



DB Enterprise, LLC
4771 So. Danube Circle
Aurora, Colorado 80015

Phone: (720) 231-1947
E-Mail: druble.jr@comcast.net

August 10, 2020

Mr. Troy Kirschman, AIA, NCARB
Hover Architecture, PC
8920 Barrons Blvd. Suite 102
Highlands Ranch, CO 80129

Re: Living Water Car Wash
Aurora, CO
(DBE #190040)

Dear Mr. Kirschman:

I have completed the preparation of a traffic conformance letter for the proposed Living Water Car Wash commercial development.

Introduction

The proposed Living Water car wash project is to be located within the Smoky Hill Crossing commercial development which is located near the intersection of East Smoky Hill Road and South Gun Club Road. Figure 1 depicts the location of the Living Water car wash project with respect to the surrounding area. As can be seen in Figure 1, the Living Water car wash project is located in the western portion of the Smoky Hill Crossing commercial development. It is bounded by residential development on the west, pad 2 of the Smoky Hill Crossing commercial development on the east, a private roadway on the south, and East Smoky Hill Road on the north. Figure 2 depicts the preliminary site plan for the proposed commercial development. This site plan is under review by the City of Aurora and may change as a result of this review. As can be seen in Figure 2, the site will have three accesses serving it. All of these accesses are located along the private road. Access A is located 70 feet south of East Smoky Hill Road. This access is an exit only access. Access B is located approximately 80 feet south of Access A. This access is a full movement access. Access C is located 225 feet east of Access B. This access will be a full movement access.

Background

A master traffic impact study was prepared for the entire Smoky Hill Crossing commercial development by SM Rocha, LLC in May 2019. The original Smoky Hill

Crossing commercial development is a mix of commercial development. The proposed Smoky Hill Crossing commercial development was expected to have the following development levels:

1. Drive-in bank – 4,500 square feet
2. Fast food with drive-through – 6,000 square feet
3. Coffee/donut shop with drive-through – 2,300 square feet
4. Gas station with convenience store – 10 vehicle fueling positions
5. Automated car wash – 3,600 square feet

The Smoky Hill Crossing commercial development was expected to generate 7,855 daily vehicle-trips with 613 vehicle-trips occurring in the AM peak-hour (316 vehicles entering and 297 vehicles leaving the site) and 579 vehicle-trips occurring in the PM peak-hour (295 vehicles entering and 284 vehicles leaving the site). It should be noted that no vehicle trips were estimated for the AM peak-hour for the automated car wash. Appendix A contains information relevant to the trip budget analysis being done in this report.

Vehicle Trip Generation Budget

The attached Table 1 depicts the number of trips that were estimated in the master traffic impact analysis report for Smoky Hill Crossing commercial development as well as the trip generation estimate for the proposed Living Water car wash project. As can be seen in Table 1, this accounts for 8.8 percent of the daily vehicle-trip generation and about 9.6 percent of the PM peak-hour vehicle-trip generation.

The proposed Living Water car wash site is generating about 6.4 percent more daily and 3.8 percent more PM peak-hour trips than was estimated in the master traffic impact analysis report. This is due to the fact that the size of the proposed Living Water car wash is about 6.4 percent higher than what was assumed in the master traffic impact analysis report. Since site plans have not been submitted for the other five pads, there is the possibility that these other site plans could come in with less square footage or a different land use than what was assumed in the master traffic impact analysis report.

Level of Service Analysis

Figure 3 shows the change in the Year 2040 PM peak-hour traffic movement between the original master traffic impact analysis report for the Smoky Hill Crossing commercial development and the Year 2040 PM peak-hour traffic movements based on the proposed Living Water car wash project. Figure 4 depicts the Year 2040 total peak-hour traffic volumes based on the original development assumptions. When you use

the new site-generated traffic, which includes the proposed Living Water car wash project, selected traffic movements change. Figure 5 depicts the revised Year 2040 PM peak-hour traffic movements. Appendix A contains selected pages from the Smoky Hill Commercial traffic impact analysis report.

A reanalysis of E. Smoky Hill Rd./Access C and E. Smoky Hill Rd./Access B was completed assuming the higher trip generation for the Living Water car wash project. For the northbound right-turn traffic movement at the intersection of E. Smoky Hill Rd. and Access C, the average vehicle delay went from 35.5 seconds per vehicle in the original master traffic impact analysis report to 35.7 seconds per vehicle with the Living Water car wash project, but the level of service remained the same, LOS "E". For the westbound left-turn traffic movement at the intersection of E. Smoky Hill Rd. and Access B, the average vehicle delay went from 90.0 seconds per vehicle in the original master traffic impact analysis report to 9.17 seconds per vehicle with the Living Water car wash project, but the level of service remained the same, LOS "F". The printout from the Synchro program are included in Appendix B.

Conclusion

It is recommended that the City of Aurora monitor the trip generation of the other site plans to ensure that the trip budget for the Smoky Hill Crossing commercial development is not exceeded. If at some point, the trip budget is exceeded, the City of Aurora can make a decision as to whether or not a new traffic impact analysis report should be prepared.

* * *

This completes my traffic compliance letter for the proposed Living Water Car Wash Project located within the Smoking Hill Crossing commercial development. Please feel free to call if you need any additional information regarding this project.

Respectfully submitted,

DB Enterprise, LLC

By: 
Dave L. Ruble Jr. P.E. 8-10-2020



DLR/bar

Enclosures:

Figures 1-5

Table 1

Appendix A – Smoky Hill Commercial Traffic Impact Analysis report dated May 2019

Appendix B – Synchro program printouts



Legend

-  - Smoky Hill Commercial
-  - Living Water Car Wash

Figure 1
Vicinity Map

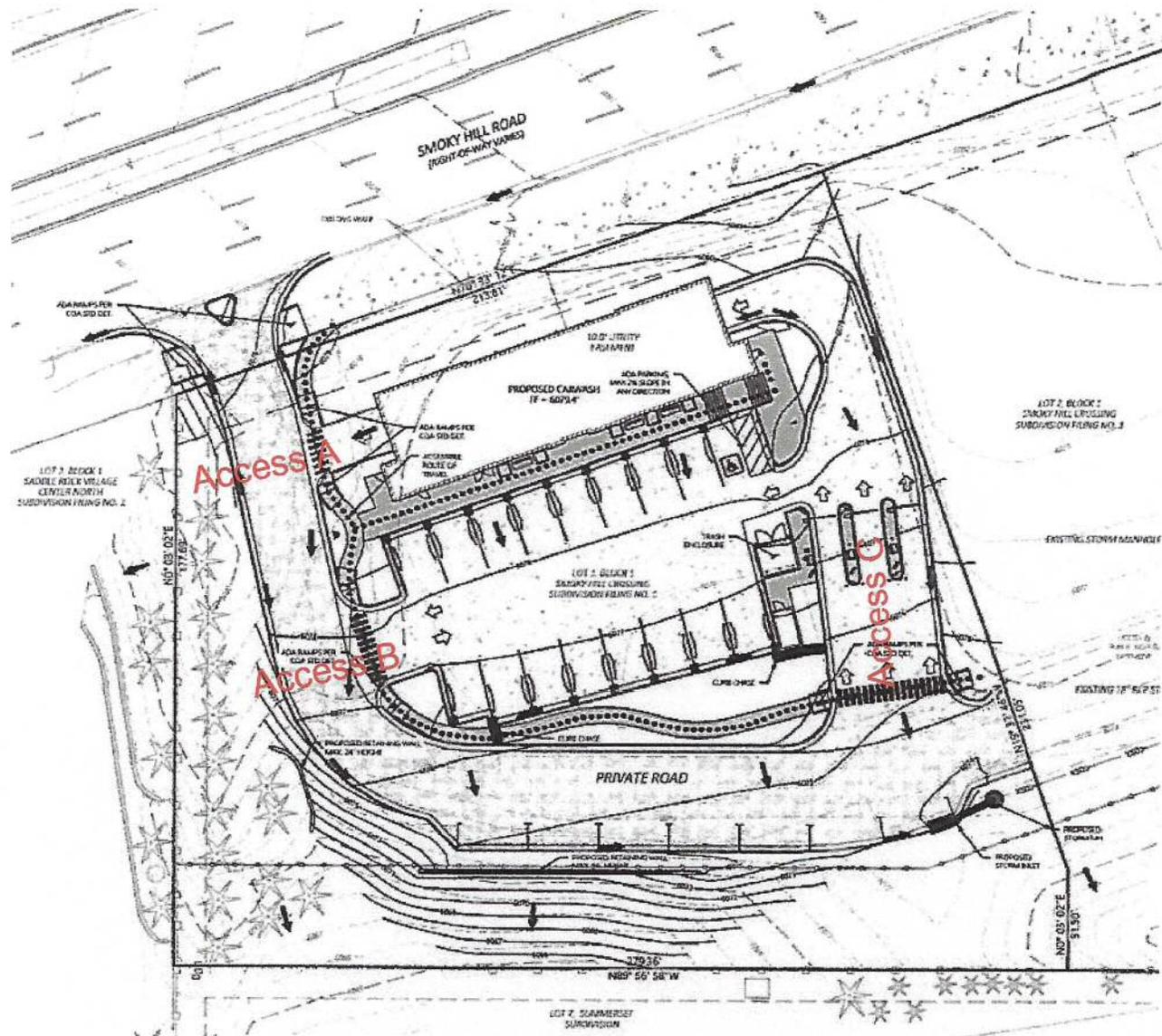
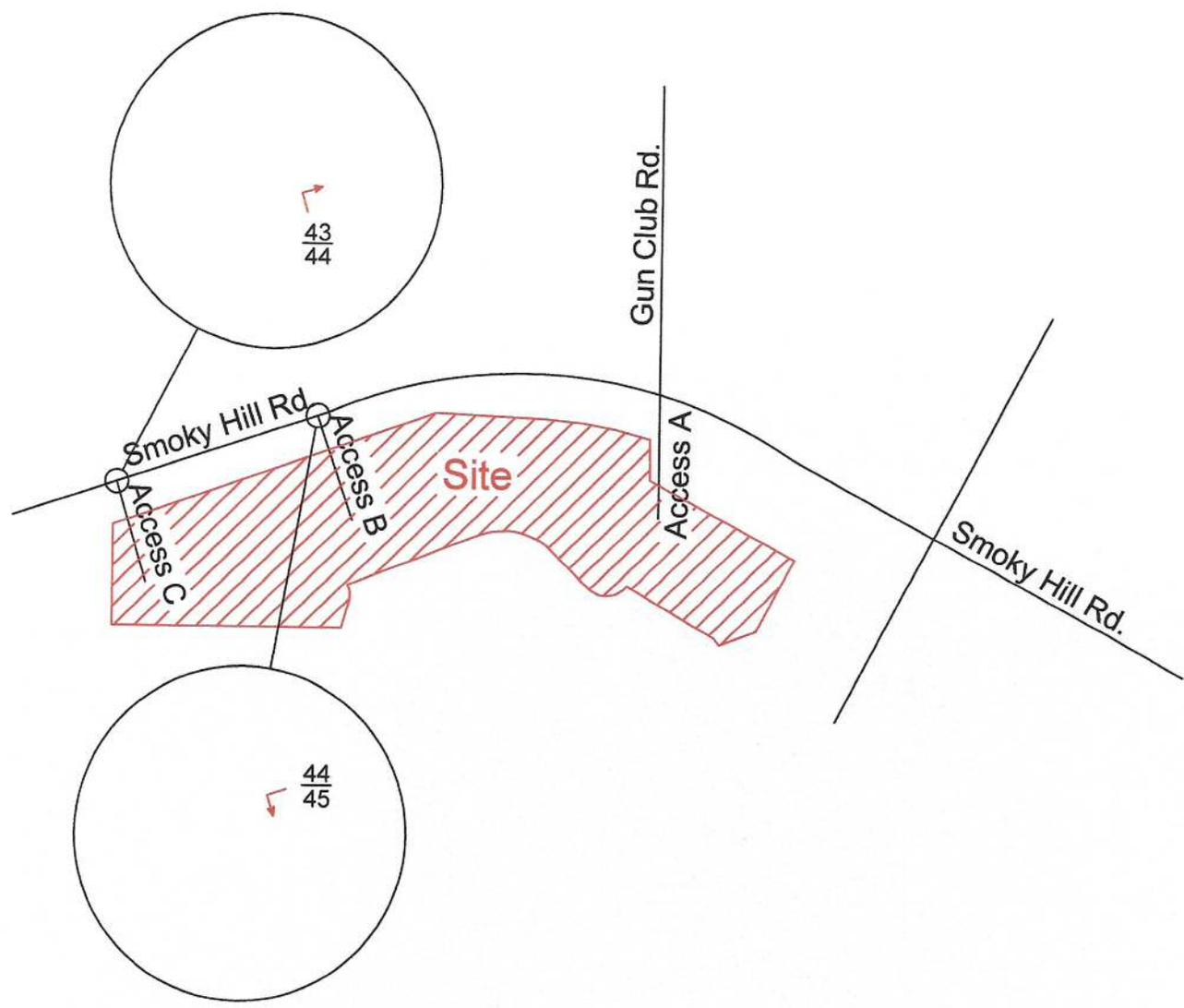
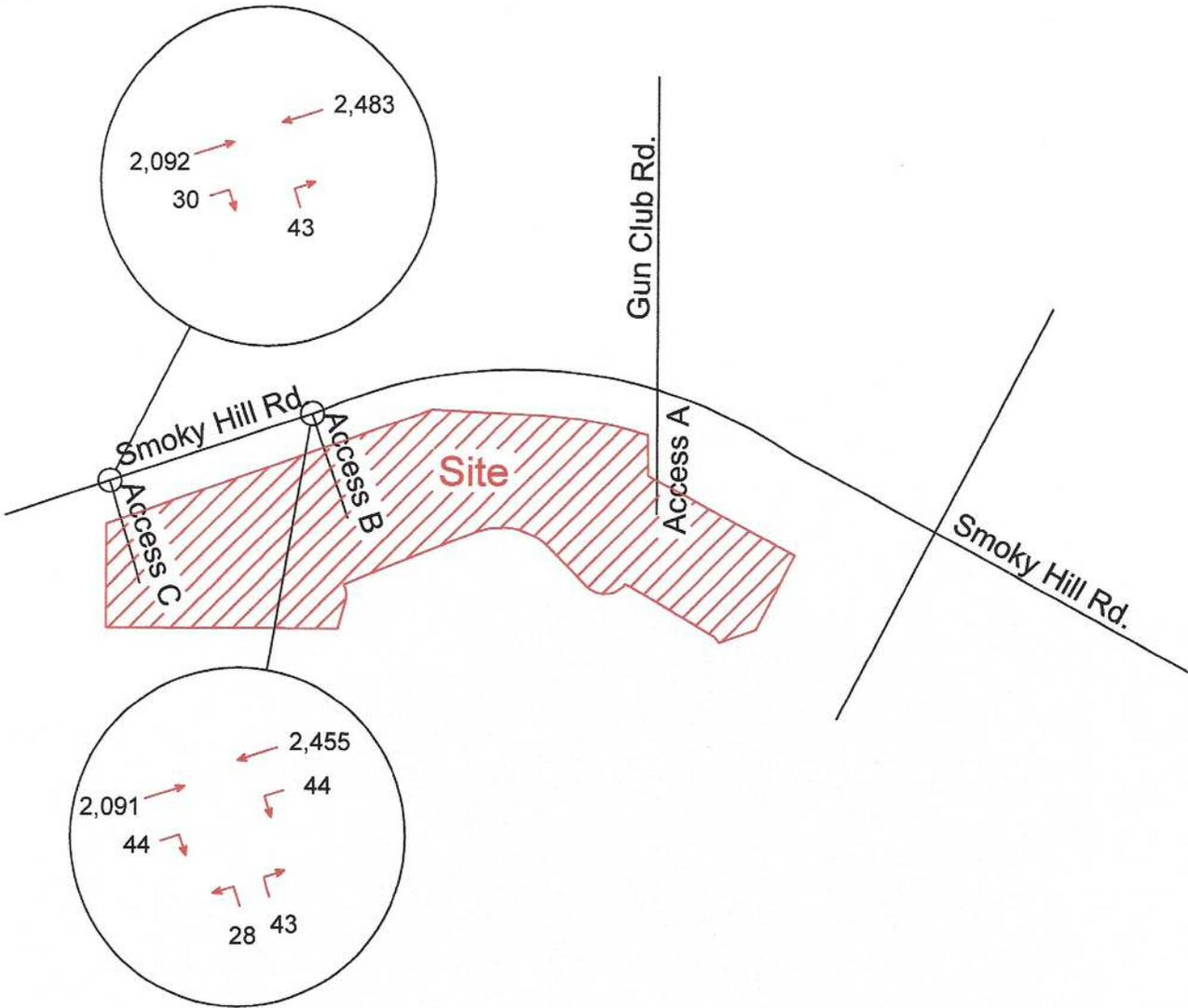


Figure 2
Site Plan



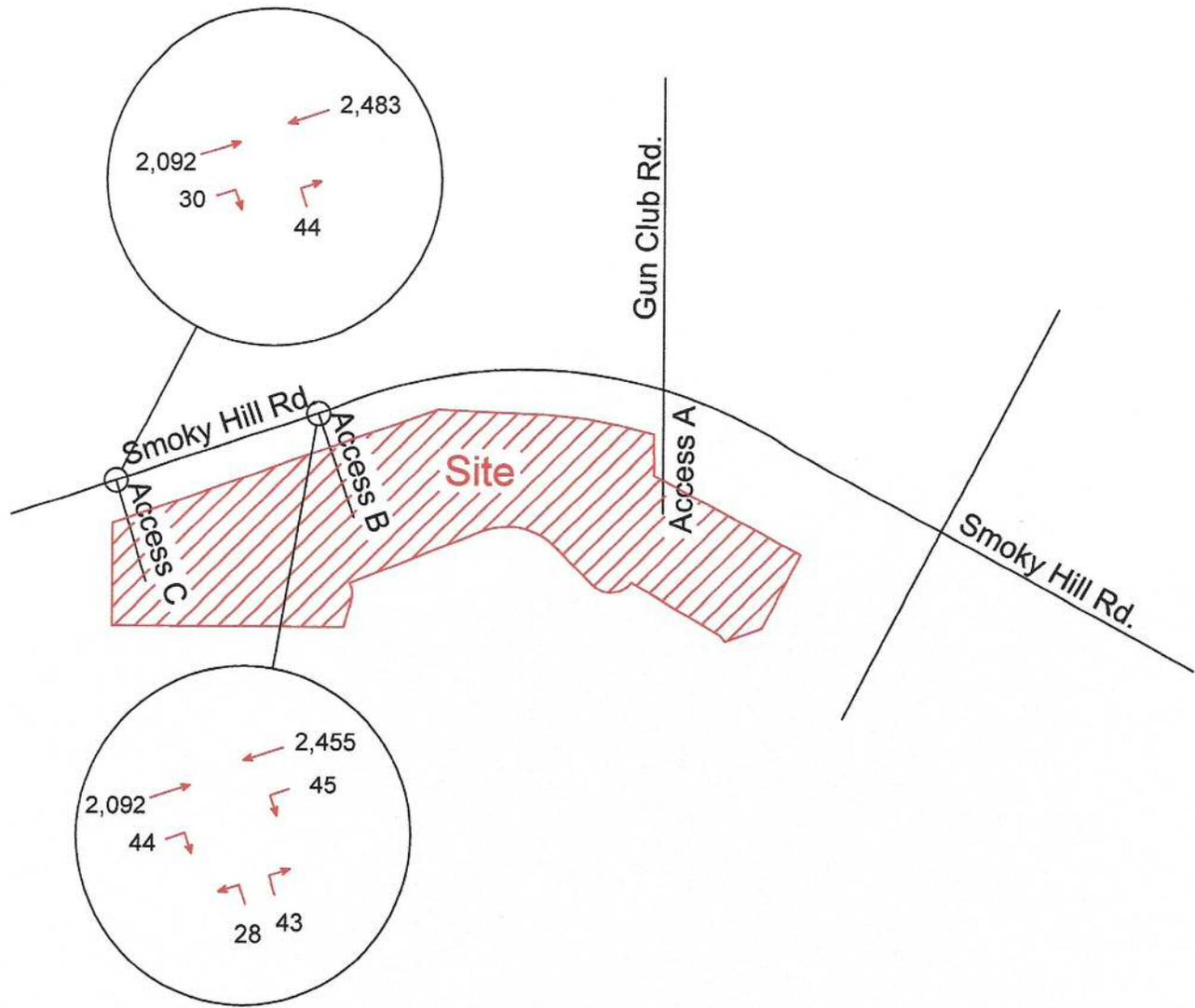
Legend
28 = Original Site-Generated PM Peak-Hour
35 = Revised Site-Generated PM Peak-Hour

Figure 3
Trip Generation Comparison
PM Peak-Hour



Legend
 $\frac{28}{35}$ = Original Site-Generated PM Peak-Hour
 Revised Site-Generated PM Peak-Hour

Figure 4
Original Year 2040
PM Peak-Hour Traffic Volumes



Legend
 $\frac{28}{35} = \frac{\text{Original Site-Generated PM Peak-Hour}}{\text{Revised Site-Generated PM Peak-Hour}}$

Figure 5
Revised Year 2040
PM Peak-Hour Traffic Volumes

Table 1
 Estimated Vehicle Trip Generation
 Living Water Car Wash Project
 Aurora, Colorado
 (DBE #200230; August, 2020)

ITE Category	Quantity	Trip Generation Rates (1)				Total Vehicle Trips Generated				
		Average Weekday	AM Peak-Hour In	Out	PM Peak-Hour In	Out	AM Peak-Hour In	Out	PM Peak-Hour In	Out
Smoky Hill Commercial Development - May 2019										
Pad 1										
948 Automated Car Wash	3.83 KSF (2)	177.50	--	--	7.10	7.10	--	--	295	284
									298	257
									316	268
									316	257
									100.0%	90.4%
									100.0%	90.8%
									100.0%	90.4%

Notes:

- (1) Source: "Trip Generation", Institute of Transportation Engineers, 10th Edition, 2017.
- (2) KSF = 1,000 Square Feet

Appendix A

Smoky Hill Commercial Traffic Impact Analysis Report

May 2019

TRAFFIC IMPACT STUDY

For

**Smoky Hill Commercial
Aurora, Colorado**

May 2019

Prepared for:

Engineering and Entitlement Solutions, Inc.
501 S Cherry Street, Suite 300
Glendale, CO 80246

Prepared by:



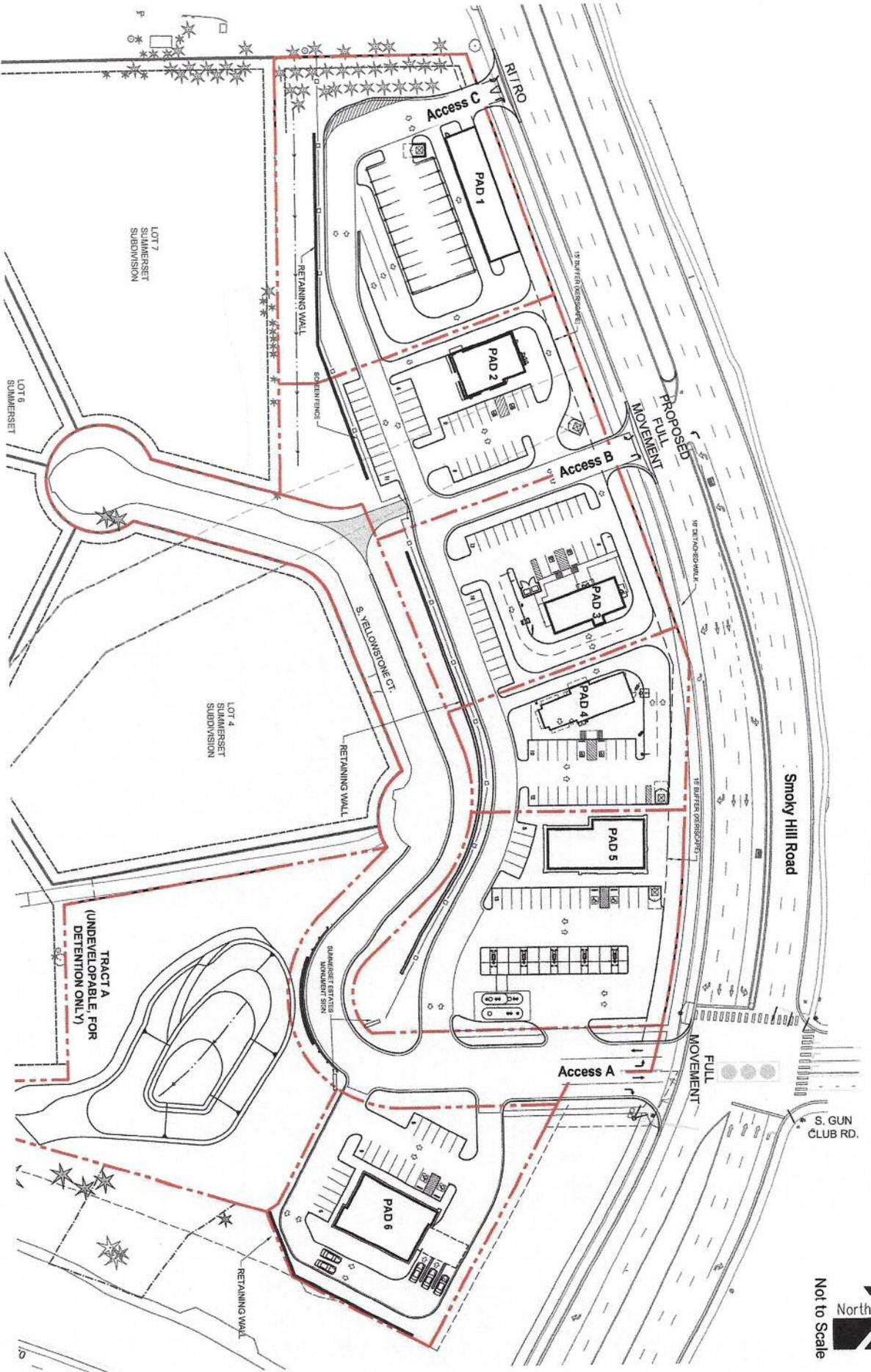
SM ROCHA, LLC
TRAFFIC AND TRANSPORTATION CONSULTANTS

8703 Yates Drive, Suite 210
Westminster, Colorado 80031
(303) 458-9798

Project Manager/Engineer:
Stephen Simon, EIT

Engineer in Responsible Charge:
Fred Lantz, PE





SMOKY HILL COMMERCIAL

Traffic Impact Study

SM ROCHA, LLC

Traffic and Transportation Consultants

Figure 2
SITE PLAN

May 2019

Page 3



IV. Proposed Project Traffic

Trip Generation

Standard traffic generation characteristics compiled by the Institute of Transportation Engineers (ITE) in their report entitled Trip Generation, 10th Edition, were applied to the proposed land use in order to estimate average daily traffic (ADT), AM Peak Hour, and PM Peak Hour vehicle trips. A vehicle trip is defined as a one-way vehicle movement from a point of origin to a point of destination.

The ITE land use codes 820 (Shopping Center), 912 (Drive-In Bank), 932 (High-Turnover (Sit-Down) Restaurant), and 945 (Gas Station with Convenience Store) were used for estimating trip generation because of their best fits to the proposed land use descriptions.

Trip generation rates used in this study are presented in Table 4.

Table 4 – Trip Generation Rates

ITE CODE	LAND USE	UNIT	TRIP GENERATION RATES						
			24 HOUR	AM PEAK HOUR			PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
912	Drive-In Bank	KSF	100.03	5.51	3.99	9.50	10.23	10.23	20.45
934	Fast Food with Drive-Through	KSF	470.95	20.50	19.69	40.19	16.99	15.68	32.67
937	Coffee/Donut Shop w/Drive Through	KSF	820.38	45.38	43.61	88.99	21.69	21.69	43.38
945	Gas w/Convenience Store	VFP	205.36	6.36	6.11	12.47	7.13	6.86	13.99
948	Automated Car Wash	KSF	177.50	*	*	*	7.10	7.10	14.20

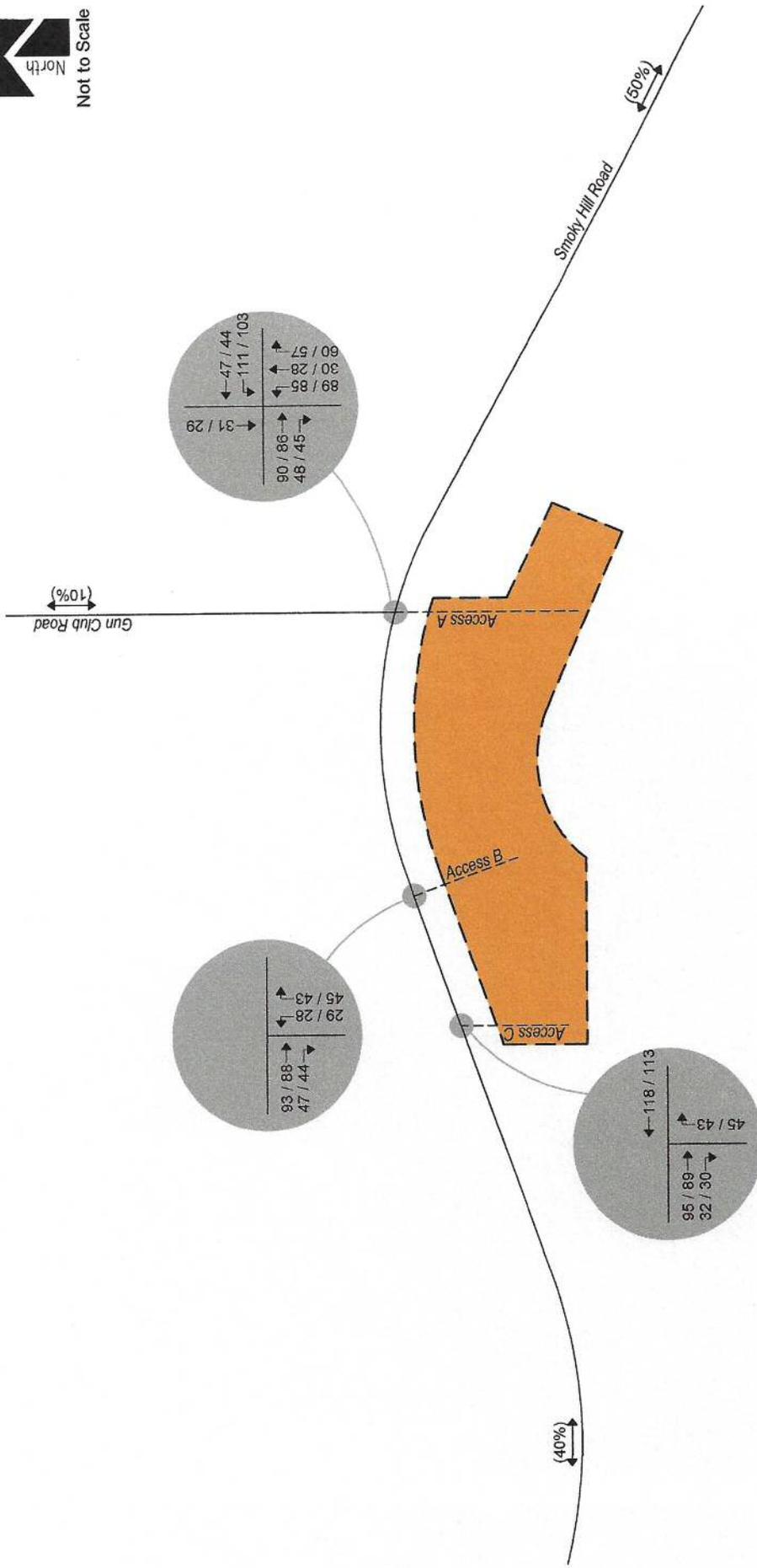
Key: KSF = Thousand Square Feet Gross Floor Area. VFP = Vehicle Fueling Positions.
 *-ITE does not report significant AM peak hour generation due to the nature of the business.
 Note: All data and calculations above are subject to being rounded to nearest value.

Table 5 illustrates projected average daily traffic (ADT), AM Peak Hour, and PM Peak Hour traffic volumes likely generated by the proposed development upon build-out.

Table 5 – Trip Generation Summary

ITE CODE	LAND USE	SIZE	TOTAL TRIPS GENERATED						
			24 HOUR	AM PEAK HOUR			PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
912	Drive-In Bank	4.5 KSF	450	25	18	43	46	46	92
934	Fast Food with Drive-Through	6.0 KSF	2,826	123	118	241	102	94	196
937	Coffee/Donut Shop w/Drive Through	2.3 KSF	1,887	104	100	205	50	50	100
945	Gas w/Convenience Store	10 VFP	2,054	64	61	125	71	69	140
948	Automated Car Wash	3.6 KSF	639	*	*	*	26	26	51
<i>Total:</i>			<i>7,855</i>	<i>316</i>	<i>298</i>	<i>613</i>	<i>295</i>	<i>284</i>	<i>579</i>

Note: All data and calculations above are subject to being rounded to nearest value.



LEGEND

- Study Intersection Volumes
- Development Site



SMOKY HILL COMMERCIAL
Traffic Impact Study

SM ROCHA, LLC
Traffic and Transportation Consultants

Figure 6
SITE DEVELOPMENT DISTRIBUTION
(%) : Overall
SITE-GENERATED
AM / PM Peak Hour

May 2019
Page 15

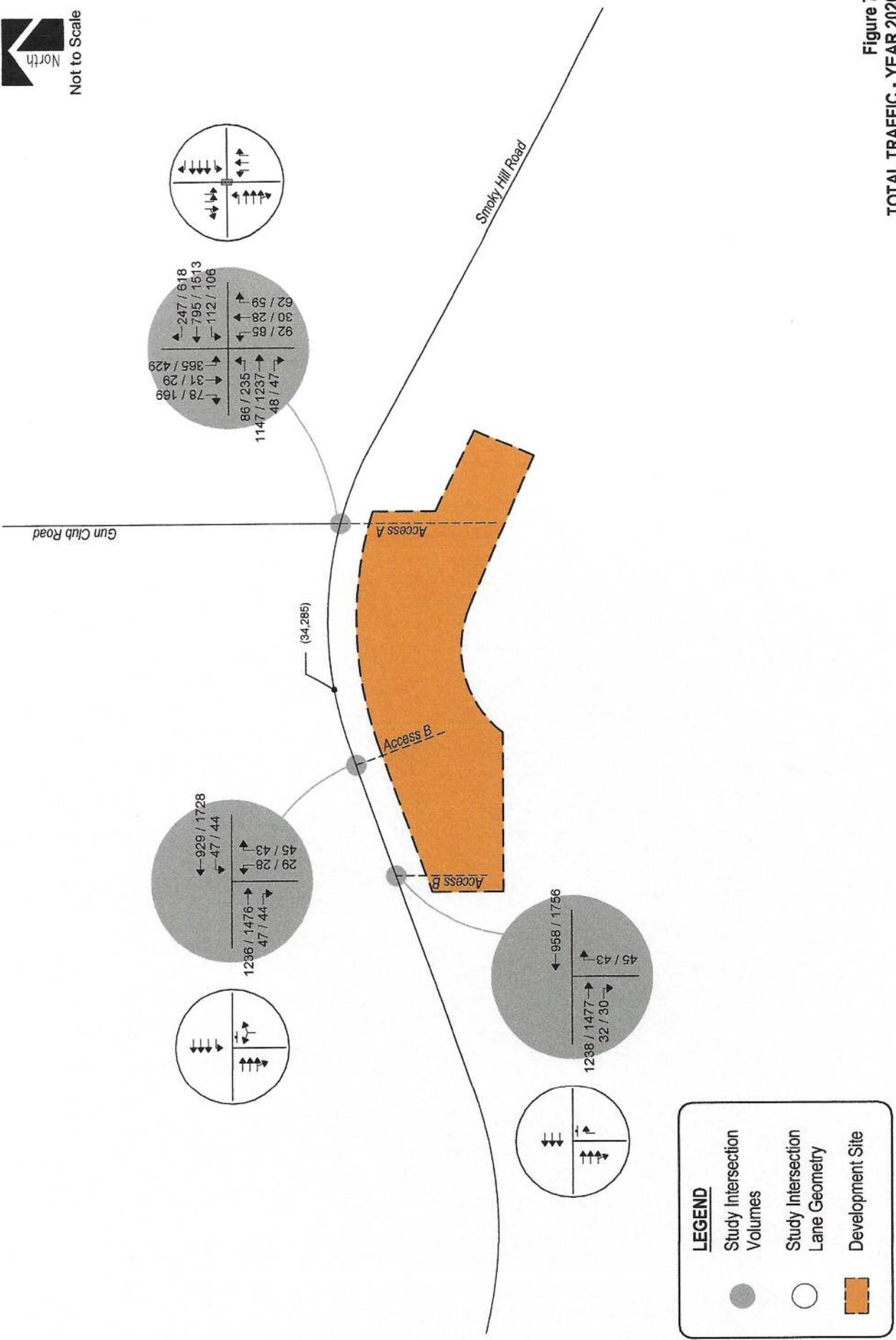
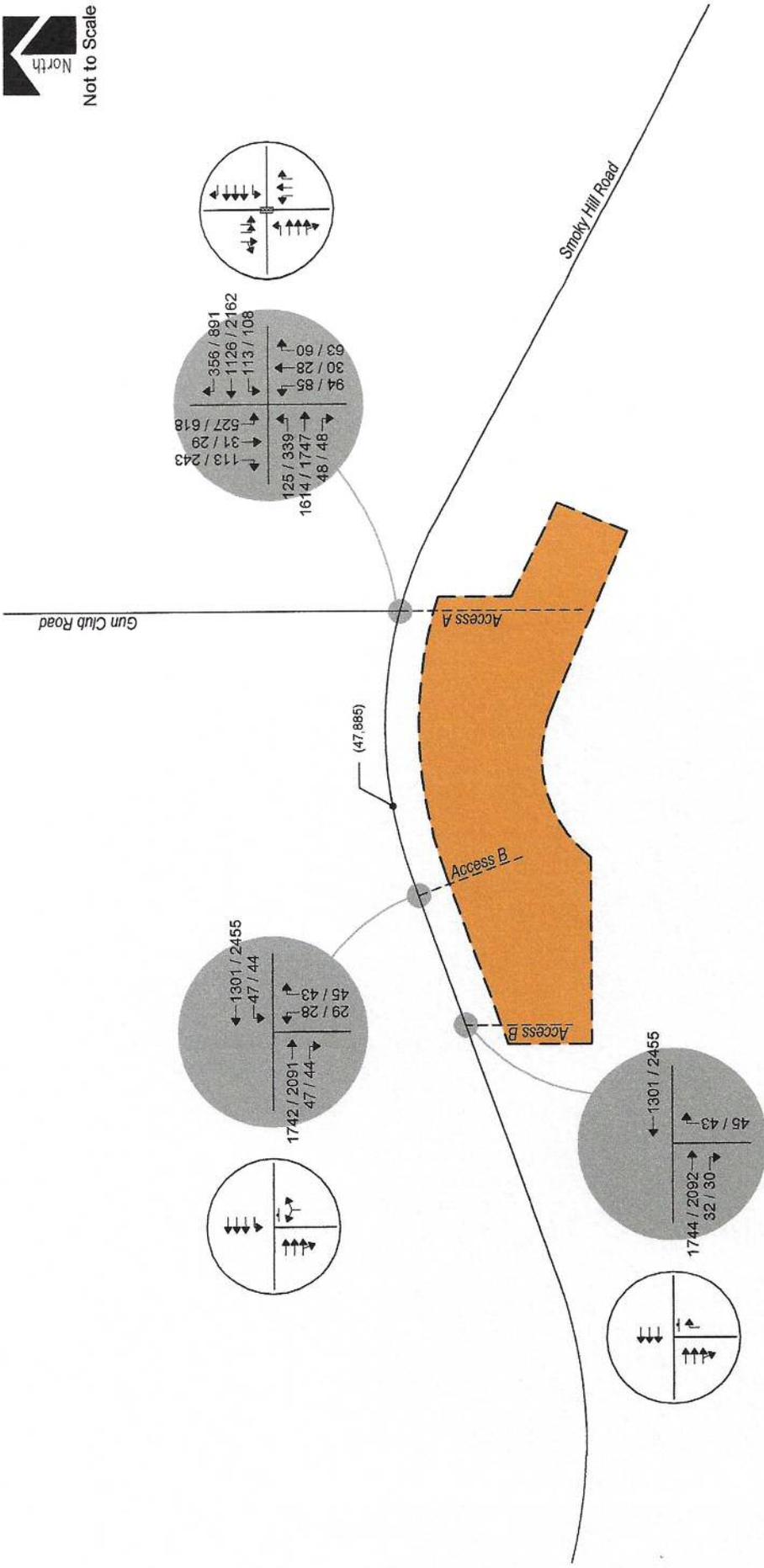


Figure 7
TOTAL TRAFFIC - YEAR 2020
 Volumes & Intersection Geometry
 AM / PM Peak Hour
 (ADT) : Average Daily Traffic



Not to Scale



LEGEND

- Study Intersection Volumes
- Study Intersection Lane Geometry
- Development Site

Figure 8
TOTAL TRAFFIC - YEAR 2040
 Volumes & Intersection Geometry
 AM / PM Peak Hour
 (ADT) : Average Daily Traffic

SMOKY HILL COMMERCIAL
 Traffic Impact Study



SM ROCHA, LLC
 Traffic and Transportation Consultants

Appendix B
Level of Service Analysis
Synchro Printouts

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑↑		↑
Traffic Vol, veh/h	2092	30	0	2483	0	43
Future Vol, veh/h	2092	30	0	2483	0	43
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
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	2274	33	0	2699	0	47

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	-	-	-	1153
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	-	0	164
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	164
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	35.5
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	164	-	-	-
HCM Lane V/C Ratio	0.285	-	-	-
HCM Control Delay (s)	35.5	-	-	-
HCM Lane LOS	E	-	-	-
HCM 95th %tile Q(veh)	1.1	-	-	-

Intersection						
Int Delay, s/veh	39.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑		↑	↑↑↑	↑	
Traffic Vol, veh/h	2091	44	44	2455	28	43
Future Vol, veh/h	2091	44	44	2455	28	43
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	-	-	-
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	2273	48	48	2668	30	47

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	2321	0	3460 1160
Stage 1	-	-	-	-	2297 -
Stage 2	-	-	-	-	1163 -
Critical Hdwy	-	-	5.34	-	5.74 7.14
Critical Hdwy Stg 1	-	-	-	-	6.64 -
Critical Hdwy Stg 2	-	-	-	-	6.04 -
Follow-up Hdwy	-	-	3.12	-	3.82 3.92
Pot Cap-1 Maneuver	-	-	86	-	~ 14 162
Stage 1	-	-	-	-	36 -
Stage 2	-	-	-	-	233 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	86	-	~ 6 162
Mov Cap-2 Maneuver	-	-	-	-	~ 6 -
Stage 1	-	-	-	-	36 -
Stage 2	-	-	-	-	103 -

Approach	EB	WB	NB
HCM Control Delay, s	0	1.6	\$ 2569.2
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	14	-	-	86	-
HCM Lane V/C Ratio	5.512	-	-	0.556	-
HCM Control Delay (s)	\$ 2569.2	-	-	90	-
HCM Lane LOS	F	-	-	F	-
HCM 95th %tile Q(veh)	10.6	-	-	2.5	-

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

Intersection

Int Delay, s/veh 0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑↑		↑
Traffic Vol, veh/h	2092	30	0	2483	0	44
Future Vol, veh/h	2092	30	0	2483	0	44
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
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	2274	33	0	2699	0	48

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	- 1153
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	- 7.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	- 3.92
Pot Cap-1 Maneuver	-	0	0 164
Stage 1	-	0	0
Stage 2	-	0	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	- 164
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	35.7
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	164	-	-	-
HCM Lane V/C Ratio	0.292	-	-	-
HCM Control Delay (s)	35.7	-	-	-
HCM Lane LOS	E	-	-	-
HCM 95th %tile Q(veh)	1.1	-	-	-

Intersection						
Int Delay, s/veh	39.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑		↑	↑↑↑	↑↑	
Traffic Vol, veh/h	2092	44	45	2455	28	43
Future Vol, veh/h	2092	44	45	2455	28	43
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	-	-	-
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	2274	48	49	2668	30	47

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	2322	0	3463
Stage 1	-	-	-	-	2298
Stage 2	-	-	-	-	1165
Critical Hdwy	-	-	5.34	-	5.74
Critical Hdwy Stg 1	-	-	-	-	6.64
Critical Hdwy Stg 2	-	-	-	-	6.04
Follow-up Hdwy	-	-	3.12	-	3.82
Pot Cap-1 Maneuver	-	-	86	-	~ 14
Stage 1	-	-	-	-	36
Stage 2	-	-	-	-	233
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	86	-	~ 6
Mov Cap-2 Maneuver	-	-	-	-	~ 6
Stage 1	-	-	-	-	36
Stage 2	-	-	-	-	100

Approach	EB	WB	NB
HCM Control Delay, s	0	1.7	\$ 2569.2
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	14	-	-	86	-
HCM Lane V/C Ratio	5.512	-	-	0.569	-
HCM Control Delay (s)	\$ 2569.2	-	-	91.7	-
HCM Lane LOS	F	-	-	F	-
HCM 95th %tile Q(veh)	10.6	-	-	2.6	-

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