White Flint
Traffic Operations Analysis

White Flint Sector Plan

Prepared for:
Montgomery county Department of Public Works and Transportation

Prepared by:
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Executive Summary

Stantec (formerly Greenhorne & O'Mara) has been retained by the Montgomery County Department of Transportation (MCDOT) to provide Traffic Impact Analysis services for the White Flint Transportation Project located in Montgomery County, Maryland. The purpose of this study is to evaluate the potential traffic impacts associated with the development plan outlined in the White Flint Sector plan, approved April 2010 by the Montgomery County Council. The Maryland State Highway Administration (MD SHA) requested this study from MCDOT to serve as a technical tool in evaluating both the near and long term needs of the network as development occurs within the sector planning area.

While this traffic study has been prepared in accordance with the general standards and procedures of the Local Area Review study (MNCPPC Guidelines) it is important to view the results of the analysis in light of the 30 + year projected build-out. A number of key assumptions are required in order to prepare the analysis including: the actual absorption of development, land use splits, directional distributions, trip generation characteristics, and through trip growth rates. Changes in these assumptions can have a dramatic impact on the final results. While this study represents an operational review of traffic conditions within the Sector Planning area, rather than a planning overview as initially conducted by the MNCPPC, it still must be viewed as a planning tool in its projection of long term traffic conditions.

As noted within the M-NCPPC Sector Plan documents, the White Flint Sector Plan covers over 430 acres and is bounded by the CSX tracks to the east, Montrose Parkway to the north, Old Georgetown Road to the west and White Flint Mall to the south. The total build-out envisioned for the sector plan could potentially add 17.6 million square feet of new development, staged in three phases. Each phase has an associated non – auto driver mode share requirement and an identified series of transportation network improvements, including but not limited to highway network changes, pedestrian and bike amenities, and streetscape improvements. Specific mode share splits and network upgrades are detailed within the analysis section for each specific phase.

This traffic study was conducted following the criteria for a Montgomery County Local Area Traffic Review Study in that it reviewed traffic conditions in layers, beginning with existing conditions, adding background traffic (approved pipeline development and growth on major arterials), and then reviewing the incremental impact of the Sector Plan at the design years of 2022 and 2042.

Stantec, MCDOT, MNCPPC, and MD SHA worked together to establish the scope of the study. The study area for the project was expanded beyond the defined bounds of the sector plan area to ensure that the analysis identified not only the direct impacts within the Sector Planning Area but also those roadways and intersections on the perimeter that would be impacted by development activity within the sector.

The study area for the traffic analysis includes 40 intersections in and around the White Flint Sector Plan area. Intersection capacity analyses were conducted using the Critical Lane Volume technique (CLV) and Synchro HCM methodologies. The results of the capacity analyses are summarized in the main body of

the report, focusing on the CLV results. The HCM results, as calculated in the SYNCHRO analysis are included in the applicable appendix for each study period.

As noted, the sector plan calls for several changes to the existing roadway network. These changes would provide for a more efficient grid network, with short block lengths for pedestrians and more routing choices for vehicular movements. The planned changes include the realignment of Executive Blvd and MD 187 (Old Georgetown Road), the extension of Hoya Street south to MD 187, the construction of Montrose Parkway East, the construction of Main/Market Street between MD 187 and MD 355 (Rockville Pike), and the extension of Nebel Street south and west to MD 355.

In order to analyze the future condition with these planned network improvements, an origin-destination (O-D) study was conducted by STV, Inc. as part of their analysis for the White Flint Partnership, and the resulting data provided to Stantec. This O-D information was combined with Stantec / MD SHA volume data to produce base regional through traffic volumes. Stantec conducted a full review of the information provided and concurred that it represented a valid procedure to estimate the base condition for the future traffic analysis.

Because this traffic study focused on only the future development activity for sites located within the White Flint Sector Planning area, the MD SHA requested that a growth rate be applied to the key corridors to account for projected development activity outside the Sector Plan. Therefore compound growth was applied to MD 355, MD 187 and Montrose Parkway through the 2022 and 2042 design years.

The future White Flint development trip component is based on the development quantities defined in the White Flint Sector Plan, as approved by MNCPPC, and further refined by the development community (with MNCPPC review and concurrence) to reflect the current expectations and visions of the future development under both an interim 2022 design year as well as the 2042 build out year. The Non-Auto Driver Mode Share (NADMS) of 32 percent was applied to the 2022 development quantities and the full-build out NADMS of 50 percent for commercial development and 51 percent for residential development was then applied to all peak hour trips for the 2042 analysis, consistent with the approved White Flint Sector Plan. MCDOT is in the process of developing a TDM program for the White Flint Sector Planning Area with the purpose to detail current mode splits, evaluate the effectiveness of current programs and develop / enhance future programs to meet and exceed the goals of the Sector Plan. For the purpose of this study, it was assumed that the NADMS percentages will be achieved.

The remaining auto driver trips were then assigned to the planned roadway network for each scenario based on the distribution as outlined by M-NCPPC in their original analysis of the sector plan traffic impact.

The 2042 traffic volumes were analyzed using CLV and HCM methodologies. Under the 2042 conditions, fifteen of the study intersections are projected to operate above their policy area threshold during at least one (1) peak hour based on CLV analysis. Ten of these intersections exceed their policy area threshold by more than 10 percent, five of which are located within the Sector Plan area.

Physical mitigation opportunities that would increase the capacity of the intersections have been identified for the five intersections in the White Flint Policy area that exceed the threshold by more than

10 percent. If future monitoring of traffic conditions in this area indicate that actual congestion levels are approaching those forecast for full build out, these mitigation measures can be considered, along with additional TDM opportunities, to address the projected intersection capacity deficiencies. Because the intersections located outside the Sector Plan will continue to be the subject of future LATR studies associated with new development activity, the information provided by this study will assist in the development of those reviews, and individual mitigation plans will be required to address any potential deficiencies. These intersections outside of the sector plan area will also be addressed by an ongoing county CIP project.

ADDITIONAL STUDIES

It is important to understand that the results of this traffic analysis represent one alternative of the projected traffic conditions thirty years into the future, and should be viewed accordingly. This report has also tested the identified critical intersections without a growth rate on the main arterials to determine the potential difference in traffic conditions. The results of this test indicate that, while the projected conditions improve, the critical intersections are still projected to operate in excess of the acceptable standards for the policy area.

In addition to HCM and CLV methodologies conducted by Stantec, STV Inc., under the direction of the White Flint Partnership, has conducted a separate study of the White Flint Sector Plan area using VISSIM. STV shared the resulting initial information with Stantec for comparison. STV's VISSIM model was developed using the same base through traffic, growth rates, and trip generation information as Stantec's model, and included both the AM and PM peak hours of the 2042 scenario. The two models differ in that VISSIM's model includes more of the internal block roadways and access points, allowing for a finer-grained traffic assignment. Traffic traveling within the White Flint area is assigned more aggressively to the business level roadways.

Regardless of the method of analysis chosen, it is important to recognize the limitations associated with conducting an operational traffic analysis, on such a large network, spanning a long range planning period, in this case in excess of thirty years.

These limitations and assumptions, which can each dramatically impact the results of the analysis include:

Growth Rates on the Main Corridors

The growth rate on the main roadways is based on the assumption that through traffic in this area will continue to grow; however, with additional ridership on both the Metro and future bus service expansion, such as the proposed Bus Rapid Transit service on MD 355, some models have shown a decrease in area through trips. While there is substantial regional planned development in this area, it is possible that background traffic will not increase in this area to the degree reflected in the assumed growth rates.

Trip Generation Characteristics

Trip generation rates are assumed to be constant. It is possible that standard ITE trip generation rates as applied in these studies could change in the future or that the trip generation characteristics of this area will not be reflected by the ITE rates, which are based on a wide range of study locations. Additionally, no separate reductions were taken from the trip generation calculations to account for internal trips within individual developments, or within the sector plan area. All trips remaining after the NADMS reduction were assumed to end or begin outside the study area, which may overestimate the trips on the main roadways.

Development Build-Out

The development quantities and trip generation used in this area assume full build out would occur in a relatively short time frame given the volume of development contemplated. Estimates of market absorption rate as performed for Montgomery County TDM planning efforts indicate that the sector plan area is unlikely to reach the plan cap by 2042. Given market demands, it is possible that 100% build-out would not be achieved in the plan lifetime.

Conclusion

The results of this traffic analysis should therefore be viewed as one planning tool for the review of traffic conditions within the White Flint Sector Plan roadway network as it develops in the future. The conditions reviewed represent a worst case analysis of the potential traffic conditions, developed based on traditional Local Area Transportation Review procedures.

Based on all of the studies conducted, it can be concluded that the roadway network within the White Flint Sector Plan can accommodate the full build-out, based on the Policy Area standards established by the County Council. Ongoing monitoring programs of the highway network and TDM programs will each be critical elements of the long term success of the White Flint Sector Plan. Future traffic and highway conditions can adapt to the traffic demands through a series of physical mitigation improvements, changes in the actual TDM characteristics both inside and outside the Planning Area, and possible changes in the actual development configuration and density of White Flint as it evolves in the future.

1.0 Introduction

1.1 HISTORY

Stantec (formerly Greenhorne & O'Mara) has been retained by the Montgomery County Department of Transportation (MCDOT) to provide Traffic Impact Analysis services for the White Flint Transportation Project located in Montgomery County, Maryland. The purpose of this study is to determine the traffic impact of the development plan outlined in the White Flint Sector plan, approved April 2010 by the Montgomery County Council. The Maryland State Highway Administration (MD SHA) requested this study from MCDOT. The study will examine the existing conditions in the sector plan study area and the M-NCPPC projections, and then it will perform a block-by-block trip generation and assignment analysis to build a bottom-up look at the future traffic in the area. The study intersections have been evaluated using Critical Lane Volume (CLV) as well as Synchro (HCM) analyses. This study identifies intersections that would exceed the policy area limits. A previous draft of this study was submitted to Montgomery County and MD SHA for comment. This study incorporates changes as per those comments, as well as additional information provided by the White Flint Partnership and their traffic consultants.

1.2 SCOPE

The White Flint sector plan updates the Sub-Area master plan for the White Flint Mall area (**Figure 1**). It includes an increase in allowable density for the majority of the sector plan area, which could lead to a significant increase in area traffic as the properties are redeveloped. The sector plan outlines several roadway network improvements, as well as ambitious goals for increasing Non-Auto Driver Mode Share (NADMS).

This study analyzes three scenarios which are as follows:

- Existing Conditions
- 2022 Intermediate Development
- 2042 Full Build out

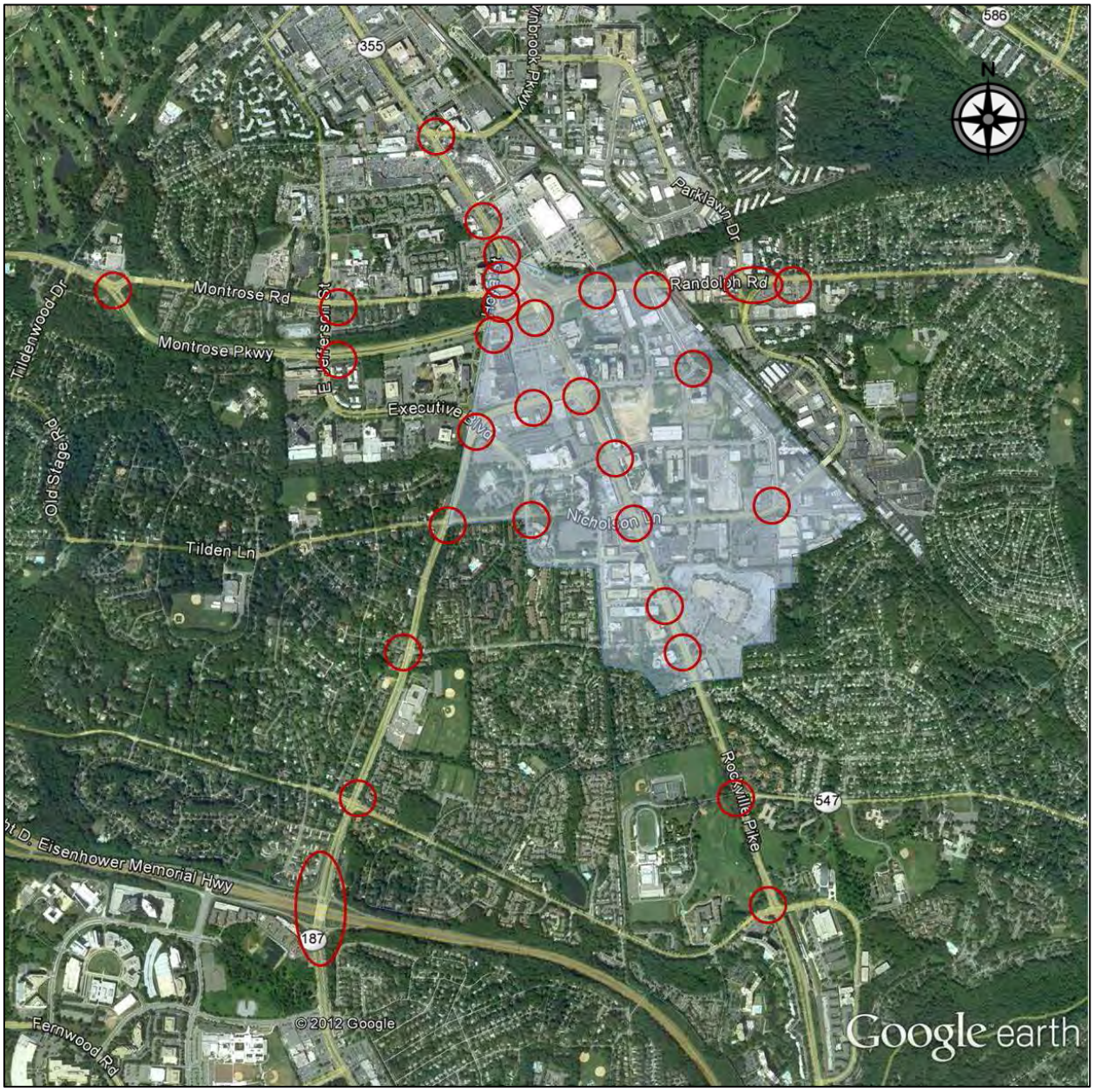


Figure 1: Vicinity Map

The following intersections have been analyzed in this study:

1. MD 355/Twinbrook Parkway
2. MD 355/Bou Avenue
3. MD 355/Hubbard Shopping Center
4. MD 355/Hoya Street "Onramp"
5. MD 355/Montrose Parkway Ramps
6. MD 355/MD 187
7. MD 355/Marinelli Road
8. MD 355/Nicholson Lane
9. MD 355/Security Blvd
10. MD 355/Edson Lane
11. MD 355/MD 547
12. MD 355/Tuckerman Lane
13. Montrose Parkway/Montrose Road
14. Montrose Road/E. Jefferson Street
15. MD 355/Hoya "OffRamp"
16. Montrose Road/Hoya Street
17. Montrose Parkway/E. Jefferson Street
18. Montrose Parkway/Hoya Street
19. Montrose Parkway/Chapman Avenue/Maple Avenue
20. Randolph Road/Nebel Street
21. Randolph Road/Parklawn Drive
22. Randolph Road/Lauderdale Drive
23. MD 187/Hoya Street/ Exeuctive Blvd
24. MD 187/MidPike Entrance/Executive Realigned
25. Old Georgetown Road/Nebel Street
26. MD 187/Nicholson Lane/Tilden Lane
27. Nicholson Lane/Executive Blvd
28. Nicholson Lane/Nebel Street
29. MD 187/Edson Lane
30. MD 187/Tuckerman Lane
31. MD 187/I-270 Northbound Ramps
32. MD 187/I-279 Southbound Ramps
33. Hoya Street/MidPike E/W Access
34. MD 355/MidPike E/W Access
35. MD 187/Main Street/Market Street
36. MD 355/Main Street/Market Street
37. Marinelli Street/Citadel Avenue
38. Nicholson Lane/Citadel Avenue
39. MD 355/Executive Blvd
40. Montrose Parkway/Parklawn Drive

2.0 Existing Conditions

2.1 EXISTING TRAFFIC VOLUMES

Traffic counts were conducted between September 13, 2011 and September 29, 2011 from 6:45 AM to 9:45 AM and from 4:00 PM to 7:00 PM at the following intersections:

- MD 355 @ Hubbard Shopping Center Entrance
- MD 355 @ Strathmore Avenue (MD 547)
- MD 355 @ Tuckerman Lane
- MD 187 @ Edson Lane/Poindexter Lane
- MD 187 @ Tuckerman Lane
- MD 355 @ Hoya Street
- MD 355 @ Twinbrook Parkway/Rollins Avenue

The existing count data for the remaining study intersections were provided by Maryland State Highway Administration (MD SHA). MD SHA performed a traffic analysis of the Montrose Parkway Phase 1 and Phase 2 traffic impacts using Synchro software. These Synchro files were provided to Stantec to use as a base for this study. Traffic counts were also conducted at all the study intersections on Saturdays between September 10, 2011 and October 22, 2011 between 10:00 AM and 2:00 PM.

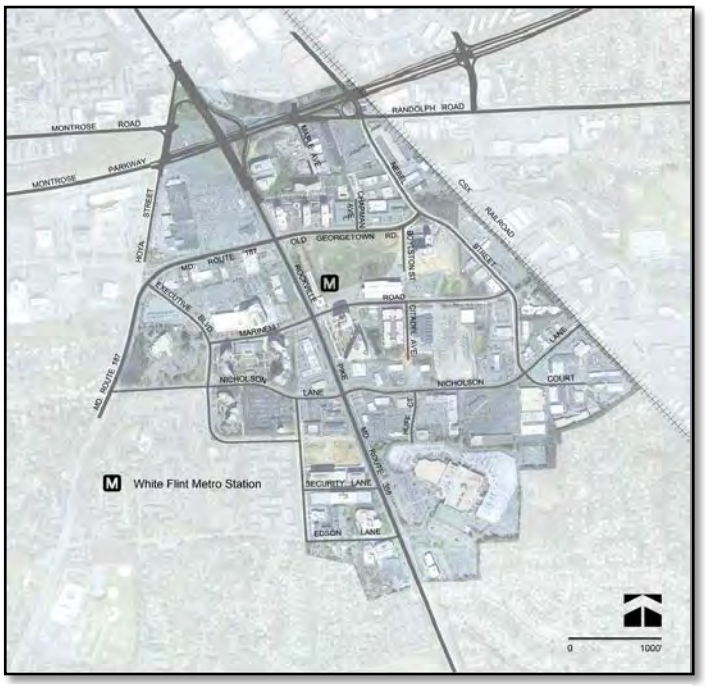
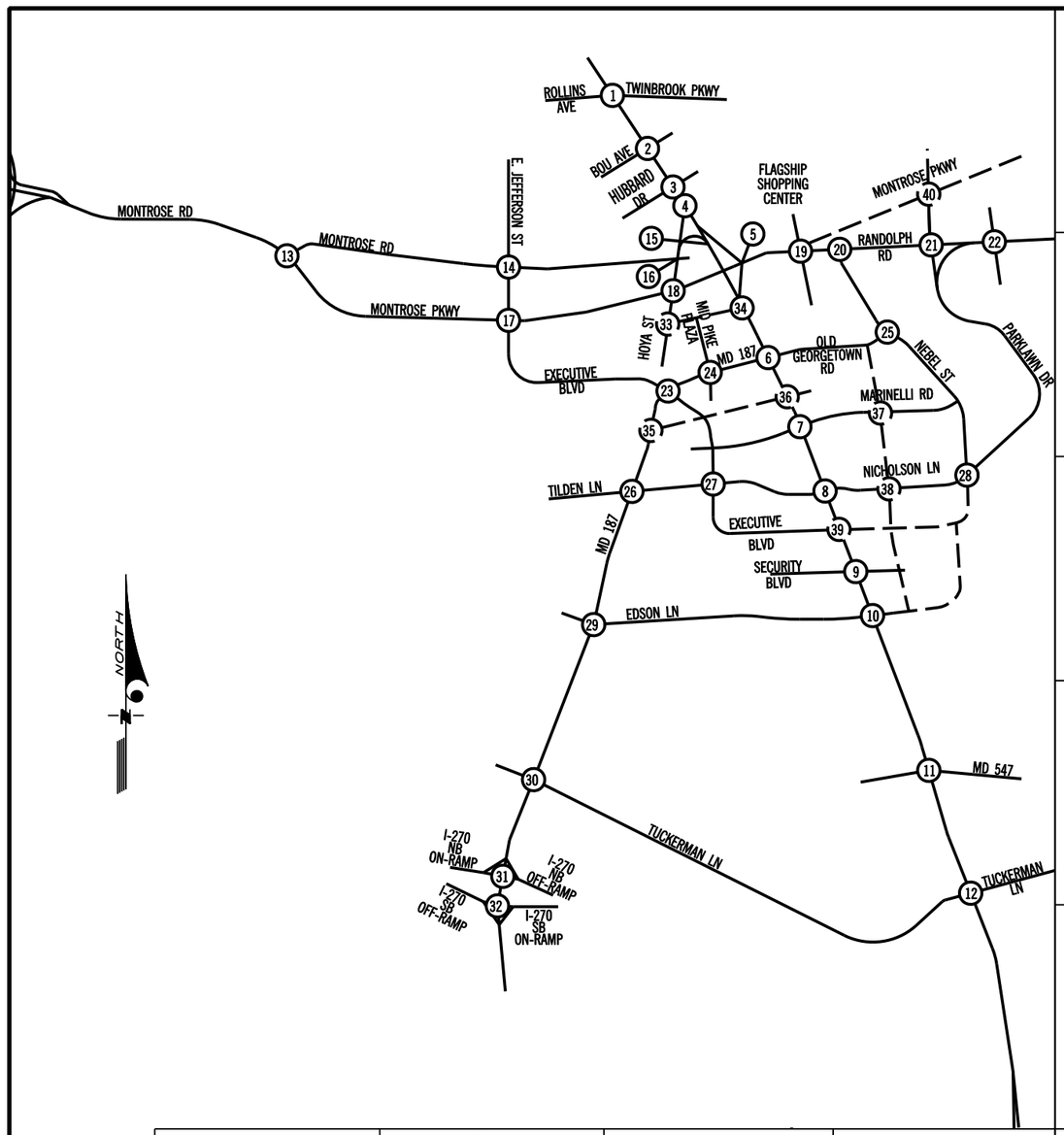
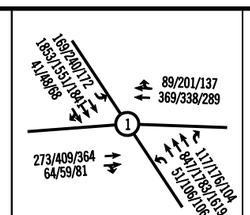
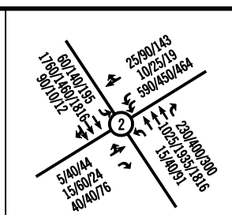


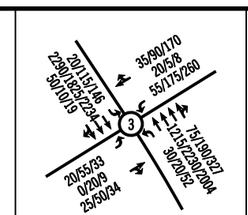
Figure 2: Existing Road Network

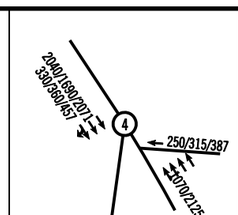
The existing road network is shown in **Figure 2**, the turning movement counts are shown in **Figure 3,** and detailed lane use and traffic control is shown in **Figure 4**. The raw traffic count data is included in **Appendix A**.

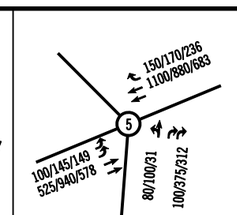


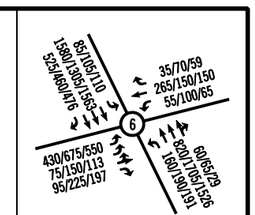


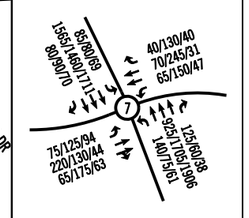


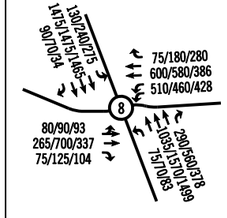


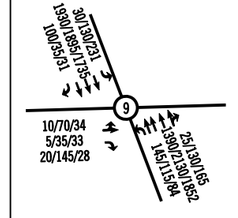


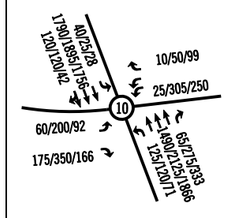


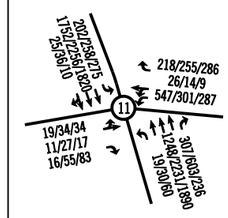


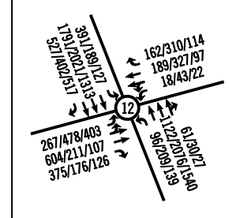


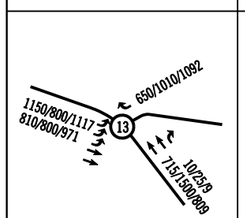


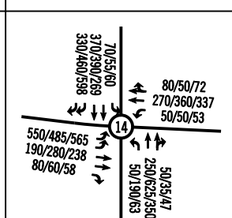


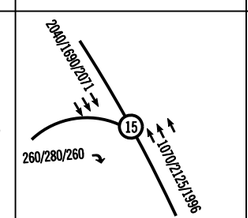


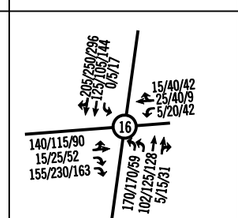


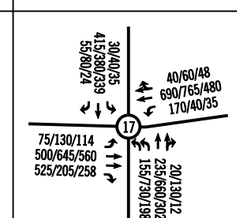


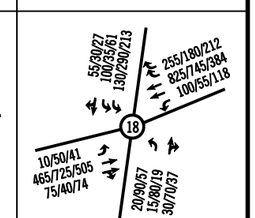


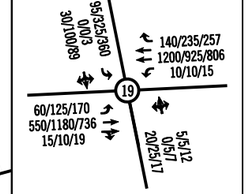


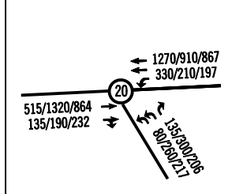


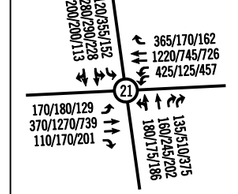


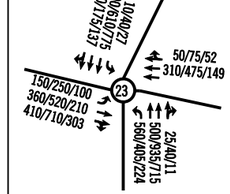


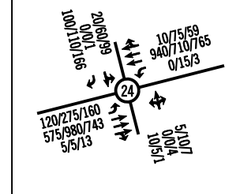


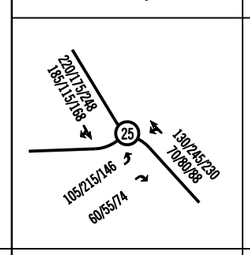


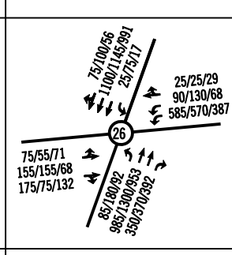


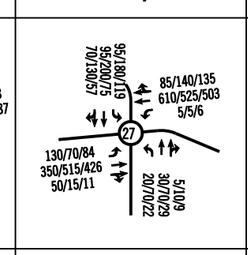


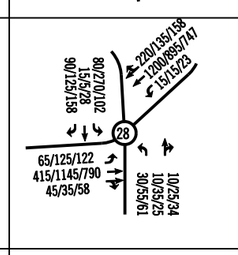


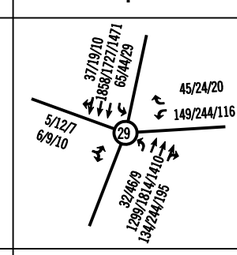


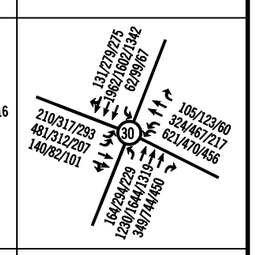


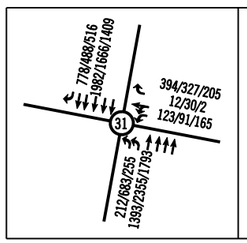


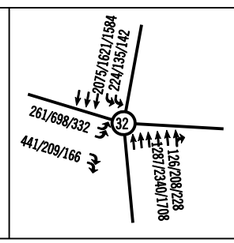


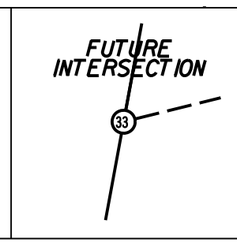


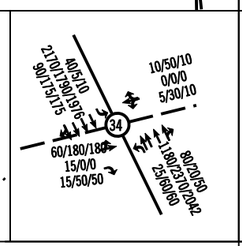


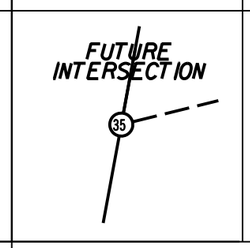


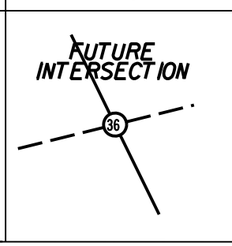


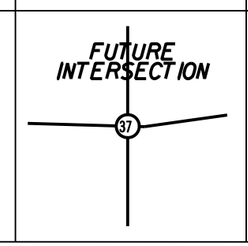


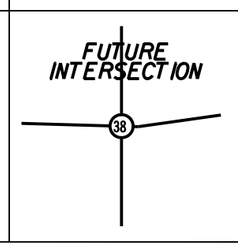


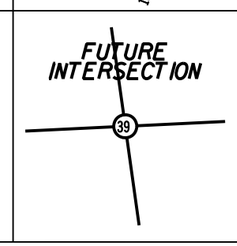












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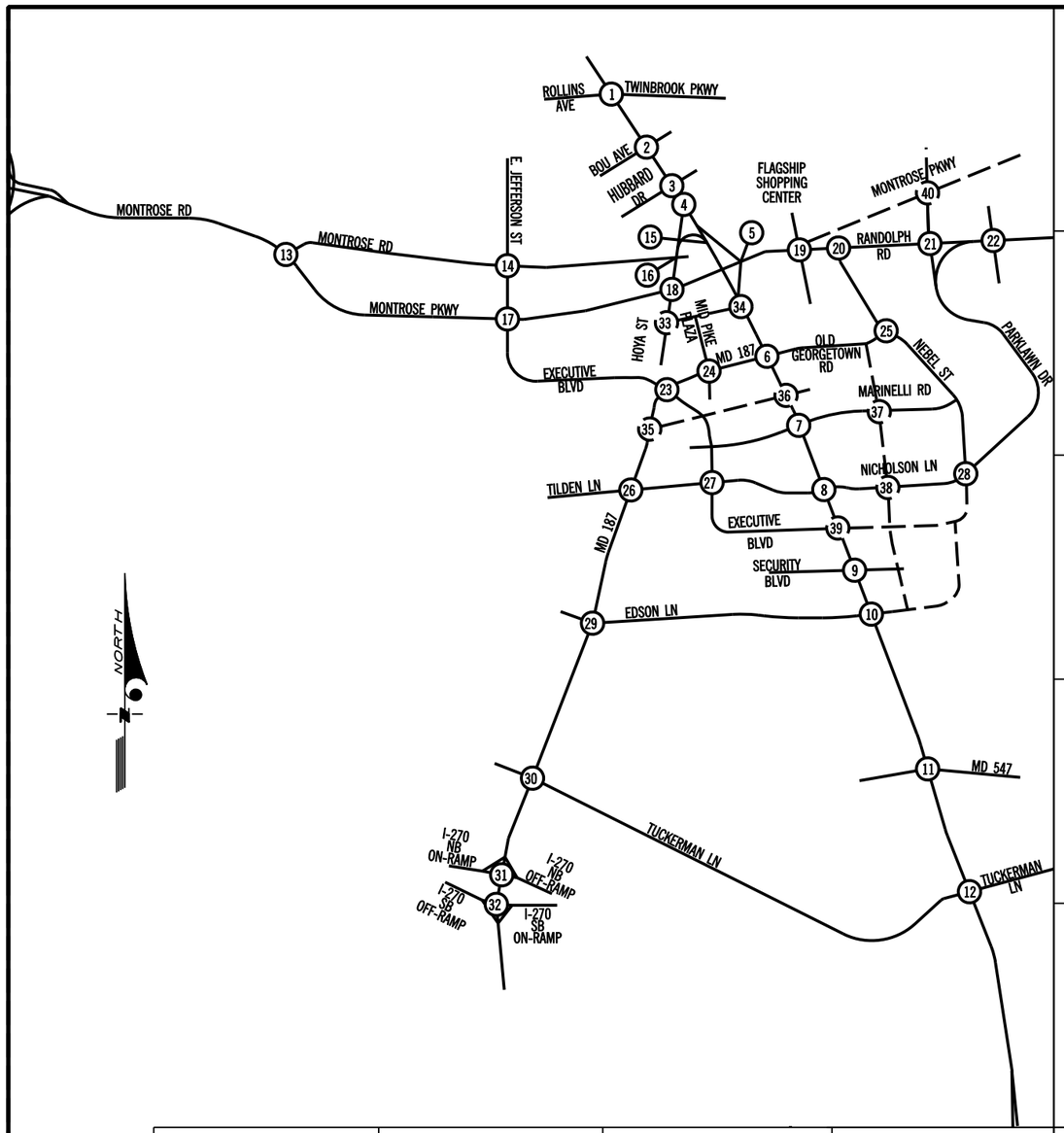
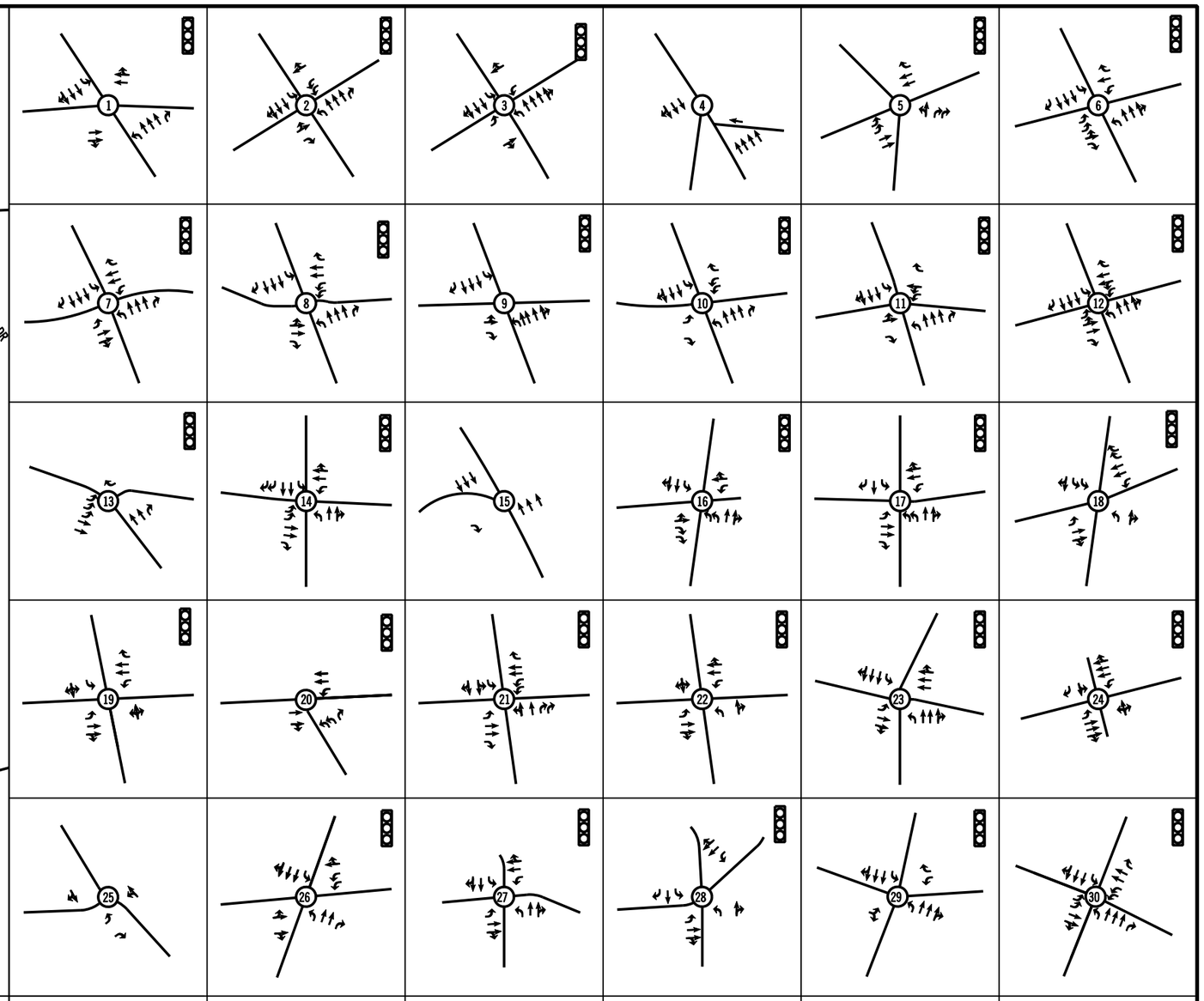
EXISTING TRAFFIC VOLUMES

MONTGOMERY COUNTY, MARYLAND

FIGURE 3

11/16/12





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SIGNALIZED INTERSECTION → SINGLE TRAVEL LANE

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EXISTING ROAD NETWORK AND LANE USE

MONTGOMERY COUNTY, MARYLAND

FIGURE 4

2.2 EXISTING TRAFFIC OPERATIONS

The existing weekday and Saturday peak hour volumes were analyzed using CLV methodology with the existing lane configurations and traffic control as shown in **Figure 4**. The CLV results for existing conditions are shown in **Table 1** and the PM peak hour results are shown graphically in **Figure 5**. CLV worksheets are contained in **Appendix B** and summarized in **Table 1**.

Critical lane volume is the standard planning level intersection evaluation method for Montgomery County, as well as MD SHA. It provides a numerical measure of intersection congestion based on the traffic volumes, lane configuration, and signal phasing. In the *Local Area Transportation Review and Policy Area Review Guidelines*, M-NCPPC divides the county into policy areas, and each of these policy areas is assigned a congestion standard for LATR analysis. These congestion standards are based on CLV analyses and provide a threshold for acceptable CLV between 1,350 and 1,800 based on availability of transit and other factors. The study area for this report includes intersections across three policy areas. These policy areas are Grosvenor, North Bethesda and White Flint. The Grosvenor and White Flint policy areas have a CLV threshold of 1,800, and the North Bethesda Policy Area has a threshold of 1,550. The policy area and threshold for each intersection are noted in **Table 1**.

Under existing conditions, the intersection MD 187/Tuckerman Lane intersection exceeds the area threshold. All other intersections operate at CLV's below the area threshold.

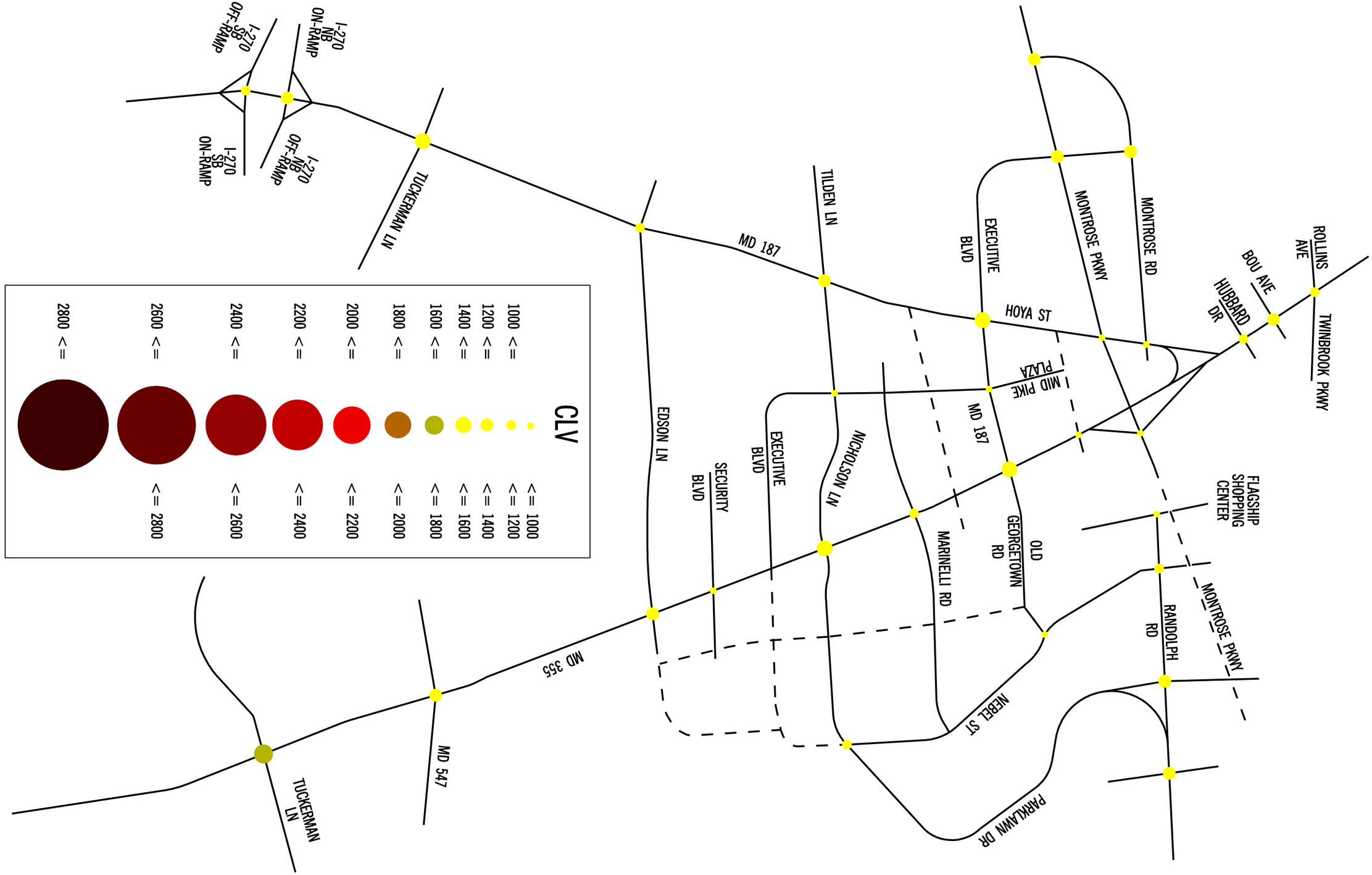
Table 1: Existing CLV Level of Service

	Intersection			
	White Flint Policy Area 1800 CLV	**AM**	**PM**	**Sat**
5	Montrose Parkway @ MD 355 Ramps	723	752	616
6	Old Georgetown Rd @ MD 355	1,182	1,415	1,283
7	MD 355 @ Marinelli Rd	935	1,036	884
8	MD 355 @ Nicholson Ln	1,110	1,516	1,315
9	MD 355 @ Security Blvd	874	921	903
10	MD 355@ Edson Lane	902	1279	981
16	Hoya Street @ Montrose Road	440	442	392
18	Hoya Street @ Montrose Pkwy	622	784	609
19	Montrose Parkway @ Chapman Ave/Maple Ave	791	921	885
20	Randolph Road @ Nebel St	723	1,166	908
23	MD 187 @ Executive Blvd./Hoya St	1,355	1,405	864
24	MD 187 @ Mid Pike/New Executive *(FUTURE)*	587	690	643
25	MD 187 @ Nebel St	580	585	650
26	MD 187 @ Nicholson Ln/Tilden Ln	1,117	1,260	901
27	Nicholson Ln @ Executive Blvd.	612	667	561
28	Nicholson Ln @ Nebel St	938	1001	763

Table 1: Existing CLV Level of Service

	Intersection			
	White Flint Policy Area 1800 CLV	**AM**	**PM**	**Sat**
33	Hoya St @ Mid Pike East-West *(FUTURE)*	N/A	N/A	N/A
34	MD 355 @ Mid Pike East-West	783	982	905
35	Old Georgetown @ Main St/Market St *(FUTURE)*	N/A	N/A	N/A
36	MD 355 @ Main Street/Market St *(FUTURE)*	N/A	N/A	N/A
37	Marinelli Rd @ Citadel Ave [1]	N/A	N/A	N/A
38	Nicholson Ln @ Citadel Ave [1]	N/A	N/A	N/A
39	MD 355 @ Executive Extended [1]	N/A	N/A	N/A
	Grosvenor Policy Area 1800 CLV			
11	MD 355 @ MD 547	1,072	1,328	1,229
12	MD 355 @ Tuckerman Ln	1,268	1,700	1,230
	North Bethesda Policy Area 1550 CLV			
1	MD 355 @ Twinbrook Parkway	995	1,186	1,048
2	MD 355 @ Bou Avenue	1,079	1,230	1,221
3	MD 355 @ Hubbard Shopping Center	976	1,086	1,189
13	Montrose Road @ Montrose Parkway	839	1,115	876
14	E. Jefferson Street @ Montrose Road	762	913	826
17	E. Jefferson Street @ Montrose Parkway	970	1,385	852
21	Randolph Road @ Parklawn Ave	1,251	1,209	902
22	Randolph Road @ Lauderdale Drive	1,118	1,321	878
29	Old Georgetown Rd @ Poindexter Ln/Edson Lane	894	1,071	757
30	Old Georgetown Rd @ Tuckerman Ln	1,640	1,481	1,264
31	Old Georgetown @ I 270 NB Ramps	1,299	1,225	874
32	Old Georgetown @ I 270 SB Ramps	1,002	1,137	785
40	Montrose Parkway @ Parklawn Drive *(FUTURE)*	N/A	N/A	N/A

*1: Existing turning movement data was not collected for these intersections.



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EXISTING PM LOS RESULTS

MONTGOMERY COUNTY, MARYLAND

FIGURE 5

3.0 Background Traffic Conditions

3.1 PLANNED ROAD IMPROVEMENTS

The sector plan calls for several changes to the existing roadway network. These changes would provide for a more efficient grid network, with short block lengths for pedestrians and more choices for vehicular movements. It would also realign several roads to result in more regular block shapes which are more conducive to redevelopment. The planned roadway layout is shown on **Figure 6** and the major changes are described below:

- **Montrose Parkway East** – this is a project currently in the county CIP that is independent of the White Flint sector plan, but will have a strong impact on the area. Montrose Parkway, a four lane facility, will be extended from the current intersection with Maple Avenue east to Veers Mill Road. Nebel Street will not intersect with Montrose Parkway. A single point urban interchange will be provided at Parklawn Drive. The existing connection between Nebel Street and Maple Avenue/Chapman Avenue on Randolph Road will be removed. More information on this improvement is provided in **Appendix A**.

- **MD 187/Executive Boulevard Realignment** – the intersection of MD 187 at Executive Boulevard is currently aligned with MD 187 headed southwest to northeast and Executive Boulevard headed northwest to southeast. Both roadways will be realigned to produce two orthogonal intersections. MD 187 will be realigned to travel north-south until the current intersection location, where it will turn 90 degrees and travel east-west until the intersection with MD 355. In the sector plan, this east-west section is planned be reduced from a six lane cross-section to four-lanes. Hoya Street will be constructed as the southbound leg of this intersection. Executive Boulevard will be realigned to travel directly north-south and will intersect the east-west portion of MD 187 between the original intersection location and MD 355, across from the Mid Pike Plaza access road.

- **Construction of Main Street/Market Street** – a new 2 lane roadway will be constructed between MD 187 and MD 355. It will run parallel to the newly realigned east-west section of MD 187 to the south. During the early phases of this project, the final section connecting to MD 355 may not be completed, as it is dependent on developer dedication.

- **Executive Boulevard** – the section of Executive Boulevard that connects to MD 355 on the western side was recently constructed by a developer. In the future, Executive Boulevard will continue to the east across MD 355 and intersect with Nebel Street (Extended) along the northern border of the White Flint Mall property.

- **Nebel Extended** – Nebel Street will be extended as a two lane facility to the south and turn toward the west to intersect with MD 355 at Edson Lane.

- **Various Local Level Streets** – there are several local level streets that will be constructed by developers as each property is redeveloped. Some of the roadways that have known alignments are

shown on **Figure 6**. More information from the sector plan on the potential road network is contained in **Appendix A**.

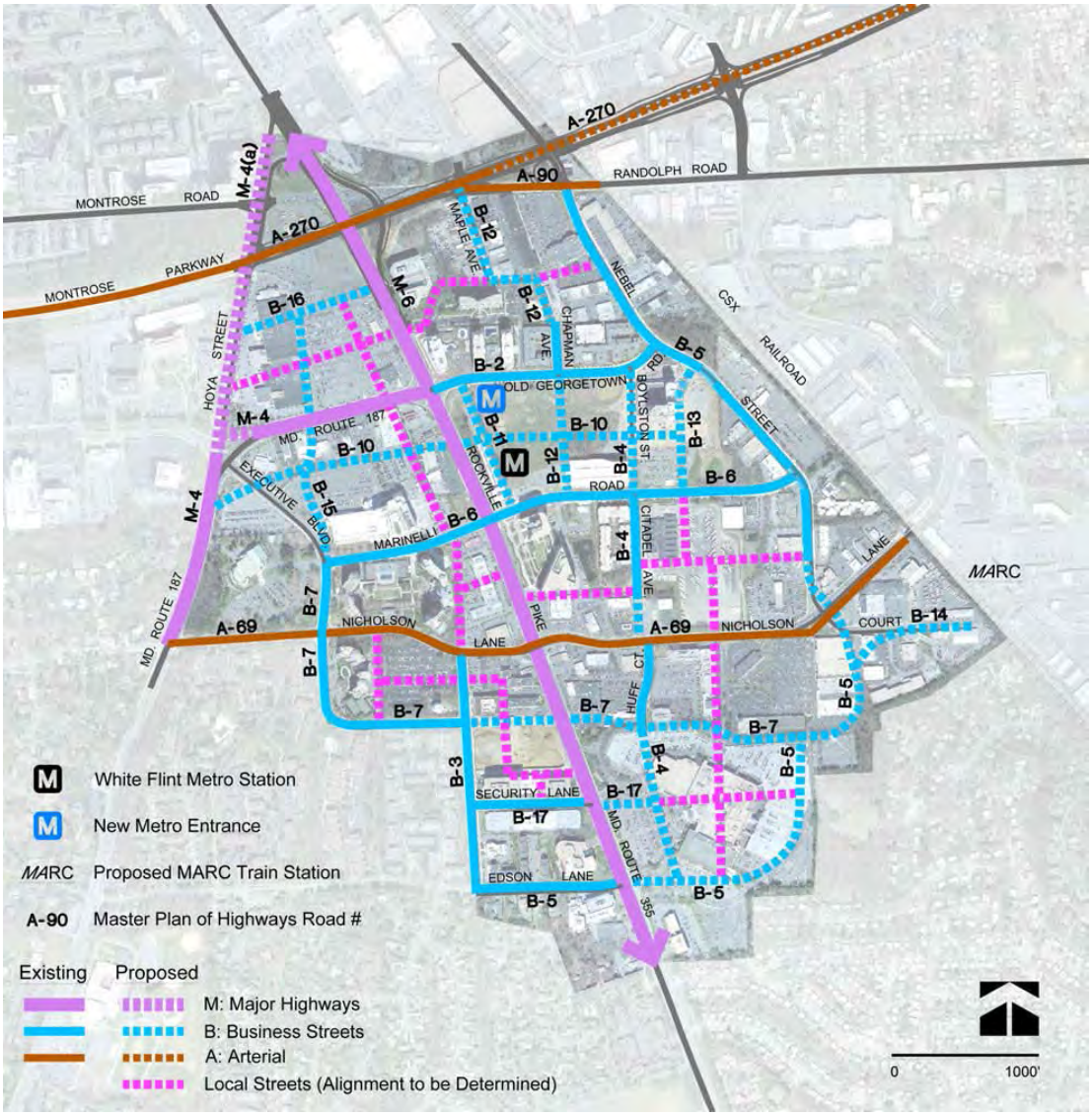


Figure 6: Planned Road Network

3.2 BACKGROUND THROUGH TRIPS AND GROWTH

In order to analyze the future condition with the planned network improvements, an origin-destination (O-D) study was conducted by STV, Inc. for the White Flint Partnership. STV used the O-D data to determine the proportions of traffic entering each network entry point, and the destination of that traffic either to a location inside the white flint area, or to another network entry/exit point. The traffic that was found to travel directly from a network entry point through the white flint area and exit at another point was considered to be the base regional through traffic. This O-D percentage information was combined with MD SHA volume data to produce base regional through traffic volumes. These volumes were

provided to Stantec by STV, Inc. to serve as a collaborative base point for future traffic analysis (see **Appendix C**).

Table 2: AADT Growth on MD 355

Year	AADT	Change in Volume Increase /(Decrease)
2004	57,750	-
2005	56,625	(1,125)
2006	53,590	(3,035)
2007	53,591	1
2008	51,982	(1,609)
2009	52,828	838
2010	53,141	321

In order to account for traffic increases from outside of the study area, MD SHA requested that a growth rate be applied to the north-south through movements on MD 355 and MD 187, and the east-west through movements on Montrose Parkway/Montrose Road. MD SHA provided average annual daily traffic (AADT) volumes on MD 355 one tenth of a mile north of Montrose Parkway. As shown in **Table 2,** the AADT volumes indicate that MD 355 in this area has shown an overall decrease in traffic between the years 2004 and 2010. There has been a modest increase over the two most recent data points, resulting in an average growth of one (1) percent per year.

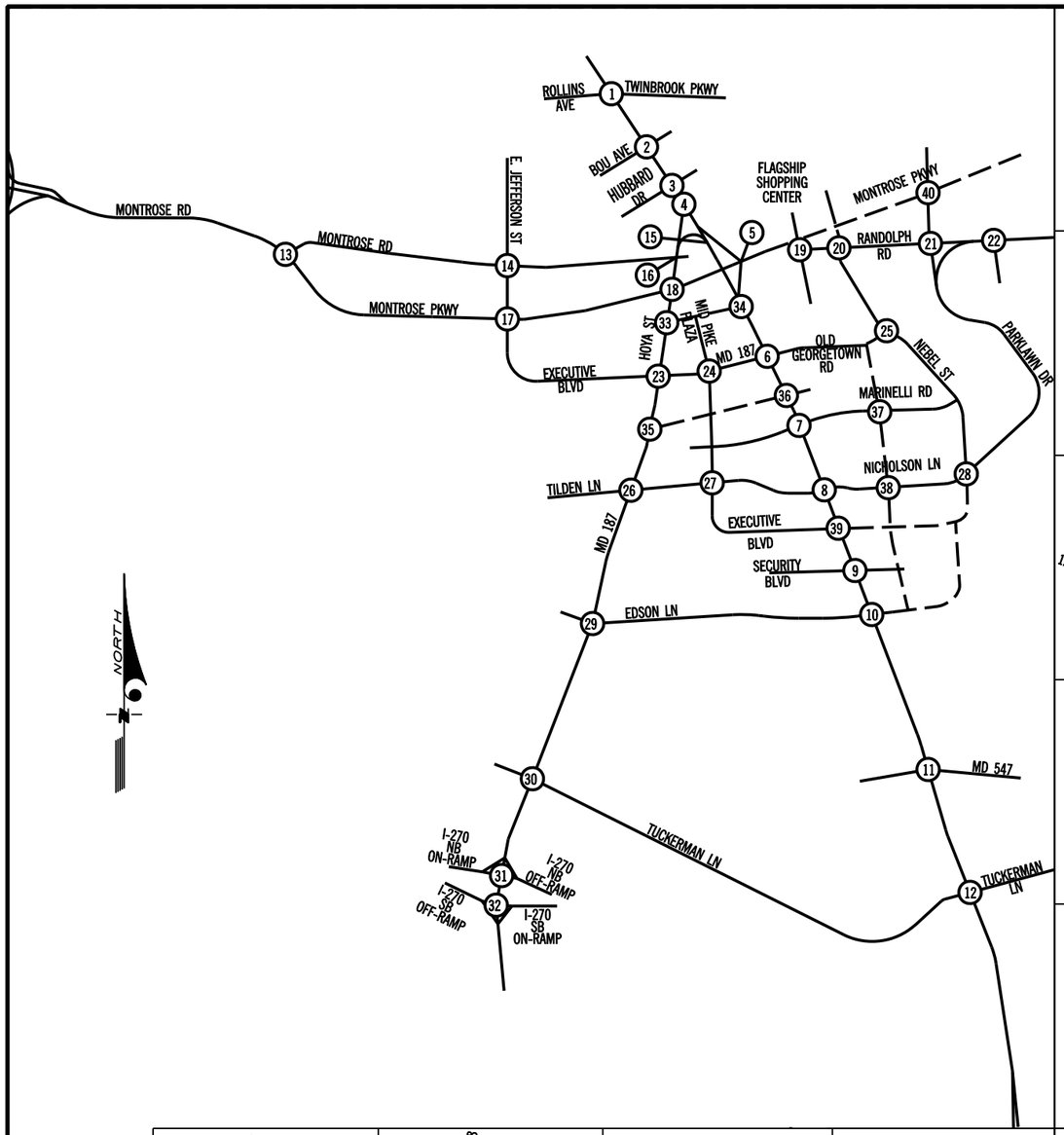
There are several large projects that are currently approved in the areas surrounding White Flint. In order to fully account for the future growth due to these nearby projects, as well as regional growth, a one (1) percent growth rate, compounded to the study year, was added to the north-south through volumes on MD 355, 0.5 percent growth was applied to Montrose Road/Montrose Parkway, and 0.25 percent growth was applied to MD 187. The future road network was analyzed under an intermediate 2022 scenario, as well as full build out. The full build-out scenario was assumed to take place in 2042 for the purposes of growth calculations. The growth was applied to STV's O-D data for both the 2022 and 2042 scenarios, and the resulting 2022 and 2042 regional through trips with growth are shown in **Figure 7** and **Figure 8**, respectively. Additional information from STV is contained in **Appendix C**.

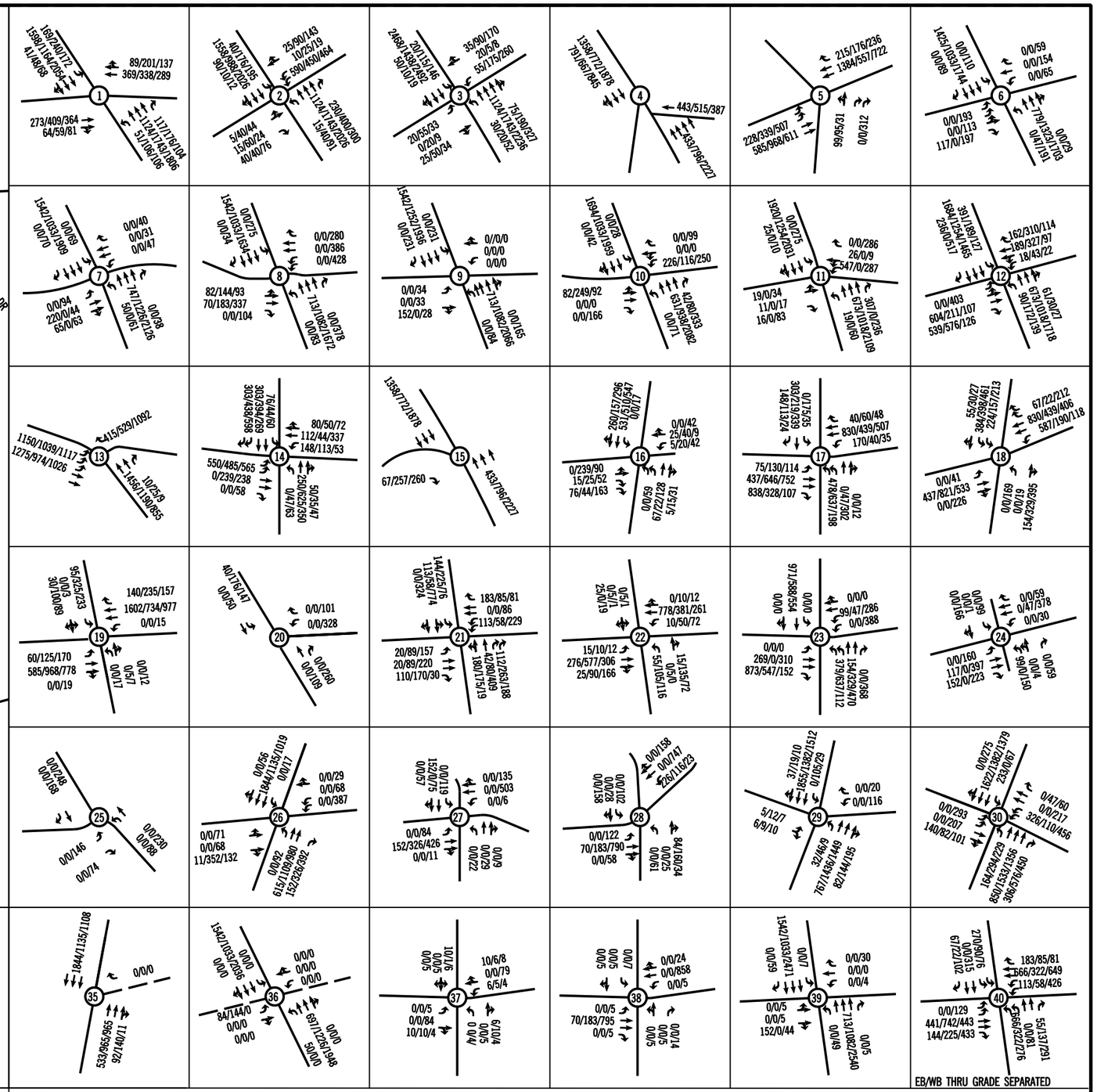
3.3 PIPELINE DEVELOPMENTS

Several developments were approved prior to the sector plan (see **Table 3**). The sector plan, as approved, requires that the overall sector plan area also reduce the trips to achieve a non-auto driver mode split (NADMS) of 50 percent for commercial development and 51 percent for residential under full build-out. These NADMS requirements apply to the entire sector plan area, including existing development that will not redevelop and the developments which have already achieved approval. Therefore, at each stage of development analyzed, the pipeline developments are assumed to have the same NADMS as the rest of the sector plan development, and are included in the overall sector plan trip generation.

Table 3: Pipeline Developments

Property/Use	Quantity	Unit
North Bethesda Center (LCOR)		
Multi-Family Residential	1,350	DU
Office	1,140,0000	SF
Commercial	Retail	SF
North Bethesda Market		
Dwelling Units	440	DU
Commercial	223,000	SF
White Flint View		
Dwelling Units	183	DU
Commercial	29,500	SF
Metro Pike Holladay		
Dwelling Units	247	DU
Commercial	201,822	SF





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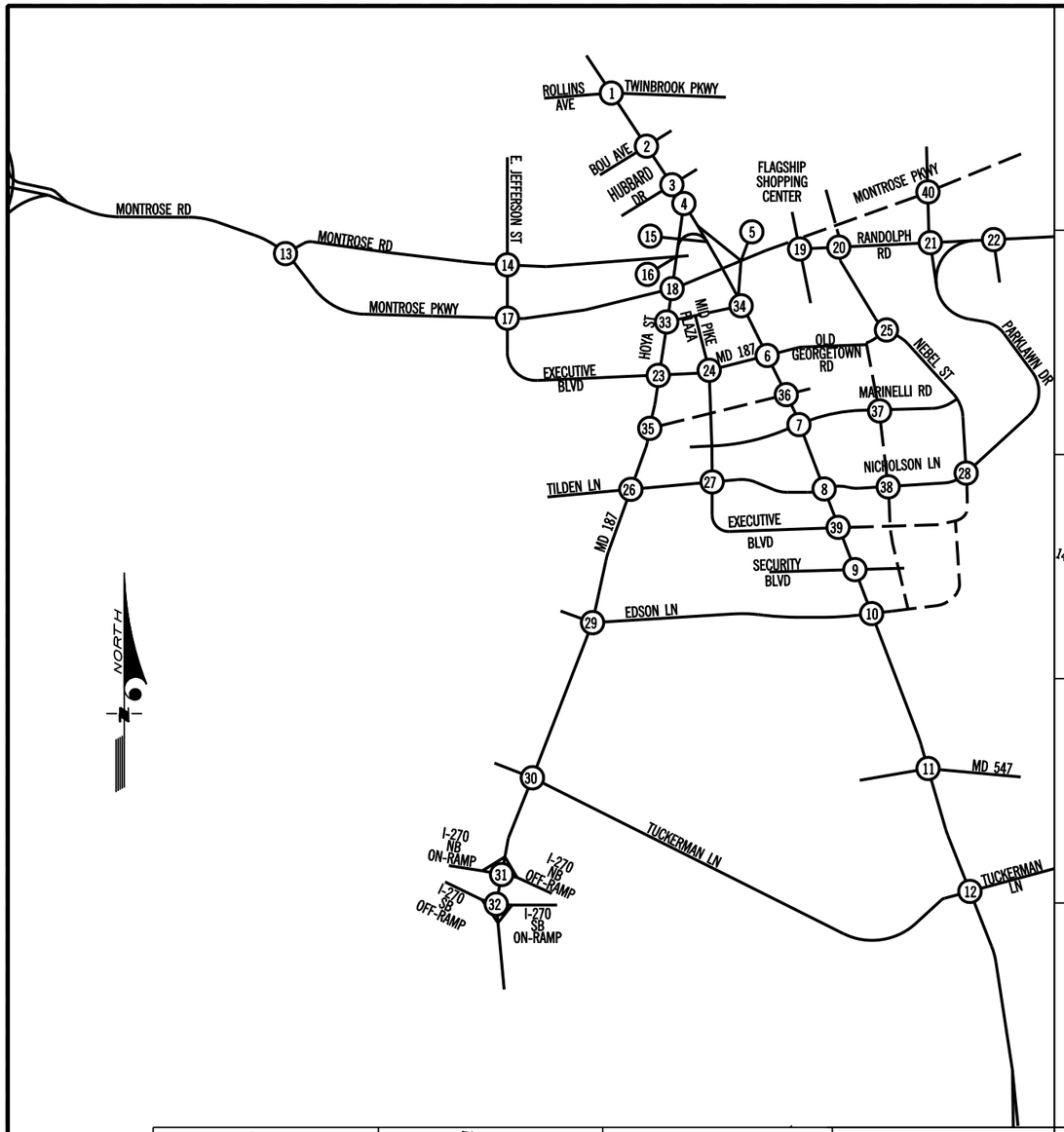
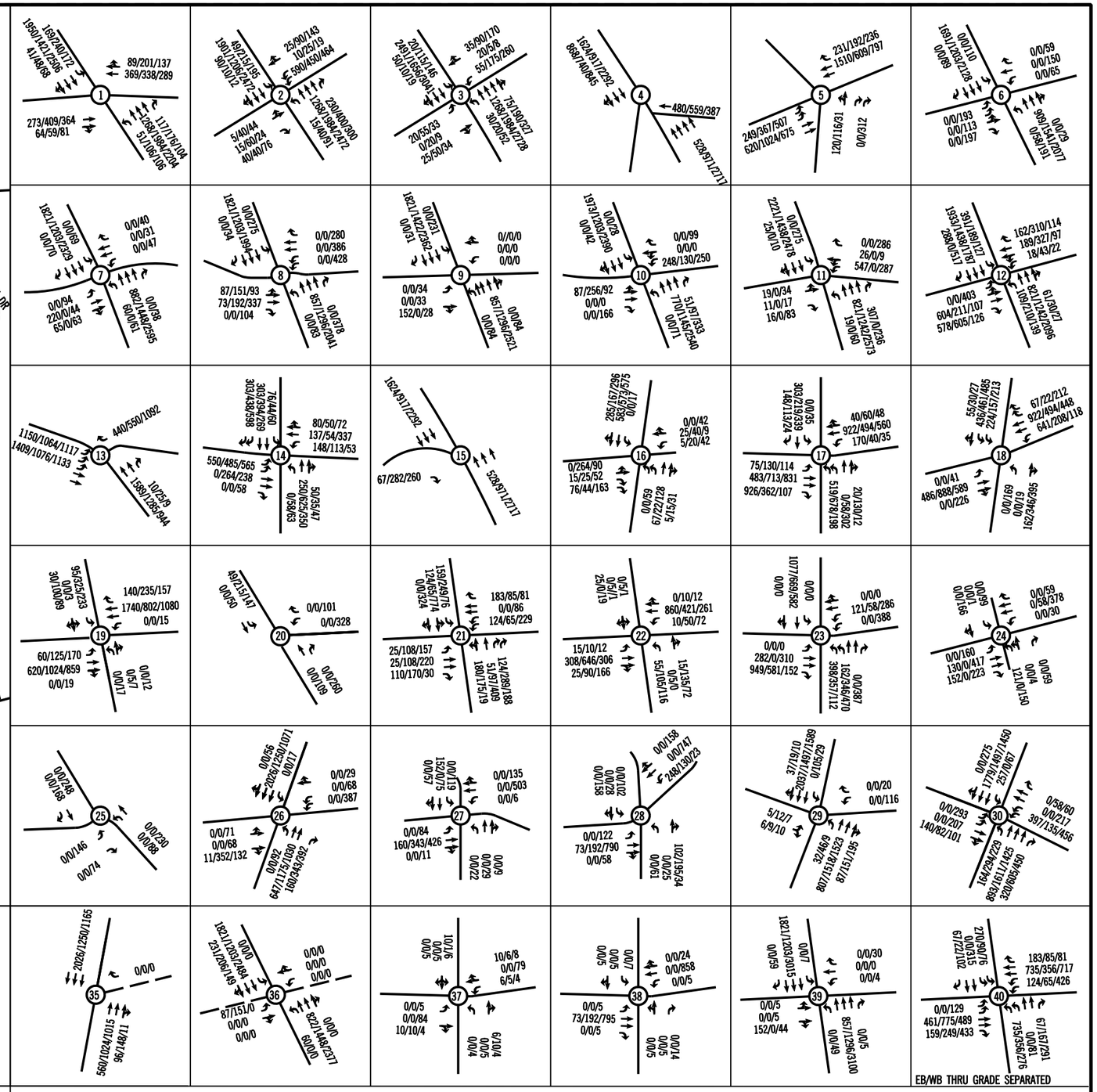
2022 REGIONAL THROUGH TRIPS

MONTGOMERY COUNTY, MARYLAND

FIGURE 7





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2042 REGIONAL THROUGH TRIPS

MONTGOMERY COUNTY, MARYLAND

FIGURE 8

4.0 2022 Future Conditions

4.1 2022 TRIP GENERATION

The sector plan area is divided into 20 blocks, as shown on the map in **Figure 9**. Future development, by use, was examined for each block. The future development is based on the development quantities planned by the land owners and development community as per information provided by the White Flint Partnership/STV Inc. These quantities include the pipeline developments already approved, the developments that are currently underway or have submitted sketch plans, and future development that is anticipated by the property owners to occur under the sector plan. These desired quantities were then adjusted to reflect the development caps imposed by the White Flint Sector Plan and were approved by MNCPPC. This collaborative process ensured that there is consensus on the assumed future trip generation in the sector plan area. For the 2022 analysis, the sector plan area is assumed to approach the end of Stage 1.

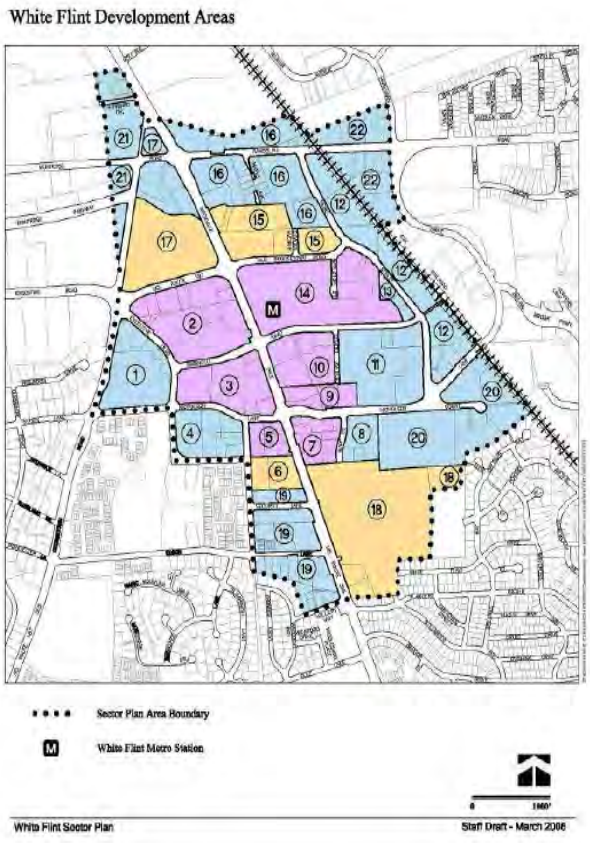


Figure 9: Block Number Map

The sector plan breaks the total development into three stages. Each stage increases the development available for approval allocation. Moving from each stage is triggered by achieving the non-auto driver mode split (NADMS) goals set by the sector plan.

The stages are as follows:

- **Stage 1** – Releases 2,000 dwelling units and 2.0 Million SF of non-residential development for approval. NADMS goal for the overall sector plan area (required to move to Stage 2) is 34%.
- **Stage 2** – Releases an additional 2,000 dwelling units and 2.0 Million SF of non-residential development for approval. NADMS goal for the overall sector plan area (required to move to Stage 3) is 42%.
- **Stage 3** – Releases final 3,800 dwelling units and 1.69 million SF of non-residential development. NADMS goal for the overall sector plan area is 50% for non-residential development and 51% for residential development.

These substantial levels of development would be built-out over many years. For the purposes of this analysis, Stantec has attempted to estimate a reasonable amount of development that could be approved and constructed by 2022. This quantity of development approaches the end of Stage 1, as outlined in the

sector plan, and includes 970,878 SF of non-residential development and 781 residential units in the pipeline development, as well as 1,171,641 SF of non-residential development and 2,671 residential units in new approvals.

The developments included in this 10-year build out were based on the current sketch plans submitted to M-NCPPC. This includes redevelopment of the White Flint Mall, Mid Pike Plaza, North Bethesda Market II and North Bethesda Gateway. For the pipeline developments, this analysis assumes partial build out of the North Bethesda Center (LCOR) development and full build out of the Metro Pike, White Flint View and North Bethesda Market I developments.

The trips generated by this proposed development were calculated using ITE trip generation rates. Montgomery County has county-specific trip generation rates that are typically used for LATR traffic impact studies; however, these rates do not include Saturday peak hours. The ITE Trip Generation Manual provides Saturday peak hour trip generation rates and equations. Therefore, in order to maintain a consistent source of trip generation information across the peak hour studied, ITE rates were used for all peak hours. The rates and equations used in this study are shown in **Table 4**.

The rates and equations were applied to the development quantities approved by MNCPPC to produce the 2022 future trip generation for the entire sector plan area as shown in **Table 5**. The full-build out NADMS of 34 percent for commercial and residential development was then applied to all peak hour trips. The remaining auto driver trips to be assigned to the roadway network are shown in the three right-hand columns of **Table 5**.

Table 4: Trip Generation Rates and Equations

Use	ITE Code	Unit (X)	Peak Hour	In/Out Split	Rate/Equation
Office	710	SF	AM	88/12	ln(Trips) = 0.8*ln(X)+1.55
			PM	17/83	Trips = 1.12*(X/1000)+78.81
			SAT	54/46	Trips = 0.41*(X/1000)
Retail	820, 814, 931, 932	SF	AM	61/39	Trips = (1/3)*(EXP(0.59*ln(X)+2.32))+(1/3)*(EXP(0.59*ln(X)+2.32))+(1/6)*(11.52*X)+(1/6)*(0.81*X)
			PM	49/51	Trips = (1/3)*(EXP(0.67*ln(X)+3.37))+(1/3)*(2.4*X+21.48)+(1/6)*(7.49*X)+(1/6)*(11.15*X)
			SAT	52/48	Trips = (1/3)*(EXP(0.65*ln(X)+3.76))+(1/3)*(42.04*0.1*X)+(1/6)*(10.82*X)+(1/6)*(14.07*X)
Industrial	130	SF	AM	82/18	ln(Trips) = 0.77*ln(X)+1.09
			PM	21/79	Trips = 0.77*(X/1000)+42.11
			SAT	32/68	Trips = 0.35*X/1000
Residential	232	DU	AM	19/81	Trips = 0.29*X+28.86
			PM	62/38	Trips = 0.34*X+15.47
			SAT	43/57	Trips = 0.30*X+28.85
Hotel	312	Room	AM	59/41	Trips = .58*X
			PM	60/40	Trips = 0.62*X
			SAT	56/44	Trips = 0.69*X+4.32

Table 5: 2022 Block by Block Trip Generation

Block	Land Use	MNCPPC Approved Development - 2022 Future	Future Trips			Future Trips with NADMS		
			AM Trips	PM Trips	SAT Trips	AM Trips	PM Trips	SAT Trips
1	County Rec Center	44,000	55	76	185	36	50	122
2	Office	23,280	58	105	13	39	69	8
	Retail	116,360	351	696	961	232	460	634
	Hotel/Conference Center	268,000	155	166	189	103	110	125
3	Office	85,963	166	175	36	110	116	24

Table 5: 2022 Block by Block Trip Generation

Block	Land Use	MNCPPC Approved Development - 2022 Future	Future Trips			Future Trips with NADMS		
			AM Trips	PM Trips	SAT Trips	AM Trips	PM Trips	SAT Trips
	Retail	115,886	350	694	958	231	458	632
	Residential	1,074	340	381	351	225	251	260
4	Residential	186	83	79	85	55	52	63
5	Office	291,500	441	405	98	291	267	65
	Retail	78,474	250	494	680	165	326	448
	Residential	339	127	131	131	84	86	97
6	Residential	397	144	150	148	95	99	109
	Industrial	223,000	191	214	78	126	141	52
7	Retail	80,586	256	505	695	169	334	459
8	Office	124,789	224	219	49	148	144	33
	Retail	41,400	146	286	391	96	189	258
	Residential	441	157	165	161	103	109	119
9	Office	21,289	54	103	12	36	68	8
	Retail	50,112	171	336	460	113	222	304
	Residential	183	82	78	84	54	51	62
10	Office	744,452	935	913	209	617	602	138
	Residential	202	87	84	89	58	56	66
11	Office	41,410	93	125	20	61	83	13
	Retail	30,720	114	223	303	75	147	200
	Specialty Retail	23,227	34	60	98	22	40	64
12	Retail	146,773	430	855	1,181	284	564	780
	Industrial	97,920	101	118	34	67	78	23
	Specialty Retail	58,718	68	87	247	45	58	163
13	Office	11,242	33	91	7	22	60	5
	Industrial	25,662	36	62	9	24	41	6
14	Office	795,378	985	970	221	650	640	146
	Retail	140,791	415	824	1,138	274	544	751
	Residential	653	218	237	225	144	157	166
15	Office	61,450	127	148	28	84	97	18
	Residential	946	303	337	313	200	222	231
16	Office	124,429	223	218	49	147	144	32
	Retail	164,467	476	946	1,307	314	624	863
	Industrial	129,283	126	142	45	83	93	30
17	Office	475,150	653	611	146	431	403	96
	Retail	281,205	767	1,530	2,120	506	1,010	1,399
	Residential	898	289	321	298	191	212	221

Table 5: 2022 Block by Block Trip Generation

Block	Land Use	MNCPPC Approved Development - 2022 Future	Future Trips			Future Trips with NADMS		
			AM Trips	PM Trips	SAT Trips	AM Trips	PM Trips	SAT Trips
	Hotel	300,000	174	186	211	115	123	139
18	Office	570,195	755	717	169	498	474	111
	Retail	983,617	2,417	4,831	6,721	1,595	3,188	4,436
	Residential	469	165	175	170	109	115	125
19	Office	900,052	1,088	1,087	244	718	717	161
	Retail	32,568	120	234	319	79	155	210
	Residential	57	45	35	46	30	23	34
20	Office	19,800	51	101	11	34	67	7
	Retail	277,331	757	1,511	2,093	500	997	1,382
	Industrial	222,835	191	214	78	126	141	51
Office Subtotal		4,290,379	5,887	5,987	1,312	3,886	3,951	865
Retail Subtotal		2,540,290	7,022	13,966	19,327	4,633	9,218	12,756
Hotel Subtotal		568,000	329	352	401	218	233	264
Industrial Subtotal		824,645	802	972	774	529	642	511
Total Commercial		**8,223,314**	**14,040**	**21,277**	**21,814**	**9,266**	**14,044**	**14,396**
Total Residential		**5,845**	**2,041**	**2,173**	**2,100**	**1,348**	**1,433**	**1,553**
Total Peak Hour Trips			**16,082**	**23,450**	**23,914**	**10,614**	**15,477**	**15,949**

4.2 2022 ROADWAY NETWORK

The road network for this scenario is assumed to include the following changes:

- **Montrose Parkway East** – this is a project currently in the county CIP that is independent of the White Flint sector plan, but will have a strong impact on the area. Montrose Parkway, a four lane facility, will be extended from the current intersection with Maple Avenue to the east. Nebel Street will not intersect with Montrose Parkway. A single point urban interchange will be provided at Parklawn Drive. The existing connection between Nebel Street and Maple Avenue/Chapman Avenue on Randolph Road will be removed. More information on this improvement is provided in **Appendix A**.

- **MD 187/Executive Boulevard Realignment** – The intersection of MD 187 at Executive Boulevard is currently aligned with MD 187 headed southwest to northeast and Executive Boulevard headed northwest to southeast. Both roadways will be realigned to produce two orthogonal intersections. MD 187 will be realigned to travel north-south until the current intersection location, where it will turn 90 degrees and travel east-west until the intersection with MD 355. MD 187 will

remain a six-lane section. Hoya Street will be constructed as the southbound leg of this intersection. Executive Boulevard will be realigned to travel directly north-south and will intersect the east-west portion of MD 187 between the original intersection location and MD 355, across from the Mid Pike Plaza access road. Significant traffic, which is currently assumed to travel southbound on MD 355 and make a right at MD 187, is assumed to use this new southbound connection, taking the right fork at Hoya Street from MD 355 and continuing south to MD 187.

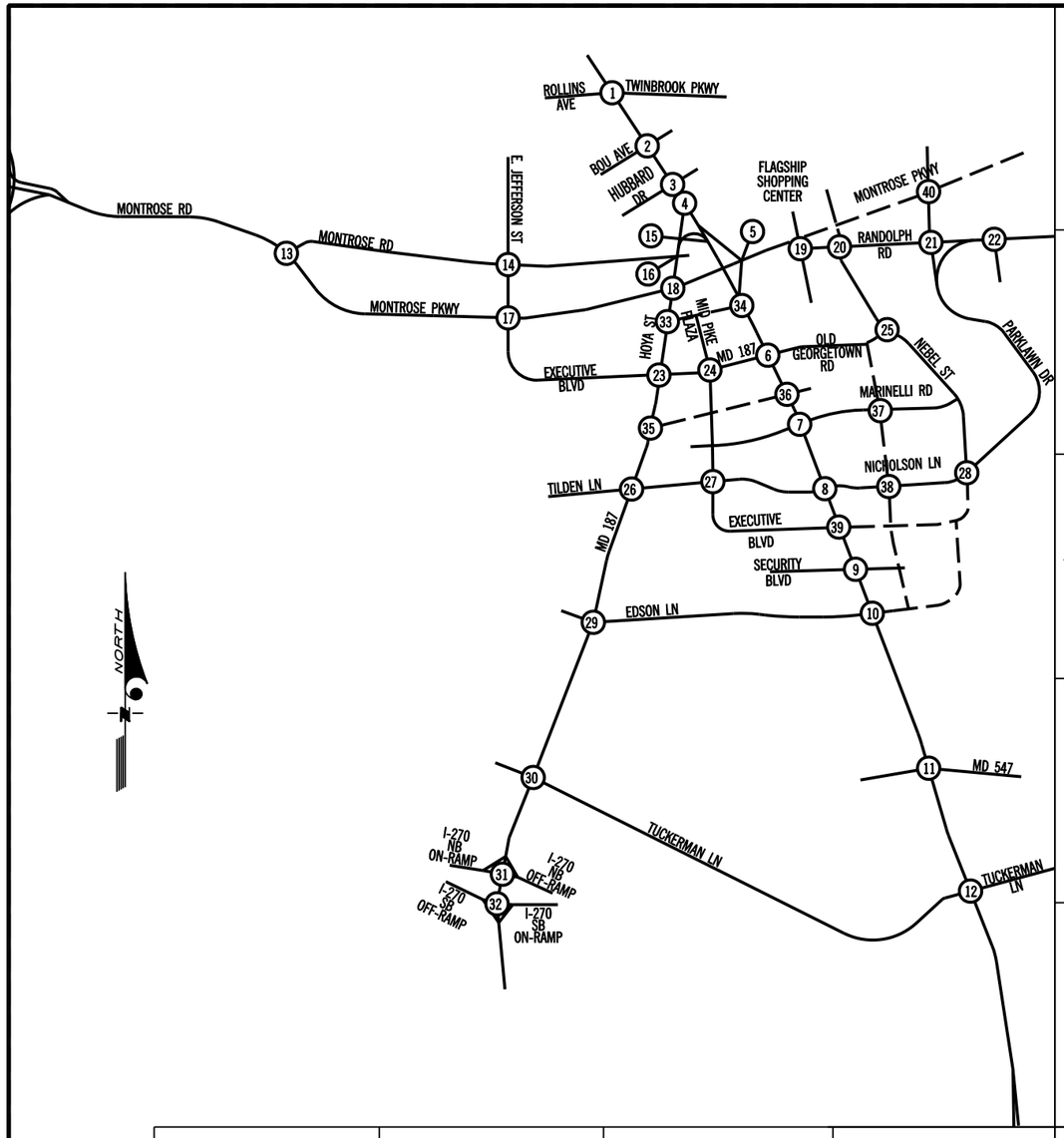
- **Construction of Main Street/Market Street** – a new 2 lane roadway will be constructed between MD 187 and MD 355. It will run parallel to the newly realigned east-west section of MD 187 to the south. It is assumed for the purposes of this study that the intersection of Main/Market with MD 355 will be a full movement signalized intersection. However, the intersection of Main/Market with MD 187 is assumed to operate as a right-in/right-out intersection.

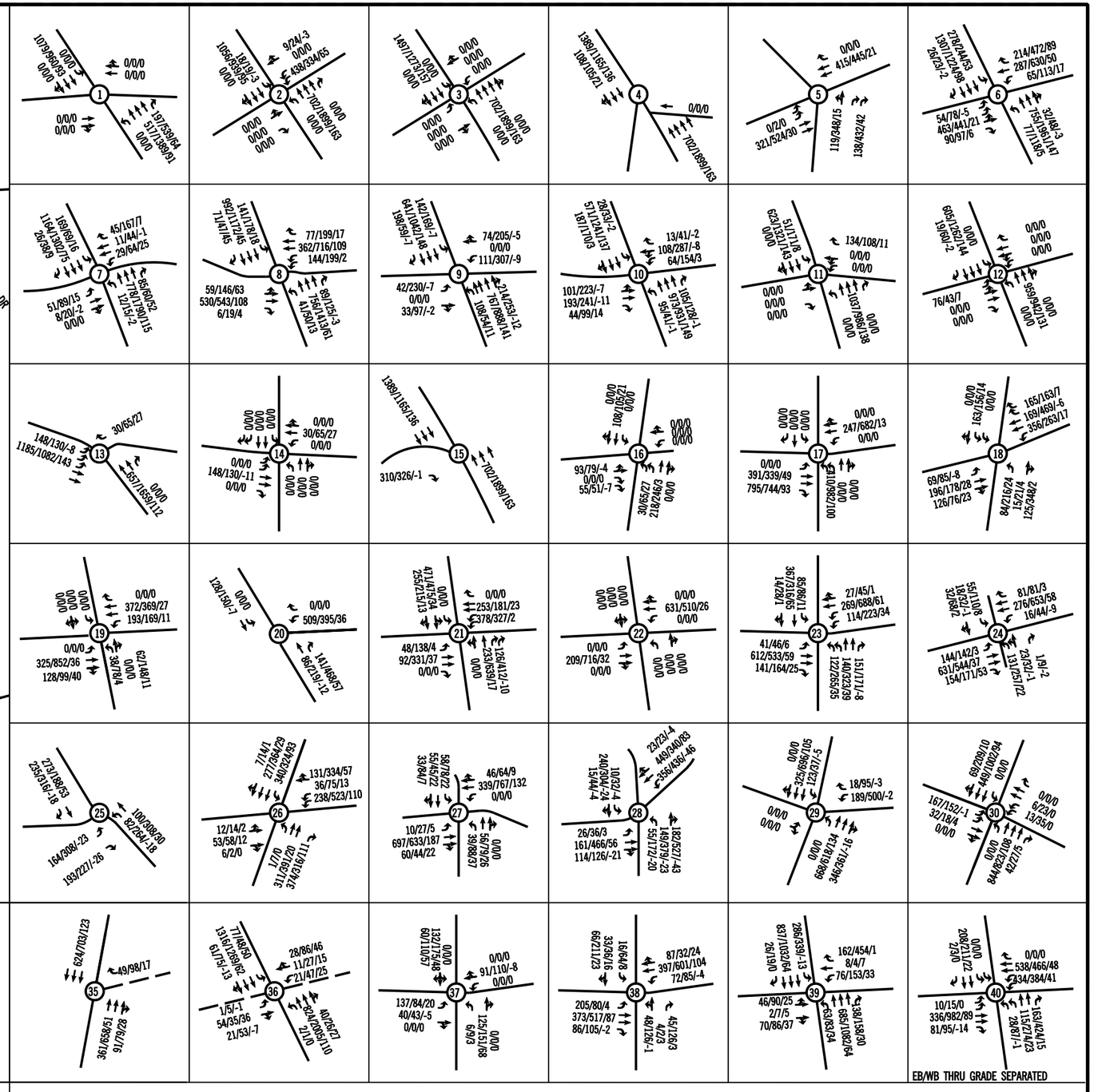
- **Various Local Level Streets** – Several local level streets will be constructed by developers as each property is redeveloped. More information from the sector plan on the potential road network is contained in **Appendix A**.

This scenario is not assumed to include the Nebel Street extension. However, the planned changes to the White Flint Mall access points are incorporated, including the addition of east-west through movements at Edson Lane.

4.3 2022 TRIP DISTRIBUTION AND TRAFFIC ASSIGNMENTS

The total White Flint Sector Plan area 2022 trip generation with the 34% NADMS as shown in **Table 5**, was assigned to the area roadway network as described above. The distribution for the future trips was based on the distribution as outlined by M-NCPPC in their analysis of the sector plan impact. The majority of the available transit options serve the north-south corridor; therefore, in the future with heavier transit use, the vehicular traffic would be more heavily weighted to the east and west. The distribution used for the future trips reflects this change. The assigned trips for the overall sector plan area trip generation are shown on **Figure 10**, with average distribution noted. The sector plan area trips were added to the 2022 Regional Through trips as shown on **Figure 7**, to produce the future traffic assignments for the 2022 scenario as shown on **Figure 11**.





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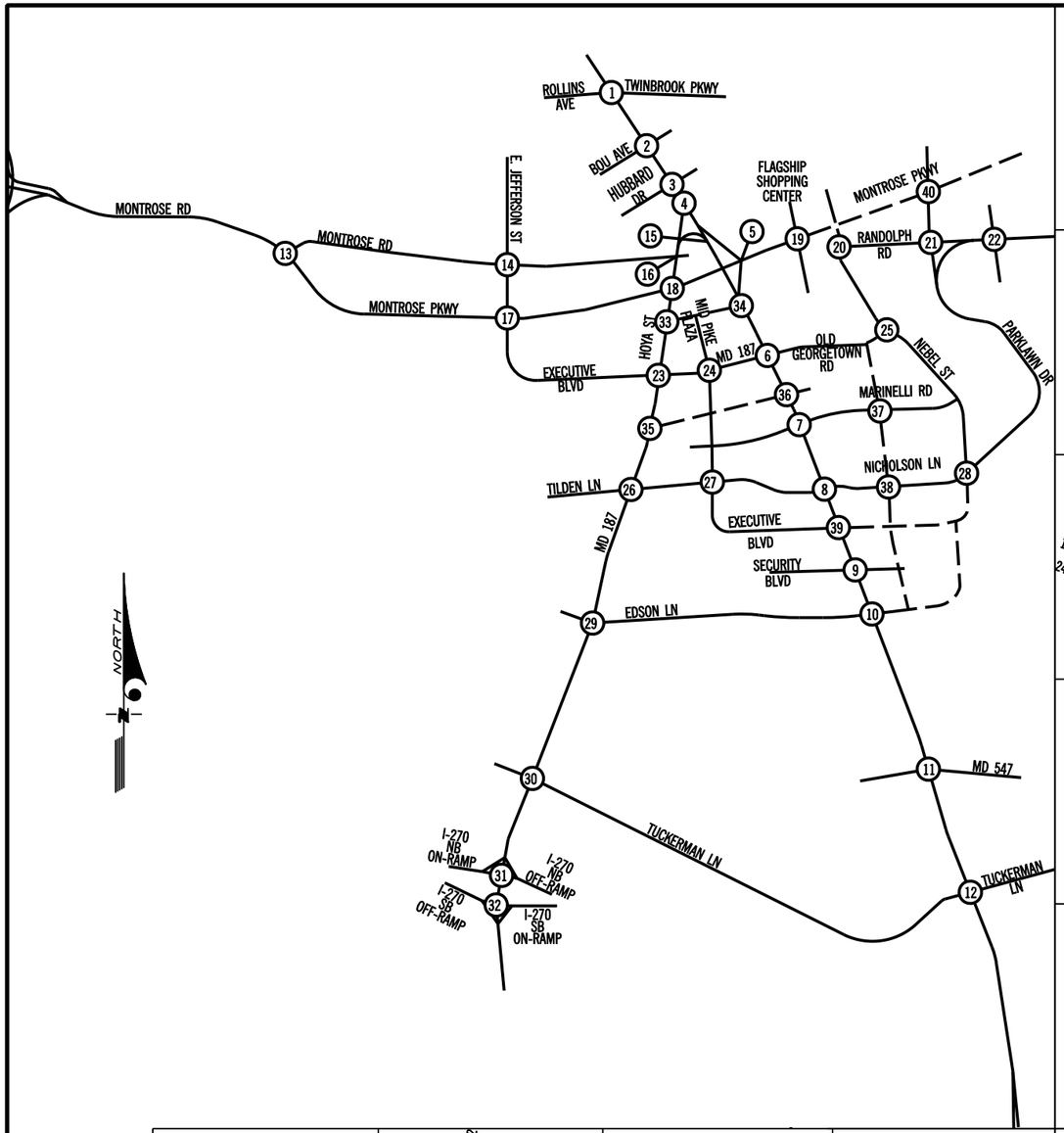
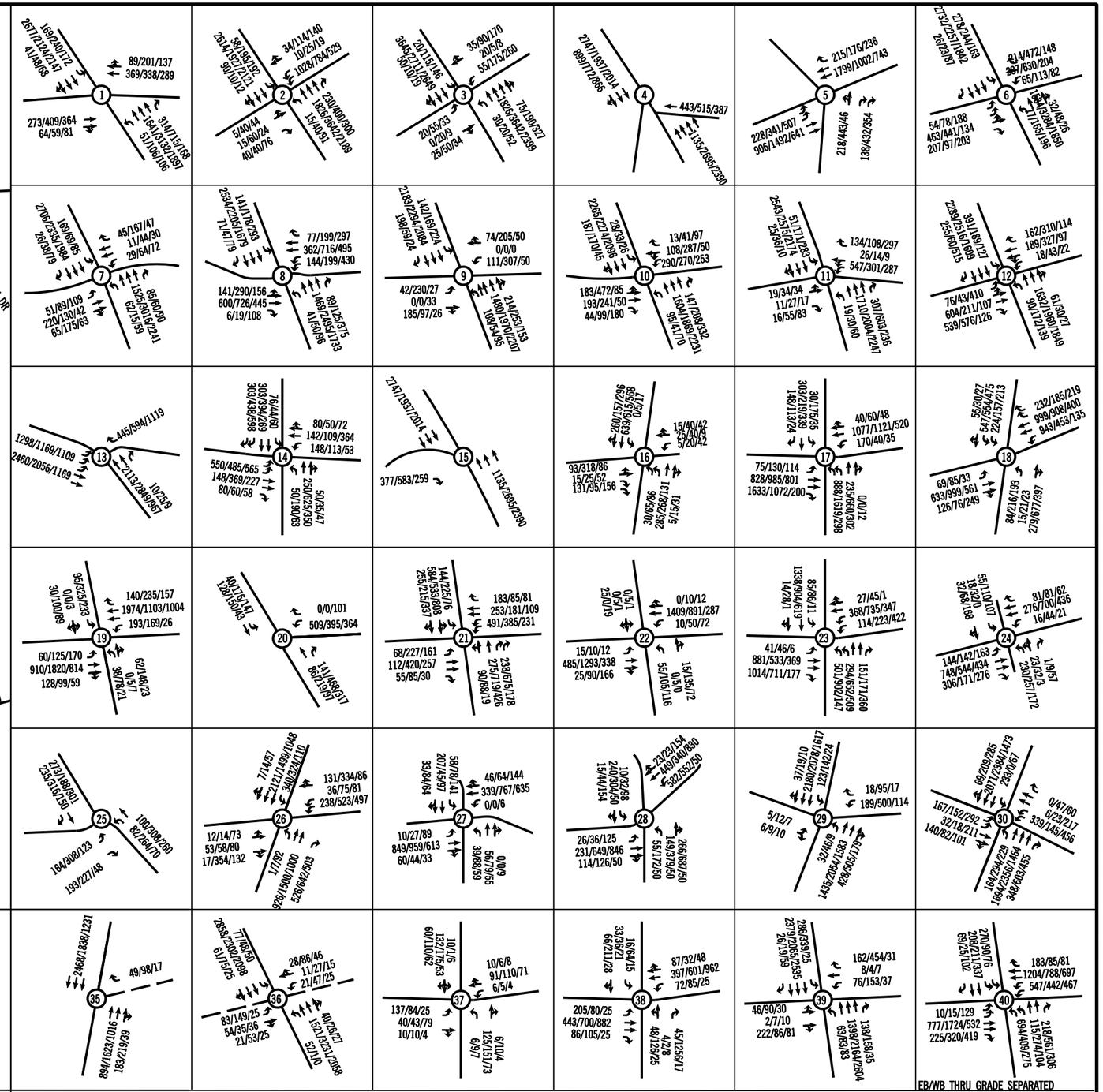
SECTOR PLAN AREA TRIP ASSIGNMENTS 2022

MONTGOMERY COUNTY, MARYLAND

FIGURE 10





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TOTAL TRAFFIC VOLUME FORECASTS 2022

MONTGOMERY COUNTY, MARYLAND

FIGURE 11

4.4 2022 TRAFFIC OPERATIONS

The 2022 traffic volumes shown in **Figure 11** were analyzed using CLV methodology. The CLV analysis worksheets are contained in **Appendix D** and are summarized in **Table 6**. The PM level of service results are also shown graphically in **Figure 12**. CLV results which exceed the policy are threshold by less than 10 percent are shown in orange. CLV results which exceed the policy area threshold by more than 10 percent are shown in red.

Ten of the study intersections are projected to operate above their policy area threshold during at least one (1) peak hour based on CLV analysis. Seven of those intersections would exceed their policy area thresholds by more than 10 percent.

The following intersections fail to meet the policy area standards based on the CLV analysis:

White Flint Policy Area

- MD 355 @ MD 187 – PM*
- MD 355 @ Nicholson Lane – PM*
- Hoya Street @ Montrose Parkway – AM*, PM*
- MD 187 @ Nicholson Ln/Tilden Ln – PM
- Nicholson Ln @ Nebel Street – PM*

North Bethesda Policy Area

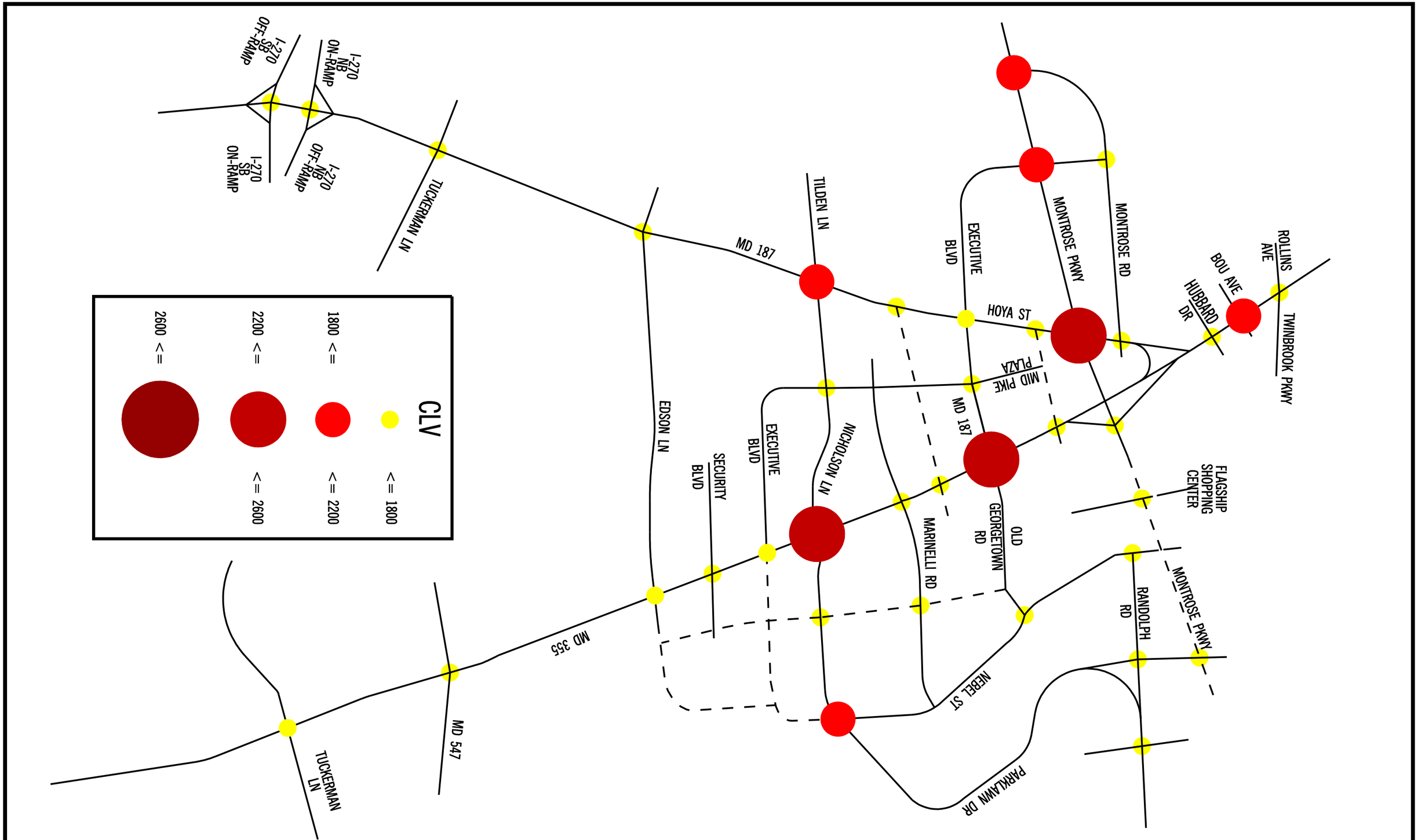
- MD 355 @ Twinbrook Parkway – PM
- MD 355 @ Bou Avenue – AM, PM*
- Montrose Road @ Montrose Parkway – AM, PM*
- E. Jefferson Street @ Montrose Parkway – PM*
- MD 187 @ Poindexter Ln/Edson Ln - PM

* Indicates CLV's that exceed their respective standards by more than 10%

This analysis accounts for only the development planned to occur inside the sector plan area. The growth rates applied to MD 355, MD 187 and Montrose Parkway will account for a portion of regional growth, but it is possible that the intersections outside of the sector plan area will reach higher levels of congestion due to other pending development in the surrounding area.

Table 6: 2022 CLV Analysis Results

	Intersection	AM	PM	SAT
	White Flint Policy Area - 1800 CLV			
5	Montrose Parkway @ MD 355 Ramps	1,308	1,234	886
6	MD 187 @ MD 355	1,566	**2,299**	1,201
7	MD 355 @ Marinelli Rd	1,243	1,424	1,049
8	MD 355 @ Nicholson Ln	1,458	**2,236**	1,511
9	MD 355 @ Security Blvd	1,212	1,338	1,041
10	MD 355@ Edson Lane	1,440	1,751	1,154
16	Hoya Street @ Montrose Road	642	871	699
18	Hoya Street @ Montrose Pkwy	**2,241**	**2,305**	1,486
19	Randolph Road @ Chapman Ave/Maple Ave	1,225	1,534	918
20	Randolph Road @ Nebel St	637	790	608
23	MD 187 @ Executive Blvd./Hoya St	1,799	1,494	866
24	MD 187 @ Mid Pike/New Executive	619	796	667
25	MD 187 @ Nebel St	548	760	494
26	MD 187 @ Nicholson Ln/Tilden Ln	1,041	1,875	1,089
27	Nicholson Ln @ Executive Blvd.	648	677	677
28	Nicholson Ln @ Nebel St	1,190	**2,061**	901
33	Hoya St @ Mid Pike East-West	951	878	534
34	MD 355 @ Mid Pike East-West	1,315	1,612	944
35	MD 187 @ Main St/Market St	9,62	780	472
36	MD 355 @ Main Street/Market St	1,254	1,515	907
37	Marinelli Rd @ Citadel Ave	446	495	232
38	Nicholson Ln @ Citadel Ave	609	829	634
39	MD 355 @ Executive Extended	1,241	1,684	1,105
	Grosvenor Policy Area 1800 CLV			
11	MD 355 @ MD 547	1,343	1,246	1,343
12	MD 355 @ Tuckerman Ln	1,566	1,680	1,118
	North Bethesda Policy Area 1550 CLV			
1	MD 355 @ Twinbrook Parkway	1,300	1,685	1,162
2	MD 355 @ Bou Avenue	1,658	**2,113**	1,387
3	MD 355 @ Hubbard Shopping Center	1,477	1,510	1,342
13	Montrose Road @ Montrose Parkway	1,639	**1,978**	957
14	E. Jefferson Street @ Montrose Road	683	774	840
17	E. Jefferson Street @ Montrose Parkway	1,503	**1,946**	978
21	Randolph Road @ Parklawn Ave	840	1,147	1,062
22	Randolph Road @ Lauderdale Drive	842	928	476
29	MD 187 @ Poindexter Ln/Edson Lane	1,052	1,610	807
30	MD 187 @ Tuckerman Ln	1,197	1,391	1,318
31	MD 187 @ I 270 NB Ramps	1,299	1,403	874
32	MD 187 @ I 270 SB Ramps	1,165	1,404	847
40	Montrose Parkway @ Parklawn Drive	854	697	878



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2022 PM LOS RESULTS

MONTGOMERY COUNTY, MARYLAND

FIGURE 12

5.0 2042 Full Build Out Conditions

5.1 2042 FULL BUILDOUT TRIP GENERATION

As outlined under 2022 conditions, the sector plan area is divided into 20 blocks, as shown on the map in **Figure 9**. The future development, by block and by use, was examined utilizing information provided by the White Flint Partnership/STV Inc. and approved by MNCPPC. These quantities include the pipeline developments already approved, the developments which are currently underway or have submitted sketch plans, future development that is anticipated by the property owners to occur under the sector plan under full build out, and existing development to remain.

The trips generated by this proposed development were calculated using ITE trip generation rates as previously discussed. The rates and equations used for the 2042 conditions are the same as discussed under 2022 conditions and were shown in **Table 4.**

The rates and equations were applied to the development quantities approved by MNCPPC to produce the total future trip generation for the entire sector plan area. The full-build out NADMS of 50 percent for commercial development and 51 percent for residential development was then applied to all peak hour trips. The remaining auto driver trips to be assigned to the roadway network are shown in the three right-hand columns of **Table 7**.

Table 7: 2042 Block by Block Trip Generation

Block	Land Use	MNCPPC Approved Development - 2042 Future	Future Trips			Future Trips with NADMS		
			AM Trips	PM Trips	SAT Trips	AM Trips	PM Trips	SAT Trips
1	Retail	33,500	123	240	326	60	118	160
	Residential	425	152	160	156	76	80	78
	County Rec Center	44,000	55	76	185	27	37	91
2	Office	987,514	1,172	1,185	263	574	581	129
	Retail	466,315	1,213	2,424	3,365	594	1,188	1,649
	Residential	1,227	385	433	397	192	216	198
	Hotel/Conference Center	230,885	134	143	164	66	70	80
3	Office	281,822	430	394	95	211	193	47
	Retail	140,000	413	820	1,132	202	402	555
	Residential	1,074	340	381	351	170	190	176
	Specialty Retail	1,200	3	43	5	2	21	2
4	Retail	35,000	127	249	339	62	122	166
	Residential	1,139	359	403	371	180	201	185
5	Office	291,500	441	405	98	216	199	48

Table 7: 2042 Block by Block Trip Generation

Block	Land Use	MNCPPC Approved Development - 2042 Future	Future Trips			Future Trips with NADMS		
			AM Trips	PM Trips	SAT Trips	AM Trips	PM Trips	SAT Trips
	Retail	78,474	250	494	680	123	242	333
	Residential	339	127	131	131	64	65	65
6	Retail	223,600	625	1,244	1,723	306	610	844
	Residential	397	144	150	148	72	75	74
7	Office	622,400	810	776	181	397	380	89
	Retail	49,965	171	336	459	84	164	225
	Residential	165	77	72	78	38	36	39
	Hotel	180,860	105	112	129	51	55	63
8	Office	157,271	269	255	59	132	125	29
	Retail	41,400	146	286	391	72	140	191
	Residential	441	157	165	161	78	83	81
9	Office	172,043	290	271	64	142	133	31
	Retail	80,571	256	505	695	125	248	341
	Residential	183	82	78	84	41	39	42
10	Office	744,452	935	913	209	458	447	103
	Residential	180	81	77	83	41	38	41
11	Office	100,000	188	191	41	92	93	20
12	Retail	103,883	318	631	869	156	309	426
	Residential	577	196	212	202	98	106	101
13	Industrial	36,904	48	71	13	23	35	6
14	Office	1,469,078	1,610	1,724	363	789	845	178
	Retail	196,458	557	1,108	1,533	273	543	751
	Residential	2,098	637	729	658	319	364	329
	Hotel	220,000	128	136	156	63	67	76
15	Residential	891	287	318	296	144	159	148
16	Office	308,000	461	424	102	226	208	50
	Retail	117,356	354	702	968	173	344	474
	Residential	546	187	201	193	94	101	96
	Industrial	33,127	44	68	12	22	33	6
17	Office	890,000	1,078	1,076	242	528	527	119
	Retail	365,200	971	1,939	2,690	476	950	1,318
	Residential	1,604	494	561	510	247	280	255
	Hotel	300,000	174	186	211	85	91	104
18	Office	1,021,800	1,204	1,223	271	590	599	133
	Retail	1,149,000	2,795	5,585	7,773	1,369	2,736	3,809
	Residential	2,205	668	765	690	334	383	345

Table 7: 2042 Block by Block Trip Generation

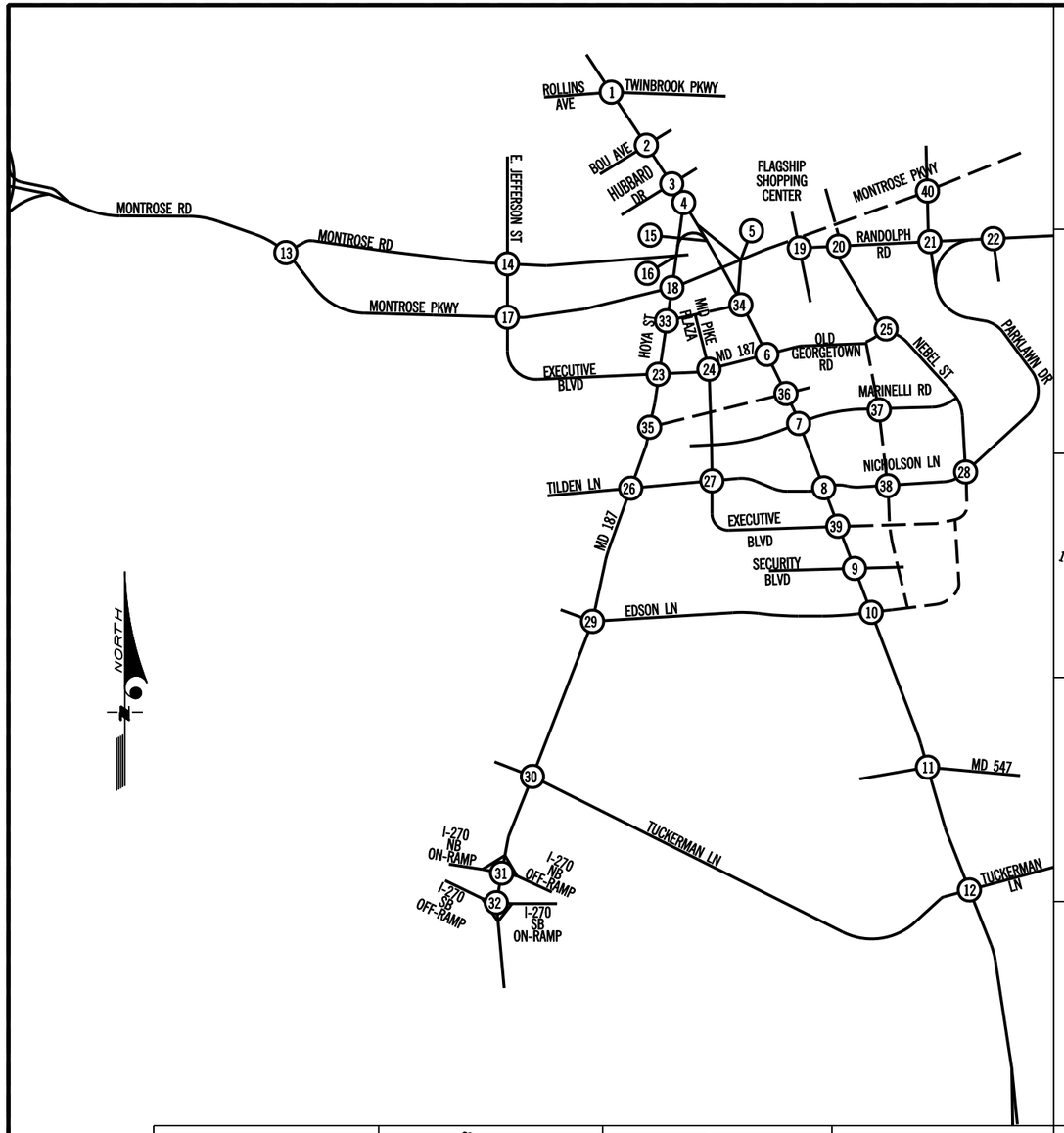
Block	Land Use	MNCPPC Approved Development - 2042 Future	Future Trips			Future Trips with NADMS		
			AM Trips	PM Trips	SAT Trips	AM Trips	PM Trips	SAT Trips
	Hotel	275,000	160	171	194	78	84	95
19	Office	907,886	1,095	1,096	246	537	537	121
	Retail	65,412	214	422	580	105	207	284
	Residential	65	48	38	48	24	19	24
20	Retail	225,000	628	1,251	1,733	308	613	849
	Residential	785	257	282	264	128	141	132
	Industrial	333,124	260	299	117	128	146	57
Office Subtotal		7,953,766	9,983	9,933	2,236	4,892	4,867	1,097
Retail Subtotal		3,371,134	9,161	18,235	25,256	4,488	8,936	12,375
Hotel Subtotal		1,206,745	700	748	854	343	367	418
Industrial Subtotal		448,355	411	556	331	202	272	162
Total Commercial		**12,980,000**	**20,254**	**29,472**	**28,677**	**9,925**	**14,442**	**14,052**
Total Residential		**14,341**	**4,678**	**5,154**	**4,822**	**2,340**	**2,576**	**2,409**
Total Peak Hour Trips			**24,932**	**34,626**	**33,499**	**12,265**	**17,018**	**16,461**

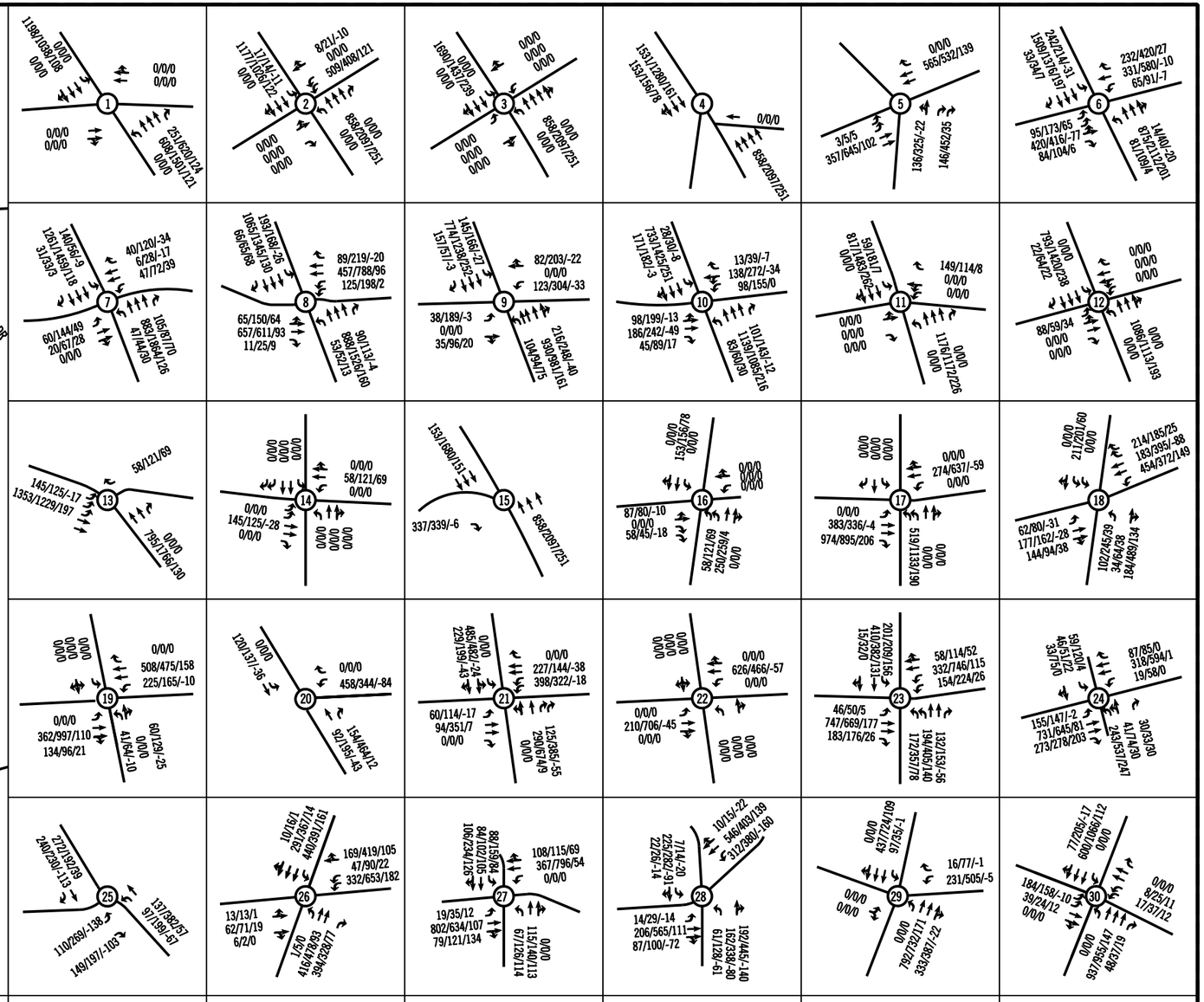
5.2 2042 FULL BUILDOUT ROADWAY NETWORK

The 2042 full build out roadway network assumes all planned road improvements, as outlined in **Section 3.1 Planned Road Improvements**, would be in place. The model also assumes that all private business-level streets interior to the development blocks will be complete. Generally, study intersections were assumed full-movement, with the exception of Old Georgetown Road at Main/Market Street. For the purposes of this long range study, signalization was generally assumed; however, additional analysis would need to be performed for all future signals to determine if they are warranted.

5.3 2042 TRIP DISTRIBUTION AND TRAFFIC ASSIGNMENTS

The total future trips for 2042 were then assigned to the roadway network as described above. The distribution for the future trips was based on the distribution outlined by M-NCPPC in their original analysis of the sector plan traffic impact. The majority of the available transit options serve the north-south corridor; therefore, in the future with heavier transit use, the vehicular traffic would be more heavily weighted to the east and west. The distribution used for the future trips reflects this change. The assigned trips for the overall sector plan area trip generation are shown on **Figure 13**, with average distribution noted. The assigned future sector plan area trips as shown in **Figure 13** were then added to the background through trips plus growth shown in **Figure 8**, resulting in the 2042 Total Future Trips as shown in **Figure 14**.





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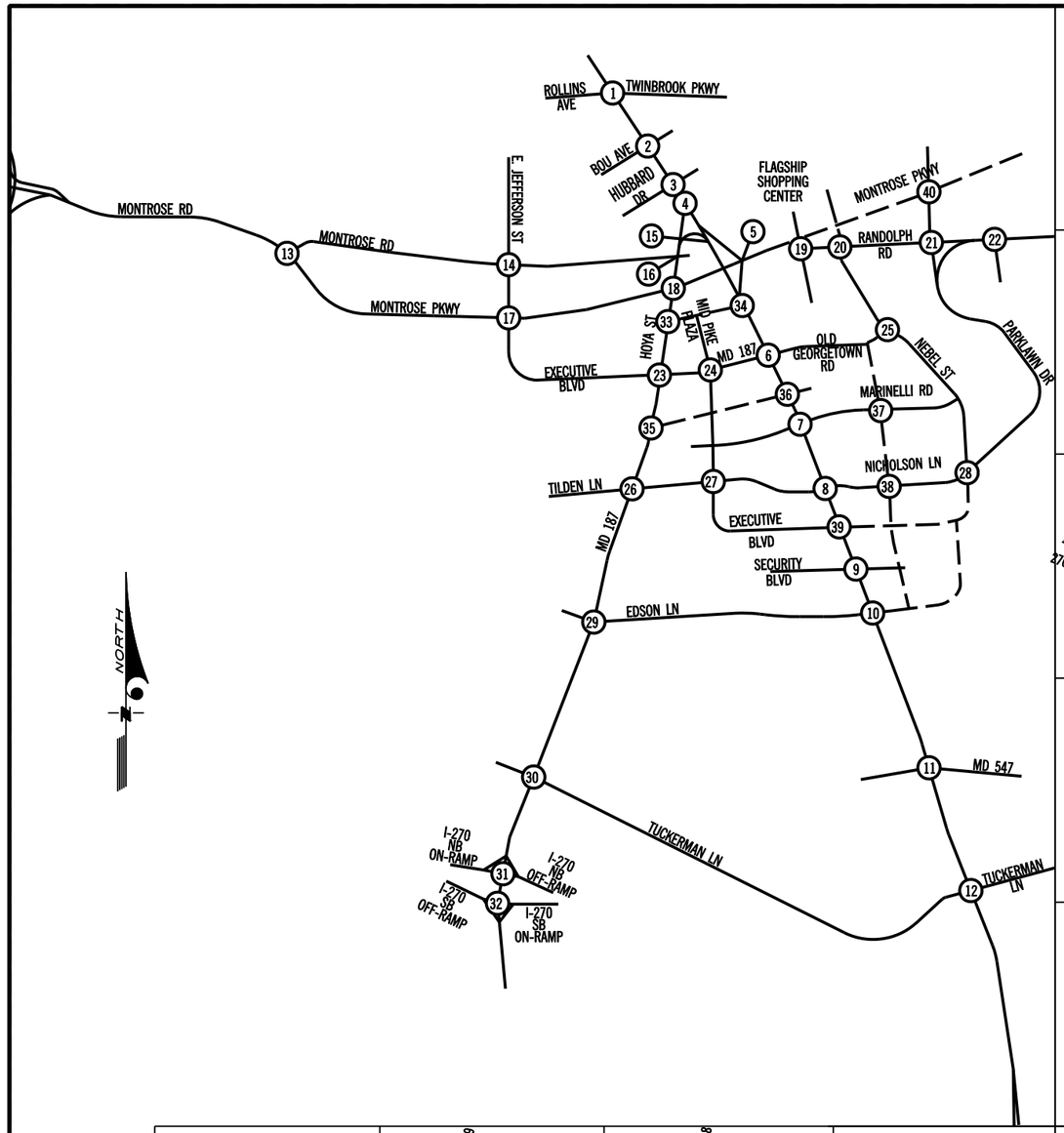
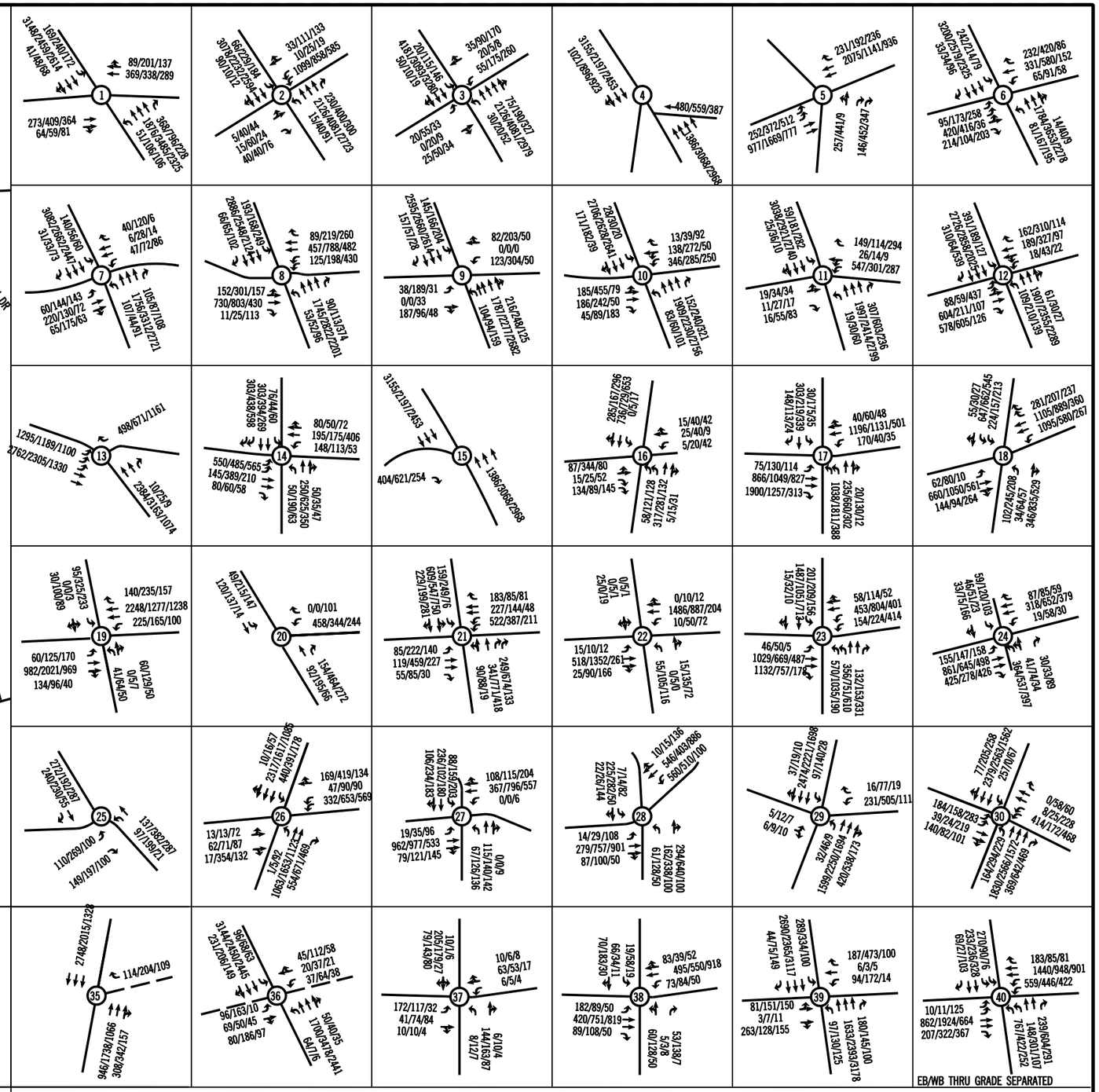
SECTOR PLAN AREA TRIP ASSIGNMENTS 2042 FULL BUILD OUT

MONTGOMERY COUNTY, MARYLAND

FIGURE 13





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TOTAL TRAFFIC VOLUME FORECASTS 2042 FULL BUILD OUT

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FIGURE 14

5.4 2042 TRAFFIC OPERATIONS

The 2042 traffic volumes shown in **Figure 14** were analyzed using CLV methodology. The CLV analysis worksheets are contained in **Appendix E** and are summarized in **Table 8**. The PM CLV level of service results are also shown graphically on **Figure 15**. CLV results which exceed the policy area threshold by less than 10 percent are shown in orange. CLV results which exceed the policy area threshold by more than 10 percent are shown in red and bold.

Fifteen of the study intersections are projected to operate above their policy area threshold during at least one (1) peak hour based on CLV analysis. Nine of those intersections would exceed their respective thresholds by more than 10 percent.

The following intersections fail to meet the policy area standards based on the CLV analysis:

White Flint Policy Area

- MD 355 @ MD 187 – PM*
- MD 355 @ Nicholson Lane – PM*
- MD 355 @ Edson Lane – PM
- Hoya Street @ Montrose Parkway – AM*, PM* & Saturday
- MD 187 @ Executive Blvd./Hoya St – AM*
- MD 187 @ Nicholson Ln/Tilden Ln – PM*
- Nicholson Ln @ Nebel Street – PM
- MD 355 @ Excecutive Blvd Extended - PM

Grosvenor Policy Area

- MD 355 @ Tuckerman Lane– PM

North Bethesda Policy Area

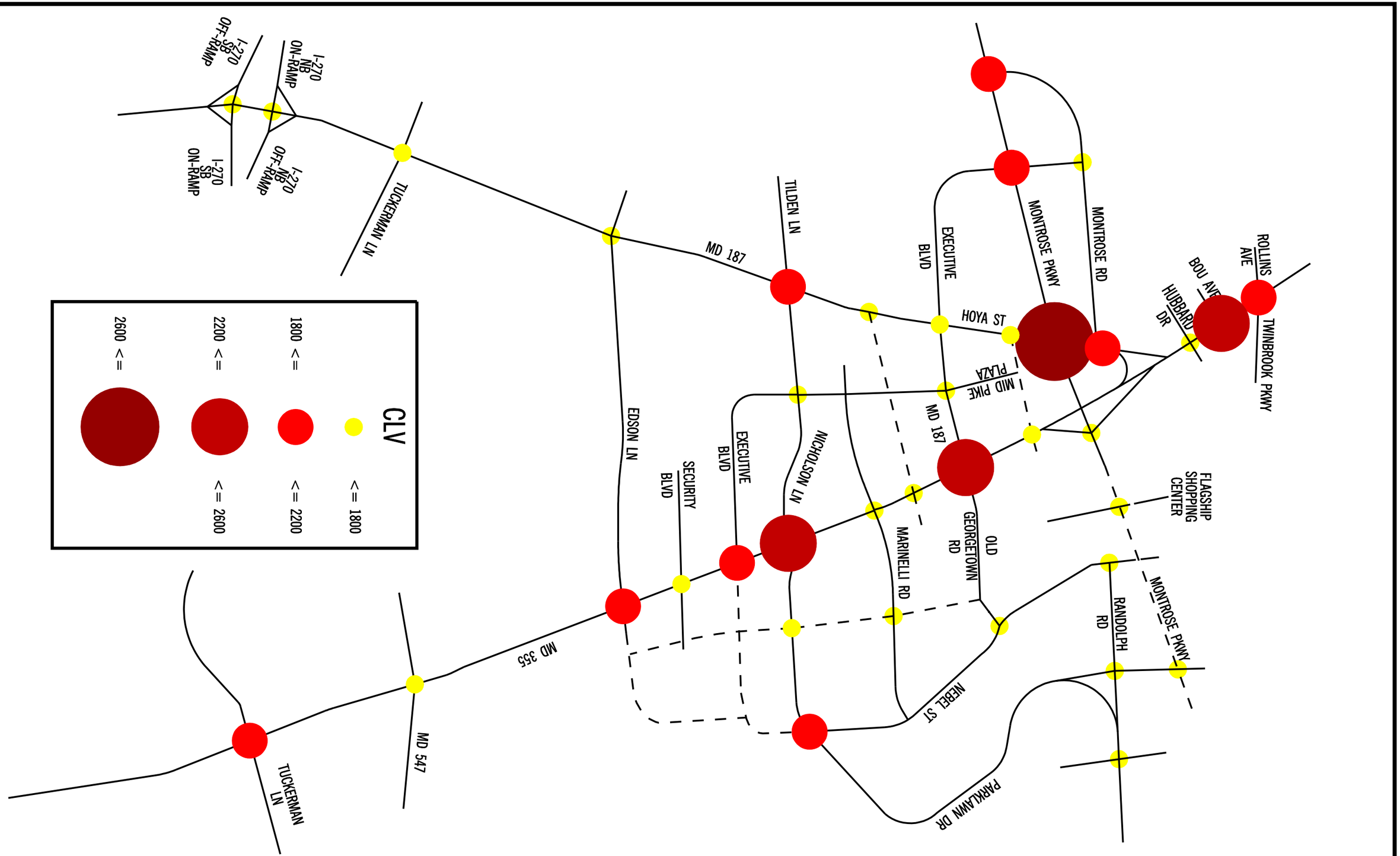
- MD 355 @ Twinbrook Parkway – PM*
- MD 355 @ Bou Avenue – AM*, PM* & Saturday
- MD 355 @ Hubbard Shopping Center – AM, PM & Saturday
- Montrose Road @ Montrose Parkway – AM*, PM*
- E. Jefferson Street @ Montrose Parkway – AM, PM*
- MD 187 @ Poindexter Lane/Edson Lane – PM

* Indicates CLV's that exceed their respective standards by more than 10%

This analysis accounts for only the development to occur inside the sector plan area. The growth rates applied to MD 355, MD 187 and Montrose Parkway will account for a portion of regional growth, but it is possible that the intersections outside of the sector plan area will reach higher levels of congestion due to other pending development in the surrounding area.

Table 8: 2042 Full Build Out CLV Analysis

	Intersection	AM	PM	SAT
	White Flint Policy Area - 1800 CLV			
5	Montrose Parkway @ MD 355 Ramps	1,508	1,326	987
6	MD 187 @ MD 355	1,787	**2,378**	1,316
7	MD 355 @ Marinelli Rd	1,445	1,528	1,225
8	MD 355 @ Nicholson Ln	1,663	**2,435**	1,632
9	MD 355 @ Security Blvd	1,374	1,478	1,257
10	MD 355@ Edson Lane	1,634	1,889	1,355
16	Hoya Street @ Montrose Road	718	997	763
18	Hoya Street @ Montrose Pkwy	**2,603**	**2,777**	1,862
19	Randolph Road @ Chapman Ave/Maple Ave	1,368	1,616	1,071
20	Randolph Road @ Nebel St	599	754	457
23	MD 187 @ Executive Blvd./Hoya St	**2,064**	1,732	1,003
24	MD 187 @ Mid Pike/New Executive	797	986	807
25	MD 187 @ Nebel St	518	660	408
26	MD 187 @ Nicholson Ln/Tilden Ln	1,268	**2,126**	1,268
27	Nicholson Ln @ Executive Blvd.	800	907	827
28	Nicholson Ln @ Nebel St	1,217	1,956	932
33	Hoya St @ Mid Pike East-West	1,118	1,078	710
34	MD 355 @ Mid Pike East-West	1,502	1,729	1,168
35	MD 187 @ Main St/Market St	1,131	974	600
36	MD 355 @ Main Street/Market St	1,499	1,682	1,159
37	Marinelli Rd @ Citadel Ave	547	511	212
38	Nicholson Ln @ Citadel Ave	684	827	655
39	MD 355 @ Executive Extended	1,449	1,843	1,459
	Grosvenor Policy Area 1800 CLV			
11	MD 355 @ MD 547	1,526	1,374	1,547
12	MD 355 @ Tuckerman Ln	1,688	1,839	1,297
	North Bethesda Policy Area 1550 CLV			
1	MD 355 @ Twinbrook Parkway	1,474	**1,815**	1,334
2	MD 355 @ Bou Avenue	**1,875**	**2,354**	1,611
3	MD 355 @ Hubbard Shopping Center	1,675	1,641	1,576
13	Montrose Road @ Montrose Parkway	**1,782**	**2,152**	1,009
14	E. Jefferson Street @ Montrose Road	711	809	862
17	E. Jefferson Street @ Montrose Parkway	1,656	**2,067**	1,045
21	Randolph Road @ Parklawn Ave	877	1,148	943
22	Randolph Road @ Lauderdale Drive	883	959	435
29	MD 187 @ Poindexter Ln/Edson Lane	1,203	1,698	847
30	MD 187 @ Tuckerman Ln	1,461	1,503	1,353
31	MD 187 @ I 270 NB Ramps	1,299	1,348	874
32	MD 187 @ I 270 SB Ramps	1,230	1,454	905
40	Montrose Parkway @ Parklawn Drive	918	727	794



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2042 PM LOS RESULTS

MONTGOMERY COUNTY, MARYLAND

FIGURE 15

5.4.1 2042 No Growth Scenario Test

In order to ascertain the impact of the regional growth applied in this analysis, the intersections identified above as exceeding the White Flint Policy Area threshold by more than 10 percent were also analyzed without growth. The trip generation and assignments as previously described were otherwise maintained. The resulting 2042 No-Growth volumes are shown in **Figure 16**. These volumes were analyzed using CLV methodology and the results are shown in **Table 9**. Though the CLV levels are reduced, all five intersections would continue operate more than 10 percent beyond the White Flint threshold, in the no-growth scenario. This indicates that the applied regional growth is not the driving factor in the projections for intersections within the White Flint Sector Plan area exceeding the CLV threshold.

Table 9: 2042 No Growth Selected Intersection CLV Analysis

	Intersection	AM	PM
6	MD 187 @ MD 355	1,646	**2,263**
8	MD 355 @ Nicholson Ln	1,610	**2,297**
18	Hoya Street @ Montrose Pkwy	**2,402**	**2,584**
23	MD 187 @ Executive Blvd./Hoya St	**1,833**	1,627
26	MD 187 @ Nicholson Ln/Tilden Ln	1,243	**2,075**

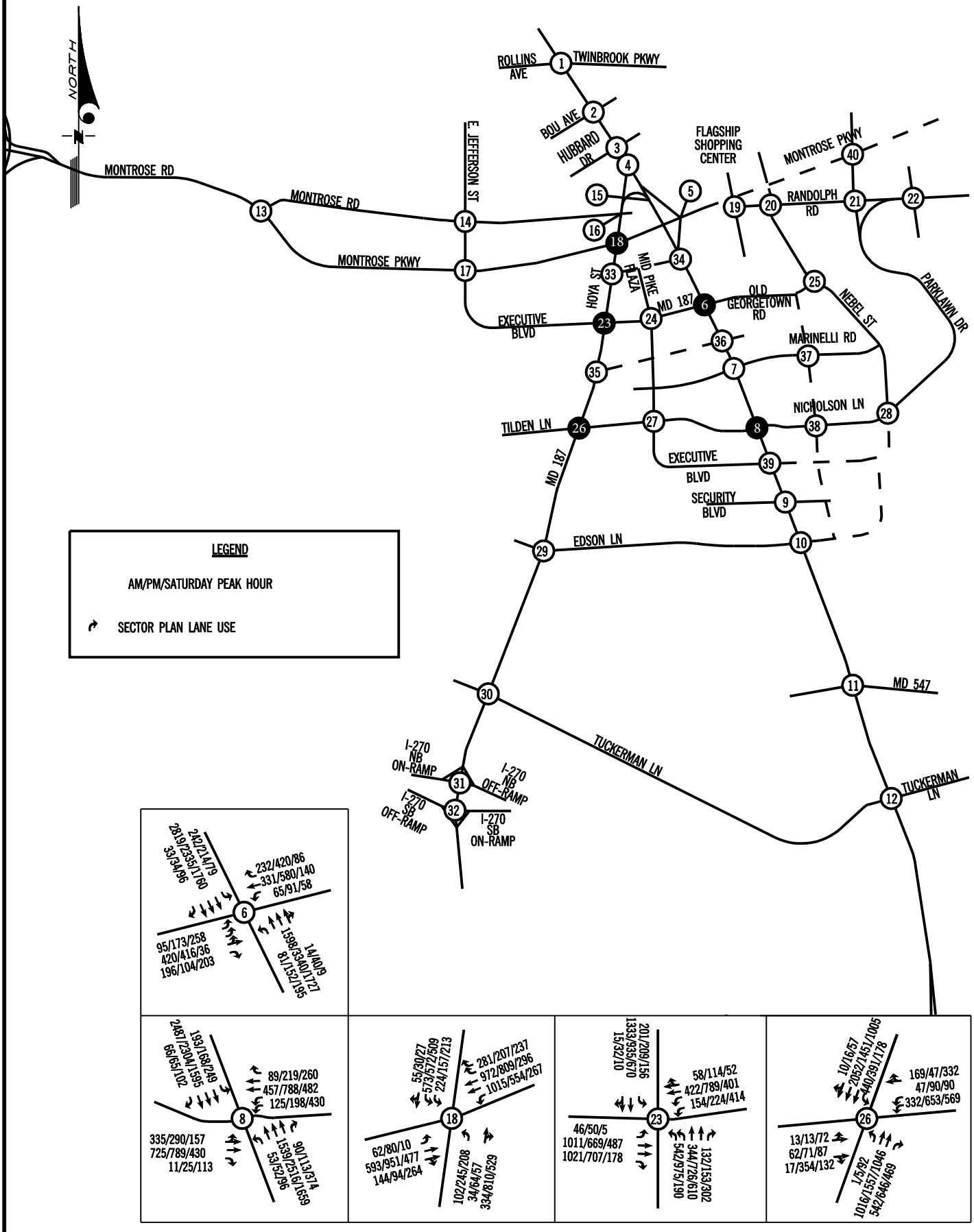

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FIGURE 16

2042 NO GROWTH TRAFFIC FORECAST VOLUMES

MONTGOMERY COUNTY, MARYLAND

6.0 Conclusion and Potential Mitigation

Based on the CLV analysis methodology, several intersections are projected to operate beyond the policy area threshold. Given the future transit-oriented, walkable nature of the White Flint Sector Plan area, and the long range of the forecasts in question, it has been suggested by Sabra Wang in a White Paper produced for MD SHA that a forecasted CLV within ten percent of the policy area threshold could be considered acceptable. Based on CLV methodology, nine total intersections are projected to operate more than 10 percent over the policy area standard in 2042. Five of these intersections are inside the White Flint Sector Plan area. Potential mitigation measures for these intersections have been identified. The resulting CLV analysis is summarized in **Table 10**, and the potential lane use changes are shown in **Figure 17**.

The remaining four study intersections outside of the White Flint Sector Plan area will be studied and addressed as part of the ongoing Montgomery County CIP project, based on MNCPPC CLATR review. Additionally, since these intersections are outside of the White Flint Sector plan area, they will also be included in traditional LATR studies performed for any nearby developments, resulting in ongoing analysis and potential mitigation.

CLV results which exceed the policy area threshold by less than 10 percent are shown in orange. CLV results which exceed the policy area threshold by more than 10 percent are shown in red. The intersection of MD 187 at MD 355 would require an additional northbound through lane on MD 355 in order to operate with an acceptable CLV. All other intersection mitigation measures include turn lanes or re-assignment of existing lanes. Additional right-of-way would be required for many of these suggested measures, which may or may not be feasible in the future as additional parcels redevelop. It is recommended that these key intersections in the policy area are monitored, and physical intersection improvements considered at such time that traffic counts indicate that the intersections are approaching high congestions levels, if feasible. Any expansions to planned right-of-way should carefully balance the goals of a transit oriented area with traffic congestion needs.

Table 10: 2042 CLV Analysis with Mitigation

	Intersection	AM	PM
	Potential Mitigation		
6	MD 187 @ MD 355 – No Mitigation	1,787	**2,378**
	with SB 2nd Left, WB 2nd Thru, EB LU Adj.	1,663	**2,021**
	with NB 4th Thru, SB 2nd Left, WB 2nd Thru	1,631	1,761
8	MD 355 @ Nicholson Ln – No Mitigation	1,663	**2,435**
	with Separate EB Left	1,583	1,931
18	Hoya Street @ Montrose Pkwy – No Mitigation	**2,603**	**2,777**
	with NB Right, WB 2nd Left, SB L to TL	1,557	1,810
23	MD 187 @ Executive Blvd./Hoya St – No Mitigation	**2,064**	1,732
	with EB double right or EB Free Right	1,775	1,732

Table 10: 2042 CLV Analysis with Mitigation

	Intersection	AM	PM
	Potential Mitigation		
26	MD 187 @ Nicholson Ln/Tilden Ln – No Mitigation	1,268	**2,126**
	with SB 2nd Left	1,127	1,969

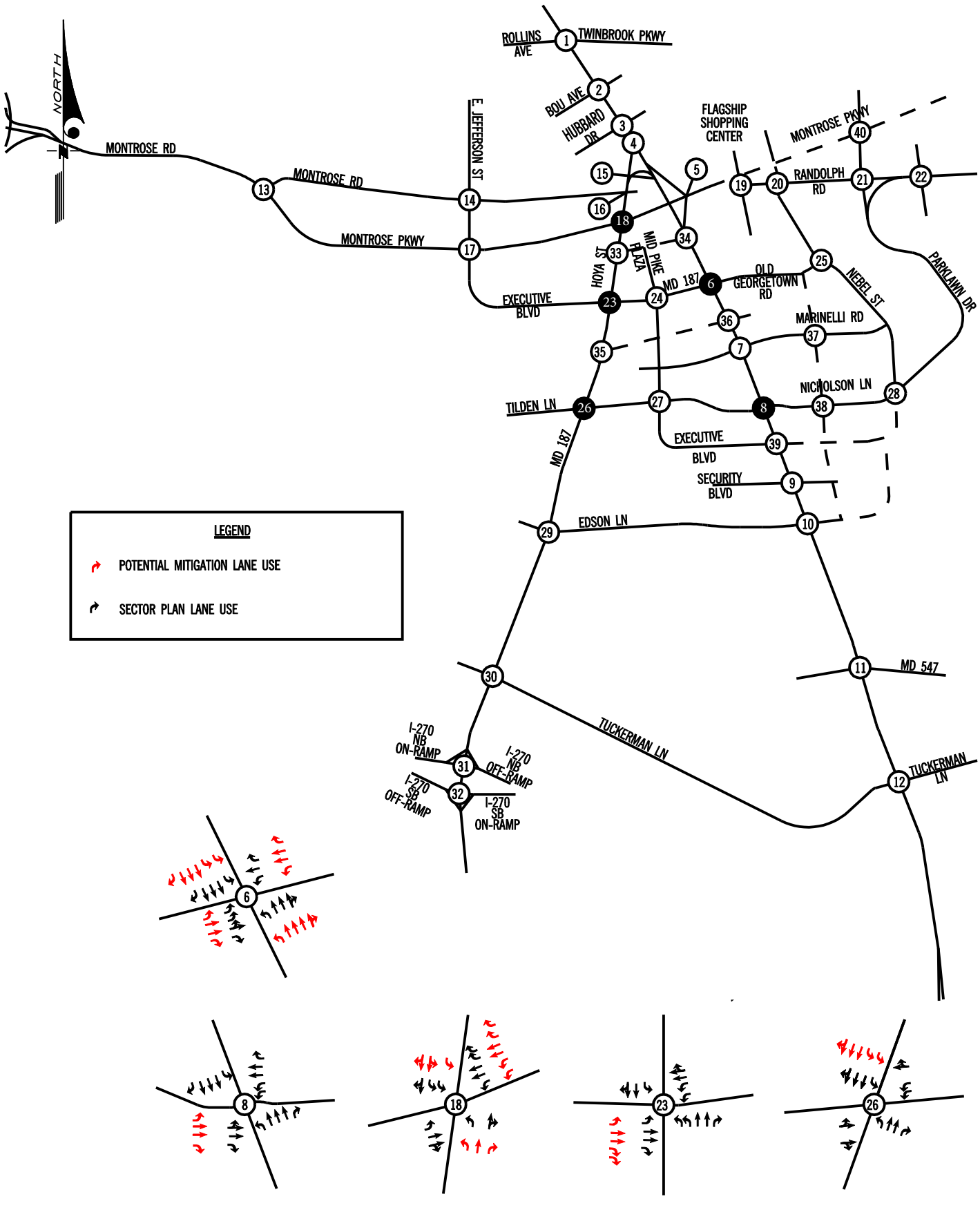

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FIGURE 17

POTENTIAL MITIGATION LANE USE

MONTGOMERY COUNTY, MARYLAND

2/28/2014