Addendum

Document Addended: December 2019 Canyon Park Subarea Plan and Planned Action Draft Environmental Impact Statement | Addendum Issued: July 9, 2020

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Introduction

This Addendum serves as an environmental document providing additional information and analysis regarding the December 2019 Canyon Park Subarea Plan and Planned Action Draft Environmental Impact Statement (Draft EIS). The Addendum does not substantially change the analysis of significant impacts and alternatives in the existing environmental document. It provides an overview of a Preferred Alternative in the range of the Draft EIS Alternatives. In response to requests, it includes information about land capacity methods, and it provides some transportation evaluation of private streets and an AM peak hour, both subjects that are not part of the City's adopted levels of service or Draft EIS thresholds of significance; however, the information can assist the subarea planning process, development of alternative levels of service policies, and general transportation circulation and operations in the study area consistent with the City's municipal code and design standards and specifications approach to inadequate road conditions. As well, an analysis of transit options is provided in response to Draft EIS mitigation measures addressing transit and to address overall congestion on the City's corridors subject to the corridor LOS.

Alternatives Considered

DRAFT EIS ALTERNATIVES AND PREFERRED ALTERNATIVE

The EIS considers a range of alternatives that illustrate how to implement the community's vision for an economic and multi-faceted center that respects the natural environment and provides multiple modes of travel. The Draft EIS alternatives and topics were developed based on a review of scoping comments and prior engagement results. The Preferred Alternative considers Draft EIS comments and public engagement results, and consideration of the vision and conditions and trends by the Planning Commission. The Draft EIS alternatives – No Action, Business Plus, Live/Work, and Live/Work Mitigated, are shared below along with the Preferred Alternative that will be evaluated further in the Final EIS pending Summer 2020. The Preferred Alternative is characterized in this Addendum since some of the transportation evaluation addresses it. The Preferred Alternative will be more fully addressed in the Final EIS with the range of environmental topics in the Draft EIS.

- No Action, a SEPA Required Alternative, assumes growth according to current trends. Between 2012 and 2018 the area appears to have added about 4,400 jobs, largely in existing buildings, and has generally achieved the 2035 job target. Residential permit applications and interest increased as well. Under current City Plans and development regulations, there is capacity to add another 4,500

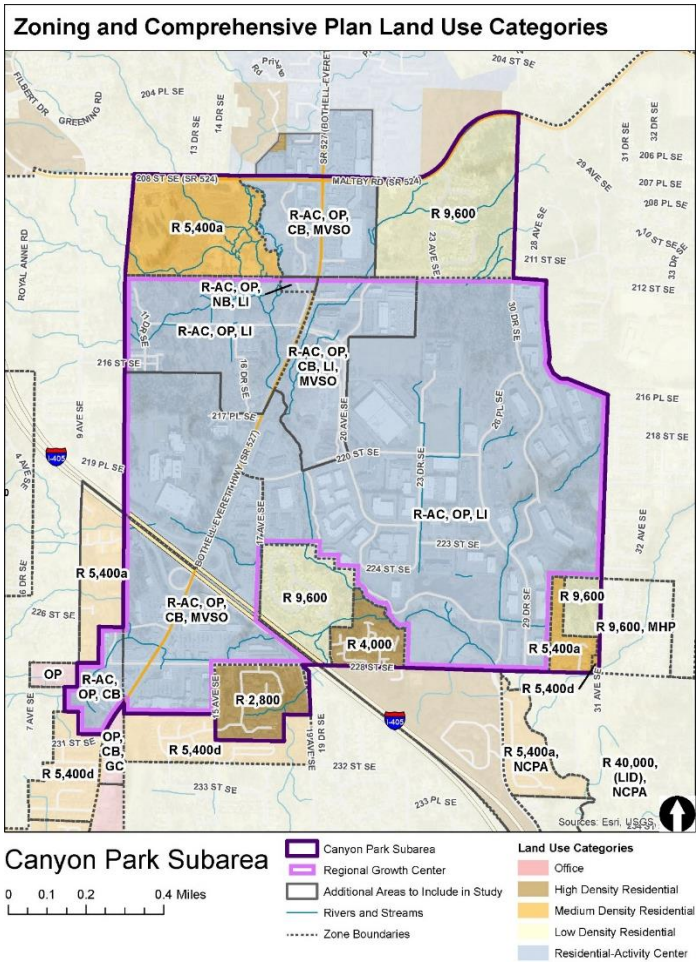
residents and about 4,800 jobs in new structures by 2035. This alternative retains current Future Land Use designations and zoning, which allow a mix of employment and residential uses through most of the study area. Current RGC boundaries are 733 acres and include areas of wetlands. The updated subarea plan, proposed revisions to the RGC boundary, incentives and regulations, investments in amenities and infrastructure, and planned action would not be adopted.

- The Business Plus Alternative would add about the same number of residents as the No Action Alternative (4,500) and a much higher number of jobs (17,350) by 2043/44. This alternative focuses most future growth in employment but allows select areas of mixed-use at shopping areas in Thrasher's Corner and to the southwest of I-405. Development evaluated includes revisions to (1) height allowances for mixed-use development, (2) minimum densities for residential uses, (3) minimum intensities for employment uses, and (4) parking standards for businesses and housing uses; added investments in transit, roads, bicycle pedestrian facilities, and trail connections; and transitions to newer stormwater standards. The RGC boundary would be revised to 613 acres to meet Puget Sound Regional Council Criteria. Amendments integrating the Subarea Plan would be made to the City's Imagine Bothell… Comprehensive Plan, development regulations, and capital plans.
- The Live/Work Alternative anticipates the greatest residential population capacity at nearly 7,200 and a substantial addition of jobs at nearly 15,300 by 2043/44. This alternative offers the most locations where mixed-use residential and retail or residential and office could be located. Revisions to development standards for both businesses and housing uses, and added investments in both infrastructure and amenities, are similar to the Business Plus Alternative. Revisions to the RGC boundary would be the same as the Business Plus Alternative. Amendments integrating the Subarea Plan would be made to the City's Imagine Bothell… Comprehensive Plan, development regulations, and capital plans.
- "Mitigated" Live/Work Alternative: To explore additional mitigation of impacts, a "Mitigated" Live/Work Alternative has been developed with a smaller RGC boundary of 565 acres, and 25% lower growth. It also includes greater transportation demand management measures, greater infrastructure investments, and level of service (LOS) policy options. It reduces impacts and is in the range of the Business Plus and Live/Work alternatives.
- The Preferred "Middle Ground" Alternative combines elements of the Draft EIS Alternatives. It is similar to the Mitigated Live/Work with a smaller RGC boundary, and a land use pattern that allows for targeted mixed uses at existing shopping centers and along the Bothell-Everett Highway. Some blocks emphasize office uses near I-405 and closer to the business park, similar to the Business Plus Alternative. Areas outside the RGC would retain their No Action zoning. Similar to the Mitigated Live-Work Alternative the Preferred "Middle Ground" Alternative includes greater transportation demand management measures, greater infrastructure investments, and level of service (LOS) policy options. It has a larger share of residential growth similar to the Live/Work Alternative and job growth similar to the Mitigated Live/Work Alternative. There is a near 1:1 jobs/housing balance under the Preferred Alternative that reduces trips compared to the other action alternatives.

LAND USE PATTERN

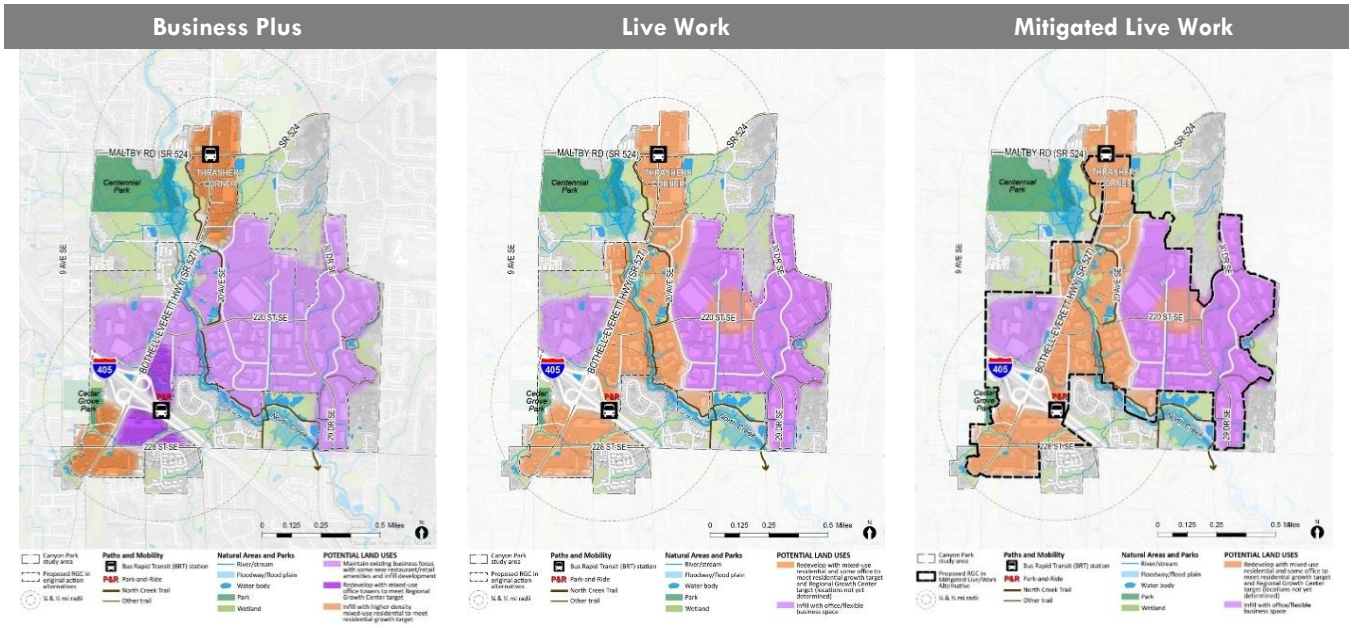
The **No Action Alternative** would retain current Future Land Use designations and zoning. Current zoning allows a mix of employment and residential uses through most of the study area, as shown in Figure 1. Action alternatives illustrated in Figure 2 and identify different areas of mixed use and business focused areas. The **Preferred Alternative** land use pattern blends the proposals of the Business Plus Alternative and Live/Work & Mitigated Live/Work Alternatives as illustrated on Figure 3.

Figure 1. Current Comprehensive Plan and Zoning Map



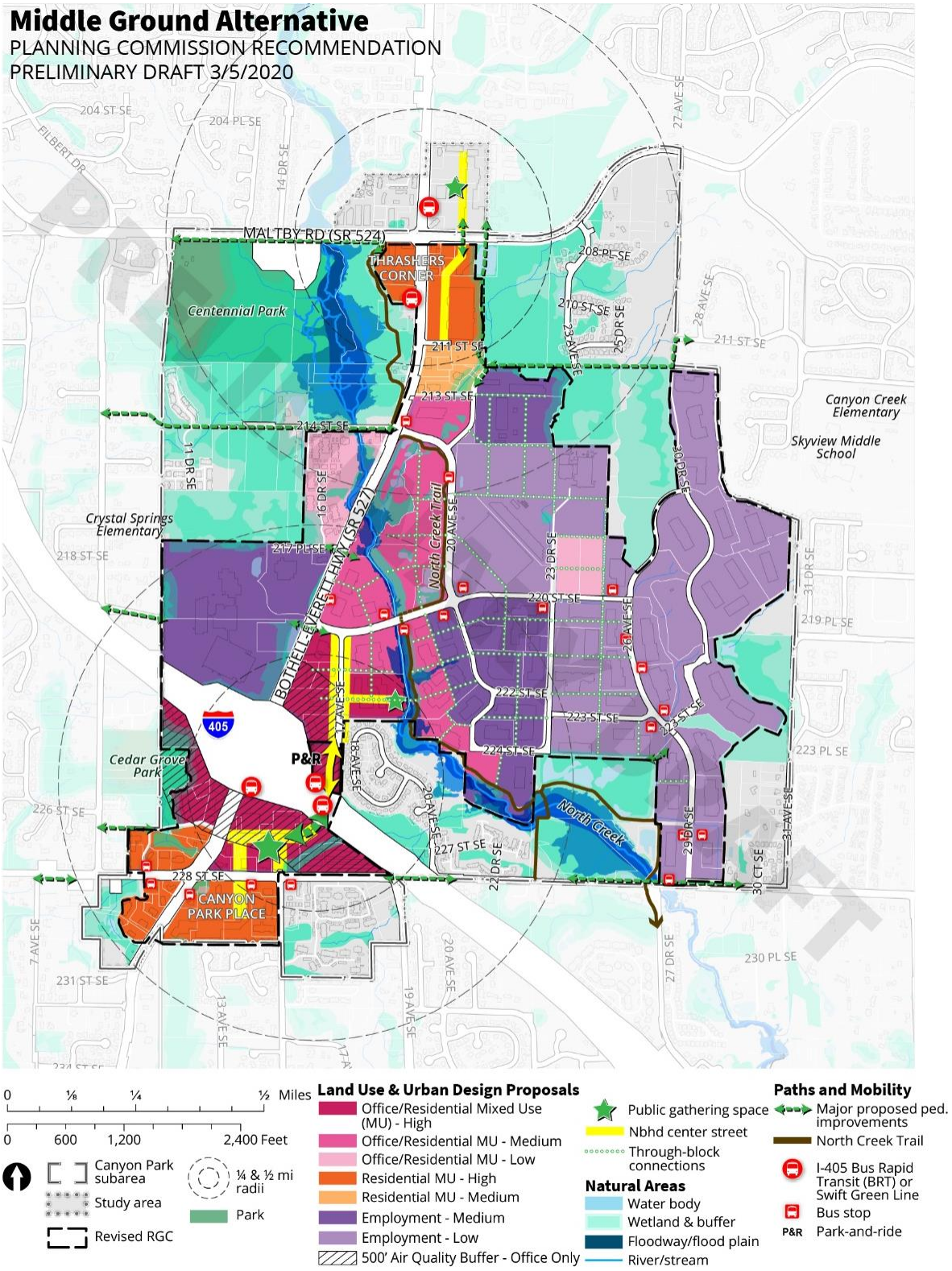
Source: City of Bothell, 2019; BERK 2019.

Figure 2. Draft EIS Alternatives – Business Plus and Live/Work and Mitigated Live/Work



Source; MAKERS, 2019.

Figure 3. Preferred "Middle Ground" Alternative – Draft

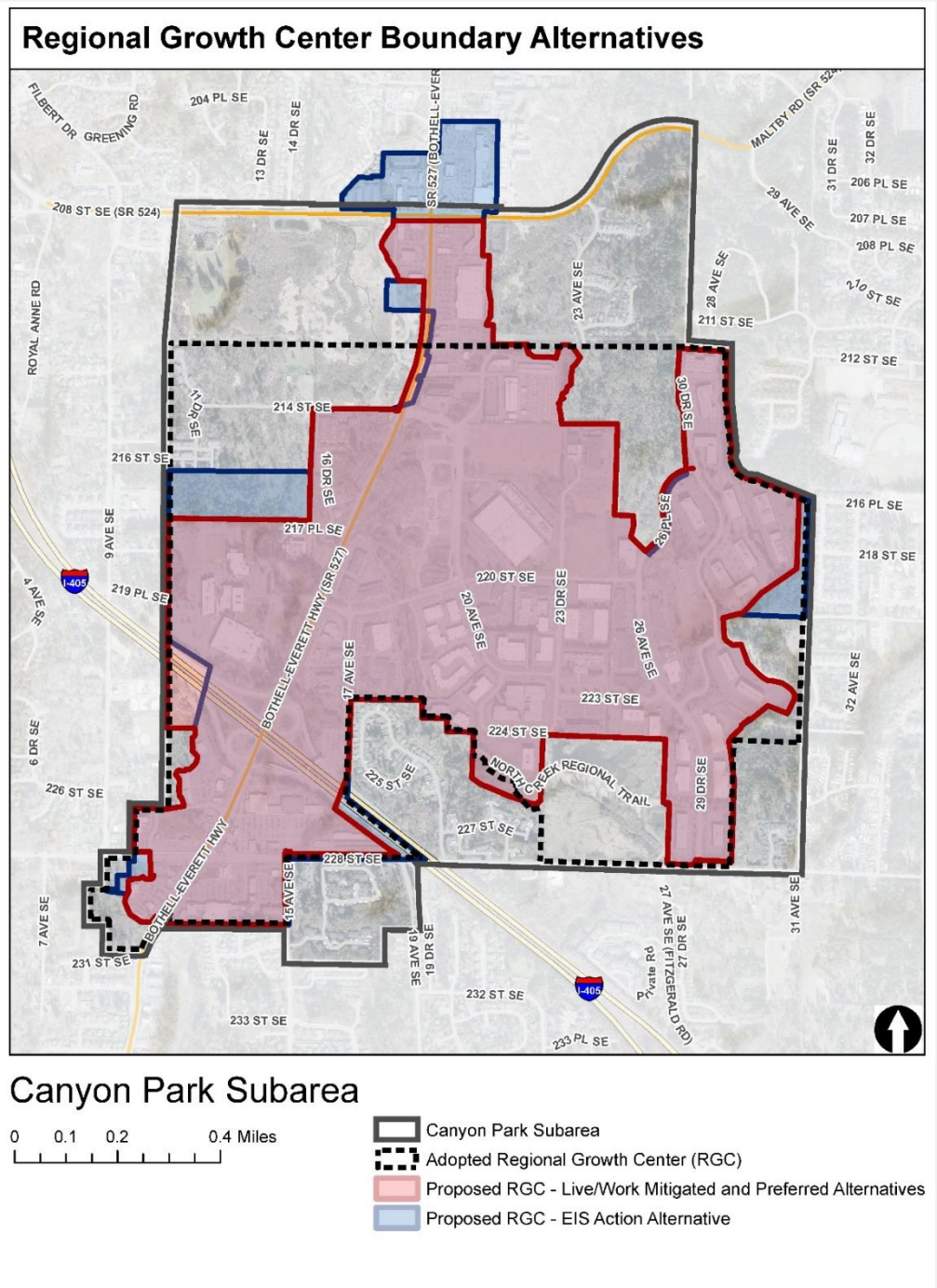


Source; MAKERS, 2020.

REGIONAL GROWTH CENTER BOUNDARIES

The Preferred Alternative addresses the smallest RGC boundary studied similar to the Mitigated Live/Work Alternative at 565 Acres and less than the Business Plus or Live/Work Alternatives at 613 acres or the No Action Alternative at 733 acres. See Figure 4.

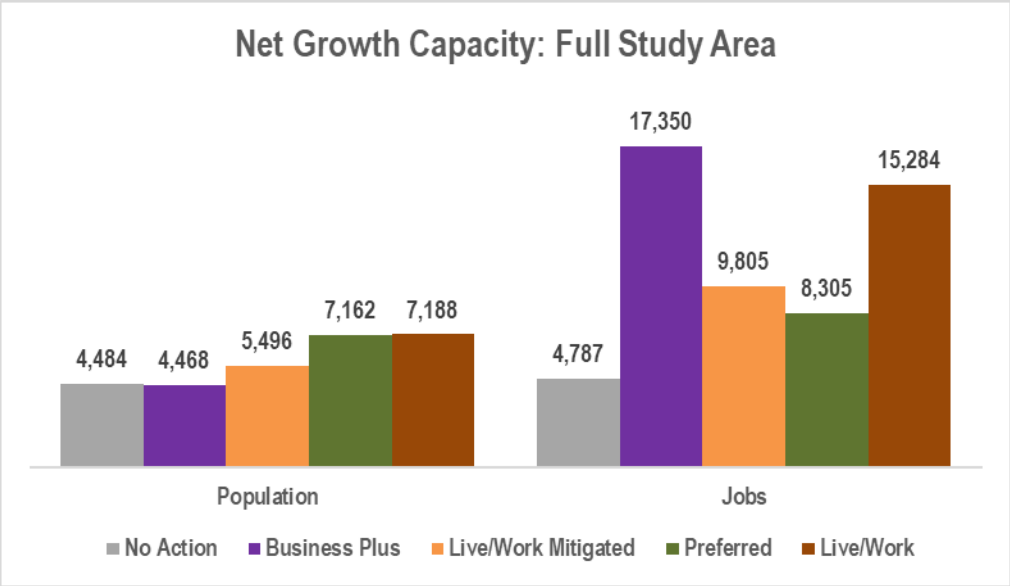
Figure 4. Comparison of RGC Boundary Alternatives



Source: City of Bothell, 2019; BERK, 2019.

Similar to other studied alternatives, the Preferred Alternative would reinforce the Canyon Park Study Area as an employment center with diverse housing choices. While the Business Plus alternative focuses to the greatest degree on employment land uses, the other Action Alternatives focus on both housing and employment land uses particularly the Live/Work Alternative followed by the Preferred Alternative. All Action Alternatives increase employment opportunities as well, with the greatest under the Business Plus Alternative and followed by the Live/Work Alternative. The Preferred Alternative provides jobs at a level similar to but a little less than the Mitigated Live/Work Alternative. There is a greater balance of expected population and jobs similar to but greater than the No Action Alternative. See Figure 5.

Figure 5. Net Growth—All Alternatives



Source: BERK, 2019.

Environmental Information

LAND USE CAPACITY

Since the December 2019 Draft Environmental Impact Statement (Draft EIS) buildable lands mapping and analysis has been updated and the method is addressed in Attachment A. The analysis addresses parcels evaluated in 2015 as redevelopable by 2035 in the County and City analysis of the 2015 *Imagine…Bothell* Comprehensive Plan Update that zoned more land for mixed uses. The analysis also updates 2012/2015 analysis with more recent Assessor data. It also corrects the location of partially-used properties compared to the Draft EIS that due to a formula error had not included total square feet for properties with multiple buildings.

Based on current zoning and the updated buildable lands analysis, the No Action Alternative could accommodate about 4,484-4,847 residents in the full study area and about 4,787-4,804 jobs including the full study area. The higher range results are the updated capacity estimates addressed in Attachment A, and the lower range estimates were included in the December 2019 Draft EIS. As a slightly lower bookend the December 2019 Draft EIS results are continued the in the SEPA process, but the updated capacity results are presented for comparison.

A comparison of capacity results for all alternatives is presented below in Table 1. The Business Plus Alternative has a similar capacity for about 4,000 residents and a much higher number of jobs at 17,350 compared to the No Action Alternative. The Live/Work Alternative would have a greater residential population of nearly 7,200 and high job count at nearly 15,300. To explore additional mitigation of impacts, a "Mitigated" Live/Work Alternative was been developed with lower growth as described above. The Preferred Alternative has a capacity for housing similar to Live/Work and a job capacity similar to but lower than the Mitigated Live/Work Alternative. Under all alternatives, nearly all the growth would be in the RGC, as shown in Table 1.

Table 1. Housing, Population, and Jobs—Net Growth

	REGIONAL GROWTH CENTER (RGC)*				FULL STUDY AREA			
Alternative	**Dwelling Capacity**	**Population Capacity**	**Job Capacity**	**Total Activity Units**	**Dwelling Capacity**	**Population Capacity**	**Job Capacity**	**Total Activity Units**
No Action EIS Assumption**	1,856	3,712	4,530	8,242	2,242	4,484	4,787	9,271
No Action: Capacity Amended**	2,029	3,713	4,430	8,143	2,654	4,847	4,804	9,651
Mitigated Live/Work	2,816	4,225	9,458	13,683	3,614	5,496	9,805	15,302
Preferred	4,075	6,142	7,598	13,740	4,687	7,162	8,305	15,467
Business Plus	2,687	4,012	17,209	21,221	2,915	4,468	17,350	21,818
Live/Work	4,498	6,732	15,143	21,875	4,726	7,188	15,284	22,472

*Note: *See Figure 4 and associated text. No Action Alternative RGC boundaries equal 733 acres. The Business Plus and Live/Work Alternatives have a RGC boundary encompassing 613 acres. The proposed boundary in the Mitigated Live/Work Alternative encompasses 565 acres.*
*** Updated capacity assumptions are shown for comparison. As a slightly lower bookend for the overall study area, the No Action EIS assumptions are continued in the SEPA process.*
Source: MAKERS, 2020; BERK, 2020.

TRANSPORTATION

Additional transportation analysis was completed to respond to comments and questions for the Preferred Alternative, which would generate the lowest new PM peak hour trips compared to other Action Alternatives in the draft EIS. The Preferred Alternative was evaluated with and without the 214th Street extension. In addition, limited AM analysis and private streets analysis address public comments and an exploration of inadequate road conditions but are not related to the City's adopted corridor LOS. Transit is reviewed to meet some of the mitigation goals expressed in Draft EIS and to better understand its effect on the City's adopted corridor LOS standard. The list of transportation mitigation projects assumed in the analysis is shown in Figure 6, and are similar to the mitigation proposed for the Mitigated Live/Work Alternative.

Figure 6. Preferred Alternative Network Map

Source: Fehr & Peers, 2020.

Figure 6 Key

No.	Project	Description
	Comprehensive Plan or WSDOT Projects	
C-1	9th Ave SE Widening: 228th St SE to SR 524	Upgrade road to a Collector road standard (3-lanes) with improved pedestrian/bike facilities. At 9th Ave SE and SR 524 add a second northbound left turn lane.
C-2	North Creek Trail – Section 4	Complete the missing link along SR 524 between current trail and Filbert Rd.
C-3	SR 527 (211th St SE to north of SR 524)	Add a third northbound through lane. Add a southbound left turn lane at SR 524 (2 left). Also known as SR 527/SR524 Intersection Improvements.
C-4	214th St SE & SR 527	Re-channelize the westbound through/left lane to a through/right lane. Replaced by project #M-4.
C-5	SR 527: Add a southbound lane between SR 524 and 220th St SE	Add a third southbound lane, and associated intersection revisions.
C-6	220th St SE and SR 527 Intersection	WSDOT planned intersection improvements as part of project #C-7 including a northbound right turn lane, dual southbound left turn lane, and additional westbound right turn lane.
C-7	WSDOT I-405, SR 522 Vicinity to SR 527 Express Toll Lanes Improvement Project	Add one ETL in each direction of I-405 between south of SR 522 and SR 527, as well as build direct access ramps at SR 522 and near SR 527 at 17th Avenue SE. Includes improvements to 17th Ave SE including a cycle track on the east side of 17th Ave, and at 220th St SE / 17th Ave SE and 220th St SE / SR-527 intersections. Funded.
C-8	WSDOT I-405, SR 527 to I-5 Express Toll Lane Project	Add one ETL in each direction of I-405 between SR 527 and I-5. Currently unfunded.
C-9	228th St SE & Fitzgerald Rd intersection	Adds eastbound right turn pocket.
C-10	228th St SE & 29th Dr SE intersection	Adds westbound right turn pocket.
C-11	228th St SE / 31st Ave SE Intersection	Add a westbound dedicated right turn lane.
C-12	Fitzgerald Rd: 240th St SE to 228th St SE	Widen road and add curb, gutter, and sidewalks.
	Mitigation Projects	
M-1	SR 527 & SR 524 Intersection	Modify the SR 524 (Maltby Rd) and SR 527 intersection to include two westbound left turn lanes and two westbound through lanes.
M-2	20th Ave SE Extension	Extend 20th Ave SE to SR 524 including a new traffic signal at SR 524.
M-3	214th St SE Roadway Extension	Extend 214th St SE west to 9th Avenue SE, including a traffic signal at 9th Ave SE and pedestrian/bicycle facilities.

No.	Project	Description
M-4	214th St SE & SR 527	Add channelized westbound right turn lane and dual westbound left turn lane. Replaces project #C-4.
	Other Operational Improvement Projects	
O-1	219th Place Extension	Allow private property owners to improve 219th Pl SE to 9th Avenue SE and open access to the properties northwest of the I-405/527 interchange.
O-2	17th Ave SE/220th St SE Intersection	Monitor traffic conditions at the 17th Ave SE/220th St SE intersection. Evaluate traffic signal timing/signal coordination changes as business park redevelops. Consider intersection improvements such as add westbound dual left-turn lanes and a new southbound receiving lane on 17th Ave SE if needed as redevelopment occurs.
O-3	North Creek Trail - 220th St SE	Complete missing North Creek Trail connection on north side of 220th Street.
O-4	Internal Street Intersection Improvements	Monitor traffic conditions and install new traffic control such as signal or roundabout for three intersections in the CPBC if warranted. Also monitor if increased capacity is needed on 220th St SE east of 20th Ave SE.
O-5	220th St SE Shared-use Path	Construct shared-use path on north side of 220th Street SE between the North Creek Trail and 26th Ave SE
O-6	26th Ave/29th Drive SE Bicycle Facility	Re-channelize road to 3-lanes and construct an on-street bike facility on 26th Ave/29th Drive between 228th Street SE and 220th Street SE.

Future Exploration or Study

1. Work with WSDOT to pursue and expedite the plan for ETL and bus access on the south side of I-405.
2. At Bothell Everett Highway and 228th St SE study the feasibility of a "displaced left turn lane" intersection concept.

PM Peak Hour Trips

The City's LOS is based on PM peak hour traffic operations along corridors. The Draft EIS also reviewed growth at three main entrances to the subarea and business park. The Preferred Alternative results in less PM peak hour trips than any of the Action Alternatives including the Mitigated Live/Work Alternative at the primary entrances to the subarea and business park. Generally, Preferred Alternative results would result in lower congestion along the corridors compared to the other action alternatives related to the City's PM peak hour standard. See Table 2.

Table 2. Estimated New PM Peak Hour Trips (In/Out/Total)— Alternatives by 2043/44

Area	No Action	FEIS Preferred Alternative	Mitigated Live/Work	Business Plus	Live/Work
1. Canyon Park Main Area	980 / 1,630 / 2,600	1,360 /2,120 /3,480	1,670 / 3,120 / 4,790	1,490 / 4,300 / 5,790	2,800 / 4,860 / 7,660

Area	No Action	FEIS Preferred Alternative	Mitigated Live/Work	Business Plus	Live/Work
2. South of I-405/SR 527 Interchange	560 / 620 / 1,180	630 /680 /1,310	560 / 580 / 1,140	1,030 / 1,200 / 2,230	1,080 / 1,130 / 2,210
3. Thrasher's Corner/North of SR 524	90 / 80 / 170	120 /100 /220	330 / 280 / 610	560 / 480 / 1,040	560 / 480 / 1,040
Total	**1,630 / 2,330 / 3,960**	**2,110 /2,900 /5,010**	**2,560 / 3,970 / 6,530**	**3,080 / 5,980 / 9,060**	**4,430 / 6,470 / 10,900**

- New PM Peak Hour Vehicle Trip Generation (MXD+ Tool).
- Assumes a 14% reduction in Vehicle Trips with TDM Strategies.

Source: Fehr & Peers, 2020.

214th Street Extension

The roadway extension was proposed to provide a more connected arterial street network within the subarea. 9th Avenue SE is a collector arterial and the City's Comprehensive Plan includes a project to upgrade the corridor to a 3-lane collector road with sidewalks and bike lanes. The new 214th Street connection would distribute peak hour traffic and enable 9th Avenue SE to serve as a north-south alternative route to the very congested SR 527 corridor for some travelers. It should be noted that most vehicles using this new connection would not be destined for I 405, as that would require significant out of direction travel, as opposed to staying on SR 527. Vehicles are more likely to be traveling west on 228th Street SE or SR 524. The Preferred Alternative was evaluated with and without the 214th Street extension between SR 527 and 9th Avenue SE during the PM period. The 2043 PM peak hour corridor LOS results are shown below in Table 3.

Table 3. 2043 PM Concurrency Corridor LOS Results for the Preferred Alternative

Corridor	With 214th Street Extension	Without 214th Street Extension
SR 524	E (63)	E (76)
SR 527	E (71)	**F (89)**
228th St SE/SW	E (62)	E (68)

Fehr & Peers, 2020. Both scenarios assumed the new 20th Avenue SE/SR 524 intersection is added to the SR 524 concurrency corridor. The 219th Place connection between Philips parking lot and 9th Avenue SE was also assumed, but the 228th Street widening was not included. No BAT lanes were assumed on SR 527.

Under the Preferred Alternative, the SR 524 and SR 527 concurrency corridors would meet the LOS E standard with the 214th Street SE extension. Several individual intersections, however, are expected to operate at LOS F on the SR 527 corridor: 220th Street SE, I-405 northbound ramp, and 228th Street SE intersections. The Preferred Alternative corridor delays are within the range of findings in the DEIS as the corridor delays are lower than the No Action Alternative (where SR 524 and SR 527 corridors operate at LOS F) as it includes transportation mitigation projects, and lower than the Mitigated Live/Work Alternative as the proposed new PM peak hour trips is about 1,500 fewer trips compared to the Mitigated Live/Work Alternative.

The 214th Street Extension would increase 9th Avenue SE vehicle traffic by up to 400 vehicles during the PM peak hour on either end of 9th Avenue SE for a total of 800 more peak hour trips. There is increased traffic expected at the 9th Avenue SE/SR 524 and 9th Avenue SE/228th Street SE intersections, and delays are expected to increase for the 228th Street SE corridor, however the corridor would still meet the LOS E standard. The 214th Street extension would also provide designated non-motorized facilities to serve alternative transportation modes to and from the subarea, reduce congestion, and improve level of service.

AM Evaluation

The AM peak hour analysis is not required under the City's LOS standard as the highest traffic volumes are during the PM peak hour as evaluated in the Draft EIS. The additional limited AM peak period analysis was completed for the Preferred Alternative at nine selected intersections including the Canyon Park main entrances along SR 527, the I-405 ramp intersections, and on 9th Avenue SE. These locations were evaluated in response to comments received from WSDOT, the Canyon Park Business Owners Association, and community members who wanted to know more about the effects of Canyon Park Subarea growth and of a potential 214th Street Extension between SR 527 and 9th Avenue SE. The AM analysis also helps inform how the PM mitigation projects identified in the Draft EIS may perform during the AM peak hour with different traffic patterns.

All studied locations, including the three main business park entrances (220th Street SE/SR 527, 214th Street SE/ SR 527 and 228th Street SE/29th Drive SE), are expected to operate at LOS E or better with the exception of SR 527/SR 524 and SR 527/228th Street SE intersections. The AM analysis of the Preferred Alternative does not fundamentally change the Draft EIS conclusions as both locations were also expected to operate at LOS F conditions under the PM peak hour for the No Action Alternative and the Mitigated Live/Work Alternative. Evaluating these two locations during the AM period could be considered as part of future development operational requirements to identify if traffic improvements are needed at these locations.

In addition, the AM analysis was evaluated for both with and without the 214th Street extension. With the 214th Street extension traffic volumes are expected to increase along 9th Avenue SE, however the intersection operations at both the 9th Avenue SE/SR 524 and 9th Avenue SE/228th Street SE intersections would operate at LOS E. The I-405 ramp intersections are also expected to operate at LOS E or better during AM conditions. The I-405 northbound ramp is expected to operate at LOS F, as shown for the Mitigated Live/Work Alternative in the Draft EIS.

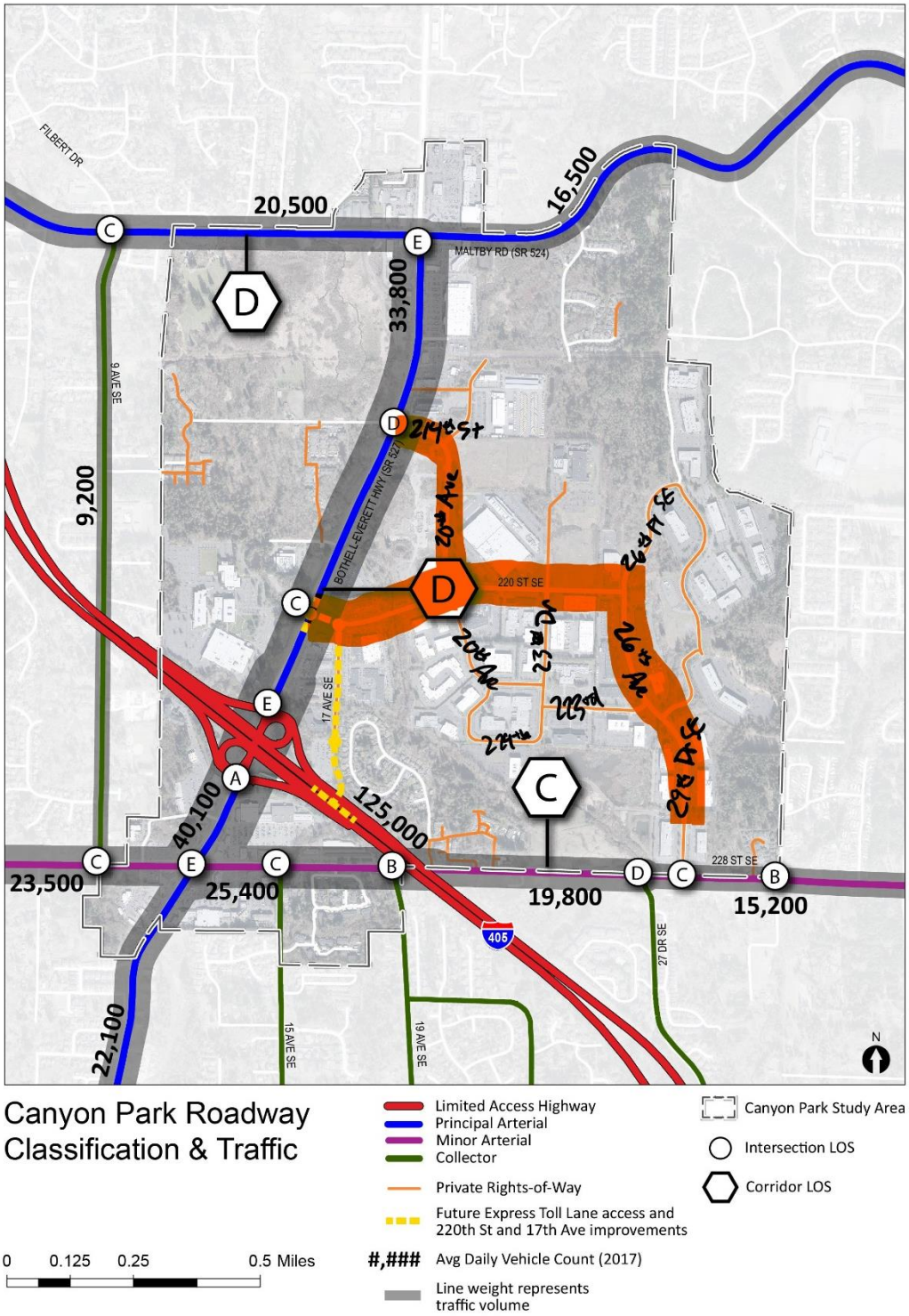
See Attachment C for additional information on the AM traffic analysis.

Private Streets Evaluation

Because business park trips largely funnel through the three main access points to the corridors under study, it was anticipated that the private street evaluation at the time of the Preferred Alternative development may show that conversion to public streets better distributes trips along a more complete network and connected network; if so, the overall traffic congestion results are likely to be similar to or slightly better than the range of results in the Draft EIS. The Preferred Alternative is expected to generate the fewest new PM peak hour trips of all Action Alternatives and results are in the range of the Draft EIS; see Table 2.

The Draft EIS noted that the City's LOS standards are corridor based and address the PM Peak hour. The Draft EIS assumes with Action Alternatives that selected private streets would become public streets in the future following improvement to public standards. A letter of intent is under discussion between the City and the Canyon Park Business Owner Association. These streets are identified on Figure 7. When public, the streets would not be part of the City's corridor LOS standards as that is applied to higher functional class corridors. However, the City has committed to evaluate the private streets at the time of the Preferred Alternative. When the streets become public, the City could track operation and safety conditions such as through its municipal code and design standards and specifications approach to inadequate road conditions.

Figure 7. Potential Future Public Streets Map



Source: Makers 2020.

Private Street Capacity and Traffic Control

The main spine road includes the east-west 220th Street SE, the north-south 26th Avenue SE/29th Drive SE, and 214th Street SE/20th Avenue SE between Sr 527 and 220th Street SE. The new PM peak hour

traffic volumes generated under the Preferred Alternative were roughly assigned onto the internal street network to estimate vehicle-to-capacity (v/c) ratios along the internal streets, as well as to identify if potential intersection control changes would be needed at full build-out. The actual assignment of new PM peak hour trips is somewhat speculative as development and driveway access may change in the future, however the approximate peak hour trips on each roadway segment was used to estimate the v/c ratio on each roadway segment. A v/c ratio over 1.0 indicates that vehicle demand is higher than roadway capacity and congestion would occur. The forecasted link volumes are likely conservatively high as vehicles trips are assigned to the main access driveways, while in reality there are smaller parking lot driveways and access points along 220th Street SE and 26th Avenue SE/29th Drive SE that may decrease vehicle demand at the internal four intersections studied:

1. 20th Avenue SE/220th Street SE
2. 23rd Avenue SE/220th Street SE
3. 26th Avenue SE/220th Street SE
4. 223rd Street SE/26th Avenue SE/29th Drive SE

To accommodate the Preferred Alternative growth, the 220th Street SE road should be 4-5 lanes. Traffic monitoring should be completed as the business park redevelops to identify if an added lane on 220th Street SE is needed east of 20th Avenue SE, where it is currently 3 lanes. The 26th Avenue SE/29th Drive SE would be near capacity under the current cross-section. A road diet to a 3-lane road to provide in-street bike facilities would increase the v/c ratio over 1.0. Vehicle trips however are likely to distribute to other local streets such as 223rd Street SE/23rd Avenue SE to avoid 26th Avenue SE during peak period congestion if possible.

Intersection Control

Within the private street network, an intersection traffic control change such as a traffic signal or roundabout would likely be needed at three intersections: 20th Avenue SE/220th Street SE, 26th Avenue SE/220th Street SE, and 223rd Street SE/29th Drive SE under the Preferred Alternative. Periodic traffic monitoring and a traffic engineering study would be needed to identify if and when an intersection control change is warranted at these locations. The draft WSDOT study, which assumed land use growth similar to the No Action Alternative, also expected a potential need for intersection control changes as the 20th Avenue SE, 23rd Avenue SE, and 26th Avenue SE intersections on 220th Street SE were expected to operate at LOS F in the future during one or both peak periods under current stop control configuration.

The 17th Avenue SE/220th Street SE intersection was also evaluated in the separate WSDOT I-405 Direct Access Ramp study and expected this intersection to operate at LOS C for both AM and PM peak hours. Under the Preferred Alternative, the lowest growth of all the Action Alternatives, this intersection is expected to operate at LOS F during both peak periods. This is a combination of the higher land use growth overall in the Preferred Alternative as well as the higher land use growth located closer to the Canyon Park park-and-ride (accessible from 17th Avenue SE only) compared to the No Action land use assumptions.

Potential improvements to address future inadequate road conditions could include traffic signal timing improvements such as increasing cycle lengths for both time periods. For the AM peak hour, the intersection could operate better with dual westbound left turn lanes and a new southbound receiving

lane on 17th Avenue SE, however widening the intersection would result in a more uncomfortable pedestrian environment as crossing distances increase.

Periodic traffic monitoring at 17th Avenue SE/220th Street SE intersection should be conducted as the business park changes and develops to identify if and when operational improvements such as signal timing/signal coordination with the adjacent SR 527/220th Street SE intersection (expected to operate at LOS F under the No Action and the Preferred Alternative) or other intersection improvements such as widening are needed to improve traffic operations. If an intersection widening/traffic operations improvement project is pursued as the business park redevelops, the City could apply its code and design manual requirements to address inadequate road conditions. See BMC 17.04.010 C and D and Bothell Design and Construction Standards, 2020 Update.

See Attachment C for additional information on the private streets traffic analysis.

Transit Facility Concepts

The SR 527 corridor peak hour congestion is expected to worsen in the future and there is a desire to improve transit access to and from the subarea. The Draft EIS identified some potential mitigation measures involving transit, as well as person-based service standards. In addition, a subarea visioning goal is for Canyon Park to be a regional transportation hub with its existing park-and-ride and bus rapid transit (BRT) service (existing *Swift* Green Line and planned Sound Transit I-405 BRT). Three potential transit facility concepts were explored at a high level for the subarea in Attachment D and summarized below:

- **Center Reversible Transit Only Lane** - the SR 527 corridor would be widened to construct a center transit only lane that would operate southbound in the AM peak period and northbound in the PM peak period to provide improved transit speed and reliability in the main commute direction. This concept is to limit widening of SR 527 corridor. Non-peak direction transit trips would travel with general-purpose traffic.
- **Outside Business Access Transit lanes** - convert the outside general-purpose lane to a BAT lane. This results in two general purpose lanes and a BAT lane in each direction. This would be a trade-off between decreasing general purpose capacity for increased transit speed and reliability to serve the subarea.
- **Internal Subarea Parallel Transit Corridor** - This concept would route transit off congested SR 527 to an internal transit corridor within the subarea. The route would be from the park-and-ride to 17th Avenue SE, 220th Street SE, and 20th Avenue SE along the new street extension to SR 524. A new signal at 2214th Street SE and 20th Avenue SE would assist transit access turning left from the 20th Avenue extension.

Each option was evaluated at a high level in terms of implementation needs, operations, and comparison of potential transit travel time. The internal parallel transit corridor has promise for local Community Transit routes with similar or slightly faster travel times than using SR 527 and could better serve people in the business park, however the *Swift* Green Line design principles is to operate on arterials. The Center Reversible Transit Only lane requires transit stops in the median so likely only the *Swift* Green Line would use it to limit widening for local stops on the corridor, however the dedicated transit facility would improve transit travel times.

In the long term, and pending support and a coordinated effort among regional partners—Community Transit, WSDOT, Snohomish County, City of Mill Creek, and City of Everett—is for Business Access and Transit (BAT) lanes through Bothell and Snohomish County by converting the outside general purpose lanes. Bothell strongly supports this long-term goal to best leverage the regional investment in a robust, functioning, and comprehensive transit system. It is noted that with the reduced vehicle capacity on SR 527 with the BAT lanes, the corridor would not meet its LOS E corridor standard. The SR 527 corridor can only meet its LOS E standard with the 214th Street extension and without outside BAT lanes converted from general purpose lanes. A policy change would be needed to either accept higher levels of corridor delay or exempt some intersections from the corridor. This would prioritize transit speed, reliability, and transit usage in the subarea over trying to "build your way out of congestion".

Attachment A: Land Capacity Updates

The 2015 analysis conducted by Snohomish County in consultation with the City was reported in the Comprehensive Plan and the Draft EIS in Tables 18 and 19.

At the time of the Draft EIS the tabular data from the County and City effort was available along with 2012 spatial data about land status (e.g. vacant, partially developed, etc.) was available. Snohomish County was provided a copy of the Draft EIS and made no comments.

Additional City and County coordination occurred following the Draft EIS Comment Period and the 2015 spatial data was provided by the County. In association with the 2015 Comprehensive Plan Update, it showed the County and City considered more lands for redevelopment by the year 2035 considering then new planning and zoning allowing for greater areas of mixed uses even if not qualifying as redevelopable or partially developed under the standard formulas in the 2012 report.

Considering the 2012 Buildable Lands Report assumptions informed by permit trends, pipeline projects, and other relevant considerations, the resulting land capacity is presented as a range. Compared to the Draft EIS results, the amended results are a little higher in capacity in the full study area but within 10% results. In the RGC, the capacity results are similar in both the Draft EIS and Amended results. The No Action Alternative assumptions in the Draft EIS are retained as a lower bookend comparison to the Action Alternatives for a conservative comparison.

Corrected information in the Draft EIS is noted in track changes below. The more detailed land capacity method is provided in Appendix B.

Buildable Land Capacity

Under the State of Washington Growth Management Act, each County and City is required to provide sufficient land capacity for added population to meet growth targets assigned by counties in consultation with cities. Many counties, including Snohomish and King Counties, also assign housing and employment targets.

The City of Bothell found that its 2014 Comprehensive Plan did not provide enough population capacity. In 2015, Bothell added opportunities for mixed-use development in the Canyon Park study area. The capacity for jobs and housing was increased by amending the zoning of portions of the study area to include the Residential-Activity Center designation, as shown in Table 18 and Table 19.

Table 18. Current Bothell Comprehensive Plan Population Capacity

County (portion)	2014 OFM[1] Pop. Est.	2035 Pop. Target (net)	Current (2014) plus target population	Pop. Capacity (2014 Pop. + Pop. capacity)	Pop. Capacity Surplus (+) or Deficit (-)	Canyon Park: *Additional population capacity*
King	24,610	6,495	31,105	35,263	+4,158	
Snohomish	17,020	6,940	23,960	20,406	-3,544	4,498
Total	**41,630**	**13,435**	**55,065**	**55,669**	**See note**	

[1] *Washington State Office of Financial Management*

Note: A total population capacity is not given for both combined counties, since surplus in one county cannot be used to offset a deficit in another county. All numbers in the above table are stated in terms of population (persons).

Source: City of Bothell, 2015.

Table 19. Current Bothell Comprehensive Plan Employment Capacity

County (portion)	Employment Target (2035) (additional jobs)	2035 Employment Capacity (surplus jobs [+] or deficit [-])	Canyon Park: Additional employment capacity	Expanded Red Barn Village
King	3,097	6,344 (+3,247)		
Snohomish	4,960	5,500 (+540)	753	807
Total	**8,057**	**11,844**	**753**	**807**

Note: Current employment figures are not shown due to the constantly changing nature of employment numbers.

Source: City of Bothell, 2015.

Most of the study area is fully or partially developed. A small amount of the study area is in active permit review, or in the "pipeline", and some lands are redevelopable or vacant. About one third of land in the study area is mapped as critical area and protected from alteration, as shown in Table 20.

Table 20. Canyon Park Property Buildable Land Status, Updated 2020

Property Status	Acres	Critical Area Acres
Developed/Constant	460.9 ~~472.5~~	213.4 ~~245.3~~
Partially-Used[1]	201.5 ~~352.4~~	42.4 ~~48.4~~
Pipeline[2]	43.1 ~~30.7~~	3.1 ~~3.1~~
Redevelopable[3]	195.9 ~~33.4~~	11.8 ~~2.7~~
Vacant	55.6 ~~45.8~~	30.9 ~~2.4~~
Total[4]	**957.0 ~~934.8~~**	**301.6 ~~302.0~~**

[1]Partially-Used: For commercial, industrial, and mixed-use zones, the floor area ratio is usually less than 25% and the building improvement to land value ratio is greater than 100%.

[2]Pipeline: Properties in permit review.

[3]Redevelopable: For multifamily, commercial, industrial, or mixed-use zoned or designated land, existing buildings valued at less than 100% of the land value are usually considered potentially redevelopable.
[4]Total acres are net parcel acres excluding public rights of way. With rights of way total acres are 1,037.
Source: Snohomish County Tomorrow, 2012; Snohomish County PDS 2015; Snohomish County Assessor, 2018; BERK, 2019 and 2020.

The *2012 Buildable Lands Report for Snohomish County* calculated capacity in the Canyon Park Study Area based on Vacant and Redevelopable Land. Redevelopable land includes parcels where the improvement value is less than 100% of the land value. As described above, the City added capacity for mixed-use development on Redevelopable land in its 2015 Comprehensive Plan.

Reviewing 2012 and 2015 County and City results ~~and maps available at the time, it appears that Partially Developed Land was not identified in the *2012 Buildable Lands Report* and not in the City's capacity analysis of its 2015 R-AC additions in the Canyon Park area~~areas updated with more recent Assessor data, the resulting buildable land is shown in Figure 36. The 2012 Buildable Lands Report defines Partially Developed land as developed to 25% of allowed building space even if building value exceeds more than 100% of the land value.

Figure 37 and Table 21 shows updated population and employment capacity conditions based on updated Snohomish County data (excluding critical areas and applying similar market availability factors as the 2012 report), and adding parcels the City and County evaluated in 2015 and addressing property information as of 2020. The resulting population capacity is similar to the City's results in 2015 (4,498 in Comprehensive Plan is similar to results in Table 21, less than 10% different) and the employment results are greater currently than studied in 2012 or 2015. Adjusting some of the assumptions about the share of property that could be used for residential and commercial in mixed-use formats could alter the results (e.g., greater population, less employment).

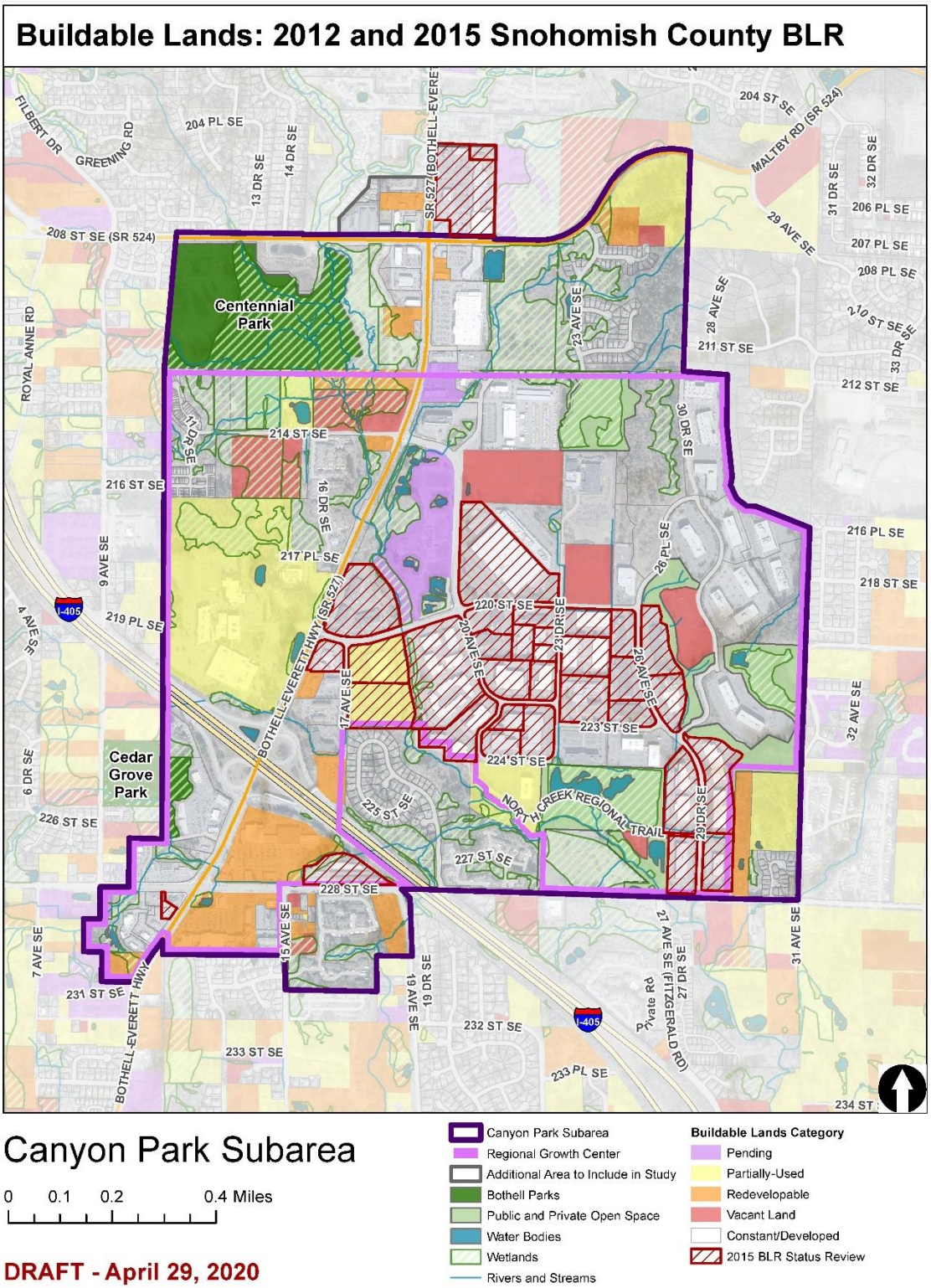
Table 21. Current Canyon Park Capacity Review

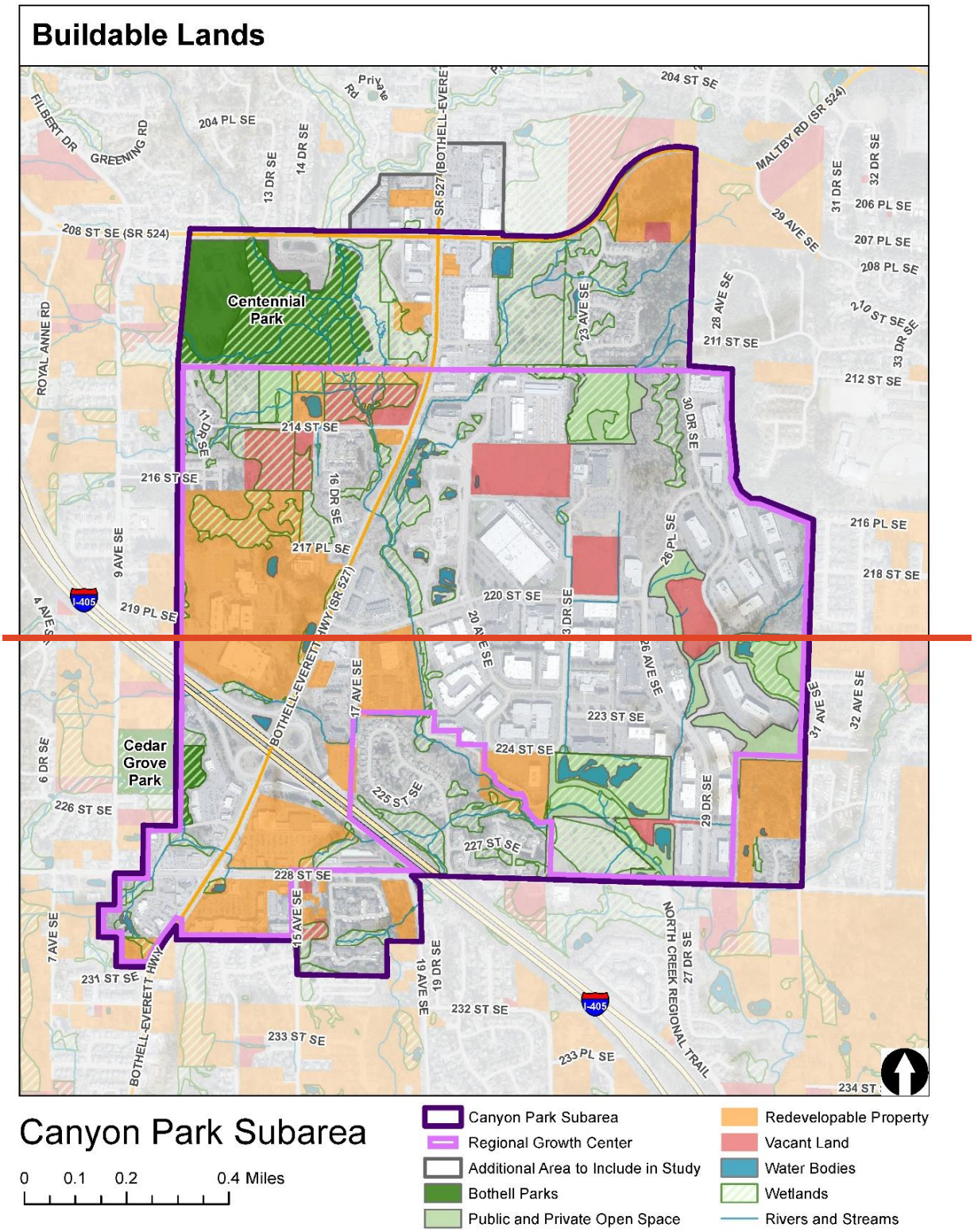
	Population Capacity		Employment Capacity	
	Full Study Area	RGC	Full Study Area	RGC
Redevelopable Land	1,856 ~~282~~	1,447 ~~124~~	2,306 ~~456~~	2,281 ~~401~~
Partially Developed Land	924~~2,192~~	344~~1,640~~	2,161~~3,877~~	1,881~~3,681~~
Pipeline Development	1,687~~1,836~~	1,687~~1,836~~	- ~~0~~	- ~~0~~
Vacant	380 ~~174~~	235 ~~108~~	337 ~~454~~	268 ~~405~~
Total	**4,847~~4,484~~**	**3,713 ~~3,708~~***	**4,804~~4,787~~**	**4,430 ~~4,487~~***

*Notes: *Reflects the adopted RGC boundary. ~~When the capacity estimates were applied to more refined blocks and transportation analysis zones the estimates rounded and were around 1% higher: 3,712 population (+4) and 4,530 (+43) but when considering the full study area, the numbers added to similar amounts.~~ This table reflects an updated and corrected land capacity analysis. The amount studied in the EIS is less than 10% different than these amounts and is a slightly lower bookend.*

Source: Snohomish County Tomorrow, 2012; Snohomish County Assessor, 2018; BERK, 2019.

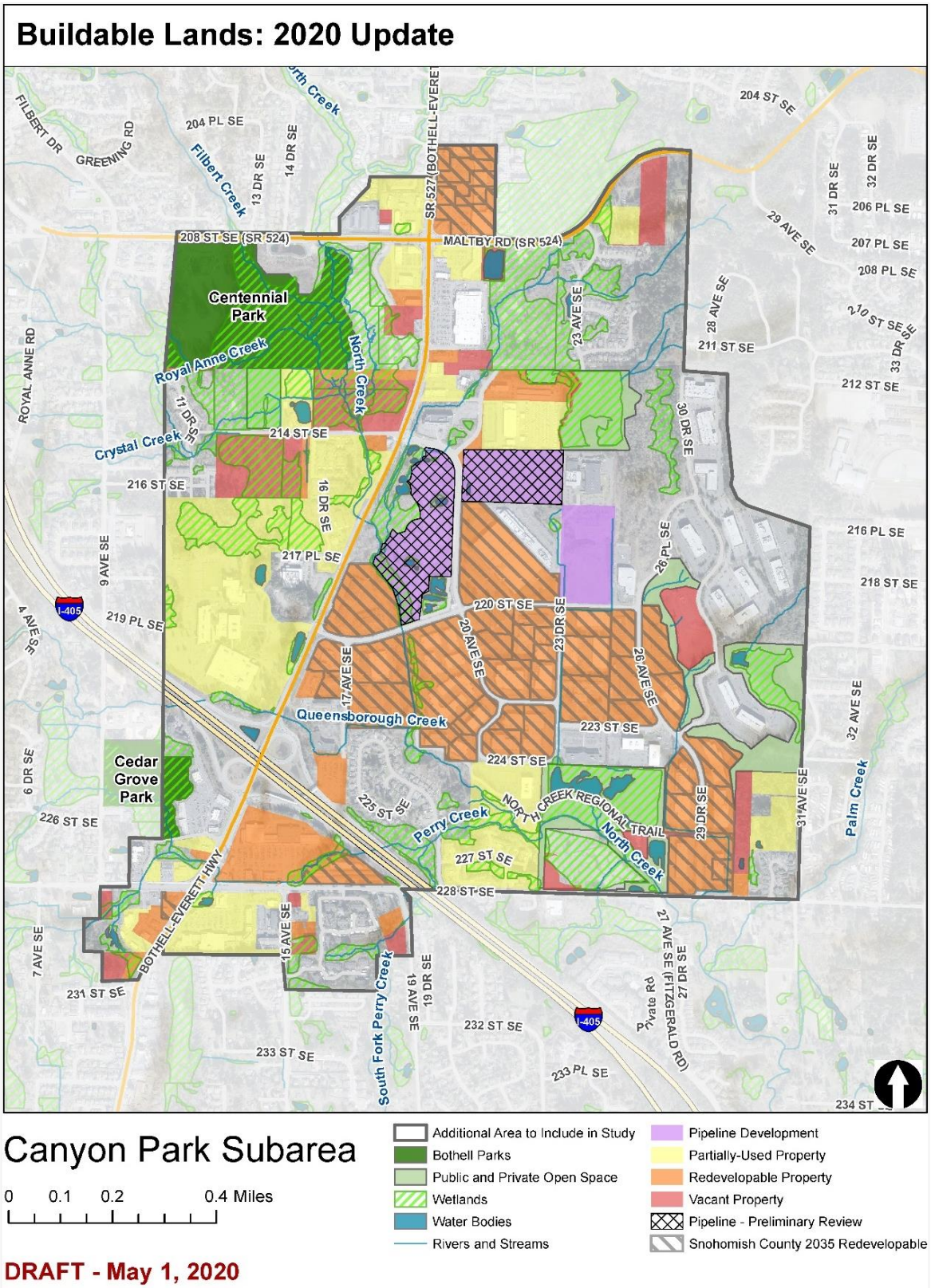
Figure 36. Canyon Park Buildable Lands, 2012 and 2015

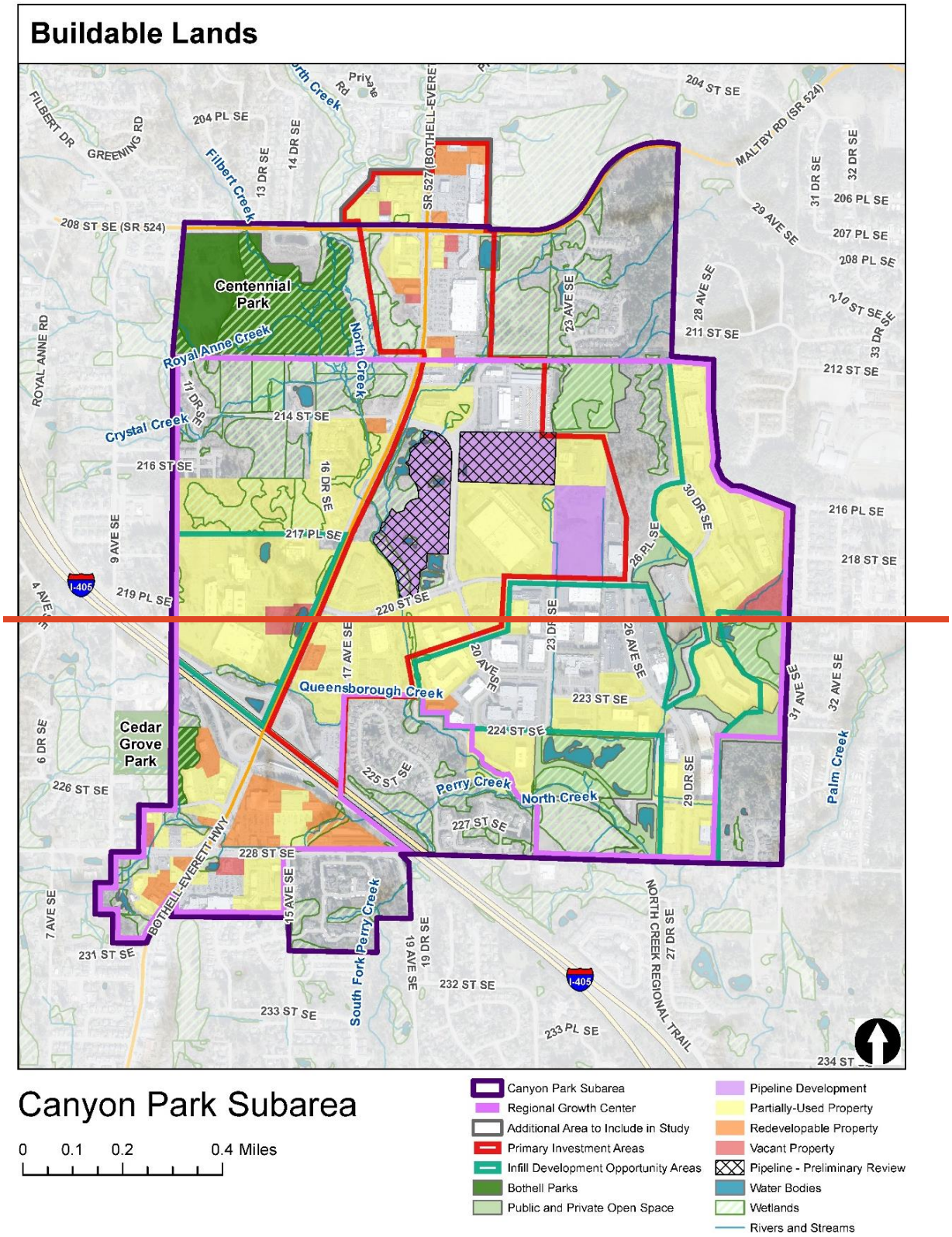




Source: Snohomish County Tomorrow, 2012; BERK, 2019.

Figure 37. Canyon Park Buildable Lands, ~~2018~~2020





Source: Snohomish County Tomorrow, 2012; Snohomish County Assessor, 2018; BERK, ~~2019~~2020.

Adding buildable land capacity to the Comprehensive Plan reported capacity, the maximum activity units per net acre by 2035 is projected to be about 31 in the present RGC boundaries.

Table 22. Activity Units, Current and 2035 Projected Current Comprehensive Plan

Activity Units	Regional Growth Center (RGC) Current	Regional Growth Center (RGC) 2035	Full Study Area Current	Full Study Area 2035
Population[1]	1,773	5,486~~5~~[4]	3,079	7,~~563~~926
Employment[2]	10,833	15,2~~3~~63[4]	11,767	16,~~554~~571
Gross Acres	733	733	1,037	1,037
Activity Units per Gross Acre	**17.2**	**28.34**	**14.3**	**23.6~~3~~**
Net Acres[3]	673	673	935	935
Activity Units per Net Acre	**18.7**	**30.8~~31.0~~**	**15.9**	**~~25.8~~26.2**

Notes/Sources:

[1]ESRI Business Analyst – 2018 population, accessed 2019.
[2]PSRC, 2017.
[3]Excludes non-parcel areas but retains private roads.
[4]~~The estimates of units for the current RGC reflect the 1% higher estimates that occurred when disaggregating capacity results across blocks and analysis zones.~~ See notes associated with Table 21.

Attachment B: Buildable Lands Methods

Bothell Canyon Park Subarea Plan Update and Planned Action

Land Capacity and Growth Assumptions Description

Background

The purpose of this document is to provide additional detail regarding assumptions and methods for the No Action and Action Alternative land use assumptions.

Under the State of Washington Growth Management Act, each County and City is required to provide sufficient land capacity for added population to meet growth targets assigned by counties in consultation with cities. Many counties, including Snohomish and King Counties, also assign housing and employment targets.

The City of Bothell found that its 2014 Comprehensive Plan did not provide enough population capacity. In 2015, Bothell added opportunities for mixed-use development in the Canyon Park study area. The capacity for jobs and housing was increased by amending the zoning of portions of the study area to include the Residential-Activity Center designation.

Pages 3-34 to 3-39 of the Draft EIS describe the City's 2015 Comprehensive Plan capacity results and updated capacity results prepared for the Bothell Canyon Park Subarea Plan and Planned Action Draft EIS in December 2019, particularly the No Action Alternative. Additional information is included in the Socioeconomics section of the Draft EIS (e.g. Tables 33 and 34).

The Action Alternatives considered land capacity results (e.g. partially used and redevelopable sites), but the results for those scenarios additionally consider Community Scoping Meeting Input including economic and urban design information (e.g. typologies) as described in Draft EIS Appendix A.

Results are intended to support the City in its efforts to meet Puget Sound Regional Council's Center's criteria for Regional Growth Centers and are expressed in the form of activity units – combined population and jobs). See more description in Section 3.2 of the Draft EIS, Land Use Patterns and Policies.

It should be noted that the focus of this document is on the current 2012 Buildable Lands Report methods as it relates to the current Comprehensive Plan/No Action Alternative. The County and cities are currently preparing an update to the Buildable Lands Report that is still in progress at the time of this writing. It should also be noted that the City will determine appropriate assumptions in the framework of the methodology update as part of its Comprehensive Plan Update due in 2024, and consider citywide results.

Land Capacity Approach

SNOHOMISH COUNTY 2012 BUILDABLE LANDS REPORT

In 2012, Snohomish County in consultation with cities produced a Buildable Lands Report. It was meant to support Comprehensive Plan Updates due by 2015. In summary, the steps include:

- Step 1: Buildable Lands Inventory (What land in the UGAs could be developed?)
- Step 2: Development History – Residential, Commercial and Industrial (What density actually happens in each zone?)
- Step 3: Capacity Calculations -- Assignment of Future Development Densities to the Buildable Lands Inventory (What is the land capacity as of 2011?)
- Step 4: Reductions for Uncertainty (How much of the land capacity is likely to be available for development by 2025?)
- Steps 5 & 6: UGA Growth Target/Capacity Comparisons (What are the growth targets, and is there enough land capacity?)

The report is available at the Snohomish County website:
https://snohomishcountywa.gov/1352/Buildable-Lands

The steps as applied to the No Action Alternative, representing the current Comprehensive Plan, are described below.

NO ACTION ALTERNATIVE

Step 1: Land Suitable for Development

Vacant, Redevelopable, and Partially-Used Land

BERK Consulting, Inc. obtained the buildable lands spatial layers from 2012, 2015, and updated parcel data from the Snohomish County Assessor. The revised analysis was conducted from January to May 2019, and corrected in February 2020. The effective base year is 2018.

Land was identified as one of the following:

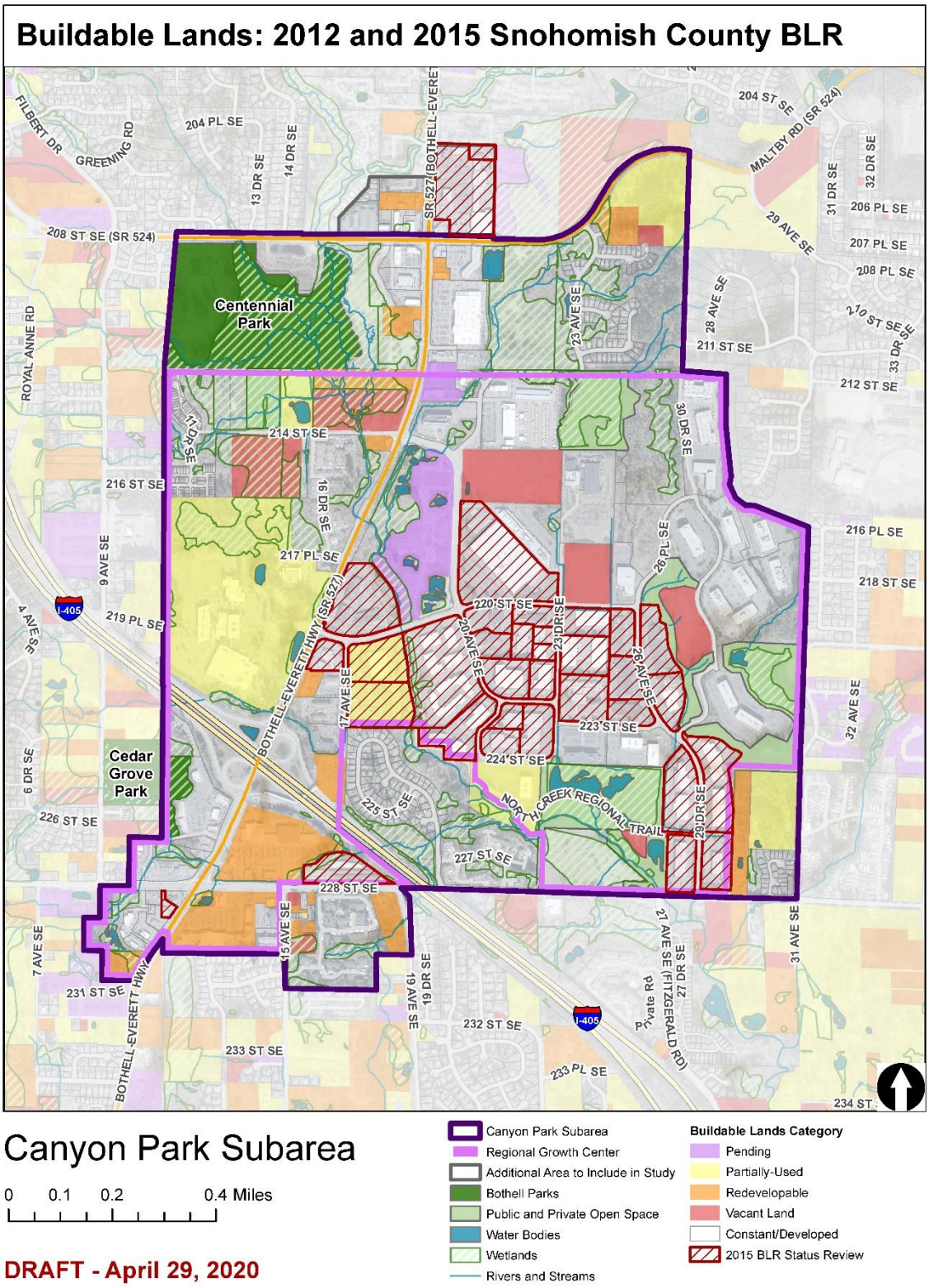
- Vacant: Generally those where the Assessor's building improvement value is less than $2,000.
- Redevelopable: For multi-family, commercial, industrial, or mixed-use zoned or designated land, existing buildings valued at less than 100% of the land value were considered potentially redevelopable.
- Partially Used: For commercial, industrial, and mixed-use zones, land developed to 25% of allowed building space even if building value exceeds more than 100% of the land value were considered partially-used.

Figure 1 has been corrected since the December 2019 Draft Environmental Impact Statement (Draft EIS) to distinguish redevleopable and partially-used properties rather than lumping them as redevelopable, and to show then pending development. In addition, Figure 1 shows parcels evaluated in 2015 as

redevelopable by 2035 in the County and City analysis of the 2015 *Imagine…Bothell* Comprehensive Plan Update that zoned more land for mixed uses. Figure 2 updates the 2012/2015 analysis with more recent Assessor data. It also corrects the location of partially-used properties compared to the Draft EIS that due to a formula error had not included total square feet for properties with multiple buildings.

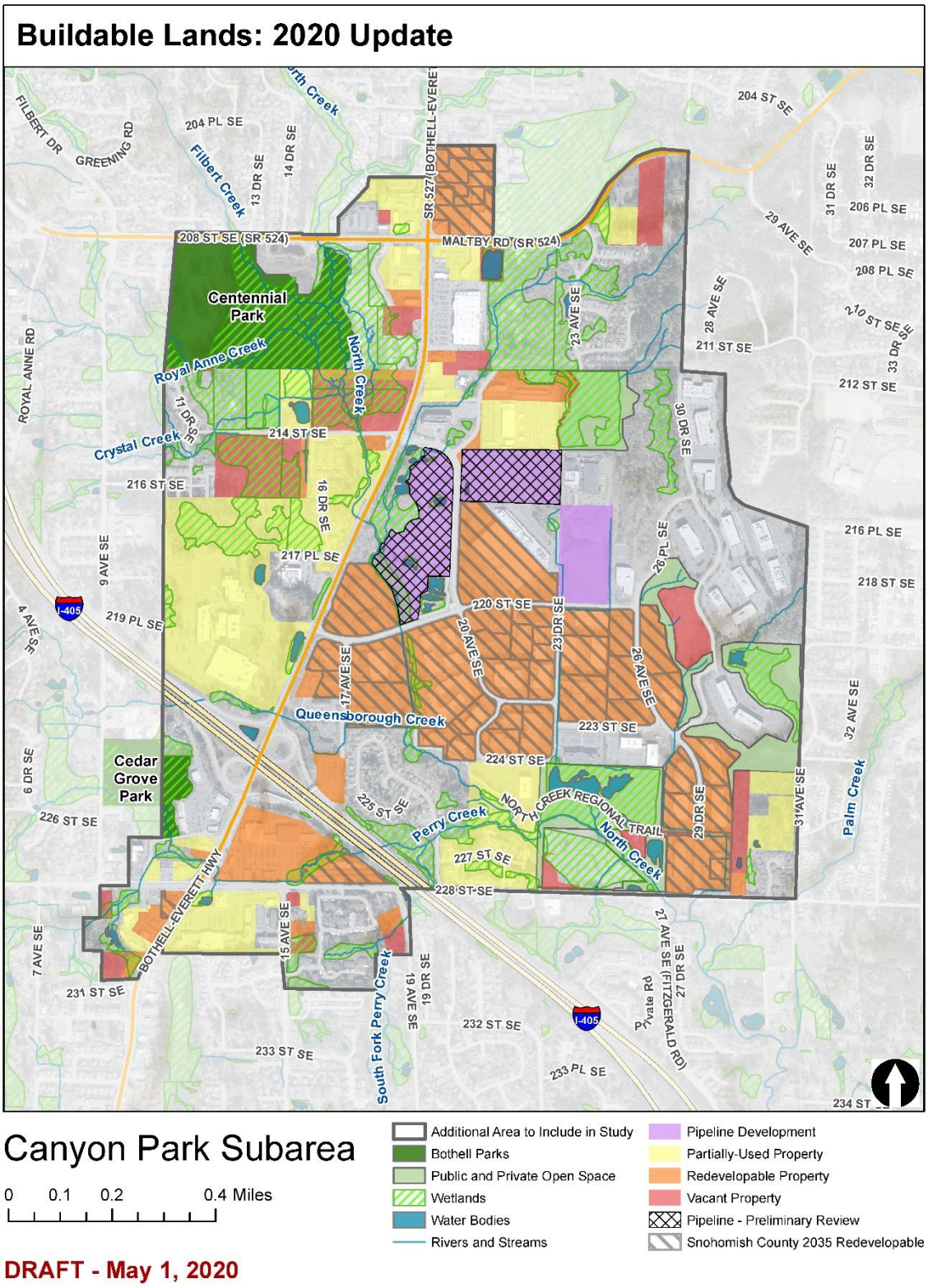
In both the 2012 Buildable Lands Report results and the more recent analysis for the Canyon Park Subarea Plan Update there is minimal vacant land in this urban area. In 2012, the results did not include much partially used land and more redevelopable land. By 2020, with more current land and improvement value information, a little more land is seen as partially used. In addition, more land is considered redevelopable by 2035. See Figure 1 compared to Figure 2.

Figure 1. Canyon Park Buildable Lands, 2012 and 2015



Source: Snohomish County Tomorrow, 2012; Snohomish County 2015; BERK, 2020.

Figure 2. Canyon Park Buildable Lands2020



Source: Snohomish County Tomorrow, 2012; Snohomish County Assessor, 2018; Snohomish County PDS 2015; BERK, 2020.

Critical Areas Deductions

Critical areas include lands important to protect for their functions and values such as wetlands, streams, and aquifers, or lands important to protect for public health and safety such as geologic hazards and floodplains. After the vacant, partially developed, and redevelopable land is summed, critical areas are deducted from the buildable land. Total acres and critical areas acres by buildable land status are reported in Table 1.

Table 1. Canyon Park Property Buildable Land Status, Updated 2020, Full Study Area

Property Status	Gross Acres	Net Acres	Critical Area Acres
Developed/Constant	460.9	247.5	213.4
Partially-Used[1]	201.5	159.1	42.4
Pipeline[2]	43.1	40.0	3.1
Redevelopable[3]	195.9	184.1	11.8
Vacant	55.6	24.8	30.9
Total[4]	**957.0**	**655.4**	**301.6**

[1]Partially-Used: For commercial, industrial, and mixed-use zones, the floor area ratio is usually less than 25% and the building improvement to land value ratio is greater than 100%.
[2]Pipeline: Properties in permit review.
[3]Redevelopable: For multifamily, commercial, industrial, or mixed-use zoned or designated land, existing buildings valued at less than 100% of the land value are usually considered potentially redevelopable. Also includes lands the County and City considered 2035 Redevelopable in the 2015 *Imagine…Bothell* Comprehensive Plan Update.
[4]Total acres are net parcel acres excluding public rights of way. With rights of way total acres are 1,037.
Source: Snohomish County Tomorrow, 2012; Snohomish County Assessor, 2018; Snohomish County PDS 2015; BERK, 2020.

Economic Units

Similar to the 2012 Buildable Lands Report, parcels were reviewed for common ownership where zoning was consistent across parcels, and considered as single economic units.

Pending Development

In addition to vacant, redevelopable, and partially used land, the Buildable Land method considers pending development including approved but not yet built projects. Pending developments can be considered in place of the standard capacity methods since they may be representative of market conditions and densities/intensities.

For the Bothell Canyon Park Subarea Plan Update purposes, the following pending developments were considered in Table 2.

Table 2. Pipeline Development Considered in No Action Land Capacity Results

Name	Status	Units
Canyon Park Apartments	Preliminary Review	561
Canyon Park Tract 24 Townhomes	Preliminary Review	239
Tract 18-19 Townhomes	Approved	118

Source: City of Bothell; BERK, 2019.

A fall 2019 pre-application addressing the Juno site also provided information about how additional employment space could be accommodated on a partially developed site.

One other proposal in preliminary review is not included regarding the Sound Transit maintenance facility. At this time, insufficient information about the Sound Transit maintenance facility proposal is available for the City to evaluate what impacts the facility may have on the vision for the subarea as well as the potential compatibility of the action alternatives in relation to the potential facility. The Sound Transit Bus Base qualifies as an essential public facility that must be evaluated by an independent Hearing Examiner who must approve a conditional use permit for the facility. Essential Public Facilities have additional approval criteria within Bothell Municipal Code Section 12.06.080(B)(2).

Step 2 and Step 3: Trends and Densities

Residential and Employment Densities

The 2012 Buildable Lands Report identifies assumed densities for each residential and mixed use zone and employees per acre for mixed use, commercial, and industrial zones considering development history between 1995 to 2010. The 2012 analysis classified most of the properties in the study area as primarily commercial or residential, with relatively few mixed use sites. More sites were considered mixed use in the 2015 analysis given zoning changes at that time, and assumed densities were increased considering how properties may develop as mixed use by 2035.

Table 3. Residential and Employment Density Assumptions (Per Acre)

Zoning	Res. Density*	Emp. Density
PCB	9.85	37.01
R 2,800	14.39	
R 4,000	19.02	
R 5,400a	5.98	
R 5,400d	5.27	
R 9,600	3.35	
R-AC, OP, CB	9.85-30	28.51-30
R-AC, OP, CB, LI, MVSO	9.85-30	30-54.66
R-AC, OP, CB, MVSO	9.85-30	30-66.25
R-AC, OP, LI	9.85-30	30-54.66
UC	45	27

Note: *For the 2015 *Imagine…Bothell* Comprehensive Plan Update capacity estimates, the County and City considered 30 dwelling units per acre and 30 employees per acre on sites allowed mixed uses. These alternative densities were applied to 100% of sites considered redevelopable by 2035.
Source: Snohomish County, 2012

These density assumptions are applied to the net buildable acres consistent with their zoning.

The 2012 results considered parcel-specific zoned densities based on predominant use of commercial or residential uses or in some cases mixed uses; in 2015 added redevelopable sites were assumed to have 30 jobs per acre and 30 residential units per acre on 100% of the same site. For mixed use zones, the buildable lands analysis for the Canyon Park Subarea Plan Update in 2020 assumes a 50/50 split on net developable acres, and half are applied the residential densities and half the employment rates. This is similar to mixed use zone approaches by other cities such as Lynnwood and Everett in the 2012 Buildable Lands Report.

The analysis assumes that future development on partially-used properties would be an expansion of their existing use, not a replacement similar to the 2012 Buildable Lands Report assumption that partially-used sites have room for additional development without demolition. The analysis for the Canyon Park Subarea Plan Update in 2020 also considers recent permit activity in the last five years. Business park area sites that were recently the subject of high-value permits (over $300,000 to multiple millions) were considered to develop all as employment rather than mixed use.

Deducting Existing Dwellings and Jobs on Partially-Used and Redevelopable Sites

Existing jobs are deducted from partially used and redevelopable sites by removing existing jobs as estimated in the 2012 Buildable Lands Report. The results removed about 2,400 jobs from Partially-Used sites and about 4,700 jobs from redevelopable sites.

Existing dwelling units are removed from the analysis similar to the above approach with jobs; there were about 78 existing dwelling units subtracted from the residential capacity.

Step 4: Reductions for Uncertainties

Miscellaneous Public/Institutional Use Reduction

Per the 2012 Buildable Lands Report methodology, a 5% reduction factor was used to account for the uncertainty of land availability for infrastructure and public needs:

> *A 5% reduction factor was used to account for the uncertainty of land availability for development due to: new stormwater regulations requiring larger detention ponds (especially in the unincorporated UGAs), potential need for regional or local stormwater facilities, potential need for transmission line, utility, or road or rail rights-of-way, potential need of land for public or institutional uses like police/fire stations, churches, water supply storage facilities, wastewater treatment and pump stations, landfills and transfer stations, cemeteries, libraries, daycares, small parks or open space, municipal offices, and other uses…*

It should be noted that a site purchased for the Northshore School District as a special high school to provide curriculum and training for students who may be a talent pipeline for businesses in the Canyon Park Subarea was identified as a partially used site with a potential to add employment whether for educational or other purposes.

Market Factor

A market factor is applied to capacity results to recognize not all landowners would be ready to develop or redevelop their property in a planning period. The Buildable Lands Report in 2012 applies a 15% deduction for vacant land and 30% for partially-used and redevelopable land.

In the No Action land capacity analysis, a 30% deduction was used on vacant, partially-used, and redevelopable land for residential purposes. For jobs, no market factor was assumed. This is because the City's assumptions for job growth in the study area between 2012 and 2035 have already been met, largely by jobs reoccupying existing buildings. There is still capacity to build new buildings in the study area.

Land Capacity Results

The Draft EIS included a sum of land capacity as listed in Table 4, assuming a market factor on residential and excluding it from employment.

Table 4. Draft EIS Results with Market Factor Assumptions

No Action Capacity in Study Area	Res. Units	Population	Total Emp.
With BLR Market Factor 30%	2,242	4,484	3,351
With no Market Factor	N/A	N/A	4,787

Source: Snohomish County Tomorrow, 2012; Snohomish County Assessor, 2018; BERK, 2019.

The overall results incorporated into the Draft EIS for the full study area and Regional Growth Center sub-set are shown in Table 13.

Table 5. Draft EIS December 2019 Canyon Park Capacity Review

	Population Capacity		Employment Capacity	
	Full Study Area	RGC	Full Study Area	RGC
Redevelopable Land	282	124	456	401
Partially Developed Land	2,192	1,640	3,877	3,681
Pipeline Development	1,836	1,836	0	0
Vacant	174	108	454	405
Total	**4,484**	**3,708***	**4,787**	**4,487***

Notes: *Reflects the adopted RGC boundary. When the capacity estimates were applied to more refined blocks and transportation analysis zones the estimates rounded and were around 1% higher: 3,712 population (+4) and 4,530 (+43) jobs but when considering the full study area, the numbers added to similar amounts.
Source: Snohomish County Tomorrow, 2012; Snohomish County Assessor, 2018; BERK, 2019.

Correcting the classification of partially-developed and redevelopable properties per the 2015 County and City evaluation for the *Imagine Bothell…*Comprehensive Plan Update, and applying assumptions as detailed above, revised results are similar in total for the Canyon Park Subarea Plan Update.

Table 6. Canyon Park Subarea and Canyon Park Vision Study Area north of Maltby Road: Net Capacity

	Population Capacity		Employment Capacity [1]	
	Full Study Area	RGC	Full Study Area	RGC
Redevelopable Land	1,856	1,447	2,306	2,281
Partially Developed Land	924	344	2,161	1,881
Pipeline Development	1,687	1,687	-	-
Vacant	380	235	337	268
Total [2]	**4,847**	**3,713**	**4,804**	**4,430**

[1] Job capacity without the market factor.
[2] If assuming properties with investment in recent permits over $300,000 stay employment oriented, as well as CPBOA properties which are limited by CC&Rs from residential at this time, the resulting job capacity for the study area equals 4,804.

If only business-park area properties with investment in recent permits over $300,000 stay employment oriented, and otherwise mixed use is assumed similar to the County and City evaluation for the 2015 *Imagine…Bothell* Comprehensive Plan Update, the resulting job capacity would slightly decrease to 4,373, and the population capacity would increase to 5,097.

Source: Snohomish County Tomorrow, 2012; Snohomish County Assessor, 2018; Snohomish County PDS 2015; BERK, 2020.

Traffic Model and Growth Trends/Market Forces

For the period 2012-2035, the Transportation evaluation for the Comprehensive Plan tested about 4,000 jobs and 3,000 dwellings (equivalent to roughly 5,300 people based on the model's 2.4 persons per household assumption that is greater than the 2 persons per household assumption in the 2012 Buildable Lands Report) within transportation analysis zones that encompass the study area and lands beyond. The transportation analysis zones extend outside the study area, but most jobs and most residential growth should be within the study area.

By updating the base year to 2018 using information from the PSRC LUV model covering the City's transportation analysis zones, results show the City has achieved the jobs planned for 2035 as of 2018 in the study area, but there is more growth anticipated for households.

To test the likelihood of additional employment growth in the 2018-2035 timeframe the transportation analysis (and the rest of the EIS) assumed growth similar to the No Action Capacity results developed earlier in 2019 per Table 8 below in Step 5: Net Capacity section.

Table 7. Comprehensive Plan Traffic Model Assumptions – Canyon Park Vicinity

Period	Res. Units	Population	Total Emp.
2012-2035 Growth	2,684	6,442	4,110
2018-2035 Growth	2,129	5,110	(256)

Source: City of Bothell 2015; Fehr & Peers, PSRC, BERK, 2019.

Step 5: Net Capacity

Following the above Steps, the updated 2020 population capacity range for the full study area is similar/slightly lower than the County's/City's results in 2015; the 2020 employment results are greater than results in 2015. Adjusting some of the assumptions about the share of property that could be used for residential and commercial in mixed-use formats could alter the results (e.g., greater population, less employment).

Table 8. Canyon Park Subarea and Canyon Park Vision Study Area north of Maltby Road: Net Capacity

Scenario	Population	Housing Units	Jobs
2012 Capacity	225	106	3,120
2015 Capacity [1]	5,272	3,003	3,965
Draft EIS Studied	4,484	2,242	4,787 [2]
Updated 2020 LCA [1]	4,847 - 5,097	2,654 - 2,790	4,373 - 4,804 [2,3]

[1] Updates capacity of the current 2015 updated Bothell Comprehensive Plan (No Action Alternative). Includes area north of Maltby Road as well as city limits. The Comprehensive Plan page LU-11 reports 4,498 for area in city limits.

[2] Job capacity without the market factor.
[3] High range of employment assumes properties with investment in recent permits over $300,000 stay employment oriented, as well as CPBOA properties which are limited by CC&Rs from residential at this time. Low range employment assumes that business-park area properties with investment in recent permits over $300,000 stay employment oriented; otherwise mixed use as evaluated by the County and City in the 2015 *Imagine…Bothell* Comprehensive Plan Update.
Source: Snohomish County Tomorrow, 2012; Snohomish County Assessor, 2018; Snohomish County PDS 2015; BERK, 2020.

The December 2019 Draft EIS assumptions tested growth similar in employment and slightly lower in population compared to 2020 results. No Action Alternative growth assumptions still remains lower than all other studied alternatives and continues as a lower bookend as described further below.

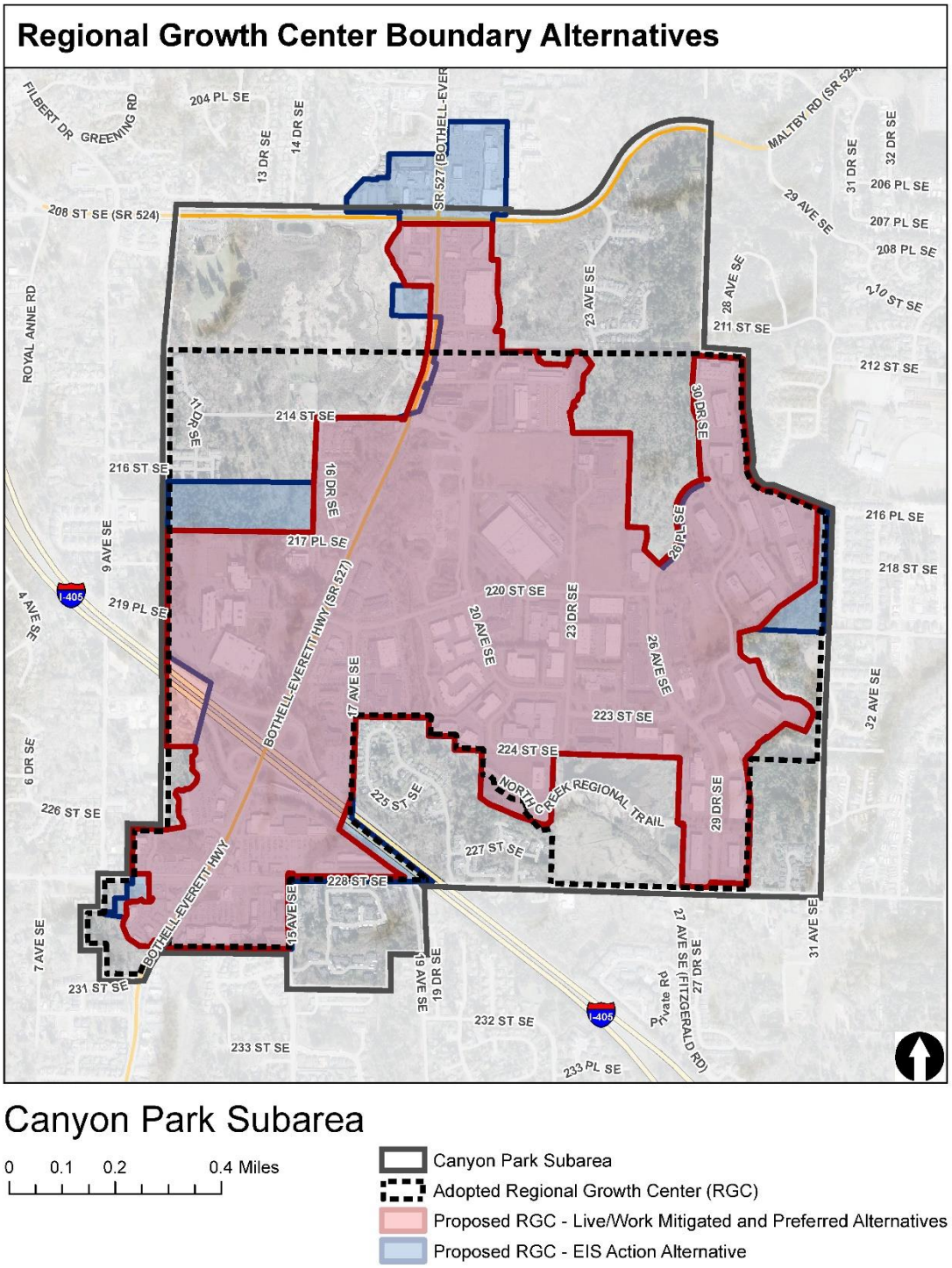
ACTION ALTERNATIVES

Regional Growth Center Boundaries

Growth estimates for Action Alternatives are based on a target of 45 activity units – population and jobs – per gross acre of Regional Growth Center area Outside of the Regional Growth Center boundary results of the No Action capacity are applied.

Current RGC boundaries are 733 acres and include areas of wetlands. The new PSRC guidance promotes more compact RGC boundaries of up to 640 acres or a square mile. The Business Plus and Live/Work Alternatives would add the Thrasher's Corner intersection and abutting properties to RGC boundaries and reduce the boundaries elsewhere, particularly excluding wetland areas that are not allowed to develop. The result is an RGC boundary of about 613 acres. The proposed boundary in the Mitigated Live/Work Alternative and Preferred Alternative is similar to those of other Action Alternatives, but refines areas further near wetlands and roads, producing a boundary of 565 acres. See Figure 3 to compare RGC boundary alternatives.

Figure 3. Comparison of RGC Boundary Alternatives



Source: City of Bothell, 2019; BERK 2019.

Typologies

Draft EIS Alternatives

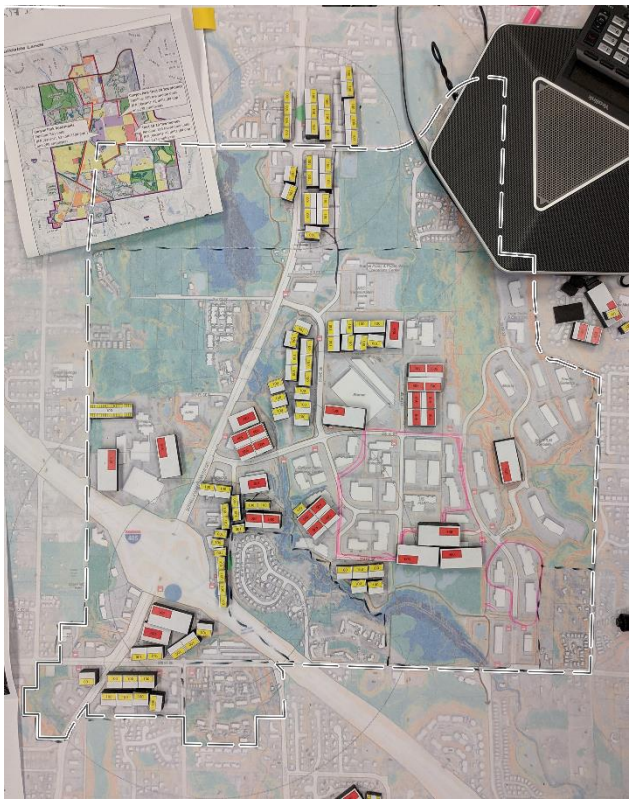
Within the study area, growth estimates are based on typologies that represent different building types and parking areas that fit the zoning standards and concepts for added jobs and housing in the study area. The typologies were created considering economic and urban design conditions in the study area. For example, the added development is largely located on sites at the shopping centers and along the Bothell-Everett Highway and near the I-405 Park and Ride, and these sites have some potential for redevelopment or infill, with employment and residential or mixed uses. Also, the areas in the central or eastern business park, there was less added development to consider retaining the business-related uses in these areas.

Typologies were provided for public exercises at a Community Scoping Meeting in spring 2019. See Attachment A. Community input at the scoping meeting informed the City and Consultant team (collectively the project team). See Draft EIS Appendix A.

The typologies were translated into employment and residents/dwellings per acre, similar to the buildable lands methodology, except that densities are planned rather than based on achieved in prior years. The typologies represent building types found in the region and suited to the study area.

Following the scoping meeting, the project team developed distinct alternatives and applied typologies to base maps. Results were summed by block and transportation analysis zone. See net results by Transportation Analysis Zone (TAZ) below.

Figure 4. Alternative Development Spring 2019

Business Plus Alternative Development	Live/Work Alternative Development
	

Source: Makers, 2019.

Market Factor

Because the growth estimates using typologies exceeded the Regional Growth Center activity-unit-based targets, a market factor of 15% was applied to growth number results for the Business Plus and Live/Work Alternatives. The resulting Activity Units per acre are still above 45 activity units per acre for a conservative analysis (activity units: Business Plus 54.0, Live/Work 55.1).

The "Mitigated Live/Work" Alternative has the same pattern as the primary Live/Work Alternative, but reduces the Regional Growth Center boundaries and the corresponding growth by about 25% to reduce mitigation requirements while still meeting the Regional Growth Center criteria of 45 activity units per acre.

Preferred Alternative

For the Preferred Alternative, the Planning Commission considered Draft EIS Alternatives and comments. Based on this, a conceptual Preferred Alternative that blended features of each alternative has been developed. The areas within the RGC were applied new zones. Areas outside the RGC were retained with No Action zones.

Table 9. Urban Design Parameters by Land Use Designation

● Required ◒ Encouraged ○ Allowed ⊗ Not allowed

Zone	Residential	Retail	Minimum Density	Parking Minimum	Public/Private Common Usable O.S.[1]	Private O.S.[2]	Examples
Residential MU – High Encourages a high intensity (6+ stories, typically apartments/condos), holistic residential neighborhood to meet residential growth targets and make use of transit, focused public investment, and nearby job opportunities.	●	● Along main streets & special corners	**Minimum:** 90 du/acre **Target:** 133 du/acre	1 stall per 450 SF retail + .75 stalls per bedroom, but no more than 2.2 stalls/unit[3] *Approx. average 1.25 stalls per unit*	●	◒	
Residential MU – Medium Encourages a medium intensity (4-6 stories), holistic residential neighborhood to meet residential growth targets and transition between the high-intensity TOD and nearby job opportunities.	●	● Along main streets & special corners	**Minimum:** 45 du/acre **Target:** 57 du/acre	1.1 stall per bedroom, but no more than 2.2 stalls per unit *Approx. average 1.5 stalls per unit*	●	◒	

[1] Encourage consolidation of open space as central gathering places in neighborhood centers (i.e., Thrasher's Corner, Canyon Park Place, and Canyon Park Business Center).
[2] To be explored further when drafting regulations.
[3] Note, some developments within a ¼ mile of frequent transit may be eligible for a parking minimum exception per HB 1923, modified by HB 2343, allowing a minimum of .75 stalls per unit.

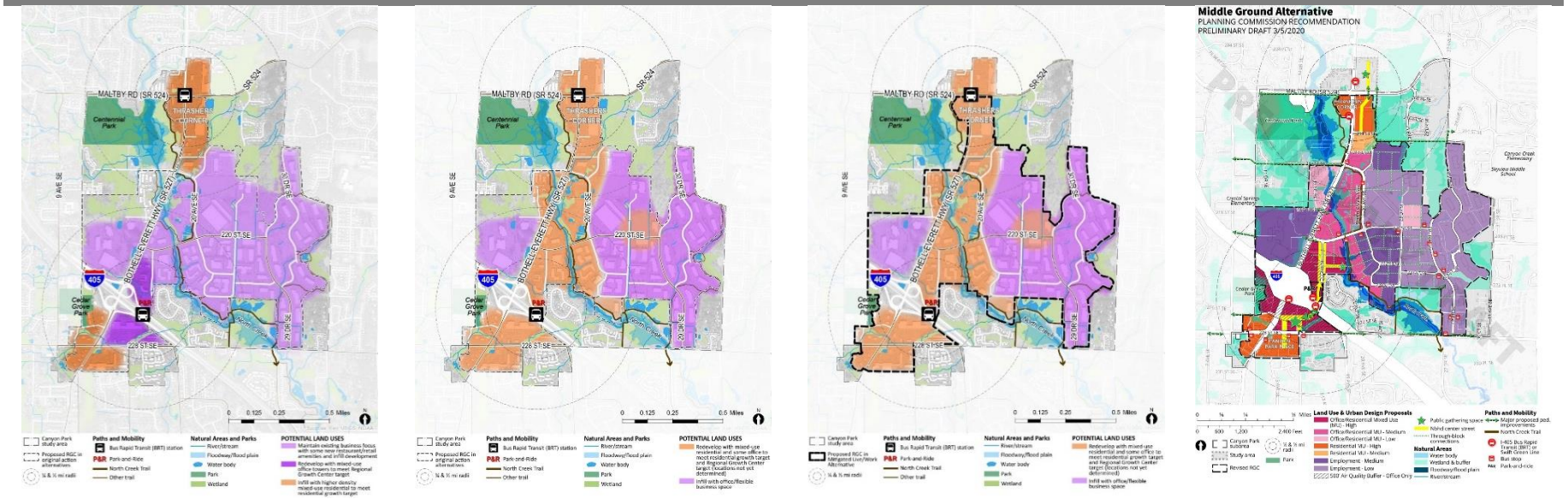
Zone	Residential	Retail	Minimum Density	Parking Minimum	Public/Private Common Usable O.S.[1]	Private O.S.[2]	Examples
Office/Residential – High Encourages high-intensity office mixed-use development (6+ stories) near transit and areas impacted by highway air quality and noise—while allowing residential—to make use of focused public investment and further develop a transit-oriented job center and holistic neighborhood.	○	◒ Along main streets & special corners	**Minimum:** 0.60 FAR or 90 du/acre **Target:** 3.00 FAR or 133 du/acre	1 stall / 500 SF office/retail *Average 1.25 per dwelling unit*	●	○ Office ◒ Res	
Office/Residential – Medium Encourages medium-intensity office mixed-use development (3-6 stories) near areas impacted by highway air quality and noise—while allowing residential—to meet growth targets, create a holistic neighborhood, and transition between the high-intensity TOD and nearby job opportunities.	○	◒ At special corners	**Minimum:** 0.50 FAR or 45 du/acre **Target:** 1.50 FAR or 57 du/acre	1 stall / 500 SF office/retail + 0.9 spaces / 1,000 SF light industrial *Average 1.5 per dwelling unit*	●	○ Office ◒ Res	

Zone	Residential	Retail	Minimum Density	Parking Minimum	Public/Private Common Usable O.S.[1]	Private O.S.[2]	Examples
Office/Residential – Low Encourages lower intensity development (1-3 stories) further from transit and focused public investments. "Missing middle" housing makes use of North Creek and connects residential areas. Commercial makes use of highway visibility and existing business park.	○	◒ At special corners	**Minimum:** 0.35 FAR 25-35 du/acre **Target:** 0.50 FAR 25-35 du/acre	1.5 stalls per bedroom, but no more than 2.2 stalls per unit	●	○ Office ◒ Res	
Employment – Medium Encourages medium intensity (3-6 story) office / flex / manufacturing to continue business park viability and make use of proximate transit and nearby holistic neighborhood. Residential not allowed to protect light industrial and incubator spaces in business park from displacement.	⊗	◒ At special corners	**Minimum:** 0.50 FAR **Target:** 1.50 FAR	1 stall / 500 SF office/retail + 0.9 spaces / 1,000 SF light industrial	● (minimal)	○	
Employment – Low Allows low intensity (1-2 story) office / flex / manufacturing to continue business park viability and make use of proximate transit and nearby holistic neighborhood. Residential not allowed to protect light industrial and incubator spaces in business park from displacement.	⊗	○	**Minimum:** 0.35 FAR **Target:** 0.50 FAR	1 stall / 400 SF office + .9 spaces / 1,000 SF light industrial	● (minimal)	○	

Source: Makers, 2020.

Figure 5. Draft EIS Alternatives – Business Plus and Live/Work and Mitigated Live/Work

Business Plus	Live Work	Mitigated Live Work	Preferred



Source; MAKERS, 2019 and 2020.

Preferred Alternative zones were applied to parcels. Preferred alternative zone standard were informed by typologies similar to Draft EIS Alternatives. Target densities and floor area ratios per Table 9 were assumed to determine capacity for population and jobs. The densities are at the target level rather than maximum or minimum. The densities were applied to net acres excluding critical areas. Additionally, household sizes of 1.5 for high and medium zones and 2.0 for low zones were applied to net housing units.

Table 10. Typologies and Densities

		Jobs per acre	Du per acre	HH size	Residents per acre	AU per acre
1	TOD Office	367				367
2	Eastgate Office	116				116
3	Low Office/flex	40				40
4	TOD 5 over 2	12	118	1.5	177	189
5	Surface parking 5 over 2		91	1.5	136.5	136.5
6	Three story walkup		22	1.5	33	33
7	Apartment Townhouse mix		57	2	114	114
8	Townhouse		17	2	34	34

Source: Makers 2020.

Table 11. Preferred Alternative Density Assumptions

Future Land Use	Target DU/ac	Household Size	Target FAR	Target AU/Ac	Res Split	Jobs Split	Res AU	Jobs AU
Residential MU – High	133	1.5	-	200	90%	10%	179.6	20.0
Residential MU – Medium	57	1.5	-	86	90%	10%	77.0	8.6
Employment – Medium			1.50	100	0%	100%	0.0	100.0
Employment – Low			0.50	50	0%	100%	0.0	50.0
Office/Residential – High	133	1.5	3.00	200	60%	40%	119.7	79.8
Office/Residential – Medium	57	1.5	1.50	86	60%	40%	51.3	34.2
Office/Residential – Low	35	2.0	0.50	70	90%	10%	63.0	7.0

Source: Makers 2020.

Jobs were distributed based on shares reflecting the intent of the zone or State Employment Security Department data. See Table 12.

Table 12. Job Sector Shares by Zone

PAFLU	Retail Pct	Office Pct	Manu Pct
Residential MU – High	0.75	0.25	0
Residential MU – Medium	0.75	0.25	0
Employment – Medium	0	0.6	0.4
Employment – Low	0	0.6	0.4
Office/Residential – High	0.25	0.5	0.25
Office/Residential – Medium	0.25	0.5	0.25
Office/Residential – Low	0.25	0.5	0.25

Source: Makers 2020.

Net Capacity

A comparison of capacity results for all alternatives is presented below in Table 13. The Business Plus Alternative has a similar capacity for about 4,000 residents and a much higher number of jobs at 17,350 compared to the No Action Alternative. The Live/Work Alternative would have a greater residential population of nearly 7,200 and high job count at nearly 15,300. To explore additional mitigation of impacts, a "Mitigated" Live/Work Alternative has been developed with lower growth as described above. The Preferred Alternative has a capacity for housing similar to Live/Work and a job capacity similar to but lower than the Mitigated Live/Work Alternative. Under all alternatives, nearly all the growth would be in the RGC, as shown in Table 13.

Table 13. Housing, Population, and Jobs—Net Growth

	Regional Growth Center (RGC)*				Full Study Area			
Alternative	Dwelling Capacity	Population Capacity	Job Capacity	Total Activity Units	Dwelling Capacity	Population Capacity	Job Capacity	Total Activity Units
No Action EIS Assumption**	1,856	3,712	4,530	8,242	2,242	4,484	4,787	9,271
No Action: Capacity Amended**	2,029	3,713	4,430	8,143	2,654	4,847	4,804	9,651
Mitigated Live/Work	2,816	4,225	9,458	13,683	3,614	5,496	9,805	15,302
Preferred	4,075	6,142	7,598	13,740	4,687	7,162	8,305	15,467
Business Plus	2,687	4,012	17,209	21,221	2,915	4,468	17,350	21,818
Live/Work	4,498	6,732	15,143	21,875	4,726	7,188	15,284	22,472

Note: *See Figure 3 and associated text. No Action Alternative RGC boundaries equal 733 acres. The Business Plus and Live/Work Alternatives have a RGC boundary encompassing 613 acres. The proposed boundary in the Mitigated Live/Work Alternative encompasses 565 acres.
** Updated capacity assumptions are shown for comparison. As a slightly lower bookend for the overall study area, the No Action EIS assumptions are continued in the SEPA process.
Source: MAKERS, 2020; BERK, 2020.

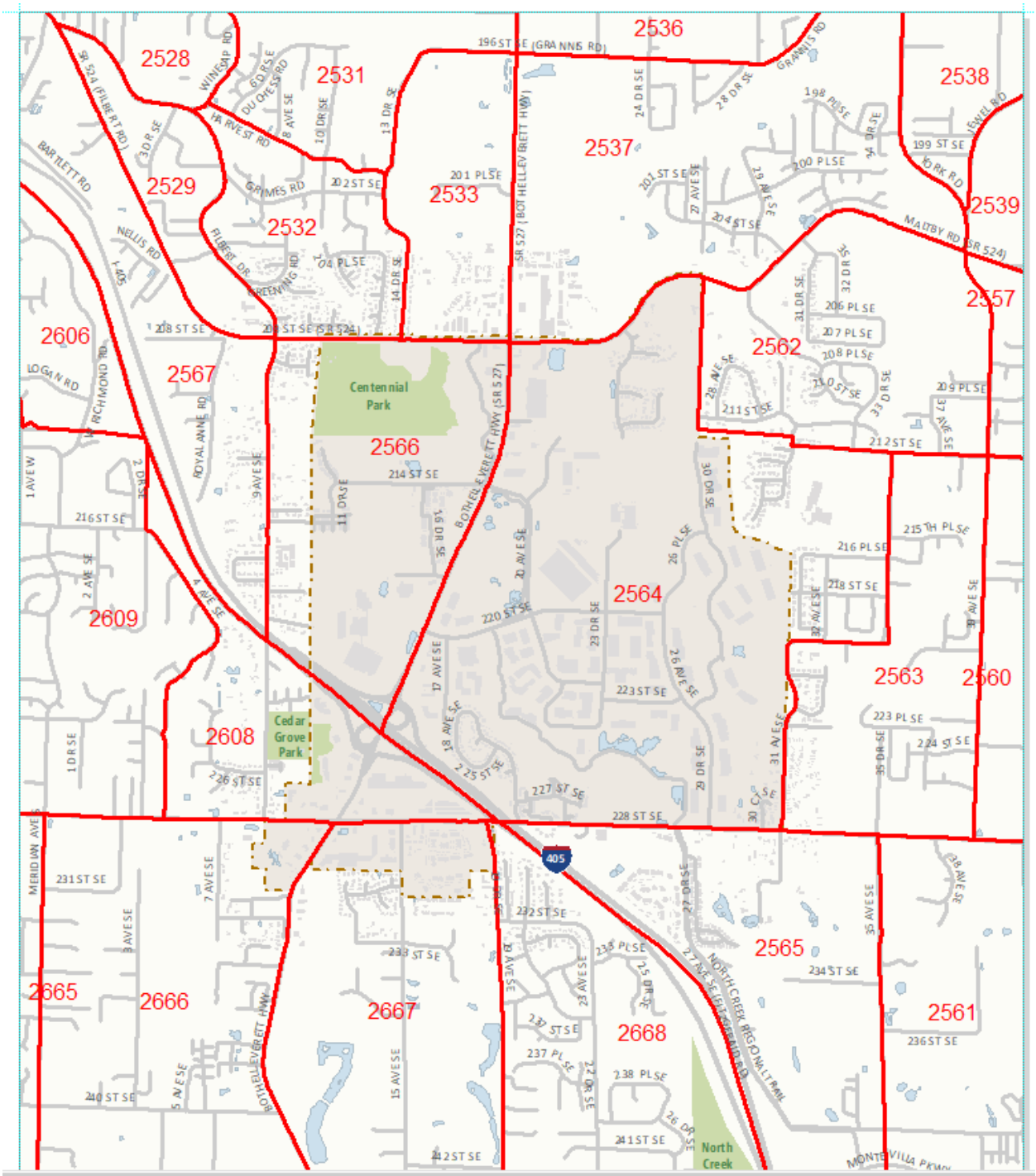
Net capacity results by TAZ for the Full Study Area are presented below. A TAZ map follows. The Preferred Alternative distributes housing similar to other Draft EIS Alternatives with more focus of housing in the southwest and less in the north. Under the Preferred Alternative, the combination of housing and jobs results in the lowest trips studied with Action Alternatives.

Table 14. Capacity by Transportation Analysis Zones (TAZs) – Full Study Area

	No Action		Mitigated Live/Work		Business Plus		Live/Work		Preferred	
TAZ	HH	Jobs	HH	Jobs	HH	Jobs	HH	Jobs	HH	Jobs
2564	1,757	2,939	2,271	8,029	704	13,454	2,970	12,292	2,707	6,232
2566	201	914	86	641	170	970	113	970	31	605
2608	86	630	216	742	454	2,235	283	1,332	681	1,260
2666	12	26	44	41	170	81	57	81	468	38
2667	28	162	346	102	567	201	453	201	470	9
2533	91	95	174	178	-	292	227	292	137	155
2537	67	21	476	72	850	117	623	117	193	5
Total	**2,242**	**4,787**	**3,614**	**9,805**	**2,915**	**17,350**	**4,726**	**15,284**	**4,687**	**8,305**

HH=households
Source: MAKERS, 2019; BERK, 2019 and 2020.

Figure 6. Transportation Analysis Zones (TAZs) in Canyon Park Subarea Vicinity



Source: Fehr & Peers, 2019.

Attachment A: Typologies

Residential

1. **TOD Mixed-Use Residential/Commercial**

101 Kirkland Ave, Kirkland - 101 Apartments

10410 NE 2nd St, Bellevue - Avalon Meydenbauer

- Structure/underground parking
- Higher relaxation of required parking units due to transit
- 5+1 stories, residential with ground-floor retail/office
- 1.1 parking space / unit + 1 space / 450 sf (relaxed parking requirements from transit)
- 150 dwelling units + 15,000 sf retail/office per acre

2. Residential, higher density multifamily

18420 102nd Ave NE, Bothell - Edition Apartments

15631 Ash Way, Lynnwood - Tivalli Apartments

- 5–6 stories, residential
- Structure/underground parking
- 1.25 spaces per unit (Low to moderate relaxation of required parking units due to transit)
- 160 dwelling units per acre

Commercial

3. **TOD Mixed Use Commercial**

1416 NW Ballard Way, Seattle - Ballard Blocks 2

15631 Ash Way, Lynnwood - Tivalli Apartments

- Structure/underground parking
- 6 stories, office with ground-floor retail
- 1 space / 500 sf office / retail (relaxed parking requirements from transit)
- 75,000 sf office + 15,000 sf retail per acre

4. Commercial - Office/Light Industrial, higher density

15809 Bear Creek Pky NE, Redmond - The Offices at Riverpark

1120 112th Ave NE, Bellevue - One Twelfth @ Twelfth - East Building

- Structure/surface parking
- 6 stories, office/light industrial uses with accessory retail/restaurant (cafe)
- 1 space / 600 sf (moderate relaxation of required parking units due to transit – also depends on mix between office and light industrial)
- 75,000 sf office / light industrial + 500 sf retail per acre

5. Mixed-Use Office/Retail, medium density

15224 Main St, Mill Creek - Park Place Center

2034 NW 56th St, Seattle - Greenfire Campus (Commercial)

- Structure/surface parking
- 4 stories, office with ground-floor retail
- 1 space / 300 sf (low relaxation of required parking units due to transit)
- 30,000 sf office + 10,000 sf retail per acre

6. Commercial - Office/Light Industrial, medium density

21540 30th Dr SE, Bothell - Canyon Park Heights Office Center

32001 32nd Ave S, Federal Way - East Campus Corporate Park I

- Structure/surface parking
- 4 stories, office/light industrial uses
- 1 space / 500 sf (low relaxation of required parking units due to transit)
- 25,000 sf office per acre

7. Commercial - Office/Flex, lower density

22102 17th Ave SE, Bothell - Building II

22722 29th Dr SE, Bothell - Canyon Park 228 - West Bldg

- Surface parking only
- 2 stories, office/flex/light industrial uses
- Infill/default development
- 1 space / 500 sf (depends on mix between office and light industrial – assumes more flex/industrial space)
- 12,000 sf office/flex per acre

Holistic Neighborhood Building Typology

Game pieces represent a range of plausible development types to help visualize what fits in the area.
They are not intended to represent every possible type.

Office – High Density

Description:
High density offices support a large number of workers on a relatively small site, relying on transit and underground parking to reduce surface parking needs. Due to the high cost of structured parking construction, these buildings are most suitable for areas with high land values and/or that are close to high capacity transit.

Height: 65 ft

Parking: 250 stalls
- 1 stall per 2 workers
- mostly structured

Activity Units per acre: 550

Activity Units per game piece: 500

Game Piece:

Office – Medium Density

Description:
These office buildings can support a large number of workers at a medium cost of construction. They require a large land area to accomodate surface parking.

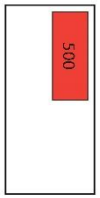
Height: 65 ft

Parking: 500 stalls
- 1 stall per worker
- mostly surface

Activity Units per acre: 174

Activity Units per game piece: 500

Game Piece:



Flex Space/Light Industrial – Low Density

Description:
Low density flexible buildings are used for many types of employment including offices, manufacturing, warehousing and transportation, research and development, and other uses requiring large, open spaces. Construction costs are low, but buildings and paved areas require a large amount of land.

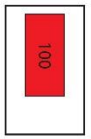
Height: 25 ft

Parking: 100 stalls
- 1 stall per worker
- mostly surface
- paved areas for truck loading included

Activity Units per acre: 56

Activity Units per game piece: 100

Game Piece:



Residential – High Density

Description:
High density residential buildings are typically apartments or condos. This type relies on transit use and structured parking to nearly eliminate surface parking. Due to the cost of structured parking, these buildings are most suitable for areas with high land values and/or that are close to high capacity transit.

Height: 65 ft

Parking: 50 stalls
- 0.75 stalls per dwelling unit
- mostly structured

Assumed household size: 1.5 people

Activity Units per acre: 260

Activity Units per game piece: 100

Game Piece:

Residential – Medium Density

Description:
This is a medium density building type with apartments or condos. Surface parking lowers the cost of construction but requires more land. More parking is provided per dwelling unit than the high-density type.

Height: 65 ft

Parking: 100 stalls
- 1.5 stalls per dwelling unit
- half surface, half structure

Assumed household size: 1.5 people

Activity Units per acre: 137

Activity Units per game piece: 100

Game Piece:

Residential – Townhouses

Description:
Townhouses are attached single-family homes, offering a moderate density while providing more private space than a multifamily building. These buildings are relatively inexpensive to build and are more affordable than detached single-family homes.

Height: 35 ft

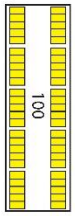
Parking: 100 stalls
- 2 stalls per dwelling unit

Assumed household size: 2 people

Activity Units per acre: 42

Activity Units per game piece: 100

Game Piece:



Attachment C: AM and Internal Street Transportation Analysis

FEHR PEERS

MEMORANDUM

Date: July 8, 2020

To: Bruce Blackburn, Steve Morikawa, and Sherman Goong, City of Bothell

From: Carmen Kwan and Kendra Breiland, Fehr & Peers

Subject: Canyon Park Subarea Plan – AM and Internal Street Transportation Analysis

SE18-0650

The Canyon Park Subarea Plan EIS is evaluating the potential impacts of additional growth to meet PSRC regional growth center criteria. The transportation chapter is focusing on potential impacts to auto/freight, transit, and people walking and biking. Potential mitigation strategies are also explored to support the proposed land use increase for the Preferred Alternative, which is expected to generate lower new PM peak hour trips (+5,000) compared to the Mitigated Live/Work Alternative (+6,500), but higher trips compared to the No Action Alternative (+4,000). This document summarizes additional transportation analysis for the Preferred Alternative to support the subarea plan and includes the following:

- Transportation mitigation test with and without the proposed 214th Street Extension between SR 527 and 9th Avenue SE.
- AM peak hour intersection operation analysis at select intersections in the subarea.
- Internal street analysis for the Canyon Park business center including peak hour vehicle-to-capacity ratios of the main spine road and potential need for intersection control changes.
- More detailed review of the AM and PM peak hour traffic operations at the 17th Avenue SE/220th Street SE intersection.

Transportation Mitigation Test – 214th Street Extension

In the Draft Environment Impact Statement (Draft EIS), a 214th Street Extension between SR 527 and 9th Avenue SE was proposed to provide a more connected arterial street network within the subarea. 9th Avenue SE is a collector arterial and the City's Comprehensive Plan includes a project to upgrade the corridor to a 3-lane collector road with sidewalks and bike lanes. The new 214th

Street connection would distribute peak hour traffic and enable 9th Avenue SE to serve as a north-south alternative route to the very congested SR 527 corridor for some travelers. The 214th Street SE extension is expected to carry approximately 800 trips in the PM peak hour. This street extension would result in increased vehicle traffic along 9th Avenue SE compared to without the extension as roughly half the vehicles would route north to SR 524 and half would route south to 228th Street SE. Two-way peak hour traffic volumes on 9th Avenue SE would increase from 1,400 – 1,700 under the Preferred Alternative without the street extension to 1,800 – 2,100 vehicles with the connection. The 2043 PM peak hour corridor LOS results are shown below in **Table 1**.

Table 1. 2043 PM Concurrency Corridor LOS Results for the Preferred Alternative

Corridor	With 214th Street Extension	Without 214th Street Extension
SR 524	E (63)	E (76)
SR 527	E (71)	**F (89)**
228th St SE/SW	E (62)	E (68)

Fehr & Peers, 2020. Both scenarios assumed the new 20th Avenue SE/SR 524 intersection is added to the SR 524 concurrency corridor. The 219th Place connection between Philips parking lot and 9th Avenue SE was also assumed, but the 228th Street widening was not included. No BAT lanes were assumed on SR 527.

- Under the Preferred Alternative, the SR 524 and SR 527 concurrency corridors would meet the LOS E standard with the 214th Street SE extension. Several individual intersections however are expected to operate at LOS F on the SR 527 corridor: 220th Street SE, I-405 northbound ramp, and 228th Street SE intersections.
- There is increased traffic expected at the 9th Avenue SE/SR 524 and 9th Avenue SE/228th Street SE intersections, and delays are expected to increase for the 228th Street SE corridor, however the corridor would still meet the LOS E standard.
- The 214th Street extension would increase 9th Avenue SE vehicle traffic by up to 400 vehicles during the PM peak hour on either end of 9th Avenue SE.
- It should be noted that most vehicles using this new connection would not be destined for I-405, as that would require significant out of direction travel, as opposed to staying on SR 527. Vehicles are more likely to be traveling west on 228th Street SE or SR 524.
- The 214th Street extension would also provide designated non-motorized facilities to serve alternative transportation modes to and from the subarea, reduce congestion, and improve level of service.
- The Preferred Alternative corridor delays are within the range of findings in the Draft EIS as the corridor delays are lower than the No Action Alternative (where SR 524 and SR 527

corridors operate at LOS F) as it includes transportation mitigation projects, and lower than the Mitigated Live/Work Alternative as the proposed new PM peak hour trips is about 1,500 fewer trips compared to the Mitigated Live/Work Alternative.

-

AM Peak Hour Analysis

The AM peak hour intersection analysis is not required under the City's LOS standard as the highest traffic volumes are during the PM peak hour as evaluated in the Draft EIS. The limited AM peak period analysis was completed for the Preferred Alternative at nine selected intersections including the Canyon Park main entrances along SR 527, the I-405 ramp intersections, and on 9th Avenue SE. These locations were evaluated in response to comments received from WSDOT, the Canyon Park Business Owners Association, and community members who wanted to know more about the effects of a potential 214th Street Extension between SR 527 and 9th Avenue SE. The traffic forecasts at the following intersections were developed by increasing the total inbound and outbound peak hour trips in the travel demand model to match the trip generation estimated from the proposed land use growth and running a new traffic assignment. The increase in traffic volumes at intersections were added onto the existing AM peak hour counts collected from WSDOT in 2018. Since traffic counts were not available at 9th Avenue SE/SR 524 and 9th Avenue/228th SE Street SE, the existing PM counts were reversed to represent the AM commute. For simplicity, the AM traffic forecasts also assumed the approximate same number of vehicles using the I-405 direct access ramps at 17th Avenue SE as the WSDOT I-405 analysis. Signal timing cycle lengths, splits, and offsets were optimized for the analysis similar to the PM peak hour in the Draft EIS.

Intersection operation results are shown in **Table 3,** and study intersections are mapped in **Figure 1**. All intersections are expected to operate at LOS E or better except for SR 527/SR 524 intersection (93 seconds of average delay) and SR 527/228th Street SE (120 -140 seconds of average delay). These two locations currently operate with high delays during peak hours and are expected to be more congested in the future with the proposed increase in land use.

- The AM analysis is not required to be evaluated for the City's LOS standard. A smaller set of locations were evaluated to test proposed mitigation projects identified as solutions for the PM Peak Hour results, to review operations during the AM period and to respond to community comments.
- The 214th Street extension would increase vehicle trips on 9th Avenue SE, and the intersection operations at SR 524/9th Avenue SE and 228th Street SE/9th Avenue SE are

similar compared to without the street connection, however the intersections are expected to operate at LOS E or better.

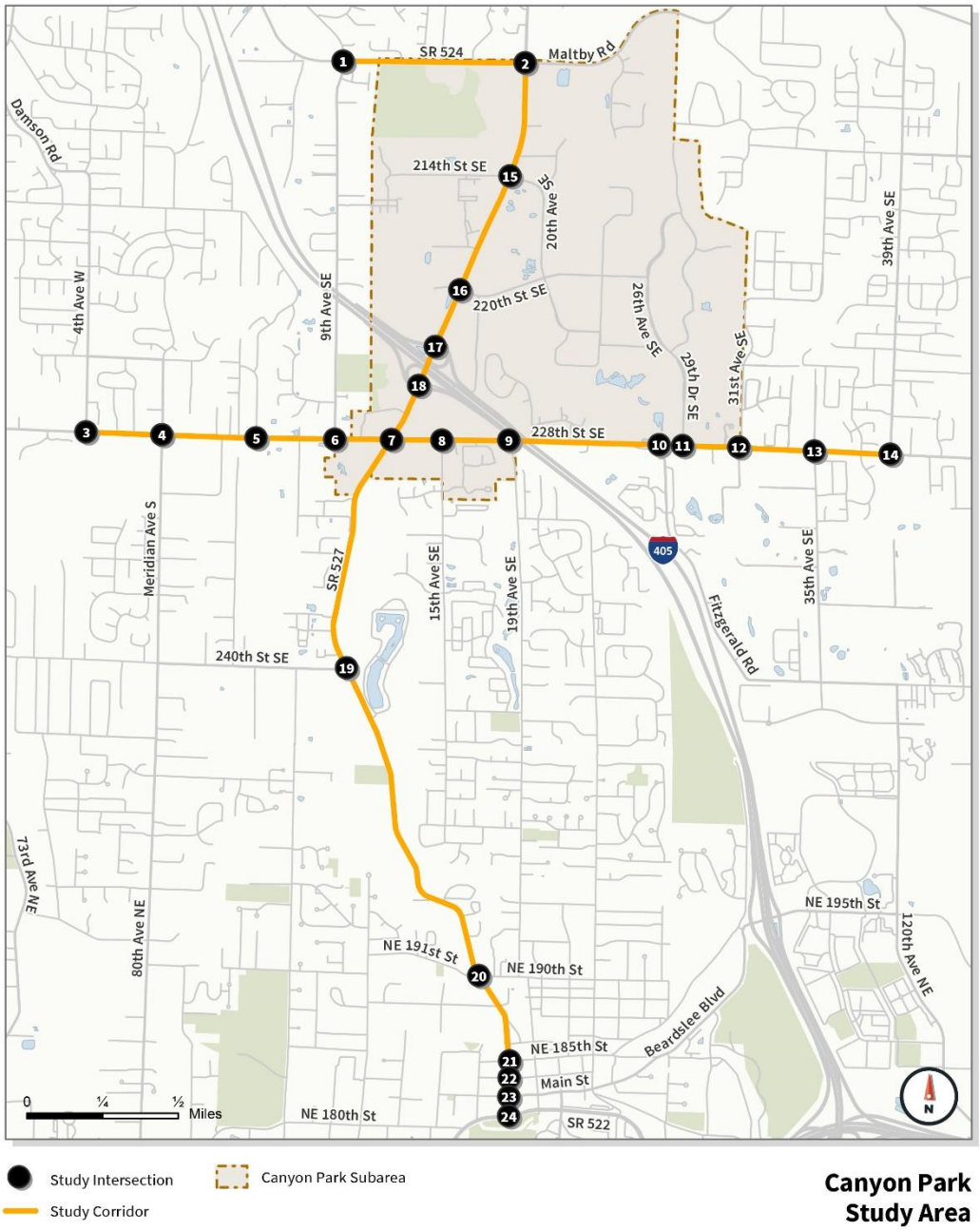
- The I-405 ramp intersections are expected to operate at LOS E or better during the AM conditions.
- The three main business park entrances (220th Street SE/SR 527, 214th Street SE/ SR 527 and 228th Street SE/29th Drive SE are expected to operate at LOS E or better.

Table 3. 2043 AM Peak Hour LOS Analysis

Map ID	Intersection	With 214th Street Connection		Without 214th Street Connection	
		Delay (sec)	LOS	Delay (sec)	LOS
1	*SR 524/9th Ave SE*	63	E	74	E
2	*SR 527/SR 524*	92	**F**	93	**F**
15	*SR 527/214th St SE*	70	E	36	D
16	*SR 527/220th St SE*	38	D	64	E
17	*SR 527/ I-405 Northbound Ramps*	5	A	5	A
18	*SR 527/ I-405 Southbound Ramps*	31	C	23	C
6	*228th St SE/9th Ave SE*	58	E	62	E
7	*SR 527/228th St SE*	120	**F**	138	**F**
11	*228th St SE/29th Dr SE*	60	E	60	E

Fehr & Peers, 2020.

Figure 1. Canyon Park Draft EIS Study Intersections



Canyon Park Study Area

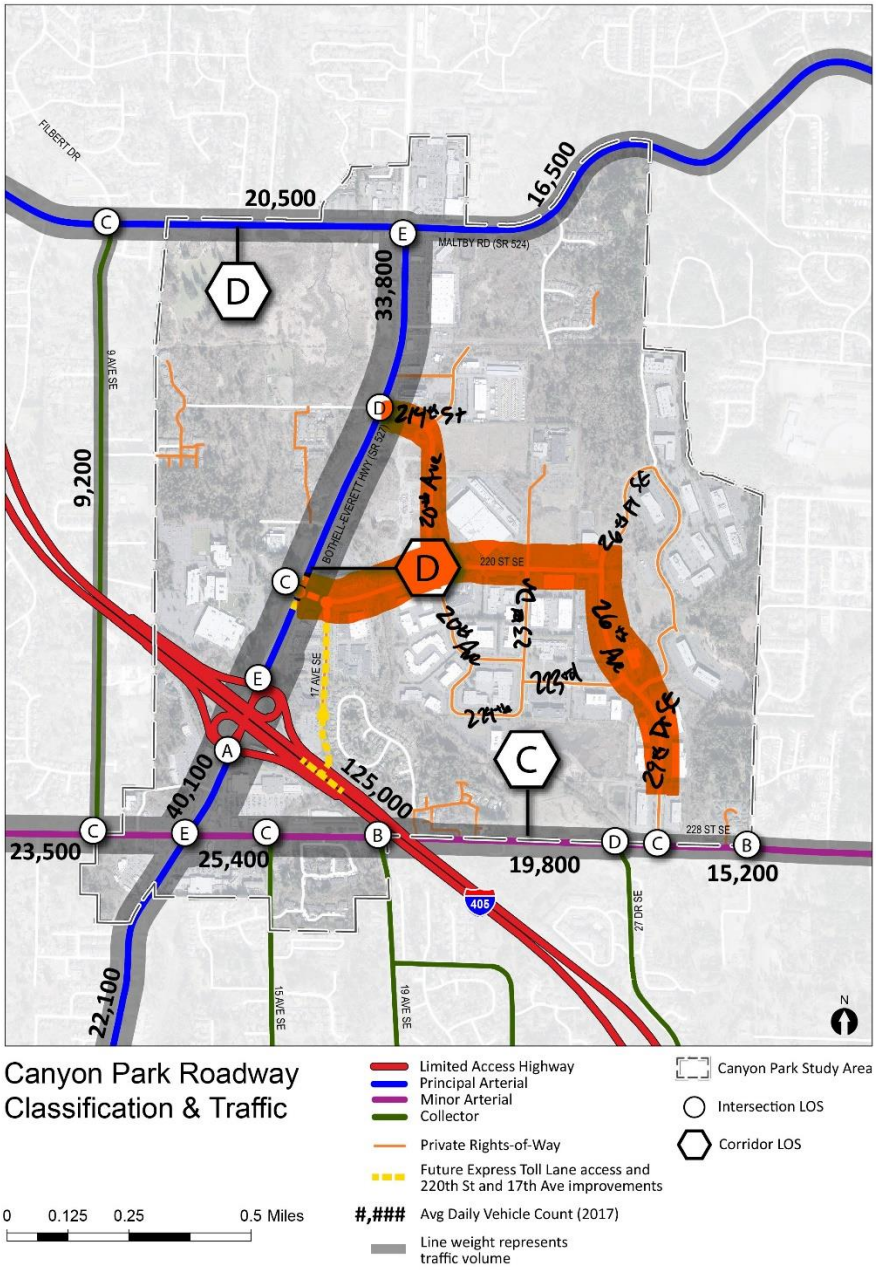
Internal Canyon Park Street Analysis

Background

Because business park trips largely funnel through the three main access points to the corridors under study, it was anticipated that the private street evaluation at the time of the Preferred Alternative development may show that conversion to public streets better distributes trips along a more complete network and connected network; if so, the overall traffic congestion results are likely to be similar to or slightly better than the range of results in the Draft EIS. The Preferred Alternative is expected to generate the fewest new PM peak hour trips of all Action Alternatives and results are in the range of the Draft EIS as noted on page 1 of this memo.

The Draft EIS noted that the City's LOS standards are corridor based and address the PM Peak hour. The Draft EIS assumes with Action Alternatives that selected private streets would become public streets in the future following improvement to public standards. A letter of intent is under discussion between the City and the Canyon Park Business Owner Association. These streets are identified on Figure 1. When public, the streets would not be part of the City's corridor LOS standards as that is applied to higher functional class corridors. However, the City has committed to evaluate the private streets at the time of the Preferred Alternative. When the streets become public, the City could track operation and safety conditions such as through its municipal code and design standards and specifications approach to inadequate road conditions.

Figure 1. Potential Future Public Streets Map



Summary of Results

Within the private street network, an intersection traffic control change such as a traffic signal or roundabout would likely be needed at three intersections: 20th Avenue SE/220th Street SE, 26th

Avenue SE/220th Street SE, and 223rd Street SE/29th Drive SE under the Preferred Alternative. Periodic traffic monitoring and a traffic engineering study would be needed to identify if and when an intersection control change is warranted at these locations. The draft WSDOT study, which assumed land use growth similar to the No Action Alternative, also expected a potential need for intersection control changes as the 20th Avenue SE, 23rd Avenue SE, and 26th Avenue SE intersections on 220th Street SE were expected to operate at LOS F in the future during one or both peak periods under current stop control configuration.

The 17th Avenue SE/220th Street SE intersection was also evaluated in the separate WSDOT I-405 Direct Access Ramp study and expected this intersection to operate at LOS C for both AM and PM peak hours. Under the Preferred Alternative, the lowest growth of all the Action Alternatives, this intersection is expected to operate at LOS F during both peak periods. This is a combination of the higher land use growth overall in the Preferred Alternative as well as the higher land use growth located closer to the Canyon Park park-and-ride (accessible from 17th Avenue SE only) compared to the No Action land use assumptions.

Potential improvements to address future inadequate road conditions could include traffic signal timing improvements such as increasing cycle lengths for both time periods. For the AM peak hour, the intersection could operate better with dual westbound left turn lanes and a new southbound receiving lane on 17th Avenue SE, however widening the intersection would result in a more uncomfortable pedestrian environment as crossing distances increase.

Periodic traffic monitoring at 17th Avenue SE/220th Street SE intersection should be conducted as the business park changes and develops to identify if and when operational improvements such as signal timing/signal coordination with the adjacent SR 527/220th Street SE intersection (expected to operate at LOS F under the No Action and the Preferred Alternative) or other intersection improvements such as widening are needed to improve traffic operations. If an intersection widening/traffic operations improvement project is pursued, this project could be constructed through frontage improvements as the business park redevelops.

Detailed results are presented below.

Vehicle-to-Capacity Ratio

The main spine road of the internal Canyon Park street system in the future is anticipated to be converted to a public street and was evaluated at a high level for the growth proposed under the

Preferred Alternative.[1] Specifically the PM peak hour vehicle-to-capacity (v/c) ratio was estimated for the main spine road (the east-west 220th Street SE, the north-south 26th Avenue SE/29th Drive SE, and 214th Street SE between SR 527 and 220th Street SE) to identify the number of travel lanes needed and the potential need for intersection control changes was estimated at four intersections below. Locations are also mapped in **Figure 2**.

1. 20th Avenue SE/220th Street SE
2. 23rd Avenue SE/220th Street SE
3. 26th Avenue SE/220th Street SE
4. 223rd Street SE/26th Avenue SE/29th Drive SE

The Preferred Alternative assumes an increase of 3,500 new PM peak hour trips for the main business park area compared to existing conditions. Land use growth by new households and new jobs was aggregated to super block areas numbered 1 through 16 (see **Figure 3**). The increase in vehicle trips was proportionately distributed to each super block based on the proposed land use growth in that block. For example, super block 7 contains 10 percent of all household and total job growth in the business park, therefore 10 percent of the new inbound and outbound trips generated are assigned to it. Actual trips generated by area will depend on the type of land use mix added, however this method provides an idea of how development could occur.

The trips were assigned onto the internal street network based on the most likely used driveway and proximity to closes business park entrance. The new trips were then added onto the existing AM and PM turning movement counts from WSDOT's Draft I-405 Express Toll Lane Analysis (received 12-6-2019) to develop the future year internal street forecasts. The actual assignment of new PM peak hour trips is somewhat speculative as development and driveway access may change in the future, however the approximate peak hour trips on each roadway segment was used to roughly estimate the v/c ratio on each link. A v/c ratio over 1.0 indicates that vehicle demand is higher than roadway capacity and congestion would occur. The forecast link volumes are likely conservatively high as vehicles trips are assigned to the main access driveways, while in reality there are smaller parking lot driveways/access points along 220th Street SE and 26th Avenue SE/29th Drive SE that may decrease vehicle demand at the internal four intersections studied.

[1] The Draft EIS assumes with Action Alternatives that selected private streets would become public streets in the future following improvement to public standards. A letter of intent is under discussion between the City and the Canyon Park Business Owner Association.

Figure 2. Internal Street and Intersection Analysis

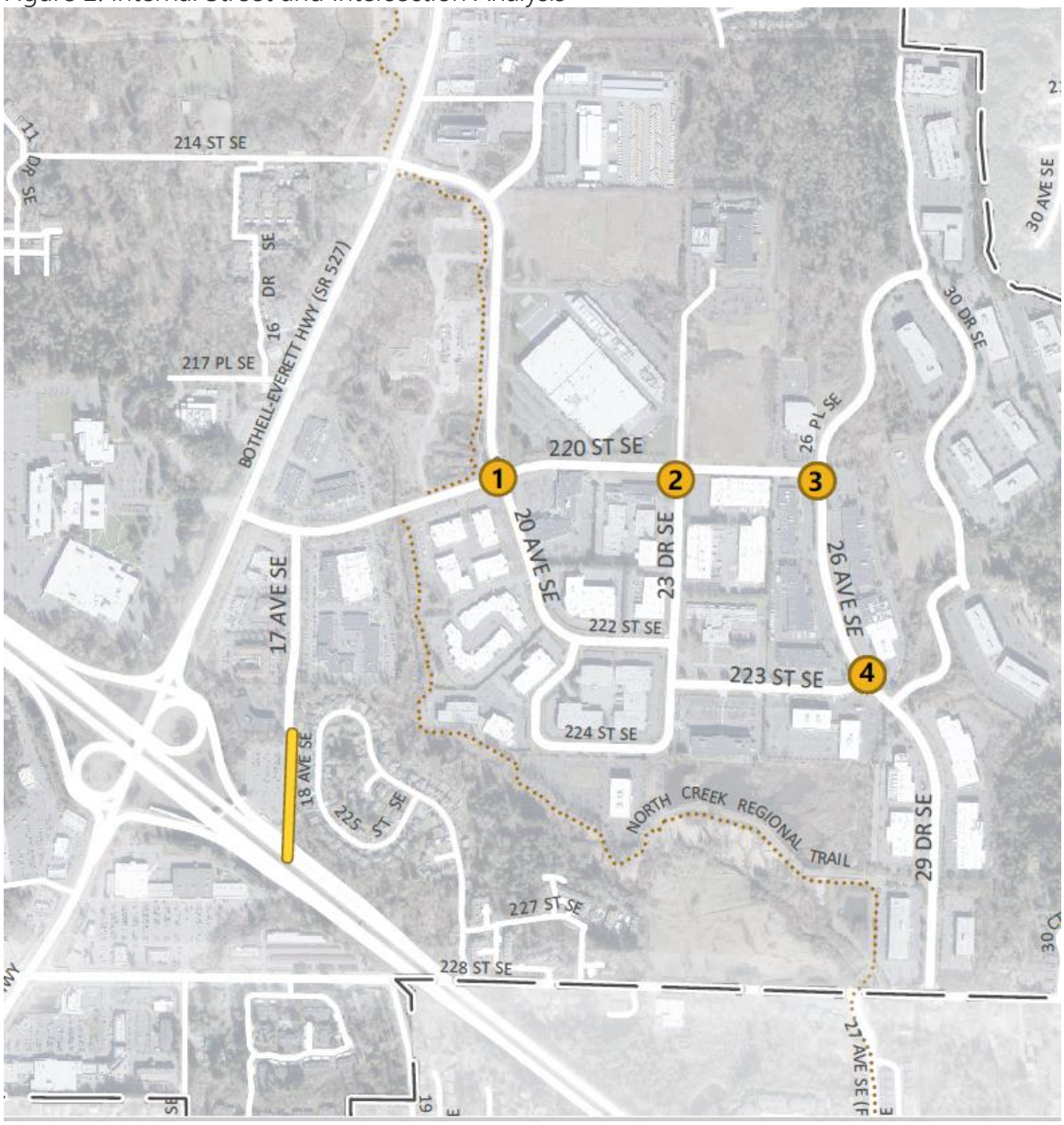
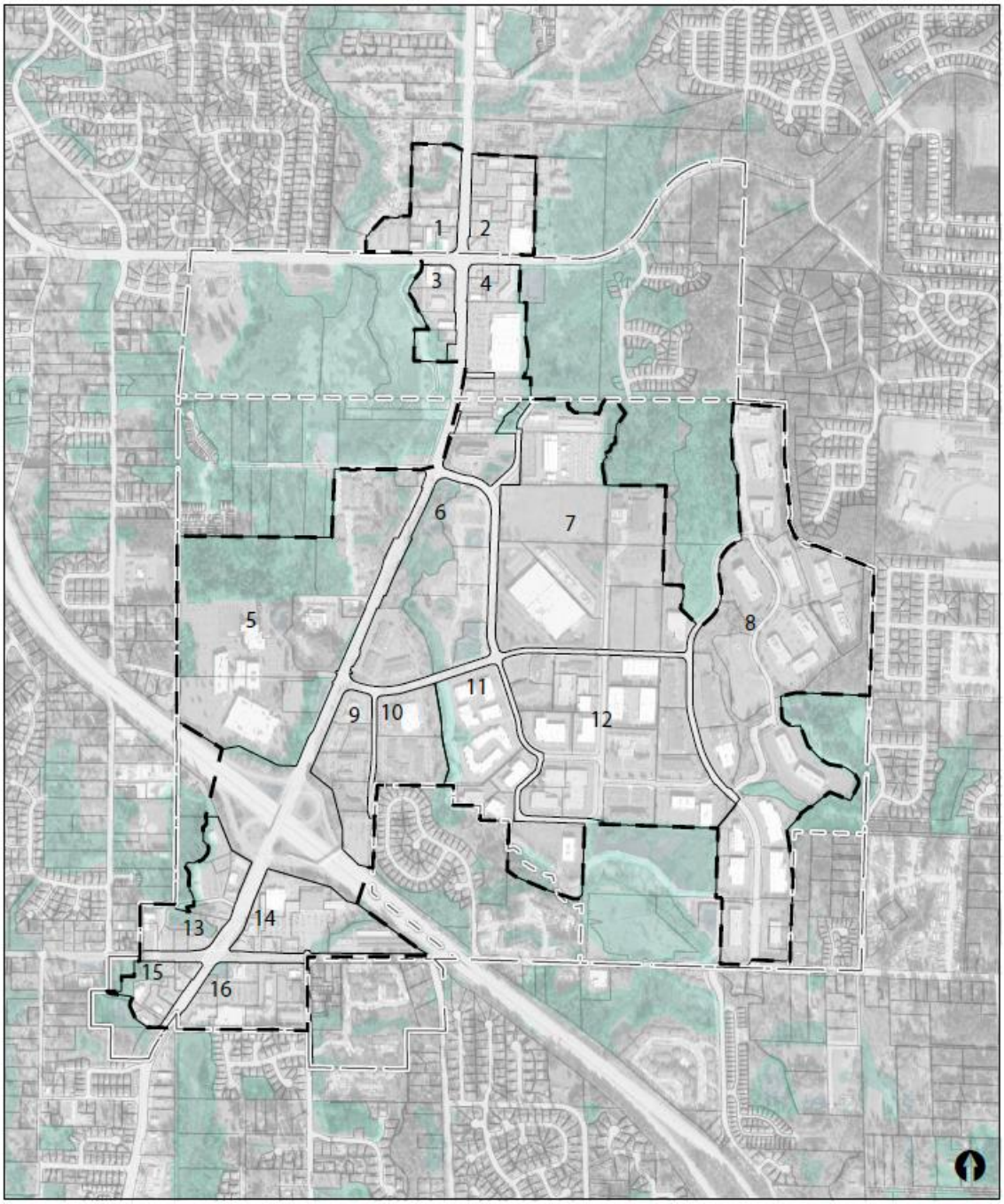


Figure 3. Canyon Park Subarea Plan – Superblock Map



The one-direction roadway approach capacity was estimated using the Quality/Level of Service Handbook, Table 7- Peak Hour Directional Volumes for Urbanized Areas (Florida Department of Transportation, 2013). This handbook and methodology is used nationwide and is appropriate for generalized planning and provides a quick review of capacity or LOS for future long-range estimates. This document summarizes generalized roadway capacities based on environment (urban or rural), and roadway characteristics: number of travel lanes, presence of left/right-turn pockets, speed limit, and presence of a median. The one-way approach capacity was estimated for each internal intersections studied.

Table 4. 2043 PM Peak Hour Volume-to-Capacity Analysis

Intersection Approach (One Way)	Preferred Alternative Link Volume	One-way Approach Capacity	Vehicle-to-Capacity Ratio	Comments
17th Ave/220th St Northbound	1800	1450	1.24	High percentage of proposed land use south of 220th St and west of 17th Ave can only be accessed via 17th Ave.
Southbound	360	600	0.63	
Eastbound	1280	1550	0.82	
Westbound	1460	1450	1.00	Just over threshold.
20th Ave/220th St Northbound	600	600	1.04	Just over threshold. Added NB left turn pocket at intersection (currently shared L/T/R) would decrease v/c ratio to less than 1.0
Southbound	540	1450	0.37	
Eastbound	1240	1550	0.81	
Westbound	1560	1150	1.36	Added WB right turn pocket at intersection (currently shared L/T, T/R), would decrease v/c ratio to 1.02
23rd Ave/220th St Northbound	80	600	0.14	
Southbound	160	600	0.28	
Eastbound	660	600	1.15	Eastbound demand could be lower if drivers use some of the smaller parking lot driveways along 220th St.
Westbound	1480	1150	1.29	Westbound demand could be lower if drivers prefer to use 23rd Ave/223rd St (parallel north-south road to the west) to access 220th Street instead of 26th Ave. New turn pockets may be needed for northbound 23rd Ave at 220th Street.

Intersection Approach (One Way)	Preferred Alternative Link Volume	One-way Approach Capacity	Vehicle-to-Capacity Ratio	Comments
26th Ave/220th St Northbound	900	750	1.19	Potentially lower vehicle demand if 223rd St/23rd Ave (parallel north-south road to the west) is used to access 220th St SE instead of 26th Ave. New turn pockets may be needed for northbound 23rd Ave at 220th Street then.
Southbound	680	750	0.90	
Eastbound	640	750	0.85	Minor approach assumed as EB approach (lowest volume intersection approach)
29th Ave/223rd St Northbound	740	750	0.98	
Southbound	620	1200	0.51	
Eastbound	520	600	0.90	
Westbound	40	600	0.07	

Fehr & Peers, 2020. Note that peak hour link volumes are a high-level estimate used mostly to determine capacity needs of the internal street system. Actual redevelopment and potential internal driveway accesses could change the results shown.

- 17th Avenue SE northbound approach is expected to have a v/c ratio over 1.0. This is mostly because of the proportion of increased land use south of 220th Street and west of 17th Avenue SE (super block 9), which can only be accessed by this road. Increasing the intersection size could lead to a more unfriendly pedestrian environment.
- The v/c ratios are over 1.0 on 220th Street SE at 20th Avenue SE and 23rd Avenue SE. A 4-5-lane cross-section on 220th Street SE should be maintained. Traffic monitoring should be conducted along 220th Street SE east of 20th Avenue SE to see if an additional travel lane is needed.
- The v/c ratios for 29th Drive is just under 1.0 for the existing street system. If a road diet is implemented for a 3-lane cross-section to accommodate bicycle facilities and to improve access using other modes, the v/c ratio may exceed 1.0. If a road diet is implemented, it is likely vehicles would shift to 23rd Avenue SE if possible to avoid peak hour congestion on 29th Drive/26th Avenue SE.
- To provide alternative, low-speed capacity to public streets within the business park, consider adopting a policy to connect surface parking lots and adjacent parcels wherever possible.

Internal Intersection Control Change

The estimated internal street volumes were also used to evaluate if a potential change in intersection control (such as a traffic signal) would be necessary. This was based on the MUTCD Peak Hour traffic signal warrant, which considers the sum of the vehicles on the higher minor approach compared to the sum of the volumes in both direction of the major street. This is to see if there are enough gaps on the major street to allow for vehicles on the minor approach to travel through the intersection. Note that this analysis is based on future year traffic forecasts at full build out. Traffic counts would need to be collected over time as Canyon Park redevelops and a traffic engineering study would be needed to identify when a traffic signal at an intersection is warranted. Other intersection traffic control such as a roundabout could also be considered.

Table 5. 2043 PM Peak Hour Internal Intersection Control Analysis

Intersection	VPH on Major Street (both)	VPH On Minor Street (Highest of two)	Minor Street Greater than 150?	Signal Warrant Met?	Comments
20th Ave/220th St	2790	600	Yes	Yes	
23rd Ave /220th St	2140	170	Yes	Maybe	Minor approach volumes just over threshold, and there are other smaller driveways between 20th Ave and 23rd Ave vehicles could use that could decrease minor approach vehicle demand.
26th Ave /220th St	1580	630	Yes	Yes	
29th Dr/223rd St	1360	530	Yes	Yes	

Fehr & Peers, 2020. Note this is a rough approximation for the full build-out conditions. Traffic monitoring would need to be conducted over time to identify when/if a traffic signal is warranted as the business park redevelops.

- An intersection control change such as a traffic signal would likely be needed at three intersections: 20th Avenue SE/220th Street SE, 26th Avenue SE/220th Street SE, and 29th Drive SE/223rd Street SE.
- The peak hour signal warrant might be met at 23rd Avenue SE/220th Street SE, however there are smaller local driveways along 220th Street SE that may reduce the demand on 23rd Avenue SE.
- Intersection control change could include traffic signal or roundabout. Traffic monitoring and traffic engineering study would be needed to identify when/if an intersection control change is warranted.

17th Avenue/220th Street Intersection Analysis

The 17th Avenue/220th Street intersection is closely spaced to the main business park entrance at 220th Street SE/SR 527, and all vehicles entering and exiting the I-405 Direct Access Ramps would travel through it. The draft WSDOT I-405 Direct Access Ramp study evaluated the traffic operations at this location under future conditions which generally equates to the Canyon Park No Action Alternative, This location was further evaluated in this memo with the higher land use growth assumed in the Canyon Park Subarea Preferred Alternative. Note that this Preferred Alternative has the lowest vehicle trip generation of all Action Alternatives evaluated in the Canyon Park Subarea Draft EIS.

Traffic volumes in the Synchro network provided by WSDOT was updated with the expected growth in trips for the Preferred Alternative, and intersection LOS and queue results were extracted. It was noted that the traffic signal timing for some phases were shorter than the time needed to accommodate a pedestrian crossing. This is coded when few pedestrian crossings are expected during the analysis hour, and when the crossing distance is long with relatively low vehicle approach volumes. When a pedestrian crossing is activated, the phase would be extended to accommodate the pedestrian crossing, and the traffic signal will go out of sync with the closely spaced coordinated SR 527/220th Street SE intersection (200 feet to the west). It may take a few cycles for the signal to go back into sync.

Future year traffic forecasts summed the existing peak hour counts, new vehicle trips from the Preferred Alternative land use growth, and the WSDOT I-405 Direct Access ramp volume forecasts. The intersection is expected to carry 4,900 PM peak hour trips, 1,600 more than the WSDOT future year forecast of 3,300 peak hour trips. The increase in vehicle demand under the Preferred Alternative results in the higher vehicle delay at the analysis intersection. The increase in demand is a result of the overall higher land use growth in the Preferred Alternative, and in particular the higher land use growth in the area south of 220th Street SE and west of 17th Avenue SE compared to the WSDOT analysis. Approximately a quarter of the new growth within the business park is located on this super block 9 area (see **Figure 3**). About 10 percent of land use growth is in super block 10 which is also only accessible by 17th Avenue SE.

Potential strategies to reduce delay at this intersection could be to increase the cycle length from 70 to 140 seconds for an improved LOS F. Widening the intersection for two westbound left-turn lanes and two 17th Avenue SE southbound through lanes south of 220th Street SE, instead of the one southbound through lane would result in LOS E operations in the AM period. Increasing the

intersection size may be undesirable however as it creates a less friendly pedestrian environment. During the PM peak hour, increasing the cycle length from 75 seconds to 150 seconds may improve operations to LOS E.

Table 6. 17th Avenue SE/220th Street SE Intersection LOS Analysis

	PM LOS	PM Delay	AM LOS	AM Delay
WSDOT I-405 ETL Study	C	22	C	21
Canyon Park- Preferred Alternative	**F**	88	**F**	104

Fehr & Peers, 2020.

The average and 95th percentile queues were extracted from the Synchro model for both the Canyon Park Preferred Alternative (**Table 7**), where values in parenthesis show the increase compared to draft WSDOT I-405 Direct Access Ramp analysis shown in draft(**Table 8**). Queues that exceed the roadway link are shown bolded in red text.

Table 7. 17th Avenue SE/220th Street SE Intersection Queue Analysis – Canyon Park

	EBL	EBT	EBR	WBL	WBT	NBL	NBT/R	SBT
Storage	50	350	350	200	655	500	575	350
PM Average Queue	75 (+25)	175 (+50)	250 (+50)	175 (+100)	225 (+100)	400 (+175)	50 (+50)	225 (+175)
PM 95th Percentile Queue	100 (+50)	200 (+75)	300 (+50)	**350** (+200)	325 (+175)	**525** (+250)	125 (+75)	**375** (+225)
AM Average Queue	25	**450** (+250)	**775** (+50)	**350** (+300)	50 (+25)	150 (+175)	25 (+25)	125 (+100)
AM 95th Percentile Queue	50 (+25)	**475** (+275)	**850** (+600)	**525** (+375)	75 (+25)	250 (+125)	100 (+50)	250 (+200)

Fehr & Peers, 2020. Queues are rounded to the nearest 25 feet. Values in parentheses are queue increase compared to draft WSDOT I-405 Express Toll Lane Analysis.

Table 8. 17th Avenue SE/220th Street SE Intersection Queue Analysis – draft WSDOT Analysis

	EBL	EBT	EBR	WBL	WBT	NBL	NBT/R	SBT
Link Distance	50	350	350	200	655	500	575	350
PM Average Queue	50	125	200	75	125	225	0	50
PM 95th Percentile Queue	50	125	250	150	150	275	50	150
AM Average Queue	25	200	300	50	25	75	0	25
AM 95th Percentile Queue	25	200	250	150	50	125	50	50

Fehr & Peers, 2020. Queues are reported from the draft WSDOT Synchro network received 12/2019. Queues are rounded to the nearest 25 feet.

- The 17th Avenue SE/220th Street intersection peak hour intersection operations are expected to operate at LOS F. The intersection is expected to carry an additional 1,600 PM peak hour trips compared to the WSDOT I-405 Express Toll Lane analysis. The adjacent SR 527/220th Street SE intersection is also expected to operate at LOS F under No Action and the Preferred Alternative.
- The 95th percentile queue lengths may exceed storage in the westbound left, northbound left, and southbound through movements during the PM peak hour. Synchro also reported that queues could be longer since vehicle demand is so high.
- During the AM peak hour, the eastbound left, eastbound right, and westbound left queues may exceed storage during the AM peak hour, which may affect operations at upstream intersections such as at SR 527.
- Strategies to address inadequate road conditions could include traffic signal timing improvements such as increased cycle length to 150 seconds for the PM peak hour. During the AM period the cycle length could increase to 140 seconds, however the intersection may still operate at LOS F. Intersection improvements could be dual westbound left turn lanes and an extra southbound through lane on 17th Avenue SE, however increasing the size of the intersection would make a more unfriendly pedestrian environment by increasing crossing distances.
- Traffic monitoring at 17th Ave/220th Street intersection location should be conducted periodically as the business park develops to identify if and when operational improvements such as signal timing/signal coordination with SR 527/220th Street intersection or other intersection improvements such as widening are needed to improve traffic operations.

Vistro File: \...\CanyonPark Network Changes_0501_With_214.vistro

Scenario 3 Preferred Alterantive (w 214th)

Report File: C:\...\PA_Vistro_v2.pdf

6/29/2020

Trip Generation summary

Added Trips

Zone ID: Name	Land Use variables	Code	Ind. Var.	Rate	Quantity	% In	% Out	Trips In	Trips Out	Total Trips	% of Total Trips
1: Zone				1.000	0.000	50.00	50.00	1360	2120	3480	69.46
2: Zone				1.000	0.000	50.00	50.00	630	680	1310	26.15
3: Zone				1.000	0.000	50.00	50.00	120	100	220	4.39
					Added Trips Total			**2110**	**2900**	**5010**	**100.00**

Vistro File: \...\CanyonPark Network Changes_0501_With_214.vistro

Scenario 3 Preferred Alterantive (w 214th)

Report File: C:\...\PA_Vistro_v2.pdf

6/29/2020

Trip Distribution summary

Zone / Gate	Zone 1: Zone			
	To Zone:		From Zone:	
	Share %	Trips	Share %	Trips
2: Zone	0.00	0	0.00	0
3: Zone	0.00	0	0.00	0
4: Gate	8.00	109	11.00	233
5: Gate	12.00	163	11.00	233
6: Gate	7.00	95	6.00	127
7: Gate	23.00	313	24.00	510
8: Gate	8.00	109	7.00	148
9: Gate	11.00	150	16.00	339
10: Gate	16.00	218	13.00	276
11: Gate	15.00	204	12.00	254
Total	**100.00**	**1361**	**100.00**	**2120**

Zone / Gate	Zone 2: Zone			
	To Zone:		From Zone:	
	Share %	Trips	Share %	Trips
1: Zone	0.00	0	0.00	0
3: Zone	0.00	0	0.00	0
4: Gate	8.00	50	11.00	75
5: Gate	12.00	76	11.00	75
6: Gate	7.00	44	6.00	41
7: Gate	23.00	145	24.00	162
8: Gate	8.00	50	7.00	48
9: Gate	11.00	69	16.00	109
10: Gate	16.00	101	13.00	88
11: Gate	15.00	95	12.00	82
Total	**100.00**	**630**	**100.00**	**680**

Zone / Gate	Zone 3: Zone			
	To Zone:		From Zone:	
	Share %	Trips	Share %	Trips
1: Zone	0.00	0	0.00	0
2: Zone	0.00	0	0.00	0
4: Gate	8.00	10	11.00	11
5: Gate	12.00	14	11.00	11
6: Gate	7.00	8	6.00	6
7: Gate	23.00	28	24.00	24
8: Gate	8.00	10	7.00	7
9: Gate	11.00	13	16.00	16
10: Gate	16.00	19	13.00	13
11: Gate	15.00	18	12.00	12
Total	**100.00**	**120**	**100.00**	**100**

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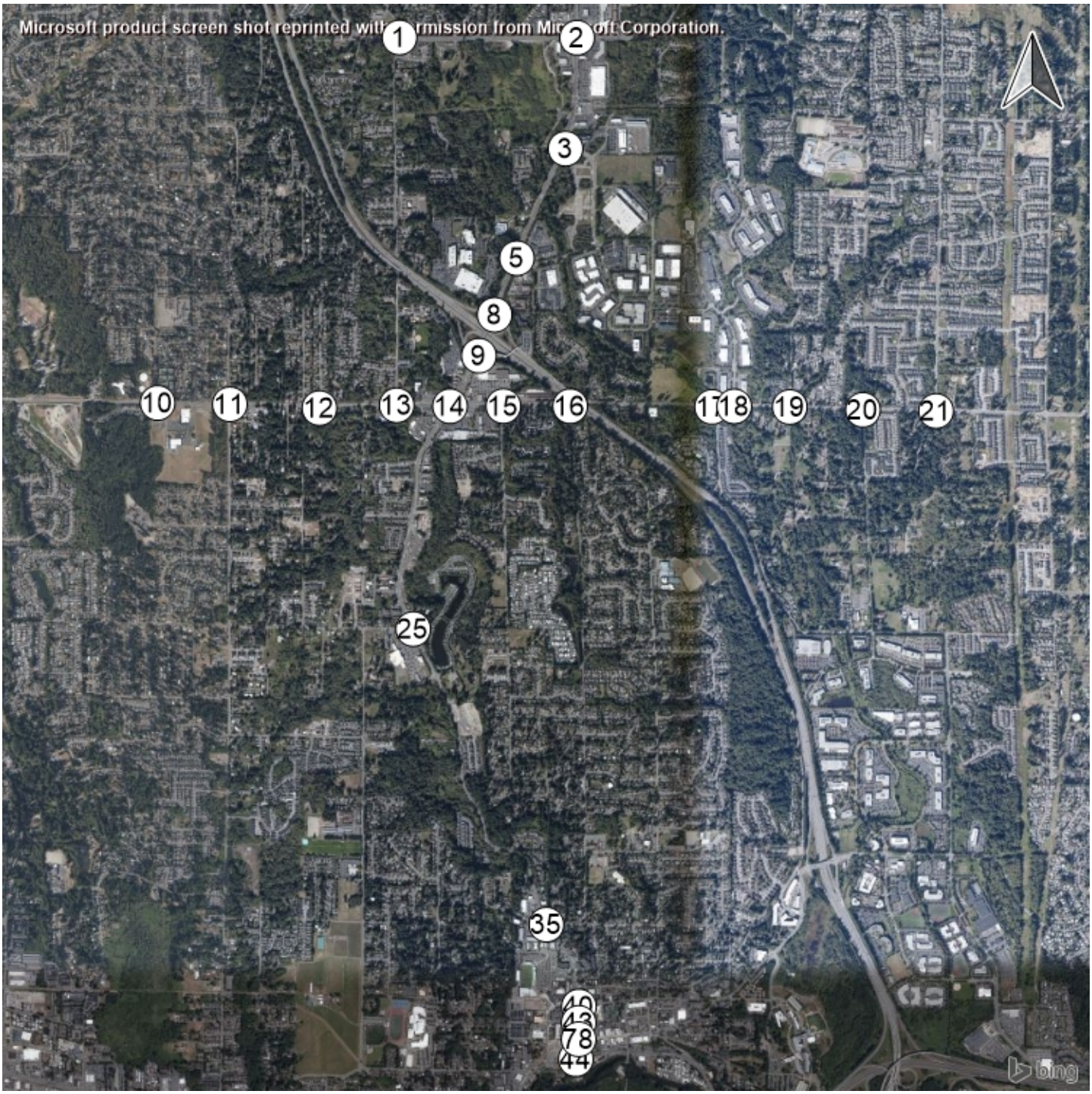
Version 7.00-06

Study Intersections



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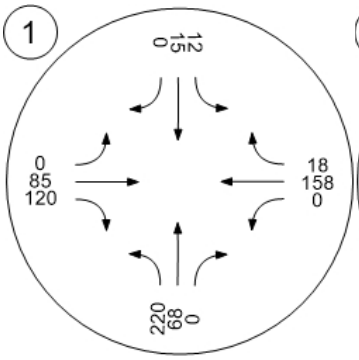
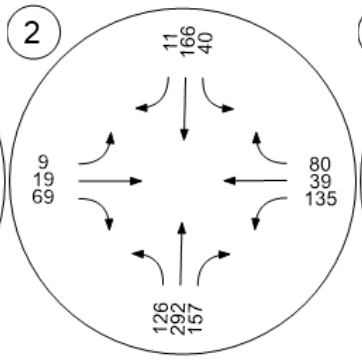
Traffic Volume - Net New Site Trips

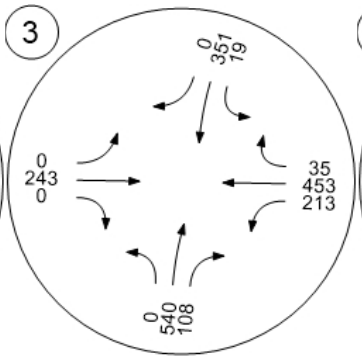
208th St SE / SR 524 & Filbe



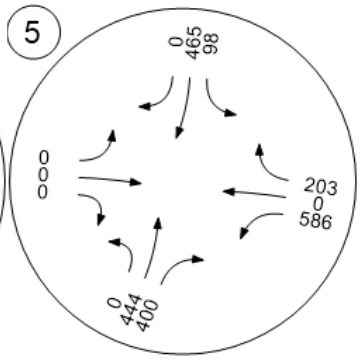
208th St SE / SR 524 & SR-



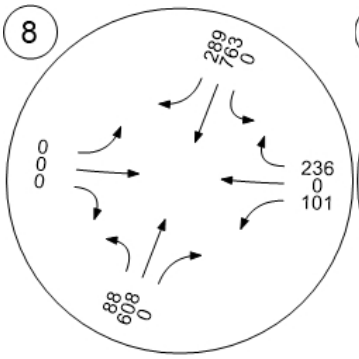
214th St SE & SR-527



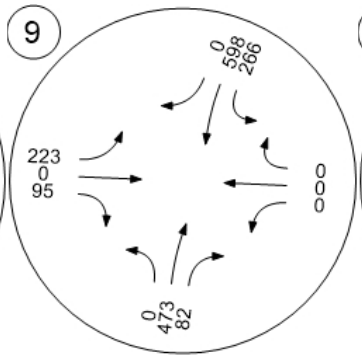
220th St SE & SR-527



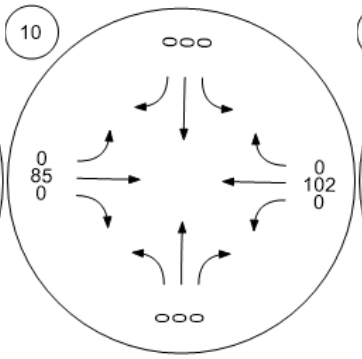
I-405 NB Ramps & SR-527



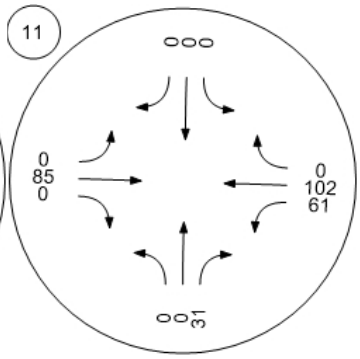
I-405 SB Ramps & SR-527



228th St SE & 4th Ave W



228th St SE & Meridian Ave



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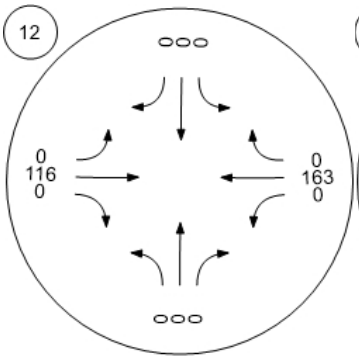
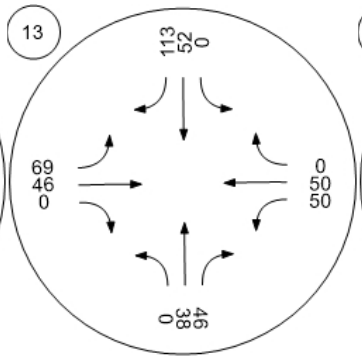
Version 7.00-06

Traffic Volume - Net New Site Trips

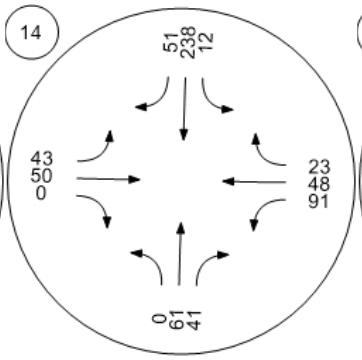
228th St SE & 4th Ave SE



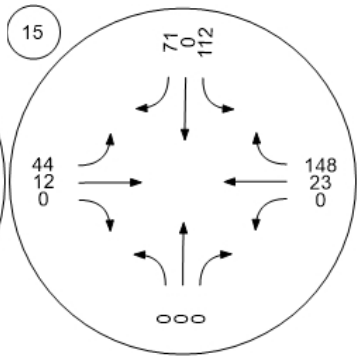
228th St SE & 9th Ave SE



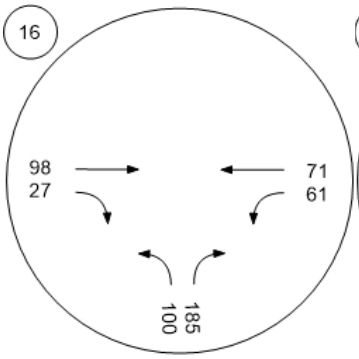
228th St SE & SR-527



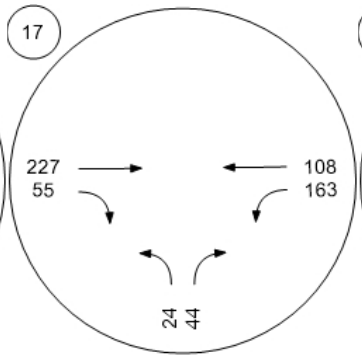
228th St SE & 15th Ave SE



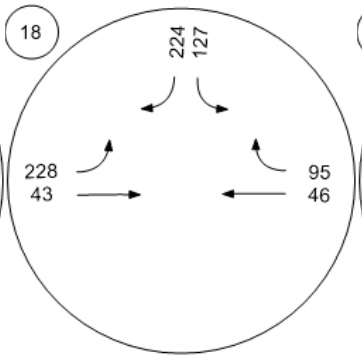
228th St SE & 19th Ave SE



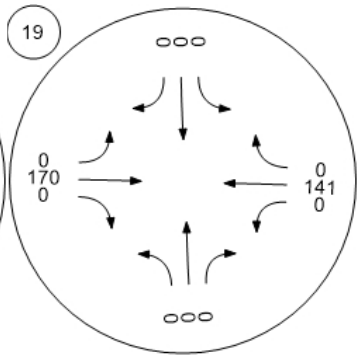
228th St SE & Fitzgerald Rd



228th St SE & 29th Dr SE



228th St SE & 31st Ave SE



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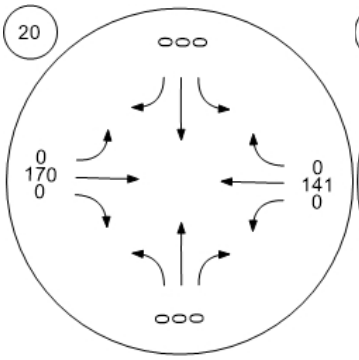
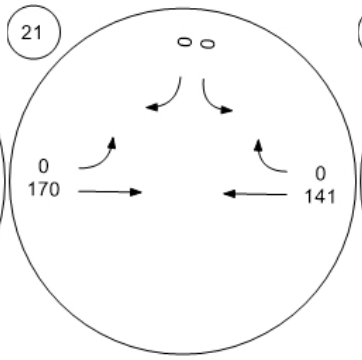
Version 7.00-06

Traffic Volume - Net New Site Trips

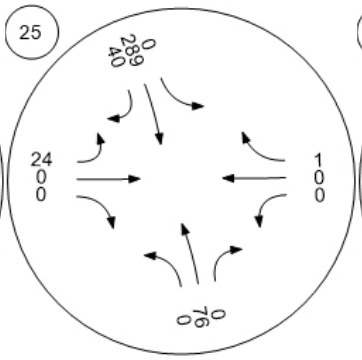
228th St SE & 35th Ave SE



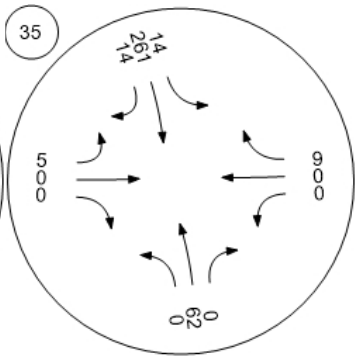
228th St SE & 39th Ave SE



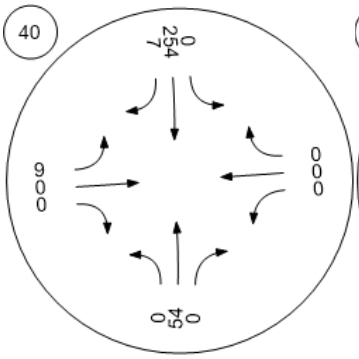
240th St SE & SR-527



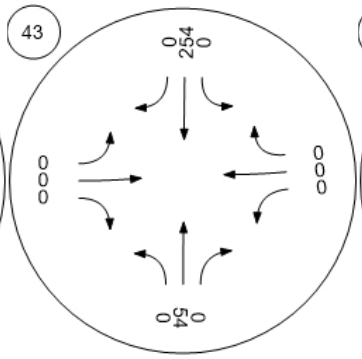
NE 191st St & SR-527



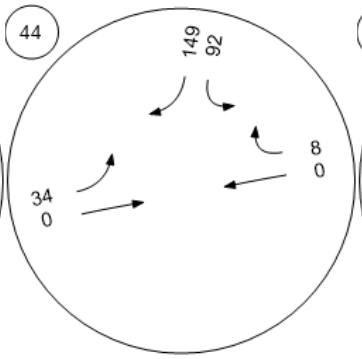
NE 185th St & SR-527



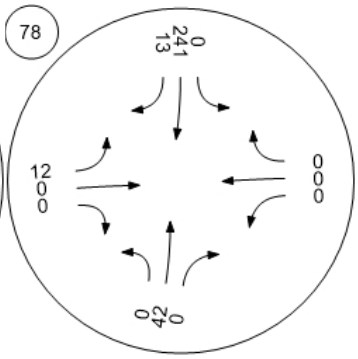
NE 183rd St & SR-527



SR-522 & SR-527



Main St & SR-527



Preferred Alternative 2043 PM Analysis

1 SR-524 Corridor

Intersection	Preferred Alternative with 214th Street		Preferred Alternative without 214th Street	
	Delay (sec)	LOS	Delay (sec)	LOS
208th St SE / SR 524 & Filbert Dr	62	E	70	E
208th St SE / SR 524 & SR-527	70	E	113	F
SR 524 / 20th Ave SE (new)	50	D	52	D
WEIGHTED AVERAGE (2 original intersections)	*66*	*E*	*96*	*F*
WEIGHTED AVERAGE (3 intersections)	*63*	*E*	*76*	*E*

2 228th Street SW/SE Corridor

Intersection				
228th St SE & 4th Ave W	22	C	30	C
228th St SE & Meridian Ave	37	D	45	D
228th St SE & 4th Ave SE	18	B	29	C
228th St SE & 9th Ave SE	76	E	66	E
228th St SE & SR-527	130	F	161	F
228th St SE & 15th Ave SE	17	B	16	B
228th St SE & 19th Ave SE	58	E	58	E
228th St SE & Fitzgerald Rd	63	E	63	E
228th St SE & 29th Dr SE	46	D	46	D
228th St SE & 31st Ave SE	76	E	76	E
228th St SE & 35th Ave SE	40	D	40	D
228th St SE & 39th Ave SE	53	D	53	D
WEIGHTED AVERAGE	*62*	*E*	*68*	*E*

5 SR-527 Corridor

Intersection				
208th St SE / SR 524 & SR-527	70	E	113	F
214th St SE & SR-527	53	D	70	E
220th St SE & SR-527	123	F	145	F
I-405 NB Ramps & SR-527	109	F	152	F
I-405 SB Ramps & SR-527	8	A	13	B
228th St SE & SR-527	130	F	161	F
240th St SE & SR-527	47	D	47	D
NE 191st St & SR-527	57	E	57	E
NE 185th St & SR-527	55	E	55	E
NE 183rd St & SR-527	16	B	16	B
Main St & SR-527	29	C	29	C
SR-522 & SR-527	61	E	61	E
WEIGHTED AVERAGE	*71*	*E*	*89*	*F*

HCM 6th Signalized Intersection Summary
1: 9th Ave SE/Filbert Dr & 208th St SE / SR 524

06/26/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	1385	270	141	1428	103	945	288	314	102	65	4
Future Volume (veh/h)	7	1385	270	141	1428	103	945	288	314	102	65	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1885	1885	1885	1870	1870	1870
Adj Flow Rate, veh/h	7	1458	209	153	1552	107	1027	313	274	112	71	3
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	1	1	1	2	2	2
Cap, veh/h	79	1504	671	146	1543	106	1156	333	291	142	145	6
Arrive On Green	0.02	0.42	0.42	0.05	0.46	0.45	0.33	0.36	0.36	0.05	0.08	0.08
Sat Flow, veh/h	1781	3554	1585	1781	3374	231	3483	919	805	1781	1780	75
Grp Volume(v), veh/h	7	1458	209	153	813	846	1027	0	587	112	0	74
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1829	1742	0	1724	1781	0	1855
Q Serve(g_s), s	0.3	56.4	3.7	7.0	64.3	64.3	39.3	0.0	46.3	7.2	0.0	5.4
Cycle Q Clear(g_c), s	0.3	56.4	3.7	7.0	64.3	64.3	39.3	0.0	46.3	7.2	0.0	5.4
Prop In Lane	1.00		1.00	1.00		0.13	1.00		0.47	1.00		0.04
Lane Grp Cap(c), veh/h	79	1504	671	146	812	836	1156	0	624	142	0	151
V/C Ratio(X)	0.09	0.97	0.31	1.05	1.00	1.01	0.89	0.00	0.94	0.79	0.00	0.49
Avail Cap(c_a), veh/h	127	1504	671	146	812	836	1156	0	678	142	0	350
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	34.8	39.7	2.4	36.9	38.2	38.2	44.5	0.0	43.5	65.5	0.0	61.8
Incr Delay (d2), s/veh	0.2	16.6	0.3	86.9	31.7	34.1	8.4	0.0	20.8	22.8	0.0	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	27.5	4.3	6.5	34.3	35.8	18.3	0.0	23.2	5.0	0.0	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.0	56.2	2.8	123.9	69.9	72.3	52.9	0.0	64.3	88.4	0.0	65.1
LnGrp LOS	C	E	A	F	F	F	D	A	E	F	A	E
Approach Vol, veh/h		1674			1812			1614			186	
Approach Delay, s/veh		49.5			75.6			57.0			79.1	
Approach LOS		D			E			E			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	63.5	50.7	15.4	6.2	68.3	11.2	54.9
Change Period (Y+Rc), s	5.0	5.0	4.5	4.5	5.0	5.0	4.5	4.5
Max Green Setting (Gmax), s	6.0	58.5	35.5	26.0	5.0	59.5	6.7	54.8
Max Q Clear Time (g_c+I1), s	9.0	58.4	41.3	7.4	2.3	66.3	9.2	48.3
Green Ext Time (p_c), s	0.0	0.1	0.0	0.3	0.0	0.0	0.0	2.1

Intersection Summary	
HCM 6th Ctrl Delay	61.8
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	709	594	329	405	609	365	566	1882	687	182	886	311
Future Volume (veh/h)	709	594	329	405	609	365	566	1882	687	182	886	311
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1870	1870	1870	1687	1687	1885	1870	1870	1870
Adj Flow Rate, veh/h	746	625	0	440	662	0	596	1981	0	196	953	0
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	2	2	2	1	1	1	2	2	2
Cap, veh/h	673	844		501	666		644	2163		183	1121	
Arrive On Green	0.19	0.24	0.00	0.24	0.31	0.00	0.21	0.47	0.00	0.05	0.32	0.00
Sat Flow, veh/h	3483	3582	1598	3456	3554	1585	3116	4605	1598	3456	3554	1585
Grp Volume(v), veh/h	746	625	0	440	662	0	596	1981	0	196	953	0
Grp Sat Flow(s),veh/h/ln	1742	1791	1598	1728	1777	1585	1558	1535	1598	1728	1777	1585
Q Serve(g_s), s	29.0	24.2	0.0	18.4	27.9	0.0	28.1	60.1	0.0	8.0	37.6	0.0
Cycle Q Clear(g_c), s	29.0	24.2	0.0	18.4	27.9	0.0	28.1	60.1	0.0	8.0	37.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	673	844		501	666		644	2163		183	1121	
V/C Ratio(X)	1.11	0.74		0.88	0.99		0.93	0.92		1.07	0.85	
Avail Cap(c_a), veh/h	673	844		647	666		690	2177		183	1121	
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.76	0.76	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	60.5	53.1	0.0	55.6	51.5	0.0	58.4	37.0	0.0	71.0	48.0	0.0
Incr Delay (d2), s/veh	68.1	3.5	0.0	8.5	29.0	0.0	17.8	7.6	0.0	86.1	8.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	19.1	11.3	0.0	8.0	13.9	0.0	12.5	23.0	0.0	5.7	17.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	128.6	56.6	0.0	64.1	80.4	0.0	76.1	44.6	0.0	157.1	56.2	0.0
LnGrp LOS	F	E		E	F		E	D		F	E	
Approach Vol, veh/h		1371	A		1102	A		2577	A		1149	A
Approach Delay, s/veh		95.8			73.9			51.9			73.4	
Approach LOS		F			E			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.2	74.5	25.7	39.4	35.3	51.3	33.0	32.1
Change Period (Y+Rc), s	4.5	* 4.5	* 4.1	* 4.1	* 4.3	4.5	* 4.1	* 4.1
Max Green Setting (Gmax), s	6.0	* 70	* 28	* 29	* 33	42.9	* 29	* 28
Max Q Clear Time (g_c+I1), s	10.0	62.1	20.4	26.2	30.1	39.6	31.0	29.9
Green Ext Time (p_c), s	0.0	7.9	1.3	0.8	0.9	2.4	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	69.5
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	245	2	369	459	393	2	2710	168	83	1381	5
Future Volume (veh/h)	25	245	2	369	459	393	2	2710	168	83	1381	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1885	1885	1885	1885	1885	1885	1856	1856	1856
Adj Flow Rate, veh/h	30	292	0	473	588	0	2	2853	0	91	1518	5
Peak Hour Factor	0.84	0.84	0.84	0.78	0.78	0.78	0.95	0.95	0.95	0.91	0.91	0.91
Percent Heavy Veh, %	4	4	4	1	1	1	1	1	1	3	3	3
Cap, veh/h	50	326	0	341	465		4	2941		82	3211	11
Arrive On Green	0.03	0.18	0.00	0.10	0.25	0.00	0.00	1.00	0.00	0.05	0.62	0.61
Sat Flow, veh/h	1753	1841	0	3483	1885	1598	1795	5316	0	1767	5212	17
Grp Volume(v), veh/h	30	292	0	473	588	0	2	2853	0	91	984	539
Grp Sat Flow(s),veh/h/ln	1753	1841	0	1742	1885	1598	1795	1716	0	1767	1689	1852
Q Serve(g_s), s	2.5	23.3	0.0	14.7	37.0	0.0	0.2	0.0	0.0	7.0	23.7	23.7
Cycle Q Clear(g_c), s	2.5	23.3	0.0	14.7	37.0	0.0	0.2	0.0	0.0	7.0	23.7	23.7
Prop In Lane	1.00		0.00	1.00		1.00	1.00		0.00	1.00		0.01
Lane Grp Cap(c), veh/h	50	326	0	341	465		4	2941		82	2080	1141
V/C Ratio(X)	0.60	0.89	0.00	1.39	1.26		0.52	0.97		1.10	0.47	0.47
Avail Cap(c_a), veh/h	70	454	0	341	465		48	2941		82	2080	1141
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	0.09	0.09	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	72.0	60.3	0.0	67.7	56.5	0.0	74.6	0.0	0.0	71.5	15.6	15.6
Incr Delay (d2), s/veh	11.0	15.5	0.0	191.5	135.3	0.0	9.6	1.6	0.0	130.0	0.8	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	12.3	0.0	15.6	35.1	0.0	0.1	0.4	0.0	6.1	8.9	9.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	83.0	75.9	0.0	259.1	191.8	0.0	84.2	1.6	0.0	201.5	16.4	17.0
LnGrp LOS	F	E	A	F	F		F	A		F	B	B
Approach Vol, veh/h		322			1061	A		2855	A		1614	
Approach Delay, s/veh		76.5			221.8			1.7			27.0	
Approach LOS		E			F			A			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	89.7	18.7	30.6	4.3	96.4	8.3	41.0
Change Period (Y+Rc), s	4.0	5.0	4.0	4.0	4.0	5.0	4.0	4.0
Max Green Setting (Gmax), s	7.0	83.0	6.0	37.0	4.0	86.0	6.0	37.0
Max Q Clear Time (g_c+I1), s	9.0	2.0	16.7	25.3	2.2	25.7	4.5	39.0
Green Ext Time (p_c), s	0.0	77.5	0.0	0.9	0.0	33.1	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	52.7
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	80	346	1330	15	860	51	1794	785	558	1620	10
Future Volume (veh/h)	28	80	346	1330	15	860	51	1794	785	558	1620	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1786	1786	1786	1786	1786	1744	1744	1744	1744	1744	1744
Adj Flow Rate, veh/h	32	221	178	1430	0	785	54	1909	0	641	1862	11
Peak Hour Factor	0.88	0.88	0.88	0.93	0.93	0.93	0.94	0.94	0.94	0.87	0.87	0.87
Percent Heavy Veh, %	1	1	1	1	1	1	4	4	4	4	4	4
Cap, veh/h	46	191	153	1032	0	1607	74	1555		516	2160	13
Arrive On Green	0.03	0.11	0.11	0.30	0.00	0.38	0.01	0.11	0.00	0.32	0.88	0.88
Sat Flow, veh/h	1701	1786	1437	3402	0	2984	1661	4761	1478	3222	4883	29
Grp Volume(v), veh/h	32	221	178	1430	0	785	54	1909	0	641	1210	663
Grp Sat Flow(s),veh/h/ln	1701	1786	1437	1701	0	1492	1661	1587	1478	1611	1587	1738
Q Serve(g_s), s	2.8	16.0	16.0	45.5	0.0	2.7	4.9	49.0	0.0	24.0	27.7	27.8
Cycle Q Clear(g_c), s	2.8	16.0	16.0	45.5	0.0	2.7	4.9	49.0	0.0	24.0	27.7	27.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	46	191	153	1032	0	1607	74	1555		516	1404	769
V/C Ratio(X)	0.70	1.16	1.16	1.39	0.00	0.49	0.73	1.23		1.24	0.86	0.86
Avail Cap(c_a), veh/h	96	191	153	1032	0	1607	100	1555		516	1404	769
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.39	0.39	0.00	0.41	0.41	0.41
Uniform Delay (d), s/veh	72.4	67.0	67.0	52.3	0.0	12.9	73.0	66.9	0.0	51.0	6.4	6.4
Incr Delay (d2), s/veh	17.4	115.0	122.6	179.7	0.0	0.1	4.0	104.8	0.0	116.4	3.1	5.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	13.4	11.1	45.3	0.0	6.4	2.2	36.0	0.0	16.4	3.3	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	89.8	182.0	189.6	231.9	0.0	13.0	77.0	171.7	0.0	167.4	9.5	11.9
LnGrp LOS	F	F	F	F	A	B	E	F		F	A	B
Approach Vol, veh/h		431			2215			1963	A		2514	
Approach Delay, s/veh		178.3			154.3			169.1			50.4	
Approach LOS		F			F			F			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	28.0	53.0	49.0	20.0	10.6	70.4	7.5	61.5
Change Period (Y+Rc), s	4.5	4.5	4.0	4.5	4.5	4.5	4.0	4.5
Max Green Setting (Gmax), s	23.5	48.5	45.0	15.5	8.5	63.5	8.0	52.5
Max Q Clear Time (g_c+I1), s	26.0	51.0	47.5	18.0	6.9	29.8	4.8	4.7
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	17.9	0.0	2.3

Intersection Summary	
HCM 6th Ctrl Delay	123.2
HCM 6th LOS	F

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	521	9	941	0	1650	530	0	2408	830
Future Volume (veh/h)	0	0	0	521	9	941	0	1650	530	0	2408	830
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1772	1772	1772	0	1786	1786	0	1786	1786
Adj Flow Rate, veh/h				635	11	0	0	1897	0	0	2768	0
Peak Hour Factor				0.82	0.82	0.82	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %				2	2	2	0	1	1	0	1	1
Cap, veh/h				525	9		0	2061		0	2061	
Arrive On Green				0.32	0.32	0.00	0.00	1.00	0.00	0.00	0.81	0.00
Sat Flow, veh/h				1660	29	1502	0	3483	1514	0	3483	1514
Grp Volume(v), veh/h				646	0	0	0	1897	0	0	2768	0
Grp Sat Flow(s),veh/h/ln				1689	0	1502	0	1697	1514	0	1697	1514
Q Serve(g_s), s				47.4	0.0	0.0	0.0	0.0	0.0	0.0	91.1	0.0
Cycle Q Clear(g_c), s				47.4	0.0	0.0	0.0	0.0	0.0	0.0	91.1	0.0
Prop In Lane				0.98		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				534	0		0	2061		0	2061	
V/C Ratio(X)				1.21	0.00		0.00	0.92		0.00	1.34	
Avail Cap(c_a), veh/h				534	0		0	2061		0	2061	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.33	1.33
Upstream Filter(I)				1.00	0.00	0.00	0.00	0.38	0.00	0.00	0.09	0.00
Uniform Delay (d), s/veh				51.3	0.0	0.0	0.0	0.0	0.0	0.0	14.4	0.0
Incr Delay (d2), s/veh				111.2	0.0	0.0	0.0	3.5	0.0	0.0	154.7	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				36.5	0.0	0.0	0.0	1.0	0.0	0.0	61.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				162.5	0.0	0.0	0.0	3.5	0.0	0.0	169.1	0.0
LnGrp LOS				F	A		A	A		A	F	
Approach Vol, veh/h					646	A		1897	A		2768	A
Approach Delay, s/veh					162.5			3.5			169.1	
Approach LOS					F			A			F	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	97.0	53.0	97.0
Change Period (Y+Rc), s	5.9	5.6	5.9
Max Green Setting (Gmax), s	91.1	47.4	91.1
Max Q Clear Time (g_c+I1), s	93.1	49.4	2.0
Green Ext Time (p_c), s	0.0	0.0	40.2

Intersection Summary	
HCM 6th Ctrl Delay	109.2
HCM 6th LOS	F

Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	497	0	760	0	0	0	0	1650	632	0	2058	820
Future Volume (veh/h)	497	0	760	0	0	0	0	1650	632	0	2058	820
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1772	0	1772				0	1786	1786	0	1772	1772
Adj Flow Rate, veh/h	512	0	0				0	1774	0	0	2189	0
Peak Hour Factor	0.97	0.97	0.97				0.93	0.93	0.93	0.94	0.94	0.94
Percent Heavy Veh, %	2	0	2				0	1	1	0	2	2
Cap, veh/h	624	0					0	2487		0	2467	
Arrive On Green	0.19	0.00	0.00				0.00	0.97	0.00	0.00	1.00	0.00
Sat Flow, veh/h	3274	0	1502				0	3483	1514	0	3455	1502
Grp Volume(v), veh/h	512	0	0				0	1774	0	0	2189	0
Grp Sat Flow(s),veh/h/ln	1637	0	1502				0	1697	1514	0	1683	1502
Q Serve(g_s), s	22.5	0.0	0.0				0.0	6.5	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	22.5	0.0	0.0				0.0	6.5	0.0	0.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	624	0					0	2487		0	2467	
V/C Ratio(X)	0.82	0.00					0.00	0.71		0.00	0.89	
Avail Cap(c_a), veh/h	1318	0					0	2487		0	2467	
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.33	1.33	1.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	0.09	0.00	0.00	0.09	0.00
Uniform Delay (d), s/veh	58.3	0.0	0.0				0.0	0.6	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	3.9	0.0	0.0				0.0	0.2	0.0	0.0	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.7	0.0	0.0				0.0	0.7	0.0	0.0	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.2	0.0	0.0				0.0	0.8	0.0	0.0	0.5	0.0
LnGrp LOS	E	A					A	A		A	A	
Approach Vol, veh/h		512	A					1774	A		2189	A
Approach Delay, s/veh		62.2						0.8			0.5	
Approach LOS		E						A			A	

Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		115.8				115.8		34.2				
Change Period (Y+Rc), s		5.9				5.9		5.6				
Max Green Setting (Gmax), s		78.1				78.1		60.4				
Max Q Clear Time (g_c+I1), s		2.0				8.5		24.5				
Green Ext Time (p_c), s		49.2				31.9		4.1				

Intersection Summary	
HCM 6th Ctrl Delay	7.7
HCM 6th LOS	A

Notes

Unsignalized Delay for [NBR, EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	608	0	0	912	183	0	0	0	190	0	25
Future Volume (veh/h)	73	608	0	0	912	183	0	0	0	190	0	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1856
Adj Flow Rate, veh/h	78	654	0	0	991	199	0	0	0	213	0	28
Peak Hour Factor	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.89	0.92	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	3
Cap, veh/h	245	2897	0	646	1158	233	0	1	0	240	0	211
Arrive On Green	0.03	0.82	0.00	0.00	0.77	0.77	0.00	0.00	0.00	0.13	0.00	0.13
Sat Flow, veh/h	1781	3647	0	1781	1512	304	0	1870	0	1781	0	1567
Grp Volume(v), veh/h	78	654	0	0	0	1190	0	0	0	213	0	28
Grp Sat Flow(s),veh/h/ln	1781	1777	0	1781	0	1815	0	1870	0	1781	0	1567
Q Serve(g_s), s	1.3	6.3	0.0	0.0	0.0	66.7	0.0	0.0	0.0	17.6	0.0	2.4
Cycle Q Clear(g_c), s	1.3	6.3	0.0	0.0	0.0	66.7	0.0	0.0	0.0	17.6	0.0	2.4
Prop In Lane	1.00		0.00	1.00		0.17	0.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	245	2897	0	646	0	1391	0	1	0	240	0	211
V/C Ratio(X)	0.32	0.23	0.00	0.00	0.00	0.86	0.00	0.00	0.00	0.89	0.00	0.13
Avail Cap(c_a), veh/h	276	2897	0	698	0	1391	0	206	0	291	0	256
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.9	3.1	0.0	0.0	0.0	11.9	0.0	0.0	0.0	63.8	0.0	57.1
Incr Delay (d2), s/veh	0.7	0.2	0.0	0.0	0.0	6.9	0.0	0.0	0.0	23.3	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	2.0	0.0	0.0	0.0	26.3	0.0	0.0	0.0	9.6	0.0	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.6	3.3	0.0	0.0	0.0	18.8	0.0	0.0	0.0	87.0	0.0	57.4
LnGrp LOS	C	A	A	A	A	B	A	A	A	F	A	E
Approach Vol, veh/h		732			1190			0			241	
Approach Delay, s/veh		5.4			18.8			0.0			83.6	
Approach LOS		A			B						F	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	0.0	126.3		23.7	7.3	118.9		0.0
Change Period (Y+Rc), s	3.5	4.0		3.5	3.5	4.0		3.5
Max Green Setting (Gmax), s	4.5	90.0		24.5	6.5	88.0		16.5
Max Q Clear Time (g_c+I1), s	0.0	8.3		19.6	3.3	68.7		0.0
Green Ext Time (p_c), s	0.0	5.5		0.5	0.1	11.2		0.0

Intersection Summary	
HCM 6th Ctrl Delay	21.5
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	603	147	189	852	252	237	177	214	125	63	12
Future Volume (veh/h)	9	603	147	189	852	252	237	177	214	125	63	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	10	648	138	203	916	248	252	188	228	147	74	14
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.94	0.94	0.94	0.85	0.85	0.85
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	452	798	170	650	1023	276	373	262	220	287	201	38
Arrive On Green	0.20	0.27	0.27	0.29	0.37	0.37	0.09	0.14	0.14	0.08	0.13	0.14
Sat Flow, veh/h	1795	2938	625	1795	2786	753	1795	1885	1587	1795	1539	291
Grp Volume(v), veh/h	10	395	391	203	588	576	252	188	228	147	0	88
Grp Sat Flow(s),veh/h/ln	1795	1791	1771	1795	1791	1748	1795	1885	1587	1795	0	1830
Q Serve(g_s), s	0.0	15.4	15.5	1.0	23.2	23.3	6.8	7.2	5.7	5.3	0.0	3.3
Cycle Q Clear(g_c), s	0.0	15.4	15.5	1.0	23.2	23.3	6.8	7.2	5.7	5.3	0.0	3.3
Prop In Lane	1.00		0.35	1.00		0.43	1.00		1.00	1.00		0.16
Lane Grp Cap(c), veh/h	452	486	481	650	657	642	373	262	220	287	0	239
V/C Ratio(X)	0.02	0.81	0.81	0.31	0.89	0.90	0.68	0.72	1.03	0.51	0.00	0.37
Avail Cap(c_a), veh/h	452	547	541	650	673	657	373	530	447	287	0	500
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.1	25.5	25.5	18.6	22.4	22.4	27.6	30.9	9.8	25.6	0.0	29.7
Incr Delay (d2), s/veh	0.0	13.7	14.0	0.3	17.1	17.7	4.8	3.7	38.6	1.5	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	8.1	8.0	2.5	12.1	12.0	1.3	3.4	5.9	2.3	0.0	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.1	39.2	39.5	18.8	39.4	40.1	32.4	34.6	48.4	27.2	0.0	30.7
LnGrp LOS	C	D	D	B	D	D	C	C	F	C	A	C
Approach Vol, veh/h		796			1367			668			235	
Approach Delay, s/veh		39.2			36.7			38.5			28.5	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.0	24.4	10.8	13.8	18.9	31.5	10.2	14.4
Change Period (Y+Rc), s	3.5	4.0	3.5	3.5	3.5	4.0	3.5	3.5
Max Green Setting (Gmax), s	9.3	22.9	7.3	21.0	4.0	28.2	6.7	21.6
Max Q Clear Time (g_c+I1), s	3.0	17.5	8.8	5.3	2.0	25.3	7.3	9.2
Green Ext Time (p_c), s	0.4	2.9	0.0	0.2	0.0	2.2	0.0	1.4

Intersection Summary	
HCM 6th Ctrl Delay	37.1
HCM 6th LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	1056	3	3	1252	240	1	0	1	51	0	8
Future Volume (veh/h)	20	1056	3	3	1252	240	1	0	1	51	0	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1900	1900	1900	1870	1870	1870
Adj Flow Rate, veh/h	24	1257	4	3	1346	252	1	0	0	62	0	0
Peak Hour Factor	0.84	0.84	0.84	0.93	0.93	0.93	0.88	0.88	0.88	0.82	0.82	0.82
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	2	2	2
Cap, veh/h	247	1331	4	360	2557	472	145	0	0	128	0	0
Arrive On Green	0.01	0.71	0.72	0.15	0.85	0.85	0.06	0.00	0.00	0.06	0.00	0.00
Sat Flow, veh/h	1781	1863	6	1795	3007	555	1722	0	0	1421	0	0
Grp Volume(v), veh/h	24	0	1261	3	793	805	1	0	0	62	0	0
Grp Sat Flow(s),veh/h/ln	1781	0	1869	1795	1791	1771	1723	0	0	1421	0	0
Q Serve(g_s), s	0.6	0.0	88.9	0.0	17.9	18.6	0.0	0.0	0.0	6.4	0.0	0.0
Cycle Q Clear(g_c), s	0.6	0.0	88.9	0.0	17.9	18.6	0.1	0.0	0.0	6.5	0.0	0.0
Prop In Lane	1.00		0.00	1.00		0.31	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	247	0	1335	360	1523	1506	145	0	0	128	0	0
V/C Ratio(X)	0.10	0.00	0.94	0.01	0.52	0.53	0.01	0.00	0.00	0.48	0.00	0.00
Avail Cap(c_a), veh/h	282	0	1408	360	1523	1506	270	0	0	251	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	8.3	0.0	18.8	41.6	3.0	3.1	66.8	0.0	0.0	69.8	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	14.5	0.0	1.3	1.4	0.0	0.0	0.0	2.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	40.4	0.1	5.3	5.5	0.0	0.0	0.0	2.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.5	0.0	33.4	41.6	4.3	4.4	66.9	0.0	0.0	72.7	0.0	0.0
LnGrp LOS	A	A	C	D	A	A	E	A	A	E	A	A
Approach Vol, veh/h		1285			1601			1			62	
Approach Delay, s/veh		32.9			4.4			66.9			72.7	
Approach LOS		C			A			E			E	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	27.0	111.6		11.4	6.0	132.5		11.4
Change Period (Y+Rc), s	4.5	* 4		3.5	3.5	4.5		3.5
Max Green Setting (Gmax), s	4.5	* 1.1E2		21.0	5.5	112.0		21.0
Max Q Clear Time (g_c+I1), s	2.0	90.9		8.5	2.6	20.6		2.1
Green Ext Time (p_c), s	0.0	16.7		0.1	0.0	22.3		0.0

Intersection Summary	
HCM 6th Ctrl Delay	18.3
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	379	821	2	110	1038	660	17	66	72	285	64	283
Future Volume (vph)	379	821	2	110	1038	660	17	66	72	285	64	283
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.2		4.5	4.2		4.5	4.5		4.8	4.5	4.8
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.94		1.00	0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.97	1.00
Satd. Flow (prot)	1787	3573		1770	3356		1770	1702		1698	1723	1576
Flt Permitted	0.07	1.00		0.15	1.00		0.95	1.00		0.95	0.47	1.00
Satd. Flow (perm)	134	3573		287	3356		1770	1702		1698	834	1576
Peak-hour factor, PHF	0.85	0.85	0.92	0.92	0.94	0.94	0.92	0.92	0.92	0.88	0.92	0.88
Adj. Flow (vph)	446	966	2	120	1104	702	18	72	78	324	70	322
RTOR Reduction (vph)	0	0	0	0	66	0	0	27	0	0	0	193
Lane Group Flow (vph)	446	968	0	120	1740	0	18	123	0	194	200	129
Confl. Peds. (#/hr)	4		3	3		4	1		3	3		1
Confl. Bikes (#/hr)						1						1
Heavy Vehicles (%)	1%	1%	2%	2%	0%	0%	2%	2%	2%	1%	2%	1%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6								8
Actuated Green, G (s)	82.5	82.5		67.2	67.2		3.4	17.4		20.9	42.8	34.9
Effective Green, g (s)	82.5	82.8		67.2	67.5		3.4	17.4		20.6	42.8	34.6
Actuated g/C Ratio	0.55	0.55		0.45	0.45		0.02	0.12		0.14	0.29	0.23
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	4.0
Lane Grp Cap (vph)	365	1972		239	1510		40	197		233	361	363
v/s Ratio Prot	c0.22	0.27		0.04	c0.52		0.01	c0.07		c0.11	0.08	
v/s Ratio Perm	c0.45			0.19							0.08	0.08
v/c Ratio	1.22	0.49		0.50	1.15		0.45	0.62		0.83	0.55	0.36
Uniform Delay, d1	58.2	20.6		27.6	41.2		72.4	63.2		63.0	45.5	48.4
Progression Factor	0.93	0.80		0.78	0.64		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	116.2	0.6		0.2	69.3		7.9	6.8		21.7	2.3	0.8
Delay (s)	170.2	17.1		21.6	95.8		80.2	69.9		84.7	47.8	49.2
Level of Service	F	B		C	F		F	E		F	D	D
Approach Delay (s)		65.4			91.2			71.0			58.4	
Approach LOS		E			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	76.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	105.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	513	380	220	302	653	523	500	981	170	552	992	821
Future Volume (veh/h)	513	380	220	302	653	523	500	981	170	552	992	821
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1230	1870	1870	1885	1885	1885	1870	1870	1870	1885	1885	1885
Adj Flow Rate, veh/h	523	388	224	321	695	430	515	1011	150	657	1181	0
Peak Hour Factor	0.98	0.98	0.98	0.94	0.94	0.94	0.97	0.97	0.97	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	1	1	1	2	2	2	1	1	1
Cap, veh/h	660	709	403	358	847	566	346	1092	162	429	955	
Arrive On Green	0.10	0.11	0.11	0.13	0.16	0.16	0.10	0.24	0.24	0.16	0.35	0.00
Sat Flow, veh/h	2273	2166	1232	1795	3582	1562	3456	4485	664	3483	3582	1598
Grp Volume(v), veh/h	523	317	295	321	695	430	515	767	394	657	1181	0
Grp Sat Flow(s),veh/h/ln	1137	1777	1621	1795	1791	1562	1728	1702	1745	1742	1791	1598
Q Serve(g_s), s	33.8	25.4	25.9	26.4	28.2	19.4	15.0	33.0	33.1	18.5	40.0	0.0
Cycle Q Clear(g_c), s	33.8	25.4	25.9	26.4	28.2	19.4	15.0	33.0	33.1	18.5	40.0	0.0
Prop In Lane	1.00		0.76	1.00		1.00	1.00		0.38	1.00		1.00
Lane Grp Cap(c), veh/h	660	582	531	358	847	566	346	829	425	429	955	
V/C Ratio(X)	0.79	0.55	0.56	0.90	0.82	0.76	1.49	0.93	0.93	1.53	1.24	
Avail Cap(c_a), veh/h	660	582	531	473	979	624	346	840	430	429	955	
HCM Platoon Ratio	0.33	0.33	0.33	0.67	0.67	0.67	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	0.81	0.81	0.81	0.72	0.72	0.72	1.00	1.00	1.00	0.09	0.09	0.00
Uniform Delay (d), s/veh	63.4	56.3	56.6	63.5	60.0	47.7	67.5	55.4	55.6	62.7	48.4	0.0
Incr Delay (d2), s/veh	5.6	3.0	3.4	12.5	6.5	6.8	235.5	16.0	26.4	239.7	107.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.9	12.7	11.9	13.7	14.0	8.5	17.8	15.7	17.4	22.0	30.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.0	59.3	60.0	75.9	66.5	54.5	303.0	71.4	82.0	302.4	155.7	0.0
LnGrp LOS	E	E	E	E	E	D	F	E	F	F	F	
Approach Vol, veh/h		1135			1446			1676			1838	A
Approach Delay, s/veh		63.9			65.0			145.0			208.1	
Approach LOS		E			E			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.5	40.5	33.9	53.1	19.0	44.0	47.5	39.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	17.5	36.5	39.0	39.0	14.5	39.5	37.5	40.5
Max Q Clear Time (g_c+I1), s	20.5	35.1	28.4	27.9	17.0	42.0	35.8	30.2
Green Ext Time (p_c), s	0.0	0.9	1.0	2.1	0.0	0.0	0.6	4.2

Intersection Summary	
HCM 6th Ctrl Delay	130.0
HCM 6th LOS	F

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	95	852	99	101	1103	190	100	24	41	209	60	183
Future Volume (veh/h)	95	852	99	101	1103	190	100	24	41	209	60	183
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.97	0.97		0.96	0.97		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	100	897	96	106	1161	176	111	27	4	225	65	73
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.90	0.90	0.90	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	0	0	0
Cap, veh/h	308	2194	235	473	2108	318	234	129	19	347	108	121
Arrive On Green	0.05	0.90	0.90	0.03	0.68	0.68	0.06	0.08	0.08	0.12	0.13	0.13
Sat Flow, veh/h	1781	3235	346	1795	3106	469	1810	1608	238	1810	806	906
Grp Volume(v), veh/h	100	493	500	106	667	670	111	0	31	225	0	138
Grp Sat Flow(s),veh/h/ln	1781	1777	1804	1795	1791	1784	1810	0	1846	1810	0	1712
Q Serve(g_s), s	2.6	6.5	6.5	2.7	28.6	29.0	8.4	0.0	2.4	16.8	0.0	11.4
Cycle Q Clear(g_c), s	2.6	6.5	6.5	2.7	28.6	29.0	8.4	0.0	2.4	16.8	0.0	11.4
Prop In Lane	1.00		0.19	1.00		0.26	1.00		0.13	1.00		0.53
Lane Grp Cap(c), veh/h	308	1205	1224	473	1216	1211	234	0	148	347	0	229
V/C Ratio(X)	0.33	0.41	0.41	0.22	0.55	0.55	0.47	0.00	0.21	0.65	0.00	0.60
Avail Cap(c_a), veh/h	383	1205	1224	512	1216	1211	234	0	345	347	0	411
HCM Platoon Ratio	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.09	0.24	0.24	0.24	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.1	2.7	2.7	6.7	12.3	12.4	58.6	0.0	64.6	53.5	0.0	61.4
Incr Delay (d2), s/veh	0.1	0.1	0.1	0.1	0.4	0.4	1.5	0.0	0.7	4.2	0.0	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	1.8	1.8	1.0	11.3	11.4	4.0	0.0	1.1	8.1	0.0	5.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.2	2.8	2.8	6.8	12.8	12.9	60.1	0.0	65.2	57.7	0.0	63.9
LnGrp LOS	B	A	A	A	B	B	E	A	E	E	A	E
Approach Vol, veh/h		1093			1443			142			363	
Approach Delay, s/veh		3.5			12.4			61.2			60.0	
Approach LOS		A			B			E			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.7	105.2	13.0	23.0	8.6	105.3	21.0	15.0
Change Period (Y+Rc), s	4.0	4.0	4.0	3.5	4.0	4.0	4.0	3.5
Max Green Setting (Gmax), s	8.0	82.0	9.0	35.5	11.0	79.0	17.0	27.5
Max Q Clear Time (g_c+I1), s	4.7	8.5	10.4	13.4	4.6	31.0	18.8	4.4
Green Ext Time (p_c), s	0.1	8.6	0.0	0.5	0.1	13.8	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	17.1
HCM 6th LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	838	277	421	1111	356	475
Future Volume (veh/h)	838	277	421	1111	356	475
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	901	298	439	1157	440	586
Peak Hour Factor	0.93	0.93	0.96	0.96	0.81	0.81
Percent Heavy Veh, %	1	1	1	1	1	1
Cap, veh/h	1083	357	480	1204	509	453
Arrive On Green	0.41	0.41	0.20	0.64	0.28	0.28
Sat Flow, veh/h	2738	872	1795	1885	1795	1598
Grp Volume(v), veh/h	609	590	439	1157	440	586
Grp Sat Flow(s),veh/h/ln	1791	1724	1795	1885	1795	1598
Q Serve(g_s), s	27.4	27.6	14.9	51.6	20.9	25.5
Cycle Q Clear(g_c), s	27.4	27.6	14.9	51.6	20.9	25.5
Prop In Lane		0.51	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	734	707	480	1204	509	453
V/C Ratio(X)	0.83	0.83	0.91	0.96	0.86	1.29
Avail Cap(c_a), veh/h	734	707	508	1204	509	453
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.86	0.86	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.8	23.8	22.6	15.2	30.6	32.3
Incr Delay (d2), s/veh	9.2	9.8	19.9	18.1	15.4	148.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.8	12.6	11.6	24.4	10.9	28.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	33.0	33.6	42.5	33.2	46.1	180.4
LnGrp LOS	C	C	D	C	D	F
Approach Vol, veh/h	1199			1596	1026	
Approach Delay, s/veh	33.3			35.8	122.8	
Approach LOS	C			D	F	

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	20.6	40.9				61.5	28.5
Change Period (Y+Rc), s	3.5	4.5				4.5	3.5
Max Green Setting (Gmax), s	18.5	35.0				57.0	25.0
Max Q Clear Time (g_c+I1), s	16.9	29.6				53.6	27.5
Green Ext Time (p_c), s	0.2	3.5				2.5	0.0

Intersection Summary	
HCM 6th Ctrl Delay	58.4
HCM 6th LOS	E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	977	235	218	1218	313	79
Future Volume (vph)	977	235	218	1218	313	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.0	3.0	4.0	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1881	1561	1770	1863	1805	1572
Flt Permitted	1.00	1.00	0.04	1.00	0.95	1.00
Satd. Flow (perm)	1881	1561	80	1863	1805	1572
Peak-hour factor, PHF	0.93	0.93	0.91	0.91	0.85	0.85
Adj. Flow (vph)	1051	253	240	1338	368	93
RTOR Reduction (vph)	0	34	0	0	0	67
Lane Group Flow (vph)	1051	219	240	1338	368	26
Confl. Peds. (#/hr)		1	1		23	
Confl. Bikes (#/hr)						3
Heavy Vehicles (%)	1%	1%	2%	2%	0%	0%
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	90.0	90.0	105.5	104.5	25.5	25.5
Effective Green, g (s)	90.5	90.0	106.0	105.0	26.0	26.0
Actuated g/C Ratio	0.60	0.60	0.71	0.70	0.17	0.17
Clearance Time (s)	4.0	4.0	3.5	4.5	3.5	3.5
Vehicle Extension (s)	4.0	4.0	3.0	4.0	3.0	3.0
Lane Grp Cap (vph)	1134	936	191	1304	312	272
v/s Ratio Prot	0.56		c0.10	0.72	c0.20	
v/s Ratio Perm		0.14	c0.79			0.02
v/c Ratio	0.93	0.23	1.26	1.03	1.18	0.10
Uniform Delay, d1	26.8	14.0	61.0	22.5	62.0	52.1
Progression Factor	1.00	1.00	1.02	1.07	1.00	1.00
Incremental Delay, d2	14.1	0.6	119.5	15.4	108.9	0.2
Delay (s)	40.9	14.6	181.4	39.4	170.9	52.3
Level of Service	D	B	F	D	F	D
Approach Delay (s)	35.7			61.0	147.0	
Approach LOS	D			E	F	

Intersection Summary			
HCM 2000 Control Delay	63.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	90.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	303	778	786	202	422	735
Future Volume (veh/h)	303	778	786	202	422	735
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1885	1885	1870	1870
Adj Flow Rate, veh/h	322	828	819	151	469	498
Peak Hour Factor	0.94	0.94	0.96	0.96	0.90	0.90
Percent Heavy Veh, %	2	2	1	1	2	2
Cap, veh/h	261	1147	779	660	499	676
Arrive On Green	0.15	0.61	0.41	0.41	0.28	0.28
Sat Flow, veh/h	1781	1870	1885	1596	1781	1585
Grp Volume(v), veh/h	322	828	819	151	469	498
Grp Sat Flow(s),veh/h/ln	1781	1870	1885	1596	1781	1585
Q Serve(g_s), s	11.0	23.0	31.0	4.6	19.3	19.7
Cycle Q Clear(g_c), s	11.0	23.0	31.0	4.6	19.3	19.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	261	1147	779	660	499	676
V/C Ratio(X)	1.23	0.72	1.05	0.23	0.94	0.74
Avail Cap(c_a), veh/h	261	1160	779	660	499	676
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.41	0.41	0.32	0.32	1.00	1.00
Uniform Delay (d), s/veh	32.0	10.1	22.0	14.3	26.4	18.0
Incr Delay (d2), s/veh	117.9	1.6	33.4	0.3	26.1	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.1	8.2	19.6	1.6	11.3	17.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	149.9	11.7	55.4	14.5	52.5	22.2
LnGrp LOS	F	B	F	B	D	C
Approach Vol, veh/h		1150	970		967	
Approach Delay, s/veh		50.4	49.1		36.9	
Approach LOS		D	D		D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		50.5		24.5	15.0	35.5
Change Period (Y+Rc), s		* 4.5		3.5	4.0	4.5
Max Green Setting (Gmax), s		* 47		21.0	11.0	31.0
Max Q Clear Time (g_c+I1), s		25.0		21.7	13.0	33.0
Green Ext Time (p_c), s		4.3		0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	45.8
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	275	960	1	1	851	200	1	0	1	260	0	230
Future Volume (veh/h)	275	960	1	1	851	200	1	0	1	260	0	230
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1826	1826	1826	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	316	1103	1	1	935	185	2	0	0	292	0	258
Peak Hour Factor	0.87	0.87	0.87	0.91	0.91	0.91	0.50	0.50	0.50	0.89	0.89	0.89
Percent Heavy Veh, %	3	3	3	5	5	5	0	0	0	0	0	0
Cap, veh/h	345	902	1	341	889	752	147	0	0	440	0	320
Arrive On Green	0.09	0.33	0.33	0.14	0.49	0.49	0.20	0.00	0.00	0.20	0.00	0.20
Sat Flow, veh/h	1767	1854	2	1739	1826	1546	256	0	0	1730	0	1610
Grp Volume(v), veh/h	316	0	1104	1	935	185	2	0	0	292	0	258
Grp Sat Flow(s),veh/h/ln	1767	0	1855	1739	1826	1546	256	0	0	1730	0	1610
Q Serve(g_s), s	9.2	0.0	36.5	0.0	36.5	5.2	0.1	0.0	0.0	0.0	0.0	11.5
Cycle Q Clear(g_c), s	9.2	0.0	36.5	0.0	36.5	5.2	11.7	0.0	0.0	11.6	0.0	11.5
Prop In Lane	1.00		0.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	345	0	903	341	889	752	147	0	0	440	0	320
V/C Ratio(X)	0.91	0.00	1.22	0.00	1.05	0.25	0.01	0.00	0.00	0.66	0.00	0.81
Avail Cap(c_a), veh/h	345	0	903	341	889	752	224	0	0	538	0	429
HCM Platoon Ratio	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.50	0.00	0.50	0.67	0.67	0.67	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.9	0.0	25.3	27.7	19.2	11.2	34.3	0.0	0.0	28.7	0.0	28.7
Incr Delay (d2), s/veh	16.8	0.0	105.4	0.0	39.7	0.4	0.0	0.0	0.0	2.3	0.0	8.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.3	0.0	42.6	0.0	23.3	1.7	0.0	0.0	0.0	5.1	0.0	4.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.8	0.0	130.7	27.7	58.9	11.6	34.3	0.0	0.0	31.0	0.0	36.7
LnGrp LOS	D	A	F	C	F	B	C	A	A	C	A	D
Approach Vol, veh/h		1420			1121			2			550	
Approach Delay, s/veh		112.5			51.1			34.3			33.6	
Approach LOS		F			D			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	15.1	41.0		18.9	15.1	41.0		18.9
Change Period (Y+Rc), s	4.5	4.5		4.0	4.5	4.5		4.0
Max Green Setting (Gmax), s	5.5	36.5		20.0	5.5	36.5		20.0
Max Q Clear Time (g_c+I1), s	2.0	38.5		13.6	11.2	38.5		13.7
Green Ext Time (p_c), s	0.0	0.0		1.4	0.0	0.0		0.0

Intersection Summary	
HCM 6th Ctrl Delay	76.2
HCM 6th LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	870	360	220	761	0	280	1	420	0	2	1
Future Volume (veh/h)	1	870	360	220	761	0	280	1	420	0	2	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	418	418	418
Adj Flow Rate, veh/h	1	1024	369	253	875	0	311	1	195	0	8	4
Peak Hour Factor	0.85	0.85	0.85	0.87	0.87	0.87	0.90	0.90	0.90	0.25	0.25	0.25
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	100	100	100
Cap, veh/h	338	897	764	414	1292	0	338	1	302	0	6	4
Arrive On Green	0.00	0.97	0.97	0.41	1.00	0.00	0.19	0.19	0.19	0.00	0.01	0.01
Sat Flow, veh/h	1767	1856	1571	1767	1856	0	1762	6	1572	0	418	354
Grp Volume(v), veh/h	1	1024	369	253	875	0	312	0	195	0	8	4
Grp Sat Flow(s),veh/h/ln	1767	1856	1571	1767	1856	0	1767	0	1572	0	418	354
Q Serve(g_s), s	0.0	72.5	1.8	11.9	0.0	0.0	26.0	0.0	17.2	0.0	2.1	1.6
Cycle Q Clear(g_c), s	0.0	72.5	1.8	11.9	0.0	0.0	26.0	0.0	17.2	0.0	2.1	1.6
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	338	897	764	414	1292	0	339	0	302	0	6	4
V/C Ratio(X)	0.00	1.14	0.48	0.61	0.68	0.00	0.92	0.00	0.65	0.00	1.35	1.04
Avail Cap(c_a), veh/h	378	897	764	414	1292	0	353	0	314	0	57	47
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.16	0.16	0.16	0.20	0.20	0.00	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	20.9	2.5	1.1	37.2	0.0	0.0	59.5	0.0	55.9	0.0	73.9	74.2
Incr Delay (d2), s/veh	0.0	66.3	0.4	0.4	0.3	0.0	27.6	0.0	3.8	0.0	223.7	142.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	17.6	0.4	6.1	0.1	0.0	14.3	0.0	7.2	0.0	0.6	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.9	68.8	1.4	37.6	0.3	0.0	87.0	0.0	59.7	0.0	297.6	216.6
LnGrp LOS	C	F	A	D	A	A	F	A	E	A	F	F
Approach Vol, veh/h		1394			1128			507			12	
Approach Delay, s/veh		50.9			8.7			76.5			270.6	
Approach LOS		D			A			E			F	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	35.6	77.5		5.1	3.7	109.4		31.8
Change Period (Y+Rc), s	4.5	* 4.5		3.5	3.5	4.5		3.5
Max Green Setting (Gmax), s	12.5	* 73		20.0	4.0	81.5		29.5
Max Q Clear Time (g_c+I1), s	13.9	74.5		4.1	2.0	2.0		28.0
Green Ext Time (p_c), s	0.0	0.0		0.0	0.0	5.2		0.3

Intersection Summary	
HCM 6th Ctrl Delay	40.4
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	615	670	691	133	88	340
Future Volume (veh/h)	615	670	691	133	88	340
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1885	1885	1856	1856	1826	1826
Adj Flow Rate, veh/h	668	728	813	151	107	0
Peak Hour Factor	0.92	0.92	0.85	0.85	0.82	0.82
Percent Heavy Veh, %	1	1	3	3	5	5
Cap, veh/h	703	1643	728	135	130	116
Arrive On Green	0.73	1.00	0.48	0.48	0.07	0.00
Sat Flow, veh/h	1795	1885	1516	282	1739	1547
Grp Volume(v), veh/h	668	728	0	964	107	0
Grp Sat Flow(s),veh/h/ln	1795	1885	0	1798	1739	1547
Q Serve(g_s), s	43.2	0.0	0.0	72.0	9.1	0.0
Cycle Q Clear(g_c), s	43.2	0.0	0.0	72.0	9.1	0.0
Prop In Lane	1.00			0.16	1.00	1.00
Lane Grp Cap(c), veh/h	703	1643	0	863	130	116
V/C Ratio(X)	0.95	0.44	0.00	1.12	0.82	0.00
Avail Cap(c_a), veh/h	703	1643	0	863	255	227
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.31	0.31	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	17.1	0.0	0.0	39.0	68.4	0.0
Incr Delay (d2), s/veh	9.7	0.3	0.0	68.1	14.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.3	0.1	0.0	47.5	4.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	26.8	0.3	0.0	107.1	82.5	0.0
LnGrp LOS	C	A	A	F	F	A
Approach Vol, veh/h		1396	964		107	
Approach Delay, s/veh		13.0	107.1		82.5	
Approach LOS		B	F		F	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		134.8		15.2	58.8	76.0
Change Period (Y+Rc), s		4.5		4.0	4.5	4.5
Max Green Setting (Gmax), s		119.5		22.0	43.5	71.5
Max Q Clear Time (g_c+I1), s		2.0		11.1	45.2	74.0
Green Ext Time (p_c), s		0.7		0.3	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	52.8
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	474	2	160	2	2	6	260	1626	2	5	1089	459
Future Volume (veh/h)	474	2	160	2	2	6	260	1626	2	5	1089	459
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1870	1885	1870	1870	1870	1885	1885	1885	1870	1885	1885
Adj Flow Rate, veh/h	593	0	0	2	2	-2	271	1694	2	5	1224	516
Peak Hour Factor	0.80	0.92	0.80	0.92	0.92	0.92	0.96	0.96	0.92	0.92	0.89	0.89
Percent Heavy Veh, %	1	2	1	2	2	2	1	1	1	2	1	1
Cap, veh/h	651	0	290	3	3	208	292	1997	2	270	1352	542
Arrive On Green	0.18	0.00	0.00	0.00	0.00	0.00	0.16	0.54	0.54	0.15	0.55	0.55
Sat Flow, veh/h	3591	0	1598	1781	1870	0	1795	3671	4	1781	2478	994
Grp Volume(v), veh/h	593	0	0	2	0	0	271	826	870	5	867	873
Grp Sat Flow(s),veh/h/ln	1795	0	1598	1781	1870	0	1795	1791	1884	1781	1791	1680
Q Serve(g_s), s	23.4	0.0	0.0	0.2	0.0	0.0	21.5	56.5	56.5	0.3	61.7	71.0
Cycle Q Clear(g_c), s	23.4	0.0	0.0	0.2	0.0	0.0	21.5	56.5	56.5	0.3	61.7	71.0
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.00	1.00		0.59
Lane Grp Cap(c), veh/h	651	0	290	3	3	0	292	974	1025	270	977	917
V/C Ratio(X)	0.91	0.00	0.00	0.70	0.00	0.00	0.93	0.85	0.85	0.02	0.89	0.95
Avail Cap(c_a), veh/h	683	0	304	37	39	0	292	1234	1299	270	993	932
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.1	0.0	0.0	72.2	0.0	0.0	59.8	27.9	27.9	52.2	29.0	31.1
Incr Delay (d2), s/veh	15.5	0.0	0.0	75.7	0.0	0.0	34.0	5.3	5.1	0.0	10.0	18.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.1	0.0	0.0	0.1	0.0	0.0	12.4	24.1	25.3	0.2	27.4	31.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.6	0.0	0.0	147.9	0.0	0.0	93.8	33.2	33.0	52.2	39.0	50.0
LnGrp LOS	E	A	A	F	A	A	F	C	C	D	D	D
Approach Vol, veh/h		593			2			1967			1745	
Approach Delay, s/veh		73.6			147.9			41.5			44.6	
Approach LOS		E			F			D			D	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	27.2	83.5		29.7	27.0	83.7		4.2
Change Period (Y+Rc), s	5.3	* 5.3		4.0	4.0	5.3		4.0
Max Green Setting (Gmax), s	3.0	* 99		27.0	23.0	79.7		3.0
Max Q Clear Time (g_c+I1), s	2.3	58.5		25.4	23.5	73.0		2.2
Green Ext Time (p_c), s	0.0	19.7		0.3	0.0	5.4		0.0

Intersection Summary	
HCM 6th Ctrl Delay	47.2
HCM 6th LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	230	130	160	310	209	130	1712	150	134	1081	134
Future Volume (veh/h)	105	230	130	160	310	209	130	1712	150	134	1081	134
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	114	250	24	178	344	209	137	1802	96	138	1114	138
Peak Hour Factor	0.92	0.92	0.92	0.90	0.90	0.90	0.95	0.95	0.95	0.97	0.97	0.97
Percent Heavy Veh, %	1	1	1	1	1	1	2	2	2	3	3	3
Cap, veh/h	126	489	404	367	330	201	219	1789	793	148	1580	195
Arrive On Green	0.04	0.26	0.26	0.09	0.30	0.30	0.06	0.50	0.50	0.06	0.50	0.50
Sat Flow, veh/h	1795	1885	1559	1795	1088	661	1781	3554	1576	1767	3155	390
Grp Volume(v), veh/h	114	250	24	178	0	553	137	1802	96	138	621	631
Grp Sat Flow(s),veh/h/ln	1795	1885	1559	1795	0	1750	1781	1777	1576	1767	1763	1783
Q Serve(g_s), s	6.5	17.0	1.7	10.6	0.0	45.5	6.3	75.5	3.5	7.6	40.8	41.0
Cycle Q Clear(g_c), s	6.5	17.0	1.7	10.6	0.0	45.5	6.3	75.5	3.5	7.6	40.8	41.0
Prop In Lane	1.00		1.00	1.00		0.38	1.00		1.00	1.00		0.22
Lane Grp Cap(c), veh/h	126	489	404	367	0	531	219	1789	793	148	883	893
V/C Ratio(X)	0.91	0.51	0.06	0.49	0.00	1.04	0.63	1.01	0.12	0.93	0.70	0.71
Avail Cap(c_a), veh/h	126	489	404	384	0	531	262	1789	793	148	883	893
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.2	47.4	41.8	35.5	0.0	52.3	29.8	37.3	10.1	69.0	28.9	29.0
Incr Delay (d2), s/veh	51.5	0.4	0.0	0.4	0.0	50.4	1.7	23.1	0.3	53.1	4.7	4.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	8.1	0.7	4.7	0.0	27.3	2.8	37.4	1.9	7.4	18.1	18.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	97.8	47.8	41.8	35.9	0.0	102.7	31.5	60.3	10.4	122.1	33.6	33.7
LnGrp LOS	F	D	D	D	A	F	C	F	B	F	C	C
Approach Vol, veh/h		388			731			2035			1390	
Approach Delay, s/veh		62.1			86.4			56.0			42.4	
Approach LOS		E			F			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	79.0	16.6	42.4	12.4	78.6	10.0	49.0
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	8.0	75.0	14.0	37.0	12.0	71.0	6.0	45.0
Max Q Clear Time (g_c+I1), s	9.6	77.5	12.6	19.0	8.3	43.0	8.5	47.5
Green Ext Time (p_c), s	0.0	0.0	0.1	0.5	0.1	6.4	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	57.3
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	124	150	10	95	260	240	13	1264	60	230	964	127
Future Volume (veh/h)	124	150	10	95	260	240	13	1264	60	230	964	127
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1870	1870	1870	1885	1885	1900	1900	1900
Adj Flow Rate, veh/h	135	163	9	112	283	247	14	1420	64	237	994	130
Peak Hour Factor	0.92	0.92	0.92	0.85	0.92	0.85	0.92	0.89	0.89	0.97	0.97	0.92
Percent Heavy Veh, %	2	2	2	1	2	2	2	1	1	0	0	0
Cap, veh/h	137	562	31	420	280	244	230	1476	66	247	1611	211
Arrive On Green	0.05	0.32	0.32	0.04	0.31	0.31	0.03	0.56	0.56	0.10	0.50	0.50
Sat Flow, veh/h	1781	1756	97	1795	912	796	1781	3487	157	1810	3201	418
Grp Volume(v), veh/h	135	0	172	112	0	530	14	728	756	237	560	564
Grp Sat Flow(s),veh/h/ln	1781	0	1853	1795	0	1708	1781	1791	1852	1810	1805	1815
Q Serve(g_s), s	7.5	0.0	10.4	5.5	0.0	46.0	0.7	57.9	58.6	14.6	33.5	33.6
Cycle Q Clear(g_c), s	7.5	0.0	10.4	5.5	0.0	46.0	0.7	57.9	58.6	14.6	33.5	33.6
Prop In Lane	1.00		0.05	1.00		0.47	1.00		0.08	1.00		0.23
Lane Grp Cap(c), veh/h	137	0	593	420	0	524	230	758	784	247	908	913
V/C Ratio(X)	0.98	0.00	0.29	0.27	0.00	1.01	0.06	0.96	0.96	0.96	0.62	0.62
Avail Cap(c_a), veh/h	137	0	593	420	0	524	289	758	784	247	908	913
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.82	0.82	0.82	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.8	0.0	38.2	35.8	0.0	52.0	24.5	31.6	31.7	47.4	26.9	26.9
Incr Delay (d2), s/veh	72.1	0.0	0.1	0.3	0.0	42.3	0.1	21.3	21.7	46.1	3.1	3.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	0.0	4.8	0.5	0.0	25.8	0.3	26.7	28.0	12.1	15.1	15.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	113.9	0.0	38.3	36.1	0.0	94.3	24.6	52.9	53.4	93.5	30.0	30.0
LnGrp LOS	F	A	D	D	A	F	C	D	D	F	C	C
Approach Vol, veh/h		307			642			1498			1361	
Approach Delay, s/veh		71.6			84.1			52.9			41.0	
Approach LOS		E			F			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.0	68.0	9.0	54.0	7.0	80.0	11.0	52.0
Change Period (Y+Rc), s	3.5	4.5	3.5	6.0	3.5	4.5	3.5	6.0
Max Green Setting (Gmax), s	15.5	63.5	5.5	48.0	8.5	70.5	7.5	46.0
Max Q Clear Time (g_c+I1), s	16.6	60.6	7.5	12.4	2.7	35.6	9.5	48.0
Green Ext Time (p_c), s	0.0	1.4	0.0	0.6	0.0	2.8	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	55.4
HCM 6th LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	100	5	130	45	200	0	1044	220	0	1004	25
Future Volume (veh/h)	75	100	5	130	45	200	0	1044	220	0	1004	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.96		0.92	0.96		0.94	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1870	1870	1870	0	1885	1885	0	1885	1885
Adj Flow Rate, veh/h	91	122	2	149	52	143	0	1111	217	0	1167	28
Peak Hour Factor	0.82	0.82	0.82	0.87	0.87	0.87	0.94	0.94	0.94	0.86	0.86	0.86
Percent Heavy Veh, %	0	0	0	2	2	2	0	1	1	0	1	1
Cap, veh/h	170	214	4	258	60	166	0	2099	408	0	2512	60
Arrive On Green	0.05	0.11	0.12	0.08	0.14	0.15	0.00	1.00	1.00	0.00	0.70	0.70
Sat Flow, veh/h	1810	1861	31	1781	419	1152	0	3081	581	0	3668	86
Grp Volume(v), veh/h	91	0	124	149	0	195	0	664	664	0	585	610
Grp Sat Flow(s),veh/h/ln	1810	0	1891	1781	0	1571	0	1791	1776	0	1791	1869
Q Serve(g_s), s	6.6	0.0	9.3	10.8	0.0	18.2	0.0	0.0	0.0	0.0	21.6	21.6
Cycle Q Clear(g_c), s	6.6	0.0	9.3	10.8	0.0	18.2	0.0	0.0	0.0	0.0	21.6	21.6
Prop In Lane	1.00		0.02	1.00		0.73	0.00		0.33	0.00		0.05
Lane Grp Cap(c), veh/h	170	0	217	258	0	227	0	1259	1249	0	1259	1314
V/C Ratio(X)	0.53	0.00	0.57	0.58	0.00	0.86	0.00	0.53	0.53	0.00	0.46	0.46
Avail Cap(c_a), veh/h	195	0	435	278	0	403	0	1259	1249	0	1259	1314
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.00	0.86	0.86	0.00	0.79	0.79
Uniform Delay (d), s/veh	55.4	0.0	62.9	51.5	0.0	62.5	0.0	0.0	0.0	0.0	9.8	9.8
Incr Delay (d2), s/veh	1.0	0.0	0.9	1.4	0.0	3.7	0.0	1.4	1.4	0.0	1.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	0.0	4.6	5.0	0.0	7.5	0.0	0.5	0.5	0.0	8.4	8.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.3	0.0	63.8	52.9	0.0	66.3	0.0	1.4	1.4	0.0	10.8	10.8
LnGrp LOS	E	A	E	D	A	E	A	A	A	A	B	B
Approach Vol, veh/h		215			344			1328			1195	
Approach Delay, s/veh		60.6			60.5			1.4			10.8	
Approach LOS		E			E			A			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		109.9	16.3	23.7		109.9	11.9	28.1				
Change Period (Y+Rc), s		4.5	3.5	6.0		4.5	3.5	6.0				
Max Green Setting (Gmax), s		86.5	14.5	35.0		86.5	10.5	39.0				
Max Q Clear Time (g_c+I1), s		2.0	12.8	11.3		23.6	8.6	20.2				
Green Ext Time (p_c), s		3.6	0.0	0.2		3.0	0.0	0.5				

Intersection Summary	
HCM 6th Ctrl Delay	15.8
HCM 6th LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	674	1310	1580	398	612	469
Future Volume (vph)	674	1310	1580	398	612	469
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5	5.0	5.0	5.5	3.5
Lane Util. Factor	0.97	0.95	0.95	1.00	0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3400	3505	3438	1503	3502	1581
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3400	3505	3438	1503	3502	1581
Peak-hour factor, PHF	0.94	0.94	0.95	0.95	0.87	0.87
Adj. Flow (vph)	717	1394	1663	419	703	539
RTOR Reduction (vph)	0	0	0	6	0	4
Lane Group Flow (vph)	717	1394	1663	413	703	535
Confl. Peds. (#/hr)	15			15	11	22
Heavy Vehicles (%)	3%	3%	5%	5%	0%	0%
Turn Type	Prot	NA	NA	pm+ov	Prot	pt+ov
Protected Phases	3 5	2	6	7	7	3 5
Permitted Phases				6		4
Actuated Green, G (s)	34.0	79.0	69.0	98.0	29.0	63.0
Effective Green, g (s)	33.0	78.5	69.0	98.0	28.5	61.5
Actuated g/C Ratio	0.22	0.52	0.46	0.65	0.19	0.41
Clearance Time (s)		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0	0.4	4.0	4.0	
Lane Grp Cap (vph)	748	1834	1581	981	665	648
v/s Ratio Prot	c0.21	c0.40	c0.48	0.08	c0.20	0.18
v/s Ratio Perm				0.19		0.16
v/c Ratio	0.96	0.76	1.05	0.42	1.06	0.83
Uniform Delay, d1	57.8	28.3	40.5	12.4	60.8	39.5
Progression Factor	1.00	1.00	1.00	1.00	1.01	0.58
Incremental Delay, d2	22.8	3.0	37.7	0.4	49.5	7.4
Delay (s)	80.6	31.3	78.2	12.8	110.6	30.3
Level of Service	F	C	E	B	F	C
Approach Delay (s)		48.1	65.0		75.8	
Approach LOS		D	E		E	

Intersection Summary			
HCM 2000 Control Delay	60.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	19.5
Intersection Capacity Utilization	92.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	6	15	30	0	220	0	1022	52	24	1041	13
Future Volume (veh/h)	12	6	15	30	0	220	0	1022	52	24	1041	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.88	1.00		1.00	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	0	1870	0	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	13	7	2	33	0	28	0	1111	54	28	1197	15
Peak Hour Factor	0.92	0.92	0.92	0.90	0.90	0.90	0.92	0.92	0.92	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	0	2	0	2	2	2	2	2
Cap, veh/h	225	67	19	83	0	0	0	1234	60	866	3008	38
Arrive On Green	0.11	0.05	0.05	0.02	0.00	0.00	0.00	0.36	0.36	0.90	1.00	1.00
Sat Flow, veh/h	1781	1352	386	1781	33		0	3538	167	1781	3593	45
Grp Volume(v), veh/h	13	0	9	33	75.1		0	573	592	28	592	620
Grp Sat Flow(s),veh/h/ln	1781	0	1738	1781	E		0	1777	1835	1781	1777	1862
Q Serve(g_s), s	0.0	0.0	0.7	0.0			0.0	45.8	45.9	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.7	0.0			0.0	45.8	45.9	0.0	0.0	0.0
Prop In Lane	1.00		0.22	1.00			0.00		0.09	1.00		0.02
Lane Grp Cap(c), veh/h	225	0	86	83			0	637	657	866	1487	1558
V/C Ratio(X)	0.06	0.00	0.10	0.40			0.00	0.90	0.90	0.03	0.40	0.40
Avail Cap(c_a), veh/h	225	0	406	125			0	1001	1033	866	1487	1558
HCM Platoon Ratio	1.00	1.00	1.00	1.00			1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00			0.00	0.61	0.61	0.87	0.87	0.87
Uniform Delay (d), s/veh	61.3	0.0	68.1	72.0			0.0	45.6	45.6	3.7	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.5	3.0			0.0	12.2	12.0	0.0	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.3	1.3			0.0	22.2	22.8	0.1	0.3	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.4	0.0	68.6	75.1			0.0	57.8	57.6	3.7	0.7	0.7
LnGrp LOS	E	A	E	E			A	E	E	A	A	A
Approach Vol, veh/h		22						1165			1240	
Approach Delay, s/veh		64.3						57.7			0.7	
Approach LOS		E						E			A	

Timer - Assigned Phs	1	2	3	4	6	7
Phs Duration (G+Y+Rc), s	71.8	58.2	6.5	13.5	130.1	19.9
Change Period (Y+Rc), s	4.5	* 4.5	3.5	6.0	4.5	3.5
Max Green Setting (Gmax), s	6.5	* 85	6.5	35.0	94.5	4.5
Max Q Clear Time (g_c+I1), s	2.0	47.9	2.0	2.7	2.0	2.0
Green Ext Time (p_c), s	0.0	5.9	0.0	0.0	6.3	0.0

Intersection Summary	
HCM 6th Ctrl Delay	29.3
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	76	1316	66	165	1031	28	295	0	300	20	0	60
Future Volume (veh/h)	76	1316	66	165	1031	28	295	0	300	20	0	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	83	1430	72	179	1121	30	321	0	326	22	0	65
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	331	2456	123	297	2522	67	184	0	370	42	16	85
Arrive On Green	1.00	1.00	1.00	0.71	0.71	0.71	0.23	0.00	0.23	0.23	0.00	0.23
Sat Flow, veh/h	488	3443	173	349	3536	95	1337	0	1585	53	70	363
Grp Volume(v), veh/h	83	736	766	179	563	588	321	0	326	87	0	0
Grp Sat Flow(s),veh/h/ln	488	1777	1839	349	1777	1853	1337	0	1585	486	0	0
Q Serve(g_s), s	6.2	0.0	0.0	45.2	20.0	20.0	3.0	0.0	29.8	2.2	0.0	0.0
Cycle Q Clear(g_c), s	26.2	0.0	0.0	45.2	20.0	20.0	35.0	0.0	29.8	32.0	0.0	0.0
Prop In Lane	1.00		0.09	1.00		0.05	1.00		1.00	0.25		0.75
Lane Grp Cap(c), veh/h	331	1267	1312	297	1267	1322	184	0	370	144	0	0
V/C Ratio(X)	0.25	0.58	0.58	0.60	0.44	0.44	1.75	0.00	0.88	0.61	0.00	0.00
Avail Cap(c_a), veh/h	331	1267	1312	297	1267	1322	184	0	370	144	0	0
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.42	0.42	0.42	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	2.4	0.0	0.0	12.6	9.0	9.0	63.5	0.0	55.5	50.2	0.0	0.0
Incr Delay (d2), s/veh	0.8	0.8	0.8	8.8	1.1	1.1	357.0	0.0	24.7	17.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.3	0.3	4.0	7.7	8.0	25.4	0.0	14.5	3.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	3.2	0.8	0.8	21.4	10.2	10.1	420.5	0.0	80.2	67.7	0.0	0.0
LnGrp LOS	A	A	A	C	B	B	F	A	F	E	A	A
Approach Vol, veh/h		1585			1330			647			87	
Approach Delay, s/veh		0.9			11.6			249.1			67.7	
Approach LOS		A			B			F			E	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	39.0	111.0	39.0	111.0
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	35.0	107.0	35.0	107.0
Max Q Clear Time (g_c+I1), s	37.0	28.2	34.0	47.2
Green Ext Time (p_c), s	0.0	19.7	0.0	17.2

Intersection Summary	
HCM 6th Ctrl Delay	50.4
HCM 6th LOS	D

HCM 6th Signalized Intersection Summary
1: 9th Ave SE/Filbert Dr & 208th St SE / SR 524

06/26/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	1444	211	141	1723	103	650	288	314	102	65	4
Future Volume (veh/h)	7	1444	211	141	1723	103	650	288	314	102	65	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1885	1885	1885	1870	1870	1870
Adj Flow Rate, veh/h	7	1520	147	153	1873	107	707	313	274	112	71	3
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	1	1	1	2	2	2
Cap, veh/h	78	1674	747	161	1726	98	994	301	264	120	145	6
Arrive On Green	0.02	0.47	0.47	0.05	0.50	0.50	0.29	0.33	0.32	0.04	0.08	0.08
Sat Flow, veh/h	1781	3554	1585	1781	3419	193	3483	919	804	1781	1780	75
Grp Volume(v), veh/h	7	1520	147	153	965	1015	707	0	587	112	0	74
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1836	1742	0	1723	1781	0	1855
Q Serve(g_s), s	0.3	56.1	2.5	6.3	71.6	71.6	25.8	0.0	46.5	5.5	0.0	5.4
Cycle Q Clear(g_c), s	0.3	56.1	2.5	6.3	71.6	71.6	25.8	0.0	46.5	5.5	0.0	5.4
Prop In Lane	1.00		1.00	1.00		0.11	1.00		0.47	1.00		0.04
Lane Grp Cap(c), veh/h	78	1674	747	161	897	927	994	0	565	120	0	151
V/C Ratio(X)	0.09	0.91	0.20	0.95	1.08	1.10	0.71	0.00	1.04	0.93	0.00	0.49
Avail Cap(c_a), veh/h	126	1754	782	161	897	927	994	0	565	120	0	406
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	34.5	34.7	2.3	33.1	35.1	35.2	45.4	0.0	47.8	66.7	0.0	62.3
Incr Delay (d2), s/veh	0.2	7.3	0.2	55.1	52.4	59.2	2.1	0.0	48.3	61.2	0.0	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	25.2	2.7	5.1	42.8	46.0	11.5	0.0	27.5	6.1	0.0	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.7	42.0	2.5	88.3	87.5	94.4	47.5	0.0	96.1	127.9	0.0	65.6
LnGrp LOS	C	D	A	F	F	F	D	A	F	F	A	E
Approach Vol, veh/h		1674			2133			1294			186	
Approach Delay, s/veh		38.5			90.8			69.5			103.1	
Approach LOS		D			F			E			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	70.8	44.5	15.5	6.2	75.6	9.5	50.5
Change Period (Y+Rc), s	5.0	5.0	4.5	4.5	5.0	5.0	4.5	4.5
Max Green Setting (Gmax), s	6.0	69.0	20.5	30.5	5.0	70.0	5.0	46.0
Max Q Clear Time (g_c+I1), s	8.3	58.1	27.8	7.4	2.3	73.6	7.5	48.5
Green Ext Time (p_c), s	0.0	7.7	0.0	0.3	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	69.5
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	709	594	388	405	609	365	861	1882	687	182	886	311
Future Volume (veh/h)	709	594	388	405	609	365	861	1882	687	182	886	311
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1870	1870	1870	1687	1687	1885	1870	1870	1870
Adj Flow Rate, veh/h	746	625	0	440	662	0	906	1981	0	196	953	0
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	2	2	2	1	1	1	2	2	2
Cap, veh/h	673	914		501	734		596	2086		145	1077	
Arrive On Green	0.19	0.26	0.00	0.24	0.35	0.00	0.06	0.15	0.00	0.04	0.30	0.00
Sat Flow, veh/h	3483	3582	1598	3456	3554	1585	3116	4605	1598	3456	3554	1585
Grp Volume(v), veh/h	746	625	0	440	662	0	906	1981	0	196	953	0
Grp Sat Flow(s),veh/h/ln	1742	1791	1598	1728	1777	1585	1558	1535	1598	1728	1777	1585
Q Serve(g_s), s	29.0	23.6	0.0	18.4	26.6	0.0	28.7	64.0	0.0	6.3	38.3	0.0
Cycle Q Clear(g_c), s	29.0	23.6	0.0	18.4	26.6	0.0	28.7	64.0	0.0	6.3	38.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	673	914		501	734		596	2086		145	1077	
V/C Ratio(X)	1.11	0.68		0.88	0.90		1.52	0.95		1.35	0.88	
Avail Cap(c_a), veh/h	673	914		647	734		596	2088		145	1077	
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.67	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.90	0.90	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	60.5	50.4	0.0	55.6	47.7	0.0	70.3	62.1	0.0	71.8	49.8	0.0
Incr Delay (d2), s/veh	68.1	2.1	0.0	9.9	15.1	0.0	242.3	10.8	0.0	196.1	10.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	19.1	10.8	0.0	8.1	12.1	0.0	32.1	28.5	0.0	6.7	18.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	128.6	52.5	0.0	65.4	62.7	0.0	312.5	72.9	0.0	268.0	60.0	0.0
LnGrp LOS	F	D		E	E		F	E		F	E	
Approach Vol, veh/h		1371	A		1102	A		2887	A		1149	A
Approach Delay, s/veh		93.9			63.8			148.1			95.5	
Approach LOS		F			E			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.5	72.0	25.7	42.3	33.0	49.5	33.0	35.0
Change Period (Y+Rc), s	4.5	* 4.5	* 4.1	* 4.1	* 4.3	4.5	* 4.1	* 4.1
Max Green Setting (Gmax), s	6.0	* 68	* 28	* 32	* 29	44.5	* 29	* 31
Max Q Clear Time (g_c+I1), s	8.3	66.0	20.4	25.6	30.7	40.3	31.0	28.6
Green Ext Time (p_c), s	0.0	1.5	1.3	1.6	0.0	3.1	0.0	0.8

Intersection Summary	
HCM 6th Ctrl Delay	113.1
HCM 6th LOS	F

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	10	2	527	10	688	2	2710	352	142	1381	5
Future Volume (veh/h)	25	10	2	527	10	688	2	2710	352	142	1381	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1885	1885	1885	1885	1885	1885	1856	1856	1856
Adj Flow Rate, veh/h	30	12	0	676	13	0	2	2853	0	156	1518	5
Peak Hour Factor	0.84	0.84	0.84	0.78	0.78	0.78	0.95	0.95	0.95	0.91	0.91	0.91
Percent Heavy Veh, %	4	4	4	1	1	1	1	1	1	3	3	3
Cap, veh/h	166	78	0	348	90		4	3345		178	3902	13
Arrive On Green	0.09	0.04	0.00	0.10	0.05	0.00	0.00	1.00	0.00	0.10	0.75	0.74
Sat Flow, veh/h	1753	1841	0	3483	1885	1598	1795	5316	0	1767	5212	17
Grp Volume(v), veh/h	30	12	0	676	13	0	2	2853	0	156	984	539
Grp Sat Flow(s),veh/h/ln	1753	1841	0	1742	1885	1598	1795	1716	0	1767	1689	1852
Q Serve(g_s), s	2.4	0.9	0.0	15.0	1.0	0.0	0.2	0.0	0.0	13.1	15.5	15.5
Cycle Q Clear(g_c), s	2.4	0.9	0.0	15.0	1.0	0.0	0.2	0.0	0.0	13.1	15.5	15.5
Prop In Lane	1.00		0.00	1.00		1.00	1.00		0.00	1.00		0.01
Lane Grp Cap(c), veh/h	166	78	0	348	90		4	3345		178	2528	1387
V/C Ratio(X)	0.18	0.15	0.00	1.94	0.14		0.52	0.85		0.88	0.39	0.39
Avail Cap(c_a), veh/h	166	196	0	348	314		48	3345		200	2528	1387
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	0.09	0.09	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	62.6	69.2	0.0	67.5	68.4	0.0	74.6	0.0	0.0	66.5	6.7	6.7
Incr Delay (d2), s/veh	0.5	0.9	0.0	433.8	0.3	0.0	9.6	0.3	0.0	30.2	0.5	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.5	0.0	27.7	0.5	0.0	0.1	0.1	0.0	7.3	5.0	5.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.1	70.1	0.0	501.3	68.7	0.0	84.2	0.3	0.0	96.7	7.1	7.5
LnGrp LOS	E	E	A	F	E		F	A		F	A	A
Approach Vol, veh/h		42			689	A		2855	A		1679	
Approach Delay, s/veh		65.1			493.1			0.3			15.6	
Approach LOS		E			F			A			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.1	101.5	19.0	10.4	4.3	116.3	18.2	11.2
Change Period (Y+Rc), s	4.0	5.0	4.0	4.0	4.0	5.0	4.0	4.0
Max Green Setting (Gmax), s	17.0	85.0	15.0	16.0	4.0	98.0	6.0	25.0
Max Q Clear Time (g_c+I1), s	15.1	2.0	17.0	2.9	2.2	17.5	4.4	3.0
Green Ext Time (p_c), s	0.1	79.3	0.0	0.0	0.0	37.8	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	70.2
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	80	346	1330	15	860	51	1978	785	558	1778	10
Future Volume (veh/h)	28	80	346	1330	15	860	51	1978	785	558	1778	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1786	1786	1786	1786	1786	1744	1744	1744	1744	1744	1744
Adj Flow Rate, veh/h	32	221	178	1430	0	785	54	2104	0	641	2044	11
Peak Hour Factor	0.88	0.88	0.88	0.93	0.93	0.93	0.94	0.94	0.94	0.87	0.87	0.87
Percent Heavy Veh, %	1	1	1	1	1	1	4	4	4	4	4	4
Cap, veh/h	46	191	153	987	0	1547	73	1650		494	2227	12
Arrive On Green	0.03	0.11	0.11	0.29	0.00	0.37	0.01	0.11	0.00	0.15	0.46	0.45
Sat Flow, veh/h	1701	1786	1437	3402	0	2982	1661	4761	1478	3222	4886	26
Grp Volume(v), veh/h	32	221	178	1430	0	785	54	2104	0	641	1327	728
Grp Sat Flow(s),veh/h/ln	1701	1786	1437	1701	0	1491	1661	1587	1478	1611	1587	1739
Q Serve(g_s), s	2.8	16.0	16.0	43.5	0.0	2.7	4.9	52.0	0.0	23.0	58.7	58.7
Cycle Q Clear(g_c), s	2.8	16.0	16.0	43.5	0.0	2.7	4.9	52.0	0.0	23.0	58.7	58.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	46	191	153	987	0	1547	73	1650		494	1446	793
V/C Ratio(X)	0.70	1.16	1.16	1.45	0.00	0.51	0.73	1.27		1.30	0.92	0.92
Avail Cap(c_a), veh/h	85	191	153	987	0	1547	89	1650		494	1446	793
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.26	0.26	0.00	0.41	0.41	0.41
Uniform Delay (d), s/veh	72.4	67.0	67.0	53.3	0.0	14.4	73.0	66.4	0.0	63.5	38.2	38.2
Incr Delay (d2), s/veh	17.4	115.0	122.6	208.0	0.0	0.1	4.8	125.0	0.0	140.1	5.0	8.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	13.4	11.1	47.2	0.0	6.8	2.2	41.3	0.0	18.9	22.8	25.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	89.8	182.0	189.6	261.3	0.0	14.5	77.8	191.4	0.0	203.6	43.2	46.7
LnGrp LOS	F	F	F	F	A	B	E	F		F	D	D
Approach Vol, veh/h		431			2215			2158	A		2696	
Approach Delay, s/veh		178.3			173.8			188.6			82.3	
Approach LOS		F			F			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	27.0	56.0	47.0	20.0	10.6	72.4	7.5	59.5
Change Period (Y+Rc), s	4.5	4.5	4.0	4.5	4.5	4.5	4.0	4.5
Max Green Setting (Gmax), s	22.5	51.5	43.0	15.5	7.5	66.5	7.0	51.5
Max Q Clear Time (g_c+I1), s	25.0	54.0	45.5	18.0	6.9	60.7	4.8	4.7
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	4.9	0.0	2.3

Intersection Summary	
HCM 6th Ctrl Delay	145.4
HCM 6th LOS	F

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	521	9	941	0	1834	530	0	2566	830
Future Volume (veh/h)	0	0	0	521	9	941	0	1834	530	0	2566	830
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1772	1772	1772	0	1786	1786	0	1786	1786
Adj Flow Rate, veh/h				635	11	0	0	2108	0	0	2949	0
Peak Hour Factor				0.82	0.82	0.82	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %				2	2	2	0	1	1	0	1	1
Cap, veh/h				514	9		0	2084		0	2084	
Arrive On Green				0.31	0.31	0.00	0.00	1.00	0.00	0.00	0.20	0.00
Sat Flow, veh/h				1660	29	1502	0	3483	1514	0	3483	1514
Grp Volume(v), veh/h				646	0	0	0	2108	0	0	2949	0
Grp Sat Flow(s),veh/h/ln				1689	0	1502	0	1697	1514	0	1697	1514
Q Serve(g_s), s				46.4	0.0	0.0	0.0	0.0	0.0	0.0	92.1	0.0
Cycle Q Clear(g_c), s				46.4	0.0	0.0	0.0	0.0	0.0	0.0	92.1	0.0
Prop In Lane				0.98		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				522	0		0	2084		0	2084	
V/C Ratio(X)				1.24	0.00		0.00	1.01		0.00	1.42	
Avail Cap(c_a), veh/h				522	0		0	2084		0	2084	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	0.33	0.33
Upstream Filter(I)				1.00	0.00	0.00	0.00	0.21	0.00	0.00	0.09	0.00
Uniform Delay (d), s/veh				51.8	0.0	0.0	0.0	0.0	0.0	0.0	59.8	0.0
Incr Delay (d2), s/veh				122.1	0.0	0.0	0.0	12.1	0.0	0.0	187.2	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				37.3	0.0	0.0	0.0	3.5	0.0	0.0	96.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				173.9	0.0	0.0	0.0	12.1	0.0	0.0	247.0	0.0
LnGrp LOS				F	A		A	F		A	F	
Approach Vol, veh/h					646	A		2108	A		2949	A
Approach Delay, s/veh					173.9			12.1			247.0	
Approach LOS					F			B			F	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	98.0	52.0	98.0
Change Period (Y+Rc), s	5.9	5.6	5.9
Max Green Setting (Gmax), s	92.1	46.4	92.1
Max Q Clear Time (g_c+I1), s	94.1	48.4	2.0
Green Ext Time (p_c), s	0.0	0.0	50.5

Intersection Summary	
HCM 6th Ctrl Delay	151.9
HCM 6th LOS	F

Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	497	0	760	0	0	0	0	1834	632	0	2216	840
Future Volume (veh/h)	497	0	760	0	0	0	0	1834	632	0	2216	840
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1772	0	1772				0	1786	1786	0	1772	1772
Adj Flow Rate, veh/h	512	0	0				0	1972	0	0	2357	0
Peak Hour Factor	0.97	0.97	0.97				0.93	0.93	0.93	0.94	0.94	0.94
Percent Heavy Veh, %	2	0	2				0	1	1	0	2	2
Cap, veh/h	623	0					0	2488		0	2468	
Arrive On Green	0.19	0.00	0.00				0.00	0.73	0.00	0.00	1.00	0.00
Sat Flow, veh/h	3274	0	1502				0	3483	1514	0	3455	1502
Grp Volume(v), veh/h	512	0	0				0	1972	0	0	2357	0
Grp Sat Flow(s),veh/h/ln	1637	0	1502				0	1697	1514	0	1683	1502
Q Serve(g_s), s	22.5	0.0	0.0				0.0	55.6	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	22.5	0.0	0.0				0.0	55.6	0.0	0.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	623	0					0	2488		0	2468	
V/C Ratio(X)	0.82	0.00					0.00	0.79		0.00	0.96	
Avail Cap(c_a), veh/h	1275	0					0	2488		0	2468	
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	0.09	0.00	0.00	0.09	0.00
Uniform Delay (d), s/veh	58.3	0.0	0.0				0.0	12.8	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	3.9	0.0	0.0				0.0	0.2	0.0	0.0	1.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.7	0.0	0.0				0.0	17.9	0.0	0.0	0.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.2	0.0	0.0				0.0	13.0	0.0	0.0	1.3	0.0
LnGrp LOS	E	A					A	B		A	A	
Approach Vol, veh/h		512	A					1972	A		2357	A
Approach Delay, s/veh		62.2						13.0			1.3	
Approach LOS		E						B			A	

Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		115.9				115.9		34.1				
Change Period (Y+Rc), s		5.9				5.9		5.6				
Max Green Setting (Gmax), s		80.1				80.1		58.4				
Max Q Clear Time (g_c+I1), s		2.0				57.6		24.5				
Green Ext Time (p_c), s		56.3				17.9		4.0				

Intersection Summary	
HCM 6th Ctrl Delay	12.5
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR, EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	792	0	0	1070	183	0	0	0	190	0	25
Future Volume (veh/h)	73	792	0	0	1070	183	0	0	0	190	0	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1856
Adj Flow Rate, veh/h	78	852	0	0	1163	199	0	0	0	213	0	28
Peak Hour Factor	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.89	0.92	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	3
Cap, veh/h	123	2897	0	539	1192	204	0	1	0	240	0	211
Arrive On Green	0.03	0.82	0.00	0.00	0.77	0.77	0.00	0.00	0.00	0.13	0.00	0.13
Sat Flow, veh/h	1781	3647	0	1781	1556	266	0	1870	0	1781	0	1567
Grp Volume(v), veh/h	78	852	0	0	0	1362	0	0	0	213	0	28
Grp Sat Flow(s),veh/h/ln	1781	1777	0	1781	0	1822	0	1870	0	1781	0	1567
Q Serve(g_s), s	1.3	8.7	0.0	0.0	0.0	103.8	0.0	0.0	0.0	17.6	0.0	2.4
Cycle Q Clear(g_c), s	1.3	8.7	0.0	0.0	0.0	103.8	0.0	0.0	0.0	17.6	0.0	2.4
Prop In Lane	1.00		0.00	1.00		0.15	0.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	123	2897	0	539	0	1396	0	1	0	240	0	211
V/C Ratio(X)	0.63	0.29	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.89	0.00	0.13
Avail Cap(c_a), veh/h	155	2897	0	591	0	1396	0	206	0	291	0	256
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	46.4	3.4	0.0	0.0	0.0	16.2	0.0	0.0	0.0	63.8	0.0	57.1
Incr Delay (d2), s/veh	5.4	0.3	0.0	0.0	0.0	18.9	0.0	0.0	0.0	23.3	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	2.8	0.0	0.0	0.0	44.3	0.0	0.0	0.0	9.6	0.0	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.9	3.6	0.0	0.0	0.0	35.2	0.0	0.0	0.0	87.0	0.0	57.4
LnGrp LOS	D	A	A	A	A	D	A	A	A	F	A	E
Approach Vol, veh/h		930			1362			0			241	
Approach Delay, s/veh		7.7			35.2			0.0			83.6	
Approach LOS		A			D						F	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	0.0	126.3		23.7	7.3	118.9		0.0
Change Period (Y+Rc), s	3.5	4.0		3.5	3.5	4.0		3.5
Max Green Setting (Gmax), s	4.5	90.0		24.5	6.5	88.0		16.5
Max Q Clear Time (g_c+I1), s	0.0	10.7		19.6	3.3	105.8		0.0
Green Ext Time (p_c), s	0.0	7.8		0.5	0.1	0.0		0.0

Intersection Summary	
HCM 6th Ctrl Delay	29.7
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	787	147	189	1010	252	237	177	214	125	63	12
Future Volume (veh/h)	9	787	147	189	1010	252	237	177	214	125	63	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	10	846	138	203	1086	248	252	188	228	147	74	14
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.94	0.94	0.94	0.85	0.85	0.85
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	432	983	160	554	1090	248	376	261	220	291	205	39
Arrive On Green	0.19	0.32	0.32	0.24	0.38	0.38	0.09	0.14	0.14	0.09	0.13	0.14
Sat Flow, veh/h	1795	3082	503	1795	2898	658	1795	1885	1587	1795	1539	291
Grp Volume(v), veh/h	10	492	492	203	669	665	252	188	228	147	0	88
Grp Sat Flow(s),veh/h/ln	1795	1791	1794	1795	1791	1766	1795	1885	1587	1795	0	1831
Q Serve(g_s), s	0.0	19.3	19.3	1.8	27.9	28.2	6.8	7.2	6.3	5.2	0.0	3.3
Cycle Q Clear(g_c), s	0.0	19.3	19.3	1.8	27.9	28.2	6.8	7.2	6.3	5.2	0.0	3.3
Prop In Lane	1.00		0.28	1.00		0.37	1.00		1.00	1.00		0.16
Lane Grp Cap(c), veh/h	432	571	572	554	673	664	376	261	220	291	0	244
V/C Ratio(X)	0.02	0.86	0.86	0.37	0.99	1.00	0.67	0.72	1.04	0.51	0.00	0.36
Avail Cap(c_a), veh/h	432	602	603	554	673	664	376	520	438	296	0	500
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.8	24.0	24.0	21.5	23.3	23.4	27.4	30.9	12.0	25.3	0.0	29.6
Incr Delay (d2), s/veh	0.0	15.6	15.6	0.4	33.1	35.4	4.6	3.7	40.2	1.4	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	10.1	10.1	2.7	17.0	17.3	1.3	3.4	6.0	2.2	0.0	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.8	39.6	39.6	21.9	56.4	58.8	32.0	34.6	52.1	26.7	0.0	30.5
LnGrp LOS	C	D	D	C	E	F	C	C	F	C	A	C
Approach Vol, veh/h		994			1537			668			235	
Approach Delay, s/veh		39.4			52.9			39.6			28.1	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.3	27.9	10.8	14.0	18.0	32.2	10.4	14.4
Change Period (Y+Rc), s	3.5	4.0	3.5	3.5	3.5	4.0	3.5	3.5
Max Green Setting (Gmax), s	7.0	25.2	7.3	21.0	4.0	28.2	7.1	21.2
Max Q Clear Time (g_c+I1), s	3.8	21.3	8.8	5.3	2.0	30.2	7.2	9.2
Green Ext Time (p_c), s	0.2	2.6	0.0	0.2	0.0	0.0	0.0	1.4

Intersection Summary	
HCM 6th Ctrl Delay	44.7
HCM 6th LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	1240	3	3	1410	240	1	0	1	51	0	8
Future Volume (veh/h)	20	1240	3	3	1410	240	1	0	1	51	0	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1900	1900	1900	1870	1870	1870
Adj Flow Rate, veh/h	24	1476	4	3	1516	252	1	0	0	62	0	0
Peak Hour Factor	0.84	0.84	0.84	0.93	0.93	0.93	0.88	0.88	0.88	0.82	0.82	0.82
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	2	2	2
Cap, veh/h	224	1405	4	240	2613	425	145	0	0	128	0	0
Arrive On Green	0.01	0.75	0.76	0.11	0.85	0.85	0.06	0.00	0.00	0.06	0.00	0.00
Sat Flow, veh/h	1781	1864	5	1795	3073	500	1722	0	0	1421	0	0
Grp Volume(v), veh/h	24	0	1480	3	870	898	1	0	0	62	0	0
Grp Sat Flow(s),veh/h/ln	1781	0	1869	1795	1791	1782	1723	0	0	1421	0	0
Q Serve(g_s), s	0.5	0.0	113.0	0.0	21.2	22.7	0.0	0.0	0.0	6.4	0.0	0.0
Cycle Q Clear(g_c), s	0.5	0.0	113.0	0.0	21.2	22.7	0.1	0.0	0.0	6.5	0.0	0.0
Prop In Lane	1.00		0.00	1.00		0.28	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	224	0	1408	240	1523	1515	145	0	0	128	0	0
V/C Ratio(X)	0.11	0.00	1.05	0.01	0.57	0.59	0.01	0.00	0.00	0.48	0.00	0.00
Avail Cap(c_a), veh/h	259	0	1408	240	1523	1515	270	0	0	251	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.4	0.0	18.5	59.8	3.3	3.4	66.8	0.0	0.0	69.8	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	38.6	0.0	1.6	1.7	0.0	0.0	0.0	2.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	57.3	0.1	6.3	6.7	0.0	0.0	0.0	2.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.6	0.0	57.1	59.8	4.8	5.1	66.9	0.0	0.0	72.7	0.0	0.0
LnGrp LOS	A	A	F	E	A	A	E	A	A	E	A	A
Approach Vol, veh/h		1504			1771			1			62	
Approach Delay, s/veh		56.3			5.1			66.9			72.7	
Approach LOS		E			A			E			E	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	21.1	117.5		11.4	6.0	132.5		11.4
Change Period (Y+Rc), s	4.5	* 4		3.5	3.5	4.5		3.5
Max Green Setting (Gmax), s	4.5	* 1.1E2		21.0	5.5	112.0		21.0
Max Q Clear Time (g_c+I1), s	2.0	115.0		8.5	2.5	24.7		2.1
Green Ext Time (p_c), s	0.0	0.0		0.1	0.0	28.4		0.0

Intersection Summary	
HCM 6th Ctrl Delay	29.4
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	195	1005	2	110	1196	660	17	66	72	285	64	125
Future Volume (veh/h)	195	1005	2	110	1196	660	17	66	72	285	64	125
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.99	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1870	1900	1900	1870	1870	1870	1885	1870	1885
Adj Flow Rate, veh/h	229	1182	2	120	1272	653	18	72	49	374	0	45
Peak Hour Factor	0.85	0.85	0.92	0.92	0.94	0.94	0.92	0.92	0.92	0.88	0.92	0.88
Percent Heavy Veh, %	1	1	1	2	0	0	2	2	2	1	2	1
Cap, veh/h	358	2340	4	261	1220	570	260	94	64	364	0	71
Arrive On Green	0.17	0.64	0.64	0.03	0.35	0.34	0.15	0.09	0.09	0.10	0.00	0.05
Sat Flow, veh/h	1795	3669	6	1781	2366	1107	1781	1033	703	3591	0	1541
Grp Volume(v), veh/h	229	577	607	120	941	984	18	0	121	374	0	45
Grp Sat Flow(s),veh/h/ln	1795	1791	1884	1781	1805	1668	1781	0	1736	1795	0	1541
Q Serve(g_s), s	13.5	25.8	25.8	5.4	77.3	77.3	1.3	0.0	10.2	15.2	0.0	3.8
Cycle Q Clear(g_c), s	13.5	25.8	25.8	5.4	77.3	77.3	1.3	0.0	10.2	15.2	0.0	3.8
Prop In Lane	1.00		0.00	1.00		0.66	1.00		0.40	1.00		1.00
Lane Grp Cap(c), veh/h	358	1142	1202	261	930	860	260	0	157	364	0	71
V/C Ratio(X)	0.64	0.51	0.51	0.46	1.01	1.15	0.07	0.00	0.77	1.03	0.00	0.64
Avail Cap(c_a), veh/h	358	1142	1202	347	930	860	260	0	301	364	0	365
HCM Platoon Ratio	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.09	0.09	0.09	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	55.5	14.5	14.5	24.3	49.1	49.2	55.2	0.0	66.7	67.4	0.0	55.3
Incr Delay (d2), s/veh	3.8	1.6	1.5	0.1	11.8	66.8	0.1	0.0	10.6	54.5	0.0	12.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.4	10.9	11.5	2.4	39.1	49.2	0.6	0.0	5.0	9.7	0.0	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.3	16.1	16.0	24.4	60.9	115.9	55.3	0.0	77.3	121.9	0.0	68.1
LnGrp LOS	E	B	B	C	F	F	E	A	E	F	A	E
Approach Vol, veh/h		1413			2045			139			419	
Approach Delay, s/veh		23.1			85.3			74.5			116.1	
Approach LOS		C			F			E			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	99.9	20.0	18.1	30.4	81.5	26.4	11.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	14.8	75.7	15.5	26.0	13.5	77.0	5.7	35.8
Max Q Clear Time (g_c+I1), s	7.4	27.8	17.2	12.2	15.5	79.3	3.3	5.8
Green Ext Time (p_c), s	0.2	10.9	0.0	0.6	0.0	0.0	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	66.2
HCM 6th LOS	E

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	697	380	220	302	653	523	500	981	170	552	992	979
Future Volume (veh/h)	697	380	220	302	653	523	500	981	170	552	992	979
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1230	1870	1870	1885	1885	1885	1870	1870	1870	1885	1885	1885
Adj Flow Rate, veh/h	711	388	224	321	695	430	515	1011	150	657	1181	0
Peak Hour Factor	0.98	0.98	0.98	0.94	0.94	0.94	0.97	0.97	0.97	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	1	1	1	2	2	2	1	1	1
Cap, veh/h	725	770	438	355	839	526	299	1074	159	350	907	
Arrive On Green	0.11	0.12	0.12	0.20	0.23	0.23	0.09	0.24	0.24	0.13	0.34	0.00
Sat Flow, veh/h	2273	2166	1232	1795	3582	1561	3456	4485	664	3483	3582	1598
Grp Volume(v), veh/h	711	317	295	321	695	430	515	767	394	657	1181	0
Grp Sat Flow(s),veh/h/ln	1137	1777	1621	1795	1791	1561	1728	1702	1745	1742	1791	1598
Q Serve(g_s), s	46.8	25.1	25.6	26.2	27.7	22.4	13.0	33.2	33.3	15.1	38.0	0.0
Cycle Q Clear(g_c), s	46.8	25.1	25.6	26.2	27.7	22.4	13.0	33.2	33.3	15.1	38.0	0.0
Prop In Lane	1.00		0.76	1.00		1.00	1.00		0.38	1.00		1.00
Lane Grp Cap(c), veh/h	725	632	576	355	839	526	299	815	418	350	907	
V/C Ratio(X)	0.98	0.50	0.51	0.90	0.83	0.82	1.72	0.94	0.94	1.88	1.30	
Avail Cap(c_a), veh/h	725	632	576	473	979	587	299	817	419	350	907	
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	0.74	0.74	0.74	0.72	0.72	0.72	1.00	1.00	1.00	0.09	0.09	0.00
Uniform Delay (d), s/veh	66.6	53.7	54.0	58.8	54.6	45.6	68.5	56.0	56.1	65.0	49.7	0.0
Incr Delay (d2), s/veh	23.9	2.1	2.4	13.1	6.8	9.8	337.6	18.7	30.0	396.0	136.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	16.8	12.4	11.6	13.2	13.3	9.4	19.7	16.0	17.8	25.6	32.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	90.5	55.9	56.4	71.8	61.4	55.4	406.1	74.7	86.1	461.0	186.2	0.0
LnGrp LOS	F	E	E	E	E	E	F	E	F	F	F	
Approach Vol, veh/h		1323			1446			1676			1838	A
Approach Delay, s/veh		74.6			61.9			179.2			284.4	
Approach LOS		E			E			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.1	39.9	33.7	57.3	17.0	42.0	51.9	39.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	14.5	35.5	39.0	43.0	12.5	37.5	41.5	40.5
Max Q Clear Time (g_c+I1), s	17.1	35.3	28.2	27.6	15.0	40.0	48.8	29.7
Green Ext Time (p_c), s	0.0	0.1	1.0	2.4	0.0	0.0	0.0	4.3

Intersection Summary	
HCM 6th Ctrl Delay	161.0
HCM 6th LOS	F

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	95	852	99	101	1103	190	100	24	41	209	60	183
Future Volume (veh/h)	95	852	99	101	1103	190	100	24	41	209	60	183
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.97	0.97		0.96	0.97		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	100	897	96	106	1161	176	111	27	4	225	65	73
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.90	0.90	0.90	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	0	0	0
Cap, veh/h	308	2194	235	497	2107	318	234	129	19	347	108	121
Arrive On Green	0.07	1.00	1.00	0.03	0.68	0.68	0.06	0.08	0.08	0.12	0.13	0.13
Sat Flow, veh/h	1781	3235	346	1795	3106	469	1810	1608	238	1810	806	906
Grp Volume(v), veh/h	100	493	500	106	667	670	111	0	31	225	0	138
Grp Sat Flow(s),veh/h/ln	1781	1777	1804	1795	1791	1784	1810	0	1846	1810	0	1712
Q Serve(g_s), s	2.6	0.0	0.0	2.7	28.6	29.1	8.4	0.0	2.4	16.8	0.0	11.4
Cycle Q Clear(g_c), s	2.6	0.0	0.0	2.7	28.6	29.1	8.4	0.0	2.4	16.8	0.0	11.4
Prop In Lane	1.00		0.19	1.00		0.26	1.00		0.13	1.00		0.53
Lane Grp Cap(c), veh/h	308	1205	1224	497	1215	1210	234	0	148	347	0	229
V/C Ratio(X)	0.32	0.41	0.41	0.21	0.55	0.55	0.47	0.00	0.21	0.65	0.00	0.60
Avail Cap(c_a), veh/h	383	1205	1224	536	1215	1210	234	0	345	347	0	411
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.09	0.24	0.24	0.24	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.9	0.0	0.0	6.6	12.4	12.5	58.6	0.0	64.6	53.5	0.0	61.4
Incr Delay (d2), s/veh	0.1	0.1	0.1	0.1	0.4	0.4	1.5	0.0	0.7	4.2	0.0	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.0	1.0	11.3	11.5	4.0	0.0	1.1	8.1	0.0	5.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.9	0.1	0.1	6.6	12.8	12.9	60.1	0.0	65.2	57.7	0.0	63.9
LnGrp LOS	A	A	A	A	B	B	E	A	E	E	A	E
Approach Vol, veh/h		1093			1443			142			363	
Approach Delay, s/veh		1.0			12.4			61.2			60.0	
Approach LOS		A			B			E			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.7	105.2	13.0	23.0	8.7	105.3	21.0	15.0
Change Period (Y+Rc), s	4.0	4.0	4.0	3.5	4.0	4.0	4.0	3.5
Max Green Setting (Gmax), s	8.0	82.0	9.0	35.5	11.0	79.0	17.0	27.5
Max Q Clear Time (g_c+I1), s	4.7	2.0	10.4	13.4	4.6	31.1	18.8	4.4
Green Ext Time (p_c), s	0.1	8.6	0.0	0.5	0.1	13.8	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	16.3
HCM 6th LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	838	277	421	1111	356	475
Future Volume (veh/h)	838	277	421	1111	356	475
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	901	298	439	1157	440	586
Peak Hour Factor	0.93	0.93	0.96	0.96	0.81	0.81
Percent Heavy Veh, %	1	1	1	1	1	1
Cap, veh/h	1083	357	480	1204	509	453
Arrive On Green	0.41	0.41	0.20	0.64	0.28	0.28
Sat Flow, veh/h	2738	872	1795	1885	1795	1598
Grp Volume(v), veh/h	609	590	439	1157	440	586
Grp Sat Flow(s),veh/h/ln	1791	1724	1795	1885	1795	1598
Q Serve(g_s), s	27.4	27.6	14.9	51.6	20.9	25.5
Cycle Q Clear(g_c), s	27.4	27.6	14.9	51.6	20.9	25.5
Prop In Lane		0.51	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	734	707	480	1204	509	453
V/C Ratio(X)	0.83	0.83	0.91	0.96	0.86	1.29
Avail Cap(c_a), veh/h	734	707	508	1204	509	453
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.86	0.86	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.8	23.8	22.6	15.2	30.6	32.3
Incr Delay (d2), s/veh	9.2	9.8	19.9	18.1	15.4	148.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.8	12.6	11.6	24.4	10.9	28.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	33.0	33.6	42.5	33.2	46.1	180.4
LnGrp LOS	C	C	D	C	D	F
Approach Vol, veh/h	1199			1596	1026	
Approach Delay, s/veh	33.3			35.8	122.8	
Approach LOS	C			D	F	

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	20.6	40.9				61.5	28.5
Change Period (Y+Rc), s	3.5	4.5				4.5	3.5
Max Green Setting (Gmax), s	18.5	35.0				57.0	25.0
Max Q Clear Time (g_c+I1), s	16.9	29.6				53.6	27.5
Green Ext Time (p_c), s	0.2	3.5				2.5	0.0

Intersection Summary	
HCM 6th Ctrl Delay	58.4
HCM 6th LOS	E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	977	235	218	1218	313	79
Future Volume (vph)	977	235	218	1218	313	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.0	3.0	4.0	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1881	1561	1770	1863	1805	1572
Flt Permitted	1.00	1.00	0.04	1.00	0.95	1.00
Satd. Flow (perm)	1881	1561	80	1863	1805	1572
Peak-hour factor, PHF	0.93	0.93	0.91	0.91	0.85	0.85
Adj. Flow (vph)	1051	253	240	1338	368	93
RTOR Reduction (vph)	0	34	0	0	0	67
Lane Group Flow (vph)	1051	219	240	1338	368	26
Confl. Peds. (#/hr)		1	1		23	
Confl. Bikes (#/hr)						3
Heavy Vehicles (%)	1%	1%	2%	2%	0%	0%
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	90.0	90.0	105.5	104.5	25.5	25.5
Effective Green, g (s)	90.5	90.0	106.0	105.0	26.0	26.0
Actuated g/C Ratio	0.60	0.60	0.71	0.70	0.17	0.17
Clearance Time (s)	4.0	4.0	3.5	4.5	3.5	3.5
Vehicle Extension (s)	4.0	4.0	3.0	4.0	3.0	3.0
Lane Grp Cap (vph)	1134	936	191	1304	312	272
v/s Ratio Prot	0.56		c0.10	0.72	c0.20	
v/s Ratio Perm		0.14	c0.79			0.02
v/c Ratio	0.93	0.23	1.26	1.03	1.18	0.10
Uniform Delay, d1	26.8	14.0	61.0	22.5	62.0	52.1
Progression Factor	1.00	1.00	1.01	1.06	1.00	1.00
Incremental Delay, d2	14.1	0.6	119.5	15.4	108.9	0.2
Delay (s)	40.9	14.6	181.2	39.2	170.9	52.3
Level of Service	D	B	F	D	F	D
Approach Delay (s)	35.7			60.8	147.0	
Approach LOS	D			E	F	

Intersection Summary			
HCM 2000 Control Delay	62.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	90.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	303	778	786	202	422	735
Future Volume (veh/h)	303	778	786	202	422	735
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1885	1885	1870	1870
Adj Flow Rate, veh/h	322	828	819	151	469	498
Peak Hour Factor	0.94	0.94	0.96	0.96	0.90	0.90
Percent Heavy Veh, %	2	2	1	1	2	2
Cap, veh/h	261	1147	779	660	499	676
Arrive On Green	0.15	0.61	0.41	0.41	0.28	0.28
Sat Flow, veh/h	1781	1870	1885	1596	1781	1585
Grp Volume(v), veh/h	322	828	819	151	469	498
Grp Sat Flow(s),veh/h/ln	1781	1870	1885	1596	1781	1585
Q Serve(g_s), s	11.0	23.0	31.0	4.6	19.3	19.7
Cycle Q Clear(g_c), s	11.0	23.0	31.0	4.6	19.3	19.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	261	1147	779	660	499	676
V/C Ratio(X)	1.23	0.72	1.05	0.23	0.94	0.74
Avail Cap(c_a), veh/h	261	1160	779	660	499	676
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.41	0.41	0.32	0.32	1.00	1.00
Uniform Delay (d), s/veh	32.0	10.1	22.0	14.3	26.4	18.0
Incr Delay (d2), s/veh	117.9	1.6	33.4	0.3	26.1	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.1	8.2	19.6	1.6	11.3	17.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	149.9	11.7	55.4	14.5	52.5	22.2
LnGrp LOS	F	B	F	B	D	C
Approach Vol, veh/h		1150	970		967	
Approach Delay, s/veh		50.4	49.1		36.9	
Approach LOS		D	D		D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		50.5		24.5	15.0	35.5
Change Period (Y+Rc), s		* 4.5		3.5	4.0	4.5
Max Green Setting (Gmax), s		* 47		21.0	11.0	31.0
Max Q Clear Time (g_c+I1), s		25.0		21.7	13.0	33.0
Green Ext Time (p_c), s		4.3		0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	45.8
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	275	960	1	1	851	200	1	0	1	260	0	230
Future Volume (veh/h)	275	960	1	1	851	200	1	0	1	260	0	230
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1826	1826	1826	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	316	1103	1	1	935	185	2	0	0	292	0	258
Peak Hour Factor	0.87	0.87	0.87	0.91	0.91	0.91	0.50	0.50	0.50	0.89	0.89	0.89
Percent Heavy Veh, %	3	3	3	5	5	5	0	0	0	0	0	0
Cap, veh/h	345	902	1	341	889	752	147	0	0	440	0	320
Arrive On Green	0.09	0.33	0.33	0.14	0.49	0.49	0.20	0.00	0.00	0.20	0.00	0.20
Sat Flow, veh/h	1767	1854	2	1739	1826	1546	256	0	0	1730	0	1610
Grp Volume(v), veh/h	316	0	1104	1	935	185	2	0	0	292	0	258
Grp Sat Flow(s),veh/h/ln	1767	0	1855	1739	1826	1546	256	0	0	1730	0	1610
Q Serve(g_s), s	9.2	0.0	36.5	0.0	36.5	5.2	0.1	0.0	0.0	0.0	0.0	11.5
Cycle Q Clear(g_c), s	9.2	0.0	36.5	0.0	36.5	5.2	11.7	0.0	0.0	11.6	0.0	11.5
Prop In Lane	1.00		0.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	345	0	903	341	889	752	147	0	0	440	0	320
V/C Ratio(X)	0.91	0.00	1.22	0.00	1.05	0.25	0.01	0.00	0.00	0.66	0.00	0.81
Avail Cap(c_a), veh/h	345	0	903	341	889	752	224	0	0	538	0	429
HCM Platoon Ratio	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.50	0.00	0.50	0.67	0.67	0.67	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.9	0.0	25.3	27.7	19.2	11.2	34.3	0.0	0.0	28.7	0.0	28.7
Incr Delay (d2), s/veh	16.8	0.0	105.4	0.0	39.7	0.4	0.0	0.0	0.0	2.3	0.0	8.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.3	0.0	42.6	0.0	23.3	1.7	0.0	0.0	0.0	5.1	0.0	4.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.8	0.0	130.7	27.7	58.9	11.6	34.3	0.0	0.0	31.0	0.0	36.7
LnGrp LOS	D	A	F	C	F	B	C	A	A	C	A	D
Approach Vol, veh/h		1420			1121			2			550	
Approach Delay, s/veh		112.5			51.1			34.3			33.6	
Approach LOS		F			D			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	15.1	41.0		18.9	15.1	41.0		18.9
Change Period (Y+Rc), s	4.5	4.5		4.0	4.5	4.5		4.0
Max Green Setting (Gmax), s	5.5	36.5		20.0	5.5	36.5		20.0
Max Q Clear Time (g_c+I1), s	2.0	38.5		13.6	11.2	38.5		13.7
Green Ext Time (p_c), s	0.0	0.0		1.4	0.0	0.0		0.0

Intersection Summary	
HCM 6th Ctrl Delay	76.2
HCM 6th LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	870	360	220	761	0	280	1	420	0	2	1
Future Volume (veh/h)	1	870	360	220	761	0	280	1	420	0	2	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	418	418	418
Adj Flow Rate, veh/h	1	1024	369	253	875	0	311	1	195	0	8	4
Peak Hour Factor	0.85	0.85	0.85	0.87	0.87	0.87	0.90	0.90	0.90	0.25	0.25	0.25
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	100	100	100
Cap, veh/h	338	897	764	414	1292	0	338	1	302	0	6	4
Arrive On Green	0.00	0.97	0.97	0.41	1.00	0.00	0.19	0.19	0.19	0.00	0.01	0.01
Sat Flow, veh/h	1767	1856	1571	1767	1856	0	1762	6	1572	0	418	354
Grp Volume(v), veh/h	1	1024	369	253	875	0	312	0	195	0	8	4
Grp Sat Flow(s),veh/h/ln	1767	1856	1571	1767	1856	0	1767	0	1572	0	418	354
Q Serve(g_s), s	0.0	72.5	1.8	11.9	0.0	0.0	26.0	0.0	17.2	0.0	2.1	1.6
Cycle Q Clear(g_c), s	0.0	72.5	1.8	11.9	0.0	0.0	26.0	0.0	17.2	0.0	2.1	1.6
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	338	897	764	414	1292	0	339	0	302	0	6	4
V/C Ratio(X)	0.00	1.14	0.48	0.61	0.68	0.00	0.92	0.00	0.65	0.00	1.35	1.04
Avail Cap(c_a), veh/h	378	897	764	414	1292	0	353	0	314	0	57	47
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.16	0.16	0.16	0.20	0.20	0.00	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	20.9	2.5	1.1	37.2	0.0	0.0	59.5	0.0	55.9	0.0	73.9	74.2
Incr Delay (d2), s/veh	0.0	66.3	0.4	0.4	0.3	0.0	27.6	0.0	3.8	0.0	223.7	142.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	17.6	0.4	6.1	0.1	0.0	14.3	0.0	7.2	0.0	0.6	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.9	68.8	1.4	37.6	0.3	0.0	87.0	0.0	59.7	0.0	297.6	216.6
LnGrp LOS	C	F	A	D	A	A	F	A	E	A	F	F
Approach Vol, veh/h		1394			1128			507			12	
Approach Delay, s/veh		50.9			8.7			76.5			270.6	
Approach LOS		D			A			E			F	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	35.6	77.5		5.1	3.7	109.4		31.8
Change Period (Y+Rc), s	4.5	* 4.5		3.5	3.5	4.5		3.5
Max Green Setting (Gmax), s	12.5	* 73		20.0	4.0	81.5		29.5
Max Q Clear Time (g_c+I1), s	13.9	74.5		4.1	2.0	2.0		28.0
Green Ext Time (p_c), s	0.0	0.0		0.0	0.0	5.2		0.3

Intersection Summary	
HCM 6th Ctrl Delay	40.4
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	615	670	691	133	88	340
Future Volume (veh/h)	615	670	691	133	88	340
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1885	1885	1856	1856	1826	1826
Adj Flow Rate, veh/h	668	728	813	151	107	0
Peak Hour Factor	0.92	0.92	0.85	0.85	0.82	0.82
Percent Heavy Veh, %	1	1	3	3	5	5
Cap, veh/h	703	1643	728	135	130	116
Arrive On Green	0.73	1.00	0.48	0.48	0.07	0.00
Sat Flow, veh/h	1795	1885	1516	282	1739	1547
Grp Volume(v), veh/h	668	728	0	964	107	0
Grp Sat Flow(s),veh/h/ln	1795	1885	0	1798	1739	1547
Q Serve(g_s), s	43.2	0.0	0.0	72.0	9.1	0.0
Cycle Q Clear(g_c), s	43.2	0.0	0.0	72.0	9.1	0.0
Prop In Lane	1.00			0.16	1.00	1.00
Lane Grp Cap(c), veh/h	703	1643	0	863	130	116
V/C Ratio(X)	0.95	0.44	0.00	1.12	0.82	0.00
Avail Cap(c_a), veh/h	703	1643	0	863	255	227
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.31	0.31	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	17.1	0.0	0.0	39.0	68.4	0.0
Incr Delay (d2), s/veh	9.7	0.3	0.0	68.1	14.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.3	0.1	0.0	47.5	4.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	26.8	0.3	0.0	107.1	82.5	0.0
LnGrp LOS	C	A	A	F	F	A
Approach Vol, veh/h		1396	964		107	
Approach Delay, s/veh		13.0	107.1		82.5	
Approach LOS		B	F		F	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		134.8		15.2	58.8	76.0
Change Period (Y+Rc), s		4.5		4.0	4.5	4.5
Max Green Setting (Gmax), s		119.5		22.0	43.5	71.5
Max Q Clear Time (g_c+I1), s		2.0		11.1	45.2	74.0
Green Ext Time (p_c), s		0.7		0.3	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	52.8
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	474	2	160	2	2	6	260	1626	2	5	1089	459
Future Volume (veh/h)	474	2	160	2	2	6	260	1626	2	5	1089	459
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1870	1885	1870	1870	1870	1885	1885	1885	1870	1885	1885
Adj Flow Rate, veh/h	593	0	0	2	2	-2	271	1694	2	5	1224	516
Peak Hour Factor	0.80	0.92	0.80	0.92	0.92	0.92	0.96	0.96	0.92	0.92	0.89	0.89
Percent Heavy Veh, %	1	2	1	2	2	2	1	1	1	2	1	1
Cap, veh/h	651	0	290	3	3	208	292	1997	2	270	1352	542
Arrive On Green	0.18	0.00	0.00	0.00	0.00	0.00	0.16	0.54	0.54	0.15	0.55	0.55
Sat Flow, veh/h	3591	0	1598	1781	1870	0	1795	3671	4	1781	2478	994
Grp Volume(v), veh/h	593	0	0	2	0	0	271	826	870	5	867	873
Grp Sat Flow(s),veh/h/ln	1795	0	1598	1781	1870	0	1795	1791	1884	1781	1791	1680
Q Serve(g_s), s	23.4	0.0	0.0	0.2	0.0	0.0	21.5	56.5	56.5	0.3	61.7	71.0
Cycle Q Clear(g_c), s	23.4	0.0	0.0	0.2	0.0	0.0	21.5	56.5	56.5	0.3	61.7	71.0
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.00	1.00		0.59
Lane Grp Cap(c), veh/h	651	0	290	3	3	0	292	974	1025	270	977	917
V/C Ratio(X)	0.91	0.00	0.00	0.70	0.00	0.00	0.93	0.85	0.85	0.02	0.89	0.95
Avail Cap(c_a), veh/h	683	0	304	37	39	0	292	1234	1299	270	993	932
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.1	0.0	0.0	72.2	0.0	0.0	59.8	27.9	27.9	52.2	29.0	31.1
Incr Delay (d2), s/veh	15.5	0.0	0.0	75.7	0.0	0.0	34.0	5.3	5.1	0.0	10.0	18.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.1	0.0	0.0	0.1	0.0	0.0	12.4	24.1	25.3	0.2	27.4	31.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.6	0.0	0.0	147.9	0.0	0.0	93.8	33.2	33.0	52.2	39.0	50.0
LnGrp LOS	E	A	A	F	A	A	F	C	C	D	D	D
Approach Vol, veh/h		593			2			1967			1745	
Approach Delay, s/veh		73.6			147.9			41.5			44.6	
Approach LOS		E			F			D			D	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	27.2	83.5		29.7	27.0	83.7		4.2
Change Period (Y+Rc), s	5.3	* 5.3		4.0	4.0	5.3		4.0
Max Green Setting (Gmax), s	3.0	* 99		27.0	23.0	79.7		3.0
Max Q Clear Time (g_c+I1), s	2.3	58.5		25.4	23.5	73.0		2.2
Green Ext Time (p_c), s	0.0	19.7		0.3	0.0	5.4		0.0

Intersection Summary	
HCM 6th Ctrl Delay	47.2
HCM 6th LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	300	0	0	0	0	0
Future Volume (veh/h)	300	0	0	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	326	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	355	316	4807	0	0	3815
Arrive On Green	0.20	0.00	0.00	0.00	0.00	0.00
Sat Flow, veh/h	1781	1585	6958	0	0	5443
Grp Volume(v), veh/h	326	0	0	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1585	1609	0	0	1702
Q Serve(g_s), s	26.9	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	26.9	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	355	316	4807	0	0	3815
V/C Ratio(X)	0.92	0.00	0.00	0.00	0.00	0.00
Avail Cap(c_a), veh/h	1496	1331	4807	0	0	3815
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	58.8	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	9.6	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.1	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	68.5	0.0	0.0	0.0	0.0	0.0
LnGrp LOS	E	A	A	A	A	A
Approach Vol, veh/h	326		0			0
Approach Delay, s/veh	68.5		0.0			0.0
Approach LOS	E					

Timer - Assigned Phs		2				6	8
Phs Duration (G+Y+Rc), s		116.1				116.1	33.9
Change Period (Y+Rc), s		4.0				4.0	4.0
Max Green Setting (Gmax), s		16.0				16.0	126.0
Max Q Clear Time (g_c+I1), s		0.0				0.0	28.9
Green Ext Time (p_c), s		0.0				0.0	1.0

Intersection Summary	
HCM 6th Ctrl Delay	68.5
HCM 6th LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	230	130	160	310	209	130	1712	150	134	1081	134
Future Volume (veh/h)	105	230	130	160	310	209	130	1712	150	134	1081	134
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	114	250	24	178	344	209	137	1802	96	138	1114	138
Peak Hour Factor	0.92	0.92	0.92	0.90	0.90	0.90	0.95	0.95	0.95	0.97	0.97	0.97
Percent Heavy Veh, %	1	1	1	1	1	1	2	2	2	3	3	3
Cap, veh/h	126	489	404	367	330	201	219	1789	793	148	1580	195
Arrive On Green	0.04	0.26	0.26	0.09	0.30	0.30	0.06	0.50	0.50	0.06	0.50	0.50
Sat Flow, veh/h	1795	1885	1559	1795	1088	661	1781	3554	1576	1767	3155	390
Grp Volume(v), veh/h	114	250	24	178	0	553	137	1802	96	138	621	631
Grp Sat Flow(s),veh/h/ln	1795	1885	1559	1795	0	1750	1781	1777	1576	1767	1763	1783
Q Serve(g_s), s	6.5	17.0	1.7	10.6	0.0	45.5	6.3	75.5	3.5	7.6	40.8	41.0
Cycle Q Clear(g_c), s	6.5	17.0	1.7	10.6	0.0	45.5	6.3	75.5	3.5	7.6	40.8	41.0
Prop In Lane	1.00		1.00	1.00		0.38	1.00		1.00	1.00		0.22
Lane Grp Cap(c), veh/h	126	489	404	367	0	531	219	1789	793	148	883	893
V/C Ratio(X)	0.91	0.51	0.06	0.49	0.00	1.04	0.63	1.01	0.12	0.93	0.70	0.71
Avail Cap(c_a), veh/h	126	489	404	384	0	531	262	1789	793	148	883	893
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.2	47.4	41.8	35.5	0.0	52.3	29.8	37.3	10.1	69.0	28.9	29.0
Incr Delay (d2), s/veh	51.5	0.4	0.0	0.4	0.0	50.4	1.7	23.1	0.3	53.1	4.7	4.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	8.1	0.7	4.7	0.0	27.3	2.8	37.4	1.9	7.4	18.1	18.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	97.8	47.8	41.8	35.9	0.0	102.7	31.5	60.3	10.4	122.1	33.6	33.7
LnGrp LOS	F	D	D	D	A	F	C	F	B	F	C	C
Approach Vol, veh/h		388			731			2035			1390	
Approach Delay, s/veh		62.1			86.4			56.0			42.4	
Approach LOS		E			F			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	79.0	16.6	42.4	12.4	78.6	10.0	49.0
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	8.0	75.0	14.0	37.0	12.0	71.0	6.0	45.0
Max Q Clear Time (g_c+I1), s	9.6	77.5	12.6	19.0	8.3	43.0	8.5	47.5
Green Ext Time (p_c), s	0.0	0.0	0.1	0.5	0.1	6.4	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	57.3
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	124	150	10	95	260	240	13	1264	60	230	964	127
Future Volume (veh/h)	124	150	10	95	260	240	13	1264	60	230	964	127
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1870	1870	1870	1885	1885	1900	1900	1900
Adj Flow Rate, veh/h	135	163	9	112	283	247	14	1420	64	237	994	130
Peak Hour Factor	0.92	0.92	0.92	0.85	0.92	0.85	0.92	0.89	0.89	0.97	0.97	0.92
Percent Heavy Veh, %	2	2	2	1	2	2	2	1	1	0	0	0
Cap, veh/h	137	562	31	420	280	244	230	1476	66	247	1611	211
Arrive On Green	0.05	0.32	0.32	0.04	0.31	0.31	0.03	0.56	0.56	0.10	0.50	0.50
Sat Flow, veh/h	1781	1756	97	1795	912	796	1781	3487	157	1810	3201	418
Grp Volume(v), veh/h	135	0	172	112	0	530	14	728	756	237	560	564
Grp Sat Flow(s),veh/h/ln	1781	0	1853	1795	0	1708	1781	1791	1852	1810	1805	1815
Q Serve(g_s), s	7.5	0.0	10.4	5.5	0.0	46.0	0.7	57.9	58.6	14.6	33.5	33.6
Cycle Q Clear(g_c), s	7.5	0.0	10.4	5.5	0.0	46.0	0.7	57.9	58.6	14.6	33.5	33.6
Prop In Lane	1.00		0.05	1.00		0.47	1.00		0.08	1.00		0.23
Lane Grp Cap(c), veh/h	137	0	593	420	0	524	230	758	784	247	908	913
V/C Ratio(X)	0.98	0.00	0.29	0.27	0.00	1.01	0.06	0.96	0.96	0.96	0.62	0.62
Avail Cap(c_a), veh/h	137	0	593	420	0	524	289	758	784	247	908	913
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.82	0.82	0.82	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.8	0.0	38.2	35.8	0.0	52.0	24.5	31.6	31.7	47.4	26.9	26.9
Incr Delay (d2), s/veh	72.1	0.0	0.1	0.3	0.0	42.3	0.1	21.3	21.7	46.1	3.1	3.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	0.0	4.8	0.5	0.0	25.8	0.3	26.7	28.0	12.1	15.1	15.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	113.9	0.0	38.3	36.1	0.0	94.3	24.6	52.9	53.4	93.5	30.0	30.0
LnGrp LOS	F	A	D	D	A	F	C	D	D	F	C	C
Approach Vol, veh/h		307			642			1498			1361	
Approach Delay, s/veh		71.6			84.1			52.9			41.0	
Approach LOS		E			F			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.0	68.0	9.0	54.0	7.0	80.0	11.0	52.0
Change Period (Y+Rc), s	3.5	4.5	3.5	6.0	3.5	4.5	3.5	6.0
Max Green Setting (Gmax), s	15.5	63.5	5.5	48.0	8.5	70.5	7.5	46.0
Max Q Clear Time (g_c+I1), s	16.6	60.6	7.5	12.4	2.7	35.6	9.5	48.0
Green Ext Time (p_c), s	0.0	1.4	0.0	0.6	0.0	2.8	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	55.4
HCM 6th LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	100	5	130	45	200	0	1044	220	0	1004	25
Future Volume (veh/h)	75	100	5	130	45	200	0	1044	220	0	1004	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.96		0.92	0.96		0.94	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1870	1870	1870	0	1885	1885	0	1885	1885
Adj Flow Rate, veh/h	91	122	2	149	52	143	0	1111	217	0	1167	28
Peak Hour Factor	0.82	0.82	0.82	0.87	0.87	0.87	0.94	0.94	0.94	0.86	0.86	0.86
Percent Heavy Veh, %	0	0	0	2	2	2	0	1	1	0	1	1
Cap, veh/h	170	214	4	258	60	166	0	2099	408	0	2512	60
Arrive On Green	0.05	0.11	0.12	0.08	0.14	0.15	0.00	1.00	1.00	0.00	0.70	0.70
Sat Flow, veh/h	1810	1861	31	1781	419	1152	0	3081	581	0	3668	86
Grp Volume(v), veh/h	91	0	124	149	0	195	0	664	664	0	585	610
Grp Sat Flow(s),veh/h/ln	1810	0	1891	1781	0	1571	0	1791	1776	0	1791	1869
Q Serve(g_s), s	6.6	0.0	9.3	10.8	0.0	18.2	0.0	0.0	0.0	0.0	21.6	21.6
Cycle Q Clear(g_c), s	6.6	0.0	9.3	10.8	0.0	18.2	0.0	0.0	0.0	0.0	21.6	21.6
Prop In Lane	1.00		0.02	1.00		0.73	0.00		0.33	0.00		0.05
Lane Grp Cap(c), veh/h	170	0	217	258	0	227	0	1259	1249	0	1259	1314
V/C Ratio(X)	0.53	0.00	0.57	0.58	0.00	0.86	0.00	0.53	0.53	0.00	0.46	0.46
Avail Cap(c_a), veh/h	195	0	435	278	0	403	0	1259	1249	0	1259	1314
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.00	0.86	0.86	0.00	0.79	0.79
Uniform Delay (d), s/veh	55.4	0.0	62.9	51.5	0.0	62.5	0.0	0.0	0.0	0.0	9.8	9.8
Incr Delay (d2), s/veh	1.0	0.0	0.9	1.4	0.0	3.7	0.0	1.4	1.4	0.0	1.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	0.0	4.6	5.0	0.0	7.5	0.0	0.5	0.5	0.0	8.4	8.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.3	0.0	63.8	52.9	0.0	66.3	0.0	1.4	1.4	0.0	10.8	10.8
LnGrp LOS	E	A	E	D	A	E	A	A	A	A	B	B
Approach Vol, veh/h		215			344			1328			1195	
Approach Delay, s/veh		60.6			60.5			1.4			10.8	
Approach LOS		E			E			A			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		109.9	16.3	23.7		109.9	11.9	28.1				
Change Period (Y+Rc), s		4.5	3.5	6.0		4.5	3.5	6.0				
Max Green Setting (Gmax), s		86.5	14.5	35.0		86.5	10.5	39.0				
Max Q Clear Time (g_c+I1), s		2.0	12.8	11.3		23.6	8.6	20.2				
Green Ext Time (p_c), s		3.6	0.0	0.2		3.0	0.0	0.5				

Intersection Summary	
HCM 6th Ctrl Delay	15.8
HCM 6th LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	674	1310	1580	398	612	469
Future Volume (vph)	674	1310	1580	398	612	469
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5	5.0	5.0	5.5	3.5
Lane Util. Factor	0.97	0.95	0.95	1.00	0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3400	3505	3438	1503	3502	1581
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3400	3505	3438	1503	3502	1581
Peak-hour factor, PHF	0.94	0.94	0.95	0.95	0.87	0.87
Adj. Flow (vph)	717	1394	1663	419	703	539
RTOR Reduction (vph)	0	0	0	6	0	4
Lane Group Flow (vph)	717	1394	1663	413	703	535
Confl. Peds. (#/hr)	15			15	11	22
Heavy Vehicles (%)	3%	3%	5%	5%	0%	0%
Turn Type	Prot	NA	NA	pm+ov	Prot	pt+ov
Protected Phases	3 5	2	6	7	7	3 5
Permitted Phases				6		4
Actuated Green, G (s)	34.0	79.0	69.0	98.0	29.0	63.0
Effective Green, g (s)	33.0	78.5	69.0	98.0	28.5	61.5
Actuated g/C Ratio	0.22	0.52	0.46	0.65	0.19	0.41
Clearance Time (s)		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0	0.4	4.0	4.0	
Lane Grp Cap (vph)	748	1834	1581	981	665	648
v/s Ratio Prot	c0.21	c0.40	c0.48	0.08	c0.20	0.18
v/s Ratio Perm				0.19		0.16
v/c Ratio	0.96	0.76	1.05	0.42	1.06	0.83
Uniform Delay, d1	57.8	28.3	40.5	12.4	60.8	39.5
Progression Factor	1.00	1.00	1.00	1.00	1.03	0.59
Incremental Delay, d2	22.8	3.0	37.7	0.4	49.5	7.4
Delay (s)	80.6	31.3	78.2	12.8	112.0	30.6
Level of Service	F	C	E	B	F	C
Approach Delay (s)		48.1	65.0		76.7	
Approach LOS		D	E		E	

Intersection Summary			
HCM 2000 Control Delay	61.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	19.5
Intersection Capacity Utilization	92.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	6	15	30	0	220	0	1022	52	24	1041	13
Future Volume (veh/h)	12	6	15	30	0	220	0	1022	52	24	1041	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.88	1.00		1.00	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	0	1870	0	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	13	7	2	33	0	28	0	1111	54	28	1197	15
Peak Hour Factor	0.92	0.92	0.92	0.90	0.90	0.90	0.92	0.92	0.92	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	0	2	0	2	2	2	2	2
Cap, veh/h	225	67	19	83	0	0	0	1234	60	866	3008	38
Arrive On Green	0.11	0.05	0.05	0.02	0.00	0.00	0.00	0.36	0.36	0.90	1.00	1.00
Sat Flow, veh/h	1781	1352	386	1781	33		0	3538	167	1781	3593	45
Grp Volume(v), veh/h	13	0	9	33	75.1		0	573	592	28	592	620
Grp Sat Flow(s),veh/h/ln	1781	0	1738	1781	E		0	1777	1835	1781	1777	1862
Q Serve(g_s), s	0.0	0.0	0.7	0.0			0.0	45.8	45.9	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.7	0.0			0.0	45.8	45.9	0.0	0.0	0.0
Prop In Lane	1.00		0.22	1.00			0.00		0.09	1.00		0.02
Lane Grp Cap(c), veh/h	225	0	86	83			0	637	657	866	1487	1558
V/C Ratio(X)	0.06	0.00	0.10	0.40			0.00	0.90	0.90	0.03	0.40	0.40
Avail Cap(c_a), veh/h	225	0	406	125			0	1001	1033	866	1487	1558
HCM Platoon Ratio	1.00	1.00	1.00	1.00			1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00			0.00	0.61	0.61	0.87	0.87	0.87
Uniform Delay (d), s/veh	61.3	0.0	68.1	72.0			0.0	45.6	45.6	3.7	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.5	3.0			0.0	12.2	12.0	0.0	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.3	1.3			0.0	22.2	22.8	0.1	0.3	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.4	0.0	68.6	75.1			0.0	57.8	57.6	3.7	0.7	0.7
LnGrp LOS	E	A	E	E			A	E	E	A	A	A
Approach Vol, veh/h		22						1165			1240	
Approach Delay, s/veh		64.3						57.7			0.7	
Approach LOS		E						E			A	

Timer - Assigned Phs	1	2	3	4	6	7
Phs Duration (G+Y+Rc), s	71.8	58.2	6.5	13.5	130.1	19.9
Change Period (Y+Rc), s	4.5	* 4.5	3.5	6.0	4.5	3.5
Max Green Setting (Gmax), s	6.5	* 85	6.5	35.0	94.5	4.5
Max Q Clear Time (g_c+I1), s	2.0	47.9	2.0	2.7	2.0	2.0
Green Ext Time (p_c), s	0.0	5.9	0.0	0.0	6.3	0.0

Intersection Summary	
HCM 6th Ctrl Delay	29.3
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	76	1316	66	165	1031	28	295	0	300	20	0	60
Future Volume (veh/h)	76	1316	66	165	1031	28	295	0	300	20	0	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	83	1430	72	179	1121	30	321	0	266	22	0	12
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	393	2755	138	278	2828	76	0	274	232	0	0	232
Arrive On Green	0.80	0.80	0.80	0.80	0.80	0.80	0.00	0.00	0.15	0.00	0.00	0.15
Sat Flow, veh/h	488	3443	173	349	3536	95	0	1870	1585	0	0	1585
Grp Volume(v), veh/h	83	736	766	179	563	588	0	0	266	0	0	12
Grp Sat Flow(s),veh/h/ln	488	1777	1839	349	1777	1853	0	1870	1585	0	0	1585
Q Serve(g_s), s	9.0	21.2	21.4	54.0	13.9	13.9	0.0	0.0	22.0	0.0	0.0	1.0
Cycle Q Clear(g_c), s	22.9	21.2	21.4	75.4	13.9	13.9	0.0	0.0	22.0	0.0	0.0	1.0
Prop In Lane	1.00		0.09	1.00		0.05	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	393	1421	1471	278	1421	1483	0	274	232	0	0	232
V/C Ratio(X)	0.21	0.52	0.52	0.64	0.40	0.40	0.00	0.00	1.14	0.00	0.00	0.05
Avail Cap(c_a), veh/h	393	1421	1471	278	1421	1483	0	274	232	0	0	232
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.45	0.45	0.45	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	7.8	5.1	5.1	18.1	4.4	4.4	0.0	0.0	64.0	0.0	0.0	55.0
Incr Delay (d2), s/veh	0.5	0.6	0.6	11.0	0.8	0.8	0.0	0.0	103.4	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	6.8	7.1	5.0	4.6	4.8	0.0	0.0	15.6	0.0	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.3	5.7	5.7	29.1	5.2	5.2	0.0	0.0	167.4	0.0	0.0	55.1
LnGrp LOS	A	A	A	C	A	A	A	A	F	A	A	E
Approach Vol, veh/h		1585			1330			266			12	
Approach Delay, s/veh		5.9			8.4			167.4			55.1	
Approach LOS		A			A			F			E	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	0.0	26.0		124.0	0.0	26.0		124.0
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s	4.0	22.0		112.0	4.0	22.0		112.0
Max Q Clear Time (g_c+I1), s	0.0	24.0		24.9	0.0	3.0		77.4
Green Ext Time (p_c), s	0.0	0.0		19.9	0.0	0.0		14.6

Intersection Summary	
HCM 6th Ctrl Delay	20.6
HCM 6th LOS	C

2043 AM Preferred Alternative

		Without 214		With 214	
Map ID	Intersection	Delay	V2 LOS	Delay	LOS
1	208th/9th	73.9	E	63.2	E
2	SR 527/208th	92.9	F	92.3	F
15	SR 527/214th	35.4	D	69.6	E
16	SR 527/220th	63.5	E	22.8	C
17	SR 527/ I-405 NB Ramps	5	A	5	A
18	SR 527/ I-405 SB Ramps	22.9	C	30.6	C
6	228th/9th	61.7	E	57.5	E
7	SR 527/228th	138.3	F	119.8	F
11	228th/29th (not widened)	60.1	E	60.2	E

HCM 6th Signalized Intersection Summary
1: 9th Ave SE/Filbert Dr & 208th St SE / SR 524

06/29/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	1428	945	314	1385	102	270	65	141	103	288	7
Future Volume (veh/h)	4	1428	945	314	1385	102	270	65	141	103	288	7
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1885	1885	1885	1870	1870	1870
Adj Flow Rate, veh/h	4	1503	920	341	1505	106	293	71	86	113	316	7
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	1	1	1	2	2	2
Cap, veh/h	161	1703	759	312	2043	143	296	156	189	179	337	7
Arrive On Green	0.01	0.48	0.48	0.14	0.61	0.60	0.09	0.20	0.20	0.07	0.18	0.18
Sat Flow, veh/h	1781	3554	1585	1781	3369	236	3483	766	928	1781	1822	40
Grp Volume(v), veh/h	4	1503	920	341	790	821	293	0	157	113	0	323
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1828	1742	0	1694	1781	0	1863
Q Serve(g_s), s	0.2	54.7	48.3	20.0	45.2	46.1	12.1	0.0	11.7	8.1	0.0	24.5
Cycle Q Clear(g_c), s	0.2	54.7	48.3	20.0	45.2	46.1	12.1	0.0	11.7	8.1	0.0	24.5
Prop In Lane	1.00		1.00	1.00		0.13	1.00		0.55	1.00		0.02
Lane Grp Cap(c), veh/h	161	1703	759	312	1078	1109	296	0	345	179	0	344
V/C Ratio(X)	0.02	0.88	1.21	1.09	0.73	0.74	0.99	0.00	0.46	0.63	0.00	0.94
Avail Cap(c_a), veh/h	214	1742	777	312	1078	1109	296	0	345	179	0	344
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.3	33.7	18.4	48.6	20.0	20.2	65.5	0.0	50.3	53.4	0.0	57.7
Incr Delay (d2), s/veh	0.0	5.8	107.2	77.6	2.8	2.9	49.0	0.0	1.2	5.3	0.0	33.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	24.3	39.7	18.0	18.7	19.7	7.4	0.0	5.1	3.9	0.0	14.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.4	39.5	125.6	126.2	22.8	23.1	114.6	0.0	51.5	58.6	0.0	90.8
LnGrp LOS	C	D	F	F	C	C	F	A	D	E	A	F
Approach Vol, veh/h		2427			1952			450			436	
Approach Delay, s/veh		72.1			41.0			92.6			82.5	
Approach LOS		E			D			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	24.0	72.7	16.2	30.5	5.7	91.0	13.5	33.2
Change Period (Y+Rc), s	5.0	5.0	4.5	4.5	5.0	5.0	4.5	4.5
Max Green Setting (Gmax), s	19.0	69.3	11.7	26.0	5.0	83.3	9.0	28.7
Max Q Clear Time (g_c+I1), s	22.0	56.7	14.1	26.5	2.2	48.1	10.1	13.7
Green Ext Time (p_c), s	0.0	11.0	0.0	0.0	0.0	15.2	0.0	0.7

Intersection Summary	
HCM 6th Ctrl Delay	63.2
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	322	616	731	456	420	95	153	440	120	155	1847	303
Future Volume (veh/h)	322	616	731	456	420	95	153	440	120	155	1847	303
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1870	1870	1870	1687	1687	1885	1870	1870	1870
Adj Flow Rate, veh/h	339	648	0	496	457	0	161	463	0	167	1986	0
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	2	2	2	1	1	1	2	2	2
Cap, veh/h	741	762		548	564		139	2192		214	1741	
Arrive On Green	0.21	0.21	0.00	0.16	0.16	0.00	0.04	0.48	0.00	0.06	0.49	0.00
Sat Flow, veh/h	3483	3582	1598	3456	3554	1585	3116	4605	1598	3456	3554	1585
Grp Volume(v), veh/h	339	648	0	496	457	0	161	463	0	167	1986	0
Grp Sat Flow(s),veh/h/ln	1742	1791	1598	1728	1777	1585	1558	1535	1598	1728	1777	1585
Q Serve(g_s), s	14.7	30.1	0.0	24.4	21.5	0.0	7.7	10.1	0.0	8.2	84.8	0.0
Cycle Q Clear(g_c), s	14.7	30.1	0.0	24.4	21.5	0.0	7.7	10.1	0.0	8.2	84.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	741	762		548	564		139	2192		214	1741	
V/C Ratio(X)	0.46	0.85		0.90	0.81		1.16	0.21		0.78	1.14	
Avail Cap(c_a), veh/h	1047	1077		561	577		139	2192		266	1741	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	59.4	65.5	0.0	71.5	70.3	0.0	82.7	26.4	0.0	80.0	44.1	0.0
Incr Delay (d2), s/veh	0.4	4.7	0.0	17.9	8.4	0.0	126.1	0.2	0.0	11.3	70.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.6	14.2	0.0	12.2	10.4	0.0	5.5	3.8	0.0	4.0	52.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.8	70.2	0.0	89.4	78.6	0.0	208.7	26.6	0.0	91.3	114.9	0.0
LnGrp LOS	E	E		F	E		F	C		F	F	
Approach Vol, veh/h		987	A		953	A		624	A		2153	A
Approach Delay, s/veh		66.6			84.3			73.6			113.1	
Approach LOS		E			F			E			F	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.4	86.4		40.8	12.0	88.8		31.5
Change Period (Y+Rc), s	4.0	4.5		* 4.1	* 4.3	4.5		4.1
Max Green Setting (Gmax), s	13.0	63.2		* 52	* 7.7	68.2		28.0
Max Q Clear Time (g_c+I1), s	10.2	12.1		32.1	9.7	86.8		26.4
Green Ext Time (p_c), s	0.2	6.7		4.6	0.0	0.0		0.8

Intersection Summary	
HCM 6th Ctrl Delay	92.3
HCM 6th LOS	F

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	457	35	15	253	116	10	630	323	362	2567	160
Future Volume (veh/h)	35	457	35	15	253	116	10	630	323	362	2567	160
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1885	1885	1885	1885	1885	1885	1856	1856	1856
Adj Flow Rate, veh/h	42	544	40	19	324	0	11	663	0	398	2821	176
Peak Hour Factor	0.84	0.84	0.84	0.78	0.78	0.78	0.95	0.95	0.95	0.91	0.91	0.91
Percent Heavy Veh, %	4	4	4	1	1	1	1	1	1	3	3	3
Cap, veh/h	231	474	35	139	355		18	1750		412	2749	168
Arrive On Green	0.13	0.28	0.28	0.04	0.19	0.00	0.02	0.68	0.00	0.23	0.56	0.56
Sat Flow, veh/h	1753	1693	124	3483	1885	1598	1795	5316	0	1767	4878	298
Grp Volume(v), veh/h	42	0	584	19	324	0	11	663	0	398	1934	1063
Grp Sat Flow(s),veh/h/ln	1753	0	1817	1742	1885	1598	1795	1716	0	1767	1689	1799
Q Serve(g_s), s	3.2	0.0	42.0	0.8	25.3	0.0	0.9	8.3	0.0	33.4	84.5	84.5
Cycle Q Clear(g_c), s	3.2	0.0	42.0	0.8	25.3	0.0	0.9	8.3	0.0	33.4	84.5	84.5
Prop In Lane	1.00		0.07	1.00		1.00	1.00		0.00	1.00		0.17
Lane Grp Cap(c), veh/h	231	0	509	139	355		18	1750		412	1903	1014
V/C Ratio(X)	0.18	0.00	1.15	0.14	0.91		0.62	0.38		0.97	1.02	1.05
Avail Cap(c_a), veh/h	231	0	509	139	490		48	1750		412	1903	1014
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.93	0.93	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.9	0.0	54.0	69.5	59.7	0.0	73.3	17.2	0.0	56.9	32.7	32.8
Incr Delay (d2), s/veh	0.4	0.0	87.4	0.2	14.7	0.0	29.2	0.6	0.0	35.2	24.8	41.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	31.5	0.4	13.6	0.0	0.6	2.8	0.0	18.6	38.5	45.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.3	0.0	141.4	69.7	74.4	0.0	102.4	17.8	0.0	92.1	57.5	74.6
LnGrp LOS	E	A	F	E	E		F	B		F	F	F
Approach Vol, veh/h		626			343	A		674	A		3395	
Approach Delay, s/veh		135.8			74.1			19.1			66.9	
Approach LOS		F			E			B			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	39.0	55.0	10.0	46.0	5.5	88.5	23.8	32.2
Change Period (Y+Rc), s	4.0	5.0	4.0	4.0	4.0	5.0	4.0	4.0
Max Green Setting (Gmax), s	35.0	50.0	6.0	42.0	4.0	81.0	9.0	39.0
Max Q Clear Time (g_c+I1), s	35.4	10.3	2.8	44.0	2.9	86.5	5.2	27.3
Green Ext Time (p_c), s	0.0	9.7	0.0	0.0	0.0	0.0	0.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	69.6
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	20	497	20	70	220	953	1412	707	1756	30
Future Volume (veh/h)	5	5	20	497	20	70	220	953	1412	707	1756	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1786	1786	1786	1786	1786	1744	1744	1744	1744	1744	1744
Adj Flow Rate, veh/h	6	6	-105	534	22	-76	234	1014	0	813	2018	34
Peak Hour Factor	0.88	0.88	0.88	0.93	0.93	0.93	0.94	0.94	0.94	0.87	0.87	0.87
Percent Heavy Veh, %	1	1	1	1	1	1	4	4	4	4	4	4
Cap, veh/h	16	1	1	597	250	938	256	1244		1567	2862	48
Arrive On Green	0.01	0.00	0.00	0.18	0.14	0.00	0.26	0.44	0.00	0.97	1.00	1.00
Sat Flow, veh/h	1701	1786	1514	3402	1786	1514	1661	4761	1478	3222	4821	81
Grp Volume(v), veh/h	6	6	-105	534	22	-76	234	1014	0	813	1328	724
Grp Sat Flow(s),veh/h/ln	1701	1786	1514	1701	1786	1514	1661	1587	1478	1611	1587	1729
Q Serve(g_s), s	0.5	0.1	0.0	23.0	1.6	0.0	20.5	27.9	0.0	2.1	0.0	0.0
Cycle Q Clear(g_c), s	0.5	0.1	0.0	23.0	1.6	0.0	20.5	27.9	0.0	2.1	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	16	1	1	597	250	938	256	1244		1567	1884	1026
V/C Ratio(X)	0.38	5.04	-104.05	0.89	0.09	-0.08	0.91	0.82		0.52	0.70	0.71
Avail Cap(c_a), veh/h	51	42	35	646	327	1004	288	2491		1567	1884	1026
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	0.53	0.53	0.00	0.09	0.09	0.09
Uniform Delay (d), s/veh	73.9	75.0	0.0	60.5	56.2	0.0	54.7	39.1	0.0	1.1	0.0	0.0
Incr Delay (d2), s/veh	14.6	1957.6	0.0	14.2	0.1	0.0	17.8	3.3	0.0	0.0	0.2	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.7	0.0	11.2	0.7	0.0	8.9	9.6	0.0	0.4	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	88.4	2032.6	0.0	74.7	56.3	0.0	72.5	42.3	0.0	1.1	0.2	0.4
LnGrp LOS	F	F	A	E	E	A	E	D		A	A	A
Approach Vol, veh/h		-93			480			1248	A		2865	
Approach Delay, s/veh		0.0			85.7			48.0			0.5	
Approach LOS		A			F			D			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	77.0	43.2	29.8	0.0	27.1	93.0	4.9	25.0
Change Period (Y+Rc), s	4.5	4.5	4.0	4.5	4.5	4.5	4.0	4.5
Max Green Setting (Gmax), s	23.5	78.0	28.0	3.0	25.5	76.0	4.0	27.0
Max Q Clear Time (g_c+I1), s	4.1	29.9	25.0	2.1	22.5	2.0	2.5	3.6
Green Ext Time (p_c), s	1.5	8.8	0.8	0.0	0.1	29.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	22.8
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	195	5	1027	0	1612	613	0	1576	529
Future Volume (veh/h)	0	0	0	195	5	1027	0	1612	613	0	1576	529
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1772	1772	1772	0	1786	1786	0	1786	1786
Adj Flow Rate, veh/h				238	6	0	0	1853	0	0	1811	0
Peak Hour Factor				0.82	0.82	0.82	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %				2	2	2	0	1	1	0	1	1
Cap, veh/h				267	7		0	2583		0	2583	
Arrive On Green				0.16	0.16	0.00	0.00	1.00	0.00	0.00	1.00	0.00
Sat Flow, veh/h				1648	42	1502	0	3483	1514	0	3483	1514
Grp Volume(v), veh/h				244	0	0	0	1853	0	0	1811	0
Grp Sat Flow(s),veh/h/ln				1690	0	1502	0	1697	1514	0	1697	1514
Q Serve(g_s), s				21.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s				21.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop In Lane				0.98		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				274	0		0	2583		0	2583	
V/C Ratio(X)				0.89	0.00		0.00	0.72		0.00	0.70	
Avail Cap(c_a), veh/h				399	0		0	2583		0	2583	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	2.00	2.00
Upstream Filter(I)				1.00	0.00	0.00	0.00	0.22	0.00	0.00	0.49	0.00
Uniform Delay (d), s/veh				61.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh				18.2	0.0	0.0	0.0	0.4	0.0	0.0	0.8	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				10.5	0.0	0.0	0.0	0.1	0.0	0.0	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				79.8	0.0	0.0	0.0	0.4	0.0	0.0	0.8	0.0
LnGrp LOS				E	A		A	A		A	A	
Approach Vol, veh/h					244	A		1853	A		1811	A
Approach Delay, s/veh					79.8			0.4			0.8	
Approach LOS					E			A			A	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	120.1	29.9	120.1
Change Period (Y+Rc), s	5.9	5.6	5.9
Max Green Setting (Gmax), s	103.1	35.4	103.1
Max Q Clear Time (g_c+I1), s	2.0	23.2	2.0
Green Ext Time (p_c), s	37.7	1.1	39.8

Intersection Summary	
HCM 6th Ctrl Delay	5.5
HCM 6th LOS	A

Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	519	0	757	0	0	0	0	1706	531	0	1307	687
Future Volume (veh/h)	519	0	757	0	0	0	0	1706	531	0	1307	687
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1772	0	1772				0	1786	1786	0	1772	1772
Adj Flow Rate, veh/h	535	0	0				0	1834	0	0	1390	0
Peak Hour Factor	0.97	0.97	0.97				0.93	0.93	0.93	0.94	0.94	0.94
Percent Heavy Veh, %	2	0	2				0	1	1	0	2	2
Cap, veh/h	650	0					0	2459		0	2440	
Arrive On Green	0.20	0.00	0.00				0.00	0.24	0.00	0.00	1.00	0.00
Sat Flow, veh/h	3274	0	1502				0	3483	1514	0	3455	1502
Grp Volume(v), veh/h	535	0	0				0	1834	0	0	1390	0
Grp Sat Flow(s),veh/h/ln	1637	0	1502				0	1697	1514	0	1683	1502
Q Serve(g_s), s	23.5	0.0	0.0				0.0	75.1	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	23.5	0.0	0.0				0.0	75.1	0.0	0.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	650	0					0	2459		0	2440	
V/C Ratio(X)	0.82	0.00					0.00	0.75		0.00	0.57	
Avail Cap(c_a), veh/h	1427	0					0	2459		0	2440	
HCM Platoon Ratio	1.00	1.00	1.00				1.00	0.33	0.33	1.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	0.09	0.00	0.00	0.62	0.00
Uniform Delay (d), s/veh	57.6	0.0	0.0				0.0	44.3	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	3.8	0.0	0.0				0.0	0.2	0.0	0.0	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.1	0.0	0.0				0.0	34.2	0.0	0.0	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.3	0.0	0.0				0.0	44.5	0.0	0.0	0.6	0.0
LnGrp LOS	E	A					A	D		A	A	
Approach Vol, veh/h		535	A					1834	A		1390	A
Approach Delay, s/veh		61.3						44.5			0.6	
Approach LOS		E						D			A	

Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		114.6				114.6		35.4				
Change Period (Y+Rc), s		5.9				5.9		5.6				
Max Green Setting (Gmax), s		73.1				73.1		65.4				
Max Q Clear Time (g_c+I1), s		2.0				77.1		25.5				
Green Ext Time (p_c), s		19.9				0.0		4.3				

Intersection Summary	
HCM 6th Ctrl Delay	30.6
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	282	1039	17	72	821	285	2	64	110	660	66	379
Future Volume (veh/h)	282	1039	17	72	821	285	2	64	110	660	66	379
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1870	1900	1900	1870	1870	1870	1885	1870	1885
Adj Flow Rate, veh/h	332	1222	18	78	873	66	2	70	87	801	0	186
Peak Hour Factor	0.85	0.85	0.92	0.92	0.94	0.94	0.92	0.92	0.92	0.88	0.92	0.88
Percent Heavy Veh, %	1	1	1	2	0	0	2	2	2	1	2	1
Cap, veh/h	504	1767	26	128	983	74	390	85	106	837	0	199
Arrive On Green	0.24	0.49	0.49	0.04	0.29	0.29	0.22	0.11	0.11	0.23	0.00	0.13
Sat Flow, veh/h	1795	3613	53	1781	3394	257	1781	755	938	3591	0	1565
Grp Volume(v), veh/h	332	606	634	78	464	475	2	0	157	801	0	186
Grp Sat Flow(s),veh/h/ln	1795	1791	1875	1781	1805	1845	1781	0	1693	1795	0	1565
Q Serve(g_s), s	19.0	39.2	39.2	5.0	36.9	36.9	0.1	0.0	13.6	33.0	0.0	15.6
Cycle Q Clear(g_c), s	19.0	39.2	39.2	5.0	36.9	36.9	0.1	0.0	13.6	33.0	0.0	15.6
Prop In Lane	1.00		0.03	1.00		0.14	1.00		0.55	1.00		1.00
Lane Grp Cap(c), veh/h	504	876	917	128	523	534	390	0	191	837	0	199
V/C Ratio(X)	0.66	0.69	0.69	0.61	0.89	0.89	0.01	0.00	0.82	0.96	0.00	0.94
Avail Cap(c_a), veh/h	504	876	917	130	588	601	390	0	293	843	0	597
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.80	0.80	0.80	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	48.0	29.6	29.6	45.5	50.9	51.0	45.8	0.0	65.0	56.8	0.0	50.5
Incr Delay (d2), s/veh	3.2	4.5	4.3	6.3	16.5	16.2	0.0	0.0	13.2	21.2	0.0	22.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.5	17.9	18.7	2.5	19.1	19.5	0.1	0.0	6.6	17.4	0.0	7.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.2	34.0	33.9	51.8	67.4	67.1	45.8	0.0	78.3	78.0	0.0	73.2
LnGrp LOS	D	C	C	D	E	E	D	A	E	E	A	E
Approach Vol, veh/h		1572			1017			159			987	
Approach Delay, s/veh		37.6			66.1			77.9			77.1	
Approach LOS		D			E			E			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.2	77.6	39.8	21.4	41.2	47.7	37.3	23.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.9	63.6	35.5	26.0	21.9	48.6	4.0	57.5
Max Q Clear Time (g_c+I1), s	7.0	41.2	35.0	15.6	21.0	38.9	2.1	17.6
Green Ext Time (p_c), s	0.0	9.3	0.2	0.8	0.1	4.2	0.0	1.3

Intersection Summary	
HCM 6th Ctrl Delay	57.5
HCM 6th LOS	E

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	975	879	276	135	351	517	158	597	161	566	1048	271
Future Volume (veh/h)	975	879	276	135	351	517	158	597	161	566	1048	271
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1230	1870	1870	1885	1885	1885	1870	1870	1870	1885	1885	1885
Adj Flow Rate, veh/h	995	897	282	144	373	424	163	615	141	674	1248	0
Peak Hour Factor	0.98	0.98	0.98	0.94	0.94	0.94	0.97	0.97	0.97	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	1	1	1	2	2	2	1	1	1
Cap, veh/h	936	1310	411	172	639	471	115	757	170	423	967	
Arrive On Green	0.69	0.83	0.82	0.16	0.30	0.30	0.03	0.18	0.18	0.04	0.09	0.00
Sat Flow, veh/h	2273	2650	831	1795	3582	1556	3456	4159	936	3483	3582	1598
Grp Volume(v), veh/h	995	601	578	144	373	424	163	501	255	674	1248	0
Grp Sat Flow(s),veh/h/ln	1137	1777	1704	1795	1791	1556	1728	1702	1691	1742	1791	1598
Q Serve(g_s), s	61.8	20.3	20.8	11.7	13.3	18.4	5.0	21.2	21.8	18.2	40.5	0.0
Cycle Q Clear(g_c), s	61.8	20.3	20.8	11.7	13.3	18.4	5.0	21.2	21.8	18.2	40.5	0.0
Prop In Lane	1.00		0.49	1.00		1.00	1.00		0.55	1.00		1.00
Lane Grp Cap(c), veh/h	936	878	842	172	639	471	115	619	308	423	967	
V/C Ratio(X)	1.06	0.68	0.69	0.84	0.58	0.90	1.42	0.81	0.83	1.59	1.29	
Avail Cap(c_a), veh/h	936	878	842	249	967	614	115	715	355	423	967	
HCM Platoon Ratio	1.67	1.67	1.67	1.67	1.67	1.67	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	0.48	0.48	0.48	1.00	1.00	1.00	1.00	1.00	1.00	0.17	0.17	0.00
Uniform Delay (d), s/veh	23.4	8.4	8.6	61.9	47.9	41.4	72.5	58.9	59.2	72.0	68.3	0.0
Incr Delay (d2), s/veh	39.5	2.1	2.2	15.1	3.9	22.8	230.0	6.5	14.0	269.3	132.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.4	4.8	4.7	5.7	5.9	7.3	5.9	9.5	10.4	24.4	37.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.9	10.5	10.8	77.0	51.8	64.1	302.5	65.3	73.2	341.3	200.4	0.0
LnGrp LOS	F	B	B	E	D	E	F	E	E	F	F	
Approach Vol, veh/h		2174			941			919			1922	A
Approach Delay, s/veh		34.6			61.2			109.6			249.8	
Approach LOS		C			E			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.2	31.3	18.4	78.1	9.0	44.5	65.8	30.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	13.5	31.0	20.3	67.2	4.5	40.0	47.5	40.0
Max Q Clear Time (g_c+I1), s	20.2	23.8	13.7	22.8	7.0	42.5	63.8	20.4
Green Ext Time (p_c), s	0.0	2.4	0.2	6.6	0.0	0.0	0.0	3.8

Intersection Summary	
HCM 6th Ctrl Delay	119.8
HCM 6th LOS	F

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	699	450	700	662	131	226
Future Volume (veh/h)	699	450	700	662	131	226
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1885	1885	1870	1870
Adj Flow Rate, veh/h	744	479	729	631	146	-68
Peak Hour Factor	0.94	0.94	0.96	0.96	0.90	0.90
Percent Heavy Veh, %	2	2	1	1	2	2
Cap, veh/h	558	1501	1035	877	162	461
Arrive On Green	0.33	1.00	0.55	0.55	0.09	0.00
Sat Flow, veh/h	1781	1870	1885	1596	1781	1585
Grp Volume(v), veh/h	744	479	729	631	146	-68
Grp Sat Flow(s),veh/h/ln	1781	1870	1885	1596	1781	1585
Q Serve(g_s), s	15.0	0.0	21.3	22.1	6.1	0.0
Cycle Q Clear(g_c), s	15.0	0.0	21.3	22.1	6.1	0.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	558	1501	1035	877	162	461
V/C Ratio(X)	1.33	0.32	0.70	0.72	0.90	-0.15
Avail Cap(c_a), veh/h	558	1501	1035	877	499	761
HCM Platoon Ratio	1.67	1.67	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.84	0.84	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	14.3	0.0	12.4	12.6	33.8	0.0
Incr Delay (d2), s/veh	159.8	0.5	4.0	5.1	16.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	32.0	0.2	8.9	8.0	3.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	174.1	0.5	16.4	17.7	50.1	0.0
LnGrp LOS	F	A	B	B	D	A
Approach Vol, veh/h		1223	1360		78	
Approach Delay, s/veh		106.1	17.0		93.8	
Approach LOS		F	B		F	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		64.7		10.3	19.0	45.7
Change Period (Y+Rc), s		* 4.5		3.5	4.0	4.5
Max Green Setting (Gmax), s		* 47		21.0	15.0	27.0
Max Q Clear Time (g_c+I1), s		2.0		8.1	17.0	24.1
Green Ext Time (p_c), s		2.2		0.4	0.0	1.9

Intersection Summary	
HCM 6th Ctrl Delay	60.2
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
1: 9th Ave SE/Filbert Dr & 208th St SE / SR 524

06/29/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	1723	945	314	1444	102	270	65	141	103	288	7
Future Volume (veh/h)	4	1723	945	314	1444	102	270	65	141	103	288	7
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1885	1885	1885	1870	1870	1870
Adj Flow Rate, veh/h	4	1814	920	341	1570	106	293	71	86	113	316	7
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	1	1	1	2	2	2
Cap, veh/h	151	1725	770	295	2066	139	291	154	186	176	333	7
Arrive On Green	0.01	0.49	0.49	0.14	0.61	0.60	0.08	0.20	0.20	0.07	0.18	0.18
Sat Flow, veh/h	1781	3554	1585	1781	3380	227	3483	766	928	1781	1822	40
Grp Volume(v), veh/h	4	1814	920	341	821	855	293	0	157	113	0	323
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1830	1742	0	1694	1781	0	1863
Q Serve(g_s), s	0.2	70.4	49.5	20.0	48.4	49.5	12.1	0.0	11.9	8.2	0.0	24.9
Cycle Q Clear(g_c), s	0.2	70.4	49.5	20.0	48.4	49.5	12.1	0.0	11.9	8.2	0.0	24.9
Prop In Lane	1.00		1.00	1.00		0.12	1.00		0.55	1.00		0.02
Lane Grp Cap(c), veh/h	151	1725	770	295	1086	1119	291	0	340	176	0	340
V/C Ratio(X)	0.03	1.05	1.20	1.15	0.76	0.76	1.01	0.00	0.46	0.64	0.00	0.95
Avail Cap(c_a), veh/h	203	1725	770	295	1086	1119	291	0	340	176	0	340
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.8	37.3	18.5	52.0	20.3	20.6	66.4	0.0	51.2	54.2	0.0	58.6
Incr Delay (d2), s/veh	0.0	36.6	100.5	100.9	3.2	3.4	54.8	0.0	1.3	6.0	0.0	35.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	38.3	39.0	18.7	20.1	21.2	7.6	0.0	5.2	4.0	0.0	15.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.8	73.9	119.0	152.9	23.6	24.0	121.3	0.0	52.5	60.2	0.0	94.2
LnGrp LOS	C	F	F	F	C	C	F	A	D	E	A	F
Approach Vol, veh/h		2738			2017			450			436	
Approach Delay, s/veh		89.0			45.6			97.3			85.4	
Approach LOS		F			D			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	24.0	74.4	16.1	30.5	5.7	92.7	13.5	33.1
Change Period (Y+Rc), s	5.0	5.0	4.5	4.5	5.0	5.0	4.5	4.5
Max Green Setting (Gmax), s	19.0	69.4	11.6	26.0	5.0	83.4	9.0	28.6
Max Q Clear Time (g_c+I1), s	22.0	72.4	14.1	26.9	2.2	51.5	10.2	13.9
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	15.6	0.0	0.7

Intersection Summary	
HCM 6th Ctrl Delay	73.9
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
2: SR-527 & 208th St SE / SR 524

06/29/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	322	616	1026	456	420	95	153	440	120	155	1847	303
Future Volume (veh/h)	322	616	1026	456	420	95	153	440	120	155	1847	303
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1870	1870	1870	1687	1687	1885	1870	1870	1870
Adj Flow Rate, veh/h	339	648	0	496	457	0	161	463	0	167	1986	0
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	2	2	2	1	1	1	2	2	2
Cap, veh/h	748	769		548	564		139	2183		214	1734	
Arrive On Green	0.21	0.21	0.00	0.16	0.16	0.00	0.04	0.47	0.00	0.06	0.49	0.00
Sat Flow, veh/h	3483	3582	1598	3456	3554	1585	3116	4605	1598	3456	3554	1585
Grp Volume(v), veh/h	339	648	0	496	457	0	161	463	0	167	1986	0
Grp Sat Flow(s),veh/h/ln	1742	1791	1598	1728	1777	1585	1558	1535	1598	1728	1777	1585
Q Serve(g_s), s	14.6	30.0	0.0	24.4	21.5	0.0	7.7	10.2	0.0	8.2	84.4	0.0
Cycle Q Clear(g_c), s	14.6	30.0	0.0	24.4	21.5	0.0	7.7	10.2	0.0	8.2	84.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	748	769		548	564		139	2183		214	1734	
V/C Ratio(X)	0.45	0.84		0.90	0.81		1.16	0.21		0.78	1.15	
Avail Cap(c_a), veh/h	1248	1284		561	577		139	2183		266	1734	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	59.1	65.1	0.0	71.5	70.3	0.0	82.7	26.6	0.0	80.0	44.3	0.0
Incr Delay (d2), s/veh	0.4	2.7	0.0	17.9	8.4	0.0	126.1	0.2	0.0	11.3	72.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.5	14.0	0.0	12.2	10.4	0.0	5.5	3.8	0.0	4.0	53.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.5	67.8	0.0	89.4	78.6	0.0	208.7	26.8	0.0	91.3	117.1	0.0
LnGrp LOS	E	E		F	E		F	C		F	F	
Approach Vol, veh/h		987	A		953	A		624	A		2153	A
Approach Delay, s/veh		65.0			84.3			73.8			115.1	
Approach LOS		E			F			E			F	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.4	86.0		41.1	12.0	88.4		31.5
Change Period (Y+Rc), s	4.0	4.5		* 4.1	* 4.3	4.5		4.1
Max Green Setting (Gmax), s	13.0	53.2		* 62	* 7.7	58.2		28.0
Max Q Clear Time (g_c+I1), s	10.2	12.2		32.0	9.7	86.4		26.4
Green Ext Time (p_c), s	0.2	6.5		5.0	0.0	0.0		0.8

Intersection Summary	
HCM 6th Ctrl Delay	92.9
HCM 6th LOS	F

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	5	35	15	10	175	10	630	480	657	2567	360
Future Volume (veh/h)	35	5	35	15	10	175	10	630	480	657	2567	360
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1885	1885	1885	1885	1885	1885	1856	1856	1856
Adj Flow Rate, veh/h	42	6	40	19	13	-82	11	663	0	722	2821	396
Peak Hour Factor	0.84	0.84	0.84	0.78	0.78	0.78	0.95	0.95	0.95	0.91	0.91	0.91
Percent Heavy Veh, %	4	4	4	1	1	1	1	1	1	3	3	3
Cap, veh/h	64	11	76	139	113	639	18	2352		601	3554	476
Arrive On Green	0.04	0.06	0.06	0.04	0.06	0.00	0.02	0.91	0.00	0.34	0.79	0.78
Sat Flow, veh/h	1753	202	1345	3483	1885	1598	1795	5316	0	1767	4515	605
Grp Volume(v), veh/h	42	0	46	19	13	-82	11	663	0	722	2076	1141
Grp Sat Flow(s),veh/h/ln	1753	0	1546	1742	1885	1598	1795	1716	0	1767	1689	1743
Q Serve(g_s), s	3.5	0.0	4.3	0.8	1.0	0.0	0.9	2.2	0.0	51.0	50.9	60.8
Cycle Q Clear(g_c), s	3.5	0.0	4.3	0.8	1.0	0.0	0.9	2.2	0.0	51.0	50.9	60.8
Prop In Lane	1.00		0.87	1.00		1.00	1.00		0.00	1.00		0.35
Lane Grp Cap(c), veh/h	64	0	87	139	113	639	18	2352		601	2658	1372
V/C Ratio(X)	0.66	0.00	0.53	0.14	0.12	-0.13	0.62	0.28		1.20	0.78	0.83
Avail Cap(c_a), veh/h	70	0	320	139	390	873	48	2352		601	2658	1372
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.91	0.91	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	71.4	0.0	68.8	69.5	66.7	0.0	73.3	3.6	0.0	49.5	8.8	10.0
Incr Delay (d2), s/veh	18.1	0.0	4.9	0.2	0.2	0.0	28.6	0.3	0.0	106.0	2.4	6.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	1.8	0.4	0.5	0.0	0.6	0.7	0.0	39.5	15.2	20.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	89.4	0.0	73.7	69.7	66.9	0.0	101.9	3.9	0.0	155.5	11.2	16.0
LnGrp LOS	F	A	E	E	E	A	F	A		F	B	B
Approach Vol, veh/h		88			-50			674	A		3939	
Approach Delay, s/veh		81.2			0.0			5.5			39.0	
Approach LOS		F			A			A			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	55.0	72.6	10.0	12.4	5.5	122.1	9.5	13.0
Change Period (Y+Rc), s	4.0	5.0	4.0	4.0	4.0	5.0	4.0	4.0
Max Green Setting (Gmax), s	51.0	45.0	6.0	31.0	4.0	92.0	6.0	31.0
Max Q Clear Time (g_c+I1), s	53.0	4.2	2.8	6.3	2.9	62.8	5.5	3.0
Green Ext Time (p_c), s	0.0	9.8	0.0	0.1	0.0	29.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	35.4
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	20	681	20	70	220	1110	1412	707	1756	30
Future Volume (veh/h)	5	5	20	681	20	70	220	1110	1412	707	1756	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1786	1786	1786	1786	1786	1744	1744	1744	1744	1744	1744
Adj Flow Rate, veh/h	6	6	-105	732	22	-76	234	1181	0	813	2018	34
Peak Hour Factor	0.88	0.88	0.88	0.93	0.93	0.93	0.94	0.94	0.94	0.87	0.87	0.87
Percent Heavy Veh, %	1	1	1	1	1	1	4	4	4	4	4	4
Cap, veh/h	16	1	1	465	180	879	256	1427		1569	3050	51
Arrive On Green	0.01	0.00	0.00	0.14	0.10	0.00	0.26	0.50	0.00	0.97	1.00	1.00
Sat Flow, veh/h	1701	1786	1514	3402	1786	1514	1661	4761	1478	3222	4821	81
Grp Volume(v), veh/h	6	6	-105	732	22	-76	234	1181	0	813	1328	724
Grp Sat Flow(s),veh/h/ln	1701	1786	1514	1701	1786	1514	1661	1587	1478	1611	1587	1729
Q Serve(g_s), s	0.5	0.1	0.0	20.5	1.7	0.0	20.5	31.7	0.0	2.0	0.0	0.0
Cycle Q Clear(g_c), s	0.5	0.1	0.0	20.5	1.7	0.0	20.5	31.7	0.0	2.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	16	1	1	465	180	879	256	1427		1569	2008	1094
V/C Ratio(X)	0.38	5.04	-104.05	1.57	0.12	-0.09	0.91	0.83		0.52	0.66	0.66
Avail Cap(c_a), veh/h	51	137	116	465	327	1004	288	2491		1569	2008	1094
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	0.47	0.47	0.00	0.47	0.47	0.47
Uniform Delay (d), s/veh	73.9	75.0	0.0	64.8	61.4	0.0	54.7	34.1	0.0	1.0	0.0	0.0
Incr Delay (d2), s/veh	14.6	1957.6	0.0	268.7	0.1	0.0	16.2	2.7	0.0	0.1	0.8	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.7	0.0	26.3	0.8	0.0	8.8	10.3	0.0	0.4	0.2	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	88.4	2032.6	0.0	333.5	61.5	0.0	71.0	36.9	0.0	1.1	0.8	1.5
LnGrp LOS	F	F	A	F	E	A	E	D		A	A	A
Approach Vol, veh/h		-93			678			1415	A		2865	
Approach Delay, s/veh		0.0			362.0			42.5			1.1	
Approach LOS		A			F			D			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	77.0	49.0	24.0	0.0	27.1	98.9	4.9	19.1
Change Period (Y+Rc), s	4.5	4.5	4.0	4.5	4.5	4.5	4.0	4.5
Max Green Setting (Gmax), s	23.5	78.0	20.0	11.0	25.5	76.0	4.0	27.0
Max Q Clear Time (g_c+I1), s	4.0	33.7	22.5	2.1	22.5	2.0	2.5	3.7
Green Ext Time (p_c), s	1.5	10.7	0.0	0.0	0.1	29.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	63.5
HCM 6th LOS	E

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	195	5	1027	0	1769	613	0	1760	529
Future Volume (veh/h)	0	0	0	195	5	1027	0	1769	613	0	1760	529
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1772	1772	1772	0	1786	1786	0	1786	1786
Adj Flow Rate, veh/h				238	6	0	0	2033	0	0	2023	0
Peak Hour Factor				0.82	0.82	0.82	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %				2	2	2	0	1	1	0	1	1
Cap, veh/h				265	7		0	2587		0	2587	
Arrive On Green				0.16	0.16	0.00	0.00	1.00	0.00	0.00	1.00	0.00
Sat Flow, veh/h				1648	42	1502	0	3483	1514	0	3483	1514
Grp Volume(v), veh/h				244	0	0	0	2033	0	0	2023	0
Grp Sat Flow(s),veh/h/ln				1690	0	1502	0	1697	1514	0	1697	1514
Q Serve(g_s), s				21.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s				21.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop In Lane				0.98		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				272	0		0	2587		0	2587	
V/C Ratio(X)				0.90	0.00		0.00	0.79		0.00	0.78	
Avail Cap(c_a), veh/h				365	0		0	2587		0	2587	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	2.00	2.00
Upstream Filter(I)				1.00	0.00	0.00	0.00	0.09	0.00	0.00	0.15	0.00
Uniform Delay (d), s/veh				61.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh				21.3	0.0	0.0	0.0	0.2	0.0	0.0	0.4	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				10.8	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				83.0	0.0	0.0	0.0	0.2	0.0	0.0	0.4	0.0
LnGrp LOS				F	A		A	A		A	A	
Approach Vol, veh/h					244	A		2033	A		2023	A
Approach Delay, s/veh					83.0			0.2			0.4	
Approach LOS					F			A			A	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	120.2	29.8	120.2
Change Period (Y+Rc), s	5.9	5.6	5.9
Max Green Setting (Gmax), s	106.1	32.4	106.1
Max Q Clear Time (g_c+I1), s	2.0	23.2	2.0
Green Ext Time (p_c), s	49.3	0.9	49.9

Intersection Summary	
HCM 6th Ctrl Delay	5.0
HCM 6th LOS	A

Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	519	0	757	0	0	0	0	1863	531	0	1491	687
Future Volume (veh/h)	519	0	757	0	0	0	0	1863	531	0	1491	687
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1772	0	1772				0	1786	1786	0	1772	1772
Adj Flow Rate, veh/h	535	0	0				0	2003	0	0	1586	0
Peak Hour Factor	0.97	0.97	0.97				0.93	0.93	0.93	0.94	0.94	0.94
Percent Heavy Veh, %	2	0	2				0	1	1	0	2	2
Cap, veh/h	650	0					0	2460		0	2440	
Arrive On Green	0.20	0.00	0.00				0.00	0.49	0.00	0.00	1.00	0.00
Sat Flow, veh/h	3274	0	1502				0	3483	1514	0	3455	1502
Grp Volume(v), veh/h	535	0	0				0	2003	0	0	1586	0
Grp Sat Flow(s),veh/h/ln	1637	0	1502				0	1697	1514	0	1683	1502
Q Serve(g_s), s	23.5	0.0	0.0				0.0	75.3	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	23.5	0.0	0.0				0.0	75.3	0.0	0.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	650	0					0	2460		0	2440	
V/C Ratio(X)	0.82	0.00					0.00	0.81		0.00	0.65	
Avail Cap(c_a), veh/h	1362	0					0	2460		0	2440	
HCM Platoon Ratio	1.00	1.00	1.00				1.00	0.67	0.67	1.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	0.09	0.00	0.00	0.49	0.00
Uniform Delay (d), s/veh	57.6	0.0	0.0				0.0	30.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	3.8	0.0	0.0				0.0	0.3	0.0	0.0	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.1	0.0	0.0				0.0	31.7	0.0	0.0	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.4	0.0	0.0				0.0	30.3	0.0	0.0	0.7	0.0
LnGrp LOS	E	A					A	C		A	A	
Approach Vol, veh/h		535	A					2003	A		1586	A
Approach Delay, s/veh		61.4						30.3			0.7	
Approach LOS		E						C			A	

Timer - Assigned Phs	2				6		8					
Phs Duration (G+Y+Rc), s	114.6				114.6		35.4					
Change Period (Y+Rc), s	5.9				5.9		5.6					
Max Green Setting (Gmax), s	76.1				76.1		62.4					
Max Q Clear Time (g_c+I1), s	2.0				77.3		25.5					
Green Ext Time (p_c), s	26.1				0.0		4.3					

Intersection Summary	
HCM 6th Ctrl Delay	22.9
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	283	1196	17	72	1005	285	2	64	110	660	66	379
Future Volume (veh/h)	283	1196	17	72	1005	285	2	64	110	660	66	379
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1870	1900	1900	1870	1870	1870	1885	1870	1885
Adj Flow Rate, veh/h	333	1407	18	78	1069	66	2	70	87	801	0	186
Peak Hour Factor	0.85	0.85	0.92	0.92	0.94	0.94	0.92	0.92	0.92	0.88	0.92	0.88
Percent Heavy Veh, %	1	1	1	2	0	0	2	2	2	1	2	1
Cap, veh/h	445	1858	24	118	1165	72	356	85	106	771	0	200
Arrive On Green	0.21	0.51	0.51	0.04	0.34	0.34	0.20	0.11	0.11	0.21	0.00	0.13
Sat Flow, veh/h	1795	3621	46	1781	3447	213	1781	755	938	3591	0	1565
Grp Volume(v), veh/h	333	696	729	78	560	575	2	0	157	801	0	186
Grp Sat Flow(s),veh/h/ln	1795	1791	1877	1781	1805	1855	1781	0	1693	1795	0	1565
Q Serve(g_s), s	20.6	46.4	46.5	4.7	44.6	44.7	0.1	0.0	13.6	32.2	0.0	15.7
Cycle Q Clear(g_c), s	20.6	46.4	46.5	4.7	44.6	44.7	0.1	0.0	13.6	32.2	0.0	15.7
Prop In Lane	1.00		0.02	1.00		0.11	1.00		0.55	1.00		1.00
Lane Grp Cap(c), veh/h	445	919	963	118	610	627	356	0	191	771	0	200
V/C Ratio(X)	0.75	0.76	0.76	0.66	0.92	0.92	0.01	0.00	0.82	1.04	0.00	0.93
Avail Cap(c_a), veh/h	445	919	963	118	641	659	356	0	293	771	0	565
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.74	0.74	0.74	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	52.4	29.1	29.1	42.2	47.6	47.7	48.0	0.0	65.0	58.9	0.0	51.1
Incr Delay (d2), s/veh	6.8	5.8	5.6	9.7	16.7	16.4	0.0	0.0	13.2	43.0	0.0	22.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.5	21.3	22.3	2.4	22.9	23.5	0.1	0.0	6.6	19.2	0.0	7.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.3	34.9	34.7	51.9	64.4	64.1	48.1	0.0	78.3	101.9	0.0	73.2
LnGrp LOS	E	C	C	D	E	E	D	A	E	F	A	E
Approach Vol, veh/h		1758			1213			159			987	
Approach Delay, s/veh		39.4			63.4			77.9			96.5	
Approach LOS		D			E			E			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.4	81.2	37.0	21.4	36.7	54.9	34.5	23.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.9	67.6	32.5	26.0	20.5	53.0	4.0	54.5
Max Q Clear Time (g_c+I1), s	6.7	48.5	34.2	15.6	22.6	46.7	2.1	17.7
Green Ext Time (p_c), s	0.0	10.2	0.0	0.8	0.0	3.7	0.0	1.3

Intersection Summary	
HCM 6th Ctrl Delay	61.7
HCM 6th LOS	E

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1132	879	276	135	351	517	158	597	161	566	1048	455
Future Volume (veh/h)	1132	879	276	135	351	517	158	597	161	566	1048	455
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1230	1870	1870	1885	1885	1885	1870	1870	1870	1885	1885	1885
Adj Flow Rate, veh/h	1155	897	282	144	373	424	163	615	141	674	1248	0
Peak Hour Factor	0.98	0.98	0.98	0.94	0.94	0.94	0.97	0.97	0.97	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	1	1	1	2	2	2	1	1	1
Cap, veh/h	938	1327	416	172	660	470	115	757	170	400	943	
Arrive On Green	0.69	0.84	0.83	0.16	0.31	0.31	0.03	0.18	0.18	0.04	0.09	0.00
Sat Flow, veh/h	2273	2650	831	1795	3582	1557	3456	4159	936	3483	3582	1598
Grp Volume(v), veh/h	1155	601	578	144	373	424	163	501	255	674	1248	0
Grp Sat Flow(s),veh/h/ln	1137	1777	1704	1795	1791	1557	1728	1702	1691	1742	1791	1598
Q Serve(g_s), s	61.9	19.0	19.5	11.7	13.1	19.5	5.0	21.2	21.8	17.2	39.5	0.0
Cycle Q Clear(g_c), s	61.9	19.0	19.5	11.7	13.1	19.5	5.0	21.2	21.8	17.2	39.5	0.0
Prop In Lane	1.00		0.49	1.00		1.00	1.00		0.55	1.00		1.00
Lane Grp Cap(c), veh/h	938	890	854	172	660	470	115	619	308	400	943	
V/C Ratio(X)	1.23	0.67	0.68	0.84	0.57	0.90	1.42	0.81	0.83	1.69	1.32	
Avail Cap(c_a), veh/h	938	890	854	249	967	604	115	715	355	400	943	
HCM Platoon Ratio	1.67	1.67	1.67	1.67	1.67	1.67	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	0.36	0.36	0.36	1.00	1.00	1.00	1.00	1.00	1.00	0.09	0.09	0.00
Uniform Delay (d), s/veh	23.3	7.7	7.8	61.9	46.9	41.2	72.5	58.9	59.2	72.2	68.5	0.0
Incr Delay (d2), s/veh	107.9	1.5	1.6	15.1	3.5	23.1	230.0	6.5	14.0	310.1	146.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	26.3	4.3	4.3	5.7	5.7	7.7	5.9	9.5	10.4	25.3	38.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	131.3	9.2	9.4	77.0	50.4	64.3	302.5	65.3	73.2	382.2	214.6	0.0
LnGrp LOS	F	A	A	E	D	E	F	E	E	F	F	
Approach Vol, veh/h		2334			941			919			1922	A
Approach Delay, s/veh		69.7			60.7			109.6			273.4	
Approach LOS		E			E			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.2	31.3	18.4	79.1	9.0	43.5	65.9	31.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	12.5	31.0	20.3	68.2	4.5	39.0	48.5	40.0
Max Q Clear Time (g_c+I1), s	19.2	23.8	13.7	21.5	7.0	41.5	63.9	21.5
Green Ext Time (p_c), s	0.0	2.4	0.2	6.6	0.0	0.0	0.0	3.8

Intersection Summary	
HCM 6th Ctrl Delay	138.3
HCM 6th LOS	F

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	699	450	700	662	131	226
Future Volume (veh/h)	699	450	700	662	131	226
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1885	1885	1870	1870
Adj Flow Rate, veh/h	744	479	729	631	146	-68
Peak Hour Factor	0.94	0.94	0.96	0.96	0.90	0.90
Percent Heavy Veh, %	2	2	1	1	2	2
Cap, veh/h	558	1501	1035	877	162	461
Arrive On Green	0.33	1.00	0.55	0.55	0.09	0.00
Sat Flow, veh/h	1781	1870	1885	1596	1781	1585
Grp Volume(v), veh/h	744	479	729	631	146	-68
Grp Sat Flow(s),veh/h/ln	1781	1870	1885	1596	1781	1585
Q Serve(g_s), s	15.0	0.0	21.3	22.1	6.1	0.0
Cycle Q Clear(g_c), s	15.0	0.0	21.3	22.1	6.1	0.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	558	1501	1035	877	162	461
V/C Ratio(X)	1.33	0.32	0.70	0.72	0.90	-0.15
Avail Cap(c_a), veh/h	558	1501	1035	877	499	761
HCM Platoon Ratio	1.67	1.67	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.81	0.81	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	14.3	0.0	12.4	12.6	33.8	0.0
Incr Delay (d2), s/veh	159.4	0.5	4.0	5.1	16.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	31.9	0.2	8.9	8.0	3.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	173.7	0.5	16.4	17.7	50.1	0.0
LnGrp LOS	F	A	B	B	D	A
Approach Vol, veh/h		1223	1360		78	
Approach Delay, s/veh		105.9	17.0		93.8	
Approach LOS		F	B		F	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		64.7		10.3	19.0	45.7
Change Period (Y+Rc), s		* 4.5		3.5	4.0	4.5
Max Green Setting (Gmax), s		* 47		21.0	15.0	27.0
Max Q Clear Time (g_c+I1), s		2.0		8.1	17.0	24.1
Green Ext Time (p_c), s		2.2		0.4	0.0	1.9

Intersection Summary	
HCM 6th Ctrl Delay	60.1
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
8: 17th Ave SE & 220th St SE

06/29/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	170	977	968	619	186	171	521	20	414	113	5	105
Future Volume (veh/h)	170	977	968	619	186	171	521	20	414	113	5	105
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		0.99	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1633	1633	1633	1870	1870	1870	1900	1900	1900
Adj Flow Rate, veh/h	179	1028	921	652	196	173	548	21	281	119	5	90
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	18	18	18	2	2	2	0	0	0
Cap, veh/h	538	914	688	458	1151	534	617	38	509	150	3	53
Arrive On Green	0.03	0.08	0.08	0.23	0.39	0.39	0.18	0.34	0.34	0.10	0.10	0.10
Sat Flow, veh/h	1781	3554	1576	1555	2972	1379	3456	111	1483	702	29	531
Grp Volume(v), veh/h	179	1028	921	652	196	173	548	0	302	214	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1576	1555	1486	1379	1728	0	1594	1262	0	0
Q Serve(g_s), s	5.0	18.0	18.0	16.0	3.0	6.2	10.8	0.0	10.8	7.0	0.0	0.0
Cycle Q Clear(g_c), s	5.0	18.0	18.0	16.0	3.0	6.2	10.8	0.0	10.8	7.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.93	0.56		0.42
Lane Grp Cap(c), veh/h	538	914	688	458	1151	534	617	0	547	206	0	0
V/C Ratio(X)	0.33	1.12	1.34	1.42	0.17	0.32	0.89	0.00	0.55	1.04	0.00	0.00
Avail Cap(c_a), veh/h	591	914	688	458	1151	534	617	0	547	206	0	0
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	17.3	32.0	22.9	17.6	14.1	15.0	28.1	0.0	18.6	32.9	0.0	0.0
Incr Delay (d2), s/veh	0.0	57.8	153.1	202.5	0.3	1.6	14.8	0.0	1.2	72.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	15.8	39.4	30.9	1.0	2.1	5.5	0.0	3.9	7.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.4	89.8	176.0	220.1	14.4	16.6	42.8	0.0	19.9	105.8	0.0	0.0
LnGrp LOS	B	F	F	F	B	B	D	A	B	F	A	A
Approach Vol, veh/h		2128			1021			850			214	
Approach Delay, s/veh		121.0			146.1			34.7			105.8	
Approach LOS		F			F			C			F	

Timer - Assigned Phs	1	2	3	4		6	7	8
Phs Duration (G+Y+Rc), s	17.0	11.0	10.9	31.1		28.0	20.0	22.0
Change Period (Y+Rc), s	4.5	4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s	12.5	7.0	9.0	25.0		24.0	16.0	18.0
Max Q Clear Time (g_c+I1), s	12.8	9.0	7.0	8.2		12.8	18.0	20.0
Green Ext Time (p_c), s	0.0	0.0	0.1	2.3		1.4	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	108.9
HCM 6th LOS	F

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
8: 17th Ave SE & 220th St SE

06/29/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	386	786	364	977	113	1243	5	559	171	10	170
Future Volume (veh/h)	105	386	786	364	977	113	1243	5	559	171	10	170
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		0.99	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1870	1870	1870	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	111	406	688	383	1028	115	1308	5	507	180	11	101
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	5	5	5	2	2	2	0	0	0	0	0	0
Cap, veh/h	212	509	687	326	930	104	1053	9	908	217	12	80
Arrive On Green	0.02	0.05	0.05	0.12	0.20	0.20	0.30	0.57	0.57	0.21	0.21	0.21
Sat Flow, veh/h	1739	3469	1516	1781	4652	519	3510	16	1584	654	56	375
Grp Volume(v), veh/h	111	406	688	383	752	391	1308	0	512	292	0	0
Grp Sat Flow(s),veh/h/ln	1739	1735	1516	1781	1702	1768	1755	0	1600	1085	0	0
Q Serve(g_s), s	4.0	8.7	11.0	9.0	15.0	15.0	22.5	0.0	15.1	15.8	0.0	0.0
Cycle Q Clear(g_c), s	4.0	8.7	11.0	9.0	15.0	15.0	22.5	0.0	15.1	16.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.29	1.00		0.99	0.62		0.35
Lane Grp Cap(c), veh/h	212	509	687	326	681	354	1053	0	917	309	0	0
V/C Ratio(X)	0.52	0.80	1.00	1.18	1.10	1.11	1.24	0.00	0.56	0.94	0.00	0.00
Avail Cap(c_a), veh/h	212	509	687	326	681	354	1053	0	917	309	0	0
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.36	0.36	0.36	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	26.8	34.6	21.9	26.0	30.0	30.0	26.3	0.0	10.0	31.1	0.0	0.0
Incr Delay (d2), s/veh	0.8	4.8	21.1	106.7	66.6	79.9	117.1	0.0	0.8	36.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	4.3	14.3	11.1	12.3	14.0	25.9	0.0	4.7	8.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.7	39.4	43.0	132.6	96.6	109.9	143.3	0.0	10.8	67.8	0.0	0.0
LnGrp LOS	C	D	F	F	F	F	F	A	B	E	A	A
Approach Vol, veh/h		1205			1526			1820			292	
Approach Delay, s/veh		40.4			109.0			106.0			67.8	
Approach LOS		D			F			F			E	

Timer - Assigned Phs	1	2	3	4		6	7	8
Phs Duration (G+Y+Rc), s	27.0	20.0	9.0	19.0		47.0	13.0	15.0
Change Period (Y+Rc), s	4.5	4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s	22.5	16.0	5.0	15.0		43.0	9.0	11.0
Max Q Clear Time (g_c+I1), s	24.5	18.0	6.0	17.0		17.1	11.0	13.0
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0		4.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	88.3
HCM 6th LOS	F

Notes

User approved pedestrian interval to be less than phase max green.

Queues
8: 17th Ave SE & 220th St SE

06/29/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	111	406	827	383	1147	1308	593	370
v/c Ratio	0.53	0.81	0.79	1.23	1.01	1.25	0.56	1.43
Control Delay	37.3	57.8	18.2	154.0	61.3	145.2	5.9	238.2
Queue Delay	0.0	0.0	1.1	0.0	33.7	0.8	0.0	2.1
Total Delay	37.3	57.8	19.4	154.0	95.0	146.0	5.9	240.3
Queue Length 50th (ft)	73	161	244	~173	~228	~397	50	~217
Queue Length 95th (ft)	m92	m191	m293	#339	#315	#520	123	#379
Internal Link Dist (ft)		272			574		493	270
Turn Bay Length (ft)	50			200		500		
Base Capacity (vph)	210	504	1042	311	1135	1050	1065	259
Starvation Cap Reductn	0	0	72	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	252	157	0	37
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.81	0.85	1.23	1.30	1.46	0.56	1.67

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Queues
8: 17th Ave SE & 220th St SE

06/29/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	179	1028	1019	652	376	548	457	235
v/c Ratio	0.39	1.13	1.17	1.48	0.24	0.89	0.55	1.52
Control Delay	9.3	91.5	99.6	248.0	8.4	48.0	5.2	286.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.3	91.5	99.6	248.0	8.4	48.0	5.2	286.0
Queue Length 50th (ft)	31	~324	~463	~357	20	120	6	~124
Queue Length 95th (ft)	m34	m#327	m#467	#551	39	#205	64	#256
Internal Link Dist (ft)		272			574		493	270
Turn Bay Length (ft)	50			200		500		
Base Capacity (vph)	475	910	873	441	1592	613	833	155
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	1.13	1.17	1.48	0.24	0.89	0.55	1.52

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Internal Street Analysis

New trips are assigned to super block based on proposed new household and jobs within each area.

PM Canyon Park Business Center - MXD 1	
In	1360
Out	2120

Superblock Number	HH	Emp	Total	Percent	Trips In	Trips Out	Notes
5	0	468	468	6%	76	119	Trips use 220th Street
6	515	515	1030	12%	168	261	Trips use 17th Ave SE
7	59	781	840	10%	137	213	Trips use 23rd Ave SE/driveway
8	0	449	449	5%	73	114	Trips use 26th Place
9	358	1787	2145	26%	349	544	Trips use 17th Ave
10	525	372	897	11%	146	228	Trips use 17th Ave
11	380	611	992	12%	161	252	Trips use 20th Ave SE
12	0	1537	1537	18%	250	390	Trips use 223rd St
Total	1838	6520	8358	100%	1360	2120	

Note, dots do not represent anything anymore. Used to represent old Business+ growth.

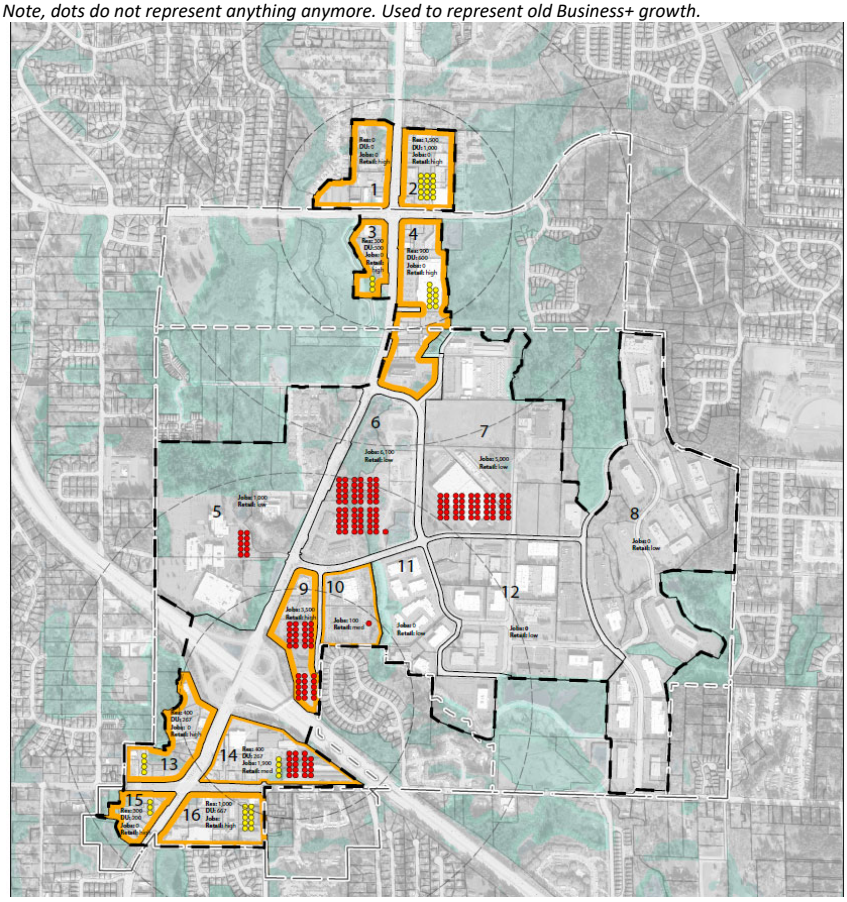


TABLE 7

Generalized **Peak Hour Directional** Volumes for Florida's **Urbanized Areas**[1]

12/18/12

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
1	Undivided	*	830	880	**
2	Divided	*	1,910	2,000	**
3	Divided	*	2,940	3,020	**
4	Divided	*	3,970	4,040	**

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
1	Undivided	*	370	750	800
2	Divided	*	730	1,630	1,700
3	Divided	*	1,170	2,520	2,560
4	Divided	*	1,610	3,390	3,420

Non-State Signalized Roadway Adjustments

(Alter corresponding state volumes by the indicated percent.)

Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
1	Divided	Yes	No	+5%
1	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
–	–	–	Yes	+ 5%

One-Way Facility Adjustment

Multiply the corresponding directional volumes in this table by 1.2

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Lanes	B	C	D	E
2	2,260	3,020	3,660	3,940
3	3,360	4,580	5,500	6,080
4	4,500	6,080	7,320	8,220
5	5,660	7,680	9,220	10,360
6	7,900	10,320	12,060	12,500

Freeway Adjustments

Auxiliary Lane	Ramp Metering
+ 1,000	+ 5%

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Median	B	C	D	E
1	Undivided	420	840	1,190	1,640
2	Divided	1,810	2,560	3,240	3,590
3	Divided	2,720	3,840	4,860	5,380

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
1	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

BICYCLE MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	150	390	1,000
50-84%	110	340	1,000	>1,000
85-100%	470	1,000	>1,000	**

PEDESTRIAN MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	140	480
50-84%	*	80	440	800
85-100%	200	540	880	>1,000

BUS MODE (Scheduled Fixed Route)[3]

(Buses in peak hour in peak direction)

Sidewalk Coverage	B	C	D	E
0-84%	> 5	≥ 4	≥ 3	≥ 2
85-100%	> 4	≥ 3	≥ 2	≥ 1

[1] Values shown are presented as peak hour directional volumes for levels of service and are for the automobile/truck modes unless specifically stated. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The table and deriving computer models should not be used for corridor or intersection design, where more refined techniques exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual.

[2] Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians using the facility.

[3] Buses per hour shown are only for the peak hour in the single direction of the higher traffic flow.

* Cannot be achieved using table input value defaults.

** Not applicable for that level of service letter grade. For the automobile mode, volumes greater than level of service D become F because intersection capacities have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.

Source:
Florida Department of Transportation
Systems Planning Office
www.dot.state.fl.us/planning/systems/sm/los/default.shtm

TABLE 7
(continued)

Generalized **Peak Hour Directional** Volumes for Florida's **Urbanized Areas**

12/18/12

INPUT VALUE ASSUMPTIONS	Uninterrupted Flow Facilities			Interrupted Flow Facilities					
				State Arterials				Class I	
	Freeways	Highways		Class I		Class II		Bicycle	Pedestrian
ROADWAY CHARACTERISTICS									
Area type (lu, u)	lu	u	u	u	u	u	u	u	u
Number of through lanes (both dir.)	4-12	2	4-6	2	4-8	2	4-8	4	4
Posted speed (mph)	70	50	50	45	50	30	30	45	45
Free flow speed (mph)	75	55	55	50	55	35	35	50	50
Auxiliary lanes (n,y)	n								
Median (n, nr, r)		n	r	n	r	n	r	r	r
Terrain (l,r)	l	l	l	l	l	l	l	l	l
% no passing zone		80							
Exclusive left turn lane impact (n, y)		[n]	y	y	y	y	y	y	y
Exclusive right turn lanes (n, y)				n	n	n	n	n	n
Facility length (mi)	4	5	5	2	2	1.9	1.8	2	2
Number of basic segments	4								
TRAFFIC CHARACTERISTICS									
Planning analysis hour factor (K)	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
Directional distribution factor (D)	0.547	0.550	0.550	0.550	0.560	0.565	0.560	0.565	0.565
Peak hour factor (PHF)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Base saturation flow rate (pcphpl)		1,700	2,100	1,950	1,950	1,950	1,950	1,950	1,950
Heavy vehicle percent	4.0	2.0	2.0	1.0	1.0	1.0	1.0	2.5	2.0
Local adjustment factor	0.91	0.97	0.98						
% left turns				12	12	12	12	12	12
% right turns				12	12	12	12	12	12
CONTROL CHARACTERISTICS									
Number of signals				4	4	10	10	4	6
Arrival type (1-6)				3	3	4	4	4	4
Signal type (a, c, p)				c	c	c	c	c	c
Cycle length (C)				120	150	120	120	120	120
Effective green ratio (g/C)				0.44	0.45	0.44	0.44	0.44	0.44
MULTIMODAL CHARACTERISTICS									
Paved shoulder/bicycle lane (n, y)								n, 50%, y	n
Outside lane width (n, t, w)								t	t
Pavement condition (d, t, w)								t	
On-street parking (n, y)								n	n
Sidewalk (n, y)									n, 50%, y
Sidewalk/roadway separation (a, t, w)									t
Sidewalk protective barrier (n, y)									n

LEVEL OF SERVICE THRESHOLDS

Level of Service	Freeways	Highways		Arterials		Bicycle	Ped	Bus
	Density	Two-Lane	Multilane	Class I	Class II	Score	Score	Buses/hr.
		%ffs	Density	ats	ats			
B	≤ 17	> 83.3	≤ 17	> 31 mph	> 22 mph	≤ 2.75	≤ 2.75	≤ 6
C	≤ 24	> 75.0	≤ 24	> 23 mph	> 17 mph	≤ 3.50	≤ 3.50	≤ 4
D	≤ 31	> 66.7	≤ 31	> 18 mph	> 13 mph	≤ 4.25	≤ 4.25	< 3
E	≤ 39	> 58.3	≤ 35	> 15 mph	> 10 mph	≤ 5.00	≤ 5.00	< 2

% ffs = Percent free flow speed ats = Average travel speed

Internal Street Capacity Estimate

	17th/220th	Assumptions
NB	1454	Two lanes divided, non-state rt adjustment, shared RT
SB	576	One lane undivided, non-state rt adjustment, no turn lane adjustment
EB	1530	Two lanes divided, non-state rt adjustment, exclusive LT and RT
WB	1454	Two lanes divided, non-state rt adjustment, shared RT
	20th/220th	
NB	576	One lane undivided, non-state rt adjustment, no turn lane adjustment
SB	1454	Two lanes divided, non-state rt adjustment, minus 5% because RT is major approach so not necessarily 'exclusive' RT
EB	1530	Two lane divided, non-state rt adjustment, no turn lane adjustment
WB	1148	Two lanes undivided, non-state rt adjustment, no turn lane adjustment
	23rd/220th	
NB	576	One lane undivided, non-state rt adjustment, no turn lane adjustment
SB	576	One lane undivided, non-state rt adjustment, no turn lane adjustment
EB	576	One lane undivided, non-state rt adjustment, no turn lane adjustment
WB	1148	Two lanes undivided, non-state rt adjustmnt, no turn lane adjustment
	26th/220th	
NB	756	One lane undivided, non-state rt adjustment, left turn lane adjustment
SB	756	One lane undivided, non-state rt adjustment, left turn lane adjustment
EB	756	One lane undivided, non-state rt adjustment, left turn lane adjustment
WB		
	223rd/29th	
NB	756	One lane undivided, non-state rt adjustment, right turn lane adjustment
SB	1224	Two lanes divided, non-state rt adjustmnt, no turn lane adjustment
EB	576	One lane undivided, non-state rt adjustment, no turn lane adjustment
WB	576	One lane undivided, non-state rt adjustment, no turn lane adjustment

Attachment D: Transit Analysis

FEHR PEERS

MEMORANDUM

Date: June 23, 2020

To: Bruce Blackburn, Steve Morikawa, and Sherman Goong, City of Bothell

From: Carmen Kwan and Kendra Breiland, Fehr & Peers

Subject: Canyon Park Subarea Plan – Transit Facility Concepts

SE18-0650

The Canyon Park Subarea Plan EIS is evaluating the potential impacts of additional growth to meet PSRC regional growth center criteria. The transportation chapter is focusing on potential impacts to auto/freight, transit, and people walking and biking. Potential mitigation strategies are also explored to support the increase in vehicle traffic with land use growth. Since the SR 527 corridor peak hour congestion is expected to worsen in the future, there is a desire to improve transit access to and from the subarea. In addition, a subarea visioning goal is for Canyon Park to be a regional transportation hub with its existing park-and-ride and bus rapid transit (BRT) service (existing *Swift* Green Line and planned Sound Transit I-405 BRT). This document summarizes a high-level review of potential transit travel time and operating conditions for three potential transit facility concepts.

Transit Facility Concepts

Within the subarea, local Community Transit (CT) and *Swift* Green Line provide transit service along SR 527 and 228th Street SE. To access the existing park-and-ride and serve the business park, transit routes complete a loop within Canyon Park. Local routes enter the business park at the 228th St SE and 29th Ave SE intersection, and the SR 527 and 214th Street intersection, while the *Swift* Green Line enters at the SR 527 and 220th Street intersection (see **Figure 1**).

Under the future No Build Alternative, the City's Comprehensive Plan assumes an additional third northbound through lane constructed from north of 211th Street to north of SR 524 intersection. In the southbound direction, a third southbound through lane would be constructed from SR 524 to 217th Street which would connect to an existing right turn lane to the I-405 northbound on/off-ramps. The SR 527 corridor is therefore generally three general purpose lanes each

direction with dual left turns at major signalized intersections, and an additional northbound channelized right-turn lane only lane approach SR 524 intersection.

Figure 1. Existing Transit Facilities.

For the Canyon Park Subarea Plan, three transit facility options are considered:

Center Reversible Transit Only Lane – the SR 527 corridor would be widened to construct a center transit only lane. SR 527 would have two southbound through lanes, dual left turn lanes approaching intersections, the center transit only lane, and three northbound through lanes. This is a capacity reduction of one general purpose lane in the southbound direction compared to the No Build Alternative. The transit only lane would operate southbound in the AM peak period and northbound in the PM peak period to provide improved transit speed and reliability in the main commute direction. During these time periods, transit in the non-peak direction would travel mixed with general-purpose traffic.

Outside Business Access Transit (BAT) Lanes – convert the outside general-purpose lane to a BAT lane. This results in two general purpose lanes and a BAT lane in each direction, and reduced vehicle capacity for general purpose traffic compared to the No Build Alternative.

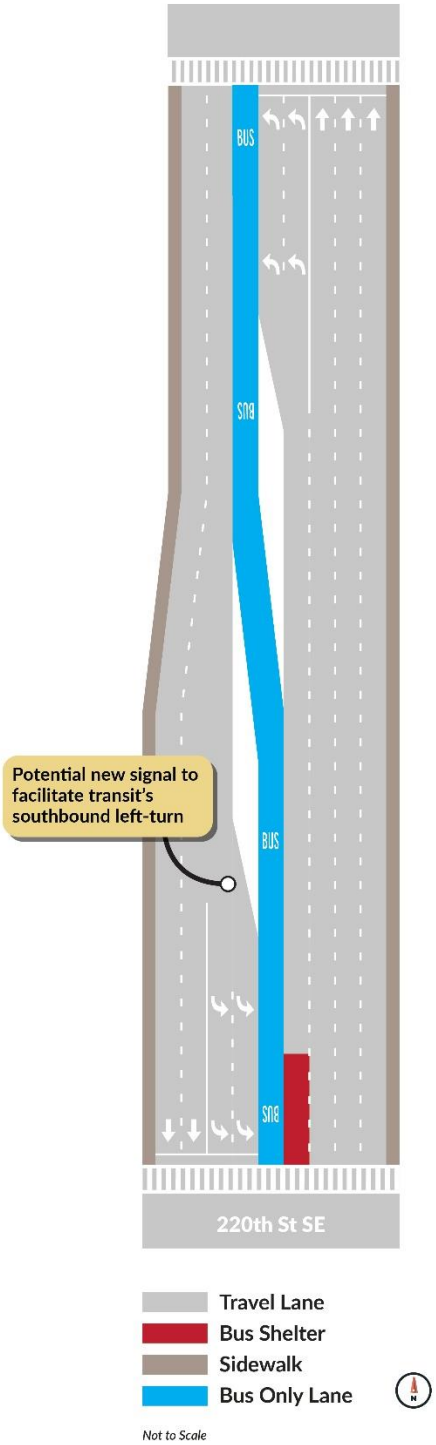
Internal Subarea Parallel Transit Corridor – The SR 527 corridor is congested during current peak periods. As the increased land use would result in additional vehicle traffic and increased congestion, this concept would route transit off SR 527 to an internal transit corridor within the subarea. The route would be from the park-and-ride at the south end to 17th Avenue SE, 220th Street SE, and 20th Avenue SE along the new street extension to SR 524. A new signal at 214th Street SE and 20th Avenue SE would assist transit access turning left from the 20th Avenue extension.

Transit Operations

Center Reversible Transit Only Lane

A conceptual plan view of this concept is shown in **Figure 2**.

Figure 2. Conceptual Drawing of Center Reversible Transit Only Lane



Note: Figure is conceptual only and not to scale.

Implementation of this transit concept would require:

- Corridor re-channelization.
- More transit operation complexity with lane shifts to the center of the roadway to access the transit only lane.
- Major intersection traffic signal revision with bus only signal/bus only phase.
- ITS overhead signs (LED changeable sign such as a red 'X'/'do not enter' and 'Bus Only') to notify buses when to use it.
- Transit stops are required in the median for peak direction traffic, which requires additional widening. This will also require a two-stage pedestrian crossing to reach the roadside. Therefore, this transit facility is likely only for SWIFT Green Line and not local routes to limit widening and constructing new stops.
- If more transit stops are included, generally buses with passenger loading on both sides of the bus would be needed
- Design would need to consider length of left-turn storage approaching intersections so queues do not back into through lanes.
- Potentially a new half traffic signal needed upstream of SR 527/220th Street SE so that SWIFT can transition from the center Transit Only lane to the southbound left-turn lane into Canyon Park.
- Southbound SWIFT stop south of SR 524 would need to be moved north of SR 524 so the Swift can serve it before entering the center Transit Only lane south of SR 524.
- Potentially need both the northbound SWIFT stop in the median (peak direction trip) and existing roadside stop (for non-peak direction trips).
- General purpose traffic would be more delayed compared to without a transit facility on SR 527 with the loss of a southbound general purpose lane and by the extra Bus Only phases needed at 220th Street and SR 524 intersections. Bus Only phases could be about 5-10 seconds at each intersection. General purpose traffic delay would be less than compared to the Outside BAT Lanes scenario.

Outside Business Access Transit (BAT) Lanes

Convert one of three general purpose lanes for a BAT lane in each direction.

- Corridor signing and striping.
- Potential traffic signal revisions (would have been needed if City constructed the Comprehensive Plan's additional SB through lane),or add transit signal priority such as at southbound 214th Street intersection so buses can merge into the southbound left-turn lane at 220h Street intersection..
- General purpose traffic experiences increased delay with the reduced capacity of SR 527 (three general purpose lanes to two general purpose lanes). Longer queues along the SR 527 is also expected. Additional traffic simulation would be needed to determine effects on SR 527 operations if this concept is chosen, and would likely be conducted when coordinated effort among regional partners are in place for Business Access and Transit (BAT) lanes through Bothell and Snohomish County. Regional partners include Community Transit, WSDOT, Snohomish County, City of Mill Creek, and City of Everett.

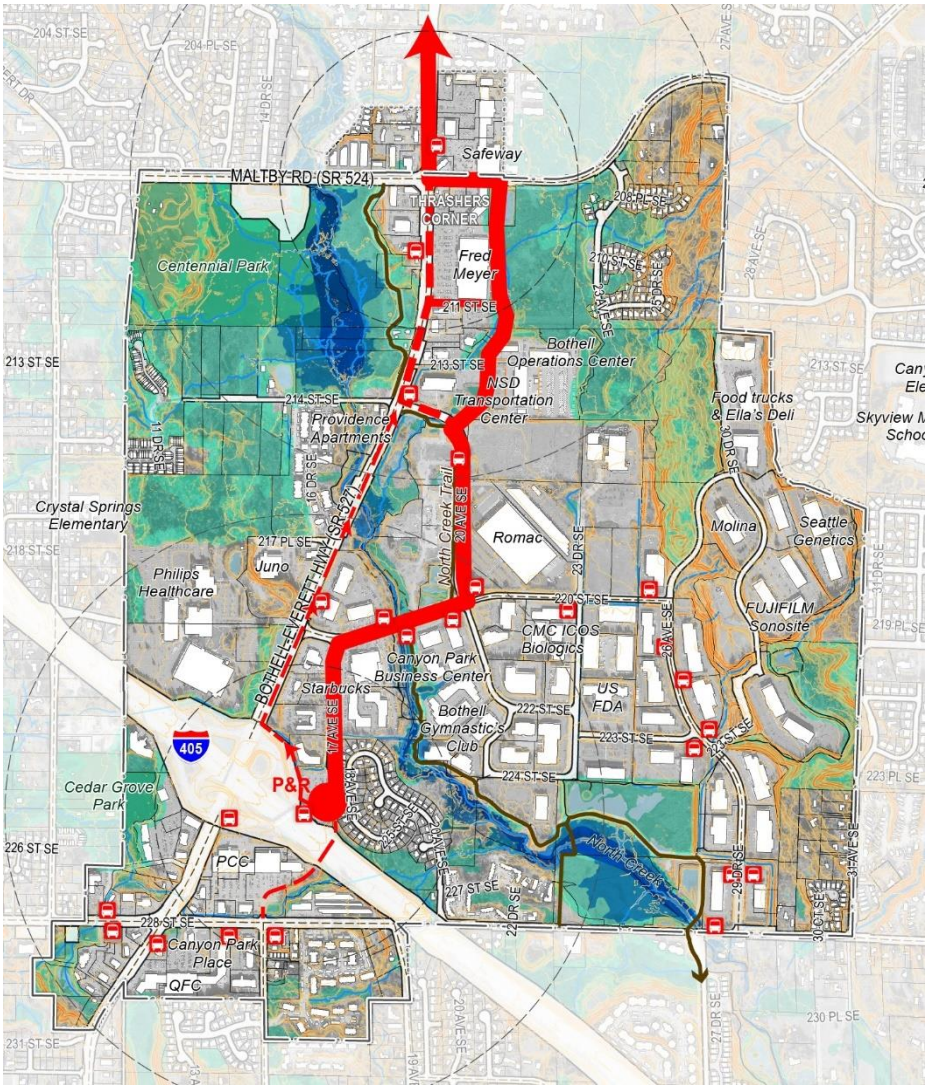
- Can be used by both local and SWIFT transit operations. Transit able to use existing roadside stops.
- Fewer lane changes for transit operators along corridor.
- SR 527/220th intersection delay increases which would affect operations at the I-405 Direct Access Ramp project. Delay increases 109 seconds to 184 seconds (both LOS F) at 220th St intersection, and from 53 seconds (LOS D) to 146 seconds (LOS F) at 214th Street intersection.
- This concept could be utilized by both local and *Swift* Green Line in both directions all hours of the day. The outside BAT lanes would also allow use by right-turning vehicles to access business driveways, which may slow down bus operations. Transit will still be able to bypass peak hour queues along the SR 527 corridor.
- Traffic simulation such as Vissim or SimTraffic is outside the scope of this subarea plan, but should be considered when regional partners are ready to coordinate on a regional transit plan for BAT lanes in the future. This is to better understand potential general purpose queueing.

Internal Parallel Transit Route

Use the internal street network from the park-and-ride, 17th Avenue SE, 220th Street SE, 20th Avenue SE, and the new 20th Avenue SE extension to SR 524. The potential route is shown in red in **Figure 3.** This concept would need to consider:

- Transit would share internal business park streets with general purpose traffic. Thus, transit accommodating infrastructure like transit signal priority and transit queue jump lanes may need to be considered.
- Slightly longer travel route compared to SR 527 corridor (1.5 miles compared to 1.2 miles).
- Better serves internal Canyon Park Business area as transit riders may not need to walk to SR 527.
- Potentially more reliable travel conditions on the internal road compared to SR 527 which is influenced by regional trips.
- New traffic signal needed at 20th Avenue SE/SR 524 with transit signal priority to facilitate bus turn onto and off of SR 524. Signal would be constructed as part of the roadway extension.
- New traffic signal potentially needed at 214th Street SE/20th Avenue SE to facilitate southbound left-turns for transit.
- General purpose traffic on the SR 527 corridor would not be affected as transit is on a new route.

Figure 3. Internal Parallel Transit Route



Transit Travel Time

The northbound PM peak hour transit travel time was estimated from the Canyon Park park-and-ride to north of SR 524 for each scenario. Travel time estimates are a combination of assumed travel speeds between intersections and Synchro intersection delay to travel through the intersection.

No Transit Facility – The No Transit Facility transit travel time assumes transit travels at the same speed as general purpose traffic. Travel time is estimated by the approach delay at each signalized intersection, and an assumed 10 mph travel speed between intersections. This was estimated as the

segment speed for an LOS E corridor which operates at 50 percent of a typical 20 mph urban street facility.

SR 527 Reversible Transit Only Lane – Assumes travel speeds of 25 mph between intersections. Intersection delay is added assuming a bus misses the through phase at each major signalized intersection. Travel times could be shorter with transit signal priority to extend the green time when a bus approaches the intersection.

Outside BAT Lanes - The outside BAT lane travel time range is shown as a range where the lower travel time assumes no intersection delay along the corridor. The higher range assumes the bus misses the northbound through phase at every signalized intersection. Transit travel times could be shorter with transit signal priority installed at intersections along the corridor.

Internal Parallel Transit Route – The internal transit route assumed an average transit travel speed of 15 mph, with intersection delay estimated from Synchro.

Table 1. Estimated 2043 PM Northbound Transit Travel Time

Scenario	Travel Time (min)
No Transit Facility	10.5 min
SR 527 Reversible Transit Only Lane	7.3 min
Outside BAT Lanes	5.5 – 9.5 min
Internal Parallel Transit Route	9.1 min

Fehr & Peers, 2020.

- The No Transit Facility travel time on SR 527 could be reduced with transit signal priority at signalized intersections along the corridor.
- The Reversible Transit Only Lane would allow for more consistent travel speeds between signalized intersections and allow transit to bypass general purpose traffic. Transit travel speeds could improve by up to three minutes compared to without a transit facility.
- The Outside BAT lanes could allow for faster transit travel times depending on the level of transit signal priority, however it may still experience some delay traveling with right-turning vehicles.

- The internal parallel transit route may have a similar or slightly better transit travel time compared to traveling on SR 527 corridor, but carries the advantage of having stops closer to destinations within the business park from the transit rider perspective.

Corridor LOS Analysis

The City's concurrency corridor LOS analysis was completed for the PM peak hour for the Preferred Alternative with and without the BAT lane, and with and without the 214th Street Extension. The proposed new 20th Avenue SE/SR 524 intersection was included with the SR 524 corridor analysis. The results for the 'No BAT Lanes' scenario represents the corridor results for the Internal Parallel Transit Route, and generally represents the Reversible Center Transit Only Lane (though intersection delays may be slightly higher to accommodate bus only phases as needed). Corridors not meeting the LOS E standard are shown bolded in red text.

Table 2. PM Corridor LOS Results

Corridor	With 214th Extension		Without 214th Extension	
	No BAT Lanes	BAT Lanes	No BAT Lanes	BAT Lanes
SR 524	E (57)	**F (82)**	E (77)	**F (92)**
SR 527	E (74)	**F (97)**	**F (86)**	**F (112)**
228th St SE/SW	E (56)	E (56)	E (63)	E (63)

Fehr & Peers, 2020. BAT lanes assumed a SR 527 cross-section of a southbound BAT, 2 southbound lanes, 2 northbound lanes, and a northbound BAT lane. All scenarios assumed the 20th Ave Extension, the 219th Place connection, and the 228th Street SE widening project.

The City's corridor concurrency LOS E standard could be met with the 214th Street SE extension between SR 527 and 9th Avenue SE. Adding BAT lanes would require changing the LOS standard, such as to accept higher levels of delay (LOS F) on the SR 527 and SR 524 corridors. The LOS Standard could change from LOS E currently to LOS F (up to 120 seconds). The City of Tukwila has adopted a similar policy for specific corridors in its Urban Center. Or the City could exempt specific intersections (such as the 220th Street SE, 214th Street SE, and SR 524 intersections) from the SR 527 corridor.

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Canyon Park PM Transit Travel Time (No Transit Facility)
assume travel time is Northbound outbound

	From	To	Length (ft)	Speed (mph)	travel time (min)	Intersection Turn Delay (Synchro)	Movement	Total Travel Time (min)	Notes
Segment 1	P&R	I-405 NB Ramp	1000	30	0.38		WBR	0.38	
Segment 2	I-405 NB Ramp	SR 527/220th St	900	10	1.02	103.6	NBT	2.75	
Segment 3	SR 527/220th St	SR 527/214th St	2100	10	2.39	62	NBT	3.42	
Segment 4	SR 527/214th St	SR 527/211st St	920	10	1.05	10.7	NBT	1.22	
Segment 5	SR 527/211st St	SR 527/SR 524	1400	10	1.59	69.4	NBT	2.75	
Total			**6320 feet, (1.2 mi)**					**10.5**	

Assumptions:

Urban travel speeds is 20 mph.
LOS E corridor is traveling at 50% of urban speed.
Assume 10 mph travel between signals.
Add intersection delay

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Canyon Park PM Transit Travel Time (SR 527 Transit Only)
assume travel time is Northbound outbound

	From	To	Length (ft)	Speed (mph)	travel time (min)	Intersection Turn Delay (Synchro)	Movement	Total Travel Time (min)	Notes
Segment 1	P&R	I-405 NB Ramp	1000	30	0.38		WBR	0.38	No WBR delay at I-405 channelized right turn.
Segment 2	I-405 NB Ramp	SR 527/220th St	900	30	0.34	103.6	NBT	2.07	Lane change to inside GP NBT lane before 220th (challenging two-lane change), then continues into transit only north of intersection, where bus goes with NBT phase. Bus stops at median station north of 220th St.
Segment 3	SR 527/220th St	SR 527/214th St	2100	30	0.80	62	NBT	1.83	Stop at SR527/220th and assume miss the through phase. NBT green phase is 88 seconds. Max waiting time is 62 seconds.
Segment 4	SR 527/214th St	SR 527/211st St	920	30	0.35	62	NBT	1.38	Assume bus just missed through phase
Segment 5	SR 527/211st St	SR 527/SR 524	1400	30	0.53	69.4	NBT	1.69	Bus Only phase allows bus to transition from Transit Only lane to outside NBT lane to serve existing bus stop. -or- Potential new traffic signal to stop all NB vehicles to allow the bus to cross over to right-most NBT lane, for the stop at Maltby Rd. Assume bus will still experience NBT intersection delay
Total			**6320 feet, (1.2 mi)**					**7.3**	

Assumptions:
Corridor speed limit is 45 mph, but assume bus will travel at average 30 mph to speed to account for dwell/aceleration/deceleration.

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Outside BAT Lane Concept

	From	To	Length (ft)	Speed (mph)	travel time (min)	Intersection Turn Delay (Synchro)	Movement	Total Travel Time (n	Notes
Segment 1	P&R	I-405 NB Ramp	1000	30	0.38		WBR	0.38	
Segment 2	I-405 NB Ramp	SR 527/220th St	900	12	0.85	88	NBT	2.32	Assume still experience 220th NBT delay. Assume just missed NBT phase
Segment 3	SR 527/220th St	SR 527/214th St	2100	12	1.99	60	NBT	2.99	Assume still experience 214th NBT delay. Assume just missed NBT phase
Segment 4	SR 527/214th St	SR 527/211st St	920	12	0.87	30	NBT	1.37	Assume still experience 214th NBT delay. Assume just missed NBT phase
Segment 5	SR 527/211st St	SR 527/SR 524	1400	12	1.33	75	NBT	2.58	Assume just missed NBT phase and will have to wait for next cycle to start. TSP for bus to travel NBT would decrease intersection delay
Total			**6320 feet, (1.2 mi)**		**5.4**			**9.6**	

Assumptions:

Urban travel speeds is 20 mph.
LOS E corridor is traveling at 50% of urban speed.
Assuming Bus is in an outside BAT lane (converted from GP lane), it can travel at slightly faster speeds, though will still need to share with right-turning vehicles.
Assume 12 mph travel between signals.
Add intersection delay

Travel Time

9.6 min if it missed the northbound through phase at every traffic signal
5.4 minutes if bus does not wait at any traffic signal

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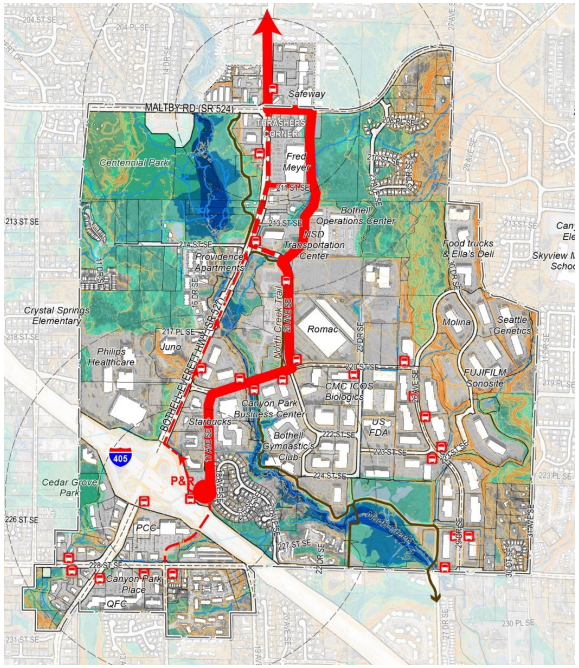
Canyon Park PM Transit Travel Time (Internal Parallel Transit Corridor)
assume travel time is Northbound outbound

	From	To	Length (ft)	Speed (mph)	travel time (min)	Intersection Turn Delay (Synchro)	Movement	Total Travel Ti	Notes
Segment 1	P&R	17th Ave/220th St	1620	15	1.23	10.7	NBR	1.41	NB Approach delay is 24 seconds, largest delay is NBL
Segment 2	17th Ave/220th St	20th Ave/220th St	1110	15	0.84	44.4	EBL	1.58	EB Approach delay is 32.7 seconds, largest delay is EBL
Segment 3	20th Ave/220th St	20th Ave/214th St	1600	15	1.21	0	NBR	1.21	
Segment 4	20th Ave/214th St	New Access 20th Ave/SR524	2500	15	1.89	145	NBL	4.31	Assume TSP could potentially decrease delay.
Segment 5	New Access 20th Ave/SR524	SR524/SR527	750	15	0.57	0	WBR	0.57	WB Approach delay is 103.7 seconds, largest delay is WBT, which may slow buses down.
Total			**7580 feet, (1.5 mi)**					**9.1**	

Sensitivity Test

20 mph	7.6 min
18 mph	8.1 min
15 mph	9.1 min



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5/18/2020 (Revised with SR 524/20th Ave Intersection)

Full Corridor Analysis

1 SR 524 Corridor

Intersection	Delay (sec)	LOS	Delay (sec)	LOS
	with 214th Extension		without 214th Extension	
208th St SE / SR 524 & Filbert Dr	62	E	83	F
208th St SE / SR 524 & SR-527	70	E	73	E
208th St SE / 20th Ave (new)	21	C	21	C
WEIGHTED AVERAGE	*57*	*E*	*77*	*E*

2 228th Street SW/SE Corridor

Intersection				
228th St SE & 4th Ave W	65	E	98	F
228th St SE & Meridian Ave	37	D	45	D
228th St SE & 4th Ave SE	18	B	29	C
228th St SE & 9th Ave SE	105	F	66	E
228th St SE & SR-527	131	F	163	F
228th St SE & 15th Ave SE	18	B	18	B
228th St SE & 19th Ave SE	50	D	50	D
228th St SE & Fitzgerald Rd	32	C	32	C
228th St SE & 29th Dr SE	23	C	23	C
228th St SE & 31st Ave SE	21	C	30	C
228th St SE & 35th Ave SE	34	C	34	C
228th St SE & 39th Ave SE	31	C	31	C
WEIGHTED AVERAGE	*56*	*E*	*63*	*E*

5 SR-527 Corridor

Intersection				
208th St SE / SR 524 & SR-527	82	F	113	F
214th St SE & SR-527	53	D	72	E
220th St SE & SR-527	109	F	119	F
I-405 NB Ramps & SR-527	125	F	136	F
I-405 SB Ramps & SR-527	24	C	26	C
228th St SE & SR-527	131	F	163	F
240th St SE & SR-527	47	D	47	D
NE 191st St & SR-527	65	E	57	E
NE 185th St & SR-527	60	E	55	E
NE 183rd St & SR-527	16	B	16	B
Main St & SR-527	4	A	29	C
SR-522 & SR-527	63	E	61	E
WEIGHTED AVERAGE	*74*	*E*	*86*	*F*

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5/20/2020 (Revised with SR 524/20th Ave Intersection)
Outside BAT lane converted from GP lane

Full Corridor Analysis

	with 214th Extension		without 214th Extension	

1 SR 524 Corridor

Intersection	Delay (sec)	LOS	Delay (sec)	LOS
208th St SE / SR 524 & Filbert Dr	62	E	83	F
208th St SE / SR 524 & SR-527	124	F	129	F
208th St SE / 20th Ave (new)	21	C	21	C
WEIGHTED AVERAGE	*82*	*F*	*92*	*F*

2 228th Street SW/SE Corridor

Intersection				
228th St SE & 4th Ave W	65	E	98	F
228th St SE & Meridian Ave	37	D	45	D
228th St SE & 4th Ave SE	18	B	29	C
228th St SE & 9th Ave SE	105	F	66	E
228th St SE & SR-527	131	F	163	F
228th St SE & 15th Ave SE	18	B	18	B
228th St SE & 19th Ave SE	50	D	50	D
228th St SE & Fitzgerald Rd	32	C	32	C
228th St SE & 29th Dr SE	23	C	23	C
228th St SE & 31st Ave SE	21	C	30	C
228th St SE & 35th Ave SE	34	C	34	C
228th St SE & 39th Ave SE	31	C	31	C
WEIGHTED AVERAGE	*56*	*E*	*63*	*E*

5 SR-527 Corridor

Intersection				
208th St SE / SR 524 & SR-527	124	F	129	F
214th St SE & SR-527	146	F	166	F
220th St SE & SR-527	184	F	236	F
I-405 NB Ramps & SR-527	125	F	144	F
I-405 SB Ramps & SR-527	24	C	26	C
228th St SE & SR-527	131	F	163	F
240th St SE & SR-527	47	D	47	D
NE 191st St & SR-527	65	E	57	E
NE 185th St & SR-527	60	E	55	E
NE 183rd St & SR-527	16	B	16	B
Main St & SR-527	4	A	29	C
SR-522 & SR-527	63	E	61	E
WEIGHTED AVERAGE	*97*	*F*	*112*	*F*