MCPB
Item No. 3
Date: 12-14-17

Mandatory Referral #MR2018006 - MD 355, Phase 2, Montrose Parkway

SA Steve Aldrich, Master Planner, Functional Planning and Policy Division, stephen.aldrich@montgomeryplanning.org, (301) 495-4528

Amy Lindsay, Planner Coordinator, Area 2 Planning Division, amy.lindsay@montgomeryplanning.org, (301) 495-2189

DA David Anspacher, Planner Coordinator, Functional Planning and Policy Division, david.anspacher@montgomeryplanning.org, (301) 495-2919

PD Pam Dunn, Chief, Functional Planning & Policy Division, pam.dunn@montgomeryplanning.org, (301) 650-4366

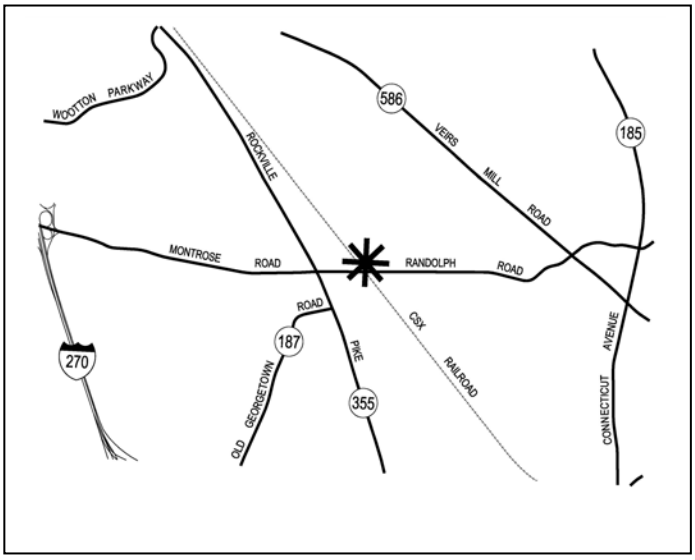
CS Carrie Sanders, Chief, Area 2 Planning Division, carrie.sanders@montgomeryplanning.org, (301) 495-4563

Completed: 12/06/17

Description

MD 355 Phase 2 Montrose Parkway is a Maryland State Highway Administration (SHA) Consolidated Transportation Program (CTP) project that is being funded by the Montgomery County Department of Transportation (MCDOT) to construct Montrose Parkway as a six-lane parkway between Rockville Pike (MD 355) and Parklawn Drive and as a four-lane parkway passing over Parklawn Drive to the project's eastern limits. The project includes a 10-foot wide shared-use path and 5-foot wide sidewalks.

This 0.62-mile long project is located within the White Flint II Sector Plan and North Bethesda/Garrett Park Master Plan areas.



Summary

This project would construct the segment of Montrose Parkway between its current terminus at the intersection with Maple Avenue/Chapman Avenue and Parklawn Drive. In order to make this new connection, Randolph Road will be closed between Maple Avenue/Chapman Avenue and 550 feet west of Nebel Street (approximately 225 feet). This project includes a bridge over Nebel Street and the CSX railroad tracks and includes a bridge and "single point urban" interchange at Parklawn Drive. Refer to the Project Exhibit in **Figure 1** for a location map with the project limits. This exhibit is also provided as **Attachment 1**.

Key project elements include the following:

- A six-lane divided parkway connecting the existing Montrose Parkway with Parklawn Drive,
- A four-lane divided parkway from the Parklawn Drive interchange to the eastern project limits, connecting to meet MCDOT's proposed four-lane divided Montrose Parkway East project (that project connects to Veirs Mill Road at Parkland Drive),
- A six-lane overpass bridge over Nebel Street and CSX tracks with a 10-foot wide sidepath,

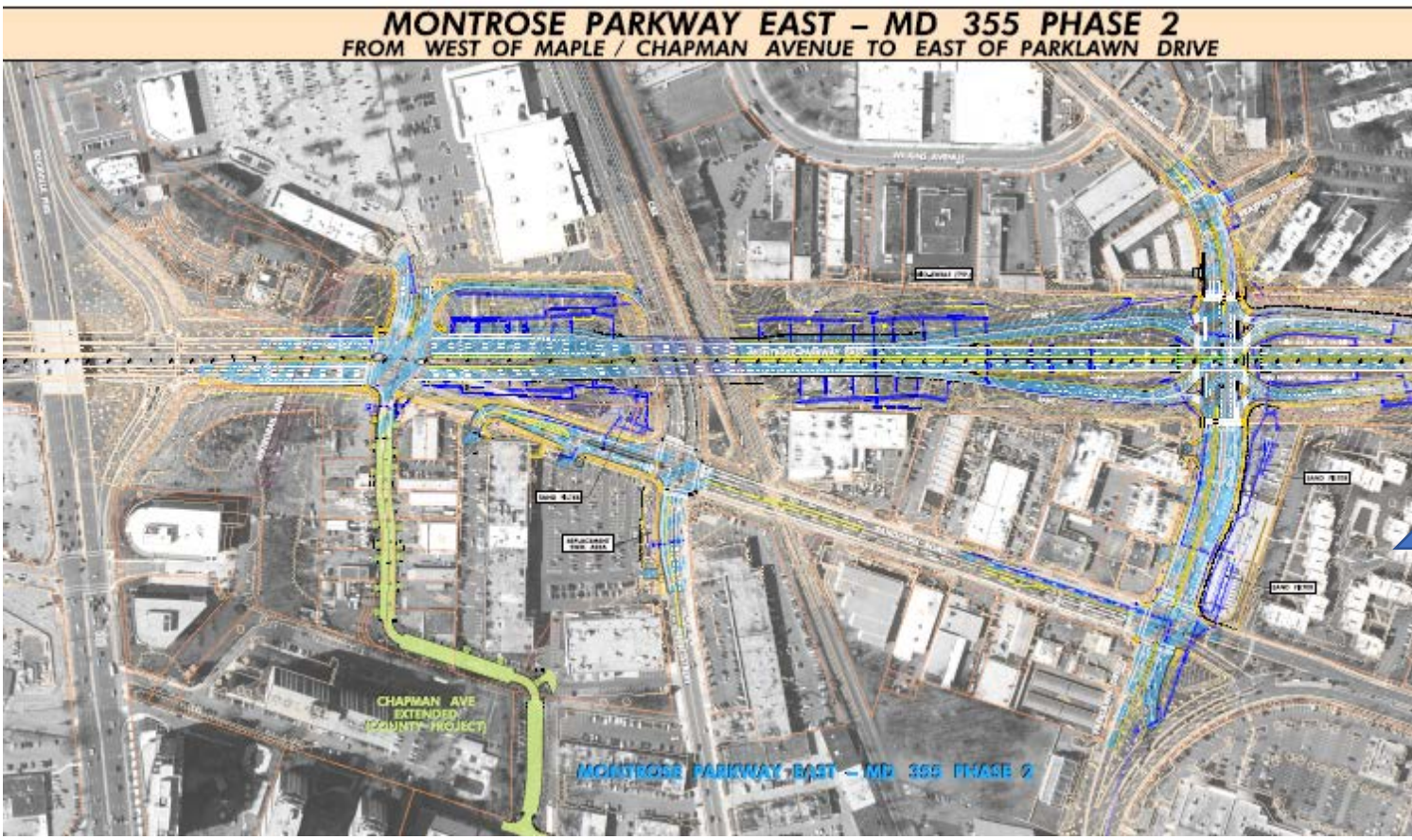


Figure 1 – MD 355 Phase 2 Montrose Parkway Project Limits/Location

- A four-lane overpass bridge over Parklawn Drive with an at-grade, single point interchange at Parklawn Drive,
- Termination of existing Randolph Road 550 feet west of Nebel Street with right-in/right-out access to the Montrose Shopping Center (5520 Randolph Road),
- No modification to the existing at-grade rail crossing of Randolph Road over the CSX Brunswick Line tracks,
- 10’ wide shared use path on the north side of Montrose Parkway along the project length with a signalized crossing at Parklawn Drive,
- Sidewalk connections along the south side of the project area using Randolph Road with connections back to Montrose Parkway at the Parklawn Drive interchange,

A vicinity map depicting the eventual connection and the surrounding zoning is shown in **Figure 2** below. Staff recommended comments follow this Summary. Report narrative in **bold** print represents key points and/or the basis for recommended comments.

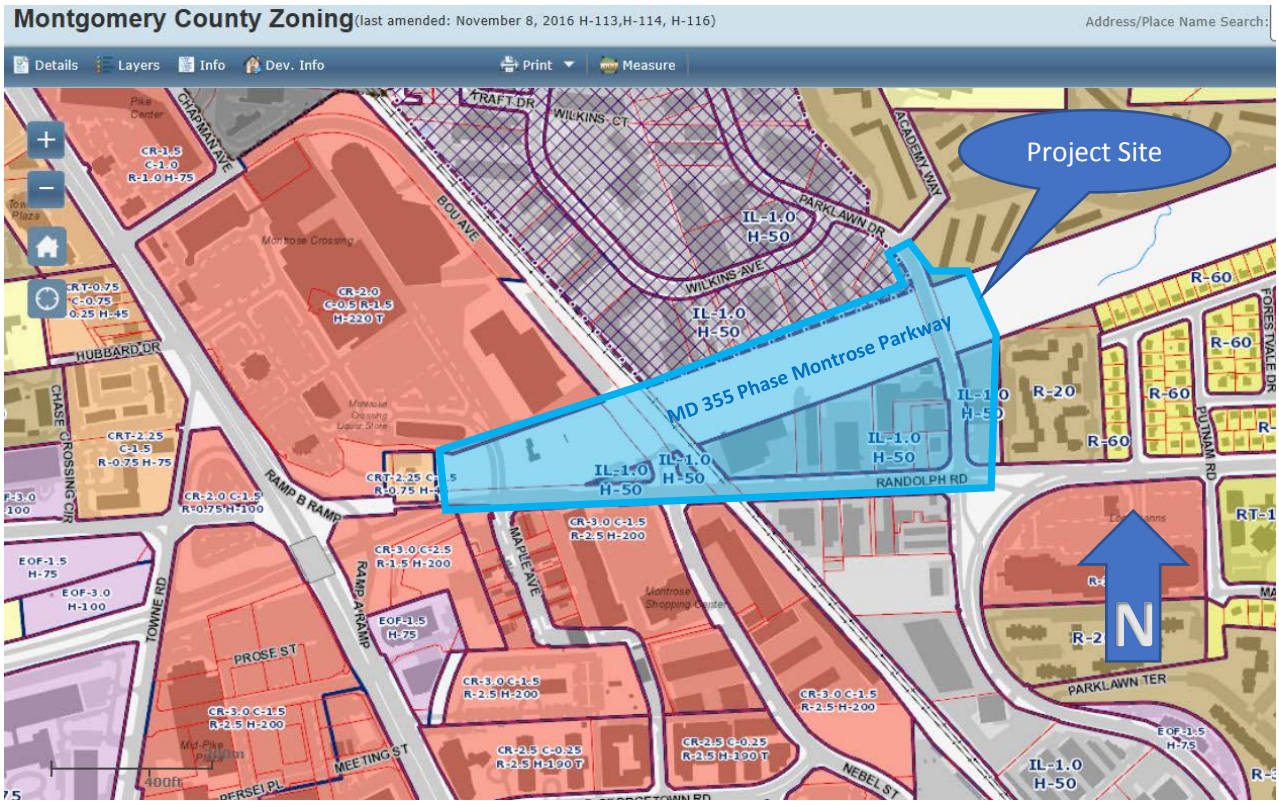


Figure 2 – MD 355 Phase 2 Montrose Parkway Project Limits and Surrounding Zoning

RECOMMENDATIONS/COMMENTS

Staff recommends approval of the MD 355 Phase 2 Montrose Parkway project with the following comments transmitted to the Montgomery County Department of Transportation:

1. **Recommend that the roadway typical sections on both Montrose Parkway and Parklawn Drive be modified to conform to the 2014 Complete Streets Design Policy and Guidelines for**

an Urban Road Code area. The typical section for Montrose Parkway should be based on urban Parkway design standards.

2. **Support a wider shared-use path (16-foot wide path, with 11 feet for bicycling and 5 feet for walking, versus the proposed 10-feet wide path) proposed on the north side of Montrose Parkway between Parklawn Drive and the eastern project limits**. The proposed sidepath cross section would provide 11 feet for bicyclists and 5 feet for pedestrians per the *Montgomery County Planning Department Bicycle Facilities Design Toolkit* (July 2017). This is consistent with the recommendations and vision of the Working Draft of the Bicycle Master Plan.
3. Support the interchange configuration (single-point urban interchange) as included in the Mandatory Referral Submittal. This interchange is consistent with the North Bethesda/Garrett Park Master Plan vision. The White Flint II Sector Plan does not discuss or recommend specific improvements at this intersection. Changes identified in the 2013 Design Review have been incorporated into the crosswalk design to more safely accommodate pedestrian and bicycle crossing needs, including a more direct crossing and an exclusive pedestrian crossing phase.
4. Support the finding of the MCDOT BRT (bus rapid transit) Feasibility Study (attached as Attachment 2) identifying a preferred BRT alignment for the Randolph Road corridor using the Randolph Road - Nebel Street - Marinelli Road route to the White Flint Metro Station with a BRT Station located on Randolph Road at Lauderdale Drive.
5. **Recommend the addition of a 6-foot wide buffer on both sides of Parklawn Drive between Randolph Road and the north side of Montrose Parkway.** This would be provided between the curb and the proposed 6-foot wide sidewalk on the east side and between the curb and the proposed ten-foot wide sidepath on the west side.
6. **Recommend the addition of crosswalks across Montrose Parkway on the east side of Maple Avenue/Chapman Avenue.** This crosswalk currently exists at the existing intersection of Montrose Parkway/Randolph Road with Maple Avenue/Chapman Avenue. The sidewalk on the east side of Chapman Avenue should be extended to connect to the southeast corner of this intersection.
7. **Recommend the replacement of a proposed 8-foot wide sidewalk on the north side of Randolph Road between Chapman Street and Nebel Street with a 10-foot wide sidepath with a 6-foot-wide buffer between the sidepath and the adjacent curb.** This improvement will greatly improve bicycle connectivity between the existing Nebel Street separated bike lanes and the proposed sidepath on the north side of Montrose Parkway
8. Recommend a change in the traffic signal design at the intersection of Parklawn Drive with the Montrose Parkway ramps to modify the NB Left/SB Left Phases (Phases 1&5) to simultaneously turn the EB Right Turn and WB Right Turn signals during this phase and not during the EB Left/WB left (Phases 3&7) Phase. This signal phasing was evaluated correctly in the MDOT SHA traffic operations analyses. The traffic signal plan should be revised accordingly.

9. **Recommend the following revisions to the Tree Save Plan to address the following prior to any demolition, clearing, or grading**:
    a. **Provide a total of 13.79 acres of reforestation on-site or in comparable locations in order to meet the requirements of Sec. 22A-9.**
    b. **Provide all planting details for the proposed reforestation.**
    c. **Provide mitigation for 2404.75 inches diameter at breast height (DBH) specimen tree removal at a rate of 1" caliper replacement per 4" DBH removed, using a minimum 3" caliper native canopy tree. The proposed plan must be revised to provide 601.2" of mitigation trees.**
    d. **Move reforestation trees outside of the areas of forest planting. Individual trees shown as planted in areas of reforestation, shrub seeding, and turf establishment. In order to mitigate for the loss of specimen trees, mitigation trees cannot be planted in areas of forest.**
    e. **Tree #484 cannot be saved with the proposed impacts. Show as removed and mitigate for tree #484.**
    f. **Provide mitigation for the proposed wetland impacts.**
    g. **Replace the tree protection details with the most recent versions.**

Background

Previous Board Actions

1. The Planning Board conducted a 30% Design Review on March 21, 2013. The initial scoping of the project was developed in close coordination with staff and the project as submitted for this Mandatory Referral remains substantially the same in concept at a later stage in design (80% design for the current submission). The Planning Staff Design Review is included as Appendix A. The Planning Board comments are included as Appendix B.
2. The Board reviewed and approved the Mandatory Referral for Phase 1 of the State's project, for a grade-separated interchange at Montrose Parkway and MD 355, on December 7, 2006. (The subject project is Phase 2 and the project is now built and operational.)
3. The Planning Board reviewed and approved the Mandatory Referral for Montrose Parkway East, an adjacent design project, for a four-lane parkway between Parklawn Drive and Veirs Mill Road, on November 1, 2007.

Nearby Related Transportation Projects

The following are nearby related transportation design projects as shown on **Attachment 3**:

1. Chapman Avenue Extended (now Maple Avenue), MCDOT Capital Improvements Program (CIP) Project 5000719: Chapman Avenue Extended would construct a road between Randolph Road and Old Georgetown Road. Within the proposed 70-foot wide closed section right-of way will be: five-foot wide sidewalks on both sides, landscape panels of varying widths up to eight feet wide on each side of the road, streetlights, storm drainage, and stormwater management.

Existing utilities will be moved underground. This project would improve local traffic circulation in the White Flint area. Design plans were completed in 2010. Construction is complete.

2. Montrose Parkway East, MCDOT CIP Project 500717: This project would construct a 4-lane divided parkway from Parklawn Drive to Veirs Mill Road (MD 586). This project includes a 10-foot wide sidepath on the north side of the road, and a 5-foot wide sidewalk on the south side of the road. The Planning Board reviewed and approved the County's Montrose Parkway East project on November 1, 2007. The project includes the connection of Montrose Parkway East to terminate at the existing intersection of Veirs Mill Road with Parkland Drive. Design and property acquisition for this project is projected to be complete by 2021; however, this project is only partially funded with approximately $62 Million (45 percent of total project budget) needed beyond the current 6-year CIP cycle. Construction of this CIP project is scheduled to begin in 2021 and be finished in 2024. This project would be completed at the same time as the subject project.

3. White Flint District West (west of MD 355), MCDOT CIP Project 501116: This project is for the completion of preliminary engineering for 35% plans, initial land acquisition for one new road, one relocated road, improvements to three existing roads, and one new bikeway in the White Flint District West area to satisfy the Sector Plan's Stage 1 requirements. Various improvements to the roads will include new traffic lanes, shared-use paths, the undergrounding of overhead utility lines, other utility relocations, and streetscaping. The project also includes the estimated final design, construction, and land acquisition costs for the projects approved in Resolution No. 16-1570, White Flint Sector Plan Implementation Strategy and Infrastructure Improvement List, Action items No. 7 and 10. These projects will become stand-alone projects once preliminary engineering for 35% is complete and final construction costs can be determined.

4. White Flint District East (east of MD 355), MCDOT CIP Project 501204: This project provides for completing preliminary engineering for 35% plans, for three new roads and one bridge in the White Flint District East area. All the roadway segments will be designed in FY 2012-2013. Various improvements to the roads will include new traffic lanes, shared use paths, the undergrounding of overhead utility lines, other utility relocations and streetscaping. The project also includes the estimated final design and construction costs for a bridge across the White Flint Metro Station, which is included in Resolution No. 16-1570, White Flint Sector Plan Implementation Strategy and Infrastructure Improvement List, Action item No. 12. These projects will become stand-alone projects once preliminary engineering for 35% plans is complete and final construction costs can be accurately determined. This project assumes the developers will dedicate the land needed for this project.

5. White Flint Traffic Analysis and Mitigation, MCDOT CIP Project 501202: This project is in direct response to requirements of the approved 2010 White Flint Sector Plan. It is composed of three components with the overall goal of mitigating the traffic impacts on communities and major intersections outside of and surrounding the White Flint Sector Plan area that will occur as a result of development densities approved under the new White Flint Sector Plan. The project has three study components: Cut-through traffic monitoring and mitigation, capacity

improvements to address congested intersections, and a study of strategies and implementation techniques to achieve the Sector Plan's modal split goal.

The following are nearby related transportation projects already constructed are as follows:

1. MD 355 Interchange Phase I: This SHA project constructed a grade-separated interchange of Montrose Parkway at MD 355 as Phase I of a two-phase SHA project. It was completed in fall 2010.

2. Montrose Parkway West: This project constructed the four-lane divided roadway from 200 feet east of Tildenwood Drive to Old Georgetown Road and widened Montrose Road from four to six lanes between Tower Oaks Boulevard and Montrose Parkway. It was completed in 2008.

3. Nebel Street separated bicycle lanes: This project constructed one-way separated bike lanes on Nebel Street between Randolph Road and Marinelli Road. It was accomplished by reducing the travel lanes in each direction to one travel lane, providing one-way separated bike lanes in both directions, and parking in the northbound direction.

PROJECT RIGHT OF WAY AND TYPICAL SECTIONS

An exhibit showing the overall project with typical sections is included in this submission as **Attachment 4**.

Montrose Parkway

Cross section exhibits are provided in Figures 2,3, 5 and 6. Plan view exhibits are provided in Figures 4 and 7. The extended Montrose Parkway will provide a 184-foot wide (max) right-of-way between the MD 355 Northbound ramps and Maple Avenue/Chapman Avenue. In this section, Montrose Parkway will be transitioning from a six-lane divided arterial into a four-lane divided roadway. To the east of Maple Avenue/Chapman Avenue, a 300 foot right of way will be provided to the east of Parklawn Drive and the eastern project limits.

Montrose Parkway was designed to be generally consistent with Montgomery County Department of Transportation standards for an Urban Parkway (MC-2007.01) with additional lanes as needed for the interchange ramps at Parklawn Drive and additional turn lanes at the Chapman Avenue intersection (the design has several design exceptions or modifications as described in the following paragraph). The MCDOT standard, however, is not consistent with the 2014 Complete Streets Policy and Standards which requires narrower travel lanes and a maximum target speed of 25mph.

Due to the interchange ramps at Parklawn Drive, there are limitations within the proposed 300-foot wide Master Planned right of way to provide the standard-specified buffer space between the edge of the road/curb and the shared use path or sidewalk. These buffers are narrower than in the standards. The Montgomery County standard for an urban parkway requires 16.5-foot wide buffer space;

However, the current design includes between 6 to 8-foot wide buffer space. In addition, the section between Nebel Street and Parklawn Drive has a narrower median width than the one recommended in the standard. The recommended width is 17 feet wide; However, the design currently includes an 8 foot-wide median in this area due to the limited amount of space available. Proposing a 17 foot-wide median in this segment would increase the amount of necessary right-of-way significantly and may result in additional displacements of adjacent businesses.

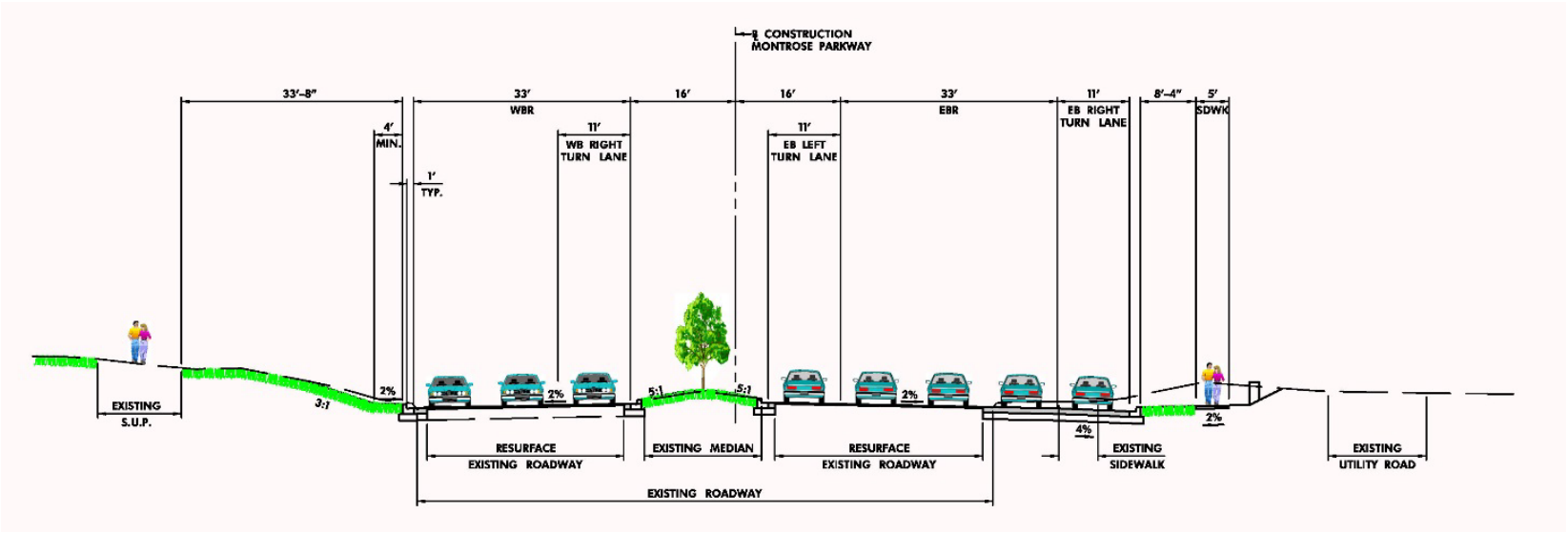


Figure 2 – Proposed Roadway Typical Section A-A - Montrose Parkway between MD 355 Northbound Ramps and Maple Avenue/Chapman Avenue (Looking East)

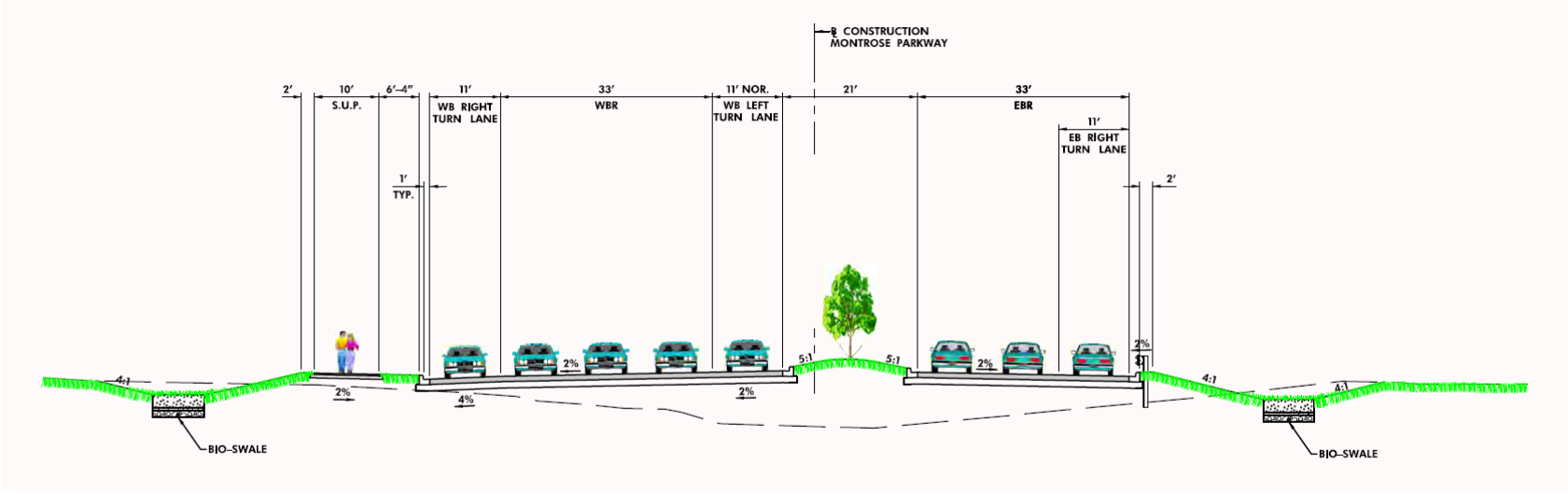


Figure 3 – Proposed Roadway Typical Section B-B- Montrose Parkway between Maple Avenue/Chapman Avenue and Nebel Street/CSX Tracks (Looking East)

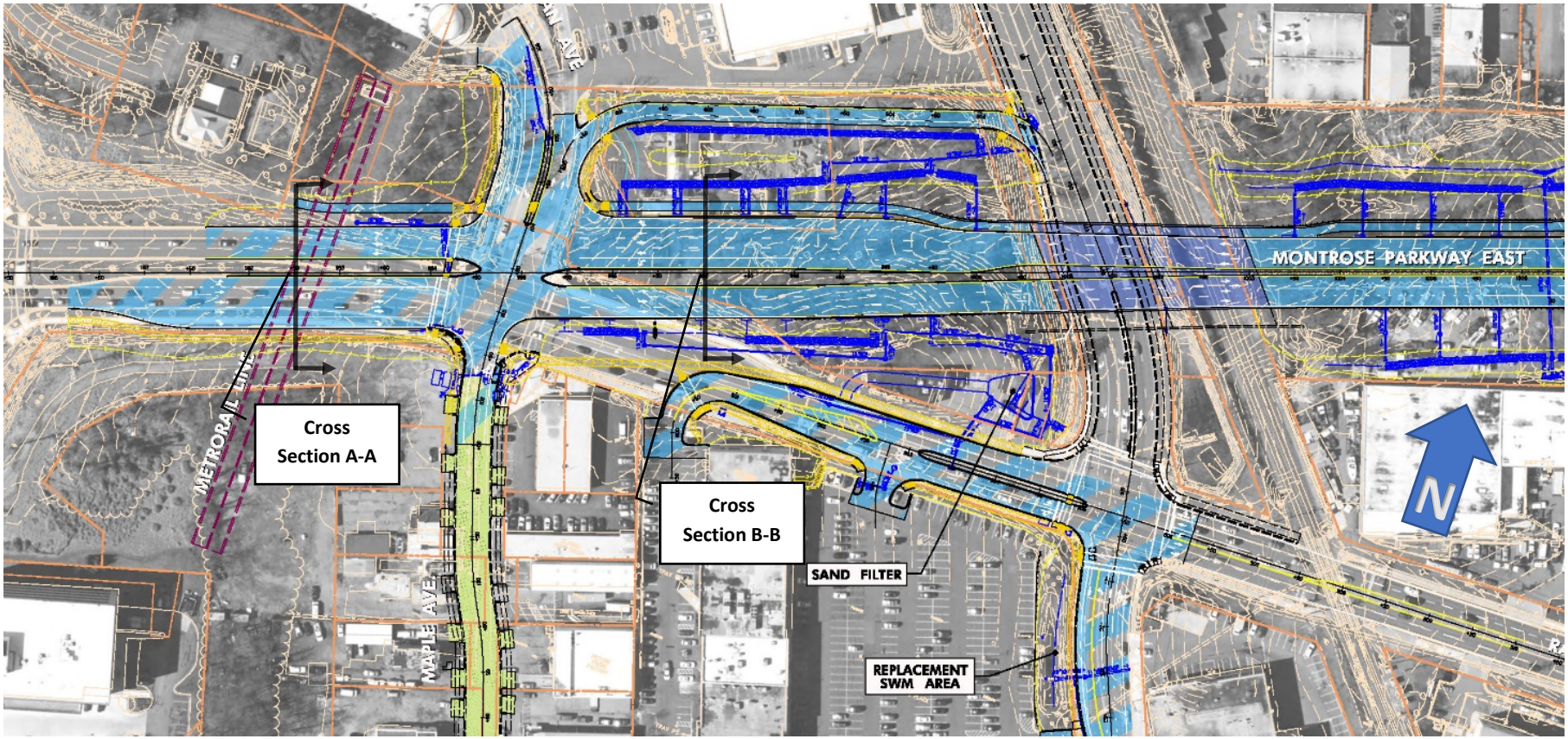


Figure 4 – Proposed Roadway Plan - MD 355 Northbound Ramps to Nebel Street/CSX Tracks

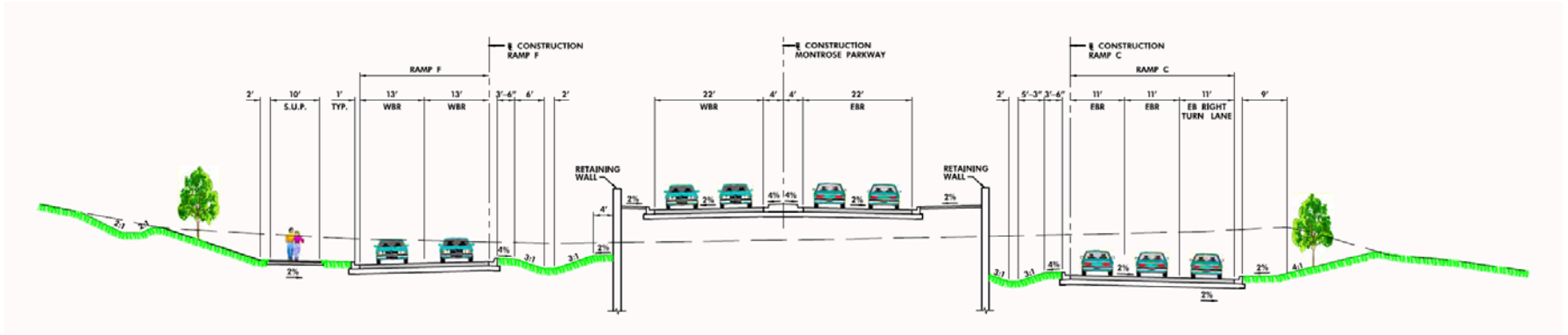


Figure 5 – Proposed Roadway Typical Section C-C - Montrose Parkway between CSX Tracks and Parklawn Drive (Looking East)

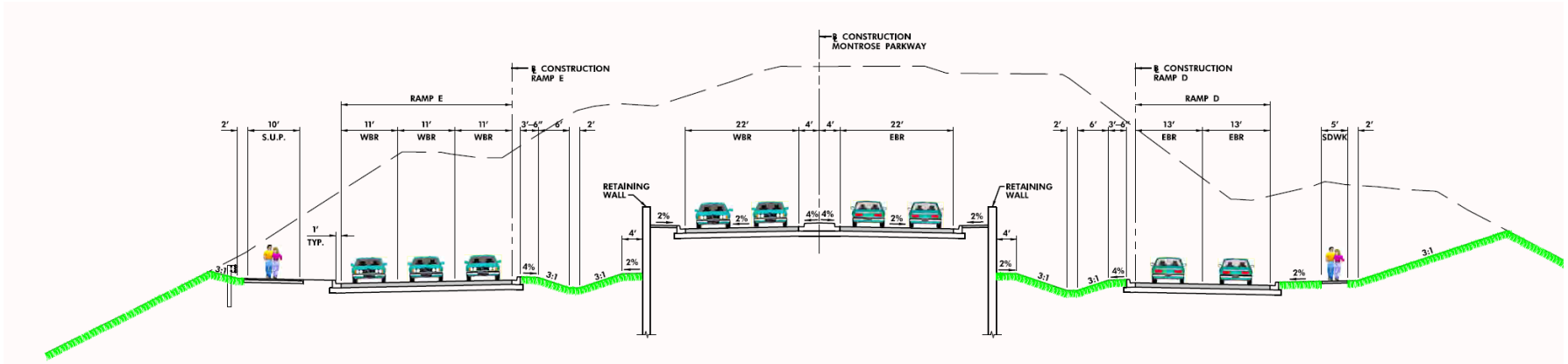


Figure 6 – Proposed Roadway Typical Section D-D - Montrose Parkway between Parklawn Drive and Eastern Project Limits (Looking East)

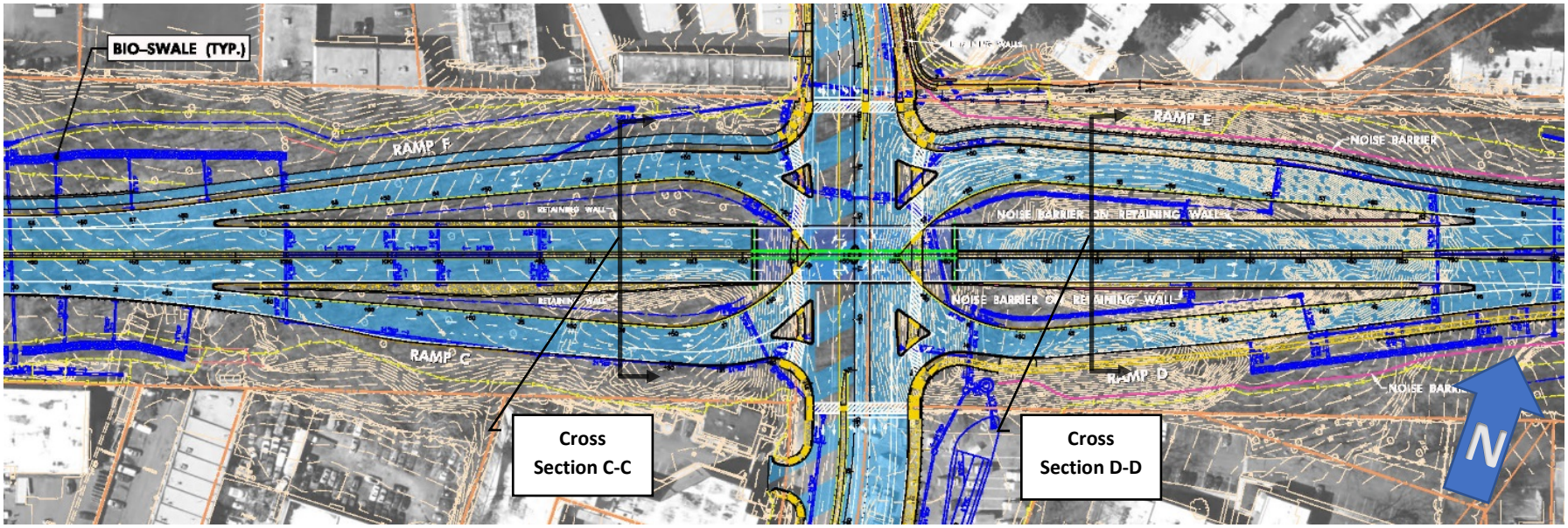


Figure 7 – Proposed Roadway Plan - Parklawn Drive interchange

Parklawn Drive

Cross section exhibits are provided in Figures 8 and 9. A plan view exhibit is provided in Figure 10. Additional right-of-way will be required on Parklawn Drive between Montrose Parkway and Randolph Road. The master planned right-of-way for Parklawn Drive in this section is 80 feet. The design plans show a 220-foot wide right-of-way on Parklawn Drive between these two roads. Most of this right-of-way will be used for stormwater management.

Parklawn Drive is master-planned as an arterial roadway. The design follows the standard for a suburban divided arterial roadway with bicycle lanes. The typical section differs from the standard on several features such as the median width, the sidewalk buffer and the inclusion of a shared use path on the northbound direction. The proposed design includes a narrower median than shown on the standard due to the limited amount of space available and geometric considerations for the interchange at Parklawn Drive. The required width as per the standard is 17 feet. A narrower median was utilized between Parklawn Drive and MD 355 due to geometric constraints. East of the Parklawn Drive interchange the median is consistently 19 feet wide.

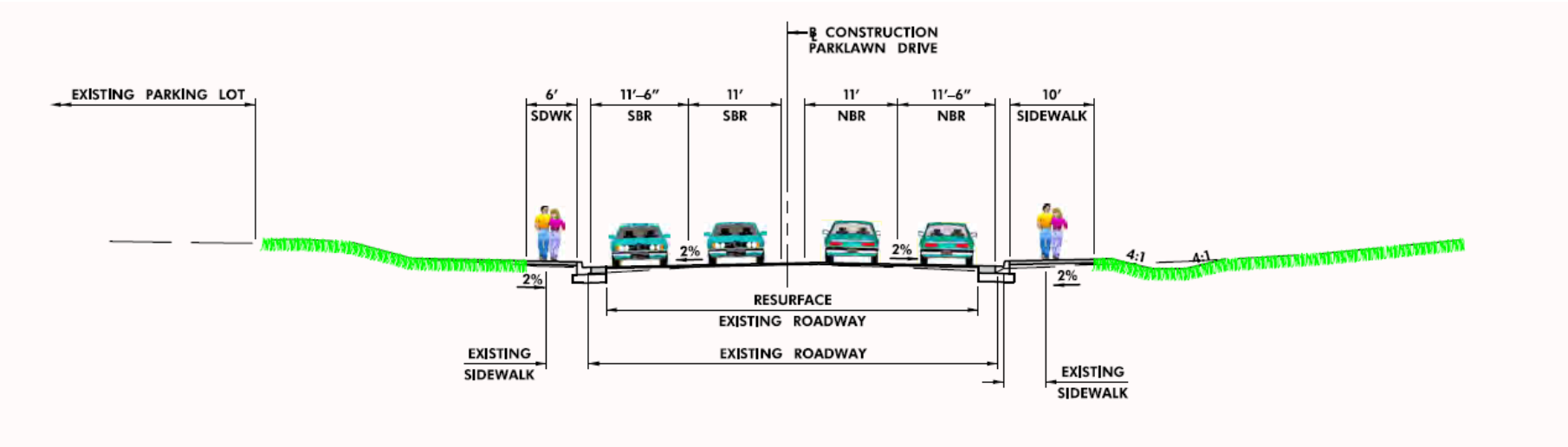


Figure 8 – Proposed Roadway Typical Section I-I - Parklawn Drive to the north of Braxfield Court (Looking North)

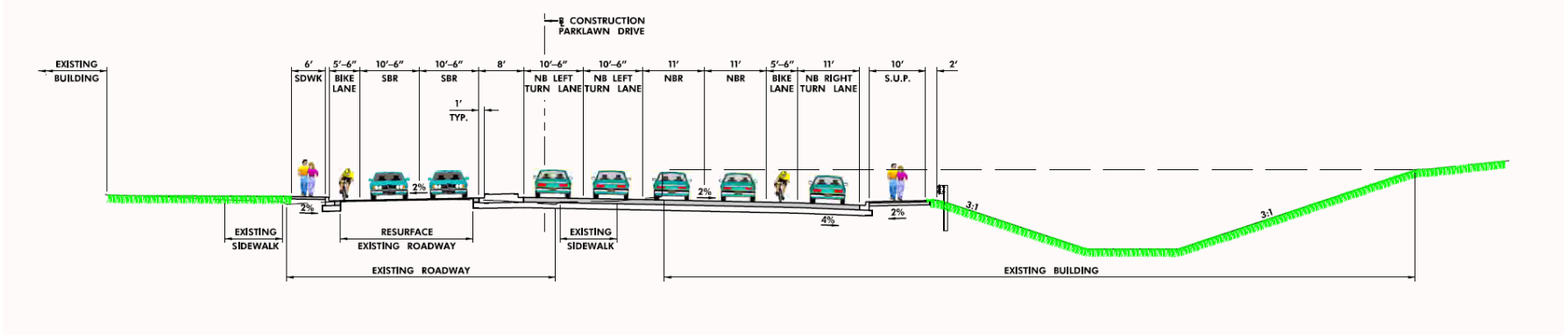


Figure 9 – Proposed Roadway Typical Section H-H - Parklawn Drive between Randolph Road and Montrose Parkway (Looking North)

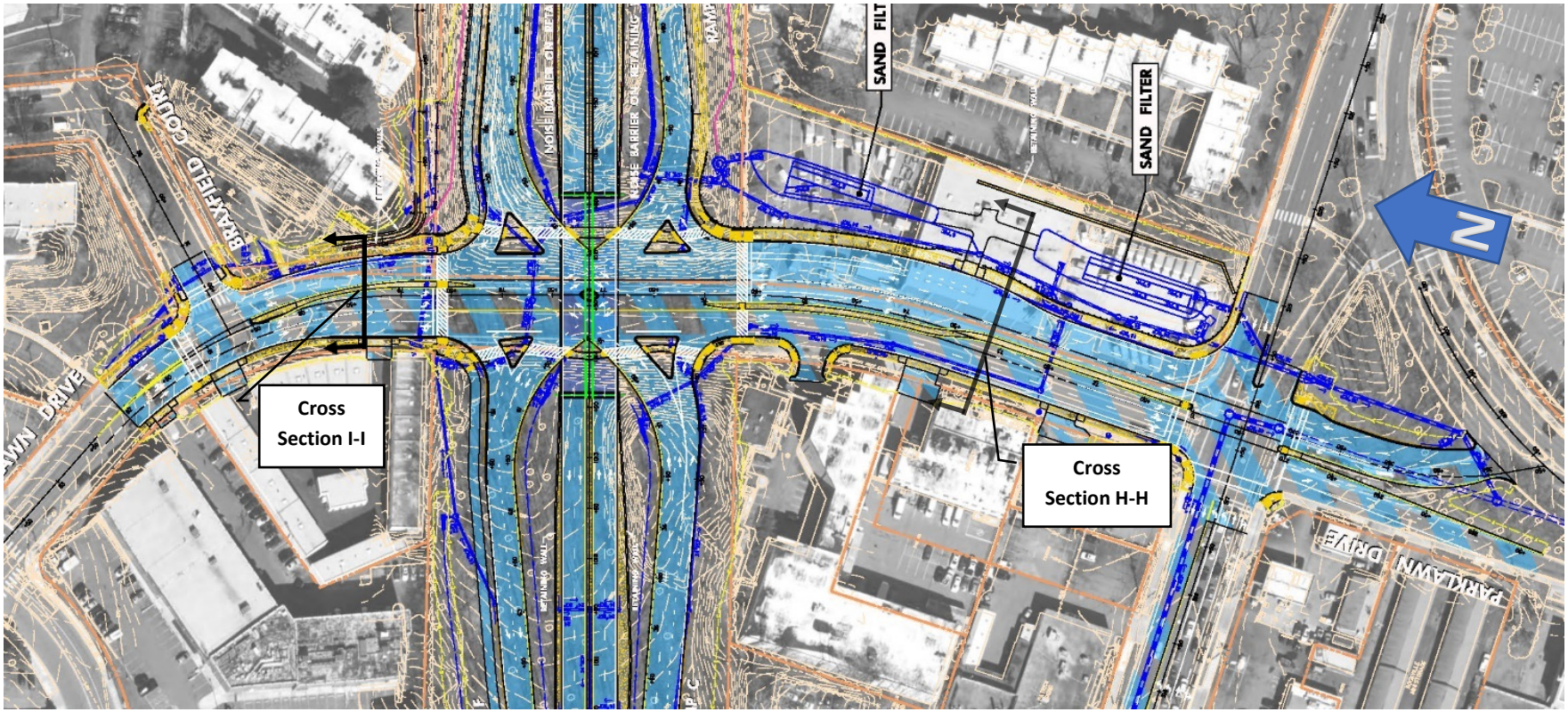


Figure 10 – Proposed Roadway Plan - Parklawn Drive between Braxfield Court and Randolph Road

Randolph Road

Cross section and plan view exhibits are provided in Figures 11 and 12, respectively. Existing Randolph Road has a master planned right-of-way of 100 feet. This road will be closed between Montrose Parkway and the Montrose Shopping Center (5520 Randolph Road) for approximately 225 feet. West of Parklawn Drive, two travel lanes will be provided in each direction, separated by a nine-foot wide median within the first 200 feet from Parklawn Drive. Eight-foot wide sidewalks will be provided on both sides of this road. The proposed design will not modify the existing Randolph Road at Nebel Street or at the CSX At-grade rail crossing. The future traffic volume is expected to be lower than existing traffic conditions with the opening of Montrose Parkway.

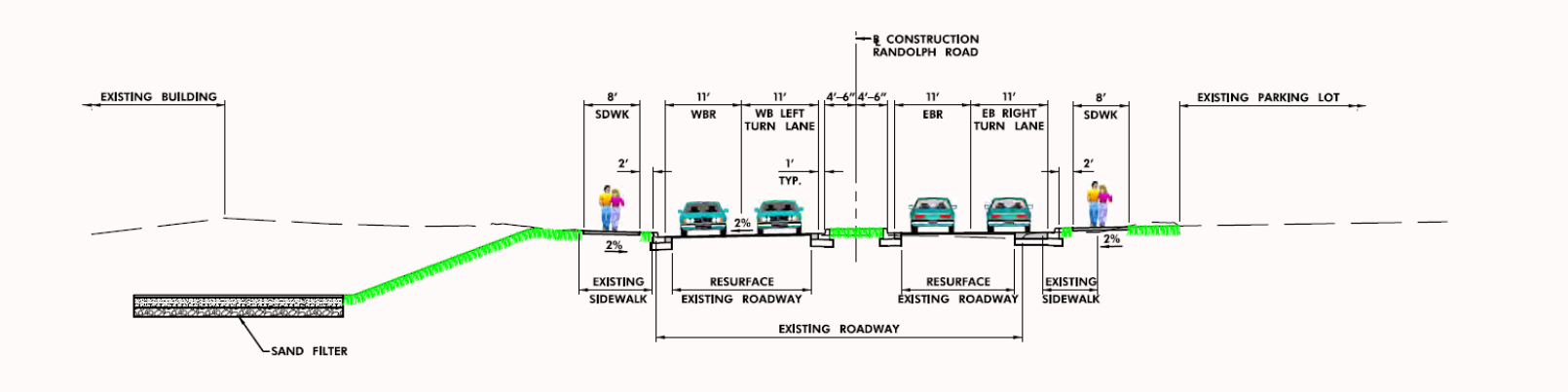


Figure 11 – Proposed Roadway Typical Section E-E – Randolph Road to the west of Parklawn Drive (Looking East)

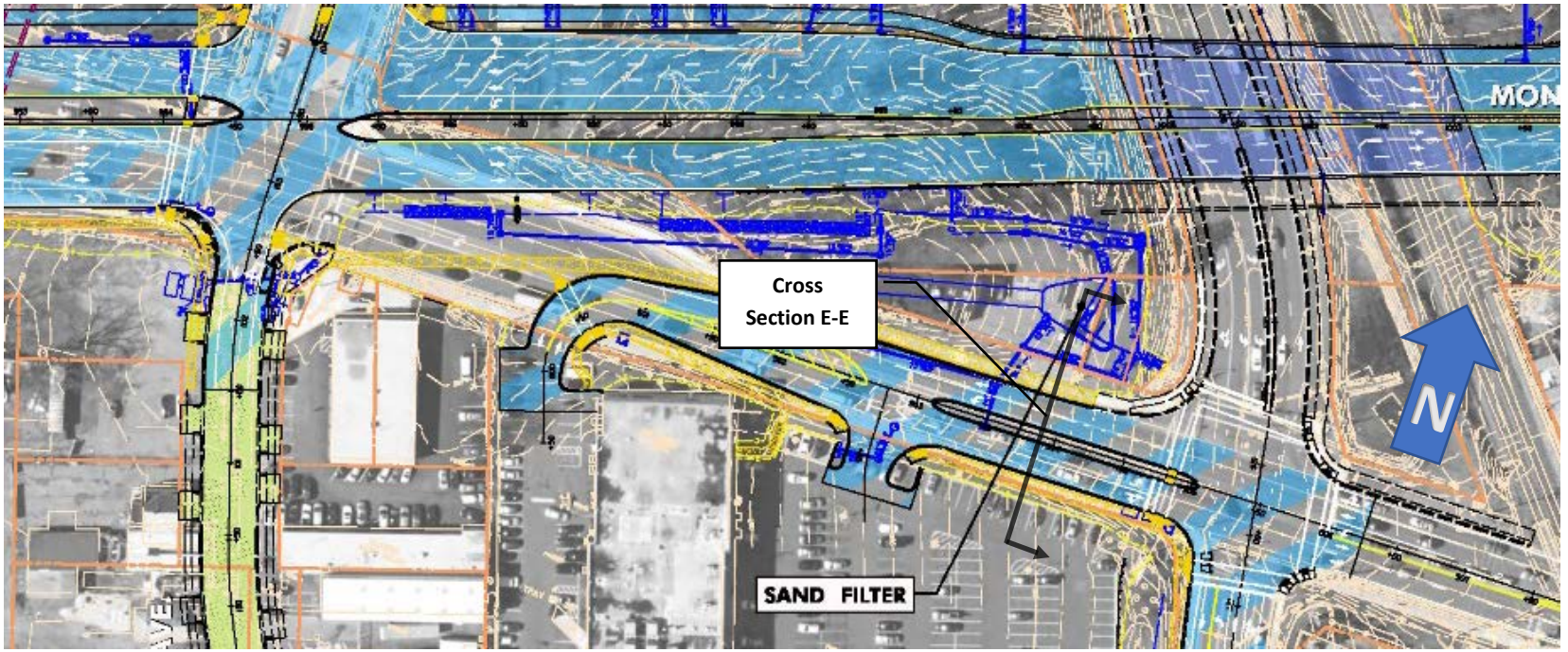


Figure 12 – Proposed Roadway Plan - Randolph Road between Montrose Parkway and Parklawn Drive

Master Plan Consistency – Roadway

The project is consistent with the Master Plan with respect to the recommendation for Montrose Parkway as a four-lane divided facility. Randolph Road would terminate approximately 550 feet west of its intersection with Nebel Street providing access to the western access of the Montrose Shopping Center located at 5520 Randolph Road.

Pedestrian and bicycles would be accommodated as follows:

- Along the north side of Montrose Parkway, a 10-foot wide shared-use path will be provided along the project length (connecting to the Montrose Parkway East project on the eastern project limits),
- Along the south side of Montrose Parkway, a 6-foot wide sidewalk will be provided between the eastern project limits and the Maple/Chapman Avenue signalized intersection,
- No sidewalk will be provided along the south side of Montrose Parkway between Maple/Chapman Avenue and Parklawn Drive,
- Between Maple/Chapman Avenue and Parklawn Drive, an eight-foot wide sidewalk will be provided from the south side of Montrose Parkway to connect to the north side of Randolph Road,
- At Parklawn Drive, a 6-foot wide sidewalk will be provided along the west side of Parklawn Drive between Randolph Road and Montrose Parkway and a 10-foot wide sidewalk will be provided on the east side of Parklawn Drive between Randolph Road and Montrose Parkway.
- Along Parklawn Drive, 5.5-foot wide bicycle lanes will be provided, between Randolph Road and Braxfield Court in the northbound direction and between Montrose Parkway and Randolph Road in the southbound direction,
- Along the south side of Montrose Parkway, a 5-foot wide sidewalk will be provided between Parklawn Drive to the eastern project limits (connecting to the Montrose Parkway East project).

Montrose Parkway

The 1992 North Bethesda/Garrett Park Master Plan recommends Montrose Parkway as a four-lane divided arterial, A-90, with a 300-foot right-of-way, landscaped median, and a hiker-biker trail/Class I bikeway between Montrose Road and Parklawn Drive. On page 154, it states that “it would have points of access to Rockville Pike and/or Old Georgetown Road, be grade-separated at Rockville Pike, Randolph Road, and the CSX Railroad…”. These three grade separations are also shown in Figure 13 below from the North Bethesda/Garrett Park Master Plan‘s Figure 56 on page 159. No specific recommendation is made for an interchange at Parklawn Drive on either page.

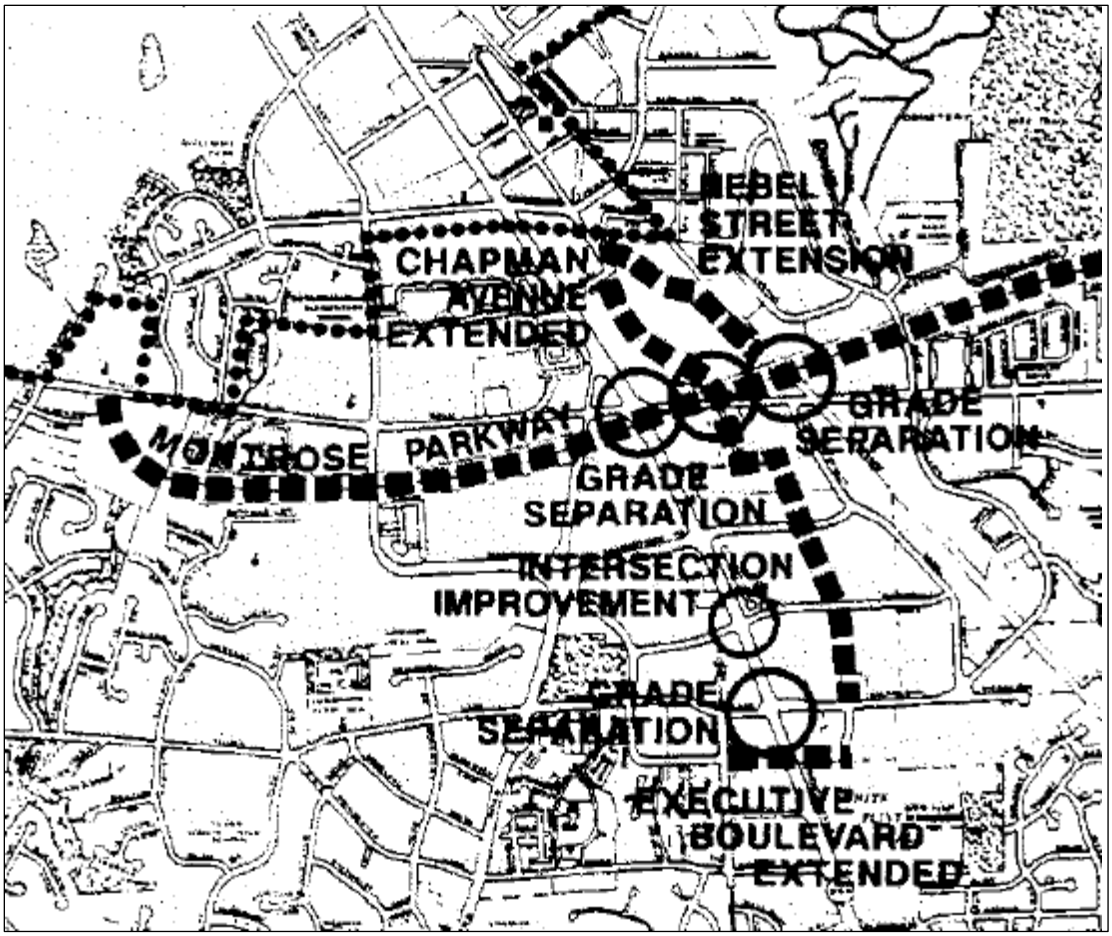


Figure1 3: Three Grade Separation Intersections shown in the North Bethesda/Garrett Park Master Plan

While an interchange at Parklawn Drive was not recommended in the Master Plan, it was assumed in the planning and preliminary design of Montrose Parkway at least as far back as 2006 even though it was not explicitly included in that project, nor was it included in the State's original design for the subject project, which would have tied back into Randolph Road just west of Parklawn Drive.

The subject project is located within the White Flint 2 Sector Plan. This recently adopted plan (refer to Figure 14 below for graphic from the Planning Board draft), does not specifically identify the Parklawn Drive/Montrose Parkway Interchange. However, the assumption of an interchange at Parklawn Drive was carried forward in the two nearby Sector Plans: Twinbrook Sector Plan and the White Flint Sector Plan.

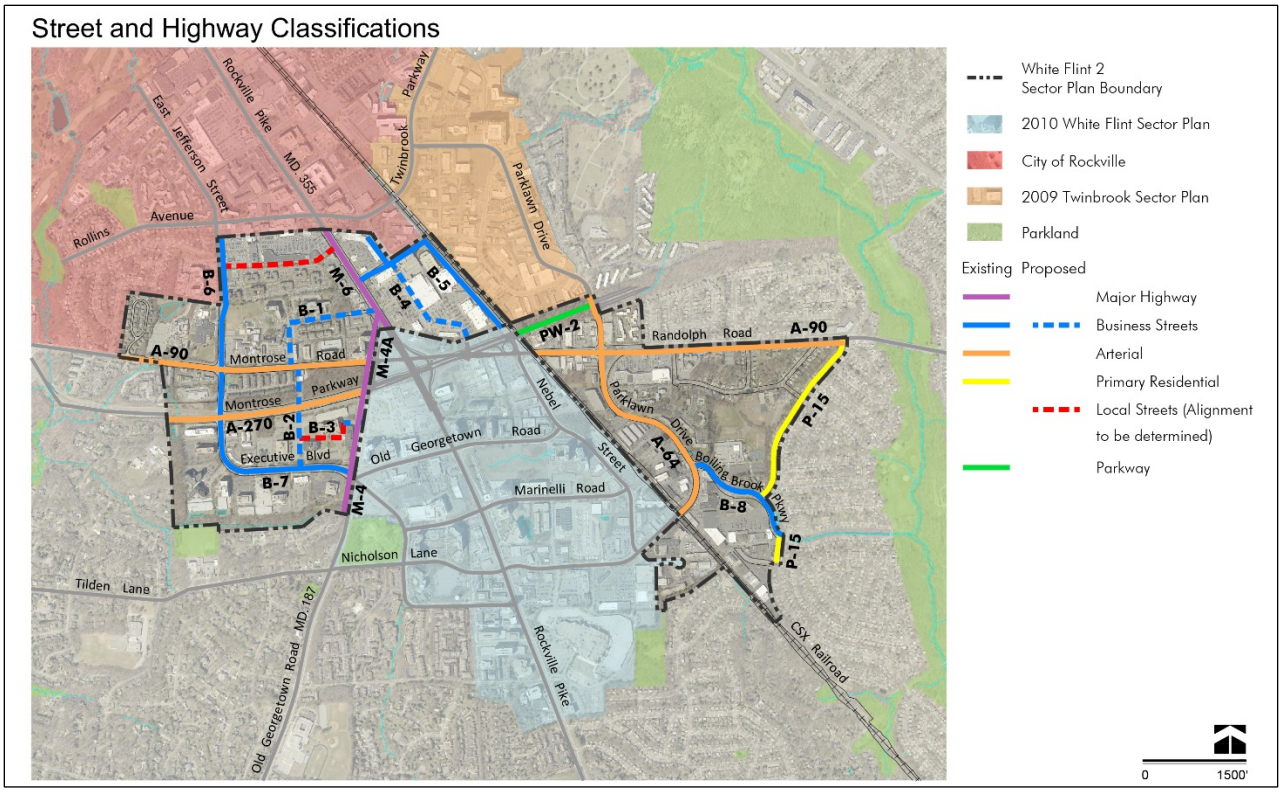


Figure 14: Existing and Proposed Street Network in the Planning Draft of the *White Flint 2 Sector Plan*

Although outside both sector plan areas, an interchange at Parklawn Drive is shown in the Street Classifications illustration on page 23 of the 2009 Twinbrook Sector Plan, in Map 46, "Existing and Proposed Street Network" on page 51 of the 2010 White Flint Sector Plan, in Map 57, "Existing and Proposed Street Network of the Planning Board draft of the 2017 White Flint 2 Sector Plan, and in Figure 37, "Proposed Street and Highway Plan," in the 1994 Aspen Hill Master Plan (refer to Figures 15 through 17 below).

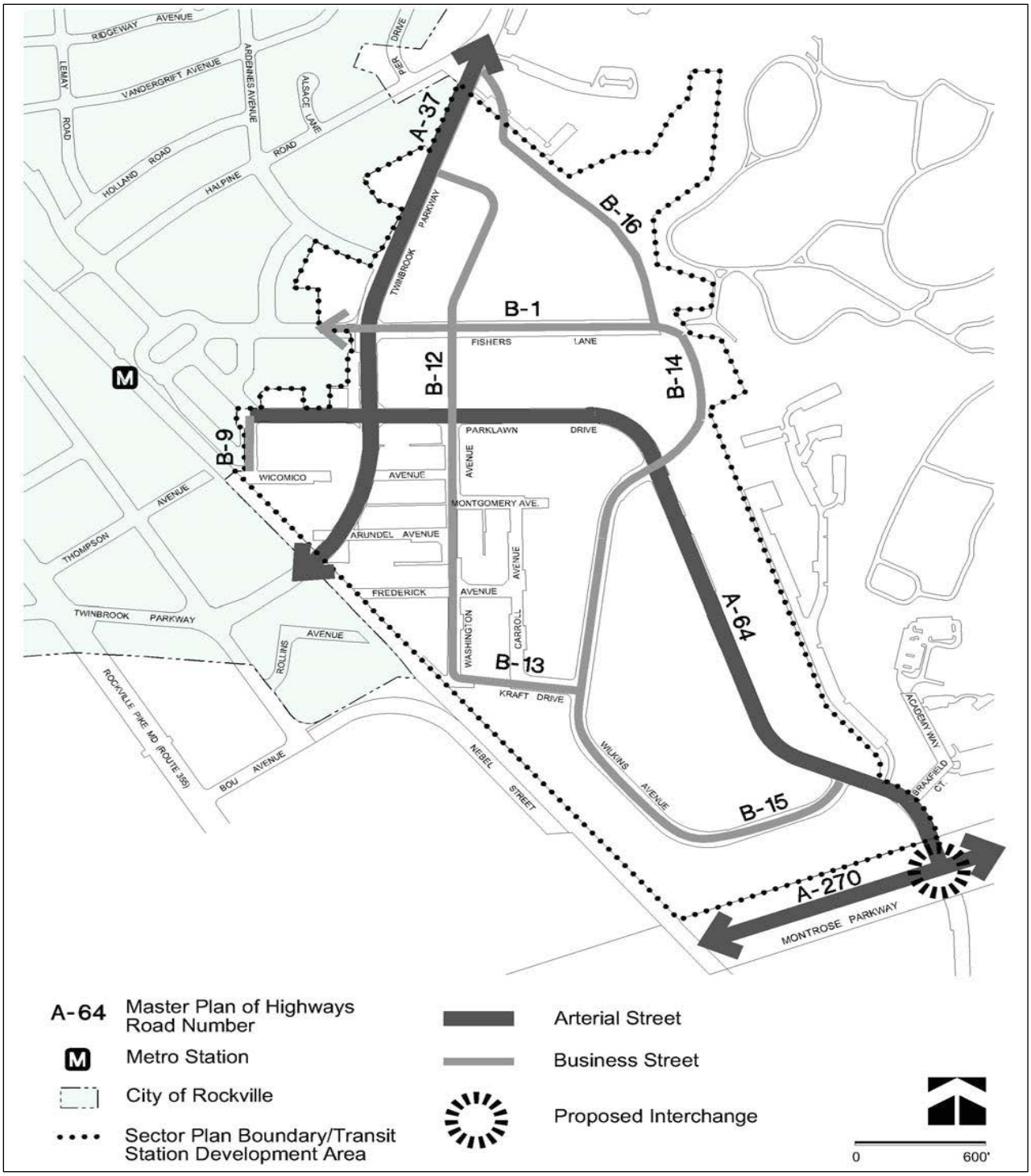


Figure 15: Street Classifications in the Twinbrook Sector Plan

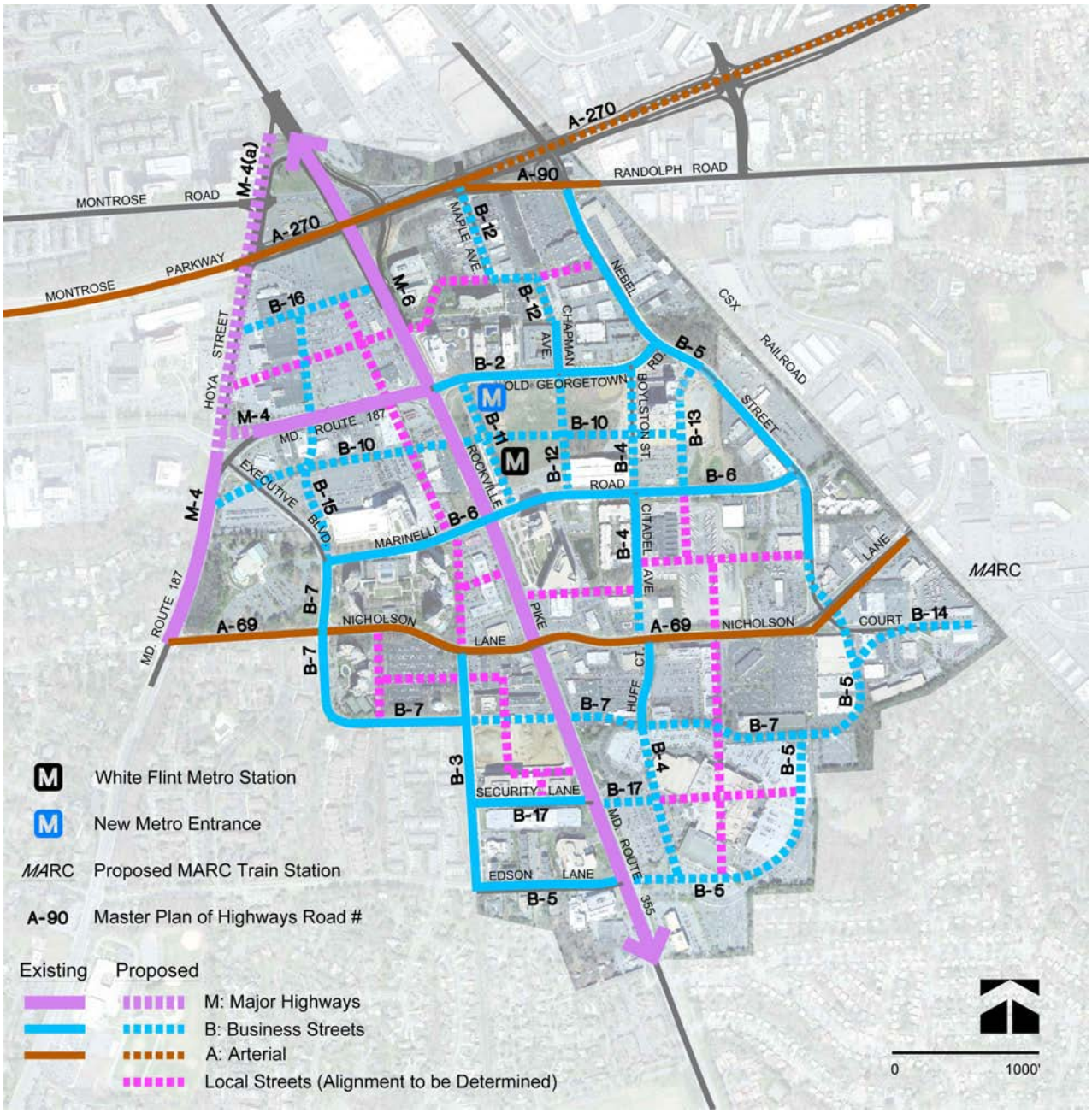


Figure 16: Existing and Proposed Street Network in the *White Flint Sector Plan*

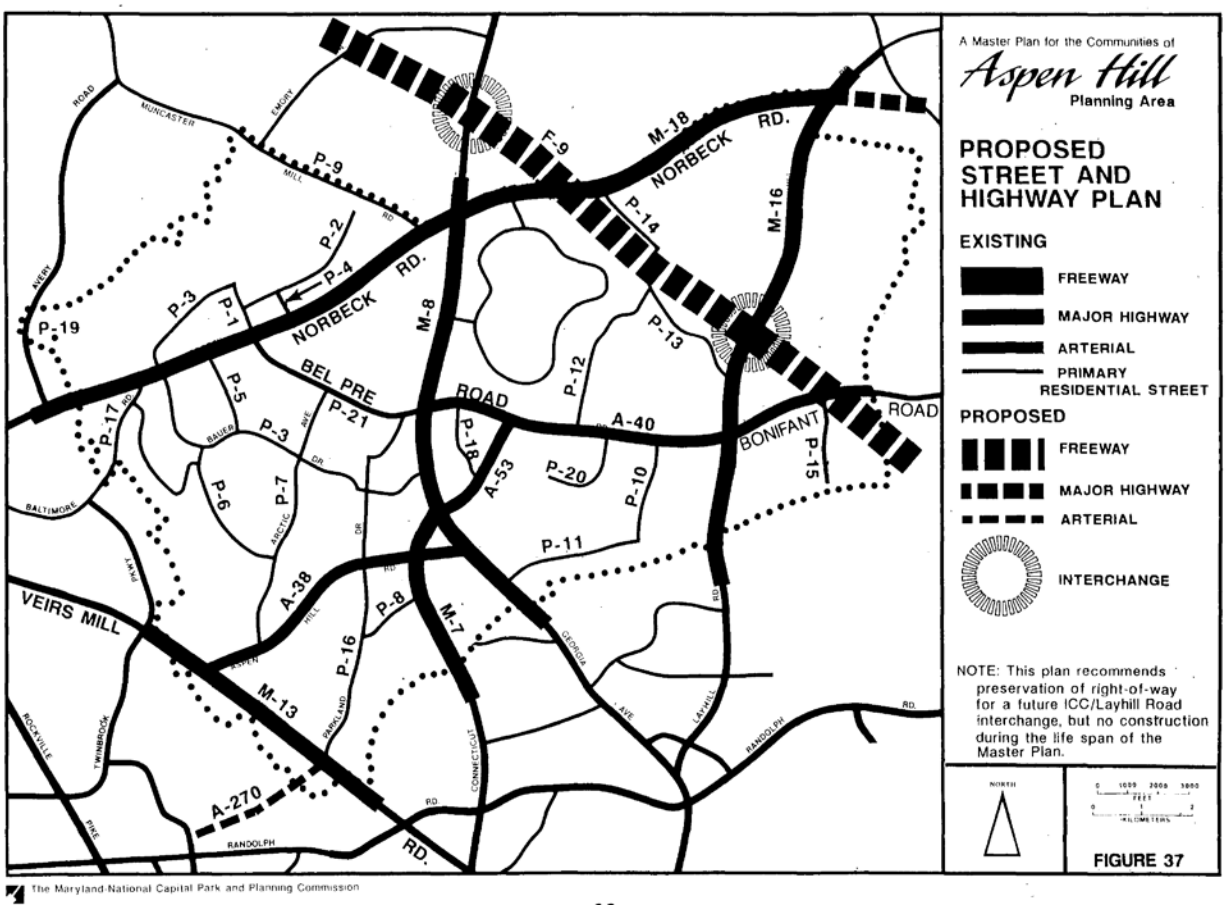


Figure 17: Proposed Street and Highway Plan in the Aspen Hill Master *Plan*

Master Plan Consistency – Public Transit

Montrose Parkway was identified as an alternate corridor for the Randolph Road Bus Rapid Transit line in the Countywide Transit Corridors Functional Master Plan (CTCFMP) with one dedicated transit lane between MD 355 and Veirs Mill Road, and a planned station on Montrose Parkway at Parklawn Drive. MCDOT conducted a bus transit feasibility study in 2015 (See **Attachment 5**) which evaluated three alternative routes to reach the BRT route terminus at the White Flint Metro Station, including Montrose Parkway to MD 355, Randolph Road to Nebel Street to Marinelli Road, and Randolph Road to Nicholson Lane to MD 355. The Randolph Road to Nebel Street to Marinelli Road route was selected as the preferred alternative with the lowest overall travel times. For this route, the Randolph Road BRT station would be located on Randolph Road at Lauderdale Drive (which is consistent with the CTCFMP). This BRT alignment would cross the CSX tracks at-grade along Randolph Road. The proposed BRT alignment (excerpted from the MCDOT BRT Feasibility Study[1], Figure 6) is shown below in Figure 17.

[1] *Montrose Parkway Bus Rapid Transit Study*, August 2015, prepared by STV Incorporated for the Montgomery County Department of Transportation.

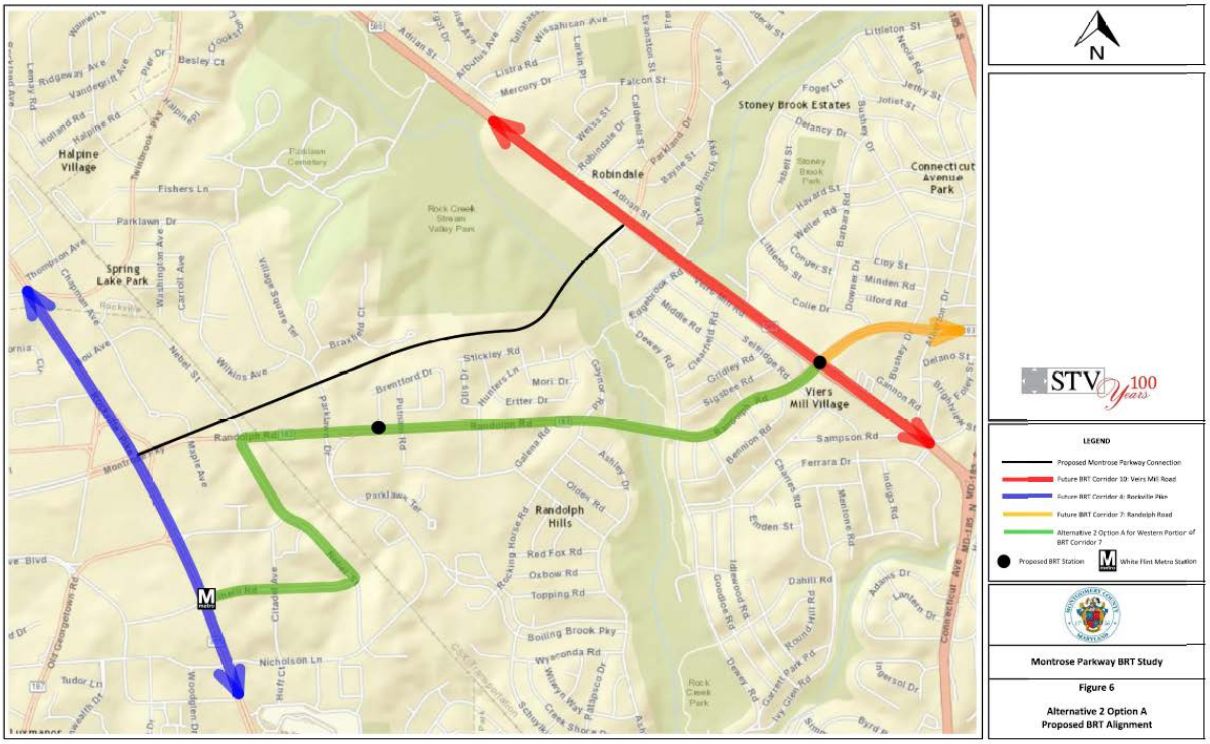


Figure 17: Selected BRT Route (Alternative 2 Option A) from the Montrose Parkway BRT Study

Master-Plan Consistency - Bikeways

The project is consistent with the adopted 2005 Countywide Bikeways Functional Master Plan, the Twinbrook Sector Plan, the White Flint Sector Plan and the ongoing White Flint 2 Sector Plan. The 2005 Countywide Bikeways Functional Master Plan recommends a shared-use path, SP-50, along Montrose Parkway, and bike lanes along Parklawn Drive, BL-27. These recommendations were confirmed by the 2009 Twinbrook Sector Plan and the 2010 White Flint Sector Plan. The proposed design includes a 10-foot-wide shared-used path along the north side of Montrose Parkway and bike lanes on Parklawn Drive. The project also proposes a shared-use path to provide connectivity to the recommended bike lanes along Parklawn Drive, BL-27.

The project is inconsistent with the Working Draft of the Bicycle Master Plan as the plan recommends Montrose Parkway to be a part of the Breezeway Network – a high-capacity network of arterial bikeways – between Rockville Pike (MD 355) and Veirs Mill Road (MD 586). One characteristic of sidepaths in the Breezeway Network is that they are wider than a typical sidepath, a minimum of 11 feet for a two-way bikeway and a minimum of 5 feet for a sidewalk, whereas this project proposes only a 10-foot-wide shared use path.

Summary – Design Issues Identified

Issue #1: The project area is located within the White Flint 2 Sector Plan Proposed Urban Road Code

The draft White Flint II Sector Plan proposes to expand the current White Flint Urban Road Code to include the entire White Flint II Sector Plan boundary. With this change, the 2014 Complete Streets Policy and Standards will apply on all White Flint 2 Sector Plan roads owned by Montgomery County, including Montrose Parkway and Parklawn Drive. The following design standards changes will therefore be required once this Sector Plan is adopted:

1. Target speeds should be no greater than 25 mph for both Montrose Parkway and Parklawn Drive. The design standards used should ensure that this standard can be achieved.
2. Travel lanes should be ten-feet wide maximum for interior lanes and 11-feet wide maximum (including the gutter pan) for a through travel lane or turning lane abutting an outside curb.

We recommend that the design standards used for this project be modified to conform with the 2014 Complete Streets Policy and Standards within the Urban Road Code area.

Issue #2: The sidepath proposed on the north side of Montrose Parkway

The proposed 10-foot wide sidepath, while consistent with current adopted Master Plans, is inconsistent with the recommendation of the Working Draft of the Bicycle Master Plan. The Working Draft of the Bicycle Master Plan recommends a width of 16-feet, providing 11 feet for bicycles and 5 feet for pedestrians. Design modifications should be made to widen the proposed sidepath by six feet within the project limits. The project limits include the bridge over Nebel Street and the CSX Tracks.

Issue #3: The planned intersection design at Montrose Parkway and Chapman Avenue/Maple Avenue

With the closure and removal of the Randolph Road segment between Maple Avenue/Chapman Avenue and Nebel Street, this intersection provides the necessary access to the existing and future land uses to the north and south of Montrose Parkway with the design remaining as shown in the **Figure 18**, with up to eight (8) east-west lanes and from four (4) to six (6) north-south lanes. **Figure 19** below shows the proposed intersection design with some recommended modifications.

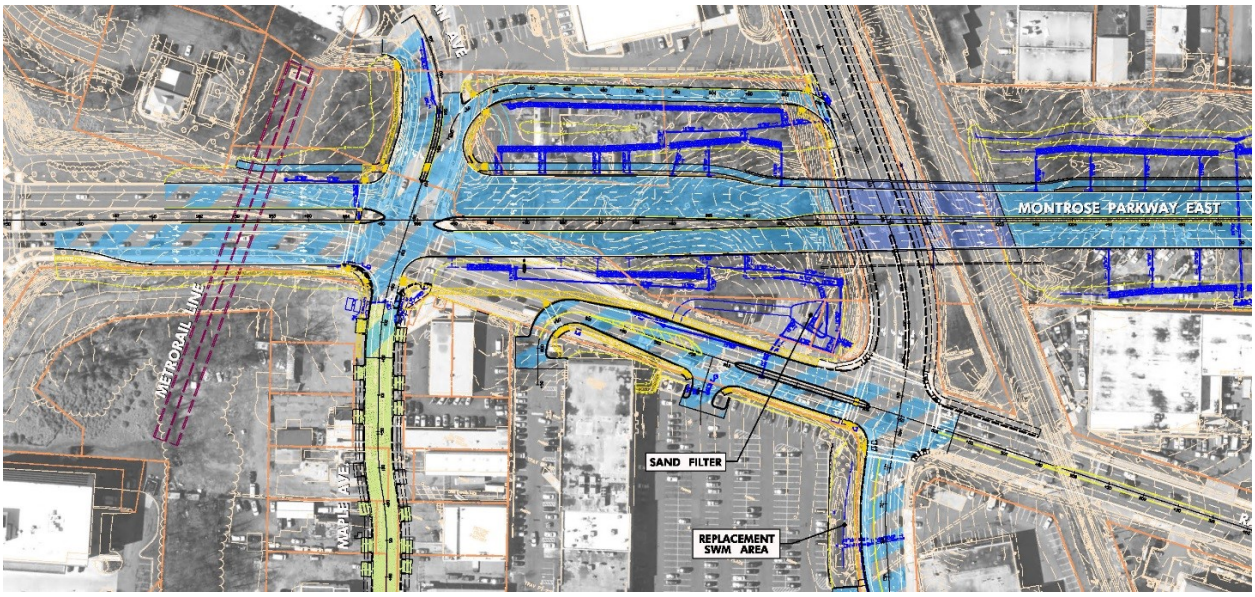


Figure 18: Maple/Chapman Avenue to Nebel Street/CSX Tracks

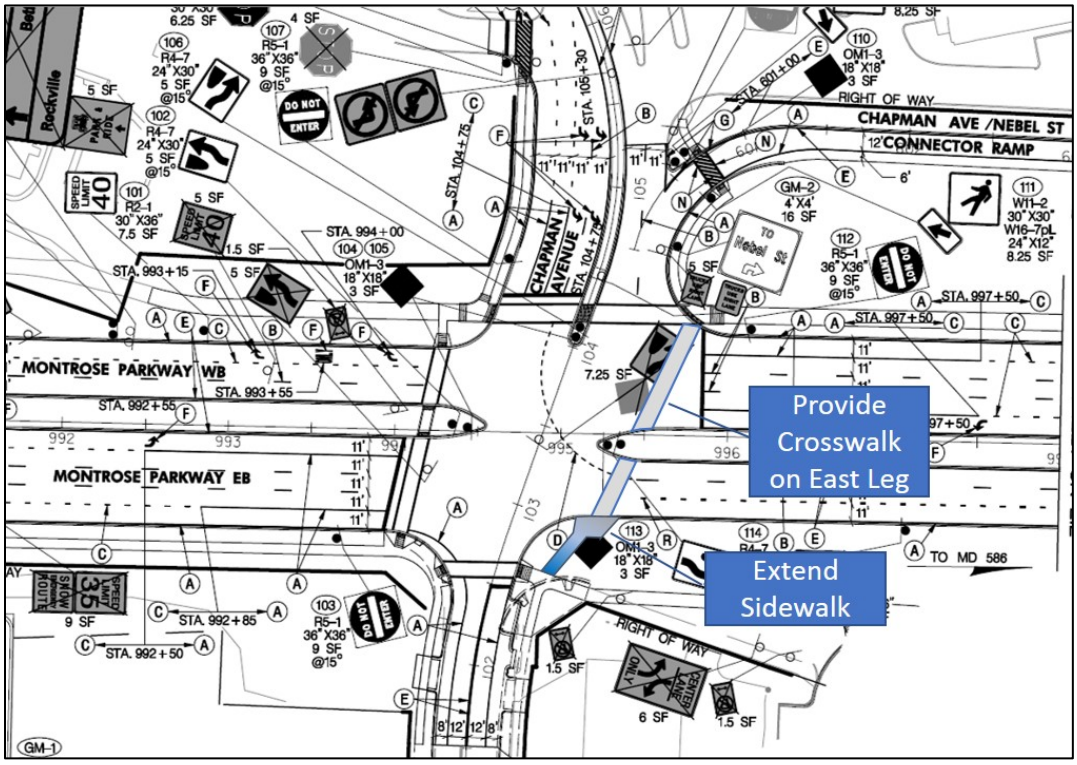


Figure 19: Montrose Parkway, Chapman Avenue/Maple Avenue Intersection

The existing intersection of Montrose Parkway/Randolph Road with Maple Avenue/Chapman Avenue currently has crosswalks on all four approaches. We see no reason to deviate from this established pattern. To the north and the south, there are 5 to 6-foot wide sidewalks along the east side of Maple Avenue/Chapman Avenue. The following recommendations are added:

- Extend the sidewalk on the southeast corner up to meet the proposed Montrose Parkway,
- Provide an eight-feet wide crosswalk on the east leg of Montrose Parkway at Maple Avenue/Chapman Avenue, and
- Add accessible curb ramps on the median and on the south curb where this new crosswalk intersects.

Issue #4: The bicycle and pedestrian connectivity between Nebel Street and Montrose Parkway

There is currently no connectivity for bicycles between Nebel Street where separated bike lanes run from Randolph Road south to Marinelli Drive. This could be significantly improved with the following modifications:

1. Provide a crosswalk on the east leg of Montrose Parkway at Chapman Avenue (Issue #3), and
2. Provide a 10-foot wide sidepath connection (with a 6-foot wide buffer) between Chapman Avenue and Nebel Street along the north side of Randolph Road (in place of a proposed 8-foot wide sidewalk) to allow bicycles and pedestrians on Nebel Street to access the Montrose Parkway sidepath. This would greatly facilitate bicycle connectivity in this area.

Figure 20 shows the staff recommended changes in orange.

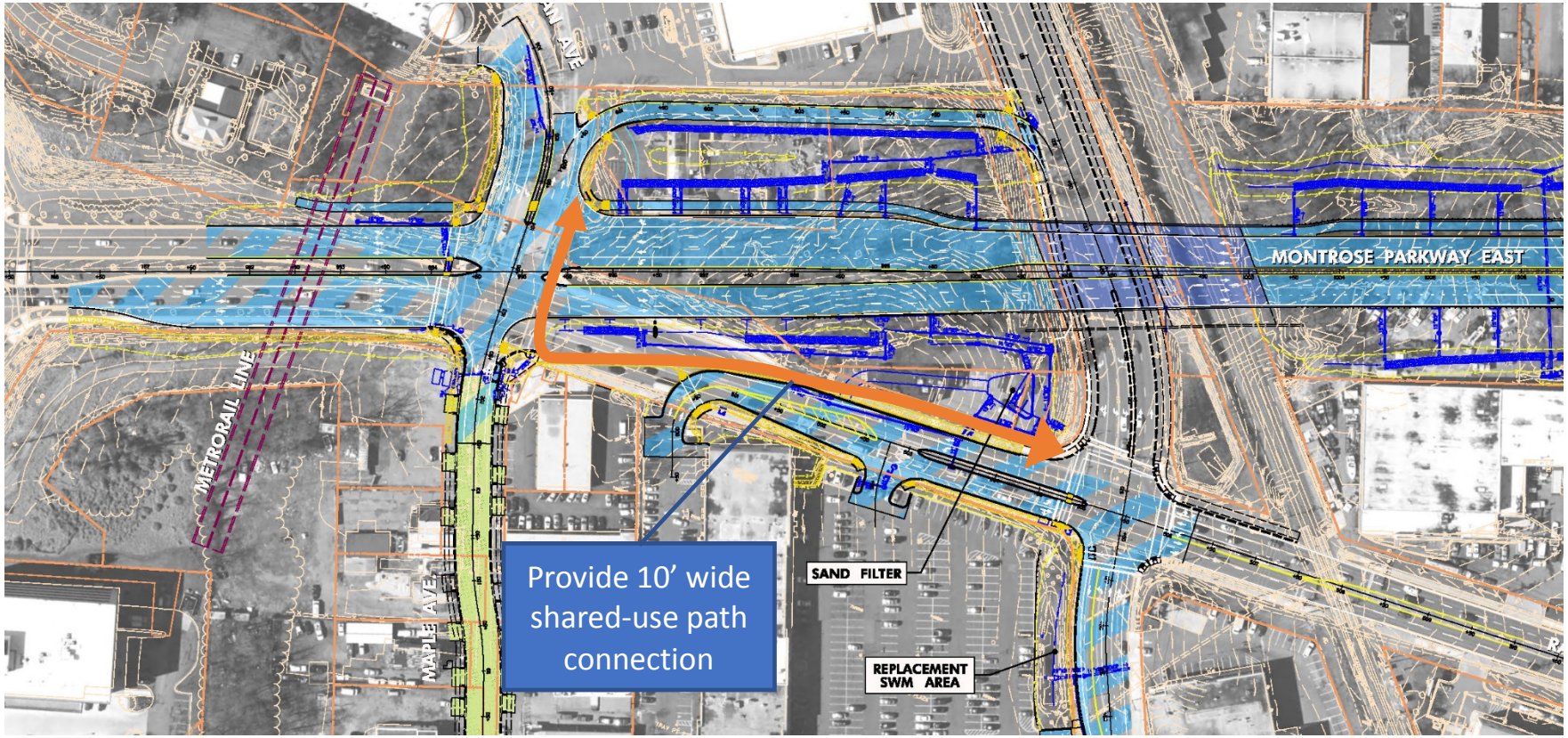


Figure 20: Proposed Modifications to Chapman Avenue-Nebel Street Connection

Issue #4: Parklawn Drive cross section and lack of adequate buffers

In addition to the need to reduce the width of travel lanes on Parklawn Drive to conform to the 2014 Complete Streets Policy and Guidelines raised in Issue #1, the current plans provide no landscaped buffer on either side of Parklawn Drive, on the west side for the proposed 6’ wide sidewalk and on the east side for the proposed 10’-wide sidepath. The presence of 5.5-foot wide bicycle lanes is essentially a substitute for providing a physical buffer space, as cars will not typically intrude into the bicycle lane; however, we strongly believe that a traditional bicycle lane is not an adequate buffer for pedestrians on a sidewalk or for pedestrians and bicyclists on a sidepath. The location of the proposed sidewalk on the east side was shifted closer to the road than the current sidewalk. Keeping this sidewalk in its current location would seem to address this issue and would provide the desired 6-foot wide buffer on the east side of Parklawn Drive. One the west side, there is plenty of available right-of-way, but most of this space is reserved for stormwater management purposes, so some design modifications might be needed to accommodate this desired buffer. The provision of 6-foot wide buffers between the sidewalk/sidepath and the road curb should be provided on both sides of Parklawn Drive between Randolph Road and Braxton Court (see **Figure 21**). It is worth noting that the 5.5-foot wide bike lanes are not currently proposed at all in the Working Draft of the Bicycle Master Plan. These bike lanes do not connect to any other bike lanes to either the north or the south of this project.

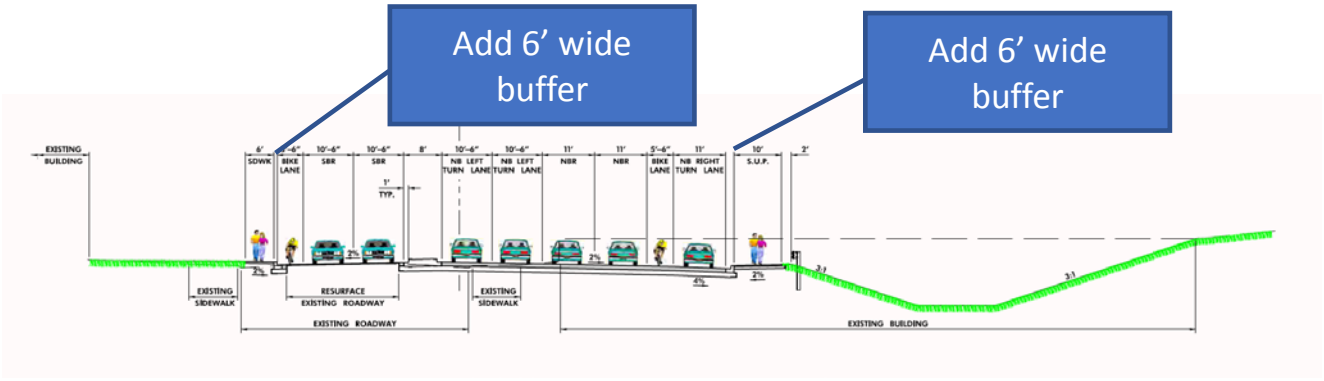


Figure 21 – Parklawn Drive lacks adequate buffers between curb and sidewalks/sidepaths

Other Project Topics

Environmental Guidelines

Staff approved Natural Resource Inventory/Forest Stand Delineation (NRI/FSD) No. 42015182E on May 11, 2015. This section of the Montrose Parkway project is mostly forested but does not include any streams or associated stream buffers. Numerous specimen trees are located on the site, within the forest. There is one small area of wetlands and wetland buffers as shown in **Figure 22**. The proposed plan shows construction within the wetlands and wetland buffers. These wetlands should

be mitigated for off-site but within the same watershed. The site is located in the Rock Creek watershed. With mitigation for the wetland impacts, the proposed project is in compliance with the Environmental Guidelines.

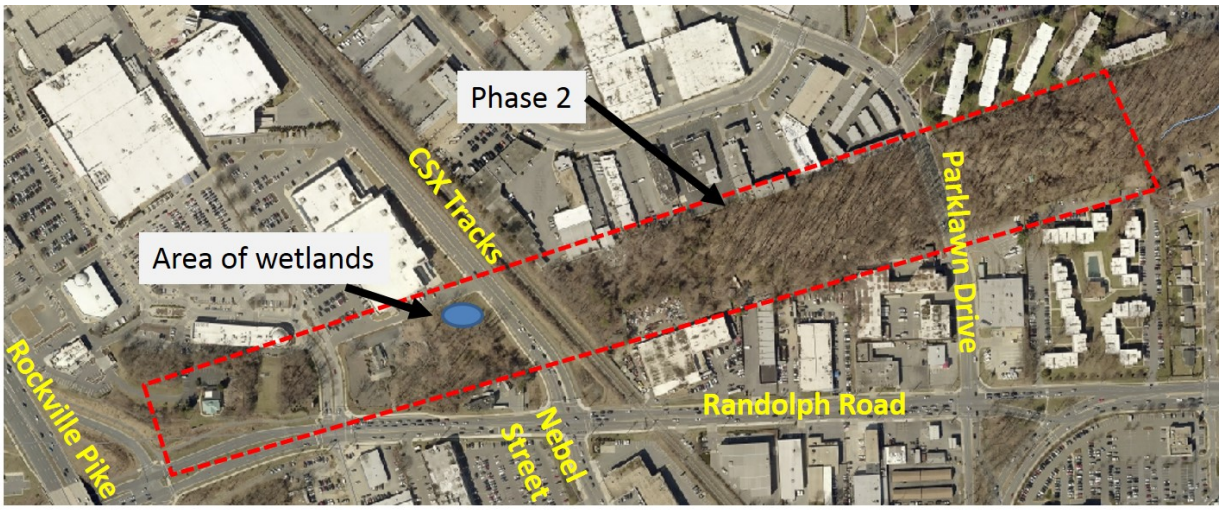


Figure 22 – Area of Wetlands within MD 355 Phase 2 Montrose Parkway limits

Forest Conservation

The proposed project is exempt from Article II of the Montgomery County Code, Chapter 22A (Forest Conservation Law), Section 22A-5(e) because the site is a State or County highway construction activity that is subject to Section 5-103 of the Natural Resources Article of the Maryland Code or Section 22A-9 of the Forest Conservation Law. Sec. 22A-9 applies to construction of a highway by the County as part of an approved Capital Improvements Program project. The proposed construction should minimize forest cutting or clearing and loss of specimen or champion trees to the extent possible while balancing design, construction, and environmental standards. The agency must make a reasonable effort to minimize the cutting or clearing of trees.

While the proposed project is exempt from Article II, the Applicant must provide reforestation at the rate of one acre of reforestation for each acre of forest cleared. The reforestation must meet the standards in subsections 22A-12(e), (g) and (h). Mitigation must be provided for the loss of specimen or champion trees must be based on the size and character of the tree.

A Tree Save Plan was submitted to fulfill the requirements of Sec. 22A-9 and shows 13.79 acres of forest removal. However, the Tree Save Plan shows the removal of 13.79 acres of forest and the reforestation of 0.49 acres of forest. The Tree Save Plan must be revised to show the complete 13.79 acres of reforestation or indicate how this requirement is being met off-site.

The proposed project includes the removal of 71 specimen trees, with a DBH of 30” or greater, for a total removal of 2404.75” DBH canopy trees. Currently, the landscape plans include 111 native canopy trees. The Planning Board has consistently applied a mitigation ratio of 1” caliper replacement per 4” DBH removed. This ratio would require 601.2” of mitigation trees, using a minimum 3” caliper native canopy tree to replace the form and function of specimen trees being removed.

Stormwater Management Concept
The Department of Permitting Services reviewed the Stormwater Management Concept and found it to be acceptable in their review letter dated January 30, 2015. It did add some items/conditions that need to be addressed during/prior to the detail sediment control/stormwater management plan stage, including

1. A detailed review of the stormwater management calculations will occur at the time of detailed plan review.
2. An engineered sediment control plan must be submitted for this development.
3. Off-site retrofit improvements other than the proposed outfall enhancements associated with Montrose Parkway East plan will be investigated prior to the first detailed plan submission to offset the waiver request for drainage areas #4 and #5.
4. The proposed mill and overlay areas may be excluded from the computations but will be included in the limits of disturbance for plan approval.
5. Written verification on clear maintenance responsibility will be required with the first submission of detailed plan review.

This list may not be all-inclusive and may change based on available information at the time.

Payment of a stormwater management contribution in accordance with Section 2 of the Stormwater Management Regulation 4-90 is not required.

Historic Preservation
The historic Montrose School is located outside the project limits. No other historic resource is located the project limits of the subject project that are listed on the Locational Atlas or the Master Plan of Historic Preservation.

Right-of-Way Acquisition
Additional right-of-way must be acquired beyond the 300-foot master planned right-of-way to accommodate a single-point urban interchange at Parklawn Drive in the northeastern quadrant of this interchange.

Park Impacts
The subject project does not impact parkland. (Parkland will be impacted by the MCDOT's Montrose Parkway East project.)

Noise Assessment
A Type I noise analysis report was completed in December 2013 for the project. The analysis and report were prepared in accordance with the Station Highway Administration's (SHA) Highway Noise Policy (2011), and Highway Noise Policy Implementation Guidelines (2011). They were also evaluated under Montgomery County's Highway Noise Abatement Policy (October 2001, Amended April 2010). Both policies were used to establish a quantifiable comparison and to provide Montgomery County with the necessary information needed to make an informed decision

pertaining to which policy should be followed. The results of this analysis revealed that noise barriers would not be warranted under MCDOT criteria; However, if SHA criteria were to be followed noise barriers would be needed to shield the Bethesda Park condominiums and the Randolph Square apartments and adjacent properties.

On July 23, 2015, a public hearing was held for the project. As a result of the feedback received on this meeting, MCDOT decided to include noise barriers to shield the Bethesda Park condominiums and Randolph Square apartments as recommended by the hearing officer's report. The noise report and hearing officer's report were included in the Mandatory Referral submittal. Noise barrier designs for Barrier 1 (north side – 2,852 feet long) and Barrier 2 (south side – 3,044 feet long) have been included in the design plans submitted for review. A third barrier was also included in the design Barrier 3 (north side – 208 feet long) near the Montrose School; however, this barrier was not included in the design submitted.

Barrier 1 is 2,852 feet long and is to be located on the north side of Montrose Parkway from Parklawn Drive to approximately 600 feet east of the existing Tennis Courts. This barrier also includes an additional 9-foot tall barrier on the proposed retaining wall parapet of the Montrose Road embankment between Parklawn Drive and the westbound exit ramp.

Barrier 2 is 3,044 feet long and is to be located on the south side of Montrose Parkway from Parklawn Drive to the vicinity of 117 Stickley Road. This barrier also includes an additional 9-foot tall barrier on the proposed retaining wall parapet of the Montrose Parkway embankment between Parklawn Drive and the eastbound entrance ramp.

Public Outreach – Noise Barriers
A public hearing was held on July 23, 2015 for the project. As part of the hearing officer's report it was recommended that noise barriers be included in the project. A subsequent meeting with the Bethesda Park Condominiums board of directors was held on January 18, 2017 to share the initial designs of the proposed barriers. A vote on the proposed noise barrier is yet to take place.

Utilities and Proposed Street Lighting
The following utility companies have facilities located within the limit of work for this project:

- Verizon
- PEPCO
- Washington Gas Light Company
- Washington Suburban Sanitary Commission (WSSC)
- Comcast
- MCDOT (fiber optic and interconnect)
- Zayo Group (formerly AboveNet and FiberGate)

Signing, marking and lighting plans as well as a utility relocation concept plan are included with this submittal.

Vehicular Traffic Volume

A detailed traffic analysis was conducted in support of this design project, and this document is included in this submission as **Attachment 5**. Traffic volume changes on nearby roads were evaluated to gauge how traffic volumes would change with the construction of Montrose Parkway between Maple/Chapman Avenues and Veirs Mill Road. The design year 2040 was considered and a summary is provided in **Table 1**. Randolph Road to the east of Parklawn Drive would experience a 20 percent reduction in daily traffic flow, Veirs Mill Road between Montrose Parkway and Randolph Road would experience a 51 percent increase in daily traffic or an increase of 21,356 vehicles per day. Montrose Parkway would carry approximately 24,514 vehicles per day west of Parklawn Drive and approximately 40,000 vehicles per day between Parklawn Drive and Veirs Mill Road.

Table 1: Forecast 2040 Daily Traffic Volumes with Completion of Montrose Parkway

Road Segment	2040 No Build Daily Weekday Traffic Volume	2040 Build Daily Weekday Traffic Volume	Percent Increase/Decrease
Randolph Road between Parklawn Drive & Lauderdale Drive	48,910	38,925	-20.4%
Veirs Mill Road between Montrose Parkway and Randolph Road	41,541	62,897	+51.4%
Montrose Parkway between Maple/Chapman and Parklawn Drive	NA	24,514	NA
Montrose Parkway between Parklawn Drive and Veirs Mill Road	NA	40,126	NA

Note: Data obtained from June 15, 2017 MDOT memorandum from Kyle Roberts to Jeff Folden, provided in the mandatory referral submission (see Attachment 5).

Intersection Congestion Levels

MDOT SHA prepared an operational analysis in June 2017 comparing congestion levels between the build and no-build alternatives and a summary is provided in **Table 2**. The study concluded that under a 2040 No-Build scenario the Nebel Street and Parklawn intersections with Randolph Road will operate over the County's Critical Lane Volume (CLV) congestion standards (the old Subdivision Staging Policy traffic operations standard). It also concluded that vehicle delays in these two intersections will exceed the County's average vehicle delay threshold (71 seconds) as established in the 2016 Subdivision Staging Policy for the North Bethesda Policy Area. The proposed build alternative would alleviate these issues with all intersections operating at improved levels of service with the current design compared to No-Build conditions.

Table 2: Forecast 2040 Peak hour Traffic Operations Summary

Intersection	2040 AM No-Build Avg Delay (LOS)	2040 PM No-Build Avg Delay (LOS)	2040 AM Build Avg Delay (LOS)	2040 PM Build Avg Delay (LOS)
Montrose Parkway at MD 355 Ramps	16.4 sec (B)	25.3 sec (C)	17.2 sec (B)	23.9 sec (C)

Montrose Parkway at Chapman Avenue	18.7 sec (B)	46.6 sec (E)	19.9 sec (B)	36.8 sec (D)
Parklawn Drive at Montrose Parkway Ramps	NA (NA)	NA (NA)	52.2 sec (D)	52.1 sec (D)
Randolph Road at Nebel Street	36.0 sec (D)	**125.7 sec (F)**	57.2 sec (E)	**78.7 sec (E)**
Randolph Road at Parklawn Drive	**83.1 sec (F)**	**90.5 sec (F)**	61.6 sec (E)	**75.2 sec (E)**

Red bold text denotes intersections with overall delay standards in excess of the current SSP delay threshold (71 seconds) for the North Bethesda Policy Area. Traffic operations along the Veirs Mill Road corridor were not included in traffic submission materials.

Montrose Parkway East Design Comments

The current project under review and the adjacent Montrose Parkway East project are considered by planning staff as linked projects, as they will both need to be completed before Montrose Parkway can be completed and open for operation. The Montrose Parkway East project underwent a Mandatory Referral in 2007 during the 35% design stage. The final design plans are now available, and are currently under review by Park and Planning staff, with Parks staff anticipating a Forest Conservation Plan Amendment (which will require a Mandatory Referral) and land sale of needed parkland from Montgomery Parks to MCDOT (which will require approval of the full Commission). Planning staff is reviewing the final design plans as part of the transportation needs assessment for the Veirs Mill Corridor Master Plan.

There are some key road safety and road geometry-related design issues from the Montrose Parkway East project that are still unresolved, and we are using this Mandatory Referral as an opportunity to highlight these issues, as the traffic that will travel through the MD 355 Phase 2 Montrose Parkway project will also travel through the Montrose Parkway East project. In addition to the project linkage, we feel this is important for several reasons, including:

- The Montgomery County Planning Department is conducting an ongoing Corridor Master Plan for Veirs Mill Road which has a Vision Zero component;
- Montgomery County has adopted a Vision Zero Action Plan that focuses on eliminating all serious injuries and fatalities by 2030;
- An Interagency Working Group has been convened by Montgomery Parks with active participation from the Planning Department, MCDOT, MDOT SHA, the Montgomery County Police Department, and the M-NCPPC Park Police to address existing road safety issues on Veirs Mill Road at the Matthew Henson Trail crossing; and
- The combined MD 355 Phase 2 Montrose Parkway and Montrose Parkway East projects, once completed, would increase future traffic volumes on Veirs Mill Road between Montrose Parkway and Randolph Road by 51 percent or over 21,000 additional vehicles per day.

These above points suggest that there is an increased need to coordinate our planning and design activities with road safety issues and that this should be a top priority in response to the Vision Zero Action Plan. Staff comments on the Montrose Parkway East project follow:

1. The 2007 Mandatory Referral requested that the design of Montrose Parkway East be coordinated with the planned BRT corridor for Veirs Mill Road. No changes were made in the Montrose Parkway East plans (between 35% design and the final design) to anticipate the need for BRT facilities on Veirs Mill Road (BRT Alternative 3.0 from the Veirs Mill BRT Study), including BRT dedicated transit lanes, or a BRT station at the intersection of Veirs Mill Road with Montrose Parkway/Parkland Drive. The planned westbound BRT Station has little room on the north side of Veirs Mill Road due to the placement of a retaining wall, resulting in a significant impact to pedestrian and bicycle accommodations along the north side of Veirs Mill Road between Parkland Drive and Turkey Branch Parkway.
2. Veirs Mill Road between Randolph Road and Montrose Parkway is projected to experience daily traffic volume increases of 51 percent (2040 SHA projections from 41,541 to 62,897 vehicles per day). This information was obtained from the traffic analysis documentation (**Attachment 5**) submitted by SHA in support of the current MD 355 Phase 2 Montrose Parkway project.
3. A sidewalk was previously requested by the Planning Board along Veirs Mill Road within the limits of construction for the Montrose Parkway East project. This sidewalk would start at Montrose Parkway in the eastbound direction (south side) and be placed on the south side of the existing service road between Montrose Parkway and the project limits to the west of Turkey Branch Parkway.
4. Crosswalks should be provided on all four corners of signalized intersections, particularly where transit facilities are provided or anticipated and where existing sidewalks or sidepaths exist. This comment, if addressed, would add a crosswalk on the east leg of Veirs Mill Road at both the Montrose Parkway/Parkland Drive and Robindale Drive intersections.
5. With the construction of Montrose Parkway East, the westbound Veirs Mill Road approach to Montrose Parkway will have lane continuity problems as a direct result of the proposed design. The median or inside travel lane will be designated as an exclusive left-turn lane immediately west of the Matthew Henson trail crossing. This introduces a lane-change decision point exactly at a location where drivers' attention should be focused on pedestrian and bicycle crossing conflicts. It also introduces a decision point in the eastbound direction, as the three lanes transition to two just before the Trail crossing. We strongly recommend the re-design of this section of Veirs Mill Road to minimize lane changing to improve through travel lane continuity to provide a safer road section. This issue will be explored more fully as part of the Veirs Mill Corridor Master Plan.
6. Long-term, a more permanent design solution is needed for the Matthew Henson Trail crossing of Veirs Mill Road. The unique vertical geometry at the bottom of two hills makes this crossing location difficult to manage safely, particularly in inclement weather. The 2007 Mandatory Referral suggested a grade separation option, by constructing a bridge for Veirs Mill Road to allow the trail to pass underneath the roadway and the expansion of the design project to address this safety issue. Germane to this review is simply the comment that despite the recommendations identified in the previous review, no changes were made to incorporate any improvements to this existing crossing. Ten years later, this at-grade trail

crossing remains a safety problem and the Montrose Parkway East project is only going to make this crossing more problematic. We encourage continued dialogue with MDOT (SHA), MCDOT, Montgomery Parks, the Planning Department and the Montgomery County Police Department to develop a long-term solution to this serious safety concern. This issue will be explored more fully as part of the Veirs Mill Corridor Master Plan

SA

Attachments:

1. Project Exhibit - Montrose Parkway East – MD 355 Phase 2
2. Montrose Parkway Bus Rapid Transit Study, August 2015, prepared by STV Incorporated for Montgomery County Department of Transportation
3. Location Map showing Proposed Project and Nearby Design Projects
4. Project Exhibit with Proposed Roadway Typical Sections – Montrose Parkway East – MD 355 Phase 2
5. MD 355 Phase 2 Traffic Analysis dated June 21, 2017 from SHA's Travel Forecasting and Analysis Division

MONTROSE PARKWAY EAST – MD 355 PHASE 2

FROM WEST OF MAPLE / CHAPMAN AVENUE TO EAST OF PARKLAWN DRIVE

Aerial Photography – MDIMAP/Imagery_5x4inch

Legend

- Montrose Parkway East – MD 355 Phase 2 Project
- Chapman Avenue Extended (County Project)
- Montrose Parkway East (County Project)
- Property Line / ROW Line

MONTROSE ROAD
ROCKVILLE PIKE
CHAPMAN AVE
MONTROSE PARKWAY WEST
NEW STREET EXTENDED
CSX
WILKINS AVENUE
PARKLAWN DRIVE
BRADFIELD COURT
BIO-SWALE (TYP.)
MONTROSE PARKWAY EAST
RAMP F
RAMP E
RAMP G
RAMP D
NOISE BARRIER
NOISE BARRIER ON RETAINING WALL
MONTROSE PARKWAY EAST (COUNTY PROJECT)
MONTROSE PARKWAY EAST
JOYCE STREET
METRORAIL LINE
NEBEL STREET
SAND FILTER
REPLACEMENT SWM AREA
RANDOLPH ROAD
355
CHAPMAN AVE EXTENDED (COUNTY PROJECT)
MONTROSE PARKWAY EAST – MD 355 PHASE 2

Montrose Parkway

Bus Rapid Transit Study

August 2015

Prepared for

Montgomery County
Department of Transportation

Prepared by

STV Incorporated
7125 Ambassador Road, Baltimore, Maryland 21244

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Appendix I: Alternative 2 Option A BRT Approach Delays per Intersection VISSIM Outputs

1. Executive Summary

As part of the ***Countywide Transit Corridors Functional Master Plan*** dated December 2013, Montgomery County plans to implement a bus rapid transit (BRT) network to expand the transit infrastructure within the County. The western portion of BRT Corridor 7: Randolph Road has two alternative alignments between Veirs Mill Road and the White Flint Metro Station. An alternatives analysis was conducted to evaluate the BRT travel times and BRT intersection delays projected for each alignment. Multiple sets of projected traffic volumes from previous planning efforts, provided by the Maryland State Highway Administration (SHA) and the Montgomery County Department of Transportation (MCDOT), were combined to generate 2040 traffic volumes throughout the study area. The assumptions for each of the two build alternatives are as follows:

- Alternative 1 BRT runs in dedicated right-of-way along Veirs Mill Road between Randolph Road and Parkland Drive, then in a single, reversible lane in the peak direction along Montrose Parkway and in mixed traffic in the off peak direction, before operating in mixed traffic along Rockville Pike prior to accessing the White Flint Metro Station.

- Alternative 2 BRT proceeds in mixed traffic on Randolph Road, Parklawn Drive, Nicholson Lane, and briefly along Rockville Pike in order to access the White Flint Metro Station.

Each Alternative also includes a sub-option, Option A, with minor changes to the alignment. Alternative 1 Option A eliminates the reversible BRT lane along Montrose Parkway, leaving both directions of the BRT to run in mixed traffic. Alternative 2 Option A considers the BRT using the more direct connection of Nebel Street to Marinelli Road, rather than Parklawn Drive, Nicholson Lane, and Rockville Pike, in order to access the White Flint Metro Station. This option would require crossing the existing at-grade Randolph Road CSX tracks, assuming this crossing remains at-grade. The ultimate alignment along Rockville Pike does include dedicated BRT right-of-way; however, since details of the operations of this right-of-way are currently unavailable, it was assumed for this study that BRT Corridor 7 vehicles would travel in mixed traffic along this section of Rockville Pike.

For the two Alternative 1 scenarios, the VISSIM analysis indicates limited BRT travel time savings as a result of the reversible BRT lane along Montrose Parkway during the AM peak hour. During the PM peak hour the reversible lane considered under Alternative 1 does save several minutes of travel time compared to Alternative 1 Option A which does not include the reversible lane. However, the travel time savings may not be substantial enough to justify the additional infrastructure costs of an added lane along Montrose Parkway, so additional consideration would be required if one of the Alternative 1 BRT alignments along Montrose Parkway is ultimately selected.

Overall, the VISSIM analysis indicates that the Alternative 2 Option A BRT travel times are lower than all other alternatives during both the AM and PM peak hour. Additionally, the BRT is projected to incur the least total intersection delay during the AM and PM peak hours under Alternative 2 Option A. This is primarily attributed to the fact that the BRT does not run along the heavily congested Rockville Pike under Alternative 2 Option A, as it does under each of the three other Alternatives and Options.

In addition to the shorter travel times and intersection delays during the AM and PM peak hours, under both of the Alternative 2 scenarios the BRT network could utilize existing pedestrian and bus stop facilities along Randolph Road. Since pedestrian activity and direct access from adjacent residential developments in close proximity to Randolph Road already exists, the BRT would be more readily accessible under Alternative 2, compared to Alternative 1 which runs along the relatively more isolated Montrose Parkway. Therefore, Alternative 2 Option A is the preferred alternative for the completion of the western portion of BRT Corridor 7: Randolph Road.

2. Introduction

As part of the ***Countywide Transit Corridors Functional Master Plan*** dated December 2013, Montgomery County plans to implement a bus rapid transit (BRT) network to expand the transit infrastructure within the County. The network includes ten corridors, with a majority of the corridors consisting of dedicated lanes for bus transit. This report contains the data, analysis, findings, and conclusions of an alternatives analysis for the completion of the western portion of BRT Corridor 7: Randolph Road.

As detailed in Montgomery County Council Resolution Number 17-952, Corridor 7: Randolph Road generally runs in the east/west direction and provides important connections to other BRT corridors including Rockville Pike (MD 355), Veirs Mill Road (MD 586), New Hampshire Avenue (MD 650), and Columbia Pike (US 29). Randolph Road also serves the activity centers of White Flint, Glenmont, and White Oak. Resolution Number 17-952 describes two potential routes for the western portion of the Randolph Road Corridor between Veirs Mill Road and Rockville Pike, and this study compares the two alternative alignments.

Two 2040 build alternatives were evaluated for Corridor 7 as part of this study. Alternative 1 considers the BRT in dedicated right-of-way along Veirs Mill Road from Randolph Road to Parkland Drive, then proceeding west along Montrose Parkway, and finally along Rockville Pike to the White Flint Metro Station. Alternative 2 considers the BRT proceeding in mixed traffic on westbound Randolph Road, south on either Parklawn Drive or Nebel Street, and west on Nicholson Lane to the White Flint Metro Station. The two alternatives and the intersections studied as part of this analysis are shown in **Figure 1**.

The two alternatives were evaluated using VISSIM traffic microsimulation software. As directed by the County, no analysis of the existing conditions or base conditions was completed for this study. Rather, the analysis was conducted as a comparative evaluation between the two alternatives, with the results of each alternative compared to each other to determine the preferred alternative.

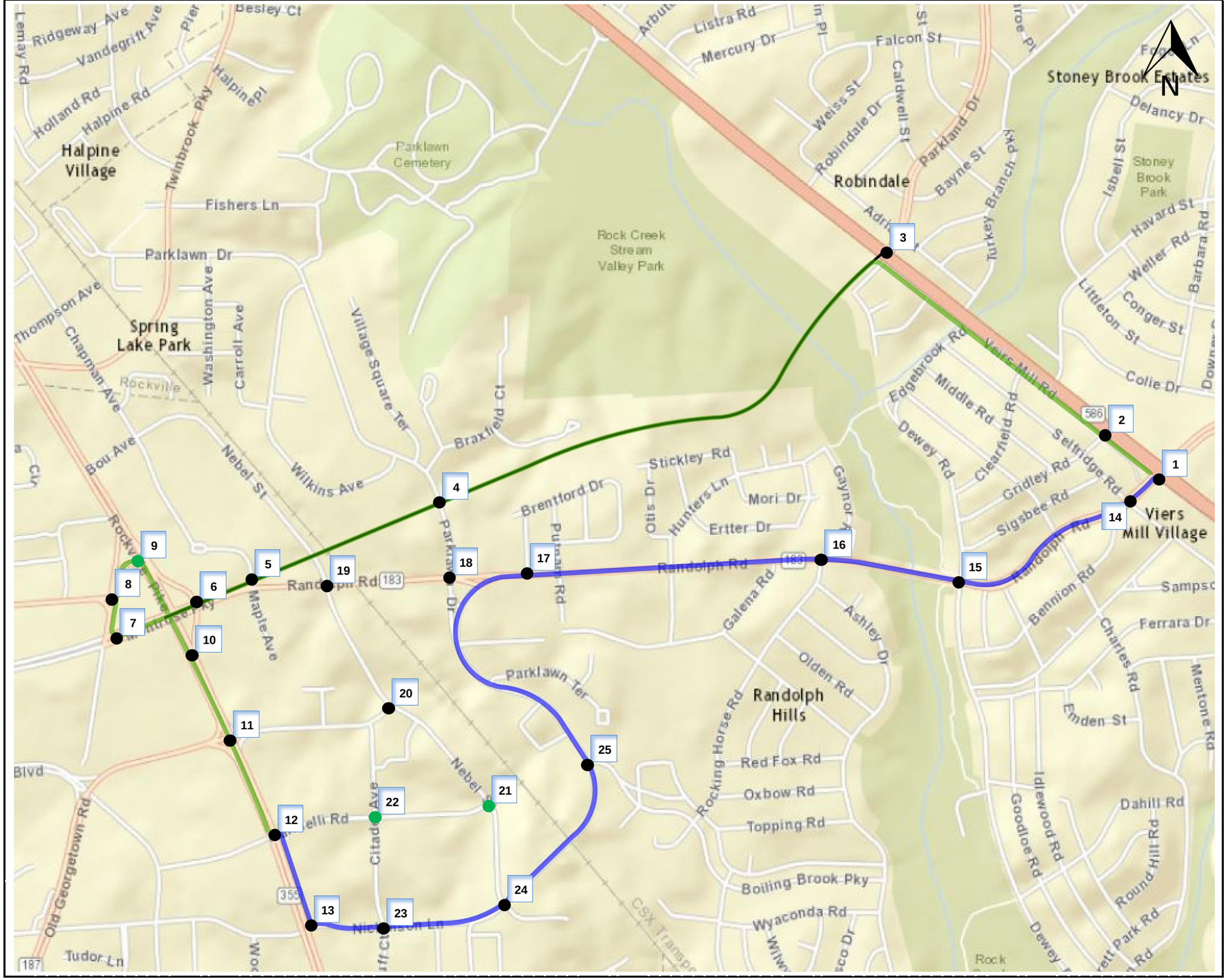
3. 2040 Vehicular Volumes

Multiple sets of projected traffic volumes have been developed by the State Highway Administration (SHA) for use in planning studies along Montrose Parkway and Veirs Mill Road. In addition, the Montgomery County Department of Transportation (MCDOT) has conducted planning studies for the White Flint Sector area adjacent to Rockville Pike (MD 355). These projections were obtained from the following sources:

- SHA's Veirs Mill (MD 586) Study Synchro Network
- SHA's Montrose Parkway Study Synchro Network
- MCDOT's White Flint Sector Plan Synchro Network obtained via SHA

The volume projections are included in **Appendix A**.

The sources for the projected volumes were each based on varying assumptions. The Montrose Parkway Study volumes were developed prior to the approval of the White Flint Sector Plan and projected high volumes of through traffic along Montrose Parkway. The White Flint Sector Plan



STV 100 Years

Intersections

1. Veirs Mill Road at Randolph Road
2. Veirs Mill Road at Gridley Road
3. Veirs Mill Road at Montrose Parkway/Parkland Drive
4. Montrose Parkway at Parklawn Drive
5. Montrose Parkway at Maple Avenue/Chapman Avenue
6. Montrose Parkway at Rockville Pike Northbound Ramps
7. Montrose Parkway at Hoya Street
8. Hoya Street at Montrose Road
9. Rockville Pike at Hoya Street
10. Rockville Pike at Mid-Pike Plaza
11. Rockville Pike at Old Georgetown Road
12. Rockville Pike at Marinelli Road
13. Rockville Pike at Nicholson Lane
14. Randolph Road at Selfridge Road
15. Randolph Road at Dewey Road
16. Randolph Road at Gaynor Road/Rocking Horse Road
17. Randolph Road at Lauderdale Drive
18. Randolph Road at Parklawn Drive
19. Randolph Road at Nebel Street
20. Old Georgetown Road at Nebel Street
21. Marinelli Road at Nebel Street
22. Marinelli Road at Citadel Avenue
23. Nicholson Lane at Citadel Avenue
24. Nicholson Lane/Parklawn Drive at Nebel Street
25. Parklawn Drive at Boiling Brook Parkway

LEGEND

- XX Intersection Number
- Signalized Intersection
- Unsignalized Intersection
- Proposed Montrose Parkway Connection
- Alternative 1
- Alternative 2

MONTGOMERY COUNTY MARYLAND

Montrose Parkway BRT Study

Figure 1

Study Area

volumes, however, project significantly fewer through volumes along Montrose Parkway. The volumes developed as part of the Veirs Mill (MD 586) Study were developed in 2012 and only partially consider the development of the White Flint Sector Plan. Projected turning volumes at the intersection of Montrose Parkway/Veirs Mill Road were rather high in this network because the original study assumed an unconstrained intersection with additional lanes, as necessary. As such, significant rebalancing of volumes was required based on input from SHA. Volume balancing was completed as follows:

- East- and westbound through volumes along Montrose Parkway for the year 2030 were based on the Montrose Parkway Study Synchro network. An annual growth rate of 0.5% was used to grow the volumes to 2040.
- Projected volumes at the intersections of Veirs Mill Road at Montrose Parkway/Parkland Drive, Gridley Road, and Randolph Road were obtained from the Veirs Mill (MD 586) Study Synchro network.
- The volumes within the White Flint Sector Plan area were based on the White Flint Sector Plan Synchro network.
- If no projections were available, volumes were derived based on volume balancing between intersections.

The projected traffic volumes from these various sources were combined and balanced based on projected development locations and knowledge of local travel patterns to produce a fully balanced network as required by VISSIM. The balanced peak hour traffic volumes are shown in **Figure 2**.

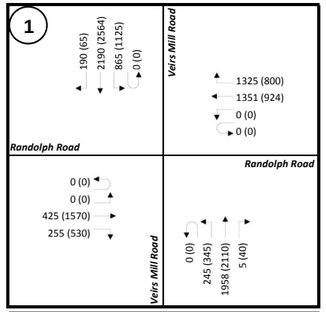
4. 2040 Network Geometry

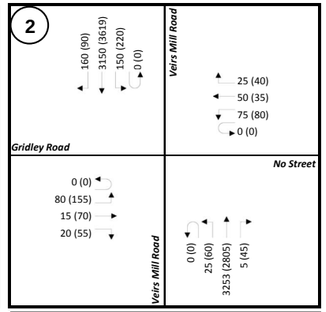
The roadway network for the year 2040 includes the completion of the Montrose Parkway extension. Per planning documents provided by SHA, the Montrose Parkway connection will extend Montrose Parkway from Chapman Avenue/Maple Avenue and connect to Veirs Mill Road at Parkland Drive. The Montrose Parkway extension also assumes the termination of Randolph Road at Nebel Street.

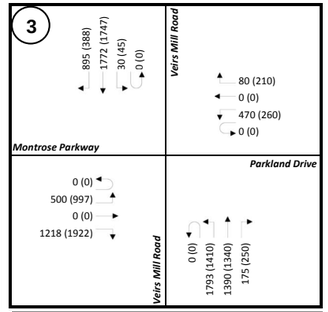
The 2040 network geometry also includes the geometry proposed as part of the White Flint Sector Plan Traffic Study and Synchro files provided by SHA. Significant lane use changes recommended as part of the White Flint Sector Plan include the completion of Hoya Street to the intersection of Old Georgetown Road at Executive Boulevard and realignment of the intersection of Old Georgetown Road at East Jefferson Street, with associated lane use changes at the intersections of Montrose Parkway at Hoya Street and Hoya Street at Montrose Road, and the addition of one travel lane in both the north- and southbound directions along Nebel Street between Randolph Road and Nicholson Lane.

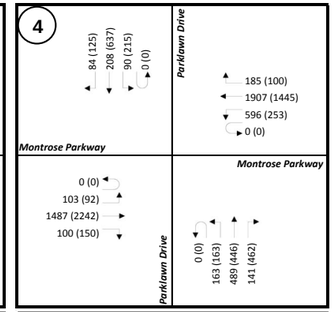
In addition to lane use changes, this analysis assumed the implementation of a traffic control signal at the intersection of Old Georgetown Road at Nebel Street. A traffic control signal at this location is needed in order to accommodate the projected increased traffic caused by the proposed White Flint development.

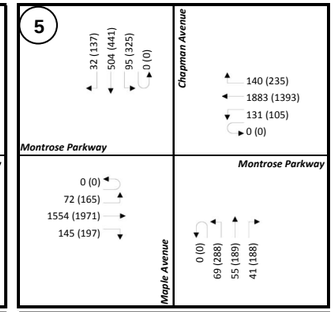
The assumed lane use and traffic control at the study intersections is shown in **Figure 3**.

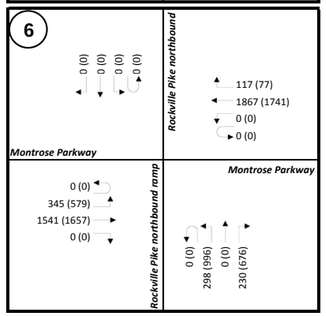


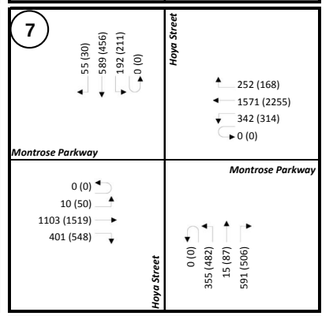


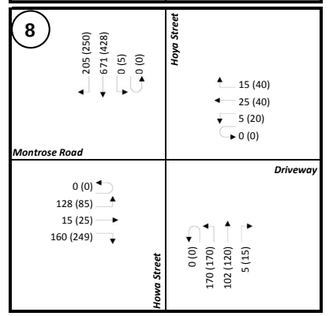


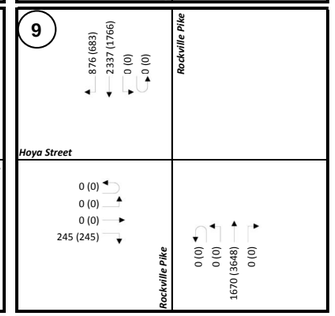


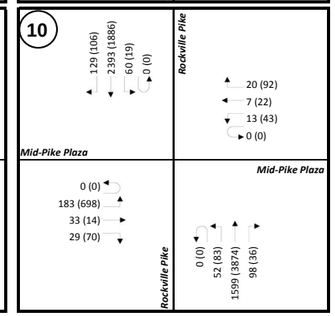


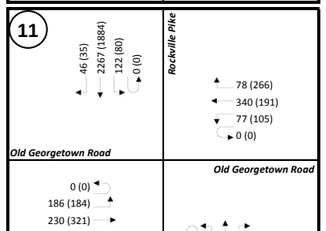


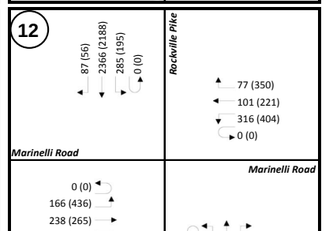


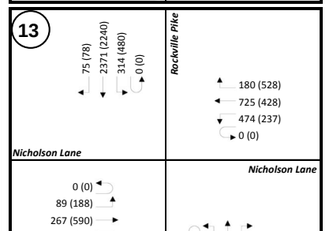


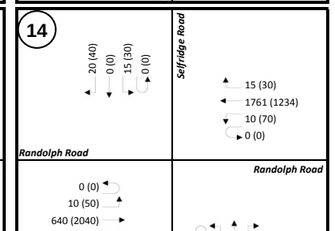


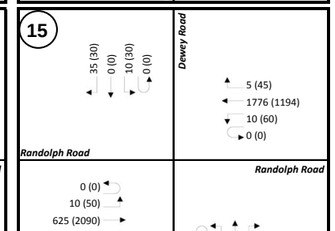


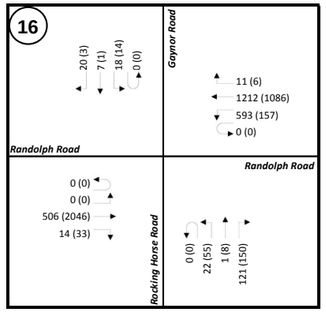


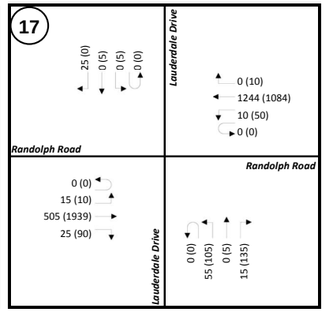


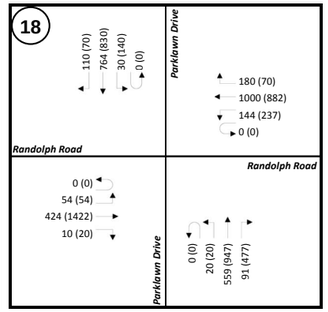


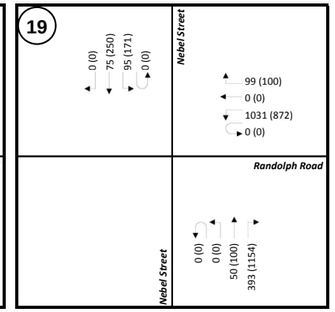


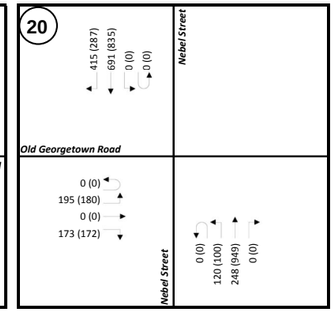


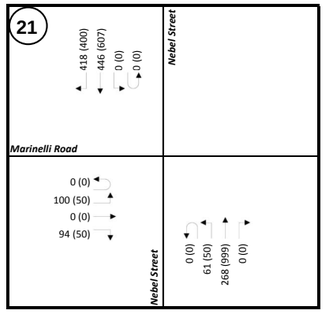


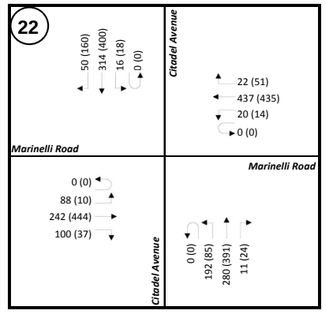


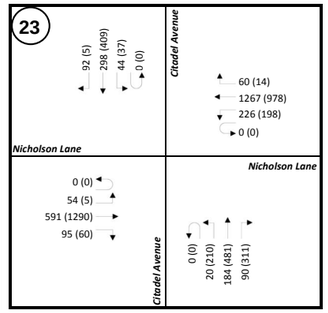


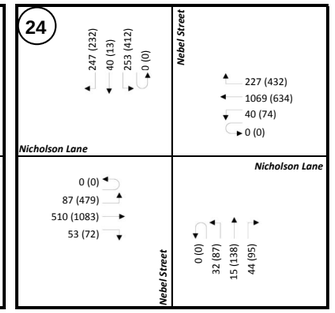


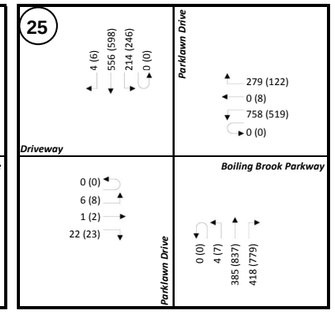












N

STV 100 Years

LEGEND

- Right Turn Movement
- Through Movement
- Left Turn Movement
- U-Turn Movement

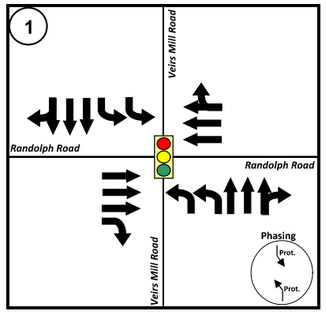
XX Intersection Number

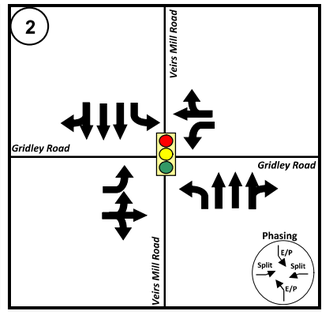
MONTGOMERY COUNTY MARYLAND 1776

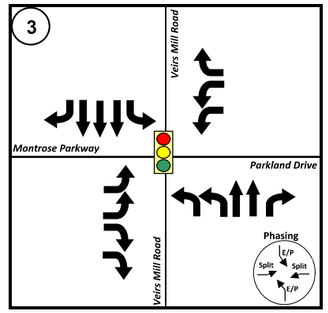
Montrose Parkway BRT Study

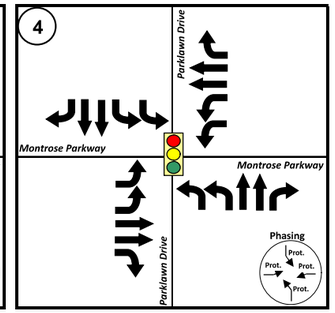
Figure 2

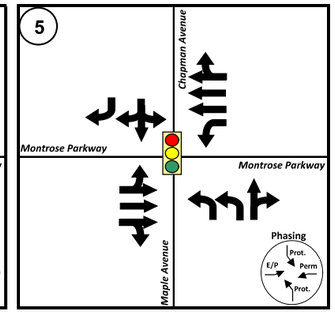
2040 Peak Hour Vehicular Volumes

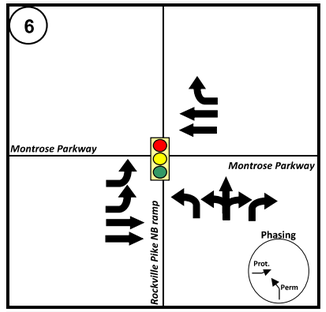


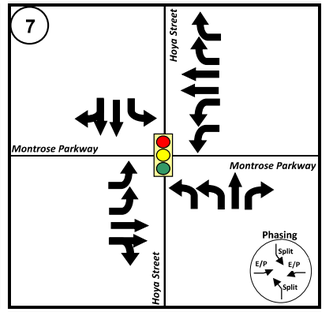


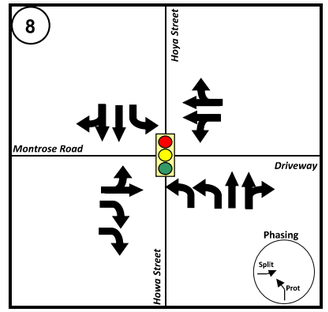


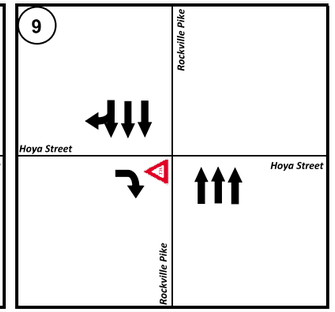


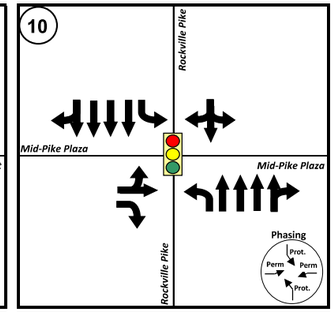


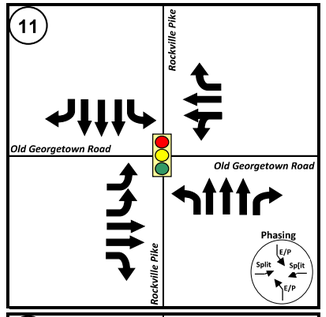


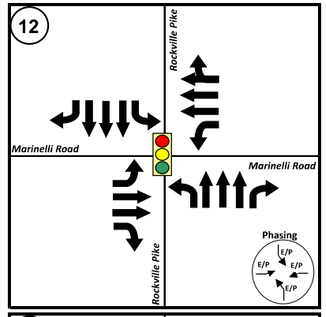


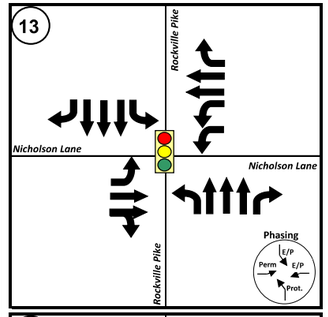


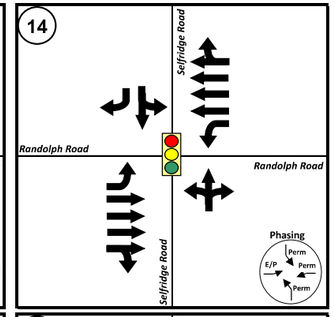


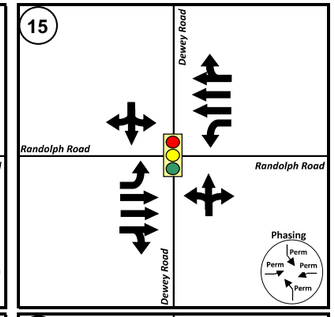


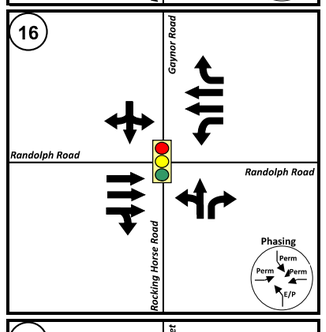


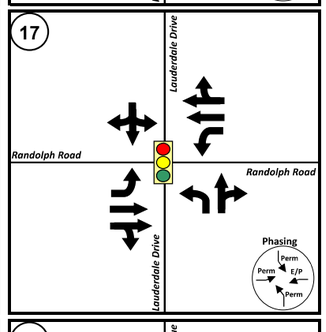


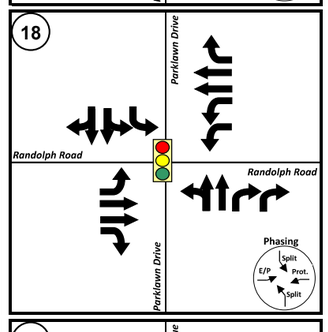


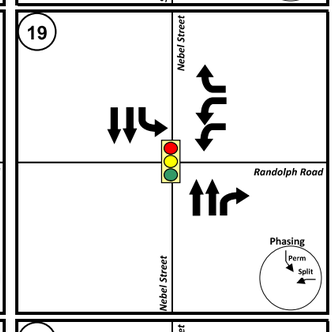


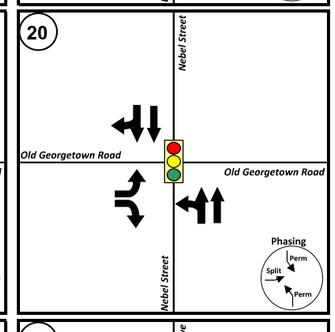


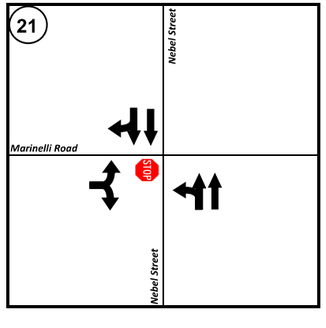


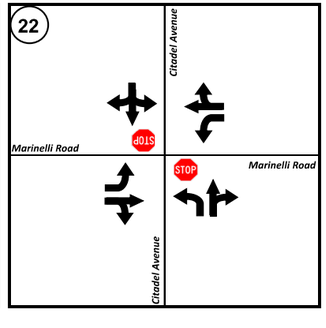


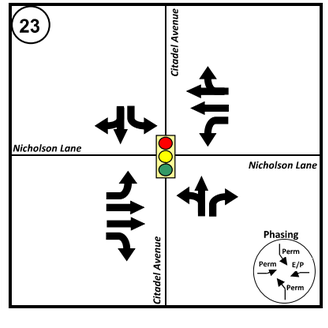


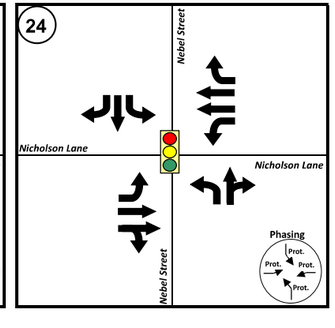


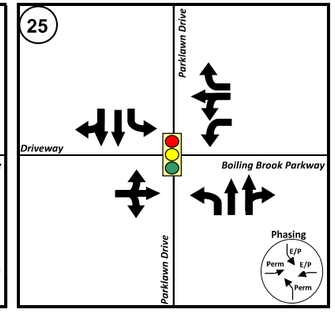


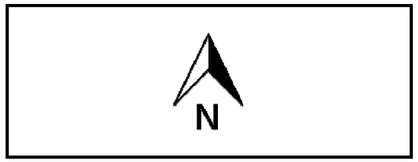












STV 100 Years

LEGEND

Lane Configurations

Signalized Intersection

STOP Unsignalized Intersection

Split Split Phasing
E/P Exclusive/Permissive Phasing
Prot. Protected Phasing
Perm Permissive Phasing
RTO Right Turn Overlap
NTOR No Turn On Red

MONTGOMERY COUNTY MARYLAND 1776

Montrose Parkway BRT Study

Figure 3

2040 Lane Configurations and Traffic Control

5. 2040 Model Development

VISSIM software was used to model each of the build alternatives for the completion of the western portion of BRT Corridor 7: Randolph Road. Signal phasing and cycle lengths for each intersection were based on the Synchro files provided by SHA, as described previously. The timings were optimized with the 2040 volumes, shown in Figure 2, and the resulting splits were utilized for this analysis. VISSIM parameters including waiting time before diffusion, emergency stop distance, and lane change distance were adjusted to reflect an urban environment involving close intersection spacing and higher than average density.

Simulation parameters were kept constant between each alternative. A 15-minute seeding time was used to ensure that vehicles could populate the network before the peak hour recording interval began. Each simulation was run ten times, at a resolution of 10 time steps per second for 60 minutes.

It should be noted that, at the direction of the County, this study does not include an Existing Conditions analysis; therefore calibration was not conducted. Without a calibrated model, results from the alternatives models are not useful for extracting accurate projections of design year level of service (LOS), delay, or specific travel time information. However, the models provide a useful *relative* comparison between the build alternatives.

6. Alternative 1

Alternative 1 assumes BRT Corridor 7 follows Veirs Mill Road from Randolph Road to Parkland Drive, then proceeds west along Montrose Parkway and along MD 355 to the White Flint Metro Station. The proposed route and stations for Alternative 1 are shown in **Figure 4**.

Based on Resolution Number 17-952, between Veirs Mill Road and Maple Avenue, the BRT would run in a single, reversible lane in the peak direction and in mixed traffic along Montrose Parkway in the off peak direction. It was assumed that the reversible lane would run in the westbound direction during the AM peak hour and in the eastbound direction during the PM peak hour. Ten minute headways were assumed for buses along the Randolph Road Corridor, based on information provided in a Rapid Transit System (RTS) Service Planning and System Integration Study presentation to MCDOT.

Resolution Number 17-952 also states that the Veirs Mill BRT Corridor consists of one bidirectional bus lane in the median of the roadway. In order to accommodate the median-running bus lane, protected left-turn phasing was assumed in the north- and southbound directions at the intersections of Veirs Mill Road at Gridley Road and Veirs Mill Road at Montrose Parkway. The Veirs Mill corridor buses were added to the network in order to accurately model the operations of the bidirectional bus lane. Similarly to the Randolph Road corridor, ten minute headways were assumed for buses along the Veirs Mill Road corridor.

The ultimate alignment along Rockville Pike does include dedicated BRT right-of-way; however, since details of the operations of this right-of-way are currently unavailable, it was assumed for this study that the BRT Corridor 7 vehicles would travel in mixed traffic along this section of Rockville Pike.


N
Halpine Village
Parklawn Cemetery
Rock Creek Stream Valley Park
Robindale
Stoney Brook Estates
Stoney Brook Park
Connecticut Avenue Park
Spring Lake Park
Rockville
Viers Mill Village
Randolph Hills
Rock Creek Park
Adrian St
Viers Mill Rd
Randolph Rd
Parklawn Dr
Fishers Ln
Parklawn Ter
Twinbrook Pky
Halpine Rd
Holland Rd
Ridgeway Ave
Vandegrift Ave
Pier Dr
Besley Ct
Halpine Pl
Mercury Dr
Listra Rd
Arbutus Ave
Wissahican Ave
Larkin Pl
Evanston St
Falcon St
Faroe Pl
Weiss St
Robindale Dr
Caldwell St
Parkland Dr
Bayne St
Turkey Branch Pkwy
Littleton St
Neola Rd
Jeffry St
Joliet St
Fogel Ln
Delancy Dr
Bushey Dr
Isbell St
Havard St
Weller Rd
Barbara Rd
Conger St
Elby St
Minden Rd
Ilford Rd
Colie Dr
Downer Dr
Atherton Dr
Edgebrook Rd
Middle Rd
Dewey Rd
Clearfield Rd
Gridley Rd
Selfridge Rd
Sigsbee Rd
Randolph Rd
Gannon Rd
Delano St
Brightview
Bennion Rd
Sampson Rd
Ferrara Dr
Charles Rd
Mentone Rd
Indigo Rd
Emden St
Idlewood Rd
Goodloe Rd
Dahill Rd
Round Hill Rd
Adams Dr
Lantern Dr
Connecticut Ave
Garrett Park Rd
Ivy Glen Rd
Ingersol Dr
Byrd
Dewey Rd
Stickley Rd
Hunters Ln
Mori Dr
Ertter Dr
Otis Dr
Putnam Rd
Gaynor Rd
Brentford Dr
Braxfield Ct
Village Square Ter
Washington Ave
Carroll Ave
Nebel St
Wilkins Ave
Chapman Ave
Thompson Ave
Rockville Pike
Maple Ave
Galena Rd
Ashley Dr
Olden Rd
Rocking Horse Rd
Red Fox Rd
Oxbow Rd
Topping Rd
Boiling Brook Pky
Wyaconda Rd
Wilwyn Way
Patapsco Dr
Creek Shore Dr
Schuylkill
CSX Transportation
Marinelli Rd
Citadel Ave
Old Georgetown Rd
Nicholson Ln
Huff Ct
Tudor Ln
Woodglen Dr
Wallwris
Crooks
Lamay Rd
Arlington Rd
Ellsworth Dr
Manor
Blvd
580
586
355
187
183
185
LEGEND
Proposed Montrose Parkway Connection
Future BRT Corridor 10: Veirs Mill Road
Future BRT Corridor 4: Rockville Pike
Future BRT Corridor 7: Randolph Road
Alternative 1 for Western Portion of BRT Corridor 7
Proposed BRT Station
White Flint Metro Station
STV 100 Years
MONTGOMERY COUNTY MARYLAND
Montrose Parkway BRT Study
Figure 4
Alternative 1
Proposed BRT Alignment

6.1. Alternative 1 Results

The BRT VISSIM measures of effectiveness (MOE's) for Alternative 1 include the BRT travel times between each station and from end to end of the western portion of the Randolph Road corridor, in addition to the BRT approach delays per intersection. The VISSIM BRT travel time outputs are included in **Appendix B** and summarized in **Table 1**.

Table 1: Alternative 1 BRT Travel Times

Alternative 1 BRT Travel Times (minutes:seconds)		
Eastbound	AM Peak Hour	PM Peak Hour
White Flint Metro Station to Montrose Parkway at Parklawn Drive Station	4:21	10:00
Montrose Parkway at Parklawn Drive Station to Veirs Mill Road at Montrose Parkway Station	2:24	2:47
Veirs Mill Road at Montrose Parkway Station to Veirs Mill Road at Randolph Road Station	2:20	3:10
End to End (Including Intermittent Dwelling)	**9:05**	**15:57**
Westbound	AM Peak Hour	PM Peak Hour
Veirs Mill Road at Randolph Road Station to Veirs Mill Road at Montrose Parkway Station	1:46	1:56
Veirs Mill Road at Montrose Parkway Station to Montrose Parkway at Parklawn Drive Station	2:36	2:38
Montrose Parkway at Parklawn Drive Station to White Flint Metro Station	5:10	11:16
End to End (Including Intermittent Dwelling)	**9:32**	**15:50**

As shown in Table 1, the end to end travel times for the east- and westbound BRT during the AM peak hour are 9:05 and 9:32, respectively. The east- and westbound BRT travel times are 15:57 and 15:50, respectively, during the PM peak hour. The longer travel times during the PM peak hour can be largely attributed to the congestion projected along Rockville Pike. Travel times along Montrose Parkway between Parklawn Drive and Veirs Mill Road are relatively consistent and account for a small portion of the end to end travel times.

The BRT approach delays per intersection are included in **Appendix C** and summarized in **Table 2**.

Table 2: Alternative 1 BRT Approach Delays per Intersection

BRT Intersection Delay (seconds)				
Intersection	Eastbound		Westbound	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Veirs Mill Road at Randolph Road Station				
Veirs Mill Road at Gridley Road	20	35	11	15
Veirs Mill Road at Montrose Parkway/Parkland Drive	34	63	67	66
Montrose Parkway at Parklawn Drive Station				
Montrose Parkway at Parklawn Drive	0	0	1	1
Montrose Parkway at Maple Avenue/Chapman Avenue	55	93	23	66
Montrose Parkway at Rockville Pike northbound ramps	16	41	12	84
Montrose Parkway at Hoya Street	N/A	N/A	4	4
Hoya Street at Montrose Road	N/A	N/A	12	7
Rockville Pike at Mid-Pike Plaza	11	107	5	85
Rockville Pike at Old Georgetown Road	45	152	44	142
White Flint Metro Station				
Total BRT Intersection Delay	**181**	**491**	**179**	**470**

As shown in Table 2, the BRT is projected to incur a total intersection delay of 181 seconds in the eastbound direction and 179 seconds in the westbound direction during the AM peak hour. During the PM peak hour, the BRT incurs 491 and 470 seconds of intersection delay in the east- and westbound directions, respectively. As with the travel time results, the primary BRT intersection delay occurs along Rockville Pike.

6.2. Alternative 1 Option A Results

As part of Alternative 1, the option to route the BRT in mixed traffic along Montrose Parkway rather than a reversible lane was considered. Alternative 1 Option A continues to assume a bidirectional bus lane in the median of Veirs Mill Road, as proposed for BRT Corridor 10. The BRT travel time outputs are included in **Appendix D** and summarized in **Table 3**.

Table 3: Alternative 1 Option A BRT Travel Times

Alternative 1 Option A BRT Travel Times (minutes:seconds)		
Eastbound	AM Peak Hour	PM Peak Hour
White Flint Metro Station to Montrose Parkway at Parklawn Drive Station	4:19	10:16
Montrose Parkway at Parklawn Drive Station to Veirs Mill Road at Montrose Parkway Station	2:23	7:52
Veirs Mill Road at Montrose Parkway Station to Veirs Mill Road at Randolph Road Station	2:21	3:07
End to End (Including Intermittent Dwelling)	**9:03**	**21:15**
Westbound	AM Peak Hour	PM Peak Hour
Veirs Mill Road at Randolph Road Station to Veirs Mill Road at Montrose Parkway Station	1:49	1:46
Veirs Mill Road at Montrose Parkway Station to Montrose Parkway at Parklawn Drive Station	2:36	2:36
Montrose Parkway at Parklawn Drive Station to White Flint Metro Station	5:26	12:32
End to End (Including Intermittent Dwelling)	**9:51**	**16:54**

As shown in Table 3, the end to end travel times for the east- and westbound BRT during the AM peak hour are 9:03 and 9:51, respectively. The east- and westbound BRT travel times are 21:15 seconds and 16:54 seconds, respectively, during the PM peak hour. As with Alternative 1, the longer travel times during the PM peak hour can be largely attributed to the congestion projected along Rockville Pike. All Option A travel times are similar to the Alternative 1 travel times, with the exception of the section of Montrose Parkway between Parklawn drive and Veirs Mill Road during the PM peak hour, which increases by more than five minutes (takes nearly three times as long) without the benefit of an exclusive lane. While this travel time savings shows that the exclusive lane offers some benefit, it may not be substantial enough to justify the substantial additional infrastructure costs of an added lane along Montrose Parkway.

The BRT approach delays per intersection are included in **Appendix E** and summarized in **Table 4**.

Table 4: Alternative 1 Option A BRT Approach Delays per Intersection

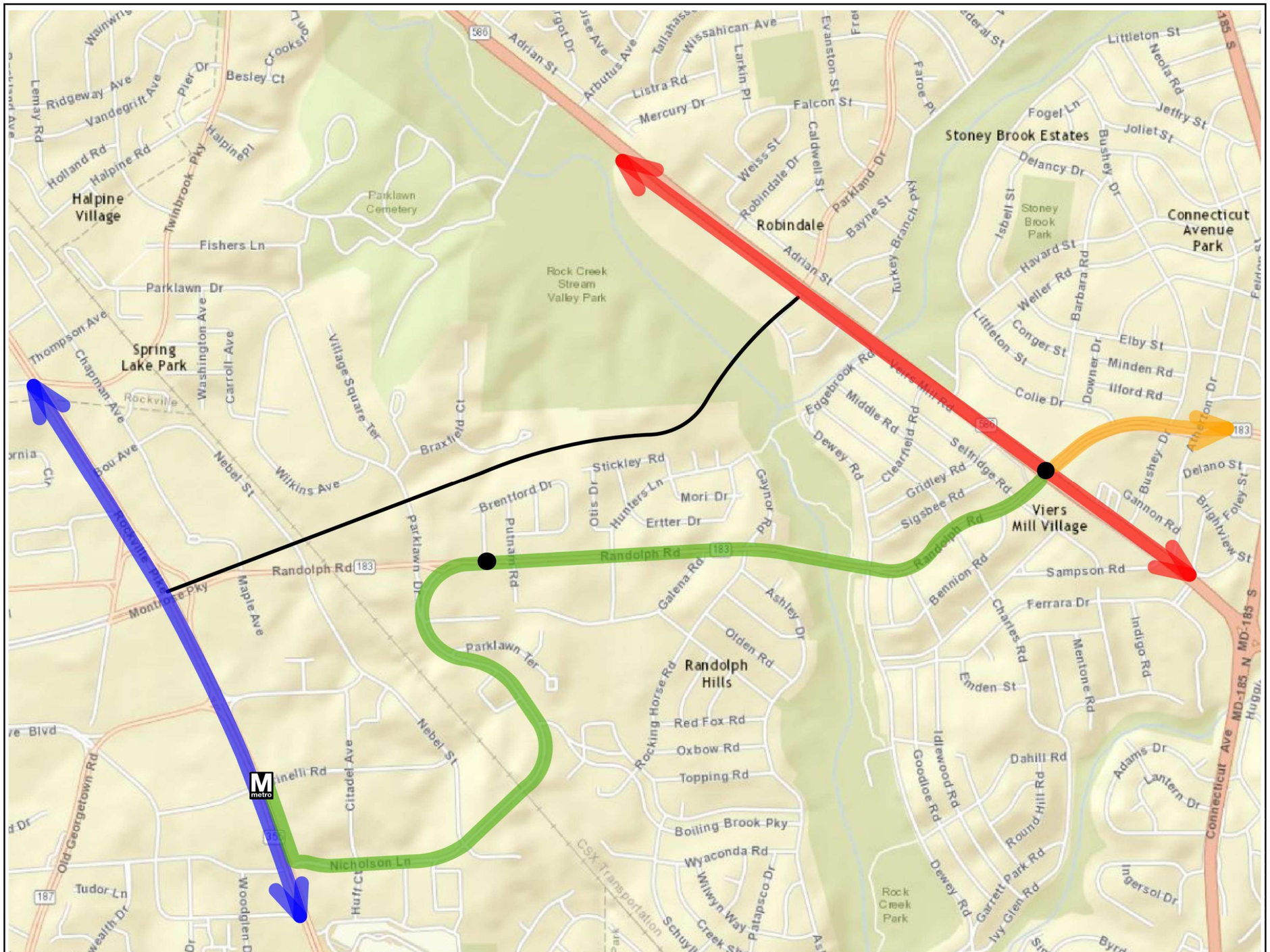
BRT Intersection Delay (seconds)				
Intersection	Eastbound		Westbound	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Veirs Mill Road at Randolph Road Station				
Veirs Mill Road at Gridley Road	20	28	12	12
Veirs Mill Road at Montrose Parkway/Parkland Drive	35	42	68	68
Montrose Parkway at Parklawn Drive Station				
Montrose Parkway at Parklawn Drive	0	2	0	0
Montrose Parkway at Maple Avenue/Chapman Avenue	52	74	23	70
Montrose Parkway at Rockville Pike northbound ramps	14	38	38	87
Montrose Parkway at Hoya Street	N/A	N/A	3	3
Hoya Street at Montrose Road	N/A	N/A	3	5
Rockville Pike at Mid-Pike Plaza	11	100	12	95
Rockville Pike at Old Georgetown Road	45	152	27	152
White Flint Metro Station				
Total BRT Intersection Delay	**177**	**436**	**186**	**492**

As shown in Table 4, the BRT is projected to incur a total intersection delay of 177 seconds in the eastbound direction and 186 seconds in the westbound direction during the AM peak hour. During the PM peak hour, the BRT incurs 436 and 492 seconds of intersection delay in the east- and westbound directions, respectively. As with the travel time results, the primary BRT intersection delay occurs along Rockville Pike. The total intersection delay for Alternative 1 Option A is comparable to the total intersection delay projected for Alternative 1.

7. Alternative 2

Alternative 2 assumes BRT Corridor 7 proceeds in mixed traffic along Randolph Road, south onto Parklawn Drive, and west onto Nicholson Lane to the White Flint Metro Station. The proposed route and stations for Alternative 2 are shown in **Figure 5**. Ten minute headways were assumed for buses along the Randolph Road corridor.

With the Alternative 2 alignment, the BRT network could utilize existing pedestrian and bus stop facilities along Randolph Road. Since pedestrian activity already exists along Randolph Road, the BRT would be more readily accessible under the Alternative 2 scenarios. Further, Alternative 2 would provide direct access to residential developments to the north and south of Randolph Road.



LEGEND

- Proposed Montrose Parkway Connection
- Future BRT Corridor 10: Veirs Mill Road
- Future BRT Corridor 4: Rockville Pike
- Future BRT Corridor 7: Randolph Road
- Alternative 2 for Western Portion of BRT Corridor 7
- Proposed BRT Station
- White Flint Metro Station

STV 100 Years

Montrose Parkway BRT Study

Figure 5

Alternative 2
Proposed BRT Alignment

7.1. Alternative 2 Results

The BRT transit VISSIM outputs for Alternative 2 include the BRT travel times between each station and from end to end of the western portion of the Randolph Road corridor in addition to the BRT approach delays per intersection. The BRT travel time outputs are included in **Appendix F** and summarized in **Table 5**.

Table 5: Alternative 2 BRT Travel Times

Alternative 2 BRT Travel Times (minutes:seconds)		
Eastbound	AM Peak Hour	PM Peak Hour
White Flint Metro Station to Randolph Road at Lauderdale Drive Station	8:47	11:44
Randolph Road at Lauderdale Drive Station to Veirs Mill Road at Randolph Road Station	3:25	3:56
End to End (Including Intermittent Dwelling)	**12:12**	**15:40**
Westbound	AM Peak Hour	PM Peak Hour
Veirs Mill Road at Randolph Road Station to Randolph Road at Lauderdale Drive Station	2:55	2:47
Randolph Road at Lauderdale Drive Station to White Flint Metro Station	7:53	7:55
End to End (Including Intermittent Dwelling)	**10:48**	**10:42**

As shown in Table 5, the end to end travel times for the east- and westbound BRT during the AM peak hour are 12:12 and 10:48, respectively. The east- and westbound BRT travel times are 15:40 and 10:42, respectively, during the PM peak hour. Travel times along Randolph Road are generally consistent, with the exception of the eastbound direction during the PM peak hour, which is almost four minutes longer than the westbound direction. The longer travel times can be largely attributed to the congestion projected along Rockville Pike and Nicholson Lane. Alternative 2 end to end travel times are relatively similar to Alternative 1, with the exception of PM westbound, which are more than five minutes (nearly 40 percent) faster under Alternative 2.

The BRT approach delays per intersection are included in **Appendix G** and summarized in **Table 6**.

Table 6: Alternative 2 BRT Approach Delays per Intersection

BRT Intersection Delay (seconds)				
Intersection	Eastbound		Westbound	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
White Flint Metro Station				
Rockville Pike at Marinelli Road	56	76	50	95
Rockville Pike at Nicholson Lane	69	186	5	21
Nicholson Lane at Citadel Avenue	49	41	38	23
Nicholson Lane/Parklawn Drive at Nebel Street	23	16	41	8
Parklawn Drive at Boiling Brook Parkway	15	29	0	1
Randolph Road at Parklawn Drive	60	27	69	96
Randolph Road at Lauderdale Drive	6	8	20	22
Randolph Road at Lauderdale Drive Station				
Randolph Road at Gaynor Road/Rocking Horse Road	5	21	3	5
Randolph Road at Dewey Road	2	0	5	2
Randolph Road at Selfridge Road	6	11	23	21
Veirs Mill Road at Randolph Road Station				
Total BRT Intersection Delay	**291**	**415**	**254**	**294**

As shown in Table 6, the BRT is projected to incur a total intersection delay of 291 seconds in the eastbound direction and 254 seconds in the westbound direction during the AM peak hour. During the PM peak hour, the BRT incurs 415 and 294 seconds of intersection delay in the east- and westbound directions, respectively. As with the travel time results, the primary BRT intersection delay occurs along Rockville Pike, particularly in the eastbound direction. Substantial westbound delays of 69 seconds and 96 seconds also occur at the intersection of Randolph Road at Parklawn Drive, during the AM and PM peak hours, respectively.

7.2. Alternative 2 Option A Results

A sub option to Alternative 2 was evaluated and considers the BRT using Nebel Street and Marinelli Road rather than Parklawn Drive and Nicholson Lane if the at-grade Randolph Road crossing of the CSX tracks is retained. It should be noted that the traffic impacts associated with the at-grade crossing were not included in the analysis. However, the traffic impacts associated with the at-grade crossing should be further considered if this alternative is selected. The proposed route and stations for Alternative 2 Option A are shown in **Figure 6**. The BRT travel time outputs are included in **Appendix H** and summarized in **Table 7**.

N

STV 100 Years

LEGEND

- Proposed Montrose Parkway Connection
- Future BRT Corridor 10: Veirs Mill Road
- Future BRT Corridor 4: Rockville Pike
- Future BRT Corridor 7: Randolph Road
- Alternative 2 Option A for Western Portion of BRT Corridor 7
- Proposed BRT Station
- White Flint Metro Station

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Montrose Parkway BRT Study

Figure 6

Alternative 2 Option A
Proposed BRT Alignment

Table 7: Alternative 2 Option A BRT Travel Times

Alternative 2 Option A BRT Travel Times (minutes:seconds)		
Eastbound	AM Peak Hour	PM Peak Hour
White Flint Metro Station to Randolph Road at Lauderdale Drive Station	3:39	5:11
Randolph Road at Lauderdale Drive Station to Veirs Mill Road at Randolph Road Station	2:33	3:04
End to End (Including Intermittent Dwelling)	**6:12**	**8:15**
Westbound	AM Peak Hour	PM Peak Hour
Veirs Mill Road at Randolph Road Station to Randolph Road at Lauderdale Drive Station	2:49	2:51
Randolph Road at Lauderdale Drive Station to White Flint Metro Station	4:56	7:09
End to End (Including Intermittent Dwelling)	**7:45**	**10:00**

As shown in Table 7, the end to end travel times for the east- and westbound BRT during the AM peak hour are 6:12 and 7:45, respectively. The east- and westbound BRT travel times are 8:15 and 10:00, respectively, during the PM peak hour. The end to end travel times in the AM and PM peak hours are shorter than each of the other alternatives evaluated. This can be primarily attributed to the fact that the BRT does not run along Rockville Pike under Alternative 2 Option A.

The BRT approach delays per intersection are included in **Appendix I** and summarized in **Table 8**.

Table 8: Alternative 2 Option A BRT Approach Delays per Intersection

BRT Intersection Delay (seconds)				
Intersection	Eastbound		Westbound	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
White Flint Metro Station				
Marinelli Road at Citadel Avenue	3	3	1	11
Marinelli Road at Nebel Street	27	53	4	5
Old Georgetown Road at Nebel Street	3	12	4	1
Randolph Road at Nebel Street	2	11	9	17
Randolph Road at Parklawn Drive	15	58	46	61
Randolph Road at Lauderdale Drive	1	0	20	22
Randolph Road at Lauderdale Drive Station				
Randolph Road at Gaynor Road/Rocking Horse Road	1	1	4	6
Randolph Road at Dewey Road	0	0	3	2
Randolph Road at Selfridge Road	7	24	20	21
Veirs Mill Road at Randolph Road Station				
Total BRT Intersection Delay	**59**	**162**	**111**	**146**

As shown in Table 8, the BRT is projected to incur a total intersection delay of 59 seconds in the eastbound direction and 111 seconds in the westbound direction during the AM peak hour. During the PM peak hour, the BRT incurs 162 and 146 seconds of intersection delay in the east- and westbound directions, respectively. The total intersection delay for Alternative 2 Option A is significantly lower than the total intersection delay projected for each of the other alternatives. As with the travel times results, this can be attributed to the fact that Alternative 2 Option A does not route the BRT along Rockville Pike.

8. Summary of Findings

Montgomery County plans to implement a BRT network to expand the transit infrastructure within the County. An alternatives analysis was conducted to evaluate the BRT travel times and BRT intersection delays projected for the completion of the western portion of BRT Corridor 7: Randolph Road.

The first alternative assumes the BRT in dedicated right-of-way follows Veirs Mill Road from Randolph Road to Parkland Drive, then proceeds west along Montrose Parkway and joins Rockville Pike to the White Flint Metro Station. The second alternative assumes the BRT proceeds in mixed traffic on westbound Randolph Road, south on Parklawn Drive, and west on Nicholson Lane to the White Flint Metro Station. Each Alternative also includes a sub-option, Option A, with minor changes to the alignment. Alternative 1 Option A includes the option to route the BRT in mixed traffic along Montrose Parkway rather than a reversible lane. Alternative 2 Option A considers the BRT using Nebel Street rather than Parklawn Drive and Marinelli Road rather than Nicholson Lane if the at-grade Randolph Road crossing of the CSX tracks is retained. It should be noted that the traffic impacts associated with the at-grade crossing were not included in the analysis of Alternative 2 Option A. However, the traffic impacts associated with the at-grade crossing should be considered if

this alternative is selected. The end to end BRT travel times are summarized in **Table 9**, and the total BRT intersection delays are summarized in **Table 10**.

Table 9: Summary of End to End BRT Travel Times

End to End BRT Travel Times (minutes:seconds)				
	Eastbound		Westbound	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Alternative 1	9:05	15:57	9:32	15:50
Alternative 1 Option A	9:03	21:15	9:51	16:54
Alternative 2	12:12	15:40	10:48	10:42
Alternative 2 Option A	6:12	8:15	7:45	10:00

Table 10: Summary of Total BRT Intersection Delay

Total BRT Intersection Delay (minutes:seconds)				
	Eastbound		Westbound	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Alternative 1	3:01	8:11	2:59	7:50
Alternative 1 Option A	2:57	7:16	3:06	8:12
Alternative 2	4:51	6:55	4:14	4:54
Alternative 2 Option A	0:59	2:42	1:51	2:26

The results of the travel time and queuing analyses indicate that there are relatively consistent changes to travel time and intersection delay results between alternatives. These differences in travel times and delays are consistent in direction (i.e. increase or decrease) and order of magnitude. The only exception occurs eastbound between Alternative 1 and Alternative 1 Option A during the PM peak hour. Alternative 1 Option A has a projected travel time that is 5 minutes and 18 seconds greater than Alternative 1; however, Alternative 1 Option A has a projected total BRT intersection delay that is 55 seconds less than Alternative 1. This can be attributed to how VISSIM calculates intersection delay for each vehicle. The default VISSIM intersection delay calculation does not recognize delay for vehicles queued more than a few hundred feet away from a signal as intersection delay associated with that signal; however, this delay is included in overall travel time. The fact that there is substantial queuing projected along Montrose Parkway would affect BRT vehicles under Alternative 1 Option A, but not Alternative 1, and explains why the overall travel times for Alternative 1 Option A are greater, but the VISSIM calculated intersection delay is similar between the two alternatives.

Table 9 indicates that the Alternative 2 Option A BRT travel times are lower than all other alternatives during both the AM and PM peak hour. Additionally, the BRT is projected to incur the least total intersection delay during the AM and PM peak hours under Alternative 2 Option A. This is primarily attributed to the fact that the BRT does not run along the heavily congested Rockville Pike under Alternative 2 Option A, as it does under each of the three other Alternatives and Options.

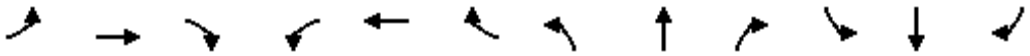
In addition to the shorter travel times and intersection delays during the AM and PM peak hours, under both of the Alternative 2 scenarios the BRT network could utilize existing pedestrian and bus stop facilities along Randolph Road. Since pedestrian activity and direct access from adjacent residential developments in close proximity to Randolph Road already exists, the BRT would be more readily accessible under Alternative 2, compared to Alternative 1 which runs along the relatively more isolated Montrose Parkway. Therefore, Alternative 2 Option A is the preferred alternative for the completion of the western portion of BRT Corridor 7: Randolph Road.

APPENDIX

A

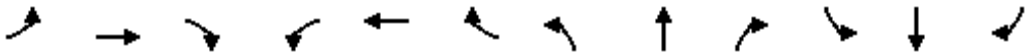
Projected Vehicular Volumes

Projected Vehicular Volumes Obtained from SHA's Veirs Mill (MD 586) Study



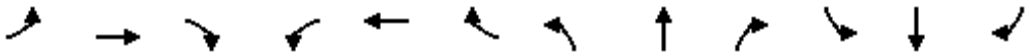
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	30	1595	645	1425	1390	175	425	335	1235	470	310	80
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	33	1734	701	1549	1511	190	462	364	1342	511	337	87
Shared Lane Traffic (%)												
Lane Group Flow (vph)	33	1734	701	1549	1701	0	462	364	1342	511	424	0

Intersection Summary



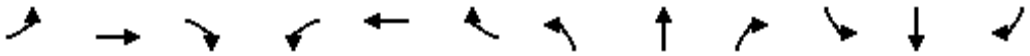
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	150	2990	160	25	2885	5	80	15	20	75	50	25
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	163	3250	174	27	3136	5	87	16	22	82	54	27
Shared Lane Traffic (%)							27%					
Lane Group Flow (vph)	163	3424	0	27	3141	0	64	61	0	0	136	27

Intersection Summary



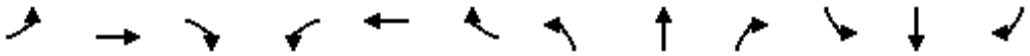
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	705	2190	190	245	1740	5	0	425	255	0	1490	1175
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	766	2380	207	266	1891	5	0	462	277	0	1620	1277
Shared Lane Traffic (%)												
Lane Group Flow (vph)	766	2587	0	266	1896	0	0	462	277	0	2897	0

Intersection Summary



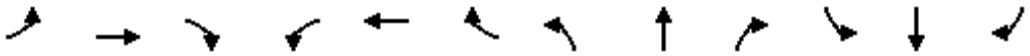
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	45	1900	470	1410	1340	250	675	325	1600	160	200	110
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	49	2065	511	1533	1457	272	734	353	1739	174	217	120
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	2065	511	1533	1729	0	734	353	1739	174	337	0

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	220	3350	90	60	2805	45	155	70	55	80	35	40
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	239	3641	98	65	3049	49	168	76	60	87	38	43
Shared Lane Traffic (%)							10%					
Lane Group Flow (vph)	239	3739	0	65	3098	0	151	153	0	0	125	43

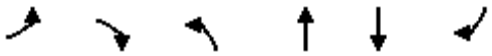
Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	1125	2335	25	265	2110	40	0	1320	415	0	715	800
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1223	2538	27	288	2293	43	0	1435	451	0	777	870
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1223	2565	0	288	2336	0	0	1435	451	0	1647	0

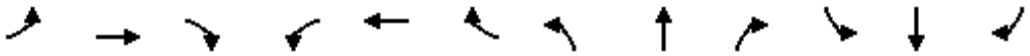
Intersection Summary

Projected Vehicular Volumes Obtained from SHA for the White Flint Sector Plan



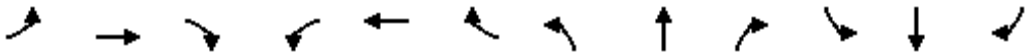
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Volume (vph)	0	0	0	1754	2290	776
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	0	0	0	1846	2411	817
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	1846	3228	0

Intersection Summary



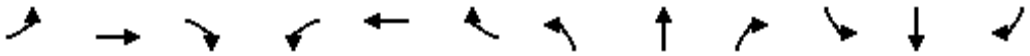
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	345	529	0	0	1323	117	298	0	230	0	0	0
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	363	557	0	0	1393	123	314	0	242	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	363	557	0	0	1393	123	0	314	242	0	0	0

Intersection Summary



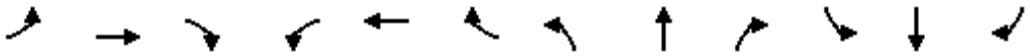
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	186	230	394	77	340	78	196	1485	41	122	2180	46
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	196	242	415	81	358	82	206	1563	43	128	2295	48
Shared Lane Traffic (%)	10%											
Lane Group Flow (vph)	176	262	415	81	358	82	206	1606	0	128	2295	48

Intersection Summary



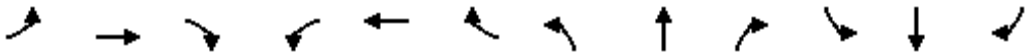
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	166	238	78	316	101	77	165	1474	202	245	2066	70
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	175	251	82	333	106	81	174	1552	213	258	2175	74
Shared Lane Traffic (%)												
Lane Group Flow (vph)	175	333	0	333	106	81	174	1552	213	258	2175	74

Intersection Summary



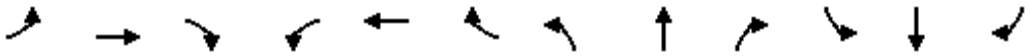
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	89	310	73	442	670	167	34	1577	199	354	2125	75
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	94	326	77	465	705	176	36	1660	209	373	2237	79
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	420	77	465	705	176	36	1660	209	373	2237	79

Intersection Summary



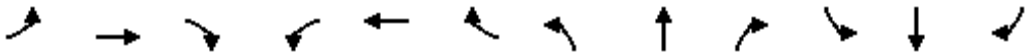
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	128	15	160	5	25	15	170	102	5	0	571	205
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	135	16	168	5	26	16	179	107	5	0	601	216
Shared Lane Traffic (%)	44%											
Lane Group Flow (vph)	76	75	168	5	42	0	179	112	0	0	817	0

Intersection Summary



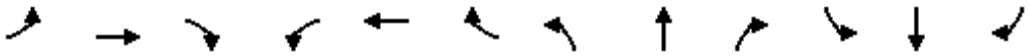
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	10	491	401	342	942	252	355	15	291	92	589	55
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	11	517	422	360	992	265	374	16	306	97	620	58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	939	0	360	992	265	374	322	0	97	620	58

Intersection Summary



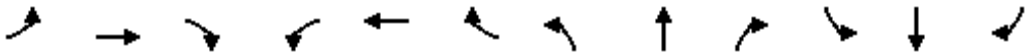
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	72	443	145	131	1258	140	69	55	41	95	504	32
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	76	466	153	138	1324	147	73	58	43	100	531	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	76	619	0	138	1324	147	0	131	43	100	531	34

Intersection Summary



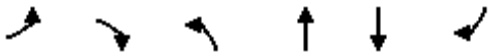
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	54	223	10	0	1000	180	20	540	0	30	685	110
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	57	235	11	0	1053	189	21	568	0	32	721	116
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	57	235	11	0	1053	189	0	589	0	29	840	0

Intersection Summary



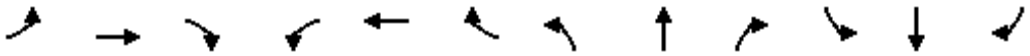
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	15	304	25	10	1116	0	55	0	15	0	0	25
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	16	320	26	11	1175	0	58	0	16	0	0	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	346	0	11	1175	0	58	16	0	0	26	0

Intersection Summary



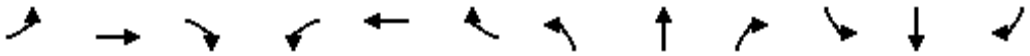
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Volume (vph)	65	84	70	159	349	115
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	68	88	74	167	367	121
Shared Lane Traffic (%)						
Lane Group Flow (vph)	68	88	74	167	367	121

Intersection Summary



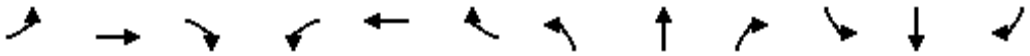
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	87	509	53	40	1344	227	32	15	44	93	40	87
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	92	536	56	42	1415	239	34	16	46	98	42	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	92	592	0	42	1654	0	34	62	0	98	134	0

Intersection Summary



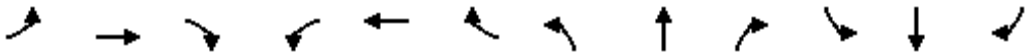
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	183	33	29	13	7	20	52	1579	98	60	2393	129
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	193	35	31	14	7	21	55	1662	103	63	2519	136
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	228	31	0	42	0	55	1765	0	63	2655	0

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	18	393	30	20	81	22	7	164	11	16	280	0
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	19	414	32	21	85	23	7	173	12	17	295	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	19	446	0	21	108	0	7	185	0	0	312	0

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	4	714	50	226	1167	60	20	184	90	44	298	20
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	4	752	53	238	1228	63	21	194	95	46	314	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	752	53	238	1291	0	0	215	95	46	335	0

Intersection Summary



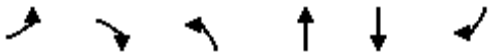
Lane Group	NBL	NBT	NBR2	SBL	SBT	SBR2	NEL	NER2	SWL	SWR2
Volume (vph)	163	480	141	90	208	84	103	100	596	185
Confl. Peds. (#/hr)										
Confl. Bikes (#/hr)										
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)										
Mid-Block Traffic (%)		0%			0%					
Adj. Flow (vph)	172	505	148	95	219	88	108	105	627	195
Shared Lane Traffic (%)										
Lane Group Flow (vph)	172	505	148	95	219	88	108	105	627	195

Intersection Summary



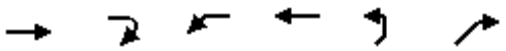
Lane Group	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	0	1292	2290	0	0	245
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Adj. Flow (vph)	0	1360	2411	0	0	258
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1360	2411	0	0	258

Intersection Summary



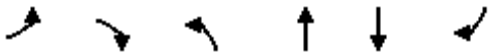
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Volume (vph)	0	0	560	91	144	0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	0	0	589	96	152	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	589	96	152	0

Intersection Summary



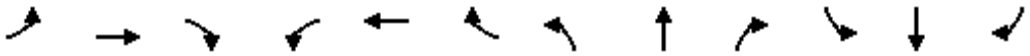
Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Volume (vph)	253	0	144	1180	0	91
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	266	0	152	1242	0	96
Shared Lane Traffic (%)						
Lane Group Flow (vph)	266	0	152	1242	0	96

Intersection Summary



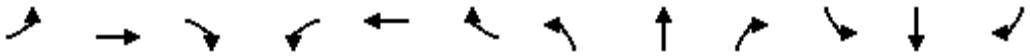
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Volume (vph)	0	0	0	3863	1736	683
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	0	0	0	4066	1827	719
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	4066	2546	0

Intersection Summary



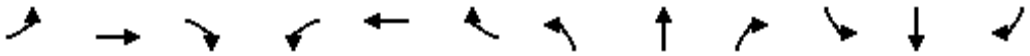
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	579	853	0	0	1147	77	996	0	676	0	0	0
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	609	898	0	0	1207	81	1048	0	712	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	609	898	0	0	1207	81	0	1048	712	0	0	0

Intersection Summary



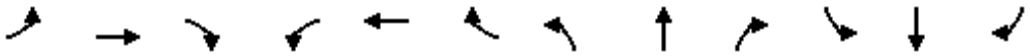
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	184	299	450	105	191	266	258	3307	26	80	1832	35
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	194	315	474	111	201	280	272	3481	27	84	1928	37
Shared Lane Traffic (%)	10%											
Lane Group Flow (vph)	175	334	474	111	201	280	272	3508	0	84	1928	37

Intersection Summary



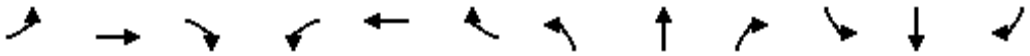
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	426	265	206	404	381	350	88	2593	140	195	1950	56
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	448	279	217	425	401	368	93	2729	147	205	2053	59
Shared Lane Traffic (%)												
Lane Group Flow (vph)	448	496	0	425	401	368	93	2729	147	205	2053	59

Intersection Summary



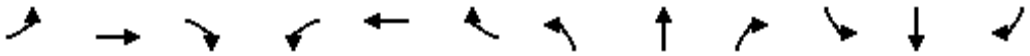
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	188	688	86	237	513	607	43	2419	335	480	2364	78
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	198	724	91	249	540	639	45	2546	353	505	2488	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	922	91	249	540	639	45	2546	353	505	2488	82

Intersection Summary



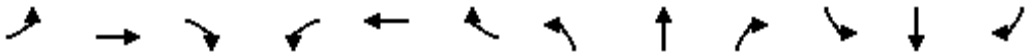
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	85	25	249	20	40	40	170	113	15	5	428	250
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	89	26	262	21	42	42	179	119	16	5	451	263
Shared Lane Traffic (%)	36%											
Lane Group Flow (vph)	57	58	262	21	84	0	179	135	0	0	719	0

Intersection Summary



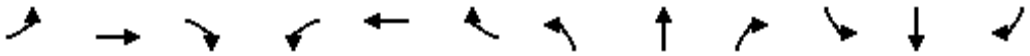
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	50	715	548	314	1236	168	482	80	506	211	456	30
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	53	753	577	331	1301	177	507	84	533	222	480	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	53	1330	0	331	1301	177	507	617	0	222	480	32

Intersection Summary



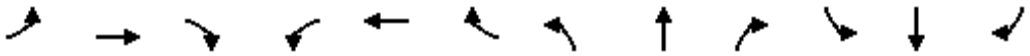
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	165	1001	197	105	585	235	288	189	188	325	441	137
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	174	1054	207	111	616	247	303	199	198	342	464	144
Shared Lane Traffic (%)												
Lane Group Flow (vph)	174	1261	0	111	616	247	0	502	198	342	464	144

Intersection Summary



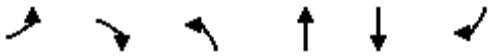
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	54	1422	20	0	837	70	20	503	0	140	480	70
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	57	1497	21	0	881	74	21	529	0	147	505	74
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	57	1497	21	0	881	74	0	550	0	132	594	0

Intersection Summary



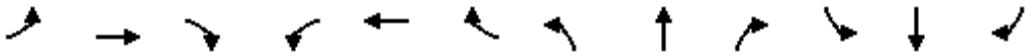
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	10	1939	90	50	984	10	105	5	135	5	5	0
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	11	2041	95	53	1036	11	111	5	142	5	5	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	2136	0	53	1047	0	111	147	0	0	10	0

Intersection Summary



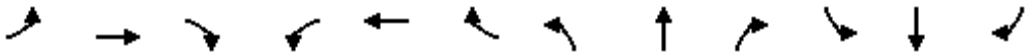
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Volume (vph)	463	86	81	340	357	129
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	487	91	85	358	376	136
Shared Lane Traffic (%)						
Lane Group Flow (vph)	487	91	85	358	376	136

Intersection Summary



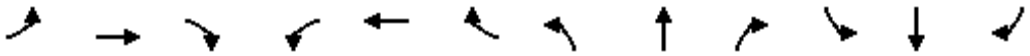
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	183	1433	72	74	873	282	87	38	95	340	11	191
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	193	1508	76	78	919	297	92	40	100	358	12	201
Shared Lane Traffic (%)												
Lane Group Flow (vph)	193	1584	0	78	1216	0	92	140	0	358	213	0

Intersection Summary



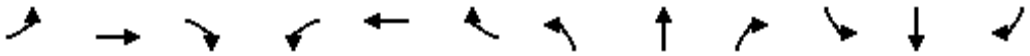
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	698	14	70	43	22	92	83	3781	36	19	1886	106
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	735	15	74	45	23	97	87	3980	38	20	1985	112
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	750	74	0	165	0	87	4018	0	20	2097	0

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	10	401	37	14	550	51	10	391	24	18	386	10
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	11	422	39	15	579	54	11	412	25	19	406	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	461	0	15	633	0	11	437	0	0	436	0

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	5	1040	10	198	978	14	10	431	311	37	409	5
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	5	1095	11	208	1029	15	11	454	327	39	431	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	1095	11	208	1044	0	0	465	327	39	436	0

Intersection Summary



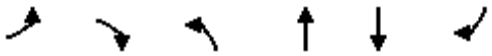
Lane Group	NBL	NBT	NBR2	SBL	SBT	SBR2	NEL	NER2	SWL	SWR2
Volume (vph)	163	346	462	215	287	125	92	150	253	100
Confl. Peds. (#/hr)										
Confl. Bikes (#/hr)										
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)										
Mid-Block Traffic (%)		0%			0%					
Adj. Flow (vph)	172	364	486	226	302	132	97	158	266	105
Shared Lane Traffic (%)										
Lane Group Flow (vph)	172	364	486	226	302	132	97	158	266	105

Intersection Summary



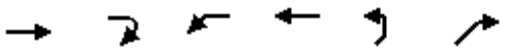
Lane Group	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	0	3207	1736	0	0	245
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Adj. Flow (vph)	0	3376	1827	0	0	258
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	3376	1827	0	0	258

Intersection Summary



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Volume (vph)	0	0	523	477	237	0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	0	0	551	502	249	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	551	502	249	0

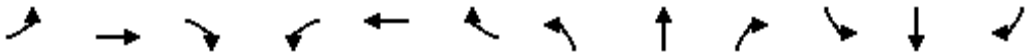
Intersection Summary



Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Volume (vph)	1562	0	237	907	0	477
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1644	0	249	955	0	502
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1644	0	249	955	0	502

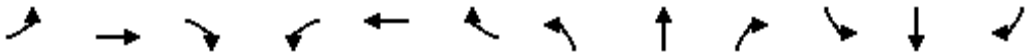
Intersection Summary

Projected Vehicular Volumes Obtained from SHA's Montrose Parkway Study



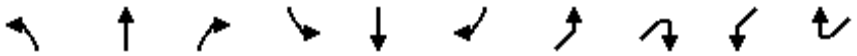
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	155	1000	0	0	1605	300	100	0	300	0	0	0
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	168	1087	0	0	1745	326	109	0	326	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	168	1087	0	0	1745	326	0	109	326	0	0	0

Intersection Summary



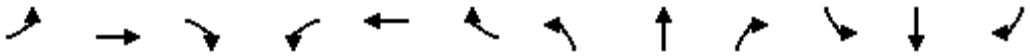
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	125	1100	75	150	1790	450	30	210	220	400	200	85
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	132	1158	79	158	1884	474	32	221	232	421	211	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	132	1237	0	158	1884	474	32	221	232	421	211	89

Intersection Summary



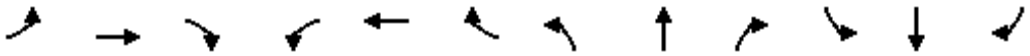
Lane Group	NBL	NBT	NBR2	SBL	SBT	SBR2	NEL	NER2	SWL	SWR2
Volume (vph)	410	400	590	280	425	185	200	295	175	260
Confl. Peds. (#/hr)	60		60	60			60	60	60	60
Confl. Bikes (#/hr)										
Peak Hour Factor	0.92	0.92	0.95	0.92	0.92	0.92	0.92	0.95	0.92	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)										
Mid-Block Traffic (%)		0%			0%					
Adj. Flow (vph)	446	435	621	304	462	201	217	311	190	274
Shared Lane Traffic (%)										
Lane Group Flow (vph)	446	435	621	304	663	0	217	311	190	274

Intersection Summary



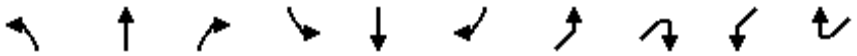
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	240	1535	0	0	1170	325	160	0	700	0	0	0
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	261	1668	0	0	1272	353	174	0	761	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	261	1668	0	0	1272	353	0	174	761	0	0	0

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	225	1875	135	100	1295	520	25	220	125	500	250	175
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	237	1974	142	105	1363	547	26	232	132	526	263	184
Shared Lane Traffic (%)												
Lane Group Flow (vph)	237	2116	0	105	1363	547	26	232	132	526	263	184

Intersection Summary



Lane Group	NBL	NBT	NBR2	SBL	SBT	SBR2	NEL	NER2	SWL	SWR2
Volume (vph)	375	500	395	260	475	165	255	375	350	350
Confl. Peds. (#/hr)	60		60	60			60	60	60	60
Confl. Bikes (#/hr)										
Peak Hour Factor	0.92	0.92	0.95	0.92	0.92	0.92	0.92	0.95	0.92	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)										
Mid-Block Traffic (%)		0%			0%					
Adj. Flow (vph)	408	543	416	283	516	179	277	395	380	368
Shared Lane Traffic (%)										
Lane Group Flow (vph)	408	543	416	283	695	0	277	395	380	368

Intersection Summary

APPENDIX

B

Alternative 1 BRT Travel Time VISSIM Outputs

AM Peak Hour

Alternative 1 BRT Travel Times (minutes:seconds)											
	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Average
Eastbound											
White Flint Metro Station to Montrose Parkway at Parklawn Drive Station	229.4	260.5	254.1	265.5	271.9	244.6	278.9	267.6	257.5	276.6	4:21
Montrose Parkway at Parklawn Drive Station to Veirs Mill Road at Montrose Parkway Station	133.8	138.5	171.9	147.1	156.5	134.9	150.5	137.5	130.7	142.9	2:24
Veirs Mill Road at Montrose Parkway Station to Veirs Mill Road at Randolph Road Station	146.8	150.1	135.6	134.2	135.6	140.6	150.4	123.2	126.2	155.0	2:20
End to End (Including Intermittent Dwelling)											**9:05**
Westbound											
Veirs Mill Road at Randolph Road Station to Veirs Mill Road at Montrose Parkway Station	91.5	107.2	116.4	113.5	121.5	85.1	126.2	101.5	85.3	115.5	1:46
Veirs Mill Road at Montrose Parkway Station to Montrose Parkway at Parklawn Drive Station	156.2	163.6	162.9	164.8	162.3	160.8	157.9	147.8	129.0	159.2	2:36
Montrose Parkway at Parklawn Drive Station to White Flint Metro Station	298.5	320.0	320.2	301.0	324.2	301.9	304.4	307.3	315.4	311.9	5:10
End to End (Including Intermittent Dwelling)											**9:32**

PM Peak Hour

Alternative 1 BRT Travel Times (minutes:seconds)											
	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Average
Eastbound											
White Flint Metro Station to Montrose Parkway at Parklawn Drive Station	599.3	594.0	566.0	577.5	604.5	655.7	636.1	592.0	580.1	597.5	10:00
Montrose Parkway at Parklawn Drive Station to Veirs Mill Road at Montrose Parkway Station	144.1	184.7	162.5	159.6	169.8	191.5	170.1	158.3	161.7	164.8	2:47
Veirs Mill Road at Montrose Parkway Station to Veirs Mill Road at Randolph Road Station	214.0	171.5	199.0	171.3	174.8	205.3	186.6	232.0	167.7	177.9	3:10
End to End (Including Intermittent Dwelling)											**15:57**
Westbound											
Veirs Mill Road at Randolph Road Station to Veirs Mill Road at Montrose Parkway Station	103.0	99.1	119.1	123.1	123.7	116.4	123.6	114.7	123.3	113.4	1:56
Veirs Mill Road at Montrose Parkway Station to Montrose Parkway at Parklawn Drive Station	151.1	174.6	161.5	160.3	160.2	141.8	160.6	139.6	157.3	168.5	2:38
Montrose Parkway at Parklawn Drive Station to White Flint Metro Station	774.5	727.5	731.5	749.1	513.5	692.8	734.6	625.3	750.6	463.7	11:16
End to End (Including Intermittent Dwelling)											**15:50**

APPENDIX

C

Alternative 1 BRT Approach Delays per Intersection
VISSIM Outputs

AM Peak Hour

Alternative 1 Intersection Delay of BRT (seconds)											
Intersection	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Average
Eastbound											
Veirs Mill Road at Randolph Road Station											
Veirs Mill Road at Gridley Road	28.8	24.6	16.2	14.8	17.9	20.3	30.0	4.3	10.6	33.9	20.1
Veirs Mill Road at Montrose Parkway/Parkland Drive	21.2	28.7	51.8	39.4	49.4	24.2	41.5	31.6	24.3	32.2	34.4
Montrose Parkway at Parklawn Drive Station											
Montrose Parkway at Parklawn Drive	0.1	0.6	0.0	0.2	0.2	0.0	0.0	0.1	0.4	0.2	0.2
Montrose Parkway at Maple Avenue/Chapman Avenue	37.6	57.1	55.3	54.6	67.5	45.6	56.6	58.4	54.8	62.3	55.0
Montrose Parkway at Rockville Pike northbound ramps	15.8	11.1	9.8	13.4	12.1	15.0	37.9	15.8	11.3	15.1	15.7
Montrose Parkway at Hoya Street	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hoya Street at Montrose Road	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Rockville Pike at Mid-Pike Plaza	6.5	6.9	12.0	10.7	5.4	12.4	9.4	15.8	15.7	14.3	10.9
Rockville Pike at Old Georgetown Road	35.8	50.7	42.2	52.7	51.3	40.5	41.2	44.6	42.4	46.2	44.8
White Flint Metro Station											
Total BRT Intersection Delay											**181.1**

Alternative 1 Intersection Delay of BRT (seconds)											
Intersection	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Average
Westbound											
Veirs Mill Road at Randolph Road Station											
Veirs Mill Road at Gridley Road	5.9	9.5	12.9	13.5	21.6	3.6	12.7	9.8	5.2	13.0	10.8
Veirs Mill Road at Montrose Parkway/Parkland Drive	65.2	80.4	71.3	74.0	69.6	74.4	66.0	57.8	44.4	70.4	67.4
Montrose Parkway at Parklawn Drive Station											
Montrose Parkway at Parklawn Drive	0.8	0.6	0.6	0.6	0.6	0.6	0.7	0.8	0.7	0.4	0.6
Montrose Parkway at Maple Avenue/Chapman Avenue	13.3	21.0	30.7	18.6	27.1	19.9	20.9	14.1	30.8	30.1	22.7
Montrose Parkway at Rockville Pike northbound ramps	7.5	10.6	6.6	10.9	16.3	19.2	18.9	18.3	1.9	13.8	12.4
Montrose Parkway at Hoya Street	3.6	4.5	2.8	2.6	5.1	6.6	5.1	3.5	4.1	3.3	4.1
Hoya Street at Montrose Road	12.4	14.9	14	11.1	10.8	9.1	6.1	10.5	15.5	11.1	11.6
Rockville Pike at Mid-Pike Plaza	3.3	0.6	10.5	4.6	14.6	7.2	2.8	1.6	0.3	3.3	4.9
Rockville Pike at Old Georgetown Road	47.1	68.9	33.3	37.4	26.1	38.7	26.0	45.8	69.3	48.9	44.2
White Flint Metro Station											
Total BRT Intersection Delay											**178.7**

PM Peak Hour

Alternative 1 Intersection Delay of BRT (seconds)											
Intersection	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Average
Eastbound											
Veirs Mill Road at Randolph Road Station											
Veirs Mill Road at Gridley Road	26.4	29.6	35.0	44.9	48.4	38.6	24.5	7.8	46.9	50.6	35.3
Veirs Mill Road at Montrose Parkway/Parkland Drive	38.1	81.6	59.2	55.6	65.7	88.8	65.3	56.0	61.5	60.3	63.2
Montrose Parkway at Parklawn Drive Station											
Montrose Parkway at Parklawn Drive	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Montrose Parkway at Maple Avenue/Chapman Avenue	96.6	89.9	83.7	93.6	98.2	104.7	97.8	80.2	103.5	79.1	92.7
Montrose Parkway at Rockville Pike northbound ramps	35.7	72.7	6.9	43.7	51.0	69.7	59.0	7.8	31.2	33.2	41.1
Montrose Parkway at Hoya Street	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hoya Street at Montrose Road	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Rockville Pike at Mid-Pike Plaza	129.4	96.4	111.7	64.0	112.8	104.8	105.7	122.9	76.4	142.6	106.7
Rockville Pike at Old Georgetown Road	138.9	150.9	168.7	145.8	137.5	151.8	137.6	150.7	178.2	164.0	152.4
White Flint Metro Station											
Total BRT Intersection Delay											**491.4**

Alternative 1 Intersection Delay of BRT (seconds)											
Intersection	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Average
Westbound											
Veirs Mill Road at Randolph Road Station											
Veirs Mill Road at Gridley Road	12.5	3.1	21.8	14.5	13.8	24.7	13.6	23.8	12.8	13.2	15.4
Veirs Mill Road at Montrose Parkway/Parkland Drive	60.3	85.4	69.9	67.9	68.2	50.6	67.2	50.0	67.3	75.8	66.3
Montrose Parkway at Parklawn Drive Station											
Montrose Parkway at Parklawn Drive	0.8	0.8	0.6	0.6	0.7	0.8	0.7	0.8	0.8	0.6	0.7
Montrose Parkway at Maple Avenue/Chapman Avenue	62.2	67.2	61.0	77.7	81.7	62.4	58.5	61.8	65.5	58.4	65.6
Montrose Parkway at Rockville Pike northbound ramps	86.0	88.0	78.6	82.4	78.2	83.8	85.8	90.2	84.4	78.8	83.6
Montrose Parkway at Hoya Street	5.4	4.1	5.0	3.4	2.2	4.0	3.2	3.7	2.7	8.6	4.2
Hoya Street at Montrose Road	0.2	9.4	7.8	13.2	12.8	11.2	9.3	0.7	6.3	0	7.1
Rockville Pike at Mid-Pike Plaza	117.7	110.4	90.7	59.2	90.7	116.5	84.3	88.2	89.2	5.6	85.3
Rockville Pike at Old Georgetown Road	186.0	136.5	190.4	192.2	42.4	137.5	160.5	134.1	188.5	46.6	141.5
White Flint Metro Station											
Total BRT Intersection Delay											**469.7**

APPENDIX

D

Alternative 1a BRT Travel Time VISSIM Outputs

AM Peak Hour

Alternative 1a BRT Travel Times (minutes:seconds)											
	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Average
Eastbound											
White Flint Metro Station to Montrose Parkway at Parklawn Drive Station	264.1	249.7	247.7	268.9	251.3	242.1	268.7	261.2	264.5	273.9	4:19
Montrose Parkway at Parklawn Drive Station to Veirs Mill Road at Montrose Parkway Station	149.0	140.2	143.5	157.4	142.2	138.1	157.2	124.8	133.5	141.1	2:23
Veirs Mill Road at Montrose Parkway Station to Veirs Mill Road at Randolph Road Station	160.1	134.2	166.6	123.2	131.6	149.6	136.7	128.9	122.4	153.1	2:21
End to End (Including Intermittent Dwelling)											**9:03**
Westbound											
Veirs Mill Road at Randolph Road Station to Veirs Mill Road at Montrose Parkway Station	117.1	114.6	120.8	106.4	103.1	91.6	121.0	93.0	104.2	114.1	1:49
Veirs Mill Road at Montrose Parkway Station to Montrose Parkway at Parklawn Drive Station	184.5	135.7	178.9	143.9	143.4	151.5	157.8	156.3	145.6	163.5	2:36
Montrose Parkway at Parklawn Drive Station to White Flint Metro Station	296.6	314.0	340.4	349.6	320.9	337.1	297.8	340.8	314.7	350.0	5:26
End to End (Including Intermittent Dwelling)											**9:51**

PM Peak Hour

Alternative 1a BRT Travel Times (minutes:seconds)											
	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Average
Eastbound											
White Flint Metro Station to Montrose Parkway at Parklawn Drive Station	707.2	687.8	551.3	550.7	504.5	711.3	593.8	605.0	644.3	606.4	10:16
Montrose Parkway at Parklawn Drive Station to Veirs Mill Road at Montrose Parkway Station	398.8	394.2	504.2	450.0	386.2	523.5	506.4	477.6	535.5	538.9	7.52
Veirs Mill Road at Montrose Parkway Station to Veirs Mill Road at Randolph Road Station	182.3	198.5	151.4	206.1	217.8	196.4	172.0	176.2	227.0	139.7	3:07
End to End (Including Intermittent Dwelling)											**21:15**
Westbound											
Veirs Mill Road at Randolph Road Station to Veirs Mill Road at Montrose Parkway Station	113.3	86.6	100.2	110.4	102.4	121.0	108.1	102.9	100.4	110.8	1:46
Veirs Mill Road at Montrose Parkway Station to Montrose Parkway at Parklawn Drive Station	163.4	156.3	148.4	165.1	147.3	179.7	167.3	146.3	145.2	143.4	2:36
Montrose Parkway at Parklawn Drive Station to White Flint Metro Station	696.7	759.3	800.5	850.2	690.5	759.5	697.8	723.0	745.1	795.7	12:32
End to End (Including Intermittent Dwelling)											**16:54**

APPENDIX

E

Alternative 1a BRT Approach Delays per Intersection
VISSIM Outputs

Alternative 1a Intersection Delay of BRT (seconds)											
Intersection	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Average
Eastbound											
Veirs Mill Road at Randolph Road Station											
Veirs Mill Road at Gridley Road	39.6	14.3	41.0	0.6	13.7	29.6	8.6	12.1	9.4	26.6	19.6
Veirs Mill Road at Montrose Parkway/Parkland Drive	34.2	37.4	34.8	52.6	38.3	25.6	42.4	23.3	29.0	32.9	35.1
Montrose Parkway at Parklawn Drive Station											
Montrose Parkway at Parklawn Drive	0.6	0.3	0.1	0.6	0.4	0.3	0.1	0.2	0.3	0.0	0.3
Montrose Parkway at Maple Avenue/Chapman Avenue	59.1	45.1	46.3	52.0	52.8	35.7	61.6	52.9	51.0	65.1	52.2
Montrose Parkway at Rockville Pike northbound ramps	21.0	12.2	17.9	13.6	15.7	16.9	10.3	6.7	9.4	11.0	13.5
Montrose Parkway at Hoya Street	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hoya Street at Montrose Road	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Rockville Pike at Mid-Pike Plaza	4.9	6.4	6.9	13.2	3.1	13.3	14.8	13.5	17.1	15.1	10.8
Rockville Pike at Old Georgetown Road	36.3	51.8	37.9	50.5	42.6	41.6	44.8	51.3	51.2	45.3	45.3
White Flint Metro Station											
Total BRT Intersection Delay											**176.8**

Alternative 1a Intersection Delay of BRT (seconds)											
Intersection	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Average
Westbound											
Veirs Mill Road at Randolph Road Station											
Veirs Mill Road at Gridley Road	12.6	18.4	9.4	12.1	10.2	3.6	14.6	9.1	13.7	10.9	11.5
Veirs Mill Road at Montrose Parkway/Parkland Drive	99.4	49.7	89.3	56.2	53.1	63.9	69.2	67.0	58.1	74.6	68.1
Montrose Parkway at Parklawn Drive Station											
Montrose Parkway at Parklawn Drive	0.3	0.2	0.1	0.2	0.1	0.2	0.1	0.1	0.2	0.1	0.2
Montrose Parkway at Maple Avenue/Chapman Avenue	19.3	11.7	32.9	27.4	15.8	31.9	16.9	25.2	15.0	29.0	22.5
Montrose Parkway at Rockville Pike northbound ramps	40.6	51.5	23.4	33.4	46.8	34.5	31.4	36.0	37.7	42.4	37.8
Montrose Parkway at Hoya Street	2.5	2.0	2.3	2.8	1.9	3.0	3.5	2.7	2.1	3.1	2.6
Hoya Street at Montrose Road	3.6	0.1	3.6	7.9	0.1	5.2	0.5	6.9	3.4	2.9	3.4
Rockville Pike at Mid-Pike Plaza	9.7	20.3	3.3	20.0	18.7	11.1	4.9	12.2	13.2	9.2	12.3
Rockville Pike at Old Georgetown Road	21.5	13.3	52.2	29.6	15.0	31.3	29.6	28.2	25.0	26.3	27.2
White Flint Metro Station											
Total BRT Intersection Delay											**185.6**

PM Peak Hour

Alternative 1a Intersection Delay of BRT (seconds)											
Intersection	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Average
Eastbound											
Veirs Mill Road at Randolph Road Station											
Veirs Mill Road at Gridley Road	17.1	23.9	23.3	35.6	23.3	39.8	40.0	24.0	33.1	14.4	27.5
Veirs Mill Road at Montrose Parkway/Parkland Drive	12.2	44.1	79.7	38.5	55.3	11.4	51.1	48.1	9.6	72.0	42.2
Montrose Parkway at Parklawn Drive Station											
Montrose Parkway at Parklawn Drive	0.6	0.4	9.4	0.3	0.3	0.9	0.7	0.2	1.3	0.4	1.5
Montrose Parkway at Maple Avenue/Chapman Avenue	76.2	78.7	78.8	93.7	86.2	64.9	46.4	89.0	41.2	84.3	73.9
Montrose Parkway at Rockville Pike northbound ramps	67.6	79.4	7.5	34.9	8.6	50.2	38.3	12.3	36.8	48.3	38.4
Montrose Parkway at Hoya Street	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hoya Street at Montrose Road	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Rockville Pike at Mid-Pike Plaza	125.3	138.1	91.3	108.2	90.4	88.4	94.6	117.5	73.6	75.8	100.3
Rockville Pike at Old Georgetown Road	139.6	153.3	126.5	115.8	128.8	186.6	146.6	162.7	225.8	138.0	152.4
White Flint Metro Station											
Total BRT Intersection Delay											**436.2**

Alternative 1a Intersection Delay of BRT (seconds)											
Intersection	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Average
Westbound											
Veirs Mill Road at Randolph Road Station											
Veirs Mill Road at Gridley Road	14.1	3.2	13.3	13.4	13.9	3.5	12.1	14.2	12.4	21.6	12.2
Veirs Mill Road at Montrose Parkway/Parkland Drive	75.0	69.6	60.1	75.7	58.4	92.2	77.5	59.0	59.0	53.4	68.0
Montrose Parkway at Parklawn Drive Station											
Montrose Parkway at Parklawn Drive	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2
Montrose Parkway at Maple Avenue/Chapman Avenue	61.6	72.8	69.5	62.1	66.5	85.5	62.3	85.2	71.0	59.3	69.6
Montrose Parkway at Rockville Pike northbound ramps	87.4	93.7	88.2	93.0	83.7	76.8	86.2	91.6	90.8	80.5	87.2
Montrose Parkway at Hoya Street	2.7	3.4	2.6	1.5	2.7	9.3	2.0	3.2	3.1	3.4	3.4
Hoya Street at Montrose Road	0.1	3.7	12.7	0.1	8.1	6.5	3.8	9.5	0.2	8.4	5.3
Rockville Pike at Mid-Pike Plaza	96.6	121.6	85.6	122.6	85.8	90.0	65.5	74.1	96.3	107.3	94.5
Rockville Pike at Old Georgetown Road	146.2	149.4	164.7	203.8	106.3	131.6	171.1	106.8	146.9	195.2	152.2
White Flint Metro Station											
Total BRT Intersection Delay											**492.6**

APPENDIX

F

Alternative 2 BRT Travel Time VISSIM Outputs

AM Peak Hour

Alternative 2 BRT Travel Times (minutes:seconds)											
	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Average
Eastbound											
White Flint Metro Station to Randolph Road at Lauderdale Drive Station	556.7	525.7	506.5	582.7	547.8	503.3	531.3	521.5	516.1	473.8	8:47
Randolph Road at Lauderdale Drive Station to Veirs Mill Road at Randolph Road Station	200.8	184.3	228.1	195.3	200.2	199.3	204.6	225.4	187.3	226.8	3:25
End to End (Including Intermittent Dwelling)											**12:12**
Westbound											
Veirs Mill Road at Randolph Road Station to Randolph Road at Lauderdale Drive Station	175.4	167.6	159.9	183.0	179.7	175.0	183.0	174.9	176.5	176.2	2:55
Randolph Road at Lauderdale Drive Station to White Flint Metro Station	445.1	552.8	448.4	395.0	442.4	487.9	595.4	433.3	481.4	448.8	7:53
End to End (Including Intermittent Dwelling)											**10:48**

PM Peak Hour

Alternative 2 BRT Travel Times (minutes:seconds)											
	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Average
Eastbound											
White Flint Metro Station to Randolph Road at Lauderdale Drive Station	699.8	659.2	735.9	729.4	690.8	681.3	671.3	710.9	765.1	695.1	8:47
Randolph Road at Lauderdale Drive Station to Veirs Mill Road at Randolph Road Station	296.3	234.5	233.0	209.6	217.9	247.5	238.8	241.1	202.7	240.3	3:25
End to End (Including Intermittent Dwelling)											**12:12**
Westbound											
Veirs Mill Road at Randolph Road Station to Randolph Road at Lauderdale Drive Station	166.7	167.0	160.9	169.0	173.2	168.8	171.1	160.1	164.2	168.9	2:55
Randolph Road at Lauderdale Drive Station to White Flint Metro Station	555.1	456.1	436.1	453.1	389.3	561.1	583.9	422.1	474.9	413.7	7:53
End to End (Including Intermittent Dwelling)											**10:48**

APPENDIX

G

Alternative 2 BRT Approach Delays per Intersection
VISSIM Outputs

AM Peak Hour

Alternative 2 Intersection Delay of BRT (seconds)											
Intersection	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Average
Eastbound											
White Flint Metro Station											
Rockville Pike at Marinelli Road	58.9	47.8	50.2	53.7	53.1	55.0	56.1	65.6	59.7	58.4	55.9
Rockville Pike at Nicholson Lane	67.8	63.2	55.8	101.0	60.9	69.5	79.5	65.1	82.5	45.8	69.1
Nicholson Lane at Citadel Avenue	54.5	45.4	34.7	49.8	41.7	28.9	50.9	92.9	46.0	41.9	48.7
Nicholson Lane/Parklawn Drive at Nebel Street	2.4	25.9	36.5	20.0	37.9	22.2	8.7	36.1	26.4	9.7	22.6
Parklawn Drive at Boiling Brook Parkway	0.4	23.0	16.3	0.2	20.0	12.9	28.6	19.3	23.2	1.2	14.5
Randolph Road at Parklawn Drive	99.2	56.8	64.9	96.9	51.8	63.3	44.7	4.3	45.6	69.6	59.7
Randolph Road at Lauderdale Drive	4.1	4.6	4.3	4.4	16.0	4.8	4.9	4.0	12.6	4.1	6.4
Randolph Road at Lauderdale Drive Station											
Randolph Road at Gaynor Road/Rocking Horse Road	0.3	0.2	13.1	0.0	6.4	0.0	0.0	18.6	0.0	8.4	4.7
Randolph Road at Dewey Road	2.5	1.9	0.8	2.8	0.9	3.9	1.7	0.4	1.8	0.0	1.7
Randolph Road at Selfridge Road	1.7	1.2	11.8	1.1	11.6	1.5	1.6	16.6	1.4	7.7	5.6
Veirs Mill Road at Randolph Road Station											
Total BRT Intersection Delay											**288.9**

Alternative 2 Intersection Delay of BRT (seconds)											
Intersection	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Average
Westbound											
White Flint Metro Station											
Rockville Pike at Marinelli Road	45.5	54.4	53.8	47.2	38.0	35.8	64.9	49.7	62.3	47.0	49.9
Rockville Pike at Nicholson Lane	5.1	2.3	6.3	1.8	8.7	4.3	4.7	6.1	5.5	4.2	4.9
Nicholson Lane at Citadel Avenue	29.4	60.4	33.6	12.2	25.3	24.5	63.6	33.9	56.7	40.0	38.0
Nicholson Lane/Parklawn Drive at Nebel Street	18.4	71.4	19.3	15.0	38.9	36.4	62.7	61.8	25.7	62.6	41.2
Parklawn Drive at Boiling Brook Parkway	0.4	0.4	0.1	0.1	0.1	0.2	0.3	0.2	0.4	0.1	0.2
Randolph Road at Parklawn Drive	55.8	67.2	55.6	59.6	76.8	100.8	71.6	55.3	80.3	64.4	68.7
Randolph Road at Lauderdale Drive	16.4	18.3	18.1	21.9	18.3	28.5	21.6	18.2	22.0	19.6	20.3
Randolph Road at Lauderdale Drive Station											
Randolph Road at Gaynor Road/Rocking Horse Road	0.8	2.0	0.5	2.4	5.5	9.1	5.7	4.4	3.3	0.6	3.4
Randolph Road at Dewey Road	5.2	5.2	3.4	2.5	3.3	4.1	6.8	5.2	7.6	2.5	4.6
Randolph Road at Selfridge Road	23.7	23.0	15.3	32.7	26.9	16.3	24.9	21.4	23.5	22.1	23.0
Veirs Mill Road at Randolph Road Station											
Total BRT Intersection Delay											**254.2**

PM Peak Hour

Alternative 2 Intersection Delay of BRT (seconds)											
Intersection	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Average
Eastbound											
White Flint Metro Station											
Rockville Pike at Marinelli Road	73.4	69.5	78.8	95.9	64.6	66.2	70.5	86.3	86.5	72.4	76.4
Rockville Pike at Nicholson Lane	196.3	173.5	177.9	237.5	183.9	154.8	185.2	125.5	223.1	202.9	186.1
Nicholson Lane at Citadel Avenue	28.2	29.4	55.6	27.6	36.0	7.7	96.0	53.4	70.0	7.6	41.2
Nicholson Lane/Parklawn Drive at Nebel Street	0.4	2.8	19.2	36.0	9.0	43.0	7.5	33.9	5.2	0.9	15.8
Parklawn Drive at Boiling Brook Parkway	25.7	24.8	39.4	22.8	19.3	20.9	40.2	21.0	30.3	41.8	28.6
Randolph Road at Parklawn Drive	50.5	73.3	52.6	46.8	79.7	79.4	50.5	79.4	53.7	45.6	26.6
Randolph Road at Lauderdale Drive	4.3	5.3	5.8	14.2	4.7	5.1	22.3	5.1	5.3	4.7	7.7
Randolph Road at Lauderdale Drive Station											
Randolph Road at Gaynor Road/Rocking Horse Road	48.4	23.9	16.1	29.8	19.8	0.0	3.1	26.3	0.0	48.5	21.6
Randolph Road at Dewey Road	0.0	0.0	0.0	0.1	1.6	0.0	0.1	0.1	0.0	0.0	0.2
Randolph Road at Selfridge Road	7.8	8.6	6.5	5.4	4.9	33.0	5.0	17.6	15.3	10.0	11.4
Veirs Mill Road at Randolph Road Station											
Total BRT Intersection Delay											**415.6**

Alternative 2 Intersection Delay of BRT (seconds)											
Intersection	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Average
Westbound											
White Flint Metro Station											
Rockville Pike at Marinelli Road	136.2	102.5	67.2	98.0	51.1	133.9	144.1	61.0	106.1	53.5	95.4
Rockville Pike at Nicholson Lane	25.1	24.0	24.0	17.1	21.8	25.0	26.4	14.1	19.6	13.3	21.0
Nicholson Lane at Citadel Avenue	16.4	25.4	16.2	17.3	25.5	20.2	20.9	39.3	28.9	18.6	22.9
Nicholson Lane/Parklawn Drive at Nebel Street	5.8	1.9	13.7	4.4	4.0	11.0	7.9	8.3	12.2	7.9	7.7
Parklawn Drive at Boiling Brook Parkway	0.6	0.3	0.5	1.0	0.5	0.1	0.6	0.9	0.8	0.1	0.5
Randolph Road at Parklawn Drive	67.5	37.4	55.5	47.9	63.0	56.2	74.2	46.2	72.0	72.2	96
Randolph Road at Lauderdale Drive	25.8	20.6	19.0	16.9	23.0	29.5	30.0	17.9	17.4	22.0	22.2
Randolph Road at Lauderdale Drive Station											
Randolph Road at Gaynor Road/Rocking Horse Road	2.3	5.6	3.8	8.6	3.3	6.3	4.2	2.4	7.1	4.3	4.8
Randolph Road at Dewey Road	3.9	2.6	0.1	1.4	6.8	2.8	0.9	2.0	1.9	0.2	2.3
Randolph Road at Selfridge Road	16.8	21.6	15.8	19.6	20.6	20.7	24.9	19.7	26.0	22.8	20.9
Veirs Mill Road at Randolph Road Station											
Total BRT Intersection Delay											**293.7**

APPENDIX

H

Alternative 2a BRT Travel Time VISSIM Outputs

AM Peak Hour

Alternative 2a BRT Travel Times (minutes:seconds)											
	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Average
Eastbound											
White Flint Metro Station to Randolph Road at Lauderdale Drive Station	207.8	206.4	230.8	231.0	207.8	204.8	208.6	228.9	247.2	217.4	3:39
Randolph Road at Lauderdale Drive Station to Veirs Mill Road at Randolph Road Station	158.4	153.3	153.9	174.1	146.4	127.9	140.6	148.9	161.5	162.3	2:33
End to End (Including Intermittent Dwelling)											**6:12**
Westbound											
Veirs Mill Road at Randolph Road Station to Randolph Road at Lauderdale Drive Station	172.3	166.1	167.6	174.5	183.5	158.7	170.6	170.4	160.0	168.6	2:49
Randolph Road at Lauderdale Drive Station to White Flint Metro Station	268.9	302.0	312.8	327.8	302.0	284.7	293.6	293.9	266.9	310.6	4:56
End to End (Including Intermittent Dwelling)											**7:45**

PM Peak Hour

Alternative 2a BRT Travel Times (minutes:seconds)											
	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Average
Eastbound											
White Flint Metro Station to Randolph Road at Lauderdale Drive Station	338.7	288.8	318.7	313.5	286.3	330.9	302.9	337.0	300.8	295.4	5:11
Randolph Road at Lauderdale Drive Station to Veirs Mill Road at Randolph Road Station	167.3	172.4	179.0	194.7	204.1	158.6	190.0	174.3	208.7	188.7	3:04
End to End (Including Intermittent Dwelling)											**8:15**
Westbound											
Veirs Mill Road at Randolph Road Station to Randolph Road at Lauderdale Drive Station	168.2	166.8	171.2	168.7	169.2	168.1	182.7	168.8	177.0	170.9	2:51
Randolph Road at Lauderdale Drive Station to White Flint Metro Station	378.9	416.2	424.7	403.5	480.6	420.1	541.2	419.5	362.1	442.2	7:09
End to End (Including Intermittent Dwelling)											**10:00**

APPENDIX

I

Alternative 2a BRT Approach Delays per Intersection
VISSIM Outputs

AM Peak Hour

Alternative 2a Intersection Delay of BRT (seconds)											
Intersection	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Average
Eastbound											
White Flint Metro Station											
Marinelli Road at Cidadel Avenue	1.7	2.7	3.1	3.3	1.6	3.0	1.2	3.3	3.4	3.0	2.6
Marinelli Road at Nebel Street	24.1	23.8	29.0	26.9	25.7	18.7	28.6	26.9	36.5	29.3	27.0
Old Georgetown Road at Nebel Street	0.4	3.0	2.3	5.3	1.3	0.0	0.2	5.1	8.3	5.2	3.1
Randolph Road at Nebel Street	1.3	2.9	2.5	2.5	2.8	0.4	1.1	1.9	1.6	1.2	1.8
Randolph Road at Parklawn Drive	14.0	10.3	20.3	22.5	4.8	15.0	7.8	24.6	30.7	4.1	15.4
Randolph Road at Lauderdale Drive	0.4	0.2	0.0	0.1	0.4	0.4	0.6	0.4	3.5	0.2	0.6
Randolph Road at Lauderdale Drive Station											
Randolph Road at Gaynor Road/Rocking Horse Road	0.7	0.4	0.1	0.1	0.0	0.7	0.5	0.2	3.4	0.4	0.7
Randolph Road at Dewey Road	0.7	0.5	0.1	0.0	0.0	0.0	0.2	0.4	0.0	0.2	0.2
Randolph Road at Selfridge Road	3.9	8.0	6.9	9.7	5.8	5.6	3.9	6.8	15.8	3.2	7.0
Veirs Mill Road at Randolph Road Station											
Total BRT Intersection Delay											**58.4**

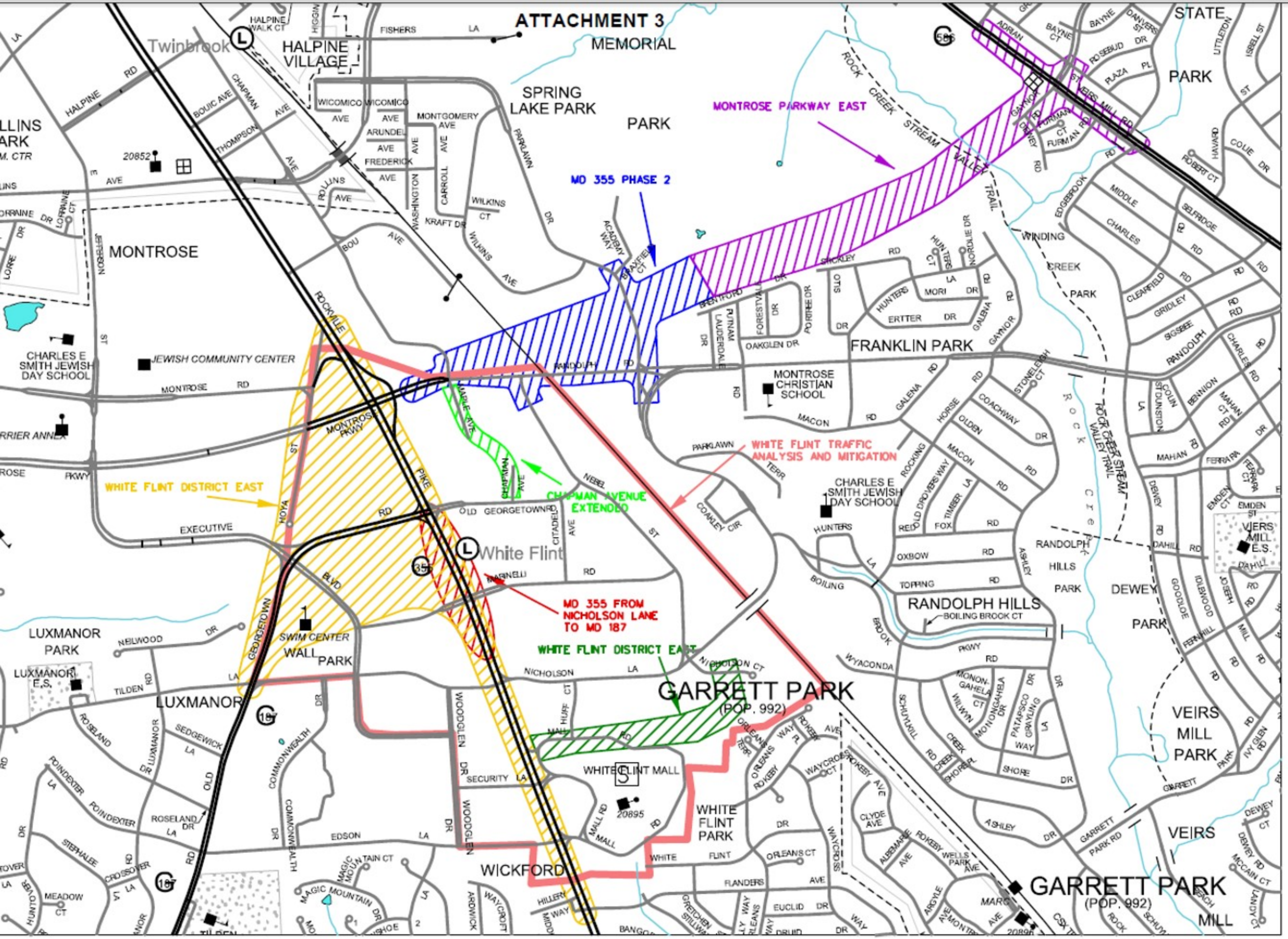
Alternative 2a Intersection Delay of BRT (seconds)											
Intersection	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Average
Westbound											
White Flint Metro Station											
Marinelli Road at Cidadel Avenue	0.2	3.3	1.3	5.6	0.4	0.0	1.0	0.6	0.6	0.7	1.4
Marinelli Road at Nebel Street	4.4	2.9	6.4	3.5	4.5	1.8	5.2	4.9	4.6	3.6	4.2
Old Georgetown Road at Nebel Street	5.8	4.7	3.1	0.8	2.9	3.8	5.3	1.5	4.7	2.8	3.5
Randolph Road at Nebel Street	11.5	11.1	5.3	7.8	14.9	7.1	6.0	6.7	7.6	12.3	9.0
Randolph Road at Parklawn Drive	36.6	67.6	53.5	61.5	36.1	44.9	51.8	30.7	33.1	43.5	45.9
Randolph Road at Lauderdale Drive	17.9	17.5	21.1	16.9	16.0	28.3	16.7	19.6	23.0	22.8	20.0
Randolph Road at Lauderdale Drive Station											
Randolph Road at Gaynor Road/Rocking Horse Road	0.9	4.2	3.0	7.3	7.0	2.4	2.9	2.0	4.7	3.5	3.8
Randolph Road at Dewey Road	3.0	3.6	2.7	5.7	2.4	3.4	3.1	2.1	1.7	3.8	3.2
Randolph Road at Selfridge Road	25.8	21.5	15.8	17.2	26.8	12.0	23.4	24.7	16.5	15.8	20.0
Veirs Mill Road at Randolph Road Station											
Total BRT Intersection Delay											**110.9**

PM Peak Hour

Alternative 2a Intersection Delay of BRT (seconds)											
Intersection	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Average
Eastbound											
White Flint Metro Station											
Marinelli Road at Cidadel Avenue	2.9	2.8	3.8	2.6	3.7	3.0	2.9	3.6	2.7	3.5	3.2
Marinelli Road at Nebel Street	56.7	39.6	53.2	41.4	57.8	45.1	73.6	59.9	50.4	49.8	52.8
Old Georgetown Road at Nebel Street	20.9	3.4	12.9	6.0	2.5	30.0	1.7	22.7	15.2	7.4	12.3
Randolph Road at Nebel Street	7.8	13.1	8.2	14.5	13.6	4.9	13.6	8.8	9.6	11.7	10.6
Randolph Road at Parklawn Drive	78.4	59.9	59.6	73.5	36.4	71.5	35.2	66.1	55.1	43.8	58.0
Randolph Road at Lauderdale Drive	0.1	0.2	0.3	0.3	0.2	0.4	0.4	0.3	0.4	0.2	0.3
Randolph Road at Lauderdale Drive Station											
Randolph Road at Gaynor Road/Rocking Horse Road	2.4	1.2	0.7	3.4	1.3	0.7	0.0	1.0	0.6	0.2	1.2
Randolph Road at Dewey Road	0.6	0.5	0.5	0.5	0.2	0.5	0.1	0.4	0.8	0.7	0.5
Randolph Road at Selfridge Road	22.5	15.4	21.7	25.6	33.0	13.9	29.7	30.4	19.0	25.0	23.6
Veirs Mill Road at Randolph Road Station											
Total BRT Intersection Delay											**162.2**

Alternative 2a Intersection Delay of BRT (seconds)											
Intersection	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Average
Westbound											
White Flint Metro Station											
Marinelli Road at Cidadel Avenue	5.9	4.6	3.2	8.3	34.6	12.2	1.8	7.8	11.3	22.4	11.2
Marinelli Road at Nebel Street	5.2	5.1	4.3	3.0	4.5	3.9	4.0	3.4	7.2	5.2	4.6
Old Georgetown Road at Nebel Street	1.4	0.8	0.2	0.9	0.6	0.5	0.8	0.7	1.5	0.3	0.8
Randolph Road at Nebel Street	12.0	26.8	8.7	26.8	43.3	23.6	4.2	6.3	6.1	6.1	16.4
Randolph Road at Parklawn Drive	41.8	42.9	53.9	41.4	34.0	43.2	154.2	79.4	58.3	63.1	61.2
Randolph Road at Lauderdale Drive	20.5	22.1	16.8	23.7	25.3	24.3	32.4	16.7	17.2	20.1	21.9
Randolph Road at Lauderdale Drive Station											
Randolph Road at Gaynor Road/Rocking Horse Road	10.0	6.2	5.8	7.8	6.6	3.6	3.5	0.0	13.5	3.6	6.1
Randolph Road at Dewey Road	2.6	1.7	3.1	1.8	2.1	1.2	1.3	3.5	1.4	6.2	2.5
Randolph Road at Selfridge Road	15.3	17.1	23.7	18.0	14.8	20.8	20.5	28.2	26.8	21.8	20.7
Veirs Mill Road at Randolph Road Station											
Total BRT Intersection Delay											**145.3**

ATTACHMENT 3



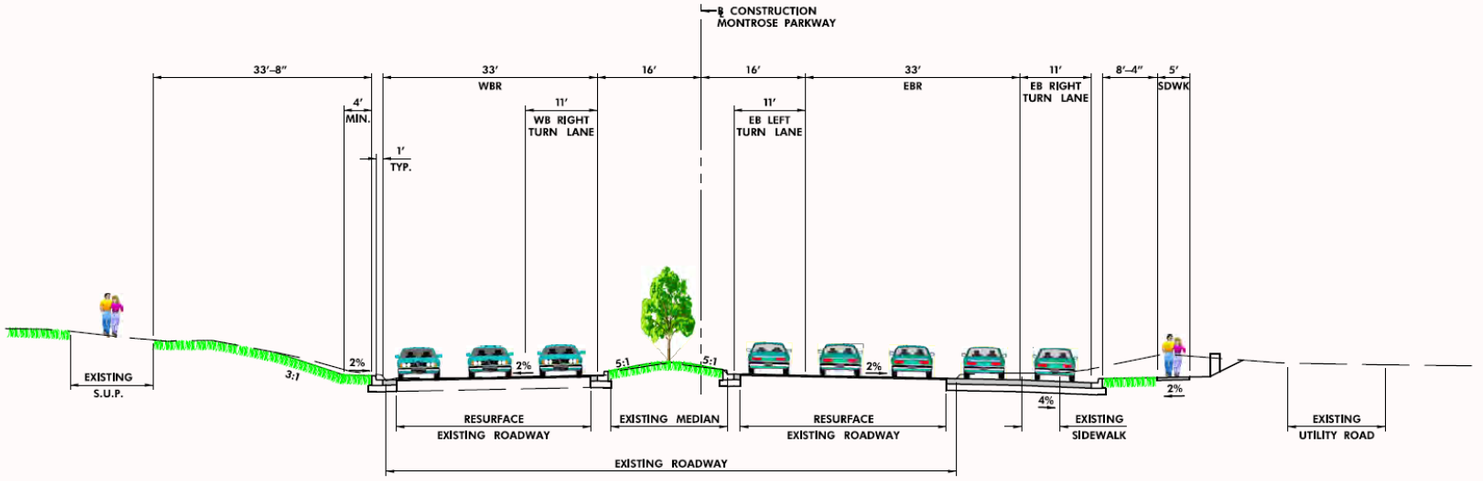
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SCALE IN FEET

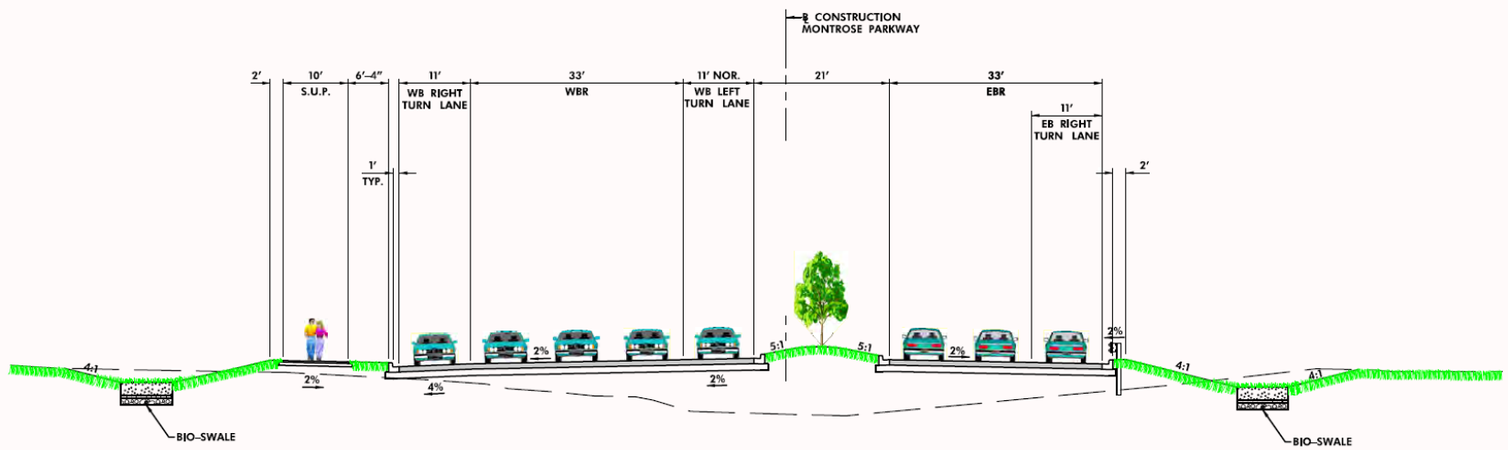
MD 355 PHASE 2

MONTROSE PARKWAY FROM CHAPMAN AVENUE TO PARKLAWN DRIVE

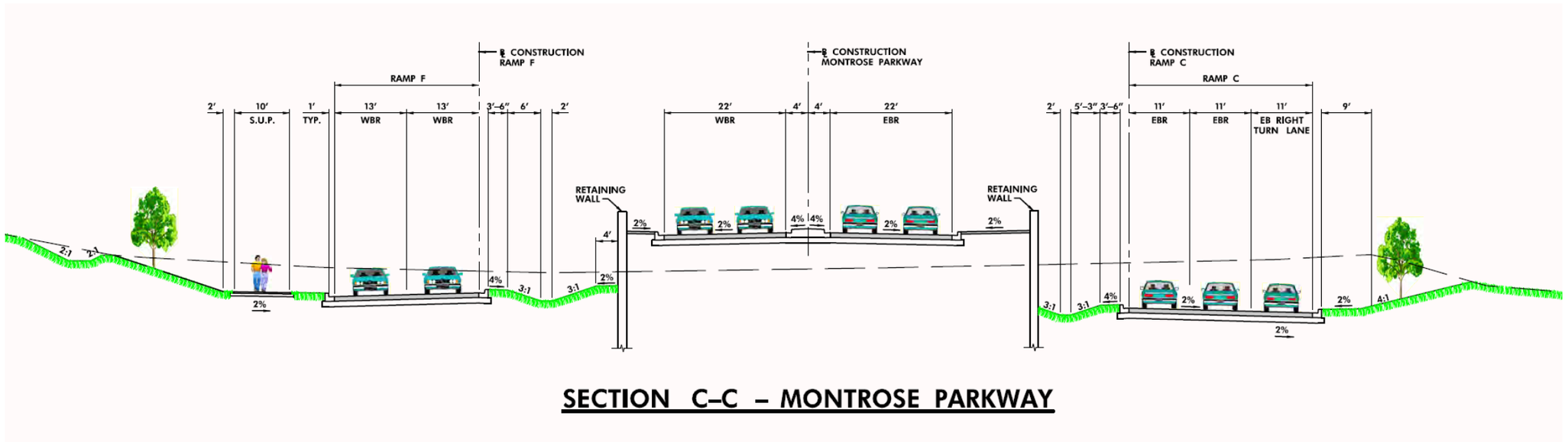
Proposed Typical Roadway Sections - Montrose Parkway Phase 2



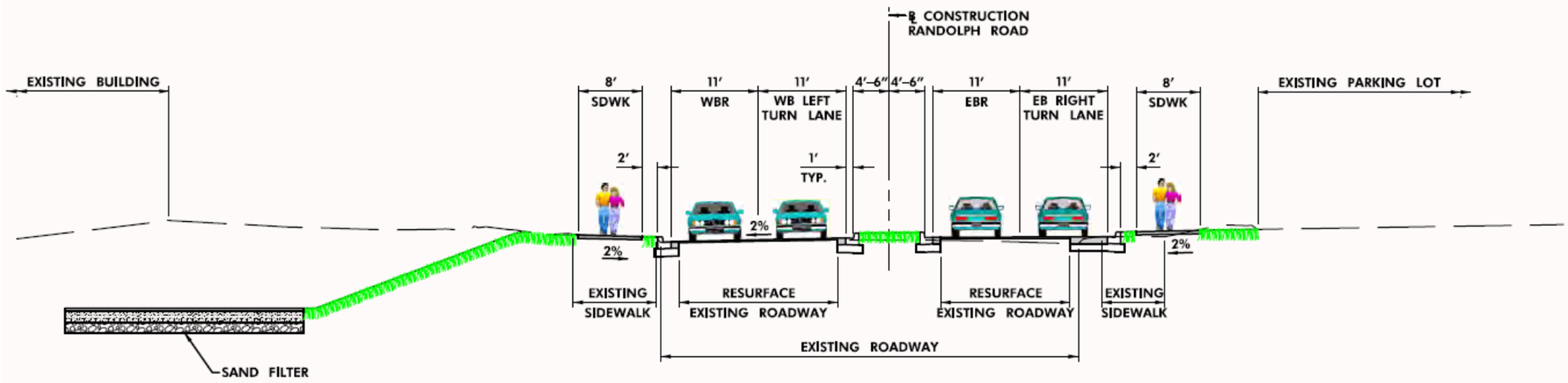
SECTION A–A – MONTROSE PARKWAY



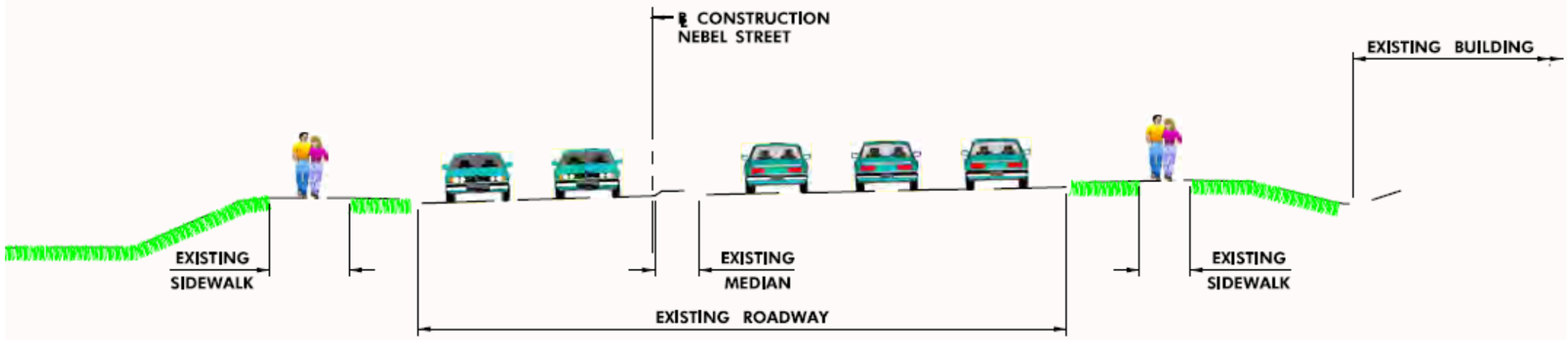
SECTION B–B – MONTROSE PARKWAY



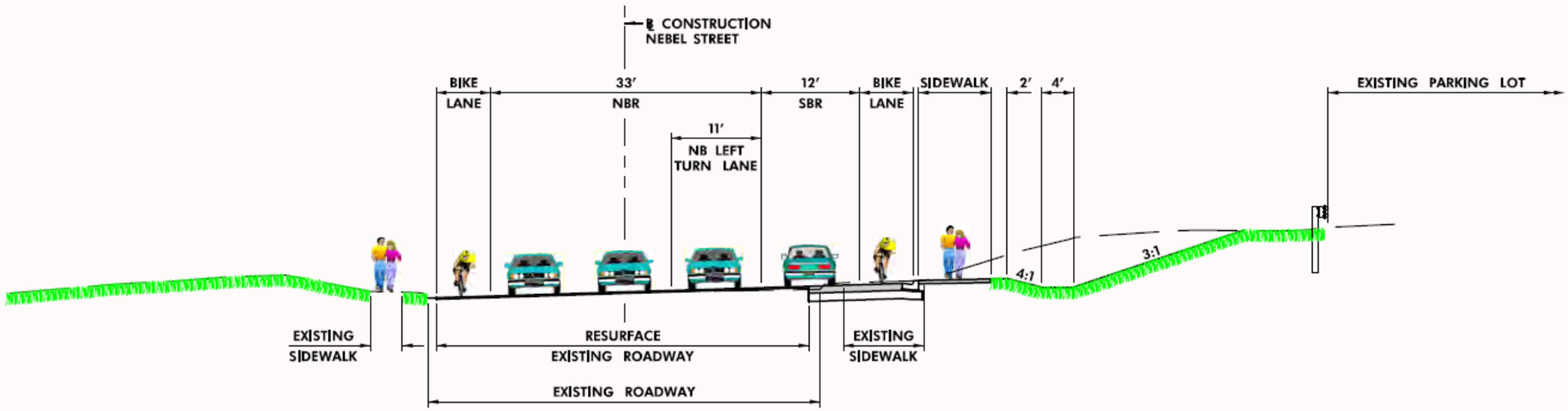
SECTION C–C – MONTROSE PARKWAY



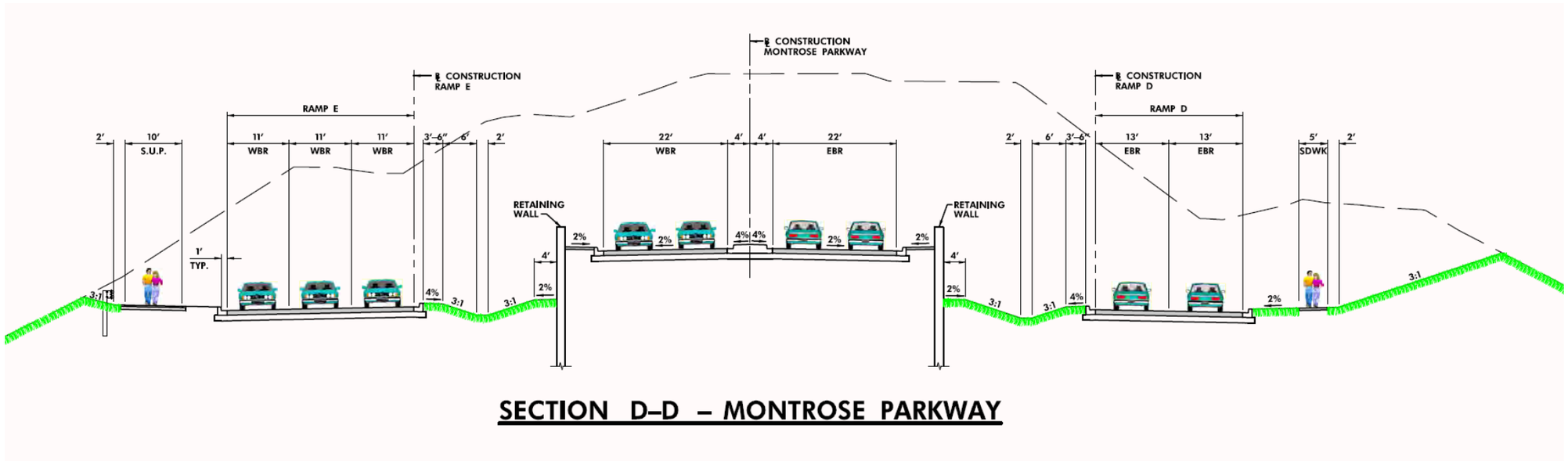
SECTION E–E – RANDOLPH ROAD



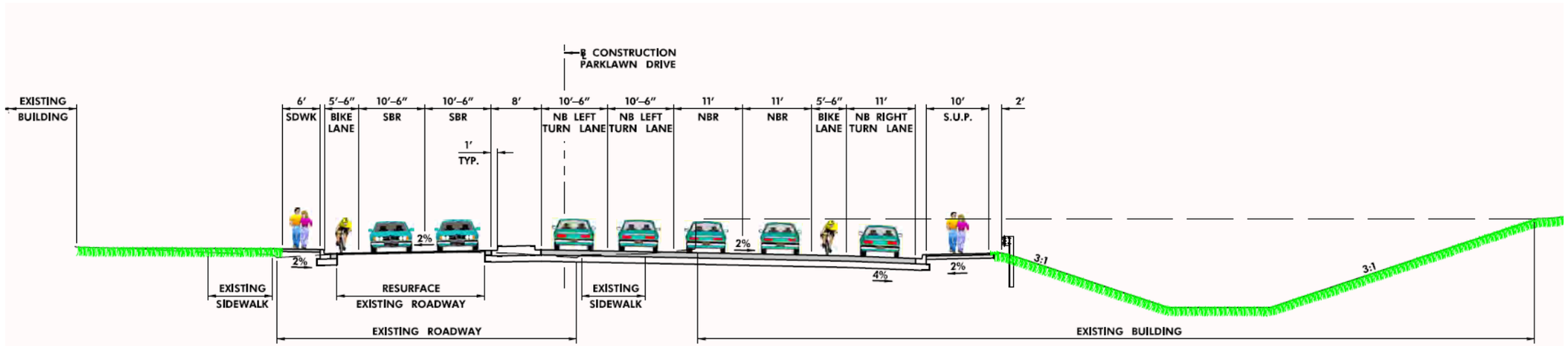
SECTION F–F – NEBEL STREET



SECTION G–G – NEBEL STREET



SECTION D–D – MONTROSE PARKWAY



SECTION H–H – PARKLAWN DRIVE

MEMORANDUM

TO: CHIEF JEFF FOLDEN
INNOVATIVE CONTRACTING DIVISION

ATTN: LUIS GONZALEZ, P.E.

FROM: CHIEF LISA SHEMER
TRAVEL FORECASTING AND ANALYSIS DIVISION

SUBJECT: MD 355 PHASE 2
MONTGOMERY COUNTY - MO344M21
MONTROSE PARKWAY OPERATIONAL ANAYSES

PREPARED BY: KYLE ROBERTS, P.E., PTOE, CONSULTANT, 443-741-3500

DATE: JUNE 15, 2017

RESPONSE REQUESTED BY: N/A

EXECUTIVE SUMMARY

The MD 355 Phase 2 Build scenarios redistribute traffic volumes and induce additional traffic throughout the study area, which relieve congestion in some locations while creating operational challenges in other locations. The Build scenarios operate with minimal delay for east/west through traffic along the proposed Montrose Parkway extension, but result in high numbers of turning movements on Randolph Road at Nebel Street and Parklawn Drive.

The Maryland – National Capital Park & Planning Commission's (M-NCPPC) *Subdivision Staging Policy (SSP)* defines Transportation Policy Areas, which establish CLV congestion standards and average vehicle delay thresholds (based on the 2010 Highway Capacity Manual) for each Policy Area throughout Montgomery County. Capacity/Operational results compared to established thresholds for the "North Bethesda" policy area are as follows:

Existing

- All intersections operate under the County's CLV congestion standard.
- All existing intersections operate under the County's average vehicle delay thresholds.

2022 No-Build

- All intersections operate under the County's CLV congestion standard.
- Average vehicle delay for the intersection of Randolph Road at Nebel Street during the PM peak hour is 72 seconds, which falls just over the average vehicle delay threshold of 71 seconds.

2040 No-Build

- Two study intersections will operate over the County's CLV congestion standard during the PM peak hour.
    - Nebel Street at Randolph Road (1611) & Parklawn Drive at Randolph Road (1665)
- Average vehicle delays at the two intersections exceed the County's average vehicle delay threshold
    - Randolph Road at Nebel Street (125.7 seconds) during the PM peak hour & Randolph Road at Parklawn Drive (83.1/90.5 seconds) during the AM and PM peak hours

2022 Build

- All intersections operate under the County's CLV congestion standard.
- All intersections operate under the County's average vehicle delay thresholds.

2040 Build

- All intersections operate under the County's CLV congestion standard.
- Average vehicle delays at the intersection of Randolph Road at Nebel Street and Randolph Road at Parklawn Drive exceed the County's average vehicle delay threshold during the PM peak hour with delays of 78.7 and 75.2 seconds, respectively.

Under Build Conditions, all intersections will meet the County's CLV congestion standards in 2022 and 2040 during the AM and PM peak hours. Although the average delay thresholds are not met under 2040 Build conditions in the PM peak, the County's three-tiered approach does not require average vehicle delay to be addressed if all intersections fall under the CLV congestion standards for the policy area. Additionally, with the White Flint 2 Master Plan work currently in draft form, it is possible CLV congestion standards and average vehicle delay thresholds will be increased upon completion of the Master Plan. For example, the White Flint policy area, in the middle of the North Bethesda policy area, has substantially higher thresholds than North Bethesda.

Queuing at the CSX railroad crossing

A VISSIM analysis of the Randolph Road railroad crossing and the adjacent study intersections was performed to evaluate the disruption to traffic flow for all forecasted years. Queue lengths from the crossing during crossing events are summarized below:

Eastbound:

- The eastbound queue always spills over into the upstream intersection of Randolph Road at Nebel Street during crossing events under Existing, No-Build, and Build conditions.
- The eastbound queue only spills over into the upstream intersection without a crossing event under 2040 PM No-Build conditions. This is caused by the downstream eastbound queue at the Parklawn Drive intersection.

Westbound:

- In the No-Build scenario, the westbound queue only spills over into the upstream intersection of Randolph Road at Parklawn Drive during peak hour freight crossing events under 2017, 2022, and 2040 conditions.
- In the Build scenario, the westbound queue spills over into the upstream intersection of Randolph Road at Parklawn Drive during all 2022 train crossings, with the exception of 2022 PM peak hour MARC train crossings, and during all 2040 train crossings.

- In the Build scenario, the westbound queue spills over into the upstream intersection of Randolph Road at Parklawn Drive under normal flow conditions beginning in 2022 during the AM peak hour, and in 2040 during the PM peak hour. This is caused by the downstream westbound queue at the Nebel Street intersection.

PURPOSE OF MEMORANDUM

The purpose of this memorandum is to provide a traffic operational analysis for the MD 355 (Rockville Pike) Phase 2 project in Montgomery County. The Phase 2 project extends Montrose Parkway from Chapman Avenue/Maple Avenue to east of Parklawn Drive. A future County project will extend Montrose Parkway further east to MD 586 (Veirs Mill Road). This analysis is intended to be used to meet the County's Mandatory Referral requirements.

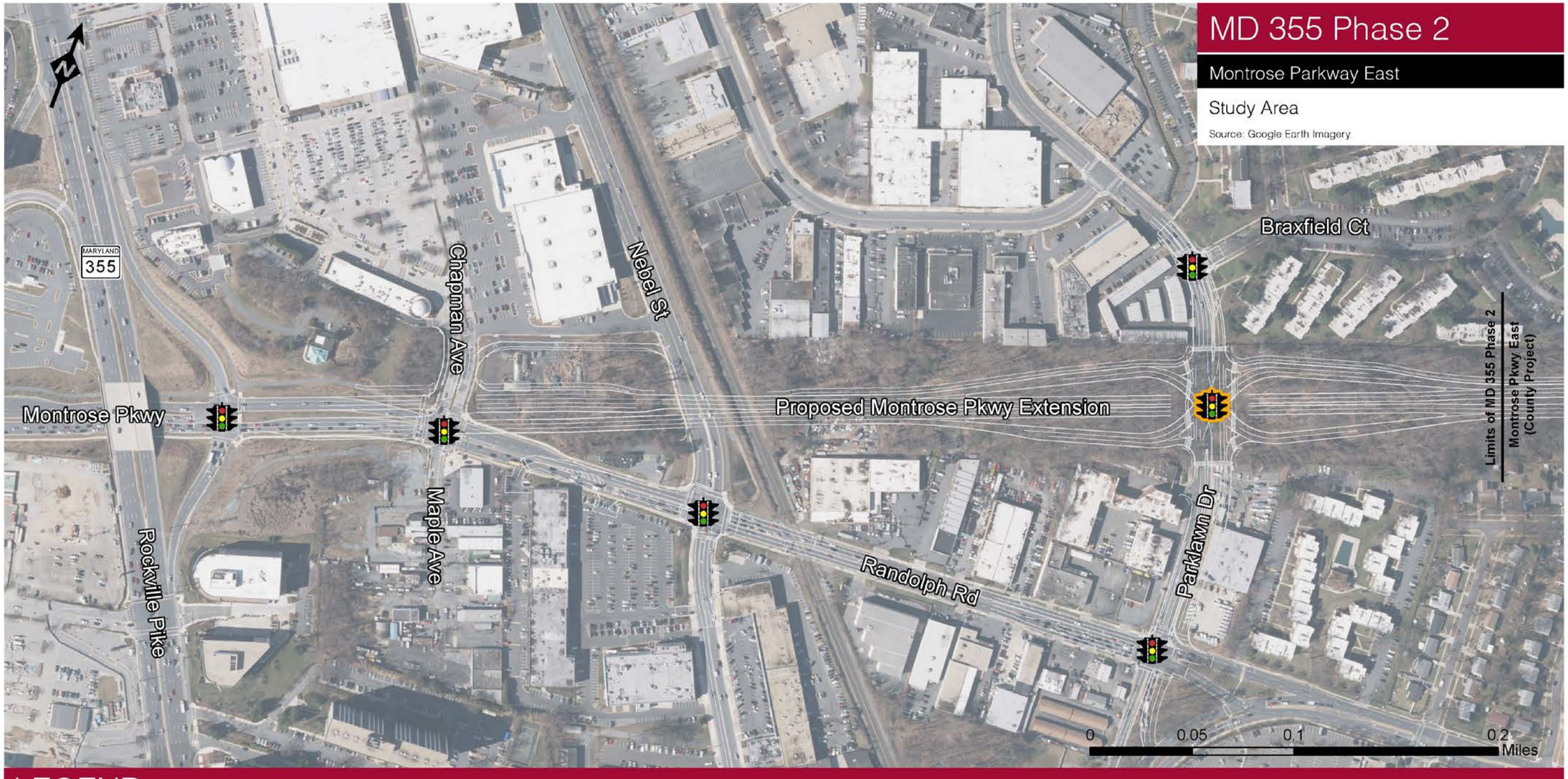
SUMMARY

Intersections included within this study area are:

1. Montrose Parkway at the MD 355 (Rockville Pike) Northbound Ramps
2. Montrose Parkway at Chapman Avenue/Maple Avenue
3. Montrose Parkway at Parklawn Drive (proposed)
4. Randolph Road at Nebel Street
5. Randolph Road at Parklawn Drive
6. Parklawn Drive at Braxfield Court

A map of the MD 355 Phase 2 study area is shown in **Figure 1**. The Travel Forecasting and Analysis Division (TFAD) developed 2017, 2022, and 2040 AM and PM peak hour traffic volumes in the study area, which were used to help assess traffic operations under No-Build and Build conditions.

Figure 1: Study Area



ANALYSIS

Analyses were performed at all study intersections using both the Critical Lane Volume (CLV) and Highway Capacity Manual (HCM) methodologies. The Maryland – National Capital Park & Planning Commission (M-NCPPC) recently adopted new Subdivision Staging Policy regulations for Montgomery County, which implement average vehicle delay thresholds based off of the HCM instead of CLV congestion standards. Since the change is relatively new, it was requested that both analyses be provided for comparison purposes.

Additional performance measures were also recorded from the traffic simulation models.

Field Review

AM and PM peak period field observations were performed on Tuesday, May 9th 2017 and Wednesday, May 10, 2017 for the entire study corridor to examine roadway characteristics and document corridor and intersection operations.

The following is a summary of the observations:

AM Peak Period

- During the AM peak period, maximum westbound queues at the intersection of Randolph Road at Parklawn Drive reached Gaynor Road, approximately 3,500 feet away.



Figure 2: Eastbound facing Westbound Queue at Intersection of Randolph Road at Parklawn Drive

- Queuing on the westbound approach of Randolph Road at Nebel Street reached the railroad crossing. A couple of westbound vehicles queued beyond the railroad crossing.
- Queuing on the westbound approach of Randolph Road at the MD 355 ramps reached Chapman Road. The queue cleared within a cycle and did not lead to cycle failure.

PM Peak Period

- During the PM peak period, eastbound Randolph Road is heavily congested from Parklawn Drive/Lauderdale Drive to the MD 355 ramps.
- The southbound left-turn movement of Nebel Street at Randolph Road experiences cycle failures as the mainline eastbound queue prevents vehicles from entering the intersection.
- The northbound approach of Nebel Street experiences significant queuing during the PM peak period (approximately 18 vehicles).
- The westbound approach on Randolph Road at Nebel Street queues to the railroad crossing. A couple of westbound vehicles were occasionally queued past the railroad crossing.
- Vehicles at unsignalized driveways have difficulties turning onto Randolph Road because the eastbound queues extend through the study corridor.

Railroad Crossing
A 12-hour count was performed at the CSX rail crossing of Randolph Road on Wednesday, May 3rd, 2017. The type and length of trains, their arrival time at the railroad crossing, and the crossing durations were collected. The observations are summarized below:

- A total of 25 trains arrived at the crossing between 7:00 am and 7:00 pm, including:
  - 13 MARC trains
  - 8 CSX freight trains
  - 2 AMTRAK trains
  - 2 Maintenance Vehicles
- Only MARC trains arrived at the crossing during the AM and PM peak hours. The trains were 6 cars long on average with an average crossing time of 1:06 minute.
  - 3 MARC trains arrived at the crossing during the AM peak hour.
  - 2 MARC trains arrived at the crossing during the PM peak hour.
- Only southbound trains arrived at the crossing between 7:00 am and 9:24 am.
- Only northbound trains arrived at the crossing between 3:52 pm and 7:00 pm.
- The longest crossing lasted 5:15 minutes due to a 118 car-long CSX freight train.

The full 12-hour count of the railroad crossing is included in **Appendix A**.

Peak Hour Traffic Volumes

Existing 2017 and future 2022 and 2040 peak hour traffic volumes were developed for intersections in the study area.

Existing (2017) balanced volumes were developed using various sources including turning movement counts collected in September 2015 by M-NCPPC and new turning movement counts collected in May 2017 as part of this project study. Existing (2017) balanced volumes are included in **Appendix B.**

The latest Metropolitan Washington Council of Governments (MWCOG) model (version 2.66, Round 9 Land Use) was used as a foundation for the future traffic volumes. The MWCOG model provides the Constrained Long Range Plan networks and Round 9 Cooperative Land Use files for the 2017, 2020, 2025, 2030 and 2040 horizon years. Additional zone and roadway network details were incorporated to provide more accurate loading from developments and traffic assignments along the corridor and surrounding subarea. TAZ centroid connectors were adjusted, network detail added (such as Nebel Street and Chapman Avenue), and turn penalties restricting illegal/impossible turns added to existing 2017 (base), 2025 (representing 2022) and 2040 roadway networks based on the M-NCPPC Montgomery County Travel/4 forecasting model. The MWCOG future 2025 (2022) and 2040 networks already incorporated the "Build" MD 355 Phase 2 project and the County's Montrose Parkway east project. Therefore, to create the "No Build" scenarios, these facilities were removed from the 2025 and 2040 "build" networks to return them to No-Build conditions (both projects are assumed to be completed by opening year).

The 2017 (base), 2025, and 2040 Subarea land use files were then created by prorating the MWCOG TAZ land use data based upon the M-NCPPC Travel/4 model and Master Plan information provided by the M-NCPPC planners. For 2017, the TAZs were disaggregated based upon the percentages found in the 2010 Travel/4 databases. For 2040, the TAZs were disaggregated based upon the M-NCPPC White Flint 2 Master Plan 2040 Recommended Land Use Scenario. For 2025, the majority of split TAZs used the 2010 percent distributions; however, some were adjusted to account for maximum current year build out in portions of the Parent MWCOG TAZ.

The four scenarios (networks and land use) were then used to conduct travel demand runs for 2017, 2025 (2022) and 2040 (Build/No-Build). These post mode choice runs included disaggregating the vehicle trip tables from the parent MWCOG travel 2017, 2025, and 2040 travel forecasts to reflect the new subarea zone detail, and then carrying out the road network traffic equilibrium on the road networks that included the additional subarea network details. The loaded networks from the travel demand runs were post-processed using the NCHRP 255/765 post-processing methods to develop the future 2022 and 2040 year local traffic/intersection data. More details about the forecasting methodology are included in **Appendix C**.

The future volume sets incorporate additional regional through traffic on the roadway network, include all relevant background traffic development volumes, and any induced demand due to new roadways. This approach was coordinated and agreed upon through discussion with M-NCPPC staff. Future balanced volumes are provided in **Appendix B**, following Existing conditions traffic volumes.

Scenarios

Five scenarios were developed for analysis, as follows:

- Existing 2017,
- 2022 No-Build,
- 2022 Build,
- 2040 No-Build, and
- 2040 Build.

The roadway geometry assumed for each scenario is outlined below.

Existing

- Assumes existing geometry and no roadway improvements. This condition includes the recent extension of Maple Avenue/Chapman Avenue between Montrose Parkway/Randolph Road and Old Georgetown Road.

2022/2040 No-Build

- Assumes same geometry as Existing conditions.

2022/2040 Build

- Assumes completion of the MD 355 Phase 2 project and the County's Montrose Parkway East project which include:
    - Extending Montrose Parkway between Chapman Avenue and Veirs Mill Road (MD 586)
    - Terminating Randolph Road at the Montrose Shopping Center
    - Providing a "slip ramp" through Montrose Crossing connecting NB Chapman Avenue to SB Nebel Street
    - Creation of a single point urban interchange (SPUI) at the intersection of Parklawn Drive at Montrose Parkway (extended).

Lane diagrams for each scenario (2017, 2022/2040 No-Build, 2022/2040 Build) can be found in **Appendix B.**

Inputs

CLV
The study intersections were coded into a CLV analysis spreadsheet. Intersection data such as the number of lanes, lane configuration, signal phasing, peak hour volumes, traffic control devices, and right turn on red/overlaps were input into the spreadsheets. Existing signal timings and phasing were obtained from the Montgomery County Department of Transportation (MCDOT) to verify intersection phasing and any overlaps that may affect the CLV results.

Synchro/SimTraffic
The study corridor was coded into a Synchro/SimTraffic network to perform capacity analysis. Synchro™ is a deterministic and macroscopic signal analysis computer software program that models street networks and traffic signal systems. SimTraffic is a microscopic traffic simulator that models traffic conditions defined in Synchro.

Geometric data such as number of lanes, lane widths, lane configuration, storage lengths, tapers, distances between intersections, etc., were input into Synchro. Existing signal timing information was obtained from MCDOT and coded into the network along with the balanced existing volumes.

Existing 2017 peak hour models were calibrated to match existing traffic volumes, HERE speed data along Randolph Road for existing year conditions, and 95th percentile queue lengths within the study area. Google Maps traffic and field observations were used to confirm queue lengths simulated by the model. This information was then used to calibrate the Synchro network models to TFAD's standard validation targets to ensure the network models replicate existing conditions. The calibrated existing Synchro networks were then modified to reflect 2022/2040 No-Build and 2022/2040 Build scenarios.

VISSIM
A VISSIM analysis of the railroad crossing and the adjacent study intersections was performed to evaluate the disruption to traffic flow for all forecasted years. VISSIM is a microscopic traffic simulation software program that models street networks, traffic signals, and transit operations. The analysis was performed to determine queue lengths from the crossing during crossing events as well as the time to return to normal flow.

As the VISSIM analysis was performed to analyze the CSX railroad crossing, the modelled network only included intersections adjacent to the crossing or intersections directly effecting the operations of the adjacent intersections. The study intersections included: (1) Randolph Road at Nebel Street, (2) Randolph Road at Parklawn Drive, and (3) Randolph Road at Lauderdale Drive.

The geometric and signal timing data defined in the previous section (Synchro/Simtraffic) were input into the VISSIM model along with the 2017, 2022, and 2040 balanced volumes. Train characteristics such as train frequency and duration of crossing events were gathered from the previously mentioned field observations along with the MARC train schedule and coded into the model.

Several assumptions related to the railroad crossing were made during the analysis:

- Flashing-light signals turn on 45 seconds before the train arrives at the crossing.
- Flashing-light signals turn off 15 seconds after the train leaves the crossing.
- Only MARC trains arrive at the crossing during the AM or PM peak hour.
- The MARC train schedule was assumed to remain constant for all study years.
- Worst-case freight crossings events were assumed to last approximately 4.5 minutes.

Three scenarios were analyzed for each alternative: (1) A typical day scenario which includes only MARC train crossings, (2) a worst case scenario in which a freight train arrives at the crossing during the peak hours, and (3) a No-Train scenario which was used to develop the maximum queue lengths under normal flow conditions. These scenarios, and the train crossings they contain, are summarized in **Table 1**.

Table 1: Modeled Scenarios and Train Schedules

Scenario	Train Types	Simulated Crossing Time	
		AM	PM
Typical Day	MARC train	(0) 7:45 AM*	(0) 4:55 PM*
		(1) 8:00 AM	(1) 5:18 PM
		(2) 8:15 AM	(2) 5:45 PM
Freight	Freight train	(1) 8:00 AM	(1) 5:15 PM
No Train	No trains	n/a	n/a

**Crossing events occur during seeding period*

Outputs

CLV
In the CLV analysis, lane-adjusted through and opposing volumes for both northbound-southbound and eastbound-westbound directions are determined and evaluated, and the greatest for each direction combined to develop the CLV for the intersection. Measures of effectiveness (MOEs) that were evaluated include level of service (LOS), volume-to-capacity (v/c) ratio, and critical lane volume (CLV).

Synchro/SimTraffic
Level of Service (LOS) calculations were performed using Synchro traffic analysis software. Synchro models operations at signalized intersections used the static methodology from the 2000 Highway Capacity Manual. The selected MOEs utilized as part of this evaluation included average vehicle delay, LOS, and intersection volume-to-capacity ratio.

SimTraffic records a variety of MOEs such as 95th percentile queue lengths and total delay per vehicle. These performance measures were extracted from five 60 minute SimTraffic simulations with 15 minute seeding intervals. The average of the five runs is reported.

Table 2 and **Table 3** summarize the results of the Existing AM and PM CLV and HCM analyses, respectively. **Table 4** and **Table 5** summarize the results of the 2022 No Build AM and PM CLV and HCM analyses, and **Table 6** and **Table 7** show the results of the 2022 Build AM and PM CLV and HCM analyses**.** **Table 8** and **Table 9** summarize the results of the 2040 No Build AM and PM CLV and HCM analyses, and **Table 10** and **Table 11** show the results of the 2040 Build AM and PM CLV and HCM analyses**. Figure 4** and **Figure 5** show the AM and PM LOS of each intersection and segment. Detailed HCM worksheets and queueing reports are provided in **Appendix D**.

VISSIM
Five simulation runs were completed for all scenarios. This includes a 30-minute seeding period followed by a 60-minute evaluation period during which performance measures are recorded. The average of the five simulation runs is reported.

Queue lengths at the railroad crossing and at select movements of the adjacent study intersections were collected at 10-second time intervals. The time to return to normal flow, measured in cycles (150 seconds), was estimated by comparing queue lengths during crossing events to the "maximum normal queue". The "maximum normal queue" was defined as the maximum observed queue length during a peak hour in which no crossing event occurs. The time to return to normal flow was measured from the start of a railroad

crossing event. The methodology used to estimate the time to return to normal flow is illustrated in **Figure 3**. In the event that more than one crossing event occurs during the evaluation period, the longest time to return to normal flow was reported.

The network time to return to normal flow was defined as the longest time to return to normal flow of an approach. Approaches with continuously growing queues, regardless of train crossings, were not considered when determining the network time to return to normal flow.

The time to return to normal flow of the approaches of the railroad crossing and adjacent intersections are presented in **Figure 6** and **Figure 7**. The time to return to normal flow at the northbound approach of the Randolph Road at Parklawn Drive intersection (#3) was not included as queuing at the approach would frequently spill back to southbound Parklawn Drive, regardless of train crossings. The time to return to normal flow following a train crossing event could not be assessed. Maximum queue lengths at the railroad crossing are included in **Table 12**. **Appendix E** contains detailed VISSIM queuing results for the approaches affected by railroad crossing events.

Figure 3: Determining Time to Return to Normal Flow

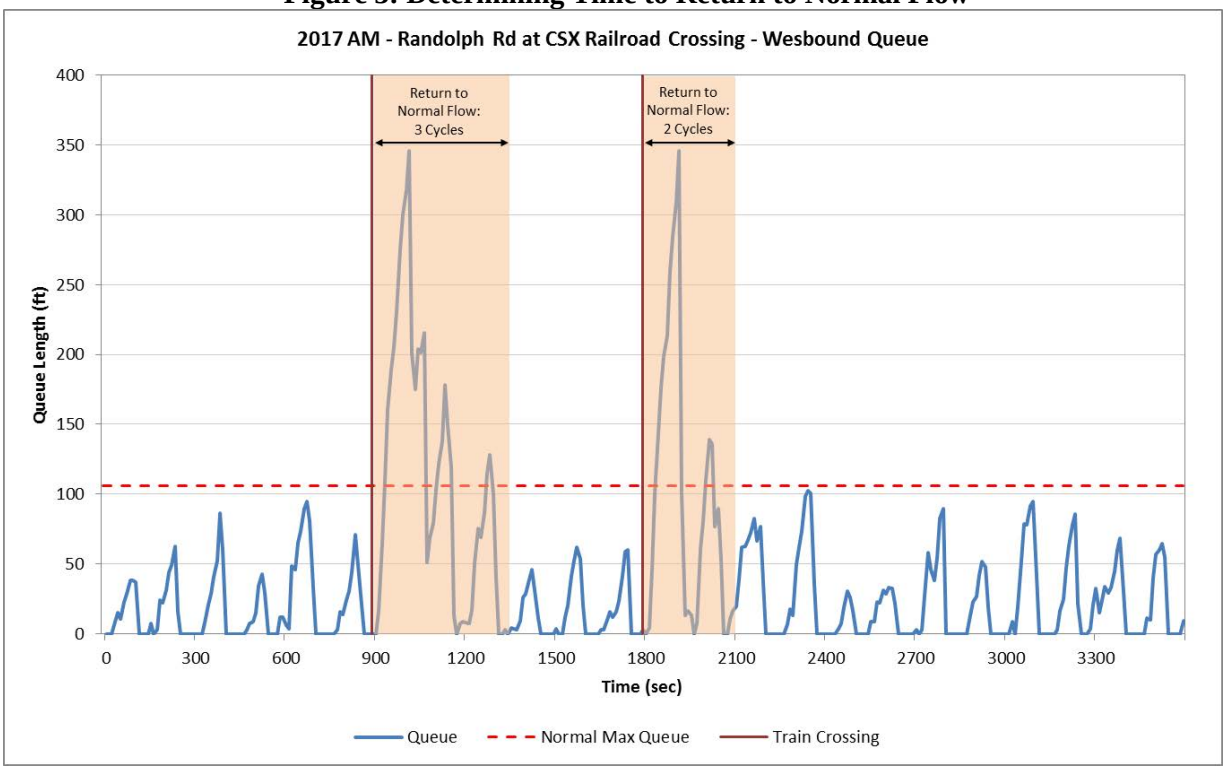


Table 2: Existing CLV Analysis

Intersection	Control	Approach	Existing - AM			Existing - PM		
			Critical Lane Volume			Critical Lane Volume		
			V/C	CLV	LOS	V/C	CLV	LOS
Rockville Pike (MD 355) Ramps A/B at Montrose Pkwy	Signalized	Overall	0.47	760	A	0.46	739	A
Chapman Ave/Maple Ave at Randolph Rd	Signalized	Overall	0.49	789	A	0.52	837	A
Nebel St at Randolph Rd	Signalized	Overall	0.65	1046	B	0.80	1276	C
Parklawn Dr at Randolph Rd	Signalized	Overall	0.76	1222	C	0.80	1287	C
Parklawn Dr at Braxfield Ct	Signalized	Overall	0.24	392	A	0.38	611	A

Table 3: Existing HCM Capacity Analysis and SimTraffic Queue Lengths and Delay by Movement

Intersection	Control	Approach	Movement	Existing - AM						Existing - PM					
				HCM			SimTraffic			HCM			SimTraffic		
				V/C	Delay (s)	LOS	Delay	95th Queues (ft)	Storage Length	V/C	Delay (s)	LOS	Delay (s)	95th Queues (ft)	Storage Length
Montrose Pkwy and MD 355 Ramps	Signalized	**Overall**	-	**0.51**	**15.7**	**B**	**14.6**	-	-	**0.52**	**18.7**	**B**	**19.4**	-	-
		EB	Left	0.47	67.8	E	63.3	150	400	0.56	67.5	E	63.5	200	400
			Through	0.28	2.7	A	3.0	100	-	0.46	5.1	A	6.9	175	-
		WB	Through	0.50	13.6	B	12.2	250	500	0.35	10.0	B	15.4	225	500
			Right	0.07	15.8	B	4.2	50	325	0.08	20.5	C	4.8	75	325
		NB	Left-Through	0.49	69.2	E	70.4	125	-	0.54	65.8	E	62.5	175	-
			Right	0.26	65.3	E	68.1	75	185	0.66	68.4	E	59.4	200	185
Montrose Pkwy and Chapman Ave	Signalized	**Overall**	-	**0.51**	**13.0**	**B**	**10.3**	-	-	**0.60**	**28.5**	**C**	**23.4**	-	-
		EB	Left	0.30	11.3	B	15.1	75	375	0.38	12.7	B	18.1	175	375
			Through-Right	0.31	10.9	B	6.0	200	500	0.61	21.7	C	20.1	400	500
		WB	Left	0.04	7.8	A	9.0	50	175	0.10	19.3	B	22.4	75	175
			Through	0.55	10.5	B	9.6	250	600	0.42	25.8	C	20.6	300	600
			Right	0.05	14.5	B	4.5	75	225	0.09	42.5	D	5.9	125	225
		NB	Left	0.26	73.4	E	78.2	50	-	0.31	71.4	E	64.9	75	-
			Through-Right	0.19	72.4	E	36.9	50	-	0.13	69.1	E	49.1	75	-
		SB	Left	0.29	71.5	E	65.9	50	-	0.66	70.9	E	58.4	175	-
			Left-Through-Right	0.12	69.1	E	39.8	75	-	0.52	64.2	E	47.1	175	-
Randolph Rd and Nebel St	Signalized	**Overall**	-	**0.70**	**23.6**	**C**	**24.7**	-	-	**0.94**	**62.6**	**E**	**84.6**	-	-
		EB	Left	0.22	21.8	C	24.3	75	150	0.04	15.3	B	43.5	100	150
			Through-Right	0.41	17.0	B	19.5	300	600	0.91	51.3	D	54.0	600	600
		WB	Left	0.72	31.1	C	28.9	225	150	0.89	87.4	F	64.8	225	150
			Through-Right	0.68	12.0	B	18.4	300	1100	0.50	12.7	B	18.5	275	1100
		NB	Left	0.55	71.9	E	75.5	125	200	1.16	190.4	F	201.8	325	200
			Through	0.51	68.9	E	63.6	125	-	0.55	59.6	E	116.2	750	-
			Right	0.08	63.4	E	12.8	75	275	0.90	90.9	F	99.8	400	275
		SB	Left	0.53	71.4	E	70.3	100	275	1.19	201.6	F	397.3	425	275
			Through	0.48	68.7	E	62.6	125	-	0.41	56.7	E	207.1	975	-
			Right	0.00	62.9	E	13.6	25	-	0.02	51.9	D	83.5	525	-
Randolph Rd and Parklawn Dr	Signalized	**Overall**	-	**0.84**	**38.1**	**D**	**39.3**	-	-	**0.92**	**45.7**	**D**	**67.5**	-	-
		EB	Left	0.82	96.2	F	62.3	200	300	0.60	29.6	C	81.9	475	300
			Through	0.19	7.6	A	10.0	100	1100	0.87	31.4	C	99.5	1075	1100
			Right	0.15	5.2	A	6.3	75	300	0.13	28.3	C	58.9	500	300
		WB	Through	0.84	30.1	C	41.9	2750	-	0.58	39.1	D	33.3	250	-
			Right	0.33	11.2	B	9.0	250	175	0.12	44.1	D	3.8	50	175
		NB	Left-Through-Right	0.90	81.8	F	68.8	225	-	0.86	78.6	E	90.6	225	-
		SB	Left	0.52	63.4	E	61.4	225	450	0.88	72.6	E	50.0	300	450
			Left-Through-Right	0.85	79.1	E	69.3	300	900	0.81	59.2	E	47.3	350	900
Parklawn Dr and Braxfield Ct	Signalized	**Overall**	-	**0.28**	**3.6**	**A**	**4.8**	-	-	**0.50**	**7.8**	**A**	**8.8**	-	-
		EB	Left-Through-Right	0.00	0.0	A	0.0	0	-	0.00	0.0	A	0.0	0	-
		WB	Left-Through	0.28	43.0	D	23.3	75	-	0.57	42.6	D	36.4	125	-
			Right	0.01	39.1	D	5.0	50	-	0.03	33.8	C	4.4	50	-
		NB	Left-Through-Right	0.25	2.5	A	5.9	75	900	0.23	4.2	A	7.7	100	900
		SB	Left-Through-Right	0.21	2.3	A	2.5	100	-	0.44	5.1	A	6.4	225	-

Queues Extend to Adjacent Study Intersection
95th Percentile Queues Exceed Storage Length

Table 4: 2022 No Build CLV Analysis

Intersection	Control	Approach	No Build 2022 - AM			No Build 2022 - PM		
			Critical Lane Volume			Critical Lane Volume		
			V/C	CLV	LOS	V/C	CLV	LOS
Rockville Pike (MD 355) Ramps A/B at Montrose Pkwy	Signalized	Overall	0.50	797	A	0.48	774	A
Chapman Ave/Maple Ave at Randolph Rd	Signalized	Overall	0.51	821	A	0.55	874	A
Nebel St at Randolph Rd	Signalized	Overall	0.68	1093	B	0.84	1342	D
Parklawn Dr at Randolph Rd	Signalized	Overall	0.81	1303	D	0.87	1390	D
Parklawn Dr at Braxfield Ct	Signalized	Overall	0.27	437	A	0.45	720	A

Table 5: 2022 No Build HCM Capacity Analysis and SimTraffic Queue Lengths and Delay by Movement

Intersection	Control	Approach	Movement	2022 No Build - AM						2022 No Build - PM					
				HCM			SimTraffic			HCM			SimTraffic		
				V/C	Delay (s)	LOS	Delay	95th Queues (ft)	Storage Length	V/C	Delay (s)	LOS	Delay (s)	95th Queues (ft)	Storage Length
Montrose Pkwy and MD 355 Ramps	Signalized	**Overall**	-	**0.54**	**16.2**	**B**	**14.8**	-	-	**0.54**	**19.3**	**B**	**65.1**	-	-
		EB	Left	0.48	67.6	E	60.9	150	400	0.57	67.4	E	105.4	600	400
			Through	0.30	2.9	A	3.2	100	-	0.48	5.4	A	95.6	950	-
		WB	Through	0.52	14.2	B	12.6	250	500	0.37	11.1	B	18.7	225	500
			Right	0.08	16.1	B	4.3	50	325	0.08	19.7	B	5.0	75	325
		NB	Left-Through	0.50	69.0	E	71.3	125	270	0.55	65.7	E	53.5	175	270
			Right	0.27	65.0	E	64.1	100	185	0.67	68.6	E	62.8	200	185
Montrose Pkwy and Chapman Ave	Signalized	**Overall**	-	**0.53**	**13.1**	**B**	**10.7**	-	-	**0.63**	**28.6**	**C**	**41.5**	-	-
		EB	Left	0.31	12.4	B	15.3	75	375	0.39	12.8	B	22.5	500	375
			Through-Right	0.33	10.9	B	7.1	200	500	0.64	22.2	C	58.4	500	500
		WB	Left	0.05	7.7	A	12.5	50	175	0.11	19.1	B	23.7	50	175
			Through	0.58	10.8	B	9.9	250	600	0.44	26.1	C	19.6	300	600
			Right	0.05	13.0	B	4.5	75	225	0.09	41.0	D	5.8	125	225
		NB	Left	0.26	73.4	E	70.6	75	-	0.35	71.7	E	63.2	75	-
			Through-Right	0.19	72.4	E	45.2	75	-	0.13	68.7	E	52.6	75	-
		SB	Left	0.29	71.5	E	66.7	50	-	0.66	70.8	E	59.5	150	-
			Left-Through-Right	0.12	69.1	E	32.8	75	-	0.52	64.9	E	46.1	175	-
Randolph Rd and Nebel St	Signalized	**Overall**	-	**0.75**	**26.2**	**C**	**25.8**	-	-	**1.00**	**72.0**	**E**	**99.1**	-	-
		EB	Left	0.25	25.4	C	27.0	100	150	0.05	15.0	B	64.3	125	150
			Through-Right	0.46	20.0	C	21.3	325	600	0.98	62.7	E	81.5	600	600
		WB	Left	0.77	38.0	D	29.8	225	150	0.94	94.1	F	65.4	225	150
			Through-Right	0.71	13.3	B	18.9	300	1100	0.53	13.9	B	18.7	275	1100
		NB	Left	0.58	73.6	E	71.9	150	210	1.23	215.6	F	211.8	325	210
			Through	0.54	69.5	E	61.8	150	-	0.57	58.7	E	132.3	750	-
			Right	0.09	62.8	E	12.7	100	275	0.96	103.6	F	103.5	400	275
		SB	Left	0.55	71.9	E	70.8	125	275	1.26	227.5	F	398.3	400	275
			Through	0.52	68.9	E	61.2	150	-	0.43	55.5	E	233.2	900	-
			Right	0.00	62.1	E	12.7	25	-	0.02	50.2	D	119.9	450	-
Randolph Rd and Parklawn Dr	Signalized	**Overall**	-	**0.90**	**44.7**	**D**	**43.1**	-	-	**0.99**	**51.0**	**D**	**78.6**	-	-
		EB	Left	0.86	105.3	F	67.5	225	300	0.69	34.9	C	105.1	475	300
			Through	0.20	8.1	A	10.9	125	1100	0.94	34.4	C	125.4	1100	1100
			Right	0.16	5.7	A	6.6	75	300	0.14	30.5	C	83.1	500	300
		WB	Through	0.89	34.6	C	42.6	3375	-	0.63	42.1	D	32.1	275	-
			Right	0.39	14.8	B	9.4	275	175	0.14	46.7	D	4.0	75	175
		NB	Left-Through-Right	0.93	94.7	F	85.8	225	-	0.93	88.8	F	95.7	225	-
		SB	Left	0.53	62.7	E	71.0	250	450	0.94	83.5	F	54.4	275	450
			Left-Through-Right	0.95	95.9	F	73.0	350	900	0.89	63.8	E	56.1	475	900
Parklawn Dr and Braxfield Ct	Signalized	**Overall**	-	**0.31**	**3.6**	**A**	**5.1**	-	-	**0.57**	**8.1**	**A**	**9.5**	-	-
		EB	Left-Through-Right	0.00	0.0	A	0.0	0	-	0.00	0.0	A	0.0	150	-
		WB	Left-Through	0.28	43.0	D	27.0	75	-	0.58	43.1	D	36.9	50	-
			Right	0.01	39.1	D	4.5	50	-	0.03	33.6	C	5.2	100	-
		NB	Left-Through-Right	0.29	2.6	A	6.1	75	900	0.27	4.4	A	8.2	250	900
		SB	Left-Through-Right	0.24	2.4	A	2.7	100	-	0.51	5.7	A	7.3	175	-

Queues Extend to Adjacent Study Intersection
95th Percentile Queues Exceed Storage Length

Table 6: 2022 Build CLV Analysis

Intersection	Control	Approach	Build 2022 - AM			Build 2022 - PM		
			Critical Lane Volume			Critical Lane Volume		
			V/C	CLV	LOS	V/C	CLV	LOS
Rockville Pike (MD 355) Ramps A/B at Montrose Pkwy	Signalized	Overall	0.52	833	A	0.52	837	A
Chapman Ave/Maple Ave at Randolph Rd	Signalized	Overall	0.42	664	A	0.43	691	A
Nebel St at Randolph Rd	Signalized	Overall	0.71	1137	B	0.79	1269	C
Parklawn Dr at Randolph Rd	Signalized	Overall	0.67	1068	B	0.74	1181	C
Parklawn Dr at Braxfield Ct	Signalized	Overall	0.31	492	A	0.49	791	A
Montrose Pkwy at Parklawn Dr	Signalized	Overall	0.39	623	A	0.44	707	A

Table 7: 2022 Build HCM Capacity Analysis and SimTraffic Queue Lengths and Delay by Movement

Intersection	Control	Approach	Movement	2022 Build - AM						2022 Build - PM					
				HCM			SimTraffic			HCM			SimTraffic		
				V/C	Delay (s)	LOS	Delay	95th Queues (ft)	Storage Length	V/C	Delay (s)	LOS	Delay (s)	95th Queues (ft)	Storage Length
Montrose Pkwy and MD 355 Ramps	Signalized	**Overall**	**-**	**0.56**	**13.5**	**B**	**16.0**	**-**	**-**	**0.59**	**19.3**	**B**	**20.5**	**-**	**-**
		EB	Left	0.45	67.8	E	64.3	175	400	0.54	67.6	E	66.8	200	400
			Through	0.32	3.0	A	3.2	100	-	0.52	6.0	A	8.2	250	-
		WB	Through	0.56	10.9	B	16.0	350	475	0.40	14.5	B	17.7	275	475
			Right	0.06	8.5	A	2.1	50	475	0.08	7.3	A	3.7	50	475
		NB	Left-Through	0.50	69.0	E	70.5	125	270	0.56	65.5	E	64.2	175	270
			Right	0.27	65.0	E	61.2	100	185	0.68	68.5	E	58.4	225	185
Montrose Pkwy and Chapman Ave	Signalized	**Overall**	**-**	**0.45**	**16.4**	**B**	**15.6**	**-**	**-**	**0.52**	**30.5**	**C**	**26.6**	**-**	**-**
		EB	Left	0.58	63.5	E	67.0	175	400	0.76	63.7	E	58.3	300	400
			Through	0.23	10.3	B	9.7	200	475	0.44	15.8	B	17.7	325	475
			Right	0.02	5.9	A	1.6	25	400	0.04	54.6	D	2.2	50	400
		WB	Left	0.43	78.4	E	62.5	75	500	0.43	73.5	E	69.1	75	500
			Through	0.46	11.6	B	12.6	275	1100	0.36	25.0	C	26.6	300	1100
			Right	0.07	5.6	A	2.3	50	400	0.11	40.8	D	3.7	75	400
		NB	Left	0.27	71.3	E	71.6	50	-	0.35	71.7	E	61.4	75	-
			Through-Right	0.20	70.4	E	47.7	50	-	0.18	69.2	E	46.0	75	-
		SB	Left	0.25	70.3	E	68.4	75	135	0.61	66.3	E	59.6	250	135
			Through	0.06	68.9	E	74.6	50	-	0.18	60.6	E	58.4	75	-
			Right	0.02	68.5	E	21.9	75	135	0.06	59.3	E	11.0	75	135
Randolph Rd and Nebel St	Signalized	**Overall**	**-**	**0.71**	**55.3**	**E**	**56.1**	**-**	**-**	**0.82**	**69.4**	**E**	**128.3**	**-**	**-**
		EB	Left	0.02	37.7	D	23.3	25	150	0.05	44.4	D	37.7	25	150
			Through-Right	0.12	40.0	D	44.9	100	-	0.25	47.6	D	46.7	150	-
		WB	Left	0.87	57.8	E	78.3	225	150	0.88	81.7	F	76.1	250	150
								900	1075					400	1075
			Through-Right	0.55	36.2	D	43.8	900	1075	0.64	83.1	F	39.0	500	1075
		NB	Left	0.57	77.4	E	70.9	125	210	0.70	73.8	E	228.0	225	210
			Through-Right	0.48	65.5	E	23.8	250	-	1.05	64.0	E	259.5	725	-
		SB	Left	0.69	69.2	E	65.1	175	275	0.88	72.2	E	64.3	350	275
								200	-					425	-
			Through-Right	0.50	59.8	E	47.4	200	-	0.47	41.4	D	33.5	275	-
Randolph Rd and Parklawn Dr	Signalized	**Overall**	**-**	**0.77**	**42.2**	**D**	**42.1**	**-**	**-**	**0.88**	**55.6**	**E**	**50.8**	**-**	**-**
		EB	Left	0.68	73.6	E	73.4	175	300	0.67	67.2	E	90.8	450	300
			Through-Right	0.27	47.4	D	31.1	250	1075	0.81	61.9	E	55.2	550	1075
		WB	Through	0.74	34.2	C	40.5	1275	-	0.46	39.8	D	37.7	325	-
			Right	0.34	16.4	B	10.4	225	175	0.15	69.8	E	10.5	125	175
		NB	Left	0.80	82.1	F	81.3	200	-	0.82	86.1	F	87.2	200	-
			Through-Right	0.37	60.9	E	70.9	175	-	0.62	65.8	E	83.6	200	-
		SB	Left	0.35	34.8	C	42.1	200	200	0.86	51.4	D	39.9	475	200
			Left-Through-Right	0.86	45.2	D	47.9	350	450	0.77	41.8	D	42.4	450	450
Parklawn Dr and Braxfield Ct	Signalized	**Overall**	**-**	**0.35**	**3.8**	**A**	**8.7**	**-**	**-**	**0.63**	**9.1**	**A**	**77.3**	**-**	**-**
		EB	Left-Through-Right	0.00	0.0	A	0.0	0	-	0.00	0.0	A	0.0	0	-
		WB	Left-Through	0.33	43.6	D	29.9	75	-	0.53	38.5	D	62.2	175	-
			Right	0.01	38.8	D	6.4	25	-	0.03	31.5	C	5.5	75	-
		NB	Left-Through-Right	0.32	2.9	A	8.5	100	175	0.31	5.5	A	10.9	175	175
		SB	Left-Through-Right	0.28	2.6	A	8.1	200	-	0.59	7.5	A	121.8	350	-
Montrose Pkwy and Parklawn Drive	Signalized	**Overall**	**-**	**0.39**	**53.5**	**D**	**35.0**	**-**	**-**	**0.58**	**46.8**	**D**	**35.0**	**-**	**-**
		EB (NE)	Left	0.13	53.3	D	51.3	50	500	0.31	74.1	E	74.9	100	500
			Right	0.61	106.1	F	1.9	50	350	0.81	63.8	E	2.9	75	350
		WB (SW)	Left	0.81	75.9	E	72.1	275	175	0.70	74.4	E	73.5	175	175
			Right	0.28	60.9	E	4.8	175	500	0.20	53.6	D	2.9	100	500
		NB	Left	0.67	77.0	E	68.9	200	225	0.37	58.4	E	80.1	175	225
								175	450					150	450
			Through	0.26	21.2	C	29.1	200	450	0.24	24.5	C	35.4	200	450
			Right	0.13	19.7	B	2.4	0	250	0.22	24.7	C	3.5	75	250
		SB	Left	0.67	67.5	E	56.9	200	150	0.80	67.6	E	59.0	200	150
								200	175					275	175
			Through-Right	0.26	26.2	C	21.1	175	175	0.54	30.6	C	25.4	250	175

Queues Extend to Adjacent Study Intersection
95th Percentile Queues Exceed Storage Length

Table 8: 2040 No Build CLV Analysis

Intersection	Control	Approach	No Build 2040 - AM			No Build 2040 - PM		
			Critical Lane Volume			Critical Lane Volume		
			V/C	CLV	LOS	V/C	CLV	LOS
Rockville Pike (MD 355) Ramps A/B at Montrose Pkwy	Signalized	Overall	0.56	897	A	0.57	912	A
Chapman Ave/Maple Ave at Randolph Rd	Signalized	Overall	0.63	1016	B	0.68	1095	B
Nebel St at Randolph Rd	Signalized	Overall	0.78	1254	C	1.01	1611	F
Parklawn Dr at Randolph Rd	Signalized	Overall	0.97	1550	E	1.04	1665	F
Parklawn Dr at Braxfield Ct	Signalized	Overall	0.32	511	A	0.52	831	A

Table 9: 2040 No Build HCM Capacity Analysis and SimTraffic Queue Lengths and Delay by Movement

Intersection	Control	Approach	Movement	2040 No Build - AM						2040 No Build - PM					
				HCM			SimTraffic			HCM			SimTraffic		
				V/C	Delay (s)	LOS	Delay	95th Queues (ft)	Storage Length	V/C	Delay (s)	LOS	Delay (s)	95th Queues (ft)	Storage Length
Montrose Pkwy and MD 355 Ramps	Signalized	**Overall**	-	**0.60**	**16.4**	**B**	**15.9**	-	-	**0.64**	**25.3**	**C**	**490.2**	-	-
		EB	Left	0.51	67.6	E	66.8	175	400	0.58	67.4	E	780.2	950	400
			Through	0.37	3.5	A	4.3	125	-	0.57	7.0	A	930.2	1150	-
		WB	Through	0.60	15.2	B	14.9	300	500	0.44	25.8	C	28.3	325	500
			Right	0.08	18.5	B	5.0	100	325	0.09	46.3	D	6.1	125	325
		NB	Left-Through	0.55	69.6	E	66.4	150	270	0.61	66.1	E	47.4	175	270
			Right	0.27	63.8	E	57.9	100	185	0.71	68.3	E	60.7	225	185
Montrose Pkwy and Chapman Ave	Signalized	**Overall**	-	**0.67**	**18.7**	**B**	**15.0**	-	-	**0.80**	**46.6**	**D**	**71.8**	-	-
		EB	Left	0.56	28.9	C	21.5	150	375	0.81	43.1	D	50.8	575	375
			Through-Right	0.39	13.3	B	9.7	275	500	0.82	36.8	D	145.3	500	500
		WB	Left	0.06	11.5	B	14.4	50	175	0.19	34.6	C	22.6	100	175
			Through	0.75	16.4	B	14.8	250	600	0.73	47.9	D	31.6	300	600
			Right	0.13	12.4	B	5.9	75	225	0.23	64.5	E	7.9	200	225
		NB	Left	0.19	70.1	E	65.5	50	-	0.35	71.7	E	70.4	75	-
			Through-Right	0.27	71.2	E	48.9	75	-	0.24	70.0	E	51.3	75	-
		SB	Left	0.47	72.5	E	68.1	50	-	0.77	64.6	E	49.6	275	-
			Left-Through-Right	0.19	68.1	E	36.8	100	-	0.70	60.3	E	47.3	350	-
Randolph Rd and Nebel St	Signalized	**Overall**	-	**0.94**	**36.0**	**D**	**30.9**	-	-	**1.24**	**125.7**	**F**	**236.4**	-	-
		EB	Left	0.45	62.4	E	29.0	125	150	0.09	18.1	B	88.6	175	150
			Through-Right	0.62	28.6	C	26.2	400	600	1.18	128.9	F	116.9	600	600
		WB	Left	0.99	72.1	E	42.8	250	150	1.10	127.0	F	62.2	225	150
			Through-Right	0.85	18.1	B	23.1	375	1100	0.63	16.5	B	19.7	300	1100
		NB	Left	0.69	80.7	F	69.0	150	210	1.54	340.5	F	537.9	325	210
			Through	0.59	69.1	E	59.3	175	-	0.73	66.2	E	493.6	650	-
			Right	0.11	60.7	E	16.2	125	275	1.32	226.3	F	494.1	400	275
		SB	Left	0.61	74.8	E	70.7	125	275	1.50	324.5	F	667.9	400	275
			Through	0.56	67.9	E	59.0	175	-	0.54	57.8	E	462.6	1050	-
			Right	0.00	60.1	E	8.6	25	-	0.02	50.3	D	274.7	850	-
Randolph Rd and Parklawn Dr	Signalized	**Overall**	-	**1.09**	**83.1**	**F**	**84.0**	-	-	**1.19**	**90.5**	**F**	**95.1**	-	-
		EB	Left	0.99	133.9	F	65.0	225	300	0.90	56.5	E	129.7	475	300
			Through	0.22	7.7	A	11.6	125	1100	1.12	93.4	F	160.9	1175	1100
			Right	0.21	5.2	A	9.4	125	300	0.21	31.5	C	111.5	500	300
		WB	Through	1.03	59.0	E	42.3	3375	-	0.74	45.3	D	25.5	775	-
			Right	0.44	19.8	B	8.6	225	175	0.18	34.0	C	4.2	100	175
		NB	Left-Through-Right	1.29	216.1	F	101.8	225	-	1.21	178.1	F	96.7	225	-
		SB	Left	0.58	64.3	E	165.6	650	450	1.08	120.6	F	70.0	525	450
			Left-Through-Right	1.23	185.1	F	296.8	900	900	1.03	92.9	F	85.3	625	900
Parklawn Dr and Braxfield Ct	Signalized	**Overall**	-	**0.36**	**3.8**	**A**	**18.9**	-	-	**0.67**	**9.4**	**A**	**9.6**	-	-
		EB	Left-Through-Right	0.00	0.0	A	0.0	0	-	0.00	0.0	A	0.0	0	-
		WB	Left-Through	0.33	43.6	D	38.5	75	-	0.53	38.5	D	36.8	150	-
			Right	0.01	38.8	D	4.5	50	-	0.03	31.5	C	5.0	75	-
		NB	Left-Through-Right	0.33	2.9	A	6.5	75	900	0.32	5.6	A	7.4	75	900
		SB	Left-Through-Right	0.29	2.6	A	31.3	250	-	0.63	8.1	A	7.9	300	-

Queues Extend to Adjacent Study Intersection
95th Percentile Queues Exceed Storage Length

Table 10: 2040 Build CLV Analysis

Intersection	Control	Approach	Build 2040 - AM			Build 2040 - PM		
			Critical Lane Volume			Critical Lane Volume		
			V/C	CLV	LOS	V/C	CLV	LOS
Rockville Pike (MD 355) Ramps A/B at Montrose Pkwy	Signalized	Overall	0.59	939	A	0.58	922	A
Chapman Ave/Maple Ave at Randolph Rd	Signalized	Overall	0.48	772	A	0.53	851	A
Nebel St at Randolph Rd	Signalized	Overall	0.84	1341	D	0.86	1379	D
Parklawn Dr at Randolph Rd	Signalized	Overall	0.79	1264	C	0.93	1495	E
Parklawn Dr at Braxfield Ct	Signalized	Overall	0.41	653	A	0.63	1015	B
Montrose Pkwy at Parklawn Dr	Signalized	Overall	0.51	813	A	0.60	957	A

Table 11: 2040 Build HCM Capacity Analysis and SimTraffic Queue Lengths and Delay by Movement

Intersection	Control	Approach	Movement	2040 Build - AM						2040 Build - PM					
				HCM			SimTraffic			HCM			SimTraffic		
				V/C	Delay (s)	LOS	Delay	95th Queues (ft)	Storage Length	V/C	Delay (s)	LOS	Delay (s)	95th Queues (ft)	Storage Length
Montrose Pkwy and MD 355 Ramps	Signalized	**Overall**	-	**0.63**	**17.2**	**B**	**20.5**	-	-	**0.65**	**23.9**	**C**	**22.4**	-	-
		EB	Left	0.48	67.6	E	64.0	150	400	0.56	67.5	E	63.3	200	400
			Through	0.37	3.6	A	3.9	150	-	0.58	7.3	A	9.7	275	-
		WB	Through	0.63	17.0	B	23.9	425	475	0.46	23.6	C	22.8	300	475
			Right	0.07	11.2	B	2.7	50	475	0.09	26.3	C	3.6	50	475
		NB	Left-Through	0.57	69.7	E	68.3	150	270	0.62	66.1	E	57.7	200	270
			Right	0.28	63.5	E	65.3	125	185	0.72	68.5	E	53.1	250	185
Montrose Pkwy and Chapman Ave	Signalized	**Overall**	-	**0.52**	**19.9**	**B**	**20.6**	-	-	**0.60**	**36.8**	**D**	**28.7**	-	-
		EB	Left	0.54	53.8	D	59.3	250	400	0.81	62.4	E	54.7	325	400
			Through	0.26	10.2	B	10.1	200	475	0.49	19.5	B	18.7	350	475
			Right	0.02	6.1	A	1.8	25	400	0.04	56.2	E	2.8	50	400
		WB	Left	0.43	77.7	E	73.7	50	500	0.43	72.8	E	67.2	50	500
			Through	0.56	17.6	B	20.8	375	1100	0.47	33.8	C	31.8	325	1100
			Right	0.10	8.4	A	3.3	75	400	0.15	59.0	E	5.2	100	400
		NB	Left	0.26	70.9	E	65.5	50	-	0.35	71.7	E	64.6	75	-
			Through-Right	0.26	71.0	E	50.6	75	-	0.24	70.0	E	48.6	75	-
		SB	Left	0.30	70.4	E	67.8	100	135	0.66	63.2	E	54.9	300	135
			Through	0.12	69.2	E	62.9	50	-	0.17	55.8	E	49.2	100	-
			Right	0.02	68.2	E	23.5	75	135	0.08	54.7	D	13.7	100	135
Randolph Rd and Nebel St	Signalized	**Overall**	-	**0.79**	**57.2**	**E**	**49.2**	-	-	**0.94**	**78.7**	**E**	**240.8**	-	-
		EB	Left	0.03	43.2	D	29.9	25	150	0.00	0.0	A	0.0	0	150
			Through-Right	0.14	45.4	D	46.5	100	-	0.41	59.6	E	54.0	175	-
		WB	Left	0.90	55.4	E	61.3	225	150	0.97	84.0	F	83.3	225	150
								700	1075					500	1075
			Through-Right	0.68	45.7	D	36.3	650	1075	0.71	78.3	E	40.7	525	1075
		NB	Left	0.60	79.1	E	78.7	125	210	0.71	74.1	E	508.3	225	210
			Through-Right	0.57	64.8	E	33.6	375	-	1.16	87.0	F	523.6	650	-
		SB	Left	0.79	73.6	E	69.9	225	275	0.96	82.7	F	75.7	375	275
								250	-					525	-
			Through-Right	0.48	56.4	E	44.6	200	-	0.47	37.8	D	31.2	250	-
Randolph Rd and Parklawn Dr	Signalized	**Overall**	-	**0.97**	**61.6**	**E**	**60.3**	-	-	**1.09**	**75.2**	**E**	**62.4**	-	-
		EB	Left	0.98	116.8	F	206.3	375	300	0.70	69.4	E	118.7	450	300
			Through-Right	0.35	57.4	E	37.8	575	1075	1.04	95.2	F	85.4	800	1075
		WB	Through	0.93	51.7	D	56.7	3375	-	0.64	49.6	D	41.1	775	-
			Right	0.44	29.1	C	17.1	325	175	0.16	76.2	E	11.7	200	175
		NB	Left	0.99	120.9	F	93.7	200	-	1.00	124.0	F	90.6	200	-
			Through-Right	0.88	80.2	F	89.9	200	-	0.98	103.1	F	87.1	200	-
		SB	Left	0.29	29.6	C	41.7	275	200	0.86	36.9	D	39.8	325	200
			Left-Through-Right	1.00	62.7	E	52.5	400	450	1.03	60.1	E	44.7	450	450
Parklawn Dr and Braxfield Ct	Signalized	**Overall**	-	**0.47**	**4.1**	**A**	**13.0**	-	-	**0.81**	**11.7**	**B**	**422.7**	-	-
		EB	Left-Through-Right	0.00	0.0	A	0.0	0	-	0.00	0.0	A	0.0	0	-
		WB	Left-Through	0.33	43.6	D	43.4	75	-	0.58	39.2	D	67.4	200	-
			Right	0.01	38.8	D	7.3	50	-	0.04	31.0	C	6.3	75	-
		NB	Left-Through-Right	0.44	3.4	A	10.0	150	175	0.40	6.4	A	12.3	175	175
		SB	Left-Through-Right	0.34	2.8	A	15.7	275	-	0.78	11.7	B	674.0	350	-
Montrose Pkwy and Parklawn Drive	Signalized	**Overall**	-	**0.51**	**52.2**	**D**	**39.4**	-	-	**0.74**	**52.1**	**D**	**37.2**	-	-
		EB (NE)	Left	0.12	50.1	D	49.3	50	500	0.32	70.8	E	78.1	100	500
			Right	0.68	94.5	F	2.7	75	350	0.81	59.1	E	5.4	150	350
		WB (SW)	Left	0.86	77.7	E	88.8	375	175	0.96	110.9	F	98.3	225	175
			Right	0.32	60.4	E	7.7	325	500	0.23	52.9	D	4.4	150	500
		NB	Left	0.71	73.1	E	77.3	225	225	0.33	39.5	D	76.8	175	225
								200	450					125	450
			Through	0.44	25.1	C	36.0	275	450	0.35	26.8	C	30.9	225	450
			Right	0.14	18.9	B	3.3	0	250	0.29	26.4	C	3.4	50	250
		SB	Left	0.68	66.8	E	53.6	200	150	0.81	66.9	E	59.0	225	150
								225	175					275	175
			Through-Right	0.33	30.6	C	25.1	175	175	0.82	45.5	D	27.6	175	175

Queues Extend to Adjacent Study Intersection
95th Percentile Queues Exceed Storage Length

Figure 4: AM Level of Service for Intersections and Roadway Corridor Links (Synchro/SimTraffic)

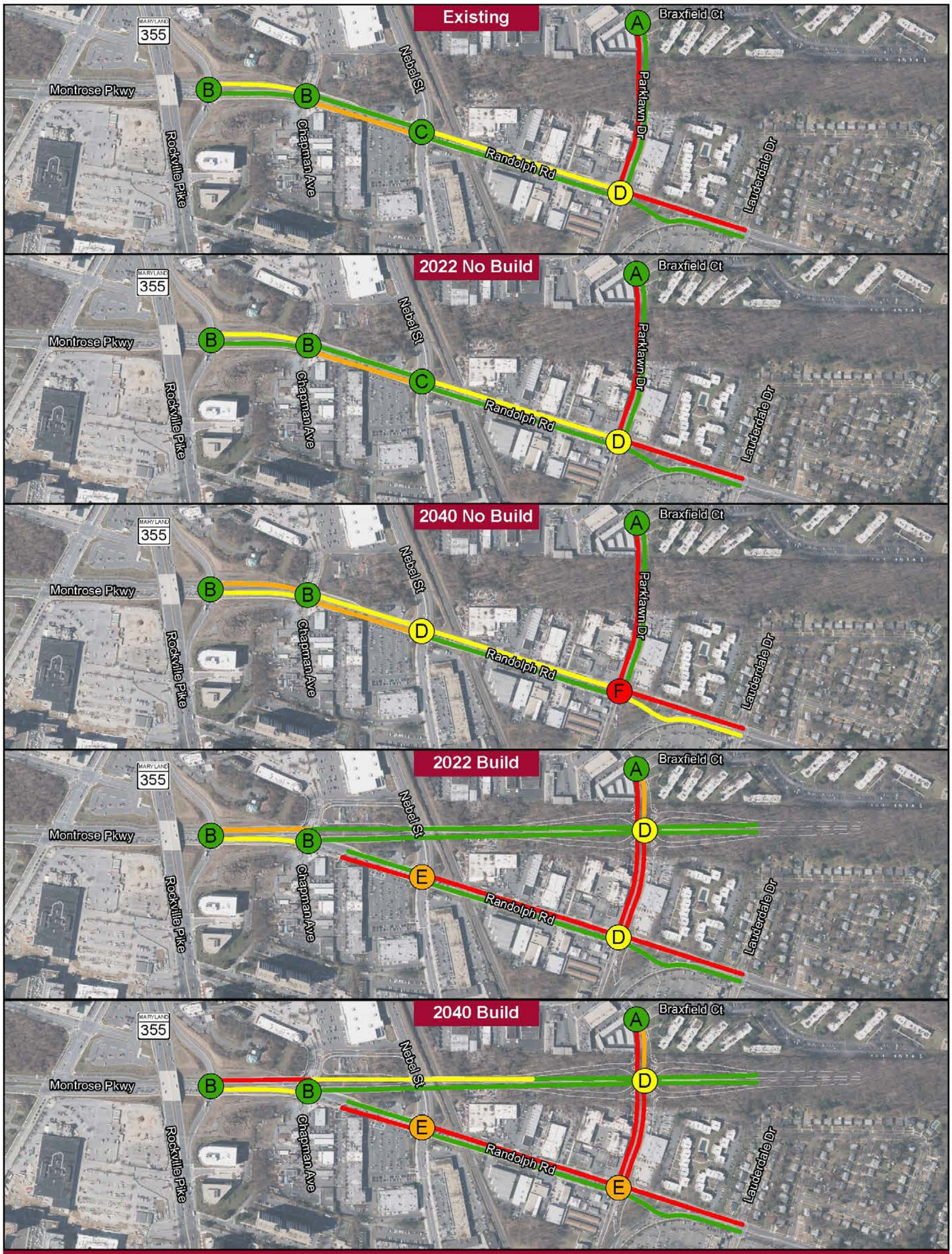


Figure 5: PM Level of Service for Intersections and Roadway Corridor Links (Synchro/SimTraffic)



Figure 6: VISSIM Time to Return to Normal Flow (Signal Cycles) - No Build

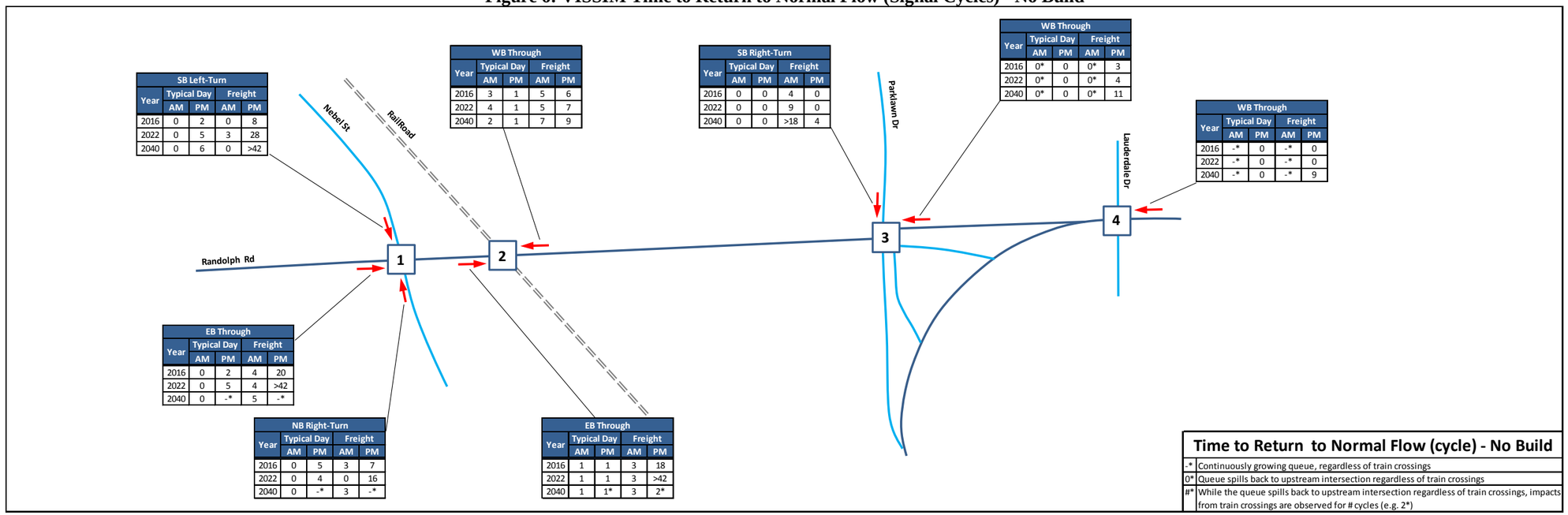


Figure 7: Time to Return to Normal Flow - Build

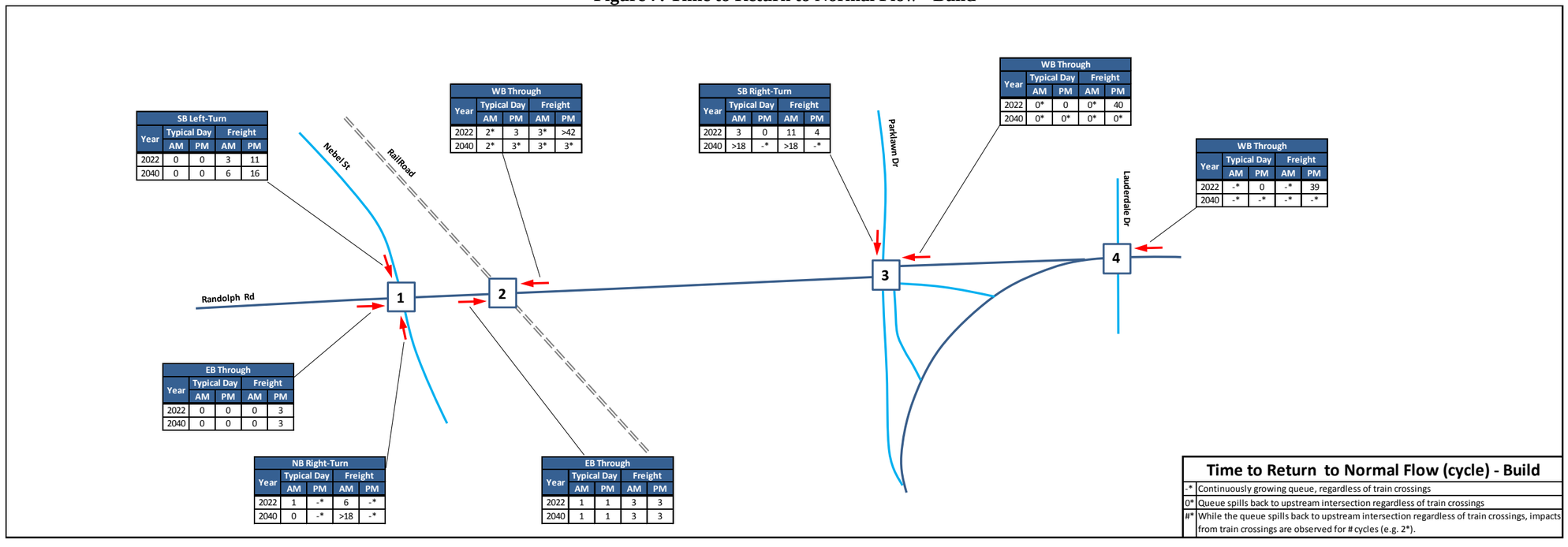


Table 12: VISSIM Queue Length(ft) at the CSX Railroad Crossing

Year	Direction	Typical Day		Freight	
		AM	PM	AM	PM
No Build					
2016	EB	357	778	1059	>1820
	WB	346	244	>3220	1389
2022	EB	357	921	1069	>1820
	WB	468	452	>3220	1519
2040	EB	420	>1820	1355	>1820
	WB	462	422	>3220	2164
Build					
2022	EB	166	265	236	325
	WB	>3220	567	>3220	1409
2040	EB	237	300	236	393
	WB	>3220	>3220	>3220	>3220

Red: Queue spills back through upstream intersection

Results

The M-NCPPC *Subdivision Staging Policy (SSP)* defines Transportation Policy Areas, which establish CLV congestion standards and average vehicle delay thresholds (based on the 2010 Highway Capacity Manual) for each Policy Area throughout Montgomery County. The County has a three-tiered approach for intersection analysis, which is shown in **Table 13**. All study intersections fall within the "North Bethesda" policy area, which has a CLV congestion standard of 1550 and an average delay threshold of 71 seconds.

Table 13: M-NCPPC Three-tiered Intersection Analysis Approach

Tier	Approach	Required for:	Features		
			Complexity	Address Delay	Address Adjacent Intersections
1	Total future CLV determines whether an intersection requires further analysis.	All areas (except development in MSPAs)	Low	No	No
2	Type of study required: Intersection Operations Analysis suffices if Tier 3 prerequisites do not apply.	Total future CLV greater than Policy Area CLV **standard**	Moderate	Yes	No
3	Or a Network Operations Analysis	Tier 2 prerequisite plus: Intersection has a total future CLV greater than 1600, or Intersection with a total future CLV greater than 1450, where development increases intersection demand by 10 CLV and either: (a) the intersection is on a congested roadway with a travel time index greater than 2.0 as documented by monitoring reports, or (b) the intersection is within 600' of another traffic signal	High	Yes	Yes

<u>2017 Existing Conditions</u>:

CLV
The results of the existing 2017 CLV analysis indicate the following:

- All study intersections will operate at LOS C or better during the AM and PM peak hours.
- All intersections will operate under the County's CLV congestion standard.

Synchro/SimTraffic
The results of the existing 2017 Synchro/SimTraffic analysis show the following:

AM

- All study intersections operate at LOS D or better.
- During the AM peak hour, considerable congestion forms in the westbound direction approaching Parklawn Drive resulting in a failing segment LOS.
    - The combination of the Randolph Road at Lauderdale Drive signal, Randolph Road at Parklawn Drive signal, and short storage length for westbound left turns onto Parklawn Drive at the Randolph Road at Parklawn Drive (east) signal cause 95th percentile AM queues to extend over 2,750 feet (Galena Road).
- All existing intersections operate under the County's average vehicle delay thresholds.

PM

- All study intersections operate at LOS D or better except for the intersection of Randolph Road at Nebel Street, which operates with a LOS E.
- During the PM peak hour, maximum eastbound queues on Randolph Road extend from Parklawn Drive to the MD 355 Northbound Ramps.
    - These queues cause all eastbound segments to operate with a failing LOS and sometimes make it difficult for side street traffic to enter Randolph Road.
    - The combination of the Randolph Road at Lauderdale Drive signal, Randolph Road at Parklawn Drive signal, and Randolph Road at Parklawn Drive (east) signal contribute to this queue.
- All existing intersections operate under the County's average vehicle delay thresholds.

VISSIM

AM MARC Train Crossing

- During the AM peak hour, MARC train crossings lead to increased queues, compared normal flow conditions, at the eastbound and westbound approaches of the railroad crossings.
    - The eastbound approach takes 1 cycle to return to normal flow.
    - The westbound approach takes 3 cycles to return to normal flow.
- During the AM peak hour, the intersections adjacent to the crossing are not affected by MARC train crossings.

PM MARC Train Crossing

- During the PM peak hour, MARC train crossings lead to increased queuing, compared normal flow conditions, at both approaches of the railroad crossing. Both approaches of the railroad crossing take 1 cycle to return to normal flow.
- The northbound approach of the Randolph Road at Nebel Street intersection takes 5 cycles to return to normal flow. The eastbound and southbound approaches of the intersection take 2 cycles to return to normal flow.

AM Freight Train Crossing

- At the railroad crossing, the eastbound and westbound queues spill over into the adjacent upstream intersections.
    - The eastbound approach takes 3 cycles to return to normal flow.
    - The westbound approach takes 5 cycles to return to normal flow.
- The intersection of Randolph Road at Nebel Street takes 4 cycles to return to normal flow.
- The intersection of Randolph Road at Parklawn Drive takes 4 cycles to return to normal flow. The westbound approach shows a continuously growing queue whose length increases at a faster rate during freight train crossing events.

PM Freight Train Crossing

- At the railroad crossing, the eastbound and westbound queues spill over into the adjacent upstream intersections.
    - The eastbound approach takes 18 cycles to return to normal flow.
    - The westbound approach takes 6 cycles to return to normal flow.
- The intersection of Randolph Road at Nebel Street takes 20 cycles to return to normal flow.
- The intersection of Randolph Road at Parklawn Drive takes 3 cycles to return to normal flow.

2022 No-Build Conditions:

CLV
The results of the 2022 No Build CLV analysis indicate the following:

- All study intersections will operate at LOS D or better during the AM and PM peak hours.
- All intersections operate under the County's CLV congestion standard.

Synchro/SimTraffic
The results of the 2022 No Build Synchro/SimTraffic analysis show the following:

AM

- No change in intersection LOS compared to Existing conditions.
- The growth of volumes in 2022 increases the magnitude of the westbound queue from the three closely spaced signals between Parklawn Drive and Lauderdale Drive.
    - The westbound queue grows to over 3,375 feet, which extends beyond Gaynor Road / Rocking Horse Road.
- All existing intersections operate under the County's average vehicle delay thresholds.

PM

- No change in intersection LOS compared to Existing conditions.
- The growth of volumes in 2022 increases the magnitude of the eastbound queue from the three closely spaced signals between Parklawn Drive and Lauderdale Drive.
    - The eastbound queue from Parklawn Drive becomes more continuous and extends 950 feet beyond the MD 355 Northbound Ramps.
- Average vehicle delay for the intersection of Randolph Road at Nebel Street during the PM peak hour is 72 seconds, which falls just over the average vehicle delay threshold of 71 seconds.

VISSIM
AM MARC Train Crossing

- During the AM peak hour, MARC train crossings lead to increased queues, compared normal flow conditions, at the eastbound and westbound approaches of the railroad crossings.
    - The eastbound approach takes 1 cycle to return to normal flow.
    - The westbound approach takes 4 cycles to return to normal flow.
- During the AM peak hour, the intersections adjacent to the crossing are not affected by MARC train crossings.

PM MARC Train Crossing

- During the PM peak hour, MARC train crossings lead to increased queuing, compared normal flow conditions, at both approaches of the railroad crossing. Both approaches of the railroad crossing take 1 cycle to return to normal flow.
- The intersection of Randolph Road at Nebel Street takes 5 cycles to return to normal flow.
- The intersection of Randolph Road at Parklawn Drive is not affected by MARC train crossings.

AM Freight Train Crossing

- At the railroad crossing, the eastbound and westbound queues spill over into the adjacent upstream intersections.
    - The eastbound approach takes 3 cycles to return to normal flow.
    - The westbound approach takes 5 cycles to return to normal flow.
- The intersection of Randolph Road at Nebel Street takes 4 cycles to return to normal flow.

- The intersection of Randolph Road at Parklawn Drive takes 9 cycles to return to normal flow. The westbound approach shows a continuously growing queue whose length increases at a faster rate during freight train crossing events.

PM Freight Train Crossing

- At the railroad crossing, the eastbound and westbound queues spill over into the adjacent upstream intersections.
    - The eastbound approach takes more than 42 cycles to return to normal flow.
    - The westbound approach takes 7 cycles to return to normal flow.
- The intersection of Randolph Road at Nebel Street takes more than 42 cycles to return to normal flow.
- The intersection of Randolph Road at Parklawn Drive takes 4 cycles to return to normal flow.

2040 No-Build Conditions:

CLV

The results of the 2040 No Build CLV analysis indicate the following:

- Parklawn Drive at Randolph Road operates with a LOS E and CLV of 1550 during the AM peak hour.
- Two study intersections will operate with a LOS F during the PM peak hour.
    - Nebel Street at Randolph Road will operate with a LOS F and CLV of 1611
    - Parklawn Drive at Randolph Road will operate with a LOS F and CLV of 1665
    - Both of these intersections fall over the County's CLV congestion standard

Synchro/SimTraffic

AM

- Randolph Road at Parklawn Drive changes from a LOS D under existing conditions to a LOS F (83.1 seconds delay).
    - Average vehicle delay at this intersection exceeds the County's average vehicle delay threshold.
- All other intersections continue to operate at LOS D or better.
- The growth of volumes in 2040 continues to increase the magnitude of the westbound queue from the three closely spaced signals between Parklawn Drive and Lauderdale Drive.
    - The westbound queue continues to extend over 3,375 feet, which extends beyond Gaynor Road / Rocking Horse Road.
- The additional volumes cause the eastbound segment between Chapman Street and Nebel Street to deteriorate to a LOS F during the AM peak hour.

PM

- Two intersections begin to operate with LOS F.
    - Randolph Road and Nebel Street deteriorates from an LOS E under existing conditions to a LOS F (125.7 seconds delay).
    - Randolph Road at Parklawn Drive changes from a LOS D under existing conditions to a LOS F (90.5 seconds delay).
    - Both of these intersections exceed the County's average vehicle delay threshold.
- All other intersections continue to operate at LOS D or better.
- The growth of volumes in 2040 increases the magnitude of the eastbound queue from the three closely spaced signals between Parklawn Drive and Lauderdale Drive.
    - The eastbound queue from Parklawn Drive extends 1,150 feet beyond the MD 355 Northbound Ramps.

- The westbound segments between the MD 355 Northbound Ramps and Nebel Street deteriorate from LOS E, under existing conditions, to LOS F.

VISSIM

AM MARC Train Crossing

- During the AM peak hour, MARC train crossings lead to increased queues, compared normal flow conditions, at the eastbound and westbound approaches of the railroad crossings.
    - The eastbound approach takes 1 cycle to return to normal flow.
    - The westbound approach takes 2 cycles to return to normal flow.
- During the AM peak hour, the intersections adjacent to the crossing are not affected by MARC train crossings.

PM MARC Train Crossing

- During the PM peak hour, MARC train crossings lead to increased queuing, compared normal flow conditions, at both approaches of the railroad crossing.
    - The eastbound approach takes 1 cycle to return to normal flow. The eastbound queue spills back to the adjacent upstream intersection under normal flow conditions.
    - The westbound approach takes 1 cycle to return to normal flow.
- At the intersection of Randolph Road at Nebel Street, the southbound approach takes 6 cycles to return to normal flow. Both the eastbound and northbound approaches show continuously growing queues, regardless of train crossings.
- The intersection of Randolph Road at Parklawn Drive is not affected by MARC train crossings.

AM Freight Train Crossing

- At the railroad crossing, the eastbound and westbound queues spill over into the adjacent upstream intersections.
    - The eastbound approach takes 3 cycles to return to normal flow.
    - The westbound approach takes 7 cycles to return to normal flow.
- The intersection of Randolph Road at Nebel Street takes 5 cycles to return to normal flow.
- The intersection of Randolph Road at Parklawn Drive takes more than 18 cycles to return to normal flow. The westbound approach shows a continuously growing queue whose length increases at a faster rate during freight train crossing events.

PM Freight Train Crossing

- At the railroad crossing, the eastbound and westbound queues spill over into the adjacent upstream intersections.
    - The eastbound approach takes 2 cycles to return to normal flow. The eastbound queue spills back to the adjacent upstream intersection under normal flow conditions. *The eastbound time to return to normal flow is lower under 2040 conditions than it is under 2022 conditions because in 2040, the westbound queue backs up to the adjacent upstream intersection regardless of train crossings.*
    - The westbound approach takes 9 cycles to return to normal flow.
- The intersection of Randolph Road at Nebel Street takes more than 42 cycles to return to normal flow. Both the eastbound and northbound approaches show continuously growing queues, regardless of train crossings.
- The intersection of Randolph Road at Parklawn Drive takes 11 cycles to return to normal flow.

2022 Build Conditions:

CLV
The results of the 2022 Build CLV analysis indicate the following:

- All study intersections will operate at LOS C or better during the AM and PM peak hours.
- All intersections operate under the County's CLV congestion standard.

Synchro/SimTraffic
The 2022 Build condition redistributes and induces additional traffic throughout the study area, which relieves congestion in some locations while creating operational challenges in other locations. The Build scenario operates with minimal delay for east/west through traffic along the proposed Montrose Parkway extension, but results in high numbers of turning movements on Randolph Road at Nebel Street and Parklawn Drive.

AM

- The new single point interchange of Montrose Parkway East at Parklawn Drive will operate with a LOS D during the AM peak hour.
- The AM level of service at Randolph Road at Nebel Street drops from an LOS C, under existing and 2022 No Build conditions, to a LOS E.
    - All other intersection levels of service will remain the same as under existing and 2022 No Build conditions.
- In the AM peak hour, the westbound queue on Randolph Road at Parklawn Drive is reduced substantially from 2022 No-Build Conditions (from 3,375' to 1,275').
- Although the westbound queue is on Randolph Road at Parklawn Drive is reduced, the new alignment causes lots of turning movements at the intersections of Nebel Street at Randolph Road and Parklawn Drive at Randolph Road.
    - The increase in westbound left-turning volumes at Randolph Road at Nebel Street causes the westbound queue to extend to 900', which degrades the westbound segment from LOS D under 2022 No Build conditions to LOS F.
- All 2022 Build intersections operate under the County's average vehicle delay thresholds.

PM

- The new single point interchange of Montrose Parkway East at Parklawn Drive will operate with a LOS D during the PM peak hour.
- During the PM peak hour at the intersection of Randolph Road at Parklawn Drive the level of service drops from a LOS D, under existing and 2022 No Build conditions, to a LOS E.
    - All other intersection levels of service will remain the same as under existing and 2022 No Build conditions.
- In the PM peak hour, the eastbound queue on Randolph Road is greatly reduced from the 2022 No Build. The proposed Montrose Parkway extension allows vehicles to travel from MD 355 to east of Parklawn Drive without experiencing any failing segments. Previously under No Build conditions, all eastbound segments between MD 355 and Parklawn Drive were failing.
- The northbound right-turn movement at Randolph Road at Nebel Street operates over capacity during the PM peak hour resulting in queues of 725'.
- The westbound segment LOS on Randolph Road approaching Nebel Street degrades from a LOS D in 2022 No Build to a failing LOS during the PM peak hour.

VISSIM

AM MARC Train Crossing

- During the AM peak hour, MARC train crossings lead to increased queues, compared normal flow conditions, at the eastbound and westbound approaches of the railroad crossings on Randolph Road.
    - The eastbound approach takes 1 cycle to return to normal flow compared to 1 cycle under No-Build conditions.
    - The westbound approach takes 2 cycles to return to normal flow compared to 4 cycles under No-Build conditions. It should be noted that the westbound queue spills back to the adjacent upstream intersection under normal flow conditions in the Build conditions, but not in the No-Build conditions.
- At the intersection of Randolph Road at Nebel Street, the northbound approach shows a 1 cycle return to normal flow after the first MARC train crossing; however, this is likely due to variations between simulation runs as the approach is unaffected by the second MARC train crossing. The eastbound and southbound approaches of the intersection are unaffected by the MARC train crossings. The intersection is unaffected by MARC train crossings in the No-Build conditions.
- The intersection of Randolph Road at Parklawn Drive takes 3 cycles to return to normal flow. The westbound approach of the intersection shows a continuously growing queue, regardless of train crossings. The intersection is unaffected by MARC train crossings in the No-Build conditions.

PM MARC Train Crossing

- During the PM peak hour, MARC train crossings lead to increased queuing, compared normal flow conditions, at both approaches of the railroad crossing.
    - The eastbound approach takes 1 cycle to return to normal flow compared to 1 cycle under No-Build conditions.
    - The westbound approach takes 3 cycles to return to normal flow compared to 1 cycle under No-Build conditions.
- At intersection of Randolph Road at Nebel Street, the northbound approach shows a continuously growing queue, regardless of train crossings. The eastbound and southbound approaches are unaffected by the MARC train crossings. The intersection returns to normal flow after 5 cycles in the No-Build conditions.
- The intersection of Randolph Road at Parklawn Drive is not affected by MARC train crossings, as in the No-Build conditions

AM Freight Train Crossing

- At the railroad crossing, the eastbound and westbound queues spill over into the adjacent upstream intersections.
    - The eastbound approach takes 3 cycles to return to normal flow compared to 3 cycles under No-Build conditions.
    - The westbound approach takes 3 cycles to return to normal flow compared to 5 cycles under No-Build conditions. It should be noted that the westbound queue spills back to the adjacent upstream intersection under normal flow conditions in the Build conditions but not in the No-Build conditions.
- The intersection of Randolph Road at Nebel Street takes 6 cycles to return to normal flow (4 cycles in No-Build conditions).
- The intersection of Randolph Road at Parklawn Drive takes 11 cycles to return to normal flow (9 cycles in No-Build conditions). The westbound approach shows a continuously growing queue whose length increases at a faster rate during freight train crossing events.

PM Freight Train Crossing

- At the railroad crossing, the eastbound and westbound queues spill over into the adjacent upstream intersections.
    - The eastbound approach takes 3 cycles to return to normal flow compared to 42 cycles under No-Build conditions. It should be noted that the eastbound queue spills back to the upstream intersection under normal flow conditions in the Build conditions but not in the No-Build conditions.
    - The westbound approach takes more than 42 cycles to return to normal flow compared to 7 cycles under No-Build conditions.
- The intersection of Randolph Road at Nebel Street takes 11 cycles to return to normal flow (more than 42 cycles in No-Build conditions). The northbound approach shows a continuously growing queue, regardless of train crossings.
- The intersection of Randolph Road at Parklawn Drive takes 40 cycles to return to normal flow (4 cycles in No-Build conditions).

2040 Build Conditions:

CLV

The results of the 2040 Build CLV analysis indicate the following:

- The intersection of Parklawn Drive at Randolph Road operates with a LOS E during the PM peak hour (CLV 1495).
- All other study intersections will operate at LOS D or better during the AM and PM peak hours.
- All intersections operate under the County's CLV congestion standard.

Synchro/SimTraffic

The 2040 Build condition redistributes and induces additional traffic throughout the study area, which relieves congestion in some locations while creating operational challenges in other locations. The Build scenario operates with minimal delay for east/west through traffic along the proposed Montrose Parkway extension, but results in high numbers of turning movements on Randolph Road at Nebel Street and Parklawn Drive.

AM

- The new single point interchange of Montrose Parkway East at Parklawn Drive will operate with a LOS D during the AM peak hour.
- During the AM peak hour, the level of service at the intersection of Randolph Road at Parklawn Drive improves from an LOS F, under 2040 No Build conditions, to a LOS E.
- The level of service at the intersection of Randolph Road at Nebel Street degrades from a LOS D, under 2040 No Build conditions, to a LOS E under 2040 No Build.
- In the AM peak hour, a reduction in the westbound queue on Randolph Road at Parklawn Drive is expected due to the decrease in volumes. However, since the queue extends out of the network (beyond Gaynor Road) the reduction cannot be quantified.
- Although the westbound queue is on Randolph Road at Parklawn Drive is reduced, the new alignment causes lots of turning movements at the intersections of Nebel Street at Randolph Road and Parklawn Drive at Randolph Road.
    - The increase in westbound left-turning volumes at Randolph Road at Nebel Street causes the westbound segment to degrade from LOS D under 2040 No Build conditions to LOS F.

PM

- The new single point interchange of Montrose Parkway East at Parklawn Drive will operate with a LOS D during the AM peak hour.

- During the PM peak hour, the level of service at the intersections of Randolph Road at Parklawn Drive and Randolph Road at Nebel Street improve from a LOS F, under 2040 No Build conditions, to a LOS E.
- In the PM peak hour, the eastbound queue on Randolph Road is greatly reduced from the 2040 No Build. The proposed Montrose Parkway extension allows vehicles to travel from MD 355 to east of Parklawn Drive without experiencing any failing segments. Previously, under No Build conditions, all eastbound segments between MD 355 and Parklawn Drive were failing.
- The westbound segment LOS on Randolph Road approaching Nebel Street degrades from a LOS D in 2040 No Build to a failing LOS during the PM peak hour.
- Average vehicle delays at the intersection of Randolph Road at Nebel Street and Randolph Road at Parklawn Drive exceed the County's average vehicle delay threshold during the PM peak hour with delays of 78.7 and 75.2 seconds, respectively. (125.7 and 90.5 seconds under 2040 No Build)

VISSIM

AM MARC Train Crossing

- During the AM peak hour, MARC train crossings lead to increased queues, compared to normal flow conditions, at the eastbound and westbound approaches of the railroad crossings.
    - The eastbound approach takes 1 cycle to return to normal flow compared to 1 cycle under No-Build conditions.
    - The westbound approach takes 2 cycles to return to normal flow compared to 2 cycles under No-Build conditions. It should be noted that the westbound queue spills back to the adjacent upstream intersection under normal flow conditions in the Build conditions but not in the No-Build conditions.
- The intersection of Randolph Road at Nebel Street is unaffected by MARC train crossings, as in the No-Build conditions.
- The intersection of Randolph Road at Parklawn Drive takes more than 18 cycles to return to normal flow. The westbound approach of the intersection shows a continuously growing queue, regardless of train crossings. The intersection is unaffected by MARC train crossings in the No-Build conditions.

PM MARC Train Crossing

- During the PM peak hour, MARC train crossings lead to increased queuing, compared normal flow conditions, at both approaches of the railroad crossing.
    - The eastbound approach takes 1 cycle to return to normal flow compared to 1 cycle under No-Build conditions. It should be noted that the eastbound queue spills back to the adjacent upstream intersection under normal flow conditions in the No-Build conditions but not the Build conditions.
    - The westbound approach takes 3 cycles to return to normal flow compared to 1 cycle under No-Build conditions. It should be noted that the westbound queue spills back to the adjacent upstream intersection under normal flow conditions in the Build conditions but not the No-Build conditions.
- At intersection of Randolph Road at Nebel Street, the northbound approach shows a continuously growing queue, regardless of train crossings. The eastbound and southbound approaches are unaffected by the MARC train crossings. In the No-Build conditions, the intersection takes 6 cycles to return to normal flow.
- At the intersection of Randolph Road at Parklawn Drive, the westbound and southbound approaches show continuously growing queues, regardless of train crossings. The intersection is unaffected by MARC train crossings in the No-Build conditions.

AM Freight Train Crossing

- At the railroad crossing, the eastbound and westbound queues spill over into the adjacent upstream intersections.
    - The eastbound approach takes 3 cycles to return to normal flow compared to 3 cycles under No-Build conditions.
    - The westbound approach takes 3 cycles to return to normal flow compared to 7 cycles under No-Build conditions. It should be noted that the westbound queue spills back to the adjacent upstream intersection under normal flow conditions in the Build conditions but not in the No-Build conditions.
- The intersection of Randolph Road at Nebel Street takes more than 18 cycles to return to normal flow (5 cycles in No-Build conditions).
- The intersection of Randolph Road at Parklawn Drive more than 18 cycles to return to normal flow. The westbound approach shows a continuously growing queue whose length increases at a faster rate during freight train crossing events. No-Build conditions show similar impacts from freight train crossings.

PM Freight Train Crossing

- At the railroad crossing, the eastbound and westbound queues spill over into the adjacent upstream intersections.
    - The eastbound approach takes 3 cycles to return to normal flow compared to 2 cycles under No-Build conditions. It should be noted that the eastbound queue spills back into the adjacent upstream intersection in the No-Build conditions but not in the Build conditions.
    - The westbound approach takes 3 cycles to return to normal flow compared to 9 cycles under No-Build conditions. The westbound queue spills back to the adjacent upstream intersection under normal flow conditions.
      The westbound time to return to normal flow is lower under 2040 conditions than it is under 2022 conditions because in 2040, the westbound queue backs up to the adjacent upstream intersection regardless of train crossings.
- The intersection of Randolph Road at Nebel Street takes 16 cycles to return to normal flow (more than 42 cycles in No-Build conditions). The northbound approach shows a continuously growing queue, regardless of train crossings.
- At the intersection of Randolph Road at Parklawn Drive, the westbound and southbound approaches show continuously growing queues, regardless of train crossings. In No-Build conditions, the intersection takes 11 cycles to return to normal flow.

Results Summary:

The results are summarized below based on MNCPPC's thresholds for the "North Bethesda" policy area:

Existing

- All intersections operate under the County's CLV congestion standard.
- All existing intersections operate under the County's average vehicle delay thresholds.

2022 No-Build

- All intersections operate under the County's CLV congestion standard.
- Average vehicle delay for the intersection of Randolph Road at Nebel Street during the PM peak hour is 72 seconds, which falls just over the average vehicle delay threshold of 71 seconds.

2040 No-Build

- Two study intersections will operate over the County's CLV congestion standard during the PM peak hour.
    - Nebel Street at Randolph Road (1611) & Parklawn Drive at Randolph Road (1665)
- Average vehicle delays at the two intersections exceed the County's average vehicle delay threshold
    - Randolph Road at Nebel Street (125.7 seconds) during the PM peak hour & Randolph Road at Parklawn Drive (83.1/90.5 seconds) during the AM and PM peak hours

2022 Build

- All intersections operate under the County's CLV congestion standard.
- All intersections operate under the County's average vehicle delay thresholds.

2040 Build

- All intersections operate under the County's CLV congestion standard.
- Average vehicle delays at the intersection of Randolph Road at Nebel Street and Randolph Road at Parklawn Drive exceed the County's average vehicle delay threshold during the PM peak hour with delays of 78.7 and 75.2 seconds, respectively.

RECOMMENDATIONS

Under Build Conditions, all intersections will meet the County's CLV congestion standards in 2022 and 2040 during the AM and PM peak hours. Although the average delay thresholds are not met under 2040 Build conditions, the County's three-tiered approach does not require average vehicle delay to be addressed if all intersections fall under the CLV congestion standards for the policy area. Additionally, with the White Flint 2 Master Plan work currently in draft form, it is possible CLV congestion standards and average vehicle delay thresholds will be increased upon completion of the Master Plan. For example, the White Flint policy area, in the middle of the North Bethesda policy area, has substantially higher thresholds than North Bethesda.

ATTACHMENTS

Appendix A: 12 hour count at Railroad Crossing
Appendix B: Balanced Line Volume Diagrams
Appendix C: Forecasting Methodology
Appendix D: Capacity Analysis and Queuing Worksheets
Appendix E: VISSIM Queuing Results

cc: Mr. Matt Baker, Regional Planner, OPPE RIPD, MDOT-SHA
Ms. Carole Delion, Travel Forecasting & Analysis Division, MDOT-SHA
Mr. Scott Holcomb, Travel Forecasting & Analysis Division, MDOT-SHA
Ms. Anyesha Mookherjee, ADE-Traffic for District 3, MDOT-SHA
Mr. David Murnan, Team Leader, District 3 Traffic, MDOT-SHA

APPENDIX A

12-Hour Count at Railroad Crossing

Randolph Rd Train Crossing - East of Nebel St (5/3/17 - 7:00a - 7:00p)							
LIGHTS TURN ON	TRAIN ENTERS INTERSECTION	TRAIN EXITS INTERSECTION	LIGHTS TURN OFF	DURATION	TOTAL CARS / DIRECTION	COMPANY	
7:00:00	7:00:19	7:00:25	7:00:40	0:00:40	7 (SB)	MARC	(1)
7:19:31	7:20:02	7:20:07	7:20:22	0:00:51	6 (SB)	MARC	
7:42:44	7:43:34	7:43:41	7:43:55	0:01:11	6 (SB)	MARC	
8:00:59	8:01:45	8:01:51	8:02:05	0:01:06	6 (SB)	MARC	
8:15:12	8:16:02	8:16:08	8:16:23	0:01:11	5 (SB)	MARC	
8:45:00	8:45:46	8:45:54	8:46:08	0:01:08	7 (SB)	MARC	
9:22:46	9:23:28	9:24:03	9:24:17	0:01:31	47 (SB)	CSX	
9:25:34	9:26:39	9:29:51	9:30:06	0:04:32	157 (NB)	CSX	
9:59:21	10:00:04	10:01:21	10:01:35	0:02:14	76 (SB)	CSX	
11:59:43	12:00:47	12:01:24	12:01:38	0:01:55	47 (NB)	CSX	
12:02:49	12:03:12	12:04:20	12:03:55	0:01:06	1 (NB)	MTC VEH	(2)
12:48:48	12:49:18	12:49:28	12:49:41	0:00:53	13 (SB)	AMTRAK	
13:01:39	13:02:41	13:03:45	13:03:58	0:02:19	65 (NB)	CSX	
13:08:50	13:09:01	13:10:19	13:09:58	0:01:08	1 (NB)	MTC VEH	(3)
15:25:40	15:26:15	15:30:38	15:30:55	0:05:15	118 (SB)	CSX	
15:47:44	15:48:19	15:52:03	15:52:21	0:04:37	93 (SB)	CSX	
15:52:26	15:53:01	15:53:07	15:53:20	0:00:54	5 (NB)	MARC	
16:07:00	16:07:52	16:07:59	16:08:13	0:01:13	5 (NB)	MARC	
16:22:23	16:23:01	16:23:11	16:23:24	0:01:01	11 (NB)	AMTRAK	
16:45:39	16:46:46	16:50:15	16:50:30	0:04:51	148 (NB)	CSX	
16:56:20	16:57:05	16:57:12	16:57:25	0:01:05	7 (NB)	MARC	
17:18:45	17:19:35	17:19:43	17:19:56	0:01:11	6 (NB)	MARC	
17:44:12	17:44:54	17:45:00	17:45:14	0:01:02	6 (NB)	MARC	
18:06:35	18:07:22	18:07:29	18:07:43	0:01:08	6 (NB)	MARC	
18:43:35	18:44:21	18:44:26	18:44:41	0:01:06	5 (NB)	MARC	

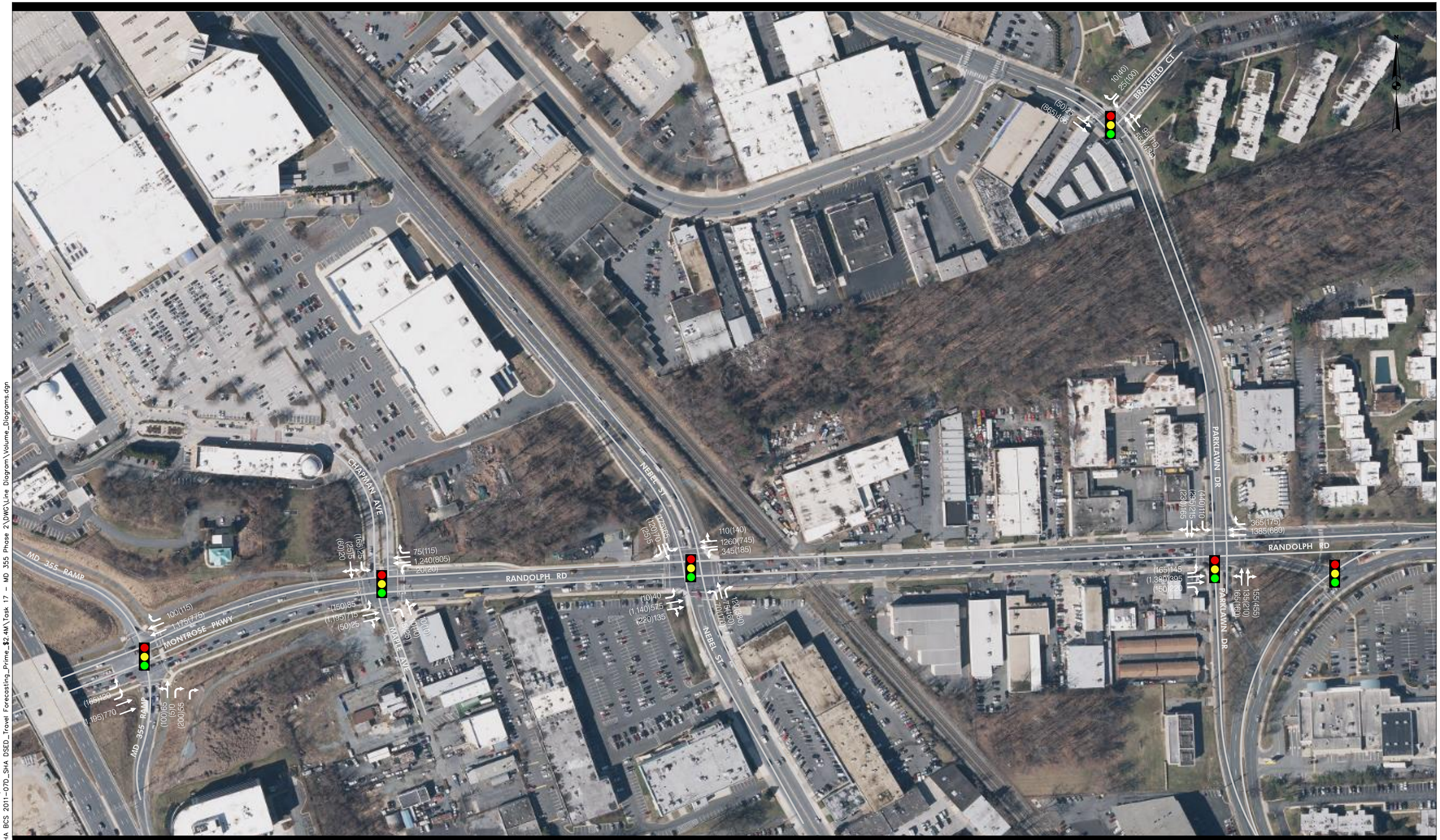
NOTE (1) OVERHEAD LIGHTS WERE ON WHEN VIDEO STARTED AND GATES WERE DOWN

NOTE (2) MTC VEHICLE EXITED TRACK - GATES UP AND LIGHTS OFF BEFORE VEHICLE WAS CLEAR OF INTERSECTION

NOTE (3) MTC VEHICLE ENTERED TRACK - GATES UP AND LIGHTS OFF BEFORE VEHICLE WAS CLEAR OF INTERSECTION

APPENDIX B

Balanced Line Volume Diagrams



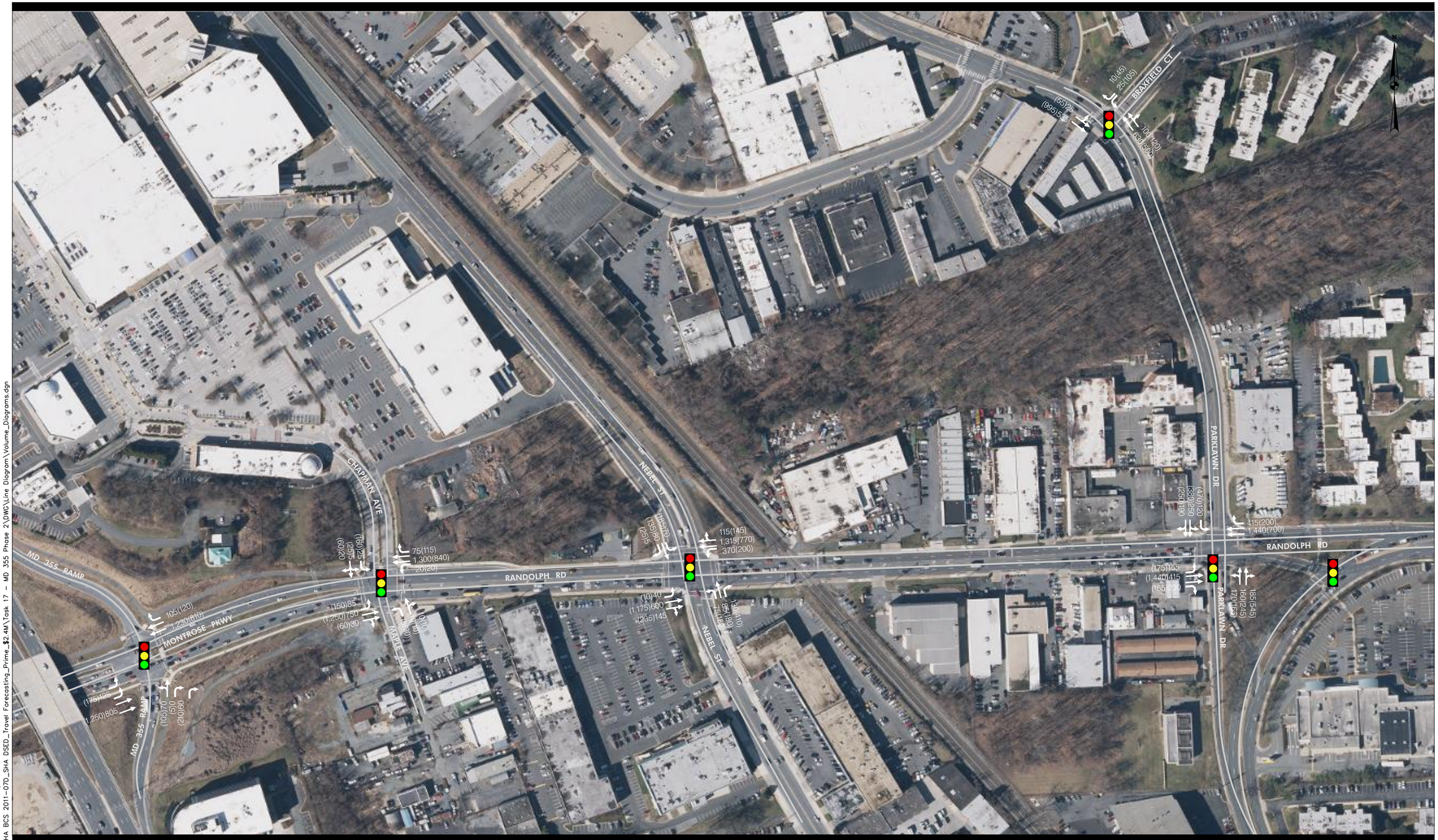
OPERATOR:siliu – PLOTTED: Monday, June 19, 2017 AT 10:36 AM
FILE NAME: \2013\39 SHA BCS 2011-07D_SHA DSED_Travel Forecasting_Prime_$2.4M\Task 17 – MD 355 Phase 2\DWG\Line Diagram\Volume_Diagrams.dgn

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

MD 355 Phase 2

Existing Volume Diagram

100' 0 100' 200'
SCALE: 1" = 100'



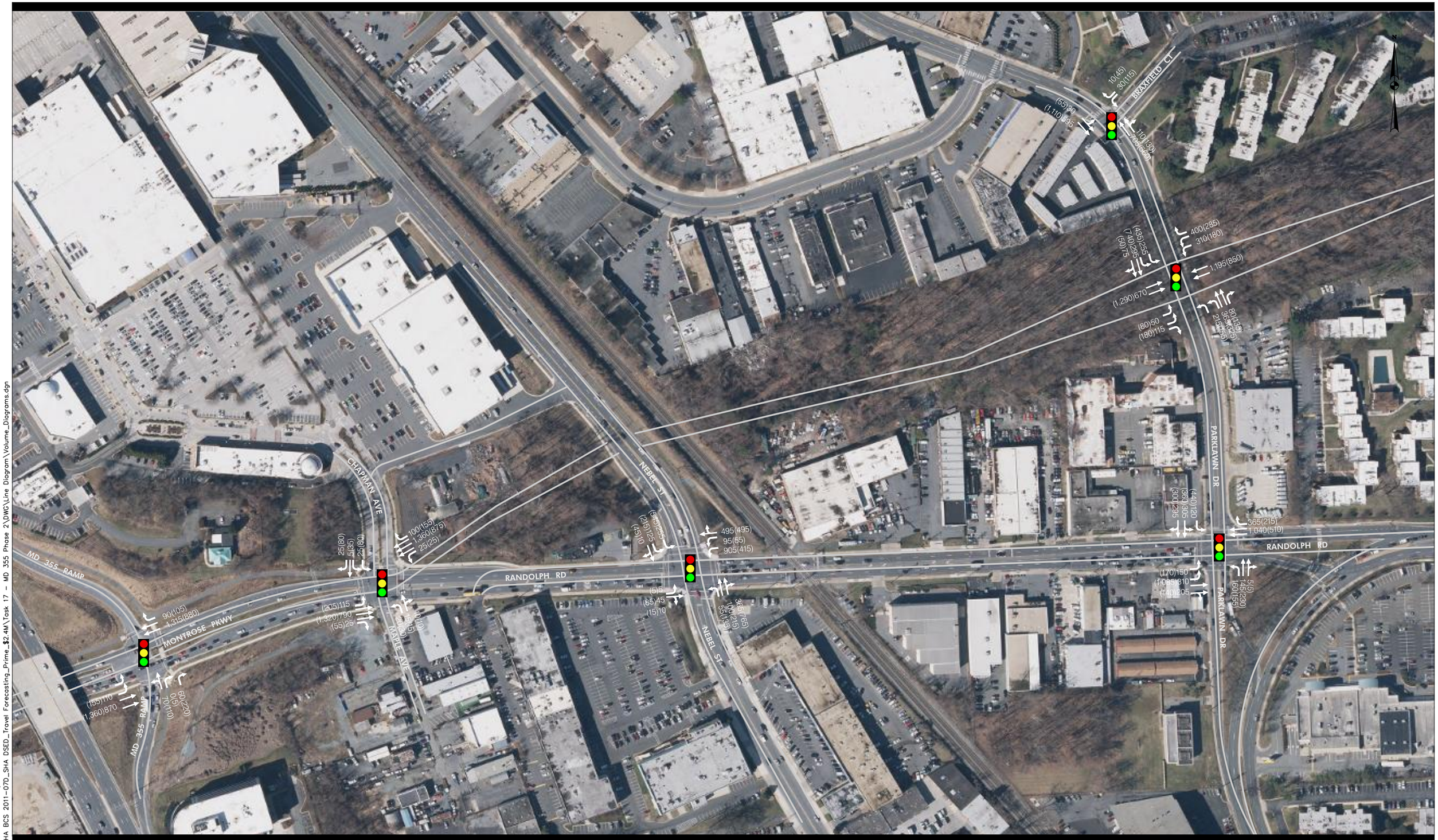
STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

MD 355 Phase 2

2022 No-Build Volume Diagram

100' 0 100' 200'
SCALE: 1" = 100'

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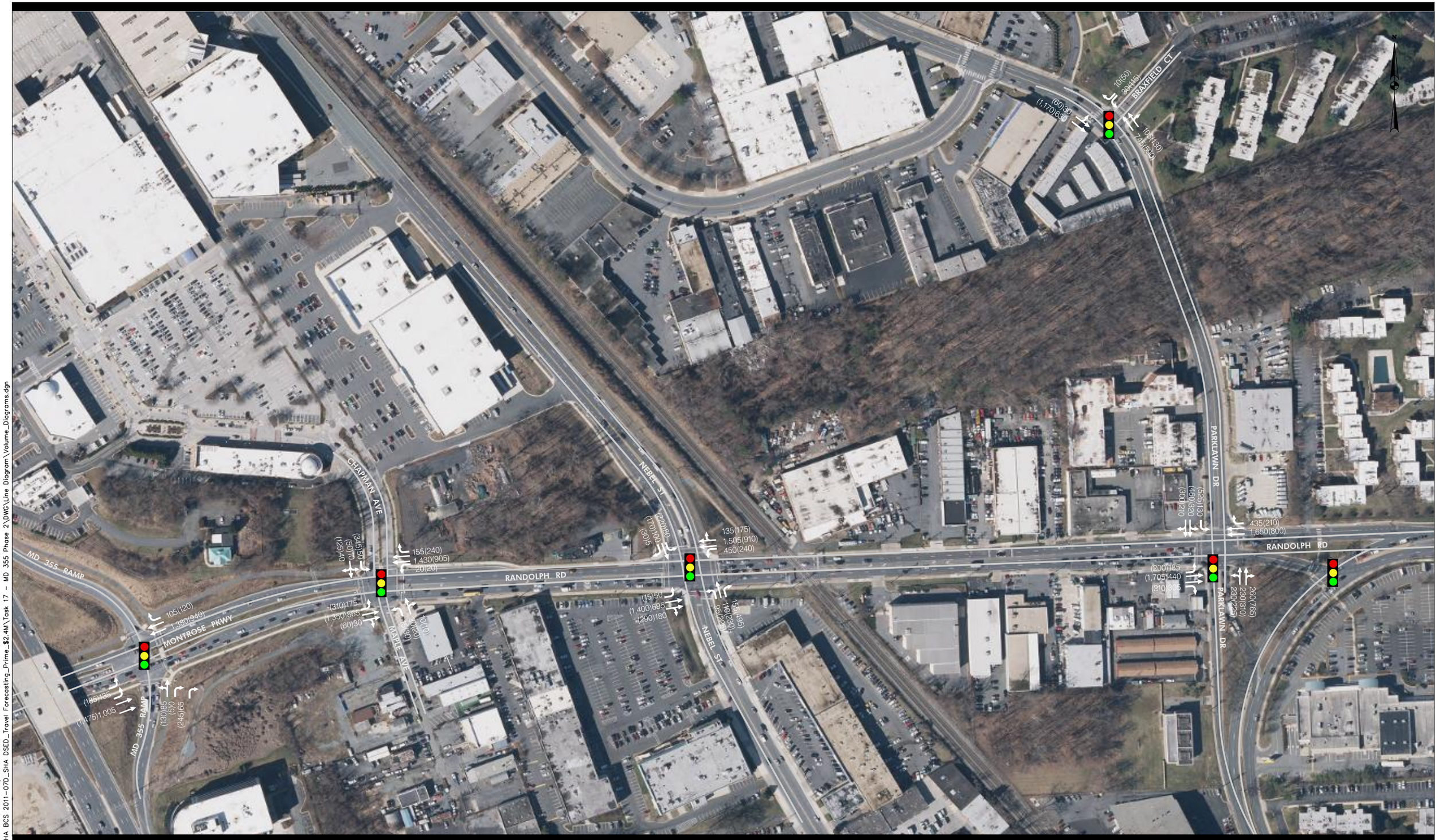
STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

MD 355 Phase 2

2022 Build Volume Diagram

100' 0 100' 200'
SCALE: 1" = 100'

OPERATOR:siu - PLOTTED: Thursday, June 08, 2017 AT 10:27 AM
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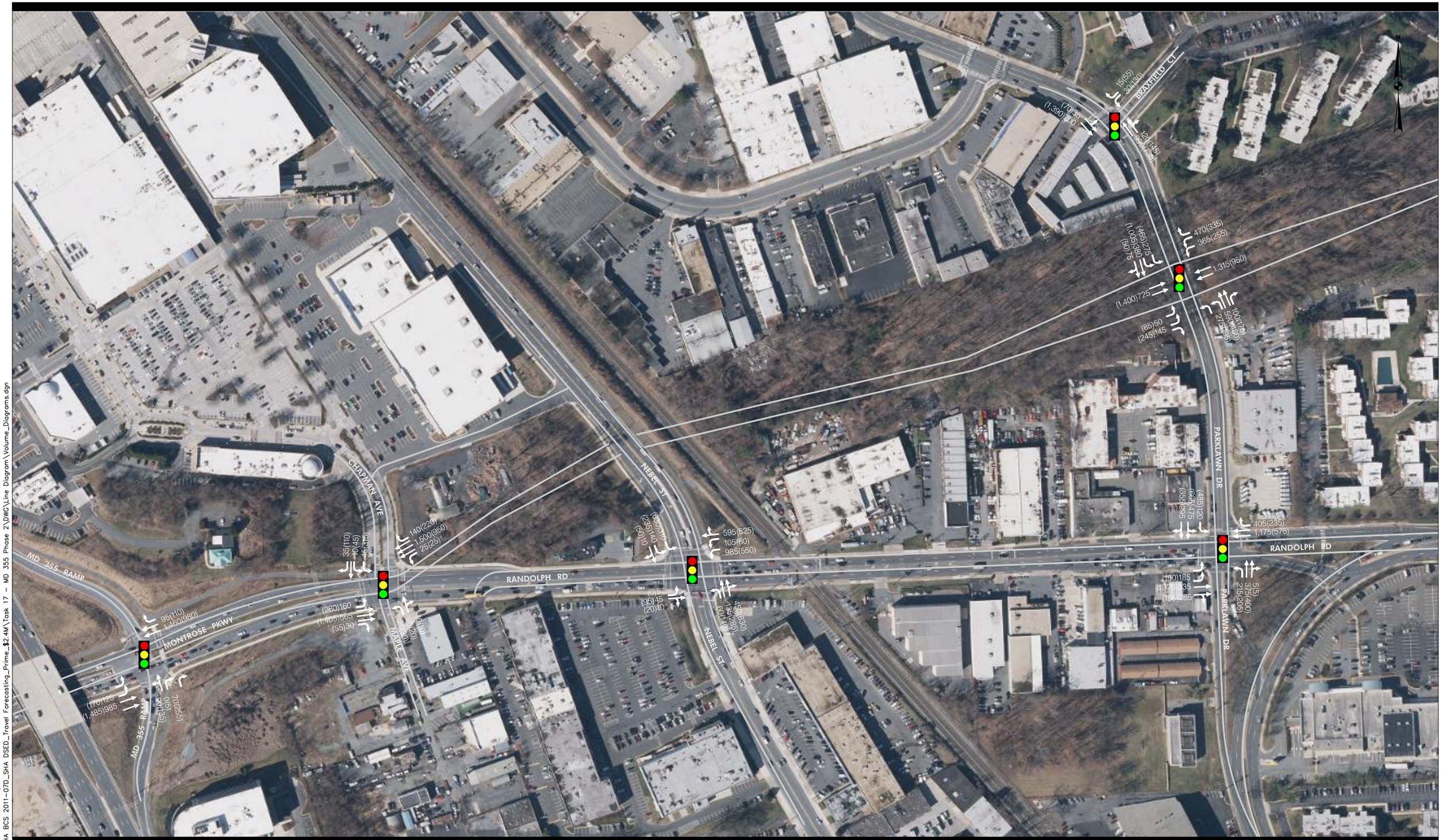
STATE OF MARYLAND
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STATE HIGHWAY ADMINISTRATION

MD 355 Phase 2

2040 No-Build Volume Diagram

100' 0 100' 200'
SCALE: 1" = 100'

OPERATOR:sliu - PLOTTED: Wednesday, June 07, 2017 AT 02:58 PM
FILE NAME:\2013\39 SHA BCS 2011-07D_SHA DSED_Travel Forecasting_Prime_$2.4M\Task 17 - MD 355 Phase 2\DWG\Line Diagram\Volume_Diagrams.dgn



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STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

MD 355 Phase 2

2040 Build Volume Diagram

100' 0 100' 200'
SCALE: 1" = 100'

APPENDIX C

Forecasting Methodology

Sabra, Wang & Associates, Inc.
Engineers • Planners • Analysts

MEMORANDUM: MD355 Ph II TDFM

To:	Carole Delion, Scott Holcomb, SHA Travel Forecasting
From:	James A. Bunch, Joseph Giancarlo, SWAI
Subject:	MD 355 Phase II Montrose Parkway Extension Travel Forecasting Analysis
Date:	June 15, 2017
CC:	Rafey Subhani, Kyle Roberts, Paul Silberman, SWAI

1 Introduction

This memorandum describes the travel forecasting process, assumptions, and results for the MD 355 (Rockville Pike) Phase 2 project in Montgomery County. The Phase 2 project extends Montrose Parkway from Chapman Avenue/Maple Avenue to east of Parklawn Drive. A future county project will extend Montrose Parkway further east to MD 586 (Veirs Mill Road). The travel forecasts are used to develop the traffic growth assumption inputs for the traffic operations analysis carried out to meet Montgomery County's Mandatory Referral requirements.

As described in the subsequent sections, the latest MWCOG model (version 2.66, Round 9 Cooperative Land Use adopted in December 2016) was used as a foundation for developing the travel forecasts. The MWCOG model provides the Constrained Long Range Plan networks and Round 9 Cooperative Land Use files for the 2017, 2020, 2025, 2030 and 2040 horizon years. Additional zone and roadway network details from the Maryland National Park and Planning Commission (MNCPPC) Travel/4 Montgomery County Model were incorporated to provide more accurate loading from developments and traffic assignments along the corridor and surrounding subarea. The study corridor, surrounding subarea, and resultant base (2017) network detail are shown in **Figure 1**.

As part of this process the MWCOG Round 9 cooperative land use assumptions for the subarea shown in **Figure 1** were reviewed and updated based upon the recommended master plan scenario provided by the MNCPPC. The scenarios (networks and demographic files) were then used to conduct travel demand runs for 2017, 2025 (2022) and 2040 (Build/No-Build). These post-mode choice runs included disaggregating the vehicle trip tables from the parent MWCOG travel 2017, 2025, and 2040 travel forecasts to reflect the new subarea zone detail and then carrying out the road network traffic equilibrium assignments on the road networks with the subarea network details.

The sections that follow are:

- Travel demand Forecasting/Subarea Analysis Overview
- Subarea Traffic Analysis Zones and Demographic Assumptions
- Base Year (2017) Network Review/Check
- 2025 No Build and Build Scenario Forecasts
- 2040 No Build and Build Scenario Forecasts

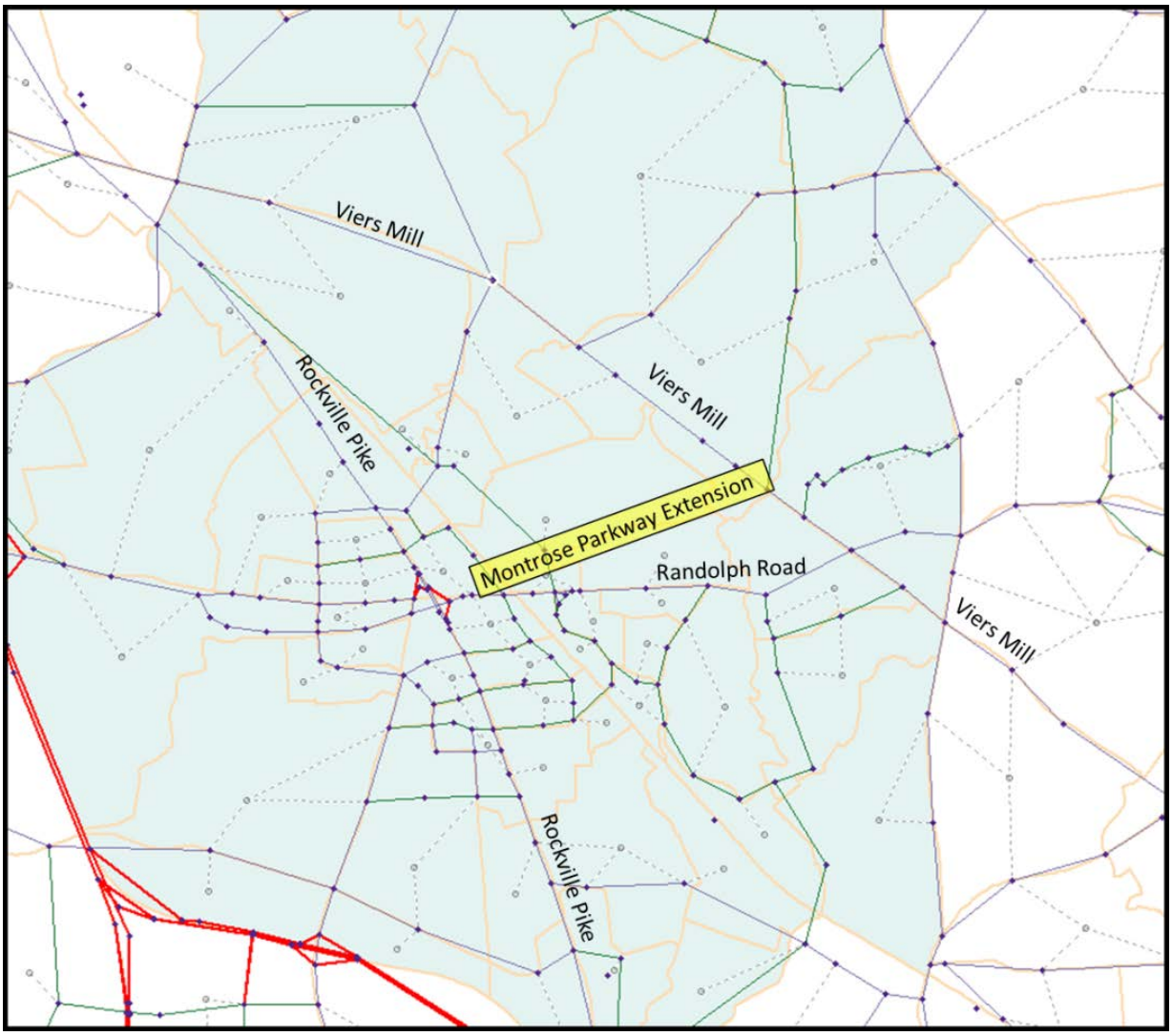


Figure 1 MD 355 Phase II Corridor and Subarea with Base Network

2 Travel Demand Forecasting/Subarea Analysis Process

The analysis uses as a foundation the currently adopted regional travel demand model from the Metropolitan Washington Council of Governments (MWCOG) to provide the base travel forecasts for each horizon year (2017, 2025 representing 2022, and 2040). The current version of the adopted regional model set is the MWCOG Version 2.3 Build 66 travel demand model (adopted by the regional Transportation Planning Board in December 2016) that includes the MWCOG Round 9 Cooperative population and employment forecasts and the Constrained Long Range Plan Networks for the years 2016, 2017, 2020, 2025, 2030, and 2040.

The MWCOG Version 2.3 Build 66 travel demand model is a traditional, trip-based, "four-step" travel demand forecasting model (Trip Generation, Trip Distribution, Mode Split, and Assignment) utilizing 4 feedback iterations to equilibrate trip distribution with congested travel times and costs. Additional

features incorporated into the standard process include estimation of motorized and non-motorized trips, time-of-day modeling, and utilization of detailed transit schedules from General Transit Feed Specification (GTFS) data. It was calibrated to the most recent transit ridership and other data in 2012, and validated to the 2010 U.S. Census data in 2013. (for details see http://www.mwcog.org/transportation/activities/models/current.asp).

The last step in the model application process is Traffic Assignment. A multi-class user-equilibrium (UE) traffic assignment (using the Frank Wolfe Algorithm), which is the generally accepted method for static traffic assignments, is utilized for each of the four feedback iterations.

The Version 2.3 model includes six user classes:

1. Single-occupant vehicle (SOV)
2. High-occupant vehicle with two persons (HOV2)
3. High-occupant vehicle with three+ persons (HOV3+)
4. Medium and heavy trucks
5. Commercial vehicles
6. Airport passengers traveling to/from the three major commercial airports serving the region (Reagan Washington National, Dulles International, and Baltimore-Washington International)

Additionally, the Version 2.3 model includes four time-of-day periods for traffic assignment:

- AM peak period (3 hours: 6:00 AM to 9:00 AM)
- Midday period (6 hours: 9:00 AM to 3:00 PM)
- PM peak period (4 hours: 3:00 PM to 7:00 PM)
- Night/early morning period (11 hours: 7:00 PM to 6:00 AM)

The MWCOG model covers the District of Columbia, neighboring parts of Maryland, Virginia, and Jefferson County in West Virginia. The 6,800-square-mile modeled area is divided into 3,722 transportation analysis zones (TAZs).

The model and its networks have been developed at a level of detail designed to support the regional Constrained Long Range Plan and its Air Quality Conformity analysis but may not have the details needed by individual jurisdictions for corridor and subarea project planning. Consequently, more detailed networks and Traffic Analysis Zones (TAZs) are often needed to capture the local traffic patterns and access locations for subarea/corridor studies and their operational analyses. Consequently, Montgomery County has enhanced the MWCOG model (based upon a previous MWCOG 2.3.52 model) by adding additional zone and network detail in order to produce the MNCPPC Travel/4 forecasting model used for assessing regionally significant projects and scenarios within the County. Currently, networks and demographic data are only available in the Travel/4 model for 2010 and 2040.

For small area sector plans and roadway improvements that are not anticipated to cause major changes to the underlying travel patterns, mode split, or time of day distributions more detail than provided in the regional models is needed for better assignments, and it has been observed that running the regional models (with their feedback loops) may produce unrealistic changes in the results far removed from the area of interest. A post mode choice assignment approach was therefore used for this effort in order to add the desired level of network detail and mimic the previous MNCPPC Travel/3 model

subarea process used for similar studies in the County (such as the White Flint Sector Plan Update). This process is shown in **Figure 2** and includes the following steps:

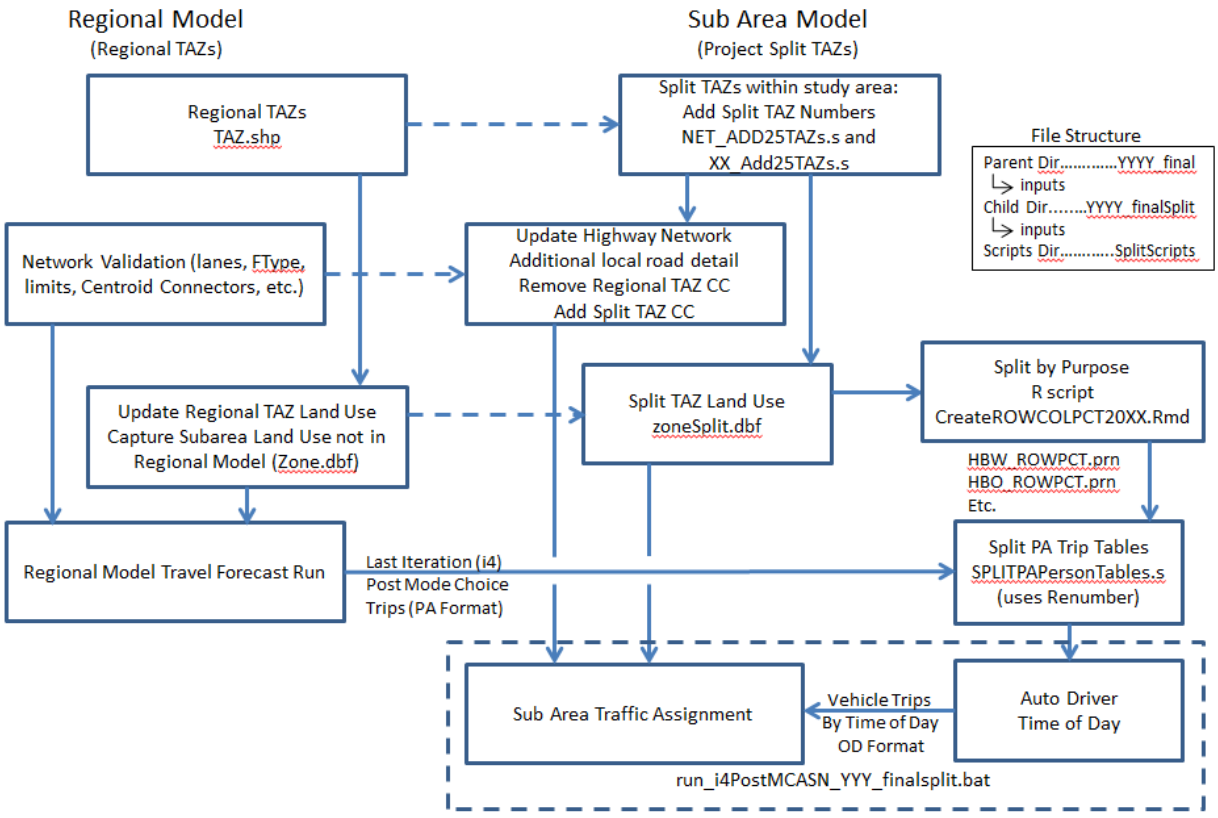


Figure 2 Subarea Assignment Process (MWCOG Base Model)

Consequently, the recommended travel forecasting approach to be applied to this study included the following activities:

- Regional Travel Model
  - Carry out Network Validation to ensure that there are no network errors within the study area (lanes, facility type, limits on modes by time of day, centroid connectors, etc.)
  - Review/update TAZ land use for MWCOG TAZ zones. If a land use scenario that is testing regionally significant developments with the study area is being analyzed develop a new regional MWCOG TAZ land use file (zone.dbf). Note, that this is not necessary if only incremental changes are anticipated within the study area that are not likely to influence regional travel patterns.
  - If network or significant demographic changes have been made, carry out a new regional model travel forecasts to act as the "Parent" for the sub area analysis. Otherwise use the foundation MWCOG forecast runs.
- Sub Area Scenario (YYYYfinalsplit)
  - Split TAZs within the study area (in new boundary shape file)
  - Add additional network detail to the MWCOG Network (zone centroids, centroid connectors, and network detail

  - Create the Split TAZ land use file. Check to see that the demographic data sums to the parent MWCOG TAZ if the MWCOG control totals are to be maintained, or to the new control total if a new land use development pattern is being tested.
  - Run the R statistics program that creates the row and column percents of the MWCOG parent TAZ for productions and attractions to/from each split TAZ. If a land use scenario is being tested these may sum to less than or greater than 100 percent for each MWCOG Parent TAZ.
  - Run the SlitPAPersonTables script to disaggregate the post mode choice person trips by purpose and mode.
  - Run the I4PostMCASN_YYYY_FinalSplit.bat to calculate the Auto Drive Trips, convert to origin/destination format by time of day and carry out the Sub Area Traffic Equilibrium Assignment
  - If this is a base year run, check the assignments against ground counts and adjust the centroid connectors, link specific free flow speeds (FSNEW), link specific capacities (CPENEW), and turn penalties to improve the route assignment. Note, that these were added to the MWCOG process in order to provide more detailed network characteristics and routing influences than found in the high level regional model (FSNEW and CPENEW were not used as part of this study)
- Summarize and provide the loaded networks to the traffic operations analysis for post-processing using NCHRP 765 procedures in order to prepare the link and turning movement growth factors used for the peak hour operational analyses

This process has the advantage of reducing the runtime associated with carrying out a full MWCOG Travel Forecast (both base and final scenarios) from over 30 hours to 5-6 hours. It also:

- Provides more network detail and realistic turning restrictions making it easier to post process the results for operational analyses.
- Maintains the trips patterns to and from each MWCOG TAZ by trip purpose
- Can be used to provide more variation in network characteristics than found in the regional model to account for local variations in capacity and/or observed lane widths, free flow speeds, coordination, etc.
- Avoids unintended cascading of impacts far removed from the area of interest.
- Can be used to test non regionally significant increases / decreases in land use within the sub area.

Of course, the practitioner must be cautious to only apply this method when non-regionally significant local projects or land use scenarios are being examined. This was the case for this effort.

3 Subarea Traffic Analysis Zones and Land Use Assumptions

This section reviews the subarea traffic analysis zone splits and land use assumptions. The subarea and the MWCOG and final subarea split TAZs within it are shown in **Figure 3**. The subarea was defined by capturing the ring of MWCOG TAZs (in red) that are within the major facilities connecting to the MD 355 Phase II corridor. It also includes both the White Flint I and II plan areas. The MNCPPC Travel/4 TAZs (in blue) that were split as part of the Travel/4 model development were transferred to the study area networks.

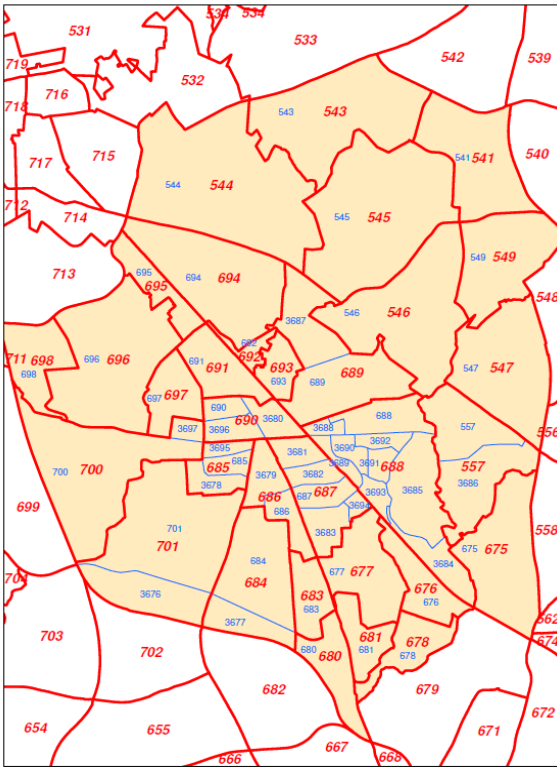


Figure 3 MD 355 Phase II Subarea (MWCOG and Subarea TAZs)

The sources of the demographic data for the study included:

- MWCOG Round 9 Cooperative Forecast at the MWCOG TAZ scale for 2017, 2025, and 2040
- MNCPPC Travel/4 2010 forecasts at the study area TAZ scale
- MNCPPC Master Plan existing plus pipeline forecasts at the study area TAZ scale
- MNCPPC Master Plan Recommended forecasts at the study area TAZ scale

MNCPPC recommended using the MNCPPC Master Plan Recommended scenario for 2040 in order to capture the expected White Flint I and II plan area development. The percentage distributions found in the MNCPPC MWCOG TAZ to study area TAZs were prorated in order to create the 2017 (base) and 2025 demographic assumptions. For 2017, the TAZs were disaggregated based upon the percentages found in the 2010 Travel/4 databases. For 2040, the TAZs were disaggregated based upon the MNCPPC Master Plan 2040 Recommended Land Use Scenario. For 2025, the majority of split TAZs used the 2010 percent distributions, however, some were adjusted to account for maximum current year build out in portions of the Parent MWCOG TAZ.

Table 1 provides a summary of the different 2040 forecasts for the MWCOG TAZs close to the MD 355 Phase II network improvements. It shows that the MNCPPC land use assumptions provide for noticeably more growth in the Corridor. The "Recommended land use" used for the study shows an increase of 6,430 Households, 18,335 Population, and 21, 290 employees within the TAZs neighboring the facility corridor.

Table 2 shows how the demographic forecasts within each MWCOG TAZ are distributed to the study area split TAZs for the full study subarea. Again, these are based upon the detailed sub area TAZ data provided by MNCPPC. Of note, is how some of the distributions within the MWCOG TAZs change as portions within them that were previously undeveloped are built upon (e.g. MWCOG TAZ 687).

Table 1 Demographic Forecast Comparison

2040 Round 9		V2.3.66			
COG TAZ	Households	HHPOP	GQPOP	Total Population	Total Employment
685	412	886	0	886	10203
686	4944	9925	0	9925	11780
687	6800	13629	148	13777	19211
688	2350	6180	4	6184	3102
690	1826	3216	440	3656	7240
700	1181	3354	0	3354	699
Total	17513	37190	592	37782	52235

2040 MNCPPC pipeline Land Use Aggregated by MWCOG TAZ					
COG TAZ	Households	HHPOP	GQPOP	Total Population	Total Employment
685	622	1159	0	1159	11633
686	6270	12343	0	12343	18116
687	7615	18626	423	19049	25567
688	2158	5169	0	5169	7072
690	3454	7538	1004	8542	8669
700	1138	4352	0	4352	804
Total	21256	49188	1427	50615	71860

Difference (MNCPPC Pipeline - Round 9)					
COG TAZ	Households	HHPOP	GQPOP	Total Population	Total Employment
685	210	273	0	273	1430
686	1326	2418	0	2418	6336
687	815	4997	275	5272	6356
688	-192	-1011	-4	-1015	3970
690	1628	4322	564	4886	1429
700	-43	998	0	998	105
	3743	11998	835	12833	19625

2040 MNCPPC Master Plan Recommended Aggregated by MWCOG TAZ					
COG TAZ	Households	HHPOP	GQPOP	Total Population	Total Employment
685	2397	4531	0	4531	14411
686	6270	12343	0	12343	18116
687	7615	18626	423	19049	25280
688	2475	5951	0	5951	6724
690	4048	8888	1004	9891	8290
700	1138	4352	0	4352	804
Total	23943	54691	1427	56117	73625

2040 Difference (MNCPPC MP Recommended - MWCOG Round 9)					
COG TAZ	Households	HHPOP	GQPOP	Total Population	Total Employment
685	1985	3645	0	3645	4208
686	1326	2418	0	2418	6336
687	815	4997	275	5272	6069
688	125	-229	-4	-233	3622
690	2222	5672	564	6235	1050
700	-43	998	0	998	105
Total	6430	17501	835	18335	21390

Table 2 Study Area TAZ Demographic Forecasts (2017, 2025 and 2040)

COG TAZ	Split TAZ	Households					Population					Employment				
		2017	2025	17->25	2040	25 -> 40	2017	2025	17->25	2040	25 -> 40	2017	2025	17->25	2040	25 -> 40
541	541	863	863	0%	865	0%	2841	2841	0%	2526	-11%	1406	1418	1%	1909	35%
543	543	1583	1583	0%	1662	5%	4043	4043	0%	4490	11%	624	636	2%	521	-18%
544	544	2102	2102	0%	2895	38%	5788	5788	0%	6704	16%	1739	1739	0%	2733	57%
545	545	1509	1509	0%	1447	-4%	4698	4698	0%	4833	3%	670	683	2%	588	-14%
546	546	2146	2146	0%	2197	2%	7254	7254	0%	6903	-5%	413	431	4%	234	-46%
547	547	1512	1512	0%	1491	-1%	5569	5569	0%	5151	-8%	988	1003	2%	842	-16%
549	549	962	962	0%	969	1%	3546	3546	0%	2412	-32%	998	1009	1%	926	-8%
557	3686	703	703	0%	705	0%	2630	2630	0%	1828	-30%	223	228	2%	246	8%
	557	565	565	0%	631	12%	2112	2112	0%	2001	-5%	277	284	3%	158	-44%
	SubTotal	1268	1268	0%	1336	5%	4742	4742	0%	3829	-19%	500	512	2%	404	-21%
675	675	1223	1223	0%	1201	-2%	3095	3095	0%	2937	-5%	727	737	1%	1018	38%
676	676	389	389	0%	316	-19%	1019	1019	0%	1316	29%	244	248	2%	133	-46%
677	677	707	707	0%	712	1%	1880	1880	0%	2246	19%	415	421	1%	339	-19%
678	678	797	797	0%	642	-19%	1391	1391	0%	1420	2%	63	66	5%	13	-80%
680	680	2059	2059	0%	2987	45%	3208	3208	0%	5640	76%	251	259	3%	152	-41%
681	681	1016	1016	0%	1016	0%	2003	2003	0%	2011	0%	319	324	2%	317	-2%
683	683	355	359	1%	415	16%	751	762	1%	1000	31%	270	272	1%	231	-15%
684	3677	721	721	0%	515	-29%	1449	1449	0%	1645	14%	74	76	3%	102	34%
	684	2137	2137	0%	1994	-7%	4297	4297	0%	5041	17%	533	545	2%	545	0%
	SubTotal	2858	2858	0%	2509	-12%	5746	5746	0%	6686	16%	607	621	2%	647	4%
685	3678	0	0	--	629	--	0	0	--	1545	--	4721	4756	1%	7980	68%
	3695	392	392	0%	576	47%	825	825	0%	973	18%	1180	1195	1%	1234	3%
	685	0	0	--	1192	--	0	0	--	2013	--	2286	2305	1%	5196	125%
	SubTotal	392	392	0%	2397	511%	825	825	0%	4531	449%	8187	8256	1%	14410	75%
686	3679	27	61	126%	3256	5238%	49	121	147%	6099	4940%	6016	10187	69%	10833	6%
	686	1806	4138	129%	3014	-27%	3380	8249	144%	6244	-24%	4245	6794	60%	7284	7%
	SubTotal	1833	4199	129%	6270	49%	3429	8370	144%	12343	47%	10261	16981	65%	18117	7%
687	3681	1321	1379	4%	1486	8%	2305	3278	42%	4119	26%	1303	1316	1%	1285	-2%
	3682	616	1644	167%	2377	45%	1062	2648	149%	5009	89%	2430	4049	67%	7020	73%
	3683	809	2198	172%	3204	46%	1914	4732	147%	8915	88%	5545	7809	41%	11870	52%
	3694	0	0	--	0	--	0	0	--	0	--	723	744	3%	751	1%
	687	171	404	136%	549	36%	381	661	73%	1006	52%	2197	2973	35%	4354	46%
	SubTotal	2917	5624	93%	7616	35%	5663	11319	100%	19049	68%	12198	16891	38%	25280	50%
688	3684	116	136	17%	107	-21%	336	380	13%	272	-28%	8	8	0%	10	25%
	3685	1116	1309	17%	608	-54%	3089	3497	13%	1616	-54%	62	62	0%	515	731%
	3688	131	153	17%	120	-22%	338	383	13%	273	-29%	145	146	1%	489	235%
	3689	0	0	--	0	--	0	0	--	0	--	1138	1147	1%	1832	60%
	3690	329	385	17%	786	104%	851	963	13%	1789	86%	383	386	1%	850	120%
	3691	32	37	16%	29	-22%	82	92	12%	66	-28%	137	140	2%	361	158%
	3692	99	116	17%	200	72%	256	290	13%	455	57%	49	50	2%	128	156%
	3693	0	0	--	222	--	0	0	--	565	--	397	397	0%	1485	274%
	688	156	183	17%	402	120%	432	489	13%	915	87%	722	730	1%	1049	44%
	SubTotal	1979	2319	17%	2474	7%	5384	6094	13%	5951	-2%	3041	3066	1%	6719	119%
689	3687	796	796	0%	796	0%	2232	2232	0%	2232	0%	260	268	3%	271	1%
	689	734	734	0%	734	0%	1933	1933	0%	1933	0%	2353	2427	3%	2450	1%
	SubTotal	1530	1530	0%	1530	0%	4165	4165	0%	4165	0%	2613	2695	3%	2721	1%
690	3680	250	250	0%	2130	752%	581	581	0%	4375	653%	1236	1236	0%	3325	169%
	3696	612	612	0%	921	50%	1235	1235	0%	2758	123%	3209	3232	1%	2538	-21%
	690	456	456	0%	997	119%	779	779	0%	2758	254%	706	706	0%	2426	244%
	SubTotal	1318	1318	0%	4048	207%	2595	2595	0%	9891	281%	5151	5174	0%	8289	60%
691	691	1108	1974	78%	3347	70%	2931	4803	64%	7368	53%	6824	6824	0%	7701	13%
692	692	399	1035	159%	1489	44%	857	2190	156%	3155	44%	640	2541	297%	2616	3%
693	693	0	0	--	2214	--	0	0	--	5266	--	5538	6521	18%	11878	82%
694	694	1787	1787	0%	1787	0%	5057	5057	0%	4267	-16%	1093	1249	14%	917	-27%
695	695	438	438	0%	638	46%	905	905	0%	1464	62%	4405	4405	0%	2961	-33%
696	696	495	495	0%	695	40%	1237	1237	0%	1600	29%	546	546	0%	286	-48%
697	697	2472	2472	0%	2491	1%	5030	5030	0%	5936	18%	439	439	0%	203	-54%
698	698	0	436	--	100	-77%	0	1097	--	210	-81%	3150	3300	5%	11090	236%
700	3697	42	42	0%	40	-5%	118	118	0%	153	30%	182	182	0%	366	101%
	700	1135	1135	0%	1098	-3%	3224	3224	0%	4199	30%	492	502	2%	438	-13%
	SubTotal	1177	1177	0%	1138	-3%	3342	3342	0%	4352	30%	674	684	1%	804	18%
701	701	616	616	0%	585	-5%	1750	1750	0%	1787	2%	680	688	1%	416	-40%
	3676	221	221	0%	302	37%	627	627	0%	971	55%	35	35	0%	18	-49%
	SubTotal	837	837	0%	887	6%	2377	2377	0%	2758	16%	715	723	1%	434	-40%
Total		**40030.93**	**47386**	**18%**	**61781**	**30%**	**101370.8**	**116991**	**15%**	**152410**	**30%**	**75709.27**	**90674**	**20%**	**125433**	**38%**

4 Base Year (2017) Network Review/Validation Checks

For the Base Year (2017), the network detail found in the MNCPPC Travel/4 2010 and 2040 networks was transferred to the MWCOG foundation networks. The additional zone centroids from the TAZ splits discussed in the previous section were added along with their centroid connectors, which were reviewed and adjusted. Network detail was also added (such as Nebel St. and Chapman Ave), and turn penalties restricting illegal/impossible turns added to existing the 2017 (base). A comparison of the MWCOG and study area 2017 networks is shown in **Figure 5**. Turn penalties were added at the red intersections nodes.

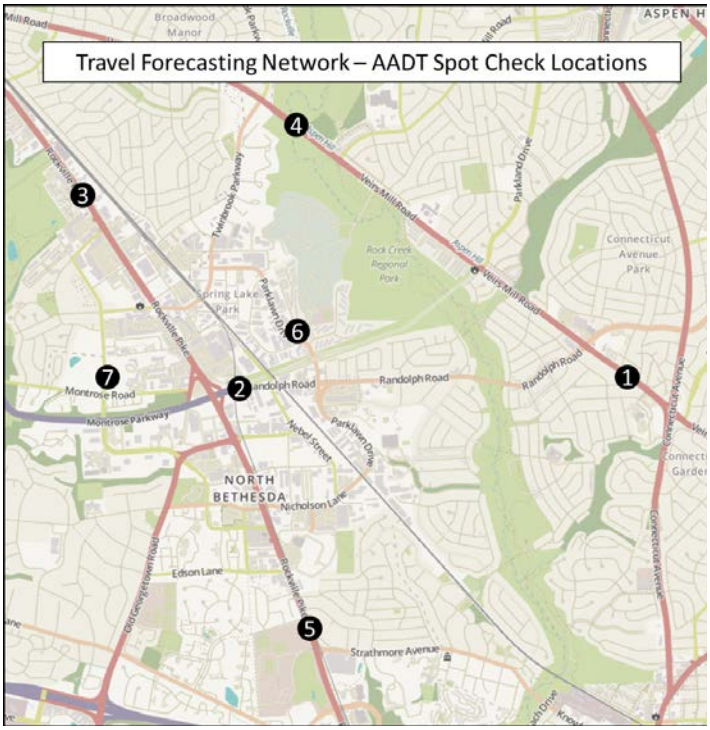


Figure 4 2017 AADT Spot Check Locations

A full validation of this process was not carried out for this study. However, spot checks for the 2017 assignment compared to 2017 counts were made at the locations shown in **Figure 4**.

Table 3 compares the MWCOG 24 hour AADT with the study area AADT. As can be seen there is significant improvement along Randolph Road and East Jefferson Street, and there is no spot where the assignments are significantly worse. The subarea assignment process therefore met expectations in providing the necessary detail for the operational analysis and improving the overall assignment.

Table 3 AADT Spot Checks

Spot AADT Checks for the Montrose Parkway Extenstion Study Area

No.	ROAD NAME	AADT 2016	MWCOG 2017 ASN	Dif	% Dif	SPLIT 2017 ASN	Dif	% Dif
1	Veirs Mill Road	39,831	43,849	4,018	10%	43,454	3,623	9%
2	Randolph Road	24,111	40,231	16,120	67%	26,627	2,516	10%
3	Rockville Pike	47,221	42,635	-4,586	-10%	42,021	-5,200	-11%
4	Veirs Mill Road	42,671	48,634	5,963	14%	48,804	6,133	14%
5	Rockville Pike	52,251	54,206	1,955	4%	51,790	-461	-1%
6	Parkland Drive	6,834	8,361	1,527	22%	8,181	1,347	20%
7	East Jefferson Street	24,132	13951	-10,181	-42%	22817	-1,315	-5%

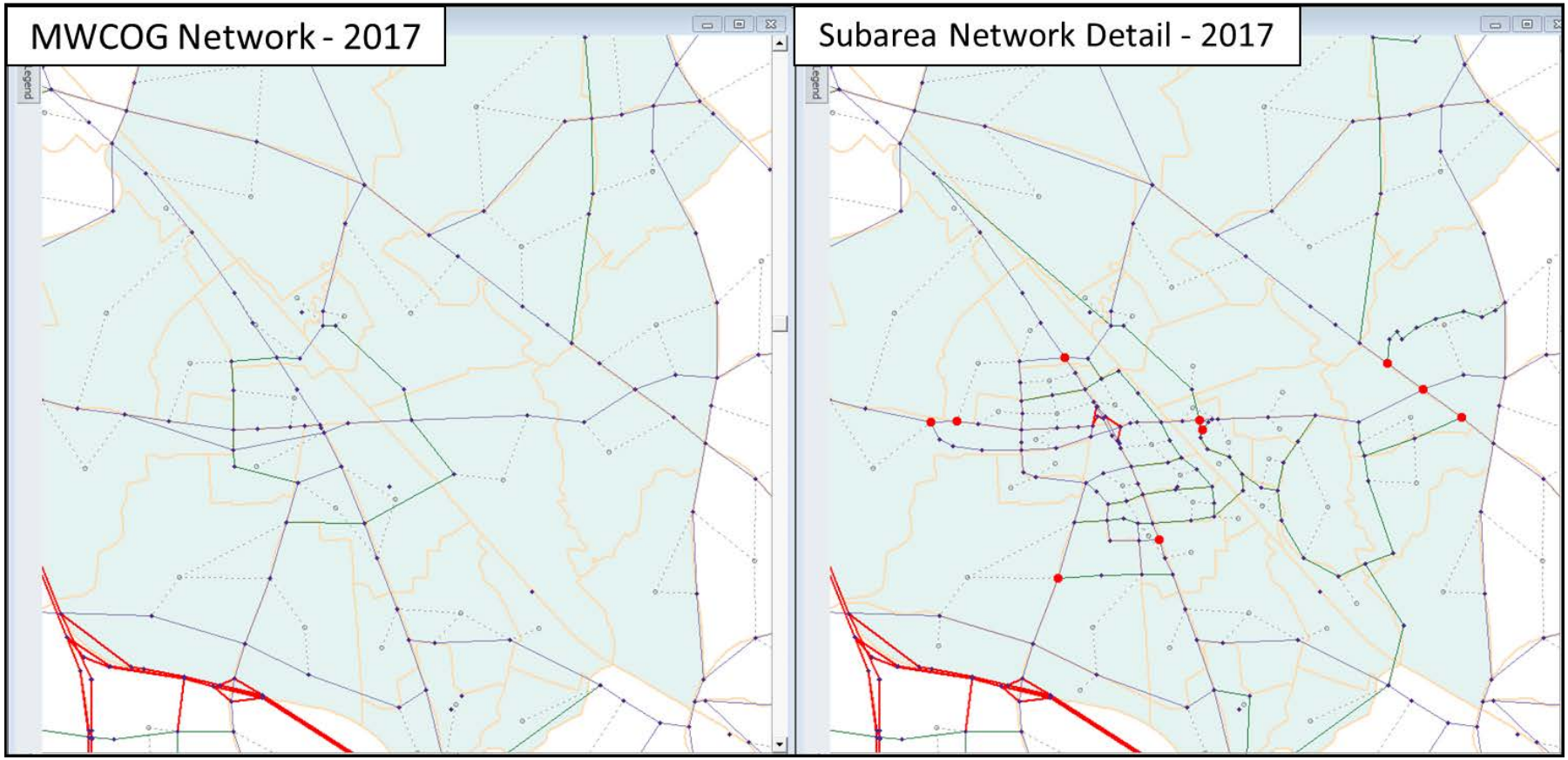


Figure 5 2017 MWCOG and Study area TAZ and Network Detail

5 2025 No Build and Build Scenario Analysis

The MWCOG future 2025 (2022) and 2040 networks already incorporated the "Build" MD 355 Phase 2 project and the County's Montrose Parkway east project. Therefore, to create the "No Build" scenarios, these facilities were removed from the 2025 and 2040 "build" networks to return them to 2017 conditions (both projects are assumed to be completed by opening year).

The post mode choice assignment process was carried for 2025. The 2025 No Build and Build AAWDTs for the study corridor are provided in **Table 4** and **Table 5** respectively. **Figure 6** and **Figure 7** show their 24-hour directional assigned volumes. These provided the growth rates and inputs for developing the peak hour turning movements and volumes used for the operational analysis described in a separate memorandum. **Table 6** and **Table 7** show the annual growth rates used, adjustments were made to account for network saturation and peak spreading.

Table 4 2025 No Build AAWDT

2025 No Build Travel Forecasts

Roadway	Segment		Base Year (2017)		Model Volume (Unadjusted)
	From	To	ADT	Model	2025
Randolph Rd	West of MD 355	MD 355	20,484	20,484	21,920
	MD 355	Chapman Ave	26,627	26,627	28,586
	Chapman Ave	Nebel St	24,514	24,514	24,489
	Nebel St	East of Nebel St	41,891	41,891	42,589
	West of Parklawn Dr	Parklawn Dr (West)	41,461	41,461	42,170
	Parklawn Dr (West)	Parklawn Dr (East)	42,777	42,777	44,689
	Parklawn Dr (East)	East of Parklawn Dr (East)	23,255	23,255	25,215
	East of Parklawn Dr (East)	Lauderdale Dr	43,998	43,998	46,636
	Lauderdale Dr	East of Lauderdale Dr	44,801	44,801	47,508
Montrose Parkway	East of Chapman	Parklawn Dr	n/a	n/a	n/a
	Parklawn Dr	East of Parklawn Dr	n/a	n/a	n/a
MD 355	On-ramp	Randolph Rd	6,124	6,124	6,877
	Randolph Rd	Off-ramp	3,465	3,465	3,789
Chapman Ave	North of Randolph Rd	Randolph Rd	1,688	1,688	1,506
	Randolph Rd	South of Randolph Rd	2,561	2,561	2,664
Nebel St	North of Randolph Rd	Randolph Rd	7,636	7,636	8,722
	Randolph Rd	South of Randolph Rd	14,709	14,709	17,871
Parklawn Dr	North of Braxfield Ct	Braxfield Ct	5,798	5,798	7,463
	Braxfield Ct	Randolph Rd	8,179	8,179	9,690
	Randolph Rd	th of Randolph Rd (Parklawn W	3,492	3,492	3,842
	Randolph Rd	uth of Randolph Rd (Parklawn Ea	1,221	1,221	1,947
Lauderdale Dr	North of Randolph Rd	Randolph Rd	481	481	507
	Randolph Rd	South of Randolph Rd	2,160	2,160	2,180
Braxfield Ct	Parklawn Dr	East of Parklawn Dr	6,160	6,160	6,057

Table 5 2025 Build AAWDT

2025 Build Travel Forecasts

Roadway	Segment		Base Year (2017)		Model Volume (Unadjusted)
	From	To	ADT	Model	2025
Randolph Rd	West of MD 355	MD 355	20,484	20,484	24,782
	MD 355	Chapman Ave	26,627	26,627	31,070
	Chapman Ave	Nebel St	24,514	24,514	1,882
	Nebel St	East of Nebel St	41,891	41,891	34,442
	West of Parklawn Dr	Parklawn Dr (West)	41,461	41,461	34,149
	Parklawn Dr (West)	Parklawn Dr (East)	42,777	42,777	32,041
	Parklawn Dr (East)	East of Parklawn Dr (East)	23,255	23,255	19,191
	East of Parklawn Dr (East)	Lauderdale Dr	43,998	43,998	34,674
	Lauderdale Dr	East of Lauderdale Dr	44,801	44,801	35,576
Montrose Parkway	East of Chapman	Parklawn Dr	24,514	24,514	27,030
	Parklawn Dr	East of Parklawn Dr	n/a	n/a	35,605
MD 355	On-ramp	Randolph Rd	6,124	6,124	6,872
	Randolph Rd	Off-ramp	3,465	3,465	1,897
Chapman Ave	North of Randolph Rd	Randolph Rd	1,688	1,688	3,345
	Randolph Rd	South of Randolph Rd	2,623	2,623	2,728
Nebel St	North of Randolph Rd	Randolph Rd	7,636	7,636	13,619
	Randolph Rd	South of Randolph Rd	14,709	14,709	19,026
Parklawn Dr	North of Braxfield Ct	Braxfield Ct	5,798	5,798	8,364
	Braxfield Ct	Montrose Parkway	8,179	8,179	11,939
	Montrose Parkway	Randolph Rd	8,179	8,179	10,220
	Randolph Rd	th of Randolph Rd (Parklawn W	3,492	3,492	3,631
	Randolph Rd	uth of Randolph Rd (Parklawn Ea	1,221	1,221	2,633
Lauderdale Dr	North of Randolph Rd	Randolph Rd	481	481	524
	Randolph Rd	South of Randolph Rd	2,160	2,160	2,195
Braxfield Ct	Parklawn Dr	East of Parklawn Dr	6,160	6,160	6,057

Table 6 2025 No Build Growth Rates

Roadway	Segment		Base Year	% Annual Increase	Adjusted Forecasts	% Increase
	From	To		2017-25	2025	2017-2025
Randolph Rd	West of MD 355	MD 355	20,484	0.88%	21,925	107%
	MD 355	Chapman Ave	26,627	0.91%	28,575	107%
	Chapman Ave	Nebel St	24,514	-0.01%	24,500	100%
	Nebel St	East of Nebel St	41,891	0.21%	42,600	102%
	West of Parklawn Dr	Parklawn Dr (West)	41,461	0.22%	42,175	102%
	Parklawn Dr (West)	Parklawn Dr (East)	42,777	0.56%	44,700	104%
	Parklawn Dr (East)	East of Parklawn Dr (East)	23,255	1.06%	25,225	108%
	East of Parklawn Dr (East)	Lauderdale Dr	43,998	0.75%	46,625	106%
	Lauderdale Dr	East of Lauderdale Dr	44,801	0.75%	47,500	106%
Montrose Parkway	On-ramp	Randolph Rd	n/a	n/a	n/a	n/a
	Randolph Rd	Off-ramp	n/a	n/a	n/a	n/a
MD 355	On-ramp	Randolph Rd	6,124	1.53%	6,875	112%
	Randolph Rd	Off-ramp	3,465	1.21%	3,800	110%
Chapman Ave	North of Randolph Rd	Randolph Rd	1,688	-1.39%	1,500	89%
	Randolph Rd	South of Randolph Rd	2,561	0.56%	2,675	104%
Nebel St	North of Randolph Rd	Randolph Rd	7,636	1.78%	8,725	114%
	Randolph Rd	South of Randolph Rd	14,709	2.69%	17,875	122%
Parklawn Dr	North of Braxfield Ct	Braxfield Ct	5,798	3.62%	7,475	129%
	Braxfield Ct	Randolph Rd	8,179	2.32%	9,700	119%
	Randolph Rd	h of Randolph Rd (Parklawn V	3,492	1.28%	3,850	110%
	Randolph Rd	th of Randolph Rd (Parklawn I	1,221	7.46%	1,950	160%
Lauderdale Dr	North of Randolph Rd	Randolph Rd	481	0.49%	500	104%
	Randolph Rd	South of Randolph Rd	2,160	0.09%	2,175	101%
Braxfield Ct	Parklawn Dr	East of Parklawn Dr	6,160	-0.22%	6,050	98%

Table 7 2025 Build Growth Rates

Roadway	Segment		Base Year	% Annual Increase	Adjusted Forecasts	% Increase
	From	To		2017-25	2025	2017-2025
Randolph Rd	West of MD 355	MD 355	20,484	2.62%	24,775	121%
	MD 355	Chapman Ave	26,627	2.09%	31,075	117%
	Chapman Ave	Nebel St	24,514	-11.54%	1,875	8%
	Nebel St	East of Nebel St	41,891	-2.22%	34,450	82%
	West of Parklawn Dr	Parklawn Dr (West)	41,461	-2.20%	34,150	82%
	Parklawn Dr (West)	Parklawn Dr (East)	42,777	-3.13%	32,050	75%
	Parklawn Dr (East)	East of Parklawn Dr (East)	23,255	-2.18%	19,200	83%
	East of Parklawn Dr (East)	Lauderdale Dr	43,998	-2.65%	34,675	79%
	Lauderdale Dr	East of Lauderdale Dr	44,801	-2.57%	35,575	79%
Montrose Parkway	On-ramp	Randolph Rd	24,514	1.28%	27,025	110%
	Randolph Rd	Off-ramp	n/a	n/a	n/a	n/a
MD 355	On-ramp	Randolph Rd	6,124	1.53%	6,875	112%
	Randolph Rd	Off-ramp	3,465	-5.65%	1,900	55%
Chapman Ave	North of Randolph Rd	Randolph Rd	1,688	12.31%	3,350	198%
	Randolph Rd	South of Randolph Rd	2,623	0.49%	2,725	104%
Nebel St	North of Randolph Rd	Randolph Rd	7,636	9.80%	13,625	178%
	Randolph Rd	South of Randolph Rd	14,709	3.67%	19,025	129%
Parklawn Dr	North of Braxfield Ct	Braxfield Ct	5,798	5.56%	8,375	144%
	Braxfield Ct	Montrose Parkway	8,179	5.76%	11,950	146%
	Montrose Parkway	Randolph Rd	8,179	3.13%	10,225	125%
	Randolph Rd	h of Randolph Rd (Parklawn V	3,492	0.48%	3,625	104%
	Randolph Rd	th of Randolph Rd (Parklawn I	1,221	14.37%	2,625	215%
Lauderdale Dr	North of Randolph Rd	Randolph Rd	481	1.14%	525	109%
	Randolph Rd	South of Randolph Rd	2,160	0.23%	2,200	102%
Braxfield Ct	Parklawn Dr	East of Parklawn Dr	6,160	-0.22%	6,050	98%

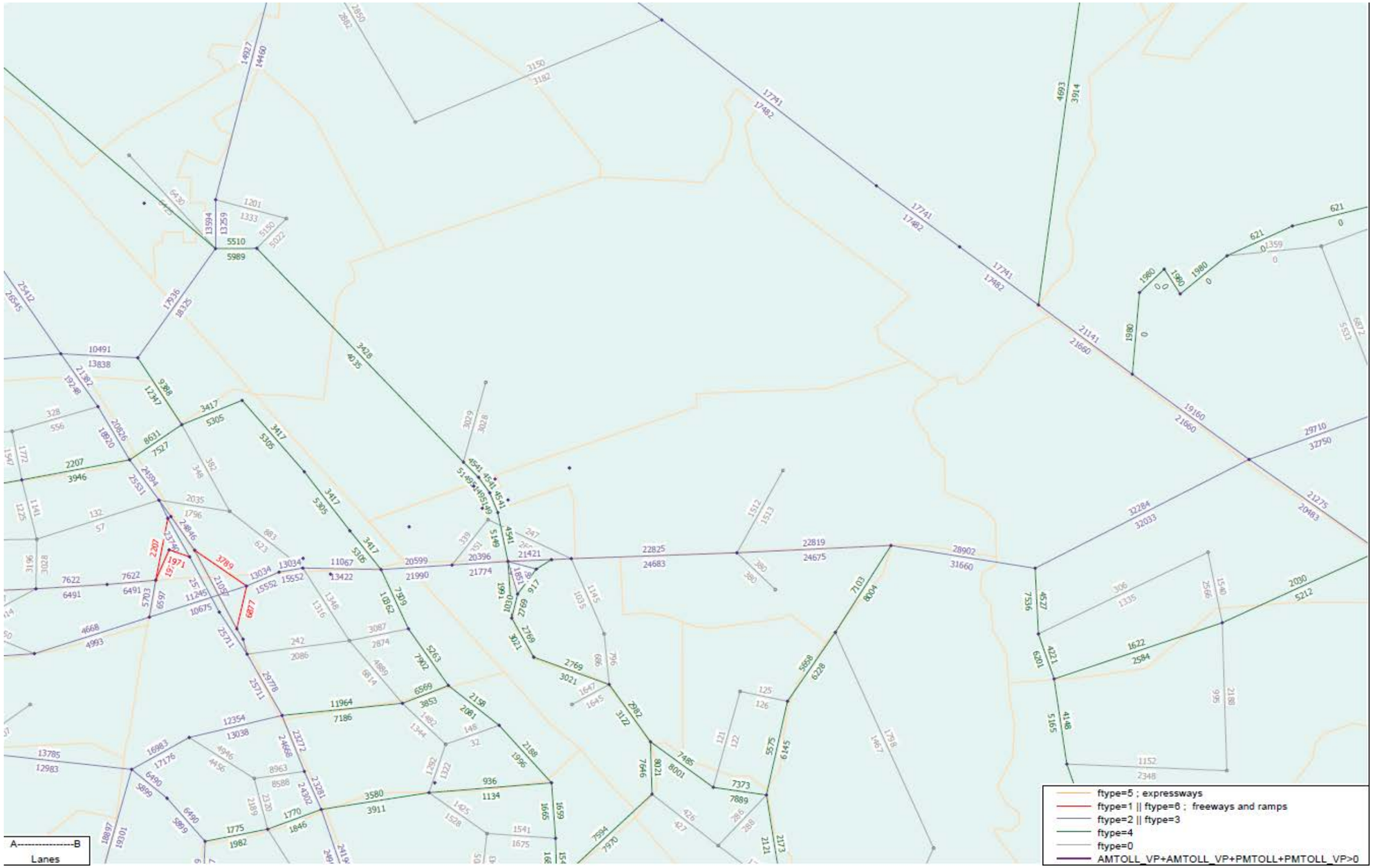


Figure 6 2025 No Build 24 hour directional Volumes

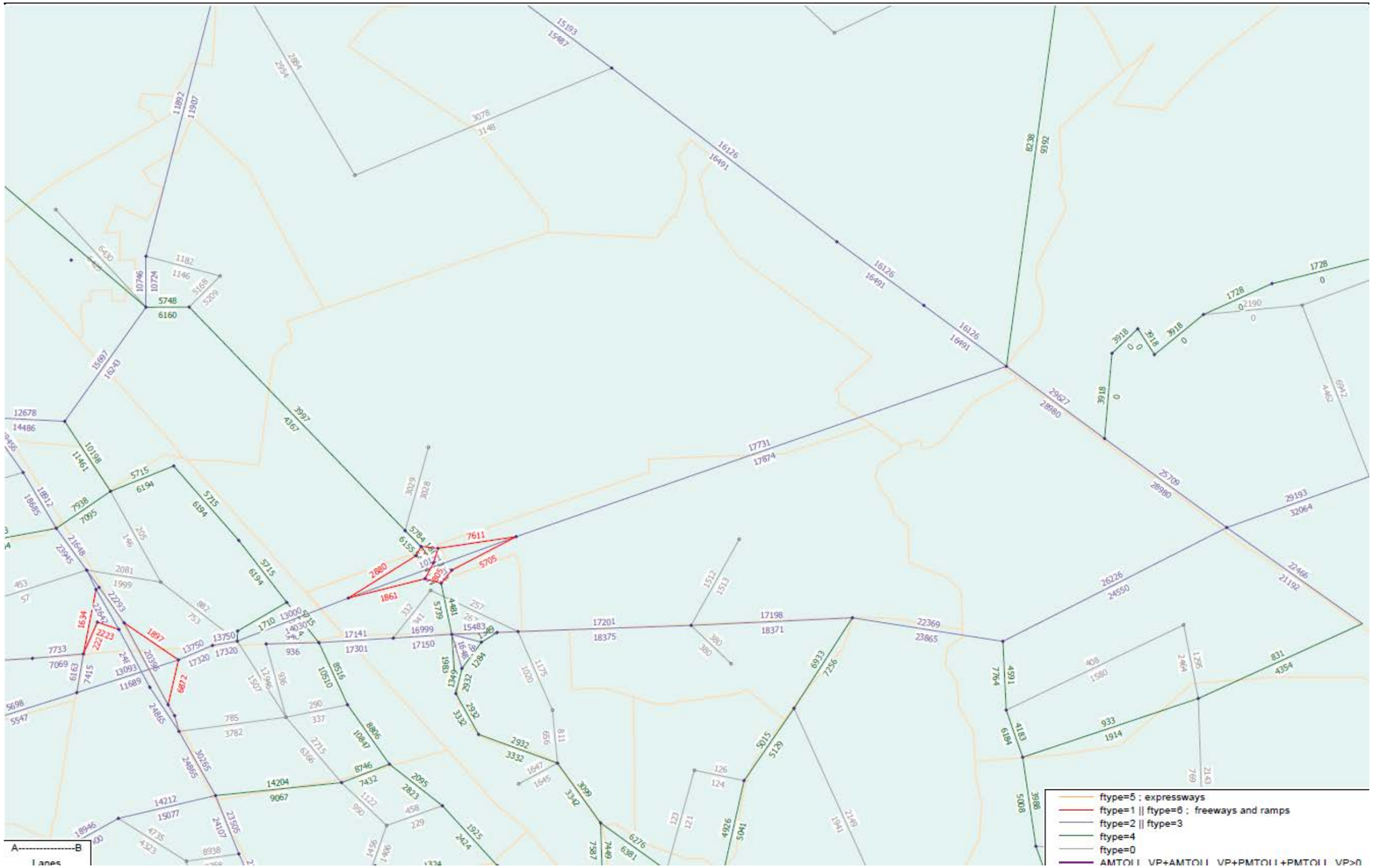


Figure 7 2025 Build 24 hour directional Volumes

6 2040 No Build and Build Scenario Analysis

The 2040 No Build and Build AAWDTs for the study corridor are provided in **Table 7** and **Table 8** and growth rates are provided in **Table 9** and **Table 10** respectively. **Figure 8** and **Figure 9** show their 24-hour directional assigned volumes. These provided the growth rates and inputs for developing the peak hour turning movements and volumes used for the operational analysis described in a separate memorandum.

Table 7 2040 No Build AAWDT

2040 No Build Travel Forecasts

Roadway	Segment		Base Year (2017)		Model Volume (Unadjusted)
	From	To	ADT	Model	2040
Randolph Rd	West of MD 355	MD 355	20,484	20,484	27,507
	MD 355	Chapman Ave	26,627	26,627	30,030
	Chapman Ave	Nebel St	24,514	24,514	29,545
	Nebel St	East of Nebel St	41,891	41,891	48,352
	West of Parklawn Dr	Parklawn Dr (West)	41,461	41,461	47,811
	Parklawn Dr (West)	Parklawn Dr (East)	42,777	42,777	48,910
	Parklawn Dr (East)	East of Parklawn Dr (East)	23,255	23,255	28,730
	East of Parklawn Dr (East)	Lauderdale Dr	43,998	43,998	52,185
	Lauderdale Dr	East of Lauderdale Dr	44,801	44,801	53,913
Montrose Parkway	East of Chapman	Parklawn Dr	n/a	n/a	n/a
	Parklawn Dr	East of Parklawn Dr	n/a	n/a	n/a
MD 355	On-ramp	Randolph Rd	6,124	6,124	8,937
	Randolph Rd	Off-ramp	3,465	3,465	3,452
Chapman Ave	North of Randolph Rd	Randolph Rd	1,688	1,688	6,276
	Randolph Rd	South of Randolph Rd	2,561	2,561	2,877
Nebel St	North of Randolph Rd	Randolph Rd	7,636	7,636	11,432
	Randolph Rd	South of Randolph Rd	14,709	14,709	24,529
Parklawn Dr	North of Braxfield Ct	Braxfield Ct	5,798	5,798	9,133
	Braxfield Ct	Randolph Rd	8,179	8,179	11,167
	Randolph Rd	th of Randolph Rd (Parklawn W	3,492	3,492	6,639
	Randolph Rd	ıth of Randolph Rd (Parklawn Ea	1,221	1,221	3,277
Lauderdale Dr	North of Randolph Rd	Randolph Rd	481	481	775
	Randolph Rd	South of Randolph Rd	2,160	2,160	4,847
Braxfield Ct	Parklawn Dr	East of Parklawn Dr	6,160	6,160	6,036

Table8 2040 Build AAWDT

2040 Build Travel Forecasts

Roadway	Segment		Base Year (2017)		Model Volume (Unadjusted)
	From	To	ADT	Model	2040
Randolph Rd	West of MD 355	MD 355	20,484	20,484	29,632
	MD 355	Chapman Ave	26,627	26,627	32,019
	Chapman Ave	Nebel St	24,514	24,514	2,033
	Nebel St	East of Nebel St	41,891	41,891	37,197
	West of Parklawn Dr	Parklawn Dr (West)	41,461	41,461	36,871
	Parklawn Dr (West)	Parklawn Dr (East)	42,777	42,777	34,555
	Parklawn Dr (East)	East of Parklawn Dr (East)	23,255	23,255	22,380
	East of Parklawn Dr (East)	Lauderdale Dr	43,998	43,998	38,934
	Lauderdale Dr	East of Lauderdale Dr	44,801	44,801	40,737
Montrose Parkway	East of Chapman	Parklawn Dr	24,514	24,514	31,219
	Parklawn Dr	East of Parklawn Dr	n/a	n/a	40,126
MD 355	On-ramp	Randolph Rd	6,124	6,124	9,355
	Randolph Rd	Off-ramp	3,465	3,465	2,606
Chapman Ave	North of Randolph Rd	Randolph Rd	1,688	1,688	5,244
	Randolph Rd	South of Randolph Rd	2,623	2,623	2,946
Nebel St	North of Randolph Rd	Randolph Rd	7,636	7,636	17,515
	Randolph Rd	South of Randolph Rd	14,709	14,709	26,194
Parklawn Dr	North of Braxfield Ct	Braxfield Ct	5,798	5,798	11,627
	Braxfield Ct	Montrose Parkway	8,179	8,179	14,558
	Montrose Parkway	Randolph Rd	8,179	8,179	12,612
	Randolph Rd	th of Randolph Rd (Parklawn W	3,492	3,492	6,701
	Randolph Rd	ıth of Randolph Rd (Parklawn Ea	1,221	1,221	4,379
Lauderdale Dr	North of Randolph Rd	Randolph Rd	481	481	778
	Randolph Rd	South of Randolph Rd	2,160	2,160	5,081
Braxfield Ct	Parklawn Dr	East of Parklawn Dr	6,160	6,160	6,036

Table 9 2040 No Build Growth Rates

Roadway	Segment From	Segment To	Base Year	% Annual Increase 2017-40	Adjusted Forecasts 2040	% Increase 2017-2040
Randolph Rd	West of MD 355	MD 355	20,484	1.12%	25,750	126%
	MD 355	Chapman Ave	26,627	0.42%	29,175	110%
	Chapman Ave	Nebel St	24,514	0.67%	28,300	115%
	Nebel St	East of Nebel St	41,891	0.50%	46,725	112%
	West of Parklawn Dr	Parklawn Dr (West)	41,461	0.50%	46,225	111%
	Parklawn Dr (West)	Parklawn Dr (East)	42,777	0.47%	47,375	111%
	Parklawn Dr (East)	East of Parklawn Dr (East)	23,255	0.77%	27,350	118%
	East of Parklawn Dr (East)	Lauderdale Dr	43,998	0.61%	50,125	114%
	Lauderdale Dr	East of Lauderdale Dr	44,801	0.66%	51,650	115%
Montrose Parkway	On-ramp	Randolph Rd	n/a	n/a	n/a	n/a
	Randolph Rd	Off-ramp	n/a	n/a	n/a	n/a
MD 355	On-ramp	Randolph Rd	6,124	1.49%	8,225	134%
	Randolph Rd	Off-ramp	3,465	-0.01%	3,450	100%
Chapman Ave	North of Randolph Rd	Randolph Rd	1,688	8.86%	5,125	304%
	Randolph Rd	South of Randolph Rd	2,561	0.40%	2,800	109%
Nebel St	North of Randolph Rd	Randolph Rd	7,636	1.62%	10,475	137%
	Randolph Rd	South of Randolph Rd	14,709	2.18%	22,075	150%
Parklawn Dr	North of Braxfield Ct	Braxfield Ct	5,798	1.87%	8,300	143%
	Braxfield Ct	Randolph Rd	8,179	1.19%	10,425	127%
	Randolph Rd	h of Randolph Rd (Parklawn V	3,492	2.95%	5,850	168%
	Randolph Rd	th of Randolph Rd (Parklawn I	1,221	5.49%	2,750	225%
Lauderdale Dr	North of Randolph Rd	Randolph Rd	481	1.99%	700	146%
	Randolph Rd	South of Randolph Rd	2,160	4.06%	4,175	193%
Braxfield Ct	Parklawn Dr	East of Parklawn Dr	6,160	-0.07%	6,050	98%

Table 10 2040 Build Growth Rates

Roadway	Segment From	Segment To	Base Year	% Annual Increase 2017-40	Adjusted Forecasts 2040	% Increase 2017-2040
Randolph Rd	West of MD 355	MD 355	20,484	1.46%	27,350	134%
	MD 355	Chapman Ave	26,627	0.66%	30,675	115%
	Chapman Ave	Nebel St	24,514	-3.99%	2,025	8%
	Nebel St	East of Nebel St	41,891	-0.49%	37,200	89%
	West of Parklawn Dr	Parklawn Dr (West)	41,461	-0.48%	36,875	89%
	Parklawn Dr (West)	Parklawn Dr (East)	42,777	-0.84%	34,550	81%
	Parklawn Dr (East)	East of Parklawn Dr (East)	23,255	-0.16%	22,375	96%
	East of Parklawn Dr (East)	Lauderdale Dr	43,998	-0.50%	38,925	88%
	Lauderdale Dr	East of Lauderdale Dr	44,801	-0.40%	40,725	91%
Montrose Parkway	On-ramp	Randolph Rd	24,514	0.89%	29,550	121%
	Randolph Rd	Off-ramp	n/a	n/a	n/a	n/a
MD 355	On-ramp	Randolph Rd	6,124	1.72%	8,550	140%
	Randolph Rd	Off-ramp	3,465	-1.09%	2,600	75%
Chapman Ave	North of Randolph Rd	Randolph Rd	1,688	6.88%	4,350	258%
	Randolph Rd	South of Randolph Rd	2,623	0.41%	2,875	110%
Nebel St	North of Randolph Rd	Randolph Rd	7,636	4.22%	15,050	197%
	Randolph Rd	South of Randolph Rd	14,709	2.55%	23,325	159%
Parklawn Dr	North of Braxfield Ct	Braxfield Ct	5,798	3.28%	10,175	175%
	Braxfield Ct	Montrose Parkway	8,179	2.54%	12,950	158%
	Montrose Parkway	Randolph Rd	8,179	1.76%	11,500	141%
	Randolph Rd	h of Randolph Rd (Parklawn V	3,492	3.00%	5,900	169%
	Randolph Rd	th of Randolph Rd (Parklawn I	1,221	8.42%	3,575	293%
Lauderdale Dr	North of Randolph Rd	Randolph Rd	481	1.99%	700	146%
	Randolph Rd	South of Randolph Rd	2,160	4.40%	4,350	201%
Braxfield Ct	Parklawn Dr	East of Parklawn Dr	6,160	-0.10%	6,025	98%

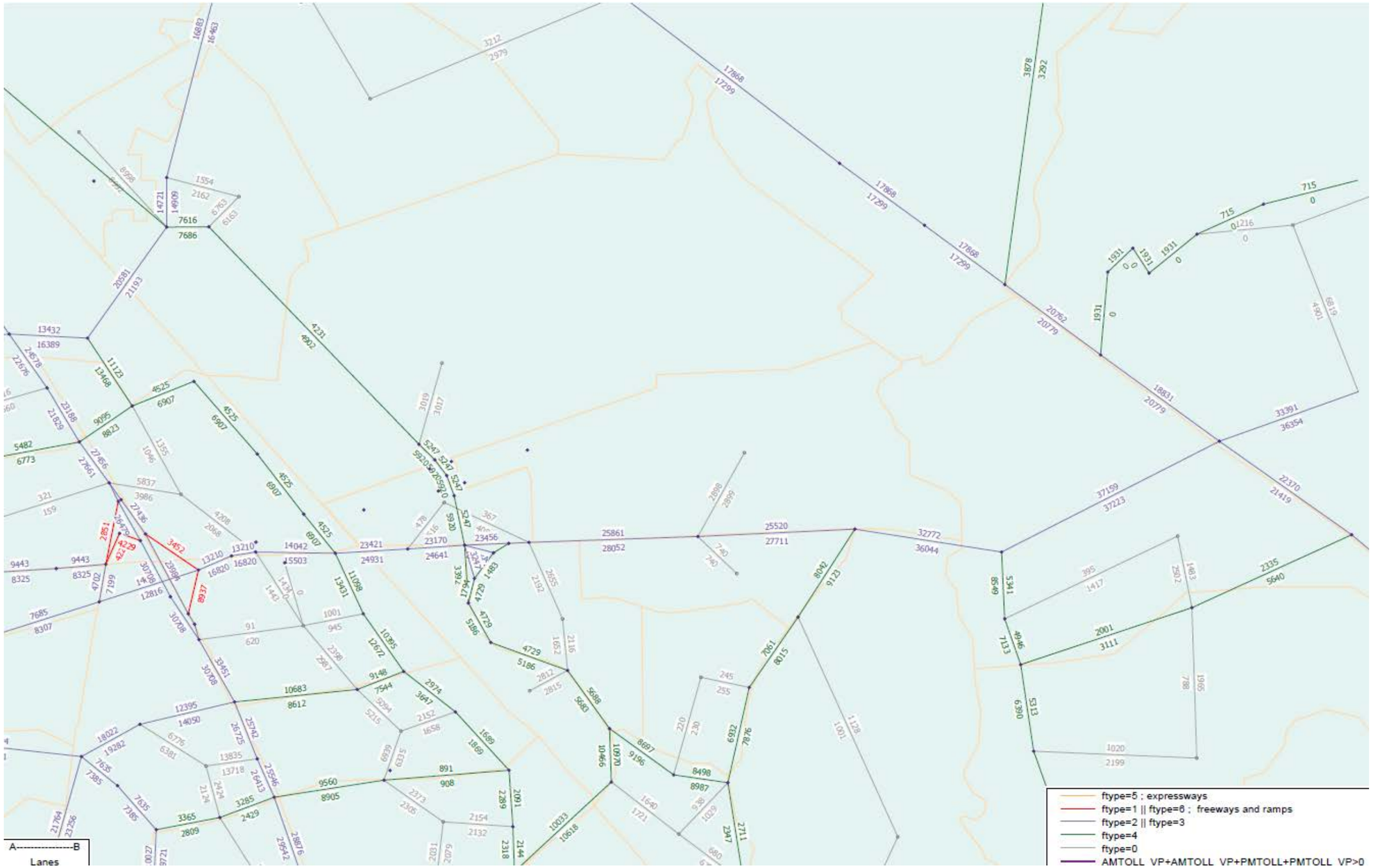


Figure 8 Figure 2 2040 No Build 24 hour directional Volumes

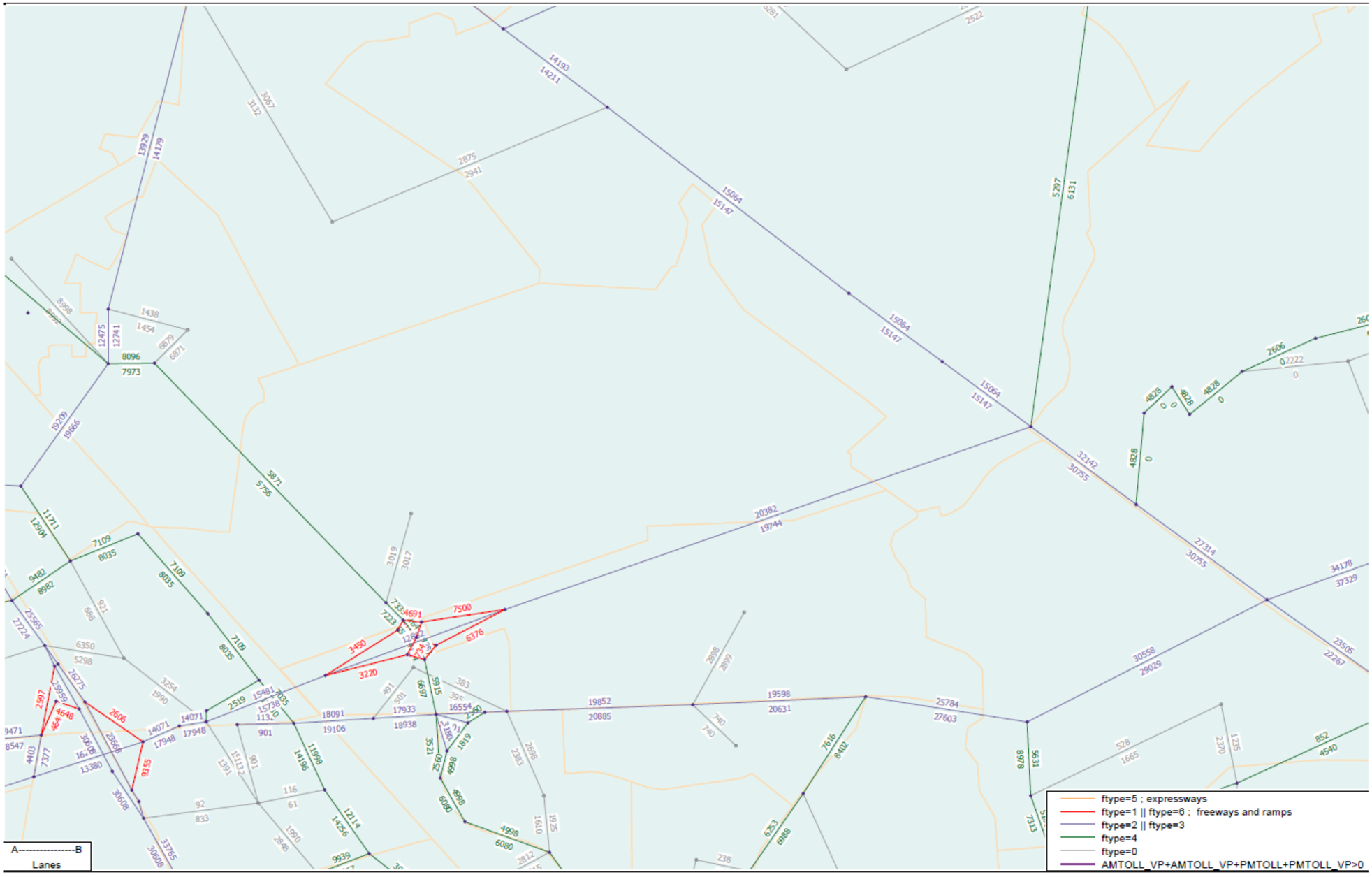


Figure 9 Figure 2 2040 Build 24 hour directional Volumes

APPENDIX D

Capacity Analysis and Queuing Worksheets

CLV Analysis

	Intersection	Control	Approach	Existing - AM			Existing - PM			No Build 2022 - AM			No Build 2022 - PM			Build 2022 - AM			Build 2022 - PM			No Build 2040 - AM			No Build 2040 - PM			Build 2040 - AM			Build 2040 - PM		
				Critical Lane Volume			Critical Lane Volume			Critical Lane Volume			Critical Lane Volume			Critical Lane Volume			Critical Lane Volume			Critical Lane Volume			Critical Lane Volume			Critical Lane Volume			Critical Lane Volume		
				V/C	CLV	LOS	V/C	CLV	LOS	V/C	CLV	LOS	V/C	CLV	LOS	V/C	CLV	LOS	V/C	CLV	LOS	V/C	CLV	LOS	V/C	CLV	LOS	V/C	CLV	LOS	V/C	CLV	LOS
1	Rockville Pike (MD 355) Ramps A/B at Montrose Pkwy	Signalized	Overall	0.47	760	A	0.46	739	A	0.50	797	A	0.48	774	A	0.52	833	A	0.52	837	A	0.56	897	A	0.57	912	A	0.59	939	A	0.58	922	A
2	Chapman Ave/Maple Ave at Randolph Rd	Signalized	Overall	0.49	789	A	0.52	837	A	0.51	821	A	0.55	874	A	0.42	664	A	0.43	691	A	0.63	1016	B	0.68	1095	B	0.48	772	A	0.53	851	A
3	Nebel St at Randolph Rd	Signalized	Overall	0.65	1046	B	0.80	1276	C	0.68	1093	B	0.84	1342	D	0.71	1137	B	0.79	1269	C	0.78	1254	C	1.01	1611	F	0.84	1341	D	0.86	1379	D
4	Parklawn Dr at Randolph Rd	Signalized	Overall	0.76	1222	C	0.80	1287	C	0.81	1303	D	0.87	1390	D	0.67	1068	B	0.74	1181	C	0.97	1550	E	1.04	1665	F	0.79	1264	C	0.93	1495	E
5	Parklawn Dr at Braxfield Ct	Signalized	Overall	0.24	392	A	0.38	611	A	0.27	437	A	0.45	720	A	0.31	492	A	0.49	791	A	0.32	511	A	0.52	831	A	0.41	653	A	0.63	1015	B
6	Montrose Pkwy at Parklawn Dr [SPUI]	Signalized	Overall													0.39	623	A	0.44	707	A							0.51	813	A	0.60	957	A

MD 355 Phase 2
Traffic Analysis
Existing Conditions

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Rockville Pike (MD 355) Ramps A/B at Montrose Pkwy

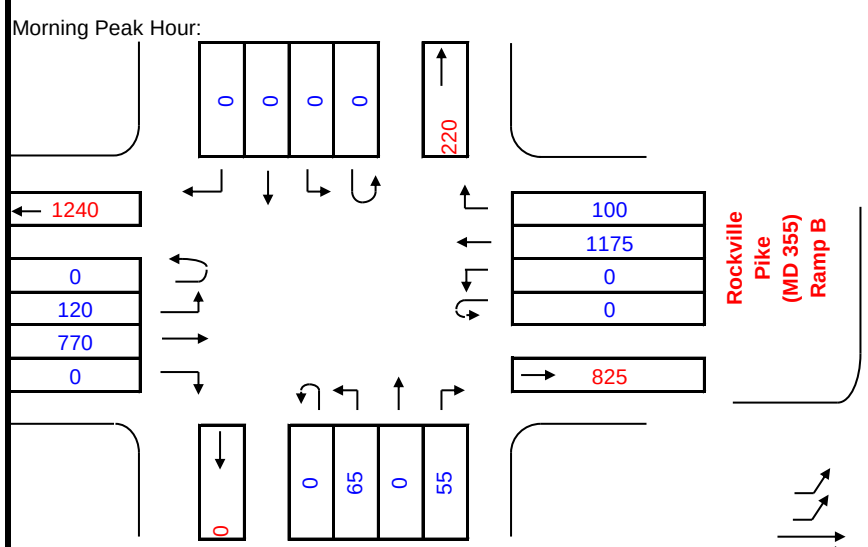
Conditions: Existing

Design Year: 2017

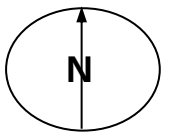
Computed by: Itenology Corporation

Date 6/8/2017

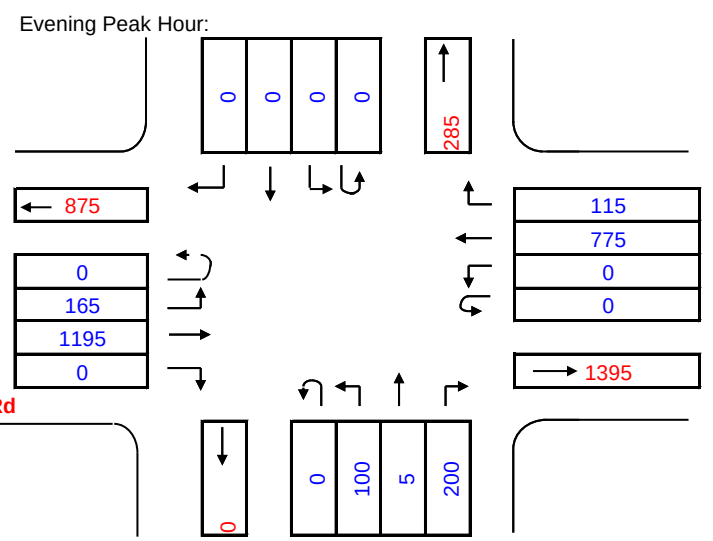
Morning Peak Hour:



Lane Configuration



Evening Peak Hour:



PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
1=	1.00	A <=	1000	<= 199	1.1
2=	0.53	B <=	1150	<= 599	2.0
3=	0.37	C <=	1300	<= 799	3.0
4=	0.30	D <=	1450	<= 999	4.0
Dbl-Lt=	0.60	E <=	1600	> 1000	5.0
		F >	1600		

Phasing

RTOR/Overlap: ☐ Northbound ☐ Southbound ☐ Eastbound ☑ Westbound

Split Phasing: ○ East/West ○ North/South ◉ None

Inx. Control: ◉ Signal ○ Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*
	NB	65	1.00	65	0	65	*
	SB	0	1.00	0	0	0	
	EB	770	0.53	408	0	408	
	WB	1175	0.53	623	72	695	*

Remarks:

* Critical volume Total **760**

Level of service (V/C) **0.47** **A**

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	200	0.53	106	0	106	*
	SB	0	1.00	0	0	0	
	EB	1195	0.53	633	0	633	*
	WB	775	0.53	411	99	510	

Remarks:

* Critical volume Total **739**

Level of service (V/C) **0.46** **A**

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Chapman Ave/Maple Ave at Randolph Rd

Conditions: Existing

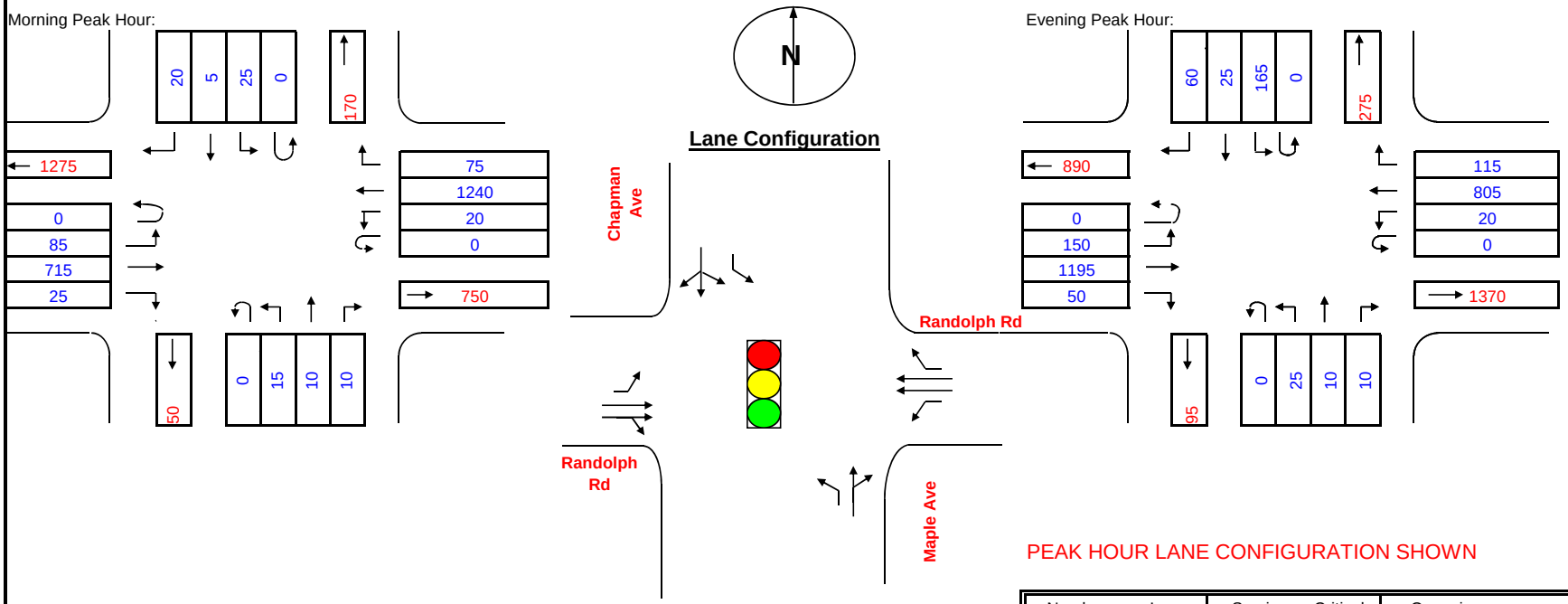
Design Year: 2017

Computed by: Itenology Corporation

Date 6/12/2017

Morning Peak Hour:

Evening Peak Hour:



PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
1=	1.00	A <= 1000		<= 199	1.1
2=	0.53	B <= 1150		<= 599	2.0
3=	0.37	C <= 1300		<= 799	3.0
4=	0.30	D <= 1450		<= 999	4.0
Dbl-Lt=	0.60	E <= 1600		> 1000	5.0
		F > 1600			

Phasing

RTOR/Overlap
- ☐ Northbound
- ☐ Southbound
- ☐ Eastbound
- ☑ Westbound

Split Phasing
- ○ East/West
- ◉ North/South
- ○ None

Inx. Control
- ◉ Signal
- ○ Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*	Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	20	1.00	20	0	20	*		NB	25	1.00	25	0	25	*
	SB	50	0.53	27	0	27	*		SB	250	0.53	133	0	133	*
	EB	740	0.53	392	20	412			EB	1245	0.53	660	20	680	*
	WB	1240	0.53	657	85	742	*		WB	805	0.53	427	150	577	
Remarks:			* Critical volume		Total	789		Remarks:			* Critical volume		Total	837	
					Level of service (V/C)	0.49	A						Level of service (V/C)	0.52	A

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Nebel St at Randolph Rd

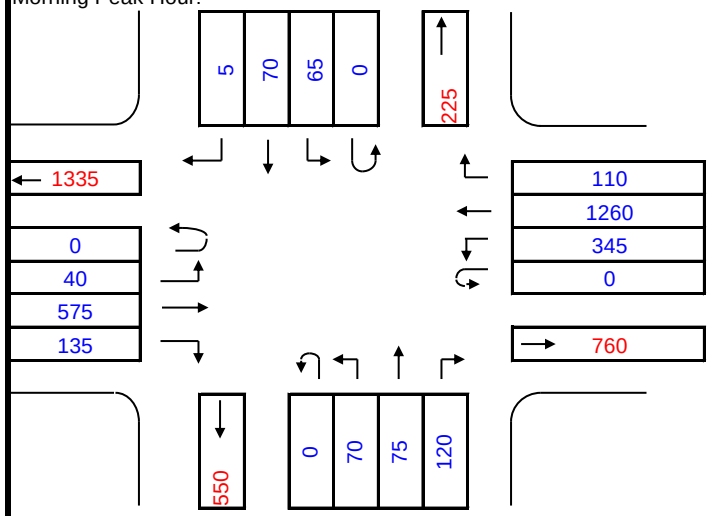
Conditions: Existing

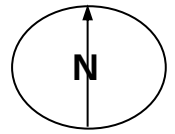
Design Year: 2017

Computed by: Itenology Corporation

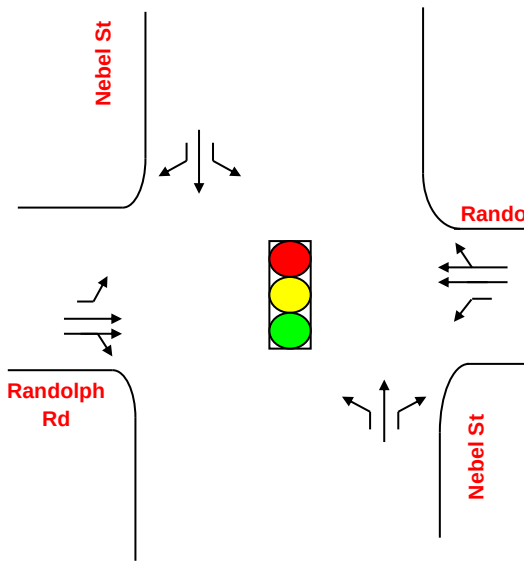
Date 6/8/2017

Morning Peak Hour:

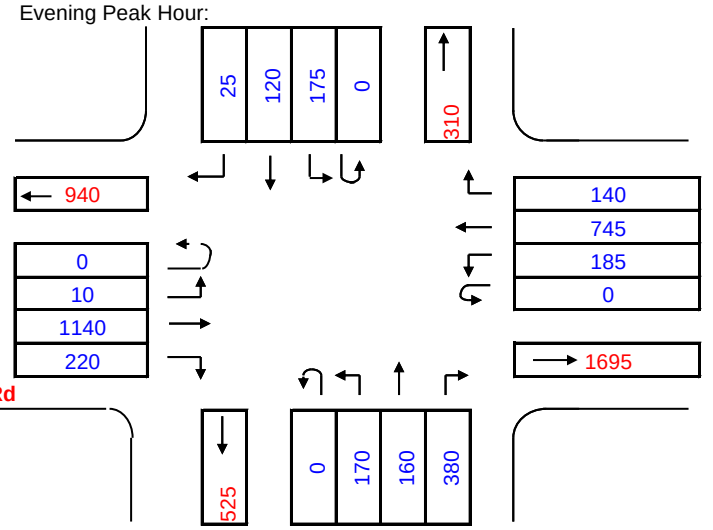




Lane Configuration



Evening Peak Hour:



PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
1 =	1.00	A <=	1000	<= 199	1.1
2 =	0.53	B <=	1150	<= 599	2.0
3 =	0.37	C <=	1300	<= 799	3.0
4 =	0.30	D <=	1450	<= 999	4.0
Dbl-Lt =	0.60	E <=	1600	> 1000	5.0
		F >	1600		

Phasing

RTOR/Overlap
- [x] Northbound
- [x] Southbound
- [ ] Eastbound
- [ ] Westbound

Split Phasing
- ( ) East/West
- ( ) North/South
- (•) None

Inx. Control
- (•) Signal
- ( ) Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*	Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	75	1.00	75	65	140	*		NB	195	1.00	195	175	370	*
	SB	70	1.00	70	70	140			SB	120	1.00	120	170	290	
	EB	710	0.53	376	345	721			EB	1360	0.53	721	185	906	*
	WB	1370	0.53	726	40	766	*		WB	885	0.53	469	10	479	
Remarks:			* Critical volume		Total	**1046**		Remarks:			* Critical volume		Total	**1276**	
					Level of service (V/C)	**0.65**	**B**						Level of service (V/C)	**0.80**	**C**

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Parklawn Dr at Randolph Rd

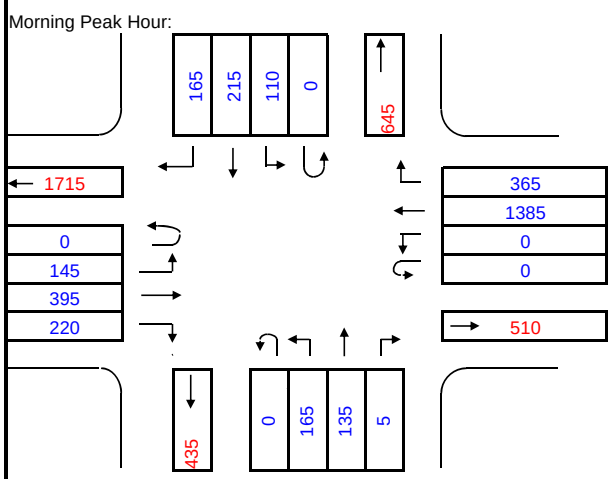
Conditions: Existing

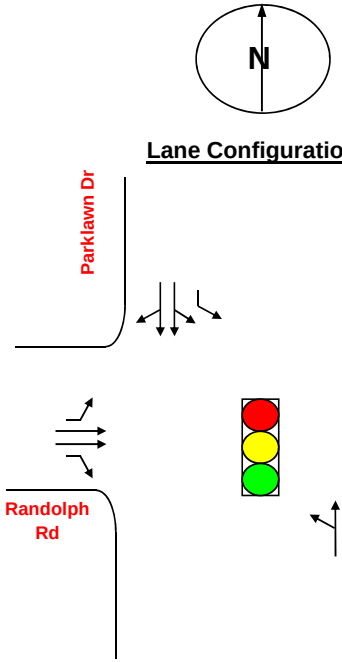
Design Year: 2017

Computed by: Itenology Corporation

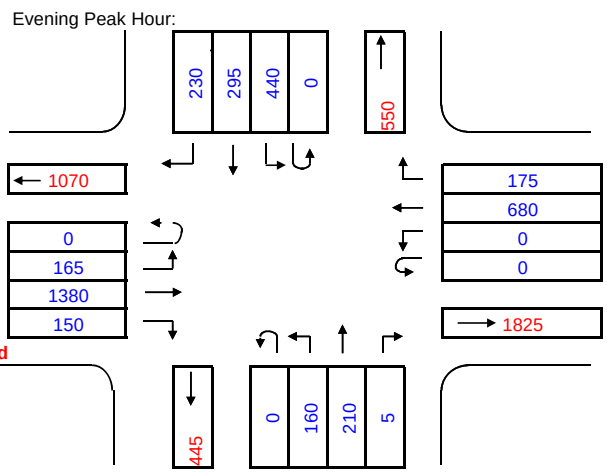
Date 6/12/2017

Morning Peak Hour:





Evening Peak Hour:



PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
1	= 1.00	A	<= 1000	<= 199	1.1
2	= 0.53	B	<= 1150	<= 599	2.0
3	= 0.37	C	<= 1300	<= 799	3.0
4	= 0.30	D	<= 1450	<= 999	4.0
Dbl-Lt	= 0.60	E	<= 1600	> 1000	5.0
		F	> 1600		

Phasing

RTOR/Overlap
- ☐ Northbound
- ☐ Southbound
- ☑ Eastbound
- ☑ Westbound

Split Phasing
- ○ East/West
- ◉ North/South
- ○ None

Inx. Control
- ◉ Signal
- ○ Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*	Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	305	0.53	162	0	162	*		NB	375	0.53	199	0	199	*
	SB	490	0.37	181	0	181	*		SB	965	0.37	357	0	357	*
	EB	395	0.53	209	0	209			EB	1380	0.53	731	0	731	*
	WB	1385	0.53	734	145	879	*		WB	680	0.53	360	165	525	
Remarks:			* Critical volume		Total	1222		Remarks:			* Critical volume		Total	1287	
					Level of service (V/C)	0.76	C						Level of service (V/C)	0.80	C

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Parklawn Dr at Braxfield Ct

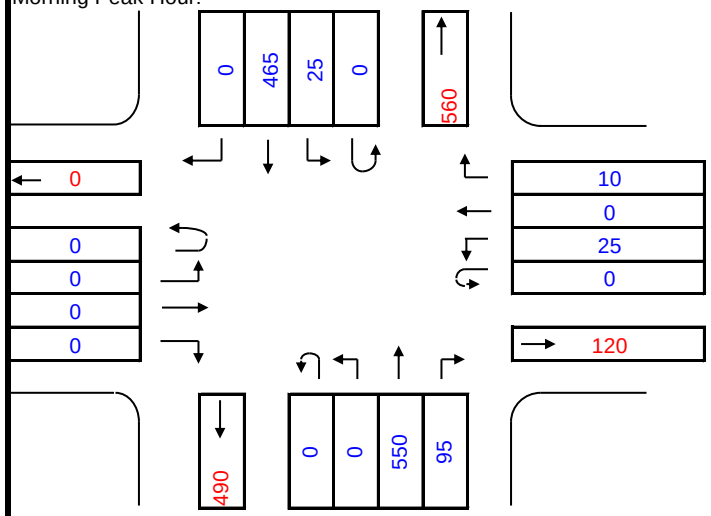
Conditions: Existing

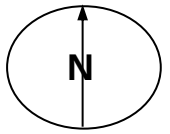
Design Year: 2017

Computed by: Itenology Corporation

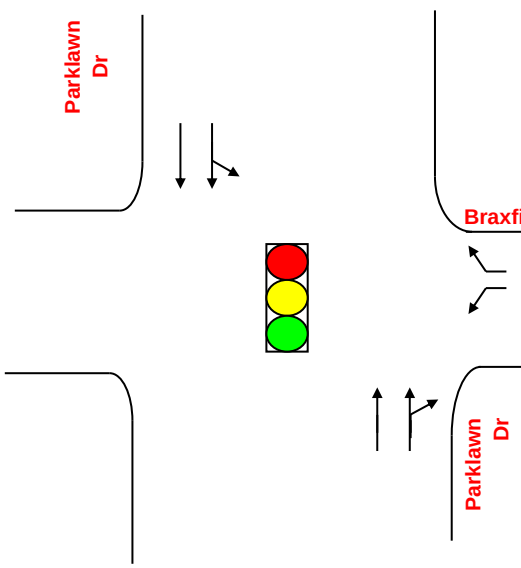
Date 6/8/2017

Morning Peak Hour:

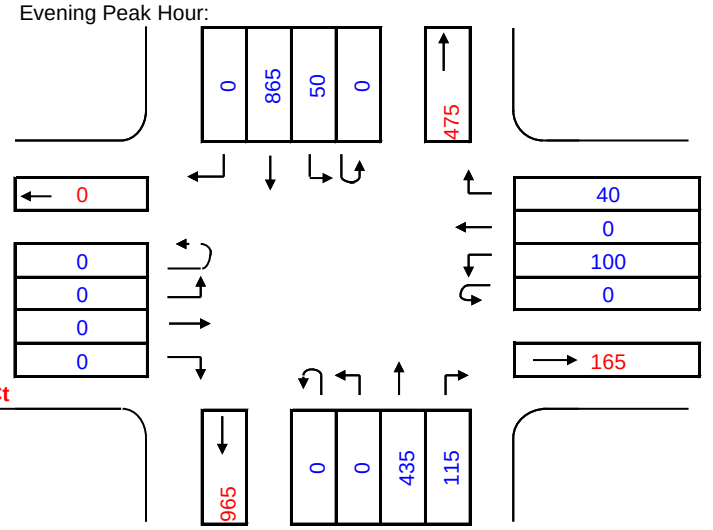




Lane Configuration



Evening Peak Hour:



PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
1 =	1.00	A <=	1000	<= 199	1.1
2 =	0.53	B <=	1150	<= 599	2.0
3 =	0.37	C <=	1300	<= 799	3.0
4 =	0.30	D <=	1450	<= 999	4.0
Dbl-Lt =	0.60	E <=	1600	> 1000	5.0
		F >	1600		

Phasing

RTOR/Overlap: ☑ Northbound ☐ Southbound ☐ Eastbound ☐ Westbound

Split Phasing: ◉ East/West ○ North/South ○ None

Inx. Control: ◉ Signal ○ Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*	Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	645	0.53	342	25	367	*		NB	550	0.53	292	50	342	
	SB	540	0.53	286	0	286			SB	965	0.53	511	0	511	*
	EB	0	0.00	0	0	0			EB	0	0.00	0	0	0	
	WB	25	1.00	25	0	25	*		WB	100	1.00	100	0	100	*
Remarks:			* Critical volume		Total	392		Remarks:			* Critical volume		Total	611	
					Level of service (V/C)	0.24	A						Level of service (V/C)	0.38	A

MD 355 Phase 2
Traffic Analysis
No Build 2022

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Rockville Pike (MD 355) Ramps A/B at Montrose Pkwy

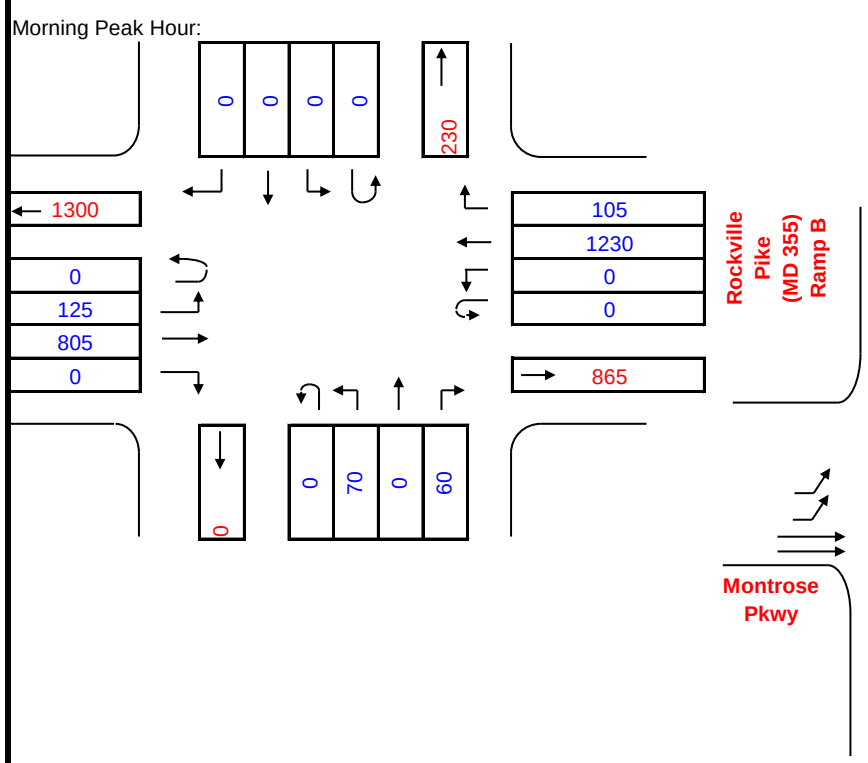
Conditions: No Build

Design Year: 2022

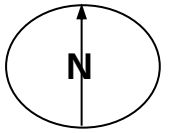
Computed by: Itenology Corporation

Date 6/8/2017

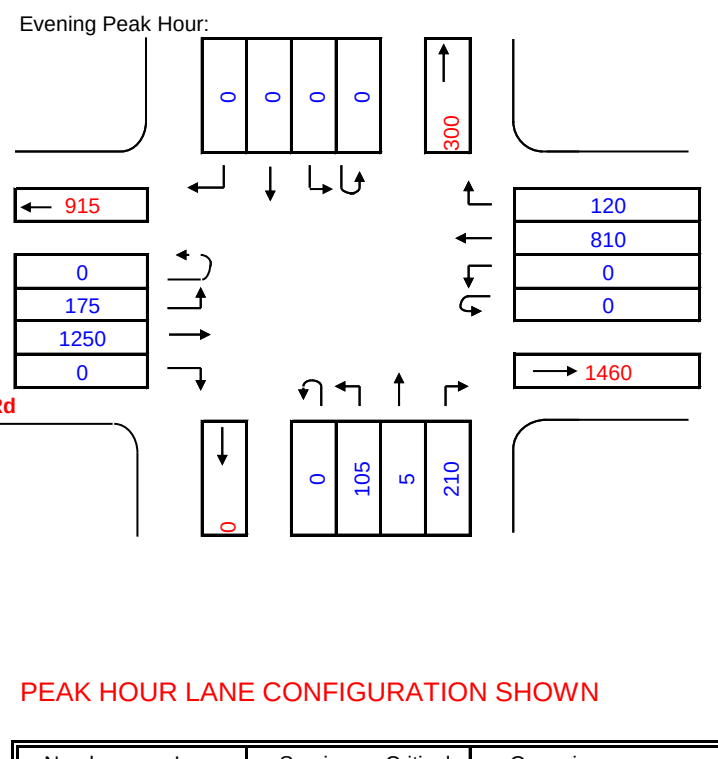
Morning Peak Hour:



Lane Configuration



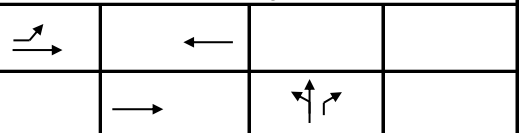
Evening Peak Hour:



PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
1=	1.00	A <=	1000	<= 199	1.1
2=	0.53	B <=	1150	<= 599	2.0
3=	0.37	C <=	1300	<= 799	3.0
4=	0.30	D <=	1450	<= 999	4.0
Dbl-Lt=	0.60	E <=	1600	> 1000	5.0
		F >	1600		

Phasing



RTOR/Overlap
- ☐ Northbound
- ☐ Southbound
- ☐ Eastbound
- ☑ Westbound

Split Phasing
- ○ East/West
- ○ North/South
- ◉ None

Inx. Control
- ◉ Signal
- ○ Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*
	NB	70	1.00	70	0	70	*
	SB	0	1.00	0	0	0	
	EB	805	0.53	427	0	427	
	WB	1230	0.53	652	75	727	*

Remarks:

* Critical volume Total **797**

Level of service (V/C) **0.50** **A**

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	210	0.53	111	0	111	*
	SB	0	1.00	0	0	0	
	EB	1250	0.53	663	0	663	*
	WB	810	0.53	429	105	534	

Remarks:

* Critical volume Total **774**

Level of service (V/C) **0.48** **A**

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Chapman Ave/Maple Ave at Randolph Rd

Conditions: No Build

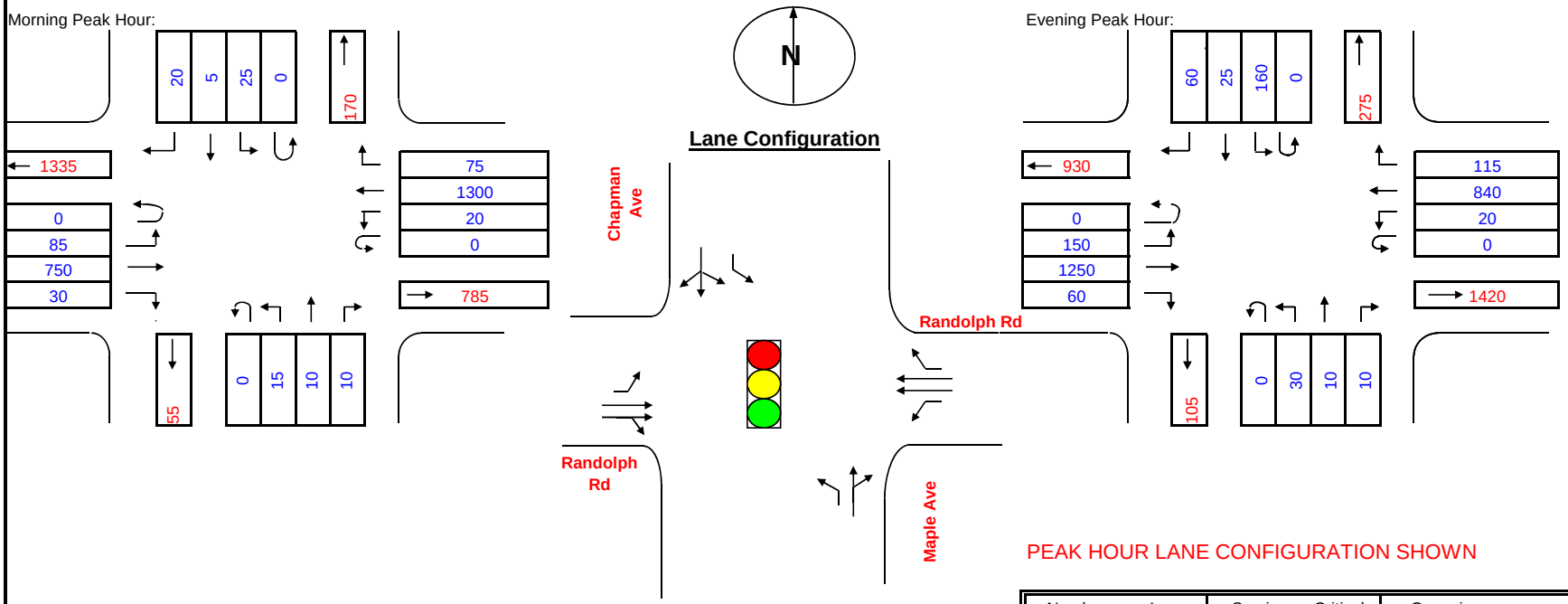
Design Year: 2022

Computed by: Itenology Corporation

Date 6/12/2017

Morning Peak Hour:

Evening Peak Hour:



PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
1=	1.00	A <= 1000		<= 199	1.1
2=	0.53	B <= 1150		<= 599	2.0
3=	0.37	C <= 1300		<= 799	3.0
4=	0.30	D <= 1450		<= 999	4.0
Dbl-Lt=	0.60	E <= 1600		> 1000	5.0
		F > 1600			

Phasing

RTOR/Overlap
- ☐ Northbound
- ☐ Southbound
- ☐ Eastbound
- ☑ Westbound

Split Phasing
- ○ East/West
- ◉ North/South
- ○ None

Inx. Control
- ◉ Signal
- ○ Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*	Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	20	1.00	20	0	20	*		NB	30	1.00	30	0	30	*
	SB	50	0.53	27	0	27	*		SB	245	0.53	130	0	130	*
	EB	780	0.53	413	20	433			EB	1310	0.53	694	20	714	*
	WB	1300	0.53	689	85	774	*		WB	840	0.53	445	150	595	
Remarks:			* Critical volume		Total	821		Remarks:			* Critical volume		Total	874	
					Level of service (V/C)	0.51	A						Level of service (V/C)	0.55	A

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Nebel St at Randolph Rd

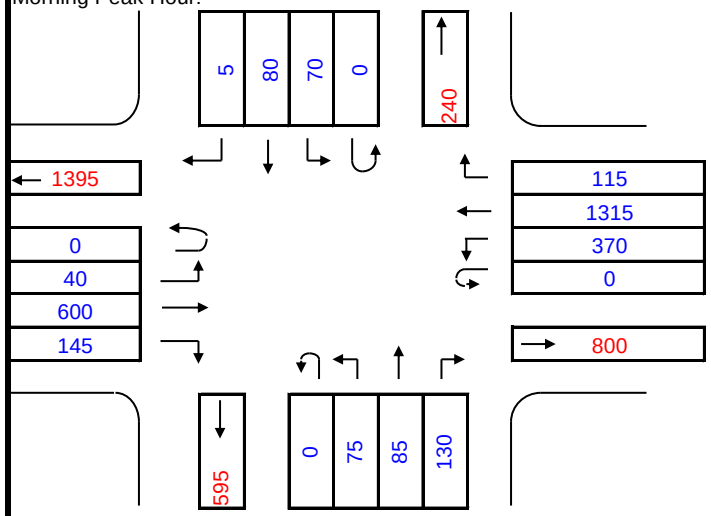
Conditions: No Build

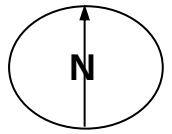
Design Year: 2022

Computed by: Itenology Corporation

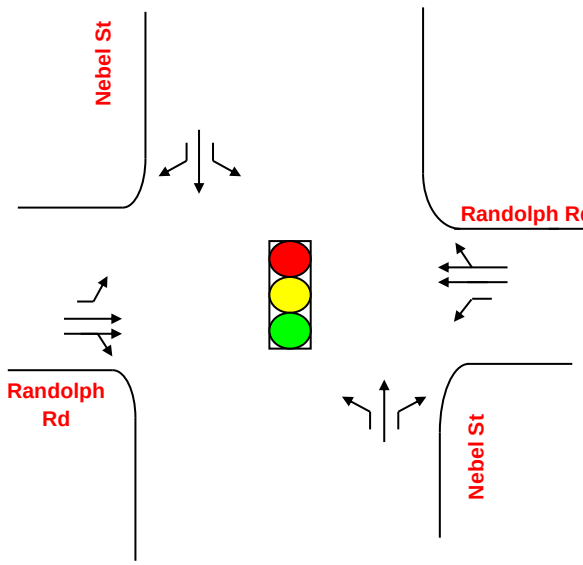
Date 6/8/2017

Morning Peak Hour:

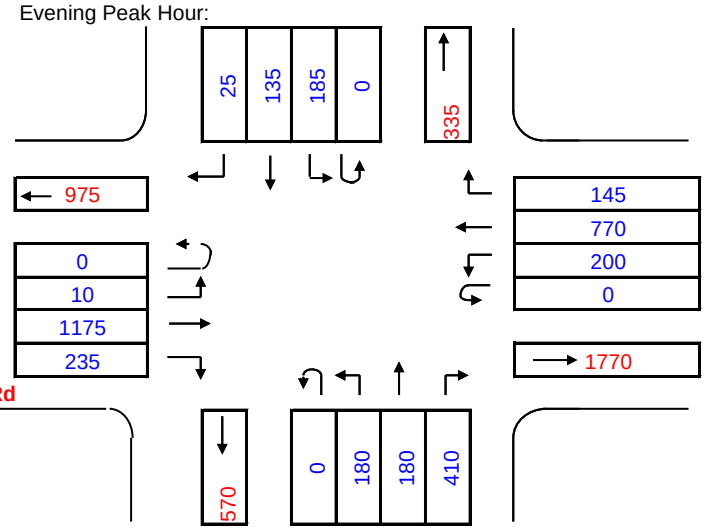




Lane Configuration



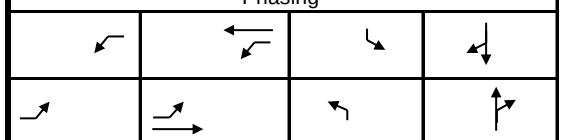
Evening Peak Hour:



PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
1 =	1.00	A <=	1000	<= 199	1.1
2 =	0.53	B <=	1150	<= 599	2.0
3 =	0.37	C <=	1300	<= 799	3.0
4 =	0.30	D <=	1450	<= 999	4.0
Dbl-Lt =	0.60	E <=	1600	> 1000	5.0
		F >	1600		

Phasing



RTOR/Overlap
- [x] Northbound
- [x] Southbound
- [ ] Eastbound
- [ ] Westbound

Split Phasing
- ( ) East/West
- ( ) North/South
- (•) None

Inx. Control
- (•) Signal
- ( ) Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*	Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	85	1.00	85	70	155	*		NB	210	1.00	210	185	395	*
	SB	80	1.00	80	75	155			SB	135	1.00	135	180	315	
	EB	745	0.53	395	370	765			EB	1410	0.53	747	200	947	*
	WB	1430	0.53	758	40	798	*		WB	915	0.53	485	10	495	
Remarks:			* Critical volume		Total	**1093**		Remarks:			* Critical volume		Total	**1342**	
					Level of service (V/C)	**0.68**	**B**						Level of service (V/C)	**0.84**	**D**

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Parklawn Dr at Randolph Rd

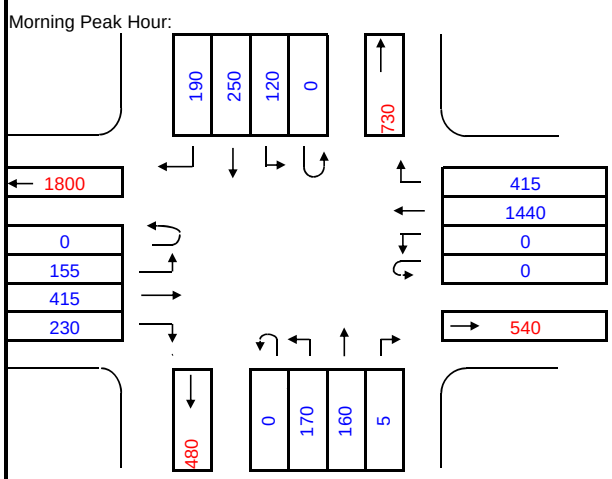
Conditions: No Build

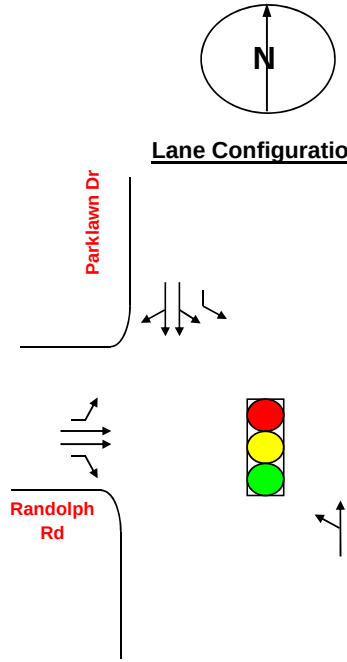
Design Year: 2022

Computed by: Itenology Corporation

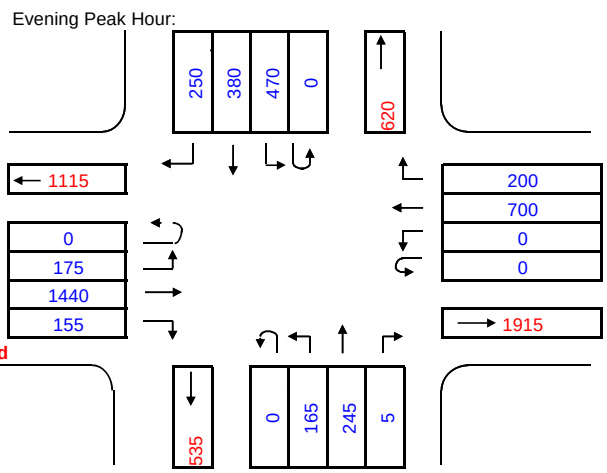
Date 6/12/2017

Morning Peak Hour:





Evening Peak Hour:



PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
1	= 1.00	A	<= 1000	<= 199	1.1
2	= 0.53	B	<= 1150	<= 599	2.0
3	= 0.37	C	<= 1300	<= 799	3.0
4	= 0.30	D	<= 1450	<= 999	4.0
Dbl-Lt	= 0.60	E	<= 1600	> 1000	5.0
		F	> 1600		

Phasing

RTOR/Overlap
- ☐ Northbound
- ☐ Southbound
- ☑ Eastbound
- ☑ Westbound

Split Phasing
- ○ East/West
- ◉ North/South
- ○ None

Inx. Control
- ◉ Signal
- ○ Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*
	NB	335	0.53	178	0	178	*
	SB	560	0.37	207	0	207	*
	EB	415	0.53	220	0	220	
	WB	1440	0.53	763	155	918	*

Remarks:

* Critical volume Total **1303**

Level of service (V/C) **0.81** **D**

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	415	0.53	220	0	220	*
	SB	1100	0.37	407	0	407	*
	EB	1440	0.53	763	0	763	*
	WB	700	0.53	371	175	546	

Remarks:

* Critical volume Total **1390**

Level of service (V/C) **0.87** **D**

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Parklawn Dr at Braxfield Ct

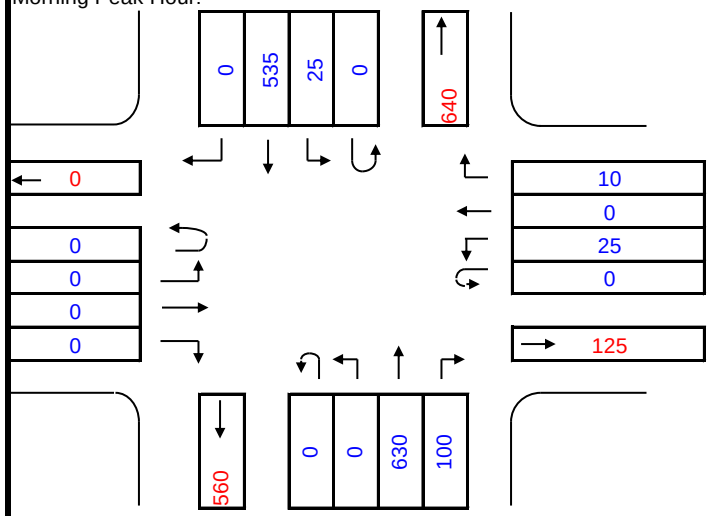
Conditions: No Build

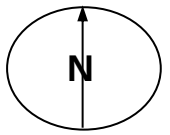
Design Year: 2022

Computed by: Itenology Corporation

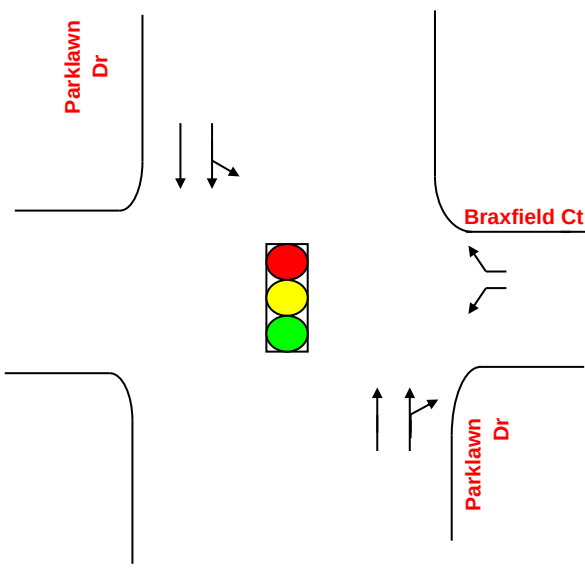
Date 6/8/2017

Morning Peak Hour:

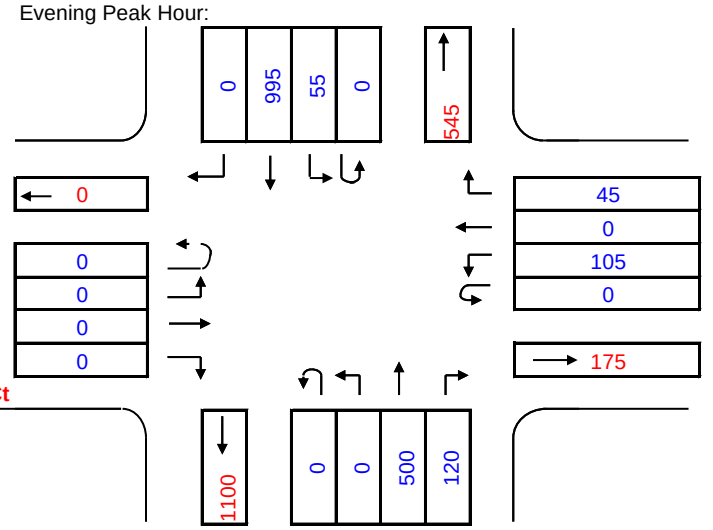




Lane Configuration



Evening Peak Hour:



PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
1 =	1.00	A <=	1000	<= 199	1.1
2 =	0.53	B <=	1150	<= 599	2.0
3 =	0.37	C <=	1300	<= 799	3.0
4 =	0.30	D <=	1450	<= 999	4.0
Dbl-Lt =	0.60	E <=	1600	> 1000	5.0
		F >	1600		

Phasing

RTOR/Overlap: ☑ Northbound ☐ Southbound ☐ Eastbound ☐ Westbound

Split Phasing: ◉ East/West ○ North/South ○ None

Inx. Control: ◉ Signal ○ Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*	Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	730	0.53	387	25	412	*		NB	620	0.53	329	55	384	
	SB	610	0.53	323	0	323			SB	1160	0.53	615	0	615	*
	EB	0	0.00	0	0	0			EB	0	0.00	0	0	0	
	WB	25	1.00	25	0	25	*		WB	105	1.00	105	0	105	*
Remarks:			* Critical volume		Total	437		Remarks:			* Critical volume		Total	720	
					Level of service (V/C)	0.27	A						Level of service (V/C)	0.45	A

MD 355 Phase 2
Traffic Analysis
Build 2022

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Rockville Pike (MD 355) Ramps A/B at Montrose Pkwy

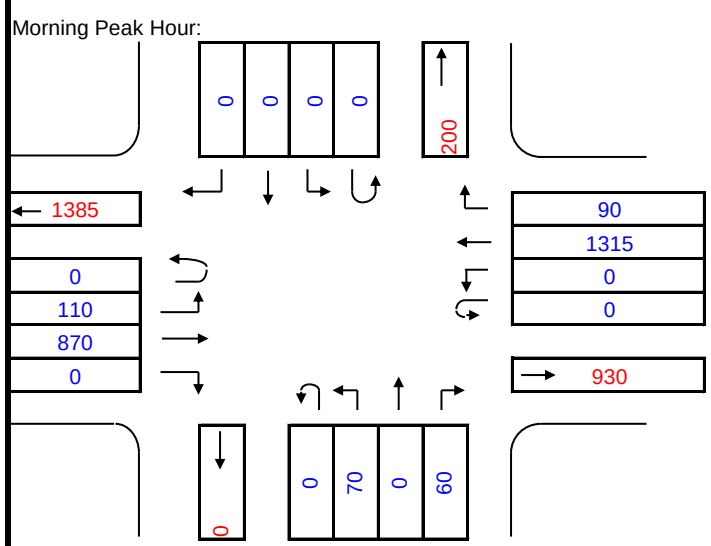
Conditions: Build

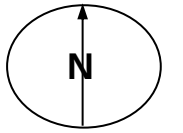
Design Year: 2022

Computed by: Itenology Corporation

Date 6/8/2017

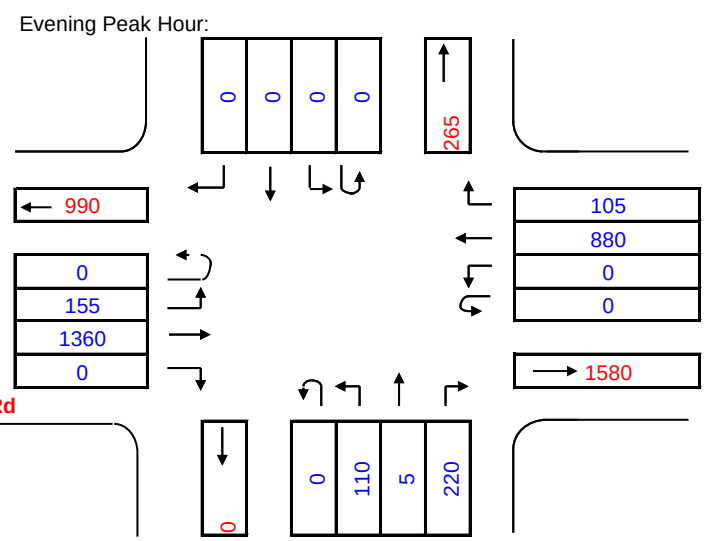
Morning Peak Hour:

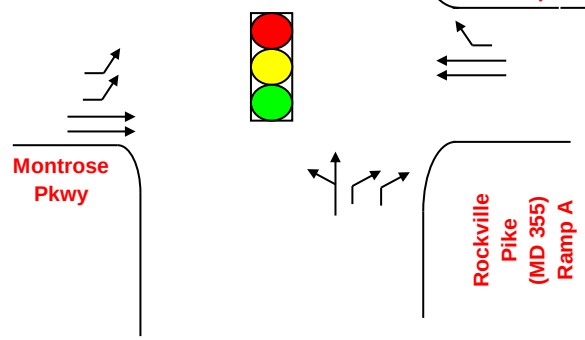




Lane Configuration

Evening Peak Hour:





PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
1=	1.00	A <=	1000	<= 199	1.1
2=	0.53	B <=	1150	<= 599	2.0
3=	0.37	C <=	1300	<= 799	3.0
4=	0.30	D <=	1450	<= 999	4.0
Dbl-Lt=	0.60	E <=	1600	> 1000	5.0
		F >	1600		

Phasing

→	←		
	→	↰ ↱	

RTOR/Overlap
- ☐ Northbound
- ☐ Southbound
- ☐ Eastbound
- ☑ Westbound

Split Phasing
- ○ East/West
- ○ North/South
- ◉ None

Inx. Control
- ◉ Signal
- ○ Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*
	NB	70	1.00	70	0	70	*
	SB	0	1.00	0	0	0	
	EB	870	0.53	461	0	461	
	WB	1315	0.53	697	66	763	*

Remarks:

* Critical volume Total **833**

Level of service (V/C) **0.52** **A**

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	220	0.53	117	0	117	*
	SB	0	1.00	0	0	0	
	EB	1360	0.53	721	0	721	*
	WB	880	0.53	466	93	559	

Remarks:

* Critical volume Total **837**

Level of service (V/C) **0.52** **A**

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Chapman Ave/Maple Ave at Randolph Rd

Conditions: Build

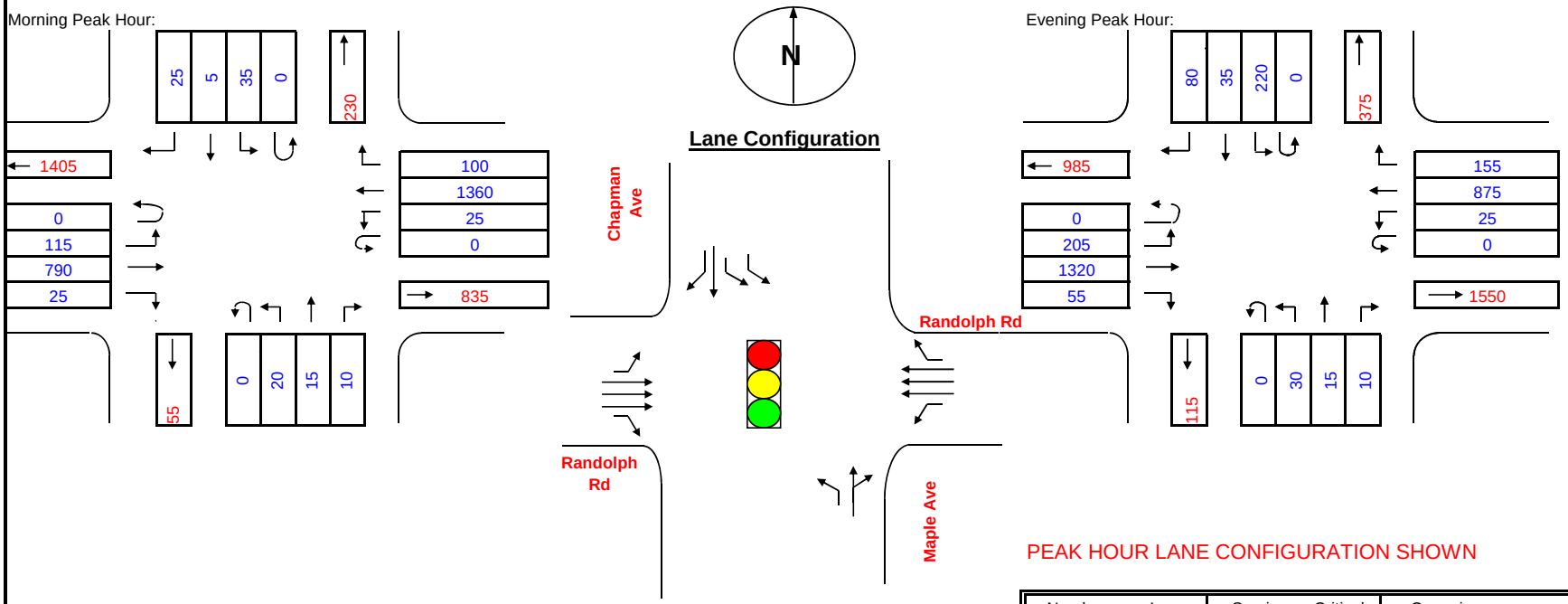
Design Year: 2022

Computed by: Itenology Corporation

Date 6/12/2017

Morning Peak Hour:

Evening Peak Hour:



PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
1=	1.00	A <= 1000		<= 199	1.1
2=	0.53	B <= 1150		<= 599	2.0
3=	0.37	C <= 1300		<= 799	3.0
4=	0.30	D <= 1450		<= 999	4.0
Dbl-Lt=	0.60	E <= 1600		> 1000	5.0
		F > 1600			

Phasing

RTOR/Overlap
- ☐ Northbound
- ☐ Southbound
- ☐ Eastbound
- ☑ Westbound

Split Phasing
- ○ East/West
- ◉ North/South
- ○ None

Inx. Control
- ◉ Signal
- ○ Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*	Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	25	1.00	25	0	25	*		NB	30	1.00	30	0	30	*
	SB	35	0.60	21	0	21	*		SB	220	0.60	132	0	132	*
	EB	790	0.37	292	25	317			EB	1320	0.37	488	25	513	
	WB	1360	0.37	503	115	618	*		WB	875	0.37	324	205	529	*
Remarks:			* Critical volume		Total	664		Remarks:			* Critical volume		Total	691	
					Level of service (V/C)	0.42	A						Level of service (V/C)	0.43	A

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Nebel St at Randolph Rd

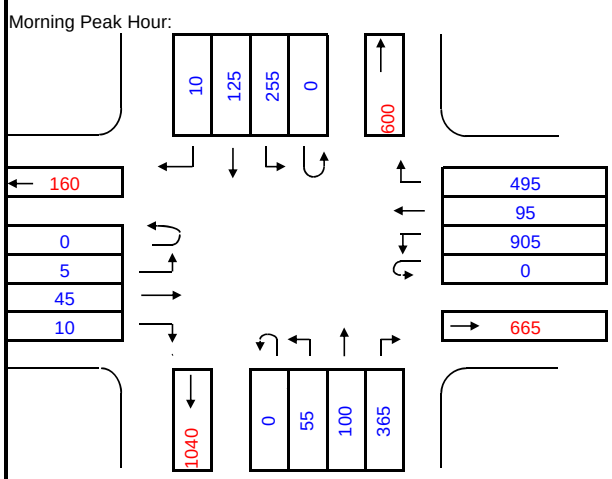
Conditions: Build

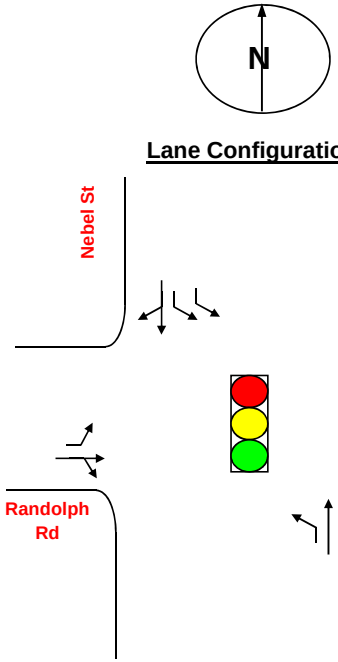
Design Year: 2022

Computed by: Itenology Corporation

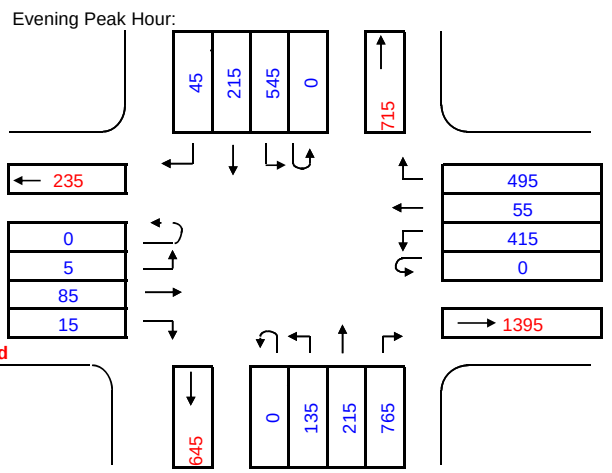
Date 6/12/2017

Morning Peak Hour:





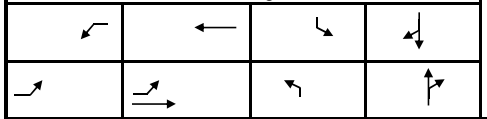
Evening Peak Hour:



PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
1	= 1.00	A	<= 1000	<= 199	1.1
2	= 0.53	B	<= 1150	<= 599	2.0
3	= 0.37	C	<= 1300	<= 799	3.0
4	= 0.30	D	<= 1450	<= 999	4.0
Dbl-Lt	= 0.60	E	<= 1600	> 1000	5.0
		F	> 1600		

Phasing



RTOR/Overlap
- [x] Northbound
- [x] Southbound
- [ ] Eastbound
- [ ] Westbound

Split Phasing
- ( ) East/West
- ( ) North/South
- (•) None

Inx. Control
- (•) Signal
- ( ) Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*	Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	465	0.53	246	153	399	*		NB	731	0.53	387	327	714	*
	SB	135	1.00	135	55	190			SB	260	1.00	260	135	395	
	EB	55	1.00	55	543	598	*		EB	100	1.00	100	249	349	
	WB	590	1.00	590	5	595			WB	550	1.00	550	5	555	*
Remarks:			* Critical volume		Total	1137		Remarks:			* Critical volume		Total	1269	
					Level of service (V/C)	0.71	B						Level of service (V/C)	0.79	C

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Parklawn Dr at Randolph Rd

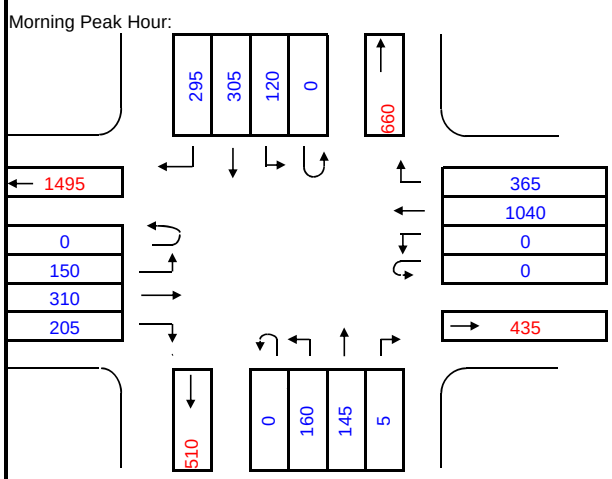
Conditions: Build

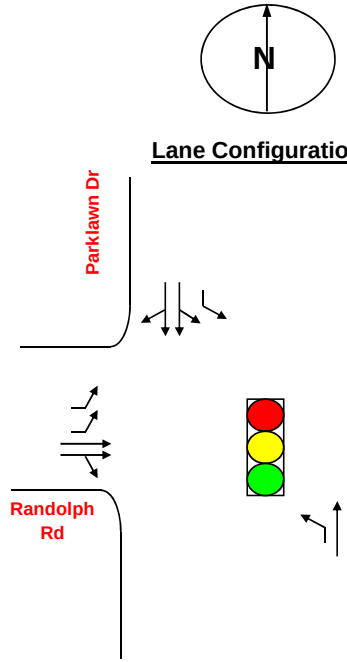
Design Year: 2022

Computed by: Itenology Corporation

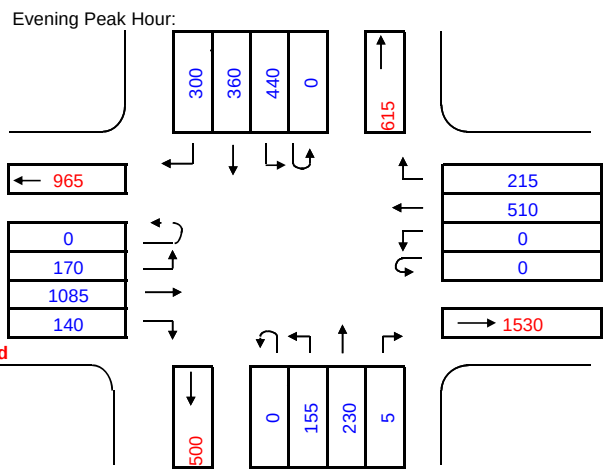
Date 6/12/2017

Morning Peak Hour:





Evening Peak Hour:



PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
1	= 1.00	A	<= 1000	<= 199	1.1
2	= 0.53	B	<= 1150	<= 599	2.0
3	= 0.37	C	<= 1300	<= 799	3.0
4	= 0.30	D	<= 1450	<= 999	4.0
Dbl-Lt	= 0.60	E	<= 1600	> 1000	5.0
		F	> 1600		

Phasing

RTOR/Overlap
- ☐ Northbound
- ☐ Southbound
- ☐ Eastbound
- ☑ Westbound

Split Phasing
- ○ East/West
- ◉ North/South
- ○ None

Inx. Control
- ◉ Signal
- ○ Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*	Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	160	1.00	160	0	160	*		NB	235	0.53	125	0	125	*
	SB	720	0.37	266	0	266	*		SB	1100	0.37	407	0	407	*
	EB	515	0.53	273	0	273			EB	1225	0.53	649	0	649	*
	WB	1040	0.53	551	90	641	*		WB	510	0.53	270	102	372	
Remarks:			* Critical volume		Total	1068		Remarks:			* Critical volume		Total	1181	
					Level of service (V/C)	0.67	B						Level of service (V/C)	0.74	C

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Parklawn Dr at Braxfield Ct

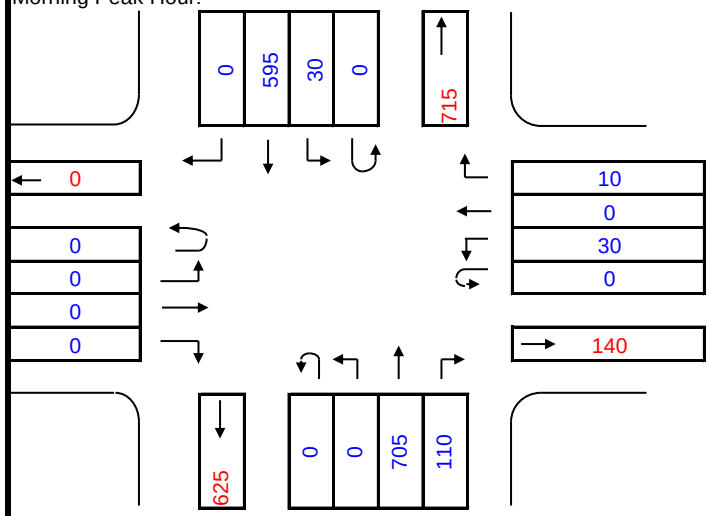
Conditions: Build

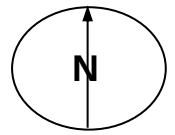
Design Year: 2022

Computed by: Itenology Corporation

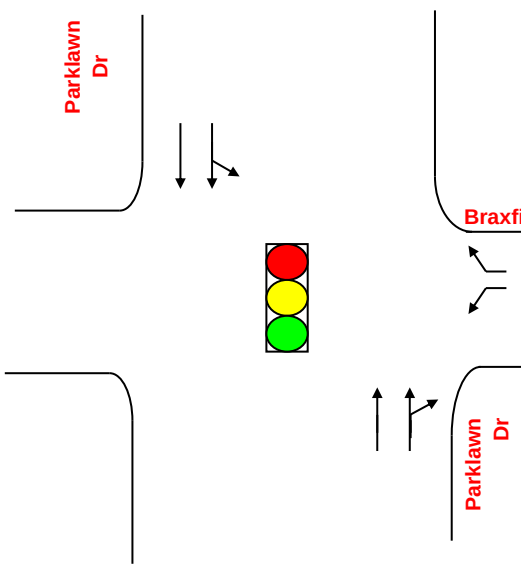
Date 6/8/2017

Morning Peak Hour:

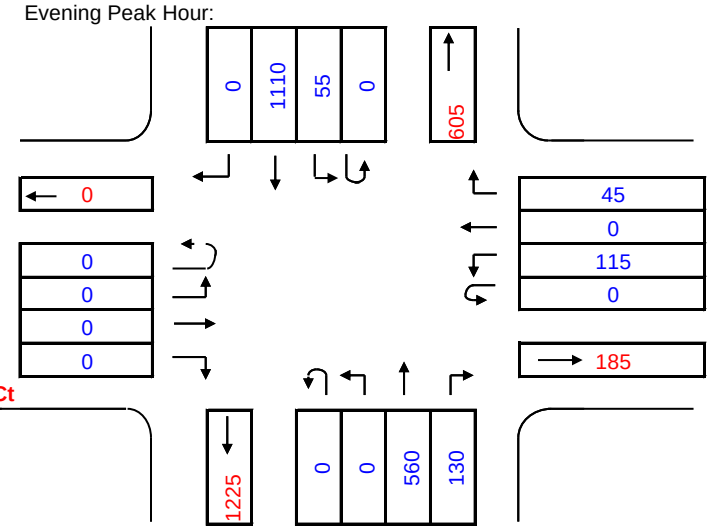




Lane Configuration



Evening Peak Hour:



PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
1 =	1.00	A <=	1000	<= 199	1.1
2 =	0.53	B <=	1150	<= 599	2.0
3 =	0.37	C <=	1300	<= 799	3.0
4 =	0.30	D <=	1450	<= 999	4.0
Dbl-Lt =	0.60	E <=	1600	> 1000	5.0
		F >	1600		

Phasing

RTOR/Overlap: ☑ Northbound ☐ Southbound ☐ Eastbound ☐ Westbound

Split Phasing: ◉ East/West ○ North/South ○ None

Inx. Control: ◉ Signal ○ Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*	Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	815	0.53	432	30	462	*		NB	690	0.53	366	55	421	
	SB	715	0.53	379	0	379			SB	1275	0.53	676	0	676	*
	EB	0	0.00	0	0	0			EB	0	0.00	0	0	0	
	WB	30	1.00	30	0	30	*		WB	115	1.00	115	0	115	*
Remarks:			* Critical volume		Total	492		Remarks:			* Critical volume		Total	791	
					Level of service (V/C)	0.31	A						Level of service (V/C)	0.49	A

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Montrose Pkwy at Parklawn Dr [SPUI]

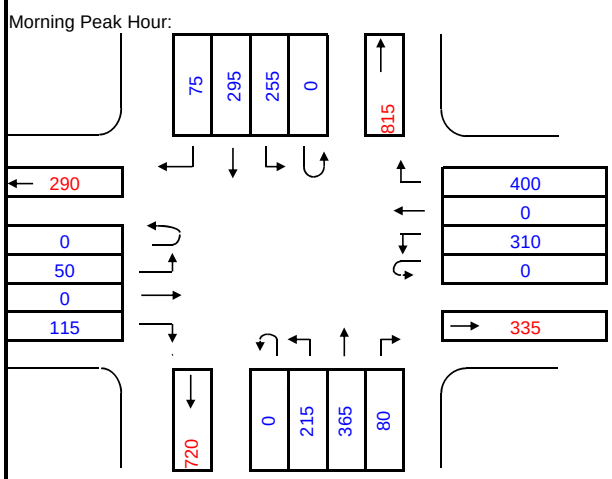
Conditions: Build

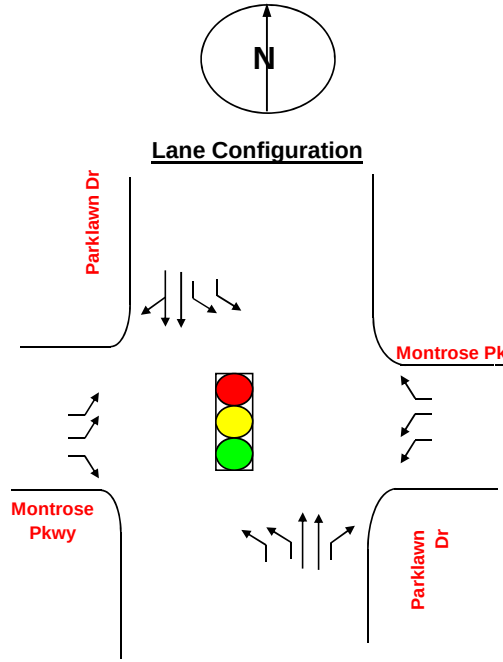
Design Year: 2022

Computed by: Itenology Corporation

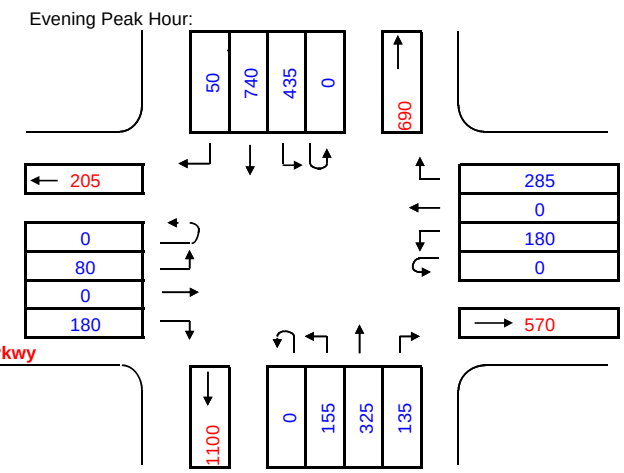
Date 6/12/2017

Morning Peak Hour:





Evening Peak Hour:



PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
1=	1.00	A <= 1000		<= 199	1.1
2=	0.53	B <= 1150		<= 599	2.0
3=	0.37	C <= 1300		<= 799	3.0
4=	0.30	D <= 1450		<= 999	4.0
Dbl-Lt=	0.60	E <= 1600		> 1000	5.0
		F > 1600			

Phasing

RTOR/Overlap
- [x] Northbound
- [ ] Southbound
- [ ] Eastbound
- [ ] Westbound

Split Phasing
- ( ) East/West
- ( ) North/South
- (•) None

Inx. Control
- (•) Signal
- ( ) Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*	Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	365	0.53	193	153	346	*		NB	325	0.53	172	261	433	
	SB	370	0.53	196	129	325			SB	790	0.53	419	93	512	*
	EB	0	1.00	0	186	186			EB	87	1.00	87	108	195	*
	WB	247	1.00	247	30	277	*		WB	24	1.00	24	48	72	
Remarks:			* Critical volume		Total	623		Remarks:			* Critical volume		Total	707	
					Level of service (V/C)	0.39	A						Level of service (V/C)	0.44	A

MD 355 Phase 2
Traffic Analysis
No Build 2040

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Rockville Pike (MD 355) Ramps A/B at Montrose Pkwy

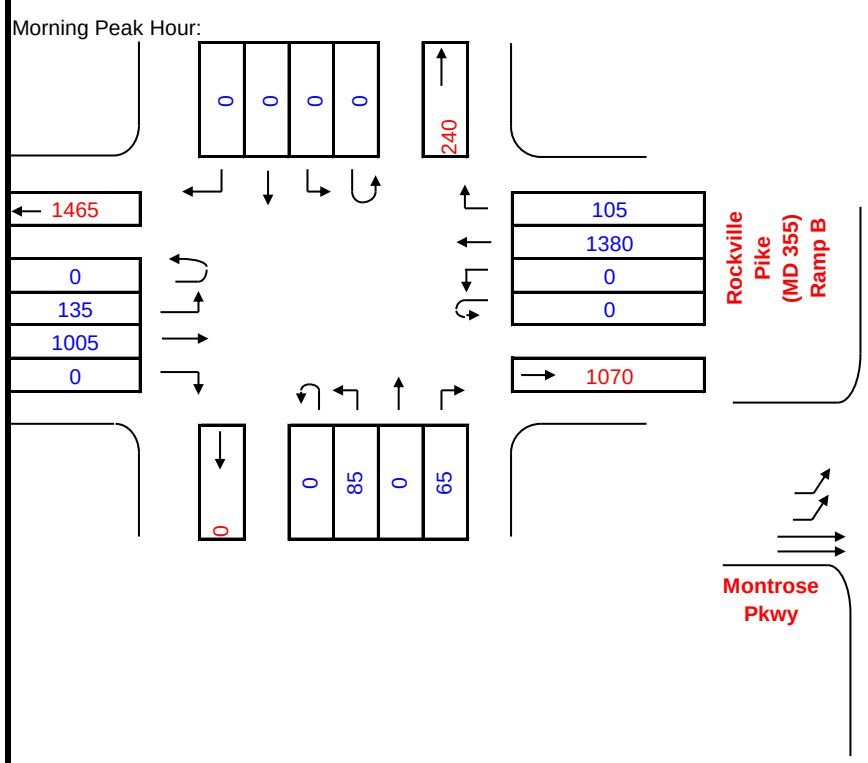
Conditions: No Build

Design Year: 2040

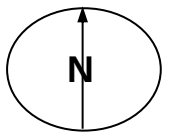
Computed by: Itenology Corporation

Date 6/8/2017

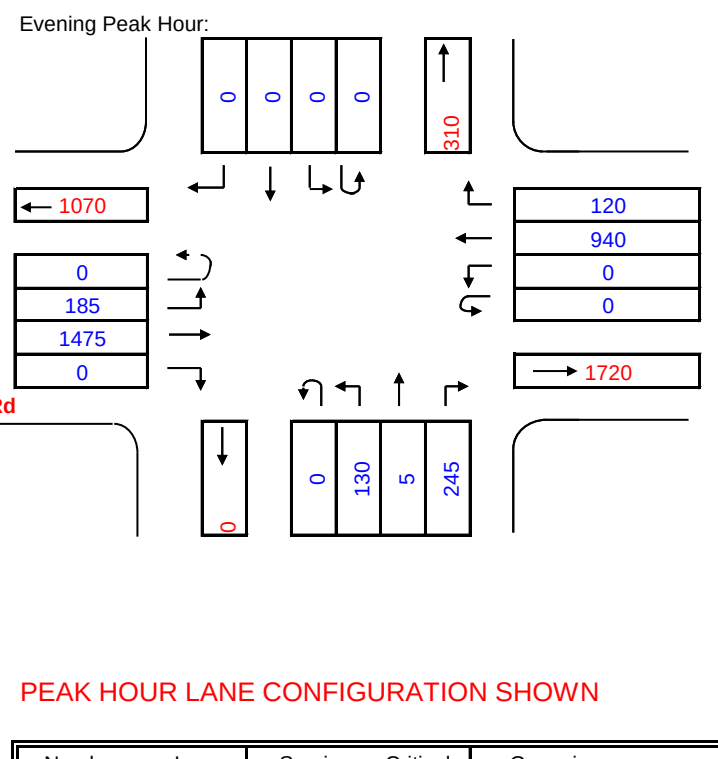
Morning Peak Hour:



Lane Configuration



Evening Peak Hour:



PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
1=	1.00	A <=	1000	<= 199	1.1
2=	0.53	B <=	1150	<= 599	2.0
3=	0.37	C <=	1300	<= 799	3.0
4=	0.30	D <=	1450	<= 999	4.0
Dbl-Lt=	0.60	E <=	1600	> 1000	5.0
		F >	1600		

Phasing

RTOR/Overlap: ☐ Northbound ☐ Southbound ☐ Eastbound ☑ Westbound

Split Phasing: ○ East/West ○ North/South ◉ None

Inx. Control: ◉ Signal ○ Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*
	NB	85	1.00	85	0	85	*
	SB	0	1.00	0	0	0	
	EB	1005	0.53	533	0	533	
	WB	1380	0.53	731	81	812	*

Remarks:

* Critical volume Total **897**

Level of service (V/C) **0.56** **A**

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	245	0.53	130	0	130	*
	SB	0	1.00	0	0	0	
	EB	1475	0.53	782	0	782	*
	WB	940	0.53	498	111	609	

Remarks:

* Critical volume Total **912**

Level of service (V/C) **0.57** **A**

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Chapman Ave/Maple Ave at Randolph Rd

Conditions: No Build

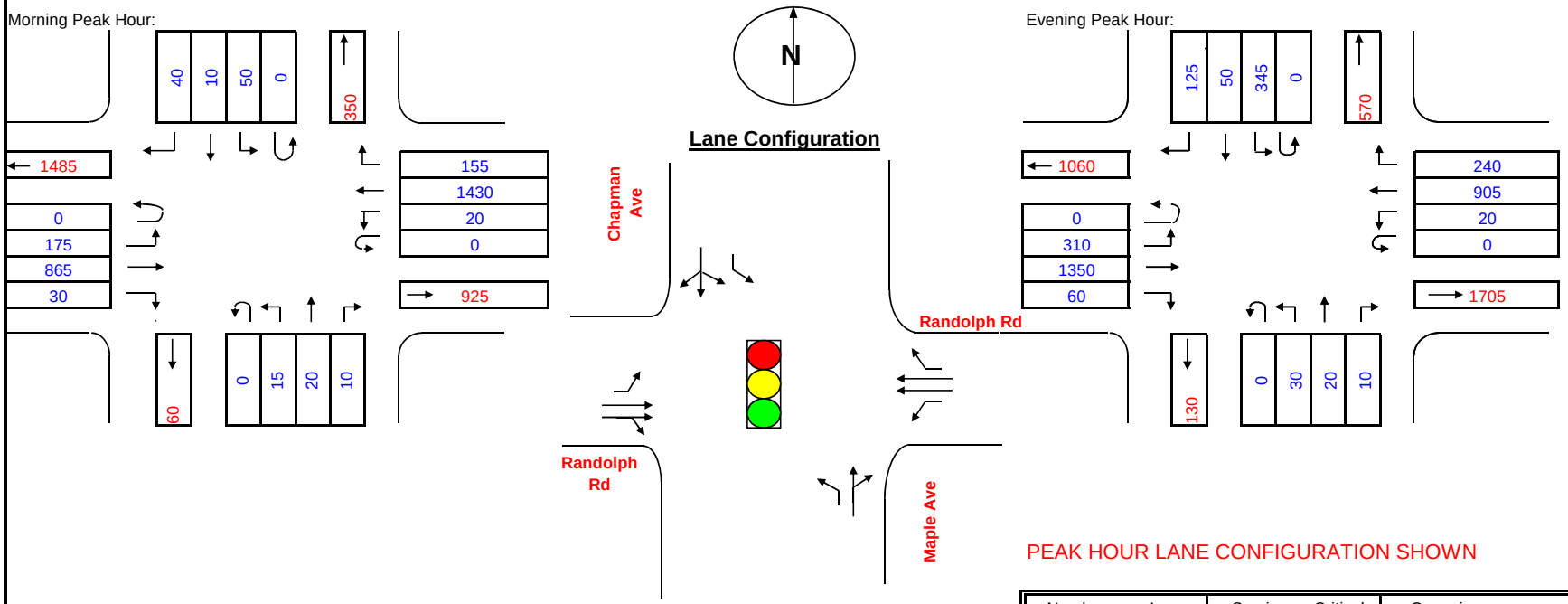
Design Year: 2040

Computed by: Itenology Corporation

Date 6/12/2017

Morning Peak Hour:

Evening Peak Hour:



PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
1=	1.00	A <= 1000		<= 199	1.1
2=	0.53	B <= 1150		<= 599	2.0
3=	0.37	C <= 1300		<= 799	3.0
4=	0.30	D <= 1450		<= 999	4.0
Dbl-Lt=	0.60	E <= 1600		> 1000	5.0
		F > 1600			

Phasing

RTOR/Overlap
- ☐ Northbound
- ☐ Southbound
- ☐ Eastbound
- ☑ Westbound

Split Phasing
- ○ East/West
- ◉ North/South
- ○ None

Inx. Control
- ◉ Signal
- ○ Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*	Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	30	1.00	30	0	30	*		NB	30	1.00	30	0	30	*
	SB	100	0.53	53	0	53	*		SB	520	0.53	276	0	276	*
	EB	895	0.53	474	20	494			EB	1410	0.53	747	20	767	
	WB	1430	0.53	758	175	933	*		WB	905	0.53	480	310	790	*
Remarks:			* Critical volume		Total	1016		Remarks:			* Critical volume		Total	1095	
					Level of service (V/C)	0.63	B						Level of service (V/C)	0.68	B

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Nebel St at Randolph Rd

Conditions: No Build

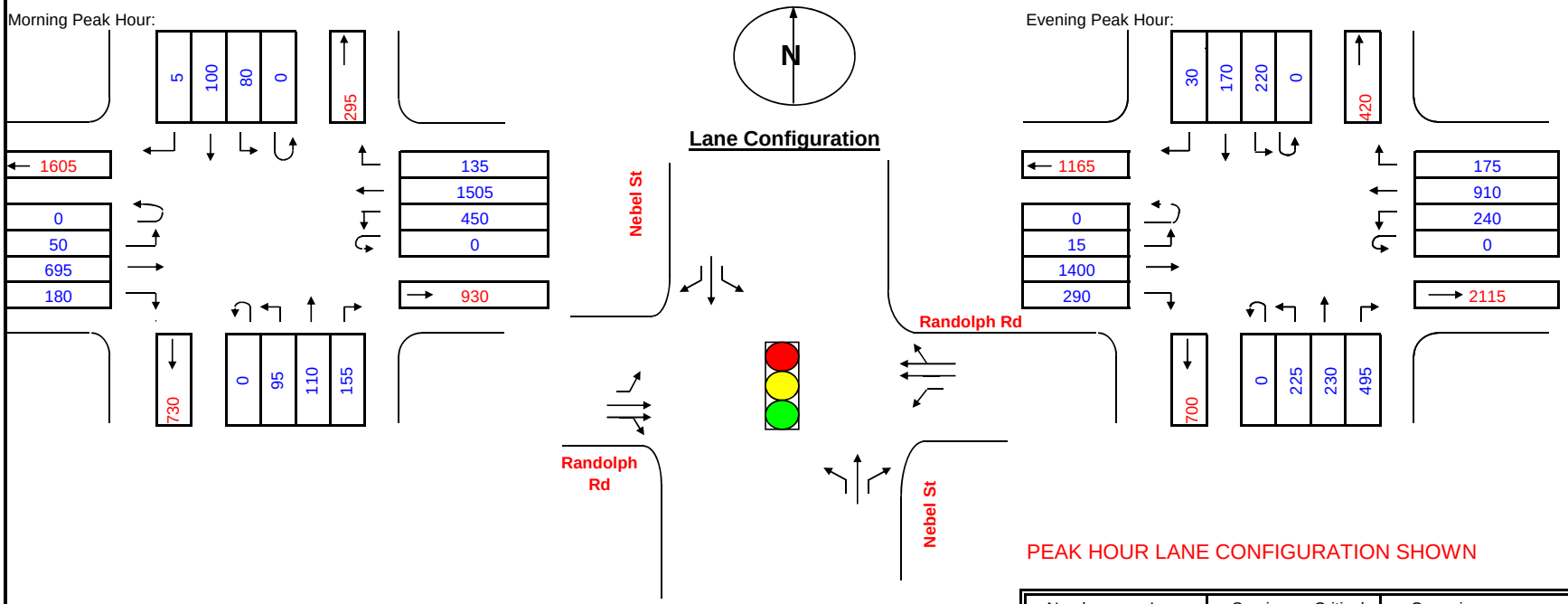
Design Year: 2040

Computed by: Itenology Corporation

Date 6/12/2017

Morning Peak Hour:

Evening Peak Hour:



PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
1	= 1.00	A	<= 1000	<= 199	1.1
2	= 0.53	B	<= 1150	<= 599	2.0
3	= 0.37	C	<= 1300	<= 799	3.0
4	= 0.30	D	<= 1450	<= 999	4.0
Dbl-Lt	= 0.60	E	<= 1600	> 1000	5.0
		F	> 1600		

Phasing

RTOR/Overlap: [x] Northbound [x] Southbound [ ] Eastbound [ ] Westbound

Split Phasing: ( ) East/West ( ) North/South (•) None

Inx. Control: (•) Signal ( ) Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*	Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	110	1.00	110	80	190			NB	255	1.00	255	220	475	*
	SB	100	1.00	100	95	195	*		SB	170	1.00	170	225	395	
	EB	875	0.53	464	450	914			EB	1690	0.53	896	240	1136	*
	WB	1640	0.53	869	50	919	*		WB	1085	0.53	575	15	590	
Remarks:			* Critical volume		Total	1254		Remarks:			* Critical volume		Total	1611	
					Level of service (V/C)	0.78	C						Level of service (V/C)	1.01	F

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Parklawn Dr at Randolph Rd

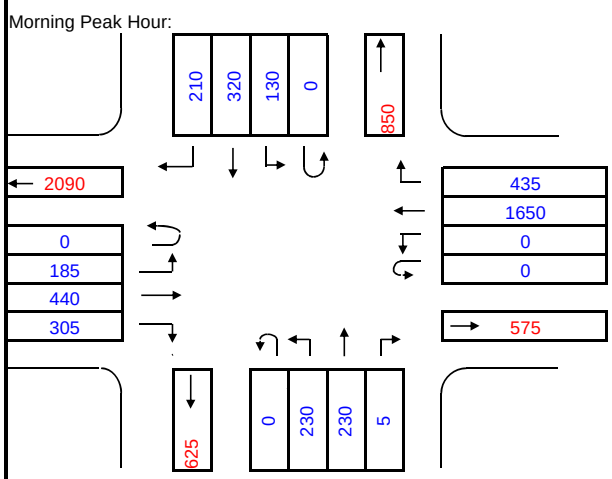
Conditions: No Build

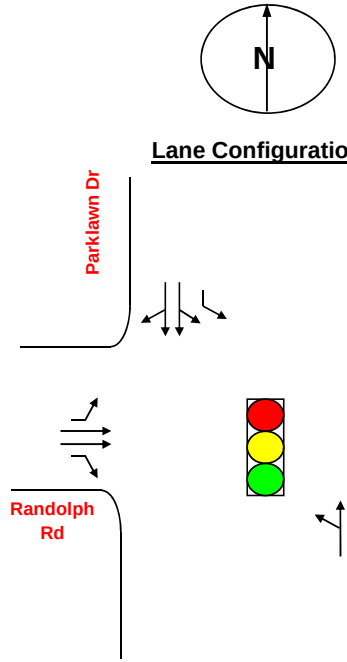
Design Year: 2040

Computed by: Itenology Corporation

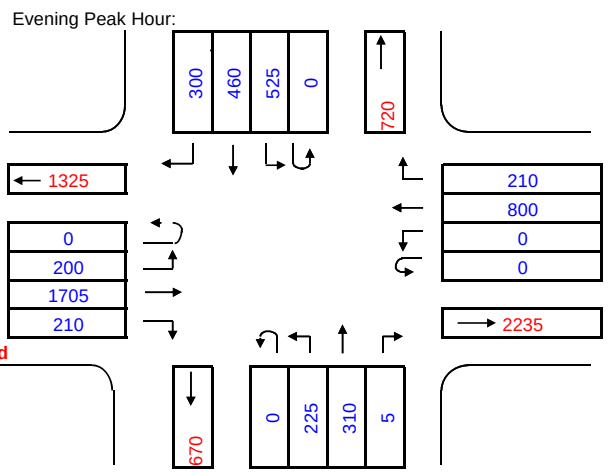
Date 6/12/2017

Morning Peak Hour:





Evening Peak Hour:



PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
1	= 1.00	A	<= 1000	<= 199	1.1
2	= 0.53	B	<= 1150	<= 599	2.0
3	= 0.37	C	<= 1300	<= 799	3.0
4	= 0.30	D	<= 1450	<= 999	4.0
Dbl-Lt	= 0.60	E	<= 1600	> 1000	5.0
		F	> 1600		

Phasing

RTOR/Overlap
- ☐ Northbound
- ☐ Southbound
- ☑ Eastbound
- ☑ Westbound

Split Phasing
- ○ East/West
- ◉ North/South
- ○ None

Inx. Control
- ◉ Signal
- ○ Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*	Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	465	0.53	246	0	246	*		NB	540	0.53	286	0	286	*
	SB	660	0.37	244	0	244	*		SB	1285	0.37	475	0	475	*
	EB	440	0.53	233	0	233			EB	1705	0.53	904	0	904	*
	WB	1650	0.53	875	185	1060	*		WB	800	0.53	424	200	624	
Remarks:			* Critical volume		Total	1550		Remarks:			* Critical volume		Total	1665	
					Level of service (V/C)	0.97	E						Level of service (V/C)	1.04	F

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Parklawn Dr at Braxfield Ct

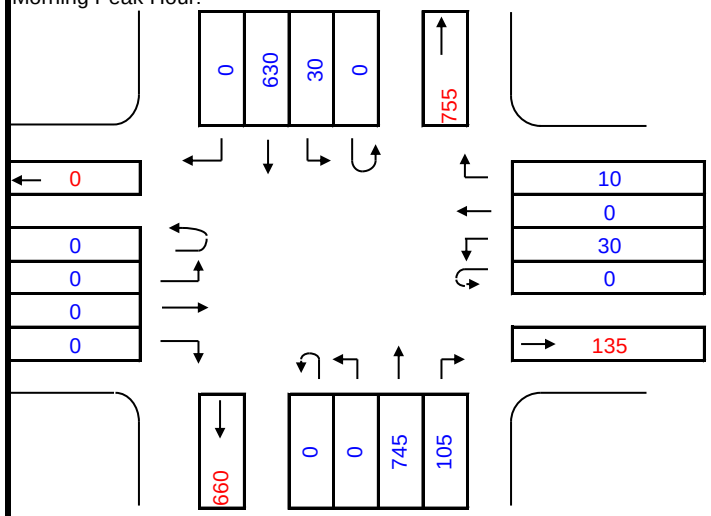
Conditions: No Build

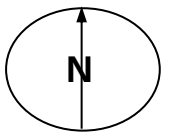
Design Year: 2040

Computed by: Itenology Corporation

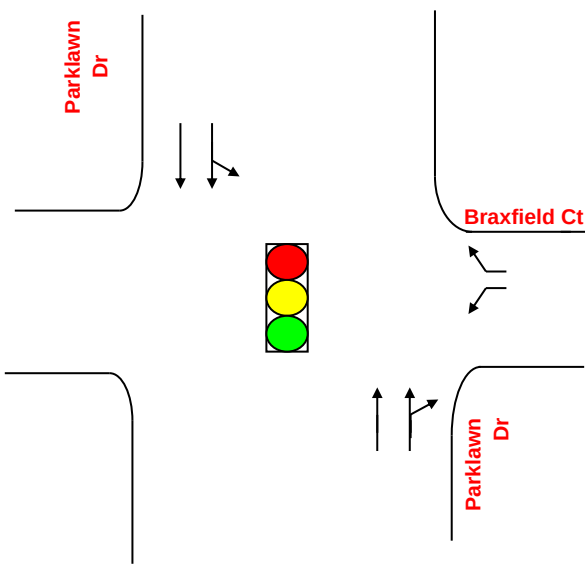
Date 6/8/2017

Morning Peak Hour:

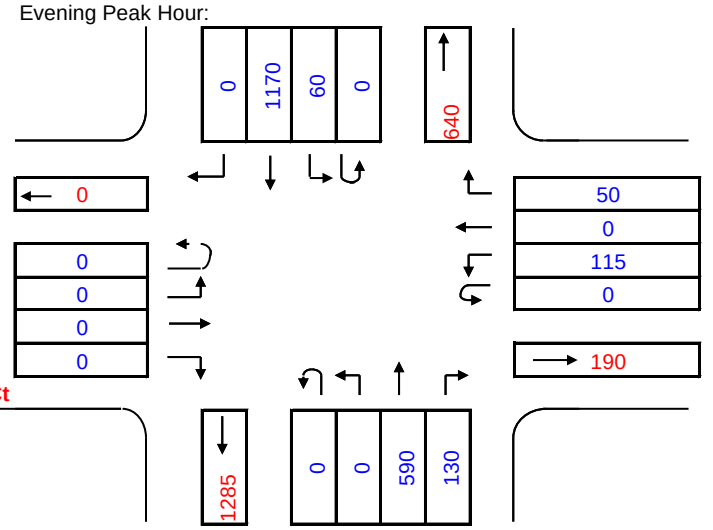




Lane Configuration



Evening Peak Hour:



PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
1 =	1.00	A <=	1000	<= 199	1.1
2 =	0.53	B <=	1150	<= 599	2.0
3 =	0.37	C <=	1300	<= 799	3.0
4 =	0.30	D <=	1450	<= 999	4.0
Dbl-Lt =	0.60	E <=	1600	> 1000	5.0
		F >	1600		

Phasing

RTOR/Overlap: ☑ Northbound ☐ Southbound ☐ Eastbound ☐ Westbound

Split Phasing: ◉ East/West ○ North/South ○ None

Inx. Control: ◉ Signal ○ Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*	Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	850	0.53	451	30	481	*		NB	720	0.53	382	60	442	
	SB	750	0.53	398	0	398			SB	1350	0.53	716	0	716	*
	EB	0	0.00	0	0	0			EB	0	0.00	0	0	0	
	WB	30	1.00	30	0	30	*		WB	115	1.00	115	0	115	*
Remarks:			* Critical volume		Total	511		Remarks:			* Critical volume		Total	831	
					Level of service (V/C)	0.32	A						Level of service (V/C)	0.52	A

MD 355 Phase 2
Traffic Analysis
Build 2040

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Rockville Pike (MD 355) Ramps A/B at Montrose Pkwy

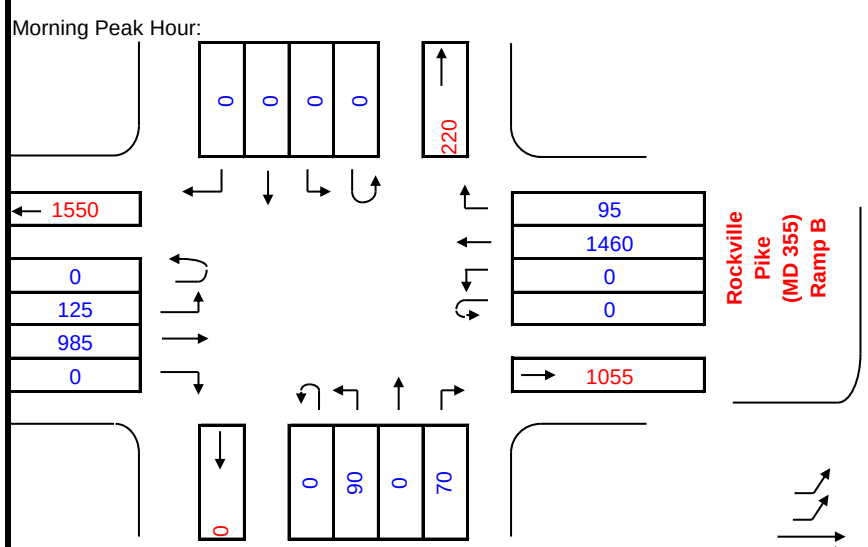
Conditions: Build

Design Year: 2040

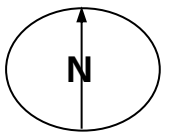
Computed by: Itenology Corporation

Date 6/8/2017

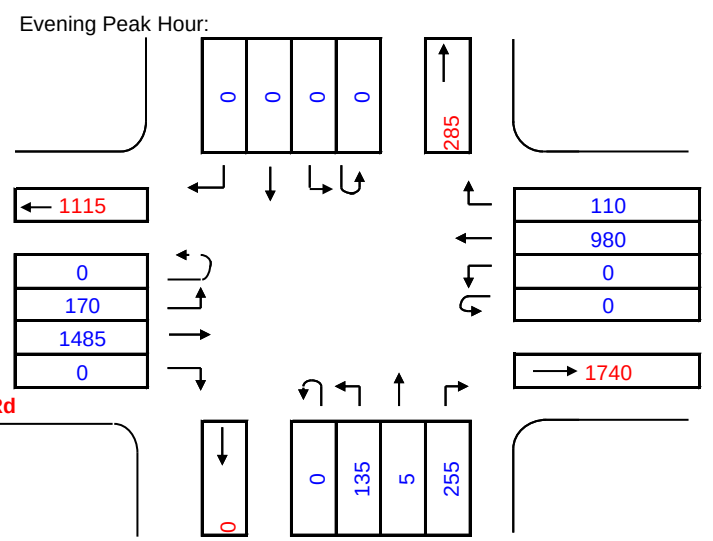
Morning Peak Hour:



Lane Configuration



Evening Peak Hour:



PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
1=	1.00	A <=	1000	<= 199	1.1
2=	0.53	B <=	1150	<= 599	2.0
3=	0.37	C <=	1300	<= 799	3.0
4=	0.30	D <=	1450	<= 999	4.0
Dbl-Lt=	0.60	E <=	1600	> 1000	5.0
		F >	1600		

Phasing

RTOR/Overlap: ☐ Northbound ☐ Southbound ☐ Eastbound ☑ Westbound

Split Phasing: ○ East/West ○ North/South ◉ None

Inx. Control: ◉ Signal ○ Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*
	NB	90	1.00	90	0	90	*
	SB	0	1.00	0	0	0	
	EB	985	0.53	522	0	522	
	WB	1460	0.53	774	75	849	*

Remarks:

* Critical volume Total **939**

Level of service (V/C) **0.59** **A**

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	255	0.53	135	0	135	*
	SB	0	1.00	0	0	0	
	EB	1485	0.53	787	0	787	*
	WB	980	0.53	519	102	621	

Remarks:

* Critical volume Total **922**

Level of service (V/C) **0.58** **A**

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Chapman Ave/Maple Ave at Randolph Rd

Conditions: Build

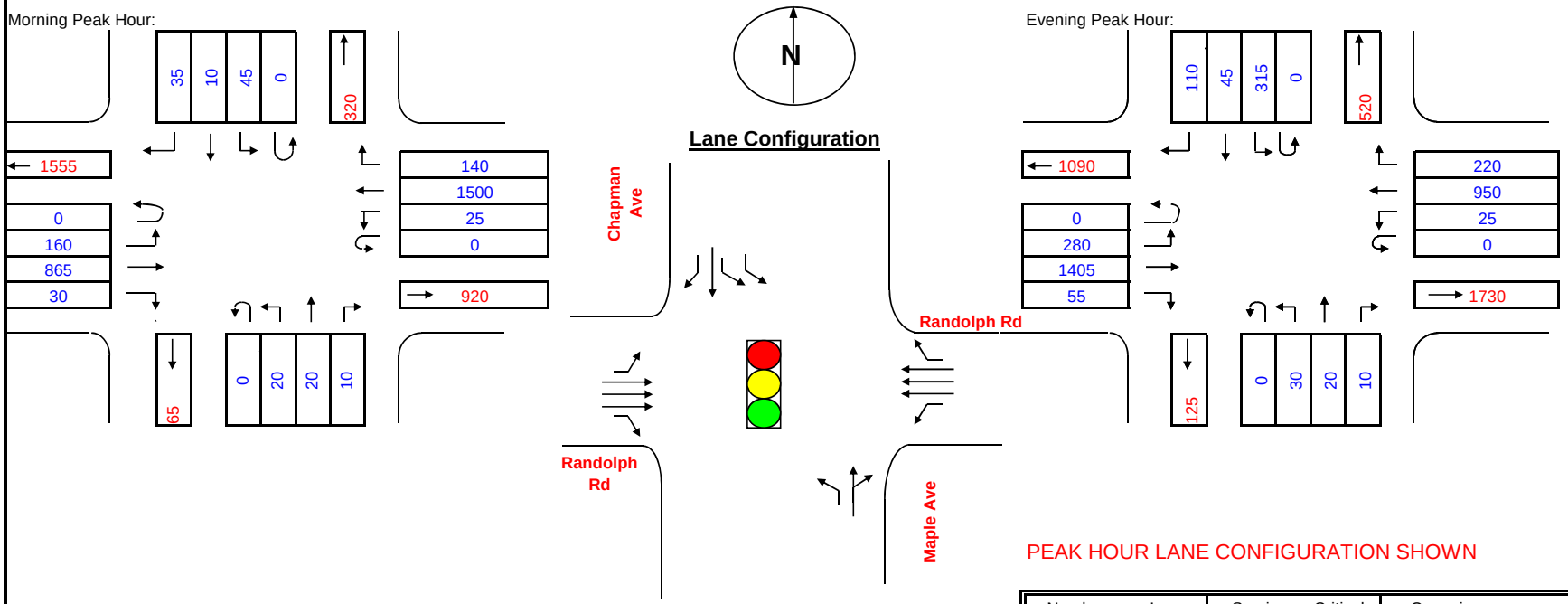
Design Year: 2040

Computed by: Itenology Corporation

Date 6/12/2017

Morning Peak Hour:

Evening Peak Hour:



PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
1=	1.00	A	<= 1000	<= 199	1.1
2=	0.53	B	<= 1150	<= 599	2.0
3=	0.37	C	<= 1300	<= 799	3.0
4=	0.30	D	<= 1450	<= 999	4.0
Dbl-Lt=	0.60	E	<= 1600	> 1000	5.0
		F	> 1600		

Phasing

RTOR/Overlap
- ☐ Northbound
- ☐ Southbound
- ☐ Eastbound
- ☑ Westbound

Split Phasing
- ○ East/West
- ◉ North/South
- ○ None

Inx. Control
- ◉ Signal
- ○ Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*	Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	30	1.00	30	0	30	*		NB	30	1.00	30	0	30	*
	SB	45	0.60	27	0	27	*		SB	315	0.60	189	0	189	*
	EB	865	0.37	320	25	345			EB	1405	0.37	520	25	545	
	WB	1500	0.37	555	160	715	*		WB	950	0.37	352	280	632	*
Remarks:			* Critical volume		Total	772		Remarks:			* Critical volume		Total	851	
					Level of service (V/C)	0.48	A						Level of service (V/C)	0.53	A

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Nebel St at Randolph Rd

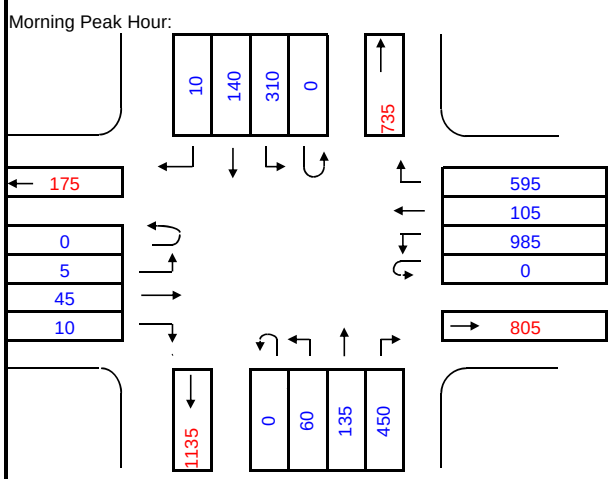
Conditions: Build

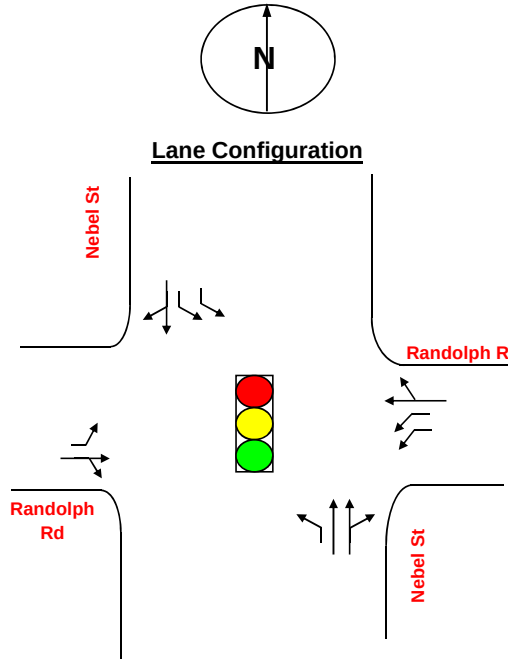
Design Year: 2040

Computed by: Itenology Corporation

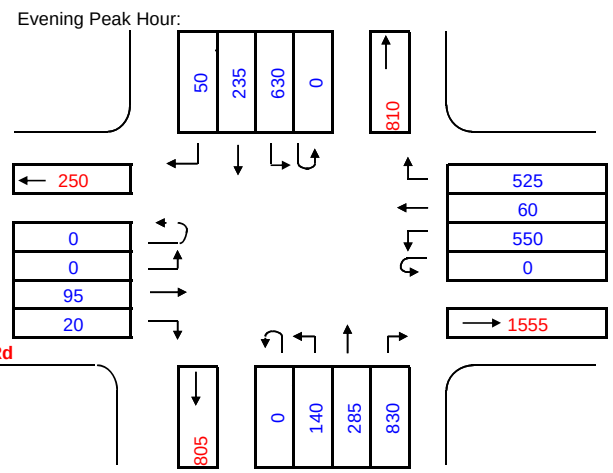
Date 6/12/2017

Morning Peak Hour:





Evening Peak Hour:



PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
1	= 1.00	A	<= 1000	<= 199	1.1
2	= 0.53	B	<= 1150	<= 599	2.0
3	= 0.37	C	<= 1300	<= 799	3.0
4	= 0.30	D	<= 1450	<= 999	4.0
Dbl-Lt	= 0.60	E	<= 1600	> 1000	5.0
		F	> 1600		

Phasing

RTOR/Overlap: ☐ Northbound ☐ Southbound ☐ Eastbound ☐ Westbound

Split Phasing: ○ East/West ○ North/South ◉ None

Inx. Control: ◉ Signal ○ Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*	Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	585	0.53	310	186	496	*		NB	785	0.53	416	378	794	*
	SB	150	1.00	150	60	210			SB	285	1.00	285	140	425	
	EB	55	1.00	55	591	646			EB	115	1.00	115	330	445	
	WB	700	1.00	700	5	705	*		WB	585	1.00	585	0	585	*
Remarks:			* Critical volume		Total	1341		Remarks:			* Critical volume		Total	1379	
					Level of service (V/C)	0.84	D						Level of service (V/C)	0.86	D

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Parklawn Dr at Randolph Rd

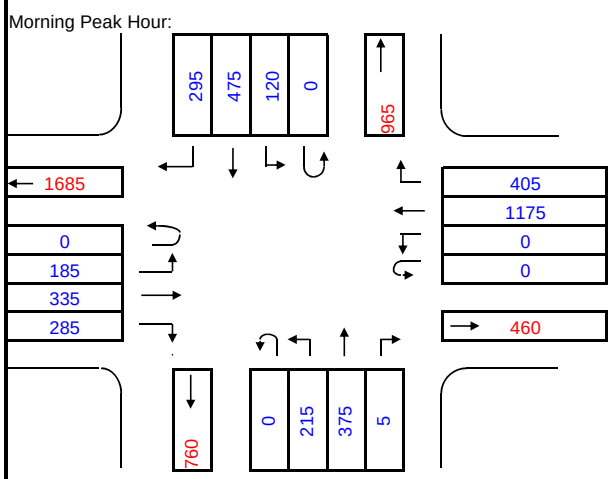
Conditions: Build

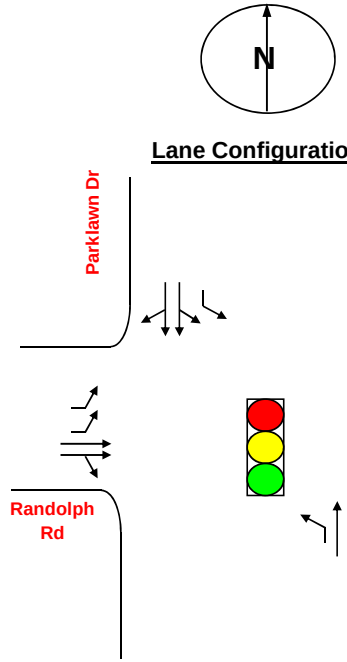
Design Year: 2040

Computed by: Itenology Corporation

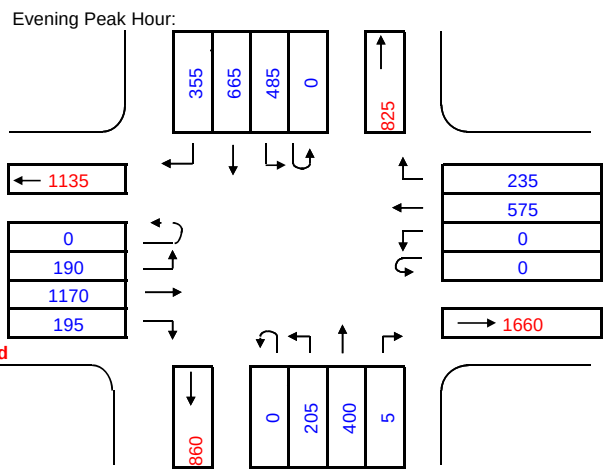
Date 6/12/2017

Morning Peak Hour:





Evening Peak Hour:



PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
1	1.00	A	<= 1000	<= 199	1.1
2	0.53	B	<= 1150	<= 599	2.0
3	0.37	C	<= 1300	<= 799	3.0
4	0.30	D	<= 1450	<= 999	4.0
Dbl-Lt	0.60	E	<= 1600	> 1000	5.0
		F	> 1600		

Phasing

RTOR/Overlap
- ☐ Northbound
- ☐ Southbound
- ☐ Eastbound
- ☑ Westbound

Split Phasing
- ○ East/West
- ◉ North/South
- ○ None

Inx. Control
- ◉ Signal
- ○ Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*	Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	380	0.53	201	0	201	*		NB	405	0.53	215	0	215	*
	SB	890	0.37	329	0	329	*		SB	1505	0.37	557	0	557	*
	EB	620	0.53	329	0	329			EB	1365	0.53	723	0	723	*
	WB	1175	0.53	623	111	734	*		WB	575	0.53	305	114	419	
Remarks:			* Critical volume		Total	1264		Remarks:			* Critical volume		Total	1495	
					Level of service (V/C)	0.79	C						Level of service (V/C)	0.93	E

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Parklawn Dr at Braxfield Ct

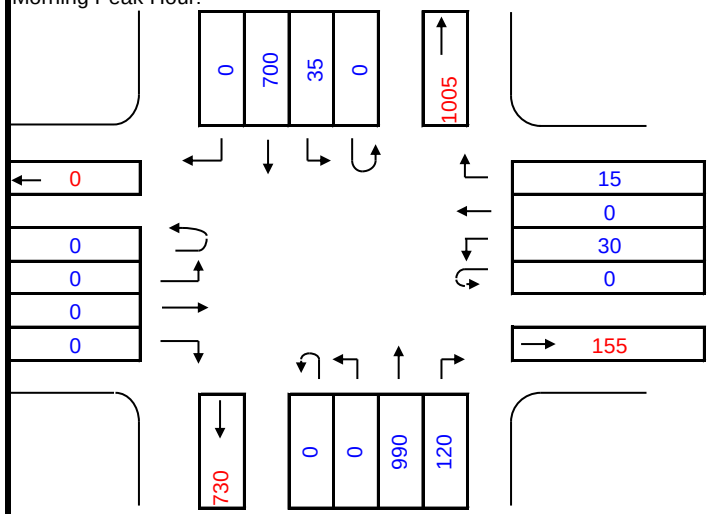
Conditions: Build

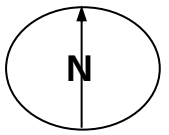
Design Year: 2040

Computed by: Itenology Corporation

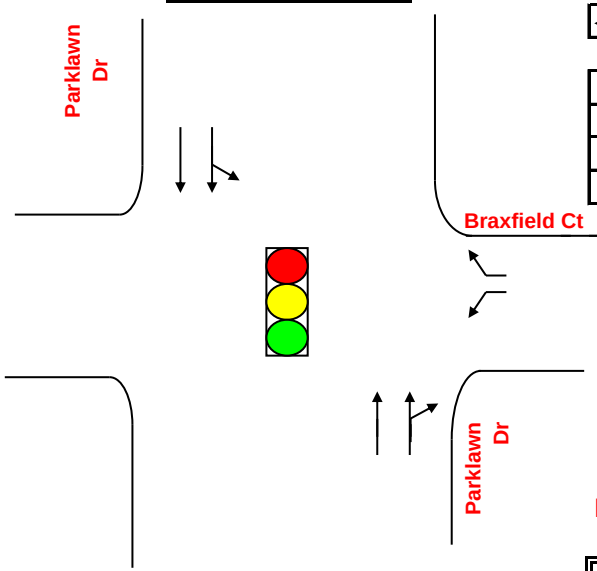
Date 6/8/2017

Morning Peak Hour:

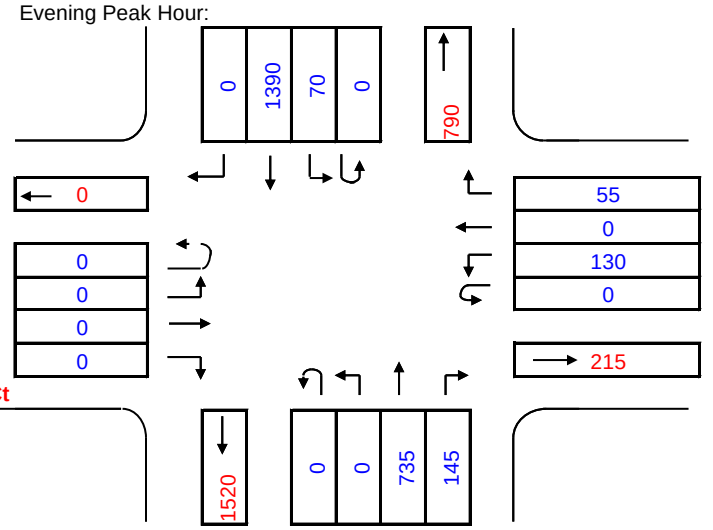




Lane Configuration



Evening Peak Hour:



PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
1 =	1.00	A <=	1000	<= 199	1.1
2 =	0.53	B <=	1150	<= 599	2.0
3 =	0.37	C <=	1300	<= 799	3.0
4 =	0.30	D <=	1450	<= 999	4.0
Dbl-Lt =	0.60	E <=	1600	> 1000	5.0
		F >	1600		

Phasing

RTOR/Overlap: ☑ Northbound ☐ Southbound ☐ Eastbound ☐ Westbound

Split Phasing: ◉ East/West ○ North/South ○ None

Inx. Control: ◉ Signal ○ Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*	Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	1110	0.53	588	35	623	*		NB	880	0.53	466	70	536	
	SB	875	0.53	464	0	464			SB	1670	0.53	885	0	885	*
	EB	0	0.00	0	0	0			EB	0	0.00	0	0	0	
	WB	30	1.00	30	0	30	*		WB	130	1.00	130	0	130	*
Remarks:			* Critical volume		Total	653		Remarks:			* Critical volume		Total	1015	
					Level of service (V/C)	0.41	A						Level of service (V/C)	0.63	B

Turning Movement Summary and Level of Service

Prepared by: **Itenology Corporation**

Count Date:

Location: Montrose Pkwy at Parklawn Dr [SPUI]

Conditions: Build

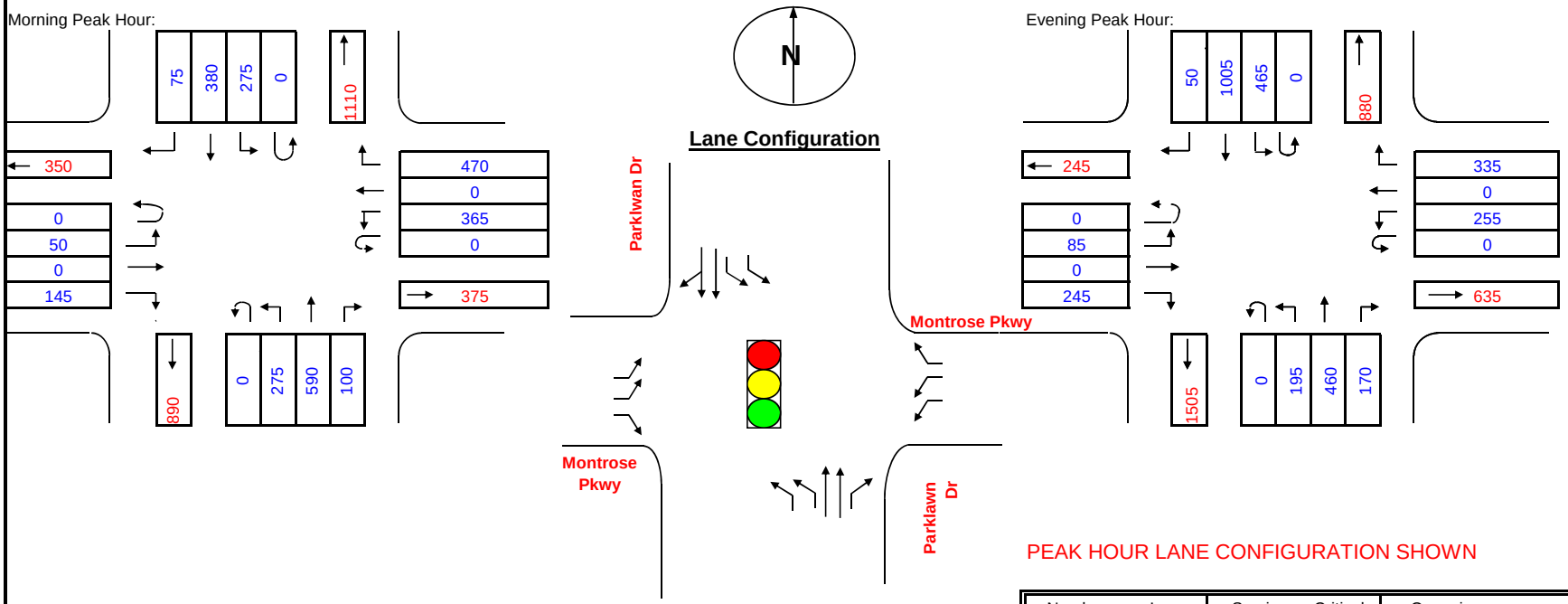
Design Year: 2040

Computed by: Itenology Corporation

Date 6/12/2017

Morning Peak Hour:

Evening Peak Hour:



PEAK HOUR LANE CONFIGURATION SHOWN

Number of Lanes	Lane Use Factor	Service Level	Critical Lane Vol	Opposing Volume (VPH)	PCE
	1= 1.00	A <= 1000		<= 199	1.1
	2= 0.53	B <= 1150		<= 599	2.0
	3= 0.37	C <= 1300		<= 799	3.0
	4= 0.30	D <= 1450		<= 999	4.0
	Dbl-Lt= 0.60	E <= 1600		> 1000	5.0
		F > 1600			

Phasing

RTOR/Overlap
- [x] Northbound
- [ ] Southbound
- [ ] Eastbound
- [ ] Westbound

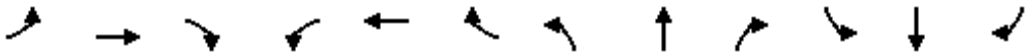
Split Phasing
- ( ) East/West
- ( ) North/South
- (•) None

Inx. Control
- (•) Signal
- ( ) Stop

Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. volume	*	Phase	Movement	Volume 1	Lane Use Factor - 2	Lane volume 1 X 2	Opposing Movement	Critical ln. Volume	*
	NB	590	0.53	313	165	478	*		NB	460	0.53	244	279	523	
	SB	455	0.53	241	165	406			SB	1055	0.53	559	117	676	*
	EB	0	1.00	0	219	219			EB	128	1.00	128	153	281	*
	WB	305	1.00	305	30	335	*		WB	56	1.00	56	51	107	
Remarks:			* Critical volume		Total	813		Remarks:			* Critical volume		Total	957	
					Level of service (V/C)	0.51	A						Level of service (V/C)	0.60	A

HCM Analysis

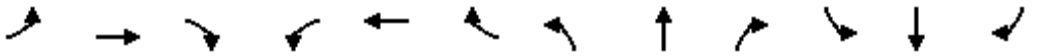
Existing Conditions



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	770	0	0	1175	100	65	0	55	0	0	0
Future Volume (vph)	120	770	0	0	1175	100	65	0	55	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.5			5.5	5.5		6.0	6.0			
Lane Util. Factor	0.97	0.95			0.95	1.00		1.00	0.88			
Frt	1.00	1.00			1.00	0.85		1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (prot)	3433	3539			3539	1583		1770	2787			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	3433	3539			3539	1583		1770	2787			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	130	837	0	0	1277	109	71	0	60	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	25	0	0	0	0	0	0
Lane Group Flow (vph)	130	837	0	0	1277	84	0	71	60	0	0	0
Turn Type	Prot	NA			NA	Perm	Split	NA	custom			
Protected Phases	1	6			2		3	3	8			
Permitted Phases						2			3			
Actuated Green, G (s)	12.0	126.1			109.1	109.1		12.4	12.4			
Effective Green, g (s)	12.0	126.1			109.1	109.1		12.4	12.4			
Actuated g/C Ratio	0.08	0.84			0.73	0.73		0.08	0.08			
Clearance Time (s)	5.0	5.5			5.5	5.5		6.0	6.0			
Vehicle Extension (s)	4.0	0.2			0.2	0.2		4.0	4.0			
Lane Grp Cap (vph)	274	2975			2574	1151		146	230			
v/s Ratio Prot	c0.04	0.24			c0.36			c0.04	0.02			
v/s Ratio Perm						0.05						
v/c Ratio	0.47	0.28			0.50	0.07		0.49	0.26			
Uniform Delay, d1	66.0	2.5			8.7	5.9		65.8	64.5			
Progression Factor	1.00	1.00			1.49	2.66		1.00	1.00			
Incremental Delay, d2	1.8	0.2			0.6	0.1		3.4	0.8			
Delay (s)	67.8	2.7			13.6	15.8		69.2	65.3			
Level of Service	E	A			B	B		E	E			
Approach Delay (s)		11.5			13.8			67.4			0.0	
Approach LOS		B			B			E			A	

Intersection Summary			
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	53.8%	ICU Level of Service	A
Analysis Period (min)	15		

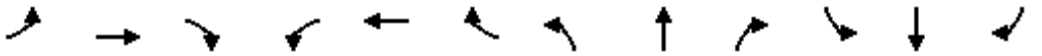
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	715	25	20	1240	75	15	10	10	25	5	20
Future Volume (vph)	85	715	25	20	1240	75	15	10	10	25	5	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.93		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3521		1770	3539	1583	1770	1723		1681	1567	
Flt Permitted	0.15	1.00		0.34	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	278	3521		637	3539	1583	1770	1723		1681	1567	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	777	27	22	1348	82	16	11	11	27	5	22
RTOR Reduction (vph)	0	1	0	0	0	25	0	11	0	0	21	0
Lane Group Flow (vph)	92	803	0	22	1348	57	16	11	0	24	9	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						
Actuated Green, G (s)	118.1	109.0		108.5	104.2	104.2	5.3	5.3		7.4	7.4	
Effective Green, g (s)	118.1	109.0		108.5	104.2	104.2	5.3	5.3		7.4	7.4	
Actuated g/C Ratio	0.79	0.73		0.72	0.69	0.69	0.04	0.04		0.05	0.05	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	0.2		4.0	0.2	0.2	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	309	2558		493	2458	1099	62	60		82	77	
v/s Ratio Prot	c0.02	c0.23		0.00	c0.38		c0.01	0.01		c0.01	0.01	
v/s Ratio Perm	0.22			0.03		0.04						
v/c Ratio	0.30	0.31		0.04	0.55	0.05	0.26	0.19		0.29	0.12	
Uniform Delay, d1	7.2	7.3		5.8	11.3	7.3	70.4	70.3		68.8	68.2	
Progression Factor	1.47	1.45		1.34	0.87	2.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.3		0.0	0.7	0.1	3.0	2.1		2.7	0.9	
Delay (s)	11.3	10.9		7.8	10.5	14.5	73.4	72.4		71.5	69.1	
Level of Service	B	B		A	B	B	E	E		E	E	
Approach Delay (s)		10.9			10.7			72.8			70.2	
Approach LOS		B			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	62.1%	ICU Level of Service	B
Analysis Period (min)	15		

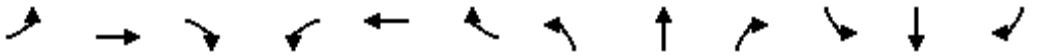
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	575	135	345	1260	110	70	75	120	65	70	5
Future Volume (vph)	40	575	135	345	1260	110	70	75	120	65	70	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3438		1770	3496		1770	1863	1583	1770	1863	1583
Flt Permitted	0.13	1.00		0.28	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	233	3438		519	3496		1770	1863	1583	1770	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	625	147	375	1370	120	76	82	130	71	76	5
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	119	0	0	5
Lane Group Flow (vph)	43	772	0	375	1487	0	76	82	11	71	76	0
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6			2					8			4
Actuated Green, G (s)	86.8	81.2		106.0	94.4		11.8	13.0	13.0	11.5	12.7	12.7
Effective Green, g (s)	86.8	81.2		106.0	94.4		11.8	13.0	13.0	11.5	12.7	12.7
Actuated g/C Ratio	0.58	0.54		0.71	0.63		0.08	0.09	0.09	0.08	0.08	0.08
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	0.2		3.0	0.2		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	192	1861		523	2200		139	161	137	135	157	134
v/s Ratio Prot	0.01	0.22		c0.09	0.43		c0.04	c0.04		0.04	0.04	
v/s Ratio Perm	0.12			c0.42					0.01			0.00
v/c Ratio	0.22	0.41		0.72	0.68		0.55	0.51	0.08	0.53	0.48	0.00
Uniform Delay, d1	15.7	20.3		11.1	17.9		66.5	65.5	63.0	66.6	65.5	62.9
Progression Factor	1.35	0.80		2.58	0.62		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.7		2.5	0.9		5.4	3.4	0.4	4.7	3.2	0.0
Delay (s)	21.8	17.0		31.1	12.0		71.9	68.9	63.4	71.4	68.7	62.9
Level of Service	C	B		C	B		E	E	E	E	E	E
Approach Delay (s)		17.2			15.8			67.2			69.8	
Approach LOS		B			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	23.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	15		

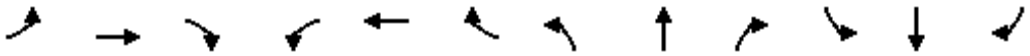
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	395	220	0	1385	365	165	135	5	110	215	165
Future Volume (vph)	145	395	220	0	1385	365	165	135	5	110	215	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	6.0	6.0		6.0	6.0		6.0		6.5	6.5	
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00		0.95		0.91	0.91	
Frt	1.00	1.00	0.85		1.00	0.85		1.00		1.00	0.94	
Flt Protected	0.95	1.00	1.00		1.00	1.00		0.97		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583		3539	1583		3438		1610	3172	
Flt Permitted	0.05	1.00	1.00		1.00	1.00		0.97		0.95	1.00	
Satd. Flow (perm)	94	3539	1583		3539	1583		3438		1610	3172	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	158	429	239	0	1505	397	179	147	5	120	234	179
RTOR Reduction (vph)	0	0	87	0	0	128	0	1	0	0	78	0
Lane Group Flow (vph)	158	429	152	0	1505	269	0	330	0	108	347	0
Turn Type	pm+pt	NA	Perm		NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6			2		4	4		3	3	
Permitted Phases	6		6			2						
Actuated Green, G (s)	95.3	95.3	95.3		76.3	76.3		16.9		19.3	19.3	
Effective Green, g (s)	95.3	95.3	95.3		76.3	76.3		16.9		19.3	19.3	
Actuated g/C Ratio	0.64	0.64	0.64		0.51	0.51		0.11		0.13	0.13	
Clearance Time (s)	7.0	6.0	6.0		6.0	6.0		6.0		6.5	6.5	
Vehicle Extension (s)	3.0	0.2	0.2		0.2	0.2		3.0		3.0	3.0	
Lane Grp Cap (vph)	193	2248	1005		1800	805		387		207	408	
v/s Ratio Prot	c0.07	0.12			0.43			c0.10		0.07	c0.11	
v/s Ratio Perm	c0.45		0.10			0.17						
v/c Ratio	0.82	0.19	0.15		0.84	0.33		0.90dl		0.52	0.85	
Uniform Delay, d1	43.9	11.3	11.0		31.5	21.8		65.3		61.0	63.9	
Progression Factor	1.70	0.66	0.45		0.83	0.47		1.00		1.00	1.00	
Incremental Delay, d2	21.6	0.2	0.3		4.1	1.0		16.4		2.4	15.1	
Delay (s)	96.2	7.6	5.2		30.1	11.2		81.8		63.4	79.1	
Level of Service	F	A	A		C	B		F		E	E	
Approach Delay (s)		23.9			26.2			81.8			75.9	
Approach LOS		C			C			F			E	

Intersection Summary			
HCM 2000 Control Delay	38.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		

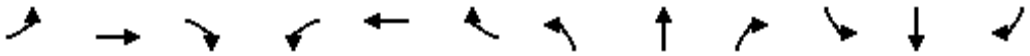
dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	25	0	10	0	550	95	25	465	0
Future Volume (vph)	0	0	0	25	0	10	0	550	95	25	465	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5	5.5		6.5			6.5	
Lane Util. Factor					1.00	1.00		0.95			0.95	
Frt					1.00	0.85		0.98			1.00	
Flt Protected					0.95	1.00		1.00			1.00	
Satd. Flow (prot)					1770	1583		3461			3530	
Flt Permitted					0.76	1.00		1.00			0.90	
Satd. Flow (perm)					1410	1583		3461			3184	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	27	0	11	0	598	103	27	505	0
RTOR Reduction (vph)	0	0	0	0	0	10	0	5	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	27	1	0	696	0	0	532	0
Turn Type				Perm	NA	Perm		NA		pm+pt	NA	
Protected Phases		8			4			5		6	2	
Permitted Phases	8			4		4	5			2		
Actuated Green, G (s)					6.2	6.2		71.8			71.8	
Effective Green, g (s)					6.2	6.2		71.8			71.8	
Actuated g/C Ratio					0.07	0.07		0.80			0.80	
Clearance Time (s)					5.5	5.5		6.5			6.5	
Vehicle Extension (s)					5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)					97	109		2761			2540	
v/s Ratio Prot								c0.20				
v/s Ratio Perm					c0.02	0.00					0.17	
v/c Ratio					0.28	0.01		0.25			0.21	
Uniform Delay, d1					39.8	39.0		2.3			2.2	
Progression Factor					1.00	1.00		1.00			1.00	
Incremental Delay, d2					3.3	0.1		0.2			0.1	
Delay (s)					43.0	39.1		2.5			2.3	
Level of Service					D	D		A			A	
Approach Delay (s)		0.0			41.9			2.5			2.3	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	3.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		

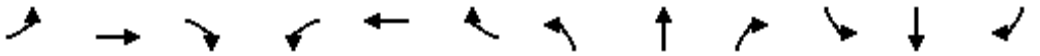
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	1195	0	0	775	115	100	5	200	0	0	0
Future Volume (vph)	165	1195	0	0	775	115	100	5	200	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.5			5.5	5.5		6.0	6.0			
Lane Util. Factor	0.97	0.95			0.95	1.00		1.00	0.88			
Frt	1.00	1.00			1.00	0.85		1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (prot)	3433	3539			3539	1583		1778	2787			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	3433	3539			3539	1583		1778	2787			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	179	1299	0	0	842	125	109	5	217	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	40	0	0	0	0	0	0
Lane Group Flow (vph)	179	1299	0	0	842	85	0	114	217	0	0	0
Turn Type	Prot	NA			NA	Perm	Split	NA	custom			
Protected Phases	1	6			2		3	3	8			
Permitted Phases						2			3			
Actuated Green, G (s)	14.1	120.7			101.6	101.6		17.8	17.8			
Effective Green, g (s)	14.1	120.7			101.6	101.6		17.8	17.8			
Actuated g/C Ratio	0.09	0.80			0.68	0.68		0.12	0.12			
Clearance Time (s)	5.0	5.5			5.5	5.5		6.0	6.0			
Vehicle Extension (s)	4.0	0.2			0.2	0.2		4.0	4.0			
Lane Grp Cap (vph)	322	2847			2397	1072		210	330			
v/s Ratio Prot	c0.05	c0.37			0.24			0.06	c0.08			
v/s Ratio Perm						0.05						
v/c Ratio	0.56	0.46			0.35	0.08		0.54	0.66			
Uniform Delay, d1	65.0	4.5			10.2	8.2		62.3	63.2			
Progression Factor	1.00	1.00			0.94	2.47		1.00	1.00			
Incremental Delay, d2	2.6	0.5			0.4	0.1		3.6	5.2			
Delay (s)	67.5	5.1			10.0	20.5		65.8	68.4			
Level of Service	E	A			B	C		E	E			
Approach Delay (s)		12.6			11.4			67.5			0.0	
Approach LOS		B			B			E			A	

Intersection Summary			
HCM 2000 Control Delay	18.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	49.6%	ICU Level of Service	A
Analysis Period (min)	15		

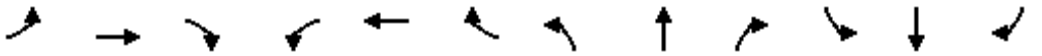
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	1195	50	20	805	115	25	10	10	165	25	60
Future Volume (vph)	150	1195	50	20	805	115	25	10	10	165	25	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.93		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1770	3518		1770	3539	1583	1770	1723		1681	1614	
Flt Permitted	0.25	1.00		0.15	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	468	3518		277	3539	1583	1770	1723		1681	1614	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	1299	54	22	875	125	27	11	11	179	27	65
RTOR Reduction (vph)	0	1	0	0	0	45	0	10	0	0	26	0
Lane Group Flow (vph)	163	1352	0	22	875	80	27	12	0	140	105	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						
Actuated Green, G (s)	105.6	95.1		92.6	88.1	88.1	7.5	7.5		18.9	18.9	
Effective Green, g (s)	105.6	95.1		92.6	88.1	88.1	7.5	7.5		18.9	18.9	
Actuated g/C Ratio	0.70	0.63		0.62	0.59	0.59	0.05	0.05		0.13	0.13	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	0.2		4.0	0.2	0.2	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	429	2230		215	2078	929	88	86		211	203	
v/s Ratio Prot	c0.03	c0.38		0.00	0.25		c0.02	0.01		c0.08	0.06	
v/s Ratio Perm	0.24			0.06		0.05						
v/c Ratio	0.38	0.61		0.10	0.42	0.09	0.31	0.13		0.66	0.52	
Uniform Delay, d1	9.3	16.3		13.0	17.0	13.5	68.7	68.1		62.5	61.3	
Progression Factor	1.29	1.26		1.47	1.49	3.15	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	1.1		0.2	0.5	0.1	2.7	1.0		8.4	2.9	
Delay (s)	12.7	21.7		19.3	25.8	42.5	71.4	69.1		70.9	64.2	
Level of Service	B	C		B	C	D	E	E		E	E	
Approach Delay (s)		20.7			27.7			70.4			67.6	
Approach LOS		C			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	28.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		

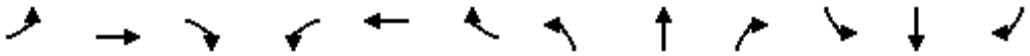
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	1140	220	185	745	140	170	160	380	175	120	25
Future Volume (vph)	10	1140	220	185	745	140	170	160	380	175	120	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3453		1770	3455		1770	1863	1583	1770	1863	1583
Flt Permitted	0.27	1.00		0.05	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	497	3453		97	3455		1770	1863	1583	1770	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	1239	239	201	810	152	185	174	413	190	130	27
RTOR Reduction (vph)	0	0	0	0	8	0	0	0	172	0	0	22
Lane Group Flow (vph)	11	1478	0	201	954	0	185	174	241	190	130	5
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6			2					8			4
Actuated Green, G (s)	73.1	70.6		91.5	83.0		13.5	25.5	25.5	13.5	25.5	25.5
Effective Green, g (s)	73.1	70.6		91.5	83.0		13.5	25.5	25.5	13.5	25.5	25.5
Actuated g/C Ratio	0.49	0.47		0.61	0.55		0.09	0.17	0.17	0.09	0.17	0.17
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	0.2		3.0	0.2		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	263	1625		225	1911		159	316	269	159	316	269
v/s Ratio Prot	0.00	0.43		c0.09	0.28		0.10	0.09		c0.11	0.07	
v/s Ratio Perm	0.02			c0.45					c0.15			0.00
v/c Ratio	0.04	0.91		0.89	0.50		1.16	0.55	0.90	1.19	0.41	0.02
Uniform Delay, d1	20.0	36.7		48.4	20.7		68.2	57.0	61.0	68.2	55.6	51.8
Progression Factor	0.76	1.18		1.26	0.58		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	7.8		26.6	0.7		122.1	2.6	29.9	133.4	1.2	0.0
Delay (s)	15.3	51.3		87.4	12.7		190.4	59.6	90.9	201.6	56.7	51.9
Level of Service	B	D		F	B		F	E	F	F	E	D
Approach Delay (s)		51.0			25.6			107.6			135.7	
Approach LOS		D			C			F			F	

Intersection Summary			
HCM 2000 Control Delay	62.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	88.1%	ICU Level of Service	E
Analysis Period (min)	15		

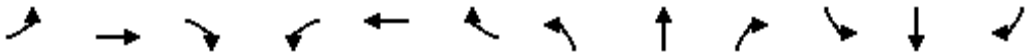
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	1380	150	0	680	175	160	210	5	440	295	230
Future Volume (vph)	165	1380	150	0	680	175	160	210	5	440	295	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	6.0	6.0		6.0	6.0		6.0		6.5	6.5	
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00		0.95		0.91	0.91	
Frt	1.00	1.00	0.85		1.00	0.85		1.00		1.00	0.95	
Flt Protected	0.95	1.00	1.00		1.00	1.00		0.98		0.95	0.99	
Satd. Flow (prot)	1770	3539	1583		3539	1583		3459		1610	3179	
Flt Permitted	0.21	1.00	1.00		1.00	1.00		0.98		0.95	0.99	
Satd. Flow (perm)	382	3539	1583		3539	1583		3459		1610	3179	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	179	1500	163	0	739	190	174	228	5	478	321	250
RTOR Reduction (vph)	0	0	62	0	0	121	0	1	0	0	46	0
Lane Group Flow (vph)	179	1500	101	0	739	69	0	406	0	354	649	0
Turn Type	pm+pt	NA	Perm		NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6			2		4	4		3	3	
Permitted Phases	6		6			2						
Actuated Green, G (s)	73.4	73.4	73.4		54.3	54.3		20.4		37.7	37.7	
Effective Green, g (s)	73.4	73.4	73.4		54.3	54.3		20.4		37.7	37.7	
Actuated g/C Ratio	0.49	0.49	0.49		0.36	0.36		0.14		0.25	0.25	
Clearance Time (s)	7.0	6.0	6.0		6.0	6.0		6.0		6.5	6.5	
Vehicle Extension (s)	3.0	0.2	0.2		0.2	0.2		3.0		3.0	3.0	
Lane Grp Cap (vph)	298	1731	774		1281	573		470		404	798	
v/s Ratio Prot	0.05	c0.42			0.21			c0.12		c0.22	0.20	
v/s Ratio Perm	0.24		0.06			0.04						
v/c Ratio	0.60	0.87	0.13		0.58	0.12		0.86		0.88	0.81	
Uniform Delay, d1	25.1	34.0	20.9		38.6	31.9		63.4		53.9	52.8	
Progression Factor	1.13	0.86	1.35		0.96	1.37		1.00		1.00	1.00	
Incremental Delay, d2	1.2	2.3	0.1		1.9	0.4		15.1		18.7	6.3	
Delay (s)	29.6	31.4	28.3		39.1	44.1		78.6		72.6	59.2	
Level of Service	C	C	C		D	D		E		E	E	
Approach Delay (s)		31.0			40.1			78.6			63.7	
Approach LOS		C			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	45.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	83.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

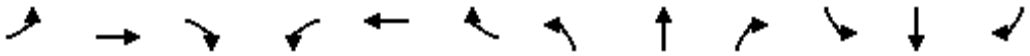


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	100	0	40	0	435	115	50	865	0
Future Volume (vph)	0	0	0	100	0	40	0	435	115	50	865	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5	5.5		6.5			6.5	
Lane Util. Factor					1.00	1.00		0.95			0.95	
Frt					1.00	0.85		0.97			1.00	
Flt Protected					0.95	1.00		1.00			1.00	
Satd. Flow (prot)					1770	1583		3428			3530	
Flt Permitted					0.76	1.00		1.00			0.88	
Satd. Flow (perm)					1410	1583		3428			3123	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	109	0	43	0	473	125	54	940	0
RTOR Reduction (vph)	0	0	0	0	0	37	0	11	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	109	6	0	587	0	0	994	0
Turn Type				Perm	NA	Perm		NA		pm+pt	NA	
Protected Phases		8			4			5		6	2	
Permitted Phases	8			4		4	5			2		
Actuated Green, G (s)					12.3	12.3		65.7			65.7	
Effective Green, g (s)					12.3	12.3		65.7			65.7	
Actuated g/C Ratio					0.14	0.14		0.73			0.73	
Clearance Time (s)					5.5	5.5		6.5			6.5	
Vehicle Extension (s)					5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)					192	216		2502			2279	
v/s Ratio Prot								0.17				
v/s Ratio Perm					c0.08	0.00					c0.32	
v/c Ratio					0.57	0.03		0.23			0.44	
Uniform Delay, d1					36.4	33.7		4.0			4.8	
Progression Factor					1.00	1.00		1.00			1.00	
Incremental Delay, d2					6.2	0.1		0.2			0.3	
Delay (s)					42.6	33.8		4.2			5.1	
Level of Service					D	C		A			A	
Approach Delay (s)		0.0			40.1			4.2			5.1	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

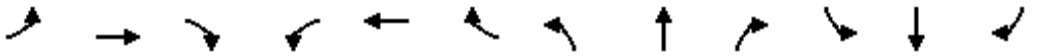
2022 No Build



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	805	0	0	1230	105	70	0	60	0	0	0
Future Volume (vph)	125	805	0	0	1230	105	70	0	60	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.5			5.5	5.5		6.0	6.0			
Lane Util. Factor	0.97	0.95			0.95	1.00		1.00	0.88			
Frt	1.00	1.00			1.00	0.85		1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (prot)	3433	3539			3539	1583		1770	2787			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	3433	3539			3539	1583		1770	2787			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	136	875	0	0	1337	114	76	0	65	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	25	0	0	0	0	0	0
Lane Group Flow (vph)	136	875	0	0	1337	89	0	76	65	0	0	0
Turn Type	Prot	NA			NA	Perm	Split	NA	custom			
Protected Phases	1	6			2		3	3	8			
Permitted Phases						2			3			
Actuated Green, G (s)	12.3	125.6			108.3	108.3		12.9	12.9			
Effective Green, g (s)	12.3	125.6			108.3	108.3		12.9	12.9			
Actuated g/C Ratio	0.08	0.84			0.72	0.72		0.09	0.09			
Clearance Time (s)	5.0	5.5			5.5	5.5		6.0	6.0			
Vehicle Extension (s)	4.0	0.2			0.2	0.2		4.0	4.0			
Lane Grp Cap (vph)	281	2963			2555	1142		152	239			
v/s Ratio Prot	c0.04	0.25			c0.38			c0.04	0.02			
v/s Ratio Perm						0.06						
v/c Ratio	0.48	0.30			0.52	0.08		0.50	0.27			
Uniform Delay, d1	65.8	2.6			9.3	6.1		65.5	64.2			
Progression Factor	1.00	1.00			1.46	2.60		1.00	1.00			
Incremental Delay, d2	1.8	0.3			0.7	0.1		3.5	0.8			
Delay (s)	67.6	2.9			14.2	16.1		69.0	65.0			
Level of Service	E	A			B	B		E	E			
Approach Delay (s)		11.6			14.4			67.1			0.0	
Approach LOS		B			B			E			A	

Intersection Summary			
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		

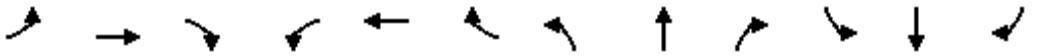
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	750	30	20	1300	75	15	10	10	25	5	20
Future Volume (vph)	85	750	30	20	1300	75	15	10	10	25	5	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.93		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3519		1770	3539	1583	1770	1723		1681	1567	
Flt Permitted	0.13	1.00		0.33	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	248	3519		609	3539	1583	1770	1723		1681	1567	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	815	33	22	1413	82	16	11	11	27	5	22
RTOR Reduction (vph)	0	1	0	0	0	25	0	11	0	0	21	0
Lane Group Flow (vph)	92	847	0	22	1413	57	16	11	0	24	9	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						
Actuated Green, G (s)	118.9	109.0		107.7	103.4	103.4	5.3	5.3		7.4	7.4	
Effective Green, g (s)	118.9	109.0		107.7	103.4	103.4	5.3	5.3		7.4	7.4	
Actuated g/C Ratio	0.79	0.73		0.72	0.69	0.69	0.04	0.04		0.05	0.05	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	0.2		4.0	0.2	0.2	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	297	2557		470	2439	1091	62	60		82	77	
v/s Ratio Prot	c0.02	c0.24		0.00	c0.40		c0.01	0.01		c0.01	0.01	
v/s Ratio Perm	0.23			0.03		0.04						
v/c Ratio	0.31	0.33		0.05	0.58	0.05	0.26	0.19		0.29	0.12	
Uniform Delay, d1	8.1	7.4		6.1	12.1	7.5	70.4	70.3		68.8	68.2	
Progression Factor	1.43	1.44		1.27	0.83	1.73	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	0.3		0.0	0.7	0.1	3.0	2.1		2.7	0.9	
Delay (s)	12.4	10.9		7.7	10.8	13.0	73.4	72.4		71.5	69.1	
Level of Service	B	B		A	B	B	E	E		E	E	
Approach Delay (s)		11.1			10.9			72.8			70.2	
Approach LOS		B			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		

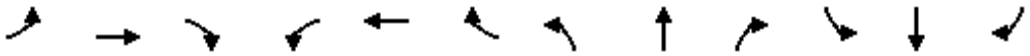
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	600	145	370	1315	115	75	85	130	70	80	5
Future Volume (vph)	40	600	145	370	1315	115	75	85	130	70	80	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3436		1770	3497		1770	1863	1583	1770	1863	1583
Flt Permitted	0.11	1.00		0.25	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	209	3436		473	3497		1770	1863	1583	1770	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	652	158	402	1429	125	82	92	141	76	87	5
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	128	0	0	5
Lane Group Flow (vph)	43	810	0	402	1551	0	82	92	13	76	87	0
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6			2					8			4
Actuated Green, G (s)	82.7	77.1		105.0	93.4		12.0	13.7	13.7	11.8	13.5	13.5
Effective Green, g (s)	82.7	77.1		105.0	93.4		12.0	13.7	13.7	11.8	13.5	13.5
Actuated g/C Ratio	0.55	0.51		0.70	0.62		0.08	0.09	0.09	0.08	0.09	0.09
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	0.2		3.0	0.2		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	173	1766		520	2177		141	170	144	139	167	142
v/s Ratio Prot	0.01	0.24		c0.11	0.44		c0.05	c0.05		0.04	0.05	
v/s Ratio Perm	0.13			c0.43					0.01			0.00
v/c Ratio	0.25	0.46		0.77	0.71		0.58	0.54	0.09	0.55	0.52	0.00
Uniform Delay, d1	17.8	23.2		13.1	19.2		66.6	65.1	62.4	66.5	65.2	62.1
Progression Factor	1.39	0.83		2.68	0.65		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.8		3.0	0.8		7.0	4.4	0.4	5.4	3.8	0.0
Delay (s)	25.4	20.0		38.0	13.3		73.6	69.5	62.8	71.9	68.9	62.1
Level of Service	C	C		D	B		E	E	E	E	E	E
Approach Delay (s)		20.3			18.3			67.6			70.1	
Approach LOS		C			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	26.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	415	230	0	1440	415	170	160	5	120	250	190
Future Volume (vph)	155	415	230	0	1440	415	170	160	5	120	250	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	6.0	6.0		6.0	6.0		6.0		6.5	6.5	
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00		0.95		0.91	0.91	
Frt	1.00	1.00	0.85		1.00	0.85		1.00		1.00	0.94	
Flt Protected	0.95	1.00	1.00		1.00	1.00		0.98		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583		3539	1583		3444		1610	3172	
Flt Permitted	0.05	1.00	1.00		1.00	1.00		0.98		0.95	1.00	
Satd. Flow (perm)	91	3539	1583		3539	1583		3444		1610	3172	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	168	451	250	0	1565	451	185	174	5	130	272	207
RTOR Reduction (vph)	0	0	93	0	0	143	0	1	0	0	79	0
Lane Group Flow (vph)	168	451	157	0	1565	308	0	363	0	117	413	0
Turn Type	pm+pt	NA	Perm		NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6			2		4	4		3	3	
Permitted Phases	6		6			2						
Actuated Green, G (s)	94.0	94.0	94.0		74.6	74.6		17.0		20.5	20.5	
Effective Green, g (s)	94.0	94.0	94.0		74.6	74.6		17.0		20.5	20.5	
Actuated g/C Ratio	0.63	0.63	0.63		0.50	0.50		0.11		0.14	0.14	
Clearance Time (s)	7.0	6.0	6.0		6.0	6.0		6.0		6.5	6.5	
Vehicle Extension (s)	3.0	0.2	0.2		0.2	0.2		3.0		3.0	3.0	
Lane Grp Cap (vph)	195	2217	992		1760	787		390		220	433	
v/s Ratio Prot	c0.07	0.13			c0.44			c0.11		0.07	c0.13	
v/s Ratio Perm	0.47		0.10			0.19						
v/c Ratio	0.86	0.20	0.16		0.89	0.39		0.93		0.53	0.95	
Uniform Delay, d1	47.1	12.0	11.6		34.0	23.5		65.9		60.3	64.3	
Progression Factor	1.64	0.66	0.47		0.84	0.58		1.00		1.00	1.00	
Incremental Delay, d2	28.0	0.2	0.3		6.1	1.2		28.7		2.5	31.6	
Delay (s)	105.3	8.1	5.7		34.6	14.8		94.7		62.7	95.9	
Level of Service	F	A	A		C	B		F		E	F	
Approach Delay (s)		26.2			30.2			94.7			89.5	
Approach LOS		C			C			F			F	

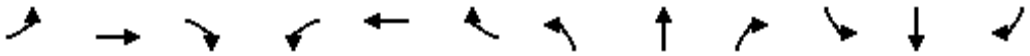
Intersection Summary			
HCM 2000 Control Delay	44.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	25	0	10	0	630	100	25	535	0
Future Volume (vph)	0	0	0	25	0	10	0	630	100	25	535	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5	5.5		6.5			6.5	
Lane Util. Factor					1.00	1.00		0.95			0.95	
Frt					1.00	0.85		0.98			1.00	
Flt Protected					0.95	1.00		1.00			1.00	
Satd. Flow (prot)					1770	1583		3466			3531	
Flt Permitted					0.76	1.00		1.00			0.90	
Satd. Flow (perm)					1410	1583		3466			3180	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	27	0	11	0	685	109	27	582	0
RTOR Reduction (vph)	0	0	0	0	0	10	0	4	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	27	1	0	790	0	0	609	0
Turn Type				Perm	NA	Perm		NA		pm+pt	NA	
Protected Phases		8			4			5		6	2	
Permitted Phases	8			4		4	5			2		
Actuated Green, G (s)					6.2	6.2		71.8			71.8	
Effective Green, g (s)					6.2	6.2		71.8			71.8	
Actuated g/C Ratio					0.07	0.07		0.80			0.80	
Clearance Time (s)					5.5	5.5		6.5			6.5	
Vehicle Extension (s)					5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)					97	109		2765			2536	
v/s Ratio Prot								c0.23				
v/s Ratio Perm					c0.02	0.00					0.19	
v/c Ratio					0.28	0.01		0.29			0.24	
Uniform Delay, d1					39.8	39.0		2.4			2.3	
Progression Factor					1.00	1.00		1.00			1.00	
Incremental Delay, d2					3.3	0.1		0.3			0.1	
Delay (s)					43.0	39.1		2.6			2.4	
Level of Service					D	D		A			A	
Approach Delay (s)		0.0			41.9			2.6			2.4	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	3.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		

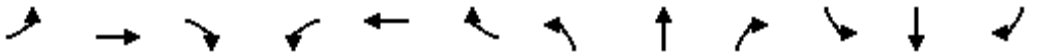
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	175	1250	0	0	810	120	105	5	210	0	0	0
Future Volume (vph)	175	1250	0	0	810	120	105	5	210	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.5			5.5	5.5		6.0	6.0			
Lane Util. Factor	0.97	0.95			0.95	1.00		1.00	0.88			
Frt	1.00	1.00			1.00	0.85		1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (prot)	3433	3539			3539	1583		1778	2787			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	3433	3539			3539	1583		1778	2787			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	190	1359	0	0	880	130	114	5	228	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	41	0	0	0	0	0	0
Lane Group Flow (vph)	190	1359	0	0	880	89	0	119	228	0	0	0
Turn Type	Prot	NA			NA	Perm	Split	NA	custom			
Protected Phases	1	6			2		3	3	8			
Permitted Phases						2			3			
Actuated Green, G (s)	14.6	120.2			100.6	100.6		18.3	18.3			
Effective Green, g (s)	14.6	120.2			100.6	100.6		18.3	18.3			
Actuated g/C Ratio	0.10	0.80			0.67	0.67		0.12	0.12			
Clearance Time (s)	5.0	5.5			5.5	5.5		6.0	6.0			
Vehicle Extension (s)	4.0	0.2			0.2	0.2		4.0	4.0			
Lane Grp Cap (vph)	334	2835			2373	1061		216	340			
v/s Ratio Prot	c0.06	c0.38			0.25			0.07	c0.08			
v/s Ratio Perm						0.06						
v/c Ratio	0.57	0.48			0.37	0.08		0.55	0.67			
Uniform Delay, d1	64.7	4.8			10.8	8.6		62.0	63.0			
Progression Factor	1.00	1.00			0.99	2.27		1.00	1.00			
Incremental Delay, d2	2.7	0.6			0.4	0.1		3.7	5.6			
Delay (s)	67.4	5.4			11.1	19.7		65.7	68.6			
Level of Service	E	A			B	B		E	E			
Approach Delay (s)		13.0			12.3			67.6			0.0	
Approach LOS		B			B			E			A	

Intersection Summary			
HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		

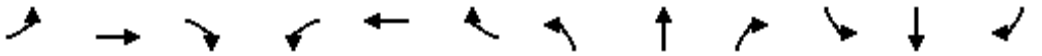
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	1250	60	20	840	115	30	10	10	160	25	60
Future Volume (vph)	150	1250	60	20	840	115	30	10	10	160	25	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.93		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1770	3515		1770	3539	1583	1770	1723		1681	1613	
Flt Permitted	0.24	1.00		0.13	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	441	3515		246	3539	1583	1770	1723		1681	1613	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	1359	65	22	913	125	33	11	11	174	27	65
RTOR Reduction (vph)	0	1	0	0	0	45	0	10	0	0	26	0
Lane Group Flow (vph)	163	1423	0	22	913	80	33	12	0	136	104	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						
Actuated Green, G (s)	105.6	95.1		92.2	87.7	87.7	7.9	7.9		18.5	18.5	
Effective Green, g (s)	105.6	95.1		92.2	87.7	87.7	7.9	7.9		18.5	18.5	
Actuated g/C Ratio	0.70	0.63		0.61	0.58	0.58	0.05	0.05		0.12	0.12	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	0.2		4.0	0.2	0.2	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	415	2228		196	2069	925	93	90		207	198	
v/s Ratio Prot	c0.03	c0.40		0.00	0.26		c0.02	0.01		c0.08	0.06	
v/s Ratio Perm	0.24			0.07		0.05						
v/c Ratio	0.39	0.64		0.11	0.44	0.09	0.35	0.13		0.66	0.52	
Uniform Delay, d1	9.6	16.9		13.6	17.4	13.6	68.6	67.8		62.7	61.6	
Progression Factor	1.25	1.24		1.38	1.47	3.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	1.3		0.3	0.5	0.1	3.2	0.9		8.1	3.2	
Delay (s)	12.8	22.2		19.1	26.1	41.0	71.7	68.7		70.8	64.9	
Level of Service	B	C		B	C	D	E	E		E	E	
Approach Delay (s)		21.2			27.7			70.5			67.9	
Approach LOS		C			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	28.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

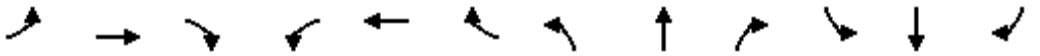
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	1175	235	200	770	145	180	180	410	185	135	25
Future Volume (vph)	10	1175	235	200	770	145	180	180	410	185	135	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3451		1770	3455		1770	1863	1583	1770	1863	1583
Flt Permitted	0.25	1.00		0.05	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	467	3451		101	3455		1770	1863	1583	1770	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	1277	255	217	837	158	196	196	446	201	147	27
RTOR Reduction (vph)	0	0	0	0	9	0	0	0	167	0	0	22
Lane Group Flow (vph)	11	1532	0	217	986	0	196	196	279	201	147	5
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6			2					8			4
Actuated Green, G (s)	70.5	68.0		89.5	81.0		13.5	27.5	27.5	13.5	27.5	27.5
Effective Green, g (s)	70.5	68.0		89.5	81.0		13.5	27.5	27.5	13.5	27.5	27.5
Actuated g/C Ratio	0.47	0.45		0.60	0.54		0.09	0.18	0.18	0.09	0.18	0.18
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	0.2		3.0	0.2		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	241	1564		232	1865		159	341	290	159	341	290
v/s Ratio Prot	0.00	c0.44		c0.10	0.29		0.11	0.11		c0.11	0.08	
v/s Ratio Perm	0.02			0.46					c0.18			0.00
v/c Ratio	0.05	0.98		0.94	0.53		1.23	0.57	0.96	1.26	0.43	0.02
Uniform Delay, d1	21.5	40.3		50.2	22.2		68.2	55.9	60.8	68.2	54.3	50.2
Progression Factor	0.70	1.15		1.24	0.59		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	16.2		31.8	0.7		147.3	2.8	42.8	159.3	1.2	0.0
Delay (s)	15.0	62.7		94.1	13.9		215.6	58.7	103.6	227.5	55.5	50.2
Level of Service	B	E		F	B		F	E	F	F	E	D
Approach Delay (s)		62.3			28.2			119.3			147.3	
Approach LOS		E			C			F			F	

Intersection Summary			
HCM 2000 Control Delay	72.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	92.0%	ICU Level of Service	F
Analysis Period (min)	15		

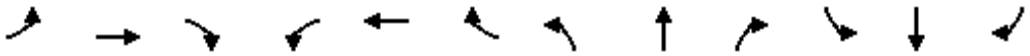
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	175	1440	155	0	700	200	165	245	5	470	380	250
Future Volume (vph)	175	1440	155	0	700	200	165	245	5	470	380	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	6.0	6.0		6.0	6.0		6.0		6.5	6.5	
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00		0.95		0.91	0.91	
Frt	1.00	1.00	0.85		1.00	0.85		1.00		1.00	0.95	
Flt Protected	0.95	1.00	1.00		1.00	1.00		0.98		0.95	0.99	
Satd. Flow (prot)	1770	3539	1583		3539	1583		3464		1610	3194	
Flt Permitted	0.18	1.00	1.00		1.00	1.00		0.98		0.95	0.99	
Satd. Flow (perm)	336	3539	1583		3539	1583		3464		1610	3194	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	190	1565	168	0	761	217	179	266	5	511	413	272
RTOR Reduction (vph)	0	0	63	0	0	141	0	1	0	0	40	0
Lane Group Flow (vph)	190	1565	105	0	761	76	0	449	0	404	752	0
Turn Type	pm+pt	NA	Perm		NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6			2		4	4		3	3	
Permitted Phases	6		6			2						
Actuated Green, G (s)	70.7	70.7	70.7		51.2	51.2		20.9		39.9	39.9	
Effective Green, g (s)	70.7	70.7	70.7		51.2	51.2		20.9		39.9	39.9	
Actuated g/C Ratio	0.47	0.47	0.47		0.34	0.34		0.14		0.27	0.27	
Clearance Time (s)	7.0	6.0	6.0		6.0	6.0		6.0		6.5	6.5	
Vehicle Extension (s)	3.0	0.2	0.2		0.2	0.2		3.0		3.0	3.0	
Lane Grp Cap (vph)	277	1668	746		1207	540		482		428	849	
v/s Ratio Prot	0.06	c0.44			0.22			c0.13		c0.25	0.24	
v/s Ratio Perm	0.27		0.07			0.05						
v/c Ratio	0.69	0.94	0.14		0.63	0.14		0.93		0.94	0.89	
Uniform Delay, d1	27.5	37.6	22.5		41.5	34.2		63.8		54.0	52.9	
Progression Factor	1.25	0.88	1.36		0.96	1.35		1.00		1.00	1.00	
Incremental Delay, d2	0.6	1.4	0.0		2.4	0.5		25.0		29.5	10.9	
Delay (s)	34.9	34.4	30.5		42.1	46.7		88.8		83.5	63.8	
Level of Service	C	C	C		D	D		F		F	E	
Approach Delay (s)		34.1			43.1			88.8			70.4	
Approach LOS		C			D			F			E	

Intersection Summary			
HCM 2000 Control Delay	51.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	88.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

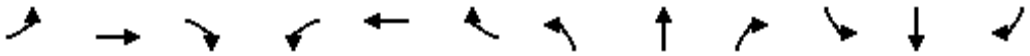


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	105	0	45	0	500	120	55	995	0
Future Volume (vph)	0	0	0	105	0	45	0	500	120	55	995	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5	5.5		6.5			6.5	
Lane Util. Factor					1.00	1.00		0.95			0.95	
Frt					1.00	0.85		0.97			1.00	
Flt Protected					0.95	1.00		1.00			1.00	
Satd. Flow (prot)					1770	1583		3437			3530	
Flt Permitted					0.76	1.00		1.00			0.87	
Satd. Flow (perm)					1410	1583		3437			3084	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	114	0	49	0	543	130	60	1082	0
RTOR Reduction (vph)	0	0	0	0	0	42	0	10	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	114	7	0	663	0	0	1142	0
Turn Type				Perm	NA	Perm		NA		pm+pt	NA	
Protected Phases		8			4			5		6	2	
Permitted Phases	8			4		4	5			2		
Actuated Green, G (s)					12.5	12.5		65.5			65.5	
Effective Green, g (s)					12.5	12.5		65.5			65.5	
Actuated g/C Ratio					0.14	0.14		0.73			0.73	
Clearance Time (s)					5.5	5.5		6.5			6.5	
Vehicle Extension (s)					5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)					195	219		2501			2244	
v/s Ratio Prot								0.19				
v/s Ratio Perm					c0.08	0.00					c0.37	
v/c Ratio					0.58	0.03		0.27			0.51	
Uniform Delay, d1					36.3	33.5		4.1			5.3	
Progression Factor					1.00	1.00		1.00			1.00	
Incremental Delay, d2					6.8	0.1		0.3			0.4	
Delay (s)					43.1	33.6		4.4			5.7	
Level of Service					D	C		A			A	
Approach Delay (s)		0.0			40.2			4.4			5.7	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

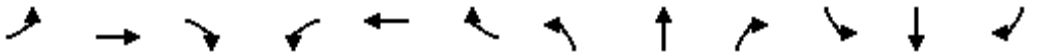
2022 Build



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	870	0	0	1315	90	70	0	60	0	0	0
Future Volume (vph)	110	870	0	0	1315	90	70	0	60	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.5			5.5	5.5		6.0	6.0			
Lane Util. Factor	0.97	0.95			0.95	1.00		1.00	0.88			
Frt	1.00	1.00			1.00	0.85		1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (prot)	3433	3539			3539	1583		1770	2787			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	3433	3539			3539	1583		1770	2787			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	946	0	0	1429	98	76	0	65	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	25	0	0	0	0	0	0
Lane Group Flow (vph)	120	946	0	0	1429	73	0	76	65	0	0	0
Turn Type	Prot	NA			NA	Perm	Split	NA	custom			
Protected Phases	1	6			2		3	3	8			
Permitted Phases						2			3			
Actuated Green, G (s)	11.6	125.6			109.0	109.0		12.9	12.9			
Effective Green, g (s)	11.6	125.6			109.0	109.0		12.9	12.9			
Actuated g/C Ratio	0.08	0.84			0.73	0.73		0.09	0.09			
Clearance Time (s)	5.0	5.5			5.5	5.5		6.0	6.0			
Vehicle Extension (s)	4.0	0.2			0.2	0.2		4.0	4.0			
Lane Grp Cap (vph)	265	2963			2571	1150		152	239			
v/s Ratio Prot	c0.03	0.27			c0.40			c0.04	0.02			
v/s Ratio Perm						0.05						
v/c Ratio	0.45	0.32			0.56	0.06		0.50	0.27			
Uniform Delay, d1	66.2	2.7			9.4	5.9		65.5	64.2			
Progression Factor	1.00	1.00			1.08	1.42		1.00	1.00			
Incremental Delay, d2	1.7	0.3			0.8	0.1		3.5	0.8			
Delay (s)	67.8	3.0			10.9	8.5		69.0	65.0			
Level of Service	E	A			B	A		E	E			
Approach Delay (s)		10.3			10.8			67.1			0.0	
Approach LOS		B			B			E			A	

Intersection Summary			
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		

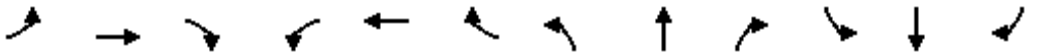
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	790	25	25	1360	100	20	15	10	35	5	25
Future Volume (vph)	115	790	25	25	1360	100	20	15	10	35	5	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	4.5	4.5	4.5	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	1749		3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	1770	1749		3433	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	125	859	27	27	1478	109	22	16	11	38	5	27
RTOR Reduction (vph)	0	0	8	0	0	40	0	10	0	0	0	26
Lane Group Flow (vph)	125	859	19	27	1478	69	22	17	0	38	5	1
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases			6			2						4
Actuated Green, G (s)	18.2	108.2	108.2	5.4	95.4	95.4	7.1	7.1		6.8	6.8	6.8
Effective Green, g (s)	18.2	108.2	108.2	5.4	95.4	95.4	7.1	7.1		6.8	6.8	6.8
Actuated g/C Ratio	0.12	0.72	0.72	0.04	0.64	0.64	0.05	0.05		0.05	0.05	0.05
Clearance Time (s)	6.0	6.0	6.0	4.5	4.5	4.5	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	4.0	0.2	0.2	3.0	3.0	3.0	4.0	4.0		4.0	4.0	4.0
Lane Grp Cap (vph)	214	3667	1141	63	3234	1006	83	82		155	84	71
v/s Ratio Prot	c0.07	0.17		0.02	c0.29		c0.01	0.01		c0.01	0.00	
v/s Ratio Perm			0.01			0.04						0.00
v/c Ratio	0.58	0.23	0.02	0.43	0.46	0.07	0.27	0.20		0.25	0.06	0.02
Uniform Delay, d1	62.3	7.0	5.9	70.8	14.0	10.4	68.9	68.7		69.1	68.5	68.4
Progression Factor	0.95	1.46	1.00	1.04	0.80	0.52	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.6	0.0	0.0	4.6	0.5	0.1	2.3	1.7		1.1	0.4	0.1
Delay (s)	63.5	10.3	5.9	78.4	11.6	5.6	71.3	70.4		70.3	68.9	68.5
Level of Service	E	B	A	E	B	A	E	E		E	E	E
Approach Delay (s)		16.7			12.3			70.8			69.5	
Approach LOS		B			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	16.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	22.5
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		

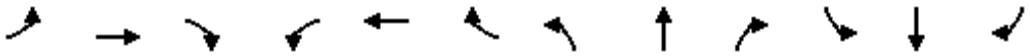
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	45	10	905	95	495	55	100	365	255	125	10
Future Volume (vph)	5	45	10	905	95	495	55	100	365	255	125	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5		6.5	6.5	
Lane Util. Factor	1.00	1.00		0.97	1.00		1.00	0.95		0.97	1.00	
Frt	1.00	0.97		1.00	0.87		1.00	0.88		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1812		3433	1628		1770	3123		3433	1842	
Flt Permitted	0.42	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	785	1812		3433	1628		1770	3123		3433	1842	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	49	11	984	103	538	60	109	397	277	136	11
RTOR Reduction (vph)	0	0	0	0	102	0	0	358	0	0	2	0
Lane Group Flow (vph)	5	60	0	984	539	0	60	148	0	277	145	0
Turn Type	pm+pt	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6											
Actuated Green, G (s)	44.1	42.9		49.2	90.9		8.9	14.9		17.5	23.5	
Effective Green, g (s)	44.1	42.9		49.2	90.9		8.9	14.9		17.5	23.5	
Actuated g/C Ratio	0.29	0.29		0.33	0.61		0.06	0.10		0.12	0.16	
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5		6.5	6.5	
Vehicle Extension (s)	3.0	0.2		3.0	0.2		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	238	518		1126	986		105	310		400	288	
v/s Ratio Prot	0.00	0.03		c0.29	c0.33		0.03	0.05		c0.08	c0.08	
v/s Ratio Perm	0.01											
v/c Ratio	0.02	0.12		0.87	0.55		0.57	0.48		0.69	0.50	
Uniform Delay, d1	37.6	39.5		47.5	17.4		68.7	63.9		63.7	57.9	
Progression Factor	1.00	1.00		1.11	2.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.5		5.1	1.4		8.7	1.6		5.5	1.9	
Delay (s)	37.7	40.0		57.8	36.2		77.4	65.5		69.2	59.8	
Level of Service	D	D		E	D		E	E		E	E	
Approach Delay (s)		39.8			49.2			66.7			65.9	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	55.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	310	205	0	1040	365	160	145	5	120	305	295
Future Volume (vph)	150	310	205	0	1040	365	160	145	5	120	305	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	6.0			6.0	6.0	6.0	6.0		6.5	6.5	
Lane Util. Factor	0.97	0.95			0.95	1.00	1.00	0.95		0.91	0.91	
Frt	1.00	0.94			1.00	0.85	1.00	1.00		1.00	0.93	
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3328			3539	1583	1770	3523		1610	3142	
Flt Permitted	0.95	1.00			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3328			3539	1583	1770	3523		1610	3142	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	337	223	0	1130	397	174	158	5	130	332	321
RTOR Reduction (vph)	0	69	0	0	0	167	0	2	0	0	114	0
Lane Group Flow (vph)	163	491	0	0	1130	230	174	161	0	117	552	0
Turn Type	Prot	NA			NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6			2		4	4		3	3	
Permitted Phases						2						
Actuated Green, G (s)	10.4	82.2			64.8	64.8	18.5	18.5		30.8	30.8	
Effective Green, g (s)	10.4	82.2			64.8	64.8	18.5	18.5		30.8	30.8	
Actuated g/C Ratio	0.07	0.55			0.43	0.43	0.12	0.12		0.21	0.21	
Clearance Time (s)	7.0	6.0			6.0	6.0	6.0	6.0		6.5	6.5	
Vehicle Extension (s)	3.0	0.2			0.2	0.2	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	238	1823			1528	683	218	434		330	645	
v/s Ratio Prot	c0.05	0.15			c0.32		c0.10	0.05		0.07	c0.18	
v/s Ratio Perm						0.15						
v/c Ratio	0.68	0.27			0.74	0.34	0.80	0.37		0.35	0.86	
Uniform Delay, d1	68.2	18.0			35.6	28.3	63.9	60.4		51.1	57.4	
Progression Factor	0.98	2.62			0.88	0.53	1.00	1.00		0.67	0.62	
Incremental Delay, d2	6.6	0.3			3.0	1.2	18.1	0.5		0.6	9.4	
Delay (s)	73.6	47.4			34.2	16.4	82.1	60.9		34.8	45.2	
Level of Service	E	D			C	B	F	E		C	D	
Approach Delay (s)		53.3			29.6			71.8			43.6	
Approach LOS		D			C			E			D	

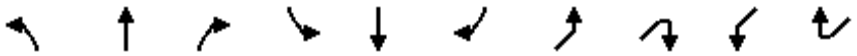
Intersection Summary			
HCM 2000 Control Delay	42.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	30	0	10	0	705	110	30	595	0
Future Volume (vph)	0	0	0	30	0	10	0	705	110	30	595	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5	5.5		6.5			6.5	
Lane Util. Factor					1.00	1.00		0.95			0.95	
Frt					1.00	0.85		0.98			1.00	
Flt Protected					0.95	1.00		1.00			1.00	
Satd. Flow (prot)					1770	1583		3467			3531	
Flt Permitted					0.76	1.00		1.00			0.88	
Satd. Flow (perm)					1410	1583		3467			3111	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	33	0	11	0	766	120	33	647	0
RTOR Reduction (vph)	0	0	0	0	0	10	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	33	1	0	886	0	0	680	0
Turn Type				Perm	NA	Perm		NA		pm+pt	NA	
Protected Phases		8			4			5		6	2	
Permitted Phases	8			4		4	5			2		
Actuated Green, G (s)					6.5	6.5		71.5			71.5	
Effective Green, g (s)					6.5	6.5		71.5			71.5	
Actuated g/C Ratio					0.07	0.07		0.79			0.79	
Clearance Time (s)					5.5	5.5		6.5			6.5	
Vehicle Extension (s)					5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)					101	114		2754			2471	
v/s Ratio Prot								c0.26				
v/s Ratio Perm					c0.02	0.00					0.22	
v/c Ratio					0.33	0.01		0.32			0.28	
Uniform Delay, d1					39.7	38.8		2.6			2.4	
Progression Factor					1.00	1.00		1.00			1.00	
Incremental Delay, d2					3.9	0.1		0.3			0.1	
Delay (s)					43.6	38.8		2.9			2.6	
Level of Service					D	D		A			A	
Approach Delay (s)		0.0			42.4			2.9			2.6	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	3.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

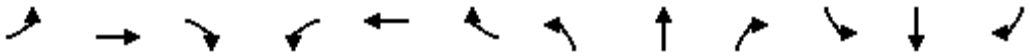
c Critical Lane Group



Movement	NBL	NBT	NBR2	SBL	SBT	SBR2	NEL	NER2	SWL	SWR2
Lane Configurations										
Traffic Volume (vph)	215	365	80	255	295	75	50	115	310	400
Future Volume (vph)	215	365	80	255	295	75	50	115	310	400
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	11.5	11.0	11.0	11.5	11.0		12.0	11.5	12.0	11.5
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		0.97	1.00	0.97	1.00
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3431		3433	1583	3433	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3431		3433	1583	3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	234	397	87	277	321	82	54	125	337	435
RTOR Reduction (vph)	0	0	0	0	0	0	0	27	0	383
Lane Group Flow (vph)	234	397	87	277	403	0	54	98	337	52
Turn Type	Prot	NA	Perm	Prot	NA		Prot	Prot	Prot	Prot
Protected Phases	5	2		1	6		8	5	4	1
Permitted Phases			2							
Actuated Green, G (s)	15.3	64.6	64.6	18.0	67.3		18.1	15.3	18.1	18.0
Effective Green, g (s)	15.3	64.6	64.6	18.0	67.3		18.1	15.3	18.1	18.0
Actuated g/C Ratio	0.10	0.43	0.43	0.12	0.45		0.12	0.10	0.12	0.12
Clearance Time (s)	11.5	11.0	11.0	11.5	11.0		12.0	11.5	12.0	11.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	350	1524	681	411	1539		414	161	414	189
v/s Ratio Prot	0.07	0.11		c0.08	c0.12		0.02	0.06	c0.10	0.03
v/s Ratio Perm			0.05							
v/c Ratio	0.67	0.26	0.13	0.67	0.26		0.13	0.61	0.81	0.28
Uniform Delay, d1	64.9	27.4	25.7	63.2	25.8		58.9	64.5	64.3	60.1
Progression Factor	1.12	0.76	0.75	1.00	1.00		0.90	1.55	1.00	1.00
Incremental Delay, d2	4.3	0.4	0.3	4.3	0.4		0.1	6.3	11.6	0.8
Delay (s)	77.0	21.2	19.7	67.5	26.2		53.3	106.1	75.9	60.9
Level of Service	E	C	B	E	C		D	F	E	E
Approach Delay (s)		39.2			43.1					
Approach LOS		D			D					

Intersection Summary			
HCM 2000 Control Delay	53.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	36.5
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		

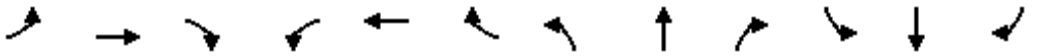
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	1360	0	0	880	105	110	5	220	0	0	0
Future Volume (vph)	155	1360	0	0	880	105	110	5	220	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.5			5.5	5.5		6.0	6.0			
Lane Util. Factor	0.97	0.95			0.95	1.00		1.00	0.88			
Frt	1.00	1.00			1.00	0.85		1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (prot)	3433	3539			3539	1583		1777	2787			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	3433	3539			3539	1583		1777	2787			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	168	1478	0	0	957	114	120	5	239	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	30	0	0	0	0	0	0
Lane Group Flow (vph)	168	1478	0	0	957	84	0	125	239	0	0	0
Turn Type	Prot	NA			NA	Perm	Split	NA	custom			
Protected Phases	1	6			2		3	3	8			
Permitted Phases						2			3			
Actuated Green, G (s)	13.6	119.6			101.0	101.0		18.9	18.9			
Effective Green, g (s)	13.6	119.6			101.0	101.0		18.9	18.9			
Actuated g/C Ratio	0.09	0.80			0.67	0.67		0.13	0.13			
Clearance Time (s)	5.0	5.5			5.5	5.5		6.0	6.0			
Vehicle Extension (s)	4.0	0.2			0.2	0.2		4.0	4.0			
Lane Grp Cap (vph)	311	2821			2382	1065		223	351			
v/s Ratio Prot	0.05	c0.42			0.27			0.07	c0.09			
v/s Ratio Perm						0.05						
v/c Ratio	0.54	0.52			0.40	0.08		0.56	0.68			
Uniform Delay, d1	65.2	5.3			11.0	8.5		61.6	62.7			
Progression Factor	1.00	1.00			1.28	0.84		1.00	1.00			
Incremental Delay, d2	2.4	0.7			0.5	0.1		3.9	5.8			
Delay (s)	67.6	6.0			14.5	7.3		65.5	68.5			
Level of Service	E	A			B	A		E	E			
Approach Delay (s)		12.3			13.8			67.5			0.0	
Approach LOS		B			B			E			A	

Intersection Summary			
HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	54.9%	ICU Level of Service	A
Analysis Period (min)	15		

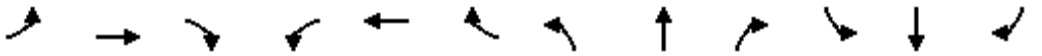
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	205	1320	55	25	875	155	30	15	10	220	35	80
Future Volume (vph)	205	1320	55	25	875	155	30	15	10	220	35	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	4.5	4.5	4.5	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	1749		3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	1770	1749		3433	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	223	1435	60	27	951	168	33	16	11	239	38	87
RTOR Reduction (vph)	0	0	21	0	0	81	0	10	0	0	0	77
Lane Group Flow (vph)	223	1435	39	27	951	87	33	17	0	239	38	10
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases			6			2						4
Actuated Green, G (s)	25.0	97.0	97.0	5.4	77.4	77.4	7.9	7.9		17.2	17.2	17.2
Effective Green, g (s)	25.0	97.0	97.0	5.4	77.4	77.4	7.9	7.9		17.2	17.2	17.2
Actuated g/C Ratio	0.17	0.65	0.65	0.04	0.52	0.52	0.05	0.05		0.11	0.11	0.11
Clearance Time (s)	6.0	6.0	6.0	4.5	4.5	4.5	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	4.0	0.2	0.2	3.0	3.0	3.0	4.0	4.0		4.0	4.0	4.0
Lane Grp Cap (vph)	295	3288	1023	63	2623	816	93	92		393	213	181
v/s Ratio Prot	c0.13	c0.28		0.02	0.19		c0.02	0.01		c0.07	0.02	
v/s Ratio Perm			0.02			0.05						0.01
v/c Ratio	0.76	0.44	0.04	0.43	0.36	0.11	0.35	0.18		0.61	0.18	0.06
Uniform Delay, d1	59.6	13.0	9.6	70.8	21.6	18.6	68.6	68.0		63.2	60.0	59.2
Progression Factor	0.90	1.21	5.69	0.97	1.14	2.18	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	9.8	0.0	0.0	4.6	0.4	0.3	3.2	1.3		3.1	0.5	0.2
Delay (s)	63.7	15.8	54.6	73.5	25.0	40.8	71.7	69.2		66.3	60.6	59.3
Level of Service	E	B	D	E	C	D	E	E		E	E	E
Approach Delay (s)		23.3			28.4			70.6			64.0	
Approach LOS		C			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	30.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	22.5
Intersection Capacity Utilization	56.4%	ICU Level of Service	B
Analysis Period (min)	15		

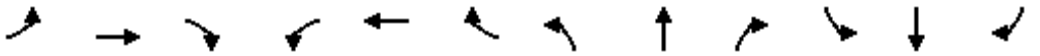
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	85	15	415	55	495	135	215	765	545	215	45
Future Volume (vph)	5	85	15	415	55	495	135	215	765	545	215	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5		6.5	6.5	
Lane Util. Factor	1.00	1.00		0.97	1.00		1.00	0.95		0.97	1.00	
Frt	1.00	0.98		1.00	0.87		1.00	0.88		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1821		3433	1611		1770	3125		3433	1814	
Flt Permitted	0.22	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	410	1821		3433	1611		1770	3125		3433	1814	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	92	16	451	60	538	147	234	832	592	234	49
RTOR Reduction (vph)	0	0	0	0	202	0	0	401	0	0	5	0
Lane Group Flow (vph)	5	108	0	451	396	0	147	665	0	592	278	0
Turn Type	pm+pt	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6											
Actuated Green, G (s)	36.4	35.8		22.3	57.5		17.9	37.1		29.3	48.5	
Effective Green, g (s)	36.4	35.8		22.3	57.5		17.9	37.1		29.3	48.5	
Actuated g/C Ratio	0.24	0.24		0.15	0.38		0.12	0.25		0.20	0.32	
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5		6.5	6.5	
Vehicle Extension (s)	3.0	0.2		3.0	0.2		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	104	434		510	617		211	772		670	586	
v/s Ratio Prot	0.00	0.06		c0.13	c0.25		0.08	c0.21		c0.17	0.15	
v/s Ratio Perm	0.01											
v/c Ratio	0.05	0.25		0.88	0.64		0.70	1.05dr		0.88	0.47	
Uniform Delay, d1	44.2	46.2		62.6	37.8		63.4	54.0		58.7	40.6	
Progression Factor	1.00	1.00		1.08	2.09		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.4		13.9	4.1		10.3	10.0		13.5	0.8	
Delay (s)	44.4	47.6		81.7	83.1		73.8	64.0		72.2	41.4	
Level of Service	D	D		F	F		E	E		E	D	
Approach Delay (s)		47.4			82.5			65.2			62.2	
Approach LOS		D			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	69.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	95.9%	ICU Level of Service	F
Analysis Period (min)	15		

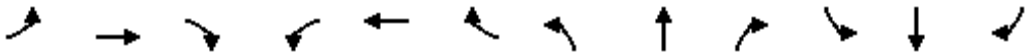
dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	170	1085	140	0	510	215	155	230	5	440	360	300
Future Volume (vph)	170	1085	140	0	510	215	155	230	5	440	360	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	6.0			6.0	6.0	6.0	6.0		6.5	6.5	
Lane Util. Factor	0.97	0.95			0.95	1.00	1.00	0.95		0.91	0.91	
Frt	1.00	0.98			1.00	0.85	1.00	1.00		1.00	0.94	
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3479			3539	1583	1770	3529		1610	3166	
Flt Permitted	0.95	1.00			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3479			3539	1583	1770	3529		1610	3166	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	185	1179	152	0	554	234	168	250	5	478	391	326
RTOR Reduction (vph)	0	6	0	0	0	154	0	1	0	0	75	0
Lane Group Flow (vph)	185	1325	0	0	554	80	168	254	0	406	714	0
Turn Type	Prot	NA			NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6			2		4	4		3	3	
Permitted Phases						2						
Actuated Green, G (s)	12.1	70.2			51.1	51.1	17.5	17.5		43.8	43.8	
Effective Green, g (s)	12.1	70.2			51.1	51.1	17.5	17.5		43.8	43.8	
Actuated g/C Ratio	0.08	0.47			0.34	0.34	0.12	0.12		0.29	0.29	
Clearance Time (s)	7.0	6.0			6.0	6.0	6.0	6.0		6.5	6.5	
Vehicle Extension (s)	3.0	0.2			0.2	0.2	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	276	1628			1205	539	206	411		470	924	
v/s Ratio Prot	0.05	c0.38			0.16		c0.09	0.07		c0.25	0.23	
v/s Ratio Perm						0.05						
v/c Ratio	0.67	0.81			0.46	0.15	0.82	0.62		0.86	0.77	
Uniform Delay, d1	67.0	34.3			38.7	34.3	64.7	63.1		50.3	48.5	
Progression Factor	0.95	1.73			1.00	2.02	1.00	1.00		0.77	0.79	
Incremental Delay, d2	3.4	2.5			1.2	0.6	21.4	2.8		12.8	3.4	
Delay (s)	67.2	61.9			39.8	69.8	86.1	65.8		51.4	41.8	
Level of Service	E	E			D	E	F	E		D	D	
Approach Delay (s)		62.5			48.7			73.9			45.1	
Approach LOS		E			D			E			D	

Intersection Summary			
HCM 2000 Control Delay	55.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		

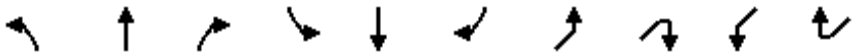
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	115	0	45	0	560	130	55	1110	0
Future Volume (vph)	0	0	0	115	0	45	0	560	130	55	1110	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5	5.5		6.5			6.5	
Lane Util. Factor					1.00	1.00		0.95			0.95	
Frt					1.00	0.85		0.97			1.00	
Flt Protected					0.95	1.00		1.00			1.00	
Satd. Flow (prot)					1770	1583		3439			3531	
Flt Permitted					0.76	1.00		1.00			0.87	
Satd. Flow (perm)					1410	1583		3439			3072	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	125	0	49	0	609	141	60	1207	0
RTOR Reduction (vph)	0	0	0	0	0	41	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	125	8	0	750	0	0	1267	0
Turn Type				Perm	NA	Perm		NA		pm+pt	NA	
Protected Phases		8			4			5		6	2	
Permitted Phases	8			4		4	5			2		
Actuated Green, G (s)					15.0	15.0		63.0			63.0	
Effective Green, g (s)					15.0	15.0		63.0			63.0	
Actuated g/C Ratio					0.17	0.17		0.70			0.70	
Clearance Time (s)					5.5	5.5		6.5			6.5	
Vehicle Extension (s)					5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)					235	263		2407			2150	
v/s Ratio Prot								0.22				
v/s Ratio Perm					c0.09	0.01					c0.41	
v/c Ratio					0.53	0.03		0.31			0.59	
Uniform Delay, d1					34.3	31.4		5.2			6.9	
Progression Factor					1.00	1.00		1.00			1.00	
Incremental Delay, d2					4.2	0.1		0.3			0.6	
Delay (s)					38.5	31.5		5.5			7.5	
Level of Service					D	C		A			A	
Approach Delay (s)		0.0			36.5			5.5			7.5	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

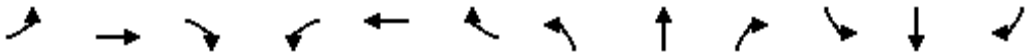


Movement	NBL	NBT	NBR2	SBL	SBT	SBR2	NEL	NER2	SWL	SWR2
Lane Configurations										
Traffic Volume (vph)	155	325	135	435	740	50	80	180	180	285
Future Volume (vph)	155	325	135	435	740	50	80	180	180	285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	11.5	11.0	11.0	11.5	11.0		12.0	11.5	12.0	11.5
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		0.97	1.00	0.97	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3506		3433	1583	3433	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3506		3433	1583	3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	168	353	147	473	804	54	87	196	196	310
RTOR Reduction (vph)	0	0	0	0	0	0	0	26	0	257
Lane Group Flow (vph)	168	353	147	473	858	0	87	170	196	53
Turn Type	Prot	NA	Perm	Prot	NA		Prot	Prot	Prot	Prot
Protected Phases	5	2		1	6		8	5	4	1
Permitted Phases			2							
Actuated Green, G (s)	19.9	62.7	62.7	25.7	68.5		12.3	19.9	12.3	25.7
Effective Green, g (s)	19.9	62.7	62.7	25.7	68.5		12.3	19.9	12.3	25.7
Actuated g/C Ratio	0.13	0.42	0.42	0.17	0.46		0.08	0.13	0.08	0.17
Clearance Time (s)	11.5	11.0	11.0	11.5	11.0		12.0	11.5	12.0	11.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	455	1479	661	588	1601		281	210	281	271
v/s Ratio Prot	0.05	0.10		c0.14	c0.24		0.03	0.11	c0.06	0.03
v/s Ratio Perm			0.09							
v/c Ratio	0.37	0.24	0.22	0.80	0.54		0.31	0.81	0.70	0.20
Uniform Delay, d1	59.3	28.2	28.0	59.7	29.3		64.9	63.2	67.0	53.3
Progression Factor	0.98	0.85	0.86	1.00	1.00		1.13	0.71	1.00	1.00
Incremental Delay, d2	0.4	0.3	0.7	7.9	1.3		0.6	18.7	7.3	0.4
Delay (s)	58.4	24.5	24.7	67.6	30.6		74.1	63.8	74.4	53.6
Level of Service	E	C	C	E	C		E	E	E	D
Approach Delay (s)		33.0			43.8					
Approach LOS		C			D					

Intersection Summary			
HCM 2000 Control Delay	46.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	36.5
Intersection Capacity Utilization	60.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

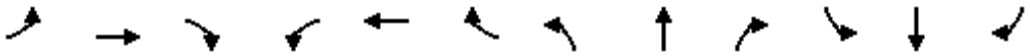
2040 No Build



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	1005	0	0	1380	105	85	0	65	0	0	0
Future Volume (vph)	135	1005	0	0	1380	105	85	0	65	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.5			5.5	5.5		6.0	6.0			
Lane Util. Factor	0.97	0.95			0.95	1.00		1.00	0.88			
Frt	1.00	1.00			1.00	0.85		1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (prot)	3433	3539			3539	1583		1770	2787			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	3433	3539			3539	1583		1770	2787			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	147	1092	0	0	1500	114	92	0	71	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	26	0	0	0	0	0	0
Lane Group Flow (vph)	147	1092	0	0	1500	88	0	92	71	0	0	0
Turn Type	Prot	NA			NA	Perm	Split	NA	custom			
Protected Phases	1	6			2		3	3	8			
Permitted Phases						2			3			
Actuated Green, G (s)	12.7	124.3			106.6	106.6		14.2	14.2			
Effective Green, g (s)	12.7	124.3			106.6	106.6		14.2	14.2			
Actuated g/C Ratio	0.08	0.83			0.71	0.71		0.09	0.09			
Clearance Time (s)	5.0	5.5			5.5	5.5		6.0	6.0			
Vehicle Extension (s)	4.0	0.2			0.2	0.2		4.0	4.0			
Lane Grp Cap (vph)	290	2932			2515	1124		167	263			
v/s Ratio Prot	c0.04	0.31			c0.42			c0.05	0.03			
v/s Ratio Perm						0.06						
v/c Ratio	0.51	0.37			0.60	0.08		0.55	0.27			
Uniform Delay, d1	65.7	3.2			10.9	6.6		64.9	63.1			
Progression Factor	1.00	1.00			1.32	2.77		1.00	1.00			
Incremental Delay, d2	1.9	0.4			0.7	0.1		4.8	0.8			
Delay (s)	67.6	3.5			15.2	18.5		69.6	63.8			
Level of Service	E	A			B	B		E	E			
Approach Delay (s)		11.1			15.4			67.1			0.0	
Approach LOS		B			B			E			A	

Intersection Summary			
HCM 2000 Control Delay	16.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

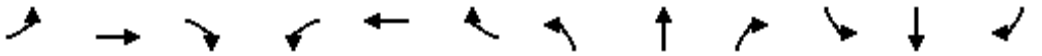
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	175	865	30	20	1430	155	15	20	10	50	10	40
Future Volume (vph)	175	865	30	20	1430	155	15	20	10	50	10	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.95		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3521		1770	3539	1583	1770	1770		1681	1570	
Flt Permitted	0.07	1.00		0.29	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	139	3521		548	3539	1583	1770	1770		1681	1570	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	190	940	33	22	1554	168	16	22	11	54	11	43
RTOR Reduction (vph)	0	1	0	0	0	45	0	10	0	0	40	0
Lane Group Flow (vph)	190	972	0	22	1554	123	16	23	0	49	19	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						
Actuated Green, G (s)	115.5	105.1		92.7	88.3	88.3	7.2	7.2		9.3	9.3	
Effective Green, g (s)	115.5	105.1		92.7	88.3	88.3	7.2	7.2		9.3	9.3	
Actuated g/C Ratio	0.77	0.70		0.62	0.59	0.59	0.05	0.05		0.06	0.06	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	0.2		4.0	0.2	0.2	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	337	2467		374	2083	931	84	84		104	97	
v/s Ratio Prot	c0.08	0.28		0.00	c0.44		0.01	c0.01		c0.03	0.01	
v/s Ratio Perm	0.35			0.03		0.08						
v/c Ratio	0.56	0.39		0.06	0.75	0.13	0.19	0.27		0.47	0.19	
Uniform Delay, d1	31.0	9.3		11.1	22.6	13.8	68.6	68.9		68.0	66.8	
Progression Factor	0.85	1.39		1.03	0.67	0.89	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.5	0.5		0.0	1.3	0.2	1.5	2.3		4.5	1.3	
Delay (s)	28.9	13.3		11.5	16.4	12.4	70.1	71.2		72.5	68.1	
Level of Service	C	B		B	B	B	E	E		E	E	
Approach Delay (s)		15.9			16.0			70.8			70.1	
Approach LOS		B			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	18.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		

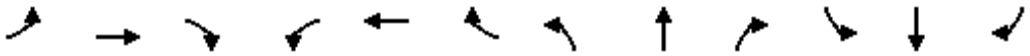
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	695	180	450	1505	135	95	110	155	80	100	5
Future Volume (vph)	50	695	180	450	1505	135	95	110	155	80	100	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3430		1770	3495		1770	1863	1583	1770	1863	1583
Flt Permitted	0.06	1.00		0.17	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	111	3430		321	3495		1770	1863	1583	1770	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	755	196	489	1636	147	103	120	168	87	109	5
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	150	0	0	4
Lane Group Flow (vph)	54	951	0	489	1780	0	103	120	18	87	109	1
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6			2					8			4
Actuated Green, G (s)	73.5	67.4		102.0	89.9		12.7	16.3	16.3	12.2	15.8	15.8
Effective Green, g (s)	73.5	67.4		102.0	89.9		12.7	16.3	16.3	12.2	15.8	15.8
Actuated g/C Ratio	0.49	0.45		0.68	0.60		0.08	0.11	0.11	0.08	0.11	0.11
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	0.2		3.0	0.2		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	121	1541		494	2094		149	202	172	143	196	166
v/s Ratio Prot	0.02	0.28		c0.19	0.51		c0.06	c0.06		0.05	0.06	
v/s Ratio Perm	0.20			c0.48					0.01			0.00
v/c Ratio	0.45	0.62		0.99	0.85		0.69	0.59	0.11	0.61	0.56	0.00
Uniform Delay, d1	25.8	31.5		33.7	24.5		66.7	63.7	60.3	66.6	63.8	60.1
Progression Factor	2.32	0.85		1.85	0.72		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.5	1.8		9.8	0.4		13.9	5.4	0.4	8.2	4.2	0.0
Delay (s)	62.4	28.6		72.1	18.1		80.7	69.1	60.7	74.8	67.9	60.1
Level of Service	E	C		E	B		F	E	E	E	E	E
Approach Delay (s)		30.4			29.7			68.5			70.7	
Approach LOS		C			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	36.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		

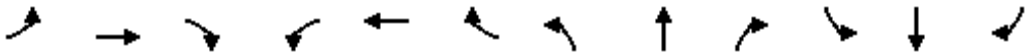
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	440	305	0	1650	435	230	230	5	130	320	210
Future Volume (vph)	185	440	305	0	1650	435	230	230	5	130	320	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	6.0	6.0		6.0	6.0		6.0		6.5	6.5	
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00		0.95		0.91	0.91	
Frt	1.00	1.00	0.85		1.00	0.85		1.00		1.00	0.94	
Flt Protected	0.95	1.00	1.00		1.00	1.00		0.98		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583		3539	1583		3449		1610	3190	
Flt Permitted	0.05	1.00	1.00		1.00	1.00		0.98		0.95	1.00	
Satd. Flow (perm)	92	3539	1583		3539	1583		3449		1610	3190	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	201	478	332	0	1793	473	250	250	5	141	348	228
RTOR Reduction (vph)	0	0	124	0	0	132	0	1	0	0	57	0
Lane Group Flow (vph)	201	478	208	0	1793	341	0	504	0	127	533	0
Turn Type	pm+pt	NA	Perm		NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6			2		4	4		3	3	
Permitted Phases	6		6			2						
Actuated Green, G (s)	94.0	94.0	94.0		74.0	74.0		17.0		20.5	20.5	
Effective Green, g (s)	94.0	94.0	94.0		74.0	74.0		17.0		20.5	20.5	
Actuated g/C Ratio	0.63	0.63	0.63		0.49	0.49		0.11		0.14	0.14	
Clearance Time (s)	7.0	6.0	6.0		6.0	6.0		6.0		6.5	6.5	
Vehicle Extension (s)	3.0	0.2	0.2		0.2	0.2		3.0		3.0	3.0	
Lane Grp Cap (vph)	203	2217	992		1745	780		390		220	435	
v/s Ratio Prot	c0.09	0.14			c0.51			c0.15		0.08	c0.17	
v/s Ratio Perm	0.53		0.13			0.22						
v/c Ratio	0.99	0.22	0.21		1.03	0.44		1.29		0.58	1.23	
Uniform Delay, d1	52.5	12.1	12.0		38.0	24.5		66.5		60.7	64.8	
Progression Factor	1.52	0.62	0.40		0.86	0.75		1.00		1.00	1.00	
Incremental Delay, d2	54.3	0.2	0.4		26.3	1.4		149.6		3.6	120.4	
Delay (s)	133.9	7.7	5.2		59.0	19.8		216.1		64.3	185.1	
Level of Service	F	A	A		E	B		F		E	F	
Approach Delay (s)		32.0			50.8			216.1			163.7	
Approach LOS		C			D			F			F	

Intersection Summary			
HCM 2000 Control Delay	83.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	103.2%	ICU Level of Service	G
Analysis Period (min)	15		

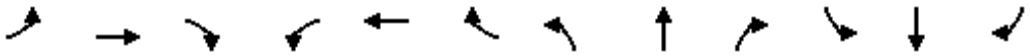
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	30	0	10	0	745	105	30	630	0
Future Volume (vph)	0	0	0	30	0	10	0	745	105	30	630	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5	5.5		6.5			6.5	
Lane Util. Factor					1.00	1.00		0.95			0.95	
Frt					1.00	0.85		0.98			1.00	
Flt Protected					0.95	1.00		1.00			1.00	
Satd. Flow (prot)					1770	1583		3474			3531	
Flt Permitted					0.76	1.00		1.00			0.88	
Satd. Flow (perm)					1410	1583		3474			3110	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	33	0	11	0	810	114	33	685	0
RTOR Reduction (vph)	0	0	0	0	0	10	0	4	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	33	1	0	920	0	0	718	0
Turn Type				Perm	NA	Perm		NA		pm+pt	NA	
Protected Phases		8			4			5		6	2	
Permitted Phases	8			4		4	5			2		
Actuated Green, G (s)					6.5	6.5		71.5			71.5	
Effective Green, g (s)					6.5	6.5		71.5			71.5	
Actuated g/C Ratio					0.07	0.07		0.79			0.79	
Clearance Time (s)					5.5	5.5		6.5			6.5	
Vehicle Extension (s)					5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)					101	114		2759			2470	
v/s Ratio Prot								c0.26				
v/s Ratio Perm					c0.02	0.00					0.23	
v/c Ratio					0.33	0.01		0.33			0.29	
Uniform Delay, d1					39.7	38.8		2.6			2.5	
Progression Factor					1.00	1.00		1.00			1.00	
Incremental Delay, d2					3.9	0.1		0.3			0.1	
Delay (s)					43.6	38.8		2.9			2.6	
Level of Service					D	D		A			A	
Approach Delay (s)		0.0			42.4			2.9			2.6	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	3.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		

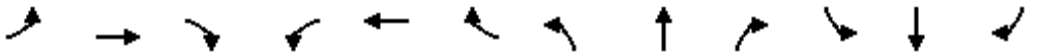
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	1475	0	0	940	120	130	5	245	0	0	0
Future Volume (vph)	185	1475	0	0	940	120	130	5	245	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.5			5.5	5.5		6.0	6.0			
Lane Util. Factor	0.97	0.95			0.95	1.00		1.00	0.88			
Frt	1.00	1.00			1.00	0.85		1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (prot)	3433	3539			3539	1583		1777	2787			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	3433	3539			3539	1583		1777	2787			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	201	1603	0	0	1022	130	141	5	266	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	37	0	0	0	0	0	0
Lane Group Flow (vph)	201	1603	0	0	1022	93	0	146	266	0	0	0
Turn Type	Prot	NA			NA	Perm	Split	NA	custom			
Protected Phases	1	6			2		3	3	8			
Permitted Phases						2			3			
Actuated Green, G (s)	15.1	118.2			98.1	98.1		20.3	20.3			
Effective Green, g (s)	15.1	118.2			98.1	98.1		20.3	20.3			
Actuated g/C Ratio	0.10	0.79			0.65	0.65		0.14	0.14			
Clearance Time (s)	5.0	5.5			5.5	5.5		6.0	6.0			
Vehicle Extension (s)	4.0	0.2			0.2	0.2		4.0	4.0			
Lane Grp Cap (vph)	345	2788			2314	1035		240	377			
v/s Ratio Prot	0.06	c0.45			0.29			0.08	c0.10			
v/s Ratio Perm						0.06						
v/c Ratio	0.58	0.57			0.44	0.09		0.61	0.71			
Uniform Delay, d1	64.4	6.2			12.6	9.5		61.1	62.0			
Progression Factor	1.00	1.00			2.01	4.84		1.00	1.00			
Incremental Delay, d2	3.0	0.9			0.4	0.1		5.0	6.3			
Delay (s)	67.4	7.0			25.8	46.3		66.1	68.3			
Level of Service	E	A			C	D		E	E			
Approach Delay (s)		13.8			28.2			67.5			0.0	
Approach LOS		B			C			E			A	

Intersection Summary			
HCM 2000 Control Delay	25.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		

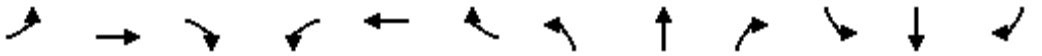
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	310	1350	60	20	905	240	30	20	10	345	50	125
Future Volume (vph)	310	1350	60	20	905	240	30	20	10	345	50	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.95		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	
Satd. Flow (prot)	1770	3517		1770	3539	1583	1770	1770		1681	1614	
Flt Permitted	0.12	1.00		0.08	1.00	1.00	0.95	1.00		0.95	0.98	
Satd. Flow (perm)	222	3517		158	3539	1583	1770	1770		1681	1614	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	337	1467	65	22	984	261	33	22	11	375	54	136
RTOR Reduction (vph)	0	2	0	0	0	119	0	10	0	0	23	0
Lane Group Flow (vph)	337	1530	0	22	984	142	33	23	0	289	253	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						
Actuated Green, G (s)	90.6	79.9		62.0	57.3	57.3	7.9	7.9		33.5	33.5	
Effective Green, g (s)	90.6	79.9		62.0	57.3	57.3	7.9	7.9		33.5	33.5	
Actuated g/C Ratio	0.60	0.53		0.41	0.38	0.38	0.05	0.05		0.22	0.22	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	0.2		4.0	0.2	0.2	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	415	1873		115	1351	604	93	93		375	360	
v/s Ratio Prot	c0.15	c0.44		0.01	0.28		c0.02	0.01		c0.17	0.16	
v/s Ratio Perm	0.34			0.07		0.09						
v/c Ratio	0.81	0.82		0.19	0.73	0.23	0.35	0.24		0.77	0.70	
Uniform Delay, d1	35.3	29.0		29.0	39.7	31.5	68.6	68.2		54.6	53.7	
Progression Factor	0.93	1.15		1.17	1.15	2.03	1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.2	3.4		0.7	2.2	0.6	3.2	1.9		10.0	6.6	
Delay (s)	43.1	36.8		34.6	47.9	64.5	71.7	70.0		64.6	60.3	
Level of Service	D	D		C	D	E	E	E		E	E	
Approach Delay (s)		37.9			51.1			70.9			62.5	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	46.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	15		

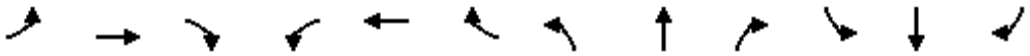
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	1400	290	240	910	175	225	230	495	220	170	30
Future Volume (vph)	15	1400	290	240	910	175	225	230	495	220	170	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3448		1770	3454		1770	1863	1583	1770	1863	1583
Flt Permitted	0.18	1.00		0.05	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	338	3448		101	3454		1770	1863	1583	1770	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	1522	315	261	989	190	245	250	538	239	185	33
RTOR Reduction (vph)	0	0	0	0	9	0	0	0	156	0	0	27
Lane Group Flow (vph)	16	1837	0	261	1170	0	245	250	382	239	185	6
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6			2					8			4
Actuated Green, G (s)	70.1	67.5		89.5	80.9		13.5	27.5	27.5	13.5	27.5	27.5
Effective Green, g (s)	70.1	67.5		89.5	80.9		13.5	27.5	27.5	13.5	27.5	27.5
Actuated g/C Ratio	0.47	0.45		0.60	0.54		0.09	0.18	0.18	0.09	0.18	0.18
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	0.2		3.0	0.2		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	182	1551		238	1862		159	341	290	159	341	290
v/s Ratio Prot	0.00	c0.53		c0.12	0.34		c0.14	0.13		0.14	0.10	
v/s Ratio Perm	0.04			0.53					c0.24			0.00
v/c Ratio	0.09	1.18		1.10	0.63		1.54	0.73	1.32	1.50	0.54	0.02
Uniform Delay, d1	22.4	41.2		52.3	24.1		68.2	57.8	61.2	68.2	55.5	50.2
Progression Factor	0.80	1.01		1.13	0.66		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	87.4		67.9	0.7		272.2	8.4	165.1	256.3	2.2	0.0
Delay (s)	18.1	128.9		127.0	16.5		340.5	66.2	226.3	324.5	57.8	50.3
Level of Service	B	F		F	B		F	E	F	F	E	D
Approach Delay (s)		127.9			36.5			214.7			196.7	
Approach LOS		F			D			F			F	

Intersection Summary			
HCM 2000 Control Delay	125.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	107.0%	ICU Level of Service	G
Analysis Period (min)	15		

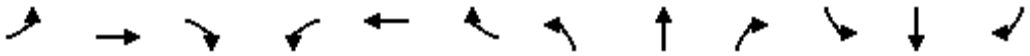
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	200	1705	210	0	800	210	225	310	5	525	460	300
Future Volume (vph)	200	1705	210	0	800	210	225	310	5	525	460	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	6.0	6.0		6.0	6.0		6.0		6.5	6.5	
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00		0.95		0.91	0.91	
Frt	1.00	1.00	0.85		1.00	0.85		1.00		1.00	0.95	
Flt Protected	0.95	1.00	1.00		1.00	1.00		0.98		0.95	0.99	
Satd. Flow (prot)	1770	3539	1583		3539	1583		3462		1610	3194	
Flt Permitted	0.13	1.00	1.00		1.00	1.00		0.98		0.95	0.99	
Satd. Flow (perm)	233	3539	1583		3539	1583		3462		1610	3194	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	217	1853	228	0	870	228	245	337	5	571	500	326
RTOR Reduction (vph)	0	0	73	0	0	131	0	0	0	0	42	0
Lane Group Flow (vph)	217	1853	155	0	870	97	0	587	0	468	887	0
Turn Type	pm+pt	NA	Perm		NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6			2		4	4		3	3	
Permitted Phases	6		6			2						
Actuated Green, G (s)	70.0	70.0	70.0		50.0	50.0		21.0		40.5	40.5	
Effective Green, g (s)	70.0	70.0	70.0		50.0	50.0		21.0		40.5	40.5	
Actuated g/C Ratio	0.47	0.47	0.47		0.33	0.33		0.14		0.27	0.27	
Clearance Time (s)	7.0	6.0	6.0		6.0	6.0		6.0		6.5	6.5	
Vehicle Extension (s)	3.0	0.2	0.2		0.2	0.2		3.0		3.0	3.0	
Lane Grp Cap (vph)	241	1651	738		1179	527		484		434	862	
v/s Ratio Prot	0.08	c0.52			0.25			c0.17		c0.29	0.28	
v/s Ratio Perm	0.34		0.10			0.06						
v/c Ratio	0.90	1.12	0.21		0.74	0.18		1.21		1.08	1.03	
Uniform Delay, d1	30.7	40.0	23.7		44.2	35.5		64.5		54.8	54.8	
Progression Factor	1.69	0.94	1.33		0.93	0.94		1.00		1.00	1.00	
Incremental Delay, d2	4.6	55.9	0.1		4.0	0.7		113.6		65.8	38.2	
Delay (s)	56.5	93.4	31.5		45.3	34.0		178.1		120.6	92.9	
Level of Service	E	F	C		D	C		F		F	F	
Approach Delay (s)		83.8			43.0			178.1			102.2	
Approach LOS		F			D			F			F	

Intersection Summary			
HCM 2000 Control Delay	90.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	102.9%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

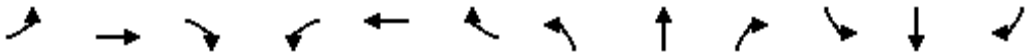


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	115	0	50	0	590	130	60	1170	0
Future Volume (vph)	0	0	0	115	0	50	0	590	130	60	1170	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5	5.5		6.5			6.5	
Lane Util. Factor					1.00	1.00		0.95			0.95	
Frt					1.00	0.85		0.97			1.00	
Flt Protected					0.95	1.00		1.00			1.00	
Satd. Flow (prot)					1770	1583		3443			3531	
Flt Permitted					0.76	1.00		1.00			0.86	
Satd. Flow (perm)					1410	1583		3443			3038	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	125	0	54	0	641	141	65	1272	0
RTOR Reduction (vph)	0	0	0	0	0	45	0	9	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	125	9	0	773	0	0	1337	0
Turn Type				Perm	NA	Perm		NA		pm+pt	NA	
Protected Phases		8			4			5		6	2	
Permitted Phases	8			4		4	5			2		
Actuated Green, G (s)					15.0	15.0		63.0			63.0	
Effective Green, g (s)					15.0	15.0		63.0			63.0	
Actuated g/C Ratio					0.17	0.17		0.70			0.70	
Clearance Time (s)					5.5	5.5		6.5			6.5	
Vehicle Extension (s)					5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)					235	263		2410			2126	
v/s Ratio Prot								0.22				
v/s Ratio Perm					c0.09	0.01					c0.44	
v/c Ratio					0.53	0.03		0.32			0.63	
Uniform Delay, d1					34.3	31.4		5.2			7.2	
Progression Factor					1.00	1.00		1.00			1.00	
Incremental Delay, d2					4.2	0.1		0.4			0.8	
Delay (s)					38.5	31.5		5.6			8.1	
Level of Service					D	C		A			A	
Approach Delay (s)		0.0			36.4			5.6			8.1	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

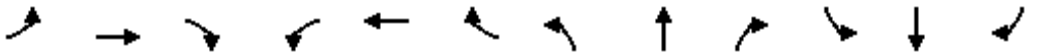
2040 Build



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	985	0	0	1460	95	90	0	70	0	0	0
Future Volume (vph)	125	985	0	0	1460	95	90	0	70	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.5			5.5	5.5		6.0	6.0			
Lane Util. Factor	0.97	0.95			0.95	1.00		1.00	0.88			
Frt	1.00	1.00			1.00	0.85		1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (prot)	3433	3539			3539	1583		1770	2787			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	3433	3539			3539	1583		1770	2787			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	136	1071	0	0	1587	103	98	0	76	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	26	0	0	0	0	0	0
Lane Group Flow (vph)	136	1071	0	0	1587	77	0	98	76	0	0	0
Turn Type	Prot	NA			NA	Perm	Split	NA	custom			
Protected Phases	1	6			2		3	3	8			
Permitted Phases						2			3			
Actuated Green, G (s)	12.3	123.8			106.5	106.5		14.7	14.7			
Effective Green, g (s)	12.3	123.8			106.5	106.5		14.7	14.7			
Actuated g/C Ratio	0.08	0.83			0.71	0.71		0.10	0.10			
Clearance Time (s)	5.0	5.5			5.5	5.5		6.0	6.0			
Vehicle Extension (s)	4.0	0.2			0.2	0.2		4.0	4.0			
Lane Grp Cap (vph)	281	2920			2512	1123		173	273			
v/s Ratio Prot	c0.04	0.30			c0.45			c0.06	0.03			
v/s Ratio Perm						0.05						
v/c Ratio	0.48	0.37			0.63	0.07		0.57	0.28			
Uniform Delay, d1	65.8	3.3			11.4	6.6		64.6	62.7			
Progression Factor	1.00	1.00			1.40	1.68		1.00	1.00			
Incremental Delay, d2	1.8	0.4			1.0	0.1		5.1	0.8			
Delay (s)	67.6	3.6			17.0	11.2		69.7	63.5			
Level of Service	E	A			B	B		E	E			
Approach Delay (s)		10.8			16.7			67.0			0.0	
Approach LOS		B			B			E			A	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		

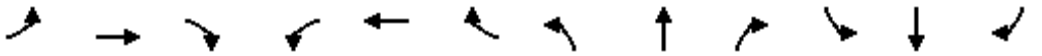
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	865	30	25	1500	140	20	20	10	45	10	35
Future Volume (vph)	160	865	30	25	1500	140	20	20	10	45	10	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	4.5	4.5	4.5	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	1770		3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	1770	1770		3433	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	174	940	33	27	1630	152	22	22	11	49	11	38
RTOR Reduction (vph)	0	0	9	0	0	65	0	10	0	0	0	36
Lane Group Flow (vph)	174	940	24	27	1630	87	22	23	0	49	11	2
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases			6			2						4
Actuated Green, G (s)	27.6	107.6	107.6	5.4	85.4	85.4	7.3	7.3		7.2	7.2	7.2
Effective Green, g (s)	27.6	107.6	107.6	5.4	85.4	85.4	7.3	7.3		7.2	7.2	7.2
Actuated g/C Ratio	0.18	0.72	0.72	0.04	0.57	0.57	0.05	0.05		0.05	0.05	0.05
Clearance Time (s)	6.0	6.0	6.0	4.5	4.5	4.5	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	4.0	0.2	0.2	3.0	3.0	3.0	4.0	4.0		4.0	4.0	4.0
Lane Grp Cap (vph)	325	3647	1135	63	2895	901	86	86		164	89	75
v/s Ratio Prot	c0.10	0.18		0.02	c0.32		0.01	c0.01		c0.01	0.01	
v/s Ratio Perm			0.01			0.05						0.00
v/c Ratio	0.54	0.26	0.02	0.43	0.56	0.10	0.26	0.26		0.30	0.12	0.02
Uniform Delay, d1	55.4	7.4	6.1	70.8	20.5	14.7	68.7	68.8		69.0	68.4	68.1
Progression Factor	0.93	1.39	1.00	1.03	0.82	0.55	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.1	0.0	0.0	4.6	0.8	0.2	2.1	2.2		1.4	0.9	0.2
Delay (s)	53.8	10.2	6.1	77.7	17.6	8.4	70.9	71.0		70.4	69.2	68.2
Level of Service	D	B	A	E	B	A	E	E		E	E	E
Approach Delay (s)		16.7			17.7			70.9			69.4	
Approach LOS		B			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	19.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	22.5
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		

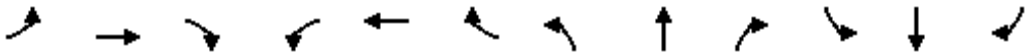
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	45	10	985	105	595	60	135	450	310	140	10
Future Volume (vph)	5	45	10	985	105	595	60	135	450	310	140	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5		6.5	6.5	
Lane Util. Factor	1.00	1.00		0.97	1.00		1.00	0.95		0.97	1.00	
Frt	1.00	0.97		1.00	0.87		1.00	0.88		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1812		3433	1625		1770	3131		3433	1844	
Flt Permitted	0.38	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	702	1812		3433	1625		1770	3131		3433	1844	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	49	11	1071	114	647	65	147	489	337	152	11
RTOR Reduction (vph)	0	0	0	0	119	0	0	424	0	0	2	0
Lane Group Flow (vph)	5	60	0	1071	642	0	65	212	0	337	161	0
Turn Type	pm+pt	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6											
Actuated Green, G (s)	36.7	36.1		51.8	87.3		9.2	17.9		18.7	27.4	
Effective Green, g (s)	36.7	36.1		51.8	87.3		9.2	17.9		18.7	27.4	
Actuated g/C Ratio	0.24	0.24		0.35	0.58		0.06	0.12		0.12	0.18	
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5		6.5	6.5	
Vehicle Extension (s)	3.0	0.2		3.0	0.2		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	176	436		1185	945		108	373		427	336	
v/s Ratio Prot	0.00	0.03		c0.31	c0.40		0.04	c0.07		c0.10	0.09	
v/s Ratio Perm	0.01											
v/c Ratio	0.03	0.14		0.90	0.68		0.60	0.57		0.79	0.48	
Uniform Delay, d1	43.1	44.7		46.7	21.7		68.6	62.4		63.7	54.9	
Progression Factor	1.00	1.00		1.11	2.05		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.7		3.5	1.3		10.5	2.4		9.9	1.5	
Delay (s)	43.2	45.4		55.4	45.7		79.1	64.8		73.6	56.4	
Level of Service	D	D		E	D		E	E		E	E	
Approach Delay (s)		45.2			51.3			66.1			68.0	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	57.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	85.6%	ICU Level of Service	E
Analysis Period (min)	15		

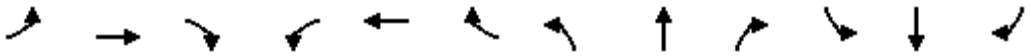
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	335	285	0	1175	405	215	375	5	120	475	295
Future Volume (vph)	185	335	285	0	1175	405	215	375	5	120	475	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	6.0			6.0	6.0	6.0	6.0		6.5	6.5	
Lane Util. Factor	0.97	0.95			0.95	1.00	1.00	0.95		0.91	0.91	
Frt	1.00	0.93			1.00	0.85	1.00	1.00		1.00	0.94	
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3295			3539	1583	1770	3533		1610	3196	
Flt Permitted	0.95	1.00			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3295			3539	1583	1770	3533		1610	3196	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	201	364	310	0	1277	440	234	408	5	130	516	321
RTOR Reduction (vph)	0	103	0	0	0	173	0	1	0	0	53	0
Lane Group Flow (vph)	201	571	0	0	1277	267	234	412	0	117	798	0
Turn Type	Prot	NA			NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6			2		4	4		3	3	
Permitted Phases						2						
Actuated Green, G (s)	9.0	74.0			58.0	58.0	20.0	20.0		37.5	37.5	
Effective Green, g (s)	9.0	74.0			58.0	58.0	20.0	20.0		37.5	37.5	
Actuated g/C Ratio	0.06	0.49			0.39	0.39	0.13	0.13		0.25	0.25	
Clearance Time (s)	7.0	6.0			6.0	6.0	6.0	6.0		6.5	6.5	
Vehicle Extension (s)	3.0	0.2			0.2	0.2	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	205	1625			1368	612	236	471		402	799	
v/s Ratio Prot	c0.06	0.17			c0.36		c0.13	0.12		0.07	c0.25	
v/s Ratio Perm						0.17						
v/c Ratio	0.98	0.35			0.93	0.44	0.99	0.88		0.29	1.00	
Uniform Delay, d1	70.4	23.3			44.1	33.9	64.9	63.8		45.5	56.2	
Progression Factor	0.98	2.45			0.90	0.80	1.00	1.00		0.64	0.61	
Incremental Delay, d2	47.5	0.4			11.8	2.0	56.0	16.4		0.3	28.2	
Delay (s)	116.8	57.4			51.7	29.1	120.9	80.2		29.6	62.7	
Level of Service	F	E			D	C	F	F		C	E	
Approach Delay (s)		71.1			45.9			94.9			58.7	
Approach LOS		E			D			F			E	

Intersection Summary			
HCM 2000 Control Delay	61.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	88.3%	ICU Level of Service	E
Analysis Period (min)	15		

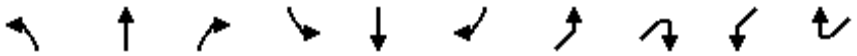
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	30	0	15	0	990	120	35	700	0
Future Volume (vph)	0	0	0	30	0	15	0	990	120	35	700	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5	5.5		6.5			6.5	
Lane Util. Factor					1.00	1.00		0.95			0.95	
Frt					1.00	0.85		0.98			1.00	
Flt Protected					0.95	1.00		1.00			1.00	
Satd. Flow (prot)					1770	1583		3482			3531	
Flt Permitted					0.76	1.00		1.00			0.84	
Satd. Flow (perm)					1410	1583		3482			2977	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	33	0	16	0	1076	130	38	761	0
RTOR Reduction (vph)	0	0	0	0	0	15	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	33	1	0	1206	0	0	799	0
Turn Type				Perm	NA	Perm		NA		pm+pt	NA	
Protected Phases		8			4			5		6	2	
Permitted Phases	8			4		4	5			2		
Actuated Green, G (s)					6.5	6.5		71.5			71.5	
Effective Green, g (s)					6.5	6.5		71.5			71.5	
Actuated g/C Ratio					0.07	0.07		0.79			0.79	
Clearance Time (s)					5.5	5.5		6.5			6.5	
Vehicle Extension (s)					5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)					101	114		2766			2365	
v/s Ratio Prot								c0.35				
v/s Ratio Perm					c0.02	0.00					0.27	
v/c Ratio					0.33	0.01		0.44			0.34	
Uniform Delay, d1					39.7	38.8		2.9			2.6	
Progression Factor					1.00	1.00		1.00			1.00	
Incremental Delay, d2					3.9	0.1		0.5			0.2	
Delay (s)					43.6	38.8		3.4			2.8	
Level of Service					D	D		A			A	
Approach Delay (s)		0.0			42.0			3.4			2.8	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	4.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

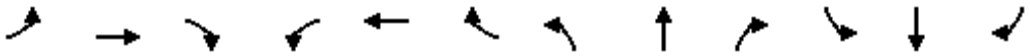
c Critical Lane Group



Movement	NBL	NBT	NBR2	SBL	SBT	SBR2	NEL	NER2	SWL	SWR2
Lane Configurations										
Traffic Volume (vph)	275	590	100	275	380	75	50	145	365	470
Future Volume (vph)	275	590	100	275	380	75	50	145	365	470
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	11.5	11.0	11.0	11.5	11.0		12.0	11.5	12.0	11.5
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		0.97	1.00	0.97	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3451		3433	1583	3433	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3451		3433	1583	3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	299	641	109	299	413	82	54	158	397	511
RTOR Reduction (vph)	0	0	18	0	18	0	0	26	0	446
Lane Group Flow (vph)	299	641	91	299	477	0	54	132	397	65
Turn Type	Prot	NA	Perm	Prot	NA		Prot	Prot	Prot	Prot
Protected Phases	5	2		1	6		8	5	4	1
Permitted Phases			2							
Actuated Green, G (s)	18.4	61.2	61.2	19.2	62.0		20.3	18.4	20.3	19.2
Effective Green, g (s)	18.4	61.2	61.2	19.2	62.0		20.3	18.4	20.3	19.2
Actuated g/C Ratio	0.12	0.41	0.41	0.13	0.41		0.14	0.12	0.14	0.13
Clearance Time (s)	11.5	11.0	11.0	11.5	11.0		12.0	11.5	12.0	11.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	421	1443	645	439	1426		464	194	464	202
v/s Ratio Prot	c0.09	c0.18		0.09	0.14		0.02	0.08	c0.12	0.04
v/s Ratio Perm			0.06							
v/c Ratio	0.71	0.44	0.14	0.68	0.33		0.12	0.68	0.86	0.32
Uniform Delay, d1	63.2	32.1	27.9	62.5	30.0		57.0	63.0	63.4	59.5
Progression Factor	1.10	0.76	0.67	1.00	1.00		0.88	1.36	1.00	1.00
Incremental Delay, d2	3.5	0.6	0.3	4.3	0.6		0.1	8.9	14.3	0.9
Delay (s)	73.1	25.1	18.9	66.8	30.6		50.1	94.5	77.7	60.4
Level of Service	E	C	B	E	C		D	F	E	E
Approach Delay (s)		38.2			44.2					
Approach LOS		D			D					

Intersection Summary			
HCM 2000 Control Delay	52.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	36.5
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		

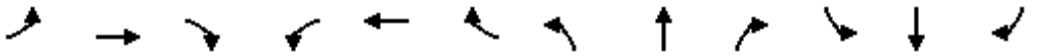
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	170	1485	0	0	980	110	135	5	255	0	0	0
Future Volume (vph)	170	1485	0	0	980	110	135	5	255	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.5			5.5	5.5		6.0	6.0			
Lane Util. Factor	0.97	0.95			0.95	1.00		1.00	0.88			
Frt	1.00	1.00			1.00	0.85		1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (prot)	3433	3539			3539	1583		1777	2787			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	3433	3539			3539	1583		1777	2787			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	185	1614	0	0	1065	120	147	5	277	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	31	0	0	0	0	0	0
Lane Group Flow (vph)	185	1614	0	0	1065	89	0	152	277	0	0	0
Turn Type	Prot	NA			NA	Perm	Split	NA	custom			
Protected Phases	1	6			2		3	3	8			
Permitted Phases						2			3			
Actuated Green, G (s)	14.4	117.7			98.3	98.3		20.8	20.8			
Effective Green, g (s)	14.4	117.7			98.3	98.3		20.8	20.8			
Actuated g/C Ratio	0.10	0.78			0.66	0.66		0.14	0.14			
Clearance Time (s)	5.0	5.5			5.5	5.5		6.0	6.0			
Vehicle Extension (s)	4.0	0.2			0.2	0.2		4.0	4.0			
Lane Grp Cap (vph)	329	2776			2319	1037		246	386			
v/s Ratio Prot	0.05	c0.46			0.30			0.09	c0.10			
v/s Ratio Perm						0.06						
v/c Ratio	0.56	0.58			0.46	0.09		0.62	0.72			
Uniform Delay, d1	64.8	6.4			12.7	9.4		60.9	61.8			
Progression Factor	1.00	1.00			1.81	2.77		1.00	1.00			
Incremental Delay, d2	2.7	0.9			0.6	0.1		5.2	6.7			
Delay (s)	67.5	7.3			23.6	26.3		66.1	68.5			
Level of Service	E	A			C	C		E	E			
Approach Delay (s)		13.5			23.9			67.6			0.0	
Approach LOS		B			C			E			A	

Intersection Summary			
HCM 2000 Control Delay	23.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		

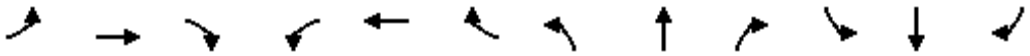
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	280	1405	55	25	950	220	30	20	10	315	45	110
Future Volume (vph)	280	1405	55	25	950	220	30	20	10	315	45	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	4.5	4.5	4.5	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	1770		3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	1770	1770		3433	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	304	1527	60	27	1033	239	33	22	11	342	49	120
RTOR Reduction (vph)	0	0	23	0	0	135	0	10	0	0	0	102
Lane Group Flow (vph)	304	1527	37	27	1033	104	33	23	0	342	49	18
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases			6			2						4
Actuated Green, G (s)	31.7	91.4	91.4	5.4	65.1	65.1	7.9	7.9		22.8	22.8	22.8
Effective Green, g (s)	31.7	91.4	91.4	5.4	65.1	65.1	7.9	7.9		22.8	22.8	22.8
Actuated g/C Ratio	0.21	0.61	0.61	0.04	0.43	0.43	0.05	0.05		0.15	0.15	0.15
Clearance Time (s)	6.0	6.0	6.0	4.5	4.5	4.5	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	4.0	0.2	0.2	3.0	3.0	3.0	4.0	4.0		4.0	4.0	4.0
Lane Grp Cap (vph)	374	3098	964	63	2206	687	93	93		521	283	240
v/s Ratio Prot	c0.17	c0.30		0.02	0.20		c0.02	0.01		c0.10	0.03	
v/s Ratio Perm			0.02			0.07						0.01
v/c Ratio	0.81	0.49	0.04	0.43	0.47	0.15	0.35	0.24		0.66	0.17	0.08
Uniform Delay, d1	56.3	16.4	11.7	70.8	30.2	25.7	68.6	68.2		59.9	55.4	54.6
Progression Factor	0.91	1.19	4.79	0.96	1.10	2.28	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	11.1	0.0	0.0	4.6	0.7	0.5	3.2	1.9		3.3	0.4	0.2
Delay (s)	62.4	19.5	56.2	72.8	33.8	59.0	71.7	70.0		63.2	55.8	54.7
Level of Service	E	B	E	E	C	E	E	E		E	E	D
Approach Delay (s)		27.5			39.3			70.9			60.5	
Approach LOS		C			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	36.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	22.5
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		

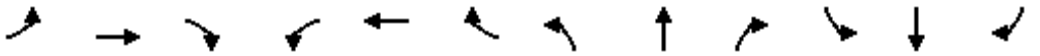
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	95	20	550	60	525	140	285	830	630	235	50
Future Volume (vph)	0	95	20	550	60	525	140	285	830	630	235	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.5		6.0	6.5		6.5	6.5		6.5	6.5	
Lane Util. Factor		1.00		0.97	1.00		1.00	0.95		0.97	1.00	
Frt		0.97		1.00	0.87		1.00	0.89		1.00	0.97	
Flt Protected		1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1814		3433	1612		1770	3144		3433	1814	
Flt Permitted		1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1814		3433	1612		1770	3144		3433	1814	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	103	22	598	65	571	152	310	902	685	255	54
RTOR Reduction (vph)	0	0	0	0	192	0	0	349	0	0	5	0
Lane Group Flow (vph)	0	125	0	598	444	0	152	863	0	685	304	0
Turn Type	pm+pt	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6											
Actuated Green, G (s)		25.4		27.0	58.4		18.3	40.9		31.2	53.8	
Effective Green, g (s)		25.4		27.0	58.4		18.3	40.9		31.2	53.8	
Actuated g/C Ratio		0.17		0.18	0.39		0.12	0.27		0.21	0.36	
Clearance Time (s)		6.5		6.0	6.5		6.5	6.5		6.5	6.5	
Vehicle Extension (s)		0.2		3.0	0.2		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		307		617	627		215	857		714	650	
v/s Ratio Prot		0.07		c0.17	c0.28		0.09	c0.27		c0.20	0.17	
v/s Ratio Perm												
v/c Ratio		0.41		0.97	0.71		0.71	1.16dr		0.96	0.47	
Uniform Delay, d1		55.6		61.1	38.6		63.3	54.5		58.8	37.1	
Progression Factor		1.00		1.06	1.93		1.00	1.00		1.00	1.00	
Incremental Delay, d2		4.0		19.3	3.6		10.8	32.4		24.0	0.7	
Delay (s)		59.6		84.0	78.3		74.1	87.0		82.7	37.8	
Level of Service		E		F	E		E	F		F	D	
Approach Delay (s)		59.6			81.1			85.5			68.8	
Approach LOS		E			F			F			E	

Intersection Summary			
HCM 2000 Control Delay	78.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	104.5%	ICU Level of Service	G
Analysis Period (min)	15		

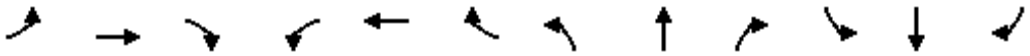
dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	190	1170	195	0	575	235	205	400	5	485	665	355
Future Volume (vph)	190	1170	195	0	575	235	205	400	5	485	665	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	6.0			6.0	6.0	6.0	6.0		6.5	6.5	
Lane Util. Factor	0.97	0.95			0.95	1.00	1.00	0.95		0.91	0.91	
Frt	1.00	0.98			1.00	0.85	1.00	1.00		1.00	0.95	
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3463			3539	1583	1770	3533		1610	3214	
Flt Permitted	0.95	1.00			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3463			3539	1583	1770	3533		1610	3214	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	207	1272	212	0	625	255	223	435	5	527	723	386
RTOR Reduction (vph)	0	9	0	0	0	185	0	1	0	0	37	0
Lane Group Flow (vph)	207	1475	0	0	625	70	223	439	0	474	1125	0
Turn Type	Prot	NA			NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6			2		4	4		3	3	
Permitted Phases						2						
Actuated Green, G (s)	13.0	61.4			41.4	41.4	19.0	19.0		51.1	51.1	
Effective Green, g (s)	13.0	61.4			41.4	41.4	19.0	19.0		51.1	51.1	
Actuated g/C Ratio	0.09	0.41			0.28	0.28	0.13	0.13		0.34	0.34	
Clearance Time (s)	7.0	6.0			6.0	6.0	6.0	6.0		6.5	6.5	
Vehicle Extension (s)	3.0	0.2			0.2	0.2	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	297	1417			976	436	224	447		548	1094	
v/s Ratio Prot	0.06	c0.43			0.18		c0.13	0.12		0.29	c0.35	
v/s Ratio Perm						0.04						
v/c Ratio	0.70	1.04			0.64	0.16	1.00	0.98		0.86	1.03	
Uniform Delay, d1	66.6	44.3			47.8	41.1	65.5	65.3		46.2	49.5	
Progression Factor	1.01	1.56			0.97	1.83	1.00	1.00		0.63	0.66	
Incremental Delay, d2	2.3	25.9			3.2	0.8	58.5	37.7		7.6	27.4	
Delay (s)	69.4	95.2			49.6	76.2	124.0	103.1		36.9	60.1	
Level of Service	E	F			D	E	F	F		D	E	
Approach Delay (s)		92.1			57.3			110.1			53.3	
Approach LOS		F			E			F			D	

Intersection Summary			
HCM 2000 Control Delay	75.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	94.6%	ICU Level of Service	F
Analysis Period (min)	15		

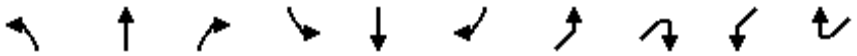
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	130	0	55	0	735	145	70	1390	0
Future Volume (vph)	0	0	0	130	0	55	0	735	145	70	1390	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5	5.5		6.5			6.5	
Lane Util. Factor					1.00	1.00		0.95			0.95	
Frt					1.00	0.85		0.98			1.00	
Flt Protected					0.95	1.00		1.00			1.00	
Satd. Flow (prot)					1770	1583		3452			3531	
Flt Permitted					0.76	1.00		1.00			0.83	
Satd. Flow (perm)					1410	1583		3452			2922	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	141	0	60	0	799	158	76	1511	0
RTOR Reduction (vph)	0	0	0	0	0	50	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	141	10	0	957	0	0	1587	0
Turn Type				Perm	NA	Perm		NA		pm+pt	NA	
Protected Phases		8			4			5		6	2	
Permitted Phases	8			4		4	5			2		
Actuated Green, G (s)					15.7	15.7		62.3			62.3	
Effective Green, g (s)					15.7	15.7		62.3			62.3	
Actuated g/C Ratio					0.17	0.17		0.69			0.69	
Clearance Time (s)					5.5	5.5		6.5			6.5	
Vehicle Extension (s)					5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)					245	276		2389			2022	
v/s Ratio Prot								0.28				
v/s Ratio Perm					c0.10	0.01					c0.54	
v/c Ratio					0.58	0.04		0.40			0.78	
Uniform Delay, d1					34.1	30.9		5.9			9.3	
Progression Factor					1.00	1.00		1.00			1.00	
Incremental Delay, d2					5.1	0.1		0.5			2.4	
Delay (s)					39.2	31.0		6.4			11.7	
Level of Service					D	C		A			B	
Approach Delay (s)		0.0			36.8			6.4			11.7	
Approach LOS		A			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	88.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	NBL	NBT	NBR2	SBL	SBT	SBR2	NEL	NER2	SWL	SWR2
Lane Configurations										
Traffic Volume (vph)	195	460	170	465	1005	50	85	245	255	335
Future Volume (vph)	195	460	170	465	1005	50	85	245	255	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	11.5	11.0	11.0	11.5	11.0		12.0	11.5	12.0	11.5
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		0.97	1.00	0.97	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3514		3433	1583	3433	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3514		3433	1583	3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	212	500	185	505	1092	54	92	266	277	364
RTOR Reduction (vph)	0	0	0	0	0	0	0	24	0	298
Lane Group Flow (vph)	212	500	185	505	1146	0	92	242	277	66
Turn Type	Prot	NA	Perm	Prot	NA		Prot	Prot	Prot	Prot
Protected Phases	5	2		1	6		8	5	4	1
Permitted Phases			2							
Actuated Green, G (s)	28.2	60.9	60.9	27.2	59.9		12.6	28.2	12.6	27.2
Effective Green, g (s)	28.2	60.9	60.9	27.2	59.9		12.6	28.2	12.6	27.2
Actuated g/C Ratio	0.19	0.41	0.41	0.18	0.40		0.08	0.19	0.08	0.18
Clearance Time (s)	11.5	11.0	11.0	11.5	11.0		12.0	11.5	12.0	11.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	645	1436	642	622	1403		288	297	288	287
v/s Ratio Prot	0.06	0.14		0.15	c0.33		0.03	c0.15	c0.08	0.04
v/s Ratio Perm			0.12							
v/c Ratio	0.33	0.35	0.29	0.81	0.82		0.32	0.81	0.96	0.23
Uniform Delay, d1	52.7	30.8	30.0	58.9	40.2		64.7	58.4	68.5	52.5
Progression Factor	0.74	0.86	0.86	1.00	1.00		1.09	0.77	1.00	1.00
Incremental Delay, d2	0.2	0.4	0.7	7.9	5.4		0.6	13.9	42.5	0.4
Delay (s)	39.5	26.8	26.4	66.9	45.5		70.8	59.1	110.9	52.9
Level of Service	D	C	C	E	D		E	E	F	D
Approach Delay (s)		29.7			52.1					
Approach LOS		C			D					

Intersection Summary			
HCM 2000 Control Delay	52.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	36.5
Intersection Capacity Utilization	73.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

SimTraffic Delay Analysis

Existing Conditions

1: Ramp A/Ramp B & Montrose Pkwy/Montrose Pkwy #1 Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBR	All
Denied Del/Veh (s)	2.8	0.3	0.0	0.0	4.0	1.6	0.4
Total Del/Veh (s)	60.5	2.7	12.2	4.2	66.4	66.5	14.2

2: Maple St/Chapman Ave & Montrose Pkwy #1/Randolph Rd #1 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2
Total Del/Veh (s)	15.1	6.1	4.5	9.0	9.6	4.5	78.1	62.7	10.9	65.8	64.9	30.0

2: Maple St/Chapman Ave & Montrose Pkwy #1/Randolph Rd #1 Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	10.3

3: Nebel St & Randolph Rd #1 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.7	3.8	4.0	0.4	0.1
Total Del/Veh (s)	24.3	20.1	16.9	28.9	18.6	16.3	71.8	62.9	9.0	66.3	62.2	13.2

3: Nebel St & Randolph Rd #1 Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	24.3

4: Parklawn Dr & Randolph Rd #1/Randolph Rd Performance by movement

Movement	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	62.3	10.1	6.3	41.9	9.0	78.8	74.9	48.4	61.4	71.4	50.7	39.3

5: Parklawn Dr & Braxfield Ct Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.3	0.2	0.1
Total Del/Veh (s)	23.2	4.9	6.0	5.2	7.8	2.0	4.7

Total Zone Performance

Denied Del/Veh (s)	1.0
Total Del/Veh (s)	2139.0

1: Ramp A/Ramp B & Montrose Pkwy/Montrose Pkwy #1 Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	2.3	0.4	0.0	0.0	3.8	3.1	1.3	0.6
Total Del/Veh (s)	61.2	6.5	15.4	4.8	59.4	45.9	58.1	18.8

2: Maple St/Chapman Ave & Montrose Pkwy #1/Randolph Rd #1 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2
Total Del/Veh (s)	18.1	20.3	16.0	22.4	20.6	5.9	64.8	74.4	23.6	58.3	56.0	36.3

2: Maple St/Chapman Ave & Montrose Pkwy #1/Randolph Rd #1 Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	23.4

3: Nebel St & Randolph Rd #1 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	42.7	38.7	45.5	73.9	59.8	68.9
Total Del/Veh (s)	43.5	54.0	54.1	64.8	19.0	15.9	159.1	77.5	54.3	323.4	147.3	14.6

3: Nebel St & Randolph Rd #1 Performance by movement

Movement	All
Denied Del/Veh (s)	15.4
Total Del/Veh (s)	69.2

4: Parklawn Dr & Randolph Rd #1/Randolph Rd Performance by movement

Movement	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	81.9	99.5	58.9	33.3	3.8	91.7	89.6	82.4	50.0	53.3	39.1	67.5

5: Parklawn Dr & Braxfield Ct Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.2	0.1	0.0	0.0	0.5	0.3	0.2
Total Del/Veh (s)	36.2	4.3	8.2	6.0	11.7	5.8	8.6

Total Zone Performance

Denied Del/Veh (s)	13.8
Total Del/Veh (s)	2472.9

2022 No Build

1: Ramp A/Ramp B & Montrose Pkwy/Montrose Pkwy #1 Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBR	All
Denied Del/Veh (s)	2.7	0.3	0.0	0.0	4.0	1.7	0.4
Total Del/Veh (s)	58.2	2.9	12.6	4.3	67.3	62.4	14.4

2: Maple St/Chapman Ave & Montrose Pkwy #1/Randolph Rd #1 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.1	0.2	0.1
Total Del/Veh (s)	15.3	7.2	4.7	12.5	9.9	4.5	70.4	67.5	22.6	66.6	56.1	22.6

2: Maple St/Chapman Ave & Montrose Pkwy #1/Randolph Rd #1 Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	10.7

3: Nebel St & Randolph Rd #1 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	3.6	0.7	3.8	3.8	0.3	0.2
Total Del/Veh (s)	27.0	21.6	19.9	29.8	19.0	17.6	68.3	61.1	8.9	67.0	60.9	12.5

3: Nebel St & Randolph Rd #1 Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	25.4

4: Parklawn Dr & Randolph Rd #1/Randolph Rd Performance by movement

Movement	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	67.5	10.9	6.6	42.6	9.4	87.8	83.6	73.6	71.0	80.3	63.5	43.1

5: Parklawn Dr & Braxfield Ct Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.2	0.2	0.1
Total Del/Veh (s)	26.9	4.4	6.2	5.4	9.2	2.2	5.0

Total Zone Performance

Denied Del/Veh (s)	1.0
Total Del/Veh (s)	2018.6

1: Ramp A/Ramp B & Montrose Pkwy/Montrose Pkwy #1 Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	32.1	31.9	0.0	0.0	3.6	4.1	1.4	17.6
Total Del/Veh (s)	73.3	63.7	18.7	5.0	49.8	52.4	61.4	47.5

2: Maple St/Chapman Ave & Montrose Pkwy #1/Randolph Rd #1 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2
Total Del/Veh (s)	22.5	58.7	53.4	23.7	19.6	5.8	63.1	75.6	29.3	59.4	55.7	33.1

2: Maple St/Chapman Ave & Montrose Pkwy #1/Randolph Rd #1 Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	41.5

3: Nebel St & Randolph Rd #1 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	50.5	50.8	45.5	113.4	111.1	106.8
Total Del/Veh (s)	64.3	82.2	78.0	65.4	19.4	14.9	161.3	81.5	58.0	284.9	122.1	13.1

3: Nebel St & Randolph Rd #1 Performance by movement

Movement	All
Denied Del/Veh (s)	21.3
Total Del/Veh (s)	77.8

4: Parklawn Dr & Randolph Rd #1/Randolph Rd Performance by movement

Movement	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	105.1	125.4	83.1	32.1	4.0	94.8	96.4	89.4	54.4	59.9	51.1	78.6

5: Parklawn Dr & Braxfield Ct Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.2	0.1	0.0	0.0	0.6	0.4	0.3
Total Del/Veh (s)	36.7	5.1	8.5	6.7	12.0	6.6	9.2

Total Zone Performance

Denied Del/Veh (s)	27.9
Total Del/Veh (s)	2552.8

2022 Build

1: Ramp A/Ramp B & Montrose Pkwy/Montrose Pkwy #1 Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBR	All
Denied Del/Veh (s)	2.7	0.3	0.0	0.0	4.0	0.8	0.3
Total Del/Veh (s)	61.6	2.9	16.0	2.1	66.5	60.4	15.7

2: Maple St/Chapman Ave & Montrose Pkwy #1/Montrose Pkwy Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	4.1
Total Del/Veh (s)	67.0	9.7	1.6	62.5	12.6	2.3	71.5	68.4	16.4	68.3	74.4	17.8

2: Maple St/Chapman Ave & Montrose Pkwy #1/Montrose Pkwy Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	15.6

3: Nebel St & Randolph Rd #1 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	3.2	0.2	0.4	1.0	0.2	0.3
Total Del/Veh (s)	23.3	46.0	39.7	78.3	53.8	41.9	67.7	53.3	15.2	64.1	48.9	25.8

3: Nebel St & Randolph Rd #1 Performance by movement

Movement	All
Denied Del/Veh (s)	0.3
Total Del/Veh (s)	55.8

4: Parklawn Dr & Randolph Rd #1/Randolph Rd Performance by movement

Movement	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	73.4	33.7	27.1	40.5	10.4	81.3	71.7	47.2	42.1	50.3	45.6	42.1

5: Parklawn Dr & Braxfield Ct Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	1.2	0.6	0.3
Total Del/Veh (s)	29.8	6.3	8.5	8.5	31.1	6.3	8.4

32: Ramp C/Ramp E & Parklawn Dr & Ramp F/Ramp D Performance by movement

Movement	NBL	NBT	NBR2	SBL	SBT	SBR2	NEL	NER2	SWL	SWR2	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	68.9	29.1	2.4	56.9	24.9	6.3	51.3	1.9	72.1	4.8	35.0

Total Zone Performance

Denied Del/Veh (s)	0.7
Total Del/Veh (s)	2203.9

1: Ramp A/Ramp B & Montrose Pkwy/Montrose Pkwy #1 Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	2.3	0.5	0.0	0.0	3.7	3.6	1.1	0.6
Total Del/Veh (s)	64.5	7.7	17.7	3.7	60.8	54.6	57.3	19.9

2: Maple St/Chapman Ave & Montrose Pkwy #1/Montrose Pkwy Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.4	3.6
Total Del/Veh (s)	58.3	17.7	2.2	69.1	26.6	3.7	61.3	64.9	17.5	59.3	58.0	7.4

2: Maple St/Chapman Ave & Montrose Pkwy #1/Montrose Pkwy Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	26.5

3: Nebel St & Randolph Rd #1 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	165.8	165.2	165.7	0.9	0.4	0.4
Total Del/Veh (s)	37.7	48.4	37.2	76.1	57.4	37.0	62.2	70.0	100.6	63.4	35.1	23.4

3: Nebel St & Randolph Rd #1 Performance by movement

Movement	All
Denied Del/Veh (s)	61.3
Total Del/Veh (s)	67.0

4: Parklawn Dr & Randolph Rd #1/Randolph Rd Performance by movement

Movement	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	90.8	55.3	54.4	37.7	10.5	87.2	83.8	75.8	39.9	45.5	39.2	50.8

5: Parklawn Dr & Braxfield Ct Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.3	0.3	0.0	0.0	88.5	86.2	49.5
Total Del/Veh (s)	61.9	5.2	11.0	10.4	59.4	34.3	27.8

32: Ramp C/Ramp E & Parklawn Dr & Ramp F/Ramp D Performance by movement

Movement	NBL	NBT	NBR2	SBL	SBT	SBR2	NEL	NET	NER2	SWL	SWT	SWR2
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	80.1	35.4	3.5	59.0	26.2	13.2	74.9	0.0	2.9	73.5	0.6	2.9

32: Ramp C/Ramp E & Parklawn Dr & Ramp F/Ramp D Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	35.9

Total Zone Performance

Denied Del/Veh (s)	51.9
Total Del/Veh (s)	2553.7

2040 No Build

1: Ramp A/Ramp B & Montrose Pkwy/Montrose Pkwy #1 Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBR	All
Denied Del/Veh (s)	2.5	0.4	0.0	0.0	3.9	1.6	0.5
Total Del/Veh (s)	64.3	3.9	14.9	5.0	62.5	56.3	15.4

2: Maple St/Chapman Ave & Montrose Pkwy #1/Randolph Rd #1 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.1
Total Del/Veh (s)	21.5	9.8	6.9	14.4	14.8	5.9	65.4	66.4	13.6	68.0	61.6	26.5

2: Maple St/Chapman Ave & Montrose Pkwy #1/Randolph Rd #1 Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	15.0

3: Nebel St & Randolph Rd #1 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	3.6	0.9	3.6	3.8	0.4	0.2
Total Del/Veh (s)	29.0	26.3	25.6	42.8	23.3	20.7	65.4	58.4	12.6	66.9	58.6	8.4

3: Nebel St & Randolph Rd #1 Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	30.5

4: Parklawn Dr & Randolph Rd #1/Randolph Rd Performance by movement

Movement	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.2	0.1	0.6	0.1
Total Del/Veh (s)	65.0	11.6	9.4	42.3	8.6	102.3	101.5	73.7	165.4	308.2	286.7	83.9

5: Parklawn Dr & Braxfield Ct Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	12.4	11.3	5.4
Total Del/Veh (s)	38.4	4.4	6.6	5.5	23.6	19.8	13.5

Total Zone Performance

Denied Del/Veh (s)	3.8
Total Del/Veh (s)	2373.6

1: Ramp A/Ramp B & Montrose Pkwy/Montrose Pkwy #1 Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	646.5	655.3	0.0	0.0	3.6	3.3	1.4	361.7
Total Del/Veh (s)	133.7	274.9	28.3	6.1	44.2	33.1	59.3	128.5

2: Maple St/Chapman Ave & Montrose Pkwy #1/Randolph Rd #1 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.4	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.3	0.3
Total Del/Veh (s)	50.8	144.9	146.2	22.6	31.6	7.9	70.3	61.6	30.4	49.4	50.5	44.1

2: Maple St/Chapman Ave & Montrose Pkwy #1/Randolph Rd #1 Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	71.6

3: Nebel St & Randolph Rd #1 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	366.0	376.8	391.1	297.3	269.5	251.4
Total Del/Veh (s)	88.6	117.2	115.6	62.2	20.3	16.6	171.9	116.8	103.0	370.6	193.1	23.3

3: Nebel St & Randolph Rd #1 Performance by movement

Movement	All
Denied Del/Veh (s)	131.5
Total Del/Veh (s)	104.9

4: Parklawn Dr & Randolph Rd #1/Randolph Rd Performance by movement

Movement	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	129.7	160.9	111.5	25.5	4.2	95.7	97.5	89.4	70.0	87.7	86.4	95.1

5: Parklawn Dr & Braxfield Ct Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.2	0.1	0.0	0.0	0.6	0.5	0.4
Total Del/Veh (s)	36.6	4.9	7.7	6.1	12.0	7.2	9.2

Total Zone Performance

Denied Del/Veh (s)	290.8
Total Del/Veh (s)	2973.0

2040 Build

1: Ramp A/Ramp B & Montrose Pkwy #3 Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBR	All
Denied Del/Veh (s)	2.5	0.3	0.0	0.0	3.9	1.0	0.4
Total Del/Veh (s)	61.5	3.6	23.9	2.7	64.4	64.3	20.1

2: Maple St/Chapman Ave & Montrose Pkwy #3 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	4.0
Total Del/Veh (s)	59.3	10.1	1.8	73.7	20.8	3.3	65.4	66.0	19.6	67.7	62.7	19.5

2: Maple St/Chapman Ave & Montrose Pkwy #3 Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	20.6

3: Nebel St & Randolph Rd #1 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	3.1	0.2	0.4	1.1	0.2	0.2
Total Del/Veh (s)	29.9	45.6	50.3	61.3	44.9	34.8	75.6	56.6	26.3	68.8	45.9	22.8

3: Nebel St & Randolph Rd #1 Performance by movement

Movement	All
Denied Del/Veh (s)	0.3
Total Del/Veh (s)	48.9

4: Parklawn Dr/Parklawn Dr #2 & Randolph Rd #1 Performance by movement

Movement	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	206.3	39.0	36.4	56.7	17.1	93.7	90.3	59.3	41.7	53.9	50.8	60.3

5: Parklawn Dr #2/Parklawn Dr & Braxfield Ct Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.7	2.1	0.9
Total Del/Veh (s)	43.3	7.2	10.0	9.9	43.4	12.2	12.1

32: Ramp C/Ramp E & Parklawn Dr #2 & Ramp F/Ramp D Performance by movement

Movement	NBL	NBT	NBR2	SBL	SBT	SBR2	NEL	NER2	SWL	SWT	SWR2	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	77.3	36.0	3.3	53.6	28.1	10.1	49.3	2.7	88.8	0.5	7.7	39.4

Total Zone Performance

Denied Del/Veh (s)	1.1
Total Del/Veh (s)	2474.0

1: Ramp A/Ramp B & Montrose Pkwy/Montrose Pkwy #1 Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	2.2	0.6	0.0	0.0	3.6	3.8	1.2	0.7
Total Del/Veh (s)	61.1	9.1	22.8	3.6	54.2	52.3	51.9	21.7

2: Maple St/Chapman Ave & Montrose Pkwy #1/Montrose Pkwy Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.4	0.4	3.4
Total Del/Veh (s)	54.7	18.7	2.8	67.2	31.8	5.2	64.3	62.3	21.0	54.5	48.8	10.3

2: Maple St/Chapman Ave & Montrose Pkwy #1/Montrose Pkwy Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	28.5

3: Nebel St & Randolph Rd #1 Performance by movement

Movement	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	447.0	431.3	428.4	0.9	0.4	0.4	169.3
Total Del/Veh (s)	54.5	51.6	83.3	59.6	38.5	61.3	69.4	103.1	74.8	32.3	23.9	71.5

4: Parklawn Dr & Randolph Rd #1/Randolph Rd Performance by movement

Movement	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	118.7	84.8	88.8	41.1	11.7	90.6	87.2	82.5	39.8	46.5	42.1	62.4

5: Parklawn Dr & Braxfield Ct Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.6	0.2	0.0	0.0	631.8	634.8	392.9
Total Del/Veh (s)	66.8	6.1	12.2	13.0	57.6	38.4	29.8

32: Ramp C/Ramp E & Parklawn Dr & Ramp F/Ramp D Performance by movement

Movement	NBL	NBT	NBR2	SBL	SBT	SBR2	NEL	NER2	SWL	SWR2	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	76.8	30.9	3.4	59.0	28.3	12.9	78.1	5.4	98.3	4.4	37.2

Total Zone Performance

Denied Del/Veh (s)	238.5
Total Del/Veh (s)	2565.2

SimTraffic Queuing Analysis

Existing Conditions

Intersection: 1: Ramp A/Ramp B & Montrose Pkwy/Montrose Pkwy #1

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	UL	L	T	T	T	T	R	LT	R	R
Maximum Queue (ft)	164	136	108	97	244	247	59	130	87	65
Average Queue (ft)	84	22	31	35	144	159	19	57	31	17
95th Queue (ft)	139	79	79	79	230	235	50	115	71	48
Link Distance (ft)			914	914	492	492			417	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	400	400					325	270		185
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 2: Maple St/Chapman Ave & Montrose Pkwy #1/Randolph Rd #1

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	TR	L	LTR
Maximum Queue (ft)	80	161	208	47	239	245	101	68	50	50	92
Average Queue (ft)	34	61	81	12	106	123	16	16	17	11	24
95th Queue (ft)	70	139	177	38	201	226	62	48	45	36	65
Link Distance (ft)		492	492		606	606		478	478	470	470
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	375			175			225				
Storage Blk Time (%)					1	1					
Queuing Penalty (veh)					0	0					

Intersection: 3: Nebel St & Randolph Rd #1

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	UL	T	TR	L	T	TR	L	T	R	L	T	R
Maximum Queue (ft)	87	247	302	199	326	313	150	140	90	114	138	25
Average Queue (ft)	21	118	161	132	182	204	66	65	44	45	53	3
95th Queue (ft)	70	221	278	208	279	290	124	123	73	94	108	17
Link Distance (ft)		606	606		1094	1094		608			755	755
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150			150			210		275	275		
Storage Blk Time (%)		3		7	12							
Queuing Penalty (veh)		1		42	40							

Intersection: 4: Parklawn Dr & Randolph Rd #1/Randolph Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	T	R	T	T	R	LT	TR	L	LT	TR
Maximum Queue (ft)	200	98	112	82	337	323	299	194	168	249	299	336
Average Queue (ft)	106	38	51	35	306	287	62	160	108	105	180	193
95th Queue (ft)	182	82	97	66	323	320	246	205	181	215	265	291
Link Distance (ft)		1094	1094		180	180	180	150	150		904	904
Upstream Blk Time (%)					48	46		34	3			
Queuing Penalty (veh)					280	267		51	5			
Storage Bay Dist (ft)	300			300						450		
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 5: Parklawn Dr & Braxfield Ct

Movement	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	LT	TR	LT	TR
Maximum Queue (ft)	73	29	65	67	110	84
Average Queue (ft)	23	10	10	17	33	19
95th Queue (ft)	55	31	39	51	83	59
Link Distance (ft)	223	223	904	904	254	254
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 14: Loehman's Plaza/Lauderdale Drive & Randolph Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LTR
Maximum Queue (ft)	24	114	151	174	1846	1849	132	34	108
Average Queue (ft)	3	26	29	36	1066	1073	61	5	32
95th Queue (ft)	16	85	103	137	2208	2196	119	24	80
Link Distance (ft)		362	362		2813	2813		253	534
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	150			125			140		
Storage Blk Time (%)		0			41		1		
Queuing Penalty (veh)		0			12		0		

Intersection: 15:

Movement	SE
Directions Served	R
Maximum Queue (ft)	292
Average Queue (ft)	136
95th Queue (ft)	277
Link Distance (ft)	291
Upstream Blk Time (%)	0
Queuing Penalty (veh)	2
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 26: Parklawn Dr

Movement	SB	SB	NW	NW
Directions Served	T	T	R	R
Maximum Queue (ft)	50	66	30	6
Average Queue (ft)	7	8	13	0
95th Queue (ft)	32	39	36	4
Link Distance (ft)	150	150	11	11
Upstream Blk Time (%)			17	0
Queuing Penalty (veh)			26	0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 144: Randolph Rd

Movement	EB	EB	WB	WB	WB	WB	NE	NE
Directions Served	T	T	L	L	T	T	R	R
Maximum Queue (ft)	150	165	200	225	414	446	130	114
Average Queue (ft)	66	74	140	219	368	381	52	35
95th Queue (ft)	131	139	229	252	438	448	107	94
Link Distance (ft)	180	180			362	362	203	203
Upstream Blk Time (%)	0	0			13	16		
Queuing Penalty (veh)	0	1			145	178		
Storage Bay Dist (ft)			175	175				
Storage Blk Time (%)			1	8	34			
Queuing Penalty (veh)			7	68	152			

Intersection: 147: Parklawn Dr

Movement	NE	NE	NE	SW
Directions Served	L	T	T	T
Maximum Queue (ft)	185	102	67	4
Average Queue (ft)	75	7	2	0
95th Queue (ft)	157	72	34	3
Link Distance (ft)		211	211	203
Upstream Blk Time (%)	0	0		
Queuing Penalty (veh)	0	0		
Storage Bay Dist (ft)	150			
Storage Blk Time (%)	2	0		
Queuing Penalty (veh)	1	0		

Network Summary

Network wide Queuing Penalty: 1280

Intersection: 1: Ramp A/Ramp B & Montrose Pkwy/Montrose Pkwy #1

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	UL	L	T	T	T	T	R	LT	R	R
Maximum Queue (ft)	204	158	197	179	242	252	62	184	212	180
Average Queue (ft)	111	40	90	85	104	119	27	93	112	54
95th Queue (ft)	180	115	171	165	197	213	56	161	183	137
Link Distance (ft)			914	914	492	492			417	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	400	400					325	270		185
Storage Blk Time (%)						0			1	0
Queuing Penalty (veh)						0			1	0

Intersection: 2: Maple St/Chapman Ave & Montrose Pkwy #1/Randolph Rd #1

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	TR	L	LTR
Maximum Queue (ft)	307	431	445	86	272	291	229	73	67	185	218
Average Queue (ft)	66	229	248	17	160	178	35	23	20	83	93
95th Queue (ft)	159	384	400	65	255	280	111	62	53	153	174
Link Distance (ft)		492	492		606	606		478	478	470	470
Upstream Blk Time (%)		0	0								
Queuing Penalty (veh)		0	0								
Storage Bay Dist (ft)	375			175			225				
Storage Blk Time (%)		1			6	3					
Queuing Penalty (veh)		2			1	4					

Intersection: 3: Nebel St & Randolph Rd #1

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	UL	T	TR	L	T	TR	L	T	R	L	T	R
Maximum Queue (ft)	163	622	627	199	302	270	259	584	325	324	637	337
Average Queue (ft)	15	478	496	128	120	136	194	330	227	275	463	118
95th Queue (ft)	92	643	647	208	255	237	306	727	384	405	975	518
Link Distance (ft)		606	606		1094	1094		608			755	755
Upstream Blk Time (%)		2	3					19			30	2
Queuing Penalty (veh)		15	20					0			0	0
Storage Bay Dist (ft)	150			150			210		275	275		
Storage Blk Time (%)		35		13	4		34	4	8	61		
Queuing Penalty (veh)		3		48	7		185	20	25	73		

Intersection: 4: Parklawn Dr & Randolph Rd #1/Randolph Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	T	R	T	T	R	LT	TR	L	LT	TR
Maximum Queue (ft)	350	1029	1044	350	304	299	80	190	189	318	362	378
Average Queue (ft)	234	681	700	226	192	200	5	166	140	198	252	246
95th Queue (ft)	454	1048	1064	479	286	297	49	216	208	292	333	348
Link Distance (ft)		1094	1094		180	180	180	150	150		904	904
Upstream Blk Time (%)		0	0		10	13		51	25			
Queuing Penalty (veh)		1	2		28	36		96	47			
Storage Bay Dist (ft)	300			300						450		
Storage Blk Time (%)	0	50	54									
Queuing Penalty (veh)	0	82	80									

Intersection: 5: Parklawn Dr & Braxfield Ct

Movement	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	LT	TR	LT	TR
Maximum Queue (ft)	146	62	107	126	250	183
Average Queue (ft)	65	21	17	25	112	53
95th Queue (ft)	119	49	63	80	212	136
Link Distance (ft)	223	223	904	904	254	254
Upstream Blk Time (%)					0	0
Queuing Penalty (veh)					0	0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 14: Loehman's Plaza/Lauderdale Drive & Randolph Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LTR
Maximum Queue (ft)	169	390	385	130	168	144	180	178	57
Average Queue (ft)	23	335	340	52	62	60	95	52	20
95th Queue (ft)	95	423	417	107	137	127	159	115	52
Link Distance (ft)		362	362		2812	2812		253	534
Upstream Blk Time (%)		5	7						
Queuing Penalty (veh)		59	75						
Storage Bay Dist (ft)	150			125			140		
Storage Blk Time (%)		22		0	1		5	0	
Queuing Penalty (veh)		5		2	0		3	0	

Intersection: 15:

Movement	NB	NB	SE
Directions Served	T	T	R
Maximum Queue (ft)	667	652	201
Average Queue (ft)	392	340	63
95th Queue (ft)	839	784	159
Link Distance (ft)	644	644	291
Upstream Blk Time (%)	26	10	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 26: Parklawn Dr

Movement	SB	SB	NW	NW
Directions Served	T	T	R	R
Maximum Queue (ft)	45	60	48	40
Average Queue (ft)	5	5	21	8
95th Queue (ft)	26	31	43	31
Link Distance (ft)	150	150	11	11
Upstream Blk Time (%)			39	11
Queuing Penalty (veh)			73	21
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 144: Randolph Rd

Movement	EB	EB	WB	WB	WB	WB	NE	NE
Directions Served	T	T	L	L	T	T	R	R
Maximum Queue (ft)	179	169	182	203	141	67	323	327
Average Queue (ft)	70	80	88	113	7	6	294	289
95th Queue (ft)	160	165	154	172	70	38	349	347
Link Distance (ft)	180	180			362	362	203	203
Upstream Blk Time (%)	1	1					85	86
Queuing Penalty (veh)	7	9					191	193
Storage Bay Dist (ft)			175	175				
Storage Blk Time (%)			0	1				
Queuing Penalty (veh)			0	5				

Intersection: 147: Parklawn Dr

Movement	NE	NE	NE	SW
Directions Served	L	T	T	T
Maximum Queue (ft)	200	337	323	4
Average Queue (ft)	183	278	232	0
95th Queue (ft)	257	408	416	3
Link Distance (ft)		211	211	203
Upstream Blk Time (%)	3	59	53	
Queuing Penalty (veh)	0	242	220	
Storage Bay Dist (ft)	150			
Storage Blk Time (%)	30	56		
Queuing Penalty (veh)	66	209		

Network Summary

Network wide Queuing Penalty: 2160

2022 No Build

Intersection: 1: Ramp A/Ramp B & Montrose Pkwy/Montrose Pkwy #1

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	UL	L	T	T	T	T	R	LT	R	R
Maximum Queue (ft)	152	113	102	123	243	259	56	156	100	82
Average Queue (ft)	84	20	34	41	149	165	20	67	37	19
95th Queue (ft)	141	69	81	94	231	241	50	125	84	55
Link Distance (ft)			914	914	492	492			417	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	400	400					325	270		185
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 2: Maple St/Chapman Ave & Montrose Pkwy #1/Randolph Rd #1

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	TR	L	LTR
Maximum Queue (ft)	87	226	262	39	225	242	96	65	88	67	88
Average Queue (ft)	34	76	90	11	109	128	14	16	20	15	21
95th Queue (ft)	69	175	200	35	201	227	58	53	56	46	59
Link Distance (ft)		492	492		606	606		478	478	470	470
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	375			175			225				
Storage Blk Time (%)					2	1					
Queuing Penalty (veh)					0	0					

Intersection: 3: Nebel St & Randolph Rd #1

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	UL	T	TR	L	T	TR	L	T	R	L	T	R
Maximum Queue (ft)	153	311	350	200	296	342	145	149	106	143	169	26
Average Queue (ft)	24	140	181	131	178	209	67	76	45	52	66	4
95th Queue (ft)	82	260	310	207	273	299	130	138	78	113	130	18
Link Distance (ft)		606	606		1094	1094		608			755	755
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150			150			210		275	275		
Storage Blk Time (%)		6		7	11		0					
Queuing Penalty (veh)		2		47	40		0					

Intersection: 4: Parklawn Dr & Randolph Rd #1/Randolph Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	T	R	T	T	R	LT	TR	L	LT	TR
Maximum Queue (ft)	248	103	116	93	343	324	301	194	183	280	351	363
Average Queue (ft)	131	42	59	36	308	284	76	169	126	124	214	229
95th Queue (ft)	218	85	104	72	329	319	267	201	183	242	310	337
Link Distance (ft)		1094	1094		180	180	180	150	150		904	904
Upstream Blk Time (%)					48	46	0	46	8			
Queuing Penalty (veh)					297	283	1	77	13			
Storage Bay Dist (ft)	300			300						450		
Storage Blk Time (%)	0											
Queuing Penalty (veh)	0											

Intersection: 5: Parklawn Dr & Braxfield Ct

Movement	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	LT	TR	LT	TR
Maximum Queue (ft)	58	33	70	75	106	81
Average Queue (ft)	21	9	9	15	40	18
95th Queue (ft)	51	31	38	54	93	60
Link Distance (ft)	223	223	904	904	254	254
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 14: Loehman's Plaza/Lauderdale Drive & Randolph Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LTR
Maximum Queue (ft)	29	77	74	174	2857	2855	128	24	91
Average Queue (ft)	3	13	12	49	2167	2163	59	3	35
95th Queue (ft)	16	49	52	168	3519	3512	107	17	81
Link Distance (ft)		362	362		2813	2813		253	534
Upstream Blk Time (%)					29	24			
Queuing Penalty (veh)					0	0			
Storage Bay Dist (ft)	150			125			140		
Storage Blk Time (%)					47		1		
Queuing Penalty (veh)					14		0		

Intersection: 15:

Movement	NB	SE
Directions Served	T	R
Maximum Queue (ft)	31	356
Average Queue (ft)	1	210
95th Queue (ft)	19	369
Link Distance (ft)	644	291
Upstream Blk Time (%)		3
Queuing Penalty (veh)		12
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 26: Parklawn Dr

Movement	SB	SB	NW	NW
Directions Served	T	T	R	R
Maximum Queue (ft)	67	82	30	14
Average Queue (ft)	13	15	19	0
95th Queue (ft)	47	55	40	7
Link Distance (ft)	150	150	11	11
Upstream Blk Time (%)			26	0
Queuing Penalty (veh)			44	1
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 144: Randolph Rd

Movement	EB	EB	WB	WB	WB	WB	NE	NE
Directions Served	T	T	L	L	T	T	R	R
Maximum Queue (ft)	157	170	200	225	413	428	127	102
Average Queue (ft)	78	84	150	221	373	384	63	40
95th Queue (ft)	146	154	236	248	423	422	111	92
Link Distance (ft)	180	180			362	362	203	203
Upstream Blk Time (%)	0	0			14	15		
Queuing Penalty (veh)	0	1			173	178		
Storage Bay Dist (ft)			175	175				
Storage Blk Time (%)			2	11	31			
Queuing Penalty (veh)			15	105	165			

Intersection: 147: Parklawn Dr

Movement	NE	NE	NE	SW
Directions Served	L	T	T	T
Maximum Queue (ft)	194	225	115	17
Average Queue (ft)	109	36	7	1
95th Queue (ft)	194	179	66	9
Link Distance (ft)		211	211	203
Upstream Blk Time (%)	0	1	0	
Queuing Penalty (veh)	0	4	0	
Storage Bay Dist (ft)	150			
Storage Blk Time (%)	7	1		
Queuing Penalty (veh)	6	4		

Network Summary

Network wide Queuing Penalty: 1483

Intersection: 1: Ramp A/Ramp B & Montrose Pkwy/Montrose Pkwy #1

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	UL	L	T	T	T	T	R	LT	R	R
Maximum Queue (ft)	213	362	663	663	260	280	72	200	215	184
Average Queue (ft)	118	180	356	354	117	128	30	88	116	70
95th Queue (ft)	190	598	941	943	211	223	59	162	197	158
Link Distance (ft)			914	914	492	492			417	
Upstream Blk Time (%)			18	15						
Queuing Penalty (veh)			0	0						
Storage Bay Dist (ft)	400	400					325	270		185
Storage Blk Time (%)			25			0		0	1	0
Queuing Penalty (veh)			43			0		0	2	0

Intersection: 2: Maple St/Chapman Ave & Montrose Pkwy #1/Randolph Rd #1

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	TR	L	LTR
Maximum Queue (ft)	425	533	523	52	283	283	151	73	71	165	195
Average Queue (ft)	195	376	390	15	151	168	30	26	19	85	90
95th Queue (ft)	490	612	603	43	258	276	103	61	51	149	170
Link Distance (ft)		492	492		606	606		478	478	470	470
Upstream Blk Time (%)		14	16								
Queuing Penalty (veh)		105	117								
Storage Bay Dist (ft)	375			175			225				
Storage Blk Time (%)	0	32			5	2					
Queuing Penalty (veh)	0	48			1	3					

Intersection: 3: Nebel St & Randolph Rd #1

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	UL	T	TR	L	T	TR	L	T	R	L	T	R
Maximum Queue (ft)	199	634	640	199	335	301	260	630	325	324	636	338
Average Queue (ft)	18	562	568	139	124	140	202	388	256	266	397	84
95th Queue (ft)	103	710	697	213	275	250	314	748	400	393	889	440
Link Distance (ft)		606	606		1094	1094		608			755	755
Upstream Blk Time (%)		14	16					19			28	1
Queuing Penalty (veh)		101	112					0			0	0
Storage Bay Dist (ft)	150			150			210		275	275		
Storage Blk Time (%)		55		17	3		39	5	10	52	1	
Queuing Penalty (veh)		5		64	6		230	31	35	70	1	

Intersection: 4: Parklawn Dr & Randolph Rd #1/Randolph Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	T	R	T	T	R	LT	TR	L	LT	TR
Maximum Queue (ft)	350	1108	1101	350	292	285	160	183	194	406	443	484
Average Queue (ft)	239	855	868	255	189	197	9	155	136	246	310	321
95th Queue (ft)	457	1240	1247	493	276	283	71	219	214	372	429	453
Link Distance (ft)		1094	1094		180	180	180	150	150		904	904
Upstream Blk Time (%)		0	0		10	12		41	26			
Queuing Penalty (veh)		3	4		29	36		86	53			
Storage Bay Dist (ft)	300			300						450		
Storage Blk Time (%)	0	54	58	0						0	0	
Queuing Penalty (veh)	0	94	90	0						0	0	

Intersection: 5: Parklawn Dr & Braxfield Ct

Movement	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	LT	TR	LT	TR
Maximum Queue (ft)	161	58	81	118	276	231
Average Queue (ft)	74	22	19	29	137	73
95th Queue (ft)	130	49	61	85	247	174
Link Distance (ft)	223	223	904	904	254	254
Upstream Blk Time (%)					1	0
Queuing Penalty (veh)					0	0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 14: Loehman's Plaza/Lauderdale Drive & Randolph Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LTR
Maximum Queue (ft)	199	386	390	133	207	162	174	174	65
Average Queue (ft)	27	334	340	51	67	64	101	59	21
95th Queue (ft)	116	431	430	106	150	139	163	129	54
Link Distance (ft)		362	362		2812	2812		253	534
Upstream Blk Time (%)		6	7					0	
Queuing Penalty (veh)		68	81					0	
Storage Bay Dist (ft)	150			125			140		
Storage Blk Time (%)	0	22		1	1		6	0	
Queuing Penalty (veh)	0	5		5	0		4	0	

Intersection: 15:

Movement	NB	NB	SE
Directions Served	T	T	R
Maximum Queue (ft)	683	681	280
Average Queue (ft)	623	597	138
95th Queue (ft)	807	827	257
Link Distance (ft)	644	644	291
Upstream Blk Time (%)	76	35	0
Queuing Penalty (veh)	0	0	1
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 26: Parklawn Dr

Movement	SB	SB	NW	NW
Directions Served	T	T	R	R
Maximum Queue (ft)	97	89	38	45
Average Queue (ft)	19	19	16	8
95th Queue (ft)	65	64	38	31
Link Distance (ft)	150	150	11	11
Upstream Blk Time (%)			32	10
Queuing Penalty (veh)			67	20
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 144: Randolph Rd

Movement	EB	EB	WB	WB	WB	WB	NE	NE
Directions Served	T	T	L	L	T	T	R	R
Maximum Queue (ft)	202	204	199	212	203	64	331	338
Average Queue (ft)	89	101	117	137	11	4	304	303
95th Queue (ft)	192	196	194	199	90	33	327	319
Link Distance (ft)	180	180			362	362	203	203
Upstream Blk Time (%)	1	1					95	97
Queuing Penalty (veh)	12	13					258	262
Storage Bay Dist (ft)			175	175				
Storage Blk Time (%)			1	3				
Queuing Penalty (veh)			5	15				

Intersection: 147: Parklawn Dr

Movement	NE	NE	NE	SW	SW
Directions Served	L	T	T	T	T
Maximum Queue (ft)	200	341	341	11	12
Average Queue (ft)	191	311	297	0	0
95th Queue (ft)	252	330	374	8	8
Link Distance (ft)		211	211	203	203
Upstream Blk Time (%)	3	80	84		
Queuing Penalty (veh)	0	381	402		
Storage Bay Dist (ft)	150				
Storage Blk Time (%)	24	80			
Queuing Penalty (veh)	65	331			

Network Summary

Network wide Queuing Penalty: 3363

2022 Build

Intersection: 1: Ramp A/Ramp B & Montrose Pkwy/Montrose Pkwy #1

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	UL	L	T	T	T	T	R	LT	R	R
Maximum Queue (ft)	193	149	116	120	370	365	51	148	118	48
Average Queue (ft)	87	22	46	36	179	191	14	62	46	10
95th Queue (ft)	157	78	94	87	322	331	41	120	98	34
Link Distance (ft)			914	914	485	485	485		418	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	400	400						270		185
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 2: Maple St/Chapman Ave & Montrose Pkwy #1/Montrose Pkwy

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	T	R	L	T	T	T	R	L	TR
Maximum Queue (ft)	202	241	244	198	26	71	294	319	185	58	63	63
Average Queue (ft)	92	86	77	48	3	18	129	147	24	17	17	15
95th Queue (ft)	165	190	179	134	16	51	250	268	93	45	47	44
Link Distance (ft)		485	485	485			1106	1106	1106		466	466
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	400				400	500				400		
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 2: Maple St/Chapman Ave & Montrose Pkwy #1/Montrose Pkwy

Movement	SB	SB	SB	SB
Directions Served	L	L	T	R
Maximum Queue (ft)	23	93	44	76
Average Queue (ft)	1	33	6	18
95th Queue (ft)	9	74	26	51
Link Distance (ft)		475	475	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	135			135
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Nebel St & Randolph Rd #1

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	L	TR	L	T	TR	L	L	TR
Maximum Queue (ft)	29	116	200	934	918	131	189	320	177	223	220
Average Queue (ft)	3	34	195	625	554	52	73	115	88	132	106
95th Queue (ft)	16	86	211	898	891	108	145	229	169	196	194
Link Distance (ft)		433		1078	1078		602	602		760	760
Upstream Blk Time (%)				0	1						
Queuing Penalty (veh)				2	5						
Storage Bay Dist (ft)	150		150			210			275		
Storage Blk Time (%)		0	30	45						0	
Queuing Penalty (veh)		0	137	203						0	

Intersection: 4: Parklawn Dr & Randolph Rd #1/Randolph Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	L	T	TR	T	T	R	L	T	TR	L	LT
Maximum Queue (ft)	156	200	216	272	317	310	280	172	97	163	222	292
Average Queue (ft)	46	96	110	161	274	264	89	126	41	90	76	166
95th Queue (ft)	108	173	187	245	341	322	218	191	88	156	187	258
Link Distance (ft)			1078	1078	176	176	176	136	136	136		454
Upstream Blk Time (%)					35	39	0	21		8		
Queuing Penalty (veh)					163	183	0	21		8		
Storage Bay Dist (ft)	300	300									200	
Storage Blk Time (%)											0	6
Queuing Penalty (veh)											0	4

Intersection: 4: Parklawn Dr & Randolph Rd #1/Randolph Rd

Movement	SB
Directions Served	TR
Maximum Queue (ft)	379
Average Queue (ft)	226
95th Queue (ft)	338
Link Distance (ft)	454
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: Parklawn Dr & Braxfield Ct

Movement	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	LT	TR	LT	TR
Maximum Queue (ft)	78	27	113	120	240	192
Average Queue (ft)	24	6	17	33	72	36
95th Queue (ft)	58	25	63	91	191	117
Link Distance (ft)	222	222	175	175	254	254
Upstream Blk Time (%)				0	1	0
Queuing Penalty (veh)				0	0	0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 14: Loehman's Plaza/Lauderdale Drive & Randolph Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LTR
Maximum Queue (ft)	37	87	83	93	837	427	140	30	99
Average Queue (ft)	5	13	12	13	177	155	57	5	33
95th Queue (ft)	24	49	49	62	601	403	110	23	81
Link Distance (ft)		362	362		2813	2813		253	534
Upstream Blk Time (%)					0				
Queuing Penalty (veh)					0				
Storage Bay Dist (ft)	150			125			140		
Storage Blk Time (%)		0			10		1		
Queuing Penalty (veh)		0			3		0		

Intersection: 15:

Movement	NB	SB	SE
Directions Served	T	T	R
Maximum Queue (ft)	11	8	369
Average Queue (ft)	1	0	283
95th Queue (ft)	13	6	402
Link Distance (ft)	644	211	291
Upstream Blk Time (%)			9
Queuing Penalty (veh)			45
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 25: Montrose Pkwy

Movement	
Directions Served	
Maximum Queue (ft)	
Average Queue (ft)	
95th Queue (ft)	
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 26: Parklawn Dr

Movement	SB	SB	NW	NW
Directions Served	T	T	R	R
Maximum Queue (ft)	95	87	28	25
Average Queue (ft)	14	13	6	3
95th Queue (ft)	54	54	24	16
Link Distance (ft)	136	136	12	12
Upstream Blk Time (%)	0	0	10	3
Queuing Penalty (veh)	0	0	10	3
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 29: Montrose Pkwy

Movement	B30
Directions Served	T
Maximum Queue (ft)	103
Average Queue (ft)	3
95th Queue (ft)	73
Link Distance (ft)	491
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 32: Ramp C/Ramp E & Parklawn Dr & Ramp F/Ramp D

Movement	NB	NB	NB	NB	SB	SB	SB	SB	NE	NE	NE	SW
Directions Served	L	L	T	T	L	L	T	T>	L	L	>	L
Maximum Queue (ft)	210	219	186	200	175	213	186	172	56	65	44	249
Average Queue (ft)	121	82	95	116	119	102	88	82	19	19	3	127
95th Queue (ft)	192	172	173	197	179	200	172	166	44	50	43	213
Link Distance (ft)		454	454	454		175	175		486	486		430
Upstream Blk Time (%)					3	5	1	1				
Queuing Penalty (veh)					0	15	4	0				
Storage Bay Dist (ft)	225				150			150			350	
Storage Blk Time (%)	1	0			9	4	2	1				
Queuing Penalty (veh)	1	0			12	4	5	2				

Intersection: 32: Ramp C/Ramp E & Parklawn Dr & Ramp F/Ramp D

Movement	SW	SW
Directions Served	L	>
Maximum Queue (ft)	287	274
Average Queue (ft)	159	35
95th Queue (ft)	255	173
Link Distance (ft)	430	
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		350
Storage Blk Time (%)	0	0
Queuing Penalty (veh)	1	0

Intersection: 144: Randolph Rd

Movement	EB	EB	WB	WB	WB	WB	NE	NE
Directions Served	T	T	L	L	T	T	R	R
Maximum Queue (ft)	176	182	200	225	388	400	153	123
Average Queue (ft)	70	81	180	210	262	219	65	43
95th Queue (ft)	142	156	233	252	490	452	121	103
Link Distance (ft)	176	176			362	362	189	189
Upstream Blk Time (%)	0	1			7	3	0	0
Queuing Penalty (veh)	1	1			69	27	0	0
Storage Bay Dist (ft)			175	175				
Storage Blk Time (%)			4	22	6			
Queuing Penalty (veh)			28	156	34			

Intersection: 147: Parklawn Dr

Movement	NE	NE	NE	SW
Directions Served	L	T	T	T
Maximum Queue (ft)	191	202	42	21
Average Queue (ft)	93	20	4	1
95th Queue (ft)	176	130	47	8
Link Distance (ft)		211	211	189
Upstream Blk Time (%)	0	1	0	
Queuing Penalty (veh)	0	2	0	
Storage Bay Dist (ft)	150			
Storage Blk Time (%)	5	0		
Queuing Penalty (veh)	4	1		

Network Summary

Network wide Queuing Penalty: 1155

Intersection: 1: Ramp A/Ramp B & Montrose Pkwy/Montrose Pkwy #1

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	UL	L	T	T	T	T	R	LT	R	R
Maximum Queue (ft)	222	190	277	255	327	337	61	198	232	194
Average Queue (ft)	108	35	128	107	128	142	19	97	138	84
95th Queue (ft)	185	113	239	209	246	257	46	169	214	185
Link Distance (ft)			914	914	485	485	485		418	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	400	400						270		185
Storage Blk Time (%)								0	3	0
Queuing Penalty (veh)								0	6	0

Intersection: 2: Maple St/Chapman Ave & Montrose Pkwy #1/Montrose Pkwy

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	T	R	L	T	T	T	R	L	TR
Maximum Queue (ft)	344	314	329	282	35	83	295	319	133	77	109	77
Average Queue (ft)	165	194	191	146	9	22	173	186	44	32	28	21
95th Queue (ft)	276	306	299	266	26	60	277	292	101	62	74	58
Link Distance (ft)		485	485	485			1106	1106	1106		466	466
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	400				400	500				400		
Storage Blk Time (%)	0											
Queuing Penalty (veh)	1											

Intersection: 2: Maple St/Chapman Ave & Montrose Pkwy #1/Montrose Pkwy

Movement	SB	SB	SB	SB
Directions Served	L	L	T	R
Maximum Queue (ft)	184	257	78	71
Average Queue (ft)	85	154	26	30
95th Queue (ft)	202	231	63	56
Link Distance (ft)		475	475	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	135			135
Storage Blk Time (%)	1	22		
Queuing Penalty (veh)	1	24		

Intersection: 3: Nebel St & Randolph Rd #1

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	L	TR	L	T	TR	L	L	TR
Maximum Queue (ft)	29	169	200	437	534	252	647	656	324	457	320
Average Queue (ft)	3	71	168	237	282	106	606	620	227	276	151
95th Queue (ft)	16	137	229	376	488	212	715	667	342	419	267
Link Distance (ft)		431		1078	1078		602	602		757	757
Upstream Blk Time (%)							34	83			
Queuing Penalty (veh)							0	0			
Storage Bay Dist (ft)	150		150			210			275		
Storage Blk Time (%)		1	19	29		1	6		1	10	
Queuing Penalty (veh)		0	40	59		1	8		3	27	

Intersection: 4: Parklawn Dr & Randolph Rd #1/Randolph Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	L	T	TR	T	T	R	L	T	TR	L	LT
Maximum Queue (ft)	166	350	532	539	253	260	180	176	140	179	250	468
Average Queue (ft)	54	241	417	431	154	167	61	126	57	153	167	267
95th Queue (ft)	124	434	526	532	232	247	122	197	116	198	295	456
Link Distance (ft)			1078	1078	176	176	176	136	136	136		454
Upstream Blk Time (%)					7	10	0	26	1	50		1
Queuing Penalty (veh)					17	24	0	33	2	65		3
Storage Bay Dist (ft)	300	300									200	
Storage Blk Time (%)		0	28								3	14
Queuing Penalty (veh)		0	47								12	32

Intersection: 4: Parklawn Dr & Randolph Rd #1/Randolph Rd

Movement	SB
Directions Served	TR
Maximum Queue (ft)	473
Average Queue (ft)	294
95th Queue (ft)	452
Link Distance (ft)	454
Upstream Blk Time (%)	1
Queuing Penalty (veh)	4
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: Parklawn Dr & Braxfield Ct

Movement	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	LT	TR	LT	TR
Maximum Queue (ft)	203	96	166	273	299	302
Average Queue (ft)	95	24	48	76	247	250
95th Queue (ft)	173	62	132	199	330	337
Link Distance (ft)	222	222	175	175	254	254
Upstream Blk Time (%)	1	0	0	1	36	33
Queuing Penalty (veh)	0	0	1	3	0	0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 14: Loehman's Plaza/Lauderdale Drive & Randolph Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LTR
Maximum Queue (ft)	99	378	377	114	180	140	178	188	57
Average Queue (ft)	14	223	236	43	57	52	97	48	20
95th Queue (ft)	57	389	398	89	129	117	164	114	49
Link Distance (ft)		362	362		2813	2813		253	534
Upstream Blk Time (%)		1	1					0	
Queuing Penalty (veh)		7	11					0	
Storage Bay Dist (ft)	150			125			140		
Storage Blk Time (%)		12		0	1		7		
Queuing Penalty (veh)		3		0	0		5		

Intersection: 15:

Movement	NB	NB	SE
Directions Served	T	T	R
Maximum Queue (ft)	536	464	217
Average Queue (ft)	231	177	60
95th Queue (ft)	608	507	162
Link Distance (ft)	644	644	291
Upstream Blk Time (%)	4	0	0
Queuing Penalty (veh)	0	0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 25: Montrose Pkwy

Movement	EB	EB	NB	B28	B28
Directions Served	T	T	R	T	
Maximum Queue (ft)	18	70	125	414	73
Average Queue (ft)	1	4	12	25	2
95th Queue (ft)	14	34	69	177	51
Link Distance (ft)	1278	1278	63	431	431
Upstream Blk Time (%)			1	0	
Queuing Penalty (veh)			4	0	
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 26: Parklawn Dr

Movement	SB	SB	NW	NW
Directions Served	T	T	R	R
Maximum Queue (ft)	67	93	28	34
Average Queue (ft)	6	9	6	21
95th Queue (ft)	33	45	23	41
Link Distance (ft)	136	136	12	12
Upstream Blk Time (%)		0	10	37
Queuing Penalty (veh)		0	12	48
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 29: Montrose Pkwy

Movement	EB	EB
Directions Served	T	T
Maximum Queue (ft)	220	443
Average Queue (ft)	7	15
95th Queue (ft)	155	224
Link Distance (ft)	1106	1106
Upstream Blk Time (%)	0	0
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 32: Ramp C/Ramp E & Parklawn Dr & Ramp F/Ramp D

Movement	NB	NB	NB	NB	NB	SB	SB	SB	SB	NE	NE	NE
Directions Served	L	L	T	T	>	L	L	T	T>	L	L	>
Maximum Queue (ft)	212	186	234	260	82	175	240	207	175	84	88	104
Average Queue (ft)	104	67	111	139	5	162	183	165	139	34	38	6
95th Queue (ft)	174	148	199	231	61	189	259	235	219	70	80	59
Link Distance (ft)		454	454	454			175	175		486	486	
Upstream Blk Time (%)						14	26	19	5			
Queuing Penalty (veh)						0	159	116	0			
Storage Bay Dist (ft)	225				250	150			150			350
Storage Blk Time (%)	0	0		1		37	15	25	12			
Queuing Penalty (veh)	0	0		1		80	34	104	44			

Intersection: 32: Ramp C/Ramp E & Parklawn Dr & Ramp F/Ramp D

Movement	SW	SW	SW
Directions Served	L	L	>
Maximum Queue (ft)	183	179	163
Average Queue (ft)	98	83	10
95th Queue (ft)	171	152	80
Link Distance (ft)	430	430	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			350
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 33: Bend

Movement	EB	EB	EB
Directions Served	T	T	
Maximum Queue (ft)	268	409	405
Average Queue (ft)	19	64	39
95th Queue (ft)	147	300	235
Link Distance (ft)	325	325	325
Upstream Blk Time (%)	0	2	0
Queuing Penalty (veh)	0	10	3
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 144: Randolph Rd

Movement	EB	EB	WB	WB	WB	WB	NE	NE
Directions Served	T	T	L	L	T	T	R	R
Maximum Queue (ft)	164	171	199	223	323	146	313	313
Average Queue (ft)	51	61	130	151	20	5	245	253
95th Queue (ft)	113	124	211	213	139	61	344	336
Link Distance (ft)	176	176			362	362	189	189
Upstream Blk Time (%)	0	0			0		40	41
Queuing Penalty (veh)	1	1			0		117	120
Storage Bay Dist (ft)			175	175				
Storage Blk Time (%)			0	4				
Queuing Penalty (veh)			2	14				

Intersection: 147: Parklawn Dr

Movement	NE	NE	NE	SW
Directions Served	L	T	T	T
Maximum Queue (ft)	200	329	230	24
Average Queue (ft)	166	230	102	1
95th Queue (ft)	261	436	288	10
Link Distance (ft)		211	211	189
Upstream Blk Time (%)	5	40	8	
Queuing Penalty (veh)	0	195	41	
Storage Bay Dist (ft)	150			
Storage Blk Time (%)	44	12		
Queuing Penalty (veh)	127	47		

Network Summary

Network wide Queuing Penalty: 1718

2040 No Build

Intersection: 1: Ramp A/Ramp B & Montrose Pkwy/Montrose Pkwy #1

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	UL	L	T	T	T	T	R	LT	R	R
Maximum Queue (ft)	174	118	149	130	292	308	121	177	111	72
Average Queue (ft)	91	22	56	55	162	178	23	72	38	17
95th Queue (ft)	152	75	120	118	264	277	80	138	87	49
Link Distance (ft)			914	914	492	492			417	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	400	400					325	270		185
Storage Blk Time (%)						0				
Queuing Penalty (veh)						0				

Intersection: 2: Maple St/Chapman Ave & Montrose Pkwy #1/Randolph Rd #1

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	TR	L	LTR
Maximum Queue (ft)	156	267	290	40	247	256	56	52	60	66	132
Average Queue (ft)	74	107	133	10	135	148	23	13	27	19	42
95th Queue (ft)	129	222	254	34	223	228	55	39	57	50	98
Link Distance (ft)		492	492		606	606		478	478	470	470
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	375			175			225				
Storage Blk Time (%)					4	1					
Queuing Penalty (veh)					1	2					

Intersection: 3: Nebel St & Randolph Rd #1

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	UL	T	TR	L	T	TR	L	T	R	L	T	R
Maximum Queue (ft)	185	367	430	200	418	407	173	194	139	132	200	30
Average Queue (ft)	35	182	247	166	234	252	81	90	57	62	82	4
95th Queue (ft)	114	320	397	236	362	359	141	163	105	115	161	20
Link Distance (ft)		606	606		1094	1094		608			755	755
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150			150			210		275	275		
Storage Blk Time (%)		10		19	16		0	0			0	
Queuing Penalty (veh)		5		143	73		0	0			0	

Intersection: 4: Parklawn Dr & Randolph Rd #1/Randolph Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	T	R	T	T	R	LT	TR	L	LT	TR
Maximum Queue (ft)	260	116	142	148	326	314	293	187	193	500	848	854
Average Queue (ft)	144	47	64	56	303	284	48	177	149	411	673	678
95th Queue (ft)	221	97	119	113	321	320	207	188	206	639	997	985
Link Distance (ft)		1094	1094		180	180	180	150	150		904	904
Upstream Blk Time (%)					47	45		74	36		12	12
Queuing Penalty (veh)					325	316		173	84		39	41
Storage Bay Dist (ft)	300			300						450		
Storage Blk Time (%)										0	63	
Queuing Penalty (veh)										1	41	

Intersection: 5: Parklawn Dr & Braxfield Ct

Movement	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	LT	TR	LT	TR
Maximum Queue (ft)	60	29	74	89	184	127
Average Queue (ft)	22	7	12	20	88	68
95th Queue (ft)	54	27	47	68	240	224
Link Distance (ft)	223	223	904	904	254	254
Upstream Blk Time (%)					13	12
Queuing Penalty (veh)					0	0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 14: Loehman's Plaza/Lauderdale Drive & Randolph Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LTR
Maximum Queue (ft)	29	132	136	174	2870	2865	171	31	104
Average Queue (ft)	4	17	29	71	2816	2816	92	9	39
95th Queue (ft)	19	75	87	201	2982	2978	156	32	84
Link Distance (ft)		362	362		2813	2813		253	534
Upstream Blk Time (%)					58	44			
Queuing Penalty (veh)					0	0			
Storage Bay Dist (ft)	150			125			140		
Storage Blk Time (%)		0			46		5		
Queuing Penalty (veh)		0			21		1		

Intersection: 15:

Movement	NB	NB	SE
Directions Served	T	T	R
Maximum Queue (ft)	685	672	370
Average Queue (ft)	598	463	307
95th Queue (ft)	878	887	439
Link Distance (ft)	644	644	291
Upstream Blk Time (%)	76	14	14
Queuing Penalty (veh)	0	0	87
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 26: Parklawn Dr

Movement	SB	SB	NW	NW
Directions Served	T	T	R	R
Maximum Queue (ft)	102	118	45	44
Average Queue (ft)	41	49	28	9
95th Queue (ft)	86	102	41	32
Link Distance (ft)	150	150	11	11
Upstream Blk Time (%)	0	0	68	14
Queuing Penalty (veh)	0	0	159	33
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 144: Randolph Rd

Movement	EB	EB	WB	WB	WB	WB	NE	NE
Directions Served	T	T	L	L	T	T	R	R
Maximum Queue (ft)	195	190	200	225	406	436	152	200
Average Queue (ft)	109	106	172	221	369	376	44	77
95th Queue (ft)	184	186	241	240	440	458	112	155
Link Distance (ft)	180	180			362	362	203	203
Upstream Blk Time (%)	1	1			13	11	0	0
Queuing Penalty (veh)	3	2			181	162	0	0
Storage Bay Dist (ft)			175	175				
Storage Blk Time (%)			2	17	22			
Queuing Penalty (veh)			21	172	166			

Intersection: 147: Parklawn Dr

Movement	NE	NE	NE	SW
Directions Served	L	T	T	T
Maximum Queue (ft)	200	343	42	20
Average Queue (ft)	197	304	1	1
95th Queue (ft)	211	379	30	10
Link Distance (ft)		211	211	203
Upstream Blk Time (%)	9	76	0	
Queuing Penalty (veh)	0	272	0	
Storage Bay Dist (ft)	150			
Storage Blk Time (%)	79	0		
Queuing Penalty (veh)	100	0		

Network Summary

Network wide Queuing Penalty: 2625

Intersection: 1: Ramp A/Ramp B & Montrose Pkwy/Montrose Pkwy #1

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	UL	L	T	T	T	T	R	LT	R	R
Maximum Queue (ft)	222	650	956	963	364	370	191	201	228	220
Average Queue (ft)	90	506	894	891	172	185	37	90	136	88
95th Queue (ft)	185	944	1135	1138	286	302	122	164	215	187
Link Distance (ft)			914	914	492	492			417	
Upstream Blk Time (%)			78	63		0				
Queuing Penalty (veh)			0	0		0				
Storage Bay Dist (ft)	400	400					325	270		185
Storage Blk Time (%)			84			1			3	0
Queuing Penalty (veh)			154			1			7	0

Intersection: 2: Maple St/Chapman Ave & Montrose Pkwy #1/Randolph Rd #1

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	TR	L	LTR
Maximum Queue (ft)	425	536	528	151	299	320	274	94	64	309	400
Average Queue (ft)	393	508	506	16	196	205	73	26	25	165	213
95th Queue (ft)	552	536	533	84	278	291	197	70	59	265	340
Link Distance (ft)		492	492		606	606		478	478	470	470
Upstream Blk Time (%)		43	47								0
Queuing Penalty (veh)		368	400								0
Storage Bay Dist (ft)	375			175			225				
Storage Blk Time (%)	0	75			14	8					
Queuing Penalty (veh)	0	233			3	18					

Intersection: 3: Nebel St & Randolph Rd #1

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	UL	T	TR	L	T	TR	L	T	R	L	T	R
Maximum Queue (ft)	200	640	640	199	331	326	260	659	325	325	797	634
Average Queue (ft)	41	609	611	138	135	165	219	628	315	301	618	285
95th Queue (ft)	169	658	647	213	281	285	313	643	393	391	1042	846
Link Distance (ft)		606	606		1094	1094		608			755	755
Upstream Blk Time (%)		22	24					60			61	8
Queuing Penalty (veh)		184	208					0			0	0
Storage Bay Dist (ft)	150			150			210		275	275		
Storage Blk Time (%)		76		18	4		42	11	40	76	0	
Queuing Penalty (veh)		11		83	9		301	78	183	129	0	

Intersection: 4: Parklawn Dr & Randolph Rd #1/Randolph Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	T	R	T	T	R	LT	TR	L	LT	TR
Maximum Queue (ft)	350	1115	1119	350	307	295	204	184	184	499	629	623
Average Queue (ft)	251	1034	1042	304	181	191	10	115	96	374	447	463
95th Queue (ft)	474	1165	1171	485	294	302	82	204	191	519	598	609
Link Distance (ft)		1094	1094		180	180	180	150	150		904	904
Upstream Blk Time (%)		1	2		7	10		18	12			
Queuing Penalty (veh)		13	20		24	33		48	32			
Storage Bay Dist (ft)	300			300						450		
Storage Blk Time (%)		63	68	0						1	8	
Queuing Penalty (veh)		125	143	0						3	21	

Intersection: 5: Parklawn Dr & Braxfield Ct

Movement	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	LT	TR	LT	TR
Maximum Queue (ft)	166	60	80	117	273	269
Average Queue (ft)	75	24	13	20	168	98
95th Queue (ft)	138	53	46	70	283	220
Link Distance (ft)	223	223	904	904	254	254
Upstream Blk Time (%)	0				2	0
Queuing Penalty (veh)	0				0	0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 14: Loehman's Plaza/Lauderdale Drive & Randolph Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LTR
Maximum Queue (ft)	130	381	397	170	270	208	189	265	81
Average Queue (ft)	20	359	364	84	123	100	139	125	24
95th Queue (ft)	93	411	412	151	228	190	209	268	63
Link Distance (ft)		362	362		2812	2812		253	534
Upstream Blk Time (%)		11	12					7	
Queuing Penalty (veh)		159	184					0	
Storage Bay Dist (ft)	150			125			140		
Storage Blk Time (%)		29		4	5		25	2	
Queuing Penalty (veh)		9		27	5		28	3	

Intersection: 15:

Movement	NB	NB	SE
Directions Served	T	T	R
Maximum Queue (ft)	688	682	345
Average Queue (ft)	662	651	209
95th Queue (ft)	676	697	324
Link Distance (ft)	644	644	291
Upstream Blk Time (%)	99	62	2
Queuing Penalty (veh)	0	0	13
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 26: Parklawn Dr

Movement	SB	SB	NW	NW
Directions Served	T	T	R	R
Maximum Queue (ft)	133	147	30	39
Average Queue (ft)	38	42	5	2
95th Queue (ft)	100	112	22	17
Link Distance (ft)	150	150	11	11
Upstream Blk Time (%)	0	0	9	3
Queuing Penalty (veh)	0	1	25	8
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 144: Randolph Rd

Movement	EB	EB	WB	WB	WB	WB	NE	NE
Directions Served	T	T	L	L	T	T	R	R
Maximum Queue (ft)	210	211	200	224	369	258	334	330
Average Queue (ft)	150	151	172	191	138	33	305	301
95th Queue (ft)	240	230	230	245	397	172	319	315
Link Distance (ft)	180	180			362	362	203	203
Upstream Blk Time (%)	5	5			3	0	99	99
Queuing Penalty (veh)	56	52			20	0	376	377
Storage Bay Dist (ft)			175	175				
Storage Blk Time (%)			3	22				
Queuing Penalty (veh)			18	113				

Intersection: 147: Parklawn Dr

Movement	NE	NE	NE
Directions Served	L	T	T
Maximum Queue (ft)	200	339	337
Average Queue (ft)	167	312	308
95th Queue (ft)	283	325	321
Link Distance (ft)		211	211
Upstream Blk Time (%)	2	89	98
Queuing Penalty (veh)	0	577	637
Storage Bay Dist (ft)	150		
Storage Blk Time (%)	7	96	
Queuing Penalty (veh)	28	516	

Network Summary

Network wide Queuing Penalty: 6066

2040 Build

Intersection: 1: Ramp A/Ramp B & Montrose Pkwy #3

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	UL	L	T	T	T	T	R	LT	R	R
Maximum Queue (ft)	161	120	157	122	429	435	44	142	130	81
Average Queue (ft)	91	26	59	44	260	268	18	75	56	15
95th Queue (ft)	146	79	127	99	409	412	43	132	111	55
Link Distance (ft)			914	914	485	485	485		418	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	400	400						270		185
Storage Blk Time (%)									0	
Queuing Penalty (veh)									0	

Intersection: 2: Maple St/Chapman Ave & Montrose Pkwy #3

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	T	R	L	T	T	T	R	L	TR
Maximum Queue (ft)	255	237	217	199	27	66	366	393	211	63	63	72
Average Queue (ft)	131	94	81	59	5	14	202	220	29	24	19	24
95th Queue (ft)	227	193	172	145	19	44	336	356	102	52	50	57
Link Distance (ft)		485	485	485			1106	1106	1106		466	466
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	400				400	500				400		
Storage Blk Time (%)		0		0								
Queuing Penalty (veh)		0		0								

Intersection: 2: Maple St/Chapman Ave & Montrose Pkwy #3

Movement	SB	SB	SB	SB
Directions Served	L	L	T	R
Maximum Queue (ft)	17	96	65	69
Average Queue (ft)	1	41	12	20
95th Queue (ft)	7	85	42	51
Link Distance (ft)		475	475	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	135			135
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Intersection: 3: Nebel St & Randolph Rd #1

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	L	TR	L	T	TR	L	L	TR
Maximum Queue (ft)	29	107	200	724	699	134	333	505	258	285	253
Average Queue (ft)	4	40	194	498	448	53	99	185	124	158	109
95th Queue (ft)	18	87	211	679	638	108	205	374	212	242	195
Link Distance (ft)		433		1078	1078		602	602		760	760
Upstream Blk Time (%)							0	0			
Queuing Penalty (veh)							0	0			
Storage Bay Dist (ft)	150		150			210			275		
Storage Blk Time (%)			26	38			0		0	0	
Queuing Penalty (veh)			128	188			0		0	0	

Intersection: 4: Parklawn Dr/Parklawn Dr #2 & Randolph Rd #1

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	L	T	TR	T	T	R	L	T	TR	L	LT
Maximum Queue (ft)	323	344	464	493	331	307	296	179	147	192	250	402
Average Queue (ft)	129	230	228	256	302	278	149	126	66	162	109	248
95th Queue (ft)	311	364	553	489	318	314	315	198	132	189	252	366
Link Distance (ft)			1078	1078	176	176	176	136	136	136		454
Upstream Blk Time (%)					54	55	1	30	6	63		0
Queuing Penalty (veh)					286	289	5	58	11	125		0
Storage Bay Dist (ft)	300	300									200	
Storage Blk Time (%)	1	15	1								0	19
Queuing Penalty (veh)	2	25	3								0	11

Intersection: 4: Parklawn Dr/Parklawn Dr #2 & Randolph Rd #1

Movement	SB
Directions Served	TR
Maximum Queue (ft)	443
Average Queue (ft)	281
95th Queue (ft)	400
Link Distance (ft)	454
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: Parklawn Dr #2/Parklawn Dr & Braxfield Ct

Movement	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	LT	TR	LT	TR
Maximum Queue (ft)	90	27	150	223	256	253
Average Queue (ft)	28	11	33	50	124	71
95th Queue (ft)	63	33	109	144	261	196
Link Distance (ft)	222	222	175	175	254	254
Upstream Blk Time (%)			0	0	5	1
Queuing Penalty (veh)			0	1	0	0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 14: Loehman's Plaza/Lauderdale Drive & Randolph Rd #1/Randolph Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LTR
Maximum Queue (ft)	29	57	106	175	2872	2858	177	142	128
Average Queue (ft)	4	6	24	79	2472	2443	91	9	45
95th Queue (ft)	18	34	75	210	3456	3456	160	61	97
Link Distance (ft)		362	362		2813	2813		253	534
Upstream Blk Time (%)					42	26			
Queuing Penalty (veh)					0	0			
Storage Bay Dist (ft)	150			125			140		
Storage Blk Time (%)					57		5		
Queuing Penalty (veh)					26		0		

Intersection: 15:

Movement	NB	NB	SE
Directions Served	T	T	R
Maximum Queue (ft)	696	659	388
Average Queue (ft)	664	493	353
95th Queue (ft)	681	907	397
Link Distance (ft)	644	644	291
Upstream Blk Time (%)	95	12	35
Queuing Penalty (veh)	0	0	268
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 25: Montrose Pkwy #3

Movement	WB	WB	B28
Directions Served	T	R	T
Maximum Queue (ft)	73	62	174
Average Queue (ft)	2	5	6
95th Queue (ft)	52	64	88
Link Distance (ft)	325		431
Upstream Blk Time (%)	0	0	0
Queuing Penalty (veh)	0	0	0
Storage Bay Dist (ft)		300	
Storage Blk Time (%)	0	0	
Queuing Penalty (veh)	0	1	

Intersection: 26: Parklawn Dr

Movement	SB	SB	NW	NW	NW
Directions Served	T	T	R	R	R
Maximum Queue (ft)	185	188	37	5	50
Average Queue (ft)	91	101	8	0	26
95th Queue (ft)	170	191	28	4	44
Link Distance (ft)	136	136	12	12	12
Upstream Blk Time (%)	3	5	16	0	53
Queuing Penalty (veh)	11	17	31	1	105
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 29: Montrose Pkwy #3

Movement	SB	B30
Directions Served	R	T
Maximum Queue (ft)	102	108
Average Queue (ft)	16	4
95th Queue (ft)	63	72
Link Distance (ft)	53	491
Upstream Blk Time (%)	1	0
Queuing Penalty (veh)	2	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 32: Ramp C/Ramp E & Parklawn Dr #2 & Ramp F/Ramp D

Movement	NB	NB	NB	NB	SB	SB	SB	SB	NE	NE	NE	SW
Directions Served	L	L	T	T	L	L	T	T>	L	L	>	L
Maximum Queue (ft)	248	268	258	276	174	225	189	175	63	71	129	342
Average Queue (ft)	123	88	152	176	121	107	125	109	19	18	7	182
95th Queue (ft)	216	196	241	259	191	220	210	198	46	49	66	325
Link Distance (ft)		454	454	454		175	175		486	486		430
Upstream Blk Time (%)					2	7	5	1				1
Queuing Penalty (veh)					0	24	18	0				3
Storage Bay Dist (ft)	225				150			150			350	
Storage Blk Time (%)	1	1		1	11	4	8	4				
Queuing Penalty (veh)	1	1		1	15	5	22	7				

Intersection: 32: Ramp C/Ramp E & Parklawn Dr #2 & Ramp F/Ramp D

Movement	SW	SW	B27
Directions Served	L	>	T
Maximum Queue (ft)	370	324	40
Average Queue (ft)	200	98	6
95th Queue (ft)	351	307	57
Link Distance (ft)	430		65
Upstream Blk Time (%)	1		1
Queuing Penalty (veh)	5		7
Storage Bay Dist (ft)		350	
Storage Blk Time (%)	2	0	
Queuing Penalty (veh)	10	0	

Intersection: 144: Randolph Rd #1

Movement	EB	EB	WB	WB	WB	WB	NE	NE
Directions Served	T	T	L	L	T	T	R	R
Maximum Queue (ft)	177	175	200	225	413	432	119	151
Average Queue (ft)	93	88	188	223	383	357	32	58
95th Queue (ft)	166	164	231	228	404	460	93	126
Link Distance (ft)	176	176			362	362	189	189
Upstream Blk Time (%)	0	1			23	7		0
Queuing Penalty (veh)	1	1			279	89		0
Storage Bay Dist (ft)			175	175				
Storage Blk Time (%)			5	28	13			
Queuing Penalty (veh)			37	225	112			

Intersection: 147: Parklawn Dr

Movement	NE	NE	SW	SW
Directions Served	L	T	T	T
Maximum Queue (ft)	200	332	77	93
Average Queue (ft)	199	312	4	6
95th Queue (ft)	202	322	48	52
Link Distance (ft)		211	189	189
Upstream Blk Time (%)	12	78	0	0
Queuing Penalty (veh)	0	345	1	1
Storage Bay Dist (ft)	150			
Storage Blk Time (%)	81			
Queuing Penalty (veh)	115			

Network Summary

Network wide Queuing Penalty: 2923

Intersection: 1: Ramp A/Ramp B & Montrose Pkwy/Montrose Pkwy #1

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	UL	L	T	T	T	T	R	LT	R	R
Maximum Queue (ft)	217	207	310	297	319	332	53	228	266	220
Average Queue (ft)	121	43	147	135	156	177	20	105	142	91
95th Queue (ft)	197	136	267	261	277	298	46	192	230	202
Link Distance (ft)			914	914	485	485	485		418	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	400	400						270		185
Storage Blk Time (%)			0					0	3	0
Queuing Penalty (veh)			0					1	9	0

Intersection: 2: Maple St/Chapman Ave & Montrose Pkwy #1/Montrose Pkwy

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	T	R	L	T	T	T	R	L	TR
Maximum Queue (ft)	372	382	366	283	42	67	309	336	244	102	91	77
Average Queue (ft)	200	203	200	157	9	16	192	208	50	44	27	24
95th Queue (ft)	319	341	321	279	27	48	288	305	146	79	68	57
Link Distance (ft)		485	485	485			1106	1106	1106		466	466
Upstream Blk Time (%)		0	0									
Queuing Penalty (veh)		0	0									
Storage Bay Dist (ft)	400				400	500				400		
Storage Blk Time (%)	0	0							0			
Queuing Penalty (veh)	1	0							0			

Intersection: 2: Maple St/Chapman Ave & Montrose Pkwy #1/Montrose Pkwy

Movement	SB	SB	SB	SB
Directions Served	L	L	T	R
Maximum Queue (ft)	185	317	103	89
Average Queue (ft)	135	201	39	39
95th Queue (ft)	226	285	89	76
Link Distance (ft)		475	475	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	135			135
Storage Blk Time (%)	3	35	0	
Queuing Penalty (veh)	4	56	0	

Intersection: 3: Nebel St & Randolph Rd #1

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	TR	L	L	TR	L	T	TR	L	L	TR
Maximum Queue (ft)	165	200	532	506	255	640	654	325	558	282
Average Queue (ft)	90	182	313	301	115	615	620	264	333	151
95th Queue (ft)	157	224	492	517	216	628	638	362	501	250
Link Distance (ft)	431		1077	1077		600	600		758	758
Upstream Blk Time (%)						38	88			
Queuing Penalty (veh)						0	0			
Storage Bay Dist (ft)		150			210			275		
Storage Blk Time (%)	1	29	39		1	10		5	20	
Queuing Penalty (veh)	0	79	108		1	13		15	63	

Intersection: 4: Parklawn Dr & Randolph Rd #1/Randolph Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	L	T	TR	T	T	R	L	T	TR	L	LT
Maximum Queue (ft)	184	350	765	775	291	288	288	173	126	174	250	483
Average Queue (ft)	47	240	562	580	193	212	79	104	49	164	196	326
95th Queue (ft)	114	441	783	797	277	288	182	182	102	181	311	508
Link Distance (ft)			1077	1077	176	176	176	136	136	136		451
Upstream Blk Time (%)			0	0	13	18	0	16	1	61		2
Queuing Penalty (veh)			0	0	35	48	0	32	2	124		15
Storage Bay Dist (ft)	300	300									200	
Storage Blk Time (%)		0	45								2	20
Queuing Penalty (veh)		0	85								11	47

Intersection: 4: Parklawn Dr & Randolph Rd #1/Randolph Rd

Movement	SB
Directions Served	TR
Maximum Queue (ft)	573
Average Queue (ft)	355
95th Queue (ft)	527
Link Distance (ft)	451
Upstream Blk Time (%)	2
Queuing Penalty (veh)	16
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: Parklawn Dr & Braxfield Ct

Movement	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	LT	TR	LT	TR
Maximum Queue (ft)	224	94	176	306	286	296
Average Queue (ft)	106	24	66	98	236	261
95th Queue (ft)	196	63	156	227	343	332
Link Distance (ft)	222	222	175	175	254	254
Upstream Blk Time (%)	2	0	0	1	32	49
Queuing Penalty (veh)	0	0	1	5	0	0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 14: Loehman's Plaza/Lauderdale Drive & Randolph Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LTR
Maximum Queue (ft)	169	378	396	167	271	189	189	272	82
Average Queue (ft)	26	308	308	69	109	84	132	98	24
95th Queue (ft)	109	419	423	131	215	163	200	232	60
Link Distance (ft)		362	362		2813	2813		253	534
Upstream Blk Time (%)		2	3					4	
Queuing Penalty (veh)		31	36					0	
Storage Bay Dist (ft)	150			125			140		
Storage Blk Time (%)		24		1	6		20	0	
Queuing Penalty (veh)		7		7	5		20	0	

Intersection: 15:

Movement	NB	NB	SB	SE
Directions Served	T	T	T	R
Maximum Queue (ft)	696	682	9	326
Average Queue (ft)	665	589	0	141
95th Queue (ft)	683	858	6	285
Link Distance (ft)	644	644	211	291
Upstream Blk Time (%)	95	19		1
Queuing Penalty (veh)	0	0		8
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 25: Montrose Pkwy

Movement	EB	EB	NB	B28
Directions Served	T	T	R	T
Maximum Queue (ft)	34	70	92	246
Average Queue (ft)	1	6	6	11
95th Queue (ft)	16	38	44	118
Link Distance (ft)	1278	1278	63	430
Upstream Blk Time (%)			0	0
Queuing Penalty (veh)			3	0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 26: Parklawn Dr

Movement	SB	SB	NW	NW	NW
Directions Served	T	T	R	R	R
Maximum Queue (ft)	165	150	28	8	39
Average Queue (ft)	42	43	3	0	26
95th Queue (ft)	114	115	16	4	40
Link Distance (ft)	136	136	12	12	12
Upstream Blk Time (%)	0	0	6	0	53
Queuing Penalty (veh)	2	1	13	1	108
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 29: Montrose Pkwy

Movement	EB	EB
Directions Served	T	T
Maximum Queue (ft)	220	217
Average Queue (ft)	7	7
95th Queue (ft)	155	153
Link Distance (ft)	1106	1106
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 32: Ramp C/Ramp E & Parklawn Dr & Ramp F/Ramp D

Movement	NB	NB	NB	NB	NB	SB	SB	SB	SB	NE	NE	NE
Directions Served	L	L	T	T	>	L	L	T	T>	L	L	>
Maximum Queue (ft)	171	160	219	246	76	175	235	204	175	77	87	221
Average Queue (ft)	89	56	106	131	3	150	156	171	148	37	40	29
95th Queue (ft)	153	124	196	220	42	201	260	233	216	70	76	142
Link Distance (ft)		451	451	451			175	175		487	487	
Upstream Blk Time (%)						14	20	23	4			
Queuing Penalty (veh)						0	155	178	0			
Storage Bay Dist (ft)	225				250	150			150			350
Storage Blk Time (%)				1		31	11	30	12			
Queuing Penalty (veh)				1		72	25	166	61			

Intersection: 32: Ramp C/Ramp E & Parklawn Dr & Ramp F/Ramp D

Movement	SW	SW	SW
Directions Served	L	L	>
Maximum Queue (ft)	236	253	250
Average Queue (ft)	142	136	27
95th Queue (ft)	221	223	144
Link Distance (ft)	432	432	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			350
Storage Blk Time (%)			0
Queuing Penalty (veh)			1

Intersection: 33: Bend

Movement	EB	EB	EB
Directions Served	T	T	
Maximum Queue (ft)	259	415	407
Average Queue (ft)	28	87	46
95th Queue (ft)	176	353	252
Link Distance (ft)	325	325	325
Upstream Blk Time (%)	0	3	1
Queuing Penalty (veh)	0	19	4
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 144: Randolph Rd

Movement	EB	EB	WB	WB	WB	WB	NE	NE
Directions Served	T	T	L	L	T	T	R	R
Maximum Queue (ft)	123	141	200	225	386	375	333	333
Average Queue (ft)	44	50	178	203	187	69	255	271
95th Queue (ft)	93	106	232	250	468	273	379	372
Link Distance (ft)	176	176			362	362	189	189
Upstream Blk Time (%)	0	0			4	0	58	65
Queuing Penalty (veh)	1	1			28	1	245	276
Storage Bay Dist (ft)			175	175				
Storage Blk Time (%)			5	23	0			
Queuing Penalty (veh)			19	94	0			

Intersection: 147: Parklawn Dr

Movement	NE	NE	NE	SW
Directions Served	L	T	T	T
Maximum Queue (ft)	200	346	316	20
Average Queue (ft)	199	313	186	1
95th Queue (ft)	202	328	410	10
Link Distance (ft)		211	211	189
Upstream Blk Time (%)	10	80	33	
Queuing Penalty (veh)	0	583	242	
Storage Bay Dist (ft)	150			
Storage Blk Time (%)	74	26		
Queuing Penalty (veh)	313	157		

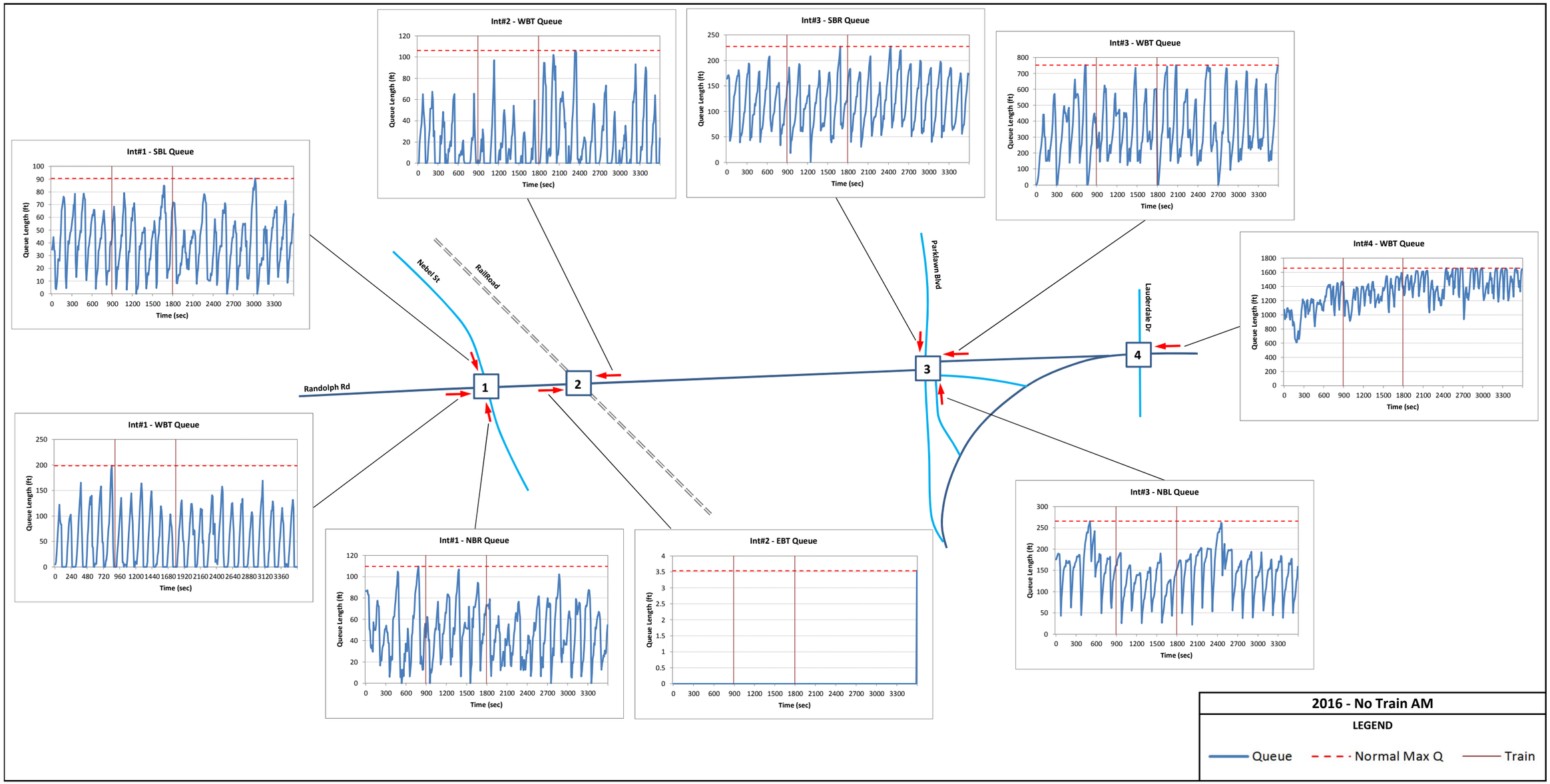
Network Summary

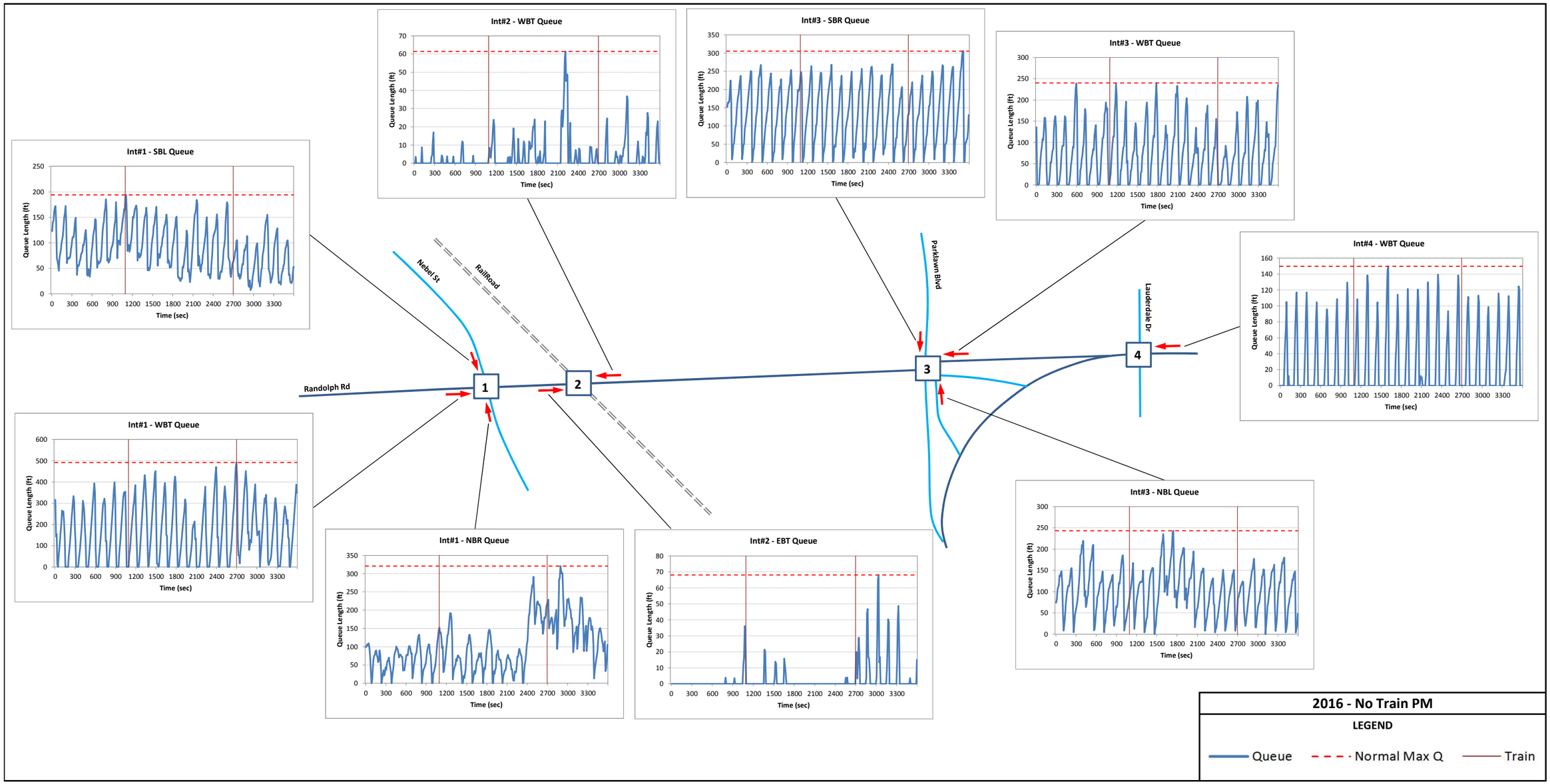
Network wide Queuing Penalty: 3655

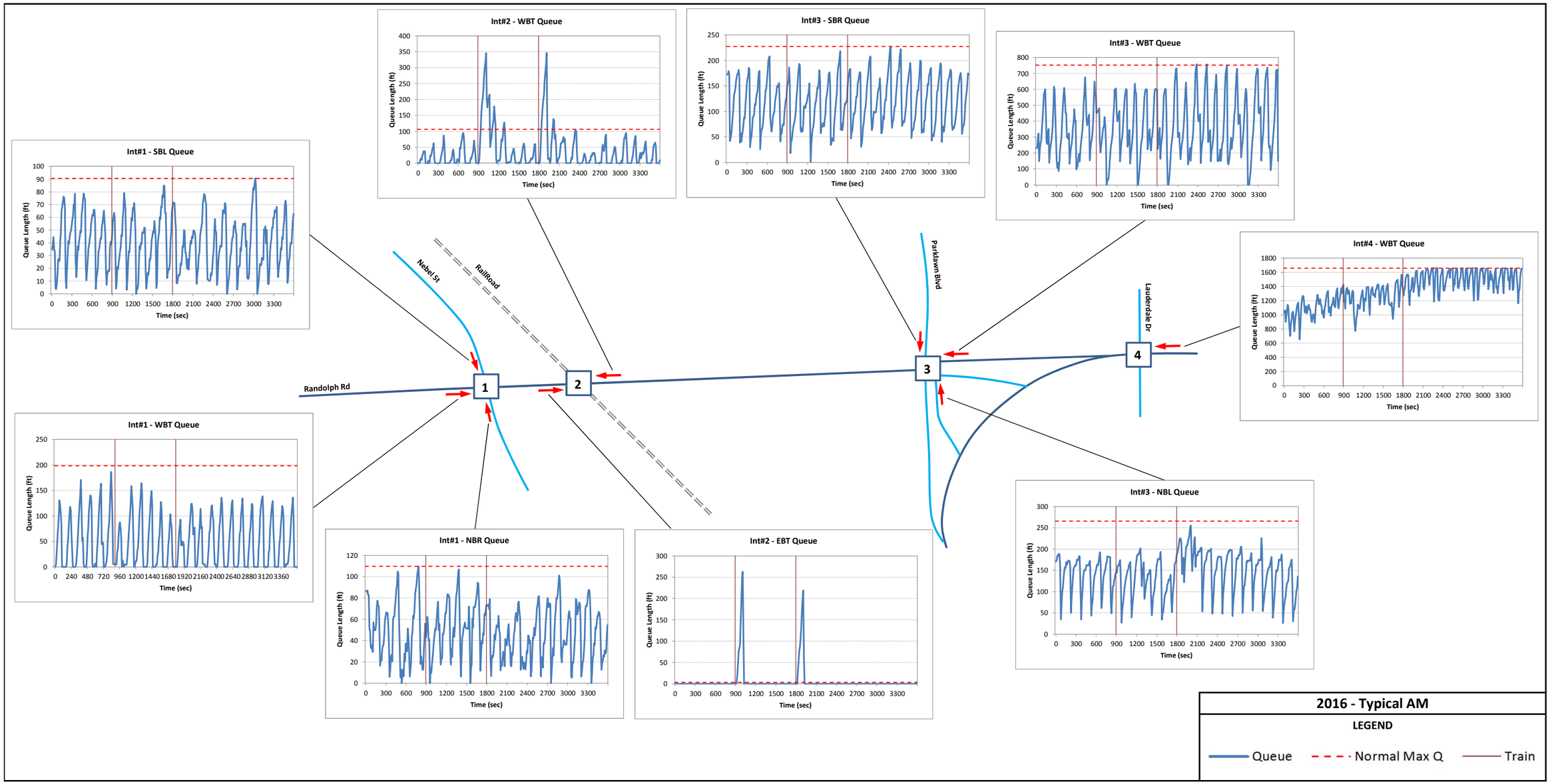
APPENDIX E

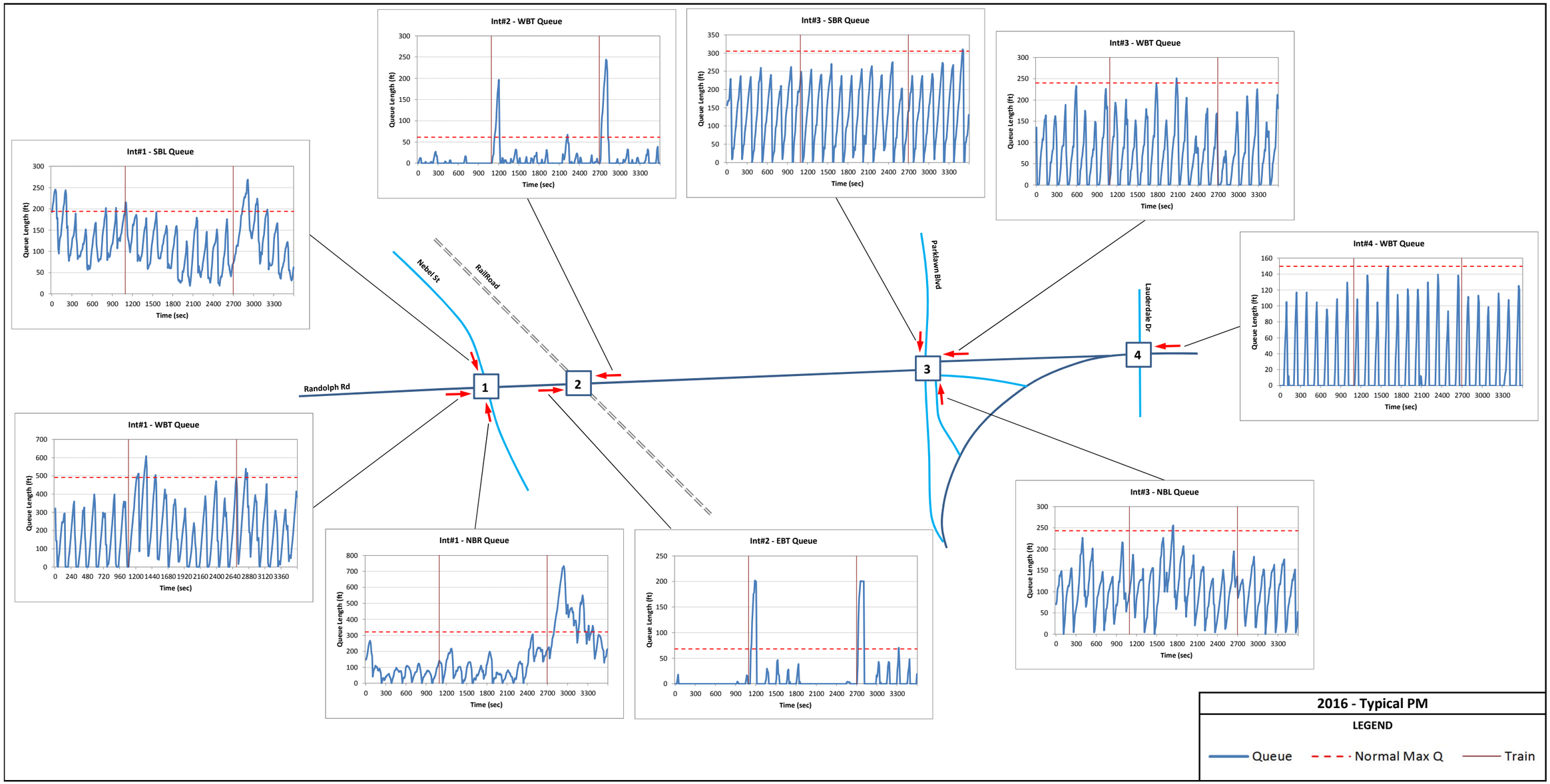
VISSIM Queuing Results

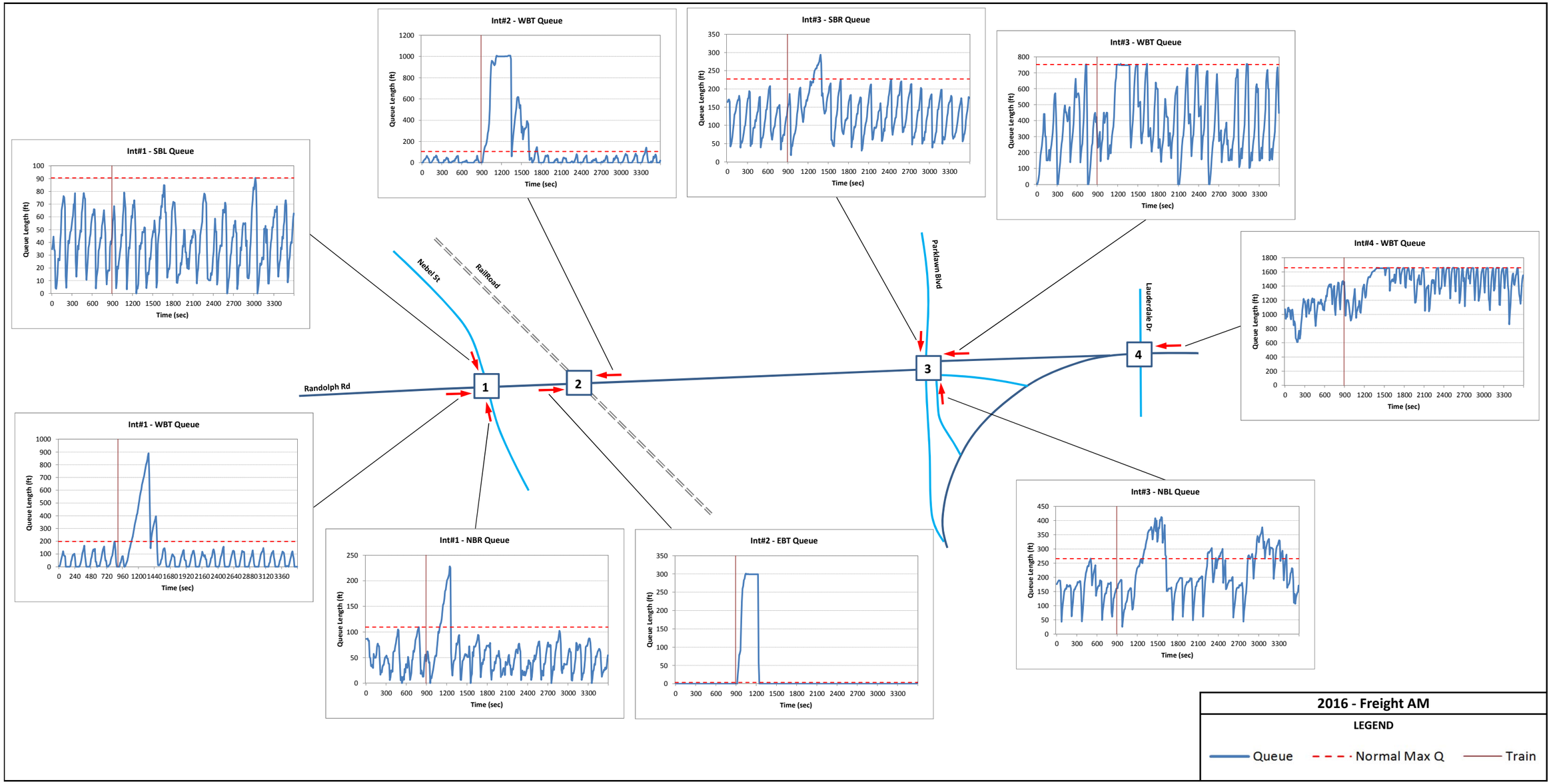
2016

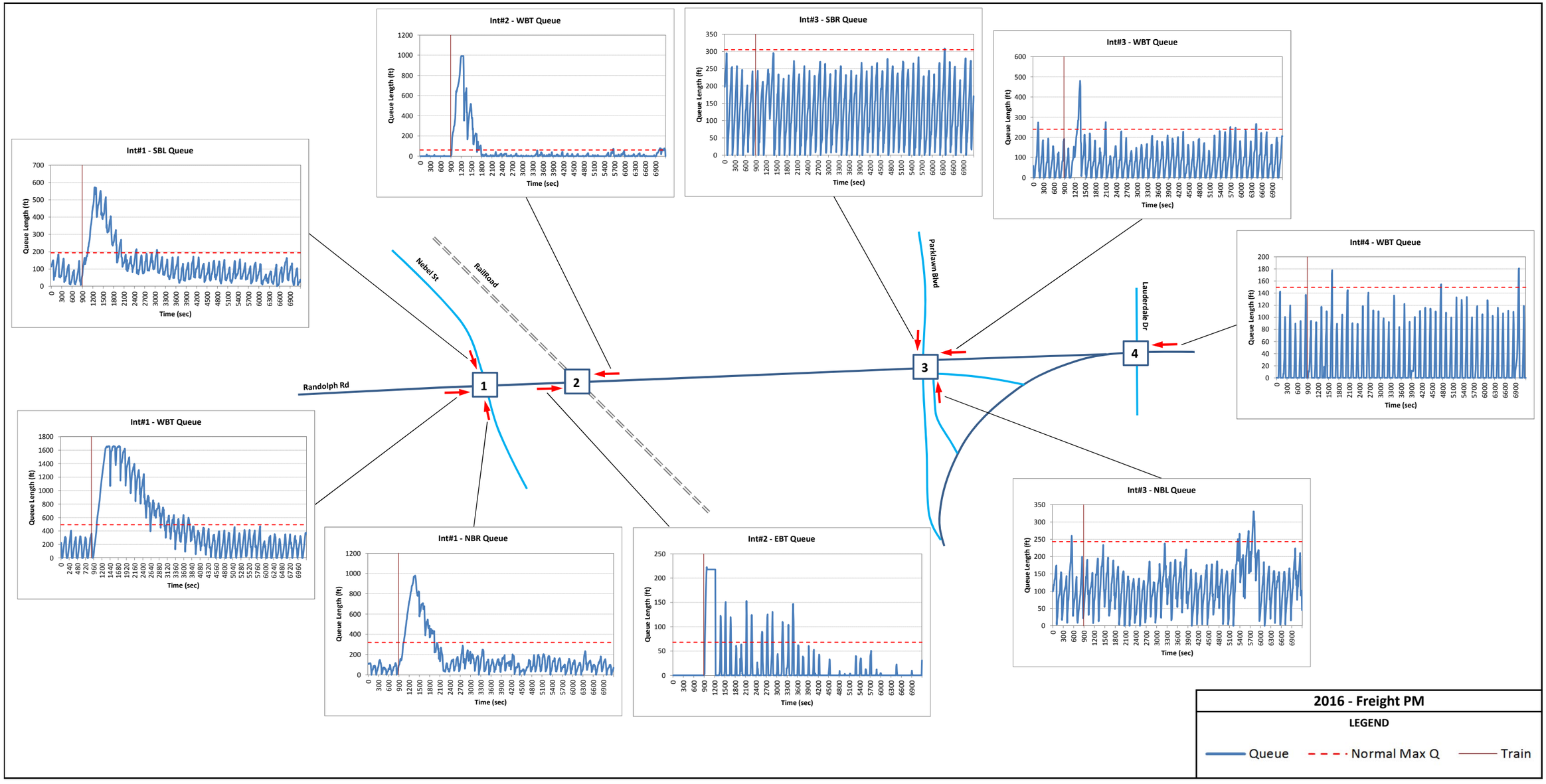

Int#1 - SBL Queue
Int#2 - WBT Queue
Int#3 - SBR Queue
Int#3 - WBT Queue
Int#4 - WBT Queue
Int#1 - WBT Queue
Int#1 - NBR Queue
Int#2 - EBT Queue
Int#3 - NBL Queue
Queue Length (ft)
Time (sec)
Nebel St
RailRoad
Parklawn Blvd
Lauderdale Dr
Randolph Rd
1
2
3
4
2016 - No Train AM
LEGEND
Queue
Normal Max Q
Train


Int#2 - WBT Queue
Queue Length (ft)
Time (sec)
Int#3 - SBR Queue
Queue Length (ft)
Time (sec)
Int#3 - WBT Queue
Queue Length (ft)
Time (sec)
Int#1 - SBL Queue
Queue Length (ft)
Time (sec)
Int#4 - WBT Queue
Queue Length (ft)
Time (sec)
Nebel St
RailRoad
Parklawn Blvd
Lauderdale Dr
Randolph Rd
1
2
3
4
Int#1 - WBT Queue
Queue Length (ft)
Time (sec)
Int#3 - NBL Queue
Queue Length (ft)
Time (sec)
Int#1 - NBR Queue
Queue Length (ft)
Time (sec)
Int#2 - EBT Queue
Queue Length (ft)
Time (sec)
2016 - No Train PM
LEGEND
Queue
Normal Max Q
Train

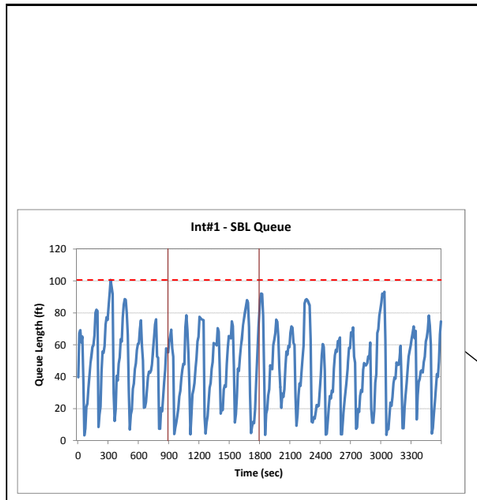

Int#2 - WBT Queue
Queue Length (ft)
Time (sec)
Int#3 - SBR Queue
Queue Length (ft)
Time (sec)
Int#3 - WBT Queue
Queue Length (ft)
Time (sec)
Int#1 - SBL Queue
Queue Length (ft)
Time (sec)
Int#4 - WBT Queue
Queue Length (ft)
Time (sec)
Nebel St
RailRoad
Parklawn Blvd
Lauderdale Dr
Randolph Rd
1
2
3
4
Int#1 - WBT Queue
Queue Length (ft)
Time (sec)
Int#1 - NBR Queue
Queue Length (ft)
Time (sec)
Int#2 - EBT Queue
Queue Length (ft)
Time (sec)
Int#3 - NBL Queue
Queue Length (ft)
Time (sec)
2016 - Typical AM
LEGEND
Queue
Normal Max Q
Train

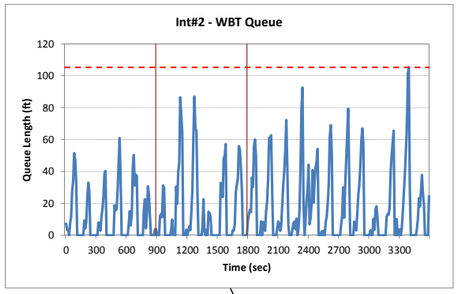

Int#1 - SBL Queue
Int#2 - WBT Queue
Int#3 - SBR Queue
Int#3 - WBT Queue
Int#4 - WBT Queue
Int#1 - WBT Queue
Int#1 - NBR Queue
Int#2 - EBT Queue
Int#3 - NBL Queue
Queue Length (ft)
Time (sec)
Nebel St
RailRoad
Parklawn Blvd
Lauderdale Dr
Randolph Rd
1
2
3
4
2016 - Typical PM
LEGEND
Queue
Normal Max Q
Train

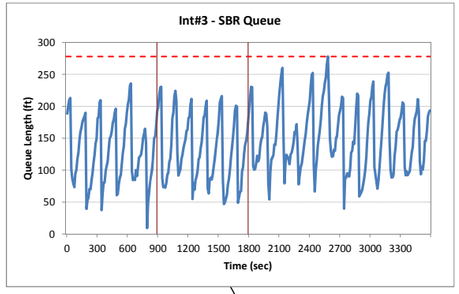

Int#1 - SBL Queue
Int#2 - WBT Queue
Int#3 - SBR Queue
Int#3 - WBT Queue
Int#4 - WBT Queue
Int#1 - WBT Queue
Int#1 - NBR Queue
Int#2 - EBT Queue
Int#3 - NBL Queue
Queue Length (ft)
Time (sec)
Nebel St
RailRoad
Randolph Rd
Parklawn Blvd
Lauderdale Dr
1
2
3
4
2016 - Freight AM
LEGEND
Queue
Normal Max Q
Train

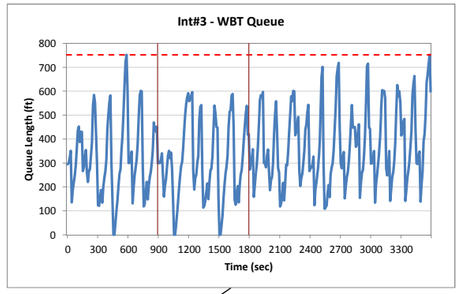

Int#1 - SBL Queue
Int#2 - WBT Queue
Int#3 - SBR Queue
Int#3 - WBT Queue
Int#4 - WBT Queue
Int#1 - WBT Queue
Int#1 - NBR Queue
Int#2 - EBT Queue
Int#3 - NBL Queue
Queue Length (ft)
Time (sec)
Nebel St
RailRoad
Randolph Rd
Parklawn Blvd
Lauderdale Dr
1
2
3
4
2016 - Freight PM
LEGEND
Queue
Normal Max Q
Train

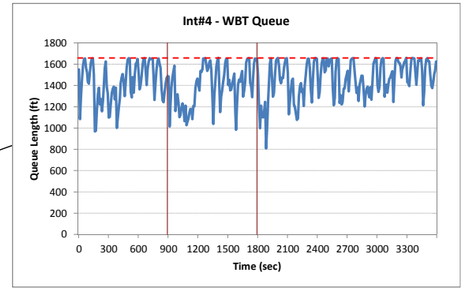
2022 No Build

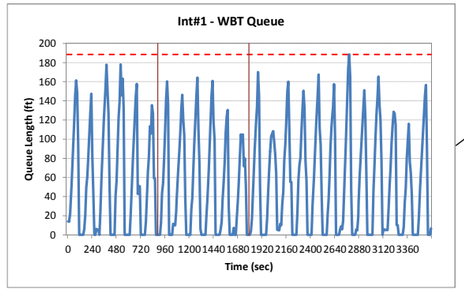


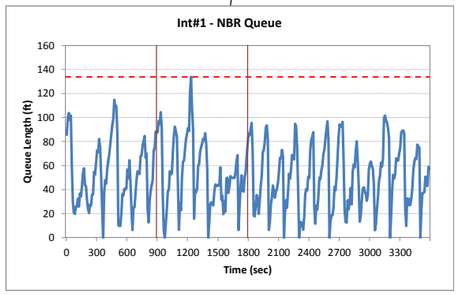


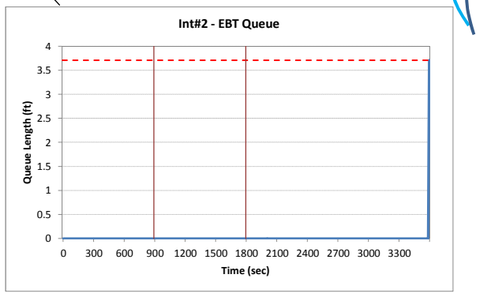


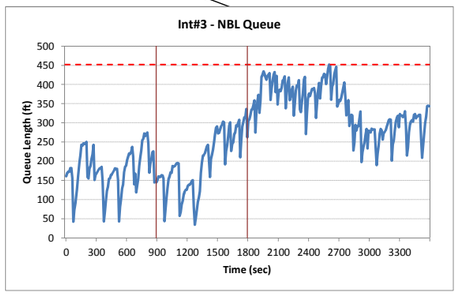


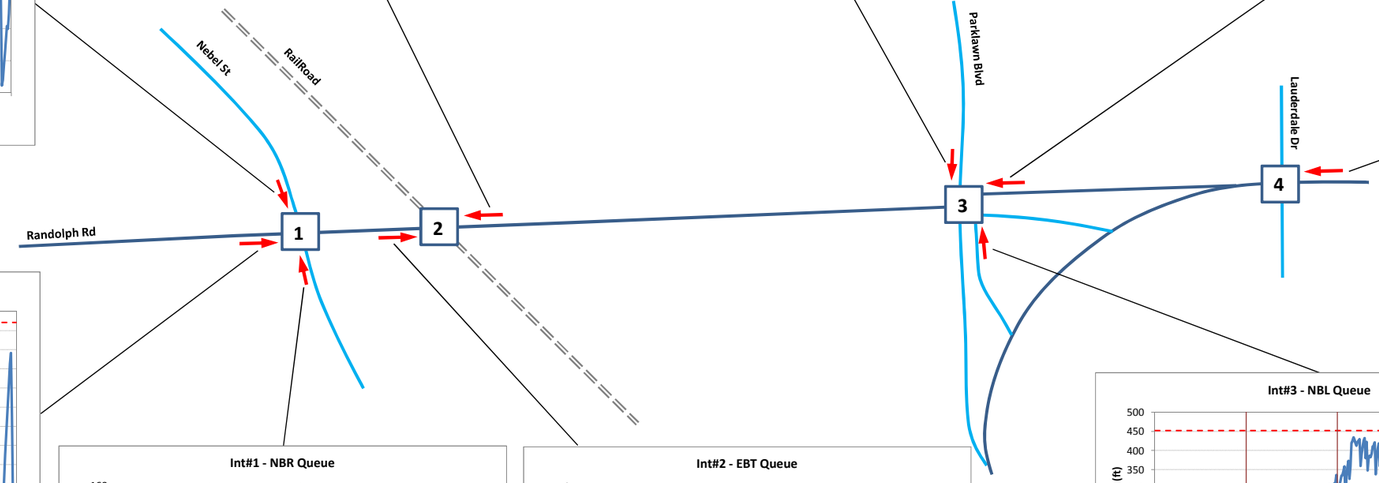








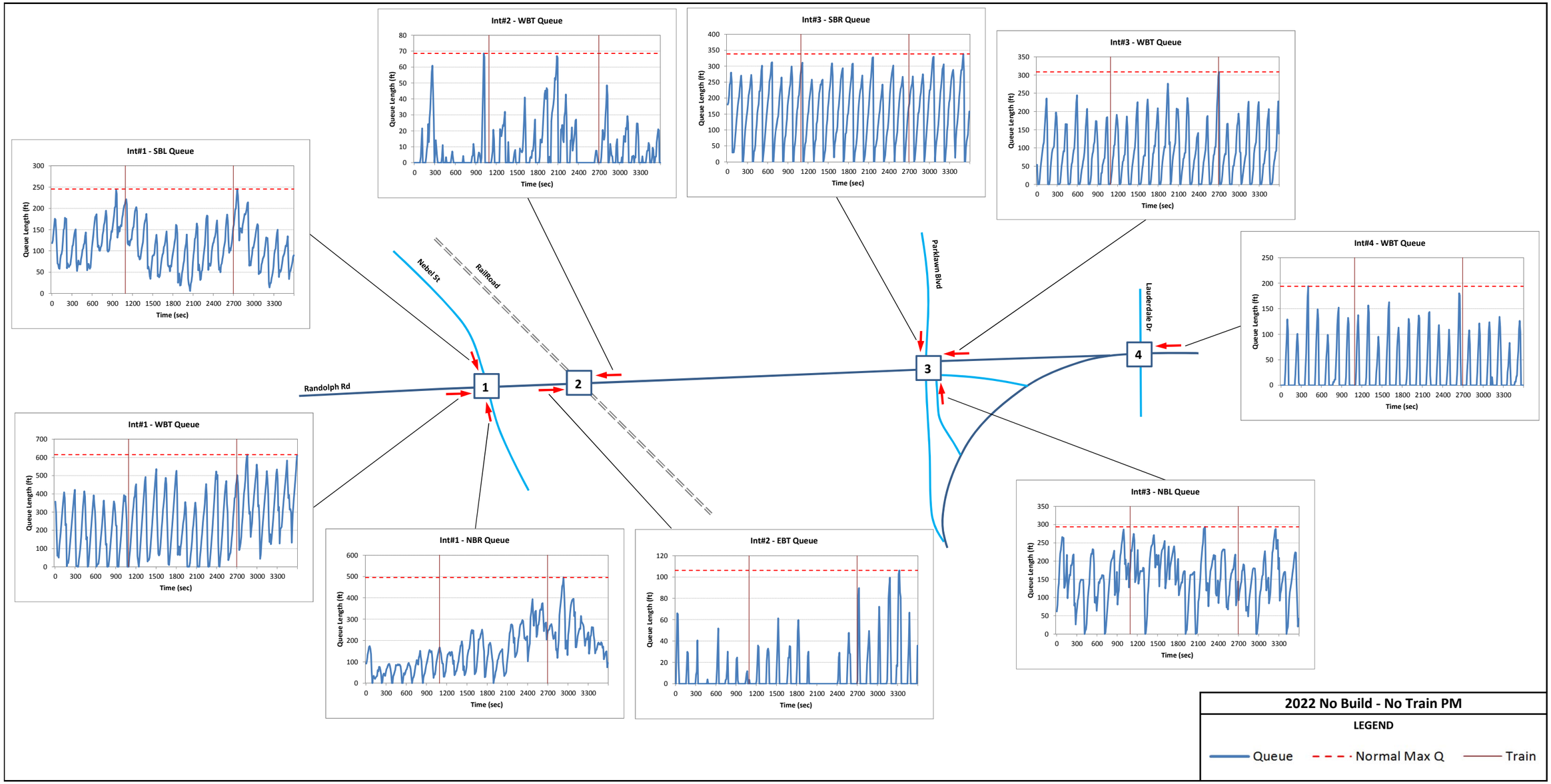


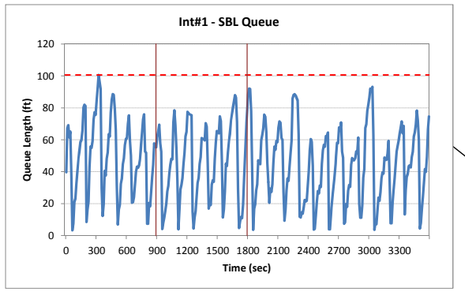


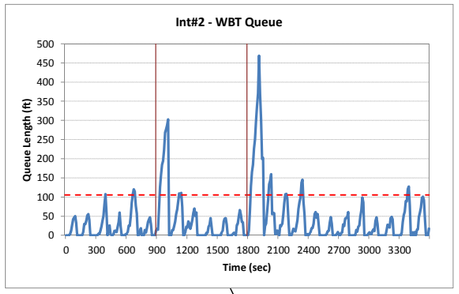
2022 No Build - No Train AM

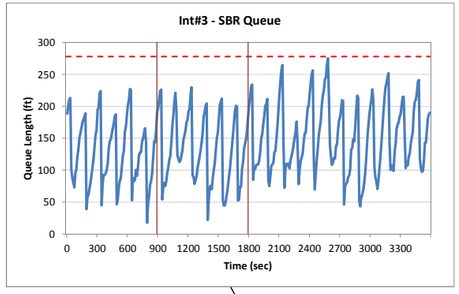
LEGEND

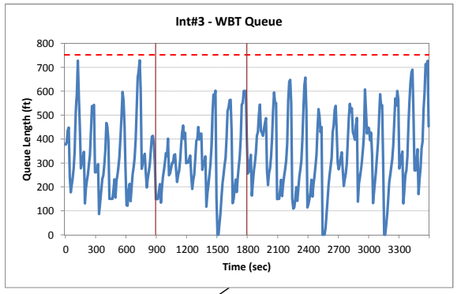
Queue — Normal Max Q — Train

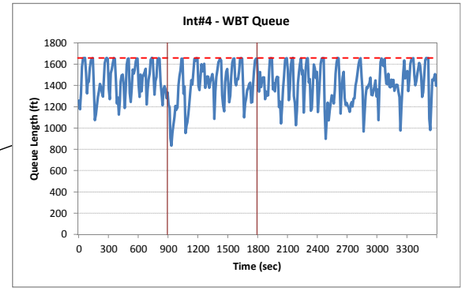

Int#1 - SBL Queue
Int#2 - WBT Queue
Int#3 - SBR Queue
Int#3 - WBT Queue
Int#4 - WBT Queue
Int#1 - WBT Queue
Int#1 - NBR Queue
Int#2 - EBT Queue
Int#3 - NBL Queue
Queue Length (ft)
Time (sec)
Nebel St
RailRoad
Randolph Rd
Parklawn Blvd
Lauderdale Dr
1
2
3
4
2022 No Build - No Train PM
LEGEND
Queue
Normal Max Q
Train

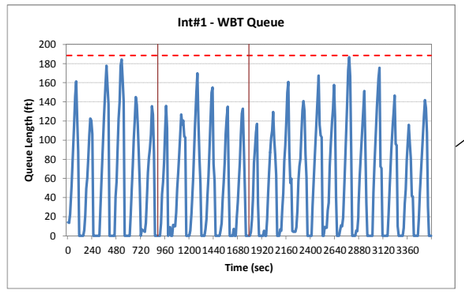


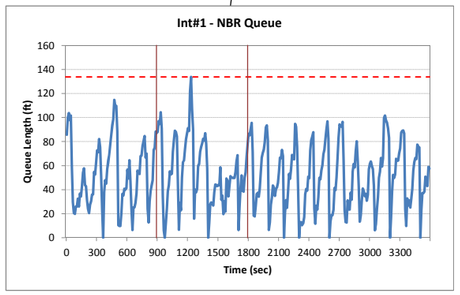


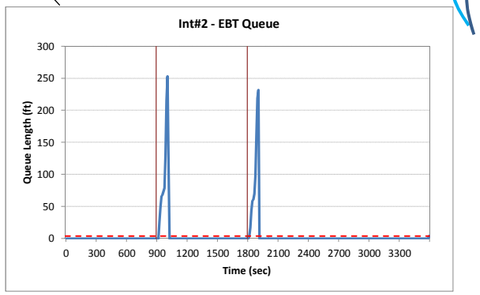


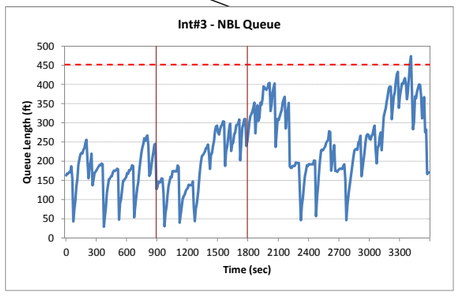










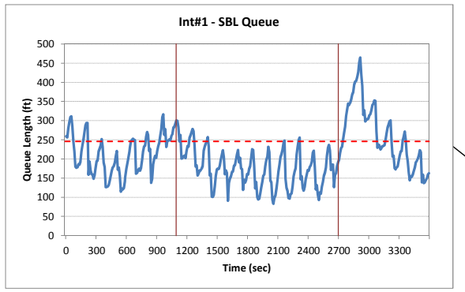


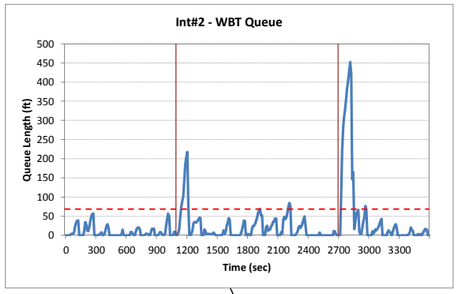


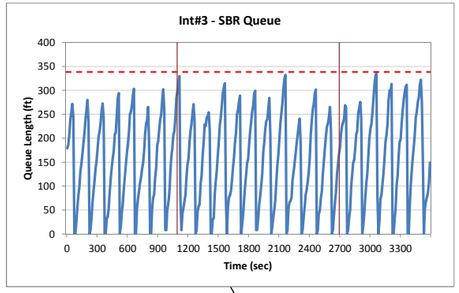
2022 No Build - Typical AM

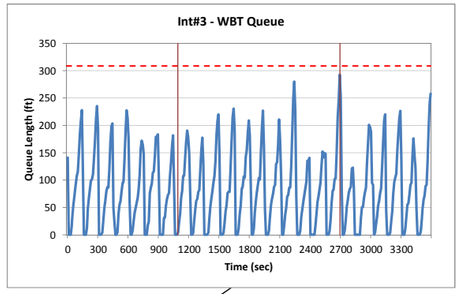
LEGEND

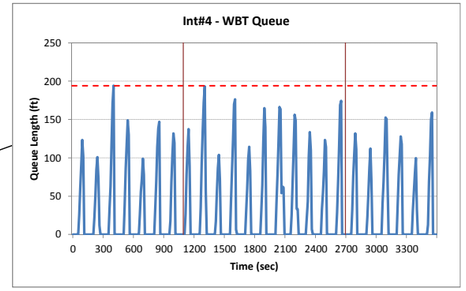
Queue — Normal Max Q — Train

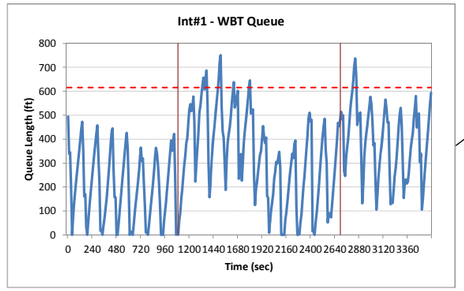


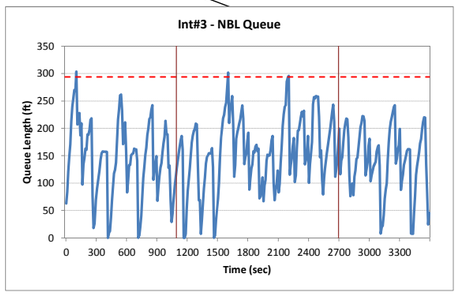


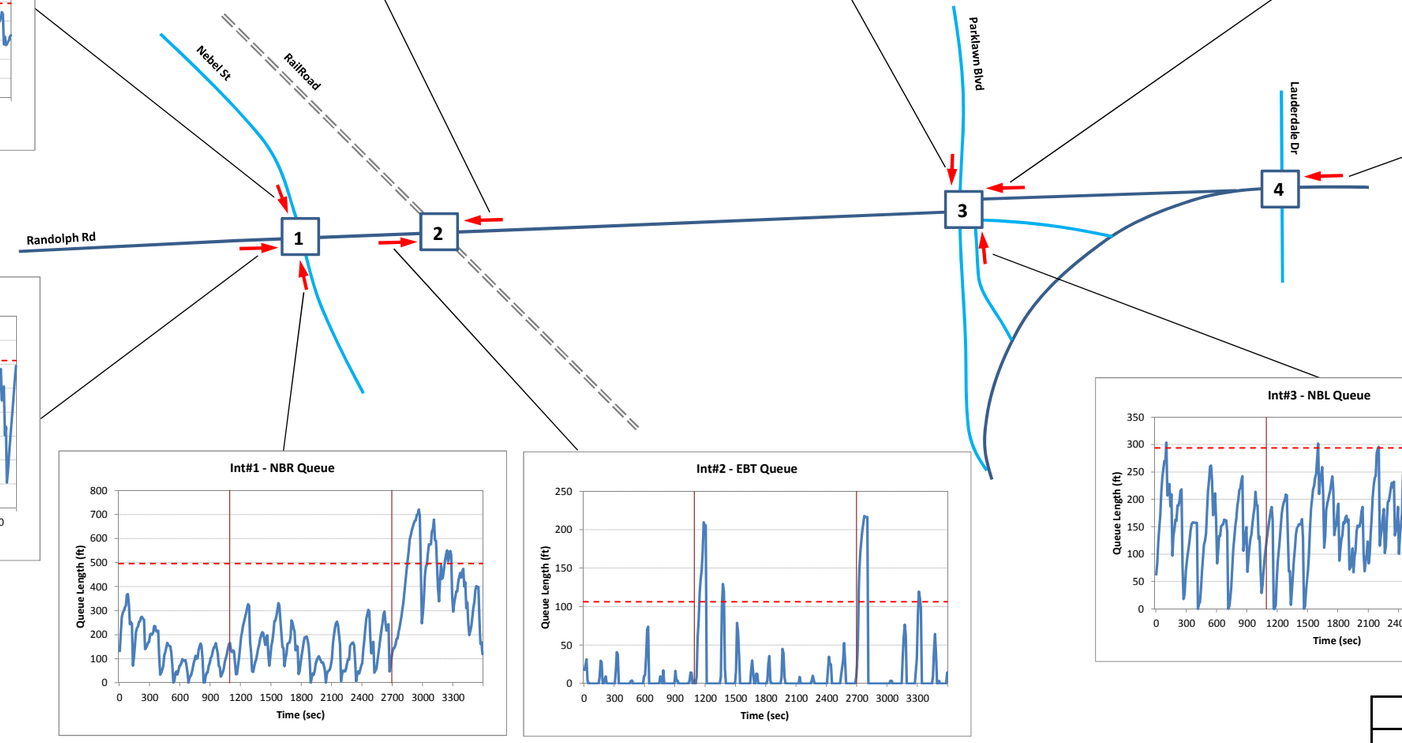








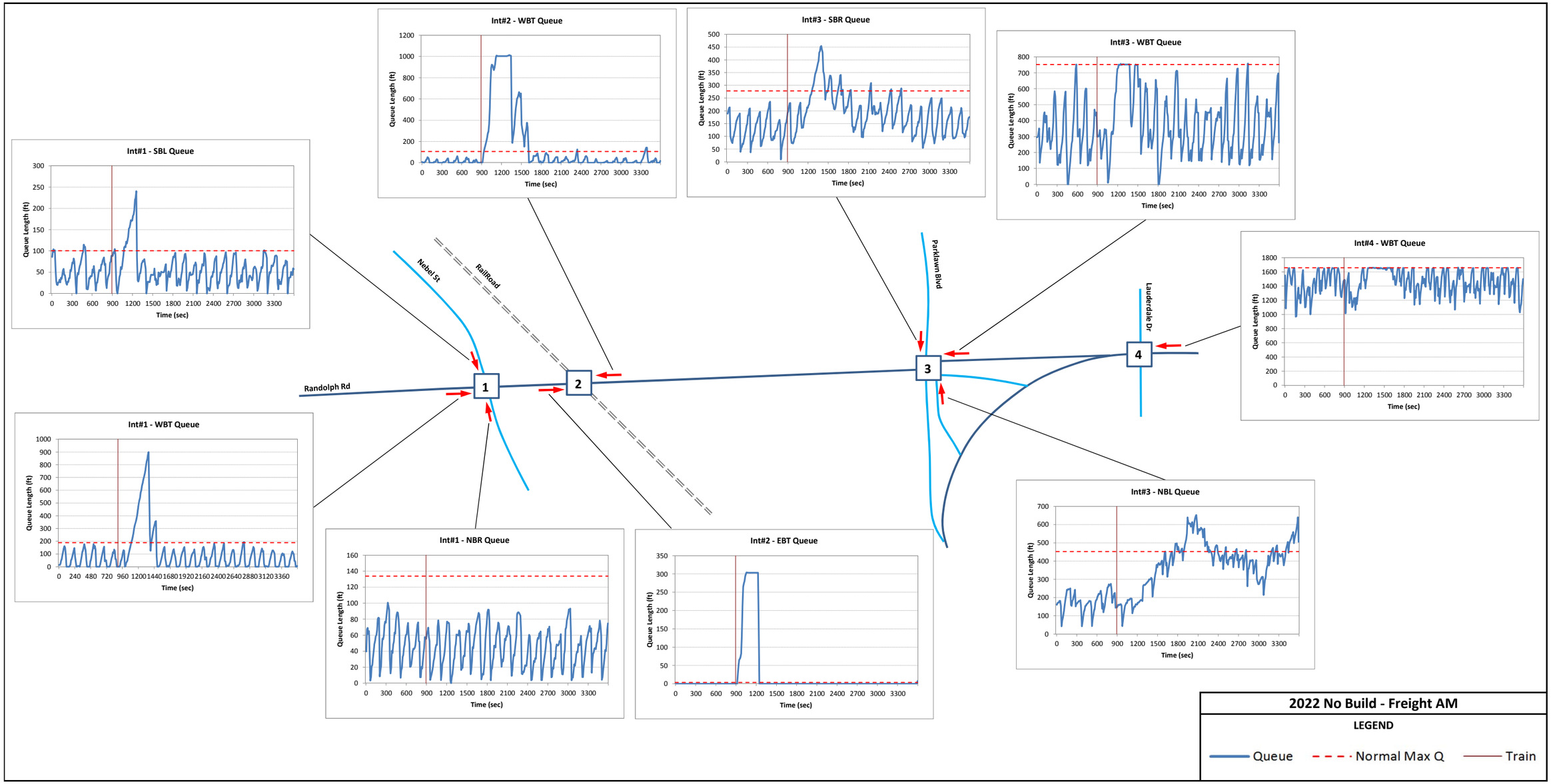


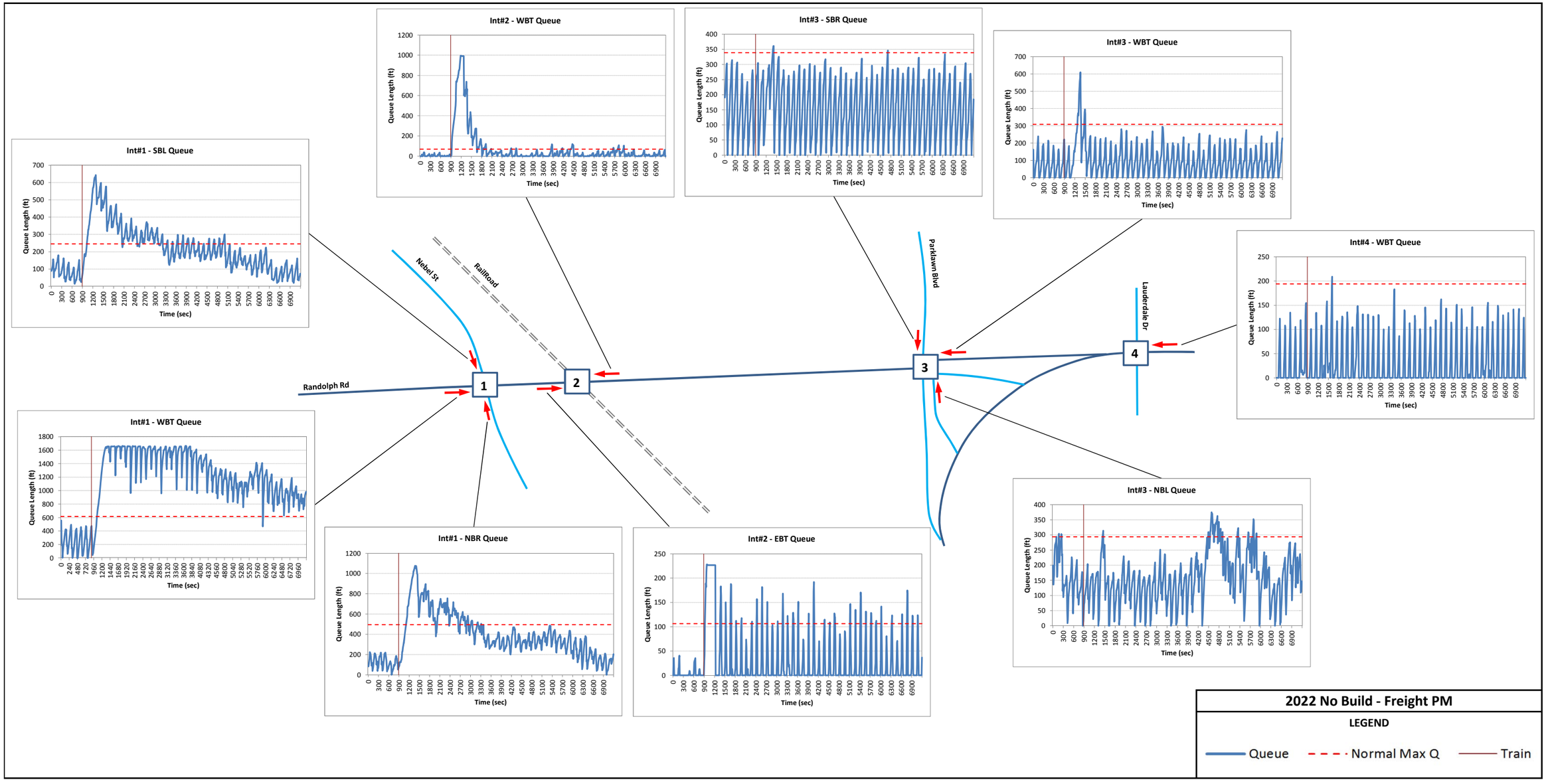


2022 No Build - Typical PM

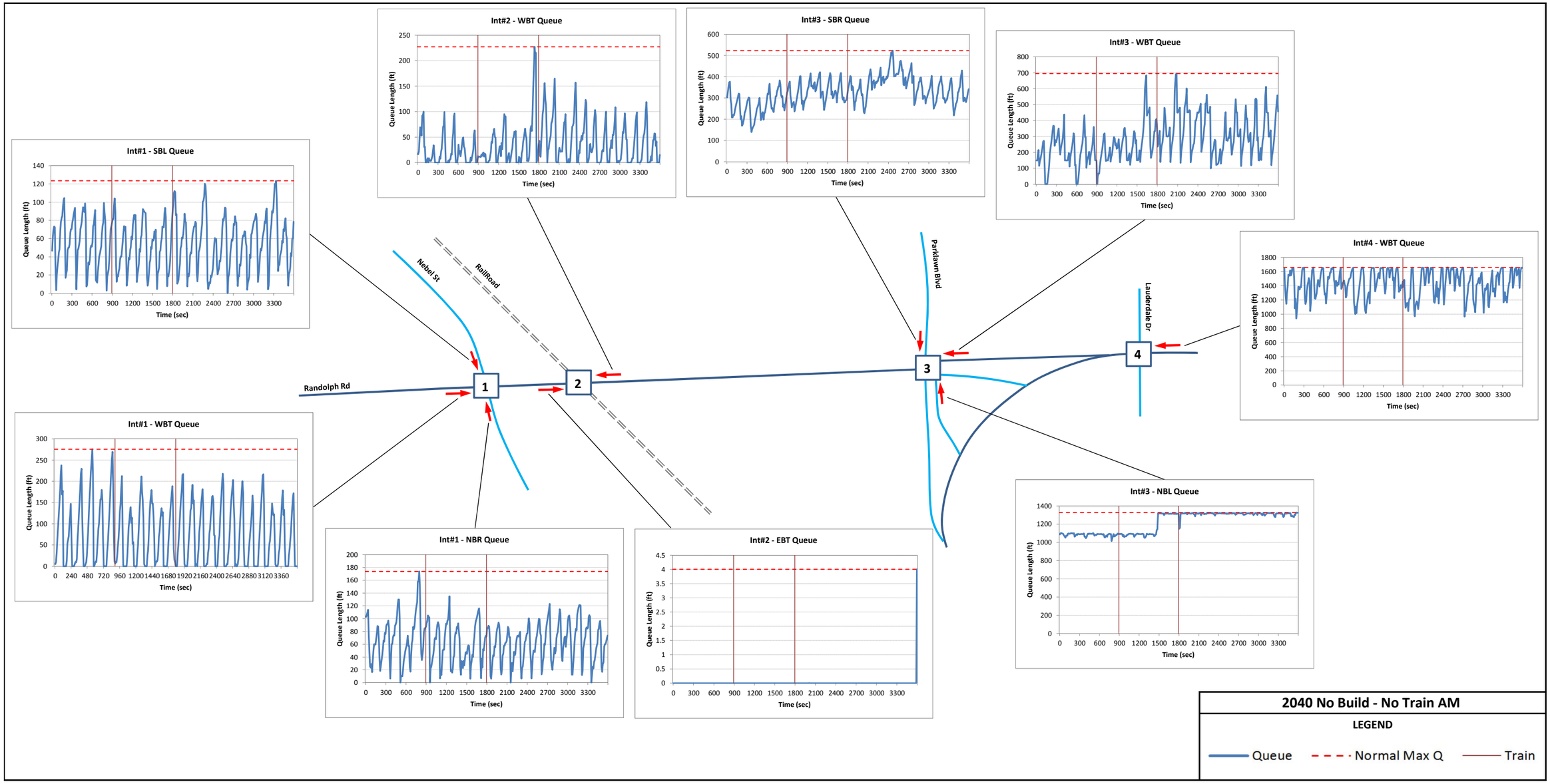
LEGEND

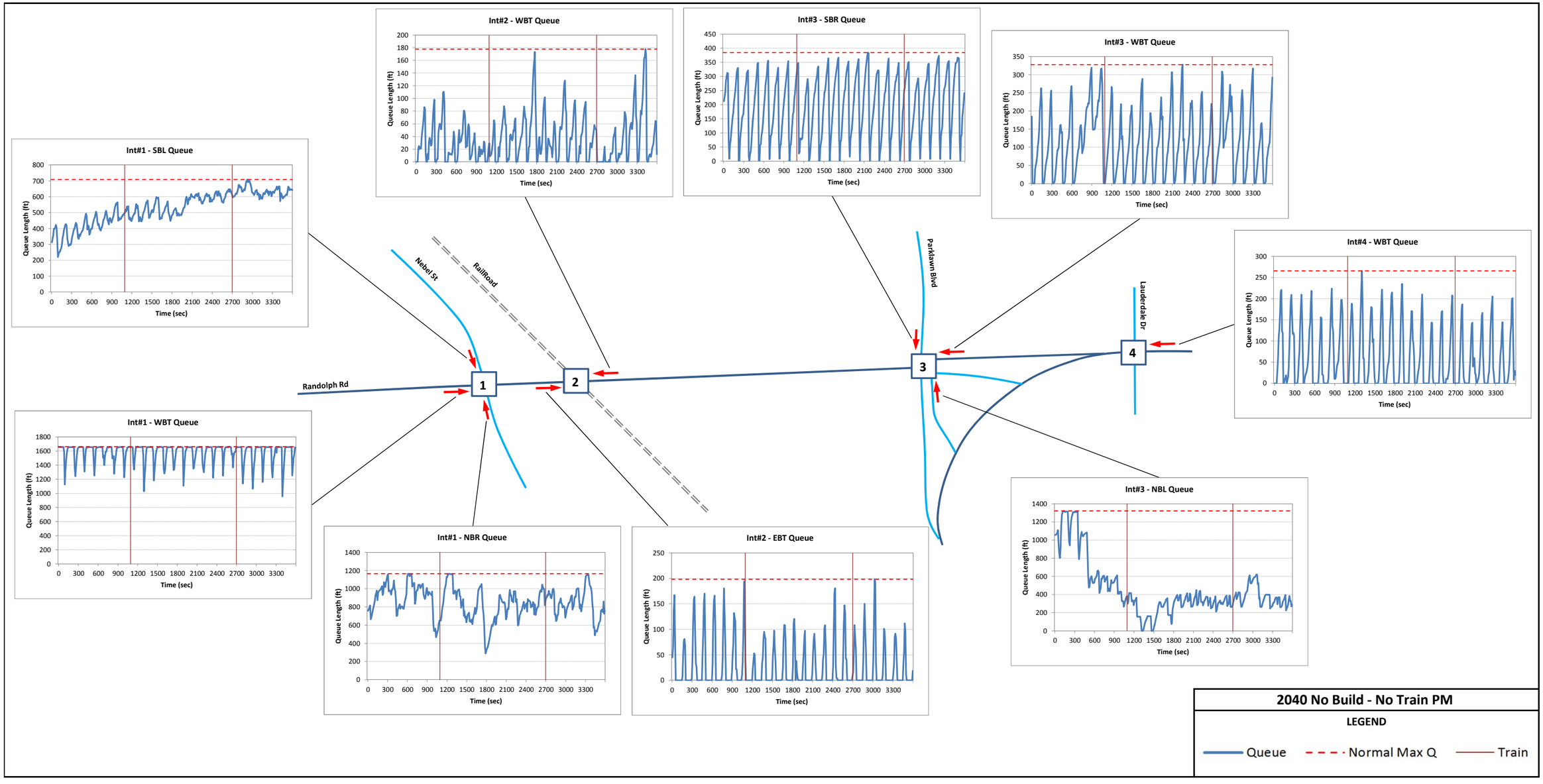
Queue — Normal Max Q — Train

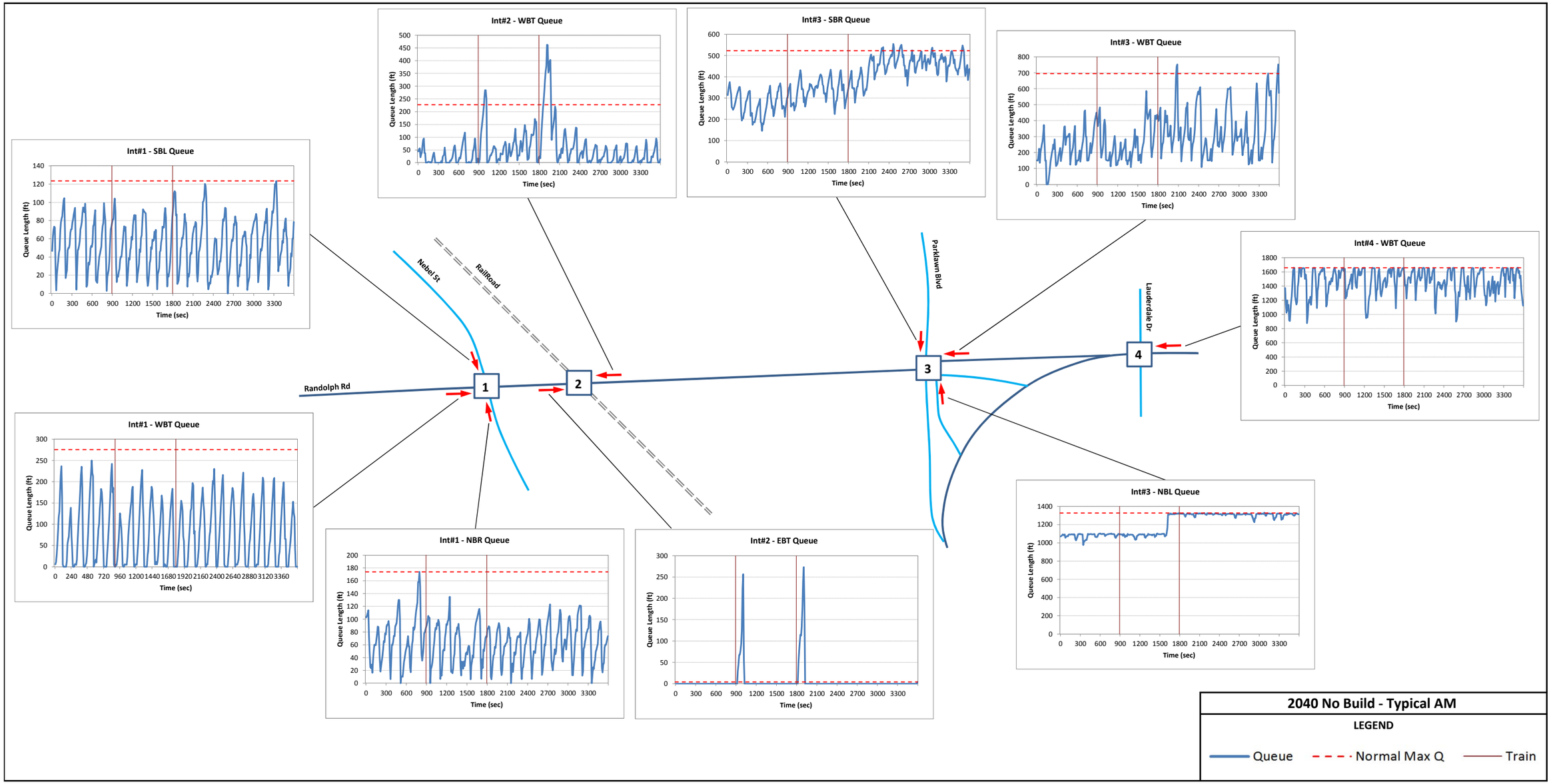

Int#1 - SBL Queue
Queue Length (ft)
Time (sec)
Int#2 - WBT Queue
Queue Length (ft)
Time (sec)
Int#3 - SBR Queue
Queue Length (ft)
Time (sec)
Int#3 - WBT Queue
Queue Length (ft)
Time (sec)
Int#4 - WBT Queue
Queue Length (ft)
Time (sec)
Int#1 - WBT Queue
Queue Length (ft)
Time (sec)
Int#1 - NBR Queue
Queue Length (ft)
Time (sec)
Int#2 - EBT Queue
Queue Length (ft)
Time (sec)
Int#3 - NBL Queue
Queue Length (ft)
Time (sec)
Nebel St
RailRoad
Parklawn Blvd
Lauderdale Dr
Randolph Rd
1
2
3
4
2022 No Build - Freight AM
LEGEND
Queue
Normal Max Q
Train

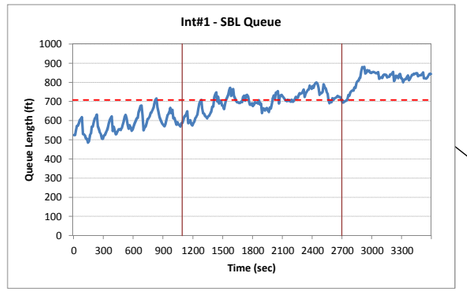

Int#1 - SBL Queue
Int#2 - WBT Queue
Int#3 - SBR Queue
Int#3 - WBT Queue
Int#4 - WBT Queue
Int#1 - WBT Queue
Int#1 - NBR Queue
Int#2 - EBT Queue
Int#3 - NBL Queue
Queue Length (ft)
Time (sec)
Nebel St
RailRoad
Randolph Rd
Parklawn Blvd
Lauderdale Dr
1
2
3
4
2022 No Build - Freight PM
LEGEND
Queue
Normal Max Q
Train

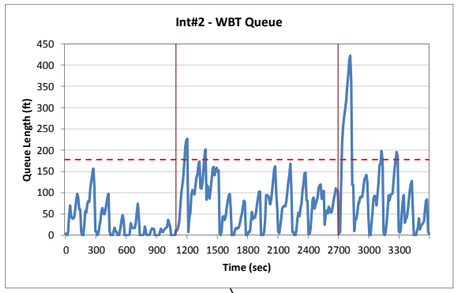
2040 No Build

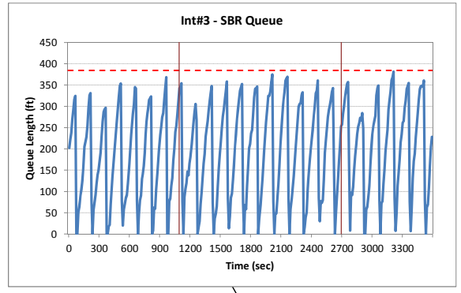

Int#1 - SBL Queue
Queue Length (ft)
Time (sec)
Int#2 - WBT Queue
Queue Length (ft)
Time (sec)
Int#3 - SBR Queue
Queue Length (ft)
Time (sec)
Int#3 - WBT Queue
Queue Length (ft)
Time (sec)
Int#4 - WBT Queue
Queue Length (ft)
Time (sec)
Int#1 - WBT Queue
Queue Length (ft)
Time (sec)
Int#1 - NBR Queue
Queue Length (ft)
Time (sec)
Int#2 - EBT Queue
Queue Length (ft)
Time (sec)
Int#3 - NBL Queue
Queue Length (ft)
Time (sec)
Nebel St
RailRoad
Parklawn Blvd
Lauderdale Dr
Randolph Rd
1
2
3
4
2040 No Build - No Train AM
LEGEND
Queue
Normal Max Q
Train

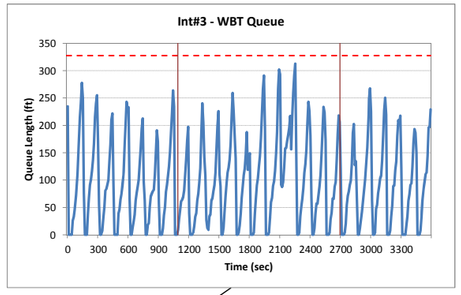

Int#1 - SBL Queue
Int#2 - WBT Queue
Int#3 - SBR Queue
Int#3 - WBT Queue
Int#4 - WBT Queue
Int#1 - WBT Queue
Int#1 - NBR Queue
Int#2 - EBT Queue
Int#3 - NBL Queue
Queue Length (ft)
Time (sec)
Nebel St
RailRoad
Parklawn Blvd
Lauderdale Dr
Randolph Rd
1
2
3
4
2040 No Build - No Train PM
LEGEND
Queue
Normal Max Q
Train

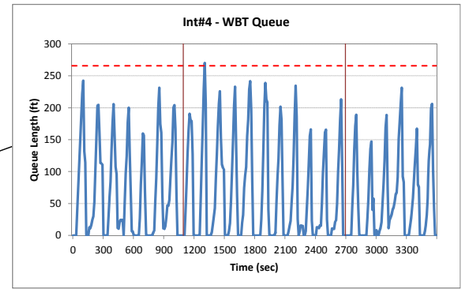

Int#2 - WBT Queue
Queue Length (ft)
Time (sec)
Int#3 - SBR Queue
Queue Length (ft)
Time (sec)
Int#3 - WBT Queue
Queue Length (ft)
Time (sec)
Int#1 - SBL Queue
Queue Length (ft)
Time (sec)
Int#4 - WBT Queue
Queue Length (ft)
Time (sec)
Nebel St
RailRoad
Randolph Rd
Parklawn Blvd
Lauderdale Dr
1
2
3
4
Int#1 - WBT Queue
Queue Length (ft)
Time (sec)
Int#3 - NBL Queue
Queue Length (ft)
Time (sec)
Int#1 - NBR Queue
Queue Length (ft)
Time (sec)
Int#2 - EBT Queue
Queue Length (ft)
Time (sec)
2040 No Build - Typical AM
LEGEND
Queue
Normal Max Q
Train

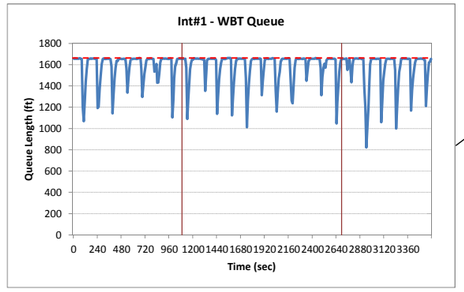


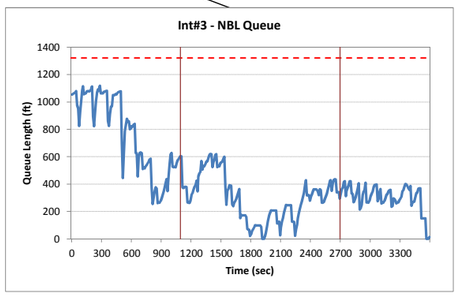


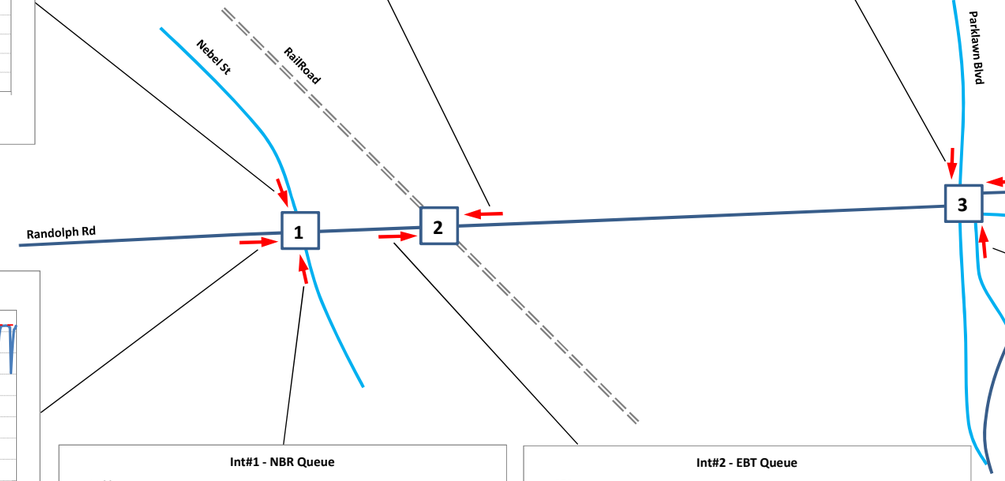








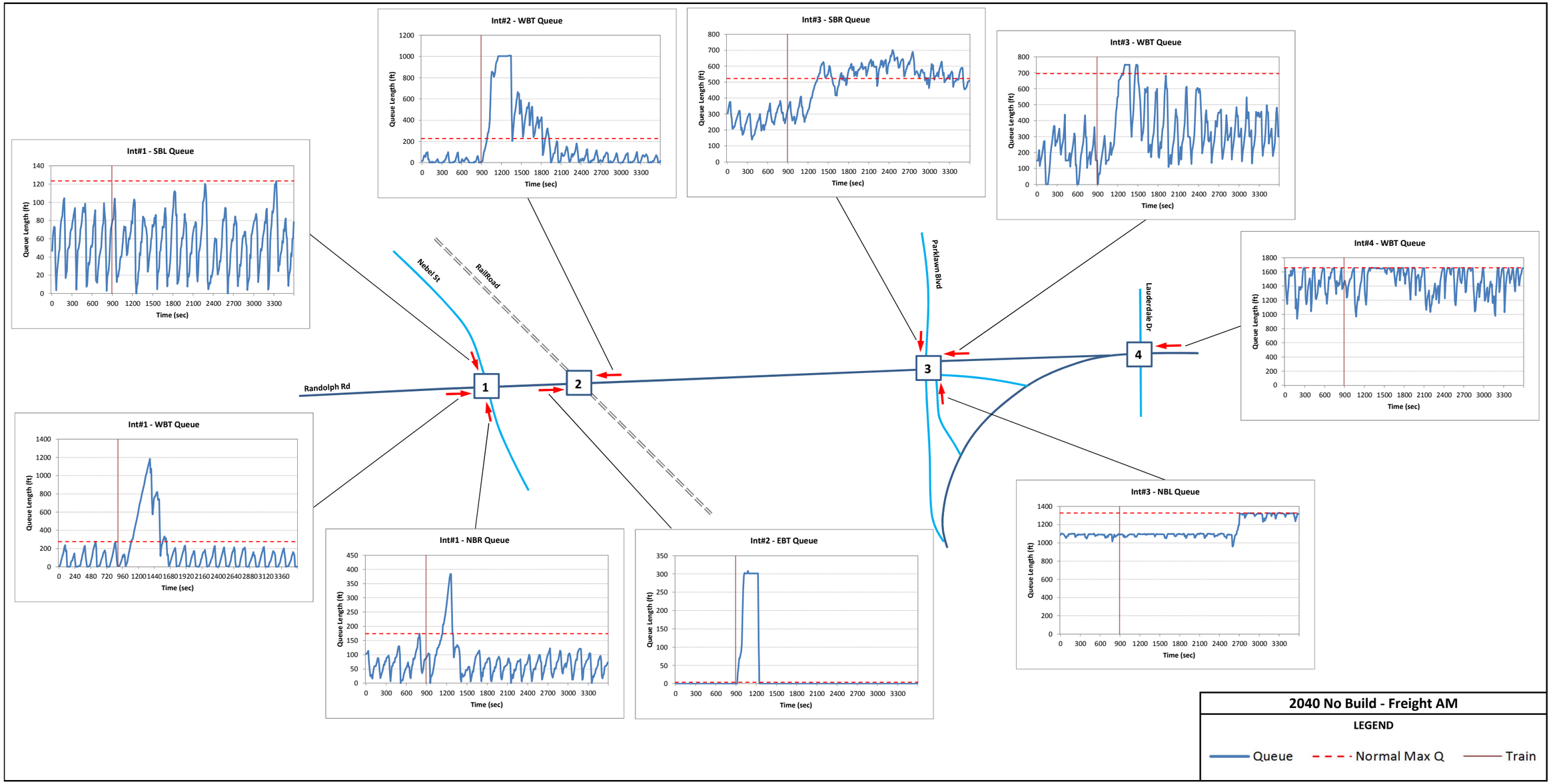


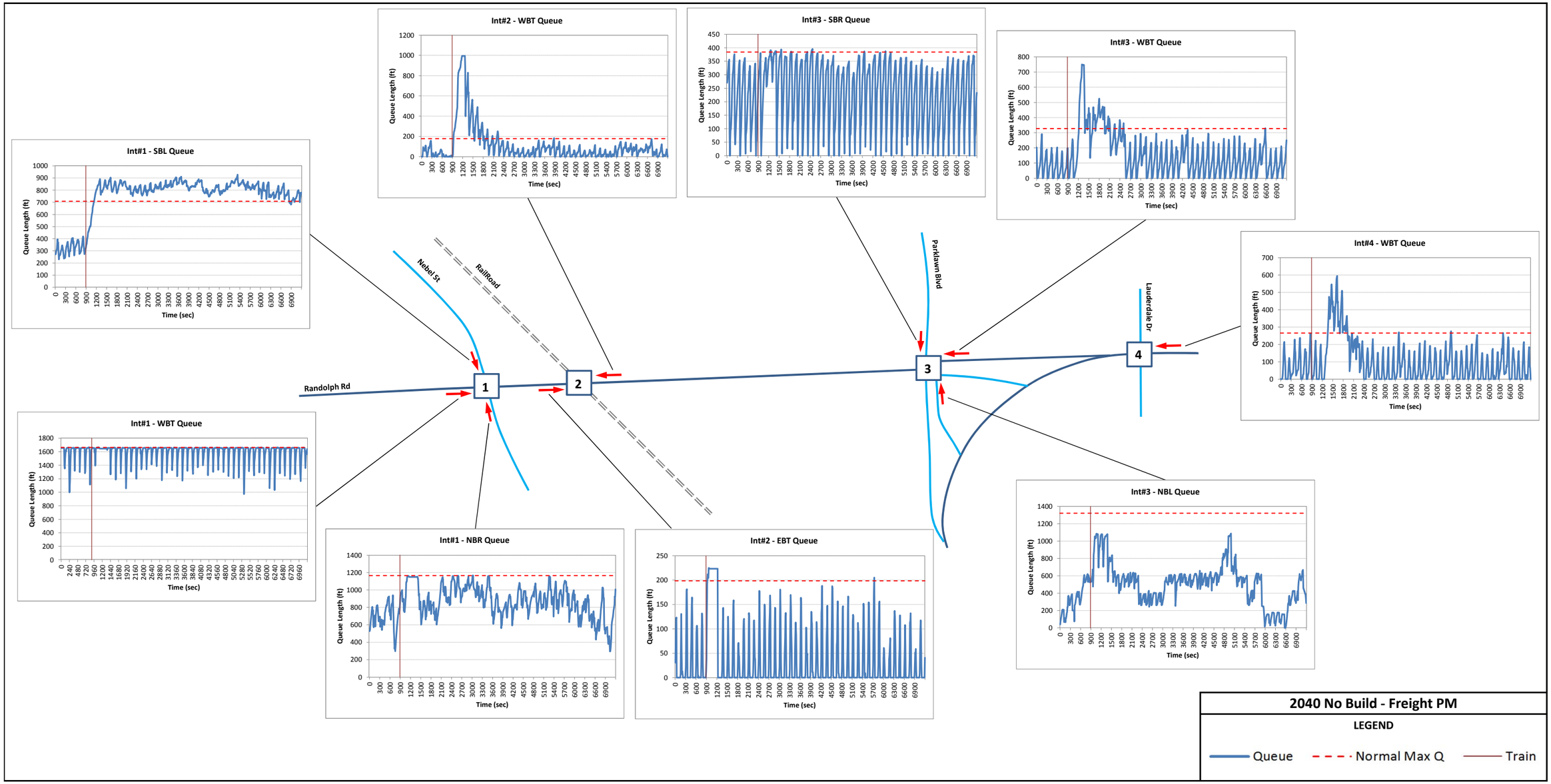


2040 No Build - Typical PM

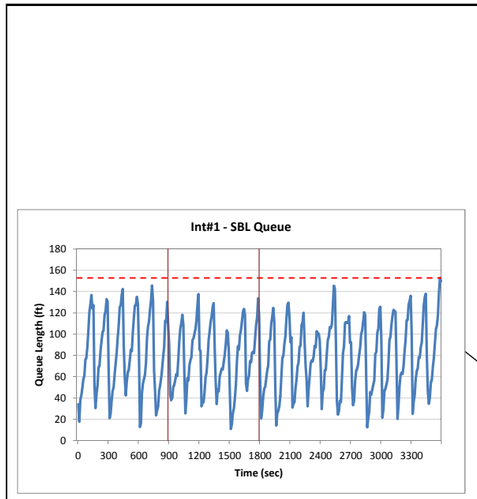
LEGEND

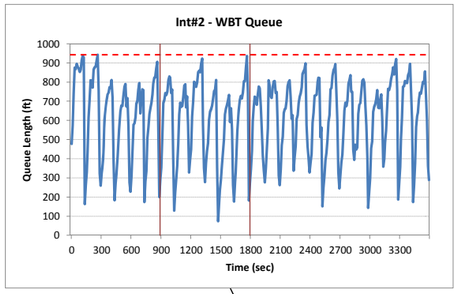
Queue — Normal Max Q — Train

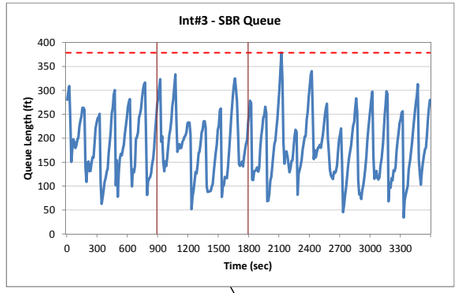

Int#1 - SBL Queue
Queue Length (ft)
Time (sec)
Int#2 - WBT Queue
Queue Length (ft)
Time (sec)
Int#3 - SBR Queue
Queue Length (ft)
Time (sec)
Int#3 - WBT Queue
Queue Length (ft)
Time (sec)
Int#4 - WBT Queue
Queue Length (ft)
Time (sec)
Int#1 - WBT Queue
Queue Length (ft)
Time (sec)
Int#1 - NBR Queue
Queue Length (ft)
Time (sec)
Int#2 - EBT Queue
Queue Length (ft)
Time (sec)
Int#3 - NBL Queue
Queue Length (ft)
Time (sec)
Nebel St
RailRoad
Parklawn Blvd
Lauderdale Dr
Randolph Rd
1
2
3
4
2040 No Build - Freight AM
LEGEND
Queue
Normal Max Q
Train

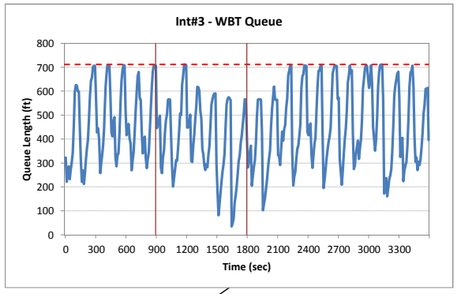

Int#1 - SBL Queue
Int#2 - WBT Queue
Int#3 - SBR Queue
Int#3 - WBT Queue
Int#4 - WBT Queue
Int#1 - WBT Queue
Int#1 - NBR Queue
Int#2 - EBT Queue
Int#3 - NBL Queue
Queue Length (ft)
Time (sec)
Nebel St
RailRoad
Randolph Rd
Parklawn Blvd
Lauderdale Dr
1
2
3
4
2040 No Build - Freight PM
LEGEND
Queue
Normal Max Q
Train

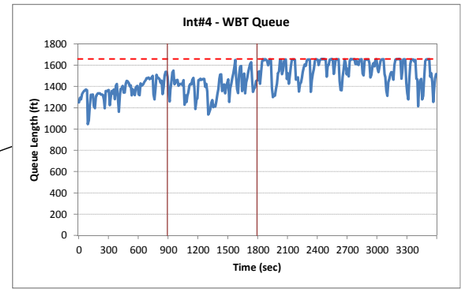
2022 Build

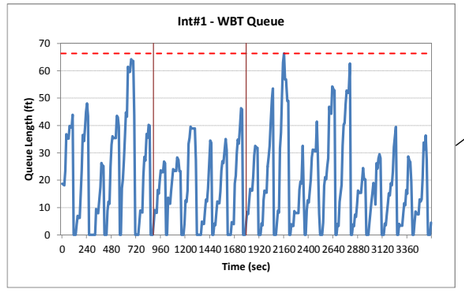


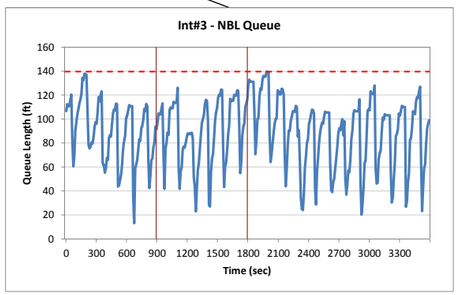


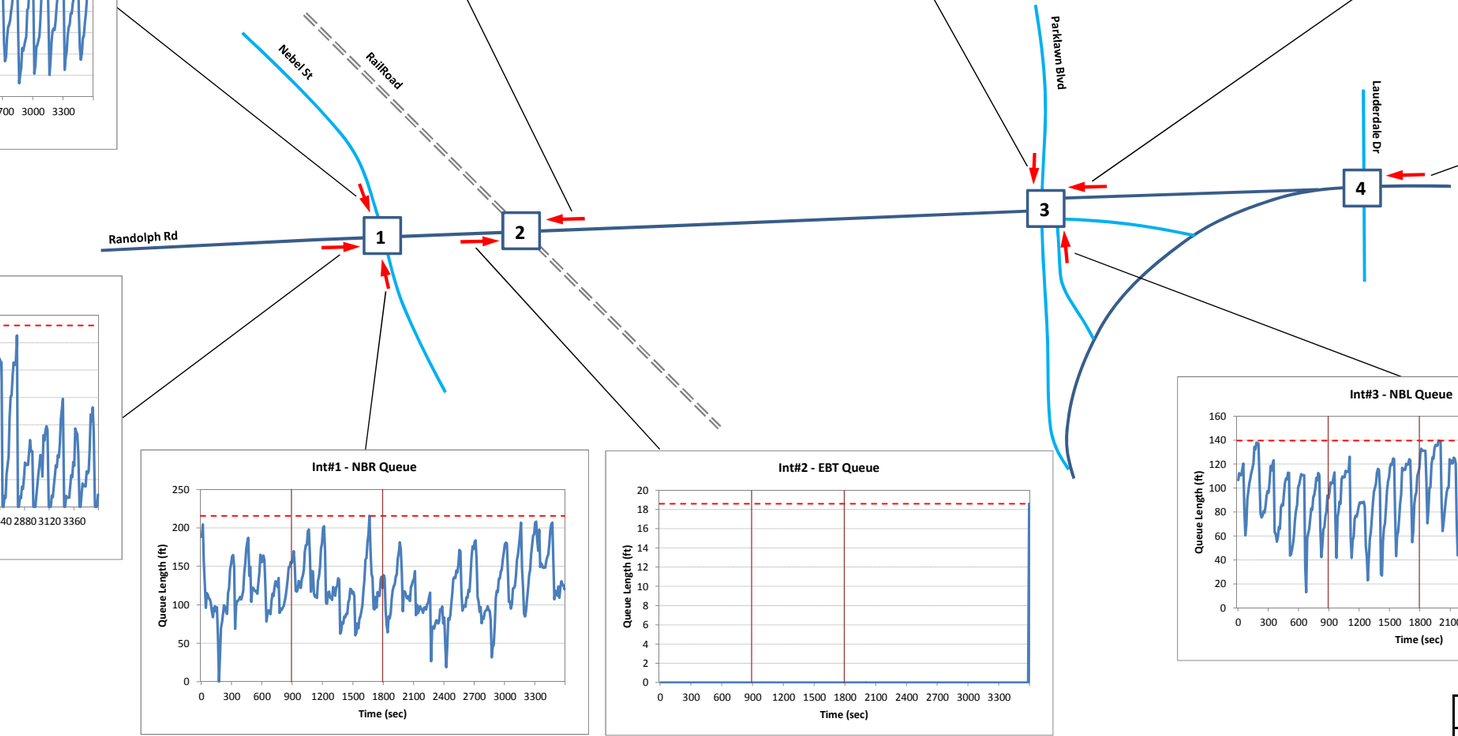








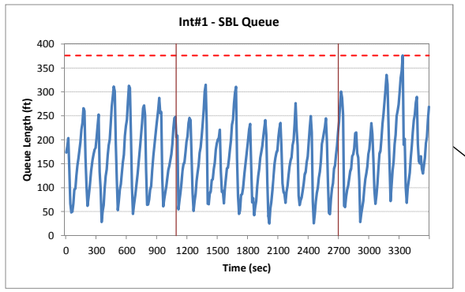


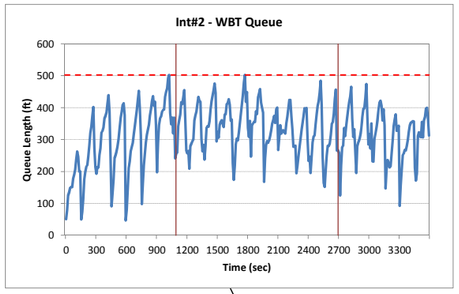


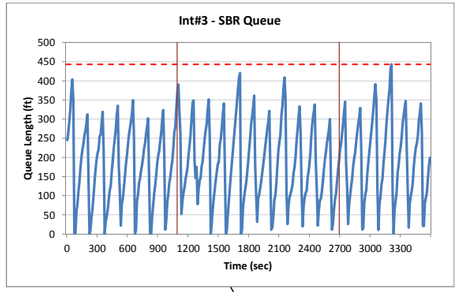
2022 Build - No Train AM

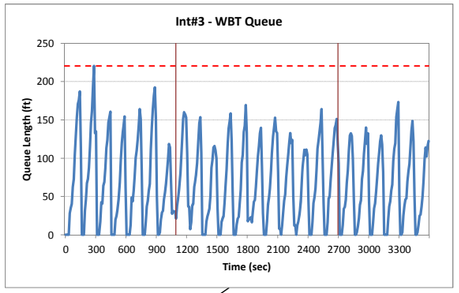
LEGEND

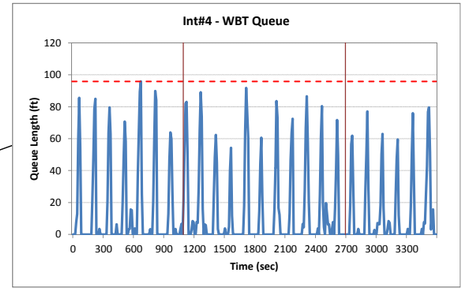
Queue — Normal Max Q — Train

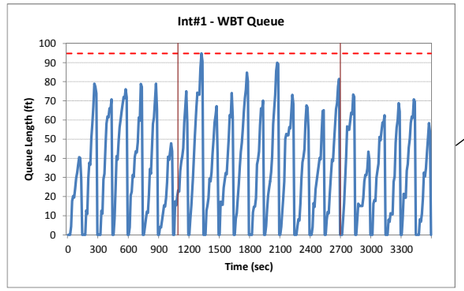


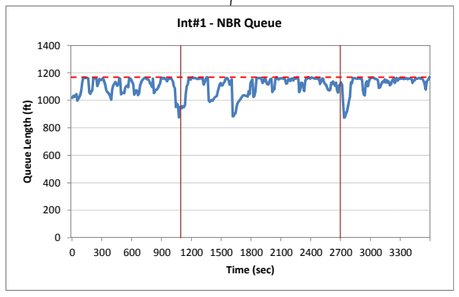


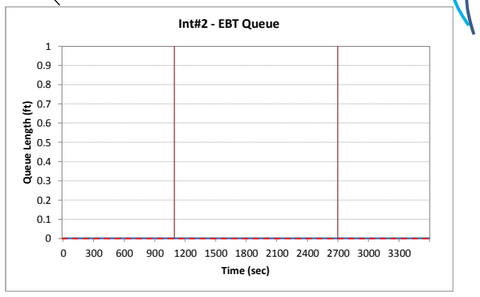


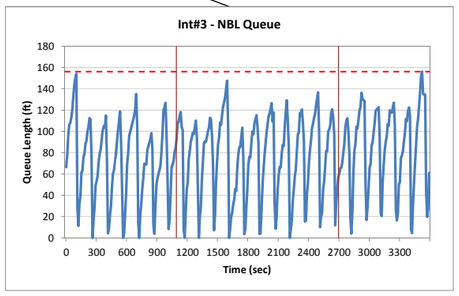


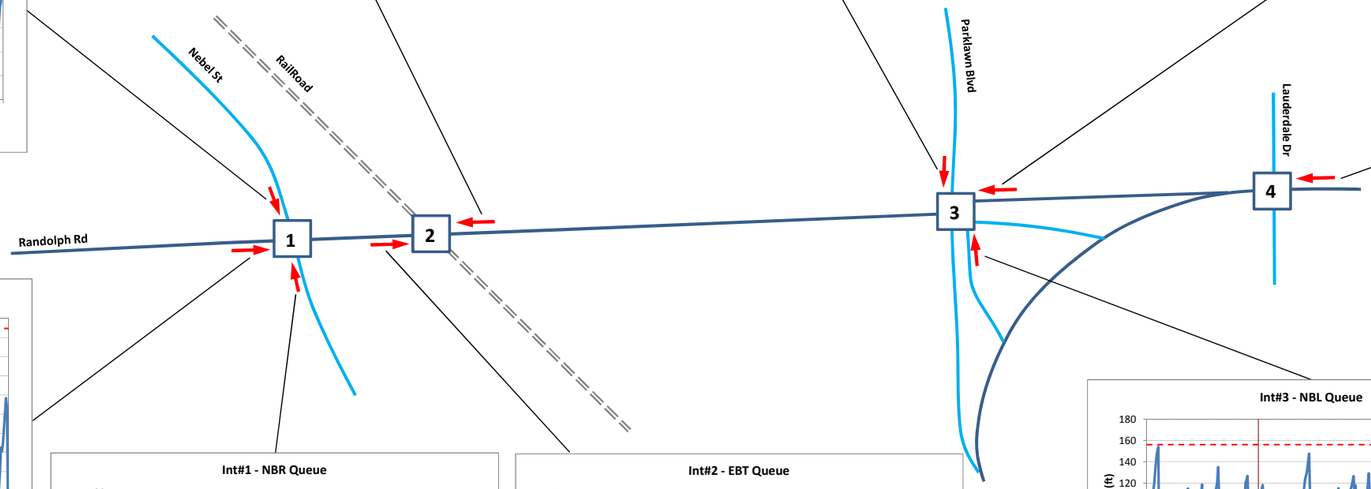








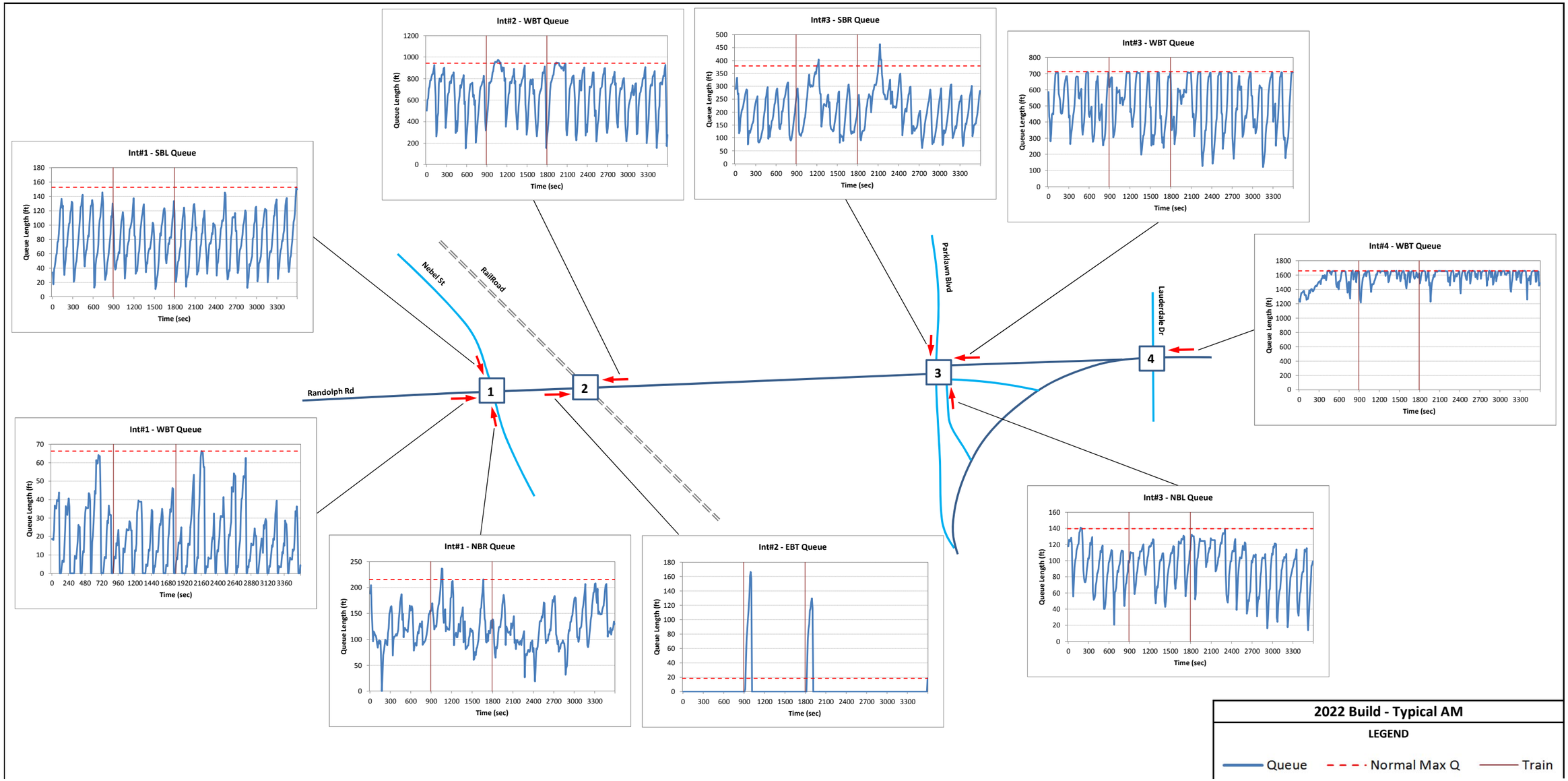


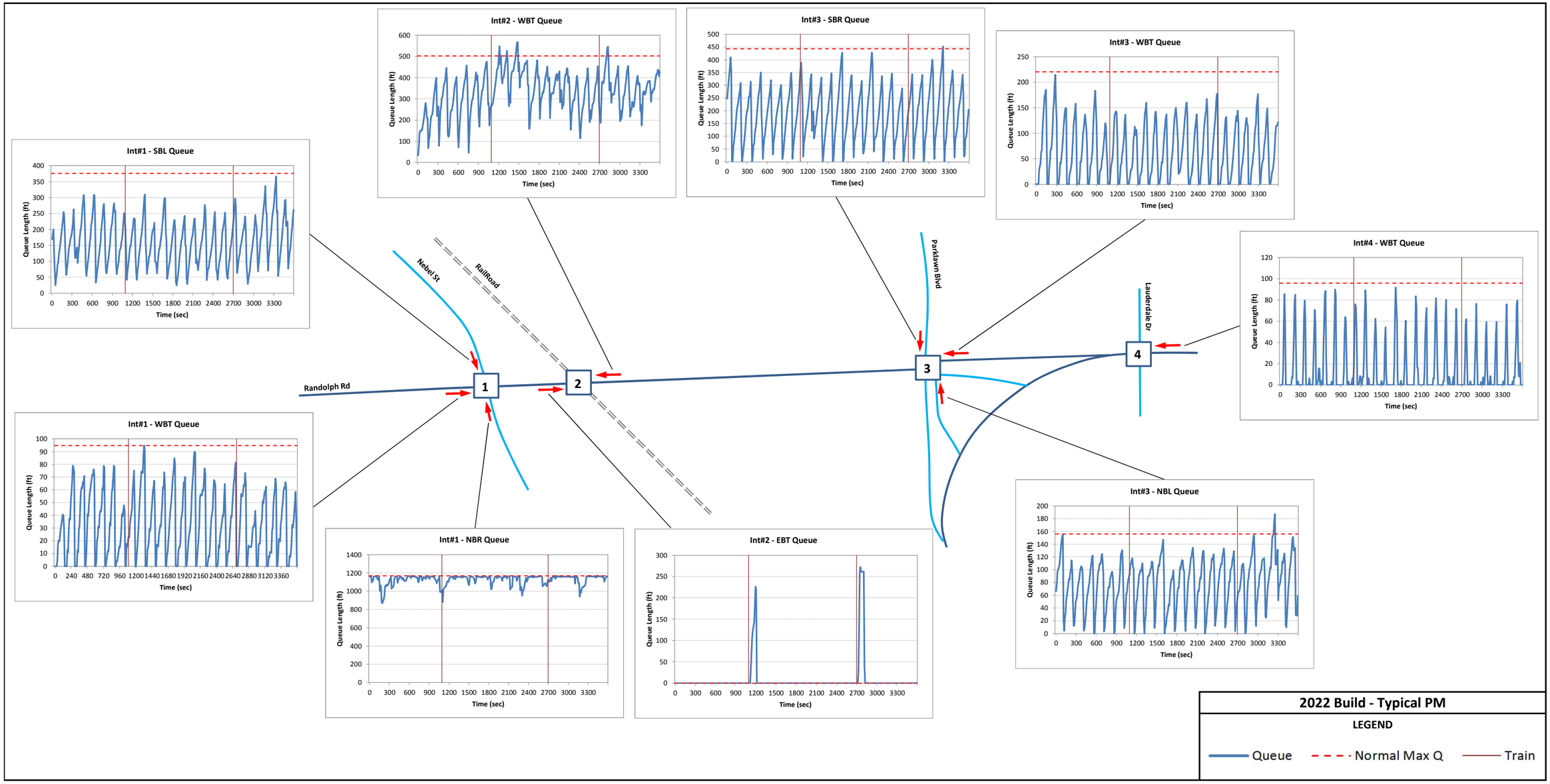


2022 Build - No Train PM

LEGEND

Queue — Normal Max Q — Train

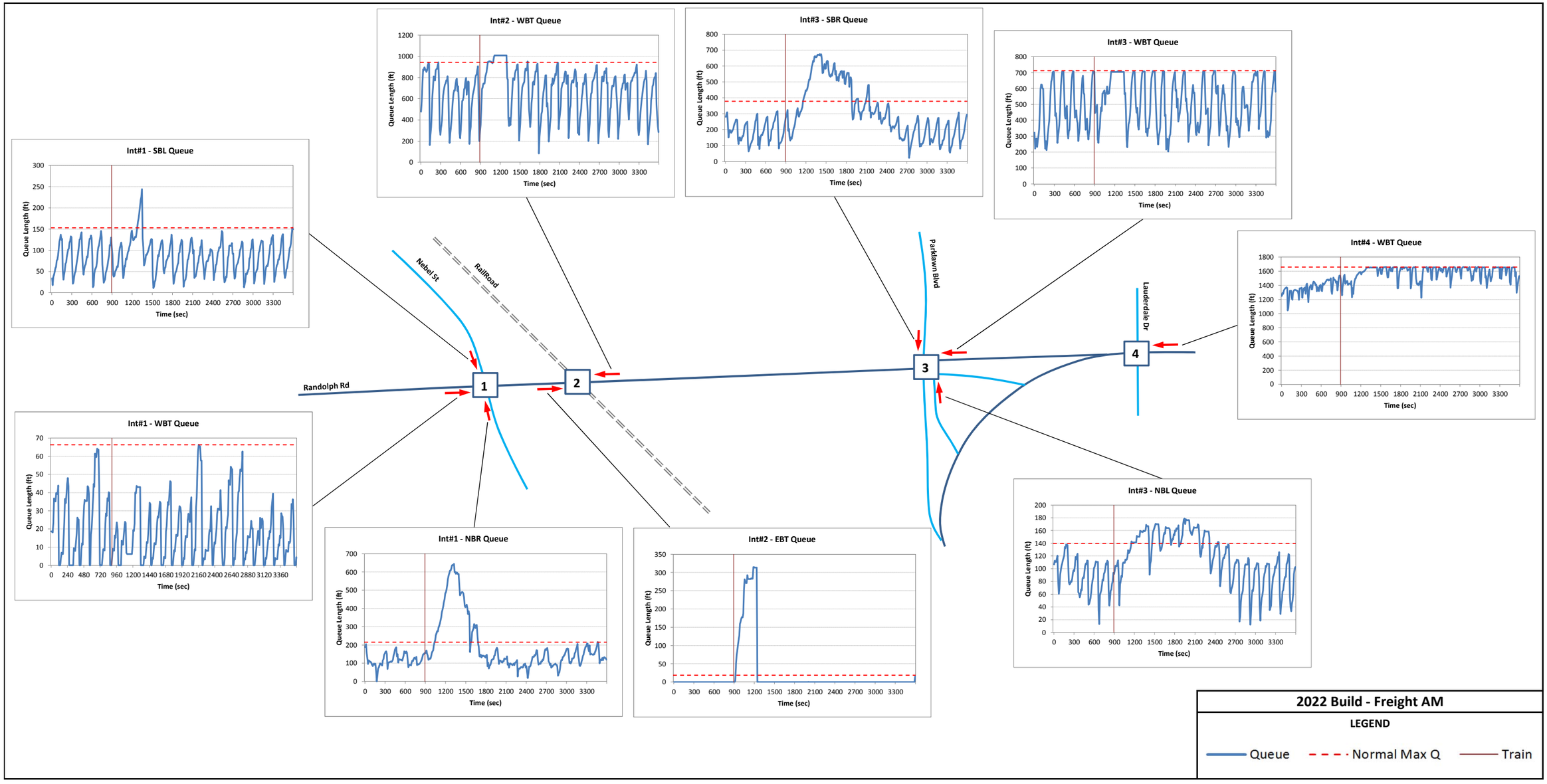

Int#1 - SBL Queue
Queue Length (ft)
Time (sec)
Int#2 - WBT Queue
Queue Length (ft)
Time (sec)
Int#3 - SBR Queue
Queue Length (ft)
Time (sec)
Int#3 - WBT Queue
Queue Length (ft)
Time (sec)
Int#4 - WBT Queue
Queue Length (ft)
Time (sec)
Int#1 - WBT Queue
Queue Length (ft)
Time (sec)
Int#1 - NBR Queue
Queue Length (ft)
Time (sec)
Int#2 - EBT Queue
Queue Length (ft)
Time (sec)
Int#3 - NBL Queue
Queue Length (ft)
Time (sec)
Nebel St
RailRoad
Parklawn Blvd
Lauderdale Dr
Randolph Rd
1
2
3
4
2022 Build - Typical AM
LEGEND
Queue
Normal Max Q
Train

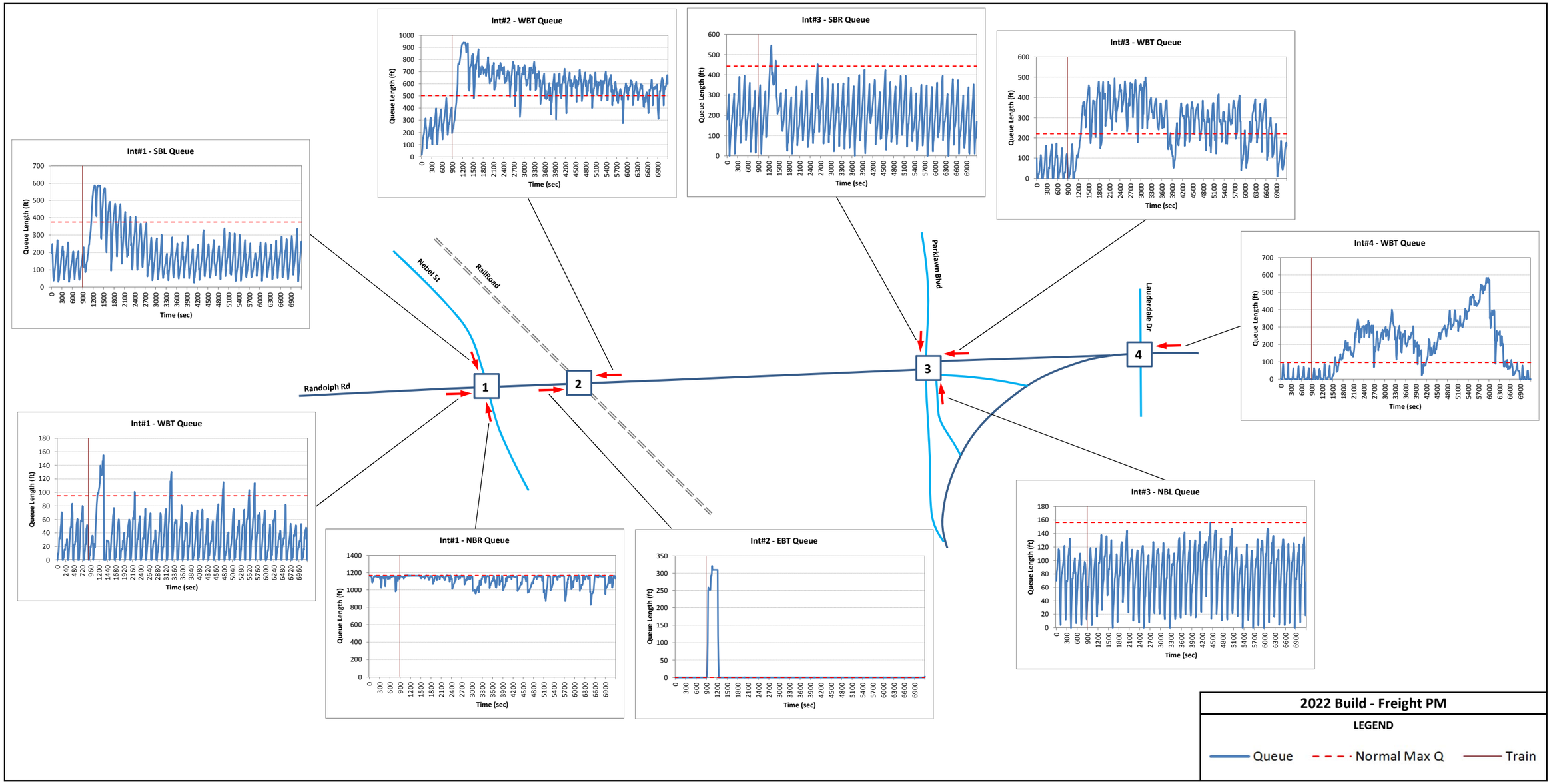


2022 Build - Typical PM

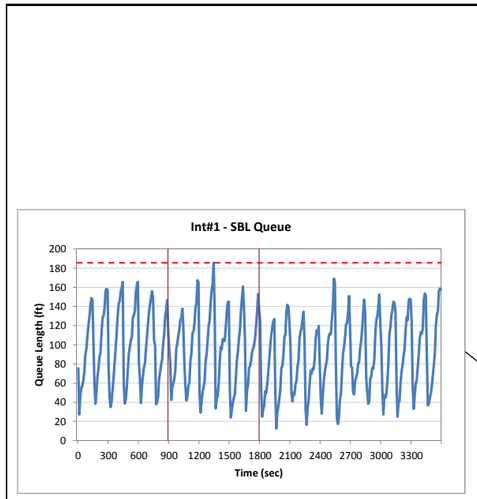
LEGEND

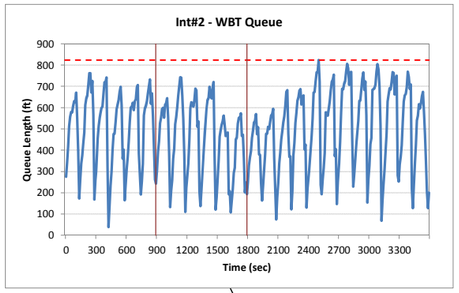
Queue — Normal Max Q — Train

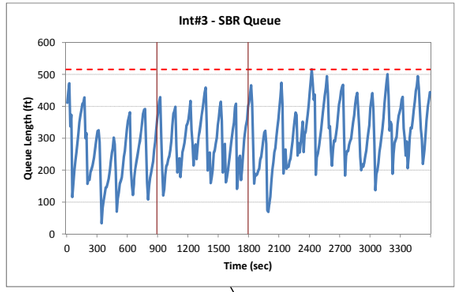

Int#1 - SBL Queue
Queue Length (ft)
Time (sec)
Int#2 - WBT Queue
Queue Length (ft)
Time (sec)
Int#3 - SBR Queue
Queue Length (ft)
Time (sec)
Int#3 - WBT Queue
Queue Length (ft)
Time (sec)
Int#4 - WBT Queue
Queue Length (ft)
Time (sec)
Int#1 - WBT Queue
Queue Length (ft)
Time (sec)
Int#1 - NBR Queue
Queue Length (ft)
Time (sec)
Int#2 - EBT Queue
Queue Length (ft)
Time (sec)
Int#3 - NBL Queue
Queue Length (ft)
Time (sec)
Nebel St
RailRoad
Parklawn Blvd
Lauderdale Dr
Randolph Rd
1
2
3
4
2022 Build - Freight AM
LEGEND
Queue
Normal Max Q
Train

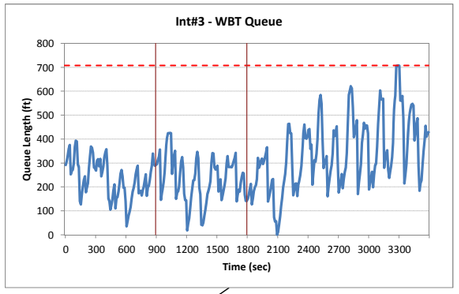

Int#1 - SBL Queue
Int#2 - WBT Queue
Int#3 - SBR Queue
Int#3 - WBT Queue
Int#4 - WBT Queue
Int#1 - WBT Queue
Int#1 - NBR Queue
Int#2 - EBT Queue
Int#3 - NBL Queue
Queue Length (ft)
Time (sec)
Nebel St
RailRoad
Randolph Rd
Parklawn Blvd
Lauderdale Dr
1
2
3
4
2022 Build - Freight PM
LEGEND
Queue
Normal Max Q
Train

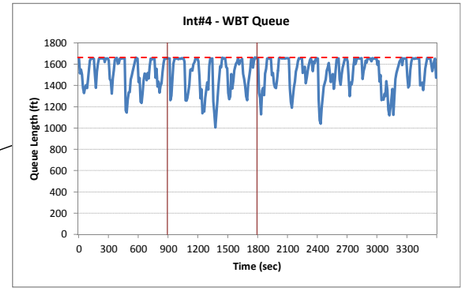
2040 Build

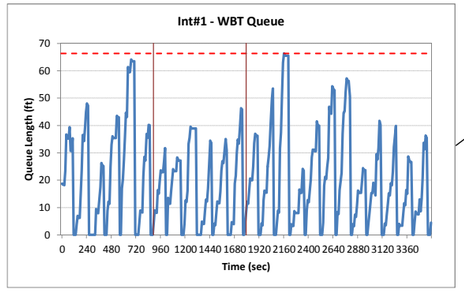


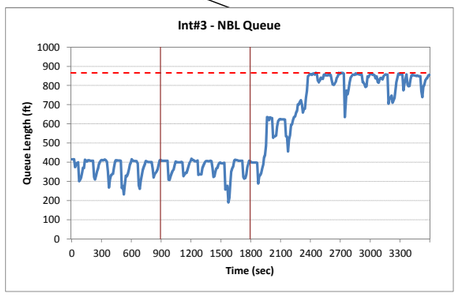


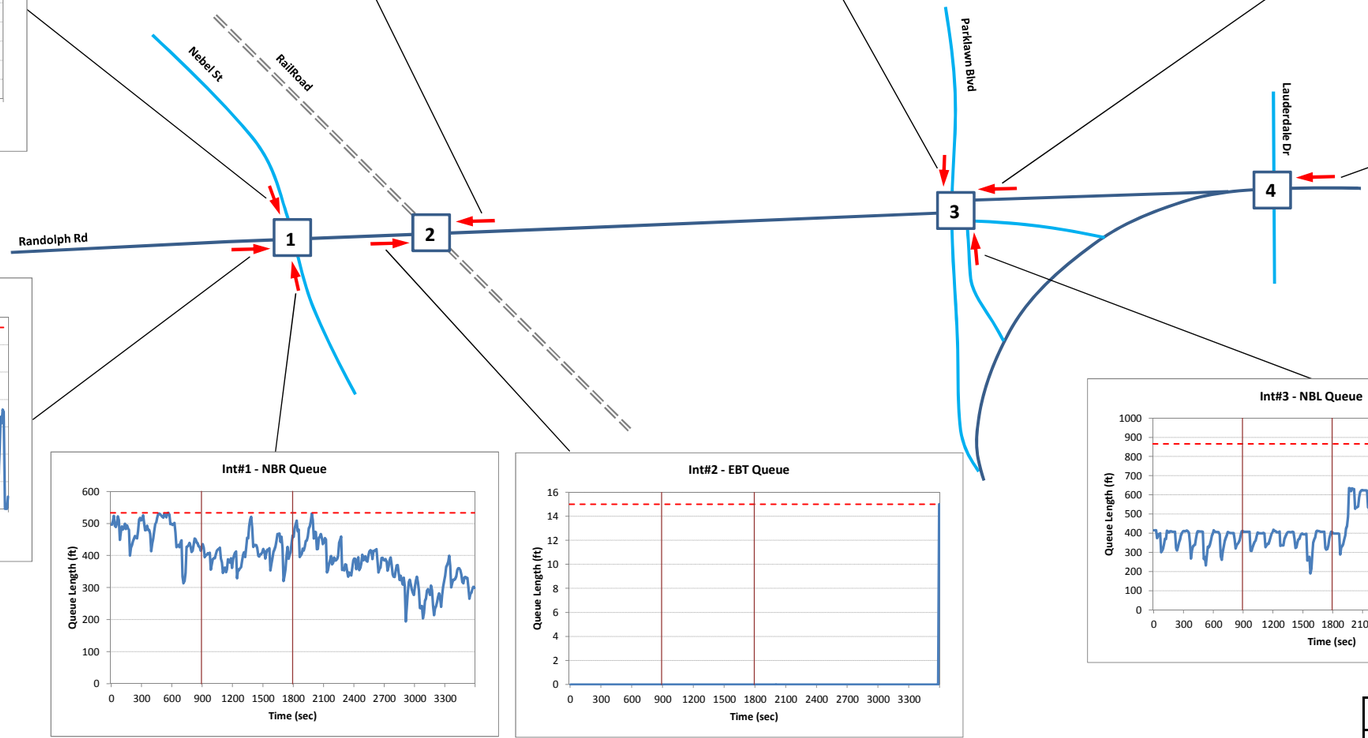








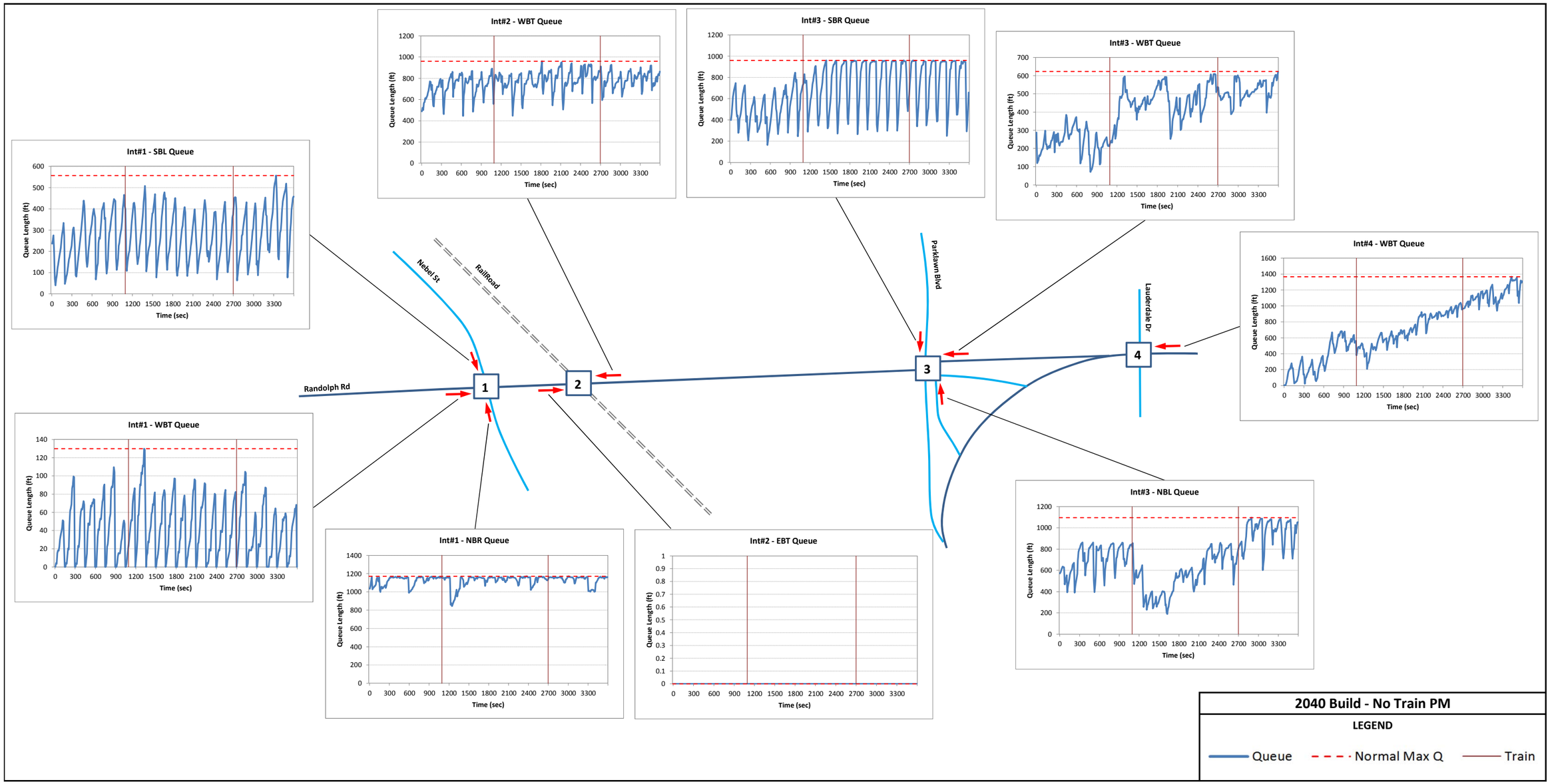


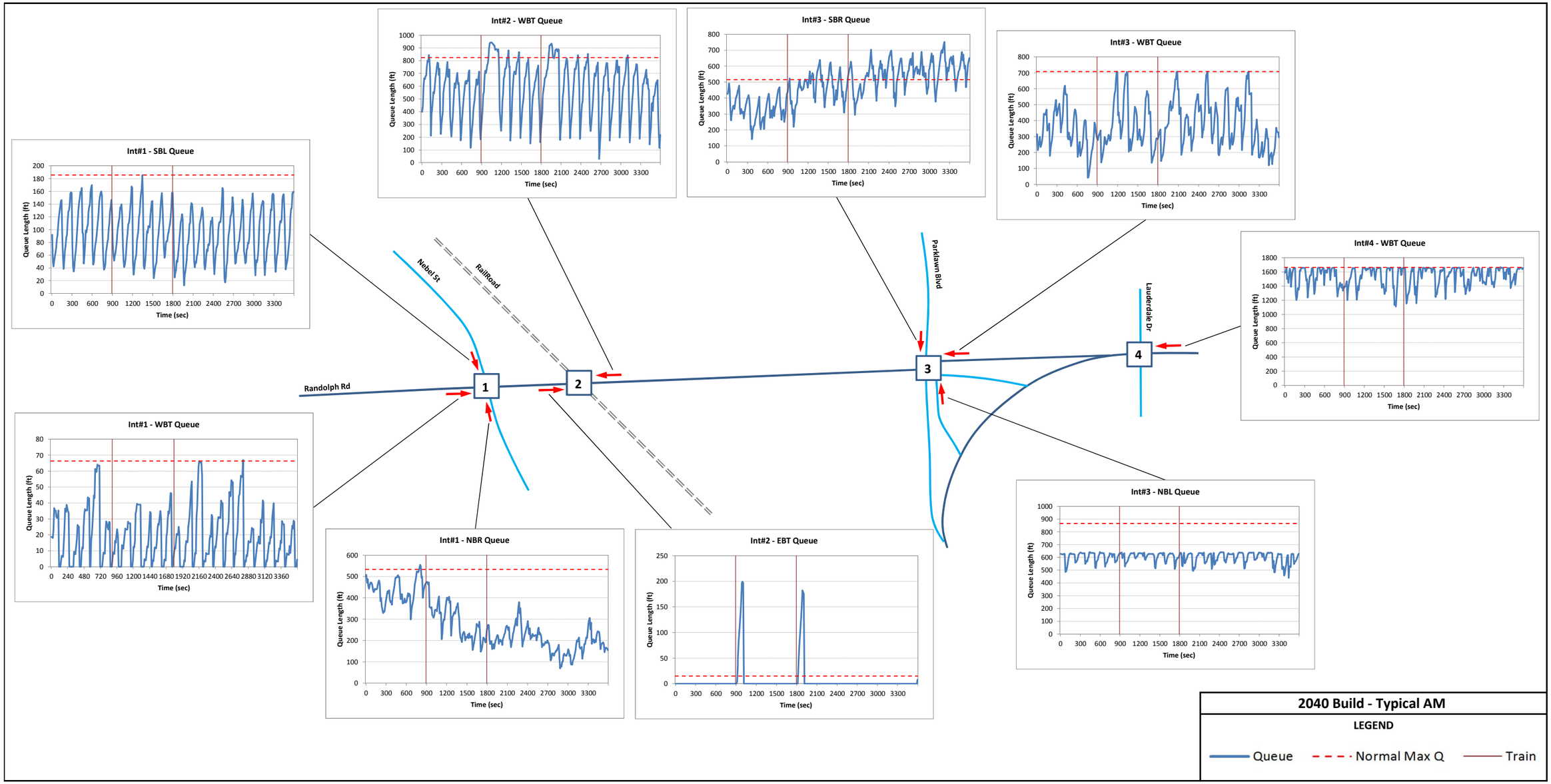


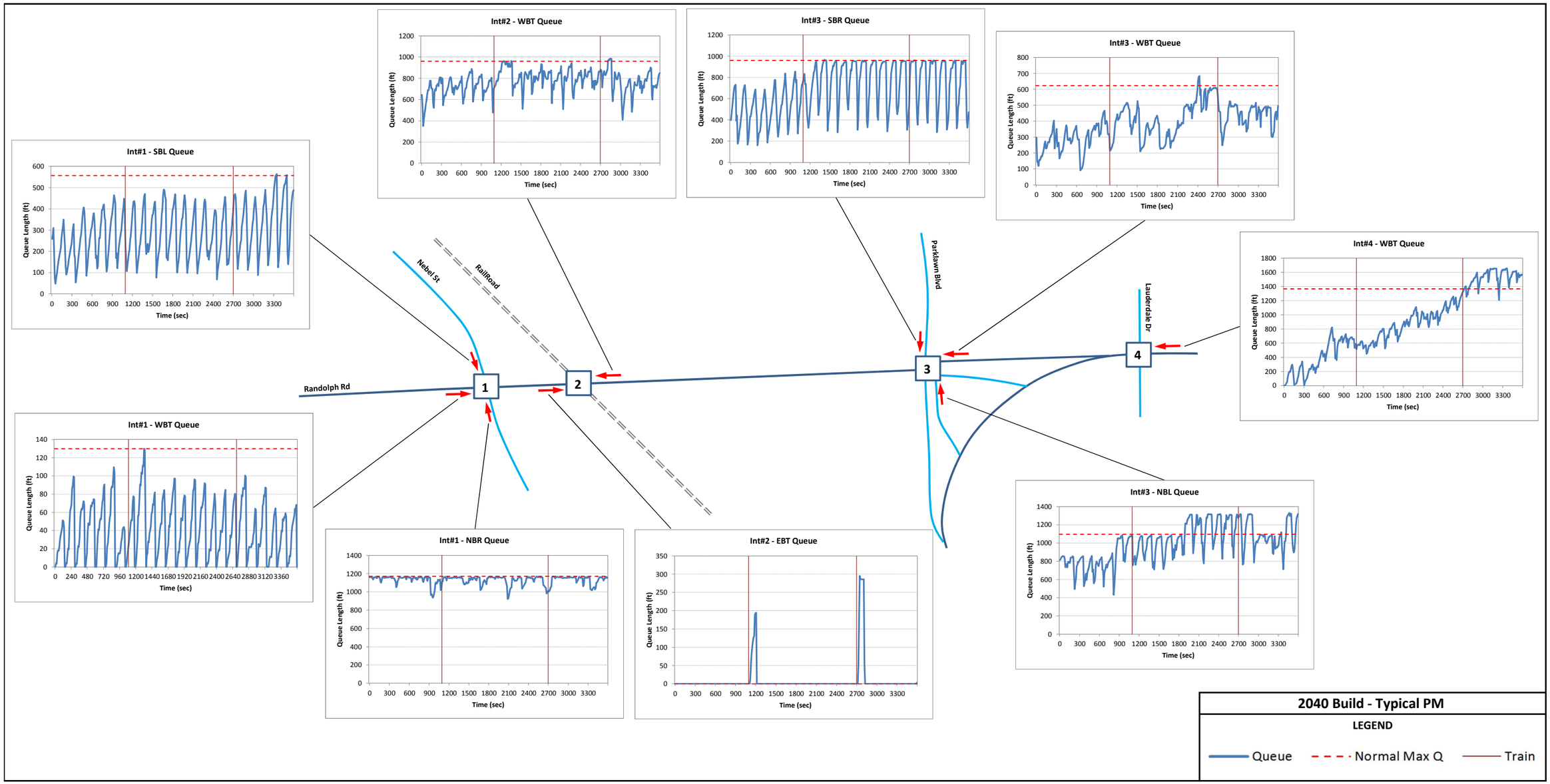
2040 Build - No Train AM

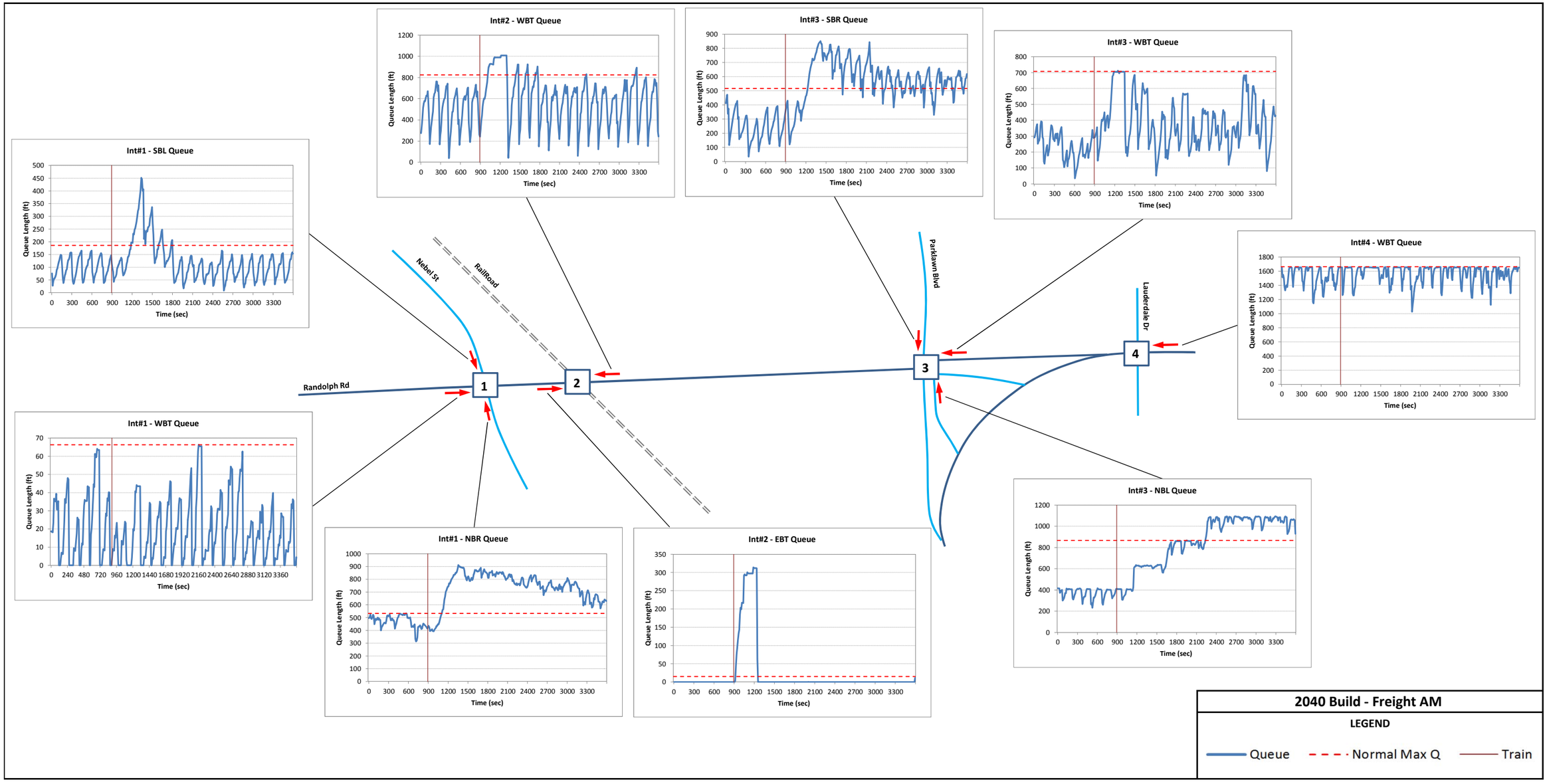
LEGEND

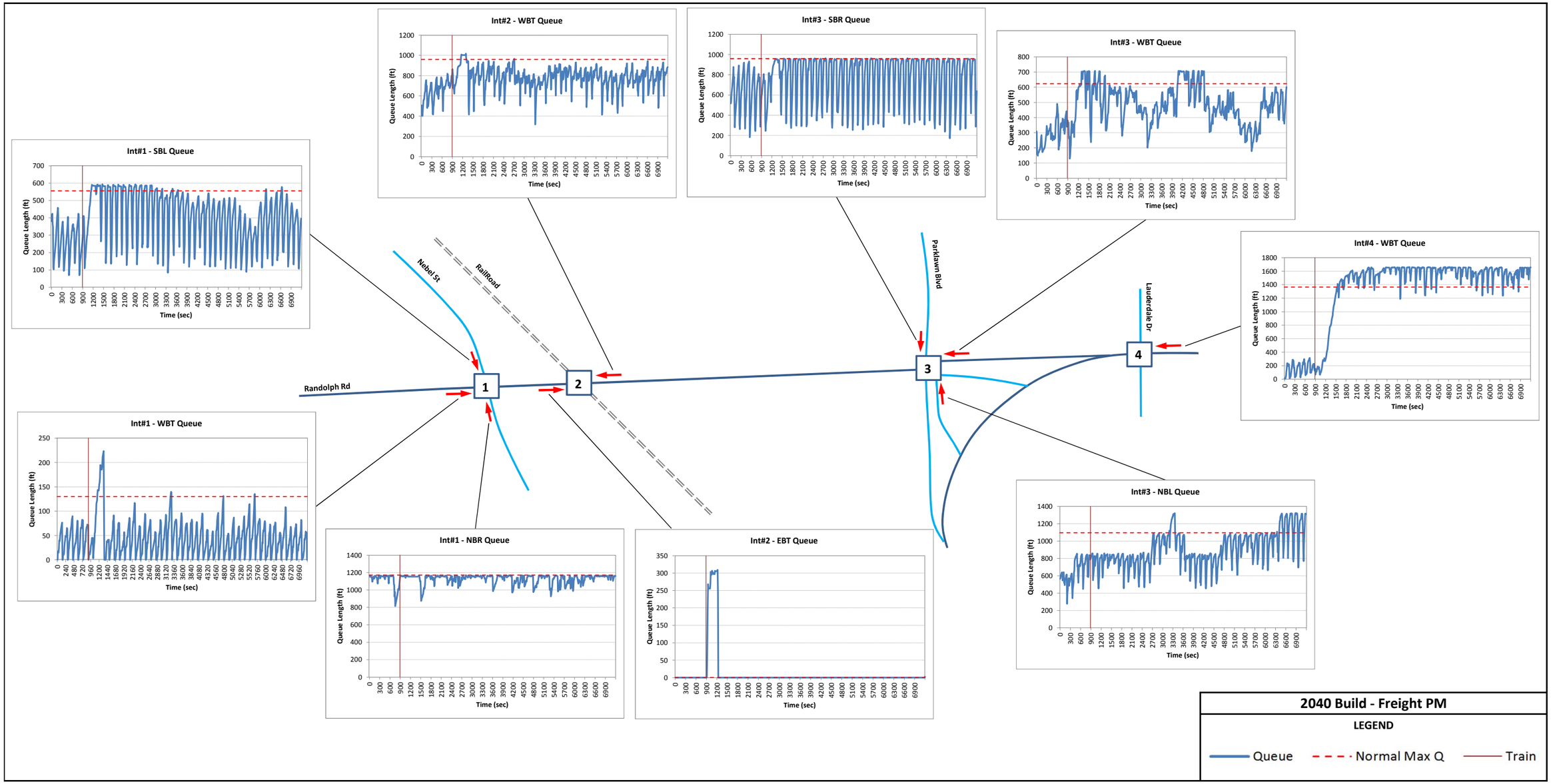
Queue — Normal Max Q — Train


Int#2 - WBT Queue
Queue Length (ft)
Time (sec)
Int#3 - SBR Queue
Queue Length (ft)
Time (sec)
Int#3 - WBT Queue
Queue Length (ft)
Time (sec)
Int#1 - SBL Queue
Queue Length (ft)
Time (sec)
Int#4 - WBT Queue
Queue Length (ft)
Time (sec)
Nebel St
RailRoad
Parklawn Blvd
Lauderdale Dr
Randolph Rd
1
2
3
4
Int#1 - WBT Queue
Queue Length (ft)
Time (sec)
Int#1 - NBR Queue
Queue Length (ft)
Time (sec)
Int#2 - EBT Queue
Queue Length (ft)
Time (sec)
Int#3 - NBL Queue
Queue Length (ft)
Time (sec)
2040 Build - No Train PM
LEGEND
Queue
Normal Max Q
Train


Int#2 - WBT Queue
Queue Length (ft)
Time (sec)
Int#3 - SBR Queue
Queue Length (ft)
Time (sec)
Int#3 - WBT Queue
Queue Length (ft)
Time (sec)
Int#1 - SBL Queue
Queue Length (ft)
Time (sec)
Int#4 - WBT Queue
Queue Length (ft)
Time (sec)
Nebel St
RailRoad
Parklawn Blvd
Lauderdale Dr
Randolph Rd
1
2
3
4
Int#1 - WBT Queue
Queue Length (ft)
Time (sec)
Int#1 - NBR Queue
Queue Length (ft)
Time (sec)
Int#2 - EBT Queue
Queue Length (ft)
Time (sec)
Int#3 - NBL Queue
Queue Length (ft)
Time (sec)
2040 Build - Typical AM
LEGEND
Queue
Normal Max Q
Train


Int#2 - WBT Queue
Queue Length (ft)
Time (sec)
Int#3 - SBR Queue
Queue Length (ft)
Time (sec)
Int#3 - WBT Queue
Queue Length (ft)
Time (sec)
Int#1 - SBL Queue
Queue Length (ft)
Time (sec)
Int#4 - WBT Queue
Queue Length (ft)
Time (sec)
Nebel St
RailRoad
Parklawn Blvd
Lauderdale Dr
Randolph Rd
1
2
3
4
Int#1 - WBT Queue
Queue Length (ft)
Time (sec)
Int#1 - NBR Queue
Queue Length (ft)
Time (sec)
Int#2 - EBT Queue
Queue Length (ft)
Time (sec)
Int#3 - NBL Queue
Queue Length (ft)
Time (sec)
2040 Build - Typical PM
LEGEND
Queue
Normal Max Q
Train


Int#2 - WBT Queue
Queue Length (ft)
Time (sec)
Int#3 - SBR Queue
Queue Length (ft)
Time (sec)
Int#3 - WBT Queue
Queue Length (ft)
Time (sec)
Int#1 - SBL Queue
Queue Length (ft)
Time (sec)
Int#4 - WBT Queue
Queue Length (ft)
Time (sec)
Nebel St
RailRoad
Randolph Rd
Parklawn Blvd
Lauderdale Dr
1
2
3
4
Int#1 - WBT Queue
Queue Length (ft)
Time (sec)
Int#1 - NBR Queue
Queue Length (ft)
Time (sec)
Int#2 - EBT Queue
Queue Length (ft)
Time (sec)
Int#3 - NBL Queue
Queue Length (ft)
Time (sec)
2040 Build - Freight AM
LEGEND
Queue
Normal Max Q
Train


Int#2 - WBT Queue
Int#3 - SBR Queue
Int#3 - WBT Queue
Int#1 - SBL Queue
Int#4 - WBT Queue
Nebel St
RailRoad
Parklawn Blvd
Randolph Rd
Lauderdale Dr
1
2
3
4
Int#1 - WBT Queue
Int#1 - NBR Queue
Int#2 - EBT Queue
Int#3 - NBL Queue
Queue Length (ft)
Time (sec)
2040 Build - Freight PM
LEGEND
Queue
Normal Max Q
Train