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March 1, 2017

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VIA EMAIL

Mr. John Boyd
West Linn Planning Department
22500 Salamo Road
West Linn, OR 97068

Re: City of West Linn File No. SUB-15-03/WAP-16-03; Findings and Evidence Supporting Approval of 34-Lot Land Division Application by Upper Midhill, LLC on Remand to the West Linn Planning Commission

Dear Mr. Boyd:

This office represents Upper Midhill, LLC, the Applicant. Please find enclosed with this letter the Applicant's findings and evidence supporting their approval by the Planning Commission of this 34-lot subdivision. The findings and evidence satisfactorily address West Linn Community Development Code ("CDC") 85.200.A, which was the sole basis for the City Council's denial of this Application.

Please place this letter and its enclosures in the official Planning Department file for this matter and before the Planning Commission at the initial evidentiary hearing on March 22, 2017.

Please contact me if you have any questions.

Very truly yours,

Michael C. Robinson

MCR:rsr
Enclosures

cc: Mr. Ryan Zygar (via email) (w/ encls.)
Mr. Andrew Tull (via email) (w/ encls.)
Mr. Matt Bell (via email) (w/ encls.)
Mr. Aaron Murphy (via email) (w/ encls.)
Ms. Megan Thornton (via email) (w/ encls.)
Mr. Seth King (via email) (w/ encls.)

BEFORE THE PLANNING COMMISSION
OF THE CITY OF WEST LINN, OREGON

SUPPLEMENTAL FINDINGS OF FACT AND CONCLUSIONS OF LAW APPROVING THE LAND USE APPLICATIONS FOR CHENE BLANC ESTATES, A 34-LOT RESIDENTIAL SUBDIVISION, ON RECONSIDERATION FROM THE OREGON LAND USE BOARD OF APPEALS

In the matter of Applications for: (1) a 34-lot Preliminary Subdivision Plat; and (2) a Water Resource Area Permit, on 6.1 Acres of Property Located at 18000 Upper Midhill Drive.	**CITY FILE NOS. AP-16-02/SUB-15-03/WAP-16-03**

I. Introduction.

Upper Midhill Estates, LLC ("Applicant") requests City of West Linn ("City") approval of a Preliminary Subdivision Plat and a Water Resource Area Permit to allow development of a 34-lot residential subdivision ("Development") on approximately 6.1 acres of property located at 18000 Upper Midhill Drive ("Property").[1] A copy of the proposed plan for the Development is set forth on page 2 of this narrative.

As explained below, the City is now reconsidering the Development. These findings address the single issue before the City on reconsideration and demonstrate that there is substantial evidence in the whole record to support the conclusion that the Development satisfies applicable approval criteria and should be approved.

[1] The Development proposes detached single-family dwellings, which are "needed housing" under both state and local law. *See* ORS 197.303(1)(a) and City Comprehensive Plan at H-1, H-2, and Figure 10-1. As a result, Applicant reserves the right to request that the City apply only "clear and objective standards, conditions, and procedures" to the Development. ORS 197.307(4).

II. Original Proceedings.

The City Council denied the Development on September 12, 2016. The sole basis for the City Council's denial was that Applicant failed to demonstrate that there were adequate public facilities to serve the Development pursuant to West Linn Community Development Code ("CDC") 85.200. *See* Final Decision and Order AP-16-02.

The applicant filed a timely Notice of Intent to Appeal the City's decision with the Land Use Board of Appeals ("LUBA") on October 3, 2016.

Subsequent to filing the appeal, Applicant filed a new application with the City requesting approval of an Expedited Land Division for 42 lots of needed housing on the Property. That application is still pending before the City.

III. Reconsideration.

The City filed an Amended Notice of Withdrawal of Decision on January 17, 2017. LUBA granted the request in an Order dated January 19, 2017. LUBA's Order requires that the City file its decision on reconsideration on or before June 1, 2017.

On reconsideration, the City Council voted on February 6, 2017 to remand the Development to the Planning Commission for reconsideration with the scope limited to determining adequacy of public transportation facilities, including traffic impact and influences and pedestrian improvements and safety. Consistent with its traditional procedures, the Planning Commission may accept new evidence and argument during its reconsideration of the Development.

IV. Applicable Approval Criteria.

As explained above, the reconsideration is limited to determining adequacy of public transportation facilities. In order to approve a Tentative Subdivision Plan, the City must find that adequate public facilities will be available:

> "No tentative subdivision or partition plan shall be approved unless adequate public facilities will be available to the partition or subdivision area prior to final plat approval and the Planning Commission or Planning Director, as applicable, finds that the following standards have been satisfied, or can be satisfied by condition of approval.
>
> "A. Streets
>
> "1. General. The location, width and grade of streets shall be considered in their relation to existing and planned streets, to the generalized or reasonable layout of streets on adjacent undeveloped lots or parcels, to topographical conditions, to public convenience and safety, to accommodate various types of transportation (automobile, bus, pedestrian, bicycle), and to the proposed use of land to be served by the streets. The functional class of a street aids in defining the primary function and associated design standards for the facility. The hierarchy of the facilities within the network in regard to the type of traffic served (through or local trips), balance of function (providing access and/or

capacity), and the level of use (generally measured in vehicles per day) are generally dictated by the functional class. The street system shall assure an adequate traffic or circulation system with intersection angles, grades, tangents, and curves appropriate for the traffic to be carried. Streets should provide for the continuation, or the appropriate projection, of existing principal streets in surrounding areas and should not impede or adversely affect development of adjoining lands or access thereto."

CDC 85.200. Further, the City has defined "adequate public facilities" as follows:

> "Adequate public facilities. Public facilities that must be adequate for an application for new construction, remodeling, or replacement of an existing structure to be approved are transportation, water, sewer, and storm sewer facilities. To be adequate, on-site and adjacent facilities must meet City standards, and off-site facilities must have sufficient capacity to (1) meet all existing demands, (2) satisfy the projected demands from projects with existing land use approvals, plus the additional demand created by the application, and (3) remain compliant with all applicable standards.
>
> "For purposes of evaluating discretionary permits in situations where the level-of-service or volume-to-capacity performance standard for an affected City or State roadway is currently failing or projected to fail to meet the standard, and an improvement project is not programmed, the approval criteria shall be that the development avoids further degradation of the affected transportation facility. Mitigation must be provided to bring the facility performance standard to existing conditions at the time of occupancy."

CDC 2.030.

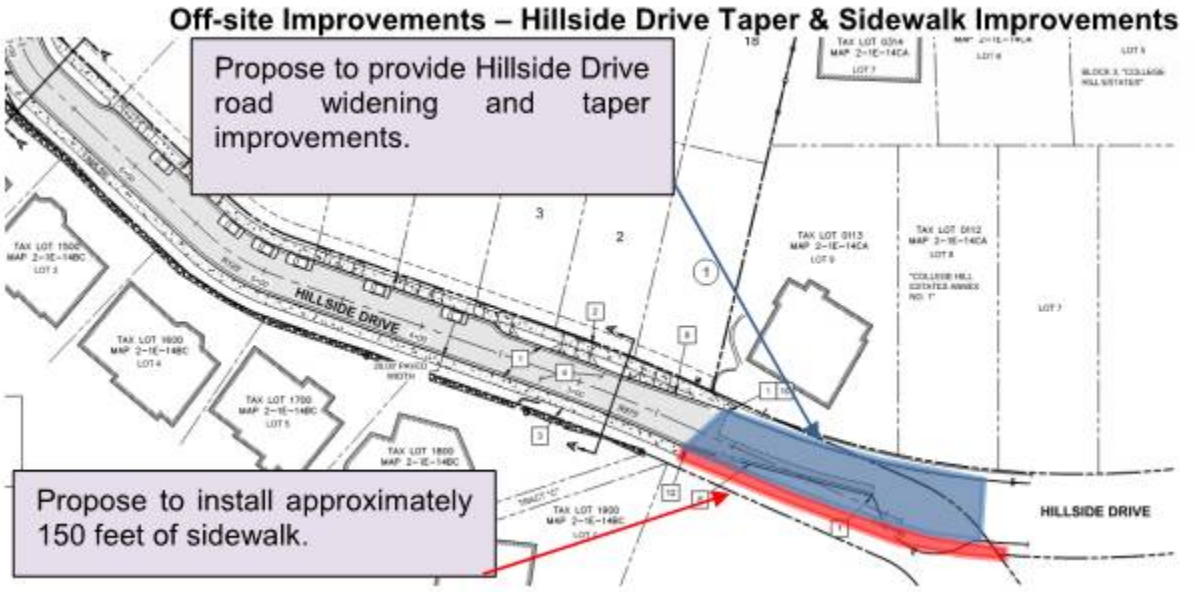
V. Supplemental Findings on Reconsideration.

A. Subject to compliance with conditions, there will be adequate and safe public transportation facilities to serve the Development concurrent with its occupancy.

The City should find that the Development satisfies this standard. As support for this conclusion, the City should rely upon the testimony of Kittelson & Associates, Inc. ("KAI"), Applicant's transportation engineer and planner, who analyzed the safety and

performance of the area street system and concluded that, subject to Applicant's completion of the following mitigation measures, the Development will be served by adequate and safe transportation facilities:

- Restriping Willamette Drive with a northbound left turn pocket on the south leg of the Willamette Drive/Arbor Drive intersection and a left-turn refuge storage area on the north leg of the intersection, as depicted in Figure 9 of KAI's March 1, 2017 memorandum ("KAI Memorandum");
- Payment of a fee in the amount of $11,600 as Applicant's proportionate share contribution toward the long-term Highway 43 Multimodal Transportation Project; and
- Hillside Drive Street and Sidewalk Improvements illustrated below:



Off-site Improvements – Hillside Drive Sidewalk (Source: Google Earth)

See KAI Memorandum. KAI reached its conclusions based upon an analysis of the background and projected traffic conditions (including trips generated by the Development) at affected intersections in the vicinity of the Development. *See* Appendices to KAI Memorandum. KAI concluded that, subject to implementation of these mitigation measures, all affected intersections would operate consistent with applicable performance standards (Level of Service or Volume-to-Capacity). KAI Memorandum at 1. In fact, Applicant's proposed interim improvements will actually improve performance during the PM peak hour at the Willamette Drive/Arbor Drive intersection. *Id.* Based upon its analysis, KAI concluded that "the proposed development plan can be constructed while maintaining safe and adequate public facilities for motorists, pedestrians, and cyclists." KAI Memorandum at 4.

Notably, on reconsideration, Applicant has committed to completing more transportation mitigation measures than Applicant proposed, or City staff recommended, in the original proceedings. *See* KAI's original Transportation Impact Analysis for the Development dated January 2016 ("TIA"), which had recommended only the payment of a fee in lieu toward completion of off-site traffic mitigation measures on Willamette Drive between Arbor Drive and Shady Hollow Way. The additional mitigation measures proposed by Applicant on reconsideration reflect Applicant's good faith commitment to addressing the transportation impacts of the Development.

However, the additional mitigation measures are not even necessary to ensure the adequacy of area facilities. The transportation engineers at both DKS Associates (the City's transportation engineer) and the Oregon Department of Transportation ("ODOT") reviewed KAI's original TIA and concurred with its recommendation that requiring payment of a fee in lieu was "appropriate." *See* Staff Report for April 20, 2016 Planning Commission meeting at 14. To the extent the fee in lieu alone ensured that there were adequate public transportation facilities to serve the Development—as these professional engineers found—Applicant's provision of the additional mitigation measures identified above concurrent with occupancy of the Development certainly ensures this standard is met.

Further, ODOT has reviewed KAI's separate Transportation Impact Analysis for a more intensive, 42-unit residential development proposal for the Property and has concluded that Applicant could mitigate the impacts of this more intensive development by completing the Arbor Drive/Willamette Drive interim improvements and paying a fee in lieu toward the long-term improvements at this intersection. *See* ODOT memorandum dated February 3, 2017. To the extent these measures were sufficient to mitigate the impacts of that more intensive development, Applicant's provision of the same mitigation measures (plus the Hillside Drive improvements) concurrent with occupancy certainly ensures this standard is met for the Development.

KAI's expert testimony that the Development can be occupied consistent with the "adequate public facilities" standard, together with the testimony from two other engineers (DKS and ODOT) that lesser mitigation measures would be adequate to mitigate the impacts of the Development, or an even more intensive development of the Property, support the conclusion that Applicant will ensure there are adequate public transportation facilities to serve the Development concurrent with its occupancy.

The City should find that the Development satisfies this standard.

B. Related Issues.

1. The City should find that Applicant may rely upon facilities that are programmed but not built to demonstrate that there are "adequate public facilities," provided Applicant pays a proportionate share fee in lieu for the programmed facility at or before occupancy of the Development.

In the original proceedings, the City interpreted the CDC to require that "adequate public facilities" be provided concurrent with occupancy of a proposed development.

The City's interpretation does not directly address whether the payment of a fee in lieu for an improvement that will be completed after occupancy meets this concurrency standard. On reconsideration, the City should find, for two reasons, that payment of a proportionate share fee in lieu for a transportation improvement prior to, or concurrent with, occupancy of a development may constitute provision of an "adequate public facility."

First, the CDC expressly permits a development applicant the option of paying a proportionate share fee in lieu of constructing necessary improvements as a means of mitigation:

> "Based upon the determination of the City Manager or the Manager's designee, the applicant shall construct or cause to be constructed, or contribute a proportionate share of the costs, for all necessary off-site improvements identified by the transportation analysis commissioned to address CDC 85.170(B)(2) that are required to mitigate impacts from the proposed subdivision. The proportionate share of the costs shall be determined by the City Manager or Manager's designee, who shall assume that the proposed subdivision provides improvements in rough proportion to identified impacts of the subdivision. Off-site transportation improvements will include bicycle and pedestrian improvements as identified in the adopted City of West Linn TSP."

CDC 85.200.A.22 (Emphasis added.). Thus, the express language of the CDC authorizes a fee in lieu as a permissible means of transportation mitigation.

Second, if the City does not allow a land use applicant the option of paying a fee in lieu as a means of providing adequate public facilities, it may cause the City to impose an unconstitutional exaction on a particular application. In order to impose a condition on a permit approval requiring dedication of real property or completion of offsite improvements, a local government must demonstrate that: (1) there is an essential nexus between the mitigation measures and the government's interest; and (2) the scope of the mitigation measures is roughly proportional to the projected impact of the development. *Nollan v. California Coastal Commission*, 483 US 825, 107 SCt 3141, 97 LEd2d 677 (1987); *Dolan v. City of Tigard*, 512 US 374, 114 SCt 2309, 129 LEd2d 304 (1994); *Koontz v. St. Johns River Water Management District*, __ US __, 133 SCt 2586, 186 LEd2d 697 (2013). The local government bears the burden of demonstrating rough proportionality. *Art Piculell Group v. Clackamas County*, 142 Or App 327, 922 P2d 1227 (1996). If a local government's proposed permit condition does not meet these

standards, it constitutes a taking of private property without just compensation in contravention of the Fifth Amendment of the U.S. Constitution. *Dolan*, 512 US at 374.

If the City determines that it cannot accept a proportionate share fee in lieu as a means of providing "adequate public facilities," it will force an applicant to choose between: (1) completing an entire transportation improvement project or facility in order to obtain occupancy of its development, even if the total cost of that project or facility greatly exceeds a level that is roughly proportional to the projected impacts of the development; or (2) receiving a denial of its project. This choice is the essence of an unconstitutional exaction. *Koontz*, __ US at __.

For these reasons, the City should find that an applicant may provide adequate public transportation facilities by payment of a fee in lieu, provided that the fee is roughly proportional to the projected impact of the development and will be paid at or before occupancy of the development.

As applied to the Development, the City's determination would allow Applicant to pay a proportionate share fee in lieu toward the Highway 43 Multimodal Transportation Project to demonstrate, in part, that Applicant is providing adequate public transportation facilities concurrent with occupancy of the Development. The City should impose a condition requiring same, as proposed in the Staff Report for the April 20, 2016 Planning Commission meeting.

2. The City should rely upon the KAI traffic analysis because the assumptions and methodology that underlie this analysis are credible.

The City should reach this conclusion for three reasons. First, KAI conducted its transportation analysis in accordance with industry and City standards and correctly identified the type of use and applied the correct trip rates for the Development. The City requires that an applicant utilize the latest edition of the Institute of Transportation Engineers' Trip Generation Manual to determine average daily vehicle trips. CDC 85.170.B.2.b. As explained in the KAI Memorandum, KAI utilized the 9th Edition of ITE's *Trip Generation*, which is the latest edition of this manual, to determine trip generation from the Development. KAI Memorandum at 2. Further, KAI utilized the correct use category (ITE Land Use Code 210 – Single-Family Detached Housing) in conducting its analysis. *Id.* Finally, KAI applied the trip rates for ITE Land Use Code 210 in its analysis. *Id.* By identifying the correct use and the correct trip rate for that use, KAI correctly projected the trip generation from the Development.

Second, KAI correctly accounted for trips from in-process developments and adjusted its counts to consider school year trips. To account for trips from in-process developments and additional growth in regional and local traffic in the study area, KAI assumed a two percent (one percent per year for each of two years) in its traffic counts. *See* KAI Memorandum at 2. KAI testified that this adjustment was sufficient to account for trips from in-process developments such as the new duplexes on Willamette Drive and the expansion of Mary's Woods. *Id.* Stated another way, if KAI had separately added in trips from in-process developments and assumed a two percent growth in area traffic, it would have resulted in double-counting of these background trips. Further, to account for school year trips, KAI conducted supplemental traffic counts at the affected intersections in October 2016 and seasonally adjusted these counts. *Id.* This type of seasonal adjustment is industry standard and consistent with the ODOT Analysis Procedures Manual. *Id.* KAI re-ran its analyses with the adjusted October 2016 counts and found that, subject to implementing the identified mitigation measures, all affected intersections would operate consistent with applicable performance standards. KAI Memorandum at 2-3. Therefore, the City should deny contentions that Applicant failed to adequately account for in-process development and school year traffic patterns in its modeling and mitigation for the Development.

Third, although KAI did not consider the impacts of construction traffic in its transportation analysis, neither City nor ODOT standards require consideration of such short-term traffic impacts that occur before the use is operational. *See, e.g.,* CDC 2.030 (defining adequacy of public facilities at "time of occupancy," not during construction). Therefore, the failure to consider construction traffic in the transportation analysis is not a basis to deny the Development. In any event, Applicant is willing to accept a condition of approval requiring Applicant to develop and implement a construction management plan to manage impacts on the surrounding neighborhood caused by construction of the Development. (Applicant's principal has prepared and complied with a similar construction management plan at another construction site in the City.)

Although opponents have expressed concerns about KAI's methodology, the above explanation responds to each concern. Opponents have not presented testimony that undermines KAI's testimony regarding the projected transportation impacts of the Development. *See Wal-Mart Stores, Inc. v. City of Bend*, 52 Or LUBA 261, 276 (2006) ("[t]he critical issue for the local decision maker will generally be whether any expert or lay testimony offered by * * * opponents raises questions or issues that undermine or call into question the conclusions and supporting documentation that are presented by the applicant's experts and, if so, whether any such questions or issues are adequately rebutted by the applicant's experts."). In fact, opponents have not presented an

alternative transportation analysis from a professional transportation engineer that reaches different conclusions than the KAI analysis.

Further, in light of the technical nature of transportation analysis and KAI's supplemental memorandum addressing its methodology and assumptions, a reasonable person would not rely upon the lay opponents' testimony over KAI's testimony on this issue. Therefore, the evidence on this issue is not correctly characterized as conflicting; the only substantial evidence is that offered by KAI, and the City should find that the assumptions and methodology that underlie the transportation impact analysis prepared by Applicant's transportation experts are credible.

3. Applicant's proposed mitigation measures will improve safety and decrease delay at the intersection of Arbor Drive and Willamette Drive contemporaneous with occupancy of the Development.

Although opponents contended in the original proceedings that the Development would not mitigate its projected impacts to the intersection of Willamette Drive and Arbor Drive, the City should deny this contention for four reasons.

First, Applicant is proposing additional transportation mitigation measures on reconsideration. In addition to paying the fee in lieu toward the Highway 43 Multimodal Transportation Project, Applicant is also proposing to complete interim restriping improvements that will create a northbound left turn pocket on the south leg of the intersection and a left-turn refuge storage area on the north leg of the intersection. As a result, the City should find that, unlike the original proceedings, Applicant is not simply relying upon a fee in lieu to mitigate the transportation impacts of the Development.

Second, Applicant's professional transportation expert has testified that the proposed mitigation measures will both improve safety and decrease delay at this intersection, even with Development-related traffic:

> "The proposed mitigation measures will significantly decrease the delay associated with the left-turn movement from Arbor Drive to OR 43 by allowing for two-stage left turns. The proposed mitigation measures will also provide separation between slowed or stopped motorists on OR 43 waiting to make a left-turn onto Arbor Drive; the separate lane will reduce the potential for rear-end crashes at the intersection."

KAI Memorandum at 3. In fact, upon implementation of Applicant's interim improvements at this intersection, its performance is actually projected to improve from LOS "F" to LOS "D." *See* KAI Memorandum at 1 and Appendix B, Figure 8.

Third, unlike the original proceedings, the timing of the interim improvements is certain because Applicant will complete them before occupancy. Because the interim improvements will be in place before occupancy, the associated safety and performance improvements will also be in place before occupancy, as required by CDC 2.030. Therefore, the interim intersection improvements constitute "adequate public facilities." Further, as explained in Section V.B.1 above, Applicant will also pay its proportionate share fee in lieu for the Highway 43 Multimodal Transportation Project prior to occupancy, which will also assure the provision of "adequate public facilities."

The City should find that Applicant's proposed mitigation measures will both decrease delay and increase safety at the Willamette Drive/Arbor Drive intersection contemporaneous with occupancy of the Development.

4. The local streets and sidewalks connecting the Development and Willamette Drive are adequate to accommodate existing and projected traffic.

Although opponents contended that the infrastructure linking the Development and Willamette Drive is inadequate, the City should deny this contention for four reasons. First, the streets connecting the Development and Willamette Drive are all classified as local streets, which are designed to accommodate up to 1,500 trips per day. KAI testified that, even including projected trips from the Development, traffic on these streets would only be approximately 900 trips per day, well below their design capacity. KAI Memorandum at 4. Although the segment of Upper Midhill Drive between Arbor Drive and Marylbrook Drive is relatively narrow, KAI has opined that it has adequate capacity to accommodate existing and projected traffic demands. *See* KAI letter dated August 12, 2016. As support for this conclusion, KAI relied upon the low levels of traffic utilizing this segment of the roadway, the fact that motorists in the neighborhood are accustomed to slowing to accommodate other traffic along this segment of the roadway, and the fact that there are no have been no reported crashes along Upper Midhill Drive over the five-year period ending December 31, 2015. *Id.* Additionally, Applicant's proposed interim improvements to the Willamette Drive/Arbor Drive intersection will decrease delays and improve safety at this intersection, which will reduce the need for Development-related traffic to detour along this stretch of Upper Midhill Drive to access Willamette Drive at the Marylbrook signal. Based upon this

evidence, the City should find that these local streets have adequate capacity to absorb traffic associated with the Development.

Second, the local sidewalk network is adequate to accommodate existing pedestrian traffic and pedestrian traffic generated by the Development because there is a continuous network of sidewalks and paths connecting the Development and Willamette Drive at the Willamette Drive/Marylbrook Drive intersection. *Id.*

Third, as explained above, Applicant will improve local street connections by completing a new connection between Upper Midhill Drive and Hillside Drive and providing road widening and sidewalk improvements along Hillside Drive south of the Property.

Fourth, to the extent there are existing safety concerns with particular local street segments in the area, such concerns are, by definition, not caused by the Development, and therefore cannot be the basis for imposing additional mitigation measures on the Development.

For these reasons, the City should deny opponents' contentions that infrastructure between the Development and Willamette Drive is substandard.

VI. Conclusion.

Throughout this process, Applicant has worked carefully to prepare a plan that addresses every concern expressed by the City and the community. The Development is not unusual in the scope or extent of its impacts, and as stated, these limited impacts will be mitigated. The Development will benefit both the neighborhood and the City as a whole.

On reconsideration, Applicant has responded to all of the City Council's reasons for its original denial of the Development with additional expert testimony, focused legal argument, and the promise to complete additional transportation mitigation measures. Accordingly, the City should find that adequate public facilities will be available to serve the Development concurrent with its occupancy.

For the foregoing reasons, and based upon the evidence referenced herein, the City Council should: (1) vacate its original Final Decision and Order to deny the Development; and (2) adopt a Final Decision and Order on Reconsideration that approves the Development, subject to conditions requiring completion of the transportation mitigation measures identified in this narrative and requiring a construction

management plan to manage construction-related impacts of the Development on the surrounding neighborhood.

Prepared by Perkins Coie LLP
March 1, 2017

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March 1, 2017 Project #: 18758.0

Mayor Russ Axelrod & Council Members
West Linn City Council
22500 Salamo Road
West Linn, Oregon

RE: Chene Blanc Estates Development

Dear Mayor Axelrod and Members of the Council,

This letter responds to the transportation-related issues raised during the August 15, 2016 City Council hearing on the proposed Chene Blanc Estates Development. The following provides a summary of the Traffic Impact Analysis (TIA) prepared for the proposed development, followed by a summary of the issues raised at the hearing, and our response to the issues.

A Traffic Impact Analysis (TIA) was prepared for the proposed Chene Blanc Estates development in January, 2016. The TIA provides an evaluation of traffic operations at several study intersections under year 2016 existing traffic conditions, year 2018 background traffic conditions (without the proposed development), and year 2018 total traffic conditions (with full build-out and occupancy of the proposed development) during the weekday a.m. and p.m. peak hours. The results of the analysis indicate that all of the study intersections currently operate acceptably and are projected to continue to operate acceptably with traffic generated by the proposed development with the exception of the OR 43/Arbor Drive intersection. The OR 43/Arbor Drive intersection currently operates at level of service (LOS) F and above capacity during the weekday a.m. peak hour and at LOS F during the weekday p.m. peak hour, which exceeds the City's applicable mobility standards for the intersection. This is primarily due to the high delay associated with the left-turn movement from Arbor Drive onto OR 43. The intersection also has a history of turning movement crashes, a majority of which involve slowed or stopped motorists waiting to making a left turn from OR 43 onto Arbor Drive.

The TIA includes an evaluation of potential mitigation measures at the OR 43/Arbor Drive intersection to address the existing operational and safety issues. The potential mitigation measures were developed in coordination with the City of West Linn and the Oregon Department of Transportation (ODOT) and are consistent with the recently adopted OR 43 Conceptual Design Plan. The potential mitigation measures include a two-way left-turn lane (TWLTL) along OR 43 with appropriate storage, deceleration, and tapers. A TWLTL would allow motorists to complete two-stage left-turns from Arbor Drive onto OR 43, which would reduce the delay associated with the movement. A TWLTL would also provide separation between slowed or stopped vehicles waiting to make a left from OR 43 onto Arbor Drive, which would reduce the potential for future crashes along the corridor. With the potential mitigation measures in place the OR 43/Arbor Drive intersection is projected to operate at LOS D, which meets the City's applicable mobility standards for the intersection

Given that the operational and safety issues at the OR 43/Arbor Drive intersection are existing and that alternative access is provided via Upper Midhill Drive and Marylhurst Drive, the TIA recommends that the developer pay a proportionate share contribution to the improvements identified in the OR 43 Conceptual Design Plan for the OR 43/Arbor Drive intersection. Per discussions with City staff, the proportionate share contribution is estimated to be approximately two percent of the cost of the improvements, or approximately $11,600 (this contribution will be in addition to the System Development Charges (SDC) paid by the developer as part of the proposed development). However, given that the improvements may not be completed prior to completion of the proposed development, the developer is proposing to construct an interim improvement at the OR 43/Arbor Drive intersection that consists of a TWLTL at the intersection that is installed within the existing paved width of the roadway. The interim TWLTL will provide the same benefit as the final improvements for motorists. Pedestrians and bicyclists wanting to access OR 43 will be able to continue to use the College Hill Place-Marylcreek Drive connection to the OR 43/Marylbrook Drive intersection, which is served by local transit service and is the main entrance to Marylhurst University.

It should be noted that the proposed development will also include a new local street connection between Upper Midhill Drive and Hillside Drive consistent with city standards as well as sidewalk improvements along the segment of Hillside Drive located adjacent to the proposed development. These improvements will occur independent of the interim improvements at the OR 43/Arbor Drive intersection and will improve local street connectivity for local residents.

Issue 1: The average daily trip calculation and estimates of the peak number of trips are grossly underestimated.

Response: Per Section 85.170.B.2.b of the City's Community Development Code, "The latest edition of the Trip Generation manual, published by the Institute of Transportation Engineers (ITE) shall be used as the standard by which to gauge average daily vehicle trips." The trip generation estimate prepared for the January 2016 Traffic Impact Analysis (TIA) was based *Trip Generation, 9th Edition*, which is the latest version of the standard reference manual. ITE Land Use Code 210 (Single-Family Detached Housing) was used at a basis for the analysis. Per ITE Land Use Code 210, single family homes tend to generate approximately 0.75 trips per dwelling unit during the weekday morning peak hour and 1.0 trips per dwelling unit during the weekday evening peak hour. These trip rates are based on studies conducted in similar areas and are used as a basis for traffic studies throughout the Portland Metro area and beyond. *Attachment A contains the data provided in ITE for Land Use Code 210.*

Issue 2: The data was collected during the summer when all the schools in West Linn and Marylhurst University were on Summer Break. Also, the data was collected before the completion of the new duplexes on Willamette Drive and the expansion of Mary's Woods.

Response: Supplemental traffic counts were conducted at the study intersections in October 2016, while school was in session. The traffic counts were balanced and seasonally adjusted in accordance with the methodologies identified in the ODOT Analysis Procedures Manual (APM) to reflect peak traffic conditions within the study area. The traffic counts were then increased by two percent (one

percent per year) to reflect growth in regional and local traffic within the study area between 2016 and the year the proposed development is expected to be fully built, 2018. This increase represents 27 additional vehicles along OR 43 during the weekday a.m. peak hour and 31 additional vehicles during the weekday p.m. peak hour. This increase accounts for the new duplexes on Willamette Drive, which were under construction when the traffic counts were conducted, and the expansion of Mary's Woods, which is not expected to occur until after full build out of the proposed development.

The traffic counts were used to update the traffic analysis prepared for the proposed development. The results of the updated traffic analysis are consistent with the results presented in the January 2016 traffic study; all intersections operate acceptably, with the exception of the OR 43/Arbor Drive intersection. Also, implementation of the potential mitigation measures (a TWLTL along OR 43) results in acceptable traffic operations at the intersection. *Figures 1-8 in Attachment B illustrate the supplemental traffic counts and summarize the results of the updated traffic analysis. The updated traffic analysis worksheets are included in Attachment C.*

Issue 3: The traffic calculations fail to account for all of the heavy truck and construction traffic that will be impacting the safety of Upper Midhill Drive during the construction of the development.

Response: The traffic analysis was prepared in accordance with City and ODOT standards and focused on total build-out conditions (i.e. residential homes fully built and occupied). As such, the traffic analysis included typical weekday heavy vehicle traffic captured in the traffic counts. While temporary construction traffic should be considered in the overall development process, it is typically handled as part of a construction management plan that can involve stakeholders.

Issue 4s: The intersection at Arbor Drive and Willamette Drive is currently unsafe and the proposed mitigation measures will not adequately address this problem.

Response: The proposed mitigation measures include a TWLTL along OR 43 at the OR 43/Arbor Drive intersection. Minor widening along OR 43 may be needed to accommodate the TWLTL along with travel lanes and on-street bike lanes in both directions. *Figure 9 in Attachment B illustrates the proposed mitigation measures.* These mitigation measures were developed in coordination with City of West Linn and Oregon Department of Transportation (ODOT) staff and are consistent with the City's recently adopted OR 43 Conceptual Design Plan. The proposed mitigation measures will be an interim solution until completion of the OR 43 Conceptual Design Plan. Phase 1 of the OR 43 Conceptual Design Plan, which includes improvements between the north city limits and Hidden Springs Road, is currently funded and is expected to be complete in 2020.

The proposed mitigation measures will decrease the delay associated with the left-turn movement from Arbor Drive onto OR 43 by allowing for two-stage left turns. The proposed mitigation measures will also provide separation between slowed or stopped motorists on OR 43 waiting to make a left-turn onto Arbor Drive; the separate lane will reduce the potential for future rear-end crashes at the intersection.

Issue 5: The infrastructure between the development and the arterial connections is substandard, particularly along Upper Midhill Drive

Response: The streets that connect the proposed development to OR 43 are sufficient to accommodate existing vehicle traffic and traffic generated by the proposed development, particularly the segment of Upper Midhill Drive located north or Arbor Drive and the segment of Arbor Drive located east of Upper Midhill Drive. As local streets, these streets are designed to accommodate up to 1,500 vehicles per day. With the proposed development, these streets are projected to accommodate less than 900 vehicles per day. Therefore, there is sufficient capacity along the existing street network to accommodate a significant increase in traffic beyond the proposed development. The segment of Upper Midhill Drive located south of Arbor Drive is narrow; however, as described in a previous response letter, it is sufficient to accommodate existing vehicle traffic and traffic generated by the proposed development, which is expected to be less than 10 vehicles per day, including one vehicle during the morning and one vehicle during the evening peak hour. With the proposed development, this segment of Upper Midhill Drive is projected to accommodate less than 300 vehicles per day.

The existing sidewalk network is also sufficient to accommodate existing pedestrian traffic and pedestrian traffic generated by the proposed development. There is a continuous network of sidewalks and paths that connect the proposed development to OR 43 at the OR 43/Marylbrook Drive intersection, which is served by local transit service and is also the main entrance to Marylhurst University. While there are gaps in the sidewalk network that connect the proposed development to the OR 43/Arbor Drive intersection, as well as other destinations along OR 43 and Upper Midhill Drive, the existing network of sidewalks and shoulders is sufficient to accommodate pedestrians.

Summary

As indicated in this letter, the proposed development plan can be constructed while maintaining safe and adequate public facilities for motorists, pedestrians, and cyclists, assuming implementation of the proposed mitigation measures. In addition, while the mitigation measures will significantly improve traffic operations at the OR 43/Arbor Drive intersection in the interim, the developers proportionate share contribution to the overall improvements along OR 43, and system development charges in general, will contribute to improvements throughout the City's transportation system for all users.

Thank you for the opportunity to provide this additional information. I will be happy to answer any additional questions you might have.

Sincerely,
KITTELSON & ASSOCIATES, INC.

Matthew Bell
Senior Planner

Attachment A ITE Land Use Code 210

Single-Family Detached Housing
(210)

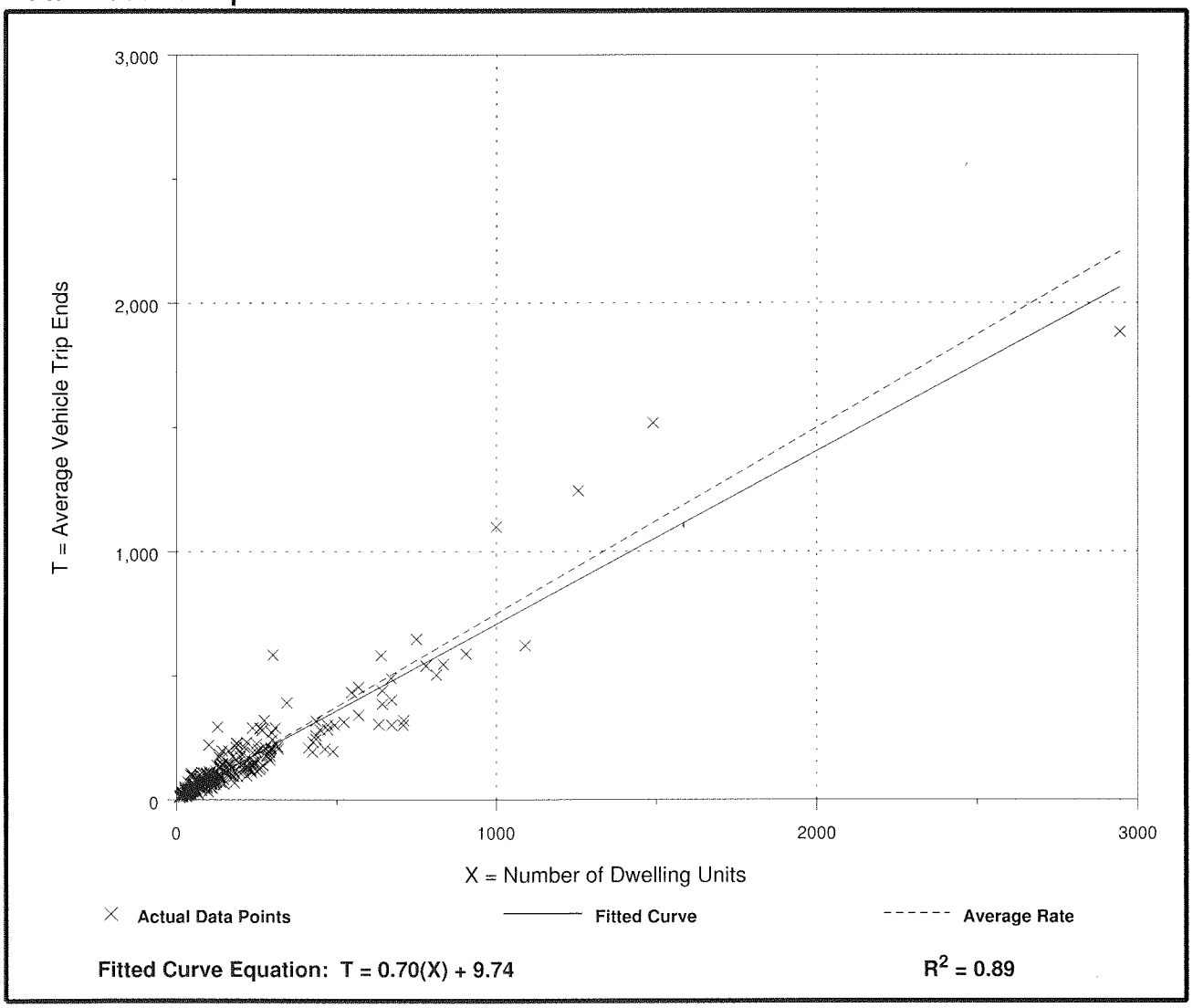
Average Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Number of Studies: 292
Avg. Number of Dwelling Units: 194
Directional Distribution: 25% entering, 75% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.75	0.33 - 2.27	0.90

Data Plot and Equation



Fitted Curve Equation: T = 0.70(X) + 9.74

R^2 = 0.89

Single-Family Detached Housing
(210)

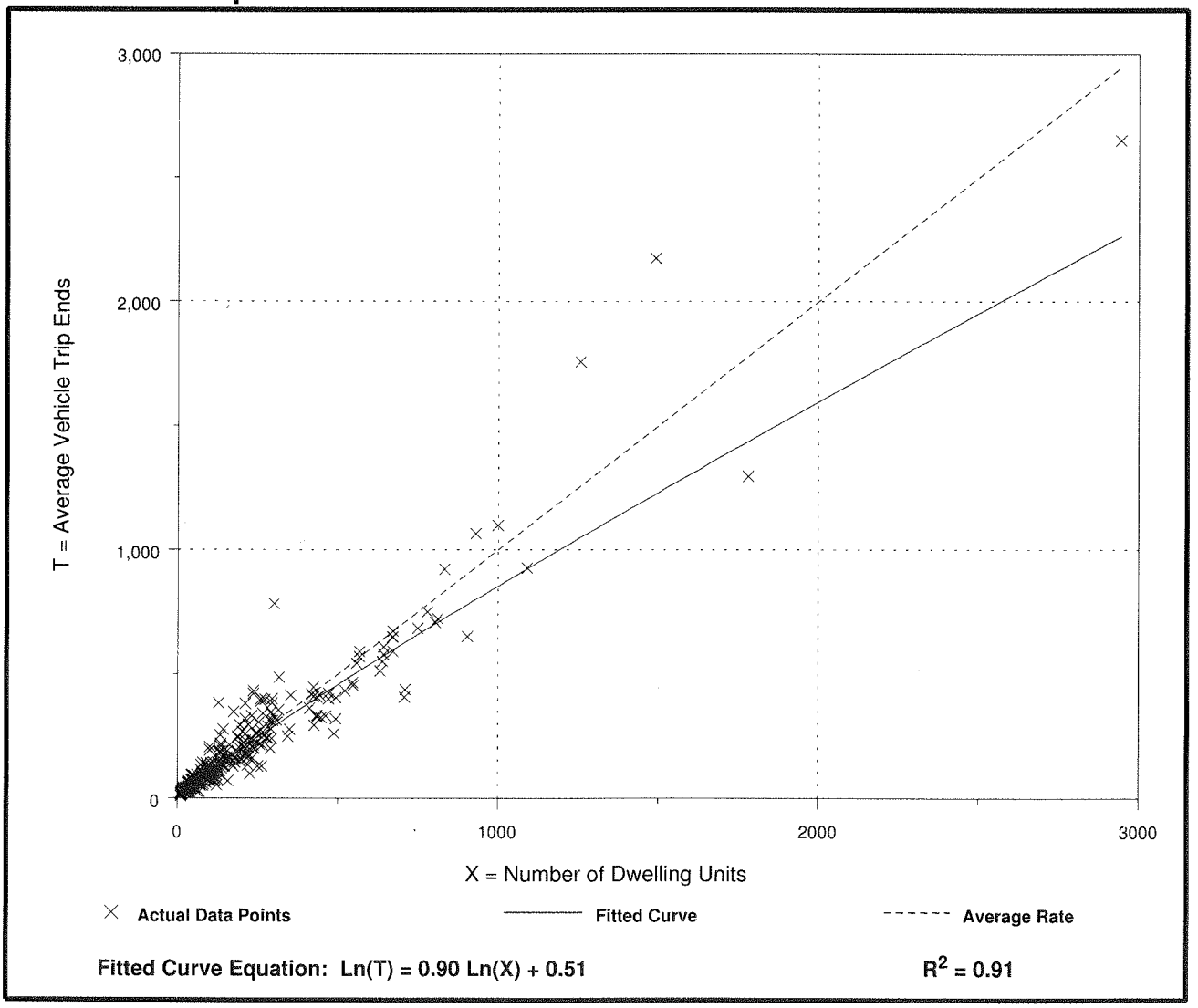
Average Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 321
Avg. Number of Dwelling Units: 207
Directional Distribution: 63% entering, 37% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
1.00	0.42 - 2.98	1.05

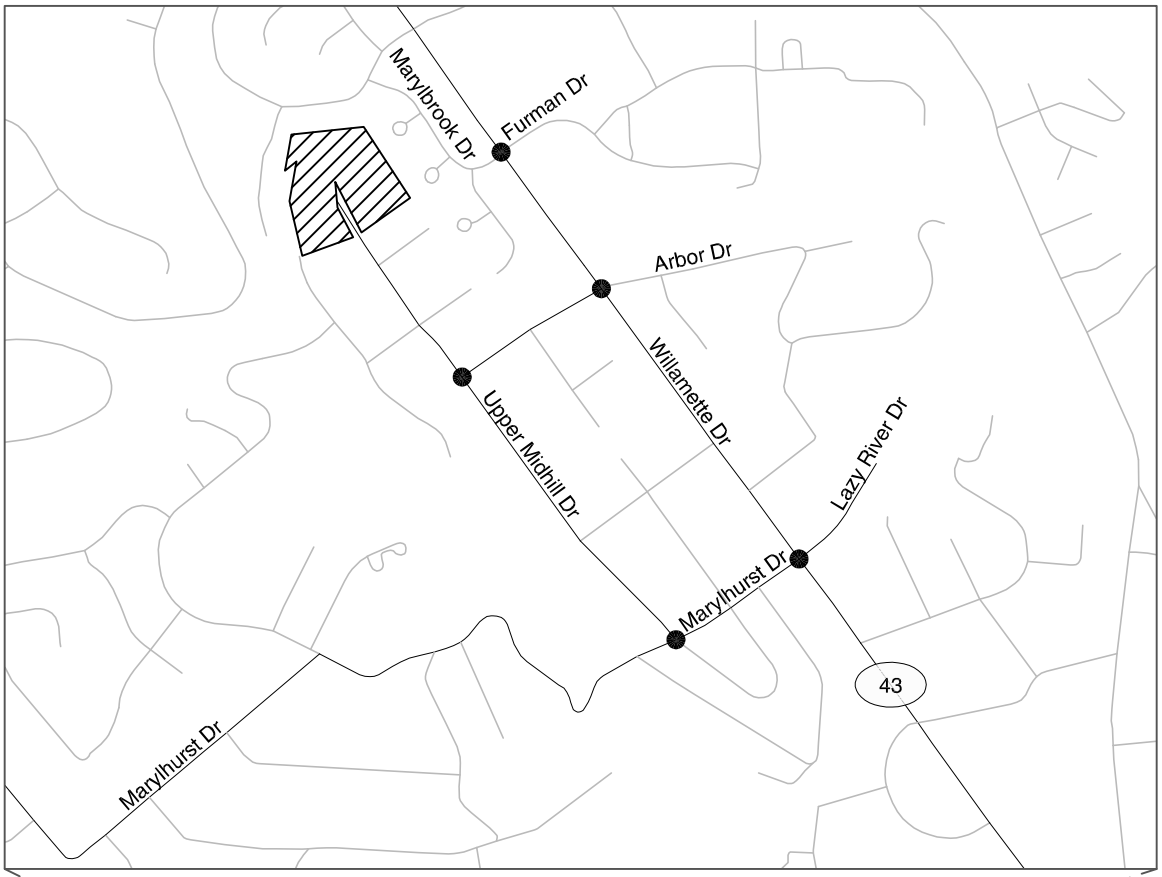
Data Plot and Equation

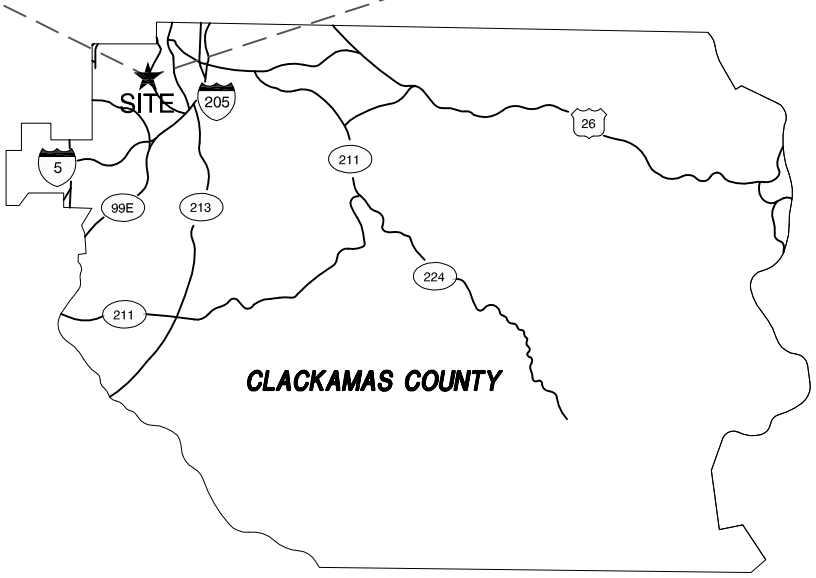


Fitted Curve Equation: Ln(T) = 0.90 Ln(X) + 0.51

R^2 = 0.91

Attachment B Analysis Figures

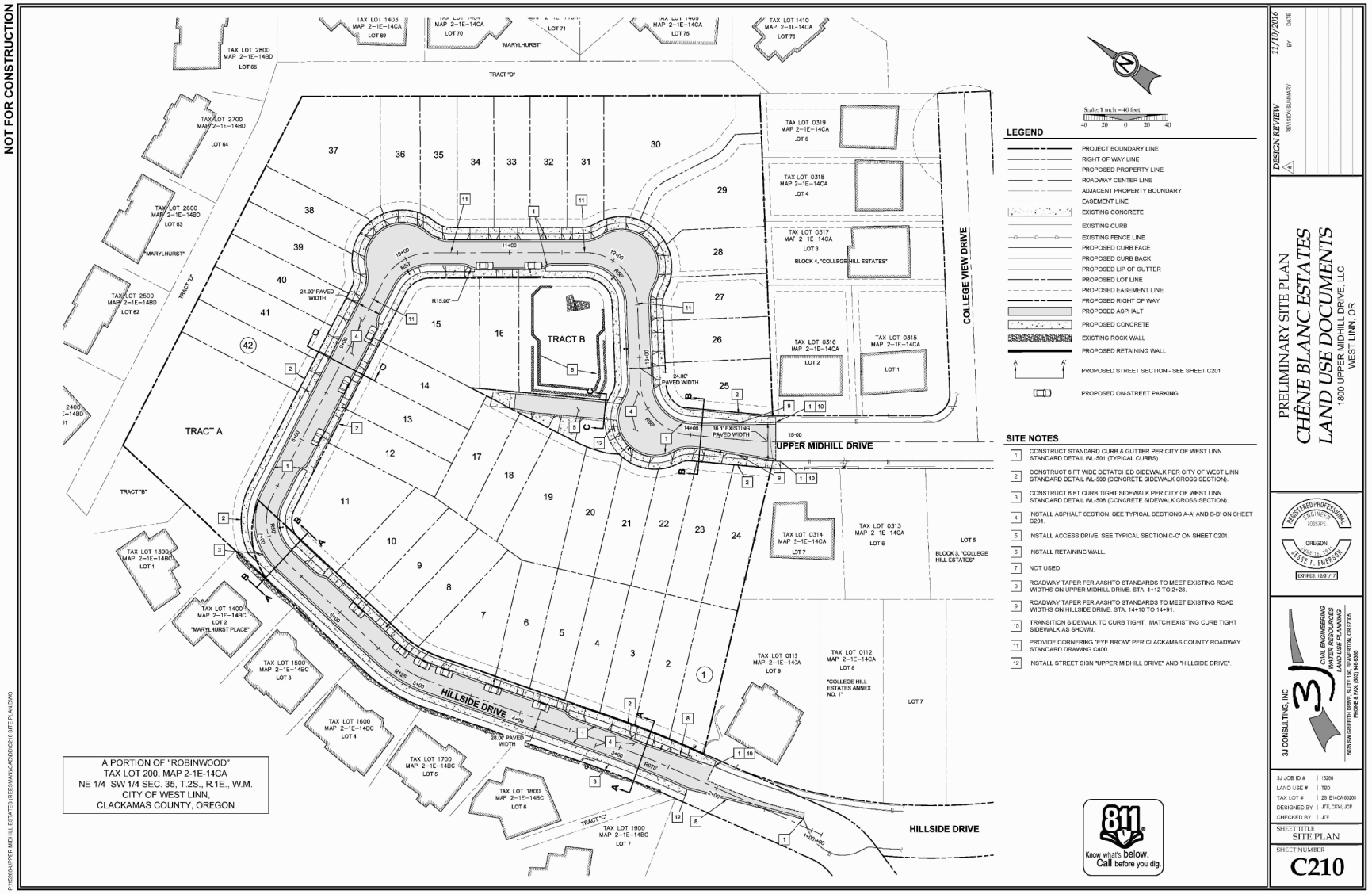




● - Study Intersections

Site Vicinity Map
West Linn, OR

Figure
1



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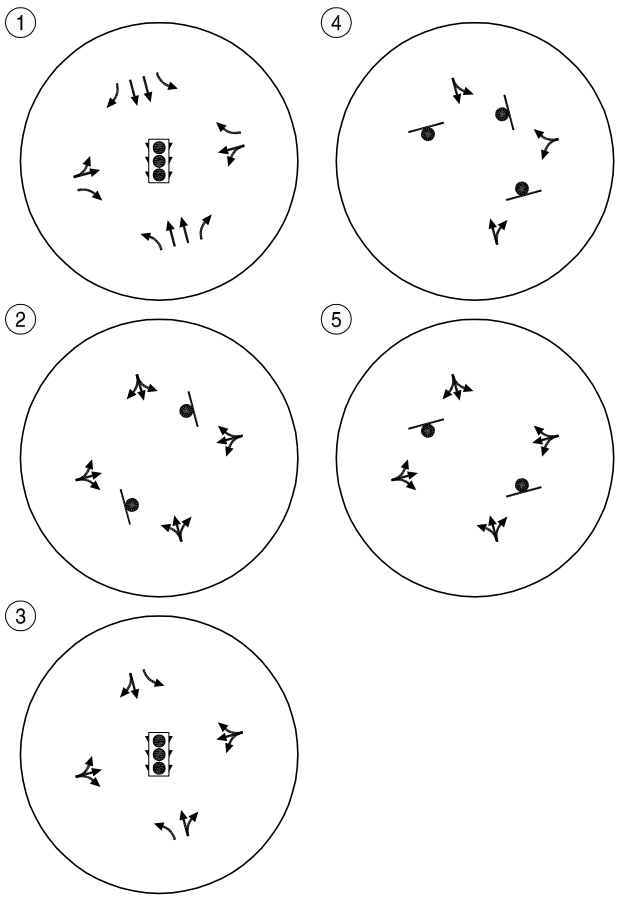
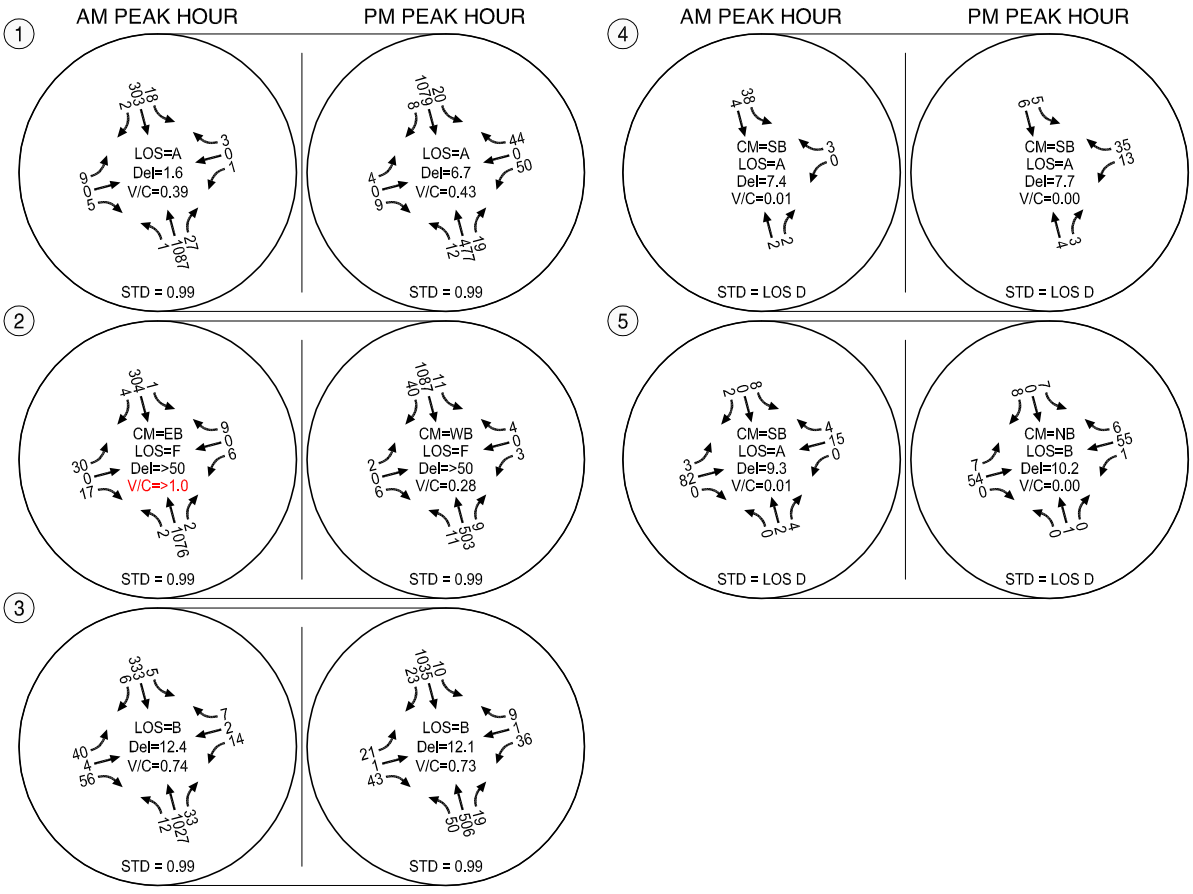
Conceptual Site Plan
West Linn, OR

Figure
2



Existing Lane Configurations & Traffic Control Devices
West Linn, OR

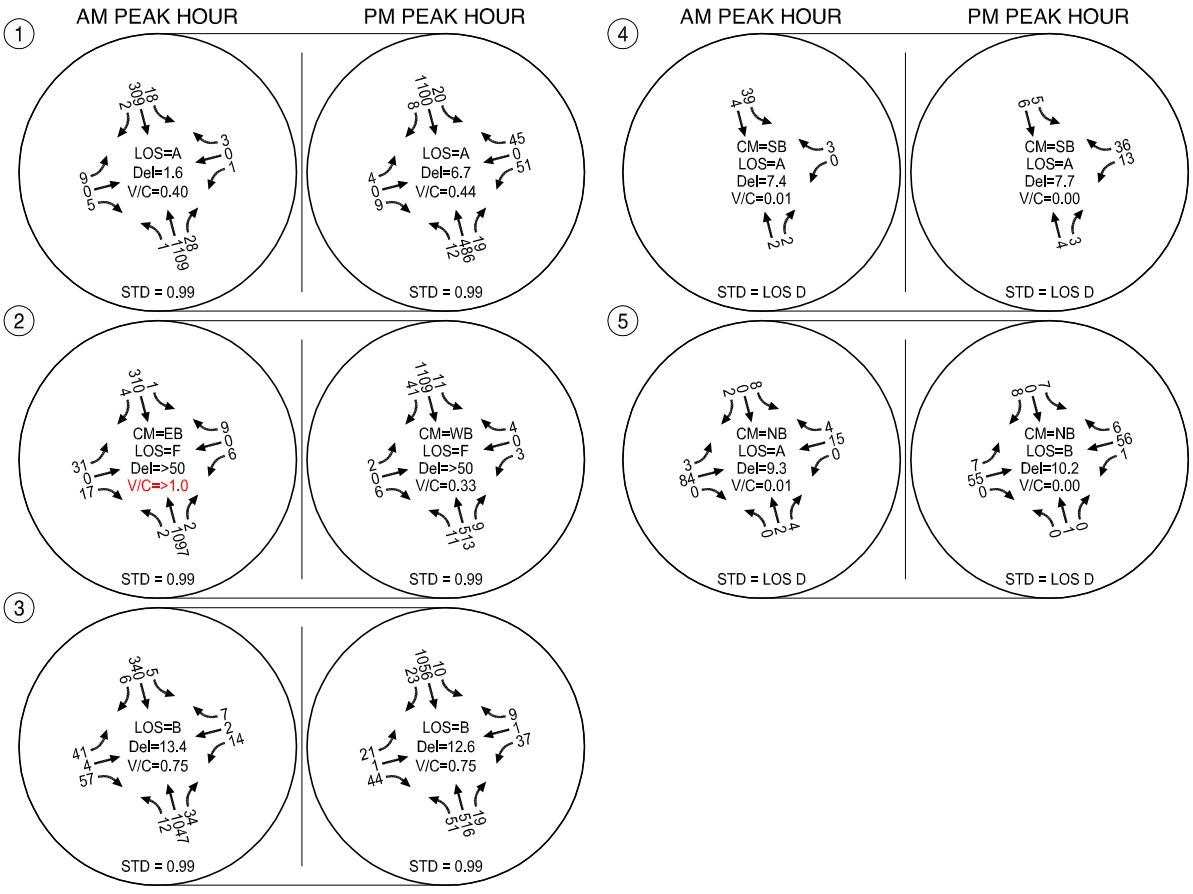
Figure 3



CM = CRITICAL MOVEMENT (TWSC)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED/AWSC) / CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED/ AWSC) / CRITICAL MOVEMENT CONTROL DELAY (TWSC)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
TWC = TWO-WAY STOP CONTROL
AWSC= ALL-WAY STOP CONTROL
STD = MOBILITY STANDARD

Existing Traffic Conditions
Weekday AM & PM Peak Hour
West Linn, OR

Figure
4



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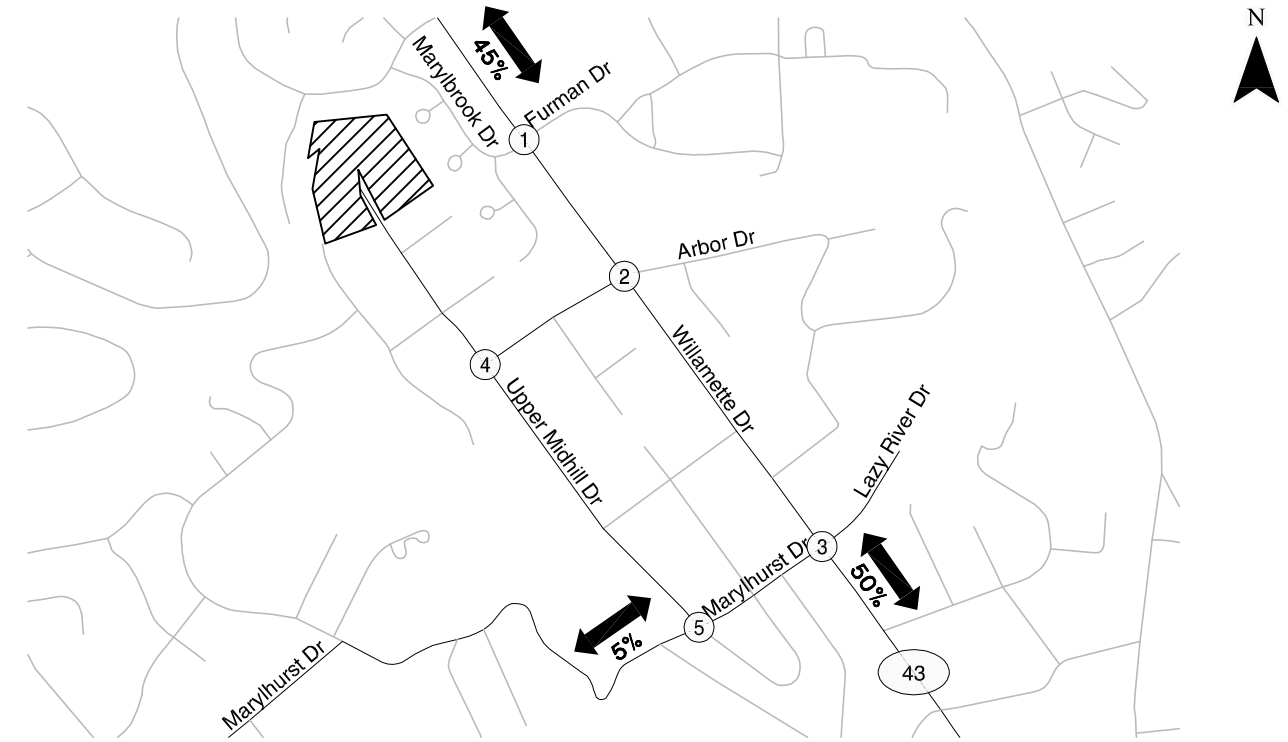
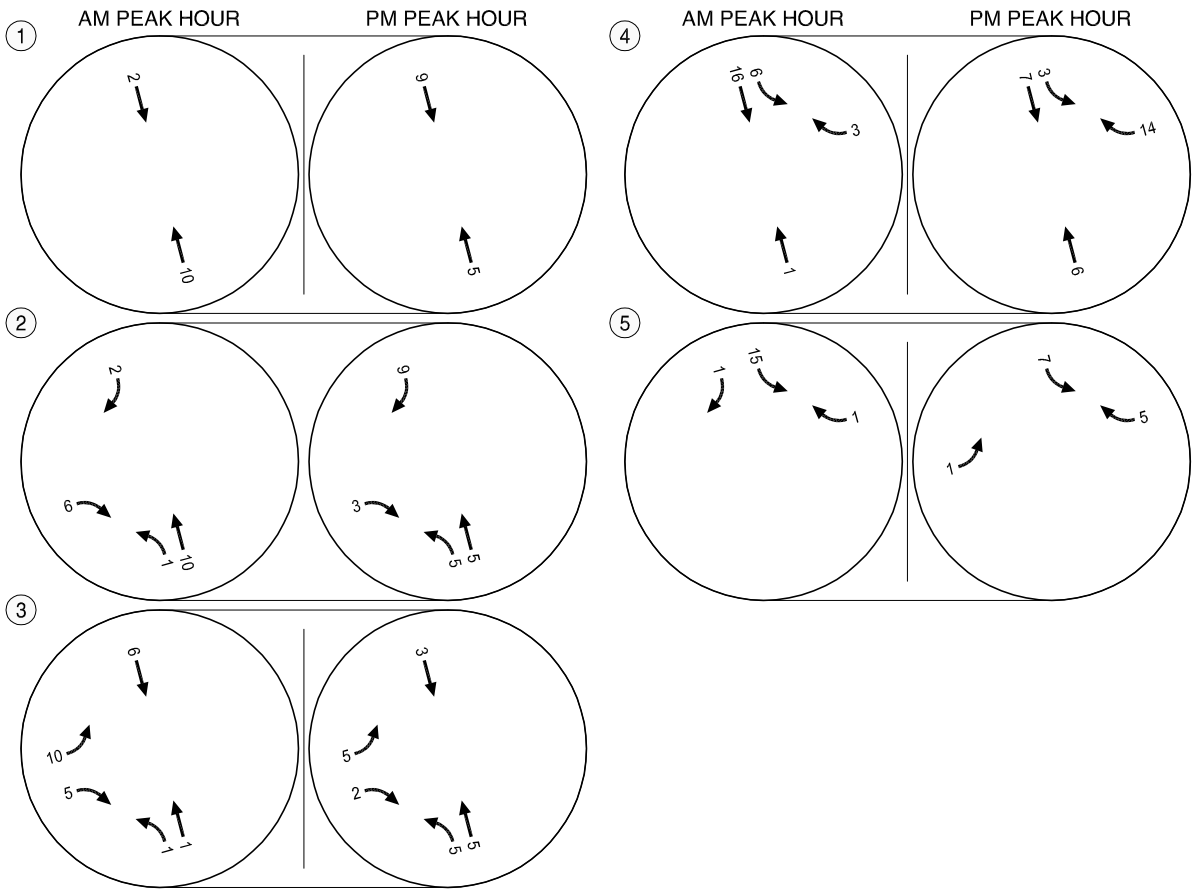
Year 2018 Background Traffic Conditions Weekday AM & PM Peak Hour West Linn, OR

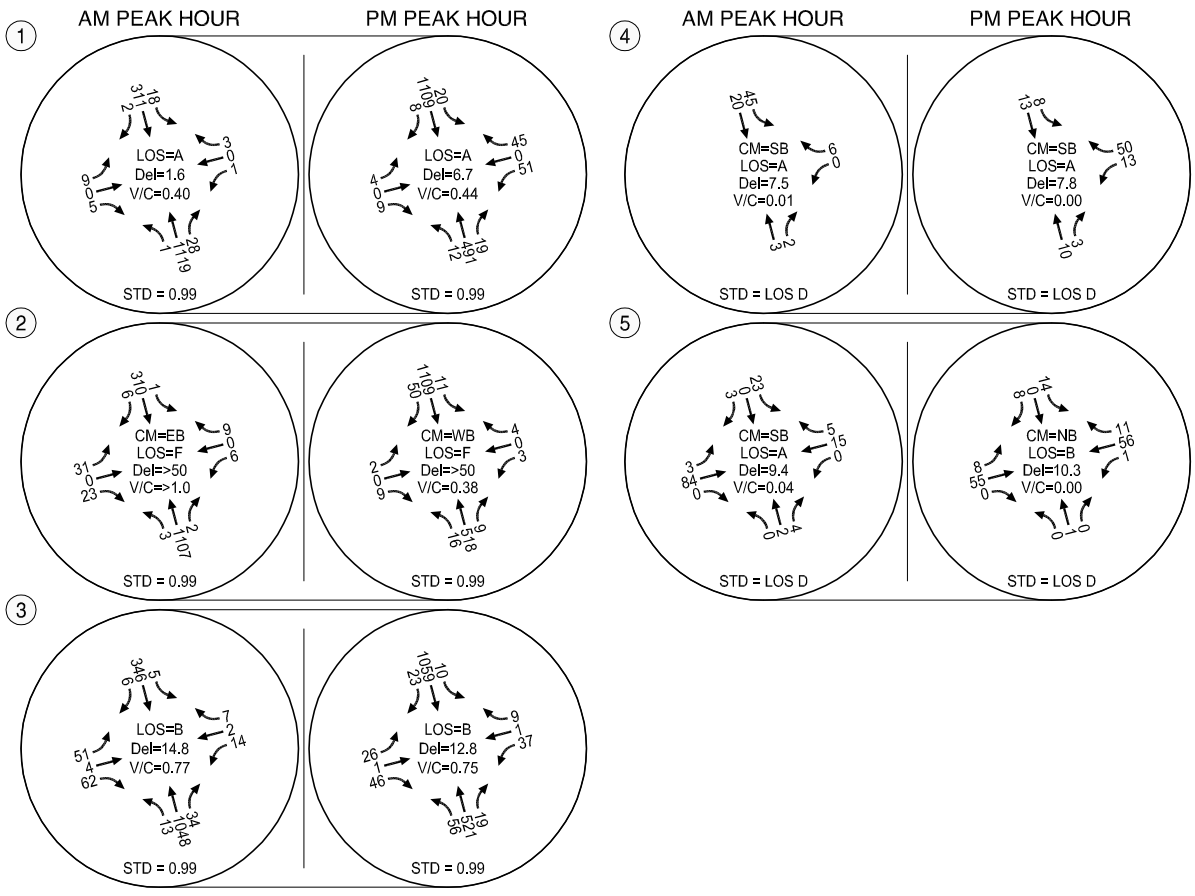
Figure 5





Estimated Trip Distribution Pattern & Site Generated Trips
Weekday AM & PM Peak Hour
West Linn, OR

Figure
6



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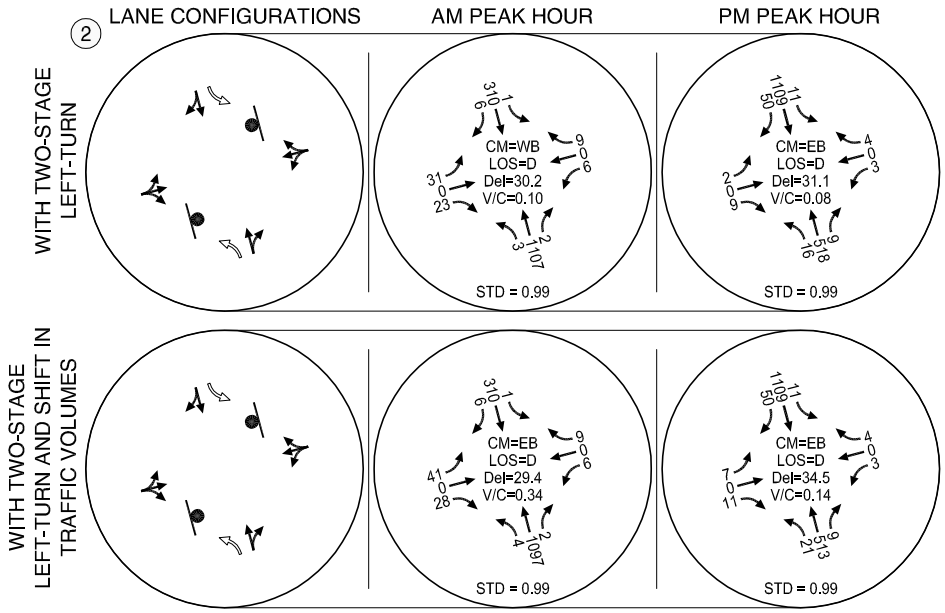
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
TWC = TWO-WAY STOP CONTROL
AWSC= ALL-WAY STOP CONTROL
STD = MOBILITY STANDARD

Year 2018 Total Traffic Conditions Weekday AM & PM Peak Hour West Linn, OR

Figure 7



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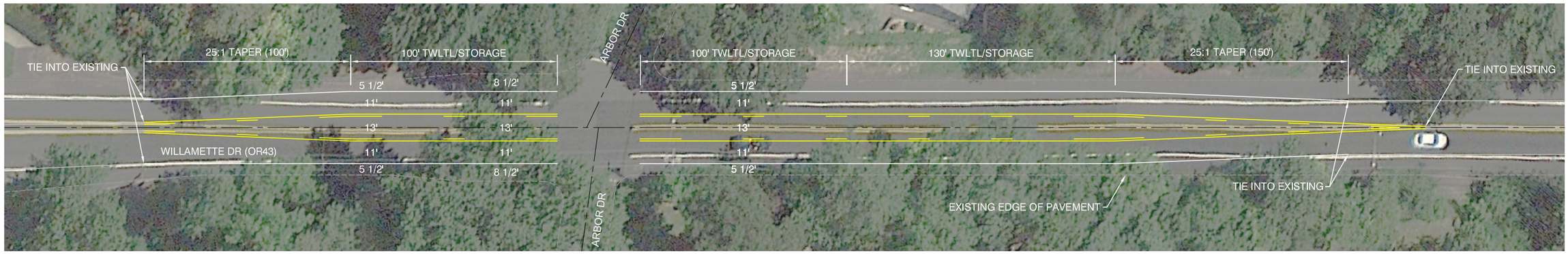
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED/AWSC) / CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED/ AWSC) / CRITICAL MOVEMENT CONTROL DELAY (TWSC)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
TWC = TWO-WAY STOP CONTROL
AWSC= ALL-WAY STOP CONTROL
STD = MOBILITY STANDARD

Year 2018 Total Traffic Conditions - Mitigated Weekday AM & PM Peak Hour West Linn, OR

Figure 8



SCALE

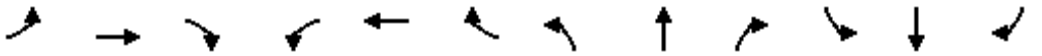
0 50 100

Willamette Drive (OR 43)/Arbor Drive Intersection Concept
West Linn, OR

Figure
9

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING/PLANNING

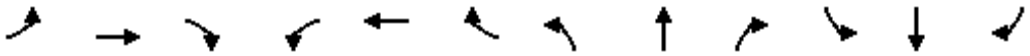
Attachment C Analysis Worksheets



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	0	5	1	0	3	1	1087	27	18	303	2
Future Volume (vph)	9	0	5	1	0	3	1	1087	27	18	303	2
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	4.5	4.5	4.5	4.5	4.5	4.5	4.5
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	0.98		1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes		0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1795	1325		899	1587	1798	3471	1459	1702	3539	1565
Flt Permitted		1.00	1.00		1.00	1.00	0.56	1.00	1.00	0.23	1.00	1.00
Satd. Flow (perm)		1889	1325		947	1587	1057	3471	1459	414	3539	1565
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)	9	0	5	1	0	3	1	1144	28	19	319	2
RTOR Reduction (vph)	0	0	5	0	0	3	0	0	5	0	0	0
Lane Group Flow (vph)	0	9	0	0	1	0	1	1144	23	19	319	2
Confl. Peds. (#/hr)	5		3	3		5	4		5	5		4
Heavy Vehicles (%)	0%	0%	20%	100%	0%	0%	0%	4%	7%	6%	2%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4	4	4	2		2	6		6
Actuated Green, G (s)		2.7	2.7		2.7	2.7	82.7	81.7	81.7	84.9	82.8	82.8
Effective Green, g (s)		2.7	2.7		2.7	2.7	82.7	81.7	81.7	84.9	82.8	82.8
Actuated g/C Ratio		0.03	0.03		0.03	0.03	0.83	0.82	0.82	0.85	0.83	0.83
Clearance Time (s)		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)		2.5	2.5		2.5	2.5	2.3	4.8	4.8	2.3	4.8	4.8
Lane Grp Cap (vph)		51	35		25	42	881	2835	1192	378	2930	1295
v/s Ratio Prot							0.00	c0.33		c0.00	0.09	
v/s Ratio Perm		c0.00	0.00		0.00	0.00	0.00		0.02	0.04		0.00
v/c Ratio		0.18	0.00		0.04	0.00	0.00	0.40	0.02	0.05	0.11	0.00
Uniform Delay, d1		47.6	47.3		47.4	47.3	1.5	2.5	1.7	1.3	1.6	1.5
Progression Factor		1.00	1.00		1.00	1.00	0.39	0.22	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.2	0.0		0.5	0.0	0.0	0.3	0.0	0.0	0.0	0.0
Delay (s)		48.8	47.4		47.9	47.4	0.6	0.9	1.7	1.4	1.7	1.5
Level of Service		D	D		D	D	A	A	A	A	A	A
Approach Delay (s)		48.3			47.5			0.9			1.6	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	1.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	55.6%	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 (veh/h)	30	0	17	6	0	9	2	1076	2	1	304	4
Future Volume (Veh/h)	30	0	17	6	0	9	2	1076	2	1	304	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	32	0	18	6	0	10	2	1157	2	1	327	4
Pedestrians		3			1						1	
Lane Width (ft)		12.0			12.0						12.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								992			884	
pX, platoon unblocked	0.27	0.27		0.27	0.27	0.27				0.27		
vC, conflicting volume	1507	1498	332	1512	1499	1160	334			1160		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1526	1493	332	1544	1496	245	334			245		
tC, single (s)	7.1	6.5	6.2	7.6	6.5	6.2	4.6			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	4.0	4.0	3.3	2.7			2.2		
p0 queue free %	0	100	97	68	100	95	100			100		
cM capacity (veh/h)	25	33	713	19	33	216	998			361		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	50	16	1161	332
Volume Left	32	6	2	1
Volume Right	18	10	2	4
cSH	38	44	998	361
Volume to Capacity	1.33	0.36	0.00	0.00
Queue Length 95th (ft)	129	31	0	0
Control Delay (s)	426.0	126.7	0.1	0.1
Lane LOS	F	F	A	A
Approach Delay (s)	426.0	126.7	0.1	0.1
Approach LOS	F	F		

Intersection Summary				
Average Delay	15.0			
Intersection Capacity Utilization	69.2%	ICU Level of Service	C	
Analysis Period (min)	15			

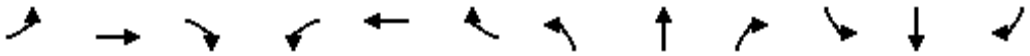
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	4	56	14	2	7	12	1027	33	5	333	6
Future Volume (vph)	40	4	56	14	2	7	12	1027	33	5	333	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		4.5	5.0		4.5	5.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.98			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	
Frt		0.92			0.96		1.00	1.00		1.00	1.00	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1695			1766		1805	1817		1805	1841	
Flt Permitted		0.86			0.68		0.55	1.00		0.17	1.00	
Satd. Flow (perm)		1486			1232		1043	1817		324	1841	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	41	4	58	14	2	7	12	1059	34	5	343	6
RTOR Reduction (vph)	0	54	0	0	6	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	49	0	0	17	0	12	1092	0	5	349	0
Confl. Peds. (#/hr)			1	1					3	3		
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	3%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)		7.4			7.4		78.6	77.6		78.6	77.6	
Effective Green, g (s)		7.4			7.4		78.6	77.6		78.6	77.6	
Actuated g/C Ratio		0.07			0.07		0.79	0.78		0.79	0.78	
Clearance Time (s)		4.5			4.5		4.5	5.0		4.5	5.0	
Vehicle Extension (s)		2.5			2.5		2.3	5.2		2.3	5.2	
Lane Grp Cap (vph)		109			91		827	1409		269	1428	
v/s Ratio Prot							0.00	c0.60		c0.00	0.19	
v/s Ratio Perm		c0.03			0.01		0.01			0.01		
v/c Ratio		0.45			0.18		0.01	0.78		0.02	0.24	
Uniform Delay, d1		44.4			43.5		2.3	6.3		6.7	3.1	
Progression Factor		1.00			1.00		1.00	1.00		2.31	1.88	
Incremental Delay, d2		2.2			0.7		0.0	4.2		0.0	0.4	
Delay (s)		46.5			44.2		2.3	10.5		15.5	6.2	
Level of Service		D			D		A	B		B	A	
Approach Delay (s)		46.5			44.2			10.4			6.3	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	0	3	2	2	38	4
Future Volume (vph)	0	3	2	2	38	4
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	0	4	3	3	49	5

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	4	6	54
Volume Left (vph)	0	0	49
Volume Right (vph)	4	3	0
Hadj (s)	-0.04	-0.30	0.18
Departure Headway (s)	4.0	3.7	4.1
Degree Utilization, x	0.00	0.01	0.06
Capacity (veh/h)	883	976	873
Control Delay (s)	7.0	6.7	7.4
Approach Delay (s)	7.0	6.7	7.4
Approach LOS	A	A	A

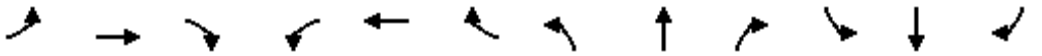
Intersection Summary			
Delay	7.3		
Level of Service	A		
Intersection Capacity Utilization	19.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	82	0	0	15	4	0	2	4	8	0	2
Future Volume (Veh/h)	3	82	0	0	15	4	0	2	4	8	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	4	101	0	0	19	5	0	2	5	10	0	2
Pedestrians					1						2	
Lane Width (ft)					12.0						12.0	
Walking Speed (ft/s)					4.0						4.0	
Percent Blockage					0						0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					868							
pX, platoon unblocked												
vC, conflicting volume	26			101			132	135	102	140	132	24
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	26			101			132	135	102	140	132	24
tC, single (s)	4.1			4.1			7.1	7.0	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.5	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	99	99	100	100
cM capacity (veh/h)	1599			1504			840	673	958	824	759	1057

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	105	24	7	12
Volume Left	4	0	0	10
Volume Right	0	5	5	2
cSH	1599	1504	854	856
Volume to Capacity	0.00	0.00	0.01	0.01
Queue Length 95th (ft)	0	0	1	1
Control Delay (s)	0.3	0.0	9.2	9.3
Lane LOS	A		A	A
Approach Delay (s)	0.3	0.0	9.2	9.3
Approach LOS			A	A

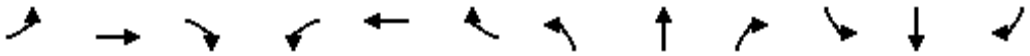
Intersection Summary				
Average Delay	1.4			
Intersection Capacity Utilization	20.6%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	9	50	0	44	12	477	19	20	1079	8
Future Volume (vph)	4	0	9	50	0	44	12	477	19	20	1079	8
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	4.5	4.5	4.5	4.5	4.5	4.5	4.5
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	0.99		1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.98
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	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1442	1592		1765	1594	1671	3505	1568	1802	3539	1578
Flt Permitted		0.72	1.00		0.76	1.00	0.21	1.00	1.00	0.46	1.00	1.00
Satd. Flow (perm)		1094	1592		1403	1594	373	3505	1568	863	3539	1578
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	4	0	10	56	0	49	13	530	21	22	1199	9
RTOR Reduction (vph)	0	0	9	0	0	45	0	0	5	0	0	2
Lane Group Flow (vph)	0	4	1	0	56	4	13	530	16	22	1199	7
Confl. Peds. (#/hr)	1		2	2		1	1		3	3		1
Heavy Vehicles (%)	25%	0%	0%	2%	0%	0%	8%	3%	0%	0%	2%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4	4	4	2		2	6		6
Actuated Green, G (s)		8.3	8.3		8.3	8.3	88.2	86.1	86.1	88.2	86.1	86.1
Effective Green, g (s)		8.3	8.3		8.3	8.3	88.2	86.1	86.1	88.2	86.1	86.1
Actuated g/C Ratio		0.08	0.08		0.08	0.08	0.80	0.78	0.78	0.80	0.78	0.78
Clearance Time (s)		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)		2.5	2.5		2.5	2.5	2.3	4.8	4.8	2.3	4.8	4.8
Lane Grp Cap (vph)		82	120		105	120	323	2743	1227	709	2770	1235
v/s Ratio Prot							c0.00	0.15		0.00	c0.34	
v/s Ratio Perm		0.00	0.00		c0.04	0.00	0.03		0.01	0.02		0.00
v/c Ratio		0.05	0.01		0.53	0.03	0.04	0.19	0.01	0.03	0.43	0.01
Uniform Delay, d1		47.2	47.0		49.0	47.1	2.5	3.1	2.6	2.2	3.9	2.6
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		0.2	0.0		4.0	0.1	0.0	0.2	0.0	0.0	0.2	0.0
Delay (s)		47.4	47.1		53.0	47.2	2.5	3.2	2.6	2.2	4.1	2.6
Level of Service		D	D		D	D	A	A	A	A	A	A
Approach Delay (s)		47.1			50.3			3.2			4.1	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

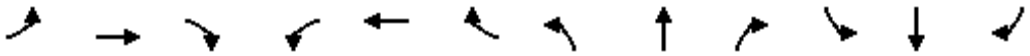
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	6	3	0	4	11	503	9	11	1087	40
Future Volume (Veh/h)	2	0	6	3	0	4	11	503	9	11	1087	40
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	0	7	3	0	4	12	547	10	12	1182	43
Pedestrians					3			1				
Lane Width (ft)					12.0			12.0				
Walking Speed (ft/s)					4.0			4.0				
Percent Blockage					0			0				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								992			884	
pX, platoon unblocked	0.27	0.27	0.23	0.27	0.27	0.92	0.23			0.92		
vC, conflicting volume	1808	1812	1204	1814	1828	555	1225			560		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1986	2001	198	2012	2063	474	288			479		
tC, single (s)	7.1	6.5	6.4	7.1	6.5	6.5	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.5	4.0	3.5	2.2			2.2		
p0 queue free %	83	100	96	72	100	99	96			99		
cM capacity (veh/h)	12	15	183	11	14	502	292			1005		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	9	7	569	1237
Volume Left	2	3	12	12
Volume Right	7	4	10	43
cSH	43	25	292	1005
Volume to Capacity	0.21	0.28	0.04	0.01
Queue Length 95th (ft)	17	21	3	1
Control Delay (s)	109.5	201.8	1.4	0.4
Lane LOS	F	F	A	A
Approach Delay (s)	109.5	201.8	1.4	0.4
Approach LOS	F	F		

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	1	43	36	1	9	50	506	19	10	1035	23
Future Volume (vph)	21	1	43	36	1	9	50	506	19	10	1035	23
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	5.0		4.5	5.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			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	
Frt		0.91			0.97		1.00	0.99		1.00	1.00	
Flt Protected		0.98			0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1598			1740		1770	1848		1801	1857	
Flt Permitted		0.91			0.75		0.14	1.00		0.45	1.00	
Satd. Flow (perm)		1477			1356		259	1848		858	1857	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	22	1	45	38	1	9	52	527	20	10	1078	24
RTOR Reduction (vph)	0	42	0	0	8	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	26	0	0	40	0	52	546	0	10	1101	0
Confl. Peds. (#/hr)									4	4		
Heavy Vehicles (%)	10%	0%	5%	3%	0%	0%	2%	2%	5%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)		6.9			6.9		82.5	78.1		75.7	74.7	
Effective Green, g (s)		6.9			6.9		82.5	78.1		75.7	74.7	
Actuated g/C Ratio		0.07			0.07		0.82	0.78		0.76	0.75	
Clearance Time (s)		4.5			4.5		4.5	5.0		4.5	5.0	
Vehicle Extension (s)		2.5			2.5		2.3	5.2		2.3	5.2	
Lane Grp Cap (vph)		101			93		280	1443		658	1387	
v/s Ratio Prot							c0.01	c0.30		0.00	c0.59	
v/s Ratio Perm		0.02			c0.03		0.14			0.01		
v/c Ratio		0.26			0.43		0.19	0.38		0.02	0.79	
Uniform Delay, d1		44.1			44.7		9.8	3.4		3.0	7.9	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.0			2.3		0.2	0.8		0.0	4.8	
Delay (s)		45.1			46.9		10.0	4.2		3.0	12.6	
Level of Service		D			D		A	A		A	B	
Approach Delay (s)		45.1			46.9			4.7			12.5	
Approach LOS		D			D			A			B	

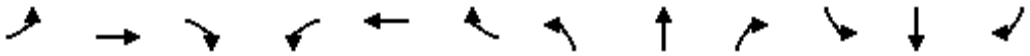
Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	13	35	4	3	5	6
Future Volume (vph)	13	35	4	3	5	6
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72
Hourly flow rate (vph)	18	49	6	4	7	8

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	67	10	15
Volume Left (vph)	18	0	7
Volume Right (vph)	49	4	0
Hadj (s)	-0.35	0.27	0.55
Departure Headway (s)	3.6	4.3	4.6
Degree Utilization, x	0.07	0.01	0.02
Capacity (veh/h)	983	809	768
Control Delay (s)	6.9	7.4	7.7
Approach Delay (s)	6.9	7.4	7.7
Approach LOS	A	A	A

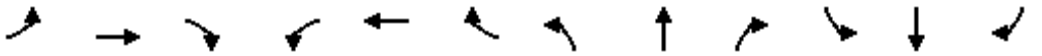
Intersection Summary			
Delay	7.1		
Level of Service	A		
Intersection Capacity Utilization	14.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	54	0	1	55	6	0	1	0	7	0	8
Future Volume (Veh/h)	7	54	0	1	55	6	0	1	0	7	0	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Hourly flow rate (vph)	11	82	0	2	83	9	0	2	0	11	0	12
Pedestrians								1			1	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					868							
pX, platoon unblocked												
vC, conflicting volume	93			83			208	202	83	198	198	88
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	93			83			208	202	83	198	198	88
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	99	100	99
cM capacity (veh/h)	1513			1526			738	691	981	757	695	974

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	93	94	2	23
Volume Left	11	2	0	11
Volume Right	0	9	0	12
cSH	1513	1526	691	857
Volume to Capacity	0.01	0.00	0.00	0.03
Queue Length 95th (ft)	1	0	0	2
Control Delay (s)	0.9	0.2	10.2	9.3
Lane LOS	A	A	B	A
Approach Delay (s)	0.9	0.2	10.2	9.3
Approach LOS			B	A

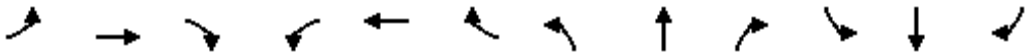
Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	21.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	0	5	1	0	3	1	1109	28	18	309	2
Future Volume (vph)	9	0	5	1	0	3	1	1109	28	18	309	2
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	4.5	4.5	4.5	4.5	4.5	4.5	4.5
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	0.98		1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes		0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1795	1325		899	1587	1798	3471	1459	1702	3539	1565
Flt Permitted		1.00	1.00		1.00	1.00	0.56	1.00	1.00	0.22	1.00	1.00
Satd. Flow (perm)		1889	1325		947	1587	1051	3471	1459	403	3539	1565
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)	9	0	5	1	0	3	1	1167	29	19	325	2
RTOR Reduction (vph)	0	0	5	0	0	3	0	0	5	0	0	0
Lane Group Flow (vph)	0	9	0	0	1	0	1	1167	24	19	325	2
Confl. Peds. (#/hr)	5		3	3		5	4		5	5		4
Heavy Vehicles (%)	0%	0%	20%	100%	0%	0%	0%	4%	7%	6%	2%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4	4	4	2		2	6		6
Actuated Green, G (s)		2.7	2.7		2.7	2.7	82.7	81.7	81.7	84.9	82.8	82.8
Effective Green, g (s)		2.7	2.7		2.7	2.7	82.7	81.7	81.7	84.9	82.8	82.8
Actuated g/C Ratio		0.03	0.03		0.03	0.03	0.83	0.82	0.82	0.85	0.83	0.83
Clearance Time (s)		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)		2.5	2.5		2.5	2.5	2.3	4.8	4.8	2.3	4.8	4.8
Lane Grp Cap (vph)		51	35		25	42	876	2835	1192	369	2930	1295
v/s Ratio Prot							0.00	c0.34		c0.00	0.09	
v/s Ratio Perm		c0.00	0.00		0.00	0.00	0.00		0.02	0.04		0.00
v/c Ratio		0.18	0.00		0.04	0.00	0.00	0.41	0.02	0.05	0.11	0.00
Uniform Delay, d1		47.6	47.3		47.4	47.3	1.5	2.5	1.7	1.3	1.6	1.5
Progression Factor		1.00	1.00		1.00	1.00	0.32	0.21	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.2	0.0		0.5	0.0	0.0	0.3	0.0	0.0	0.0	0.0
Delay (s)		48.8	47.4		47.9	47.4	0.5	0.9	1.7	1.4	1.7	1.5
Level of Service		D	D		D	D	A	A	A	A	A	A
Approach Delay (s)		48.3			47.5			0.9			1.6	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	1.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

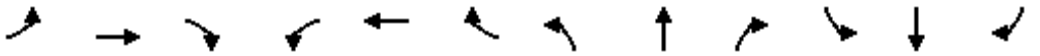
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	0	17	6	0	9	2	1097	2	1	310	4
Future Volume (Veh/h)	31	0	17	6	0	9	2	1097	2	1	310	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	33	0	18	6	0	10	2	1180	2	1	333	4
Pedestrians		3			1						1	
Lane Width (ft)		12.0			12.0						12.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								992			884	
pX, platoon unblocked	0.28	0.28		0.28	0.28	0.28				0.28		
vC, conflicting volume	1536	1527	338	1541	1528	1183	340			1183		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1628	1596	338	1646	1600	371	340			371		
tC, single (s)	7.1	6.5	6.2	7.6	6.5	6.2	4.6			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	4.0	4.0	3.3	2.7			2.2		
p0 queue free %	0	100	97	64	100	95	100			100		
cM capacity (veh/h)	21	30	707	17	30	190	992			336		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	51	16	1184	338
Volume Left	33	6	2	1
Volume Right	18	10	2	4
cSH	33	39	992	336
Volume to Capacity	1.57	0.41	0.00	0.00
Queue Length 95th (ft)	142	35	0	0
Control Delay (s)	550.5	153.0	0.1	0.1
Lane LOS	F	F	A	A
Approach Delay (s)	550.5	153.0	0.1	0.1
Approach LOS	F	F		

Intersection Summary				
Average Delay	19.3			
Intersection Capacity Utilization	70.4%	ICU Level of Service	C	
Analysis Period (min)	15			



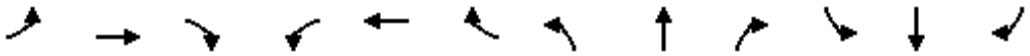
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	4	57	14	2	7	12	1047	34	5	340	6
Future Volume (vph)	41	4	57	14	2	7	12	1047	34	5	340	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		4.5	5.0		4.5	5.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.98			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	
Frt		0.92			0.96		1.00	1.00		1.00	1.00	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1696			1766		1805	1817		1805	1841	
Flt Permitted		0.86			0.73		0.54	1.00		0.15	1.00	
Satd. Flow (perm)		1486			1333		1030	1817		291	1841	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	42	4	59	14	2	7	12	1079	35	5	351	6
RTOR Reduction (vph)	0	53	0	0	6	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	52	0	0	17	0	12	1113	0	5	357	0
Confl. Peds. (#/hr)			1	1					3	3		
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	3%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)		8.5			8.5		77.5	76.5		77.5	76.5	
Effective Green, g (s)		8.5			8.5		77.5	76.5		77.5	76.5	
Actuated g/C Ratio		0.08			0.08		0.78	0.76		0.78	0.76	
Clearance Time (s)		4.5			4.5		4.5	5.0		4.5	5.0	
Vehicle Extension (s)		2.5			2.5		2.3	5.2		2.3	5.2	
Lane Grp Cap (vph)		126			113		806	1390		240	1408	
v/s Ratio Prot							0.00	c0.61		c0.00	0.19	
v/s Ratio Perm		c0.03			0.01		0.01			0.02		
v/c Ratio		0.41			0.15		0.01	0.80		0.02	0.25	
Uniform Delay, d1		43.4			42.4		2.6	7.1		8.1	3.4	
Progression Factor		1.00			1.00		1.00	1.00		2.25	1.83	
Incremental Delay, d2		1.6			0.4		0.0	4.9		0.0	0.4	
Delay (s)		45.0			42.8		2.6	12.1		18.3	6.7	
Level of Service		D			D		A	B		B	A	
Approach Delay (s)		45.0			42.8			12.0			6.9	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	0	3	2	2	39	4
Future Volume (vph)	0	3	2	2	39	4
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	0	4	3	3	51	5

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	4	6	56
Volume Left (vph)	0	0	51
Volume Right (vph)	4	3	0
Hadj (s)	-0.04	-0.30	0.18
Departure Headway (s)	4.0	3.7	4.1
Degree Utilization, x	0.00	0.01	0.06
Capacity (veh/h)	881	976	873
Control Delay (s)	7.0	6.7	7.4
Approach Delay (s)	7.0	6.7	7.4
Approach LOS	A	A	A

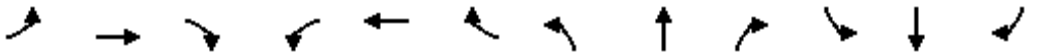
Intersection Summary			
Delay	7.3		
Level of Service	A		
Intersection Capacity Utilization	19.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	84	0	0	15	4	0	2	4	8	0	2
Future Volume (Veh/h)	3	84	0	0	15	4	0	2	4	8	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	4	104	0	0	19	5	0	2	5	10	0	2
Pedestrians					1						2	
Lane Width (ft)					12.0						12.0	
Walking Speed (ft/s)					4.0						4.0	
Percent Blockage					0						0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					868							
pX, platoon unblocked												
vC, conflicting volume	26			104			136	138	105	142	136	24
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	26			104			136	138	105	142	136	24
tC, single (s)	4.1			4.1			7.1	7.0	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.5	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	99	99	100	100
cM capacity (veh/h)	1599			1500			836	670	954	821	756	1057

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	108	24	7	12
Volume Left	4	0	0	10
Volume Right	0	5	5	2
cSH	1599	1500	851	852
Volume to Capacity	0.00	0.00	0.01	0.01
Queue Length 95th (ft)	0	0	1	1
Control Delay (s)	0.3	0.0	9.3	9.3
Lane LOS	A		A	A
Approach Delay (s)	0.3	0.0	9.3	9.3
Approach LOS			A	A

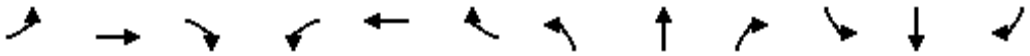
Intersection Summary				
Average Delay	1.4			
Intersection Capacity Utilization	20.7%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	9	51	0	45	12	486	19	20	1100	8
Future Volume (vph)	4	0	9	51	0	45	12	486	19	20	1100	8
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	4.5	4.5	4.5	4.5	4.5	4.5	4.5
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	0.99		1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.98
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	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1442	1592		1765	1594	1671	3505	1568	1802	3539	1578
Flt Permitted		0.72	1.00		0.76	1.00	0.21	1.00	1.00	0.45	1.00	1.00
Satd. Flow (perm)		1093	1592		1403	1594	363	3505	1568	855	3539	1578
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	4	0	10	57	0	50	13	540	21	22	1222	9
RTOR Reduction (vph)	0	0	9	0	0	46	0	0	5	0	0	2
Lane Group Flow (vph)	0	4	1	0	57	4	13	540	16	22	1222	7
Confl. Peds. (#/hr)	1		2	2		1	1		3	3		1
Heavy Vehicles (%)	25%	0%	0%	2%	0%	0%	8%	3%	0%	0%	2%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4	4	4	2		2	6		6
Actuated Green, G (s)		8.3	8.3		8.3	8.3	88.2	86.1	86.1	88.2	86.1	86.1
Effective Green, g (s)		8.3	8.3		8.3	8.3	88.2	86.1	86.1	88.2	86.1	86.1
Actuated g/C Ratio		0.08	0.08		0.08	0.08	0.80	0.78	0.78	0.80	0.78	0.78
Clearance Time (s)		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)		2.5	2.5		2.5	2.5	2.3	4.8	4.8	2.3	4.8	4.8
Lane Grp Cap (vph)		82	120		105	120	316	2743	1227	703	2770	1235
v/s Ratio Prot							c0.00	0.15		0.00	c0.35	
v/s Ratio Perm		0.00	0.00		c0.04	0.00	0.03		0.01	0.02		0.00
v/c Ratio		0.05	0.01		0.54	0.03	0.04	0.20	0.01	0.03	0.44	0.01
Uniform Delay, d1		47.2	47.0		49.0	47.1	2.5	3.1	2.6	2.2	4.0	2.6
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		0.2	0.0		4.5	0.1	0.0	0.2	0.0	0.0	0.2	0.0
Delay (s)		47.4	47.1		53.5	47.2	2.6	3.2	2.6	2.2	4.2	2.6
Level of Service		D	D		D	D	A	A	A	A	A	A
Approach Delay (s)		47.1			50.5			3.2			4.1	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

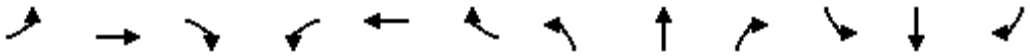
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	6	3	0	4	11	513	9	11	1109	41
Future Volume (Veh/h)	2	0	6	3	0	4	11	513	9	11	1109	41
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	0	7	3	0	4	12	558	10	12	1205	45
Pedestrians					3			1				
Lane Width (ft)					12.0			12.0				
Walking Speed (ft/s)					4.0			4.0				
Percent Blockage					0			0				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								992			884	
pX, platoon unblocked	0.27	0.27	0.23	0.27	0.27	0.92	0.23			0.92		
vC, conflicting volume	1842	1846	1228	1850	1864	566	1250			571		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2070	2085	298	2096	2150	480	393			485		
tC, single (s)	7.1	6.5	6.4	7.1	6.5	6.5	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.5	4.0	3.5	2.2			2.2		
p0 queue free %	80	100	96	68	100	99	95			99		
cM capacity (veh/h)	10	14	160	9	12	495	266			994		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	9	7	580	1262
Volume Left	2	3	12	12
Volume Right	7	4	10	45
cSH	38	21	266	994
Volume to Capacity	0.24	0.33	0.05	0.01
Queue Length 95th (ft)	19	24	4	1
Control Delay (s)	128.7	239.9	1.7	0.5
Lane LOS	F	F	A	A
Approach Delay (s)	128.7	239.9	1.7	0.5
Approach LOS	F	F		

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	1	44	37	1	9	51	516	19	10	1056	23
Future Volume (vph)	21	1	44	37	1	9	51	516	19	10	1056	23
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	5.0		4.5	5.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			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	
Frt		0.91			0.98		1.00	0.99		1.00	1.00	
Flt Protected		0.98			0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1598			1740		1770	1849		1801	1858	
Flt Permitted		0.91			0.74		0.13	1.00		0.45	1.00	
Satd. Flow (perm)		1477			1344		239	1849		846	1858	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	22	1	46	39	1	9	53	538	20	10	1100	24
RTOR Reduction (vph)	0	43	0	0	8	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	26	0	0	41	0	53	557	0	10	1123	0
Confl. Peds. (#/hr)									4	4		
Heavy Vehicles (%)	10%	0%	5%	3%	0%	0%	2%	2%	5%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)		7.0			7.0		82.4	78.0		75.6	74.6	
Effective Green, g (s)		7.0			7.0		82.4	78.0		75.6	74.6	
Actuated g/C Ratio		0.07			0.07		0.82	0.78		0.76	0.75	
Clearance Time (s)		4.5			4.5		4.5	5.0		4.5	5.0	
Vehicle Extension (s)		2.5			2.5		2.3	5.2		2.3	5.2	
Lane Grp Cap (vph)		103			94		264	1442		649	1386	
v/s Ratio Prot							c0.01	c0.30		0.00	c0.60	
v/s Ratio Perm		0.02			c0.03		0.16			0.01		
v/c Ratio		0.25			0.43		0.20	0.39		0.02	0.81	
Uniform Delay, d1		44.0			44.6		10.8	3.5		3.0	8.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.0			2.3		0.2	0.8		0.0	5.2	
Delay (s)		45.0			46.9		11.1	4.2		3.0	13.4	
Level of Service		D			D		B	A		A	B	
Approach Delay (s)		45.0			46.9			4.8			13.3	
Approach LOS		D			D			A			B	

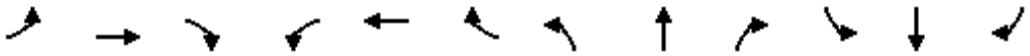
Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	13	36	4	3	5	6
Future Volume (vph)	13	36	4	3	5	6
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72
Hourly flow rate (vph)	18	50	6	4	7	8

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	68	10	15
Volume Left (vph)	18	0	7
Volume Right (vph)	50	4	0
Hadj (s)	-0.35	0.27	0.55
Departure Headway (s)	3.6	4.3	4.6
Degree Utilization, x	0.07	0.01	0.02
Capacity (veh/h)	984	809	768
Control Delay (s)	6.9	7.4	7.7
Approach Delay (s)	6.9	7.4	7.7
Approach LOS	A	A	A

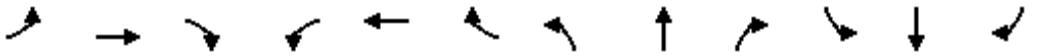
Intersection Summary			
Delay	7.1		
Level of Service	A		
Intersection Capacity Utilization	14.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	55	0	1	56	6	0	1	0	7	0	8
Future Volume (Veh/h)	7	55	0	1	56	6	0	1	0	7	0	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Hourly flow rate (vph)	11	83	0	2	85	9	0	2	0	11	0	12
Pedestrians								1			1	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					868							
pX, platoon unblocked												
vC, conflicting volume	95			84			212	205	84	200	200	90
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	95			84			212	205	84	200	200	90
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	99	100	99
cM capacity (veh/h)	1510			1524			734	688	980	754	692	972

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	94	96	2	23
Volume Left	11	2	0	11
Volume Right	0	9	0	12
cSH	1510	1524	688	854
Volume to Capacity	0.01	0.00	0.00	0.03
Queue Length 95th (ft)	1	0	0	2
Control Delay (s)	0.9	0.2	10.2	9.3
Lane LOS	A	A	B	A
Approach Delay (s)	0.9	0.2	10.2	9.3
Approach LOS			B	A

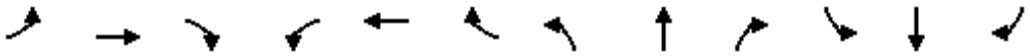
Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	21.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	0	5	1	0	3	1	1119	28	18	311	2
Future Volume (vph)	9	0	5	1	0	3	1	1119	28	18	311	2
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	4.5	4.5	4.5	4.5	4.5	4.5	4.5
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	0.98		1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes		0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1795	1325		899	1587	1798	3471	1459	1702	3539	1565
Flt Permitted		1.00	1.00		1.00	1.00	0.55	1.00	1.00	0.22	1.00	1.00
Satd. Flow (perm)		1889	1325		947	1587	1049	3471	1459	398	3539	1565
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)	9	0	5	1	0	3	1	1178	29	19	327	2
RTOR Reduction (vph)	0	0	5	0	0	3	0	0	5	0	0	0
Lane Group Flow (vph)	0	9	0	0	1	0	1	1178	24	19	327	2
Confl. Peds. (#/hr)	5		3	3		5	4		5	5		4
Heavy Vehicles (%)	0%	0%	20%	100%	0%	0%	0%	4%	7%	6%	2%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4	4	4	2		2	6		6
Actuated Green, G (s)		2.7	2.7		2.7	2.7	82.7	81.7	81.7	84.9	82.8	82.8
Effective Green, g (s)		2.7	2.7		2.7	2.7	82.7	81.7	81.7	84.9	82.8	82.8
Actuated g/C Ratio		0.03	0.03		0.03	0.03	0.83	0.82	0.82	0.85	0.83	0.83
Clearance Time (s)		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)		2.5	2.5		2.5	2.5	2.3	4.8	4.8	2.3	4.8	4.8
Lane Grp Cap (vph)		51	35		25	42	875	2835	1192	365	2930	1295
v/s Ratio Prot							0.00	c0.34		c0.00	0.09	
v/s Ratio Perm		c0.00	0.00		0.00	0.00	0.00		0.02	0.04		0.00
v/c Ratio		0.18	0.00		0.04	0.00	0.00	0.42	0.02	0.05	0.11	0.00
Uniform Delay, d1		47.6	47.3		47.4	47.3	1.5	2.5	1.7	1.4	1.6	1.5
Progression Factor		1.00	1.00		1.00	1.00	0.32	0.22	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.2	0.0		0.5	0.0	0.0	0.3	0.0	0.0	0.0	0.0
Delay (s)		48.8	47.4		47.9	47.4	0.5	0.9	1.7	1.4	1.7	1.5
Level of Service		D	D		D	D	A	A	A	A	A	A
Approach Delay (s)		48.3			47.5			0.9			1.6	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	1.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	56.5%	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 (veh/h)	31	0	23	6	0	9	3	1107	2	1	310	6
Future Volume (Veh/h)	31	0	23	6	0	9	3	1107	2	1	310	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	33	0	25	6	0	10	3	1190	2	1	333	6
Pedestrians		3			1						1	
Lane Width (ft)		12.0			12.0						12.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								992			884	
pX, platoon unblocked	0.29	0.29		0.29	0.29	0.29				0.29		
vC, conflicting volume	1549	1540	339	1561	1542	1193	342			1193		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1666	1636	339	1707	1643	458	342			458		
tC, single (s)	7.1	6.5	6.2	7.6	6.5	6.2	4.6			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	4.0	4.0	3.3	2.7			2.2		
p0 queue free %	0	100	96	61	100	94	100			100		
cM capacity (veh/h)	21	30	706	15	29	179	990			328		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	58	16	1195	340
Volume Left	33	6	3	1
Volume Right	25	10	2	6
cSH	36	36	990	328
Volume to Capacity	1.61	0.44	0.00	0.00
Queue Length 95th (ft)	156	37	0	0
Control Delay (s)	541.7	168.3	0.1	0.1
Lane LOS	F	F	A	A
Approach Delay (s)	541.7	168.3	0.1	0.1
Approach LOS	F	F		

Intersection Summary				
Average Delay	21.3			
Intersection Capacity Utilization	72.0%	ICU Level of Service	C	
Analysis Period (min)	15			

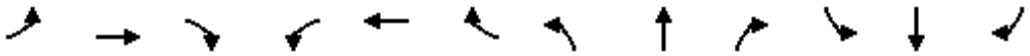
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	4	62	14	2	7	13	1048	34	5	346	6
Future Volume (vph)	51	4	62	14	2	7	13	1048	34	5	346	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		4.5	5.0		4.5	5.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.99			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	
Frt		0.93			0.96		1.00	1.00		1.00	1.00	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1703			1766		1805	1817		1805	1841	
Flt Permitted		0.85			0.76		0.53	1.00		0.14	1.00	
Satd. Flow (perm)		1475			1382		1015	1817		271	1841	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	53	4	64	14	2	7	13	1080	35	5	357	6
RTOR Reduction (vph)	0	46	0	0	6	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	75	0	0	17	0	13	1114	0	5	363	0
Confl. Peds. (#/hr)			1	1					3	3		
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	3%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)		9.9			9.9		76.2	75.1		76.0	75.0	
Effective Green, g (s)		9.9			9.9		76.2	75.1		76.0	75.0	
Actuated g/C Ratio		0.10			0.10		0.76	0.75		0.76	0.75	
Clearance Time (s)		4.5			4.5		4.5	5.0		4.5	5.0	
Vehicle Extension (s)		2.5			2.5		2.3	5.2		2.3	5.2	
Lane Grp Cap (vph)		146			136		782	1364		221	1380	
v/s Ratio Prot							0.00	c0.61		c0.00	0.20	
v/s Ratio Perm		c0.05			0.01		0.01			0.02		
v/c Ratio		0.51			0.12		0.02	0.82		0.02	0.26	
Uniform Delay, d1		42.8			41.1		2.9	8.0		9.2	3.9	
Progression Factor		1.00			1.00		1.00	1.00		2.03	1.76	
Incremental Delay, d2		2.3			0.3		0.0	5.5		0.0	0.5	
Delay (s)		45.0			41.4		2.9	13.5		18.8	7.3	
Level of Service		D			D		A	B		B	A	
Approach Delay (s)		45.0			41.4			13.4			7.5	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	73.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	0	6	3	2	45	20
Future Volume (vph)	0	6	3	2	45	20
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	0	8	4	3	58	26

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	8	7	84
Volume Left (vph)	0	0	58
Volume Right (vph)	8	3	0
Hadj (s)	-0.04	-0.26	0.14
Departure Headway (s)	4.1	3.7	4.1
Degree Utilization, x	0.01	0.01	0.09
Capacity (veh/h)	863	953	880
Control Delay (s)	7.1	6.8	7.5
Approach Delay (s)	7.1	6.8	7.5
Approach LOS	A	A	A

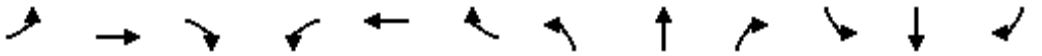
Intersection Summary			
Delay	7.4		
Level of Service	A		
Intersection Capacity Utilization	20.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	84	0	0	15	5	0	2	4	23	0	3
Future Volume (Veh/h)	3	84	0	0	15	5	0	2	4	23	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	4	104	0	0	19	6	0	2	5	28	0	4
Pedestrians					1						2	
Lane Width (ft)					12.0						12.0	
Walking Speed (ft/s)					4.0						4.0	
Percent Blockage					0						0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					868							
pX, platoon unblocked												
vC, conflicting volume	27			104			138	139	105	143	136	24
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	27			104			138	139	105	143	136	24
tC, single (s)	4.1			4.1			7.1	7.0	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.5	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	99	97	100	100
cM capacity (veh/h)	1597			1500			831	669	954	820	755	1057

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	108	25	7	32
Volume Left	4	0	0	28
Volume Right	0	6	5	4
cSH	1597	1500	851	844
Volume to Capacity	0.00	0.00	0.01	0.04
Queue Length 95th (ft)	0	0	1	3
Control Delay (s)	0.3	0.0	9.3	9.4
Lane LOS	A		A	A
Approach Delay (s)	0.3	0.0	9.3	9.4
Approach LOS			A	A

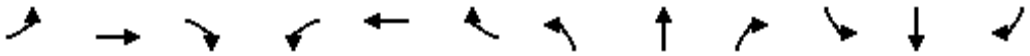
Intersection Summary				
Average Delay	2.3			
Intersection Capacity Utilization	21.6%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	9	51	0	45	12	491	19	20	1109	8
Future Volume (vph)	4	0	9	51	0	45	12	491	19	20	1109	8
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	4.5	4.5	4.5	4.5	4.5	4.5	4.5
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	0.99		1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.98
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	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1442	1592		1765	1594	1671	3505	1568	1802	3539	1578
Flt Permitted		0.72	1.00		0.76	1.00	0.20	1.00	1.00	0.45	1.00	1.00
Satd. Flow (perm)		1093	1592		1403	1594	358	3505	1568	849	3539	1578
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	4	0	10	57	0	50	13	546	21	22	1232	9
RTOR Reduction (vph)	0	0	9	0	0	46	0	0	5	0	0	2
Lane Group Flow (vph)	0	4	1	0	57	4	13	546	16	22	1232	7
Confl. Peds. (#/hr)	1		2	2		1	1		3	3		1
Heavy Vehicles (%)	25%	0%	0%	2%	0%	0%	8%	3%	0%	0%	2%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4	4	4	2		2	6		6
Actuated Green, G (s)		8.3	8.3		8.3	8.3	88.2	86.1	86.1	88.2	86.1	86.1
Effective Green, g (s)		8.3	8.3		8.3	8.3	88.2	86.1	86.1	88.2	86.1	86.1
Actuated g/C Ratio		0.08	0.08		0.08	0.08	0.80	0.78	0.78	0.80	0.78	0.78
Clearance Time (s)		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)		2.5	2.5		2.5	2.5	2.3	4.8	4.8	2.3	4.8	4.8
Lane Grp Cap (vph)		82	120		105	120	312	2743	1227	698	2770	1235
v/s Ratio Prot							c0.00	0.16		0.00	c0.35	
v/s Ratio Perm		0.00	0.00		c0.04	0.00	0.03		0.01	0.02		0.00
v/c Ratio		0.05	0.01		0.54	0.03	0.04	0.20	0.01	0.03	0.44	0.01
Uniform Delay, d1		47.2	47.0		49.0	47.1	2.6	3.1	2.6	2.2	4.0	2.6
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		0.2	0.0		4.5	0.1	0.0	0.2	0.0	0.0	0.2	0.0
Delay (s)		47.4	47.1		53.5	47.2	2.6	3.2	2.6	2.2	4.2	2.6
Level of Service		D	D		D	D	A	A	A	A	A	A
Approach Delay (s)		47.1			50.5			3.2			4.2	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

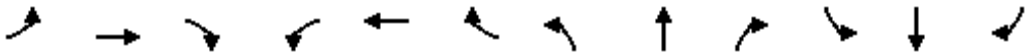
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	9	3	0	4	16	518	9	11	1109	50
Future Volume (Veh/h)	2	0	9	3	0	4	16	518	9	11	1109	50
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	0	10	3	0	4	17	563	10	12	1205	54
Pedestrians					3			1				
Lane Width (ft)					12.0			12.0				
Walking Speed (ft/s)					4.0			4.0				
Percent Blockage					0			0				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								992			884	
pX, platoon unblocked	0.27	0.27	0.23	0.27	0.27	0.91	0.23			0.91		
vC, conflicting volume	1862	1866	1233	1872	1888	571	1259			576		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2124	2139	316	2161	2220	483	431			489		
tC, single (s)	7.1	6.5	6.4	7.1	6.5	6.5	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.5	4.0	3.5	2.2			2.2		
p0 queue free %	78	100	94	63	100	99	93			99		
cM capacity (veh/h)	9	12	156	8	11	492	257			989		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	12	7	590	1271
Volume Left	2	3	17	12
Volume Right	10	4	10	54
cSH	43	19	257	989
Volume to Capacity	0.28	0.38	0.07	0.01
Queue Length 95th (ft)	24	26	5	1
Control Delay (s)	119.4	286.5	2.5	0.5
Lane LOS	F	F	A	A
Approach Delay (s)	119.4	286.5	2.5	0.5
Approach LOS	F	F		

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	1	46	37	1	9	56	521	19	10	1059	23
Future Volume (vph)	26	1	46	37	1	9	56	521	19	10	1059	23
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	5.0		4.5	5.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			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	
Frt		0.91			0.98		1.00	0.99		1.00	1.00	
Flt Protected		0.98			0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1600			1740		1770	1849		1801	1858	
Flt Permitted		0.90			0.71		0.13	1.00		0.44	1.00	
Satd. Flow (perm)		1468			1285		236	1849		840	1858	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	27	1	48	39	1	9	58	543	20	10	1103	24
RTOR Reduction (vph)	0	45	0	0	8	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	31	0	0	41	0	58	562	0	10	1126	0
Confl. Peds. (#/hr)									4	4		
Heavy Vehicles (%)	10%	0%	5%	3%	0%	0%	2%	2%	5%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)		7.0			7.0		82.4	78.0		75.6	74.6	
Effective Green, g (s)		7.0			7.0		82.4	78.0		75.6	74.6	
Actuated g/C Ratio		0.07			0.07		0.82	0.78		0.76	0.75	
Clearance Time (s)		4.5			4.5		4.5	5.0		4.5	5.0	
Vehicle Extension (s)		2.5			2.5		2.3	5.2		2.3	5.2	
Lane Grp Cap (vph)		102			89		261	1442		644	1386	
v/s Ratio Prot							c0.01	c0.30		0.00	c0.61	
v/s Ratio Perm		0.02			c0.03		0.17			0.01		
v/c Ratio		0.31			0.46		0.22	0.39		0.02	0.81	
Uniform Delay, d1		44.2			44.7		11.1	3.5		3.0	8.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.2			2.7		0.3	0.8		0.0	5.3	
Delay (s)		45.4			47.4		11.3	4.3		3.0	13.5	
Level of Service		D			D		B	A		A	B	
Approach Delay (s)		45.4			47.4			4.9			13.4	
Approach LOS		D			D			A			B	

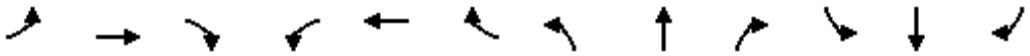
Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	13	50	10	3	8	13
Future Volume (vph)	13	50	10	3	8	13
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72
Hourly flow rate (vph)	18	69	14	4	11	18

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	87	18	29
Volume Left (vph)	18	0	11
Volume Right (vph)	69	4	0
Hadj (s)	-0.39	0.53	0.55
Departure Headway (s)	3.6	4.6	4.6
Degree Utilization, x	0.09	0.02	0.04
Capacity (veh/h)	976	752	757
Control Delay (s)	7.0	7.7	7.8
Approach Delay (s)	7.0	7.7	7.8
Approach LOS	A	A	A

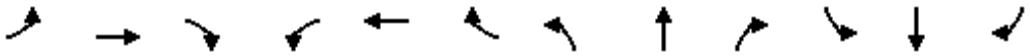
Intersection Summary			
Delay	7.3		
Level of Service	A		
Intersection Capacity Utilization	18.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	55	0	1	56	11	0	1	0	14	0	8
Future Volume (Veh/h)	8	55	0	1	56	11	0	1	0	14	0	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Hourly flow rate (vph)	12	83	0	2	85	17	0	2	0	21	0	12
Pedestrians								1			1	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					868							
pX, platoon unblocked												
vC, conflicting volume	103			84			218	215	84	206	206	94
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	103			84			218	215	84	206	206	94
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	97	100	99
cM capacity (veh/h)	1500			1524			727	679	980	747	686	967

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	95	104	2	33
Volume Left	12	2	0	21
Volume Right	0	17	0	12
cSH	1500	1524	679	814
Volume to Capacity	0.01	0.00	0.00	0.04
Queue Length 95th (ft)	1	0	0	3
Control Delay (s)	1.0	0.2	10.3	9.6
Lane LOS	A	A	B	A
Approach Delay (s)	1.0	0.2	10.3	9.6
Approach LOS			B	A

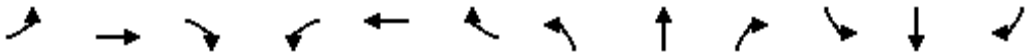
Intersection Summary				
Average Delay	1.9			
Intersection Capacity Utilization	22.5%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	0	23	6	0	9	3	1107	2	1	310	6
Future Volume (Veh/h)	31	0	23	6	0	9	3	1107	2	1	310	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	33	0	25	6	0	10	3	1190	2	1	333	6
Pedestrians		3			1						1	
Lane Width (ft)		12.0			12.0						12.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								992			884	
pX, platoon unblocked	0.30	0.30		0.30	0.30	0.30				0.30		
vC, conflicting volume	1548	1540	339	1558	1542	1193	342			1193		
vC1, stage 1 conf vol	341	341		1198	1198							
vC2, stage 2 conf vol	1207	1199		360	344							
vCu, unblocked vol	1663	1636	339	1697	1642	459	342			459		
tC, single (s)	7.1	6.5	6.2	7.6	6.5	6.2	4.6			4.1		
tC, 2 stage (s)	6.1	5.5		6.6	5.5							
tF (s)	3.5	4.0	3.3	4.0	4.0	3.3	2.7			2.2		
p0 queue free %	77	100	96	96	100	94	100			100		
cM capacity (veh/h)	143	154	706	135	155	178	990			328		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	58	16	3	1192	1	339
Volume Left	33	6	3	0	1	0
Volume Right	25	10	0	2	0	6
cSH	218	159	990	1700	328	1700
Volume to Capacity	0.27	0.10	0.00	0.70	0.00	0.20
Queue Length 95th (ft)	26	8	0	0	0	0
Control Delay (s)	27.4	30.2	8.6	0.0	16.0	0.0
Lane LOS	D	D	A		C	
Approach Delay (s)	27.4	30.2	0.0		0.0	
Approach LOS	D	D				

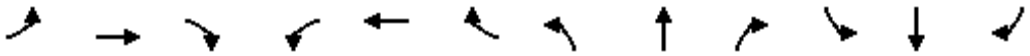
Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	69.8%	ICU Level of Service		C
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	9	3	0	4	16	518	9	11	1109	50
Future Volume (Veh/h)	2	0	9	3	0	4	16	518	9	11	1109	50
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	0	10	3	0	4	17	563	10	12	1205	54
Pedestrians					3			1				
Lane Width (ft)					12.0			12.0				
Walking Speed (ft/s)					4.0			4.0				
Percent Blockage					0			0				
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								992			884	
pX, platoon unblocked	0.27	0.27	0.23	0.27	0.27	0.92	0.23			0.92		
vC, conflicting volume	1857	1866	1233	1845	1888	571	1259			576		
vC1, stage 1 conf vol	1256	1256		605	605							
vC2, stage 2 conf vol	601	610		1240	1283							
vCu, unblocked vol	2162	2196	319	2117	2278	490	434			495		
tC, single (s)	7.1	6.5	6.4	7.1	6.5	6.5	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.5	3.5	4.0	3.5	2.2			2.2		
p0 queue free %	98	100	94	97	100	99	93			99		
cM capacity (veh/h)	126	122	155	115	95	490	257			990		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	12	7	17	573	12	1259
Volume Left	2	3	17	0	12	0
Volume Right	10	4	0	10	0	54
cSH	150	204	257	1700	990	1700
Volume to Capacity	0.08	0.03	0.07	0.34	0.01	0.74
Queue Length 95th (ft)	6	3	5	0	1	0
Control Delay (s)	31.1	23.3	20.0	0.0	8.7	0.0
Lane LOS	D	C	C		A	
Approach Delay (s)	31.1	23.3	0.6		0.1	
Approach LOS	D	C				

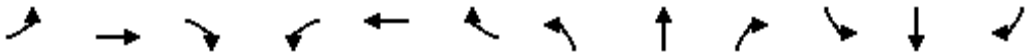
Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	71.7%	ICU Level of Service	C	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	0	28	6	0	9	4	1097	2	1	310	6
Future Volume (Veh/h)	41	0	28	6	0	9	4	1097	2	1	310	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	44	0	30	6	0	10	4	1180	2	1	333	6
Pedestrians		3			1						1	
Lane Width (ft)		12.0			12.0						12.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								992			884	
pX, platoon unblocked	0.28	0.28		0.28	0.28	0.28				0.28		
vC, conflicting volume	1540	1532	339	1555	1534	1183	342			1183		
vC1, stage 1 conf vol	341	341		1190	1190							
vC2, stage 2 conf vol	1199	1191		365	344							
vCu, unblocked vol	1642	1614	339	1696	1621	372	342			372		
tC, single (s)	7.1	6.5	6.2	7.6	6.5	6.2	4.6			4.1		
tC, 2 stage (s)	6.1	5.5		6.6	5.5							
tF (s)	3.5	4.0	3.3	4.0	4.0	3.3	2.7			2.2		
p0 queue free %	71	100	96	96	100	95	100			100		
cM capacity (veh/h)	150	159	706	141	160	190	990			336		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	74	16	4	1182	1	339
Volume Left	44	6	4	0	1	0
Volume Right	30	10	0	2	0	6
cSH	220	168	990	1700	336	1700
Volume to Capacity	0.34	0.10	0.00	0.70	0.00	0.20
Queue Length 95th (ft)	35	8	0	0	0	0
Control Delay (s)	29.4	28.6	8.7	0.0	15.7	0.0
Lane LOS	D	D	A		C	
Approach Delay (s)	29.4	28.6	0.0		0.0	
Approach LOS	D	D				

Intersection Summary				
Average Delay	1.7			
Intersection Capacity Utilization	70.7%	ICU Level of Service	C	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	0	11	3	0	4	21	513	9	11	1109	50
Future Volume (Veh/h)	7	0	11	3	0	4	21	513	9	11	1109	50
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	0	12	3	0	4	23	558	10	12	1205	54
Pedestrians					3			1				
Lane Width (ft)					12.0			12.0				
Walking Speed (ft/s)					4.0			4.0				
Percent Blockage					0			0				
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								992			884	
pX, platoon unblocked	0.27	0.27	0.23	0.27	0.27	0.92	0.23			0.92		
vC, conflicting volume	1864	1873	1233	1854	1895	566	1259			571		
vC1, stage 1 conf vol	1256	1256		612	612							
vC2, stage 2 conf vol	608	617		1242	1283							
vCu, unblocked vol	2190	2224	319	2152	2306	485	434			490		
tC, single (s)	7.1	6.5	6.4	7.1	6.5	6.5	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.5	3.5	4.0	3.5	2.2			2.2		
p0 queue free %	94	100	92	97	100	99	91			99		
cM capacity (veh/h)	126	122	155	106	89	494	257			994		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	20	7	23	568	12	1259
Volume Left	8	3	23	0	12	0
Volume Right	12	4	0	10	0	54
cSH	142	193	257	1700	994	1700
Volume to Capacity	0.14	0.04	0.09	0.33	0.01	0.74
Queue Length 95th (ft)	12	3	7	0	1	0
Control Delay (s)	34.5	24.4	20.4	0.0	8.7	0.0
Lane LOS	D	C	C		A	
Approach Delay (s)	34.5	24.4	0.8		0.1	
Approach LOS	D	C				

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	71.7%	ICU Level of Service	C	
Analysis Period (min)	15			

Oregon
Kate Brown, Governor

Department of Transportation
Region 1 Headquarters
123 NW Flanders Street
Portland, Oregon 97209
(503) 731.8200
FAX (503) 731.8259

2/3/17 ODOT #7400

ODOT Response

Project Name: Upper Midhill Subdivision - Chene Blanc	**Applicant:** Upper Midhill Estates, LLC by Ryan Zygar
Jurisdiction: City of West Linn	**Jurisdiction Case #:** SUB-16-03/WRG-16-10
Site Address: 18000 Upper Midhill Drive, West Linn, OR	**Legal Description:** 02S 01E 13CA **Tax Lot(s):** 00200
State Highway: OR 43	**Mileposts:** 7.78 to 8.0

The site of this proposed land use action is in the vicinity of Willamette Drive (OR-43). ODOT has permitting authority for this facility and an interest in ensuring that this proposed land use is compatible with its safe and efficient operation. **Please direct the applicant to the District Contact indicated below to determine permit requirements and obtain application information.**

COMMENTS/FINDINGS

ODOT reviewed the Traffic Impact Analysis (TIA) dated January 29, 2016 submitted by Kittelson & Associates, Inc. (KAI). As indicated in the TIA, all the study intersections operate acceptably during the weekday AM and PM peak hours with the exception of the Willamette Drive (OR-43) / Arbor Drive intersection. The same intersection has experienced a significant number of turning movement crashes during the past five years. To mitigate the impact of the development, the TIA findings propose the construction of a northbound left turn lane and a left turn refuge/storage area on the north leg of the OR-43 / Arbor Drive intersection.

ODOT supports the proposed mitigation concept to improve mobility standards and address safety issues at this intersection. However, in order to construct this turn lane to ODOT standards, the developer would need to extend the three lane section from Arbor Drive to Shady Hollow Way, creating a continuous two-way left turn-lane that includes bike lanes along this section of the highway. Because the City is already pursuing funding for the Highway 43 Multimodal Transportation Project to widen this segment of the highway to three lanes, ODOT recommends that the City collect a proportionate share of funding from the applicant to apply to the future project.

To mitigate the traffic impacts from the proposed subdivision until the Highway 43 Multimodal Transportation Project is constructed, ODOT recommends that the applicant be required to construct their proposed interim solution that includes restriping the highway with a northbound left turn pocket on the south leg of the intersection and a left turn refuge/storage area on the north leg of the intersection. Before design plans are submitted for review, the applicant must provide pavement coring samples from the shoulder of the highway (within the future travel lanes) to demonstrate that there is sufficient pavement to accommodate vehicular travel. Please coordinate with the District Contact below regarding the coring process.

All improvements within the State highway right of way are subject to the ODOT Highway Design Manual (HDM) standards. If design deviates from these standards, then a Design Exception is required to be submitted by a licensed engineer for review, and approval must be obtained from the State Roadway and Traffic Engineer. The proposed turn lane will likely require Design Exceptions that appear to align with the conceptual design for Highway 43 Multimodal Transportation Project. ODOT has approved a Design Concurrence for this project and will take that into consideration when reviewing Design Exceptions for the proposed interim turn lane. (Please note that if a Design Exception is required, it may take up to 3 months to process).

Permits and Agreements to Work in State Right of Way

☒ An ODOT Miscellaneous Permit must be obtained for all work in the highway right of way. When the total value of improvements within the ODOT right of way is estimated to be $100,000 or more, an agreement with ODOT is required to address the transfer of ownership of the improvement to ODOT. An Intergovernmental Agreement (IGA) is required for agreements involving local governments and a Cooperative Improvement Agreement (CIA) is required for private sector agreements. The agreement shall address the work standards that must be followed, maintenance responsibilities, and compliance with ORS 276.071, which includes State of Oregon prevailing wage requirements.

Note: If a CIA is required, it may take up to **6 months** to process.

All ODOT permits and approvals must reach 100% plans before the District Contact will sign-off on a local jurisdiction building permit, or other necessary requirement prior to construction.

Please send a copy of the Notice of Decision including conditions of approval to:

ODOT Region 1 Planning
Development Review
123 NW Flanders St
Portland, OR 97209

Region1_DEVREV_Applications@odot.state.or.us

Development Review Planner: Seth Brumley	503.731.8234, Seth.A.Brumley@odot.state.or.us
Traffic Contact: Avi Tayar, P.E.	503.731.8221
District Contact: James Nelson	971.673.2942