁽³⁾	53.03	0.95	0.58	2.36	2.55	7,849	140	86	349	378	2%	7,692	137	84	342	370	34%	5,077	
210	Single-Family Detached Housing	714	DU ⁽⁴⁾	9.44	0.19	0.56	0.62	0.37	6,740	132	396	445	262	2%	6,583	130	393	437	255	0%	6,583	
									14,589	272	482	794	639		14,275	267	477	779	624		11,660	
Trip Generation Estimate From The Waterview Sketch Plan Updated Master Traffic Impact Study by LSC January 9, 2018																						
820	Shopping Center	148	KSF	59.20	0.83	0.51	2.53	2.85	8,762	123	75	374	422	0%	8,762	123	75	374	422	34%	5,783	
495	Recreational Community Center	33	KSF	33.82	1.35	0.70	1.34	1.40	1,116	45	23	44	46	50%	558	23	11	22	23	0%	558	
210	Single-Family Detached Housing	865	DU	9.52	0.19	0.56	0.63	0.37	8,235	162	487	545	320	⁽⁵⁾	7,354	99	403	503	280	0%	7,354	
520	Elementary School	500	Students	1.29	0.25	0.20	0.07	0.08	645	124	101	37	38	50%	322	62	50	19	19	0%	322	
									18,758	453	686	1,000	826		16,996	306	539	918	744		14,017	
Change In Trip Generation Estimate									-4,169	-181	-204	-206	-187		-2,721	-39	-62	-139	-120		-2,357	

Notes:

(1) Source: based on *Trip Generation* , 10th Edition, 2017 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) DU = dwelling unit

(5) Residential were balanced with estimated internal trips to and from the school and recreation center

Source: LSC Transportation Consultants, Inc.

<p style="text-align: center;">Table 3 Waterview Sketch Plan Traffic Signal Warrant Analysis of Full-Movement Site Access to Bradley Road</p>

Period	2 or More Lanes on Major Approach & 1 Lane on Minor Approach																													
	Traffic Volumes														Warrant 1, Eight Hour Vehicular Volume Evaluation								Warrant 2, Four Hour Vehicular Volume Evaluation							
Hour															Warrant Threshold Met?								Existing + 34% Buildout of Residential				Existing + 23% Buildout of Retail			
	Existing ⁽¹⁾		Added by 100% Buildout of Residential		Added by 34% Buildout of Residential		Added by 100% Buildout of Retail		Added by 23% Buildout Retail		Existing + 34% Buildout of Residential		Existing + 23% Buildout of Retail		Warrant Thresholds		Existing + 34% Buildout of Residential		Existing + 23% Buildout of Retail		Minor Street Minimum		Met?							
	Major ⁽²⁾	Minor ⁽³⁾	Major	Minor	Major	Minor	Major	Minor	Major	Minor	Major	Minor	Major	Minor	Major	Minor	Major	Minor	A 70%	B 70%	A 70%	B 70%	Minor Street Minimum	Met?	Minor Street Minimum	Met?				
6:00 AM	1002	0	67	147	23	50	16	9	4	2	1025	50	1006	2	420	105	630	53	No	No	No	No	60	No	60	No				
7:00 AM	1237	0	118	260	40	88	90	49	21	11	1277	88	1258	11	420	105	630	53	No	Yes	No	No	60	Yes	60	No				
8:00 AM	1098	0	110	240	37	82	163	89	37	20	1135	82	1135	20	420	105	630	53	No	Yes	No	No	60	Yes	60	No				
9:00 AM	866	0	76	167	26	57	293	159	67	37	892	57	933	37	420	105	630	53	No	Yes	No	No	66	No	63	No				
10:00 AM	884	0	85	186	29	63	456	248	105	57	913	63	989	57	420	105	630	53	No	Yes	No	Yes	64	No	61	No				
11:00 AM	1039	0	92	202	31	69	676	368	155	85	1070	69	1194	85	420	105	630	53	No	Yes	No	Yes	60	Yes	60	Yes				
12:00 Noon	824	0	266	111	90	38	290	287	67	66	914	38	891	66	420	105	630	53	No	No	No	Yes	64	No	66	No				
1:00 PM	789	0	291	121	99	41	270	267	62	61	888	41	851	61	420	105	630	53	No	No	No	Yes	67	No	72	No				
2:00 PM	792	0	320	133	109	45	261	258	60	59	901	45	852	59	420	105	630	53	No	No	No	Yes	65	No	72	No				
3:00 PM	949	0	349	145	119	49	255	253	59	58	1068	49	1008	58	420	105	630	53	No	No	No	Yes	60	No	60	No				
4:00 PM	1165	0	436	181	148	62	267	264	61	61	1313	62	1226	61	420	105	630	53	No	Yes	No	Yes	60	Yes	60	Yes				
5:00 PM	1222	0	426	177	145	60	270	267	62	61	1367	60	1284	61	420	105	630	53	No	Yes	No	Yes	60	No	60	Yes				
6:00 PM	995	0	349	145	119	49	232	230	53	53	1114	49	1048	53	420	105	630	53	No	No	No	No	60	No	60	No				
																			0	7	0	8		4	3					
																			No	No	No	Yes		Yes	No					

Notes:

- (1) Hourly variation based on traffic counts on Powers Boulevard south of Bradley Road
- (2) The major street volumes include all (left/through/right) movements on Bradley Rd
- (3) The minor street volumes includes only the northbound left movement

Source: LSC Transportation Consultants, Inc.

Table 4
"A" Street and Bradley Road Signal Escrow Analysis
Springs at Waterview East

Development	Minor Approach Volume ⁽¹⁾			Signal Escrow Amounts	
	AM	PM	Fair Share	Escrow of \$500,000	Portion of Total Escrow Per DU ⁽²⁾
Based on Projected 2040 Total Traffic Volumes					
Springs at Waterview East Residential	189	125	32.8%	\$163,883.09	\$230.17
Springs at Waterview East Commercial	46	176	23.2%	\$115,866.39	---
Background	90	332	44.1%	\$220,250.52	---
\$500,000					
Based on 2040 Total Traffic Assuming No Development of the Parcel(s) North of Bradley					
Springs at Waterview East Residential	189	125	58.6%	\$292,910.45	\$411.39
Springs at Waterview East Commercial	46	176	41.4%	\$207,089.55	---
\$500,000					
Notes:					
(1) Minor approach volume includes northbound and southbound left-turn and through movements					
(2) DU = dwelling unit					
Source: LSC Transportation Consultants, Inc.					

Table 5 Running Escrow Analysis Template Bradley Road and "A" Street Springs at Waterview East				
Subdivisions Currently Proposed			Signal Escrow Amounts (Portion of Total Escrow of \$279,749.48 ⁽¹⁾)	
Subdivision Name	Number of Residential Lots or Acres of Commercial Development	Status	Escrow Per Lot or Acre	Total Escrow
Residential				
Residential Filing 1	100	Example only	\$230.17	\$23,017.29
Future Residential	614	Future	\$230.17	\$141,326.15
Total Residential Escrow				\$164,343.44
Commercial				
Commercial Filing 1	10	Example only	\$4,456.40	\$44,564.00
Future Commercial	16	Future	\$4,456.40	\$71,302.39
Total Commercial Escrow				\$115,866.39
Total Springs at Waterview East Escrow				\$280,209.83
Notes: (1) See Table 4				
Source: LSC Transportation Consultants, Inc., May 19,2018				

Table 6 Improvements Table Springs at Waterview East Preliminary Plan		
Improvement	Timing /"Trigger Point(s)"	Responsibility ⁽¹⁾
Access Points to Bradley Road		
Full-movement access to Bradley Road 1,030 feet east of Powers Boulevard	With development of either the residential or commercial portion of the Springs at Waterview East	Applicant
Right-in/right-out access 1,300 feet east of the full-movement access	This access would be constructed with the adjacent portion of the residential subdivision or it may be required to provide a second access if a connection east to Bradley Heights (City development) is not available.	Applicant
Traffic Signal		
Traffic Signal Escrow - Prorated escrow amount with each final plat toward the planned traffic signal at the full-movement access to Bradley Road 1,030 feet east of Powers Boulevard	Not necessary if an IGA between the County and the Waterview 2 Metro District is established and the district becomes responsible for signal installation when warranted/directed by the County PWD. Otherwise, an escrow amount would be payable with each residential and commercial final plat	Waterview II Metropolitan District
Traffic Signal Installation - Installation of the traffic signal at the full-movement access to Bradley Road 1,030 feet east of Powers Boulevard. Any funds held in escrow would be returned to the applicant.	As determined by El Paso County Public Works - 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 El Paso County Public Works. The estimated timing based on the traffic volumes projected in this report is as follows: With either development of 34% of the residential portion of Springs at Waterview East (242 DUs) or development of about 23% of the commercial portion of Springs at Waterview East. These trigger points/timing estimates and the need for the signal are subject to change and would be evaluated with each final plat application. County public works approval is required for signal installation.	Waterview II Metropolitan District.
Auxiliary Turn Lanes		
Eastbound right-turn deceleration lane on Bradley Road approaching "A Street"- the full-movement site access	With initial development/final plat of either the residential or commercial portion of the Springs at Waterview East. The trigger is a westbound left-turn volume of 25 vehicles per hour.	Applicant
Westbound left-turn lane on Bradley Road approaching the full-movement site access	With initial development/final plat of either the residential or commercial portion of the Springs at Waterview East. The trigger is a westbound left-turn volume of 10 vehicles per hour.	Applicant
Eastbound right-turn acceleration lanes on Bradley Road in the form of continuous accel/decel lanes between "A Street" and the right-in/right-out site access and between the right-in/right-out site access and the city access point to the east.	With the applicable final plat of either the residential or commercial portion of the Springs at Waterview East which results in the turn lane threshold to be exceeded (as determined by final plat traffic reports). The threshold is a northbound right-turn volume of 50 vehicles per hour.	Applicant
Eastbound right-turn deceleration lane on Bradley Road approaching the right-in/right-out access	With development of the residential portion of the Springs at Waterview East (Parcel P-18) OR if the access is required for a secondary access and the right turning volume would exceed 25 vehicles per hour.	Applicant
Westbound left-turn lane on Bradley Road approaching the full-movement site access	With initial development/final plat of either the residential or commercial portion of the Springs at Waterview East. The trigger is a westbound left-turn volume of 10 vehicles per hour.	Applicant
Restripe Bradley Road for dual westbound left-turn lanes approaching Powers Boulevard	With development of the commercial portion of Springs at Waterview East	Applicant
Restripe Powers Boulevard for dual southbound left-turn lanes approaching Bradley Road	With development of the commercial portion of Springs at Waterview East if not completed by other development(s) or CDOT. The timing of this improvement could be evaluated with each final plat.	Likely the commercial portion of Springs at Waterview East if not completed by other development(s) or CDOT.
Street Widening/Construction		
Construct Bradley Road between Goldfield Drive and Powers Boulevard. This would include intersection modifications at the Powers/Bradley intersection associated with conversion of this intersection from a three-leg to a four-leg intersection.	Future with development of the Waterview parcel northwest of Powers/Bradley or by El Paso County/PPRTA ⁽²⁾ if that parcel is not developed. The 2040 MTCP shows the roadway segment constructed.	The developer of the Waterview parcel northwest of Powers/Bradley (if this parcel is developed) or El Paso County/PPRTA if that parcel is not developed.
Notes: (1) Preliminary concept of responsibility; the actual construction responsibility would be determined through subdivision applications and cost recovery if applicable agreements. (2) PPRTA = Pikes Peak Rural Transportation Authority.		
Source: LSC Transportation Consultants, Inc. 5/18/2018		

<p>Table 7</p> <p>Auxiliary Turn Lanes/Speed Change Lanes</p> <p>Springs at Waterview East</p>
--

		CDOT/ECM Standard (ft)				Existing/Proposed (ft)				Difference From Standard (ft)			
		Taper	Acceleration/ Deceleration	Stacking	Total	Taper	Acceleration/ Deceleration	Stacking	Total	Taper	Acceleration/ Deceleration	Stacking	Total
Intersection	Turn Lane	Length	Distance	Distance	Distance	Length	Distance	Distance ⁽¹⁾	Distance	Length	Distance	Distance	Distance
Powers Boulevard/Bradley Road (CDOT)													
	Single Lane	300	700	670	1670	300	700	0	1000	0	0	-670	-670
	Dual Lanes	600	700	335	1635	600	700	335	1635	0	0	0	0
	Northbound Right-Turn Decel. Lane	300	700	---	1000	300	600	---	900	0	-100	---	-100
	Northbound Right-Turn Accel. Lane	300	1170	---	1470	300	430	---	730	0	-740	---	-740
	Westbound Left-Turn Decel. Lane(s)	200	235	265	700	200	235	390	825	0	0	125	125
	Westbound Right-Turn Decel. Lane	200	235	---	435		See Section Below				See Section Below		
Bradley Road													
Westbound Right-Turn Deceleration and Acceleration Lanes													
	Westbound Right-Turn Acceleration Lane from "A" Street	180	760	---	1375	200	480	---	915	0	-280	---	-460
	Westbound Right-Turn Deceleration Lane approaching Powers Boulevard	200	235	---			235	---			0	---	
Eastbound Right-Turn Deceleration and Acceleration Lanes													
	Eastbound Right-Turn Acceleration Lane from Powers Boulevard	200	760	---	1195	200	480	---	915	0	-280	---	-280
	Eastbound Right-Turn Deceleration Lane approaching "A" Street		235	---			235	---		0	0	---	
	Eastbound Right-Turn Acceleration Lane from "A" Street	200	760	---	1195	200	740	---	1175	0	-20	---	-20
	Eastbound Right-Turn Deceleration Lane approaching Right-in/Right-out Access		235	---			235	---		0	0	---	
Left Turn Lane													
	Westbound Left-Turn Decel. Lane approaching "A" Street	200	235	260	695	200	235	260	695	0	0	0	0
"A" Street													
	Northbound Right-Turn Lane	160	155	---	315	160	155	---	315	0	0	---	0
	Northbound Left-Turn Lanes (dual)	160	155	155	470	90		220	310	-70	-90		-160
"C" Street													
	Eastbound Left-Turn Lane at the Commercial Access ⁽²⁾	96 ⁽³⁾	155	31	282	90	155		230-240'	-6	-31		-37

Notes:	
(1) During off-peak periods, any unused stacking length will function as additional deceleration distance.	
(2) The final dimensions of the eastbound left-turn lane on "C" street will be determined with the roundabout design.	
(3) Based on a minimum taper ratio of 8:1 allowed for by the ECM for tangent bay tapers in constrained locations.	

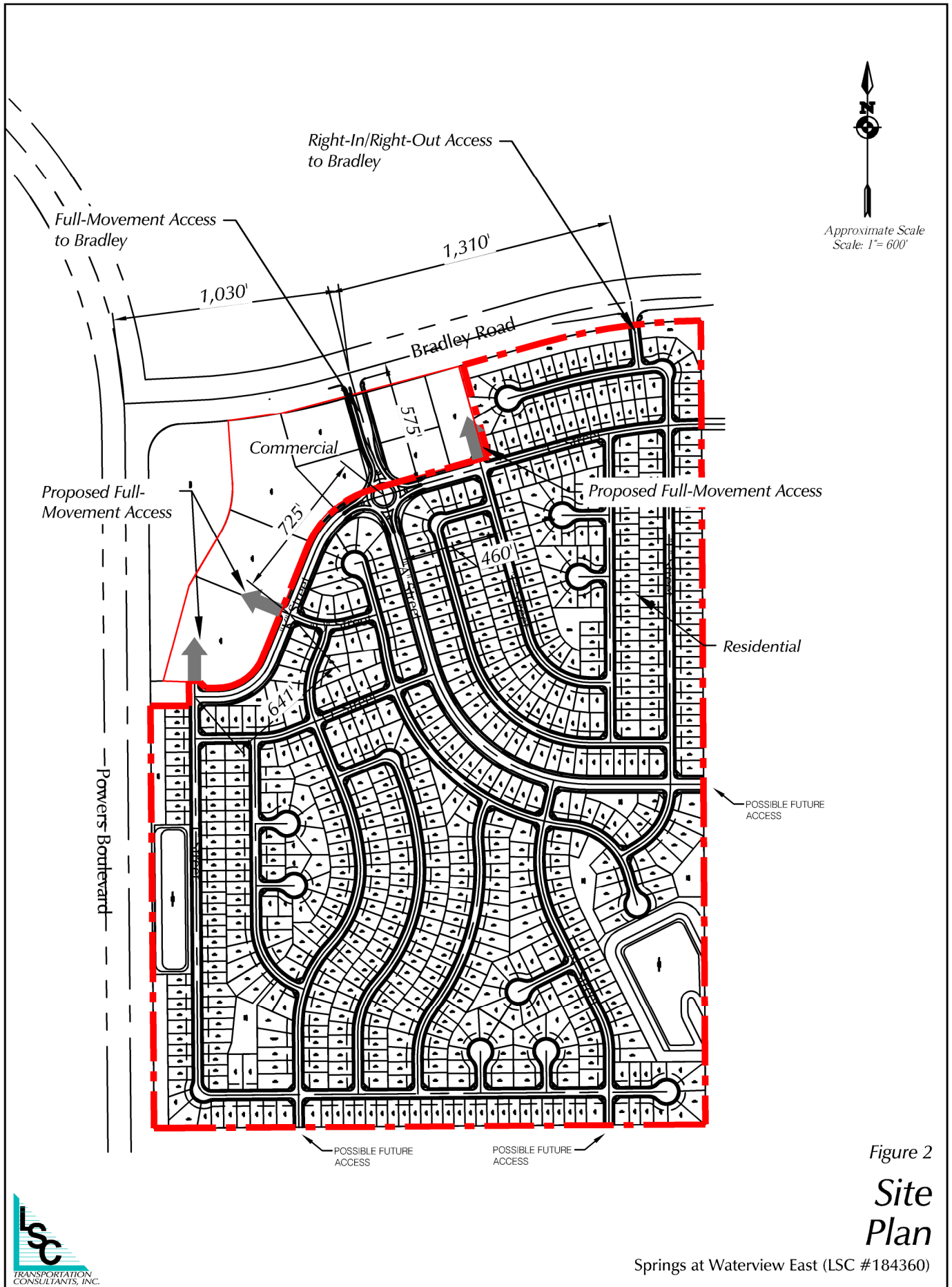
Source: LSC Transportation Consultants, Inc.

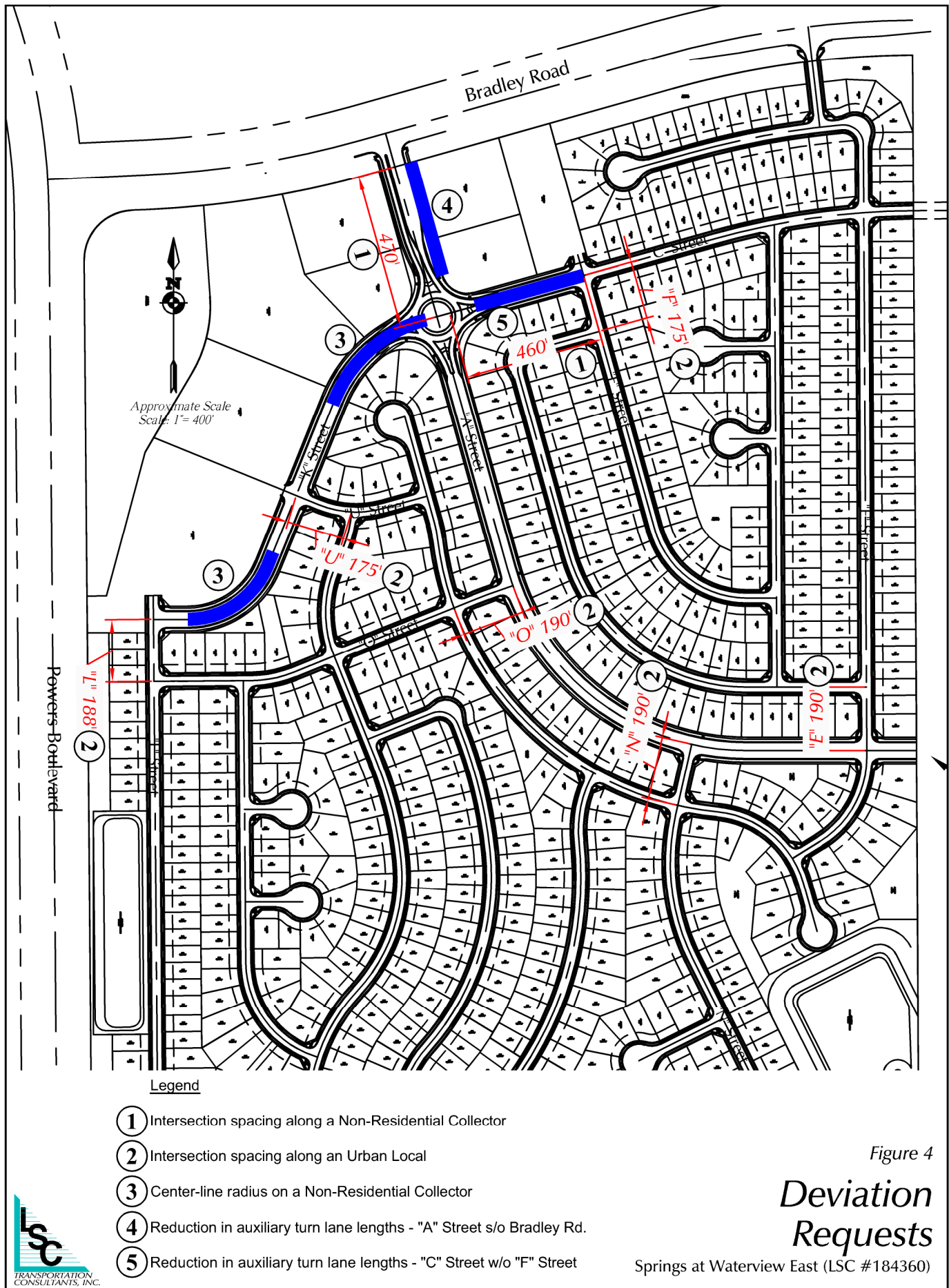


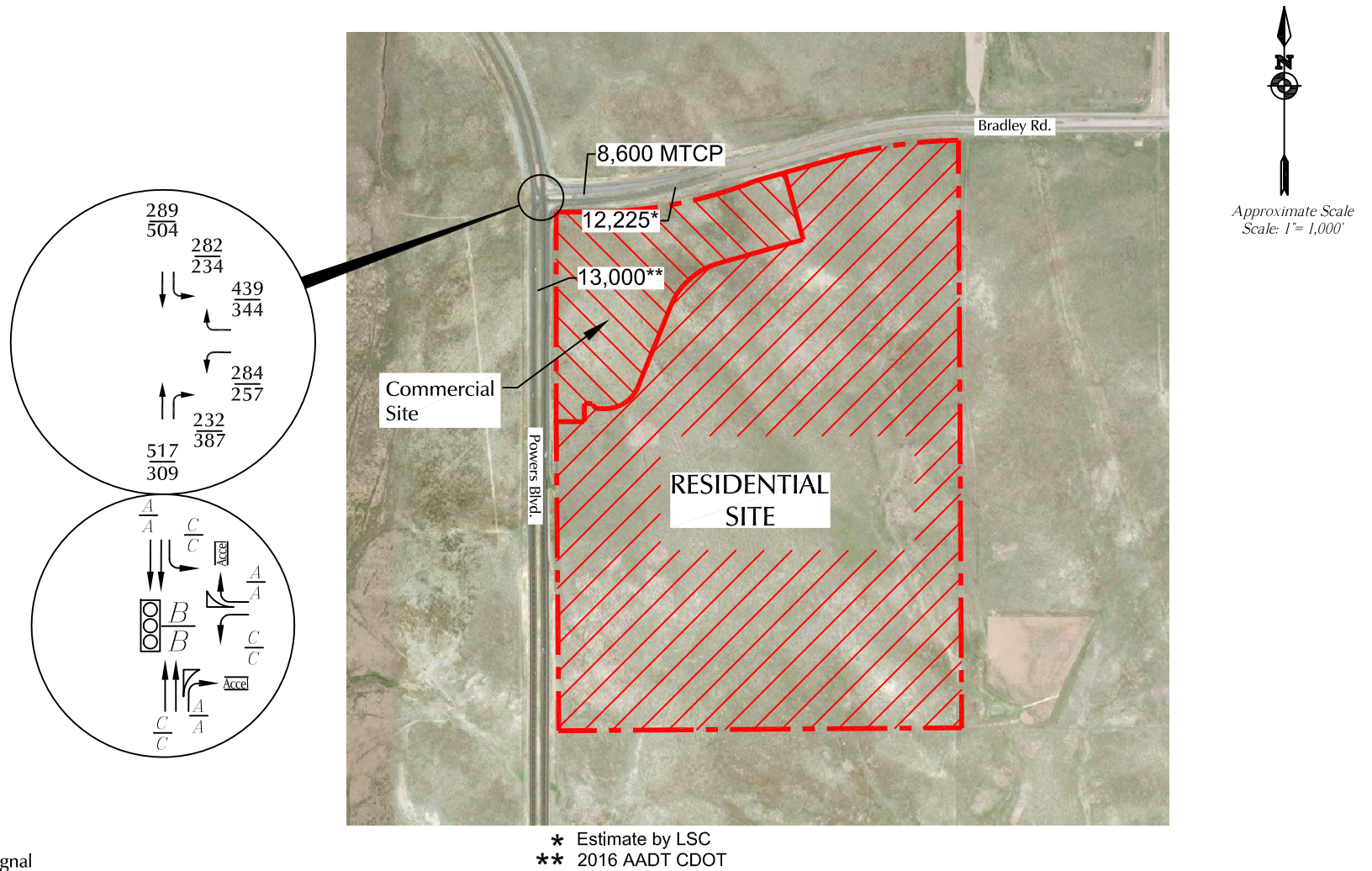
Figure 1

Vicinity Map

Springs at Waterview East (LSC #184360)







LEGEND:



= Traffic Signal

$\frac{XX}{XX}$ = AM Weekday Peak-Hour Traffic (vehicles per hour)
PM Weekday Peak-Hour Traffic (vehicles per hour) Counts by LSC April 2018

$\frac{A}{B}$ = 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 5

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

Springs at Waterview East (LSC #184360)

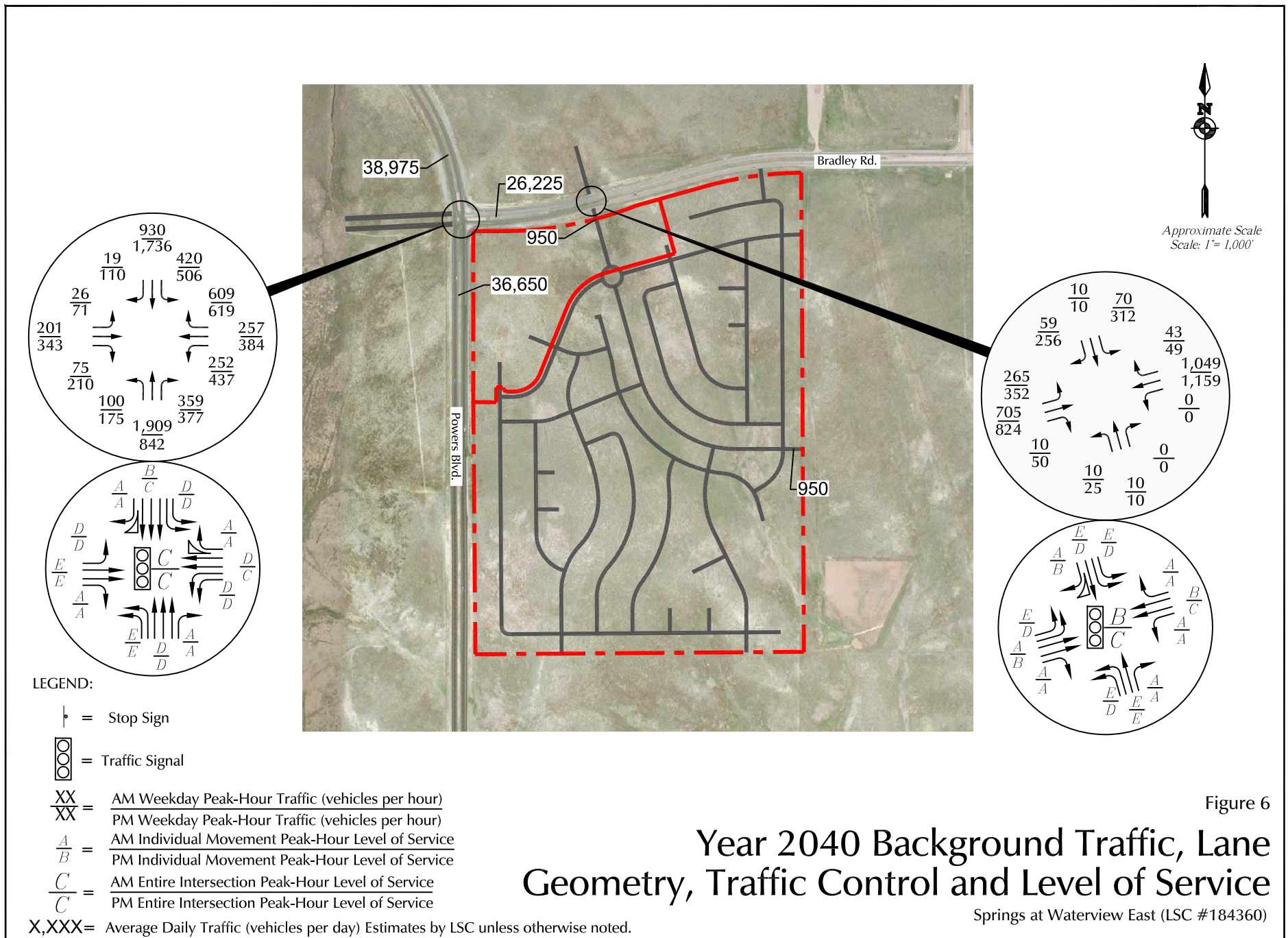
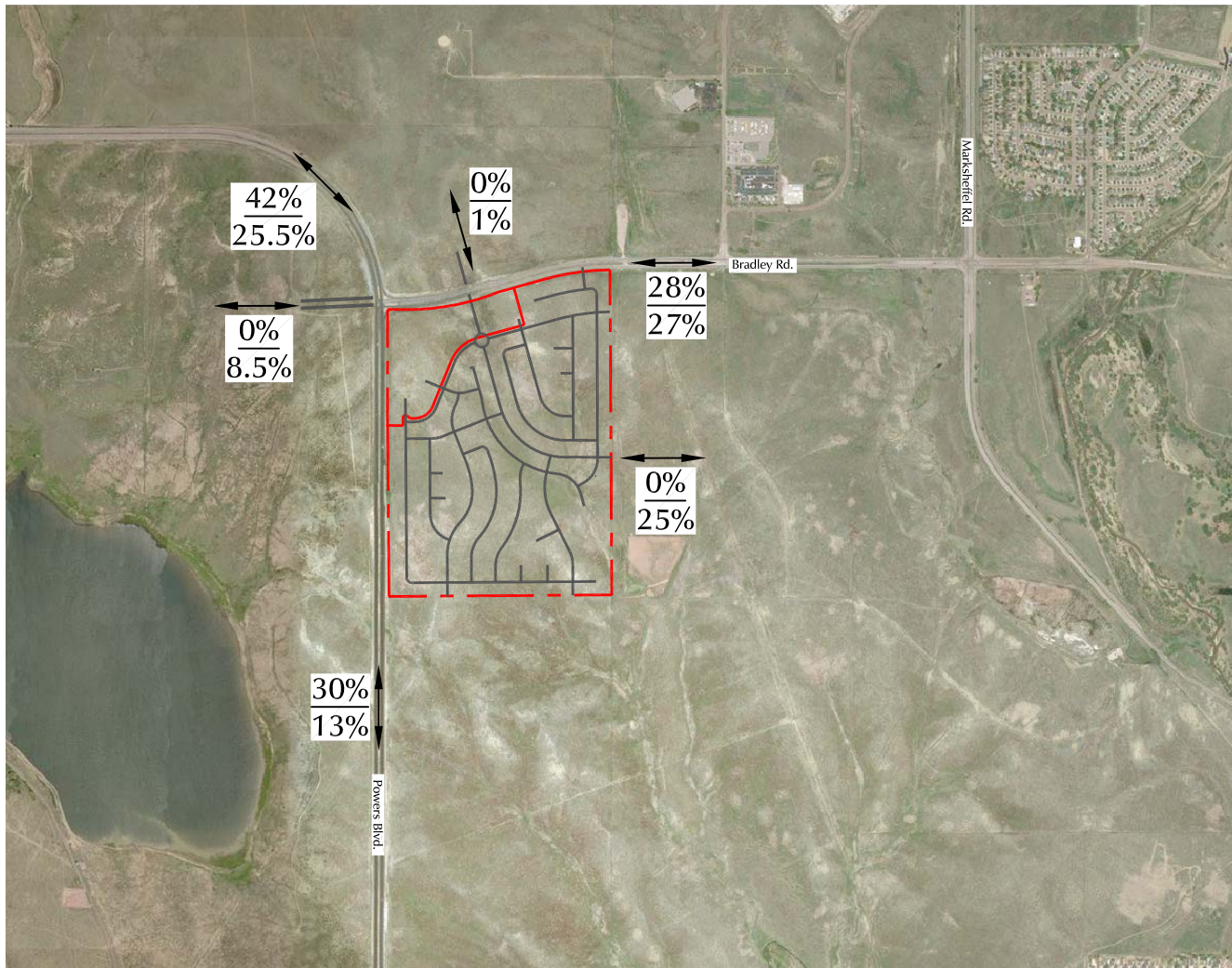


Figure 6
Year 2040 Background Traffic, Lane
Geometry, Traffic Control and Level of Service

Springs at Waterview East (LSC #184360)



Approximate Scale
Scale: 1" = 2,000'

LEGEND:

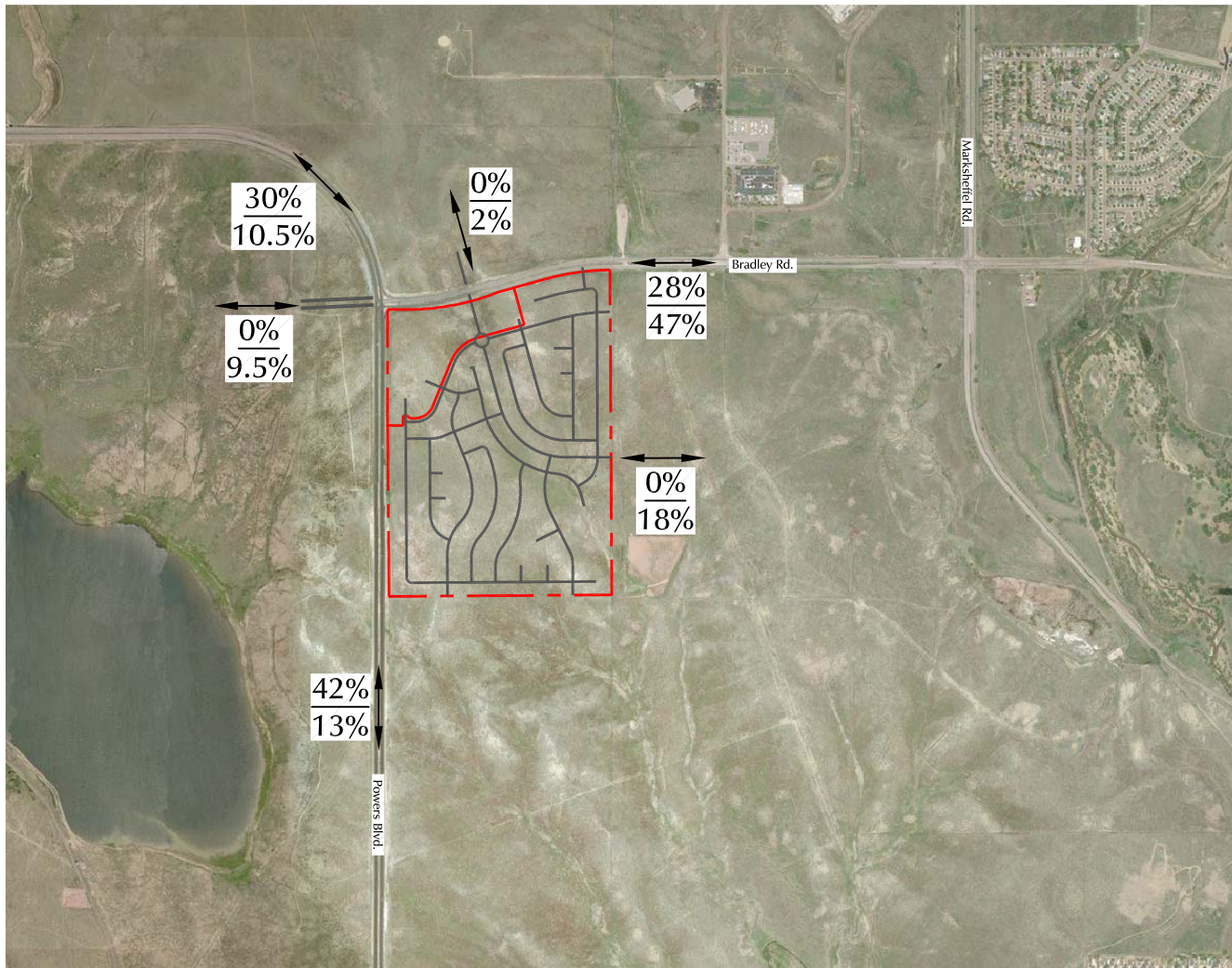
$\frac{XX\%}{XX\%}$
 $\frac{XX\%}{XX\%}$

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

Figure 7

Directional Distribution of Residential Generated Traffic

Springs at Waterview East (LSC #184360)



Approximate Scale
Scale: 1" = 2,000'

LEGEND:

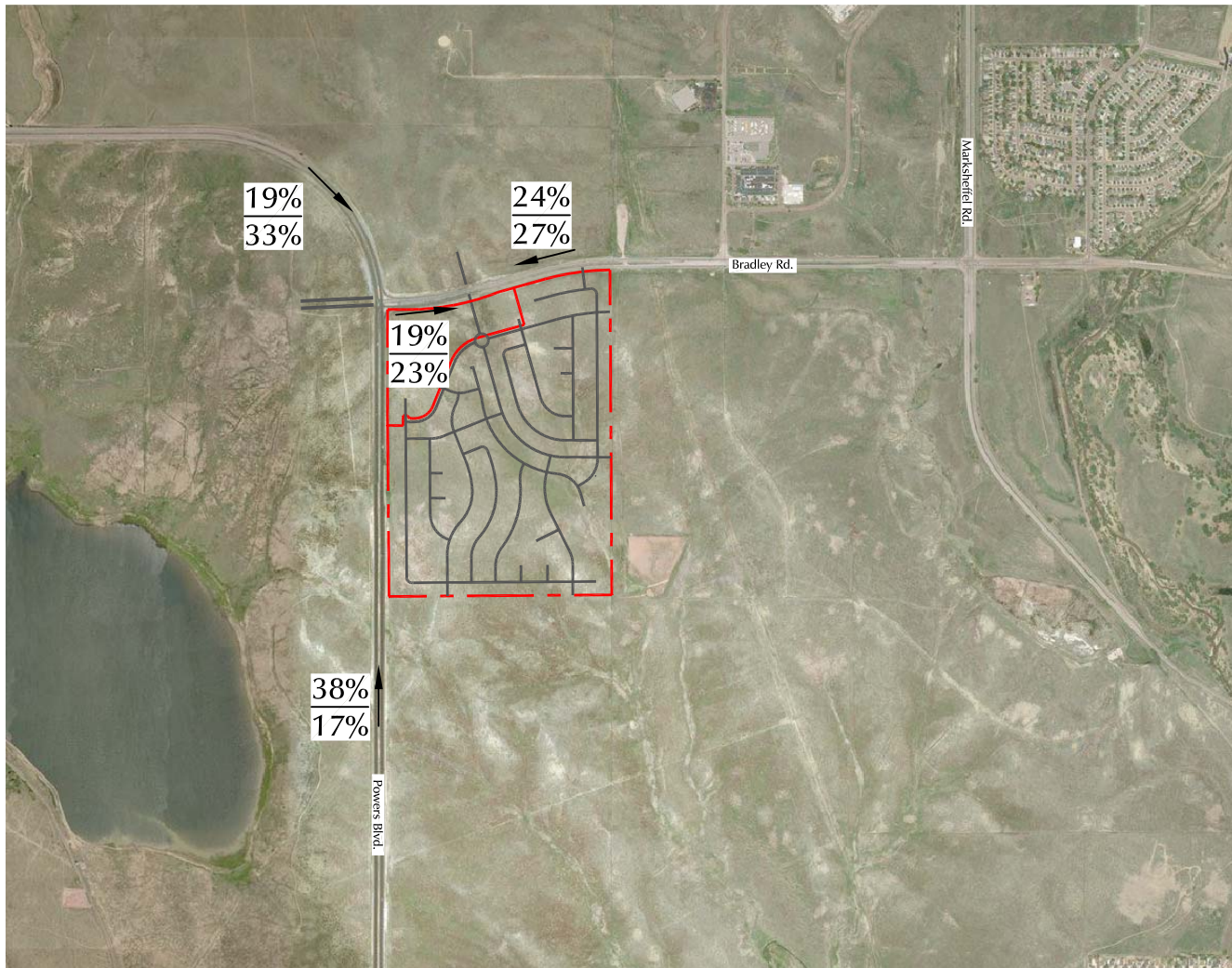
$\frac{XX\%}{XX\%}$
 $\frac{XX\%}{XX\%}$

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

Figure 8

Directional Distribution of Primary Commercial Generated Traffic

Springs at Waterview East (LSC #184360)



LEGEND:

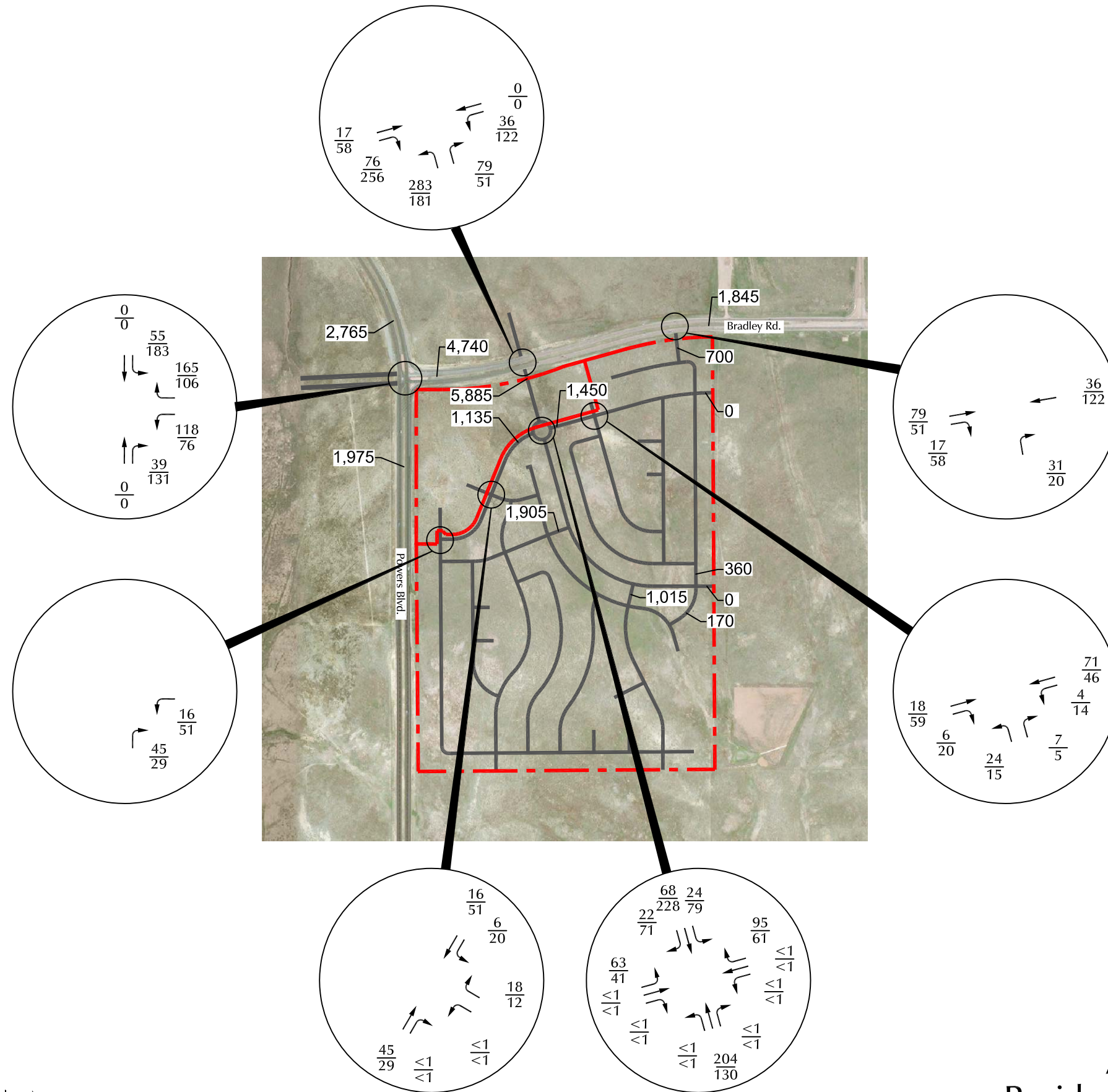
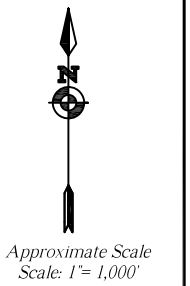
$\frac{XX\%}{XX\%}$

$= \frac{\text{AM Percent Directional Distribution}}{\text{PM Percent Directional Distribution}}$

Directional Distribution of Passby Commercial Generated Traffic

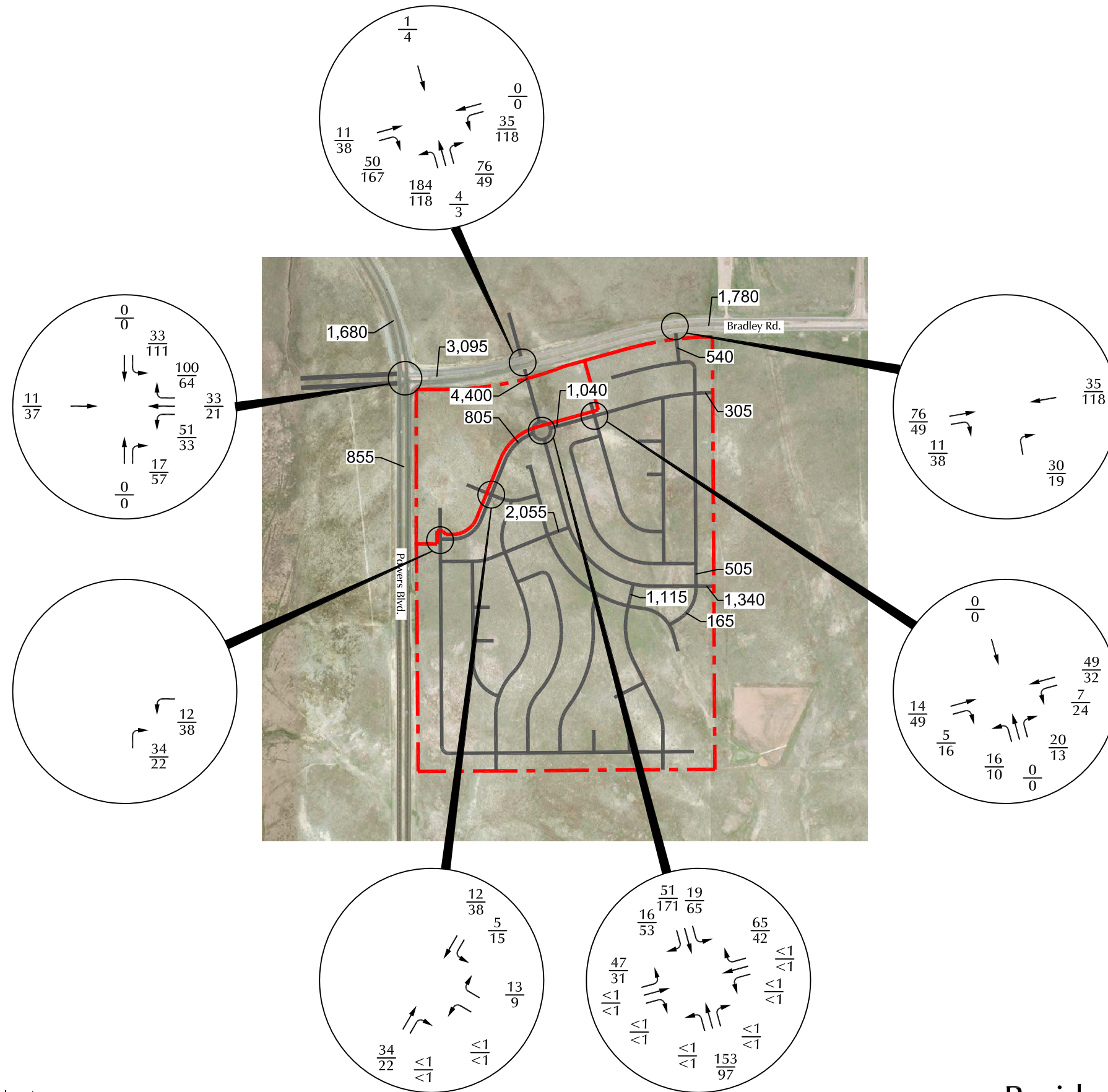
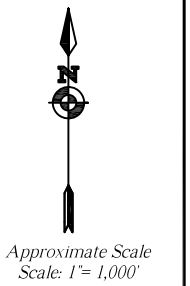
Springs at Waterview East (LSC #184360)

Figure 9



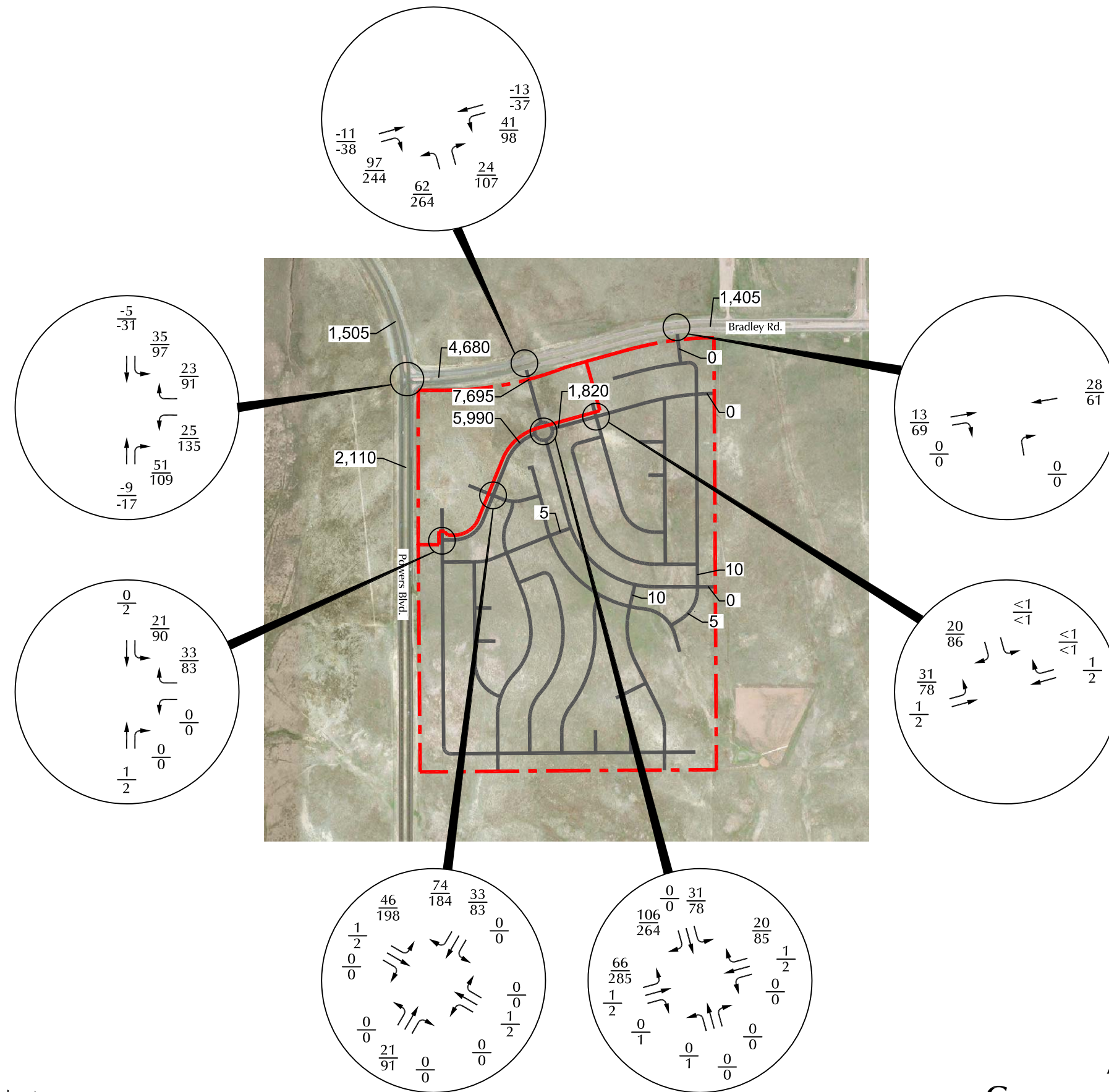
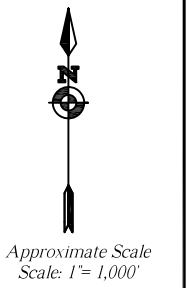
LEGEND:
 $\frac{XX}{XX}$ = AM Weekday Peak-Hour Traffic (vehicles per hour)
 $\frac{XX}{XX}$ = PM Weekday Peak-Hour Traffic (vehicles per hour)
 X,XXX= Average Daily Traffic (vehicles per day)

Figure 10
**Assignment of Short-Term
 Residential Site-Generated Traffic**
 Springs at Waterview East (LSC #184360)



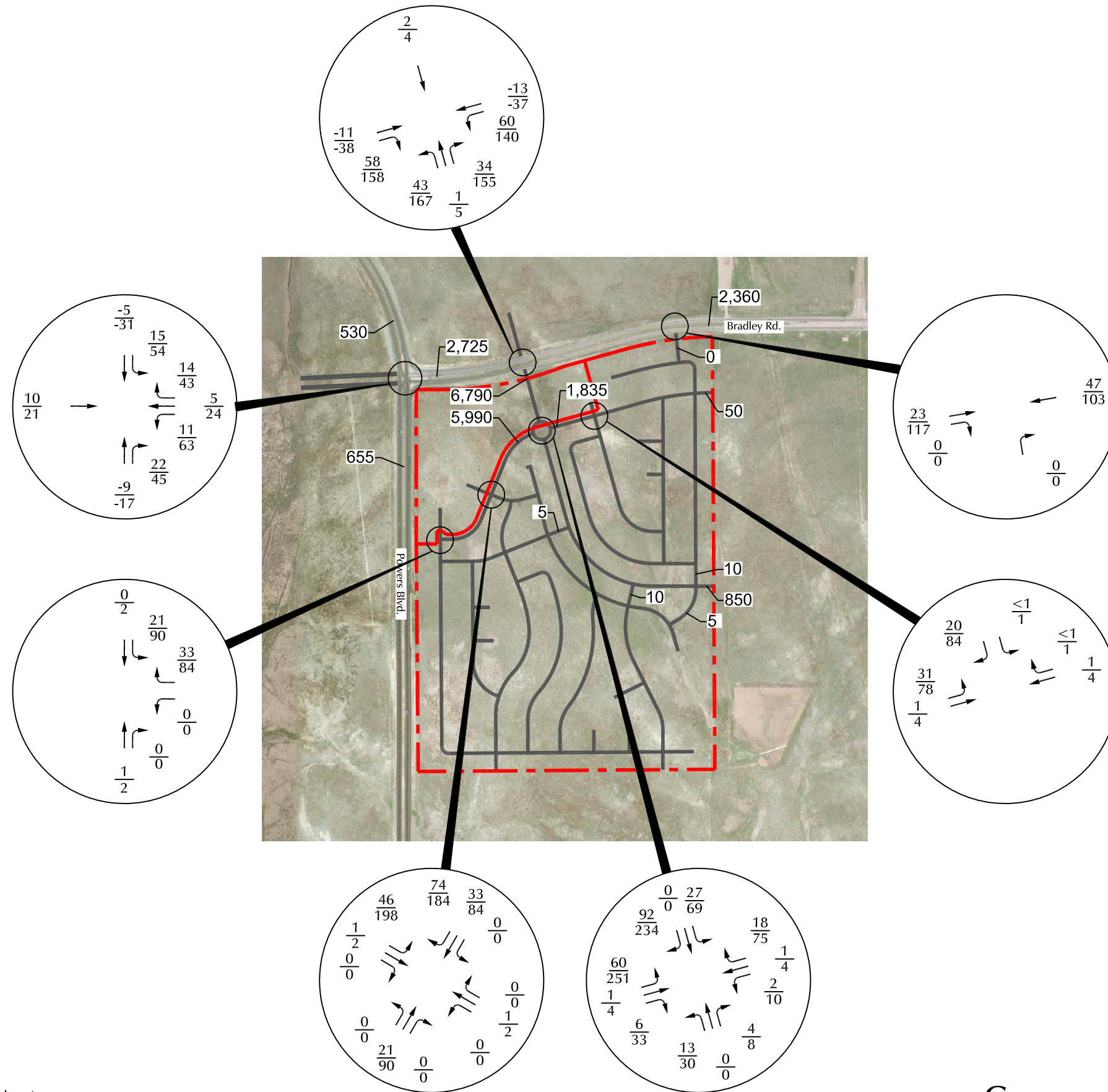
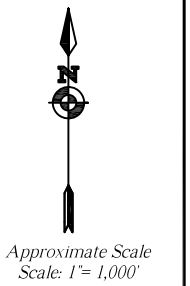
LEGEND:
 $\frac{XX}{XX}$ = AM Weekday Peak-Hour Traffic (vehicles per hour)
 $\frac{XX}{XX}$ = PM Weekday Peak-Hour Traffic (vehicles per hour)
 X,XXX= Average Daily Traffic (vehicles per day)

Figure 11
**Assignment of Long-Term
 Residential Site-Generated Traffic**
 Springs at Waterview East (LSC #184360)



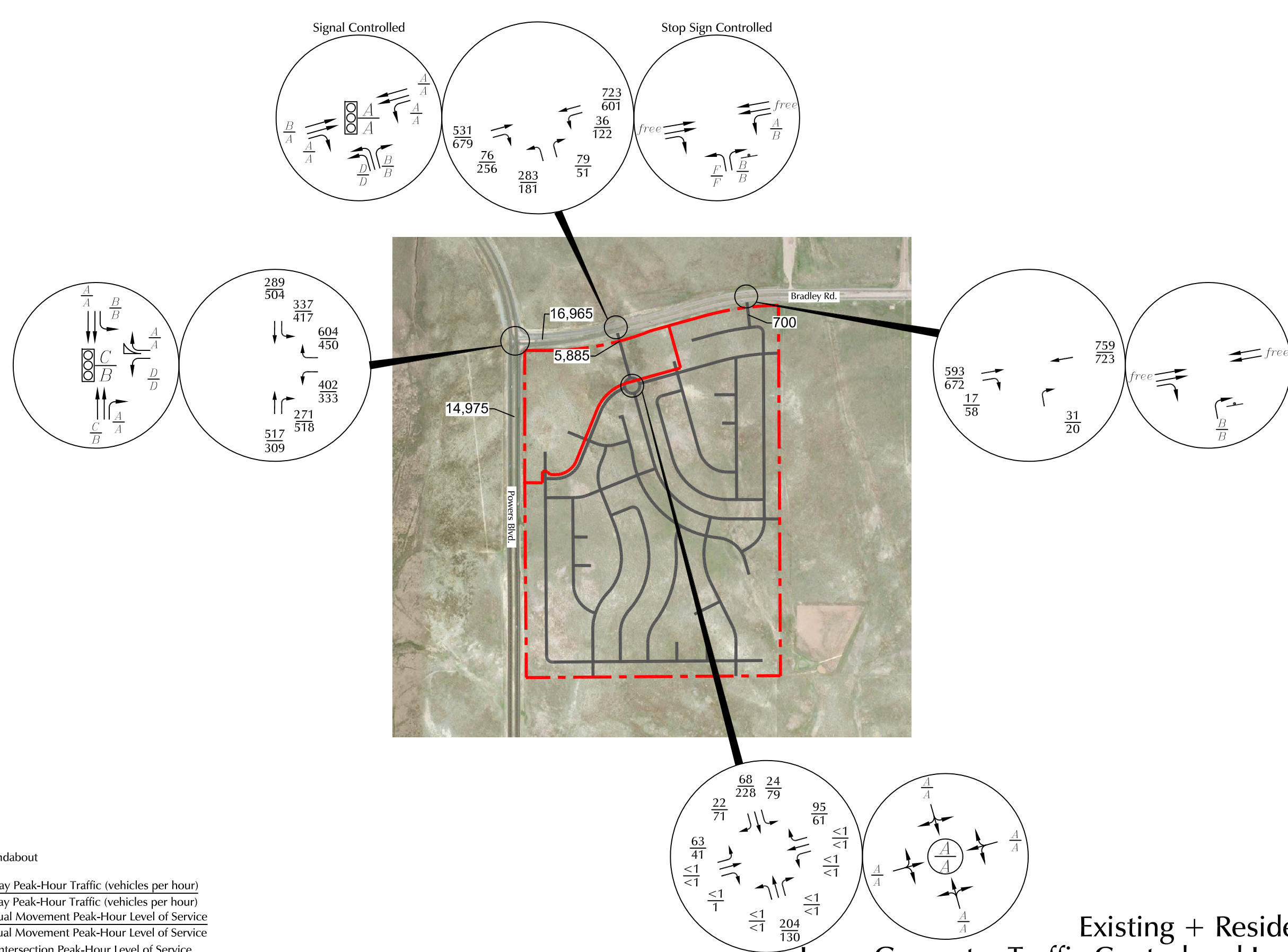
LEGEND:
 $\frac{XX}{XX}$ = $\frac{\text{AM Weekday Peak-Hour Traffic (vehicles per hour)}}{\text{PM Weekday Peak-Hour Traffic (vehicles per hour)}}$
 X,XXX= Average Daily Traffic (vehicles per day)

Figure 12
**Assignment of Short-Term
 Commercial Site-Generated Traffic**
 Springs at Waterview East (LSC #184360)



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 13
**Assignment of Long-Term
 Commercial Site-Generated Traffic**
 Springs at Waterview East (LSC #184360)



LEGEND:

○ = Modern Roundabout

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

Figure 14

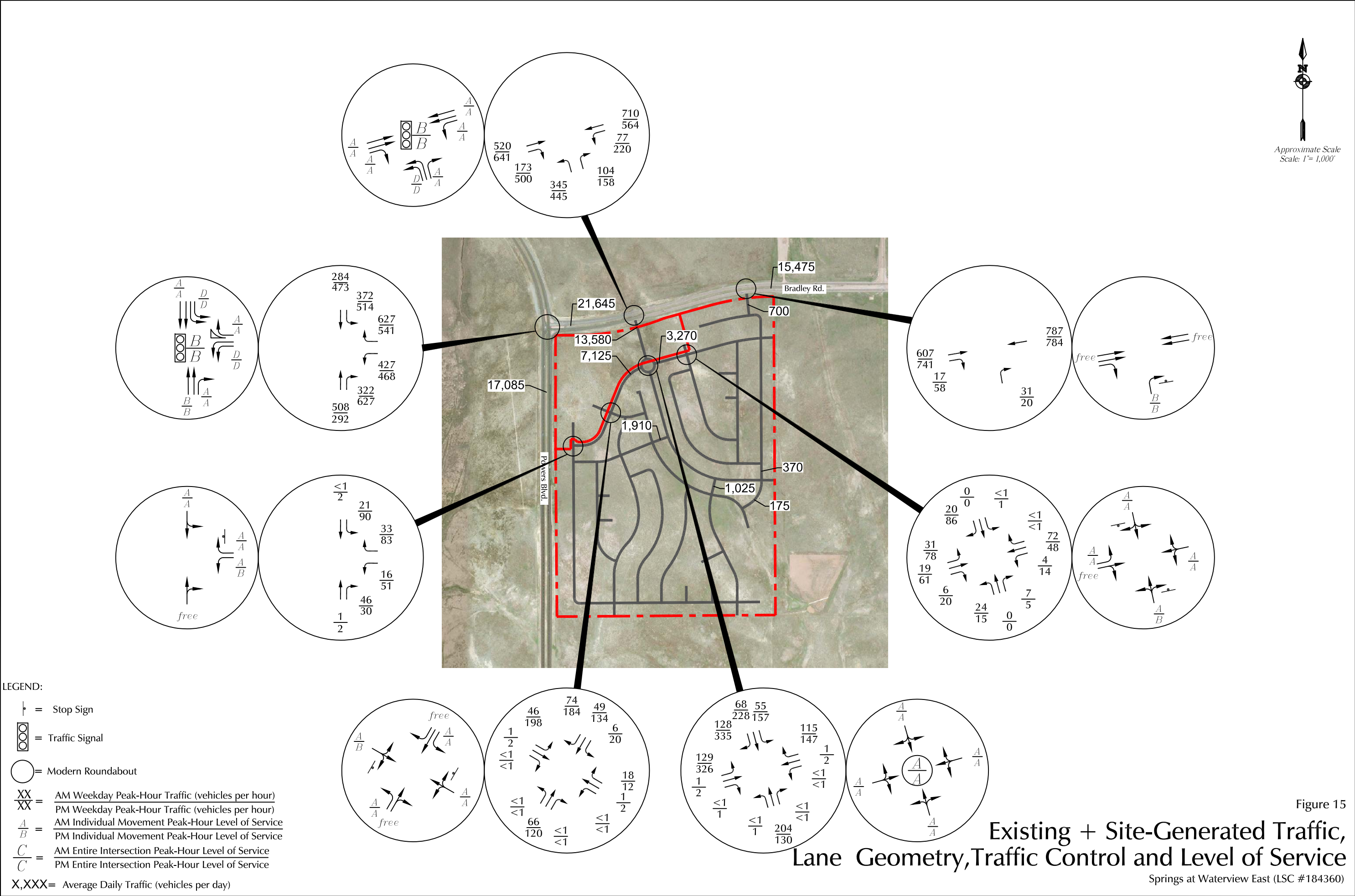
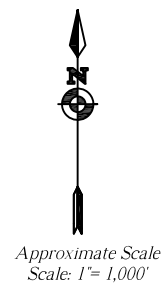
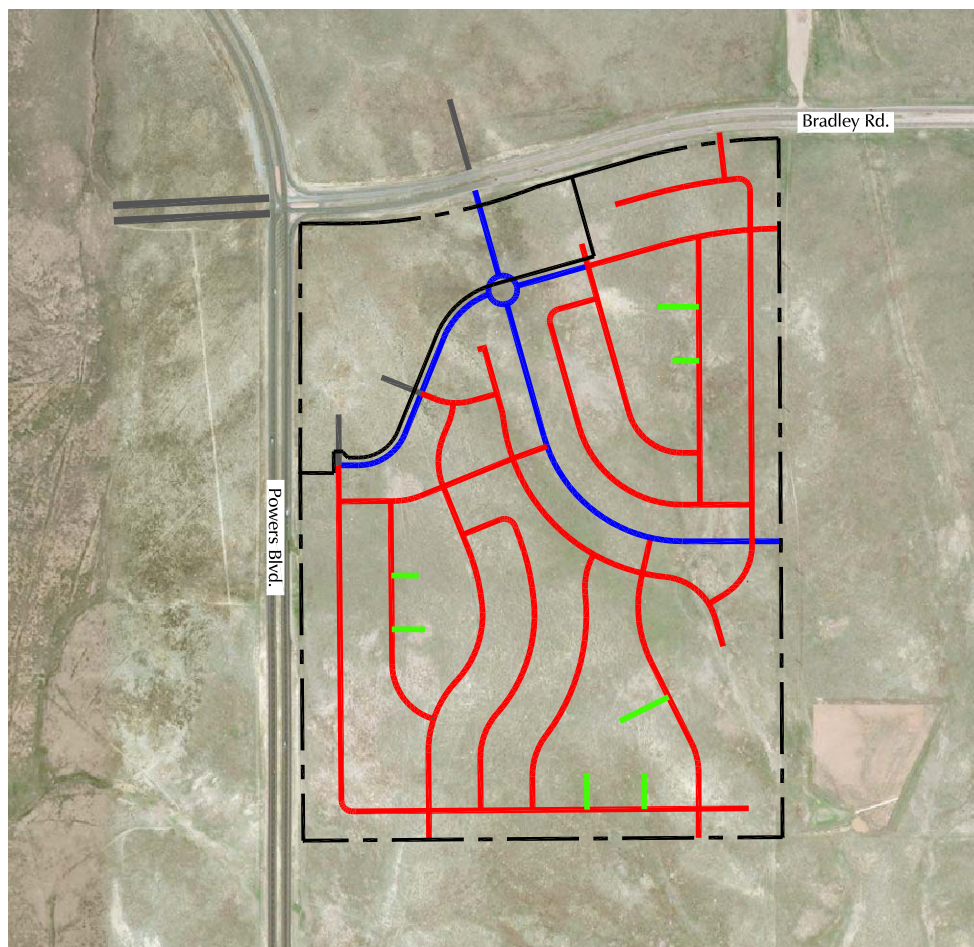


Figure 15
Existing + Site-Generated Traffic,
Lane Geometry, Traffic Control and Level of Service
Springs at Waterview East (LSC #184360)



LEGEND:

- = Urban Non-Residential Collector
- = Urban Local
- = Urban Local (Low Volume)

Figure 17
**Recommended
Classifications**
Springs at Waterview East (LSC #184360)

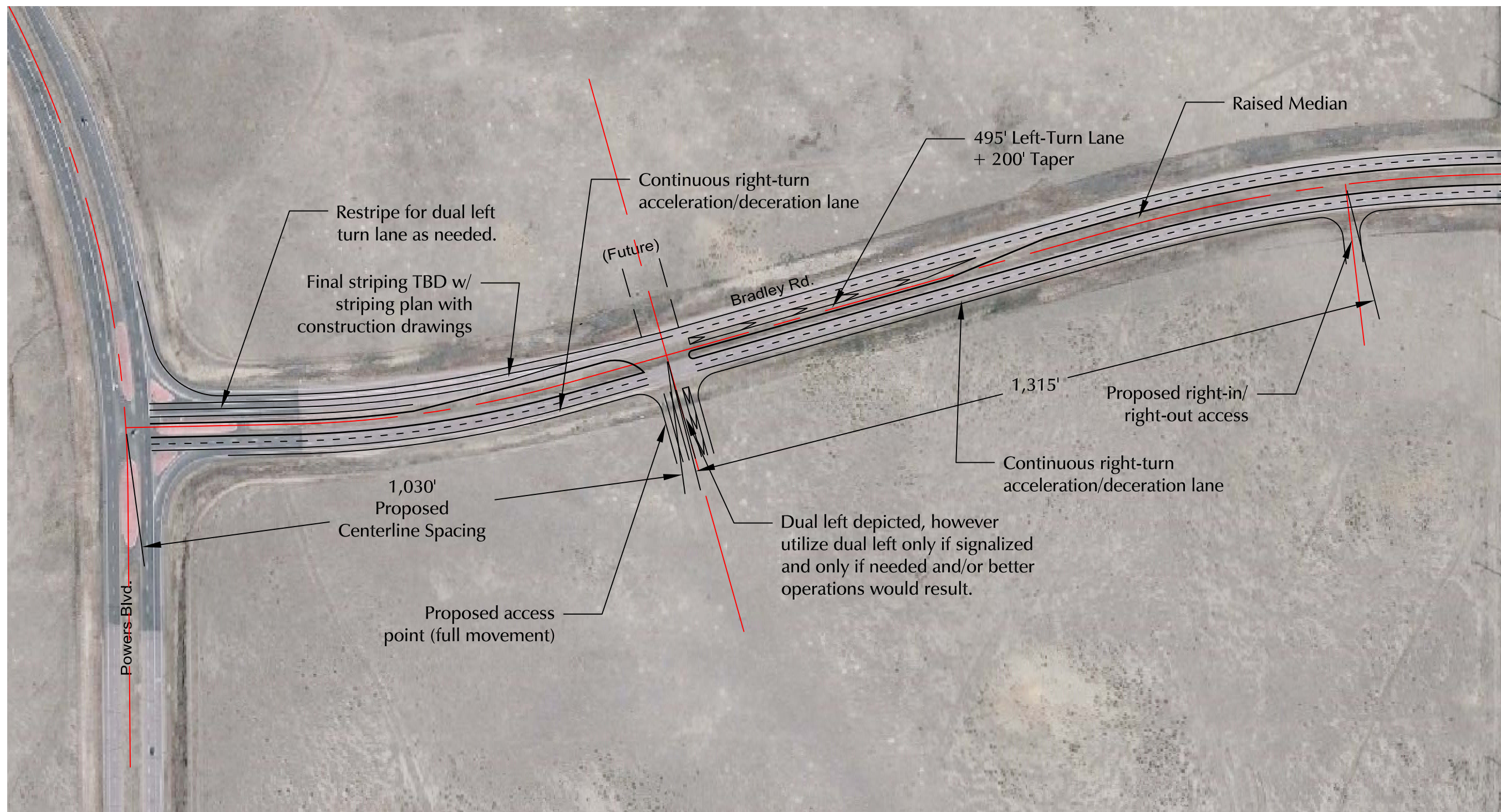
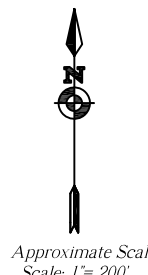


Figure 18

Short-Term Bradley Road Lane Recommendations

Springs at Waterview East (LSC #184360)

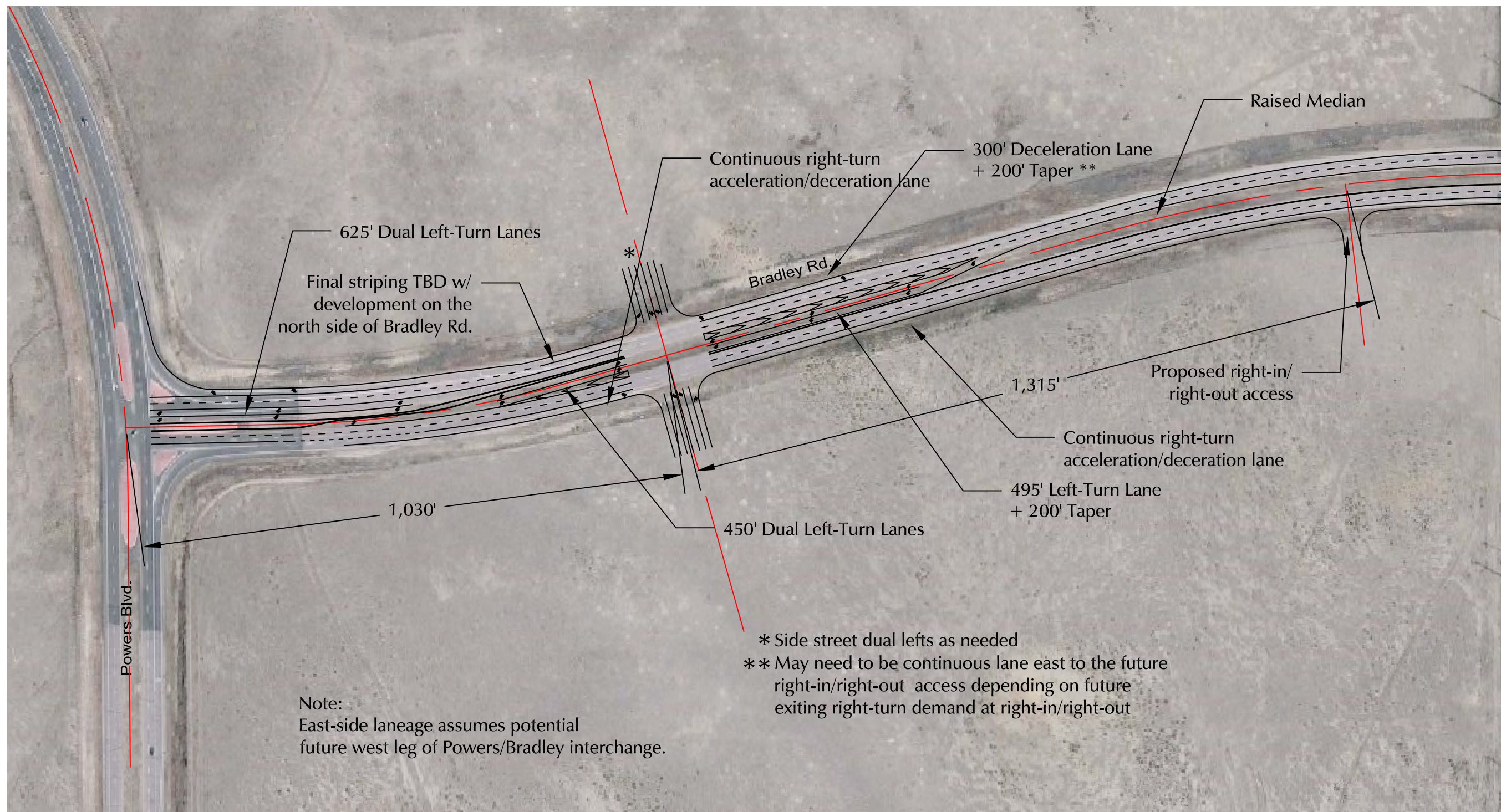


Figure 19

Long-Term Bradley Road Lane Recommendations

Springs at Waterview East (LSC #184360)



Development Services Department
2880 International Circle
Colorado Springs, Colorado 80910

Phone: 719.520.6300
Fax: 719.520.6695
Website www.elpasoco.com

DEVIATION REVIEW AND DECISION FORM

Procedure # R-FM-051-07
Issue Date: 12/31/07
Revision Issued: 00/00/00

DSD FILE NO.:

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General Property Information:

Address of Subject Property (Street Number/Name): N/A
Tax Schedule ID(s) #: 5500000135
Legal Description of Property: W2 SEC 9-15-65, EX PT TO RDS

Subdivision or Project Name: Waterview Sketch Plan

Section of ECM from Which Deviation is Sought: 2.2.5.B.1

Specific Criteria from Which a Deviation is Sought: Intersection spacing along a Principal Arterial

Proposed Nature and Extent of Deviation: Request for right-in/right-out access point to both the westbound and eastbound directions of Bradley Road approximately 2,340 feet east of Powers Boulevard to serve the proposed residential (south side of Bradley) and non-residential (north side of Bradley) Sketch Plan land uses east of Powers.

Applicant Information:

Applicant: CPR Entitlements, LLC Email Address: dse.pak7@gmail.com
Applicant is: ☐ Owner ☒ Consultant ☐ Contractor
Mailing Address: 31 North Tejon St., Suite 500, Colorado Springs State: CO Postal Code: 80903
Telephone Number: 719-227-7388 Fax Number: 719-227-7392

Engineer Information:

Engineer: Jeffrey C. Hodsdon, P.E., PTOE Email Address: jchodsdon@lscs.com
Company Name: LSC Transportation Consultants, Inc.
Mailing Address: 516 North Tejon Street State: CO Postal Code: 80903
Registration Number: 31684 State of Registration: Colorado
Telephone Number: (719) 633-2868 Fax Number: (719) 633-5430

Explanation of Request (Attached diagrams, figures and other documentation to clarify request):

Section of ECM from Which Deviation is Sought: 2.2.5.B.1
Specific Criteria from Which a Deviation is Sought: Access spacing along a Principal Arterial

Proposed Nature and Extent of Deviation: Request for right-in/right-out access point to both the westbound and eastbound directions of Bradley Road approximately 2,340 feet east of Powers Boulevard to serve the proposed residential (south side of Bradley) and non-residential (north side of Bradley) Sketch Plan land uses east of Powers.

Reason for the Requested Deviation: The deviation is requested to provide second points of access to the proposed sketch plan land uses located north and south of Bradley Road and east of Powers Boulevard. The primary access would be at the currently proposed full-movement access approximately 1,030 feet east of Powers (please refer to separate deviation request). The deviation is requested as the property only has public roadway frontage to Bradley Road and Powers Boulevard and no access will be allowed to Powers. Bradley is the only roadway to which these parcels could have direct access. The right-in/right-out access point would provide a second point of access for these development areas and would improve circulation for these areas. Given the limited access opportunities to these

sketch plan areas, the right-in/right-out access point would distribute the site-generated right-turn movements to/from Bradley Road at two locations instead of one. This will reduce the turning movements at the proposed full-movement access to the west.

Comparison of Proposed Deviation to ECM Standard: The requested accesses would be approximately 1,560 feet west of Foreign Trade Zone Boulevard, 2,340 feet east of Powers Boulevard, and about 1,315 feet east of the proposed full-movement intersection location. The south side right-in/right out would be 1,135 feet west of a future right-in/right-out access to the Bradley Heights development (City of Colorado Springs).

Applicable Regional or National Standards used as Basis: _____

Application Consideration:

CHECK IF APPLICATION MEETS CRITERIA FOR CONSIDERATION

JUSTIFICATION

☐ The ECM standard is inapplicable to a particular situation.

☒ Topography, right-of-way, or other geographical conditions or impediments impose an undue hardship on the applicant, and an equivalent alternative that can accomplish the same design objective is available and does not compromise public safety or accessibility.

The parcels northeast and northwest of Powers Boulevard/ Bradley Road have no access without either the proposed full-movement access (separate deviation form) or this proposed access. This proposed access is requested for purposes of providing a second access. A future minor connection is planned between Waterview and Bradley Heights to the east but currently, however, this has been planned for connectivity between developments and is not intended to provide other than a minor connection. Given the master-planned uses, the size of the land area to be served, and essentially access to Bradley Road only, a second point of access (right-in/right-out) to Bradley is needed.

☐ A change to a standard is required to address a specific design or construction problem, and if not modified, the standard will impose an undue hardship on the applicant with little or no material benefit to the public.

If at least one of the criteria listed above is not met, this application for deviation cannot be considered.

Criteria for Approval:

PLEASE EXPLAIN HOW EACH OF THE FOLLOWING CRITERIA HAVE BEEN SATISFIED BY THIS REQUEST

The request for a deviation is not based exclusively on financial considerations.

The request is not based on financial considerations. The request is based on the need to provide a second access to serve the parcels northeast and northwest of Powers Boulevard that would have no access without access to Bradley Road. The first/primary access would be the proposed full-movement to Bradley Road (separate deviation). See the above justification paragraph under "Application Consideration" for additional detail.

The deviation will achieve the intended result with a comparable or superior design and quality of improvement.

The intersection spacing would be sufficient to achieve auxiliary right-turn lanes on Bradley Road. The deviation is requested as the property only has public roadway frontage to Bradley Road and Powers Boulevard and no access will be allowed to Powers. Bradley is the only roadway to which these parcels could have direct access. The right-in/right-out access points would provide a second point of

El Paso County Procedures Manual

Procedure # R-FM-051-07

Issue Date: 12/31/07

Revision Issued: 00/00/00

DSD File No. _____ **SKP 16-002** _____

access for these development areas and would improve circulation for these areas. Given the limited access opportunities to these parcels, these right-in/right-out access points would distribute the site-generated right-turn movements to/from Bradley Road at two locations instead of one. This will reduce the turning movements at the proposed full-movement access to the west and potentially at the Foreign Trade Zone/Bradley intersection to the east if a future connection is created between Waterview and Foreign Trade Zone Blvd (right-of-way is not currently available, but a connection could potentially be established with the development of the private property to the east of Waterview).

The deviation will not adversely affect safety or operations.

The intersection would operate at a satisfactory level of service based on short-term and long-term traffic volume projections. The intersection spacing would be sufficient to achieve auxiliary right-turn lanes. The center median on Bradley Road would physically prevent left-turn movements. Future traffic signals at the Bradley/Foreign Trade Zone intersection and at the proposed Waterview full-movement intersection to the west would generate gaps in through traffic on Bradley Road which would be utilized by exiting right-turn movements to turn onto Bradley Road. Please refer to the attached LSC Traffic Technical Memorandum for additional technical detail and analysis results.

The deviation will not adversely affect maintenance and its associated cost.

N/A

The deviation will not adversely affect aesthetic appearance.

N/A

Owner, Applicant and Engineer Declaration:

To the best of my knowledge, the information on this application and all additional or supplemental documentation is true, factual and complete. I am fully aware that any misrepresentation of any information on this application may be grounds for denial. I have familiarized myself with the rules, regulations and procedures with respect to preparing and filing this application. I also understand that an incorrect submittal will be cause to have the project removed from the agenda of the Planning Commission, Board of County Commissioners and/or Board of Adjustment or delay review, and that any approval of this application is based on the representations made in the application and may be revoked on any breach of representation or condition(s) of approval.

Signature of owner (or authorized representative)

Date

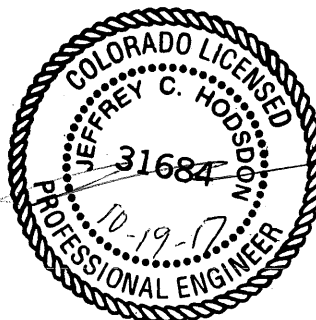
Signature of applicant (if different from owner)

Date

Signature of Engineer

Date

Engineer's Seal



El Paso County Procedures Manual

Procedure # R-FM-051-07

Issue Date: 12/31/07

Revision Issued: 00/00/00

DSD File No. SKP 16-002

Review and Recommendation:

APPROVED by the ECM Administrator

Approved

by Elizabeth Nijkamp
El Paso County Planning and Community Development
on behalf of Jennifer Irvine, County Engineer, ECM Administrator



03/28/2018 4:04:26 PM Date

This request has been determined to have met the criteria for approval. A deviation from Section
2.2.5.B.1 of ECM is hereby granted based on the justification provided. Comments:

The approved RIRO may be closed after a second access has been established to
the subdivision.

____ Additional comments or information are attached.

DENIED by the ECM Administrator

Date

This request has been determined not to have met criteria for approval. A deviation from Section
____ of ECM is hereby denied. Comments:

____ Additional comments or information are attached.



Development Services Department
2880 International Circle
Colorado Springs, Colorado 80910

Phone: 719.520.6300
Fax: 719.520.6695
Website www.elpasoco.com

DEVIATION REVIEW AND DECISION FORM

Procedure # R-FM-051-07
Issue Date: 12/31/07
Revision Issued: 00/00/00

DSD FILE NO.:

--	--	--	--	--	--	--	--

General Property Information:

Address of Subject Property (Street Number/Name): N/A
Tax Schedule ID(s) #: 5500000135
Legal Description of Property: W2 SEC 9-15-65, EX PT TO RDS

Subdivision or Project Name: Waterview Sketch Plan

Section of ECM from Which Deviation is Sought: 2.2.5.B.1

Specific Criteria from Which a Deviation is Sought: Intersection spacing along a Principal Arterial
Proposed Nature and Extent of Deviation: Request for a full-movement, future public street signalized intersection with Bradley Road approximately 1,030 feet east of Powers Boulevard to serve the proposed residential and non-residential Sketch Plan land uses north and south of Bradley Road and east of Powers.

Applicant Information:

Applicant: CPR Entitlements, LLC Email Address: dse.pak7@gmail.com
Applicant is: ☐ Owner ☒ Consultant ☐ Contractor
Mailing Address: 31 North Tejon Street, Suite 500, Colorado Springs State: CO Postal Code: 80903
Telephone Number: 719-227-7388 Fax Number: 719-227-7392

Engineer Information:

Engineer: Jeffrey C. Hodsdon, P.E., PTOE Email Address: jchodsdon@lscs.com
Company Name: LSC Transportation Consultants, Inc.
Mailing Address: 516 North Tejon Street State: CO Postal Code: 80903
Registration Number: 31684 State of Registration: Colorado
Telephone Number: (719) 633-2868 Fax Number: (719) 633-5430

Explanation of Request (Attached diagrams, figures and other documentation to clarify request):

Section of ECM from Which Deviation is Sought: 2.2.5.B.1
Specific Criteria from Which a Deviation is Sought: Access spacing along a Principal Arterial

Proposed Nature and Extent of Deviation: Request for a full-movement, future public street signalized intersection with Bradley Road approximately 1,030 feet east of Powers Boulevard to serve the proposed residential and non-residential Sketch Plan land uses north and south of Bradley Road and east of Powers.

Reason for the Requested Deviation: The deviation is requested to provide a future public street intersection and the major access for the proposed Sketch Plan land uses located north and south of Bradley Road and east of Powers Boulevard. The deviation is needed regardless of the exact location of the access because the access would be either less than 1/2-mile from the Powers/Bradley intersection or less than 1/2-mile from the Foreign Trade Zone intersection. The deviation is requested as the property only has public roadway frontage to Bradley Road and Powers Boulevard and no access will be allowed to Powers. Bradley is the only roadway to which these parcels could have direct access.

Also, a full-movement access to Bradley Road was shown on the older approved Sketch Plan.

Comparison of Proposed Deviation to ECM Standard: The requested access would be approximately 2,870 feet west of Foreign Trade Zone Boulevard (exceeds 1/2-mile spacing) and approximately 1,030 feet east of Powers Boulevard, whereas 2,640 feet is the ECM standard.

Applicable Regional or National Standards used as Basis: _____

Application Consideration:

CHECK IF APPLICATION MEETS CRITERIA FOR CONSIDERATION

JUSTIFICATION

☐ The ECM standard is inapplicable to a particular situation.

☒ Topography, right-of-way, or other geographical conditions or impediments impose an undue hardship on the applicant, and an equivalent alternative that can accomplish the same design objective is available and does not compromise public safety or accessibility.

The parcels northeast and northwest of Powers Boulevard have no access without the proposed access. A future minor connection is planned between Waterview and Bradley Heights to the east; however, this has been planned for connectivity between developments and would not be sufficient access. Also, given the master-planned uses and size of the land area to be served by the access to Bradley, a right-in/right-out access would not suffice. A full-movement access is necessary. A full-movement access between Powers and Foreign Trade Zone Boulevard has been shown on the Waterview Sketch Plan for a number of years. The currently proposed location would be superior to that location previously shown 2,000 feet east of Powers.

☐ A change to a standard is required to address a specific design or construction problem, and if not modified, the standard will impose an undue hardship on the applicant with little or no material benefit to the public.

If at least one of the criteria listed above is not met, this application for deviation cannot be considered.

Criteria for Approval:

PLEASE EXPLAIN HOW EACH OF THE FOLLOWING CRITERIA HAVE BEEN SATISFIED BY THIS REQUEST

The request for a deviation is not based exclusively on financial considerations.

The request is not based on financial considerations. The request is based on the need to provide a future public street intersection on Bradley Road to serve the parcels northeast and northwest of Powers Boulevard that would have no access without access to Bradley Road. See the above justification paragraph under "Application Consideration" for additional detail.

The deviation will achieve the intended result with a comparable or superior design and quality of improvement.

The intersection spacing would be sufficient to achieve auxiliary left-turn lanes on Bradley Road. The spacing to Powers (west) and Foreign Trade Zone Boulevard (east) will be sufficient to allow this intersection to be signalized. Given the location of land uses to be served in relation to the Powers/Bradley intersection the proposed intersection location would be optimal. Also, the proposed intersection location would be near the north/south dividing line between the proposed commercial and residential development (established as a result of the airport APZ line). This would result in a north/south public street which would serve both the commercial and residential development well. It would provide a buffer between the commercial and residential areas and it would much better serve the

commercial site and make it more viable by moving the full-movement, future signalized intersection to the adjacent northeast corner of the commercial area. The proposed location would be far superior from this perspective. The previous plan showed the first full-movement east of Powers located nearly a quarter-mile to the east of the commercial development area. This, arguably, would not work for commercial development. Commercial/retail development would be most viable when located adjacent to the intersection of Powers and Bradley with a pre-established full-movement, future signalized intersection on Bradley Road at the proposed location. The intersection should be shown at the best location outside the CDOT A-line now.

The deviation will not adversely affect safety or operations.

The intersection would operate at a satisfactory level of service based on short-term and long-term traffic volume projections. The intersection spacing would be sufficient to achieve auxiliary turn lanes and these lanes would accommodate the projected vehicle queues. Good Bradley Road corridor traffic signal progression could be achieved with a future traffic signal at this intersection. The intersection at the proposed location would also provide the option for coordinating the signal at this intersection with the future signal at the Powers/Bradley intersection. Please refer to the attached LSC Traffic Technical Memorandum for additional technical detail and analysis results. The memorandum also addresses the turning movements from Powers onto eastbound Bradley with the relatively short distances to the entry points to the eastbound auxiliary turn lanes at the proposed Waterview intersection.

The deviation will not adversely affect maintenance and its associated cost.

N/A

The deviation will not adversely affect aesthetic appearance.

N/A

Owner, Applicant and Engineer Declaration:

To the best of my knowledge, the information on this application and all additional or supplemental documentation is true, factual and complete. I am fully aware that any misrepresentation of any information on this application may be grounds for denial. I have familiarized myself with the rules, regulations and procedures with respect to preparing and filing this application. I also understand that an incorrect submittal will be cause to have the project removed from the agenda of the Planning Commission, Board of County Commissioners and/or Board of Adjustment or delay review, and that any approval of this application is based on the representations made in the application and may be revoked on any breach of representation of condition(s) of approval.

Signature of owner (or authorized representative)

Date

Signature of applicant (if different from owner)

Date

Signature of Engineer

Date

Engineer's Seal



Review and Recommendation:
APPROVED by the ECM Administrator



This request has been determined to have met the criteria for approval. A deviation from Section 2.2.5.B.1 of ECM is hereby granted based on the justification provided. Comments:

____ Additional comments or information are attached.

DENIED by the ECM Administrator

____ Date _____

This request has been determined not to have met criteria for approval. A deviation from Section _____ of ECM is hereby denied. Comments:

____ Additional comments or information are attached.

LSC Transportation Consultants, Inc.
Colorado Springs, CO 80905
719-633-2868

Default Comments

Change These in The Preferences Window

Select File/Preference in the Main Scree

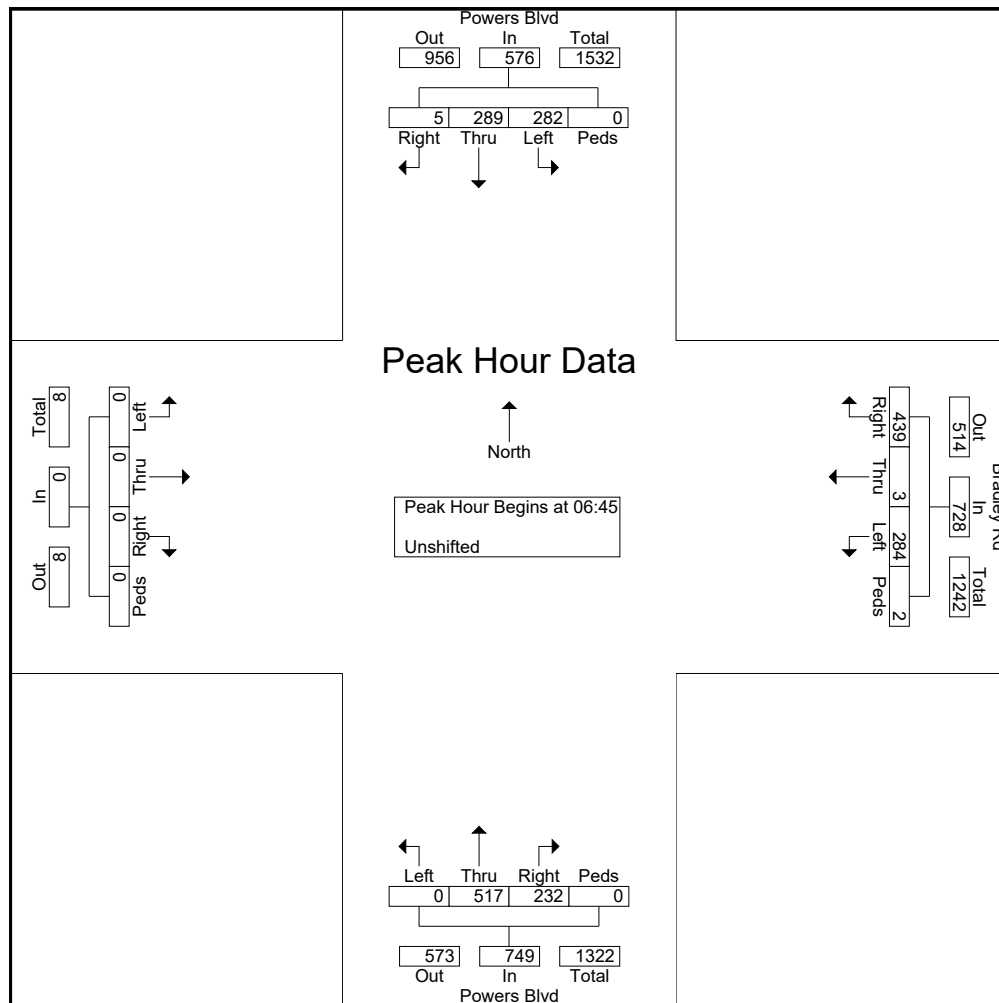
Then Click the Comments Tab

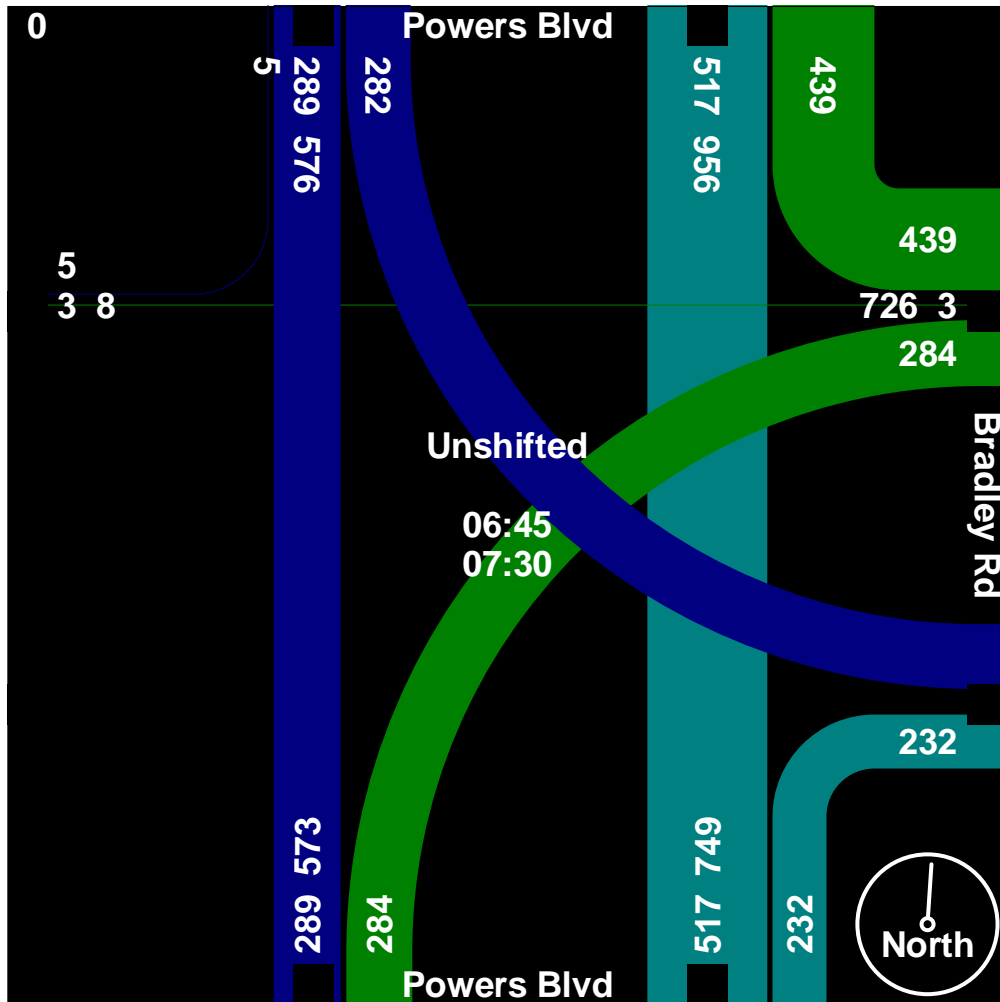
Groups Printed- Unshifted

	Powers Blvd Southbound					Bradley Rd Westbound					Powers Blvd Northbound					Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:30	61	54	0	0	115	68	0	71	0	139	0	89	73	0	162	0	0	0	0	0	416
06:45	67	68	0	0	135	80	0	104	0	184	0	110	55	0	165	0	0	0	0	0	484
Total	128	122	0	0	250	148	0	175	0	323	0	199	128	0	327	0	0	0	0	0	900
07:00	67	87	0	0	154	71	0	119	0	190	0	120	58	0	178	0	0	0	0	0	522
07:15	66	56	5	0	127	65	3	111	2	181	0	154	65	0	219	0	0	0	0	0	527
07:30	82	78	0	0	160	68	0	105	0	173	0	133	54	0	187	0	0	0	0	0	520
07:45	63	77	0	0	140	78	0	62	0	140	0	93	54	0	147	0	0	0	0	0	427
Total	278	298	5	0	581	282	3	397	2	684	0	500	231	0	731	0	0	0	0	0	1996
08:00	36	66	0	0	102	89	0	70	0	159	0	97	47	0	144	0	0	0	0	0	405
08:15	50	72	0	0	122	93	0	61	0	154	0	73	37	0	110	0	0	0	0	0	386

LSC Transportation Consultants, Inc.
Colorado Springs, CO 80905
719-633-2868

	Powers Blvd Southbound					Bradley Rd Westbound					Powers Blvd Northbound					Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 to 08:15 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45																					
06:45	67	68	0	0	135	80	0	104	0	184	0	110	55	0	165	0	0	0	0	0	484
07:00	67	87	0	0	154	71	0	119	0	190	0	120	58	0	178	0	0	0	0	0	522
07:15	66	56	5	0	127	65	3	111	2	181	0	154	65	0	219	0	0	0	0	0	527
07:30	82	78	0	0	160	68	0	105	0	173	0	133	54	0	187	0	0	0	0	0	520
Total Volume	282	289	5	0	576	284	3	439	2	728	0	517	232	0	749	0	0	0	0	0	2053
% App. Total	49	50.2	0.9	0		39	0.4	60.3	0.3		0	69	31	0		0	0	0	0		
PHF	.860	.830	.250	.000	.900	.888	.250	.922	.250	.958	.000	.839	.892	.000	.855	.000	.000	.000	.000	.000	.974





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Colorado Springs, CO 80905
719-633-2868

Default Comments

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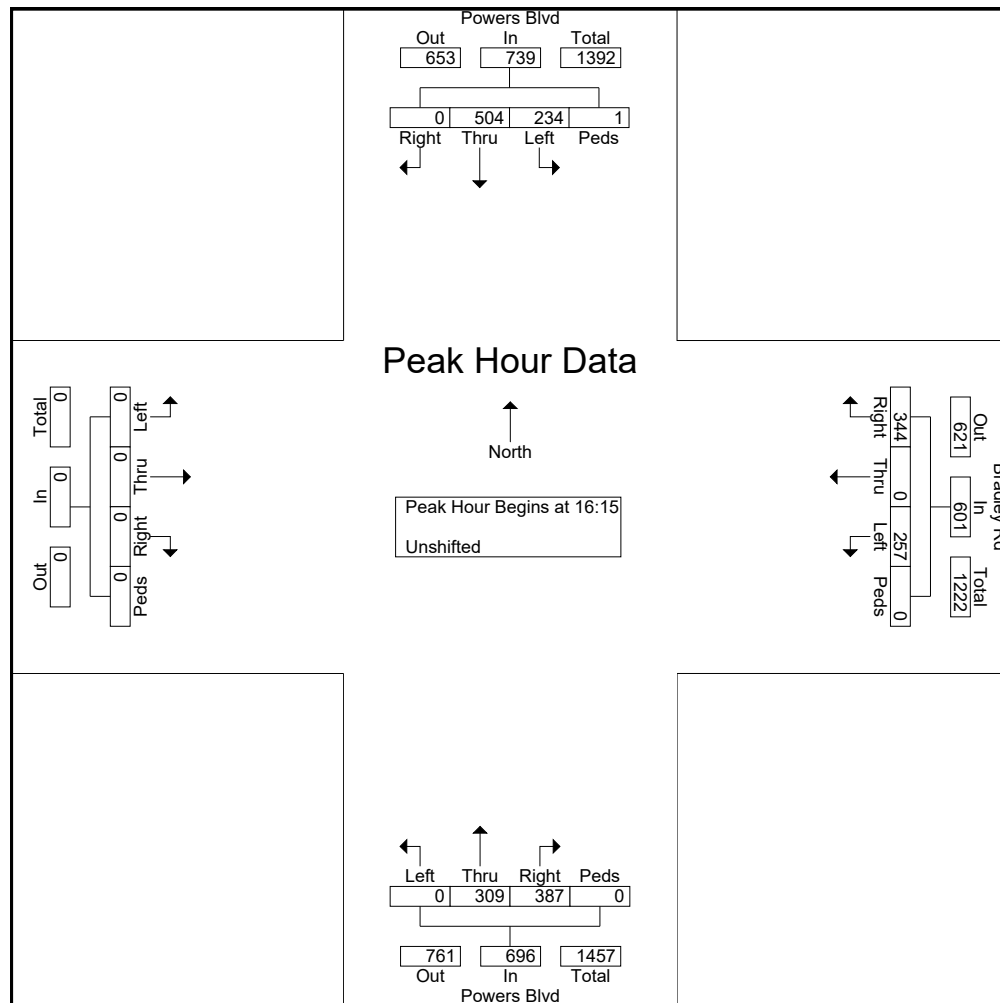
Then Click the Comments Tab

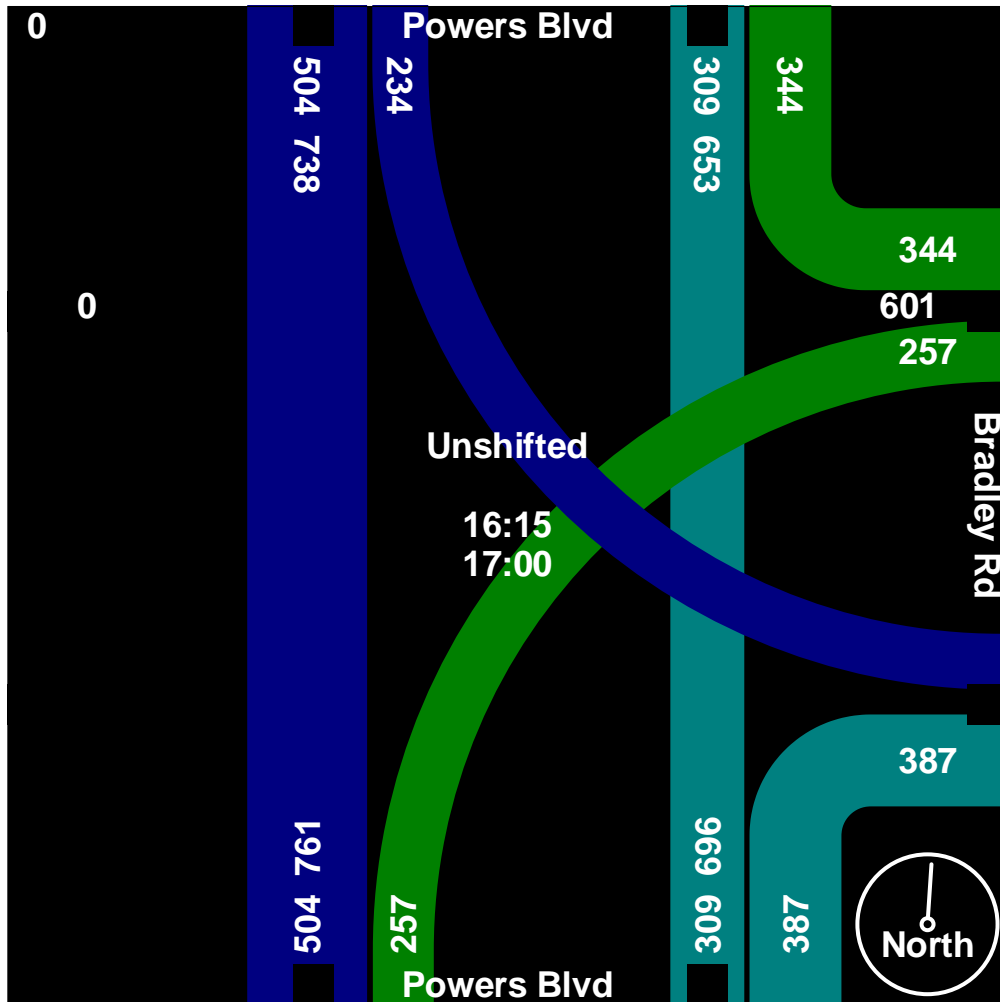
Groups Printed- Unshifted

	Powers Blvd Southbound					Bradley Rd Westbound					Powers Blvd Northbound					Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
16:00	82	119	0	0	201	55	1	100	0	156	0	75	70	0	145	0	0	0	0	0	502
16:15	66	121	0	0	187	63	0	90	0	153	0	55	115	0	170	0	0	0	0	0	510
16:30	64	122	0	0	186	65	0	95	0	160	0	81	80	0	161	0	0	0	0	0	507
16:45	45	124	0	1	170	64	0	95	0	159	0	66	103	0	169	0	0	0	0	0	498
Total	257	486	0	1	744	247	1	380	0	628	0	277	368	0	645	0	0	0	0	0	2017
17:00	59	137	0	0	196	65	0	64	0	129	0	107	89	0	196	0	0	0	0	0	521
17:15	78	125	0	0	203	52	0	58	0	110	0	77	97	0	174	0	0	0	0	0	487
17:30	55	109	0	0	164	54	0	46	0	100	0	80	78	0	158	0	0	0	0	0	422
17:45	57	116	0	0	173	49	0	52	0	101	0	82	81	0	163	0	0	0	0	0	437
Total	249	487	0	0	736	220	0	220	0	440	0	346	345	0	691	0	0	0	0	0	1867

LSC Transportation Consultants, Inc.
Colorado Springs, CO 80905
719-633-2868













	Powers Blvd Southbound					Bradley Rd Westbound					Powers Blvd Northbound					Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:15																					
16:15	66	121	0	0	187	63	0	90	0	153	0	55	115	0	170	0	0	0	0	0	510
16:30	64	122	0	0	186	65	0	95	0	160	0	81	80	0	161	0	0	0	0	0	507
16:45	45	124	0	1	170	64	0	95	0	159	0	66	103	0	169	0	0	0	0	0	498
17:00	59	137	0	0	196	65	0	64	0	129	0	107	89	0	196	0	0	0	0	0	521
Total Volume	234	504	0	1	739	257	0	344	0	601	0	309	387	0	696	0	0	0	0	0	2036
% App. Total	31.7	68.2	0	0.1		42.8	0	57.2	0		0	44.4	55.6	0		0	0	0	0		
PHF	.886	.920	.000	.250	.943	.988	.000	.905	.000	.939	.000	.722	.841	.000	.888	.000	.000	.000	.000	.000	.977





Timings
37: Powers & Bradley Rd.

Existing Traffic
AM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	175	363	530	251	301	267
Future Volume (vph)	175	363	530	251	301	267
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	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
Total Split (s)	20.0	20.0	50.0	50.0	20.0	70.0
Total Split (%)	22.2%	22.2%	55.6%	55.6%	22.2%	77.8%
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	None	None	None	None	None	None
Act Effect Green (s)	10.8	10.8	16.4	16.4	15.2	36.7
Actuated g/C Ratio	0.19	0.19	0.28	0.28	0.26	0.64
v/c Ratio	0.53	0.61	0.61	0.44	0.72	0.13
Control Delay	28.2	8.0	20.8	4.8	32.7	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.2	8.0	20.8	4.8	32.7	4.6
LOS	C	A	C	A	C	A
Approach Delay	14.6		15.7			19.5
Approach LOS	B		B			B

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 57.6

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 16.5

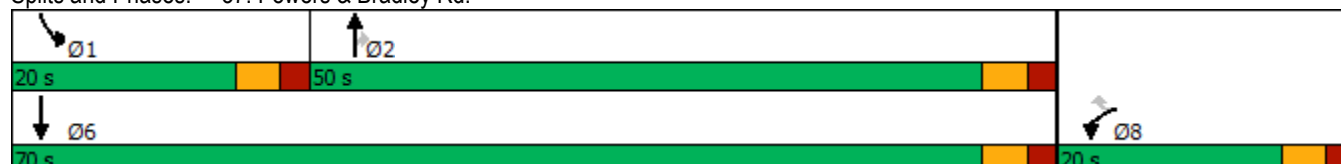
Intersection LOS: B

Intersection Capacity Utilization 53.5%

ICU Level of Service A













Analysis Period (min) 15

Splits and Phases: 37: Powers & Bradley Rd.



Timings
1: Powers & Bradley Rd.

Existing Traffic
PM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	257	344	309	387	234	504
Future Volume (vph)	257	344	309	387	234	504
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	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
Total Split (s)	20.0	20.0	51.0	51.0	20.0	71.0
Total Split (%)	22.0%	22.0%	56.0%	56.0%	22.0%	78.0%
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	None	None	None	None	None	None
Act Effect Green (s)	13.8	13.8	11.4	11.4	13.4	29.9
Actuated g/C Ratio	0.26	0.26	0.21	0.21	0.25	0.56
v/c Ratio	0.57	0.52	0.46	0.64	0.56	0.27
Control Delay	24.1	5.9	21.1	7.4	24.3	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.1	5.9	21.1	7.4	24.3	6.7
LOS	C	A	C	A	C	A
Approach Delay	13.7		13.5			12.3
Approach LOS	B		B			B

Intersection Summary

Cycle Length: 91
 Actuated Cycle Length: 53.8
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 13.1
 Intersection LOS: B
 Intersection Capacity Utilization 48.2%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 1: Powers & Bradley Rd.



Timings

1: Powers & Bradley Rd.

Existing Plus Total Site-Generated Traffic

AM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↰	↰	↰↰	↰	↰↰	↰↰
Traffic Volume (vph)	427	627	508	322	372	284
Future Volume (vph)	427	627	508	322	372	284
Turn Type	Prot	Free	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		Free		2		
Detector Phase	8		2	2	1	6
Switch Phase						
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	9.0		9.0	9.0	9.0	9.0
Total Split (s)	30.0		45.0	45.0	25.0	70.0
Total Split (%)	30.0%		45.0%	45.0%	25.0%	70.0%
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0	5.0	5.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		C-Max	C-Max	None	C-Max
Act Effect Green (s)	18.3	100.0	49.9	49.9	16.8	71.7
Actuated g/C Ratio	0.18	1.00	0.50	0.50	0.17	0.72
v/c Ratio	0.72	0.42	0.29	0.34	0.69	0.12
Control Delay	42.9	1.5	16.4	3.2	45.5	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.9	1.5	16.4	3.2	45.5	4.9
LOS	D	A	B	A	D	A
Approach Delay	18.3		11.3			27.9
Approach LOS	B		B			C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

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

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 18.6

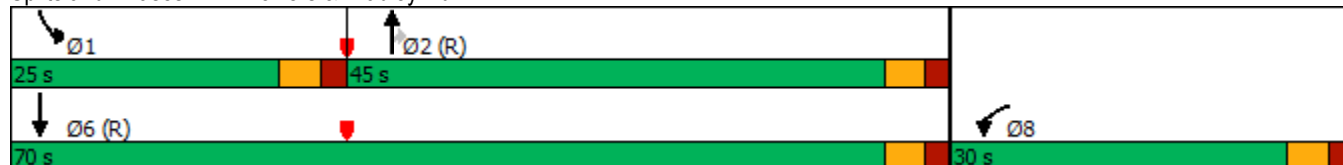
Intersection LOS: B

Intersection Capacity Utilization 49.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: Powers & Bradley Rd.



Timings

2: Waterview Full Access & Bradley Rd.

Existing Plus Total Site-Generated Traffic

AM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘	↘
Traffic Volume (vph)	520	173	77	710	345	104
Future Volume (vph)	520	173	77	710	345	104
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)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0	21.0	9.0	21.0	21.0	21.0
Total Split (s)	65.0	65.0	10.0	75.0	25.0	25.0
Total Split (%)	65.0%	65.0%	10.0%	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)	64.9	64.9	74.0	74.0	16.0	16.0
Actuated g/C Ratio	0.65	0.65	0.74	0.74	0.16	0.16
v/c Ratio	0.25	0.17	0.14	0.29	0.68	0.32
Control Delay	3.6	0.3	4.6	4.9	45.9	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.6	0.3	4.6	4.9	45.9	9.4
LOS	A	A	A	A	D	A
Approach Delay	2.8			4.9	37.4	
Approach LOS	A			A	D	

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

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

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 11.7

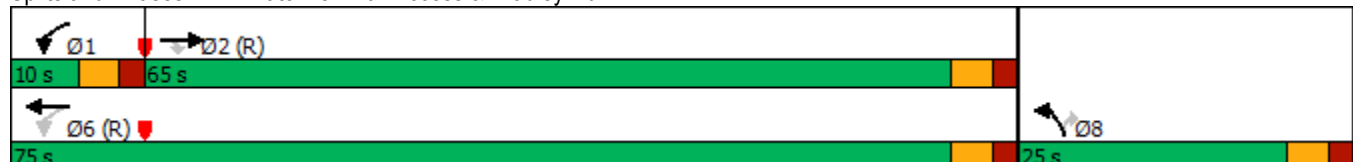
Intersection LOS: B

Intersection Capacity Utilization 41.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Waterview Full Access & Bradley Rd.



HCM 6th TWSC
3: Waterview RIRO & Bradley Rd.

Existing Plus Total Site-Generated Traffic
AM Peak Hour

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗		↑↑		↗
Traffic Vol, veh/h	607	17	0	787	0	31
Future Vol, veh/h	607	17	0	787	0	31
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	500	-	-	-	0
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	660	18	0	855	0	34
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	330
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	666
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	666
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		10.7	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT		
Capacity (veh/h)	666	-	-	-		
HCM Lane V/C Ratio	0.051	-	-	-		
HCM Control Delay (s)	10.7	-	-	-		
HCM Lane LOS	B	-	-	-		
HCM 95th %tile Q(veh)	0.2	-	-	-		





HCM 6th Roundabout
5: "A" Street & "K" Street/"C" Street

Existing Plus Total Site-Generated Traffic
AM Peak Hour

Intersection				
Intersection Delay, s/veh	4.6			
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	141	126	222	273
Demand Flow Rate, veh/h	144	127	226	278
Vehicles Circulating, veh/h	136	369	205	1
Vehicles Exiting, veh/h	143	62	75	495
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	4.1	5.1	5.1	4.3
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	144	127	226	278
Cap Entry Lane, veh/h	1201	947	1120	1378
Entry HV Adj Factor	0.979	0.992	0.980	0.980
Flow Entry, veh/h	141	126	222	273
Cap Entry, veh/h	1176	939	1098	1351
V/C Ratio	0.120	0.134	0.202	0.202
Control Delay, s/veh	4.1	5.1	5.1	4.3
LOS	A	A	A	A
95th %tile Queue, veh	0	0	1	1

HCM 6th TWSC
9: "L" Street/West Retail Access & "K" Street

Existing Plus Total Site-Generated Traffic
AM Peak Hour

Intersection						
Int Delay, s/veh	5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	33	1	46	21	0
Future Vol, veh/h	16	33	1	46	21	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	200	0	-	-	-	-
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	17	36	1	50	23	0
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	72	26	0	0	51	0
Stage 1	26	-	-	-	-	-
Stage 2	46	-	-	-	-	-
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	932	1050	-	-	1555	-
Stage 1	997	-	-	-	-	-
Stage 2	976	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	918	1050	-	-	1555	-
Mov Cap-2 Maneuver	918	-	-	-	-	-
Stage 1	982	-	-	-	-	-
Stage 2	976	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	8.7	0	7.4			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 918 1050	1555	-		
HCM Lane V/C Ratio	-	- 0.019 0.034	0.015	-		
HCM Control Delay (s)	-	- 9 8.6	7.4	0		
HCM Lane LOS	-	- A A	A	A		
HCM 95th %tile Q(veh)	-	- 0.1 0.1	0	-		

HCM 6th TWSC
10: "K" Street & Middle Retail Access/"U" Street

Existing Plus Total Site-Generated Traffic
AM Peak Hour

Intersection												
Int Delay, s/veh	2.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	↕
Traffic Vol, veh/h	46	1	0	0	1	18	0	66	0	6	49	74
Future Vol, veh/h	46	1	0	0	1	18	0	66	0	6	49	74
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	205	-	-	205	-	155
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	50	1	0	0	1	20	0	72	0	7	53	80






Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	150	139	53	180	219	72	133	0	0	72	0	0
Stage 1	67	67	-	72	72	-	-	-	-	-	-	-
Stage 2	83	72	-	108	147	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	818	752	1014	782	679	990	1452	-	-	1528	-	-
Stage 1	943	839	-	938	835	-	-	-	-	-	-	-
Stage 2	925	835	-	897	775	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	798	748	1014	778	676	990	1452	-	-	1528	-	-
Mov Cap-2 Maneuver	798	748	-	778	676	-	-	-	-	-	-	-
Stage 1	943	835	-	938	835	-	-	-	-	-	-	-
Stage 2	906	835	-	892	771	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	9.8		8.8		0		0.3	
HCM LOS	A		A					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1452	-	-	797	966	1528	-
HCM Lane V/C Ratio	-	-	-	0.064	0.021	0.004	-
HCM Control Delay (s)	0	-	-	9.8	8.8	7.4	-
HCM Lane LOS	A	-	-	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-

HCM 6th TWSC
12: 'F' Street/East Retail Access & "C" Street

Existing Plus Total Site-Generated Traffic
AM Peak Hour

Intersection												
Int Delay, s/veh	4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	31	19	6	4	72	0	24	0	7	0	0	20
Future Vol, veh/h	31	19	6	4	72	0	24	0	7	0	0	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	34	21	7	4	78	0	26	0	8	0	0	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	78	0	0	28	0	0	190	179	25	183	182	78
Stage 1	-	-	-	-	-	-	93	93	-	86	86	-
Stage 2	-	-	-	-	-	-	97	86	-	97	96	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1520	-	-	1585	-	-	770	715	1051	778	712	983
Stage 1	-	-	-	-	-	-	914	818	-	922	824	-
Stage 2	-	-	-	-	-	-	910	824	-	910	815	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1520	-	-	1585	-	-	738	697	1051	758	694	983
Mov Cap-2 Maneuver	-	-	-	-	-	-	738	697	-	758	694	-
Stage 1	-	-	-	-	-	-	894	800	-	902	822	-
Stage 2	-	-	-	-	-	-	887	822	-	883	797	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	4.1			0.4			9.8			8.7		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	791	1520	-	-	1585	-	-	983
HCM Lane V/C Ratio	0.043	0.022	-	-	0.003	-	-	0.022
HCM Control Delay (s)	9.8	7.4	-	-	7.3	0	-	8.7
HCM Lane LOS	A	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.1

Timings
1: Powers & Bradley Rd.

Existing Plus Total Site-Generated Traffic
PM Peak Hour

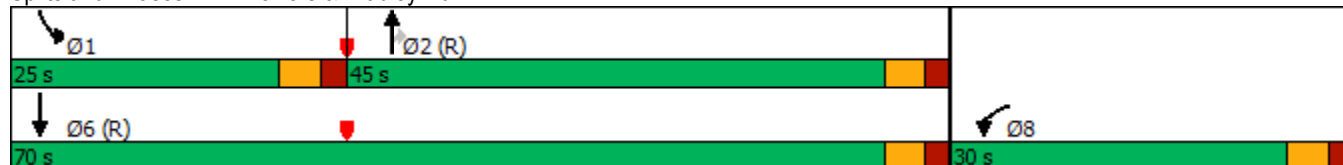
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	468	541	292	627	514	473
Future Volume (vph)	468	541	292	627	514	473
Turn Type	Prot	Free	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		Free		2		
Detector Phase	8		2	2	1	6
Switch Phase						
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	9.0		9.0	9.0	9.0	9.0
Total Split (s)	30.0		45.0	45.0	25.0	70.0
Total Split (%)	30.0%		45.0%	45.0%	25.0%	70.0%
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0	5.0	5.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		C-Max	C-Max	None	C-Max
Act Effect Green (s)	20.0	100.0	45.1	45.1	19.9	70.0
Actuated g/C Ratio	0.20	1.00	0.45	0.45	0.20	0.70
v/c Ratio	0.74	0.37	0.21	0.67	0.80	0.20
Control Delay	37.0	1.2	18.1	7.0	47.8	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.0	1.2	18.1	7.0	47.8	5.8
LOS	D	A	B	A	D	A
Approach Delay	17.8		10.5			27.7
Approach LOS	B		B			C

Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 18.7
 Intersection Capacity Utilization 61.8%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 1: Powers & Bradley Rd.



Timings

2: Waterview Full Access & Bradley Rd.

Existing Plus Total Site-Generated Traffic

PM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘↘	↘
Traffic Volume (vph)	641	500	220	564	445	158
Future Volume (vph)	641	500	220	564	445	158
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)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0	21.0	9.0	21.0	21.0	21.0
Total Split (s)	65.0	65.0	10.0	75.0	25.0	25.0
Total Split (%)	65.0%	65.0%	10.0%	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)	60.7	60.7	71.8	71.8	18.2	18.2
Actuated g/C Ratio	0.61	0.61	0.72	0.72	0.18	0.18
v/c Ratio	0.32	0.46	0.47	0.24	0.78	0.40
Control Delay	5.8	1.6	8.2	5.3	48.1	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	1.6	8.2	5.3	48.1	8.4
LOS	A	A	A	A	D	A
Approach Delay	4.0			6.1	37.7	
Approach LOS	A			A	D	

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

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

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 12.7

Intersection LOS: B

Intersection Capacity Utilization 55.1%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 2: Waterview Full Access & Bradley Rd.



HCM 6th TWSC
3: Waterview RIRO & Bradley Rd.

Existing Plus Total Site-Generated Traffic
PM Peak Hour

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗		↑↑		↗
Traffic Vol, veh/h	741	58	0	784	0	20
Future Vol, veh/h	741	58	0	784	0	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	500	-	-	-	0
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	805	63	0	852	0	22
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	403
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	597
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	597
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		11.3	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT		
Capacity (veh/h)	597	-	-	-		
HCM Lane V/C Ratio	0.036	-	-	-		
HCM Control Delay (s)	11.3	-	-	-		
HCM Lane LOS	B	-	-	-		
HCM 95th %tile Q(veh)	0.1	-	-	-		





HCM 6th Roundabout
5: "A" Street & "K" Street/"C" Street

Existing Plus Total Site-Generated Traffic
PM Peak Hour

Intersection				
Intersection Delay, s/veh	8.5			
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	357	162	142	783
Demand Flow Rate, veh/h	364	164	145	797
Vehicles Circulating, veh/h	426	506	536	3
Vehicles Exiting, veh/h	374	175	254	667
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	8.9	6.5	6.5	9.2
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	364	164	145	797
Cap Entry Lane, veh/h	894	824	799	1376
Entry HV Adj Factor	0.981	0.988	0.981	0.982
Flow Entry, veh/h	357	162	142	783
Cap Entry, veh/h	876	813	783	1352
V/C Ratio	0.407	0.199	0.182	0.579
Control Delay, s/veh	8.9	6.5	6.5	9.2
LOS	A	A	A	A
95th %tile Queue, veh	2	1	1	4

HCM 6th TWSC
9: "L" Street/West Retail Access & "K" Street

Existing Plus Total Site-Generated Traffic
PM Peak Hour

Intersection						
Int Delay, s/veh	7.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	51	83	2	30	90	2
Future Vol, veh/h	51	83	2	30	90	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	200	0	-	-	-	-
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	55	90	2	33	98	2
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	217	19	0	0	35	0
Stage 1	19	-	-	-	-	-
Stage 2	198	-	-	-	-	-
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	771	1059	-	-	1576	-
Stage 1	1004	-	-	-	-	-
Stage 2	835	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	723	1059	-	-	1576	-
Mov Cap-2 Maneuver	723	-	-	-	-	-
Stage 1	942	-	-	-	-	-
Stage 2	835	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	9.3	0	7.3			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 723 1059 1576	-	-		
HCM Lane V/C Ratio	-	- 0.077 0.085 0.062	-	-		
HCM Control Delay (s)	-	- 10.4 8.7 7.4	0			
HCM Lane LOS	-	- B A A	A			
HCM 95th %tile Q(veh)	-	- 0.2 0.3 0.2	-			

HCM 6th TWSC
10: "K" Street & Middle Retail Access/"U" Street

Existing Plus Total Site-Generated Traffic
PM Peak Hour

Intersection												
Int Delay, s/veh	4.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	↕
Traffic Vol, veh/h	198	2	0	0	2	12	0	120	0	20	134	184
Future Vol, veh/h	198	2	0	0	2	12	0	120	0	20	134	184
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	205	-	-	205	-	155
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	215	2	0	0	2	13	0	130	0	22	146	200






Major/Minor	Minor2		Minor1		Major1		Major2	
Conflicting Flow All	328	320	146	421	520	130	346	0
Stage 1	190	190	-	130	130	-	-	-
Stage 2	138	130	-	291	390	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-
Pot Cap-1 Maneuver	625	597	901	543	461	920	1213	-
Stage 1	812	743	-	874	789	-	-	-
Stage 2	865	789	-	717	608	-	-	-
Platoon blocked, %								-
Mov Cap-1 Maneuver	607	588	901	535	454	920	1213	-
Mov Cap-2 Maneuver	607	588	-	535	454	-	-	-
Stage 1	812	732	-	874	789	-	-	-
Stage 2	850	789	-	704	599	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.2	9.6	0	0.4
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1213	-	-	607	802	1455	-
HCM Lane V/C Ratio	-	-	-	0.358	0.019	0.015	-
HCM Control Delay (s)	0	-	-	14.2	9.6	7.5	-
HCM Lane LOS	A	-	-	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.6	0.1	0	-

HCM 6th TWSC
12: 'F' Street/East Retail Access & "C" Street

Existing Plus Total Site-Generated Traffic
PM Peak Hour

Intersection												
Int Delay, s/veh	5.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	78	61	20	14	48	0	15	0	5	1	0	86
Future Vol, veh/h	78	61	20	14	48	0	15	0	5	1	0	86
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	85	66	22	15	52	0	16	0	5	1	0	93













Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	52	0	0	88	0	0	376	329	77	332	340	52
Stage 1	-	-	-	-	-	-	247	247	-	82	82	-
Stage 2	-	-	-	-	-	-	129	82	-	250	258	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1554	-	-	1508	-	-	581	590	984	621	582	1016
Stage 1	-	-	-	-	-	-	757	702	-	926	827	-
Stage 2	-	-	-	-	-	-	875	827	-	754	694	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1554	-	-	1508	-	-	501	552	984	587	545	1016
Mov Cap-2 Maneuver	-	-	-	-	-	-	501	552	-	587	545	-
Stage 1	-	-	-	-	-	-	715	663	-	875	819	-
Stage 2	-	-	-	-	-	-	787	819	-	709	656	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	3.7			1.7			11.6			8.9		
HCM LOS							B			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	571	1554	-	-	1508	-	-	1008
HCM Lane V/C Ratio	0.038	0.055	-	-	0.01	-	-	0.094
HCM Control Delay (s)	11.6	7.5	-	-	7.4	0	-	8.9
HCM Lane LOS	B	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0.2	-	-	0	-	-	0.3

Timings
1: Powers & Bradley Rd.

Existing Plus Residential Site-Generated Traffic
AM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	402	604	517	271	337	289
Future Volume (vph)	402	604	517	271	337	289
Turn Type	Prot	Free	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		Free		2	6	
Detector Phase	8		2	2	1	6
Switch Phase						
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	9.0		9.0	9.0	9.0	9.0
Total Split (s)	35.0		45.0	45.0	20.0	65.0
Total Split (%)	35.0%		45.0%	45.0%	20.0%	65.0%
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0	5.0	5.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		C-Max	C-Max	None	C-Max
Act Effect Green (s)	27.3	100.0	44.1	44.1	62.7	62.7
Actuated g/C Ratio	0.27	1.00	0.44	0.44	0.63	0.63
v/c Ratio	0.88	0.40	0.37	0.35	0.66	0.14
Control Delay	50.1	1.3	20.6	3.6	15.7	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.1	1.3	20.6	3.6	15.7	8.3
LOS	D	A	C	A	B	A
Approach Delay	20.8		14.7			12.3
Approach LOS	C		B			B

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 16.6

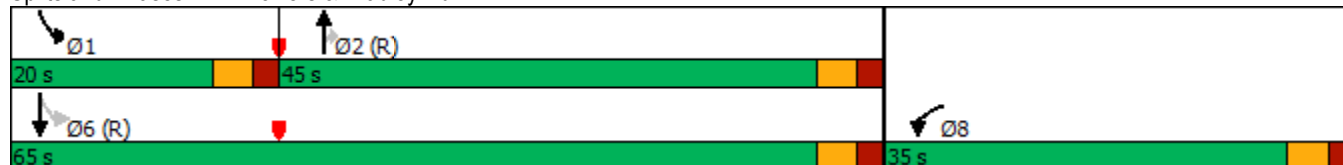
Intersection LOS: B

Intersection Capacity Utilization 67.7%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Powers & Bradley Rd.



Timings
2: Waterview Full Access & Bradley Rd.

Existing Plus Residential Site-Generated Traffic

AM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘↘	↘
Traffic Volume (vph)	531	76	36	723	283	79
Future Volume (vph)	531	76	36	723	283	79
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)	22.5	22.5	9.5	22.5	22.5	22.5
Total Split (s)	60.0	60.0	10.0	70.0	30.0	30.0
Total Split (%)	60.0%	60.0%	10.0%	70.0%	30.0%	30.0%
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	None	None
Act Effect Green (s)	70.2	70.2	76.7	76.7	14.3	14.3
Actuated g/C Ratio	0.70	0.70	0.77	0.77	0.14	0.14
v/c Ratio	0.23	0.07	0.06	0.29	0.63	0.29
Control Delay	10.2	5.5	3.5	4.0	46.0	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.2	5.5	3.5	4.0	46.0	10.7
LOS	B	A	A	A	D	B
Approach Delay	9.6			4.0	38.3	
Approach LOS	A			A	D	

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 47 (47%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 13.2

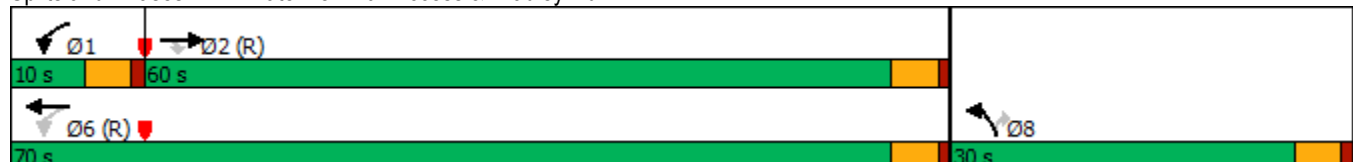
Intersection LOS: B

Intersection Capacity Utilization 38.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Waterview Full Access & Bradley Rd.



HCM 6th TWSC
2: Waterview Full Access & Bradley Rd.

Existing Plus Residential Site-Generated Traffic
AM Peak Hour

Intersection						
Int Delay, s/veh	43.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Vol, veh/h	531	76	36	723	283	79
Future Vol, veh/h	531	76	36	723	283	79
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	-	0	0
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	577	83	39	786	308	86

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	660	0	1048	289
Stage 1	-	-	-	-	577	-
Stage 2	-	-	-	-	471	-
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	-	-	924	-	~ 223	708
Stage 1	-	-	-	-	525	-
Stage 2	-	-	-	-	594	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	924	-	~ 214	708
Mov Cap-2 Maneuver	-	-	-	-	~ 214	-
Stage 1	-	-	-	-	503	-
Stage 2	-	-	-	-	594	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	208.5
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	214	708	-	-	924	-
HCM Lane V/C Ratio	1.437	0.121	-	-	0.042	-
HCM Control Delay (s)	263.7	10.8	-	-	9.1	-
HCM Lane LOS	F	B	-	-	A	-
HCM 95th %tile Q(veh)	18.1	0.4	-	-	0.1	-

Notes			
~: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗		↑↑		↗
Traffic Vol, veh/h	593	17	0	759	0	31
Future Vol, veh/h	593	17	0	759	0	31
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	500	-	-	-	0
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	645	18	0	825	0	34
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	323
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	673
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	673
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		10.6	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT		
Capacity (veh/h)	673	-	-	-		
HCM Lane V/C Ratio	0.05	-	-	-		
HCM Control Delay (s)	10.6	-	-	-		
HCM Lane LOS	B	-	-	-		
HCM 95th %tile Q(veh)	0.2	-	-	-		








HCM 6th Roundabout
5: "A" Street & "L" Street

Existing Plus Residential Site-Generated Traffic
AM Peak Hour

Intersection				
Intersection Delay, s/veh	4.1			
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	68	103	222	124
Demand Flow Rate, veh/h	69	104	226	125
Vehicles Circulating, veh/h	101	295	95	0
Vehicles Exiting, veh/h	24	26	75	399
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.4	4.5	4.5	3.4
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	69	104	226	125
Cap Entry Lane, veh/h	1245	1021	1252	1380
Entry HV Adj Factor	0.986	0.990	0.980	0.988
Flow Entry, veh/h	68	103	222	124
Cap Entry, veh/h	1227	1012	1228	1364
V/C Ratio	0.055	0.102	0.180	0.091
Control Delay, s/veh	3.4	4.5	4.5	3.4
LOS	A	A	A	A
95th %tile Queue, veh	0	0	1	0

Timings
1: Powers & Bradley Rd.

Existing Plus Residential Site-Generated Traffic
PM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	333	450	309	518	417	504
Future Volume (vph)	333	450	309	518	417	504
Turn Type	Prot	Free	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		Free		2	6	
Detector Phase	8		2	2	1	6
Switch Phase						
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	9.0		9.0	9.0	9.0	9.0
Total Split (s)	35.0		45.0	45.0	20.0	65.0
Total Split (%)	35.0%		45.0%	45.0%	20.0%	65.0%
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0	5.0	5.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		C-Max	C-Max	None	C-Max
Act Effect Green (s)	24.4	100.0	45.9	45.9	65.6	65.6
Actuated g/C Ratio	0.24	1.00	0.46	0.46	0.66	0.66
v/c Ratio	0.81	0.30	0.21	0.56	0.62	0.23
Control Delay	47.1	0.7	18.1	4.1	13.3	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.1	0.7	18.1	4.1	13.3	7.9
LOS	D	A	B	A	B	A
Approach Delay	20.5		9.3			10.3
Approach LOS	C		A			B

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 13.0

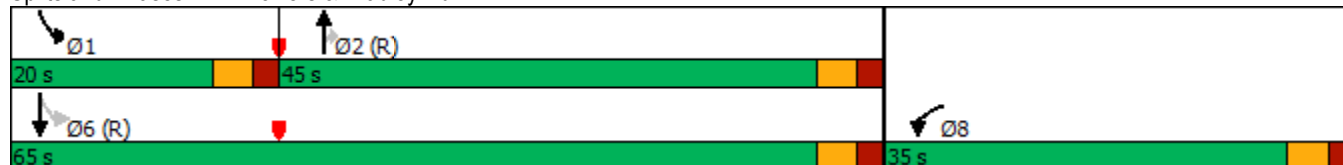
Intersection LOS: B

Intersection Capacity Utilization 63.5%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: Powers & Bradley Rd.



Timings
2: Waterview Full Access & Bradley Rd.

Existing Plus Residential Site-Generated Traffic
PM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘↘	↘
Traffic Volume (vph)	679	256	122	601	181	51
Future Volume (vph)	679	256	122	601	181	51
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)	22.5	22.5	9.5	22.5	22.5	22.5
Total Split (s)	60.0	60.0	10.0	70.0	30.0	30.0
Total Split (%)	60.0%	60.0%	10.0%	70.0%	30.0%	30.0%
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	None	None
Act Effect Green (s)	68.2	68.2	79.9	79.9	11.1	11.1
Actuated g/C Ratio	0.68	0.68	0.80	0.80	0.11	0.11
v/c Ratio	0.31	0.24	0.23	0.23	0.52	0.25
Control Delay	9.7	3.5	3.4	2.8	46.5	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.7	3.5	3.4	2.8	46.5	13.7
LOS	A	A	A	A	D	B
Approach Delay	8.0			2.9	39.4	
Approach LOS	A			A	D	

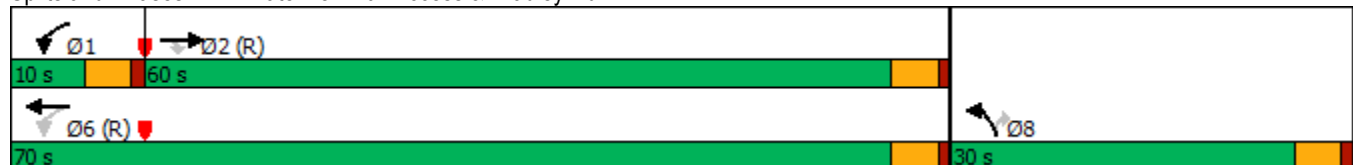
Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 47 (47%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.52
 Intersection Signal Delay: 9.9
 Intersection Capacity Utilization 41.9%
 Analysis Period (min) 15

Intersection LOS: A

ICU Level of Service A

Splits and Phases: 2: Waterview Full Access & Bradley Rd.



HCM 6th TWSC
2: Waterview Full Access & Bradley Rd.

Existing Plus Residential Site-Generated Traffic
PM Peak Hour

Intersection						
Int Delay, s/veh	39.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Vol, veh/h	679	256	122	601	181	51
Future Vol, veh/h	679	256	122	601	181	51
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	-	0	0
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	738	278	133	653	197	55

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	1016
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	-	678
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	678
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2	\$ 318.8
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	117	628	-	-	678	-
HCM Lane V/C Ratio	1.682	0.088	-	-	0.196	-
HCM Control Delay (s)	\$ 405.4	11.3	-	-	11.6	-
HCM Lane LOS	F	B	-	-	B	-
HCM 95th %tile Q(veh)	14.9	0.3	-	-	0.7	-

Notes			
~: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗		↑↑		↗
Traffic Vol, veh/h	672	58	0	723	0	20
Future Vol, veh/h	672	58	0	723	0	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	500	-	-	-	0
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	730	63	0	786	0	22
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	365
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	632
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	632
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		10.9	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT		
Capacity (veh/h)	632	-	-	-		
HCM Lane V/C Ratio	0.034	-	-	-		
HCM Control Delay (s)	10.9	-	-	-		
HCM Lane LOS	B	-	-	-		
HCM 95th %tile Q(veh)	0.1	-	-	-		

HCM 6th Roundabout
5: "A" Street & "L" Street

Existing Plus Residential Site-Generated Traffic


































PM Peak Hour

Intersection				
Intersection Delay, s/veh	4.8			
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	45	66	141	411
Demand Flow Rate, veh/h	46	67	144	419
Vehicles Circulating, veh/h	340	190	133	0
Vehicles Exiting, veh/h	79	87	253	257
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	4.2	3.7	4.1	5.3
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	46	67	144	419
Cap Entry Lane, veh/h	976	1137	1205	1380
Entry HV Adj Factor	0.978	0.985	0.980	0.981
Flow Entry, veh/h	45	66	141	411
Cap Entry, veh/h	954	1120	1181	1354
V/C Ratio	0.047	0.059	0.120	0.304
Control Delay, s/veh	4.2	3.7	4.1	5.3
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	1

Timings

1: Powers & Bradley Rd

2040 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	201	75	252	257	609	100	1909	359	420	930	19
Future Volume (vph)	26	201	75	252	257	609	100	1909	359	420	930	19
Turn Type	pm+pt	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free			Free			Free			6
Detector Phase	7	4		3	8		5	2		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	17.0		25.0	32.0		17.0	57.0		31.0	71.0	71.0
Total Split (%)	7.7%	13.1%		19.2%	24.6%		13.1%	43.8%		23.8%	54.6%	54.6%
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)	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
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)	17.4	12.4	130.0	15.1	26.5	130.0	9.3	52.0	130.0	30.5	73.2	73.2
Actuated g/C Ratio	0.13	0.10	1.00	0.12	0.20	1.00	0.07	0.40	1.00	0.23	0.56	0.56
v/c Ratio	0.16	0.63	0.05	0.65	0.37	0.40	0.42	0.97	0.23	0.54	0.33	0.02
Control Delay	38.4	65.1	0.1	51.1	35.3	2.3	62.7	52.0	0.3	47.4	16.4	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	38.4	65.1	0.1	51.1	35.3	2.3	62.7	52.0	0.3	47.4	16.4	0.1
LOS	D	E	A	D	D	A	E	D	A	D	B	A
Approach Delay		46.7			20.9			44.6			25.7	
Approach LOS		D			C			D			C	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

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

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 34.6

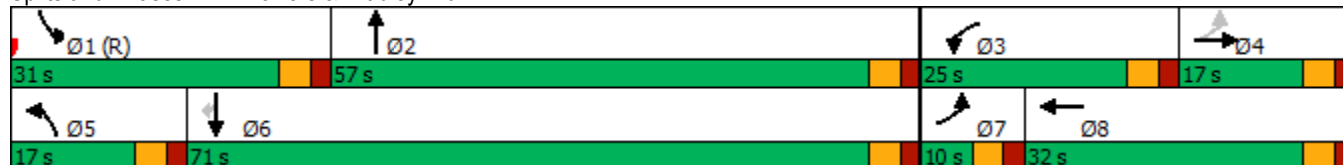
Intersection LOS: C

Intersection Capacity Utilization 81.1%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: Powers & Bradley Rd























Timings

2: "A" Street & Bradley Rd

2040 Background Traffic

AM Peak Hour

											
Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR	Ø1
Lane Configurations											
Traffic Volume (vph)	265	705	10	1049	43	10	10	70	10	59	
Future Volume (vph)	265	705	10	1049	43	10	10	70	10	59	
Turn Type	Prot	NA	Perm	NA	Perm	Prot	NA	Prot	NA	Perm	
Protected Phases	5	2		6		3	8	7	4		1
Permitted Phases			2		6					4	
Detector Phase	5	2	2	6	6	3	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
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
Total Split (s)	20.0	68.0	68.0	60.0	60.0	35.0	15.0	35.0	15.0	15.0	12.0
Total Split (%)	15.4%	52.3%	52.3%	46.2%	46.2%	26.9%	11.5%	26.9%	11.5%	11.5%	9%
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
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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lead	Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
Act Effect Green (s)	15.0	110.1	110.1	89.1	89.1	6.0	6.4	8.2	8.4	8.4	
Actuated g/C Ratio	0.12	0.85	0.85	0.69	0.69	0.05	0.05	0.06	0.06	0.06	
v/c Ratio	0.70	0.25	0.01	0.46	0.04	0.07	0.12	0.34	0.09	0.26	
Control Delay	69.5	9.2	0.0	11.6	0.1	60.0	61.6	62.2	57.4	2.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	69.5	9.2	0.0	11.6	0.1	60.0	61.6	62.2	57.4	2.7	
LOS	E	A	A	B	A	E	E	E	E	A	
Approach Delay		25.4		11.1			60.8		36.7		
Approach LOS		C		B			E		D		

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 74 (57%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 19.5

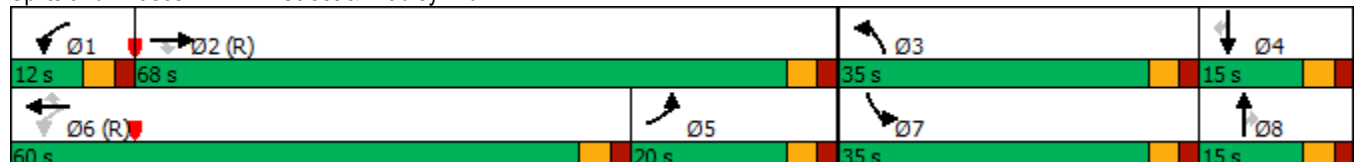
Intersection LOS: B

Intersection Capacity Utilization 57.7%

ICU Level of Service B

























Analysis Period (min) 15

Splits and Phases: 2: "A" Street & Bradley Rd



Timings
1: Powers & Bradley Rd

2040 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	343	210	437	384	619	175	842	377	506	1736	110
Future Volume (vph)	71	343	210	437	384	619	175	842	377	506	1736	110
Turn Type	pm+pt	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free			Free			Free			6
Detector Phase	7	4		3	8		5	2		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	29.0		30.0	49.0		15.0	33.0		38.0	56.0	56.0
Total Split (%)	7.7%	22.3%		23.1%	37.7%		11.5%	25.4%		29.2%	43.1%	43.1%
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)	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
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)	23.5	18.5	130.0	21.7	37.1	130.0	11.3	28.0	130.0	41.9	58.6	58.6
Actuated g/C Ratio	0.18	0.14	1.00	0.17	0.29	1.00	0.09	0.22	1.00	0.32	0.45	0.45
v/c Ratio	0.37	0.72	0.14	0.79	0.39	0.40	0.61	0.79	0.25	0.47	0.78	0.14
Control Delay	35.8	61.5	0.2	45.3	25.7	1.1	66.2	54.4	0.4	38.3	34.5	2.2
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	35.8	61.5	0.2	45.3	25.7	1.1	66.2	54.4	0.4	38.3	34.5	2.2
LOS	D	E	A	D	C	A	E	D	A	D	C	A
Approach Delay		37.9			21.1			41.3			33.8	
Approach LOS		D			C			D			C	

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: 0.79

Intersection Signal Delay: 32.9

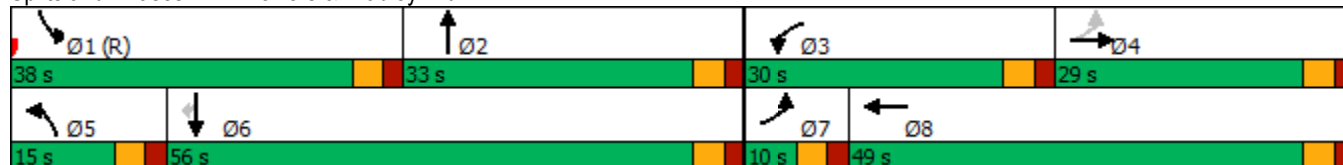
Intersection LOS: C

Intersection Capacity Utilization 77.1%

ICU Level of Service D





















Analysis Period (min) 15

Splits and Phases: 1: Powers & Bradley Rd



Timings 2: "A" Street & Bradley Rd

2040 Background Traffic
PM Peak Hour

											
Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR	Ø1
Lane Configurations											
Traffic Volume (vph)	352	824	50	1159	49	25	10	312	10	256	
Future Volume (vph)	352	824	50	1159	49	25	10	312	10	256	
Turn Type	Prot	NA	Perm	NA	Perm	pm+pt	NA	pm+pt	NA	Perm	
Protected Phases	5	2		6		3	8	7	4		1
Permitted Phases			2		6	8		4		4	
Detector Phase	5	2	2	6	6	3	8	7	4	4	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	15.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	25.0	75.0	75.0	65.0	65.0	30.0	10.0	30.0	10.0	10.0	15.0
Total Split (%)	19.2%	57.7%	57.7%	50.0%	50.0%	23.1%	7.7%	23.1%	7.7%	7.7%	12%
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
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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
Act Effect Green (s)	18.8	97.1	97.1	73.3	73.3	12.9	6.4	22.9	13.9	13.9	
Actuated g/C Ratio	0.14	0.75	0.75	0.56	0.56	0.10	0.05	0.18	0.11	0.11	
v/c Ratio	0.75	0.33	0.04	0.61	0.06	0.08	0.12	0.60	0.06	0.66	
Control Delay	42.7	10.1	2.2	22.6	0.1	43.6	61.6	52.3	51.8	14.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	42.7	10.1	2.2	22.6	0.1	43.6	61.6	52.3	51.8	14.1	
LOS	D	B	A	C	A	D	E	D	D	B	
Approach Delay		19.2		21.6			49.0		35.4		
Approach LOS		B		C			D		D		

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 39 (30%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 23.6

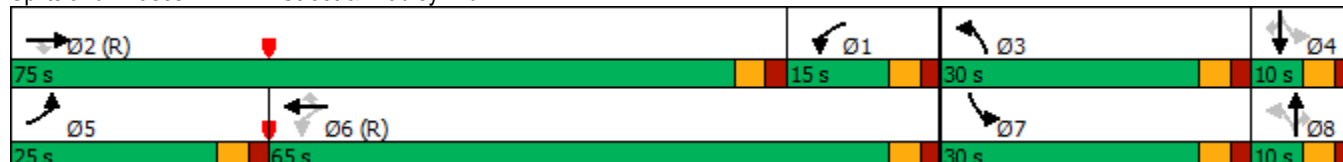
Intersection LOS: C

Intersection Capacity Utilization 70.1%

ICU Level of Service C

Analysis Period (min) 15

























Splits and Phases: 2: "A" Street & Bradley Rd



Timings

1: Powers & Bradley Rd

2040 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	222	75	314	295	723	100	1900	398	469	925	19
Future Volume (vph)	26	222	75	314	295	723	100	1900	398	469	925	19
Turn Type	pm+pt	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free			Free			Free			6
Detector Phase	7	4		3	8		5	2		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	17.0		25.0	32.0		17.0	57.0		31.0	71.0	71.0
Total Split (%)	7.7%	13.1%		19.2%	24.6%		13.1%	43.8%		23.8%	54.6%	54.6%
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)	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
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)	17.3	12.3	130.0	17.1	28.3	130.0	9.3	52.0	130.0	28.7	71.4	71.4
Actuated g/C Ratio	0.13	0.09	1.00	0.13	0.22	1.00	0.07	0.40	1.00	0.22	0.55	0.55
v/c Ratio	0.16	0.70	0.05	0.72	0.39	0.47	0.42	0.96	0.26	0.64	0.34	0.02
Control Delay	38.0	69.0	0.1	49.1	35.0	2.8	62.7	51.2	0.4	51.2	17.3	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	38.0	69.0	0.1	49.1	35.0	2.8	62.7	51.2	0.4	51.2	17.3	0.1
LOS	D	E	A	D	C	A	E	D	A	D	B	A
Approach Delay		50.5			20.9			43.2			28.3	
Approach LOS		D			C			D			C	

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: 0.96

Intersection Signal Delay: 34.4

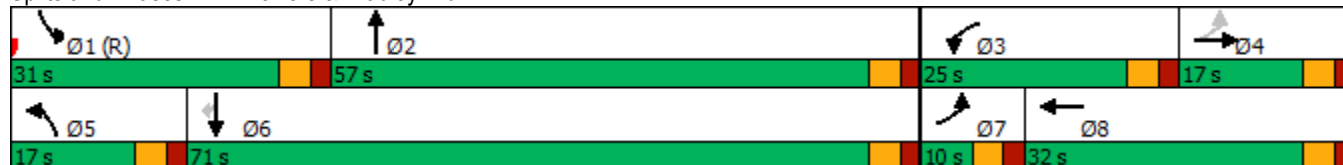
Intersection LOS: C

Intersection Capacity Utilization 84.0%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: Powers & Bradley Rd



























Timings

2: "A" Street & Bradley Rd

2040 Total Traffic

AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	265	705	118	95	1036	43	238	15	110	70	13	59
Future Volume (vph)	265	705	118	95	1036	43	238	15	110	70	13	59
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)	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)	20.0	68.0	68.0	12.0	60.0	60.0	35.0	15.0	15.0	35.0	15.0	15.0
Total Split (%)	15.4%	52.3%	52.3%	9.2%	46.2%	46.2%	26.9%	11.5%	11.5%	26.9%	11.5%	11.5%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	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)	15.0	81.8	81.8	75.7	75.7	75.7	14.8	13.3	13.3	8.2	6.6	6.6
Actuated g/C Ratio	0.12	0.63	0.63	0.58	0.58	0.58	0.11	0.10	0.10	0.06	0.05	0.05
v/c Ratio	0.70	0.33	0.12	0.25	0.53	0.05	0.64	0.08	0.40	0.34	0.15	0.29
Control Delay	72.7	23.7	12.1	15.2	18.6	0.1	62.4	52.5	8.4	62.2	62.1	3.4
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	72.7	23.7	12.1	15.2	18.6	0.1	62.4	52.5	8.4	62.2	62.1	3.4
LOS	E	C	B	B	B	A	E	D	A	E	E	A
Approach Delay		34.4			17.7			45.7			37.8	
Approach LOS		C			B			D			D	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 74 (57%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 29.0

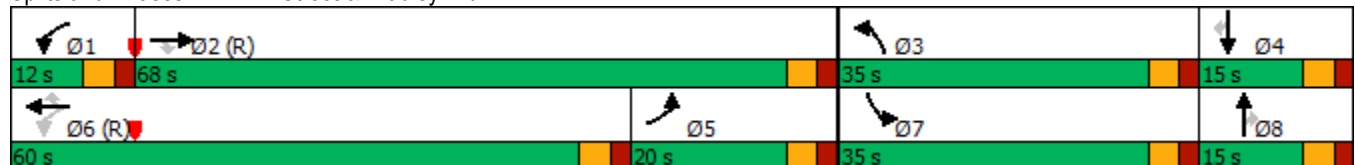
Intersection LOS: C

Intersection Capacity Utilization 62.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 2: "A" Street & Bradley Rd



HCM 6th TWSC
3: Waterview RIRO & Bradley Rd

2040 Total Traffic
AM Peak Hour

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗		↑↑		↗
Traffic Vol, veh/h	874	11	0	1174	0	30
Future Vol, veh/h	874	11	0	1174	0	30
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	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	95	95	98	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	892	12	0	1198	0	32
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	446
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	560
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	560
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		11.8	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1		EBT	EBR	WBT	
Capacity (veh/h)	560		-	-	-	
HCM Lane V/C Ratio	0.056		-	-	-	
HCM Control Delay (s)	11.8		-	-	-	
HCM Lane LOS	B		-	-	-	
HCM 95th %tile Q(veh)	0.2		-	-	-	





HCM 6th Roundabout
5: "A" Street & "L" Street

2040 Total Traffic
AM Peak Hour

Intersection				
Intersection Delay, s/veh	4.4			
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	124	94	206	244
Demand Flow Rate, veh/h	126	96	210	249
Vehicles Circulating, veh/h	132	324	170	17
Vehicles Exiting, veh/h	134	56	88	403
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.9	4.6	4.8	4.2
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	126	96	210	249
Cap Entry Lane, veh/h	1206	992	1160	1356
Entry HV Adj Factor	0.984	0.979	0.982	0.982
Flow Entry, veh/h	124	94	206	244
Cap Entry, veh/h	1187	971	1139	1331
V/C Ratio	0.104	0.097	0.181	0.184
Control Delay, s/veh	3.9	4.6	4.8	4.2
LOS	A	A	A	A
95th %tile Queue, veh	0	0	1	1

HCM 6th TWSC
9: "L" Street & West Retail Access

2040 Total Traffic
AM Peak Hour

Intersection						
Int Delay, s/veh	5.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	12	33	1	34	21	0
Future Vol, veh/h	12	33	1	34	21	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	200	0	-	-	-	-
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	13	36	1	37	23	0
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	66	20	0	0	38	0
Stage 1	20	-	-	-	-	-
Stage 2	46	-	-	-	-	-
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	939	1058	-	-	1572	-
Stage 1	1003	-	-	-	-	-
Stage 2	976	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	925	1058	-	-	1572	-
Mov Cap-2 Maneuver	925	-	-	-	-	-
Stage 1	988	-	-	-	-	-
Stage 2	976	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	8.6	0	7.3			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 925 1058 1572	-	-		
HCM Lane V/C Ratio	-	- 0.014 0.034 0.015	-	-		
HCM Control Delay (s)	-	- 8.9 8.5 7.3	0			
HCM Lane LOS	-	- A A A	A			
HCM 95th %tile Q(veh)	-	- 0 0.1 0	-			

HCM 6th TWSC
10: "L" Street & Middle Retail Access/"U" Street

2040 Total Traffic
AM Peak Hour

Intersection												
Int Delay, s/veh	2.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	↕
Traffic Vol, veh/h	46	1	0	0	1	13	0	55	0	5	45	74
Future Vol, veh/h	46	1	0	0	1	13	0	55	0	5	45	74
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	205	-	-	205	-	155
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	50	1	0	0	1	14	0	60	0	5	49	80






Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	127	119	49	160	199	60	129	0	0	60	0	0
Stage 1	59	59	-	60	60	-	-	-	-	-	-	-
Stage 2	68	60	-	100	139	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	849	773	1022	808	699	1008	1463	-	-	1550	-	-
Stage 1	955	848	-	954	847	-	-	-	-	-	-	-
Stage 2	945	847	-	909	784	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	834	771	1022	805	697	1008	1463	-	-	1550	-	-
Mov Cap-2 Maneuver	834	771	-	805	697	-	-	-	-	-	-	-
Stage 1	955	845	-	954	847	-	-	-	-	-	-	-
Stage 2	931	847	-	905	782	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.6	8.7	0	0.3
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1463	-	-	833	977	1550	-
HCM Lane V/C Ratio	-	-	-	0.061	0.016	0.004	-
HCM Control Delay (s)	0	-	-	9.6	8.7	7.3	-
HCM Lane LOS	A	-	-	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0	0	-

HCM 6th TWSC
12: 'F' Street/East Retail Access & "C" Street

2040 Total Traffic
AM Peak Hour

Intersection												
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	20	0	0	67	0	0	0	0	0	0	13
Future Vol, veh/h	22	20	0	0	67	0	0	0	0	0	0	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	24	22	0	0	73	0	0	0	0	0	0	14

























Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	73	0	0	22	0	0	150	143	22	143	143	73
Stage 1	-	-	-	-	-	-	70	70	-	73	73	-
Stage 2	-	-	-	-	-	-	80	73	-	70	70	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1527	-	-	1593	-	-	818	748	1055	826	748	989
Stage 1	-	-	-	-	-	-	940	837	-	937	834	-
Stage 2	-	-	-	-	-	-	929	834	-	940	837	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1527	-	-	1593	-	-	797	736	1055	816	736	989
Mov Cap-2 Maneuver	-	-	-	-	-	-	797	736	-	816	736	-
Stage 1	-	-	-	-	-	-	925	824	-	922	834	-
Stage 2	-	-	-	-	-	-	916	834	-	925	824	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	3.9	0	0	8.7
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1527	-	-	1593	-	-	989
HCM Lane V/C Ratio	-	0.016	-	-	-	-	-	0.014
HCM Control Delay (s)	0	7.4	-	-	0	-	-	8.7
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0

Timings
1: Powers & Bradley Rd

2040 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	401	210	533	429	726	175	825	479	671	1705	110
Future Volume (vph)	71	401	210	533	429	726	175	825	479	671	1705	110
Turn Type	pm+pt	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free			Free			Free			6
Detector Phase	7	4		3	8		5	2		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	29.0		30.0	49.0		15.0	33.0		38.0	56.0	56.0
Total Split (%)	7.7%	22.3%		23.1%	37.7%		11.5%	25.4%		29.2%	43.1%	43.1%
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)	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
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)	25.3	20.3	130.0	23.8	41.2	130.0	10.6	28.0	130.0	37.8	55.2	55.2
Actuated g/C Ratio	0.19	0.16	1.00	0.18	0.32	1.00	0.08	0.22	1.00	0.29	0.42	0.42
v/c Ratio	0.35	0.76	0.14	0.87	0.39	0.47	0.64	0.78	0.31	0.69	0.81	0.15
Control Delay	33.4	61.8	0.2	55.0	28.9	1.3	68.9	53.8	0.5	46.2	37.5	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	33.4	61.8	0.2	55.0	28.9	1.3	68.9	53.8	0.5	46.2	37.5	2.3
LOS	C	E	A	D	C	A	E	D	A	D	D	A
Approach Delay		39.9			25.2			38.3			38.3	
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: 0.87

Intersection Signal Delay: 35.0

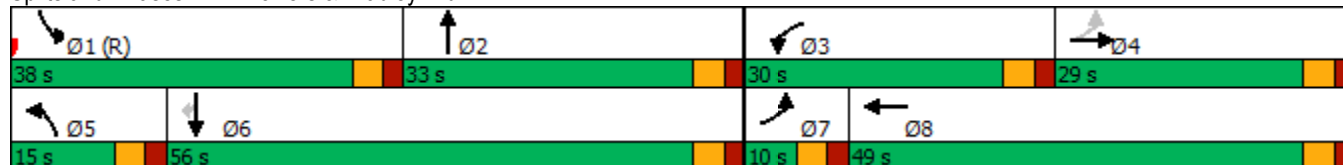
Intersection LOS: D

Intersection Capacity Utilization 80.9%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: Powers & Bradley Rd



























Timings

2: "A" Street & Bradley Rd

2040 Total Traffic

PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	352	824	375	258	1122	49	310	17	203	312	19	256
Future Volume (vph)	352	824	375	258	1122	49	310	17	203	312	19	256
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	5.0	5.0	10.0	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	15.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	25.0	75.0	75.0	15.0	65.0	65.0	30.0	10.0	10.0	30.0	10.0	10.0
Total Split (%)	19.2%	57.7%	57.7%	11.5%	50.0%	50.0%	23.1%	7.7%	7.7%	23.1%	7.7%	7.7%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	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)	18.2	74.0	74.0	65.8	65.8	65.8	27.8	10.1	10.1	24.1	8.2	8.2
Actuated g/C Ratio	0.14	0.57	0.57	0.51	0.51	0.51	0.21	0.08	0.08	0.19	0.06	0.06
v/c Ratio	0.77	0.42	0.37	0.67	0.64	0.06	0.50	0.12	0.67	0.56	0.17	0.76
Control Delay	48.5	14.6	4.5	39.6	26.4	0.1	44.0	57.4	18.0	45.2	60.5	21.5
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	48.5	14.6	4.5	39.6	26.4	0.1	44.0	57.4	18.0	45.2	60.5	21.5
LOS	D	B	A	D	C	A	D	E	B	D	E	C
Approach Delay		19.9			27.9			34.5			35.4	
Approach LOS		B			C			C			D	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 39 (30%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 26.8

Intersection LOS: C

Intersection Capacity Utilization 69.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: "A" Street & Bradley Rd



HCM 6th TWSC
3: Waterview RIRO & Bradley Rd

2040 Total Traffic
PM Peak Hour

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗		↑↑		↗
Traffic Vol, veh/h	1301	38	0	1429	0	19
Future Vol, veh/h	1301	38	0	1429	0	19
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	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	95	95	98	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1328	40	0	1458	0	20
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	664
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	403
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	403
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		14.4	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT		
Capacity (veh/h)	403	-	-	-		
HCM Lane V/C Ratio	0.05	-	-	-		
HCM Control Delay (s)	14.4	-	-	-		
HCM Lane LOS	B	-	-	-		
HCM 95th %tile Q(veh)	0.2	-	-	-		





HCM 6th Roundabout
5: "A" Street & "K" Street/"C" Street

2040 Total Traffic
PM Peak Hour

Intersection				
Intersection Delay, s/veh	7.9			
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	336	138	179	686
Demand Flow Rate, veh/h	343	139	183	698
Vehicles Circulating, veh/h	401	478	449	48
Vehicles Exiting, veh/h	345	154	295	569
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	8.3	5.9	6.4	8.6
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	343	139	183	698
Cap Entry Lane, veh/h	917	847	873	1314
Entry HV Adj Factor	0.979	0.992	0.979	0.983
Flow Entry, veh/h	336	138	179	686
Cap Entry, veh/h	898	841	855	1292
V/C Ratio	0.374	0.164	0.210	0.531
Control Delay, s/veh	8.3	5.9	6.4	8.6
LOS	A	A	A	A
95th %tile Queue, veh	2	1	1	3

HCM 6th TWSC
9: "L" Street/West Retail Access & "K" Street

2040 Total Traffic
PM Peak Hour

Intersection						
Int Delay, s/veh	7.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	39	83	2	22	90	2
Future Vol, veh/h	39	83	2	22	90	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	200	0	-	-	-	-
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	42	90	2	24	98	2
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	212	14	0	0	26	0
Stage 1	14	-	-	-	-	-
Stage 2	198	-	-	-	-	-
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	776	1066	-	-	1588	-
Stage 1	1009	-	-	-	-	-
Stage 2	835	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	728	1066	-	-	1588	-
Mov Cap-2 Maneuver	728	-	-	-	-	-
Stage 1	946	-	-	-	-	-
Stage 2	835	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	9.2	0	7.3			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 728 1066 1588			-	
HCM Lane V/C Ratio	-	- 0.058 0.085 0.062			-	
HCM Control Delay (s)	-	- 10.3 8.7 7.4			0	
HCM Lane LOS	-	- B A A			A	
HCM 95th %tile Q(veh)	-	- 0.2 0.3 0.2			-	

HCM 6th TWSC
10: "K" Street & Middle Retail Access/"U" Street

2040 Total Traffic
PM Peak Hour

Intersection												
Int Delay, s/veh	4.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	↕
Traffic Vol, veh/h	198	2	0	0	2	9	0	112	0	15	122	184
Future Vol, veh/h	198	2	0	0	2	9	0	112	0	15	122	184
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	205	-	-	205	-	155
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	215	2	0	0	2	10	0	122	0	16	133	200






Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	293	287	133	388	487	122	333	0	0	122	0	0
Stage 1	165	165	-	122	122	-	-	-	-	-	-	-
Stage 2	128	122	-	266	365	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	659	623	916	571	481	929	1226	-	-	1465	-	-
Stage 1	837	762	-	882	795	-	-	-	-	-	-	-
Stage 2	876	795	-	739	623	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	645	616	916	565	476	929	1226	-	-	1465	-	-
Mov Cap-2 Maneuver	645	616	-	565	476	-	-	-	-	-	-	-
Stage 1	837	754	-	882	795	-	-	-	-	-	-	-
Stage 2	864	795	-	729	616	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	13.4		9.6		0		0.3	
HCM LOS	B		A					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1226	-	-	645 792	1465	-	-
HCM Lane V/C Ratio	-	-	-	0.337 0.015	0.011	-	-
HCM Control Delay (s)	0	-	-	13.4 9.6	7.5	-	-
HCM Lane LOS	A	-	-	B A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	1.5 0	0	-	-

HCM 6th TWSC
12: 'F' Street/East Retail Access & "C" Street

2040 Total Traffic
PM Peak Hour

Intersection												
Int Delay, s/veh	5.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	78	53	16	24	36	1	10	0	13	1	0	86
Future Vol, veh/h	78	53	16	24	36	1	10	0	13	1	0	86
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	85	58	17	26	39	1	11	0	14	1	0	93

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	40	0	0	75	0	0	375	329	67	336	337	40
Stage 1	-	-	-	-	-	-	237	237	-	92	92	-
Stage 2	-	-	-	-	-	-	138	92	-	244	245	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1570	-	-	1524	-	-	582	590	997	618	584	1031
Stage 1	-	-	-	-	-	-	766	709	-	915	819	-
Stage 2	-	-	-	-	-	-	865	819	-	760	703	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1570	-	-	1524	-	-	501	549	997	577	543	1031
Mov Cap-2 Maneuver	-	-	-	-	-	-	501	549	-	577	543	-
Stage 1	-	-	-	-	-	-	725	671	-	866	805	-
Stage 2	-	-	-	-	-	-	773	805	-	709	665	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	3.9	2.9	10.4	8.9
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	697	1570	-	-	1524	-	-	1022
HCM Lane V/C Ratio	0.036	0.054	-	-	0.017	-	-	0.093
HCM Control Delay (s)	10.4	7.4	-	-	7.4	0	-	8.9
HCM Lane LOS	B	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0.2	-	-	0.1	-	-	0.3

Queuing and Blocking Report

Intersection: 2: "A" Street & 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)	182	206	710	848	369	336	347	434	333	191	204	66
Average Queue (ft)	103	123	114	149	42	196	226	262	33	97	122	21
95th Queue (ft)	165	189	328	399	199	317	328	380	157	162	182	54
Link Distance (ft)			910	910	910		1231	1231				413
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	450	450				495			235	300	300	
Storage Blk Time (%)								11				
Queuing Penalty (veh)								5				

Intersection: 2: "A" Street & Bradley Rd

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	L	T	R
Maximum Queue (ft)	78	254	214	69	263
Average Queue (ft)	46	152	92	19	129
95th Queue (ft)	70	227	196	52	230
Link Distance (ft)		276	276	276	276
Upstream Blk Time (%)		0	0		2
Queuing Penalty (veh)		0	0		0
Storage Bay Dist (ft)	300				
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 12: 'F' Street/East Retail Access & "C" Street

Movement	EB	WB	NB	SB
Directions Served	L	LTR	LTR	LTR
Maximum Queue (ft)	31	24	35	79
Average Queue (ft)	3	2	15	33
95th Queue (ft)	17	15	40	56
Link Distance (ft)		468	144	191
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	150			
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 5