

APPENDIX D

U- 4913 INFORMATION



Draft Capacity Analysis Report
SR 3174 (Idlewild Rd) Widening with
Small Area Plan
(NCDOT STIP U-4913)

An Analysis of 2040 Build Alternatives

For:

North Carolina Department of Transportation

By:

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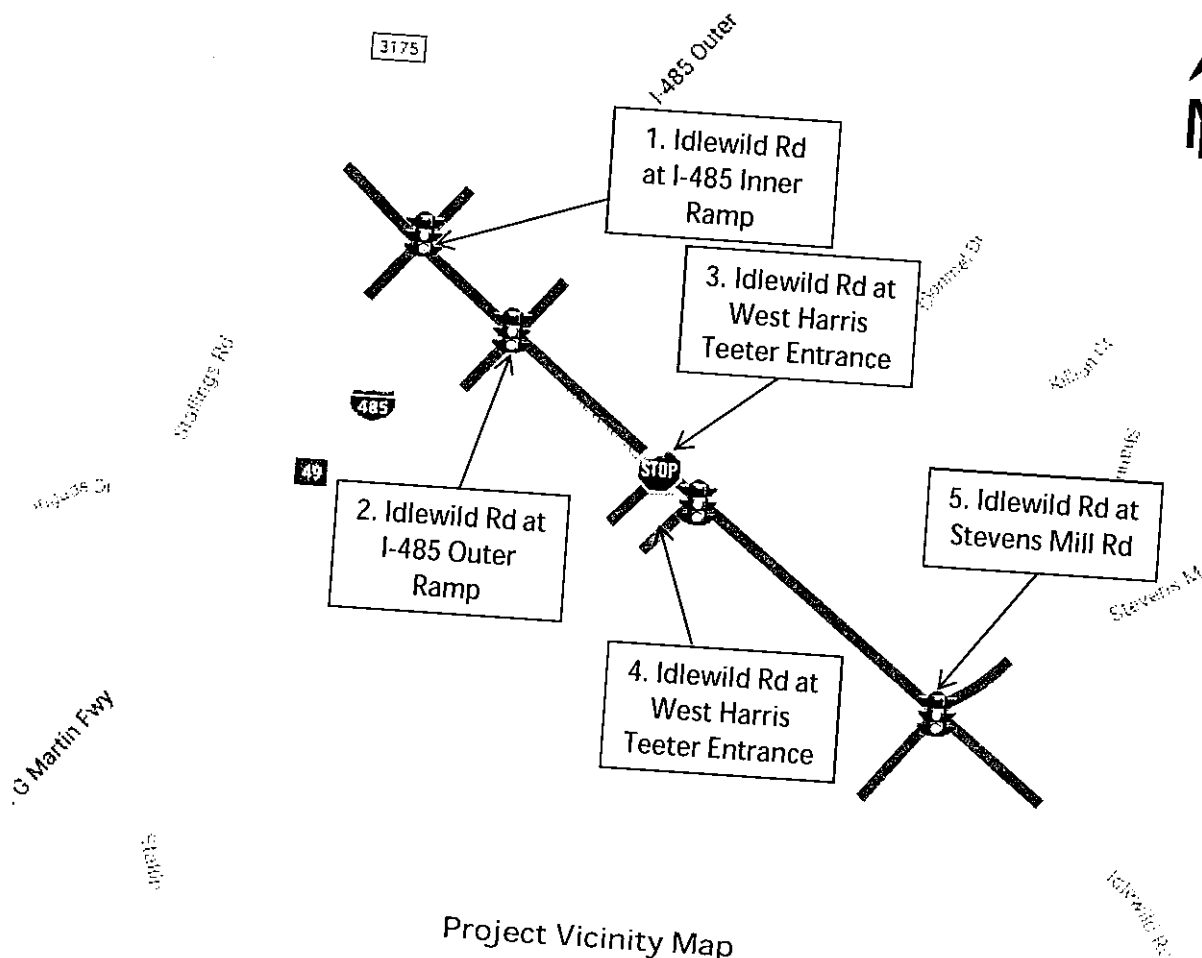
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1.0 INTRODUCTION

This report summarizes the capacity analysis findings for North Carolina Department of Transportation (NCDOT) State Transportation Improvement Program (STIP) Project U-4913 supplemental traffic analysis including the small area plan. U-4913 consists of widening SR 3174/SR 1582 (Idlewild Rd) in Mecklenburg and Union Counties. In the vicinity of the project, Idlewild Rd serves as an east-west collector route connecting eastern suburbs of Charlotte to I-485.

The previous Build Alternatives studied for this project involved upgrading and widening of the corridor between Stallings Rd and Stevens Mill Rd. The widening for the previous alternatives was kept to a four-lane section. For this supplemental study, traffic operations were analyzed with the small area plan to determine the roadway sections and intersection lane configurations needed to maintain acceptable levels of service.

The analysis area is shown in the Project Vicinity Map and the Small Area Plan graphic. The green line represents AECOM's project limits (from the capacity analysis perspective).



Project Vicinity Map

The following intersections are included in the traffic analysis and shown in the Project Vicinity Map:

1. Idlewild Rd at I-485 Inner Ramps
2. Idlewild Rd at I-485 Outer Ramps
3. Idlewild Rd at west Harris Teeter Entrance
4. Idlewild Rd at east Harris Teeter Entrance
5. Idlewild Rd at Stevens Mill Rd

2.0 SCOPE

This report includes an evaluation of the following alternatives:

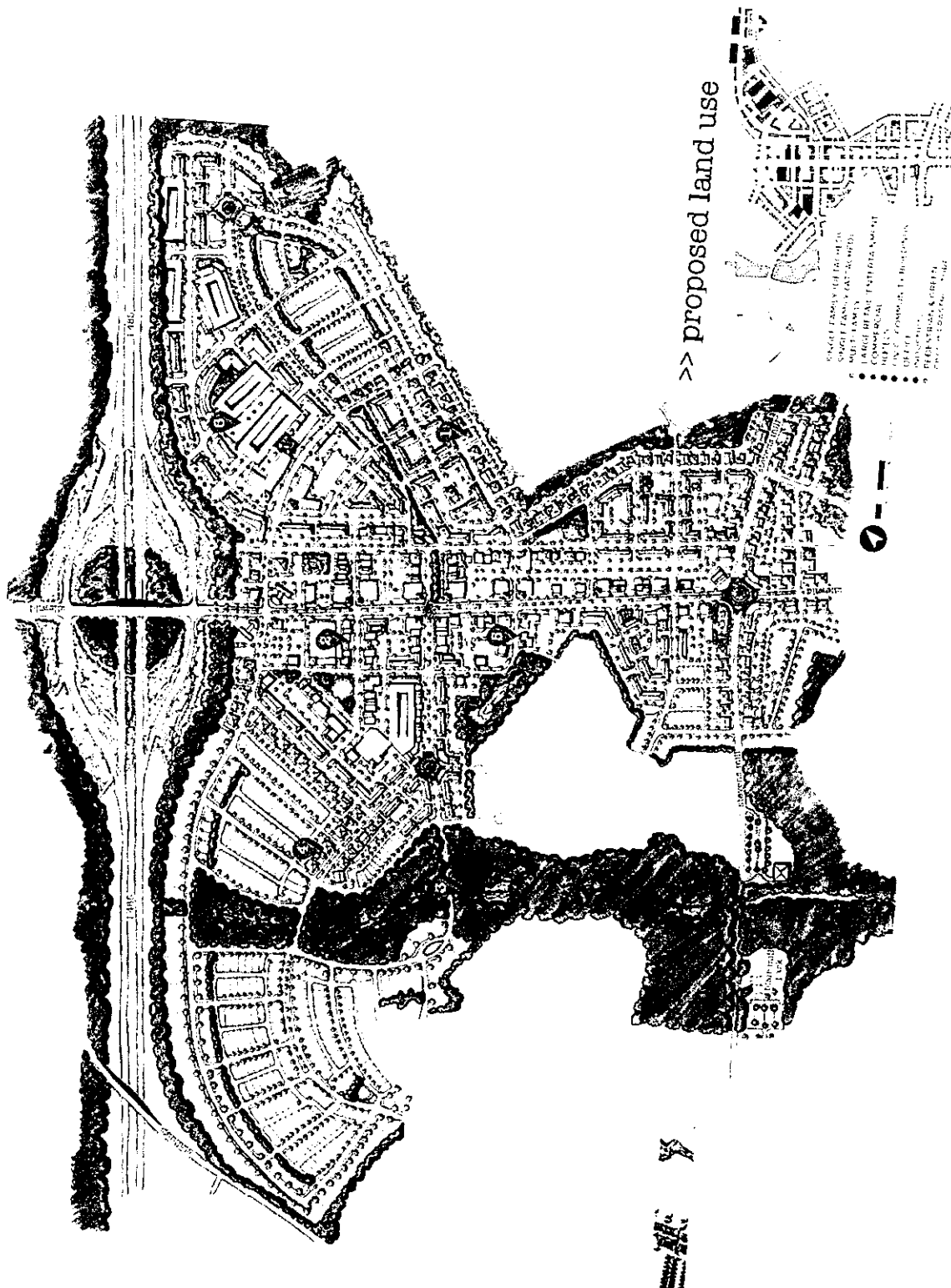
- Trip generation estimates based on the proposed development plans.
- Trip distribution and trip assignment for the proposed development at the study area intersections.
- 2040 Build Alternative – Traditional Intersections With Small Area Plan
- 2040 Build Alternative – Superstreet Intersections With Small Area Plan
- Idlewild Rd at Stallings Rd – Roundabout Failure Year
- 2040 Build Alternative – Superstreet Intersections – Steven's Mill Adjustments

Using the traffic volume data included in the Capacity Analysis Report dated September 2017, a Synchro and SimTraffic capacity analysis was performed. Per the current scope of the project, the analysis includes build conditions without the small area master plan and build conditions with the small area master plan with recommendations on future improvements.

All of the 2040 Build Alternatives include a Diverging Diamond Interchange (DDI) at I-485. The Traditional Intersections alternative includes a median divided roadway from I-485 to Stevens Mill Rd and the Superstreet Intersections alternative includes superstreet intersections from I-485 to Stevens Mill Rd with less access points to the small area plan, as discussed in section 5.0.

A roundabout failure year analysis was also conducted at the proposed Idlewild Rd at Stallings Rd roundabout. This analysis was used to determine the year in which either a LOS E or a V/C ratio of higher than 0.85 is projected. The roundabout failure year analysis was conducted for the conditions without the small area plan and also with the small area plan.

The 2040 Build Alternative – Superstreet Intersections – Steven's Mill Adjustments was included to determine what additional improvements were necessary to achieve LOS D at the Stevens Mill Rd intersection with the superstreet intersection without the small area plan.



Small Area Plan

3.0 EXISTING CONDITIONS

SR 3174/SR 1582 (Idlewild Rd) is two lane roadway that serves as an east-west collector route connecting eastern suburbs of Charlotte to I-485. It widens to four lanes at the I-485 interchange only. It carries 23,000 vehicles per day at the I-485 interchange, dropping to 18,000 vehicles per day west of the interchange. It has a posted speed limit of 45 miles per hour (mph). Approximately 2% of this traffic is heavy vehicles.

SR 3175 (Stallings Rd) is an north-south collector roadway providing access mainly to residential communities. It is a two lane roadway and carries 6,000 vehicles per day. It is stop controlled at Idlewild Rd. Approximately 2% of this traffic is heavy vehicles.

I-485 is a four-lane divided interstate with ramps that carry between 3,500 to 5,200 vehicles per day. It has a diamond configuration with signals at each ramp intersection.

The Harris Teeter shopping center is served by two access driveways. The western driveway is right in / right out with a stop sign and leads to the center of the shopping center. The eastern driveway is full movement signalized and leads to the side of the shopping center.

SR 1524 (Stevens Mill Rd) is a north-south collector roadway providing access mainly to residential communities. It is two-lane undivided road and widens at Idlewild Rd to provide turn lanes. It carries 8,500 vehicles per day. Approximately 2% of this traffic is heavy vehicles.

4.0 METHOD OF ANALYSIS

4.1 Traffic Volume Assumptions

Traffic volume data included in the Capacity Analysis Report dated September 2017 was used for the 2040 Build Alternative – Traditional Intersections and 2040 Build Alternative – Superstreet Intersections with the small area plan.

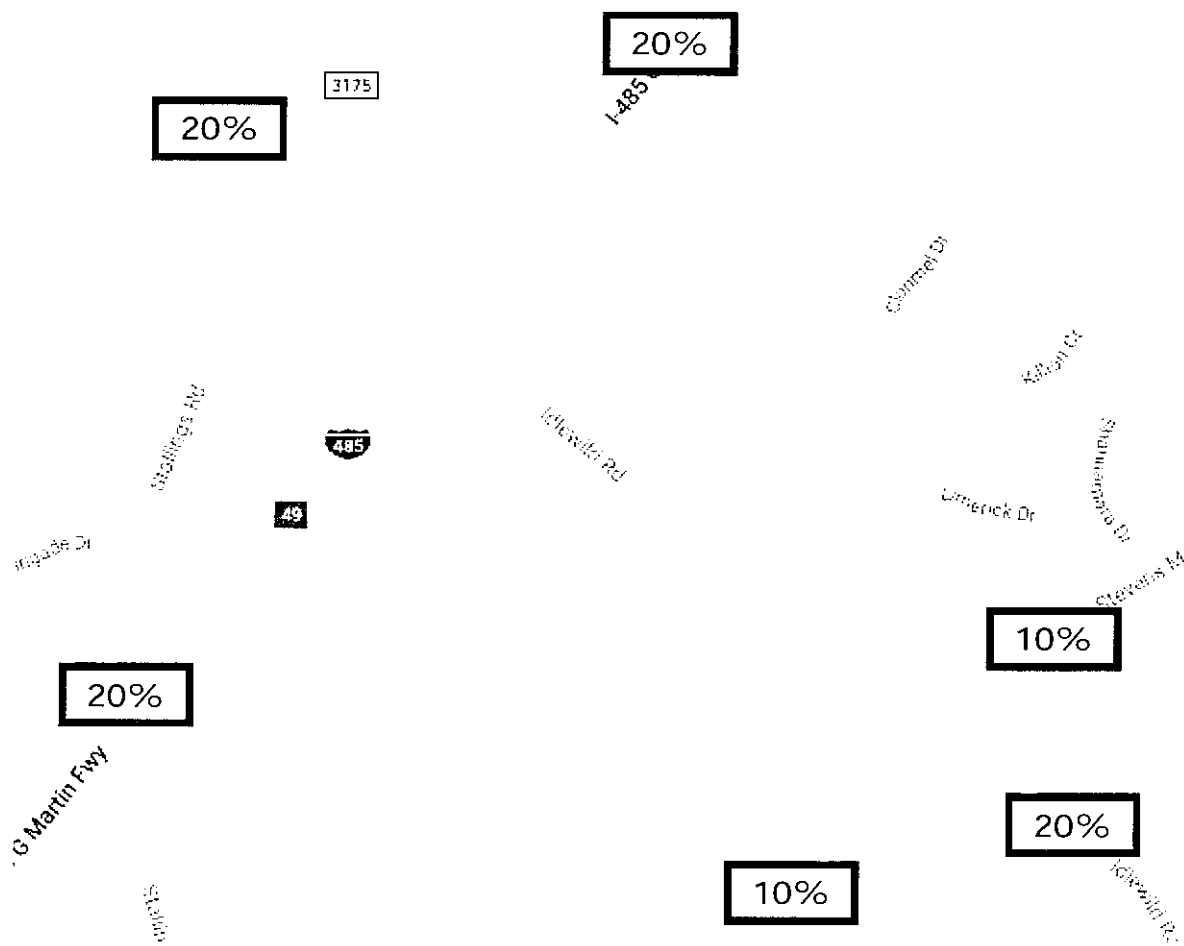
4.2 Trip Generation

Estimates of daily, AM peak hour and PM peak hour trips generated by the proposed small area plan were developed based on rates published in the Trip Generation Manual, 10th Edition (Institute of Transportation Engineers, 2017). The trip generation rates and resulting trip generation for the proposed small area plan are discussed in Section 5.0 of this report.

Due to the high-level nature of this analysis, internal trip and pass-by trip reductions were not applied to the trips generated by the small area plan.

4.3 Trip Distribution and Assignment

Trip distribution is the percentage of site traffic that travels on various roadways to and from the site. A generalized trip distribution for the daily, AM, and PM peak hour were developed based on knowledge of the study area, locations of residential developments and employment centers, and logical travel paths to and from major travel corridors in the vicinity of the site. The trip distribution percentages assumed in this study assigned to non-internal capture trips are shown in the Small Area Plan Trip Distribution graphic.



Small Area Plan Trip Distribution

4.4 Capacity Analysis

The highway capacity analyses performed were based on methodologies from the *Highway Capacity Manual (HCM 2010)*. Traffic modeling software used in the capacity analyses were *Synchro 9.1* and *SimTraffic 9.2, (Build 914, Rev 6)*. The analyses were conducted in accordance with the latest NCDOT Congestion Management Unit's *Capacity Analysis Guidelines for TIP projects*, dated July 2015.

The traffic carrying ability of a roadway is described by levels of service (LOS) that range from LOS A to LOS F. Table 1 defines the traffic flow conditions and approximate driver comfort level at each level of service for signalized and unsignalized intersections, as well as basic freeway segments and ramp merges/diverges. Note that the delays associated with LOS for signalized intersections are different from those associated with unsignalized intersections. *HCM 2010* explains that drivers perceive that a signalized intersection is designed to carry higher traffic volumes, and therefore expect to experience greater delays at signalized intersections. A signalized intersection is described by a single LOS. Unsignalized intersections are assigned a LOS for each minor movement.

Table 1 – Level of Service (LOS) Index			
LOS	Traffic Flow Conditions	Delay (sec) Signalized Intersections	Delay (sec) Unsignalized Intersections
A	Progression is extremely favorable and most vehicles do not stop at all.	≤ 10	≤ 10
B	Good progression, some delay.	> 10 - 20	> 10 - 15
C	Fair progression, higher delay.	> 20 - 35	> 15 - 25
D	Unfavorable progression, congestion becomes apparent.	> 35 - 55	> 25 - 35
E	Poor progression, substantial delay.	> 55 - 80	> 35 - 50
F	Poor progression, extreme delay.	> 80	> 50

Source: HCM 2010

The roundabout failure year analysis at the proposed Idlewild Rd and Stallings Rd roundabout was conducted in *SIDRA INTERSECTION (Version 7.0.7.6759)*. The analysis was used to determine the year in which either a LOS E or a V/C ratio of higher than 0.85 is projected.

5.0 SMALL AREA PLAN

The small area plan includes a mixed-use core of commercial and office land use with multi-family housing serving as a buffer between the mixed-use and single family residential land use. The land use locations are shown in the Small Area Plan graphic.

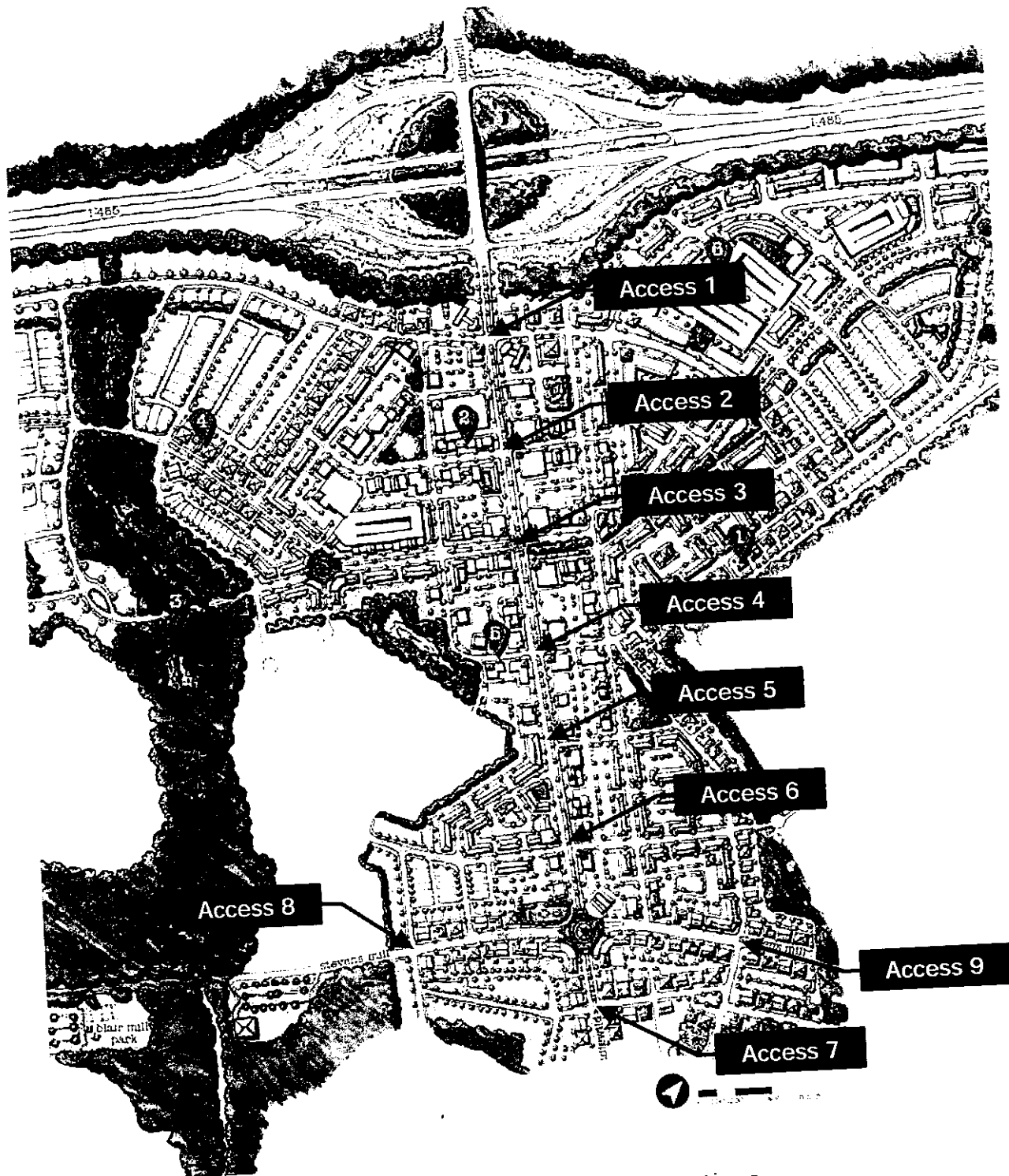
Based on the small area plan, land use amounts were estimated. The proposed land uses and the estimated amounts of each land use is shown in Table 2.

Table 2 – Small Area Plan Land Use Summary	
Land Use	Amount
Single-Family Detached	370 units
Multi-Family ¹	3152 units
Commercial	555,000 s.f.
Hotel	150 rooms
Office	835,000 s.f.

1. Multi-family housing also includes single family attached

Access to the site would be provided by the following nine intersections, seven access intersections along Idlewild Rd (one full access and five right-in right-out intersections) and two access intersections along Stevens Mill Rd (both full access), shown in the Small Area Plan Access Intersections graphic. All of these access points were assumed to be utilized for the 2040 Build Alternative – Traditional Intersection.

The trip generation rates/equations are shown in Appendix A and resulting trip generation are shown in Table 3. The proposed development is expected to generate 49,490 average weekday daily, 2,585 A.M. peak hour (1,321 in, 1,264 out), and 4,445 P.M. peak hour (2,085 in, 2,360 out) trips.



Small Area Plan Access Intersections

Table 3 – Trip Generation Rates for the Small Area Plan

Land Use	ITE	Average Daily	AM Peak			PM Peak		
	Code		In	Out	Total	In	Out	Total
Single-Family Detached	210	3,465	67	201	268	226	131	357
Multi-Family	220	17,177	252	755	1,007	756	460	1,216
Commercial	820	19,281	266	163	429	926	1,005	1,931
Hotel	310	1,254	35	35	70	43	43	86
Office	710	8,313	701	110	811	134	721	855
Total New Trips		49,490	1,321	1,264	2,585	2,085	2,360	4,445

The total new external trips generated by the proposed small area plan shown in Table 3 were assigned to the study area network according to the appropriate distributions shown in the Small Area Plan Trip Distribution graphic with consideration to the driver's origin/destination location and the ease of access for each turning movement at the study area intersections. The total new external AM and PM peak hour trip assignment of site-generated trips at the study area intersections are presented in Figure 1 and 2.

The 2040 Build Alternative – Traditional Intersections peak hour traffic volumes were developed by combining the 2040 Build Alternative without small area plan peak hour traffic volumes (from the Capacity Analysis Report dated September 2017) and the small area plan peak hour traffic assignment shown in Figure 1 and 2. The 2040 Build Alternative – Traditional Intersections peak hour traffic volumes are shown in Figure 3 and 4.

For the 2040 Build Alternative – Superstreet Intersections, access was eliminated at Access 2, Access 5, and at the east leg of Access 7 due to the proposed locations of the u-turn intersections. The volumes associated with the eliminated access locations were rerouted to other access points based on logical travel patterns. The 2040 Build Alternative – Superstreet Intersections peak hour traffic volumes are shown in Figure 7 and 8.

6.0 FINDINGS

6.1 2040 Build Alternative – Traditional Intersections

A capacity analysis was performed for 2040 Build Alternative – Traditional Intersections With Small Area Plan for the AM and PM peak periods for all of the study intersections. In this alternative, the I-485 interchange is a DDI and Idlewild Rd is a median divided roadway with traditional intersections from I-485 to Stevens Mill Rd.

Levels of service for study intersections are summarized in Table 4. Traffic volumes are shown in Figure 3 and 4. Levels of service and lane configurations are shown in Figure 5 and 6, and detailed Synchro reports are located in Appendix B. As shown in the lane configurations, Idlewild Rd had to be widened to a six-lane section to accommodate the extra volumes from the small area plan and several turn lanes had to be added and/or extended at the study area intersections too.

Table 4 – 2040 Build Alternative - Traditional Intersections			
Level of Service			
#	Intersection	Level of Service	
		AM Peak	PM Peak
21	Idlewild Rd at I-485 Inner Ramps	B	B
	Eastbound Through	C	C
	Eastbound Right	C	B
	Westbound Left	A	A
	Westbound Through	A	A
	Southbound Left	B	B
	Southbound Right	C	B
22	Idlewild Rd at I-485 Outer Ramps	B	C
	Eastbound Left	C	C
	Eastbound Through	C	C
	Westbound Through	A	B
	Westbound Right	A	A
	Northbound Left	B	B
	Northbound Right	B	C

**Table 4 (Cont.) – 2040 Build Alternative - Traditional Intersections
Level of Service**

#	Intersection	Level of Service	
		AM Peak	PM Peak
3	Idlewild Rd at Access 1	B	B
	Eastbound Left	E	D
	Eastbound Through / Right	A	A
	Westbound Left	C	C
	Westbound Through	B	C
	Westbound Right	A	A
	Northbound Right	C	C
	Southbound Right	C	E
4	Idlewild Rd at Access 2	-	-
	Northbound Right	E	F
	Southbound Right	F	F
5	Idlewild Rd at Access 3	C	D
	Eastbound Left	F	E
	Eastbound Through / Right	B	C
	Westbound Left	D	F
	Westbound Through	B	C
	Westbound Right	A	B
	Northbound Left	E	F
	Northbound Through	E	E
	Northbound Right	F	F
	Southbound Left	F	F
	Southbound Through	E	E
	Southbound Right	E	E
6	Idlewild Rd at Access 4	-	-
	Northbound Right	E	F
	Southbound Right	F	F
7	Idlewild Rd at Access 5	-	-
	Northbound Right	E	F
	Southbound Right	F	F
8	Idlewild Rd at Access 6	-	-
	Northbound Right	*	*
	Southbound Right	*	*

Movements with zero delay were omitted

* Intersection has more lanes than HCS can calculate LOS

Table 4 (Cont.) – 2040 Build Alternative - Traditional Intersections Level of Service			
#	Intersection	Level of Service	
		AM Peak	PM Peak
9	Idlewild Rd at Stevens Mill Rd	D	D
	Eastbound Left	E	E
	Eastbound Through	B	C
	Eastbound Right	A	A
	Westbound Left	E	F
	Westbound Through	D	D
	Westbound Right	A	A
	Northbound Left	F	F
	Northbound Through	F	F
	Northbound Right	D	D
	Southbound Left	F	F
	Southbound Through	F	F
	Southbound Right	D	D
		-	-
10	Idlewild Rd at Access 7	-	-
	Northbound Right	D	F
	Southbound Right	F	E
11	Stevens Mill Rd at Access 8	-	-
	Eastbound Left / Through / Right	F	F
	Westbound Left / Through / Right	C	C
	Northbound Left / Through / Right	A	A
	Southbound Left	A	A
12	Stevens Mill Rd at Access 9	-	-
	Eastbound Left / Through / Right	F	F
	Westbound Left / Through / Right	F	F
	Northbound Left	A	B
	Southbound Left / Through / Right	A	B

As shown in Table 4, five (5) of the 12 intersections analyzed operate at LOS D in both peak hours. The Idlewild Rd and Steven Mill Rd intersection functions at LOS D in the peak hours. The right in / right out intersections along Idlewild Rd all operate at a LOS F in the AM and PM peak hours, although the v/c ratios are below 1.0. The full-access intersections along Stevens Mill Rd operate at LOS E or F in the AM and/or PM peak hours, indicating additional intersection improvements, like signalization, may be needed.

6.2 2040 Build Alternative – Superstreet Intersections

A capacity analysis was performed for 2040 Build Alternative – Superstreet Intersections for the AM and PM peak periods for all of the study intersections. In this alternative, the I-485 interchange is a DDI and Idlewild Rd has superstreet intersections from I-485 to Stevens Mill Rd. In the superstreet alternative, access was eliminated at Access 2, Access 5 and the east leg of Access 7 due to the proposed locations of the u-turn intersections.

Levels of service for study intersections are summarized in Table 5. Traffic volumes are shown in Figure 7 and 8. Levels of service and lane configurations are shown in Figure 9 and 10, and detailed Synchro reports are located in Appendix C. As shown in the lane configurations, Idlewild Rd had to be widened to a six-lane section to accommodate the extra volumes from the small area plan and several turn lanes had to be added and/or extended at the study area intersections too.

Table 5 – 2040 Build Alternative - Superstreet Intersections Level of Service			
#	Intersection	Level of Service	
		AM Peak	PM Peak
21	Idlewild Rd at I-485 Inner Ramps	B	B
	Eastbound Through	C	C
	Eastbound Right	C	B
	Westbound Left	B	A
	Westbound Through	B	A
	Southbound Left	B	B
	Southbound Right	C	B
22	Idlewild Rd at I-485 Outer Ramps	B	C
	Eastbound Left	B	C
	Eastbound Through	B	C
	Westbound Through	B	B
	Westbound Right	A	A
	Northbound Left	B	B
	Northbound Right	B	C

**Table 5 (Cont.) – 2040 Build Alternative - Superstreet Intersections
Level of Service**

#	Intersection	Level of Service	
		AM Peak	PM Peak
31	Idlewild Rd EB at Access 1	A	A
	Eastbound Through	A	A
	Eastbound Right	A	A
	Westbound Left	C	C
	Northbound Right	C	C
32	Idlewild Rd WB at Access 1	B	C
	Eastbound Left	E	D
	Westbound Through / Right	B	B
	Southbound Right	C	E
41	Idlewild Rd EB at Access 3 & Access 4 U-Turn	A	B
	Eastbound Through	A	A
	Westbound U-Turn	D	D
51	Idlewild Rd EB at Access 3	A	C
	Eastbound Through	A	C
	Eastbound Right	A	A
	Westbound Left	C	D
	Northbound Right	C	F
52	Idlewild Rd WB at Access 3	C	D
	Eastbound Left	E	D
	Westbound Through / Right	C	C
	Southbound Right	D	F
61	Idlewild Rd EB at Access 4	-	-
	Northbound Right	E	F
62	Idlewild Rd WB at Access 4	-	-
	Southbound Right	F	F
71	Idlewild Rd EB at Access 6 U-Turn	B	C
	Eastbound Through	A	B
	Westbound U-Turn	C	E
72	Idlewild Rd WB at Access 3 & Access 4 U-Turn	A	B
	Eastbound U-Turn	D	C
	Westbound Through	A	A
81	Idlewild Rd EB at Access 6	-	-
	Northbound Right	*	*

**Table 5 (Cont.) – 2040 Build Alternative - Superstreet Intersections
Level of Service**

#	Intersection	Level of Service	
		AM Peak	PM Peak
82	Idlewild Rd WB at Access 6	-	-
	Southbound Right	F	F
91	Idlewild Rd EB at Stevens Mill Rd	B	C
	Eastbound Through	B	C
	Eastbound Right	A	B
	Westbound Left	C	D
	Northbound Right	C	E
92	Idlewild Rd WB at Stevens Mill Rd	C	B
	Eastbound Left	C	C
	Westbound Through	C	B
	Westbound Right	A	A
	Southbound Right	E	D
101	Idlewild Rd EB at Access 7	-	-
	Northbound Right	D	F
102	Idlewild Rd WB at Stevens Mill Rd U-Turn	B	B
	Eastbound U-Turn	B	C
	Westbound Through	C	B
11	Stevens Mill Rd at Access 8	-	-
	Eastbound Left / Through / Right	F	F
	Westbound Left / Through / Right	C	C
	Northbound Left / Through / Right	A	A
	Southbound Left	A	A
12	Stevens Mill Rd at Access 9	-	-
	Eastbound Left / Through / Right	F	F
	Westbound Left / Through / Right	F	F
	Northbound Left	A	B
	Southbound Left / Through / Right	A	B

Movements with zero delay were omitted

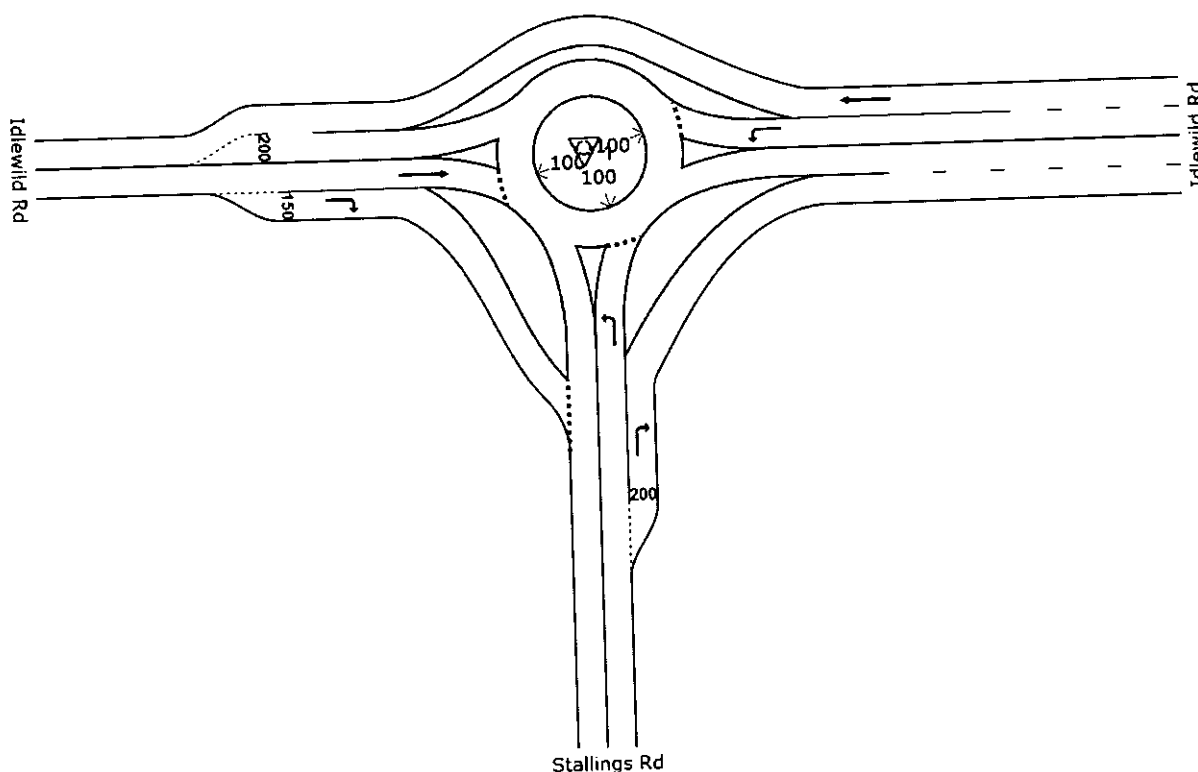
* Intersection has more lanes than HCS can calculate LOS

As shown in Table 5, 12 of the 19 intersections operate at LOS D or better in both peak hours. The Idlewild Rd and Steven Mill Rd superstreet intersection functions at LOS C or better in the peak hours. Most of the right in / right out intersections along Idlewild Rd operate at a LOS E or LOS F in the AM and/or PM peak hours, although the v/c ratios are below 1.0. The full-access intersections along Stevens Mill Rd operate at F in the AM and PM peak hours, indicating additional intersection improvements, like signalization, may be needed.

6.3 Idlewild Rd at Stallings Rd – Roundabout Failure Year

A roundabout failure year analysis was conducted at the proposed Idlewild Rd at Stallings Rd roundabout. This analysis was used to determine the year in which either a LOS E or a V/C ratio of higher than 0.85 is projected. The roundabout failure year analysis was conducted for the conditions without the small area plan and also with the small area plan.

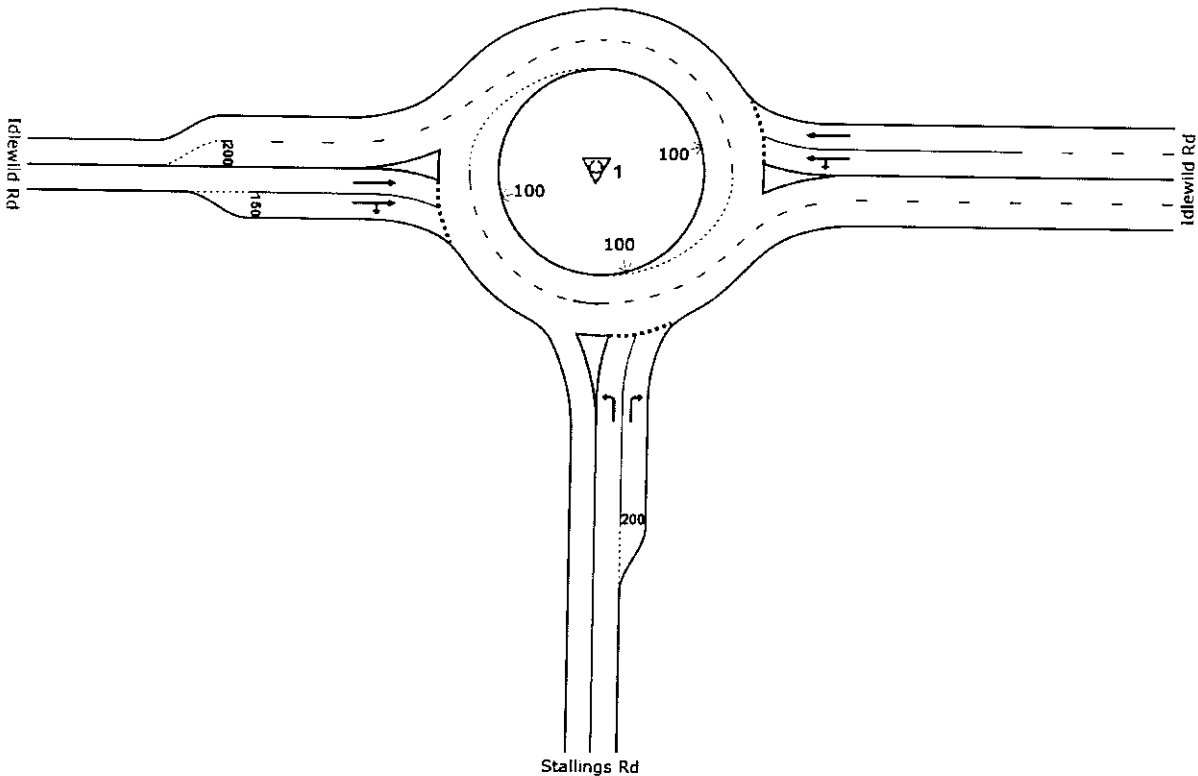
For the alternative without the small area plan, the lane configurations are shown in the Idlewild Rd at Stallings Rd Roundabout – Without Small Area Plan graphic.



Idlewild Rd at Stallings Rd Roundabout – Without Small Area Plan

For the alternative without the small area plan, the failure year analysis conducted in SIDRA INTERSECTION showed that the roundabout would fail in 20 years based on the AM peak hour volumes and 10 years based on the PM peak hour volumes. Therefore, the roundabout without the small area master plan has a failure year of 2027. The results of this analysis are shown in Appendix D.

For the alternative with the small area plan, the lane configurations are shown in the Idlewild Rd at Stallings Rd Roundabout – With Small Area Plan graphic.



Idlewild Rd at Stallings Rd Roundabout – With Small Area Plan

The traffic volumes for this alternative include the traffic generated by the small area plan. The with small area plan analysis assumed that 15% of the traffic to/from the small area plan were to/from the west along Idlewild Rd and that 5% of the traffic to/from the small area plan were to/from the west along Stallings Rd.

For the alternative with the small area plan, the failure year analysis conducted in SIDRA INTERSECTION showed that the roundabout would fail at opening based on both the AM and PM peak hour volumes. The results of this analysis are shown in Appendix D.

6.4 2040 Build Alternative – Superstreet Intersections – Stevens Mill Adjustments

A capacity analysis was performed for 2040 Build Alternative – Superstreet Intersections for the AM and PM peak periods for the Stevens Mill Road location without the small area plan. In this alternative, modifications were made to this location to achieve LOS D.

Levels of service for study intersections are summarized in Table 6. Detailed Synchro reports are located in Appendix E.

Table 6 – 2040 Build Alternative - Superstreet Intersections – Stevens Mill Adjustments			
Level of Service			
#	Intersection	Level of Service	
		AM Peak	PM Peak
61	Idlewild Rd at Stevens Mill Rd Eastbound	B	D
	Eastbound Through	B	D
	Eastbound Right	A	A
	Westbound Left	D	C
	Northbound Right	D	F
62	Idlewild Rd at Stevens Mill Rd Westbound	D	B
	Westbound Through	D	B
	Westbound Right	A	A
	Eastbound Left	D	C
	Southbound Right	F	D
63	Idlewild Rd at Stevens Mill Rd Eastbound U-Turn	B	D
	Eastbound Through	A	C
	Eastbound U-Turn	D	F
64	Idlewild Rd at Stevens Mill Rd Westbound U-Turn	C	B
	Westbound Through	C	B
	Westbound U-Turn	F	D

For the AM peak hour, it was necessary to add a third right turn lane from SB Stevens Mill Rd, and an additional receiving lane that drops at the U-turn. For the PM peak hour, the coordination offsets were adjusted. Several movements still have a V/C ratio that exceeds 1.0.

7.0 REFINEMENT TO SMALL AREA PLAN

Based on the guidance from NCDOT, the small area plan was revised to reduce the number of proposed buildings, however the plans still includes the same property types. NCDOT provided the proposed land uses and the estimated amounts of each land use as shown in Table 7.

Table 7 – Revised Small Area Plan Land Use Summary	
Land Use	Amount
Single-Family Detached	101 units
Multi-Family	730 units
Commercial	384,100 s.f.
Hotel	150 rooms
Office	255,300 s.f.

The resulting trip generation for the revised Small area plan provided by NCDOT is shown in Table 8. The proposed development is expected to generate 25,332 average weekday daily, 1,072 A.M. peak hour (576 in, 496 out), and 2,285 P.M. peak hour (1,078 in, 1,207 out) trips.

Table 8 – Revised Trip Generation Rates for the Small Area Plan								
Land Use	ITE Code	Average Daily	AM Peak			PM Peak		
			In	Out	Total	In	Out	Total
Single-Family Detached	210	954	19	56	75	63	37	100
Multi-Family	220	5,478	72	243	315	219	128	347
Commercial	820	15,012	213	131	344	706	765	1,471
Hotel	310	42	29	71	46	44	90	1,254
Office	710	230	37	267	44	233	277	2,634
Total New Trips		25,332	576	496	1,072	1,078	1,207	2,285

Access to the site would still be provided by the proposed nine intersections, seven access intersections along Idlewild Rd (one full access and five right-in right-out intersections) and two access intersections along Stevens Mill Rd (both full access), shown in the Small Area Plan Access Intersections graphic.

The total new external trips generated by the proposed small area plan shown in Table 8 were assigned to the study area network according to the appropriate distributions shown in the Small Area Plan Trip Distribution graphic with consideration to the driver's origin/destination location and the ease of access for each turning movement at the study area intersections. The total new external AM and PM peak hour trip assignment of site-generated trips at the study area intersections are presented in Figure 11 and 12.

The 2040 Build Alternative – Traditional Intersections peak hour traffic volumes were developed by combining the 2040 Build Alternative without small area plan peak hour traffic volumes (from the Capacity Analysis Report dated September 2017) and the revised small area plan peak hour traffic assignment shown in Figure 11 and 12. The 2040 Build Alternative – Revised Traditional Intersections peak hour traffic volumes are shown in Figure 13 and 14.

For the 2040 Build Alternative – Superstreet Intersections, access was eliminated at Access 2, Access 5, and at the east leg of Access 7 due to the proposed locations of the u-turn intersections. The volumes associated with the eliminated access locations were rerouted to other access points based on logical travel patterns. The 2040 Build Alternative – Revised Superstreet Intersections peak hour traffic volumes are shown in Figure 19 and 20.

8.0 FINDINGS

8.1 2040 Build Alternative – Revised Traditional Intersections (4 lanes)

A capacity analysis was performed for 2040 Build Alternative – Traditional Intersections With Revised Small Area Plan for the AM and PM peak periods for all of the study intersections. In this alternative, the I-485 interchange is a DDI and Idlewild Rd is a median divided roadway with traditional intersections from I-485 to Stevens Mill Rd.

Levels of service for study intersections are summarized in Table 9. Traffic volumes are shown in Figure 13 and 14. Levels of service and lane configurations are shown in Figure 15 and 16, and detailed Synchro reports are located in Appendix F. As shown in the lane configurations, Idlewild Rd was assumed to be widened to a four-lane section with several turn lanes added and/or extended at the study area intersections.

Table 9 – 2040 Build Alternative - Revised Traditional Intersections Level of Service			
#	Intersection	Level of Service	
		AM Peak	PM Peak
21	Idlewild Rd at I-485 Inner Ramps	D	D
	Eastbound Through	F	F
	Eastbound Right	D	D
	Westbound Left	C	E
	Westbound Through	A	A
	Southbound Left	B	C
	Southbound Right	D	D
22	Idlewild Rd at I-485 Outer Ramps	F	F
	Eastbound Left	D	C
	Eastbound Through	F	F
	Westbound Through	F	F
	Westbound Right	A	A
	Northbound Left	D	C
	Northbound Right	C	D

**Table 9 (Cont.) – 2040 Build Alternative - Revised Traditional Intersections
Level of Service**

#	Intersection	Level of Service	
		AM Peak	PM Peak
3	Idlewild Rd at Access 1	C	E
	Eastbound Left	F	F
	Eastbound Through / Right	A	D
	Westbound Left	E	F
	Westbound Through	D	D
	Westbound Right	A	A
	Northbound Right	F	F
	Southbound Right	F	F
4	Idlewild Rd at Access 2	-	-
	Northbound Right	D	E
	Southbound Right	E	F
5	Idlewild Rd at Access 3	C	E
	Eastbound Left	F	F
	Eastbound Through / Right	A	F
	Westbound Left	F	F
	Westbound Through	C	C
	Westbound Right	A	A
	Northbound Left	F	E
	Northbound Through	F	F
	Northbound Right	F	F
	Southbound Left	F	E
	Southbound Through	F	F
	Southbound Right	F	F
6	Idlewild Rd at Access 4	-	-
	Northbound Right	D	F
	Southbound Right	E	D
7	Idlewild Rd at Access 5	-	-
	Northbound Right	C	E
	Southbound Right	E	E
8	Idlewild Rd at Access 6	-	-
	Northbound Right	*	*
	Southbound Right	*	*

Movements with zero delay were omitted

* Intersection has more lanes than HCS can calculate LOS

Table 9 (Cont.) – 2040 Build Alternative - Revised Traditional Intersections
Level of Service

#	Intersection	Level of Service	
		AM Peak	PM Peak
9	Idlewild Rd at Stevens Mill Rd	E	E
	Eastbound Left	F	E
	Eastbound Through	C	D
	Eastbound Right	A	A
	Westbound Left	F	F
	Westbound Through	E	D
	Westbound Right	A	A
	Northbound Left	F	F
	Northbound Through	F	F
	Northbound Right	E	E
	Southbound Left	F	F
	Southbound Through	F	F
	Southbound Right	E	D
10	Idlewild Rd at Access 7	-	-
	Northbound Right	D	E
	Southbound Right	E	D
11	Stevens Mill Rd at Access 8	-	-
	Eastbound Left / Through / Right	D	D
	Westbound Left / Through / Right	C	C
	Northbound Left / Through / Right	A	A
	Southbound Left	A	A
12	Stevens Mill Rd at Access 9	-	-
	Eastbound Left / Through / Right	D	D
	Westbound Left / Through / Right	F	F
	Northbound Left	A	A
	Southbound Left / Through / Right	A	A

As shown in Table 9, two (2) of the 12 intersections analyzed operate at LOS D or better in both peak hours. The Idlewild and I-485 Outer Ramps function at LOS F during both peak hours. The Idlewild Rd and Stevens Mill Rd intersection functions at LOS E in both peak hours. The right in / right out intersections along Idlewild Rd all operate at a LOS E or F in the AM and PM peak hours, although the v/c ratios are below 1.0. The full-access intersections along Stevens Mill Rd operate at LOS D to F in the AM and/or PM peak hours.

8.2 2040 Build Alternative – Revised Traditional Intersections (6 lanes)

A capacity analysis was performed for 2040 Build Alternative – Traditional Intersections With Revised Small Area Plan for the AM and PM peak periods for all of the study intersections. In this alternative, the I-485 interchange is a DDI and Idlewild Rd is a median divided roadway with traditional intersections from I-485 to Stevens Mill Rd.

Levels of service for study intersections are summarized in Table 10. Traffic volumes are shown in Figure 13 and 14. Levels of service and lane configurations are shown in Figure 17 and 18, and detailed Synchro reports are located in Appendix G. As shown in the lane configurations, Idlewild Rd was assumed to be widened to a six-lane section with several turn lanes added and/or extended at the study area intersections.

Table 10 – 2040 Build Alternative - Revised Traditional Intersections Level of Service			
#	Intersection	Level of Service	
		AM Peak	PM Peak
21	Idlewild Rd at I-485 Inner Ramps	B	C
	Eastbound Through	C	D
	Eastbound Right	B	B
	Westbound Left	B	A
	Westbound Through	B	B
	Southbound Left	B	C
	Southbound Right	B	B
22	Idlewild Rd at I-485 Outer Ramps	C	D
	Eastbound Left	D	D
	Eastbound Through	C	C
	Westbound Through	B	E
	Westbound Right	A	A
	Northbound Left	C	B
	Northbound Right	B	C

Table 10 (Cont.) – 2040 Build Alternative - Revised Traditional Intersections Level of Service

#	Intersection	Level of Service	
		AM Peak	PM Peak
3	Idlewild Rd at Access 1	A	A
	Eastbound Left	D	D
	Eastbound Through / Right	A	A
	Westbound Left	E	D
	Westbound Through / Right	A	A
	Northbound Right	D	D
	Southbound Right	D	D
4	Idlewild Rd at Access 2	-	-
	Northbound Right	D	F
	Southbound Right	F	F
5	Idlewild Rd at Access 3	B	C
	Eastbound Left	E	D
	Eastbound Through / Right	B	B
	Westbound Left	C	E
	Westbound Through	A	A
	Northbound Left	E	F
	Northbound Through	D	D
	Northbound Right	D	D
	Southbound Left	D	F
	Southbound Through	D	D
	Southbound Right	D	F
	Southbound Right	D	F
6	Idlewild Rd at Access 4	-	-
	Northbound Right	D	F
	Southbound Right	E	E
7	Idlewild Rd at Access 5	-	-
	Northbound Right	D	F
	Southbound Right	E	E
8	Idlewild Rd at Access 6	-	-
	Northbound Right	*	*
	Southbound Right	*	*

Movements with zero delay were omitted

* Intersection has more lanes than HCS can calculate LOS

Table 10 (Cont.) – 2040 Build Alternative - Revised Traditional Intersections Level of Service			
#	Intersection	Level of Service	
		AM Peak	PM Peak
9	Idlewild Rd at Stevens Mill Rd	C	C
	Eastbound Left	D	E
	Eastbound Through	B	B
	Eastbound Right	A	A
	Westbound Left	E	F
	Westbound Through	C	C
	Westbound Right	A	A
	Northbound Left	F	F
	Northbound Through	E	F
	Northbound Right	C	C
	Southbound Left	E	F
	Southbound Through	F	E
	Southbound Right	E	D
		-	-
10	Idlewild Rd at Access 7	-	-
	Northbound Right	D	E
	Southbound Right	E	D
11	Stevens Mill Rd at Access 8	-	-
	Eastbound Left / Through / Right	D	D
	Westbound Left / Through / Right	C	C
	Northbound Left / Through / Right	A	A
	Southbound Left	A	A
		-	-
12	Stevens Mill Rd at Access 9	-	-
	Eastbound Left / Through / Right	D	D
	Westbound Left / Through / Right	F	F
	Northbound Left	A	A
	Southbound Left / Through / Right	A	A

As shown in Table 10, six (6) of the 12 intersections analyzed operate at LOS D or better in both peak hours. The right in / right out intersections along Idlewild Rd all operate at a LOS E or F in the AM and PM peak hours, although the v/c ratios are below 1.0. The full-access intersections along Stevens Mill Rd operate at LOS D to F in the AM and/or PM peak hours. All of the poorly performing intersections are stop controlled. All of the major signalized intersections function acceptably with LOS ranging from A to D.

8.3 2040 Build Alternative – Revised Superstreet Intersections

A capacity analysis was performed for 2040 Build Alternative – Superstreet Intersections With Revised Small Area Plan for the AM and PM peak periods for all of the study intersections. In this alternative, the I-485 interchange is a DDI and Idlewild Rd has superstreet intersections from I-485 to Stevens Mill Rd. In the superstreet alternative, access was eliminated at Access 2, Access 5 and the east leg of Access 7 due to the proposed locations of the u-turn intersections.

Levels of service for study intersections are summarized in Table 11. Traffic volumes are shown in Figure 19 and 20. Levels of service and lane configurations are shown in Figure 21 and 22, and detailed Synchro reports are located in Appendix H. As shown in the lane configurations, Idlewild Rd was assumed to be a six-lane section to accommodate the extra volumes from the revised small area plan and several turn lanes had to be added and/or extended at the study area intersections.

**Table 11 – 2040 Build Alternative – Revised Superstreet Intersections
Level of Service**

#	Intersection	Level of Service	
		AM Peak	PM Peak
21	Idlewild Rd at I-485 Inner Ramps	B	B
	Eastbound Through	C	C
	Eastbound Right	B	B
	Westbound Left	A	B
	Westbound Through	A	A
	Southbound Left	B	C
	Southbound Right	B	B
22	Idlewild Rd at I-485 Outer Ramps	B	C
	Eastbound Left	B	B
	Eastbound Through	C	C
	Westbound Through	B	C
	Westbound Right	A	A
	Northbound Left	B	B
	Northbound Right	B	C

Table 11 (Cont.) – 2040 Build Alternative - Revised Superstreet Intersections Level of Service			
#	Intersection	Level of Service	
		AM Peak	PM Peak
31	Idlewild Rd EB at Access 1	A	A
	Eastbound Through / Right	A	A
	Westbound Left	C	C
	Northbound Right	C	C
32	Idlewild Rd WB at Access 1	A	A
	Eastbound Left	D	C
	Westbound Through / Right	A	A
	Southbound Right	C	D
41	Idlewild Rd EB at Access 3 & Access 4 U-Turn	A	B
	Eastbound Through	A	A
	Westbound U-Turn	C	D
51	Idlewild Rd EB at Access 3	A	B
	Eastbound Through / Right	A	A
	Westbound Left	C	C
	Northbound Right	C	D
52	Idlewild Rd WB at Access 3	A	B
	Eastbound Left	C	C
	Westbound Through / Right	A	A
	Southbound Right	C	D
61	Idlewild Rd EB at Access 4	-	-
	Northbound Right	D	F
62	Idlewild Rd WB at Access 4	-	-
	Southbound Right	F	F
71	Idlewild Rd EB at Access 6 U-Turn	A	B
	Eastbound Through	A	A
	Westbound U-Turn	C	C
72	Idlewild Rd WB at Access 3 & Access 4 U-Turn	A	A
	Eastbound U-Turn	C	D
	Westbound Through	A	A
81	Idlewild Rd EB at Access 6	-	-
	Northbound Right	*	*

Table 11 (Cont.) – 2040 Build Alternative - Revised Superstreet Intersections Level of Service

#	Intersection	Level of Service	
		AM Peak	PM Peak
82	Idlewild Rd WB at Access 6	-	-
	Southbound Right	F	F
91	Idlewild Rd EB at Stevens Mill Rd	B	B
	Eastbound Through	A	B
	Eastbound Right	A	A
	Westbound Left	C	C
	Northbound Right	C	D
92	Idlewild Rd WB at Stevens Mill Rd	B	B
	Eastbound Left	B	C
	Westbound Through	B	B
	Westbound Right	A	A
	Southbound Right	D	C
101	Idlewild Rd EB at Access 7	-	-
	Northbound Right	D	E
102	Idlewild Rd WB at Stevens Mill Rd U-Turn	B	B
	Eastbound U-Turn	C	C
	Westbound Through	B	B
11	Stevens Mill Rd at Access 8	-	-
	Eastbound Left / Through / Right	D	D
	Westbound Left / Through / Right	C	C
	Northbound Left / Through / Right	A	A
	Southbound Left	A	A
12	Stevens Mill Rd at Access 9	-	-
	Eastbound Left / Through / Right	D	D
	Westbound Left / Through / Right	F	F
	Northbound Left	A	A
	Southbound Left / Through / Right	A	A

Movements with zero delay were omitted

* Intersection has more lanes than HCS can calculate LOS

As shown in Table 11, thirteen (13) of the 19 intersections analyzed operate at LOS D in both peak hours. The five (5) poorly operating locations are limited to stop-controlled locations. It should be noted that the number of turn lanes at intersections is reduced when compared to the traditional intersections.

The intersection of Idlewild Road and Stevens Mill Road was further examined with a Michigan Left configuration. U-turns are proposed exclusively on Idlewild Road. Levels of service for study intersections are summarized in Table 12. Traffic volumes are shown in Figure 23. Levels of service and lane configurations are shown in Figure 24, and detailed Synchro reports are located in Appendix H.

Table 12– 2040 Build Alternative - Revised Superstreet Intersections Steven's Mill Road Michigan Left Level of Service			
#	Intersection	Level of Service	
		AM Peak	PM Peak
71	Idlewild Rd EB at Access 6 U-Turn	A	B
	Eastbound Through	A	A
	Westbound U-Turn	C	D
91	Idlewild Rd EB at Stevens Mill Rd	B	B
	Eastbound Through	B	B
	Eastbound Right	A	A
	Westbound Through	B	A
	Westbound Right	A	A
	Northbound Through	C	D
	Northbound Right	C	D
	Southbound Through	C	D
	Southbound Right	D	E
102	Idlewild Rd WB at Stevens Mill Rd U-Turn	B	B
	Eastbound U-Turn	D	C
	Westbound Through	B	B

As shown in Table 12, all of the three (3) intersections analyzed operate at LOS B or better in both peak hours. This performance is similar to the superstreet, and would still require a six-lane section. It would also not change the turn lane requirements at intersections significantly.

9.0 CONCLUSIONS & RECOMMENDATIONS

Sections 9.1 through 9.9 summarize the findings and recommendations of the capacity analyses.

9.1 2040 Build Alternative – Traditional Intersections

With traditional intersections between I-485 and Stevens Mill Rd, five (5) of the 12 intersections analyzed operate at LOS D in both peak hours. The Idlewild Rd and Steven Mill Rd intersection functions at LOS D in the peak hours. The right in / right out

intersections along Idlewild Rd all operate at a LOS E or LOS F in the AM and/or PM peak hours, although the v/c ratios are below 1.0. The full-access intersections along Stevens Mill Rd operate at LOS F in the AM and PM peak hours, indicating additional intersection improvements, like signalization, may be needed. Idlewild Rd had to be widened to a six-lane section to accommodate the extra volumes from the small area plan and several turn lanes had to be added and/or extended at the study area intersections too.

9.2 2040 Build Alternative – Superstreet Intersections

With superstreet intersections between I-485 and Stevens Mill Rd, 12 of the 19 intersections operate at LOS D or better in both peak hours. The Idlewild Rd and Steven Mill Rd superstreet intersection functions at LOS C or better in the peak hours. Most of the right in / right out intersections along Idlewild Rd operate at a LOS E or LOS F in the AM and/or PM peak hours, although the v/c ratios are below 1.0. The full-access intersections along Stevens Mill Rd operate at LOS F in the AM and PM peak hours, indicating additional intersection improvements, like signalization, may be needed.

9.3 2040 Build Alternative – Revised Traditional Intersections (4 lanes)

With the revision to the small area plan to reduce the number of trips associate with the development, a revaluation was performed to determine if a four-lane section was a viable option. Two (2) of the 12 intersections analyzed operate at LOS D in both peak hours. The Idlewild and I-485 Outer Ramps function at LOS F during both peak hours. The Idlewild Rd and Steven Mill Rd intersection functions at LOS E in the peak hours. The right in / right out intersections along Idlewild Rd all operate at a LOS E or F in the AM and PM peak hours, although the v/c ratios are below 1.0.

9.4 2040 Build Alternative – Revised Traditional Intersections (6 lanes)

With the revision to the small area plan to reduce the number of trips associate with the development, a revaluation was performed to determine if a six lane section was a viable option. Six (6) of the 12 intersections analyzed operate at LOS D in both peak hours. The right in / right out intersections along Idlewild Rd all operate at a LOS E or F in the AM and PM peak hours, although the v/c ratios are below 1.0. The full-access intersections along Stevens Mill Rd operate at LOS D to F in the AM and/or PM peak hours. All of the poorly performing intersection are stop controlled. All of the major signalized intersections function acceptably with LOS ranging from A to D.

9.5 2040 Build Alternative – Revised Superstreet Intersections

With the revision to the small area plan to reduce the number of trips associate with the development, a revaluation was performed to determine if a six lane section was a viable option. Thirteen (13) of the 19 intersections analyzed operate at LOS D in both peak hours. The five (5) poorly operating locations are limited to stop-controlled

locations. It should be noted that the number of turn lanes at intersections is reduced when compared to the traditional intersections.

A Michigan left configuration at Stevens Mill Road would provide performance similar to the superstreet, and would still require a six lane section. It would also not change the turn lane requirements at intersections significantly.

9.6 Idlewild Rd Recommendations

With the small area plan and either the superstreet intersections or traditional intersections between I-485 and Stevens Mill Rd, Idlewild Rd has to be widened to a six-lane section, several turn lanes have to be added and/or extended to accommodate the added volumes.

Also with both intersection alternatives, the majority of right in / right out small area plan access intersections along Idlewild Rd operate at LOS E or LOS F in the AM and/or PM peak hours, although the v/c ratios are below 1.0. These poor LOS operations are due to the traffic models predicting that traffic will be required to wait a considerable length of time to make right turns onto Idlewild Rd from the small area plan access roads due to the low gap opportunities.

It is recommended that as the small area plan development occurs that the developer be responsible for studying the access intersections along Idlewild Rd and make necessary improvements to maintain acceptable levels of service at the access intersections.

With the revision to the small area plan to reduce the number of trips associated with the development, a six lane section would still be necessary to accommodate the additional development traffic.

9.7 Stevens Mill Rd Recommendations

With the small area plan and either the superstreet intersections or traditional intersections between I-485 and Stevens Mill Rd, Stevens Mill Rd has to be widened to a four-lane section, to the small area plan intersections to the north and south of Idlewild Rd to accommodate the added volumes.

Also with both intersection alternatives, the full-access small area plan access intersections along Stevens Mill Rd operate at F in the AM and PM peak hours, indicating additional intersection improvements, like signalization, may be needed.

It is recommended that as the small area plan development occurs that the developer be responsible for studying the access intersections along Stevens Mill Rd and make necessary improvements to maintain acceptable levels of service at the access intersections.

With the revision to the small area plan to reduce the number of trips associated with the development, similar laneage would still be necessary to accommodate the additional development traffic.

9.8 Idlewild Rd at Stallings Rd Roundabout Recommendations

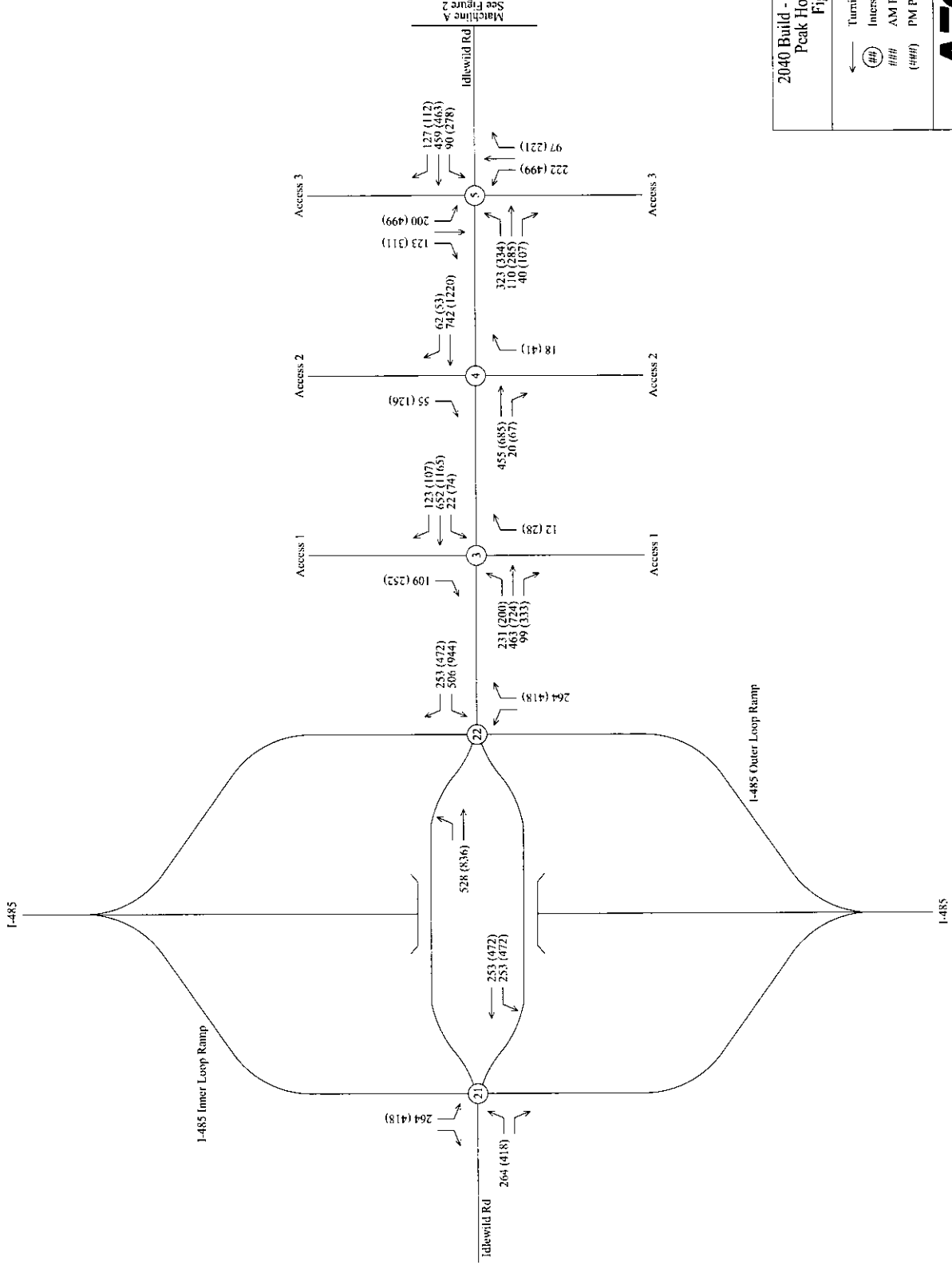
For the alternative without the small area plan, the failure year analysis conducted in SIDRA INTERSECTION showed that the roundabout would fail in 20 years based on the AM peak hour volumes and 10 years based on the PM peak hour volumes. Therefore, the roundabout without the small area master plan has a failure year of 2030 (10 years after the opening year of 2020).

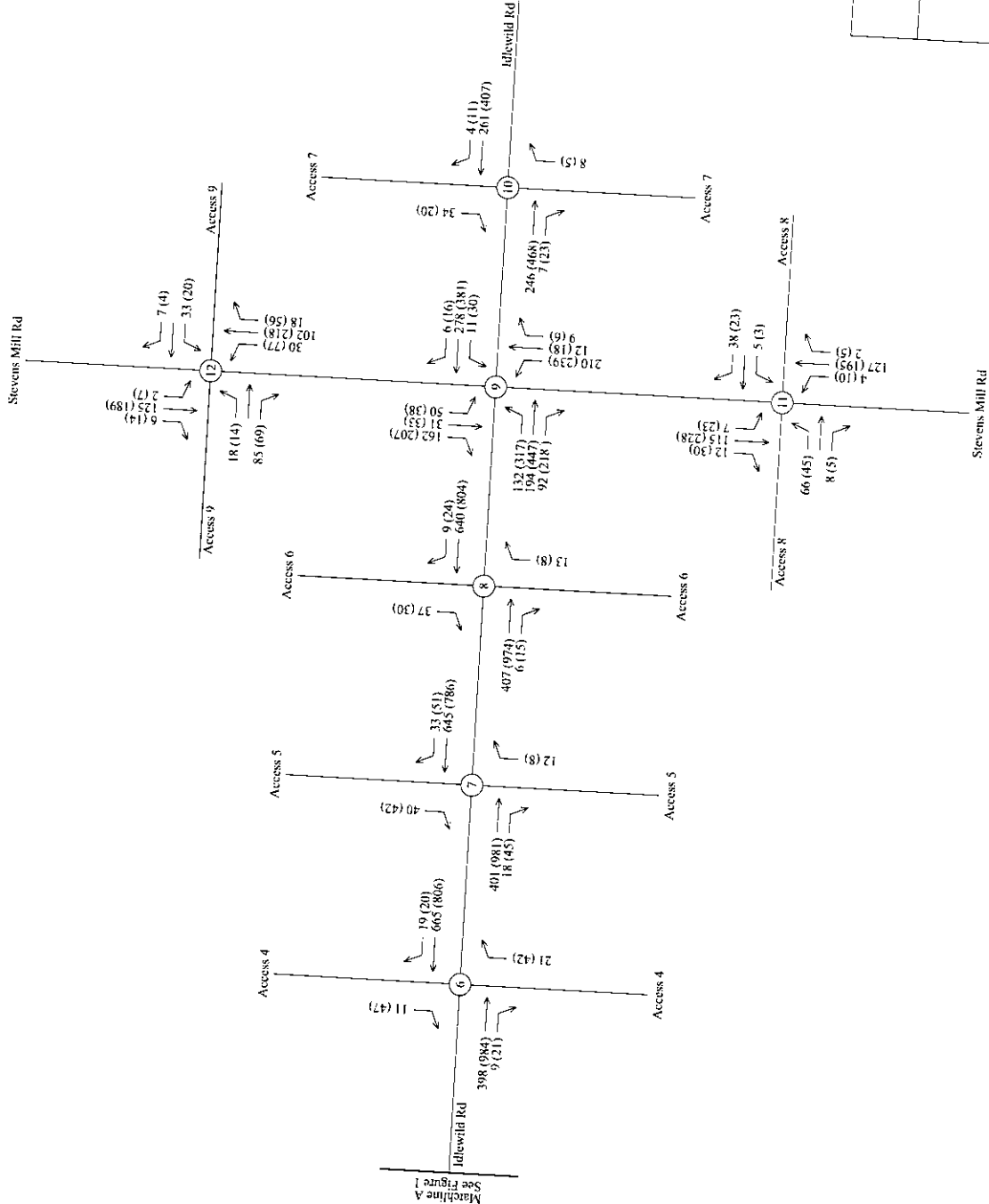
For the alternative with the small area plan, the failure year analysis conducted in SIDRA INTERSECTION showed that the roundabout would fail at opening based on both the AM and PM peak hour volumes.

Based on the failure year analysis, if the small area plan development moves forward with the amount of development currently proposed, it is recommended that a roundabout not be installed at the Idlewild Rd at Stallings Rd intersection. If the small area plan is not developed, it is recommended that the roundabout be constructed to allow for additional lanes if necessary.

9.9 2040 Build Alternative – Superstreet Intersections – Stevens Mill Adjustments

In this alternative, modifications were made to this location to achieve LOS D. This does not include the small area plan. For the AM peak hour, it was necessary to add an additional receiving lane that drops at the U-turn. For the PM peak hour, the coordination offsets were adjusted. Several movements still have a V/C ratio that exceeds 1.0.





2040 Build - Small Area Plan
Peak Hour Volumes
Figure 2

Turning Movement

Intersection Number

AM Peak Hour Volumes

PM Peak Hour Volumes

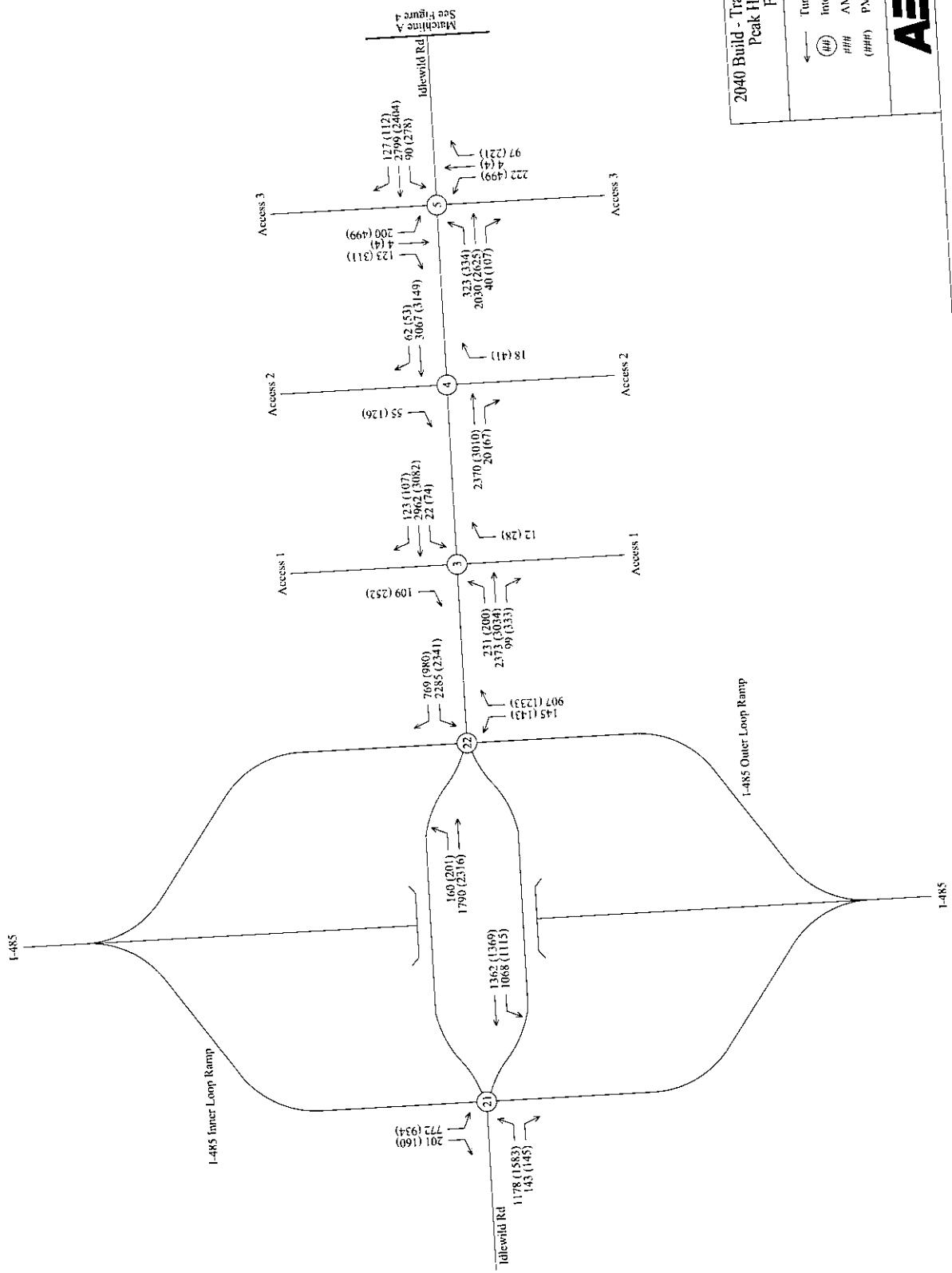
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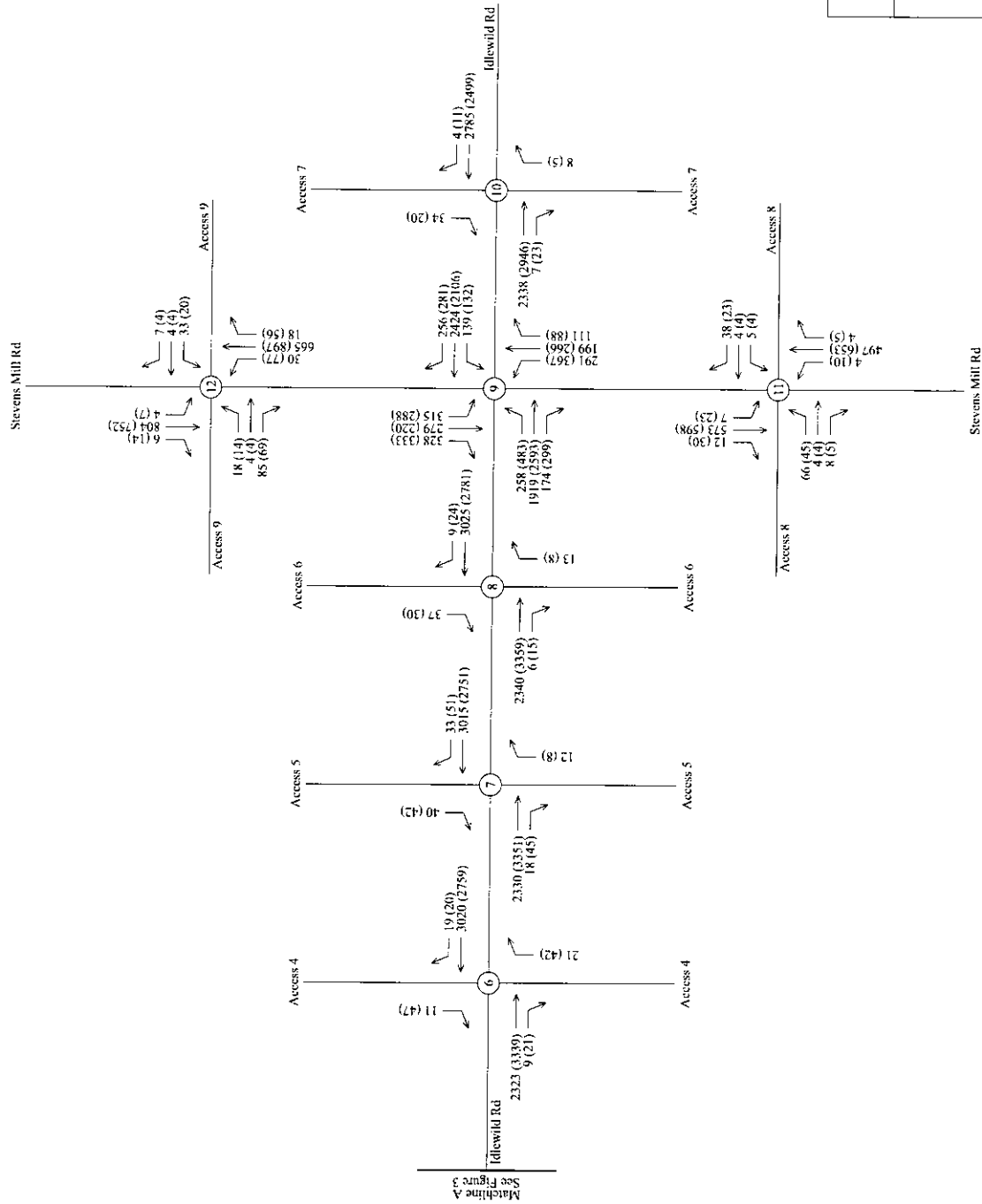
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2040 Build - Traditional Intersections
Peak Hour Volumes
Figure 3

← Turning Movement
 (##) Intersection Number
 ### AM Peak Hour Volumes
 (###) PM Peak Hour Volumes

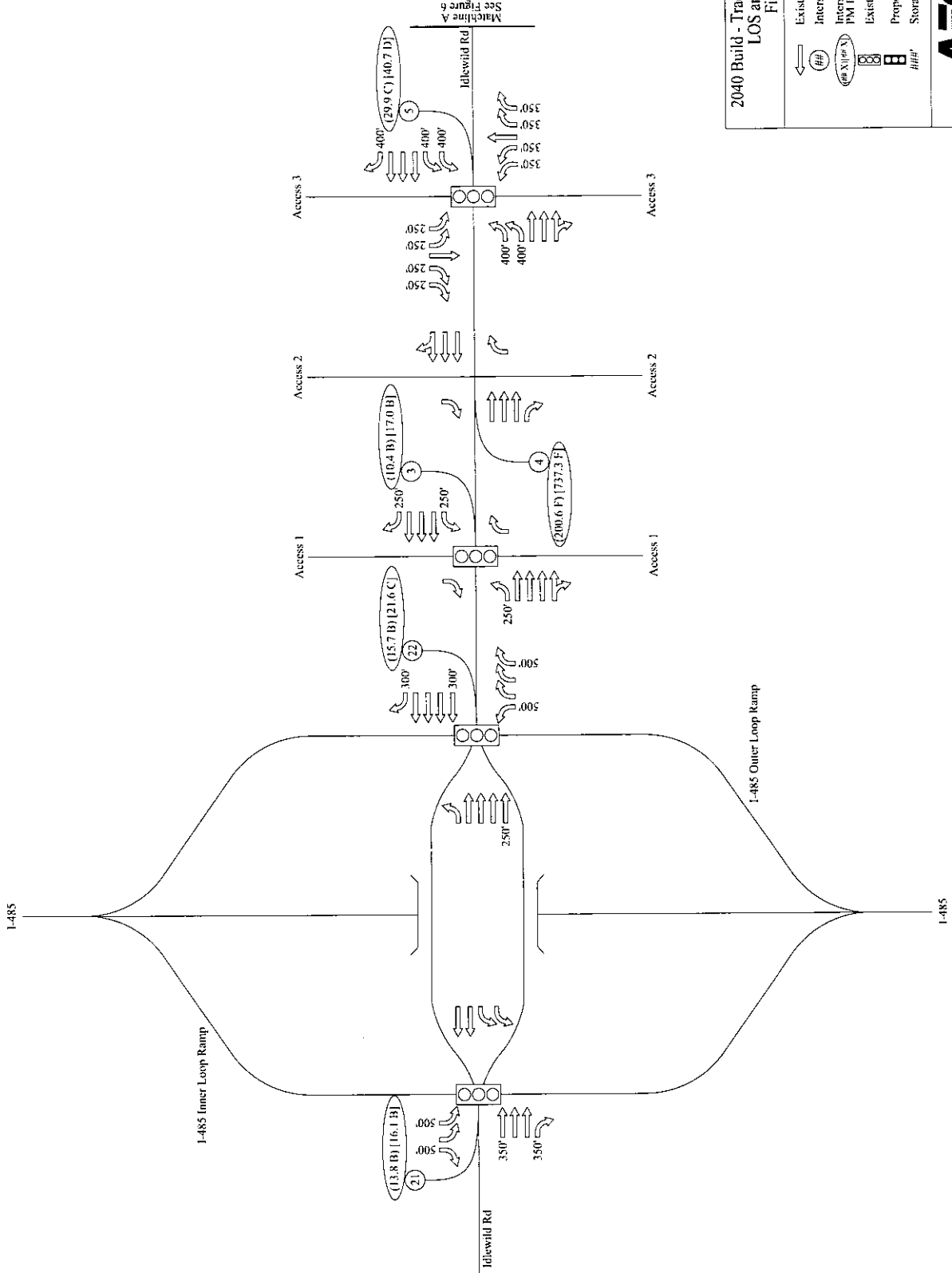




2040 Build - Traditional Intersections
Peak Hour Volumes
Figure 4

Turning Movement
Intersection Number
AM Peak Hour Volumes
PM Peak Hour Volumes



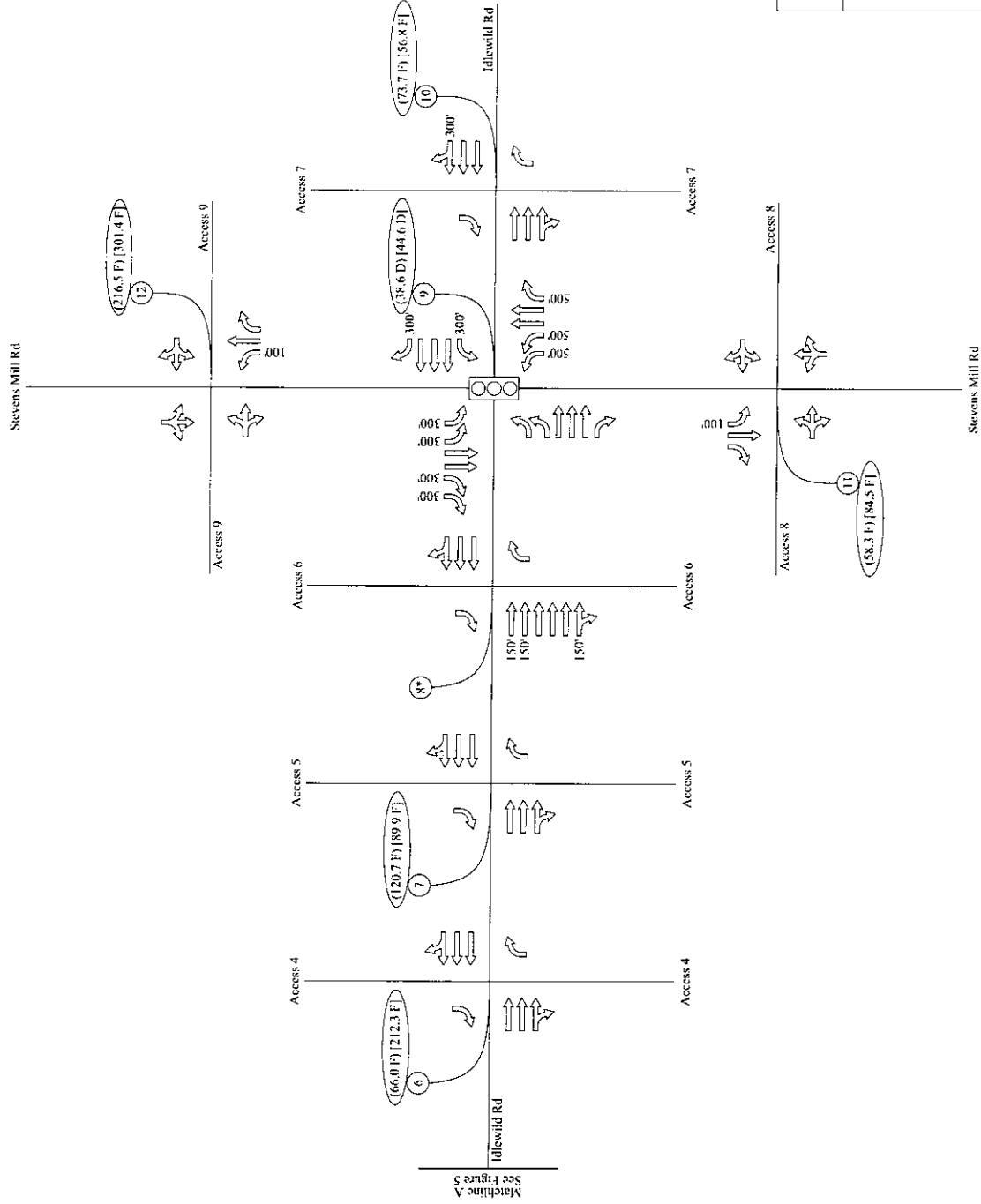


Idlewild Rd
See Figure 6
Matchline A

2040 Build - Traditional Intersections
LOS and Laneage
Figure 5

Existing Laneage	Intersection Number	Intersection AM Peak and PM Peak Delay and LOS	Existing Signal	Proposed Signal	Storage
→	##	(## X) (## X)	⊞	⊞	###'

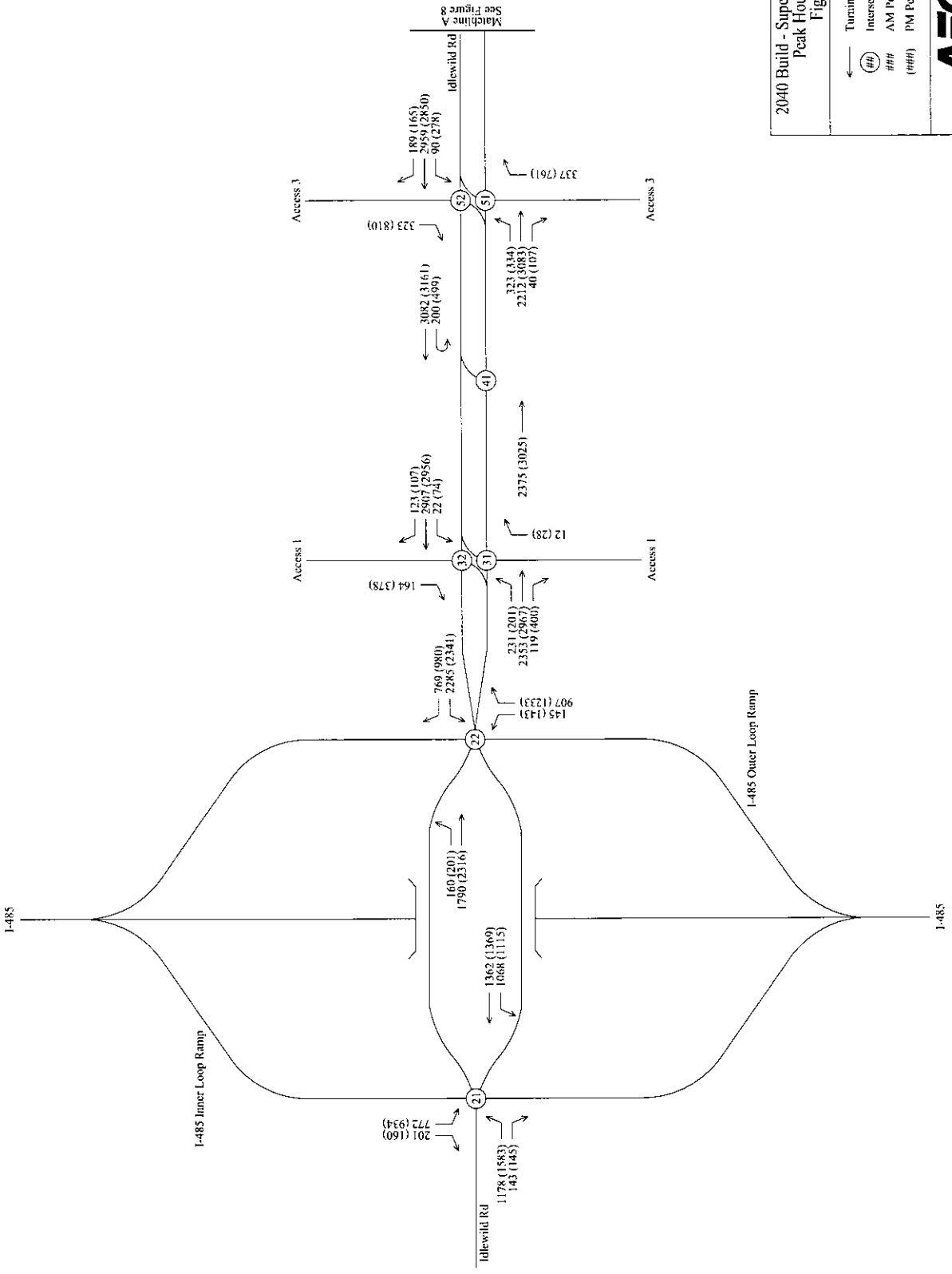




2040 Build - Traditional Intersections
LOS and Laneage
Figure 6

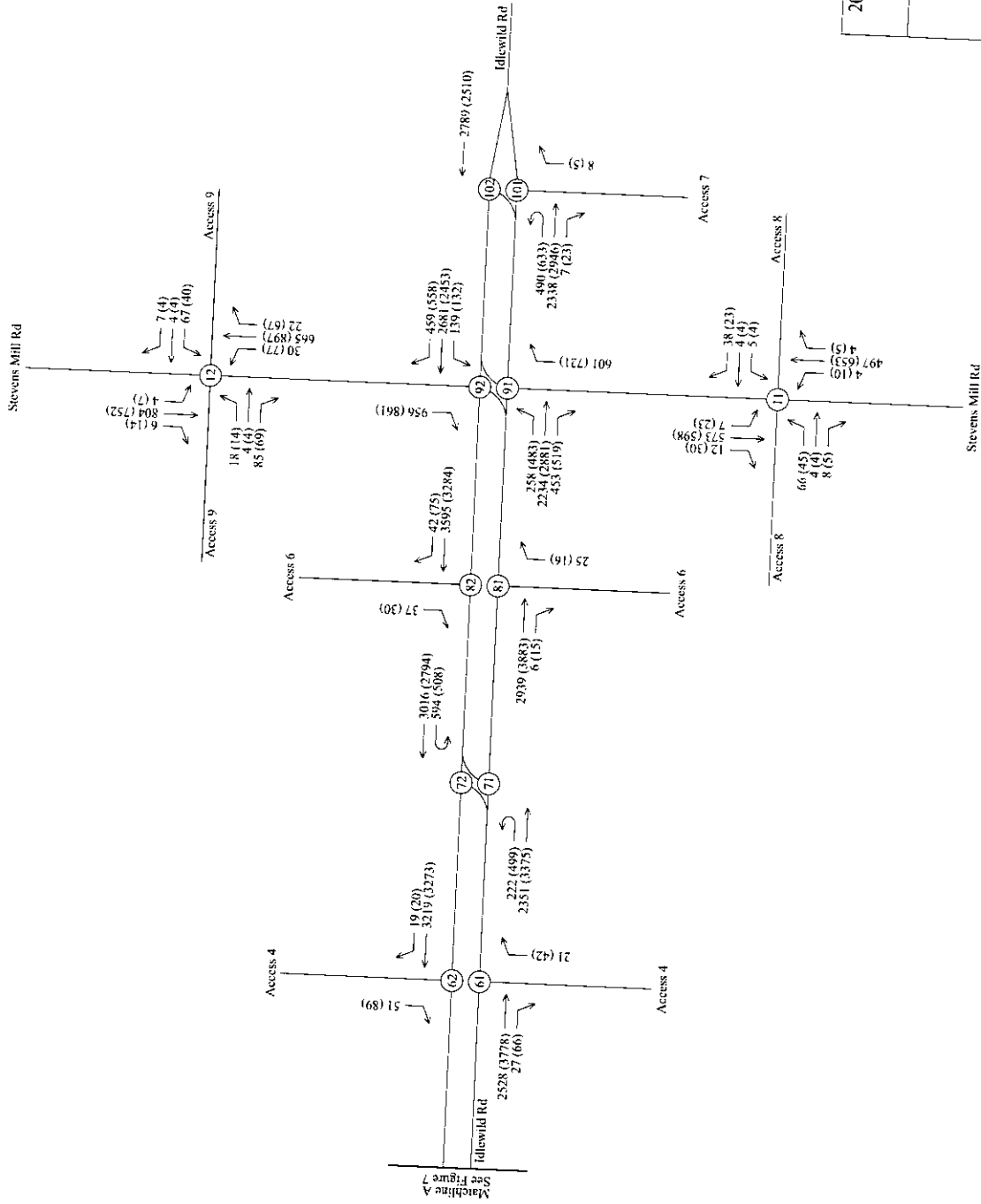
* Intersection has more lanes than HCS can calculate LOS

AECOM



2040 Build - Superstreet Intersections
Peak Hour Volumes
Figure 7

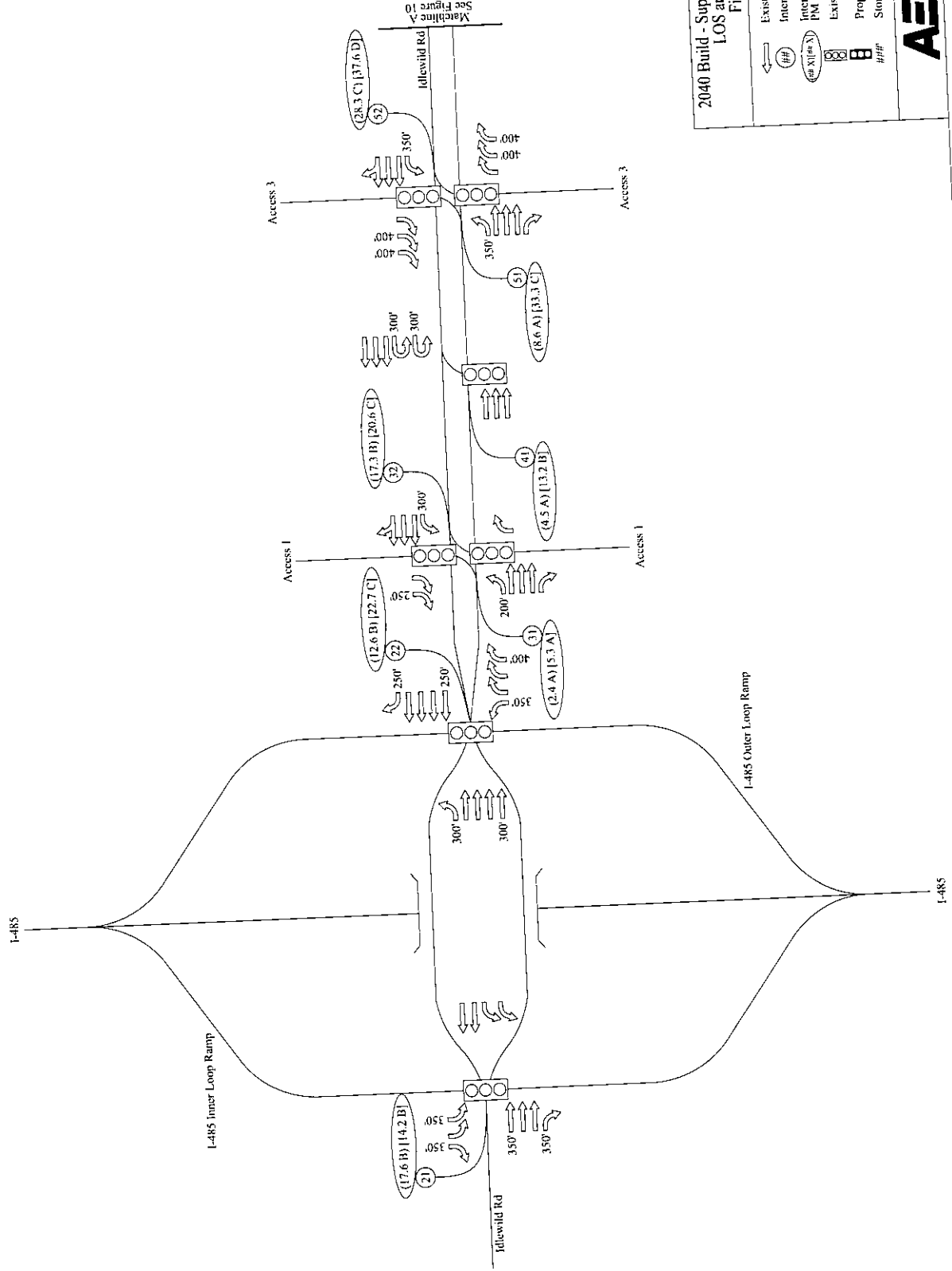
←	Turning Movement
Ⓢ	Intersection Number
###	AM Peak Hour Volumes
(###)	PM Peak Hour Volumes



2040 Build - Superstreet Intersections
Peak Hour Volumes
Figure 8

Turning Movement
Intersection Number
AM Peak Hour Volumes
PM Peak Hour Volumes

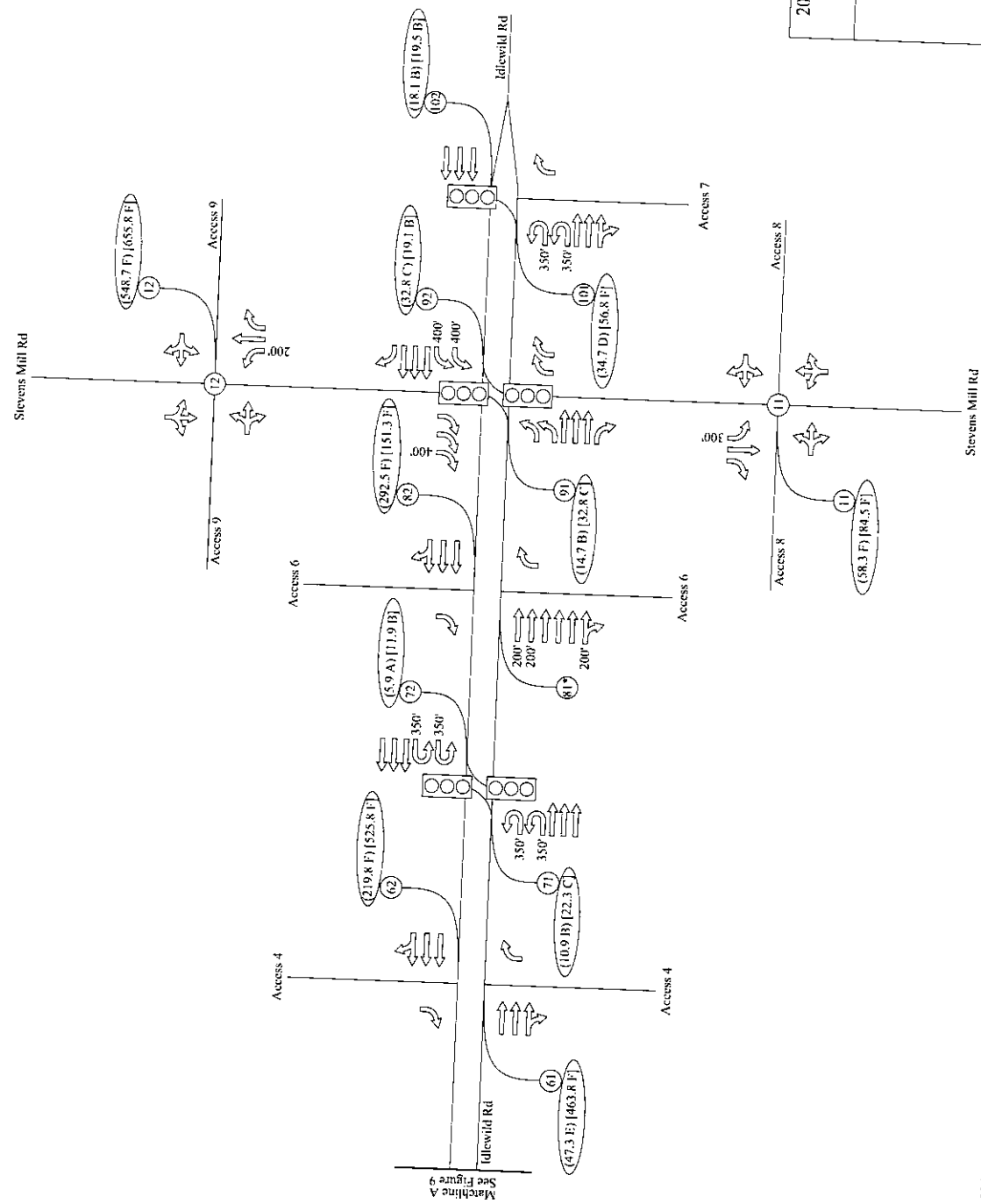
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2040 Build - Superstreet Intersections
LOS and Laneage
Figure 9

Existing Laneage	Intersection Number
Intersection AM Peak and PM Peak Delay and LOS	Existing Signal
Proposed Signal	Storage

AECOM

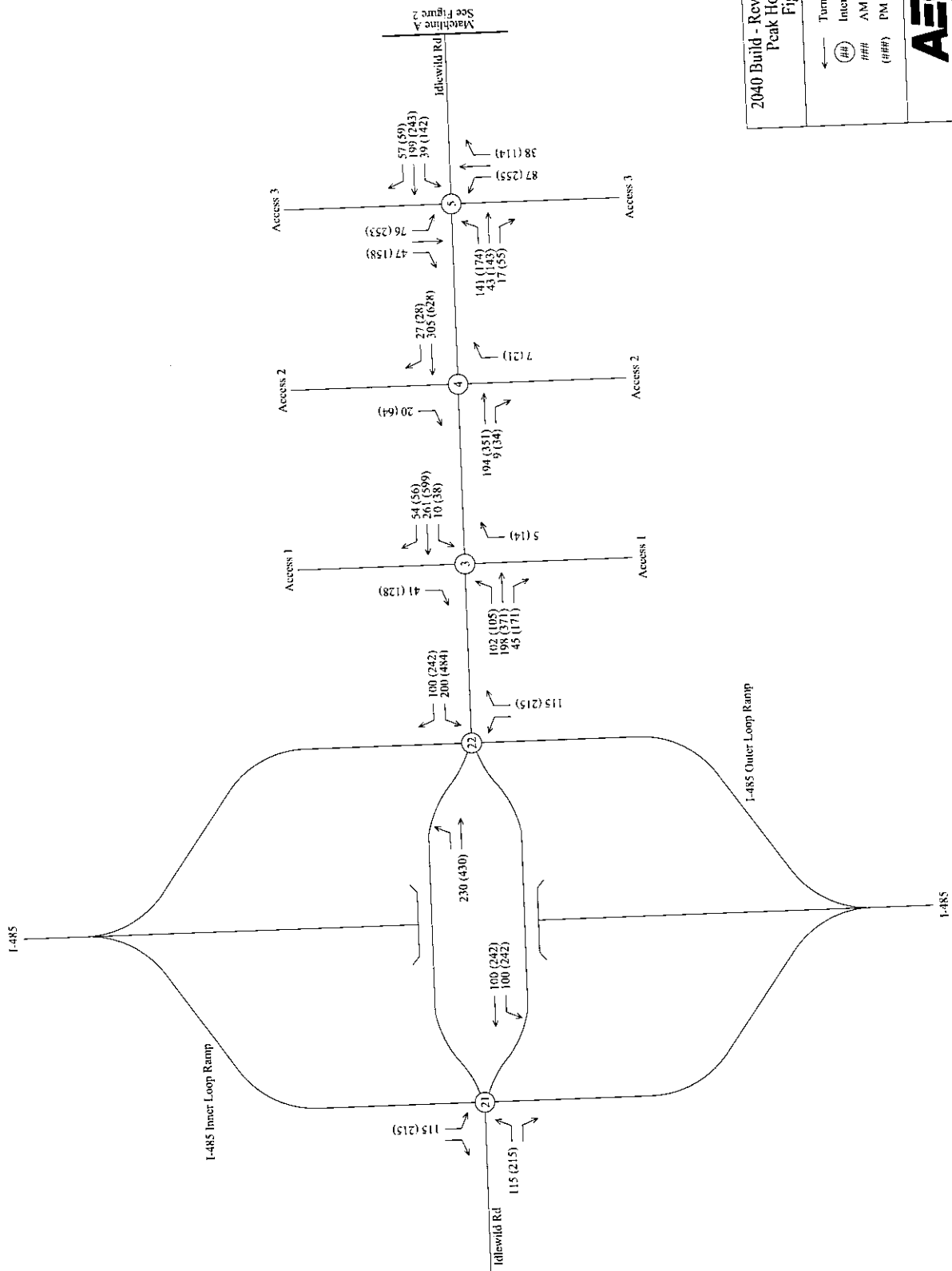


2040 Build - Superstreet Intersections
LOS and Laneage
Figure 10

Existing Laneage	Intersection Number
Intersection AM Peak and PM Peak Delay and LOS	Existing Signal
Proposed Signal	Storage

AECOM

* Intersection has more lanes than HCS can calculate LOS



2040 Build - Revised Small Area Plan
Peak Hour Volumes
Figure 11

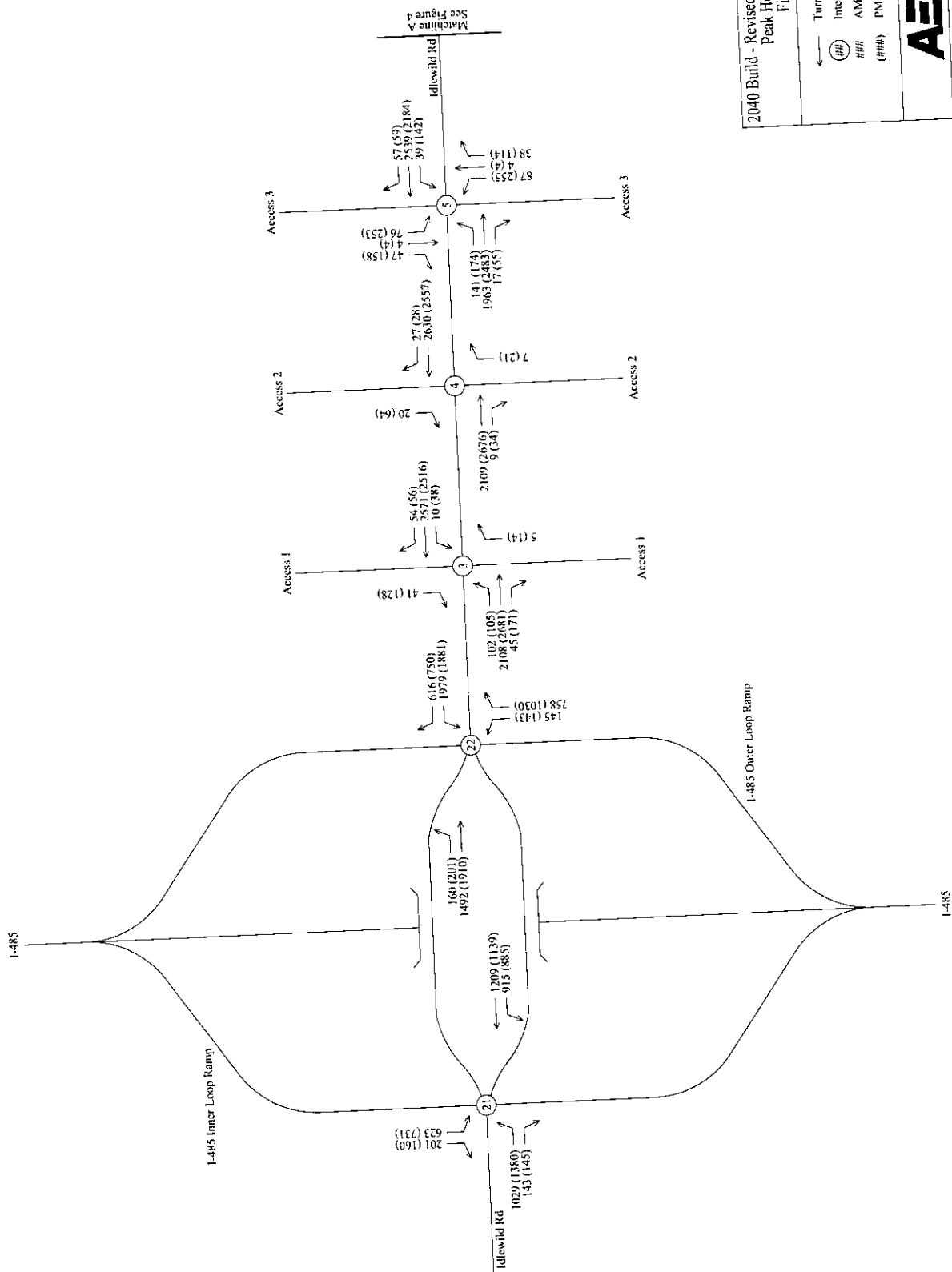
Turning Movement
Intersection Number
AM Peak Hour Volumes
(###) PM Peak Hour Volumes

AECOM



Turning Movement	Intersection Number	AM Peak Hour Volumes	PM Peak Hour Volumes
←—	(##)	###	(###)

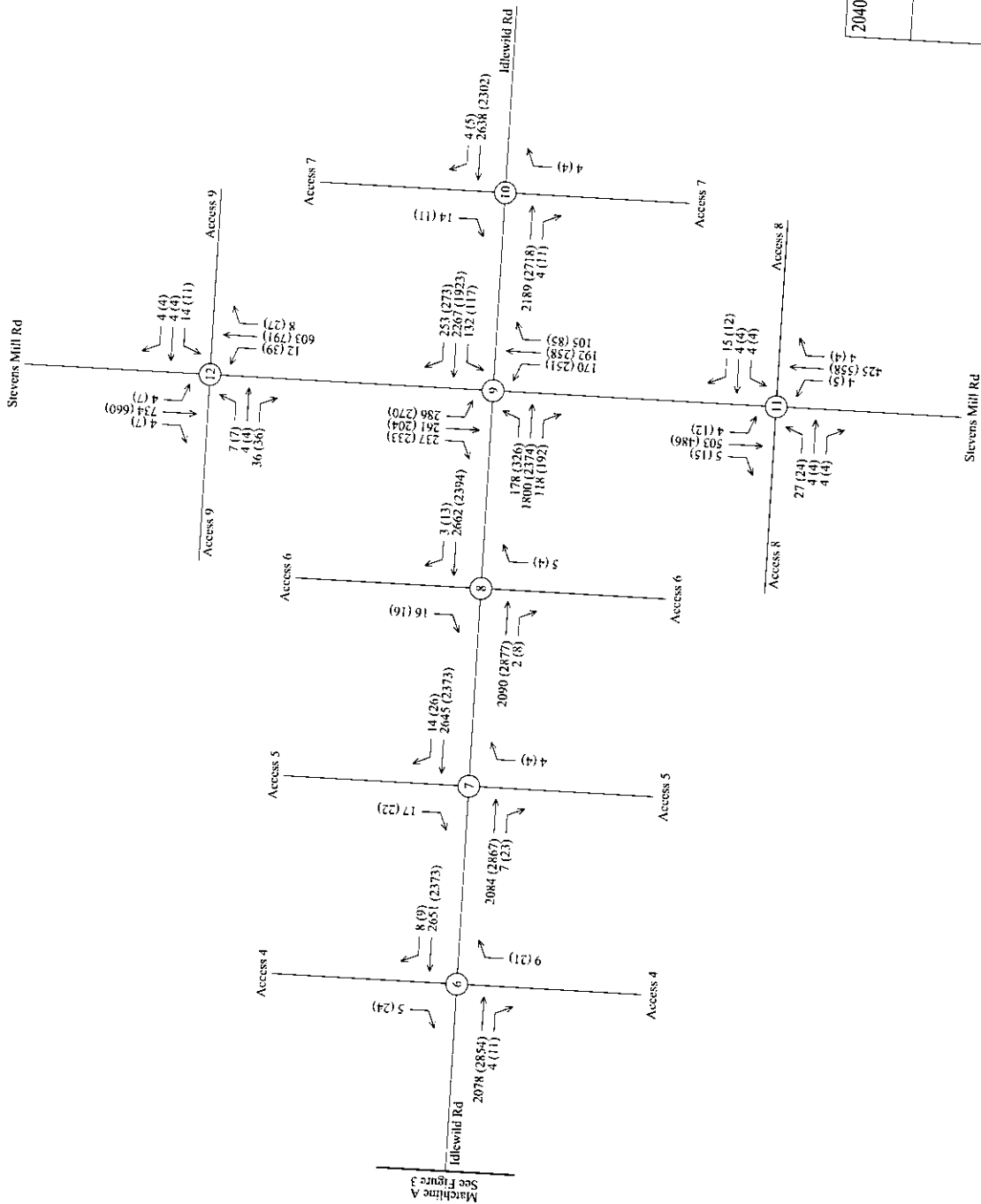
AECOM



2040 Build - Revised Traditional Intersections
Peak Hour Volumes
Figure 13

Turning Movement
Intersection Number
AM Peak Hour Volumes
PM Peak Hour Volumes

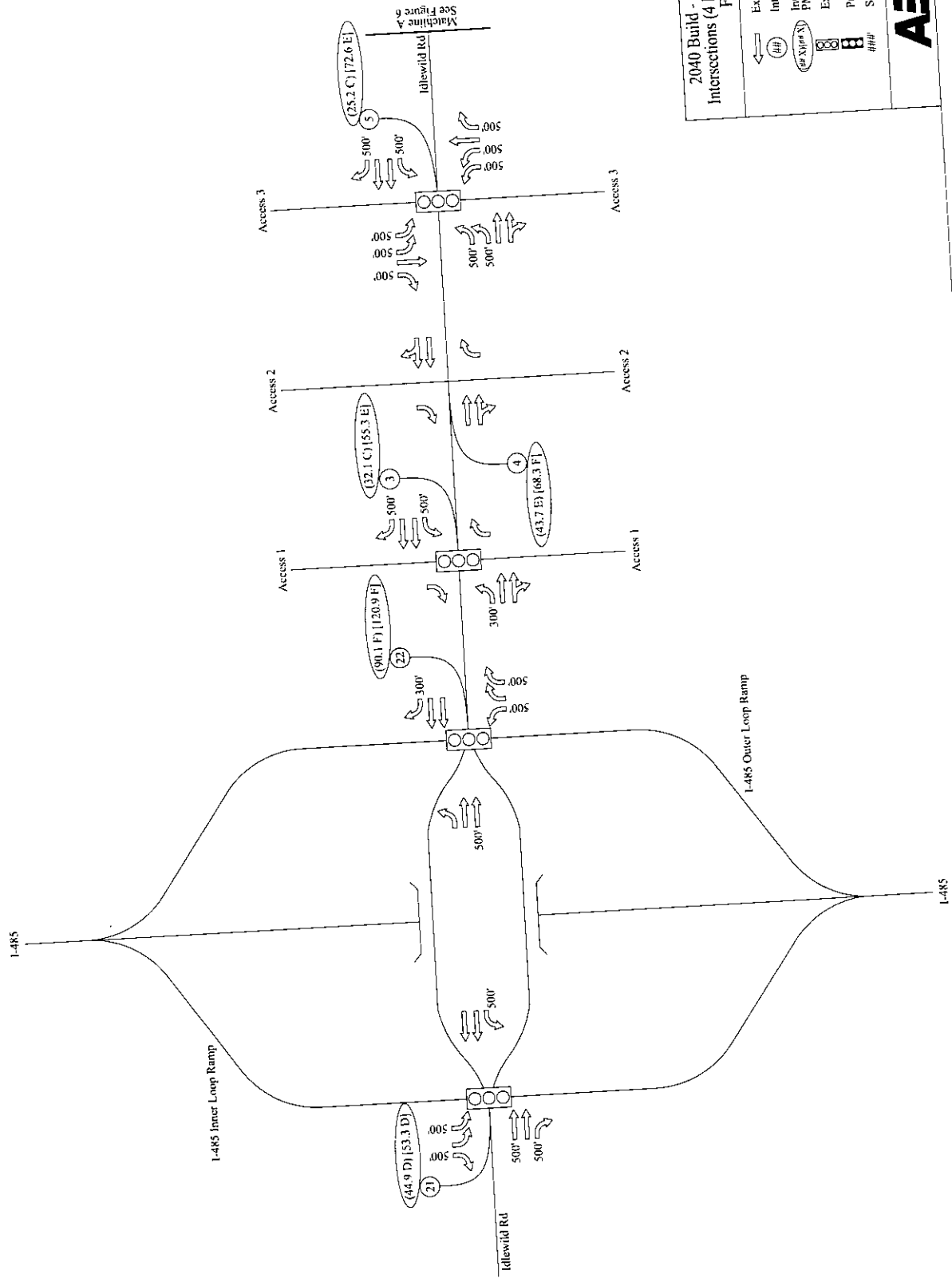
AECOM



2040 Build - Revised Traditional Intersections
Peak Hour Volumes
Figure 14

←	Turning Movement	Intersection Number	AM Peak Hour Volumes	PM Peak Hour Volumes
(##)		###		(###)

AECOM

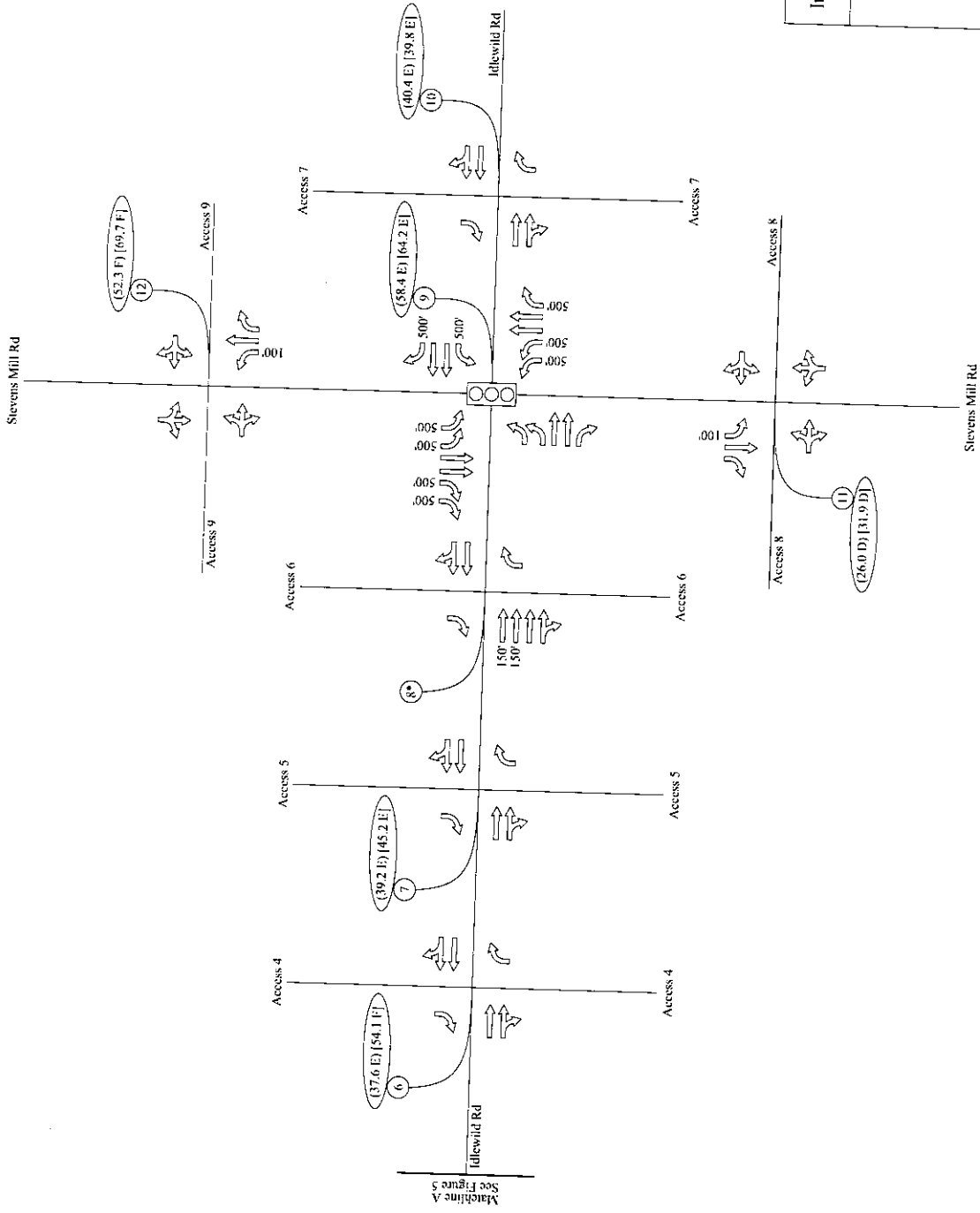


Idlewild Rd
See Figure 6
Matchline A

2040 Build - Revised Traditional Intersections (4 lane) LOS and Lcncage
Figure 15

Existing Lcncage	Intersection Number	Intersection AM Peak and PM Peak Delay and LOS	Existing Signal	Proposed Signal	Storage
→	(#)	(#) X (#) X	ⓧ	ⓧ	###'

AECOM

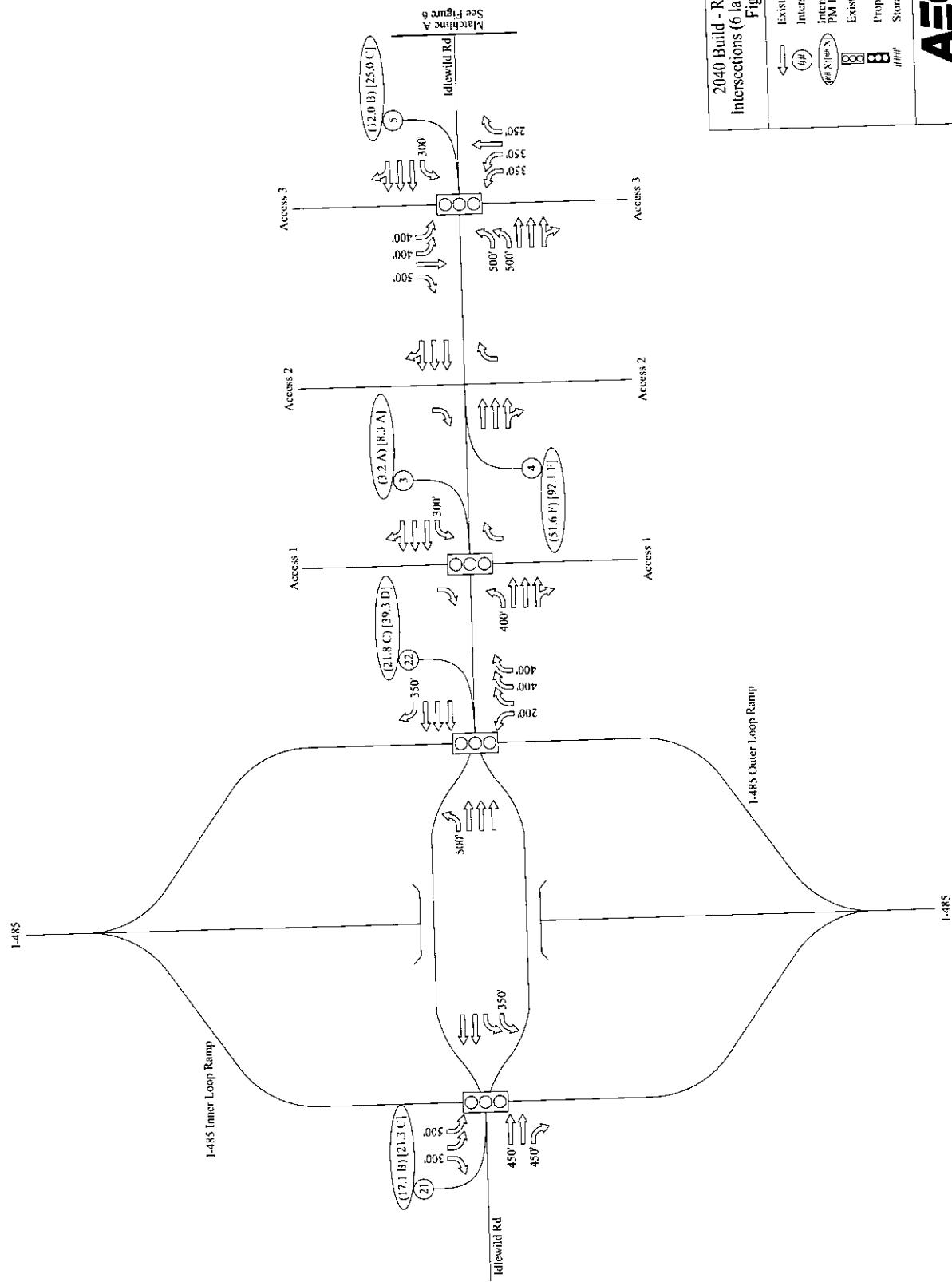


2040 Build - Revised Traditional Intersections (4 lane) LOS and Lcage Figure 16

Existing Laneage	Intersection Number
Intersection AM Peak and PM Peak Delay and LOS	Existing Signal
Proposed Signal	Storage

AECOM

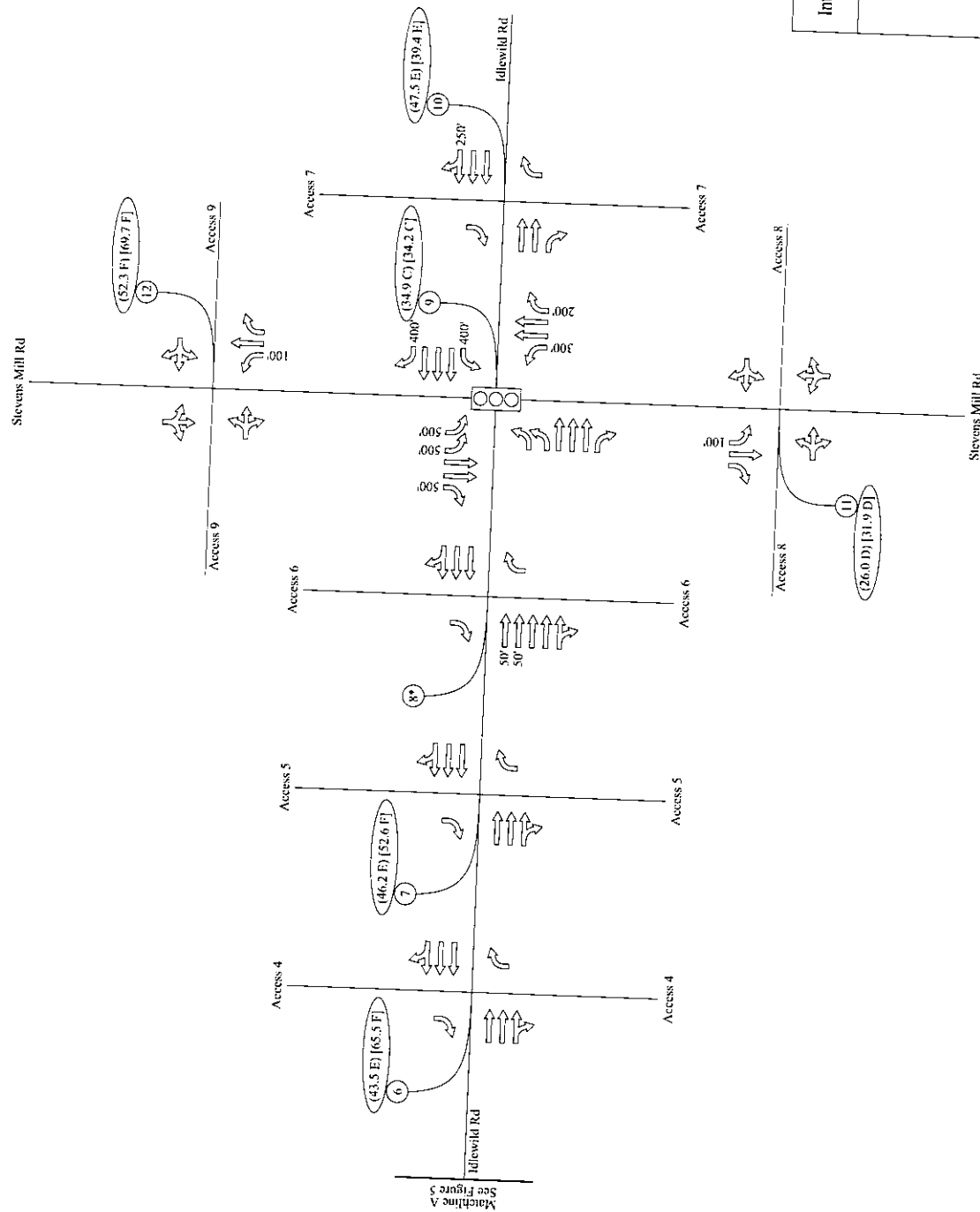
* Intersection has more lanes than HCS can calculate LOS



2040 Build - Revised Traditional Intersections (6 lane) LOS and Lcncage
Figure 17

Existing Lcncage	Existing Signal
Intersection Number	Intersection AM Peak and PM Peak Delay and LOS
Existing Signal	Proposed Signal
Storage	

AECOM



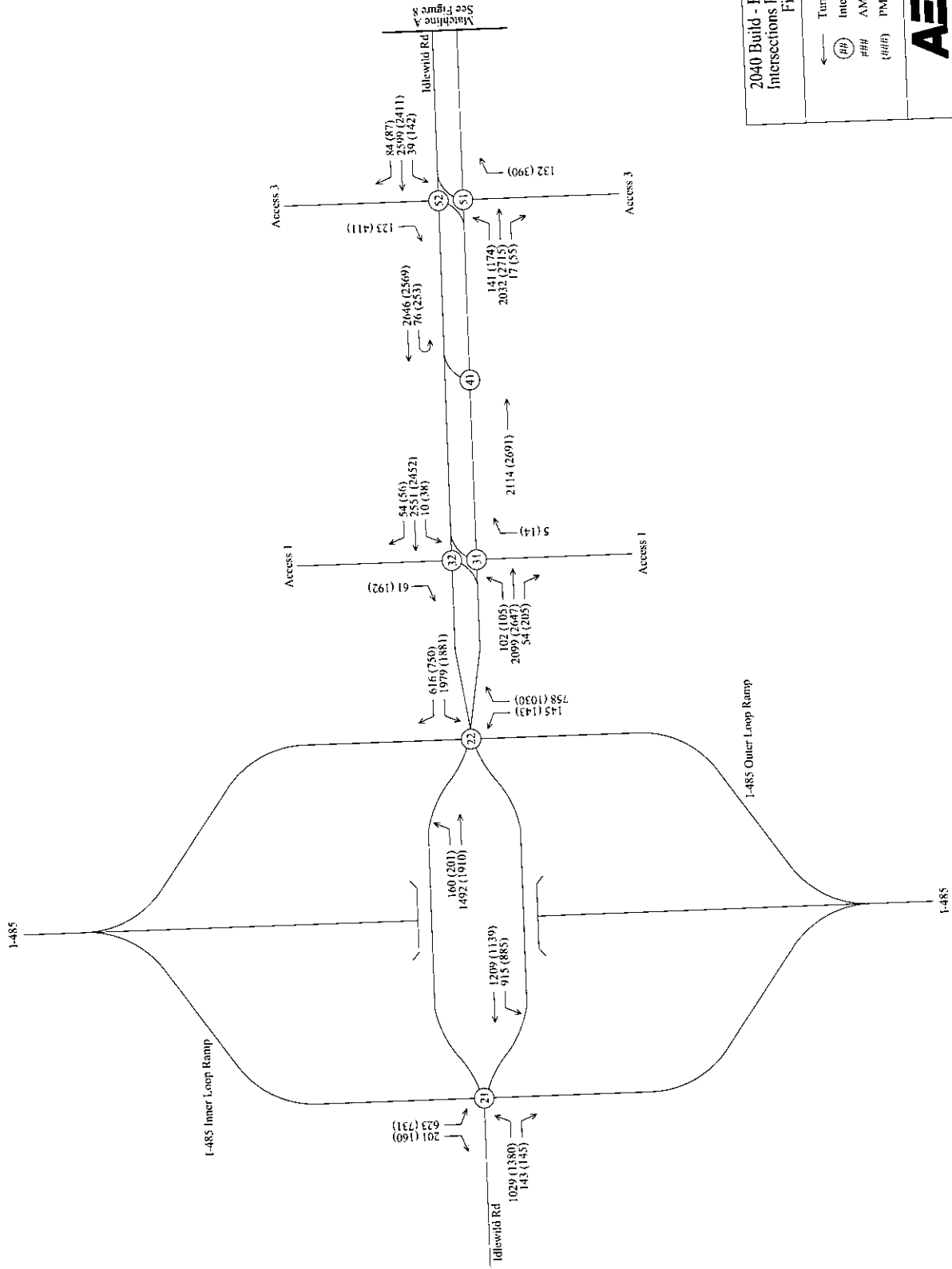
Matchline A
See Figure 5

2040 Build - Revised Traditional
Intersections (6 lane) LOS and Laneage
Figure 18

Existing Laneage	Intersection Number
Intersection AM Peak and PM Peak Delay and LOS	Existing Signal
Proposed Signal	Storage

AECOM

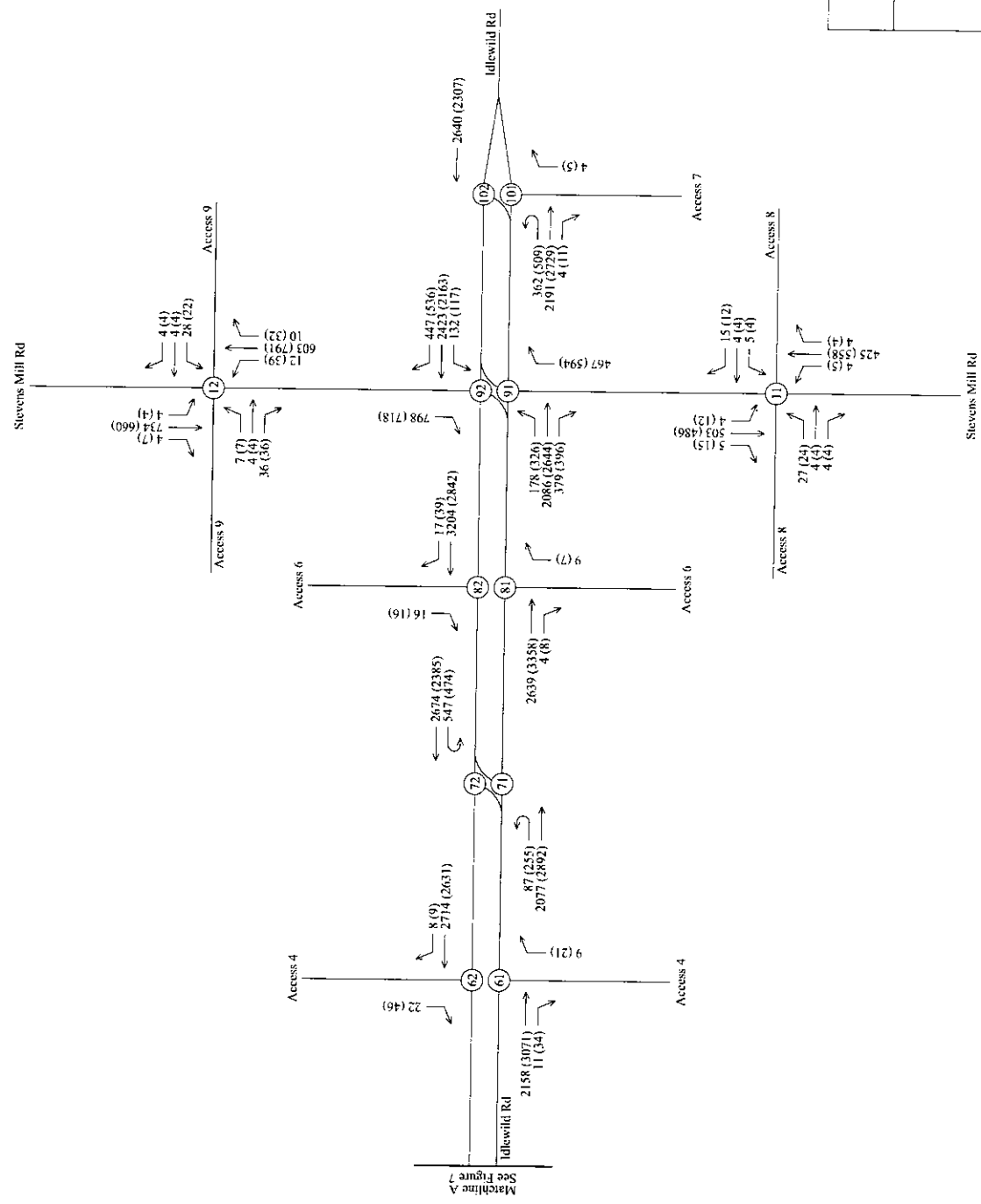
* Intersection has more lanes than HCS can calculate LOS



2040 Build - Revised Superstreet
Intersections Peak Hour Volumes
Figure 19

Turning Movement
Intersection Number
AM Peak Hour Volumes
PM Peak Hour Volumes

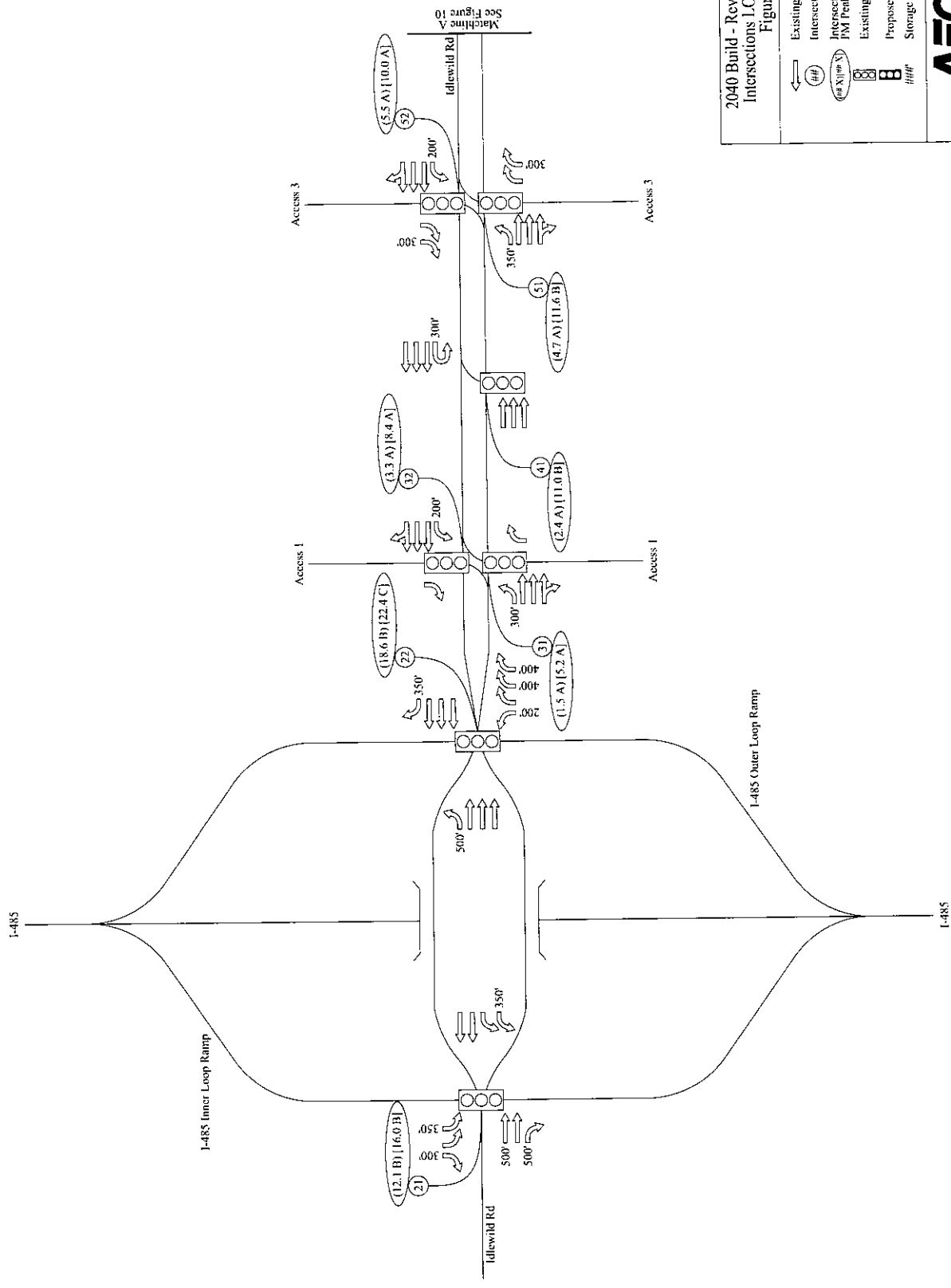
AECOM



2040 Build - Revised Superstreet
Intersections Peak Hour Volumes
Figure 20

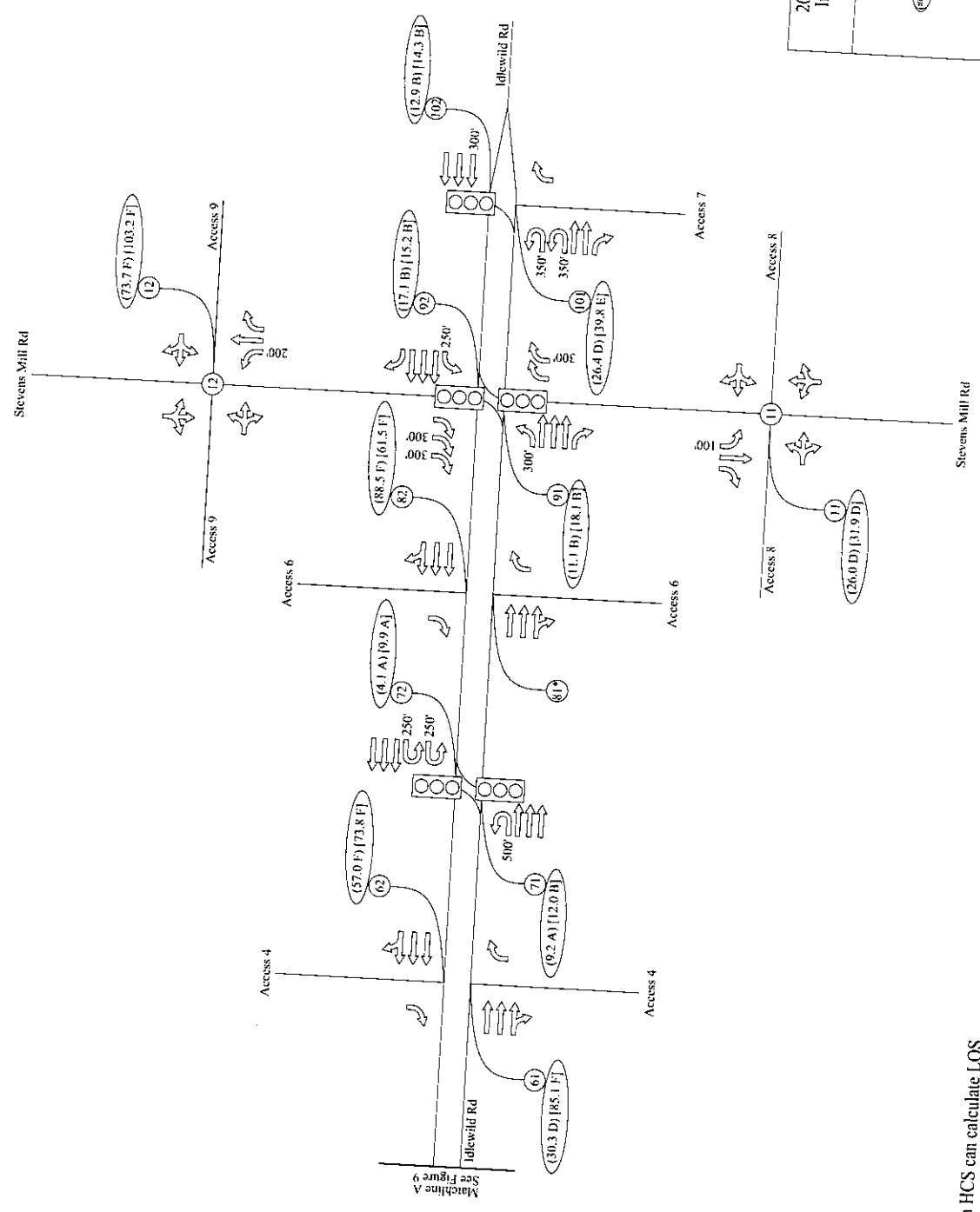
Turning Movement
Intersection Number
AM Peak Hour Volumes
PM Peak Hour Volumes





2040 Build - Revised Superstreet Intersections LOS and Laneage Figure 21

Existing Laneage	Intersection Number	Intersection AM Peak and PM Peak Delay and LOS	Existing Signal	Proposed Signal	Storage
---	##	(## X) (## X)	---	---	###



2040 Build - Revised Superstreet
Intersections LOS and Laneage
Figure 22

Existing Laneage	Existing Signal
Intersection Number	Proposed Signal
Intersection AM Peak and PM Peak Delay and LOS	Storage
	#/Hr

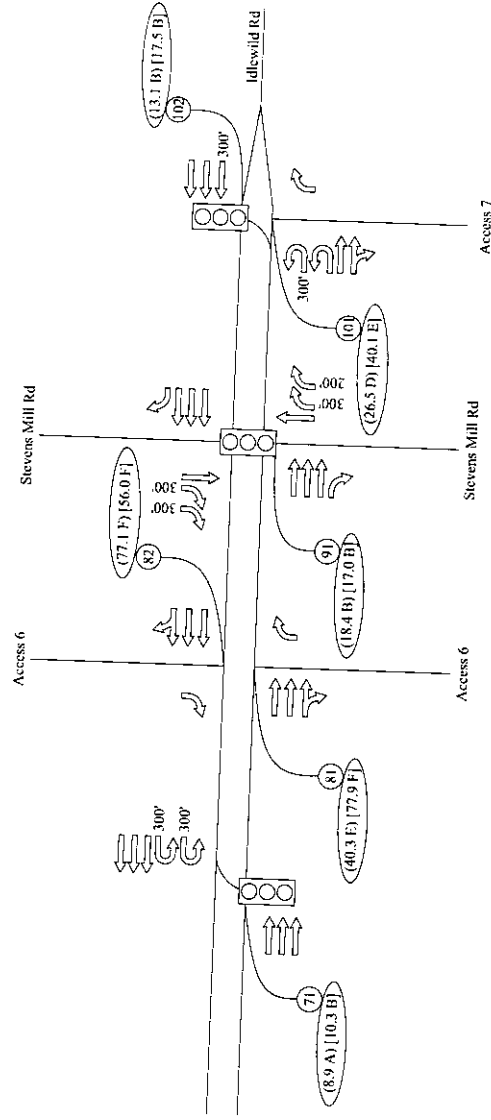
AECOM

* Intersection has more lanes than HCS can calculate LOS



←	Turning Movement
(##)	Intersection Number
###	AM Peak Hour Volumes
(###)	PM Peak Hour Volumes

AECOM



2040 Build - Revised Michigan Left
Intersection LOS and Laneage
Figure 24

- Existing Laneage
- Intersection Number
- Intersection AM Peak and PM Peak Delay and LOS
- Existing Signal
- Proposed Signal
- Storage



MEMORANDUM

June 2017

TO: Tim Boland, PE
NCDOT Division 10

FROM: Ivo Dernev, PE
AECOM, Technical Services of North Carolina, Inc.

SUBJECT: TIP Project No. U-4913
Widen SR 3174/SR 1582 (Idlewild Rd) from I-485 to SR 1524 (Stevens Mill Rd) in
Mecklenburg and Union Counties
NCDOT Division 10

Please find attached the 2017/2040 Traffic Forecast for the above mentioned project. This forecast was reviewed and approved by NCDOT Transportation Planning Branch on June 19, 2017.

Project U-4913 includes widening of SR 3174/SR 1582 (Idlewild Rd) to four lanes from I-485 to SR 1524 (Stevens Mill Rd) in Mecklenburg and Union Counties, North Carolina. The study area limits for this forecast cover SR 3174/SR 1582 (Idlewild Rd) from SR 3175 (Stallings Road) to SR 1524 (Stevens Mill Rd).

The project subject to the forecast analysis is located within the boundary of Charlotte Regional Transportation Planning Organization (CRTPO) area and is part of the Metrolina Regional Model (MRM) roadway network.

This project is scheduled for construction in Horizon Year 2025 in the CRTPO 2040 Metropolitan Transportation Plans (MTP) (adopted in April 2016; last amended in February 2016). Two previous forecasts for TIP projects I-5507 and U-4714 having overlapping segments with the current traffic forecast have been developed recently:

- I-5507 was completed in December 2015 by RS&H
- U-4714 was completed in February 2013 and amended in July 2013 by NCDOT TPB

Included in the traffic forecast is the analysis for four scenarios, two 2017 Base Year and two 2040 Future Year scenarios:

- **2017 Base Year No-Build** (Existing conditions)
- **2017 Base Year Build** – Widen existing two-lane SR 3174/SR 1582 (Idlewild Rd) to four-lanes from I-485 to SR 1524 (Stevens Mill Rd)
- **2040 Future Year No-Build** - (Existing conditions)
- **2040 Future Year Build** – Widen existing two-lane SR 3174/SR 1582 (Idlewild Rd) to four-lanes from I-485 to SR 1524 (Stevens Mill Rd)

Certain assumptions were made in the development of the forecast:

Fiscal Constraint: The project is located within the boundaries of a MPO; therefore the travel demand model and traffic forecasts are fiscally-constrained to match the assumptions of the CRTPO 2040 MTP.

The following projects included in the 2040 MTPs were considered as projects anticipated to have possible impact on traffic volumes and patterns in the traffic forecast vicinity:

- I-5507 - Widening of I-485 from I-77 to Independence Blvd (US 74)
- U-2509B - Widening of Independence Blvd (US 74) with managed lanes from Sardis Rd N to I-485
- U-5007 - Widening of Matthews-Mint Hill Rd (NC 51) from Matthews Township Pkwy to Lawyers Rd
- U-5115 - Intersection improvements at Matthews-Mint Hill Rd (NC 51) and Idlewild Rd
- R-3329/ R-2559 - New four-lane toll freeway from I-485 (Charlotte Outer Loop) to US 74 between Wingate and Marshville
- Idlewild Widening - Widening of Idlewild Rd from Stevens Mill Rd to Faith Church Rd

If it is determined that any of these assumptions have become inconsistent with the project and surrounding area, please request updated traffic projections at this location.

Travel Demand Model: The Metrolina Regional Model 15 Version 1.1, adopted April 20th, 2016, was used as a tool in the development of this forecast.

Development Activity: Based upon information provided by interviewees, no developments are scheduled/proposed for construction within the study area at the time of the development of this forecast.

Forecast Methodology: The 2017 traffic volumes and design factors were developed based upon current counts, historic AADT trend projections and previous forecasts.

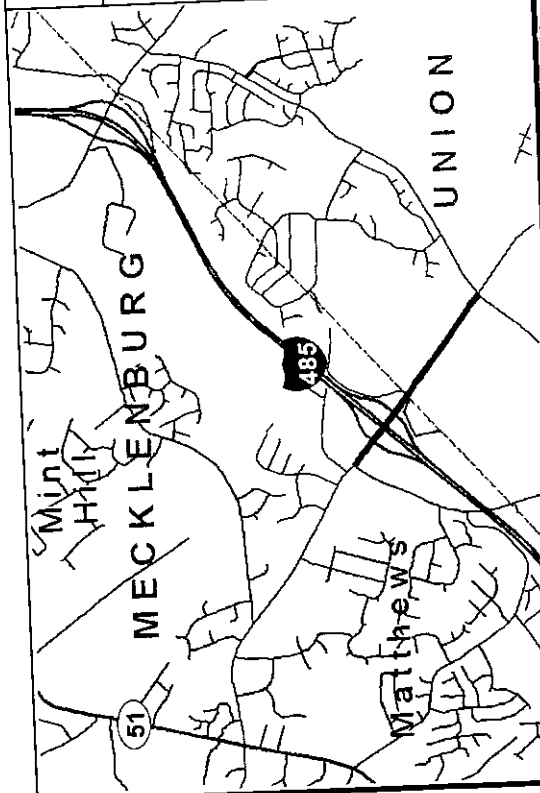
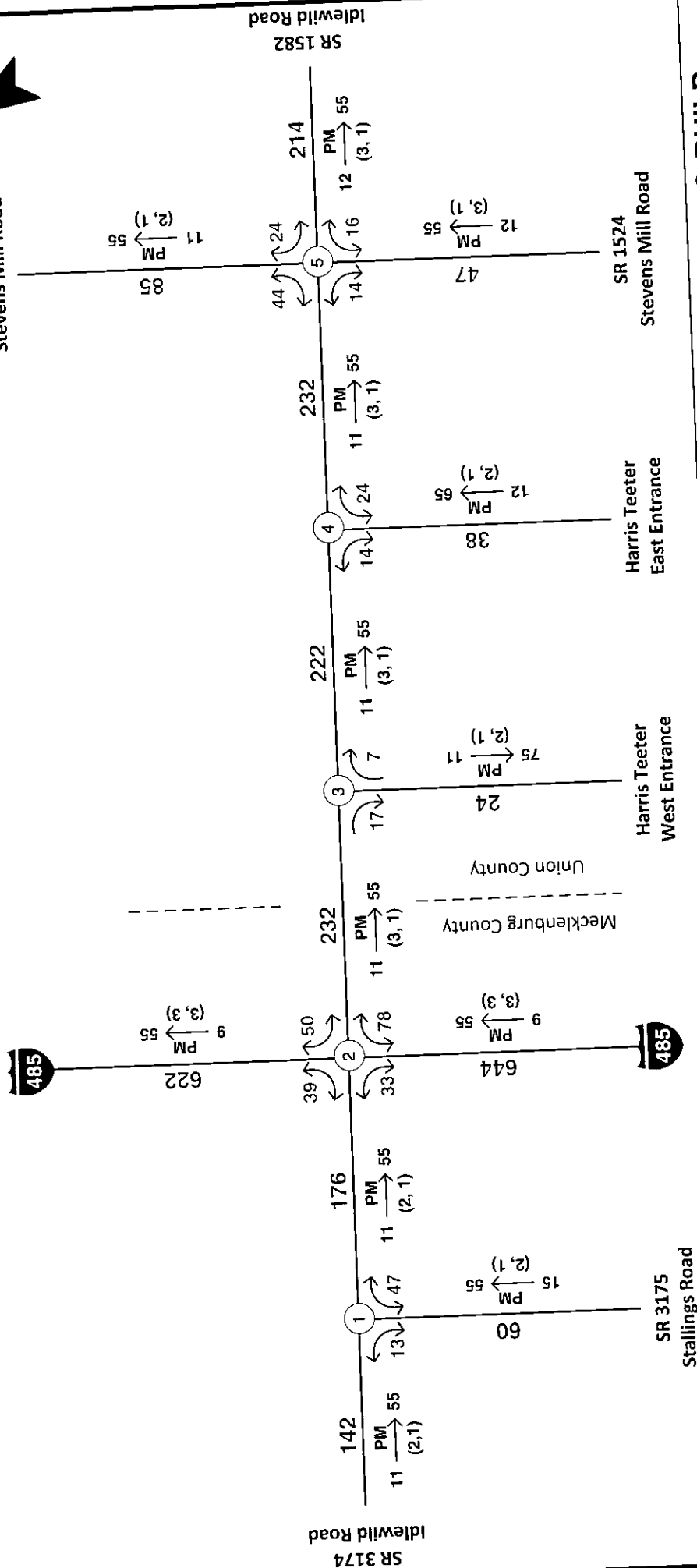
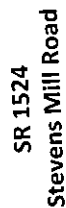
The MRM15_v1.1 was relied upon in the calculation of the 2040 Future Year traffic volumes. Historic growth rates were analyzed and compared to modeled growth rates. Engineering judgment adjustments were applied as needed in finalizing the volumes in order to develop a balanced forecast.

Interpolation: To determine any intermediate years, straight-line interpolation may be used. AADT volumes may be extrapolated for up to two years immediately following 2040. If it is determined that any of these assumptions have become inconsistent with the project and surrounding area activity, please request updated projections at this location.

If you have any questions or if I can be of further assistance, please do not hesitate to call me at (919) 239-7203, or e-mail me at ivo.dernev@aecom.com.

cc: FILE (Mecklenburg County, Union County, TIP Project U-4913)

cc: (via e-mail as PDF attachments)
James Dunlop, PE, Congestion Management Section
Glenn Mumford, PE, Roadway Design Unit
Clark Morrison, PE, Pavement Management Unit
Stuart Basham, Highway Division 10 Planning Engineer
Robert W. Cook, AICP, Charlotte Region TPO Director
Brian Wert, PE, TPB Metrolina Group Supervisor
Keith Dixon, State Traffic Forecasting Engineer



**BASE YEAR NO-BUILD
SHEET 1 OF 4**

2017
AVERAGE ANNUAL
DAILY TRAFFIC

LEGEND

No. of Vehicles Per Day in 100s

1- Less than 50 vpd

Movement Prohibited

$$K \xrightarrow[\text{(d,t)}]{PM} D$$

Design Hour Factor (%)

200

Peak Hour Directional Split (%)

Indicates Direction of D

Indicates Encountered

TIP: U-4913

WBS: 40543.1.2

COUNTY: Mecklenberg/Union

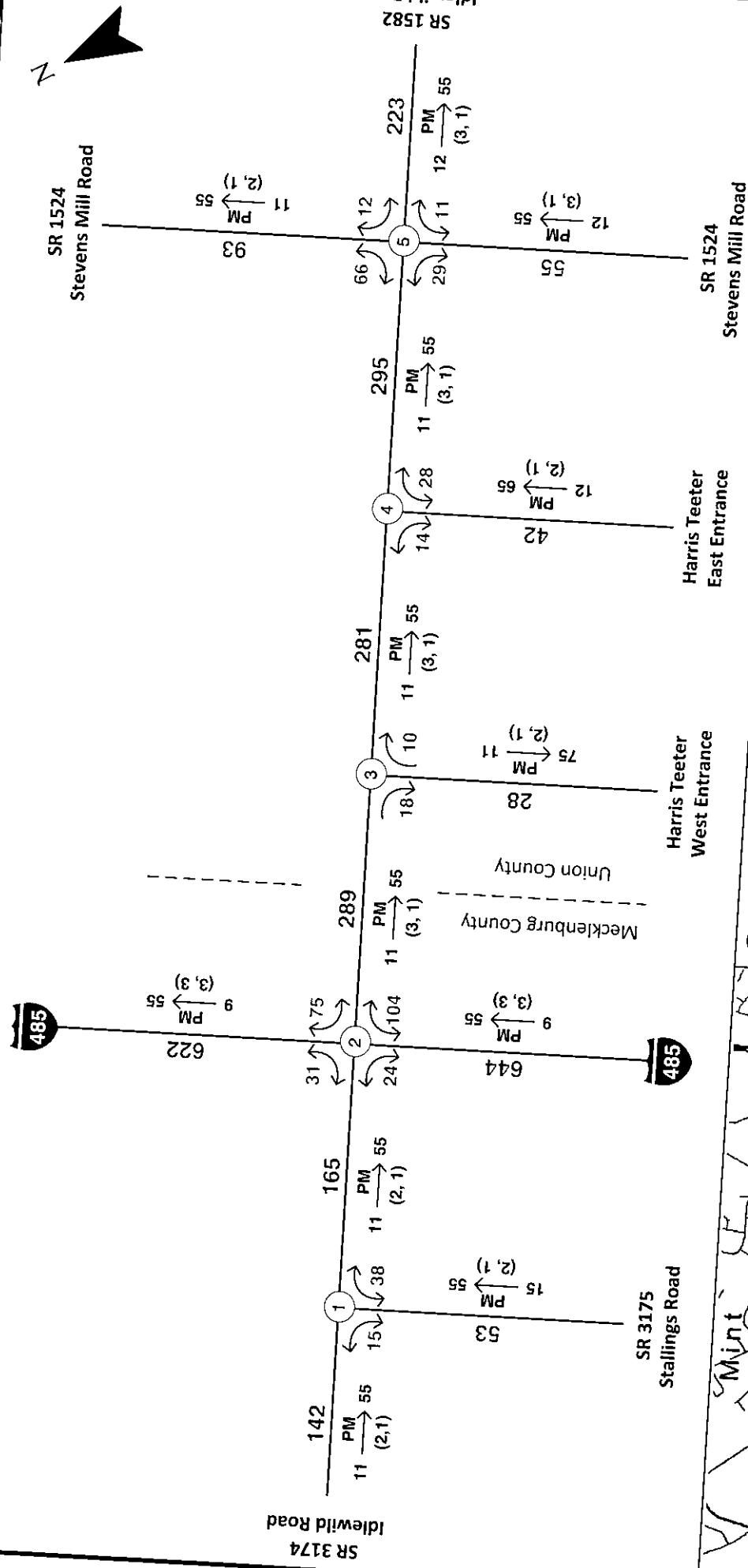
DIVISION: 10

DATE: June 2017

PREPARED BY: AECOM

LOCATION: SR 3174/SR 1582 (Idlewild Rd) from I-485 to SR 1524 (Stevens Mill Rd)

PROJECT: Widen SR 3174/SR 1582
(Idlewild Rd)

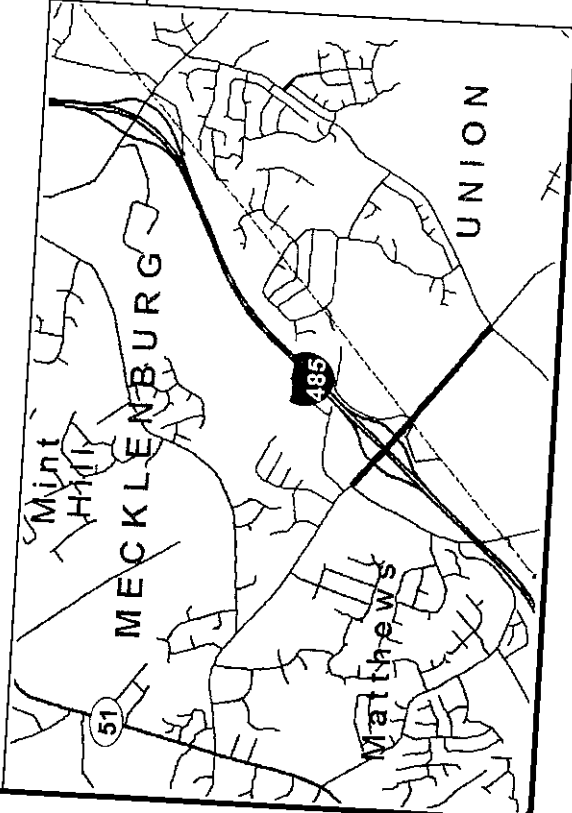


BASE YEAR BUILD
SHEET 2 OF 4

2017
AVERAGE ANNUAL DAILY TRAFFIC

LEGEND

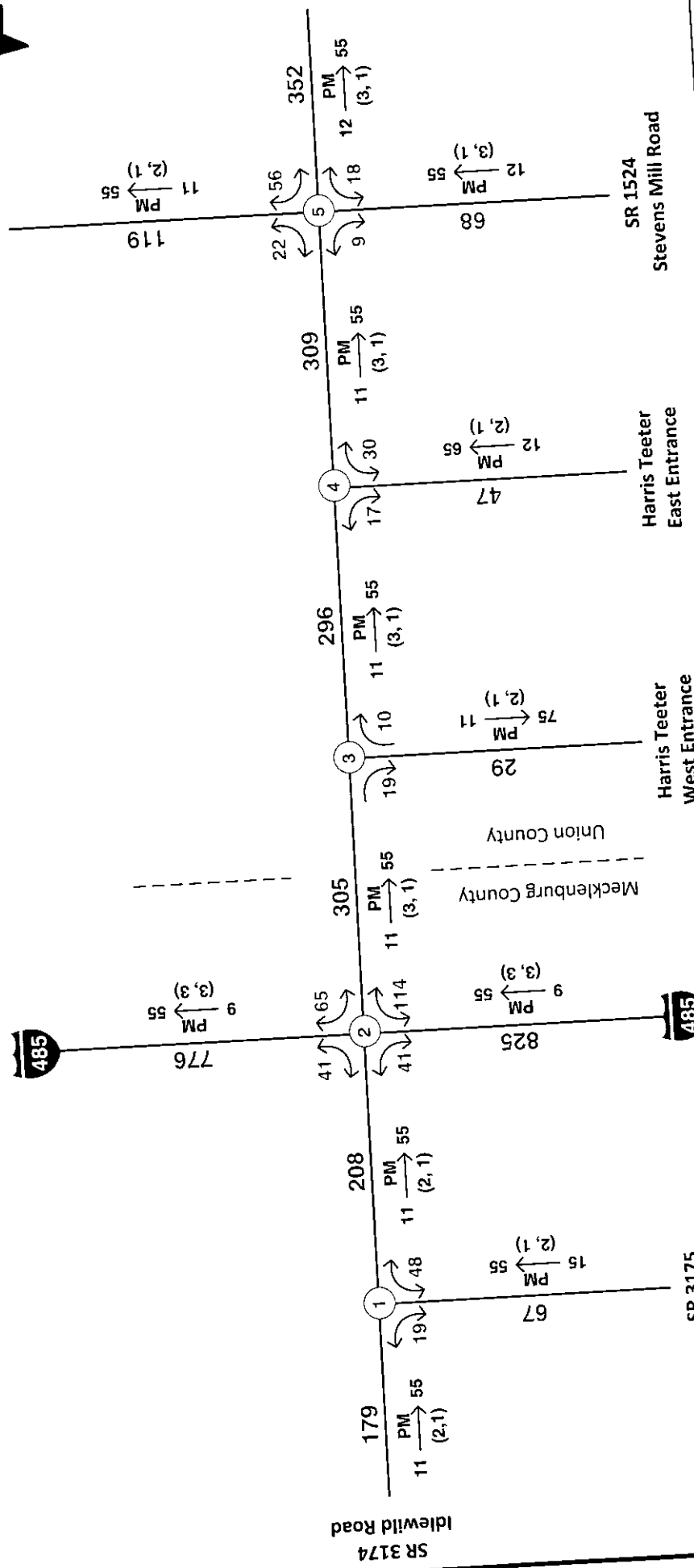
- ### No. of Vehicles Per Day in 100s
- 1- Less than 50 vpd
- X Movement Prohibited
- K Design Hour Factor (%)
- PM PM Peak Period
- D Peak Hour Directional Split (%)
- ↑ Indicates Direction of D
- (d, t) Duals, TT-STs (%)



TIP: U-4913	WBS: 40543.1.2
COUNTY: Mecklenburg/Union	DIVISION: 10
DATE: June 2017	
PREPARED BY: AECOM	
LOCATION: SR 3174/SR 1582 (Idlewild Rd) from I-485 to SR 1524 (Stevens Mill Rd)	
PROJECT: Widen SR 3174/SR 1582 (Idlewild Rd)	



SR 1524
Stevens Mill Road

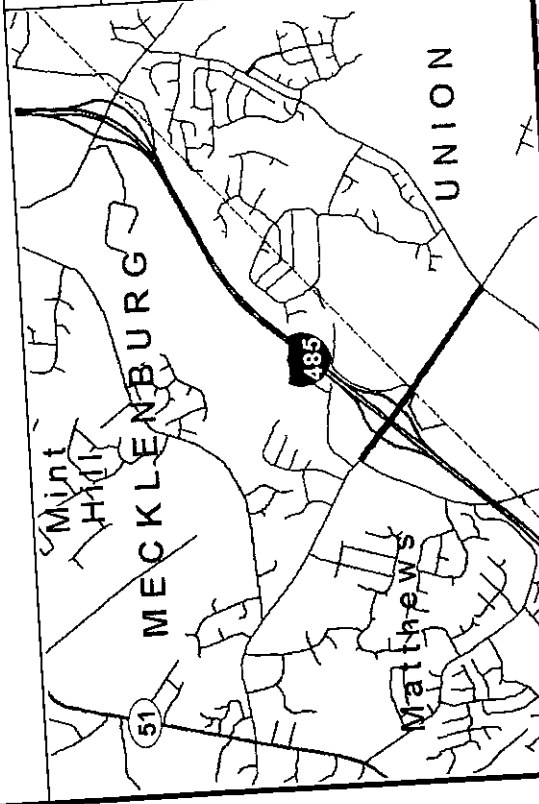


**FUTURE YEAR NO-BUILD
SHEET 3 OF 4**

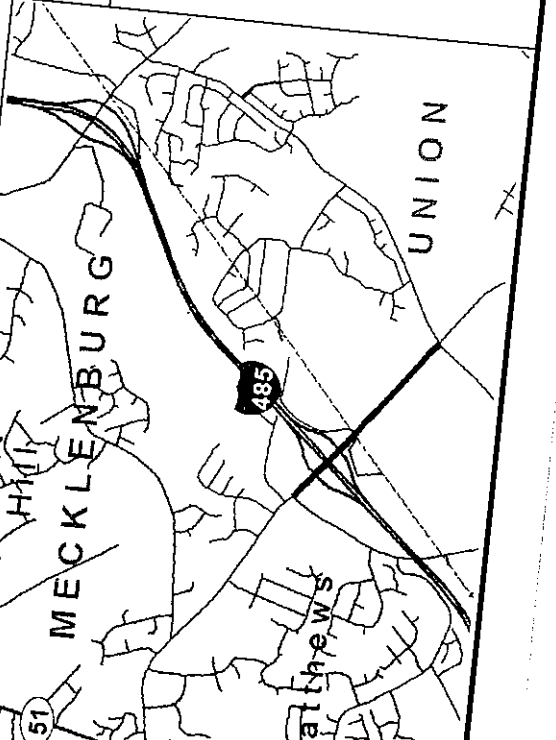
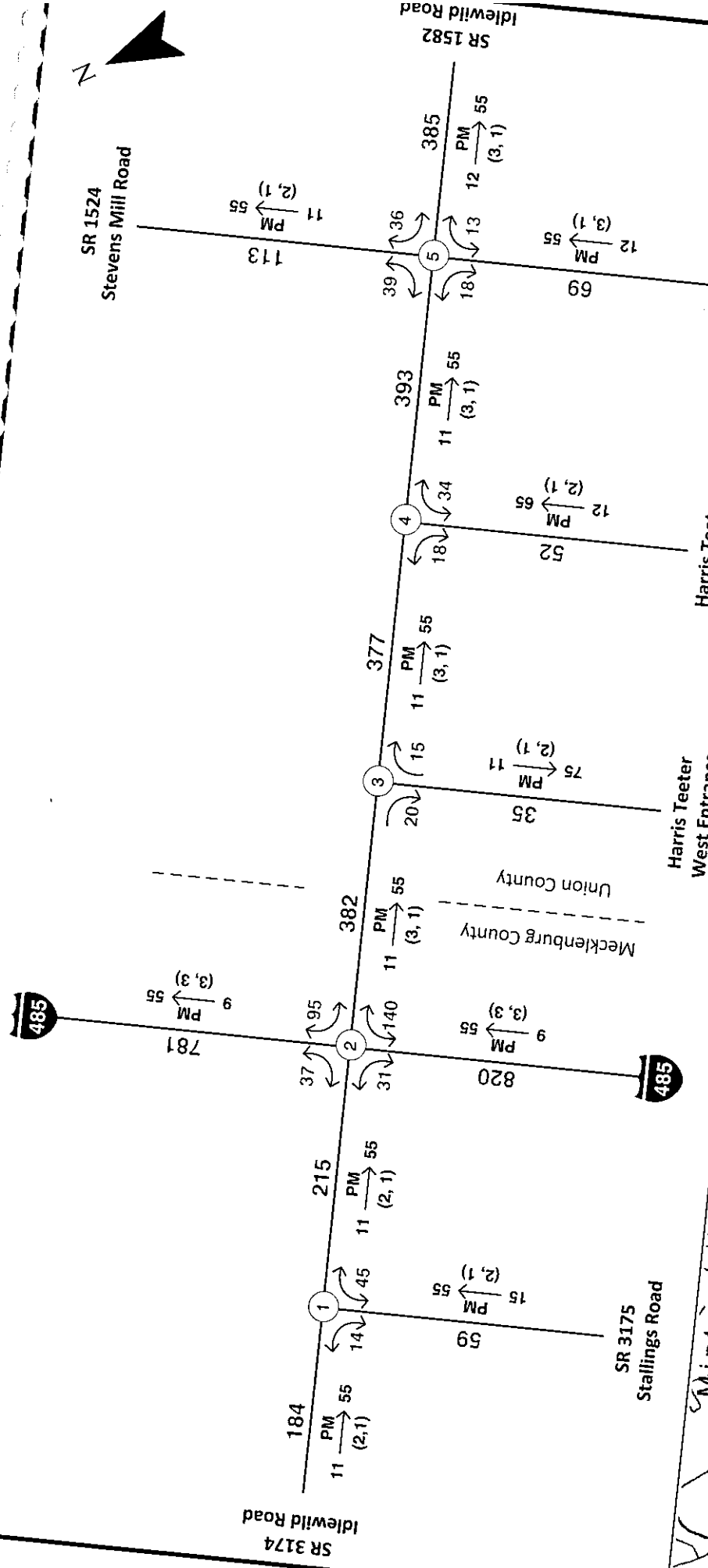
2040 AVERAGE ANNUAL
DAILY TRAFFIC

LEGEND

- ### No. of Vehicles Per Day in 100s
- 1- Less than 50 vpd
- X Movement Prohibited
- K Design Hour Factor (%)
- PM PM Peak Period
- D Peak Hour Directional Split (%)
- Indicates Direction of D
- (d, t) Duals, TT-STs (%)



TIP: U-4913	WBS: 40543.1.2
COUNTY: Mecklenburg/Union	DIVISION: 10
DATE: June 2017	
PREPARED BY: AECOM	
LOCATION: SR 3174/SR 1582 (Idlewild Rd) from I-485 to SR 1524 (Stevens Mill Rd)	
PROJECT: Widen SR 3174/SR 1582 (Idlewild Rd)	



2040

AVERAGE ANNUAL
DAILY TRAFFIC

FUTURE YEAR BUILD SHEET 4 OF 4

LEGEND

- ### No. of Vehicles Per Day in 100s
- 1- Less than 50 vpd
- X Movement Prohibited
- K Design Hour Factor (%)
- PM PM Peak Period
- D Peak Hour Directional Split (%)
- Indicates Direction of D
- (d, t) Duals, TT-STs (%)

TIP: U-4913

WBS: 40543.1.2

COUNTY: Mecklenburg/Union

DATE: June 2017

PREPARED BY: AECOM

LOCATION: SR 3174/SR 1582 (Idlewild Rd) from I-485 to SR 1524 (Stevens Mill Rd)

PROJECT: Widen SR 3174/SR 1582 (Idlewild Rd)

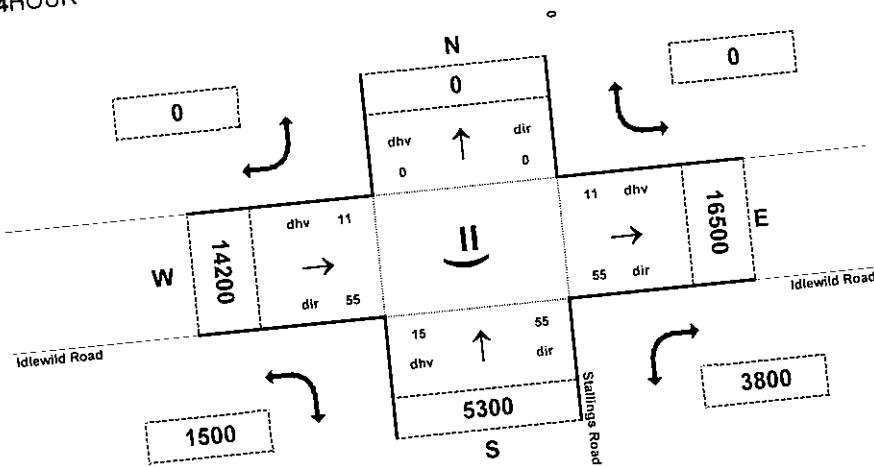
Peak Hour Volume Breakouts Report:
02 Idlewild Road and Stallings Road

Traffic Forecast Release Date:
June-17

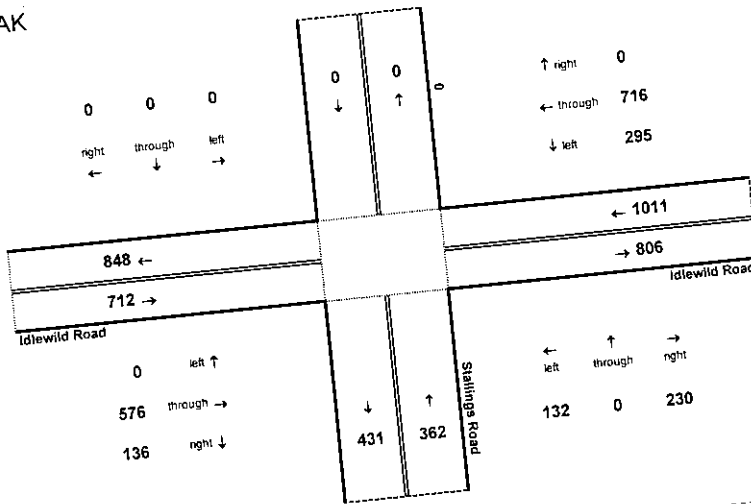
Traffic Data Year:
2017 Build

Project:
U-4913

24HOUR



AMPEAK



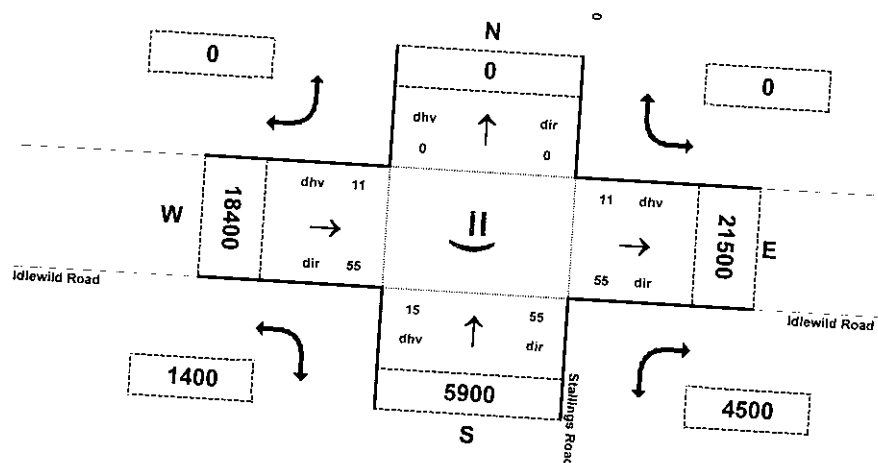
AM peak hour inflow is 2085 vehicles. AM peak hour outflow is 2086 vehicles.

PMPEAK



PM peak hour inflow is 2086 vehicles. PM peak hour outflow is 2085 vehicles.

24 HOUR



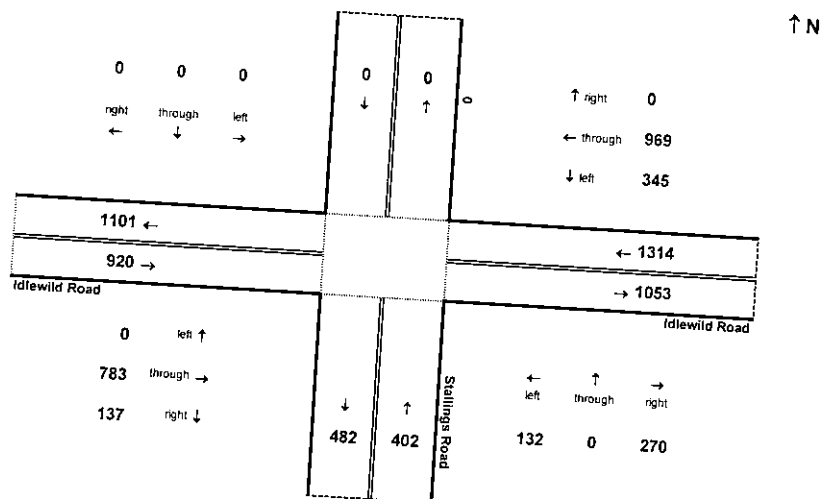
Peak Hour Volume Breakouts Report: 02 Idlewild Road and Stallings Road

Traffic Forecast Release Date:
June-17

Traffic Data Year:
2040 Build

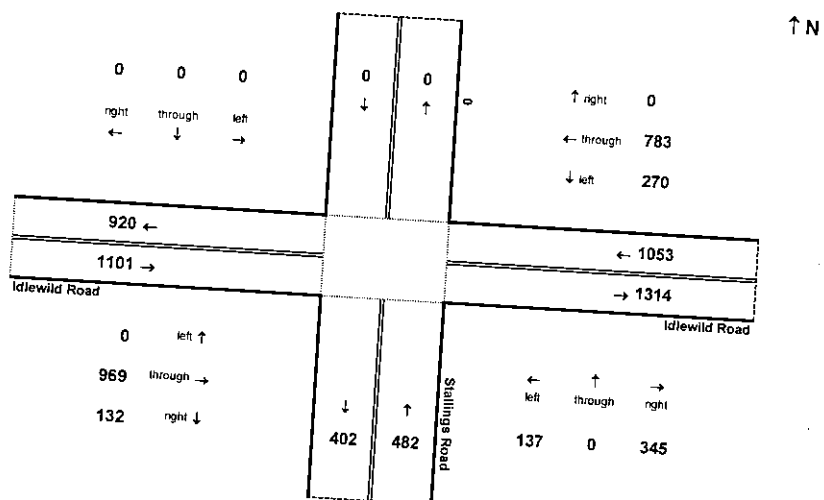
Project:
U-4913

AMPEAK

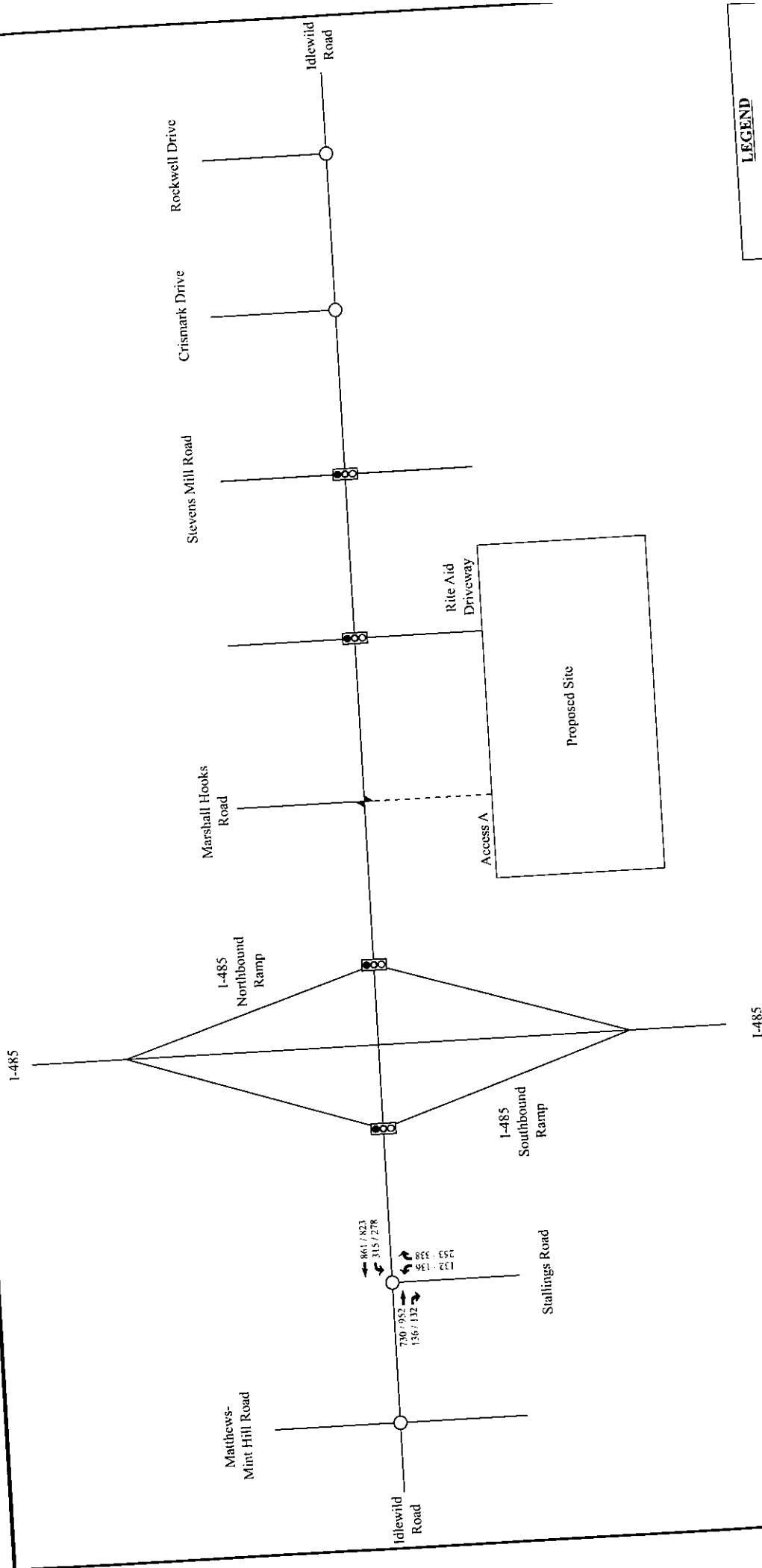


AM peak hour inflow is 2636 vehicles. AM peak hour outflow is 2637 vehicles.

PMPEAK

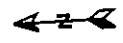


PM peak hour inflow is 2637 vehicles. PM peak hour outflow is 2636 vehicles.



LEGEND

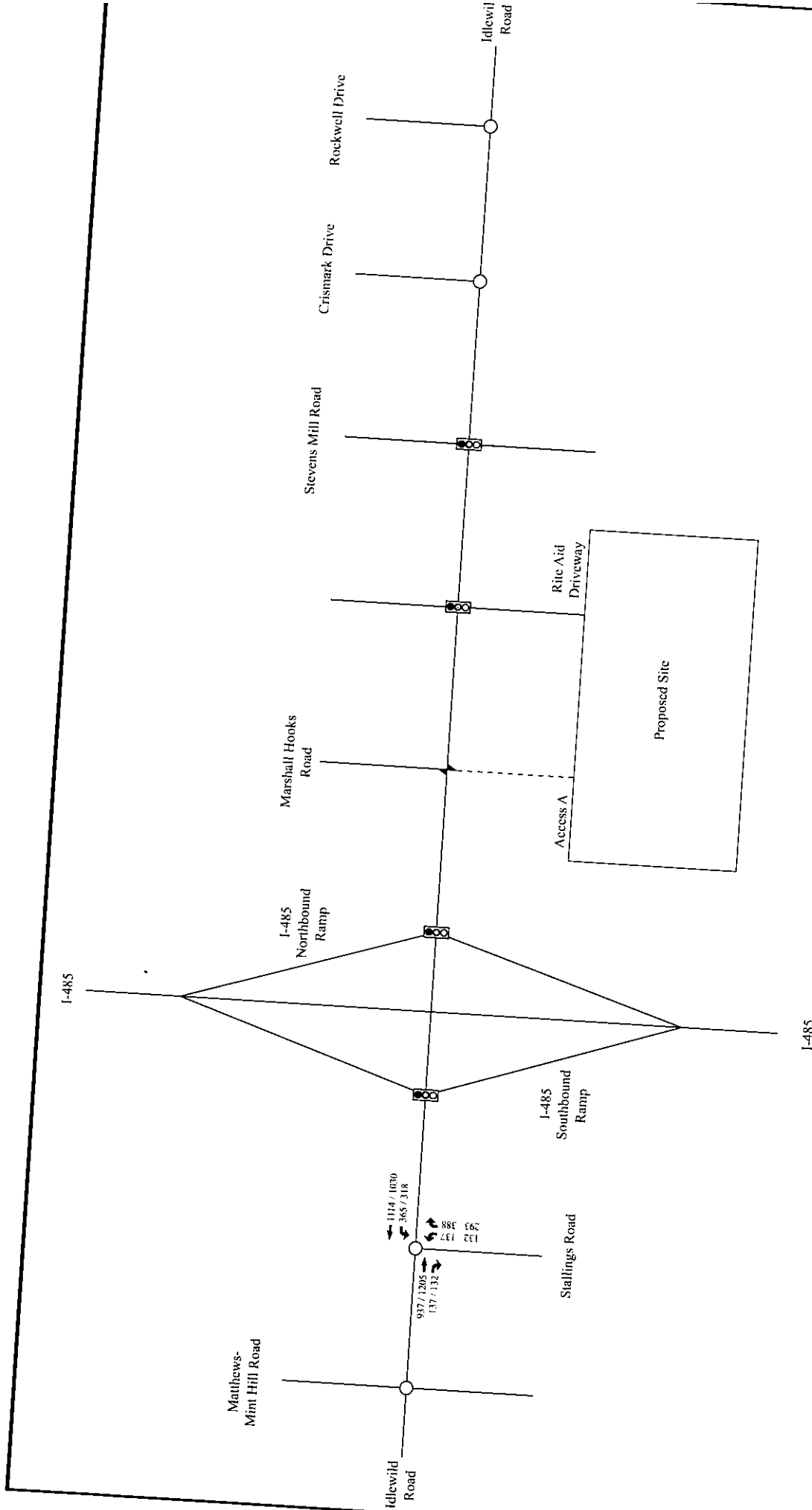
- Unsignalized Intersection
- Signalized Intersection
- Directional Crossover
- AM / PM Peak Hour Traffic Volume



2017 Build
Peak Hour Traffic Volumes
Scale: Not to Scale
Figure 1

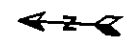
Idlewild Road
Matthews, NC





LEGEND

- Unsignalized Intersection
- Signalized Intersection
- ↔ Directional Crossover
- ↔ AM / PM Peak Hour Traffic Volume





RAMLEY KEMP ASSOCIATES
TRANSPORTATION ENGINEERS

Idlewild Road
Matthews, NC

2040 Build
Peak Hour Traffic Volumes

Scale: Not to Scale

Figure 2

[illegible]

APPENDIX E

IDLEWILD ROAD AND MATTHEWS-MINT HILL ROAD

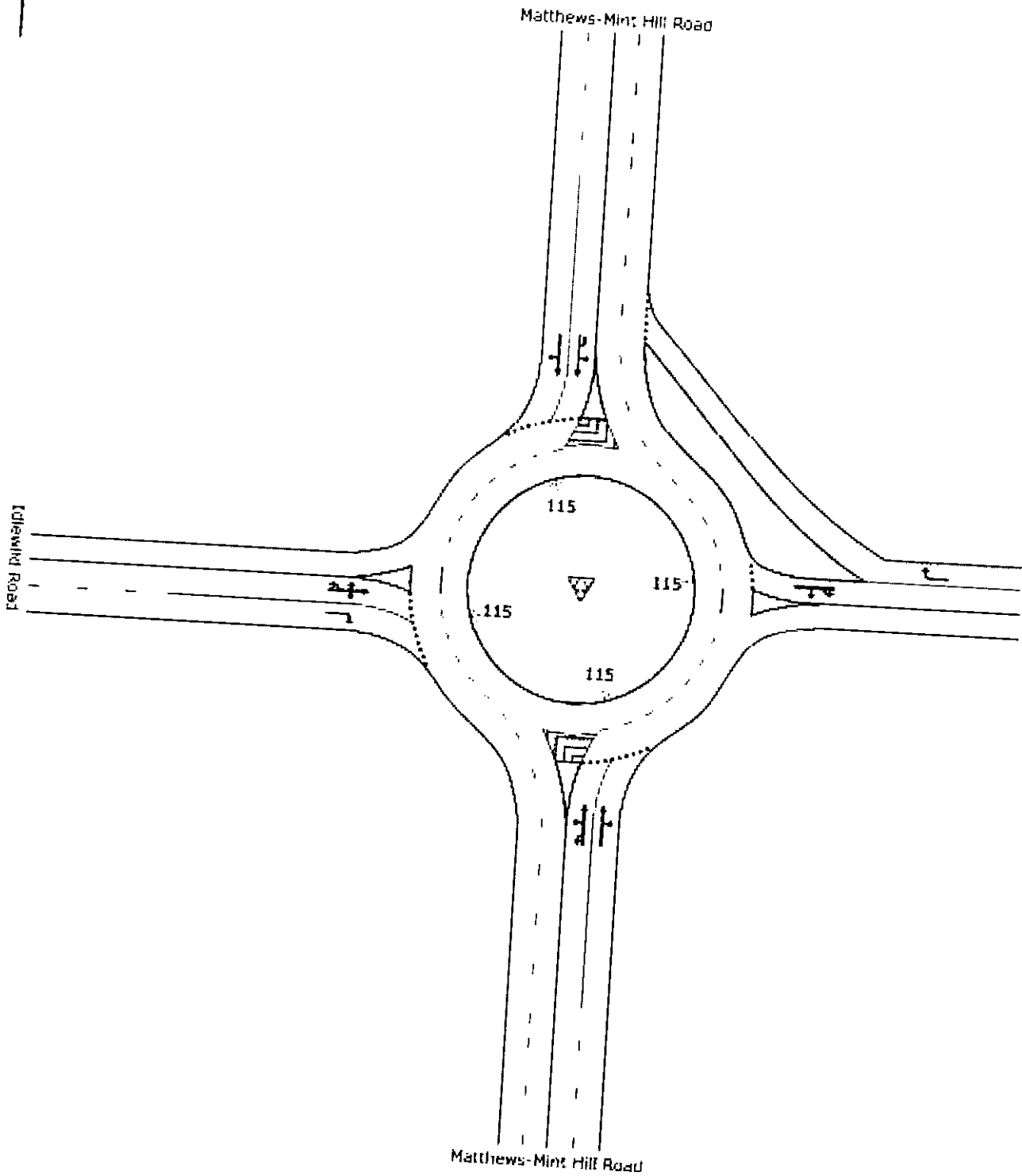
SIDRA REPORTS

[illegible]

SITE LAYOUT

Site: 1 [2018 Existing AM]

New Site
Roundabout



MOVEMENT SUMMARY

Site: 1 [2018 Existing AM]

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Matthews-Mint Hill Road											
3u	U	24	2.0	0.290	15.3	LOS C	1.8	46.1	0.66	0.75	35.3
3	L2	178	2.0	0.290	12.7	LOS B	1.8	46.1	0.66	0.75	34.3
8	T1	294	2.0	0.290	6.1	LOS A	1.9	48.5	0.65	0.62	35.7
18	R2	60	2.0	0.290	6.2	LOS A	1.9	48.5	0.65	0.59	34.9
Approach		557	2.0	0.290	8.7	LOS A	1.9	48.5	0.65	0.66	35.1
East: Idlewild Road											
1u	U	7	2.0	1.104	74.7	LOS F	44.6	1133.9	1.00	2.42	19.0
1	L2	387	2.0	1.104	72.1	LOS F	44.6	1133.9	1.00	2.42	18.7
6	T1	518	2.0	1.104	65.8	LOS F	44.6	1133.9	1.00	2.42	18.6
16	R2	171	2.0	0.184	5.3	LOS A	0.8	20.8	0.49	0.62	36.0
Approach		1082	2.0	1.104	58.5	LOS F	44.6	1133.9	0.92	2.14	20.2
North: Matthews-Mint Hill Road											
7u	U	3	67.1	0.964	79.8	LOS F	18.0	459.4	1.00	1.60	19.4
7	L2	108	2.0	0.964	65.7	LOS F	18.0	459.4	1.00	1.60	19.8
4	T1	593	2.0	0.964	57.3	LOS F	21.9	556.7	1.00	1.64	20.2
14	R2	156	2.0	0.964	55.7	LOS F	21.9	556.7	1.00	1.67	20.1
Approach		860	2.3	0.964	58.1	LOS F	21.9	556.7	1.00	1.64	20.1
West: Idlewild Road											
5u	U	1	2.0	0.554	18.4	LOS C	3.5	89.4	0.82	0.98	35.4
5	L2	119	2.0	0.554	15.8	LOS C	3.5	89.4	0.82	0.98	34.4
2	T1	227	2.0	0.554	9.5	LOS A	3.5	89.4	0.82	0.98	34.2
12	R2	157	2.0	0.339	9.3	LOS A	1.6	39.9	0.74	0.87	34.1
Approach		503	2.0	0.554	11.0	LOS B	3.5	89.4	0.80	0.94	34.2
All Vehicles		3002	2.1	1.104	41.2	LOS E	44.6	1133.9	0.87	1.52	23.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

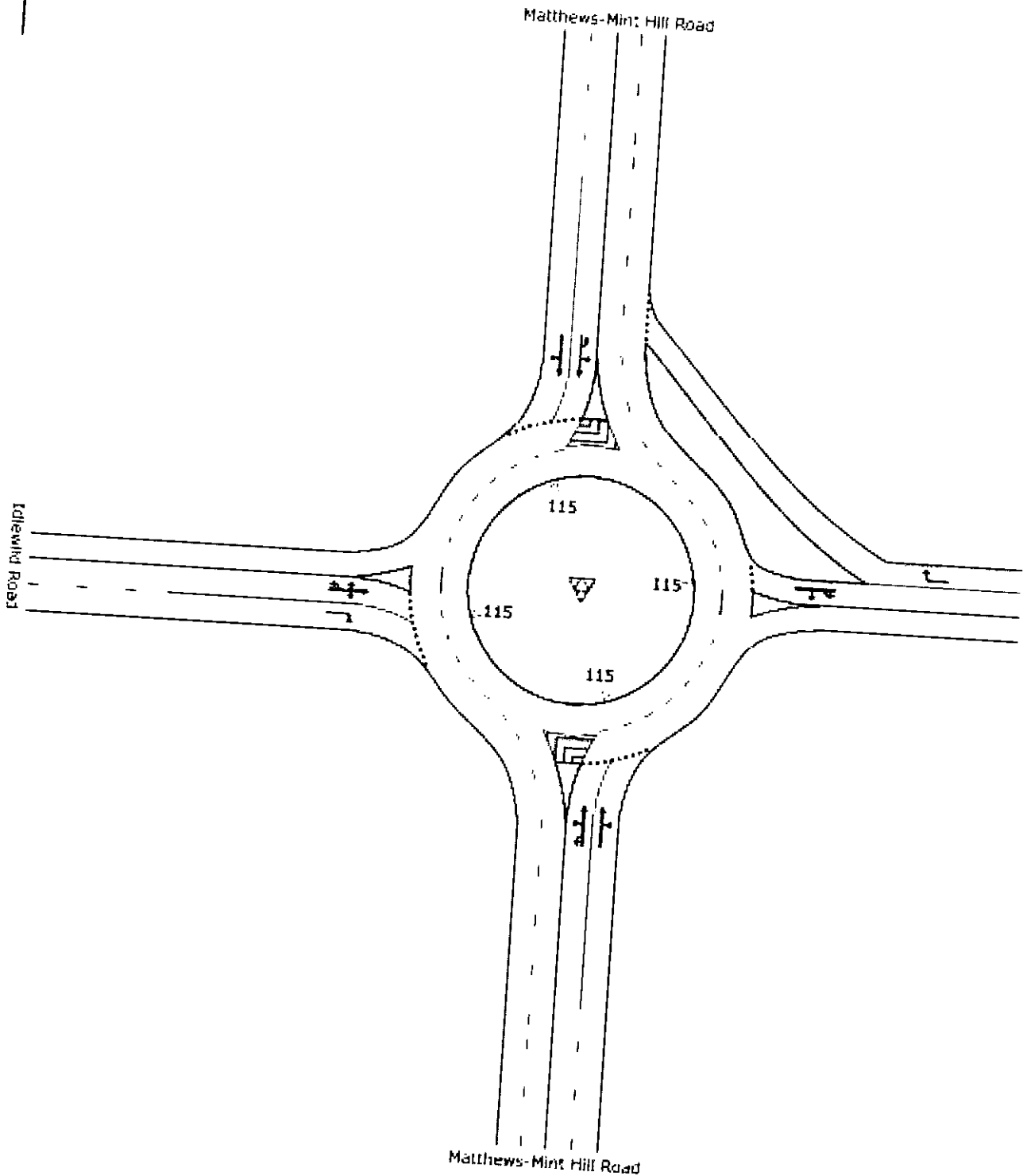
SIDRA INTERSECTION 7.0 | Copyright © 2000-2016 Akcelik and Associates Pty Ltd | sidrasolutions.com
Organisation: RAMEY KEMP & ASSOCIATES, INC. | Processed: Wednesday, February 27, 2019 11:29:31 AM

Project: Y:\2018 Projects\18181.01 Idlewild Road Mixed Use Update - Matthews, NC\KRA Traffic\TIA 02-15-2019\Analysis\Sidra\Idlewild Road and Matthews-Mint Hill Road.sip7

SITE LAYOUT

Site: 1 [2020 No-Build AM]

New Site
Roundabout



MOVEMENT SUMMARY

Site: 1 [2020 No-Build AM]

New Site
Roundabout

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Matthews-Mint Hill Road											
3u	U	24	2.0	0.297	15.4	LOS C	1.9	47.6	0.66	0.75	35.3
3	L2	181	2.0	0.297	12.8	LOS B	1.9	47.6	0.66	0.75	34.3
8	T1	300	2.0	0.297	6.2	LOS A	2.0	50.0	0.66	0.62	35.7
18	R2	61	2.0	0.297	6.2	LOS A	2.0	50.0	0.66	0.59	34.8
Approach		567	2.0	0.297	8.7	LOS A	2.0	50.0	0.66	0.67	35.1
East: Idlewild Road											
1u	U	7	2.0	1.131	85.5	LOS F	50.6	1286.0	1.00	2.63	17.5
1	L2	394	2.0	1.131	82.9	LOS F	50.6	1286.0	1.00	2.63	17.2
6	T1	528	2.0	1.131	76.6	LOS F	50.6	1286.0	1.00	2.63	17.2
16	R2	174	2.0	0.188	5.3	LOS A	0.8	21.4	0.50	0.62	36.0
Approach		1103	2.0	1.131	67.6	LOS F	50.6	1286.0	0.92	2.32	18.7
North: Matthews-Mint Hill Road											
7u	U	1	2.0	0.973	70.2	LOS F	18.9	479.9	1.00	1.62	19.8
7	L2	110	2.0	0.973	67.6	LOS F	18.9	479.9	1.00	1.62	19.5
4	T1	606	2.0	0.973	59.3	LOS F	22.8	580.0	1.00	1.67	19.8
14	R2	159	2.0	0.973	57.8	LOS F	22.8	580.0	1.00	1.70	19.8
Approach		876	2.0	0.973	60.1	LOS F	22.8	580.0	1.00	1.67	19.8
West: Idlewild Road											
5u	U	1	2.0	0.569	18.6	LOS C	3.7	93.3	0.83	0.98	35.3
5	L2	121	2.0	0.569	16.0	LOS C	3.7	93.3	0.83	0.98	34.3
2	T1	231	2.0	0.569	9.8	LOS A	3.7	93.3	0.83	0.98	34.1
12	R2	160	2.0	0.348	9.4	LOS A	1.6	41.4	0.75	0.88	34.0
Approach		513	2.0	0.569	11.1	LOS B	3.7	93.3	0.80	0.95	34.1
All Vehicles		3059	2.0	1.131	45.1	LOS E	50.6	1286.0	0.88	1.60	22.7

Motor Settings dialog (Site tab).

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

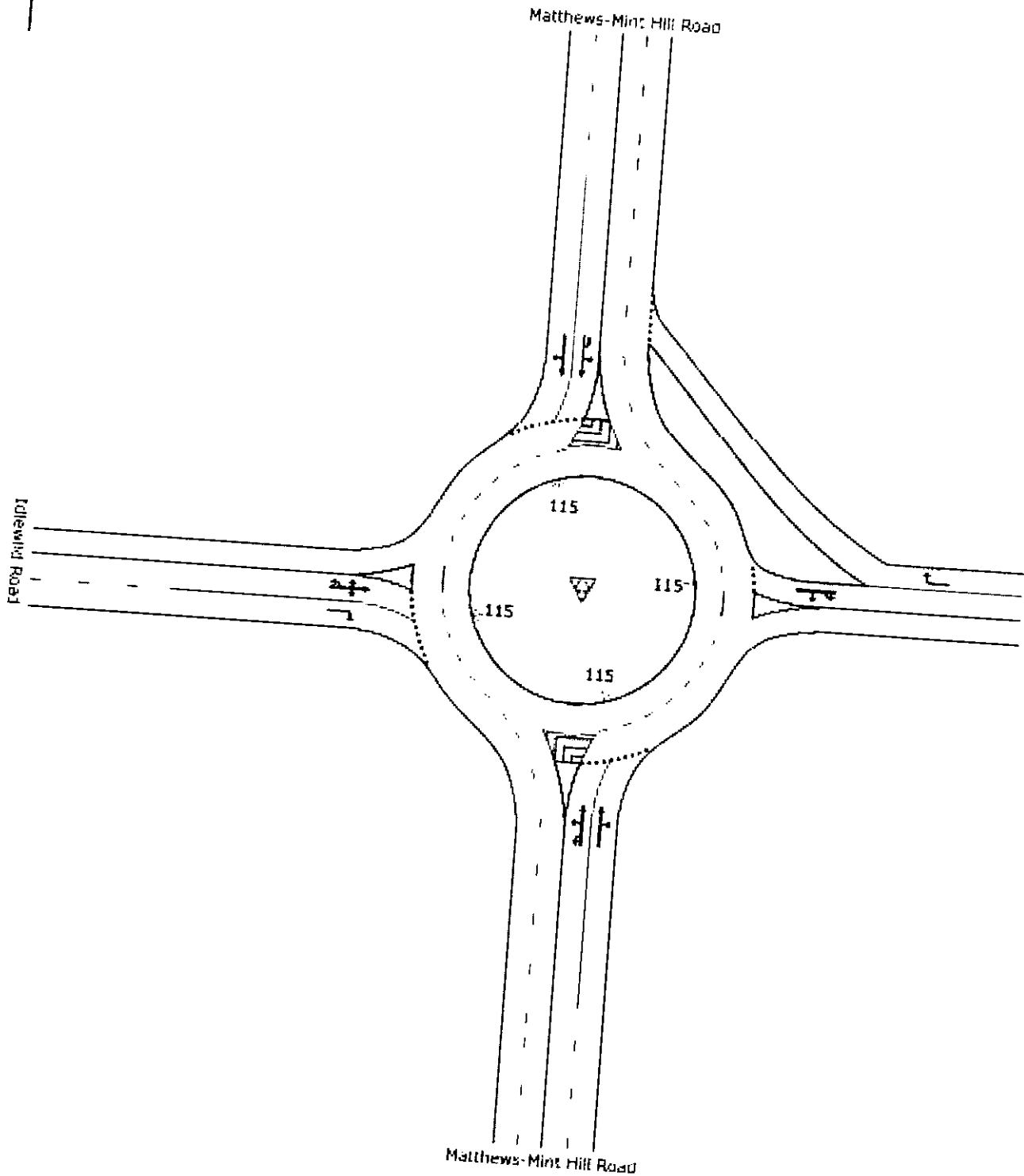
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Project: Y:\2018 Projects\18181.01 Idlewild Road Mixed Use Update - Matthews, NC\IRKA Traffic\TIA 02-15-2019\Analysis\Sidra\Idlewild Road and Matthews-Mint Hill Road.sip7

SITE LAYOUT

Site: 1 [2020 Build Phase 1 AM]

New Site
Roundabout



MOVEMENT SUMMARY

Site: 1 [2020 Build Phase 1 AM]

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Matthews-Mint Hill Road											
3u	U	24	2.0	0.300	15.5	LOS C	1.9	48.3	0.67	0.76	35.3
3	L2	181	2.0	0.300	12.8	LOS B	1.9	48.3	0.67	0.76	34.3
8	T1	300	2.0	0.300	6.2	LOS A	2.0	50.9	0.66	0.63	35.7
18	R2	63	2.0	0.300	6.3	LOS A	2.0	50.9	0.66	0.60	34.8
Approach		569	2.0	0.300	8.7	LOS A	2.0	50.9	0.67	0.67	35.1
East: Idlewild Road											
1u	U	7	2.0	1.160	97.4	LOS F	57.6	1462.4	1.00	2.86	16.0
1	L2	401	2.0	1.160	94.8	LOS F	57.6	1462.4	1.00	2.86	15.8
6	T1	546	2.0	1.160	88.6	LOS F	57.6	1462.4	1.00	2.86	15.8
16	R2	181	2.0	0.195	5.3	LOS A	0.9	22.4	0.50	0.63	36.0
Approach		1134	2.0	1.160	77.5	LOS F	57.6	1462.4	0.92	2.50	17.3
North: Matthews-Mint Hill Road											
7u	U	1	2.0	0.977	71.1	LOS F	19.1	486.2	1.00	1.63	19.7
7	L2	112	2.0	0.977	68.5	LOS F	19.1	486.2	1.00	1.63	19.4
4	T1	606	2.0	0.977	60.1	LOS F	23.2	588.1	1.00	1.67	19.7
14	R2	159	2.0	0.977	58.6	LOS F	23.2	588.1	1.00	1.71	19.6
Approach		878	2.0	0.977	60.9	LOS F	23.2	588.1	1.00	1.68	19.6
West: Idlewild Road											
5u	U	1	2.0	0.577	18.7	LOS C	3.8	95.6	0.83	0.99	35.3
5	L2	121	2.0	0.577	16.1	LOS C	3.8	95.6	0.83	0.99	34.3
2	T1	237	2.0	0.577	9.8	LOS A	3.8	95.6	0.83	0.99	34.1
12	R2	160	2.0	0.350	9.5	LOS A	1.6	41.6	0.75	0.88	34.0
Approach		519	2.0	0.577	11.2	LOS B	3.8	95.6	0.81	0.95	34.1
All Vehicles		3100	2.0	1.160	49.1	LOS E	57.6	1462.4	0.88	1.67	21.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

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

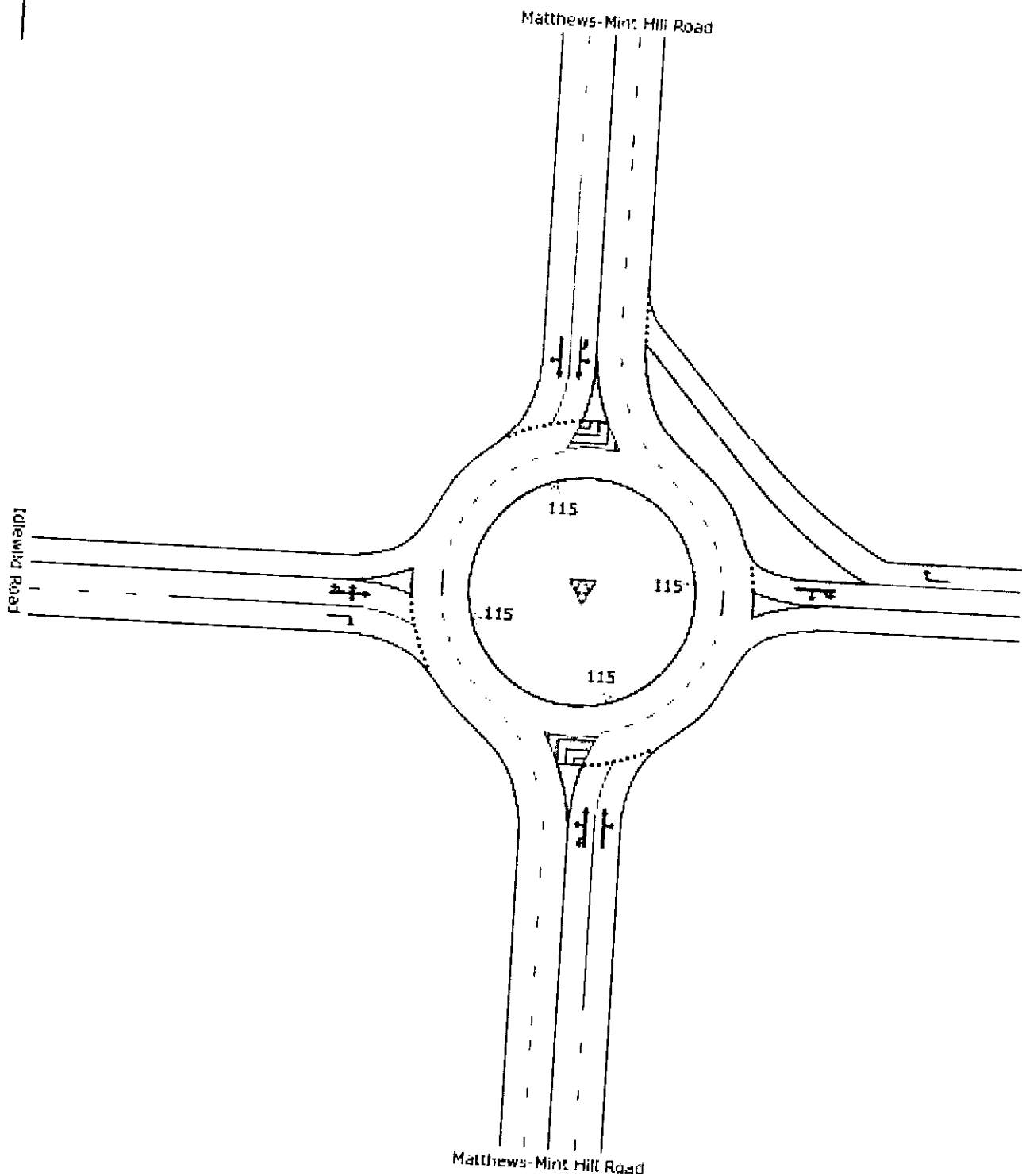
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Project: Y:\2018 Projects\18181.01 Idlewild Road Mixed Use Update - Matthews, NC\IRKA Traffic\TIA 02-15-2019\Analysis\Sidra\Idlewild Road and Matthews-Mint Hill Road.sip7

SITE LAYOUT

Site: 1 [2020 Build AM]

New Site
Roundabout



MOVEMENT SUMMARY

Site: 1 [2020 Build AM]

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Matthews-Mint Hill Road											
3u	U	24	2.0	0.322	15.8	LOS C	2.1	52.9	0.71	0.78	35.1
3	L2	181	2.0	0.322	13.2	LOS B	2.1	52.9	0.71	0.78	34.1
8	T1	300	2.0	0.322	6.6	LOS A	2.2	56.1	0.71	0.66	35.5
18	R2	76	2.0	0.322	6.6	LOS A	2.2	56.1	0.71	0.63	34.7
Approach		581	2.0	0.322	9.1	LOS A	2.2	56.1	0.71	0.70	34.9
East: Idlewild Road											
1u	U	7	2.0	1.205	116.5	LOS F	68.4	1738.5	1.00	3.18	14.2
1	L2	409	2.0	1.205	113.8	LOS F	68.4	1738.5	1.00	3.18	14.0
6	T1	571	2.0	1.205	107.6	LOS F	68.4	1738.5	1.00	3.18	14.0
16	R2	189	2.0	0.204	5.4	LOS A	0.9	23.7	0.50	0.63	35.9
Approach		1176	2.0	1.205	93.4	LOS F	68.4	1738.5	0.92	2.77	15.4
North: Matthews-Mint Hill Road											
7u	U	1	2.0	0.985	72.8	LOS F	19.8	504.0	1.00	1.66	19.4
7	L2	124	2.0	0.985	70.2	LOS F	19.8	504.0	1.00	1.66	19.1
4	T1	606	2.0	0.985	61.8	LOS F	24.0	610.1	1.00	1.70	19.4
14	R2	159	2.0	0.985	60.3	LOS F	24.0	610.1	1.00	1.74	19.4
Approach		890	2.0	0.985	62.7	LOS F	24.0	610.1	1.00	1.70	19.4
West: Idlewild Road											
5u	U	1	2.0	0.636	19.5	LOS C	4.4	112.5	0.86	1.02	34.9
5	L2	121	2.0	0.636	16.9	LOS C	4.4	112.5	0.86	1.02	34.0
2	T1	271	2.0	0.636	10.6	LOS B	4.4	112.5	0.86	1.02	33.8
12	R2	160	2.0	0.365	9.8	LOS A	1.7	43.5	0.75	0.89	33.8
Approach		553	2.0	0.636	11.8	LOS B	4.4	112.5	0.83	0.98	33.8
All Vehicles		3200	2.0	1.205	55.4	LOS F	68.4	1738.5	0.89	1.79	20.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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

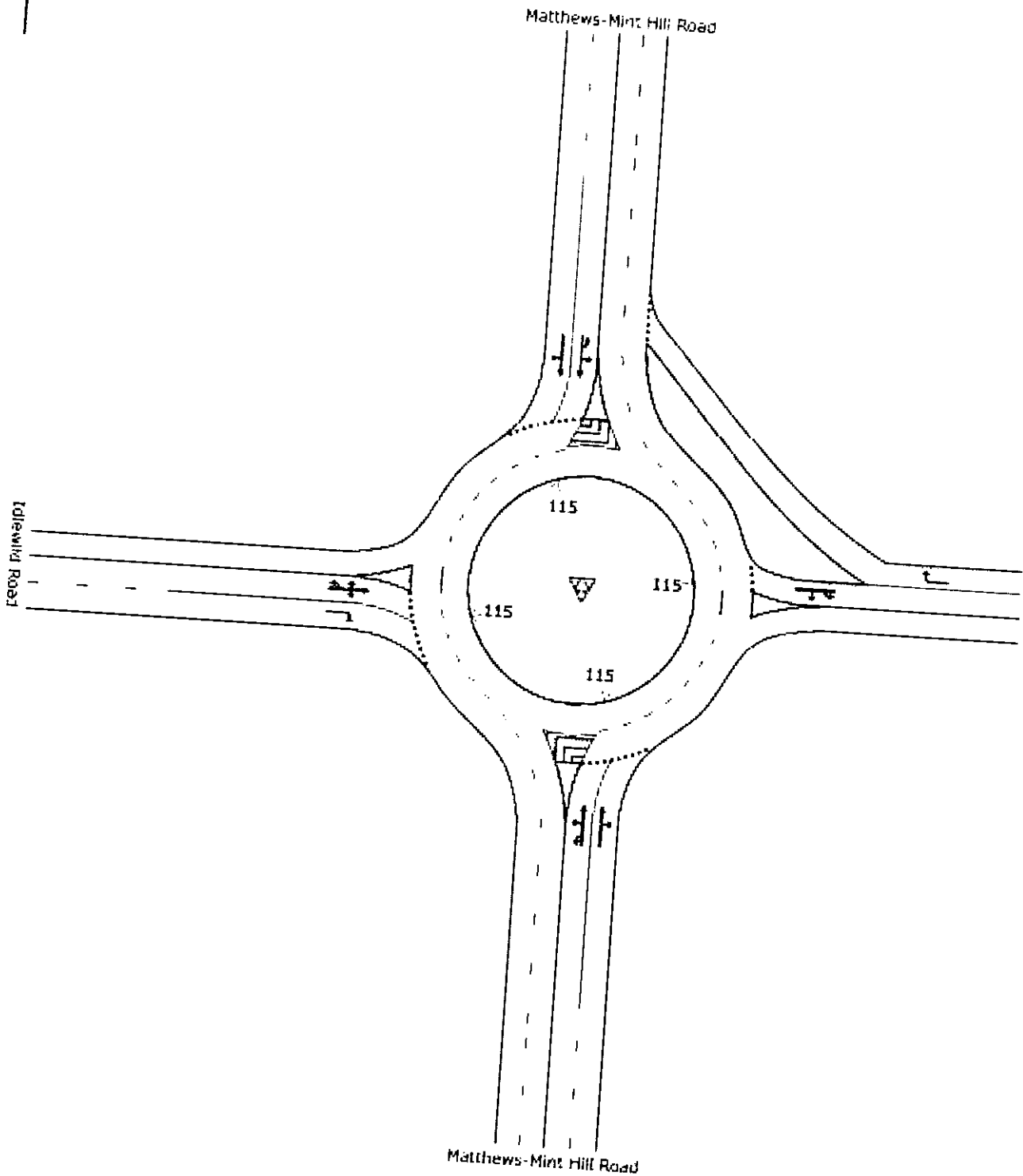
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Project: Y:\2018 Projects\18181.01 Idlewild Road Mixed Use Update - Matthews, NC\KRA Traffic\TIA 02-15-2019\Analysis\Sidra\Idlewild Road and Matthews-Mint Hill Road.sip7

SITE LAYOUT

Site: 1 [2018 Existing PM]

New Site
Roundabout



MOVEMENT SUMMARY

Site: 1 [2018 Existing PM]

New Site
Roundabout

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Matthews-Mint Hill Road											
3u	U	6	2.0	0.906	45.4	LOS E	16.4	415.3	1.00	1.48	25.2
3	L2	121	2.0	0.906	42.8	LOS E	16.4	415.3	1.00	1.48	24.7
8	T1	754	2.0	0.906	34.9	LOS D	18.9	479.9	1.00	1.50	25.2
18	R2	224	2.0	0.906	33.4	LOS D	18.9	479.9	1.00	1.51	25.1
Approach		1106	2.0	0.906	35.5	LOS E	18.9	479.9	1.00	1.50	25.1
East: Idlewild Road											
1u	U	6	2.0	0.775	23.0	LOS C	6.8	172.2	0.94	1.13	33.0
1	L2	161	2.0	0.775	20.4	LOS C	6.8	172.2	0.94	1.13	32.1
6	T1	282	2.0	0.775	14.2	LOS B	6.8	172.2	0.94	1.13	31.9
16	R2	228	2.0	0.352	7.1	LOS A	1.8	46.9	0.74	0.85	35.3
Approach		677	2.0	0.775	13.3	LOS B	6.8	172.2	0.87	1.04	33.0
North: Matthews-Mint Hill Road											
7u	U	8	2.0	0.552	18.1	LOS C	4.8	121.7	0.85	0.93	34.7
7	L2	238	2.0	0.552	15.5	LOS C	4.8	121.7	0.85	0.93	33.8
4	T1	588	2.0	0.552	8.6	LOS A	5.0	128.1	0.85	0.87	34.8
14	R2	110	2.0	0.552	8.5	LOS A	5.0	128.1	0.85	0.84	34.1
Approach		943	2.0	0.552	10.4	LOS B	5.0	128.1	0.85	0.88	34.4
West: Idlewild Road											
5u	U	1	2.0	0.890	25.4	LOS D	9.9	250.9	0.95	1.25	32.4
5	L2	107	2.0	0.890	22.8	LOS C	9.9	250.9	0.95	1.25	31.6
2	T1	496	2.0	0.890	16.6	LOS C	9.9	250.9	0.95	1.25	31.4
12	R2	110	2.0	0.297	10.0	LOS B	1.2	30.0	0.71	0.85	33.7
Approach		713	2.0	0.890	16.5	LOS C	9.9	250.9	0.92	1.19	31.7
All Vehicles		3439	2.0	0.906	20.3	LOS C	18.9	479.9	0.92	1.17	30.1

Parameter Settings dialog (Site tab).

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.

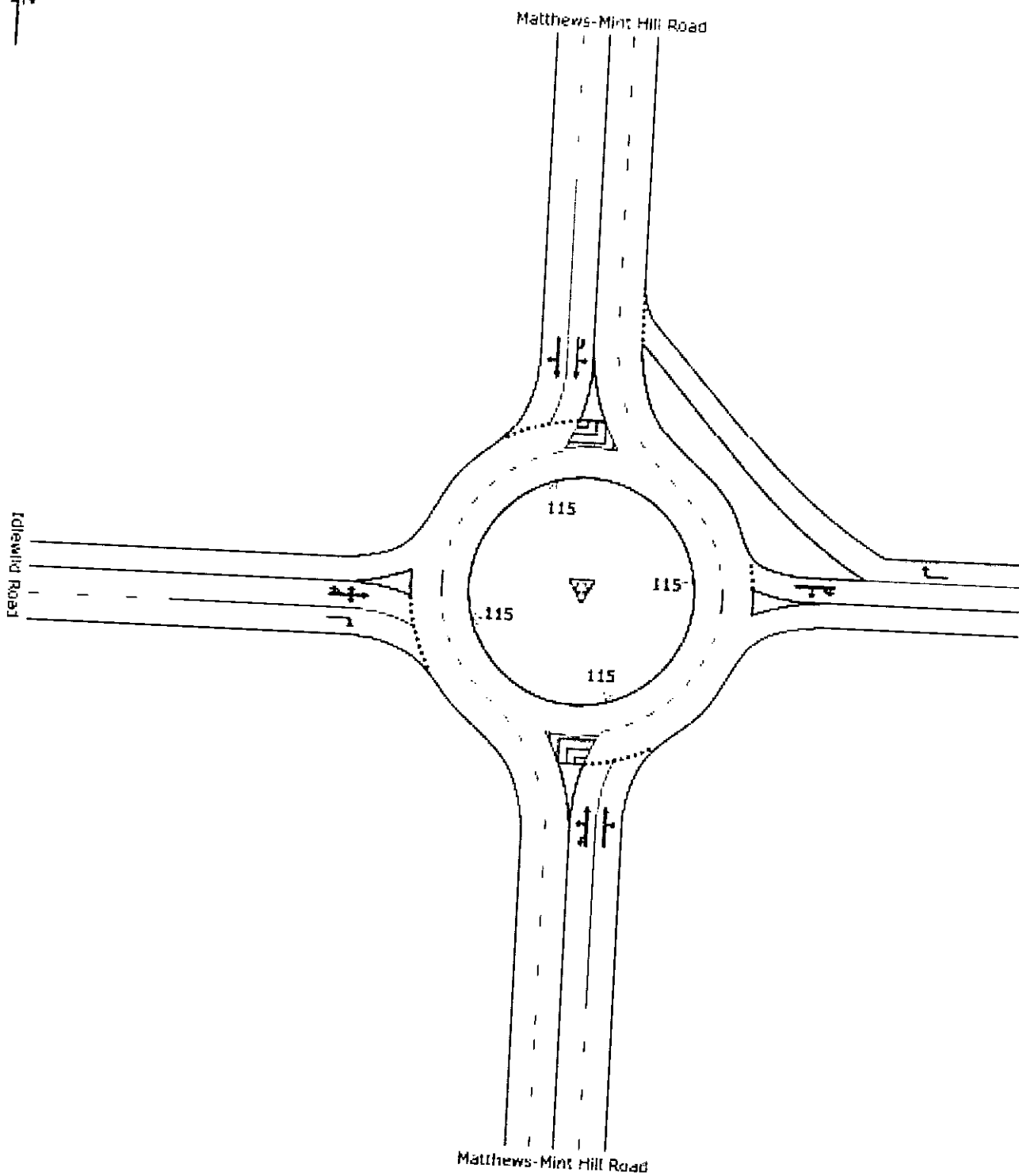
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

▽ Site: 1 [2020 No-Build PM]

New Site
Roundabout



MOVEMENT SUMMARY

Site: 1 [2020 No-Build PM]

New Site
Roundabout

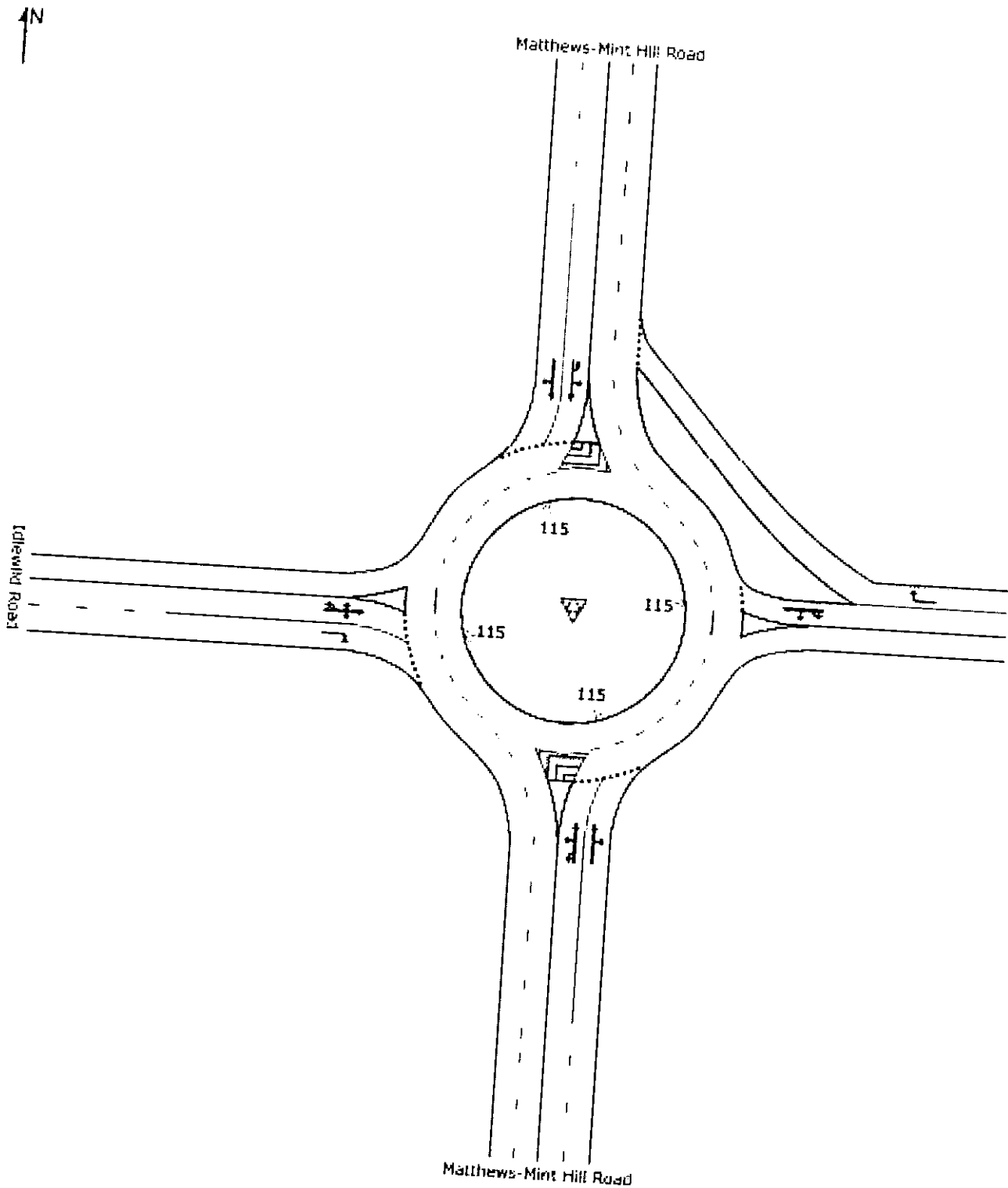
Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Matthews-Mint Hill Road											
3u	U	6	2.0	0.952	54.3	LOS F	19.7	501.3	1.00	1.61	23.0
3	L2	123	2.0	0.952	51.7	LOS F	19.7	501.3	1.00	1.61	22.5
8	T1	770	2.0	0.952	43.7	LOS E	23.1	586.4	1.00	1.63	22.9
18	R2	229	2.0	0.952	42.1	LOS E	23.1	586.4	1.00	1.66	22.9
Approach		1128	2.0	0.952	44.3	LOS E	23.1	586.4	1.00	1.63	22.9
East: Idlewild Road											
1u	U	6	2.0	0.803	24.2	LOS C	7.4	186.8	0.95	1.16	32.4
1	L2	164	2.0	0.803	21.6	LOS C	7.4	186.8	0.95	1.16	31.6
6	T1	288	2.0	0.803	15.4	LOS C	7.4	186.8	0.95	1.16	31.4
16	R2	232	2.0	0.364	7.2	LOS A	1.9	49.1	0.75	0.87	35.3
Approach		690	2.0	0.803	14.2	LOS B	7.4	186.8	0.88	1.06	32.6
North: Matthews-Mint Hill Road											
7u	U	8	2.0	0.571	18.6	LOS C	5.1	130.2	0.87	0.96	34.6
7	L2	242	2.0	0.571	16.0	LOS C	5.1	130.2	0.87	0.96	33.7
4	T1	600	2.0	0.571	9.0	LOS A	5.4	137.6	0.87	0.90	34.7
14	R2	112	2.0	0.571	8.9	LOS A	5.4	137.6	0.87	0.88	34.0
Approach		962	2.0	0.571	10.8	LOS B	5.4	137.6	0.87	0.91	34.3
West: Idlewild Road											
5u	U	1	2.0	0.924	28.6	LOS D	11.6	295.1	0.98	1.34	31.0
5	L2	109	2.0	0.924	26.0	LOS D	11.6	295.1	0.98	1.34	30.3
2	T1	506	2.0	0.924	19.7	LOS C	11.6	295.1	0.98	1.34	30.1
12	R2	112	2.0	0.308	10.2	LOS B	1.2	31.6	0.72	0.86	33.6
Approach		728	2.0	0.924	19.2	LOS C	11.6	295.1	0.94	1.27	30.6
All Vehicles		3508	2.0	0.952	24.0	LOS C	23.1	586.4	0.93	1.25	28.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 Roundabout LOS Method: Same as Sign Control.
 Vehicle movement LOS values are based on average delay per movement.
 Intersection and Approach LOS values are based on average delay for all vehicle movements.
 Roundabout Capacity Model: SIDRA Standard.
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 1 [2020 Build Phase 1 AM]

New Site
Roundabout



MOVEMENT SUMMARY

Site: 1 [2020 Build Phase 1 PM]

New Site
Roundabout

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Matthews-Mint Hill Road											
3u	U	6	2.0	1.003	67.7	LOS F	24.2	613.5	1.00	1.77	20.3
3	L2	123	2.0	1.003	65.1	LOS F	24.2	613.5	1.00	1.77	19.9
8	T1	770	2.0	1.003	57.0	LOS F	28.7	728.6	1.00	1.81	20.2
18	R2	236	2.0	1.003	55.3	LOS F	28.7	728.6	1.00	1.84	20.2
Approach		1134	2.0	1.003	57.6	LOS F	28.7	728.6	1.00	1.81	20.2
East: Idlewild Road											
1u	U	6	2.0	0.830	25.5	LOS D	8.1	204.8	0.96	1.20	31.9
1	L2	169	2.0	0.830	22.9	LOS C	8.1	204.8	0.96	1.20	31.1
6	T1	299	2.0	0.830	16.6	LOS C	8.1	204.8	0.96	1.20	30.9
16	R2	237	2.0	0.371	7.3	LOS A	2.0	50.3	0.75	0.87	35.2
Approach		710	2.0	0.830	15.1	LOS C	8.1	204.8	0.89	1.09	32.2
North: Matthews-Mint Hill Road											
7u	U	8	2.0	0.587	19.1	LOS C	5.4	137.7	0.88	0.98	34.3
7	L2	249	2.0	0.587	16.4	LOS C	5.4	137.7	0.88	0.98	33.4
4	T1	600	2.0	0.587	9.5	LOS A	5.8	146.1	0.89	0.93	34.5
14	R2	112	2.0	0.587	9.3	LOS A	5.8	146.1	0.89	0.91	33.9
Approach		969	2.0	0.587	11.3	LOS B	5.8	146.1	0.89	0.94	34.1
West: Idlewild Road											
5u	U	1	2.0	0.967	34.4	LOS D	14.8	374.7	1.00	1.49	28.8
5	L2	109	2.0	0.967	31.8	LOS D	14.8	374.7	1.00	1.49	28.1
2	T1	526	2.0	0.967	25.5	LOS D	14.8	374.7	1.00	1.49	28.0
12	R2	112	2.0	0.312	10.3	LOS B	1.3	32.1	0.72	0.86	33.5
Approach		748	2.0	0.967	24.2	LOS C	14.8	374.7	0.96	1.40	28.7
All Vehicles		3561	2.0	1.003	29.5	LOS D	28.7	728.6	0.94	1.34	26.9

Parameter Settings dialog (Site tab).

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.

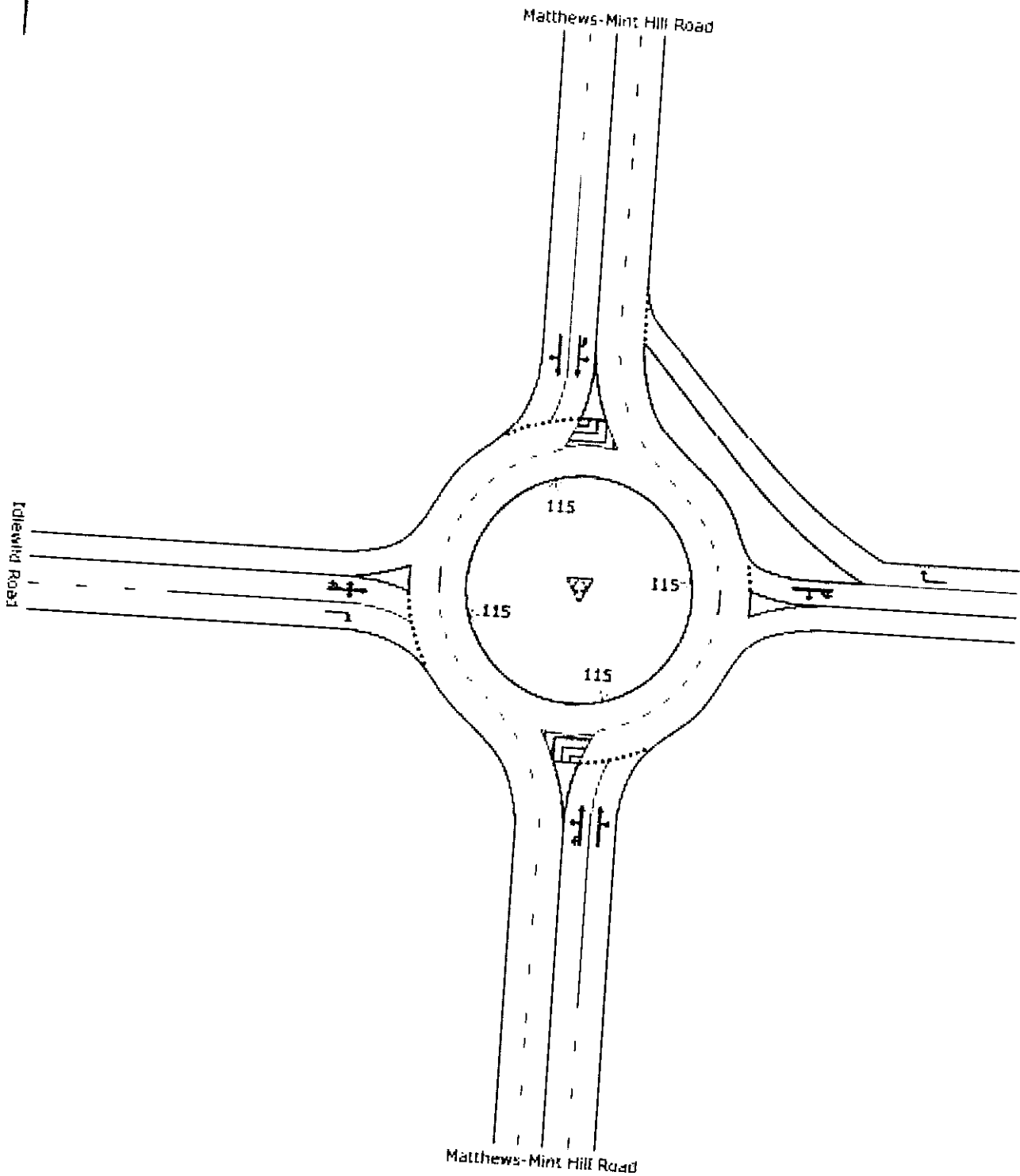
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

▽ Site: 1 [2020 Build PM]

New Site
Roundabout



MOVEMENT SUMMARY

Site: 1 [2020 Build PM]

New Site
Roundabout

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Matthews-Mint Hill Road											
3u	U	6	2.0	1.035	77.7	LOS F	27.3	692.3	1.00	1.88	18.6
3	L2	123	2.0	1.035	75.1	LOS F	27.3	692.3	1.00	1.88	18.4
8	T1	770	2.0	1.035	67.0	LOS F	32.7	829.5	1.00	1.93	18.6
18	R2	243	2.0	1.035	65.3	LOS F	32.7	829.5	1.00	1.98	18.5
Approach		1142	2.0	1.035	67.6	LOS F	32.7	829.5	1.00	1.94	18.6
East: Idlewild Road											
1u	U	6	2.0	0.863	27.1	LOS D	9.3	235.0	0.98	1.25	31.2
1	L2	177	2.0	0.863	24.5	LOS C	9.3	235.0	0.98	1.25	30.4
6	T1	322	2.0	0.863	18.2	LOS C	9.3	235.0	0.98	1.25	30.3
16	R2	244	2.0	0.375	7.2	LOS A	2.0	51.3	0.75	0.87	35.3
Approach		749	2.0	0.863	16.2	LOS C	9.3	235.0	0.90	1.12	31.7
North: Matthews-Mint Hill Road											
7u	U	8	2.0	0.614	20.0	LOS C	5.9	150.9	0.91	1.02	33.8
7	L2	257	2.0	0.614	17.3	LOS C	5.9	150.9	0.91	1.02	32.9
4	T1	600	2.0	0.614	10.3	LOS B	6.4	161.4	0.92	0.98	34.3
14	R2	112	2.0	0.614	10.1	LOS B	6.4	161.4	0.92	0.96	33.8
Approach		977	2.0	0.614	12.2	LOS B	6.4	161.4	0.92	0.99	33.8
West: Idlewild Road											
5u	U	1	2.0	1.019	46.5	LOS E	20.6	522.6	1.00	1.75	25.0
5	L2	109	2.0	1.019	43.9	LOS E	20.6	522.6	1.00	1.75	24.5
2	T1	548	2.0	1.019	37.6	LOS E	20.6	522.6	1.00	1.75	24.4
12	R2	112	2.0	0.318	10.4	LOS B	1.3	33.0	0.73	0.87	33.5
Approach		770	2.0	1.019	34.5	LOS D	20.6	522.6	0.96	1.62	25.4
All Vehicles		3638	2.0	1.035	35.1	LOS E	32.7	829.5	0.95	1.45	25.2

Parameter Settings dialog (Site tab).

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 Roundabout LOS Method: Same as Sign Control.
 Vehicle movement LOS values are based on average delay per movement.
 Intersection and Approach LOS values are based on average delay for all vehicle movements.
 Roundabout Capacity Model: SIDRA Standard.
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX F

IDLEWILD ROAD AND STALLINGS ROAD

SYNCHRO AND SIDRA REPORTS

[illegible]

Idlewild Mixed Use
2: Stallings Road & Idlewild Road

2018 Existing
Timing Plan: AM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰		↰	↰	↰	↰
Traffic Volume (veh/h)	348	96	431	728	50	250
Future Volume (Veh/h)	348	96	431	728	50	250
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	387	107	479	809	56	278
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)				821		
pX, platoon unblocked					0.86	
vC, conflicting volume			494		2208	440
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			494		2327	440
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			55		0	55
cM capacity (veh/h)			1070		19	617

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	494	479	809	334
Volume Left	0	479	0	56
Volume Right	107	0	0	278
cSH	1700	1070	1700	100
Volume to Capacity	0.29	0.45	0.48	3.35
Queue Length 95th (ft)	0	59	0	Err
Control Delay (s)	0.0	11.1	0.0	Err
Lane LOS		B		F
Approach Delay (s)	0.0	4.1		Err
Approach LOS				F

Intersection Summary			
Average Delay		1580.8	
Intersection Capacity Utilization		76.2%	ICU Level of Service
Analysis Period (min)		15	D

Idlewild Mixed Use
2: Stallings Road & Idlewild Road

2020 No-Build
Timing Plan: AM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↘	↑	↘	
Traffic Volume (veh/h)	355	98	440	743	51	255
Future Volume (Veh/h)	355	98	440	743	51	255
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	394	109	489	826	57	283
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh				821		
Upstream signal (ft)					0.85	
pX, platoon unblocked					2252	448
vC, conflicting volume			503			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			503		2389	448
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			54		0	54
cM capacity (veh/h)			1061		17	610
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	503	489	826	340		
Volume Left	0	489	0	57		
Volume Right	109	0	0	283		
cSH	1700	1061	1700	89		
Volume to Capacity	0.30	0.46	0.49	3.81		
Queue Length 95th (ft)	0	62	0	Err		
Control Delay (s)	0.0	11.3	0.0	Err		
Lane LOS		B		F		
Approach Delay (s)	0.0	4.2		Err		
Approach LOS				F		
Intersection Summary						
Average Delay			1577.9			
Intersection Capacity Utilization			77.6%	ICU Level of Service		D
Analysis Period (min)			15			

Idlewild Mixed Use
2: Stallings Road & Idlewild Road

2020 Build Phase 1
Timing Plan: AM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔	↔	↔	
Traffic Volume (veh/h)	360	98	440	767	51	255
Future Volume (Veh/h)	360	98	440	767	51	255
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	400	109	489	852	57	283
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)			821			
pX, platoon unblocked					0.84	
vC, conflicting volume			509		2284	
vC1, stage 1 conf vol					454	
vC2, stage 2 conf vol						
vCu, unblocked vol			509		2433	
tC, single (s)			4.1		6.4	
tC, 2 stage (s)					6.2	
tF (s)			2.2		3.5	
p0 queue free %			54		0	
cM capacity (veh/h)			1056		16	
					606	
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	509	489	852	340		
Volume Left	0	489	0	57		
Volume Right	109	0	0	283		
cSH	1700	1056	1700	83		
Volume to Capacity	0.30	0.46	0.50	4.07		
Queue Length 95th (ft)	0	62	0	Err		
Control Delay (s)	0.0	11.3	0.0	Err		
Lane LOS		B		F		
Approach Delay (s)	0.0	4.1		Err		
Approach LOS				F		
Intersection Summary						
Average Delay	1554.9					
Intersection Capacity Utilization	77.8%			ICU Level of Service		
Analysis Period (min)	15			D		

Idlewild Mixed Use
2: Stallings Road & Idlewild Road

	EBT	EBR	WBL	WBT	NBL	NBR
Movement	↔		↔	↔	↔	↔
Lane Configurations	413	98	440	804	51	255
Traffic Volume (veh/h)	413	98	440	804	51	255
Future Volume (Veh/h)	Free			Free	Stop	
Sign Control	0%			0%	0%	
Grade	0.90	0.90	0.90	0.90	0.90	0.90
Peak Hour Factor	459	109	489	893	57	283
Hourly flow rate (vph)						
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)				821		
Upstream signal (ft)					0.83	
pX, platoon unblocked			568		2384	514
vC, conflicting volume						
vC1, stage 1 conf vol						
vC2, stage 2 conf vol			568		2564	514
vCu, unblocked vol			4.1		6.4	6.2
tC, single (s)						
tC, 2 stage (s)			2.2		3.5	3.3
tF (s)			51		0	50
p0 queue free %			1004		12	561
cM capacity (veh/h)						
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	568	489	893	340		
Volume Left	0	489	0	57		
Volume Right	109	0	0	283		
cSH	1700	1004	1700	66		
Volume to Capacity	0.33	0.49	0.53	5.13		
Queue Length 95th (ft)	0	68	0	Err		
Control Delay (s)	0.0	11.9	0.0	Err		
Lane LOS		B		F		
Approach Delay (s)	0.0	4.2		Err		
Approach LOS				F		
Intersection Summary						
Average Delay	1487.1			ICU Level of Service		D
Intersection Capacity Utilization	80.6%					
Analysis Period (min)	15					

Idlewild Mixed Use
2: Stallings Road & Idlewild Road

2018 Existing
Timing Plan: PM Peak Hour

Timing Plan: PM Peak Hour						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰		↱	↰	↱	
Traffic Volume (veh/h)	666	141	277	670	52	302
Future Volume (Veh/h)	666	141	277	670	52	302
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	740	157	308	744	58	336
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)			None			
Upstream signal (ft)						
pX, platoon unblocked			821			
vC, conflicting volume					0.89	
vC1, stage 1 conf vol			897	2178	818	
vC2, stage 2 conf vol						
vCu, unblocked vol			897	2264	818	
tC, single (s)			4.1	6.4	6.2	
tC, 2 stage (s)						
tF (s)			2.2	3.5	3.3	
p0 queue free %			59	0	11	
cM capacity (veh/h)			757	24	376	
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	897	308	744	394		
Volume Left	0	308	0	58		
Volume Right	157	0	0	336		
cSH	1700	757	1700	118		
Volume to Capacity	0.53	0.41	0.44	3.35		
Queue Length 95th (ft)	0	50	0	Err		
Control Delay (s)	0.0	13.0	0.0	Err		
Lane LOS		B		F		
Approach Delay (s)	0.0	3.8		Err		
Approach LOS				F		
Intersection Summary						
Average Delay	1683.1					
Intersection Capacity Utilization	90.5%					
Analysis Period (min)	15					
ICU Level of Service				E		

Idlewild Mixed Use
2: Stallings Road & Idlewild Road

2020 No-Build
Timing Plan: PM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↖	↗	↖	
Traffic Volume (veh/h)	679	144	283	683	53	308
Future Volume (Veh/h)	679	144	283	683	53	308
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	754	160	314	759	59	342
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)				821		
Upstream signal (ft)					0.88	
pX, platoon unblocked			914		2221	834
vC, conflicting volume						
vC1, stage 1 conf vol						
vC2, stage 2 conf vol			914		2319	834
vCu, unblocked vol			4.1		6.4	6.2
tC, single (s)						
tC, 2 stage (s)			2.2		3.5	3.3
tF (s)			58		0	7
p0 queue free %			746		21	368
cM capacity (veh/h)						
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	914	314	759	401		
Volume Left	0	314	0	59		
Volume Right	160	0	0	342		
cSH	1700	746	1700	108		
Volume to Capacity	0.54	0.42	0.45	3.73		
Queue Length 95th (ft)	0	52	0	Err		
Control Delay (s)	0.0	13.3	0.0	Err		
Lane LOS		B		F		
Approach Delay (s)	0.0	3.9		Err		
Approach LOS				F		
Intersection Summary				1680.8		
Average Delay				92.1%	ICU Level of Service	
Intersection Capacity Utilization				15		
Analysis Period (min)						

Idlewild Mixed Use
2: Stallings Road & Idlewild Road

2020 Build Phase 1
Timing Plan: PM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔	↔	↔	↔
Traffic Volume (veh/h)	705	144	283	697	53	308
Future Volume (Veh/h)	705	144	283	697	53	308
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	783	160	314	774	59	342
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)				821		
pX, platoon unblocked					0.88	
vC, conflicting volume			943		2265	863
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			943		2371	863
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			57		0	3
cM capacity (veh/h)			727		19	354
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	943	314	774	401		
Volume Left	0	314	0	59		
Volume Right	160	0	0	342		
cSH	1700	727	1700	99		
Volume to Capacity	0.55	0.43	0.46	4.05		
Queue Length 95th (ft)	0	55	0	Err		
Control Delay (s)	0.0	13.7	0.0	Err		
Lane LOS		B		F		
Approach Delay (s)	0.0	3.9		Err		
Approach LOS				F		
Intersection Summary						
Average Delay		1650.4				
Intersection Capacity Utilization		93.5%		ICU Level of Service		F
Analysis Period (min)		15				

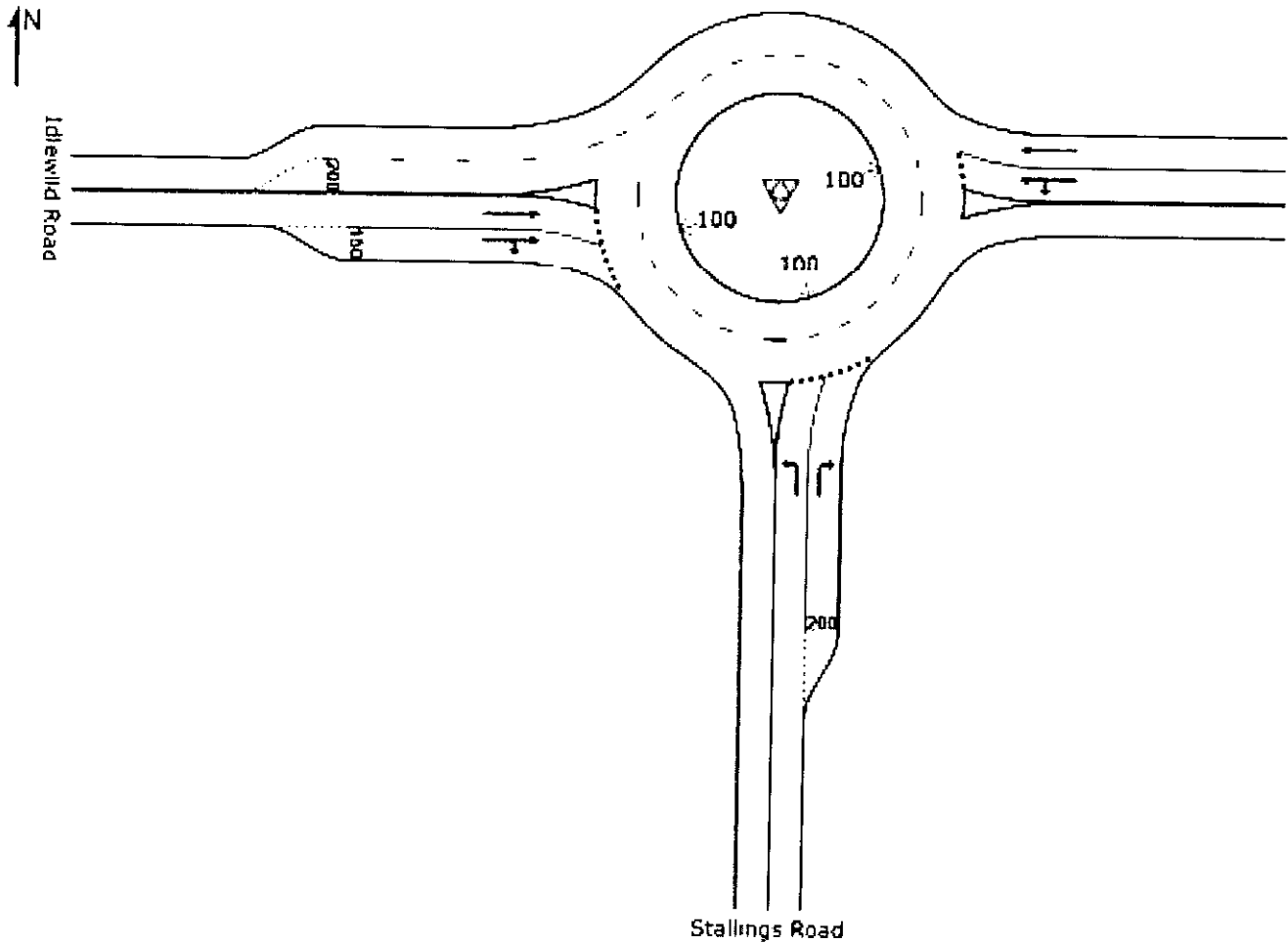
Idlewild Mixed Use
2: Stallings Road & Idlewild Road

	EBT	EBR	WBL	WBT	NBL	NBR
Movement	↔		↔	↔	↔	↔
Lane Configurations	739	144	283	732	53	308
Traffic Volume (veh/h)	739	144	283	732	53	308
Future Volume (Veh/h)	Free			Free	Stop	
Sign Control	0%			0%	0%	
Grade	0.90	0.90	0.90	0.90	0.90	0.90
Peak Hour Factor	821	160	314	813	59	342
Hourly flow rate (vph)						
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)	None			None		
Median type						
Median storage (veh)				821		
Upstream signal (ft)					0.87	
pX, platoon unblocked			981		2342	901
vC, conflicting volume						
vC1, stage 1 conf vol						
vC2, stage 2 conf vol			981		2469	901
vCu, unblocked vol			4.1		6.4	6.2
tC, single (s)						
tC, 2 stage (s)			2.2		3.5	3.3
tF (s)			55		0	0
p0 queue free %			704		16	337
cM capacity (veh/h)						
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	981	314	813	401		
Volume Left	0	314	0	59		
Volume Right	160	0	0	342		
cSH	1700	704	1700	85		
Volume to Capacity	0.58	0.45	0.48	4.71		
Queue Length 95th (ft)	0	58	0	Err		
Control Delay (s)	0.0	14.2	0.0	Err		
Lane LOS		B		F		
Approach Delay (s)	0.0	3.9		Err		
Approach LOS				F		
Intersection Summary						
Average Delay	1599.9					F
Intersection Capacity Utilization	95.3%			ICU Level of Service		
Analysis Period (min)	15					

SITE LAYOUT

▽ Site: 102 [Idlewild Road and Stallings Road 2017 Build AM]

New Site
Roundabout



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MOVEMENT SUMMARY

 Site: 102 [Idlewild Road and Stallings Road 2017 Build AM]

New Site
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Stallings Road											
3	L2	143	2.0	0.345	14.9	LOS B	2.1	53.8	0.86	0.86	28.7
18	R2	275	2.0	0.527	17.0	LOS C	4.3	109.6	0.94	1.00	23.4
Approach		418	2.0	0.527	16.2	LOS C	4.3	109.6	0.91	0.95	25.7
East: Idlewild Road											
1	L2	342	2.0	0.432	10.1	LOS B	2.8	70.6	0.49	0.34	30.5
6	T1	936	2.0	0.483	0.1	LOS A	0.0	0.0	0.00	0.00	38.2
Approach		1278	2.0	0.483	2.8	LOS A	2.8	70.6	0.13	0.09	35.7
West: Idlewild Road											
2	T1	793	2.0	0.845	24.9	LOS C	13.3	338.8	0.96	1.01	21.0
12	R2	148	2.0	0.280	10.8	LOS B	1.3	33.4	0.58	0.53	31.2
Approach		941	2.0	0.845	22.7	LOS C	13.3	338.8	0.90	0.94	22.8
All Vehicles		2638	2.0	0.845	12.0	LOS B	13.3	338.8	0.53	0.53	29.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

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

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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

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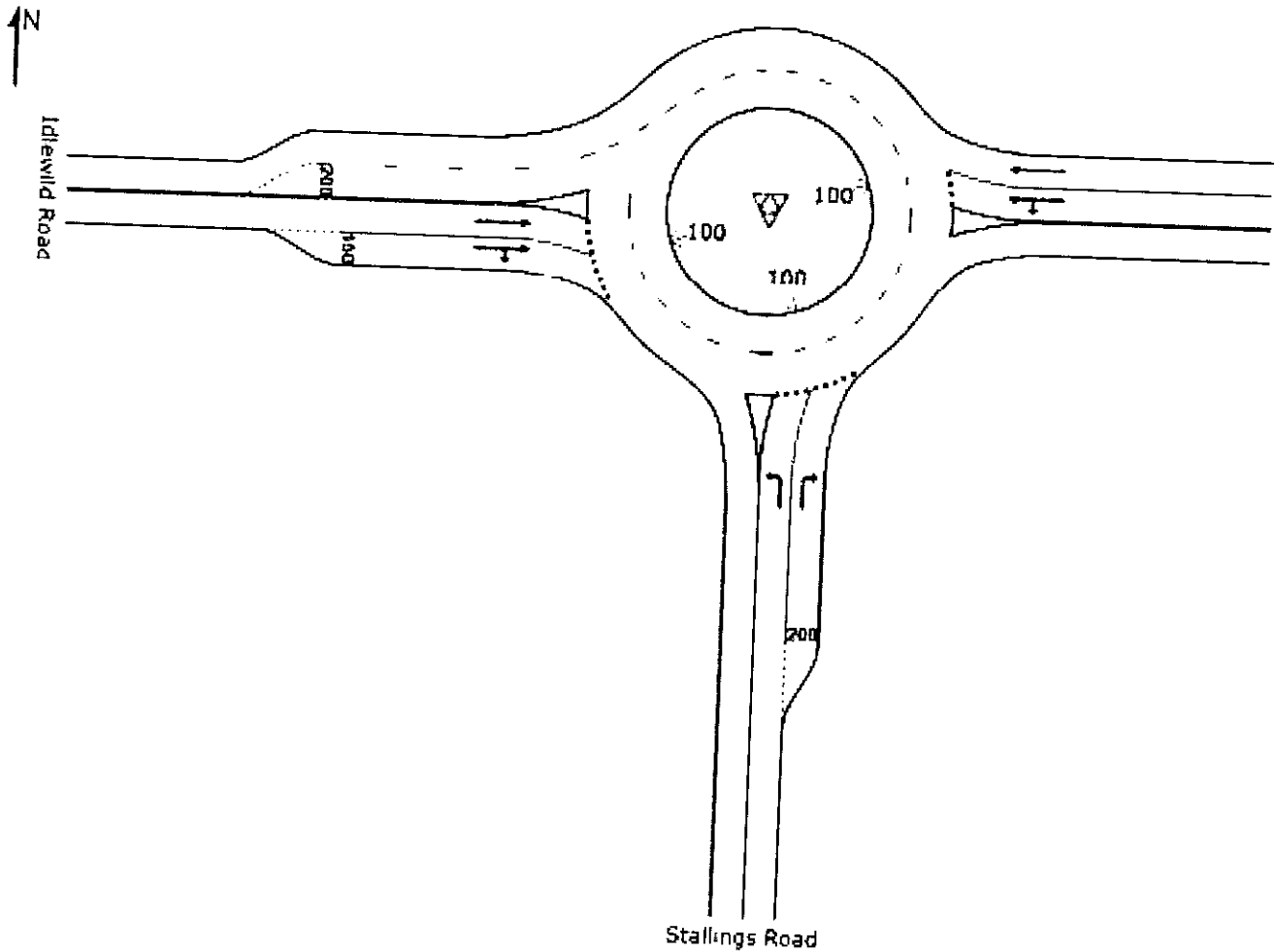
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SITE LAYOUT

Site: 102 [Idlewild Road and Stallings Road 2040 Build AM]

New Site
Roundabout



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MOVEMENT SUMMARY

 Site: 102 [Idlewild Road and Stallings Road 2040 Build AM]

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Stallings Road											
3	L2	143	2.0	0.440	21.6	LOS C	2.9	74.3	0.92	0.96	26.5
18	R2	318	2.0	0.728	31.0	LOS D	7.6	193.6	1.00	1.17	18.6
Approach		462	2.0	0.728	28.1	LOS D	7.6	193.6	0.97	1.11	21.5
East: Idlewild Road											
1	L2	397	2.0	0.530	12.8	LOS B	3.8	97.4	0.56	0.41	29.5
6	T1	1211	2.0	0.625	0.1	LOS A	0.0	0.0	0.00	0.00	38.1
Approach		1608	2.0	0.625	3.3	LOS A	3.8	97.4	0.14	0.10	35.5
West: Idlewild Road											
2	T1	1018	2.0	1.143	97.1	LOS F	62.8	1594.6	1.00	2.48	9.8
12	R2	149	2.0	0.300	11.8	LOS B	1.4	36.4	0.62	0.60	30.8
Approach		1167	2.0	1.143	86.2	LOS F	62.8	1594.6	0.95	2.24	11.3
All Vehicles		3237	2.0	1.143	36.7	LOS E	62.8	1594.6	0.55	1.02	21.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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

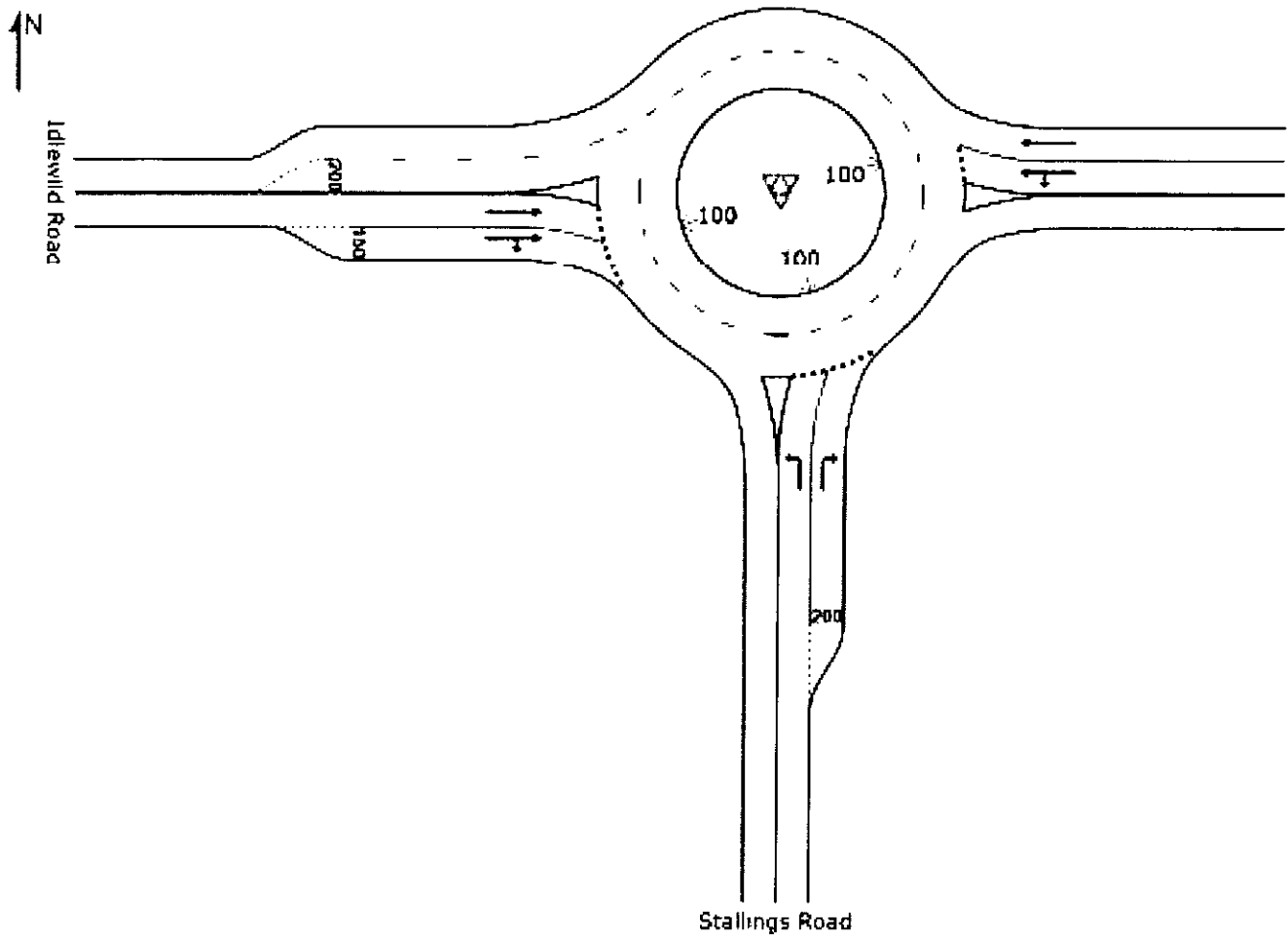
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SITE LAYOUT

Site: 102 [Idlewild Road and Stallings Road 2017 Build PM]

New Site
Roundabout



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MOVEMENT SUMMARY

 Site: 102 [Idlewild Road and Stallings Road 2017 Build PM]

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Stallings Road											
3	L2	148	2.0	0.535	29.7	LOS D	3.7	93.6	0.95	1.02	24.3
18	R2	367	2.0	0.937	63.6	LOS F	14.7	374.3	1.00	1.45	12.6
Approach		515	2.0	0.937	53.9	LOS F	14.7	374.3	0.98	1.33	15.8
East: Idlewild Road											
1	L2	302	2.0	0.400	9.9	LOS A	2.5	63.2	0.49	0.34	30.6
6	T1	895	2.0	0.462	0.1	LOS A	0.0	0.0	0.00	0.00	38.2
Approach		1197	2.0	0.462	2.6	LOS A	2.5	63.2	0.12	0.09	35.9
West: Idlewild Road											
2	T1	1035	2.0	1.067	68.6	LOS F	48.2	1224.2	1.00	1.81	11.7
12	R2	143	2.0	0.262	10.2	LOS B	1.2	31.0	0.55	0.48	31.5
Approach		1178	2.0	1.067	61.5	LOS F	48.2	1224.2	0.94	1.65	13.3
All Vehicles		2890	2.0	1.067	35.7	LOS E	48.2	1224.2	0.61	0.95	20.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

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

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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

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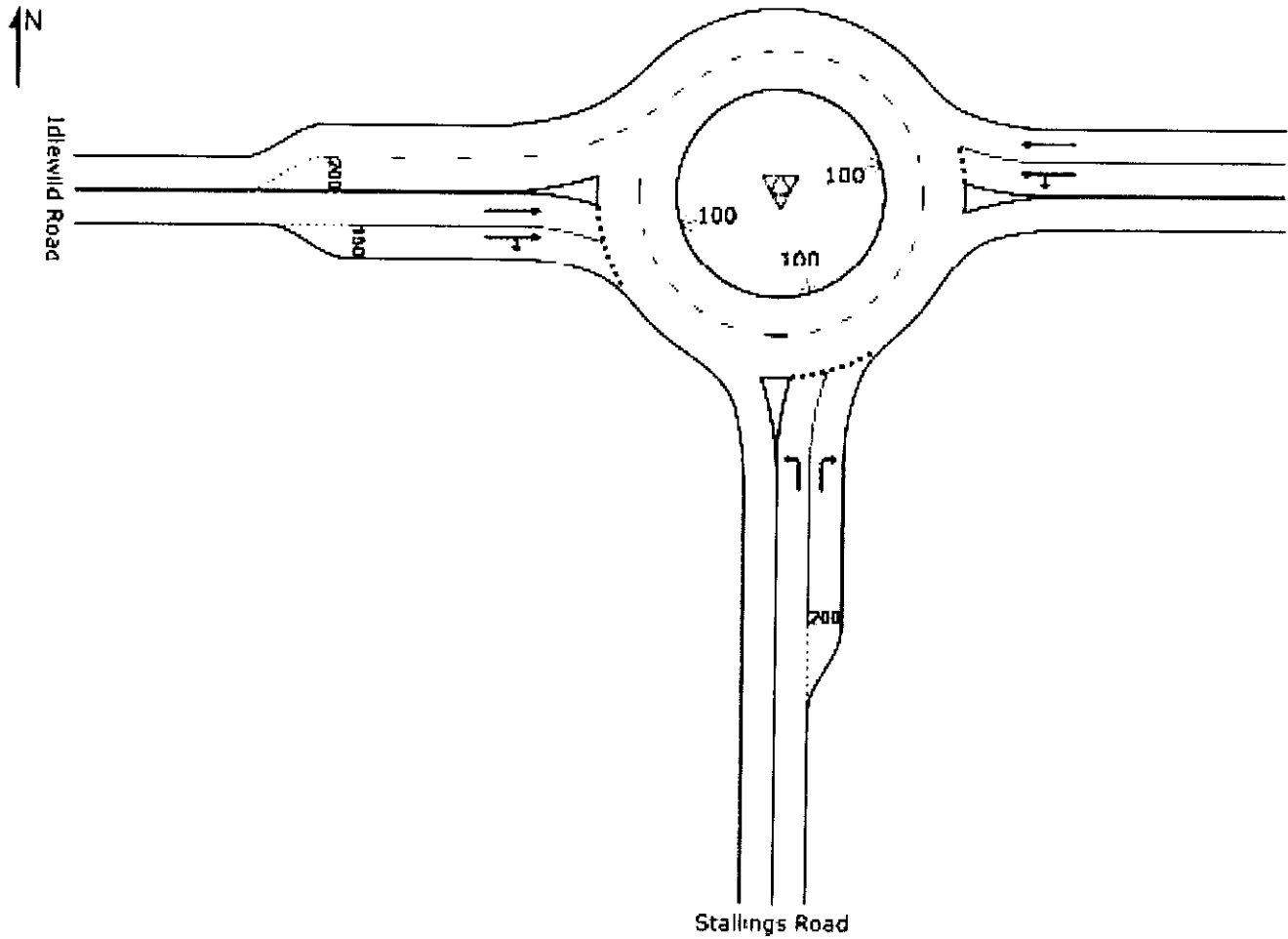
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SITE LAYOUT

Site: 102 [Idlewild Road and Stallings Road 2040 Build PM]

New Site
Roundabout



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MOVEMENT SUMMARY

 Site: 102 [Idlewild Road and Stallings Road 2040 Build PM]

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Stallings Road											
3	L2	149	2.0	0.477	24.0	LOS C	2.9	73.0	0.88	0.93	25.8
18	R2	422	2.0	0.887	47.2	LOS E	11.9	302.2	1.00	1.35	15.0
Approach		571	2.0	0.887	41.2	LOS E	11.9	302.2	0.97	1.24	18.0
East: Idlewild Road											
1	L2	346	2.0	0.479	11.9	LOS B	3.2	80.8	0.53	0.39	29.8
6	T1	1120	2.0	0.578	0.1	LOS A	0.0	0.0	0.00	0.00	38.2
Approach		1465	2.0	0.578	2.9	LOS A	3.2	80.8	0.13	0.09	35.7
West: Idlewild Road											
2	T1	1310	2.0	1.370	184.1	LOS F	130.7	3320.7	0.99	3.72	5.8
12	R2	143	2.0	0.337	12.0	LOS B	1.7	41.9	0.61	0.57	30.8
Approach		1453	2.0	1.370	167.1	LOS F	130.7	3320.7	0.95	3.41	6.6
All Vehicles		3489	2.0	1.370	77.5	LOS F	130.7	3320.7	0.61	1.66	13.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

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

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

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

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APPENDIX G

IDLEWILD ROAD AND I-485 SOUTHBOUND RAMPS

SYNCHRO REPORTS

[illegible]

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑						↑	↑
Traffic Volume (vph)	0	466	132	407	703	0	0	0	0	155	4	456
Future Volume (vph)	0	466	132	407	703	0	0	0	0	155	4	456
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		100	275		0	0		0	0		375
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	0			225			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950							0.953	
Satd. Flow (prot)	0	3539	1583	1770	3539	0	0	0	0	0	1775	1583
Flt Permitted				0.296							0.953	
Satd. Flow (perm)	0	3539	1583	551	3539	0	0	0	0	0	1775	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			50			50	
Link Distance (ft)		821			870			1574			1673	
Travel Time (s)		12.4			13.2			21.5			22.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	518	147	452	781	0	0	0	0	172	4	507
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	518	147	452	781	0	0	0	0	0	176	507
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA	Perm	pm+pt	NA					Perm	NA	Perm
Protected Phases		2		1	6						4	
Permitted Phases			2	6						4		4
Detector Phase		2	2	1	6					4	4	4
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0	12.0					7.0	7.0	7.0
Minimum Split (s)		18.0	18.0	13.0	18.0					13.0	13.0	13.0
Total Split (s)		30.0	30.0	37.0	67.0					53.0	53.0	53.0
Total Split (%)		25.0%	25.0%	30.8%	55.8%					44.2%	44.2%	44.2%
Maximum Green (s)		24.3	24.3	31.7	61.3					47.2	47.2	47.2
Yellow Time (s)		4.5	4.5	3.0	4.5					3.8	3.8	3.8
All-Red Time (s)		1.2	1.2	2.3	1.2					2.0	2.0	2.0
Lost Time Adjust (s)		-0.7	-0.7	-0.3	-0.7						-0.8	-0.8
Total Lost Time (s)		5.0	5.0	5.0	5.0						5.0	5.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)		6.0	6.0	2.0	6.0					2.0	2.0	2.0
Minimum Gap (s)		3.0	3.0	0.2	3.0					0.2	0.2	0.2
Time Before Reduce (s)		15.0	15.0	0.0	15.0					0.0	0.0	0.0

Idlewild Mixed Use
3: I-485 SB Ramp & Idlewild Road

2018 Existing
Timing Plan: AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time To Reduce (s)		30.0	30.0	0.0	2.0					0.0	0.0	0.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
Act Effct Green (s)		36.9	36.9	67.2	67.2					42.8	42.8	
Actuated g/C Ratio		0.31	0.31	0.56	0.56					0.36	0.36	
v/c Ratio		0.48	0.30	0.80	0.39					0.28	0.90	
Control Delay		38.5	38.3	26.4	12.2					27.7	56.0	
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	
Total Delay		38.5	38.3	26.4	12.2					27.7	56.0	
LOS		D	D	C	B					C	E	
Approach Delay		38.5			17.4					48.7		
Approach LOS		D			B					D		
Queue Length 50th (ft)		178	91	231	184					94	360	
Queue Length 95th (ft)		260	166	206	122					143	#499	
Internal Link Dist (ft)		741			790			1494		1593		
Turn Bay Length (ft)			100	275								375
Base Capacity (vph)		1087	486	633	1981					710	633	
Starvation Cap Reductn		0	0	0	0					0	0	
Spillback Cap Reductn		0	0	0	0					0	0	
Storage Cap Reductn		0	0	0	0					0	0	
Reduced v/c Ratio		0.48	0.30	0.71	0.39					0.25	0.80	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 56 (47%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 31.1
 Intersection Capacity Utilization 59.7%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service B
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 3: I-485 SB Ramp & Idlewild Road

Ø1	Ø2 (R)	Ø4
37 s	30 s	53 s
Ø6 (R)		
67 s		

Idlewild Mixed Use
3: I-485 SB Ramp & Idlewild Road

2020 No-Build
Timing Plan: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑						↑	↑
Traffic Volume (vph)	0	475	135	415	717	0	0	0	0	158	4	465
Future Volume (vph)	0	475	135	415	717	0	0	0	0	158	4	465
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		100	275		0	0	0	0	0		375
Storage Lanes	0		1	1		0	0	0	0	0		1
Taper Length (ft)	0			225		0	25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt Protected			0.850									
Satd. Flow (prot)				0.950								0.850
Frt Permitted	0	3539	1583	1770	3539	0	0	0	0	0	0.953	
Satd. Flow (perm)				0.255								
Right Turn on Red	0	3539	1583	475	3539	0	0	0	0	0	0.953	1583
Satd. Flow (RTOR)			No			No			No		1775	1583
Link Speed (mph)		45			45							No
Link Distance (ft)		821			870			50			50	
Travel Time (s)		12.4			13.2			1574			1673	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	21.5	0.90	0.90	22.8	0.90
Adj. Flow (vph)	0	528	150	461	797	0	0	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)								0	0	0	4	517
Lane Group Flow (vph)	0	528	150	461	797	0	0	0	0	176		
Enter Blocked Intersection	No	No	No	No	No	No	No	0	0	0	180	517
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	No	No	No	Left	Right
Median Width(ft)	12			12			0	0	0	0	0	
Link Offset(ft)	0			0			0	0	0	0	0	
Crosswalk Width(ft)	16			16			16			16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA	Perm	pm+pt	NA						NA	Perm
Protected Phases		2		1	6					Perm		
Permitted Phases			2	6							4	
Detector Phase		2	2	1	6							
Switch Phase										4		4
Minimum Initial (s)										4		4
Minimum Split (s)	12.0	12.0	7.0	12.0								
Total Split (s)	19.0	19.0	14.0	19.0						7.0	7.0	7.0
Total Split (%)	29.0	29.0	37.0	66.0						14.0	14.0	14.0
Maximum Green (s)	24.2%	24.2%	30.8%	55.0%						54.0	54.0	54.0
Yellow Time (s)	22.0	22.0	30.0	59.0						45.0%	45.0%	45.0%
All-Red Time (s)	5.0	5.0	5.0	5.0						47.0	47.0	47.0
Lost Time Adjust (s)	2.0	2.0	2.0	2.0						5.0	5.0	5.0
Total Lost Time (s)	-2.0	-2.0	-2.0	-2.0						2.0	2.0	2.0
Lead/Lag	5.0	5.0	5.0	5.0							-2.0	-2.0
Lead-Lag Optimize?	Lag	Lag	Lead							5.0	5.0	
Vehicle Extension (s)	Yes	Yes	Yes									
Recall Mode	3.0	3.0	3.0	3.0								
Act Effect Green (s)	C-Min	C-Min	None	C-Min						3.0	3.0	3.0
	31.6	31.6	65.1	65.1						None	None	None
										44.9	44.9	

Lanes, Volumes, Timings
RKA

Idlewild Mixed Use
3: I-485 SB Ramp & Idlewild Road

2020 No-Build
Timing Plan: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.26	0.26	0.54	0.54						0.37	0.37
v/c Ratio		0.57	0.36	0.82	0.42						0.27	0.87
Control Delay		43.3	42.4	27.9	14.5						26.4	51.2
Queue Delay		0.0	0.0	0.0	0.0						0.0	0.0
Total Delay		43.3	42.4	27.9	14.5						26.4	51.2
LOS		D	D	C	B						C	D
Approach Delay		43.1			19.4						44.8	
Approach LOS		D			B						D	
Queue Length 50th (ft)		201	102	260	224						93	355
Queue Length 95th (ft)		267	172	#161	48						144	#503
Internal Link Dist (ft)		741			790			1494			1593	
Turn Bay Length (ft)			100	275							724	375
Base Capacity (vph)		932	417	603	1920						0	0
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0.25	0.80
Reduced v/c Ratio		0.57	0.36	0.76	0.42							

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 61 (51%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 32.2

Intersection Capacity Utilization 60.7%

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Intersection LOS: C

ICU Level of Service B

Splits and Phases: 3: I-485 SB Ramp & Idlewild Road

Ø1	Ø2 (R)	Ø4
37 s	29 s	54 s
Ø6 (R)		
66 s		

Idlewild Mixed Use
3: I-485 SB Ramp & Idlewild Road

2020 Build Phase 1
Timing Plan: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↖	↑↑						↖	↗
Traffic Volume (vph)	0	480	135	438	741	0	0	0	0	164	4	465
Future Volume (vph)	0	480	135	438	741	0	0	0	0	164	4	465
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		100	275		0	0		0	0		375
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	0			225			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950								0.953
Satd. Flow (prot)	0	3539	1583	1770	3539	0	0	0	0	0	1775	1583
Flt Permitted				0.249							0.953	
Satd. Flow (perm)	0	3539	1583	464	3539	0	0	0	0	0	1775	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			50			50	
Link Distance (ft)		821			870			1574			1673	
Travel Time (s)		12.4			13.2			21.5			22.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	533	150	487	823	0	0	0	0	182	4	517
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	533	150	487	823	0	0	0	0	0	186	517
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA	Perm	pm+pt	NA					Perm	NA	Perm
Protected Phases		2		1	6						4	
Permitted Phases			2	6								4
Detector Phase		2	2	1	6						4	4
Switch Phase										4	4	4
Minimum Initial (s)		12.0	12.0	7.0	12.0					7.0	7.0	7.0
Minimum Split (s)		19.0	19.0	14.0	19.0					14.0	14.0	14.0
Total Split (s)		30.0	30.0	38.0	68.0					52.0	52.0	52.0
Total Split (%)		25.0%	25.0%	31.7%	56.7%					43.3%	43.3%	43.3%
Maximum Green (s)		23.0	23.0	31.0	61.0					45.0	45.0	45.0
Yellow Time (s)		5.0	5.0	5.0	5.0					5.0	5.0	5.0
All-Red Time (s)		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0	-2.0	-2.0					-2.0	-2.0	-2.0
Total Lost Time (s)		5.0	5.0	5.0	5.0					5.0	5.0	5.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
Act Effect Green (s)		31.4	31.4	65.9	65.9					44.1	44.1	44.1

Lanes, Volumes, Timings
RKA

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Idlewild Mixed Use
3: I-485 SB Ramp & Idlewild Road

2020 Build Phase 1
Timing Plan: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.26	0.26	0.55	0.55						0.37	0.37
v/c Ratio		0.58	0.36	0.85	0.42						0.29	0.89
Control Delay		43.5	42.2	29.1	13.8						27.4	54.0
Queue Delay		0.0	0.0	0.0	0.0						0.0	0.0
Total Delay		43.5	42.2	29.1	13.8						27.4	54.0
LOS		D	D	C	B						C	D
Approach Delay		43.2			19.5						47.0	
Approach LOS		D			B						D	
Queue Length 50th (ft)		204	102	288	242						97	357
Queue Length 95th (ft)		267	170	#257	55						153	#548
Internal Link Dist (ft)		741			790			1494			1593	
Turn Bay Length (ft)			100	275							695	620
Base Capacity (vph)		925	413	613	1943						0	0
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0.27	0.83
Reduced v/c Ratio		0.58	0.36	0.79	0.42							

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 56 (47%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.89
 Intersection Signal Delay: 32.7
 Intersection Capacity Utilization 62.0%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: C
 ICU Level of Service B

Splits and Phases: 3: I-485 SB Ramp & Idlewild Road

Ø1	Ø2 (R)	Ø4
38 s	30 s	52 s
Ø6 (R)		
68 s		

Idlewild Mixed Use
3: I-485 SB Ramp & Idlewild Road

2020 Build
Timing Plan: AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↓	↑↑						↓	↑
Traffic Volume (vph)	0	533	135	467	778	0	0	0	0	196	4	465
Future Volume (vph)	0	533	135	467	778	0	0	0	0	196	4	465
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		100	275		0	0		0	0		375
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	0			225			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950							0.953	
Satd. Flow (prot)	0	3539	1583	1770	3539	0	0	0	0	0	1775	1583
Flt Permitted				0.196							0.953	
Satd. Flow (perm)	0	3539	1583	365	3539	0	0	0	0	0	1775	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			50			50	
Link Distance (ft)		821			870			1574			1673	
Travel Time (s)		12.4			13.2			21.5			22.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	592	150	519	864	0	0	0	0	218	4	517
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	592	150	519	864	0	0	0	0	0	222	517
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA	Perm	pm+pt	NA					Perm	NA	Perm
Protected Phases		2		1	6						4	
Permitted Phases			2	6						4		4
Detector Phase		2	2	1	6					4	4	4
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0	12.0					7.0	7.0	7.0
Minimum Split (s)		19.0	19.0	14.0	19.0					14.0	14.0	14.0
Total Split (s)		31.0	31.0	39.0	70.0					50.0	50.0	50.0
Total Split (%)		25.8%	25.8%	32.5%	58.3%					41.7%	41.7%	41.7%
Maximum Green (s)		24.0	24.0	32.0	63.0					43.0	43.0	43.0
Yellow Time (s)		5.0	5.0	5.0	5.0					5.0	5.0	5.0
All-Red Time (s)		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0	-2.0	-2.0						-2.0	-2.0
Total Lost Time (s)		5.0	5.0	5.0	5.0						5.0	5.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
Act Effct Green (s)		29.8	29.8	67.0	67.0						43.0	43.0

Lanes, Volumes, Timings
RKA

Synchro 9 Report
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Idlewild Mixed Use
3: I-485 SB Ramp & Idlewild Road

2020 Build
Timing Plan: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.25	0.25	0.56	0.56						0.36	0.36
v/c Ratio		0.68	0.38	0.89	0.44						0.35	0.91
Control Delay		46.5	42.9	35.7	13.9						29.5	58.3
Queue Delay		0.0	0.0	0.0	0.0						0.0	0.0
Total Delay		46.5	42.9	35.7	13.9						29.5	58.3
LOS		D	D	D	B						C	E
Approach Delay		45.8			22.1						49.6	
Approach LOS		D			C						D	
Queue Length 50th (ft)		228	101	307	251						122	368
Queue Length 95th (ft)		296	168	#474	71						187	#569
Internal Link Dist (ft)		741			790			1494			1593	
Turn Bay Length (ft)			100	275								375
Base Capacity (vph)		877	392	601	1974						665	593
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.68	0.38	0.86	0.44						0.33	0.87

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 36 (30%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.91
 Intersection Signal Delay: 35.3
 Intersection Capacity Utilization 64.2%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: D
 ICU Level of Service C

Splits and Phases: 3: I-485 SB Ramp & Idlewild Road

← Ø1	→ Ø2 (R)	↓ Ø4
39 s	31 s	50 s
← Ø6 (R)		
70 s		

							Ø2	Ø4
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations			↑↑			↑		
Traffic Volume (vph)	0	0	1209	0	0	201		
Future Volume (vph)	0	0	1209	0	0	201		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00		
Fr _t						0.865		
Flt Protected								
Satd. Flow (prot)	0	0	3539	0	0	1611		
Flt Permitted								
Satd. Flow (perm)	0	0	3539	0	0	1611		
Right Turn on Red				No		No		
Satd. Flow (RTOR)								
Link Speed (mph)		45	45		50			
Link Distance (ft)		378	100		821			
Travel Time (s)		5.7	1.5		11.2			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90		
Adj. Flow (vph)	0	0	1343	0	0	223		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	0	1343	0	0	223		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Left	Left	Right	Left	Right		
Median Width(ft)		0	0		0			
Link Offset(ft)		0	0		0			
Crosswalk Width(ft)		16	16		16			
Two way Left Turn Lane								
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Turning Speed (mph)	15			9	15	9		
Turn Type			NA			Prot		
Protected Phases			8			6	2	4
Permitted Phases								
Detector Phase			8			6		
Switch Phase								
Minimum Initial (s)			12.0			7.0	12.0	7.0
Minimum Split (s)			19.0			14.0	19.0	14.0
Total Split (s)			64.0			56.0	56.0	64.0
Total Split (%)			53.3%			46.7%	47%	53%
Maximum Green (s)			57.0			49.0	49.0	57.0
Yellow Time (s)			5.0			5.0	5.0	5.0
All-Red Time (s)			2.0			2.0	2.0	2.0
Lost Time Adjust (s)			-2.0			-2.0		
Total Lost Time (s)			5.0			5.0		
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)			3.0			3.0	3.0	3.0
Recall Mode			None			Min	Min	None
Act Effct Green (s)			55.1			47.2		
Actuated g/C Ratio			0.49			0.42		
v/c Ratio			0.77			0.33		
Control Delay			3.1			24.2		

Idlewild Mixed Use
3: Idlewild Road & I-485 Southbound Off Ramp

2040 No-Build
Timing Plan: AM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø2	Ø4
Queue Delay			0.0			0.0		
Total Delay			3.1			24.2		
LOS			A			C		
Approach Delay			3.1		24.2			
Approach LOS			A		C			
Queue Length 50th (ft)			7			113		
Queue Length 95th (ft)			8			176		
Internal Link Dist (ft)		298	20		741			
Turn Bay Length (ft)								
Base Capacity (vph)			1885			741		
Starvation Cap Reductn			0			0		
Spillback Cap Reductn			0			0		
Storage Cap Reductn			0			0		
Reduced v/c Ratio			0.71			0.30		

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 112.4
Natural Cycle: 55
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 6.1
Intersection Capacity Utilization 70.2%
Analysis Period (min) 15

Intersection LOS: A
ICU Level of Service C

Splits and Phases: 3: Idlewild Road & I-485 Southbound Off Ramp

#33 #333 → Ø2	#333 ↘ Ø4
56 s	64 s
#3 ↙ Ø6	#3 #33 ← Ø8
56 s	64 s

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑						↑↑				
Traffic Volume (vph)	0	1029	0	0	0	0	0	1209	0	0	0	0
Future Volume (vph)	0	1029	0	0	0	0	0	1209	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Flt Protected												
Satd. Flow (prot)	0	3539	0	0	0	0	0	3539	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	3539	0	0	0	0	0	3539	0	0	0	0
Right Turn on Red	No		No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		131			138			133			100	
Travel Time (s)		2.0			2.1			2.0			1.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1143	0	0	0	0	0	1343	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1143	0	0	0	0	0	1343	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA						NA				
Protected Phases		2						8				
Permitted Phases												
Detector Phase		2						8				
Switch Phase												
Minimum Initial (s)		12.0						12.0				
Minimum Split (s)		19.0						19.0				
Total Split (s)		56.0						64.0				
Total Split (%)		46.7%						53.3%				
Maximum Green (s)		49.0						57.0				
Yellow Time (s)		5.0						5.0				
All-Red Time (s)		2.0						2.0				
Lost Time Adjust (s)		-2.0						-2.0				
Total Lost Time (s)		5.0						5.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0						3.0				
Recall Mode		Min						None				
Act Effect Green (s)		47.2						55.1				
Actuated g/C Ratio		0.42						0.49				
v/c Ratio		0.77						0.77				
Control Delay		32.5						27.7				

Lane Group	Ø4	Ø6
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	4	6
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	14.0	14.0
Total Split (s)	64.0	56.0
Total Split (%)	53%	47%
Maximum Green (s)	57.0	49.0
Yellow Time (s)	5.0	5.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	Min
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0						0.0				
Total Delay		32.5						27.7				
LOS		C						C				
Approach Delay		32.5						27.7				
Approach LOS		C						C				
Queue Length 50th (ft)		388						435				
Queue Length 95th (ft)		475						526				
Internal Link Dist (ft)		51			58			53			20	
Turn Bay Length (ft)												
Base Capacity (vph)		1629						1885				
Starvation Cap Reductn		0						0				
Spillback Cap Reductn		0						0				
Storage Cap Reductn		0						0				
Reduced v/c Ratio		0.70						0.71				

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 112.4

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 30.0

Intersection Capacity Utilization 70.2%

Analysis Period (min) 15

Intersection LOS: C

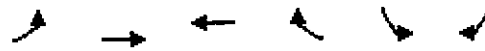
ICU Level of Service C

Splits and Phases: 33: Idlewild Road

#33 #333   Ø2	#333  Ø4
56 s	64 s
#3  Ø6	#3 #33   Ø8
56 s	64 s

Lane Group	Ø4	Ø6
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø6	Ø8
Lane Configurations		↑↑			↗↘			
Traffic Volume (vph)	0	1029	0	0	623	0		
Future Volume (vph)	0	1029	0	0	623	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0			0	500	0		
Storage Lanes	0			0	1	0		
Taper Length (ft)	25				100			
Lane Util. Factor	1.00	0.95	1.00	1.00	0.97	1.00		
Flt Protected					0.950			
Satd. Flow (prot)	0	3539	0	0	3433	0		
Flt Permitted					0.950			
Satd. Flow (perm)	0	3539	0	0	3433	0		
Right Turn on Red				No	No	No		
Satd. Flow (RTOR)								
Link Speed (mph)		45	45		50			
Link Distance (ft)		138	615		766			
Travel Time (s)		2.1	9.3		10.4			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90		
Adj. Flow (vph)	0	1143	0	0	692	0		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	1143	0	0	692	0		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Left	Left	Right	Left	Right		
Median Width(ft)		12	12		24			
Link Offset(ft)		0	0		0			
Crosswalk Width(ft)		16	16		16			
Two way Left Turn Lane								
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Turning Speed (mph)	15			9	15	9		
Turn Type		NA			Prot			
Protected Phases		2			4		6	8
Permitted Phases								
Detector Phase		2			4			
Switch Phase								
Minimum Initial (s)		12.0			7.0		7.0	12.0
Minimum Split (s)		19.0			14.0		14.0	19.0
Total Split (s)		56.0			64.0		56.0	64.0
Total Split (%)		46.7%			53.3%		47%	53%
Maximum Green (s)		49.0			57.0		49.0	57.0
Yellow Time (s)		5.0			5.0		5.0	5.0
All-Red Time (s)		2.0			2.0		2.0	2.0
Lost Time Adjust (s)		-2.0			-2.0			
Total Lost Time (s)		5.0			5.0			
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)		3.0			3.0		3.0	3.0
Recall Mode		Min			None		Min	None
Act Effect Green (s)		47.2			55.1			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø6	Ø8
Actuated g/C Ratio		0.42			0.49			
v/c Ratio		0.77			0.41			
Control Delay		3.9			19.6			
Queue Delay		0.0			0.0			
Total Delay		3.9			19.6			
LOS		A			B			
Approach Delay		3.9			19.6			
Approach LOS		A			B			
Queue Length 50th (ft)		8			170			
Queue Length 95th (ft)		10			217			
Internal Link Dist (ft)		58	535		686			
Turn Bay Length (ft)					500			
Base Capacity (vph)		1629			1828			
Starvation Cap Reductn		0			0			
Spillback Cap Reductn		0			0			
Storage Cap Reductn		0			0			
Reduced v/c Ratio		0.70			0.38			

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 112.4

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 9.8

Intersection Capacity Utilization 54.6%

Analysis Period (min) 15

Intersection LOS: A

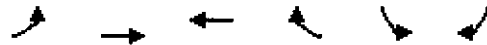
ICU Level of Service A

Splits and Phases: 333: Idlewild Road & I-485 Southbound Off Ramp

#33 #333 → → Ø2	#333 ↘ Ø4
56 s	64 s
#3 ↙ Ø6	#3 #33 ← ↑ Ø8
56 s	64 s

Idlewild Mixed Use
3: Idlewild Road & I-485 Southbound Off Ramp

2040 Build
Timing Plan: AM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø2	Ø4
Lane Configurations			↑↑			↑		
Traffic Volume (vph)	0	0	1274	0	0	201		
Future Volume (vph)	0	0	1274	0	0	201		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00		
Frt						0.865		
Flt Protected								
Satd. Flow (prot)	0	0	3539	0	0	1611		
Flt Permitted								
Satd. Flow (perm)	0	0	3539	0	0	1611		
Right Turn on Red				No		No		
Satd. Flow (RTOR)								
Link Speed (mph)		45	45		50			
Link Distance (ft)		378	100		821			
Travel Time (s)		5.7	1.5		11.2			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90		
Adj. Flow (vph)	0	0	1416	0	0	223		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	0	1416	0	0	223		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Left	Left	Right	Left	Right		
Median Width(ft)		0	0		0			
Link Offset(ft)		0	0		0			
Crosswalk Width(ft)		16	16		16			
Two way Left Turn Lane								
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Turning Speed (mph)	15			9	15	9		
Turn Type			NA			Prot		
Protected Phases			8			6	2	4
Permitted Phases								
Detector Phase			8			6		
Switch Phase								
Minimum Initial (s)			12.0			7.0	12.0	7.0
Minimum Split (s)			19.0			14.0	19.0	14.0
Total Split (s)			64.0			56.0	56.0	64.0
Total Split (%)			53.3%			46.7%	47%	53%
Maximum Green (s)			57.0			49.0	49.0	57.0
Yellow Time (s)			5.0			5.0	5.0	5.0
All-Red Time (s)			2.0			2.0	2.0	2.0
Lost Time Adjust (s)			-2.0			-2.0		
Total Lost Time (s)			5.0			5.0		
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)			3.0			3.0	3.0	3.0
Recall Mode			None			Min	Min	None
Act Effct Green (s)			56.6			48.8		
Actuated g/C Ratio			0.49			0.42		
v/c Ratio			0.82			0.33		
Control Delay			3.4			24.4		

Idlewild Mixed Use
3: Idlewild Road & I-485 Southbound Off Ramp

2040 Build
Timing Plan: AM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø2	Ø4
Queue Delay			0.0			0.0		
Total Delay			3.4			24.4		
LOS			A			C		
Approach Delay			3.4		24.4			
Approach LOS			A		C			
Queue Length 50th (ft)			7			113		
Queue Length 95th (ft)			8			176		
Internal Link Dist (ft)		298	20		741			
Turn Bay Length (ft)								
Base Capacity (vph)			1821			716		
Starvation Cap Reductn			0			0		
Spillback Cap Reductn			0			0		
Storage Cap Reductn			0			0		
Reduced v/c Ratio			0.78			0.31		

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 115.5
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 6.3
Intersection Capacity Utilization 73.7%
Analysis Period (min) 15
Intersection LOS: A
ICU Level of Service D

Splits and Phases: 3: Idlewild Road & I-485 Southbound Off Ramp

#33 #333 → → Ø2	#333 ↘ Ø4
56 s	64 s
#3 ↙ Ø6	#3 #33 ← ↑ Ø8
56 s	64 s

Idlewild Mixed Use
33: Idlewild Road

2040 Build
Timing Plan: AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑						↑↑				
Traffic Volume (vph)	0	1091	0	0	0	0	0	1274	0	0	0	0
Future Volume (vph)	0	1091	0	0	0	0	0	1274	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Frt												
Frt Protected												
Satd. Flow (prot)	0	3539	0	0	0	0	0	3539	0	0	0	0
Frt Permitted												
Satd. Flow (perm)	0	3539	0	0	0	0	0	3539	0	0	0	0
Right Turn on Red	No		No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		131			138			133			100	
Travel Time (s)		2.0			2.1			2.0			1.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1212	0	0	0	0	0	1416	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1212	0	0	0	0	0	1416	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA						NA				
Protected Phases		2						8				
Permitted Phases												
Detector Phase		2						8				
Switch Phase												
Minimum Initial (s)		12.0						12.0				
Minimum Split (s)		19.0						19.0				
Total Split (s)		56.0						64.0				
Total Split (%)		46.7%						53.3%				
Maximum Green (s)		49.0						57.0				
Yellow Time (s)		5.0						5.0				
All-Red Time (s)		2.0						2.0				
Lost Time Adjust (s)		-2.0						-2.0				
Total Lost Time (s)		5.0						5.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0						3.0				
Recall Mode		Min						None				
Act Effct Green (s)		48.8						56.6				
Actuated g/C Ratio		0.42						0.49				
v/c Ratio		0.81						0.82				
Control Delay		34.8						30.0				

Lane Group	Ø4	Ø6
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	4	6
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	14.0	14.0
Total Split (s)	64.0	56.0
Total Split (%)	53%	47%
Maximum Green (s)	57.0	49.0
Yellow Time (s)	5.0	5.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	Min
Act Effect Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		

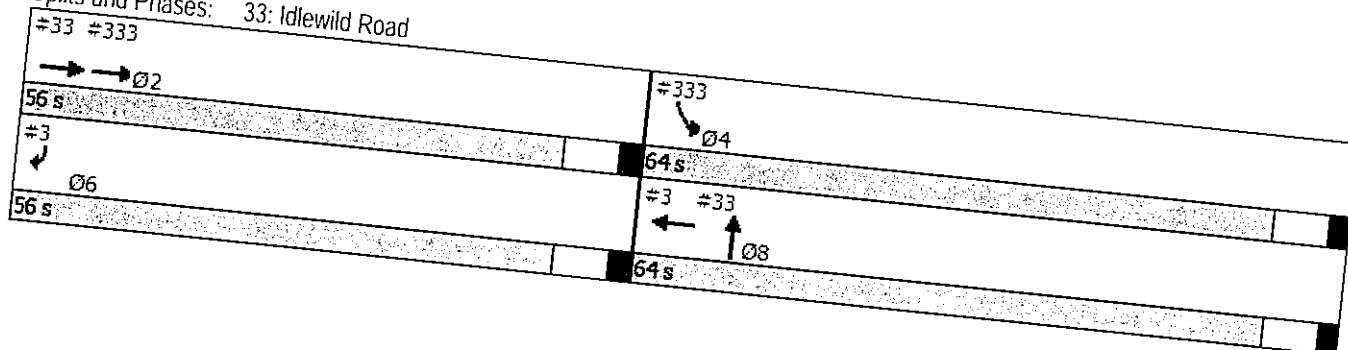
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0						0.0				
Total Delay		34.8						30.0				
LOS		C						C				
Approach Delay		34.8						30.0				
Approach LOS		C						C				
Queue Length 50th (ft)		424						30.0				
Queue Length 95th (ft)		517						C				
Internal Link Dist (ft)		51						474				
Turn Bay Length (ft)					58			573				
Base Capacity (vph)								53				
Starvation Cap Reductn	1574										20	
Spillback Cap Reductn	0							1821				
Storage Cap Reductn	0							0				
Reduced v/c Ratio	0							0				
	0.77							0.78				

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 115.5
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 32.2
 Intersection Capacity Utilization 73.7%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service D

Splits and Phases: 33: Idlewild Road



Idlewild Mixed Use
33: Idlewild Road

Timing Plan: AM Peak Hour

Lane Group

Ø4 Ø6

Queue Delay

Total Delay

LOS

Approach Delay

Approach LOS

Queue Length 50th (ft)

Queue Length 95th (ft)

Internal Link Dist (ft)

Turn Bay Length (ft)

Base Capacity (vph)

Starvation Cap Reductn

Spillback Cap Reductn

Storage Cap Reductn

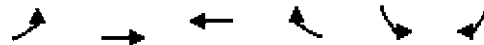
Reduced v/c Ratio

Intersection Summary

Idlewild Mixed Use
333: Idlewild Road & I-485 Southbound Off Ramp

2040 Build
Timing Plan: AM Peak Hour

							Ø6	Ø8
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations		↑↑			↑↑			
Traffic Volume (vph)	0	1091	0	0	661	0		
Future Volume (vph)	0	1091	0	0	661	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0			0	500	0		
Storage Lanes	0			0	1	0		
Taper Length (ft)	25				100			
Lane Util. Factor	1.00	0.95	1.00	1.00	0.97	1.00		
Frt								
Flt Protected					0.950			
Satd. Flow (prot)	0	3539	0	0	3433	0		
Flt Permitted					0.950			
Satd. Flow (perm)	0	3539	0	0	3433	0		
Right Turn on Red				No	No	No		
Satd. Flow (RTOR)								
Link Speed (mph)		45	45		50			
Link Distance (ft)		138	615		766			
Travel Time (s)		2.1	9.3		10.4			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90		
Adj. Flow (vph)	0	1212	0	0	734	0		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	1212	0	0	734	0		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Left	Left	Right	Left	Right		
Median Width(ft)		12	12		24			
Link Offset(ft)		0	0		0			
Crosswalk Width(ft)		16	16		16			
Two way Left Turn Lane								
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Turning Speed (mph)	15			9	15	9		
Turn Type		NA			Prot			
Protected Phases		2			4		6	8
Permitted Phases								
Detector Phase		2			4			
Switch Phase								
Minimum Initial (s)		12.0			7.0		7.0	12.0
Minimum Split (s)		19.0			14.0		14.0	19.0
Total Split (s)		56.0			64.0		56.0	64.0
Total Split (%)		46.7%			53.3%		47%	53%
Maximum Green (s)		49.0			57.0		49.0	57.0
Yellow Time (s)		5.0			5.0		5.0	5.0
All-Red Time (s)		2.0			2.0		2.0	2.0
Lost Time Adjust (s)		-2.0			-2.0			
Total Lost Time (s)		5.0			5.0			
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)		3.0			3.0		3.0	3.0
Recall Mode		Min			None		Min	None
Act Effect Green (s)		48.8			56.6			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø6	Ø8
Actuated g/C Ratio		0.42			0.49			
v/c Ratio		0.81			0.44			
Control Delay		4.2			20.3			
Queue Delay		0.0			0.0			
Total Delay		4.2			20.3			
LOS		A			C			
Approach Delay		4.2			20.3			
Approach LOS		A			C			
Queue Length 50th (ft)		9			184			
Queue Length 95th (ft)		10			233			
Internal Link Dist (ft)		58	535		686			
Turn Bay Length (ft)					500			
Base Capacity (vph)		1574			1766			
Starvation Cap Reductn		0			0			
Spillback Cap Reductn		0			0			
Storage Cap Reductn		0			0			
Reduced v/c Ratio		0.77			0.42			

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 115.5
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 10.3
 Intersection Capacity Utilization 57.3%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 333: Idlewild Road & I-485 Southbound Off Ramp

#33 #333 → → Ø2	#333 ↘ Ø4
56 s	64 s
#3 ↙ Ø6	#3 #33 ← ↑ Ø8
56 s	64 s

Idlewild Mixed Use
3: I-485 SB Ramp & Idlewild Road

2018 Existing
Timing Plan: PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑						↑	↑
Traffic Volume (vph)	0	839	129	265	647	0	0	0	0	265	4	300
Future Volume (vph)	0	839	129	265	647	0	0	0	0	265	4	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		100	275		0	0		0	0		375
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	0			225			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950							0.953	
Satd. Flow (prot)	0	3539	1583	1770	3539	0	0	0	0	0	1775	1583
Flt Permitted				0.192							0.953	
Satd. Flow (perm)	0	3539	1583	358	3539	0	0	0	0	0	1775	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			50			50	
Link Distance (ft)		821			870			1574			1673	
Travel Time (s)		12.4			13.2			21.5			22.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	932	143	294	719	0	0	0	0	294	4	333
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	932	143	294	719	0	0	0	0	0	298	333
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA	Perm	pm+pt	NA					Perm	NA	Perm
Protected Phases		2		1	6						4	
Permitted Phases			2	6						4		4
Detector Phase		2	2	1	6					4	4	4
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0	12.0					7.0	7.0	7.0
Minimum Split (s)		18.0	18.0	13.0	18.0					13.0	13.0	13.0
Total Split (s)		48.0	48.0	29.0	77.0					43.0	43.0	43.0
Total Split (%)		40.0%	40.0%	24.2%	64.2%					35.8%	35.8%	35.8%
Maximum Green (s)		42.3	42.3	23.7	71.3					37.2	37.2	37.2
Yellow Time (s)		4.5	4.5	3.0	4.5					3.8	3.8	3.8
All-Red Time (s)		1.2	1.2	2.3	1.2					2.0	2.0	2.0
Lost Time Adjust (s)		-0.7	-0.7	-0.3	-0.7						-0.8	-0.8
Total Lost Time (s)		5.0	5.0	5.0	5.0						5.0	5.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)		6.0	6.0	2.0	6.0					2.0	2.0	2.0
Minimum Gap (s)		3.0	3.0	0.2	3.0					0.2	0.2	0.2
Time Before Reduce (s)		15.0	15.0	0.0	15.0					0.0	0.0	0.0

Lanes, Volumes, Timings
RKA

Synchro 9 Report
Page 1

Idlewild Mixed Use
3: I-485 SB Ramp & Idlewild Road

2018 Existing
Timing Plan: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time To Reduce (s)		30.0	30.0	0.0	2.0					0.0	0.0	0.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
Act Effct Green (s)		57.9	57.9	79.8	79.8						30.2	30.2
Actuated g/C Ratio		0.48	0.48	0.66	0.66						0.25	0.25
v/c Ratio		0.55	0.19	0.67	0.31						0.67	0.84
Control Delay		25.7	21.8	28.5	14.5						47.1	60.2
Queue Delay		0.0	0.0	0.0	0.0						0.0	0.0
Total Delay		25.7	21.8	28.5	14.5						47.1	60.2
LOS		C	C	C	B						D	E
Approach Delay		25.2			18.6						54.0	
Approach LOS		C			B						D	
Queue Length 50th (ft)		260	61	124	99						207	244
Queue Length 95th (ft)		406	130	240	277						281	329
Internal Link Dist (ft)		741			790			1494			1593	
Turn Bay Length (ft)			100	275								375
Base Capacity (vph)		1707	763	520	2352						562	501
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.55	0.19	0.57	0.31						0.53	0.66

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 14 (12%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 29.4
 Intersection Capacity Utilization 65.3%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 3: I-485 SB Ramp & Idlewild Road

Ø1	Ø2 (R)	Ø4
29 s	48 s	43 s
Ø6 (R)		
77 s		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↓	↑↑						↓	↑
Traffic Volume (vph)	0	856	132	270	660	0	0	0	0	270	4	306
Future Volume (vph)	0	856	132	270	660	0	0	0	0	270	4	306
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		100	275		0	0			0		375
Storage Lanes	0		1	1		0	0			0		1
Taper Length (ft)	0			225		0	0			0		1
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									
Flt Protected				0.950								0.850
Satd. Flow (prot)	0	3539	1583	1770	3539	0	0	0	0	0	0.953	
Flt Permitted				0.165								
Satd. Flow (perm)	0	3539	1583	307	3539	0	0	0	0	0	0.953	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			50			50	
Link Distance (ft)		821			870							
Travel Time (s)		12.4			13.2			1574			1673	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	21.5			22.8	
Adj. Flow (vph)	0	951	147	300	733	0	0	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)								0	0	300	4	340
Lane Group Flow (vph)	0	951	147	300	733	0	0	0	0	0	304	340
Enter Blocked Intersection	No	No	No	No	No	No	No	0	0	0	0	0
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA	Perm	pm+pt	NA							
Protected Phases		2		1	6					Perm	NA	Perm
Permitted Phases			2	6							4	
Detector Phase		2	2	1	6						4	4
Switch Phase											4	4
Minimum Initial (s)		12.0	12.0	7.0	12.0							
Minimum Split (s)		19.0	19.0	14.0	19.0					7.0	7.0	7.0
Total Split (s)		47.0	47.0	30.0	77.0					14.0	14.0	14.0
Total Split (%)		39.2%	39.2%	25.0%	64.2%					43.0	43.0	43.0
Maximum Green (s)		40.0	40.0	23.0	70.0					35.8%	35.8%	35.8%
Yellow Time (s)		5.0	5.0	5.0	5.0					36.0	36.0	36.0
All-Red Time (s)		2.0	2.0	2.0	2.0					5.0	5.0	5.0
Lost Time Adjust (s)		-2.0	-2.0	-2.0	-2.0					2.0	2.0	2.0
Total Lost Time (s)		5.0	5.0	5.0	5.0						-2.0	-2.0
Lead/Lag		Lag	Lag	Lead							5.0	5.0
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0							
Recall Mode		C-Min	C-Min	None	C-Min					3.0	3.0	3.0
Act Effct Green (s)		52.5	52.5	77.7	77.7					None	None	None

Lanes, Volumes, Timings
RKA

Idlewild Mixed Use

3: I-485 SB Ramp & Idlewild Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.44	0.44	0.65	0.65						0.27	0.27
v/c Ratio		0.61	0.21	0.67	0.32						0.64	0.80
Control Delay		30.2	24.9	30.2	16.4						44.4	54.8
Queue Delay		0.0	0.0	0.0	0.0						0.0	0.0
Total Delay		30.2	24.9	30.2	16.4						44.4	54.8
LOS		C	C	C	B						D	D
Approach Delay		29.5			20.4						D	
Approach LOS		C			C							
Queue Length 50th (ft)		300	71	152	114						205	242
Queue Length 95th (ft)		423	135	244	274						286	337
Internal Link Dist (ft)		741			790			1494			1593	
Turn Bay Length (ft)			100	275							562	501
Base Capacity (vph)		1547	692	503	2291						0	0
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0.54	0.68
Reduced v/c Ratio		0.61	0.21	0.60	0.32							

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 83 (69%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 30.8

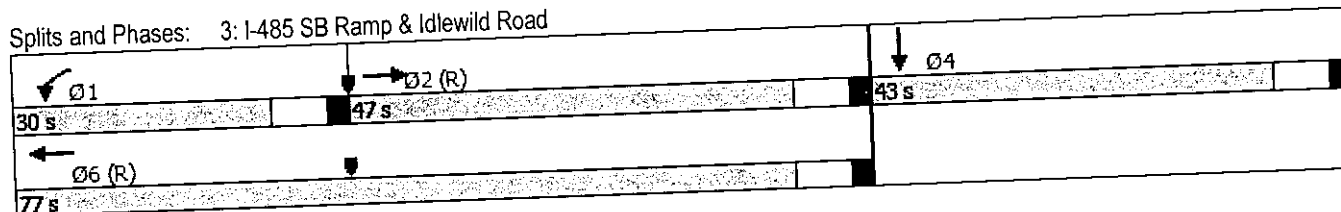
Intersection Capacity Utilization 66.3%

Analysis Period (min) 15

Intersection LOS: C

ICU Level of Service C

Splits and Phases: 3: I-485 SB Ramp & Idlewild Road



												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑						↑	↑
Traffic Volume (vph)	0	882	132	284	674	0	0	0	0	287	4	306
Future Volume (vph)	0	882	132	284	674	0	0	0	0	287	4	306
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		100	275		0	0		0	0		375
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	0			225			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950							0.953	
Satd. Flow (prot)	0	3539	1583	1770	3539	0	0	0	0	0	1775	1583
Flt Permitted				0.155							0.953	
Satd. Flow (perm)	0	3539	1583	289	3539	0	0	0	0	0	1775	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			50			50	
Link Distance (ft)		821			870			1574			1673	
Travel Time (s)		12.4			13.2			21.5			22.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	980	147	316	749	0	0	0	0	319	4	340
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	980	147	316	749	0	0	0	0	0	323	340
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA	Perm	pm+pt	NA					Perm	NA	Perm
Protected Phases		2		1	6						4	
Permitted Phases			2	6						4		4
Detector Phase		2	2	1	6					4	4	4
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0	12.0					7.0	7.0	7.0
Minimum Split (s)		19.0	19.0	14.0	19.0					14.0	14.0	14.0
Total Split (s)		49.0	49.0	30.0	79.0					41.0	41.0	41.0
Total Split (%)		40.8%	40.8%	25.0%	65.8%					34.2%	34.2%	34.2%
Maximum Green (s)		42.0	42.0	23.0	72.0					34.0	34.0	34.0
Yellow Time (s)		5.0	5.0	5.0	5.0					5.0	5.0	5.0
All-Red Time (s)		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0	-2.0	-2.0						-2.0	-2.0
Total Lost Time (s)		5.0	5.0	5.0	5.0						5.0	5.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
Act Effect Green (s)		52.6	52.6	78.4	78.4						31.6	31.6

Idlewild Mixed Use
3: I-485 SB Ramp & Idlewild Road

2020 Build Phase 1
Timing Plan: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.44	0.44	0.65	0.65						0.26	0.26
v/c Ratio		0.63	0.21	0.71	0.32						0.69	0.82
Control Delay		30.3	24.5	27.9	16.6						47.5	57.3
Queue Delay		0.0	0.0	0.0	0.0						0.0	0.0
Total Delay		30.3	24.5	27.9	16.6						47.5	57.3
LOS		C	C	C	B						D	E
Approach Delay		29.5			19.9						52.5	
Approach LOS		C			B						D	
Queue Length 50th (ft)		317	72	177	177						221	242
Queue Length 95th (ft)		428	131	257	283						314	346
Internal Link Dist (ft)		741			790			1494			1593	
Turn Bay Length (ft)			100	275								375
Base Capacity (vph)		1549	693	497	2312						532	474
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.63	0.21	0.64	0.32						0.61	0.72

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 92 (77%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 31.3
 Intersection Capacity Utilization 68.7%
 Analysis Period (min) 15

Intersection LOS: C
ICU Level of Service C

Splits and Phases: 3: I-485 SB Ramp & Idlewild Road

← Ø1	→ Ø2 (R)	↓ Ø4
30 s	49 s	41 s
← Ø5 (R)		
79 s		

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑						↑	↑
Traffic Volume (vph)	0	916	132	314	709	0	0	0	0	308	4	306
Future Volume (vph)	0	916	132	314	709	0	0	0	0	308	4	306
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		100	275		0	0		0	0		375
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	0			225			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950							0.953	
Satd. Flow (prot)	0	3539	1583	1770	3539	0	0	0	0	0	1775	1583
Flt Permitted				0.130							0.953	
Satd. Flow (perm)	0	3539	1583	242	3539	0	0	0	0	0	1775	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			50			50	
Link Distance (ft)		821			870			1574			1673	
Travel Time (s)		12.4			13.2			21.5			22.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1018	147	349	788	0	0	0	0	342	4	340
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1018	147	349	788	0	0	0	0	0	346	340
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA	Perm	pm+pt	NA					Perm	NA	Perm
Protected Phases		2		1	6						4	
Permitted Phases			2	6						4		4
Detector Phase		2	2	1	6					4	4	4
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0	12.0					7.0	7.0	7.0
Minimum Split (s)		19.0	19.0	14.0	19.0					14.0	14.0	14.0
Total Split (s)		48.0	48.0	32.0	80.0					40.0	40.0	40.0
Total Split (%)		40.0%	40.0%	26.7%	66.7%					33.3%	33.3%	33.3%
Maximum Green (s)		41.0	41.0	25.0	73.0					33.0	33.0	33.0
Yellow Time (s)		5.0	5.0	5.0	5.0					5.0	5.0	5.0
All-Red Time (s)		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0	-2.0	-2.0					-2.0	-2.0	-2.0
Total Lost Time (s)		5.0	5.0	5.0	5.0					5.0	5.0	5.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
Act Effct Green (s)		50.0	50.0	78.6	78.6						31.4	31.4

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.42	0.42	0.66	0.66						0.26	0.26
v/c Ratio		0.69	0.22	0.76	0.34						0.75	0.82
Control Delay		33.3	26.0	27.6	13.8						50.8	58.1
Queue Delay		0.0	0.0	0.0	0.0						0.0	0.0
Total Delay		33.3	26.0	27.6	13.8						50.8	58.1
LOS		C	C	C	B						D	E
Approach Delay		32.4			18.0						54.4	
Approach LOS		C			B						D	
Queue Length 50th (ft)		356	77	194	237						240	242
Queue Length 95th (ft)		456	133	287	250						344	350
Internal Link Dist (ft)		741			790			1494			1593	
Turn Bay Length (ft)			100	275								375
Base Capacity (vph)		1474	659	502	2318						517	461
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.69	0.22	0.70	0.34						0.67	0.74

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 80 (67%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 32.0

Intersection LOS: C

Intersection Capacity Utilization 72.5%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 3: I-485 SB Ramp & Idlewild Road

 Ø1	 Ø2 (R)	 Ø4
32 s	48 s	40 s
 Ø6 (R)		
80 s		

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑						↑↑				
Traffic Volume (vph)	0	1380	0	0	0	0	0	1139	0	0	0	0
Future Volume (vph)	0	1380	0	0	0	0	0	1139	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Fr												
Flt Protected												
Satd. Flow (prot)	0	3539	0	0	0	0	0	3539	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	3539	0	0	0	0	0	3539	0	0	0	0
Right Turn on Red	No		No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		131			138			133			100	
Travel Time (s)		2.0			2.1			2.0			1.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1533	0	0	0	0	0	1266	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1533	0	0	0	0	0	1266	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA						NA				
Protected Phases		2						8				
Permitted Phases												
Detector Phase		2						8				
Switch Phase												
Minimum Initial (s)		12.0						12.0				
Minimum Split (s)		19.0						19.0				
Total Split (s)		71.0						59.0				
Total Split (%)		54.6%						45.4%				
Maximum Green (s)		64.0						52.0				
Yellow Time (s)		5.0						5.0				
All-Red Time (s)		2.0						2.0				
Lost Time Adjust (s)		-2.0						-2.0				
Total Lost Time (s)		5.0						5.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0						3.0				
Recall Mode		Min						None				
Act Effct Green (s)		64.7						52.8				
Actuated g/C Ratio		0.51						0.41				
v/c Ratio		0.85						0.86				
Control Delay		33.4						41.6				

Lane Group	Ø4	Ø6
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	4	6
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	14.0	14.0
Total Split (s)	59.0	71.0
Total Split (%)	45%	55%
Maximum Green (s)	52.0	64.0
Yellow Time (s)	5.0	5.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	Min
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0						0.2				
Total Delay		33.4						41.9				
LOS		C						D				
Approach Delay		33.4						D				
Approach LOS		C						41.9				
Queue Length 50th (ft)		574						D				
Queue Length 95th (ft)		682						504				
Internal Link Dist (ft)		51						604				
Turn Bay Length (ft)					58			53			20	
Base Capacity (vph)		1834						1501				
Starvation Cap Reductn		0						0				
Spillback Cap Reductn		0						25				
Storage Cap Reductn		0						0				
Reduced v/c Ratio		0.84						0.86				

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 127.5

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 37.2

Intersection Capacity Utilization 78.0%

Analysis Period (min) 15

Intersection LOS: D

ICU Level of Service D

Splits and Phases: 33: Idlewild Road

#33 #333	#333
→ → Ø2	↘ Ø4
71 s	59 s
#3	#3 #33
↙ Ø6	← ↗ Ø8
71 s	59 s

Lane Group	Ø4	Ø6
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø6	Ø8
Lane Configurations		↑↑			↓↓			
Traffic Volume (vph)	0	1380	0	0	731	0		
Future Volume (vph)	0	1380	0	0	731	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0			0	500	0		
Storage Lanes	0			0	1	0		
Taper Length (ft)	25				100			
Lane Util. Factor	1.00	0.95	1.00	1.00	0.97	1.00		
Flt Protected					0.950			
Satd. Flow (prot)	0	3539	0	0	3433	0		
Flt Permitted					0.950			
Satd. Flow (perm)	0	3539	0	0	3433	0		
Right Turn on Red				No	No	No		
Satd. Flow (RTOR)								
Link Speed (mph)		45	45		50			
Link Distance (ft)		138	615		766			
Travel Time (s)		2.1	9.3		10.4			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90		
Adj. Flow (vph)	0	1533	0	0	812	0		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	1533	0	0	812	0		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Left	Left	Right	Left	Right		
Median Width(ft)		12	12		24			
Link Offset(ft)		0	0		0			
Crosswalk Width(ft)		16	16		16			
Two way Left Turn Lane								
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Turning Speed (mph)	15			9	15	9		
Turn Type		NA			Prot			
Protected Phases		2			4			
Permitted Phases							6	8
Detector Phase		2			4			
Switch Phase								
Minimum Initial (s)		12.0			7.0		7.0	12.0
Minimum Split (s)		19.0			14.0		14.0	19.0
Total Split (s)		71.0			59.0		71.0	59.0
Total Split (%)		54.6%			45.4%		55%	45%
Maximum Green (s)		64.0			52.0		64.0	52.0
Yellow Time (s)		5.0			5.0		5.0	5.0
All-Red Time (s)		2.0			2.0		2.0	2.0
Lost Time Adjust (s)		-2.0			-2.0			
Total Lost Time (s)		5.0			5.0			
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)		3.0			3.0		3.0	3.0
Recall Mode		Min			None		Min	None
Act Effect Green (s)		64.7			52.8			

Lanes, Volumes, Timings
RKA

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø6	Ø8
Actuated g/C Ratio		0.51			0.41			
v/c Ratio		0.85			0.57			
Control Delay		4.2			30.7			
Queue Delay		0.0			0.0			
Total Delay		4.2			30.7			
LOS		A			C			
Approach Delay		4.2			30.7			
Approach LOS		A			C			
Queue Length 50th (ft)		11			266			
Queue Length 95th (ft)		25			330			
Internal Link Dist (ft)		58	535		686			
Turn Bay Length (ft)					500			
Base Capacity (vph)		1834			1456			
Starvation Cap Reductn		0			0			
Spillback Cap Reductn		0			0			
Storage Cap Reductn		0			0			
Reduced v/c Ratio		0.84			0.56			

Intersection Summary

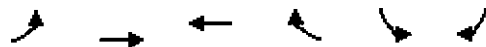
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 127.5
 Natural Cycle: 70
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 13.4
 Intersection Capacity Utilization 67.3%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 333: Idlewild Road & I-485 Southbound Off Ramp

#33 #333	#333
→ → Ø2	↘ Ø4
71 s	59 s
#3	#3 #33
↙ Ø6	← ↗ Ø8
71 s	59 s

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø2	Ø4
Lane Configurations			↑↑			↑		
Traffic Volume (vph)	0	0	1192	0	0	160		
Future Volume (vph)	0	0	1192	0	0	160		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00		
Frt						0.865		
Flt Protected								
Satd. Flow (prot)	0	0	3539	0	0	1611		
Flt Permitted								
Satd. Flow (perm)	0	0	3539	0	0	1611		
Right Turn on Red				No		No		
Satd. Flow (RTOR)								
Link Speed (mph)		45	45		50			
Link Distance (ft)		378	100		821			
Travel Time (s)		5.7	1.5		11.2			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90		
Adj. Flow (vph)	0	0	1324	0	0	178		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	0	1324	0	0	178		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Left	Left	Right	Left	Right		
Median Width(ft)		0	0		0			
Link Offset(ft)		0	0		0			
Crosswalk Width(ft)		16	16		16			
Two way Left Turn Lane								
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Turning Speed (mph)	15			9	15	9		
Turn Type			NA			Prot		
Protected Phases			8			6	2	4
Permitted Phases								
Detector Phase			8			6		
Switch Phase								
Minimum Initial (s)			12.0			7.0	12.0	7.0
Minimum Split (s)			19.0			14.0	19.0	14.0
Total Split (s)			63.0			77.0	77.0	63.0
Total Split (%)			45.0%			55.0%	55%	45%
Maximum Green (s)			56.0			70.0	70.0	56.0
Yellow Time (s)			5.0			5.0	5.0	5.0
All-Red Time (s)			2.0			2.0	2.0	2.0
Lost Time Adjust (s)			-2.0			-2.0		
Total Lost Time (s)			5.0			5.0		
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)			3.0			3.0	3.0	3.0
Recall Mode			None			Min	Min	None
Act Effct Green (s)			58.0			71.9		
Actuated g/C Ratio			0.41			0.51		
v/c Ratio			0.90			0.21		
Control Delay			6.3			19.4		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø2	Ø4
Queue Delay			0.0			0.0		
Total Delay			6.3			19.4		
LOS			A			B		
Approach Delay			6.3		19.4			
Approach LOS			A		B			
Queue Length 50th (ft)			7			86		
Queue Length 95th (ft)			18			134		
Internal Link Dist (ft)		298	20		741			
Turn Bay Length (ft)								
Base Capacity (vph)			1467			829		
Starvation Cap Reductn			0			0		
Spillback Cap Reductn			0			0		
Storage Cap Reductn			0			0		
Reduced v/c Ratio			0.90			0.21		

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 139.9
 Natural Cycle: 90
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 7.8
 Intersection Capacity Utilization 81.2%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service D

Splits and Phases: 3: Idlewild Road & I-485 Southbound Off Ramp

#33 #333 → → Ø2	#333 ↘ Ø4
77 s	63 s
#3 ↙ Ø6	#3 #33 ← ↑ Ø8
77 s	63 s

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑						↑↑				
Traffic Volume (vph)	0	1444	0	0	0	0	0	1192	0	0	0	0
Future Volume (vph)	0	1444	0	0	0	0	0	1192	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Fr												
Flt Protected												
Satd. Flow (prot)	0	3539	0	0	0	0	0	3539	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	3539	0	0	0	0	0	3539	0	0	0	0
Right Turn on Red	No		No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		131			138			133			100	
Travel Time (s)		2.0			2.1			2.0			1.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1604	0	0	0	0	0	1324	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1604	0	0	0	0	0	1324	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA						NA				
Protected Phases		2						8				
Permitted Phases												
Detector Phase		2						8				
Switch Phase												
Minimum Initial (s)		12.0						12.0				
Minimum Split (s)		19.0						19.0				
Total Split (s)		77.0						63.0				
Total Split (%)		55.0%						45.0%				
Maximum Green (s)		70.0						56.0				
Yellow Time (s)		5.0						5.0				
All-Red Time (s)		2.0						2.0				
Lost Time Adjust (s)		-2.0						-2.0				
Total Lost Time (s)		5.0						5.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0						3.0				
Recall Mode		Min						None				
Act Effct Green (s)		71.9						58.0				
Actuated g/C Ratio		0.51						0.41				
v/c Ratio		0.88						0.90				
Control Delay		37.3						48.1				

Lane Group	Ø4	Ø6
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	4	6
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	14.0	14.0
Total Split (s)	63.0	77.0
Total Split (%)	45%	55%
Maximum Green (s)	56.0	70.0
Yellow Time (s)	5.0	5.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	Min
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0						0.0				
Total Delay		37.3						48.1				
LOS		D						D				
Approach Delay		37.3						48.1				
Approach LOS		D						D				
Queue Length 50th (ft)		665						587				
Queue Length 95th (ft)		779						694				
Internal Link Dist (ft)		51			58			53			20	
Turn Bay Length (ft)												
Base Capacity (vph)		1821						1467				
Starvation Cap Reductn		0						0				
Spillback Cap Reductn		0						0				
Storage Cap Reductn		0						0				
Reduced v/c Ratio		0.88						0.90				

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 139.9

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 42.1

Intersection Capacity Utilization 81.2%

Analysis Period (min) 15

Intersection LOS: D

ICU Level of Service D

Splits and Phases: 33: Idlewild Road

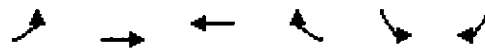
#33 #333   Ø2	#333  Ø4
77 s	63 s
#3  Ø6	#3 #33   Ø8
77 s	63 s

Lane Group	Ø4	Ø6
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø6	Ø8
Lane Configurations		↑↑			↓↓			
Traffic Volume (vph)	0	1444	0	0	769	0		
Future Volume (vph)	0	1444	0	0	769	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0			0	500	0		
Storage Lanes	0			0	1	0		
Taper Length (ft)	25				100			
Lane Util. Factor	1.00	0.95	1.00	1.00	0.97	1.00		
Frt								
Flt Protected					0.950			
Satd. Flow (prot)	0	3539	0	0	3433	0		
Flt Permitted					0.950			
Satd. Flow (perm)	0	3539	0	0	3433	0		
Right Turn on Red				No	No	No		
Satd. Flow (RTOR)								
Link Speed (mph)		45	45		50			
Link Distance (ft)		138	615		766			
Travel Time (s)		2.1	9.3		10.4			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90		
Adj. Flow (vph)	0	1604	0	0	854	0		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	1604	0	0	854	0		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Left	Left	Right	Left	Right		
Median Width(ft)		12	12		24			
Link Offset(ft)		0	0		0			
Crosswalk Width(ft)		16	16		16			
Two way Left Turn Lane								
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Turning Speed (mph)	15			9	15	9		
Turn Type		NA			Prot			
Protected Phases		2			4		6	8
Permitted Phases								
Detector Phase		2			4			
Switch Phase								
Minimum Initial (s)		12.0			7.0		7.0	12.0
Minimum Split (s)		19.0			14.0		14.0	19.0
Total Split (s)		77.0			63.0		77.0	63.0
Total Split (%)		55.0%			45.0%		55%	45%
Maximum Green (s)		70.0			56.0		70.0	56.0
Yellow Time (s)		5.0			5.0		5.0	5.0
All-Red Time (s)		2.0			2.0		2.0	2.0
Lost Time Adjust (s)		-2.0			-2.0			
Total Lost Time (s)		5.0			5.0			
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)		3.0			3.0		3.0	3.0
Recall Mode		Min			None		Min	None
Act Effct Green (s)		71.9			58.0			

Lanes, Volumes, Timings
RKA

Synchro 9 Report
Page 1



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø6	Ø8
Actuated g/C Ratio		0.51			0.41			
v/c Ratio		0.88			0.60			
Control Delay		4.7			34.1			
Queue Delay		0.0			0.0			
Total Delay		4.7			34.1			
LOS		A			C			
Approach Delay		4.7			34.1			
Approach LOS		A			C			
Queue Length 50th (ft)		12			309			
Queue Length 95th (ft)		25			377			
Internal Link Dist (ft)		58	535		686			
Turn Bay Length (ft)					500			
Base Capacity (vph)		1821			1423			
Starvation Cap Reductn		0			0			
Spillback Cap Reductn		0			0			
Storage Cap Reductn		0			0			
Reduced v/c Ratio		0.88			0.60			

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 139.9
 Natural Cycle: 90
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 14.9
 Intersection Capacity Utilization 70.2%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 333: Idlewild Road & I-485 Southbound Off Ramp

#33 #333 → → Ø2	#333 ↘ Ø4
77 s	63 s
#3 ↙ Ø6	#3 #33 ← ↑ Ø8
77 s	63 s

APPENDIX H

IDLEWILD ROAD AND I-485 NORTHBOUND RAMPS

SYNCHRO REPORTS



												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	229	392	0	0	981	337	129	4	168	0	0	0
Future Volume (vph)	229	392	0	0	981	337	129	4	168	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	275		0	0		125	200		850	0		0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (ft)	225			25			225			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	0.88	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950							0.954				
Satd. Flow (prot)	1770	3539	0	0	3539	1583	0	1777	2787	0	0	0
Flt Permitted	0.207							0.954				
Satd. Flow (perm)	386	3539	0	0	3539	1583	0	1777	2787	0	0	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			50			50	
Link Distance (ft)		870			595			1525			1596	
Travel Time (s)		13.2			9.0			20.8			21.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	254	436	0	0	1090	374	143	4	187	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	254	436	0	0	1090	374	0	147	187	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases	2					6	4		4			
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	13.0	18.0			18.0	18.0	13.0	13.0	13.0			
Total Split (s)	28.0	93.0			65.0	65.0	27.0	27.0	27.0			
Total Split (%)	23.3%	77.5%			54.2%	54.2%	22.5%	22.5%	22.5%			
Maximum Green (s)	22.6	87.3			59.3	59.3	21.7	21.7	21.7			
Yellow Time (s)	3.0	4.5			4.5	4.5	3.7	3.7	3.7			
All-Red Time (s)	2.4	1.2			1.2	1.2	1.6	1.6	1.6			
Lost Time Adjust (s)	-0.4	-0.7			-0.7	-0.7		-0.3	-0.3			
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0	5.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	6.0			6.0	6.0	1.0	1.0	1.0			
Minimum Gap (s)	0.2	3.0			3.0	3.0	0.2	0.2	0.2			
Time Before Reduce (s)	0.0	15.0			15.0	15.0	0.0	0.0	0.0			

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time To Reduce (s)	0.0	30.0			30.0	30.0	0.0	0.0	0.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
Act Effct Green (s)	96.3	96.3			81.4	81.4		13.7	13.7			
Actuated g/C Ratio	0.80	0.80			0.68	0.68		0.11	0.11			
v/c Ratio	0.60	0.15			0.45	0.35		0.73	0.59			
Control Delay	29.0	5.4			9.1	8.6		71.1	57.5			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	29.0	5.4			9.1	8.6		71.1	57.5			
LOS	C	A			A	A		E	E			
Approach Delay		14.1			9.0			63.5				
Approach LOS		B			A			E				
Queue Length 50th (ft)	150	19			194	109		112	79			
Queue Length 95th (ft)	234	65			268	m167		174	115			
Internal Link Dist (ft)		790			515			1445			1516	
Turn Bay Length (ft)	275					125			850			
Base Capacity (vph)	575	2841			2400	1073		325	510			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.44	0.15			0.45	0.35		0.45	0.37			

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 36 (30%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 17.7

Intersection LOS: B

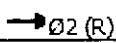
Intersection Capacity Utilization 59.7%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Idlewild Road & I-485 NB Ramp

			
93 s		27 s	
			
28 s		65 s	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 				 			
Traffic Volume (vph)	234	400	0	0	1001	344	132	4	171	0	0	0
Future Volume (vph)	234	400	0	0	1001	344	132	4	171	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	275		0	0		125	200		850	0		0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (ft)	225			25			225			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	0.88	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950							0.954				
Satd. Flow (prot)	1770	3539	0	0	3539	1583	0	1777	2787	0	0	0
Flt Permitted	0.184							0.954				
Satd. Flow (perm)	343	3539	0	0	3539	1583	0	1777	2787	0	0	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			50			50	
Link Distance (ft)		870			595			1525			1596	
Travel Time (s)		13.2			9.0			20.8			21.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	260	444	0	0	1112	382	147	4	190	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	260	444	0	0	1112	382	0	151	190	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases	2					6	4		4			
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	14.0	19.0			19.0	19.0	14.0	14.0	14.0			
Total Split (s)	29.0	93.0			64.0	64.0	27.0	27.0	27.0			
Total Split (%)	24.2%	77.5%			53.3%	53.3%	22.5%	22.5%	22.5%			
Maximum Green (s)	22.0	86.0			57.0	57.0	20.0	20.0	20.0			
Yellow Time (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	-2.0	-2.0			-2.0	-2.0		-2.0	-2.0			
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0	5.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
Act Effct Green (s)	92.8	92.8			73.7	73.7		17.2	17.2			

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.77	0.77			0.61	0.61		0.14	0.14			
v/c Ratio	0.60	0.16			0.51	0.39		0.59	0.48			
Control Delay	16.2	9.0			11.4	11.1		57.4	50.6			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	16.2	9.0			11.4	11.1		57.4	50.6			
LOS	B	A			B	B		E	D			
Approach Delay		11.6			11.3			53.6				
Approach LOS		B			B			D				
Queue Length 50th (ft)	5	0			140	91		111	77			
Queue Length 95th (ft)	284	226			342	m204		174	114			
Internal Link Dist (ft)		790			515			1445			1516	
Turn Bay Length (ft)	275					125			850			
Base Capacity (vph)	550	2737			2173	972		325	510			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.47	0.16			0.51	0.39		0.46	0.37			

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 12 (10%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.60

Intersection Signal Delay: 17.1

Intersection LOS: B

Intersection Capacity Utilization 60.7%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Idlewild Road & I-485 NB Ramp

 Ø2 (R)		 Ø4
93 s		27 s
 Ø5	 Ø6 (R)	
29 s	64 s	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 				 			
Traffic Volume (vph)	234	411	0	0	1048	361	132	4	179	0	0	0
Future Volume (vph)	234	411	0	0	1048	361	132	4	179	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	275		0	0		125	200		850	0		0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (ft)	225			25			225			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	0.88	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950							0.954				
Satd. Flow (prot)	1770	3539	0	0	3539	1583	0	1777	2787	0	0	0
Flt Permitted	0.169							0.954				
Satd. Flow (perm)	315	3539	0	0	3539	1583	0	1777	2787	0	0	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			50			50	
Link Distance (ft)		870			595			1525			1596	
Travel Time (s)		13.2			9.0			20.8			21.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	260	457	0	0	1164	401	147	4	199	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	260	457	0	0	1164	401	0	151	199	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases	2					6	4		4			
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	14.0	19.0			19.0	19.0	14.0	14.0	14.0			
Total Split (s)	29.0	95.0			66.0	66.0	25.0	25.0	25.0			
Total Split (%)	24.2%	79.2%			55.0%	55.0%	20.8%	20.8%	20.8%			
Maximum Green (s)	22.0	88.0			59.0	59.0	18.0	18.0	18.0			
Yellow Time (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	-2.0	-2.0			-2.0	-2.0		-2.0	-2.0			
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0	5.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
Act Efect Green (s)	93.2	93.2			73.7	73.7		16.8	16.8			

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.78	0.78			0.61	0.61		0.14	0.14			
v/c Ratio	0.62	0.17			0.54	0.41		0.61	0.51			
Control Delay	15.2	7.5			11.7	11.2		58.8	52.0			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	15.2	7.5			11.7	11.2		58.8	52.0			
LOS	B	A			B	B		E	D			
Approach Delay		10.3			11.6			54.9				
Approach LOS		B			B			D				
Queue Length 50th (ft)	7	0			190	108		111	81			
Queue Length 95th (ft)	277	212			m380	m218		178	121			
Internal Link Dist (ft)		790			515			1445			1516	
Turn Bay Length (ft)	275					125			850			
Base Capacity (vph)	536	2749			2173	972		296	464			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.49	0.17			0.54	0.41		0.51	0.43			

Intersection Summary:

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 4 (3%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 17.0

Intersection LOS: B

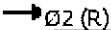
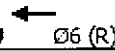
Intersection Capacity Utilization 62.0%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Idlewild Road & I-485 NB Ramp

			
95 s		25 s	
			
29 s		66 s	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 				 			
Traffic Volume (vph)	234	496	0	0	1114	383	132	4	221	0	0	0
Future Volume (vph)	234	496	0	0	1114	383	132	4	221	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	275		0	0		125	200		850	0		0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (ft)	225			25			225			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	0.88	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950							0.954				
Satd. Flow (prot)	1770	3539	0	0	3539	1583	0	1777	2787	0	0	0
Flt Permitted	0.148							0.954				
Satd. Flow (perm)	276	3539	0	0	3539	1583	0	1777	2787	0	0	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			50			50	
Link Distance (ft)		870			595			1525			1596	
Travel Time (s)		13.2			9.0			20.8			21.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	260	551	0	0	1238	426	147	4	246	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	260	551	0	0	1238	426	0	151	246	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases	2					6	4		4			
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	14.0	19.0			19.0	19.0	14.0	14.0	14.0			
Total Split (s)	27.0	95.0			68.0	68.0	25.0	25.0	25.0			
Total Split (%)	22.5%	79.2%			56.7%	56.7%	20.8%	20.8%	20.8%			
Maximum Green (s)	20.0	88.0			61.0	61.0	18.0	18.0	18.0			
Yellow Time (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	-2.0	-2.0			-2.0	-2.0		-2.0	-2.0			
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0	5.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
Act Efect Green (s)	92.7	92.7			72.6	72.6		17.3	17.3			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.77	0.77			0.60	0.60		0.14	0.14			
v/c Ratio	0.65	0.20			0.58	0.44		0.59	0.61			
Control Delay	16.3	6.6			12.9	11.8		57.4	54.7			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	16.3	6.6			12.9	11.8		57.4	54.7			
LOS	B	A			B	B		E	D			
Approach Delay		9.7			12.6			55.7				
Approach LOS		A			B			E				
Queue Length 50th (ft)	11	0			218	124		110	102			
Queue Length 95th (ft)	247	239			m282	m162		178	147			
Internal Link Dist (ft)		790			515			1445			1516	
Turn Bay Length (ft)	275					125			850			
Base Capacity (vph)	486	2733			2141	958		296	464			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.53	0.20			0.58	0.44		0.51	0.53			

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 100 (83%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 17.8

Intersection LOS: B

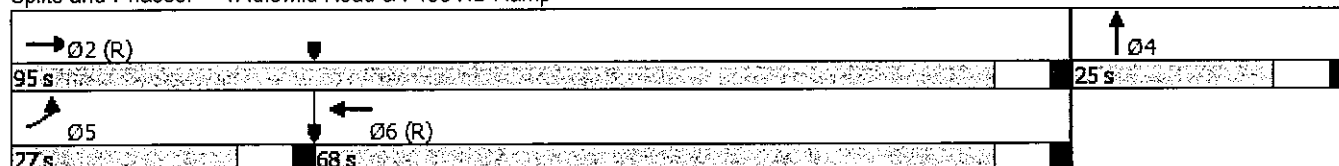
Intersection Capacity Utilization 64.2%

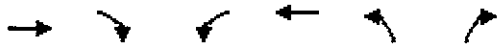
ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Idlewild Road & I-485 NB Ramp



							Ø2	Ø4
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations				↑↑↑	↗			
Traffic Volume (vph)	0	0	0	1979	145	0		
Future Volume (vph)	0	0	0	1979	145	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Storage Length (ft)		0	0		500	0		
Storage Lanes		0	0		0	0		
Taper Length (ft)			25		100			
Lane Util. Factor	1.00	1.00	1.00	0.91	1.00	1.00		
Frt								
Flt Protected					0.950			
Satd. Flow (prot)	0	0	0	5085	1770	0		
Flt Permitted					0.950			
Satd. Flow (perm)	0	0	0	5085	1770	0		
Right Turn on Red		No			No	No		
Satd. Flow (RTOR)								
Link Speed (mph)	45			45	50			
Link Distance (ft)	584			219	648			
Travel Time (s)	8.8			3.3	8.8			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90		
Adj. Flow (vph)	0	0	0	2199	161	0		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	0	0	2199	161	0		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Right	Left	Left	Left	Right		
Median Width(ft)	12			12	12			
Link Offset(ft)	0			0	0			
Crosswalk Width(ft)	16			16	16			
Two way Left Turn Lane								
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Turning Speed (mph)		9	15		15	9		
Turn Type				NA	Prot			
Protected Phases				6	8		2	4
Permitted Phases								
Detector Phase				6	8			
Switch Phase								
Minimum Initial (s)				12.0	7.0		7.0	12.0
Minimum Split (s)				19.0	14.0		14.0	19.0
Total Split (s)				67.0	53.0		67.0	53.0
Total Split (%)				55.8%	44.2%		56%	44%
Maximum Green (s)				60.0	46.0		60.0	46.0
Yellow Time (s)				5.0	5.0		5.0	5.0
All-Red Time (s)				2.0	2.0		2.0	2.0
Lost Time Adjust (s)				-2.0	-2.0			
Total Lost Time (s)				5.0	5.0			
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)				3.0	3.0		3.0	3.0
Recall Mode				C-Min	None		C-Min	None
Act Effct Green (s)				62.0	48.0			



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø2	Ø4
Actuated g/C Ratio				0.52	0.40			
v/c Ratio				0.84	0.23			
Control Delay				3.9	24.9			
Queue Delay				0.0	0.0			
Total Delay				3.9	24.9			
LOS				A	C			
Approach Delay				3.9	24.9			
Approach LOS				A	C			
Queue Length 50th (ft)				29	81			
Queue Length 95th (ft)				30	132			
Internal Link Dist (ft)	504			139	568			
Turn Bay Length (ft)					500			
Base Capacity (vph)				2627	708			
Starvation Cap Reductn				0	0			
Spillback Cap Reductn				0	0			
Storage Cap Reductn				0	0			
Reduced v/c Ratio				0.84	0.23			

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 34 (28%), Referenced to phase 2:NBR and 6:, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 5.3

Intersection Capacity Utilization 54.6%

Analysis Period (min) 15

Intersection LOS: A

ICU Level of Service A

Splits and Phases: 4: I-485 Northbound Off ramp

#444	#44 #444
Ø2 (R)	Ø4
67 s	53 s
#4 #44	#4
Ø6 (R)	Ø8
67 s	53 s

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑						↑↑↑	
Traffic Volume (vph)	0	0	0	0	1979	0	0	0	0	0	1492	0
Future Volume (vph)	0	0	0	0	1979	0	0	0	0	0	1492	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.91	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	0	0	0	5085	0	0	0	0	0	5085	0
Flt Permitted												
Satd. Flow (perm)	0	0	0	0	5085	0	0	0	0	0	5085	0
Right Turn on Red			No	No		No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		219			108			112			188	
Travel Time (s)		3.3			1.6			1.7			2.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	0	2199	0	0	0	0	0	1658	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	2199	0	0	0	0	0	1658	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type					NA						NA	
Protected Phases					6						4	
Permitted Phases												
Detector Phase					6						4	
Switch Phase												
Minimum Initial (s)					12.0						12.0	
Minimum Split (s)					19.0						19.0	
Total Split (s)					67.0						53.0	
Total Split (%)					55.8%						44.2%	
Maximum Green (s)					60.0						46.0	
Yellow Time (s)					5.0						5.0	
All-Red Time (s)					2.0						2.0	
Lost Time Adjust (s)					-2.0						-2.0	
Total Lost Time (s)					5.0						5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)					3.0						3.0	
Recall Mode					C-Min						None	
Act Effct Green (s)					62.0						48.0	
Actuated g/C Ratio					0.52						0.40	
v/c Ratio					0.84						0.82	
Control Delay					14.0						36.1	

Lane Group	Ø2	Ø8
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Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	2	8
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	14.0	14.0
Total Split (s)	67.0	53.0
Total Split (%)	56%	44%
Maximum Green (s)	60.0	46.0
Yellow Time (s)	5.0	5.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	C-Min	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay					0.0						0.0	
Total Delay					14.0						36.1	
LOS					B						D	
Approach Delay					14.0						36.1	
Approach LOS					B						D	
Queue Length 50th (ft)					191						413	
Queue Length 95th (ft)					341						477	
Internal Link Dist (ft)		139			28			32			108	
Turn Bay Length (ft)												
Base Capacity (vph)					2627						2034	
Starvation Cap Reductn					0						0	
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					0.84						0.82	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 34 (28%), Referenced to phase 2:NBR and 6:, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 23.5

Intersection Capacity Utilization 75.4%

Analysis Period (min) 15

Intersection LOS: C

ICU Level of Service D

Splits and Phases: 44:

#444	#44 #444
→ Ø2 (R)	↓ → Ø4
67 s	53 s
#4 #44	#4
← ← Ø6 (R)	↙ Ø8
67 s	53 s

Lane Group 02 08

Queue Delay

Total Delay

LOS

Approach Delay

Approach LOS

Queue Length 50th (ft)

Queue Length 95th (ft)

Internal Link Dist (ft)

Turn Bay Length (ft)

Base Capacity (vph)

Starvation Cap Reductn

Spillback Cap Reductn

Storage Cap Reductn

Reduced v/c Ratio

Intersection Summary

								
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø6	Ø8
Lane Configurations	↑↑↑					↓↓↓		
Traffic Volume (vph)	1492	0	0	0	0	758		
Future Volume (vph)	1492	0	0	0	0	758		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Storage Length (ft)		0	0		0	400		
Storage Lanes		0	0		0	1		
Taper Length (ft)			25		25			
Lane Util. Factor	0.91	1.00	1.00	1.00	1.00	0.76		
Frt						0.850		
Flt Protected								
Satd. Flow (prot)	5085	0	0	0	0	3610		
Flt Permitted								
Satd. Flow (perm)	5085	0	0	0	0	3610		
Right Turn on Red		No				No		
Satd. Flow (RTOR)								
Link Speed (mph)	45			45	50			
Link Distance (ft)	112			150	691			
Travel Time (s)	1.7			2.3	9.4			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90		
Adj. Flow (vph)	1658	0	0	0	0	842		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	1658	0	0	0	0	842		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Right	Left	Left	Left	Right		
Median Width(ft)	0			0	0			
Link Offset(ft)	0			0	0			
Crosswalk Width(ft)	16			16	16			
Two way Left Turn Lane								
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Turning Speed (mph)		9	15		15	9		
Turn Type	NA					Prot		
Protected Phases	4					2	6	8
Permitted Phases								
Detector Phase	4					2		
Switch Phase								
Minimum Initial (s)	12.0					7.0	12.0	7.0
Minimum Split (s)	19.0					14.0	19.0	14.0
Total Split (s)	53.0					67.0	67.0	53.0
Total Split (%)	44.2%					55.8%	56%	44%
Maximum Green (s)	46.0					60.0	60.0	46.0
Yellow Time (s)	5.0					5.0	5.0	5.0
All-Red Time (s)	2.0					2.0	2.0	2.0
Lost Time Adjust (s)	-2.0					-2.0		
Total Lost Time (s)	5.0					5.0		
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0					3.0	3.0	3.0
Recall Mode	None					C-Min	C-Min	None
Act Effct Green (s)	48.0					62.0		

Lanes, Volumes, Timings
RKA

Synchro 9 Report
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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø6	Ø8
Actuated g/C Ratio	0.40					0.52		
v/c Ratio	0.82					0.45		
Control Delay	3.1					19.3		
Queue Delay	0.0					0.0		
Total Delay	3.1					19.3		
LOS	A					B		
Approach Delay	3.1				19.3			
Approach LOS	A				B			
Queue Length 50th (ft)	7					174		
Queue Length 95th (ft)	8					217		
Internal Link Dist (ft)	32			70	611			
Turn Bay Length (ft)						400		
Base Capacity (vph)	2034					1865		
Starvation Cap Reductn	0					0		
Spillback Cap Reductn	0					0		
Storage Cap Reductn	0					0		
Reduced v/c Ratio	0.82					0.45		

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 34 (28%), Referenced to phase 2:NBR and 6:, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 8.6
 Intersection Capacity Utilization 75.4%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service D

Splits and Phases: 444: I-485 Northbound Off Ramp & Idlewild Road

#444	#44 #444
Ø2 (R)	→ Ø4
67 s	53 s
#4 #44	#4
← Ø6 (R)	← Ø8
67 s	53 s