

American Furniture Warehouse

Traffic Impact Study

Prepared for:
Nolan Morrison
American Furniture Warehouse
8820 American Way
Englewood, CO 80112

JANUARY 20, 2021

LSC Transportation Consultants
Prepared by: Colleen Guillotte, P.E., PTOE, RSP
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LSC #204790



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January 20, 2021

Nolan Morrison
American Furniture Warehouse
8820 American Way
Englewood, CO 80112

RE: American Furniture
Colorado Springs, Colorado
Traffic Impact Study
LSC #204790

Dear Mr. Morrison:

In response to your request, LSC Transportation Consultants, Inc. has prepared this traffic impact study for the proposed American Furniture Warehouse to be located southwest of the intersection of Tutt Boulevard and Templeton Gap Road in Colorado Springs, Colorado. Figure 1 shows the site location.

REPORT CONTENTS

The report contains the following:

- The proposed land use for the site;
- The existing and planned roadways in the study area including the number of lanes, classifications, posted speed limits, existing and proposed intersection/access spacing, lane geometries, traffic controls, etc.;
- The existing traffic volumes at the intersection of Tutt/Templeton Gap and the current intersection level of service;
- The projected future peak-hour traffic volumes for the access points and the intersection of Tutt/Templeton Gap;
- The projected future levels of service at the access points and the intersection of Tutt/Templeton Gap;
- A queuing analysis of Tutt Boulevard and Templeton Gap Road adjacent to the site; and
- Findings and recommendations.

PREVIOUS TRAFFIC STUDIES

In February 2007, a traffic study was completed by LSC for this development (Powers Professional Park). The previous study included parcels to the northeast and southeast of the Tutt Boulevard/Templeton Gap intersection that are not included in this study. The northeast parcel is already developed. The southeast parcel was studied in the *Tuscany Plaza Building #5* traffic study, LSC, July 2019. Other studies that have been recently completed in the area include:

- *Galiant Townhomes*, LSC, May 2020
- *The Lodge III*, LSC, February 2020
- *Watermark at Greenbriar*, LSC, April 2019
- *Maverik at Woodmen and Tutt*, LSC, May 2017

SITE LAND USE AND ACCESS

The 34-acre site is planned to be developed with an American Furniture Warehouse. The facility will include a 122,500-square-foot show room and a 210,500 square-foot warehouse. Additionally, a shopping center will be developed on the northwest and southwest corners of the Tutt Boulevard/Templeton Gap Road roundabout. It has been assumed for the purposes of this report that these will be developed as proposed in the previous analysis of this site. Based on the previous report, it has been assumed that the northwest corner will develop with approximately 25,000 square feet of retail, restaurant, and office land use. The southwest corner has been assumed to develop with 22,600 square feet of bank, retail, and office land use.

Full-movement access is proposed to Tutt Boulevard about 475 feet south and 375 feet north of Templeton Gap Road (centerline to centerline). There are existing curb cuts and turn lanes at these proposed access locations. Both of these access points aligned with full-movement access points on the east side of Tutt Boulevard.

ACCESS SIGHT DISTANCE

Figure 3 shows the required City of Colorado Springs Engineering Criteria Manual vehicle lines-of-sight for intersection sight distance at the proposed access points to Tutt Boulevard. The sight-distance analysis is based on the posted speed limit of 30 miles per hour (mph) on Tutt Boulevard and is required to be 335 feet. As shown in Figure 3 intersection sight distances required can be met in both directions for the proposed access point to Tutt Boulevard.

EXISTING TRAFFIC CONDITIONS

Figure 1 shows the streets adjacent to and in the vicinity of the site. Adjacent streets serving the site are identified below followed by a brief description of each:

Tutt Boulevard is a four-lane Minor Arterial that runs north/south parallel to Powers Boulevard that extends north from Constitution Avenue to Cowpoke Road on the east side of Powers

Boulevard. Tutt Boulevard is planned to be extended north to Research Parkway. In the vicinity of the site, Tutt Boulevard has a raised median and a posted speed limit of 30 miles per hour (mph). The intersection with Templeton Gap is constructed as a modern two-lane roundabout.

Templeton Gap Road consists of many discontinuous sections that extend northeast through Colorado Springs. The section of Templeton Gap Road in the vicinity of the site is a two-lane Collector and has a posted speed limit of 35 mph.

Baseline Traffic Volumes

Figure 4 shows the morning and afternoon peak-hour traffic volumes at the intersection of Tutt Boulevard and Templeton Gap Road, based on counts conducted by LSC in September 2018. These traffic counts were used because they were conducted prior to the COVID-19 pandemic and therefore not affected by changes in traffic patterns as a result of the pandemic. The traffic count reports are attached.

EXISTING LEVELS OF SERVICE

Level of service (LOS) is a quantitative measure of the level of congestion or delay at an intersection. Level of service is indicated on a scale from “A” to “F.” LOS A represents control delay of less than 10 seconds for unsignalized and signalized intersections. LOS F represents control delay of more than 50 seconds for unsignalized intersections. Table 1 shows the level of service delay ranges.

Table 1: Intersection Levels of Service Delay Ranges

Level of Service	Signalized Intersections	Unsignalized Intersections
	Average Control Delay (seconds per vehicle)	Average Control Delay (seconds per vehicle) ⁽¹⁾
A	10.0 sec or less	10.0 sec or less
B	10.1-20.0 sec	10.1-15.0 sec
C	20.1-35.0 sec	15.1-25.0 sec
D	35.1-55.0 sec	25.1-35.0 sec
E	55.1-80.0 sec	35.1-50.0 sec
F	80.1 sec or more	50.1 sec or more
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 intersection of Tutt Boulevard/Templeton Gap Road was analyzed based on the roundabout method of analysis procedures found in the *Highway Capacity Manual, 6th Edition* by the Transportation Research Board. Figure 4 shows the detailed level of service analysis results. As shown, the intersection and all approaches operate at LOS A. The level of service (LOS) reports are attached.

BACKGROUND TRAFFIC

Background traffic is the traffic estimated to be on the adjacent roadways and at adjacent intersections without the proposed development's trip generation of site-generated traffic volumes. Background traffic includes the through traffic and the traffic generated by nearby developments, but assumes zero traffic generated by the site.

Figure 5 shows the 2040 background traffic volumes. The background traffic volume estimates were based on previous work completed in the area by LSC and other consultants (including the Maverik at Woodmen and Tutt, The Lodge II, Cumbre Vista, Powerwood Filing No.2, and Dublin North developments), and traffic count data.

The 2040 background traffic estimates assume the completed, full-width Tutt Boulevard arterial street connection between Dublin Boulevard and Woodmen Road. A connection just north of Dublin has been established. However, the current two-lane connection through recently-developed parcels is an interim condition. The 2040 scenario also assumes Tutt extended north to Research Parkway. The 2040 background volumes assume all of the currently-vacant parcels along Tutt Boulevard between Dublin Boulevard and Research Parkway are developed.

TRIP GENERATION

Estimates of the traffic volumes expected to be generated by the site were made using the nationally published trip-generation rates found in *Trip Generation, 10th Edition, 2017* by the Institute of Transportation Engineers (ITE). Table 2 shows the trip-generation estimates. For this analysis, the ITE land use Discount Home Furnishing Superstore (ITE Code 869) was used to represent American Furniture Warehouse. The adjacent commercial buildings were analyzed using the Shopping Center land use (ITE Code 820).

Table 2, below, presents a summary of the estimated site trip generation on a typical weekday. The detailed trip-generation estimate for the development, including ITE rates for the proposed land use, is presented in Table 3.

Approximately 10,280 total vehicle trips are projected to enter and exit the site at the access point ("driveway trips") on the average weekday during a 24-hour period. During the morning peak hour, approximately 230 vehicles would enter and 135 vehicles would exit the site. During the evening peak hour, approximately 427 vehicles would enter and 408 vehicles would exit the site.

The proposed development is projected to generate approximately 9,045 (new/non-pass-by or diverted) vehicle trips on the average weekday during a 24-hour period.

Table 2: Estimated External Site Vehicle-Trip Generation (Vehicles per Hour)

Analysis Period	Total Trips			Pass-by Trips			New Trips		
	In	Out	Total	In	Out	Total	In	Out	Total
A.M. Peak Hour	230	135	365	30	30	60	200	105	305
P.M. Peak Hour	427	408	835	53	53	106	374	302	676
Daily/24-Hour	5,140	5,140	10,280	617	617	1,234	4,523	4,523	9,046

Pass-by Trips

The trips generated by the site have also been aggregated by trip type to account for the pass-by phenomenon. A pass-by trip is one made by a motorist who would already be on an adjacent road regardless of the proposed development, but who stops in at the site while passing by. The pass-by motorist would then continue on his or her way to a final destination in the original direction. For purposes of this report, pass-by trips are trips by motorists already traveling on Tutt Boulevard. Pass-by trips are shown in Table 3 and are based on *Trip Generation Handbook - An ITE Proposed Recommended Practice, 3rd Edition, 2014* by ITE.

TRIP DISTRIBUTION AND ASSIGNMENT

The estimated directional distribution of the site-generated traffic volumes on the adjacent roadways is an important factor in determining the site's traffic impacts. Figure 6 shows the directional distribution estimates for the primary site-generated traffic. The estimates have been based on the following factors: the land use proposed for the site and its location (adjacent to two major streets), the existing and planned street and roadway system in the vicinity, and the existing/projected traffic volumes.

When the distribution percentages (from Figure 6) were applied to the trip-generation estimates (from Table 2), the site-generated traffic volumes on the area roadways were determined. Figure 7 shows the site-generated traffic volumes.

TOTAL TRAFFIC

Figure 8 shows the 2040 total traffic volumes at the site access points and the intersection of Tutt/Templeton Gap. The volumes are the sum of the 2040 background traffic volumes from Figure 5, plus the site-generated traffic volumes from Figure 7.

PROJECTED LEVELS OF SERVICE

Intersection Levels of Service

The site access points and the intersection of Tutt/Templeton Gap were analyzed to determine the projected levels of service for the 2040 background and total traffic volumes. Figures 5 and 8 show the level of service analysis results for the background and total traffic scenarios, respectively. The level of service (LOS) reports are attached.

The intersection of Tutt/Templeton Gap is designed as a two-lane modern roundabout. All approaches are projected to operate at LOS B or better during the peak hours, based on the projected 2040 total traffic volumes.

Both proposed full-movement site accesses to Tutt are projected to operate at a LOS D or better for all approaches during the peak hours as stop-sign-controlled intersections, with the exception of the westbound approach at the south access. This approach is anticipated to operate at LOS E during the afternoon peak. This approach is across from the site and is not anticipated to have any site-generated traffic on the leg.

VEHICLE QUEUING ANALYSIS

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

The projected 95th percentile northbound left-turn queue on Tutt Boulevard approaching the north site access is 40 feet long. There is currently no turn lane for this movement. However, there is adequate space within the existing median to construct a turn lane. It is recommended that the turn lane have a 60-foot reverse curve bay taper with 50 feet of storage.

The projected 95th percentile northbound left-turn queue on Tutt Boulevard approaching the south site access is 75 feet long. The existing turn lane is adequate for the projected queuing. The projected eastbound queue at this intersection is 170 feet. This could be reduced by constructing an eastbound right-turn lane.

The 95th percentile queues on all of the roundabout approaches are projected to be 100 feet or less. Therefore, the queues at the roundabout should not impact any adjacent access points.

INTERNAL ACCESS LOCATIONS

The locations of the internal access points west of Tutt Boulevard have not yet been determined. These internal access points will need to be spaced far enough from Tutt Boulevard to allow for queuing and potential turn bays.

First Internal Access West of the Roundabout

The access spacing west of the roundabout should allow for at least 100 feet of queuing at the eastbound approach to the roundabout. In addition, this access spacing should be sufficient to allow for a westbound left-turn pocket at the internal access point. Lastly, this spacing should allow for intersection sight distance between the access and the roundabout. It is estimated that vehicles exiting the roundabout into the site would have a speed of approximately 20-25 mph. This requires a minimum stopping sight distance of 115-155 feet. As the access is relatively close to the roundabout, LSC recommends this internal access spacing be further studied/evaluated with the development plan.

First Internal Access West of the Tutt/South Access Drive Intersection

The 95th percentile queue for the eastbound approach at the south site access is 170 feet, although this could be reduced by constructing an eastbound right-turn lane. The estimated turning speed for vehicles turning into the site would be approximately 15 mph, which requires a minimum stopping sight distance of 80 feet. This access spacing should allow for this queuing and sight distance. However, this internal access spacing should be further studied with the development plan.

CONCLUSIONS AND RECOMMENDATIONS

Trip Generation

- The proposed development is projected to generate about 9,045 new external vehicle trips on the average weekday, with about half entering and half exiting the site during a 24-hour period. During the morning peak hour, about 230 vehicles would enter and 135 vehicles would exit the site. During the afternoon peak hour, about 427 vehicles would enter and 408 vehicles would exit the site.

Projected Levels of Service

- The intersection of Tutt/Templeton Gap is projected to operate at LOS B or better during the peak hours, based on the projected 2040 total traffic volumes.
- The proposed full-movement site accesses to Tutt are projected to operate at a LOS D or better for all approaches during the peak hours as stop-sign-controlled intersections, with

the exception of the westbound approach at the south access. This approach is projected to operate at LOS E during the afternoon peak hour.

Recommendations

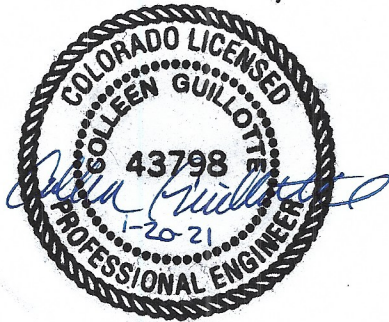
- There is not an existing northbound left-turn lane on Tutt Boulevard approaching the north site access. It is recommended that a turn lane be constructed with a 60-foot reverse curve bay taper and 50 feet of storage.
- The existing 140-foot northbound left-turn lane on Tutt Boulevard approaching the south site access could accommodate the projected queues, based on the 2040 total traffic volumes.

* * * * *

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

Sincerely,

LSC TRANSPORTATION CONSULTANTS, INC.



By _____
Colleen Guillotte, PE, PTOE, RSP
Project Manager

CRG:jas

Enclosures: Table 3
Figures 1-8
Traffic Count Reports
Level of Service Reports
Queuing Reports

Tables

Table 3. Detailed Trip Generation Estimate

														New External Trips Generated
Land Use Code	Land Use Description	Trip Generation Units	Trip Generation Rates ⁽¹⁾					Total Trips Generated					Pass-By Trips ⁽²⁾	Average
			Average Weekday	Morning Peak Hour	Afternoon Peak Hour	Average Weekday	Morning Peak Hour	Afternoon Peak Hour	Average Weekday					
			Traffic	In	Out	In	Out	Traffic	In	Out	In	Out		Traffic
820	Shopping Center	47.6 KSF ⁽³⁾	76.24	2.29	1.40	3.16	3.43	3,629	109	67	151	163	34%	2,395
869	Discount Home Furnishing Superstore	332.5 KSF	20.00	0.36	0.21	0.83	0.74	6,650	121	68	277	245	0%	6,650
Total Trip Generation Estimate								10,279	230	135	427	408		9,045
Notes:														
(1) Source: "Trip Generation, 10th Edition, 2017" by the Institute of Transportation Engineers (ITE)														
(2) Source: "Trip Generation Handbook - An ITE Proposed Recommended Practice, Third Edition September 2017" by ITE														
(3) KSF = one thousand square feet of floor space														
Source: LSC Transportation Consultants, Inc.														

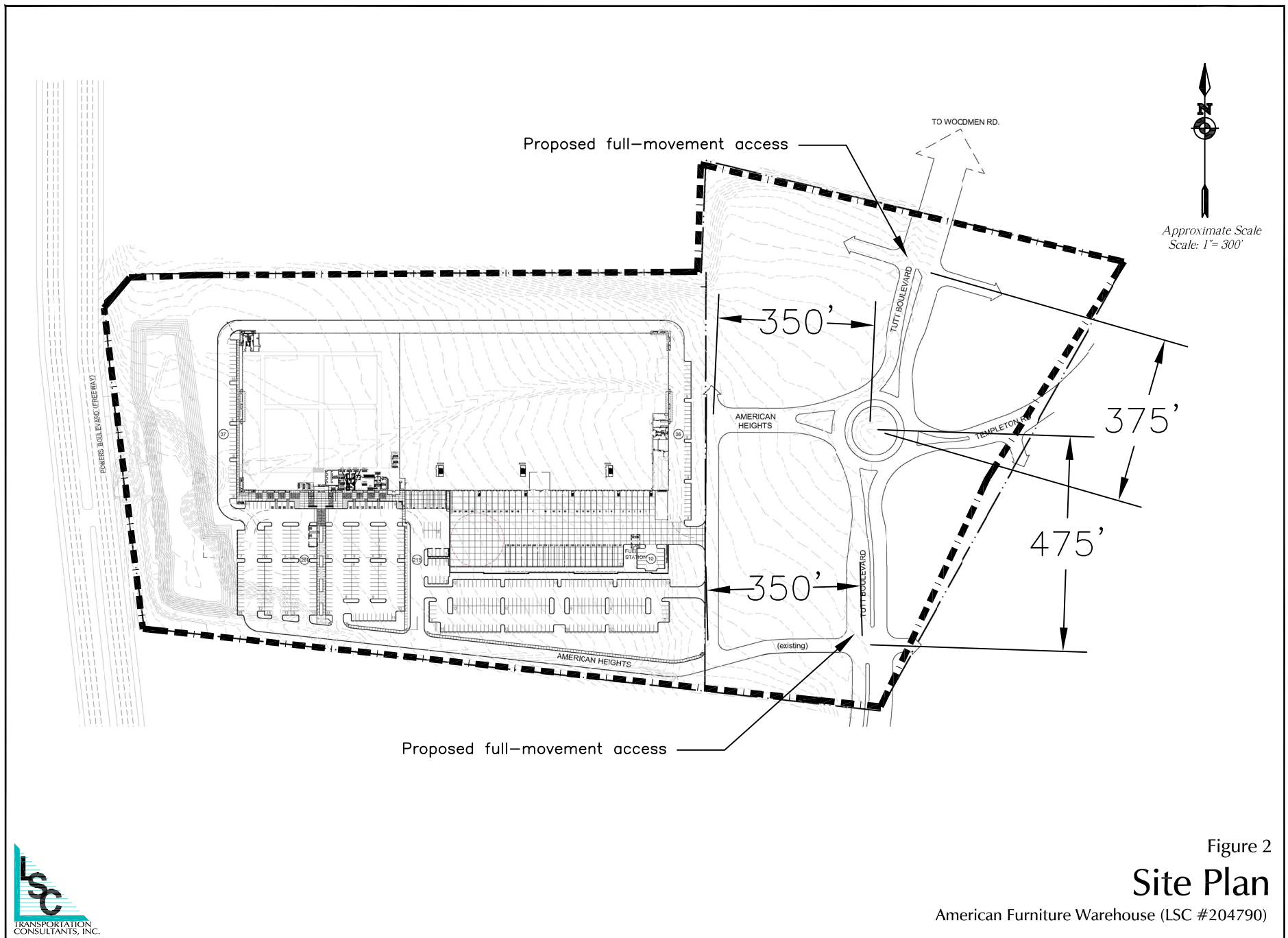
Figures

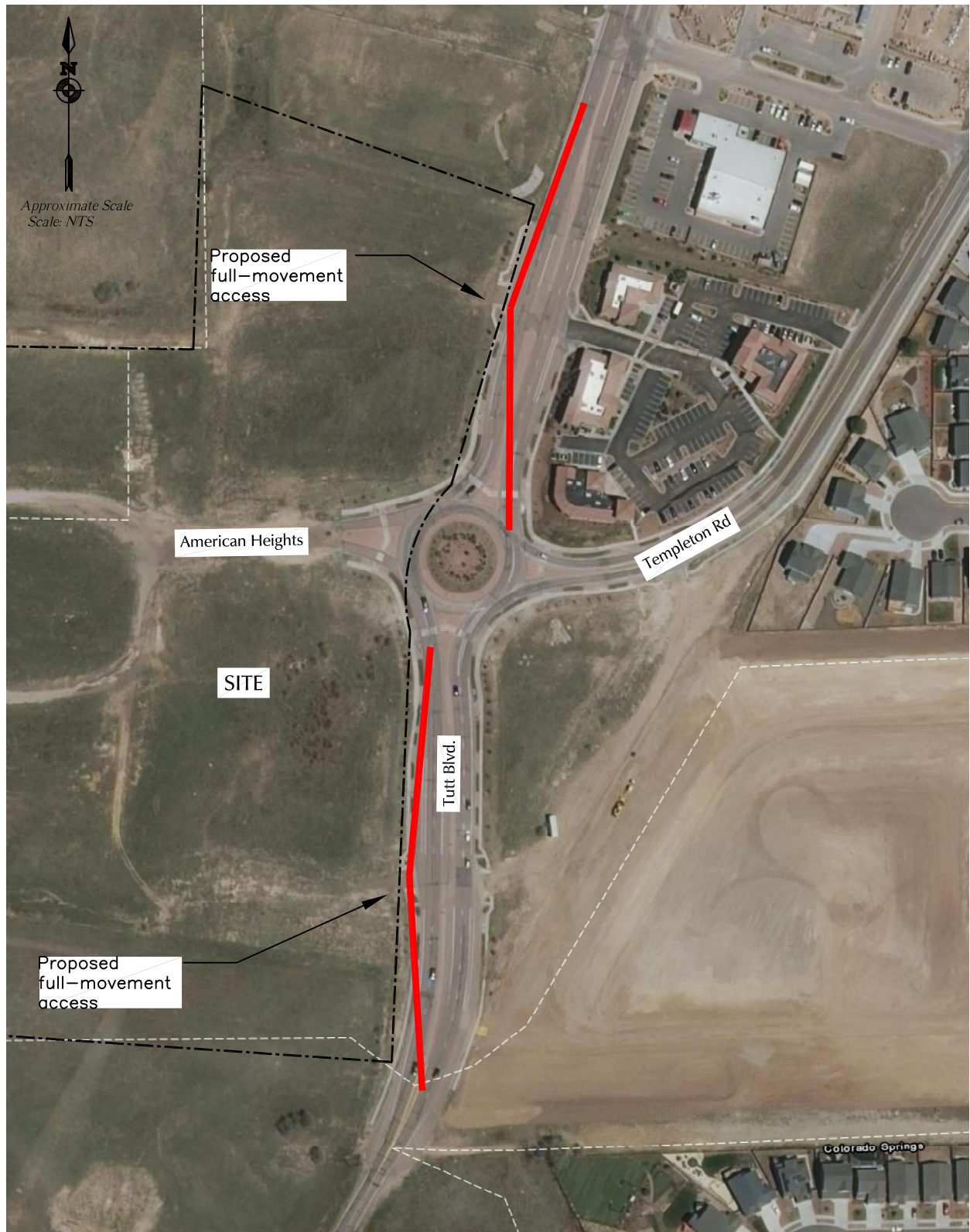


Approximate Scale
Scale: 1" = 1,200'

Figure 1
**Vicinity
Map**

American Furniture Warehouse (LSC #204790)



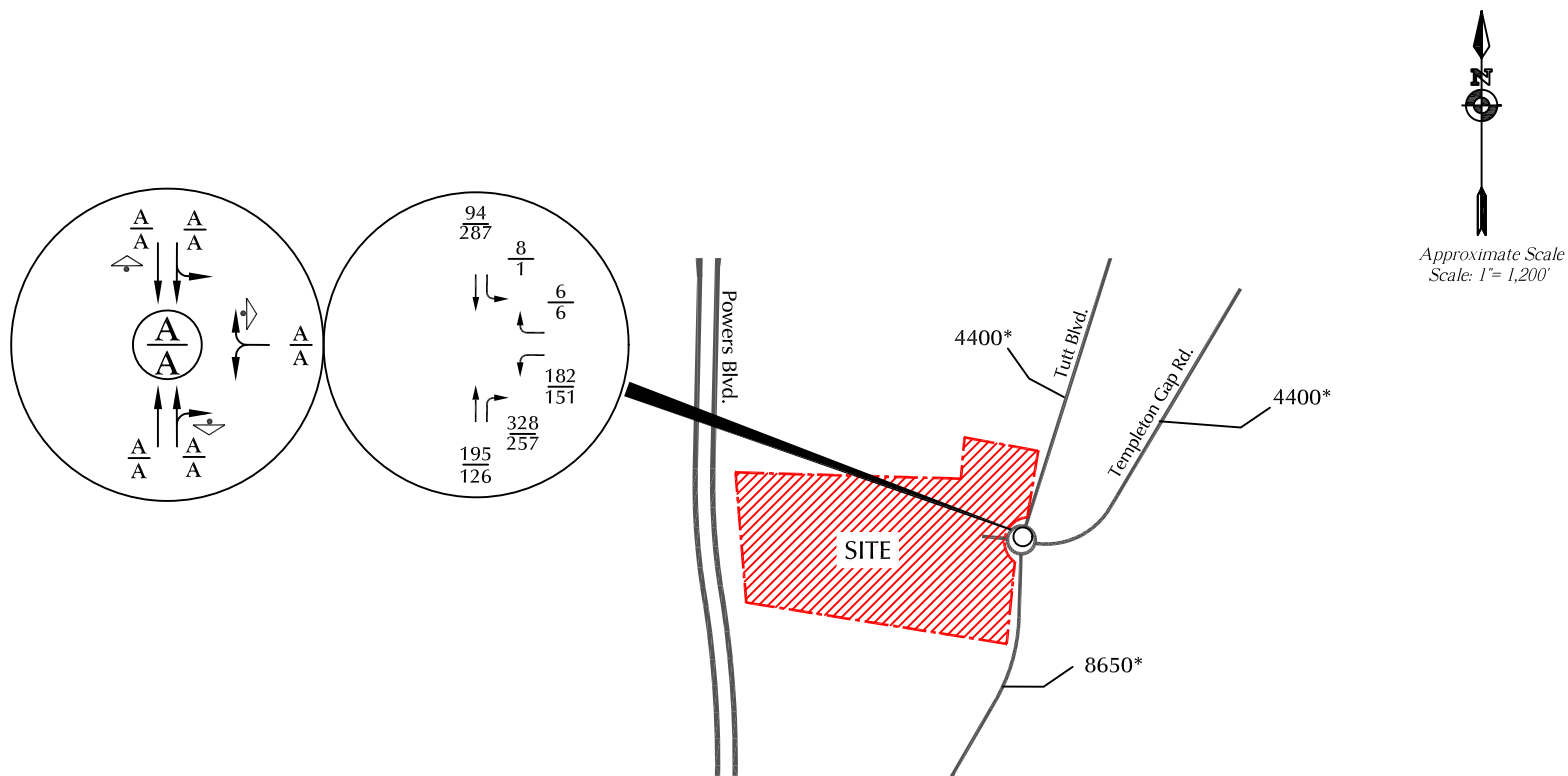


— = 335' Required
Sight Distance
(based on 30 mph)

Figure 3

Sight Distance Analysis

American Furniture Warehouse (LSC #204790)



LEGEND:

◁ = Yield Sign

*LSC Estimates

○ = Roundabout

$\frac{26}{31} = \frac{\text{AM Weekday Peak-Hour Traffic (vehicles per hour)}}{\text{PM Weekday Peak-Hour Traffic (vehicles per hour)}}$ Based on counts by LSC Sept 2018

XXX = Average Weekday Daily Traffic (vehicles per day)

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

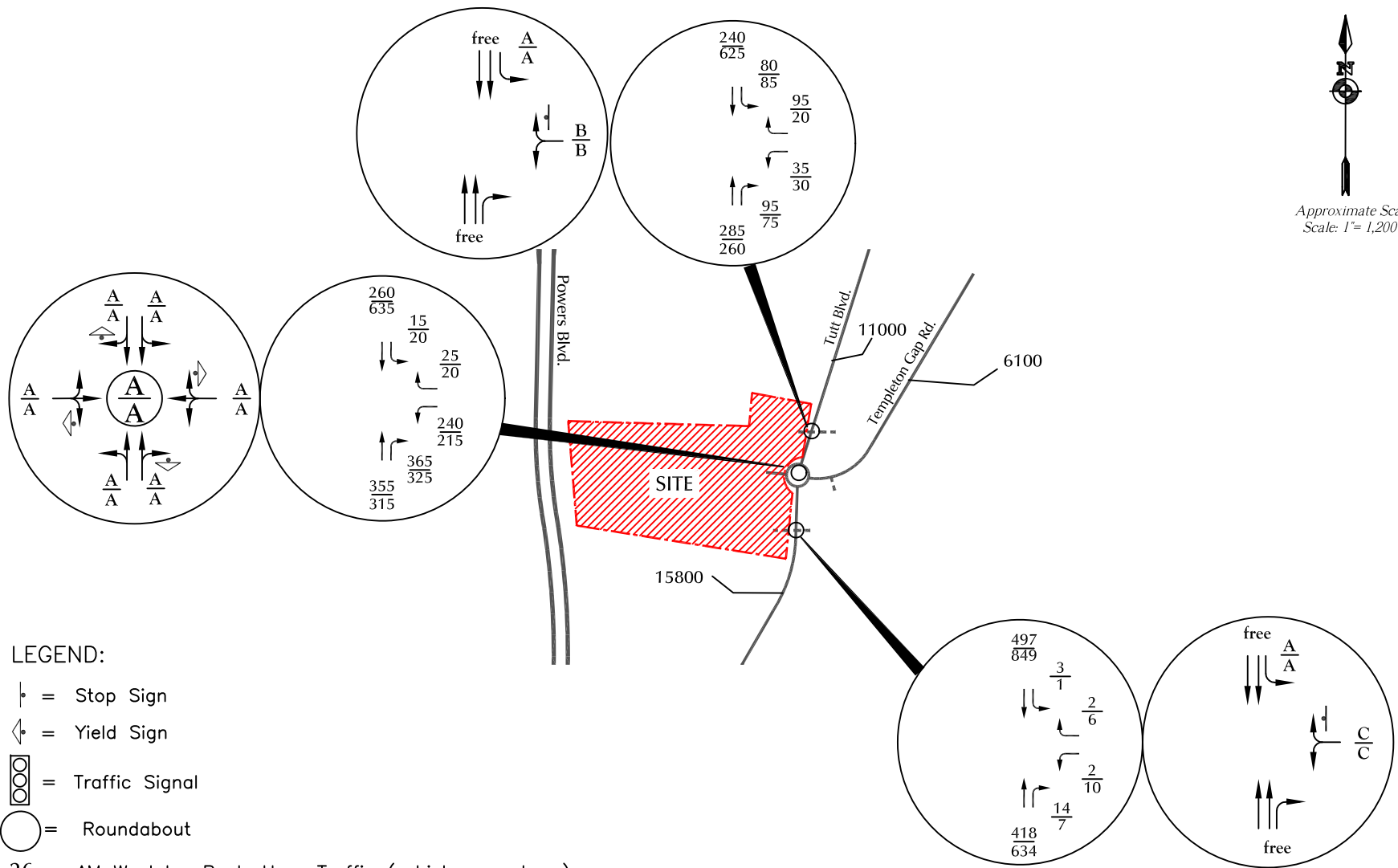
$\frac{C}{D} = \frac{\text{AM Entire Intersection Peak-Hour Level of Service}}{\text{PM Entire Intersection Peak-Hour Level of Service}}$



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

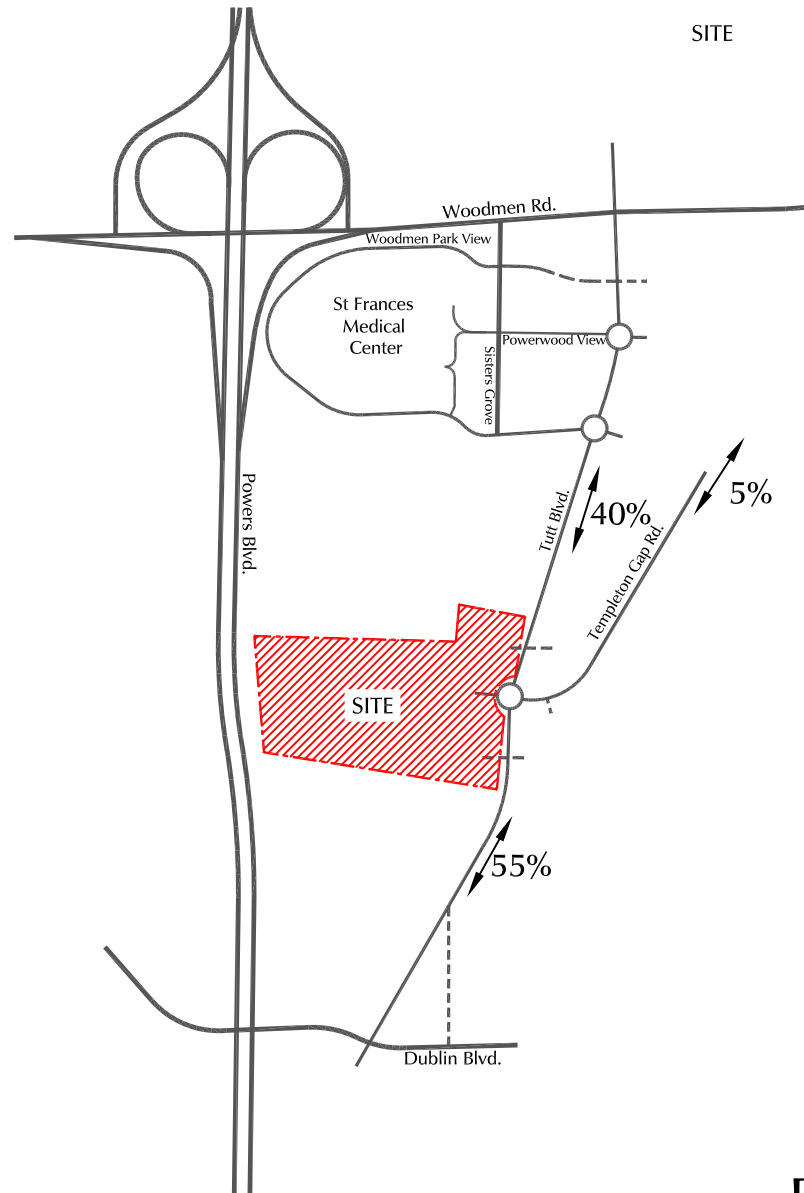
American Furniture Warehouse (LSC #204790)

Figure 4



2040 Background Traffic, Lane Geometry, Traffic Control and Level of Service

Figure 5



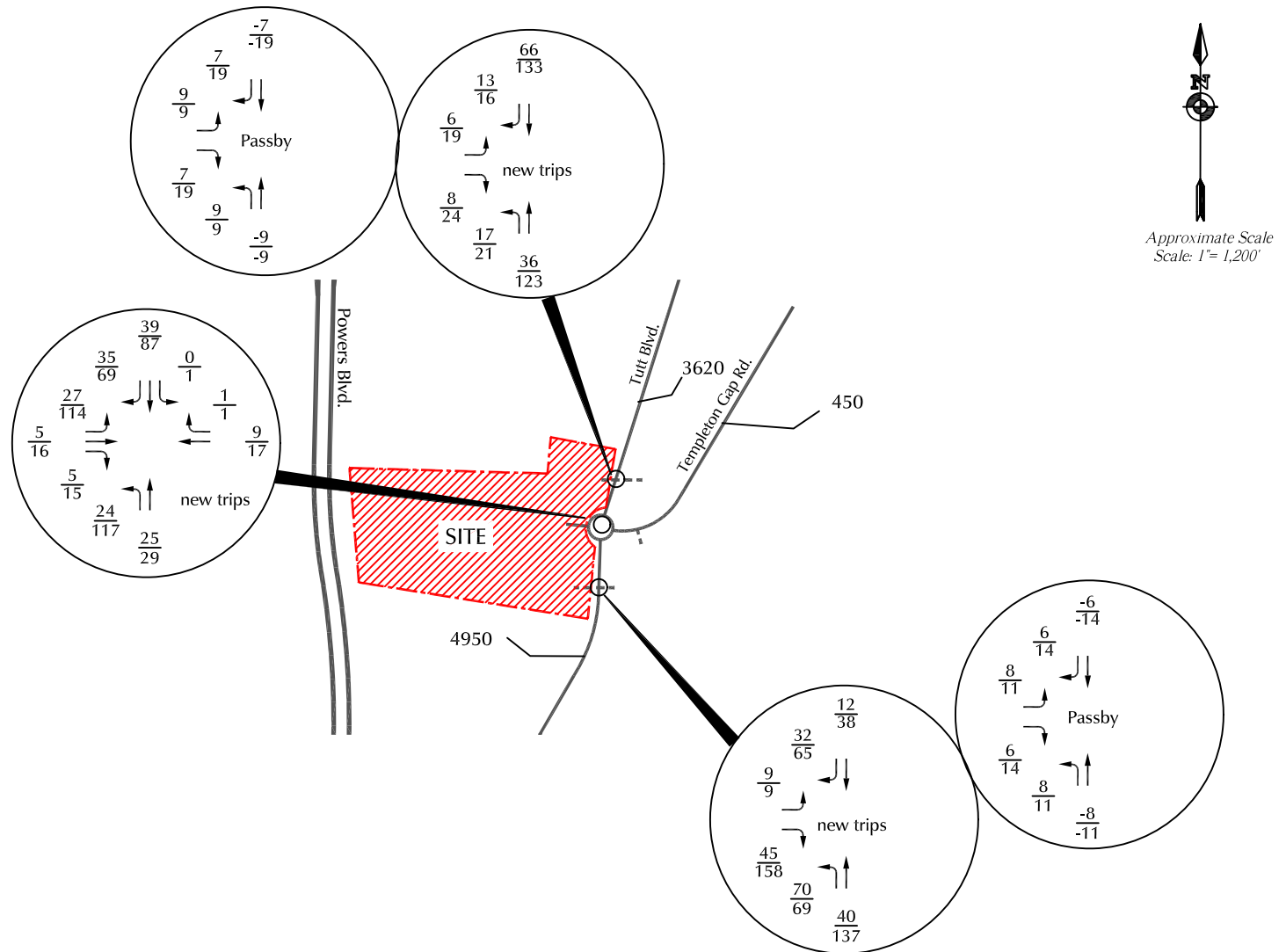
Approximate Scale
Scale: 1" = 1,200'

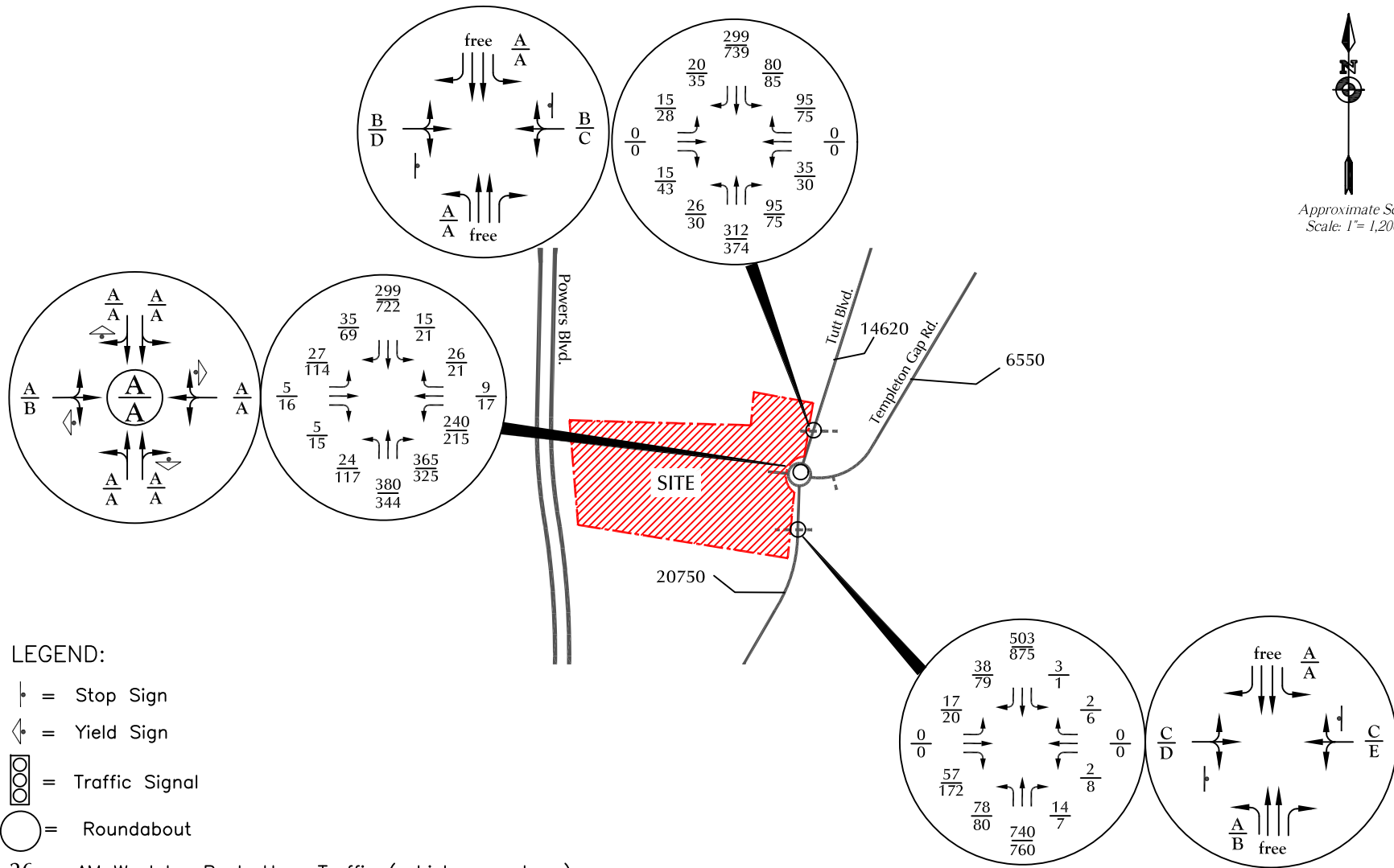
Figure 6
**Directional Distribution
of Site-Generated Traffic**

American Furniture Warehouse (LSC #204790)



LEGEND:
35% = Percent Directional Distribution (non-passby trips)





Approximate Scale
Scale: 1" = 1,200'

Figure 8
2040 Total Traffic, Lane Geometry,
Traffic Control and Level of Service

Traffic Counts

LSC Transportation Consultants, Inc.

545 E Pikes Peak Ave, Suite 210

Colorado Springs, CO 80905

719-633-2868

File Name : Tutt Blvd - Wolf Ridge Rd AM

Site Code : 00184850

Start Date : 9/11/2018

Page No : 1

Groups Printed- Unshifted

	Tutt Blvd Southbound				Wolf Ridge Rd Westbound				Tutt Blvd Northbound				Wolf Ridge Rd Eastbound				Int. Total
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
06:30	0	9	0	0	18	0	0	0	0	30	31	0	0	0	0	0	88
06:45	0	14	0	0	23	0	0	0	0	54	57	0	0	0	0	0	148
Total	0	23	0	0	41	0	0	0	0	84	88	0	0	0	0	0	236
07:00	2	13	0	2	33	0	1	1	0	33	95	0	0	0	0	0	180
07:15	6	29	0	0	55	0	2	0	0	52	132	0	0	0	0	0	276
07:30	0	25	0	0	48	0	3	0	0	43	54	0	0	0	0	0	173
07:45	0	27	0	0	46	0	0	0	0	67	47	0	0	0	0	0	187
Total	8	94	0	2	182	0	6	1	0	195	328	0	0	0	0	0	816
08:00	1	23	0	0	36	0	0	0	0	46	40	0	0	0	0	0	146
08:15	0	25	0	0	19	0	3	0	0	50	34	0	0	0	0	0	131
Grand Total	9	165	0	2	278	0	9	1	0	375	490	0	0	0	0	0	1329
Apprch %	5.1	93.8	0	1.1	96.5	0	3.1	0.3	0	43.4	56.6	0	0	0	0	0	
Total %	0.7	12.4	0	0.2	20.9	0	0.7	0.1	0	28.2	36.9	0	0	0	0	0	

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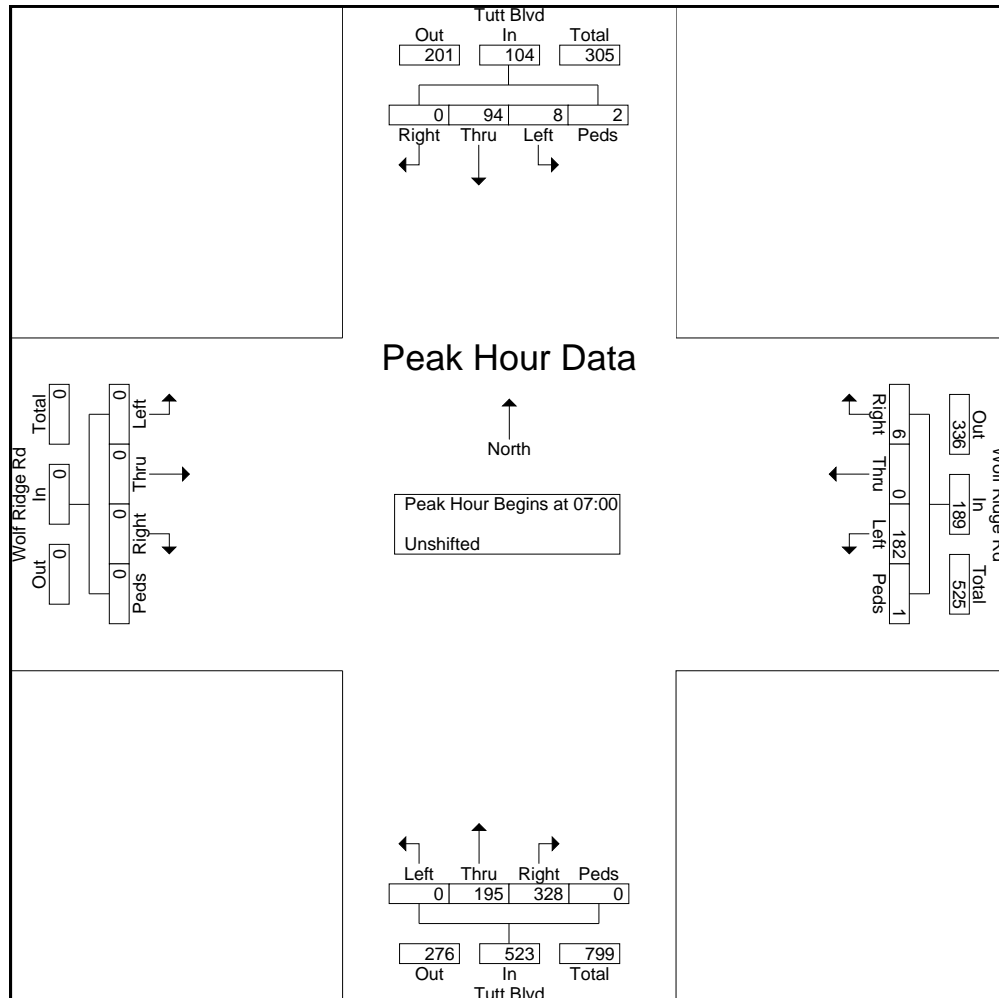
File Name : Tutt Blvd - Wolf Ridge Rd AM

Site Code : 00184850

Start Date : 9/11/2018

Page No : 2

	Tutt Blvd Southbound					Wolf Ridge Rd Westbound					Tutt Blvd Northbound					Wolf Ridge Rd 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 07:00																					
07:00	2	13	0	2	17	33	0	1	1	35	0	33	95	0	128	0	0	0	0	0	180
07:15	6	29	0	0	35	55	0	2	0	57	0	52	132	0	184	0	0	0	0	0	276
07:30	0	25	0	0	25	48	0	3	0	51	0	43	54	0	97	0	0	0	0	0	173
07:45	0	27	0	0	27	46	0	0	0	46	0	67	47	0	114	0	0	0	0	0	187
Total Volume	8	94	0	2	104	182	0	6	1	189	0	195	328	0	523	0	0	0	0	0	816
% App. Total	7.7	90.4	0	1.9		96.3	0	3.2	0.5		0	37.3	62.7	0		0	0	0	0		
PHF	.333	.810	.000	.250	.743	.827	.000	.500	.250	.829	.000	.728	.621	.000	.711	.000	.000	.000	.000	.000	.739



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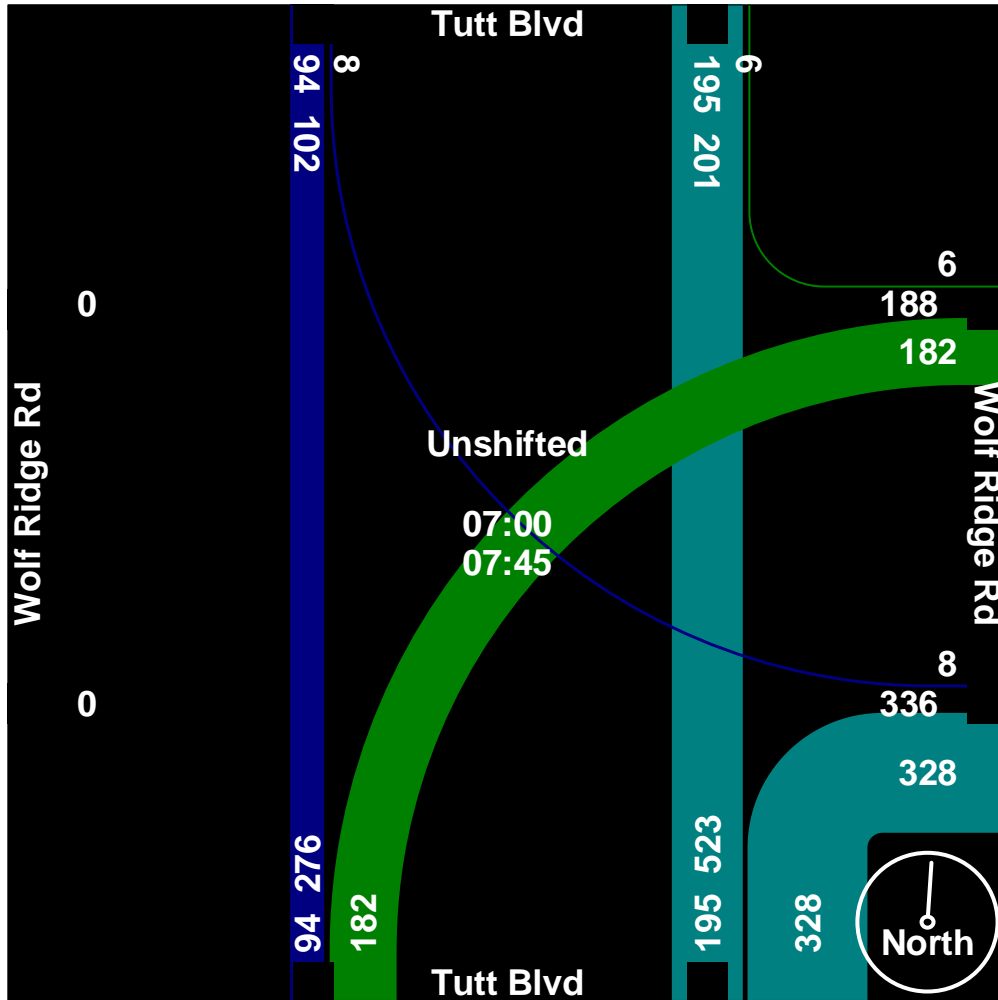
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Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
16:00	2	58	0	0	40	0	0	0	1	22	41	0	0	0	0	0	164
16:15	0	71	0	1	36	0	0	0	0	18	44	0	0	0	0	0	170
16:30	0	87	0	1	33	0	1	0	0	28	64	1	0	0	0	0	215
16:45	0	51	0	1	40	1	1	0	0	36	65	0	0	0	0	0	195
Total	2	267	0	3	149	1	2	0	1	104	214	1	0	0	0	0	744
17:00	1	77	0	0	38	0	3	0	0	31	62	0	0	0	0	0	212
17:15	0	72	0	1	40	0	1	0	0	31	66	1	0	0	0	0	212
17:30	1	53	0	0	33	1	1	0	0	28	58	0	0	0	0	0	175
17:45	1	47	0	0	28	0	0	0	1	17	40	0	0	1	0	0	135
Total	3	249	0	1	139	1	5	0	1	107	226	1	0	1	0	0	734
Grand Total	5	516	0	4	288	2	7	0	2	211	440	2	0	1	0	0	1478
Apprch %	1	98.3	0	0.8	97	0.7	2.4	0	0.3	32.2	67.2	0.3	0	100	0	0	
Total %	0.3	34.9	0	0.3	19.5	0.1	0.5	0	0.1	14.3	29.8	0.1	0	0.1	0	0	

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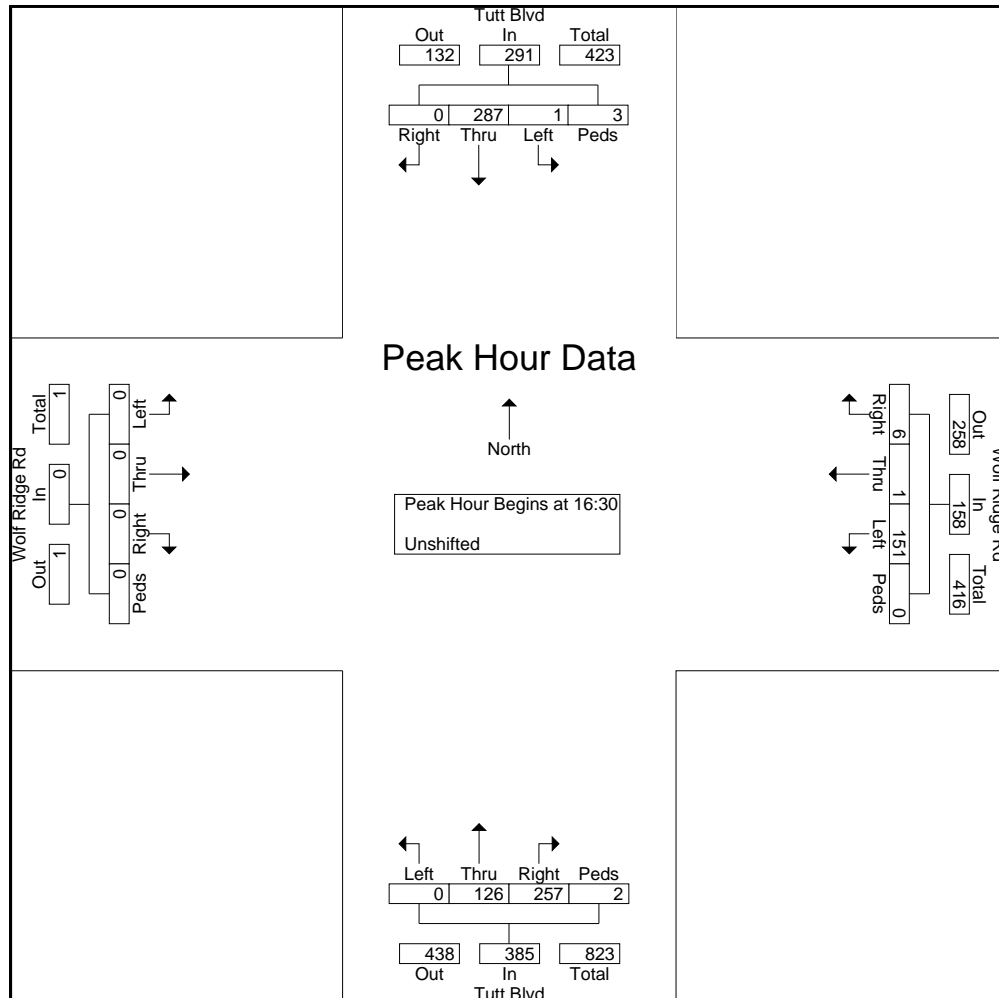
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	Tutt Blvd Southbound					Wolf Ridge Rd Westbound					Tutt Blvd Northbound					Wolf Ridge Rd Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:30																					
16:30	0	87	0	1	88	33	0	1	0	34	0	28	64	1	93	0	0	0	0	0	215
16:45	0	51	0	1	52	40	1	1	0	42	0	36	65	0	101	0	0	0	0	0	195
17:00	1	77	0	0	78	38	0	3	0	41	0	31	62	0	93	0	0	0	0	0	212
17:15	0	72	0	1	73	40	0	1	0	41	0	31	66	1	98	0	0	0	0	0	212
Total Volume	1	287	0	3	291	151	1	6	0	158	0	126	257	2	385	0	0	0	0	0	834
% App. Total	0.3	98.6	0	1		95.6	0.6	3.8	0		0	32.7	66.8	0.5		0	0	0	0		
PHF	.250	.825	.000	.750	.827	.944	.250	.500	.000	.940	.000	.875	.973	.500	.953	.000	.000	.000	.000	.000	.970



LSC Transportation Consultants, Inc.

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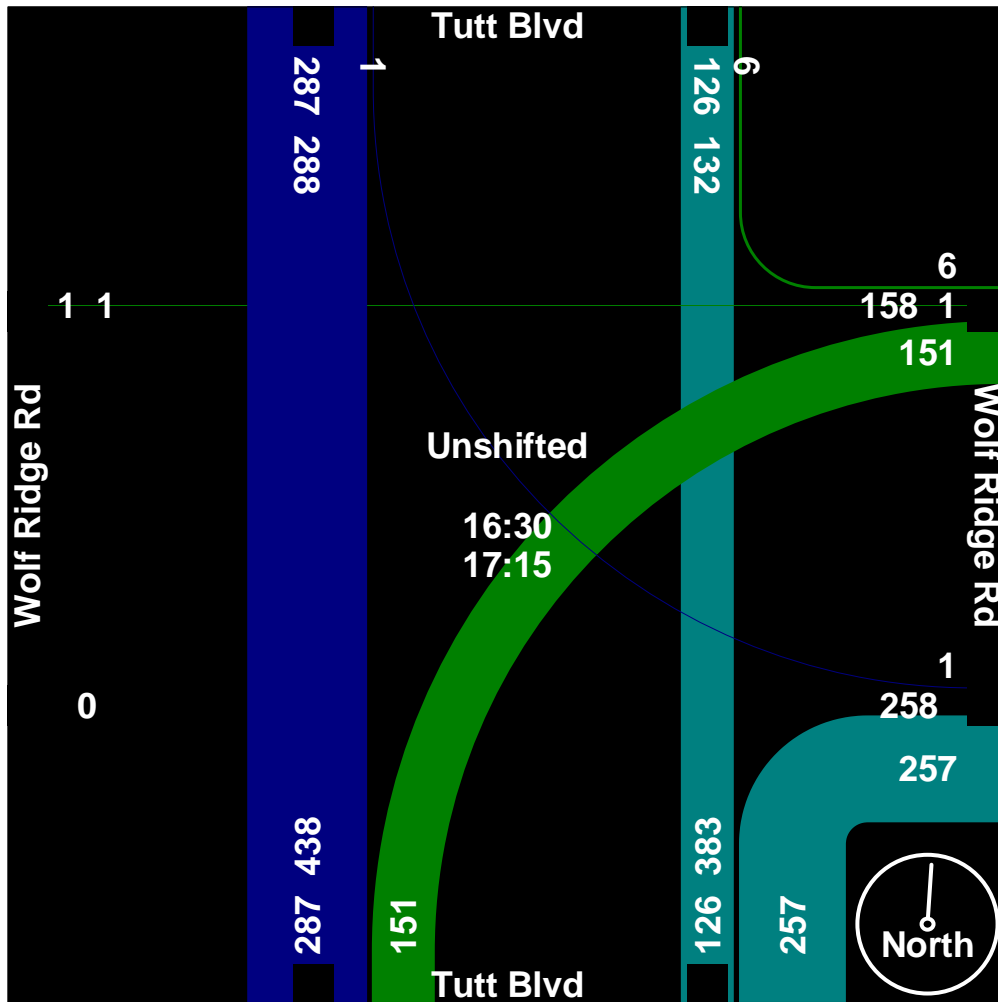
719-633-2868

File Name : Tutt Blvd - Wolf Ridge Rd PM

Site Code : 00184850

Start Date : 9/10/2018

Page No : 3



Levels of Service

LANE SUMMARY



Site: 101 [rTutt/Templeton - Existing AM]

Existing

Site Category: AM Peak Hour

Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Tutt Blvd													
Lane 1	212	3.0	1300	0.163	63 ⁵	4.1	LOS A	0.7	17.8	Full	350	0.0	0.0
Lane 2 ^d	357	3.0	1368	0.261	100	4.9	LOS A	1.2	31.1	Full	350	0.0	0.0
Approach	568	3.0		0.261		4.6	LOS A	1.2	31.1				
East: Templeton Gap Rd													
Lane 1 ^d	204	3.0	1145	0.178	100	4.7	LOS A	0.7	18.3	Full	615	0.0	0.0
Approach	204	3.0		0.178		4.7	LOS A	0.7	18.3				
North: Tutt Blvd													
Lane 1	54	3.0	1087	0.049	100	3.7	LOS A	0.2	4.6	Full	250	0.0	0.0
Lane 2 ^d	57	3.0	1159	0.049	100	3.5	LOS A	0.2	4.5	Full	250	0.0	0.0
Approach	111	3.0		0.049		3.6	LOS A	0.2	4.6				
Intersection	884	3.0		0.261		4.5	LOS A	1.2	31.1				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

⁵ Lane under-utilisation found by the program

^d Dominant lane on roundabout approach

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LANE SUMMARY

 **Site: 101 [Tutt/Templeton - Existing PM]**

Existing
Site Category: PM Peak Hour
Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Tutt Blvd													
Lane 1	137	3.0	1309	0.105	52 ⁵	3.6	LOS A	0.4	10.7	Full	350	0.0	0.0
Lane 2 ^d	279	3.0	1377	0.203	100	4.3	LOS A	0.9	22.6	Full	350	0.0	0.0
Approach	416	3.0		0.203		4.1	LOS A	0.9	22.6				
East: Templeton Gap Rd													
Lane 1 ^d	171	3.0	1223	0.140	100	4.1	LOS A	0.5	14.0	Full	615	0.0	0.0
Approach	171	3.0		0.140		4.1	LOS A	0.5	14.0				
North: Tutt Blvd													
Lane 1	152	3.0	1122	0.135	100	4.4	LOS A	0.5	13.8	Full	250	0.0	0.0
Lane 2 ^d	161	3.0	1194	0.135	100	4.2	LOS A	0.5	13.5	Full	250	0.0	0.0
Approach	313	3.0		0.135		4.3	LOS A	0.5	13.8				
Intersection	900	3.0		0.203		4.1	LOS A	0.9	22.6				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

⁵ Lane under-utilisation found by the program

^d Dominant lane on roundabout approach

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LANE SUMMARY

 **Site: 101 [Tutt/Templeton - 2040 BG AM]**

2040 Background
Site Category: AM Peak Hour
Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Tutt Blvd													
Lane 1	381	3.0	1291	0.295	100	5.4	LOS A	1.5	37.8	Full	350	0.0	0.0
Lane 2 ^d	401	3.0	1359	0.295	100	5.2	LOS A	1.4	36.8	Full	350	0.0	0.0
Approach	783	3.0		0.295		5.3	LOS A	1.5	37.8				
East: Templeton Gap Rd													
Lane 1 ^d	288	3.0	983	0.293	100	6.6	LOS A	1.2	31.8	Full	615	0.0	0.0
Approach	288	3.0		0.293		6.6	LOS A	1.2	31.8				
North: Tutt Blvd													
Lane 1	144	3.0	1024	0.141	100	4.8	LOS A	0.6	14.2	Full	250	0.0	0.0
Lane 2 ^d	155	3.0	1097	0.141	100	4.5	LOS A	0.5	13.8	Full	250	0.0	0.0
Approach	299	3.0		0.141		4.7	LOS A	0.6	14.2				
Intersection	1370	3.0		0.295		5.5	LOS A	1.5	37.8				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach






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HCM 6th TWSC
3: Tutt Blvd & South Access

2040 Background Traffic
AM Peak Hour

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	2	718	14	3	497
Future Vol, veh/h	2	2	718	14	3	497
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	150	140	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	2	764	15	3	529

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1035	382	0	0	779
Stage 1	764	-	-	-	-
Stage 2	271	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22
Pot Cap-1 Maneuver	228	616	-	-	834
Stage 1	420	-	-	-	-
Stage 2	750	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	227	616	-	-	834
Mov Cap-2 Maneuver	227	-	-	-	-
Stage 1	420	-	-	-	-
Stage 2	747	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	332	834
HCM Lane V/C Ratio	-	-	0.013	0.004
HCM Control Delay (s)	-	-	16	9.3
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0	0

HCM 6th TWSC
6: Tutt Blvd & North Access

2040 Background Traffic
AM Peak Hour

Intersection						
Int Delay, s/veh	2.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑↑	↑	↑	↑↑
Traffic Vol, veh/h	35	95	285	95	80	240
Future Vol, veh/h	35	95	285	95	80	240
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	75	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	101	303	101	85	255

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	601	152	0	0	404
Stage 1	303	-	-	-	-
Stage 2	298	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22
Pot Cap-1 Maneuver	432	867	-	-	1151
Stage 1	723	-	-	-	-
Stage 2	727	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	400	867	-	-	1151
Mov Cap-2 Maneuver	400	-	-	-	-
Stage 1	723	-	-	-	-
Stage 2	673	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.9	0	2.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	660	1151
HCM Lane V/C Ratio	-	-	0.21	0.074
HCM Control Delay (s)	-	-	11.9	8.4
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.8	0.2

LANE SUMMARY



Site: 101 [Tutt/Templeton - 2040 BG PM]

2040 Background
Site Category: PM Peak Hour
Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Tutt Blvd													
Lane 1	339	3.0	1284	0.264	100	5.1	LOS A	1.3	32.4	Full	350	0.0	0.0
Lane 2 ^d	357	3.0	1353	0.264	100	4.9	LOS A	1.2	31.5	Full	350	0.0	0.0
Approach	696	3.0		0.264		5.0	LOS A	1.3	32.4				
East: Templeton Gap Rd													
Lane 1 ^d	255	3.0	1022	0.250	100	5.9	LOS A	1.0	26.5	Full	615	0.0	0.0
Approach	255	3.0		0.250		5.9	LOS A	1.0	26.5				
North: Tutt Blvd													
Lane 1	344	3.0	1050	0.328	100	6.7	LOS A	1.5	39.5	Full	250	0.0	0.0
Lane 2 ^d	368	3.0	1124	0.328	100	6.4	LOS A	1.5	38.8	Full	250	0.0	0.0
Approach	712	3.0		0.328		6.6	LOS A	1.5	39.5				
Intersection	1663	3.0		0.328		5.8	LOS A	1.5	39.5				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach






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HCM 6th TWSC
3: Tutt Blvd & South Access

2040 Background Traffic
PM Peak Hour

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	6	634	7	1	849
Future Vol, veh/h	10	6	634	7	1	849
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	150	140	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	6	674	7	1	903

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1128	337	0	0	681
Stage 1	674	-	-	-	-
Stage 2	454	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22
Pot Cap-1 Maneuver	198	659	-	-	907
Stage 1	468	-	-	-	-
Stage 2	606	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	198	659	-	-	907
Mov Cap-2 Maneuver	198	-	-	-	-
Stage 1	468	-	-	-	-
Stage 2	605	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.3	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	268	907
HCM Lane V/C Ratio	-	-	0.064	0.001
HCM Control Delay (s)	-	-	19.3	9
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.2	0

HCM 6th TWSC
6: Tutt Blvd & North Access

2040 Background Traffic
PM Peak Hour

Intersection						
Int Delay, s/veh	1.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	YY		↑↑	↑	↑	↑↑
Traffic Vol, veh/h	30	75	260	75	85	625
Future Vol, veh/h	30	75	260	75	85	625
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	75	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	80	277	80	90	665

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	790	139	0	0	357
Stage 1	277	-	-	-	-
Stage 2	513	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22
Pot Cap-1 Maneuver	327	884	-	-	1198
Stage 1	745	-	-	-	-
Stage 2	566	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	302	884	-	-	1198
Mov Cap-2 Maneuver	302	-	-	-	-
Stage 1	745	-	-	-	-
Stage 2	524	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.8	0	1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	570	1198
HCM Lane V/C Ratio	-	-	0.196	0.075
HCM Control Delay (s)	-	-	12.8	8.2
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.7	0.2

USER REPORT FOR SITE



Project: Tutt-Templeton

Template: Report



Site: 101 [Tutt/Templeton - 2040 Total AM]

2040 Total

Site Category: AM Peak Hour

Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Tutt Blvd													
Lane 1	407	3.0	1249	0.326	100	5.9	LOS A	1.7	42.7	Full	350	0.0	0.0
Lane 2 ^d	429	3.0	1318	0.326	100	5.7	LOS A	1.6	41.6	Full	350	0.0	0.0
Approach	836	3.0		0.326		5.8	LOS A	1.7	42.7				
East: Templeton Gap Rd													
Lane 1 ^d	299	3.0	915	0.327	100	7.5	LOS A	1.4	35.5	Full	615	0.0	0.0
Approach	299	3.0		0.327		7.5	LOS A	1.4	35.5				
North: Tutt Blvd													
Lane 1	183	3.0	989	0.185	100	5.4	LOS A	0.7	19.1	Full	250	0.0	0.0
Lane 2 ^d	196	3.0	1063	0.185	100	5.1	LOS A	0.7	18.7	Full	250	0.0	0.0
Approach	379	3.0		0.185		5.2	LOS A	0.7	19.1				
West: Access													
Lane 1 ^d	40	3.0	814	0.049	100	4.9	LOS A	0.2	4.3	Full	200	0.0	0.0
Approach	40	3.0		0.049		4.9	LOS A	0.2	4.3				
Intersection	1554	3.0		0.327		5.9	LOS A	1.7	42.7				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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HCM 6th TWSC
3: Tutt Blvd & Site Access

2040 Total Traffic
AM Peak Hour

Intersection												
Int Delay, s/veh	1.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↕	↕	↕	↕	↕
Traffic Vol, veh/h	17	0	51	2	0	2	78	740	14	3	503	38
Future Vol, veh/h	17	0	51	2	0	2	78	740	14	3	503	38
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	-	-	-	-	-	-	140	-	150	140	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	0	54	2	0	2	83	787	15	3	535	40

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1101	1509	268	1227	1534	394	575	0	0	802	0	0
Stage 1	541	541	-	953	953	-	-	-	-	-	-	-
Stage 2	560	968	-	274	581	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	166	119	730	134	115	605	994	-	-	817	-	-
Stage 1	493	519	-	278	336	-	-	-	-	-	-	-
Stage 2	480	330	-	709	498	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	154	109	730	116	105	605	994	-	-	817	-	-
Mov Cap-2 Maneuver	154	109	-	116	105	-	-	-	-	-	-	-
Stage 1	452	517	-	255	308	-	-	-	-	-	-	-
Stage 2	438	302	-	654	496	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	16.8		23.9		0.8		0.1	
HCM LOS	C		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	994	-	-	377 195	817	-	-
HCM Lane V/C Ratio	0.083	-	-	0.192 0.022	0.004	-	-
HCM Control Delay (s)	9	-	-	16.8 23.9	9.4	-	-
HCM Lane LOS	A	-	-	C C	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.7 0.1	0	-	-

HCM 6th TWSC
8: Tutt Blvd

2040 Total Traffic
AM Peak Hour

Intersection												
Int Delay, s/veh	3.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕	↕	↕	↕	↕
Traffic Vol, veh/h	15	0	15	35	0	95	26	312	95	80	299	20
Future Vol, veh/h	15	0	15	35	0	95	26	312	95	80	299	20
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	-	-	-	-	-	-	150	-	150	150	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	0	16	37	0	101	28	332	101	85	318	21

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	710	977	159	717	897	166	339	0	0	433	0	0
Stage 1	488	488	-	388	388	-	-	-	-	-	-	-
Stage 2	222	489	-	329	509	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	321	249	858	317	278	849	1217	-	-	1123	-	-
Stage 1	530	548	-	607	607	-	-	-	-	-	-	-
Stage 2	760	548	-	658	536	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	262	225	858	288	251	849	1217	-	-	1123	-	-
Mov Cap-2 Maneuver	262	225	-	288	251	-	-	-	-	-	-	-
Stage 1	518	506	-	593	593	-	-	-	-	-	-	-
Stage 2	654	535	-	597	495	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	14.8		13.6		0.5		1.7	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1217	-	-	401 557	1123	-	-
HCM Lane V/C Ratio	0.023	-	-	0.08 0.248	0.076	-	-
HCM Control Delay (s)	8	-	-	14.8 13.6	8.5	-	-
HCM Lane LOS	A	-	-	B B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3 1	0.2	-	-

USER REPORT FOR SITE



Project: Tutt-Templeton

Template: Report



Site: 101 [Tutt/Templeton - 2040 Total PM]

2040 Total

Site Category: PM Peak Hour

Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Tutt Blvd													
Lane 1	414	3.0	1122	0.369	100	6.9	LOS A	1.9	48.2	Full	350	0.0	0.0
Lane 2 ^d	440	3.0	1194	0.369	100	6.6	LOS A	1.8	47.2	Full	350	0.0	0.0
Approach	854	3.0		0.369		6.8	LOS A	1.9	48.2				
East: Templeton Gap Rd													
Lane 1 ^d	275	3.0	798	0.345	100	8.6	LOS A	1.5	37.6	Full	615	0.0	0.0
Approach	275	3.0		0.345		8.6	LOS A	1.5	37.6				
North: Tutt Blvd													
Lane 1	427	3.0	915	0.466	100	9.7	LOS A	2.8	71.8	Full	250	0.0	0.0
Lane 2 ^d	461	3.0	989	0.466	100	9.1	LOS A	2.7	69.7	Full	250	0.0	0.0
Approach	888	3.0		0.466		9.4	LOS A	2.8	71.8				
West: Access													
Lane 1 ^d	158	3.0	551	0.286	100	10.6	LOS B	1.1	27.0	Full	200	0.0	0.0
Approach	158	3.0		0.286		10.6	LOS B	1.1	27.0				
Intersection	2175	3.0		0.466		8.3	LOS A	2.8	71.8				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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Organisation: LSC TRANSPORTATION CONSULTANTS, INC. | Created: Wednesday, January 20, 2021 9:39:04 AM

Project: C:\Users\cguillotte\LSCCS Dropbox\IM\2020\204790 - American Furniture Warehouse\Sidra\Tutt-Templeton.sip8

HCM 6th TWSC
3: Tutt Blvd & Site Access

2040 Total Traffic
PM Peak Hour

Intersection												
Int Delay, s/veh	3.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕	↕	↕	↕	↕
Traffic Vol, veh/h	20	0	172	6	0	6	80	760	7	1	875	79
Future Vol, veh/h	20	0	172	6	0	6	80	760	7	1	875	79
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	-	-	-	-	-	-	140	-	150	140	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	21	0	183	6	0	6	85	809	7	1	931	84

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1508	1919	466	1447	1996	405	1015	0	0	816	0	0
Stage 1	933	933	-	979	979	-	-	-	-	-	-	-
Stage 2	575	986	-	468	1017	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	83	67	543	92	60	595	679	-	-	807	-	-
Stage 1	286	343	-	268	326	-	-	-	-	-	-	-
Stage 2	470	324	-	545	313	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	74	59	543	55	52	595	679	-	-	807	-	-
Mov Cap-2 Maneuver	74	59	-	55	52	-	-	-	-	-	-	-
Stage 1	250	343	-	235	285	-	-	-	-	-	-	-
Stage 2	407	284	-	361	313	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	32.7		45.7		1		0	
HCM LOS	D		E					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	679	-	-	327 101	807	-	-
HCM Lane V/C Ratio	0.125	-	-	0.625 0.126	0.001	-	-
HCM Control Delay (s)	11.1	-	-	32.7 45.7	9.5	-	-
HCM Lane LOS	B	-	-	D E	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	4 0.4	0	-	-

HCM 6th TWSC
8: Tutt Blvd

2040 Total Traffic
PM Peak Hour

Intersection												
Int Delay, s/veh	3.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕	↕	↕	↕	↕
Traffic Vol, veh/h	28	0	43	30	0	75	30	374	75	85	739	35
Future Vol, veh/h	28	0	43	30	0	75	30	374	75	85	739	35
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	-	-	-	-	-	-	150	-	150	150	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	30	0	46	32	0	80	32	398	80	90	786	37

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1229	1508	393	1035	1465	199	823	0	0	478	0	0
Stage 1	966	966	-	462	462	-	-	-	-	-	-	-
Stage 2	263	542	-	573	1003	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	134	120	606	186	127	809	803	-	-	1081	-	-
Stage 1	273	331	-	549	563	-	-	-	-	-	-	-
Stage 2	719	518	-	472	318	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	110	106	606	156	112	809	803	-	-	1081	-	-
Mov Cap-2 Maneuver	110	106	-	156	112	-	-	-	-	-	-	-
Stage 1	262	304	-	527	540	-	-	-	-	-	-	-
Stage 2	622	497	-	400	292	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	30		19		0.6		0.9	
HCM LOS	D		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	803	-	-	218 368	1081	-	-
HCM Lane V/C Ratio	0.04	-	-	0.346 0.304	0.084	-	-
HCM Control Delay (s)	9.7	-	-	30 19	8.6	-	-
HCM Lane LOS	A	-	-	D C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	1.5 1.3	0.3	-	-

Queuing Reports

Queuing and Blocking Report

AM Peak Hour

01/20/2021

Intersection: 1: Tutt Blvd & Templeton Gap Rd

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	LT	TR	LT
Maximum Queue (ft)	45	108	50	14	57
Average Queue (ft)	11	46	11	0	24
95th Queue (ft)	38	87	38	7	52
Link Distance (ft)	216	167	335	335	232
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Tutt Blvd & Site Access

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	L	L	R
Maximum Queue (ft)	68	34	73	14	6
Average Queue (ft)	21	5	29	1	0
95th Queue (ft)	45	22	60	8	2
Link Distance (ft)	159	228			
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			140	140	150
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 8: Tutt Blvd

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	L	R	L
Maximum Queue (ft)	41	100	31	22	59
Average Queue (ft)	13	36	7	1	22
95th Queue (ft)	33	71	27	9	49
Link Distance (ft)	219	165			
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			150	150	150
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 0

Queuing and Blocking Report

PM Peak Hour

01/20/2021

Intersection: 1: Tutt Blvd & Templeton Gap Rd

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	96	129	77	30	107	66
Average Queue (ft)	43	53	29	1	53	5
95th Queue (ft)	80	98	64	11	91	32
Link Distance (ft)	216	167	335	335	232	232
Upstream Blk Time (%)		0				
Queuing Penalty (veh)		0				
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 3: Tutt Blvd & Site Access

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	L	T	R
Maximum Queue (ft)	178	43	94	43	4	2	6
Average Queue (ft)	76	11	36	1	0	0	0
95th Queue (ft)	168	35	74	30	3	2	4
Link Distance (ft)	159	228		410		335	
Upstream Blk Time (%)	13						
Queuing Penalty (veh)	0						
Storage Bay Dist (ft)			140		140		150
Storage Blk Time (%)			0				
Queuing Penalty (veh)			1				

Intersection: 8: Tutt Blvd

Movement	EB	WB	NB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	T	R	L	R
Maximum Queue (ft)	90	104	49	4	17	69	9
Average Queue (ft)	31	36	13	0	1	25	0
95th Queue (ft)	66	73	40	3	9	55	4
Link Distance (ft)	219	165		232			
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			150		150	150	150
Storage Blk Time (%)							
Queuing Penalty (veh)							

Network Summary

Network wide Queuing Penalty: 1