REVISED TRAFFIC ANALYSIS SUPPLEMENTAL TECHNICAL REPORT

Oregon Department of Transportation

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I-5 ROSE QUARTER IMPROVEMENT PROJECT

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Executive Summary

This **Revised** Traffic Analysis Supplemental Technical Report provides the traffic analysis results of the 2045 Revised Build Alternative and compares those with the updated traffic analysis results of the 2045 No-Build Alternative. **Updated and/or revised information since the 2022 Land Use Supplemental Technical Report is shown in bold text. The 2045 Revised Build Alternative is expected to improve traffic operations on both the I-5 mainline and local street system when compared to the 2045 No-Build Alternative. There are locations where certain modes may experience a degradation in performance, but, in general, traffic, bicycle/pedestrian, and transit operations will be improved in the study area.**

The 2045 Revised Build Alternative design elements on the freeway segments are similar to those in the Build Alternative with continuous auxiliary lanes in both northbound and southbound directions and 12-foot right shoulders. The 2045 Revised Build Alternative would provide narrower median shoulders when compared to the Build Alternative but wider than those in the 2045 No-Build Alternative. Freeway and weaving segment lengths and traffic volumes in the 2045 Revised Build Alternative would be similar to those proposed in the Build Alternative. The minor differences are not expected to cause a substantive difference to the expected mainline operational benefits identified in the 2019 Traffic Analysis Technical Report.

For the local street analysis, the 2045 Revised Build Alternative would also include a new local street connection of NE Hancock Street to N Flint Avenue and relocation of the I-5 southbound off-ramp (exit ramp) from N Broadway to N Williams Avenue at NE Wheeler Avenue (westbound) and to NE Weidler Street at NE Victoria Avenue (eastbound). The exit ramp would divide westbound traffic from eastbound traffic, with a single lane connection at N Wheeler Avenue/ N Williams Avenue/ N Ramsay Way and single lane bridge (flyover) over I-5 to connect with NE Weidler Street. The new I-5 southbound exit ramp will add a second right turn lane at the intersection of NE Weidler Street/ NE Victoria Avenue adjacent to the right turn lane from the I-5 northbound exit ramp. The traffic volumes on the local streets in the 2045 Revised Build Alternative are generally higher than those forecast for the 2045 No-Build Alternative. This Revised Traffic Analysis Supplemental Technical Report also evaluates two design options of the Revised Build Alternative for the local street circulation: 2-way Ramsay Design Option and 2-way Wheeler Design Option. Both design options would allow traffic from the relocated I-5 southbound exit ramp at N Wheeler Avenue/ N Williams Avenue/ N Ramsay Way to turn left onto southbound N Williams Avenue. The 2-way Ramsay Design Option would convert the existing one-way eastbound N Ramsay Way between NE Wheeler Avenue and N Center Court Street into a 2-way street, allowing westbound travel for the I-5 southbound exit ramp traffic. The 2-way Wheeler Design Option would convert

N Wheeler Avenue and N Vancouver Avenue between N Ramsay Way and N/ NE Broadway to a 2-way street and add a new travel lane in the northbound direction. This would allow traffic from the I-5 southbound exit ramp traffic to access westbound N Broadway.

Bicycle volumes for both the 2045 No-Build and 2045 Revised Build Alternative have been updated to reflect higher baseline bicycle volumes. These updates are based on additional existing bicycle counts provided by the City of Portland and an anticipated increase in bicycle mode share as forecast in the City of Portland's Central City 2035 Comprehensive Plan mode share target for bicycles within the Central City.

2045 Revised Build Alternative – Freeway Analysis

The 2045 Revised Build Alternative would improve traffic operations at all freeway segments including the four weaving segments below in both the AM (7:00 AM to 9:00 AM) and PM (4:00 PM to 6:00 PM) analysis periods when compared to the 2045 No-Build Alternative:

- I-5 NB between the I-84 entrance ramp and NE Weidler Street exit ramp
- I-5 NB between the N Broadway entrance ramp and I-405 exit ramp
- I-5 SB between I-405 entrance ramp and N Broadway exit ramp
- I-5 SB between the **N Wheeler Avenue/ N Williams Avenue/ N Ramsay Way entrance** ramp and I-84 exit ramp

2045 Revised Build Alternative – Local Street Analysis

Traffic operations for local street intersections under the 2045 No-Build and 2045 Revised Build Alternative were updated and evaluated using both Synchro and Vissim analysis. The traffic analysis using Synchro indicates that under the 2045 Revised Build Alternative, all **study** intersections would operate at acceptable[1] Level of Service (LOS) **except for the N Wheeler Avenue/ N Williams Avenue/ N Ramsay Way and I-5 southbound entrance and exit ramp terminal intersection, which will operate at LOS E**. Compared to the 2045 No-Build **Alternative**, the 2045 Revised Build Alternative shows LOS would improve at the intersection of N Broadway and N Vancouver Avenue from LOS F in **the AM peak hour to LOS B for the 2-way Ramsay Design Option and LOS C for the 2-way Wheeler Design Option. The I-5 northbound exit ramp terminal intersection at NE Weidler Street/ NE Victoria Avenue would improve from LOS E in the AM peak hour to LOS C in both design options.**

[1] *City of Portland operational target: LOS D for signalized intersections and LOS E for unsignalized intersections. n.d. Portland Policy Document. TRN-10.27 - Traffic Capacity Analysis for Land Use Review Cases. Available: https://www.portlandoregon.gov/citycode/article/41049*

The I-5 southbound exit ramp terminal intersection at N Wheeler Avenue/ N Williams Avenue/ N Ramsay Way is expected to exceed the Highway Design Manual (HDM) mobility target (v/c of 0.75 or lower) in the AM and PM peak hours in both design options. The I-5 northbound exit ramp terminal intersection at NE Weidler Street/ NE Victoria Avenue is expected to exceed the HDM mobility target (v/c of 0.75 or lower.) during the AM peak hour in both design options.

As part of the adoption of the Central City 2035 Plan, the Central City, which includes the I-5 ramp terminal intersections, has been designated as a Multimodal Mixed-Use Area (MMA). This designation provides flexibility for determining effects of land use actions by lifting mobility standards requirements at ODOT facilities. Transportation standards such as safety and multimodal access still apply. Although both ramp terminal intersections exceed the HDM mobility target, the Revised Build Alternative reduces exit ramp queuing and provides bicycle and pedestrian crossing improvements.

Vissim microsimulation analysis results indicate that under the 2045 Revised Build Alternative all intersections would operate at LOS D or better in the AM and PM peak hours **for both design options** and LOS of several intersections would improve compared to the 2045 No-Build condition. The I-5 northbound exit ramp at the intersection of NE Weidler Street/ NE Victoria Avenue will operate at LOS E in the 2045 No-Build Alternative in both the AM and PM peak hours. In comparison, under the 2045 Revised Build Alternative this intersection will operate at LOS **B and C in the AM and PM peak hours, respectively, in both design options**.

In the 2045 No-Build Alternative, the N Broadway/N Vancouver Avenue and I-5 southbound exit ramp terminal intersection will operate at LOS F in the PM peak hour. When relocated in the 2045 Revised Build Alternative, the I-5 southbound exit ramp intersection at N Wheeler Avenue/ N Williams Avenue/ N Ramsay Way would operate at LOS D in both design options. When comparing operations for the I-5 southbound exit ramp in the PM peak hour, the exit ramp approach is operating at LOS F in the 2045 No-Build Alternative at the N Broadway/ N Vancouver Avenue intersection and LOS D in the 2045 Revised Build Alternative at the N Wheeler Avenue/ N Williams Avenue/ N Ramsay Way intersection. The flyover portion of the I-5 southbound exit ramp approach at the NE Weidler Street/ NE Victoria Avenue intersection is operating at LOS C.

Vissim results indicate that 95th percentile queue lengths on the I-5 northbound and southbound exit ramps will not exceed the proposed ramp storage length approaching both ramp terminals **in both design options of the 2045 Revised Build Alternative. In comparison, both the I-5 northbound and southbound exit ramp queues exceed the available ramp storage in either the AM or PM peak hours in the No-Build Alternative.** In the 2045 No-Build Alternative, queuing on eastbound N Weidler Street is approximately 450 feet east of the NW

Lovejoy Street and NW Broadway intersection during the PM peak hour and queuing on westbound N Broadway during the AM peak hour extends to **the NE Martin Luther King Jr.** Boulevard **intersection**. In the 2045 Revised Build Alternative, eastbound queuing on N Weidler Street in the PM peak hour is less than in the 2045 No-Build Alternative and westbound queuing on N Broadway is **less** during the AM peak hour but **is approaching NE Martin Luther King** Jr. Boulevard during the PM peak hour.

Bicycle delays and travel times were also evaluated for the 2045 No-Build and 2045 Revised Build Alternatives. Both alternatives serve a similar volume of **bicycles** in both the AM and PM peak hours but with considerably more delay in 2045 No-Build for key movements. In the AM peak hour, southbound bicycles on N Vancouver Avenue experience over 2 minutes of delay in the 2045 No-Build Alternative compared to approximately 25 seconds of delay in the 2045 Revised Build Alternative **in both design options**. In the PM peak hour, northbound bicycles on N Williams Avenue experience 90 seconds of delay crossing NE Weidler Street and 2 minutes of delay crossing N Broadway, compared to approximately 30 seconds at both locations in the 2045 Revised Build Alternative **for both design options**.

Bicycle travel times for the 2045 Revised Build Alternative **are consistently shorter in both design options compared to the 2045 No-Build Alternative. Westbound travel times in both AM and PM peak hours are slightly longer in the 2-way Wheeler Design Option compared to the 2-way Ramsay Design Option due to the additional signal phase at the N Broadway/ N Vancouver Avenue intersection, which results in less green time[2] for westbound bicycle and vehicular traffic.**

Transit travel times were evaluated for bus routes and streetcar routes. Bus travel times would be shorter in the northbound, southbound, and westbound routes during the AM peak period compared to the 2045 No-Build Alternative and would be longer in the eastbound routes by up to 20 to 30 seconds. During the PM peak period, Revised Build Alternative bus travel times would be similar to or shorter in the westbound, eastbound, and northbound directions and would be longer in the southbound direction compared to the 2045 No-Build Alternative. The 2-way Wheeler Design Option is approximately 30 seconds longer in the southbound direction compared to the 2-way Ramsay Design. During the PM peak period, southbound bus service travel times are approximately 20 seconds longer in the 2-way Ramsay Design Option and 50 seconds longer in the 2-way Wheeler Design Option compared to the 2045 No-Build Alternative. Northbound travel times are similar in the 2-way Wheeler

[2] *The time during which a given traffic movement or set of movements may proceed; it is equal to the cycle length minus the effective red time.*
Traffic Signal Timing Manual: Chapter 3 - Office of Operations (dot.gov)

Design Option and are less than 20 seconds longer in the 2-way Ramsay Design Option compared to the 2045 No-Build Alternative. In both design options, travel times in the eastbound and westbound bus routes are up to 1 minute shorter compared to the 2045 No-Build Alternative.

Compared to the 2045 No-Build Alternative, there is an additional traffic signal at the N Williams Avenue and NE Hancock Street intersection that affects northbound routes in the 2045 Revised Build Alternative. **The relocation of the I-5 southbound exit ramp to the N Wheeler Avenue/ N Williams Avenue/ N Ramsay Way intersection also requires an additional signal phase that reduces the green time for northbound and southbound traffic, affecting the overall transit travel time in both design options. The southbound bus travel time experiences additional delay in the 2-way Wheeler Design Option due to the additional signal phase for the northbound left turn movement, which reduces the green time available for southbound N Vancouver Avenue. The 2-way Wheeler Design Option also removes the southbound bus only lane between N Broadway and NE Weidler Street, which would have buses traveling with general traffic.**

Streetcar travel times for the westbound routes are expected to be shorter during both the AM and PM peak hours in the 2045 Revised Build Alternative, with improvements of 30 seconds to 1 minute compared to the 2045 No-Build Alternative. Eastbound Streetcar travel times are similar between design options and would generally be within 20 to 25 seconds of the 2045 No-Build travel times during the AM peak period and 1 to 2 minutes shorter during the PM peak period.

Refinements to signal timing and signal progression within the project area may shorten bus and Streetcar service travel times and will be further evaluated during design. The addition of transit signal priority, bus only lanes, bus queue jumps, and bus stop consolidation will also be evaluated during design.

1.0 INTRODUCTION

The I-5 Rose Quarter Improvement Project (Project) Environmental Assessment (EA) was released in February 2019. The Federal Highway Administration (FHWA) published a Finding of No Significant Impact (FONSI) and Revised EA (REA) for the Build Alternative on November 6, 2020. Since the issuance of the FONSI, the Oregon Department of Transportation (ODOT) has made changes to the design of the proposed Build Alternative to create a Revised Build Alternative and re-evaluated the changes in the context of the FONSI/REA. At the conclusion of the re-evaluation, FHWA and ODOT agreed that the design changes require additional analyses beyond what was presented in the REA, and FHWA rescinded the FONSI on January 18, 2022. **ODOT prepared a Transportation Safety Supplemental Technical Report, which was published with the I-5 Rose Quarter Improvement Project Supplemental Environmental Assessment (SEA) on November 15, 2022. In response to public comments received on the SEA, ODOT refined the design of the Revised Build Alternative. This Revised Transportation Safety Supplemental Technical Report reflects changes to the evaluation of the Transportation Safety impacts based on those design refinements, which are described below in Section 2.0. All updated information is shown in bold text.**

2.0 BUILD ALTERNATIVE DESIGN CHANGES

Changes to the Build Alternative include modification to the highway cover design and changes associated with advancements in other elements of the project design, some of which require expansion of the Project Area. This section describes the highway cover design changes and design changes that resulted from advancements in project engineering **and comments on the SEA**. The evaluation of these changes is presented in Section 6.2 of this supplemental technical report.

2.1 DESIGN PROCESS

Through 2021, ODOT facilitated an Independent Highway Cover Assessment, as directed by the Oregon Transportation Commission, that engaged the Project's advisory committees and community members in a series of collaborative workshops to explore the design opportunities for the highway cover. The purpose of the Independent Highway Cover Assessment was to understand **partner** goals and objectives within the Project Area, generate potential highway cover scenarios, and assess the impacts and benefits of these scenarios. The Independent Highway Cover Assessment team worked directly with local community members from the historic Albina neighborhood to understand how the highway cover design concepts might best serve the historic Albina community. The Project's Historic Albina Advisory Board (HAAB),

Executive Steering Committee (ESC) and the Community Oversight Advisory Board (COAC) also provided input as part of the Independent Highway Cover Assessment process. These sessions explored potential opportunities for economic development in the Albina community and the highway cover design concepts.

In July 2021, Oregon Governor Brown convened a series of meetings with Project **partners** and community organizations to discuss the design concepts developed in the Independent Highway Cover Assessment. In August 2021, the HAAB—as supported by the ESC and the COAC, and through the Governor-led process—recommended "Hybrid 3" as the preferred highway cover design concept (Figure 1). The Hybrid 3 highway cover design concept represents a proposed community solution to maximize developable space on a single highway cover. The Hybrid 3 highway cover design concept maintains the commitment for the Project to create opportunities for the local community to grow wealth through business ownership and long-term career prospects through the Project's Disadvantaged Business Enterprise and workforce program. Following the community and **partner** recommendations, in September 2021, the Oregon Transportation Commission directed ODOT to advance further evaluation of the Hybrid 3 highway cover design concept, with conditions related to the Project's funding process and other technical analyses.

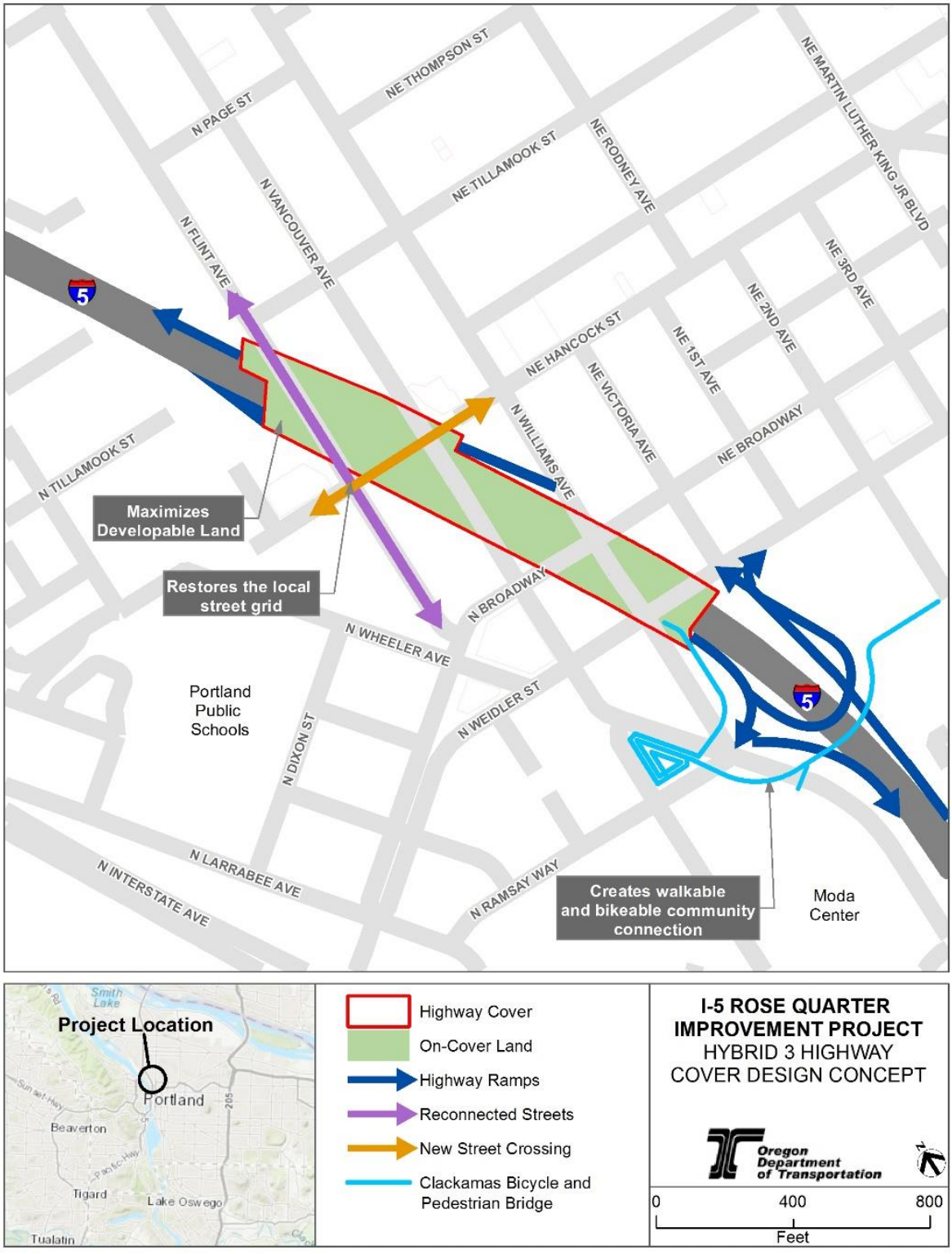
In January 2022, Governor Brown entered into a Letter of Agreement with the City of Portland, Metro, and Multnomah County that demonstrated their shared understanding and collective support for the Hybrid 3 concept as part of the Project. The Letter of Agreement specifically highlights the desire to connect the Lower Albina neighborhood, create buildable space, and enhance wealth-generating opportunities for the community, while simultaneously addressing the area's transportation needs. Additionally, the Letter of Agreement supports the development of a process to define the future development vision for what could ultimately be built on top of the highway cover upon Project completion – this process is referred to as a Community Framework Agreement. The Letter of Agreement states that the City of Portland will lead a Community Framework Agreement process and that it should be between the City of Portland, ODOT, other state agencies and local jurisdictions as necessary, with the participation of organizations that represent the Albina community and Black residents. Any future real estate or open space development on top of the cover would require executing long-term air rights and lease agreements, and that any such actions or decisions are subject at all times to applicable local, state, and federal laws including but not limited to land use and NEPA processes.

In June 2022, ODOT and the City of Portland executed an Intergovernmental Agreement (IGA), building upon the January 2022 Letter of Agreement. The IGA further states that the City will lead the future highway cover land use, programming and development processes and development of a Community Framework Agreement, in consultation with the ODOT to ensure

the highway, local streets and resulting land parcels within the Project are coordinated. As such, ODOT would construct the highway cover as part of the Project and the City of Portland would lead the process to define what is ultimately built on the new land created by the Project's highway cover. In the IGA, both ODOT and the City agreed that ODOT will retain ownership of the highway cover structure and the new developable area created on the highway cover structure upon Project completion.

FHWA and ODOT released the I-5 Rose Quarter Improvement SEA on November 15, 2022. In response to comments on the SEA, ODOT refined the design of the Revised Build Alternative. The sections below describe the highway cover design changes and the design changes that resulted from advancements in project engineering and **comments on the SEA and** are incorporated into the Revised Build Alternative.

Figure 1 Hybrid 3 Highway Cover Design Concept **with Ramp Reconfiguration**

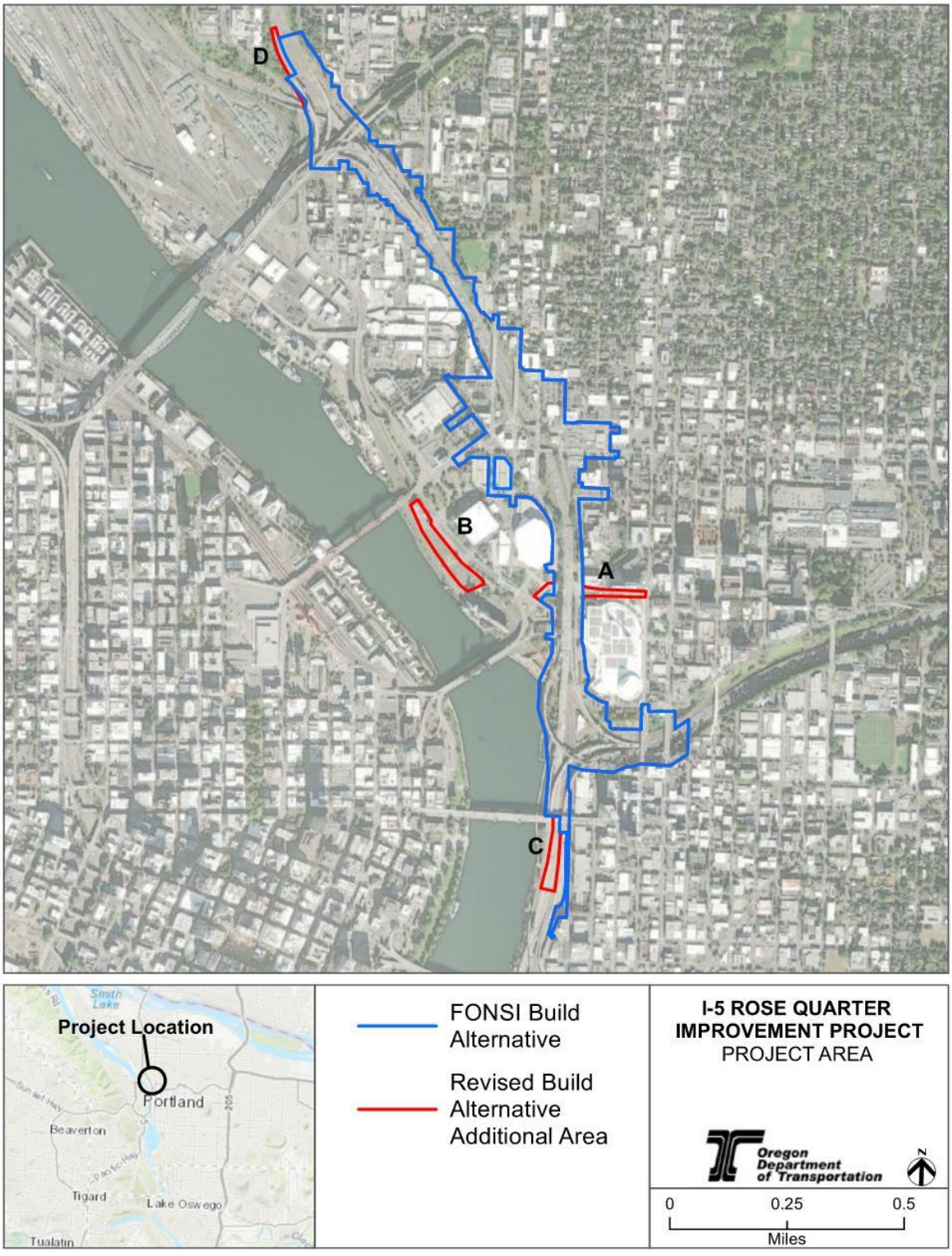


2.2 PROJECT AREA

The Project Area is defined as the area within which improvements are proposed, including where permanent modifications to adjacent parcels may occur and where potential temporary impacts from construction activities could result. As Project design information advanced, some changes required expansion of the Project Area presented in the REA and FONSI. In total, approximately 8.7 acres would be added to the Project Area. The changes are as follows, with letter references to the areas shown in Figure 2:

- A: Utility conflicts with Light Rail Transit (LRT) along NE Holladay Street between N Interstate Avenue and NE Martin Luther King Jr. Boulevard required expanding the Project Area by 1.9 acres to include additional overhead utility relocations (label A in Figure 2).
- B: An existing parking lot (known as Aegean Lot) south of N Interstate Avenue and the Broadway Bridge may be used for contractor staging during construction and is added to the Project Area (label B, Figure 2). ODOT identified this 4.3-acre construction staging area for contractor use based on its location, size, and suitability recognizing that, because of the urban setting and high-density land development in the construction area, it would be difficult for a construction contractor to find the space needed near or next to the project work areas for equipment staging, material storage, and the required co-location space for the contractor/construction personnel. This location meets all of the Project requirements: large level open space, proximity to the project work areas, and access for staging/storage of materials and equipment. Any materials stored in the area and site runoff would be subject to the same regulations as required throughout the project site.
- C: The southern end of the Project Area is expanded by 2.4 acres to include the portion of I-5 south of the Burnside Bridge proposed for a retrofit of the existing bridge rail, restriping the existing freeway, and installation of new guide signs (label C, Figure 2).
- D: At the northernmost end of the Project Area, a 1.1-acre area of ODOT right of way along the I-5 shoulders is now included in the Project Area for fiber optic conduit (label D, Figure 2).

Figure 2 Previous and Current Project Area.

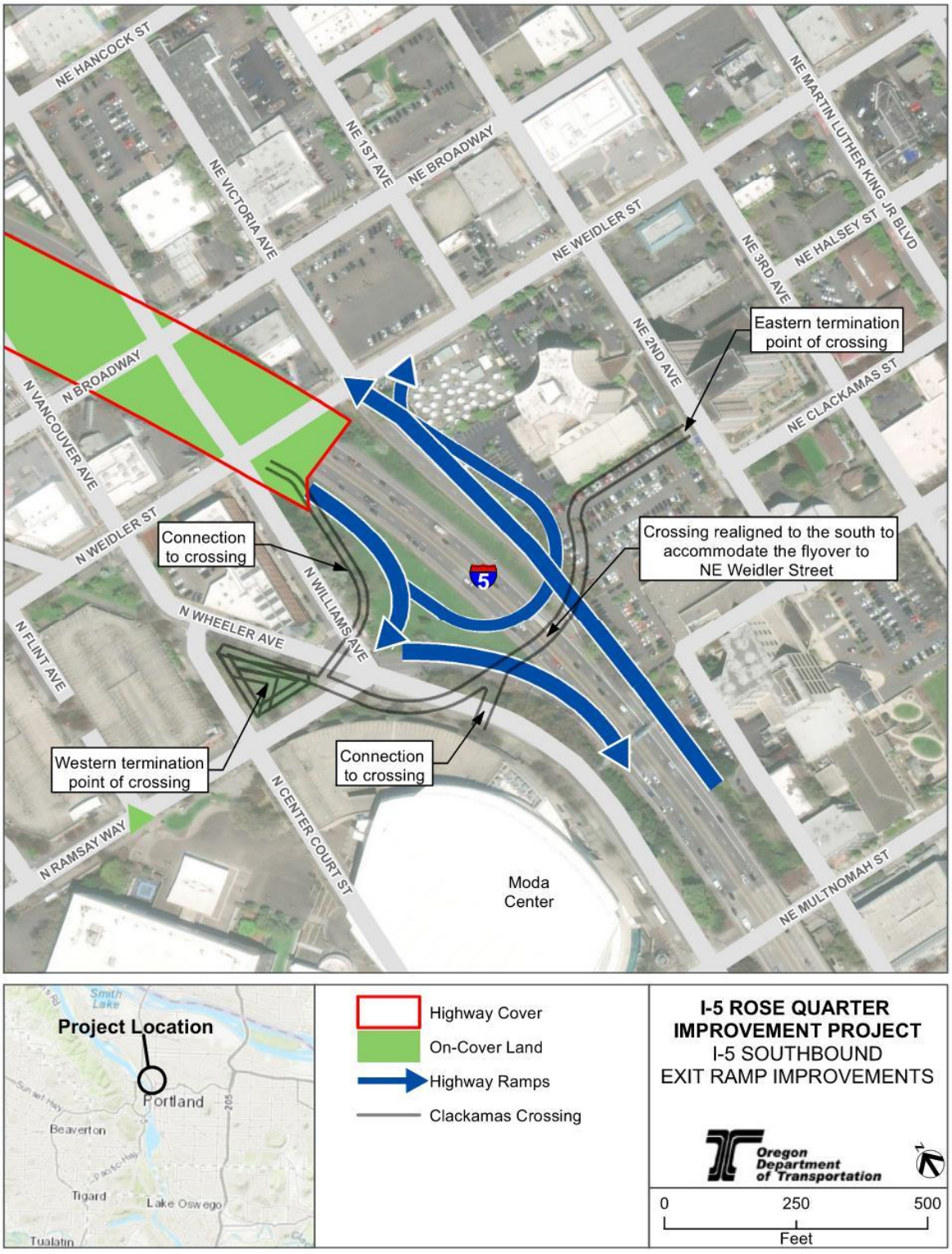


2.3 I-5 MAINLINE IMPROVEMENTS CHANGES

The Build Alternative included relocation of the I-5 southbound **entrance** ramp at N Wheeler Avenue to N/NE Weidler Street at N Williams Avenue via the new Weidler/Broadway/Ramsay highway cover, construction of auxiliary lanes and full shoulders (12 feet in width) on I-5 between I-405 and I-84 in both directions, and associated improvements to I-5 through the Project Area. The Revised Build Alternative includes the following changes to those elements of the Build Alternative:

- Move the I-5 southbound exit ramp termini from N Broadway to N Wheeler Avenue/ N Williams Avenue/N Ramsay Way (westbound) **and NE Weidler Street (eastbound). The exit ramp would divide westbound traffic from eastbound traffic as seen in Figure 3, with a single lane connection at N Wheeler Avenue/ N Williams Avenue/ N Ramsay Way and single lane bridge (flyover) over I-5 to connect with NE Weidler Street.**
- Reduce the freeway median shoulder through the entire Project Area, from 12 feet to 8 feet (4 to 5 feet within highway cover). The outside shoulder width of 12 feet remains unchanged.
- Relocate Noise Wall 24 from N Commercial Avenue near Harriet Tubman Middle School to attach to Walls 1 and 2 along the east edge of I-5.
- Keep the I-5 southbound entrance ramp from **N** Wheeler Avenue/ N Williams Avenue/ N Ramsay Way on the existing alignment rather than relocate it to parallel N Williams Avenue.
- On I-5 south of the Burnside Bridge: retrofit existing bridge rail, restripe freeway in both the northbound and southbound directions, and install new guide signs on an existing sign structure in the southbound direction.

Figure 3 I-5 SB Exit Ramp: Traffic Splitting Eastbound from Westbound Traffic

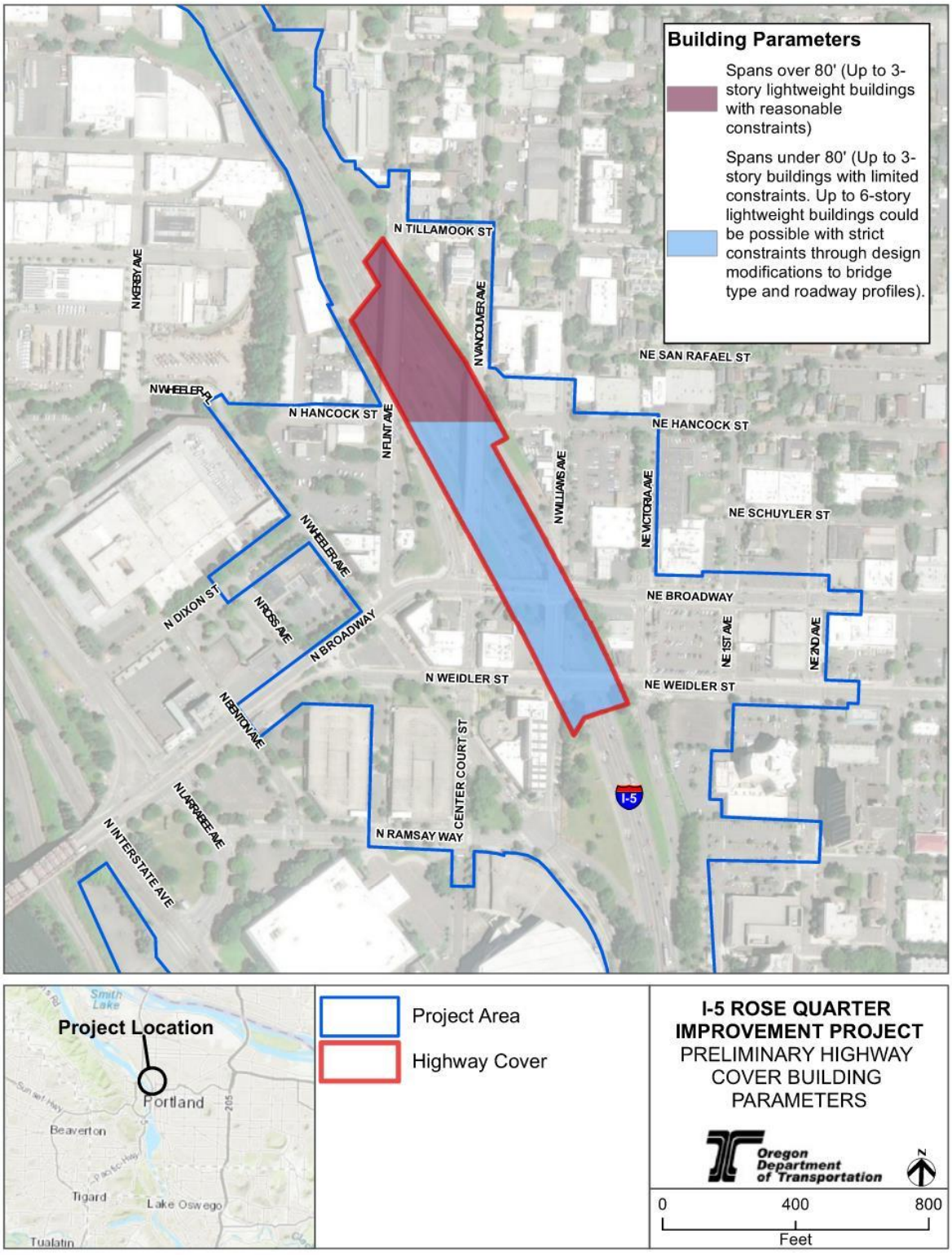


2.4 HIGHWAY COVER CHANGES

The Build Alternative included the construction of two highway cover structures over I-5 for roadway crossings and other purposes. The Revised Build Alternative, based on Hybrid 3 (see Figure 1), includes the following changes to the highway covers:

- Provide one continuous highway cover over I-5 rather than separate covers at the existing N Flint Avenue, NE Weidler Street, NE Broadway, N Williams Avenue, and the N Vancouver Avenue overcrossings.
- Expand the limits of the highway cover by approximately 35 feet to the west and approximately 400 feet to the north.
- Design and construct the highway cover to accommodate multi-story buildings. Due to span length and site constraints, design would constrain building size, location, type, and use on portions of the cover (Figure 4). Generally, buildings up to three stories could be accommodated throughout the highway cover. Buildings of up to six stories could be accommodated where span lengths are shorter than 80 feet with strict design constraints.

Figure 4 Building Parameters on the Cover



Future development on the highway cover would follow a community process according to the City-led Community Framework Agreement, as described in Section 2.1. ODOT anticipates this process could continue past completion of cover construction.

As part of the Project, ODOT anticipates programming interim uses on the highway cover for the time period between Project completion and when the City-led development process would be implemented. Upon Project completion, the added surface space created by the highway cover over I-5 could provide an opportunity for new and modern bicycle facilities, making the area more connected, walkable and bike friendly. It could also provide opportunity for various potential types of public spaces, to be precisely determined during the Project's final design phase and through robust community engagement, consisting of one or more of the following types of uses:

- Landscaped areas for **accessible,** active, and passi**ve** recreation and/or to provide a buffer, backdrop and visual comfort, such as gardens, lawns or planter beds.
- **Accessible** plazas and hardscaped open space for active and passive recreation, such as courts, plazas, splash pads, picnic areas, and community gathering spaces.
- **Accessible** interpretive signage, historical markers, landmarks and other areas of historical recognition and narrative such as art pieces and other historical signage/kiosks and pavement focused on the historic Albina community.
- Temporary and lightweight vertical features to support episodic, mobile commercial activities such as **accessible** food market shed, eating pavilion, food carts, or picnic venues.

These features may be removed upon implementation of the development determined by the community process or may be incorporated into that development.

2.5 RELATED LOCAL SYSTEM MULTIMODAL IMPROVEMENTS CHANGES

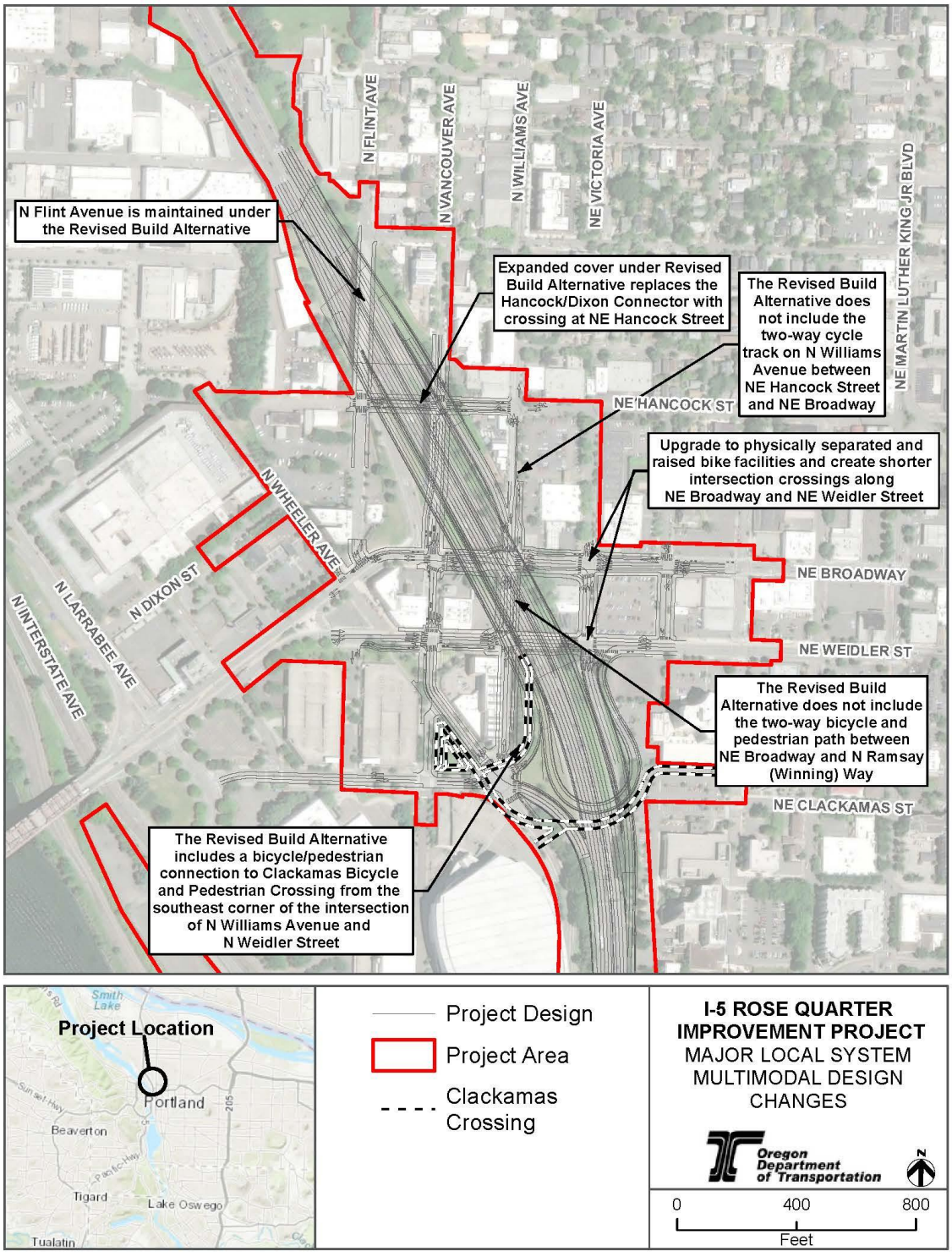
The Revised Build Alternative includes the following changes to local system multimodal improvements to accommodate the Hybrid 3 design concept and subsequent design refinements (see Figure 5 below):

- **Construct** the **accessible** Clackamas Bicycle and Pedestrian Crossing **(a.k.a. Clackamas Crossing):**
  - **Realign the crossing to the south to accommodate the flyover to NE Weidler Street**
  - **Relocate the western termination point of the crossing to the triangle of land framed by N Center Court Street, NE Wheeler Avenue, and N Ramsay Way.**

- **Provide the following connections to the crossing (to be confirmed in the final design phase):**
  - **From the southeast corner of the intersection of N Williams Avenue and N Weidler Street that spans over N Wheeler Avenue and connects to the crossing, and**
  - **From the Garden Garage, which is attached to the Moda Center**
- Construct wider sidewalks and bike lanes at sidewalk level and physically separated from the roadway with a curb and provide protected bike signal phases at multiple intersections along NE Broadway and NE Weidler Street.

- Connect N Flint Avenue across I-5 from NE Tillamook Street to N Hancock Street and terminate it at N Broadway.
- Remove the NE Hancock Street overcrossing of I-5 from N Williams Avenue to N Dixon Street as proposed in the Build Alternative. NE Hancock Street would be extended across I-5 and reconnect to NE Hancock Street west of N Flint Avenue as part of the expanded highway cover. **Permitted traffic modes and roadway profile to be determined during design.**
- Remove the two-way cycle track on N Williams Avenue between NE Hancock Street and NE Broadway and a two-way bicycle and pedestrian path between NE Broadway and N Ramsay Way from the design and instead convert the on-road bike lane to a protected bike lane, with a transition to the existing on-road bike lane at or near NE Hancock Street (to be confirmed in the final design phase).

Figure 5 Major Local System Multimodal Design Changes

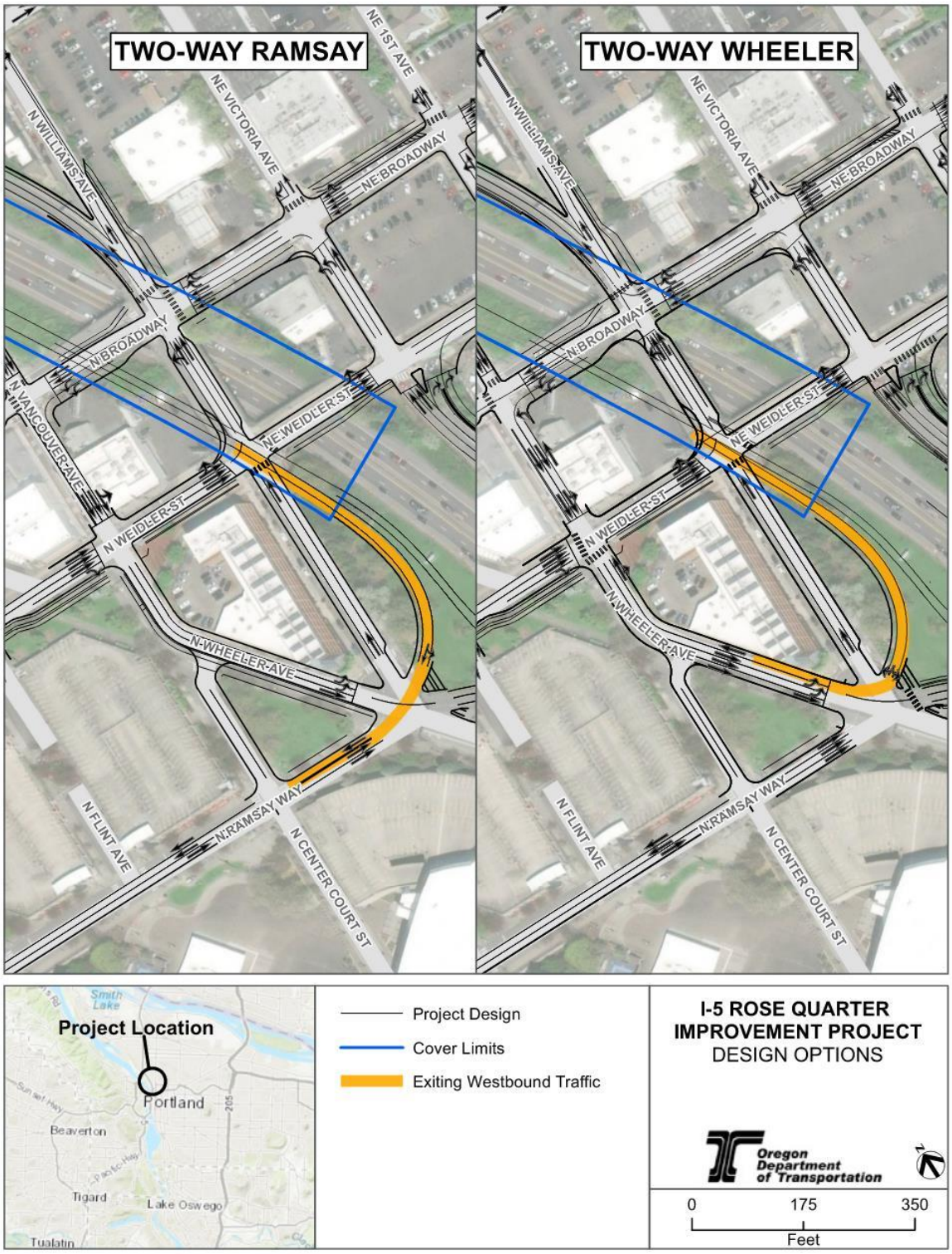


To accommodate I-5 southbound traffic exiting at N Wheeler Avenue/ N Williams Avenue/ N Ramsay Way, ODOT is considering two design options, both of which are evaluated in this report (Figure 6):

- **2-way Ramsay Design Option - Convert N Ramsay Way between N Center Court Street and NE Wheeler Avenue from an eastbound one-way facility to a two-way facility.**
- **2-way Wheeler Design Option - Construct a new northbound travel lane on NE Wheeler Avenue between N Broadway and N Ramsay Way and maintain the three existing southbound travel lanes between N Weidler Street and N Ramsay Way.**

Both design options also include a left turn movement from the I-5 southbound exit ramp to southbound N Williams Avenue. This movement was previously accommodated via N Wheeler Avenue/ N Vancouver Avenue between N Broadway and N Ramsay Way.

Figure 6 Design Options for I-5 SB Exit Ramp: Traffic Heading West



3.0 REGULATORY FRAMEWORK

The regulatory framework is the same as was evaluated in the 2019 Traffic Analysis Technical Report.

4.0 METHODOLOGY AND DATA SOURCES

The methodology and data sources are the same as those described in the 2019 Traffic Analysis Technical Report with the exception of the methodology used to develop future bicycle volumes and the methodology used to calculate 95th percentile queue length.

Bicycle volumes were updated based on additional existing bicycle counts provided by City of Portland and an anticipated increase in bicycle mode share target within Central City described in the City of Portland's Central City 2035 Comprehensive Plan.

The methodology for calculating the 95th percentile queue length has been updated for improved accuracy. Vissim queue counters were used to record the maximum queue length for each signal cycle length interval. The 95th percentile queue length was calculated for each of the 10 simulation runs based on these "cycle length maximum queues". The resulting values were then averaged. 95th percentile queue length is reported for the I-5 southbound and I-5 northbound exit ramps, the eastbound approach of N Weidler at N Larrabee Avenue, and the westbound approach of NE Broadway at NE Victoria Avenue.

To provide comparable results in this **Revised** Traffic Analysis Supplemental Technical Report, these changes in methodology were applied to both the 2045 No-Build Alternative and 2045 Revised Build Alternative models. Also, both the 2045 No-Build Alternative and 2045 Revised Build Alternative models have been refined to provide a more comprehensive local street and bicycle network. To better understand the potential impacts in the local street network and address specific design elements of the Revised Build Alternative, the following modifications have been made:

- Add the N Wheeler Avenue connection north of N Broadway
- Connect N Ramsay Way between N Larrabee Avenue and N Wheeler Avenue
- Add the U-turn movement from N Broadway and N Weidler Street
- Connect the local bicycle network

Also, bicycle and pedestrian crossing have been updated to reflect more detailed assumptions that were refined as the design has progressed at each intersection. Detailed bicycle and

pedestrian crossing assumptions are presented in section 6.2. **The local street analysis includes evaluations for two design options: 2-way Ramsay Design Option and 2-way Wheeler Design Option.** Therefore, both 2045 No-Build Alternative and 2045 Revised Build Alternative analysis results in this **Revised** Traffic Analysis Supplemental Technical Report provide a more refined comparison of traffic operational performance between the 2045 No-Build Alternative and the 2045 Revised Build Alternative than was presented for the 2045 No-Build Alternative and the 2045 Build Alternative in the 2019 Traffic Analysis Technical Report. Due to the updated 2045 No-Build Alternative model, the 2045 No-Build Alternative traffic analysis results may differ from those documented in the 2019 Traffic Analysis Technical Report.

4.1 AREA OF POTENTIAL IMPACT

The API for the traffic analysis generally corresponds to the Project Area shown in Figure 2, except along N Broadway, where the API extends west to N Larrabee Avenue. This extension is the same as shown in the Area of Potential Impact in the 2019 Traffic Analysis Technical Report.

4.2 FUTURE TRAFFIC VOLUMES

As described in the 2019 Traffic Analysis Technical Report, the Metro Regional Travel Demand Models, which have a detailed system of the City of Portland roadway network, were used to forecast future demand for the horizon year 2045. Metro maintains travel demand models for the base (year 2015) and future conditions (year 2040). The 2040 travel demand model integrates planned transportation projects and land use changes in the metro area to generate future volume forecasts. The 2040 travel demand model used for the 2019 Traffic Analysis Technical Report incorporated transportation projects identified in the financially constrained list in the 2014 Regional Transportation Plan (RTP). For this analysis, the 2040 travel demand model was reviewed to determine if it is consistent with the current 2018 RTP. As documented in the List of Reasonably Foreseeable Future Actions Report (Appendix A), there were no new projects in the 2018 RTP that would influence the future traffic demand in the I-5 corridor and its surrounding roadway network when compared to the 2014 RTP; therefore, the travel demand models used in the development of future traffic volumes incorporated into the 2019 Traffic Analysis Technical Report are still valid to be used for this analysis.

ODOT is in the initial planning stages for the Regional Mobility Pricing Project (RMPP), which evaluates congestion pricing on I-5 through and beyond the Rose Quarter project area. RMPP is not included in the financially constrained projected list included in the 2018 Regional Transportation Plan (RTP) and is therefore not included in Metro's regional travel demand model which was used for volume development for the I-5 Rose Quarter Improvement Project. The traffic analysis results of this **report** do not include the Regional Mobility Pricing Project. However, the RMPP project team has completed separately a sensitivity analysis to look at the

cumulative impacts of RMPP and the I-5 Rose Quarter Improvement Project. The results of this analysis are summarized in Appendix B and included in this report for information only.

To develop the 2045 forecast volumes for the No-Build and Revised Build Alternatives, the volume growth from the 2015 base year and the 2040 future year was used to calculate an annual growth rate using a straight-line growth method. This growth rate was applied to the 5-year increment between 2040 and 2045 to extend the demand model for the Project's horizon year. The 2045 Revised Build Alternative model was developed by:

1. Updating the 2045 No-Build Alternative model with the widened I-5 freeway segment between the I-84 and I-405 interchanges
2. Incorporating the newly proposed roadway network adjustments (i.e., relocation of I-5 southbound ramp terminal to N Wheeler Avenue, extension of NE Hancock Street to N Flint Avenue, maintain N Flint Avenue in its current location) and updating intersection lane configurations

Comparing 2045 No-Build Alternative and 2045 Revised Build Alternative travel demand models, ODOT investigated trip changes within and outside of the Project Area to identify trip pattern changes between the No-Build and Revised Build Alternatives for 2045. Within the Project Area, the travel demand model shows trips on I-5 would be 5 to 14 percent higher under the Revised Build Alternative during peak hours when compared to the No-Build Alternative. Outside of the Project Area, trip differences were evaluated at several central city bridges. Trip differences between 2045 No-Build and 2045 Revised Build Alternative are inconsequential beyond the API limits with no substantive traffic volume changes beyond the Traffic Analysis API anticipated. **The 2045 No Build and 2045 Revised Build AM and PM peak hour volume are provided in Appendix C.**

Appendix D also provides an evaluation of the proposed auxiliary lanes based on 2023 APM methodology which concluded that adding auxiliary lanes to freeway segments on I-5 northbound section from the I-84 entrance ramp to the N Greeley Avenue exit ramp and on the I-5 southbound section from the N Greeley Avenue entrance ramp to the Morrison Bridge exit ramp would not result in system capacity increase.

4.3 ASSESSMENT OF IMPACTS

4.3.1 Traffic Operations Performance Measures, Mobility Target, and Standards

The traffic operations performance measures (v/c, LOS, delay, 95th percentile queue and travel times), Oregon Highway Plan (OHP) mobility target, HDM mobility standards, and the City of Portland LOS Standards for local intersections are the same as those described in the 2019 Traffic Analysis Technical Report. The mobility target and standards have not changed since 2019.

4.3.2 Traffic Operations Software

The traffic operations software is the same as those described in the 2019 Traffic Analysis Technical Report.

Highway Capacity Software (HCS) was used to evaluate basic freeway segments, merge, diverge, and weaving operations. HCS is a deterministic analysis tool for freeway operations by implementing the Highway Capacity Manual (HCM) methodologies for basic weaving, merging, and diverging freeway segments. For the 2019 Traffic Analysis Technical Report, a traffic microsimulation software called Vissim was used to supplement the freeway analysis. Comparing the 2045 Revised Build Alternative to the Build Alternative, the locations of the merge and diverge ramp junctions and the lengths of weaving segments between entrance ramps and **exit** ramps are relatively the same as well as the peak hour volumes along the mainline segments and the on-and **exit** ramps. As a result, the prior Vissim freeway mainline analysis methodologies and results presented in the 2019 Traffic Analysis Technical Report including lane-by-lane speed were determined to still be valid. Thus, Vissim modeling of the freeway operations for the 2045 Revised Build Alternative was not updated as part of this **Revised** Traffic Analysis Supplemental Technical Report.

Vissim modeling, however, was updated to analyze local street traffic operations including ramp terminal intersections and reporting delays; 95th percentile queues; and bus, streetcar, and bicycle travel times. Vissim can model and quantify performance of individual pedestrians, bicycles, automobiles, trucks, buses, and streetcars and provide performance measure results that account for modal interactions, up and/or downstream congestion, and capacity limitations that can result from queues extending beyond the storage provided at each intersection. Therefore, Vissim quantifies overall intersection delays more realistically than typical equation based HCM methods such as Synchro. In addition, the intersection LOS is computed from a microsimulation analysis, which is not HCM compliant. As a result, the intersection LOS is reported as an “estimated LOS”.

Synchro software was used to supplement Vissim modeling to report the intersection v/c ratio, delay and LOS as measurements of performance. Synchro is a deterministic analysis and signal optimization tool that uses the general characteristics of an intersection to evaluate how it would operate based on the HCM methodologies. Ramp terminal intersection v/c ratios are used to compare to the OHP traffic mobility targets for the 2045 No-Build Alternative and to compare to the Highway Design Manual (HDM) design standards for the 2045 Revised Build Alternative. The intersections not associated with the highway ramp terminals are subject to City of Portland standards of LOS D for signalized intersections and LOS E for unsignalized intersections (City of Portland n.d.). **As part of the adoption of the Central City 2035 Plan, the Central City, which includes the 13 intersections analyzed in this report, has been designated as a Multimodal Mixed-Use Area (MMA). This designation provides flexibility for determining effects of land use actions by lifting mobility standards requirements at ODOT facilities. Transportation standards such as safety and multimodal access still apply.**

5.0 AFFECTED ENVIRONMENT

The affected environment is the same as that evaluated in the 2019 Traffic Analysis Technical Report.

6.0 ENVIRONMENTAL CONSEQUENCES

6.1 NO-BUILD ALTERNATIVE

6.1.1 Direct Impacts

The No-Build Alternative would have the same direct impacts in all freeway segments as described in the 2019 Traffic Analysis Technical Report. The 2045 No-Build Alternative freeway operations are summarized in Table 5 and Table 6 in Section 6.2.2.1 and show that the I-5 northbound weave segment between the I--84 entrance ramp and the NE Weidler Street exit ramp would exceed the OHP mobility target of a v/c ratio of 0.99 in the second AM and PM peak hours (7:00-8:00 AM and 4:00-5:00 PM) and also would exceed the OHP mobility target of a v/c ratio of 1.1 in the first AM peak hour (8:00-9:00 AM). The I-5 southbound weave between the NE Weidler Street entrance ramp and the I-84 exit ramp would exceed the OHP mobility target of a v/c ratio of 0.99 in the second AM peak hour (7:00-8:00 AM). **Minimum stopping sight distance is provided within these weaving sections in both the northbound and southbound directions.**

As described under section 4.0, the local street analysis for the 2045 No-Build Alternative has been updated with revised bicycle volumes and a more refined bicycle and local street network. Therefore, the local street 2045 No-Build Alternative analysis results differ from those

presented in the 2019 Traffic Analysis Technical Report. Table 1 and Table 2 show the updated 2045 No-Build Alternative Synchro analysis results and Table 3 and Table 4 present the updated 2045 No-Build Vissim analysis results.

Synchro analysis results show that all intersections will operate at a LOS D or better in both the AM and PM peak hours with the exception of the N Broadway/ N Vancouver **Avenue**/ I-5 southbound exit ramp intersection which would operate at LOS F in the AM peak hour. The v/c ratio at this intersection exceeds the OHP mobility target of 0.85 for ramp terminal intersections for both the AM and PM peak hours. **The NE Weidler Street/ NE Victoria Avenue/ I-5 northbound exit ramp intersection will operate at LOS E in the AM peak hour.** Detailed HCM reports from Synchro are provided in Appendix **E**.

Table 1 Synchro Analysis Results: 2045 No-Build Alternative 8:00 AM - 9:00 AM

ID	Intersection	v/c	Delay (sec)	LOS
1	N Broadway & N Vancouver Ave (existing I-5 SB exit ramp)	**1.07**	**84.2**	**F**
2	N/NE Broadway & N Williams Ave	**0.65**	**12.3**	**B**
3	NE Broadway & NE Victoria Ave	**0.64**	**12.0**	**B**
4	NE Broadway & NE 2nd Ave	**0.49**	**10.0**	**B**
5	NE Weidler St & NE 2nd Ave	**0.40**	**8.6**	**A**
6	I-5 NB exit ramp at NE Weidler St & NE Victoria Ave	**0.65**	**64.5**	**E**
7	N/NE Weidler St & N Williams Ave	**0.32**	**3.7**	**A**
8	N Weidler St & N Vancouver Ave	**0.49**	**9.3**	**A**
9	N Broadway & N Benton Ave	**0.42**	**11.5**	**B**
10	N Broadway & N Larrabee Ave	**0.59**	**9.7**	**A**
11	N Wheeler Ave/ N Williams Ave/ N Ramsay Way & I-5 SB Ramps	**0.45**	**9.9**	**A**
12	N Williams Ave & N/NE Hancock St	**0.33**	**14.3**	**B**
13	N Vancouver Ave & NE Hancock St	-	-	-
14	**N Williams Ave & N/NE Multnomah St**	**0.24**	**10.4**	**B**

Note: Red = v/c exceeds OHP mobility target for ramp terminals or LOS below D for signalized local intersections.

Table 2 Synchro Analysis Results: 2045 No-Build Alternative 5:00 PM – 6:00 PM

ID	Intersection	v/c	Delay (sec)	LOS
1	N Broadway & N Vancouver Ave (existing I-5 SB exit ramp)	**0.92**	**44.2**	**D**
2	N/NE Broadway & N Williams Ave	**0.57**	**13.5**	**B**
3	NE Broadway & NE Victoria Ave	**0.53**	**9.1**	**A**
4	NE Broadway & NE 2nd Ave	**0.40**	**10.0**	**A**
5	NE Weidler St & NE 2nd Ave	**0.41**	**11.7**	**B**
6	I-5 NB exit ramp at NE Weidler St & NE Victoria Ave	**0.60**	**19.7**	**B**
7	N/NE Weidler St & N Williams Ave	**0.46**	**4.3**	**A**
8	N Weidler St & N Vancouver Ave	**0.63**	**13.3**	**B**
9	N Broadway & N Benton Ave	**0.50**	**20.6**	**C**
10	N Broadway & N Larrabee Ave	**0.66**	**19.4**	**B**
11	N Wheeler Ave/ N Williams Ave/ N Ramsay Way & I-5 SB Ramps	**0.40**	**12.2**	**B**
12	N Williams Ave & N/NE Hancock St	**0.21**	**14.8**	**B**
13	N Vancouver Ave & NE Hancock St	-	-	-
14	**N Williams Ave & N/NE Multnomah St**	**0.36**	**11.0**	**B**

Note: Red = v/c exceeds OHP mobility target for ramp terminals or LOS below D for signalized local intersections.

As shown below, the Vissim analysis results indicate that all intersections would operate at a LOS D or better in the AM peak hour except for the NE Weidler **Street/** NE Victoria Avenue/ I-5 northbound exit ramp intersection, which would operate at LOS E. During the PM peak hour, all intersections are expected to operate at a LOS D or better except for the I-5 southbound and I-5 northbound exit ramp intersections, which would operate at LOS F and LOS E, respectively.

Vissim can model and quantify performance of individual pedestrians, bicycles, automobiles, trucks, buses, and streetcars and provide performance measure results that account for modal interactions, up and/or downstream congestion, and capacity limitations that can result from queues extending beyond the storage provided at each intersection. Therefore, Vissim quantifies overall intersection delays more realistically than typical deterministic equation based HCM methods such as Synchro. Detailed Vissim intersection results for the first and second AM and PM peak hours for all movements are provided in Appendix **F**.

Table 3 Vissim Analysis Results: 2045 No-Build Alternative 8:00 AM – 9:00 AM

ID	Intersection	Delay (sec)	LOS*
1	N Broadway & N Vancouver Ave (existing I-5 SB exit ramp)	43.8	D
2	N/NE Broadway & N Williams Ave	16.3	B
3	NE Broadway & NE Victoria Ave	38.9	D
4	NE Broadway & NE 2nd Ave	27.7	C
5	NE Weidler St & NE 2nd Ave	7.1	A
6	I-5 NB exit ramp at NE Weidler St & NE Victoria Ave	66.1	E
7	N/NE Weidler St & N Williams Ave	3.6	A
8	N Weidler St & N Vancouver Ave	12.9	B
9	N Broadway & N Benton Ave	14.2	B
10	N Broadway & N Larrabee Ave	12.1	B
11	N Wheeler Ave/ N Williams Ave/ N Ramsay Way & I-5 SB Ramps	37.2	D
12	N Williams Ave & **N/**NE Hancock St	11.2	B
13	N Vancouver Ave & NE Hancock St	N/A	N/A
14	**N Williams Ave & N/NE Multnomah St**	**10.4**	**B**

*Note: *LOS is non HCM compliant*

Table 4 Vissim Analysis Results: 2045 No-Build Alternative 5:00 PM – 6:00 PM

ID	Intersection	Delay (sec)	LOS*
1	N Broadway & N Vancouver Ave (existing I-5 SB exit ramp)	87.6	F
2	N/NE Broadway & N Williams Ave	15.4	B
3	NE Broadway & NE Victoria Ave	28.1	C
4	NE Broadway & NE 2nd Ave	11.4	B
5	NE Weidler St & NE 2nd Ave	9.2	A
6	I-5 NB exit ramp at NE Weidler St & NE Victoria Ave	75.4	E
7	N/NE Weidler St & N Williams Ave	17.8	B
8	N Weidler St & N Vancouver Ave	28.1	C
9	N Broadway & N Benton Ave	17.9	B
10	N Broadway & N Larrabee Ave	43.4	D
11	N Wheeler Ave/ N Williams Ave/ N Ramsay Way & I-5 SB Ramps	28.5	C
12	N Williams Ave & N/NE Hancock St	10.9	B
13	N Vancouver Ave & NE Hancock St	N/A	N/A
14	**N Williams Ave & N/NE Multnomah St**	**11.5**	**B**

*Note: Red = LOS below D for signalized local intersections. *LOS is non HCM **compliant***

6.1.2 **Indirect** Impacts

The No-Build Alternative would have the same indirect impacts as described in the 2019 Traffic Analysis Technical Report.

6.2 REVISED BUILD ALTERNATIVE

6.2.1 Short-term Construction Impacts

The short-term impacts of the Revised Build Alternative would be similar to those described in the 2019 Traffic Analysis Technical Report with two exceptions, the overall construction and transportation disruptions occurring in phases for up to 4-8 years, which is greater than the previous assumption of up to 4 years and the closure of N Williams Avenue. This increase in duration is based on the construction of a larger single continuous highway cover, which would require additional construction stages and phases. N Williams Avenue between N Wheeler Avenue and NE Weidler Street would be closed for the majority of the highway cover construction. The complete closure of N Williams Avenue during construction of the new highway cover and the relocation the southbound exit ramp on N Williams Avenue would have a greater impact on transit, cyclists, pedestrians, and vehicles traveling on this section of N Williams Avenue. **Construction impacts on N Russell Street, NE Multnomah Street, and NE Lloyd Boulevard are the same as those described in the 2019 Traffic Analysis Technical Report.**

For each construction phase, the project would develop a traffic management plan to identify lane and road closures and develop detour plans, as necessary. Also, for each phase of the project, maintenance of traffic strategies would be developed to ensure safe accommodation of pedestrians, cyclists, transit, and vehicle users while providing a safe construction work zone. Detours plans are anticipated for pedestrians, bicycles, vehicles, and buses as ramp and local streets closures would be needed in order to construct highway ramp improvements, the highway cover structure, and reconstruct sections of local roads. The Project would coordinate with TriMet, City of Portland, and Portland Streetcar to identify traffic management strategies that minimize durations of disruptions of transit service and minimize out-of-direction pedestrian and bicycle detours.

As described above in the Project Area Changes section, an existing parking lot south of N Interstate Avenue and the Broadway Bridge may be used for contractor staging during construction of the Project. The parking lot will be used primarily for storage of staging equipment and materials for multiple construction activities including those required during night operations. This yard would also serve as the main location to store materials that are procured early, such as drilled shaft permanent casings, pipe piles, and sign bridges. Furthermore, this yard could provide needed space for fabrication of concrete form work,

welding of miscellaneous materials for the job, equipment maintenance and repair. The lot would also be used to house temporary job site trailers and used for contractor parking for multiple staff and subcontractors.

Access to the contractor staging site would be through existing truck routes including Interstate Avenue, N Broadway and N Weidler Street which could provide adequate access to the entire project site including connections to I-5 ramps. The temporary truck trips are consistent with the type of commercial and industrial uses that currently operate within the area and the volume of trips that would be generated by the construction activities will be fairly consistent with the prior uses of the site. The site has been used for similar construction and staging operations and is assumed to be used as part of the construction operations for the duration of the project.

6.2.2 Direct Impacts

6.2.2.1 Future Freeway Traffic Operations

This section describes 2045 Revised Build Alternative freeway traffic operations based on the HCS analysis results for the two AM peak hours (7:00-9:00 AM) and PM peak hours (4:00-6:00 PM). **The inside shoulder width is reduced in the Revised Build Alternative in segments on I-5 between I-84 and I-405 when compared to the Build Alternative with the median lateral clearance varying from 4 feet to 8 feet. Freeway capacity calculations were performed using HCM methodologies. According to the "HCM 6th Edition: A Guide for Multimodal Mobility Analysis", median clearances of 2 feet or more on the left side of the travel lanes generally have little impact on traffic. Therefore, no capacity adjustments to reflect the reduced left-side lateral clearance from the left travel lane edge are available in the analysis. As a result, the freeway mainline capacity was assumed to be the same with the proposed median shoulder width reduction accounted for under the Revised Build Alternative.**

In the 2045 Revised Build Alternative, the I-5 northbound weave segment between the I-84 entrance ramp and Weidler exit ramp and the I-5 southbound weave segment between the Weidler entrance ramp and I-84 exit ramp are expected to operate over the HDM design standard of a v/c ratio of 0.75 in the 7:00-9:00 AM and 4:00-6:00 PM peak hours. The HDM design standard is more stringent than the 2045 No-Build Alternative mobility target of a v/c ratio of 0.99 in the second AM and PM peak hours and a v/c ratio of 1.1 in the AM and PM peak hours because it is designated for design purposes. Although the 2045 Revised Build Alternative v/c ratios exceed HDM design standards, it is expected to substantially improve highway operations compared to the 2045 No-Build Alternative. The HCS analysis results comparing the 2045 No-Build and Revised Build Alternatives in the second AM and PM peak hours (7-8 AM and 4-5 PM) and in the first AM and PM peak hours (8-9 AM and 5-6 PM) are presented in Table 5

and Table 6, respectively. The v/c ratios that exceed OHP mobility targets in the 2045 No-Build Alternative and HDM mobility standards in the 2045 Revised Build Alternative are highlighted.

Table 5 HCS Analysis Results: 2045 No-Build Alternative and 2045 Revised Build Alternative Second (7:00 – 8:00) AM and (4:00 – 5:00) PM Peak Hour

Direction	Location	Analysis Type	2045 No-Build Alternative			2045 Revised Build Alternative		
			v/c	Volume Density (pc/mi/ln)	LOS	v/c	Volume Density (pc/mi/ln)	LOS
I-5 NB	I-84 entrance ramp to Weidler exit ramp	Weaving	1.16 (1.02)	* (*)	F (F)	0.89 (0.78)	41.1 (34.2)	E (D)
	Weidler exit ramp to Broadway entrance ramp	Basic Section	0.91 (0.79)	42.5 (36.6)	E (E)	0.72 (0.64)	33.5 (29.6)	D (D)
	Broadway entrance ramp to I-405 exit ramp	Weaving	0.92 (0.78)	36.9 (31.6)	E (D)	0.72 (0.63)	30.6 (26.9)	D (C)
	Greeley Exit ramp	Diverge	0.75 (0.72)	32.4 (30.6)	D (D)	0.53 (0.50)	21.8 (20.7)	C (C)
I-5 SB	I-84 entrance ramp to Weidler exit ramp	Weaving	0.73 (0.64)	32.1 (25.5)	D (C)	0.70 (0.62)	34.5 (28.7)	D (D)
	Weidler exit ramp to Broadway entrance ramp	Basic Section	0.94 (0.70)	44.1 (32.8)	E (D)	0.70 (0.56)	33.0 (26.3)	D (D)
	Broadway entrance ramp to I-405 exit ramp	Weaving	1.03 (0.81)	* (34.7)	F (D)	0.95 (0.79)	42.3 (30.9)	E (D)
	Greeley Exit ramp	Diverge	0.81 (0.61)	33.3 (24.9)	D (C)	0.58 (0.46)	23.7 (18.8)	C (C)

Notes: HCS = Highway Capacity Software; HDM = Highway Design Manual; LOS = Level of Service;
OHP= Oregon Highway Plan; pc/mi/ln = passenger car per mile per lane; v/c = volume-to-capacity ratio LOS is based on the calculated volume density and not based on v/c ratio shown.
Orange = v/c ratio exceeds OHP mobility target of 0.99 for the 2045 No-Build second peak hour.
Red = v/c ratio exceeds HDM mobility target of 0.75 for the Revised Build peak hour.
** = Volume density not reported (demand exceeds capacity).*

Table 6 HCS Analysis Results: 2045 No-Build and Revised Build Alternative First (8:00 – 9:00) AM and (5:00 – 6:00) PM Peak Hour

Direction	Location	Analysis Type	2045 No-Build Alternative			2045 Revised Build Alternative		
			v/c	Volume Density (pc/mi/ln)	LOS	v/c	Volume Density (pc/mi/ln)	LOS
I-5 NB	I-84 entrance ramp to Weidler exit ramp	Weaving	1.16 (1.02)	* (*)	F (F)	0.89 (0.81)	41.1 (36.1)	E (E)
	Weidler exit ramp to Broadway entrance ramp	Basic Section	0.91 (0.82)	42.5 (38.1)	E (E)	0.72 (0.66)	33.5 (30.8)	D (D)
	Broadway entrance ramp to I-405 exit ramp	Weaving	0.92 (0.82)	36.9 (33.3)	E (D)	0.72 (0.66)	30.6 (28.2)	D (D)
	Greeley exit ramp	Diverge	0.75 (0.75)	32.4 (31.9)	D (D)	0.53 (0.53)	21.8 (21.5)	C (C)
I-5 SB	I-84 entrance ramp to Weidler exit ramp	Weaving	0.73 (0.67)	32.1 (26.8)	D (C)	0.70 (0.65)	34.5 (30.4)	D (D)
	Weidler exit ramp to Broadway entrance ramp	Basic Section	0.94 (0.73)	44.1 (34.1)	E (D)	0.70 (0.59)	33.0 (27.5)	D (D)
	Broadway entrance ramp to I-405 exit ramp	Weaving	1.03 (0.84)	* (36.7)	F (E)	0.95 (0.82)	42.3 (32.9)	E (D)
	Greeley exit ramp	Diverge	0.81 (0.64)	33.3 (26.0)	D (C)	0.58 (0.48)	23.7 (19.7)	C (C)

Notes: HCS = Highway Capacity Software; HDM = Highway Design Manual; LOS = Level of Service; OHP = Oregon Highway Plan; pc/mi/ln = passenger car per mile per lane; v/c = volume-to-capacity ratio LOS is based on the calculated volume density and not based on v/c ratio shown.

Orange = v/c ratio exceeds OHP mobility target of 1.1 for the 2045 No-Build peak hour.

Red = v/c ratio exceeds HDM mobility target of 0.75 for the Revised Build peak hour.

** = Volume density not reported (demand exceeds capacity).*

Comparing to the Build Alternative, the freeway operations improvements in the 2045 Revised Build Alternative are similar as the locations of the merge and diverge ramp junctions and the lengths of weaving segments between entrance ramps and exit ramps are relatively the same and the peak hour volumes along the mainline segments and the on-and exit ramps are similar.

6.2.2.2 Future Local Street Traffic Operations

This section describes the 2045 No-Build Alternative and 2045 Revised Build Alternative traffic operations for the local street intersections using Synchro and Vissim. Comparison to the Build Alternative is not provided as only the 2045 No-Build and Revised Build models have been

refined with updates in the bicycle volume forecast, detailed bicycle and pedestrian crossing assumptions and more refined local street network.

Synchro is a deterministic analysis and signal optimization tool that was used to obtain intersection v/c ratio and LOS results to compare to ODOT HDM mobility standards due to the limitations of providing v/c ratios from microsimulation. Vissim was used to model the operations of motor vehicles, transit, pedestrians,[3] and bicycles and evaluate demand served, delay, travel time, and queuing. Vissim quantifies overall intersection delays more realistically than typical equation based HCM methods such as Synchro by accounting for modal interactions, up and/or downstream congestion, and capacity limitations that can result from queues extending beyond the storage provided at each intersection.

Compared to the 2045 No-Build Alternative, the 2045 Revised Build Alternative would include higher traffic volume demand as well as bicycle and pedestrian improvements that would include protected bicycle and ped phases at locations with exclusive turning lanes and Lead**ing** Pedestrian Intervals (LPIs) at selected locations with permissive pedestrian phases. Also, the local street network in the 2045 Revised Build Alternative would accommodate physically separated and raised bicycle facilities along N/NE Broadway and N/NE Weidler Street, as well as along N Williams Avenue.

The analysis of the 2045 Revised Build Alternative **for both the 2-way Ramsay Design Option and the 2-way Wheeler Design Option is** based on the following key bicycle/pedestrian crossing assumptions at locations with conflicting bicycle/pedestrian and vehicular **turning** movements:

- Protected bicycle crossings
  - EB/WB at N Broadway and N Larrabee Avenue (included in 2045 No-Build)
  - EB at N Weidler Street and N Vancouver Avenue
  - WB at N/NE Broadway and N Williams Avenue (included in 2045 No-Build)
  - NB at N Williams Avenue and N/NE Hancock Street
  - SB at N Broadway and N Vancouver Avenue
- Protected pedestrian crossings
  - **N Broadway and N Larrabee Avenue (north and south legs, included in 2045 No-Build)**
  - N Weidler Street and N Vancouver Avenue (south leg)

[3] *Pedestrians were modeled using traditional "vehicle" inputs with footpath (no interaction) behavior on crosswalk links as opposed to the VisWalk functionality in Vissim.*

  - NE Broadway and NE Victoria Avenue (west leg)
  - N/NE Broadway and N Williams Avenue (north leg)
  - N Broadway and N Vancouver Avenue (south **and west legs**)
- Permitted pedestrian crossings with LPI
  - **N Broadway and N Larrabee Avenue (east leg)**
  - **N Broadway Street and N Benton Avenue (all legs)**
  - **N Weidler Street and N Vancouver Avenue (east leg)**
  - **N/NE Weidler Street and N Williams Avenue (north and east leg)**
  - NE Weidler Street and I-5 northbound exit ramp (north leg)
  - NE Broadway and NE Victoria Avenue (north leg)
  - **NE Broadway and N Williams Avenue (west leg)**
  - **N Wheeler Avenue/ N Williams Avenue/ N Ramsay Way (south leg)**
- **Pedestrian crossings are provided at all legs of the study intersections.**

Synchro Analysis Results

Synchro software was used for the analysis of the local street intersection operations to supplement the Vissim analysis. The Synchro analysis results are presented in Table 7 and Table 8 for the AM (8:00-9:00 AM) and PM (5:00-6:00 PM) peak hours, with locations that exceed v/c mobility standards for ramp terminal intersections and LOS operational targets for local streets highlighted. **As part of the adoption of the Central City 2035 Plan, the Central City, which includes the intersections in these tables, has been designated as a Multimodal Mixed-Use Area (MMA). This designation provides flexibility for determining effects of land use actions by lifting mobility standards requirements at ODOT facilities. Transportation standards such as safety and multimodal access still apply. Detailed HCM reports from Synchro are provided in Appendix E.**

Table 7 Synchro Analysis Results: Future Conditions 8:00 AM – 9:00 AM

ID	Intersection	2045 No-Build Alternative			2045 Revised Build Alternative 2-way Ramsay			2045 Revised Build Alternative 2-way Wheeler		
		v/c	Delay (sec)	LOS	v/c	Delay (sec)	LOS	v/c	Delay (sec)	LOS
1	N Broadway & N Vancouver Ave (existing I-5 SB exit ramp)	1.07	84.2	F	0.62	17.8	B	0.76	31.7	C
2	N/NE Broadway & N Williams Ave	0.65	12.3	B	0.71	45.8	D	0.72	45.1	D
3	NE Broadway & NE Victoria Ave	0.64	12.0	B	0.67	32.0	C	0.67	32.0	C
4	NE Broadway & NE 2nd Ave	0.49	10.0	B	0.47	9.7	A	0.47	9.7	A
5	NE Weidler St & NE 2nd Ave	0.40	8.6	A	0.48	4.4	A	0.48	4.4	A
6	I-5 NB exit ramp at NE Weidler St & NE Victoria Ave	0.65	64.5	E	0.86	22.1	C	0.86	22.4	C
7	N/NE Weidler St & N Williams Ave	0.32	3.7	A	0.12	45.8	D	0.12	51.2	D
8	N Weidler St & N Vancouver Ave	0.49	9.3	A	0.55	16.8	B	0.66	25.8	C
9	N Broadway & N Benton Ave	0.42	11.5	B	0.48	46.6	D	0.53	47.2	D
10	N Broadway & N Larrabee Ave	0.59	9.7	A	0.69	28.0	C	0.61	22.2	C
11	N Wheeler Ave/ N Williams Ave/ N Ramsay Way & I-5 SB Ramps	0.45	9.9	A	0.78	59.5	E	0.82	70.6	E
12	N Williams Ave & N/NE Hancock St	0.33	14.3	B	0.43	17.0	B	0.43	16.3	B
13	N Vancouver Ave & NE Hancock St	—	—	—	0.11	12.3	B	0.11	11.8	B
14	N Williams Ave **& N/NE Multnomah St**	0.24	10.4	B	0.36	11.2	B	0.36	11.2	B

Note: Red = v/c exceeds OHP in the No-Build Alternative or HDM mobility target in the Revised Build Alternative for ramp terminals or LOS below D for signalized local intersections.

Table 8 Synchro Analysis Results: Future Conditions 5:00 PM - 6:00 PM

ID	Intersection	2045 No-Build Alternative			2045 Revised Build Alternative 2-Way Ramsay			2045 Revised Build Alternative 2-Way Wheeler		
		v/c	Delay (sec)	LOS	v/c	Delay (sec)	LOS	v/c	Delay (sec)	LOS
1	N Broadway & N Vancouver Ave (existing I-5 SB exit ramp)	0.92	44.2	D	0.40	14.8	B	0.63	32.8	C
2	N/NE Broadway & N Williams Ave	0.57	13.5	B	0.66	37.2	D	0.67	32.6	C
3	NE Broadway & NE Victoria Ave	0.53	9.1	A	0.55	21.3	C	0.55	21.5	C
4	NE Broadway & NE 2nd Ave	0.40	10.0	A	0.32	10.0	A	0.32	9.7	A
5	NE Weidler St & NE 2nd Ave	0.41	11.7	B	0.52	3.8	A	0.52	4.5	A
6	I-5 NB exit ramp at NE Weidler St & NE Victoria Ave	0.60	19.7	B	0.71	16.2	B	0.71	14.9	B
7	N/NE Weidler St & N Williams Ave	0.46	4.3	A	0.26	24.4	C	0.26	22.9	C
8	N Weidler St & N Vancouver Ave	0.63	13.3	B	0.56	17.3	B	0.64	18.6	B
9	N Broadway & N Benton Ave	0.50	20.6	C	0.55	30.9	C	0.53	33.9	C
10	N Broadway & N Larrabee Ave	0.66	19.4	B	0.78	35.4	D	0.55	16.3	B
11	N Wheeler Ave/ N Williams Ave/ N Ramsay Way & I-5 SB Ramps	0.40	12.2	B	0.84	57.9	E	0.88	68.9	E
12	N Williams Ave & N/NE Hancock St	0.21	14.8	B	0.45	27.5	C	0.45	25.5	C
13	N Vancouver Ave & N/NE Hancock St	-	-	-	0.09	11.2	B	0.09	10.8	B
14	N Williams Ave **& N/NE Multnomah St**	0.36	11.0	B	0.36	11.1	B	0.36	11.1	B

*Note: **Red** = v/c exceeds OHP **in the No-Build Alternative or** HDM mobility **target in the Revised Build Alternative** for ramp terminals or LOS below D for signalized local intersections.*

As shown in Table 7 and Table 8, the I-5 southbound ramp terminal intersection at N Broadway/ N Vancouver Avenue would exceed the OHP mobility target in the 2045 No-Build Alternative, **with a v/c of 1.07 in the AM peak hour and 0.92 in the PM peak hour. When** relocated in the 2045 Revised Build Alternative, the N Wheeler/ N Williams/ N Ramsay Way and I-5 southbound

entrance and exit ramp terminal intersection would **exceed** the HDM mobility target **(v/c of 0.75 or lower) in both design options, with a v/c of 0.78 to 0.88 during the AM and PM peak hours. With the addition of the southbound flyover traffic to the NE Weidler Street/ NE Victoria Avenue intersection, the I-5 northbound ramp terminal intersection is expected to exceed the HDM mobility target in the AM peak hour in both design options, with a v/c of 0.86.**

In the 2045 Revised Build Alternative, all study intersections would operate at LOS D or better in both the AM and PM peak hours in both design options except for the N Wheeler Avenue/ N Williams Avenue/ N Ramsay Way and I-5 southbound entrance and exit ramp terminal intersection, which will operate at LOS E.

It should be noted that there are limitations with modeling separate bicycle and pedestrian only phases in Synchro, and that the analysis does not consider surrounding congestion or the full impacts of signal progression and queue spillback between intersections. Vissim analysis results below considered effects of queuing and congestion of adjacent intersections.

Vissim Analysis Results

This section describes 2045 Revised Build Alternative local street traffic operations using delay and LOS results from the Vissim analysis for the AM (7:00-9:00 AM) and PM (4:00-6:00 PM) peak periods, with results provided for the peak and shoulder hours. This section also describes 95th Percentile queue lengths for the I-5 northbound and southbound exit ramps, eastbound queues on N Broadway from N Larrabee Avenue, and westbound queues on NE Broadway from NE Victoria Avenue. The Vissim analysis results are presented in Table 9, Table 10, Table 11, and Table 12. Detailed output showing volume, delay, and queue lengths for all movements at intersections are included in Appendix **F**.

In the 2045 Revised Build Alternative, the results of the Vissim analysis indicate that during the AM and PM peak hours, all intersections are expected to operate at LOS D or better **in both design options**. In comparison, there are multiple intersections in the 2045 No-Build Alternative that would operate at LOS E or F during the AM and PM peak hours. While most intersections in the 2045 Revised Build Alternative would operate at LOS D or better, intersection delays at some locations, particularly in the PM peak would be higher than the 2045 No-Build Alternative. This is primarily due to the **proposed improvements on the I-5 mainline** in the 2045 Revised Build Alternative that **result in a higher volume of served vehicles on the local street network** and the **relocation** of **the I-5 southbound exit ramp, which re-routes** vehicular movements **compared to the 2045 No-Build Alternative**.

Although overall vehicular intersection delay is expected to be higher at some locations in the 2045 Revised Build Alternative compared to the 2045 No-Build Alternative, the 2045 Revised Build condition would be better at balancing pedestrian safety and the delays of all modes with the addition of separate dedicated signal phases for bicycles, protected phases for pedestrians, and the use of Leading Pedestrian Intervals (LPIs) for permissive pedestrian crossings. **More details are available in the Safety and Active Transportation Reports.**

The Vissim analysis indicates that the I-5 northbound exit ramp intersection **at** NE Weidler Street/ NE Victoria Avenue would operate at LOS E in the 2045 No-Build Alternative in both the AM (8:00-9:00 AM) and PM (5:00-6:00 PM) peak hours. In comparison, under the 2045 Revised Build Alternative this intersection would operate at LOS C **or better during** both peak hours **in both design options**.

In the 2045 No-Build Alternative, the I-5 southbound exit ramp intersection **at** N Broadway/ N Vancouver Avenue would operate at LOS F in the PM (5:00-6:00 PM) peak hour. **When relocated in** the 2045 Revised Build Alternative**, the I-5 southbound exit ramp intersection at N** Wheeler **Avenue/** N **Williams Avenue/ N Ramsay Way would operate at LOS D in both design options**. **When comparing operations for the I-5 southbound exit ramp approach in the PM peak hour, the exit ramp itself is operating at LOS F in the 2045 No-Build Alternative at the N Broadway/ N Vancouver Avenue intersection and LOS D in the 2045 Revised Build Alternative at the N Wheeler Avenue/ N Williams Avenue/ N Ramsay Way intersection. The flyover portion of the I-5 southbound exit ramp to NE Weidler Street is operating at LOS C**.

Table 9 Vissim Analysis Results: Future Conditions 7:00 AM - 8:00 AM

ID	Intersection	2045 No-Build Alternative		2045 Revised Build Alternative 2-Way Ramsay		2045 Revised Build Alternative 2-Way Wheeler	
		Delay (sec)	LOS*	Delay (sec)	LOS*	Delay (sec)	LOS*
1	N Broadway & N Vancouver Ave (existing I-5 SB exit ramp)	42.0	D	**6.7**	**A**	**10.9**	**B**
2	N/NE Broadway & N Williams Ave	14.8	B	**10.0**	**B**	**10.2**	**B**
3	NE Broadway & NE Victoria Ave	30.5	C	**18.3**	**B**	**18.2**	**B**
4	NE Broadway & NE 2nd Ave	16.7	B	**7.8**	**A**	**7.5**	**A**
5	NE Weidler St & NE 2nd Ave	6.6	A	**5.3**	**A**	**5.4**	**A**
6	I-5 NB exit ramp at NE Weidler St & NE Victoria Ave	48.5	D	**17.8**	**B**	**18.0**	**B**
7	N/NE Weidler St & N Williams Ave	3.6	A	**3.3**	**A**	**3.5**	**A**
8	N Weidler St & N Vancouver Ave	10.9	B	**18.1**	**B**	**15.4**	**B**
9	N Broadway & N Benton Ave	12.7	B	**9.7**	**A**	**10.1**	**B**
10	N Broadway & N Larrabee Ave	10.5	B	**19.3**	**B**	**15.4**	**B**
11	N Wheeler Ave/ N Williams Ave/ N Ramsay Way & I-5 SB Ramps	28.2	C	**26.6**	**C**	**34.3**	**C**
12	N Williams Ave & N/NE Hancock St	11.4	B	**15.5**	**B**	**15.5**	**B**
13	N Vancouver Ave & NE Hancock St	—	—	**3.3**	**A**	**3.4**	**A**
14	**N Williams Ave & N/NE Multnomah St**	**10.4**	**B**	**11.7**	**B**	**11.5**	**B**

**LOS is non HCM compliant*

Table 10 Vissim Analysis Results: Future Conditions 8:00 AM - 9:00 AM

ID	Intersection	2045 No-Build Alternative		2045 Revised Build Alternative 2-Way Ramsay		2045 Revised Build Alternative 2-Way Wheeler	
		Delay (sec)	LOS*	Delay (sec)	LOS*	Delay (sec)	LOS*
1	N Broadway & N Vancouver Ave (existing I-5 SB exit ramp)	43.8	D	**7.9**	**A**	**15.1**	**B**
2	N/NE Broadway & N Williams Ave	16.3	B	**9.9**	**A**	**11.1**	**B**
3	NE Broadway & NE Victoria Ave	38.9	D	**23.5**	**C**	**24.8**	**C**
4	NE Broadway & NE 2nd Ave	27.7	C	**10.6**	**B**	**11.0**	**B**
5	NE Weidler St & NE 2nd Ave	7.1	A	**5.9**	**A**	**5.9**	**A**
6	I-5 NB exit ramp at NE Weidler St & NE Victoria Ave	66.1	E	**17.1**	**B**	**17.7**	**B**
7	N/NE Weidler St & N Williams Ave	3.6	A	**3.8**	**A**	**4.3**	**A**
8	N Weidler St & N Vancouver Ave	12.9	B	**19.5**	**B**	**17.3**	**B**
9	N Broadway & N Benton Ave	14.2	B	**11.2**	**B**	**11.3**	**B**
10	N Broadway & N Larrabee Ave	12.1	B	**20.7**	**C**	**17.2**	**B**
11	N Wheeler Ave/ N Williams Ave/ N Ramsay Way & I-5 SB Ramps	37.2	D	**30.1**	**C**	**38.0**	**D**
12	N Williams Ave & N/NE Hancock St.	11.2	B	**16.9**	**B**	**16.6**	**B**
13	N Vancouver Ave & NE Hancock St	—	—	**4.4**	**A**	**4.2**	**A**
14	**N Williams Ave & N/NE Multnomah St**	**10.7**	**B**	**11.7**	**B**	**12.0**	**B**

**LOS is non HCM compliant*

Table 11 Vissim Analysis Results: Future Conditions 4:00 PM - 5:00 PM

ID	INTERSECTION	2045 No-Build Alternative		2045 Revised Build Alternative 2-Way Ramsay		2045 Revised Build Alternative 2-Way Wheeler	
		Delay (sec)	LOS*	Delay (sec)	LOS*	Delay (sec)	LOS*
1	N Broadway & N Vancouver Ave (existing I-5 SB exit ramp)	70.0	E	**7.1**	**A**	**18.0**	**B**
2	N/NE Broadway & N Williams Ave	13.4	B	**11.2**	**B**	**11.5**	**B**
3	NE Broadway & NE Victoria Ave	23.1	C	**26.6**	**C**	**27.2**	**C**
4	NE Broadway & NE 2nd Ave	10.2	B	**11.0**	**B**	**9.3**	**A**
5	NE Weidler St & NE 2nd Ave	9.8	A	**10.7**	**B**	**10.9**	**B**
6	I-5 NB exit ramp at NE Weidler St & NEVictoria Ave	52.4	D	**22.7**	**C**	**23.6**	**C**
7	N/NE Weidler St & N Williams Ave	13.8	B	**3.4**	**A**	**3.4**	**A**
8	N Weidler St & N Vancouver Ave	22.3	C	**14.3**	**B**	**18.6**	**B**
9	N Broadway & N Benton Ave	13.4	B	**12.2**	**B**	**12.6**	**B**
10	N Broadway & N Larrabee Ave	28.7	C	**26.7**	**C**	**21.2**	**C**
11	N Wheeler Ave/ N Williams Ave/ N Ramsay Way & I-5 SB Ramps	22.4	C	**41.8**	**D**	**41.4**	**D**
12	N Williams Ave & N/NE Hancock St	10.8	B	**28.5**	**C**	**27.8**	**C**
13	N Vancouver Ave & NE Hancock St	---	---	**2.8**	**A**	**3.0**	**A**
14	**N Williams Ave & N/NE Multnomah St**	**11.6**	**B**	**11.7**	**B**	**11.7**	**B**

*Red = LOS exceeds the City's operational target for local streets. *LOS is non HCM compliant*

Table 12 Vissim Analysis Results: Future Conditions 5:00 PM - 6:00 PM

ID	Intersection	2045 No-Build Alternative		2045 Revised Build Alternative 2-Way Ramsay		2045 Revised Build Alternative 2-Way Wheeler	
		Delay (sec)	LOS*	Delay (sec)	LOS*	Delay (sec)	LOS*
1	N Broadway & N Vancouver Ave (existing I-5 SB exit ramp)	87.6	F	**6.8**	**A**	**17.3**	**B**
2	N/NE Broadway & N Williams Ave	15.4	B	**11.4**	**B**	**11.7**	**B**
3	NE Broadway & NE Victoria Ave	28.1	C	**34.3**	**C**	**33.4**	**C**
4	NE Broadway & NE 2nd Ave	11.4	B	**17.8**	**B**	**16.8**	**B**
5	NE Weidler St & NE 2nd Ave	9.2	A	**10.8**	**B**	**10.8**	**B**
6	I-5 NB exit ramp at NE Weidler St & NE Victoria Ave	75.4	E	**23.4**	**C**	**23.9**	**C**
7	N/NE Weidler St & N Williams Ave	17.8	B	**3.6**	**A**	**3.9**	**A**
8	N Weidler St & N Vancouver Ave	28.1	C	**15.3**	**B**	**15.5**	**B**
9	N Broadway & N Benton Ave	17.9	B	**14.8**	**B**	**13.4**	**B**
10	N Broadway & N Larrabee Ave	43.4	D	**33.7**	**C**	**22.4**	**C**
11	N Wheeler Ave/ N Williams Ave/ N Ramsay Way & I-5 SB Ramps	28.5	C	**43.4**	**D**	**43.7**	**D**
12	N Williams Ave & N/NE Hancock St	10.9	B	**33.0**	**C**	**32.5**	**C**
13	N Vancouver Ave & NE Hancock St	—	—	**2.9**	**A**	**3.1**	**A**
14	**N Williams Ave & N/NE Multnomah St**	**11.5**	**B**	**11.8**	**B**	**11.7**	**B**

*Red = LOS exceeds the City's operational target for local streets. *LOS is non HCM compliant*

Future Conditions 95th Percentile Queue Length, feet

This section reports 95th percentile queues at the I-5 southbound and northbound exit ramps, the eastbound approach of N Weidler at N Larrabee Avenue, and the westbound approach of NE Broadway/ NE Victoria Avenue based on the calculated 95th percentile queue lengths. The methodology for calculating the 95th percentile queue length has been updated for improved accuracy. Vissim queue counters were used to record the maximum queue length for each signal cycle length interval. The 95th percentile queue length was calculated for each of the 10 simulation runs based on these "cycle length maximum queues". The resulting values were then averaged. The 95th percentile queue lengths are shown in Table 13 for the AM peak period and Table 14 for the PM peak period.

Table 13 Future Conditions AM Peak Period 95th Percentile Queue Length, feet

Location	2045 No-Build Alternative			2045 Revised Build Alternative 2-Way Ramsay			2045 Revised Build Alternative 2-Way Wheeler		
	Decel Length	Storage Length	Queue Length	Decel Length	Storage Length	Queue Length	Decel Length	Storage Length	Queue Length
I-5 SB exit ramp at N Broadway & N Vancouver Ave (2045 No-Build)	410	590*	250	—	—	—	—	—	—
I-5 SB exit ramp at NE Wheeler Ave & N Ramsay Way (Revised Build)	—	—	—	415	1,440*	430	415	1,440*	590
I-5 SB exit ramp at NE Weidler St & NE Victoria Ave (Revised Build)	—	—	—	415	2,250*	275	415	2,250*	275
I-5 NB exit ramp at NE Weidler St & NE Victoria Ave	440	320*	>760***	510	490*	430	510	490*	455
N Weidler St at N Larrabee Ave (EB approach)	—	2,000**	195	—	2,000**	255	—	2,000**	245
NE Broadway at NE Victoria Ave (WB approach)	—	1,000**	1070	—	1,000**	680	—	1,000**	685

**Storage Length on the exit ramps represent the full length of the ramp excluding the deceleration length*
***Distance to NW Lovejoy Street and MLK Boulevard.*
****Queue exceeds the length of the ramp and mixes with I-5 mainline queues*

Table 14 Future Conditions PM Peak Period 95th Percentile Queue Length, feet

Location	2045 No-Build Alternative			2045 Revised Build Alternative 2-Way Ramsay			2045 Revised Build Alternative 2-Way Wheeler		
	Decel Length	Storage Length	Queue Length	Decel Length	Storage Length	Queue Length	Decel Length	Storage Length	Queue Length
I-5 SB exit ramp at N Broadway & N Vancouver Ave (2045 No-Build)	410	590*	>1,000***	—	—	—	—	—	—
I-5 SB exit ramp at NE Wheeler Ave & N Ramsay Way (Revised Build)	—	—	—	415	1,440*	675	415	1,440*	630
I-5 SB exit ramp at NE Weidler St & NE Victoria Ave (Revised Build)	—	—	—	415	2,250*	640	415	2,250*	675
I-5 NB exit ramp at NE Weidler St & NE Victoria Ave	440	320*	>760***	510	490*	380	510	490*	470
N Weidler St at N Larrabee Ave (EB approach)	—	2,000**	1,520	—	2,000**	815	—	2,000**	620
NE Broadway at NE Victoria Ave (WB approach)	—	1,000**	280	—	1,000**	865	—	1,000**	845

**Storage Length on the exit ramps represent the length of the ramp excluding the deceleration length*
***Distance to NW Lovejoy Street and MLK Boulevard.*
****Queue exceeds the length of the ramp and mixes with I-5 mainline queues.*

In the updated 2045 No-Build Alternative, queuing on the southbound I-5 exit ramp exceeds the available storage in the PM peak hour, while queuing on the northbound I-5 exit ramp exceeds the available storage in both peak hours. It should be noted that when queues exceed the length of the ramp it becomes difficult to differentiate ramp queuing from mainline queuing, but queue spillback from the ramps does contribute to additional mainline congestion. The northbound I-5 exit ramp is a single lane exit in the 2045 No-Build Alternative and only has a single right-turn lane to eastbound NE Weidler Street. While this movement is considered "free-flow", vehicles must yield to bicycles and pedestrians which contributes to queuing that blocks the northbound through movement.

Queuing on the southbound I-5 exit ramp in the 2045 No-Build Alternative is the result of queue spillback on N Vancouver Avenue between N Broadway and NE Weidler Street as well as limited green time available at the ramp terminal intersection. Queuing on eastbound N Weidler Street is approximately 450 feet east of the NW Lovejoy Street and NW Broadway

intersection during the PM peak hour and queuing on westbound N Broadway during the AM peak hour extends to **NE Martin Luther King** Jr. Boulevard.

In the 2045 Revised Build Alternative, queues on the northbound and southbound I-5 exit ramps would not exceed the available storage **or encroach into the deceleration area** in the AM and PM peak hours **in both design options**. The northbound I-5 exit ramp is a two-lane exit in the 2045 Revised Build Alternative and includes a signalized dual right-turn lane to eastbound NE Weidler Street, which improves **exit ramp queuing**. **The right-most right turn lane accommodates I-5 southbound traffic coming from the flyover, and the left-most right turn lane accommodates I-5 northbound traffic.** The relocation of the southbound I-5 exit ramp also improves queuing in the 2045 Revised Build Alternative **in both design options**. **In addition, both design options will provide adequate safe stopping distance for the current design speeds. The project team will explore a wide range of safety and operational enhancement treatments to manage potential traffic queues on the exit ramps through design refinement including, but not limited to, upstream queue detection for exit ramps intended to limit the potential for queuing to impact the mainline.**

Eastbound queues on N Weidler Street in the PM peak hour would be less than in the 2045 No-Build Alternative. Westbound queues on N Broadway would **also** be **reduced** during the AM peak hour but would **approach NE Martin Luther King Jr.** Boulevard during the PM peak hour **in both design options**. There are additional signal phases at the NE Broadway/ NE Victoria Avenue intersection in the Revised Build Alternative that provide for protected pedestrian crossing on the west leg of the intersection. The reduced green time for westbound N Broadway results in increased queuing **(approximately 600 additional feet of queuing)** on westbound N Broadway in the PM peak hour.

6.2.2.3 Future Local Street Bicycle Conditions

Bicycle Analysis (delay)

Bicycle delay**s** through the signalized intersections were analyzed in Vissim for all dedicated bicycle lanes and are shown in Table 15 and Table 16 for the AM and PM peak hours. As shown below, the updated 2045 No-Build and 2045 Revised Build Alternatives are serving a similar volume of bicycles in both the AM and PM peak hours **(Appendix G)** but with considerably more delay in 2045 No-Build Alternative for key movements.

In the AM peak hour, southbound bicycles on N Vancouver Avenue are expected to experience over 2 minutes of delay in the 2045 No-Build Alternative due to the minimal amount of green time allowed for N Vancouver Avenue. In comparison, southbound bicycles in the 2045 Revised Build Alternative would experience approximately 25 seconds of delay **in both design options**

due to the removal of the I-5 southbound exit ramp and the additional green time allotted to N Vancouver Avenue.

It should be noted that southbound to westbound bicycles in the 2045 No-Build Alternative would continue using N Flint Avenue due to existing turn restrictions at N Vancouver Avenue and N Broadway that prohibit southbound right-turn movements across the existing I-5 southbound exit ramp. In the 2045 Revised Build Alternative bicycles could travel southbound on N Vancouver Avenue and turn right to westbound in both design options, but due to increased westbound bicycle/vehicular conflicts resulting in increased delays for N Flint Avenue traffic during the AM peak period, a portion of the southbound bicycles (approximately 250 bicycles in the AM peak period) were routed down N Vancouver Avenue resulting in an even bicycle trip distribution between N Flint Avenue and N Vancouver Avenue that helped to balance the southbound auto delays on N Vancouver Avenue and N Flint Avenue as cyclists and drivers will take the path of least resistance.

In the PM peak hour, northbound bicycles on N Williams Avenue are expected to experience 90 seconds of delay crossing NE Weidler Street and 2 minutes of delay crossing N Broadway in the 2045 No-Build Alternative compared to approximately 30 seconds at both locations in **both of** the 2045 Revised Build Alternative **design options**. The reconfiguration of the intersection of N Wheeler **Avenue**/ N Williams **Avenue/ N Ramsay Way** and I-5 **southbound entrance** ramp terminal intersection between the two alternatives would add additional signal phases that would result in greater delays for northbound bicycles in the PM peak hour in the 2045 Revised Build Alternative compared to the 2045 No-Build Alternative (approximately **60 seconds vs 30 seconds). It should be noted that the Clackamas Crossing in the 2045 Revised Build Alternative provides an alternate route for cyclists that originates east of I-5, reducing the number of northbound bicycles on N Williams Avenue compared to the 2045 No-Build Alternative (10 bicycles in the AM peak hour and 110 bicycles in the PM peak hour).**

Refinements to signal timing and signal progression within the project area may reduce bicycle delays and will be further evaluated during design. Bicycle storage design and operations refinements will **also** be considered during the design phase.

Table 15 Future Conditions Bicycle Delay– 8:00 AM - 9:00 AM

ID	Intersection	Movement	2045 No-Build Alternative		2045 Revised Build Alternative 2-way Ramsay		2045 Revised Build Alternative 2-way Wheeler	
			Volume Served	Delay (sec)	Volume Served	Delay (sec)	Volume Served	Delay (sec)
1	N Broadway & N Vancouver Ave (existing I-5 SB exit ramp)	WB Bicycle	294	15.0	**298**	**0.4**	**297**	**0.3**
		SB Bicycle	604	125.2	**840**	**24.2**	**844**	**23.7**
2	N/NE Broadway & N Williams Ave	WB Bicycle	306	44.3	**309**	**40.8**	**308**	**52.4**
		NB Bicycle	94	12.7	**100**	**8.6**	**101**	**10.7**
3	NE Broadway & NE Victoria Ave	WB Bicycle	307	9.1	**309**	**16.1**	**309**	**15.8**
4	NE Broadway & NE 2nd Ave	WB Bicycle	306	23.6	**306**	**7.3**	**306**	**7.3**
5	NE Weidler St & NE 2nd Ave	EB Bicycle	96	12.0	**99**	**0.1**	**100**	**0.1**
6	I-5 NB exit ramp at NE Weidler St & NE Victoria Ave	EB Bicycle	99	15.6	**100**	**1.2**	**100**	**0.8**
7	N/NE Weidler St & N Williams Ave	EB Bicycle	99	3.5	**100**	**0.2**	**100**	**0.3**
		NB Bicycle	93	31.6	**100**	**22.5**	**101**	**21.2**
8	N Weidler St & N Vancouver Ave	EB Bicycle	147	29.2	**147**	**32.1**	**148**	**34.2**
		SB Bicycle	569	44.1	**598**	**30.8**	**599**	**25.8**
9	N Broadway & N Benton Ave	WB Bicycle	1407	16.3	**1419**	**12.5**	**1418**	**12.6**
		EB Bicycle	147	1.3	**152**	**0.3**	**152**	**0.6**
10	N Broadway & N Larrabee Ave	WB Bicycle	1390	54.0	**1427**	**24.4**	**1427**	**25.1**
		EB Bicycle	147	21.4	**181**	**24.1**	**181**	**22.9**
11	N Wheeler Ave/ N Williams Ave/ N Ramsay Way & I-5 SB Ramps	NB Bicycle	47	29.3	**40**[1]	**43.4**	**40**[1]	**42.8**
		SB Bicycle	523	93.8	**604**	**19.8**	**604**	**25.5**

[1]*Note: Revised Build Alternative reroutes 10 northbound bicycles from N Williams Avenue to the Clackamas Crossing during the AM peak.*

Table 16 Future Conditions Bicycle Delay – 5:00 PM - 6:00 PM

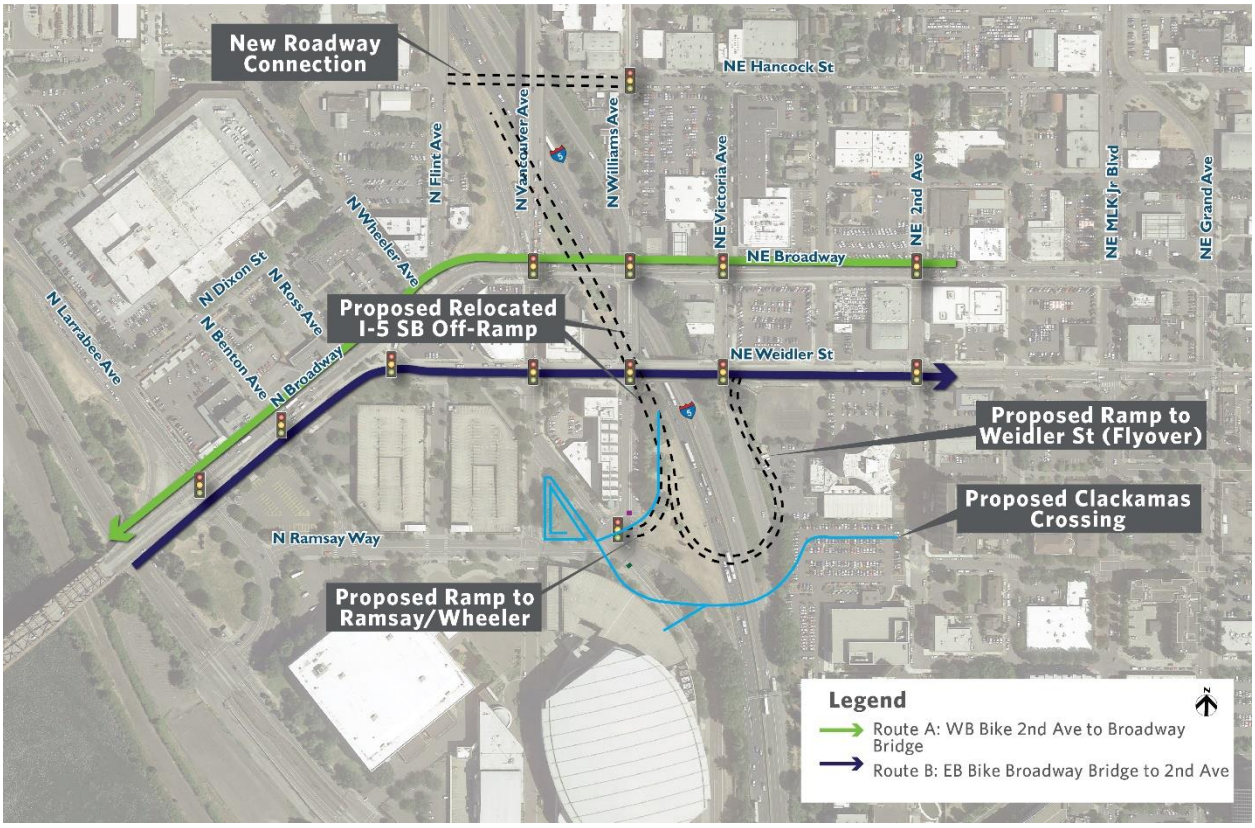
ID	Intersection	Movement	2045 No-Build Alternative		2045 Revised Build Alternative 2-way Ramsay		2045 Revised Build Alternative 2-way Wheeler	
			Volume Served	Delay (sec)	Volume Served	Delay (sec)	Volume Served	Delay (sec)
1	N Broadway & N Vancouver Ave (existing I-5 SB exit ramp)	WB Bicycle	68	18.7	**68**	**0.0**	**69**	**0.1**
		SB Bicycle	**58**	**35.4**	**60**	**23.8**	**61**	**25.2**
2	N/NE Broadway & N Williams Ave	WB Bicycle	100	52.7	**101**	**52.9**	**100**	**57.1**
		NB Bicycle	1316	122.5	**1421**	**30.2**	**1419**	**29.9**
3	NE Broadway & NE Victoria Ave	WB Bicycle	100	13.0	**101**	**12.5**	**100**	**13.0**
4	NE Broadway & NE 2nd Ave	WB Bicycle	100	14.6	**100**	**13.0**	**100**	**12.6**
5	NE Weidler St & NE 2nd Ave	EB Bicycle	96	14.7	**96**	**0.9**	**98**	**1.0**
6	I-5 NB exit ramp at NE Weidler St & NE Victoria Ave	EB Bicycle	97	13.4	**97**	**20.4**	**100**	**21.6**
7	N/NE Weidler St & N Williams Ave	EB Bicycle	97	6.1	**98**	**0.2**	**100**	**0.3**
		NB Bicycle	1383	89.8	**1430**	**33.5**	**1433**	**33.9**
8	N Weidler St & N Vancouver Ave	EB Bicycle	810	45.3	**821**	**32.8**	**822**	**33.0**
		SB Bicycle	47	17.5	**49**	**43.3**	**50**	**32.7**
9	N Broadway & N Benton Ave	WB Bicycle	129	14.1	**125**	**17.1**	**126**	**16.5**
		EB Bicycle	803	1.5	**828**	**0.7**	**829**	**0.9**
10	N Broadway & N Larrabee Ave	WB Bicycle	129	17.7	**125**	**20.9**	**126**	**20.3**
		EB Bicycle	813	61.4	**862**	**34.8**	**862**	**33.1**
11	N Wheeler Ave/ N Williams Ave/ N Ramsay Way & I-5 SB Ramps	NB Bicycle	725	31.8	**617**[1]	**61.7**	**608**[1]	**57.7**
		SB Bicycle	46	13.8	**49**	**32.5**	**49**	**34.7**

[1]*Note: Revised Build Alternative reroutes 110 northbound bicycles from N Williams Avenue to the Clackamas Crossing during the PM peak.*

Bicycle Travel Time

Bicycle travel times going westbound and eastbound on N/NE Broadway and N/NE Weidler Street from west of N Larrabee Avenue to east of NE 2nd Avenue were also evaluated using the Vissim simulated travel times for both the 2045 No-Build Alternative and 2045 Revised Build Alternative **design options**. The bicycle travel time segments are shown in Figure 7 and summarized in Table 17 and Table 18 for the AM and PM peak hours.

Figure 7 Bicycle Travel Time Routes



As shown below in Table 17 and Table 18 , bicycle travel times for the 2045 Revised Build Alternative **are consistently shorter** in **both design options compared** to the 2045 No-**Build Alternative. Westbound travel times are up to 20 seconds slower in the 2-way Wheeler Design Option compared to the 2-way Ramsay Design Option due to the modified signal phasing** at the **N Broadway** and N Vancouver Avenue intersection. **In the 2-way Wheeler Design Option an additional signal phase is required to accommodate a left turn movement from northbound N Vancouver Avenue to westbound N Broadway. This results in less green time for westbound** bicycle and **vehicular traffic.**

Table 17 **AM** Future Conditions Bicycle Travel Time, minutes

Direction	7-8 AM			8-9 AM		
	2045 No-Build	2045 Revised Build Alternative 2-way Ramsay	2045 Revised Build Alternative 2-way Wheeler	2045 No-Build	2045 Revised Build Alternative 2-way Ramsay	2045 Revised Build Alternative 2-way Wheeler
Bicycle Westbound	**4.5**	**3.9**	**4.0**	5.0	**4.0**	**4.3**
Bicycle Eastbound	**3.6**	**3.2**	**3.2**	3.6	**3.2**	**3.2**

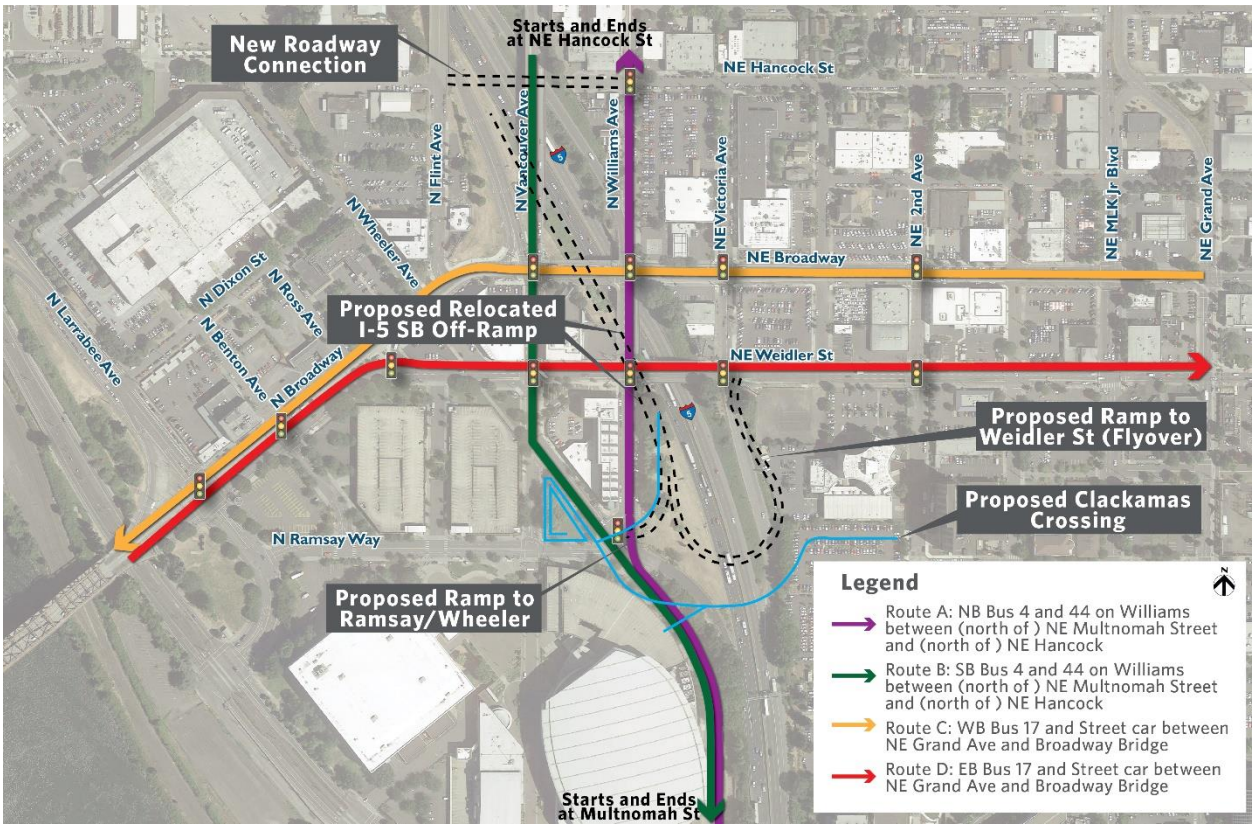
Table 18 PM Future Conditions Bicycle Travel Time, minutes

Direction	4-5 PM			5-6 PM		
	2045 No-Build	2045 Revised Build Alternative 2-way Ramsay	2045 Revised Build Alternative 2-way Wheeler	2045 No-Build	2045 Revised Build Alternative 2-way Ramsay	2045 Revised Build Alternative 2-way Wheeler
Bicycle Westbound	4.2	**4.1**	**4.1**	4.5	**4.3**	**4.4**
Bicycle Eastbound	4.2	**3.6**	**3.5**	4.9	**3.6**	**3.6**

Bus Travel Time

Bus service travel times from the Vissim simulation results were used to assess bus operations under future conditions for the AM and PM peak periods. Three bus lines traverse the local intersections within the Project API and travel times were captured for the routes shown in Figure 8. Bus 4 and Bus 44 travel on N Williams Avenue and N Vancouver Avenue between NE Multnomah Street and NE Hancock Street and Bus 17 travels on N/NE Broadway from NE Grand Avenue to the Broadway Bridge west of N Larrabee Avenue.

Figure 8 Bus and Streetcar Travel Time Routes



As shown below in Table 19, **northbound**, southbound, and westbound bus service travel times are expected to be **similar to or** shorter in the 2045 Revised Build Alternative AM peak hours **compared to the 2045 No-Build Alternative for both design options**. With the removal of the I-5 southbound exit ramp at the N Broadway and N Vancouver Avenue intersection, there would be less congestion on N Vancouver Avenue between N Broadway and NE Weidler Street and more green time would be provided for southbound traffic on N Vancouver Avenue,

resulting in less queuing and delay compared to the 2045 No-Build Alternative condition. **Eastbound** bus service travel times are approximately 20 to **30** seconds longer compared to the 2045 No-Build Alternative.

During the PM peak period (see Table 20), southbound bus service travel times are approximately 20 seconds longer in the 2-way Ramsay Design Option and 50 seconds longer in the 2-way Wheeler Design Option compared to the 2045 No-Build Alternative. The relocation of the I-5 southbound exit ramp to the N Wheeler Avenue/ N Williams Avenue/ N Ramsay Way intersection adds an additional signal phase that reduces the green time for southbound traffic, affecting the overall travel time in both design options. The southbound bus travel time experiences an additional delay in the 2-way Wheeler Design Option due to the additional signal phase for the northbound left-turn movement at N Broadway/ N Vancouver Avenue, which reduces the green time available for southbound N Vancouver Avenue. The 2-way Wheeler Design Option also removes the southbound bus only lane between N Broadway and NE Weidler Street.

Northbound bus service travel times in the PM peak period are less than 20 seconds longer in duration compared to the 2045 No-Build Alternative. As previously noted, the 2045 Revised Build Alternative would include an additional traffic signal at the N Williams Avenue**/ N/**NE Hancock Street intersection that would affect northbound routes. The current design assumption is that a traffic signal is needed at this location to accommodate a diagonal bicycle crossing. Options for transitions to tie into existing bicycle facilities north of N Broadway will be further evaluated during design. **Eastbound and westbound bus routes for the 2045 Revised Build Alternative design options are up to 1 minute shorter compared to** the 2045 No-Build Alternative **in the PM peak period.**

Refinements to signal timing and signal progression within the project area may shorten bus service travel times and will be further evaluated during design. The addition of transit signal priority, bus only lanes, bus queue jumps, and bus stop consolidation will also be evaluated as potential mitigation during design.

Table 19 **AM** Future Conditions Bus Travel Time, minutes

Direction	7-8 AM			8-9 AM		
	2045 No-Build	2045 Revised Build Alternative 2-way Ramsay	2045 Revised Build Alternative 2-way Wheeler	2045 No-Build	2045 Revised Build Alternative 2-way Ramsay	2045 Revised Build Alternative 2-way Wheeler
Bus 4 and 44 NB	3.5	**2.7**	**2.7**	3.5	**2.8**	**2.8**
Bus 4 and 44 SB	3.4	**3.3**	**3.5**	4.0	**3.4**	**3.5**
Bus 17 WB	4.3	**3.4**	**3.4**	5.1	**3.7**	**3.8**
Bus 17 EB	3.0	**3.1**	**3.2**	3.3	**3.6**	**3.8**

Table 20 **PM** Future Conditions Bus Travel Time, minutes

Direction	4-5 PM			5-6 PM		
	2045 No-Build	2045 Revised Build Alternative 2-way Ramsay	2045 Revised Build Alternative 2-way Wheeler	2045 No-Build	2045 Revised Build Alternative 2-way Ramsay	2045 Revised Build Alternative 2-way Wheeler
Bus 4 and 44 NB	3.6	**3.6**	**3.5**	3.7	**4.0**	**3.7**
Bus 4 and 44 SB	2.8	**3.1**	**3.6**	2.9	**3.1**	**3.7**
Bus 17 WB	4.7	**4.0**	**4.1**	4.9	**4.0**	**4.1**
Bus 17 EB	3.9	**3.8**	**3.7**	4.6	**4.5**	**3.9**

Streetcar Travel Time

Streetcar service travel times from the Vissim simulation results were used to assess Streetcar operations under future conditions for the AM and PM peak periods. The travel time routes for both the westbound and eastbound streetcar are reported between NE Grand Avenue and the Broadway Bridge west of N Larrabee Avenue (see Figure 8). As shown below in **Table 21 and Table 22**, westbound Streetcar travel times in the 2045 Revised Build Alternative are expected to be shorter compared to 2045 No-Build, particularly during the AM and PM peak hours. **Both design options have similar travel times with improvements of 30 seconds to 1 minute compared to the 2045 No-Build Alternative.**

Eastbound Streetcar travel times are also similar between design options and would generally be within 20 to 25 seconds of the 2045 No-Build travel times during the AM peak period and 1 to 2 minutes shorter during the PM peak period. Refinements to signal timing within the project area could shorten eastbound Streetcar service travel times during the AM peak period and will be further evaluated during design.

Table **21 AM** Future Conditions Streetcar Travel Time, minutes

Direction	7-8 AM			8-9 AM		
	2045 No-Build	2045 Revised Build Alternative 2-way Ramsay	2045 Revised Build Alternative 2-way Wheeler	2045 No-Build	2045 Revised Build Alternative 2-way Ramsay	2045 Revised Build Alternative 2-way Wheeler
Westbound Streetcar	4.1	**3.5**	**3.5**	4.3	**3.6**	**3.7**
Eastbound Streetcar	3.3	**3.7**	**3.7**	3.2	**3.6**	**3.6**

Table **22 PM** Future Conditions Streetcar Travel Time, minutes

Direction	4-5 PM			5-6 PM		
	2045 No-Build	2045 Revised Build Alternative 2-way Ramsay	2045 Revised Build Alternative 2-way Wheeler	2045 No-Build	2045 Revised Build Alternative 2-way Ramsay	2045 Revised Build Alternative 2-way Wheeler
Westbound Streetcar	4.4	**3.9**	**3.9**	5.0	**4.0**	**4.0**
Eastbound Streetcar	4.7	**3.8**	**3.7**	5.7	**3.8**	**3.8**

6.2.3 Indirect Impacts

There would be no additional indirect impacts under the 2045 Revised Build Alternative than those disclosed in the 2019 Traffic Analysis Technical Report. Similar to the Build Alternative, the 2045 Revised Build Alternative would have indirect impacts for event access to the Moda Center due to the relocation of the existing I-5 southbound exit ramp terminal. Potential mitigations in the traffic operations including wayfinding signage to guide traffic from the proposed N **Wheeler Avenue/ N** Williams Avenue/ N Ramsay Way southbound exit ramp to access the Moda Center and traffic signal adjustments would be necessary. During the design phase, traffic analysis of the ingress conditions would be performed to identify specific mitigation and develop event traffic management plan to accommodate the additional traffic volumes during both event ingress and egress conditions. **Also, as described in the 2019 Traffic**

Analysis Technical Report, the Clackamas Crossing would provide an additional route for bicycles and pedestrians to cross I-5 using a separated facility with less exposure to motor vehicles and that can avoid crossing the complex intersections of ramp terminals. The Clackamas Crossing in the Revised Build Alternative provides additional grade separated connections compared to that described in the 2019 Traffic Analysis including a connection parallel to N Williams Avenue from the crossing to the southeast corner of the intersection of N Williams Avenue and N/NE Weidler Street and a direct connection from the crossing to the Garden Garage.

6.2.4 Cumulative Impacts

The cumulative impact analysis considered the Project's impacts combined with other past, present, and reasonably foreseeable future actions that would result in the environmental impacts in the Project Area. The travel demand model for this project is based on the 2014 Metro Regional Transportation Plan (RTP) and changes from the 2014 and 2018 RTP have been evaluated and reviewed. There are no changes in the projects considered for the RFFA list and therefore there are no updates on the trip generation, travel demand, or modeling used in the traffic analysis of the Project. Therefore, the cumulative impacts of the 2045 Revised Build Alternative would be the same as those reported in the 2019 Traffic Analysis Technical Report.

6.3 CONCLUSION

The traffic analysis presented in this supplemental report include the following results for the Revised Build Alternative:

- Traffic operations would improve at all highway segments including the four weaving segments between I-84 and I-405 in both the AM (7:00 AM to 9:00 AM) and PM (4:00 PM to 6:00 PM) analysis periods when compared to the 2045 No-Build Alternative.
- **The I-5 southbound exit ramp terminal intersection at N Wheeler Avenue / N Williams Avenue/ N Ramsay Way intersection is expected to exceed the Highway Design Manual (HDM) mobility target (v/c of 0.75 or lower) in both the AM and PM peak hours in both design options. The I-5 northbound exit ramp terminal intersection at NE Weidler Street/ NE Victoria Avenue is expected to exceed the HDM mobility target (v/c of 0.75 or lower) during the AM peak hour in both design options.**
- **As part of the adoption of the Central City 2035 Plan, the Central City, which includes the I-5 ramp terminal intersections, has been designated as a Multimodal Mixed-Use Area (MMA). This designation provides flexibility for determining significant effects of land use actions by lifting mobility standards requirements at ODOT facilities. Transportation standards such as safety and multimodal access still apply. Although both ramp terminal**

intersections exceed the HDM mobility target, the Revised Build Alternative reduces exit ramp queuing and provides bicycle and pedestrian crossing improvements.

- All intersections would operate at acceptable LOS D or better using Synchro analysis results **except for the N Wheeler Avenue/ N Williams Avenue/ N Ramsay Way and I-5 southbound entrance and exit ramp terminal intersection, which will operate at LOS E.**
- All intersections would operate at LOS D or better in the AM and PM peak hours using Vissim analysis results.
- 95th percentile queue lengths on the I-5 northbound and southbound exit ramps would be reduced in the 2045 Revised Build Alternative compared to the 2045 No-Build Alternative and would not exceed the proposed ramp storage length approaching both ramp terminals.
- Eastbound queuing on N Weidler Street in the PM peak hour would be less than in the 2045 No-Build Alternative and westbound queuing on N Broadway would be **less** during the AM peak hour but would **approach Martin Luther King** Jr. Boulevard during the PM peak hour**, which is approximately 600 feet longer compared to the 2045 No-Build Alternative.**
- **Bicycle** delays in the eastbound and westbound direction would **generally** be shorter compared to those in the No-Build Alternative. **Bicycle delays in the northbound and southbound direction would generally be shorter compared to those in the No-Build Alternative except for southbound bicycles at the N Weidler Street and N Vancouver Avenue intersection and northbound bicycles at the N Wheeler Avenue/ N Williams Avenue/ N Ramsay Way and I-5 southbound entrance ramp terminal intersection in the PM peak hour (15 to 30 seconds longer).**
- **Bicycle travel times in both the eastbound and westbound direction would be shorter compared to those in the No-Build Alternative. Westbound travel times would be up to 20 seconds slower in the 2-way Wheeler Design Option compared to the 2-way Ramsay Design Option.**
- **Bus travel times would be shorter in the northbound, southbound, and westbound routes during the AM peak period compared to the No-Build and would be longer in the eastbound routes by 20 to 30 seconds. During the PM peak period, Revised Build Alternative bus travel times would be similar to or shorter in the westbound, eastbound, and northbound direction and would be longer in the southbound direction compared to the No-Build Alternative. The 2-way Wheeler Design Option is approximately 30 seconds longer in the southbound direction compared to the 2-way Ramsay Design Option.**
- **Streetcar travel times in the westbound direction would be between 30 seconds and 1 minute shorter compared to the No-Build Alternative and would be 20 to 25 seconds**

longer in the eastbound direction during the AM peak period compared to No-Build Alternative.

7.0 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

Mitigation measures would be the same as reported in the 2019 Traffic Analysis Technical Report.

8.0 PREPARERS

NAME	DISCIPLINE	EDUCATION	YEARS OF EXPERIENCE
Jeremy Jackson	Traffic Engineer	B.S. in Civil Engineering	**18**
Mingwei Shen	Traffic Engineer	B.S. in Civil Engineering	**5**
Simon Eng	Traffic Engineer	B.S. in Civil Engineering	35

9.0 REFERENCES

City of Portland. n.d. Portland Policy Document. TRN-10.27 - Traffic Capacity Analysis for Land Use Review Cases. Available: https://www.portlandoregon.gov/citycode/article/41049

Metro. 2014. Regional Transportation Plan. Available: https://www.oregonmetro.gov/sites/default/files/2015/05/29/RTP-2014-final.PDF

Metro. 2018 Regional Transportation Plan. Available:

https://www.oregonmetro.gov/sites/default/files/2018/07/02/draft2018RTP_publicreviewweb.pdf

ODOT (Oregon Department of Transportation). 1999. Oregon Highway Plan, an Element of the Oregon Transportation Plan. Originally Adopted March 18, 1999, Including Amendments through May 2015. Available: http://www.oregon.gov/ODOT/Planning/Documents/OHP.pdf.

ODOT. 2012b. ODOT Highway Design Manual. Available: https://www.oregon.gov/ODOT/Engineering/Pages/Hwy-Design-Manual.aspx

ODOT. 2020. Analysis Procedure Manual. Version 2. Transportation Development Division Planning Section, Transportation Planning Analysis Unit, Salem, Oregon. Available: https://www.oregon.gov/odot/Planning/Pages/APM.aspx

ODOT. 2019. Traffic Analysis Technical Report. I-5 Rose Quarter Improvement Project. Prepared for the Oregon Department of Transportation. Portland, Oregon. January. Available:

https://i5rosequarter.oregon.gov/Documents/I5RQ_Traffic-Technical-Report_010819.pdf

TRB (Transportation Research Board). 2010. HCM 2010: Highway Capacity Manual. Washington D.C.

City of Portland. 2020. Portland 2035 Transportation System Plan

https://www.portland.gov/transportation/planning/tsp-document-downloads

City of Portland. 2012 Central City 2035 N/NE Quadrant Plan

https://www.portland.gov/sites/default/files/2020-01/complete-adopted-plan_lores_0.pdf

Appendix A: List of Reasonably Foreseeable Future Actions

REASONABLY FORESEEABLE FUTURE ACTIONS COMPARISON

Date: Tuesday June 15, 2022 **[REVISED SEPTEMBER 1, 2023]**

Project: K19071 I-5 Rose Quarter Improvement Project

To: Steve Drahota

From: Brian Bauman

Subject: Reasonably Foreseeable Future Actions Comparison

1.0 INTRODUCTION

Reasonably Foreseeable Future Actions (RFFAs) having the potential to contribute to a cumulative effect with the Build Alternative for the I-5 Rose Quarter Improvement Project (Project) were identified in 2019 technical reports supporting the Project's Environmental Assessment (EA) and the Finding of No Significant Impact (FONSI) and Revised EA. The purpose of this memo is to review the RFFAs documented in the 2019 technical reports and update them based on changes in plans for future development in the Project vicinity. The updated RFFAs presented herein are used in the assessment of cumulative environmental effects of the Project's Revised Build Alternative presented in the I-5 Rose Quarter Improvement Project Supplemental EA.

2.0 RFFA ASSESSMENT

As part of the cumulative impacts analysis included in the 2019 technical reports, ODOT considered planned and programmed projects in the Project Area and surrounding areas that are likely to be implemented by 2045 to be reasonably foreseeable. Future (2045) traffic conditions were interpolated from Metro's regional travel demand model which is built on population and employment growth forecasts adopted by the Metro Council and the financially constrained project list included in the 2014 Regional Transportation Plan (RTP). This updated RFFA **assessment** compares projects included in the most recent 2018 RTP that may contribute to a cumulative effect with the Project with the RFFAs documented in the 2019 technical reports.

2.1 LAND USE ASSUMPTIONS – LAND USE AND ASSUMPTIONS FOR RFFAS

The RFFAs included in the 2019 technical reports include City-owned parcels proposed for redevelopment (East/West parking garages, Benton surface parking lot, Phase II Entertainment Lot); improvements to the Veterans Memorial Coliseum, Moda Center, Annex lot plus building; and private redevelopment (Vulcan/Thunderbird site west of N Interstate and the Weston-owned site at N Larrabee and N Broadway). In addition to these actions, public entities such as the Portland Water Bureau, TriMet, Metro/Oregon Convention Center, Portland Public Schools, and Multnomah County plan to undertake improvement projects within the area before 2045.

Both the 2014 and 2018 RTPs support the implementation of the 2040 Growth Concept, which is the region's adopted land use and transportation strategy for managing growth and building healthy, equitable communities and a strong economy. The RFFAs listed above were included in both the 2014 RTP and the 2018 RTP and are the only projects that may have an impact on traffic within the I-5 Rose Quarter Improvement Project Area. Additional assumptions can be found in Appendix M Attachment 3 (Page 77) of the 2018 RTP dated December 6th, 2018.

For the 2019 Traffic Analysis Technical Report and the 2023 Revised Traffic Analysis Supplemental Technical Report, the Project team utilized the regionally adopted population and employment numbers associated with Metroscope and the Regional Travel Demand Model as the baseline for travel demand development in conjunction with Metro. Additionally, the adopted I-5 Rose Quarter Project in the RTP was coordinated with the updates to the Comprehensive Plan and Zoning designations in the NNE quadrant plan covering the project study area. It should be noted that the comprehensive plan and zoning designations in the study area were designated primarily General Commercial (GC) which allows for the maximum density. While there have been changes or additional detail to proposed developments in the Project Area, these do not change the underlying assumptions of build-out of those parcels in accordance with the applicable comprehensive plan designations.

Since the FONSI and Revised EA were released in 2020, the Portland Public School's Long Range Facility Plan lists Harriet Tubman Middle School (HTMS) as under consideration for relocation (PPS 2021) and funding for the relocation is provided to the Oregon Department of Administrative Services in Oregon House Bill 5202, Section 323 which was signed by Governor Brown on April 4, 2022. The relocation of HTMS is a new RFFA for purposes of cumulative analyses for the Supplemental EA. The middle school occupies approximately 2.2 acres zoned Commercial Mixed Use and 0.13 acres zoned

Open Space. After the school use of the existing building relocates, re-use of the land and building could include several potential outcomes, and it is not possible to predict how the land will be used. In the event the buildings are demolished, and the site is redeveloped under the current zoning, the 2.2-acre Commercial Mixed Use 3 portion could support a large-scale mixed-use building with 6-7 stories including retail, office, residential, institutional, and limited industrial uses. There is a minimum residential density requirement of 1 unit per 1,000 square feet of site area, which would translate to a minimum of approximately 95 residential units.

2.2 TRANSPORTATION ASSUMPTIONS – FREEWAY VOLUMES AND 2019 ASSUMPTIONS

The Columbia River Crossing Project is included in the 2014 RTP financially constrained project list and is in Metro's 2014 regional travel demand model (RTDM). The Columbia River Crossing Project remained in the financially constrained list in the 2018 RTP (See Table 4 in Appendix M of the 2018 RTP dated December 6th, 2018, on Page 13). Tolling was assumed as a part of the Columbia River Crossing Project (Appendix 3.4 of the 2014 RTP Technical Appendix on Page 337 and Appendix M of the 2018 RTP on Page 13). No other major projects have been completed or incorporated into the RTP that would substantially affect travel volumes, therefore there are no changes to the RFFAs in the Revised Traffic Analysis Supplemental Technical Report.

Projects under the Oregon Toll Program were not on the 2014 or 2018 RTP financially constrained list and, therefore, were not included as part of the future modeling scenarios in the 2019 Traffic Analysis Technical Report. Tolling is currently in an environmental review process for I-205 at the Abernethy Bridge (I-205 Toll Project), as well as in a planning phase for I-5 and other portions of I-205 (Regional Mobility Pricing Project; RMPP). Volume development for the traffic analysis for the Supplemental EA was conducted from November 2021 to December 2021. Metro added the I-205 Toll Project (which, at that time included tolls at the Abernethy and Tualatin River bridges) to the RTP financially constrained list in May 2022; i.e., after volume development for the Supplemental EA was complete. Regional modeling performed for the I-205 Toll Project in 2021 determined that daily volume changes resulting from the I-205 Toll Project alternatives would be negligible (less than 2% in volume) on I-5

at the Marquam Bridge (i.e., south of the I-5 Rose Quarter Improvement Project)[1]. Therefore, the RFFAs for the I-5 Rose Quarter Improvement Project were not updated to include the I-205 Toll Project and ODOT determined there would not be analytical value to performing sensitivity tests related to the effects of the I-205 Toll Project on the I-5 Rose Quarter Improvement Project.

The RMPP is not on the 2018 RTP financially constrained list and therefore was not considered as an RFFA in the Supplemental EA. Due to public interest, ODOT had its consultant team conduct a sensitivity analysis of the potential influence of the RMPP on I-5 in the Project area. The results of that analysis are contained in Appendix D of the 2023 Revised Traffic Analysis Supplemental Technical Report. Because the RMPP is in the early stages of planning, and assumptions used in the sensitivity analysis are likely to change as the RMPP project elements become more defined in subsequent phases, the results have many limitations.

2.3 TRANSPORTATION ASSUMPTIONS – LOCAL STREET VOLUMES AND 2019 ASSUMPTIONS

As a part of the multi-modal traffic modelling work, the 2019 Traffic Analysis Technical Report included additional network refinement and operational detail based on input from the City of Portland, including elements of the Central City in Motion project. The primary change was lane reallocations on Broadway. These changes were incorporated in the 2018 RTP, and thus the change is consistent with that plan. The Broadway Multi-Modal Corridor project is project #11646 in the 2018 RTP. No other projects have been completed or incorporated into the RTP that would affect travel volumes, therefore there are no changes to the RFFAs in the Traffic Analysis Supplemental Technical Report.

3.0 FINDINGS

The RFFAs identified for the 2019 technical reports to support the cumulative impacts analysis of the Project Build Alternative were reviewed to determine if updates were needed to assess traffic and cumulative impacts of the Revised Build Alternative. The 2014 and 2018 RTPs were also reviewed and compared. No projects were added to or removed from the RFFA list that would affect traffic impacts, volumes, or performance in

[1] I-205 Toll Project Comparison of Screening Alternatives (March 31, 2021). https://www.oregon.gov/odot/tolling/Documents/FINAL%20I-205%20Comparison%20of%20Screening%20Alternatives%20Report%20033121_508.pdf

the project area. The relocation of HTMS may impact future use of the existing site; however, neither the relocations nor the RFFAs have resulted in updates that would result in any changes to trip generation, travel demand or to modeling used in the evaluation of the Project.

Appendix B: Regional Mobility Pricing Project / Rose Quarter Regional Travel Demand Model Sensitivity Test Results Summary

Memorandum

Date	July 21, 2022
To	I-5 Rose Quarter Improvement Project Team
From	Regional Mobility Pricing Project Team
Subject	RMPP/RQ Regional Travel Demand Model Sensitivity Test Results Summary

1 Purpose

This memo provides a summary of regional travel demand model (RTDM) results in the vicinity of the I-5 Rose Quarter Improvement Project (RQ Project) for different future model scenarios in 2045. Specifically, this review looked at the impacts that the RQ Project and the Regional Mobility Pricing Project (RMPP) could have on each other. This sensitivity analysis also was prepared to further address issues identified by the RQ Project team in response to stakeholder questions received during the 2019 Environmental Assessment public comment period for the RQ Project.

The Portland Metro RTDM was used to provide high level traffic analysis and comparisons to better understand the relationship between the two projects. The RQ Project would include construction of additional auxiliary lanes and shoulders on I-5 between I-84 and I-405. The RMPP would apply pricing (tolls) on all lanes of I-5 and I-205 to manage traffic congestion.

2 Methodology/Assumptions

Four model scenarios were evaluated in 2045 and compared to assess potential changes in conditions with and without RMPP and with and without the RQ Project improvements. Table 1 shows major projects that were included for each scenario. Scenarios with RQ Project improvements are called No Build while scenarios without RMPP are called No Action.

The RMPP (Action) scenarios include preliminary modeling toll rate assumptions developed for the Initial Congestion Pricing Concept (ICPC). The ICPC scenario was developed to address congestion in 2045 baseline (No Action) conditions. These assume construction of the RQ Project and other (constrained) projects in the Regional Transportation Plan that have been identified as reasonably likely to be funded by 2045. The RMPP toll rate assumptions will be updated/refined as the project is developed further.

The ICPC toll rate assumptions are assumed to be variable by time of day based on an hourly schedule, not dynamically priced as a function of congestion. No adjustments or modifications were made to the toll rate assumptions to account for RQ Project Build/No Build status. The toll rate assumptions were held constant between the two model scenarios that include the RMPP.

Table 1. Scenarios Compared in 2045

	Baseline Scenarios for RMPP		Additional Scenarios for Sensitivity Test	
	RMPP No Action w/ RQ Build	RMPP ICPC w/ RQ Build	RMPP No Action w/ RQ No Build	RMPP ICPC w/ RQ No Build
I-205 Toll Project	✓	✓	✓	✓
I-205 Improvements Project	✓	✓	✓	✓
IBR Program Toll	✓	✓	✓	✓
IBR Program Improvements	✓	✓	✓	✓
Rose Quarter Improvement Project	✓	✓	x	x
RMPP Initial Congestion Pricing Concept	x	✓	x	✓

3 Limitations

Specific results from the RTDM scenarios are expected to differ from the RQ Project technical analysis, as different methodologies, assumptions, and tools are applied in each project. RMPP project results are also expected to change as more detailed and refined analysis will be performed during later project phases.

Regional travel demand models do not supersede or replace the need for more refined traffic operations analysis currently being conducted by the RQ project team. The RTDM forecasts are generally not appropriate for directly predicting future traffic conditions at specific locations. They are best used to support planning decision-making by providing relative comparisons between scenarios and high-level indicators of potential changes in key performance measures.

The RMPP's ICPC was not designed to eliminate traffic congestion in the Rose Quarter but was designed to manage demand and congestion along the I-5 and I-205 corridors in the Portland metro area, assuming the RQ Project improvements have been constructed on I-5. Either updating the project objectives or the baseline assumptions could change the assumed/applied toll rates of the RMPP.

The analysis presented is limited to consideration of results on the I-5 mainline and does not include evaluation of potential changes in traffic conditions on other nearby roadways in the area around the RQ Project.

4 Results

Tables 2 and 3 show the peak hour model volumes on I-5 between I-405 and I-84 for each of the four scenarios. All model scenarios reflect average weekday conditions in 2045. While the number of trips on I-5 increases under a RQ Project build scenario for all four conditions analyzed (two in the AM and two in

the PM), the model network changes indicate that most of these trips are rerouting from other roadways that are alternatives to I-5. This reflects the model reacting to changed conditions to increase the efficiency of the network by transferring trips to I-5 and away from a more congested alternatives such as I-405 and/or surface streets near I-5.

Table 2. 2045 Average Weekday Traffic Volumes on I-5 between I-405 and Broadway/Weidler Interchange

8-9 AM	RMPP No Action		RMPP ICPC	
	RQ No Build	RQ Build	RQ No Build	RQ Build
NB	4,948	5,634	3,938	4,179
SB	4,605	5,190	3,356	3,931

5-6 PM	RMPP No Action		RMPP ICPC	
	RQ No Build	RQ Build	RQ No Build	RQ Build
NB	4,487	5,121	3,425	3,327
SB	5,624	5,710	4,370	4,071

Source: Metro Regional Travel Demand Model

Table 3. 2045 Average Weekday Traffic Volumes on I-5 between I-84 and Broadway/Weidler Interchange

8-9 AM	RMPP No Action		RMPP ICPC	
	RQ No Build	RQ Build	RQ No Build	RQ Build
NB	4,711	5,437	4,150	4,519
SB	4,328	4,884	3,531	3,900

5-6 PM	RMPP No Action		RMPP ICPC	
	RQ No Build	RQ Build	RQ No Build	RQ Build
NB	4,839	5,534	4,160	4,129
SB	5,046	5,547	4,297	4,236

Source: Metro Regional Travel Demand Model

Both the RQ Project build and the RMPP ICPC would be expected to result in changes in traffic volumes, circulation patterns, and traffic operations on I-5 and other roadways near the RQ Project area. RQ Project improvements are expected to increase the driver's ability to safely navigate the roadway near the junctions of I-5, I-405, and I-84. The RMPP is expected to manage demand to help prevent traffic flow breakdowns with their associated social, economic, and environmental costs. Both of these projects support improved traffic flow and reduced congestion on I-5. While additional analysis would be needed to fully understand the expected changes in traffic operations, looking at relative differences in speeds from the RTDM can provide insights for these projects.

Table 4 and 5 below show the RTDM forecast vehicle speeds during peak hours on I-5 between I-405 and I-84 for each of the four scenarios. All model scenarios reflect average weekday conditions in 2045. It should be noted that small differences in speeds (less than a few miles per hour) are negligible and should not be viewed as a substantive difference between scenarios.

Table 4. 2045 Average Weekday Traffic Speed (in mph) on I-5 between I-405 and Broadway/Weidler Interchange

8-9 AM	RMPP No Action		RMPP ICPC	
	RQ No Build	RQ Build	RQ No Build	RQ Build
NB	22	33	39	44
SB	39	37	45	44

5-6 PM	RMPP No Action		RMPP ICPC	
	RQ No Build	RQ Build	RQ No Build	RQ Build
NB	31	39	43	46
SB	31	35	42	45

Source: Metro Regional Travel Demand Model

Table 5. 2045 Average Weekday Traffic Speed (in mph) on I-5 between I-84 and Broadway/Weidler Interchange

8-9 AM	RMPP No Action		RMPP ICPC	
	RQ No Build	RQ Build	RQ No Build	RQ Build
NB	14	32	27	41
SB	38	39	44	44

5-6 PM	RMPP No Action		RMPP ICPC	
	RQ No Build	RQ Build	RQ No Build	RQ Build
NB	14	33	27	44
SB	33	36	41	44

Source: Metro Regional Travel Demand Model

The RQ Project would not construct any improvements to I-5 southbound between I-405 and Broadway/Weidler interchange; the added auxiliary lane and shoulder in the southbound direction begins south of the southbound Broadway exit. RTDM traffic speed results in this section show limited changes when comparing RQ No-Build and RQ Build in the RMPP ICPC. A more detailed traffic operations analysis is needed to incorporate additional operational factors such as downstream queuing impacts. However, some trends can be identified.

In general, most freeway facilities tend to operate with maximum vehicle flow when average speeds are between 40 mph and 50 mph. Speeds below 40 mph usually indicate a freeway with congestion that negatively impacts its ability to efficiently move vehicles and that can lead to major flow breakdowns. To achieve speeds above 50 mph, the freeway is not likely to be carrying all traffic that it could. The analysis indicates that speeds between 40mph and 50 mph are achieved on all roadway segments only where both the RMPP and the RQ Project improvements are in place.

Table 6 shows the number of hours per day that congestion can be expected to be experienced on I-5 for each of four scenarios and shows the complementary effect with both strategies in place. All model scenarios reflect average weekday conditions in 2045.

Table 6. 2045 Daily Number of Hours with Congestion on I-5 between I-84 and I-405

		RMPP No Action		RMPP ICPC	
		RQ No Build	RQ Build	RQ No Build	RQ Build
Between **I-405** and Broadway/Weidler Interchange	NB	13	6	7	0
	SB	6	8	0	0
Between **I-84** and Broadway/Weidler Interchange	NB	15	13	12	0
	SB	12	7	0	0

Note: Congestion defined when the ratio of hourly model volume to roadway capacity exceeds 0.8.

Source: Metro Regional Travel Demand Model

5 Summary of Findings

The following observations were made based on comparing the RTDM results for 2045 scenarios:

- Both the RQ Project and RMPP Initial Congestion Pricing Concept (ICPC) were needed to reduce congestion below the congestion threshold (0.80 V/C) for all hours and directions of travel.
- RMPP ICPC could reduce peak hour volumes/demand on I-5 by approximately 1,000 vehicles per hour or more in each direction near the Rose Quarter.
- The RQ Project and RMPP ICPC are each expected to reduce the duration and severity of congestion on I-5 near the Rose Quarter.
- RMPP ICPC is comparatively more effective at improving speeds to above 40 mph.
- RMPP ICPC toll rate assumptions would need to be refined if RQ Project improvements are not constructed. Otherwise, severe congestion would remain on northbound I-5 near I-84.
- For a more refined operational analysis, post-processing of the RTDM results is necessary.

Appendix C: 2045 No Build and 2045 Build AM and PM Peak Hour Traffic Volumes

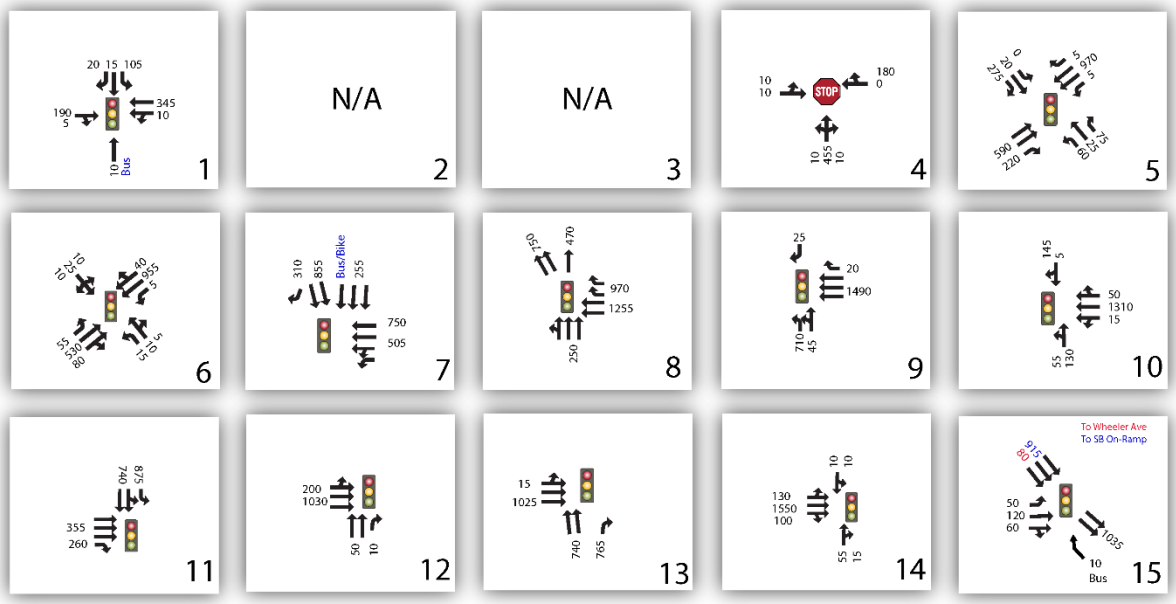


Figure 1 - No-Build 2045 AM Peak Hour Volumes
8:00-9:00 AM

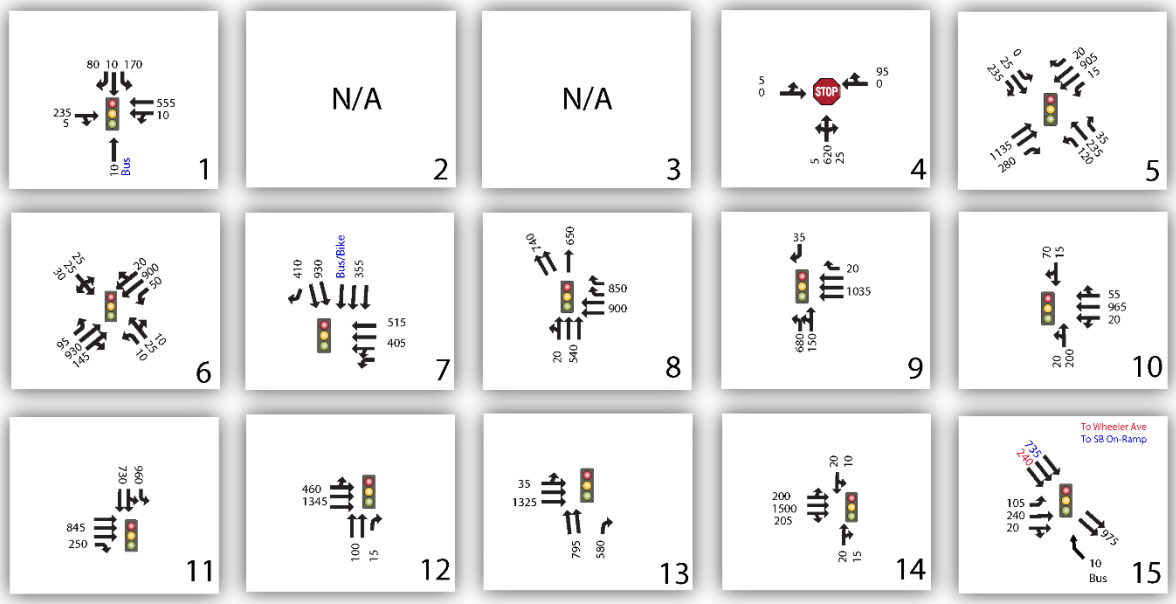


Figure 2 - No-Build 2045 PM Peak Hour Volumes
5:00-6:00 PM

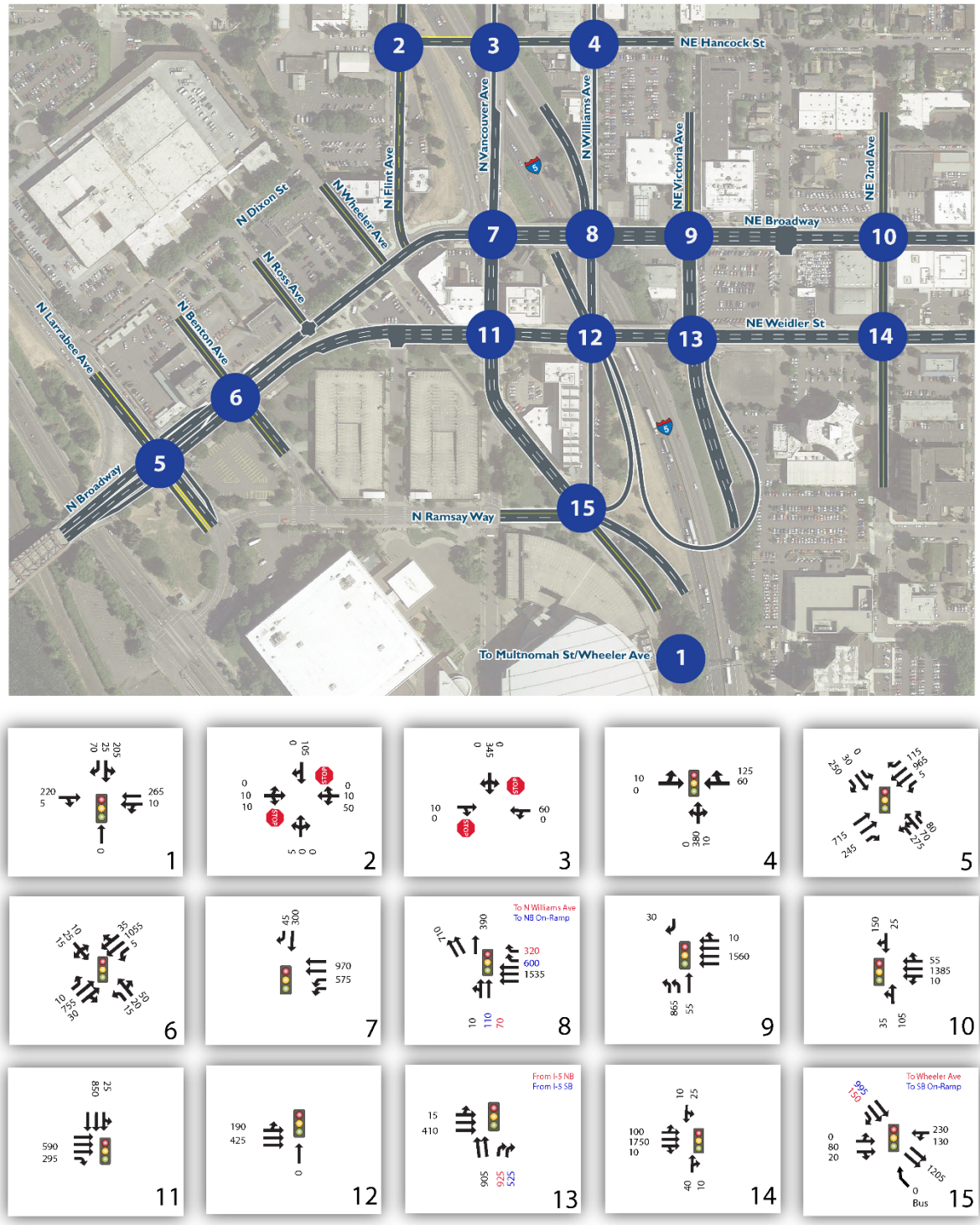
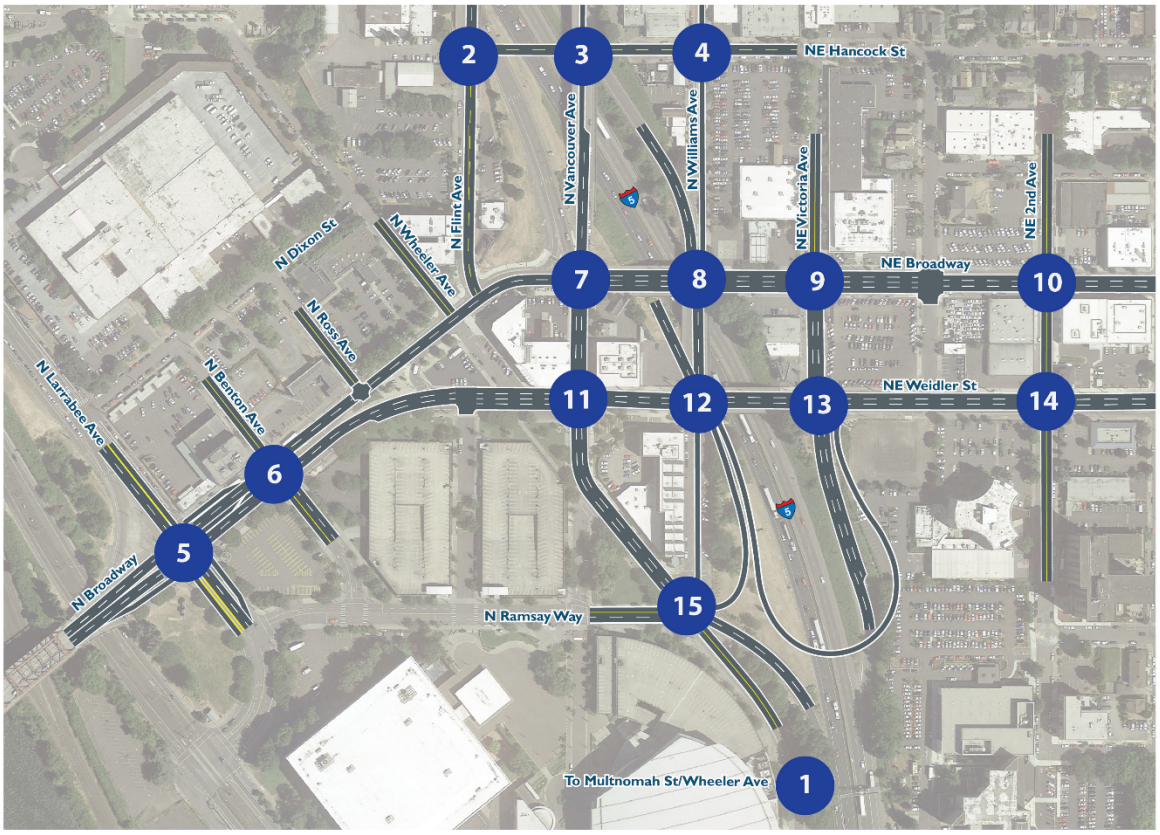


***Figure 3** - Future Year 2045 Build AM Peak Hour Volumes (Ramsay Flyover)* 8:00-9:00 AM



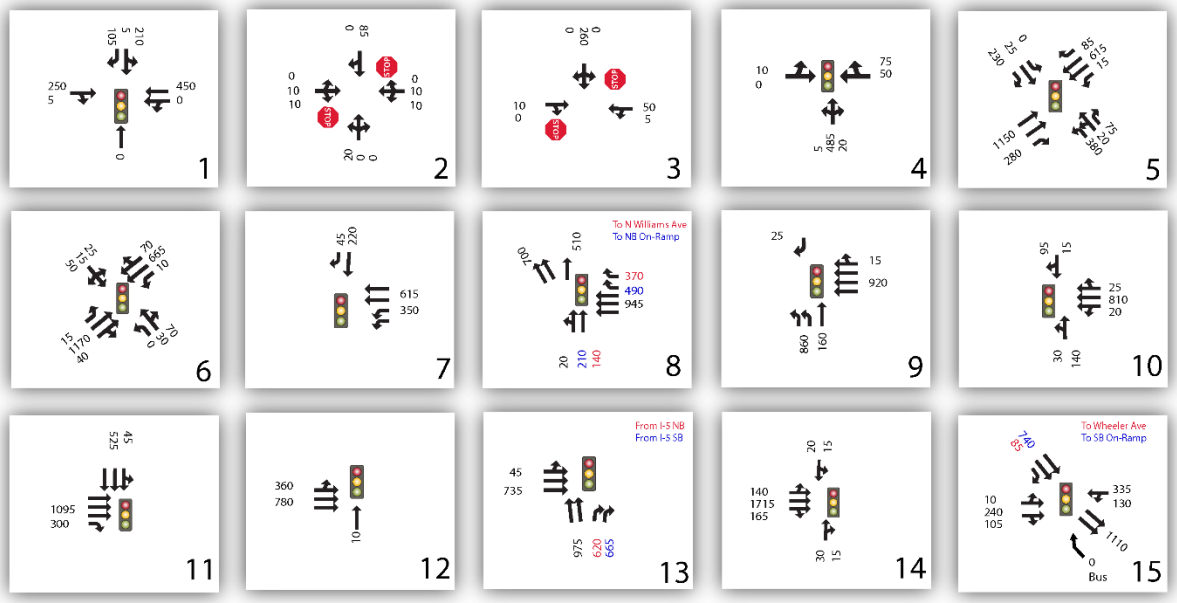
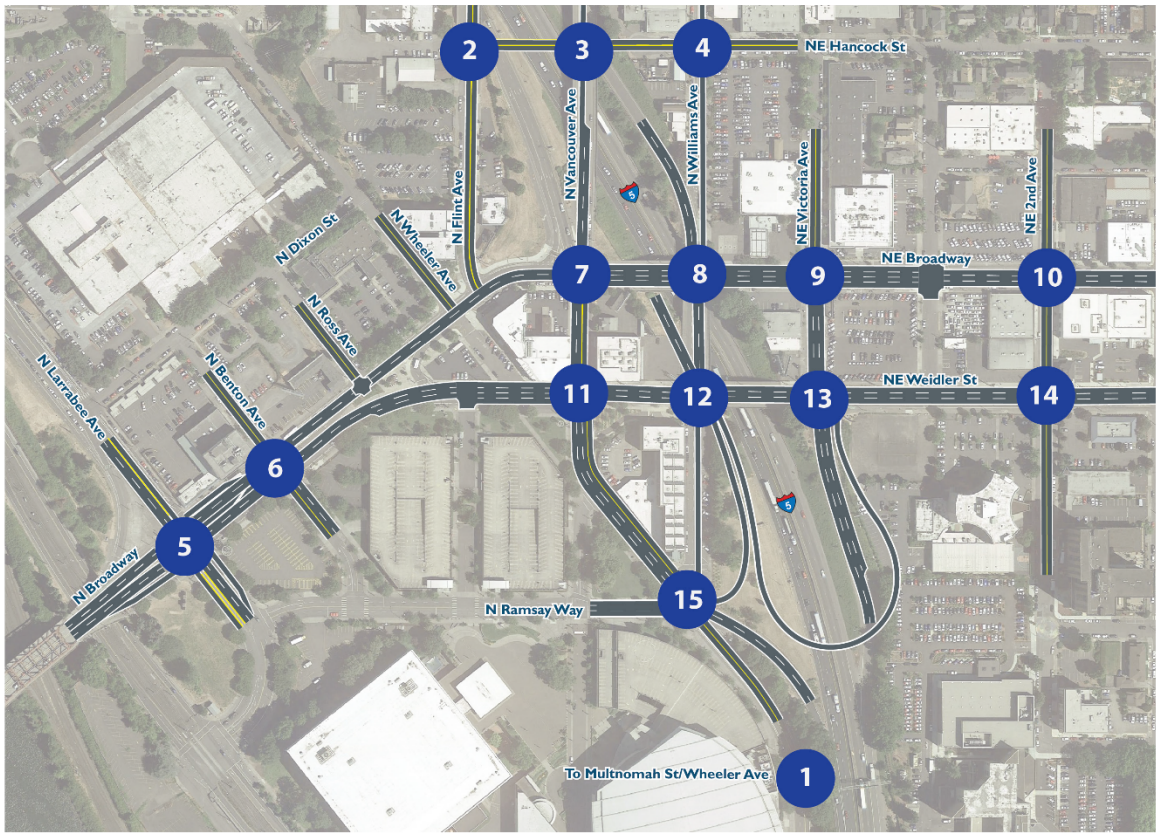


Figure 4- Future Year 2045 Build PM Peak Hour Volumes (Ramsay Flyover) **5:00-6:00 PM**



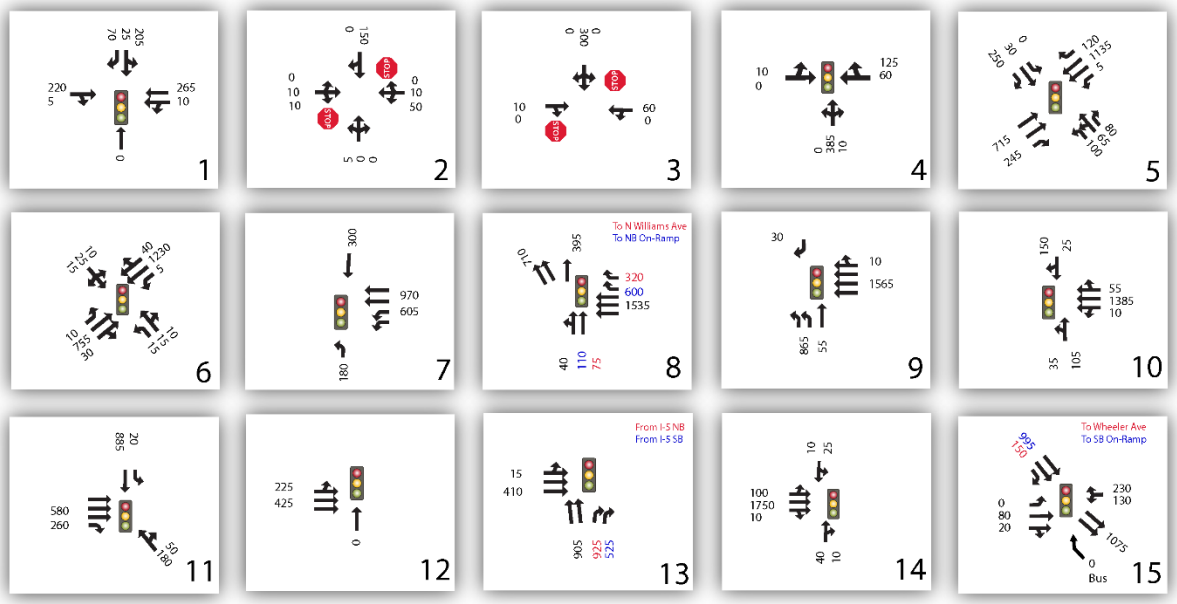
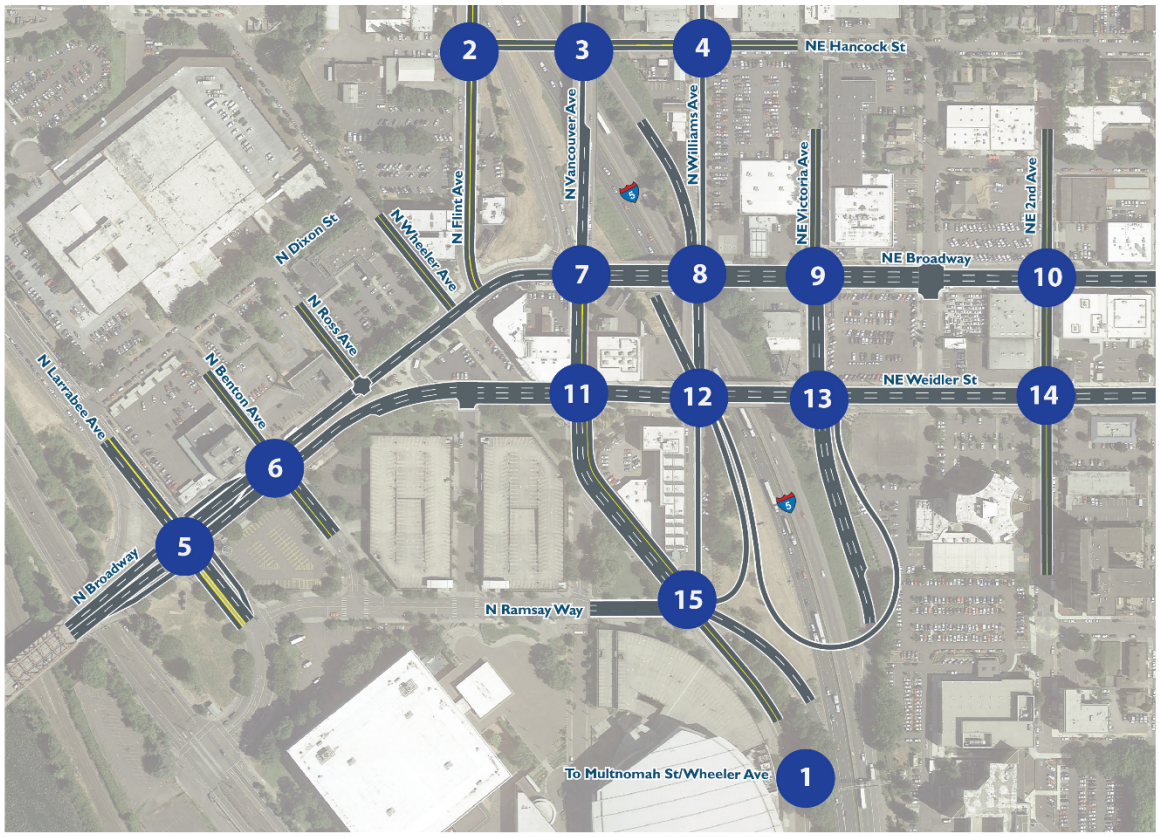


***Figure 5** - Future Year 2045 Build AM Peak Hour Volumes (Wheeler Flyover)* 8:00-9:00 AM



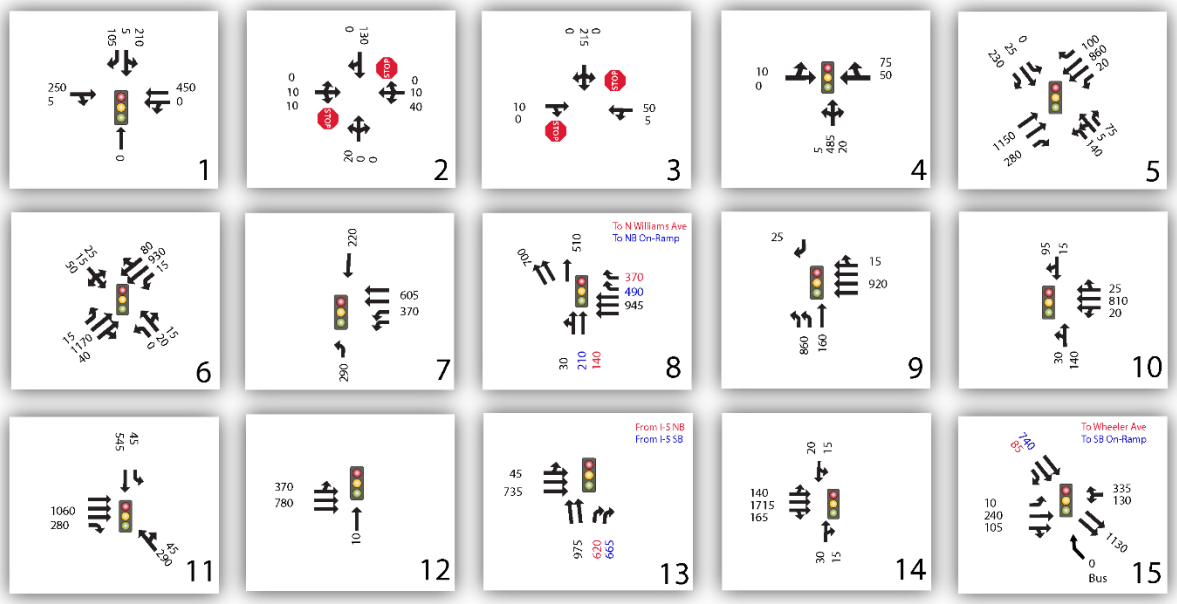


Figure 6 - Future Year 2045 Build PM Peak Hour Volumes (Wheeler Flyover) 5:00-6:00 PM

Appendix D: Auxiliary Lane Analysis

Auxiliary Lane Analysis

This Appendix provides the results of the Auxiliary Lanes analysis for the I-5 Rose Quarter Project. The 2023 Analysis Procedure Manual[4] has been updated to include a new traffic analysis methodology for evaluating auxiliary lanes to determine whether the freeway weaving lanes function as an auxiliary lane or as a regular through lane that would add system capacity. The methodology utilizes the volume ratio (VR), which is defined as the ratio between the weaving flows (i.e., sum of the freeway to exit ramp and freeway to entrance ramp flows) and total demand flow in the weaving section. The volume ratio needs to be computed and compared with the maximum weaving lengths in Exhibit 10A-2 of the Highway Capacity Manual (HCM) to determine if the given weaving segment length is less than the indicated distances. If it is, then the weaving lane would function as an auxiliary lane. If the given weaving segment length is greater than the maximum operational weaving length, the auxiliary lane would result in system capacity increase.

Exhibit 10A-2: Maximum (Operational) Weaving Length (mi)[1]

VR	SINGLE LANE ENTRANCE/ EXIT RAMPS	DUAL LANE ENTRANCE AND/OR EXIT RAMP[2]
0.1	0.7	0.4
0.2	0.9	0.6
0.3	1.1	0.8
0.4	1.3	0.9
0.5	1.5	1.2
0.6	1.7[a]	1.4
0.7	n/a	1.6

[1]Maximum weaving length calculations based on HCM 7th Edition Equation 13-4.
[2]The dual entrance/exit ramps are full lanes and not widened for ramp metering.
[a]Value obtained from HCM 7th Edition Exhibit 13-11, which is based on Equation 13-4.

[4] *ODOT Analysis Procedures Manual Version 2 Appendix 10A - Auxiliary Lanes,* APM Appendix 10A

$$VR = \frac{(v_{FR}+v_{RF})}{(v_{FF}+v_{RF}+v_{FR}+v_{RR})}$$

Where:

V_{FR} = Freeway to exit ramp flow

V_{RF} = Exit ramp to freeway flow

V_{FF} = Freeway through flow

V_{RR} = Entrance ramp to exit ramp flow (optional)

This new methodology was applied to evaluate the freeway sections in the Revised Build Alternative including the I-5 northbound auxiliary lane from the I-84 entrance ramp to the N Greeley Avenue exit ramp and the I-5 southbound auxiliary lane from the N Greeley Avenue entrance ramp to the Morrison Bridge exit ramp.

The analysis shows that both the I-5 northbound section from the I-84 entrance ramp to the N Greeley Avenue exit ramp and the I-5 southbound section from the N Greeley Ave entrance ramp to the Morrison Bridge exit ramp are expected to operate as an auxiliary lane and would not result in system capacity increase.

There are two nested weaving lanes within each of the northbound and southbound full auxiliary lanes. These nested weaving lanes are:

1. I-5 northbound from I-84 entrance ramp to NE Weidler Street exit ramp,
2. I-5 northbound from N Broadway entrance ramp to I-405 exit ramp,
3. I-5 southbound from I-405 entrance ramp to N Broadway exit ramp, and
4. I-5 southbound from NE Wheeler Street entrance ramp to I-84 exit ramp

These nested auxiliary lanes were each evaluated individually. It was determined that all four nested auxiliary lanes would operate as auxiliary lanes and would not result in system capacity increase.

Appendix D - Table 1 - I-5 NB Aux. Lane from I-84 entrance ramp to Greeley Ave exit ramp 2045 AM and PM Peak Hour Volumes

v_{FR} = Sum of upstream freeway volume to Weider, I-405 and Greeley exit ramps
v_{RF} = I-84 ramp to freeway north of Greeley exit ramp + Broadway ramp to freeway north of Greeley exit ramp - i.e. entrance ramp traffic continuing to NB I-5
v_{FF} = Upstream mainline volume 3,330 (3,125) - V_{FR} (upstream freeway volume to Weider, I-405 and Greeley exit ramps)
v_{RR} = I-84 ramp to I-405 and Greeley exit ramps + Broadway ramp to Greeley exit ramp. Excluded I-84 to Weidler and Broadway to I-405 ramp to ramp volumes because they can use their respective nested and would not need to use the full aux. lane between Greeley and Morrison.

I-5 NB Aux. Lane from I-84 entrance ramp to Greeley Ave exit ramp - 2045 AM Peak Hour Volumes

	Upstream freeway volume to:	Weidler exit ramp	I-405 exit ramp	Greeley exit ramp
v_{FR} =	2,390	1020	750	620

		I-84 entrance ramp to freeway north of Greeley exit ramp	Broadway entrance ramp to freeway north of Greeley exit ramp
v_{RF} =	935	595	340

v_{FF} = 940

		I-84 entrance ramp to I-405 exit ramp	I-84 entrance ramp to Greeley exit ramp	Broadway entrance ramp to Greeley exit ramp
v_{RR} =	1,420	805	395	220

v_{FR}	v_{RF}	V_{FF}	v_{RR}	VR	Maximum (Operational) Weaving Length (miles)	Weaving section distance (miles)	Is it a through lane?
2,390	935	940	1,420	0.58	1.36	1.03	No

I-5 NB Aux. Lane from I-84 entrance ramp to Greeley Ave exit ramp - 2045 PM Peak Hour Volumes

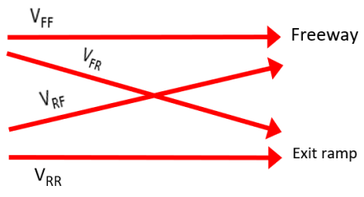
		Weidler exit ramp	I-405 exit ramp	Greeley exit ramp
v_{FR} =	1,830	840	505	485

		I-84 entrance ramp to freeway north of Greeley exit ramp	Broadway entrance ramp to freeway north of Greeley exit ramp
v_{RF} =	1,010	625	385

v_{FF} = 1,295

		I-84 entrance ramp to I-405 exit ramp	I-84 entrance ramp to Greeley exit ramp	Broadway entrance ramp to Greeley exit ramp
v_{RR} =	1,115	745	230	140

v_{FR}	v_{FF}	V_{FF}	v_{RR}	VR	Maximum (Operational) Weaving Length (miles)	Weaving section distance (miles)	Is it a through lane?
1,830	1,010	1,295	1,115	0.54	1.28	1.03	No



$$VR = \frac{(v_{FR} + v_{RF})}{(v_{FF} + v_{FR} + v_{RF} + v_{RR})}$$

v_{FR} Freeway to exit ramp flow
v_{FR} Entrance ramp to freeway flow
v_{FR} Freeway through flow
v_{FR} Entrance ramp to exit ramp flow (optional)

Exhibit 10A-2: Maximum (Operational) Weaving Length (mi)[1]		
VR	Single lane entrance/ exit ramps	Dual lane entrance and/or exit ramp[2]
0.1	0.7	0.4
0.2	0.9	0.6
0.3	1.1	0.8
0.4	1.3	0.9
0.5	1.5	1.2
0.6	1.7[a]	1.4
0.7	n/a	1.6

[1]Maximum weaving length calculations based on HCM 7th Edition Equation 13-4.
[2]The dual entrance/exit ramps are full lanes and not widened for ramp metering.
[a]Value obtained from HCM 7th Edition Exhibit 13-11, which is based on Equation 13-4.

Appendix D - Table 2 - I-5 SB Aux. Lane from Greeley Ave entrance ramp to Morrison exit ramp 2045 AM and PM Peak Hour Volumes

v_{FR} = Sum of upstream freeway volume to Broadway, I-84 and Morrison exit ramps
v_{RF} = Greeley ramp to freeway south of Morrison + I-405 ramp to south of Morrison + Wheeler ramp to south of Morrison - i.e. entrance ramp traffic continuing to SB I-5
v_{FF} = Upstream mainline volume 2,630 (2,275) - V_{FR} (sum of upstream freeway volume to Broadway, I-84 and Morrison exit ramps)
v_{RR} = Greeley ramp to Broadway, I-84 and Morrison exit ramps + I-405 ramp to I-84 and Morrison exit ramps + Wheeler to Morrison exit ramp
Excluded I-405 to Broadway and Wheeler to I-84 ramp to ramp volumes because they can use their respective nested aux. lane

I-5 SB Aux. Lane from Greeley Ave entrance ramp to Morrison exit ramp 2045 AM Peak Hour Volumes

	Upstream freeway volume to:	Broadway exit ramp	I-84 exit ramp	Morrison exit ramp
v_{FR} =	1,760	435	765	560

		Greeley entrance ramp to freeway south of Morrison	I-405 entrance ramp to freeway south of Morrison	Wheeler entrance ramp to freeway south of Morrison
v_{RF} =	1,205	320	465	420

v_{FF} = 870

		Greeley entrance ramp to Broadway exit ramp	Greeley entrance ramp to I-84 exit ramp	Greeley entrance ramp to Morrison exit ramp	I-405 entrance ramp to I-84 exit ramp	I-405 entrance ramp to Morrison exit ramp	Wheeler to Morrison exit ramp
v_{RR} =	1,535	195	150	200	425	295	270

v_{FR}	v_{RF}	v_{FF}	v_{RR}	VR	Maximum (Operational) Weaving Length (miles)	Weaving section distance (miles)	Is it a through lane?
1,760	1,205	870	1,535	0.55	1.60	1.42	No

I-5 SB Aux. Lane from Greeley Ave entrance ramp to Morrison exit ramp 2045 PM Peak Hour Volumes

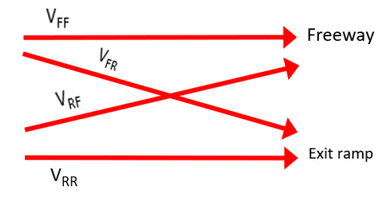
	Upstream freeway volume to:	Broadway exit ramp	I-84 exit ramp	Morrison exit ramp
v_{FR} =	1,690	550	655	485

		Greeley entrance ramp to freeway south of Morrison	I-405 entrance ramp to freeway south of Morrison	Wheeler entrance ramp to freeway south of Morrison
v_{RF} =	985	210	385	390

v_{FF} = 585

		Greeley entrance ramp to Broadway exit ramp	Greeley entrance ramp to I-84 exit ramp	Greeley entrance ramp to Morrison exit ramp	I-405 entrance ramp to I-84 exit ramp	I-405 entrance ramp to Morrison exit ramp	Wheeler to Morrison exit ramp
v_{RR} =	1,630	195	125	170	485	330	325

v_{FR}	v_{RF}	v_{FF}	v_{RR}	VR	Maximum (Operational) Weaving Length, miles	Weaving section distance (miles)	Is it a through lane?
1,690	985	585	1,630	0.55	1.60	1.42	No



$$VR = \frac{(v_{FR} + v_{RF})}{(v_{FF} + v_{FR} + v_{RF} + v_{RR})}$$

v_{FR} Freeway to exit ramp flow
v_{FR} Entrance ramp to freeway flow
v_{FR} Freeway through flow

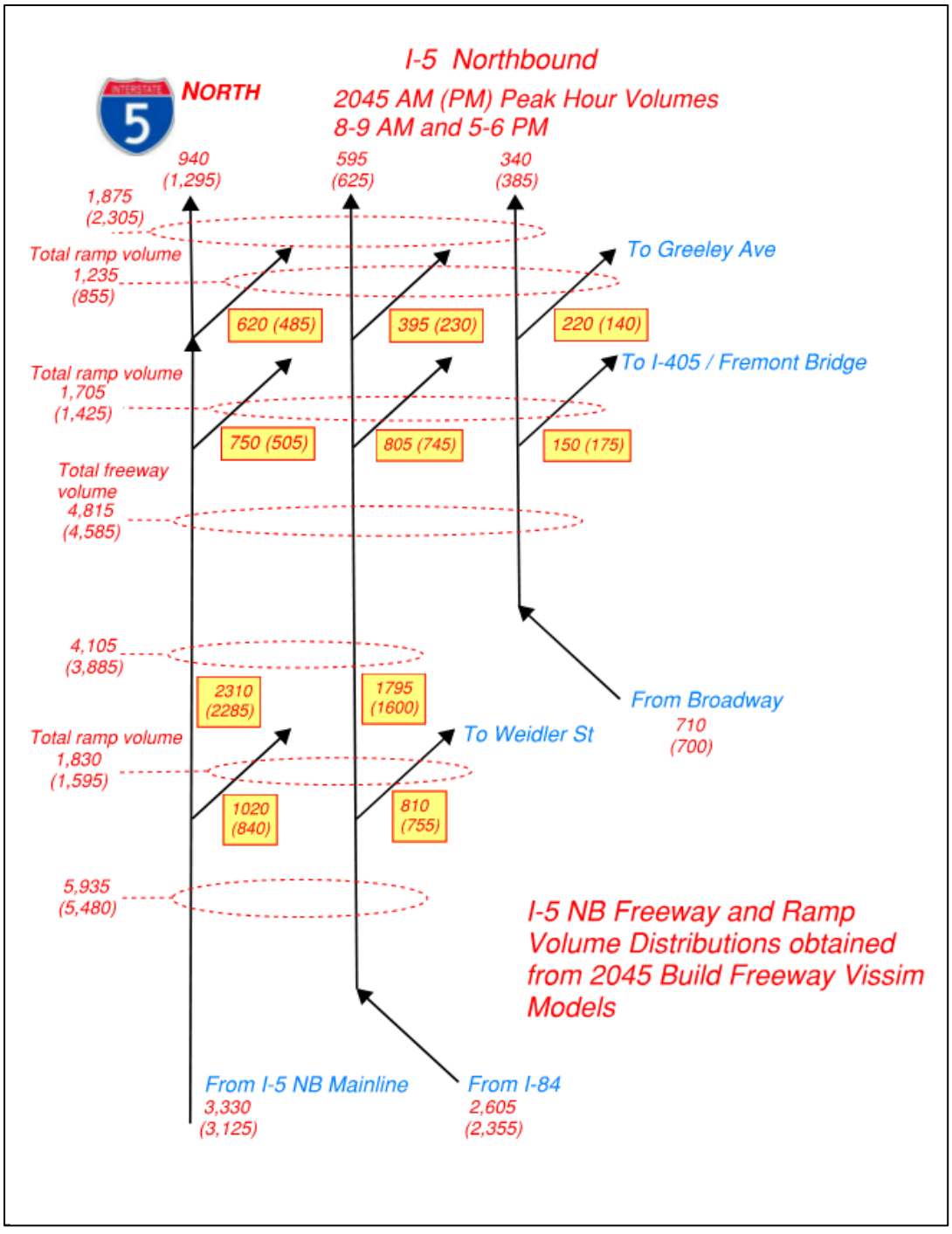
v_{FR} Entrance ramp to exit ramp flow (optional)

Exhibit 10A-2: Maximum (Operational) Weaving Length (mi)[1]

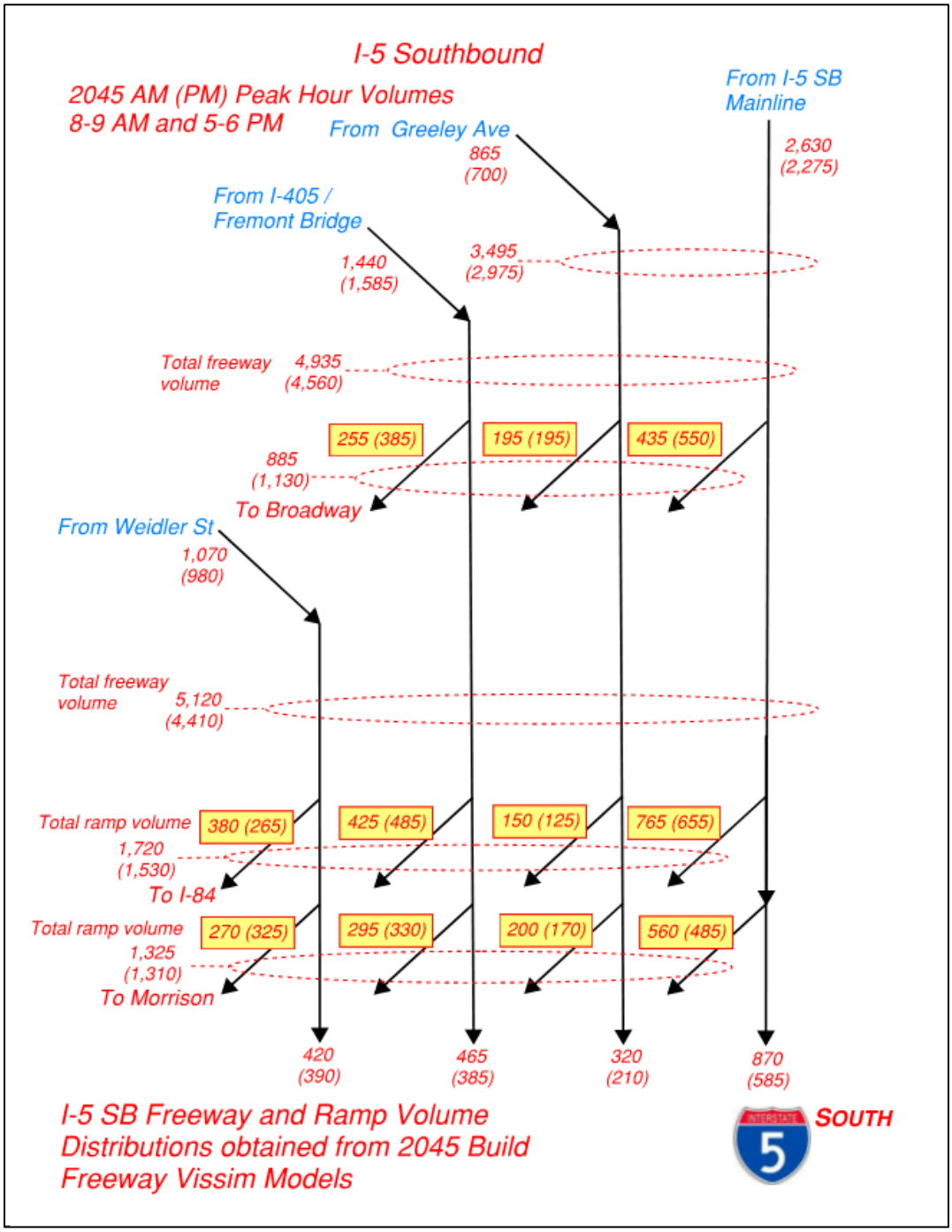
VR	Single lane entrance/ exit ramps	Dual lane entrance and/or exit ramp[2]
0.1	0.7	0.4
0.2	0.9	0.6
0.3	1.1	0.8
0.4	1.3	0.9
0.5	1.5	1.2
0.6	1.7[a]	1.4
0.7	n/a	1.6

[1]Maximum weaving length calculations based on HCM 7th Edition Equation 13-4.
[2]The dual entrance/exit ramps are full lanes and not widened for ramp metering.
[a]Value obtained from HCM 7th Edition Exhibit 13-11, which is based on Equation 13-4.

Appendix D Figure 1 - I-5 NB Freeway and Ramp Volume Distributions Obtained from 2045 Build Freeway Vissim Models



Appendix D Figure 2 - I-5 SB Freeway and Ramp Volume Distributions Obtained from 2045 Build Freeway Vissim Models



Appendix D – Table 3 - Analysis of the nested weaving lanes - 2045 AM Peak Hour Volumes

Northbound	Sta	2045 AM Peak Hour Volume	From ramp	To ramp	VR (from HCS files)	Maximum (Operational) Weaving Length	Weaving section distance	Is it a through lane?
I-84 entrance ramp x2	38083	2,605	I-84 entrance ramp x2*	Weidler exit ramp x2*	0.46	1.08	0.19	No
I-5 through		*5,935*						
Weidler exit ramp x2	37058	1,830						
I-5 through		4,105						
Broadway entrance ramp	34553	710	Broadway entrance ramp x1*	I-405 exit ramp x2*	0.39	0.89	0.21	No
I-5 through		*4,815*						
I-405 exit ramp x2	33523	1,705						
I-5 through		3,110						
Greeley exit ramp	32746	1,235						

Southbound	Sta	2045 AM Peak Hour Volume	From ramp	To ramp	VR	Max weaving distance	Weaving section distance	Is it a through lane?
Greeley entrance ramp	32080	865						
I-5 through		3,495						
I-405 entrance ramp	32950	1,440	**I-405 entrance ramp x1***	**Broadway exit ramp x2***	0.36	0.86	0.34	No
I-5 through		*4,935*						
Broadway exit ramp x2	34669	885						
I-5 through		4,050						
Wheeler entrance ramp	37183	1,070	**Wheeler entrance ramp x1***	**I-84 exit ramp x1***	0.40	1.30	0.20	No
I-5 through		*5,120*						
I-84 exit ramp	38223	1,720						
I-5 through		3,400						
Morrison exit ramp	39485	1,325						

**Nested Weaving Lanes*

** L_B used, Weaving section base length between the gore points*

** Volumes are 2045 peak hour volumes, consistent with those used for HCM analysis in the SEA*

Exhibit 10A-2: Maximum (Operational) Weaving Length (mi)[1]		
VR	**Single lane entrance/ exit ramps**	**Dual lane entrance and/or exit ramp[2]**
0.1	0.7	0.4
0.2	0.9	0.6
0.3	1.1	0.8
0.4	1.3	0.9
0.5	1.5	1.2
0.6	1.7[a]	1.4
0.7	n/a	1.6

[1]Maximum weaving length calculations based on HCM 7th Edition Equation 13-4.

[2]The dual entrance/exit ramps are full lanes and not widened for ramp metering.

[a]Value obtained from HCM 7th Edition Exhibit 13-11, which is based on Equation 13-4.

Appendix D – Table 4 - Analysis of the nested weaving lanes - 2045 PM Peak Hour Volumes

Northbound	Sta	2045 PM Peak Hour Volume	From ramp	To ramp	VR (from HCS files)	Maximum (Operational) Weaving Length	Weaving section distance	Is it a through lane?
I-84 entrance ramp x2	38083	2,355	**I-84 entrance ramp x2***	**Weidler exit ramp x2***	0.46	1.08	0.19	No
I-5 through		*5,480*						
Weidler exit ramp x2	37058	1,595						
I-5 through		3,885						
Broadway entrance ramp	34553	700	**Broadway entrance ramp x1***	**I-405 exit ramp x2***	0.36	0.86	0.21	No
I-5 through		*4,585*						
I-405 exit ramp x2	33523	1,425						
I-5 through		3,160						
Greeley exit ramp	32746	855						

Southbound	Sta	2045 PM Peak Hour Volume	From ramp	To ramp	VR	Maximum (Operational) Weaving Length	Weaving section distance	Is it a through lane?
Greeley entrance ramp	32080	700						
I-5 through		2,975						
I-405 entrance ramp	32950	1,585	**I-405 entrance ramp x1***	**Broadway exit ramp x2***	0.42	0.96	0.34	No
I-5 through		*4,560*						
Broadway exit ramp x2	34669	1,130						
I-5 through		3,430						
Wheeler entrance ramp	37183	980	**Wheeler entrance ramp x1***	**I-84 exit ramp x1***	0.41	1.32	0.20	No
I-5 through		*4,410*						
I-84 exit ramp	38223	1,530						
I-5 through		2,880						
Morrison exit ramp	39485	1,310						

**Nested Weaving Lanes*

** LB used, Weaving section base length between the gore points*

** Volumes are 2045 peak hour volumes, consistent with those used for HCM analysis in the SEA*

Exhibit 10A-2: Maximum (Operational) Weaving Length (mi)[1]		
VR	**Single lane entrance/ exit ramps**	**Dual lane entrance and/or exit ramp[2]**
0.1	0.7	0.4
0.2	0.9	0.6
0.3	1.1	0.8
0.4	1.3	0.9
0.5	1.5	1.2
0.6	1.7[a]	1.4
0.7	n/a	1.6

[1]*Maximum weaving length calculations based on HCM 7th Edition Equation 13-4.*

[2]*The dual entrance/exit ramps are full lanes and not widened for ramp metering.*

[a]Value obtained from HCM 7th Edition Exhibit 13-11, which is based on Equation 13-4

Appendix E: Synchro Model Intersection Results - 2045 AM and PM Peak Hour No Build

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	60	25	75	0	20	275	0	590	220	5	970	5
Future Volume (vph)	60	25	75	0	20	275	0	590	220	5	970	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	3.0		4.0	3.8		4.0	3.5	4.0	4.0	3.2
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00		0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.97		1.00	0.67		1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1703	1792	1482		1792	1017		3406	1524	1703	3406	1524
Flt Permitted	0.75	1.00	1.00		1.00	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1352	1792	1482		1792	1017		3406	1524	1703	3406	1524
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	26	79	0	21	289	0	621	232	5	1021	5
RTOR Reduction (vph)	0	0	70	0	0	0	0	0	55	0	0	2
Lane Group Flow (vph)	63	26	9	0	21	289	0	621	177	5	1021	3
Confl. Peds. (#/hr)			6			28						
Confl. Bikes (#/hr)						1425						
Turn Type	Perm	NA	custom	Perm	NA	Free		NA	custom	Prot	NA	custom
Protected Phases		4			8			6	16!	5!	2	16
Permitted Phases	4		5	8		Free						
Actuated Green, G (s)	8.7	8.7	7.0		5.4	61.1		24.3	34.8	7.0	34.0	34.8
Effective Green, g (s)	8.7	8.7	7.0		5.6	61.1		24.8	35.3	6.0	34.8	35.6
Actuated g/C Ratio	0.14	0.14	0.11		0.09	1.00		0.41	0.58	0.10	0.57	0.58
Clearance Time (s)	4.0	4.0	3.0		4.2			4.5	4.0	3.0	4.8	4.0
Vehicle Extension (s)	1.0	1.0	0.5		1.0			0.5	3.0	0.5	0.5	3.0
Lane Grp Cap (vph)	192	255	169		164	1017		1382	880	167	1939	887
v/s Ratio Prot		0.01			0.01			0.18	0.12	0.00	c0.30	0.00
v/s Ratio Perm	0.05		0.01			c0.28						
v/c Ratio	0.33	0.10	0.05		0.13	0.28		0.45	0.20	0.03	0.53	0.00
Uniform Delay, d1	23.6	22.8	24.1		25.5	0.0		13.2	6.2	24.9	8.1	5.3
Progression Factor	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.1	0.0		0.1	0.7		0.1	0.1	0.0	0.1	0.0
Delay (s)	23.9	22.9	24.1		25.6	0.7		13.3	6.3	24.9	8.2	5.3
Level of Service	C	C	C		C	A		B	A	C	A	A
Approach Delay (s)		23.9			2.4			11.4			8.3	
Approach LOS		C			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	61.1	Sum of lost time (s)	19.5
Intersection Capacity Utilization	53.1%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	10	25	10	15	10	5	55	530	80	5	955	40
Future Volume (vph)	10	25	10	15	10	5	55	530	80	5	955	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.5		4.0	4.8	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.99		1.00	0.98		1.00	0.97	
Flpb, ped/bikes		0.99		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.97		1.00	0.95		1.00	0.98		1.00	0.99	
Flt Protected		0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1700		1703	1687		1703	3270		1703	3276	
Flt Permitted		0.95		0.76	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1634		1354	1687		1703	3270		1703	3276	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	26	11	16	11	5	58	558	84	5	1005	42
RTOR Reduction (vph)	0	8	0	0	4	0	0	4	0	0	2	0
Lane Group Flow (vph)	0	40	0	16	12	0	58	638	0	5	1045	0
Confl. Peds. (#/hr)	24		4			24			18			26
Confl. Bikes (#/hr)									150			1425
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4								
Actuated Green, G (s)		18.4		18.4	18.4		6.3	89.7		1.1	84.2	
Effective Green, g (s)		18.4		18.4	18.4		6.3	89.7		1.1	84.2	
Actuated g/C Ratio		0.15		0.15	0.15		0.05	0.74		0.01	0.69	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.5		4.0	4.8	
Vehicle Extension (s)		1.0		1.0	1.0		0.5	0.5		0.5	0.5	
Lane Grp Cap (vph)		247		204	255		88	2410		15	2266	
v/s Ratio Prot					0.01		c0.03	0.20		0.00	c0.32	
v/s Ratio Perm		c0.02		0.01								
v/c Ratio		0.16		0.08	0.05		0.66	0.26		0.33	0.46	
Uniform Delay, d1		44.9		44.4	44.1		56.6	5.2		59.9	8.5	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1		0.1	0.0		12.8	0.3		4.7	0.7	
Delay (s)		45.0		44.4	44.2		69.4	5.5		64.7	9.2	
Level of Service		D		D	D		E	A		E	A	
Approach Delay (s)		45.0			44.3			10.8			9.4	
Approach LOS		D			D			B			A	

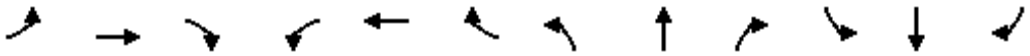
Intersection Summary			
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	121.7	Sum of lost time (s)	12.8
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBT	SBT	SER	SER2
Lane Configurations					
Traffic Volume (vph)	505	750	255	855	310
Future Volume (vph)	505	750	255	855	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	3.5	4.5	4.9
Lane Util. Factor	*0.52	*0.52	0.95	*0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	1.00	1.00
Satd. Flow (prot)	881	1825	3406	3406	1524
Flt Permitted	0.95	0.99	1.00	1.00	1.00
Satd. Flow (perm)	881	1825	3406	3406	1524
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	532	789	268	900	326
RTOR Reduction (vph)	0	0	0	0	0
Lane Group Flow (vph)	335	986	268	900	326
Confl. Peds. (#/hr)	6				
Bus Blockages (#/hr)	0	5	0	0	0
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		6	4	3	
Permitted Phases	6				3
Actuated Green, G (s)	27.7	27.7	9.2	19.1	19.1
Effective Green, g (s)	28.4	28.4	10.1	19.5	19.1
Actuated g/C Ratio	0.41	0.41	0.14	0.28	0.27
Clearance Time (s)	4.7	4.7	4.4	4.9	4.9
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	357	740	491	948	415
v/s Ratio Prot			c0.08	c0.26	
v/s Ratio Perm	0.38	0.54			0.21
v/c Ratio	0.94	1.33	0.55	0.95	0.79
Uniform Delay, d1	20.0	20.8	27.8	24.8	23.6
Progression Factor	0.54	0.58	1.00	1.00	1.00
Incremental Delay, d2	29.4	156.9	1.2	18.0	9.4
Delay (s)	40.2	168.9	29.1	42.8	33.0
Level of Service	D	F	C	D	C
Approach Delay (s)		136.3	29.1		
Approach LOS		F	C		

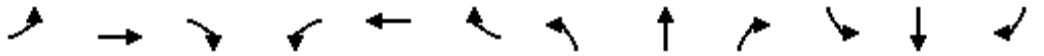
Intersection Summary			
HCM 2000 Control Delay	84.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	1255	970	0	250	0	0	0	0
Future Volume (vph)	0	0	0	0	1255	970	0	250	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.6		4.0				
Lane Util. Factor					*0.87	0.88		0.91				
Frpb, ped/bikes					1.00	1.00		1.00				
Flpb, ped/bikes					1.00	1.00		1.00				
Frt					1.00	0.85		1.00				
Flt Protected					1.00	1.00		1.00				
Satd. Flow (prot)					3119	2682		4893				
Flt Permitted					1.00	1.00		1.00				
Satd. Flow (perm)					3119	2682		4893				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	1321	1021	0	263	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1321	1021	0	263	0	0	0	0
Confl. Peds. (#/hr)							2					
Turn Type					NA	custom		NA				
Protected Phases					2			4				
Permitted Phases						6	4					
Actuated Green, G (s)					47.7	34.1		13.5				
Effective Green, g (s)					48.3	34.1		13.7				
Actuated g/C Ratio					0.69	0.49		0.20				
Clearance Time (s)					4.6	4.6		4.2				
Vehicle Extension (s)					3.0	3.0		2.0				
Lane Grp Cap (vph)					2152	1306		957				
v/s Ratio Prot					c0.42			c0.05				
v/s Ratio Perm						c0.38						
v/c Ratio					0.61	0.78		0.27				
Uniform Delay, d1					5.8	14.9		23.9				
Progression Factor					0.73	0.97		0.95				
Incremental Delay, d2					1.1	4.0		0.1				
Delay (s)					5.4	18.5		22.8				
Level of Service					A	B		C				
Approach Delay (s)		0.0			11.1			22.8			0.0	
Approach LOS		A			B			C			A	

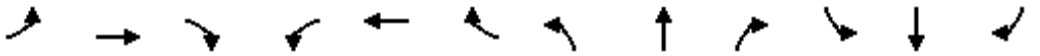
Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	83.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	1490	20	710	45	0	0	0	25
Future Volume (vph)	0	0	0	0	1490	20	710	45	0	0	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0		3.8	4.0				4.0
Lane Util. Factor					0.86		0.95	0.95				1.00
Frpb, ped/bikes					1.00		1.00	1.00				0.98
Flpb, ped/bikes					1.00		1.00	1.00				1.00
Frt					1.00		1.00	1.00				0.86
Flt Protected					1.00		0.95	0.96				1.00
Satd. Flow (prot)					6128		1618	1633				1515
Flt Permitted					1.00		0.95	0.96				1.00
Satd. Flow (perm)					6128		1618	1633				1515
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	1568	21	747	47	0	0	0	26
RTOR Reduction (vph)	0	0	0	0	0	0	16	14	0	0	0	18
Lane Group Flow (vph)	0	0	0	0	1589	0	440	324	0	0	0	8
Confl. Peds. (#/hr)						28	9					9
Confl. Bikes (#/hr)						310						
Turn Type					NA		Prot	NA				Perm
Protected Phases					2		1 4	4				
Permitted Phases												4
Actuated Green, G (s)					31.4		30.0	30.0				21.5
Effective Green, g (s)					32.0		26.2	30.2				21.7
Actuated g/C Ratio					0.46		0.37	0.43				0.31
Clearance Time (s)					4.6			4.2				4.2
Vehicle Extension (s)					3.0			2.0				2.0
Lane Grp Cap (vph)					2801		605	704				469
v/s Ratio Prot					c0.26		c0.27	0.20				
v/s Ratio Perm												0.01
v/c Ratio					0.57		0.73	0.46				0.02
Uniform Delay, d1					13.9		18.8	14.1				16.8
Progression Factor					0.70		0.98	0.50				1.00
Incremental Delay, d2					0.8		2.0	0.1				0.0
Delay (s)					10.5		20.5	7.2				16.8
Level of Service					B		C	A				B
Approach Delay (s)		0.0			10.5			14.8			16.8	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	11.8
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		

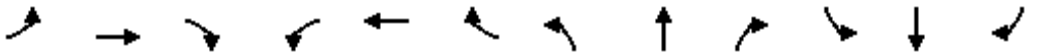
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	15	1310	50	55	130	0	0	5	145
Future Volume (vph)	0	0	0	15	1310	50	55	130	0	0	5	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.5			4.5			4.5	
Lane Util. Factor					0.91			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			0.97	
Flpb, ped/bikes					1.00			1.00			1.00	
Frt					0.99			1.00			0.87	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					4821			1758			1512	
Flt Permitted					1.00			0.86			1.00	
Satd. Flow (perm)					4821			1527			1512	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	16	1379	53	58	137	0	0	5	153
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	0	0	0	1445	0	0	195	0	0	154	0
Confl. Peds. (#/hr)				20		20	18					18
Confl. Bikes (#/hr)						310						
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					2			4			4	
Permitted Phases				2			4					
Actuated Green, G (s)					46.8			14.2			14.2	
Effective Green, g (s)					46.8			14.2			14.2	
Actuated g/C Ratio					0.67			0.20			0.20	
Clearance Time (s)					4.5			4.5			4.5	
Vehicle Extension (s)					0.2			3.0			3.0	
Lane Grp Cap (vph)					3223			309			306	
v/s Ratio Prot											0.10	
v/s Ratio Perm					0.30			c0.13				
v/c Ratio					0.45			0.63			0.50	
Uniform Delay, d1					5.5			25.5			24.8	
Progression Factor					1.00			0.92			1.00	
Incremental Delay, d2					0.5			4.0			1.3	
Delay (s)					5.9			27.4			26.1	
Level of Service					A			C			C	
Approach Delay (s)		0.0			5.9			27.4			26.1	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		

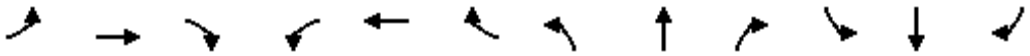
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	355	260	0	0	0	0	0	0	875	740	0
Future Volume (vph)	0	355	260	0	0	0	0	0	0	875	740	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0							3.6	4.0	
Lane Util. Factor		0.91	1.00							0.91	0.91	
Frpb, ped/bikes		1.00	0.97							1.00	1.00	
Flpb, ped/bikes		1.00	1.00							1.00	1.00	
Frt		1.00	0.85							1.00	1.00	
Flt Protected		1.00	1.00							0.95	0.98	
Satd. Flow (prot)		4893	1476							1550	3179	
Flt Permitted		1.00	1.00							0.95	0.98	
Satd. Flow (perm)		4893	1476							1550	3179	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	374	274	0	0	0	0	0	0	921	779	0
RTOR Reduction (vph)	0	0	159	0	0	0	0	0	0	226	71	0
Lane Group Flow (vph)	0	374	115	0	0	0	0	0	0	327	1076	0
Confl. Peds. (#/hr)			18							10		
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	5	0
Turn Type		NA	Perm							Prot	NA	
Protected Phases		6								8	4	
Permitted Phases			6									
Actuated Green, G (s)		20.5	20.5							40.9	40.9	
Effective Green, g (s)		21.0	21.0							41.4	41.4	
Actuated g/C Ratio		0.30	0.30							0.59	0.59	
Clearance Time (s)		4.5	4.5							4.1	4.5	
Vehicle Extension (s)		3.0	3.0							3.0	3.0	
Lane Grp Cap (vph)		1467	442							916	1880	
v/s Ratio Prot		0.08								0.21	c0.34	
v/s Ratio Perm			c0.08									
v/c Ratio		0.25	0.26							0.36	0.57	
Uniform Delay, d1		18.6	18.6							7.4	8.8	
Progression Factor		1.00	1.00							0.63	0.64	
Incremental Delay, d2		0.4	1.4							0.1	0.2	
Delay (s)		19.0	20.0							4.8	5.8	
Level of Service		B	C							A	A	
Approach Delay (s)		19.4			0.0			0.0			5.5	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	11.1
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		

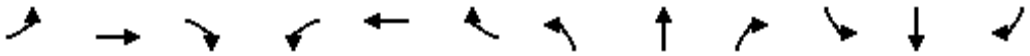
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	200	1030	0	0	0	0	0	50	10	0	0	0
Future Volume (vph)	200	1030	0	0	0	0	0	50	10	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0			
Lane Util. Factor		0.91						0.95	1.00			
Frpb, ped/bikes		1.00						1.00	0.97			
Flpb, ped/bikes		1.00						1.00	1.00			
Frt		1.00						1.00	0.85			
Flt Protected		0.99						1.00	1.00			
Satd. Flow (prot)		4802						3406	1472			
Flt Permitted		0.99						1.00	1.00			
Satd. Flow (perm)		4802						3406	1472			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	211	1084	0	0	0	0	0	53	11	0	0	0
RTOR Reduction (vph)	0	29	0	0	0	0	0	0	10	0	0	0
Lane Group Flow (vph)	0	1266	0	0	0	0	0	53	1	0	0	0
Confl. Peds. (#/hr)	26								20			
Bus Blockages (#/hr)	0	5	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA						NA	Perm			
Protected Phases		2						4				
Permitted Phases	2								4			
Actuated Green, G (s)		52.4						8.9	8.9			
Effective Green, g (s)		52.9						9.1	9.1			
Actuated g/C Ratio		0.76						0.13	0.13			
Clearance Time (s)		4.5						4.2	4.2			
Vehicle Extension (s)		0.2						0.5	0.5			
Lane Grp Cap (vph)		3628						442	191			
v/s Ratio Prot								c0.02				
v/s Ratio Perm		0.26							0.00			
v/c Ratio		0.35						0.12	0.01			
Uniform Delay, d1		2.8						26.9	26.5			
Progression Factor		0.81						1.00	1.00			
Incremental Delay, d2		0.2						0.0	0.0			
Delay (s)		2.5						27.0	26.5			
Level of Service		A						C	C			
Approach Delay (s)		2.5			0.0			26.9			0.0	
Approach LOS		A			A			C			A	

Intersection Summary			
HCM 2000 Control Delay	3.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.7%	ICU Level of Service	A
Analysis Period (min)	15		

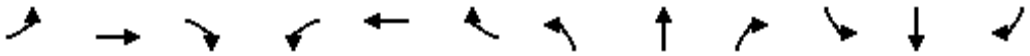
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	1025	0	0	0	0	0	740	765	0	0	0
Future Volume (vph)	15	1025	0	0	0	0	0	740	765	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0			
Lane Util. Factor		0.91						0.95	1.00			
Frpb, ped/bikes		1.00						1.00	0.86			
Flpb, ped/bikes		1.00						1.00	1.00			
Frt		1.00						1.00	0.85			
Flt Protected		1.00						1.00	1.00			
Satd. Flow (prot)		4887						3406	1305			
Flt Permitted		1.00						1.00	1.00			
Satd. Flow (perm)		4887						3406	1305			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	1079	0	0	0	0	0	779	805	0	0	0
RTOR Reduction (vph)	0	12	0	0	0	0	0	0	346	0	0	0
Lane Group Flow (vph)	0	1083	0	0	0	0	0	779	459	0	0	0
Confl. Peds. (#/hr)	28								42			
Confl. Bikes (#/hr)									100			
Turn Type	Perm	NA						NA	Perm			
Protected Phases		6						8				
Permitted Phases	6								8			
Actuated Green, G (s)		42.5						18.1	18.1			
Effective Green, g (s)		43.0						19.0	19.0			
Actuated g/C Ratio		0.61						0.27	0.27			
Clearance Time (s)		4.5						4.9	4.9			
Vehicle Extension (s)		3.5						3.9	3.9			
Lane Grp Cap (vph)		3002						924	354			
v/s Ratio Prot								0.23				
v/s Ratio Perm		0.22							c0.35			
v/c Ratio		0.36						0.84	1.30			
Uniform Delay, d1		6.7						24.1	25.5			
Progression Factor		0.60						1.00	1.00			
Incremental Delay, d2		0.3						7.3	152.8			
Delay (s)		4.4						31.4	178.3			
Level of Service		A						C	F			
Approach Delay (s)		4.4			0.0			106.1			0.0	
Approach LOS		A			A			F			A	

Intersection Summary			
HCM 2000 Control Delay	64.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		

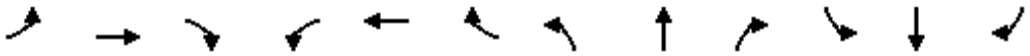
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	1550	100	0	0	0	0	55	15	10	10	0
Future Volume (vph)	130	1550	100	0	0	0	0	55	15	10	10	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5			4.5	
Lane Util. Factor		0.86						1.00			1.00	
Frpb, ped/bikes		0.99						0.99			1.00	
Flpb, ped/bikes		1.00						1.00			0.99	
Frt		0.99						0.97			1.00	
Flt Protected		1.00						1.00			0.98	
Satd. Flow (prot)		6041						1731			1740	
Flt Permitted		1.00						1.00			0.88	
Satd. Flow (perm)		6041						1731			1563	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	137	1632	105	0	0	0	0	58	16	11	11	0
RTOR Reduction (vph)	0	7	0	0	0	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	1867	0	0	0	0	0	71	0	0	22	0
Confl. Peds. (#/hr)	10		30						12	12		
Confl. Bikes (#/hr)			100									
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		2						4			4	
Permitted Phases	2									4		
Actuated Green, G (s)		48.2						12.8			12.8	
Effective Green, g (s)		48.2						12.8			12.8	
Actuated g/C Ratio		0.69						0.18			0.18	
Clearance Time (s)		4.5						4.5			4.5	
Vehicle Extension (s)		0.5						0.5			0.5	
Lane Grp Cap (vph)		4159						316			285	
v/s Ratio Prot								c0.04				
v/s Ratio Perm		0.31									0.01	
v/c Ratio		0.45						0.22			0.08	
Uniform Delay, d1		4.9						24.4			23.7	
Progression Factor		1.54						1.00			0.92	
Incremental Delay, d2		0.2						0.1			0.0	
Delay (s)		7.8						24.5			21.8	
Level of Service		A						C			C	
Approach Delay (s)		7.8			0.0			24.5			21.8	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	8.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	45.4%	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 (veh/h)	10	10	0	0	0	180	10	455	10	0	0	0
Future Volume (Veh/h)	10	10	0	0	0	180	10	455	10	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	11	11	0	0	0	189	11	479	11	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								498				
pX, platoon unblocked	0.99	0.99		0.99	0.99	0.99				0.99		
vC, conflicting volume	696	512	0	512	506	484	0			490		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	687	501	0	501	496	473	0			479		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	95	98	100	100	100	67	99			100		
cM capacity (veh/h)	235	458	1073	458	461	576	1597			1051		

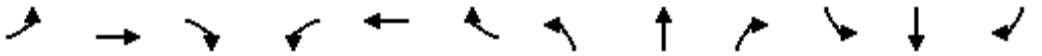
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	22	189	501
Volume Left	11	0	11
Volume Right	0	189	11
cSH	311	576	1597
Volume to Capacity	0.07	0.33	0.01
Queue Length 95th (ft)	6	36	1
Control Delay (s)	17.5	14.3	0.2
Lane LOS	C	B	A
Approach Delay (s)	17.5	14.3	0.2
Approach LOS	C	B	

Intersection Summary				
Average Delay	4.5			
Intersection Capacity Utilization	42.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	EBR2	NBT	SET	SER
Lane Configurations						
Traffic Volume (vph)	50	120	60	10	915	80
Future Volume (vph)	50	120	60	10	915	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.6	5.6
Lane Util. Factor	1.00	0.88		1.00	0.95	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	0.95	1.00		1.00	1.00	1.00
Satd. Flow (prot)	1703	2682		1792	3406	1524
Flt Permitted	0.95	1.00		1.00	1.00	1.00
Satd. Flow (perm)	1703	2682		1792	3406	1524
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	126	63	11	963	84
RTOR Reduction (vph)	0	91	0	0	0	0
Lane Group Flow (vph)	53	98	0	11	963	84
Turn Type	Perm	Prot		NA	NA	custom
Protected Phases		4				2
Permitted Phases	4			3	2	
Actuated Green, G (s)	5.1	5.1		0.9	34.9	34.9
Effective Green, g (s)	5.1	5.1		0.9	34.9	34.9
Actuated g/C Ratio	0.09	0.09		0.02	0.62	0.62
Clearance Time (s)	5.0	5.0		5.0	5.6	5.6
Vehicle Extension (s)	0.5	0.5		1.5	0.5	0.5
Lane Grp Cap (vph)	153	242		28	2103	941
v/s Ratio Prot		c0.04				0.06
v/s Ratio Perm	0.03			c0.01	c0.28	
v/c Ratio	0.35	0.41		0.39	0.46	0.09
Uniform Delay, d1	24.1	24.3		27.5	5.8	4.4
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	0.4		3.3	0.7	0.2
Delay (s)	24.6	24.7		30.8	6.5	4.6
Level of Service	C	C		C	A	A
Approach Delay (s)	24.7			30.8	6.3	
Approach LOS	C			C	A	

Intersection Summary			
HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	56.5	Sum of lost time (s)	15.6
Intersection Capacity Utilization	47.9%	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)	0	190	5	10	345	0	0	20	0	105	20	20
Future Volume (vph)	0	190	5	10	345	0	0	20	0	105	20	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	4.0
Lane Util. Factor		1.00			0.95			1.00			1.00	1.00
Frt		1.00			1.00			1.00			1.00	0.85
Flt Protected		1.00			1.00			1.00			0.96	1.00
Satd. Flow (prot)		1787			3401			1792			1720	1524
Flt Permitted		1.00			0.95			1.00			0.77	1.00
Satd. Flow (perm)		1787			3226			1792			1386	1524
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	200	5	11	363	0	0	21	0	111	21	21
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	0	13
Lane Group Flow (vph)	0	203	0	0	374	0	0	21	0	0	132	8
Turn Type		NA		Perm	NA			NA		Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases				6						4		4
Actuated Green, G (s)		27.5			27.5			23.5			23.5	23.5
Effective Green, g (s)		28.0			28.0			24.0			24.0	24.0
Actuated g/C Ratio		0.47			0.47			0.40			0.40	0.40
Clearance Time (s)		4.5			4.5			4.5			4.5	4.5
Vehicle Extension (s)		3.0			3.0			3.0			3.0	3.0
Lane Grp Cap (vph)		833			1505			716			554	609
v/s Ratio Prot		0.11						0.01				
v/s Ratio Perm					c0.12						c0.10	0.01
v/c Ratio		0.24			0.25			0.03			0.24	0.01
Uniform Delay, d1		9.6			9.7			10.9			11.9	10.9
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.7			0.1			0.1			0.2	0.0
Delay (s)		10.3			9.7			11.0			12.2	10.9
Level of Service		B			A			B			B	B
Approach Delay (s)		10.3			9.7			11.0			12.0	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	120	235	35	0	25	235	0	1135	280	15	905	20
Future Volume (vph)	120	235	35	0	25	235	0	1135	280	15	905	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	3.0		4.0	3.8		4.0	3.5	4.0	4.0	3.2
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00		0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.90		1.00	0.95		1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	1845	1408		1845	1482		3505	1568	1752	3505	1568
Flt Permitted	0.75	1.00	1.00		1.00	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1378	1845	1408		1845	1482		3505	1568	1752	3505	1568
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	126	247	37	0	26	247	0	1195	295	16	953	21
RTOR Reduction (vph)	0	0	35	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	126	247	2	0	26	247	0	1195	295	16	953	21
Confl. Peds. (#/hr)			18			50						
Confl. Bikes (#/hr)						130						
Turn Type	Perm	NA	custom	Perm	NA	Free		NA	custom	Prot	NA	custom
Protected Phases		4			8			6	16!	5!	2	16
Permitted Phases	4		5	8		Free						
Actuated Green, G (s)	20.9	20.9	6.0		11.3	102.3		48.4	57.9	6.0	57.1	57.9
Effective Green, g (s)	20.9	20.9	6.0		11.5	102.3		48.9	58.4	5.0	57.9	58.7
Actuated g/C Ratio	0.20	0.20	0.06		0.11	1.00		0.48	0.57	0.05	0.57	0.57
Clearance Time (s)	4.0	4.0	3.0		4.2			4.5	4.0	3.0	4.8	4.0
Vehicle Extension (s)	1.0	1.0	0.5		1.0			0.5	3.0	0.5	0.5	3.0
Lane Grp Cap (vph)	281	376	82		207	1482		1675	895	85	1983	899
v/s Ratio Prot		c0.13			0.01			c0.34	0.19	0.01	c0.27	0.01
v/s Ratio Perm	0.09		0.00			c0.17						
v/c Ratio	0.45	0.66	0.03		0.13	0.17		0.71	0.33	0.19	0.48	0.02
Uniform Delay, d1	35.7	37.4	45.4		40.9	0.0		21.1	11.6	46.7	13.2	9.4
Progression Factor	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	3.1	0.0		0.1	0.2		1.2	0.2	0.4	0.1	0.0
Delay (s)	36.1	40.5	45.4		41.0	0.2		22.4	11.8	47.1	13.3	9.4
Level of Service	D	D	D		D	A		C	B	D	B	A
Approach Delay (s)		39.6			4.1			20.3			13.8	
Approach LOS		D			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	102.3	Sum of lost time (s)	19.5
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	25	25	30	10	25	10	95	930	145	50	900	20
Future Volume (vph)	25	25	30	10	25	10	95	930	145	50	900	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.5		4.0	4.8	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.94		1.00	0.95		1.00	0.92		1.00	0.99	
Flpb, ped/bikes		0.96		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.95		1.00	0.96		1.00	0.98		1.00	1.00	
Flt Protected		0.98		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1541		1752	1678		1752	3157		1752	3470	
Flt Permitted		0.92		0.68	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1438		1250	1678		1752	3157		1752	3470	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	26	26	32	11	26	11	100	979	153	53	947	21
RTOR Reduction (vph)	0	17	0	0	8	0	0	6	0	0	1	0
Lane Group Flow (vph)	0	67	0	11	29	0	100	1126	0	53	967	0
Confl. Peds. (#/hr)	118		124			118			40			58
Confl. Bikes (#/hr)									835			130
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4								
Actuated Green, G (s)		30.0		30.0	30.0		10.3	79.4		6.3	75.1	
Effective Green, g (s)		30.0		30.0	30.0		10.3	79.4		6.3	75.1	
Actuated g/C Ratio		0.23		0.23	0.23		0.08	0.62		0.05	0.59	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.5		4.0	4.8	
Vehicle Extension (s)		1.0		1.0	1.0		0.5	0.5		0.5	0.5	
Lane Grp Cap (vph)		336		292	392		140	1955		86	2032	
v/s Ratio Prot					0.02		c0.06	c0.36		0.03	0.28	
v/s Ratio Perm		c0.05		0.01								
v/c Ratio		0.20		0.04	0.07		0.71	0.58		0.62	0.48	
Uniform Delay, d1		39.5		37.9	38.3		57.5	14.4		59.8	15.2	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1		0.0	0.0		13.4	1.2		8.9	0.8	
Delay (s)		39.6		38.0	38.3		70.9	15.7		68.7	16.0	
Level of Service		D		D	D		E	B		E	B	
Approach Delay (s)		39.6			38.2			20.2			18.8	
Approach LOS		D			D			C			B	

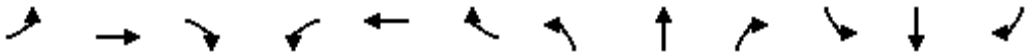
Intersection Summary			
HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	128.2	Sum of lost time (s)	12.8
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBT	SBT	SER	SER2
Lane Configurations					
Traffic Volume (vph)	405	515	355	930	410
Future Volume (vph)	405	515	355	930	410
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	3.5	4.5	4.9
Lane Util. Factor	*0.52	*0.52	0.95	*0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.98	0.99	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	1.00	1.00
Satd. Flow (prot)	890	1868	3505	3505	1568
Flt Permitted	0.95	0.99	1.00	1.00	1.00
Satd. Flow (perm)	890	1868	3505	3505	1568
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	426	542	374	979	432
RTOR Reduction (vph)	0	0	0	0	0
Lane Group Flow (vph)	268	700	374	979	432
Confl. Peds. (#/hr)	26				
Bus Blockages (#/hr)	0	5	0	0	0
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		6	4	3	
Permitted Phases	6				3
Actuated Green, G (s)	27.3	27.3	9.6	19.1	19.1
Effective Green, g (s)	28.0	28.0	10.5	19.5	19.1
Actuated g/C Ratio	0.40	0.40	0.15	0.28	0.27
Clearance Time (s)	4.7	4.7	4.4	4.9	4.9
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	356	747	525	976	427
v/s Ratio Prot			c0.11	c0.28	
v/s Ratio Perm	0.30	0.37			0.28
v/c Ratio	0.75	0.94	0.71	1.00	1.01
Uniform Delay, d1	18.0	20.2	28.3	25.2	25.4
Progression Factor	0.32	0.35	1.00	1.00	1.00
Incremental Delay, d2	12.6	19.4	8.0	29.6	46.5
Delay (s)	18.3	26.4	36.3	54.8	72.0
Level of Service	B	C	D	D	E
Approach Delay (s)		24.2	36.3		
Approach LOS		C	D		

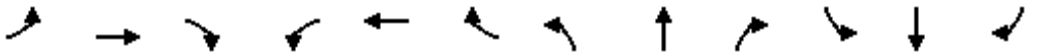
Intersection Summary			
HCM 2000 Control Delay	44.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	900	850	20	540	0	0	0	0
Future Volume (vph)	0	0	0	0	900	850	20	540	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.6		4.0				
Lane Util. Factor					*0.87	0.88		0.91				
Frpb, ped/bikes					1.00	1.00		1.00				
Flpb, ped/bikes					1.00	1.00		1.00				
Frt					1.00	0.85		1.00				
Flt Protected					1.00	1.00		1.00				
Satd. Flow (prot)					3210	2760		5024				
Flt Permitted					1.00	1.00		1.00				
Satd. Flow (perm)					3210	2760		5024				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	947	895	21	568	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	67	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	947	895	0	522	0	0	0	0
Confl. Peds. (#/hr)							14					
Turn Type					NA	custom	Perm	NA				
Protected Phases					2			4				
Permitted Phases						6	4					
Actuated Green, G (s)					45.4	36.6		15.8				
Effective Green, g (s)					46.0	36.6		16.0				
Actuated g/C Ratio					0.66	0.52		0.23				
Clearance Time (s)					4.6	4.6		4.2				
Vehicle Extension (s)					3.0	3.0		2.0				
Lane Grp Cap (vph)					2109	1443		1148				
v/s Ratio Prot					c0.30							
v/s Ratio Perm						c0.32		0.10				
v/c Ratio					0.45	0.62		0.45				
Uniform Delay, d1					5.8	11.8		23.2				
Progression Factor					0.92	1.06		1.03				
Incremental Delay, d2					0.6	1.9		0.1				
Delay (s)					6.0	14.4		24.1				
Level of Service					A	B		C				
Approach Delay (s)		0.0			10.1			24.1			0.0	
Approach LOS		A			B			C			A	

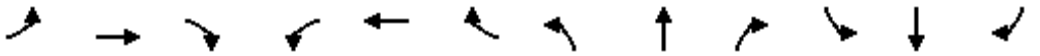
Intersection Summary			
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	47.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	1035	20	680	150	0	0	0	35
Future Volume (vph)	0	0	0	0	1035	20	680	150	0	0	0	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0		3.8	4.0				4.0
Lane Util. Factor					0.86		0.95	0.95				1.00
Frpb, ped/bikes					0.99		1.00	1.00				0.94
Flpb, ped/bikes					1.00		1.00	1.00				1.00
Frt					1.00		1.00	1.00				0.86
Flt Protected					1.00		0.95	0.97				1.00
Satd. Flow (prot)					6288		1665	1698				1495
Flt Permitted					1.00		0.95	0.97				1.00
Satd. Flow (perm)					6288		1665	1698				1495
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	1089	21	716	158	0	0	0	37
RTOR Reduction (vph)	0	0	0	0	0	0	16	14	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1110	0	421	423	0	0	0	37
Confl. Peds. (#/hr)						102	42					42
Confl. Bikes (#/hr)						100						
Turn Type					NA		Prot	NA				Perm
Protected Phases					2		1 4	4				
Permitted Phases												4
Actuated Green, G (s)					31.9		29.5	29.5				21.1
Effective Green, g (s)					32.5		25.7	29.7				21.3
Actuated g/C Ratio					0.46		0.37	0.42				0.30
Clearance Time (s)					4.6			4.2				4.2
Vehicle Extension (s)					3.0			2.0				2.0
Lane Grp Cap (vph)					2919		611	720				454
v/s Ratio Prot					c0.18		c0.25	c0.25				
v/s Ratio Perm												0.02
v/c Ratio					0.38		0.69	0.59				0.08
Uniform Delay, d1					12.2		18.8	15.4				17.4
Progression Factor					0.65		0.52	0.50				1.00
Incremental Delay, d2					0.4		1.6	0.5				0.0
Delay (s)					8.3		11.2	8.3				17.4
Level of Service					A		B	A				B
Approach Delay (s)		0.0			8.3			9.8			17.4	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	11.8
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		

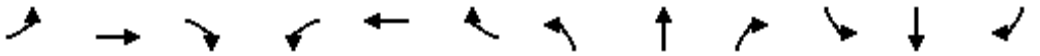
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	20	965	55	20	200	0	0	15	70
Future Volume (vph)	0	0	0	20	965	55	20	200	0	0	15	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.5			4.5			4.5	
Lane Util. Factor					0.91			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			0.94	
Flpb, ped/bikes					1.00			1.00			1.00	
Frt					0.99			1.00			0.89	
Flt Protected					1.00			1.00			1.00	
Satd. Flow (prot)					4941			1828			1546	
Flt Permitted					1.00			0.97			1.00	
Satd. Flow (perm)					4941			1782			1546	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	21	1016	58	21	211	0	0	16	74
RTOR Reduction (vph)	0	0	0	0	5	0	0	0	0	0	14	0
Lane Group Flow (vph)	0	0	0	0	1090	0	0	232	0	0	76	0
Confl. Peds. (#/hr)				34		38	56					56
Confl. Bikes (#/hr)						100						
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					2			4			4	
Permitted Phases				2			4					
Actuated Green, G (s)					44.7			16.3			16.3	
Effective Green, g (s)					44.7			16.3			16.3	
Actuated g/C Ratio					0.64			0.23			0.23	
Clearance Time (s)					4.5			4.5			4.5	
Vehicle Extension (s)					0.2			3.0			3.0	
Lane Grp Cap (vph)					3155			414			359	
v/s Ratio Prot											0.05	
v/s Ratio Perm					0.22			c0.13				
v/c Ratio					0.35			0.56			0.21	
Uniform Delay, d1					5.9			23.7			21.7	
Progression Factor					1.00			0.92			1.00	
Incremental Delay, d2					0.3			1.6			0.3	
Delay (s)					6.2			23.3			22.0	
Level of Service					A			C			C	
Approach Delay (s)		0.0			6.2			23.3			22.0	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		

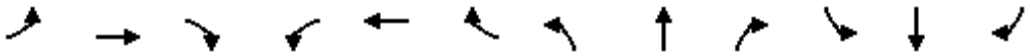
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	845	250	0	0	0	0	0	0	960	730	0
Future Volume (vph)	0	845	250	0	0	0	0	0	0	960	730	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0							3.6	4.0	
Lane Util. Factor		0.91	1.00							0.91	0.91	
Frpb, ped/bikes		1.00	0.95							1.00	1.00	
Flpb, ped/bikes		1.00	1.00							1.00	1.00	
Frt		1.00	0.85							1.00	1.00	
Flt Protected		1.00	1.00							0.95	0.98	
Satd. Flow (prot)		5036	1485							1595	3257	
Flt Permitted		1.00	1.00							0.95	0.98	
Satd. Flow (perm)		5036	1485							1595	3257	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	889	263	0	0	0	0	0	0	1011	768	0
RTOR Reduction (vph)	0	0	144	0	0	0	0	0	0	237	14	0
Lane Group Flow (vph)	0	889	119	0	0	0	0	0	0	370	1158	0
Confl. Peds. (#/hr)			38							16		
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	5	0
Turn Type		NA	Perm							Prot	NA	
Protected Phases		6								8	4	
Permitted Phases			6									
Actuated Green, G (s)		20.7	20.7							34.2	40.7	
Effective Green, g (s)		21.2	21.2							34.7	41.2	
Actuated g/C Ratio		0.30	0.30							0.50	0.59	
Clearance Time (s)		4.5	4.5							4.1	4.5	
Vehicle Extension (s)		3.0	3.0							3.0	3.0	
Lane Grp Cap (vph)		1525	449							790	1916	
v/s Ratio Prot		c0.18								0.23	c0.30	
v/s Ratio Perm			0.08								0.06	
v/c Ratio		0.58	0.27							0.47	0.60	
Uniform Delay, d1		20.7	18.5							11.6	9.2	
Progression Factor		1.00	1.00							0.70	0.73	
Incremental Delay, d2		1.6	1.4							0.8	0.6	
Delay (s)		22.3	19.9							8.9	7.3	
Level of Service		C	B							A	A	
Approach Delay (s)		21.8			0.0			0.0			7.9	
Approach LOS		C			A			A			A	

Intersection Summary					
HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.63				
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	11.1		
Intersection Capacity Utilization	57.5%	ICU Level of Service	B		
Analysis Period (min)	15				

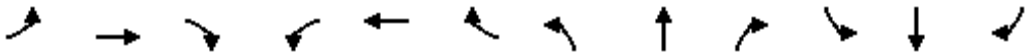
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	460	1345	0	0	0	0	0	100	15	0	0	0
Future Volume (vph)	460	1345	0	0	0	0	0	100	15	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0			
Lane Util. Factor		0.91						0.95	1.00			
Frpb, ped/bikes		1.00						1.00	0.86			
Flpb, ped/bikes		0.97						1.00	1.00			
Frt		1.00						1.00	0.85			
Flt Protected		0.99						1.00	1.00			
Satd. Flow (prot)		4807						3505	1345			
Flt Permitted		0.99						1.00	1.00			
Satd. Flow (perm)		4807						3505	1345			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	484	1416	0	0	0	0	0	105	16	0	0	0
RTOR Reduction (vph)	0	77	0	0	0	0	0	0	13	0	0	0
Lane Group Flow (vph)	0	1823	0	0	0	0	0	105	3	0	0	0
Confl. Peds. (#/hr)	110								120			
Bus Blockages (#/hr)	0	5	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA						NA	Perm			
Protected Phases		2						4				
Permitted Phases	2								4			
Actuated Green, G (s)		49.5						11.8	11.8			
Effective Green, g (s)		50.0						12.0	12.0			
Actuated g/C Ratio		0.71						0.17	0.17			
Clearance Time (s)		4.5						4.2	4.2			
Vehicle Extension (s)		0.2						0.5	0.5			
Lane Grp Cap (vph)		3433						600	230			
v/s Ratio Prot								c0.03				
v/s Ratio Perm		0.38							0.00			
v/c Ratio		0.53						0.17	0.01			
Uniform Delay, d1		4.6						24.8	24.1			
Progression Factor		0.54						1.00	1.00			
Incremental Delay, d2		0.5						0.1	0.0			
Delay (s)		3.0						24.8	24.1			
Level of Service		A						C	C			
Approach Delay (s)		3.0			0.0			24.7			0.0	
Approach LOS		A			A			C			A	

Intersection Summary			
HCM 2000 Control Delay	4.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		

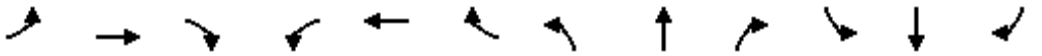
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	1325	0	0	0	0	0	795	580	0	0	0
Future Volume (vph)	35	1325	0	0	0	0	0	795	580	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0			
Lane Util. Factor		0.91						0.95	1.00			
Frpb, ped/bikes		1.00						1.00	0.71			
Flpb, ped/bikes		1.00						1.00	1.00			
Frt		1.00						1.00	0.85			
Flt Protected		1.00						1.00	1.00			
Satd. Flow (prot)		5006						3505	1107			
Flt Permitted		1.00						1.00	1.00			
Satd. Flow (perm)		5006						3505	1107			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	37	1395	0	0	0	0	0	837	611	0	0	0
RTOR Reduction (vph)	0	12	0	0	0	0	0	0	333	0	0	0
Lane Group Flow (vph)	0	1420	0	0	0	0	0	837	279	0	0	0
Confl. Peds. (#/hr)	144								208			
Confl. Bikes (#/hr)									100			
Turn Type	Perm	NA						NA	Perm			
Protected Phases		6						8				
Permitted Phases	6								8			
Actuated Green, G (s)		40.5						20.1	20.1			
Effective Green, g (s)		41.0						21.0	21.0			
Actuated g/C Ratio		0.59						0.30	0.30			
Clearance Time (s)		4.5						4.9	4.9			
Vehicle Extension (s)		3.5						3.9	3.9			
Lane Grp Cap (vph)		2932						1051	332			
v/s Ratio Prot								0.24				
v/s Ratio Perm		0.28							c0.25			
v/c Ratio		0.48						0.80	0.84			
Uniform Delay, d1		8.4						22.5	22.9			
Progression Factor		0.39						1.00	1.00			
Incremental Delay, d2		0.5						6.3	21.7			
Delay (s)		3.8						28.8	44.6			
Level of Service		A						C	D			
Approach Delay (s)		3.8			0.0			35.5			0.0	
Approach LOS		A			A			D			A	

Intersection Summary			
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		

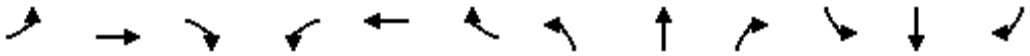
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	200	1500	205	0	0	0	0	20	15	10	20	0
Future Volume (vph)	200	1500	205	0	0	0	0	20	15	10	20	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5			4.5	
Lane Util. Factor		0.86						1.00			1.00	
Frpb, ped/bikes		0.96						0.99			1.00	
Flpb, ped/bikes		0.99						1.00			1.00	
Frt		0.98						0.94			1.00	
Flt Protected		0.99						1.00			0.98	
Satd. Flow (prot)		5919						1727			1812	
Flt Permitted		0.99						1.00			0.93	
Satd. Flow (perm)		5919						1727			1707	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	211	1579	216	0	0	0	0	21	16	11	21	0
RTOR Reduction (vph)	0	18	0	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	1988	0	0	0	0	0	35	0	0	32	0
Confl. Peds. (#/hr)	58		152						2	2		
Confl. Bikes (#/hr)			100									
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		2						4			4	
Permitted Phases	2									4		
Actuated Green, G (s)		45.8						15.2			15.2	
Effective Green, g (s)		45.8						15.2			15.2	
Actuated g/C Ratio		0.65						0.22			0.22	
Clearance Time (s)		4.5						4.5			4.5	
Vehicle Extension (s)		0.5						0.5			0.5	
Lane Grp Cap (vph)		3872						375			370	
v/s Ratio Prot								c0.02				
v/s Ratio Perm		0.34									0.02	
v/c Ratio		0.51						0.09			0.09	
Uniform Delay, d1		6.3						21.9			21.9	
Progression Factor		1.73						1.00			1.17	
Incremental Delay, d2		0.4						0.0			0.0	
Delay (s)		11.3						21.9			25.7	
Level of Service		B						C			C	
Approach Delay (s)		11.3			0.0			21.9			25.7	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	45.5%	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 (veh/h)	5	0	0	0	0	95	5	620	25	0	0	0
Future Volume (Veh/h)	5	0	0	0	0	95	5	620	25	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	5	0	0	0	0	100	5	653	26	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								498				
pX, platoon unblocked	0.88	0.88		0.88	0.88	0.88				0.88		
vC, conflicting volume	776	689	0	676	676	666	0			679		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	682	583	0	569	569	557	0			572		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	100	100	100	79	100			100		
cM capacity (veh/h)	252	373	1082	381	380	467	1617			881		

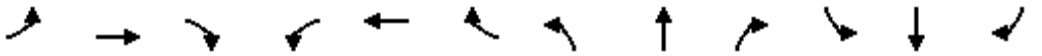
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	5	100	684
Volume Left	5	0	5
Volume Right	0	100	26
cSH	252	467	1617
Volume to Capacity	0.02	0.21	0.00
Queue Length 95th (ft)	2	20	0
Control Delay (s)	19.6	14.8	0.1
Lane LOS	C	B	A
Approach Delay (s)	19.6	14.8	0.1
Approach LOS	C	B	

Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	47.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	EBR2	NBT	SET	SER
Lane Configurations						
Traffic Volume (vph)	105	240	20	10	735	240
Future Volume (vph)	105	240	20	10	735	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.6	5.6
Lane Util. Factor	1.00	0.88		1.00	0.95	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	0.95	1.00		1.00	1.00	1.00
Satd. Flow (prot)	1752	2760		1845	3505	1568
Flt Permitted	0.95	1.00		1.00	1.00	1.00
Satd. Flow (perm)	1752	2760		1845	3505	1568
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	111	253	21	11	774	253
RTOR Reduction (vph)	0	83	0	0	0	0
Lane Group Flow (vph)	111	191	0	11	774	253
Turn Type	Perm	Prot		NA	NA	custom
Protected Phases		4				2
Permitted Phases	4			3	2	
Actuated Green, G (s)	10.2	10.2		0.9	34.1	34.1
Effective Green, g (s)	10.2	10.2		0.9	34.1	34.1
Actuated g/C Ratio	0.17	0.17		0.01	0.56	0.56
Clearance Time (s)	5.0	5.0		5.0	5.6	5.6
Vehicle Extension (s)	0.5	0.5		1.5	0.5	0.5
Lane Grp Cap (vph)	293	463		27	1965	879
v/s Ratio Prot		c0.07				0.16
v/s Ratio Perm	0.06			c0.01	c0.22	
v/c Ratio	0.38	0.41		0.41	0.39	0.29
Uniform Delay, d1	22.5	22.6		29.7	7.5	7.0
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.3	0.2		3.6	0.6	0.8
Delay (s)	22.8	22.8		33.3	8.1	7.8
Level of Service	C	C		C	A	A
Approach Delay (s)	22.8			33.3	8.0	
Approach LOS	C			C	A	

Intersection Summary			
HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	60.8	Sum of lost time (s)	15.6
Intersection Capacity Utilization	45.7%	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)	0	235	5	0	555	0	0	20	0	170	20	80
Future Volume (vph)	0	235	5	0	555	0	0	20	0	170	20	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	4.0
Lane Util. Factor		1.00			0.95			1.00			1.00	1.00
Frt		1.00			1.00			1.00			1.00	0.85
Flt Protected		1.00			1.00			1.00			0.96	1.00
Satd. Flow (prot)		1840			3505			1845			1766	1568
Flt Permitted		1.00			1.00			1.00			0.74	1.00
Satd. Flow (perm)		1840			3505			1845			1358	1568
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	247	5	0	584	0	0	21	0	179	21	84
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	0	50
Lane Group Flow (vph)	0	251	0	0	584	0	0	21	0	0	200	34
Turn Type		NA			NA			NA		Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases				6						4		4
Actuated Green, G (s)		27.5			27.5			23.5			23.5	23.5
Effective Green, g (s)		28.0			28.0			24.0			24.0	24.0
Actuated g/C Ratio		0.47			0.47			0.40			0.40	0.40
Clearance Time (s)		4.5			4.5			4.5			4.5	4.5
Vehicle Extension (s)		3.0			3.0			3.0			3.0	3.0
Lane Grp Cap (vph)		858			1635			738			543	627
v/s Ratio Prot		0.14			c0.17			0.01				
v/s Ratio Perm											c0.15	0.02
v/c Ratio		0.29			0.36			0.03			0.37	0.05
Uniform Delay, d1		9.9			10.2			10.9			12.7	11.0
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.9			0.1			0.1			0.4	0.0
Delay (s)		10.7			10.4			11.0			13.1	11.1
Level of Service		B			B			B			B	B
Approach Delay (s)		10.7			10.4			11.0			12.5	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	11.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Synchro Model Intersection Results - 2045 AM and PM Peak Hour Revised Build

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	275	70	80	0	30	250	0	715	245	5	965	115
Future Volume (vph)	275	70	80	0	30	250	0	715	245	5	965	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	3.5		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00		0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.95		1.00	0.66		1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1618	1703	1443		1792	999		3406	1524	1703	3406	1524
Flt Permitted	0.95	1.00	1.00		1.00	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1618	1703	1443		1792	999		3406	1524	1703	3406	1524
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	289	74	84	0	32	263	0	753	258	5	1016	121
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	289	74	84	0	32	263	0	753	258	5	1016	121
Confl. Peds. (#/hr)			6			28						
Confl. Bikes (#/hr)			30			1480						
Turn Type	Split	NA	Perm	Split	NA	Free		NA	custom	Prot	NA	custom
Protected Phases	4	4		8	8			6!	16!	5 15 25!	2	8 26
Permitted Phases			4			Free						
Actuated Green, G (s)	27.6	27.6	27.6		10.5	140.0		82.6	22.7	1.3	88.4	33.2
Effective Green, g (s)	28.1	28.1	28.1		11.0	140.0		83.1	23.2	1.8	88.9	34.2
Actuated g/C Ratio	0.20	0.20	0.20		0.08	1.00		0.59	0.17	0.01	0.64	0.24
Clearance Time (s)	4.5	4.5	4.5		4.5			4.5	4.5		4.5	
Vehicle Extension (s)	1.0	1.0	1.0		1.0			0.5	0.5		0.5	
Lane Grp Cap (vph)	324	341	289		140	999		2021	252	21	2162	372
v/s Ratio Prot	c0.18	0.04			0.02			0.22	c0.17	0.00	c0.30	0.08
v/s Ratio Perm			0.06			c0.26						
v/c Ratio	0.89	0.22	0.29		0.23	0.26		0.37	1.02	0.24	0.47	0.33
Uniform Delay, d1	54.5	46.8	47.5		60.5	0.0		14.8	58.4	68.4	13.3	43.4
Progression Factor	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.43	0.18	0.43
Incremental Delay, d2	24.5	0.1	0.2		0.3	0.6		0.5	63.0	1.6	0.5	0.1
Delay (s)	78.9	46.9	47.7		60.8	0.6		15.4	121.4	99.8	3.0	18.8
Level of Service	E	D	D		E	A		B	F	F	A	B
Approach Delay (s)		67.8			7.2			42.4			5.1	
Approach LOS		E			A			D			A	

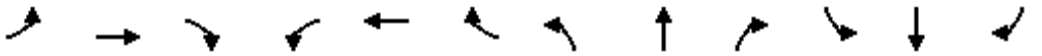
Intersection Summary			
HCM 2000 Control Delay	28.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	10	25	15	15	20	50	10	755	30	5	1055	35
Future Volume (vph)	10	25	15	15	20	50	10	755	30	5	1055	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99		1.00	0.96		1.00	0.99		1.00	0.97	
Flpb, ped/bikes		0.99		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.96		1.00	0.89		1.00	0.99		1.00	1.00	
Flt Protected		0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1679		1703	1541		1703	3360		1703	3301	
Flt Permitted		0.93		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1585		1703	1541		1703	3360		1703	3301	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	26	16	16	21	53	11	795	32	5	1111	37
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	53	0	16	74	0	11	827	0	5	1148	0
Confl. Peds. (#/hr)	24		4			24			18			26
Confl. Bikes (#/hr)									150			1450
Turn Type	Perm	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases		4		3	8		1	6		5	2	
Permitted Phases	4											
Actuated Green, G (s)		13.0		3.3	22.9		3.3	49.2		4.2	50.1	
Effective Green, g (s)		13.5		3.8	23.4		3.8	49.7		4.7	50.6	
Actuated g/C Ratio		0.10		0.03	0.17		0.03	0.36		0.03	0.36	
Clearance Time (s)		4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		1.0		3.0	3.0		0.5	0.5		0.5	0.5	
Lane Grp Cap (vph)		152		46	257		46	1192		57	1193	
v/s Ratio Prot				c0.01	c0.05		c0.01	0.25		0.00	c0.35	
v/s Ratio Perm		c0.03										
v/c Ratio		0.35		0.35	0.29		0.24	0.69		0.09	0.96	
Uniform Delay, d1		59.1		66.9	51.0		66.7	38.6		65.6	43.8	
Progression Factor		1.00		1.00	1.00		0.87	0.76		1.07	0.86	
Incremental Delay, d2		0.5		4.5	0.6		0.9	3.2		0.2	17.5	
Delay (s)		59.6		71.4	51.6		59.3	32.5		70.4	55.3	
Level of Service		E		E	D		E	C		E	E	
Approach Delay (s)		59.6			55.1			32.9			55.3	
Approach LOS		E			E			C			E	

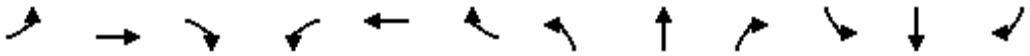
Intersection Summary			
HCM 2000 Control Delay	46.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



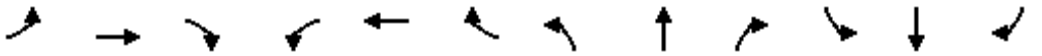
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	575	970	0	0	0	0	0	300	45
Future Volume (vph)	0	0	0	575	970	0	0	0	0	0	300	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0						4.0	4.0
Lane Util. Factor				0.97	0.95						1.00	1.00
Frt				1.00	1.00						1.00	0.85
Flt Protected				0.95	1.00						1.00	1.00
Satd. Flow (prot)				3303	3372						1792	1524
Flt Permitted				0.95	1.00						1.00	1.00
Satd. Flow (perm)				3303	3372						1792	1524
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	605	1021	0	0	0	0	0	316	47
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	605	1021	0	0	0	0	0	316	47
Bus Blockages (#/hr)	0	0	0	0	5	0	0	0	0	0	0	0
Turn Type				Prot	NA						NA	custom
Protected Phases				6	2						4	8
Permitted Phases												
Actuated Green, G (s)				33.7	40.5						20.5	4.5
Effective Green, g (s)				34.2	41.0						21.0	5.0
Actuated g/C Ratio				0.49	0.59						0.30	0.07
Clearance Time (s)				4.5	4.5						4.5	4.5
Vehicle Extension (s)				3.0	3.0						3.0	3.0
Lane Grp Cap (vph)				1613	1975						537	108
v/s Ratio Prot				0.18	c0.30						c0.18	0.03
v/s Ratio Perm												
v/c Ratio				0.38	0.52						0.59	0.44
Uniform Delay, d1				11.2	8.6						20.8	31.1
Progression Factor				1.49	1.76						1.00	1.00
Incremental Delay, d2				0.6	0.8						1.7	2.8
Delay (s)				17.3	15.9						22.5	33.9
Level of Service				B	B						C	C
Approach Delay (s)		0.0			16.4			0.0			24.0	
Approach LOS		A			B			A			C	

Intersection Summary			
HCM 2000 Control Delay	17.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	49.3%	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)	0	0	0	0	1535	920	10	180	0	0	0	0
Future Volume (vph)	0	0	0	0	1535	920	10	180	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0		4.0				
Lane Util. Factor					0.91	0.88		0.95				
Frpb, ped/bikes					1.00	1.00		1.00				
Flpb, ped/bikes					1.00	1.00		1.00				
Frt					1.00	0.85		1.00				
Flt Protected					1.00	1.00		1.00				
Satd. Flow (prot)					4893	2682		3395				
Flt Permitted					1.00	1.00		1.00				
Satd. Flow (perm)					4893	2682		3395				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	1616	968	11	189	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1616	968	0	200	0	0	0	0
Confl. Peds. (#/hr)							4					
Turn Type					NA	custom	Perm	NA				
Protected Phases					2			4				
Permitted Phases						6	4					
Actuated Green, G (s)					39.5	20.5		18.5				
Effective Green, g (s)					40.0	21.0		19.0				
Actuated g/C Ratio					0.57	0.30		0.27				
Clearance Time (s)					4.5	4.5		4.5				
Vehicle Extension (s)					3.0	3.0		2.0				
Lane Grp Cap (vph)					2796	804		921				
v/s Ratio Prot					c0.33							
v/s Ratio Perm						c0.36		0.06				
v/c Ratio					0.58	1.20		0.22				
Uniform Delay, d1					9.6	24.5		19.7				
Progression Factor					0.63	0.79		0.44				
Incremental Delay, d2					0.6	99.5		0.0				
Delay (s)					6.6	118.8		8.7				
Level of Service					A	F		A				
Approach Delay (s)		0.0			48.6			8.7			0.0	
Approach LOS		A			D			A			A	

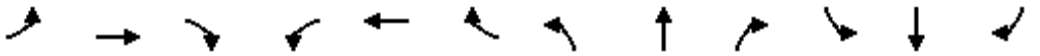
Intersection Summary			
HCM 2000 Control Delay	45.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	1560	10	865	55	0	0	0	30
Future Volume (vph)	0	0	0	0	1560	10	865	55	0	0	0	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0		4.0	4.0				4.0
Lane Util. Factor					0.86		0.97	1.00				1.00
Frpb, ped/bikes					1.00		1.00	1.00				1.00
Flpb, ped/bikes					1.00		1.00	1.00				1.00
Frt					1.00		1.00	1.00				0.86
Flt Protected					1.00		0.95	1.00				1.00
Satd. Flow (prot)					6141		3303	1792				1550
Flt Permitted					1.00		0.95	1.00				1.00
Satd. Flow (perm)					6141		3303	1792				1550
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	1642	11	911	58	0	0	0	32
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1653	0	911	58	0	0	0	32
Confl. Peds. (#/hr)						28						
Confl. Bikes (#/hr)						310						
Turn Type					NA		Prot	NA				Perm
Protected Phases					2		3	8				
Permitted Phases												8
Actuated Green, G (s)					19.1		31.5	38.9				38.9
Effective Green, g (s)					19.6		32.0	39.4				39.4
Actuated g/C Ratio					0.28		0.46	0.56				0.56
Clearance Time (s)					4.5		4.5	4.5				4.5
Vehicle Extension (s)					3.0		0.2	2.0				2.0
Lane Grp Cap (vph)					1719		1509	1008				872
v/s Ratio Prot					c0.27		c0.28	c0.03				
v/s Ratio Perm												0.02
v/c Ratio					0.96		0.60	0.06				0.04
Uniform Delay, d1					24.8		14.2	6.9				6.8
Progression Factor					1.30		0.57	0.40				1.00
Incremental Delay, d2					13.3		1.7	0.0				0.0
Delay (s)					45.7		9.8	2.8				6.8
Level of Service					D		A	A				A
Approach Delay (s)		0.0			45.7			9.4			6.8	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	32.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		

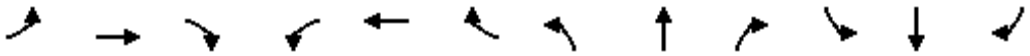
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	10	1385	55	35	105	0	0	25	150
Future Volume (vph)	0	0	0	10	1385	55	35	105	0	0	25	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					0.91			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			0.97	
Flpb, ped/bikes					1.00			1.00			1.00	
Frt					0.99			1.00			0.88	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					4819			1764			1543	
Flt Permitted					1.00			0.89			1.00	
Satd. Flow (perm)					4819			1590			1543	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	11	1458	58	37	111	0	0	26	158
RTOR Reduction (vph)	0	0	0	0	5	0	0	0	0	0	26	0
Lane Group Flow (vph)	0	0	0	0	1522	0	0	148	0	0	158	0
Confl. Peds. (#/hr)				20		20	18					18
Confl. Bikes (#/hr)						310						
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					2			4			4	
Permitted Phases				2			4					
Actuated Green, G (s)					45.4			15.6			15.6	
Effective Green, g (s)					45.9			16.1			16.1	
Actuated g/C Ratio					0.66			0.23			0.23	
Clearance Time (s)					4.5			4.5			4.5	
Vehicle Extension (s)					0.2			3.0			3.0	
Lane Grp Cap (vph)					3159			365			354	
v/s Ratio Prot											c0.10	
v/s Ratio Perm					0.32			0.09				
v/c Ratio					0.48			0.41			0.45	
Uniform Delay, d1					6.1			22.9			23.1	
Progression Factor					1.00			1.04			1.00	
Incremental Delay, d2					0.5			0.7			0.9	
Delay (s)					6.6			24.5			24.0	
Level of Service					A			C			C	
Approach Delay (s)		0.0			6.6			24.5			24.0	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		

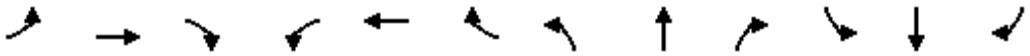
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	590	295	0	0	0	0	0	0	25	850	0
Future Volume (vph)	0	590	295	0	0	0	0	0	0	25	850	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0								4.0	
Lane Util. Factor		0.91	1.00								0.91	
Frpb, ped/bikes		1.00	1.00								1.00	
Flpb, ped/bikes		1.00	1.00								1.00	
Frt		1.00	0.85								1.00	
Flt Protected		1.00	1.00								1.00	
Satd. Flow (prot)		4893	1524								4853	
Flt Permitted		1.00	1.00								1.00	
Satd. Flow (perm)		4893	1524								4853	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	621	311	0	0	0	0	0	0	26	895	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	621	311	0	0	0	0	0	0	0	921	0
Confl. Peds. (#/hr)										10		
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	5	0
Turn Type		NA	custom							Perm	NA	
Protected Phases		6 9	16								4	
Permitted Phases										4		
Actuated Green, G (s)		38.0	21.9								20.0	
Effective Green, g (s)		38.5	22.4								20.5	
Actuated g/C Ratio		0.55	0.32								0.29	
Clearance Time (s)			4.5								4.5	
Vehicle Extension (s)			3.0								3.0	
Lane Grp Cap (vph)		2691	487								1421	
v/s Ratio Prot		c0.13	c0.20									
v/s Ratio Perm											0.19	
v/c Ratio		0.23	0.64								0.65	
Uniform Delay, d1		8.1	20.3								21.6	
Progression Factor		1.20	0.91								0.88	
Incremental Delay, d2		0.0	2.5								0.9	
Delay (s)		9.8	21.1								20.1	
Level of Service		A	C								C	
Approach Delay (s)		13.6			0.0			0.0			20.1	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	41.9%	ICU Level of Service	A
Analysis Period (min)	15		

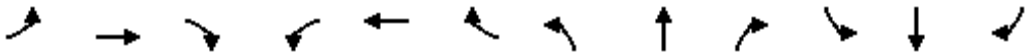
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	190	425	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	190	425	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0										
Lane Util. Factor		0.91										
Frpb, ped/bikes		1.00										
Flpb, ped/bikes		0.98										
Frt		1.00										
Flt Protected		0.98										
Satd. Flow (prot)		4711										
Flt Permitted		0.98										
Satd. Flow (perm)		4711										
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	200	447	0	0	0	0	0	0	0	0	0	0
RTOR Reduction (vph)	0	169	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	478	0	0	0	0	0	0	0	0	0	0
Confl. Peds. (#/hr)	26											
Bus Blockages (#/hr)	0	5	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA										
Protected Phases		2						4				
Permitted Phases	2											
Actuated Green, G (s)		10.2										
Effective Green, g (s)		10.7										
Actuated g/C Ratio		0.15										
Clearance Time (s)		4.5										
Vehicle Extension (s)		0.2										
Lane Grp Cap (vph)		720										
v/s Ratio Prot												
v/s Ratio Perm		0.10										
v/c Ratio		0.66										
Uniform Delay, d1		28.0										
Progression Factor		1.47										
Incremental Delay, d2		4.7										
Delay (s)		45.8										
Level of Service		D										
Approach Delay (s)		45.8			0.0			0.0			0.0	
Approach LOS		D			A			A			A	

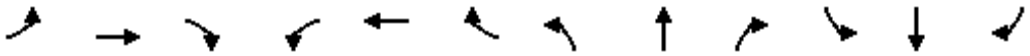
Intersection Summary			
HCM 2000 Control Delay	45.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.12		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	15.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	410	0	0	0	0	0	905	1450	0	0	0
Future Volume (vph)	15	410	0	0	0	0	0	905	1450	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0			
Lane Util. Factor		0.91						0.95	*0.78			
Frpb, ped/bikes		1.00						1.00	1.00			
Flpb, ped/bikes		1.00						1.00	1.00			
Frt		1.00						1.00	0.85			
Flt Protected		1.00						1.00	1.00			
Satd. Flow (prot)		4877						3406	2377			
Flt Permitted		1.00						1.00	1.00			
Satd. Flow (perm)		4877						3406	2377			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	432	0	0	0	0	0	953	1526	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	448	0	0	0	0	0	953	1526	0	0	0
Confl. Peds. (#/hr)	28											
Turn Type	Perm	NA						NA	Prot			
Protected Phases		6						8	8			
Permitted Phases	6											
Actuated Green, G (s)		12.9						45.1	45.1			
Effective Green, g (s)		13.4						45.6	45.6			
Actuated g/C Ratio		0.19						0.65	0.65			
Clearance Time (s)		4.5						4.5	4.5			
Vehicle Extension (s)		3.5						3.9	3.9			
Lane Grp Cap (vph)		933						2218	1548			
v/s Ratio Prot								0.28	c0.64			
v/s Ratio Perm		0.09										
v/c Ratio		0.48						0.43	0.99			
Uniform Delay, d1		25.2						5.9	11.9			
Progression Factor		0.84						1.00	1.00			
Incremental Delay, d2		1.7						0.6	19.7			
Delay (s)		22.9						6.5	31.6			
Level of Service		C						A	C			
Approach Delay (s)		22.9			0.0			22.0			0.0	
Approach LOS		C			A			C			A	

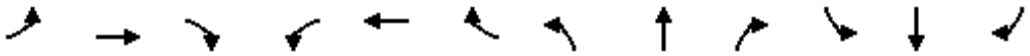
Intersection Summary			
HCM 2000 Control Delay	22.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	1750	10	0	0	0	0	40	10	25	10	0
Future Volume (vph)	100	1750	10	0	0	0	0	40	10	25	10	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		0.91						1.00			1.00	
Frpb, ped/bikes		1.00						0.99			1.00	
Flpb, ped/bikes		1.00						1.00			0.98	
Frt		1.00						0.97			1.00	
Flt Protected		1.00						1.00			0.97	
Satd. Flow (prot)		4872						1727			1698	
Flt Permitted		1.00						1.00			0.77	
Satd. Flow (perm)		4872						1727			1360	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	1842	11	0	0	0	0	42	11	26	11	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	0	1958	0	0	0	0	0	43	0	0	37	0
Confl. Peds. (#/hr)	10		30						12	12		
Confl. Bikes (#/hr)			100									
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		2						4			4	
Permitted Phases	2									4		
Actuated Green, G (s)		53.0						8.0			8.0	
Effective Green, g (s)		53.5						8.5			8.5	
Actuated g/C Ratio		0.76						0.12			0.12	
Clearance Time (s)		4.5						4.5			4.5	
Vehicle Extension (s)		0.5						0.5			0.5	
Lane Grp Cap (vph)		3723						209			165	
v/s Ratio Prot								0.03				
v/s Ratio Perm		0.40									c0.03	
v/c Ratio		0.53						0.21			0.22	
Uniform Delay, d1		3.3						27.7			27.8	
Progression Factor		0.95						1.00			0.92	
Incremental Delay, d2		0.3						0.2			0.2	
Delay (s)		3.4						27.9			25.7	
Level of Service		A						C			C	
Approach Delay (s)		3.4			0.0			27.9			25.7	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	4.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		

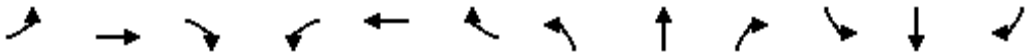
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	0	0	60	125	0	380	10	0	0	0
Future Volume (vph)	10	0	0	0	60	125	0	380	10	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		1.00			1.00			1.00				
Frt		1.00			0.91			1.00				
Flt Protected		0.95			1.00			1.00				
Satd. Flow (prot)		1703			1629			1786				
Flt Permitted		0.51			1.00			1.00				
Satd. Flow (perm)		916			1629			1786				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	0	0	0	63	132	0	400	11	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	11	0	0	195	0	0	411	0	0	0	0
Turn Type	Perm	NA			NA			NA				
Protected Phases		2			2			4				
Permitted Phases	2						4					
Actuated Green, G (s)		13.7			13.7			29.6				
Effective Green, g (s)		14.2			14.2			30.1				
Actuated g/C Ratio		0.20			0.20			0.43				
Clearance Time (s)		4.5			4.5			4.5				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		185			330			767				
v/s Ratio Prot					c0.12			c0.23				
v/s Ratio Perm		0.01										
v/c Ratio		0.06			0.59			0.54				
Uniform Delay, d1		22.5			25.3			14.8				
Progression Factor		1.00			1.00			0.77				
Incremental Delay, d2		0.1			2.8			0.2				
Delay (s)		22.6			28.1			11.6				
Level of Service		C			C			B				
Approach Delay (s)		22.6			28.1			11.6			0.0	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	38.1%	ICU Level of Service	A
Analysis Period (min)	15		

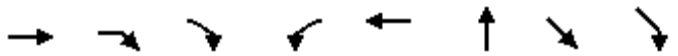
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	10	0	0	60	0	0	0	0	0	345	0
Future Volume (Veh/h)	0	10	0	0	60	0	0	0	0	0	345	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	11	0	0	63	0	0	0	0	0	363	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								487				
pX, platoon unblocked												
vC, conflicting volume	394	363	363	368	363	0	363			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	394	363	363	368	363	0	363			0		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	100	98	100	100	89	100	100			100		
cM capacity (veh/h)	510	558	673	572	558	1073	1174			1597		

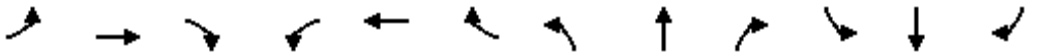
Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	11	63	363
Volume Left	0	0	0
Volume Right	0	0	0
cSH	558	558	1597
Volume to Capacity	0.02	0.11	0.00
Queue Length 95th (ft)	2	9	0
Control Delay (s)	11.6	12.3	0.0
Lane LOS	B	B	
Approach Delay (s)	11.6	12.3	0.0
Approach LOS	B	B	

Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	28.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBT	EBR	EBR2	WBL	WBT	NBT	SET	SER
Lane Configurations								
Traffic Volume (vph)	0	80	20	130	230	0	995	150
Future Volume (vph)	0	80	20	130	230	0	995	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0		6.0	6.0
Lane Util. Factor	0.95	0.95			1.00		0.95	1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00
Frt	0.85	0.85			1.00		1.00	0.85
Flt Protected	1.00	1.00			0.98		1.00	1.00
Satd. Flow (prot)	1447	1447			1761		3406	1524
Flt Permitted	1.00	1.00			0.98		1.00	1.00
Satd. Flow (perm)	1447	1447			1761		3406	1524
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	84	21	137	242	0	1047	158
RTOR Reduction (vph)	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	52	53	0	0	379	0	1047	158
Confl. Peds. (#/hr)			10					
Turn Type	NA	Prot		Split	NA		NA	Prot
Protected Phases	4	4		6	6	8	5	5
Permitted Phases								
Actuated Green, G (s)	8.7	8.7			16.0		34.0	34.0
Effective Green, g (s)	8.7	8.7			16.0		34.0	34.0
Actuated g/C Ratio	0.10	0.10			0.18		0.37	0.37
Clearance Time (s)	6.0	6.0			6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0			1.5		3.0	3.0
Lane Grp Cap (vph)	138	138			310		1276	571
v/s Ratio Prot	0.04	c0.04			c0.22		c0.31	0.10
v/s Ratio Perm								
v/c Ratio	0.38	0.38			1.22		0.82	0.28
Uniform Delay, d1	38.5	38.5			37.4		25.6	19.8
Progression Factor	1.00	1.00			1.00		1.00	1.00
Incremental Delay, d2	1.7	1.8			125.6		4.4	0.3
Delay (s)	40.2	40.3			162.9		30.0	20.0
Level of Service	D	D			F		C	C
Approach Delay (s)	40.2				162.9	0.0	28.7	
Approach LOS	D				F	A	C	

Intersection Summary			
HCM 2000 Control Delay	59.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	90.7	Sum of lost time (s)	26.0
Intersection Capacity Utilization	66.0%	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)	0	220	5	10	265	0	0	0	0	205	25	70
Future Volume (vph)	0	220	5	10	265	0	0	0	0	205	25	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0						4.0	4.0
Lane Util. Factor		1.00			0.95						1.00	1.00
Frt		1.00			1.00						1.00	0.85
Flt Protected		1.00			1.00						0.96	1.00
Satd. Flow (prot)		1787			3399						1716	1524
Flt Permitted		1.00			0.94						0.75	1.00
Satd. Flow (perm)		1787			3216						1342	1524
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	232	5	11	279	0	0	0	0	216	26	74
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	0	44
Lane Group Flow (vph)	0	236	0	0	290	0	0	0	0	0	242	30
Turn Type		NA		Perm	NA					Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases				6						4		4
Actuated Green, G (s)		27.5			27.5						23.5	23.5
Effective Green, g (s)		28.0			28.0						24.0	24.0
Actuated g/C Ratio		0.47			0.47						0.40	0.40
Clearance Time (s)		4.5			4.5						4.5	4.5
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		833			1500						536	609
v/s Ratio Prot		c0.13										
v/s Ratio Perm					0.09						c0.18	0.02
v/c Ratio		0.28			0.19						0.45	0.05
Uniform Delay, d1		9.8			9.4						13.2	11.0
Progression Factor		1.00			1.00						1.00	1.00
Incremental Delay, d2		0.9			0.1						0.6	0.0
Delay (s)		10.7			9.4						13.8	11.0
Level of Service		B			A						B	B
Approach Delay (s)		10.7			9.4			0.0			13.1	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	11.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	34.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	380	20	75	0	25	230	0	1150	280	15	615	85
Future Volume (vph)	380	20	75	0	25	230	0	1150	280	15	615	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	3.5		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00		0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.94		1.00	0.94		1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1665	1752	1473		1845	1472		3505	1568	1752	3505	1568
Flt Permitted	0.95	1.00	1.00		1.00	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1665	1752	1473		1845	1472		3505	1568	1752	3505	1568
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	400	21	79	0	26	242	0	1211	295	16	647	89
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	400	21	79	0	26	242	0	1211	295	16	647	89
Confl. Peds. (#/hr)			18			50						
Confl. Bikes (#/hr)			30			160						
Turn Type	Split	NA	Perm	Split	NA	Free		NA	custom	Prot	NA	custom
Protected Phases	4	4		8	8			6!	16!	5 15 25!	2	8 26
Permitted Phases			4			Free						
Actuated Green, G (s)	36.0	36.0	36.0		13.0	140.0		70.4	26.0	2.6	77.5	39.0
Effective Green, g (s)	36.5	36.5	36.5		13.5	140.0		70.9	26.5	3.1	78.0	40.0
Actuated g/C Ratio	0.26	0.26	0.26		0.10	1.00		0.51	0.19	0.02	0.56	0.29
Clearance Time (s)	4.5	4.5	4.5		4.5			4.5	4.5		4.5	
Vehicle Extension (s)	1.0	1.0	1.0		1.0			0.5	0.5		0.5	
Lane Grp Cap (vph)	434	456	384		177	1472		1775	296	38	1952	448
v/s Ratio Prot	c0.24	0.01			0.01			c0.35	c0.19	0.01	c0.18	0.06
v/s Ratio Perm			0.05			c0.16						
v/c Ratio	0.92	0.05	0.21		0.15	0.16		0.68	1.00	0.42	0.33	0.20
Uniform Delay, d1	50.4	38.7	40.4		58.0	0.0		26.1	56.7	67.6	16.8	37.9
Progression Factor	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.50	0.11	0.72
Incremental Delay, d2	24.6	0.0	0.1		0.1	0.2		2.1	51.0	2.5	0.4	0.1
Delay (s)	75.0	38.7	40.5		58.1	0.2		28.2	107.7	104.1	2.4	27.3
Level of Service	E	D	D		E	A		C	F	F	A	C
Approach Delay (s)		68.0			5.9			43.8			7.5	
Approach LOS		E			A			D			A	

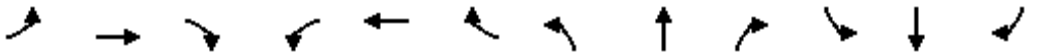
Intersection Summary			
HCM 2000 Control Delay	35.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	25	15	50	0	30	70	15	1170	40	10	665	70
Future Volume (vph)	25	15	50	0	30	70	15	1170	40	10	665	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.88			0.86		1.00	0.97		1.00	0.98	
Flpb, ped/bikes		0.95			1.00		1.00	1.00		1.00	1.00	
Frt		0.92			0.90		1.00	1.00		1.00	0.99	
Flt Protected		0.99			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1410			1414		1752	3399		1752	3381	
Flt Permitted		0.90			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1293			1414		1752	3399		1752	3381	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	26	16	53	0	32	74	16	1232	42	11	700	74
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	95	0	0	106	0	16	1274	0	11	774	0
Confl. Peds. (#/hr)	118		124			118			40			58
Confl. Bikes (#/hr)									835			130
Turn Type	Perm	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4											
Actuated Green, G (s)		25.0			34.0		11.3	58.1		2.5	49.3	
Effective Green, g (s)		25.5			34.5		11.8	58.6		3.0	49.8	
Actuated g/C Ratio		0.18			0.25		0.08	0.42		0.02	0.36	
Clearance Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		1.0			3.0		0.5	0.5		0.5	0.5	
Lane Grp Cap (vph)		235			348		147	1422		37	1202	
v/s Ratio Prot					c0.07		0.01	c0.37		c0.01	0.23	
v/s Ratio Perm		c0.07										
v/c Ratio		0.40			0.30		0.11	0.90		0.30	0.64	
Uniform Delay, d1		50.5			43.0		59.2	37.9		67.5	37.7	
Progression Factor		1.00			1.00		0.59	0.42		1.10	0.95	
Incremental Delay, d2		0.4			0.5		0.1	7.3		1.6	2.6	
Delay (s)		51.0			43.5		34.8	23.4		75.9	38.3	
Level of Service		D			D		C	C		E	D	
Approach Delay (s)		51.0			43.5			23.5			38.8	
Approach LOS		D			D			C			D	

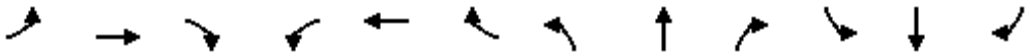
Intersection Summary			
HCM 2000 Control Delay	30.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	61.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



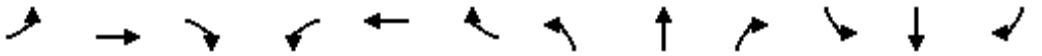
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	350	615	0	0	0	0	0	220	45
Future Volume (vph)	0	0	0	350	615	0	0	0	0	0	220	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0						4.0	4.0
Lane Util. Factor				0.97	0.95						1.00	1.00
Frt				1.00	1.00						1.00	0.85
Flt Protected				0.95	1.00						1.00	1.00
Satd. Flow (prot)				3400	3470						1845	1568
Flt Permitted				0.95	1.00						1.00	1.00
Satd. Flow (perm)				3400	3470						1845	1568
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	368	647	0	0	0	0	0	232	47
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	368	647	0	0	0	0	0	232	47
Bus Blockages (#/hr)	0	0	0	0	5	0	0	0	0	0	0	0
Turn Type				Prot	NA						NA	custom
Protected Phases				6	2						4	8
Permitted Phases												
Actuated Green, G (s)				29.9	40.5						20.5	4.5
Effective Green, g (s)				30.4	41.0						21.0	5.0
Actuated g/C Ratio				0.43	0.59						0.30	0.07
Clearance Time (s)				4.5	4.5						4.5	4.5
Vehicle Extension (s)				3.0	3.0						3.0	3.0
Lane Grp Cap (vph)				1476	2032						553	112
v/s Ratio Prot				0.11	c0.19						c0.13	0.03
v/s Ratio Perm												
v/c Ratio				0.25	0.32						0.42	0.42
Uniform Delay, d1				12.6	7.4						19.6	31.1
Progression Factor				1.08	1.48						1.00	1.00
Incremental Delay, d2				0.4	0.4						2.3	2.5
Delay (s)				13.9	11.3						22.0	33.6
Level of Service				B	B						C	C
Approach Delay (s)		0.0			12.2			0.0			23.9	
Approach LOS		A			B			A			C	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	47.0%	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)	0	0	0	0	945	860	20	350	0	0	0	0
Future Volume (vph)	0	0	0	0	945	860	20	350	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0		4.0				
Lane Util. Factor					0.91	0.88		0.95				
Frpb, ped/bikes					1.00	1.00		1.00				
Flpb, ped/bikes					1.00	1.00		1.00				
Frt					1.00	0.85		1.00				
Flt Protected					1.00	1.00		1.00				
Satd. Flow (prot)					5036	2760		3492				
Flt Permitted					1.00	1.00		1.00				
Satd. Flow (perm)					5036	2760		3492				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	995	905	21	368	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	995	905	0	389	0	0	0	0
Confl. Peds. (#/hr)							14					
Turn Type					NA	custom	Perm	NA				
Protected Phases					2			4				
Permitted Phases						6	4					
Actuated Green, G (s)					39.5	20.5		18.5				
Effective Green, g (s)					40.0	21.0		19.0				
Actuated g/C Ratio					0.57	0.30		0.27				
Clearance Time (s)					4.5	4.5		4.5				
Vehicle Extension (s)					3.0	3.0		2.0				
Lane Grp Cap (vph)					2877	828		947				
v/s Ratio Prot					c0.20							
v/s Ratio Perm						c0.33		0.11				
v/c Ratio					0.35	1.09		0.41				
Uniform Delay, d1					8.0	24.5		20.9				
Progression Factor					0.50	0.84		1.42				
Incremental Delay, d2					0.2	56.1		0.1				
Delay (s)					4.2	76.6		29.9				
Level of Service					A	E		C				
Approach Delay (s)		0.0			38.7			29.9			0.0	
Approach LOS		A			D			C			A	

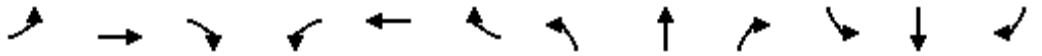
Intersection Summary			
HCM 2000 Control Delay	37.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	920	15	860	160	0	0	0	25
Future Volume (vph)	0	0	0	0	920	15	860	160	0	0	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0		4.0	4.0				4.0
Lane Util. Factor					0.86		0.97	1.00				1.00
Frpb, ped/bikes					0.99		1.00	1.00				1.00
Flpb, ped/bikes					1.00		1.00	1.00				1.00
Frt					1.00		1.00	1.00				0.86
Flt Protected					1.00		0.95	1.00				1.00
Satd. Flow (prot)					6292		3400	1845				1596
Flt Permitted					1.00		0.95	1.00				1.00
Satd. Flow (perm)					6292		3400	1845				1596
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	968	16	905	168	0	0	0	26
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	984	0	905	168	0	0	0	26
Confl. Peds. (#/hr)						102						
Confl. Bikes (#/hr)						100						
Turn Type					NA		Prot	NA				Perm
Protected Phases					2		3	8				
Permitted Phases												8
Actuated Green, G (s)					15.3		26.5	42.7				42.7
Effective Green, g (s)					15.8		27.0	43.2				43.2
Actuated g/C Ratio					0.23		0.39	0.62				0.62
Clearance Time (s)					4.5		4.5	4.5				4.5
Vehicle Extension (s)					3.0		0.2	2.0				2.0
Lane Grp Cap (vph)					1420		1311	1138				984
v/s Ratio Prot					c0.16		c0.27	c0.09				
v/s Ratio Perm												0.02
v/c Ratio					0.69		0.69	0.15				0.03
Uniform Delay, d1					24.9		18.0	5.6				5.2
Progression Factor					1.25		0.52	0.13				1.00
Incremental Delay, d2					2.8		2.6	0.0				0.0
Delay (s)					33.8		12.0	0.8				5.2
Level of Service					C		B	A				A
Approach Delay (s)		0.0			33.8			10.3			5.2	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		

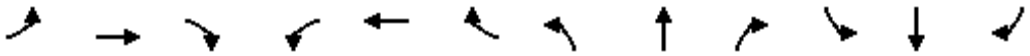
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	20	810	25	30	140	0	0	15	95
Future Volume (vph)	0	0	0	20	810	25	30	140	0	0	15	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					0.91			1.00			1.00	
Frpb, ped/bikes					1.00			1.00			0.92	
Flpb, ped/bikes					1.00			0.99			1.00	
Frt					1.00			1.00			0.88	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					4991			1804			1493	
Flt Permitted					1.00			0.93			1.00	
Satd. Flow (perm)					4991			1691			1493	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	21	853	26	32	147	0	0	16	100
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	30	0
Lane Group Flow (vph)	0	0	0	0	898	0	0	179	0	0	86	0
Confl. Peds. (#/hr)				34		38	56					56
Confl. Bikes (#/hr)						100						
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					2			4			4	
Permitted Phases				2			4					
Actuated Green, G (s)					48.0			13.0			13.0	
Effective Green, g (s)					48.5			13.5			13.5	
Actuated g/C Ratio					0.69			0.19			0.19	
Clearance Time (s)					4.5			4.5			4.5	
Vehicle Extension (s)					0.2			3.0			3.0	
Lane Grp Cap (vph)					3458			326			287	
v/s Ratio Prot											0.06	
v/s Ratio Perm					0.18			c0.11				
v/c Ratio					0.26			0.55			0.30	
Uniform Delay, d1					4.0			25.5			24.2	
Progression Factor					1.00			1.08			1.00	
Incremental Delay, d2					0.2			1.7			0.6	
Delay (s)					4.2			29.3			24.8	
Level of Service					A			C			C	
Approach Delay (s)		0.0			4.2			29.3			24.8	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.1%	ICU Level of Service	A
Analysis Period (min)	15		

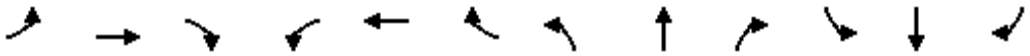
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↱								↑↑↑	
Traffic Volume (vph)	0	1095	300	0	0	0	0	0	0	45	525	0
Future Volume (vph)	0	1095	300	0	0	0	0	0	0	45	525	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0								4.0	
Lane Util. Factor		0.91	1.00								0.91	
Frpb, ped/bikes		1.00	1.00								1.00	
Flpb, ped/bikes		1.00	1.00								1.00	
Frt		1.00	0.85								1.00	
Flt Protected		1.00	1.00								1.00	
Satd. Flow (prot)		5036	1568								4974	
Flt Permitted		1.00	1.00								1.00	
Satd. Flow (perm)		5036	1568								4974	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1153	316	0	0	0	0	0	0	47	553	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1153	316	0	0	0	0	0	0	0	600	0
Confl. Peds. (#/hr)										16		
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	5	0
Turn Type		NA	custom							Perm	NA	
Protected Phases		6 9	16								4	
Permitted Phases										4		
Actuated Green, G (s)		43.2	16.5								14.8	
Effective Green, g (s)		43.7	17.0								15.3	
Actuated g/C Ratio		0.62	0.24								0.22	
Clearance Time (s)			4.5								4.5	
Vehicle Extension (s)			3.0								3.0	
Lane Grp Cap (vph)		3143	380								1087	
v/s Ratio Prot		c0.23	c0.20									
v/s Ratio Perm											0.12	
v/c Ratio		0.37	0.83								0.55	
Uniform Delay, d1		6.4	25.1								24.3	
Progression Factor		1.26	0.96								1.00	
Incremental Delay, d2		0.3	11.2								0.6	
Delay (s)		8.3	35.4								25.0	
Level of Service		A	D								C	
Approach Delay (s)		14.2			0.0			0.0			25.0	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	17.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		

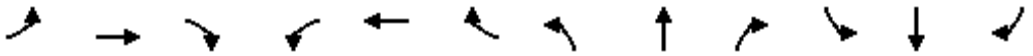
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	360	780	0	0	0	0	0	10	0	0	0	0
Future Volume (vph)	360	780	0	0	0	0	0	10	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0				
Lane Util. Factor		0.91						1.00				
Frpb, ped/bikes		1.00						1.00				
Flpb, ped/bikes		0.96						1.00				
Frt		1.00						1.00				
Flt Protected		0.98						1.00				
Satd. Flow (prot)		4743						1845				
Flt Permitted		0.98						1.00				
Satd. Flow (perm)		4743						1845				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	379	821	0	0	0	0	0	11	0	0	0	0
RTOR Reduction (vph)	0	161	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1039	0	0	0	0	0	11	0	0	0	0
Confl. Peds. (#/hr)	110											
Bus Blockages (#/hr)	0	5	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA						NA				
Protected Phases		2						4				
Permitted Phases	2											
Actuated Green, G (s)		19.3						38.7				
Effective Green, g (s)		19.8						39.2				
Actuated g/C Ratio		0.28						0.56				
Clearance Time (s)		4.5						4.5				
Vehicle Extension (s)		0.2						0.5				
Lane Grp Cap (vph)		1341						1033				
v/s Ratio Prot								c0.01				
v/s Ratio Perm		0.22										
v/c Ratio		0.77						0.01				
Uniform Delay, d1		23.1						6.8				
Progression Factor		0.88						1.00				
Incremental Delay, d2		4.2						0.0				
Delay (s)		24.5						6.8				
Level of Service		C						A				
Approach Delay (s)		24.5			0.0			6.8			0.0	
Approach LOS		C			A			A			A	

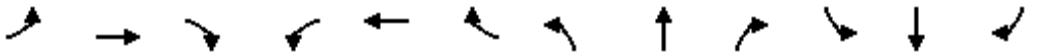
Intersection Summary			
HCM 2000 Control Delay	24.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	735	0	0	0	0	0	975	1285	0	0	0
Future Volume (vph)	45	735	0	0	0	0	0	975	1285	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0			
Lane Util. Factor		0.91						0.95	*0.97			
Frpb, ped/bikes		1.00						1.00	1.00			
Flpb, ped/bikes		0.99						1.00	1.00			
Frt		1.00						1.00	0.85			
Flt Protected		1.00						1.00	1.00			
Satd. Flow (prot)		4979						3505	3042			
Flt Permitted		1.00						1.00	1.00			
Satd. Flow (perm)		4979						3505	3042			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	774	0	0	0	0	0	1026	1353	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	821	0	0	0	0	0	1026	1353	0	0	0
Confl. Peds. (#/hr)	144											
Turn Type	Perm	NA						NA	Prot			
Protected Phases		6						8	8			
Permitted Phases	6											
Actuated Green, G (s)		20.0						38.0	38.0			
Effective Green, g (s)		20.5						38.5	38.5			
Actuated g/C Ratio		0.29						0.55	0.55			
Clearance Time (s)		4.5						4.5	4.5			
Vehicle Extension (s)		3.5						3.9	3.9			
Lane Grp Cap (vph)		1458						1927	1673			
v/s Ratio Prot								0.29	c0.44			
v/s Ratio Perm		0.16										
v/c Ratio		0.56						0.53	0.81			
Uniform Delay, d1		21.0						10.0	12.8			
Progression Factor		0.94						1.00	1.00			
Incremental Delay, d2		1.4						1.1	4.3			
Delay (s)		21.1						11.1	17.1			
Level of Service		C						B	B			
Approach Delay (s)		21.1			0.0			14.5			0.0	
Approach LOS		C			A			B			A	

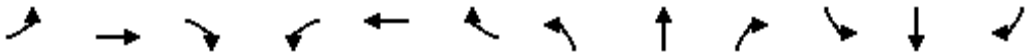
Intersection Summary			
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	140	1715	165	0	0	0	0	30	15	15	20	0
Future Volume (vph)	140	1715	165	0	0	0	0	30	15	15	20	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		0.91						1.00			1.00	
Frpb, ped/bikes		0.99						0.99			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.99						0.95			1.00	
Flt Protected		1.00						1.00			0.98	
Satd. Flow (prot)		4881						1751			1801	
Flt Permitted		1.00						1.00			0.84	
Satd. Flow (perm)		4881						1751			1541	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	147	1805	174	0	0	0	0	32	16	16	21	0
RTOR Reduction (vph)	0	8	0	0	0	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	2118	0	0	0	0	0	39	0	0	37	0
Confl. Peds. (#/hr)	58		152						2	2		
Confl. Bikes (#/hr)			100									
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		2						4			4	
Permitted Phases	2									4		
Actuated Green, G (s)		55.0						6.0			6.0	
Effective Green, g (s)		55.5						6.5			6.5	
Actuated g/C Ratio		0.79						0.09			0.09	
Clearance Time (s)		4.5						4.5			4.5	
Vehicle Extension (s)		0.5						0.5			0.5	
Lane Grp Cap (vph)		3869						162			143	
v/s Ratio Prot								0.02				
v/s Ratio Perm		0.43									c0.02	
v/c Ratio		0.55						0.24			0.26	
Uniform Delay, d1		2.7						29.5			29.5	
Progression Factor		0.87						1.00			1.02	
Incremental Delay, d2		0.4						0.3			0.3	
Delay (s)		2.7						29.7			30.5	
Level of Service		A						C			C	
Approach Delay (s)		2.7			0.0			29.7			30.5	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	3.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		

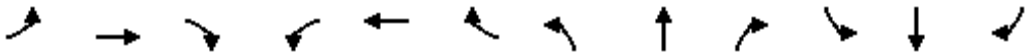
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	0	0	50	75	5	485	20	0	0	0
Future Volume (vph)	10	0	0	0	50	75	5	485	20	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		1.00			1.00			1.00				
Frt		1.00			0.92			0.99				
Flt Protected		0.95			1.00			1.00				
Satd. Flow (prot)		1752			1696			1834				
Flt Permitted		0.58			1.00			1.00				
Satd. Flow (perm)		1069			1696			1834				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	0	0	0	53	79	5	511	21	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	11	0	0	132	0	0	537	0	0	0	0
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		2			2			4				
Permitted Phases	2						4					
Actuated Green, G (s)		6.4			6.4			23.0				
Effective Green, g (s)		6.9			6.9			23.5				
Actuated g/C Ratio		0.10			0.10			0.34				
Clearance Time (s)		4.5			4.5			4.5				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		105			167			615				
v/s Ratio Prot					c0.08							
v/s Ratio Perm		0.01						0.29				
v/c Ratio		0.10			0.79			0.87				
Uniform Delay, d1		28.7			30.8			21.8				
Progression Factor		1.00			1.00			0.63				
Incremental Delay, d2		0.4			22.0			7.5				
Delay (s)		29.2			52.8			21.3				
Level of Service		C			D			C				
Approach Delay (s)		29.2			52.8			21.3			0.0	
Approach LOS		C			D			C			A	

Intersection Summary			
HCM 2000 Control Delay	27.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



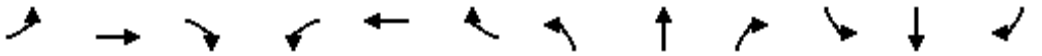
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	10	0	5	50	0	0	0	0	0	260	0
Future Volume (Veh/h)	0	10	0	5	50	0	0	0	0	0	260	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	11	0	5	53	0	0	0	0	0	274	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								487				
pX, platoon unblocked												
vC, conflicting volume	300	274	274	280	274	0	274			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	300	274	274	280	274	0	274			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	98	100	99	92	100	100			100		
cM capacity (veh/h)	608	631	762	662	631	1082	1283			1617		

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	11	58	274
Volume Left	0	5	0
Volume Right	0	0	0
cSH	631	634	1617
Volume to Capacity	0.02	0.09	0.00
Queue Length 95th (ft)	1	8	0
Control Delay (s)	10.8	11.2	0.0
Lane LOS	B	B	
Approach Delay (s)	10.8	11.2	0.0
Approach LOS	B	B	

Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	27.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	EBR2	WBL	WBT	NBT	SET	SER
Lane Configurations									
Traffic Volume (vph)	10	0	240	105	130	335	0	740	85
Future Volume (vph)	10	0	240	105	130	335	0	740	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	6.0			6.0		6.0	6.0
Lane Util. Factor		0.95	0.95			1.00		0.95	1.00
Frpb, ped/bikes		1.00	1.00			1.00		1.00	1.00
Flpb, ped/bikes		1.00	1.00			1.00		1.00	1.00
Frt		0.86	0.85			1.00		1.00	0.85
Flt Protected		1.00	1.00			0.99		1.00	1.00
Satd. Flow (prot)		1501	1490			1819		3505	1568
Flt Permitted		1.00	1.00			0.99		1.00	1.00
Satd. Flow (perm)		1501	1490			1819		3505	1568
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	0	253	111	137	353	0	779	89
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	188	187	0	0	490	0	779	89
Confl. Peds. (#/hr)				10					
Turn Type	Prot	NA	custom		Split	NA		NA	Prot
Protected Phases	4		4		6	6	8	5	5
Permitted Phases									
Actuated Green, G (s)		16.2	16.2			26.0		25.0	25.0
Effective Green, g (s)		16.2	16.2			26.0		25.0	25.0
Actuated g/C Ratio		0.16	0.16			0.26		0.25	0.25
Clearance Time (s)			6.0			6.0		6.0	6.0
Vehicle Extension (s)			3.0			1.5		3.0	3.0
Lane Grp Cap (vph)		245	243			476		883	395
v/s Ratio Prot		0.13	c0.13			c0.27		c0.22	0.06
v/s Ratio Perm									
v/c Ratio		0.77	0.77			1.03		0.88	0.23
Uniform Delay, d1		39.7	39.7			36.6		35.7	29.4
Progression Factor		1.00	1.00			1.00		1.00	1.00
Incremental Delay, d2		13.4	13.6			49.0		10.3	0.3
Delay (s)		53.1	53.4			85.6		46.0	29.7
Level of Service		D	D			F		D	C
Approach Delay (s)		53.2				85.6	0.0	44.3	
Approach LOS		D				F	A	D	

Intersection Summary			
HCM 2000 Control Delay	57.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	99.2	Sum of lost time (s)	26.0
Intersection Capacity Utilization	74.5%	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	250	5	0	450	0	0	0	0	210	5	105
Future Volume (vph)	0	250	5	0	450	0	0	0	0	210	5	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0						4.0	4.0
Lane Util. Factor		1.00			0.95						1.00	1.00
Frt		1.00			1.00						1.00	0.85
Flt Protected		1.00			1.00						0.95	1.00
Satd. Flow (prot)		1840			3505						1759	1568
Flt Permitted		1.00			1.00						0.73	1.00
Satd. Flow (perm)		1840			3505						1348	1568
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	263	5	0	474	0	0	0	0	221	5	111
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	0	67
Lane Group Flow (vph)	0	267	0	0	474	0	0	0	0	0	226	44
Turn Type		NA			NA					Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases				6						4		4
Actuated Green, G (s)		27.5			27.5						23.5	23.5
Effective Green, g (s)		28.0			28.0						24.0	24.0
Actuated g/C Ratio		0.47			0.47						0.40	0.40
Clearance Time (s)		4.5			4.5						4.5	4.5
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		858			1635						539	627
v/s Ratio Prot		c0.15			0.14							
v/s Ratio Perm											c0.17	0.03
v/c Ratio		0.31			0.29						0.42	0.07
Uniform Delay, d1		10.0			9.9						13.0	11.1
Progression Factor		1.00			1.00						1.00	1.00
Incremental Delay, d2		0.9			0.1						0.5	0.0
Delay (s)		10.9			10.0						13.5	11.2
Level of Service		B			A						B	B
Approach Delay (s)		10.9			10.0			0.0			12.7	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	32.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	100	65	80	0	30	250	0	715	245	5	1135	120
Future Volume (vph)	100	65	80	0	30	250	0	715	245	5	1135	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	3.5		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00		0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.92		1.00	0.66		1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1618	1703	1407		1792	999		3406	1524	1703	3406	1524
Flt Permitted	0.95	1.00	1.00		1.00	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1618	1703	1407		1792	999		3406	1524	1703	3406	1524
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	68	84	0	32	263	0	753	258	5	1195	126
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	105	68	84	0	32	263	0	753	258	5	1195	126
Confl. Peds. (#/hr)			6			28						
Confl. Bikes (#/hr)			30			1480						
Turn Type	Split	NA	Perm	Split	NA	Free		NA	custom	Prot	NA	custom
Protected Phases	4	4		8	8			6!	16!	5 15 25!	2	8 26
Permitted Phases			4			Free						
Actuated Green, G (s)	15.7	15.7	15.7		10.6	140.0		94.4	22.7	1.3	100.2	33.3
Effective Green, g (s)	16.2	16.2	16.2		11.1	140.0		94.9	23.2	1.8	100.7	34.3
Actuated g/C Ratio	0.12	0.12	0.12		0.08	1.00		0.68	0.17	0.01	0.72	0.24
Clearance Time (s)	4.5	4.5	4.5		4.5			4.5	4.5		4.5	
Vehicle Extension (s)	1.0	1.0	1.0		1.0			0.5	0.5		0.5	
Lane Grp Cap (vph)	187	197	162		142	999		2308	252	21	2449	373
v/s Ratio Prot	c0.06	0.04			0.02			0.22	c0.17	0.00	c0.35	0.08
v/s Ratio Perm			0.06			c0.26						
v/c Ratio	0.56	0.35	0.52		0.23	0.26		0.33	1.02	0.24	0.49	0.34
Uniform Delay, d1	58.5	57.0	58.2		60.4	0.0		9.3	58.4	68.4	8.5	43.5
Progression Factor	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.18	0.49	0.37
Incremental Delay, d2	2.3	0.4	1.2		0.3	0.6		0.4	63.0	1.3	0.4	0.1
Delay (s)	60.8	57.4	59.4		60.7	0.6		9.7	121.4	82.2	4.6	16.4
Level of Service	E	E	E		E	A		A	F	F	A	B
Approach Delay (s)		59.5			7.2			38.2			6.0	
Approach LOS		E			A			D			A	

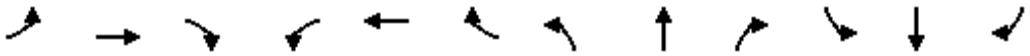
Intersection Summary			
HCM 2000 Control Delay	22.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	10	25	15	15	15	5	10	755	30	5	1230	40
Future Volume (vph)	10	25	15	15	15	5	10	755	30	5	1230	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99		1.00	0.99		1.00	0.99		1.00	0.97	
Flpb, ped/bikes		0.99		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.96		1.00	0.96		1.00	0.99		1.00	1.00	
Flt Protected		0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1678		1703	1707		1703	3363		1703	3304	
Flt Permitted		0.94		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1602		1703	1707		1703	3363		1703	3304	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	26	16	16	16	5	11	795	32	5	1295	42
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	53	0	16	21	0	11	827	0	5	1337	0
Confl. Peds. (#/hr)	24		4			24			18			26
Confl. Bikes (#/hr)									150			1450
Turn Type	Perm	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases		4		3	8		1	6		5	2	
Permitted Phases	4											
Actuated Green, G (s)		13.0		3.3	23.0		3.3	55.4		5.2	57.3	
Effective Green, g (s)		13.5		3.8	23.5		3.8	55.9		5.7	57.8	
Actuated g/C Ratio		0.10		0.03	0.17		0.03	0.40		0.04	0.41	
Clearance Time (s)		4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		1.0		3.0	3.0		0.5	0.5		0.5	0.5	
Lane Grp Cap (vph)		154		46	286		46	1342		69	1364	
v/s Ratio Prot				c0.01	c0.01		c0.01	0.25		0.00	c0.40	
v/s Ratio Perm		c0.03										
v/c Ratio		0.34		0.35	0.07		0.24	0.62		0.07	0.98	
Uniform Delay, d1		59.1		66.9	49.1		66.7	33.5		64.6	40.5	
Progression Factor		1.00		1.00	1.00		0.90	0.89		1.11	0.92	
Incremental Delay, d2		0.5		4.5	0.1		0.9	2.1		0.1	18.5	
Delay (s)		59.6		71.4	49.2		61.3	31.9		71.6	55.7	
Level of Service		E		E	D		E	C		E	E	
Approach Delay (s)		59.6			58.8			32.3			55.8	
Approach LOS		E			E			C			E	

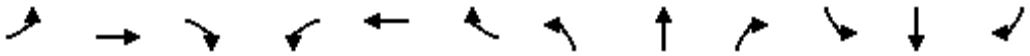
Intersection Summary			
HCM 2000 Control Delay	47.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



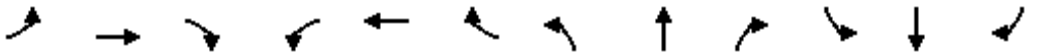
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	605	970	0	180	0	0	0	300	0
Future Volume (vph)	0	0	0	605	970	0	180	0	0	0	300	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0				4.0	
Lane Util. Factor				0.97	0.95		1.00				1.00	
Frt				1.00	1.00		1.00				1.00	
Flt Protected				0.95	1.00		0.95				1.00	
Satd. Flow (prot)				3303	3372		1703				1792	
Flt Permitted				0.95	1.00		0.95				1.00	
Satd. Flow (perm)				3303	3372		1703				1792	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	637	1021	0	189	0	0	0	316	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	637	1021	0	189	0	0	0	316	0
Bus Blockages (#/hr)	0	0	0	0	5	0	0	0	0	0	0	0
Turn Type				Prot	NA		Prot				NA	
Protected Phases				6	2		3				4	
Permitted Phases												
Actuated Green, G (s)				26.7	33.5		10.8				12.2	
Effective Green, g (s)				27.2	34.0		11.3				12.7	
Actuated g/C Ratio				0.39	0.49		0.16				0.18	
Clearance Time (s)				4.5	4.5		4.5				4.5	
Vehicle Extension (s)				3.0	3.0		3.0				3.0	
Lane Grp Cap (vph)				1283	1637		274				325	
v/s Ratio Prot				0.19	c0.30		c0.11				c0.18	
v/s Ratio Perm												
v/c Ratio				0.50	0.62		0.69				0.97	
Uniform Delay, d1				16.2	13.3		27.7				28.5	
Progression Factor				1.34	1.40		1.89				1.00	
Incremental Delay, d2				1.1	1.5		6.5				42.2	
Delay (s)				22.9	20.0		58.9				70.7	
Level of Service				C	C		E				E	
Approach Delay (s)		0.0			21.1			58.9			70.7	
Approach LOS		A			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	31.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.6%	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)	0	0	0	0	1535	920	40	185	0	0	0	0
Future Volume (vph)	0	0	0	0	1535	920	40	185	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0		4.0				
Lane Util. Factor					0.91	0.88		0.95				
Frpb, ped/bikes					1.00	1.00		1.00				
Flpb, ped/bikes					1.00	1.00		1.00				
Frt					1.00	0.85		1.00				
Flt Protected					1.00	1.00		0.99				
Satd. Flow (prot)					4893	2682		3373				
Flt Permitted					1.00	1.00		0.99				
Satd. Flow (perm)					4893	2682		3373				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	1616	968	42	195	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1616	968	0	237	0	0	0	0
Confl. Peds. (#/hr)							4					
Turn Type					NA	custom	Perm	NA				
Protected Phases					2			4				
Permitted Phases						6	4					
Actuated Green, G (s)					39.5	20.5		18.5				
Effective Green, g (s)					40.0	21.0		19.0				
Actuated g/C Ratio					0.57	0.30		0.27				
Clearance Time (s)					4.5	4.5		4.5				
Vehicle Extension (s)					3.0	3.0		2.0				
Lane Grp Cap (vph)					2796	804		915				
v/s Ratio Prot					c0.33							
v/s Ratio Perm						c0.36		0.07				
v/c Ratio					0.58	1.20		0.26				
Uniform Delay, d1					9.6	24.5		20.0				
Progression Factor					0.63	0.79		0.35				
Incremental Delay, d2					0.6	99.5		0.1				
Delay (s)					6.6	118.8		7.0				
Level of Service					A	F		A				
Approach Delay (s)		0.0			48.6			7.0			0.0	
Approach LOS		A			D			A			A	

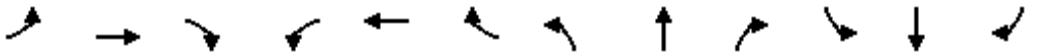
Intersection Summary			
HCM 2000 Control Delay	45.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	1560	10	865	55	0	0	0	30
Future Volume (vph)	0	0	0	0	1560	10	865	55	0	0	0	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0		4.0	4.0				4.0
Lane Util. Factor					0.86		0.97	1.00				1.00
Frpb, ped/bikes					1.00		1.00	1.00				1.00
Flpb, ped/bikes					1.00		1.00	1.00				1.00
Frt					1.00		1.00	1.00				0.86
Flt Protected					1.00		0.95	1.00				1.00
Satd. Flow (prot)					6141		3303	1792				1550
Flt Permitted					1.00		0.95	1.00				1.00
Satd. Flow (perm)					6141		3303	1792				1550
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	1642	11	911	58	0	0	0	32
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1653	0	911	58	0	0	0	32
Confl. Peds. (#/hr)						28						
Confl. Bikes (#/hr)						310						
Turn Type					NA		Prot	NA				Perm
Protected Phases					2		3	8				
Permitted Phases												8
Actuated Green, G (s)					19.1		31.5	38.9				38.9
Effective Green, g (s)					19.6		32.0	39.4				39.4
Actuated g/C Ratio					0.28		0.46	0.56				0.56
Clearance Time (s)					4.5		4.5	4.5				4.5
Vehicle Extension (s)					3.0		0.2	2.0				2.0
Lane Grp Cap (vph)					1719		1509	1008				872
v/s Ratio Prot					c0.27		c0.28	c0.03				
v/s Ratio Perm												0.02
v/c Ratio					0.96		0.60	0.06				0.04
Uniform Delay, d1					24.8		14.2	6.9				6.8
Progression Factor					1.30		0.57	0.41				1.00
Incremental Delay, d2					13.3		1.7	0.0				0.0
Delay (s)					45.7		9.8	2.8				6.8
Level of Service					D		A	A				A
Approach Delay (s)		0.0			45.7			9.4			6.8	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	32.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		

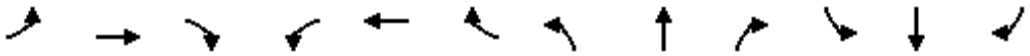
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	10	1385	55	35	105	0	0	25	150
Future Volume (vph)	0	0	0	10	1385	55	35	105	0	0	25	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					0.91			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			0.97	
Flpb, ped/bikes					1.00			1.00			1.00	
Frt					0.99			1.00			0.88	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					4819			1764			1543	
Flt Permitted					1.00			0.89			1.00	
Satd. Flow (perm)					4819			1590			1543	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	11	1458	58	37	111	0	0	26	158
RTOR Reduction (vph)	0	0	0	0	5	0	0	0	0	0	26	0
Lane Group Flow (vph)	0	0	0	0	1522	0	0	148	0	0	158	0
Confl. Peds. (#/hr)				20		20	18					18
Confl. Bikes (#/hr)						310						
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					2			4			4	
Permitted Phases				2			4					
Actuated Green, G (s)					45.4			15.6			15.6	
Effective Green, g (s)					45.9			16.1			16.1	
Actuated g/C Ratio					0.66			0.23			0.23	
Clearance Time (s)					4.5			4.5			4.5	
Vehicle Extension (s)					0.2			3.0			3.0	
Lane Grp Cap (vph)					3159			365			354	
v/s Ratio Prot											c0.10	
v/s Ratio Perm					0.32			0.09				
v/c Ratio					0.48			0.41			0.45	
Uniform Delay, d1					6.1			22.9			23.1	
Progression Factor					1.00			1.04			1.00	
Incremental Delay, d2					0.5			0.7			0.9	
Delay (s)					6.6			24.5			24.0	
Level of Service					A			C			C	
Approach Delay (s)		0.0			6.6			24.5			24.0	
Approach LOS		A			A			C			C	

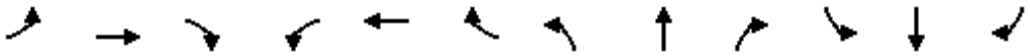
Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	580	260	0	0	0	0	180	50	20	885	0
Future Volume (vph)	0	580	260	0	0	0	0	180	50	20	885	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0					4.0			4.0	
Lane Util. Factor		0.91	1.00					1.00			0.95	
Frt		1.00	0.85					0.97			1.00	
Flt Protected		1.00	1.00					1.00			1.00	
Satd. Flow (prot)		4893	1524					1739			3368	
Flt Permitted		1.00	1.00					1.00			0.95	
Satd. Flow (perm)		4893	1524					1739			3187	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	611	274	0	0	0	0	189	53	21	932	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	611	274	0	0	0	0	242	0	0	953	0
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	5	0
Turn Type		NA	custom					NA		Perm	NA	
Protected Phases		6 9	16					4			4	
Permitted Phases										4		
Actuated Green, G (s)		36.5	20.4					21.5			21.5	
Effective Green, g (s)		37.0	20.9					22.0			22.0	
Actuated g/C Ratio		0.53	0.30					0.31			0.31	
Clearance Time (s)			4.5					4.5			4.5	
Vehicle Extension (s)			3.0					3.0			3.0	
Lane Grp Cap (vph)		2586	455					546			1001	
v/s Ratio Prot		c0.12	c0.18					0.14				
v/s Ratio Perm											c0.30	
v/c Ratio		0.24	0.60					0.44			0.95	
Uniform Delay, d1		8.9	21.0					19.1			23.5	
Progression Factor		0.96	0.78					1.00			1.08	
Incremental Delay, d2		0.0	2.1					0.6			15.1	
Delay (s)		8.6	18.3					19.7			40.4	
Level of Service		A	B					B			D	
Approach Delay (s)		11.6			0.0			19.7			40.4	
Approach LOS		B			A			B			D	

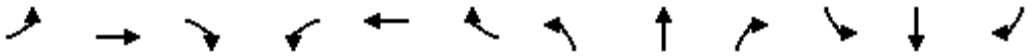
Intersection Summary			
HCM 2000 Control Delay	25.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	225	425	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	225	425	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0										
Lane Util. Factor		0.91										
Frpb, ped/bikes		1.00										
Flpb, ped/bikes		0.98										
Frt		1.00										
Flt Protected		0.98										
Satd. Flow (prot)		4694										
Flt Permitted		0.98										
Satd. Flow (perm)		4694										
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	237	447	0	0	0	0	0	0	0	0	0	0
RTOR Reduction (vph)	0	200	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	484	0	0	0	0	0	0	0	0	0	0
Confl. Peds. (#/hr)	26											
Bus Blockages (#/hr)	0	5	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA										
Protected Phases		2						4				
Permitted Phases	2											
Actuated Green, G (s)		10.3										
Effective Green, g (s)		10.8										
Actuated g/C Ratio		0.15										
Clearance Time (s)		4.5										
Vehicle Extension (s)		0.2										
Lane Grp Cap (vph)		724										
v/s Ratio Prot												
v/s Ratio Perm		0.10										
v/c Ratio		0.67										
Uniform Delay, d1		27.9										
Progression Factor		1.67										
Incremental Delay, d2		4.7										
Delay (s)		51.2										
Level of Service		D										
Approach Delay (s)		51.2			0.0			0.0			0.0	
Approach LOS		D			A			A			A	

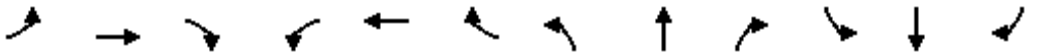
Intersection Summary			
HCM 2000 Control Delay	51.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.12		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	16.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	410	0	0	0	0	0	905	1450	0	0	0
Future Volume (vph)	15	410	0	0	0	0	0	905	1450	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0			
Lane Util. Factor		0.91						0.95	*0.78			
Frpb, ped/bikes		1.00						1.00	1.00			
Flpb, ped/bikes		1.00						1.00	1.00			
Frt		1.00						1.00	0.85			
Flt Protected		1.00						1.00	1.00			
Satd. Flow (prot)		4877						3406	2377			
Flt Permitted		1.00						1.00	1.00			
Satd. Flow (perm)		4877						3406	2377			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	432	0	0	0	0	0	953	1526	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	448	0	0	0	0	0	953	1526	0	0	0
Confl. Peds. (#/hr)	28											
Turn Type	Perm	NA						NA	Prot			
Protected Phases		6						8	8			
Permitted Phases	6											
Actuated Green, G (s)		12.9						45.1	45.1			
Effective Green, g (s)		13.4						45.6	45.6			
Actuated g/C Ratio		0.19						0.65	0.65			
Clearance Time (s)		4.5						4.5	4.5			
Vehicle Extension (s)		3.5						3.9	3.9			
Lane Grp Cap (vph)		933						2218	1548			
v/s Ratio Prot								0.28	c0.64			
v/s Ratio Perm		0.09										
v/c Ratio		0.48						0.43	0.99			
Uniform Delay, d1		25.2						5.9	11.9			
Progression Factor		0.92						1.00	1.00			
Incremental Delay, d2		1.7						0.6	19.7			
Delay (s)		24.9						6.5	31.6			
Level of Service		C						A	C			
Approach Delay (s)		24.9			0.0			22.0			0.0	
Approach LOS		C			A			C			A	

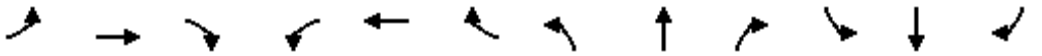
Intersection Summary			
HCM 2000 Control Delay	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	1750	10	0	0	0	0	40	10	25	10	0
Future Volume (vph)	100	1750	10	0	0	0	0	40	10	25	10	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		0.91						1.00			1.00	
Frpb, ped/bikes		1.00						1.00			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		1.00						0.97			1.00	
Flt Protected		1.00						1.00			0.97	
Satd. Flow (prot)		4872						1742			1732	
Flt Permitted		1.00						1.00			0.77	
Satd. Flow (perm)		4872						1742			1387	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	1842	11	0	0	0	0	42	11	26	11	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	0	1958	0	0	0	0	0	43	0	0	37	0
Confl. Peds. (#/hr)	10		30									
Confl. Bikes (#/hr)			100									
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		2						4			4	
Permitted Phases	2									4		
Actuated Green, G (s)		53.0						8.0			8.0	
Effective Green, g (s)		53.5						8.5			8.5	
Actuated g/C Ratio		0.76						0.12			0.12	
Clearance Time (s)		4.5						4.5			4.5	
Vehicle Extension (s)		0.5						0.5			0.5	
Lane Grp Cap (vph)		3723						211			168	
v/s Ratio Prot								0.02				
v/s Ratio Perm		0.40									c0.03	
v/c Ratio		0.53						0.21			0.22	
Uniform Delay, d1		3.3						27.7			27.8	
Progression Factor		0.95						1.00			0.92	
Incremental Delay, d2		0.3						0.2			0.2	
Delay (s)		3.3						27.9			25.7	
Level of Service		A						C			C	
Approach Delay (s)		3.3			0.0			27.9			25.7	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	4.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		

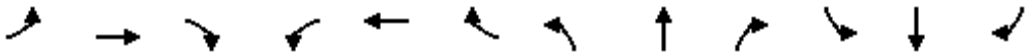
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	0	0	60	125	0	385	10	0	0	0
Future Volume (vph)	10	0	0	0	60	125	0	385	10	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		1.00			1.00			1.00				
Frt		1.00			0.91			1.00				
Flt Protected		0.95			1.00			1.00				
Satd. Flow (prot)		1703			1629			1786				
Flt Permitted		0.51			1.00			1.00				
Satd. Flow (perm)		916			1629			1786				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	0	0	0	63	132	0	405	11	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	11	0	0	195	0	0	416	0	0	0	0
Turn Type	Perm	NA			NA			NA				
Protected Phases		2			2			4				
Permitted Phases	2						4					
Actuated Green, G (s)		13.7			13.7			29.8				
Effective Green, g (s)		14.2			14.2			30.3				
Actuated g/C Ratio		0.20			0.20			0.43				
Clearance Time (s)		4.5			4.5			4.5				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		185			330			773				
v/s Ratio Prot					c0.12			c0.23				
v/s Ratio Perm		0.01										
v/c Ratio		0.06			0.59			0.54				
Uniform Delay, d1		22.5			25.3			14.7				
Progression Factor		1.00			1.00			0.71				
Incremental Delay, d2		0.1			2.8			0.2				
Delay (s)		22.6			28.1			10.7				
Level of Service		C			C			B				
Approach Delay (s)		22.6			28.1			10.7			0.0	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	16.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	38.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



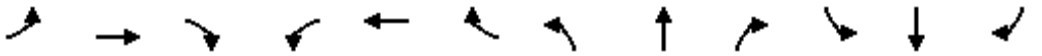
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	10	0	0	60	0	0	0	0	0	300	0
Future Volume (Veh/h)	0	10	0	0	60	0	0	0	0	0	300	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	11	0	0	63	0	0	0	0	0	316	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								487				
pX, platoon unblocked												
vC, conflicting volume	348	316	316	322	316	0	316			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	348	316	316	322	316	0	316			0		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	100	98	100	100	89	100	100			100		
cM capacity (veh/h)	551	593	715	615	593	1073	1222			1597		

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	11	63	316
Volume Left	0	0	0
Volume Right	0	0	0
cSH	593	593	1597
Volume to Capacity	0.02	0.11	0.00
Queue Length 95th (ft)	1	9	0
Control Delay (s)	11.2	11.8	0.0
Lane LOS	B	B	
Approach Delay (s)	11.2	11.8	0.0
Approach LOS	B	B	

Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	25.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	EBR2	WBL	WBT	WBR	NBT	SET	SER
Lane Configurations									
Traffic Volume (vph)	0	80	20	130	0	230	0	995	150
Future Volume (vph)	0	80	20	130	0	230	0	995	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0			6.0	6.0
Lane Util. Factor		0.88			1.00			0.95	1.00
Frpb, ped/bikes		1.00			1.00			1.00	1.00
Flpb, ped/bikes		1.00			1.00			1.00	1.00
Frt		0.85			0.91			1.00	0.85
Flt Protected		1.00			0.98			1.00	1.00
Satd. Flow (prot)		2682			1609			3406	1524
Flt Permitted		1.00			0.98			1.00	1.00
Satd. Flow (perm)		2682			1609			3406	1524
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	84	21	137	0	242	0	1047	158
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	105	0	0	379	0	0	1047	158
Confl. Peds. (#/hr)			10						
Turn Type	Prot	Prot		Split	NA			NA	Prot
Protected Phases	4	4		6	6		8	5	5
Permitted Phases									
Actuated Green, G (s)		8.9			16.0			34.0	34.0
Effective Green, g (s)		8.9			16.0			34.0	34.0
Actuated g/C Ratio		0.10			0.18			0.37	0.37
Clearance Time (s)		6.0			6.0			6.0	6.0
Vehicle Extension (s)		3.0			1.5			3.0	3.0
Lane Grp Cap (vph)		262			283			1273	570
v/s Ratio Prot		c0.04			c0.24			c0.31	0.10
v/s Ratio Perm									
v/c Ratio		0.40			1.34			0.82	0.28
Uniform Delay, d1		38.5			37.5			25.7	19.9
Progression Factor		1.00			1.00			1.00	1.00
Incremental Delay, d2		1.0			174.6			4.4	0.3
Delay (s)		39.5			212.1			30.1	20.1
Level of Service		D			F			C	C
Approach Delay (s)					212.1		0.0	28.8	
Approach LOS					F		A	C	

Intersection Summary			
HCM 2000 Control Delay	70.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	90.9	Sum of lost time (s)	26.0
Intersection Capacity Utilization	68.0%	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)	0	220	5	10	265	0	0	0	0	205	25	70
Future Volume (vph)	0	220	5	10	265	0	0	0	0	205	25	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0						4.0	4.0
Lane Util. Factor		1.00			0.95						1.00	1.00
Frt		1.00			1.00						1.00	0.85
Flt Protected		1.00			1.00						0.96	1.00
Satd. Flow (prot)		1787			3399						1716	1524
Flt Permitted		1.00			0.94						0.75	1.00
Satd. Flow (perm)		1787			3216						1342	1524
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	232	5	11	279	0	0	0	0	216	26	74
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	0	44
Lane Group Flow (vph)	0	236	0	0	290	0	0	0	0	0	242	30
Turn Type		NA		Perm	NA					Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases				6						4		4
Actuated Green, G (s)		27.5			27.5						23.5	23.5
Effective Green, g (s)		28.0			28.0						24.0	24.0
Actuated g/C Ratio		0.47			0.47						0.40	0.40
Clearance Time (s)		4.5			4.5						4.5	4.5
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		833			1500						536	609
v/s Ratio Prot		c0.13										
v/s Ratio Perm					0.09						c0.18	0.02
v/c Ratio		0.28			0.19						0.45	0.05
Uniform Delay, d1		9.8			9.4						13.2	11.0
Progression Factor		1.00			1.00						1.00	1.00
Incremental Delay, d2		0.9			0.1						0.6	0.0
Delay (s)		10.7			9.4						13.8	11.0
Level of Service		B			A						B	B
Approach Delay (s)		10.7			9.4			0.0			13.1	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	11.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	34.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	140	5	75	0	25	230	0	1150	280	20	860	100
Future Volume (vph)	140	5	75	0	25	230	0	1150	280	20	860	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	3.5		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00		0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.93		1.00	0.94		1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1665	1752	1456		1845	1472		3505	1568	1752	3505	1568
Flt Permitted	0.95	1.00	1.00		1.00	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1665	1752	1456		1845	1472		3505	1568	1752	3505	1568
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	147	5	79	0	26	242	0	1211	295	21	905	105
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	147	5	79	0	26	242	0	1211	295	21	905	105
Confl. Peds. (#/hr)			18			50						
Confl. Bikes (#/hr)			30			160						
Turn Type	Split	NA	Perm	Split	NA	Free		NA	Perm	Prot	NA	custom
Protected Phases	4	4		8	8			6!		5 15 25!	2	8 26
Permitted Phases			4			Free			6			
Actuated Green, G (s)	24.6	24.6	24.6		13.2	140.0		80.3	80.3	4.0	88.7	44.9
Effective Green, g (s)	25.1	25.1	25.1		13.7	140.0		80.8	80.8	4.5	89.2	45.9
Actuated g/C Ratio	0.18	0.18	0.18		0.10	1.00		0.58	0.58	0.03	0.64	0.33
Clearance Time (s)	4.5	4.5	4.5		4.5			4.5	4.5		4.5	
Vehicle Extension (s)	0.5	0.5	0.5		1.0			0.5	0.5		0.5	
Lane Grp Cap (vph)	298	314	261		180	1472		2022	904	56	2233	514
v/s Ratio Prot	c0.09	0.00			0.01			c0.35		0.01	c0.26	0.07
v/s Ratio Perm			0.05			c0.16			0.19			
v/c Ratio	0.49	0.02	0.30		0.14	0.16		0.60	0.33	0.38	0.41	0.20
Uniform Delay, d1	51.7	47.3	49.9		57.8	0.0		19.1	15.4	66.4	12.4	33.9
Progression Factor	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.41	0.17	0.59
Incremental Delay, d2	0.5	0.0	0.2		0.1	0.2		1.3	1.0	1.3	0.5	0.1
Delay (s)	52.2	47.3	50.1		57.9	0.2		20.4	16.4	94.7	2.5	20.0
Level of Service	D	D	D		E	A		C	B	F	A	C
Approach Delay (s)		51.4			5.8			19.7			6.2	
Approach LOS		D			A			B			A	

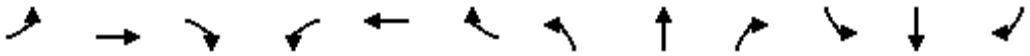
Intersection Summary			
HCM 2000 Control Delay	16.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	25	15	50	0	20	15	15	1170	40	15	930	80
Future Volume (vph)	25	15	50	0	20	15	15	1170	40	15	930	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.88			0.91		1.00	0.97		1.00	0.98	
Flpb, ped/bikes		0.95			1.00		1.00	1.00		1.00	1.00	
Frt		0.92			0.94		1.00	1.00		1.00	0.99	
Flt Protected		0.99			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1404			1571		1752	3399		1752	3408	
Flt Permitted		0.92			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1311			1571		1752	3399		1752	3408	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	26	16	53	0	21	16	16	1232	42	16	979	84
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	95	0	0	37	0	16	1274	0	16	1063	0
Confl. Peds. (#/hr)	118		124			118			40			58
Confl. Bikes (#/hr)									835			130
Turn Type	Perm	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4											
Actuated Green, G (s)		25.0			34.0		5.2	58.2		2.5	55.5	
Effective Green, g (s)		25.5			34.5		5.7	58.7		3.0	56.0	
Actuated g/C Ratio		0.18			0.25		0.04	0.42		0.02	0.40	
Clearance Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		1.0			3.0		0.5	0.5		0.5	0.5	
Lane Grp Cap (vph)		238			387		71	1425		37	1363	
v/s Ratio Prot					c0.02		c0.01	c0.37		c0.01	0.31	
v/s Ratio Perm		c0.07										
v/c Ratio		0.40			0.10		0.23	0.89		0.43	0.78	
Uniform Delay, d1		50.5			40.7		65.0	37.8		67.7	36.6	
Progression Factor		1.00			1.00		0.67	0.52		1.07	0.96	
Incremental Delay, d2		0.4			0.1		0.5	7.6		2.7	4.1	
Delay (s)		50.9			40.8		44.1	27.2		74.9	39.4	
Level of Service		D			D		D	C		E	D	
Approach Delay (s)		50.9			40.8			27.4			39.9	
Approach LOS		D			D			C			D	

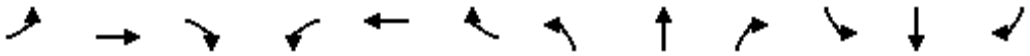
Intersection Summary			
HCM 2000 Control Delay	33.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	61.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



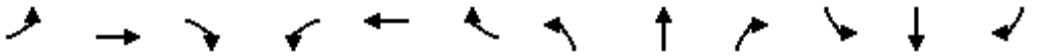
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	370	605	0	290	0	0	0	220	0
Future Volume (vph)	0	0	0	370	605	0	290	0	0	0	220	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0				4.0	
Lane Util. Factor				0.97	0.95		1.00				1.00	
Frt				1.00	1.00		1.00				1.00	
Flt Protected				0.95	1.00		0.95				1.00	
Satd. Flow (prot)				3400	3470		1752				1845	
Flt Permitted				0.95	1.00		0.95				1.00	
Satd. Flow (perm)				3400	3470		1752				1845	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	389	637	0	305	0	0	0	232	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	389	637	0	305	0	0	0	232	0
Bus Blockages (#/hr)	0	0	0	0	5	0	0	0	0	0	0	0
Turn Type				Prot	NA		Prot				NA	
Protected Phases				6	2		3				4	
Permitted Phases												
Actuated Green, G (s)				22.9	33.5		11.5				11.5	
Effective Green, g (s)				23.4	34.0		12.0				12.0	
Actuated g/C Ratio				0.33	0.49		0.17				0.17	
Clearance Time (s)				4.5	4.5		4.5				4.5	
Vehicle Extension (s)				3.0	3.0		3.0				3.0	
Lane Grp Cap (vph)				1136	1685		300				316	
v/s Ratio Prot				0.11	c0.18		c0.17				c0.13	
v/s Ratio Perm												
v/c Ratio				0.34	0.38		1.02				0.73	
Uniform Delay, d1				17.5	11.3		29.0				27.5	
Progression Factor				0.97	1.05		1.43				1.00	
Incremental Delay, d2				0.8	0.6		50.3				8.5	
Delay (s)				17.8	12.5		91.8				36.0	
Level of Service				B	B		F				D	
Approach Delay (s)		0.0			14.5			91.8			36.0	
Approach LOS		A			B			F			D	

Intersection Summary			
HCM 2000 Control Delay	32.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	54.4%	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)	0	0	0	0	945	860	30	350	0	0	0	0
Future Volume (vph)	0	0	0	0	945	860	30	350	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0		4.0				
Lane Util. Factor					0.91	0.88		0.95				
Frpb, ped/bikes					1.00	1.00		1.00				
Flpb, ped/bikes					1.00	1.00		1.00				
Frt					1.00	0.85		1.00				
Flt Protected					1.00	1.00		1.00				
Satd. Flow (prot)					5036	2760		3487				
Flt Permitted					1.00	1.00		1.00				
Satd. Flow (perm)					5036	2760		3487				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	995	905	32	368	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	995	905	0	400	0	0	0	0
Confl. Peds. (#/hr)							14					
Turn Type					NA	custom	Perm	NA				
Protected Phases					2			4				
Permitted Phases						6	4					
Actuated Green, G (s)					39.5	20.5		18.5				
Effective Green, g (s)					40.0	21.0		19.0				
Actuated g/C Ratio					0.57	0.30		0.27				
Clearance Time (s)					4.5	4.5		4.5				
Vehicle Extension (s)					3.0	3.0		2.0				
Lane Grp Cap (vph)					2877	828		946				
v/s Ratio Prot					c0.20							
v/s Ratio Perm						c0.33		0.11				
v/c Ratio					0.35	1.09		0.42				
Uniform Delay, d1					8.0	24.5		21.0				
Progression Factor					0.60	0.60		0.69				
Incremental Delay, d2					0.2	56.1		0.1				
Delay (s)					5.0	70.8		14.6				
Level of Service					A	E		B				
Approach Delay (s)		0.0			36.4			14.6			0.0	
Approach LOS		A			D			B			A	

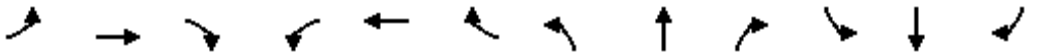
Intersection Summary			
HCM 2000 Control Delay	32.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	920	15	860	160	0	0	0	25
Future Volume (vph)	0	0	0	0	920	15	860	160	0	0	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0		4.0	4.0				4.0
Lane Util. Factor					0.86		0.97	1.00				1.00
Frpb, ped/bikes					0.99		1.00	1.00				1.00
Flpb, ped/bikes					1.00		1.00	1.00				1.00
Frt					1.00		1.00	1.00				0.86
Flt Protected					1.00		0.95	1.00				1.00
Satd. Flow (prot)					6292		3400	1845				1596
Flt Permitted					1.00		0.95	1.00				1.00
Satd. Flow (perm)					6292		3400	1845				1596
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	968	16	905	168	0	0	0	26
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	984	0	905	168	0	0	0	26
Confl. Peds. (#/hr)						102						
Confl. Bikes (#/hr)						100						
Turn Type					NA		Prot	NA				Perm
Protected Phases					2		3	8				
Permitted Phases												8
Actuated Green, G (s)					15.3		26.5	42.7				42.7
Effective Green, g (s)					15.8		27.0	43.2				43.2
Actuated g/C Ratio					0.23		0.39	0.62				0.62
Clearance Time (s)					4.5		4.5	4.5				4.5
Vehicle Extension (s)					3.0		0.2	2.0				2.0
Lane Grp Cap (vph)					1420		1311	1138				984
v/s Ratio Prot					c0.16		c0.27	c0.09				
v/s Ratio Perm												0.02
v/c Ratio					0.69		0.69	0.15				0.03
Uniform Delay, d1					24.9		18.0	5.6				5.2
Progression Factor					1.25		0.54	0.28				1.00
Incremental Delay, d2					2.8		2.6	0.0				0.0
Delay (s)					33.9		12.2	1.6				5.2
Level of Service					C		B	A				A
Approach Delay (s)		0.0			33.9			10.6			5.2	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	21.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		

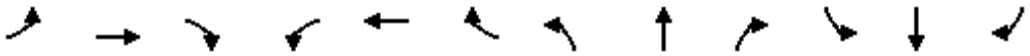
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	20	810	25	30	140	0	0	15	95
Future Volume (vph)	0	0	0	20	810	25	30	140	0	0	15	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					0.91			1.00			1.00	
Frpb, ped/bikes					1.00			1.00			0.92	
Flpb, ped/bikes					1.00			0.99			1.00	
Frt					1.00			1.00			0.88	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					4991			1804			1493	
Flt Permitted					1.00			0.93			1.00	
Satd. Flow (perm)					4991			1691			1493	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	21	853	26	32	147	0	0	16	100
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	30	0
Lane Group Flow (vph)	0	0	0	0	898	0	0	179	0	0	86	0
Confl. Peds. (#/hr)				34		38	56					56
Confl. Bikes (#/hr)						100						
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					2			4			4	
Permitted Phases				2			4					
Actuated Green, G (s)					48.0			13.0			13.0	
Effective Green, g (s)					48.5			13.5			13.5	
Actuated g/C Ratio					0.69			0.19			0.19	
Clearance Time (s)					4.5			4.5			4.5	
Vehicle Extension (s)					0.2			3.0			3.0	
Lane Grp Cap (vph)					3458			326			287	
v/s Ratio Prot											0.06	
v/s Ratio Perm					0.18			c0.11				
v/c Ratio					0.26			0.55			0.30	
Uniform Delay, d1					4.0			25.5			24.2	
Progression Factor					1.00			1.00			1.00	
Incremental Delay, d2					0.2			1.7			0.6	
Delay (s)					4.2			27.2			24.8	
Level of Service					A			C			C	
Approach Delay (s)		0.0			4.2			27.2			24.8	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.1%	ICU Level of Service	A
Analysis Period (min)	15		

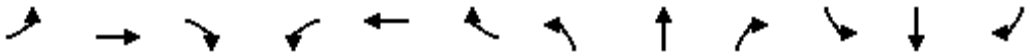
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1060	280	0	0	0	0	290	45	45	545	0
Future Volume (vph)	0	1060	280	0	0	0	0	290	45	45	545	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0					4.0			4.0	
Lane Util. Factor		0.91	1.00					1.00			0.95	
Frpb, ped/bikes		1.00	1.00					1.00			1.00	
Flpb, ped/bikes		1.00	1.00					1.00			1.00	
Frt		1.00	0.85					0.98			1.00	
Flt Protected		1.00	1.00					1.00			1.00	
Satd. Flow (prot)		5036	1568					1811			3455	
Flt Permitted		1.00	1.00					1.00			0.83	
Satd. Flow (perm)		5036	1568					1811			2871	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1116	295	0	0	0	0	305	47	47	574	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1116	295	0	0	0	0	352	0	0	621	0
Confl. Peds. (#/hr)										16		
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	5	0
Turn Type		NA	custom					NA		Perm	NA	
Protected Phases		6 9	16					4			4	
Permitted Phases										4		
Actuated Green, G (s)		38.1	16.5					19.9			19.9	
Effective Green, g (s)		38.6	17.0					20.4			20.4	
Actuated g/C Ratio		0.55	0.24					0.29			0.29	
Clearance Time (s)			4.5					4.5			4.5	
Vehicle Extension (s)			3.0					3.0			3.0	
Lane Grp Cap (vph)		2776	380					527			836	
v/s Ratio Prot		c0.22	c0.19					0.19				
v/s Ratio Perm											c0.22	
v/c Ratio		0.40	0.78					0.67			0.74	
Uniform Delay, d1		9.0	24.7					21.8			22.4	
Progression Factor		1.09	0.93					1.00			0.96	
Incremental Delay, d2		0.3	7.1					3.2			3.2	
Delay (s)		10.2	30.1					25.0			24.9	
Level of Service		B	C					C			C	
Approach Delay (s)		14.3			0.0			25.0			24.9	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	18.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		

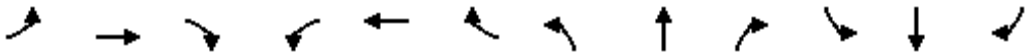
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	370	780	0	0	0	0	0	10	0	0	0	0
Future Volume (vph)	370	780	0	0	0	0	0	10	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0				
Lane Util. Factor		0.91						1.00				
Frpb, ped/bikes		1.00						1.00				
Flpb, ped/bikes		0.96						1.00				
Frt		1.00						1.00				
Flt Protected		0.98						1.00				
Satd. Flow (prot)		4739						1845				
Flt Permitted		0.98						1.00				
Satd. Flow (perm)		4739						1845				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	389	821	0	0	0	0	0	11	0	0	0	0
RTOR Reduction (vph)	0	166	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1044	0	0	0	0	0	11	0	0	0	0
Confl. Peds. (#/hr)	110											
Bus Blockages (#/hr)	0	5	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA						NA				
Protected Phases		2						4				
Permitted Phases	2											
Actuated Green, G (s)		19.3						38.7				
Effective Green, g (s)		19.8						39.2				
Actuated g/C Ratio		0.28						0.56				
Clearance Time (s)		4.5						4.5				
Vehicle Extension (s)		0.2						0.5				
Lane Grp Cap (vph)		1340						1033				
v/s Ratio Prot								c0.01				
v/s Ratio Perm		0.22										
v/c Ratio		0.78						0.01				
Uniform Delay, d1		23.1						6.8				
Progression Factor		0.82						1.00				
Incremental Delay, d2		4.2						0.0				
Delay (s)		23.0						6.8				
Level of Service		C						A				
Approach Delay (s)		23.0			0.0			6.8			0.0	
Approach LOS		C			A			A			A	

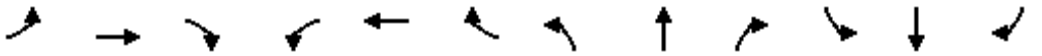
Intersection Summary			
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	33.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	735	0	0	0	0	0	975	1285	0	0	0
Future Volume (vph)	45	735	0	0	0	0	0	975	1285	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0	4.0			
Lane Util. Factor		0.91						0.95	*0.97			
Frpb, ped/bikes		1.00						1.00	1.00			
Flpb, ped/bikes		0.99						1.00	1.00			
Frt		1.00						1.00	0.85			
Flt Protected		1.00						1.00	1.00			
Satd. Flow (prot)		4979						3505	3042			
Flt Permitted		1.00						1.00	1.00			
Satd. Flow (perm)		4979						3505	3042			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	774	0	0	0	0	0	1026	1353	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	821	0	0	0	0	0	1026	1353	0	0	0
Confl. Peds. (#/hr)	144											
Turn Type	Perm	NA						NA	Prot			
Protected Phases		6						8	8			
Permitted Phases	6											
Actuated Green, G (s)		20.0						38.0	38.0			
Effective Green, g (s)		20.5						38.5	38.5			
Actuated g/C Ratio		0.29						0.55	0.55			
Clearance Time (s)		4.5						4.5	4.5			
Vehicle Extension (s)		3.5						3.9	3.9			
Lane Grp Cap (vph)		1458						1927	1673			
v/s Ratio Prot								0.29	c0.44			
v/s Ratio Perm		0.16										
v/c Ratio		0.56						0.53	0.81			
Uniform Delay, d1		21.0						10.0	12.8			
Progression Factor		0.70						1.00	1.00			
Incremental Delay, d2		1.4						1.1	4.3			
Delay (s)		16.0						11.1	17.1			
Level of Service		B						B	B			
Approach Delay (s)		16.0			0.0			14.5			0.0	
Approach LOS		B			A			B			A	

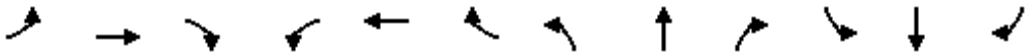
Intersection Summary			
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	140	1715	165	0	0	0	0	30	15	15	20	0
Future Volume (vph)	140	1715	165	0	0	0	0	30	15	15	20	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		0.91						1.00			1.00	
Frpb, ped/bikes		0.99						0.99			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.99						0.95			1.00	
Flt Protected		1.00						1.00			0.98	
Satd. Flow (prot)		4881						1751			1801	
Flt Permitted		1.00						1.00			0.84	
Satd. Flow (perm)		4881						1751			1541	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	147	1805	174	0	0	0	0	32	16	16	21	0
RTOR Reduction (vph)	0	8	0	0	0	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	2118	0	0	0	0	0	39	0	0	37	0
Confl. Peds. (#/hr)	58		152						2	2		
Confl. Bikes (#/hr)			100									
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		2						4			4	
Permitted Phases	2									4		
Actuated Green, G (s)		55.0						6.0			6.0	
Effective Green, g (s)		55.5						6.5			6.5	
Actuated g/C Ratio		0.79						0.09			0.09	
Clearance Time (s)		4.5						4.5			4.5	
Vehicle Extension (s)		0.5						0.5			0.5	
Lane Grp Cap (vph)		3869						162			143	
v/s Ratio Prot								0.02				
v/s Ratio Perm		0.43									c0.02	
v/c Ratio		0.55						0.24			0.26	
Uniform Delay, d1		2.7						29.5			29.5	
Progression Factor		1.17						1.00			1.02	
Incremental Delay, d2		0.4						0.3			0.3	
Delay (s)		3.5						29.7			30.5	
Level of Service		A						C			C	
Approach Delay (s)		3.5			0.0			29.7			30.5	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	4.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		

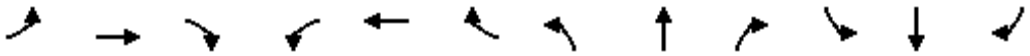
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	0	0	50	75	5	485	20	0	0	0
Future Volume (vph)	10	0	0	0	50	75	5	485	20	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		1.00			1.00			1.00				
Frt		1.00			0.92			0.99				
Flt Protected		0.95			1.00			1.00				
Satd. Flow (prot)		1752			1696			1834				
Flt Permitted		0.58			1.00			1.00				
Satd. Flow (perm)		1069			1696			1834				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	0	0	0	53	79	5	511	21	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	11	0	0	132	0	0	537	0	0	0	0
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		2			2			4				
Permitted Phases	2						4					
Actuated Green, G (s)		6.4			6.4			23.0				
Effective Green, g (s)		6.9			6.9			23.5				
Actuated g/C Ratio		0.10			0.10			0.34				
Clearance Time (s)		4.5			4.5			4.5				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		105			167			615				
v/s Ratio Prot					c0.08							
v/s Ratio Perm		0.01						0.29				
v/c Ratio		0.10			0.79			0.87				
Uniform Delay, d1		28.7			30.8			21.8				
Progression Factor		1.00			1.00			0.51				
Incremental Delay, d2		0.4			22.0			7.4				
Delay (s)		29.2			52.8			18.7				
Level of Service		C			D			B				
Approach Delay (s)		29.2			52.8			18.7			0.0	
Approach LOS		C			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	25.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



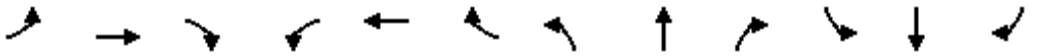
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	10	0	5	50	0	0	0	0	0	215	0
Future Volume (Veh/h)	0	10	0	5	50	0	0	0	0	0	215	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	11	0	5	53	0	0	0	0	0	226	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								487				
pX, platoon unblocked												
vC, conflicting volume	252	226	226	232	226	0	226			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	252	226	226	232	226	0	226			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	98	100	99	92	100	100			100		
cM capacity (veh/h)	657	671	811	712	671	1082	1337			1617		

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	11	58	226
Volume Left	0	5	0
Volume Right	0	0	0
cSH	671	675	1617
Volume to Capacity	0.02	0.09	0.00
Queue Length 95th (ft)	1	7	0
Control Delay (s)	10.5	10.8	0.0
Lane LOS	B	B	
Approach Delay (s)	10.5	10.8	0.0
Approach LOS	B	B	

Intersection Summary				
Average Delay	2.5			
Intersection Capacity Utilization	24.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	EBR2	WBL	WBT	WBR	NBT	SET	SER
Lane Configurations									
Traffic Volume (vph)	10	240	105	130	0	335	0	740	85
Future Volume (vph)	10	240	105	130	0	335	0	740	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0			6.0	6.0
Lane Util. Factor	1.00	0.88			1.00			0.95	1.00
Frpb, ped/bikes	1.00	1.00			1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00			1.00	1.00
Frt	1.00	0.85			0.90			1.00	0.85
Flt Protected	0.95	1.00			0.99			1.00	1.00
Satd. Flow (prot)	1752	2760			1642			3505	1568
Flt Permitted	0.95	1.00			0.99			1.00	1.00
Satd. Flow (perm)	1752	2760			1642			3505	1568
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	253	111	137	0	353	0	779	89
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	11	364	0	0	490	0	0	779	89
Confl. Peds. (#/hr)			10						
Turn Type	Prot	Prot		Split	NA			NA	Prot
Protected Phases	4	4		6	6		8	5	5
Permitted Phases									
Actuated Green, G (s)	16.8	16.8			26.0			25.0	25.0
Effective Green, g (s)	16.8	16.8			26.0			25.0	25.0
Actuated g/C Ratio	0.17	0.17			0.26			0.25	0.25
Clearance Time (s)	6.0	6.0			6.0			6.0	6.0
Vehicle Extension (s)	3.0	3.0			1.5			3.0	3.0
Lane Grp Cap (vph)	294	464			427			878	392
v/s Ratio Prot	0.01	c0.13			c0.30			c0.22	0.06
v/s Ratio Perm									
v/c Ratio	0.04	0.78			1.15			0.89	0.23
Uniform Delay, d1	34.7	39.8			36.9			36.0	29.7
Progression Factor	1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	0.1	8.5			90.5			10.8	0.3
Delay (s)	34.8	48.2			127.4			46.8	30.0
Level of Service	C	D			F			D	C
Approach Delay (s)					127.4		0.0	45.1	
Approach LOS					F		A	D	

Intersection Summary			
HCM 2000 Control Delay	68.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	99.8	Sum of lost time (s)	26.0
Intersection Capacity Utilization	75.4%	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	250	5	0	450	0	0	0	0	210	5	105
Future Volume (vph)	0	250	5	0	450	0	0	0	0	210	5	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0						4.0	4.0
Lane Util. Factor		1.00			0.95						1.00	1.00
Frt		1.00			1.00						1.00	0.85
Flt Protected		1.00			1.00						0.95	1.00
Satd. Flow (prot)		1840			3505						1759	1568
Flt Permitted		1.00			1.00						0.73	1.00
Satd. Flow (perm)		1840			3505						1348	1568
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	263	5	0	474	0	0	0	0	221	5	111
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	0	67
Lane Group Flow (vph)	0	267	0	0	474	0	0	0	0	0	226	44
Turn Type		NA			NA					Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases				6						4		4
Actuated Green, G (s)		27.5			27.5						23.5	23.5
Effective Green, g (s)		28.0			28.0						24.0	24.0
Actuated g/C Ratio		0.47			0.47						0.40	0.40
Clearance Time (s)		4.5			4.5						4.5	4.5
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		858			1635						539	627
v/s Ratio Prot		c0.15			0.14							
v/s Ratio Perm											c0.17	0.03
v/c Ratio		0.31			0.29						0.42	0.07
Uniform Delay, d1		10.0			9.9						13.0	11.1
Progression Factor		1.00			1.00						1.00	1.00
Incremental Delay, d2		0.9			0.1						0.5	0.0
Delay (s)		10.9			10.0						13.5	11.2
Level of Service		B			A						B	B
Approach Delay (s)		10.9			10.0			0.0			12.7	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	32.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Appendix F: Vissim Model Intersection Results

Table F-1 Future No-Build Alternative 8-9 AM

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Williams Ave & N/NE Hancock St	1001	EB	EBL	10	9	7.2	68	12	675	597	11.2
	1001		EBT	10	10	8.3	47	12			
	1001	WB	WBT	0	0	0.0	106	31			
	1001		WBR	180	179	11.2	138	29			
	1001	NB	NBL	10	6	2.8	2	7			
	1001		NBT	455	383	1.5	0	0			
	1001		NBR	10	10	1.5	0	0			
N/NE Broadway & N Williams Ave	1008	WB	WBT	1255	1175	13.9	287	20	2,475	2,309	16.3
	1008		WBR	970	896	16.9	285	15			
	1008	NB	NBL	0	0	0.0	119	18			
	1008		NBT	250	239	25.5	137	27			
N Broadway & N Vancouver Ave (I-5 SB Exit Ramp)	1009	SB	SBL	855	600	81.2	276	48	2,675	2,240	43.8
	1009		SBT	255	248	31.0	141	16			
	1009		SBR	310	211	71.3	223	54			
	1009	WB	WBL	505	493	26.9	278	27			
	1009		WBT	750	688	19.5	278	27			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Broadway & N Larrabee Ave	1010	EB	EBT	590	609	7.2	262	90	1,970	1,818	12.1
	1010		EBR	220	218	42.3	508	105			
	1010	SB	SBL	0	2	81.5	19	10			
	1010		SBT	20	19	84.5	65	11			
	1010	WB	WBL	5	2	86.5	26	25			
	1010		WBT	970	811	0.9	123	73			
	1010		WBR	5	2	38.0	21	12			
	1010	NB	NBL	60	58	62.4	150	36			
	1010		NBT	25	26	61.6	80	15			
	1010		NBR	75	71	6.2	93	25			
N Weidler St & N Vancouver Ave	1055	EB	EBT	355	371	14.6	195	45	2,230	1,968	12.9
	1055		EBR	260	260	11.7	228	32			
	1055	SB	SBL	875	627	5.6	279	16			
	1055		SBT	740	710	18.9	276	16			
N Wheeler Ave/ N Williams Ave/ N Ramsey Way &I-5 SB Entrance Ramp	1067	EB	EBL	50	42	33.8	160	49	1,235	1,221	37.2
	1067		EBT	120	120	35.5	160	49			
	1067		EBR	60	56	46.1	160	49			
	1067	SB	SBL	915	906	39.4	305	12			
	1067		SBT	80	80	11.3	137	51			
	1067	NB	NBT	10	18	30.6	64	15			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N/NE Weidler St & N Williams Ave	1068	EB	EBL	200	182	2.4	179	58	1,290	1,051	3.6
	1068		EBT	1030	818	3.0	178	58			
	1068	NB	NBT	50	48	19.7	62	12			
	1068		NBR	10	2	21.5	70	8			
N Broadway & N Benton Ave	1098	EB	EBL	55	54	67.1	172	41	1,740	1,579	14.2
	1098		EBT	530	544	2.8	199	42			
	1098		EBR	80	83	2.6	204	42			
	1098	SB	SBL	10	7	56.0	116	23			
	1098		SBT	25	24	58.3	116	23			
	1098		SBR	10	12	24.6	121	23			
	1098	WB	WBL	5	3	72.7	24	11			
	1098		WBT	955	788	15.2	388	92			
	1098		WBR	40	35	26.5	391	92			
	1098	NB	NBL	15	16	61.7	63	13			
	1098		NBT	10	10	44.3	63	12			
	1098		NBR	5	5	70.7	63	12			
NE Broadway & NE Victoria Ave	2001	SB	SBR	25	24	50.4	61	6	2,290	2,128	38.9
	2001	WB	WBT	1490	1485	45.3	530	45			
	2001		WBR	20	21	47.9	530	45			
	2001	NB	NBL	710	564	22.1	272	12			
	2001		NBT	45	33	27.4	272	12			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
NE Weidler St & NE Victoria Ave/ I-5 NB Ramp	2091	EB	EBL	15	10	7.0	57	13	2,545	2,029	66.1
	2091		EBT	1025	813	0.8	57	13			
	2091	NB	NBT	740	586	113.8	3470	2418			
	2091		NBR	765	620	52.5	375	110			
NE Weidler St & NE 2nd Ave	2247	EB	EBL	130	102	8.8	236	39	1,870	1,512	7.1
	2247		EBT	1550	1248	6.1	236	39			
	2247		EBR	100	78	3.6	240	39			
	2247	SB	SBL	10	6	13.8	57	15			
	2247		SBT	10	11	30.1	57	15			
	2247	NB	NBT	55	57	24.4	98	18			
	2247		NBR	15	10	9.5	103	18			
NE Broadway & NE 2nd Ave	2248	SB	SBT	5	6	19.2	137	34	1,710	1,669	27.7
	2248		SBR	145	142	15.0	139	32			
	2248	WB	WBL	15	11	16.5	539	14			
	2248		WBT	1310	1301	28.8	539	14			
	2248		WBR	50	49	47.7	539	14			
	2248	NB	NBL	55	58	30.2	196	43			
	2248		NBT	130	102	22.0	196	43			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Williams Ave & N/NE Multnomah St	1066	EB	EBT	190	188	9.7	152	15	715	698	10.7
	1066		EBR	5	6	11.3	152	15			
	1066	SB	SBL	105	95	14.0	147	34			
	1066		SBT	20	22	13.4	147	34			
	1066		SBR	20	18	13.2	57	19			
	1066	WB	WBL	10	10	10.8	122	15			
	1066		WBT	345	341	9.4	122	15			
	1066	NB	NBT	20	18	21.7	67	13			
	1066		NBR	0	0	0.0	67	13			

Table F-2 Future No-Build Alternative 5-6 PM

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Williams Ave & N/NE Hancock St	1001	EB	EBL	5	4	6.9	41	1	750	681	10.9
	1001		EBT	0	0	0.0	20	1			
	1001	WB	WBT	0	0	0.0	66	26			
	1001		WBR	95	93	10.9	103	24			
	1001	NB	NBL	5	2	4.2	0	0			
	1001		NBT	620	563	2.3	0	0			
	1001		NBR	25	19	2.5	0	0			
N/NE Broadway & N Williams Ave	1008	WB	WBT	900	881	11.2	262	26	2,320	2,176	15.4
	1008		WBR	860	801	14.5	284	14			
	1008	NB	NBL	20	18	26.8	192	42			
	1008		NBT	540	478	24.0	225	55			
N Broadway & N Vancouver Ave (I-5 SB Exit Ramp)	1009	SB	SBL	930	669	125.7	4048	4228	2,615	2,206	73.1
	1009		SBT	355	335	80.8	472	247			
	1009		SBR	410	304	85.3	319	205			
	1009	WB	WBL	405	400	39.1	258	19			
	1009		WBT	515	498	16.9	258	19			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Broadway & N Larrabee Ave	1010	EB	EBT	1135	1099	64.7	1782	959	2,770	2,587	43.4
	1010		EBR	280	256	67.1	1086	734			
	1010	SB	SBL	0	0	0.0	0	0			
	1010		SBT	25	26	69.5	85	18			
	1010	WB	WBL	15	11	45.7	51	11			
	1010		WBT	905	791	1.5	194	64			
	1010		WBR	20	17	32.6	62	24			
	1010	NB	NBL	120	121	85.1	220	12			
	1010		NBT	235	233	38.7	210	11			
	1010		NBR	35	33	21.3	80	42			
N Weidler St & N Vancouver Ave	1055	EB	EBT	845	818	38.6	371	14	2,785	2,446	28.1
	1055		EBR	250	238	16.5	336	50			
	1055	SB	SBL	960	714	30.0	319	7			
	1055		SBT	730	677	17.5	316	7			
N Wheeler Ave/ N Williams Ave/ N Ramsey Way &I-5 SB Entrance Ramp	1067	EB	EBL	105	85	52.1	172	33	1,350	1,277	28.5
	1067		EBT	240	233	26.3	172	33			
	1067		EBR	20	19	23.0	172	33			
	1067	SB	SBL	735	712	30.9	273	26			
	1067		SBT	240	210	14.2	199	43			
	1067	NB	NBT	10	18	21.9	69	12			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N/NE Weidler St & N Williams Ave	1068	EB	EBL	460	397	20.4	289	8	1,920	1,613	17.8
	1068		EBT	1345	1126	13.8	288	8			
	1068	NB	NBT	100	90	55.4	156	52			
	1068		NBR	15	0	0.0	77	13			
N Broadway & N Benton Ave	1098	EB	EBL	95	94	50.0	291	32	2,265	2,090	17.9
	1098		EBT	930	896	13.5	271	45			
	1098		EBR	145	137	7.0	276	45			
	1098	SB	SBL	25	24	62.4	151	28			
	1098		SBT	25	25	53.4	151	28			
	1098		SBR	30	31	25.6	156	28			
	1098	WB	WBL	50	45	90.3	129	44			
	1098		WBT	900	781	12.1	347	91			
	1098		WBR	20	14	13.1	350	91			
	1098	NB	NBL	10	7	66.7	45	23			
	1098		NBT	25	28	48.3	110	34			
	1098		NBR	10	7	70.3	110	34			
NE Broadway & NE Victoria Ave	2001	SB	SBR	35	33	45.5	79	22	1,920	1,835	28.1
	2001	WB	WBT	1035	1035	35.2	379	70			
	2001		WBR	20	17	45.0	379	70			
	2001	NB	NBL	680	620	15.8	282	15			
	2001		NBT	150	130	24.5	282	15			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
NE Weidler St & NE Victoria Ave/ I-5 NB Ramp	2091	EB	EBL	35	25	12.7	273	20	2,735	2,398	75.4
	2091		EBT	1325	1107	6.3	273	20			
	2091	NB	NBT	795	721	125.5	4974	1063			
	2091		NBR	580	545	58.0	334	93			
NE Weidler St & NE 2nd Ave	2247	EB	EBL	200	164	10.3	293	20	1,970	1,716	9.2
	2247		EBT	1500	1317	8.6	293	20			
	2247		EBR	205	171	6.8	297	20			
	2247	SB	SBL	10	11	24.9	71	17			
	2247		SBT	20	19	36.1	71	17			
	2247	NB	NBT	20	19	23.4	55	14			
	2247		NBR	15	14	8.0	60	14			
NE Broadway & NE 2nd Ave	2248	SB	SBT	15	12	13.8	73	14	1,345	1,294	11.4
	2248		SBR	70	68	7.1	81	21			
	2248	WB	WBL	20	19	7.6	377	114			
	2248		WBT	965	955	11.3	377	114			
	2248		WBR	55	57	13.6	377	114			
	2248	NB	NBL	20	19	22.4	184	42			
	2248		NBT	200	165	12.1	184	42			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Williams Ave & N/NE Multnomah St	1066	EB	EBT	235	235	10.2	166	26	1,085	1,038	11.5
	1066		EBR	5	5	9.2	166	26			
	1066	SB	SBL	170	144	16.2	188	27			
	1066		SBT	20	18	15.7	188	27			
	1066		SBR	80	68	13.8	96	34			
	1066	WB	WBL	0	0	0.0	143	19			
	1066		WBT	555	551	10.2	143	19			
	1066	NB	NBT	20	18	21.7	67	13			
	1066		NBR	0	0	0.0	67	13			

Table F-3 Future No-Build Alternative 7-8 AM

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Williams Ave & N/NE Hancock St	1001	EB	EBL	8	7	7.1	61	15	559	557	11.4
	1001		EBT	8	8	8.4	40	15			
	1001	WB	WBT	0	0	0.0	110	28			
	1001		WBR	149	147	11.4	140	28			
	1001	NB	NBL	8	7	2.6	0	0			
	1001		NBT	378	379	1.6	0	0			
	1001		NBR	8	10	1.3	0	0			
N/NE Broadway & N Williams Ave	1008	WB	WBT	1042	1013	12.8	291	22	2,055	2,029	14.8
	1008		WBR	805	800	14.5	278	11			
	1008	NB	NBL	0	0	0.0	112	22			
	1008		NBT	208	218	25.3	134	26			
N Broadway & N Vancouver Ave (I-5 SB Exit Ramp)	1009	SB	SBL	710	665	72.1	285	55	2,221	2,115	42.0
	1009		SBT	212	206	30.6	143	11			
	1009		SBR	257	241	60.5	191	35			
	1009	WB	WBL	419	398	25.0	269	16			
	1009		WBT	623	606	16.5	269	16			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Broadway & N Larrabee Ave	1010	EB	EBT	490	493	7.7	304	121	1,636	1,603	10.5
	1010		EBR	183	176	37.1	424	196			
	1010	SB	SBL	0	1	85.7	17	16			
	1010		SBT	17	15	77.2	76	28			
	1010	WB	WBL	4	2	82.0	25	3			
	1010		WBT	805	783	0.8	104	70			
	1010		WBR	4	3	35.5	25	13			
	1010	NB	NBL	50	47	61.0	157	42			
	1010		NBT	21	20	58.5	77	14			
	1010		NBR	62	65	5.9	84	15			
N Weidler St & N Vancouver Ave	1055	EB	EBT	295	300	14.9	205	23	1,851	1,768	10.9
	1055		EBR	216	205	9.9	193	78			
	1055	SB	SBL	726	677	4.7	271	19			
	1055		SBT	614	586	16.5	268	19			
N Wheeler Ave/ N Williams Ave/ N Ramsey Way &I-5 SB Entrance Ramp	1067	EB	EBL	42	34	34.9	139	33	1,025	968	28.2
	1067		EBT	100	98	27.2	139	33			
	1067		EBR	50	43	25.6	139	33			
	1067	SB	SBL	759	707	30.0	298	20			
	1067		SBT	66	71	9.3	105	27			
	1067	NB	NBT	8	16	31.1	68	15			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N/NE Weidler St & N Williams Ave	1068	EB	EBL	166	165	2.6	166	51	1,071	1,015	3.6
	1068		EBT	855	809	3.0	165	51			
	1068	NB	NBT	42	40	18.7	63	13			
	1068		NBR	8	1	16.1	69	9			
N Broadway & N Benton Ave	1098	EB	EBL	46	44	67.9	191	54	1,443	1,422	12.7
	1098		EBT	440	447	2.5	185	50			
	1098		EBR	66	65	2.6	190	50			
	1098	SB	SBL	8	8	56.1	107	27			
	1098		SBT	21	20	52.4	107	27			
	1098		SBR	8	8	20.6	112	27			
	1098	WB	WBL	4	3	87.3	31	19			
	1098		WBT	793	768	12.9	315	35			
	1098		WBR	33	35	17.4	318	35			
	1098	NB	NBL	12	11	57.6	59	12			
	1098		NBT	8	10	52.0	57	18			
	1098		NBR	4	3	53.3	57	18			
NE Broadway & NE Victoria Ave	2001	SB	SBR	21	18	39.4	53	8	1,901	1,869	30.5
	2001	WB	WBT	1237	1216	38.0	530	39			
	2001		WBR	17	15	36.9	530	39			
	2001	NB	NBL	589	586	14.9	263	16			
	2001		NBT	37	34	23.0	263	16			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
NE Weidler St & NE Victoria Ave/ I-5 NB Ramp	2091	EB	EBL	12	9	5.0	56	28	2,112	2,072	48.5
	2091		EBT	851	796	0.8	56	28			
	2091	NB	NBT	614	616	77.6	1814	2181			
	2091		NBR	635	650	38.9	302	92			
NE Weidler St & NE 2nd Ave	2247	EB	EBL	108	100	8.4	244	31	1,552	1,522	6.6
	2247		EBT	1287	1268	5.8	244	31			
	2247		EBR	83	84	3.3	248	31			
	2247	SB	SBL	8	6	13.5	50	17			
	2247		SBT	8	9	29.0	50	17			
	2247	NB	NBT	46	44	23.5	97	15			
	2247		NBR	12	10	11.0	102	15			
NE Broadway & NE 2nd Ave	2248	SB	SBT	4	6	15.0	135	27	1,419	1,408	16.7
	2248		SBR	120	117	12.9	136	27			
	2248	WB	WBL	12	10	10.8	504	31			
	2248		WBT	1087	1094	16.4	504	31			
	2248		WBR	42	40	20.0	504	31			
	2248	NB	NBL	46	44	27.2	203	49			
	2248		NBT	108	99	19.9	203	49			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Williams Ave & N/NE Multnomah St	1066	EB	EBT	158	155	9.6	159	14	594	582	10.4
	1066		EBR	4	5	11.1	159	14			
	1066	SB	SBL	87	77	13.2	146	36			
	1066		SBT	17	23	12.5	146	36			
	1066		SBR	17	15	12.7	54	24			
	1066	WB	WBL	8	8	7.5	123	24			
	1066		WBT	286	284	9.2	123	24			
	1066	NB	NBT	17	16	22.6	66	13			
	1066		NBR	0	0	0.0	66	13			

Table F-4 Future No-Build Alternative 4-5 PM

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Williams Ave & N/NE Hancock St	1001	EB	EBL	5	4	6.9	42	1	720	692	10.8
	1001		EBT	0	0	0.0	21	1			
	1001	WB	WBT	0	0	0.0	70	25			
	1001		WBR	91	89	10.8	106	22			
	1001	NB	NBL	5	4	6.9	35	53			
	1001		NBT	595	573	2.9	19	38			
	1001		NBR	24	22	3.3	19	38			
N/NE Broadway & N Williams Ave	1008	WB	WBT	864	856	8.8	253	22	2,227	2,167	13.4
	1008		WBR	826	798	11.8	280	11			
	1008	NB	NBL	19	19	26.1	192	39			
	1008		NBT	518	495	23.5	201	49			
N Broadway & N Vancouver Ave (I-5 SB Exit Ramp)	1009	SB	SBL	893	726	97.2	452	158	2,511	2,257	58.7
	1009		SBT	341	342	54.2	247	42			
	1009		SBR	394	314	77.5	226	42			
	1009	WB	WBL	389	382	30.3	232	25			
	1009		WBT	494	493	15.1	232	25			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Broadway & N Larrabee Ave	1010	EB	EBT	1090	1110	36.0	808	128	2,660	2,601	28.7
	1010		EBR	269	272	48.7	639	178			
	1010	SB	SBL	0	0	0.0	0	0			
	1010		SBT	24	22	67.2	65	19			
	1010	WB	WBL	14	11	41.3	39	18			
	1010		WBT	869	805	1.5	187	51			
	1010		WBR	19	17	30.1	53	20			
	1010	NB	NBL	115	116	79.8	218	13			
	1010		NBT	226	216	37.8	216	11			
	1010		NBR	34	31	8.4	69	19			
N Weidler St & N Vancouver Ave	1055	EB	EBT	811	807	33.0	362	15	2,674	2,495	22.3
	1055		EBR	240	240	13.7	259	64			
	1055	SB	SBL	922	770	19.5	301	10			
	1055		SBT	701	679	15.8	298	10			
N Wheeler Ave/ N Williams Ave/ N Ramsey Way &I-5 SB Entrance Ramp	1067	EB	EBL	101	84	45.1	148	29	1,296	1,279	22.4
	1067		EBT	230	231	24.4	148	29			
	1067		EBR	19	17	24.9	148	29			
	1067	SB	SBL	706	703	21.4	246	41			
	1067		SBT	230	226	14.7	188	66			
	1067	NB	NBT	10	18	22.7	65	16			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N/NE Weidler St & N Williams Ave	1068	EB	EBL	442	406	15.6	284	6	1,843	1,667	13.8
	1068		EBT	1291	1169	11.4	283	6			
	1068	NB	NBT	96	92	36.1	99	14			
	1068		NBR	14	0	0.0	66	0			
N Broadway & N Benton Ave	1098	EB	EBL	91	86	44.5	266	40	2,175	2,103	13.4
	1098		EBT	893	913	6.7	226	53			
	1098		EBR	139	140	5.0	231	53			
	1098	SB	SBL	24	20	55.5	125	19			
	1098		SBT	24	24	51.9	125	19			
	1098		SBR	29	31	22.6	130	19			
	1098	WB	WBL	48	40	83.3	116	15			
	1098		WBT	864	794	11.1	312	78			
	1098		WBR	19	16	13.2	315	78			
	1098	NB	NBL	10	9	63.0	45	16			
	1098		NBT	24	25	47.6	83	21			
	1098		NBR	10	6	46.6	83	21			
NE Broadway & NE Victoria Ave	2001	SB	SBR	34	32	38.0	67	14	1,844	1,812	23.1
	2001	WB	WBT	994	980	30.6	284	51			
	2001		WBR	19	16	39.7	284	51			
	2001	NB	NBL	653	648	11.0	287	10			
	2001		NBT	144	137	21.3	287	10			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
NE Weidler St & NE Victoria Ave/ I-5 NB Ramp	2091	EB	EBL	34	27	11.4	280	13	2,626	2,480	52.4
	2091		EBT	1272	1137	6.7	280	13			
	2091	NB	NBT	763	764	83.3	2822	2199			
	2091		NBR	557	553	38.0	325	71			
NE Weidler St & NE 2nd Ave	2247	EB	EBL	192	176	10.8	310	26	1,891	1,767	9.8
	2247		EBT	1440	1342	9.3	310	26			
	2247		EBR	197	188	7.2	314	26			
	2247	SB	SBL	10	13	24.1	65	14			
	2247		SBT	19	18	35.2	65	14			
	2247	NB	NBT	19	19	23.8	58	13			
	2247		NBR	14	13	7.9	62	13			
NE Broadway & NE 2nd Ave	2248	SB	SBT	14	13	12.7	64	13	1,290	1,265	10.2
	2248		SBR	67	63	6.6	68	17			
	2248	WB	WBL	19	18	9.2	271	61			
	2248		WBT	926	924	9.6	271	61			
	2248		WBR	53	53	11.5	271	61			
	2248	NB	NBL	19	19	23.6	180	33			
	2248		NBT	192	175	13.2	180	33			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Williams Ave & N/NE Multnomah St	1066	EB	EBT	226	222	10.0	183	29	1,042	1,017	11.6
	1066		EBR	5	6	9.9	183	29			
	1066	SB	SBL	163	153	16.0	175	30			
	1066		SBT	19	18	15.8	175	30			
	1066		SBR	77	69	13.7	95	31			
	1066	WB	WBL	0	0	0.0	145	22			
	1066		WBT	533	531	10.2	145	22			
	1066	NB	NBT	19	18	21.3	68	11			
	1066		NBR	0	0	0.0	68	11			

Table F-5 Future Revised Build Alternative **2-Way Ramsay** 8-9 AM

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Williams Ave & N/NE Hancock St	1001	EB	EBL	10	10	30.7	76	20	585	559	16.9
	1001	WB	WBT	60	62	29.3	213	20			
	1001		WBR	125	122	30.6	213	20			
	1001	NB	NBL	0	0	0.0	263	24			
	1001		NBT	380	357	9.8	263	24			
	1001		NBR	10	8	11.7	263	24			
N/NE Broadway & N Williams Ave	1008	WB	WBT	1535	1412	6.3	232	31	2,645	2,460	9.9
	1008		WBR	920	858	12.1	280	7			
	1008	NB	NBL	10	5	26.7	151	40			
	1008		NBT	180	187	26.7	151	40			
N Broadway & N Vancouver Ave	1009	SB	SBT	300	294	26.0	292	45	1,890	1,753	7.9
	1009		SBR	45	48	51.6	109	28			
	1009	WB	WBL	575	537	4.6	146	45			
	1009		WBT	970	875	1.5	126	24			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Broadway & N Larrabee Ave	1010	EB	EBT	715	717	11.7	335	101	2,500	2,356	20.7
	1010		EBR	245	235	35.6	406	63			
	1010	SB	SBL	0	0	0.0	0	0			
	1010		SBT	30	29	81.1	96	15			
	1010	WB	WBL	5	4	49.7	31	13			
	1010		WBT	965	877	2.8	163	64			
	1010		WBR	115	109	33.2	210	50			
	1010	NB	NBL	275	239	58.3	221	12			
	1010		NBT	70	65	58.2	221	12			
	1010		NBR	80	83	68.8	190	25			
N Weidler St & N Vancouver Ave	1055	EB	EBT	590	599	5.2	199	107	1,760	1,717	19.5
	1055		EBR	295	280	42.5	349	25			
	1055	SB	SBL	25	19	26.0	257	18			
	1055		SBT	850	820	21.9	257	18			
N Wheeler Ave/ N Williams Ave/ N Ramsey Way & I-5 SB Ramps	1067	EB	EBL	0	0	0.0	90	18	1,615	1,505	30.1
	1067		EBT	80	75	32.9	90	18			
	1067		EBR	20	19	35.8	90	18			
	1067	WB	WBL	130	116	56.5	493	49			
	1067		WBT	230	184	57.3	493	49			
	1067	SB	SBL	995	970	22.7	299	19			
	1067		SBT	150	131	18.9	170	52			
	1067	NB	NBT	10	10	44.4	48	0			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N/NE Weidler St & N Williams Ave	1068	EB	EBL	190	184	3.4	141	48	625	625	3.8
	1068		EBT	425	430	3.4	138	48			
	1068	NB	NBT	10	10	27.9	47	0			
N Broadway & N Benton Ave	1098	EB	EBL	10	11	64.7	50	14	2,025	1,922	11.2
	1098		EBT	755	761	5.1	230	44			
	1098		EBR	30	27	5.1	230	44			
	1098	SB	SBL	10	6	51.4	114	16			
	1098		SBT	25	22	51.0	114	16			
	1098		SBR	15	18	53.4	114	16			
	1098	WB	WBL	5	3	52.5	30	16			
	1098		WBT	1055	959	9.1	403	73			
	1098		WBR	35	34	27.1	403	73			
	1098	NB	NBL	15	15	64.7	54	14			
	1098		NBT	20	20	54.8	146	29			
	1098		NBR	50	45	54.7	146	29			
NE Broadway & NE Victoria Ave	2001	SB	SBR	30	28	11.7	41	8	2,520	2,332	23.5
	2001	WB	WBT	1560	1548	32.3	532	36			
	2001		WBR	10	12	54.2	532	36			
	2001	NB	NBL	865	699	5.2	105	26			
	2001		NBT	55	46	5.4	105	26			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
NE Weidler St & NE Victoria Ave/ I-5 NB Ramp	2091	EB	EBL	15	14	18.9	185	20	2,780	2,348	17.1
	2091		EBT	410	418	11.2	185	20			
	2091	NB	NBT	905	731	16.5	175	25			
	2091		NBR	1450	1185	19.5	551	58			
NE Weidler St & NE 2nd Ave	2247	EB	EBL	100	90	7.6	266	65	1,945	1,676	5.9
	2247		EBT	1750	1502	5.1	266	65			
	2247		EBR	10	7	4.7	270	65			
	2247	SB	SBL	25	22	15.9	63	17			
	2247		SBT	10	12	20.2	63	17			
	2247	NB	NBT	40	35	24.4	71	12			
	2247		NBR	10	8	9.5	77	12			
NE Broadway & NE 2nd Ave	2248	SB	SBT	25	22	25.9	150	17	1,765	1,728	10.6
	2248		SBR	150	151	17.2	151	17			
	2248	WB	WBL	10	12	4.2	381	113			
	2248		WBT	1385	1368	8.4	381	113			
	2248		WBR	55	50	12.7	384	113			
	2248	NB	NBL	35	35	14.9	148	45			
	2248		NBT	105	90	28.5	148	45			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Vancouver Ave & N/NE Hancock St	2249	EB	EBT	10	10	26.6	39	22	415	423	4.4
	2249		EBR	0	0	0.0	39	22			
	2249	WB	WBL	0	1	10.3	99	10			
	2249		WBT	60	60	12.8	93	10			
	2249	SB	SBT	345	352	2.3	9	19			
	2249		SBR	0	0	0.0	9	19			
N Williams Ave & N/NE Multnomah St	1066	EB	EBT	220	214	10.2	151	19	810	767	11.7
	1066		EBR	5	5	6.1	151	19			
	1066	SB	SBL	205	177	15.2	194	34			
	1066		SBT	25	30	15.1	194	34			
	1066		SBR	70	59	12.9	84	30			
	1066	WB	WBL	10	12	12.4	112	18			
	1066		WBT	265	260	9.3	112	18			
	1066	NB	NBT	10	10	29.3	48	0			
	1066		NBR	0	0	0.0	48	0			

Table F-6 Future Revised Build Alternative 2-Way Ramsay 5-6 PM

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Williams Ave & N/NE Hancock St	1001	EB	EBL	10	10	37.0	65	11	645	609	33.0
	1001	WB	WBT	50	45	111.5	285	48			
	1001		WBR	75	73	110.1	285	48			
	1001	NB	NBL	5	5	3.5	310	93			
	1001		NBT	485	461	14.2	310	93			
	1001		NBR	20	15	6.9	310	93			
N/NE Broadway & N Williams Ave	1008	WB	WBT	945	901	4.8	187	44	2,175	2,079	11.4
	1008		WBR	860	801	13.8	298	17			
	1008	NB	NBL	20	18	22.7	241	5			
	1008		NBT	350	359	22.2	241	5			
N Broadway & N Vancouver Ave	1009	SB	SBT	220	221	21.8	209	26	1,230	1,178	6.8
	1009		SBR	45	42	33.7	83	21			
	1009	WB	WBL	350	338	2.3	93	27			
	1009		WBT	615	577	1.7	78	18			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Broadway & N Larrabee Ave	1010	EB	EBT	1150	1155	34.7	962	394	2,645	2,555	33.7
	1010		EBR	280	278	41.9	572	315			
	1010	SB	SBL	0	0	0.0	0	0			
	1010		SBT	25	25	72.3	75	23			
	1010	WB	WBL	15	14	79.5	58	15			
	1010		WBT	615	577	2.6	195	71			
	1010		WBR	85	76	36.1	154	23			
	1010	NB	NBL	380	340	55.4	219	11			
	1010		NBT	20	18	57.2	219	11			
	1010		NBR	75	72	102.6	166	50			
N Weidler St & N Vancouver Ave	1055	EB	EBT	1095	1100	5.4	350	15	2,015	1,960	15.3
	1055		EBR	350	293	58.3	363	31			
	1055	SB	SBL	45	46	20.9	196	24			
	1055		SBT	525	521	11.6	196	24			
N Wheeler Ave/ N Williams Ave/ N Ramsey Way & I-5 SB Ramps	1067	EB	EBL	10	10	47.9	213	34	1,655	1,544	43.4
	1067		EBT	240	229	46.9	213	34			
	1067		EBR	105	97	45.6	213	34			
	1067	WB	WBL	130	108	53.6	515	44			
	1067		WBT	335	278	54.8	515	44			
	1067	SB	SBL	740	723	37.2	284	9			
	1067		SBT	85	89	33.5	157	47			
	1067	NB	NBT	10	10	42.8	47	0			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N/NE Weidler St & N Williams Ave	1068	EB	EBL	360	361	5.0	191	35	1,160	1,165	3.6
	1068		EBT	780	784	2.3	191	35			
	1068	NB	NBT	20	20	30.1	77	24			
N Broadway & N Benton Ave	1098	EB	EBL	15	11	51.2	113	87	2,160	2,097	14.8
	1098		EBT	1170	1177	10.8	300	16			
	1098		EBR	40	38	18.3	300	16			
	1098	SB	SBL	25	24	57.5	168	24			
	1098		SBT	15	15	48.9	168	24			
	1098		SBR	50	50	55.0	168	24			
	1098	WB	WBL	10	9	72.1	46	13			
	1098		WBT	665	620	9.7	282	66			
	1098		WBR	70	64	15.2	282	66			
	1098	NB	NBL	0	0	0.0	0	0			
	1098		NBT	30	29	51.3	163	31			
	1098		NBR	70	60	50.5	163	31			
NE Broadway & NE Victoria Ave	2001	SB	SBR	25	24	15.5	39	7	1,980	1,854	34.3
	2001	WB	WBT	920	918	51.9	544	21			
	2001		WBR	15	14	136.5	544	21			
	2001	NB	NBL	860	761	17.2	265	17			
	2001		NBT	160	137	3.4	265	17			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
NE Weidler St & NE Victoria Ave/ I-5 NB Ramp	2091	EB	EBL	45	39	13.4	182	32	3,040	2,759	23.4
	2091		EBT	735	746	7.5	182	32			
	2091	NB	NBT	975	858	31.8	636	287			
	2091		NBR	1285	1116	28.0	722	232			
NE Weidler St & NE 2nd Ave	2247	EB	EBL	140	141	14.7	423	43	2,100	1,936	10.8
	2247		EBT	1715	1566	9.9	423	43			
	2247		EBR	165	153	11.3	426	43			
	2247	SB	SBL	15	15	13.5	74	19			
	2247		SBT	20	18	30.9	74	19			
	2247	NB	NBT	30	29	22.9	64	11			
	2247		NBR	15	14	11.0	70	11			
NE Broadway & NE 2nd Ave	2248	SB	SBT	15	15	19.1	115	52	1,135	1,125	17.8
	2248		SBR	95	94	15.9	117	52			
	2248	WB	WBL	20	18	5.9	363	125			
	2248		WBT	810	802	18.6	363	125			
	2248		WBR	25	26	35.1	366	125			
	2248	NB	NBL	30	29	13.8	161	19			
	2248		NBT	140	142	13.1	161	19			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Vancouver Ave & N/NE Hancock St	2249	EB	EBT	10	10	14.8	25	2	325	333	2.9
	2249		EBR	0	0	0.0	25	2			
	2249	WB	WBL	5	2	9.2	83	10			
	2249		WBT	50	49	8.0	77	10			
	2249	SB	SBT	260	273	1.5	0	0			
	2249		SBR	0	0	0.0	0	0			
N Williams Ave & N/NE Multnomah St	1066	EB	EBT	250	248	10.2	168	24	1,045	1,005	11.8
	1066		EBR	5	5	10.7	168	24			
	1066	SB	SBL	210	191	15.3	178	28			
	1066		SBT	15	14	15.3	178	28			
	1066		SBR	105	90	14.6	102	27			
	1066	WB	WBL	0	0	0.0	127	14			
	1066		WBT	450	447	10.0	127	14			
	1066	NB	NBT	10	10	29.3	48	0			
	1066		NBR	0	0	0.0	48	0			

Table F-7 Future Revised Build Alternative 2-Way Ramsay 7-8 AM

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Williams Ave & N/NE Hancock St	1001	EB	EBL	8	8	23.3	63	22	485	488	15.5
	1001	WB	WBT	50	49	29.4	167	19			
	1001		WBR	104	102	31.5	167	19			
	1001	NB	NBL	0	0	0.0	242	34			
	1001		NBT	315	324	8.2	242	34			
	1001		NBR	8	7	9.9	242	34			
N/NE Broadway & N Williams Ave	1008	WB	WBT	1274	1255	6.5	229	34	2,195	2,170	10.0
	1008		WBR	764	755	12.2	285	20			
	1008	NB	NBL	8	5	31.7	156	45			
	1008		NBT	149	155	27.1	156	45			
N Broadway & N Vancouver Ave	1009	SB	SBT	249	249	25.2	252	21	1,568	1,547	6.7
	1009		SBR	37	40	41.0	97	15			
	1009	WB	WBL	477	474	3.1	128	25			
	1009		WBT	805	786	1.3	130	52			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Broadway & N Larrabee Ave	1010	EB	EBT	593	603	9.4	242	40	2,073	2,063	19.3
	1010		EBR	203	206	33.8	285	51			
	1010	SB	SBL	0	0	0.0	0	0			
	1010		SBT	25	20	82.5	66	15			
	1010	WB	WBL	4	3	25.3	26	11			
	1010		WBT	801	794	2.0	128	53			
	1010		WBR	95	93	32.9	158	31			
	1010	NB	NBL	228	218	58.8	230	19			
	1010		NBT	58	58	60.3	230	19			
	1010		NBR	66	68	67.7	181	36			
N Weidler St & N Vancouver Ave	1055	EB	EBT	490	499	4.4	169	33	1,462	1,477	18.1
	1055		EBR	245	247	34.6	314	41			
	1055	SB	SBL	21	15	27.5	249	3			
	1055		SBT	706	716	21.7	249	3			
N Wheeler Ave/ N Williams Ave/ N Ramsey Way & I-5 SB Ramps	1067	EB	EBL	0	0	0.0	88	12	1,341	1,352	26.6
	1067		EBT	66	66	30.8	88	12			
	1067		EBR	17	15	28.5	88	12			
	1067	WB	WBL	108	106	41.4	388	45			
	1067		WBT	191	190	41.9	388	45			
	1067	SB	SBL	826	828	22.1	280	3			
	1067		SBT	125	138	17.4	185	47			
	1067	NB	NBT	8	10	40.6	47	0			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N/NE Weidler St & N Williams Ave	1068	EB	EBL	158	148	2.5	133	57	519	523	3.3
	1068		EBT	353	365	2.8	130	57			
	1068	NB	NBT	8	10	31.4	47	0			
N Broadway & N Benton Ave	1098	EB	EBL	8	10	59.5	61	31	1,681	1,678	9.7
	1098		EBT	627	642	4.9	207	22			
	1098		EBR	25	24	4.0	207	22			
	1098	SB	SBL	8	5	53.4	108	13			
	1098		SBT	21	18	56.2	108	13			
	1098		SBR	12	12	60.0	108	13			
	1098	WB	WBL	4	3	52.3	31	18			
	1098		WBT	876	867	6.7	326	92			
	1098		WBR	29	27	16.8	326	92			
	1098	NB	NBL	12	10	74.1	61	31			
	1098		NBT	17	16	56.2	163	32			
	1098		NBR	42	44	53.2	163	32			
NE Broadway & NE Victoria Ave	2001	SB	SBR	25	24	9.6	33	9	2,092	2,067	18.3
	2001	WB	WBT	1295	1289	25.9	471	71			
	2001		WBR	8	10	37.6	471	71			
	2001	NB	NBL	718	701	5.0	125	39			
	2001		NBT	46	45	6.4	125	39			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
NE Weidler St & NE Victoria Ave/ I-5 NB Ramp	2091	EB	EBL	12	12	19.1	161	22	2,307	2,290	17.8
	2091		EBT	340	350	10.0	161	22			
	2091	NB	NBT	751	732	17.2	188	32			
	2091		NBR	1204	1195	20.3	582	56			
NE Weidler St & NE 2nd Ave	2247	EB	EBL	83	82	6.3	229	32	1,614	1,609	5.3
	2247		EBT	1453	1455	4.7	229	32			
	2247		EBR	8	7	3.5	232	32			
	2247	SB	SBL	21	20	15.4	55	24			
	2247		SBT	8	10	19.9	55	24			
	2247	NB	NBT	33	29	24.4	64	13			
	2247		NBR	8	6	8.4	71	13			
NE Broadway & NE 2nd Ave	2248	SB	SBT	21	20	23.1	121	22	1,466	1,462	7.8
	2248		SBR	125	124	13.5	122	22			
	2248	WB	WBL	8	10	3.7	225	93			
	2248		WBT	1150	1156	5.5	225	93			
	2248		WBR	46	44	6.2	227	94			
	2248	NB	NBL	29	29	16.5	148	48			
	2248		NBT	87	81	27.5	148	48			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Vancouver Ave & N/NE Hancock St	2249	EB	EBT	8	8	19.7	38	22	344	353	3.3
	2249		EBR	0	0	0.0	38	22			
	2249	WB	WBL	0	0	10.6	89	28			
	2249		WBT	50	49	10.5	83	28			
	2249	SB	SBT	286	296	1.6	5	16			
	2249		SBR	0	0	0.0	5	16			
N Williams Ave & N/NE Multnomah St	1066	EB	EBT	183	176	9.9	164	13	672	678	11.7
	1066		EBR	4	5	9.3	164	13			
	1066	SB	SBL	170	168	15.2	180	18			
	1066		SBT	21	31	14.6	180	18			
	1066		SBR	58	60	14.8	110	34			
	1066	WB	WBL	8	9	8.6	98	13			
	1066		WBT	220	220	8.5	98	13			
	1066	NB	NBT	8	10	28.9	47	0			
	1066		NBR	0	0	0.0	47	0			

Table F-8 Future Revised Build Alternative 2-Way Ramsay 4-5 PM

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Williams Ave & N/NE Hancock St	1001	EB	EBL	10	9	35.9	57	10	620	587	28.5
	1001	WB	WBT	48	44	97.2	269	61			
	1001		WBR	72	69	96.7	269	61			
	1001	NB	NBL	5	5	2.4	299	79			
	1001		NBT	466	446	12.0	299	79			
	1001		NBR	19	15	4.9	299	79			
N/NE Broadway & N Williams Ave	1008	WB	WBT	907	867	4.6	157	21	2,088	2,006	11.2
	1008		WBR	826	776	13.1	294	17			
	1008	NB	NBL	19	19	21.1	234	16			
	1008		NBT	336	346	22.9	234	16			
N Broadway & N Vancouver Ave	1009	SB	SBT	211	214	22.9	217	45	1,180	1,144	7.1
	1009		SBR	43	45	32.4	94	37			
	1009	WB	WBL	336	331	2.2	108	39			
	1009		WBT	590	554	1.8	91	17			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Broadway & N Larrabee Ave	1010	EB	EBT	1104	1121	21.6	685	116	2,539	2,492	26.7
	1010		EBR	269	267	36.4	426	117			
	1010	SB	SBL	0	0	0.0	0	0			
	1010		SBT	24	24	77.4	78	15			
	1010	WB	WBL	14	14	84.9	56	12			
	1010		WBT	590	570	2.7	170	54			
	1010		WBR	82	81	36.8	149	24			
	1010	NB	NBL	365	327	59.3	227	15			
	1010		NBT	19	17	58.0	227	15			
	1010		NBR	72	72	65.8	150	32			
N Weidler St & N Vancouver Ave	1055	EB	EBT	1051	1047	5.2	318	49	1,934	1,889	14.3
	1055		EBR	336	281	52.8	379	21			
	1055	SB	SBL	43	42	20.1	185	24			
	1055		SBT	504	520	11.3	185	24			
N Wheeler Ave/ N Williams Ave/ N Ramsey Way & I-5 SB Ramps	1067	EB	EBL	10	9	47.9	210	30	1,590	1,542	41.8
	1067		EBT	230	234	45.3	210	30			
	1067		EBR	101	98	49.4	210	30			
	1067	WB	WBL	125	116	49.6	507	50			
	1067		WBR	322	0	0.0	0	0			
	1067	SB	SBL	710	710	35.8	278	4			
	1067		SBT	82	92	31.2	161	32			
	1067	NB	NBT	10	10	31.8	47	0			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N/NE Weidler St & N Williams Ave	1068	EB	EBL	346	340	4.6	168	40	1,114	1,106	3.4
	1068		EBT	749	747	2.2	168	40			
	1068	NB	NBT	19	19	30.2	72	21			
N Broadway & N Benton Ave	1098	EB	EBL	14	10	57.2	58	52	2,072	2,047	12.2
	1098		EBT	1123	1142	6.8	305	11			
	1098		EBR	38	43	12.4	305	11			
	1098	SB	SBL	24	21	56.7	154	18			
	1098		SBT	14	13	52.8	154	18			
	1098		SBR	48	48	57.0	154	18			
	1098	WB	WBL	10	9	66.4	41	14			
	1098		WBT	638	616	9.1	245	32			
	1098		WBR	67	61	14.1	245	32			
	1098	NB	NBL	0	0	0.0	0	0			
	1098		NBT	29	26	51.9	161	16			
	1098		NBR	67	59	53.0	161	16			
NE Broadway & NE Victoria Ave	2001	SB	SBR	24	23	13.3	36	10	1,901	1,806	26.6
	2001	WB	WBT	883	872	38.8	506	76			
	2001		WBR	14	14	91.8	506	76			
	2001	NB	NBL	826	756	16.1	270	15			
	2001		NBT	154	142	3.4	270	15			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
NE Weidler St & NE Victoria Ave/ I-5 NB Ramp	2091	EB	EBL	43	40	15.4	197	41	2,919	2,719	22.7
	2091		EBT	706	704	7.7	197	41			
	2091	NB	NBT	936	861	29.8	416	136			
	2091		NBR	1234	1113	26.9	756	259			
NE Weidler St & NE 2nd Ave	2247	EB	EBL	134	129	14.0	384	54	2,014	1,896	10.7
	2247		EBT	1646	1550	9.9	384	54			
	2247		EBR	158	146	10.9	388	54			
	2247	SB	SBL	14	13	14.4	73	28			
	2247		SBT	19	18	32.6	73	28			
	2247	NB	NBT	29	30	21.9	58	13			
	2247		NBR	14	11	9.2	65	13			
NE Broadway & NE 2nd Ave	2248	SB	SBT	14	13	14.7	101	36	1,089	1,081	11.0
	2248		SBR	91	91	10.5	103	36			
	2248	WB	WBL	19	18	6.2	323	86			
	2248		WBT	778	778	10.5	323	86			
	2248		WBR	24	24	11.9	325	86			
	2248	NB	NBL	29	30	14.7	163	25			
	2248		NBT	134	128	13.5	163	25			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Vancouver Ave & N/NE Hancock St	2249	EB	EBT	10	9	15.3	25	2	313	320	2.8
	2249		EBR	0	0	0.0	25	2			
	2249	WB	WBL	5	3	6.3	84	21			
	2249		WBT	48	46	8.2	78	21			
	2249	SB	SBT	250	263	1.4	0	0			
	2249		SBR	0	0	0.0	0	0			
N Williams Ave & N/NE Multnomah St	1066	EB	EBT	240	237	10.4	206	35	1,004	988	11.7
	1066		EBR	5	6	11.7	206	35			
	1066	SB	SBL	202	189	15.1	175	23			
	1066		SBT	14	14	14.0	175	23			
	1066		SBR	101	102	14.3	110	32			
	1066	WB	WBL	0	0	0.0	113	9			
	1066		WBT	432	431	9.8	113	9			
	1066	NB	NBT	10	10	29.0	47	0			
	1066		NBR	0	0	0.0	47	0			

Table F-9 Future Revised Build Alternative 2-Way Wheeler 8-9 AM

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Williams Ave & N/NE Hancock St	1001	EB	EBL	10	10	28.1	80	21	590	558	16.6
	1001	WB	WBT	60	62	28.9	213	20			
	1001		WBR	125	122	30.4	213	20			
	1001	NB	NBL	0	0	0.0	265	34			
	1001		NBT	385	357	9.5	265	34			
	1001		NBR	10	8	11.1	265	34			
N/NE Broadway & N Williams Ave	1008	WB	WBT	1535	1410	8.2	257	21	2,680	2,490	11.1
	1008		WBR	920	858	12.2	282	12			
	1008	NB	NBL	40	35	13.1	136	9			
	1008		NBT	185	187	27.2	136	9			
N Broadway & N Vancouver Ave	1009	SB	SBT	300	298	36.8	324	51	2,055	1,885	15.1
	1009	WB	WBL	605	566	21.0	259	21			
	1009		WBT	970	878	4.1	179	38			
	1009	NB	NBL	180	143	14.7	147	13			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Broadway & N Larrabee Ave	1010	EB	EBT	715	717	11.2	341	98	2,495	2,354	17.2
	1010		EBR	245	235	37.2	406	66			
	1010	SB	SBL	0	0	0.0	0	0			
	1010		SBT	30	29	80.1	99	19			
	1010	WB	WBL	5	4	68.0	33	13			
	1010		WBT	1135	1017	2.3	203	53			
	1010		WBR	120	109	32.0	204	30			
	1010	NB	NBL	100	98	59.5	155	18			
	1010		NBT	65	63	60.7	155	18			
	1010		NBR	80	83	68.5	186	28			
N Weidler St & N Vancouver Ave	1055	EB	EBT	580	589	5.4	202	95	1,975	1,888	17.3
	1055		EBR	260	252	30.9	310	48			
	1055	SB	SBL	20	22	30.8	267	16			
	1055		SBT	885	845	21.0	267	16			
	1055	NB	NBT	180	142	18.3	187	18			
	1055		NBR	50	37	18.0	187	18			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Wheeler Ave/ N Williams Ave/ N Ramsey Way & I-5 SB Ramps	1067	EB	EBL	0	0	0.0	78	14	1,615	1,500	38.0
	1067		EBT	80	76	33.3	78	14			
	1067		EBR	20	19	32.4	78	14			
	1067	WB	WBL	130	115	81.3	513	41			
	1067		WBR	230	183	83.3	513	41			
	1067	SB	SBL	995	967	26.9	311	15			
	1067		SBT	150	131	21.9	188	53			
	1067	NB	NBT	10	10	41.1	47	0			
N/NE Weidler St & N Williams Ave	1068	EB	EBL	225	214	3.6	166	58	660	655	4.3
	1068		EBT	425	432	4.0	163	58			
	1068	NB	NBT	10	10	31.1	47	0			
N Broadway & N Benton Ave	1098	EB	EBL	10	11	65.2	49	14	2,155	2,025	11.3
	1098		EBT	755	761	5.0	248	38			
	1098		EBR	30	27	4.8	248	38			
	1098	SB	SBL	10	6	52.0	114	16			
	1098		SBT	25	22	51.1	114	16			
	1098		SBR	15	17	52.6	114	16			
	1098	WB	WBL	5	4	79.2	36	17			
	1098		WBT	1230	1101	11.2	489	84			
	1098		WBR	40	35	26.8	489	84			
	1098	NB	NBL	15	15	63.9	52	17			
	1098		NBT	15	17	55.5	85	13			
	1098		NBR	5	7	56.1	85	13			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
NE Broadway & NE Victoria Ave	2001	SB	SBR	30	28	11.8	40	7	2,520	2,332	24.8
	2001	WB	WBT	1560	1548	33.4	541	18			
	2001		WBR	10	12	56.0	541	18			
	2001	NB	NBL	865	699	7.0	178	55			
	2001		NBT	55	46	5.7	178	55			
NE Weidler St & NE Victoria Ave/ I-5 NB Ramp	2091	EB	EBL	15	14	25.5	202	35	2,780	2,348	17.7
	2091		EBT	410	421	12.2	202	35			
	2091	NB	NBT	905	731	17.0	175	16			
	2091		NBR	1450	1183	20.0	582	65			
NE Weidler St & NE 2nd Ave	2247	EB	EBL	100	90	7.0	258	66	1,945	1,676	5.9
	2247		EBT	1750	1503	5.1	258	66			
	2247		EBR	10	7	4.1	262	66			
	2247	SB	SBL	25	22	15.3	65	16			
	2247		SBT	10	12	21.0	65	16			
	2247	NB	NBT	40	35	24.3	71	12			
	2247		NBR	10	8	9.2	77	12			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
NE Broadway & NE 2nd Ave	2248	SB	SBT	25	22	24.7	143	17	1,765	1,727	11.0
	2248		SBR	150	151	16.4	144	17			
	2248	WB	WBL	10	12	4.7	422	104			
	2248		WBT	1385	1368	8.9	422	104			
	2248		WBR	55	50	13.7	425	104			
	2248	NB	NBL	35	35	15.2	151	35			
	2248		NBT	105	90	28.5	151	35			
N Vancouver Ave & N/NE Hancock St	2249	EB	EBT	10	10	24.0	35	22	370	378	4.2
	2249		EBR	0	0	0.0	35	22			
	2249	WB	WBL	0	1	8.5	103	14			
	2249		WBT	60	60	12.2	97	14			
	2249	SB	SBT	300	307	1.9	4	12			
	2249		SBR	0	0	0.0	4	12			
N Williams Ave & N/NE Multnomah St	1066	EB	EBT	220	214	10.2	152	18	810	767	12.0
	1066		EBR	5	5	6.1	152	18			
	1066	SB	SBL	205	178	16.3	180	43			
	1066		SBT	25	29	15.9	180	43			
	1066		SBR	70	59	13.5	82	16			
	1066	WB	WBL	10	12	12.3	112	18			
	1066		WBT	265	260	9.3	112	18			
	1066	NB	NBT	10	10	29.3	48	0			
	1066		NBR	0	0	0.0	48	0			

Table F-10 Future Revised Build Alternative 2-Way Wheeler 5-6 PM

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Williams Ave & N/NE Hancock St	1001	EB	EBL	10	10	34.2	63	11	645	613	32.5
	1001	WB	WBT	50	45	111.1	288	48			
	1001		WBR	75	73	108.4	288	48			
	1001	NB	NBL	5	5	3.8	301	83			
	1001		NBT	485	464	14.1	301	83			
	1001		NBR	20	16	6.9	301	83			
N/NE Broadway & N Williams Ave	1008	WB	WBT	945	899	4.9	173	35	2,185	2,083	11.7
	1008		WBR	860	797	14.1	299	17			
	1008	NB	NBL	30	28	26.3	240	9			
	1008		NBT	350	361	22.4	240	9			
N Broadway & N Vancouver Ave	1009	SB	SBT	220	222	32.5	227	26	1,485	1,377	17.3
	1009	WB	WBL	370	355	9.6	130	39			
	1009		WBT	605	569	2.2	88	25			
	1009	NB	NBL	290	233	51.5	225	34			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Broadway & N Larrabee Ave	1010	EB	EBT	1150	1154	22.3	732	166	2,655	2,558	22.4
	1010		EBR	280	276	38.1	488	115			
	1010	SB	SBL	0	0	0.0	0	0			
	1010		SBT	25	25	71.0	77	22			
	1010	WB	WBL	20	18	82.9	66	21			
	1010		WBT	860	777	2.2	205	58			
	1010		WBR	100	90	33.0	182	30			
	1010	NB	NBL	140	138	56.8	161	27			
	1010		NBT	5	6	47.3	161	27			
	1010		NBR	75	74	68.6	157	31			
N Weidler St & N Vancouver Ave	1055	EB	EBT	1060	1077	5.5	284	66	2,265	2,211	15.5
	1055		EBR	280	278	43.4	339	40			
	1055	SB	SBL	45	46	59.0	246	33			
	1055		SBT	545	538	25.4	246	33			
	1055	NB	NBT	290	233	28.2	225	11			
	1055		NBR	45	39	25.1	225	11			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Wheeler Ave/ N Williams Ave/ N Ramsey Way & I-5 SB Ramps	1067	EB	EBL	10	9	47.9	181	37	1,655	1,543	43.7
	1067		EBT	240	231	44.2	181	37			
	1067		EBR	105	100	48.6	181	37			
	1067	WB	WBL	130	107	50.1	522	24			
	1067		WBR	335	277	50.6	522	24			
	1067	SB	SBL	740	721	40.8	286	13			
	1067		SBT	85	88	31.9	145	18			
	1067	NB	NBT	10	10	28.5	48	0			
N/NE Weidler St & N Williams Ave	1068	EB	EBL	370	375	5.2	216	43	1,170	1,182	3.9
	1068		EBT	780	788	2.7	216	43			
	1068	NB	NBT	20	19	29.9	69	17			
N Broadway & N Benton Ave	1098	EB	EBL	15	12	57.0	78	46	2,375	2,276	13.4
	1098		EBT	1170	1179	6.9	293	23			
	1098		EBR	40	38	13.7	293	23			
	1098	SB	SBL	25	24	60.8	175	25			
	1098		SBT	15	15	47.9	175	25			
	1098		SBR	50	50	56.2	175	25			
	1098	WB	WBL	15	13	77.5	57	8			
	1098		WBT	930	839	14.5	401	91			
	1098		WBR	80	72	16.8	401	91			
	1098	NB	NBL	0	0	0.0	0	0			
	1098		NBT	20	22	48.9	100	33			
	1098		NBR	15	14	48.1	100	33			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
NE Broadway & NE Victoria Ave	2001	SB	SBR	25	24	15.1	38	8	1,980	1,845	33.4
	2001	WB	WBT	920	911	50.5	527	63			
	2001		WBR	15	13	138.2	527	63			
	2001	NB	NBL	860	761	17.1	272	5			
	2001		NBT	160	137	3.7	272	5			
NE Weidler St & NE Victoria Ave/ I-5 NB Ramp	2091	EB	EBL	45	39	10.0	195	41	3,040	2,756	23.9
	2091		EBT	735	749	7.2	195	41			
	2091	NB	NBT	975	858	32.9	598	266			
	2091		NBR	1285	1110	28.6	685	129			
NE Weidler St & NE 2nd Ave	2247	EB	EBL	140	141	15.3	419	53	2,100	1,934	10.8
	2247		EBT	1715	1564	9.8	419	53			
	2247		EBR	165	153	11.0	422	53			
	2247	SB	SBL	15	14	13.4	68	14			
	2247		SBT	20	18	31.5	68	14			
	2247	NB	NBT	30	29	23.1	68	10			
	2247		NBR	15	15	11.1	75	10			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
NE Broadway & NE 2nd Ave	2248	SB	SBT	15	14	16.4	97	20	1,135	1,119	16.8
	2248		SBR	95	95	8.6	98	20			
	2248	WB	WBL	20	18	5.3	382	113			
	2248		WBT	810	796	18.1	382	113			
	2248		WBR	25	26	32.8	385	113			
	2248	NB	NBL	30	28	16.0	166	41			
	2248		NBT	140	143	13.6	166	41			
N Vancouver Ave & N/NE Hancock St	2249	EB	EBT	10	10	14.9	24	2	325	333	3.1
	2249		EBR	0	0	0.0	24	2			
	2249	WB	WBL	5	2	8.2	87	13			
	2249		WBT	50	49	7.9	81	13			
	2249	SB	SBT	215	230	1.6	9	15			
	2249		SBR	45	43	2.5	9	15			
N Williams Ave & N/NE Multnomah St	1066	EB	EBT	250	248	10.3	168	24	1,045	1,005	11.7
	1066		EBR	5	5	11.0	168	24			
	1066	SB	SBL	210	189	15.1	196	71			
	1066		SBT	15	14	14.8	196	71			
	1066		SBR	105	91	14.2	101	25			
	1066	WB	WBL	0	0	0.0	125	14			
	1066		WBT	450	448	10.1	125	14			
	1066	NB	NBT	10	10	29.3	48	0			
	1066		NBR	0	0	0.0	48	0			

Table F-11 Future Revised Build Alternative 2-Way Wheeler 7-8 AM

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Williams Ave & N/NE Hancock St	1001	EB	EBL	8	8	21.9	64	21	490	488	15.5
	1001	WB	WBT	50	49	29.5	167	20			
	1001		WBR	104	102	31.6	167	20			
	1001	NB	NBL	0	0	0.0	229	34			
	1001		NBT	320	324	8.2	229	34			
	1001		NBR	8	7	9.8	229	34			
N/NE Broadway & N Williams Ave	1008	WB	WBT	1274	1254	6.8	208	21	2,225	2,205	10.2
	1008		WBR	764	756	12.3	278	12			
	1008	NB	NBL	33	38	11.4	157	9			
	1008		NBT	154	156	27.9	157	9			
N Broadway & N Vancouver Ave	1009	SB	SBT	249	251	35.4	285	51	1,705	1,691	10.9
	1009	WB	WBL	502	501	10.4	172	21			
	1009		WBT	805	787	2.5	156	38			
	1009	NB	NBL	149	152	16.0	184	13			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Broadway & N Larrabee Ave	1010	EB	EBT	593	603	8.8	235	98	2,070	2,071	15.4
	1010		EBR	203	207	35.3	296	66			
	1010	SB	SBL	0	0	0.0	0	0			
	1010		SBT	25	21	80.4	66	19			
	1010	WB	WBL	4	3	20.7	26	13			
	1010		WBT	942	941	1.7	150	53			
	1010		WBR	100	95	31.7	167	30			
	1010	NB	NBL	83	79	60.2	158	18			
	1010		NBT	54	56	63.0	158	18			
	1010		NBR	66	68	68.9	182	28			
N Weidler St & N Vancouver Ave	1055	EB	EBT	481	490	4.7	164	95	1,640	1,660	15.4
	1055		EBR	216	217	24.7	266	48			
	1055	SB	SBL	17	19	31.0	261	16			
	1055		SBT	735	744	18.5	261	16			
	1055	NB	NBTNBR	149	151	18.6	190	18			
	1055			42	40	17.6	190	18			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Wheeler Ave/ N Williams Ave/ N Ramsey Way & I-5 SB Ramps	1067	EB	EBL	0	0	0.0	80	14	1,341	1,349	34.3
	1067		EBT	66	65	34.6	80	14			
	1067		EBR	17	15	34.4	80	14			
	1067	WB	WBL	108	106	64.9	471	41			
	1067		WBT	191	0	0.0	0	0			
	1067	SB	SBL	826	826	25.7	288	15			
	1067		SBT	125	138	22.0	186	53			
	1067	NB	NBT	8	10	41.6	47	0			
N/NE Weidler St & N Williams Ave	1068	EB	EBL	187	183	2.9	124	58	548	557	3.5
	1068		EBT	353	365	3.1	122	58			
	1068	NB	NBT	8	10	25.5	47	0			
N Broadway & N Benton Ave	1098	EB	EBL	8	10	60.0	60	14	1,787	1,790	10.1
	1098		EBT	627	643	5.0	220	38			
	1098		EBR	25	24	4.0	220	38			
	1098	SB	SBL	8	5	53.1	108	16			
	1098		SBT	21	18	56.6	108	16			
	1098		SBR	12	12	60.9	108	16			
	1098	WB	WBL	4	4	58.1	38	17			
	1098		WBT	1021	1016	9.5	406	84			
	1098		WBR	33	30	17.1	406	84			
	1098	NB	NBL	12	10	71.2	54	17			
	1098		NBT	12	13	54.4	67	13			
	1098		NBR	4	6	67.0	67	13			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
NE Broadway & NE Victoria Ave	2001	SB	SBR	25	24	9.7	33	7	2,092	2,069	18.2
	2001	WB	WBT	1295	1290	25.8	485	18			
	2001		WBR	8	10	40.9	485	18			
	2001	NB	NBL	718	701	5.0	127	55			
	2001		NBT	46	45	6.5	127	55			
NE Weidler St & NE Victoria Ave/ I-5 NB Ramp	2091	EB	EBL	12	12	25.3	162	35	2,307	2,291	18.0
	2091		EBT	340	350	10.7	162	35			
	2091	NB	NBT	751	732	17.4	192	16			
	2091		NBR	1204	1196	20.5	611	65			
NE Weidler St & NE 2nd Ave	2247	EB	EBL	83	81	6.4	227	66	1,614	1,609	5.4
	2247		EBT	1453	1455	4.8	227	66			
	2247		EBR	8	7	3.7	230	66			
	2247	SB	SBL	21	20	16.5	55	16			
	2247		SBT	8	10	20.2	55	16			
	2247	NB	NBT	33	29	24.4	64	12			
	2247		NBR	8	6	8.2	71	12			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
NE Broadway & NE 2nd Ave	2248	SB	SBT	21	20	22.9	129	17	1,466	1,463	7.5
	2248		SBR	125	124	13.6	131	17			
	2248	WB	WBL	8	10	4.0	186	104			
	2248		WBT	1150	1157	5.0	186	104			
	2248		WBR	46	44	5.8	189	104			
	2248	NB	NBL	29	29	16.5	139	35			
	2248		NBT	87	81	27.5	139	35			
N Vancouver Ave & N/NE Hancock St	2249	EB	EBT	8	8	20.0	38	22	307	315	3.4
	2249		EBR	0	0	0.0	38	22			
	2249	WB	WBL	0	0	8.6	89	14			
	2249		WBT	50	49	10.3	83	14			
	2249	SB	SBT	249	258	1.6	12	12			
	2249		SBR	0	0	0.0	12	12			
N Williams Ave & N/NE Multnomah St	1066	EB	EBT	183	176	9.9	164	18	672	677	11.5
	1066		EBR	4	5	9.3	164	18			
	1066	SB	SBL	170	167	14.6	185	43			
	1066		SBT	21	31	13.9	185	43			
	1066		SBR	58	60	14.5	92	16			
	1066	WB	WBL	8	9	8.6	98	18			
	1066		WBT	220	220	8.5	98	18			
	1066	NB	NBT	8	10	28.9	47	0			
	1066		NBR	0	0	0.0	47	0			

Table F-12 Future Revised Build Alternative 2-Way Wheeler 4-5 PM

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Williams Ave & N/NE Hancock St	1001	EB	EBL	10	9	33.6	57	11	620	589	27.8
	1001	WB	WBT	48	43	95.0	268	63			
	1001		WBR	72	69	95.7	268	63			
	1001	NB	NBL	5	5	2.1	306	86			
	1001		NBT	466	448	11.9	306	86			
	1001		NBR	19	15	4.2	306	86			
N/NE Broadway & N Williams Ave	1008	WB	WBT	907	865	4.8	170	41	2,098	2,011	11.5
	1008		WBR	826	782	13.2	289	15			
	1008	NB	NBL	29	23	28.4	235	25			
	1008		NBT	336	341	23.4	235	25			
N Broadway & N Vancouver Ave	1009	SB	SBT	211	214	33.1	241	50	1,425	1,348	18.0
	1009	WB	WBL	355	346	9.1	156	68			
	1009		WBT	581	542	2.0	76	18			
	1009	NB	NBL	278	246	52.6	225	33			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Broadway & N Larrabee Ave	1010	EB	EBT	1104	1121	20.1	616	75	2,549	2,509	21.2
	1010		EBR	269	271	36.4	397	99			
	1010	SB	SBL	0	0	0.0	0	0			
	1010		SBT	24	24	75.7	77	16			
	1010	WB	WBL	19	18	82.5	79	39			
	1010		WBT	826	776	2.4	202	38			
	1010		WBR	96	92	34.8	166	25			
	1010	NB	NBL	134	131	57.6	180	26			
	1010		NBT	5	5	49.8	180	26			
	1010		NBR	72	72	65.7	155	34			
N Weidler St & N Vancouver Ave	1055	EB	EBT	1018	1013	5.2	271	62	2,174	2,143	18.6
	1055		EBR	269	271	41.5	339	41			
	1055	SB	SBL	43	41	64.8	227	30			
	1055		SBT	523	535	23.5	227	30			
	1055	NB	NBT	278	245	29.0	236	16			
	1055		NBR	43	38	28.6	236	16			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
N Wheeler Ave/ N Williams Ave/ N Ramsey Way & I-5 SB Ramps	1067	EB	EBL	10	9	48.2	210	29	1,590	1,547	41.4
	1067		EBT	230	232	43.7	210	29			
	1067		EBR	101	96	46.3	210	29			
	1067	WB	WBL	125	113	50.1	512	43			
	1067		WBR	322	280	50.9	512	43			
	1067	SB	SBL	710	714	36.1	279	6			
	1067		SBT	82	93	31.8	158	42			
	1067	NB	NBT	10	10	31.9	47	0			
N/NE Weidler St & N Williams Ave	1068	EB	EBL	355	340	4.6	195	40	1,123	1,109	3.4
	1068		EBT	749	751	2.3	195	40			
	1068	NB	NBT	19	19	26.5	73	24			
N Broadway & N Benton Ave	1098	EB	EBL	14	10	55.6	43	12	2,278	2,226	12.6
	1098		EBT	1123	1144	6.0	280	33			
	1098		EBR	38	41	12.0	280	33			
	1098	SB	SBL	24	20	57.8	156	23			
	1098		SBT	14	13	57.3	156	23			
	1098		SBR	48	49	57.1	156	23			
	1098	WB	WBL	14	13	75.4	58	19			
	1098		WBT	893	835	13.8	409	106			
	1098		WBR	77	70	16.8	409	106			
	1098	NB	NBL	0	0	0.0	0	0			
	1098		NBT	19	19	51.8	93	34			
	1098		NBR	14	13	53.8	93	34			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
NE Broadway & NE Victoria Ave	2001	SB	SBR	24	23	12.6	34	10	1,901	1,812	27.2
	2001	WB	WBT	883	875	39.9	511	66			
	2001		WBR	14	14	98.7	511	66			
	2001	NB	NBL	826	758	16.1	268	23			
	2001		NBT	154	143	3.5	268	23			
NE Weidler St & NE Victoria Ave/ I-5 NB Ramp	2091	EB	EBL	43	40	9.8	192	42	2,919	2,724	23.6
	2091		EBT	706	708	7.2	192	42			
	2091	NB	NBT	936	864	31.6	551	204			
	2091		NBR	1234	1112	28.4	724	229			
NE Weidler St & NE 2nd Ave	2247	EB	EBL	134	129	14.1	412	40	2,014	1,896	10.9
	2247		EBT	1646	1549	10.1	412	40			
	2247		EBR	158	146	11.6	416	40			
	2247	SB	SBL	14	13	14.0	73	28			
	2247		SBT	19	18	31.1	73	28			
	2247	NB	NBT	29	30	21.7	58	13			
	2247		NBR	14	11	8.2	65	13			

Intersection	Node	Approach	Movement	Movement					Intersection		
				Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)	Max Queue (feet)	Std. Dev. (feet)	Volume Demand (vph)	Volume Served (vph)	Vehicle Delay (sec)
NE Broadway & NE 2nd Ave	2248	SB	SBT	14	13	14.8	81	21	1,089	1,080	9.3
	2248		SBR	91	91	7.5	82	21			
	2248	WB	WBL	19	18	6.4	293	88			
	2248		WBT	778	777	8.5	293	88			
	2248		WBR	24	24	8.9	296	88			
	2248	NB	NBL	29	30	15.3	158	19			
	2248		NBT	134	127	13.7	158	19			
N Vancouver Ave & N/NE Hancock St	2249	EB	EBT	10	9	15.3	25	2	312	318	3.0
	2249		EBR	0	0	0.0	25	2			
	2249	WB	WBL	5	3	6.3	85	16			
	2249		WBT	48	45	8.0	79	16			
	2249	SB	SBT	206	220	1.5	13	20			
	2249		SBR	43	43	2.2	13	20			
N Williams Ave & N/NE Multnomah St	1066	EB	EBT	240	238	10.4	205	36	1,004	987	11.7
	1066		EBR	5	6	10.5	205	36			
	1066	SB	SBL	202	190	14.7	181	18			
	1066		SBT	14	13	14.9	181	18			
	1066		SBR	101	99	14.4	110	29			
	1066	WB	WBL	0	0	0.0	114	11			
	1066		WBT	432	431	9.9	114	11			
	1066	NB	NBT	10	10	28.9	47	0			
	1066		NBR	0	0	0.0	47	0			

Appendix G: 2045 No Build and 2045 Build AM and PM Peak Hour Bike Volumes

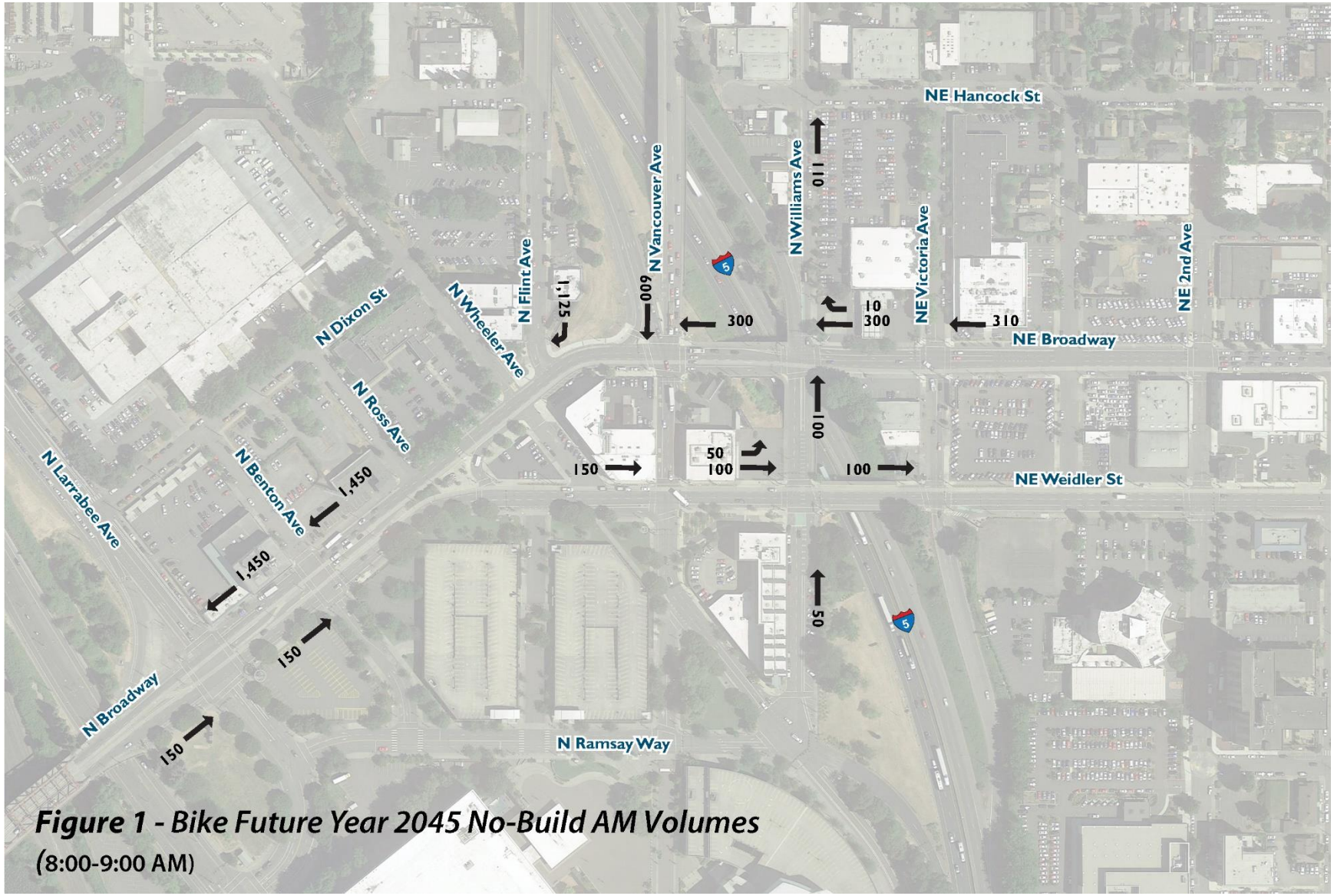


Figure 1 - Bike Future Year 2045 No-Build AM Volumes
(8:00-9:00 AM)

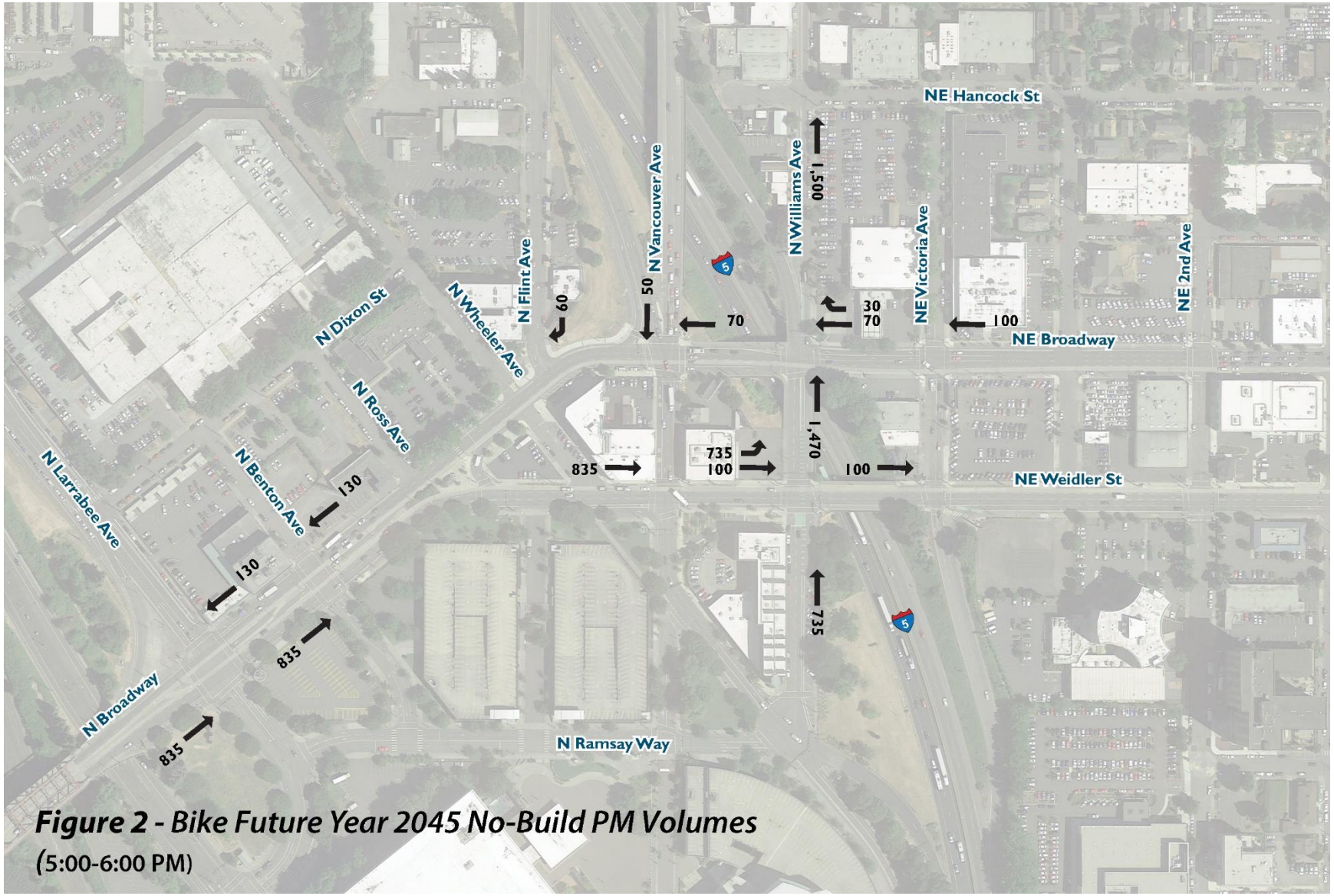


***Figure 2** - Bike Future Year 2045 No-Build PM Volumes*
(5:00-6:00 PM)

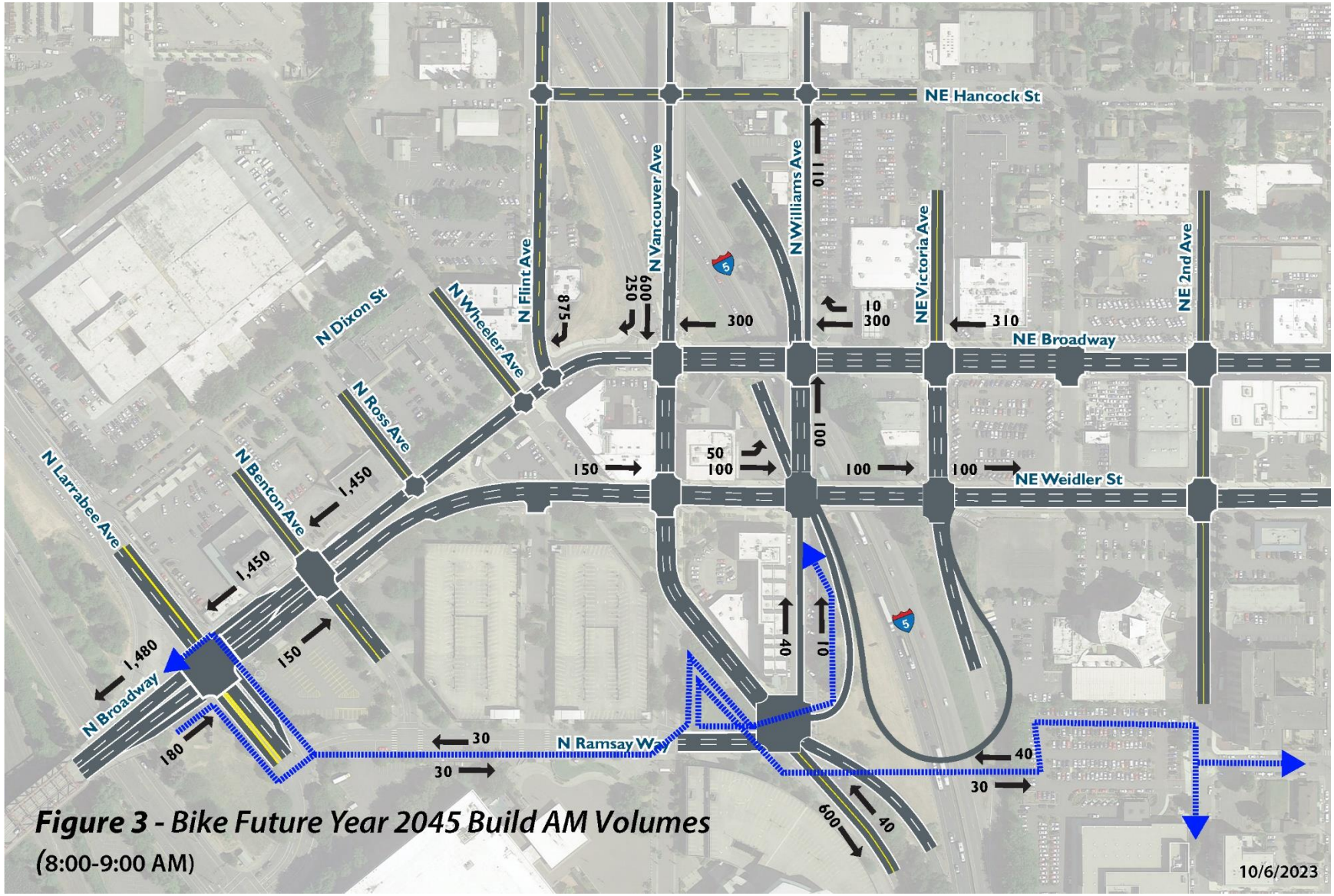


Figure 3 - Bike Future Year 2045 Build AM Volumes
(8:00-9:00 AM)

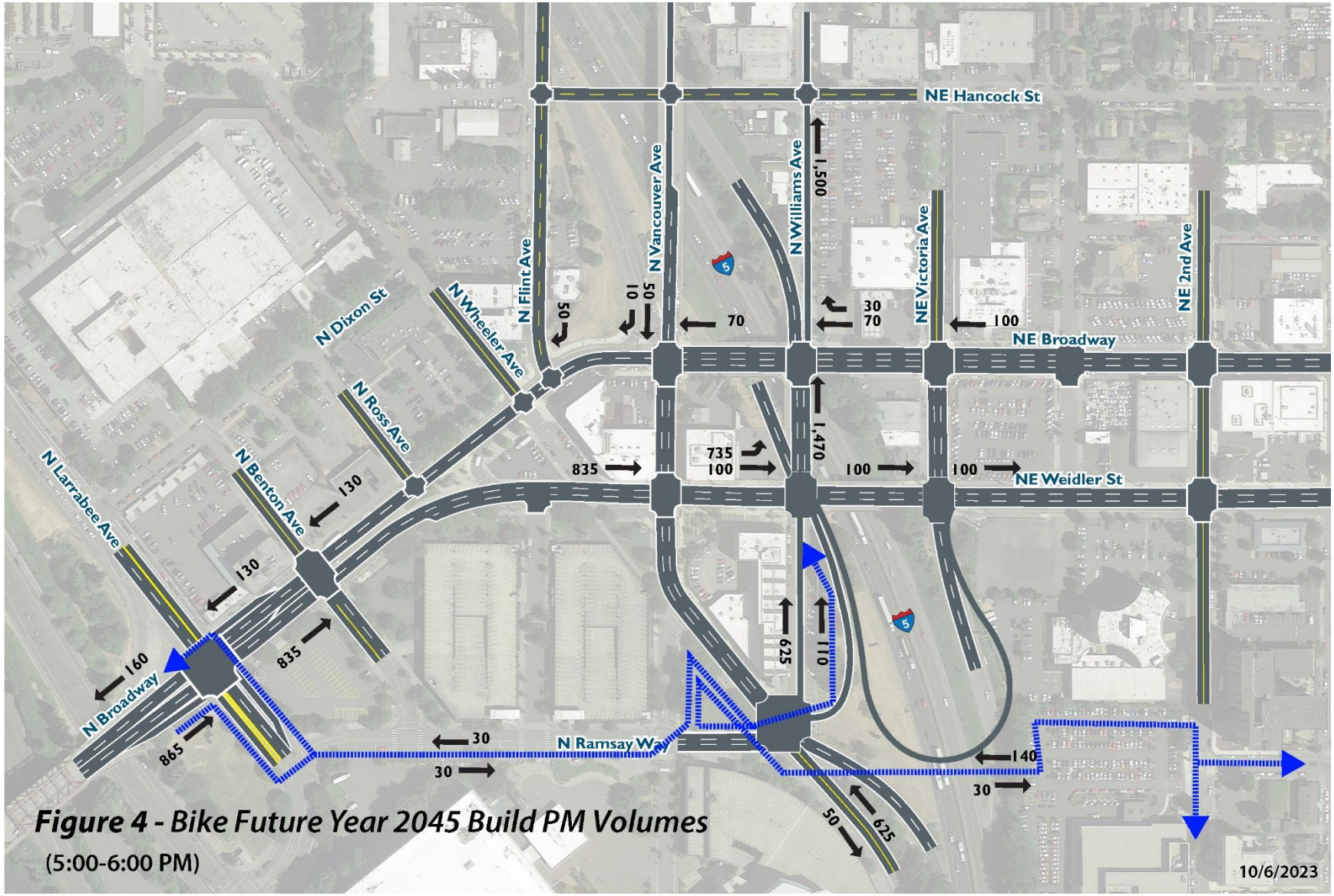


Figure 4 - Bike Future Year 2045 Build PM Volumes

(5:00-6:00 PM)