

ESSEX POINT AT MT. CLEMENT TRAFFIC IMPACT ANALYSIS ESSEX COUNTY, VIRGINIA

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Prepared for:

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EXECUTIVE SUMMARY

PURPOSE

The purpose of this report is to present the results of a Traffic Impact Analysis (TIA), conducted and submitted on behalf of 7 and M Development, LLC (the “Applicant”) in conjunction with a rezoning application and associated preliminary plan for the redevelopment of an approximate 13.186-acre site in Essex County, Virginia. Specifically, the property is located north of Richmond Highway (Route 360) and west of Hospital Road and east of Mt. Clement Road, south of the Town of Tappahannock.

The Applicant proposes to develop the currently undeveloped property with a mixed-use development comprised of senior adult housing, workforce housing, and a mix of non-residential uses including centralized wellness/community services, retail, office, and a drive-through commercial use. The development would include an integrated internal street network with on-site pedestrian facilities for non-vehicular mobility and recreation. The development includes more urban “complete street” design principles with on-street parking and enhanced streetscape features to promote active lifestyles. For purposes of this analysis, the assumed program includes the following:

- 13 Senior Duplex Units
- 122 Senior Multifamily Units
- 28 Workforce Multifamily Units
- 12,450 Gross Square Feet (GSF) Retail Use
- 44,780 GSF Office Use
- 2,610 Fast-Food Restaurant with Drive-Through
- 8,490 GSF Community Center
- 12,000 GSF Health Club

The preceding represents a potential mix of uses that could develop on the property for the purposes of assessing a higher trip generating (“worse case”) scenario. The ultimate development mix will be dependent on market demands and may not build out at the intensity evaluated herein. Redevelopment of the property for the purposes of this analysis would occur in a single phase with a projected build-out year of 2027. Access to the property will be provided via right-in/right-out and right-in only entrances along Richmond Highway.

The TIA was conducted in general accordance with the Virginia Department of Transportation (VDOT) TIA *Administrative Guidelines* dated August 2022 and the VDOT *Traffic Operations and*

Safety Analysis Manual (TOSAM), Version 2.0, dated February 2020. The TIA analysis parameters were discussed and agreed upon with VDOT and County staff at a Scope of Work meeting in October 2022.

CONCLUSIONS

The principal findings of this study are as follows:

1. The proposed development includes a complementary mix of residential and non-residential uses. Due to the mix of uses, the site would experience a naturally occurring synergy thereby reducing vehicle trips to/from the site.
2. Under 2022 existing conditions, all signalized study intersections currently operate at an overall LOS “D” or better during the AM and PM weekday peak hours. No turning movement 95th percentile queues exceed available storage at the study intersections.
3. Under 2027 background future conditions (without the proposed development), all signalized study intersections would continue to operate at an overall LOS “D” or better during the AM and/or PM weekday peak hours. The turning movement 95th percentile queues are contained within the available storage, consistent with 2022 existing conditions.
4. According to ITE, the proposed mixed-use development is estimated to generate the following site related vehicle trips:
 - 219 weekday AM peak hour trips (134 inbound and 85 outbound)
 - 281 weekday PM peak hour trips (126 inbound and 155 outbound)
 - 2,584 weekday average daily trips
5. Under 2027 total future conditions (with the proposed development), overall intersection and certain movement delays would experience minor increases, but overall levels of service would remain consistent with 2027 background future conditions. Turning movement 95th percentile queues storage under 2027 total future queues would continue to be contained within the available storage lengths, consistent with 2027 background future conditions.
6. An Access Management Exception (AM-E) for the intersection spacing from the proposed right-in/right-out access on Richmond Highway to the right in only access will need to be submitted to VDOT for approval.
7. The proposed main entrance (right-in/right-out) meets the VDOT warrant for a full-width right turn lane along Richmond Highway. The proposed right-in only meets the VDOT warrant

for a right turn taper. Due to the presence of heavy vehicles and higher travel speeds along Richmond Highway, full-width right turn lanes, or a continuous right turn lane, are recommended for both proposed entrances.

RECOMMENDATIONS

Based on the results of the TIA, the following recommendations should be considered in conjunction with build-out of the proposed development:

1. The development should include an integrated internal street network that emphasizes pedestrian mobility with connections between the residential and non-residential uses in order to maximize the internal synergy of the site and reduce overall vehicle trips.
2. The internal streets should be designed to public street standards while being privately owned and maintained. The Applicant should commit to ongoing maintenance of the internal streets. These streets should be publicly accessible.
3. The internal street network should be designed so that the streets may be extended into the adjoining properties should those properties (re)develop in the future.
4. The proposed entrances along Richmond Highway should be designed with full-width right turn lanes in accordance with the VDOT *Road Design Manual*.

SECTION 1: INTRODUCTION

STUDY PURPOSE

The purpose of this report is to present the results of a Traffic Impact Analysis (TIA), conducted and submitted on behalf of 7 and M Development, LLC (the “Applicant”) in conjunction with a rezoning application and associated preliminary plan for the redevelopment of an approximate 13.186-acre site in Essex County, Virginia. Specifically, the property is located north of Richmond Highway (Route 360) and west of Hospital Road and east of Mt. Clement Road, south of the Town of Tappahannock, as shown on Figure 1-1.

DESCRIPTION OF PROPOSED DEVELOPMENT

The Applicant proposes to develop the currently undeveloped property with a mixed-use development comprised of senior adult housing, workforce housing, and a mix of non-residential uses including centralized wellness/community services, retail, office, and a drive-through commercial use. The development would include an integrated internal street network with on-site pedestrian facilities for non-vehicular mobility and recreation. The development includes more urban “complete street” design principles with on-street parking and enhanced streetscape features to promote active lifestyles. The internal street network is proposed to be privately maintained but would function as publicly accessible streets.

For purposes of this analysis, the assumed program includes the following:


- 13 Senior Duplex Units
- 122 Senior Multifamily Units
- 28 Workforce Multifamily Units
- 12,450 Gross Square Feet (GSF) Retail Use
- 44,780 GSF Office Use
- 2,610 Fast-Food Restaurant with Drive-Through
- 8,490 GSF Community Center
- 12,000 GSF Health Club

A full-size copy of the preliminary plan is included herein as Appendix A.

In order to evaluate the impacts of the proposed development on the surrounding roadway network, the Applicant and their representatives developed the study scope to gain concurrence on the study parameters with both Essex County and Virginia Department of Transportation (VDOT) staff. A copy of the executed Scope of Work is included in Appendix B.



Figure 1-1
Site Location

 Site Location



NORTH
Mt. Clement Property
Essex County, Virginia



STUDY OBJECTIVES

The objectives of the study consist of the following:

1. Analyze baseline transportation conditions for the year 2022.
2. Analyze future transportation conditions in the build-out year of 2027 without the proposed development.
3. Analyze future transportation conditions in the build-out year of 2027 with the proposed development.
4. Identify development-related traffic impacts associated with the proposed development in the projected build-out year of 2027 and recommend appropriate transportation improvements, if any, needed to mitigate those impacts.

STUDY AREA

The study area was selected based on those intersections potentially affected by the proposed development. This study presents an analysis of existing (2022) transportation conditions and future (2027) scenarios, both with and without the proposed development, for the intersections identified within the study area. For purposes of this analysis, the following intersections were analyzed and are shown on Figure 1-2:

1. Richmond Highway (Route 360)/Lagrange Industrial Drive
2. Richmond Highway (Route 360)/Mt. Clement Road
3. Richmond Highway (Route 360)/Right-in/Right-out Site Access Steet (Future Intersection)
4. Internal Access Street/ Internal Cross Street (Future Intersection)
5. Richmond Highway (Route 360)/Right-in Site Entrance (Future Intersection)
6. Richmond Highway (Route 360)/Hospital Road (Route 708)
7. Richmond Highway (Route 360)/Tidewater Trail (Route 17)

STUDY METHODOLOGY

Synchro software (Version 11) was used to evaluate levels of service at the study intersections during the weekday AM and PM peak hours. Synchro is a macroscopic model used for optimizing traffic signal timing and performing capacity analyses. The software can model existing traffic signal timings or optimize splits, offsets, and cycle lengths for individual intersections, an arterial,

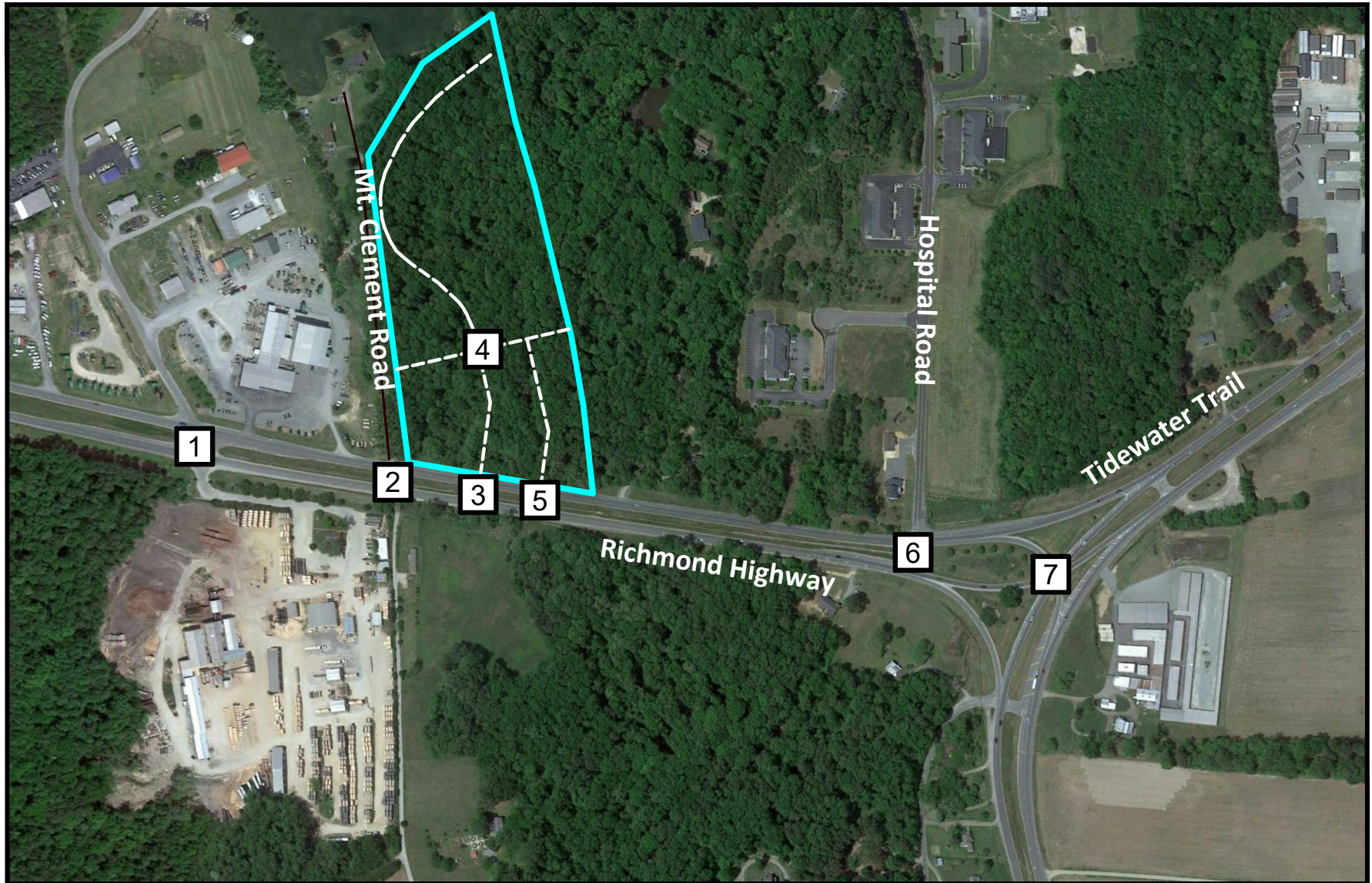


Figure 1-2
Study Intersections

Study Intersections



NORTH
Mt. Clement Property
Essex County, Virginia



or a complete network. Synchro allows the user to evaluate the effects of changing intersection geometrics, traffic demands, traffic control, and/or traffic signal settings as well as optimize traffic signal timings. Specific analysis parameters, including peak hour factors (PHF) and heavy vehicle factors (HV%), were applied to the Synchro analysis based on the scope requirements and the guidance of the Traffic Operations and Safety Analysis Manual (TOSAM) provided by VDOT.

The levels of service reported for the signalized and unsignalized intersections analyzed herein were taken from the Highway Capacity Manual 2000 (HCM) reports generated by Synchro version 11. Level of service descriptions are included in Appendix C.

Tasks undertaken in this study include the following:

1. Reviewed the Applicant's proposal and related development plans.
2. Conducted a field reconnaissance of existing roadway and intersection geometries, traffic controls, and speed limits.
3. Met with Essex County staff, VDOT staff, and the members of the project team to establish the general study scope and specific analysis parameters.
4. Obtained recent (2022) traffic counts of key study intersections within the study area during the weekday AM and PM peak hours.
5. Calculated 2022 existing baseline levels of service at each of the key study intersections.
6. Forecasted AM and PM peak hour background future traffic based on existing traffic counts, regional traffic growth for a project build-out year of 2027.
7. Calculated 2027 background levels of service at each of the key study intersections.
8. Estimated the weekday AM and PM peak hour trips that would be generated with build-out of the proposed development based on standard Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition, rates and/or equations.
9. Forecasted weekday AM and PM peak hour total future traffic based on background traffic forecasts plus site trip assignments for 2027 build-out conditions
10. Calculated 2027 total future levels of service for each of the key study intersections.
11. Identified roadway improvements/enhancements required, if any, to mitigate future traffic associated with the proposed development.

Sources of data for this study included recent (2022) traffic counts provided by VDOT, traffic counts conducted by Wells + Associates, the Institute of Transportation Engineers, the *Highway Capacity Manual 2000*, and Synchro version 11. The existing Synchro network files for the study area were obtained from VDOT staff.

SECTION 2: BACKGROUND INFORMATION

SITE LOCATION

The property is located in Essex County, Virginia north of Richmond Highway (Route 360) and west of Hospital Road and east of Mt. Clement Road, south of the Town of Tappahannock as shown on Figure 1-1.

HISTORY OF PARCEL

The property is currently undeveloped.

CURRENT ZONING

The property is currently zoned B-1 (Limited Business District).

NEARBY USES

Nearby uses adjacent to the property include an industrial park to the west (James River Equipment) and a hospital to the east (Tidewater Memorial Hospital).

As discussed with county and VDOT staff, there are no nearby approved developments to be included as a pipeline development in future analysis scenarios.

ESSEX COUNTY COMPREHENSIVE PLAN

The Site is located in the Development Service District and the Highway Corridor Enhancement District of the Essex County Comprehensive Plan. In the Development Service District, the growth in these areas will prevent the outward sprawl of residential development into rural County areas, and keep the new population close to the existing centers where residential development can be economically provided with utilities, services, and employment. The Corridor Enhancement District's purpose is to protect and improve the quality of visual appearance along these linear corridors and to provide guidelines to ensure that buffering, landscaping, lighting, signage, and proposed structures are internally consistent and of a quality that contributes to the County's character.

EXISTING ROADWAY NETWORK

Functional Classification. Functional classification defines the role that a particular roadway plays in moving traffic and facilitating parcel access. Roadways are assigned to one of several designations within a hierarchy according to the character of travel service it provides. Based on VDOT's Functional Classification Map, Richmond Highway and Tidewater Trail are classified as "Principal Arterial" roadways. Lagrange Industrial Drive, Mt. Clement Road, and Hospital Road are classified as a "Local Street".

Existing Roadway Network. Direct access to the site is provided via a right-in/right-out and a right-in access on Richmond Highway. Existing lane use and traffic controls for study intersections are shown on Figure 2-1.

Richmond Highway (Route 360). Richmond Highway is constructed as a four (4) lane median-divided roadway with a posted speed limit of 45 miles per hour (mph). According to 2019 VDOT traffic data, Richmond Highway carries approximately 10,000 vehicles per day (vpd) with 8% heavy vehicles.

Tidewater Trail (Route 17). Tidewater Trail is constructed as a four (4) lane median-divided roadway with a posted speed limit of 45 mph. According to 2019 VDOT traffic data, Tidewater Trail carries approximately 23,000 vpd with 6% heavy vehicles.

Hospital Road (Route 708). Hospital Road is constructed as a two (2) lane undivided roadway with a posted speed limit of 45 mph. According to 2019 VDOT traffic data, Hospital Road carries approximately 2,600 vpd.

Lagrange Industrial. The access through the Lagrange Industrial park is constructed as a two (2) lane undivided roadway with a posted speed limit of 25 mph.

Mt. Clement Road. Mt. Clement Road is constructed as a two (2) lane undivided unpaved roadway. There is currently public right-of-way for a portion of the roadway. However, the roadway terminates approximately 0.25 mile from Richmond Highway and currently serves as the sole access for two (2) single family residential properties.

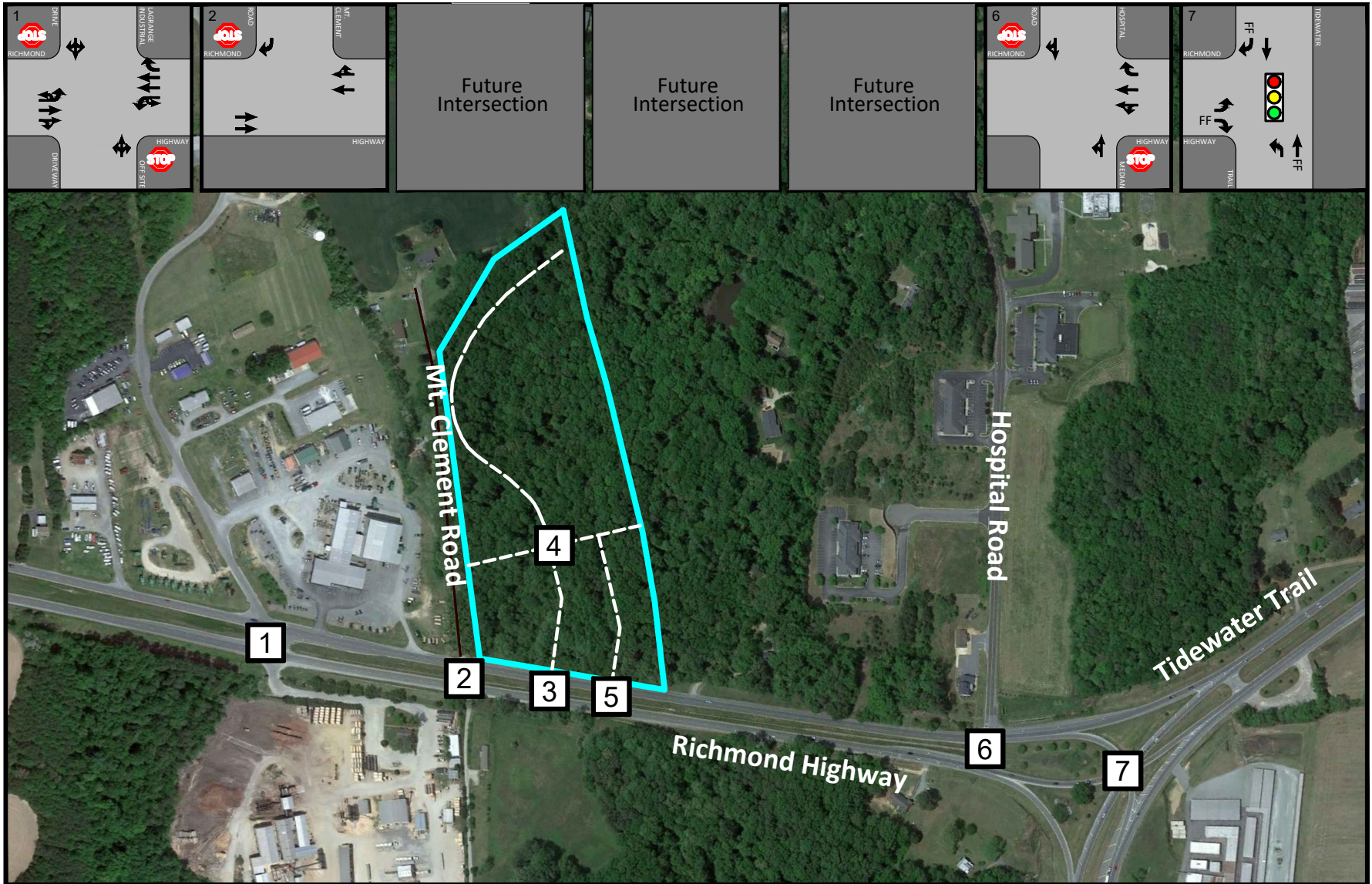


Figure 2-1
2022 Existing Lane Use and Traffic Controls

Study Intersections
FF Free Flow



Mt. Clement Property
Essex County, Virginia

EXISTING CRASH DATA

Crash data for the study intersections were obtained from VDOT from February 2017 through September 2022. The reports are provided in Appendix D. The crash data were sorted by intersection location, and the results for the most recent five-year period are summarized in Table 2-1. For purposes of this analysis, accidents occurring within 250 feet of the specified intersection are counted towards the crash rate at that intersection. According to VDOT's Crash Data Analysis Manual, Version 1, 250 feet is the typical intersection node offset for network-level screening. The crash history at each location was reviewed and broken down by severity using the KABCO scale, which defines the levels of injury severity as follows:

- K (Fatal)
- A (Incapacitating Injury)
- B+C (Minor Injury)
- O (Property Damage Only)

Fatal injuries include deaths that occur within thirty days following injury in a motor vehicle crash. If several people are injured in a crash, the most severe injury level is used to set crash severity.

As shown in Table 2-1, over the past five years, a total of 41 incidents have occurred over the four (4) locations. The highest accident location (with 24 incidents) occurred at the Richmond Highway/Tidewater Trail intersection. Out of all the reported crashes, there was only one incapacitating injury. In Virginia, a non-incapacitating (or minor/possible) injury is defined as an injury that results in bruising, swelling, abrasions, limping, etc. Possible injuries include those that have a complaint of pain or momentary unconsciousness. Of the total number of accidents reported, there are no reported fatalities. Based on the reported crash history, the locations within the study intersection would not be considered high crash sites.

In addition to the collision severity, Table 2-2 summarizes the collision types in the area. The VDOT's Crash Data Analysis Manual outlines 17 different collision types, and rear-end, angle, non-collision, sideswipe-same direction and fixed object are observed in the 41 incidents, where rear end collisions being the majority of the collisions. Based on the crash descriptions shown in Appendix D, these rear-end collisions are when the from-end of one vehicle collides with the backside of another vehicle. The 16 rear-end collisions reported are predominantly attributed to a failure to stop to stopped traffic in front of the car, erratic lane changes, and drivers stopping for red lights. The 13 angle collisions occur due to a failure to yield to opposing traffic, erratic lane changes, and drivers running red lights. The fixed object collisions occurred by a vehicle driving off the road and colliding with an object or colliding with a deer in the roadway. The sideswipe – same direction collisions occurred when the car failed to see another car when merging and the other collision occurred when the car was swerving to avoid another car. The non-collision incident occurred when the car drove over gravel and skidded off the road.

Table 2-1
 Mt. Clement Property
 Crash Analysis: KABCO Severity

February 2017 - September 2022	KABCO Severity Code				Total
	(A) Incapacitating Injury	(B) Non-incapacitating Injury	(C) Possible Injury	(O) No Injury	
Intersection					
Richmond Highway/ Lagrange Industrial Drive	0	0	0	2	2
Richmond Highway/ Mt.Clement Road	0	0	0	0	0
Richmond Highway/ Hospital Road	0	6	0	9	15
Richmond Highway/ Tidewater Trail	1	8	1	14	24

Note(s):

Table 2-2
 Mt. Clement Property
 Crash Analysis: Collision Type Summary

February 2017 - September 2022 Intersection	Collision Type				
	Rear End	Angle	Non-Collision	Sideswipe Same Direction	Fixed Object
Richmond Highway/ Lagrange Industrial Drive	1	0	0	1	0
Richmond Highway/ Mt.Clement Road	0	0	0	0	0
Richmond Highway/ Hospital Road	5	5	0	0	5
Richmond Highway/ Tidewater Trail	10	8	1	1	4
Collision Type Total:	16	13	1	2	9

SECTION 3: ANALYSIS OF 2022 EXISTING CONDITIONS

TRAFFIC COUNTS

Vehicle turning movement, pedestrian, and bicycle counts were obtained for the following key study intersections:

1. Richmond Highway (Route 360)/Lagrange Industrial Drive
2. Richmond Highway (Route 360)/Mt. Clement Road
3. Richmond Highway (Route 360)/Hospital Road (Route 708)
4. Richmond Highway (Route 360)/Tidewater Trail (Route 17)

The peak period traffic counts were conducted on Thursday, November 3, 2022. The counts were conducted from 6:00 AM to 9:00 AM and from 4:00 PM to 7:00 PM. The count data summary sheets are included for reference in Appendix E.

OPERATIONAL ANALYSIS

Level of Service Results. Capacity/level of service (LOS) analyses were conducted at the study intersections based on the existing lane use and traffic controls (Figure 2-1), 2022 existing traffic volumes (Figure 3-1), and existing Synchro network files obtained from VDOT. The capacity analyses results, as reported by Synchro, are presented in Appendix F and summarized in Table 3-1.

Weekday AM Peak Hour. During the weekday AM peak hour, all signalized intersections currently operate at an overall LOS “D” or better. All traffic movements at the unsignalized study intersections currently operate at LOS “B” or better.

Weekday PM Peak Hour. During the weekday PM peak hour, all signalized intersections currently operate at an overall LOS “D” or better. All traffic movements at the unsignalized study intersections currently operate at LOS “C” or better.

Queuing Results. The 95th percentile queues of 2022 existing conditions are used to establish a datum against which to compare future conditions. The 95th percentile queue is defined as the maximum back of queue with 95th percentile traffic volumes. The 95th percentile queue is not necessarily ever observed, it is simply based on statistical calculations.

Queuing analyses were conducted at the study intersections based on the existing lane use and traffic controls (Figure 2-1), 2022 existing traffic volumes (Figure 3-1), and existing Synchro

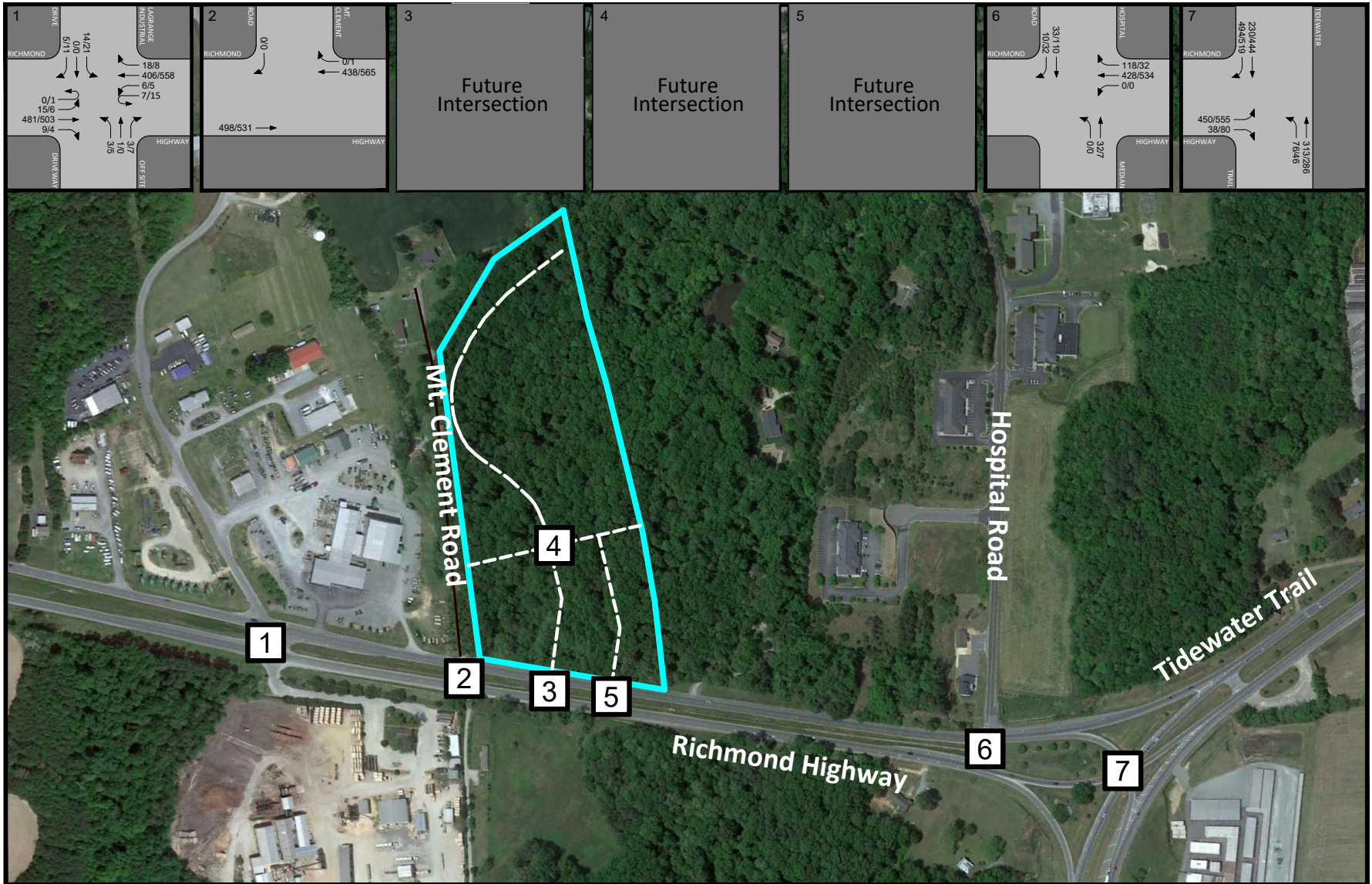


Figure 3-1
2022 Existing Traffic Volumes

Study Intersections



Mt. Clement Property
Essex County, Virginia



network files obtained from VDOT. The queueing analyses results, as reported by Synchro, are presented in Appendix F and summarized in Table 3-2.

As shown in Table 3-2, existing queues do not exceed the existing available storage lengths.

Table 3-1
 Mt. Clement Property
 Intersection Levels of Service Summary (1) (2) (3)

Intersection	Operating Condition	Street Name	Approach/ Movement	Existing 2022	
				AM	PM
1 Richmond Highway/ Lagrange Industrial Drive	STOP	Richmond Highway	EBLU	A [8.5]	A [8.6]
		Richmond Highway	EBTR	A [0.0]	A [0.0]
		Richmond Highway	WBLU	A [9.2]	A [8.4]
		Richmond Highway	WBT	A [0.0]	A [0.0]
		Richmond Highway	WBR	A [0.0]	A [0.0]
		Lagrange Industrial Drive Driveway	NBLTR	B [14.3]	B [12.5]
			SBLTR	B [13.2]	B [13.7]
2 Richmond Highway/ Mt. Clement Road	STOP	Richmond Highway	EBT	A [0.0]	A [0.0]
		Richmond Highway	WBTR	A [0.0]	A [0.0]
		Mt. Clement Road	SBR	A [0.0]	B [10.1]
6 Richmond Highway/ Hospital Road	STOP	Richmond Highway	WBLT	A [0.0]	A [0.0]
		Richmond Highway	WBR	A [0.0]	A [0.0]
		Median	NBLT	B [14.5]	B [14.2]
		Hospital Road	SBTR	B [12.5]	C [15.8]
7 Richmond Highway/ Tidewater Trail	Signal	Richmond Highway	EBT	D (36.1)	D (42.2)
		Tidewater Trail	WBT	D (45.8)	D (46.5)
		Tidewater Trail	SBT	<u>C (29.8)</u>	<u>D (40.4)</u>
			Overall	D (35.2)	D (41.7)

Notes (1) Numbers in parentheses () represent delay at signalized intersections in seconds per vehicle.

(2) Numbers in brackets [] represent delay at unsignalized intersections in seconds per vehicle.

(3) Roadway names in bold are considered north/south for purposes of this analysis

Table 3-2
 Mt. Clement Property
 Intersection Queuing Summary (1) (2)

Intersection	Operating Condition	Street Name	Approach/ Movement	Available Storage (ft)	Existing 2022	
					AM	PM
1 Richmond Highway/ Lagrange Industrial Drive	STOP	Richmond Highway	EBLU	330	1	0
		Richmond Highway	EBTR	N/A	0	0
		Richmond Highway	WBLU	250	1	0
		Richmond Highway	WBT	N/A	0	0
		Richmond Highway	WBR	355	0	0
		Lagrange Industrial Drive	NBLTR	N/A	1	2
		Driveway	SBLTR	N/A	3	6
2 Richmond Highway/ Mt. Clement Road	STOP	Richmond Highway	EBT	N/A	0	0
		Richmond Highway	WBTR	N/A	0	0
		Mt. Clement Road	SBR	N/A	0	0
6 Richmond Highway/ Hospital Road	STOP	Richmond Highway	WBLT	N/A	0	0
		Richmond Highway	WBR	N/A	0	0
		Median	NBLT	250	7	1
		Hospital Road	SBTR	N/A	7	32
7 Richmond Highway/ Tidewater Trail	Signal	Richmond Highway	EBT	N/A	339	535
		Tidewater Trail	WBT	N/A	95	65
		Tidewater Trail	SBT	N/A	266	466

Notes (1) Queue length is based on the 95th percentile queue in feet as reported by Synchro, Version 11.

(2) Roadway names in bold are considered north/south for purposes of this analysis

SECTION 4: ANALYSIS OF 2022 BACKGROUND FUTURE CONDITIONS

REGIONAL GROWTH

For the anticipated build-out year of 2027, increases in traffic associated with regional growth were estimated at 1.0%, compounded annually, for five (5) years from 2022 to 2027 at the following movements:

- Richmond Highway through movements and turning movements at Richmond Highway/Tidewater Trail
- Tidewater Trail through and turning movements

The growth volumes from 2022 to 2027 are shown on Figure 4-1.

PIPELINE DEVELOPMENTS FORECASTS

There are no pipeline developments considered in conjunction with the subject proposed development.

2027 BACKGROUND FUTURE TRAFFIC FORECASTS

As shown on Figure 4-2, the 2027 background future traffic forecasts were developed by combining the 2022 existing traffic volumes (Figure 3-1), and the regional growth from 2022 to 2027 (Figure 4-1).

OPERATIONAL ANALYSIS

Level of Service Results. Capacity/level of service (LOS) analyses were conducted at the study intersections based on the 2027 background future traffic forecasts (Figure 4-2), the 2027 background future lane use and traffic controls (Figure 4-3), and existing Synchro network files obtained from VDOT. The capacity analyses results, as reported by Synchro, are presented in Appendix G and summarized in Table 4-1.

Weekday AM Peak Hour. During the weekday AM peak hour, all signalized intersections currently operate at an overall LOS “D” or better. All traffic movements at the unsignalized study intersections currently operate at LOS “B” or better.

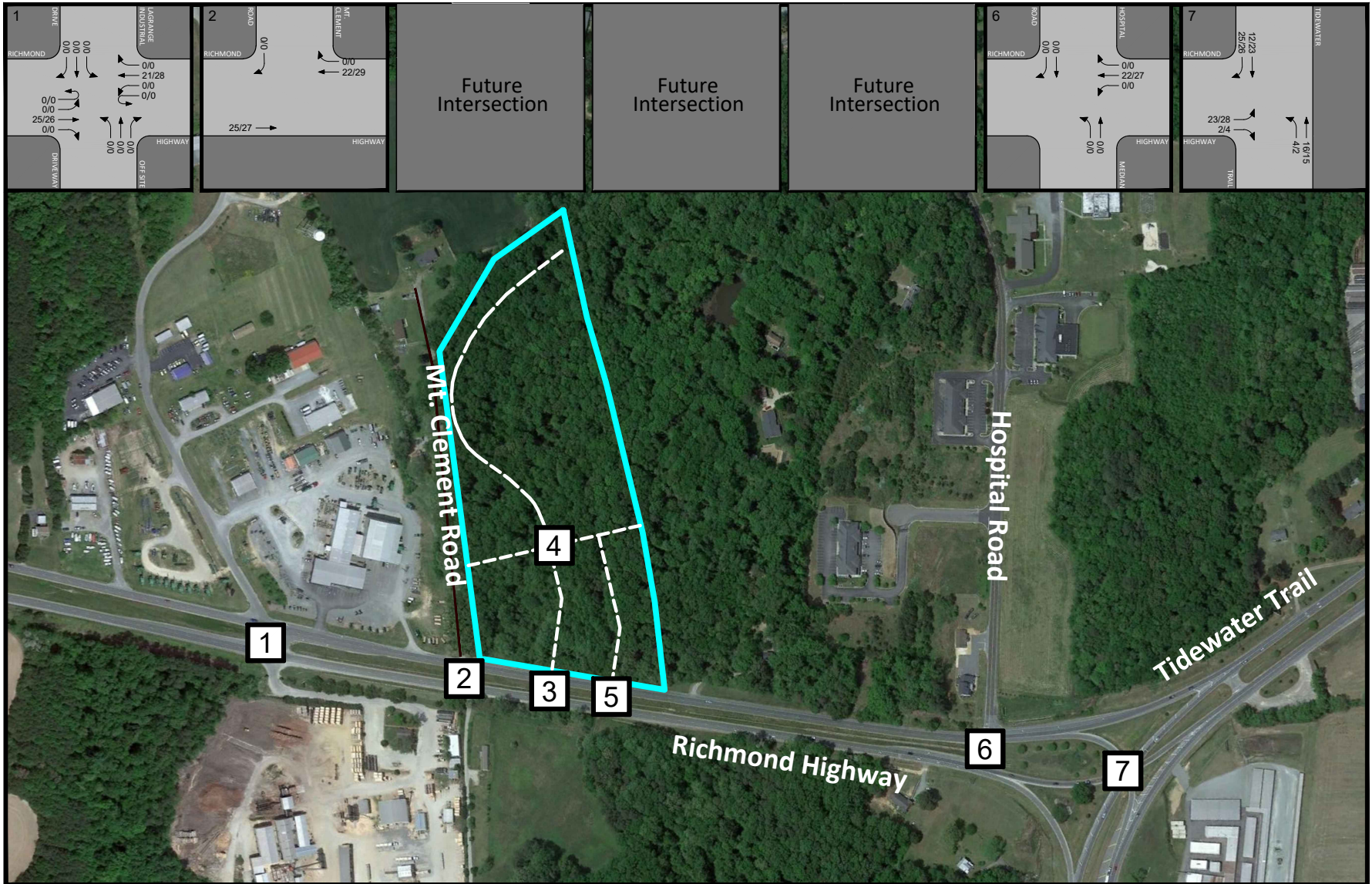


Figure 4-1
Regional Growth (2022 to 2027)

Study Intersections



Mt. Clement Property
Essex County, Virginia



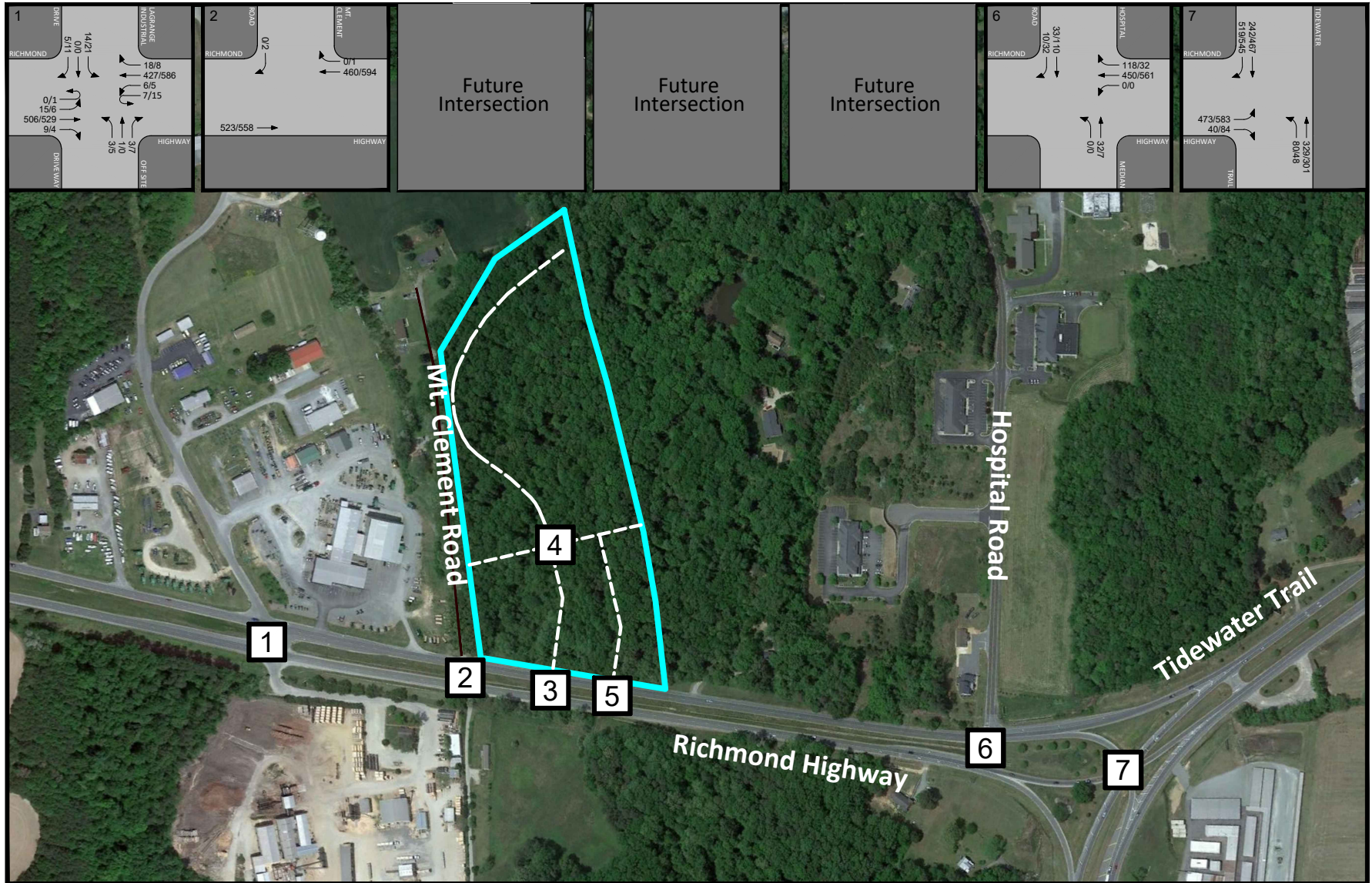


Figure 4-2
2027 Background Future Traffic Forecasts

Study Intersections



NORTH
Mt. Clement Property
Essex County, Virginia

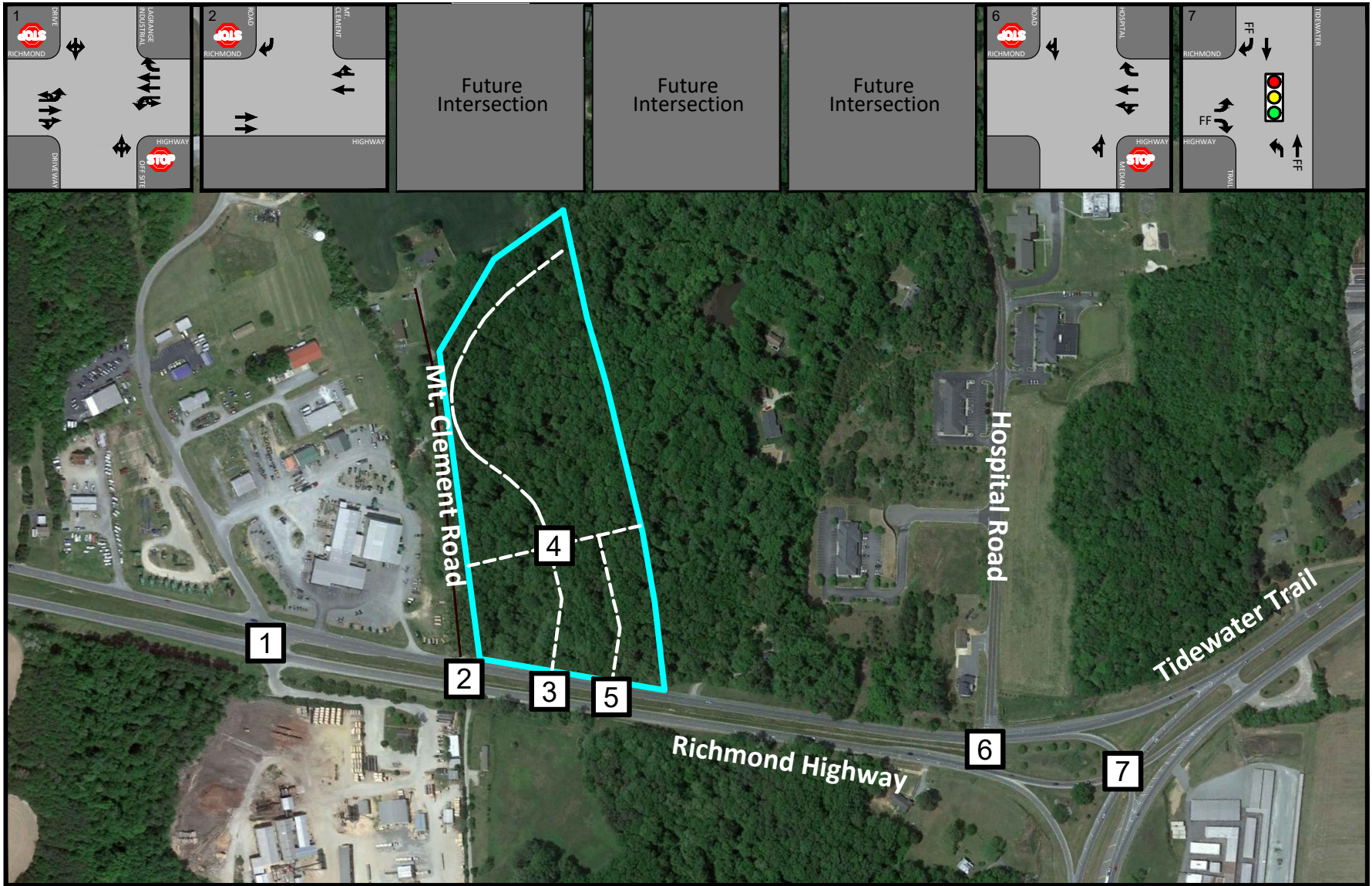


Figure 4-3
2027 Background Future Lane Use and Traffic Controls

Study Intersections
FF Free Flow



Mt. Clement Property
Essex County, Virginia

Table 4-1
 Mt. Clement Property
 Intersection Levels of Service Summary (1) (2) (3)

Intersection	Operating Condition	Street Name	Approach/Movement	Existing 2022		Background 2027	
				AM	PM	AM	PM
1 Richmond Highway/ Lagrange Industrial Drive	STOP	Richmond Highway	EBLU	A [8.5]	A [8.6]	A [8.6]	A [8.7]
		Richmond Highway	EBTR	A [0.0]	A [0.0]	A [0.0]	A [0.0]
		Richmond Highway	WBLU	A [9.2]	A [8.4]	A [9.3]	A [8.5]
		Richmond Highway	WBTR	A [0.0]	A [0.0]	A [0.0]	A [0.0]
		Richmond Highway	WBR	A [0.0]	A [0.0]	A [0.0]	A [0.0]
		Lagrange Industrial Drive Driveway	NBLTR	B [14.3]	B [12.5]	B [14.7]	B [12.8]
			SBLTR	B [13.2]	B [13.7]	B [13.4]	B [14.1]
2 Richmond Highway/ Mt. Clement Road	STOP	Richmond Highway	EBT	A [0.0]	A [0.0]	A [0.0]	A [0.0]
		Richmond Highway	WBTR	A [0.0]	A [0.0]	A [0.0]	A [0.0]
		Mt. Clement Road	SBR	A [0.0]	B [10.1]	A [0.0]	B [10.3]
6 Richmond Highway/ Hospital Road	STOP	Richmond Highway	WBLT	A [0.0]	A [0.0]	A [0.0]	A [0.0]
		Richmond Highway	WBR	A [0.0]	A [0.0]	A [0.0]	A [0.0]
		Median	NBLT	B [14.5]	B [14.2]	B [14.8]	B [14.6]
		Hospital Road	SBTR	B [12.5]	C [15.8]	B [12.8]	C [16.3]
7 Richmond Highway/ Tidewater Trail	Signal	Richmond Highway	EBT	D (36.1)	D (42.2)	D (36.0)	D (45.0)
		Tidewater Trail	WBTR	D (45.8)	D (46.5)	D (46.0)	D (46.6)
		Tidewater Trail	SBTR	<u>C (29.8)</u>	<u>D (40.4)</u>	<u>C (31.6)</u>	<u>D (41.1)</u>
			Overall	D (35.2)	D (41.7)	D (35.6)	D (43.4)

Notes: (1) Numbers in parentheses () represent delay at signalized intersections in seconds per vehicle.

(2) Numbers in brackets [] represent delay at unsignalized intersections in seconds per vehicle.

(3) Roadway names in bold are considered north/south for purposes of this analysis

Weekday PM Peak Hour. During the weekday PM peak hour, all signalized intersections currently operate at an overall LOS “D” or better. All traffic movements at the unsignalized study intersections currently operate at LOS “C” or better.

Summary. 2027 background future conditions (without the proposed development) would experience increased delays at all signalized intersections but will remain generally consistent with 2022 existing conditions.

Queuing Results. To compare against 2022 existing conditions, queuing analyses were conducted at the study intersections based on the 2027 background future traffic forecasts (Figure 4-4), the 2027 background future lane use and traffic controls (Figure 4-5), and existing Synchro network files obtained from VDOT. The queuing analyses results, as reported by Synchro, are presented in Appendix G and summarized in Table 4-2.

As shown in Table 4-2, consistent with 2022 existing conditions, 95th percentile queues do not exceed the existing available storage lengths.

Table 4-2
 Mt. Clement Property
 Intersection Queuing Summary (1) (2)

Intersection	Operating Condition	Street Name	Approach/ Movement	Available Storage (ft)	Existing 2022		Background 2027	
					AM	PM	AM	PM
1 Richmond Highway/ Lagrange Industrial Drive	STOP	Richmond Highway	EBLU	330	1	0	1	0
		Richmond Highway	EBTR	N/A	0	0	0	0
		Richmond Highway	WBLU	250	1	0	1	0
		Richmond Highway	WBT	N/A	0	0	0	0
		Richmond Highway	WBR	355	0	0	0	0
		Lagrange Industrial Drive Driveway	NBLTR	N/A	1	2	1	2
			SBLTR	N/A	3	6	3	6
2 Richmond Highway/ Mt. Clement Road	STOP	Richmond Highway	EBT	N/A	0	0	0	0
		Richmond Highway	WBTR	N/A	0	0	0	0
		Mt. Clement Road	SBR	N/A	0	0	0	0
6 Richmond Highway/ Hospital Road	STOP	Richmond Highway	WBLT	N/A	0	0	0	0
		Richmond Highway	WBR	N/A	0	0	0	0
		Median	NBLT	250	7	1	7	1
		Hospital Road	SBTR	N/A	7	32	8	33
7 Richmond Highway/ Tidewater Trail	Signal	Richmond Highway	EBT	N/A	339	535	364	577
		Tidewater Trail	WBT	N/A	95	65	98	67
		Tidewater Trail	SBT	N/A	266	466	285	467

Notes (1) Queue length is based on the 95th percentile queue in feet as reported by Synchro, Version 11.

(2) Roadway names in bold are considered north/south for purposes of this analysis

SECTION 5: ANALYSIS OF 2027 TOTAL FUTURE CONDITIONS

DESCRIPTION OF PROPOSED DEVELOPMENT

The Applicant proposes to develop the currently undeveloped property with a mixed-use development comprised of senior adult housing, workforce housing, and a mix of non-residential uses including centralized wellness/community services, retail, office, and a drive-through commercial use. The development would include an integrated internal street network with on-site pedestrian facilities for non-vehicular mobility and recreation. The development includes more urban “complete street” design principles with on-street parking and enhanced streetscape features to promote active lifestyles. The internal street network is proposed to be privately maintained but would function as publicly accessible streets.

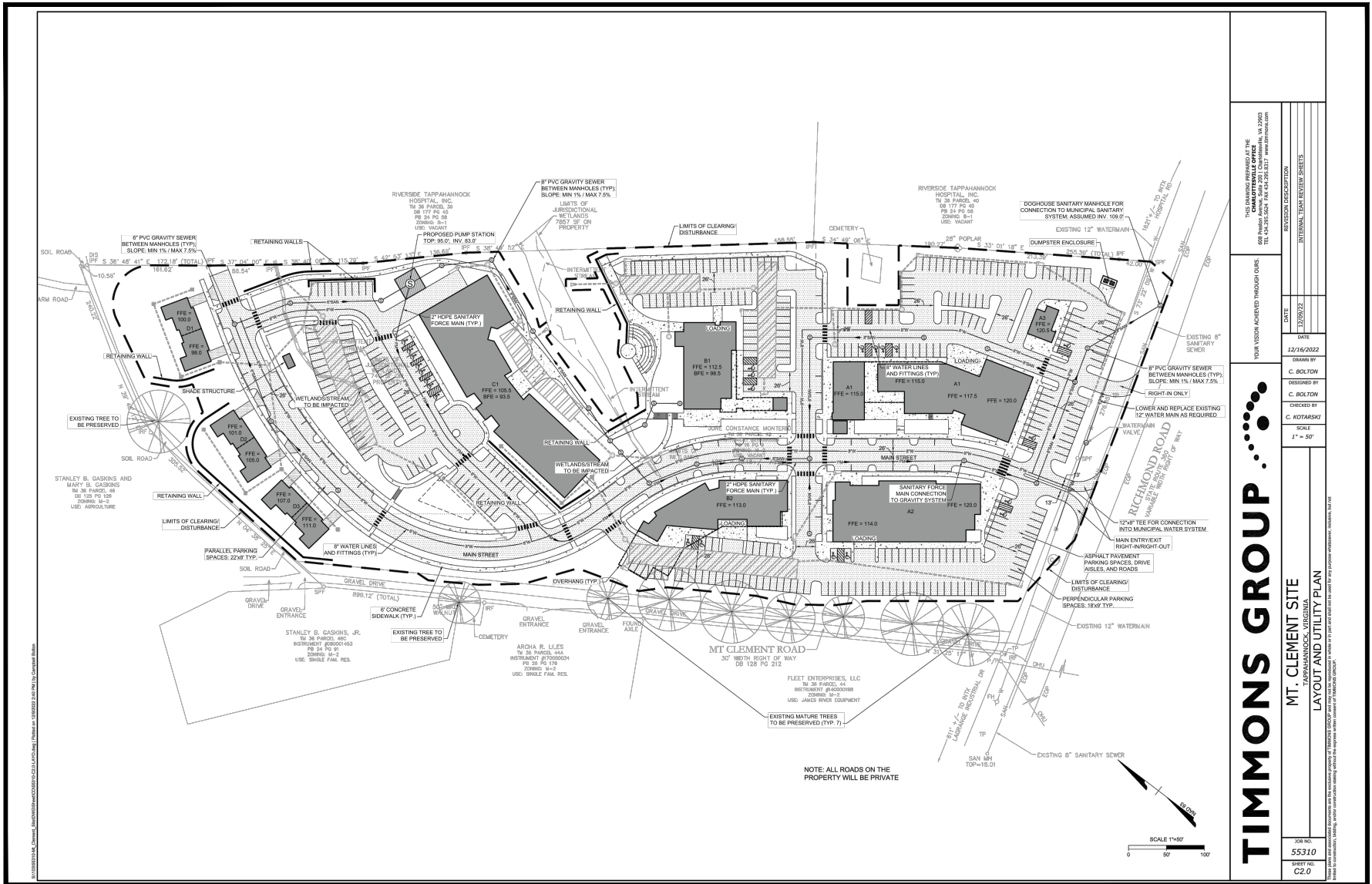
For purposes of this analysis, the assumed program includes the following:

- 13 Senior Duplex Units
- 122 Senior Multifamily Units
- 28 Workforce Multifamily Units
- 12,450 Gross Square Feet (GSF) Retail Use
- 44,780 GSF Office Use
- 2,610 Fast-Food Restaurant with Drive-Through
- 8,490 GSF Community Center
- 12,000 GSF Health Club

A reduction of the Applicant’s development plan is provided on Figure 5-1. The 2027 total future lane use and traffic controls are shown on Figure 5-2.

SITE TRIP GENERATION

The new site trips that would be generated by the proposed development were estimated based on the ITE Trip Generation Manual, 11th Edition, rates/equations for Land Use Codes 251 (Senior Adult Housing – Single Family), 252 (Senior Adult Housing – Multifamily), 221 (Multifamily Housing), 710 (General Office Building) and 822 (Strip Retail Plaza (<40k)) 934 (Fast-Food Restaurant with Drive-Through Window), 495 (Recreational Community Center), and 492 (Heath/Fitness Club) were used to estimate the number of trips generated for the phases; square footage was used as the independent variable for the office, community center, fitness club, restaurant, and shopping center uses while number of units was used as the independent variable for the residential uses, consistent with the approved Scope of Work.



TIMMONS GROUP

**MT. CLEMENT SITE
TAPPAHANNOCK, VIRGINIA
LAYOUT AND UTILITY PLAN**

DATE	12/16/2022
DRAWN BY	C. BOLTOW
DESIGNED BY	C. BOLTOW
ENGINEER	C. KOTASKI
SCALE	1" = 50'

YOUR VISION ACHIEVED THROUGH OURS

THE DRAWINGS PROVIDED AT THE
CHARITABLE OFFICE
600 Main Street, Suite 200
Tel: 434.276.5626 Fax: 434.276.8317 www.timmons.com

REVISION DESCRIPTION

NO.	DATE	DESCRIPTION
1	12/16/2022	INTERNAL TITAN REVISED SHEETS

JOB NO. 55310
SHEET NO. C2.0

NOTES:
1. ALL RIGHTS OF WAY, EASEMENTS, AND UTILITIES SHOWN ARE BASED ON RECORD PLANS AND FIELD SURVEY.
2. VERIFY CONDITIONS BEFORE CONSTRUCTION.
3. ALL DIMENSIONS ARE UNLESS OTHERWISE NOTED.
4. ALL DISTANCES ARE IN FEET AND INCHES.
5. ALL DISTANCES ARE TO THE CENTERLINE UNLESS OTHERWISE NOTED.
6. ALL DISTANCES ARE TO THE FACE UNLESS OTHERWISE NOTED.
7. ALL DISTANCES ARE TO THE CENTERLINE UNLESS OTHERWISE NOTED.
8. ALL DISTANCES ARE TO THE FACE UNLESS OTHERWISE NOTED.
9. ALL DISTANCES ARE TO THE CENTERLINE UNLESS OTHERWISE NOTED.
10. ALL DISTANCES ARE TO THE FACE UNLESS OTHERWISE NOTED.

Figure 5-1
Preliminary Site Layout



Mt. Clement Property
Essex County, Virginia



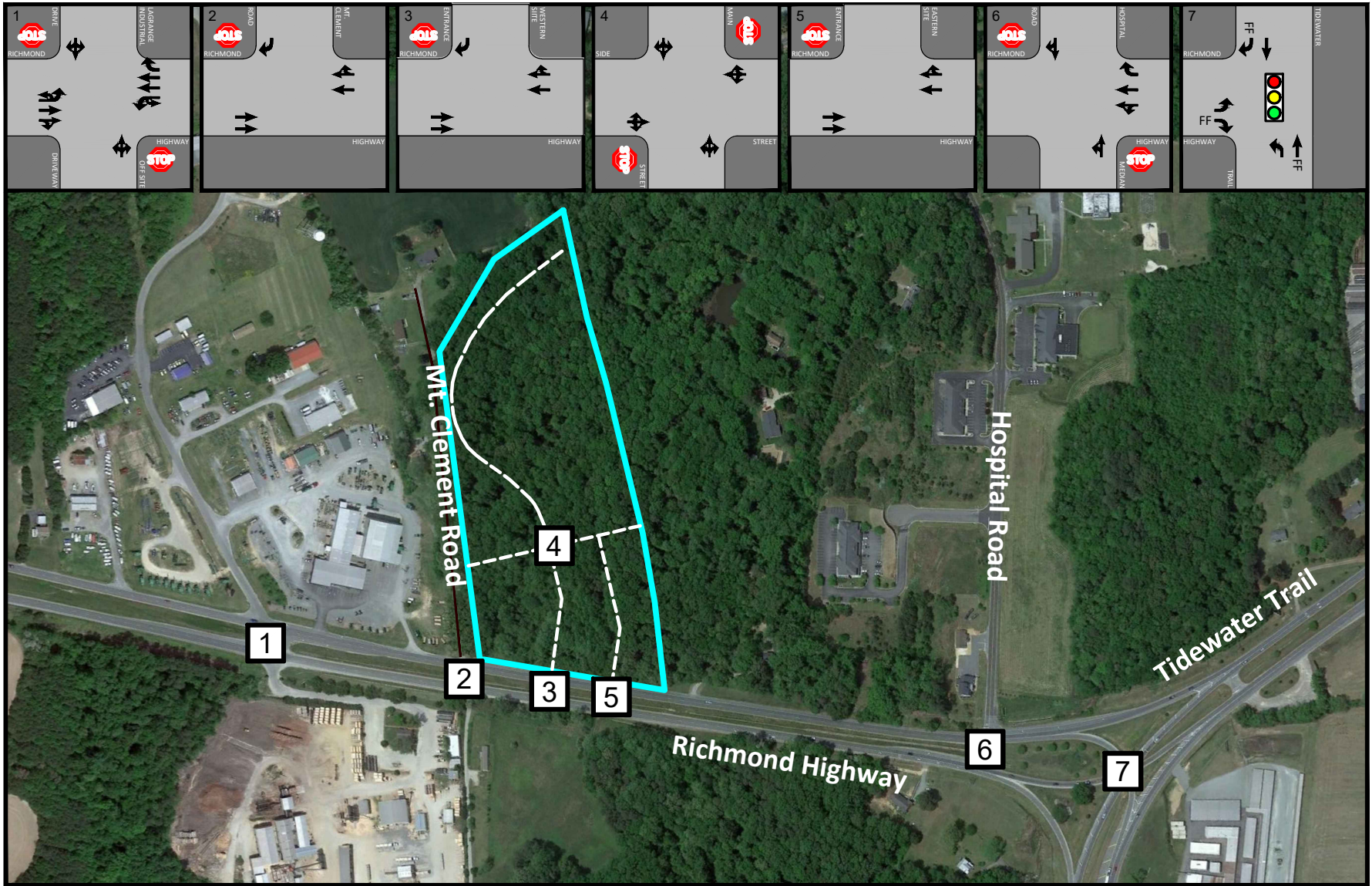


Figure 5-2
2027 Total Future Lane Use and Traffic Controls

Study Intersections
FF Free Flow



Mt. Clement Property
Essex County, Virginia



Internal Capture and Pass-By Reductions In mixed-use developments such as that proposed by the Applicant, a portion of residential and non-residential generated trips are internally captured. The same is true between the office and retail components. In recognition of this occurrence, the VDOT TIA *Administrative Guidelines* set forth standard internal trip reduction factors for the various land use component relationships. Consistent with VDOT Guidelines and pursuant to the approved Scope of Work, a 5% internal factor, 10% internal factor, and 10% internal factor were applied to the retail, restaurant, community center, and fitness club-generated trips during the AM peak hour and PM peak hour and weekday daily trips, respectively. For the office use, a 5% internal factor was applied for the AM and PM peak hour trips and the weekday daily trips.

Consistent with ITE Trip Generation Manual a pass-by reduction of 15% was applied to the retail component for the AM and PM peak hour trips and the weekday daily trips. A pass-by reduction was also applied to the restaurant component representing 50% of restaurant trips during the AM peak hour, 55% during the PM peak hour and 55% during the weekday.

The site trip generation analysis is shown on Table 5-1 and is summarized below:

- 219 weekday AM peak hour trips (134 inbound and 85 outbound)
- 281 weekday PM peak hour trips (126 inbound and 155 outbound)
- 2,584 weekday average daily trips

Table 5-1
 Mt. Clement Property
 Trip Generation Analysis (1)(2)(3)(4)

ITE Land Use	Land Use Code	Amount	Units	Weekday AM Peak Hour			Weekday PM Peak Hour			Weekday Average Daily Trips
				In	Out	Total	In	Out	Total	
Proposed Development										
General Office Building	710	44,780	GSF	60	8	68	11	53	64	485
<i>Residential/Office Internal Capture(5% AM/5% PM/5% Weekday):</i>				<u>0</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(2)</u>	<u>(24)</u>
Subtotal Office Trips:				60	7	67	10	52	62	461
Strip Retail Plaza (<40k)	822	12,450	GSF	17	12	29	46	45	91	678
<i>Residential/Retail Internal Capture(5%AM/10%PM/10% Weekday):</i>				<u>0</u>	<u>0</u>	<u>0</u>	<u>(1)</u>	<u>(1)</u>	<u>(2)</u>	<u>(24)</u>
Subtotal Retail Trips:				17	12	29	45	44	89	654
<i>Strip Retail Plaza Pass-by Reduction(15%AM/15%PM/15% Weekday):</i>				<u>(3)</u>	<u>(2)</u>	<u>(5)</u>	<u>(7)</u>	<u>(7)</u>	<u>(14)</u>	<u>(98)</u>
Subtotal Retail External New Trips:				14	10	24	38	37	75	556
Fast-Food Restaurant with Drive-Through Window	934	2,610	GSF	59	57	116	45	41	86	1,220
<i>Residential/Fast-Food Internal Capture(5%AM/10%PM/10% Weekday):</i>				<u>(1)</u>	<u>(1)</u>	<u>(2)</u>	<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>(43)</u>
Subtotal Fast-Food Trips:				58	56	114	44	39	83	1177
<i>Fast Food Restaurant Pass-by Reduction(50%AM/55%PM/55% Weekday):</i>				<u>(29)</u>	<u>(28)</u>	<u>(57)</u>	<u>(24)</u>	<u>(21)</u>	<u>(45)</u>	<u>(647)</u>
Subtotal Fast-Food External New Trips:				29	28	57	20	18	38	530
Recreational Community Center	495	8,490	GSF	11	5	16	10	11	21	245
<i>Residential/Community Center Internal Capture(5%AM/10%PM/10% Weekday):</i>				<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>(9)</u>
Subtotal Community Center Trips:				11	5	16	10	11	21	236
Health/Fitness Club	492	12,000	GSF	8	8	16	23	18	41	346
<i>Residential/Health Club Internal Capture(5%AM/10%PM/10% Weekday):</i>				<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>(12)</u>
Subtotal Health Club Trips:				8	8	16	23	18	41	334
Senior Adult Housing - Single-Family	251	13	DU	3	5	8	5	4	9	56
Senior Adult Housing - Multifamily	252	122	DU	8	16	24	17	14	31	395
Multifamily Housing	221	28	DU	<u>2</u>	<u>8</u>	<u>10</u>	<u>7</u>	<u>4</u>	<u>11</u>	<u>127</u>
Total Residential Trips:				13	29	42	29	22	51	578
<i>Residential/Office Internal Capture(5% AM/5% PM/5% Weekday):</i>				<u>0</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(2)</u>	<u>(24)</u>
<i>Residential/Retail/Community Center/Health Club Internal Capture(5%AM/10%PM/15% Weekday):</i>				<u>(1)</u>	<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>(2)</u>	<u>(5)</u>	<u>(87)</u>
Subtotal External Residential Trips				12	27	39	25	19	44	467
Total Proposed Trips:				168	119	287	164	190	354	3552
<i>Internal Capture Trips:</i>				<u>(2)</u>	<u>(4)</u>	<u>(6)</u>	<u>(7)</u>	<u>(7)</u>	<u>(14)</u>	<u>(223)</u>
Total Vehicle Trips:				166	115	281	157	183	340	3329
<i>Total Pass-by Trips:</i>				<u>(32)</u>	<u>(30)</u>	<u>(62)</u>	<u>(31)</u>	<u>(28)</u>	<u>(59)</u>	<u>(745)</u>
Total New External Trips:				134	85	219	126	155	281	2584

Note(s):

- (1) Trip generation based on the Institute of Transportation Engineers' (ITE) [Trip Generation Manual](#), 11th Edition.
- (2) Pass-by reductions based on the Institute of Transportation Engineers' (ITE) [Trip Generation Manual](#), 11th Edition.
- (3) Internal capture reductions based on the [VDOT Traffic Impact Analysis Regulations Administrative Guidelines](#).
- (4) No information on the average daily pass-by rate for Fast-Food Restaurants with Drive-Through Window so 55% reduction was used.
- (5) No information on average daily trips for LUC 492, LUC 495 (Recreational Community Center) was used to calculate average daily trips.

SITE TRIP ASSIGNMENTS

The new peak hour site trips were assigned to the study intersections based on the distributions discussed during the TIA scoping process as summarized below:

- To/from the west along Richmond Highway: 30%
- To/from the north along Tidewater Trail: 50%
- To/from the south along Tidewater Trail: 20%

The resulting site trip assignments are shown on Figure 5-3.

2027 TOTAL FUTURE TRAFFIC FORECASTS

As shown on Figure 5-4, the 2027 total future traffic forecasts were developed by combining the 2027 background future traffic forecasts (Figure 4-2), and the site trip assignments (Figure 5-3).

OPERATIONAL ANALYSIS

Level of Service Results. Capacity/level of service (LOS) analyses were conducted at the study intersections based on the 2027 total future traffic forecasts (Figure 5-4), the 2027 total future lane use and traffic controls (Figure 5-2), and modified Synchro network files consistent with the 2027 background future analyses. The capacity analyses results, as reported by Synchro, are presented in Appendix H and summarized in Table 5-2.

Weekday AM Peak Hour. During the weekday AM peak hour, all signalized intersections currently operate at an overall LOS “D” or better. All traffic movements at the unsignalized study intersections currently operate at LOS “B” or better.

Weekday PM Peak Hour. During the weekday PM peak hour, all signalized intersections currently operate at an overall LOS “D” or better. All traffic movements at the unsignalized study intersections currently operate at LOS “C” or better.

Summary. 2027 total future conditions (with the proposed development) are generally consistent with 2027 background future conditions.

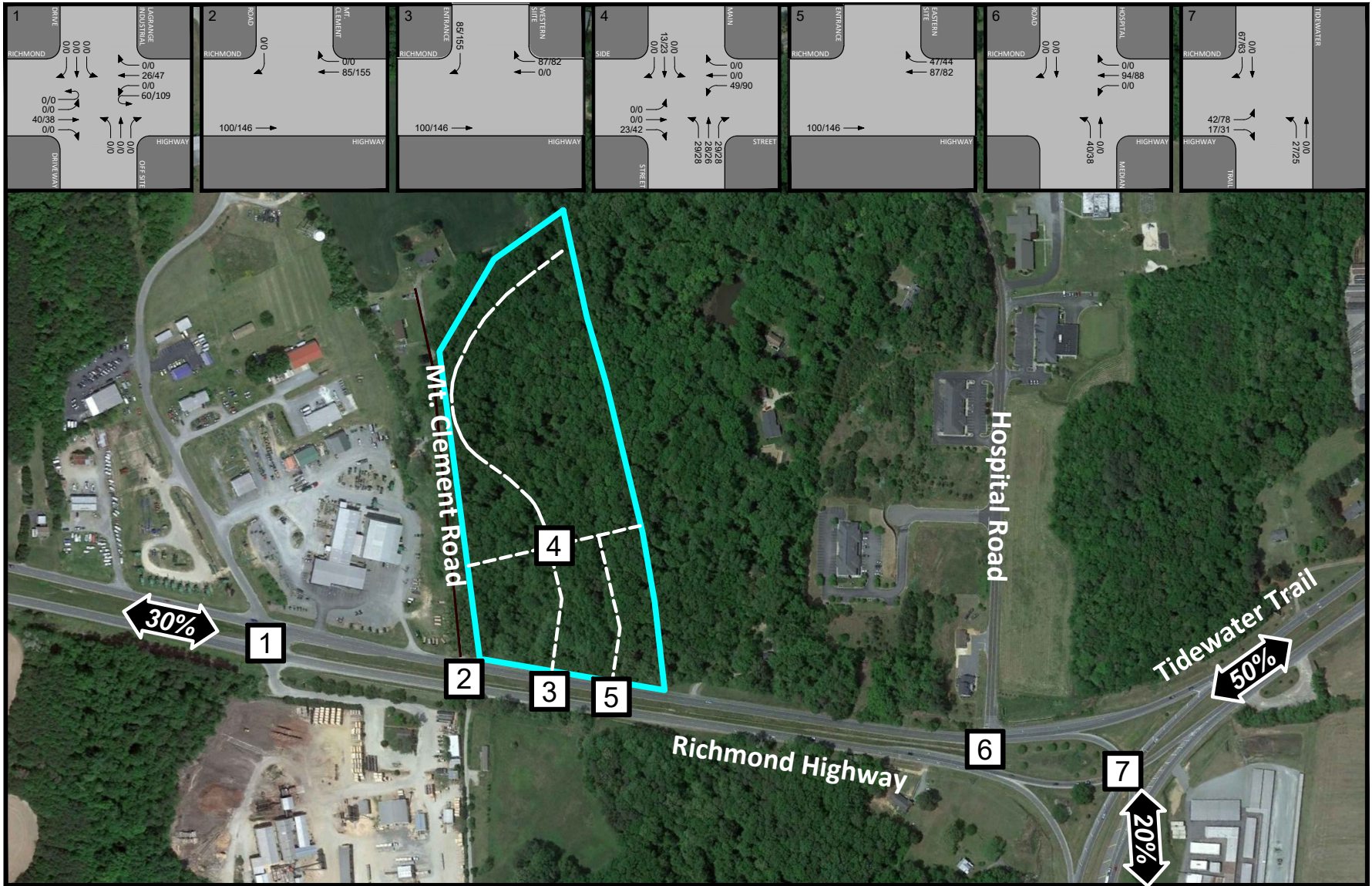


Figure 5-3
Site Trip Assignments and Trip Distribution

Study Intersections
 Trip Distribution



Mt. Clement Property
Essex County, Virginia



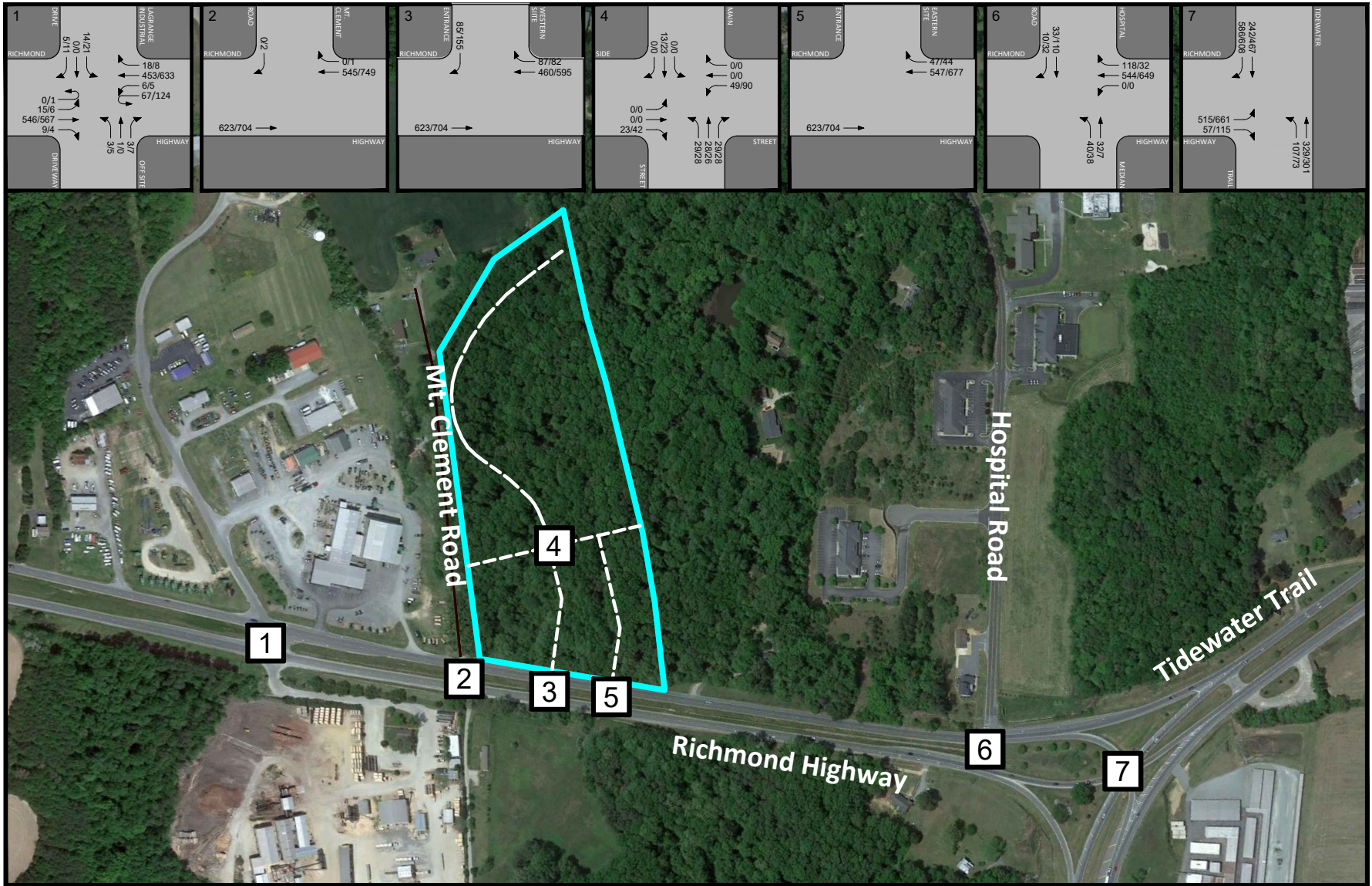


Figure 5-4
2027 Total Future Traffic Forecasts

Study Intersections



Mt. Clement Property
Essex County, Virginia



Table 5-2
 Mt. Clement Property
 Intersection Levels of Service Summary (1) (2) (3)

Intersection	Operating Condition	Street Name	Approach/ Movement	Existing 2022		Background 2027		Total Future 2027	
				AM	PM	AM	PM	AM	PM
1 Richmond Highway/ Lagrange Industrial Drive	STOP	Richmond Highway Richmond Highway Richmond Highway Richmond Highway Lagrange Industrial Drive Driveway	EBLU	A [8.5]	A [8.6]	A [8.6]	A [8.7]	A [8.6]	A [8.9]
			EBTR	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]
			WBLU	A [9.2]	A [8.4]	A [9.3]	A [8.5]	A [9.4]	A [8.7]
			WBT	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]
			WBR	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]
			NBLTR	B [14.3]	B [12.5]	B [14.7]	B [12.8]	C [15.3]	B [13.2]
			SBLTR	B [13.2]	B [13.7]	B [13.4]	B [14.1]	B [13.8]	B [14.7]
2 Richmond Highway/ Mt. Clement Road	STOP	Richmond Highway Richmond Highway Mt. Clement Road	EBT	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]
			WBTR	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]
			SBR	A [0.0]	B [10.1]	A [0.0]	B [10.3]	A [0.0]	B [10.9]
3 Richmond Highway/ Western Site Entrance	STOP	Richmond Highway Richmond Highway Richmond Highway	EBT	N/A	N/A	N/A	N/A	A [0.0]	A [0.0]
			WBTR	N/A	N/A	N/A	N/A	A [0.0]	A [0.0]
			SBR	N/A	N/A	N/A	N/A	B [10.9]	B [12.8]
4 Main Street/ Side Street	STOP	Side Street Side Street Main Street Main Street	EBLTR	N/A	N/A	N/A	N/A	A [8.5]	A [8.6]
			WBLTR	N/A	N/A	N/A	N/A	A [9.9]	B [10.6]
			NBLTR	N/A	N/A	N/A	N/A	A [2.6]	A [2.6]
			SBLTR	N/A	N/A	N/A	N/A	A [0.0]	A [0.0]
5 Richmond Highway/ Eastern Site Entrance	STOP	Richmond Highway Richmond Highway	EBT	N/A	N/A	N/A	N/A	A [0.0]	A [0.0]
			WBTR	N/A	N/A	N/A	N/A	A [0.0]	A [0.0]
6 Richmond Highway/ Hospital Road	STOP	Richmond Highway Richmond Highway Median Hospital Road	WBLT	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]
			WBR	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]
			NBLT	B [14.5]	B [14.2]	B [14.8]	B [14.6]	B [15.0]	C [16.3]
			SBTR	B [12.5]	C [15.8]	B [12.8]	C [16.3]	B [14.0]	C [18.4]
7 Richmond Highway/ Tidewater Trail	Signal	Richmond Highway Tidewater Trail Tidewater Trail	EBT	D (36.1)	D (42.2)	D (36.0)	D (45.0)	D (36.1)	D (53.1)
			WBT	D (45.8)	D (46.5)	D (46.0)	D (46.6)	D (43.1)	D (50.1)
			SBT	<u>C (29.8)</u>	<u>D (40.4)</u>	<u>C (31.6)</u>	<u>D (41.1)</u>	<u>D (37.7)</u>	<u>D (53.3)</u>
			Overall	D (35.2)	D (41.7)	D (35.6)	D (43.4)	D (37.4)	D (53.0)

Note: (1) Numbers in parentheses () represent delay at signalized intersections in seconds per vehicle.

(2) Numbers in brackets [] represent delay at unsignalized intersections in seconds per vehicle.

(3) Roadway names in bold are considered north/south for purposes of this analysis

Queuing Results. To compare against 2027 background future conditions, queuing analyses were conducted at the study intersections based on the 2027 total future traffic forecasts (Figure 5-4), the 2027 total future lane use and traffic controls (Figure 5-2), and modified Synchro network files consistent with the 2027 background future analyses. The capacity analyses results, as reported by Synchro, are presented in Appendix H and summarized in Table 5-3.

As shown in Table 5-3, consistent with 2027 background future conditions, 95th percentile queues under 2027 total future conditions, there would be no locations where 95th percentile queues would begin to exceed available storage lengths at the study intersections (consistent with 2027 background future queues).

Table 5-3
 Mt. Clement Property
 Intersection Queuing Summary (1) (2)

Intersection	Operating Condition	Street Name	Approach/ Movement	Available Storage (ft)	Existing 2022		Background 2027		Total Future 2027	
					AM	PM	AM	PM	AM	PM
1 Richmond Highway/ Lagrange Industrial Drive	STOP	Richmond Highway	EBLU	330	1	0	1	0	1	0
		Richmond Highway	EBTR	N/A	0	0	0	0	0	0
		Richmond Highway	WBLU	250	1	0	1	0	1	0
		Richmond Highway	WBT	N/A	0	0	0	0	0	0
		Richmond Highway	WBR	355	0	0	0	0	0	0
		Lagrange Industrial Drive Driveway	NBLTR	N/A	1	2	1	2	2	2
			SBLTR	N/A	3	6	3	6	3	7
2 Richmond Highway/ Mt. Clement Road	STOP	Richmond Highway	EBT	N/A	0	0	0	0	0	0
		Richmond Highway	WBTR	N/A	0	0	0	0	0	0
		Mt. Clement Road	SBR	N/A	0	0	0	0	0	0
3 Richmond Highway/ Western Site Entrance	STOP	Richmond Highway	EBT	N/A	N/A	N/A	N/A	N/A	0	0
		Richmond Highway	WBTR	N/A	N/A	N/A	N/A	N/A	0	0
		Richmond Highway	SBR	N/A	N/A	N/A	N/A	N/A	11	27
4 Main Street / Side Street	STOP	Side Street	EBLTR	N/A	N/A	N/A	N/A	N/A	2	3
		Side Street	WBLTR	N/A	N/A	N/A	N/A	N/A	5	11
		Main Street	NBLTR	N/A	N/A	N/A	N/A	N/A	2	1
		Main Street	SBLTR	N/A	N/A	N/A	N/A	N/A	0	0
5 Richmond Highway/ Eastern Site Entrance	STOP	Richmond Highway	EBT	N/A	N/A	N/A	N/A	0	0	
		Richmond Highway	WBTR	N/A	N/A	N/A	N/A	0	0	
6 Richmond Highway/ Hospital Road	STOP	Richmond Highway	WBLT	N/A	0	0	0	0	0	0
		Richmond Highway	WBR	N/A	0	0	0	0	0	0
		Median	NBLT	250	7	1	7	1	23	12
		Hospital Road	SBTR	N/A	7	32	8	33	9	39
7 Richmond Highway/ Tidewater Trail	Signal	Richmond Highway	EBT	N/A	339	535	364	577	380	697
		Tidewater Trail	WBT	N/A	95	65	98	67	188	95
		Tidewater Trail	SBT	N/A	266	466	285	467	437	504

Notes (1) Queue length is based on the 95th percentile queue in feet as reported by Synchro, Version 11.

(2) Roadway names in bold are considered north/south for purposes of this analysis

SECTION 6: ACCESS MANAGEMENT

OVERVIEW

According to the Federal Highway Administration (FHWA), access management is “the proactive management of vehicular access points to land parcels adjacent to all manner of roadways. Good access management promotes safe and efficient use of the transportation network.” In 2007, the Virginia General Assembly approved legislation to direct the VDOT commissioner to develop and implement access management regulations and standards with the goals of:

- Reducing traffic congestion,
- Enhancing public safety by decreasing traffic crash rates,
- Supporting economic development by promoting the efficient movement of people and goods,
- Reducing the need for new highways and road widening by maximizing the performance of the existing state highways, and
- Preserving the public investment in new highways.

INTERSECTION SPACING

Appendix F of the VDOT Road Design Manual (RDM) establishes the intersection spacing criteria for various types of roadways within the Commonwealth. A summary of the spacing criteria found within RDM, Appendix F, Table 2-2 are reproduced in Appendix I. Both site access points were evaluated based on the established VDOT criteria as shown in Table 6-1 and Figure 6-1.

As shown in Table 6-1, the proposed partial movement entrances serving the proposed development along Richmond Highway would comply with the pertinent intersection spacing criteria with the exception of the spacing from the right-in/right-out access to the right-in-only access. The spacing at this location will be approximately 160, which is 145 feet less than the VDOT intersection spacing requirement and will therefore require the submission and approval of an Access Management Exception (AM-E) to be reviewed and approved by VDOT.

Table 6-1
 Mt. Clement Property
 Intersection Spacing Summary^{(1) (2)}

Roadway	Classification	From	To	Spacing Type	Spacing (ft)		Meets Standard?
					Standard	Provided	
Richmond Highway (Route 360) (Route 360)	Principal Arterial	Lagrange Industrial Drive	Right-in/Right-out Site Access Steet	Type 4	<u>Centerline to Centerline</u> 305	825	YES
		Right-in/Right-out Site Access Steet	Right-in Site Entrance	Type 4	305	160	NO
		Right-in Site Entrance	Hospital Road	Type 4	305	1235	YES

Notes:

(1) Access Management requirements based on Road Design Manual , Table 2-2

(2) All measured distances are approximate.

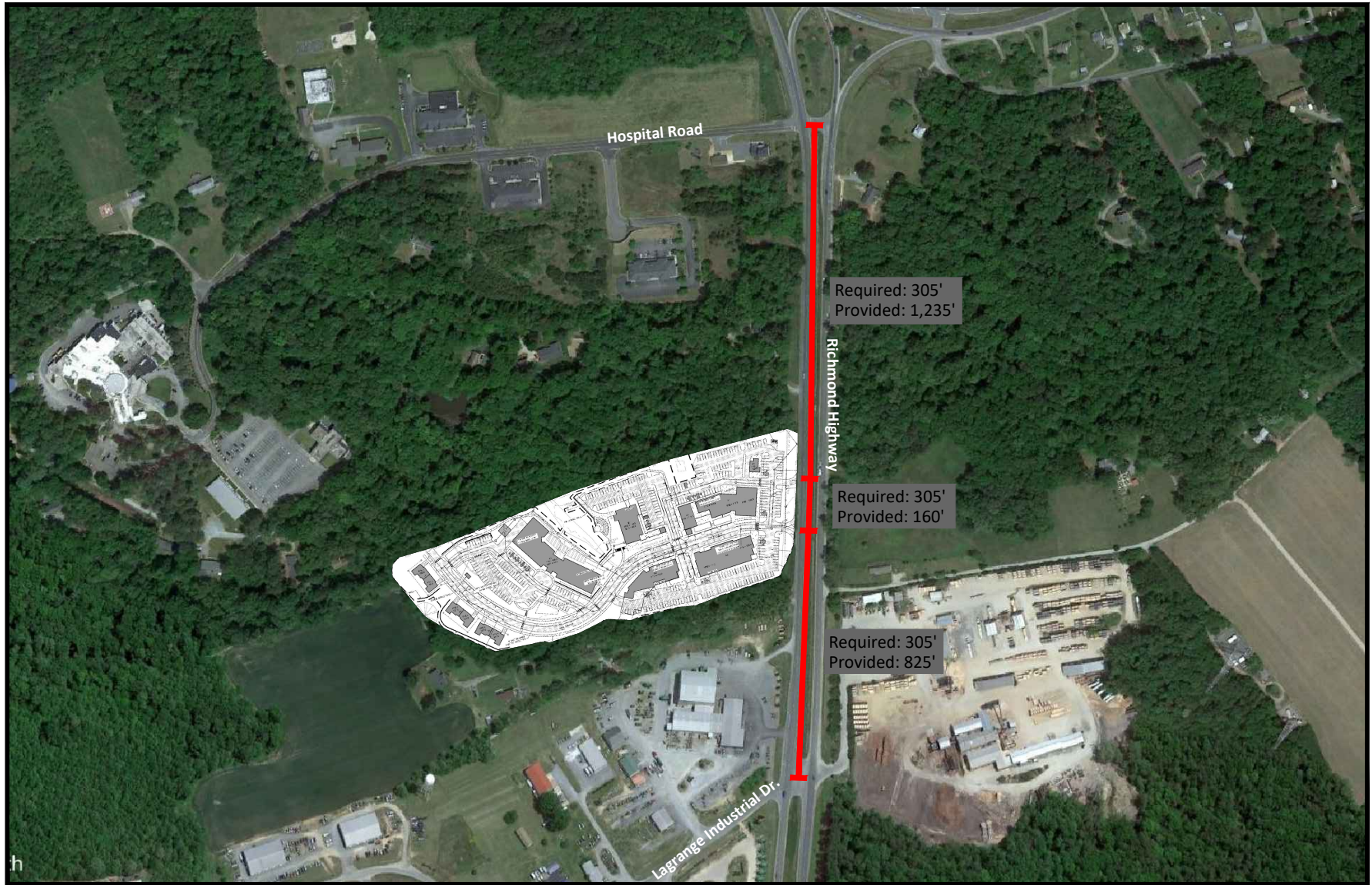


Figure 6-1
Intersection Spacing



NORTH
Mt. Clement Property
Essex County, Virginia



TURN LANE WARRANTS

The VDOT RDM recommends that right and left-turn lanes are to be provided for traffic in both directions “...in the design of intersections.” The warrants for turn lanes and/or tapers are typically based on the number of lanes on the facility being evaluated (two or four lanes), the volume of approach/opposing vehicles, and the number of vehicles turning left or right.

A right turn lane warrant was conducted for the westbound right-turn Richmond Highway into the proposed right-in/right-out only access using the 2027 total future traffic forecasts. A full-width right-turn lane and taper is warranted along westbound Richmond Highway at the proposed right-in/right-out access. A right turn lane warrant was conducted for the westbound right-turn Richmond Highway into the proposed right-in only access using the 2027 total future traffic forecasts. A right-turn lane taper is warranted along westbound Richmond Highway at the proposed right-in access. The VDOT turn lane warrant analysis graphic is provided in Appendix J.

As shown in the Applicant’s development plan, although only taper treatment is warranted at the proposed right-in only, both entrances will include full-width right turn lanes. Given the high-speed nature of Richmond Highway, the presence of heavy vehicles, and potential sight distance considerations, full-width right turn lanes were determined to be desirable to maximize safety. Both entrances will meet the turn lane requirements in accordance with the VDOT *Road Design Manual*.

SECTION 7: CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

CONCLUSIONS

The principal findings of this study are as follows:

1. The proposed development includes a complementary mix of residential and non-residential uses. Due to the mix of uses, the site would experience a naturally occurring synergy thereby reducing vehicle trips to/from the site.
2. Under 2022 existing conditions, all signalized study intersections currently operate at an overall LOS “D” or better during the AM and PM weekday peak hours. No turning movement 95th percentile queues exceed available storage at the study intersections.
3. Under 2027 background future conditions (without the proposed development), all signalized study intersections would continue to operate at an overall LOS “D” or better during the AM and/or PM weekday peak hours. The turning movement 95th percentile queues are contained within the available storage, consistent with 2022 existing conditions.
4. According to ITE, the proposed mixed-use development is estimated to generate the following site related vehicle trips:
 - 219 weekday AM peak hour trips (134 inbound and 85 outbound)
 - 281 weekday PM peak hour trips (126 inbound and 155 outbound)
 - 2,584 weekday average daily trips
5. Under 2027 total future conditions (with the proposed development), overall intersection and certain movement delays would experience minor increases, but overall levels of service would remain consistent with 2027 background future conditions. Turning movement 95th percentile queues storage under 2027 total future queues would continue to be contained within the available storage lengths, consistent with 2027 background future conditions.
6. An Access Management Exception (AM-E) for the intersection spacing from the proposed right-in/right-out access on Richmond Highway to the right in only access will need to be submitted to VDOT for approval.
7. The proposed main entrance (right-in/right-out) meets the VDOT warrant for a full-width right turn lane along Richmond Highway. The proposed right-in only meets the VDOT warrant for a right turn taper. Due to the presence of heavy vehicles and higher travel speeds along

Richmond Highway, full-width right turn lanes, or a continuous right turn lane, are recommended for both proposed entrances.

RECOMMENDATIONS

Based on the results of the TIA, the following recommendations should be considered in conjunction with build-out of the proposed development:

1. The development should include an integrated internal street network that emphasizes pedestrian mobility with connections between the residential and non-residential uses in order to maximize the internal synergy of the site and reduce overall vehicle trips.
2. The internal streets should be designed to public street standards while being privately owned and maintained. The Applicant should commit to ongoing maintenance of the internal streets. These streets should be publicly accessible.
3. The internal street network should be designed so that the streets may be extended into the adjoining properties should those properties (re)develop in the future.
4. The proposed entrances along Richmond Highway should be designed with full-width right turn lanes in accordance with the *VDOT Road Design Manual*.