PROJECT TIGER (WEGMANS)
AIR PARK ASSOCIATES SITE
HANOVER COUNTY, VIRGINIA

Traffic Impact Analysis

December 13, 2019

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COMMONWEALTH OF VIRGINIA
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Prepared for:

Hanover County

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

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TABLE OF CONTENTS

TABLE OF CONTENTS I

APPENDICES III

LIST OF TABLES IV

LIST OF FIGURES V

LIST OF FIGURES (CONTINUED) VI

1 EXECUTIVE SUMMARY 1-1

1.1 REPORT PURPOSE AND STUDY OBJECTIVES 1-1
1.2 INTRODUCTION 1-1
1.2.1 Site Location and Study Area *1-2*
1.2.2 Proposed Development *1-3*
1.2.3 Principal Findings *1-4*
1.2.4 Recommendations *1-5*

2 BACKGROUND INFORMATION 2-1

2.1 ASSUMED TRANSPORTATION IMPROVEMENTS 2-1
2.2 DESCRIPTION OF DEVELOPMENT 2-1
2.3 STUDY AREA LIMITS 2-2
2.4 EXISTING ROADWAY NETWORK 2-2

3 ANALYSIS OF EXISTING CONDITIONS 3-1

3.1 EXISTING TRAFFIC VOLUMES 3-1
3.2 CAPACITY ANALYSES 3-2
3.3 2019 EXISTING TRAFFIC VOLUMES ANALYSIS 3-4

4 ANALYSIS OF BACKGROUND CONDITIONS WITHOUT DEVELOPMENT 4-1

4.1 FUTURE BACKGROUND TRAFFIC VOLUMES 4-1
4.2 CAPACITY ANALYSES 4-1
4.3 ASSUMED BACKGROUND IMPROVEMENTS 4-2
4.4 2022/2027/2032/2037 BACKGROUND TRAFFIC VOLUMES ANALYSIS 4-2

5 TRIP GENERATION 5-1

6 SITE TRIP DISTRIBUTION AND ASSIGNMENT 6-1

6.1 TRIP DISTRIBUTION METHODOLOGY 6-1
6.2 TRAFFIC ASSIGNMENT 6-1
6.3 PROPOSED DEVELOPMENT SITE TRIPS 6-1

7 PHASED ANALYSIS OF FUTURE TOTAL CONDITIONS WITH DEVELOPMENT 7-1

7.1 FUTURE TOTAL TRAFFIC VOLUMES 7-1
7.2 CAPACITY ANALYSES 7-1
7.2.1 2022 Phase 1 Traffic Volumes Analysis *7-1*
7.2.2 2027 Phase 2 Traffic Volumes Analysis *7-6*
7.2.3 2032 Phase 3 (Full Buildout) Traffic Volumes Analysis *7-10*
7.2.4 2035 Full Buildout + 3 Years Traffic Volumes Analysis *7-14*

8 ADDITIIONAL ANALYSES 8-1

8.1 TURN LANE WARRANT ANALYSIS 8-1
8.2 SIGNAL WARRANT ANALYSIS 8-2
8.3 ROUNDABOUT ANALYSIS 8-4

9 CONCLUSIONS 9-1
9.1 PRINCIPAL FINDINGS 9-1
9.2 RECOMMENDATIONS 9-2

APPENDICES

Appendix A – Scoping Document (12/03/2019)

Appendix B – Traffic Counts

Appendix C – SYNCHRO & SimTraffic Analysis of 2019 Existing Conditions

Appendix D – SYNCHRO & SimTraffic Analysis of 2022/2027/2032/2035 Background Conditions

Appendix E – SYNCHRO & SimTraffic Analysis of 2022/2027/2032/2035 Total Conditions

Appendix F – Turn Lane Warrant Analysis Nomographs

Appendix G – Signal Warrant Analysis Outputs

Appendix H – SIDRA Roundabout Analysis Outputs

Appendix I – Hanover County/VDOT Comments Regarding 12/13/2019 TIA

Appendix J – Response to Hanover County/VDOT Comments Regarding 12/13/2019 TIA

LIST OF TABLES

TABLE 1-1: TRIP GENERATION SUMMARY 1-3

TABLE 3-1: LEVEL OF SERVICE DEFINITIONS 3-2

TABLE 3-2: UNSIGNALIZED AND SIGNALIZED INTERSECTION LEVEL OF SERVICE CRITERIA 3-3

TABLE 3-3: INTERSECTION LEVEL OF SERVICE, DELAY, AND QUEUE SUMMARY 2019 EXISTING TRAFFIC AND EXISTING GEOMETRY 3-6

TABLE 4-1: INTERSECTION LEVEL OF SERVICE, DELAY, AND QUEUE SUMMARY 2022 BACKGROUND TRAFFIC VOLUMES – WITH SLIDING HILL ROAD WIDENING GEOMETRY 4-5

TABLE 4-2: INTERSECTION LEVEL OF SERVICE, DELAY, AND QUEUE SUMMARY 2027 BACKGROUND TRAFFIC VOLUMES – WITH SLIDING HILL ROAD WIDENING GEOMETRY 4-7

TABLE 4-3: INTERSECTION LEVEL OF SERVICE, DELAY, AND QUEUE SUMMARY 2032 BACKGROUND TRAFFIC VOLUMES – WITH SLIDING HILL ROAD WIDENING GEOMETRY 4-9

TABLE 4-4: INTERSECTION LEVEL OF SERVICE, DELAY, AND QUEUE SUMMARY 2035 BACKGROUND TRAFFIC VOLUMES – WITH SLIDING HILL ROAD WIDENING GEOMETRY 4-11

TABLE 5-1: TRIP GENERATION SUMMARY 5-1

TABLE 7-1: INTERSECTION LEVEL OF SERVICE, DELAY, AND QUEUE SUMMARY 2022 PHASE 1 TOTAL TRAFFIC VOLUMES 7-4

TABLE 7-2: INTERSECTION LEVEL OF SERVICE, DELAY, AND QUEUE SUMMARY 2027 PHASE 2 TOTAL TRAFFIC VOLUMES 7-8

TABLE 7-3: INTERSECTION LEVEL OF SERVICE, DELAY, AND QUEUE SUMMARY 2032 PHASE 3 (FULL BUILDOUT) TOTAL TRAFFIC VOLUMES 7-12

TABLE 7-4: INTERSECTION LEVEL OF SERVICE, DELAY, AND QUEUE SUMMARY 2035 FULL BUILDOUT + 3 YEARS TOTAL TRAFFIC VOLUMES 7-16

LIST OF FIGURES

FIGURE 2-1: SURROUNDING ROADWAY NETWORK AND SITE LOCATION
FIGURE 2-2: PRELIMINARY SITE LAYOUT
FIGURE 2-3: 2019 EXISTING GEOMETRY
FIGURE 2-4: 2022 BACKGROUND GEOMETRY
FIGURE 3-1: 2019 EXISTING WEEKDAY AM PEAK HOUR VOLUMES
FIGURE 3-2: 2019 EXISTING WEEKDAY PM PEAK HOUR VOLUMES
FIGURE 3-3: 2019 EXISTING SATURDAY PEAK HOUR VOLUMES
FIGURE 4-1: 2022 BACKGROUND WEEKDAY AM PEAK HOUR VOLUMES
FIGURE 4-2: 2022 BACKGROUND WEEKDAY PM PEAK HOUR VOLUMES
FIGURE 4-3: 2022 BACKGROUND SATURDAY PEAK HOUR VOLUMES
FIGURE 4-4: 2027 BACKGROUND WEEKDAY AM PEAK HOUR VOLUMES
FIGURE 4-5: 2027 BACKGROUND WEEKDAY PM PEAK HOUR VOLUMES
FIGURE 4-6: 2027 BACKGROUND SATURDAY PEAK HOUR VOLUMES
FIGURE 4-7: 2032 BACKGROUND WEEKDAY AM PEAK HOUR VOLUMES
FIGURE 4-8: 2032 BACKGROUND WEEKDAY PM PEAK HOUR VOLUMES
FIGURE 4-9: 2032 BACKGROUND SATURDAY PEAK HOUR VOLUMES
FIGURE 4-10: 2035 BACKGROUND WEEKDAY AM PEAK HOUR VOLUMES
FIGURE 4-11: 2035 BACKGROUND WEEKDAY PM PEAK HOUR VOLUMES
FIGURE 4-12: 2035 BACKGROUND SATURDAY PEAK HOUR VOLUMES
FIGURE 6-1: OVERALL SITE TRIP DISTRIBUTION
FIGURE 6-2: TRIP DISTRIBUTION – ALL PHASES
FIGURE 6-3: PHASE 1 NEW SITE TRIPS AM PEAK HOUR
FIGURE 6-4: PHASE 1 NEW SITE TRIPS PM PEAK HOUR
FIGURE 6-5: PHASE 1 NEW SITE TRIPS SATURDAY PEAK HOUR
FIGURE 6-6: PHASE 2 NEW SITE TRIPS AM PEAK HOUR
FIGURE 6-7: PHASE 2 NEW SITE TRIPS PM PEAK HOUR
FIGURE 6-8: PHASE 2 NEW SITE TRIPS SATURDAY PEAK HOUR
FIGURE 6-9: PHASE 3 NEW SITE TRIPS AM PEAK HOUR
FIGURE 6-10: PHASE 3 NEW SITE TRIPS PM PEAK HOUR
FIGURE 6-11: PHASE 3 NEW SITE TRIPS SATURDAY PEAK HOUR
FIGURE 6-12: FULL BUILDOUT (PHASES 1+2+3) NEW SITE TRIPS AM PEAK HOUR
FIGURE 6-13: FULL BUILDOUT (PHASES 1+2+3) NEW SITE TRIPS PM PEAK HOUR
FIGURE 6-14: FULL BUILDOUT (PHASES 1+2+3) NEW SITE TRIPS SATURDAY PEAK HOUR

LIST OF FIGURES (Continued)

FIGURE 7-1: 2022 TOTAL WEEKDAY AM PEAK HOUR VOLUMES (2022 BACKGROUND + PHASE 1)
FIGURE 7-2: 2022 TOTAL WEEKDAY PM PEAK HOUR VOLUMES (2022 BACKGROUND + PHASE 1)
FIGURE 7-3: 2022 TOTAL SATURDAY PEAK HOUR VOLUMES (2022 BACKGROUND + PHASE 1)
FIGURE 7-4: 2027 TOTAL WEEKDAY AM PEAK HOUR VOLUMES (2027 BACKGROUND + PHASES 1 AND 2)
FIGURE 7-5: 2027 TOTAL WEEKDAY PM PEAK HOUR VOLUMES (2027 BACKGROUND + PHASES 1 AND 2)
FIGURE 7-6: 2027 TOTAL SATURDAY PEAK HOUR VOLUMES (2027 BACKGROUND + PHASES 1 AND 2)
FIGURE 7-7: 2032 TOTAL WEEKDAY AM PEAK HOUR VOLUMES (2032 BACKGROUND + FULL BUILDOUT)
FIGURE 7-8: 2032 TOTAL WEEKDAY PM PEAK HOUR VOLUMES (2032 BACKGROUND + FULL BUILDOUT)
FIGURE 7-9: 2032 TOTAL SATURDAY PEAK HOUR VOLUMES (2032 BACKGROUND + FULL BUILDOUT)
FIGURE 7-10: 2035 TOTAL WEEKDAY AM PEAK HOUR VOLUMES (2035 BACKGROUND + FULL BUILDOUT)
FIGURE 7-11: 2035 TOTAL WEEKDAY PM PEAK HOUR VOLUMES (2035 BACKGROUND + FULL BUILDOUT)
FIGURE 7-12: 2035 TOTAL SATURDAY PEAK HOUR VOLUMES (2035 BACKGROUND + FULL BUILDOUT)
FIGURE 8-1: TRAFFIC SIGNAL WARRANTS #2 AND #3 (2022 BACKGROUND VOLUMES)

1 EXECUTIVE SUMMARY

This study presents the findings of a traffic impact analysis (TIA) for the proposed Project Tiger (Wegmans) development, a warehousing and distribution facility located on the Air Park Associates Site along the Sliding Hill Road corridor in Hanover County, VA.

The TIA was originally submitted on December 13, 2019. Hanover County and VDOT provided comments in January 2020. This TIA incorporates all necessary revisions to address the comments provided by the reviewing agencies. A copy of the comments is included in Appendix I and the responses to the comments are included in Appendix J.

This report addresses the proposed phasing of the development and the associated traffic impacts on the Sliding Hill Road and Lewistown Road corridors. The goal of this study is identifying improvements that preserve the capacity of the surrounding roadway network while providing functional access to the Project Tiger (Wegmans) development.

1.1 Report Purpose and Study Objectives

The purpose of the TIA is to quantify the impacts of Project Tiger (Wegmans) on the adjacent transportation network and to identify potential improvements. The objectives of the traffic study are as follows:

- Evaluate existing conditions and identify deficiencies in the existing roadway network.
- Evaluate future background conditions without the proposed development and identify deficiencies in the future roadway network resulting from background traffic growth.
- Evaluate future Build conditions (with the proposed site) and identify potential improvements that will mitigate the impacts associated with the development.
- Identify a phasing plan for development and transportation improvements, if needed.

This TIA has been prepared in accordance with the Scope of Study agreed upon between Hanover County, VDOT, and Timmons Group. The official scoping documents are provided in Appendix A. The study has been prepared in accordance with all applicable Hanover County and VDOT standards and guidance.

1.2 Introduction

Project Tiger (Wegmans) is proposed on a 217-acre parcel, formerly known as the Air Park Associates Site. The site is bounded by Route 656 (Sliding Hill Road) on the south and east, by Route 657 (Ashcake Road) to the north, and by the Hanover County Municipal Airport property to the south and west. A vicinity map is shown on Figure 2-1.

The proposed project is anticipated to consist of three (3) phases of development, in 2022, 2027, and 2032, and includes up to 1,690,650 SF of warehousing and distribution land uses. The phase breakdown is as follows:

- Phase 1 includes 1,085,000 SF of warehousing and distribution;
- Phase 2 includes 205,650 SF of warehousing and distribution; and
- Phase 3 includes 400,000 SF of warehousing.

The development is assumed to have a 13-year buildout from 2019 (existing in this study) to 2032. Phasing of the project was assumed at five-year intervals. Phases 1, 2, and 3 (full buildout) are assumed

to occur in 2022, 2027, and 2032, respectively. In addition, a future analysis looking three (3) years beyond the final buildout date is included. Analyses were performed based on 2019, 2022, 2027, 2032, and 2035 weekday AM, PM, and Saturday peak hour volumes as specified and agreed upon at scoping.

1.2.1 Site Location and Study Area

Project Tiger (Wegmans) is located to the northwest of the Sliding Hill Road/New Ashcake Road intersection and to the southwest of the Sliding Hill Road/Ashcake Road/Peaks Road/Mt. Hermon Road intersection in Hanover County, VA, as shown on Figure 2-1. The proposed site has frontage along Sliding Hill Road and Ashcake Road.

Access to the site will be provided via two (2) entrances, both constructed during Phase 1 of the buildout:

1. A full-access entrance will be constructed on Sliding Hill Road, located approximately 1,800 feet north of the Sliding Hill Road/New Ashcake Road intersection; and
2. A full-access entrance will be constructed on Ashcake Road, located approximately 4,000 feet west of the Sliding Hill Road/Ashcake Road/Peaks Road/Mt. Hermon Road intersection.

In addition, Project Tiger (Wegmans) will construct two (2) gated, emergency vehicle entrances, one (1) each to Sliding Hill Road and Ashcake Road. A preliminary site layout is shown on Figure 2-2.

The study area is shown in Figure 2-1 and includes the following 14 intersections:

1. Route 656 (Sliding Hill Rd) at Route 637 (Atlee Station Rd)/Route 1261 (Leadbetter Rd);
2. Route 656 at Route 2035 (Charter Hill Ct)/Route 2044 (Kings Charter Dr);
3. Route 656 at Route 1265 (Totopotomoy Trail);
4. Route 656 at Route 1383 (Atlee Commerce Blvd)/Route 1649 (Atlee Commons Dr);
5. Route 656 at Route 813 (Airpark Dr);
6. Route 656 at Route 643 (New Ashcake Rd);
7. Route 656 (Sliding Hill Rd/Mt. Hermon Rd) at Route 657 (Ashcake Rd/Peaks Rd);
8. Route 802 (Lewistown Rd) at Interstate 95 Southbound On-/Off-Ramp;
9. Route 802 at Route 657 (Ashcake Rd);
10. Route 802 at Route 809 (Air Park Rd);
11. Route 802 at Interstate 95 Northbound Off-Ramp/Travel Plaza Entrance;
12. Route 802 at Interstate 95 Northbound On-Ramp;
13. Route 656 (Sliding Hill Rd) at Site Entrance "A" (Build conditions only); and
14. Route 657 (Ashcake Rd) at Site Entrance "B" (Build conditions only).

1.2.2 Proposed Development

As noted prior, the proposed 217-acre project is anticipated to consist of three (3) phases of development, in 2022, 2027, and 2032, for up to 1,690,650 SF of warehousing and distribution land uses. The phase breakdown is as follows:

- Phase 1 includes 1,085,000 SF of warehousing and distribution;
- Phase 2 includes 205,650 SF of warehousing and distribution; and
- Phase 3 includes 400,000 SF of warehousing.

As indicated in Table 1-1, on a typical weekday, the total assumed land uses listed above are anticipated to generate approximately 3,164 daily trips, 275 AM peak hour trips, 283 PM peak hour trips, and 85 Saturday peak hour trips.

Table 1-1: Trip Generation Summary

				WEEKDAY							SATURDAY			
					AM PEAK HOUR			PM PEAK HOUR				SAT PEAK HOUR		
LAND USE	ITE CODE	AMOUNT	UNITS	ADT	IN	OUT	TOTAL	IN	OUT	TOTAL	ADT	IN	OUT	TOTAL
Phase 1														
Warehousing	150	520,000	SF (GFA)	867	68	20	88	24	66	90	-	-	-	-
High-Cube Cold Storage	157	565,000	SF (GFA)	1,191	50	15	65	17	47	64	-	-	-	-
Warehousing (SATURDAY)	150	1,085,000	SF (GFA)	-	-	-	-	-	-	-	163	34	20	54
	Phase 1 Total	1,085,000	SF (GFA)	2,058	118	35	153	42	113	154	163	34	20	54
Phase 2														
Warehousing	150	99,650	SF (GFA)	203	28	9	37	11	29	40	-	-	-	-
High-Cube Cold Storage	157	106,000	SF (GFA)	225	9	3	12	3	10	13	-	-	-	-
Warehousing (SATURDAY)	150	205,650	SF (GFA)	-	-	-	-	-	-	-	31	6	4	10
	Phase 2 Total	205,650	SF (GFA)	428	37	12	49	14	39	52	31	6	4	10
Phase 3														
Warehousing	150	400,000	SF (GFA)	678	56	18	73	20	56	76	60	13	7	20
Total		1,690,650	SF (GFA)	**3,164**	**211**	**64**	**275**	**75**	**208**	**283**	**254**	**53**	**31**	**85**

1.2.3 Principal Findings

The 2019 existing conditions exhibit moderate delays and queuing along the roadway network. Overall, all intersections operate well during the AM peak hour, with only side street operations performing poorly. Traffic operations during the PM peak hour worsen, with some intersections experiencing heavy delays for both individual movements and the overall intersection. During the Saturday peak hour, no operational issues were noted for mainline or side street operations. Of note is the unsignalized intersection of Sliding Hill Road and New Ashcake Road, which has northbound left turn volumes over 600 in the AM peak hour, poor levels of service, and heavy queues.

Under 2022, 2027, 2032, and 2035 background analyses, operational, queuing, and capacity issues noted under existing (2019) conditions initially improve due to the widening of the Sliding Hill Road corridor to four (4) lanes. As volumes grow over the next 16 years (most notable in 2032 and 2035), the benefits realized due to the widening begin to diminish. This is notable at the signalized Atlee Station Road intersection where both mainline and side street volumes are heavy. In addition, the side street approaches at the unsignalized intersections along the Sliding Hill Road corridor of Totopotomoy Trail, Atlee Commerce Boulevard and along Lewistown Road at Ashcake Road witness issues associated with left turning traffic entering the mainline. Those individual movements and approaches that are over capacity under existing conditions worsen with background growth and existing operational issues are exacerbated.

The first phase of development of Project Tiger (Wegmans) is accommodated through the installation of two (2) full-access entrances – Site Entrance "A" on Sliding Hill Road and Site Entrance "B" on Ashcake Road – and an auxiliary eastbound left turn lane on Sliding Hill Road. Under 2022 Future Total conditions, intersections along the Sliding Hill Road and Lewistown Road corridors operate at a LOS E or better and exhibit the same general operational characteristics and shortcoming noted in the 2022 background analysis. There are no major capacity issues noted at the study intersections that were not present under background analysis.

The second phase of development of Project Tiger (Wegmans) continues to be accommodated through the entrances on Sliding Hill Road and Ashcake Road constructed in Phase 1. Under 2027 Future Total conditions, all intersection along the Sliding Hill Road and Lewistown Road corridors continue to operate at a LOS E or better and exhibit the same general operational characteristics and shortcoming noted in the 2027 background analysis. Queuing and capacity issues are noted at the intersection of Sliding Hill Road and Atlee Station Road. There are no major capacity issues noted at the study intersections with the exception of the eastbound approach of Lewistown Road at Ashcake Road and the intersection of Sliding Hill Road and Atlee Station Road.

The third and final phase of development of Project Tiger (Wegmans) continues to be accommodated through the entrances on Sliding Hill Road and Ashcake Road constructed in Phase 1. Under 2032/2035 Future Total volume conditions, all intersection along the Sliding Hill Road and Lewistown Road corridors continue to operate at a LOS E or better and exhibit the same general operational characteristics and shortcoming noted in the 2032/2035 background analysis, with the exception of the eastbound approach of Lewistown Road at Ashcake Road and the intersection of Sliding Hill Road and Atlee Station Road.

In general, the buildout of the proposed site does not significantly impact either the Sliding Hill Road or Lewistown Road corridors beyond those thresholds identified within the 2032/2035 background analyses. Of particular note are the signal at Atlee Station Road and the eastbound approach of Lewiston at Ashcake Road, which exhibit poor operations under both background and total scenarios.

The Ashcake Road corridor between Lewistown Road and Sliding Hill Road currently carries approximately 2,700 vehicles per day; Project Tiger (Wegmans) is anticipated to add approximately 635 new daily trips (20% of site traffic). While this represents a 25% increase in overall volumes along the corridor, the 2-lane corridor is well under its carrying capacity and does not experience any queuing or operational issues under existing, background, or total future conditions. In addition, Project Tiger (Wegmans) has agreed to direct all truck traffic along the Sliding Hill Road corridor only; no truck traffic is anticipated to utilize the Ashcake Road corridor.

1.2.4 Recommendations

The installation of required roadway improvements will correspond with the traffic generated by the respective phase of the development. This report identifies the proposed phasing of Project Tiger (Wegmans) and the roadway improvements associated with each. The focus of this work is identifying a comprehensive access plan that provides functional access to Project Tiger (Wegmans) and preserves the capacity of the surrounding roadway network.

Throughout the process, the goal was to determine the need for roadway improvements as the site develops and ensure that the existing local roads are not negatively impacted due to the anticipated traffic volumes.

It should be noted that a traffic signal is warranted at the intersection of Sliding Hill Road and New Ashcake Road under existing and background conditions (see Chapter 8). Signalization, or other alternative treatment of the intersection, is recommended as a background improvement to the Sliding Hill Road corridor to alleviate current and expected queuing and operational issues within the study area prior to the development of Project Tiger (Wegmans). In coordination with VDOT and Hanover County, a signal justification report (SJR) is being completed in conjunction with this TIA and will address the background operational issues at the Sliding Hill Road and New Ashcake Road intersection.

To accommodate the anticipated traffic of Project Tiger (Wegmans), the recommended phasing plan is as follows:

- Phase 1 – Site development of 1,085,000 SF of warehousing and distribution land uses (approximately 2,060 ADT)
    - Construct an entrance on Sliding Hill Road (Site Entrance "A").
    - Construct an eastbound left turn lane on Sliding Hill Road at Site Entrance "A".
    - Construct an entrance on Ashcake Road (Site Entrance "B").

- Phase 2 – Site development of 205,650 SF of warehousing and distribution land uses (approximately 430 ADT)
    - No further improvements beyond those described in Phase 1.

- Phase 3 – Site development of 400,000 SF of warehousing land use (approximately 680 ADT)
    - No further improvements beyond those described in Phase 1.

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2 BACKGROUND INFORMATION

2.1 ASSUMED TRANSPORTATION IMPROVEMENTS

Per the approved scope, Hanover County is in the process of widening the Sliding Hill Road corridor from 2-lanes to 4-lanes between the intersections of Atlee Station Road/Leadbetter Road and New Ashcake Road. The widening improvements will be completed by the end of 2021, therefore, all analyses in 2022 and beyond will include the widening improvements on Sliding Hill Road.

2.2 DESCRIPTION OF DEVELOPMENT

The Project Tiger (Wegmans) site is located on a 217-acre parcel, formerly known as the Air Park Associates Site. The site is bounded by Route 656 (Sliding Hill Road) on the south and east, by Route 657 (Ashcake Road) to the north, and by the Hanover County Municipal Airport property to the south and west. A vicinity map is shown on Figure 2-1.

The proposed project is anticipated to consist of three (3) phases of development, in 2022, 2027, and 2032 for up to 1,690,650 SF of warehousing and distribution land uses. The phase breakdown is as follows:

- Phase 1 includes 1,085,000 SF of warehousing and distribution;
- Phase 2 includes 205,650 SF of warehousing and distribution; and
- Phase 3 includes 400,000 SF of warehousing.

The proposed site has frontage along Sliding Hill Road and Ashcake Road. Access to the development will be provided via two (2) entrances, both constructed during Phase 1 of the buildout:

1. A full-access entrance will be constructed on Sliding Hill Road, located approximately 1,800 feet north of the Sliding Hill Road/New Ashcake Road intersection; and
2. A full-access entrance will be constructed on Ashcake Road, located approximately 4,000 feet west of the Sliding Hill Road/Ashcake Road/Peaks Road/Mt. Hermon Road intersection.

In addition, Project Tiger (Wegmans) will include two (2) gated, emergency vehicle entrances, one (1) each on Sliding Hill Road and Ashcake Road. A preliminary site layout is shown on Figure 2-2.

The development is assumed to have a 13-year buildout from 2019 (existing in this study) to 2032. Phasing of the project was assumed at five-year intervals. Phases 1, 2, and 3 (full buildout) are assumed to occur in 2022, 2027, and 2032, respectively. In addition, a future analysis looking three (3) years beyond the final buildout date is included. Analyses were performed based on 2019, 2022, 2027, 2032, and 2035 weekday AM, PM, and Saturday peak hour volumes as specified and agreed upon at scoping.

As indicated in Table 1-1, on a typical weekday, the assumed uses listed above are anticipated to generate approximately 3,164 daily trips, 275 AM peak hour trips, 283 PM peak hour trips, and 85 Saturday peak hour trips.

No other access to the site will be available from Sliding Hill Road, Ashcake Road, or other local roads at this time. In addition, all trucks associated with the development will utilize only the entrance along Sliding Hill Road and will not be routed along Ashcake Road.

2.3 Study Area Limits

The study area is shown in Figure 2-1 and includes the following 14 intersections:

1. Route 656 (Sliding Hill Rd) at Route 637 (Atlee Station Rd)/Route 1261 (Leadbetter Rd);
2. Route 656 at Route 2035 (Charter Hill Ct)/Route 2044 (Kings Charter Dr);
3. Route 656 at Route 1265 (Totopotomoy Trail);
4. Route 656 at Route 1383 (Atlee Commerce Blvd)/Route 1649 (Atlee Commons Dr);
5. Route 656 at Route 813 (Airpark Dr);
6. Route 656 at Route 643 (New Ashcake Rd);
7. Route 656 (Sliding Hill Rd/Mt. Hermon Rd) at Route 657 (Ashcake Rd/Peaks Rd);
8. Route 802 (Lewistown Rd) at Interstate 95 Southbound On-/Off-Ramp;
9. Route 802 at Route 657 (Ashcake Rd);
10. Route 802 at Route 809 (Air Park Rd);
11. Route 802 at Interstate 95 Northbound Off-Ramp/Travel Plaza Entrance;
12. Route 802 at Interstate 95 Northbound On-Ramp;
13. Route 656 (Sliding Hill Rd) at Site Entrance "A" (Build conditions only); and
14. Route 657 (Ashcake Rd) at Site Entrance "B" (Build conditions only).

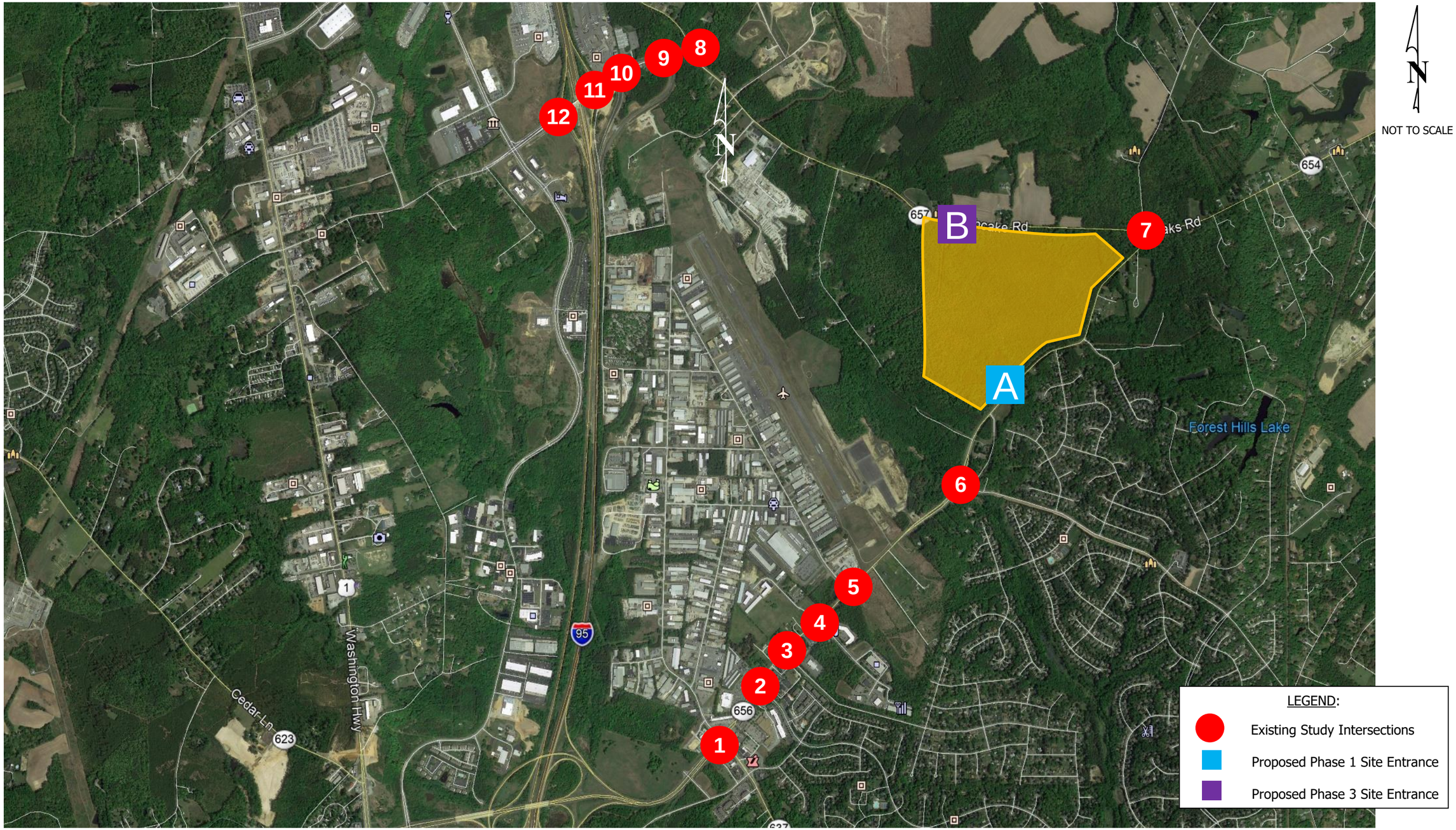
2.4 Existing Roadway Network

Sliding Hill Road (Route 656) is an east-west, urban minor arterial with a posted speed limit of 45 mph that carries approximately 16,000 vehicles per day. Sliding Hill Road is a 4-lane, median divided roadway to the west of Kings Charter Drive and a 2-lane, undivided roadway to the east. Sliding Hill Road, which will serve as the main access road to the site, connects with major routes including US Route 1, Interstate 95, Atlee Station Road, New Ashcake Road, and Ashcake Road. There is an active Hanover County project that includes widening Sliding Hill Road and turn lane and signal improvements along the corridor between Atlee Station Road and New Ashcake Road. The improvements will be complete by the end of 2021.

Lewistown Road (Route 802) is a 2-lane, median divided, rural minor arterial with a posted speed limit of 35 mph that carries approximately 5,800 vehicles per day. Lewistown Road travels east-west and connects US Route 10, Interstate 95, and Ashcake Road.

Ashcake Road (Route 657) is a 2-lane, undivided, rural minor arterial with a posted speed limit of 45 mph that carries approximately 2,700 vehicles per day. Ashcake Road travels east-west through Hanover County and connects US Route 1 with US Route 301 and other points to the west.

The existing intersection geometry is shown on Figure 2-3. The proposed 2022 background geometry is shown on Figure 2-4.



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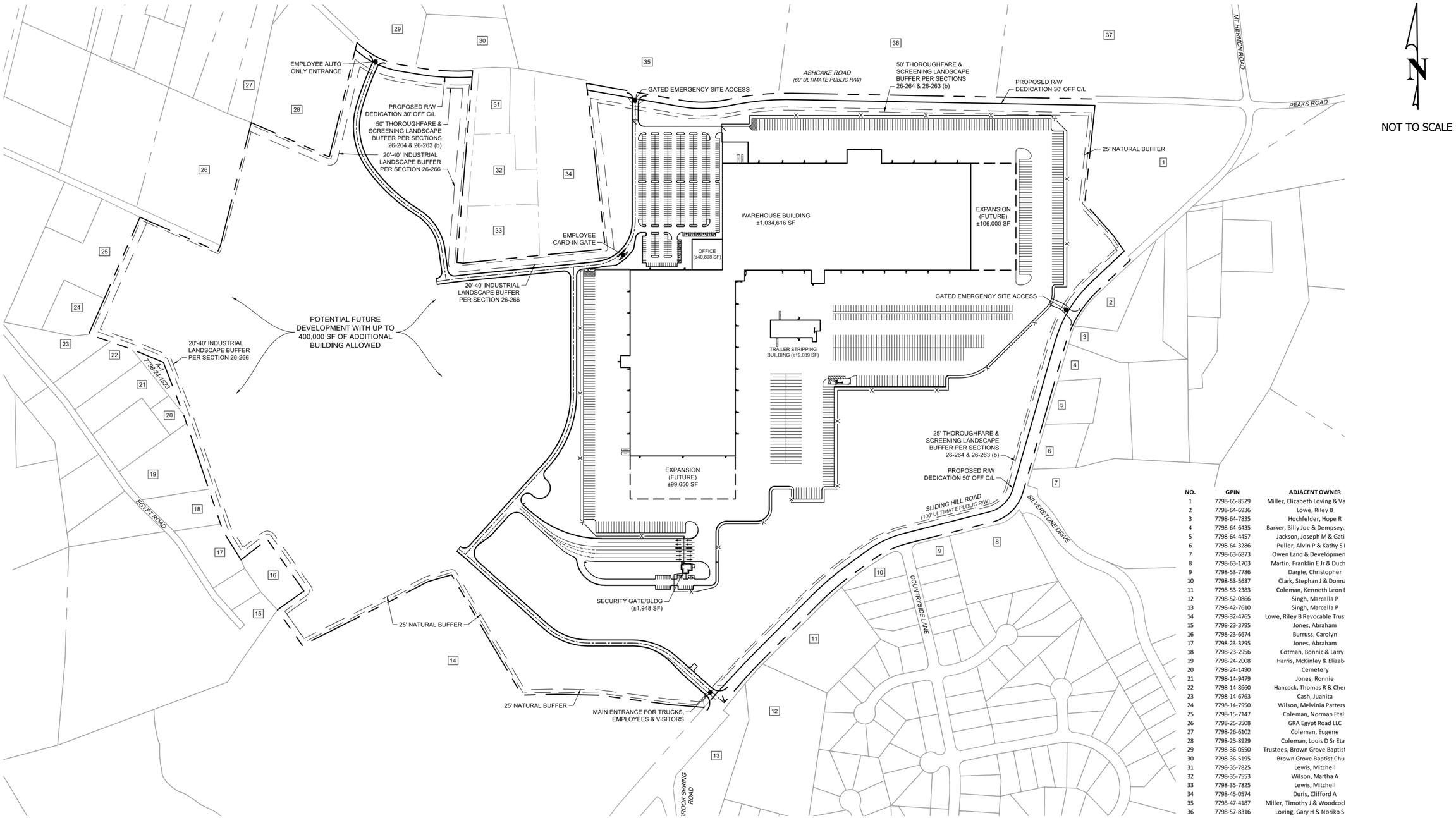
Surrounding Roadway Network and Site Location
Project Tiger (Wegmans)

Figure
2-1

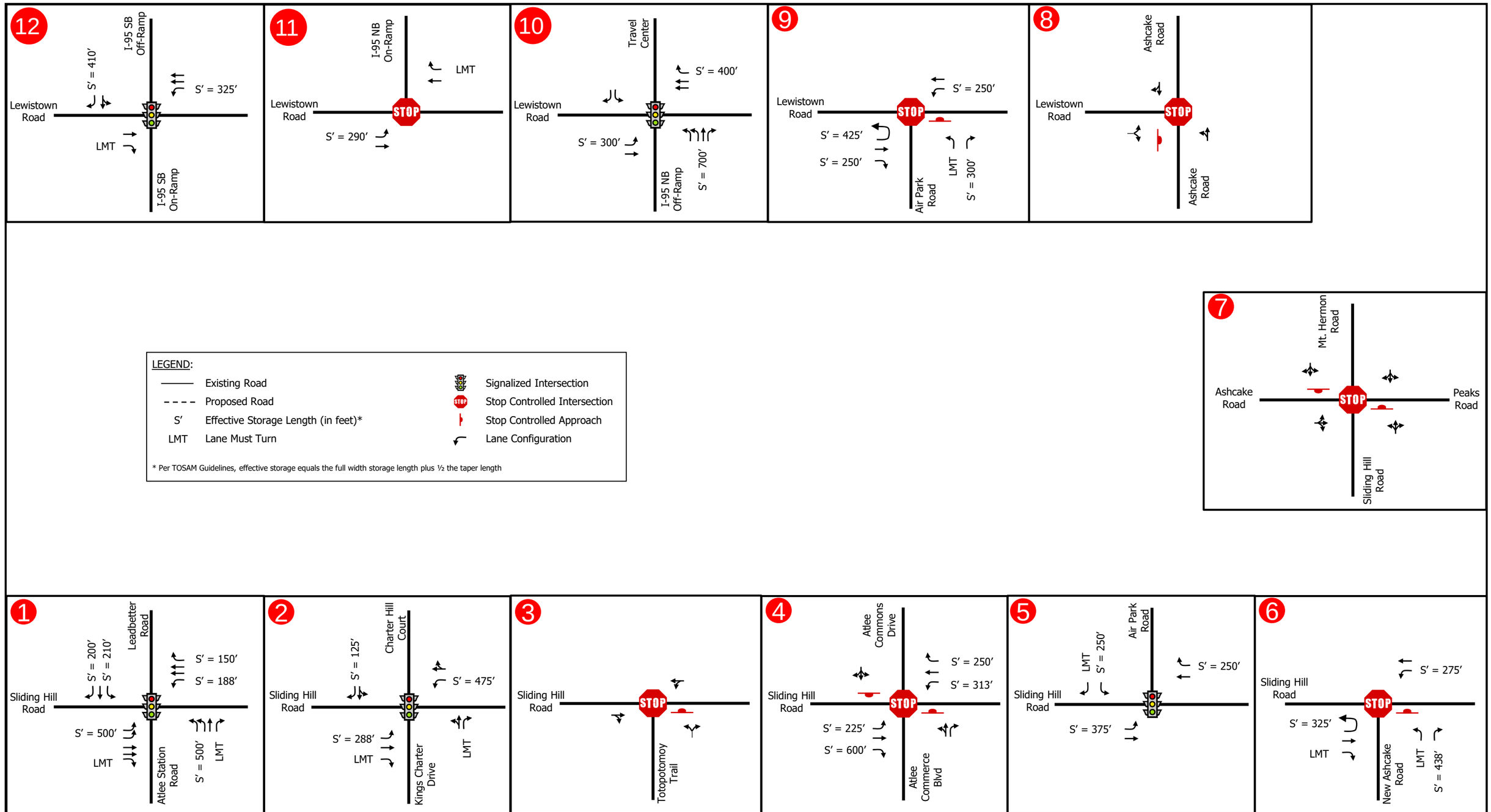


NO.	GPIN	ADJACENT OWNER
1	7798-65-8529	Miller, Elizabeth Loving & Va
2	7798-64-6936	Lowe, Riley B
3	7798-64-7835	Hochfelder, Hope R
4	7798-64-6435	Barker, Billy Joe & Dempsey.
5	7798-64-4457	Jackson, Joseph M & Gati
6	7798-64-3286	Puller, Alvin P & Kathy S I
7	7798-63-6873	Owen Land & Developmen
8	7798-63-1703	Martin, Franklin E Jr & Duch
9	7798-53-7786	Dargie, Christopher
10	7798-53-5637	Clark, Stephan J & Donna
11	7798-53-2383	Coleman, Kenneth Leon I
12	7798-52-0866	Singh, Marcella P
13	7798-42-7610	Singh, Marcella P
14	7798-32-4765	Lowe, Riley B Revocable Trus
15	7798-23-3795	Jones, Abraham
16	7798-23-6674	Burruss, Carolyn
17	7798-23-3795	Jones, Abraham
18	7798-23-2956	Cotman, Bonnic & Larry
19	7798-24-2008	Harris, McKinley & Elizab
20	7798-24-1490	Cemetery
21	7798-14-9479	Jones, Ronnie
22	7798-14-8660	Hancock, Thomas R & Che
23	7798-14-6763	Cash, Juanita
24	7798-14-7950	Wilson, Melvinia Patters
25	7798-15-7147	Coleman, Norman Etal
26	7798-25-3508	GRA Egypt Road LLC
27	7798-26-6102	Coleman, Eugene
28	7798-25-8929	Coleman, Louis D Sr Eta
29	7798-36-0550	Trustees, Brown Grove Baptis
30	7798-36-5195	Brown Grove Baptist Chu
31	7798-35-7825	Lewis, Mitchell
32	7798-35-7553	Wilson, Martha A
33	7798-35-7825	Lewis, Mitchell
34	7798-45-0574	Duris, Clifford A
35	7798-47-4187	Miller, Timothy J & Woodcock
36	7798-57-8316	Loving, Gary H & Noriko S

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Preliminary Site Layout
Project Tiger (Wegmans)

Figure
2-2



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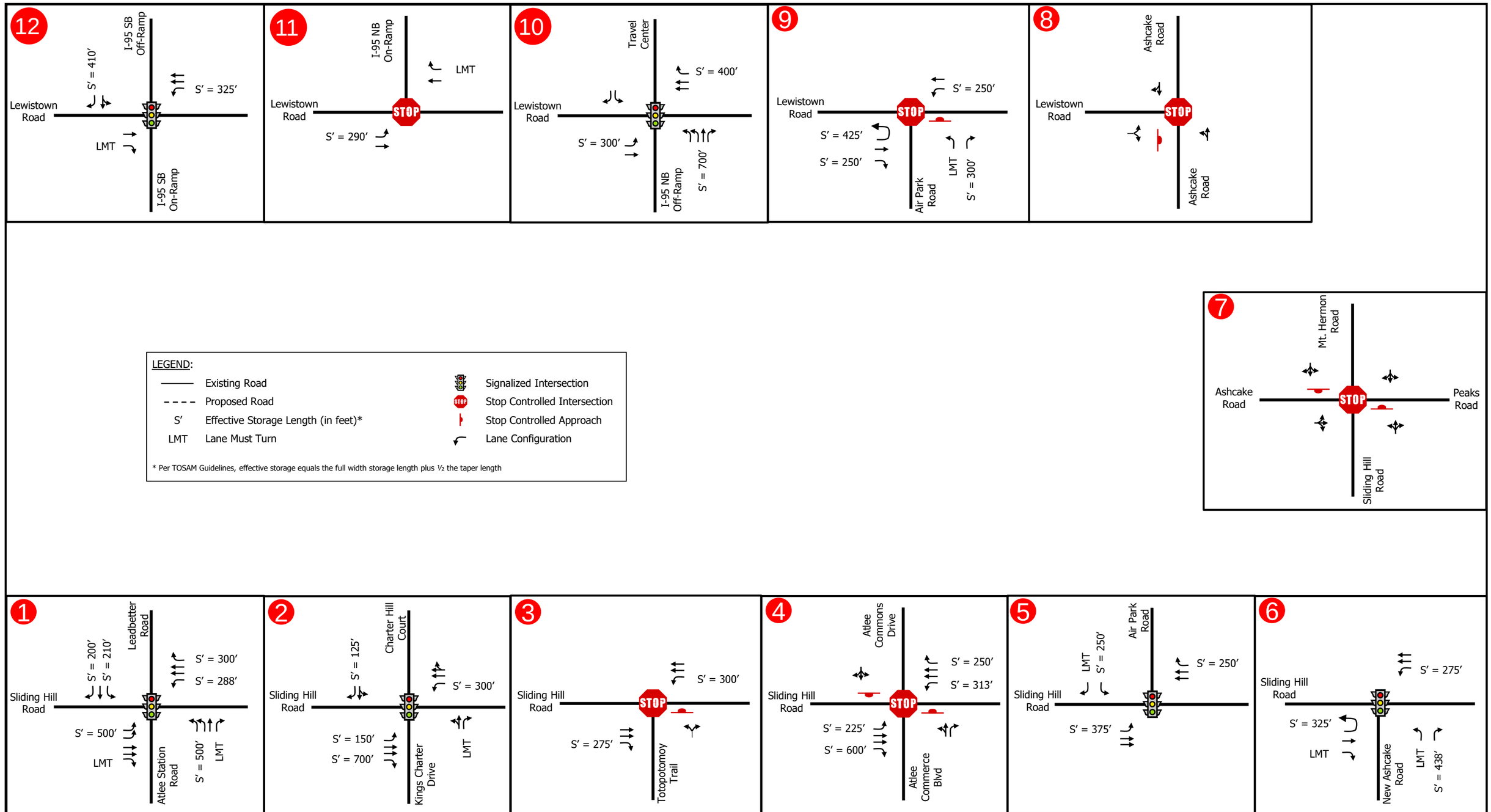
2019 Existing Geometry
Project Tiger (Wegmans)

Figure
2-3



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2022 Background Geometry – With Sliding Hill Road Widening
Project Tiger (Wegmans)

Figure 2-4

3 ANALYSIS OF EXISTING CONDITIONS

Level of service calculations for the intersections within the study area were performed using SYNCHRO Version 10. SYNCHRO calculates delay based on techniques outlined in the 2000 Highway Capacity Manual. The following 12 existing intersections were analyzed:

1. Route 656 (Sliding Hill Rd) at Route 637 (Atlee Station Rd)/Route 1261 (Leadbetter Rd);
2. Route 656 at Route 2035 (Charter Hill Ct)/Route 2044 (Kings Charter Dr);
3. Route 656 at Route 1265 (Totopotomoy Trail);
4. Route 656 at Route 1383 (Atlee Commerce Blvd)/Route 1649 (Atlee Commons Dr);
5. Route 656 at Route 813 (Airpark Dr);
6. Route 656 at Route 643 (New Ashcake Rd);
7. Route 656 (Sliding Hill Rd/Mt. Hermon Rd) at Route 657 (Ashcake Rd/Peaks Rd);
8. Route 802 (Lewistown Rd) at Interstate 95 Southbound On-/Off-Ramp;
9. Route 802 at Route 657 (Ashcake Rd);
10. Route 802 at Route 809 (Air Park Rd);
11. Route 802 at Interstate 95 Northbound Off-Ramp/Travel Plaza Entrance; and
12. Route 802 at Interstate 95 Northbound On-Ramp.

To evaluate the impacts of the traffic generated by the proposed development, analyses were completed for the following:

1. Weekday AM peak hour of the adjacent street (7:30-8:30 AM);
2. Weekday PM peak hour of the adjacent street (4:30-5:30 PM); and
3. Saturday mid-day peak hour of the adjacent street (12:30-1:30).

3.1 EXISTING TRAFFIC VOLUMES

Existing count data was obtained from a peak hour directional turning movement (DTM) count at each of the 12 intersections noted above. The peak hour DTM counts were collected on Tuesday, June 4, 2019 from 7:00 AM to 9:00 AM and from 4:00 PM to 6:30 PM. Saturday peak hour DTM counts were collected on Saturday, June 1, 2019 from 11:00 AM to 2:00 PM. The DTM counts included heavy vehicles by movement and pedestrian counts. The complete count data is provided in Appendix B.

The count data was used to develop the 2019 existing peak hour volumes used in the analyses. The 2019 existing AM (7:30 – 8:30) and PM (4:30 – 5:30 PM) peak hour volumes are summarized on Figures 3-1, 3-2, and 3-3 (all figures are located at the end of the chapter after page 3-8).

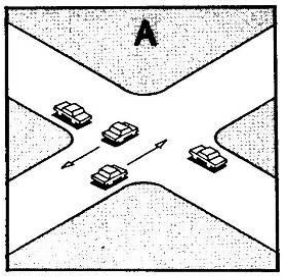
Traffic data from the 12 intersections was used to determine through traffic volumes on Sliding Hill Road and Ashcake Road for the adjacent analysis intersections under Build conditions. Please note that private entrances were assumed to have minimal volumes and were not analyzed.

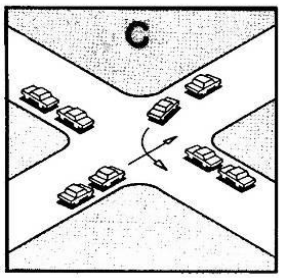
3.2 CAPACITY ANALYSES

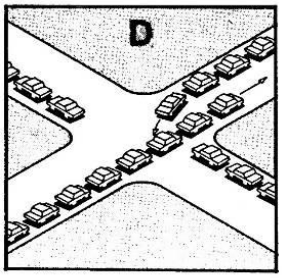
Capacity analysis allows traffic engineers to determine the impacts of traffic on the surrounding roadway network. The Highway Capacity Manual methodologies govern how the capacity analyses are conducted and how the results are interpreted. Levels of service (LOS) are determined for each part of the roadway network. In Chesterfield County, the standard for the overall intersection is LOS D representing acceptable results, while the standard for individual traffic movements is LOS E. Table 3-1 shows in detail how each of these levels of service are interpreted.

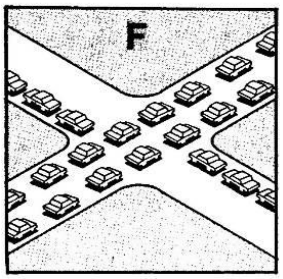
Table 3-1: Level of Service Definitions

Level of Service	Roadway Segments or Controlled Access Highways	Intersections
A	Free flow, low traffic density.	No vehicle waits longer than one signal indication.
B	Delay is not unreasonable, stable traffic flow.	On a rare occasion motorists wait through more than one signal indication.
C	Stable condition, movements somewhat restricted due to higher volumes, but not objectionable for motorists.	Intermittently drivers wait through more than one signal indication, and occasionally backups may develop behind left turning vehicles, traffic flow still stable and acceptable.
D	Movements more restricted, queues and delays may occur during short peaks, but lower demands occur often enough to permit clearing, thus preventing excessive backups.	Delays at intersections may become extensive with some, especially left-turning vehicles waiting two or more signal indications, but enough cycles with lower demand occur to permit periodic clearance, thus preventing excessive backups.
E	Actual capacity of the roadway invloves delay to all motorists due to congestion.	Very long queues may create lengthly delays, especially for left-turning vehicles.
F	Forced flow with demand volumes greater than capacity resulting in complete congestion. Volumes drop to zero in extreme cases.	Backups from locations downstream restrict or prevent movement of vehicles out of approach creating a storage ares during part or all of an hour.









SOURCE: *"A Policy on Design of Design of Urban Highways and Arterial Streets"* - AASHTO, 1973 based upon material published in *"Highway Capacity Manual"*, National Academy of Sciences, 1965.

For both unsignalized and signalized intersections, level of service is defined in terms of delay, a measure of driver discomfort, frustration, fuel consumption and lost travel time. Table 3-2 summarizes the delay associated with each LOS category:

Table 3-2: Unsignalized and Signalized Intersection Level of Service Criteria

Signalized Intersections		Unsignalized Intersections	
Level of Service	Control Delay per Vehicle (sec/veh)	Level of Service	Average Control Delay (sec/veh)
A	≤ 10	A	0 to 10
B	> 10 to ≤ 20	B	> 10 to ≤ 15
C	> 20 to ≤ 35	C	> 15 to ≤ 25
D	> 35 to ≤ 55	D	> 25 to ≤ 35
E	> 55 to ≤ 80	E	> 35 to ≤ 50
F	> 80	F	> 50

Source: Exhibit 16-2 and Exhibit 17-2 from TRB's "Highway Capacity Manual 2000"

Twelve (12) intersections were analyzed using the 2019 existing volumes shown on Figures 3-1, 3-2, and 3-3. These intersections, both signalized and unsignalized, were analyzed using SYNCHRO Version 10 based on 2000 HCM methodologies with the following assumptions:

- 12-foot lane widths;
- No parking activity or bus stops;
- Peak hour factor (PHF) by total intersection was determined from the DTM counts for existing conditions analysis and a minimum PHF of 0.92 was utilized for all background and total analyses;
- Signal timing data provided by VDOT; and
- Heavy vehicle (HV) percentages as determined from the DTM counts and available data.

3.3 2019 EXISTING TRAFFIC VOLUMES ANALYSIS

Table 3-3 summarizes the 2019 existing intersection LOS, delay, and queues based on the 2019 existing traffic volumes shown on Figures 3-1, 3-2, and 3-3 and the existing intersection geometry and traffic controls shown on Figure 2-3. The corresponding SYNCHRO worksheets are included in Appendix C.

Please note that the intersection numbers shown on the level of service and delay summary tables correspond to the intersection numbers used in the SYNCHRO models.

As indicated in Table 3-3, all movements at the signalized intersection of Sliding Hill Road at Atlee Station Road/Leadbetter Road operate at LOS E or better during both the AM and PM peak hours. Only three movements operate with LOS E/F: EB Dual Left (AM only), WB Left (AM & PM), and NB Dual Left (AM only). The signalized intersection operates at an overall LOS D during the AM and PM peak hours and at LOS C during the Saturday peak hour.

The available turn lane storage is sufficient to accommodate the 95th percentile and maximum queue lengths during the AM, PM, and Saturday peak hours on both Sliding Hill Road and Atlee Station Road. However, it should be noted that certain through queues on the mainlines of eastbound Sliding Hill Road (PM only), westbound Sliding Hill Road (All scenarios), and southbound Leadbetter Road (AM & PM) block access to auxiliary turn lanes.

At the signalized intersection of Sliding Hill Road at Kings Charter Drive/Charter Hill Court, the intersection operates at an overall LOS E during both the AM and PM peak hours and LOS C during the Saturday peak hour. Multiple movements at the intersection operate at LOS F during the AM and PM peak hours. During the Saturday peak hour, all movements operate at LOS E or better.

The available turn lane storage is sufficient to accommodate the 95th percentile and maximum queue lengths during the AM, PM and SAT peak hours on Sliding Hill Road and Kings Charter Drive/Charter Hill Court. It should be noted that certain through queues on mainline Sliding Hill Road block access to auxiliary turn lanes and do not allow the turn lanes to be fully utilized. The eastbound and westbound through queues during the AM and PM peak hours present blocking issues. No issues are reported for queuing during the Saturday peak hour. During the AM peak hour, queues on eastbound Sliding Hill Road are greater than 600 feet and queues on westbound Sliding Hill Road are greater than 1,000 feet. During the PM peak hour, queues on eastbound Sliding Hill Road are greater than 900 feet and queues on westbound Sliding Hill Road are greater than 700 feet.

At the unsignalized intersection of Sliding Hill Road and Totopotomoy Trail, the mainline movements, eastbound and westbound on Sliding Hill Road, operate at LOS A during all scenarios. The northbound approach of Totopotomoy Trail operates at LOS F during the AM and PM peak hours and at LOS D during the Saturday peak hour. For the northbound approach, the PM peak hour operates significantly worse and can be attributed to the heavy through volumes at the intersection and limited gaps for exiting traffic. It is difficult for northbound traffic to enter onto mainline Sliding Hill Road.

At the unsignalized intersection of Sliding Hill Road and Atlee Commerce Boulevard/Atlee Commons Drive, the mainline movements operate at LOS B or better during all scenarios. The northbound and southbound approaches from the side streets operate at LOS F during the AM and PM peak hours and at LOS D during the Saturday peak hour. For the side street approaches, the AM and PM peak hours operate significantly worse and can be attributed to the heavy through volumes at the intersection and limited gaps for traffic.

As indicated in Table 3-3, the signalized intersection of Sliding Hill Road at Air Park Road operates at an overall LOS C during the AM, LOS B during the PM, and LOS A during the Saturday peak hours. All movements at the intersection operate at LOS D or better during all three analysis scenarios. The available turn lane storage is sufficient to accommodate the 95th percentile and maximum queue lengths during the AM, PM, and Saturday peak hours on either Sliding Hill Road or Air Park Road.

At the unsignalized intersection of Sliding Hill Road and New Ashcake Road, the mainline movements on Sliding Hill Road operate at LOS A during all three peak hours. The northbound approach of New Ashcake Road operates at LOS F during the AM, at LOS E during the PM, and at LOS C during the Saturday peak hours. During the AM peak hour, there are more than 600 vehicles turning left from the side street onto mainline Sliding Hill Road. This contributes to the excessive queues during the AM peak hour for the northbound approach. It is highly likely that the poor operations and queuing at the intersection are preventing the true number of northbound lefts from entering the corridor. During the PM and Saturday peak hours, the queuing and delay at the intersection are less and allow the intersection to function more appropriately.

The following unsignalized intersections within the study area experience operations of LOS D or better for all movements and approaches and do not show any queuing issues:

- Sliding Hill Road at Ashcake Road/Peaks Road/Mt. Hermon Road;
- Lewistown Road at Ashcake Road;
    - Only exception is the eastbound left turn movement during the PM peak hour (LOS F)
- Lewistown Road at Air Park Road; and
- Lewistown Road at I-95 NB On-Ramp.

As indicated in Table 3-3, all movements at the signalized intersection of Lewistown Road and the I-95 NB Off-Ramp/Travel Center Entrance operate at LOS D or better during the AM, PM, and Saturday peak hours. The signalized intersection operates at an overall LOS C during all analysis scenario peak hours. The intersection operates in an acceptable manner and there are no queuing issues noted.

At the signalized intersection of Lewistown Road and the I-95 SB On/Off-Ramp, the intersection operates at an overall LOS B for all three analysis scenarios. All mainline movements along Lewistown Road operate at LOS B or better during the AM, PM, and Saturday peak hours. The southbound approach from the I-95 off-ramp operates at LOS D during all three peak hours. The mainline approaches do not experience any queuing issues. The longest queue that the SB off-ramp experiences is 192 feet, during the PM peak hour, which will not impact any operations on I-95.

Table 3-3: Intersection Level of Service, Delay, and Queue Summary
2019 Existing Traffic and Existing Geometry

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				PM PEAK HOUR				SATURDAY PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)
1. Sliding Hill Road (E-W) at	EB Dual Left [2]	500	69.4	E	381	#277	43.5	D	343	122	48.3	D	139	75
Atlee Station Road (N) /	EB Thru		28.7	C	350	278	36.5	D	678	406	21.9	C	269	203
Leadbetter Road (S)	EB Right		9.2	A	89	19	14.0	B	398	70	9.6	A	150	32
Signalized	*EB Approach*		*42.1*	*D*	--	--	*32.1*	*C*	--	--	*23.1*	*C*	--	--
	WB Left	188	61.3	E	188	m49	61.8	E	188	m91	46.0	D	147	117
	WB Thru		28.7	C	348	m335	38.5	D	338	m264	29.8	C	197	205
	WB Right	150	28.7	C	150	m0	28.9	C	150	m0	19.0	B	148	m0
	WB Approach		*31.2*	*C*	--	--	*40.7*	*D*	--	--	*31.1*	*C*	--	--
	NB Dual Left [2]	500	81.3	F	392	#337	50.3	D	240	153	47.3	D	196	121
	NB Thru		46.0	D	229	196	45.0	D	126	108	44.7	D	105	85
	NB Right		39.8	D	79	8	42.4	D	106	0	42.9	D	66	0
	NB Approach		*68.7*	*E*	--	--	*47.4*	*D*	--	--	*45.8*	*D*	--	--
	SB Left	210	53.8	D	148	104	43.9	D	183	141	49.1	D	86	77
	SB Thru		50.2	D	370	69	43.3	D	752	135	48.8	D	105	75
	SB Right	200	31.4	C	200	180	36.8	D	200	419	31.3	C	132	33
	SB Approach		*37.8*	*D*	--	--	*38.9*	*D*	--	--	*40.3*	*D*	--	--
	Overall		44.9	D	--	--	37.6	D	--	--	31.7	C	--	--
2. Sliding Hill Road (E-W) at	EB Left	288	57.1	E	287	m65	41.4	D	288	m57	3.5	A	77	15
King's Charter Drive (N)	EB Thru		51.0	D	614	659	55.9	E	946	#889	9.8	A	170	138
Charter Hill Court (S)	EB Right		14.5	B	72	49	15.0	B	614	m5	13.0	B	33	0
Signalized	*EB Approach*		*47.6*	*D*	--	--	*59.5*	*E*	--	--	*9.4*	*A*	--	--
	WB Left	475	8.4	A	265	m14	36.1	D	444	#122	15.1	B	95	62
	WB Thru-Right		90.0	F	660	#1163	49.0	D	625	#797	22.1	C	317	415
	WB Approach		*84.7*	*F*	--	--	*47.2*	*D*	--	--	*21.2*	*C*	--	--
	NB Left-Thru		69.7	E	202	#203	151.0	F	384	#279	53.4	D	121	86
	NB Right		46.1	D	69	0	46.6	D	255	62	48.2	D	68	0
	NB Approach		*63.0*	*E*	--	--	*95.0*	*F*	--	--	*50.8*	*D*	--	--
	SB Left-Thru		56.4	E	93	67	60.0	E	168	#145	56.7	E	134	98
	SB Right	125	51.7	D	59	0	46.2	D	114	0	47.9	D	67	0
	SB Approach		*55.0*	*D*	--	--	*56.9*	*E*	--	--	*54.2*	*D*	--	--
	Overall		68.0	E	--	--	55.7	E	--	--	20.5	C	--	--
3. Sliding Hill Road (E-W) at	EB Thru-Right		†	†	†	†	†	†	†	†	†	†	†	†
Totopotomoy Trail (N)	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
Unsignalized	WB Left-Thru		0.4	A	194	1	2.8	A	592	6	0.4	A	163	1
	WB Approach		*0.4*	*A*	--	--	*2.8*	*A*	--	--	*0.4*	*A*	--	--
	NB Left-Right		726.0	F	295	286	Err **	Err *	626	Err	34.7	D	62	32
	NB Approach		*726.0*	*F*	--	--	*Err **	*Err **	--	--	*34.7*	*D*	--	--
4. Sliding Hill Road (E-W) at	EB Left	225	13.1	B	106	20	10.2	B	67	9	8.9	A	35	3
Atlee Commerce Boulevard (N) /	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Atlee Commons Drive (S)	EB Right	600	*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
Unsignalized	*EB Approach*		*2.1*	*A*	--	--	*0.8*	*A*	--	--	*0.5*	*A*	--	--
	WB Left	313	8.9	A	31	3	10.4	B	41	2	8.7	A	6	0
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Right	250	*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Approach		*0.3*	*A*	--	--	*0.3*	*A*	--	--	*0.0*	*A*	--	--
	NB Left-Thru		945.5	F	78	88	1326.9	F	140	139	39.0	E	30	2
	NB Right		11.8	B	33	2	20.4	C	74	19	12.4	B	25	0
	NB Approach		*598.7*	*F*	--	--	*527.0*	*F*	--	--	*32.4*	*D*	--	--
	SB L-T-R		89.5	F	102	83	360.0	F	390	307	12.9	B	49	7
	SB Approach		*89.5*	*F*	--	--	*360.0*	*F*	--	--	*12.9*	*B*	--	--
5. Sliding Hill Road (E-W) at	EB Left	375	25.8	C	250	m#199	4.0	A	136	m14	2.4	A	44	m5
Cedar Run (N) /	EB Thru-Right		1.6	A	86	60	4.2	A	284	m121	1.7	A	129	28
Air Park Road (S)	*EB Approach*		*12.9*	*B*	--	--	*4.2*	*A*	--	--	*1.8*	*A*	--	--
Signalized	WB Left-Thru		28.5	C	369	714	13.8	B	261	327	7.7	A	155	239
	WB Right	250	11.4	B	232	28	9.1	A	69	14	5.0	A	25	8
	WB Approach		*26.6*	*C*	--	--	*13.6*	*B*	--	--	*7.6*	*A*	--	--
	SB Left	250	52.1	D	77	52	51.0	D	170	134	51.1	D	52	29
	SB Right		50.9	D	114	56	44.8	D	171	78	50.1	D	42	38
	SB Approach		*51.1*	*D*	--	--	*46.5*	*D*	--	--	*50.3*	*D*	--	--
	Overall		24.2	C	--	--	15.2	B	--	--	6.9	A	--	--
6. Sliding Hill Road (E-W) at	EB U-Turn	325	0.0	A	12	0	0.0	A	0	0	0.0	A	12	0
New Ashcake Road (N)	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	EB Right [3]		†	†	--	--	†	†	--	--	†	†	--	--
	EB Approach		*0.0*	*A*	--	--	*0.0*	*A*	--	--	*0.0*	*A*	--	--
	WB Left	275	7.5	A	37	2	8.1	A	47	5	7.6	A	28	2
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*0.9*	*A*	--	--	*2.5*	*A*	--	--	*1.0*	*A*	--	--
	NB Left		152.9	F	668	684	54.2	F	242	236	18.9	C	153	90
	NB Right		9.0	A	66	5	10.3	B	53	5	9.3	A	33	3
	NB Approach		*142.0*	*F*	--	--	*49.9*	*E*	--	--	*18.0*	*C*	--	--

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				PM PEAK HOUR				SATURDAY PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)
7. Ashcake Road (E) /	EB L-T-R		0.4	A	22	0	0.4	A	15	1	0.4	A	7	0
Peaks Road (W) at	*EB Approach*		*0.4*	*A*	--	--	*0.4*	*A*	--	--	*0.4*	*A*	--	--
Sliding Hill Road (N) /	WB L-T-R		4.5	A	43	7	4.9	A	46	5	5.3	A	37	6
Mt Hermon Road (S)	*WB Approach*		*4.5*	*A*	--	--	*4.9*	*A*	--	--	*5.3*	*A*	--	--
Unsignalized	NB L-T-R		18.2	C	92	48	19.7	C	124	94	12.7	B	76	33
	NB Approach		*18.2*	*C*	--	--	*19.7*	*C*	--	--	*12.7*	*B*	--	--
	SB Right		15.2	C	82	23	14.3	B	54	10	12.6	B	54	11
	SB Approach		*15.2*	*C*	--	--	*14.3*	*B*	--	--	*12.6*	*B*	--	--
8. Lewistown Road (E) at	EB Left-Right		26.1	D	168	103	77.4	F	305	338	11.8	B	78	29
Ashcake Road (N-S)	*EB Approach*		*26.1*	*D*	--	--	*77.4*	*F*	--	--	*11.8*	*B*	--	--
Unsignalized	NB Left-Thru		4.8	A	111	10	4.2	A	91	7	2.5	A	29	2
	NB Approach		*4.8*	*A*	--	--	*4.2*	*A*	--	--	*2.5*	*A*	--	--
	SB Thru-Right		†	†	†	†	†	†	†	†	†	†	†	†
	SB Approach		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
9. Lewistown Road (E-W) at	EB U-Turn	425	0.0	A	36	0	0.0	A	25	0	0.0	A	7	0
Air Park Road (N)	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	EB Right	250	†	†	--	--	†	†	--	--	†	†	--	--
	EB Approach		*0.0*	*A*	--	--	*0.0*	*A*	--	--	*0.0*	*A*	--	--
	WB Left	250	8.5	A	69	8	8.5	A	48	5	7.7	A	31	1
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*2.6*	*A*	--	--	*1.5*	*A*	--	--	*1.3*	*A*	--	--
	NB Left		17.3	C	110	31	18.5	C	156	69	10.1	B	59	6
	NB Right	300	17.3	C	72	--	18.5	C	93	--	10.1	B	35	--
	NB Approach		*17.3*	*C*	--	--	*18.5*	*C*	--	--	*10.1*	*B*	--	--
10. Lewistown Road (E-W) at	EB Left		14.4	B	65	19	7.9	A	85	6	19.0	B	107	49
I-95 NB Off-Ramp (N) /	EB Thru		11.8	B	131	77	7.8	A	161	28	13.2	B	82	70
Travel Center Entrance (S)	*EB Approach*		*12.2*	*B*	--	--	*7.8*	*A*	--	--	*15.5*	*B*	--	--
Signalized	WB Thru		19.4	B	109	97	20.1	C	139	132	18.8	B	68	60
	WB Right		17.3	B	36	m0	17.3	B	22	0	18.0	B	34	0
	WB Approach		*19.2*	*B*	--	--	*19.9*	*B*	--	--	*18.7*	*B*	--	--
	NB Dual Left [2]		38.0	D	207	#178	41.3	D	167	96	39.7	D	121	81
	NB Thru		33.4	C	138	69	42.0	D	173	77	41.8	D	153	96
	NB Right		32.0	C	101	52	38.0	D	101	47	37.2	D	64	0
	NB Approach		*35.5*	*D*	--	--	*40.0*	*D*	--	--	*39.4*	*D*	--	--
	SB Left		40.7	D	56	15	45.7	D	68	24	45.6	D	50	25
	SB Right		40.8	D	139	0	45.1	D	116	0	45.4	D	121	0
	SB Approach		*40.8*	*D*	--	--	*45.1*	*D*	--	--	*45.4*	*D*	--	--
	Overall		28.7	C	--	--	28.1	C	--	--	32.3	C	--	--
11. Lewistown Road (E-W) at	EB Left	290	11.1	B	104	8	11.0	B	119	24	8.6	A	65	6
I-95 NB On-Ramp (S)	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	*EB Approach*		*3.1*	*A*	--	--	*4.7*	*A*	--	--	*2.9*	*A*	--	--
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Right		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*
12. Lewistown Road (E-W) at	EB Thru		10.8	B	131	90	14.0	B	200	191	6.7	A	104	80
I-95 SB On/Off-Ramp (N-S)	EB Right		10.6	B	--	37	14.2	B	--	4	6.6	A	--	26
Signalized	*EB Approach*		*10.7*	*B*	--	--	*14.1*	*B*	--	--	*6.7*	*A*	--	--
	WB Left		5.9	A	119	40	7.3	A	146	121	2.0	A	64	8
	WB Thru		3.1	A	64	44	3.9	A	97	75	0.8	A	40	8
	WB Right [3]		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*3.9*	*A*	--	--	*5.4*	*A*	--	--	*1.2*	*A*	--	--
	SB Left-Thru		39.3	D	149	82	47.7	D	192	77	48.0	D	146	68
	SB Right [3]		36.3	D	--	54	39.9	D	--	25	43.7	D	--	46
	SB Approach		*37.2*	*D*	--	--	*43.7*	*D*	--	--	*45.2*	*D*	--	--
	Overall		12.1	B	--	--	13.7	B	--	--	11.3	B	--	--

[1] Overall intersection LOS and delay reported for signalized intersections and roundabouts only.

[2] Dual left turn lanes; average storage is provided.

[3] Channelized right turn not controlled by the signal.

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

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

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

**Delay greater than 9999.99 seconds cannot be calculated by SYNCHRO.

* Volume exceeds ideal saturation flow rate of 1,900 vphpl; LOS is not calculated by SYNCHRO.

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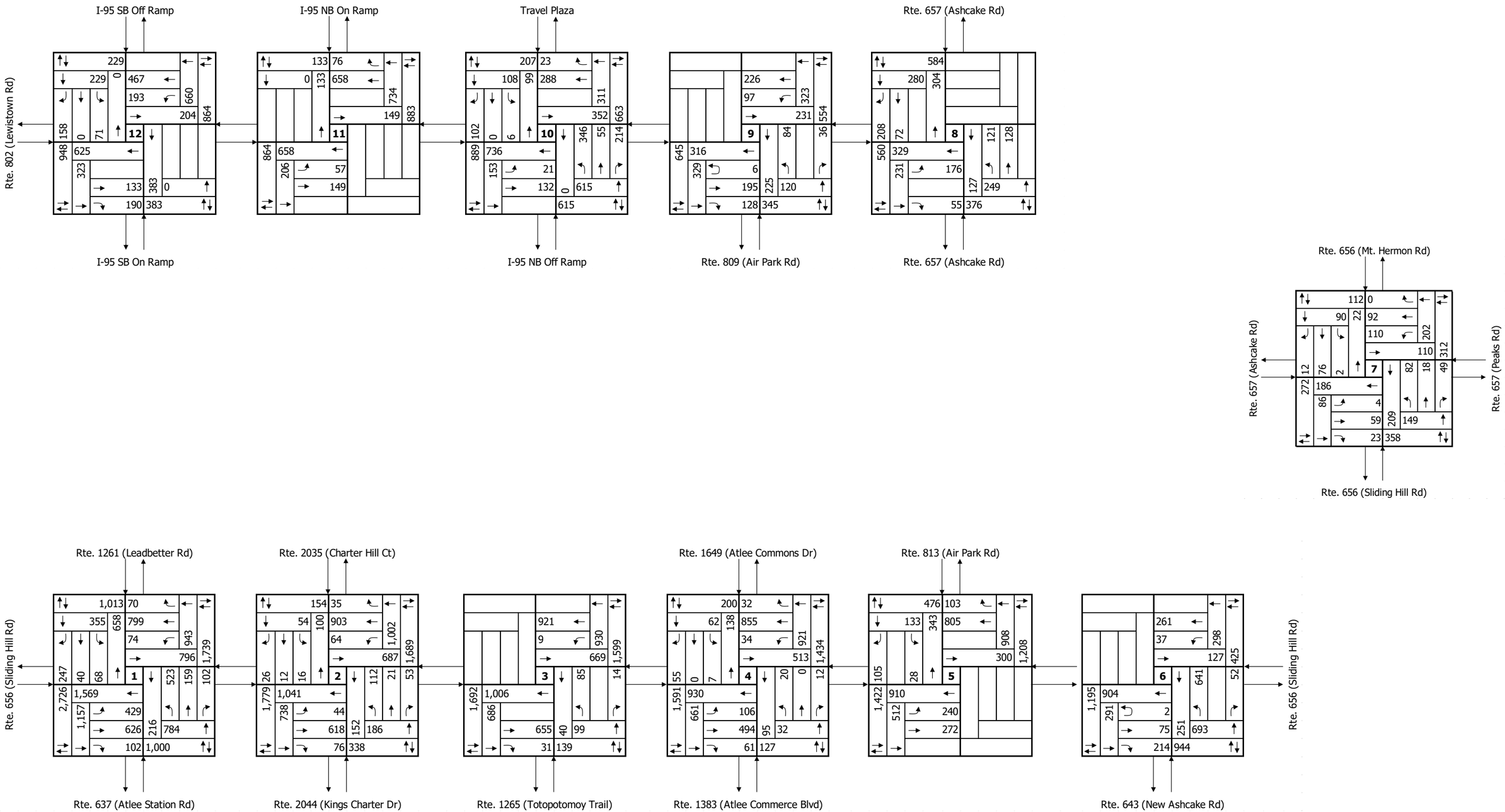
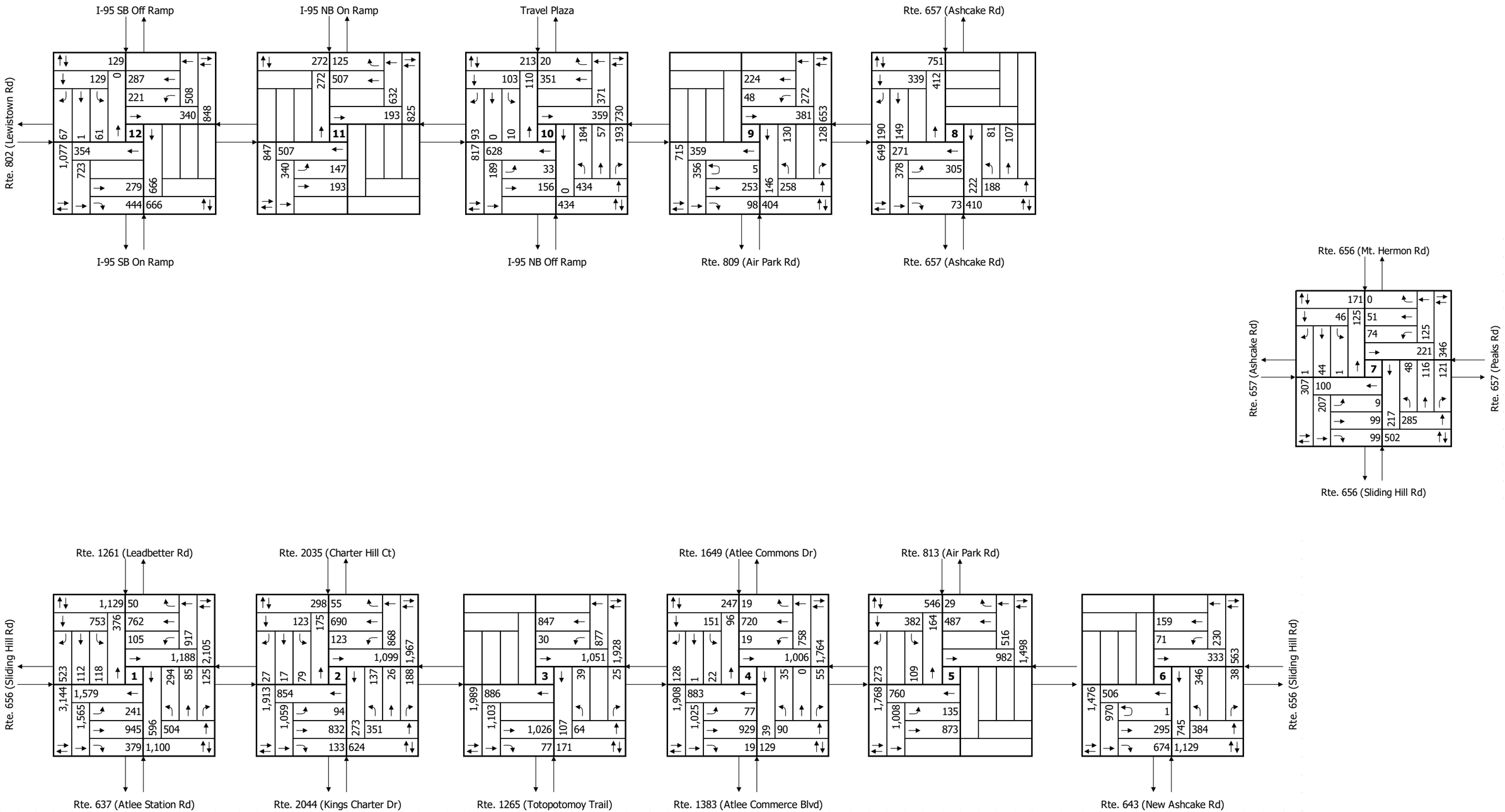


TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Existing 2019 Weekday AM Peak Hour Volumes
Project Tiger (Wegmans)

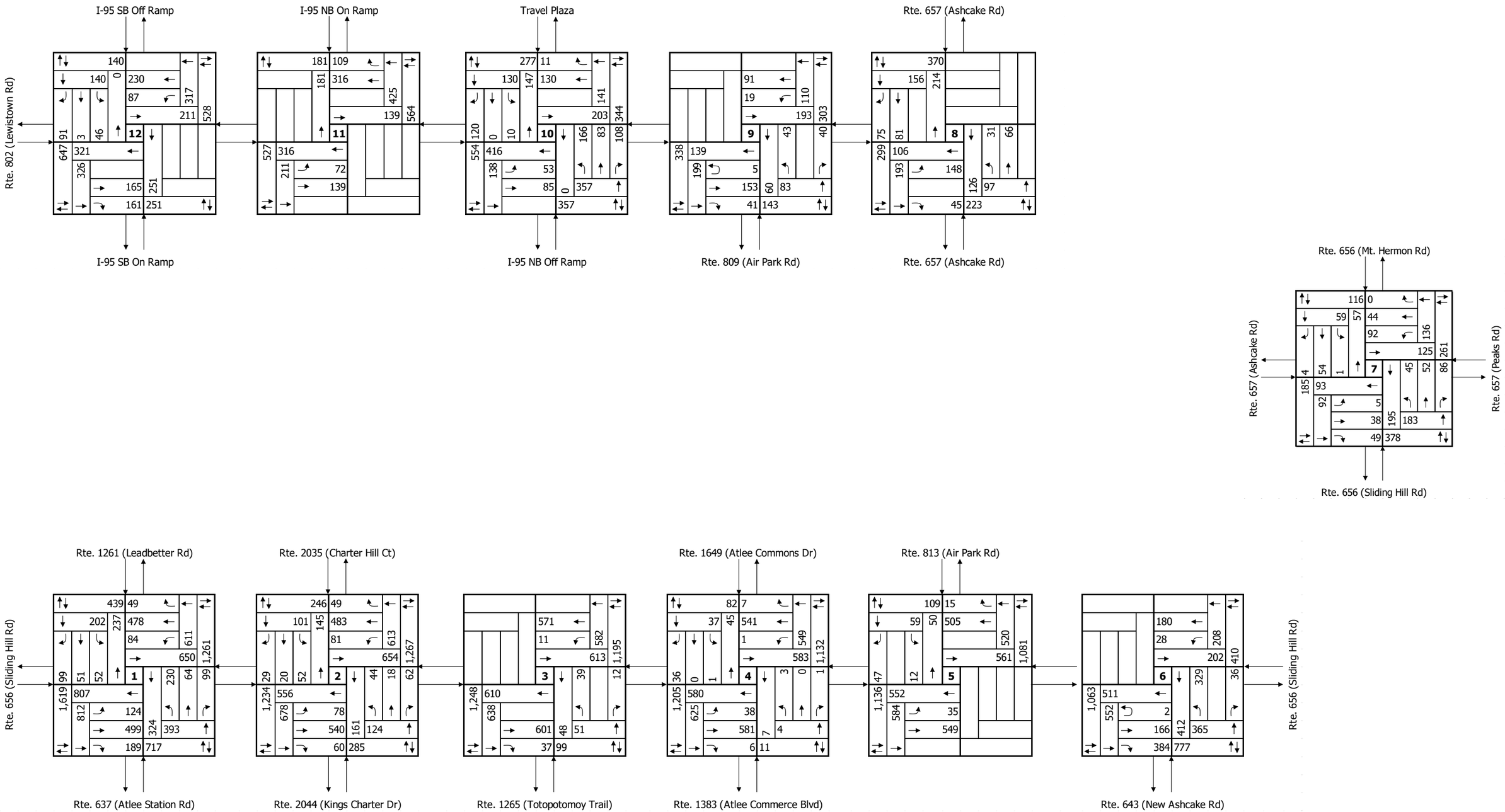
Figure
3-1



TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Existing 2019 Weekday PM Peak Hour Volumes
Project Tiger (Wegmans)

Figure
3-2



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Existing 2019 Saturday Peak Hour Volumes
Project Tiger (Wegmans)

Figure
3-3

4 ANALYSIS OF BACKGROUND CONDITIONS WITHOUT DEVELOPMENT

To complete the analysis of the future background conditions (without development), the existing volumes were projected to 2022, 2027, 2032, and 2035 using an annual growth rate. The projected future background volumes along with the proposed 4-lane intersection geometry based on the *2015 Sliding Hill Corridor Study* completed in were used to complete capacity analyses for the study intersections.

4.1 FUTURE BACKGROUND TRAFFIC VOLUMES

In accordance with the scoping documents, an annual compounded growth rate of 1.5% was applied to the 2019 existing traffic volumes for all roadways within the study area for the anticipated buildout period.

In addition to background growth, Timmons Group added traffic related to the following four (4) approved developments located along Atlee Station Road that were provided by Hanover County: Giles Farm, Honey Meadows, Tyree Chappell, and Charleston Ridge. Given the location of the developments within the study area, the only intersection that sees a meaningful change in traffic is Sliding Hill Road at Atlee Station Road/Leadbetter Road. The remainder of the Sliding Hill Road corridor only sees a slight increase in through traffic volumes from the developments (<20 vehicles). There are no volumes added to the Ashcake Road or Lewistown Road corridors from the approved developments.

These are a similar growth rate and background development volumes used in the *2015 Sliding Hill Road Corridor Study.* In addition, all geometric improvements shown in Figure 2-4 for the Sliding Hill Road widening project under construction and supported by the *2015 Sliding Hill Road Corridor Study* were used in the background analysis for this report.

The 2022, 2027, 2032, and 2035 background AM, PM, and Saturday peak hour traffic volumes used in the analyses are shown on Figures 4-1 through 4-12 (all figures are located at the end of the chapter after page 4-12). The figures show the background growth including the development

4.2 CAPACITY ANALYSES

Capacity analysis allows traffic engineers to determine the impacts of traffic on the surrounding roadway network. Levels of service (LOS) are determined for each part of the roadway network. In Hanover County, the standard for the overall intersection is LOS D representing acceptable results, while the standard for individual traffic movements is LOS E. For detailed information about level of service definitions and criteria for unsignalized and signalized intersections, see Chapter 3.2 Capacity Analyses.

The same 12 intersections used in the existing 2019 analysis above were analyzed using the 2022, 2027, 2032, and 2035 background volumes shown on Figures 4-1 through 4-12. These intersections, both signalized and unsignalized, were analyzed using SYNCHRO Version 10 based on 2000 HCM methodologies using the assumptions listed on page 3-3. For all the future background analyses, the minimum peak hour factor is 0.92. Given that the existing signals along the Sliding Hill Road and Lewistown Road corridors are operating as actuated-coordinated, all signals were optimized to ensure that the increase in background traffic volumes was accounted for in the timings and operations.

4.3 Assumed Background Improvements

Per the approved scope, Hanover County is in the process of widening the Sliding Hill Road corridor from 2-lanes to 4-lanes between the intersections of Atlee Station Road/Leadbetter Road and New Ashcake Road. The widening improvements will be completed by the end of 2021, therefore, all background analysis in 2022 and beyond will incorporate the widening improvements on Sliding Hill Road.

A traffic signal warrant analysis was completed for the intersection of Sliding Hill Road and New Ashcake Road. The results of the signal warrant analysis are summarized in Chapter 8 and Appendix G of this report. Under 2019 existing conditions, and continuing in all background analysis conditions, a traffic signal is warranted and recommended at the intersection of Sliding Hill Road and New Ashcake Road. Given the poor operations of approximately 700 lefts from the minor street onto the major street, it is in the best interests of the operations for Sliding Hill Road to assume the installation of a traffic signal in 2022. In addition, Hanover County assumed the signalization of the New Ashcake Road intersection in the *2015 Sliding Hill Road Corridor Study*. The inclusion of a traffic signal in the background analysis will provide a more accurate baseline of operations for the total analysis.

4.4 2022/2027/2032/2037 Background Traffic Volumes Analysis

Tables 4-1 through 4-4 summarize the 2022, 2027, 2032, and 2035 background intersection LOS, delay, and queues based on the background traffic volumes shown on Figures 4-1 through 4-12, respectively. The corresponding SYNCHRO worksheets are included in Appendix D.

Please note that the intersection numbers shown on the level of service and delay summary tables correspond to the intersection numbers used in the SYNCHRO models.

The goal for this chapter is to provide a comparison of each intersection as the existing traffic volumes are grown across the roadway network. Each intersection will be evaluated to determine where its geometric and operational limitations are and when the issues present themselves over the four (4) background analysis periods.

At the signalized intersection of Sliding Hill Road and Atlee Station Road/Leadbetter Road, all individual movements, approaches, and the overall intersection continue to operate at the same LOS as the existing traffic volumes in the 2022 and 2027 background analysis years. Under the 2032 and 2035 background analysis years, the overall LOS at the intersection degrades to LOS E during the AM and PM peak hours. In addition, multiple movements begin to operate at LOS F, including the EB Dual Left (AM and PM peak), WB Left (PM only), NB Dual Left (AM and PM), SB Left (AM only), and SB Right (PM only).

A review of the analysis queues and the available turn lane storage finds that the turn lanes continue to be sufficient to accommodate the 95th percentile and maximum queue lengths during the AM, PM, and Saturday peak hours under all 4 background analysis years. As in the existing conditions, certain through queues block access to auxiliary turn lanes based on the queuing results in the background analysis years. The movements are eastbound Sliding Hill Road (PM only in 2027, AM & PM in 2032/2035), westbound Sliding Hill Road (AM and PM for all background years), northbound Atlee Station Road (AM only in 2032/2035), and southbound Leadbetter Road (AM & PM for all background years) block access to auxiliary turn lanes. Due to the extensive through movement queues during the peak hours noted, the turn lanes appear to be at capacity when they may not operate as such.

At the signalized intersection of Sliding Hill Road and Kings Charter Drive/Charter Hill Court, the overall operations of the intersection improve in the background conditions due to the additional through lanes installed by the Sliding Hill Road widening project (complete by 2021). In all four (4) background analysis years, the overall intersection operates at LOS B during the AM and Saturday peak hours and at LOS C during the PM peak hour. All movements at the intersection operate at LOS E or better during all the analysis periods.

With the widening improvements on Sliding Hill Road, the available turn lane storage is sufficient to accommodate the 95th percentile and maximum queue lengths during the AM, PM, and Saturday peak hours. It should be noted that certain through queues on mainline Sliding Hill Road block access to auxiliary turn lanes and do not allow the turn lanes to be fully utilized. The eastbound and westbound through queues during the AM and PM peak hours present blocking issues in 2027 and beyond. No issues are reported for queuing during the Saturday peak hour.

As under the existing, the mainline movements on Sliding Hill Road at the unsignalized intersection of Sliding Hill Road and Totopotomoy Trail operate at LOS B or better during all background analysis scenarios. The northbound approach of Totopotomoy Trail continues to operate at LOS F during the AM and PM peak hours but improves to operate at LOS C during the Saturday peak hour. With the additional through lane in each direction on the mainline, the delay and queue for the northbound approach has been significantly reduced. Still, the poor level of service and delay can be attributed to the heavy through volumes at the intersection and limited gaps for exiting traffic.

At the unsignalized intersection of Sliding Hill Road and Atlee Commerce Boulevard/Atlee Commons Drive, the mainline movements continue to operate at LOS B or better during all background analysis scenarios. The northbound and southbound approaches continue to operate at LOS F, continuously worsening in each background year until 2035, when vehicles are likely to have exaggerated delays to access Sliding Hill Road, specifically the PM peak hour. The delays and queues can be attributed to the heavy through volumes at the intersection and limited gaps for exiting traffic.

As indicated in Tables 4-1 through 4-4, the signalized intersection of Sliding Hill Road at Air Park Road continues to operate at an overall LOS C or better during the AM, PM, and Saturday peak hours under all background analysis scenarios. All movements at the intersection operate at LOS D or better during all three analysis scenarios. The available turn lane storage is sufficient to accommodate the 95th percentile and maximum queue lengths during the AM, PM, and Saturday peak hours on either Sliding Hill Road or Air Park Road.

With the installation of a traffic signal at the intersection of Sliding Hill Road at New Ashcake Road under background conditions, the northbound approach from New Ashcake Road improves from LOS F under all scenarios to operate at LOS D or better under all background analysis years. All movements operate at LOS E or better under all background analysis years, with the exception of the eastbound right turn movement on Sliding Hill Road, which operates at LOS F under 2032 and 2035 background conditions. The total volume of vehicles making the eastbound right turn is in excess of 700 vehicles, which contributes to the overall operational deficiencies. The remaining movements do not experience any noticeable queuing or delays issues under the background analysis scenarios.

The unsignalized intersection of Sliding Hill Road at Ashcake Road/Peaks Road/Mt. Hermon Road continues to have all movements and approaches operate at LOS C or better under all 2022 and 2027 background conditions. In 2032 and 2035 background conditions, the northbound approach from Sliding Hill Road operates at LOS D during the PM peak hour only; there is also an approximately 250 feet of queue, although this does not impact any other intersections. The remainder of the movements and approaches operate at LOS C or better in 2032 and 2035 background conditions.

The unsignalized intersection of Lewistown Road at Ashcake Road continues to have the mainline Ashcake Road movements and approaches operate at LOS A during all background analysis years. The eastbound approach from Lewistown Road continues to operate at LOS F during the PM peak hour under all background analysis years. The queues on Lewistown Road extend approximately 300 feet during the AM peak hour, 600 feet during the PM peak hour, and 100 feet during the Saturday peak hour. The queues during the PM peak hour will negatively impact the Air Park Road intersection, which is approximately 450 feet to the west on Lewistown Road.

The following unsignalized intersections within the study area experience operations of LOS C or better for all movements and approaches and do not show any queuing issues:

- Lewistown Road at Air Park Road
- Lewistown Road at I-95 NB On-Ramp

As indicated in Tables 4-1 through 4-4, all movements at the signalized intersection of Lewistown Road and the I-95 NB Off-Ramp/Travel Center Entrance continues to operate at LOS D or better during the AM, PM, and Saturday peak hours in all background analysis years. The signalized intersection continues to operate at an overall LOS C during all background analysis scenario peak hours. The intersection operates in an acceptable manner and there are no queuing issues noted.

At the signalized intersection of Lewistown Road and the I-95 SB On/Off-Ramp, the intersection continues to operate at an overall LOS B for all peak hour scenarios in all background analysis years. All mainline movements along Lewistown Road operate at LOS B or better during the AM, PM, and Saturday peak hours. The southbound approach from the I-95 off-ramp continues to operate at LOS D during all three peak hours. The mainline approaches do not experience any queuing issues. The longest queue that the off-ramp experiences is 200 feet during the PM peak hour, which will not impact any operations on I-95.

Overall, any operational, queuing, and capacity deficiencies observed under existing conditions will continue under all background conditions. The individual movements and approaches that are over capacity will continue to be over capacity after background growth. In general, the Sliding Hill Road widening project will improve operations. The Lewistown Road and Ashcake Road corridors operate well and will continue to do so in the future.

Table 4-1: Intersection Level of Service, Delay, and Queue Summary
2022 Background Traffic Volumes – With Sliding Hill Road Widening Geometry

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				PM PEAK HOUR				SATURDAY PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)
1. Sliding Hill Road (E-W) at	EB Dual Left [2]	500	72.6	E	435	#279	56.6	E	274	#152	39.6	D	133	67
Atlee Station Road (N) /	EB Thru		33.1	C	415	280	45.4	D	458	#481	22.6	C	208	188
Leadbetter Road (S)	EB Right		12.9	B	85	12	20.2	C	266	77	12.5	B	116	16
Signalized	*EB Approach*		*45.8*	*D*	--	--	*40.7*	*D*	--	--	*22.9*	*C*	--	--
	WB Left	288	25.6	C	219	m87	55.2	E	227	m#181	25.1	C	134	89
	WB Thru		28.3	C	347	#326	21.2	C	280	320	8.6	A	164	48
	WB Right	300	28.1	C	260	m2	27.5	C	45	m1	19.0	B	43	0
	WB Approach		*28.1*	*C*	--	--	*25.7*	*C*	--	--	*11.7*	*B*	--	--
	NB Dual Left [2]	500	65.3	E	436	#337	64.6	E	286	#200	38.4	D	194	107
	NB Thru		41.6	D	325	196	47.5	D	161	121	36.1	D	101	76
	NB Right		36.4	D	102	0	44.0	D	99	0	34.6	C	72	0
	NB Approach		*56.6*	*E*	--	--	*56.6*	*E*	--	--	*37.1*	*D*	--	--
	SB Left	210	70.8	E	161	#132	39.3	D	200	137	42.4	D	86	69
	SB Thru		52.3	D	361	73	39.1	D	1011	139	41.9	D	85	68
	SB Right	200	30.3	C	200	125	57.8	E	200	#368	25.1	C	135	0
	SB Approach		*40.6*	*D*	--	--	*52.0*	*D*	--	--	*33.8*	*C*	--	--
	Overall		42.9	D	--	--	41.5	D	--	--	23.4	C	--	--
2. Sliding Hill Road (E-W) at	EB Left	150	3.5	A	74	m4	9.0	A	137	m15	4.2	A	68	17
King's Charter Drive (N)	EB Thru		3.9	A	125	55	9.0	A	217	m72	5.2	A	99	44
Charter Hill Court (S)	EB Right	700	15.2	B	37	m1	1.0	A	71	m0	16.1	B	33	0
Signalized	*EB Approach*		*5.0*	*A*	--	--	*8.0*	*A*	--	--	*6.0*	*A*	--	--
	WB Left	300	6.1	A	94	13	23.2	C	169	68	7.3	A	102	13
	WB Thru-Right		9.4	A	303	99	20.7	C	279	165	11.9	B	171	62
	WB Approach		*9.2*	*A*	--	--	*21.0*	*C*	--	--	*11.3*	*B*	--	--
	NB Left-Thru		52.3	D	199	166	54.3	D	236	195	41.6	D	113	74
	NB Right		42.2	D	53	0	41.5	D	151	10	38.3	D	70	0
	NB Approach		*49.4*	*D*	--	--	*47.4*	*D*	--	--	*39.9*	*D*	--	--
	SB Left-Thru		52.6	D	92	54	54.9	D	189	132	41.5	D	130	82
	SB Right	125	49.6	D	69	0	45.1	D	122	0	37.7	D	76	0
	SB Approach		*51.2*	*D*	--	--	*52.7*	*D*	--	--	*40.4*	*D*	--	--
	Overall		12.5	B	--	--	20.7	C	--	--	13.2	B	--	--
3. Sliding Hill Road (E-W) at	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Totopotomoy Trail (N)	EB Right	275	†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	300	9.1	A	38	1	10.5	B	54	4	8.7	A	31	1
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*0.1*	*A*	--	--	*0.4*	*A*	--	--	*0.2*	*A*	--	--
	NB Left-Right		38.3	E	128	67	42.7	E	93	50	17.8	C	68	15
	NB Approach		*38.3*	*E*	--	--	*42.7*	*E*	--	--	*17.8*	*C*	--	--
4. Sliding Hill Road (E-W) at	EB Left	225	10.3	B	85	13	9.7	A	58	9	8.6	A	28	3
Atlee Commerce Boulevard (N) /	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Atlee Commons Drive (S)	EB Right		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
Unsignalized	*EB Approach*		*1.6*	*A*	--	--	*0.7*	*A*	--	--	*0.5*	*A*	--	--
	WB Left	283	8.9	A	43	3	10.7	B	38	3	8.8	A	6	0
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Right	250	*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Approach		*0.3*	*A*	--	--	*0.3*	*A*	--	--	*0.0*	*A*	--	--
	NB Left-Thru		51.7	F	63	21	337.7	F	86	101	24.6	C	27	1
	NB Right		10.1	B	30	1	13.3	B	74	11	10.3	B	22	0
	NB Approach		*36.0*	*E*	--	--	*139.2*	*F*	--	--	*21.1*	*C*	--	--
	SB L-T-R		16.0	C	86	16	39.2	E	263	100	9.7	A	49	4
	SB Approach		*16.0*	*C*	--	--	*39.2*	*E*	--	--	*9.7*	*A*	--	--
5. Sliding Hill Road (E-W) at	EB Left	383	11.0	B	217	12	4.5	A	148	m45	1.9	A	56	3
Cedar Run (N) /	EB Thru-Right		4.1	A	88	128	5.4	A	203	345	2.8	A	92	40
Air Park Road (S)	*EB Approach*		*7.3*	*A*	--	--	*5.3*	*A*	--	--	*2.8*	*A*	--	--
Signalized	WB Left	150	3.6	A	21	m1	9.5	A	31	m3	4.3	A	24	m3
	WB Thru		14.2	B	226	315	10.2	B	172	112	6.9	A	100	89
	WB Right	250	14.5	B	78	m8	12.9	B	59	m0	8.3	A	28	m0
	WB Approach		*14.2*	*B*	--	--	*10.3*	*B*	--	--	*6.9*	*A*	--	--
	NB L-T-R		55.0	D	50	28	54.8	D	40	28	50.1	D	32	25
	NB Approach		*55.0*	*D*	--	--	*54.8*	*D*	--	--	*50.1*	*D*	--	--
	SB Left		49.4	D	63	51	50.6	D	121	137	40.8	D	51	26
	SB Thru-Right		48.6	D	101	59	44.6	D	165	83	40.4	D	50	38
	SB Approach		*48.8*	*D*	--	--	*46.3*	*D*	--	--	*40.5*	*D*	--	--
	Overall		15.3	B	--	--	15.1	B	--	--	7.2	A	--	--
6. Sliding Hill Road (E-W) at	EB Left	325	12.4	B	11	m2	5.6	A	7	m0	15.9	B	22	m2
New Ashcake Road (N-S)	EB Thru		15.6	B	88	26	12.6	B	234	72	19.2	B	174	71
Signalized	EB Right [3]		25.8	C	--	67	59.0	E	--	233	39.3	D	--	106
	EB Approach		*23.0*	*C*	--	--	*44.8*	*D*	--	--	*33.1*	*C*	--	--
	WB Left	275	33.0	C	80	51	23.3	C	90	55	16.0	B	53	26
	WB Thru-Right		36.6	D	138	145	16.5	B	88	65	17.1	B	84	66
	WB Approach		*36.2*	*D*	--	--	*18.5*	*B*	--	--	*16.9*	*B*	--	--
	NB Left		22.5	C	397	517	38.1	D	347	349	26.6	C	269	244
	NB Thru-Right		10.9	B	64	20	25.3	C	66	29	19.0	B	44	24
	NB Approach		*21.6*	*C*	--	--	*36.7*	*D*	--	--	*25.7*	*C*	--	--
	SB L-T-R		64.0	E	56	29	64.0	E	58	29	120.9	F	46	26
	SB Approach		*64.0*	*E*	--	--	*64.0*	*E*	--	--	*120.9*	*F*	--	--
	Overall		25.7	C	--	--	39.1	D	--	--	28.8	C	--	--

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				PM PEAK HOUR				SATURDAY PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)
7. Ashcake Road (E) /	EB L-T-R		0.4	A	16	0	0.3	A	17	0	0.4	A	6	0
Peaks Road (W) at	*EB Approach*		*0.4*	*A*	--	--	*0.3*	*A*	--	--	*0.4*	*A*	--	--
Sliding Hill Road (N) /	WB L-T-R		4.5	A	47	7	5.3	A	54	6	5.3	A	45	6
Mt Hermon Road (S)	*WB Approach*		*4.5*	*A*	--	--	*5.3*	*A*	--	--	*5.3*	*A*	--	--
Unsignalized	NB L-T-R		16.3	C	117	40	21.5	C	185	101	12.7	B	141	33
	NB Approach		*16.3*	*C*	--	--	*21.5*	*C*	--	--	*12.7*	*B*	--	--
	SB Right		14.4	B	76	20	15.9	C	54	12	12.6	B	54	10
	SB Approach		*14.4*	*B*	--	--	*15.9*	*C*	--	--	*12.6*	*B*	--	--
8. Lewistown Road (E) at	EB Left-Right		24.5	C	171	95	52.3	F	364	259	11.9	B	96	31
Ashcake Road (N-S)	*EB Approach*		*24.5*	*C*	--	--	*52.3*	*F*	--	--	*11.9*	*B*	--	--
Unsignalized	NB Left-Thru		4.7	A	118	10	4.1	A	100	7	2.6	A	45	2
	NB Approach		*4.7*	*A*	--	--	*4.1*	*A*	--	--	*2.6*	*A*	--	--
	SB Thru-Right		†	†	†	†	†	†	†	†	†	†	†	†
	SB Approach		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
9. Lewistown Road (E-W) at	EB U-Turn	425	0.0	A	38	0	0.0	A	17	0	0.0	A	12	0
Air Park Road (N)	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	EB Right	250	†	†	--	--	†	†	--	--	†	†	--	--
	EB Approach		*0.0*	*A*	--	--	*0.0*	*A*	--	--	*0.0*	*A*	--	--
	WB Left	250	8.5	A	73	8	8.3	A	53	4	7.7	A	30	1
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*2.5*	*A*	--	--	*1.5*	*A*	--	--	*1.4*	*A*	--	--
	NB Left		16.8	C	112	29	15.1	C	119	43	10.2	B	61	6
	NB Right	300	16.8	C	59	--	15.1	C	94	--	10.2	B	34	--
	NB Approach		*16.8*	*C*	--	--	*15.1*	*C*	--	--	*10.2*	*B*	--	--
10. Lewistown Road (E-W) at	EB Left		14.3	B	70	19	9.6	A	92	12	10.5	B	104	28
I-95 NB Off-Ramp (N) /	EB Thru		9.8	A	151	80	10.4	B	144	81	8.3	A	77	42
Travel Center Entrance (S)	*EB Approach*		*10.4*	*B*	--	--	*10.2*	*B*	--	--	*9.1*	*A*	--	--
Signalized	WB Thru		21.1	C	124	111	21.6	C	131	144	20.0	B	73	60
	WB Right		18.7	B	37	m0	18.7	B	35	0	18.8	B	29	0
	WB Approach		*20.9*	*C*	--	--	*21.5*	*C*	--	--	*19.9*	*B*	--	--
	NB Dual Left [2]		34.4	C	183	148	34.0	C	153	85	33.9	C	121	73
	NB Thru		30.9	C	152	66	34.3	C	148	69	35.7	D	163	86
	NB Right		30.0	C	105	35	31.9	C	104	42	31.8	C	70	0
	NB Approach		*32.5*	*C*	--	--	*33.1*	*C*	--	--	*33.7*	*C*	--	--
	SB Left		40.7	D	54	15	41.0	D	63	22	39.5	D	52	22
	SB Right		40.9	D	145	0	40.3	D	119	0	39.4	D	114	0
	SB Approach		*40.9*	*D*	--	--	*40.4*	*D*	--	--	*39.4*	*D*	--	--
	Overall		27.4	C	--	--	25.9	C	--	--	27.7	C	--	--
11. Lewistown Road (E-W) at	EB Left	290	11.2	B	94	8	9.9	A	108	17	8.7	A	69	6
I-95 NB On-Ramp (S)	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	*EB Approach*		*3.1*	*A*	--	--	*4.3*	*A*	--	--	*3.0*	*A*	--	--
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Right		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*
12. Lewistown Road (E-W) at	EB Thru		11.0	B	137	93	12.0	B	240	189	7.1	A	88	79
I-95 SB On/Off-Ramp (N-S)	EB Right		10.8	B	--	39	12.1	B	--	55	6.9	A	--	27
Signalized	*EB Approach*		*10.9*	*B*	--	--	*12.0*	*B*	--	--	*7.0*	*A*	--	--
	WB Left		3.7	A	145	13	2.5	A	141	10	2.2	A	75	10
	WB Thru		2.6	A	94	14	1.1	A	98	6	1.4	A	65	11
	WB Right [3]		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*3.0*	*A*	--	--	*1.7*	*A*	--	--	*1.6*	*A*	--	--
	SB Left-Thru		39.2	D	141	83	43.5	D	189	77	41.7	D	157	63
	SB Right [3]		36.2	D	--	55	36.4	D	--	23	38.0	D	--	40
	SB Approach		*37.1*	*D*	--	--	*39.8*	*D*	--	--	*39.3*	*D*	--	--
	Overall		11.5	B	--	--	10.8	B	--	--	10.6	B	--	--

[1] *Overall intersection LOS and delay reported for signalized intersections and roundabouts only.*

[2] *Dual left turn lanes; average storage is provided.*

[3] *Channelized right turn not controlled by the signal.*

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

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

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

Table 4-2: Intersection Level of Service, Delay, and Queue Summary
2027 Background Traffic Volumes – With Sliding Hill Road Widening Geometry

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				PM PEAK HOUR				SATURDAY PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)
1. Sliding Hill Road (E-W) at	EB Dual Left [2]	500	76.1	E	444	#317	79.2	E	378	#182	44.1	D	148	77
Atlee Station Road (N) /	EB Thru		35.2	D	454	322	54.5	D	596	#544	24.7	C	262	224
Leadbetter Road (S)	EB Right		12.7	B	102	13	21.1	C	372	110	13.3	B	122	18
Signalized	*EB Approach*		*48.2*	*D*	--	--	*49.8*	*D*	--	--	*25.0*	*C*	--	--
	WB Left	288	29.4	C	287	m103	77.2	E	234	m#186	28.1	C	163	95
	WB Thru		35.3	D	462	#496	21.5	C	278	331	9.6	A	187	53
	WB Right	300	30.2	C	300	m2	26.9	C	66	m0	20.3	C	44	0
	WB Approach		*34.4*	*C*	--	--	*28.6*	*C*	--	--	*13.0*	*B*	--	--
	NB Dual Left [2]	500	73.0	E	453	#385	80.1	F	288	#222	42.7	D	190	124
	NB Thru		44.8	D	401	222	48.7	D	158	128	39.8	D	116	87
	NB Right		38.9	D	115	0	44.3	D	129	0	38.1	D	79	0
	NB Approach		*62.7*	*E*	--	--	*65.9*	*E*	--	--	*41.1*	*D*	--	--
	SB Left	210	91.3	F	179	#157	38.9	D	200	146	44.5	D	87	78
	SB Thru		57.8	E	416	82	38.7	D	1050	148	44.1	D	95	75
	SB Right	200	33.8	C	200	169	84.3	F	200	#458	27.4	C	142	0
	SB Approach		*47.7*	*D*	--	--	*70.0*	*E*	--	--	*36.0*	*D*	--	--
	Overall		47.8	D	--	--	50.9	D	--	--	25.6	C	--	--
2. Sliding Hill Road (E-W) at	EB Left	150	4.5	A	82	m4	9.9	A	138	m15	2.9	A	83	10
King's Charter Drive (N)	EB Thru		4.5	A	134	63	9.2	A	230	m73	5.5	A	102	229
Charter Hill Court (S)	EB Right	700	15.1	B	42	m1	1.0	A	74	m0	15.6	B	33	0
Signalized	*EB Approach*		*5.6*	*A*	--	--	*8.2*	*A*	--	--	*6.1*	*A*	--	--
	WB Left	300	6.1	A	179	15	30.0	C	188	93	7.0	A	104	21
	WB Thru-Right		8.8	A	344	92	20.5	C	293	163	10.4	B	195	156
	WB Approach		*8.6*	*A*	--	--	*21.8*	*C*	--	--	*9.9*	*A*	--	--
	NB Left-Thru		58.5	E	218	190	58.1	E	226	#222	46.5	D	112	85
	NB Right		45.7	D	60	0	41.5	D	176	21	42.5	D	68	0
	NB Approach		*54.8*	*D*	--	--	*49.2*	*D*	--	--	*44.5*	*D*	--	--
	SB Left-Thru		58.1	E	84	62	56.5	E	196	#141	47.4	D	143	96
	SB Right	125	54.3	D	66	0	45.0	D	115	0	42.0	D	81	0
	SB Approach		*56.3*	*E*	--	--	*54.0*	*D*	--	--	*45.9*	*D*	--	--
	Overall		13.1	B	--	--	21.4	C	--	--	13.5	B	--	--
3. Sliding Hill Road (E-W) at	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Totopotomoy Trail (N)	EB Right	275	†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	300	9.3	A	47	1	11.0	B	58	5	8.9	A	37	1
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*0.1*	*A*	--	--	*0.4*	*A*	--	--	*0.2*	*A*	--	--
	NB Left-Right		54.6	F	125	95	62.5	F	163	72	19.9	C	71	19
	NB Approach		*54.6*	*F*	--	--	*62.5*	*F*	--	--	*19.9*	*C*	--	--
4. Sliding Hill Road (E-W) at	EB Left	225	10.7	B	93	15	10.0	A	62	10	8.7	A	35	4
Atlee Commerce Boulevard (N) /	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Atlee Commons Drive (S)	EB Right		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
Unsignalized	*EB Approach*		*1.7*	*A*	--	--	*0.8*	*A*	--	--	*0.5*	*A*	--	--
	WB Left	283	9.1	A	39	4	11.2	B	26	3	9.0	A	3	0
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Right	250	*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Approach		*0.3*	*A*	--	--	*0.3*	*A*	--	--	*0.0*	*A*	--	--
	NB Left-Thru		67.5	F	63	29	573.1	F	102	124	27.7	D	28	1
	NB Right		10.3	B	36	2	14.0	B	71	12	10.5	B	21	0
	NB Approach		*46.1*	*E*	--	--	*229.4*	*F*	--	--	*23.4*	*C*	--	--
	SB L-T-R		19.2	C	108	22	68.1	F	361	155	9.9	A	52	5
	SB Approach		*19.2*	*C*	--	--	*68.1*	*F*	--	--	*9.9*	*A*	--	--
5. Sliding Hill Road (E-W) at	EB Left	383	12.4	B	258	108	4.8	A	161	m50	1.6	A	61	3
Cedar Run (N) /	EB Thru-Right		4.8	A	96	166	6.1	A	236	433	2.5	A	103	45
Air Park Road (S)	*EB Approach*		*8.3*	*A*	--	--	*5.9*	*A*	--	--	*2.5*	*A*	--	--
Signalized	WB Left	150	2.8	A	30	m1	12.4	B	39	m3	4.8	A	24	m3
	WB Thru		16.1	B	257	393	11.6	B	178	189	6.8	A	110	100
	WB Right	250	15.3	B	144	m12	13.4	B	56	m0	8.1	A	29	m0
	WB Approach		*16.0*	*B*	--	--	*11.7*	*B*	--	--	*6.9*	*A*	--	--
	NB L-T-R		60.2	E	42	30	55.0	D	48	28	49.3	D	42	27
	NB Approach		*60.2*	*E*	--	--	*55.0*	*D*	--	--	*49.3*	*D*	--	--
	SB Left		54.5	D	65	58	50.9	D	147	145	45.9	D	41	29
	SB Thru-Right		53.4	D	121	64	44.2	D	198	86	45.4	D	48	41
	SB Approach		*53.7*	*D*	--	--	*46.1*	*D*	--	--	*45.5*	*D*	--	--
	Overall		17.1	B	--	--	15.8	B	--	--	7.2	A	--	--
6. Sliding Hill Road (E-W) at	EB Left	325	13.9	B	24	m2	7.4	A	2	m0	4.2	A	7	m1
New Ashcake Road (N-S)	EB Thru		18.1	B	86	49	15.0	B	234	74	6.5	A	195	19
Signalized	EB Right [3]		43.5	D	--	235	76.4	E	--	245	9.6	A	--	46
	EB Approach		*36.6*	*D*	--	--	*57.6*	*E*	--	--	*8.7*	*A*	--	--
	WB Left	275	32.1	C	83	59	18.1	B	85	59	17.0	B	54	29
	WB Thru-Right		35.2	D	144	170	17.1	B	74	70	18.3	B	84	73
	WB Approach		*34.8*	*C*	--	--	*17.4*	*B*	--	--	*18.1*	*B*	--	--
	NB Left		29.9	C	552	592	38.6	D	370	376	29.7	C	291	290
	NB Thru-Right		13.5	B	59	21	24.7	C	60	29	20.8	C	52	26
	NB Approach		*28.5*	*C*	--	--	*37.1*	*D*	--	--	*28.8*	*C*	--	--
	SB L-T-R		70.1	E	50	31	64.0	E	54	29	56.4	E	53	28
	SB Approach		*70.1*	*E*	--	--	*64.0*	*E*	--	--	*56.4*	*E*	--	--
	Overall		32.2	C	--	--	46.8	D	--	--	17.4	B	--	--

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				PM PEAK HOUR				SATURDAY PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)
7. Ashcake Road (E) /	EB L-T-R		0.4	A	28	0	0.4	A	21	1	0.5	A	13	0
Peaks Road (W) at	*EB Approach*		*0.4*	*A*	--	--	*0.4*	*A*	--	--	*0.5*	*A*	--	--
Sliding Hill Road (N) /	WB L-T-R		4.5	A	49	7	5.1	A	57	6	5.3	A	39	6
Mt Hermon Road (S)	*WB Approach*		*4.5*	*A*	--	--	*5.1*	*A*	--	--	*5.3*	*A*	--	--
Unsignalized	NB L-T-R		18.3	C	117	49	21.6	C	213	108	13.5	B	144	39
	NB Approach		*18.3*	*C*	--	--	*21.6*	*C*	--	--	*13.5*	*B*	--	--
	SB Right		15.3	C	76	23	14.8	B	56	11	13.2	B	54	12
	SB Approach		*15.3*	*C*	--	--	*14.8*	*B*	--	--	*13.2*	*B*	--	--
8. Lewistown Road (E) at	EB Left-Right		30.7	D	246	124	87.2	F	372	365	12.5	B	92	36
Ashcake Road (N-S)	*EB Approach*		*30.7*	*D*	--	--	*87.2*	*F*	--	--	*12.5*	*B*	--	--
Unsignalized	NB Left-Thru		4.8	A	162	11	4.2	A	116	7	2.6	A	50	2
	NB Approach		*4.8*	*A*	--	--	*4.2*	*A*	--	--	*2.6*	*A*	--	--
	SB Thru-Right		†	†	†	†	†	†	†	†	†	†	†	†
	SB Approach		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
9. Lewistown Road (E-W) at	EB U-Turn	425	0.0	A	30	0	0.0	A	32	0	0.0	A	18	0
Air Park Road (N)	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	EB Right	250	†	†	--	--	†	†	--	--	†	†	--	--
	EB Approach		*0.0*	*A*	--	--	*0.0*	*A*	--	--	*0.0*	*A*	--	--
	WB Left	250	8.6	A	80	9	8.4	A	50	4	7.7	A	33	1
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*2.6*	*A*	--	--	*1.5*	*A*	--	--	*1.3*	*A*	--	--
	NB Left		18.4	C	114	36	16.5	C	129	54	10.3	B	63	7
	NB Right	300	18.4	C	62	--	16.5	C	140	--	10.3	B	32	--
	NB Approach		*18.4*	*C*	--	--	*16.5*	*C*	--	--	*10.3*	*B*	--	--
10. Lewistown Road (E-W) at	EB Left		13.7	B	81	21	10.1	B	114	11	10.9	B	111	30
I-95 NB Off-Ramp (N) /	EB Thru		10.1	B	175	85	9.6	A	161	37	8.6	A	77	46
Travel Center Entrance (S)	*EB Approach*		*10.6*	*B*	--	--	*9.7*	*A*	--	--	*9.5*	*A*	--	--
Signalized	WB Thru		22.8	C	139	120	21.8	C	143	155	20.7	C	69	64
	WB Right		19.9	B	37	m0	18.5	B	26	0	19.3	B	36	0
	WB Approach		*22.6*	*C*	--	--	*21.6*	*C*	--	--	*20.6*	*C*	--	--
	NB Dual Left [2]		34.4	C	205	160	34.7	C	153	91	33.4	C	126	76
	NB Thru		30.5	C	136	69	35.1	D	160	73	35.2	D	162	90
	NB Right		29.6	C	114	45	32.2	C	94	52	31.3	C	65	0
	NB Approach		*32.4*	*C*	--	--	*33.6*	*C*	--	--	*33.2*	*C*	--	--
	SB Left		39.6	D	64	18	41.2	D	52	23	39.5	D	46	23
	SB Right		39.7	D	154	0	40.4	D	121	0	39.4	D	118	0
	SB Approach		*39.7*	*D*	--	--	*40.5*	*D*	--	--	*39.4*	*D*	--	--
	Overall		27.6	C	--	--	26.1	C	--	--	27.7	C	--	--
11. Lewistown Road (E-W) at	EB Left	290	11.7	B	113	10	10.3	B	117	20	8.8	A	65	7
I-95 NB On-Ramp (S)	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	*EB Approach*		*3.2*	*A*	--	--	*4.5*	*A*	--	--	*3.0*	*A*	--	--
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Right		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*
12. Lewistown Road (E-W) at	EB Thru		11.6	B	140	103	12.5	B	247	205	7.3	A	99	86
I-95 SB On/Off-Ramp (N-S)	EB Right		11.3	B	--	42	12.6	B	--	57	7.0	A	--	28
Signalized	*EB Approach*		*11.4*	*B*	--	--	*12.6*	*B*	--	--	*7.1*	*A*	--	--
	WB Left		3.6	A	151	38	3.2	A	147	11	2.4	A	78	10
	WB Thru		2.6	A	107	36	1.4	A	72	6	1.5	A	68	11
	WB Right [3]		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*2.9*	*A*	--	--	*2.2*	*A*	--	--	*1.7*	*A*	--	--
	SB Left-Thru		39.2	D	160	88	45.0	D	185	82	41.7	D	150	66
	SB Right [3]		36.0	D	--	57	36.3	D	--	27	37.9	D	--	46
	SB Approach		*37.0*	*D*	--	--	*40.5*	*D*	--	--	*39.2*	*D*	--	--
	Overall		11.6	B	--	--	11.4	B	--	--	10.7	B	--	--

[1] Overall intersection LOS and delay reported for signalized intersections and roundabouts only.

[2] Dual left turn lanes; average storage is provided.

[3] Channelized right turn not controlled by the signal.

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

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

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

Table 4-3: Intersection Level of Service, Delay, and Queue Summary
2032 Background Traffic Volumes – With Sliding Hill Road Widening Geometry

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				PM PEAK HOUR				SATURDAY PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)
1. Sliding Hill Road (E-W) at	EB Dual Left [2]	500	89.1	F	476	#349	83.6	F	421	#207	40.2	D	152	75
Atlee Station Road (N) /	EB Thru		41.5	D	578	356	66.5	E	797	#644	26.3	C	239	224
Leadbetter Road (S)	EB Right		14.4	B	95	13	23.0	C	568	146	13.8	B	122	18
Signalized	*EB Approach*		*56.6*	*E*	--	--	*58.1*	*E*	--	--	*25.5*	*C*	--	--
	WB Left	288	27.3	C	288	m104	100.0	F	275	m#223	27.5	C	136	66
	WB Thru		54.8	D	636	#576	27.5	C	367	#465	12.2	B	187	82
	WB Right	300	30.9	C	300	m3	29.0	C	165	m1	20.6	C	47	0
	WB Approach		*50.9*	*D*	--	--	*36.4*	*D*	--	--	*15.0*	*B*	--	--
	NB Dual Left [2]	500	85.8	F	489	#423	105.2	F	384	#263	39.0	D	212	122
	NB Thru		45.3	D	599	237	54.4	D	316	144	35.8	D	116	85
	NB Right		38.6	D	180	0	48.4	D	180	4	34.1	C	88	0
	NB Approach		*71.3*	*E*	--	--	*82.6*	*F*	--	--	*37.2*	*D*	--	--
	SB Left	210	104.6	F	182	#170	41.2	D	197	164	40.3	D	99	77
	SB Thru		58.5	E	448	#87	40.9	D	1046	165	40.0	D	108	75
	SB Right	200	34.4	C	200	194	102.6	F	200	#560	24.0	C	148	0
	SB Approach		*50.6*	*D*	--	--	*83.4*	*F*	--	--	*32.2*	*C*	--	--
	Overall		57.9	E	--	--	61.3	E	--	--	25.3	C	--	--
2. Sliding Hill Road (E-W) at	EB Left	150	7.7	A	100	m4	11.9	B	149	m17	3.3	A	127	13
King's Charter Drive (N)	EB Thru		4.6	A	166	m67	9.8	A	251	m82	6.3	A	237	59
Charter Hill Court (S)	EB Right	700	15.5	B	48	m0	1.0	A	74	m0	15.7	B	59	m0
Signalized	*EB Approach*		*5.9*	*A*	--	--	*8.9*	*A*	--	--	*6.8*	*A*	--	--
	WB Left	300	5.9	A	196	m15	32.2	C	288	#127	13.3	B	113	34
	WB Thru-Right		9.9	A	376	123	21.0	C	366	227	12.3	B	201	159
	WB Approach		*9.6*	*A*	--	--	*22.6*	*C*	--	--	*12.4*	*B*	--	--
	NB Left-Thru		58.5	E	218	201	64.2	E	295	#260	42.0	D	125	83
	NB Right		45.1	D	63	0	44.8	D	181	51	38.0	D	73	0
	NB Approach		*54.6*	*D*	--	--	*53.8*	*D*	--	--	*40.0*	*D*	--	--
	SB Left-Thru		59.3	E	89	65	64.5	E	236	#173	42.9	D	160	93
	SB Right	125	54.6	D	73	0	48.9	D	122	0	37.5	D	90	0
	SB Approach		*57.0*	*E*	--	--	*61.2*	*E*	--	--	*41.4*	*D*	--	--
	Overall		13.7	B	--	--	23.0	C	--	--	14.1	B	--	--
3. Sliding Hill Road (E-W) at	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Totopotomoy Trail (N)	EB Right	275	†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	300	9.5	A	38	1	11.7	B	58	5	9.0	A	32	1
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*0.1*	*A*	--	--	*0.4*	*A*	--	--	*0.2*	*A*	--	--
	NB Left-Right		86.5	F	185	135	108.3	F	189	106	22.0	C	70	23
	NB Approach		*86.5*	*F*	--	--	*108.3*	*F*	--	--	*22.0*	*C*	--	--
4. Sliding Hill Road (E-W) at	EB Left	225	11.2	B	107	18	10.4	B	54	11	8.9	A	31	4
Atlee Commerce Boulevard (N) /	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Atlee Commons Drive (S)	EB Right		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
Unsignalized	*EB Approach*		*1.8*	*A*	--	--	*0.8*	*A*	--	--	*0.5*	*A*	--	--
	WB Left	283	9.3	A	39	4	11.7	B	37	3	9.2	A	5	0
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Right	250	*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Approach		*0.3*	*A*	--	--	*0.3*	*A*	--	--	*0.0*	*A*	--	--
	NB Left-Thru		95.3	F	69	39	1011.3	F	125	153	31.2	D	28	2
	NB Right		10.5	B	35	2	14.8	B	82	15	10.8	B	24	0
	NB Approach		*63.0*	*F*	--	--	*400.0*	*F*	--	--	*27.1*	*D*	--	--
	SB L-T-R		22.8	C	138	29	153.6	F	440	248	9.9	A	56	5
	SB Approach		*22.8*	*C*	--	--	*153.6*	*F*	--	--	*9.9*	*A*	--	--
5. Sliding Hill Road (E-W) at	EB Left	383	17.1	B	288	206	6.9	A	188	m117	3.1	A	54	8
Cedar Run (N) /	EB Thru-Right		5.9	A	98	175	8.8	A	209	510	2.7	A	108	46
Air Park Road (S)	*EB Approach*		*11.0*	*B*	--	--	*8.6*	*A*	--	--	*2.7*	*A*	--	--
Signalized	WB Left	150	3.1	A	32	m1	7.9	A	26	m2	4.2	A	22	m2
	WB Thru		18.1	B	295	427	8.5	A	210	169	6.9	A	141	103
	WB Right	250	15.9	B	186	m13	13.8	B	73	m0	8.4	A	50	m0
	WB Approach		*17.8*	*B*	--	--	*8.8*	*A*	--	--	*7.0*	*A*	--	--
	NB L-T-R		60.2	E	56	30	60.2	E	50	30	50.1	D	36	25
	NB Approach		*60.2*	*E*	--	--	*60.2*	*E*	--	--	*50.1*	*D*	--	--
	SB Left		54.4	D	74	61	56.3	E	173	166	40.8	D	58	28
	SB Thru-Right		53.3	D	126	66	48.0	D	190	93	40.4	D	56	40
	SB Approach		*53.5*	*D*	--	--	*50.3*	*D*	--	--	*40.4*	*D*	--	--
	Overall		18.9	B	--	--	17.2	B	--	--	7.1	A	--	--
6. Sliding Hill Road (E-W) at	EB Left	325	12.9	B	15	m2	12.1	B	2	m0	9.9	A	19	m1
New Ashcake Road (N-S)	EB Thru		17.1	B	102	30	12.7	B	246	157	10.0	A	157	58
Signalized	EB Right [3]		42.6	D	--	260	94.5	F	--	326	12.6	B	--	63
	EB Approach		*35.7*	*D*	--	--	*69.4*	*E*	--	--	*11.8*	*B*	--	--
	WB Left	275	35.1	D	90	63	15.2	B	108	67	12.2	B	50	29
	WB Thru-Right		38.4	D	162	184	14.9	B	81	80	13.3	B	82	76
	WB Approach		*38.0*	*D*	--	--	*15.0*	*B*	--	--	*13.2*	*B*	--	--
	NB Left		29.5	C	584	688	53.9	D	473	433	38.3	D	328	284
	NB Thru-Right		11.9	B	61	21	30.2	C	71	31	23.4	C	58	25
	NB Approach		*28.1*	*C*	--	--	*51.4*	*D*	--	--	*36.6*	*D*	--	--
	SB L-T-R		71.5	E	64	31	71.5	E	50	31	120.9	F	47	26
	SB Approach		*71.5*	*E*	--	--	*71.5*	*E*	--	--	*120.9*	*F*	--	--
	Overall		32.5	C	--	--	57.1	E	--	--	21.2	C	--	--

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				PM PEAK HOUR				SATURDAY PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)
7. Ashcake Road (E) /	EB L-T-R		0.4	A	13	0	0.4	A	20	1	0.5	A	16	0
Peaks Road (W) at	*EB Approach*		*0.4*	*A*	--	--	*0.4*	*A*	--	--	*0.5*	*A*	--	--
Sliding Hill Road (N) /	WB L-T-R		4.6	A	54	8	5.1	A	66	7	5.4	A	43	7
Mt Hermon Road (S)	*WB Approach*		*4.6*	*A*	--	--	*5.1*	*A*	--	--	*5.4*	*A*	--	--
Unsignalized	NB L-T-R		21.3	C	124	64	26.2	D	261	140	14.5	B	129	46
	NB Approach		*21.3*	*C*	--	--	*26.2*	*D*	--	--	*14.5*	*B*	--	--
	SB Right		16.3	C	81	27	15.6	C	56	13	13.7	B	58	14
	SB Approach		*16.3*	*C*	--	--	*15.6*	*C*	--	--	*13.7*	*B*	--	--
8. Lewistown Road (E) at	EB Left-Right		43.4	E	320	175	145.3	F	373	504	13.2	B	98	42
Ashcake Road (N-S)	*EB Approach*		*43.4*	*E*	--	--	*145.3*	*F*	--	--	*13.2*	*B*	--	--
Unsignalized	NB Left-Thru		5.0	A	180	13	4.3	A	114	8	2.6	A	53	2
	NB Approach		*5.0*	*A*	--	--	*4.3*	*A*	--	--	*2.6*	*A*	--	--
	SB Thru-Right		†	†	†	†	†	†	†	†	†	†	†	†
	SB Approach		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
9. Lewistown Road (E-W) at	EB U-Turn	425	0.0	A	62	0	0.0	A	136	0	0.0	A	18	0
Air Park Road (N)	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	EB Right	250	†	†	--	--	†	†	--	--	†	†	--	--
	EB Approach		*0.0*	*A*	--	--	*0.0*	*A*	--	--	*0.0*	*A*	--	--
	WB Left	250	8.7	A	86	10	8.5	A	50	5	7.8	A	33	1
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*2.6*	*A*	--	--	*1.5*	*A*	--	--	*1.4*	*A*	--	--
	NB Left		21.0	C	144	46	18.7	C	513	71	10.5	B	60	8
	NB Right	300	21.0	C	61	--	18.7	C	266	--	10.5	B	34	--
	NB Approach		*21.0*	*C*	--	--	*18.7*	*C*	--	--	*10.5*	*B*	--	--
10. Lewistown Road (E-W) at	EB Left		13.0	B	88	0	10.7	B	109	m16	11.1	B	118	31
I-95 NB Off-Ramp (N) /	EB Thru		10.1	B	180	90	9.7	A	211	93	8.8	A	93	48
Travel Center Entrance (S)	*EB Approach*		*10.5*	*B*	--	--	*9.9*	*A*	--	--	*9.7*	*A*	--	--
Signalized	WB Thru		24.1	C	131	131	23.3	C	153	165	21.1	C	76	68
	WB Right		20.7	C	48	m0	19.5	B	43	0	19.6	B	38	0
	WB Approach		*23.8*	*C*	--	--	*23.1*	*C*	--	--	*21.0*	*C*	--	--
	NB Dual Left [2]		33.8	C	138	170	34.6	C	162	97	33.2	C	133	82
	NB Thru		29.7	C	148	72	35.0	C	178	78	35.1	D	156	98
	NB Right		28.9	C	138	58	32.0	C	214	62	30.9	C	81	0
	NB Approach		*31.7*	*C*	--	--	*33.5*	*C*	--	--	*33.0*	*C*	--	--
	SB Left		39.5	D	57	18	39.7	D	65	25	39.6	D	48	25
	SB Right		39.7	D	148	0	39.2	D	138	0	39.5	D	136	0
	SB Approach		*39.7*	*D*	--	--	*39.2*	*D*	--	--	*39.5*	*D*	--	--
	Overall		27.6	C	--	--	26.5	C	--	--	27.7	C	--	--
11. Lewistown Road (E-W) at	EB Left	290	12.2	B	109	11	10.7	B	151	23	9.0	A	64	8
I-95 NB On-Ramp (S)	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	*EB Approach*		*3.4*	*A*	--	--	*4.6*	*A*	--	--	*3.1*	*A*	--	--
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Right		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*
12. Lewistown Road (E-W) at	EB Thru		12.3	B	151	114	13.0	B	234	213	7.5	A	100	93
I-95 SB On/Off-Ramp (N-S)	EB Right		11.9	B	--	44	13.1	B	--	55	7.2	A	--	29
Signalized	*EB Approach*		*12.1*	*B*	--	--	*13.0*	*B*	--	--	*7.3*	*A*	--	--
	WB Left		3.3	A	169	64	3.6	A	161	10	2.5	A	84	11
	WB Thru		2.4	A	130	62	1.1	A	112	6	1.5	A	81	12
	WB Right [3]		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*2.6*	*A*	--	--	*2.2*	*A*	--	--	*1.8*	*A*	--	--
	SB Left-Thru		39.0	D	180	93	49.4	D	197	90	41.8	D	150	70
	SB Right [3]		35.7	D	--	58	36.5	D	--	33	37.6	D	--	46
	SB Approach		*36.8*	*D*	--	--	*42.7*	*D*	--	--	*39.1*	*D*	--	--
	Overall		11.6	B	--	--	11.8	B	--	--	10.8	B	--	--

[1] *Overall intersection LOS and delay reported for signalized intersections and roundabouts only.*

[2] *Dual left turn lanes; average storage is provided.*

[3] *Channelized right turn not controlled by the signal.*

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

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

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

Table 4-4: Intersection Level of Service, Delay, and Queue Summary
2035 Background Traffic Volumes – With Sliding Hill Road Widening Geometry

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				PM PEAK HOUR				SATURDAY PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)
1. Sliding Hill Road (E-W) at	EB Dual Left [2]	500	104.8	F	486	#374	88.0	F	403	#206	44.7	D	162	86
Atlee Station Road (N) /	EB Thru		41.8	D	741	375	78.0	E	867	#644	27.6	C	280	247
Leadbetter Road (S)	EB Right		14.2	B	499	14	22.1	C	808	176	14.2	B	122	18
Signalized	*EB Approach*		*62.5*	*E*	--	--	*65.4*	*E*	--	--	*27.1*	*C*	--	--
	WB Left	288	27.6	C	288	m105	128.3	F	281	m#202	25.8	C	147	117
	WB Thru		62.1	E	705	#612	29.3	C	506	#495	10.4	B	181	63
	WB Right	300	30.5	C	300	m2	27.2	C	297	m0	20.5	C	48	0
	WB Approach		*57.0*	*E*	--	--	*41.2*	*D*	--	--	*13.4*	*B*	--	--
	NB Dual Left [2]	500	102.5	F	497	#453	111.1	F	390	#259	48.3	D	204	139
	NB Thru		46.5	D	745	249	51.0	D	278	141	39.5	D	130	95
	NB Right		38.7	D	663	0	44.4	D	171	0	37.7	D	91	0
	NB Approach		*82.7*	*F*	--	--	*84.4*	*F*	--	--	*41.3*	*D*	--	--
	SB Left	210	118.0	F	200	#179	39.9	D	198	164	45.5	D	101	86
	SB Thru		60.8	E	587	#98	39.6	D	1048	163	45.0	D	111	84
	SB Right	200	35.2	D	200	210	135.0	F	200	#601	27.7	C	151	4
	SB Approach		*53.9*	*D*	--	--	*105.3*	*F*	--	--	*36.6*	*D*	--	--
	Overall		65.0	E	--	--	70.1	E	--	--	26.6	C	--	--
2. Sliding Hill Road (E-W) at	EB Left	150	10.3	B	105	m6	13.4	B	149	m20	3.2	A	96	8
King's Charter Drive (N)	EB Thru		4.8	A	193	m68	9.4	A	258	m75	5.7	A	114	159
Charter Hill Court (S)	EB Right	700	15.8	B	43	m0	0.8	A	77	m0	16.0	B	41	m0
Signalized	*EB Approach*		*6.3*	*A*	--	--	*8.7*	*A*	--	--	*6.3*	*A*	--	--
	WB Left	300	6.3	A	161	m15	43.3	D	234	#172	7.7	A	107	16
	WB Thru-Right		10.0	A	390	101	21.8	C	315	197	10.7	B	211	174
	WB Approach		*9.7*	*A*	--	--	*24.8*	*C*	--	--	*10.3*	*B*	--	--
	NB Left-Thru		60.1	E	241	212	67.3	E	272	#278	48.1	D	147	94
	NB Right		44.9	D	64	0	41.4	D	206	44	42.5	D	75	0
	NB Approach		*55.8*	*E*	--	--	*53.4*	*D*	--	--	*45.3*	*D*	--	--
	SB Left-Thru		61.0	E	93	67	67.8	E	194	#187	47.9	D	158	103
	SB Right	125	55.1	E	72	0	45.3	D	123	0	41.6	D	110	0
	SB Approach		*58.1*	*E*	--	--	*62.9*	*E*	--	--	*46.1*	*D*	--	--
	Overall		14.1	B	--	--	23.8	C	--	--	13.8	B	--	--
3. Sliding Hill Road (E-W) at	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Totopotomoy Trail (N)	EB Right	275	†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	300	9.6	A	43	1	12.0	B	62	6	9.2	A	35	1
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*0.1*	*A*	--	--	*0.4*	*A*	--	--	*0.2*	*A*	--	--
	NB Left-Right		119.4	F	169	166	159.4	F	227	133	24.4	C	78	27
	NB Approach		*119.4*	*F*	--	--	*159.4*	*F*	--	--	*24.4*	*C*	--	--
4. Sliding Hill Road (E-W) at	EB Left	225	11.6	B	114	20	10.6	B	72	13	9.0	A	39	4
Atlee Commerce Boulevard (N) /	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Atlee Commons Drive (S)	EB Right		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
Unsignalized	*EB Approach*		*1.8*	*A*	--	--	*0.8*	*A*	--	--	*0.5*	*A*	--	--
	WB Left	283	9.5	A	49	4	12.1	B	40	4	9.3	A	6	0
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Right	250	*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Approach		*0.3*	*A*	--	--	*0.3*	*A*	--	--	*0.0*	*A*	--	--
	NB Left-Thru		120.9	F	82	47	Err **	Err *	136	Err	34.5	D	28	2
	NB Right		10.6	B	38	2	15.4	C	90	16	10.9	B	22	0
	NB Approach		*79.9*	*F*	--	--	*3880.0*	*F*	--	--	*29.8*	*D*	--	--
	SB L-T-R		28.3	D	152	39	243.7	F	432	316	10.0	A	57	5
	SB Approach		*28.3*	*D*	--	--	*243.7*	*F*	--	--	*10.0*	*A*	--	--
5. Sliding Hill Road (E-W) at	EB Left	383	21.7	C	317	165	5.7	A	174	m65	1.9	A	56	4
Cedar Run (N) /	EB Thru-Right		5.0	A	100	162	7.8	A	257	500	2.6	A	113	51
Air Park Road (S)	*EB Approach*		*12.7*	*B*	--	--	*7.5*	*A*	--	--	*2.6*	*A*	--	--
Signalized	WB Left	150	3.3	A	67	m1	13.2	B	48	m2	5.4	A	25	m3
	WB Thru		20.1	C	305	463	12.0	B	199	185	7.0	A	122	112
	WB Right	250	196.5	F	249	m13	14.5	B	79	m0	8.1	A	32	m0
	WB Approach		*39.9*	*D*	--	--	*12.2*	*B*	--	--	*7.0*	*A*	--	--
	NB L-T-R		60.2	E	52	30	55.0	D	51	28	49.3	D	40	27
	NB Approach		*60.2*	*E*	--	--	*55.0*	*D*	--	--	*49.3*	*D*	--	--
	SB Left		54.8	D	75	64	50.8	D	166	158	45.9	D	53	30
	SB Thru-Right		53.5	D	142	68	43.5	D	216	90	45.3	D	50	44
	SB Approach		*53.8*	*D*	--	--	*45.6*	*D*	--	--	*45.4*	*D*	--	--
	Overall		32.2	C	--	--	16.6	B	--	--	7.3	A	--	--
6. Sliding Hill Road (E-W) at	EB Left	325	12.8	B	26	m3	8.1	A	10	m0	5.2	A	22	m1
New Ashcake Road (N-S)	EB Thru		19.0	B	119	34	17.7	B	279	169	7.5	A	166	23
Signalized	EB Right [3]		47.6	D	--	265	104.8	F	--	402	14.7	B	--	52
	EB Approach		*39.7*	*D*	--	--	*78.2*	*E*	--	--	*12.5*	*B*	--	--
	WB Left	275	37.2	D	96	66	29.4	C	119	67	17.7	B	52	32
	WB Thru-Right		40.8	D	174	194	17.9	B	90	80	19.1	B	97	83
	WB Approach		*40.3*	*D*	--	--	*21.3*	*C*	--	--	*18.9*	*B*	--	--
	NB Left		29.1	C	600	715	41.2	D	385	428	30.6	C	325	327
	NB Thru-Right		11.0	B	125	20	24.1	C	64	30	20.2	C	50	26
	NB Approach		*27.7*	*C*	--	--	*39.3*	*D*	--	--	*29.5*	*C*	--	--
	SB L-T-R		71.5	E	54	31	64.0	E	62	29	56.4	E	48	28
	SB Approach		*71.5*	*E*	--	--	*64.0*	*E*	--	--	*56.4*	*E*	--	--
	Overall		33.7	C	--	--	60.3	E	--	--	19.6	B	--	--

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				PM PEAK HOUR				SATURDAY PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)
7. Ashcake Road (E) /	EB L-T-R		0.4	A	24	0	0.4	A	20	1	0.4	A	12	0
Peaks Road (W) at	*EB Approach*		*0.4*	*A*	--	--	*0.4*	*A*	--	--	*0.4*	*A*	--	--
Sliding Hill Road (N) /	WB L-T-R		4.6	A	53	9	5.2	A	64	7	5.4	A	56	7
Mt Hermon Road (S)	*WB Approach*		*4.6*	*A*	--	--	*5.2*	*A*	--	--	*5.4*	*A*	--	--
Unsignalized	NB L-T-R		23.7	C	128	75	31.1	D	254	169	15.1	C	149	51
	NB Approach		*23.7*	*C*	--	--	*31.1*	*D*	--	--	*15.1*	*C*	--	--
	SB Right		17.2	C	89	30	16.3	C	56	15	14.1	B	65	15
	SB Approach		*17.2*	*C*	--	--	*16.3*	*C*	--	--	*14.1*	*B*	--	--
8. Lewistown Road (E) at	EB Left-Right		55.6	F	330	212	191.8	F	382	604	13.6	B	98	46
Ashcake Road (N-S)	*EB Approach*		*55.6*	*F*	--	--	*191.8*	*F*	--	--	*13.6*	*B*	--	--
Unsignalized	NB Left-Thru		5.1	A	205	14	4.4	A	138	9	2.6	A	47	2
	NB Approach		*5.1*	*A*	--	--	*4.4*	*A*	--	--	*2.6*	*A*	--	--
	SB Thru-Right		†	†	†	†	†	†	†	†	†	†	†	†
	SB Approach		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
9. Lewistown Road (E-W) at	EB U-Turn	425	0.0	A	35	0	0.0	A	245	0	0.0	A	15	0
Air Park Road (N)	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	EB Right	250	†	†	--	--	†	†	--	--	†	†	--	--
	EB Approach		*0.0*	*A*	--	--	*0.0*	*A*	--	--	*0.0*	*A*	--	--
	WB Left	250	8.8	A	83	11	8.6	A	47	5	7.8	A	33	2
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*2.6*	*A*	--	--	*1.5*	*A*	--	--	*1.4*	*A*	--	--
	NB Left		23.0	C	132	54	20.3	C	833	83	10.7	B	67	8
	NB Right	300	23.0	C	67	--	20.3	C	282	--	10.7	B	36	--
	NB Approach		*23.0*	*C*	--	--	*20.3*	*C*	--	--	*10.7*	*B*	--	--
10. Lewistown Road (E-W) at	EB Left		13.2	B	85	0	9.4	A	98	m16	11.2	B	107	32
I-95 NB Off-Ramp (N) /	EB Thru		10.6	B	212	96	9.9	A	252	104	8.9	A	95	50
Travel Center Entrance (S)	*EB Approach*		*10.9*	*B*	--	--	*9.8*	*A*	--	--	*9.8*	*A*	--	--
Signalized	WB Thru		24.9	C	150	137	23.9	C	149	172	21.4	C	79	71
	WB Right		21.2	C	43	m0	19.8	B	37	0	19.9	B	35	0
	WB Approach		*24.6*	*C*	--	--	*23.7*	*C*	--	--	*21.3*	*C*	--	--
	NB Dual Left [2]		33.5	C	212	178	34.5	C	158	101	33.1	C	129	86
	NB Thru		29.3	C	145	74	34.9	C	168	80	35.0	C	175	102
	NB Right		28.6	C	124	65	31.9	C	295	63	30.7	C	71	0
	NB Approach		*31.4*	*C*	--	--	*33.4*	*C*	--	--	*32.8*	*C*	--	--
	SB Left		39.6	D	67	20	39.7	D	75	26	39.5	D	56	26
	SB Right		39.7	D	163	0	39.1	D	136	0	39.4	D	141	0
	SB Approach		*39.7*	*D*	--	--	*39.2*	*D*	--	--	*39.4*	*D*	--	--
	Overall		27.7	C	--	--	26.6	C	--	--	27.7	C	--	--
11. Lewistown Road (E-W) at	EB Left	290	12.6	B	132	12	11.0	B	188	25	9.1	A	83	8
I-95 NB On-Ramp (S)	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	*EB Approach*		*3.5*	*A*	--	--	*4.8*	*A*	--	--	*3.1*	*A*	--	--
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Right		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*
12. Lewistown Road (E-W) at	EB Thru		12.8	B	168	122	13.8	B	301	236	8.2	A	102	99
I-95 SB On/Off-Ramp (N-S)	EB Right		12.8	B	--	46	13.8	B	--	59	7.8	A	--	30
Signalized	*EB Approach*		*12.4*	*B*	--	--	*13.8*	*B*	--	--	*8.0*	*A*	--	--
	WB Left		3.5	A	165	65	3.3	A	173	11	2.8	A	84	12
	WB Thru		2.4	A	122	61	1.0	A	104	7	1.7	A	74	13
	WB Right [3]		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*2.7*	*A*	--	--	*2.0*	*A*	--	--	*2.0*	*A*	--	--
	SB Left-Thru		38.9	D	162	96	49.8	D	183	92	39.7	D	140	71
	SB Right [3]		35.5	D	--	59	36.3	D	--	35	36.5	D	--	47
	SB Approach		*36.6*	*D*	--	--	*42.8*	*D*	--	--	*37.6*	*D*	--	--
	Overall		11.7	B	--	--	12.1	B	--	--	10.9	B	--	--

[1] *Overall intersection LOS and delay reported for signalized intersections and roundabouts only.*

[2] *Dual left turn lanes; average storage is provided.*

[3] *Channelized right turn not controlled by the signal.*

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

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

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

**Delay greater than 9999.99 seconds cannot be calculated by SYNCHRO.

* Volume exceeds ideal saturation flow rate of 1,900 vphpl; LOS is not calculated by SYNCHRO.

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Background 2022 Weekday AM Peak Hour Volumes
Project Tiger (Wegmans)

Figure
4-1

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

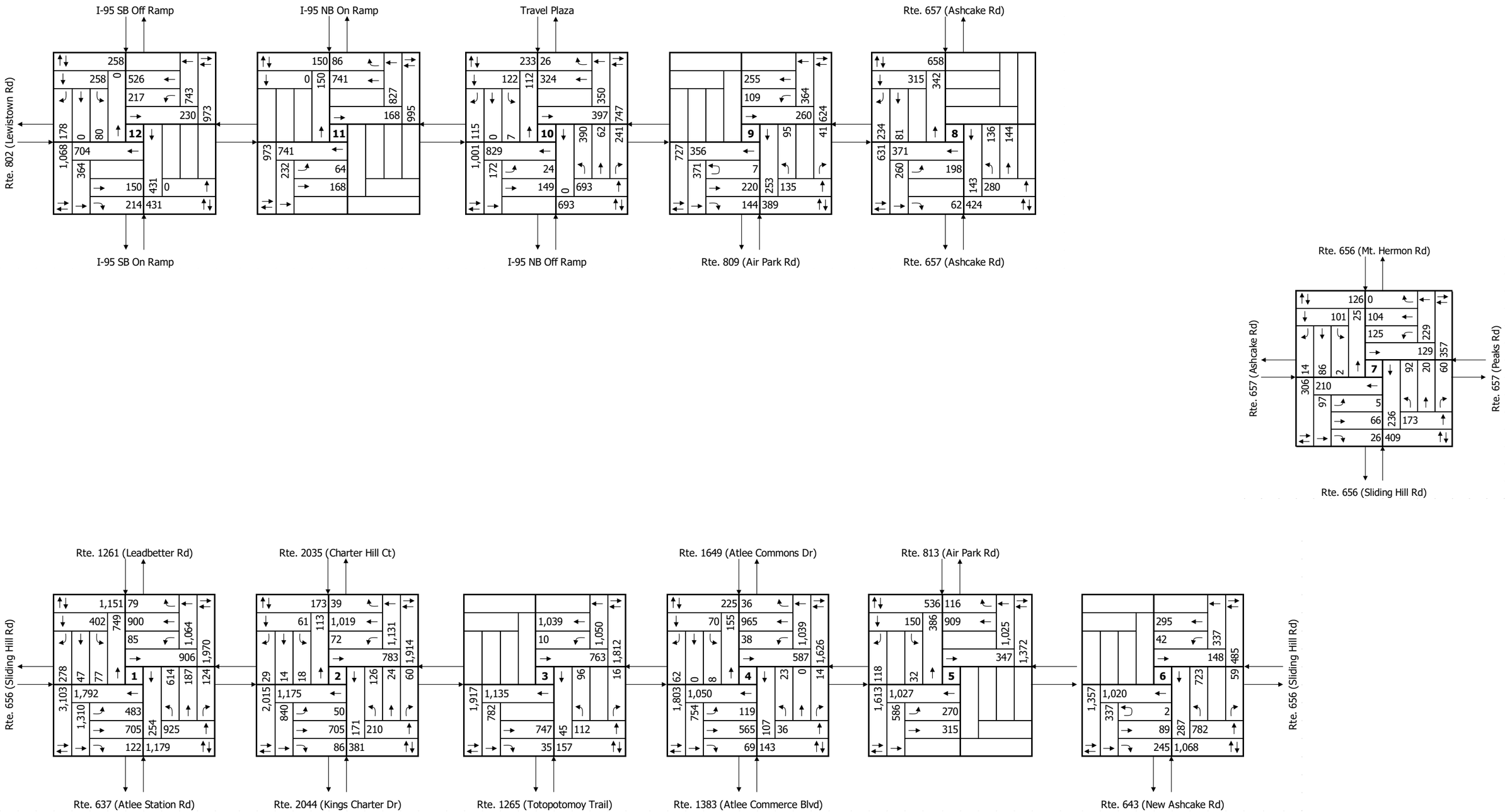
Background 2022 Weekday PM Peak Hour Volumes
Project Tiger (Wegmans)

Figure
4-2

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Background 2022 Saturday Peak Hour Volumes
Project Tiger (Wegmans)

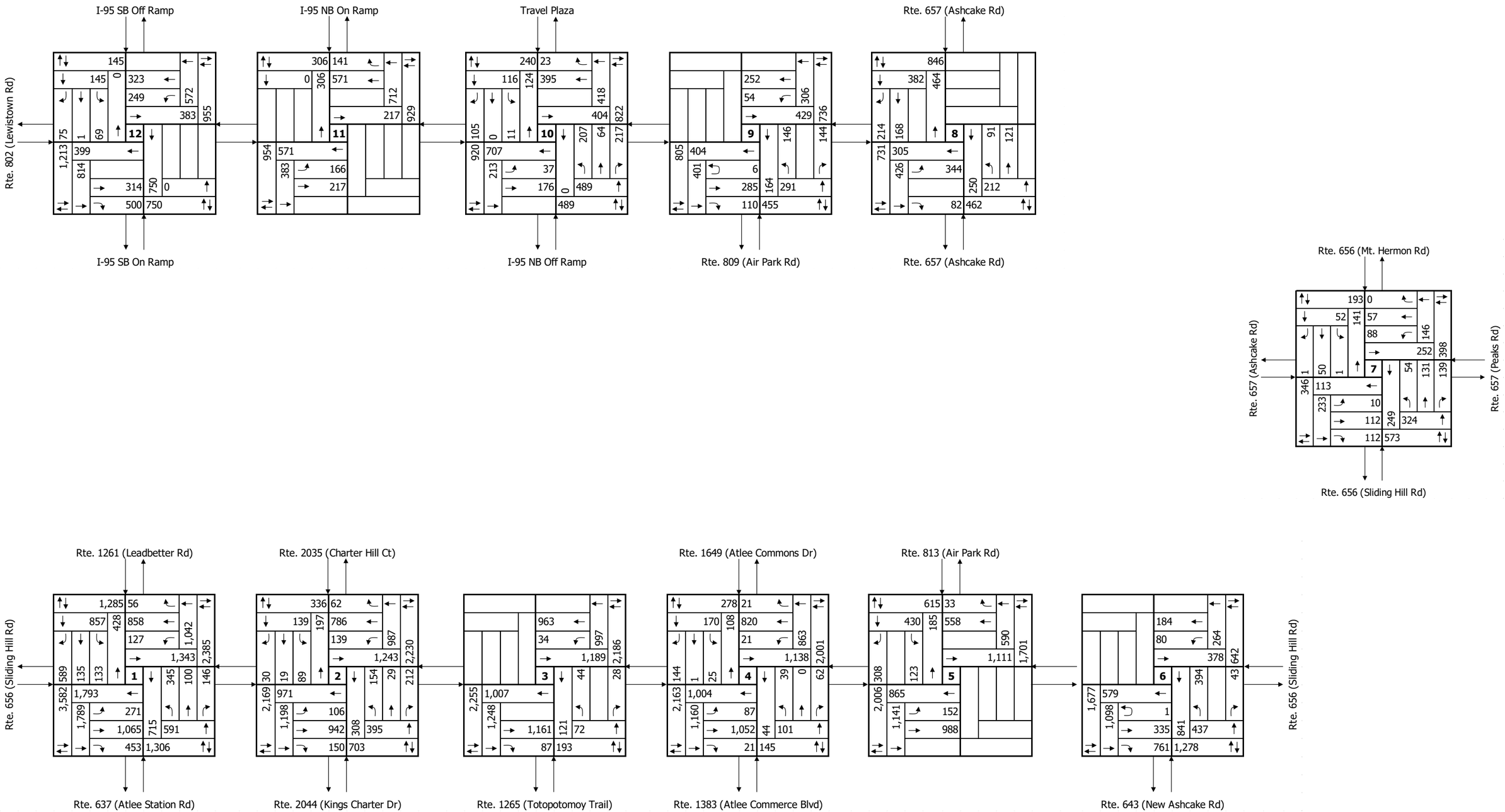
Figure
4-3



TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Background 2027 Weekday AM Peak Hour Volumes
Project Tiger (Wegmans)

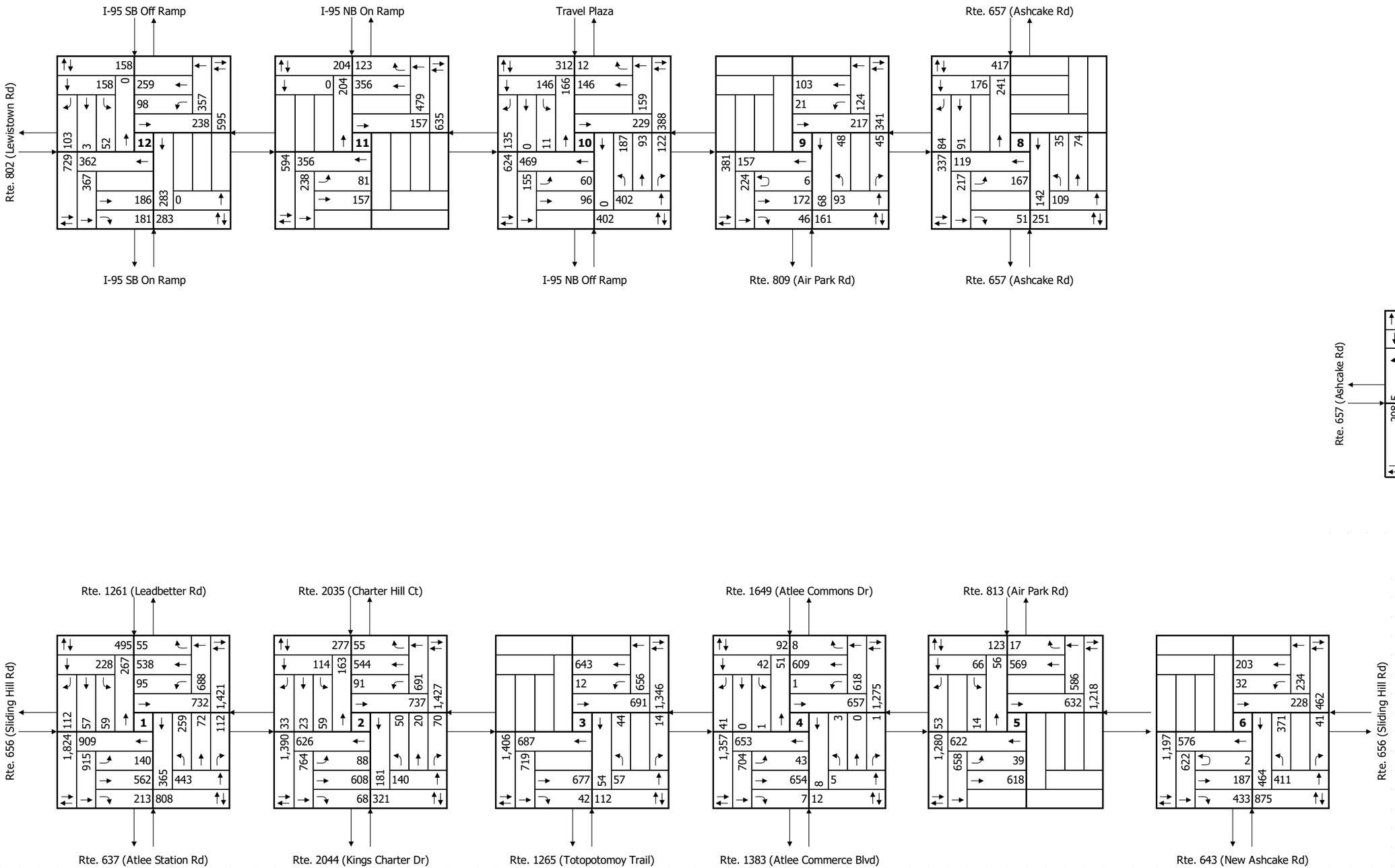
Figure
4-4



TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Background 2027 Weekday PM Peak Hour Volumes
Project Tiger (Wegmans)

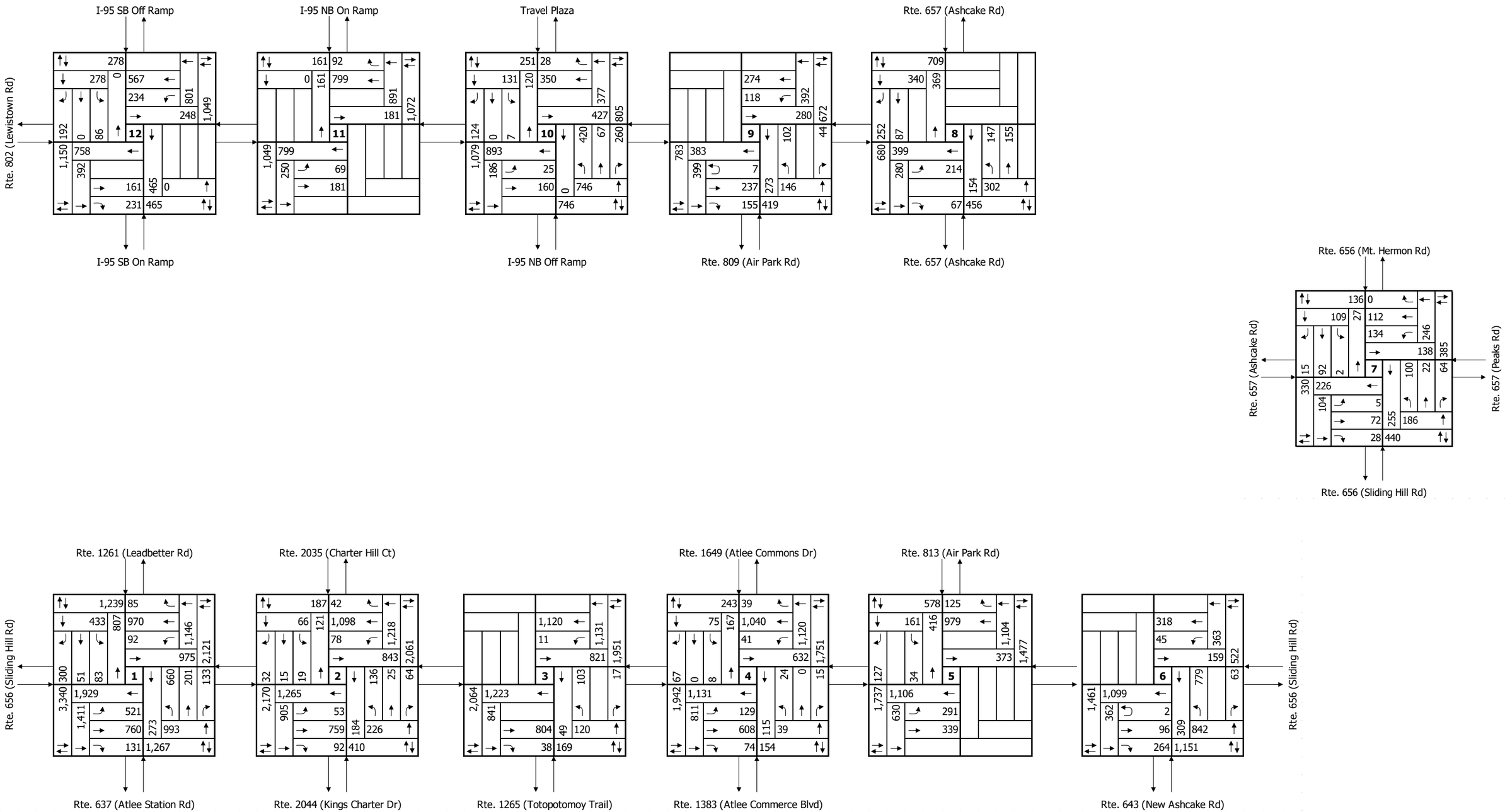
Figure
4-5



TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Background 2027 Saturday Peak Hour Volumes
Project Tiger (Wegmans)

Figure
4-6



TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Background 2032 Weekday AM Peak Hour Volumes
Project Tiger (Wegmans)

Figure
4-7

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

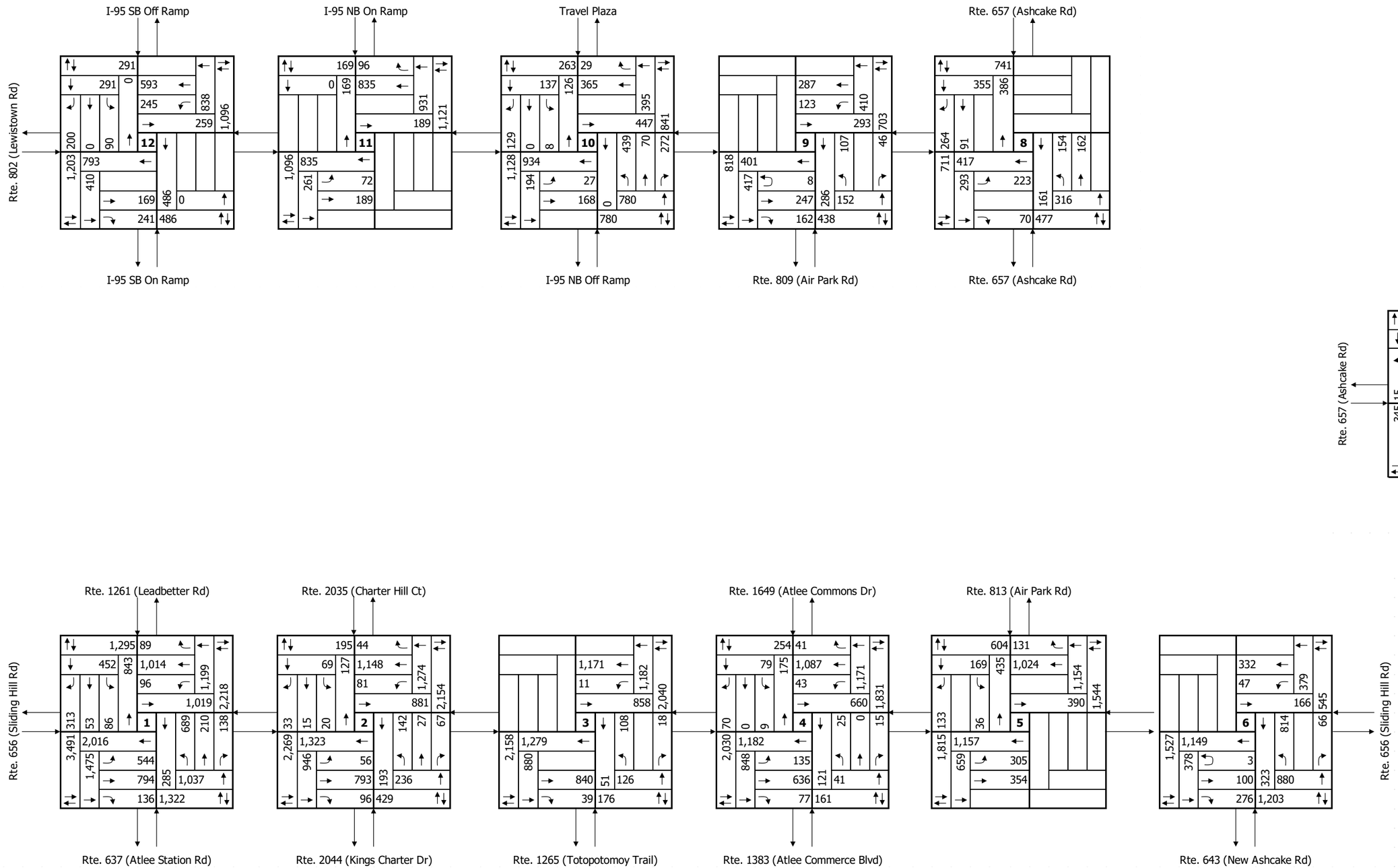
Background 2032 Weekday PM Peak Hour Volumes
Project Tiger (Wegmans)

Figure
4-8

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Background 2032 Saturday Peak Hour Volumes
Project Tiger (Wegmans)

Figure
4-9



TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

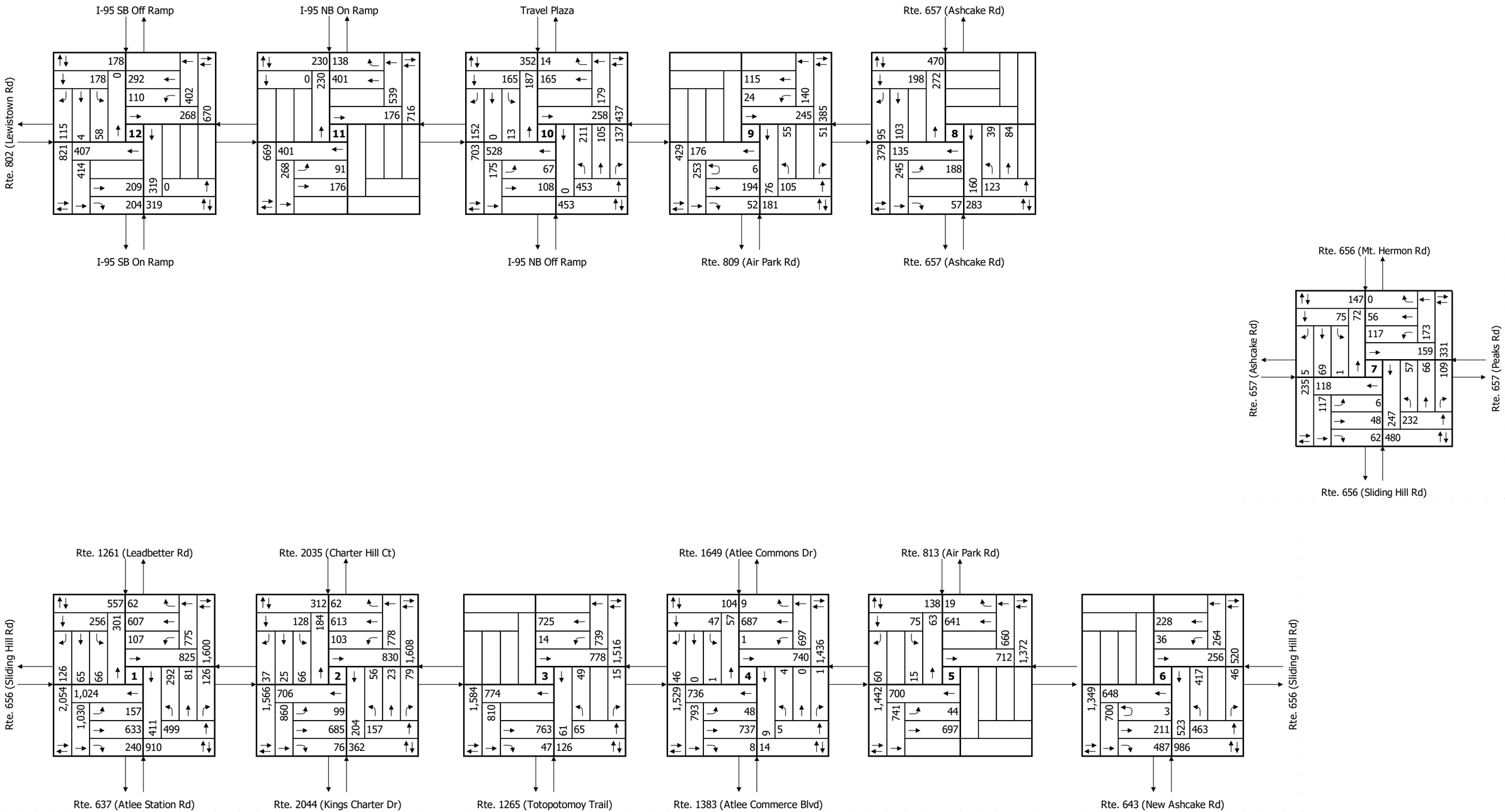
Background 2035 Weekday AM Peak Hour Volumes
Project Tiger (Wegmans)

Figure
4-10

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Background 2035 Weekday PM Peak Hour Volumes
Project Tiger (Wegmans)

Figure
4-11



TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Background 2035 Saturday Peak Hour Volumes
Project Tiger (Wegmans)

Figure
4-12

5 TRIP GENERATION

The proposed Project Tiger (Wegmans) is located on a 217-acre parcel, formerly known as the Air Park Associates Site. The site is bounded by Route 656 (Sliding Hill Road) on the south and east, by Route 657 (Ashcake Road) to the north, and by the Hanover County Municipal Airport property to the south and west. A vicinity map is shown on Figure 2-1.

The proposed project is anticipated to consist of three (3) phases of development, in 2022, 2027, and 2032 for up to 1,690,650 SF of warehousing and distribution land uses. The phase breakdown is as follows:

- Phase 1 includes 1,085,000 SF of warehousing and distribution;
- Phase 2 includes 205,650 SF of warehousing and distribution; and
- Phase 3 includes 400,000 SF of warehousing.

The site-generated traffic volumes for the proposed site shown in Table 5-1 are based on the trip generation information provided in the 10th Edition of the ITE *Trip Generation Manual*. Trip generation was calculated using square footage as the independent variable for the warehousing and high-cube cold storage land uses.

Table 5-1: Trip Generation Summary

				WEEKDAY							SATURDAY			
					AM PEAK HOUR			PM PEAK HOUR				SAT PEAK HOUR		
LAND USE	ITE CODE	AMOUNT	UNITS	ADT	IN	OUT	TOTAL	IN	OUT	TOTAL	ADT	IN	OUT	TOTAL
Phase 1														
Warehousing	150	520,000	SF (GFA)	867	68	20	88	24	66	90	-	-	-	-
High-Cube Cold Storage	157	565,000	SF (GFA)	1,191	50	15	65	17	47	64	-	-	-	-
Warehousing (SATURDAY)	150	1,085,000	SF (GFA)	-	-	-	-	-	-	-	163	34	20	54
	Phase 1 Total	1,085,000	SF (GFA)	2,058	118	35	153	42	113	154	163	34	20	54
Phase 2														
Warehousing	150	99,650	SF (GFA)	203	28	9	37	11	29	40	-	-	-	-
High-Cube Cold Storage	157	106,000	SF (GFA)	225	9	3	12	3	10	13	-	-	-	-
Warehousing (SATURDAY)	150	205,650	SF (GFA)	-	-	-	-	-	-	-	31	6	4	10
	Phase 2 Total	205,650	SF (GFA)	428	37	12	49	14	39	52	31	6	4	10
Phase 3														
Warehousing	150	400,000	SF (GFA)	678	56	18	73	20	56	76	60	13	7	20
Total		1,690,650	SF (GFA)	**3,164**	**211**	**64**	**275**	**75**	**208**	**283**	**254**	**53**	**31**	**85**

As shown in Table 5-1, on a typical weekday, the total assumed uses listed above are anticipated to generate approximately 3,164 daily trips, 275 AM peak hour trips, 283 PM peak hour trips, and 85 Saturday peak hour trips.

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6 SITE TRIP DISTRIBUTION AND ASSIGNMENT

Site traffic for the proposed development was distributed onto the surrounding roadway network. The trip distributions are based on existing traffic volume data on the roadway network surrounding the site and the expected use of proposed entrances and existing roads within the study area. The trip distributions were approved during the scoping process and serve as the basis this study.

6.1 TRIP DISTRIBUTION METHODOLOGY

The trip distribution percentages were determined based on the directional turning movement count data on the existing roadway network and average daily traffic volumes for the surrounding roadway network. All trip distributions were coordinated with and approved by Hanover County and VDOT prior to analysis. Also, again, it should be noted that it is assumed all truck trips to and from the site will be via Sliding Hill Road, per discussions with the applicant.

6.2 TRAFFIC ASSIGNMENT

Access to the site will be provided via two (2) existing roadway corridors:

- Sliding Hill Road Corridor – Connects from the Interstate 95 interchange at Sliding Hill Road east along Sliding Hill Road through the intersection of Atlee Station Road/Leadbetter Road to the proposed Site Entrance "A" to the east of New Ashcake Road. Approximately 60% of traffic for the site will enter via the Interstate 95/Sliding Hill Road interchange. All truck traffic will utilize this route. In addition, 5% will utilize Atlee Station Road, 10% will utilize New Ashcake Road, and 5% will utilize Peaks Road, all of which are anticipated to be employee traffic.

- Lewistown Road Corridor – Connects from the Interstate 95 interchange at Lewistown Road east along Lewistown Road to Ashcake Road, eventually entering the site on Sliding Hill Road in Phases 1 and 2 and entering the site on Ashcake Road in Phase 3. Approximately 20% of traffic for the site will enter via the Interstate 95/Lewistown Road interchange, all of which are anticipated to be employee traffic.

The overall site traffic distribution, as noted above and agreed to during scoping, is shown on Figure 6-1.

Site Entrance "A" on Sliding Hill Road and Site Entrance "B" on Ashcake Road will both be opened during Phase 1 of the project. All truck traffic will enter/exit via Site Entrance "A" on Sliding Hill Road and will be directed to utilize only Sliding Hill Road to/from I-95. Employees and other site trips will enter/exit the site via either Site Entrance "A" or "B" and are expected to originate from the I-95 corridor as well as other adjacent local roadways. It is anticipated that all site trips from the Lewistown Road corridor were assumed to enter via Site Entrance "B", or approximately 20% of site trips.

6.3 PROPOSED DEVELOPMENT SITE TRIPS

The trip distribution percentages for the site-generated trips in Phases 1 and 2 are shown on Figure 6-2 (all figures are located at the end of the chapter after page 6-2). The trip distribution percentages from Figure 6-2 were applied to the site trips from Table 5-1 to generate the AM, PM, and Saturday peak hour site trips for Phases 1, 2, and 3 and are shown on Figures 6-3 through 6-11.

The trip distribution percentages from Figure 6-2 were applied to the site trips from Table 5-1 to generate the AM, PM, and Saturday peak hour site trips for Full Buildout (Phase 1+2+3) and are shown on Figures 6-12 through 6-14.

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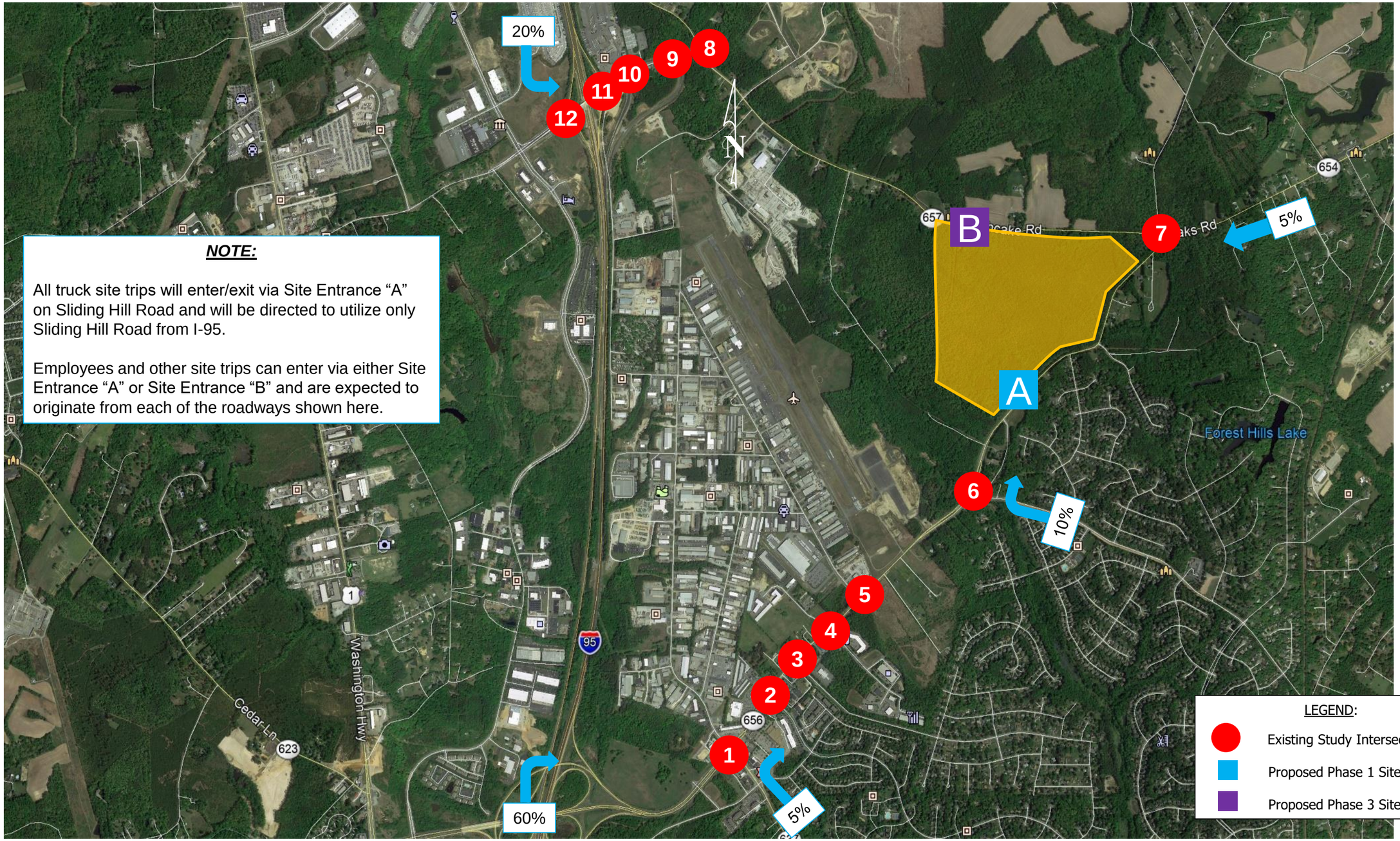

NOT TO SCALE

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Overall Site Trip Distribution
Project Tiger (Wegmans)

Figure
6-1

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Trip Distribution
All Phases
Project Tiger (Wegmans)

Figure
6-2

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Trip Generation
Phase 1 New Trips AM Peak Hour
Project Tiger (Wegmans)

Figure
6-3

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Trip Generation
Phase 1 New Trips PM Peak Hour
Project Tiger (Wegmans)

Figure
6-4

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Trip Generation
Phase 1 New Trips Saturday Peak Hour
Project Tiger (Wegmans)

Figure
6-5

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Trip Generation
Phase 2 New Trips AM Peak Hour
Project Tiger (Wegmans)

Figure
6-6

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Trip Generation
Phase 2 New Trips PM Peak Hour
Project Tiger (Wegmans)

Figure
6-7

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Trip Generation
Phase 2 New Trips Saturday Peak Hour
Project Tiger (Wegmans)

Figure
6-8

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Trip Generation
Phase 3 New Trips AM Peak Hour
Project Tiger (Wegmans)

Figure
6-9

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Trip Generation
Phase 3 New Trips PM Peak Hour
Project Tiger (Wegmans)

Figure
6-10

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Trip Generation
Phase 3 New Trips Saturday Peak Hour
Project Tiger (Wegmans)

Figure
6-11

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Trip Generation
Full Buildout (Phases 1+2+3) New Trips AM Peak Hour
Project Tiger (Wegmans)

Figure
6-12

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Trip Generation
Full Buildout (Phases 1+2+3) New Trips PM Peak Hour
Project Tiger (Wegmans)

Figure
6-13

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Trip Generation
Full Buildout (Phases 1+2+3) New Trips Saturday Peak Hour
Project Tiger (Wegmans)

Figure
6-14

7 PHASED ANALYSIS OF FUTURE TOTAL CONDITIONS WITH DEVELOPMENT

To complete the analysis of the Future Total conditions, estimated site trips for Project Tiger (Wegmans) were added to the 2022, 2027, 2032, and 2035 background volumes. The projected total 2022, 2027, 2032, and 2035 volumes were used in the capacity analyses for the study intersections.

7.1 FUTURE TOTAL TRAFFIC VOLUMES

To generate the 2022, 2027, 2032, and 2035 Total volumes used in the analyses, the total site-generated traffic for Phase 1 (Figures 6-3 through 6-5) were added to the 2022 background volumes, Phase 2 (Figures 6-6 through 6-8), were added to the 2027 background volumes, and Full Buildout (Figures 6-12 through 6-14) were added to the 2032 and 2035 background volumes. The resulting 2022, 2027, 2032, and 2035 Total AM, PM, and Saturday peak hour traffic volumes used in the analyses are shown on Figures 7-1 through 7-12 (all figures are located at the end of the chapter after page 7-20).

7.2 CAPACITY ANALYSES

Capacity analysis allows traffic engineers to determine the impacts of traffic on the surrounding roadway network. Levels of service (LOS) are determined for each part of the roadway network. In Hanover County, the standard for the overall intersection is LOS D representing acceptable results, while the standard for individual traffic movements is LOS E. For detailed information about level of service definitions and criteria for unsignalized and signalized intersections, see Chapter 3.2 Capacity Analyses.

Fourteen (14) intersections were analyzed using the 2022, 2027, 2032, and 2035 Total volumes shown on Figures 7-1 through 7-12. These intersections, both signalized and unsignalized, were analyzed using SYNCHRO Version 10 based on 2000 HCM methodologies using the assumptions listed on page 3-3. For all Total analyses, the minimum peak hour factor is 0.92. Given that the existing signals along the Sliding Hill Road and Lewistown Road corridors are operating as actuated-coordinated, all signals were optimized to ensure that the increase in background traffic volumes was accounted for in the timings and operations.

7.2.1 2022 Phase 1 Traffic Volumes Analysis

Table 7-1 summarizes the intersection LOS, delay, and 95th percentile queues based on the 2022 Total traffic volumes shown on Figures 7-1 through 7-3 and the proposed intersection geometry. As noted prior, all site trips entering from the Sliding Hill Road corridor enters through the proposed Site Entrance "A" and all site trips entering from the Lewistown Road corridor enters through the proposed Site Entrance "B". There are no changes in geometry for the existing intersections. The corresponding SYNCHRO worksheets are included in Appendix E. Please note that the intersection numbers shown on the level of service and delay summary tables correspond to the intersection numbers used in the SYNCHRO models.

As indicated in Table 7-1, all movements at the signalized intersection of Sliding Hill Road at Atlee Station Road/Leadbetter Road continue to operate at LOS D or better during both the AM and PM peak hours under 2022 Total conditions. The following movements operate with LOS E: EB Dual Left (AM & PM), WB Left (PM only), NB Dual Left (AM & PM), SB Left (AM only), and SB Right (PM only). All movements operate at LOS D or better during the Saturday peak hour. The signalized intersection operates at an overall LOS D during the AM and PM peak hours and at LOS C during the Saturday peak hour.

The available turn lane storage continues to be sufficient to accommodate the 95th percentile and maximum queue lengths during the AM, PM, and Saturday peak hours on both Sliding Hill Road and Atlee Station Road. However, it should be noted that certain through queues on the mainlines of westbound Sliding Hill Road (AM & PM) and southbound Leadbetter Road (AM & PM) block access to auxiliary turn

lanes. The northbound Atlee Station Road approach is improved by the signal retiming and does not experience any significant queuing issues.

At the signalized intersection of Sliding Hill Road at Kings Charter Drive/Charter Hill Court, the intersection continues to operate at an overall LOS B during the AM, PM, and Saturday peak hours. All movements at the intersection operate at LOS D or better during the AM, PM, and Saturday peak hours.

The available turn lane storage is sufficient to accommodate the 95th percentile and maximum queue lengths during all peak hours on Sliding Hill Road and Kings Charter Drive/Charter Hill Court. It should be noted that certain through queues on mainline Sliding Hill Road block access to auxiliary turn lanes and do not allow the turn lanes to be fully utilized. The eastbound through queues during the PM peak hour present blocking issues. No issues are reported for queuing during the Saturday peak hour.

At the unsignalized intersection of Sliding Hill Road and Totopotomoy Trail, the mainline movements, eastbound and westbound on Sliding Hill Road, continue to operate at LOS A during all peak hours. The northbound approach of Totopotomoy Trail operates at LOS E during the AM and PM peak hours and at LOS C during the Saturday peak hour. Although the northbound approach operates with a LOS E, the queues experienced are roughly 100 to 130 feet, or approximately five (5) vehicles.

At the unsignalized intersection of Sliding Hill Road and Atlee Commerce Boulevard/Atlee Commons Drive, the mainline movements continue operate at LOS B or better during all scenarios. The northbound approach operates at LOS F during the AM peak hour and both the northbound and southbound approaches operate at LOS E/F during the PM peak hour. For the side street approaches, the AM and PM peak hour operations can be attributed to the heavy through volumes at the intersection and limited gaps for exiting traffic. These issues were noted in existing and background analysis conditions.

As indicated in Table 7-1, the signalized intersection of Sliding Hill Road at Air Park Road operates at an overall LOS B during both the AM and PM peak hours and LOS A during the Saturday peak hour. All movements at the intersection operate at LOS D or better during all three analysis scenarios. The available turn lane storage is sufficient to accommodate the 95th percentile and maximum queue lengths during the AM, PM, and Saturday peak hours on either Sliding Hill Road or Air Park Road. It should be noted that the westbound through movement during the AM peak hour extends beyond the turn lane storage and may prevent vehicles from entering the auxiliary turn lanes.

At the signalized intersection of Sliding Hill Road at New Ashcake Road, all movements and approaches operate at LOS D or better during all analysis peak hours. The intersection operates with an overall LOS C during the AM and PM peak hours and LOS B during the Saturday peak hour. The available turn lane storage is sufficient to accommodate the 95th percentile and maximum queue lengths during the AM, PM, and Saturday peak hours on either Sliding Hill Road or New Ashcake Road.

The following unsignalized intersections within the study area continues to operate at LOS C or better for all movements and approaches and do not show any queuing issues:

- Sliding Hill Road at Ashcake Road/Peaks Road/Mt. Hermon Road
- Lewistown Road at Air Park Road
- Lewistown Road at I-95 NB On-Ramp

At the unsignalized intersection of Lewistown Road at Ashcake Road, the mainline operations on Ashcake Road continue to operate at LOS A during all analysis periods. However, during the PM peak hour, the eastbound approach of Lewistown Road continues to operate at LOS F as it did under 2022 background conditions. The queues on Lewistown Road are 350 feet, which is equal to approximately 14 vehicles, and do not impact the nearby Air Park Road intersection.

As indicated in Table 7-1, all movements at the signalized intersection of Lewistown Road and the I-95 NB Off-Ramp/Travel Center Entrance continue to operate at LOS D or better during the AM, PM, and Saturday peak hours. The signalized intersection continues to operate at an overall LOS C during all analysis scenario peak hours. The intersection operates in an acceptable manner and there are no queuing issues noted.

At the signalized intersection of Lewistown Road and the I-95 SB On/Off-Ramp, the intersection continues to operate at an overall LOS B for all three analysis scenarios. All mainline movements along Lewistown Road operate at LOS B or better during the AM, PM, and Saturday peak hours. The southbound approach from the I-95 off-ramp continues to operate at LOS D during all three peak hours. The mainline approaches do not experience any queuing issues. The longest queue that the off-ramp experiences is 220 feet during the PM peak hour, which will not impact any operations on I-95.

At the proposed unsignalized intersection of Site Entrance "A" on Sliding Hill Road, all movements and approaches operate at LOS B or better during the AM, PM, and Saturday peak hours. The mainline movements along Sliding Hill Road operate at LOS A during all analysis periods. The available turn lane storage is sufficient to accommodate the 95th percentile and maximum queue lengths during all peak hours on Sliding Hill Road. The longest queue observed for the proposed eastbound left turn lane on Sliding Hill into the site is 58 feet, or approximately 3 vehicles, and occurs during the AM peak hour. The intersection operates in an acceptable manner and there are no queuing issues noted.

At the proposed unsignalized intersection of Site Entrance "B" on Ashcake Road, all movements and approaches operate at LOS B or better during the AM, PM, and Saturday peak hours. The mainline movements along Ashcake Road operate at LOS A during all analysis periods. The available turn lane storage is sufficient to accommodate the 95th percentile and maximum queue lengths during all peak hours on Sliding Hill Road. The intersection operates in an acceptable manner and there are no queuing issues noted.

Table 7-1: Intersection Level of Service, Delay, and Queue Summary
2022 Phase 1 Total Traffic Volumes

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				PM PEAK HOUR				SATURDAY PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)
1. Sliding Hill Road (E-W) at	EB Dual Left [2]	500	72.6	E	400	#279	73.0	E	275	#160	39.6	D	141	67
Atlee Station Road (N) /	EB Thru		32.9	C	402	314	53.2	D	466	#484	23.0	C	216	196
Leadbetter Road (S)	EB Right		12.1	B	77	12	20.0	B	246	82	12.6	B	112	16
Signalized	*EB Approach*		*44.9*	*D*	--	--	*47.8*	*D*	--	--	*23.1*	*C*	--	--
	WB Left	288	27.8	C	265	m89	61.6	E	184	m#177	30.0	C	124	52
	WB Thru		29.6	C	363	#371	20.5	C	226	#314	12.4	B	170	78
	WB Right	300	27.9	C	258	m2	25.1	C	49	m0	19.0	B	49	0
	WB Approach		*29.3*	*C*	--	--	*25.7*	*C*	--	--	*15.4*	*B*	--	--
	NB Dual Left [2]	500	66.2	E	395	#337	70.1	E	256	#192	38.4	D	112	107
	NB Thru		41.8	D	221	196	44.4	D	123	112	36.1	D	93	76
	NB Right		36.5	D	98	0	40.6	D	110	0	34.6	C	78	0
	NB Approach		*57.1*	*E*	--	--	*58.4*	*E*	--	--	*37.1*	*D*	--	--
	SB Left	210	72.8	E	156	#133	36.0	D	197	128	42.4	D	98	69
	SB Thru		52.5	D	359	73	35.9	D	1050	130	41.9	D	97	68
	SB Right	200	30.4	C	200	125	61.5	E	200	#362	25.1	C	121	0
	SB Approach		*41.1*	*D*	--	--	*53.5*	*D*	--	--	*33.8*	*C*	--	--
	Overall		43.0	D	--	--	44.7	D	--	--	24.5	C	--	--
2. Sliding Hill Road (E-W) at	EB Left	150	3.6	A	79	m3	9.5	A	115	m13	3.0	A	84	14
King's Charter Drive (N)	EB Thru		3.7	A	141	57	8.2	A	211	m62	5.7	A	114	47
Charter Hill Court (S)	EB Right	700	15.1	B	43	m0	0.2	A	62	m0	15.3	B	47	0
Signalized	*EB Approach*		*4.8*	*A*	--	--	*7.3*	*A*	--	--	*6.2*	*A*	--	--
	WB Left	300	5.9	A	107	13	22.9	C	122	72	11.8	B	105	36
	WB Thru-Right		9.4	A	295	103	16.9	B	245	155	11.1	B	170	136
	WB Approach		*9.2*	*A*	--	--	*17.7*	*B*	--	--	*11.2*	*B*	--	--
	NB Left-Thru		52.3	D	208	166	54.3	D	180	#203	41.4	D	94	73
	NB Right		42.2	D	55	0	38.4	D	117	0	38.2	D	70	0
	NB Approach		*49.4*	*D*	--	--	*45.7*	*D*	--	--	*39.8*	*D*	--	--
	SB Left-Thru		53.3	D	82	55	52.6	D	159	#135	41.8	D	121	83
	SB Right	125	49.9	D	69	0	41.3	D	83	0	37.8	D	60	0
	SB Approach		*51.7*	*D*	--	--	*50.2*	*D*	--	--	*40.7*	*D*	--	--
	Overall		12.1	B	--	--	18.7	B	--	--	13.1	B	--	--
3. Sliding Hill Road (E-W) at	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Totopotomoy Trail (N)	EB Right	275	†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	300	9.3	A	38	1	10.6	B	52	4	8.8	A	28	1
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*0.1*	*A*	--	--	*0.3*	*A*	--	--	*0.2*	*A*	--	--
	NB Left-Right		47.0	E	129	80	49.6	E	100	56	18.5	C	66	16
	NB Approach		*47.0*	*E*	--	--	*49.6*	*E*	--	--	*18.5*	*C*	--	--
4. Sliding Hill Road (E-W) at	EB Left	225	10.4	B	98	13	10.0	A	60	9	8.6	A	30	3
Atlee Commerce Boulevard (N) /	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Atlee Commons Drive (S)	EB Right		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
Unsignalized	*EB Approach*		*1.5*	*A*	--	--	*0.7*	*A*	--	--	*0.5*	*A*	--	--
	WB Left	283	9.2	A	44	3	10.9	B	30	3	8.9	A	0	0
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Right	250	*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Approach		*0.3*	*A*	--	--	*0.3*	*A*	--	--	*0.0*	*A*	--	--
	NB Left-Thru		64.5	F	59	25	402.6	F	74	108	25.6	D	26	1
	NB Right		10.4	B	30	2	13.5	B	68	11	10.4	B	25	0
	NB Approach		*44.0*	*E*	--	--	*164.6*	*F*	--	--	*21.8*	*C*	--	--
	SB L-T-R		17.2	C	84	18	48.6	E	258	117	9.7	A	53	4
	SB Approach		*17.2*	*C*	--	--	*48.6*	*E*	--	--	*9.7*	*A*	--	--
5. Sliding Hill Road (E-W) at	EB Left	383	11.5	B	223	24	4.8	A	152	m15	2.2	A	58	7
Cedar Run (N) /	EB Thru-Right		4.5	A	98	163	4.8	A	207	191	1.7	A	96	40
Air Park Road (S)	*EB Approach*		*7.3*	*A*	--	--	*4.8*	*A*	--	--	*1.8*	*A*	--	--
Signalized	WB Left	150	3.7	A	51	m1	9.6	A	35	m3	3.8	A	23	m2
	WB Thru		14.5	B	233	326	11.6	B	204	160	6.7	A	107	94
	WB Right	250	14.5	B	106	m9	13.7	B	47	m0	8.3	A	26	m0
	WB Approach		*14.5*	*B*	--	--	*11.7*	*B*	--	--	*6.8*	*A*	--	--
	NB L-T-R		55.0	D	51	28	49.6	D	50	27	50.1	D	46	25
	NB Approach		*55.0*	*D*	--	--	*49.6*	*D*	--	--	*50.1*	*D*	--	--
	SB Left		49.4	D	64	51	45.1	D	132	126	40.8	D	47	26
	SB Thru-Right		48.6	D	114	59	40.2	D	178	78	40.4	D	44	38
	SB Approach		*48.8*	*D*	--	--	*41.6*	*D*	--	--	*40.5*	*D*	--	--
	Overall		15.0	B	--	--	14.1	B	--	--	6.5	A	--	--
6. Sliding Hill Road (E-W) at	EB Left	325	10.2	B	20	m1	4.4	A	5	m0	5.4	A	17	m1
New Ashcake Road (N-S)	EB Thru		20.4	C	134	36	7.3	A	193	64	11.2	B	168	30
Signalized	EB Right [3]		25.8	C	--	37	37.9	D	--	189	8.3	A	--	7
	EB Approach		*23.5*	*C*	--	--	*27.9*	*C*	--	--	*9.3*	*A*	--	--
	WB Left	275	37.1	D	82	55	12.9	B	86	58	16.0	B	50	27
	WB Thru-Right		37.1	D	141	156	13.2	B	84	85	17.1	B	85	70
	WB Approach		*37.1*	*D*	--	--	*13.2*	*B*	--	--	*17.0*	*B*	--	--
	NB Left		22.5	C	456	517	46.6	D	348	325	26.6	C	262	244
	NB Thru-Right		10.9	B	74	22	27.4	C	64	29	19.0	B	50	24
	NB Approach		*21.4*	*C*	--	--	*44.3*	*D*	--	--	*25.7*	*C*	--	--
	SB L-T-R		64.0	E	56	29	53.6	D	48	28	120.9	F	50	26
	SB Approach		*64.0*	*E*	--	--	*53.6*	*D*	--	--	*120.9*	*F*	--	--
	Overall		26.0	C	--	--	29.2	C	--	--	17.2	B	--	--

7. Ashcake Road (E) /	EB L-T-R		0.4	A	10	0	0.4	A	13	0	0.4	A	8	0
Peaks Road (W) at	*EB Approach*		*0.4*	*A*	--	--	*0.4*	*A*	--	--	*0.4*	*A*	--	--
Sliding Hill Road (N) /	WB L-T-R		4.6	A	51	7	5.1	A	57	6	5.3	A	47	6
Mt Hermon Road (S)	*WB Approach*		*4.6*	*A*	--	--	*5.1*	*A*	--	--	*5.3*	*A*	--	--
Unsignalized	NB L-T-R		16.7	C	107	41	18.7	C	190	88	12.8	B	124	33
	NB Approach		*16.7*	*C*	--	--	*18.7*	*C*	--	--	*12.8*	*B*	--	--
	SB Right		14.6	B	79	20	14.1	B	48	10	12.7	B	52	11
	SB Approach		*14.6*	*B*	--	--	*14.1*	*B*	--	--	*12.7*	*B*	--	--
8. Lewistown Road (E) at	EB Left-Right		26.5	D	224	111	73.4	F	349	319	12.1	B	78	33
Ashcake Road (N-S)	*EB Approach*		*26.5*	*D*	--	--	*73.4*	*F*	--	--	*12.1*	*B*	--	--
Unsignalized	NB Left-Thru		4.9	A	134	11	4.7	A	127	9	2.8	A	46	2
	NB Approach		*4.9*	*A*	--	--	*4.7*	*A*	--	--	*2.8*	*A*	--	--
	SB Thru-Right		†	†	†	†	†	†	†	†	†	†	†	†
	SB Approach		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
9. Lewistown Road (E-W) at	EB U-Turn	425	0.0	A	32	0	0.0	A	24	0	0.0	A	11	0
Air Park Road (N)	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	EB Right	250	†	†	--	--	†	†	--	--	†	†	--	--
	EB Approach		*0.0*	*A*	--	--	*0.0*	*A*	--	--	*0.0*	*A*	--	--
	WB Left	250	8.5	A	69	8	8.3	A	52	4	7.7	A	31	1
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*2.5*	*A*	--	--	*1.3*	*A*	--	--	*1.3*	*A*	--	--
	NB Left		17.5	C	122	31	15.6	C	164	46	10.2	B	61	6
	NB Right	300	17.5	C	60	--	15.6	C	115	--	10.2	B	32	--
	NB Approach		*17.5*	*C*	--	--	*15.6*	*C*	--	--	*10.2*	*B*	--	--
10. Lewistown Road (E-W) at	EB Left		10.0	A	68	15	8.4	A	103	8	10.6	B	94	29
I-95 NB Off-Ramp (N) /	EB Thru		9.4	A	151	84	9.3	A	159	63	8.4	A	80	47
Travel Center Entrance (S)	*EB Approach*		*9.5*	*A*	--	--	*9.1*	*A*	--	--	*9.2*	*A*	--	--
Signalized	WB Thru		21.4	C	129	116	21.2	C	139	148	20.0	B	69	61
	WB Right		18.9	B	40	m0	18.1	B	26	0	18.8	B	27	0
	WB Approach		*21.3*	*C*	--	--	*21.0*	*C*	--	--	*19.9*	*B*	--	--
	NB Dual Left [2]		34.7	C	193	148	35.1	D	159	87	33.9	C	114	73
	NB Thru		31.1	C	148	66	35.6	D	154	71	35.7	D	174	86
	NB Right		30.1	C	107	54	32.7	C	114	43	31.8	C	70	0
	NB Approach		*32.8*	*C*	--	--	*34.1*	*C*	--	--	*33.7*	*C*	--	--
	SB Left		40.7	D	68	15	41.0	D	62	22	39.5	D	41	22
	SB Right		40.9	D	145	0	40.3	D	117	0	39.4	D	105	0
	SB Approach		*40.9*	*D*	--	--	*40.4*	*D*	--	--	*39.4*	*D*	--	--
	Overall		27.1	C	--	--	25.7	C	--	--	27.5	C	--	--
11. Lewistown Road (E-W) at	EB Left	290	11.2	B	105	8	10.1	B	134	17	8.7	A	65	6
I-95 NB On-Ramp (S)	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	*EB Approach*		*2.8*	*A*	--	--	*4.3*	*A*	--	--	*2.9*	*A*	--	--
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Right		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*
12. Lewistown Road (E-W) at	EB Thru		12.0	B	156	99	12.3	B	187	194	7.3	A	90	81
I-95 SB On/Off-Ramp (N-S)	EB Right		11.7	B	--	42	12.4	B	--	57	7.0	A	--	27
Signalized	*EB Approach*		*11.8*	*B*	--	--	*12.3*	*B*	--	--	*7.1*	*A*	--	--
	WB Left		2.6	A	162	10	2.5	A	152	10	2.3	A	69	10
	WB Thru		1.6	A	121	11	1.0	A	113	6	1.5	A	66	11
	WB Right [3]		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*1.9*	*A*	--	--	*1.6*	*A*	--	--	*1.7*	*A*	--	--
	SB Left-Thru		39.1	D	183	103	45.1	D	220	83	41.7	D	137	69
	SB Right [3]		34.9	C	--	54	36.0	D	--	22	37.7	D	--	39
	SB Approach		*36.5*	*D*	--	--	*40.6*	*D*	--	--	*39.2*	*D*	--	--
	Overall		11.5	B	--	--	11.2	B	--	--	10.9	B	--	--
13. Sliding Hill Road (E-W) at	EB Left	300	8.2	A	58	6	7.9	A	32	2	7.8	A	34	2
Site Entrance A (S)	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	*EB Approach*		*3.2*	*A*	--	--	*0.7*	*A*	--	--	*0.8*	*A*	--	--
	WB Thru-Right		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*
	SB Left		14.5	B	23	0	14.5	B	31	7	12.2	B	10	0
	SB Right		10.6	B	53	3	10.3	B	64	10	9.6	A	37	2
	SB Approach		*10.4*	*B*	--	--	*10.6*	*B*	--	--	*9.7*	*A*	--	--
14. Sliding Hill Road (E-W) at	EB Left-Thru		0.0	A	--	--	0.0	A	--	--	0.0	A	--	--
Site Entrance B (S)	*EB Approach*		*0.0*	*A*	--	--	*0.0*	*A*	--	--	*0.0*	*A*	--	--
Unsignalized	WB Thru-Right		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*
	NB Left-Right		10.4	B	36	1	10.8	B	41	3	9.7	A	30	0
	NB Approach		*10.4*	*B*	--	--	*10.8*	*B*	--	--	*9.7*	*A*	--	--

[1] Overall intersection LOS and delay reported for signalized intersections and roundabouts only.

[2] Dual left turn lanes; average storage is provided.

[3] Channelized right turn not controlled by the signal.

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

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

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

7.2.2 2027 Phase 2 Traffic Volumes Analysis

Table 7-2 summarizes the intersection LOS, delay, and 95th percentile queues based on the 2027 Total traffic volumes shown on Figures 7-4 through 7-6 and the proposed intersection geometry. As noted prior, all site trips entering from the Sliding Hill Road corridor enters through the proposed Site Entrance "A" and all site trips entering from the Lewistown Road corridor enters through the proposed Site Entrance "B". There are no changes in geometry for the existing intersections. The corresponding SYNCHRO worksheets are included in Appendix E.

Please note that the intersection numbers shown on the level of service and delay summary tables correspond to the intersection numbers used in the SYNCHRO models.

As indicated in Table 7-2, all approaches at the signalized intersection of Sliding Hill Road at Atlee Station Road/Leadbetter Road continue to operate at LOS E or better during both the AM and PM peak hours under 2027 Total conditions. The following movements operate with LOS F: NB Left (PM only), SB Left (AM only), and SB Right (PM only). All movements operate at LOS D or better during the Saturday peak hour. The signalized intersection continues to operate at an overall LOS D during the AM and PM peak hours and at LOS C during the Saturday peak hour.

The available turn lane storage continues to be sufficient to accommodate the 95th percentile and maximum queue lengths during the AM, PM, and Saturday peak hours on both Sliding Hill Road and Atlee Station Road. However, it should be noted that certain through queues on the mainlines of eastbound Sliding Hill Road (PM), westbound Sliding Hill Road (AM & PM), northbound Atlee Station Road (AM only), and southbound Leadbetter Road (AM & PM) block access to auxiliary turn lanes. Operations are similar to existing and background results.

At the signalized intersection of Sliding Hill Road at Kings Charter Drive/Charter Hill Court, the intersection continues to operate at an overall LOS B during the AM and Saturday peak hours and at LOS C during the PM peak hour. All movements at the intersection operate at LOS D or better during the AM, PM, and Saturday peak hours, with the exception of the side street lefts, which operate at LOS E during both the AM and PM peak hours.

The available turn lane storage is sufficient to accommodate the 95th percentile and maximum queue lengths during the all peak hours on Sliding Hill Road and Kings Charter Drive/Charter Hill Court. It should be noted that certain through queues on mainline Sliding Hill Road block access to auxiliary turn lanes and do not allow the turn lanes to be fully utilized. The eastbound through queues during the PM peak hour and the westbound through queues during the AM and PM peak hours present blocking issues. No issues are reported for queuing during the Saturday peak hour.

At the unsignalized intersection of Sliding Hill Road and Totopotomoy Trail, the mainline movements, eastbound and westbound on Sliding Hill Road, continue to operate at LOS B or better during all peak hours. The northbound approach of Totopotomoy Trail operates at LOS F during the AM and PM peak hours and at LOS C during the Saturday peak hour. Although the northbound approach operates with a LOS F, the queues experienced are roughly 140 to 170 feet, or approximately 7 vehicles.

At the unsignalized intersection of Sliding Hill Road and Atlee Commerce Boulevard/Atlee Commons Drive, the mainline movements continue operate at LOS B or better during all scenarios. The northbound approach operates at LOS F during the AM and PM peak hours and the southbound approach operates at LOS F during the PM peak hour. For the side street approaches, the AM and PM peak hour operations can be attributed to the heavy through volumes at the intersection and limited gaps for exiting traffic. These issues were noted in existing and background analysis conditions.

As indicated in Table 7-2, the signalized intersection of Sliding Hill Road at Air Park Road continues to operate at an overall LOS B during both the AM and PM peak hours and LOS A during the Saturday peak hour. All movements at the intersection continue to operate at LOS D or better during all three analysis scenarios. The available turn lane storage is sufficient to accommodate the 95th percentile and maximum queue lengths during the AM, PM, and Saturday peak hours on either Sliding Hill Road or Air Park Road.

At the signalized intersection of Sliding Hill Road at New Ashcake Road, all movements and approaches operate at LOS D or better during all analysis peak hours, with the exception of the southbound approach, which operates at LOS E. The intersection operates with an overall LOS C during the AM, LOS D during the PM, and LOS B during the Saturday peak hours. The available turn lane storage is sufficient to accommodate the 95th percentile and maximum queue lengths during the AM, PM, and Saturday peak hours on either Sliding Hill Road or New Ashcake Road.

The following unsignalized intersections within the study area continues to operate at LOS C or better for all movements and approaches and do not show any queuing issues:

- Sliding Hill Road at Ashcake Road/Peaks Road/Mt. Hermon Road
- Lewistown Road at Air Park Road
- Lewistown Road at I-95 NB On-Ramp

At the unsignalized intersection of Lewistown Road at Ashcake Road, the mainline operations on Ashcake Road continue to operate at LOS A during all analysis periods. However, during the PM peak hour, the eastbound approach of Lewistown Road operates at LOS F as it did under 2027 background conditions. The queues on Lewistown Road are 375 feet, which is equal to approximately 15 vehicles, and do not impact the nearby Air Park Road intersection.

As indicated in Table 7-2, all movements at the signalized intersection of Lewistown Road and the I-95 NB Off-Ramp/Travel Center Entrance continue to operate at LOS D or better during the AM, PM, and Saturday peak hours. The signalized intersection continues to operate at an overall LOS C during all analysis scenario peak hours. The intersection operates in an acceptable manner and there are no queuing issues noted. Operations are similar to existing and background results.

At the signalized intersection of Lewistown Road and the I-95 SB On/Off-Ramp, the intersection continues to operate at an overall LOS B for all three analysis scenarios. All mainline movements along Lewistown Road operate at LOS B or better during the AM, PM, and Saturday peak hours. The southbound approach from the I-95 off-ramp continues to operate at LOS D during all three peak hours. The mainline approaches do not experience any queuing issues. The longest queue that the off-ramp experiences is 200 feet during the AM peak hour, which will not impact any operations on I-95.

At the proposed unsignalized intersection of Site Entrance "A" on Sliding Hill Road, all movements and approaches continue to operate at LOS B or better during the AM, PM, and Saturday peak hours. The provided turn lane storage is sufficient to accommodate the 95th percentile and maximum queue lengths during all peak hours on Sliding Hill Road. The longest queue observed for the proposed eastbound left turn lane on Sliding Hill into the site is 79 feet, or approximately 4 vehicles, and occurs during the AM peak hour. The intersection operates in an acceptable manner and there are no queuing issues noted.

At the proposed unsignalized intersection of Site Entrance "B" on Ashcake Road, all movements and approaches continue to operate at LOS B or better during the AM, PM, and Saturday peak hours. The available turn lane storage is sufficient to accommodate the 95th percentile and maximum queue lengths during all peak hours on Sliding Hill Road. The intersection operates in an acceptable manner and there are no queuing issues noted.

Table 7-2: Intersection Level of Service, Delay, and Queue Summary
2027 Phase 2 Total Traffic Volumes

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				PM PEAK HOUR				SATURDAY PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)
1. Sliding Hill Road (E-W) at	EB Dual Left [2]	500	76.1	E	418	#317	79.2	E	373	#182	44.3	D	156	77
Atlee Station Road (N) /	EB Thru		34.8	C	430	372	62.2	E	722	#574	24.8	C	242	231
Leadbetter Road (S)	EB Right		11.7	B	92	13	21.5	C	471	114	13.2	B	120	17
Signalized	*EB Approach*		*47.0*	*D*	--	--	*54.6*	*D*	--	--	*25.1*	*C*	--	--
	WB Left	288	33.1	C	274	m106	77.1	E	263	m#182	28.8	C	142	99
	WB Thru		38.6	D	605	#521	26.1	C	449	#462	9.4	A	196	55
	WB Right	300	30.1	C	300	m4	26.6	C	206	m0	20.0	B	39	0
	WB Approach		*37.5*	*D*	--	--	*32.2*	*C*	--	--	*12.9*	*B*	--	--
	NB Dual Left [2]	500	73.0	E	467	#385	86.7	F	337	#225	43.0	D	202	124
	NB Thru		44.8	D	351	222	49.3	D	183	128	40.0	D	107	87
	NB Right		38.9	D	114	0	44.5	D	134	0	38.3	D	82	0
	NB Approach		*62.6*	*E*	--	--	*69.8*	*E*	--	--	*41.3*	*D*	--	--
	SB Left	210	95.6	F	173	#160	38.9	D	186	146	44.5	D	99	78
	SB Thru		58.3	E	444	82	38.7	D	1050	148	44.1	D	105	75
	SB Right	200	34.0	C	200	169	84.3	F	200	#458	27.5	C	160	0
	SB Approach		*48.7*	*D*	--	--	*70.0*	*E*	--	--	*36.0*	*D*	--	--
	Overall		48.3	D	--	--	53.9	D	--	--	25.6	C	--	--
2. Sliding Hill Road (E-W) at	EB Left	150	4.2	A	86	m3	11.5	B	149	m14	2.9	A	79	9
King's Charter Drive (N)	EB Thru		4.3	A	119	66	8.6	A	309	m71	5.5	A	104	238
Charter Hill Court (S)	EB Right	700	15.0	B	39	m1	0.8	A	77	m0	15.5	B	30	0
Signalized	*EB Approach*		*5.3*	*A*	--	--	*7.9*	*A*	--	--	*6.1*	*A*	--	--
	WB Left	300	6.5	A	130	14	29.1	C	211	96	7.5	A	103	19
	WB Thru-Right		8.8	A	384	92	18.8	B	316	154	10.5	B	184	163
	WB Approach		*8.7*	*A*	--	--	*20.1*	*C*	--	--	*10.2*	*B*	--	--
	NB Left-Thru		58.5	E	215	190	60.5	E	247	#234	46.9	D	122	86
	NB Right		45.7	D	69	0	41.8	D	160	22	42.7	D	72	0
	NB Approach		*54.8*	*D*	--	--	*50.5*	*D*	--	--	*44.8*	*D*	--	--
	SB Left-Thru		58.6	E	93	62	60.2	E	198	#156	47.4	D	135	96
	SB Right	125	54.5	D	74	0	45.4	D	122	0	42.0	D	109	0
	SB Approach		*56.6*	*E*	--	--	*57.0*	*E*	--	--	*45.9*	*D*	--	--
	Overall		12.6	B	--	--	20.8	C	--	--	13.4	B	--	--
3. Sliding Hill Road (E-W) at	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Totopotomoy Trail (N)	EB Right	275	†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	300	9.6	A	32	1	11.2	B	64	5	8.9	A	35	1
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*0.1*	*A*	--	--	*0.3*	*A*	--	--	*0.2*	*A*	--	--
	NB Left-Right		78.4	F	164	120	84.4	F	144	88	20.7	C	70	20
	NB Approach		*78.4*	*F*	--	--	*84.4*	*F*	--	--	*20.7*	*C*	--	--
4. Sliding Hill Road (E-W) at	EB Left	225	10.9	B	87	16	10.5	B	71	11	8.8	A	45	4
Atlee Commerce Boulevard (N) /	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Atlee Commons Drive (S)	EB Right		†	†	--	--	†	†	--	--	†	†	--	--
Unsignalized	*EB Approach*		*1.5*	*A*	--	--	*0.8*	*A*	--	--	*0.5*	*A*	--	--
	WB Left	283	9.5	A	50	4	11.4	B	30	3	9.1	A	9	0
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Right	250	†	†	--	--	†	†	--	--	†	†	--	--
	WB Approach		*0.3*	*A*	--	--	*0.3*	*A*	--	--	*0.0*	*A*	--	--
	NB Left-Thru		95.9	F	76	38	742.9	F	88	133	29.1	D	28	2
	NB Right		10.8	B	38	2	14.3	B	89	13	10.7	B	22	0
	NB Approach		*63.9*	*F*	--	--	*295.0*	*F*	--	--	*24.5*	*C*	--	--
	SB L-T-R		21.8	C	102	26	111.9	F	322	203	9.9	A	55	5
	SB Approach		*21.8*	*C*	--	--	*111.9*	*F*	--	--	*9.9*	*A*	--	--
5. Sliding Hill Road (E-W) at	EB Left	383	13.2	B	281	84	5.3	A	155	m62	1.5	A	56	3
Cedar Run (N) /	EB Thru-Right		5.0	A	99	218	6.5	A	215	461	2.5	A	106	46
Air Park Road (S)	*EB Approach*		*8.2*	*A*	--	--	*6.4*	*A*	--	--	*2.4*	*A*	--	--
Signalized	WB Left	150	2.9	A	79	m1	14.0	B	36	m3	5.0	A	24	m3
	WB Thru		16.9	B	281	411	13.2	B	216	235	7.1	A	116	107
	WB Right	250	15.2	B	199	m13	13.4	B	59	m1	8.1	A	33	m0
	WB Approach		*16.7*	*B*	--	--	*13.2*	*B*	--	--	*7.1*	*A*	--	--
	NB L-T-R		60.2	E	46	30	55.0	D	62	28	49.3	D	43	27
	NB Approach		*60.2*	*E*	--	--	*55.0*	*D*	--	--	*49.3*	*D*	--	--
	SB Left		54.5	D	57	58	50.9	D	171	145	45.9	D	39	29
	SB Thru-Right		53.4	D	135	64	44.2	D	187	86	45.4	D	52	41
	SB Approach		*53.7*	*D*	--	--	*46.1*	*D*	--	--	*45.5*	*D*	--	--
	Overall		16.9	B	--	--	16.2	B	--	--	7.2	A	--	--
6. Sliding Hill Road (E-W) at	EB Left	325	9.6	A	21	m1	4.1	A	12	m0	4.0	A	13	m1
New Ashcake Road (N-S)	EB Thru		18.2	B	141	41	12.3	B	236	85	6.3	A	211	20
Signalized	EB Right [3]		31.4	C	--	0	65.4	E	--	652	9.9	A	--	41
	EB Approach		*25.6*	*C*	--	--	*48.0*	*D*	--	--	*8.7*	*A*	--	--
	WB Left	275	37.0	D	92	63	15.7	B	92	67	17.0	B	69	30
	WB Thru-Right		35.1	D	154	183	15.8	B	100	104	18.4	B	92	78
	WB Approach		*35.4*	*D*	--	--	*15.8*	*B*	--	--	*18.2*	*B*	--	--
	NB Left		30.9	C	591	606	49.6	D	399	#436	29.7	C	288	290
	NB Thru-Right		13.8	B	86	23	28.2	C	68	33	20.9	C	48	26
	NB Approach		*29.2*	*C*	--	--	*47.1*	*D*	--	--	*28.7*	*C*	--	--
	SB L-T-R		70.1	E	64	31	54.9	D	50	28	56.4	E	58	28
	SB Approach		*70.1*	*E*	--	--	*54.9*	*D*	--	--	*56.4*	*E*	--	--
	Overall		30.0	C	--	--	41.0	D	--	--	17.3	B	--	--

7. Ashcake Road (E) /	EB L-T-R		0.4	A	18	0	0.4	A	23	1	0.5	A	15	0
Peaks Road (W) at	*EB Approach*		*0.4*	*A*	--	--	*0.4*	*A*	--	--	*0.5*	*A*	--	--
Sliding Hill Road (N) /	WB L-T-R		4.7	A	42	8	5.2	A	64	6	5.4	A	35	6
Mt Hermon Road (S)	*WB Approach*		*4.7*	*A*	--	--	*5.2*	*A*	--	--	*5.4*	*A*	--	--
Unsignalized	NB L-T-R		19.0	C	121	52	22.2	C	197	114	13.6	B	136	39
	NB Approach		*19.0*	*C*	--	--	*22.2*	*C*	--	--	*13.6*	*B*	--	--
	SB Right		15.7	C	74	24	14.9	B	55	11	13.2	B	55	12
	SB Approach		*15.7*	*C*	--	--	*14.9*	*B*	--	--	*13.2*	*B*	--	--
8. Lewistown Road (E) at	EB Left-Right		35.7	E	309	155	138.5	F	373	473	12.7	B	97	39
Ashcake Road (N-S)	*EB Approach*		*35.7*	*E*	--	--	*138.5*	*F*	--	--	*12.7*	*B*	--	--
Unsignalized	NB Left-Thru		5.0	A	160	12	4.9	A	124	10	2.8	A	55	2
	NB Approach		*5.0*	*A*	--	--	*4.9*	*A*	--	--	*2.8*	*A*	--	--
	SB Thru-Right		†	†	†	†	†	†	†	†	†	†	†	†
	SB Approach		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
9. Lewistown Road (E-W) at	EB U-Turn	425	0.0	A	38	0	0.0	A	43	0	0.0	A	22	0
Air Park Road (N)	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	EB Right	250	†	†	--	--	†	†	--	--	†	†	--	--
	EB Approach		*0.0*	*A*	--	--	*0.0*	*A*	--	--	*0.0*	*A*	--	--
	WB Left	250	8.7	A	86	9	8.4	A	59	4	7.7	A	27	1
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*2.5*	*A*	--	--	*1.4*	*A*	--	--	*1.3*	*A*	--	--
	NB Left		19.7	C	117	39	17.6	C	181	60	10.4	B	63	7
	NB Right	300	19.7	C	55	--	17.6	C	196	--	10.4	B	28	--
	NB Approach		*19.7*	*C*	--	--	*17.6*	*C*	--	--	*10.4*	*B*	--	--
10. Lewistown Road (E-W) at	EB Left		11.7	B	80	16	9.4	A	97	10	11.1	B	127	32
I-95 NB Off-Ramp (N) /	EB Thru		9.2	A	202	91	9.4	A	173	51	8.8	A	103	50
Travel Center Entrance (S)	*EB Approach*		*9.5*	*A*	--	--	*9.4*	*A*	--	--	*9.6*	*A*	--	--
Signalized	WB Thru		22.9	C	138	123	21.5	C	140	163	20.7	C	60	66
	WB Right		19.9	B	40	m0	18.1	B	32	0	19.3	B	27	0
	WB Approach		*22.7*	*C*	--	--	*21.4*	*C*	--	--	*20.6*	*C*	--	--
	NB Dual Left [2]		34.4	C	199	160	35.5	D	159	93	33.4	C	132	76
	NB Thru		30.5	C	147	69	36.0	D	147	75	35.2	D	146	89
	NB Right		29.6	C	119	45	32.8	C	123	54	31.3	C	71	0
	NB Approach		*32.4*	*C*	--	--	*34.4*	*C*	--	--	*33.2*	*C*	--	--
	SB Left		39.6	D	51	18	41.2	D	52	23	39.5	D	50	23
	SB Right		39.7	D	139	0	40.4	D	120	0	39.4	D	126	0
	SB Approach		*39.7*	*D*	--	--	*40.5*	*D*	--	--	*39.4*	*D*	--	--
	Overall		27.1	C	--	--	26.0	C	--	--	27.5	C	--	--
11. Lewistown Road (E-W) at	EB Left	290	11.4	B	107	10	10.5	B	131	20	8.8	A	69	7
I-95 NB On-Ramp (S)	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	*EB Approach*		*2.9*	*A*	--	--	*4.4*	*A*	--	--	*2.9*	*A*	--	--
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Right		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*
12. Lewistown Road (E-W) at	EB Thru		12.9	B	133	110	13.0	B	228	208	7.5	A	105	88
I-95 SB On/Off-Ramp (N-S)	EB Right		12.5	B	--	45	13.1	B	--	57	7.2	A	--	29
Signalized	*EB Approach*		*12.6*	*B*	--	--	*13.0*	*B*	--	--	*7.4*	*A*	--	--
	WB Left		4.5	A	164	72	3.1	A	154	11	2.6	A	81	11
	WB Thru		3.3	A	124	66	1.4	A	98	6	1.6	A	50	12
	WB Right [3]		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*3.6*	*A*	--	--	*2.1*	*A*	--	--	*1.9*	*A*	--	--
	SB Left-Thru		39.7	D	183	112	47.4	D	200	92	41.6	D	148	74
	SB Right [3]		34.4	C	--	55	35.7	D	--	27	37.3	D	--	45
	SB Approach		*36.4*	*D*	--	--	*41.7*	*D*	--	--	*39.0*	*D*	--	--
	Overall		12.8	B	--	--	11.9	B	--	--	11.1	B	--	--
13. Sliding Hill Road (E-W) at	EB Left	300	8.4	A	79	9	7.9	A	35	3	7.8	A	31	2
Site Entrance A (S)	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	*EB Approach*		*3.7*	*A*	--	--	*0.8*	*A*	--	--	*0.9*	*A*	--	--
	WB Thru-Right		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*
	SB Left		16.2	C	26	3	15.7	C	31	2	12.7	B	10	0
	SB Right		10.6	B	53	4	10.7	B	74	15	9.7	A	33	2
	SB Approach		*10.9*	*B*	--	--	*11.1*	*B*	--	--	*9.9*	*A*	--	--
14. Sliding Hill Road (E-W) at	EB Left-Thru		0.0	A	--	--	0.0	A	--	--	0.0	A	--	--
Site Entrance B (S)	*EB Approach*		*0.0*	*A*	--	--	*0.0*	*A*	--	--	*0.0*	*A*	--	--
Unsignalized	WB Thru-Right		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*
	NB Left-Right		10.6	B	34	1	11.1	B	53	4	9.8	A	32	0
	NB Approach		*10.6*	*B*	--	--	*11.1*	*B*	--	--	*9.8*	*A*	--	--

[1] Overall intersection LOS and delay reported for signalized intersections and roundabouts only.

[2] Dual left turn lanes; average storage is provided.

[3] Channelized right turn not controlled by the signal.

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

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

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

7.2.3 2032 Phase 3 (Full Buildout) Traffic Volumes Analysis

Table 7-3 summarizes the intersection LOS, delay, and 95th percentile queues based on the 2032 Total traffic volumes shown on Figures 7-7 through 7-9 and the proposed intersection geometry. As noted prior, all site trips entering from the Sliding Hill Road corridor enters through the proposed Site Entrance "A" and all site trips entering from the Lewistown Road corridor enters through the proposed Site Entrance "B". There are no changes in geometry for the existing intersections. The corresponding SYNCHRO worksheets are included in Appendix E.

Please note that the intersection numbers shown on the level of service and delay summary tables correspond to the intersection numbers used in the SYNCHRO models.

As indicated in Table 7-3, almost all movements at the signalized intersection of Sliding Hill Road at Atlee Station Road/Leadbetter Road continue to operate at LOS E or better during both the AM and PM peak hours under 2032 Total conditions. The following movements operate with LOS F: EB Dual Left (AM & PM), WB Left (PM only), NB Dual Left (AM & PM), SB Left (AM only), and SB Right (PM only). All movements operate at LOS D or better during the Saturday peak hour. The signalized intersection continues to operate at an overall LOS E during the AM and PM peak hours and at LOS C during the Saturday peak hour, which is similar to the 2032 background analysis.

The available turn lane storage continues to be sufficient to accommodate the 95th percentile and maximum queue lengths during the AM, PM, and Saturday peak hours on both Sliding Hill Road and Atlee Station Road. However, it should be noted that certain through queues on the mainlines of eastbound Sliding Hill Road (AM & PM), westbound Sliding Hill Road (AM & PM), northbound Atlee Station Road (AM only), and southbound Leadbetter Road (AM & PM) block access to auxiliary turn lanes.

At the signalized intersection of Sliding Hill Road at Kings Charter Drive/Charter Hill Court, the intersection continues to operate at an overall LOS B during the AM and Saturday peak hours and at LOS C during the PM peak hour. All movements at the intersection operate at LOS D or better during the AM, PM, and Saturday peak hours, with the exception of the side street lefts during the AM and PM peak hours, which operate at LOS E.

The available turn lane storage is sufficient to accommodate the 95th percentile and maximum queue lengths during the all peak hours on Sliding Hill Road and Kings Charter Drive/Charter Hill Court. It should be noted that certain through queues on mainline Sliding Hill Road block access to auxiliary turn lanes and do not allow the turn lanes to be fully utilized. The eastbound and westbound through queues during both the AM and PM peak hours present blocking issues. No issues are reported for queuing during the Saturday peak hour. Operations are similar to background 2032 results.

At the unsignalized intersection of Sliding Hill Road and Totopotomoy Trail, the mainline movements, eastbound and westbound on Sliding Hill Road, continue to operate at LOS B or better during all peak hours. The northbound approach of Totopotomoy Trail continues to operate at LOS F during the AM and PM peak hours and at LOS C during the Saturday peak hour. Although the northbound approach operates with a LOS F, the queues experienced are roughly 190 to 210 feet, or approximately 8 vehicles, which is similar to the background 2032 analysis results.

At the unsignalized intersection of Sliding Hill Road and Atlee Commerce Boulevard/Atlee Commons Drive, the mainline movements continue to operate at LOS B or better during all scenarios. The northbound approach continues to operate at LOS F during the AM and PM peak hours and the southbound approach operates at LOS F during the PM peak hour. For the side street approaches, the AM and PM peak hour operations can be attributed to the heavy through volumes at the intersection and limited gaps for exiting traffic. These issues were noted in existing and background analysis conditions.

As indicated in Table 7-3, the signalized intersection of Sliding Hill Road at Air Park Road continues to operate at an overall LOS B during both the AM and PM peak hours and LOS A during the Saturday peak hour. All movements at the intersection continue to operate at LOS D or better during all three analysis scenarios. The available turn lane storage is sufficient to accommodate the 95th percentile and maximum queue lengths during the AM, PM, and Saturday peak hours on either Sliding Hill Road or Air Park Road.

At the signalized intersection of Sliding Hill Road at New Ashcake Road, all movements and approaches operate at LOS E or better during all analysis peak hours, with the exception of the eastbound right turn, which operates at LOS F during the PM peak hour, and the southbound approach, which operates at LOS F during the Saturday peak hour. The intersection continues to operate with an overall LOS C during the AM and Saturday peak hours and at LOS D during the PM peak hour. The available turn lane storage is sufficient to accommodate the 95th percentile and maximum queue lengths during the AM, PM, and Saturday peak hours on either Sliding Hill Road or New Ashcake Road. Operations are similar to background results.

The following unsignalized intersections within the study area continues to operate at LOS D or better for all movements and approaches and do not show any queuing issues:

- Sliding Hill Road at Ashcake Road/Peaks Road/Mt. Hermon Road
- Lewistown Road at Air Park Road
- Lewistown Road at I-95 NB On-Ramp

At the unsignalized intersection of Lewistown Road at Ashcake Road, the mainline operations on Ashcake Road continue to operate at LOS A during all analysis periods. However, during the AM and PM peak hours, the eastbound approach of Lewistown Road operates at LOS F, as it did under 2032 background conditions. The queues on Lewistown Road are 382 feet, which is equal to approximately 15 vehicles, and do not impact the nearby Air Park Road intersection.

As indicated in Table 7-3, all movements at the signalized intersection of Lewistown Road and the I-95 NB Off-Ramp/Travel Center Entrance continue to operate at LOS D or better during the AM, PM, and Saturday peak hours. The signalized intersection continues to operate at an overall LOS C during all analysis scenario peak hours. The intersection operates in an acceptable manner and there are no queuing issues noted. Operations are similar to existing and background results.

At the signalized intersection of Lewistown Road and the I-95 SB On/Off-Ramp, the intersection continues to operate at an overall LOS B for all three analysis scenarios. All mainline movements along Lewistown Road operate at LOS B or better during the AM, PM, and Saturday peak hours. The southbound approach from the I-95 off-ramp continues to operate at LOS D during all three peak hours. The mainline approaches do not experience any queuing issues. The longest queue that the off-ramp experiences is 326 feet, which will not impact any operations on I-95.

At the proposed unsignalized intersection of Site Entrance "A" on Sliding Hill Road, all movements and approaches continue to operate at LOS C or better during the AM, PM, and Saturday peak hours. The mainline movements along Sliding Hill Road operate at LOS A during all analysis periods. The available turn lane storage is sufficient to accommodate the 95th percentile and maximum queue lengths during all peak hours on Sliding Hill Road, with a maximum queue of 99 feet, or approximately 4 vehicles. The intersection operates in an acceptable manner and there are no queuing issues noted.

At the proposed unsignalized intersection of Site Entrance "B" on Ashcake Road, all movements and approaches operate at LOS B or better during the AM, PM, and Saturday peak hours. The mainline movements along Sliding Hill Road operate at LOS A during all analysis periods. The intersection operates in an acceptable manner and there are no queuing issues noted.

Table 7-3: Intersection Level of Service, Delay, and Queue Summary
2032 Phase 3 (Full Buildout) Total Traffic Volumes

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				PM PEAK HOUR				SATURDAY PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)
1. Sliding Hill Road (E-W) at	EB Dual Left [2]	500	105.0	F	487	#360	104.1	F	452	#205	40.3	D	148	76
Atlee Station Road (N) /	EB Thru		39.2	D	701	397	67.0	E	776	#626	26.7	C	258	237
Leadbetter Road (S)	EB Right		12.5	B	365	11	21.7	C	601	163	13.9	B	121	18
Signalized	*EB Approach*		*59.2*	*E*	--	--	*61.3*	*E*	--	--	*25.8*	*C*	--	--
	WB Left	288	31.8	C	287	m#128	94.0	F	280	m#175	26.8	C	161	68
	WB Thru		46.1	D	659	#582	23.4	C	412	#508	11.3	B	202	80
	WB Right	300	29.3	C	300	m2	25.0	C	229	m0	20.4	C	50	0
	WB Approach		*43.8*	*D*	--	--	*31.8*	*C*	--	--	*14.1*	*B*	--	--
	NB Dual Left [2]	500	96.7	F	495	#432	129.3	F	467	#257	39.4	D	199	123
	NB Thru		46.5	D	706	240	53.1	D	489	#144	36.0	D	107	85
	NB Right		39.2	D	397	0	45.2	D	340	0	34.2	C	82	0
	NB Approach		*78.5*	*E*	--	--	*95.4*	*F*	--	--	*37.5*	*D*	--	--
	SB Left	210	118.1	F	199	#175	40.6	D	184	159	40.3	D	84	77
	SB Thru		60.5	E	521	#94	40.4	D	1050	159	40.0	D	118	75
	SB Right	200	35.6	D	200	197	137.5	F	200	#552	24.1	C	128	0
	SB Approach		*54.2*	*D*	--	--	*107.2*	*F*	--	--	*32.3*	*C*	--	--
	Overall		58.9	E	--	--	66.9	E	--	--	25.1	C	--	--
2. Sliding Hill Road (E-W) at	EB Left	150	7.4	A	95	m3	14.4	B	149	m29	3.3	A	148	12
King's Charter Drive (N)	EB Thru		4.8	A	169	m70	10.5	B	235	m75	6.2	A	218	61
Charter Hill Court (S)	EB Right	700	15.1	B	49	m1	0.7	A	67	m0	15.7	B	49	m0
Signalized	*EB Approach*		*5.8*	*A*	--	--	*9.6*	*A*	--	--	*6.7*	*A*	--	--
	WB Left	300	7.2	A	207	m14	38.9	D	238	#152	14.0	B	103	26
	WB Thru-Right		9.5	A	353	100	23.2	C	342	214	13.4	B	206	172
	WB Approach		*9.4*	*A*	--	--	*25.1*	*C*	--	--	*13.5*	*B*	--	--
	NB Left-Thru		59.3	E	214	203	63.5	E	256	#260	42.0	D	115	83
	NB Right		45.2	D	64	0	41.5	D	175	34	38.0	D	71	0
	NB Approach		*55.3*	*E*	--	--	*51.7*	*D*	--	--	*40.0*	*D*	--	--
	SB Left-Thru		60.5	E	80	65	63.2	E	233	#175	42.9	D	143	93
	SB Right	125	55.0	D	64	0	45.2	D	124	0	37.5	D	88	0
	SB Approach		*57.8*	*E*	--	--	*59.3*	*E*	--	--	*41.4*	*D*	--	--
	Overall		13.2	B	--	--	23.7	C	--	--	14.3	B	--	--
3. Sliding Hill Road (E-W) at	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Totopotomoy Trail (N)	EB Right	275	†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	300	10.0	A	40	1	11.9	B	58	5	9.1	A	37	1
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*0.1*	*A*	--	--	*0.4*	*A*	--	--	*0.2*	*A*	--	--
	NB Left-Right		157.1	F	201	181	172.2	F	193	133	23.3	C	62	25
	NB Approach		*157.1*	*F*	--	--	*172.2*	*F*	--	--	*23.3*	*C*	--	--
4. Sliding Hill Road (E-W) at	EB Left	225	11.5	B	105	19	11.1	B	76	13	8.9	A	35	4
Atlee Commerce Boulevard (N) /	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Atlee Commons Drive (S)	EB Right		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
Unsignalized	*EB Approach*		*1.6*	*A*	--	--	*0.8*	*A*	--	--	*0.5*	*A*	--	--
	WB Left	283	10.0	A	50	5	12.1	B	28	4	9.3	A	5	0
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Right	250	*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Approach		*0.4*	*A*	--	--	*0.3*	*A*	--	--	*0.0*	*A*	--	--
	NB Left-Thru		165.4	F	88	54	1390.8	F	130	162	33.5	D	28	2
	NB Right		11.2	B	38	2	15.3	C	87	15	10.9	B	14	0
	NB Approach		*106.6*	*F*	--	--	*547.0*	*F*	--	--	*29.0*	*D*	--	--
	SB L-T-R		28.5	D	120	38	292.3	F	456	329	9.9	A	51	5
	SB Approach		*28.5*	*D*	--	--	*292.3*	*F*	--	--	*9.9*	*A*	--	--
5. Sliding Hill Road (E-W) at	EB Left	383	19.9	B	293	133	5.9	A	152	m49	2.8	A	59	8
Cedar Run (N) /	EB Thru-Right		5.7	A	109	243	7.1	A	273	501	2.6	A	123	47
Air Park Road (S)	*EB Approach*		*11.0*	*B*	--	--	*7.0*	*A*	--	--	*2.6*	*A*	--	--
Signalized	WB Left	150	3.1	A	57	m1	13.9	B	49	m4	4.4	A	23	m3
	WB Thru		18.7	B	312	444	14.2	B	251	236	7.5	A	139	110
	WB Right	250	16.0	B	219	m13	14.3	B	72	m1	8.4	A	35	m0
	WB Approach		*18.3*	*B*	--	--	*14.2*	*B*	--	--	*7.5*	*A*	--	--
	NB L-T-R		60.2	E	56	30	55.0	D	50	28	50.1	D	38	25
	NB Approach		*60.2*	*E*	--	--	*55.0*	*D*	--	--	*50.1*	*D*	--	--
	SB Left		54.7	D	79	62	50.8	D	174	154	40.8	D	47	28
	SB Thru-Right		53.5	D	157	67	43.7	D	222	88	40.4	D	64	40
	SB Approach		*53.7*	*D*	--	--	*45.7*	*D*	--	--	*40.4*	*D*	--	--
	Overall		18.7	B	--	--	16.6	B	--	--	7.2	A	--	--
6. Sliding Hill Road (E-W) at	EB Left	325	9.3	A	15	m1	3.5	A	10	m0	11.1	B	16	m1
New Ashcake Road (N-S)	EB Thru		19.9	B	190	45	15.6	B	278	124	11.3	B	162	70
Signalized	EB Right [3]		32.8	C	--	35	92.8	F	--	263	15.6	B	--	14
	EB Approach		*26.7*	*C*	--	--	*67.0*	*E*	--	--	*14.1*	*B*	--	--
	WB Left	275	41.1	D	118	66	31.5	C	131	76	12.4	B	54	31
	WB Thru-Right		36.6	D	165	198	18.1	B	115	121	13.5	B	84	82
	WB Approach		*37.2*	*D*	--	--	*21.4*	*C*	--	--	*13.4*	*B*	--	--
	NB Left		35.1	D	580	732	41.2	D	391	411	37.7	D	348	284
	NB Thru-Right		13.4	B	79	25	24.8	C	76	32	23.3	C	62	26
	NB Approach		*32.9*	*C*	--	--	*39.2*	*D*	--	--	*36.0*	*D*	--	--
	SB L-T-R		71.5	E	58	31	64.0	E	56	29	120.9	F	50	26
	SB Approach		*71.5*	*E*	--	--	*64.0*	*E*	--	--	*120.9*	*F*	--	--
	Overall		32.5	C	--	--	51.5	D	--	--	21.9	C	--	--

7. Ashcake Road (E) /	EB L-T-R		0.4	A	20	0	0.4	A	20	1	0.5	A	18	0
Peaks Road (W) at	*EB Approach*		*0.4*	*A*	--	--	*0.4*	*A*	--	--	*0.5*	*A*	--	--
Sliding Hill Road (N) /	WB L-T-R		4.7	A	50	9	5.2	A	70	7	5.4	A	41	7
Mt Hermon Road (S)	*WB Approach*		*4.7*	*A*	--	--	*5.2*	*A*	--	--	*5.4*	*A*	--	--
Unsignalized	NB L-T-R		22.7	C	140	70	27.7	D	224	151	14.5	B	113	47
	NB Approach		*22.7*	*C*	--	--	*27.7*	*D*	--	--	*14.5*	*B*	--	--
	SB Right		16.9	C	79	29	15.8	C	56	13	13.8	B	58	14
	SB Approach		*16.9*	*C*	--	--	*15.8*	*C*	--	--	*13.8*	*B*	--	--
8. Lewistown Road (E) at	EB Left-Right		57.5	F	347	234	238.8	F	382	667	13.5	B	99	46
Ashcake Road (N-S)	*EB Approach*		*57.5*	*F*	--	--	*238.8*	*F*	--	--	*13.5*	*B*	--	--
Unsignalized	NB Left-Thru		5.3	A	156	14	5.3	A	171	12	2.9	A	59	3
	NB Approach		*5.3*	*A*	--	--	*5.3*	*A*	--	--	*2.9*	*A*	--	--
	SB Thru-Right		†	†	†	†	†	†	†	†	†	†	†	†
	SB Approach		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
9. Lewistown Road (E-W) at	EB U-Turn	425	0.0	A	38	0	0.0	A	388	0	0.0	A	24	0
Air Park Road (N)	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	EB Right	250	†	†	--	--	†	†	--	--	†	†	--	--
	EB Approach		*0.0*	*A*	--	--	*0.0*	*A*	--	--	*0.0*	*A*	--	--
	WB Left	250	8.9	A	90	10	8.6	A	48	5	7.8	A	33	1
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*2.6*	*A*	--	--	*1.3*	*A*	--	--	*1.3*	*A*	--	--
	NB Left		23.4	C	150	52	20.6	C	1288	82	10.7	B	56	8
	NB Right	300	23.4	C	64	--	20.6	C	300	--	10.7	B	40	--
	NB Approach		*23.4*	*C*	--	--	*20.6*	*C*	--	--	*10.7*	*B*	--	--
10. Lewistown Road (E-W) at	EB Left		10.3	B	76	m8	9.9	A	106	m15	11.3	B	119	32
I-95 NB Off-Ramp (N) /	EB Thru		9.8	A	209	104	10.6	B	304	114	9.0	A	93	54
Travel Center Entrance (S)	*EB Approach*		*9.9*	*A*	--	--	*10.5*	*B*	--	--	*9.9*	*A*	--	--
Signalized	WB Thru		23.9	C	155	133	23.8	C	176	181	21.1	C	73	70
	WB Right		20.4	C	41	m0	19.5	B	30	0	19.6	B	23	0
	WB Approach		*23.6*	*C*	--	--	*23.6*	*C*	--	--	*21.0*	*C*	--	--
	NB Dual Left [2]		34.4	C	211	173	34.6	C	155	97	33.2	C	129	82
	NB Thru		30.1	C	150	73	35.0	C	172	78	35.1	D	190	98
	NB Right		29.2	C	150	59	32.0	C	505	62	30.9	C	74	0
	NB Approach		*32.2*	*C*	--	--	*33.5*	*C*	--	--	*33.0*	*C*	--	--
	SB Left		39.5	D	48	18	39.7	D	76	25	39.6	D	54	25
	SB Right		39.7	D	168	0	39.2	D	128	0	39.5	D	127	0
	SB Approach		*39.7*	*D*	--	--	*39.2*	*D*	--	--	*39.5*	*D*	--	--
	Overall		27.2	C	--	--	26.5	C	--	--	27.5	C	--	--
11. Lewistown Road (E-W) at	EB Left	290	12.4	B	129	11	11.0	B	258	24	9.0	A	69	8
I-95 NB On-Ramp (S)	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	*EB Approach*		*2.9*	*A*	--	--	*4.6*	*A*	--	--	*3.0*	*A*	--	--
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Right		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*
12. Lewistown Road (E-W) at	EB Thru		14.2	B	173	125	14.9	B	459	223	8.3	A	110	96
I-95 SB On/Off-Ramp (N-S)	EB Right		13.6	B	--	49	14.7	B	--	58	7.9	A	--	30
Signalized	*EB Approach*		*13.9*	*B*	--	--	*14.8*	*B*	--	--	*8.1*	*A*	--	--
	WB Left		4.9	A	182	97	3.6	A	172	11	2.9	A	91	12
	WB Thru		3.6	A	140	104	1.2	A	100	6	1.8	A	64	13
	WB Right [3]		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*4.0*	*A*	--	--	*2.2*	*A*	--	--	*2.1*	*A*	--	--
	SB Left-Thru		39.8	D	218	125	44.3	D	326	102	39.7	D	138	79
	SB Right [3]		33.5	C	--	55	34.4	C	--	32	36.0	D	--	46
	SB Approach		*36.0*	*D*	--	--	*39.6*	*D*	--	--	*37.4*	*D*	--	--
	Overall		13.3	B	--	--	12.7	B	--	--	11.2	B	--	--
13. Sliding Hill Road (E-W) at	EB Left	300	8.7	A	99	13	8.0	A	44	4	7.9	A	41	3
Site Entrance A (S)	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	*EB Approach*		*4.3*	*A*	--	--	*1.0*	*A*	--	--	*1.0*	*A*	--	--
	WB Thru-Right		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*
	SB Left		19.2	C	26	1	17.3	C	31	3	13.4	B	26	0
	SB Right		11.0	B	62	7	11.4	B	88	23	9.9	A	41	3
	SB Approach		*11.5*	*B*	--	--	*11.8*	*B*	--	--	*10.1*	*B*	--	--
14. Sliding Hill Road (E-W) at	EB Left-Thru		0.0	A	--	--	0.0	A	--	--	0.0	A	--	--
Site Entrance B (S)	*EB Approach*		*0.0*	*A*	--	--	*0.0*	*A*	--	--	*0.0*	*A*	--	--
Unsignalized	WB Thru-Right		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*
	NB Left-Right		10.9	B	32	2	11.6	B	58	6	9.9	A	30	1
	NB Approach		*10.9*	*B*	--	--	*11.6*	*B*	--	--	*9.9*	*A*	--	--

[1] Overall intersection LOS and delay reported for signalized intersections and roundabouts only.

[2] Dual left turn lanes; average storage is provided.

[3] Channelized right turn not controlled by the signal.

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

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

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

7.2.4 2035 Full Buildout + 3 Years Traffic Volumes Analysis

Table 7-4 summarizes the intersection LOS, delay, and queues based on the 2037 Build traffic volumes shown on Figures 7-10 through 7-12 and the proposed intersection geometry. As noted prior, all site trips entering from the Sliding Hill Road corridor enters through the proposed Site Entrance "A" and all site trips entering from the Lewistown Road corridor enters through the proposed Site Entrance "B". There are no changes in geometry for the existing intersections. The corresponding SYNCHRO worksheets are included in Appendix E.

Please note that the intersection numbers shown on the level of service and delay summary tables correspond to the intersection numbers used in the SYNCHRO models.

As indicated in Table 7-4, almost all movements at the signalized intersection of Sliding Hill Road at Atlee Station Road/Leadbetter Road continue to operate at LOS E or better during both the AM and PM peak hours under 2035 Total conditions. The following movements operate with LOS F: EB Dual Left (AM & PM), WB Left (PM only), NB Dual Left (AM & PM), SB Left (AM & PM), and SB Right (AM only). All movements operate at LOS D or better during the Saturday peak hour. The signalized intersection continues to operate at an overall LOS E during the AM and PM peak hours and at LOS C during the Saturday peak hour, which is similar to the 2032 and 2035 background analysis.

The available turn lane storage continues to be sufficient to accommodate the 95th percentile and maximum queue lengths during the AM, PM, and Saturday peak hours on both Sliding Hill Road and Atlee Station Road. However, it should be noted all through queues on the mainlines of eastbound Sliding Hill Road (AM & PM), westbound Sliding Hill Road (AM & PM), northbound Atlee Station Road (AM only), and southbound Leadbetter Road (AM & PM) block access to auxiliary turn lanes.

At the signalized intersection of Sliding Hill Road at Kings Charter Drive/Charter Hill Court, the intersection continues to operate at an overall LOS B during the AM and Saturday peak hours and at LOS C during the PM peak hour. All movements at the intersection operate at LOS D or better during the AM, PM, and Saturday peak hours, with the exception of the northbound and southbound lefts during the AM and PM peak hours, which operate at LOS E. Operations are similar to background 2035 results.

The available turn lane storage is sufficient to accommodate the 95th percentile and maximum queue lengths during the all peak hours on Sliding Hill Road and Kings Charter Drive/Charter Hill Court. It should be noted that certain through queues on mainline Sliding Hill Road block access to auxiliary turn lanes and do not allow the turn lanes to be fully utilized. The eastbound and westbound through queues during the AM and PM peak hours present blocking issues. No issues are reported for queuing during the Saturday peak hour. Operations are similar to background results.

At the unsignalized intersection of Sliding Hill Road and Totopotomoy Trail, the mainline movements, eastbound and westbound on Sliding Hill Road, continue to operate at LOS B or better during all peak hours. The northbound approach of Totopotomoy Trail continues to operate at LOS F during the AM and PM peak hours and at LOS D during the Saturday peak hour. Although the northbound approach operates with a LOS F, the queues experienced are roughly 200 to 250 feet, or approximately 10 vehicles, which is similar to the background 2035 analysis results.

At the unsignalized intersection of Sliding Hill Road and Atlee Commerce Boulevard/Atlee Commons Drive, the mainline movements continue to operate at LOS B or better during all scenarios. The northbound approach continues to operate at LOS F during the AM and PM peak hours and the southbound approach operates at LOS F during the PM peak hour. For the side street approaches, the AM and PM peak hour operations can be attributed to the heavy through volumes at the intersection and limited gaps for exiting traffic. These issues were noted in existing and background analysis conditions.

As indicated in Table 7-4, the signalized intersection of Sliding Hill Road at Air Park Road operates at an overall LOS C during the AM, LOS B during the PM, and LOS A during the Saturday peak hour. All movements at the intersection continue to operate at LOS D or better during all three analysis scenarios. The available turn lane storage is sufficient to accommodate the 95th percentile and maximum queue lengths during the AM, PM, and Saturday peak hours on either Sliding Hill Road or Air Park Road. Operations are similar to background 2035 results.

At the signalized intersection of Sliding Hill Road at New Ashcake Road, all movements and approaches operate at LOS E or better during all analysis peak hours, with the exception of the eastbound right turn, which operates at LOS F during the PM peak hour. The intersection continues to operate with an overall LOS C during the AM, LOS E during the PM, and LOS B during the Saturday peak hours. The available turn lane storage is sufficient to accommodate the 95th percentile and maximum queue lengths during the AM, PM, and Saturday peak hours on either Sliding Hill Road or New Ashcake Road. Operations are similar to background results.

The following unsignalized intersections within the study area continues to operate at LOS D or better for all movements and approaches and do not show any queuing issues:

- Sliding Hill Road at Ashcake Road/Peaks Road/Mt. Hermon Road
- Lewistown Road at Air Park Road
- Lewistown Road at I-95 NB On-Ramp

At the unsignalized intersection of Lewistown Road at Ashcake Road, the mainline operations on Ashcake Road continue to operate at LOS A during all analysis periods. However, during the AM and PM peak hours, the eastbound approach of Lewistown Road operates at LOS F, as it did under 2035 background conditions. The queues on Lewistown Road are roughly 1,000 feet and will impact the nearby Air Park Road intersection. The queuing and operations issues are similar to the background 2035 analysis issues.

As indicated in Table 7-4, all movements at the signalized intersection of Lewistown Road and the I-95 NB Off-Ramp/Travel Center Entrance continue to operate at LOS D or better during the AM, PM, and Saturday peak hours. The signalized intersection continues to operate at an overall LOS C during all analysis scenario peak hours. The intersection operates in an acceptable manner and there are no queuing issues noted. Operations are similar to existing and background results.

At the signalized intersection of Lewistown Road and the I-95 SB On/Off-Ramp, the intersection continues to operate at an overall LOS B for all three analysis scenarios. All mainline movements along Lewistown Road operate at LOS B or better during the AM, PM, and Saturday peak hours. The southbound approach from the I-95 off-ramp continues to operate at LOS D during all three peak hours. The mainline approaches do not experience any queuing issues. The longest queue that the off-ramp experiences is 400 feet, which will not impact any operations on I-95.

At the proposed unsignalized intersection of Site Entrance "A" on Sliding Hill Road, all movements and approaches operates at LOS C or better during the AM, PM, and Saturday peak hours. The mainline movements along Sliding Hill Road operate at LOS A during all analysis periods. The available turn lane storage is sufficient to accommodate the 95th percentile and maximum queue lengths during all peak hours on Sliding Hill Road, with a maximum queue of 94 feet, or approximately 4 vehicles. The intersection operates in an acceptable manner and there are no queuing issues noted.

At the proposed unsignalized intersection of Site Entrance "B" on Ashcake Road, all movements and approaches continue to operate at LOS B or better during the AM, PM, and Saturday peak hours. The mainline movements along Sliding Hill Road operate at LOS A during all analysis periods. The intersection operates in an acceptable manner and there are no queuing issues noted.

Table 7-4: Intersection Level of Service, Delay, and Queue Summary
2035 Full Buildout + 3 Years Total Traffic Volumes

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				PM PEAK HOUR				SATURDAY PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	Maximum Queue Length (ft)	95th Percentile Queue Length (ft)
1. Sliding Hill Road (E-W) at	EB Dual Left [2]	500	108.9	F	547	#376	110.8	F	444	#228	44.7	D	169	86
Atlee Station Road (N) /	EB Thru		39.6	D	866	428	79.4	E	876	#714	27.9	C	272	262
Leadbetter Road (S)	EB Right		12.3	B	562	12	23.1	C	848	191	14.1	B	148	18
Signalized	*EB Approach*		*60.8*	*E*	--	--	*70.2*	*E*	--	--	*27.3*	*C*	--	--
	WB Left	288	33.3	C	288	m114	108.2	F	287	m#218	27.1	C	165	118
	WB Thru		61.4	E	719	#632	33.3	C	646	#589	11.1	B	194	60
	WB Right	300	29.5	C	300	m2	27.1	C	300	m0	20.5	C	40	0
	WB Approach		*56.8*	*E*	--	--	*41.7*	*D*	--	--	*14.0*	*B*	--	--
	NB Dual Left [2]	500	112.4	F	497	#460	118.4	F	431	#279	43.3	D	208	139
	NB Thru		47.6	D	734	251	55.7	E	351	151	39.5	D	127	95
	NB Right		39.3	D	616	3	48.5	D	145	14	37.7	D	97	0
	NB Approach		*89.0*	*F*	--	--	*90.3*	*F*	--	--	*41.3*	*D*	--	--
	SB Left	210	145.1	F	193	#185	43.3	D	192	176	45.5	D	97	86
	SB Thru		64.9	E	599	#105	43.0	D	1047	175	45.0	D	126	84
	SB Right	200	36.0	D	200	212	157.5	F	200	#658	27.7	C	160	4
	SB Approach		*60.1*	*E*	--	--	*121.9*	*F*	--	--	*36.6*	*D*	--	--
	Overall		66.4	E	--	--	75.4	E	--	--	26.8	C	--	--
2. Sliding Hill Road (E-W) at	EB Left	150	10.1	B	114	m5	14.1	B	149	m28	4.0	A	92	16
King's Charter Drive (N)	EB Thru		4.7	A	192	m72	10.2	B	266	m85	5.3	A	118	61
Charter Hill Court (S)	EB Right	700	15.6	B	46	m1	0.9	A	85	m0	15.8	B	35	m0
Signalized	*EB Approach*		*6.0*	*A*	--	--	*9.4*	*A*	--	--	*6.0*	*A*	--	--
	WB Left	300	6.1	A	241	m14	40.2	D	276	#174	8.3	A	104	15
	WB Thru-Right		9.5	A	398	108	21.9	C	384	203	11.1	B	215	160
	WB Approach		*9.3*	*A*	--	--	*24.2*	*C*	--	--	*10.8*	*B*	--	--
	NB Left-Thru		62.1	E	247	214	70.6	E	302	#287	48.1	D	123	94
	NB Right		45.3	D	77	0	45.0	D	205	61	42.5	D	76	0
	NB Approach		*57.3*	*E*	--	--	*56.8*	*E*	--	--	*45.3*	*D*	--	--
	SB Left-Thru		62.2	E	97	67	70.8	E	223	#195	48.9	D	134	104
	SB Right	125	55.3	E	78	0	49.2	D	124	0	41.8	D	83	0
	SB Approach		*58.9*	*E*	--	--	*66.1*	*E*	--	--	*46.9*	*D*	--	--
	Overall		13.4	B	--	--	24.3	C	--	--	13.7	B	--	--
3. Sliding Hill Road (E-W) at	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Totopotomoy Trail (N)	EB Right	275	†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	300	10.1	B	39	1	12.4	B	58	6	9.3	A	37	1
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*0.1*	*A*	--	--	*0.4*	*A*	--	--	*0.2*	*A*	--	--
	NB Left-Right		217.0	F	233	217	270.1	F	193	166	26.0	D	80	29
	NB Approach		*217.0*	*F*	--	--	*270.1*	*F*	--	--	*26.0*	*D*	--	--
4. Sliding Hill Road (E-W) at	EB Left	225	11.9	B	113	21	11.3	B	82	14	9.1	A	36	4
Atlee Commerce Boulevard (N) /	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Atlee Commons Drive (S)	EB Right		†	†	--	--	†	†	--	--	†	†	--	--
Unsignalized	*EB Approach*		*1.6*	*A*	--	--	*0.8*	*A*	--	--	*0.5*	*A*	--	--
	WB Left	283	10.1	B	54	5	12.4	B	33	4	9.5	A	3	0
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Right	250	†	†	--	--	†	†	--	--	†	†	--	--
	WB Approach		*0.4*	*A*	--	--	*0.3*	*A*	--	--	*0.0*	*A*	--	--
	NB Left-Thru		220.6	F	77	64	Err **	Err *	166	Err	37.0	E	28	3
	NB Right		11.3	B	32	2	16.0	C	83	17	11.1	B	22	0
	NB Approach		*142.7*	*F*	--	--	*3880.4*	*F*	--	--	*31.9*	*D*	--	--
	SB L-T-R		37.7	E	138	52	450.6	F	485	405	10.1	B	52	5
	SB Approach		*37.7*	*E*	--	--	*450.6*	*F*	--	--	*10.1*	*B*	--	--
5. Sliding Hill Road (E-W) at	EB Left	383	23.0	C	306	162	8.3	A	194	m96	1.9	A	58	4
Cedar Run (N) /	EB Thru-Right		6.0	A	121	239	10.0	A	272	565	2.6	A	109	51
Air Park Road (S)	*EB Approach*		*12.5*	*B*	--	--	*9.8*	*A*	--	--	*2.5*	*A*	--	--
Signalized	WB Left	150	3.0	A	56	m1	7.5	A	59	m1	5.3	A	22	m3
	WB Thru		20.4	C	311	480	11.0	B	237	263	7.2	A	130	122
	WB Right	250	204.0	F	219	m13	14.6	B	111	m0	8.1	A	29	m0
	WB Approach		*40.4*	*D*	--	--	*11.1*	*B*	--	--	*7.2*	*A*	--	--
	NB L-T-R		60.2	E	56	30	60.2	E	50	30	49.3	D	55	27
	NB Approach		*60.2*	*E*	--	--	*60.2*	*E*	--	--	*49.3*	*D*	--	--
	SB Left		55.0	D	76	65	56.4	E	180	172	45.9	D	52	30
	SB Thru-Right		53.6	D	135	69	47.7	D	258	94	45.3	D	56	44
	SB Approach		*53.9*	*D*	--	--	*50.2*	*D*	--	--	*45.4*	*D*	--	--
	Overall		31.3	C	--	--	17.9	B	--	--	7.2	A	--	--
6. Sliding Hill Road (E-W) at	EB Left	325	9.6	A	20	m1	32.5	C	10	m1	4.3	A	25	m1
New Ashcake Road (N-S)	EB Thru		24.0	C	199	#46	23.4	C	345	295	7.4	A	178	23
Signalized	EB Right [3]		39.2	D	--	0	149.5	F	--	551	13.2	B	--	48
	EB Approach		*32.1*	*C*	--	--	*107.6*	*F*	--	--	*11.2*	*B*	--	--
	WB Left	275	43.6	D	106	70	30.8	C	128	84	17.8	B	62	34
	WB Thru-Right		38.7	D	177	209	23.0	C	137	133	19.3	B	98	90
	WB Approach		*39.3*	*D*	--	--	*24.9*	*C*	--	--	*19.1*	*B*	--	--
	NB Left		35.4	D	554	#853	35.1	D	356	459	30.6	C	338	327
	NB Thru-Right		12.5	B	137	25	22.5	C	78	33	20.3	C	54	28
	NB Approach		*33.1*	*C*	--	--	*33.6*	*C*	--	--	*29.4*	*C*	--	--
	SB L-T-R		71.5	E	56	31	71.5	E	52	31	56.4	E	52	28
	SB Approach		*71.5*	*E*	--	--	*71.5*	*E*	--	--	*56.4*	*E*	--	--
	Overall		34.5	C	--	--	74.1	E	--	--	18.9	B	--	--

7. Ashcake Road (E) /	EB L-T-R		0.4	A	39	0	0.4	A	31	1	0.4	A	14	0
Peaks Road (W) at	*EB Approach*		*0.4*	*A*	--	--	*0.4*	*A*	--	--	*0.4*	*A*	--	--
Sliding Hill Road (N) /	WB L-T-R		4.8	A	63	9	5.2	A	64	7	5.4	A	53	7
Mt Hermon Road (S)	*WB Approach*		*4.8*	*A*	--	--	*5.2*	*A*	--	--	*5.4*	*A*	--	--
Unsignalized	NB L-T-R		25.3	D	141	81	33.0	D	251	182	15.2	C	140	52
	NB Approach		*25.3*	*D*	--	--	*33.0*	*D*	--	--	*15.2*	*C*	--	--
	SB Right		17.9	C	89	32	16.5	C	53	15	14.2	B	59	15
	SB Approach		*17.9*	*C*	--	--	*16.5*	*C*	--	--	*14.2*	*B*	--	--
8. Lewistown Road (E) at	EB Left-Right		75.6	F	370	280	298.1	F	381	773	14.0	B	112	51
Ashcake Road (N-S)	*EB Approach*		*75.6*	*F*	--	--	*298.1*	*F*	--	--	*14.0*	*B*	--	--
Unsignalized	NB Left-Thru		5.3	A	176	15	5.4	A	150	13	2.9	A	61	3
	NB Approach		*5.3*	*A*	--	--	*5.4*	*A*	--	--	*2.9*	*A*	--	--
	SB Thru-Right		†	†	†	†	†	†	†	†	†	†	†	†
	SB Approach		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
9. Lewistown Road (E-W) at	EB U-Turn	425	0.0	A	34	0	0.0	A	316	0	0.0	A	24	0
Air Park Road (N)	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	EB Right	250	†	†	--	--	†	†	--	--	†	†	--	--
	EB Approach		*0.0*	*A*	--	--	*0.0*	*A*	--	--	*0.0*	*A*	--	--
	WB Left	250	9.0	A	91	11	8.6	A	56	5	7.8	A	37	2
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*2.6*	*A*	--	--	*1.4*	*A*	--	--	*1.3*	*A*	--	--
	NB Left		25.9	D	135	62	22.8	C	1248	98	10.8	B	60	8
	NB Right	300	25.9	D	77	--	22.8	C	300	--	10.8	B	42	--
	NB Approach		*25.9*	*D*	--	--	*22.8*	*C*	--	--	*10.8*	*B*	--	--
10. Lewistown Road (E-W) at	EB Left		10.0	A	82	m6	8.7	A	111	m15	11.5	B	109	34
I-95 NB Off-Ramp (N) /	EB Thru		10.3	B	220	95	10.4	B	283	109	9.2	A	90	55
Travel Center Entrance (S)	*EB Approach*		*10.3*	*B*	--	--	*10.1*	*B*	--	--	*10.0*	*A*	--	--
Signalized	WB Thru		24.7	C	150	140	24.4	C	158	189	21.5	C	65	73
	WB Right		20.9	C	42	m0	19.8	B	26	0	19.9	B	31	0
	WB Approach		*24.4*	*C*	--	--	*24.2*	*C*	--	--	*21.4*	*C*	--	--
	NB Dual Left [2]		34.1	C	219	181	34.5	C	224	101	33.1	C	138	86
	NB Thru		29.6	C	151	76	34.9	C	182	80	35.0	C	182	102
	NB Right		28.9	C	152	66	31.9	C	515	63	30.7	C	79	0
	NB Approach		*31.9*	*C*	--	--	*33.4*	*C*	--	--	*32.8*	*C*	--	--
	SB Left		39.6	D	66	20	39.7	D	72	26	39.5	D	56	26
	SB Right		39.7	D	148	0	39.1	D	127	0	39.4	D	129	0
	SB Approach		*39.7*	*D*	--	--	*39.2*	*D*	--	--	*39.4*	*D*	--	--
	Overall		27.3	C	--	--	26.6	C	--	--	27.5	C	--	--
11. Lewistown Road (E-W) at	EB Left	290	12.8	B	112	12	11.3	B	245	26	9.2	A	78	9
I-95 NB On-Ramp (S)	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	*EB Approach*		*3.0*	*A*	--	--	*4.7*	*A*	--	--	*3.0*	*A*	--	--
	WB Thru		†	†	†	†	†	†	†	†	†	†	†	†
	WB Right		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*
12. Lewistown Road (E-W) at	EB Thru		14.8	B	153	134	15.6	B	545	247	8.5	A	97	102
I-95 SB On/Off-Ramp (N-S)	EB Right		14.2	B	--	51	15.4	B	319	62	8.1	A	--	31
Signalized	*EB Approach*		*14.4*	*B*	--	--	*15.6*	*B*	--	--	*8.3*	*A*	--	--
	WB Left		4.9	A	180	101	3.7	A	169	11	3.0	A	82	13
	WB Thru		3.6	A	149	110	1.2	A	118	7	1.9	A	73	14
	WB Right [3]		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*4.0*	*A*	--	--	*2.3*	*A*	--	--	*2.2*	*A*	--	--
	SB Left-Thru		39.8	D	214	127	43.4	D	401	103	39.6	D	148	81
	SB Right [3]		33.3	C	--	56	34.1	C	150	34	35.9	D	--	47
	SB Approach		*35.9*	*D*	--	--	*39.0*	*D*	--	--	*37.3*	*D*	--	--
	Overall		13.4	B	--	--	13.1	B	--	--	11.3	B	--	--
13. Sliding Hill Road (E-W) at	EB Left	300	8.9	A	94	14	8.1	A	47	4	7.9	A	40	3
Site Entrance A (S)	EB Thru		†	†	†	†	†	†	†	†	†	†	†	†
Unsignalized	*EB Approach*		*4.4*	*A*	--	--	*0.9*	*A*	--	--	*1.0*	*A*	--	--
	WB Thru-Right		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*
	SB Left		19.8	C	31	1	17.9	C	35	3	13.7	B	18	0
	SB Right		11.4	B	83	7	11.6	B	95	21	10.0	A	52	3
	SB Approach		*11.8*	*B*	--	--	*12.0*	*B*	--	--	*10.2*	*B*	--	--
14. Sliding Hill Road (E-W) at	EB Left-Thru		0.0	A	--	--	0.0	A	--	--	0.0	A	--	--
Site Entrance B (S)	*EB Approach*		*0.0*	*A*	--	--	*0.0*	*A*	--	--	*0.0*	*A*	--	--
Unsignalized	WB Thru-Right		†	†	†	†	†	†	†	†	†	†	†	†
	WB Approach		*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*	*†*
	NB Left-Right		11.1	B	36	2	11.7	B	56	6	10.0	A	30	1
	NB Approach		*11.1*	*B*	--	--	*11.7*	*B*	--	--	*10.0*	*A*	--	--

[1] Overall intersection LOS and delay reported for signalized intersections and roundabouts only.

[2] Dual left turn lanes; average storage is provided.

[3] Channelized right turn not controlled by the signal.

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

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

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

**Delay greater than 9999.99 seconds cannot be calculated by SYNCHRO.

* Volume exceeds ideal saturation flow rate of 1,900 vphpl; LOS is not calculated by SYNCHRO.

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TIMMONS GROUP
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Total 2022 Weekday AM Peak Hour Volumes (2022 Background + Phase 1) Project Tiger (Wegmans)

Figure 7-1

TIMMONS GROUP
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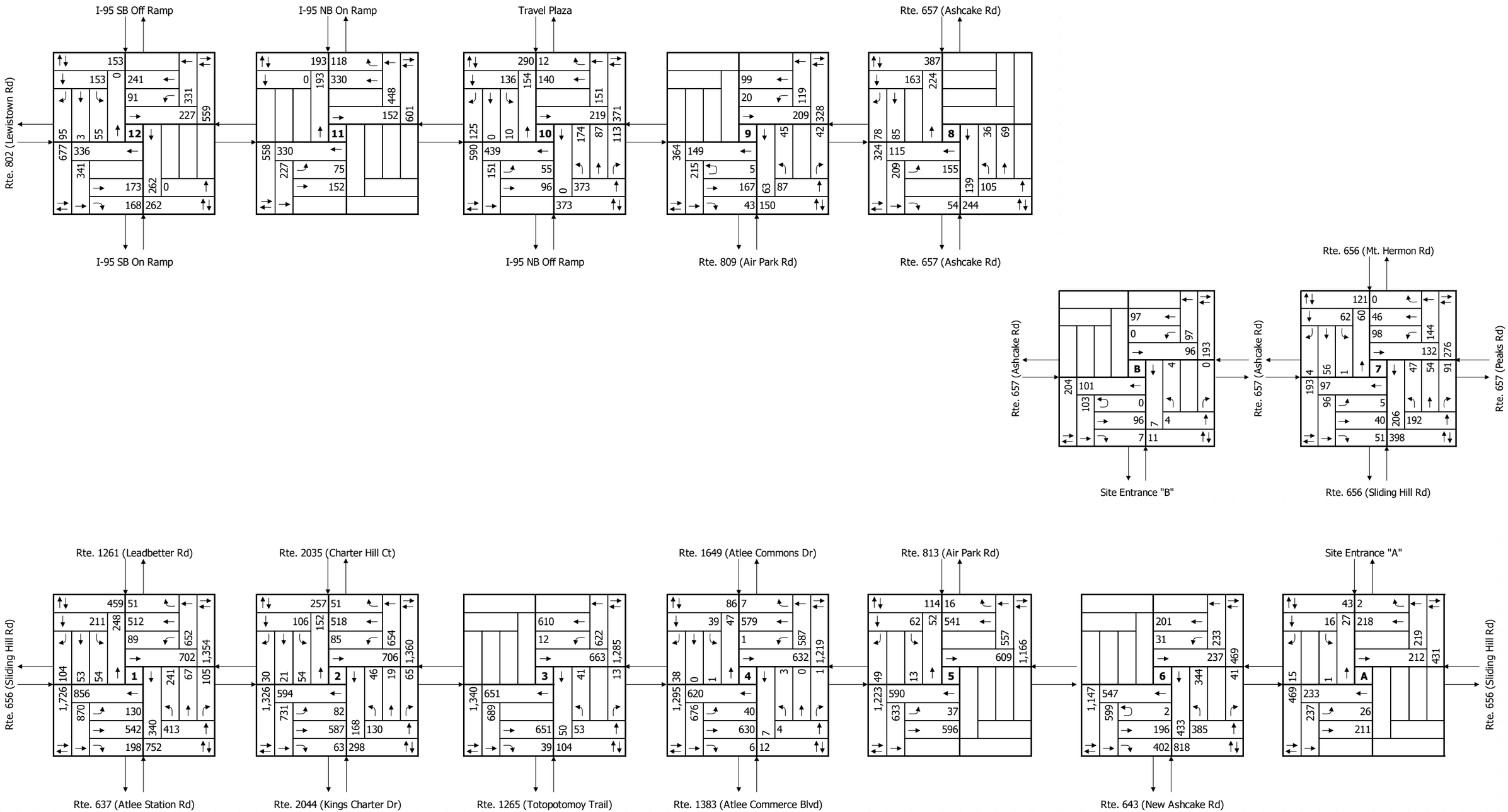
Total 2022 Weekday PM Peak Hour Volumes (2022 Background + Phase 1) Project Tiger (Wegmans)

Figure 7-2



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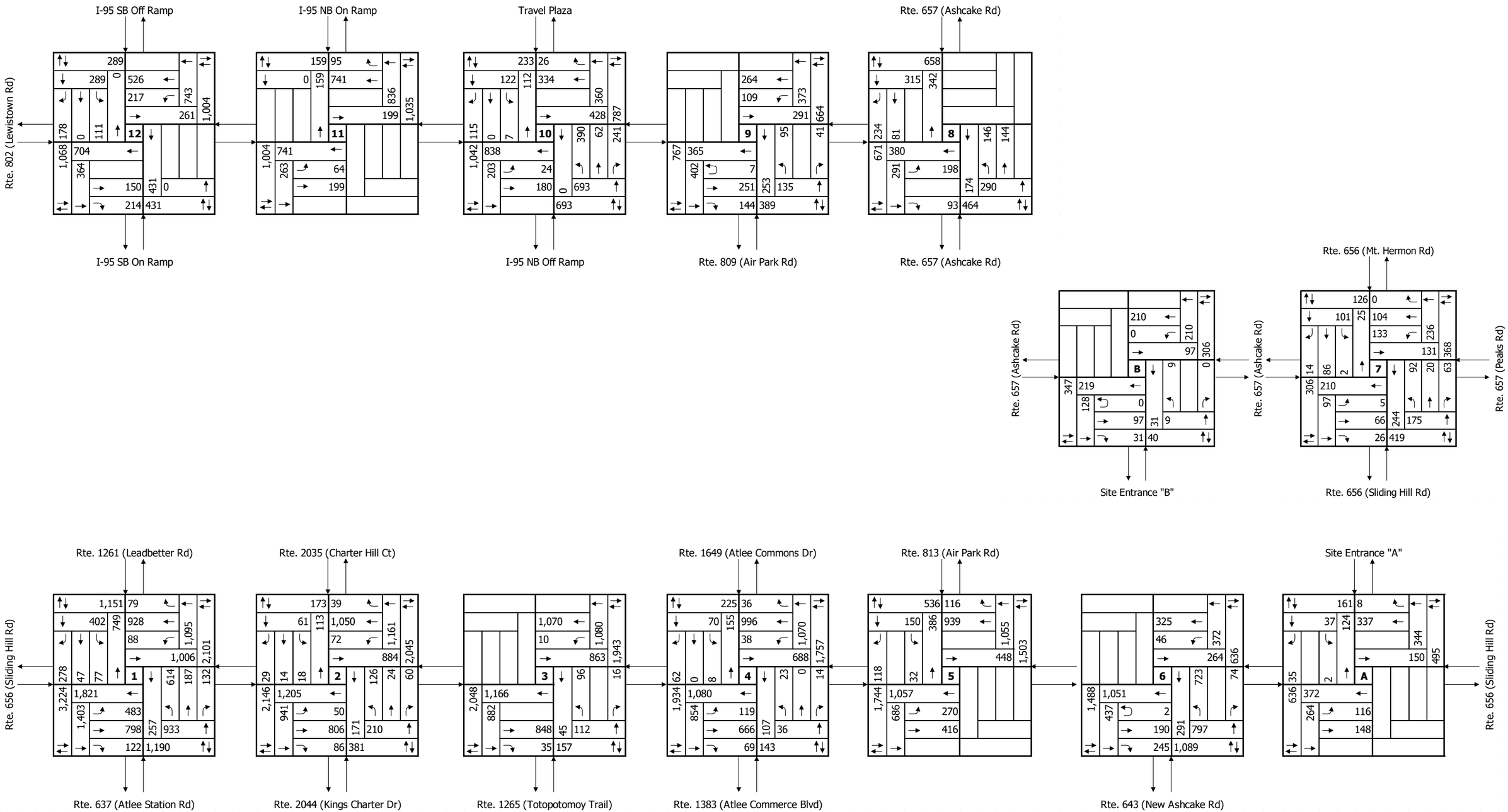
Total 2022 Saturday Peak Hour Volumes (2022 Background + Phase 1) Project Tiger (Wegmans)

Figure 7-3



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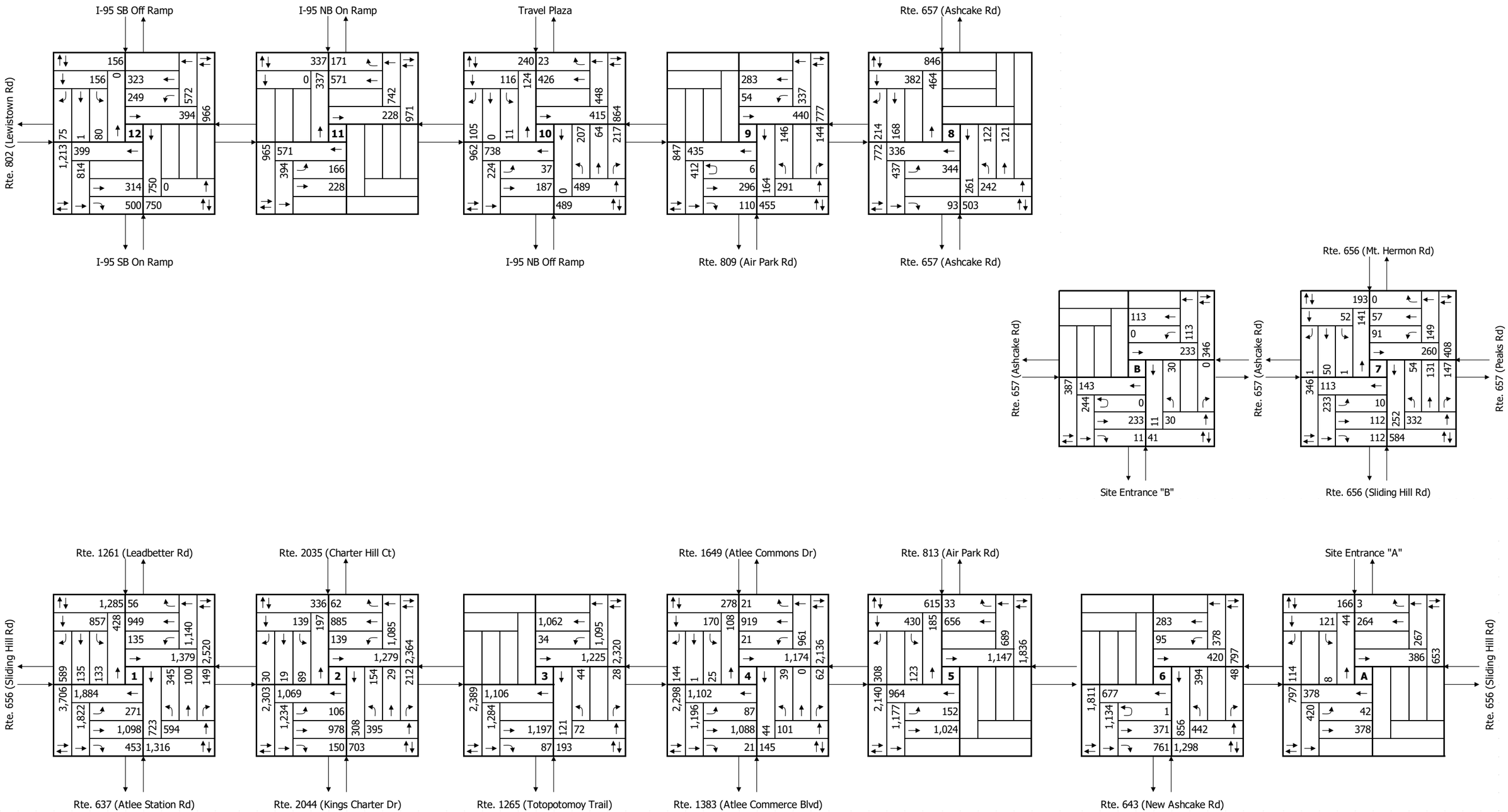
Total 2027 Weekday AM Peak Hour Volumes (2027 Background + Phases 1 and 2) Project Tiger (Wegmans)

Figure 7-4



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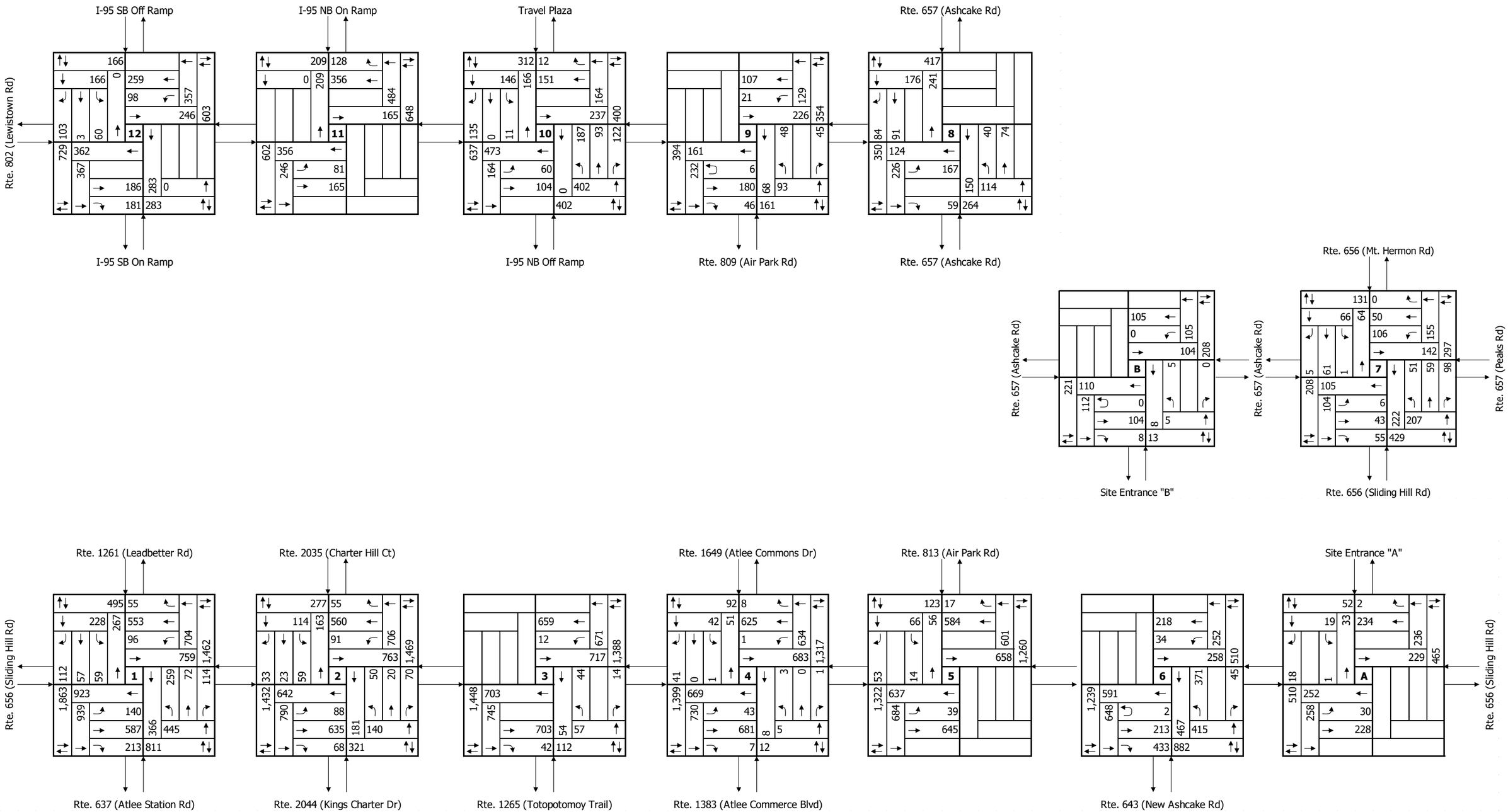
Total 2027 Weekday PM Peak Hour Volumes (2027 Background + Phases 1 and 2) Project Tiger (Wegmans)

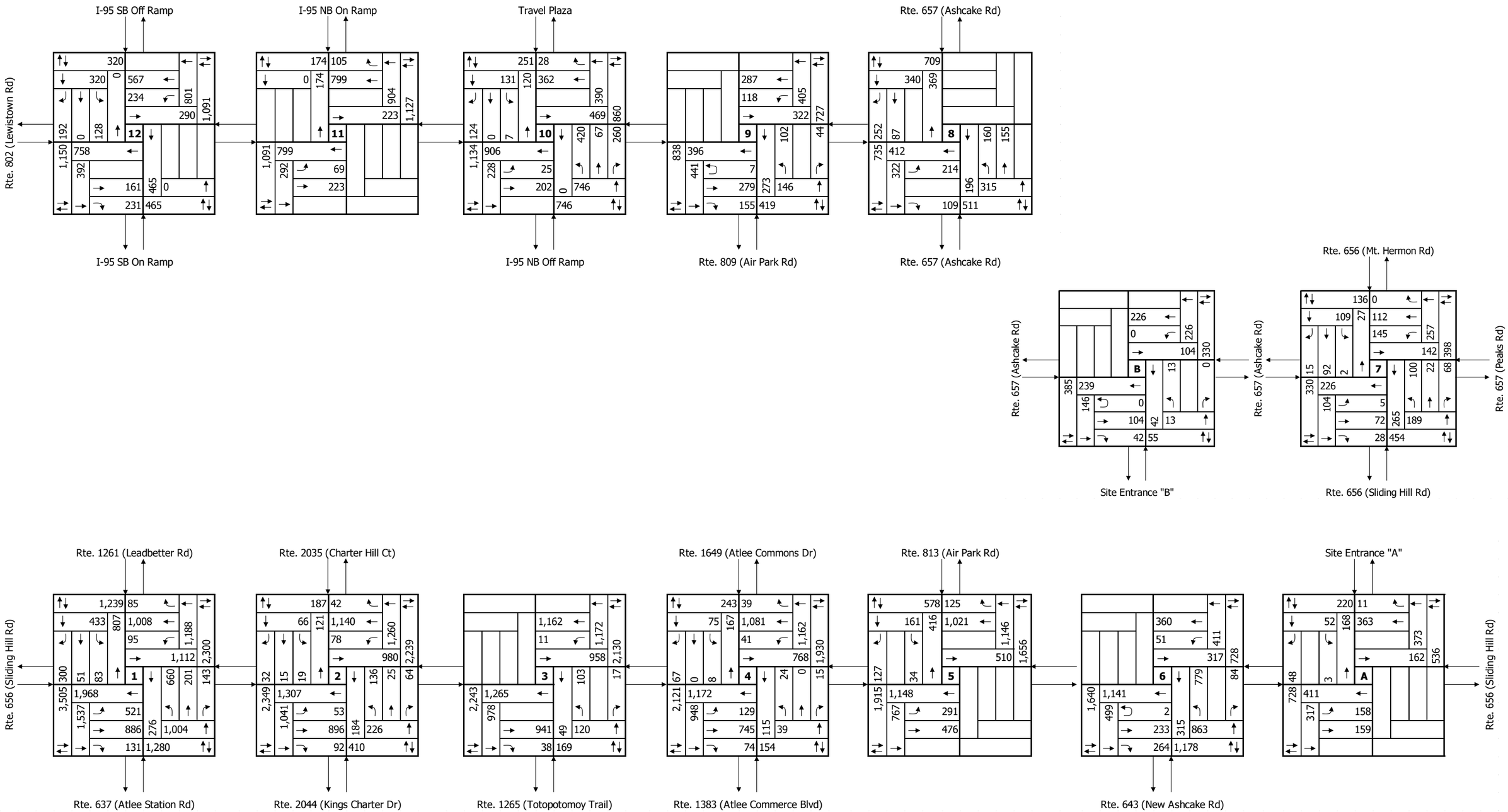
Figure 7-5



TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Total 2027 Saturday Peak Hour Volumes (2027 Background + Phases 1 and 2) Project Tiger (Wegmans)

Figure 7-6



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Total 2032 Weekday AM Peak Hour Volumes (2032 Background + Full Buildout) Project Tiger (Wegmans)

Figure 7-7

TIMMONS GROUP
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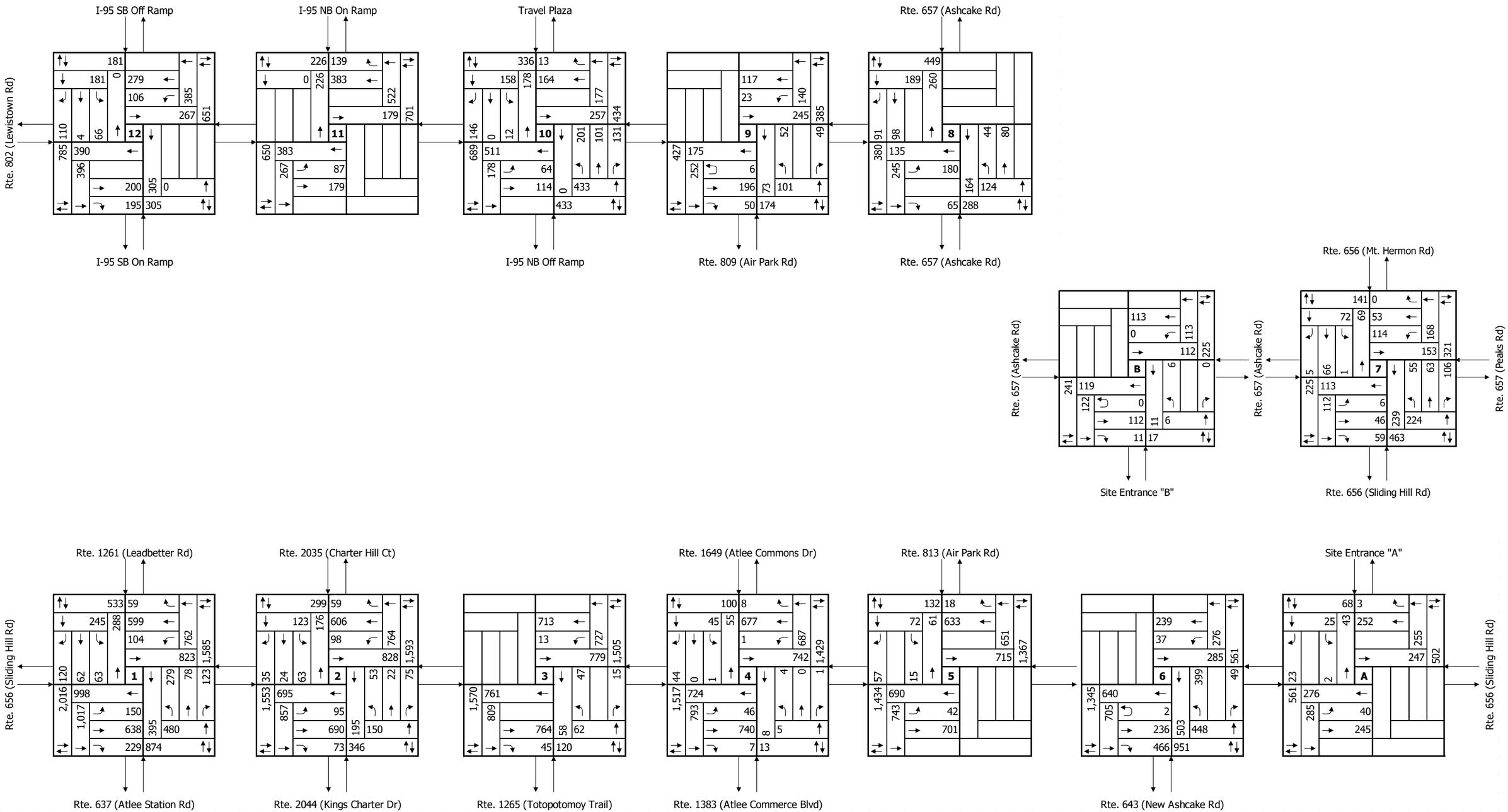
Total 2032 Weekday PM Peak Hour Volumes (2032 Background + Full Buildout) Project Tiger (Wegmans)

Figure 7-8



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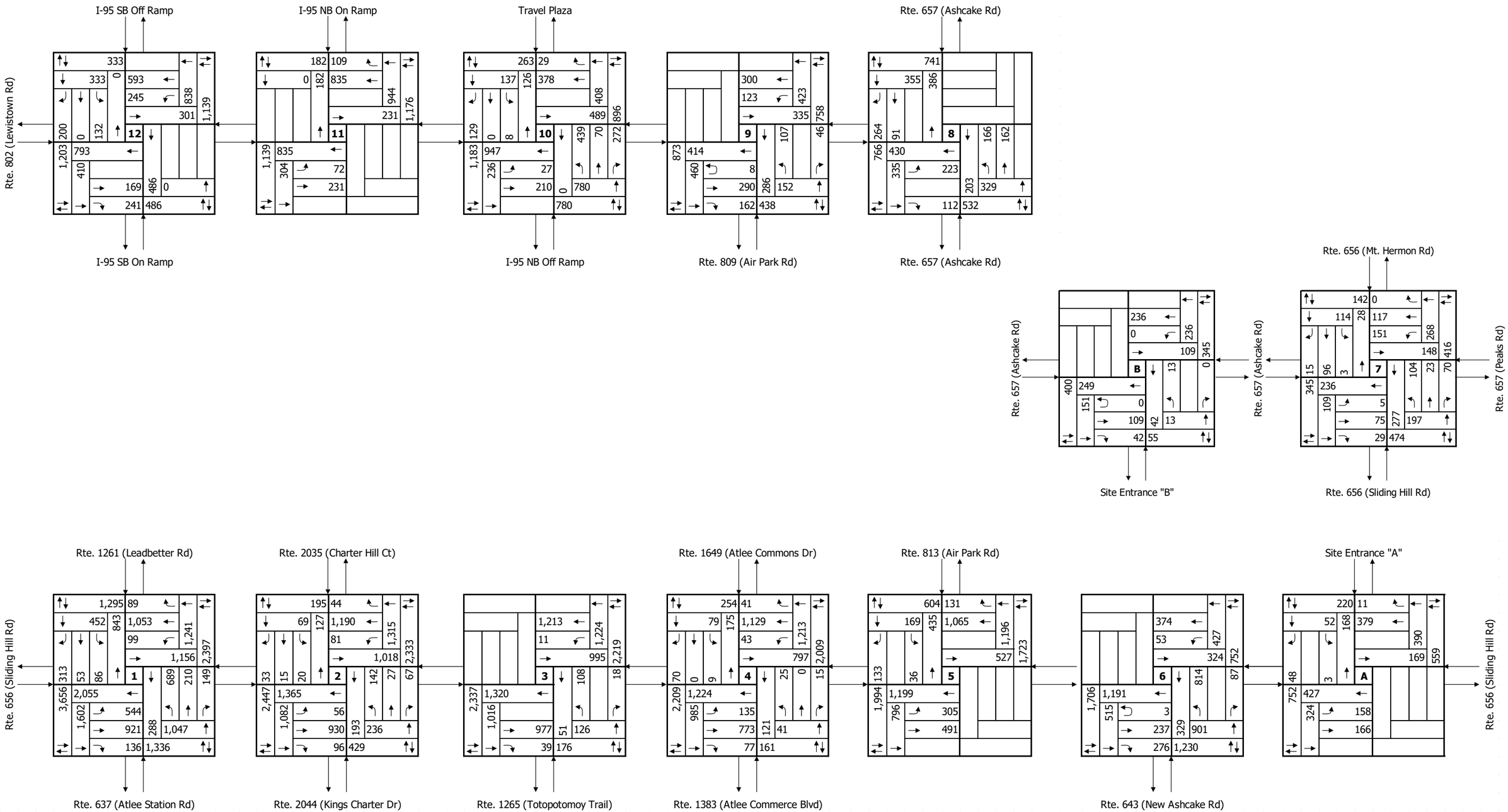
Total 2032 Saturday Peak Hour Volumes (2032 Background + Full Buildout) Project Tiger (Wegmans)

Figure 7-9



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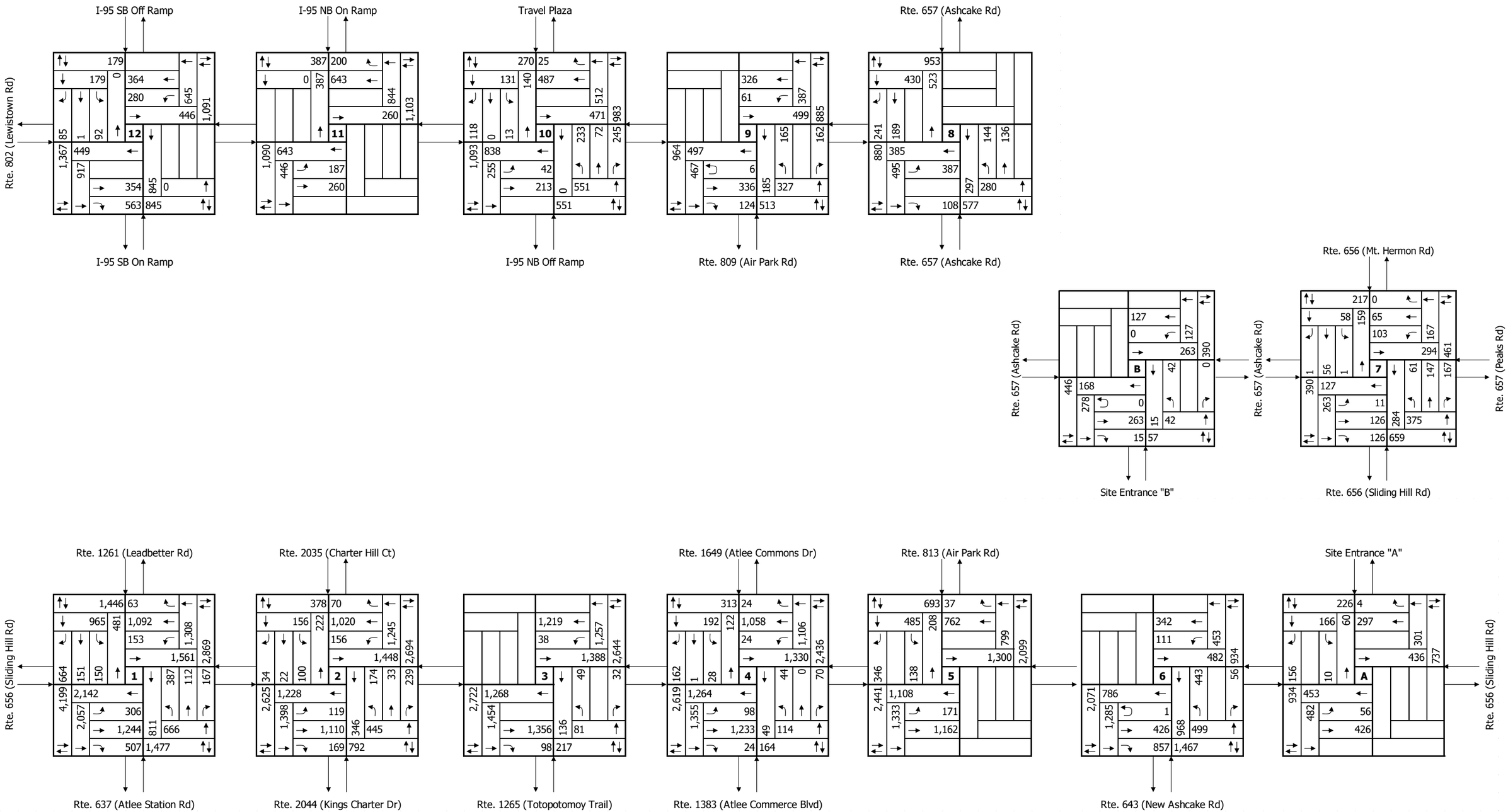
Total 2035 Weekday AM Peak Hour Volumes (2035 Background + Full Buildout) Project Tiger (Wegmans)

Figure 7-10



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Total 2035 Weekday PM Peak Hour Volumes (2035 Background + Full Buildout) Project Tiger (Wegmans)

Figure 7-11

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Total 2035 Saturday Peak Hour Volumes (2035 Background + Full Buildout) Project Tiger (Wegmans)

Figure 7-12

8 ADDITIIONAL ANALYSES

The goal of the following chapter is to provide an analysis of potential improvements within the study area that may impact the analysis or recommendations for Project Tiger (Wegmans).

8.1 TURN LANE WARRANT ANALYSIS

The study area includes multiple unsignalized intersections that currently do not have turn lanes. To gauge the impacts of the proposed site trips on the existing roadway network, turn lane warrant analyses was completed for the following movements under existing, background, and total conditions:

1. WB Left on Peaks Road at Sliding Hill Road/Ashcake Road;
2. NB Left on Ashcake Road at Lewistown Road;
3. EB Left on Sliding Hill Road at proposed Site Entrance "A";
4. WB Right on Sliding Hill Road at proposed Site Entrance "A"; and
5. EB Right on Ashcake Road at proposed Site Entrance "B".

The turn lane warrant analyses were completed with existing, background, and total volumes. If at any point a turn lane was warranted, no turn lane warrants were completed after that period, assuming background growth or proposed site trips would continue to warrant the turn lane.

The appropriate right and left turn lane warrant nomographs from Appendix F of the VDOT *Road Design Manual* were used to complete the turn lane warrant analyses for each of the listed movements.

The turn lane warrant analysis indicates that turn lanes are warranted for the following movements:

- NB Left turn from Ashcake Road onto Lewistown Road
  - Under Existing 2019 Conditions
- EB Left turn from Sliding Hill Road onto proposed Site Entrance "A"
  - Under Total 2022 Conditions

Given the posted speed limit and rural classification on Ashcake Road, the minimum turn lane sizing for the northbound left at Lewistown Road is 200' of storage and 200' of taper. Given the posted speed limit and urban classification on Sliding Hill Road, the minimum turn lane sizing for the eastbound left at Site Entrance "A" is 100' of storage and 200' of taper. The remaining movements investigated for a right or left turn lane do not meet the minimum thresholds for warranting installation of a turn lane or taper.

Copies of the turn lane nomographs are included in Appendix F.

8.2 SIGNAL WARRANT ANALYSIS

Hanover County proposed the installation of a traffic signal at the intersection of Sliding Hill Road and New Ashcake Road in the *2015 Sliding Hill Road Corridor Study*. In addition, the intersection of Sliding Hill Road and New Ashcake Road operates with very poor levels of service under existing 2019 conditions; vehicles approaching from New Ashcake Road turning left onto Sliding Hill Road experience delays in excess of 100 seconds and queues over 500 feet. The queuing and operational deficiencies under existing 2019 conditions contribute to an undercount in vehicles at the intersection, as the intersection cannot process all NB vehicles on New Ashcake Road.

To address the operational issues at the intersection, maintain consistency with previous analysis of the Sliding Hill Road corridor, and maintain consistency between the background analysis and total analysis, a traffic signal was assumed at the intersection of Sliding Hill Road and New Ashcake Road. The following traffic signal warrant analysis was completed in support to installing the traffic signal beyond the operational failures of the side street and the recommendations of the *2015 Sliding Hill Road Corridor Study*.

The signal warrant analyses were completed using the existing, background, and total volumes from the report. The warrant analyses were conducted following procedures from the 2009 edition of the *Manual on Uniform Traffic Control Devices* (MUTCD) using Highway Capacity Software (HCS) and the hourly volumes from 7:00 AM to 7:00 PM. Warrants 1 (Eight-Hour), 2 (Four-Hour), and 3 (Peak Hour) of the nine (9) signal warrants outlined in the 2009 MUTCD were considered for the analyses.

The following six (6) warrants were not in included in this analysis because they are not applicable to the nature/context of the development and/or adjacent roadway infrastructure.

- Warrant 4 – Pedestrian Volume
- Warrant 5 – School Crossing
- Warrant 6 – Coordinated Signal System
- Warrant 7 – Crash Experience
- Warrant 8 – Roadway Network
- Warrant 9 – Intersection Near a Grade Crossing

The MUTCD contains both 100% and 70% volume thresholds that can be used in the signal warrant analysis. The 100% volume thresholds were used to complete the analyses since there are no characteristics supporting the use of the 70% volume thresholds other than that the posted speed limit on Sliding Hill Road is above 40 MPH.

The eastbound approach of Sliding Hill Road includes a dedicated right turn lane. The major street right turn volumes (from eastbound Sliding Hill Road) experiences minimal conflict when entering the minor street (New Ashcake Road) due to the uncontrolled approach and unopposed movement. Since there is not a substantial conflict, the eastbound major street right turn volumes were excluded from the traffic signal warrant analysis.

The minor street approach (from northbound New Ashcake Road) operates with two (2) lanes, one (1) dedicated lane for left turns and one (1) lane dedicated for right turns. The MUTCD includes language that the effects of right turn vehicles from the minor street approach can be discounted from the total minor street traffic when evaluating signal warrants. Given the presence of the dedicated right turn lane on New Ashcake Road, the northbound approach was evaluated as a one (1) lane approach with only traffic volume in the left turn lane considered.

Therefore, the lane geometry used in the traffic signal warrant analysis for the major street was assumed to be two (2) lanes and the minor street was analyzed with both one (1) and two (2) lane configurations.

Under 2019 existing conditions, the traffic volumes at the intersection meet the thresholds for Warrant 3 (Peak Hour). Under 2022/2027/2032/2035 background conditions, the traffic volumes at the intersection meet the thresholds for both Warrant 2 (Four-Hour) and Warrant 3 (Peak Hour). Figure 8-1 illustrates the satisfaction of Warrants 2 and 3 under the 100% and 70% volume thresholds for 2022 background volumes.

Given that the traffic volumes satisfied 100% volume thresholds for Warrant 3 under existing 2019 conditions and satisfied 100% volume thresholds for Warrants 2 and 3 under background 2022 conditions, a traffic signal is recommended at the Sliding Hill Road at New Ashcake Road intersection.

The following points were considered within the context of the recommended traffic signal:

- Existing traffic volumes satisfy Warrant 3 under 100% volume thresholds;
- Background traffic volumes satisfy Warrants 2 and 3 under 100% volume thresholds;
- Operational and queuing issues exist on New Ashcake Road under unsignalized conditions;
- Potential future operations of the subject intersection assuming the addition of a 4th/western leg;
- Long-term coordination of signals along the corridor will improve Sliding Hill Road operations; and
- Safety issues anticipated with anxious drivers making a left at an unsignalized, median-divided, crossover on a four-lane roadway that experiences significant side street delays.

The signal warrant analysis outputs from HCS warrant software are included in Appendix G.

Per discussion with VDOT and Hanover County, a separate signal justification report (SJR) is being completed for the intersection of Sliding Hill Road and New Ashcake Road. Additional discussion concerning the traffic signal warrant is included in the SJR document.

8.3 ROUNDABOUT ANALYSIS

A roundabout SIDRA analysis was completed to determine the feasibility of installing a roundabout at the intersection of Sliding Hill Road and New Ashcake Road. The 2019 existing volumes and the 2035 background volumes were analyzed for a single-lane roundabout geometry.

The single-lane roundabout operates well under 2019 existing conditions, with each approach operating at LOS C or better and the overall intersection operating at LOS B or better under all scenarios. The queuing and operational issues associated with the northbound approach of New Ashcake Road are relieved and traffic from the side street have adequate gaps to enter the mainline.

As traffic volumes grow on the corridor to 2035 background conditions, the single-lane roundabout begins to experience queuing and delay issues. During the AM peak hour, the westbound approach of Sliding Hill Road does not see an adequate number of gaps due to the 850+ vehicles turning left from northbound New Ashcake Road and operates at LOS F. During the PM peak hour, the eastbound approach of Sliding Hill Road has over 1,300 vehicles approaching the intersection, almost double the other two (2) approaches combined, which creates an imbalance of operations and a level of service F. During the Saturday peak hour, the single-lane roundabout geometry operates well, as under existing conditions.

Given the heavy flow of eastbound right turns from Sliding Hill Road onto New Ashcake Road, an additional analysis was completed using the 2035 background traffic volumes, where the geometry was a single-lane roundabout with an eastbound slip right lane. During the AM peak hour, the westbound approach of Sliding Hill Road improves to operate at LOS B and queues are reduced to less than 75 feet. During the PM peak hour, the eastbound approach of Sliding Hill Road improves to operate at LOS A, however, the westbound approach of Sliding Hill Road worsens to operate at LOS E due to the additional vehicles from New Ashcake Road that can enter the roundabout. The single-lane geometry with an eastbound slip right lane operates well in the Saturday peak hour. It should be noted that the addition of the eastbound slip right lane improves the overall intersection operations to a LOS C or better for all analysis periods.

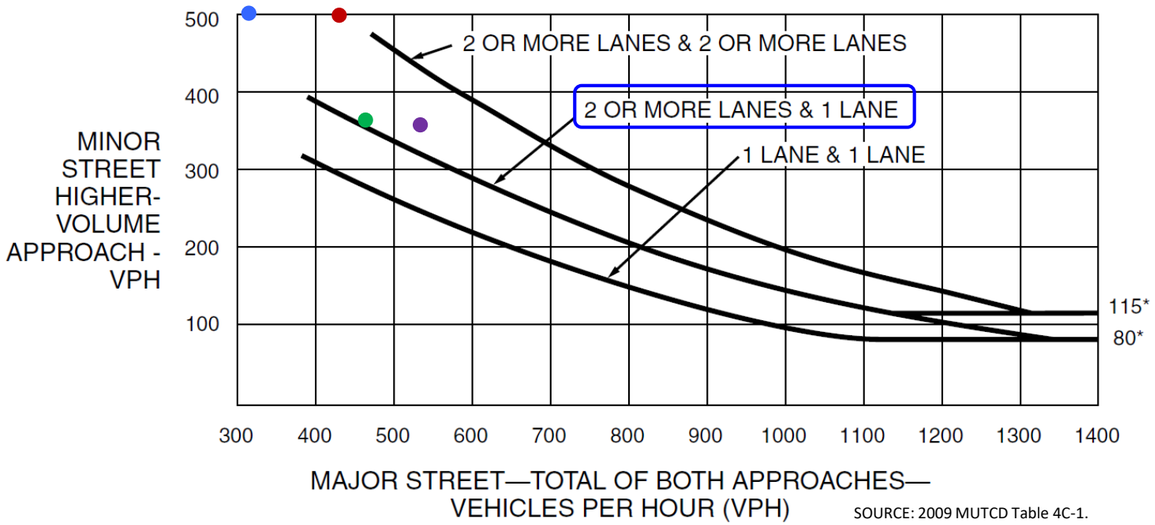
A double-lane roundabout geometry was included for the 2035 background analysis conditions. The increased capacity of the double-lane geometry will improve the operates of the intersection to LOS B or better for all movements and approaches.

Overall, the imbalance of volumes at the intersection of Sliding Hill Road at New Ashcake Road does not provide for adequate operations under long-term background volumes on the corridor with a single-lane roundabout. The installation of a single-lane roundabout with an eastbound slip right lane movement onto New Ashcake Road will operate well in the 2035 background analysis year. The installation of a double-lane roundabout has been found adequate as well; however, the additional right-of-way and construction costs are deemed too high to provide the requisite benefit to the Sliding Hill Road corridor. The additional volumes from Project Tiger (Wegmans) will produce mostly through volumes, which will exacerbate any existing or background queuing and operational issues for a roundabout.

The roundabout analysis outputs from SIDRA are included in Appendix H.

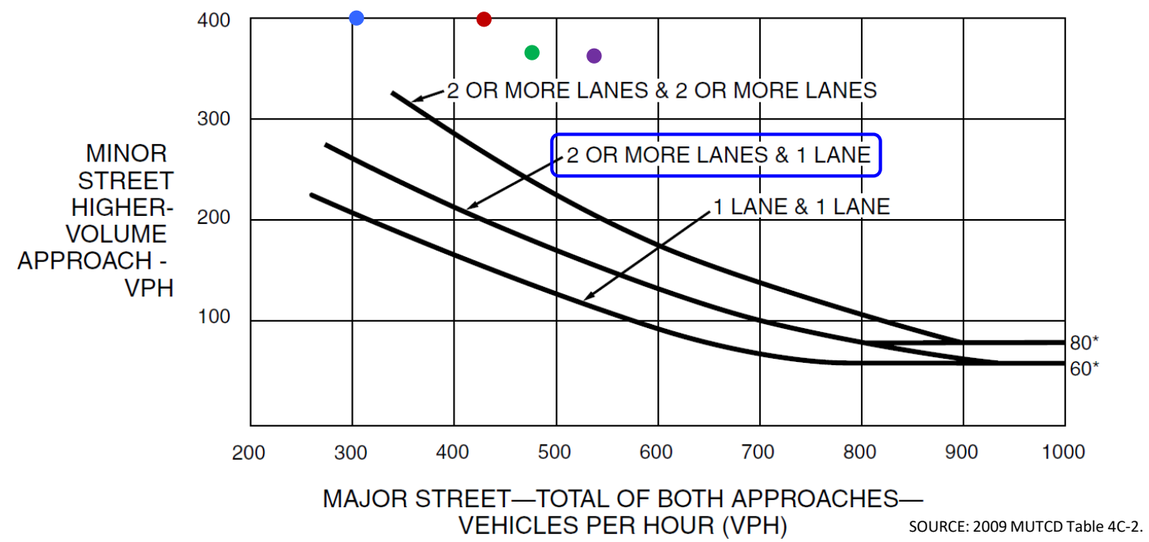
Per discussion with VDOT and Hanover County, a separate signal justification report (SJR) is being completed for the intersection of Sliding Hill Road and New Ashcake Road. Additional discussion concerning the roundabout is included in the SJR document.

Warrant 2, Four-Hour Vehicular Volume



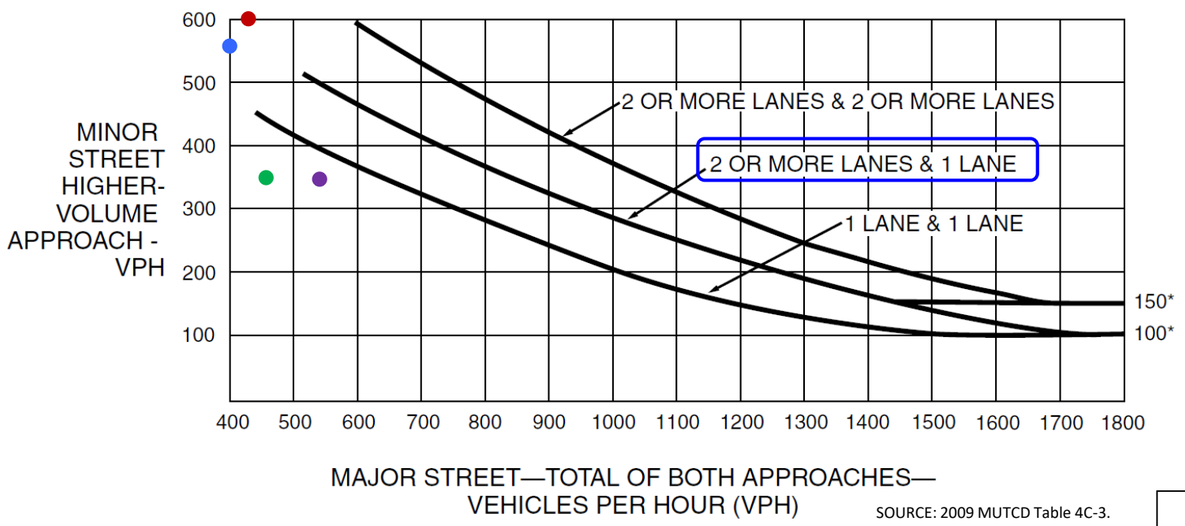
SOURCE: 2009 MUTCD Table 4C-1.

Warrant 2, Four-Hour Vehicular Volume (70% Factor)



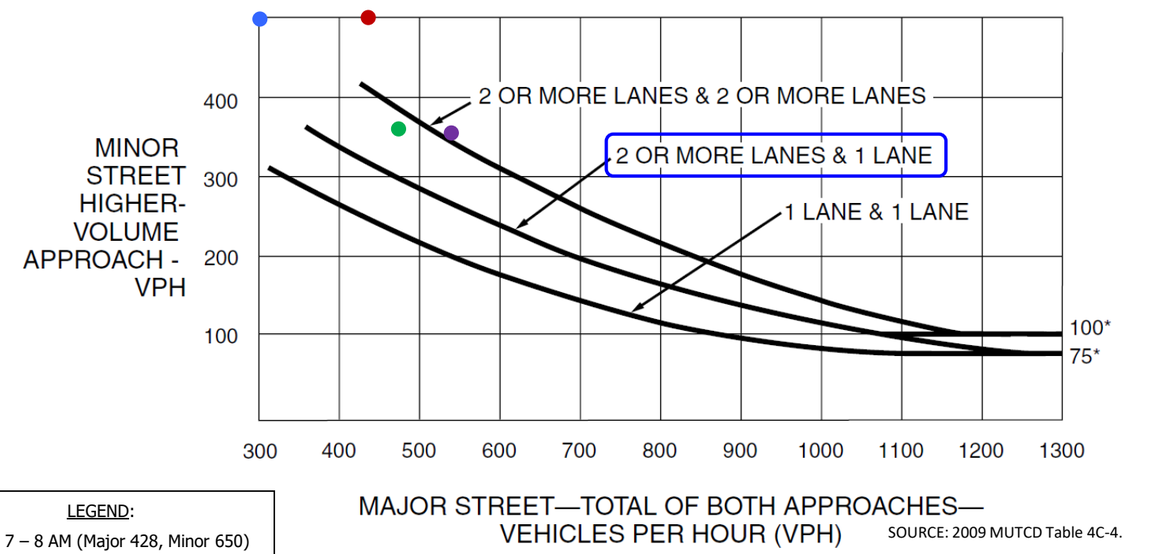
SOURCE: 2009 MUTCD Table 4C-2.

Warrant 3, Peak Hour



SOURCE: 2009 MUTCD Table 4C-3.

Warrant 3, Peak Hour (70% Factor)



SOURCE: 2009 MUTCD Table 4C-4.

LEGEND:

- 7 – 8 AM (Major 428, Minor 650)
- 8 – 9 AM (Major 301, Minor 542)
- 4 – 5 PM (Major 477, Minor 362)
- 5 – 6 PM (Major 528, Minor 360)

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Traffic Signal Warrants #2 and #3
2022 Background Volumes
Project Tiger (Wegmans)

Figure
8-1

9 CONCLUSIONS

Analyses were performed for the 2019 existing volumes, the 2022/2027/2032/2035 background volumes, and the 2022/2027/2032/2035 total volumes, which includes site traffic generated by Project Tiger (Wegmans).

9.1 PRINCIPAL FINDINGS

The 2019 existing conditions exhibit moderate delays and queuing along the roadway network. Overall, all intersections operate well during the AM peak hour, with only side street operations performing poorly. Traffic operations during the PM peak hour worsen, with some intersections experiencing heavy delays for both individual movements and the overall intersection. During the Saturday peak hour, no operational issues were noted for mainline or side street operations. Of note is the unsignalized intersection of Sliding Hill Road and New Ashcake Road, which has northbound left turn volumes over 600 in the AM peak hour, poor levels of service, and heavy queues.

Under 2022, 2027, 2032, and 2035 background analyses, operational, queuing, and capacity issues noted under existing (2019) conditions initially improve due to the widening of the Sliding Hill Road corridor to four (4) lanes. As volumes grow over the next 16 years (most notable in 2032 and 2035), the benefits realized due to the widening begin to diminish. This is notable at the signalized Atlee Station Road intersection where both mainline and side street volumes are heavy. In addition, the side street approaches at the unsignalized intersections along the Sliding Hill Road corridor of Totopotomoy Trail, Atlee Commerce Boulevard and along Lewistown Road at Ashcake Road witness issues associated with left turning traffic entering the mainline. Those individual movements and approaches that are over capacity under existing conditions worsen with background growth and existing operational issues are exacerbated.

The first phase of development of Project Tiger (Wegmans) is accommodated through the installation of two (2) full-access entrances – Site Entrance "A" on Sliding Hill Road and Site Entrance "B" on Ashcake Road – and an auxiliary eastbound left turn lane on Sliding Hill Road. Under 2022 Future Total conditions, intersections along the Sliding Hill Road and Lewistown Road corridors operate at a LOS E or better and exhibit the same general operational characteristics and shortcoming noted in the 2022 background analysis. There are no major capacity issues noted at the study intersections that were not present under background analysis.

The second phase of development of Project Tiger (Wegmans) continues to be accommodated through the entrances on Sliding Hill Road and Ashcake Road constructed in Phase 1. Under 2027 Future Total conditions, all intersection along the Sliding Hill Road and Lewistown Road corridors continue to operate at a LOS E or better and exhibit the same general operational characteristics and shortcoming noted in the 2027 background analysis. Queuing and capacity issues are noted at the intersection of Sliding Hill Road and Atlee Station Road. There are no major capacity issues noted at the study intersections with the exception of the eastbound approach of Lewistown Road at Ashcake Road and the intersection of Sliding Hill Road and Atlee Station Road.

The third and final phase of development of Project Tiger (Wegmans) continues to be accommodated through the entrances on Sliding Hill Road and Ashcake Road constructed in Phase 1. Under 2032/2035 Future Total volume conditions, all intersection along the Sliding Hill Road and Lewistown Road corridors continue to operate at a LOS E or better and exhibit the same general operational characteristics and shortcoming noted in the 2032/2035 background analysis, with the exception of the eastbound approach of Lewistown Road at Ashcake Road and the intersection of Sliding Hill Road and Atlee Station Road.

In general, the buildout of the proposed site does not significantly impact either the Sliding Hill Road or Lewistown Road corridors beyond those thresholds identified within the 2032/2035 background analyses. Of particular note are the signal at Atlee Station Road and the eastbound approach of Lewiston at Ashcake Road, which exhibit poor operations under both background and total scenarios.

The Ashcake Road corridor between Lewistown Road and Sliding Hill Road currently carries approximately 2,700 vehicles per day; Project Tiger (Wegmans) is anticipated to add approximately 635 new daily trips (20% of site traffic). While this represents a 25% increase in overall volumes along the corridor, the 2-lane corridor is well under its carrying capacity and does not experience any queuing or operational issues under existing, background, or total future conditions. In addition, Project Tiger (Wegmans) has agreed to direct all truck traffic along the Sliding Hill Road corridor only; no truck traffic is anticipated to utilize the Ashcake Road corridor.

9.2 RECOMMENDATIONS

The installation of required roadway improvements will correspond with the traffic generated by the respective phase of the development. This report identifies the proposed phasing of Project Tiger (Wegmans) and the roadway improvements associated with each. The focus of this work is identifying a comprehensive access plan that provides functional access to Project Tiger (Wegmans) and preserves the capacity of the surrounding roadway network.

Throughout the process, the goal was to determine the need for roadway improvements as the site develops and ensure that the existing local roads are not negatively impacted due to the anticipated traffic volumes.

It should be noted that a traffic signal is warranted at the intersection of Sliding Hill Road and New Ashcake Road under existing and background conditions (see Chapter 8). Signalization, or other alternative treatment of the intersection, is recommended as a background improvement to the Sliding Hill Road corridor to alleviate current and expected queuing and operational issues within the study area prior to the development of Project Tiger (Wegmans). In coordination with VDOT and Hanover County, a signal justification report (SJR) is being completed in conjunction with this TIA and will address the background operational issues at the Sliding Hill Road and New Ashcake Road intersection.

To accommodate the anticipated traffic of Project Tiger (Wegmans), the recommended phasing plan is as follows:

- Phase 1 – Site development of 1,085,000 SF of warehousing and distribution land uses (approximately 2,060 ADT)
    - Construct an entrance on Sliding Hill Road (Site Entrance "A").
    - Construct an entrance on Ashcake Road (Site Entrance "B").
    - Construct an eastbound left turn lane on Sliding Hill Road at Site Entrance "A".

- Phase 2 – Site development of 205,650 SF of warehousing and distribution land uses (approximately 430 ADT)
    - No further improvements beyond those described in Phase 1.

- Phase 3 – Site development of 400,000 SF of warehousing land use (approximately 680 ADT)
    - No further improvements beyond those described in Phase 1.