WELLS + ASSOCIATES

ART PLACE PHASE 2

WASHINGTON, DC

CTR ADDENDUM

March 5, 2019

!ŃJű tfl-ŏŜ tKl-ăŜ н

Comprehensive Transportation Review

Addendum

Washington, DC

March 5, 2019

Prepared by:

Wells + Associates

(703) 917-6620

INTRODUCTION

OVERVIEW

The Morris and Gwendolyn Cafritz Foundation (the "Applicant") proposes to redevelop a property on the west side of South Dakota Avenue between Ingraham Street and Kennedy Street. The property is located on Square 3765 (Lots 1,2,3,4,5,6,7,8, and 9) and Square 3767 (Lots 1,2,3, and 4). As shown on Figure 1, the site is bordered by South Dakota Avenue NE to the east, Ingraham Street NE to the south, a public alley to the west and Kennedy Street NE to the north. The site is divided by 4th Street NE running north to south through the western portion of the site. The Applicant has filed an application with the DC surveyor's office to close 4th Street and the north-south public alley located between 4th Street and S. Dakota Avenue.

The proposed project will require modification to the 1st Stage PUD approval in addition to a 2nd Stage PUD approval. The site will be redeveloped with a mixed-use program including approximately 264 total multi-family residential units (234 market rate dwelling units and 30 artist housing units), including associated common amenity space and artist work space, family entertainment uses, and retail uses (including a ground level grocery store). The Project represents a significant investment in cultural, artistic and educational programming in an area of the city that is relatively underserved by such programming and resources.

In total, approximately 923 shared parking spaces will be provided on-site in structured garages and will be accessed via Ingraham Street, Kennedy Street, and the public alley along the west site boundary. Each entry location will provide full ingress/egress movements. The proposed site plan is shown on Figure 2.

A Comprehensive Transportation Review (CTR) was submitted to the District Department of Transportation (DDOT) on February 18, 2019 based on the preliminary scoping document updated through February 4, 2019. The CTR analyzed the existing and 2023 future conditions and provided recommendations to mitigate the impact of the subject site.

During on the continued discussions with DDOT staff, additional Saturday analysis was requested to be included. The results of the Saturday analysis are the subject of this addendum to the CTR.

STUDY SCOPE

The scope of the study and proposed methodologies are consistent with the previously submitted CTR and were approved by the District Department of Transportation (DDOT). The scoping document is included in Attachment 1.

Consistent with the previously submitted weekday analyses, the following intersections were identified for detailed analysis and agreed to by DDOT:

- Riggs Road/South Dakota Avenue,
- Riggs Road/1st Place,
- Riggs Road/Chillum Place,
- South Dakota Avenue/Kennedy Street,
- South Dakota Avenue/Jefferson Street,
- South Dakota Avenue/Ingraham Street,
- South Dakota Avenue/Hamilton Street/Driveway, and
- South Dakota Avenue/Galloway Street.

EXISTING CONDITIONS

TRAFFIC VOLUMES

Existing Saturday vehicular turning movement, bicycle, and pedestrian counts were conducted on Saturday, February 23, 2019 from 10:00 AM to 2:00 PM. Existing vehicular peak hour traffic volumes are shown on Figure 3. Peak hour pedestrian volumes are shown on Figure 4. Traffic count data are included in Attachment 2. Individual peak hours were selected for each intersection to provide a conservative analysis; therefore, volumes may not balance exactly between intersections.

OPERATIONAL ANALYSIS

Capacity Analysis

Capacity/level of service (LOS) analyses were conducted at the study intersections based on the existing lane use and traffic control shown on Figure 5, existing traffic volumes shown on Figure 3, existing pedestrian volumes shown on Figure 4, and existing traffic signal timings obtained from DDOT.

Synchro software (Version 10) was used to evaluate levels of service at the study intersections during the Saturday peak hour. Synchro is a macroscopic model used to evaluate the effects of changing intersection geometrics, traffic demands, traffic control, and/or traffic signal settings and to optimize traffic signal timings. The levels of service reported were taken from the Highway Capacity Manual (HCM) 2000 reports generated by Synchro. The results of the analyses are summarized in Table 1 and capacity analysis worksheets are included in Attachment 3.

As shown in Table 1, under existing conditions, all study intersections operate at acceptable overall levels of service (LOS) "D" or better. In addition, all approaches at unsignalized intersections operate at acceptable levels of service (i.e. a LOS D or better).

Queue Analysis

A queue analysis was conducted under existing conditions. The 95th percentile queue lengths were calculated using SimTraffic based on 10 averaged simulation runs. The results are summarized in Table 2. Queue reports are provided in Attachment 3.

As shown in Table 2, the following lane groups have 95th percentile queues that exceed the available storage under existing conditions:

Riggs Road/South Dakota Avenue/3rd Street NE

- Eastbound left from Riggs Road to 3rd Street NE
- Northbound left from S. Dakota Avenue to Riggs Road
- Southbound left from 3rd Street NE to Riggs Road

Riggs Road/First Place

- Eastbound through on Riggs Road

S. Dakota Avenue/Galloway Street

- Northbound approach on S. Dakota Avenue

Queues that extend to adjacent intersections are typical in urban environments where intersections are closely spaced.

Table 1
Art Place Phase II
Existing Conditions Intersection Level of Service Summary [1,2]

Intersection	Control	Lane Group Approach	Existing Conditions (2019)		Future Conditions without Development (2023)		Future Conditions with Development (2023)		Future Conditions with Improvements with Development (2023)	
			SAT Peak Hour		SAT Peak Hour		SAT Peak Hour		SAT Peak Hour	
			LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1. **Riggs Road**/South Dakota Avenue	Signalized	EBL	B	16.4	B	19.5	C	20.5	C	23.2
		EBT	C	27.6	C	31.0	C	31.7	D	35.8
Proposed Mitigation Measures		EBR	C	25.1	C	26.7	C	30.0	D	44.7
1. Signal timing split improvements		WBL	D	38.7	D	40.4	E	56.9	E	73.9
2. Additonal storage capacity for northbound left		WBTR	C	34.4	C	33.6	C	33.6	D	38.7
		NBL	F	111.4	F	161.7	F	223.8	F	112.3
		NBTR	C	20.8	C	21.1	C	22.0	B	18.8
		SBL	D	44.2	D	46.8	D	49.7	D	49.7
		SBTR	D	36.4	D	36.6	D	37.8	D	37.8
		Overall	**D**	**42.2**	**D**	**52.6**	**E**	**65.6**	**D**	**50.7**
2. **Riggs Road**/First Place	Signalized	EBT	C	32.3	D	40.1	D	52.1	C	27.7
		EBR	B	13.9	B	14.4	B	14.4	B	10.6
Proposed Mitigation Measures		WBL	B	12.0	B	15.0	B	13.8	C	23.2
1. Signal timing split improvements		WBT	A	6.4	A	7.1	A	7.7	A	4.9
		NBL	D	40.9	D	43.6	D	43.6	D	49.6
		NBR	C	22.4	C	22.4	C	22.4	C	27.7
		Overall	**C**	**21.9**	**C**	**26.5**	**C**	**32.8**	**B**	**19.4**
3. **Riggs Road**/Chillum Place	Signalized	EBLTR	A	4.6	A	4.9	A	5.2	A	5.2
		WBLTR	A	3.3	A	3.6	A	3.8	A	3.8
		NBLTR	C	31.1	C	31.1	C	31.1	C	31.1
		SBLTR	C	33.3	C	33.5	C	33.5	C	33.5
		Overall	A	**6.9**	A	**7.0**	A	**7.1**	A	**7.1**
4. South Dakota Avenue/**Kennedy Street**	Signalized	EBLTR/EBL	C	30.9	C	29.7	D	44.7	D	39.6
		EBTR	-	-	-	-	-	-	C	25.1
		WBLTR	C	32.5	C	32.9	C	26.8	C	27.3
Proposed Mitigation Measures		NBLTR	A	3.3	A	4.0	A	7.0	A	3.1
1. Separated eastbound left and through-right lanes		SBLTR	A	3.6	A	4.4	A	8.7	A	8.3
		Overall	**A**	**5.1**	**A**	**6.2**	**B**	**11.7**	**A**	**9.5**
5. South Dakota Avenue/**Jefferson Street**	Unsignalized	WBLR	C	17.6	C	17.1	C	17.8	B	14.0
		NBTR	A	0.0	A	0.0	A	0.0	A	0.0
		SBTR	A	0.4	A	0.4	A	0.4	A	0.4
6. South Dakota Avenue/**Ingraham Street**	Unsignalized	EBLTR	D	29.7	D	32.2	F	65.3	-	-
		WBLTR	B	12.7	B	12.9	B	13.3	-	-
		NBLTR	A	0.7	A	0.7	A	3.6	-	-
		SBLTR	A	0.2	A	0.2	A	0.2	-	-
Proposed Mitigation Measures	Signalized	EBLTR	-	-	-	-	-	-	D	43.9
1. Add signal		WBLTR	-	-	-	-	-	-	C	26.9
		NBLTR	-	-	-	-	-	-	B	10.9
		SBLTR	-	-	-	-	-	-	A	7.8
		Overall	**-**	**-**	**-**	**-**	**-**	**-**	**B**	**12.4**
7. South Dakota Avenue/**Hamilton Street**	Signalized	EBLTR	A	0.0	C	28.5	C	28.5	C	28.5
		WBLTR	C	28.4	C	28.4	C	28.4	C	28.4
		NBLTR	A	5.5	A	7.7	A	8.2	A	8.2
		SBLTR	A	6.8	A	9.4	B	10.1	B	10.1
		Overall	**A**	**6.5**	**A**	**9.4**	**A**	**9.9**	**A**	**9.9**
8. South Dakota Avenue/**Galloway Street**	Signalized	EBLTR	C	24.6	C	25.4	C	25.4	C	25.4
		WBLTR	C	23.5	C	23.5	C	23.5	C	23.5
		NBLTR	A	9.8	B	11.6	B	13.2	B	13.2
		SBLTR	B	18.3	B	20.0	C	21.9	C	21.9
		Overall	**B**	**15.4**	**B**	**17.0**	**B**	**18.5**	**B**	**18.5**

Notes:
1. Capacity analysis based on Highway Capacity Manual methodology, using Synchro 10.
2. Roadway names in **bold** are considered east/west for purposes of this analysis.

Table 2
Art Place Phase 2
Intersection Queue Summary [1,2]

Intersection	Traffic Control	Lane Group	Storage Length	Existing Conditions		Future Conditions without Development (2023)		Future Conditions with Development (2023)		Future Conditions with Development with Improvements (2023)	
				SAT Peak Hour Queue (ft)		SAT Peak Hour Queue (ft)		SAT Peak Hour Queue (ft)		SAT Peak Hour Queue (ft)	
				50th	95th	50th	95th	50th	95th	50th	95th
1. **Riggs Road**/South Dakota Avenue/3rd Street NE	Signalized	EBL	105	48	110	60	135	54	124	88	170
		EBT	230	86	151	95	171	87	160	167	266
Proposed Mitigation Measures		EBR	230	114	212	125	223	213	443	189	309
1. Signal timing split improvements		WBL	235	41	90	62	125	144	252	130	233
2. Additional storage capacity for northbound left		WBT	500	122	195	121	194	156	355	146	281
		NBL	380	244	407	362	497	405	531	347	558
		NBT	470	78	328	295	767	592	928	107	382
		SBL	75	41	86	50	94	47	95	50	99
		SBT	190	52	107	58	122	84	236	67	134
2. **Riggs Road**/First Place	Signalized	EBT	390	368	437	376	426	380	422	379	430
		EBR	220	74	197	89	217	85	212	88	212
Proposed Mitigation Measures		WBL	390	24	59	22	56	23	58	31	66
1. Signal timing split improvements		WBT	680	94	198	95	188	81	166	81	152
		NBL	350	80	127	93	136	94	138	95	135
		NBR	350	30	114	47	158	54	175	51	172
3. **Riggs Road**/Chillum Place	Signalized	EBLTR	650	147	259	149	265	134	252	161	286
		WBLTR	260	76	147	90	172	110	220	104	200
		NBLTR	370	38	74	38	76	38	83	41	81
		SBLTR	220	56	106	53	98	56	104	52	93
4. South Dakota Avenue/**Kennedy Street**	Signalized	EBLTR/EBL	245	9	30	11	35	91	144	68	118
		EBTR	245	-	-	-	-	-	-	12	36
Proposed Mitigation Measures		WBLTR	220	42	84	60	111	74	165	53	98
1. Separated eastbound left and through-right lanes		NBLTR	210	93	183	133	247	217	343	111	222
		SBLTR	675	60	114	72	121	158	409	112	164
5. South Dakota Avenue/**Jefferson Street**	Unsignalized	WBLR	640	18	47	17	45	54	157	20	52
		NBTR	215	1	16	17	95	143	306	12	73
		SBLT	215	6	33	9	41	33	160	8	40
6. South Dakota Avenue/**Ingraham Street**	Unsignalized	EBLTR	280	24	53	34	65	137	232	-	-
		WBLTR	850	5	24	7	27	8	32	-	-
		NBLTR	195	14	60	16	71	164	298	-	-
		SBLTR	220	4	22	5	31	30	141	-	-
Improvement	Signalized	EBLTR	280	-	-	-	-	-	-	78	135
1. Add Signal		WBLTR	850	-	-	-	-	-	-	5	23
2. Alignment with adjacent driveway		NBLTR	195	-	-	-	-	-	-	167	251
		SBLTR	220	-	-	-	-	-	-	84	154
7. South Dakota Avenue/**Hamilton Street**	Signalized	EBLTR	150	8	25	31	65	42	109	29	65
		WBLTR	575	13	70	7	23	10	35	7	23
		NBLTR	430	13	58	57	153	243	550	74	183
		SBLTR	180	10	55	43	110	50	128	51	127
8. South Dakota Avenue/**Galloway Street**	Signalized	EBLTR	555	26	65	39	95	64	190	37	84
		WBLTR	600	8	27	8	23	17	83	8	26
		NBLTR	220	141	247	193	330	287	441	245	389
		SBLTR	420	122	186	133	199	106	191	149	231

Notes:
1. Capacity analysis based on an averageaa of 10 SimTraffic Simulations, using SimTraffic 10.
2. Roadway names in **bold** are considered east/west for purposes of this analysis.

FUTURE BACKGROUND CONDITIONS

TRAFFIC VOLUMES

Overview

In order to forecast year 2023 background traffic volumes in the study area without the proposed redevelopment, consistent with the previously submitted CTR, increases in traffic associated with growth outside the immediate site vicinity (regional growth) and increases in traffic associated with planned or approved but not yet constructed developments in the study area (pipeline developments) were considered.

Regional Growth

Consistent with the previously submitted CTR, a conservative growth rate of one-half percent per year, compounded annually over five years (2018 to 2023) was applied to the existing vehicular volumes shown on Figure 3. The estimated regional growth is shown on Figure 6.

Pipeline Developments

Any trips generated by matter-of-right or zoning-approved developments outside of the immediate study area are assumed included in the regional growth rate. In addition, consistent with the previously submitted CTR, five pipeline developments planned in the study area were identified during the scoping process. The 6000 New Hampshire Avenue development (Metro Day School) and potential Art Place Phase C school uses will be closed on Saturdays; therefore, no site generated trips were estimated. As summarized in Table 3, the developments are estimated to generate approximately 373 Saturday peak hour trips. Traffic volumes for the pipeline developments are shown on Figure 7. Individual pipeline development forecasts are included in Attachment 4.

Background Forecasts

Background 2023 traffic forecasts (without the proposed redevelopment) were developed by combining the existing traffic volumes (Figure 3), Regional Growth (Figure 6), and the Pipeline Site Trip Assignments (Figure 7). The resulting 2023 background traffic forecasts are shown on Figure 8.

Table 3
Pipeline Trip Generation Summary

Land Use	ITE Code	Setting/Location	Size	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total
Art Place Phase 1 - Vacant Space[1]							
Residential			88	DU	294	273	567
Non-auto Trips				*66%*	*195*	*180*	*374*
Vehicle Trips					**99**	**93**	**193**
Fort Totten South[2]							
Residential			185	DU	165	158	323
Non-auto Trips				*61%*	*101*	*96*	*198*
Vehicle Trips					**64**	**62**	**125**
5600 2nd Street NE							
Mini-Warehouse[3]	151	General Urban/Suburban	177,707	SF	33	22	55
Vehicle Trips					**33**	**22**	**55**
Total Pipeline Vehicle Trips					**196**	**177**	**373**

Notes
1 Calculated using TrispDC, assuming occupancy of the existing Art Place Phase 1.
2 Calculated using TripsDC, densities taken from Fort Totten South plans dated May 24, 2018.
3 Trip generation taken from Wells + Associates Traffic Analysis Memorandum dated August 15, 2016.

OPERATIONAL ANALYSIS

Capacity Analysis

Capacity/level of service (LOS) analyses were conducted at the study intersections based on the existing lane use and traffic control shown on Figure 5, future background traffic forecasts shown on Figure 8, and existing DDOT traffic signal timings.

The level of service results for the 2023 background conditions without the proposed project are presented in Attachment 5 and summarized in Table 1. As shown in Table 1, under background conditions, many of the study intersections will experience increases in delay as a result of the background traffic growth and pipeline projects. all study intersections continue to operate at acceptable overall levels of service (LOS) "D" or better. In addition, all approaches at unsignalized intersections operate at acceptable levels of service (i.e. a LOS D or better).

Further, consistent with existing Saturday conditions, each approach at the unsignalized study intersections continues to operate at LOS "D" or better.

Queue Analysis

A queue analysis was conducted for 2023 Saturday conditions without the Art Place Phase 2 redevelopment. The 95th percentile queue lengths were calculated using SimTraffic methodology based on the average of ten simulation runs. The results are summarized in Table 2. Queue reports are provided in Attachment 5.

As shown in Table 2, the 95th percentile queues at several study intersections will increase under background conditions. With the addition of background traffic, the northbound left queue exceeds the available storage area and blocks the northbound through lane. The queueing at the intersection causes downstream queueing on S. Dakota Avenue. The following lane groups have 95th percentile queues are projected to exceed the available storage:

Riggs Road/South Dakota Avenue/3rd Street NE
- Eastbound left from Riggs to 3rd Street NE
- Northbound left from S. Dakota Avenue to Riggs Road
- Northbound through on S. Dakota Avenue to 3rd Street NE
- Southbound left from 3rd Street NE to Riggs Road

Riggs Road/First Place
- Eastbound through on Riggs Road

S. Dakota Avenue/Kennedy Street
- Northbound approach on S. Dakota Avenue

S. Dakota Avenue/Galloway Street
- Northbound approach on Galloway Street

SITE ANALYSIS

OVERVIEW

The subject site is located within 0.25 miles of the Fort Totten Metrorail station in Ward 5. The proposed project will require modification to the 1st Stage PUD approval in addition to a 2nd Stage PUD approval. The site is currently developed with the Riggs Plaza Apartment buildings. One of the existing apartment buildings will remain.

The proposed redevelopment will include approximately 270 total multi-family residential units (234 market rate dwelling units and 30 artist housing units shown on current plans) including associated common amenity space and artist work space, family entertainment uses, and retail uses (including a ground level grocery store).

TRIP GENERATION ANALYSIS

Total Trips

The total number of person-trips (including auto trips, pedestrian trips, transit trips, and bicycle trips) anticipated to be generated by the proposed mix of uses was estimated based on the Institute of Transportation Engineer's (ITE's) Trip Generation Manual, 10th Edition for the retail and museum uses (Land Use Codes 580 and 820, respectively) and historic Wells + Associates data for community Live Theatre uses, and estimated weekly visitors to the Meow Wolf. TripsDC was used to generated traffic for the residential uses and ground floor retail in the previously submitted CTR for the AM and PM peak hours but TripsDC does not provide Saturday trip generation estimates. Land Use Codes 220 and 820 from the ITE's Trip Generation Manual were used to determine the proportional difference of weekday PM peak hour to Saturday peak hour trip generation for the proposed uses. As shown in Table 4, the proportional difference was applied to the PM peak hour trips generated by the TripsDC tool to determine the Saturday peak hour trips.

Based on the aforementioned methodology, the proposed development would generate 2,054 ***total person trips*** during the Saturday peak hour.

Table 4
Art Place Phase 2
Site Trip Generation Summary

Land Use		ITE Code	Setting/Location	Size	Units	SAT Peak Hour IN	SAT Peak Hour OUT	SAT Peak Hour TOTAL
Residential				264	D.U.			
ITE Trips[2]						58	60	118
Person Trips[1]	AVO		1.96			113	118	231
Vehicle Person Trips		AM	PM	32%		36	38	74
Non-auto Person Trips		*64%*	*71%*	*68%*		*77*	*80*	*157*
Transit		*28%*	*20%*	*24%*		27	28	55
Bike		*4%*	*4%*	*4%*		4	5	9
Walk		*32%*	*47%*	*40%*		45	47	92
Vehicle Trips		*36%*	*29%*	32%		19	19	38
Shopping Center		820	General Urban/Suburban	84,800	SF (GLA)			
ITE Trips[2]						351	324	675
Person Trips[5]	AVO	2.0				688	635	1323
Vehicle Person Trips						*323*	*298*	*622*
Non-auto Person Trips		*Ret.*	*Entert.*			*365*	*337*	*701*
Metro[3]		*0.29*	*0.26*	27%		*171*	*186*	*357*
Bus[3]		*0.08*	*0.06*	7%		*44*	*48*	*93*
Walk/Bike[3]		*0.27*	*0.11*	19%		*121*	*131*	*251*
Walk				*14%*		*90*	*98*	*189*
Bike				*5%*		*30*	*33*	*63*
Vehicle Trips						165	152	317
Live Theater				250	Seats			
Total						88	15	103
Rate per seat[4]						0	0	0
Person Trips[5]	AVO	2.0				175	30	205
Vehicle Person Trips						100	17	117
Non-auto Person Trips			Entert.			*75*	*13*	*88*
Metro[3]			*0.11*	*11%*		*19*	*4*	*23*
Motorcoach		*48*	*0.15*	*15%*		*30*	*0*	*30*
MetroBus[3]			*0.06*	*6%*		*10*	*2*	*12*
Walk/Bike[3]			*0.11*	*11%*		*19*	*4*	*23*
Walk				*8%*		*14*	*3*	*17*
Bike				*3%*		*5*	*1*	*6*
Motorcoach Trips						*1*	*0*	*1*
Vehicle Trips						50	9	59
All Vehicle Trips						51	9	60
Meow Wolf				77,204	SF			
Person Trips[6]	AVO	3.19				27	142	169
Vehicle Person Trips						*15*	*81*	*96*
Non-auto Person Trips			Entert.			*12*	*61*	*73*
Metro[3]			*0.11*	*11%*		*3*	*16*	*19*
Motorcoach		*48*	*0.15*	*15%*		-	*25*	*25*
MetroBus[3]			*0.06*	*6%*		*2*	*8*	*10*
Walk/Bike[3]			*0.11*	*11%*		*3*	*16*	*19*
Walk				*8%*		*2*	*12*	*14*
Bike				*3%*		*1*	*4*	*5*
Motorcoach Trips						-	*1*	*1*
Vehicle Trips						5	25	30
All Vehicle Trips						5	26	31
Museum		580	General Urban/Suburban	113,452	SF			
ITE Trips[2]						53	22	75
Person Trips[5]	AVO	3.19				170	69	239
Vehicle Person Trips						*97*	*39*	*136*
Non-auto Person Trips			Entert.			*73*	*30*	*103*
Metro[3]			*0.11*	*11%*		*1*	*6*	*7*
Motorcoach		*48*	*0.15*	*15%*		-	*10*	*10*
MetroBus[3]			*0.06*	*6%*		*1*	*3*	*4*
Walk/Bike[3]			*0.11*	*11%*		*1*	*6*	*7*
Walk				*8%*		*1*	*4*	*5*
Bike				*3%*		-	*2*	*2*
Motorcoach Trips						-	1	1
Vehicle Trips						30	12	43
All Vehicle Trips						30	13	44
Total Proposed Development								
Total Person Trips						1,118	936	2,054
Non-auto Person Trips						*602*	*521*	*1,122*
Personal Vehicle Trips						269	217	486
Motorcoach Trips						1	2	3
All Vehicle Trips						270	219	489

Notes:
[1] Residential trip generation (including non-auto mode split) calculated using tripsDC.org.
[2] Trips generated using Institute of Transportation Engineers (ITE) Trip Generation, 10th Edition.
[3] Metro, bus, and walk/bike mode splits taken from WMATA 2005 Ridership Survey. The walk mode split was assumed to be 75% of the total walk/bike split.
[4] Based on counts collected by W + A on Thursday, March 10, 2016 and reflects a show with 90% attendance at an off-site venue.
[5] Average Vehicle Occupancy from National Household Travel Survey
[6] Meow Wolf trip generation estimates calculated based on an assumed 9,500 weekly visitors.

Non-Auto Mode Split

A portion of the trips generated by the proposed redevelopment would be made by non-auto modes of transportation. The percentage of non-auto trips is related to the prevalence of transit and other alternative transportation services, the walkability of the site, and the degree to which non-auto modes of transportation are encouraged such as through implementation of a Transportation Demand Management Plan. Non-auto trip reductions for the Saturday peak hour were consistent with the PM peak hour reductions from the previously submitted CTR.

The trip generation for the proposed mix of uses, including vehicle trips and person trips delineated by non-auto mode, is summarized in Table 4. As shown in Table 4, based on the non-auto mode splits, the site is estimated to generate 489 Saturday peak hour vehicle trips.

Site Trip Distribution and Assignment

The distribution of peak hour site trips generated by the proposed development was based on existing traffic patterns in the study area, approved and recently constructed background projects, and general knowledge of routes to/from the site. Consistent with the previously submitted CTR, the anticipated site trip distributions are shown in Table 5.

Table 5
Site Trip Distributions

Roadway	Direction (to/from)	Residential Distribution	Retail Distribution
Riggs Road	West	50%	30%
	East	15%	25%
South Dakota Avenue	South	35%	30%
3rd Street	North	0%	15%
Total		**100%**	**100%**

The anticipated distributions were applied to the trip generation. The resulting site trip assignments for the residential and retail uses are shown on Figures 9A/B, respectively.

TOTAL FUTURE CONDITIONS

TRAFFIC FORECASTS

Total future traffic forecasts with the proposed redevelopment were determined by combining the background volumes shown on Figure 8 with the site traffic volumes shown on Figures 9A/B yield the 2023 total future traffic forecasts shown on Figure 10.

OPERATIONAL ANALYSIS

Capacity Analysis

Capacity analyses were performed at the study intersections using the lane use and traffic control shown on Figure 5, the total future peak hour traffic forecasts shown on Figure 10, and existing traffic signal timings, consistent with background conditions. The level of service results for the 2023 total future conditions with the proposed redevelopment are included in Attachment 6 and summarized in Table 1.

By comparing total future levels of service (with the proposed redevelopment) to background levels of service (without the proposed redevelopment), the impact of the proposed development can be identified. In accordance with DDOT methodology, an impact is defined as follows:

- Degradation in approach level of service to LOS E or LOS F or
- Increase in approach delay by more than five seconds when compared to background conditions for intersection approaches operating at an overall LOS E or LOS F under background conditions.

As shown on Table 1, all study intersections operate at overall LOS “E” or better under background conditions without the proposed redevelopment. With the addition of site traffic, the intersections of S. Dakota Avenue/Riggs Road is projected to experience increases in delay to LOS “E” under total future conditions with development.

Queue Analysis

A queue analysis was conducted for 2023 total future conditions with the Art Place Phase 2 redevelopment. The 95th percentile queue lengths were calculated using the SimTraffic microsimulation model with ten simulation runs. The results are summarized in Table 2 and queue reports are provided in Attachment 6.

By comparing total future queues to background queues, the impact of the proposed development can be identified. In accordance with DDOT guidelines, an impact is defined as an increase in the 95th percentile queue greater than 150 feet when compared to background conditions.

Riggs Road/South Dakota Avenue/3rd Street NE
- Eastbound left from Riggs Road to 3rd Street NE
- Eastbound left from Riggs Road to S. Dakota Avenue
- Westbound left from Riggs Road to S. Dakota Avenue
- Northbound left from S. Dakota Avenue to Riggs Road
- Northbound through on S. Dakota Avenue to 3rd Street NE
- Southbound left from 3rd Street NE to Riggs Road
- Southbound through from 3rd Street NE to S. Dakota Avenue

Riggs Road/First Place
- Eastbound through on Riggs Road

S. Dakota Avenue/Kennedy Street
- Northbound approach on S. Dakota Avenue

S. Dakota Avenue/Jefferson Street
- Northbound approach on S. Dakota Avenue

S. Dakota Avenue/Ingraham Street
- Northbound approach on S. Dakota Avenue

S. Dakota Avenue/Hamilton Street
- Northbound approach on S. Dakota Avenue

S. Dakota Avenue/Galloway Street
- Northbound approach on S. Dakota Avenue

As shown in Table 2, consistent with background future conditions, several of the studied queues would increase by more than 150 feet due to the northbound left queue at Riggs and South Dakota extending beyond the available storage.

IMPROVEMENT ANALYSIS

In order to mitigate the impact of the proposed redevelopment, as outlined above, a series of improvements were evaluated to determine their effectiveness in offsetting the impact of the proposed redevelopment. Improvements considered for each intersection were identified in the previously submitted CTR and reevaluated for the Saturday peak hour within this memorandum.

As shown in Tables 1 and 2, the previously proposed improvements would continue to mitigate the site's impact on delays at each intersection in the study area. The impact on queues could be mitigated by the extension of the northbound left turn lanes on S. Dakota at Riggs. With the extended turn lane and previously analyzed improvements, the queues throughout the study area would decrease to within 150 feet of background conditions. However, the median space has been designed to provide future access to an as yet undeveloped parcel of land on the east side of S. Dakota. Therefore, in line with the recommendations in the February 18 CTR, we recommend the project Transportation Demand Management plan be implemented to reduce vehicular trips to and from the proposed project.

CONCLUSIONS AND RECOMMENDATIONS

The Saturday peak hour analyses included herein further reinforces the conclusions and recommendations originally included in the CTR submitted for the Art Place Phase 2 PUD application dated February 18, 2019. Consistent with the AM and PM peak hours, the proposed capacity improvements and transportation demand management measures would mitigate future conditions with development study intersections to appropriate levels of service and reduce the number of trips generated by the subject site.

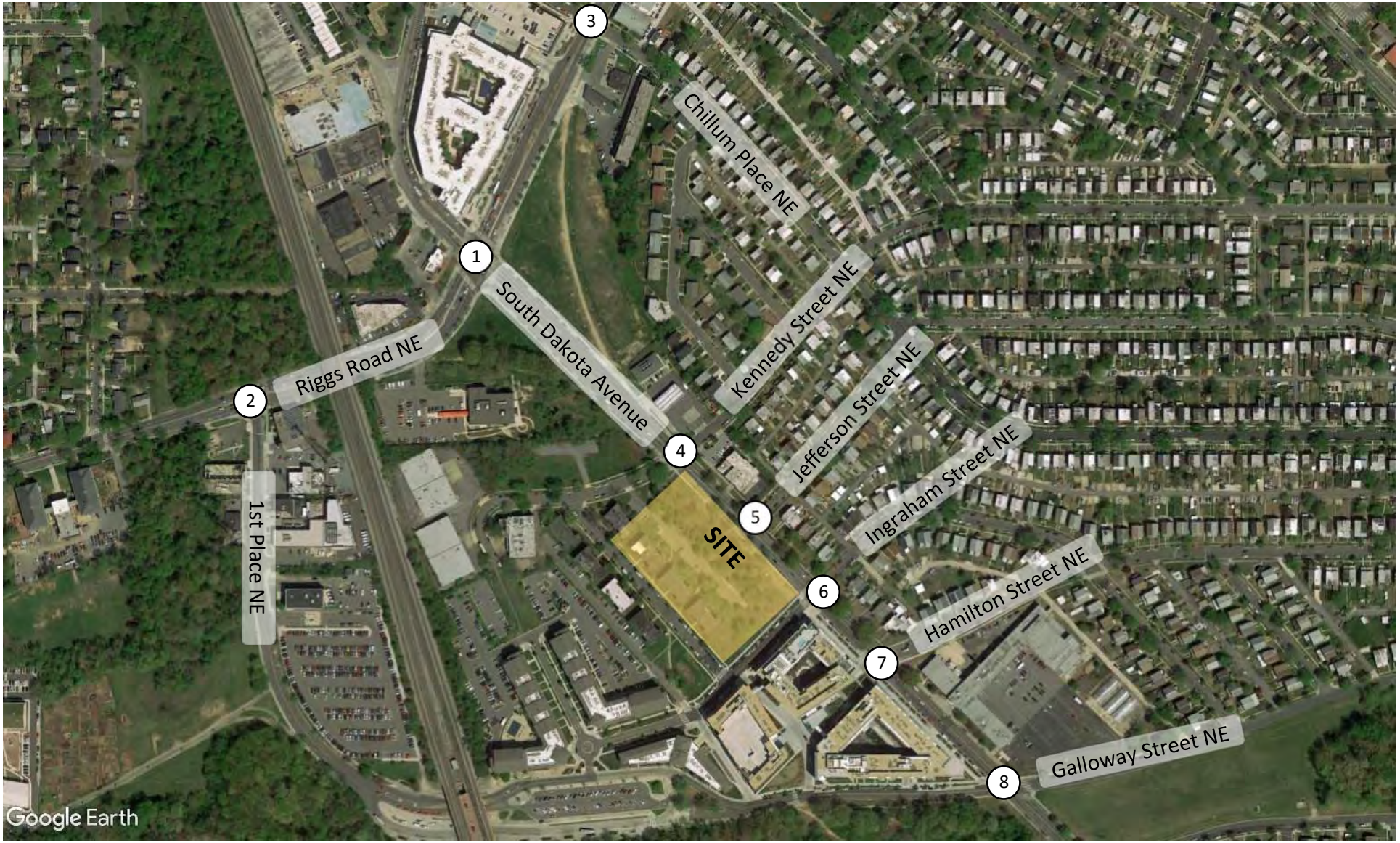


Figure 1
Project Locaon and Proposed Study Area`

NORTH

Art Place Phase II
Washington, DC

Figure 2
Project Site Plan

NORTH

Art Place Phase II
Washington, DC

O:\PROJECTS\7501 - 8000\7611 ART PLACE PHASE II\GRAPHICS\REPORT FIGURES\7611 VOLUMES.DWG

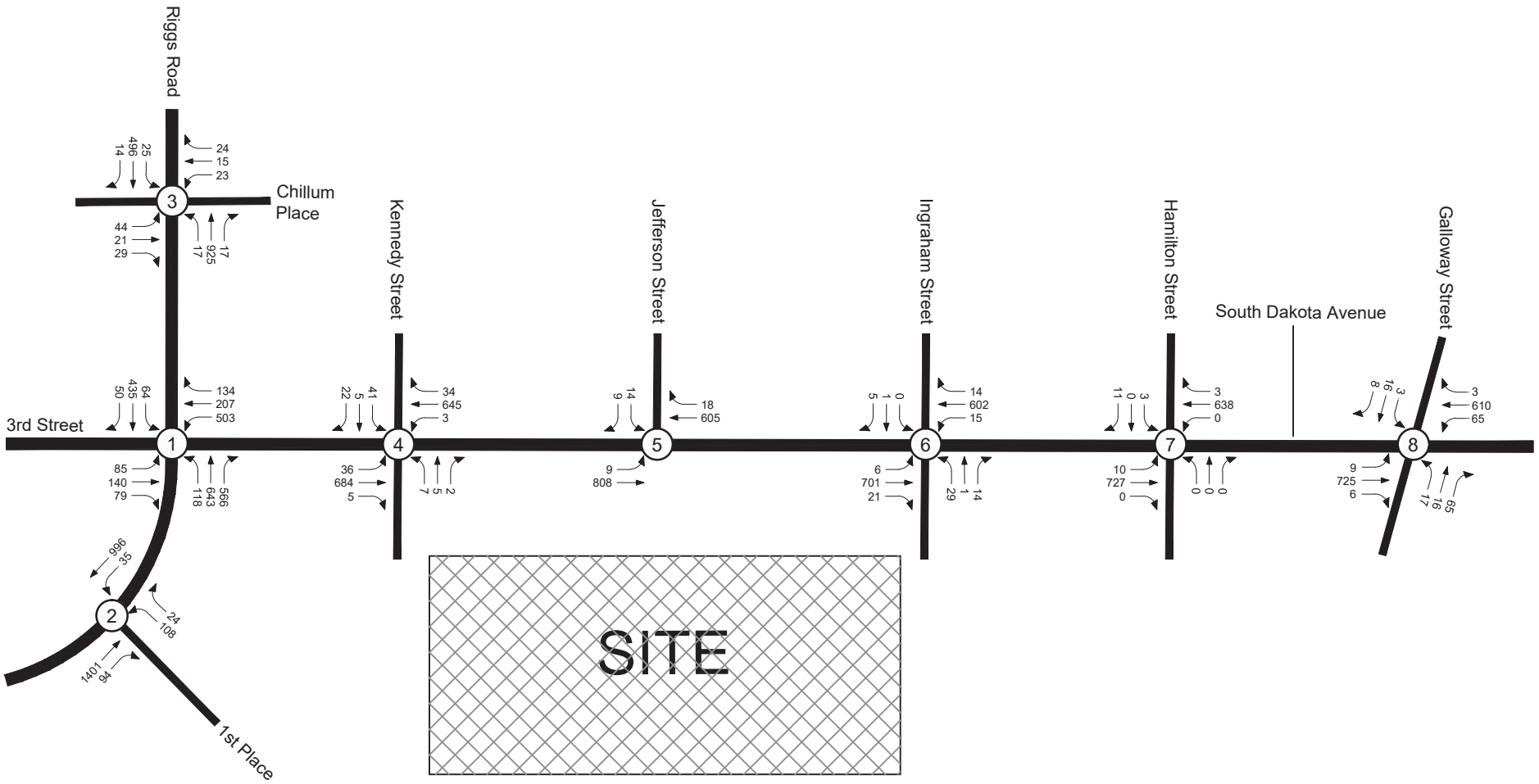


Figure 3
Existing Saturday Peak Hour Traffic Volumes

SAT PEAK HOUR
000

NORTH

Art Place Phase II
Washington, DC

O:\PROJECTS\7501 - 8000\7611 ART PLACE PHASE II\GRAPHICS\REPORT FIGURES\7611 VOLUMES.DWG

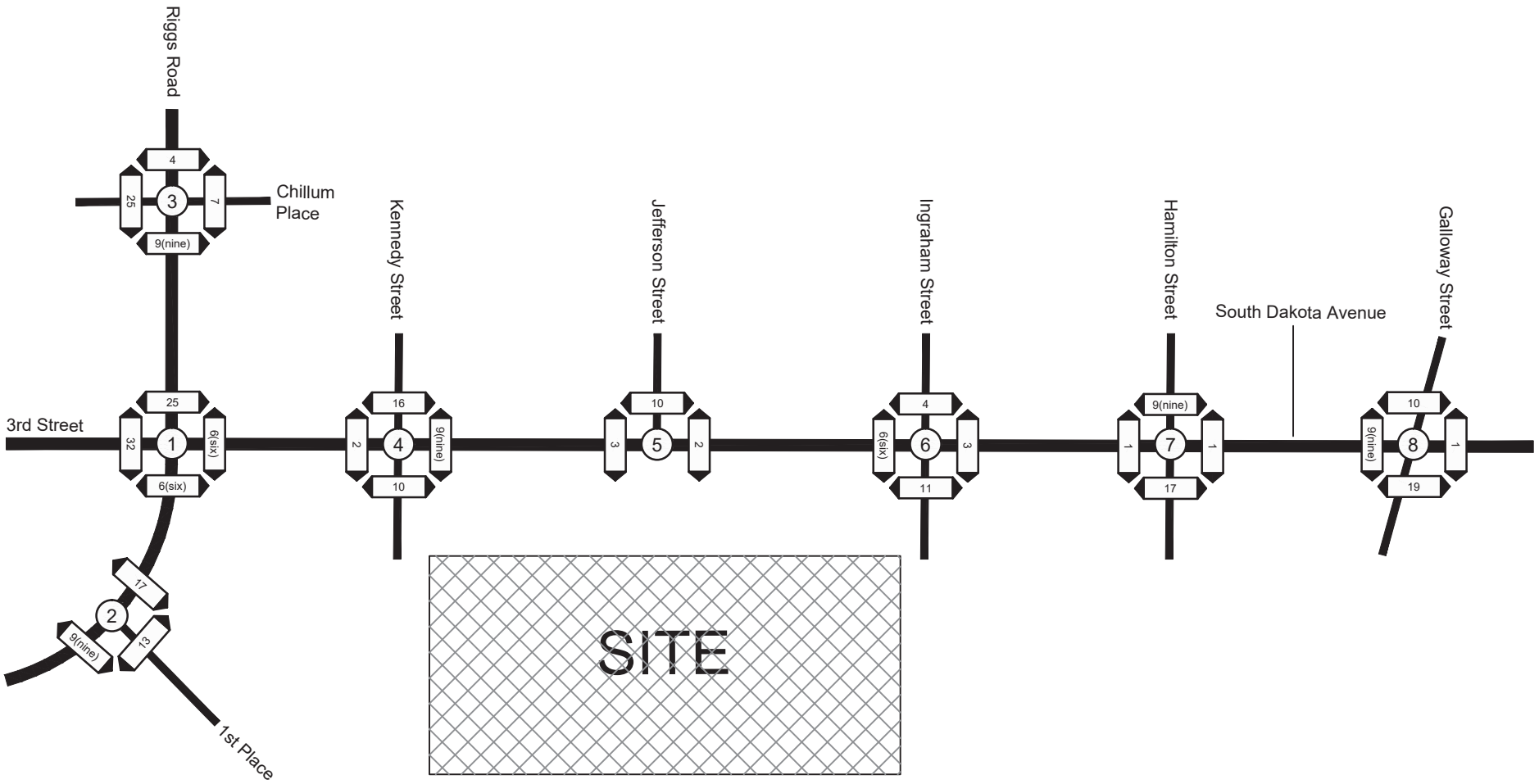


Figure 4
Existing Pedestrian Saturday Volumes

000 SAT PEAK HOUR

NORTH

Art Place Phase II
Washington, DC

O:\PROJECTS\7501 - 8000\7611 ART PLACE PHASE II\GRAPHICS\REPORT FIGURES\7611 VOLUMES.DWG

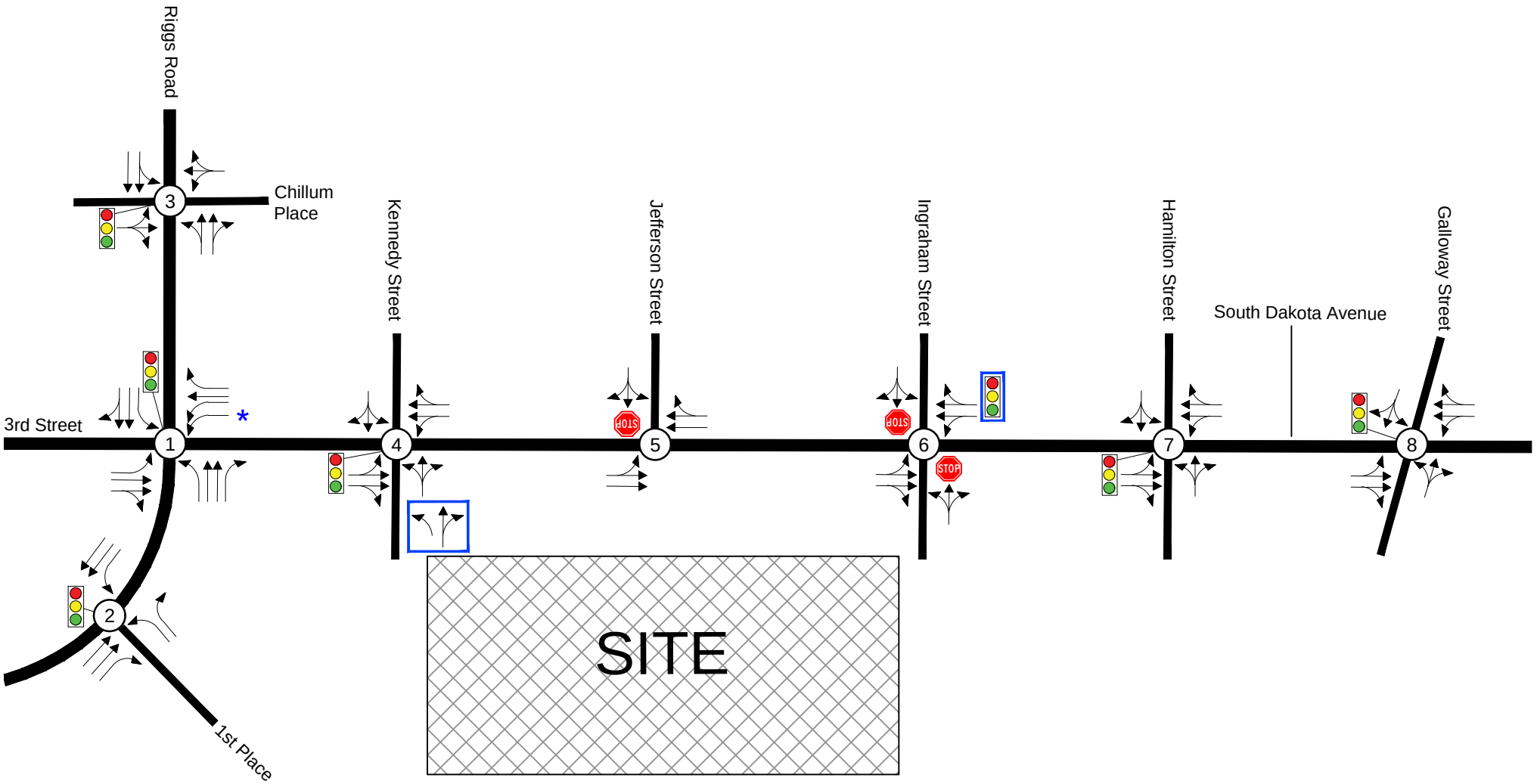


Figure 5
Lane Use and Traffic Control

Represents One Travel Lane
Signalized Intersection
Stop Sign
Future Improvement
* Turn Lane Storage Extension

NORTH
Art Place Phase II
Washington, DC

O:\PROJECTS\7501 - 8000\7611 ART PLACE PHASE II\GRAPHICS\REPORT FIGURES\7611 VOLUMES.DWG

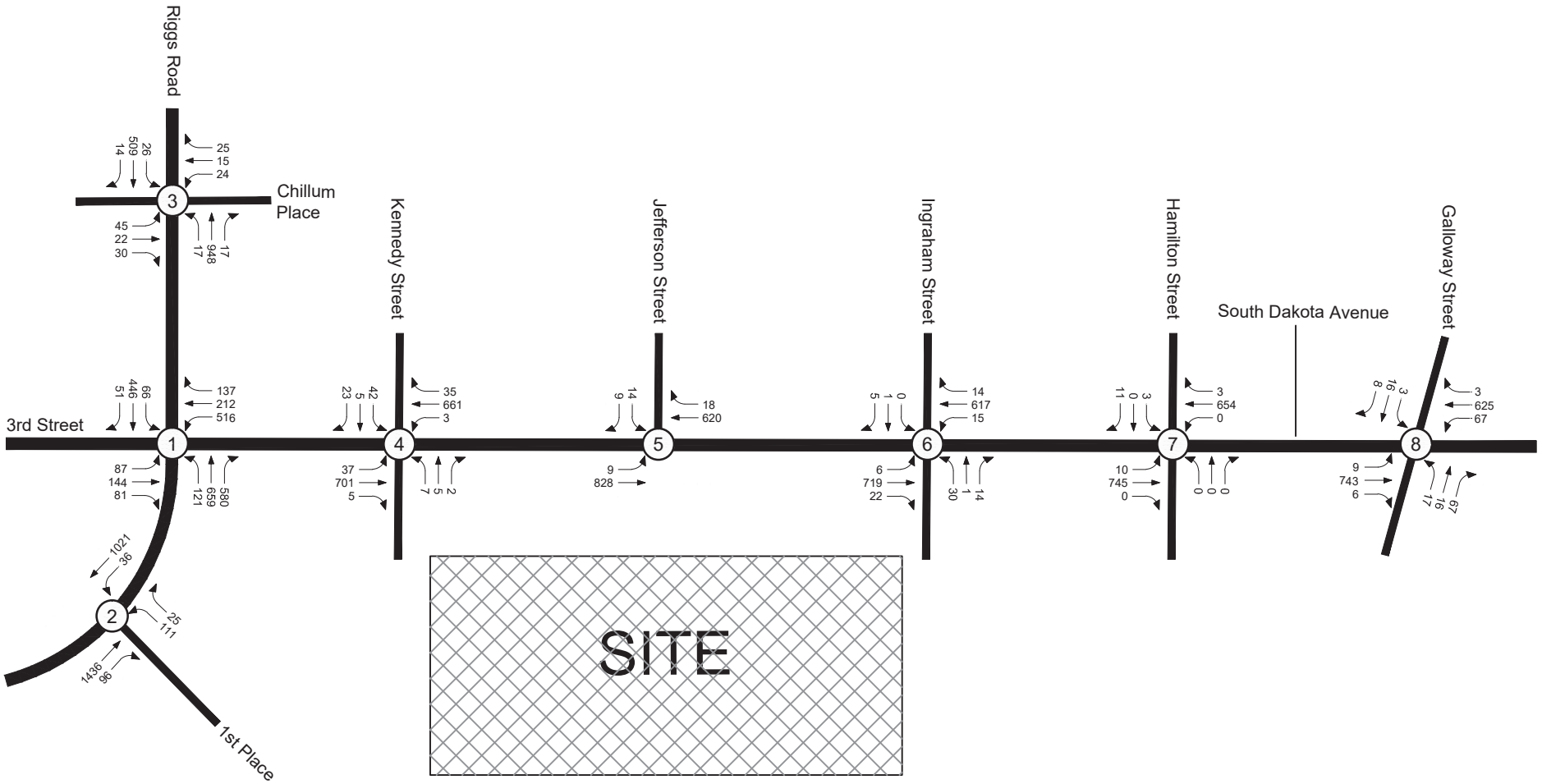


Figure 6
Existing Saturday Peak Hour Traffic Volumes
with Regional Growth

SAT PEAK HOUR
000

NORTH

Art Place Phase II
Washington, DC

O:\PROJECTS\7501 - 8000\7611 ART PLACE PHASE II\GRAPHICS\REPORT FIGURES\7611 VOLUMES.DWG

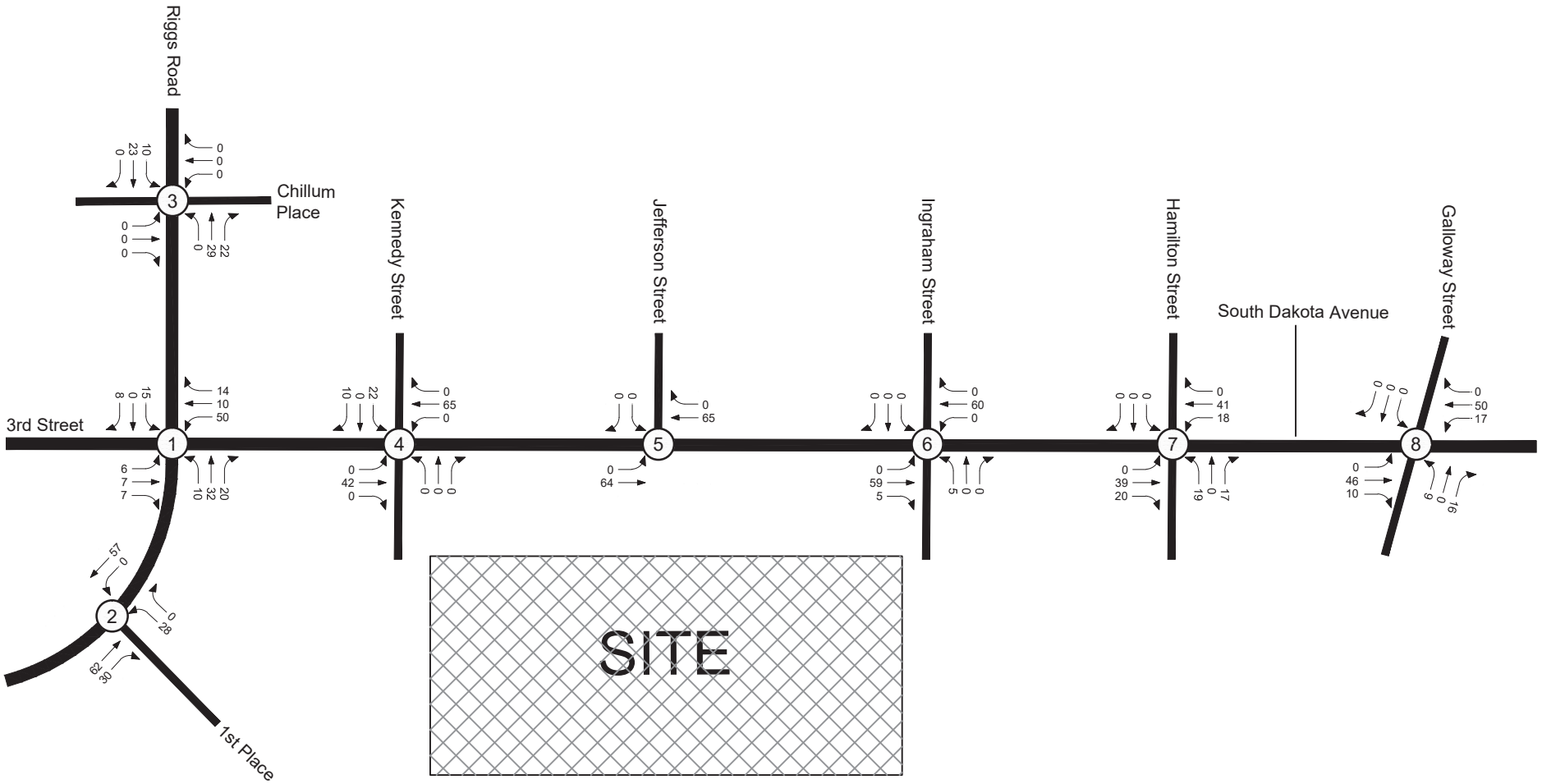


Figure 7
Total Pipeline Development
Saturday Peak Hour Traffic Volumes

SAT PEAK HOUR
000

NORTH
Art Place Phase II
Washington, DC

O:\PROJECTS\7501 - 8000\7611 ART PLACE PHASE II\GRAPHICS\REPORT FIGURES\7611 VOLUMES.DWG

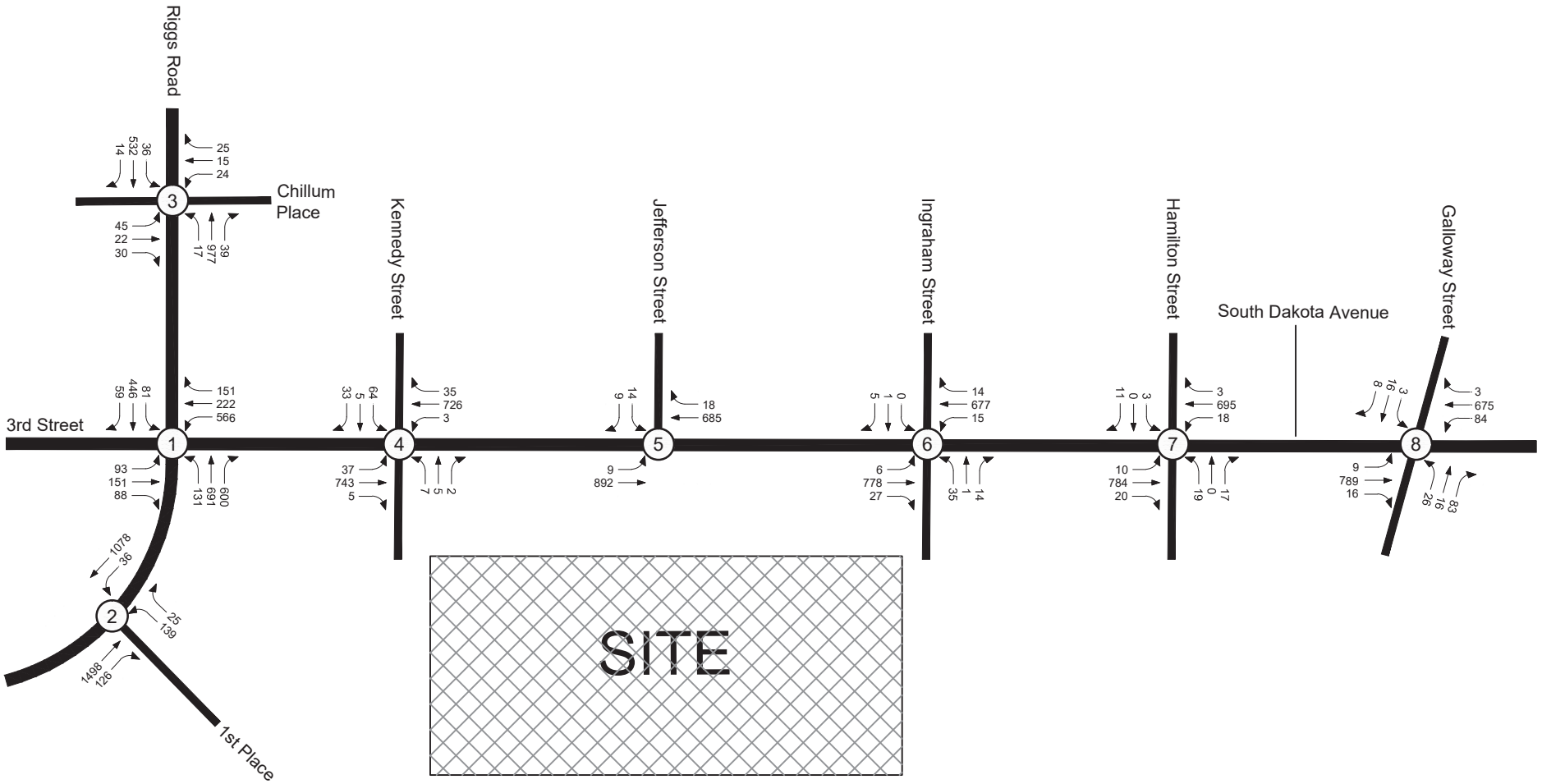


Figure 8
2023 Background
Saturday Peak Hour Traffic Volumes

Art Place Phase II
Washington, DC

O:\PROJECTS\7501 - 8000\7611 ART PLACE PHASE II\GRAPHICS\REPORT FIGURES\7611 VOLUMES.DWG

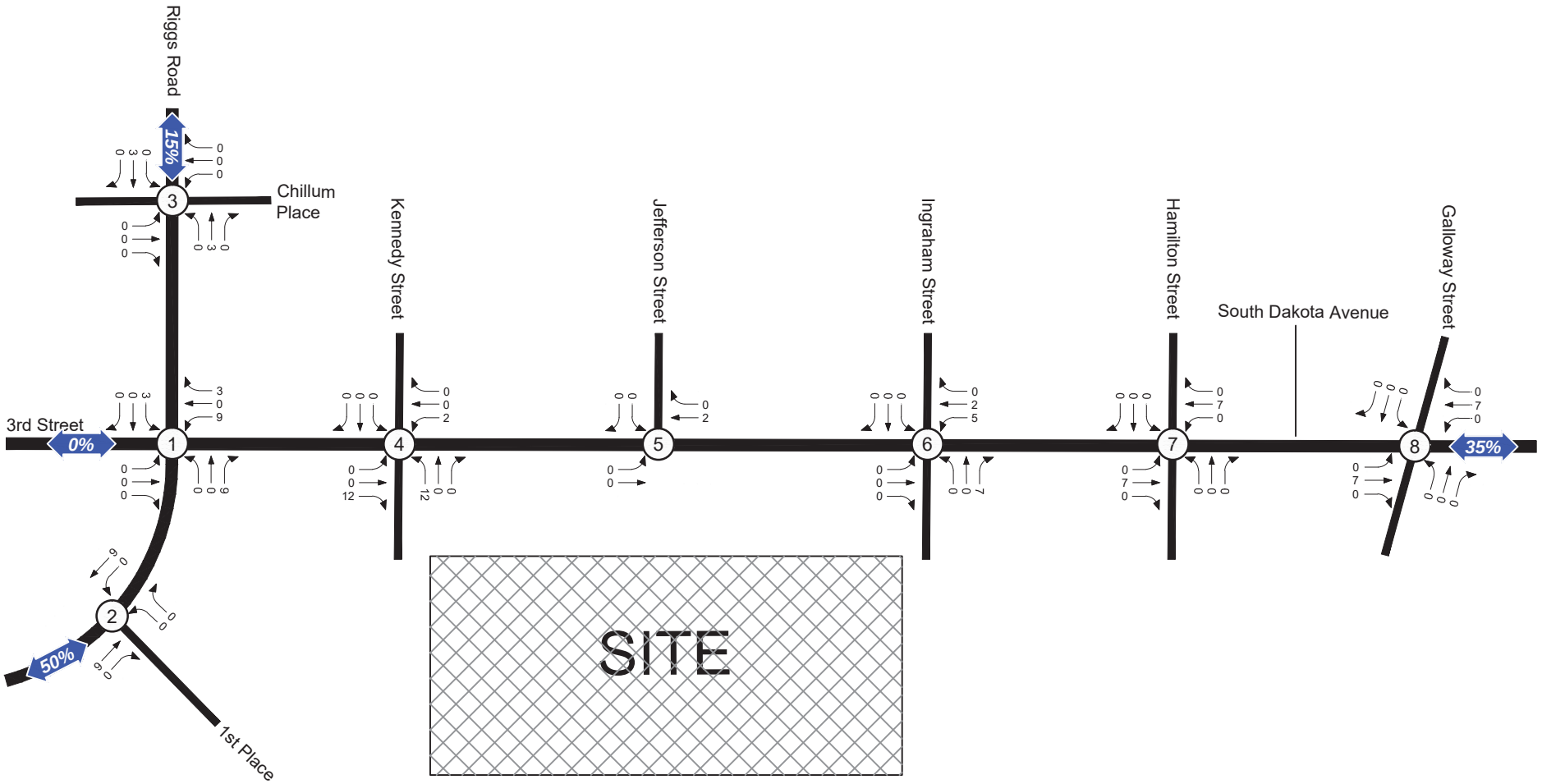


Figure 9A
Site Residential
Saturday Peak Hour Traffic Volumes

XX% Site Distribution

000 SAT PEAK HOUR

NORTH

Art Place Phase II
Washington, DC

O:\PROJECTS\7501 - 8000\7611 ART PLACE PHASE II\GRAPHICS\REPORT FIGURES\7611 VOLUMES.DWG

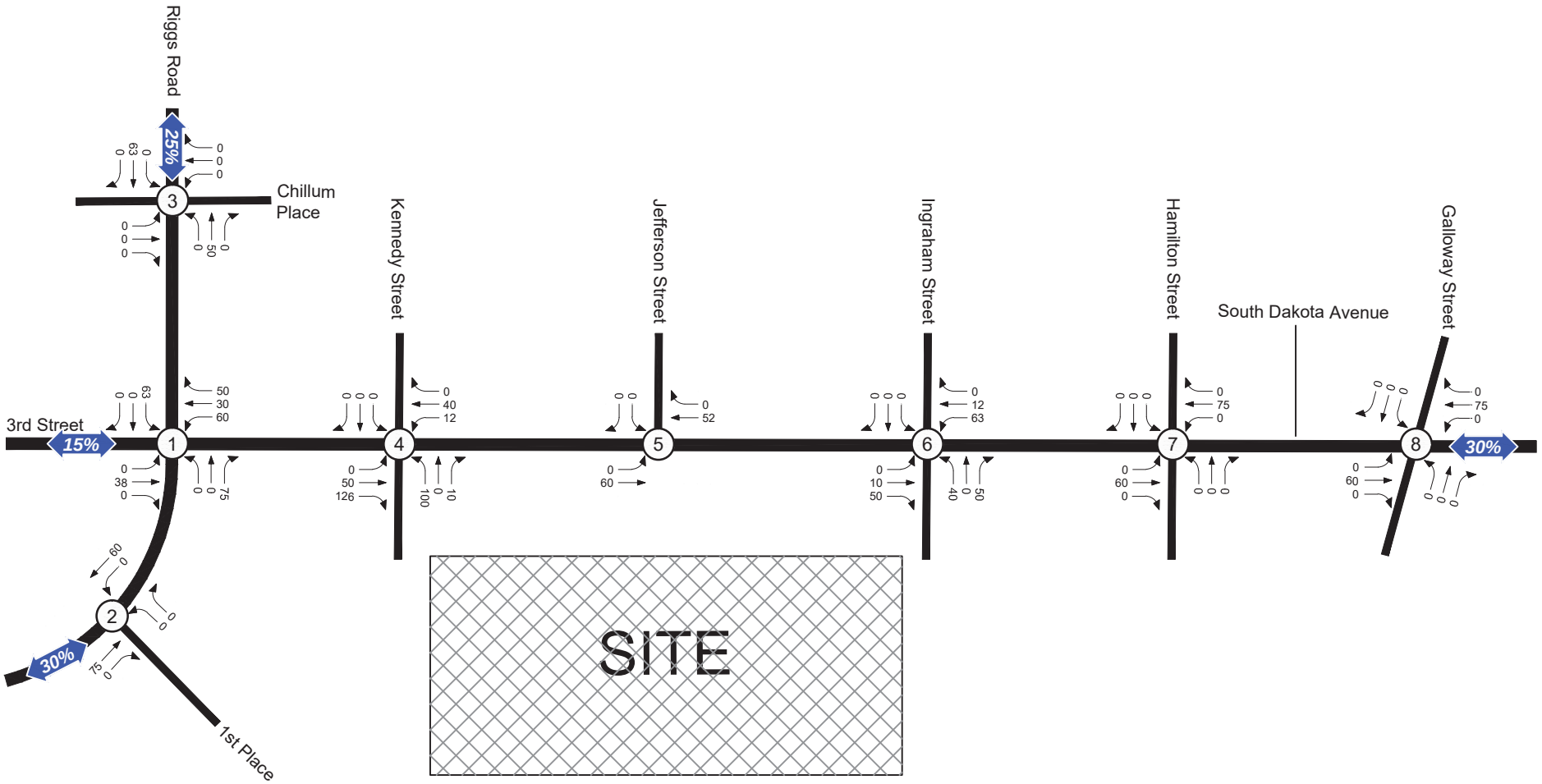


Figure 9B
Site Retail
Saturday Peak Hour Traffic Volumes

XX% Site Distribution

000 SAT PEAK HOUR

NORTH

Art Place Phase II
Washington, DC

O:\PROJECTS\7501 - 8000\7611 ART PLACE PHASE II\GRAPHICS\REPORT FIGURES\7611 VOLUMES.DWG

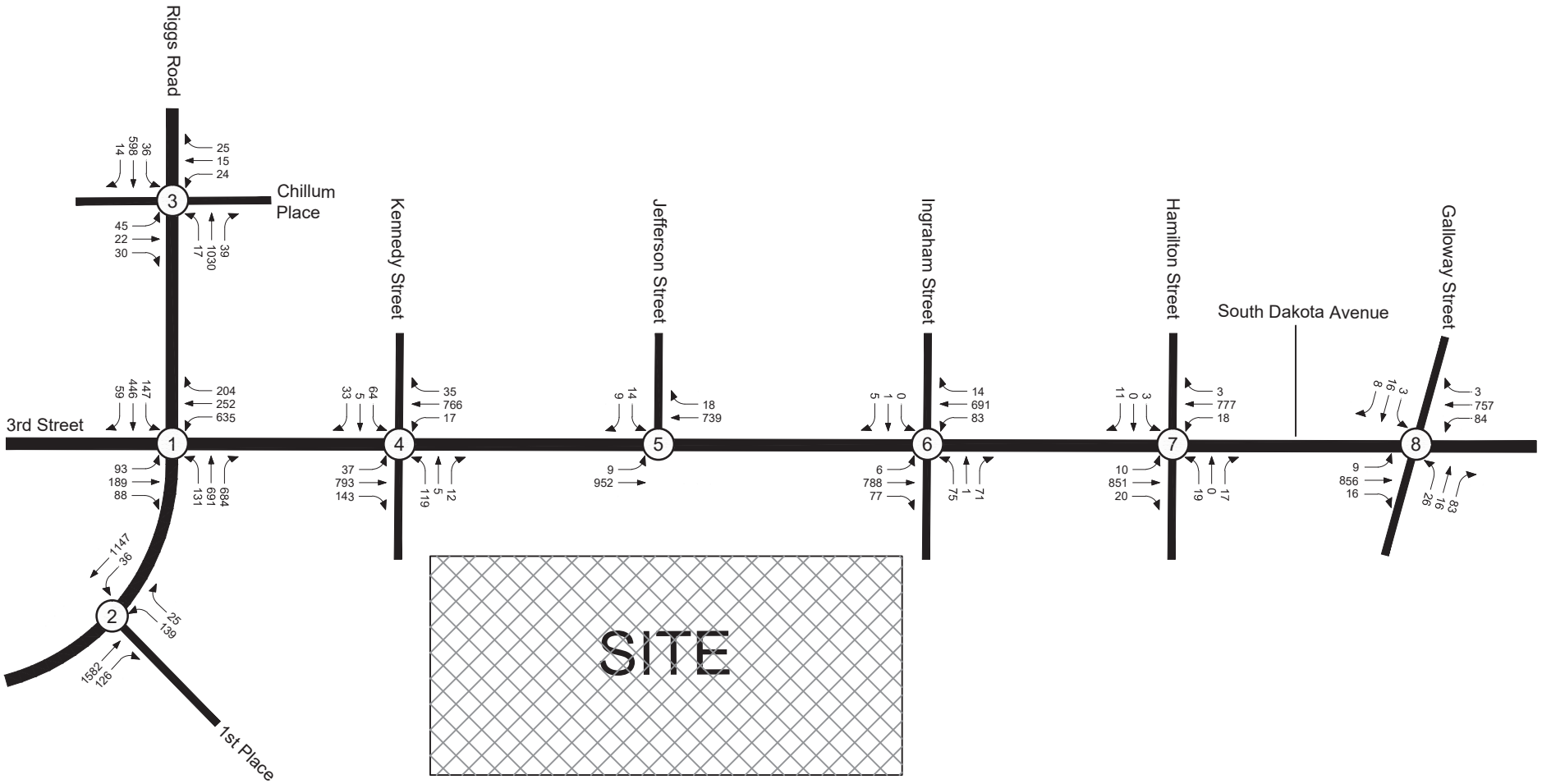


Figure 10

2023 Total Future Peak Hour Traffic Volumes

000 SAT PEAK HOUR

NORTH

Art Place Phase II
Washington, DC

ATTACHMENT 1
SCOPING DOCUMENT

District Department of Transportation (DDOT)
Comprehensive Transportation Review (CTR) Scoping Form

The purpose of the Comprehensive Transportation Review (CTR) study is to evaluate potential impacts to the transportation network that can be expected to result from an approved action of the Zoning Commission (ZC), Board of Zoning Adjustment (BZA), Public Space Committee (PSC), a Federal action, or DDOT project. The Scoping Form accompanies the *Guidance for Comprehensive Transportation Review* and provides the Applicant an opportunity to propose a scope of work to evaluate the potential transportation impacts of the project.

Scoping Information
Date(s) Scoping Form Submitted to DDOT: September 13, 2018 updated through February 4, 2019 Follow up DDOT comments provided February 8, 2019
DDOT Case Manager: Ted Van Houten / Jonathan Rogers
Date(s) Scoping Form Comments Submitted to Applicant:
Date Scoping Form Finalized:

Project Overview		**Proposed Development Program**	
Project Name: Art Place Phase II		**Use(s)**	
Street Address: 5266 South Dakota Avenue NE, Washington, D.C. 20011		**Residential (dwelling units):**	Approx. 270
Square & Block / ANC: Square 3767 Lots 1,2,3,4, and Square 3765 1,2,3,4,5,6,7,8,9 ANC 5A		**Retail (square feet):**	111,502 SF
Applicant Name: The Morris and Gwendolyn Cafritz Foundation		**Office (square feet):**	
Transportation Consultant:	Wells + Associates Barbara Mosier, P.E., PTOE 1110 Bonifant Street, Suite 210, Silver Spring, MD 20910	**Hotel (rooms):**	
Land Use Counsel:	Goulston & Storrs	**Other:** **Live Theatre** **Meow Wolf** **Museum**	250 seats 77,204 SF 113,452 SF
Case Type & No. (ZC, BZA, PSC, etc.):	PUD (06-10D)	**# of Vehicle Parking Spaces:**	Approx. 930
Prior Related Action(s) (ZC, BZA, PSC, etc.):	ZC 06-10 A,B and C	**# of Carshare spaces:**	TBD
Current Zoning and/or Overlay District:	RA-1	**# of Electric Vehicle Stations:**	TBD

Estimated Date of Hearing:	TBD	**# of Bicycle Parking Spaces (long- and short-term)**	
Projected Build-Out Year:	2023	**Long-term:**	119
Small Area Plan (if applicable):	Riggs Road and South Dakota Avenue Small Area Plan	**Short-term:**	65
Livability Study (if applicable):	N/A	**Loading Berths/Spaces:**	4/2

Existing Site and Description of Action: *Describe the type(s) of regulatory approval(s) being requested and any background information on the project relevant to the requested action such as the existing uses, amount of vehicle parking, and other notable proposed changes on-site.*

The Morris and Gwendolyn Cafritz Foundation (the "Applicant") proposes to redevelop the site with a mixed-use program including approximately 270 multi-family residential units (264 dwelling units shown on current plans) and associated common amenity space, 30 units of artists housing and work space, family entertainment uses, and retail uses (including a ground level grocery store). The proposed project will require modification to the 1st Stage PUD approval in addition to a 2nd Stage PUD approval. The site is located on the west side of South Dakota Avenue between Ingraham Street and Kennedy Street on Square 3765 (Lots 1,2,3,4,5,6,7,8, and 9) and 3767 (Lots 1,2,3, and 4). As shown on Figure 1, the site is bordered by South Dakota Avenue NE to the east, Ingraham Street NE to the south, a public alley to the west and Kennedy Street NE to the north. The site is divided by 4th Street NE running north to south through the western portion of the site. The Applicant has filed an application with the DC surveyor's office to close 4th Street and the north-south public alley located between 4th Street and S. Dakota Avenue. The Project represents a significant investment in cultural, artistic and educational programming in an area of the city that is relatively underserved by such programming and resources.

In total, approximately 923 shared parking spaces will be provided on-site in structured garages and will be accessed via Ingraham Street, Kennedy Street, and the public alley along the west site boundary. Each entry location will provide full ingress/egress movements.

Previous Conditions and Commitments: *List all relevant conditions and proffers still in effect from a previous approval (Campus Master Plan, First Stage PUD, etc.) and status of completion.*

The First-Stage Order described the approved plans for Block B as follow:

> Building B shall be constructed as a three-story building not to exceed 60 feet in height and shall include approximately 144,000 square feet of anchor retail and supporting retail uses, 59,000 square feet of grocery, an approximately 47,000 square foot children's museum, as well as recreational and meeting space for resident and community seniors, with a total gross floor area not to exceed 456,000 square feet, all of which would be for non-residential uses. Building B shall have maximum lot occupancy of approximately 76% and contain approximately 1,100 parking spaces.

The Project complies with the general parameters established for the Site in the First-Stage Order, but differs from the specific development plans for Block B in the following ways: (i) the project retains 4th Street as a private mixed-use street that allows for the creation of an active pedestrian area, (ii) in order to further the tenant relocation process for existing tenants of the Riggs Plaza Apartment complex, one of the existing Riggs Plaza Apartments buildings will remain on the Site, (iii) the uses envisioned for the entire Site in the First-Stage Order will be shifted such that Block B will include residential uses and the family entertainment zone, as well as the originally intended grocery, retail, and museum space, (iv) certain development standards, including height, total GFA, FAR, and number of parking spaces have been adjusted to accommodate the shift in uses within the overall Site as well as the replacement of a single building with multiple structures and significant pedestrian plaza areas, which will contribute to a vibrant and engaging pedestrian environment on Block B and the larger Site. The number of parking spaces for Block B has been reduced from 1,110 spaces in the 1st Stage approval to approximately 930 spaces (923 spaces shown on current plans).

Section 1: SITE DESIGN

DDOT reviews the site plan to evaluate consistency with DDOT's standards, policies, and approach to access as documented in the most recent Design and Engineering Manual (DEM). If the proposal for use of public space is found to be inconsistent with the agency approach, DDOT will note this regardless of its relevance to the action. It is DDOT's position that issues regarding public space should be addressed at the earliest possible opportunity to minimize concerns that may result from proposed access design.

CATEGORY & GUIDELINES	CONSULTANT PROPOSAL	DDOT COMMENTS
Site Access Show site access points for vehicles, pedestrians and bicyclists, including proposed curb cut locations, curb cuts to be closed, access controls (e.g., right-in/out, signalized), sight distance analysis from access points, driveway widths and spacing, on- and off-site parking garage locations, inter-parcel connections, and public/private status of driveways, alleys, and streets. ☒ *Scoping/CTR Figure – Project Location Map* ☒ *Scoping/CTR Figure – Site Circulation Plan*	Access to the retail, grocery, and museum (eastern) parking structure is proposed via Ingraham Street and Kennedy Street. Ingraham Street and Kennedy Street will operate as a full access/egress curb cut. Parking to the residential (western) parking structure is proposed via the existing alley along the site's western border. The project location is shown on Figure 1. The site Circulation is shown on Figure 2. A pick-up/drop-off loop is proposed on private space off of the Kennedy Street driveway for the event space. Further, a PUDO area is planned on the north side of S. Dakota Avenue immediately adjacent to main entrance at the northwest corner of the intersection of S. Dakota Avenue/Ingraham Street. Since the original submission of the scoping document, a curb cut off of the public alley on the western site boundary has been added for improved site circulation and access for the residential uses.	We do not support the access point on South Dakota Avenue. The South Dakota access point introduces unnecessary pedestrian conflict. This should be addressed prior to the completion of the scoping process. The South Dakota Avenue curb cut has been eliminated from the study and is no longer proposed. Include sight distance triangle for all proposed sight access points. Sight distance triangles will be included for all proposed site access points. Show where the future Kennedy Street alignment will go. Provide the distance between the new curb cut off the public alley and the future alignment of Kennedy Street. Make sure the alley and new curb cut are consistent with the DEM (January 2019 edition) for future conditions. Refer to Sections 31.4 and 31.5. Provide more information on the function and operations of

		the new circular driveway on private space off of Kennedy Street. It's on private space now, but with the future realignment of Kennedy Street, it will become public space. We have some concerns about how the circular driveway will operate when it's in private space, and how this could impact operations on public space when Kennedy Street is realigned. The distance from the future Kennedy alignment to the curb cut off of the public alley will verified. The new circular driveway is envisioned as a temporary use of private space prior to the realignment of Kennedy Street. The driveway will be utilized mostly during events hosted in the building. The circular driveway will be removed when Kennedy Street is realigned.
Loading Discuss and show the quantity and sizes of loading berths/delivery spaces, trash storage locations, on- and off-site loading locations, turnaround design, nearby commercial loading zones, and anticipated demand, operations, and routing of delivery and trash vehicles. Identify the sizes of trucks anticipated to serve the site and design vehicles to be used in truck turning diagrams. ☒ *Scoping/CTR Figure – Loading Area Design* ☒ *CTR Figure(s) – Truck Turning Diagrams (on the site and to/from designated truck routes and alleys)* ☒ *CTR Figure – Truck Routing To and From Site (when a grocer or big box retailer is proposed)*	Loading for the museum and retail uses is proposed on-site with access via the closed portion of 4th Street. Residential loading on the west side of 4th Street is proposed off of the public alley along the western edge of the building. Regular deliveries for the retail uses and grocery store are anticipated to be made with a maximum vehicle size of WB-50. The grocery store may require occasional WB-67 deliveries. Swept area diagrams showing inbound and outbound movements for each vehicle will be included in the CTR. The loading areas are shown on Figure 3.	A surveyor's order will be required to close 4th Street. If 4th Street remains public, the loading does not meet our standard. Acknowledged, the appropriate documents have been filed for the closure of 4th Street. Please provide a graphic that shows how each use is connected to a loading berth. Internal circulation of the building is shown on Figure 3.

<table>
<tr>
<td></td>
<td>ZR16 Minimum Loading Berths and Service/Delivery Space Requirements
<table>
<tr><th>Use</th><th>Minimum Loading Berths</th><th>Minimum Service/Delivery Spaces</th></tr>
<tr><td>Residential (264 DU)</td><td>1</td><td>1</td></tr>
<tr><td>Retail (111,502 SF)</td><td>3</td><td>1</td></tr>
<tr><td>Entertainment, Assembly, and Performing Arts (202,415 SF)</td><td>2</td><td>0</td></tr>
<tr><td>Proposed</td><td>4</td><td>2</td></tr>
</table>
</td>
<td>Please provide additional information on location and operation for loading in the residential building.
Loading for the residential building is provided off of the public alley on the western site boundary, as shown on Figure 3.</td>
</tr>
<tr>
<td>Streetscape & Public Realm
Provide a conceptual layout of the streetscape and public realm including at minimum: curb cuts, vaults, sidewalk widths, street trees, grade changes, building projections, short-term bicycle parking and any existing bus stops. Also provide the permit tracking numbers and PSC hearing date, if known, for any approved public space designs.

☒ Scoping Figure – Preliminary Public Space Design Concept
☐ CTR Figure – Public Space Design Concept</td>
<td>The design of public space will be consistent with DDOT standards and with what has already been constructed as part of Part A of the Art Place development. Preliminary public space concepts are included as Attachment 1.</td>
<td>Clarify the use and function of the grey rectangles in public space shown in Attachment 1. If they are projections, they must comply with public space regulations. Please clarify prior to completion of the scoping process.
The grey rectangles have been eliminated.

Clearly mark the property line in Attachment 1.
The property line has been added to Attachment 1.

If sidewalk is on private space, an easement will be required.
Acknowledged.</td>
</tr>
<tr>
<td>Curbside Management
Propose a curbside management plan that is consistent with DDOT standards. The curbside management plan should delineate existing and proposed on-street parking designations/restrictions, including but not limited to building entrance zones, commercial loading zones, multi-space meters, and net change in # of on-street spaces as a result of the proposal.

☒ CTR Figure – Existing Curbside Designations
☒ CTR Figure – Preliminary Proposed Curbside Management Plan</td>
<td>A discussion of curbside management will be included in the CTR. Graphics depicting the existing and proposed conditions will also be provided.</td>
<td>Please provide a preliminary curbside signage plan.
A preliminary curbside signage plan will be included in the CTR.

DDOT understands the applicant may want to host food trucks on private space. The trucks would need to cross public space to access private space. Please provide more information on what you</td>
</tr>
</table>

☐ *CTR Figure – Preliminary Proposed Signage and Marking Plan*		propose. The public plaza would be activated with various events and uses to enhance this essential corner of the project. An in depth description of the site and its related activities will be included in the CTR.
Motorcoaches Propose methodology for data collection and analysis. Describe and show the parking locations, anticipated demand, existing areas on- and off-site for loading and unloading (and desired loading times restrictions, if any), and potential routes to and from designated truck routes. This is typically required for uses that generate significant tourist activity (hotels, museums, cruises, etc.). ☒ *CTR Figure – Motor Coach Loading Areas* ☒ *CTR Figure – Motor Coach Routing*	Buses will load and unload on South Dakota Avenue, north of Ingraham Street (just east of the main entrance to the museum). In addition, a bus loading area will be designated on the north side of Ingraham Street. A bus routing plan will be provided as part of the CTR.	Provide more information on bus loading and unloading at the site. A full analysis of the bus loading and unloading operations will be included in the CTR. Please demonstrate that buses can occupy parking lane, thus not impeding traffic on South Dakota Avenue. Our preference is to load buses on side streets, please demonstrate why bus loading on South Dakota Avenue is necessary. The parking lane has been designed to properly store a bus so that it does not impede the travel lanes. The Applicant estimates that the number of buses traveling to the site will not fit on the side streets and will require additional storage area on South Dakota Avenue. Please provide more information on the operation of tour and coach buses, and how they will access the site. You will need to coordinate closely with DDOT's Parking and Ground Transportation

		Division. They will be attending the meeting on February 13. The Applicant acknowledges and anticipates working closely with DDOT's Parking and Ground Transportation Division as the bus operations are determined. More detailed information will be provided in the CTR.
Sustainable Transportation Elements Identify all sustainable transportation elements, such as electric vehicle charging stations proposed to be included in the project.	A portion of the parking spaces in the proposed garage will be equipped for EV stations. Additional spaces will be designed to not prohibit the future installation of EV stations. The number of EV spaces will be identified as plans are refined.	Please provide one EV space for every fifty parking spaces. Acknowledged.
Heritage Trees Heritage Trees are defined as having a circumference of 100 inches or more and are typically located on private property. They are protected by District law and must be preserved if non-hazardous. Special Trees are between 44 inches and 99 inches in circumference and may be removed with a permit.	There are no heritage trees on-site.	Please see attached comments from DDOT Urban Forestry Division. Acknowledged.
Section 2: TRAVEL ASSUMPTIONS		
CATEGORY & GUIDELINES	**CONSULTANT PROPOSAL**	**DDOT COMMENTS**

Strategic Planning Elements Identify relevant planning efforts and demonstrate how the proposed action is consistent with District-wide planning documents, as well as localized studies. The evaluation should consider at least the following high level/District-wide documents: • MoveDC and its relevant modal elements • DDOT Livability Study (relevant to the project) • OP Small Area Plans (relevant to the project) • District of Columbia Comprehensive Plan • State Transportation Improvement Plan (STIP) • Vision Zero Action Plan • Capital Bikeshare Development Plan • Washington Metropolitan Area Transit Authority's (WMATA) Metrorail and Metrobus Plans • DDOT Corridor studies (e.g., Transit Development Plan, Streetscape Design Plans and Guidelines)	The following relevant studies will be utilized throughout the creation of the CTR: • DDOT Design and Engineering Manual • District of Columbia Zoning Regulations of 2016 • District of Columbia Pedestrian Master Plan • District of Columbia Bicycle Master Plan • DDOT Public Realm Design Guide • Transportation Improvement Program (TIP) for the Washington Metropolitan Region (prepared by the Nation Capitol Region Transportation Research Board) • MoveDC Plan • SustainableDC Plan • Riggs Road and South Dakota Avenue Small Area Plan	
Transportation Network Improvements List and map all roadway, transit, bicycle, and pedestrian projects funded by DDOT or WMATA, or proffered by developers, in the vicinity of the study area and expected to open for public use prior to the proposal's anticipated build-out year. ☒ *Scoping/CTR Figure – Map showing locations of background transportation network improvements*	No specific improvements to roadways in the study area were outlined in the Small Area Plan or the TIP.	
Local Traffic Growth List and map developments to be analyzed as local background growth. This should include anticipated matter-of-right and zoning-approved developments within ¼ mile of site and ones more than ¼ mile from site if traffic distributed through study intersections. Include portions of developments anticipated to open by the projected build-out year. ☒ *Scoping/CTR Figure – Map showing background development projects near study area* ☒ *Scoping/CTR Figure – Table showing completion amounts of background developments* ☒ *CTR Figure – Table showing trip generation assumptions for background developments* ☒ *CTR Figure(s) – Assignment of Background Traffic*	Any trips generated by matter-of-right or zoning-approved developments outside of the immediate area will be accounted for in the conservative growth rate. The following pipeline developments will be explicitly included in future traffic forecasts: • Art Place Phase A unoccupied residential units and unoccupied retail square footage • Fort Totten South (160 townhomes 23,000 SF retail) • 6000 New Hampshire Avenue (110 single family dwellings and townhomes) • 5600 2nd Street NE (Self-storage facility >50,000 SF) • Future school planned on Block C of the Art Place PUD application (250 students Max)	

(for each development)

Regional Traffic Growth

Propose a methodology to account for growth in regional travel demand passing through the study area. An appropriate methodology could include reviewing MWCOG model growth rates, historic DDOT AADT traffic counts, or data from other planning studies. These sources should only be used as a guide. Map proposed growth rates by facility, direction, and time of day.

☒ *Scoping/CTR Figure(s) – Table and map showing projected regional growth assumptions (dependent on methodology)*

Based on Historical ADT's from DDOT's website for Riggs Road and South Dakota Avenue near the subject site, it was determined that growth rates on roadways within the study area were generally negative. Therefore, a conservative growth rate of 0.5 percent, compounded annually initially was proposed.

The Historical ADT's have been provided in Attachment 2.

Vehicle Parking

Identify parking locations and justify the amount of on-site vehicle parking, including a comparison to the number of spaces required by ZR16 and any previous approvals. Use the *DDOT Park Right DC* tool to assess vehicle parking demand for residential over retail projects.

Provide parking calculations and parking ratios by land use, including any eligible ZR16 vehicle parking reductions (e.g., within ¼ mile of Priority Bus Route, within ½ mile of Metrorail Station, providing carshare spaces, located within a D zone, etc.).

☒ *Scoping/CTR Figure – ZR16 Vehicle Parking Calculations and Proposed Parking Ratios by Land Use*

The required and proposed vehicle parking is summarized below:

Required (per §701.5)	Provided	Approved For Block B as Part of 1st Stage PUD
Residential (264 DU) = 1 per 3 DU in excess of 4 units 260/3 = 87 spaces	87 spaces† (0.33 sp/unit)	-
Retail (111,502 SF) = 1.33 per 1,000 SF in excess of 3,000 SF 108.5*1.33 = 144 spaces	835 spaces‡ (2.66 sp/kSF)	-
Entertainment, Assembly, and Performing Arts (202,415 SF) = 2 per 1,000 SF 202.4*2 = 405 spaces		-
636 spaces	**923 spaces**	**1,100 spaces**

† 76 parking spaces are proposed in the residential garage. A minimum of 11 parking spaces will be designated in the larger garage as residential parking for the artists' residences.

‡ The proposed retail and cultural uses will share parking. As such, an allocation of parking between the uses has not been determined.

Note that a reduction in parking of 16 percent is proposed compared to what was approved under the Stage 1 PUD.

Bicycle Parking

Identify the locations of proposed bicycle parking and justify the amount of long- and short-term spaces proposed. Provide a calculation of the number of spaces required by ZR16.

☒ *Scoping/CTR Figure – ZR16 calculations for bicycle parking and shower/locker Facilities*

☒ *Scoping/CTR Figure – Locations of internal bicycle parking spaces, routing to these spaces, and related support facilities including locker rooms, showers, storage areas, and service repair room*

Long-term Bicycle Parking		Short-term Bicycle Parking	
Required (per §802.1)	**Provided**	**Required (per §802.1)**	**Provided**
Residential (264 DU) = 1 per 3 DU 264/3 = 88 spaces	88 spaces†	Residential (264 DU) = 1 per 20 DU 264/20 = 13 spaces	13 spaces
Retail (111,502 SF) = 1 per 10,000 SF 11.15*1 = 11 spaces	11 spaces	Retail (111,502 SF) = 1 per 3,500 SF 31.86*1 = 32 spaces	32 spaces
Entertainment, Assembly, and Performing Arts (202,415 SF) = 1 per 10,000 SF 20.24*1 = 20 spaces	20 spaces	Entertainment, Assembly, and Performing Arts (202,415 SF) = 1 per 10,000 SF 20.24*1 = 20 spaces	20 spaces
Total	119 spaces		65 spaces

† ZR 16 (§802.2) indicates that after the first 50 spaces for a use are provided, additional spaces are required at ½ the rate specified in §802.1. However, DC Law requires one bicycle space per three units for residential developments and does allow a reduction after the first 50 spaces.

Locations of internal bicycle parking spaces, routing to these spaces, and related support facilities will be included in the CTR. They will comply with all applicable requirements.

Please provide a site plan showing how you are providing long term bike parking.

Long-term bicycle parking for the western building is shown on Figure 3. Additional long-term bicycle parking is available in the first parking level below grade.

Show how the number of required long term bicycle parking spaces are accommodated, consistent with the spacing requirements in zoning.

A discussion of the long-term bicycle parking and a more in depth design will be included in the CTR.

Mode Split

Provide mode split assumptions with sources and justification. Sources of data could include the most recent *Census Transportation Planning Products (CTPP)* or the *2005 WMATA Development-Related Ridership Survey*. Note that the walking mode share will account for internal trip synergies for mixed use developments.

The agreed upon mode split assumptions should not be revised between scoping and CTR submission without DDOT concurrence.

☒ *Scoping/CTR Figure – Mode Split Assumptions*

TripsDC was used to determine the auto, transit, bike, and walk mode splits for the proposed residential uses. A breakdown of trips, by mode, provided by TripsDC is included in Attachment 3.

Mode split assumptions for non-residential land uses were determined from the 2005 WMATA Ridership Survey. An average of two (2) previously collected retail and entertainment developments (U Street/African-Amer Civil War Memorial/Cardozo and Silver Spring) provided in the 2005 study were used. A summary of the data is provided in Attachment 4.

Average Vehicle Occupancy rates for the retail and museum were obtained from data published by the National Household Travel Survey. This data was used to convert vehicle trips to person trips.

Trip Generation Provide site-generated trip generation estimates, utilizing the most recent version of ITE *Trip Generation Manual* or another agreed upon methodology such as manual doorway or driveway counts at similar facilities. Estimates must be provided by mode, type of trip, land use, and development phase. Modes include transit (rail and bus), bicycle, walk, and automobile. Existing site trips should be based on visual counts and not estimated based on trip generation calculations. ☒ *Scoping Figure – Vehicle Trip Generation Calcs for CTR Threshold* ☒ *Scoping/CTR Figure – Multi-Modal Trip Generation*	Site-generated trips were calculated using TripsDC and the ITE's Trip Generation Manual, 10th Edition, as noted in Attachment 5. Average Vehicle Occupancy rates, used to convert person trips to vehicle trips and vice versa, were found using the National Household Travel Survey. A summary of the multi-modal trip generation and vehicle trip generation calculations are provided in Attachment 5.	Prepare trip generation estimates using the ITE land use code for museums. Compare that to the WMATA ridership study for entertainment use, and use the more conservative estimate. The ITE land use code for museums was utilized for the trip generation analysis. Since the original submission of the scoping document, the trip generation estimates have been updated based on the new mix of uses and anticipated tenants. Although It is intended that a single operator would manage all of the uses, the children's theatre and Meow Wolf have been separated out from the museum and retail rates for trip generation purposes. The updated trip generation analysis is summarized in Attachment 5. Please show how tour and coach buses are accounted for in the mode split. Tour and coach buses were assumed as 15% of each non-auto share for the museum, live theatre, and Meow Wolf. In Attachment 5, you are using the same mode splits but now there are 250 more parking spaces. The vehicle mode split should be higher to reflect the increase in parking. The parking increase was proportional to the increase in SF in the building. The parking ratios are consistent with the first submission and, therefore, would not require a higher vehicle mode split.

Trip Distribution Provide sources and justification for proposed percentage distribution of site-generated trips. Additionally, document proposed pass-by distributions and the re-routing of existing or future vehicles based on any changes to the transportation network. ☒ *Scoping/CTR Figure – Percentage Distribution Map(s) by Land Use, Direction, and Time of Day* ☒ *CTR Figure – Assignment of Site-Generated Trips* ☐ *CTR Figure – Assignment of Pass-By or Re-Routed Trips, as needed*	Consistent with previously approved studies in the project area, the distribution of peak hour trips generated by the proposed development was determined based on existing and anticipated traffic patterns in the study area. The distribution of site trips for the residential and retail portions would differ slightly, as outlined below. Trip distributions are shown on Figure 1. **Roadway / Direction (to/from) / Residential Distribution / Retail Distribution** Riggs Road — West — 50% — 30% Riggs Road — East — 15% — 25% South Dakota Avenue — South — 35% — 30% 3rd Street — North — 0% — 15% Total — 100% — 100%	

Section 3: IMPACT ASSESSMENT

CATEGORY & GUIDELINES	CONSULTANT PROPOSAL	DDOT COMMENTS
Traffic Impact Analysis (TIA) **Study Area and Data Collection** Identify study intersections commensurate with the impact of the proposed project and the travel demand it will generate. Study area should include all major signalized and unsignalized intersections, intersections expected to realize large numbers of new traffic, and intersections that may experience changing traffic patterns. ☒ *Scoping/CTR Figure – Study Intersections*	The following study intersections are proposed: 1. Riggs Road/South Dakota Avenue, 2. Riggs Road/1st Place, 3. Riggs Road/Chillum Place, 4. South Dakota Avenue/Kennedy Street, 5. South Dakota Avenue/Jefferson Street, 6. South Dakota Avenue/Ingraham Street, 7. South Dakota Avenue/Hamilton Street/Driveway, and 8. South Dakota Avenue/Galloway Street See Figure 1 for a map of the study area. Traffic counts will be conducted on a typical weekday, when DC public schools and Congress are in session, from 6:30AM – 9:30AM and from 4PM – 7PM.	Per DDOT email, no additional intersections are needed for data collection. Acknowledged. Due to the recently announced uses/tenants, please also collect traffic counts on Saturday, and provide impact analysis for Saturday traffic as well. While it is not anticipated that Saturday peak hour conditions would vary from the more critical PM peak hour, Saturday impact analysis will be provided in the CTR.

TIA Study Scenarios Propose an appropriate set of scenarios to analyze. Note the anticipated build-out year and project phasing. Analysis scenarios should consider: • *Existing Conditions* • *Background Conditions (No-Build)* • *Total Future Conditions (With Development)* • *Total Future Conditions (With Mitigation)* • *Total Future Conditions (+5 Years), as necessary* • *Additional Scenarios For Each Phase, as necessary* • *Long Range 25+ Years Planning Scenario for Larger Projects*	The following conditions will be included in the CTR: • Existing (2018) Conditions • Background Conditions (2023) – No-Build • Total Future Conditions (2023) – With Development • Total Future Conditions (2023) – With Mitigation, if required	
TIA Methodology Propose an appropriate methodology for the capacity analysis including the type of software program to be used. Per DEM 38.3.5.1, HCM methodology should be used to determine Level of Service (LOS) and vehicle queue lengths. DDOT requires Synchro software for LOS analysis and SimTraffic (10 simulations averaged) for queue lengths. *Provide hard copies of simulation analyses in CTR appendix and electronic copies of analysis files at time of submission.* ☒ *CTR Figure(s) – TMCs for Existing, Background, and Total Future Scenarios* ☒ *CTR Figure(s) – Synchro LOS Results for Existing, Background, and Total Future Scenarios* ☐ *CTR Figure(s) – SimTraffic Queuing Results for Existing, Background, and Total Future Scenarios*	Synchro v.10 will be used to conduct the AM and PM weekday peak level of service/capacity analyses and Synchro input files will be provided along with the study submittal. Existing signal timings will be requested from DDOT and utilized in the analyses. Synchro v.10 will also be used to determine the expected AM and PM weekday peak queue lengths (the longer of the 50th percentile and the 95th percentile queues will be reported). The available storage lengths will be measured from the approach stop bar to the nearest intersection or end of turn lane, as appropriate. All intersections where overall average or approach operates under LOS "E" in existing, background, and total future scenarios will be highlighted. Vehicular trip mitigation measures will be proposed for any site-generated impacts, defined as: • Degradation of approach LOS to "E" or worse under total future conditions compared to background conditions, • Increase in approach delay operating at a LOS "E" or "F" of greater than five percent, when compared to background scenario • Increase in 95% queue length of greater than 150 feet, when compared to background scenario	

Pedestrian Network Propose methodology for evaluating the condition of the existing pedestrian network and determining the project's impact. Evaluate, at a minimum, sidewalk widths, network completeness, whether facilities meet DDOT and ADA standards, whether pedestrian signal timings are adequate, and identifying critical walking routes. ☒ *Scoping/CTR Figure – Pedestrian Study Area and Walking Routes to Transit, Schools, Activity Centers* ☒ *CTR Figure – Pedestrian Network Existing Conditions* ☒ *CTR Figure – Pedestrian Network Future Conditions (if improvements are programmed/proffered by others or proposed by the Applicant)*	A discussion of the existing and proposed pedestrian facilities in the immediate vicinity of the proposed development will be provided. Additionally, relevant information from the Pedestrian Master Plan will be included. Figure 4 shows the existing pedestrian network.	Define "immediate vicinity". Be sure to provide an analysis of conditions to major destinations such as WMATA Metrorail stations, bus stops/stations, and nearby neighborhood-serving retail. The discussion of the pedestrian facilities will include an approximately ¼ mile radius of the center of the site. Specific information will be provided regarding major pedestrian generators and destinations.
Bicycle Network Propose methodology for evaluating the condition of the existing bicycle network and determining the project's impact, including impacts to Capital Bikeshare. Evaluate, at a minimum, network completeness and adequacy of Capital Bikeshare locations and availability. ☒ *Scoping/CTR Figure – Bicycle Study Area and Bicycling Routes to Transit, Schools, Activity Centers* ☒ *CTR Figure – Bicycle Network Existing Conditions* ☒ *CTR Figure – Bicycle Network Future Conditions (if improvements are programmed/proffered by others or proposed by the Applicant)*	A discussion of the existing and proposed bicycle facilities in the within ½ mile of the proposed development will be provided. Figure 5 shows the existing bicycle network.	We would be interested in finding a location for an additional Bikeshare station located as part of the development. Acknowledged, a bikeshare station is currently being evaluated by the design team.
Transit Network Propose methodology and metrics for evaluating and determining the transit impacts of the project. Evaluate, at a minimum, existing transit stop locations, adjacent bus routes and Metro headways, planned transit improvements, and an assessment of existing transit stop conditions (e.g., ADA compliance, bus shelters, benches, etc.). For rail stations, refer to the 2008 *WMATA Station Site and Access Planning Manual*, as well as various station capacity studies. ☒ *Scoping/CTR Figure – Map of Adjacent Transit Routes and Stations*	The existing transit service and any planned transit improvements, if applicable, will be discussed in the report. Transit analysis will include a summary of existing bus service (average headways and spans of service), as well as an assessment of ADA compliance for the bus stop closest to the subject site. All bus stops in the study area will be shown and indicate whether or not a shelter is present. Figure 6 shows the existing transit network.	

Safety Analysis Propose methodology to identify crash patterns at study intersections and mitigate potential safety concerns. Identify intersections with a crash rate of 1.0 MEVs or higher over the most recent 3-year period, document the types of crashes, and evaluate crash trends at these intersections. A safety analysis is only required if a capacity analysis is required.	Crash data will be requested from DDOT for the study intersections. Crash rates per million entering vehicles will be calculated and any rate above 1.0 MEV will be identified. Sight distance analysis for all proposed curb cuts will be provided during the permitting process. Where possible, recommendations for potential safety improvements will be made for locations with a rate above 1.0 MEV. Note, however, that our ability to recommend potential improvements depends on the level of detail provided in the crash data summaries.	
Internal Circulation and Transportation Facilities If site contains 500 or more vehicle parking spaces, evaluate on-site vehicle parking demand and provide analysis demonstrating parking entrance and ramps can properly process vehicles without queuing onto public streets. Provide proposed parking supply, queuing analysis, and physical controls to parking area, if applicable. ☒ *CTR Figure – Parking ramps and processing facilities along with processing speed*	The CTR will provide an evaluation of the processing times at each garage entrance. The CTR will also provide proposed parking supply, queuing analysis, and physical controls to parking area.	
On-Street Parking Occupancy Study This analysis is required if BZA relief from 5 or more on-site vehicle parking spaces is being requested. It may also be required as part of a ZC or permitting case, if DDOT has concerns about site-generated vehicles parking in adjacent residential neighborhoods. ☐ *Scoping/CTR Figure – Study Area/Block Faces* ☐ *CTR Figure(s) – Block Face Parking Inventory and Restrictions* ☐ *CTR Figure(s) – Vehicle Parking Space Utilization by Study Period*	N/A	
Section 4: MITIGATIONS		

The completed CTR should detail all proposed mitigations. The purpose of including the Mitigations section in the Scoping Form is to note DDOT's Significant Impact policy, DDOT's approach to mitigation, and to allow the Applicant to gain initial feedback on potential mitigations the Applicant may ultimately propose. Any mitigation strategies discussed and included in the Scoping Form are not considered binding until formally committed to in the CTR.

DDOT Significant Impact Policy: Per DEM 38.3.5, all site-generated vehicular impacts to the transportation network during study peak hours must be mitigated. Vehicular impacts are defined as 1) the degradation of an intersection approach to LOS E or F or intersection v/c ratio to 1.0 or greater under Total Future Conditions; 2) if an approach exceeds LOS E or F or intersection exceeds 1.0 v/c ratio under Background Conditions then an increase in delay or v/c ratio by 5% or more under Total Future Conditions; 3) vehicle queuing length exceeds available capacity of approach or turn lane under Total Future Conditions; 4) if the 95th percentile queue length of an approach or turn lane increases by 150 feet or more from Background to Total Future Conditions.

DDOT's approach to mitigate impacts to the network is to first establish optimal site design and operations to support efficient site circulation. When these efforts alone cannot properly mitigate an action's impact, reducing on-site vehicle parking, implementing TDM measures, and making upgrades to the pedestrian, bicycle, and transit networks to encourage use of non-automotive modes should be proposed. Only when these options are exhausted will DDOT consider capacity-increasing changes to the roadway network because such changes often have detrimental impacts on non-automotive travel and are often contrary to the District's multi-modal transportation goals.

☒ *The Applicant acknowledges DDOT's Significant Impact Policy and the Agency's approach to mitigation that prioritizes reducing vehicle parking, implementing TDM strategies, and making non-automotive network improvements.*

CATEGORY & GUIDELINES	CONSULTANT PROPOSAL	DDOT COMMENTS
Transportation Demand Management (TDM) A TDM Plan is typically required to offset site-generated impacts to the transportation network or in situations where a site provides more parking than DDOT determines is practical for the use and surrounding context.	Transportation Demand Management (TDM) strategies and incentives for encouraging alternate modes of transportation by land use will be identified for the proposed development. A graphic depicting the nearby transportation facilities/services (bus stops, Metrorail stations, car-sharing locations, and Capital Bikeshare locations) will be prepared.	
Operational Changes Describe all proposed operational changes in CTR and provide supporting analysis and warrants in the study appendix. All proposed changes in traffic control must be conducted following the procedures outlined in the Manual of Uniform Traffic Control Devices (MUTCD).	Concurrent with the subject stage 2 PUD, 4th Street is proposed to become a private street. By making 4th Street private, the Applicant envisions a safe pedestrian corridor to serve the adjacent retail and museum uses, with limited vehicular traffic. A private alley will be constructed north of the West residential building. The CTR will also study a potential traffic signal at the intersection of Ingraham Street and South Dakota Avenue.	DDOT is installing a HAWK signal at South Dakota and Ingraham. DDOT is capable of upgrading the HAWK to a full signal, in case the CTR analysis supports a full signal at the intersection. Make sure to accommodate a HAWK (and if warranted, a full signal) in your plans. The HAWK signal will be accommodated in future plans. If warranted and required based on the analysis, a full signal will be accommodated.

Geometric Changes Describe all proposed geometric changes in CTR and provide supporting analysis and warrants in the study appendix.	No geometric changes are proposed for the CTR.	
Performance Monitoring DDOT may require a performance monitoring plan in situations where anticipated vehicle trips are large in magnitude, unpredictable, or necessitate a vehicle trip cap. The monitoring plan will establish thresholds for new trips a project can generate, define post-completion evaluation criteria and methodology, determine the frequency of reporting, and establish potential remediating measures (e.g., adjust trip caps or implement additional TDM strategies).	N/A	

Section 5: ADDITIONAL TOPICS FOR DISCUSSION DURING SCOPING

CATEGORY & GUIDELINES	CONSULTANT PROPOSAL	DDOT COMMENTS
These items include status of Community Benefits Agreement, ANC concerns, traffic calming proposals, Traffic Operations and Parking Plan (TOPP), additional analyses such as merge/weave analysis, etc.	The draft benefits and amenities package is being prepared for the Art Place property.	

FIGURES

Figure 1
Project Location, Proposed Study Area and Distribuons`

NORTH

Art Place Phase II
Washington, DC

Figure 2
Project Site Plan

NORTH

Art Place Phase II
Washington, DC

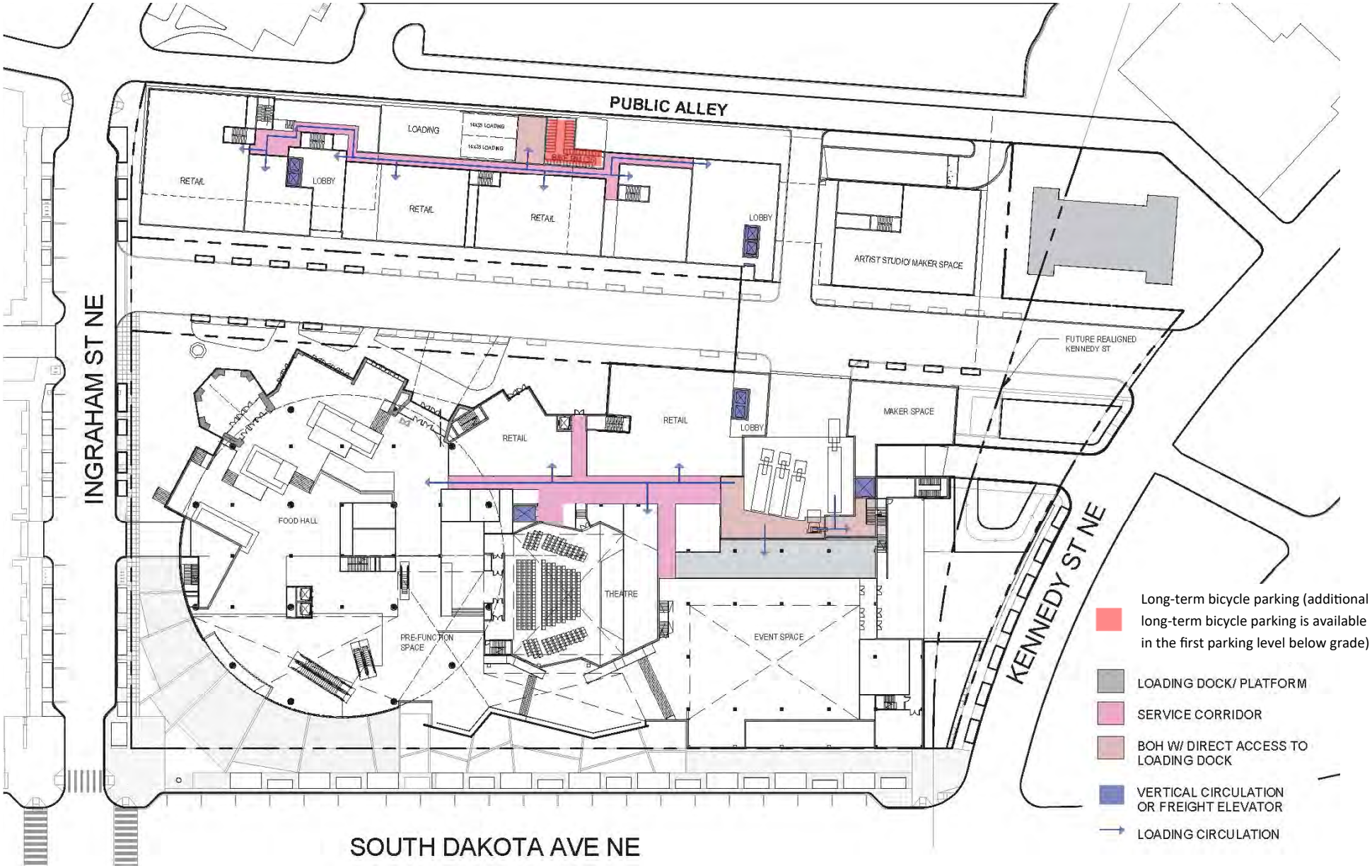


Figure 3
Site Loading Plan

NORTH

Art Place Phase II
Washington, DC

Figure 4
Preliminary 1/4 Mile Walk Shed

Bus Stop - Shelter
No Shelter
Sidewalk
Crosswalk
Metrorail Station

High Pedestrian Activity and Deficiency
Low Pedestrian Activity and Deficiency

NORTH

Art Place Phase II
Washington, DC

Figure 5
Preliminary One Half Mile Bike Shed

NORTH

Art Place Phase II
Washington, DC

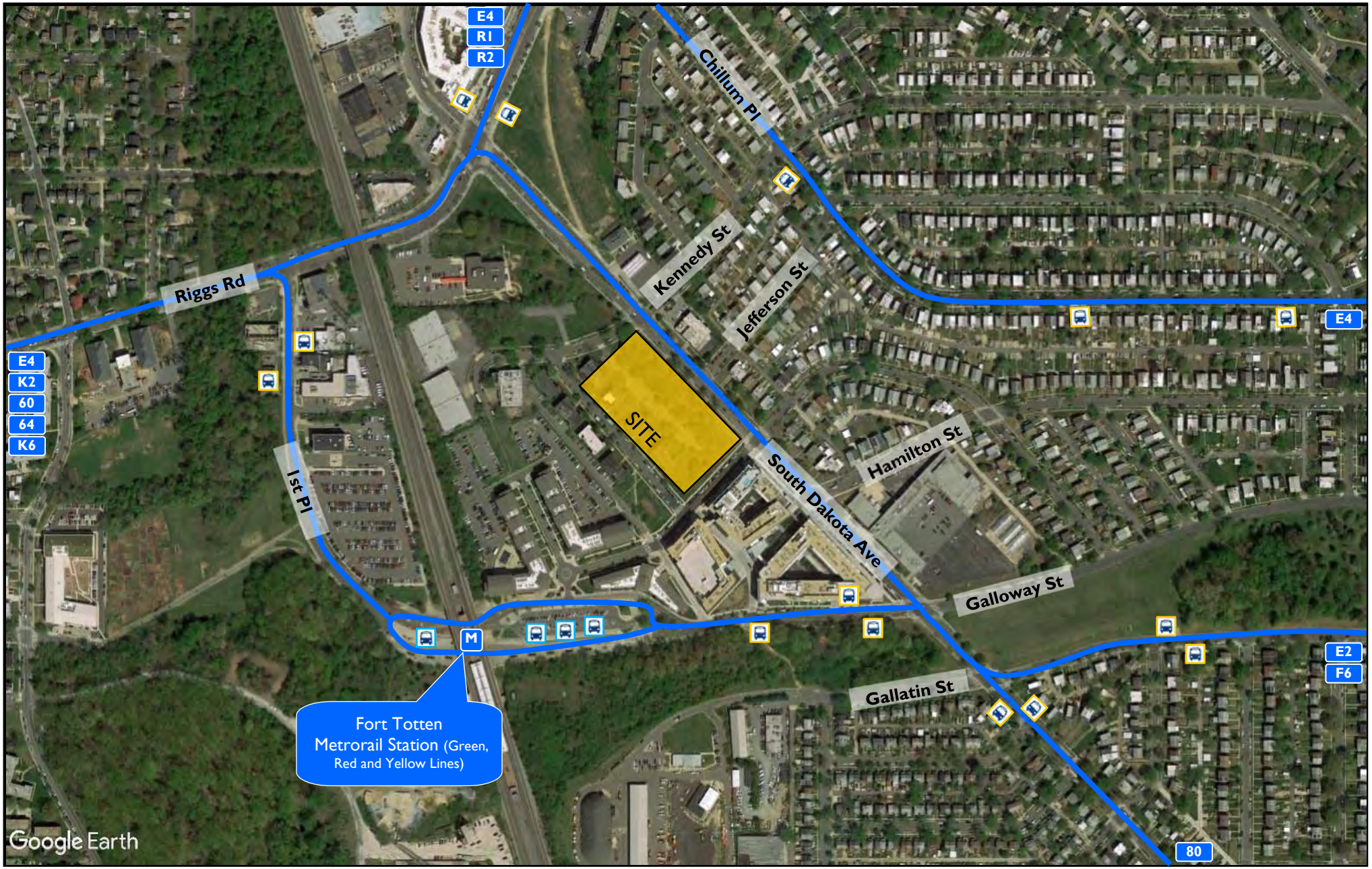


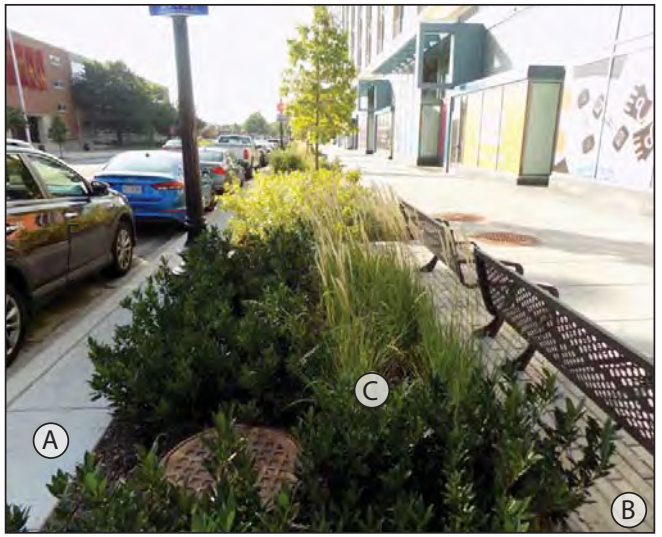
Figure 6
Adjacent Transit Map

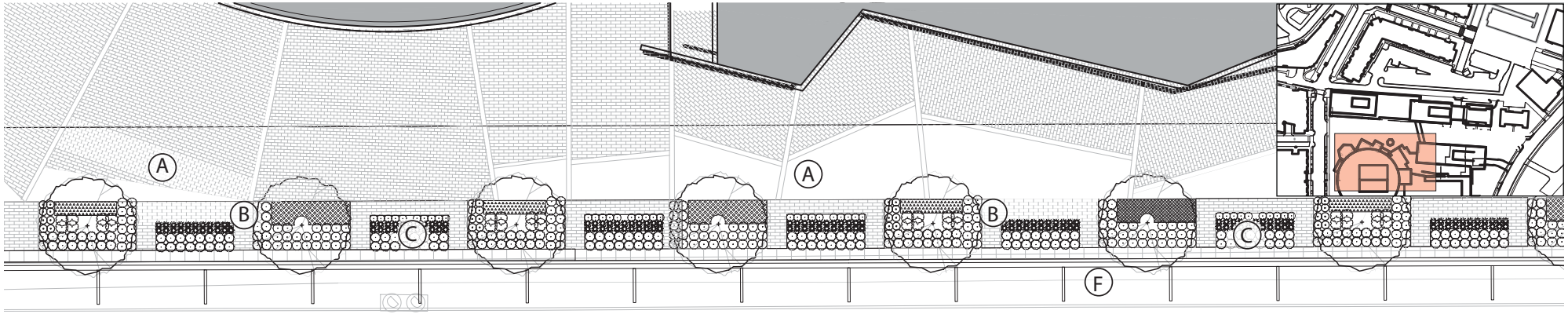
Bus Stop - Shelter No Shelter
XX Metrobus Route
M Metrorail Station (Green, Red and Yellow Lines)

NORTH

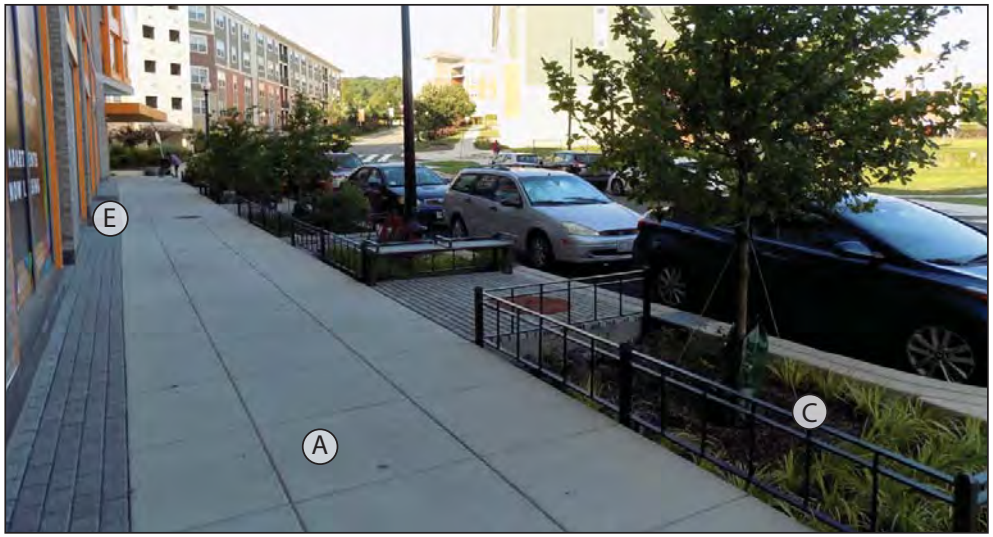
Art Place Phase II
Washington, DC

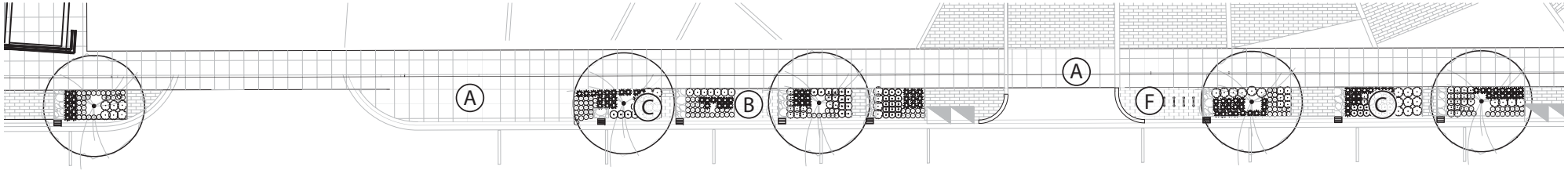
ATTACHMENT 1
PRELIMINARY PUBLIC SPACE DESIGN



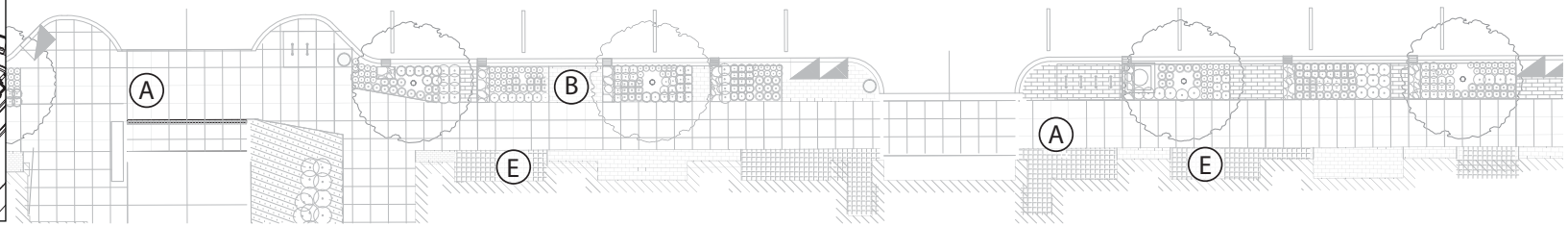


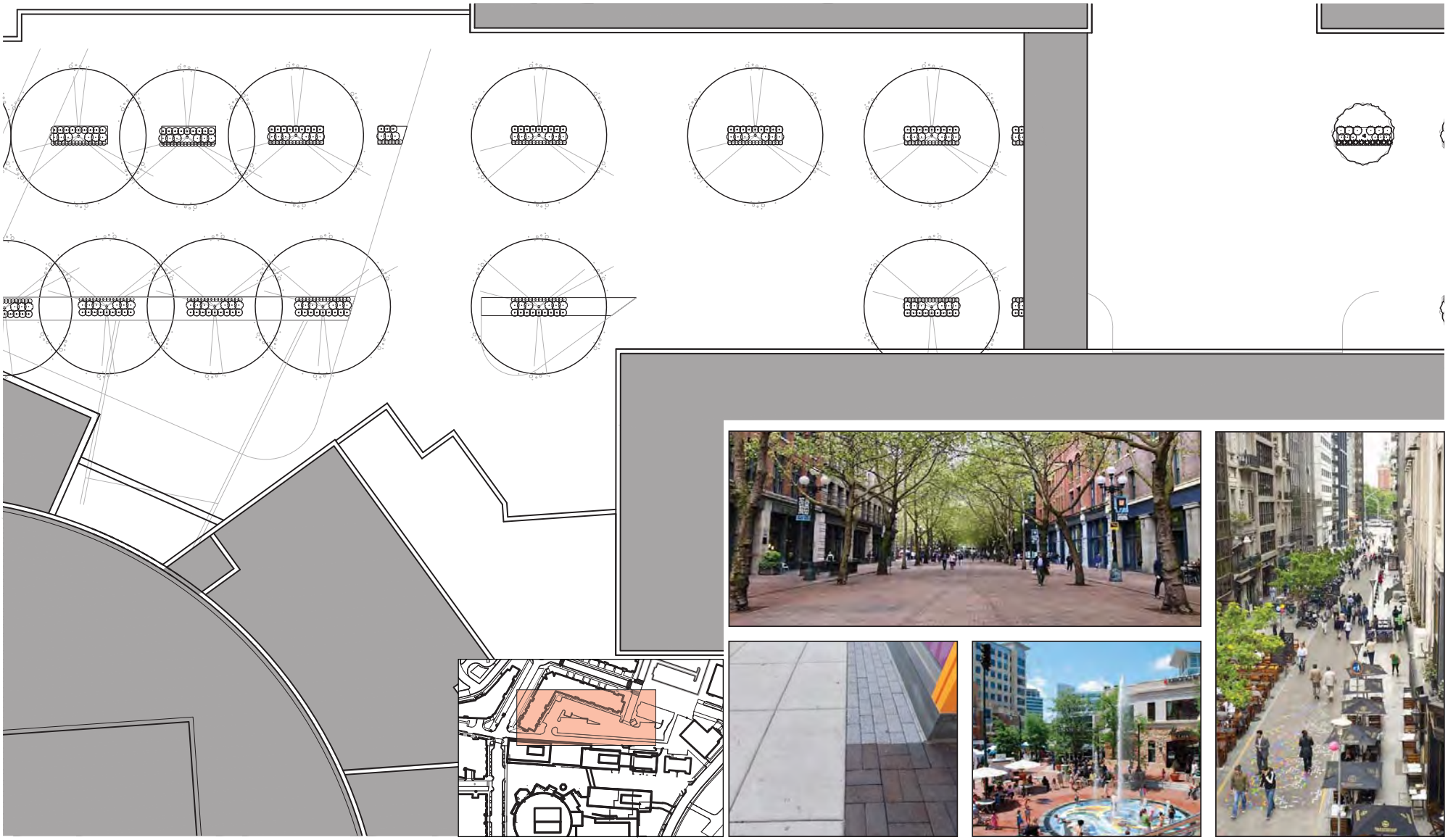
SOUTH DAKOTA AVE NE





INGRAHAM ST NE





BUILDING B

PERKINS EASTMAN | STUDIO SHANGHAI | VIKA CAPITOL

SCALE
0 10 20

TYPICAL PEDESTRIAN & 4TH STREETSCAPE

ART PLACE AT FORT TOTTEN

ATTACHMENT 2
HISTORICAL ADT GROWTH

Historical ADT Growth Rate

Roadway		DDOT ADT							
	2002	2008	2009	2010	2011	2012	2013	2014	2015
Riggs Road between 1st and South Dakota	28.9	29.7	29.9	28.8	26.4	26.2	26.3	28.2	29.1
South Dakota from Riggs to Rhode Island	16.5	18.1	18.2	16.4	16.5	16.4	17.7	18.0	21.8

Roadway	Compounded Growth Rate										
	Growth from 2002 to 2008	Growth from 2002 to 2009	Growth from 2002 to 2010	Growth from 2002 to 2011	Growth from 2002 to 2012	Growth from 2002 to 2013	Growth from 2002 to 2014	Growth from 2002 to 2015	Average growth	Average ADT	Weighted Average Growth
Riggs Road between 1st and South Dakota	0.68%	0.85%	-0.06%	-1.28%	-1.22%	-1.04%	-0.24%	0.06%	-0.28%	28.2	-0.45%
South Dakota from Riggs to Rhode Island	2.34%	2.48%	-0.10%	0.00%	-0.08%	0.78%	0.87%	2.56%	1.11%	17.7	0.70%

Total Average Growth (Weighted)	0.25%
Total Average Growth (Unweighted)	0.41%

ATTACHMENT 3
TripsDC MODE SPLIT ASSUMPTIONS

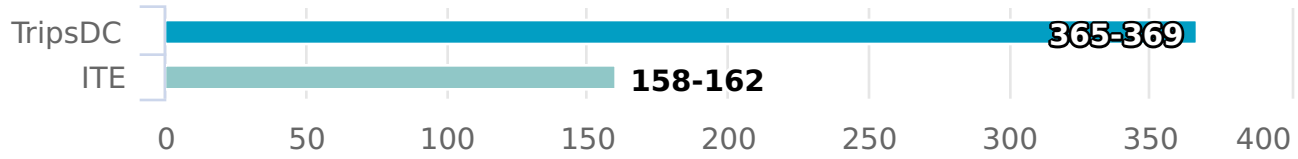
TripsDC Trip Generation Estimates

Art Place Phase II

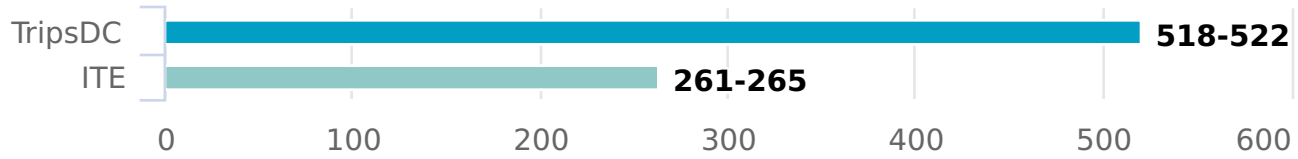
Project address: 5217 4th Street Northeast, Washington, District of Columbia 20011, United States

Residential units: 264 / Retail square footage (KSF): 26.702 / Parking spaces: 91

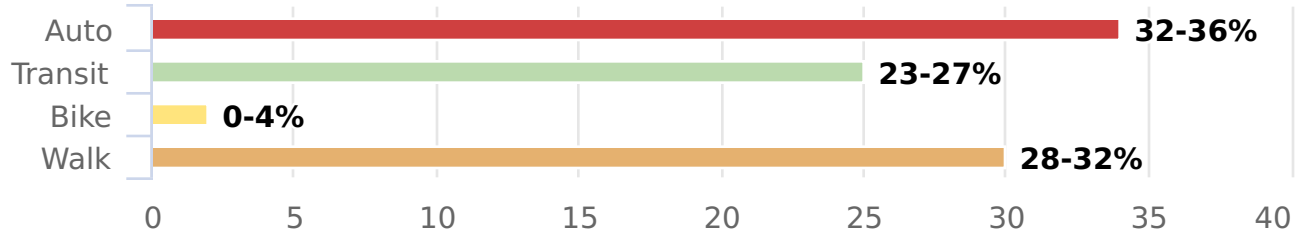
Person Trips AM



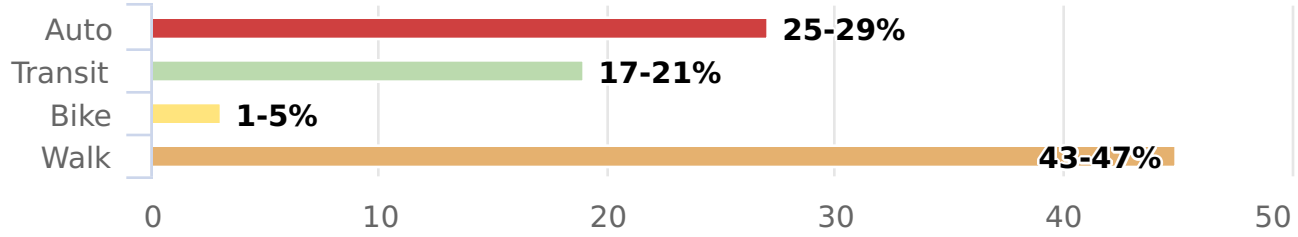
Person Trips PM



Mode Split AM



Mode Split PM



TripsDC provides trip generation estimates informed by empirical DC base research. Consult with DDOT about the appropriateness of the estimates based on the specific development proposal.

Generated on: Mon Jan 28 2019 14:13:11 GMT+0000 (UTC)

ATTACHMENT 4
2005 WMATA RIDERSHIP SURVEY MODE SPLIT ASSUMPTIONS

Table 15
Mode Shares at Retail, Hotel and Entertainment Sites

Site Name	Site Type	Mode			
		Metrorail[1]	Metrobus & Other Transit[2]	Auto[3]	Walk & Other[4]
Ballston Station Area					
Ballston Common	R	23%	7%	43%	27%
Holiday Inn Arlington	H	17%	0%	67%	17%
Regal Cinemas	E	35%	9%	39%	17%
Crystal City Station Area					
Crystal Plaza Shops	R	36%	5%	24%	36%
The Underground	R	31%	6%	27%	35%
Crystal Gateway Marriott	H	27%	7%	24%	42%
Crystal Hyatt Regency	H	48%	3%	21%	28%
Eisenhower Avenue Station Area					
AMC Hoffman Theaters	E	12%	1%	83%	4%
Friendship Heights Station Area					
Embassy Suites Chevy Chase Pavilion	H	33%	5%	25%	36%
Silver Spring Station Area					
Silver Spring Neighborhood Center	R	9%	10%	67%	14%
Holiday Inn Silver Spring	H	8%	4%	54%	33%
AFI Silver Theater	E	39%	2%	49%	10%
The Majestic 20	E	19%	13%	56%	13%
U Street/African American Civil War Memorial/Cardozo Station Area					
U St Main Street	R	44%	13%	19%	25%
Average Among Sites					
Retail Sites	R	**29%**	**8%**	**36%**	**27%**
Hotel Sites	H	**27%**	**4%**	**38%**	**31%**
Entertainment Sites	E	**26%**	**6%**	**57%**	**11%**

Notes: [1] Includes multimodal trips that may have involved auto or bus use in combination with Metrorail.
[2] Includes bus only trips, and commuter rail, such as MARC, VRE or Amtrak.
[3] Includes trips as driver and passenger of a private automobile.
[4] Includes cycling and any other form of transportation one may use.
R: Retail
H: Hotel
E: Entertainment (Movie Theater)

Among the entertainment (movie theater) sites, the Regal Cinemas and AFI Silver Theater drew the highest percentages of Metrorail riders (35 and 39 percent, respectively) (see Table 15). The AMC Hoffman, with its ample free parking and good highway access, had a much lower Metrorail use rate of only 12 percent.

More detailed information about the frequency analysis conducted for retail, hotel and entertainment (movie theater) sites can be found in Appendices C.1.3 through C.1.5.

ATTACHMENT 5
SITE TRIP GENERATION

Site Trip Generation Summary

Land Use		ITE Code	Setting/Location	Size	Units	AM Peak Hour IN	AM Peak Hour OUT	AM Peak Hour TOTAL	PM Peak Hour IN	PM Peak Hour OUT	PM Peak Hour TOTAL
Residential				264	D.U.						
Person Trips[1]		AM	PM			96	273	369	318	204	522
Non-auto Person Trips		*64%*	*71%*			*61*	*175*	*236*	*226*	*145*	*371*
Transit		*28%*	*20%*			27	76	103	63	41	104
Bike		*4%*	*4%*			4	11	15	13	8	21
Walk		*32%*	*47%*			31	87	118	149	96	245
Vehicle Trips		*36%*	*29%*			35	98	133	92	59	151
Shopping Center		820	General Urban/Suburban	84,800	SF (GLA)						
ITE Trips[2]						120	74	194	231	250	481
Person Trips[5]	AVO	2.0				236	145	381	471	471	943
Vehicle Person Trips						*111*	*68*	*179*	*222*	*222*	*443*
Non-auto Person Trips		*Ret.*	*Entert.*			*125*	*77*	*202*	*250*	*250*	*500*
Metro[3]		*0.29*	*0.26*	*27%*		*64*	*39*	*103*	*122*	*132*	*255*
Bus[3]		*0.08*	*0.06*	*7%*		*17*	*10*	*27*	*32*	*34*	*66*
Walk/Bike[3]		*0.27*	*0.11*	*19%*		*45*	*27*	*72*	*86*	*93*	*179*
Walk				*14%*		*33*	*21*	*54*	*64*	*70*	*134*
Bike				*5%*		*11*	*7*	*18*	*21*	*23*	*45*
Vehicle Trips						56	35	91	113	113	226
Live Theater				250	Seats						
Total						3	2	5	88	15	103
Rate per seat[4]						-	-	-	0.35	0.06	0.40
Person Trips[5]	AVO	2.0				5	4	9	175	30	205
Vehicle Person Trips						3	2	5	100	17	117
Non-auto Person Trips			Entert.			*2*	*2*	*4*	*75*	*13*	*88*
Metro[3]			*0.26*	*26%*		*1*	*1*	*2*	*27*	*27*	*53*
Bus[3]			*0.06*	*6%*		*1*	*0*	*1*	*6*	*6*	*12*
Walk/Bike[3]			*0.11*	*11%*		*1*	-	*1*	*11*	*12*	*23*
Walk				*8%*		*1*	-	*1*	*8*	*9*	*17*
Bike				*3%*		-	-	*0*	*3*	*3*	*6*
Vehicle Trips						2	1	3	50	9	59
Meow Wolf				77,204	SF						
Person Trips[6]	AVO	3.19				15	2	17	27	142	169
Vehicle Person Trips						*8*	*1*	*10*	*15*	*81*	*96*
Non-auto Person Trips			Entert.			*7*	*1*	*7*	*12*	*61*	*73*
Metro[3]			*0.26*	*26%*		*4*	*1*	*4*	*7*	*37*	*44*
Bus[3]			*0.06*	*6%*		*1*	*0*	*1*	*2*	*9*	*10*
Walk/Bike[3]			*0.11*	*11%*		*2*	*0*	*2*	*3*	*16*	*19*
Walk				*8%*		*1*	*0*	*1*	*2*	*12*	*14*
Bike				*3%*		*0*	*0*	*0*	*1*	*4*	*5*
Vehicle Trips						3	0	3	5	25	30
Museum		580	General Urban/Suburban	113,452	SF						
ITE Trips[2]						27	4	32	3	17	20
Person Trips[5]	AVO	3.19				87	15	102	10	55	65
Vehicle Person Trips						*50*	*9*	*58*	*6*	*32*	*37*
Non-auto Person Trips			Entert.			*37*	*6*	*44*	*4*	*23*	*28*
Metro[3]			*0.26*	*26%*		*23*	*4*	*27*	*3*	*14*	*17*
Bus[3]			*0.06*	*6%*		*5*	*1*	*6*	*1*	*3*	*4*
Walk/Bike[3]			*0.11*	*11%*		*9*	*2*	*11*	*1*	*5*	*7*
Walk				*8%*		*7*	*1*	*8*	*1*	*5*	*5*
Bike				*3%*		*2*	*1*	*3*	*1*	*1*	*2*
Vehicle Trips						16	2	18	2	10	12
Total Proposed Development											
Total Person Trips						439	439	878	1,002	902	1,904
Non-auto Person Trips						*232*	*261*	*493*	*567*	*492*	*1,060*
Vehicle Trips						111	136	248	262	216	477

Notes:

[1] Residential trip generation (including non-auto mode split) calculated using tripsDC.org.

[2] Trips generated using Institute of Transportation Engineers (ITE) Trip Generation, 10th Edition.

[3] Metro, bus, and walk/bike mode splits taken from WMATA 2005 Ridership Survey. The walk mode split was assumed to be 75% of the total walk/bike split.

[4] Based on counts collected by W + A on Thursday, March 10, 2016 and reflects a show with 90% attendance at an off-site venue.

[5] Average Vehicle Occupancy from National Household Travel Survey

[6] Meow Wolf trip generation estimates calculated based on an assumed 9,500 weekly visitors.

ATTACHMENT 2
TRAFFIC COUNT DATA

Turning Movement Count		
Import Type: CAR		
BASIC	*	
Collected By:	Wells + Associates	<< Collected By: [NAME]
Date:	2/23/19	<< Date: [mm/dd/yyyy]
IntID:	1	<< IntID: [Integer ID of Intersection]
Time Interval:	15 Minutes	<< Time Interval: [Interval Length In Minutes]
Last Row With Data:	27	<< Last Row With Data: [Row Number]
Road Name #1	Riggs Road NE	<< Road Name #1: [Road 1 Name]
Road Name #2	South Dakota Avenue NE	<< Road Name #2: [Road 2 Name]

Do Not Edit Gray Cells
Enter Information In Yellow Cells
Red Cells Contain Helpful Information

Time Format: [h:mm AM/PM]
Examples: 1:30 AM, 4:15 PM, 9:30 AM

TIME	SBR	SBT	SBL	SBPD	WBR	WBT	WBL	WBPD	NBR	NBT	NBL	NBPD	EBR	EBT	EBL	EBPD
10:00:00 AM	19	28	16	16	21	83	9	5	21	43	103	0	77	96	13	2
10:15:00 AM	17	27	8	13	14	79	16	8	22	54	105	0	86	136	12	1
10:30:00 AM	13	20	13	12	12	85	10	7	32	44	115	2	80	120	10	0
10:45:00 AM	16	19	15	3	14	83	14	1	23	50	109	0	94	102	22	1
11:00:00 AM	14	36	19	8	11	89	11	6	26	32	89	5	93	119	22	2
11:15:00 AM	15	27	13	16	18	92	10	5	25	42	93	3	114	123	15	4
11:30:00 AM	16	49	16	13	14	99	10	6	28	48	115	10	80	163	34	6
11:45:00 AM	10	40	12	8	10	107	17	4	35	33	99	4	104	164	35	2
12:00:00 PM	18	27	25	8	11	105	10	4	22	56	103	4	113	137	25	2
12:15:00 PM	17	26	17	9	13	102	24	5	26	45	99	7	128	187	38	0
12:30:00 PM	24	34	19	6	13	102	15	5	28	51	124	1	212	132	34	3
12:45:00 PM	17	31	21	5	10	114	23	4	32	45	121	2	138	176	27	3
1:00:00 PM	13	40	23	8	12	108	14	11	36	59	140	3	112	181	20	0
1:15:00 PM	25	35	22	13	15	111	12	5	38	52	118	0	104	154	37	0
1:30:00 PM	19	29	26	9	22	97	13	5	23	46	162	2	120	127	33	0
1:45:00 PM	23	45	24	10	13	98	13	3	13	50	112	1	131	192	34	0

Turning Movement Count
Import Type: TRUCK
BASIC
Collected By: Wells + Associates
Date: 2/23/19
IntID: 1
Time Interval: 15 Minutes
Last Row With Data: 27
Road Name #1 Riggs Road NE
Road Name #2 South Dakota Avenue NE

TIME	SBR	SBT	SBL	SBPD	WBR	WBT	WBL	WBPD	NBR	NBT	NBL	NBPD	EBR	EBT	EBL	EBPD
10:00:00 AM	0	2	0	16	0	2	0	5	0	2	5	0	1	3	0	2
10:15:00 AM	0	0	0	13	1	1	0	8	2	1	3	0	6	5	0	1
10:30:00 AM	0	0	0	12	0	2	1	7	2	2	0	2	4	4	2	0
10:45:00 AM	0	0	0	3	1	1	0	1	1	1	5	0	6	7	0	1
11:00:00 AM	0	0	0	8	0	1	0	6	1	1	3	5	5	4	0	2
11:15:00 AM	0	0	0	16	0	1	0	5	2	2	2	3	6	2	0	4
11:30:00 AM	0	0	0	13	0	4	0	6	1	2	7	10	3	4	1	6
11:45:00 AM	0	2	0	8	0	0	0	4	0	2	3	4	6	7	0	2
12:00:00 PM	0	0	0	8	0	1	0	4	5	3	7	4	4	7	1	2
12:15:00 PM	1	0	0	9	0	1	1	5	0	3	1	7	1	1	0	0
12:30:00 PM	0	0	0	6	0	0	0	5	0	2	3	1	10	3	0	3
12:45:00 PM	0	0	0	5	0	0	0	4	4	2	8	2	7	2	0	3
1:00:00 PM	0	0	0	8	0	0	0	11	1	1	5	3	4	4	1	0
1:15:00 PM	1	0	0	13	0	1	0	5	0	0	3	0	3	3	1	0
1:30:00 PM	0	0	0	9	1	0	0	5	1	2	4	2	5	2	1	0
1:45:00 PM	0	0	0	10	0	0	0	3	1	1	2	1	6	9	1	0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0

Turning Movement Count		
Import Type: CAR		
BASIC	*	
Collected By:	Wells + Associates	<< Collected By: [NAME]
Date:	2/23/19	<< Date: [mm/dd/yyyy]
IntID:	2	<< IntID: [Integer ID of Intersection]
Time Interval:	15 Minutes	<< Time Interval: [Interval Length In Minutes]
Last Row With Data:	27	<< Last Row With Data: [Row Number]
Road Name #1	Riggs Road NE	<< Road Name #1: [Road 1 Name]
Road Name #2	1st Place NE	<< Road Name #2: [Road 2 Name]

Do Not Edit Gray Cells
Enter Information In Yellow Cells
Red Cells Contain Helpful Information

Time Format: [h:mm AM/PM]
Examples: 1:30 AM, 4:15 PM, 9:30 AM

TIME	SBR	SBT	SBL	SBPD	WBR	WBT	WBL	WBPD	NBR	NBT	NBL	NBPD	EBR	EBT	EBL	EBPD
10:00:00 AM				5		215	9	0	9		14	4	13	210		2
10:15:00 AM				5		214	7	3	2		17	1	13	238		2
10:30:00 AM				2		222	5	9	4		28	1	13	211		3
10:45:00 AM				2		210	8	2	5		28	1	30	231		2
11:00:00 AM				5		194	6	4	5		20	3	22	240		3
11:15:00 AM				3		205	3	1	7		17	3	22	261		2
11:30:00 AM				5		219	6	9	3		23	5	25	284		3
11:45:00 AM				1		208	6	7	6		25	4	22	299		3
12:00:00 PM				2		226	7	0	4		21	0	24	280		2
12:15:00 PM				3		222	10	5	7		29	6	29	359		3
12:30:00 PM				2		251	11	4	5		27	3	26	372		2
12:45:00 PM				4		257	6	5	9		22	1	19	347		0
1:00:00 PM				3		266	8	3	3		30	3	20	323		4
1:15:00 PM				1		262	9	3	6		23	0	25	290		1
1:30:00 PM				3		274	9	0	4		25	1	23	308		0
1:45:00 PM				3		244	11	2	4		19	2	21	312		1

Turning Movement Count
Import Type: TRUCK
BASIC
Collected By: Wells + Associates
Date: 2/23/19
IntID: 2
Time Interval: 15 Minutes
Last Row With Data: 27
Road Name #1 Riggs Road NE
Road Name #2 1st Place NE

TIME	SBR	SBT	SBL	SBPD	WBR	WBT	WBL	WBPD	NBR	NBT	NBL	NBPD	EBR	EBT	EBL	EBPD
10:00:00 AM				5		215	9	0	9		14	4	13	210		2
10:15:00 AM				5		214	7	3	2		17	1	13	238		2
10:30:00 AM				2		222	5	9	4		28	1	13	211		3
10:45:00 AM				2		210	8	2	5		28	1	30	231		2
11:00:00 AM				5		194	6	4	5		20	3	22	240		3
11:15:00 AM				3		205	3	1	7		17	3	22	261		2
11:30:00 AM				5		219	6	9	3		23	5	25	284		3
11:45:00 AM				1		208	6	7	6		25	4	22	299		3
12:00:00 PM				2		226	7	0	4		21	0	24	280		2
12:15:00 PM				3		222	10	5	7		29	6	29	359		3
12:30:00 PM				2		251	11	4	5		27	3	26	372		2
12:45:00 PM				4		257	6	5	9		22	1	19	347		0
1:00:00 PM				3		266	8	3	3		30	3	20	323		4
1:15:00 PM				1		262	9	3	6		23	0	25	290		1
1:30:00 PM				3		274	9	0	4		25	1	23	308		0
1:45:00 PM				3		244	11	2	4		19	2	21	312		1
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0

Turning Movement Count		
Import Type: CAR		
BASIC	*	
Collected By:	Wells + Associates	<< Collected By: [NAME]
Date:	2/23/19	<< Date: [mm/dd/yyyy]
IntID:	3	<< IntID: [Integer ID of Intersection]
Time Interval:	15 Minutes	<< Time Interval: [Interval Length In Minutes]
Last Row With Data:	27	<< Last Row With Data: [Row Number]
Road Name #1	Riggs Road NE	<< Road Name #1: [Road 1 Name]
Road Name #2	Chillum Place NE	<< Road Name #2: [Road 2 Name]

Do Not Edit Gray Cells
Enter Information In Yellow Cells
Red Cells Contain Helpful Information

Time Format: [h:mm AM/PM]
Examples: 1:30 AM, 4:15 PM, 9:30 AM

TIME	SBR	SBT	SBL	SBPD	WBR	WBT	WBL	WBPD	NBR	NBT	NBL	NBPD	EBR	EBT	EBL	EBPD
10:00:00 AM	12	3	3	5	5	110	3	2	3	3	7	4	3	133	3	5
10:15:00 AM	8	1	6	0	2	124	9	0	4	2		0	3	147	4	0
10:30:00 AM	7	4	9	5	4	117	2	1	5	8	3	3	11	127	1	1
10:45:00 AM	4	7	7	5	3	113	5	1	4	2	3	0	3	109	4	3
11:00:00 AM	9	5	2	8	2	118	5	1	5	2	4	4	7	165	6	4
11:15:00 AM	5	4	8	1	3	113	8	0	7	3	5	5	4	157	3	2
11:30:00 AM	6	4	4	4	1	118	3	1	5	3	8	0	5	167	6	2
11:45:00 AM	18	7	7	0	3	122	18	0	6	2	11	0	3	168	11	0
12:00:00 PM	6	6	6	9	4	108	2	2	4	1	6	7	7	206	2	10
12:15:00 PM	8	9	3	9	1	133	5	1	12	9	7	2	2	211	6	2
12:30:00 PM	11	7	11	12	6	131	7	0	7	3	9	6	1	142	3	3
12:45:00 PM	6	4	15	0	4	129	4	4	6	1	7	1	7	182	4	0
1:00:00 PM	3	6	15	6	4	130	5	3	11	6	2	0	4	215	4	2
1:15:00 PM	9	5	11	3	4	129	7	0	3	3	8	1	6	265	3	2
1:30:00 PM	11	8	6	12	4	123	7	0	3	1	7	4	4	219	2	4
1:45:00 PM	6	2	12	4	2	114	6	1	7	5	6	2	3	226	8	1

Turning Movement Count
Import Type: TRUCK
BASIC
Collected By: Wells + Associates
Date: 2/23/19
IntID: 3
Time Interval: 15 Minutes
Last Row With Data: 27
Road Name #1 Riggs Road NE
Road Name #2 Chillum Place NE

TIME	SBR	SBT	SBL	SBPD	WBR	WBT	WBL	WBPD	NBR	NBT	NBL	NBPD	EBR	EBT	EBL	EBPD
10:00:00 AM	0	0	0	5	0	0	0	2	0	0	0	4	0	0	1	5
10:15:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
10:30:00 AM	0	0	0	5	0	0	0	1	0	0	0	3	1	3	0	1
10:45:00 AM	0	0	0	5	0	0	0	1	0	0	0	0	0	2	0	3
11:00:00 AM	0	0	0	8	0	0	0	1	0	0	0	4	0	2	0	4
11:15:00 AM	0	0	0	1	0	0	0	0	0	0	0	5	1	1	0	2
11:30:00 AM	0	0	0	4	0	0	0	1	0	0	0	0	0	4	1	2
11:45:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
12:00:00 PM	0	0	0	9	0	0	0	2	0	0	0	7	1	3	0	10
12:15:00 PM	0	0	0	9	0	0	0	1	0	0	0	2	0	0	0	2
12:30:00 PM	0	0	0	12	0	0	0	0	0	0	0	6	0	1	0	3
12:45:00 PM	0	0	0	0	0	0	0	4	0	0	0	1	1	1	0	0
1:00:00 PM	0	0	0	6	0	0	0	3	0	0	0	0	0	2	0	2
1:15:00 PM	0	0	0	3	0	0	0	0	0	0	0	1	0	1	0	2
1:30:00 PM	0	0	0	12	0	0	0	0	0	0	0	4	0	0	0	4
1:45:00 PM	0	0	0	4	0	0	0	1	0	0	0	2	1	0	0	1
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0

Turning Movement Count		
Import Type: CAR		
BASIC	*	
Collected By:	Wells + Associates	<< Collected By: [NAME]
Date:	2/23/19	<< Date: [mm/dd/yyyy]
IntID:	4	<< IntID: [Integer ID of Intersection]
Time Interval:	15 Minutes	<< Time Interval: [Interval Length In Minutes]
Last Row With Data:	27	<< Last Row With Data: [Row Number]
Road Name #1	South Dakota Avenue NE	<< Road Name #1: [Road 1 Name]
Road Name #2	Kennedy Street NE	<< Road Name #2: [Road 2 Name]

Do Not Edit Gray Cells
Enter Information In Yellow Cells
Red Cells Contain Helpful Information

Time Format: [h:mm AM/PM]
Examples: 1:30 AM, 4:15 PM, 9:30 AM

TIME	SBR	SBT	SBL	SBPD	WBR	WBT	WBL	WBPD	NBR	NBT	NBL	NBPD	EBR	EBT	EBL	EBPD
10:00:00 AM	1	128	5	2	4	2	12	7	9	146	2	4	2	3	2	3
10:15:00 AM		121	8	2	10	1	8	2	13	148		1			4	1
10:30:00 AM	2	107	6	1	4	1	9	0	11	165		2	1	4	1	5
10:45:00 AM	1	115	6	0	4	1	13	3	13	147		0		1		1
11:00:00 AM	3	143	8	2	2	1	16	8	10	137		0		1		2
11:15:00 AM		144	9	4	2	1	12	4	17	147		2		1	4	2
11:30:00 AM	3	130	12	0	4	2	14	6	11	141		4	1	1		2
11:45:00 AM	2	137	13	0	5		15	3	10	141		5		1	3	5
12:00:00 PM	1	146	10	0	3		14	8	10	132		2	1			0
12:15:00 PM	1	158	10	0	4	3	11	4	8	162		3	1	3	2	1
12:30:00 PM	1	206	11	1	7		13	5	11	138	2	3		1		4
12:45:00 PM	2	157	9	0	4	1	8	4	8	160	1	3	1	1	1	5
1:00:00 PM	1	163	6	1	7	1	9	3	7	185		0			4	0
1:15:00 PM	1	118	10	2	5	3	10	3	10	166	1	3		2	2	0
1:30:00 PM	1	153	11	0	3	1	9	5	10	163		6		1	2	0
1:45:00 PM	2	156	8	3	2	1	10	9	16	140		0	1	2	4	2

Turning Movement Count
Import Type: TRUCK
BASIC
Collected By: Wells + Associates
Date: 2/23/19
IntID: 4
Time Interval: 15 Minutes
Last Row With Data: 27
Road Name #1 South Dakota Avenue NE
Road Name #2 Kennedy Street NE

TIME	SBR	SBT	SBL	SBPD	WBR	WBT	WBL	WBPD	NBR	NBT	NBL	NBPD	EBR	EBT	EBL	EBPD
10:00:00 AM	0	0	0	2	0	0	0	7	1	3	0	4	0	0	0	3
10:15:00 AM	0	0	0	2	0	0	0	2	0	3	0	1	0	0	0	1
10:30:00 AM	0	0	0	1	0	0	0	0	0	3	0	2	0	0	0	5
10:45:00 AM	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	1
11:00:00 AM	0	0	0	2	0	0	0	8	0	1	0	0	0	0	0	2
11:15:00 AM	0	0	0	4	0	0	0	4	2	2	0	2	0	0	1	2
11:30:00 AM	0	0	0	0	0	0	0	6	0	3	0	4	0	0	0	2
11:45:00 AM	0	0	0	0	0	0	0	3	0	5	0	5	0	0	0	5
12:00:00 PM	0	0	0	0	0	0	0	8	0	5	0	2	0	0	0	0
12:15:00 PM	0	0	0	0	0	0	0	4	1	1	0	3	0	0	0	1
12:30:00 PM	0	0	0	1	0	0	0	5	1	0	0	3	0	0	0	4
12:45:00 PM	0	0	0	0	0	0	0	4	0	4	0	3	0	0	0	5
1:00:00 PM	0	0	0	1	0	0	0	3	0	1	0	0	0	0	0	0
1:15:00 PM	0	0	0	2	0	0	0	3	0	1	0	3	0	0	0	0
1:30:00 PM	0	0	0	0	0	0	0	5	0	2	0	6	0	0	0	0
1:45:00 PM	0	0	0	3	0	0	0	9	0	1	0	0	0	0	0	2
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0

Turning Movement Count		
Import Type: CAR		
BASIC	*	
Collected By:	Wells + Associates	<< Collected By: [NAME]
Date:	2/23/19	<< Date: [mm/dd/yyyy]
IntID:	5	<< IntID: [Integer ID of Intersection]
Time Interval:	15 Minutes	<< Time Interval: [Interval Length In Minutes]
Last Row With Data:	27	<< Last Row With Data: [Row Number]
Road Name #1	South Dakota Avenue NE	<< Road Name #1: [Road 1 Name]
Road Name #2	Jefferson Street NE	<< Road Name #2: [Road 2 Name]

Do Not Edit Gray Cells
Enter Information In Yellow Cells
Red Cells Contain Helpful Information

Time Format: [h:mm AM/PM]
Examples: 1:30 AM, 4:15 PM, 9:30 AM

TIME	SBR	SBT	SBL	SBPD	WBR	WBT	WBL	WBPD	NBR	NBT	NBL	NBPD	EBR	EBT	EBL	EBPD
10:00:00 AM		137	1	2				0	4	135		0				0
10:15:00 AM		143		0	1		6	0	1	152		0				0
10:30:00 AM		120	3	0	2		3	0	3	157		0				0
10:45:00 AM		124	2	3	2			0	1	146		0				0
11:00:00 AM		129	2	0	1		2	0	1	121		0				1
11:15:00 AM		146	4	0	3		3	0	1	140		0				1
11:30:00 AM		178		0	3		2	0	2	152		0				0
11:45:00 AM		192	4	2	1		1	4	5	148		2				2
12:00:00 PM		193	3	0	4		5	3	2	160		0				1
12:15:00 PM		184		1	3		5	1	5	154		0				0
12:30:00 PM		239	2	0	1		3	2	6	143		0				1
12:45:00 PM		164	4	0	1		4	2	2	158		0				1
1:00:00 PM		161	5	1	2		3	5	1	179		0				0
1:15:00 PM		134		0	1		1	1	1	173		0				2
1:30:00 PM		203	7	1	2		1	2	1	172		0				0
1:45:00 PM		202	6	0	2		1	0	1	149		0				2

Turning Movement Count
Import Type: TRUCK
BASIC
Collected By: Wells + Associates
Date: 2/23/19
IntID: 5
Time Interval: 15 Minutes
Last Row With Data: 27
Road Name #1 South Dakota Avenue NE
Road Name #2 Jefferson Street NE

TIME	SBR	SBT	SBL	SBPD	WBR	WBT	WBL	WBPD	NBR	NBT	NBL	NBPD	EBR	EBT	EBL	EBPD
10:00:00 AM		3	0	2	0		0	0	0	3		0				0
10:15:00 AM		3	0	0	0		0	0	0	3		0				0
10:30:00 AM		4	0	0	0		0	0	0	4		0				0
10:45:00 AM		2	0	3	0		0	0	0	3		0				0
11:00:00 AM		2	0	0	0		0	0	0	1		0				1
11:15:00 AM		3	0	0	0		0	0	0	5		0				1
11:30:00 AM		1	0	0	0		0	0	0	3		0				0
11:45:00 AM		4	0	2	0		0	4	1	4		2				2
12:00:00 PM		3	0	0	1		0	3	0	3		0				1
12:15:00 PM		2	0	1	0		0	1	0	2		0				0
12:30:00 PM		4	0	0	0		0	2	0	1		0				1
12:45:00 PM		4	0	0	0		0	2	0	5		0				1
1:00:00 PM		5	0	1	0		0	5	0	2		0				0
1:15:00 PM		1	0	0	0		0	1	0	1		0				2
1:30:00 PM		0	0	1	0		0	2	0	2		0				0
1:45:00 PM		1	1	0	0		0	0	0	2		0				2
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0

Turning Movement Count		
Import Type: CAR		
BASIC	*	
Collected By:	Wells + Associates	<< Collected By: [NAME]
Date:	2/23/19	<< Date: [mm/dd/yyyy]
IntID:	6	<< IntID: [Integer ID of Intersection]
Time Interval:	15 Minutes	<< Time Interval: [Interval Length In Minutes]
Last Row With Data:	27	<< Last Row With Data: [Row Number]
Road Name #1	South Dakota Avenue NE	<< Road Name #1: [Road 1 Name]
Road Name #2	Ingraham Street NE	<< Road Name #2: [Road 2 Name]

Do Not Edit Gray Cells
Enter Information In Yellow Cells
Red Cells Contain Helpful Information

Time Format: [h:mm AM/PM]
Examples: 1:30 AM, 4:15 PM, 9:30 AM

TIME	SBR	SBT	SBL	SBPD	WBR	WBT	WBL	WBPD	NBR	NBT	NBL	NBPD	EBR	EBT	EBL	EBPD
10:00:00 AM	11	127	2	2	1	1		2	1	145	4	0	5		2	5
10:15:00 AM	7	139	1	3	1			1		152		1	5		10	2
10:30:00 AM	6	123		2	2		1	0	1	159	3	1	6	1	7	1
10:45:00 AM	2	116		0	2			0		154	3	1	3			3
11:00:00 AM	6	150	1	0				2		114	5	0	8	1	7	3
11:15:00 AM	4	151		1	2		1	3	4	139	1	0	9	2	12	5
11:30:00 AM	8	142	1	1	1		1	0	1	143	1	0	4		3	6
11:45:00 AM	4	149	2	2	2	1	1	1	13	139	3	0			6	3
12:00:00 PM	6	159		0	1	1		2	1	147		0	11		4	1
12:15:00 PM	4	167	1	2	1	1		1	11	132	4	1	2	1	8	0
12:30:00 PM	6	216	1	0	1			2	1	140	4	0	2		2	5
12:45:00 PM	4	153	2	0	1			0	2	156	3	1	5		8	4
1:00:00 PM	7	165	2	4	2			1		174	4	1	5		11	2
1:15:00 PM	4	128	4	1	1		1	2		149	2	0	5		10	1
1:30:00 PM	5	160		2	4		1	0		153	1	0	2		8	2
1:45:00 PM	7	168	1	1	2		1	0		148	2	0	6		3	4

Turning Movement Count
Import Type: TRUCK
BASIC
Collected By: Wells + Associates
Date: 2/23/19
IntID: 6
Time Interval: 15 Minutes
Last Row With Data: 27
Road Name #1 South Dakota Avenue NE
Road Name #2 Ingraham Street NE

TIME	SBR	SBT	SBL	SBPD	WBR	WBT	WBL	WBPD	NBR	NBT	NBL	NBPD	EBR	EBT	EBL	EBPD
10:00:00 AM	1	1	0	2	0	0	0	2	0	4	0	0	0	0	0	5
10:15:00 AM	0	0	0	3	0	0	0	1	0	0	0	1	0	0	1	2
10:30:00 AM	1	0	0	2	0	0	0	0	0	3	0	1	0	0	0	1
10:45:00 AM	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	3
11:00:00 AM	0	3	0	0	0	0	0	2	0	0	0	0	0	0	1	3
11:15:00 AM	0	1	0	1	0	0	0	3	0	3	0	0	0	0	0	5
11:30:00 AM	0	0	0	1	0	0	0	0	0	3	0	0	0	0	0	6
11:45:00 AM	0	2	0	2	0	0	0	1	0	1	1	0	0	0	0	3
12:00:00 PM	0	1	0	0	0	0	0	2	0	2	0	0	0	0	0	1
12:15:00 PM	0	0	0	2	0	0	0	1	0	2	0	1	0	0	0	0
12:30:00 PM	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	5
12:45:00 PM	0	3	0	0	0	0	0	0	0	4	0	1	0	0	0	4
1:00:00 PM	0	1	0	4	0	0	0	1	0	1	0	1	0	0	0	2
1:15:00 PM	0	1	0	1	0	0	0	2	0	0	0	0	0	0	0	1
1:30:00 PM	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
1:45:00 PM	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	4
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0

Turning Movement Count		
Import Type: CAR		
BASIC	*	
Collected By:	Wells + Associates	<< Collected By: [NAME]
Date:	2/23/19	<< Date: [mm/dd/yyyy]
IntID:	7	<< IntID: [Integer ID of Intersection]
Time Interval:	15 Minutes	<< Time Interval: [Interval Length In Minutes]
Last Row With Data:	27	<< Last Row With Data: [Row Number]
Road Name #1	South Dakota Avenue NE	<< Road Name #1: [Road 1 Name]
Road Name #2	Hamilton Street NE	<< Road Name #2: [Road 2 Name]

Do Not Edit Gray Cells
Enter Information In Yellow Cells
Red Cells Contain Helpful Information

Time Format: [h:mm AM/PM]
Examples: 1:30 AM, 4:15 PM, 9:30 AM

TIME	SBR	SBT	SBL	SBPD	WBR	WBT	WBL	WBPD	NBR	NBT	NBL	NBPD	EBR	EBT	EBL	EBPD
10:00:00 AM		145	1	0	5		2	3	4	144		0				3
10:15:00 AM		142		0				1		147		1				4
10:30:00 AM		126	4	0	2		1	0	1	164		0				3
10:45:00 AM		133		0	2			0		166		0				2
11:00:00 AM		157	2	0	2		1	3		125		0				2
11:15:00 AM		164	2	0	3		2	1	1	155		3				6
11:30:00 AM		152		2	1		3	2	1	147		1				4
11:45:00 AM		160	1	0			1	1	3	150	1	1				3
12:00:00 PM		170	1	1	3		1	5	1	146		1				4
12:15:00 PM		166	3	0	5			0	1	139		0				2
12:30:00 PM		225	1	0	2		2	5	1	149		0				8
12:45:00 PM		171	4	0	2			2		172		0				6
1:00:00 PM		165	2	1	2		1	2	1	178		1				1
1:15:00 PM		131	5	1	1		1	2		162		0				0
1:30:00 PM		163	1	0	1			0	2	162	1	0			1	0
1:45:00 PM		167	3	2	4		1	0	2	148	1	1	2			4

Turning Movement Count
Import Type: TRUCK
BASIC
Collected By: Wells + Associates
Date: 2/23/19
IntID: 7
Time Interval: 15 Minutes
Last Row With Data: 27
Road Name #1 South Dakota Avenue NE
Road Name #2 Hamilton Street NE

TIME	SBR	SBT	SBL	SBPD	WBR	WBT	WBL	WBPD	NBR	NBT	NBL	NBPD	EBR	EBT	EBL	EBPD
10:00:00 AM	0	4	0	0	0	0	0	3	0	4	0	0	0	0	0	3
10:15:00 AM	0	3	0	0	0	0	0	1	0	2	0	1	0	0	0	4
10:30:00 AM	0	4	0	0	0	0	0	0	0	2	0	0	0	0	0	3
10:45:00 AM	0	3	0	0	0	0	0	0	0	3	0	0	0	0	0	2
11:00:00 AM	0	5	0	0	0	0	0	3	0	0	0	0	0	0	0	2
11:15:00 AM	0	3	0	0	0	0	0	1	0	5	0	3	0	0	0	6
11:30:00 AM	0	2	0	2	0	0	0	2	0	3	0	1	0	0	0	4
11:45:00 AM	0	5	0	0	0	0	0	1	0	5	0	1	0	0	0	3
12:00:00 PM	0	2	0	1	0	0	0	5	0	5	0	1	0	0	0	4
12:15:00 PM	0	3	0	0	0	0	0	0	0	4	0	0	0	0	0	2
12:30:00 PM	0	4	0	0	0	0	0	5	0	1	0	0	0	0	0	8
12:45:00 PM	0	4	0	0	0	0	0	2	0	5	0	0	0	0	0	6
1:00:00 PM	0	5	0	1	0	0	0	2	0	2	0	1	0	0	0	1
1:15:00 PM	0	1	0	1	0	0	0	2	0	1	0	0	0	0	0	0
1:30:00 PM	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0
1:45:00 PM	0	2	1	2	0	0	0	0	0	2	0	1	0	0	0	4
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0

Turning Movement Count		
Import Type: CAR		
BASIC	*	
Collected By:	Wells + Associates	<< Collected By: [NAME]
Date:	2/23/19	<< Date: [mm/dd/yyyy]
IntID:	8	<< IntID: [Integer ID of Intersection]
Time Interval:	15 Minutes	<< Time Interval: [Interval Length In Minutes]
Last Row With Data:	27	<< Last Row With Data: [Row Number]
Road Name #1	South Dakota Avenue NE	<< Road Name #1: [Road 1 Name]
Road Name #2	Galloway Street NE	<< Road Name #2: [Road 2 Name]

Do Not Edit Gray Cells
Enter Information In Yellow Cells
Red Cells Contain Helpful Information

Time Format: [h:mm AM/PM]
Examples: 1:30 AM, 4:15 PM, 9:30 AM

TIME	SBR	SBT	SBL	SBPD	WBR	WBT	WBL	WBPD	NBR	NBT	NBL	NBPD	EBR	EBT	EBL	EBPD
10:00:00 AM		138	1	0	3	5	5	3		142	11	3	10	1	3	3
10:15:00 AM		149		3		2	2	1	1	145	19	0	15	3	2	4
10:30:00 AM	3	119	2	4	1	4	2	0		168	15	2	5		5	5
10:45:00 AM	4	125		1		4	1	0	1	156	26	0	12	6	2	3
11:00:00 AM	6	149	2	2		1	2	1	1	119	19	0	15		2	4
11:15:00 AM	7	159		2	2	3	1	0	2	139	8	0	15	2	7	3
11:30:00 AM	2	148	2	4	1	2	2	3	2	141	14	0	21	4	7	13
11:45:00 AM	1	153		3	1	1	1	3	1	158	16	3	20	1	4	3
12:00:00 PM	2	143		1	1	3		1		137	22	0	14	2	4	3
12:15:00 PM	4	172	1	2	3	6		1	1	139	18	0	12	1	3	2
12:30:00 PM		230	3	0	4	3	1	2	1	146	12	0	14	4	3	7
12:45:00 PM	1	176	4	0	1	4	2	1		154	16	0	20	1	6	7
1:00:00 PM	1	147	1	7		3		6	1	171	19	1	19	10	5	3
1:15:00 PM	1	129	2	2		6	1	2	1	162	16	0	11	4	4	0
1:30:00 PM	2	155	3	1	3	4	3	2	5	160	8	0	16	2	2	1
1:45:00 PM	2	167	1	1	1	2	3	0	2	146	16	0	20	2	6	4

Turning Movement Count
Import Type: TRUCK
BASIC
Collected By: Wells + Associates
Date: 2/23/19
IntID: 8
Time Interval: 15 Minutes
Last Row With Data: 27
Road Name #1 South Dakota Avenue NE
Road Name #2 Galloway Street NE

TIME	SBR	SBT	SBL	SBPD	WBR	WBT	WBL	WBPD	NBR	NBT	NBL	NBPD	EBR	EBT	EBL	EBPD
10:00:00 AM	0	3	0	0	0	0	0	3	0	6	1	3	0	0	0	3
10:15:00 AM	0	1	0	3	0	1	0	1	0	3	2	0	2	0	0	4
10:30:00 AM	0	3	0	4	0	0	0	0	0	2	2	2	0	0	0	5
10:45:00 AM	0	2	0	1	0	0	0	0	0	1	1	0	0	0	0	3
11:00:00 AM	1	2	0	2	0	0	0	1	0	1	2	0	4	0	0	4
11:15:00 AM	0	1	0	2	0	0	0	0	0	0	0	0	0	0	2	3
11:30:00 AM	0	1	0	4	1	0	0	3	0	2	0	0	0	0	0	13
11:45:00 AM	0	3	0	3	0	0	0	3	0	4	3	3	3	0	1	3
12:00:00 PM	1	1	0	1	0	0	0	1	0	3	1	0	1	0	1	3
12:15:00 PM	0	3	0	2	0	0	0	1	0	2	0	0	1	0	0	2
12:30:00 PM	0	2	0	0	0	0	0	2	0	0	2	0	0	0	0	7
12:45:00 PM	0	5	0	0	0	0	0	1	0	4	1	0	2	0	1	7
1:00:00 PM	1	5	0	7	0	0	0	6	0	1	1	1	1	0	1	3
1:15:00 PM	0	0	0	2	0	0	0	2	0	1	0	0	2	0	0	0
1:30:00 PM	0	0	0	1	0	0	0	2	0	3	0	0	1	0	0	1
1:45:00 PM	0	1	0	1	0	1	0	0	0	0	1	0	3	0	1	4
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0
0				0				0				0				0

ATTACHMENT 3
EXISTING LEVEL OF SERVICE AND QUEUE REPORTS

HCM Signalized Intersection Capacity Analysis
1: South Dakota Avenue & Riggs Road

Existing SAT

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	643	566	64	435	50	503	207	134	85	140	79
Future Volume (vph)	118	643	566	64	435	50	503	207	134	85	140	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	11	12	12	11	11	10	12	12
Grade (%)		-5%			1%			4%			-5%	
Total Lost time (s)	5.0	5.0	3.0	5.0	5.0		3.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.94		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1621	3106	1367	1616	3006		2970	2762		1518	3117	
Flt Permitted	0.36	1.00	1.00	0.22	1.00		0.95	1.00		0.53	1.00	
Satd. Flow (perm)	606	3106	1367	376	3006		2970	2762		842	3117	
Peak-hour factor, PHF	0.88	0.88	0.88	0.93	0.93	0.93	0.90	0.90	0.90	0.93	0.93	0.93
Adj. Flow (vph)	134	731	643	69	468	54	559	230	149	91	151	85
RTOR Reduction (vph)	0	0	239	0	7	0	0	82	0	0	64	0
Lane Group Flow (vph)	134	731	404	69	515	0	559	297	0	91	172	0
Confl. Peds. (#/hr)	32		6	6		32	6		25	25		6
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	2%	2%	4%	0%	0%	0%	4%	2%	4%	0%	0%	1%
Bus Blockages (#/hr)	0	8	0	0	8	8	0	0	0	0	0	0
Parking (#/hr)						6						
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		Prot	NA		Perm	NA	
Protected Phases	1	6	7	5	2		7	4			8	
Permitted Phases	6		6	2						8		
Actuated Green, G (s)	46.4	40.0	59.0	41.6	37.6		19.0	52.0		28.0	28.0	
Effective Green, g (s)	50.4	42.0	63.0	45.6	39.6		21.0	54.0		30.0	30.0	
Actuated g/C Ratio	0.42	0.35	0.52	0.38	0.33		0.18	0.45		0.25	0.25	
Clearance Time (s)	7.0	7.0	5.0	7.0	7.0		5.0	7.0		7.0	7.0	
Vehicle Extension (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	325	1087	717	204	991		519	1242		210	779	
v/s Ratio Prot	c0.03	c0.24	0.10	0.02	0.17		c0.19	0.11			0.06	
v/s Ratio Perm	0.14		0.20	0.11						c0.11		
v/c Ratio	0.41	0.67	0.56	0.34	0.52		1.08	0.24		0.43	0.22	
Uniform Delay, d1	31.4	33.2	19.2	38.4	32.5		49.5	20.3		37.9	35.7	
Progression Factor	0.52	0.79	1.23	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	1.5	1.4	0.4	1.9		61.9	0.5		6.4	0.7	
Delay (s)	16.4	27.6	25.1	38.7	34.4		111.4	20.8		44.2	36.4	
Level of Service	B	C	C	D	C		F	C		D	D	
Approach Delay (s)		25.5			34.9			74.8			38.6	
Approach LOS		C			C			E			D	

Intersection Summary				
HCM 2000 Control Delay	42.2	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.67			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	83.4%	ICU Level of Service	E	

HCM Signalized Intersection Capacity Analysis
1: South Dakota Avenue & Riggs Road

Existing SAT

Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
2: First Place & Riggs Road

Existing SAT

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1401	94	35	996	108	24
Future Volume (vph)	1401	94	35	996	108	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	11	10	10
Grade (%)	-7%			1%	-1%	
Total Lost time (s)	4.0	4.0	3.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00	0.93	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3077	1138	1408	3064	1348	1120
Flt Permitted	1.00	1.00	0.07	1.00	0.95	1.00
Satd. Flow (perm)	3077	1138	101	3064	1348	1120
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.92	0.92
Adj. Flow (vph)	1490	100	37	1060	117	26
RTOR Reduction (vph)	0	27	0	0	0	0
Lane Group Flow (vph)	1490	73	37	1060	117	26
Confl. Peds. (#/hr)		13	13		9	17
Heavy Vehicles (%)	2%	15%	11%	2%	13%	13%
Bus Blockages (#/hr)	0	0	0	0	0	18
Turn Type	NA	Perm	pm+pt	NA	Prot	pt+ov
Protected Phases	6		5	2	4	4 5
Permitted Phases		6	2			
Actuated Green, G (s)	63.0	63.0	81.0	81.0	27.0	46.0
Effective Green, g (s)	65.0	65.0	83.0	83.0	29.0	48.0
Actuated g/C Ratio	0.54	0.54	0.69	0.69	0.24	0.40
Clearance Time (s)	6.0	6.0	5.0	6.0	6.0	
Lane Grp Cap (vph)	1666	616	233	2119	325	448
v/s Ratio Prot	c0.48		0.02	c0.35	c0.09	0.02
v/s Ratio Perm		0.06	0.09			
v/c Ratio	0.89	0.12	0.16	0.50	0.36	0.06
Uniform Delay, d1	24.4	13.5	14.2	8.7	37.8	22.1
Progression Factor	1.00	1.00	0.78	0.67	1.00	1.00
Incremental Delay, d2	7.9	0.4	0.9	0.5	3.1	0.2
Delay (s)	32.3	13.9	12.0	6.4	40.9	22.4
Level of Service	C	B	B	A	D	C
Approach Delay (s)	31.1			6.6	37.5	
Approach LOS	C			A	D	

Intersection Summary				
HCM 2000 Control Delay	21.9	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	68.9%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Chillum Place & Riggs Road

Existing SAT

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	925	17	25	496	14	23	15	24	44	21	29
Future Volume (vph)	17	925	17	25	496	14	23	15	24	44	21	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	14	14	14	10	10	10
Grade (%)		2%			-2%			-4%			-4%	
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		1.00			1.00			0.95			0.96	
Flt Protected		1.00			1.00			0.98			0.98	
Satd. Flow (prot)		3134			3080			1490			1310	
Flt Permitted		0.94			0.88			0.87			0.84	
Satd. Flow (perm)		2954			2720			1323			1130	
Peak-hour factor, PHF	0.88	0.88	0.88	0.96	0.96	0.96	0.82	0.82	0.82	0.94	0.94	0.94
Adj. Flow (vph)	19	1051	19	26	517	15	28	18	29	47	22	31
RTOR Reduction (vph)	0	1	0	0	1	0	0	25	0	0	26	0
Lane Group Flow (vph)	0	1088	0	0	557	0	0	50	0	0	74	0
Confl. Peds. (#/hr)	25		7	7		25	9		4	4		9
Confl. Bikes (#/hr)			1			2						
Heavy Vehicles (%)	0%	0%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	10	10	0	10	10	0	0	0	0	0	0
Parking (#/hr)							6	6	6	6	6	6
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		58.4			58.4			9.6			9.6	
Effective Green, g (s)		60.4			60.4			11.6			11.6	
Actuated g/C Ratio		0.75			0.75			0.14			0.14	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		1.0			1.0			3.0			3.0	
Lane Grp Cap (vph)		2230			2053			191			163	
v/s Ratio Prot												
v/s Ratio Perm		c0.37			0.20			0.04			c0.07	
v/c Ratio		0.49			0.27			0.26			0.46	
Uniform Delay, d1		3.8			3.0			30.4			31.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.8			0.3			0.7			2.0	
Delay (s)		4.6			3.3			31.1			33.3	
Level of Service		A			A			C			C	
Approach Delay (s)		4.6			3.3			31.1			33.3	
Approach LOS		A			A			C			C	

Intersection Summary				
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.48			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	57.9%	ICU Level of Service	B	

Analysis Period (min)	15
c Critical Lane Group	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	5	2	41	5	22	3	645	34	36	684	5
Future Volume (vph)	7	5	2	41	5	22	3	645	34	36	684	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	15	15	15	10	11	11	11	11	11
Grade (%)		-7%			-2%			2%			-2%	
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.98			0.96			0.99			1.00	
Flt Protected		0.98			0.97			1.00			1.00	
Satd. Flow (prot)		1463			1742			3042			3158	
Flt Permitted		0.88			0.81			0.95			0.89	
Satd. Flow (perm)		1315			1445			2900			2802	
Peak-hour factor, PHF	0.75	0.75	0.75	0.85	0.85	0.85	0.88	0.88	0.88	0.83	0.83	0.83
Adj. Flow (vph)	9	7	3	48	6	26	3	733	39	43	824	6
RTOR Reduction (vph)	0	3	0	0	23	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	16	0	0	57	0	0	772	0	0	873	0
Confl. Peds. (#/hr)	2		9	9		2	10		16	16		10
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	3%	0%	0%	0%
Parking (#/hr)	6	6	6									
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6			2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)		8.4			8.4			59.6			59.6	
Effective Green, g (s)		10.4			10.4			61.6			61.6	
Actuated g/C Ratio		0.13			0.13			0.77			0.77	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			1.0			1.0	
Lane Grp Cap (vph)		170			187			2233			2157	
v/s Ratio Prot												
v/s Ratio Perm		0.01			c0.04			0.27			c0.31	
v/c Ratio		0.10			0.31			0.35			0.40	
Uniform Delay, d1		30.7			31.5			2.9			3.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.2			0.9			0.4			0.6	
Delay (s)		30.9			32.5			3.3			3.6	
Level of Service		C			C			A			A	
Approach Delay (s)		30.9			32.5			3.3			3.6	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
5: South Dakota Avenue & Jefferson Street

Existing SAT

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	14	9	605	18	9	808
Future Volume (Veh/h)	14	9	605	18	9	808
Sign Control	Stop		Free			Free
Grade	-7%		2%			-2%
Peak Hour Factor	0.75	0.75	0.96	0.96	0.85	0.85
Hourly flow rate (vph)	19	12	630	19	11	951
Pedestrians	10		2			3
Lane Width (ft)	12.0		10.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			537			306
pX, platoon unblocked	0.94	0.99			0.99	
vC, conflicting volume	1149	338			659	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	958	297			624	
tC, single (s)	6.8	7.1			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.2	
p0 queue free %	92	98			99	
cM capacity (veh/h)	239	656			945	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	31	420	229	328	634
Volume Left	19	0	0	11	0
Volume Right	12	0	19	0	0
cSH	317	1700	1700	945	1700
Volume to Capacity	0.10	0.25	0.13	0.01	0.37
Queue Length 95th (ft)	8	0	0	1	0
Control Delay (s)	17.6	0.0	0.0	0.4	0.0
Lane LOS	C			A	
Approach Delay (s)	17.6	0.0		0.1	
Approach LOS	C				

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	42.8%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
6: South Dakota Avenue & Ingraham Street

Existing SAT

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	1	14	0	1	5	15	602	14	6	701	21
Future Volume (Veh/h)	29	1	14	0	1	5	15	602	14	6	701	21
Sign Control		Stop			Stop			Free			Free	
Grade		-4%			-6%			2%			-2%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.89	0.89	0.89	0.82	0.82	0.82
Hourly flow rate (vph)	39	1	19	0	1	7	17	676	16	7	855	26
Pedestrians		11			4			3			6	
Lane Width (ft)		11.0			10.0			11.0			11.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		1			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								267			576	
pX, platoon unblocked	0.93	0.93	0.98	0.93	0.93	0.92	0.98			0.92		
vC, conflicting volume	1278	1623	454	1186	1628	356	892			696		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1067	1438	412	967	1443	127	857			496		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	75	99	97	100	99	99	98			99		
cM capacity (veh/h)	157	120	579	183	119	828	773			989		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	59	8	355	354	434	454
Volume Left	39	0	17	0	7	0
Volume Right	19	7	0	16	0	26
cSH	204	475	773	1700	989	1700
Volume to Capacity	0.29	0.02	0.02	0.21	0.01	0.27
Queue Length 95th (ft)	29	1	2	0	1	0
Control Delay (s)	29.7	12.7	0.7	0.0	0.2	0.0
Lane LOS	D	B	A		A	
Approach Delay (s)	29.7	12.7	0.4		0.1	
Approach LOS	D	B				

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	47.6%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
7: South Dakota Avenue & Garage Entrance/Hamilton Street

Existing SAT

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	3	0	11	0	638	3	10	727	0
Future Volume (vph)	0	0	0	3	0	11	0	638	3	10	727	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	10	12	12	11	11	11
Grade (%)		0%			-5%			1%			-2%	
Total Lost time (s)					4.0			3.0			3.0	
Lane Util. Factor					1.00			0.95			0.95	
Frpb, ped/bikes					0.99			1.00			1.00	
Flpb, ped/bikes					1.00			1.00			1.00	
Frt					0.89			1.00			1.00	
Flt Protected					0.99			1.00			1.00	
Satd. Flow (prot)					1290			3167			2906	
Flt Permitted					0.99			1.00			0.95	
Satd. Flow (perm)					1290			3167			2749	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.90	0.90	0.90	0.82	0.82	0.82
Adj. Flow (vph)	0	0	0	4	0	15	0	709	3	12	887	0
RTOR Reduction (vph)	0	0	0	0	17	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	2	0	0	712	0	0	899	0
Confl. Peds. (#/hr)	1		1	1		1	17		9	9		17
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Parking (#/hr)				6	6	6					6	6
Turn Type				Split	NA			NA		Perm	NA	
Protected Phases	3	3		4	4			6			2	
Permitted Phases							6			2		
Actuated Green, G (s)					5.0			44.6			44.6	
Effective Green, g (s)					7.0			46.6			46.6	
Actuated g/C Ratio					0.10			0.67			0.67	
Clearance Time (s)					6.0			5.0			5.0	
Vehicle Extension (s)					3.0			1.0			1.0	
Lane Grp Cap (vph)					129			2108			1830	
v/s Ratio Prot					c0.00			0.22				
v/s Ratio Perm											c0.33	
v/c Ratio					0.01			0.34			0.49	
Uniform Delay, d1					28.4			5.0			5.8	
Progression Factor					1.00			1.00			1.00	
Incremental Delay, d2					0.0			0.4			0.9	
Delay (s)					28.4			5.5			6.8	
Level of Service					C			A			A	
Approach Delay (s)		0.0			28.4			5.5			6.8	
Approach LOS		A			C			A			A	

Intersection Summary				
HCM 2000 Control Delay	6.5	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.39			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	43.0%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
8: South Dakota Avenue & Galloway Street

Existing SAT

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	16	65	3	16	8	65	610	3	9	725	6
Future Volume (vph)	17	16	65	3	16	8	65	610	3	9	725	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	14	14	11	11	11	11	12	12	11	12	12
Grade (%)		-4%			-1%			2%			-1%	
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.91			0.96			1.00			1.00	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		1528			1335			3151			3190	
Flt Permitted		0.95			0.97			0.75			0.94	
Satd. Flow (perm)		1467			1306			2379			3014	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.89	0.89	0.89	0.79	0.79	0.79
Adj. Flow (vph)	23	21	87	4	21	11	73	685	3	11	918	8
RTOR Reduction (vph)	0	65	0	0	8	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	66	0	0	28	0	0	761	0	0	936	0
Confl. Peds. (#/hr)	9		1	1		9	19		10	10		19
Heavy Vehicles (%)	12%	0%	6%	0%	0%	0%	6%	1%	0%	0%	2%	17%
Bus Blockages (#/hr)	6	6	6	6	6	6	0	0	0	0	0	0
Parking (#/hr)				6	6	6						6
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		8			4		5	2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)		18.0			18.0			47.0			36.0	
Effective Green, g (s)		20.0			20.0			49.0			38.0	
Actuated g/C Ratio		0.25			0.25			0.61			0.48	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		366			326			1534			1431	
v/s Ratio Prot								c0.05				
v/s Ratio Perm		c0.04			0.02			0.25			c0.31	
v/c Ratio		0.18			0.09			0.50			0.65	
Uniform Delay, d1		23.6			23.0			8.6			16.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.1			0.5			1.1			2.3	
Delay (s)		24.6			23.5			9.8			18.3	
Level of Service		C			C			A			B	
Approach Delay (s)		24.6			23.5			9.8			18.3	
Approach LOS		C			C			A			B	

Intersection Summary				
HCM 2000 Control Delay	15.4	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.49			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	68.7%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

Intersection: 1: South Dakota Avenue & Riggs Road

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB
Directions Served	L	T	T	R	L	T	TR	L	L	T	TR	L
Maximum Queue (ft)	132	180	174	251	120	225	220	383	396	401	196	93
Average Queue (ft)	48	86	85	114	41	122	121	244	243	78	62	41
95th Queue (ft)	110	151	150	212	90	195	194	399	407	328	151	86
Link Distance (ft)		689	689	689		654	654			664	664	
Upstream Blk Time (%)										0		
Queuing Penalty (veh)										0		
Storage Bay Dist (ft)	120				230			400	400			70
Storage Blk Time (%)	1	9				0		1	4			4
Queuing Penalty (veh)	2	10				0		1	5			3

Intersection: 1: South Dakota Avenue & Riggs Road

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	138	99
Average Queue (ft)	52	24
95th Queue (ft)	107	67
Link Distance (ft)	487	487
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)	6	
Queuing Penalty (veh)	6	

Intersection: 2: First Place & Riggs Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	T	R	L	T	T	L	R
Maximum Queue (ft)	388	416	175	74	237	267	122	182
Average Queue (ft)	342	368	74	24	83	94	80	30
95th Queue (ft)	432	437	197	59	178	198	127	114
Link Distance (ft)	360	360			689	689		295
Upstream Blk Time (%)	13	36						
Queuing Penalty (veh)	0	0						
Storage Bay Dist (ft)			150	375			100	
Storage Blk Time (%)		40	0				5	0
Queuing Penalty (veh)		38	1				1	0

Intersection: 3: Chillum Place & Riggs Road

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	TR	LT	TR	LTR	LTR
Maximum Queue (ft)	286	307	188	144	86	131
Average Queue (ft)	130	147	76	30	38	56
95th Queue (ft)	240	259	147	91	74	106
Link Distance (ft)	654	654	352	352	724	355
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 4: South Dakota Avenue & Kennedy Street

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	38	101	219	142	123	118
Average Queue (ft)	9	42	93	56	52	60
95th Queue (ft)	30	84	183	121	104	114
Link Distance (ft)		240	248	248	664	664
Upstream Blk Time (%)			0			
Queuing Penalty (veh)			0			
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 5: South Dakota Avenue & Jefferson Street

Movement	WB	NB	NB	SB	SB
Directions Served	LR	T	TR	LT	T
Maximum Queue (ft)	57	33	20	64	47
Average Queue (ft)	18	1	1	6	3
95th Queue (ft)	47	16	10	33	26
Link Distance (ft)	235	209	209	248	248
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: South Dakota Avenue & Ingraham Street

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	54	30	106	54	38	48
Average Queue (ft)	24	5	14	2	4	3
95th Queue (ft)	53	24	60	25	22	22
Link Distance (ft)	270	242	208	208	209	209
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 7: South Dakota Avenue & Garage Entrance/Hamilton Street

Movement	WB	NB	NB	SB	SB
Directions Served	LTR	LT	TR	LT	TR
Maximum Queue (ft)	28	126	99	102	109
Average Queue (ft)	8	13	8	13	10
95th Queue (ft)	25	70	50	58	55
Link Distance (ft)	303	406	406	208	208
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 8: South Dakota Avenue & Galloway Street

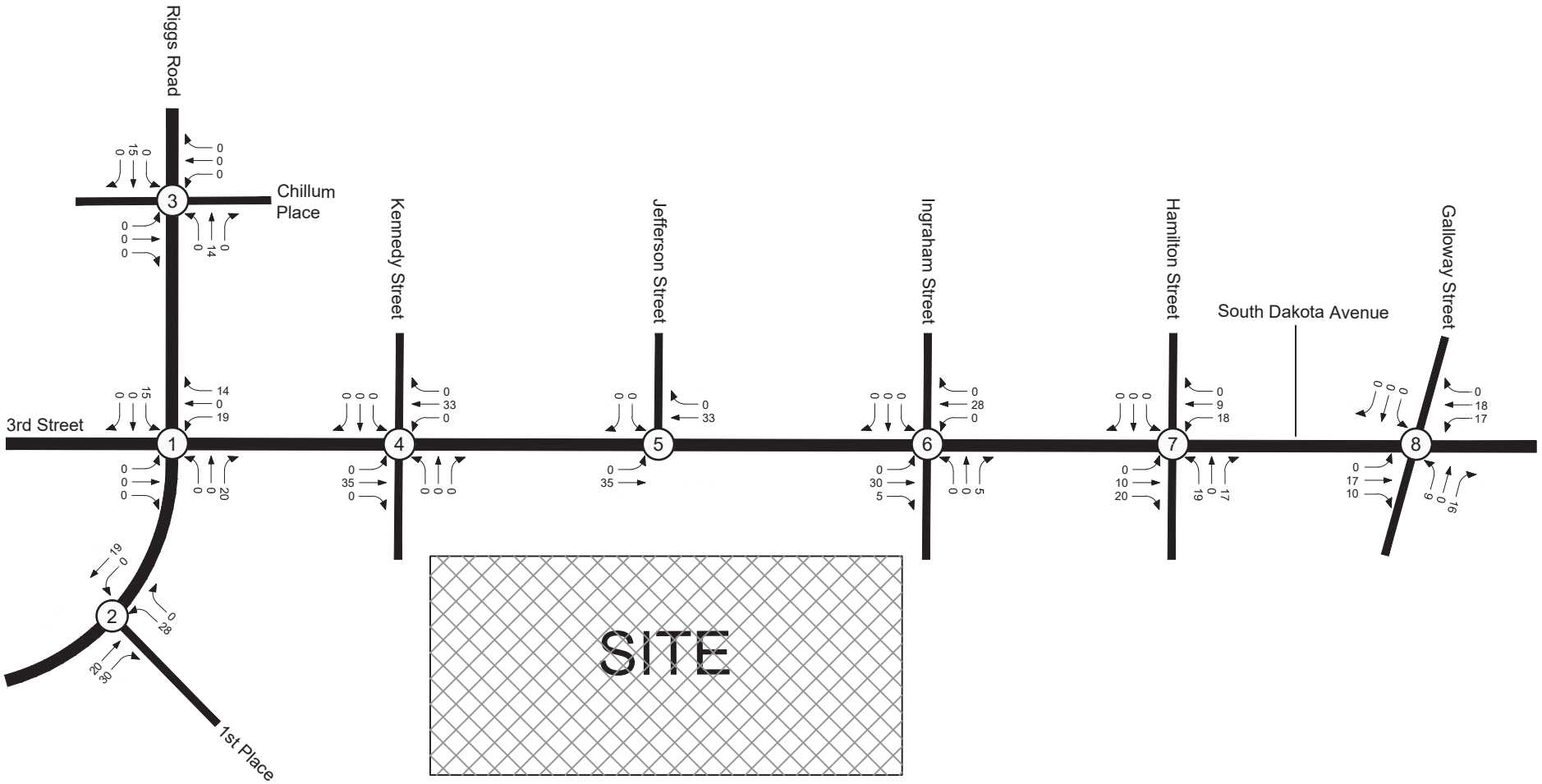
Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	89	39	283	217	195	204
Average Queue (ft)	26	8	141	79	112	122
95th Queue (ft)	65	27	247	185	180	186
Link Distance (ft)	286	369	350	350	406	406
Upstream Blk Time (%)			0			
Queuing Penalty (veh)			0			
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Zone Summary

Zone wide Queuing Penalty: 67

ATTACHMENT 4
INDIVIDUAL PIPELINE FORECASTS

O:\PROJECTS\7501 - 8000\7611 ART PLACE PHASE II\GRAPHICS\REPORT FIGURES\7611 VOLUMES.DWG

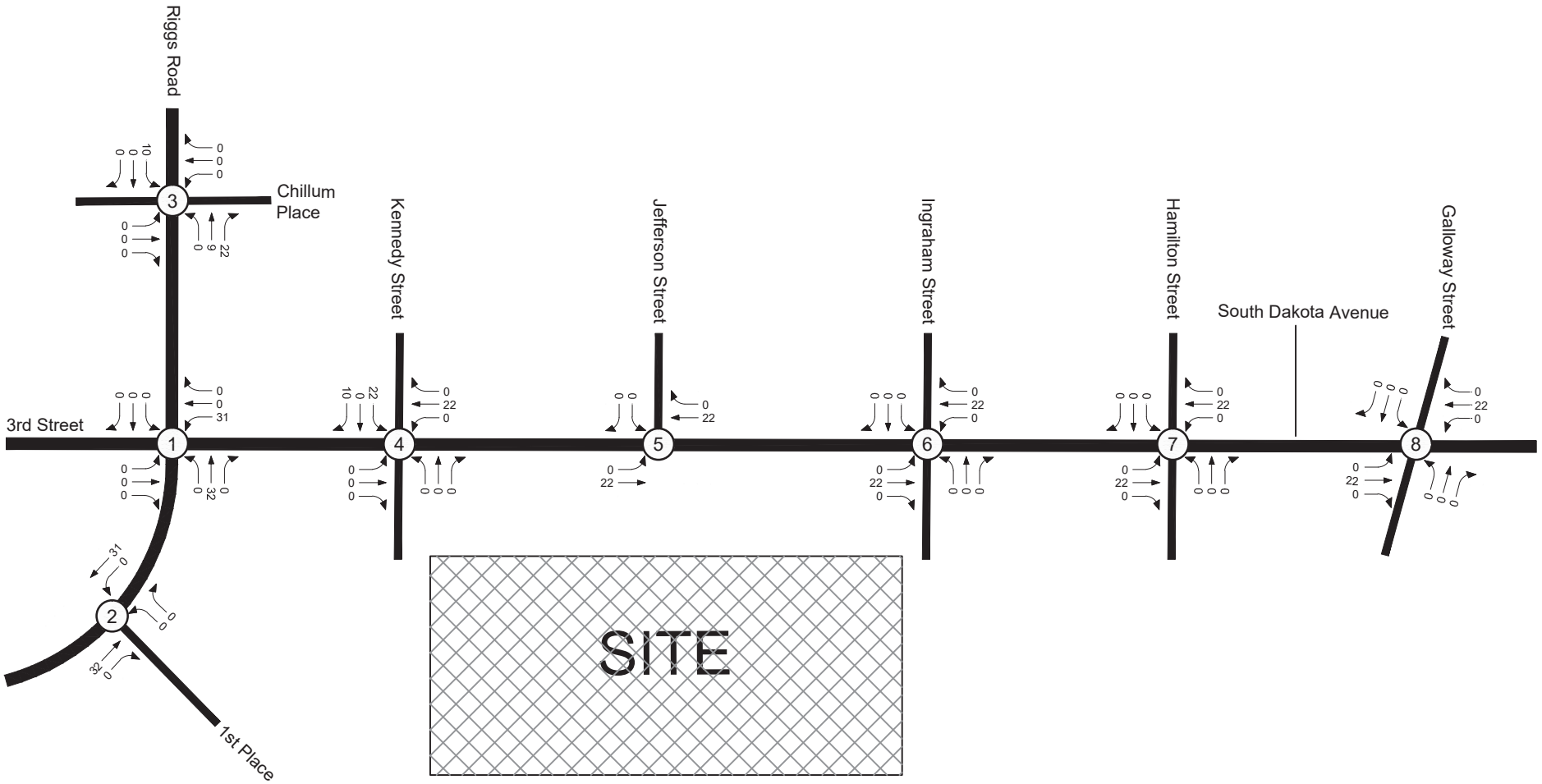


Attachment 4A
Pipeline Development 1: Art Place Phase A
Saturday Peak Hour Traffic Volumes

SAT PEAK HOUR
000

NORTH
Art Place Phase II
Washington, DC

O:\PROJECTS\7501 - 8000\7611 ART PLACE PHASE II\GRAPHICS\REPORT FIGURES\7611 VOLUMES.DWG

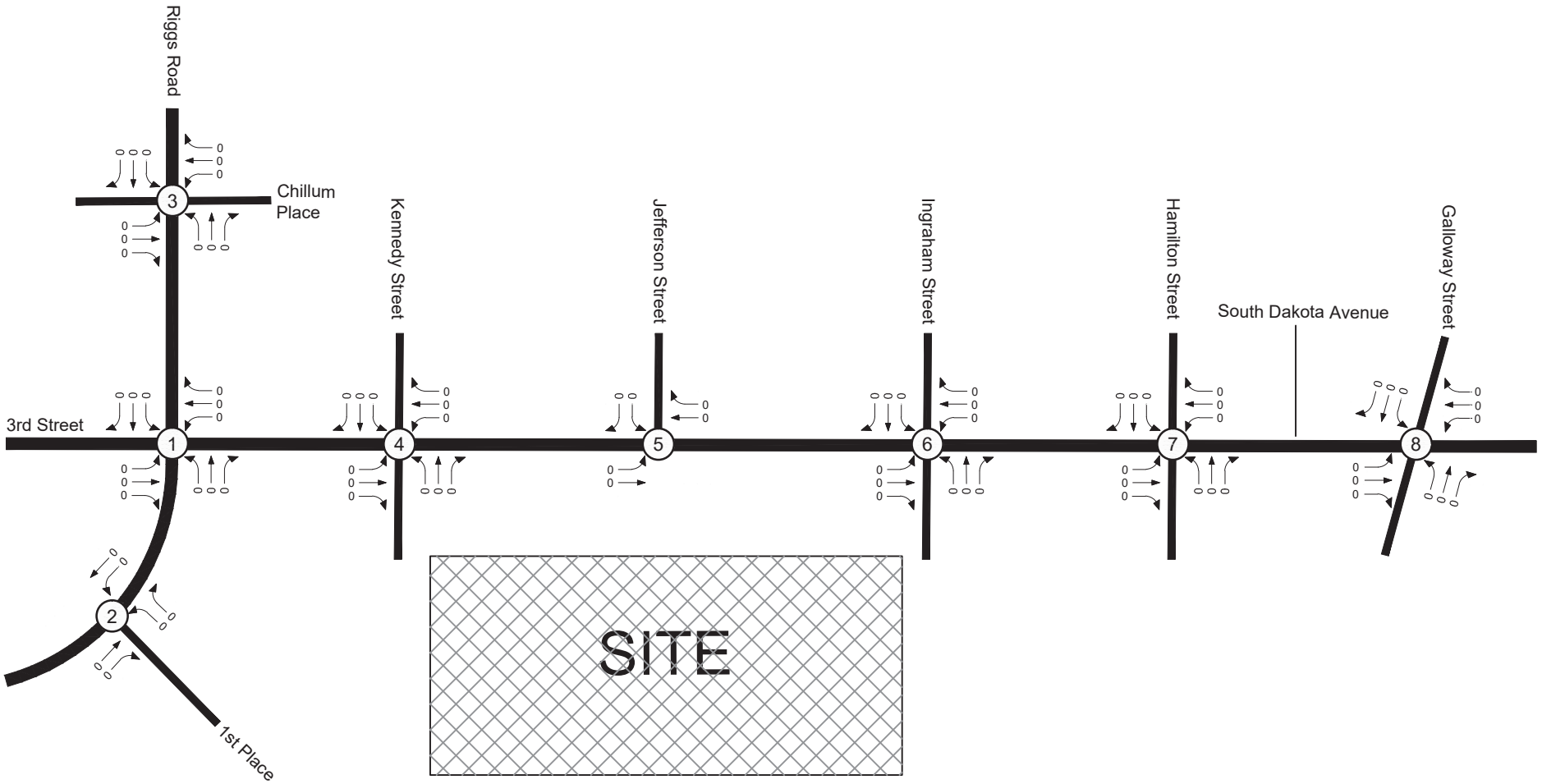


Attachment 4B
Pipeline Development 2: Fort Totten South
Saturday Peak Hour Traffic Volumes

SAT PEAK HOUR
000

NORTH
Art Place Phase II
Washington, DC

O:\PROJECTS\7501 - 8000\7611 ART PLACE PHASE II\GRAPHICS\REPORT FIGURES\7611 VOLUMES.DWG

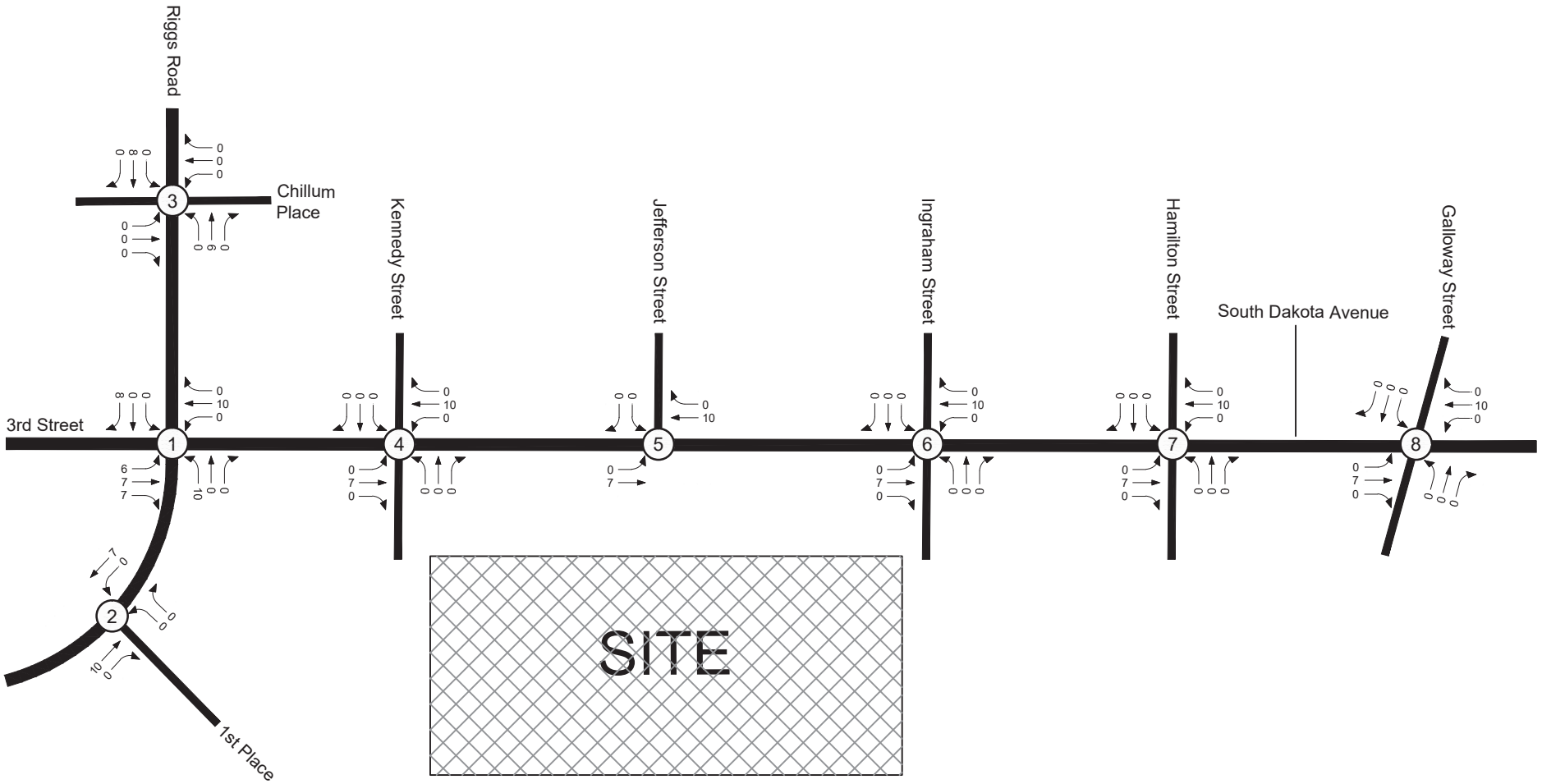


Attachment 4C
Pipeline Development 3: 6000 New Hampshire Avenue
Saturday Peak Hour Traffic Volumes

SAT PEAK HOUR
000

NORTH
Art Place Phase II
Washington, DC

O:\PROJECTS\7501 - 8000\7611 ART PLACE PHASE II\GRAPHICS\REPORT FIGURES\7611 VOLUMES.DWG

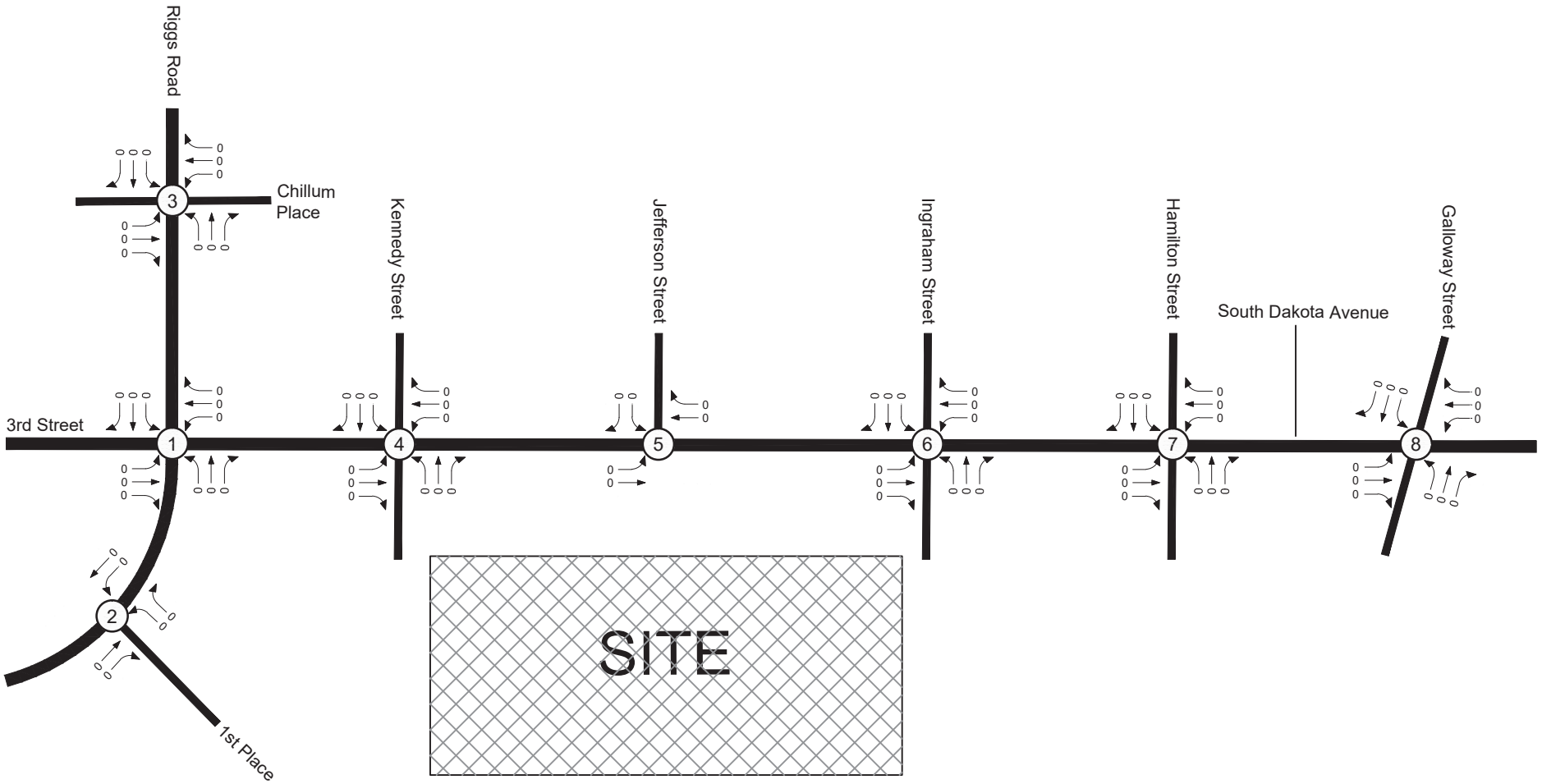


Attachment 4D
Pipeline Development 4: 5600 2nd Street NE
Saturday Peak Hour Traffic Volumes

SAT PEAK HOUR
000

NORTH
Art Place Phase II
Washington, DC

O:\PROJECTS\7501 - 8000\7611 ART PLACE PHASE II\GRAPHICS\REPORT FIGURES\7611 VOLUMES.DWG



Attachment 4E
Pipeline Development 5: School
Saturday Peak Hour Traffic Volumes

SAT PEAK HOUR
000

NORTH
Art Place Phase II
Washington, DC

ATTACHMENT 5
BACKGROUND LEVEL OF SERVICE AND QUEUE REPORTS

HCM Signalized Intersection Capacity Analysis
1: South Dakota Avenue & Riggs Road

Background SAT

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	691	600	81	446	59	566	222	151	93	151	88
Future Volume (vph)	131	691	600	81	446	59	566	222	151	93	151	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	11	12	12	11	11	10	12	12
Grade (%)		-5%			1%			4%			-5%	
Total Lost time (s)	5.0	5.0	3.0	5.0	5.0		3.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.94		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1622	3106	1367	1616	2997		2970	2755		1520	3111	
Flt Permitted	0.34	1.00	1.00	0.19	1.00		0.95	1.00		0.51	1.00	
Satd. Flow (perm)	582	3106	1367	330	2997		2970	2755		814	3111	
Peak-hour factor, PHF	0.88	0.88	0.88	0.93	0.93	0.93	0.90	0.90	0.90	0.93	0.93	0.93
Adj. Flow (vph)	149	785	682	87	480	63	629	247	168	100	162	95
RTOR Reduction (vph)	0	0	224	0	9	0	0	92	0	0	71	0
Lane Group Flow (vph)	149	785	458	87	534	0	629	323	0	100	186	0
Confl. Peds. (#/hr)	32		6	6		32	6		25	25		6
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	2%	2%	4%	0%	0%	0%	4%	2%	4%	0%	0%	1%
Bus Blockages (#/hr)	0	8	0	0	8	8	0	0	0	0	0	0
Parking (#/hr)						6						
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		Prot	NA		Perm	NA	
Protected Phases	1	6	7	5	2		7	4			8	
Permitted Phases	6		6	2						8		
Actuated Green, G (s)	44.0	39.0	58.0	44.0	39.0		19.0	52.0		28.0	28.0	
Effective Green, g (s)	48.0	41.0	62.0	48.0	41.0		21.0	54.0		30.0	30.0	
Actuated g/C Ratio	0.40	0.34	0.52	0.40	0.34		0.18	0.45		0.25	0.25	
Clearance Time (s)	7.0	7.0	5.0	7.0	7.0		5.0	7.0		7.0	7.0	
Vehicle Extension (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	293	1061	706	207	1023		519	1239		203	777	
v/s Ratio Prot	c0.03	c0.25	0.11	0.02	0.18		c0.21	0.12			0.06	
v/s Ratio Perm	0.17		0.22	0.14						c0.12		
v/c Ratio	0.51	0.74	0.65	0.42	0.52		1.21	0.26		0.49	0.24	
Uniform Delay, d1	34.7	34.8	21.1	39.9	31.7		49.5	20.6		38.5	35.9	
Progression Factor	0.56	0.84	1.19	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.6	1.6	0.5	1.9		112.2	0.5		8.3	0.7	
Delay (s)	19.5	31.0	26.7	40.4	33.6		161.7	21.1		46.8	36.6	
Level of Service	B	C	C	D	C		F	C		D	D	
Approach Delay (s)		28.1			34.5			105.8			39.5	
Approach LOS		C			C			F			D	

Intersection Summary				
HCM 2000 Control Delay	52.6	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.74			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	86.3%	ICU Level of Service	E	

HCM Signalized Intersection Capacity Analysis
1: South Dakota Avenue & Riggs Road
Background SAT

Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
2: First Place & Riggs Road

Background SAT

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1498	126	36	1078	139	25
Future Volume (vph)	1498	126	36	1078	139	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	11	10	10
Grade (%)	-7%			1%	-1%	
Total Lost time (s)	4.0	4.0	3.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00	0.93	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3077	1138	1408	3064	1348	1120
Flt Permitted	1.00	1.00	0.06	1.00	0.95	1.00
Satd. Flow (perm)	3077	1138	87	3064	1348	1120
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.92	0.92
Adj. Flow (vph)	1594	134	38	1147	151	27
RTOR Reduction (vph)	0	33	0	0	0	0
Lane Group Flow (vph)	1594	101	38	1147	151	27
Confl. Peds. (#/hr)		13	13		9	17
Heavy Vehicles (%)	2%	15%	11%	2%	13%	13%
Bus Blockages (#/hr)	0	0	0	0	0	18
Turn Type	NA	Perm	pm+pt	NA	Prot	pt+ov
Protected Phases	6		5	2	4	4 5
Permitted Phases		6	2			
Actuated Green, G (s)	63.0	63.0	81.0	81.0	27.0	46.0
Effective Green, g (s)	65.0	65.0	83.0	83.0	29.0	48.0
Actuated g/C Ratio	0.54	0.54	0.69	0.69	0.24	0.40
Clearance Time (s)	6.0	6.0	5.0	6.0	6.0	
Lane Grp Cap (vph)	1666	616	225	2119	325	448
v/s Ratio Prot	c0.52		0.02	c0.37	c0.11	0.02
v/s Ratio Perm		0.09	0.10			
v/c Ratio	0.96	0.16	0.17	0.54	0.46	0.06
Uniform Delay, d1	26.2	13.8	16.5	9.1	38.9	22.1
Progression Factor	1.00	1.00	0.86	0.73	1.00	1.00
Incremental Delay, d2	13.9	0.6	0.8	0.5	4.7	0.3
Delay (s)	40.1	14.4	15.0	7.1	43.6	22.4
Level of Service	D	B	B	A	D	C
Approach Delay (s)	38.1			7.4	40.4	
Approach LOS	D			A	D	

Intersection Summary			
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Chillum Place & Riggs Road

Background SAT

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	977	39	36	532	14	24	15	25	45	22	30
Future Volume (vph)	17	977	39	36	532	14	24	15	25	45	22	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	14	14	14	10	10	10
Grade (%)		2%			-2%			-4%			-4%	
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			1.00			0.95			0.96	
Flt Protected		1.00			1.00			0.98			0.98	
Satd. Flow (prot)		3119			3080			1489			1311	
Flt Permitted		0.94			0.84			0.87			0.84	
Satd. Flow (perm)		2939			2580			1315			1127	
Peak-hour factor, PHF	0.88	0.88	0.88	0.96	0.96	0.96	0.82	0.82	0.82	0.94	0.94	0.94
Adj. Flow (vph)	19	1110	44	38	554	15	29	18	30	48	23	32
RTOR Reduction (vph)	0	2	0	0	1	0	0	26	0	0	26	0
Lane Group Flow (vph)	0	1171	0	0	606	0	0	51	0	0	77	0
Confl. Peds. (#/hr)	25		7	7		25	9		4	4		9
Confl. Bikes (#/hr)			1			2						
Heavy Vehicles (%)	0%	0%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	10	10	0	10	10	0	0	0	0	0	0
Parking (#/hr)							6	6	6	6	6	6
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		58.3			58.3			9.7			9.7	
Effective Green, g (s)		60.3			60.3			11.7			11.7	
Actuated g/C Ratio		0.75			0.75			0.15			0.15	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		1.0			1.0			3.0			3.0	
Lane Grp Cap (vph)		2215			1944			192			164	
v/s Ratio Prot												
v/s Ratio Perm		c0.40			0.23			0.04			c0.07	
v/c Ratio		0.53			0.31			0.27			0.47	
Uniform Delay, d1		4.0			3.2			30.3			31.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.9			0.4			0.8			2.1	
Delay (s)		4.9			3.6			31.1			33.5	
Level of Service		A			A			C			C	
Approach Delay (s)		4.9			3.6			31.1			33.5	
Approach LOS		A			A			C			C	

Intersection Summary					
HCM 2000 Control Delay	7.0	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.52				
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0		
Intersection Capacity Utilization	62.7%	ICU Level of Service	B		

HCM Signalized Intersection Capacity Analysis
3: Chillum Place & Riggs Road

Background SAT

Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
4: South Dakota Avenue & Kennedy Street

Background SAT

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	5	2	64	5	33	3	726	35	37	743	5
Future Volume (vph)	7	5	2	64	5	33	3	726	35	37	743	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	15	15	15	10	11	11	11	11	11
Grade (%)		-7%			-2%			2%			-2%	
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.98			0.96			0.99			1.00	
Flt Protected		0.98			0.97			1.00			1.00	
Satd. Flow (prot)		1464			1739			3045			3159	
Flt Permitted		0.88			0.80			0.95			0.88	
Satd. Flow (perm)		1322			1433			2902			2775	
Peak-hour factor, PHF	0.75	0.75	0.75	0.85	0.85	0.85	0.88	0.88	0.88	0.83	0.83	0.83
Adj. Flow (vph)	9	7	3	75	6	39	3	825	40	45	895	6
RTOR Reduction (vph)	0	3	0	0	24	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	16	0	0	96	0	0	865	0	0	946	0
Confl. Peds. (#/hr)	2		9	9		2	10		16	16		10
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	3%	0%	0%	0%
Parking (#/hr)	6	6	6									
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6			2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)		9.7			9.7			58.3			58.3	
Effective Green, g (s)		11.7			11.7			60.3			60.3	
Actuated g/C Ratio		0.15			0.15			0.75			0.75	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			1.0			1.0	
Lane Grp Cap (vph)		193			209			2187			2091	
v/s Ratio Prot												
v/s Ratio Perm		0.01			c0.07			0.30			c0.34	
v/c Ratio		0.09			0.46			0.40			0.45	
Uniform Delay, d1		29.5			31.3			3.5			3.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.2			1.6			0.5			0.7	
Delay (s)		29.7			32.9			4.0			4.4	
Level of Service		C			C			A			A	
Approach Delay (s)		29.7			32.9			4.0			4.4	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
5: South Dakota Avenue & Jefferson Street

Background SAT

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	14	9	685	18	9	892
Future Volume (Veh/h)	14	9	685	18	9	892
Sign Control	Stop		Free			Free
Grade	-7%		2%			-2%
Peak Hour Factor	0.75	0.75	0.96	0.96	0.85	0.85
Hourly flow rate (vph)	19	12	714	19	11	1049
Pedestrians	10		2			3
Lane Width (ft)	12.0		10.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			537			306
pX, platoon unblocked	0.94	0.95			0.95	
vC, conflicting volume	1282	380			743	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	934	248			630	
tC, single (s)	6.8	7.1			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.2	
p0 queue free %	92	98			99	
cM capacity (veh/h)	246	684			909	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	31	476	257	361	699
Volume Left	19	0	0	11	0
Volume Right	12	0	19	0	0
cSH	327	1700	1700	909	1700
Volume to Capacity	0.09	0.28	0.15	0.01	0.41
Queue Length 95th (ft)	8	0	0	1	0
Control Delay (s)	17.1	0.0	0.0	0.4	0.0
Lane LOS	C			A	
Approach Delay (s)	17.1	0.0		0.1	
Approach LOS	C				

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	45.4%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
6: South Dakota Avenue & Ingraham Street

Background SAT

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	1	14	0	1	5	15	677	14	6	778	27
Future Volume (Veh/h)	35	1	14	0	1	5	15	677	14	6	778	27
Sign Control		Stop			Stop			Free			Free	
Grade		-4%			-6%			2%			-2%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.89	0.89	0.89	0.82	0.82	0.82
Hourly flow rate (vph)	47	1	19	0	1	7	17	761	16	7	949	33
Pedestrians		11			4			3			6	
Lane Width (ft)		11.0			10.0			11.0			11.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		1			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								267			576	
pX, platoon unblocked	0.91	0.91	0.96	0.91	0.91	0.89	0.96			0.89		
vC, conflicting volume	1418	1806	505	1318	1814	398	993			781		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1050	1474	390	940	1483	79	901			508		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	70	99	97	100	99	99	98			99		
cM capacity (veh/h)	159	112	581	188	111	860	723			948		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	67	8	398	396	482	508
Volume Left	47	0	17	0	7	0
Volume Right	19	7	0	16	0	33
cSH	198	466	723	1700	948	1700
Volume to Capacity	0.34	0.02	0.02	0.23	0.01	0.30
Queue Length 95th (ft)	35	1	2	0	1	0
Control Delay (s)	32.2	12.9	0.7	0.0	0.2	0.0
Lane LOS	D	B	A		A	
Approach Delay (s)	32.2	12.9	0.4		0.1	
Approach LOS	D	B				

Intersection Summary				
Average Delay	1.4			
Intersection Capacity Utilization	50.1%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
7: South Dakota Avenue & Garage Entrance/Hamilton Street

Background SAT

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	0	17	3	0	11	18	695	3	10	784	20
Future Volume (vph)	19	0	17	3	0	11	18	695	3	10	784	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	10	12	12	11	11	11
Grade (%)		0%			-5%			1%			-2%	
Total Lost time (s)		4.0			4.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.94			0.89			1.00			1.00	
Flt Protected		0.97			0.99			1.00			1.00	
Satd. Flow (prot)		1549			1290			3164			2893	
Flt Permitted		0.97			0.99			0.92			0.94	
Satd. Flow (perm)		1549			1290			2920			2735	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.90	0.90	0.90	0.82	0.82	0.82
Adj. Flow (vph)	25	0	23	4	0	15	20	772	3	12	956	24
RTOR Reduction (vph)	0	0	0	0	17	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	48	0	0	2	0	0	795	0	0	991	0
Confl. Peds. (#/hr)	1		1	1		1	17		9	9		17
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Parking (#/hr)				6	6	6					6	6
Turn Type	Split	NA		Split	NA		Perm	NA		Perm	NA	
Protected Phases	3	3		4	4			6			2	
Permitted Phases							6			2		
Actuated Green, G (s)		6.6			5.0			41.4			41.4	
Effective Green, g (s)		8.6			7.0			43.4			43.4	
Actuated g/C Ratio		0.12			0.10			0.62			0.62	
Clearance Time (s)		6.0			6.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			1.0			1.0	
Lane Grp Cap (vph)		190			129			1810			1695	
v/s Ratio Prot		c0.03			c0.00							
v/s Ratio Perm								0.27			c0.36	
v/c Ratio		0.25			0.01			0.44			0.58	
Uniform Delay, d1		27.8			28.4			6.9			7.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.7			0.0			0.8			1.5	
Delay (s)		28.5			28.4			7.7			9.4	
Level of Service		C			C			A			A	
Approach Delay (s)		28.5			28.4			7.7			9.4	
Approach LOS		C			C			A			A	

Intersection Summary				
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.47			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	48.6%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
8: South Dakota Avenue & Galloway Street

Background SAT

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	16	83	3	16	8	84	675	3	9	789	16
Future Volume (vph)	26	16	83	3	16	8	84	675	3	9	789	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	14	14	11	11	11	11	12	12	11	12	12
Grade (%)		-4%			-1%			2%			-1%	
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.91			0.96			1.00			1.00	
Flt Protected		0.99			0.99			0.99			1.00	
Satd. Flow (prot)		1519			1335			3147			3178	
Flt Permitted		0.94			0.97			0.67			0.94	
Satd. Flow (perm)		1437			1302			2119			3001	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.89	0.89	0.89	0.79	0.79	0.79
Adj. Flow (vph)	35	21	111	4	21	11	94	758	3	11	999	20
RTOR Reduction (vph)	0	83	0	0	8	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	84	0	0	28	0	0	855	0	0	1028	0
Confl. Peds. (#/hr)	9		1	1		9	19		10	10		19
Heavy Vehicles (%)	12%	0%	6%	0%	0%	0%	6%	1%	0%	0%	2%	17%
Bus Blockages (#/hr)	6	6	6	6	6	6	0	0	0	0	0	0
Parking (#/hr)				6	6	6						6
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		8			4		5	2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)		18.0			18.0			47.0			36.0	
Effective Green, g (s)		20.0			20.0			49.0			38.0	
Actuated g/C Ratio		0.25			0.25			0.61			0.48	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		359			325			1400			1425	
v/s Ratio Prot								c0.06				
v/s Ratio Perm		c0.06			0.02			0.31			c0.34	
v/c Ratio		0.23			0.09			0.61			0.72	
Uniform Delay, d1		23.9			23.0			9.6			16.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.5			0.5			2.0			3.2	
Delay (s)		25.4			23.5			11.6			20.0	
Level of Service		C			C			B			B	
Approach Delay (s)		25.4			23.5			11.6			20.0	
Approach LOS		C			C			B			B	

Intersection Summary				
HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.55			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	73.7%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

Intersection: 1: South Dakota Avenue & Riggs Road

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB
Directions Served	L	T	T	R	L	T	TR	L	L	T	TR	L
Maximum Queue (ft)	143	208	212	251	148	219	217	411	423	581	456	93
Average Queue (ft)	60	95	95	125	62	119	121	354	362	295	93	50
95th Queue (ft)	135	171	167	223	125	193	194	479	497	767	269	94
Link Distance (ft)		689	689	689		654	654			664	664	
Upstream Blk Time (%)										9	0	
Queuing Penalty (veh)										33	0	
Storage Bay Dist (ft)	120				230			400	400			70
Storage Blk Time (%)	2	11				0		11	28	0		6
Queuing Penalty (veh)	6	14				0		13	31	2		5

Intersection: 1: South Dakota Avenue & Riggs Road

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	152	119
Average Queue (ft)	58	36
95th Queue (ft)	122	91
Link Distance (ft)	487	487
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)	8	
Queuing Penalty (veh)	7	

Intersection: 2: First Place & Riggs Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	T	R	L	T	T	L	R
Maximum Queue (ft)	397	411	175	69	235	242	123	221
Average Queue (ft)	349	376	89	22	84	95	93	47
95th Queue (ft)	424	426	217	56	169	188	136	158
Link Distance (ft)	360	360			689	689		295
Upstream Blk Time (%)	18	44						
Queuing Penalty (veh)	0	0						
Storage Bay Dist (ft)			150	375			100	
Storage Blk Time (%)		43	0				10	0
Queuing Penalty (veh)		54	1				3	0

Intersection: 3: Chillum Place & Riggs Road

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	TR	LT	TR	LTR	LTR
Maximum Queue (ft)	279	289	223	153	93	112
Average Queue (ft)	135	149	90	38	38	53
95th Queue (ft)	250	265	172	108	76	98
Link Distance (ft)	654	654	352	352	724	355
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 4: South Dakota Avenue & Kennedy Street

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	43	142	243	200	129	132
Average Queue (ft)	11	60	133	82	62	72
95th Queue (ft)	35	111	247	175	113	121
Link Distance (ft)		240	248	248	664	664
Upstream Blk Time (%)			5	0		
Queuing Penalty (veh)			16	2		
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 5: South Dakota Avenue & Jefferson Street

Movement	WB	NB	NB	SB	SB
Directions Served	LR	T	TR	LT	T
Maximum Queue (ft)	52	113	73	70	45
Average Queue (ft)	17	17	5	9	3
95th Queue (ft)	45	95	45	41	26
Link Distance (ft)	235	209	209	248	248
Upstream Blk Time (%)		0	0		
Queuing Penalty (veh)		1	0		
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: South Dakota Avenue & Ingraham Street

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	79	30	118	24	57	61
Average Queue (ft)	34	7	16	1	5	5
95th Queue (ft)	65	27	71	15	29	31
Link Distance (ft)	270	242	208	208	209	209
Upstream Blk Time (%)			0			
Queuing Penalty (veh)			0			
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 7: South Dakota Avenue & Garage Entrance/Hamilton Street

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	82	26	216	168	133	136
Average Queue (ft)	31	7	57	35	38	43
95th Queue (ft)	65	23	153	111	98	110
Link Distance (ft)	171	303	406	406	208	208
Upstream Blk Time (%)					0	0
Queuing Penalty (veh)					0	0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 8: South Dakota Avenue & Galloway Street

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	116	30	347	294	207	230
Average Queue (ft)	39	8	193	128	119	133
95th Queue (ft)	95	23	330	265	185	199
Link Distance (ft)	286	369	350	350	406	406
Upstream Blk Time (%)			1	0		
Queuing Penalty (veh)			0	0		
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Zone Summary

Zone wide Queuing Penalty: 188

ATTACHMENT 6
TOTAL FUTURE LEVEL OF SERVICE AND QUEUE REPORTS

HCM Signalized Intersection Capacity Analysis
1: South Dakota Avenue & Riggs Road

Total Future SAT

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	691	684	147	446	59	635	252	204	93	189	88
Future Volume (vph)	131	691	684	147	446	59	635	252	204	93	189	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	11	12	12	11	11	10	12	12
Grade (%)		-5%			1%			4%			-5%	
Total Lost time (s)	5.0	5.0	3.0	5.0	5.0		3.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.93		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1622	3106	1367	1616	2997		2970	2727		1524	3141	
Flt Permitted	0.34	1.00	1.00	0.19	1.00		0.95	1.00		0.47	1.00	
Satd. Flow (perm)	582	3106	1367	330	2997		2970	2727		747	3141	
Peak-hour factor, PHF	0.88	0.88	0.88	0.93	0.93	0.93	0.90	0.90	0.90	0.93	0.93	0.93
Adj. Flow (vph)	149	785	777	158	480	63	706	280	227	100	203	95
RTOR Reduction (vph)	0	0	173	0	9	0	0	103	0	0	46	0
Lane Group Flow (vph)	149	785	604	158	534	0	706	404	0	100	252	0
Confl. Peds. (#/hr)	32		6	6		32	6		25	25		6
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	2%	2%	4%	0%	0%	0%	4%	2%	4%	0%	0%	1%
Bus Blockages (#/hr)	0	8	0	0	8	8	0	0	0	0	0	0
Parking (#/hr)						6						
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		Prot	NA		Perm	NA	
Protected Phases	1	6	7	5	2		7	4			8	
Permitted Phases	6		6	2						8		
Actuated Green, G (s)	44.0	39.0	58.0	44.0	39.0		19.0	52.0		28.0	28.0	
Effective Green, g (s)	48.0	41.0	62.0	48.0	41.0		21.0	54.0		30.0	30.0	
Actuated g/C Ratio	0.40	0.34	0.52	0.40	0.34		0.18	0.45		0.25	0.25	
Clearance Time (s)	7.0	7.0	5.0	7.0	7.0		5.0	7.0		7.0	7.0	
Vehicle Extension (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	293	1061	706	207	1023		519	1227		186	785	
v/s Ratio Prot	0.03	0.25	c0.15	c0.04	0.18		c0.24	0.15			0.08	
v/s Ratio Perm	0.17		0.29	0.26						c0.13		
v/c Ratio	0.51	0.74	0.86	0.76	0.52		1.36	0.33		0.54	0.32	
Uniform Delay, d1	34.7	34.8	25.1	43.1	31.7		49.5	21.3		39.0	36.7	
Progression Factor	0.59	0.88	1.06	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	1.1	3.4	13.9	1.9		174.3	0.7		10.7	1.1	
Delay (s)	20.5	31.7	30.0	56.9	33.6		223.8	22.0		49.7	37.8	
Level of Service	C	C	C	E	C		F	C		D	D	
Approach Delay (s)		30.0			38.8			139.5			40.8	
Approach LOS		C			D			F			D	

Intersection Summary				
HCM 2000 Control Delay	65.6	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	0.85			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	92.5%	ICU Level of Service	F	

HCM Signalized Intersection Capacity Analysis
1: South Dakota Avenue & Riggs Road
Total Future SAT

Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
2: First Place & Riggs Road

Total Future SAT

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1582	126	36	1147	139	25
Future Volume (vph)	1582	126	36	1147	139	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	11	10	10
Grade (%)	-7%			1%	-1%	
Total Lost time (s)	4.0	4.0	3.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00	0.93	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3077	1138	1408	3064	1348	1120
Flt Permitted	1.00	1.00	0.06	1.00	0.95	1.00
Satd. Flow (perm)	3077	1138	87	3064	1348	1120
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.92	0.92
Adj. Flow (vph)	1683	134	38	1220	151	27
RTOR Reduction (vph)	0	32	0	0	0	0
Lane Group Flow (vph)	1683	102	38	1220	151	27
Confl. Peds. (#/hr)		13	13		9	17
Heavy Vehicles (%)	2%	15%	11%	2%	13%	13%
Bus Blockages (#/hr)	0	0	0	0	0	18
Turn Type	NA	Perm	pm+pt	NA	Prot	pt+ov
Protected Phases	6		5	2	4	4 5
Permitted Phases		6	2			
Actuated Green, G (s)	63.0	63.0	81.0	81.0	27.0	46.0
Effective Green, g (s)	65.0	65.0	83.0	83.0	29.0	48.0
Actuated g/C Ratio	0.54	0.54	0.69	0.69	0.24	0.40
Clearance Time (s)	6.0	6.0	5.0	6.0	6.0	
Lane Grp Cap (vph)	1666	616	225	2119	325	448
v/s Ratio Prot	c0.55		0.02	c0.40	c0.11	0.02
v/s Ratio Perm		0.09	0.10			
v/c Ratio	1.01	0.17	0.17	0.58	0.46	0.06
Uniform Delay, d1	27.5	13.9	18.5	9.5	38.9	22.1
Progression Factor	1.00	1.00	0.72	0.78	1.00	1.00
Incremental Delay, d2	24.6	0.6	0.5	0.3	4.7	0.3
Delay (s)	52.1	14.4	13.8	7.7	43.6	22.4
Level of Service	D	B	B	A	D	C
Approach Delay (s)	49.3			7.9	40.4	
Approach LOS	D			A	D	

Intersection Summary				
HCM 2000 Control Delay	32.8	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.81			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	74.4%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Chillum Place & Riggs Road

Total Future SAT

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	1030	39	36	598	14	24	15	25	45	22	30
Future Volume (vph)	17	1030	39	36	598	14	24	15	25	45	22	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	14	14	14	10	10	10
Grade (%)		2%			-2%			-4%			-4%	
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			1.00			0.95			0.96	
Flt Protected		1.00			1.00			0.98			0.98	
Satd. Flow (prot)		3120			3083			1489			1311	
Flt Permitted		0.94			0.84			0.87			0.84	
Satd. Flow (perm)		2938			2587			1315			1127	
Peak-hour factor, PHF	0.88	0.88	0.88	0.96	0.96	0.96	0.82	0.82	0.82	0.94	0.94	0.94
Adj. Flow (vph)	19	1170	44	38	623	15	29	18	30	48	23	32
RTOR Reduction (vph)	0	2	0	0	1	0	0	26	0	0	26	0
Lane Group Flow (vph)	0	1231	0	0	675	0	0	51	0	0	77	0
Confl. Peds. (#/hr)	25		7	7		25	9		4	4		9
Confl. Bikes (#/hr)			1			2						
Heavy Vehicles (%)	0%	0%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	10	10	0	10	10	0	0	0	0	0	0
Parking (#/hr)							6	6	6	6	6	6
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		58.3			58.3			9.7			9.7	
Effective Green, g (s)		60.3			60.3			11.7			11.7	
Actuated g/C Ratio		0.75			0.75			0.15			0.15	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		1.0			1.0			3.0			3.0	
Lane Grp Cap (vph)		2214			1949			192			164	
v/s Ratio Prot												
v/s Ratio Perm		c0.42			0.26			0.04			c0.07	
v/c Ratio		0.56			0.35			0.27			0.47	
Uniform Delay, d1		4.2			3.3			30.3			31.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.0			0.5			0.8			2.1	
Delay (s)		5.2			3.8			31.1			33.5	
Level of Service		A			A			C			C	
Approach Delay (s)		5.2			3.8			31.1			33.5	
Approach LOS		A			A			C			C	

Intersection Summary				
HCM 2000 Control Delay	7.1	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.54			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	64.5%	ICU Level of Service	C	

HCM Signalized Intersection Capacity Analysis
3: Chillum Place & Riggs Road

Total Future SAT

Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
4: South Dakota Avenue & Kennedy Street

Total Future SAT

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	119	5	12	64	5	33	17	766	35	37	793	143
Future Volume (vph)	119	5	12	64	5	33	17	766	35	37	793	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	15	15	15	10	11	11	11	11	11
Grade (%)		-7%			-2%			2%			-2%	
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		1.00			1.00			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.96			0.99			0.98	
Flt Protected		0.96			0.97			1.00			1.00	
Satd. Flow (prot)		1452			1744			3015			3073	
Flt Permitted		0.69			0.79			0.92			0.88	
Satd. Flow (perm)		1044			1429			2772			2717	
Peak-hour factor, PHF	0.75	0.75	0.75	0.85	0.85	0.85	0.88	0.88	0.88	0.83	0.83	0.83
Adj. Flow (vph)	159	7	16	75	6	39	19	870	40	45	955	172
RTOR Reduction (vph)	0	5	0	0	22	0	0	4	0	0	17	0
Lane Group Flow (vph)	0	177	0	0	98	0	0	925	0	0	1155	0
Confl. Peds. (#/hr)	2		9	9		2	10		16	16		10
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	50%	1%	3%	0%	0%	0%
Parking (#/hr)	6	6	6									
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6			2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)		15.5			15.5			52.5			52.5	
Effective Green, g (s)		17.5			17.5			54.5			54.5	
Actuated g/C Ratio		0.22			0.22			0.68			0.68	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			1.0			1.0	
Lane Grp Cap (vph)		228			312			1888			1850	
v/s Ratio Prot												
v/s Ratio Perm		c0.17			0.07			0.33			c0.43	
v/c Ratio		0.78			0.31			0.49			0.62	
Uniform Delay, d1		29.4			26.2			6.1			7.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		15.3			0.6			0.9			1.6	
Delay (s)		44.7			26.8			7.0			8.7	
Level of Service		D			C			A			A	
Approach Delay (s)		44.7			26.8			7.0			8.7	
Approach LOS		D			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
5: South Dakota Avenue & Jefferson Street

Total Future SAT

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	14	9	739	18	9	952
Future Volume (Veh/h)	14	9	739	18	9	952
Sign Control	Stop		Free			Free
Grade	-7%		2%			-2%
Peak Hour Factor	0.75	0.75	0.96	0.96	0.85	0.85
Hourly flow rate (vph)	19	12	770	19	11	1120
Pedestrians	10		2			3
Lane Width (ft)	12.0		10.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			537			306
pX, platoon unblocked	0.86	0.96			0.96	
vC, conflicting volume	1374	408			799	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	907	299			707	
tC, single (s)	6.8	7.1			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.2	
p0 queue free %	92	98			99	
cM capacity (veh/h)	236	637			857	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	31	513	276	384	747
Volume Left	19	0	0	11	0
Volume Right	12	0	19	0	0
cSH	312	1700	1700	857	1700
Volume to Capacity	0.10	0.30	0.16	0.01	0.44
Queue Length 95th (ft)	8	0	0	1	0
Control Delay (s)	17.8	0.0	0.0	0.4	0.0
Lane LOS	C			A	
Approach Delay (s)	17.8	0.0		0.1	
Approach LOS	C				

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	47.2%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
6: South Dakota Avenue & Ingraham Street

Total Future SAT

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	1	71	0	1	5	83	691	14	6	788	77
Future Volume (Veh/h)	75	1	71	0	1	5	83	691	14	6	788	77
Sign Control		Stop			Stop			Free			Free	
Grade		-4%			-6%			2%			-2%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.89	0.89	0.89	0.82	0.82	0.82
Hourly flow rate (vph)	100	1	95	0	1	7	93	776	16	7	961	94
Pedestrians		11			4			3			6	
Lane Width (ft)		11.0			10.0			11.0			11.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		1			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								267			576	
pX, platoon unblocked	0.91	0.91	0.91	0.91	0.91	0.87	0.91			0.87		
vC, conflicting volume	1620	2015	542	1567	2054	406	1066			796		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1032	1463	288	973	1505	12	866			461		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	33	99	85	100	99	99	87			99		
cM capacity (veh/h)	150	102	641	143	96	924	706			962		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	196	8	481	404	488	574
Volume Left	100	0	93	0	7	0
Volume Right	95	7	0	16	0	94
cSH	238	444	706	1700	962	1700
Volume to Capacity	0.82	0.02	0.13	0.24	0.01	0.34
Queue Length 95th (ft)	159	1	11	0	1	0
Control Delay (s)	65.3	13.3	3.6	0.0	0.2	0.0
Lane LOS	F	B	A		A	
Approach Delay (s)	65.3	13.3	2.0		0.1	
Approach LOS	F	B				

Intersection Summary				
Average Delay	6.9			
Intersection Capacity Utilization	78.0%	ICU Level of Service	D	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
7: South Dakota Avenue & Garage Entrance/Hamilton Street

Total Future SAT

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	0	17	3	0	11	18	777	3	10	851	20
Future Volume (vph)	19	0	17	3	0	11	18	777	3	10	851	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	10	12	12	11	11	11
Grade (%)		0%			-5%			1%			-2%	
Total Lost time (s)		4.0			4.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.94			0.89			1.00			1.00	
Flt Protected		0.97			0.99			1.00			1.00	
Satd. Flow (prot)		1549			1290			3165			2894	
Flt Permitted		0.97			0.99			0.92			0.94	
Satd. Flow (perm)		1549			1290			2920			2734	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.90	0.90	0.90	0.82	0.82	0.82
Adj. Flow (vph)	25	0	23	4	0	15	20	863	3	12	1038	24
RTOR Reduction (vph)	0	0	0	0	17	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	48	0	0	2	0	0	886	0	0	1073	0
Confl. Peds. (#/hr)	1		1	1		1	17		9	9		17
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Parking (#/hr)				6	6	6					6	6
Turn Type	Split	NA		Split	NA		Perm	NA		Perm	NA	
Protected Phases	3	3		4	4			6			2	
Permitted Phases							6			2		
Actuated Green, G (s)		6.6			5.0			41.4			41.4	
Effective Green, g (s)		8.6			7.0			43.4			43.4	
Actuated g/C Ratio		0.12			0.10			0.62			0.62	
Clearance Time (s)		6.0			6.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			1.0			1.0	
Lane Grp Cap (vph)		190			129			1810			1695	
v/s Ratio Prot		c0.03			c0.00							
v/s Ratio Perm								0.30			c0.39	
v/c Ratio		0.25			0.01			0.49			0.63	
Uniform Delay, d1		27.8			28.4			7.3			8.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.7			0.0			0.9			1.8	
Delay (s)		28.5			28.4			8.2			10.1	
Level of Service		C			C			A			B	
Approach Delay (s)		28.5			28.4			8.2			10.1	
Approach LOS		C			C			A			B	

Intersection Summary				
HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.50			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	51.1%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
8: South Dakota Avenue & Galloway Street

Total Future SAT

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	16	83	3	16	8	84	757	3	9	856	16
Future Volume (vph)	26	16	83	3	16	8	84	757	3	9	856	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	14	14	11	11	11	11	12	12	11	12	12
Grade (%)		-4%			-1%			2%			-1%	
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.91			0.96			1.00			1.00	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		1519			1335			3152			3180	
Flt Permitted		0.94			0.97			0.65			0.94	
Satd. Flow (perm)		1437			1302			2071			3000	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.89	0.89	0.89	0.79	0.79	0.79
Adj. Flow (vph)	35	21	111	4	21	11	94	851	3	11	1084	20
RTOR Reduction (vph)	0	83	0	0	8	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	84	0	0	28	0	0	948	0	0	1113	0
Confl. Peds. (#/hr)	9		1	1		9	19		10	10		19
Heavy Vehicles (%)	12%	0%	6%	0%	0%	0%	6%	1%	0%	0%	2%	17%
Bus Blockages (#/hr)	6	6	6	6	6	6	0	0	0	0	0	0
Parking (#/hr)				6	6	6						6
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		8			4		5	2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)		18.0			18.0			47.0			36.0	
Effective Green, g (s)		20.0			20.0			49.0			38.0	
Actuated g/C Ratio		0.25			0.25			0.61			0.48	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		359			325			1376			1425	
v/s Ratio Prot								c0.07				
v/s Ratio Perm		c0.06			0.02			0.35			c0.37	
v/c Ratio		0.23			0.09			0.69			0.78	
Uniform Delay, d1		23.9			23.0			10.4			17.5	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.5			0.5			2.8			4.3	
Delay (s)		25.4			23.5			13.2			21.9	
Level of Service		C			C			B			C	
Approach Delay (s)		25.4			23.5			13.2			21.9	
Approach LOS		C			C			B			C	

Intersection Summary				
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.60			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	78.3%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

Intersection: 1: South Dakota Avenue & Riggs Road

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB
Directions Served	L	T	T	R	L	T	TR	L	L	T	TR	L
Maximum Queue (ft)	140	191	179	472	234	351	333	412	425	684	632	94
Average Queue (ft)	54	87	87	213	144	156	143	394	405	592	125	47
95th Queue (ft)	124	160	157	443	252	355	290	501	531	928	382	95
Link Distance (ft)		689	689	689		654	654			664	664	
Upstream Blk Time (%)				5		2	0			39	0	
Queuing Penalty (veh)				28		6	0			177	1	
Storage Bay Dist (ft)	120				230			400	400			70
Storage Blk Time (%)	2	9			10	0		23	67	0		6
Queuing Penalty (veh)	5	12			22	0		28	85	1		6

Intersection: 1: South Dakota Avenue & Riggs Road

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	263	246
Average Queue (ft)	84	76
95th Queue (ft)	236	234
Link Distance (ft)	487	487
Upstream Blk Time (%)	3	3
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)	14	
Queuing Penalty (veh)	13	

Intersection: 2: First Place & Riggs Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	T	R	L	T	T	L	R
Maximum Queue (ft)	391	408	175	66	216	220	124	241
Average Queue (ft)	354	380	85	23	72	81	94	54
95th Queue (ft)	422	397	212	58	155	166	138	175
Link Distance (ft)	360	360			689	689		295
Upstream Blk Time (%)	23	54						0
Queuing Penalty (veh)	0	0						0
Storage Bay Dist (ft)			150	375			100	
Storage Blk Time (%)		48	0				11	1
Queuing Penalty (veh)		60	1				3	1

Intersection: 3: Chillum Place & Riggs Road

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	TR	LT	TR	LTR	LTR
Maximum Queue (ft)	272	286	268	208	110	129
Average Queue (ft)	118	134	110	48	38	56
95th Queue (ft)	225	252	220	143	83	104
Link Distance (ft)	654	654	352	352	724	355
Upstream Blk Time (%)			1	0		
Queuing Penalty (veh)			0	0		
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 4: South Dakota Avenue & Kennedy Street

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	130	185	275	295	365	372
Average Queue (ft)	91	74	217	160	138	158
95th Queue (ft)	144	165	343	332	399	409
Link Distance (ft)		240	248	248	664	664
Upstream Blk Time (%)		5	46	13	6	7
Queuing Penalty (veh)		0	174	50	32	34
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 5: South Dakota Avenue & Jefferson Street

Movement	WB	NB	NB	SB	SB
Directions Served	LR	T	TR	LT	T
Maximum Queue (ft)	177	237	246	187	175
Average Queue (ft)	54	143	94	33	31
95th Queue (ft)	157	306	262	160	156
Link Distance (ft)	235	209	209	248	248
Upstream Blk Time (%)	4	34	9	9	9
Queuing Penalty (veh)	0	130	36	39	39
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Queuing and Blocking Report

Total Future SAT

Intersection: 6: South Dakota Avenue & Ingraham Street

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	222	42	239	259	131	139
Average Queue (ft)	137	8	164	112	27	30
95th Queue (ft)	232	32	298	282	132	141
Link Distance (ft)	270	242	208	208	209	209
Upstream Blk Time (%)	1		42	20	9	10
Queuing Penalty (veh)	0		169	82	42	50
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 7: South Dakota Avenue & Garage Entrance/Hamilton Street

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	119	43	449	466	148	169
Average Queue (ft)	42	10	243	229	46	50
95th Queue (ft)	109	35	541	550	116	128
Link Distance (ft)	171	303	406	406	208	208
Upstream Blk Time (%)	5		28	23		0
Queuing Penalty (veh)	0		111	91		0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 8: South Dakota Avenue & Galloway Street

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	200	83	384	373	190	206
Average Queue (ft)	64	17	287	241	97	106
95th Queue (ft)	190	83	441	428	176	191
Link Distance (ft)	286	369	350	350	406	406
Upstream Blk Time (%)	8		35	19		
Queuing Penalty (veh)	0		0	0		
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Zone Summary

Zone wide Queuing Penalty: 1530

HCM Signalized Intersection Capacity Analysis
1: South Dakota Avenue & Riggs Road

Total Future with Improvements SAT

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	691	684	147	446	59	635	252	204	93	189	88
Future Volume (vph)	131	691	684	147	446	59	635	252	204	93	189	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	11	12	12	11	11	10	12	12
Grade (%)		-5%			1%			4%			-5%	
Total Lost time (s)	5.0	5.0	3.0	5.0	5.0		3.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.93		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1624	3106	1369	1616	2997		2970	2727		1524	3141	
Flt Permitted	0.31	1.00	1.00	0.15	1.00		0.95	1.00		0.47	1.00	
Satd. Flow (perm)	530	3106	1369	263	2997		2970	2727		747	3141	
Peak-hour factor, PHF	0.88	0.88	0.88	0.93	0.93	0.93	0.90	0.90	0.90	0.93	0.93	0.93
Adj. Flow (vph)	149	785	777	158	480	63	706	280	227	100	203	95
RTOR Reduction (vph)	0	0	173	0	8	0	0	97	0	0	46	0
Lane Group Flow (vph)	149	785	604	158	535	0	706	410	0	100	252	0
Confl. Peds. (#/hr)	32		6	6		32	6		25	25		6
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	2%	2%	4%	0%	0%	0%	4%	2%	4%	0%	0%	1%
Bus Blockages (#/hr)	0	8	0	0	8	8	0	0	0	0	0	0
Parking (#/hr)						6						
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		Prot	NA		Perm	NA	
Protected Phases	1	6	7	5	2		7	4			8	
Permitted Phases	6		6	2						8		
Actuated Green, G (s)	38.0	33.0	57.0	40.0	34.0		24.0	57.0		28.0	28.0	
Effective Green, g (s)	42.0	35.0	61.0	44.0	36.0		26.0	59.0		30.0	30.0	
Actuated g/C Ratio	0.35	0.29	0.51	0.37	0.30		0.22	0.49		0.25	0.25	
Clearance Time (s)	7.0	7.0	5.0	7.0	7.0		5.0	7.0		7.0	7.0	
Vehicle Extension (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	249	905	695	186	899		643	1340		186	785	
v/s Ratio Prot	0.03	0.25	0.19	c0.06	0.18		c0.24	0.15			0.08	
v/s Ratio Perm	0.17		0.25	c0.25						c0.13		
v/c Ratio	0.60	0.87	0.87	0.85	0.59		1.10	0.31		0.54	0.32	
Uniform Delay, d1	40.8	40.3	26.0	46.2	35.8		47.0	18.3		39.0	36.7	
Progression Factor	0.54	0.76	1.46	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	5.3	6.8	27.6	2.9		65.3	0.6		10.7	1.1	
Delay (s)	23.2	35.8	44.7	73.9	38.7		112.3	18.8		49.7	37.8	
Level of Service	C	D	D	E	D		F	B		D	D	
Approach Delay (s)		38.7			46.6			73.2			40.8	
Approach LOS		D			D			E			D	

Intersection Summary				
HCM 2000 Control Delay	50.7	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.82			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	92.5%	ICU Level of Service	F	

HCM Signalized Intersection Capacity Analysis
1: South Dakota Avenue & Riggs Road

Total Future with Improvements SAT

Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
2: First Place & Riggs Road

Total Future with Improvements SAT

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1582	126	36	1147	139	25
Future Volume (vph)	1582	126	36	1147	139	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	11	10	10
Grade (%)	-7%			1%	-1%	
Total Lost time (s)	4.0	4.0	3.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00	0.93	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3077	1138	1408	3064	1348	1120
Flt Permitted	1.00	1.00	0.06	1.00	0.95	1.00
Satd. Flow (perm)	3077	1138	88	3064	1348	1120
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.92	0.92
Adj. Flow (vph)	1683	134	38	1220	151	27
RTOR Reduction (vph)	0	32	0	0	0	0
Lane Group Flow (vph)	1683	102	38	1220	151	27
Confl. Peds. (#/hr)		13	13		9	17
Heavy Vehicles (%)	2%	15%	11%	2%	13%	13%
Bus Blockages (#/hr)	0	0	0	0	0	18
Turn Type	NA	Perm	pm+pt	NA	Prot	pt+ov
Protected Phases	6		5	2	4	4 5
Permitted Phases		6	2			
Actuated Green, G (s)	71.0	71.0	85.0	85.0	23.0	38.0
Effective Green, g (s)	73.0	73.0	87.0	87.0	25.0	40.0
Actuated g/C Ratio	0.61	0.61	0.72	0.72	0.21	0.33
Clearance Time (s)	6.0	6.0	5.0	6.0	6.0	
Lane Grp Cap (vph)	1871	692	184	2221	280	373
v/s Ratio Prot	c0.55		0.02	c0.40	c0.11	0.02
v/s Ratio Perm		0.09	0.13			
v/c Ratio	0.90	0.15	0.21	0.55	0.54	0.07
Uniform Delay, d1	20.3	10.1	14.7	7.5	42.4	27.3
Progression Factor	1.00	1.00	1.49	0.59	1.00	1.00
Incremental Delay, d2	7.4	0.5	1.2	0.5	7.3	0.4
Delay (s)	27.7	10.6	23.2	4.9	49.6	27.7
Level of Service	C	B	C	A	D	C
Approach Delay (s)	26.5			5.5	46.3	
Approach LOS	C			A	D	

Intersection Summary				
HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.78			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	74.4%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	1030	39	36	598	14	24	15	25	45	22	30
Future Volume (vph)	17	1030	39	36	598	14	24	15	25	45	22	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	14	14	14	10	10	10
Grade (%)		2%			-2%			-4%			-4%	
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			1.00			0.95			0.96	
Flt Protected		1.00			1.00			0.98			0.98	
Satd. Flow (prot)		3120			3083			1489			1311	
Flt Permitted		0.94			0.84			0.87			0.84	
Satd. Flow (perm)		2938			2587			1315			1127	
Peak-hour factor, PHF	0.88	0.88	0.88	0.96	0.96	0.96	0.82	0.82	0.82	0.94	0.94	0.94
Adj. Flow (vph)	19	1170	44	38	623	15	29	18	30	48	23	32
RTOR Reduction (vph)	0	2	0	0	1	0	0	26	0	0	26	0
Lane Group Flow (vph)	0	1231	0	0	675	0	0	51	0	0	77	0
Confl. Peds. (#/hr)	25		7	7		25	9		4	4		9
Confl. Bikes (#/hr)			1			2						
Heavy Vehicles (%)	0%	0%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	10	10	0	10	10	0	0	0	0	0	0
Parking (#/hr)							6	6	6	6	6	6
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		58.3			58.3			9.7			9.7	
Effective Green, g (s)		60.3			60.3			11.7			11.7	
Actuated g/C Ratio		0.75			0.75			0.15			0.15	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		1.0			1.0			3.0			3.0	
Lane Grp Cap (vph)		2214			1949			192			164	
v/s Ratio Prot												
v/s Ratio Perm		c0.42			0.26			0.04			c0.07	
v/c Ratio		0.56			0.35			0.27			0.47	
Uniform Delay, d1		4.2			3.3			30.3			31.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.0			0.5			0.8			2.1	
Delay (s)		5.2			3.8			31.1			33.5	
Level of Service		A			A			C			C	
Approach Delay (s)		5.2			3.8			31.1			33.5	
Approach LOS		A			A			C			C	

Intersection Summary				
HCM 2000 Control Delay	7.1	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.54			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	64.5%	ICU Level of Service	C	

Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
4: South Dakota Avenue & Kennedy Street

Total Future with Improvements SAT

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	119	5	12	64	5	33	17	766	35	37	793	143
Future Volume (vph)	119	5	12	64	5	33	17	766	35	37	793	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	15	15	15	10	11	11	11	11	11
Grade (%)		-7%			-2%			2%			-2%	
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00			0.95			0.95	
Frpb, ped/bikes	1.00	0.98			1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00			0.99			1.00			1.00	
Frt	1.00	0.90			0.96			0.99			0.98	
Flt Protected	0.95	1.00			0.97			1.00			1.00	
Satd. Flow (prot)	1460	1356			1739			3045			3073	
Flt Permitted	0.69	1.00			0.80			0.92			0.88	
Satd. Flow (perm)	1060	1356			1440			2801			2717	
Peak-hour factor, PHF	0.75	0.75	0.75	0.85	0.85	0.85	0.88	0.88	0.88	0.83	0.83	0.83
Adj. Flow (vph)	159	7	16	75	6	39	19	870	40	45	955	172
RTOR Reduction (vph)	0	13	0	0	22	0	0	4	0	0	16	0
Lane Group Flow (vph)	159	10	0	0	98	0	0	925	0	0	1156	0
Confl. Peds. (#/hr)	2		9	9		2	10		16	16		10
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	3%	0%	0%	0%
Parking (#/hr)	6	6	6									
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6			2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)	14.9	14.9			14.9			53.1			53.1	
Effective Green, g (s)	16.9	16.9			16.9			55.1			55.1	
Actuated g/C Ratio	0.21	0.21			0.21			0.69			0.69	
Clearance Time (s)	6.0	6.0			6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0			3.0			1.0			1.0	
Lane Grp Cap (vph)	223	286			304			1929			1871	
v/s Ratio Prot		0.01										
v/s Ratio Perm	c0.15				0.07			0.33			c0.43	
v/c Ratio	0.71	0.04			0.32			0.48			0.62	
Uniform Delay, d1	29.3	25.1			26.7			5.8			6.7	
Progression Factor	1.00	1.00			1.00			0.41			1.00	
Incremental Delay, d2	10.3	0.1			0.6			0.7			1.5	
Delay (s)	39.6	25.1			27.3			3.1			8.3	
Level of Service	D	C			C			A			A	
Approach Delay (s)		37.8			27.3			3.1			8.3	
Approach LOS		D			C			A			A	

Intersection Summary				
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.64			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	79.4%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
5: South Dakota Avenue & Jefferson Street

Total Future with Improvements SAT

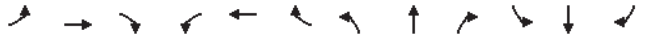
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	14	9	739	18	9	952
Future Volume (Veh/h)	14	9	739	18	9	952
Sign Control	Stop		Free			Free
Grade	-7%		2%			-2%
Peak Hour Factor	0.75	0.75	0.96	0.96	0.85	0.85
Hourly flow rate (vph)	19	12	770	19	11	1120
Pedestrians	10		2			3
Lane Width (ft)	12.0		10.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			270			306
pX, platoon unblocked	0.90	0.90			0.90	
vC, conflicting volume	1374	408			799	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	691	123			557	
tC, single (s)	6.8	7.1			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.2	
p0 queue free %	94	98			99	
cM capacity (veh/h)	337	782			915	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	31	513	276	384	747
Volume Left	19	0	0	11	0
Volume Right	12	0	19	0	0
cSH	432	1700	1700	915	1700
Volume to Capacity	0.07	0.30	0.16	0.01	0.44
Queue Length 95th (ft)	6	0	0	1	0
Control Delay (s)	14.0	0.0	0.0	0.4	0.0
Lane LOS	B			A	
Approach Delay (s)	14.0	0.0		0.1	
Approach LOS	B				

Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	47.2%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
6: South Dakota Avenue & Ingraham Street

Total Future with Improvements SAT



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	1	71	0	1	5	83	691	14	6	788	77
Future Volume (vph)	75	1	71	0	1	5	83	691	14	6	788	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	10	10	10	10	11	11	10	11	11
Grade (%)		-4%			-6%			2%			-2%	
Total Lost time (s)		7.0			7.0			7.0			7.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			0.98			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.93			0.88			1.00			0.99	
Flt Protected		0.98			1.00			0.99			1.00	
Satd. Flow (prot)		1320			1238			3055			3088	
Flt Permitted		0.84			1.00			0.70			0.95	
Satd. Flow (perm)		1131			1238			2155			2932	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.89	0.89	0.89	0.82	0.82	0.82
Adj. Flow (vph)	100	1	95	0	1	7	93	776	16	7	961	94
RTOR Reduction (vph)	0	46	0	0	6	0	0	1	0	0	8	0
Lane Group Flow (vph)	0	150	0	0	2	0	0	884	0	0	1054	0
Confl. Peds. (#/hr)	6		3	3		6	11		4	4		11
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Parking (#/hr)	6	6	6	6	6	6						
Turn Type	Perm	NA			NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		14.5			14.5			51.5			51.5	
Effective Green, g (s)		14.5			14.5			51.5			51.5	
Actuated g/C Ratio		0.18			0.18			0.64			0.64	
Clearance Time (s)		7.0			7.0			7.0			7.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		204			224			1387			1887	
v/s Ratio Prot					0.00							
v/s Ratio Perm		c0.13						c0.41			0.36	
v/c Ratio		0.74			0.01			0.64			0.56	
Uniform Delay, d1		30.9			26.9			8.6			7.9	
Progression Factor		1.00			1.00			1.00			0.86	
Incremental Delay, d2		12.9			0.0			2.2			1.0	
Delay (s)		43.9			26.9			10.9			7.8	
Level of Service		D			C			B			A	
Approach Delay (s)		43.9			26.9			10.9			7.8	
Approach LOS		D			C			B			A	

Intersection Summary				
HCM 2000 Control Delay	12.4	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.66			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.0	
Intersection Capacity Utilization	85.5%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
7: South Dakota Avenue & Garage Entrance/Hamilton Street

Total Future with Improvements SAT

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	0	17	3	0	11	18	777	3	10	851	20
Future Volume (vph)	19	0	17	3	0	11	18	777	3	10	851	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	10	12	12	11	11	11
Grade (%)		0%			-5%			1%			-2%	
Total Lost time (s)		4.0			4.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.94			0.89			1.00			1.00	
Flt Protected		0.97			0.99			1.00			1.00	
Satd. Flow (prot)		1549			1290			3165			2894	
Flt Permitted		0.97			0.99			0.92			0.94	
Satd. Flow (perm)		1549			1290			2920			2734	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.90	0.90	0.90	0.82	0.82	0.82
Adj. Flow (vph)	25	0	23	4	0	15	20	863	3	12	1038	24
RTOR Reduction (vph)	0	0	0	0	17	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	48	0	0	2	0	0	886	0	0	1073	0
Confl. Peds. (#/hr)	1		1	1		1	17		9	9		17
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Parking (#/hr)				6	6	6					6	6
Turn Type	Split	NA		Split	NA		Perm	NA		Perm	NA	
Protected Phases	3	3		4	4			6			2	
Permitted Phases							6			2		
Actuated Green, G (s)		6.6			5.0			41.4			41.4	
Effective Green, g (s)		8.6			7.0			43.4			43.4	
Actuated g/C Ratio		0.12			0.10			0.62			0.62	
Clearance Time (s)		6.0			6.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			1.0			1.0	
Lane Grp Cap (vph)		190			129			1810			1695	
v/s Ratio Prot		c0.03			c0.00							
v/s Ratio Perm								0.30			c0.39	
v/c Ratio		0.25			0.01			0.49			0.63	
Uniform Delay, d1		27.8			28.4			7.3			8.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.7			0.0			0.9			1.8	
Delay (s)		28.5			28.4			8.2			10.1	
Level of Service		C			C			A			B	
Approach Delay (s)		28.5			28.4			8.2			10.1	
Approach LOS		C			C			A			B	

Intersection Summary				
HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.50			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	51.1%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
8: South Dakota Avenue & Galloway Street

Total Future with Improvements SAT

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	16	83	3	16	8	84	757	3	9	856	16
Future Volume (vph)	26	16	83	3	16	8	84	757	3	9	856	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	14	14	11	11	11	11	12	12	11	12	12
Grade (%)		-4%			-1%			2%			-1%	
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.91			0.96			1.00			1.00	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		1519			1335			3152			3180	
Flt Permitted		0.94			0.97			0.65			0.94	
Satd. Flow (perm)		1437			1302			2071			3000	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.89	0.89	0.89	0.79	0.79	0.79
Adj. Flow (vph)	35	21	111	4	21	11	94	851	3	11	1084	20
RTOR Reduction (vph)	0	83	0	0	8	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	84	0	0	28	0	0	948	0	0	1113	0
Confl. Peds. (#/hr)	9		1	1		9	19		10	10		19
Heavy Vehicles (%)	12%	0%	6%	0%	0%	0%	6%	1%	0%	0%	2%	17%
Bus Blockages (#/hr)	6	6	6	6	6	6	0	0	0	0	0	0
Parking (#/hr)				6	6	6						6
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		8			4		5	2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)		18.0			18.0			47.0			36.0	
Effective Green, g (s)		20.0			20.0			49.0			38.0	
Actuated g/C Ratio		0.25			0.25			0.61			0.48	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		359			325			1376			1425	
v/s Ratio Prot								c0.07				
v/s Ratio Perm		c0.06			0.02			0.35			c0.37	
v/c Ratio		0.23			0.09			0.69			0.78	
Uniform Delay, d1		23.9			23.0			10.4			17.5	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.5			0.5			2.8			4.3	
Delay (s)		25.4			23.5			13.2			21.9	
Level of Service		C			C			B			C	
Approach Delay (s)		25.4			23.5			13.2			21.9	
Approach LOS		C			C			B			C	

Intersection Summary				
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.60			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	78.3%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

Queuing and Blocking Report

Total Future with Improvements SAT

Intersection: 1: South Dakota Avenue & Riggs Road

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB
Directions Served	L	T	T	R	L	T	TR	L	L	T	TR	L
Maximum Queue (ft)	145	298	303	334	231	299	288	471	477	348	331	94
Average Queue (ft)	88	148	167	189	130	146	146	344	347	107	90	50
95th Queue (ft)	170	258	266	309	233	281	258	547	558	382	225	99
Link Distance (ft)		689	689	689		654	654			658	658	
Upstream Blk Time (%)										0	0	
Queuing Penalty (veh)										1	0	
Storage Bay Dist (ft)	120				230			550	550			70
Storage Blk Time (%)	5	17			6	0		0	2	0		7
Queuing Penalty (veh)	16	22			14	1		0	2	0		7

Intersection: 1: South Dakota Avenue & Riggs Road

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	160	162
Average Queue (ft)	67	62
95th Queue (ft)	134	131
Link Distance (ft)	487	487
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)	10	
Queuing Penalty (veh)	9	

Intersection: 2: First Place & Riggs Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	T	R	L	T	T	L	R
Maximum Queue (ft)	385	414	175	77	184	197	124	234
Average Queue (ft)	347	379	88	31	69	81	95	51
95th Queue (ft)	430	411	212	66	139	152	135	172
Link Distance (ft)	360	360			689	689		295
Upstream Blk Time (%)	13	41						
Queuing Penalty (veh)	0	0						
Storage Bay Dist (ft)			150	375			100	
Storage Blk Time (%)		37	0				11	0
Queuing Penalty (veh)		47	1				3	0

Intersection: 3: Chillum Place & Riggs Road

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	TR	LT	TR	LTR	LTR
Maximum Queue (ft)	307	330	262	203	95	103
Average Queue (ft)	142	161	104	46	41	52
95th Queue (ft)	263	286	200	132	81	93
Link Distance (ft)	654	654	352	352	724	355
Upstream Blk Time (%)			0			
Queuing Penalty (veh)			0			
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 4: South Dakota Avenue & Kennedy Street

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	L	TR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	123	39	116	253	176	162	180
Average Queue (ft)	68	12	53	111	50	89	112
95th Queue (ft)	118	36	98	222	119	144	164
Link Distance (ft)			242	242	242	658	658
Upstream Blk Time (%)				2	0		
Queuing Penalty (veh)				6	1		
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 5: South Dakota Avenue & Jefferson Street

Movement	WB	NB	NB	SB	SB
Directions Served	LR	T	TR	LT	T
Maximum Queue (ft)	67	126	53	69	45
Average Queue (ft)	20	12	3	8	3
95th Queue (ft)	52	73	28	40	22
Link Distance (ft)	235	209	209	242	242
Upstream Blk Time (%)		0			
Queuing Penalty (veh)		0			
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: South Dakota Avenue & Ingraham Street

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	149	30	235	229	160	166
Average Queue (ft)	78	5	167	123	70	84
95th Queue (ft)	135	23	251	223	141	154
Link Distance (ft)	270	242	208	208	209	209
Upstream Blk Time (%)			4	1		0
Queuing Penalty (veh)			17	3		0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 7: South Dakota Avenue & Garage Entrance/Hamilton Street

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	79	28	226	182	152	165
Average Queue (ft)	29	7	74	43	42	51
95th Queue (ft)	65	23	183	131	114	127
Link Distance (ft)	171	303	406	406	208	208
Upstream Blk Time (%)					0	0
Queuing Penalty (veh)					0	0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 8: South Dakota Avenue & Galloway Street

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	107	36	365	349	273	286
Average Queue (ft)	37	8	245	179	134	149
95th Queue (ft)	84	26	389	327	218	231
Link Distance (ft)	286	369	350	350	406	406
Upstream Blk Time (%)			4	1		
Queuing Penalty (veh)			0	0		
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Zone Summary

Zone wide Queuing Penalty: 150