

February 1, 2022

Mr. Sadek Darwiche PO Box 1677, Jackson, WY 83001 <u>SDarwiche@HotelJackson.com</u> (307) 733-0004

#### RE: Traffic Impact Study - Proposed 57-Unit Apartment Conversion at 3000 W Big Trail Drive

Dear Mr. Darwiche,

This analysis describes the estimated impact of traffic generated by a proposed conversion of a recently closed elderly care facility to a workforce housing facility on Big Trail Drive, as it may influence traffic operations at the intersection of Big Trail Drive at US-26/191/89. Facility location shown on the aerial maps below.





#### Location Maps:





#### **EXECUTIVE SUMMARY**

The property at 3000 W Big Trail Drive, also known as Legacy Lodge, is looking to convert the existing elderly care facility to workforce housing apartments. No additional development is proposed with the pending applications, and the owner proposes to limit occupancy to no more than 2 unrelated persons per unit. The property currently has 36 parking spaces. By restriping, the paved parking area can accommodate 41 parking spaces without expanding the current parking footprint. 41 parking spaces is below what is typically accepted by both the Teton County Land Development Regulations and the Institute of Traffic Engineers for the proposed use. In order to account for this difference, the owner intends to incentivize and promote the use of transit, carsharing, bicycles and other alternative transportation modes over the use of single occupancy vehicles. While these variables (reduced parking availability, transit, carsharing, etc.) have not been accounted for in this analysis, these variables are expected to lower the anticipated site generated traffic and impact on the overall network. Therefore, the data that follows regarding trip generation and impacts is the upper most bound of what we would expect to see here without any reductions or offsets from the utilization of alternative modes of transportation.

The Institute of Traffic Engineers (ITE) Trip Generation Manual anticipates that an apartment typically generates on average 6.65 trips per day per dwelling unit. The table below provides a comparison of the site generated trips that would be anticipated from both an elderly care facility and an apartment:

	Total	Generated	Trips	Distr	ibution of	Generated	Trips
Land Use	Daily	AM Hour	PM Hour	AM IN	AM OUT	PM IN	PM OUT
Senior Assisted Living (63 Beds, ITE Code 254)	173	11	18	6	5	9	9
Apartment (57 D.U., ITE Code 220)	379	29	35	6	23	23	12

Key findings from the overall analysis regarding the conversion to workforce housing has been summarized below:

- Based on ITE Trip generation rates, an additional 206 site generated trips during a 24-hour period would be added to the current 5,887contributed by the community as a whole;
- Based on traffic counts, currently 179 and 87 left turn movements are made from Big Trail Drive onto US 26 during the AM and PM peak hours. The conversion would add an additional 16 (8.7%) and 3 (3.1%) vehicles to the left turn movement during the AM and PM peak hours, respectively;
- The intersection, in its current state, is failing to provide users making a Left Turn from Big Trail Drive on to US 26 an adequate level of service and will only deteriorate with time, as shown by the table below. This is driven in large part by the traffic growth along US 26 and a lack of gaps in the flow of traffic and is less effected by traffic growth within the Rafter J community and the development in question.



Traffic Scenario	Movement	Level of Service	Control Delay per Vehicle (Seconds)
2021 AM Peak	Eastbound Left Turn	F	196.9
2022 AM Peak (No Build)	Eastbound Left Turn	F	239.2
2022 AM Peak (Build)	Eastbound Left Turn	F	288.9
2042 AM Peak (No Build)	Eastbound Left Turn	F	4,380.0
2042 AM Peak (Build)	Eastbound Left Turn	F	4,626.1
2021 PM Peak	Eastbound Left Turn	F	283.7
2022 PM Peak (No Build)	Eastbound Left Turn	F	345.5
2022 PM Peak (Build)	Eastbound Left Turn	F	436.0
2042 PM Peak (No Build)	Eastbound Left Turn	F	11,322
2042 PM Peak (Build)	Eastbound Left Turn	F	12,745

\*"Build" refers to conversion of Legacy Lodge to workforce housing while "No Build" refers to the property being left vacant



#### **TRANSPORTATION NETWORK CHARACTERISTICS**

The site is served by a 32' wide public street, connecting to a five-lane highway (US-26). A ten-foot off-street shareduse path crosses the site and leads to the Town of Jackson, and this will promote alternative modes of travel. Currently there is no transit services offered to Rafter J, however START bus had previously proposed service at a 30 min frequency within its February 2020 operations plan. The implementation of this service was ultimately put on Hold / Suspend under the revised April 2020 operations update due to complications from COVID -19.

The owner met with Bruce Able, START Bus Transit Operations Director and Susan Mick, START Bus Board member on January 13, 2022 to discuss the possibility for START to provide transit service to Rafter J Ranch. Mr. Able said that there is increasing calls for transit service south of Town, including Rafter J. During the START board retreat in November, 2021, the board set priorities and they include providing START transit service to Rafter J. It is not clear what form of transit service will be considered for Rafter J but, it will likely include an on demand (micro transit) service or a combination of an on demand and fixed route service that would connect to traditional fixed route service in town.

#### **RAFTER J COMMUNITY**

Rafter J is comprised of a few different unique land uses that each contribute traffic to the overall network. An approximation of the land uses and associated site generated trips has been provided in the table below:

Land Lise	Total	Generated	Trips	Distr	ibution of (	Generated	Trips
Land USe	Daily	AM Hour	PM Hour	AM IN	AM OUT	PM IN	PM OUT
Single Family House (495 DU, ITE Code 210)	4,712	371	495	93	124	312	137
Medical / Dental Office (4,500 SF, ITE Code 720)	163	11	16	8	2	4	12
Day Care Center, CLC (12,000 SF, ITE Code 565)	889	146	148	77	69	70	78
Gateway Church (13,500, ITE 560)	123	8	7	5	3	4	4

Table 1. Rafter J Community Site Generated Trips

#### **PREVIOUS LAND USE**

The previous land use was an 50,500 square foot elderly assisted living facility with 57 living units, 63 beds. Estimated traffic for such a facility is as follows:

Land Lica	Total	Generated	Trips	Distr	ibution of (	Generated	Trips
Land Use	Daily	AM Hour	PM Hour	AM IN	AM OUT	PM IN	PM OUT
Senior Assisted Living (63 Beds, ITE Code 254)	173	11	18	6	5	9	9

Table 2. Existing Land Use Site Generated Trips



### **PROPOSED SITE ALTERNATIVES**

The proposed workforce housing apartments use an existing building and parking area. The proposed use will have the following characteristics:

- 57 Apartments, including six two-bedrooms, thirty-three one-bedrooms, and eighteen studios
  - o 41 parking spaces, if re-striped
  - o Limited to 2 Un-related occupants per unit
- Alternative Land Uses: Standard ITE Trip Generation Rates

### **TRIP GENERATION AND SITE-GENERATED TRAFFIC**

Using Institute of Transportation Engineers (ITE) standard trip rates for Land Use 220 (Apartments with 114 residents), the site will generate the following trip generation pattern shown in the table below. Trip generation is analyzed without consideration of mode choice and therefore excludes the consideration of transit, ride sharing, and or other alternative means of transportation that would lower the anticipated impact to the transportation network.

Land Llas	Tota	al Generated	l Trips	Dist	ribution of (	Generated	l Trips
(Variable, Source)	Daily	AM Hour	PM Hour	AM IN	AM OUT	PM IN	PM OUT
Apartment (57 D.U., ITE Code 220)	379	29	35	6	23	23	12
Apartment (114 People, ITE Code 220)	377	31	45	7	24	29	16

Table 3 Proposed Land Use Site Generated Trips

# ALTERNATIVE LAND USE SITE GENERATED TRAFFIC FOR COMPARISON

Four alternative development scenarios were chosen based on the outcome of the ZCV2021-0012. Based on the review conducted by Teton County, the property is zoned CL per the 11<sup>th</sup> printing of the 1978 LDRs. From the land uses defined as either conditional or outright for the CL Zone, the following land uses were chosen to reflect an ITE equivalent development to provide estimates on the developments site generated traffic. The site generated traffic estimates are provided below for comparison:

	Total 0	Generated	l Trips	Distr	ibution of (	Generated	Trips
ITE Land Use	Daily	AM Hour	PM Hour	AM IN	AM OUT	PM IN	PM OUT
Convenience Market with Gasoline Pumps (4 Fuel Pumps, ITE code 853)	2,170	66	76	33	33	38	38
Fast Food with Drive-Thru (3,000 SF, ITE Code 934)	1,488	136	98	69	67	51	47
Medical / Dental Office (50,500 SF, ITE Code 720)	1,825	121	180	96	25	50	130
Day Care Center (50,500 SF, ITE Code 565)	3,740	615	623	326	289	293	330

Table 4 Alternative Land Use Site Generated Trips





#### Current Traffic Volumes at the US-26/191/89 / Big Trail Drive intersection

Through-traffic volumes on US-26 are based on historic counts at WYDOT Automatic Traffic Recorder (ATR) #32 on US 26 located south of the site. Available December 2020 weekday counts were increased 56% to approximate a September weekday, and a further 7.8% to correct from 2020 AADT to 2021 AADT. These adjustment percentages were produced using publicly available historic counts by WYDOT at ATR 32.

Y2 then conducted a traffic count of the peak-hour turn movements entering and exiting Big Trail Drive on Monday Dec 13, 2021. December count volumes were similarly inflated by 56% to replicate AM and PM peak design hours on a September weekday in 2021. Resulting base-year turn movement estimates are on the following page.

#### **Future Turn Movement Forecasts:**

Turn Movement Forecasts were developed for the years 2022 and 2042 (20 years) using historic growth rates at ATR #32 on US-26. Average annual AADT growth at that location has averaged 3.1% annually since 2010. Because development in the corridor service area (Wilson, Jackson, Grand Teton, Yellowstone, Hoback, Alpine, Star Valley and points south) shows no signs of abating, future Turn movements were also grown at 3.1% annually. Resulting turn Movement Diagrams are provided in Appendix A

				Turn Mo	vement Cou	ints: US-26	(/191/89 @	<b>Big Trail Dr</b>	ive					Γ
Project # 21153	Se	p/Dec Season	al Adj. Factor	1.560										
Monday, Dec 13, 2021	2021/2020	Annual Adjus	stment factor	1.078										
AM Peak Traffic	Nort	thbound US-15	91/89	Sout	hbound US 19.	1/89	East	bound Big Trai	Pr.				Total	ΒĦ
Time	LEFT	THROUGH			THROUGH	RIGHT	LEFT		RIGHT					0.936
07:00 - 07:15	0					4	6		2				15	
07:15 - 07:30	9					£	18		4				31	
07:30 -07:45	-					2	33		ę				39	
07:45 - 08:00	2	508			215	9	54		∞				75	160
08:00 - 08:15	2					18	49		œ				72	217
08:15 - 08:30	6					14	30		ŝ				56	242
08:30 - 08:45	∞					17	46		e				74	277
08:45 - 09:00	7	420			193	14	47		e				71	273
TOTAL	40	928	•	•	408	78	286	0	29	0	•	0	433	
	4.1%	95.9%	0.0%	0.0%	84.0%	16.0%	90.8%	0.0%	9.2%	#DIV/01	#DIV/0i	#DIV/01		
AM PEAK VOLUMES	26	508	•		215	63	172		12					
ADJUSTED AM DHV	41	854	•	•	362	98	268	•	19	•	•	•		
Monday, Dec 13, 2021														
Midday Traffic	Nort	thbound US-19	1/89	Sout	hbound US 19.	1/89	East	bound Big Trail	Dr.				Total	ΗF
Time	LEFT	THROUGH			THROUGH	RIGHT	LEFT		RIGHT					
11:00 - 11:15													•	
11:15 - 11;30													•	
11:30 - 11:45													•	
11:45 - 12:00													•	0
12:00 - 12:15													•	•
12:15 - 12:30													•	0
12:30 - 12:45													0	0
12:45 - 13:00													0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	#DIV/01	i0//I0#	#DIV/0i	#DIV/0	#DIV/01	#DIV/01	#DIV/01	i0//ID#	#DIV/0	#DIV/0i	i0//ID#	#DIV/01		
MIDDAY PEAK VOLUMES	•	•			•	•	•				•	•		
SEASONALLY ADJUSTED	•	•	•	•	•	•	•	•	•		•	•		
Monday, Dec 13, 2021														
PM Peak Traffic	Nor	thbound US-15	91/89	Sout	hbound US 19.	1/89	East	bound Big Trai	Ŀ.				Total	Ħ
Time	LEFT	THROUGH			THROUGH	RIGHT	LEFT		RIGHT					0.967
16:30 - 16:45	m					39	29		8				79	
16:45 - 17:00	1	192			580	39	23		2				65	
17:00 - 17:15	1					45	17		8				11	
17:15 - 17:30	2					51	18		4				75	290
17:30 - 17:45	1					40	20		0				61	272
17:45 - 18:00	£	181			708	29	15		2				49	256
18:00 - 18:15	0					20	15		1				36	221
18:15 - 18:30	0					29	6		0				38	184
TOTAL	п	373	•	•	1288	292	146	0	25	0	0	0	474	1223
	2.9%	97.1%	0.0%	0.0%	81.5%	18.5%	85.4%	0.0%	14.6%	i0//ID#	i0//I0#	i0//IC#		
PM PEAK VOLUMES		192	0	0	708	174	87	0	22	0	0	0		
ADJUSTED PM DHV	11	323	•		1,191	271	136	•	34		-	•		





#### Capacity Analyses of US-26/89/191 at Big Trail Drive:

Capacity analyses were conducted for a Stop-Controlled intersection using the Highway Capacity Software (HCS) 2010 for the scenarios defined below. The peak hour factor (PHF) was 0.92. The PHF provides a relationship between the peak 15 min window with the total voume during the peak hour.

The table below depicts critical movements at the US-26 / Big Trail drive intersection. Full Capacity Analysis Reports are provided in Appendix B.

Troffic Scopario	Movement	Level of	Control Delay per Vehicle
	Factbound Loft Turn	E	(Seconus)
2021 AWI FEAK		F A	10.0
	Eastbound Right Lurn	A	10.0
		A	8.0
2022 AM Peak (No Build)	Eastbound Left Turn	F	239.2
	Eastbound Right Turn	В	10.0
	Northbound Left Turn	A	8.6
2022 AM Peak (Build)	Eastbound Left Turn	F	288.9
	Eastbound Right Turn	В	10.1
	Northbound Left Turn	A	8.6
2042 AM Peak (No Build)	Eastbound Left Turn	F	4,380.0
	Eastbound Right Turn	В	12.3
	Northbound Left Turn	В	10.7
2042 AM Peak (Build)	Eastbound Left Turn	F	4,626.1
	Eastbound Right Turn	В	12.4
	Northbound Left Turn	В	10.8
2021 PM Peak	Eastbound Left Turn	F	283.7
	Eastbound Right Turn	C	15.3
	Northbound Left Turn	В	12.5
2022 PM Peak (No Build)	Eastbound Left Turn	F	345.5
	Eastbound Right Turn	C	15.7
	Northbound Left Turn	В	12.8
2022 PM Peak (Build)	Eastbound Left Turn	F	436.0
	Eastbound Right Turn	C	16.0
	Northbound Left Turn	В	13.1
2042 PM Peak (No Build)	Eastbound Left Turn	F	11,322
	Eastbound Right Turn	E	49.4
	Northbound Left Turn	D	31.4
2042 PM Peak (Build)	Eastbound Left Turn	F	12,745
	Eastbound Right Turn	F	52.4
	Northbound Left Turn	D	32.9



#### **Findings**:

The general finding is that the eastbound left turn is already failing during peak hours. This occurs because of the high volume and lack of gaps in the opposing north-south through traffic movements on US-26. If north-south traffic continues to grow at 3.1% annually as projected, the level of service at this intersection will continue to worsen for the foreseeable future.

Regarding the specific effect of the conversion of the properties use, there will be an overall increase of approximately 206 trips generated by the site. Focusing on the left turn movement, the AM and PM peak hours will see an additional 16 and 3 left turn movements as a result of the conversion respectively. This equates to an approximate 8.7% and 3.1% increase respectively in the AM and PM left turning movement volumes. This increase in volume can be quantified by an anticpated increase in delay for a vehicle making a left hand turning movement of approximately 50 seconds during the AM peak periods and 90 secounds during the PM peak.

#### **Recommendations / Alternatives for Evaluation:**

Recommednations and alternaitves offered below have not been evaluated from a traffic engineering or roadway geometrics perspective and are only offered as possible solutions for further study.

Network Improvements: Proposals exist to connect South Park Loop Road and Tribal Trail Road to WY 22 at a point 1.4 miles west of US-26. This potential connection, combined with a connection from Big Trail Drive to South Park Loop Road, would provide a north-south road parallel to US-26 that would reduce demand for the left turn from Big Trail drive to northbound US-26. This network alternative could reduce traffic demand on US-26 and the US-26/Big Trail Drive intersection

Intersection Improvements: At the US-26 Big Trail Drive intersection itself, other geometric improvement alternatives for evaluation include the following:

- 1. No Action
- 2. Traffic-Actuated signal at the Big Trail Drive
- 3. Median Refuge to facilitate a 2-part left turn onto US-26
- 4. 2-lane Roundabout N-S with a 1-Lane West Leg
- 5. 2 X 1-Lane Roundabout with Northbound through Bypass Lane
- 6. Grade Separation and Northbound Merge Lane (tunnel under US-26)
- 7. Expanded Regional Transit with Bus Signal Override

Because the Wyoming Department of Transportation is responsible for US-26/89/191, any proposed improvement falls under that agency's jurisdiction. WYDOT should consider the needs at this intersection along with other proposed improvements in the State Long-Range Plan and State Transportation Improvement Program.



#### **Contact Information:**

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OA/QC Gary Grigsby, PE, PLS Office Manager Western Research and Development / Y2 Consultants – Cheyenne Office (307) 632-5656



**APPENDIX A: Turn Movement Forecasts** 

**AM Peak Site-Generated Traffic** Leg 1: US-26/191/89 North Leg TOTAL SB 27 NB 21 6 0 0 6 RIGHT THRU LEFT Leg 4: Big Trail Drive West Leg WB 7 TOTAL 31 21 LEFT 0 THRU EΒ 24 3 RIGHT Leg 3: US-26/191/89 South Leg THRU LEFT RIGHT 1 0 0 3 1 SB 4 NB TOTAL

US-26/191/89 at Big Trail Drive

#### **Crossroad Diagram:**

**Crossroad Diagram:** 



**Crossroad Diagram:** 



US-26/191/89 at Big Trail Drive

TOTAL

**Crossroad Diagram:** 

2022 AM Peak DHV BUILD SCENARIO







TOTAL

US-26/191/89 at Big Trail Drive

**Roundabout Diagram:** 

2042 AM Peak Design Year DHV Estimate (No Build)



Crossroad Diagram:







US-26/191/89 at Big Trail Drive

Crossroad Diagram:



**Crossroad Diagram:** 



TOTAL

#### **Big Trail Drive** US-26/191/89 at







US-26/191/89 **Big Trail Drive** at

**Roundabout Diagram:** 

2042 PM Peak Design Year DHV Estimate (No Build)



Crossroad Diagram:



2042 PM Peak DHV BUILD SCENARIO





**APPENDIX B: Intersection Capacity Reports** 

<b>General Information</b>		Site Information	
Analyst	G Grigsby	Intersection	Big Trail Dr & US 26/191/
Agency/Co.	Western R&D	Jurisdiction	
Date Performed	1/2/2022	East/West Street	Big Trail Drive
Analysis Year	2021	North/South Street	US 26/191/89
Time Analyzed	2021 AM Peak (Existing)	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	W Big Trail Dr & US 26		

#### Lanes



Vehicle Volumes and Ad	justme	ents														
Approach	1	Eastb	ound			West	bound		1	North	bound		1	South	nbound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	0	1		0	0	0	0	1	2	0	0	0	2	0
Configuration		L		R						L	Т				Т	TR
Volume, V (veh/h)		268	1	19						41	854				362	98
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked											-					
Percent Grade (%)		(	)											A		
Right Turn Channelized		N	0			٩	No			٦	No			-	No	
Median Type/Storage				Undi	vided											
Critical and Follow-up H	leadwa	ys														
Base Critical Headway (sec)						1	1	1		1	1		1			
Critical Headway (sec)						1				1						
Base Follow-Up Headway (sec)								1	1	1					1	
Follow-Up Headway (sec)														1		
Delay, Queue Length, an	nd Leve	el of S	ervic	e												
Flow Rate, v (veh/h)	1	291		21	[	1	1	1	T	45	T	T	T	1	T	-
Capacity, c (veh/h)		228		747				1000		1054						
v/c Ratio		1.28		0.03						0.04						
95% Queue Length, Q <sub>95</sub> (veh)		15.1		0.1						0.1						
Control Delay (s/veh)		196.9		10.0						8.6						
Level of Service, LOS		F		A						A						
Approach Delay (s/veh)		18	4.3	-						(	).4					
Approach LOS		f							1							

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HCS 2010 TWSC Version 6.90 2021 AM Peak Existing.xtw

	1311	HCS	201	0 Tw	o-W	'ay St	:op-(	Conti	rol R	epor	t		12 E	113		241
General Information		1.1.1		-			Site	Infor	natio	n	1		-	1	1.11	-
Analyst	G Gria	sbv		-		-	Inters	ection	_		Big Tr	ail Dr &	US 26/1	91/		
Agency/Co.	Weste	rn R&D	-	1.1.1.1.1		110 200	Jurisd	liction	1.4.4		- sig			5.17	1.00	-
Date Performed	1/2/20	)22					East/	Nest Str	eet		Big Tr	ail Drive	9			
Analysis Year	2022		1100	-		-	North	/South	Street		US 26	/191/89	)			-
Time Analyzed	2022	AM Peak	(No Bi	uild)			Peak	Hour Fa	ctor		0.92			-		
Intersection Orientation	North	South	. (			-	Analy	sis Time	Period (	'hrs)	0.25		-	-		-
Project Description	W Big	Trail Dr	& US 2	6	_		/ arrary	515 11110	Tenou							
Longe	W big	nan er	a os z			-	-	-	-	-	-			12.17		
Vakiele Valumes and As	1			1 4 1 4 4 4 5	<mark>Я Т</mark> Major	-↓ ↓ ↑ ↓ Street: No	t rth South									
Vehicle Volumes and Ac	djustme	nts	-								1.2				1	
Approach		Eastb	ound			West	bound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	0	1		0	0	0	0	1	2	0	0	0	2	0
Configuration		L		R						L	Т				Т	TR
Volume, V (veh/h)		276		20						42	880				373	101
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)		(	)									1				
Right Turn Channelized		N	о			٢	lo	0000		Ν	lo	100		٢	lo	
Median Type/Storage				Undi	vided											
Critical and Follow-up I	Headwa	ys														
Base Critical Headway (sec)				1		1		1	1	-			1			1
Critical Headway (sec)				1.0												
Base Follow-Up Headway (sec)						1	-		-							
Follow-Up Headway (sec)																
Delay Queue Length	nd Leve	lofS	ervic	e					-		-		-			-
Flow Rate v (veh/h)		300		- 22		1		r	-	AE		-	1	-	1	1
Canacity c (veh/h)		219		729					-	1040						
v/c Patio	-	1 20	-	150						0.04			-	-	-	
	_	1.50		0.03						0.04						
Some Queue Length, Q <sub>95</sub> (Ven)		10.9		0.1		-				0.1					-	-
Level of Consists 100	-	239.2		10.0						ð.b						
Level of Service, LUS	_	F _		B						A						
Approach Delay (s/veh)		22	3.5							(	J.4		1			

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Approach LOS

F

HCS 2010 TWSC Version 6.90 2022 AM Peak No Action.xtw

C		1	1000		100									0.00		10000
General Information							Site	Inform	natio	n		-			1. 1.	
Analyst	G Grigs	sby			_		Inters	ection		_	Big Tr	ail Dr &	US 26/1	91/		
Agency/Co.	Wester	n R&D					Juriso	liction				-				
Date Performed	1/2/202	22	_				East/	West Str	eet	_	Big Tr	ail Drive	9	_	_	
Analysis Year	2022						North	/South	Street		US 26	/191/89	)			
Time Analyzed	2022 A	M Peak	(Build)		_	_	Peak	Hour Fa	ctor		0.92					
Intersection Orientation	North-S	South					Analy	sis Time	Period (	hrs)	0.25					
Project Description	W Big T	Trail Dr	& US 26	5												
Lanes																
						ግ	t									
Vehicle Volumes and Ad	ljustmer	nts	100		<b>A</b> T ► Major	ገ 1 የ ቀ ነ Street: No	t t	r								
Vehicle Volumes and Ad Approach	ljustmer	<b>its</b> Eastbo	ound		<b>A T *</b> Major	T T Street: No Westl	th-South	7		North	bound			South	bound	
<b>Vehicle Volumes and Ad</b> Approach Movement	ljustmer	Eastbo	ound T		Major U	Street: No Westl	th South	R		North	ibound T	R	U	South	abound T	R
<b>Vehicle Volumes and Ad</b> Approach Movement Priority	ljustmer	Tts Eastbo L 10	ound T 11	R 12	א זי א Major U	Street: No Westl	th South bound T 8	R 9	U 1U	North L 1	bound T 2	R 3	U 4U	South L 4	abound T 5	R 6
Vehicle Volumes and Ad Approach Movement Priority Number of Lanes	ljustmen U	Eastbo L 10 1	ound T 11 0	R 12 1	Major U	Street: No Westl	th-South cound T 8 0	R 9 0	U 1U 0	North L 1	ibound T 2 2	R 3 0	U 4U 0	South L 4 0	bound T 5 2	R 6 0
Vehicle Volumes and Ad Approach Movement Priority Number of Lanes Configuration	ljustmer	Eastbo L 10 1 L	ound T 11 0	R 12 1 R 222	א זי א Major	Westl C 7 0	th South cound T 8 0	R 9 0	U 1U 0	North L 1 L	bound T 2 Z T	R 3 0	U 4U 0	South L 4 0	bound T 5 2 T 272	R 6 0 TR
Vehicle Volumes and Ad Approach Movement Priority Number of Lanes Configuration Volume, V (veh/h) Percent Heavy Vehicles (%)	ljustmen U	Eastbo L 10 1 L 297	ound T 11 0	R 12 1 R 23	אַזיי Major	Street: No Westl	th-South cound T 8 0	R 9 0	U 1U 0	North L 1 L 43	bound T 2 2 T 880	R 3 0	U 4U 0	South L 4 0	bound T 5 2 T 373	R 6 0 TR 107
Vehicle Volumes and Ad Approach Movement Priority Number of Lanes Configuration Volume, V (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked	ljustmer	Eastbo L 10 1 L 297 3	ound T 11 0	R 12 1 R 23 3	א איז איז איז איז איז איז איז איז איז אי	Westl C 7 0	th South	R 9 0	U 1U 0	North L 1 L 43 3	bound T 2 2 T 880	R 3 0	U 4U 0	South L 4 0	bound T 5 2 T 373	R 6 0 TR 107
Vehicle Volumes and Ad Approach Movement Priority Number of Lanes Configuration Volume, V (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%)	ljustmen U	Eastbo L 10 1 L 297 3	ound T 11 0	R 12 1 R 23 3	An Major	Street: No	th-South	R 9 0		North L 1 L 43 3	bound T 2 2 T 880	R 3 0	U 4U 0	South L 4 0	bound T 5 2 T 373	R 6 0 TR 107
Vehicle Volumes and Ad Approach Movement Priority Number of Lanes Configuration Volume, V (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Bight Turn Channelized	ljustmer	Eastbo L 10 1 L 297 3 0	ound T 11 0	R 12 1 R 23 3	אַר איז	Westl	th South	R 9 0		North L 1 L 43 3	bound T 2 2 T 880	R 3 0	U 4U 0	South L 4 0	bound T 5 2 T 373	R 6 0 TR 107
Vehicle Volumes and Ad Approach Movement Priority Number of Lanes Configuration Volume, V (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type/Storage	ljustmen U I I I I I I I I I I I I I I I I I I	Eastbo L 10 1 297 3 0 No	ound T 11 0	R 12 1 R 23 3	A T Major	Street: No	th-South	R 9 0		North L 1 L 43 3	Ibound T 2 2 T 880 80	R 3 0	U 4U 0	South L 4 0	bound T 5 2 T 373 No	R 6 0 TR 107
Vehicle Volumes and Ad Approach Movement Priority Number of Lanes Configuration Volume, V (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type/Storage		Eastbo L 10 1 297 3 0 N	ound T 11 0	R 12 1 R 23 3 Undi	אַשיי שאון איז	Vesti U 7 0	th South	R 9 0		North L 1 L 43 3	bound T 2 2 T 880	R 3 0	U 4U 0	South 4 0	T       5       2       T       373	R 6 0 TR 107
Vehicle Volumes and Ad Approach Movement Priority Number of Lanes Configuration Volume, V (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type/Storage Critical and Follow-up H	ljustmer	Eastbol       L       10       1       297       3       0       No	ound T 11 0	R 12 1 R 23 3 Undi	An Kajor	Vesti L 7 0	th South	R 9 0		North L 1 L 43 3	bound T 2 2 T 880	R 3 0	U 4U 0	South L 4 0	bound T 5 2 T 373	R 6 0 TR 107
Vehicle Volumes and Ad Approach Movement Priority Number of Lanes Configuration Volume, V (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type/Storage <b>Critical and Follow-up H</b> Base Critical Headway (sec)	ljustmer	Eastbo L 10 1 297 3 0 N 8	ound T 11 0	R 12 1 R 23 3 Undi	אַשייע איז	Vesti U 7 0	th South	R 9 0		North L 1 L 43 3	Ibound T 2 2 T 880	R 3 0	U 4U 0	South L 4 0	T 5 2 T 373	R 6 0 TR 107
Vehicle Volumes and Ad Approach Movement Priority Number of Lanes Configuration Volume, V (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type/Storage <b>Critical and Follow-up H</b> Base Critical Headway (sec) Critical Headway (sec)	ljustmer	Eastbol         L         10         1         297         3         0         No	ound T 11 0	R 12 1 R 23 3 	A T * Major	Vesti L 7 0	th South	R 9 0		North L 1 L 43 3	bound T 2 2 T 880	R 3 0		South L 4 0	Ibound T 5 2 T 373 373	R 6 0 TR 107

Flow Rate, v (veh/h)	323	25		47		
Capacity, c (veh/h)	215	736		1035		
v/c Ratio	1.50	0.03		0.05		
95% Queue Length, Q <sub>95</sub> (veh)	19.6	0.1		0.1		
Control Delay (s/veh)	288.9	10.1		8.6		
Level of Service, LOS	F	В		A		
Approach Delay (s/veh)	268.8			0.4		
Approach LOS	F					

	HCS 2010 Two-V	Vay Stop-Control Repo	rt
General Information		Site Information	
Analyst	G Grigsby	Intersection	Big Trail Dr & US 26/191/
Agency/Co.	Western R&D	Jurisdiction	
Date Performed	1/2/2022	East/West Street	Big Trail Drive
Analysis Year	2042	North/South Street	US 26/191/89
Time Analyzed	2042 AM Peak (No Build)	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	W Big Trail Dr & US 26		

#### Lanes



#### Vehicle Volumes and Adjustments

Approach	1	Eastb	ound			West	bound		1	North	bound		1	South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	0	1		0	0	0	0	1	2	0	0	0	2	0
Configuration		L		R					1	L	т		1		Т	TR
Volume, V (veh/h)		509		36						78	1621				687	186
Percent Heavy Vehicles (%)		3		3					1	3						
Proportion Time Blocked																
Percent Grade (%)		C														
Right Turn Channelized		N	0			Ν	lo	1		١	lo			٩	10	
Median Type/Storage				Undi	vided											
Critical and Follow-up H	eadwa	ys						11								
Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																
Delay, Queue Length, an	d Leve	el of Se	ervice	e						di.						
Flow Rate, v (veh/h)		553		39				1		85						
Capacity, c (veh/h)		53		534						713						
v/c Ratio		10.41		0.07				1		0.12						
95% Queue Length, Q <sub>95</sub> (veh)		65.6		0.2						0.4						
Control Delay (s/veh)		4380.0		12.3						10.7						
Level of Service, LOS		F		В						В						
Approach Delay (s/veh)		409	2.3							(	).5					
Approach LOS		F														

<b>General Information</b>		Site Information	
Analyst	G Grigsby	Intersection	Big Trail Dr & US 26/191,
Agency/Co.	Western R&D	Jurisdiction	
Date Performed	1/2/2022	East/West Street	Big Trail Drive
Analysis Year	2042	North/South Street	US 26/191/89
Time Analyzed	2042 AM Peak (Build)	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	W Big Trail Dr & US 26		
		4 + <sub>k</sub>	

#### **Vehicle Volumes and Adjustments** Approach Eastbound Westbound Northbound Southbound U Т U U L U Movement L R L Т R Т R L Т R 10 7 9 1U 2 3 4U 6 Priority 11 12 8 1 4 5 Number of Lanes 1 0 1 0 0 0 0 2 0 0 0 2 0 1 Configuration L R L Т Т TR 530 Volume, V (veh/h) 39 79 1621 687 192 Percent Heavy Vehicles (%) 3 3 3 **Proportion Time Blocked** Percent Grade (%) 0 **Right Turn Channelized** No No No No Median Type/Storage Undivided **Critical and Follow-up Headways** Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) **Delay, Queue Length, and Level of Service** Flow Rate, v (veh/h) 576 42 86 Capacity, c (veh/h) 53 531 709 v/c Ratio 10.95 0.08 0.12 95% Queue Length, Q95 (veh) 68.6 0.3 0.4 4626.1 10.8 Control Delay (s/veh) 12.4 Level of Service, LOS F В В Approach Delay (s/veh) 4312.6 0.5 F Approach LOS

<b>General Information</b>		Site Information	
Analyst	G Grigsby	Intersection	Big Trail Dr & US 26/191/
Agency/Co.	Western R&D	Jurisdiction	
Date Performed	1/2/2022	East/West Street	Big Trail Drive
Analysis Year	2021	North/South Street	US 26/191/89
Time Analyzed	2021 PM Peak (Existing)	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	W Big Trail Dr & US 26		



# Vehicle Volumes and Adjustments

Approach		Eastb	ound			West	bound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	10	1	2	3	4U	4	5	6
Number of Lanes		1	0	1		0	0	0	0	1	2	0	0	0	2	0
Configuration		L		R						L	Т				Т	TR
Volume, V (veh/h)		136		34						11	323				1131	136
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)		(	כ							0						
Right Turn Channelized		N	ю			٢	١o			Ν	10			1	No	
Median Type/Storage				Undi	vided											
Critical and Follow-up H	eadwa	iys													1997	
Base Critical Headway (sec)														-		
Critical Headway (sec)																
Base Follow-Up Headway (sec)								1								
Follow-Up Headway (sec)																
Delay, Queue Length, an	d Leve	el of S	ervic	e												
Flow Rate, v (veh/h)		148		37					1	12						
Capacity, c (veh/h)		109		387						489						
v/c Ratio		1.36		0.10			-			0.02						
95% Queue Length, Q <sub>95</sub> (veh)		10.3		0.3	1					0.1						
Control Delay (s/veh)		283.7		15.3						12.5		1				
Level of Service, LOS		F		С						В						
Approach Delay (s/veh)		230.0							0.4							
Approach LOS		F									1					

General Information	1-17/23						Sito	Infor	matior		100	1	1000		1.1.1.1	
General mormation			dint.	1		1.1	Site	mon	nation		1					
Analyst	G Grig	sby	_	_			Inters	ection	_	_	Big Tr	ail Dr &	US 26/1	91/		
Agency/Co.	Wester	rn R&D					Jurisd	liction								
Date Performed	1/2/20	22					East/\	West Str	eet		Big Tr	ail Drive				
Analysis Year	2022						North	/South	Street	-	US 26	/191/89				
Time Analyzed	2022 P	PM Peak (I	No Buil	d)			Peak	Hour Fa	ctor		0.92					
Intersection Orientation	North-	South					Analy	sis Time	Period (	nrs)	0.25			-	1012	
Project Description	W Big	Trail Dr &	ι US 26													
Lanes					Brit											
				<mark>14 1 ኢቀ ኦ</mark> ሀ												
Vehicle Volumes and /	Adjustme	nts			이 가 색 Major :	1 1 Street: Nor	th-South									
<b>Vehicle Volumes and A</b> Approach	Adjustme	<b>nts</b> Eastboo	und		រា ។ Major វ	ጉ ተ ናreet: Nor Westt	th South			North	bound			South	bound	
<b>Vehicle Volumes and A</b> Approach Movement	<b>Adjustme</b>	nts Eastbou	und		ብ ጎ ጘ Major : U	Street: Nor Westt	the South	R		North	bound	R	U	South	abound T	R
<b>Vehicle Volumes and A</b> Approach Movement Priority	Adjustme	nts Eastbou L 10	und T 11	R 12	រាក Major U	Notesta Westte L 7	th South cound T 8	R 9	U 1U	North L 1	bound T 2	R 3	U 4U	South L 4	abound T 5	R 6
Vehicle Volumes and A Approach Movement Priority Number of Lanes	Adjustme	Eastbour L 10 1	und T 11 0	R 12 1	រាំ។ Major : U	T t T T T Street Nor Westt L 7 0	th South T 8 0	R 9 0	U 1U 0	North L 1 1	bound T 2 2	R 3 0	U 4U 0	South L 4	nbound T 5 2	R 6 0
Vehicle Volumes and A Approach Movement Priority Number of Lanes Configuration	Adjustme	Eastbour L 10 1 L	und T 11 0	R 12 1 R	<del>ກຳ ກ</del> Major ໃ	Vestte L 7 0	th South cound T 8 0	R 9 0	U 1U 0	North L 1 L	bound T 2 2 T	R 3 0	U 4U 0	South L 4 0	bound T 5 2 T	R 6 0 TR
Vehicle Volumes and A Approach Movement Priority Number of Lanes Configuration Volume, V (veh/h)	Adjustme	Eastbout       10       1       1       1       1       1       1       1	und T 11 0	R 12 1 R 35	<mark>្សា ។</mark> Major : U	Westt L 7 0	th South T 8 0	R 9 0	U 1U 0	North L 1 L L 11	bound T 2 2 T 333	R 3 0	U 4U 0	South L 4 0	nbound T 5 2 T 1166	R 6 0 TR 140
Vehicle Volumes and A Approach Movement Priority Number of Lanes Configuration Volume, V (veh/h) Percent Heavy Vehicles (%)		Eastbout       L       10       1       L       103	und T 11 0	R 12 1 R 35 3	ብ ጉ ነ Major : U	Vestl Vestl 1 7 0	th South Dound T 8 0	R 9 0	U 1U 0	North L 1 L 11 2	bound T 2 Z T 333	R 3 0	U 4U 0	South L 4 0	bound T 5 2 T 1166	R 6 0 TR 140
Vehicle Volumes and A Approach Movement Priority Number of Lanes Configuration Volume, V (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked	Adjustme	Eastbour L 10 10 1 L 140 3 1	und T 11 0	R 12 1 R 35 3	រាក Major ។ U	Westt	bound T 8 0	R 9 0	U 1U 0	North L 1 1 L 11 3	bound T 2 2 T 333	R 3 0	U 4U 0	South L 4 0	T 5 2 T 1166	R 6 0 TR 140
Vehicle Volumes and A Approach Movement Priority Number of Lanes Configuration Volume, V (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%)		Eastbout       L       10       1       L       100       3       0	und T 11 0	R 12 1 R 35 3	រាក ។ Major :	Westh L 7 0	th South	R 9 0	U 1U 0	North L 1 L 11 3	bound T 2 2 T 333	R 3 0	U 4U 0	South L 4 O	bound T 5 2 T 1166	R 6 0 TR 140

#### Critical and Follow-up Headways

Median Type/Storage

Critical and Follow-up Hea	adways						
Base Critical Headway (sec)							
Critical Headway (sec)							
Base Follow-Up Headway (sec)							
Follow-Up Headway (sec)							
Delay, Queue Length, and	Level of Serv	vice					
Flow Rate, v (veh/h)	152	38		12			
Capacity, c (veh/h)	101	374		471		-	
v/c Ratio	1.50	0.10		0.03			
95% Queue Length, Q <sub>95</sub> (veh)	11.4	0.3		0.1			
Control Delay (s/veh)	345.5	15.7		12.8			
Level of Service, LOS	F	С		В			
Approach Delay (s/veh)	279.6			0.4			
Approach LOS	F			1.1.1.1.	1111		

Undivided

<b>General Information</b>		Site Information							
Analyst	G Grigsby	Intersection	Big Trail Dr & US 26/191/						
Agency/Co.	Western R&D	Jurisdiction							
Date Performed	1/2/2022	East/West Street	Big Trail Drive						
Analysis Year	2022	North/South Street	US 26/191/89						
Time Analyzed	2022 PM Peak (Build)	Peak Hour Factor	0.92						
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25						
Project Description	W Big Trail Dr & US 26								

#### Lanes



#### Vehicle Volumes and Adjustments

Approach	1	Eastb	ound			West	oound			North	bound		1	South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	0	1		0	0	0	0	1	2	0	0	0	2	0
Configuration		L		R						L	Т				Т	TR
Volume, V (veh/h)		154		37						14	333				1166	166
Percent Heavy Vehicles (%)		3		3						3				2		
Proportion Time Blocked																
Percent Grade (%)		C				A,						1				
Right Turn Channelized		N	0			١	10			N	10			1	No	
Median Type/Storage				Undi	vided											
Critical and Follow-up He	eadwa	ys														
Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																
Delay, Queue Length, and	d Leve	l of S	ervic	e												
Flow Rate, v (veh/h)		167		40			1			15						
Capacity, c (veh/h)		97		366			101.54			459						
v/c Ratio		1.71		0.11						0.03						
95% Queue Length, Q <sub>95</sub> (veh)		13.4		0.4						0.1						
Control Delay (s/veh)		436.0		16.0						13.1						
Level of Service, LOS		F		С						В						
Approach Delay (s/veh)		354	4.8							C	).5					
Approach LOS		F									121				1.2	

	HCS 2010 Two-V	Nay Stop-Control Repo	rt
General Information		Site Information	
Analyst	G Grigsby	Intersection	Big Trail Dr & US 26/191/
Agency/Co.	Western R&D	Jurisdiction	
Date Performed	1/2/2022	East/West Street	Big Trail Drive
Analysis Year	2042	North/South Street	US 26/191/89
Time Analyzed	2042 PM Peak (No Build)	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	W Big Trail Dr & US 26		

#### Lanes



Southbound

Northbound

# Vehicle Volumes and Adjustments Approach Eastbound Westbound Movement U L T R U L T R U

Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	0	1		0	0	0	0	1	2	0	0	0	2	0
Configuration		L		R						L	Т				Т	TR
Volume, V (veh/h)		258		65						21	613				2147	258
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)		(	D													
Right Turn Channelized		N	lo			Ν	lo			١	lo	direct.		١	No	
Median Type/Storage				Undi	vided											
<b>Critical and Follow-up H</b>	eadwa	ays											12.11			
Base Critical Headway (sec)																
Critical Headway (sec)				1												
Base Follow-Up Headway (sec)								1								
Follow-Up Headway (sec)																
Delay, Queue Length, an	d Leve	el of S	ervice	e												
Flow Rate, v (veh/h)		280		71				T		23						
Capacity, c (veh/h)		11		149				1		159						
v/c Ratio		24.73		0.48			1		1	0.14		1				
95% Queue Length, Q <sub>95</sub> (veh)		36.5		2.2				1		0.5						
Control Delay (s/veh)		11322. 4		49.4						31.4						
Level of Service, LOS	3	F		E						D						
Approach Delay (s/veh)		904	42.1								.0					
Approach LOS			F													

Seneral Information		Site Information							
Analyst	G Grigsby	Intersection	Big Trail Dr & US 26/191/						
Agency/Co.	Western R&D	Jurisdiction							
Date Performed	1/2/2022	East/West Street	Big Trail Drive						
Analysis Year	2042	North/South Street	US 26/191/89						
Time Analyzed	2042 PM Peak (Build)	Peak Hour Factor	0.92						
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25						
Project Description	W Big Trail Dr & US 26								



Vehicle Volumes and Ad	justme	ents														
Approach	Eastbound			Westbound			Northbound			Southbound						
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	0	1		0	0	0	0	1	2	0	0	0	2	0
Configuration		L		R						L	Т				Т	TR
Volume, V (veh/h)		272		67			1.00			24	613				2147	284
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No			No			No					
Median Type/Storage	Undivided															
Critical and Follow-up H	eadwa	ays	1.4										0.0			
Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																
Delay, Queue Length, an	d Leve	el of S	ervic	e												
Flow Rate, v (veh/h)		296		73						26						
Capacity, c (veh/h)		11	0.00	145						155						
v/c Ratio		27.80		0.50						0.17						
95% Queue Length, Q₃₅ (veh)		38.5		2.4						0.6						
Control Delay (s/veh)		12745. 8		52.4						32.9						
Level of Service, LOS		F		F						D						
Approach Delay (s/veh)	10234.7								1.2							
Approach LOS	F															