

APPENDIX C

MADISON EAST-WEST BRT

Documented Categorical Exclusion
Transportation Technical Report

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Prepared for:

City of Madison



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REVISIONS

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1. Introduction

The Madison East-West Bus Rapid Transit (BRT) Project (the project) is a proposed 15-mile route serving east-west travel needs in central Madison, Wisconsin. The project extends from East Springs Drive on the east side of Madison to a proposed new park-and-ride at Junction Road on the west side of Madison. Operating primarily via East Washington Avenue, University Avenue, and Mineral Point Road, the project will serve the major regional destinations of the isthmus (downtown Madison), the University of Wisconsin-Madison (UW) campus, Madison Area Technical College, and major employers and several shopping centers located throughout the corridor. BRT buses would use a combination of center-running bus lanes, side bus lanes, and mixed-traffic lanes. The project also includes electric bus charging infrastructure at the Sun Prairie Park-and-Ride and the Metro Satellite Maintenance Facility where BRT layovers will occur.

This technical memo describes potential changes to traffic operations that are anticipated to result from the proposed project.

The East-West BRT will consist of three service patterns which overlap to offer five-minute headways in the core of the system. To minimize unnecessary transfers, each of these patterns will have short stretches that operate as a local service, as shown in Figure 1. Local bus routes, indicated with dashed lines, would operate without BRT infrastructure.

Figure 2 is a guideway map of the proposed route. Guideways can be side-running (buses operate in the right-most lane), center-running (buses operate in the center lanes of the roadway where a median is sometimes located), or mixed-traffic (buses operate in general traffic lanes like any other vehicle). Typical sections are shown in Attachment B.

Figure 1: Project Location Map

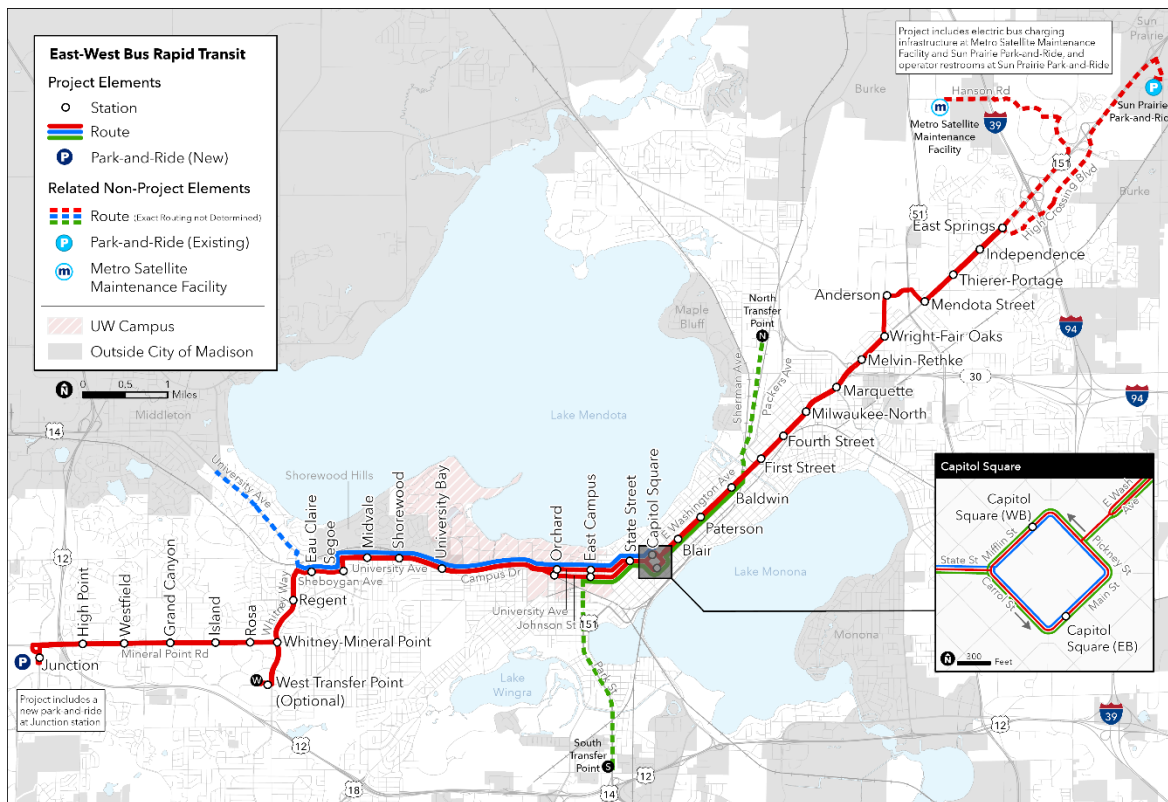
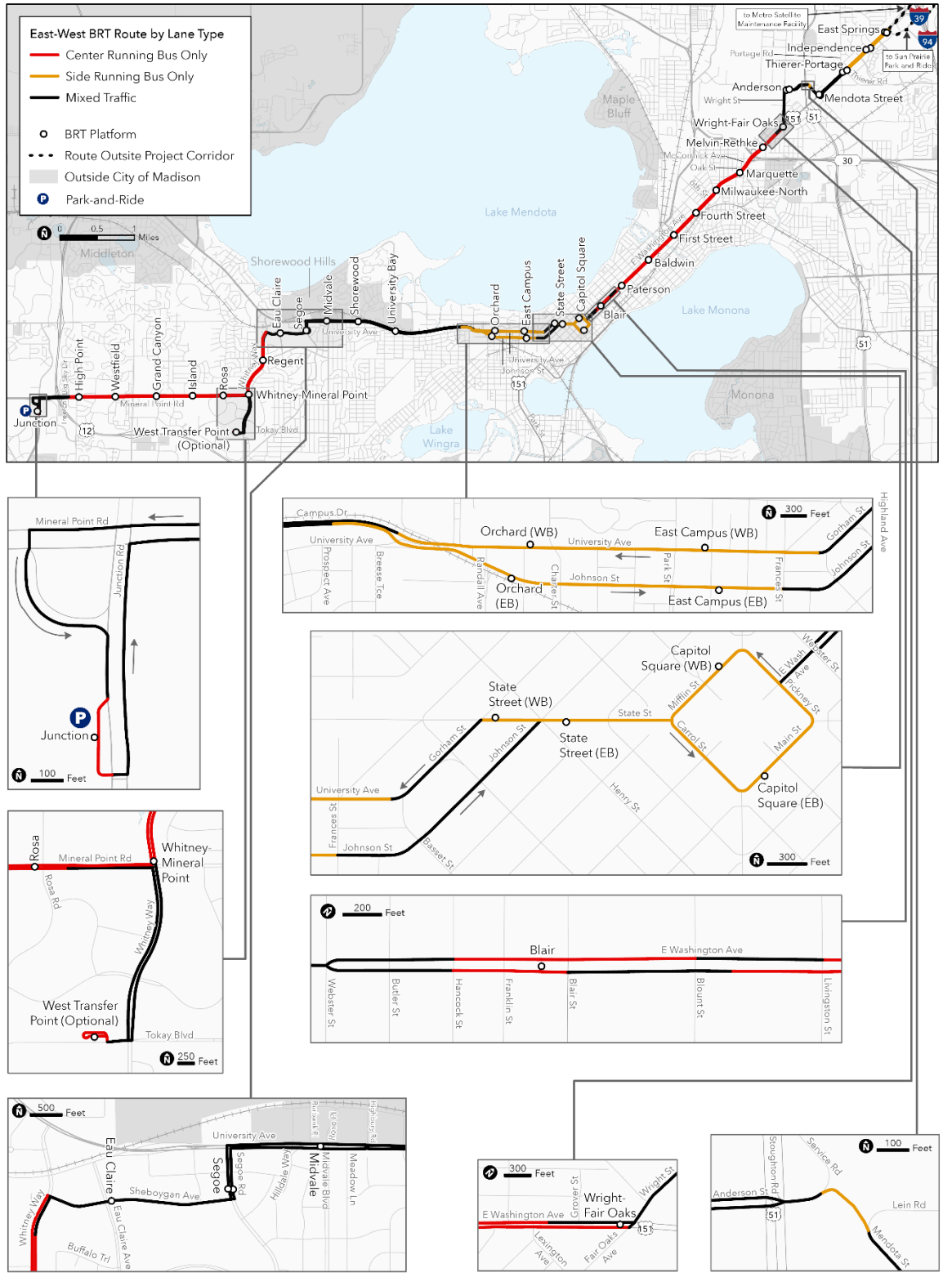


Figure 2: Guideway Map



2. Traffic

There are three ways that the project could affect traffic operations along the project route. These include:

1. Physical changes that affect capacity of the roadways
2. Operational changes to traffic signalized intersections
3. Bus operations (flow and starts/stops) that affect capacity along the roadways

2.1. Physical Changes That Affect Capacity of the Roadways

2.1.1. Lane Changes

Where the project proposes to convert a segment of the roadway's general-purpose traffic lane to a bus-only lane, capacity of the system to carry vehicles would be reduced because private cars and trucks would have fewer lanes to use. Refer to Table 1 for the existing and proposed number of lanes and current volumes on each roadway on the East-West BRT Project route. Typical roadway section schematics that show how existing roadways would be changed by the project are included in Appendix B.

Detailed information regarding traffic operations along East Washington Avenue is available in a separate traffic analysis report¹ included here as Attachment C. The traffic analysis report summarizes future operations on East Washington Avenue by stating, "In general, operations in 2034 with BRT in service results in more movements on US and state highway approaches experiencing LOS E and F operations compared to base conditions without BRT service." Table 1 summarize roadway lane configurations under existing and proposed conditions.

Table 1: Roadway Segment Summary: Volumes and Lanes

Roadway	AADT Range ²	Number of existing general-purpose vehicle lanes in each direction	Number of proposed general-purpose vehicle lanes in each direction with BRT
Mineral Point Road	26,750 – 32,550	2	2
Whitney Way	12,000 - 18,500	2	1
Sheboygan Avenue	4,600	1	1
University Avenue (west of campus)	40,200 – 54,400	3	3
Campus Drive	22,050 – 41,400	2	2
University Avenue	24,950 – 28,450	3	3
Johnson Street	22,050 – 30,950	4	3

¹ Strand Associates, Traffic Modeling for Bus Rapid Transit on United States (US) 151/East Washington Avenue Technical Report (Draft July 2, 2021).

² Most recent traffic volume data from City of Madison. Annual Average Daily Traffic (vehicles per day): Available at <http://cityofmadison.maps.arcgis.com/apps/webappviewer/index.html?id=8c2d43c18d8542c7bdf8a93a11d7e545>. Accessed March 2021.

Roadway	AADT Range ²	Number of existing general-purpose vehicle lanes in each direction	Number of proposed general-purpose vehicle lanes in each direction with BRT
East Washington Avenue (East of Livingston Street)	43,100 – 52,650	3	2 (3 lanes – same as existing condition – will remain in peak direction during peak hours)
East Washington Avenue (Milwaukee Street to Highway 30)	45,550	3 (Westbound)	3 / 2 (One general purpose traffic lane would be converted to a bus-only lane during morning peak hours. During peak hours this bus lane would be accessible by all traffic.)
		3 (Eastbound)	3 / 2 (One general purpose traffic lane will be converted to a bus-only lane during <u>the evening peak</u> hours. During peak hours this bus lane would be accessible by all traffic.)
East Washington Ave (East of Highway 30)	35,850	3	3 / 2 (One general purpose traffic lane would be converted to bus-only lane that would be designated a bus-only lane during <u>off peak</u> hours. During peak hours that bus lane would be accessible by all traffic.)
Wright Street	7,850 – 12,850	1	1
Anderson Street (West of Eagan Road)	15,950	2	2
E Washington Avenue (East of Portage Road)	39,500 – 49,750	4	3

Note: Gold shading signifies segment proposed for general-purpose lane reduction

Table 1 indicates five roadway segments that would experience a reduction in the number of general-purpose travel lanes with the introduction of the project. In general, this reduction results from dedicating a general-purpose lane to bus-only operations. Expected effects of the proposed lane reductions are described below.

- **Whitney Way.** Whitney Way has adequate capacity to handle the volume of traffic it experiences with a single lane in each direction. Signalized intersection timings would be optimized to alleviate potential queuing and delay caused by lane reduction at intersections on Whitney Way.
- **Johnson Street.** Currently, the outside lane on Johnson Street operates as a “de facto” bus and right turn lane because there is a high volume of regular transit buses and right turns that use this lane. Dedicating this lane to bus-only would not significantly change the way it is currently used and thus not significantly degrade operational quality.
- **East Washington Avenue.** East Washington Avenue already has excess capacity during non-peak times of the day. Additionally, fall 2020 traffic counts indicate the reduction in traffic volumes prompted by the pandemic are continuing. Therefore, reducing the general-purpose lanes during non-peak times is not anticipated to significantly degrade operational quality. East of Milwaukee Street (eastbound) and Highway 30 (westbound), two of the bus-only segments on East Washington Avenue would reopen to general traffic during peak periods to minimize operational degradation. The four-lane segment of East Washington Avenue east of Portage Road would have a permanent reduction of one lane. The outside lane in this segment primarily operates as a right-turn along the segment. Since the bus-only lane would be used by general traffic making right turns, this dedication of the lane to bus-only status is not anticipated to significantly degrade operational quality. Attachment C includes the traffic analysis report for East Washington Avenue.

2.1.2. Left Turns at Center Running BRT Lanes

Along the East Washington Avenue segments of the project, the center running BRT lanes would require the elimination of some left turn movements from East Washington Avenue to the side street network. Left turns that would be eliminated are listed in Table 2 and a map of locations of restricted left turn movements is available in Attachment A. More information regarding traffic volumes and operational characteristics along East Washington Avenue is available in the separate traffic analysis report in Attachment C. In addition, the elimination of one left turn on University Avenue is required.

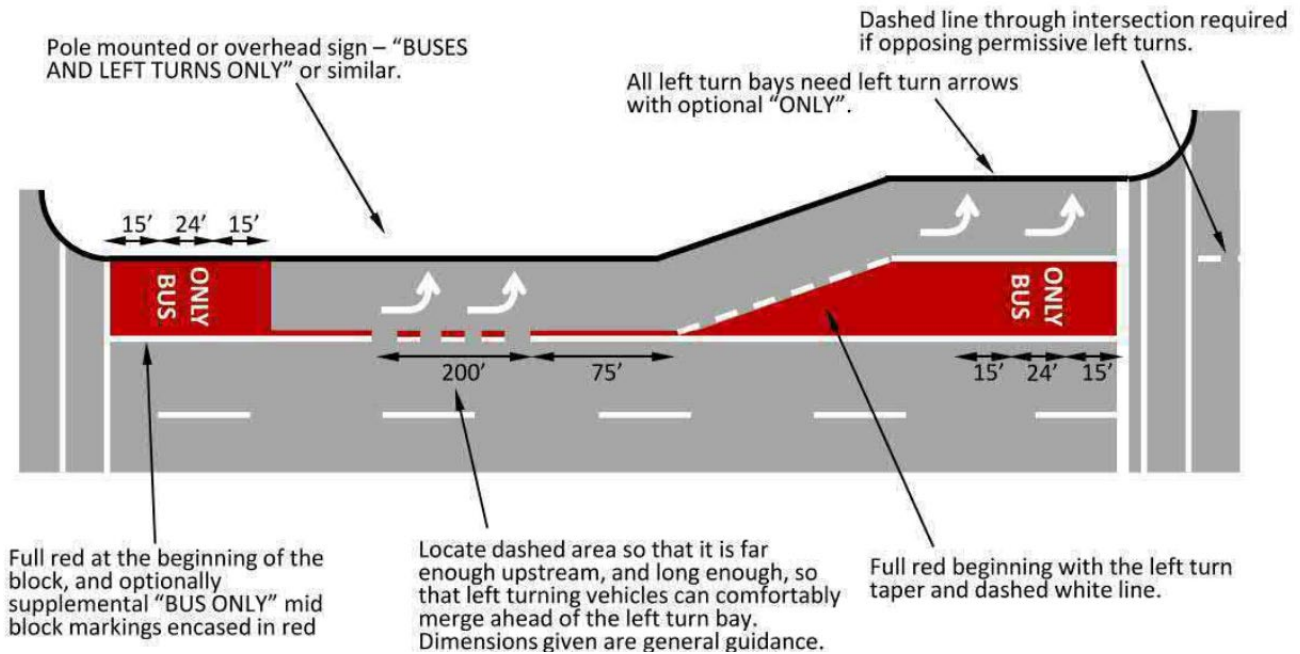
Table 2: Locations of Proposed Left Turn Movement Elimination

Intersection	Left Turn Eliminated
East Washington Avenue at Paterson Street	Eastbound
East Washington Avenue at Baldwin Street	Eastbound
East Washington Avenue at Fourth Street	Westbound
East Washington Avenue at Milwaukee Street	Westbound
East Washington Avenue at Melvin Court	Eastbound
University Avenue at Hill Street	Westbound (possible)

In addition to some restricted left turns, there are locations where left turning motorists would need to merge with the bus-only lane and cross that lane to access the left turn storage lane. These left turn movements would be present at all intersections in the center running guideway sections, (generally, along Mineral Point Road and East Washington Avenue) except at intersection locations with a center bus station; there, general motorists would not need to merge across the bus-only lane and instead would stay to the right of the station prior to making a left turn. There would be some potential added delay for left turning motorists who need to adjust speed to merge across the bus lane. Figure 3 provides a schematic of how these merge maneuvers would operate. These merges across the bus-only lane are not anticipated to add significant delay into the roadway

system. While some motorists would experience increased delay, others would experience decreased delay, resulting in no change to overall intersection delay.

Figure 3: Left Turn Merges Across Bus-Only Lane Schematic



2.2. Operational Changes to Traffic Signalized Intersections

Most routine traffic delay and congestion is related to the way an intersection is controlled by traffic signals, stop signs, or other treatments. The project would add traffic signals at select intersections and proposes to install transit signal priority (TSP) and other signalized intersection technologies to improve speed and reliability for the East-West BRT Project.

2.2.1. Additional New Traffic Signalized Intersections

The project proposes to add new traffic signals at the following locations, where access to the major road from intersecting minor roads is currently controlled by stop signs:

- Sheboygan Avenue and Segoe Road
- Sheboygan Avenue and Whitney Way
- Junction Road Park-and-Ride and Junction Road
- East Washington Avenue and Melvin Court / Rethke Avenue
- East Washington Avenue and Independence Lane

Each new traffic signal would add new delay to the primary roadway because at each of these intersections, the primary roadway is currently free-flow and does not need to stop for any side street traffic. When a traffic signal is installed, that primary roadway would have periods where traffic would be stopped at a red light to allow side street motorists to proceed. This would also tend to lessen the delay that a side street motorist experiences at these locations because there would be dedicated green, right-of-way time for side street motorists to drive through the intersections. Delay would vary based on the signal phasing at each intersection and some users would experience increased delay while others would have reduced delay; overall, a net change in delay is not anticipated.

All new traffic signals would be optimized to maximize efficiency and reduce delay of the new signalized intersections and of the overall system of adjacent signalized intersections. Signal phasing would be adjusted to accommodate these new signals with the goal of optimizing traffic operations and minimizing added delay.

2.2.2. Signalized Intersections with Transit Signal Priority

The East-West BRT route includes dozens of signalized intersections that direct motorists, bicyclists, and pedestrians. Many of the signalized intersections along the route are in coordinated systems in which the intersections effectively communicate with one another and can manage platoons of vehicles from one intersection to another. The project would add TSP along all intersections along the route from Junction Road to East Springs Drive. TSP equipment would allow traffic signals to communicate with approaching BRT buses and extend a green signal or shorten a red signal to minimize the time a bus spends stopped at a red light.

TSP would introduce some additional delay for the minor (side) street motorists because it would tend to favor increased efficiency for the main roadway. The increased side street delay would occur when a BRT bus approaches an intersection during a red signal on the main street (the street carrying the BRT bus) and causes the signal priority to shift from the side street to the primary street, or when a green signal is extended to allow a BRT bus to travel through the intersection. This would only slightly increase delay for side street motorists during the periods that a BRT bus is approaching and is not anticipated to be significant or recognizable by most motorists.

2.3. Bus Flow and Starts/Stops That Affect Capacity Along the Roadways

There are two ways in which the physical presence of BRT buses on roadways could affect the average motorist: added volume of buses on roads and the slowing, stopping, and starting of those buses.

Between the East Campus Mall and Capitol Square stations where the Red, Blue, and Green Lines³ overlap (see Figure 1), 12 BRT buses plus local buses would operate in each direction on the proposed route during weekdays. Between the Eau Claire Avenue and East Campus Mall stations where the Red and Blue Lines overlap, 8 BRT buses would operate in each direction during weekdays. Finally, between the East Campus Mall and First Street stations, where the East-West and North-South BRT routes overlap, 8 BRT buses would operate in both directions during weekdays. Fewer buses would operate during evening and weekend hours.

The addition of BRT buses would be offset by a planned systemwide route restructuring that would reduce duplicative service along the BRT route. BRT will serve about half as many bus stops as existing bus service does, but all will be in lane. The reduction or elimination of local bus service in the corridor results in a similar or lower number of buses and no significant impact to traffic flow.

2.4. Controlling Intersection Level of Service Changes Along the Route

The traffic analysis examined changes to level of service at nine controlling intersections along the East-West BRT route. Controlling intersections serve as the basis for traffic signal timings throughout the area and typically have the highest Vehicle to Capacity (V/C) ratio – an indication of congestion. Implementation of the Build Alternative would result in changes to level of service at several of these intersections compared with the No Build Alternative, summarized in Table 3. The addition of new signals and TSP would improve operations at several intersections compared with the No Build Alternative (highlighted in green) and would degrade operations at select intersections (highlighted in yellow), causing an LOS F at only one intersection: East Washington Avenue at Blair Street in the p.m. peak period.

³ The East-West BRT Project is designated to be called the Red Line. The Middleton (Blue) and North-South (Green) Lines are two additional BRT routes that Madison Metro Transit plans to introduce. These routes would use the East-West BRT infrastructure along the project route and local bus stops outside the corridor.

BRT operations were analyzed using 2019 traffic volumes; to date, traffic has not returned to 2019 levels because of travel behavior changes caused by the COVID-19 pandemic, suggesting that the modeling results are conservative. A City of Madison traffic volume analysis found that most arterials carried approximately 10 percent less traffic in September 2021 than in September 2019, and much of the traffic volume reduction is in the morning and evening peak periods. On East Washington Avenue, traffic volumes are approximately 55 percent and 70 percent of their pre-covid levels in the morning and evening peaks, respectively, from 2019 to 2021. An increase in telework and other travel behavior changes resulting from the pandemic may create a lasting pattern of reduced traffic volumes, leading to better traffic operations than what are portrayed in the operations analysis and throughout this section. In many cases where the overall intersection level of service (LOS) deteriorates, critical intersection movements are largely unchanged; some intersections operated poorly prior to the pandemic.

Converting one of the three existing general purpose lanes on East Washington Avenue to bus-only lanes impacts the LOS at certain intersections. However, microsimulation traffic modeling at these intersections indicates modest increases in queue lengths that can still be cleared during a single signal cycle. Additionally, while the implementation of East-West BRT is anticipated to result in reduced LOS at certain intersections, the project would increase the overall person throughput of the corridor.

Table 3: Existing and Proposed Levels of Service at Controlling Intersections

Intersection	AM Peak		PM Peak	
	LOS without Project	LOS with Project	LOS without Project	LOS with Project
Mineral Point Road at Gammon Road	D	E	C	C
Mineral Point Road at Whitney Way	C	C	C	D
Whitney Way at Regent Street	A	A	B	C
Johnson Street at Park Street	C	C	F	F
University Avenue at Park Street	C	C	D	D
East Washington Avenue at Blair Street	C	B*	E	F
East Washington Avenue at First Street	D	E	F	F
East Washington Avenue at Milwaukee Street	F	C*	F	C
East Washington Avenue at Zeier Road	F	C*	D	D

*Traffic signal timings were optimized with the implementation of the BRT service and some overall intersection LOS results improved.

As shown in Table 3, there are three intersections that are anticipated to operate at LOS F with the project, two of which (Johnson Street at Park Street and East Washington Avenue at First Street) would also operate at LOS F without the project. At the East Washington Avenue and Blair Street intersection, the increase in overall intersection delay during the evening peak period would result in a deterioration from LOS E without the project to LOS F with the project. This impact results from a reduction in the number of general purpose lanes on

eastbound East Washington Avenue. Three blocks south of East Washington Avenue along Blair Street, the City is currently making improvements to increase throughput at the five-way intersection of Blair Street, John Nolen Drive, and Wilson Street. These improvements are anticipated to help mitigate the loss of capacity on East Washington Avenue. Further, the City has adopted several plans and policies that accept some increase in vehicle delay to improve safety by reducing speeding and improve alternative modes of transportation. These plans include Madison in Motion, the City's transportation master plan⁴; Vision Zero⁵; and Complete Green Streets.⁶

The delays for movements on US Highway 151 (right turn from northbound Blair Street to East Washington Avenue and left turn from westbound East Washington Avenue to southbound Blair Street) are unchanged or improved and signal timings are optimized with implementation of the project.

Observation of microsimulation traffic modeling suggests similar northbound Blair Street (US Highway 151) queue lengths with or without the project. Microsimulation reports averaging the results from nine simulation runs indicate modestly longer northbound queue lengths without the project, with an average length of 640 to 660 feet and 95th percentile length of 1,030 to 1,070 feet. With the project, the average queue length is 580 to 590 feet, with a 95th percentile length of 920 to 950 feet. The eastbound queuing would worsen with the conversion of one of the three existing eastbound general purpose lanes to a bus-only lane, but as noted above, City policy supports these conditions considering the context adjacent to the Capitol Square and Capitol Loop in the City's downtown area.

2.5. Parking

The project would have some effect on street parking availability. Mineral Point Road, Whitney Way, University Ave, State Street currently do not have on-street parking and so would be unaffected by BRT routing. The limited parking that exists on portions of Johnson Street, the Capital Square, and East Washington Ave from Pinckney to Blair Street will remain.

On East Washington Avenue from Blount Street to Milwaukee Street/Highway 30, approximately 120 on-street parking spaces would be prohibited for about two hours in the a.m. peak direction and 142 on-street parking spaces would be prohibited for about two hours in the p.m. peak direction.

In addition, some riders currently access transit by parking on public streets prior to boarding the bus. This is common throughout the system and may continue with the implementation of BRT. If this continues with BRT, it would provide greater access to the system for area residents, but could reduce the availability of on-street parking.

Concern about parking on Regent Street was expressed by stakeholders in the University Hill Farms neighborhood. There are approximately 81 parking spaces along this segment. City staff conducted a parking inventory in this area on Tuesday, December 14, 2021 at approximately 9:30 a.m. and found 16 vehicles parked for a utilization of 20 percent. Satellite imagery from Google taken on Wednesday, October 3, 2018, showed 13 vehicles parked on the street in this stretch, a utilization of approximately 16 percent. Satellite imagery from Wednesday, June 4 and Thursday, June 12, 2014 and earlier dates shows similar or lower parking utilization. During this period of time before the COVID 19 pandemic, commuter bus traffic has served Regent Street and Eau Claire Avenue with equal or better service compared to the proposed BRT service during commute times.

4 Madison in Motion Transportation Plan. Available at <https://www.cityofmadison.com/transportation/documents/MIM/MIMReportWeb.pdf>. Accessed 5 May 2022.

5 Vision Zero Initiative. Available at <https://www.cityofmadison.com/transportation/initiatives/vision-zero>. Accessed 5 May 2022.

6 Complete Green Streets. Available at <https://www.cityofmadison.com/transportation/initiatives/complete-green-streets>. Accessed 5 May 2022.

To manage parking impacts, the City of Madison has a Residential Parking Permit Program (RP3) where residents can be given priority for parking through the purchase of permits, generally allowing them to park on streets for two days while unpermitted cars can only park for two hours. Program details are described in Madison General Ordinance 12.138 and on the City's website.⁷ Areas in the BRT corridor that are covered by the RP3 program include the University Hill Farms Historic District east and north of the area of concern, State Street Historic District, Saint Patrick's Roman Catholic Church, and the Wisconsin State Capitol (except for parking directly adjacent, which is controlled by the State of Wisconsin). Breese Stevens Municipal Athletic Field, Gisholt Machine Company, and Madison East High School are also in RP3 districts; as they are on East Washington Avenue, the peak hour restriction would limit all-day parking availability directly in front of these locations. The following figure illustrates that many centrally located residential areas along the BRT are within an RP3 area and have access to this management option.

Figure 4: RP3 Zones along East-West BRT Corridor



The project would also add surface lot parking at the west terminal and would serve the existing Sun Prairie Park-and-Ride. This parking would allow riders outside the BRT walkshed the opportunity to drive to the BRT terminal to access the system, and would also accommodate bike parking, pickups, and drop-offs. By expanding frequent service further from the central city and providing parking at the west terminal, the project could

⁷ City of Madison Parking Permits. Available at <https://www.cityofmadison.com/parking-utility/permits/residential-parking-permits>. Accessed 23 November 2021.

prompt riders who live farther from the city center to access BRT without parking on public streets or by using the Park-and-Ride lots.

3. Transit

Madison’s proposed BRT routes are intended to serve as the core of the Metro Transit network. The East-West BRT Project would include bus lanes, BRT stations and infrastructure, TSP, and other components as described in Section 1.1 of the DCE. The North-South and Middleton BRT routes would use this BRT infrastructure when operating in the East-West BRT corridor and would use local bus stops outside the corridor. All three routes would use new branded BRT buses, most or all of which are planned to be electric.

Service levels on the BRT and local routes are shown in Table 4 below. The buses operating on all three BRT routes would be purchased as part of the project. In combination, the East-West, North-South, and Middleton BRT routes would offer a five-minute headway in the core of the system.

Table 4: East-West BRT Project Proposed Spans and Headways

Service Day	Span	East-West BRT	Middleton BRT (Capitol Square to Eau Claire)	Middleton BRT (Capitol Square to Middleton)	North-South BRT (East Campus to First Street)
Weekday	Early AM: 5 – 6 a.m.	30 mins.	-	-	30 mins.
	AM Peak: 6 – 9 a.m.	15 mins.	-	15 mins.	15 mins.
	Midday: 9 a.m. – 4 p.m.	15 mins.	15 mins.	-	15 mins.
	PM Peak: 4 – 7 p.m.	15 mins.	-	15mins.	15 mins.
	Evening: 7 p.m. – 12 a.m.	30 mins.	-	-	30 mins.
Saturday	Early AM: 6 – 7 a.m.	30 mins.	-	-	30 mins.
	Midday: 7 a.m. – 4 p.m.	15 mins.	-	-	30 mins.
	PM Peak: 4 – 7 p.m.	15 mins.	-	-	30 mins.
	Evening: 8 – 11 p.m.	30 mins.	-	-	30 mins.
Sunday	All Day: 6 a.m. – 11 p.m.	30 mins.	-	-	30 mins.

The BRT span of service (hours of operation) would be the same as local service (pre-pandemic), generally from about 5 a.m. to midnight on weekdays. Along most of the route, bus volumes would remain largely unchanged because East-West BRT would replace bus service hours already in the corridor. On some portions of the route, the number of buses would be reduced because fewer 60-foot buses would be needed to meet the same demand as the 40-foot buses currently used and because service would be restructured to be more efficient overall.

Several changes would need to be made to existing transit service when East-West BRT operations begin to reflect the enhanced service provided by East-West BRT. Most of the BRT system would operate in center-running lanes with station platforms requiring left side doors. Metro Transit’s existing fleet of more than 200 buses have doors only on the right side and thus would not be able to serve BRT platforms. Several overlapping

local routes with lower service frequencies would be replaced with the three BRT routes.⁸ This service change would provide more frequent and reliable service than what currently exists in the corridor.

The changes to the transit network described in Table 5 reflect those described and mapped in Appendix D Service Plan and Operations and Maintenance Cost memo (March 2022).

Metro Transit is also leading the Transit Network Redesign (TNR), which is a separate action with independent utility. The TNR is intended to create a route system that will better serve Madison area residents and businesses by increasing access and frequency, decreasing travel times, and improving the quality of transit riders' experience. The projects acknowledge the effects of each other, but each project has value with or without the implementation of the other. Neither project restricts the consideration of alternatives of the other project nor do they trigger the other action. The Transit Network Redesign, if approved, will make broader changes to local bus service throughout the network and not just within the East-West BRT corridor. Its effects are not evaluated in this document.

⁸ Routes 2, 10, 11, 12, 15, 28, 56, 57, 70, 71, and 72 on University Avenue, and Routes 6, 14, 15, 25, 27, 29, 56, and 57 on East Washington Avenue would be substantially or entirely replaced by the East-West BRT Project, as summarized in Table 8.

Table 5: Transit Service Changes Necessary for East-West BRT

Route	Service Change/Potential Impact	Proposed Mitigation	Reduction in Service?
East-West BRT Project	New east-west BRT route with local service continuing past the eastern terminus to Sun Prairie and American Center; generally replaces the west half of Route 2, the east half of Route 6, Route 14, and Routes 26 and 36	Improves service; no mitigation needed	No
Middleton BRT	New Middleton BRT route with local service continuing west along Route 71 and 72 route patterns; generally replaces Routes 70, 71, and 72	Improves service; no mitigation needed	No
North-South BRT	New north-south BRT route from North Transfer Point to South Transfer Point via Packers Avenue and Park Street; generally replaces southern half of Route 5	Improves service; no mitigation needed	No
1, 4, 7, 8, 13, 16, 17, 18, 19, 20, 21, 22, 31, 32, 33, 34, 35, 38, 39, 40, 44, 47, 48, 49, 50, 51, 52, 55, 58, 59, 63, 68, 75, 80, 81, 82, 84	No change	No mitigation needed	No
2	Route shortened so that the western terminus is the UW hospital (western portion replaced by East-West BRT service); frequency reduced from 15 to 30 minutes during peak periods and remains 30 minutes the rest of the day	Although some riders would have to walk up to one-quarter mile farther to access a bus stop, East-West BRT would provide higher-frequency, more direct service than the Route 2 and results in a net improvement to transit access. No mitigation needed.	No
3	Route moved from University Avenue, Johnson/Gorham Street, and William Street to Broom Street/Bassett Street and Wilson Street/Doty Street to avoid duplication with BRT	Although some riders would have to walk up to one-quarter mile farther to access a Route 3 bus stop (one-half mile at the heart of Capitol Square), the existing level of service on Route 3 would be maintained. No mitigation needed.	No

Route	Service Change/Potential Impact	Proposed Mitigation	Reduction in Service?
5+6	The eastern half of Route 5 is combined with the western half of Route 6; the southern part of Route 5 would be replaced by North-South BRT and the eastern part of Route 6 would be replaced by the East-West BRT Project	Existing service along Routes 5 and 6 would be maintained or improved by the proposed changes: BRT service would provide better frequency throughout the day every day, and the new combined local route would maintain service in areas not served by BRT. No mitigation needed.	No
10	Route shortened and replaced by BRT east of Broom Street	East of Broom Street, Route 10 is redundant with Routes 2 and 5; while some riders south of Washington Avenue would have to walk up to one-quarter mile farther to access service, BRT would improve the frequency and quality of service. No mitigation needed.	No
11+12	Route shortened so that it operates from the Capitol Square to the east only; the western half of the route would be replaced by East-West BRT	Duplicative service would be eliminated when BRT is implemented and BRT would provide high-frequency service throughout the day; where BRT and local routes do not overlap, local service would be maintained with the same alignment and frequency. No mitigation needed.	No
14+15	Route combined into one route serving the Route 14 area north of Mineral Point Road and the Route 15 service area near Old Sauk Road	The service area along Mineral Point Road would be replaced with East-West BRT, which would improve service frequency and span. No mitigation needed.	No
23	Route shortened so that the southern terminus is the East Towne Mall; revised route would operate as a circulator from the East Towne Mall to Sun Prairie Park-and-Ride consistent with current route	BRT service south of the East Towne Mall would provide improved frequency and span compared with existing service and the revised Route 23 would provide the same level of service to the same areas that are currently served. No mitigation needed.	No
25	Replaced by East-West BRT	BRT service would provide improved frequency and span compared with existing service. No mitigation needed.	No

Route	Service Change/Potential Impact	Proposed Mitigation	Reduction in Service?
26	Replaced by East-West BRT	The East-West BRT extension to the Metro Satellite Maintenance Facility would serve the area currently served by Route 26. BRT service would provide improved frequency and span compared with existing service, which currently operates at 30-minute headways during the day and 60-minute headways early and late. No mitigation needed.	Minor increase in walking distance to access transit service in small areas
27	Replaced by North-South BRT	BRT service would provide improved frequency and span compared with existing service. No mitigation needed.	No
28+56+57	Routes combined and moved from Sheboygan Avenue to Old Middleton Road and from East Washington Avenue to Johnson Street / Gorham Street to avoid duplication with BRT. Service offered every 30 minutes all day, weekdays only.	Existing routes operate during peak periods on weekdays only. Route 28 provides 10- to 15-minute frequency and Routes 56 and 57 operate at 30-minute frequencies. The new combined route would provide improved span of service at a similar frequency. No mitigation needed.	No
29	Shortened so that the North Transfer Point is the southern terminus; south of this point, Route 29 would be replaced by North-South BRT	Duplicative service would be eliminated when BRT is implemented and BRT would provide high-frequency service throughout the day; where BRT and local routes do not overlap, local service would be maintained with the same alignment and frequency. No mitigation needed.	No
30	Extended to Portage Haye to replace part of the discontinued Route 6	Increase in service. No mitigation needed.	No
36	Replaced by East-West BRT	The East-West BRT extension to the Metro Satellite Maintenance Facility would serve the area currently served by Route 36. BRT service would provide improved frequency and span compared with existing service, which currently operates at 60-minute headways; no mitigation needed.	No
67	Replaced by East-West BRT	BRT service would provide improved frequency and span compared with existing service; no mitigation needed.	No

Route	Service Change/Potential Impact	Proposed Mitigation	Reduction in Service?
70	Shortened so that the Eau Claire station is the southern/east terminus; east of this point, Route 70 would be replaced by North-South BRT	Duplicative service would be eliminated when BRT is implemented and BRT would provide improved frequency compared with existing 60-minute frequency; where BRT and local routes do not overlap, local service would be maintained with existing circulation and service characteristics. No mitigation needed.	No
71+72	Routes 71 and 72 are essentially replaced by Middleton BRT	BRT service would provide improved frequency and span compared with existing service. No mitigation needed.	No

While there would be service reductions and even elimination of some local routes, the East-West, Middleton, and North-South BRT lines would replace this service, consolidating overlapping low-frequency routes into more frequent, visible, and higher-capacity service. The service changes described above intend to eliminate local service that duplicates BRT.

Table 6 summarizes the approximate number of weekday buses in 2019 (before the COVID-19 pandemic began) and the projected number of BRT buses proposed on weekdays in 2024 along the BRT route. While there is a decline in the number of buses in some areas, this does not represent a reduction in service. The decrease in bus volume occurs through what is called the “funnel,” where several routes converge to travel across the isthmus. Many of these buses do not have stops serving the surrounding areas; thus, implementation of East-West BRT would provide more frequent transit service with conveniently spaced stops while also reducing bus volumes in areas where residents and business owners are sensitive to traffic levels, including along State Street and near the Hill Farms historic district. Additionally, as noted above, the use of higher-capacity 60-foot buses would require fewer vehicles to meet the demand currently served by 40-foot buses.

Table 6: Existing and Planned Weekday Bus Volumes

BRT Route Location	2019	2024 BRT
	Weekday Buses	Weekday Buses
Mineral Point Road, West of High Point Road	36	128
Mineral Point Road, West of Island Drive	120	128
Whitney Way, South of Mineral Point Road	252	256
Whitney Way, North of Mineral Point Road	156	128
Sheboygan Avenue, East of Eau Claire Avenue	302	256
University Avenue at Shorewood Boulevard	504	240
Campus Drive	402	240
University Avenue and Johnson Street at Brooks Street	831	240 + 250-300 local
University Avenue and Johnson Street, Lake Street to Bassett Street	711	368 + 250-300 local
State Street at Fairchild Street	618	368
Capitol Square at Wisconsin Avenue and MLK Jr Boulevard	786	368 + 100 local

East Washington Avenue at Ingersoll Street	282	256
East Washington Avenue, East of Milwaukee Street	183	128
East Washington Avenue, East of Highway 30	129	128
East Washington Avenue at Thierer Road	123	128

4. Bicycles

In most cases bicycle accommodations would remain unchanged. The two exceptions are Mineral Point Road, where there would be an improvement, and East Washington Ave, where the westbound bike lane would be closed in the morning peak period and the eastbound bike lane would be closed in the evening peak period.

The East-West BRT lane configuration on Mineral Point Road would eliminate the existing shared bus and bike lane on the segment of Mineral Point Road. A widened sidewalk parallel to this segment of Mineral Point Road is proposed. It will replace the existing sidewalk and accommodate both pedestrians and bicyclists and provides a protected “All Ages and Abilities” enhancement to the bicycle network.

During peak hours, the proposed lane configuration along East Washington Avenue would eliminate an existing bike lane in the peak direction between Blair Street and Milwaukee Street/Highway 30. This measure is necessary to avoid significant motor vehicle delays and traffic diversion onto local streets.

The change is expected to require cyclists to divert to lower-stress parallel streets or paths during peak hours. The most convenient parallel routes include Capital City Trail and East Mifflin Street.⁹ Wayfinding signage would be added to help bicyclists navigate to alternative routes. The impact from the reduction of bicycle facilities in the peak hours in the peak direction is expected to be moderated with nearby parallel low-stress options, and with further planned expansion of the low-stress bicycle route network on the city’s East Side. Though specific projects have not yet been identified, expansion of the East Side bicycle network is funded in the City’s 2022-2026 Transportation Improvement Program.¹⁰

5. Summary

The project would introduce physical and operational changes to the roadways along the East-West BRT route. These changes would be in the form of actual physical lane changes, operational changes at signalized intersections, and addition of BRT buses to the traffic flow. None of the proposed changes are anticipated to introduce significantly degraded operations on the proposed roadways. Key summary statements from the motor vehicle operational analysis:

1. Segments of Whitney Way, Johnson Street, and East Washington Avenue between Portage Road and East Springs Boulevard during off-peak hours would experience a reduction in general-purpose travel lanes. Generally, these reductions result from dedicating one of the general-purpose lanes to bus-only operation. On East Washington Avenue, there would be no reduction in general purpose lanes during

⁹ Greater Madison Metropolitan Planning Organization Low Stress Bike Route Finder.

<https://www.arcgis.com/apps/webappviewer/index.html?id=cb7a2e78477044c19bf6a5eaa1820e38>. Accessed August 2021.

¹⁰ Madison Metropolitan Area and Dane County 2022-2026 Transportation Improvement Program. Available at

https://www.greatermadisonmpo.org/planning/documents/TIPfinal22_WEB.pdf. Accessed 22 November 2021.

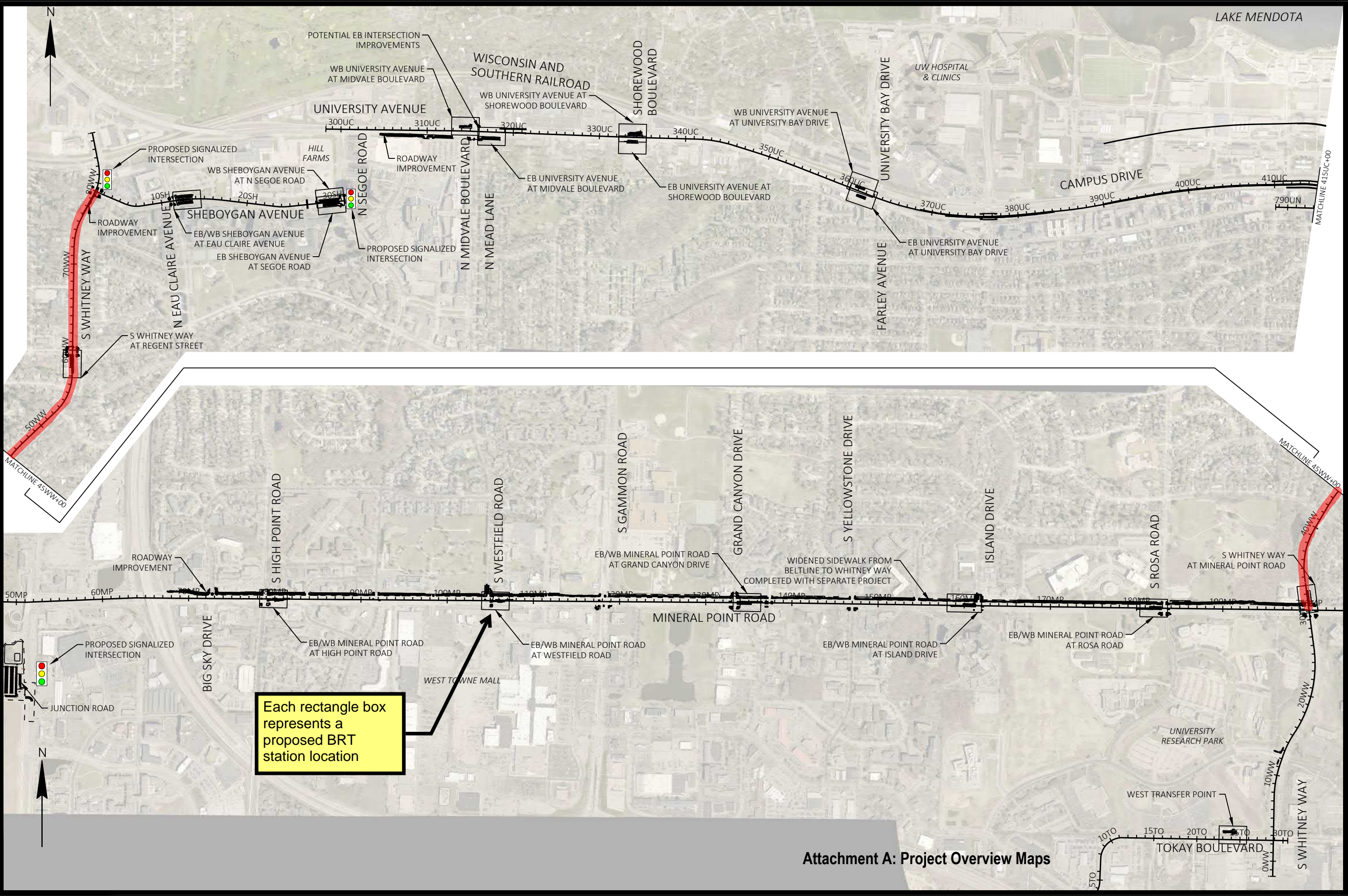
the peak hour in the peak direction. None of these lane reductions are anticipated to significantly degrade operational quality.

2. The project staff conducted a separate traffic analysis for East Washington Avenue between Blair Street and Wright Street, which would be reduced to two lanes in each direction except during peak periods. Attachment C documents the potential for some side-street motorists' delay at signalized intersections resulting from the introduction of the project (where side-street is defined as the street that intersects with the main BRT-carrying roadway).
3. The proposed center running bus operation on specific segments of East Washington Avenue would eliminate left turns at five cross streets; motorists accessing those five streets from Washington Avenue would be expected to alter their routes to accommodate these changes. Each of the proposed locations are considered relatively low-volume movements and these restrictions are not anticipated to significantly degrade operational quality.
4. The project proposes to add five new traffic signalized intersections. All new traffic signals would be optimized to maximize efficiency and reduce delay of the intersection and of the overall system of adjacent signalized intersections. The addition of these new signals is not anticipated to significantly degrade operational quality.
5. Most signalized intersections along the proposed route would be outfitted with TSP infrastructure to help maximize efficiency of the BRT system. The addition of this technology may inject minor delay into the side-street movements (see item two above for detailed analysis conducted along the East Washington Avenue corridor) but is not anticipated to significantly degrade operational quality; overall, intersection delay would remain approximately equal with or without TSP.
6. The project would result in six to 10 BRT buses per hour in each direction along certain segments of the route. These buses would operate either in dedicated lanes or in general purpose travel lanes. Lane reductions will be avoided during peak hours. The addition of these buses into the general traffic volume is not anticipated to significantly degrade operational quality.
7. An analysis of controlling intersections along the BRT corridor was performed and found modest impacts. Compared with the No Build Alternative, the BRT project would improve operations at three intersections in the a.m. peak and one intersection in the p.m. peak and would result in degraded operations at two intersections in the a.m. peak and three intersections in the p.m. peak. LOS would be unacceptable at two intersections during the p.m. peak under the Build Alternative.
8. The BRT corridor will remove few to no on-street parking spaces from the corridor, with the exception of East Washington Ave, which will prohibit on-street parking in the peak hour in the peak direction. Currently some transit riders park on local streets prior to boarding their bus. This may continue with BRT implementation. Madison has a Residential Parking Permit System in centrally located neighborhoods that help manage impacts from commuter parking.
9. Local bus service is planned to remain with small changes to accommodate the BRT service. Duplicative routes along the BRT corridor will be consolidated and replaced with the BRT service. Metro Transit is performing a Transit Network Redesign as a separate action which could have broader impacts to local service outside the corridor.

10. Bicycle accommodations would largely remain the same for most of the BRT route. Accommodations on Mineral Point Road will be improved through the provision of a widened sidewalk/path which will provide an "All Ages and Abilities" shared use path in place of the bus lane cyclists currently share with buses. On East Washington Avenue, bicycle facilities will be removed in the peak period in the peak direction from Blair Street to Milwaukee St/Highway 30. For much of this length, there are parallel low-stress bike facilities. As a separate project, the City of Madison has allocated about \$1 million in capital improvement funds to enhance east-west bicycle connectivity on the near-east side.

Attachment A:

Project Overview Maps



Each rectangle box represents a proposed BRT station location

Attachment A: Project Overview Maps

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	60631225P		

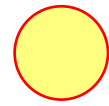
60631225P
 CITY OF MADISON, DANE COUNTY, WI
 CONTRACT NO: 60631225C

PROJECT OVERVIEW
 BUS RAPID TRANSIT
 CITY OF MADISON

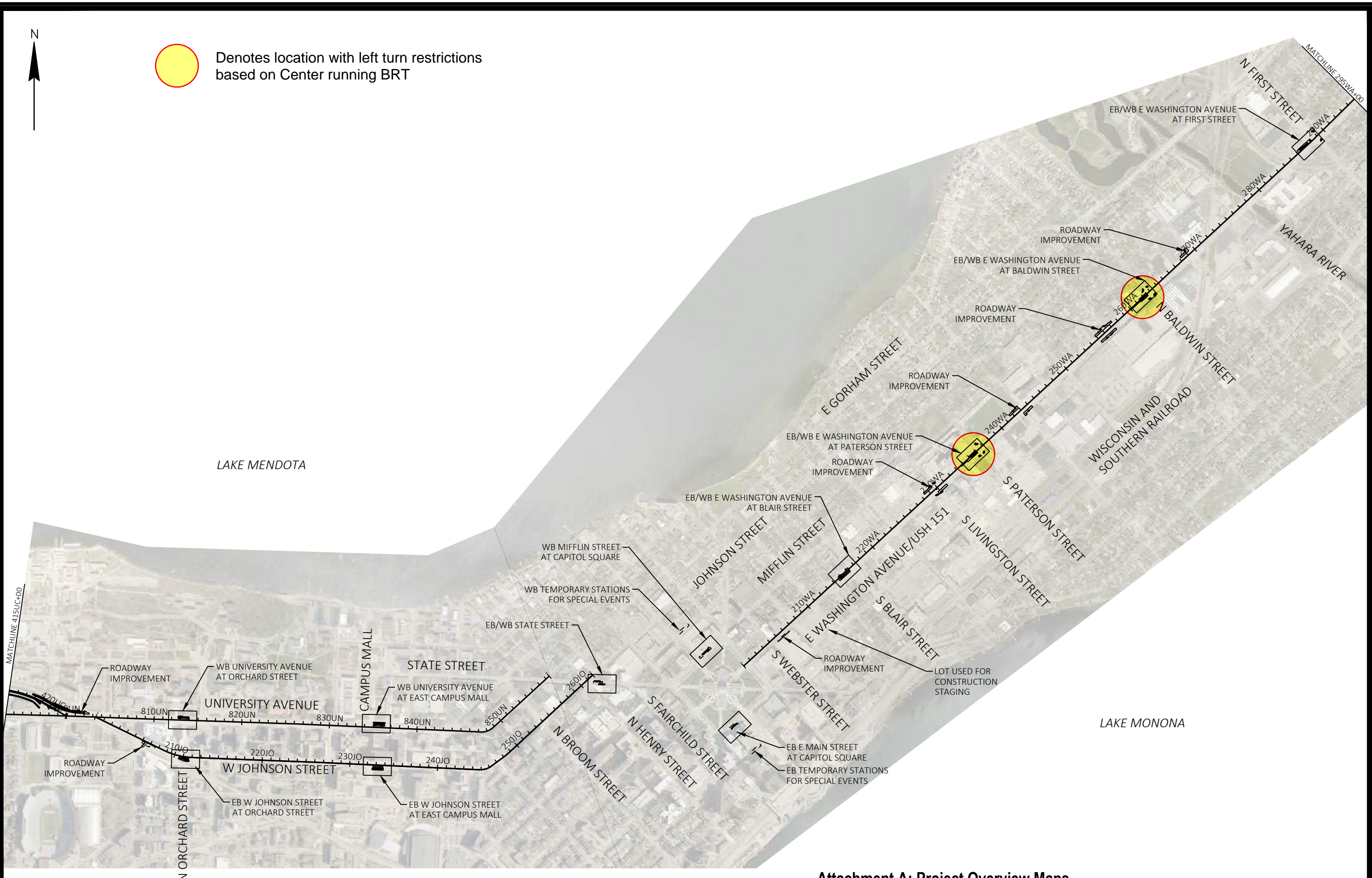


60631225P
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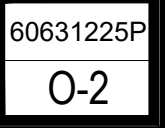


Denotes location with left turn restrictions based on Center running BRT



MARK	REVISION	DATE	BY
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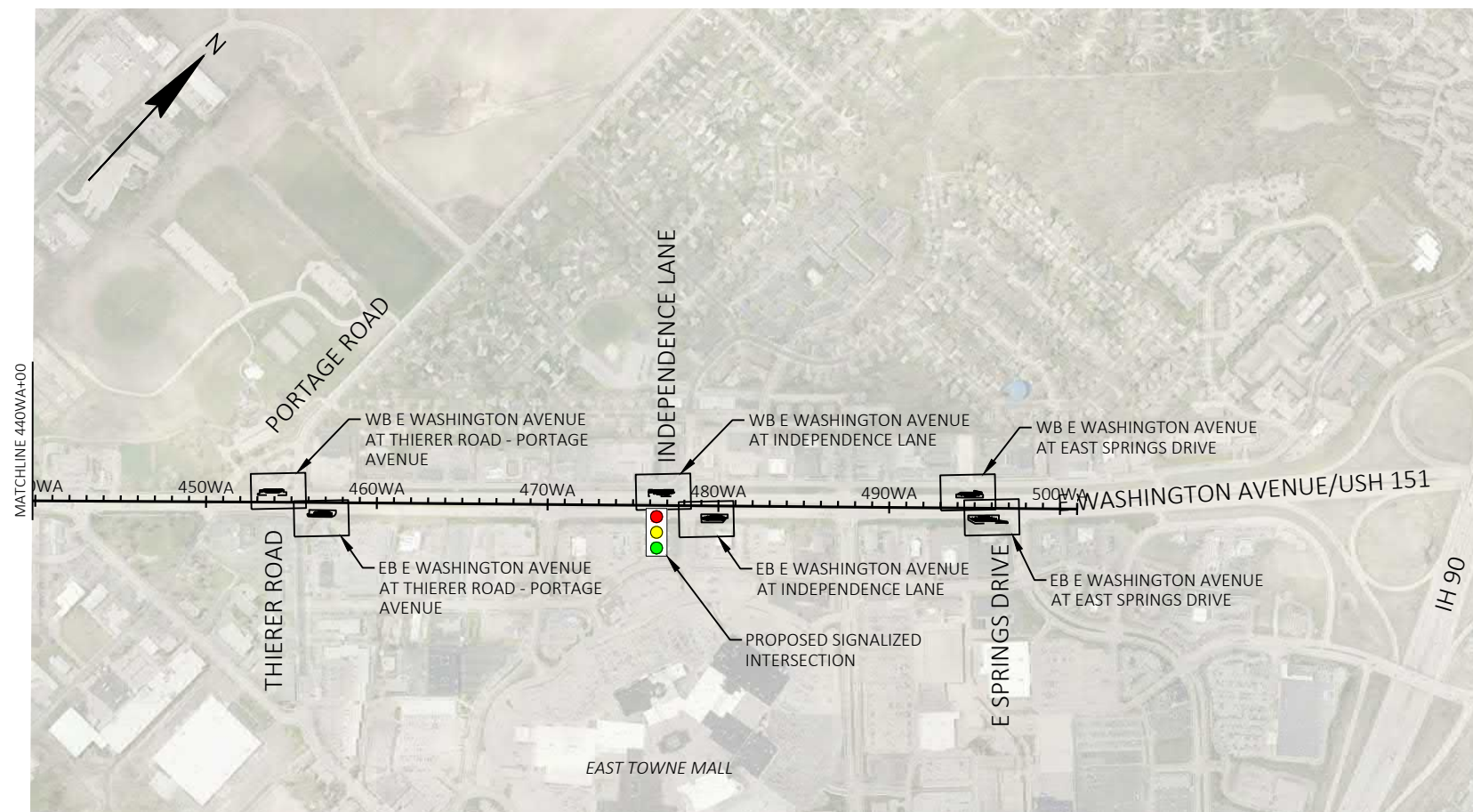
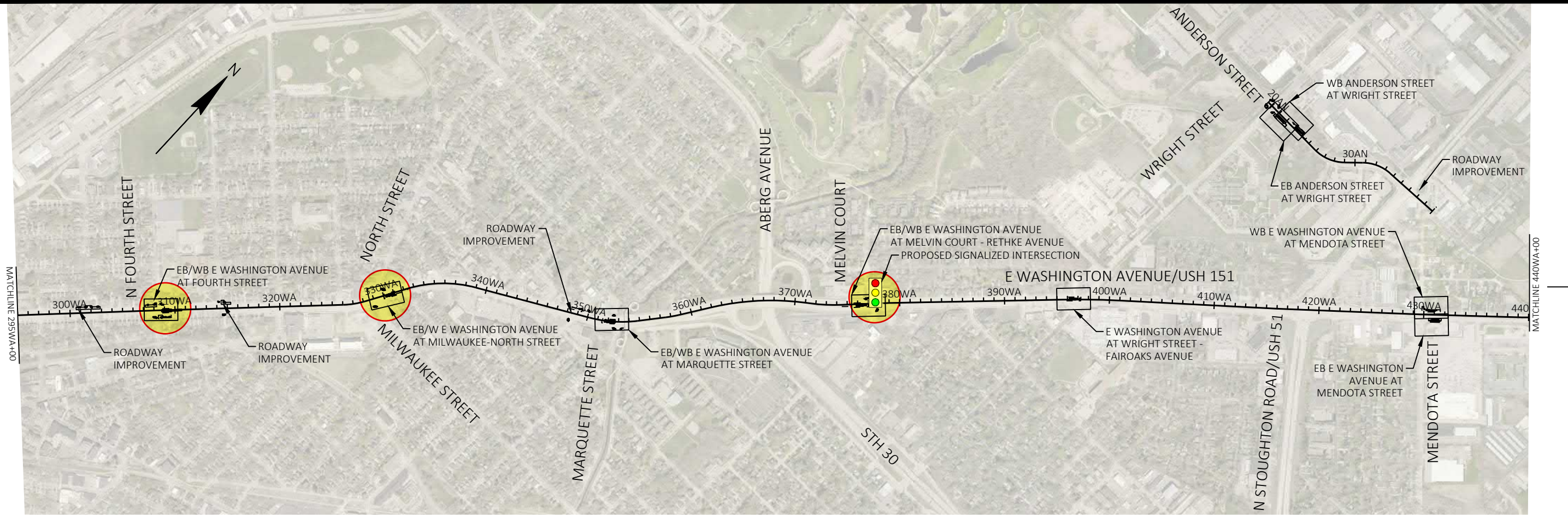
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 CITY OF MADISON, DANE COUNTY, WI
 CONTRACT NO: 60631225C




60631225P

Attachment A: Project Overview Maps

FILE NAME: C:\P\WORKING\AECOM_DS20_NA_2019\MICHAEL.SCHNEIDERZ@AECOM.COM\DM586348\020201-PO.DWG
 LAYOUT NAME: 02
 LAST PLOT DATE: 2021-08-06



 Denotes location with left turn restrictions based on Center running BRT

Attachment A: Project Overview Maps

MARK	REVISION	DATE	BY
	Designed By: AECOM	2021-08-02	
	60631225P		

60631225P
 CITY OF MADISON, DANE COUNTY, WI
 CONTRACT NO: 60631225C

PROJECT OVERVIEW
 BUS RAPID TRANSIT
 CITY OF MADISON

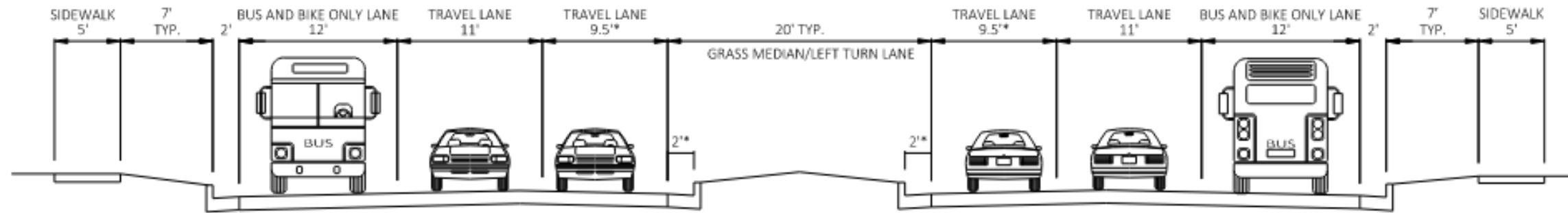


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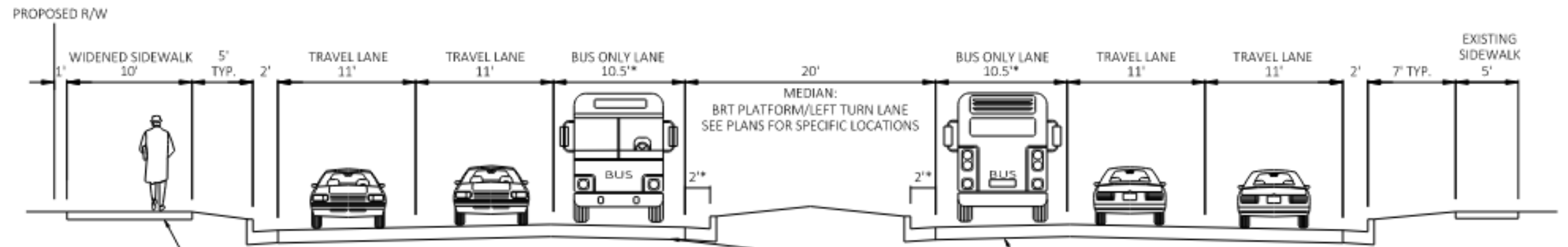
0-3

Attachment B:

Typical Section Schematics



EXISTING TYPICAL SECTION
MINERAL POINT ROAD
LOOKING EAST



FINISHED TYPICAL SECTION
MINERAL POINT ROAD
LOOKING EAST

PROPOSED R/W

WIDENED SIDEWALK 10'

TRAVEL LANE 11'

TRAVEL LANE 11'

BUS ONLY LANE 10.5'

MEDIAN: 20'
BRT PLATFORM/LEFT TURN LANE
SEE PLANS FOR SPECIFIC LOCATIONS

BUS ONLY LANE 10.5'

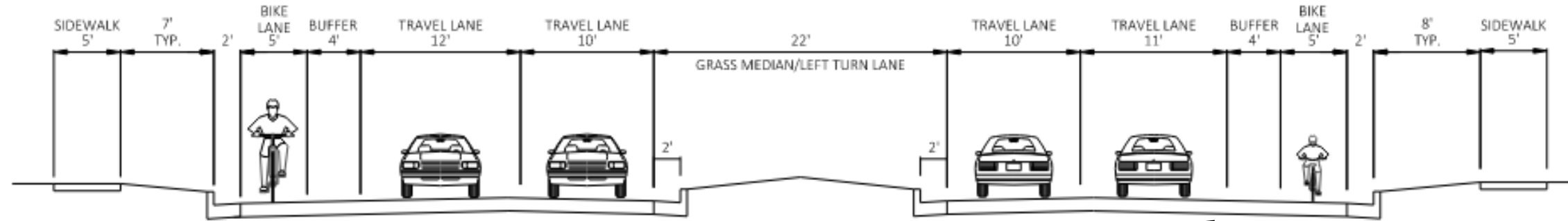
TRAVEL LANE 11'

TRAVEL LANE 11'

EXISTING SIDEWALK 5'

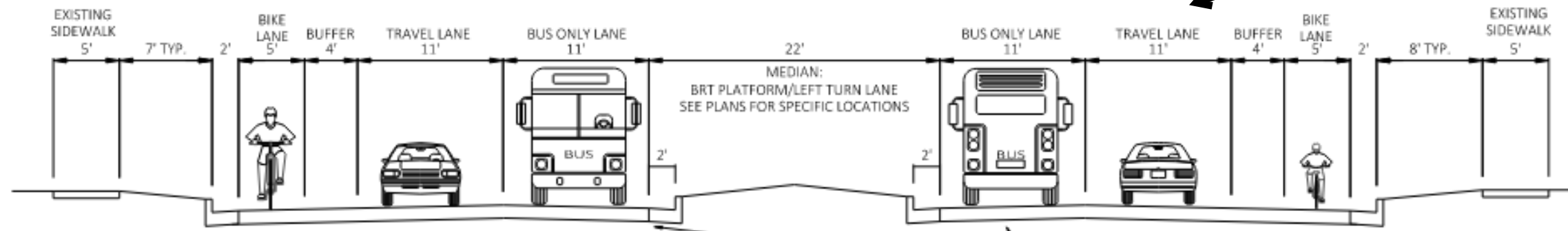
SEPARATE MINERAL POINT ROAD WIDENED SIDEWALK PROJECT TO BE CONSTRUCTED AFTER BUS RAPID TRANSIT PROJECT

SEE CENTER RUNNING STATION PLATFORM TYPICAL SECTION AND PLAN SHEETS FOR CONSTRUCTION DETAILS

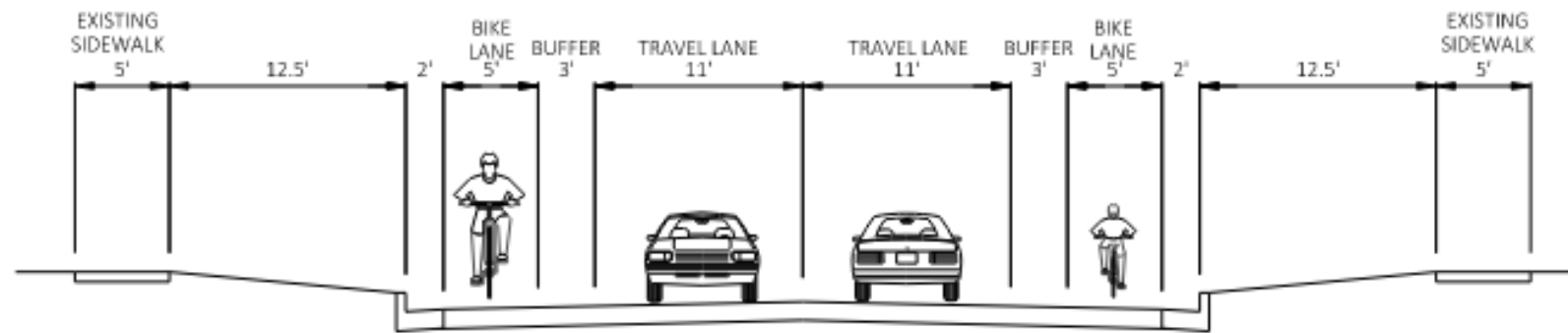


EXISTING TYPICAL SECTION
WHITNEY WAY
LOOKING NORTH

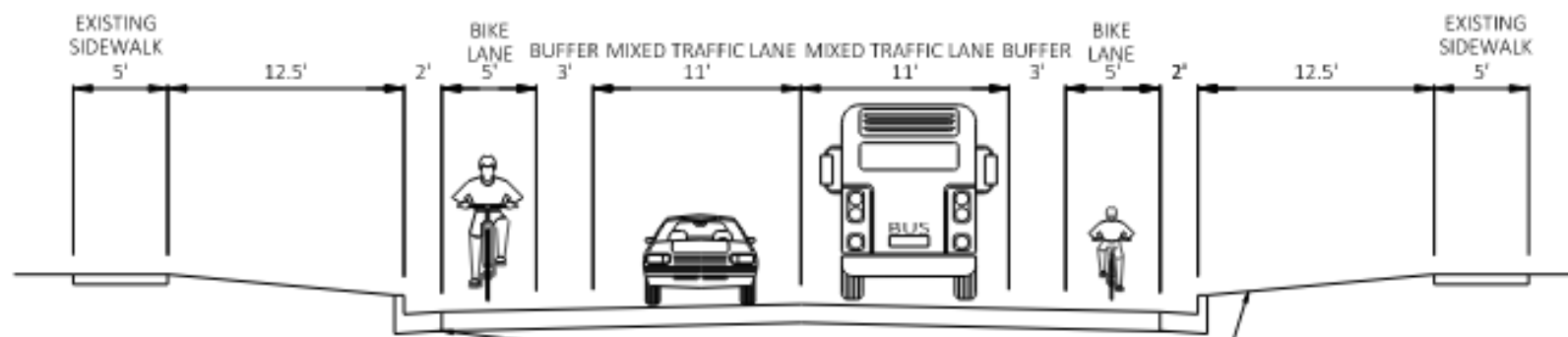
Whitney Way reduced from two general purpose lanes in each direction to one general purpose lane in each direction



FINISHED TYPICAL SECTION
WHITNEY WAY
LOOKING NORTH

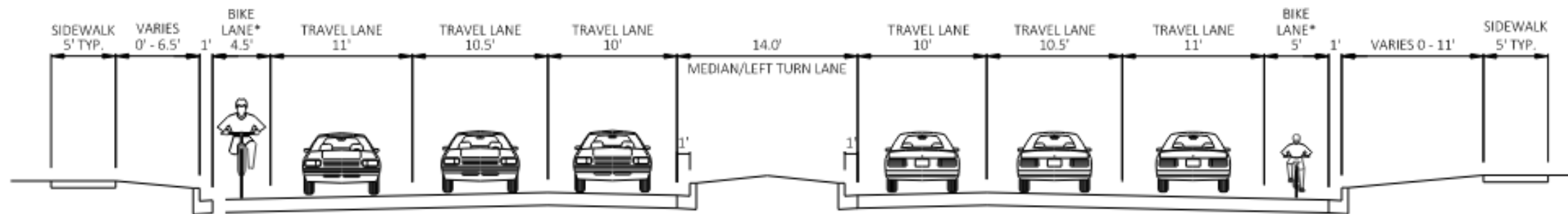


EXISTING TYPICAL SECTION
SHEBOYGAN AVENUE
LOOKING EAST

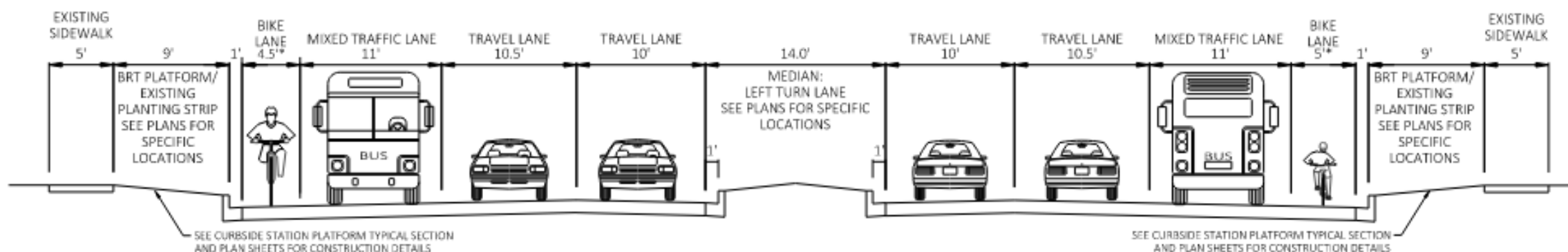


FINISHED TYPICAL SECTION
SHEBOYGAN AVENUE
LOOKING EAST

SEE SIDE RUNNING STATION PLATFORM TYPICAL SECTION AND PLAN SHEETS FOR CONSTRUCTION DETAILS



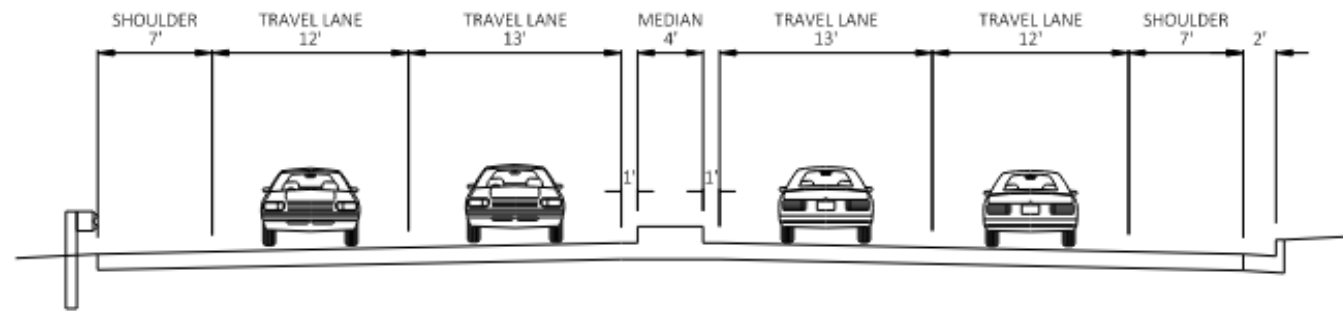
EXISTING TYPICAL SECTION
UNIVERSITY AVENUE
LOOKING EAST



FINISHED TYPICAL SECTION
UNIVERSITY AVENUE
LOOKING EAST

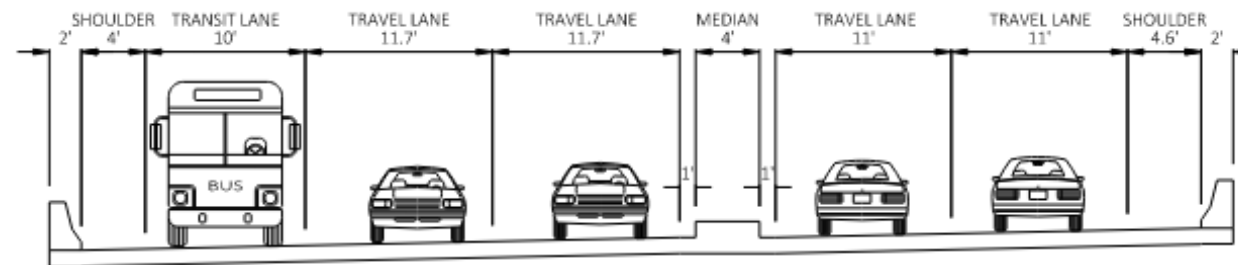
SEE CURBSIDE STATION PLATFORM TYPICAL SECTION AND PLAN SHEETS FOR CONSTRUCTION DETAILS

SEE CURBSIDE STATION PLATFORM TYPICAL SECTION AND PLAN SHEETS FOR CONSTRUCTION DETAILS



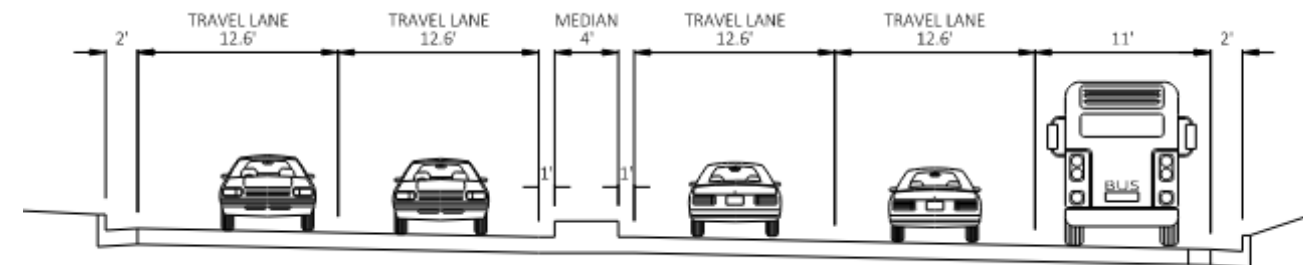
EXISTING TYPICAL SECTION

CAMPUS DRIVE
LOOKING EAST



FINISHED TYPICAL SECTION

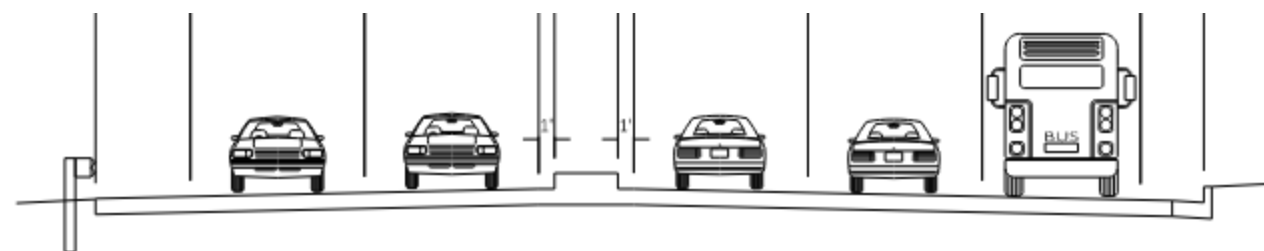
CAMPUS DRIVE MEDIAN SHIFT OVER HIGHLAND AVENUE
LOOKING EAST



FINISHED TYPICAL SECTION

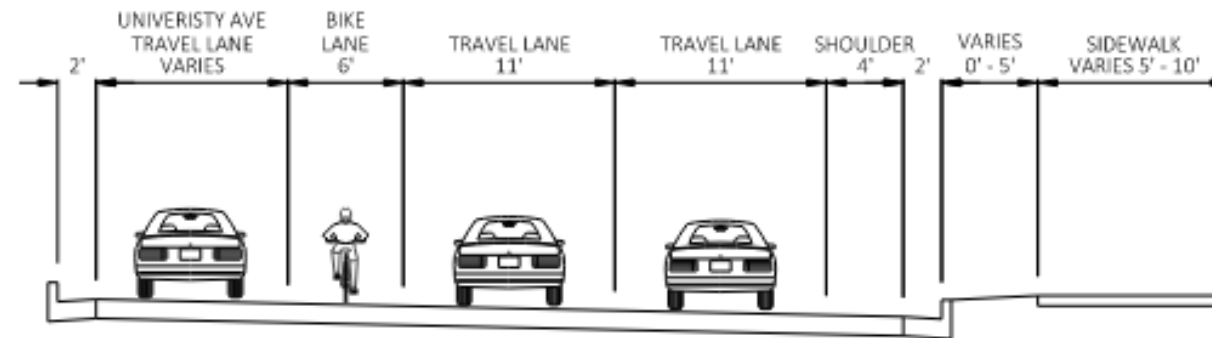
CAMPUS DRIVE PEDESTRIAN BRIDGE TO UNIVERSITY AVENUE
LOOKING EAST

1.4'
WIDENING

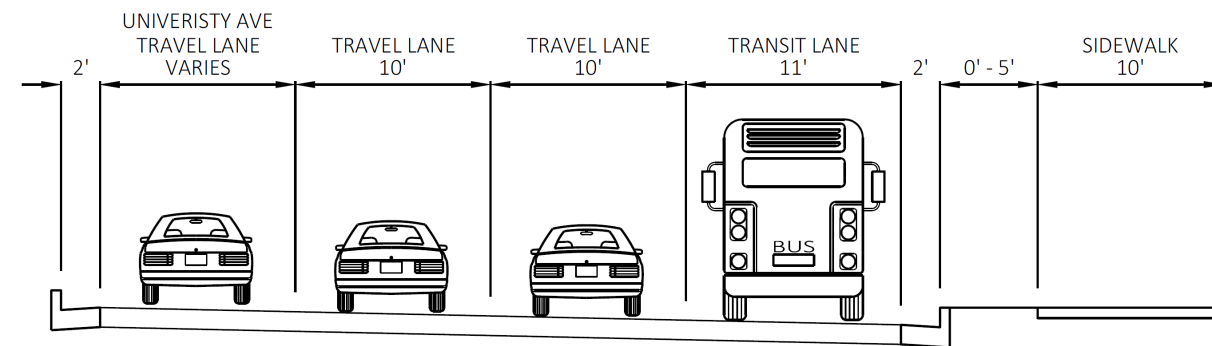


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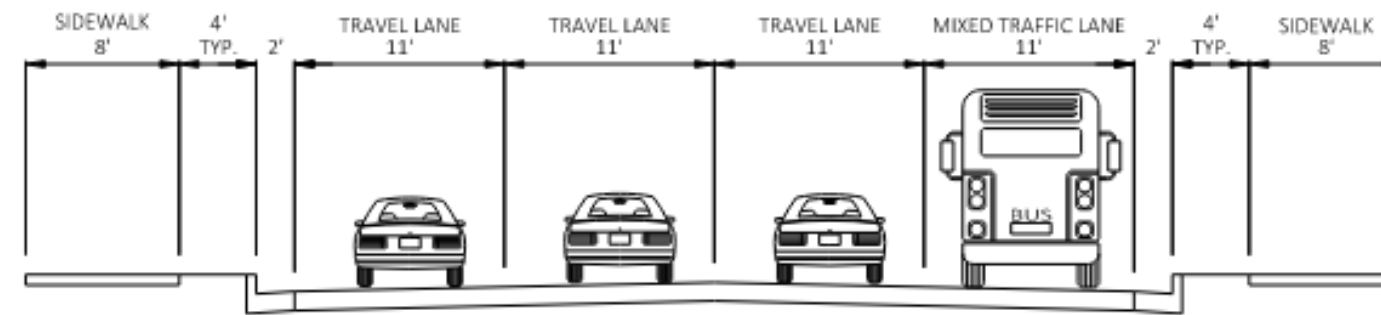
CAMPUS DRIVE EAST OF WALNUT STREET TO PEDESTRIAN BRIDGE
LOOKING EAST



EXISTING TYPICAL SECTION
 CAMPUS DRIVE NEAR BABCOCK DRIVE
 LOOKING WEST

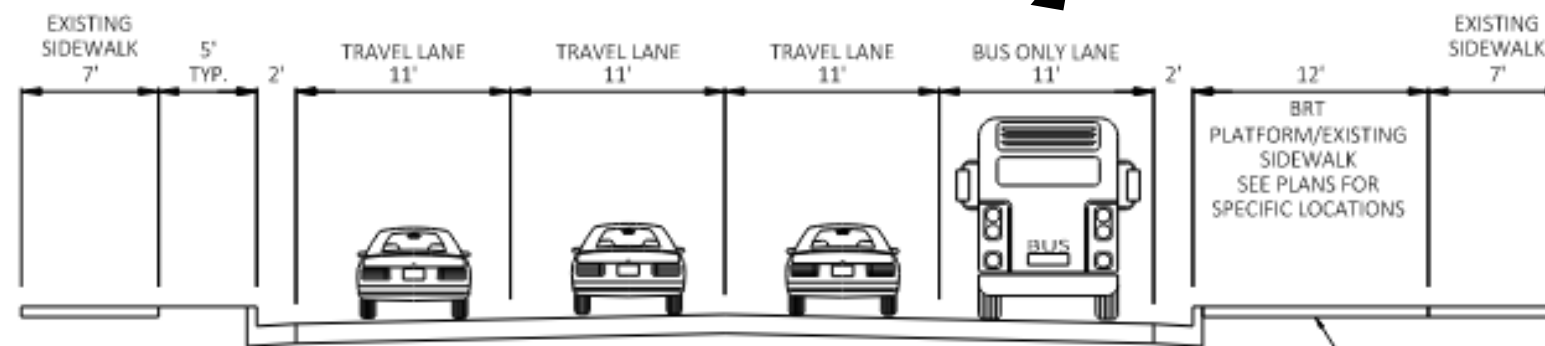


FINISHED TYPICAL SECTION
 CAMPUS DRIVE WIDENING NEAR BABCOCK DRIVE
 LOOKING WEST



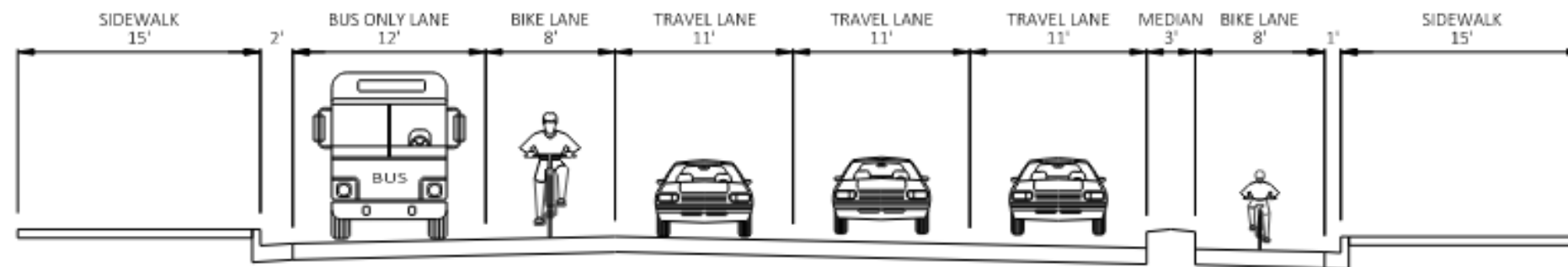
EXISTING TYPICAL SECTION
W JOHNSON STREET
LOOKING EAST

Johnson Street reduced from four general purpose lanes in each direction to three general purpose lane in each direction

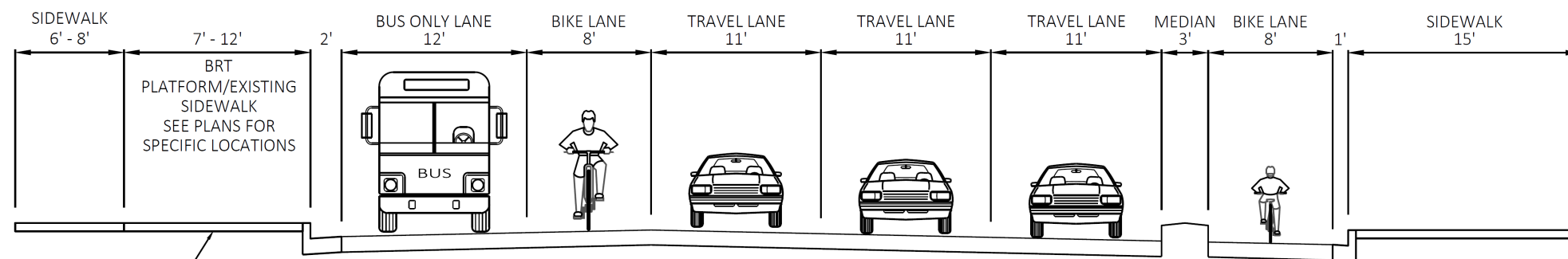


FINISHED TYPICAL SECTION
W JOHNSON STREET
LOOKING EAST

SEE CURBSIDE STATION PLATFORM TYPICAL SECTION AND PLAN SHEETS FOR CONSTRUCTION DETAILS



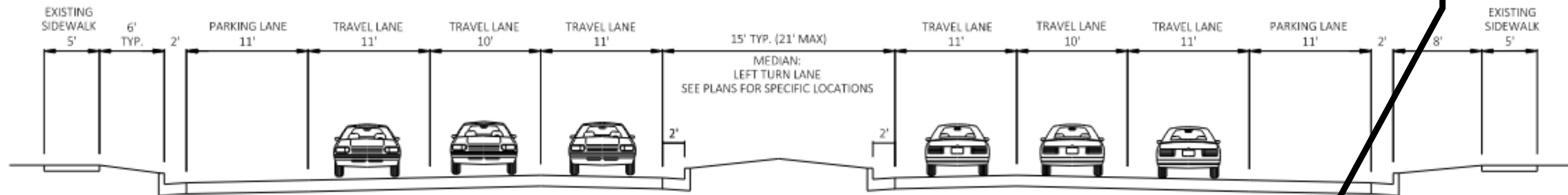
EXISTING TYPICAL SECTION
UNIVERSITY AVE



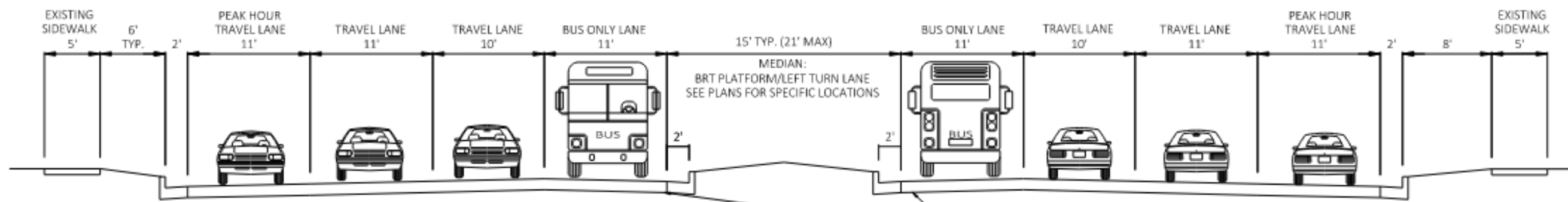
SEE CURBSIDE STATION PLATFORM TYPICAL SECTION AND PLAN SHEETS FOR CONSTRUCTION DETAILS

FINISHED TYPICAL SECTION
UNIVERSITY AVE
LOOKING EAST

East Washington Avenue reduced from three general purpose lanes in each direction to two general purpose lane in each direction except during commuting peak hours, then the outside/right-side lane will open for general purpose traffic.



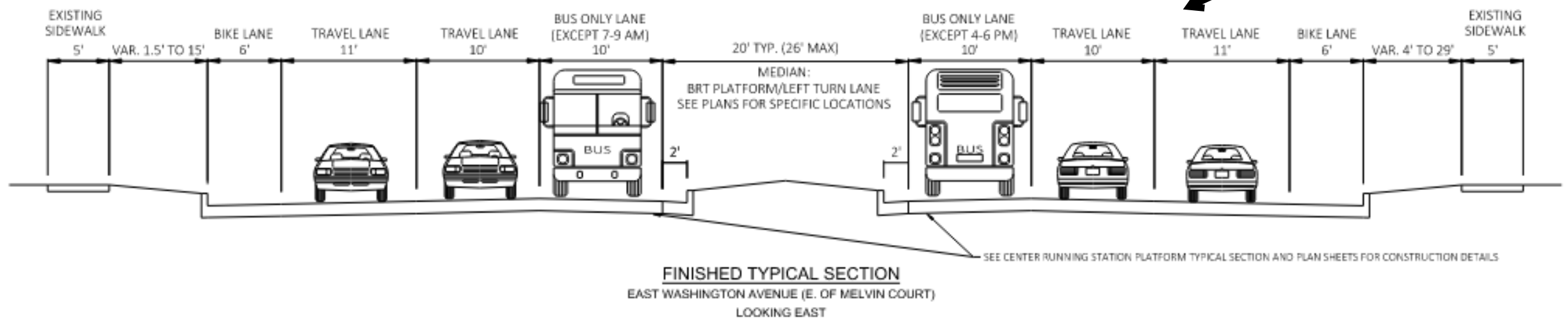
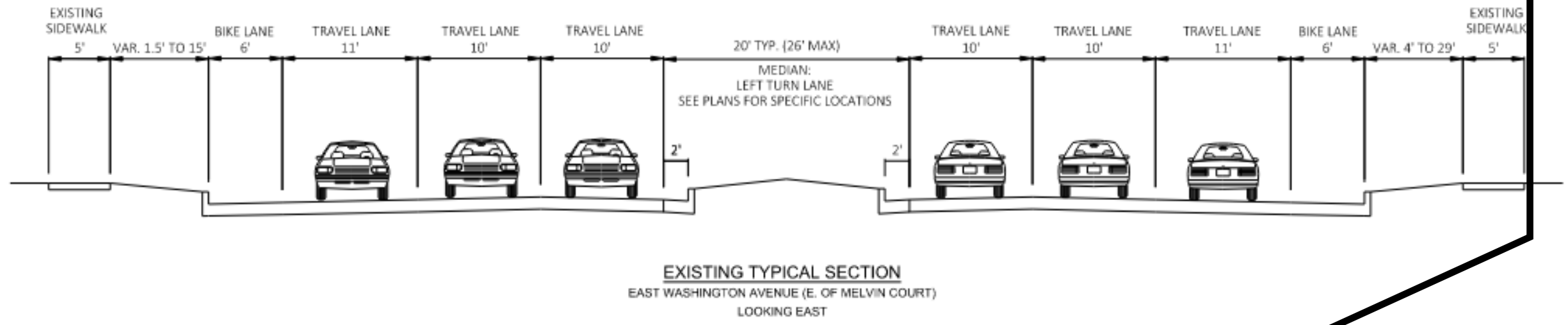
EXISTING TYPICAL SECTION
EAST WASHINGTON AVENUE (E. OF LIVINGSTON STREET)
LOOKING EAST

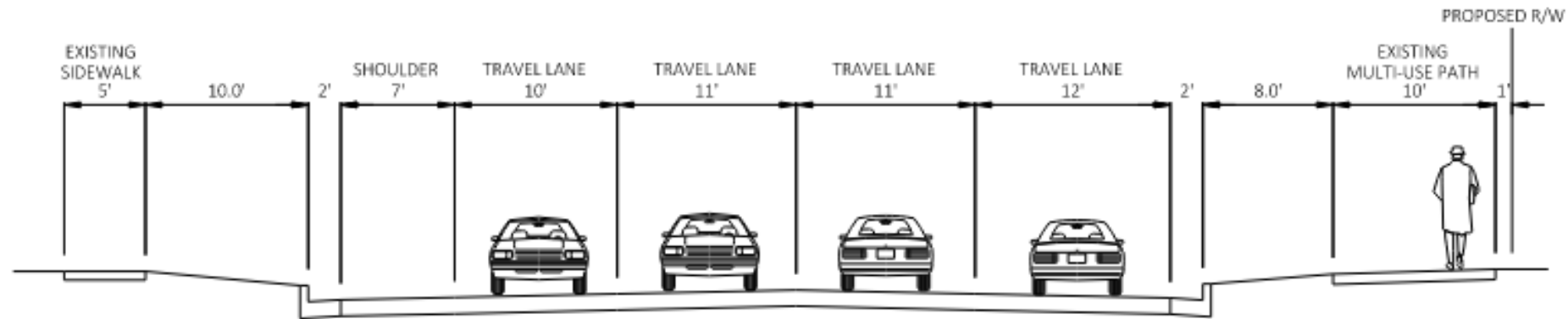


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EAST WASHINGTON AVENUE (E. OF LIVINGSTON STREET)
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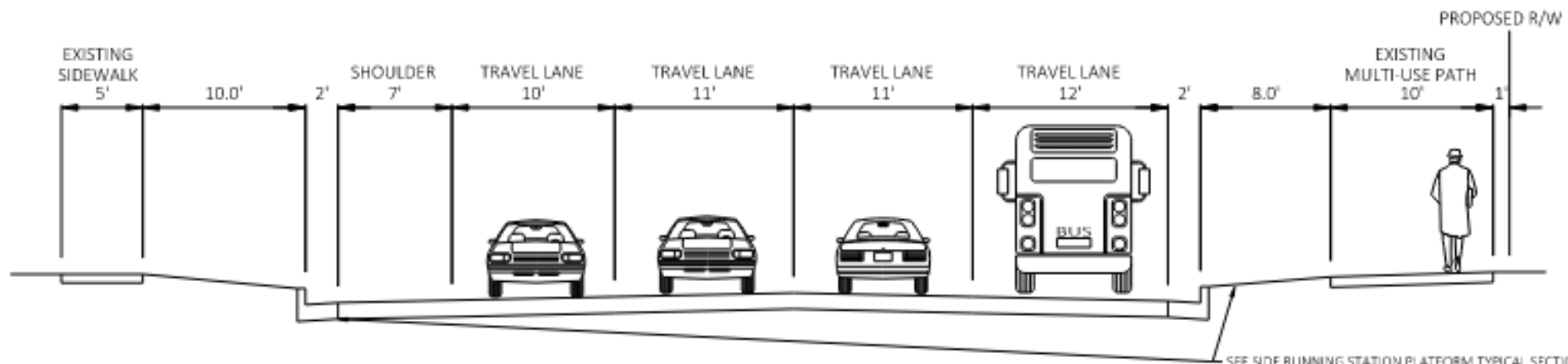
SEE CENTER RUNNING STATION PLATFORM TYPICAL SECTION AND PLAN SHEETS FOR CONSTRUCTION DETAILS

East Washington Avenue reduced from three general purpose lanes in each direction to two general purpose lanes in each direction except during commuting peak hours, then the inside/left-side lanes will open for general purpose traffic.





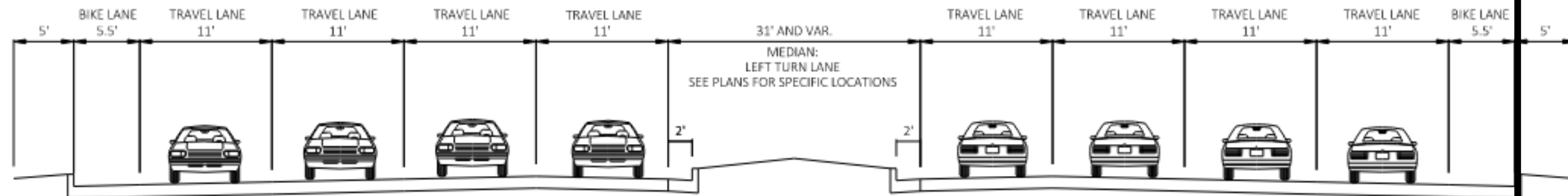
EXISTING TYPICAL SECTION
 ANDERSON STREET (E. OF WRIGHT STREET)
 LOOKING EAST



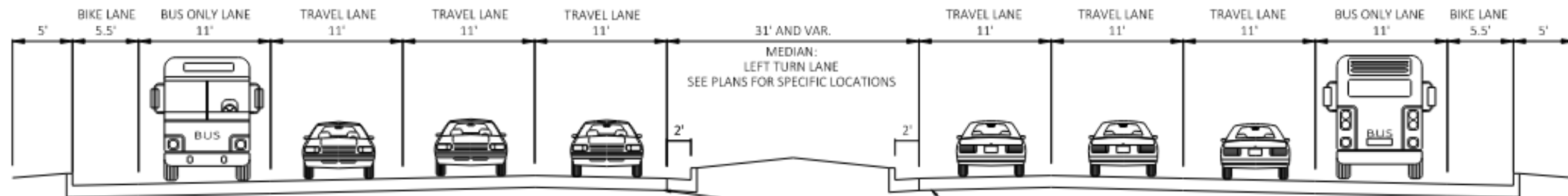
FINISHED TYPICAL SECTION
 ANDERSON STREET (E. OF WRIGHT STREET)
 LOOKING EAST

SEE SIDE RUNNING STATION PLATFORM TYPICAL SECTION AND PLAN SHEETS FOR CONSTRUCTION DETAILS

East Washington Avenue reduced from four general purpose lanes in each direction to three general purpose lanes in each direction/



EXISTING TYPICAL SECTION
EAST WASHINGTON AVENUE (W. OF EAGAN ROAD)
LOOKING EAST



FINISHED TYPICAL SECTION
EAST WASHINGTON AVENUE (W. OF EAGAN ROAD)
LOOKING EAST

Attachment C:

East Washington Avenue Traffic Impact Analysis

University Ave Traffic Impact Analysis

Controlling Intersection Traffic Impact Analysis

Professional

Engineering

Services

Traffic Analysis
for Bus Rapid
Transit on US
151/East
Washington
Avenue

Report

City of Madison,

Wisconsin

October 2021





Strand Associates, Inc.®
910 West Wingra Drive
Madison, WI 53715
(P) 608.251.4843

October 13, 2021

Mr. Tom Lynch, P.E., PTOE, PTP, AICP
Director of Transportation
City of Madison
Madison Municipal Building
214 Martin Luther King Jr. Boulevard, Suite 109
Madison, WI 53703

Re: Traffic Modeling for Bus Rapid Transit on United States (US) 151/East Washington Avenue

Dear Mr. Lynch:

Following is the final Traffic Modeling for Bus Rapid Transit on US 151/East Washington Avenue report. Each item inquired about by the Wisconsin Department of Transportation (WisDOT) is addressed.

Please call 608-251-4843 with questions.

Sincerely,

STRAND ASSOCIATES, INC.®

A handwritten signature in blue ink, appearing to read 'Jeff Held'.

Jeff Held, P.E., PTOE

Enclosure: Report

c/enc: Julia Suprock, AICP, AECOM, Inc.

Report for City of Madison, Wisconsin

Traffic Analysis for Bus Rapid Transit on US 151/East Washington Avenue



Jeffrey S. Held
2021-10-13

Prepared by:

STRAND ASSOCIATES, INC.®
910 West Wingra Drive
Madison, WI 53715
www.strand.com

October 2021



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or Following

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APPENDIX D—2034 BASE CONDITIONS HCM REPORTS

APPENDIX E—2034 BRT CONDITIONS HCM REPORTS

APPENDIX F—FIRST STREET BUS SIGNAL PHASE CALCULATIONS

APPENDIX G—SUMMARY OF WISDOT COMMENTS AND BRT PROJECT TEAM REPLIES

ES.01 BACKGROUND

The City of Madison (City) and its consultant team are in preliminary design stages for the East-West Bus Rapid Transit (BRT) project. The Locally Preferred Alternative (LPA) generally runs from southwest of the intersection of South Junction Road and Mineral Point Road, through the Madison Isthmus, to East Towne Mall with some service extending to the Sun Prairie Park and Ride located southwest of the intersection of Reiner Road and O’Keefe Avenue.

East Washington Avenue is a high priority transit corridor for the City, and staff and elected leaders wish to increase the number of people being carried in buses. It also serves bicyclists in a shared parking and bike lane. The densification of the 700 to 1000 blocks has also led to increasing numbers of pedestrians and pedestrian crossings.

The City proposes dedicating the median (center) lanes for bus traffic from the Capitol Square to Wright Street. From Livingston Street to Milwaukee Street the existing parking/bike lane will remain, except during the peak hours in the peak direction where parking will be restricted, and it will become a general purpose travel lane. There will be no bicycle facilities in the peak direction during the peak hours along this portion of the corridor. From Milwaukee Street to Wright Street during the peak hours in the peak direction, the median lane will be open to mixed traffic. Therefore, in the section of East Washington Avenue where the BRT is proposed to be center running, the existing capacity of three lanes for general purpose traffic would be maintained in the peak directions during the peak periods.

The project team completed traffic modeling using Synchro11/SimTraffic11 software by Trafficware, Inc. to understand potential impacts of the proposed peak-hour lane configurations and left-turn restrictions associated with the BRT project. Full reports for all the intersections are provided in Appendices B through E and more detailed summaries are provided in Sections 2 and 3. Wisconsin Department of Transportation (WisDOT) staff and their representatives reviewed and provided comments on this report. The comments along with BRT team replies are included in Appendix G.

ES.02 2024 CONDITIONS

In general, motor vehicle operations in 2024 with BRT in service are similar to the base conditions. There is some congestion and queuing along US (United States) 151/East Washington Avenue in either scenario. Adding the BRT service combined with optimizing signal cycle lengths, phasing, and coordination scenarios results in a higher number of Level of Service (LOS) E and LOS F movements on the US and state highway intersection *approaches*.¹

Notably, the number of US and state highway *route motor vehicle movements* that operate at LOS F are the same or higher without the BRT service than with BRT service for all three peak hours: one versus one in the AM peak hour; one versus none in the noon hour; and eight versus six in the PM peak hour.

¹Level of Service is a measure of the average motor vehicle delay and uses a scale from LOS A (very little delay) to LOS F (volume exceeds capacity).

Bicycle level of traffic stress is a rating given to a road segment or crossing indicating the traffic stress it imposes on bicyclists². Levels of traffic stress (LTS) range from 1 to 4 as follows:

- LTS 1: Strong separation from all except low speed, low volume traffic. Suitable for children.
- LTS 2: Except in low speed, low volume traffic situations, cyclists have their own place to ride that keeps them from having to interact with traffic except at formal crossings. Physical separation from higher speed and multilane traffic. Crossings that are easy for an adult to navigate. Corresponds to design criteria for Dutch bicycle route facilities. A LTS that most adults can tolerate, particularly those sometimes classified as “interested but concerned”.
- LTS 3: Involves interaction with moderate speed or multilane traffic, or close proximity to higher speed traffic. A LTS acceptable to those classified as “enthused and confident”.
- LTS 4: Involves interaction with higher speed traffic or close proximity to high speed traffic. A LTS acceptable only to those classified as “strong and fearless”.

In 2024 without BRT service, bicycle accommodations are provided for the length of the corridor 24 hours per day. The bicycle LTS along East Washington Avenue from Blair Street to Marquette Street ranges from 2.0 to 2.5. With the proposed BRT service and associated lane usage the LTS along East Washington Avenue from Blair Street to Marquette Street continues to range from 2.0 to 2.5 during the off-peak periods. The LTS is 4.0 during the peak periods in the peak directions due to allowing general purpose motor vehicle travel in the shared parking/bike lane.

ES.03 2034 CONDITIONS

In general, motor vehicle operations in 2034 with BRT in service results in more movements on US and state highway *approaches* experiencing LOS E and F operations compared to base conditions without BRT service.

Notably, the number of US and state highway *route* movements that operate at LOS F is higher without the BRT service than with BRT service for all three peak hours: three versus two in the AM peak hour; one versus zero in the Noon hour; and ten versus nine in the PM peak hour.

In 2034 without BRT service, bicycle accommodations are provided for the length of the corridor 24 hours per day. The bicycle LTS along East Washington Avenue from Blair Street to Marquette Street ranges from 2.0 to 2.5. With the proposed BRT service, and associated lane usage, the LTS along East Washington Avenue from Blair Street to Marquette Street continues to range from 2.0 to 2.5 during the off-peak periods. The LTS is 4.0 during the peak periods in the peak directions due to allowing general purpose motor vehicle travel in the shared parking/bike lane.

The 2034 sensitivity analysis for motor vehicle traffic documented in this report applies a 0.94 percent annual growth rate over ten years at WisDOT’s request. This represents more traffic volume growth from 2024 to 2034 than occurred from the early 2000s through 2019. The City agrees to monitor traffic volumes

² <http://www.northeastern.edu/pe-ter.furth/research/level-of-traffic-stress/>, accessed July 21, 2021

and operations along US 151/East Washington Avenue and coordinate with WisDOT to evaluate the need for and timing of any adjustments to BRT and general purpose time-of-day lane usage.

ES.04 SUMMARY OF ADDITIONAL WISDOT INQUIRIES

A. Provide Motor Vehicle Capacity Analysis for the Off-Peak Lane Reductions

The only intersection with marginal operations in the off-peak direction with the proposed general purpose lane reduction is First Street westbound during the PM peak hour. The westbound through movement operates at LOS D with an average of 53.7 seconds of delay per vehicle and a volume to capacity ratio (v/c) of 0.96.

These types of conditions for motor vehicle traffic are not out of character for the US 151/East Washington Avenue corridor in general, particularly in the peak inbound AM and outbound PM directions. The project team proposes that this is a reasonable tradeoff for providing a dedicated bus lane for BRT service as well as an on-street bicycle accommodation (shared with the on-street parking) for 22 hours of the day, particularly because removal of the on-street parking/bike lane increases the bicycle LTS to 4.0 because cyclists must take a full travel lane.

B. Provide Motor Vehicle Operations and Safety Analysis for the Left-Turn Restrictions

1. Operations Analysis

While the left-turns that receive additional traffic experience higher delay, none of them operate with a volume to capacity ratio that exceeds 1.0. The westbound left at Marquette Street drops just into the LOS F range during the PM peak hour with 86.9 seconds of delay per vehicle and a volume to capacity ratio of 0.86. Observation of the SimTraffic simulation does not suggest the westbound left operations or queuing are of concern for westbound US 151/East Washington Avenue traffic.

2. Safety Analysis

Based on the operations results, the project team does not foresee safety concerns associated with the left-turn restrictions and the redistributed traffic causing undue congestion. The local street system nearby is a grid, providing multiple route options for the redistributed traffic, which should help disperse it relatively quickly moving away from the US 151/East Washington Avenue corridor.

Some drivers may elect to perform a downstream U-turn maneuver in lieu of one of the restricted left-turn movements; however, U-turns are generally allowed on US 151/East Washington Avenue currently and the City has not identified any safety concerns associated with them. The City provided crash summary information indicating the percentage of East Washington Avenue crashes that were labeled as U-turn related from 2015 through 2019 was 0.46 percent. The peer corridors of University Avenue, Fish Hatchery Road, Park Street, and Stoughton Road had U-turn crash percentages ranging from 0.19 to 0.58 percent over the same timeframe. Though it is worth

noting that the number of intersections where U-turns are allowed, the number of opposing through lanes, and overall corridor lengths vary across these streets.

Based on the previous information, as well as the generally accepted premise that alternatives to left-turn movements tend to provide capacity and safety benefits (such as the quadrant intersection and Michigan U-turn designs), the project team does not foresee safety concerns associated with restricting the relatively low-volume left-turn movements at select center/median station locations.

C. Provide Operations Analysis for Blair Street, First Street, Mendota Street, Portage Road, and East Springs Drive

Full reports for these intersections are provided in Appendices B through E and a more detailed summary is provided in Section 3. Following is a summary of the 2024 modeling results only for locations that experience LOS F movements.

1. Blair Street

a. AM Peak Hour

Modest congestion and queuing occur at Blair Street in the Base Conditions (without BRT) but all movements operate at LOS D or better, except the northbound left, which is just into the LOS E range at 57.9 seconds per vehicle. The overall intersection operates at LOS C with 24.0 seconds of delay per vehicle.

When BRT service is added, the northbound left movement drops to LOS F with 102.8 seconds of delay per vehicle but operates below capacity with a v/c ratio of 0.87. The southbound left movement drops just into LOS E operations but has a low v/c ratio of 0.54. The other movements remain at LOS D or better and the overall intersection operates well at LOS B with 14.1 seconds of delay per vehicle.

b. Noon Hour (Not Applicable, no LOS F movements)

c. PM Peak Hour

Congestion and queuing occur at Blair Street in the Base Conditions (without BRT). The northbound right (US 151) operates at LOS F with 125.3 seconds of delay per vehicle and a v/c ratio of 1.15. The non-US/state route eastbound through and northbound left movements also operate at LOS F and the southbound left movement operates at LOS E. The overall intersection operates at LOS E with 70.3 seconds of delay per vehicle.

Congestion and queuing remain at Blair Street when BRT is in service. The optimized signal timings provide similar operations for the northbound right (US 151) movement operating at LOS F with 113.7 seconds of delay per vehicle and a v/c ratio of 1.13. The non-US/state route eastbound through and northbound left movements also operate at LOS F, and the southbound left movement operates at LOS E. The overall intersection

operations drop to LOS F with 141.1 seconds of delay per vehicle because of the eastbound through movement general purpose lane reduction from three to two.

Observation of SimTraffic microsimulation suggests similar northbound (US 151) queue lengths without versus with BRT service. SimTraffic reports averaging the results from nine simulation runs indicate modestly longer northbound queue lengths without BRT (average length 640 to 660 feet and 95th percentile length 1,030 to 1,070 feet) versus with BRT (average length 580 to 590 feet and 95th percentile length 920 to 950 feet). The eastbound queuing does worsen with the BRT service converting one of the three existing eastbound general purpose lanes to bus only, but City staff have reviewed this and are comfortable with these conditions considering the context adjacent to the Capitol Square and Capitol Loop in the City's downtown area.

2. First Street

a. AM Peak Hour

Congestion and queuing occur at First Street in the Base Conditions (without BRT). The eastbound left and southbound left operate at LOS E while the southbound through operates at LOS F with a v/c ratio of 0.89. The inbound/westbound through movement operates at LOS D but the v/c ratio is 1.10. The overall intersection operates at LOS D with 44.5 seconds of delay per vehicle.

When BRT service is added and the signal timings are optimized, the eastbound left, westbound left, westbound through, and southbound left operate at LOS E. The left turns have v/c ratios of 0.66 or less, while the inbound/westbound through has a v/c ratio of 1.07 (slightly better than Base Conditions). The overall intersection operates at LOS E with 60.4 seconds of delay per vehicle.

b. Noon Hour

Modest congestion and queuing occur at First Street in the Base Conditions (without BRT) with all movements operating at LOS D or better, except the eastbound left (LOS E with 65.5 seconds of delay per vehicle and a v/c ratio of 0.66) and the southbound left (LOS F with 103.6 seconds of delay per vehicle and a v/c ratio of 0.98). The overall intersection operates at LOS B with 17.0 seconds of delay per vehicle.

When BRT service is added, and the signal timings, phasing, and coordination is optimized, all movements operate at LOS D or better, except the eastbound left (LOS E with 56.3 seconds of delay per vehicle and a v/c ratio of 0.67), the westbound left (LOS E with 58.1 seconds of delay and a v/c ratio of 0.52) and the southbound left (LOS E with 69.5 seconds of delay per vehicle and a v/c ratio of 0.81). The overall intersection operates at LOS C with 33.0 seconds of delay per vehicle.

c. PM Peak Hour

Congestion and queuing occurs at First Street in the Base Conditions (without BRT), with three movements operating at LOS F: the eastbound through with a v/c of 1.30; the westbound right with a v/c of 0.09; and the southbound left with a v/c of 1.02. The overall intersection operates at LOS F with 102.4 seconds of delay per vehicle.

Congestion and queuing remain at First Street when BRT is in service. There are three movements that operate at LOS E: the eastbound left with a v/c ratio of 0.76; the westbound left with a v/c ratio of 0.59; and the southbound through with a v/c ratio of 0.74. The eastbound through operates at LOS F with a v/c of 1.27. The southbound left operates at LOS F with a v/c ratio of 1.19. The overall intersection operations are similar at LOS F with 105.9 seconds of delay per vehicle.

Observation of SimTraffic microsimulation shows similar operations without BRT compared to with BRT. In either case, despite the poor LOS and high v/c ratios predicted by HCS for the eastbound through movement, traffic in the simulation is nearly always accommodated in one signal cycle (cycle failures are rare and do not appear more frequent when BRT service is added).

3. Mendota Street

- a. AM Peak Hour (Not Applicable, no LOS F movements)
- b. Noon Hour (Not Applicable, no LOS F movements)
- c. PM Peak Hour (Not Applicable, no LOS F movements)

4. Portage Road/Thierer Road

- a. AM Peak Hour (Not Applicable, no LOS F movements)
- b. Noon Hour (Not Applicable, no LOS F movements)
- c. PM Peak Hour (Not Applicable, no LOS F movements)

5. East Springs Drive

- a. AM Peak Hour (Not Applicable, no LOS F movements)
- b. Noon Hour (Not Applicable, no LOS F movements)
- c. PM Peak Hour (Not Applicable, no LOS F movements)

D. Provide Operations Analysis for Any Bus Signal Phases

The only intersection along US 151/East Washington Avenue where a bus-only signal phase is proposed is at First Street. The phase would accommodate outbound BRT buses providing north to south service making the eastbound left-turn movement from East Washington Avenue to First Street. These buses would get their own signal phase while all other traffic faces a red signal. The north to south service is proposed to have a 15-minute headway.

The operations modeling indicates the addition of a bus-only phase that occurs only once every 15 minutes has mostly negligible impacts on operations at US 151/East Washington Avenue and First Street. Some movements experience increased delay while others experience decreased delay. For all three hours considered the overall intersection delay and v/c ratio is the same, or a little less, with the added bus phase.

SECTION 1
BACKGROUND AND METHODOLOGY

1.01 BACKGROUND

The City of Madison (City) and its project team are in preliminary design stages for the East-West Bus Rapid Transit (BRT) project. The Locally Preferred Alternative (LPA) generally runs from southwest of the intersection of South Junction Road and Mineral Point Road, through the Madison Isthmus, to East Towne Mall with some service extending to the Sun Prairie Park and Ride located southwest of the intersection of Reiner Road and O’Keefe Avenue. Service using BRT buses, but without BRT station amenities is also planned west to the City of Middleton, south to the South Transfer Point at the Park Street and Badger Road intersection, and north to the North Transfer Point at the Aberg Avenue and Huxley Street intersection. Figure 1.01-1 shows proposed BRT system.

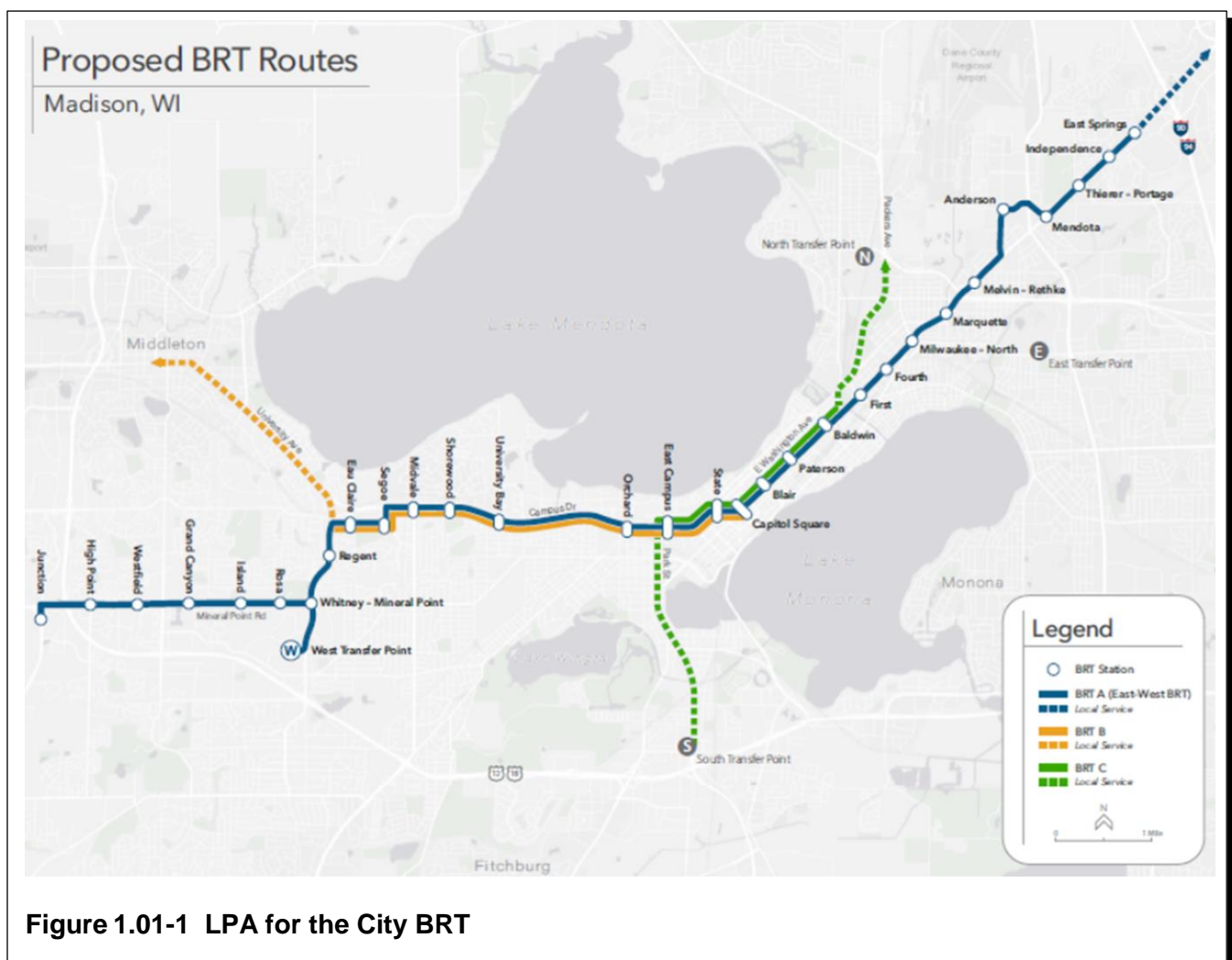


Figure 1.01-1 LPA for the City BRT

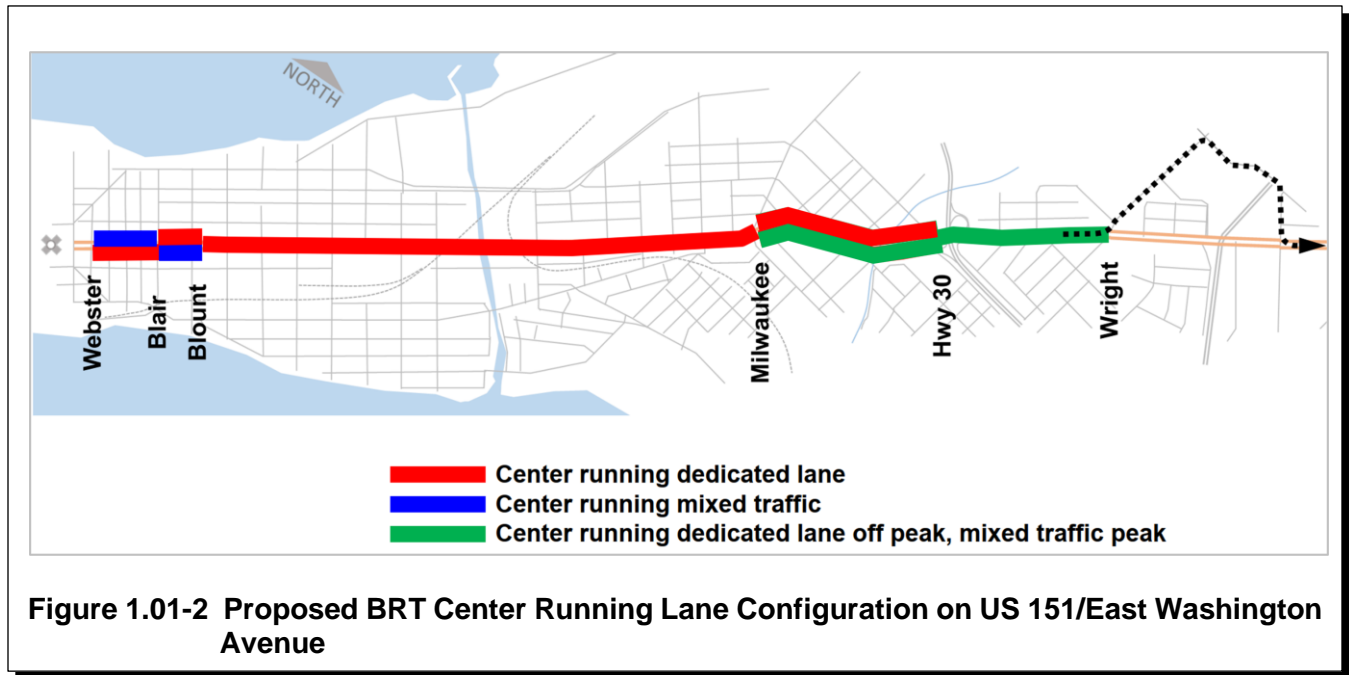
East Washington Avenue is a high priority transit corridor for the City, and staff and elected leaders wish to increase the numbers of people being carried in buses. It also serves bicyclists in a shared parking and bike lane. The densification of the 700 to 1000 blocks has also led to increasing numbers of pedestrians and pedestrian crossings.

Along East Washington Avenue the LPA includes the following BRT elements:

1. On East Washington Avenue from Webster Street to Wright Street. The BRT buses are proposed to run along the median (center) travel lanes and serve stations located in the medians.
2. On Wright Street, Anderson Street (past Madison College), and Mendota Street, BRT buses are proposed to run in mixed traffic and serve stations located in the side terrace areas.
3. On US 151/East Washington Avenue from Mendota Street to Portage Road/Thierer Road: BRT buses are proposed to run in mixed traffic and serve stations located in the side terrace areas.
4. On US 151/East Washington Avenue from Portage Road/Thierer Road to East Springs Drive: BRT buses are proposed to run in the rightmost lane which will be converted from a general purpose lane and serve stations located in the side terrace areas.

A. Proposed BRT Lane Configurations

In the section of East Washington Avenue where the BRT is proposed to be center running, the existing capacity of three lanes for general purpose traffic would be maintained in the peak directions during the peak periods. Figure 1.01-2 shows the proposed BRT lane configuration from the Capital Square/Webster Street to Wright Street, where the BRT service will depart East Washington Avenue to serve Madison College on Anderson Street.



In locations where a shared on-street parking and bike lane currently exists, the BRT buses would use the center lanes and they would be designated as bus-only lanes 24 hours per day. The on-street parking would be prohibited during the peak periods in the peak directions to allow general purpose traffic to use them for travel (shown in red in Figure 1.01-2). To accommodate this, the existing curb bumpouts in these portions of East Washington Avenue would be removed to allow motor vehicle parking lane use during peak periods. Bicycle facilities would also cease to exist in the peak directions during the peak hours.

In locations where a shared on-street parking and bike lane does not exist the BRT would either operate in with mixed traffic 24 hours per day (shown in blue in Figure 1.01-2) or in mixed traffic in the peak direction during the peak periods only (shown in green in Figure 1.01-2) while operating in a bus-only lane outside the peak periods. The result is a corridor that provides an exclusive bus lane for efficient BRT service along nearly its entire length for 22 hours per day or more, yet does not reduce the existing peak period general purpose lane capacity (three lanes in the peak direction) from the existing conditions from the Capitol Square to Thierer Road/Portage Road. East of Thierer Road/Portage Road the LPA proposes converting the rightmost general purpose lane to a bus only lane 24 hours per day, reducing general purpose capacity from four lanes in each direction to three lanes in each direction.

B. Left-Turn Restrictions

In some locations the existing median width is not sufficient to support construction of a BRT station while also maintaining the existing left turn lane. The project proposes eliminating some left-turn movements on US 151/East Washington Avenue and using the existing left-turn lane areas to accommodate the stations. Figure 1.01-3 shows the intersections where left-turn movements would be eliminated, and the existing left-turn lane(s) would be used for the station areas.

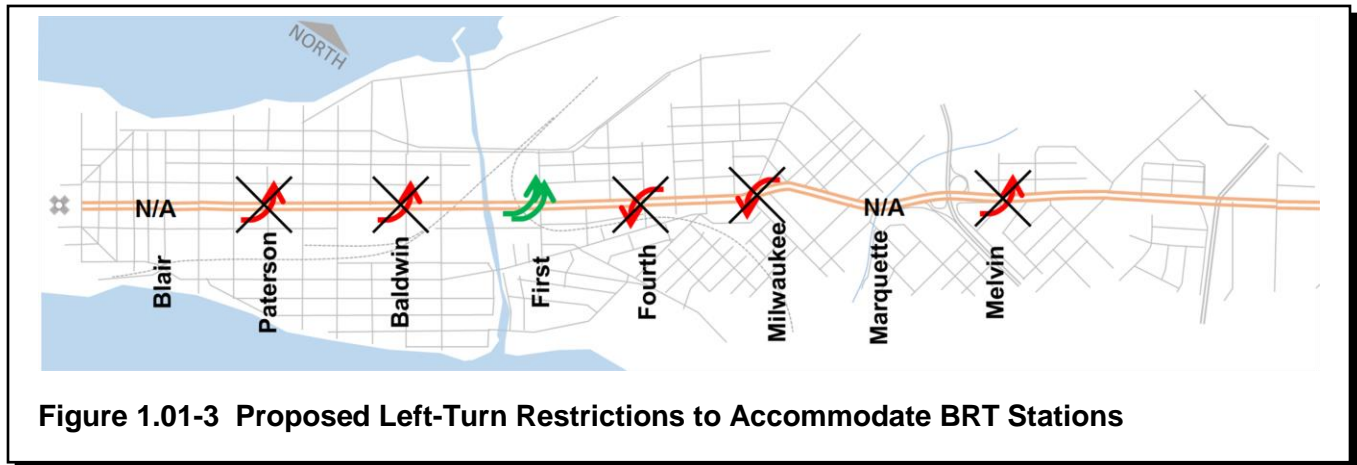


Figure 1.01-3 Proposed Left-Turn Restrictions to Accommodate BRT Stations

The volumes for the left-turn restrictions are shown in Table 1.01-1.

Left Turn	AM Peak Hour (vph)	Noon Hour (vph)	PM Peak Hour (vph)
Eastbound left turn at Paterson Street	25	32	78
Eastbound left turn at Baldwin Street	45	69	121
Westbound left turn at Fourth Street	22	28	31
Westbound left turn at Milwaukee Street	52	29	46
Eastbound left turn at Melvin Court	11	21	45

Table 1.01-1 Left-Turn Restrictions Proposed

1.02 TRAFFIC ANALYSIS METHODOLOGY

The project team completed motor vehicle traffic modeling using Synchro11/SimTraffic11 software by Trafficware, Inc. to understand potential impacts of the proposed peak-hour lane configurations and left-turn restrictions associated with the BRT project. The existing conditions models were provided by City of Madison Traffic Engineering (TE) staff and represent the traffic signal timings and traffic volumes that existed in 2019, or pre-COVID pandemic conditions. Traffic modeling results are reported using Synchro’s Highway Capacity Manual (HCM) results using the latest edition able to provide operations information at each signalized intersection.¹

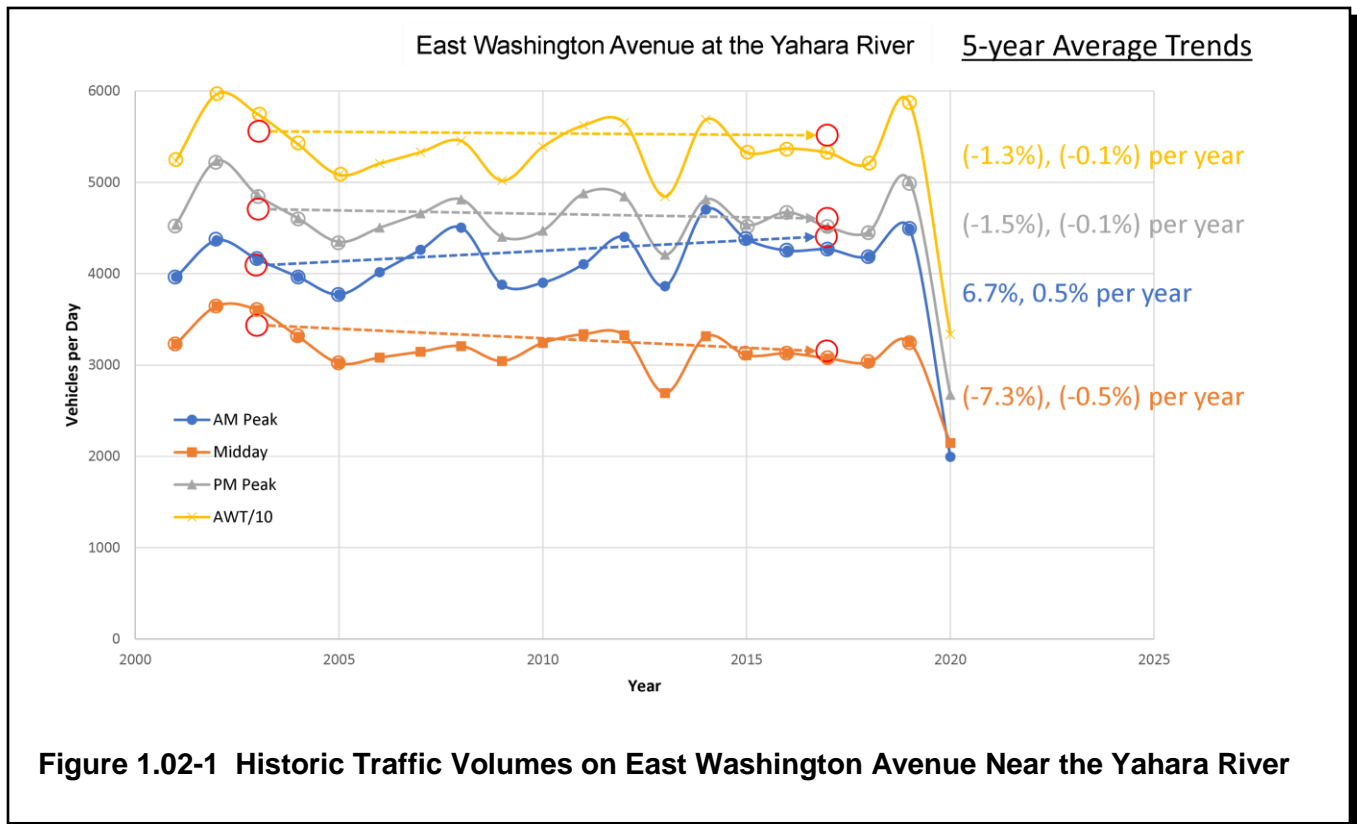
WisDOT staff and their representatives reviewed and provided comments on this report. The comments along with BRT team replies are included in Appendix G.

¹Signals using standard National Electrical Manufacturers Association (NEMA) eight-phase operation are reported using HCM 6th Edition, those that do not are reported using HCM2000.

A. Traffic Volumes

The traffic volumes used in this analysis are primarily from StreetLight data for the 2019 calendar year, Monday through Friday, excluding holidays. The project team compared the StreetLight data to the traffic volumes in the City-supplied Base Conditions traffic models (representing approximately 2016 to 2018 traffic assembled from multiple sources) as a check. For 21 of the 762 turning movements across all three peak hours (less than 3 percent), it appears the StreetLight data is erroneous (missing or unreasonable values compared to the City model values, nearby intersections, and/or familiarity with corridor conditions) and for these movements the turning movement value from the City-provided models was used. The team also flagged locations where the StreetLight data was 30 percent higher or lower than the City provided volumes and used the average of the StreetLight volumes and the City provided volume at those locations. Overall, the StreetLight data was consistent with the City-supplied data for over 90 percent of the turning movements in each of the three peak hours. Appendix A provides the traffic volume set used in this analysis.

The Base Conditions models represent 2024 without BRT (existing conditions) and with BRT service. The project team did not apply growth factors to the 2019 volume set to reach a 2024 condition because the 2019 data represents pre-COVID volumes and traffic currently remains below 2019 levels. Furthermore, historic counts along East Washington Avenue have shown essentially zero growth over approximately the past 15 years, despite significant infill redevelopment directly on the corridor. It is therefore reasonable to assume the 2019 volume set is representative of conditions in 2024. Figure 1.02-1 shows the traffic volumes and five-year average growth rates for 2001 to 2005 and 2014 to 2019 based on data from the Wisconsin Department of Transportation's (WisDOT's) Automated Traffic Recorder located on US 151/East Washington Avenue near the Yahara River bridge. Only the AM peak hour shows modest traffic growth of 0.5 percent per year. The midday and PM peak hours and Average Weekday Traffic (AWT) had lower five-year average volumes from 2015 to 2019 compared to 2001 to 2005.



At the request of WisDOT staff, in addition to the 2024 conditions, a sensitivity analysis was completed using a higher volume set. The Dane County Travel Demand Model (TDM) forecasts traffic growth on US 151/East Washington to grow at 0.94 percent per year between 2010 and 2050. This traffic analysis also includes a future conditions analysis based on applying a linear growth rate of 0.94 years for ten years, or 109.4 percent of the 2024 traffic volumes.

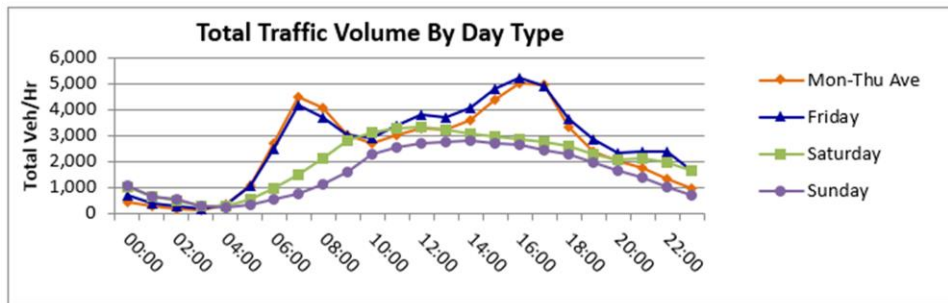
B. Peak Periods used for Analysis

The proposed peak period parking lane usage and general purpose traffic allowance in the bus lanes described above are anticipated to occur westbound/inbound from 7 to 9 A.M. and eastbound/outbound from 4 to 6 P.M. The traffic analysis summarized in this report uses the following timeframes:

1. AM peak hour: 7 to 8 A.M.
2. Noon hour: 12 to 1 P.M.
3. PM peak hour: 4 to 5 P.M.

Figure 1.02-2 shows Automatic Traffic Recorder (ATR) data on US 151/East Washington Avenue near the Yahara River bridge and confirms both the proposed timeframes for the peak direction lane usage adjustments and the three individual hours used in the traffic modeling.

June 2019



Hour	Mon-Thurs Average			Mon-Fri Average			7 Day Average		
	Pos Dir	Neg Dir	Total	Pos Dir	Neg Dir	Total	Pos Dir	Neg Dir	Total
00:00-00:59	240	225	465	274	241	515	367	299	666
01:00-01:59	141	119	260	159	129	287	221	167	388
02:00-02:59	101	81	182	117	86	203	175	116	292
03:00-03:59	69	71	140	75	74	149	103	84	187
04:00-04:59	120	202	322	121	203	324	124	179	303
05:00-05:59	341	750	1,091	346	742	1,088	295	608	903
06:00-06:59	690	2,023	2,712	677	1,989	2,666	559	1,562	2,121
07:00-07:59	1,390	3,103	4,493	1,367	3,061	4,428	1,114	2,368	3,481
08:00-08:59	1,313	2,747	4,060	1,310	2,676	3,986	1,140	2,171	3,311
09:00-09:59	1,218	1,779	2,996	1,233	1,764	2,997	1,172	1,597	2,768
10:00-10:59	1,278	1,434	2,712	1,316	1,437	2,753	1,327	1,409	2,736
11:00-11:59	1,539	1,489	3,028	1,590	1,507	3,097	1,577	1,461	3,038
12:00-12:59	1,665	1,586	3,251	1,749	1,609	3,358	1,726	1,529	3,255
13:00-13:59	1,705	1,526	3,230	1,773	1,547	3,319	1,724	1,497	3,221
14:00-14:59	2,081	1,500	3,581	2,145	1,532	3,677	1,978	1,489	3,467
15:00-15:59	2,852	1,537	4,389	2,889	1,577	4,466	2,495	1,504	3,999
16:00-16:59	3,309	1,703	5,012	3,299	1,752	5,050	2,759	1,637	4,396
17:00-17:59	3,141	1,817	4,959	3,081	1,865	4,946	2,557	1,715	4,272
18:00-18:59	1,858	1,476	3,334	1,850	1,546	3,395	1,632	1,488	3,120
19:00-19:59	1,332	1,064	2,396	1,355	1,129	2,484	1,260	1,120	2,380
20:00-20:59	1,109	915	2,024	1,126	960	2,085	1,070	951	2,021
21:00-21:59	1,001	778	1,779	1,069	827	1,897	1,023	831	1,854
22:00-22:59	731	594	1,325	875	658	1,533	863	664	1,527
23:00-23:59	539	413	952	623	467	1,090	642	473	1,115
Daily Total	29,763	28,930	58,693	30,417	29,376	59,793	27,904	26,919	54,823

Figure 1.02-2 Hourly Traffic Volumes on East Washington Avenue near the Yahara River

C. Left-Turn Restriction Volume Redistribution

The project team used the following assumptions regarding how drivers will choose to complete a substitute maneuver to the left turns that are eliminated:

- 50 percent turn left at the closest upstream signal (if possible, otherwise downstream).
- 30 percent turn left at the closest downstream signal (if possible, otherwise upstream).

- 20 percent use a different route or use an unsignalized intersection for a left-turn or U-turn (not modeled).

D. Traffic Modeling Assumptions

In early 2020 in response to COVID, TE staff installed pedestrian phase recall for all approaches at the signals along US 151/East Washington Avenue (meaning pedestrian phases for all crosswalks are called/displayed during every signal cycle). Strand Associates, Inc[®] (Strand) staff updated the pedestrian recall settings in the models based on coordination with TE staff and the current best estimate of which locations will continue to use pedestrian recall versus those that will return to pedestrian actuated operation, summarized as follows:

- Livingston Street to Baldwin Street: all pedestrian phases on recall.
- First Street: actuated pedestrian operation.
- Fourth Street: pedestrian recall in the AM peak hour only (to accommodate school students).
- Sixth Street and intersection to the east: actuated pedestrian operation.

The proposed conditions (with BRT) models use the same traffic volumes with optimized traffic signal timings and splits. This is intended to represent conditions at the time BRT service is initiated in 2024. There are two new signals proposed to provide pedestrian access to BRT stations: Melvin Court and Independence Lane. In addition, at station locations where the East Washington Avenue left-turn movements will be offset from oncoming through traffic more than they are currently or a station is located on the other side of the intersection and the visibility will be challenging, the left-turn phasing is modeled as protected-only. The project team allowed Synchro 11 to optimize lead versus lag protected-only left-turn phasing. These locations include:

- Paterson Street westbound left turn
- Baldwin Street westbound left-turn lane
- First Street westbound left-turn lane
- Fourth Street eastbound left-turn
- Milwaukee Street/North Street eastbound left-turn lane
- Marquette Street westbound left-turn lane
- Melvin Court westbound left-turn lane

SECTION 2
TRAFFIC ANALYSIS RESULTS

2.01 OPERATIONAL GOALS

The WisDOT Facilities Development Manual (FDM) Chapter 11, Section 5, Subsection 3.2.1 indicates the desirable motor vehicle Level of Service (LOS) is LOS D for US 151/East Washington Avenue because it is a National Highway System (NHS) route.

Additionally, both WisDOT and the Federal Highway Administration (FHWA) seek to provide bicycle accommodations on key routes. The Greater Madison Metropolitan Planning Organization (GMMPO) uses bicycle LTS to understand the degree to which bicycles are accommodated on and along streets¹. Bicycle LTS is a rating given to a road segment or crossing indicating the traffic stress it imposes on bicyclists. LTS ranges from 1 to 4 as follows:

- LTS 1: Strong separation from all except low speed, low volume traffic. Suitable for children.
- LTS 2: Except in low speed, low volume traffic situations, cyclists have their own place to ride that keeps them from having to interact with traffic except at formal crossings. Physical separation from higher speed and multilane traffic. Crossings that are easy for an adult to navigate. Corresponds to design criteria for Dutch bicycle route facilities. A LTS that most adults can tolerate, particularly those sometimes classified as “interested but concerned”.
- LTS 3: Involves interaction with moderate speed or multilane traffic, or close proximity to higher speed traffic. A LTS acceptable to those classified as “enthused and confident”.
- LTS 4: Involves interaction with higher speed traffic or close proximity to high speed traffic. A LTS acceptable only to those classified as “strong and fearless”.

The City seeks to provide low levels of traffic stress on City streets.

2.02 2024 CONDITIONS

A. Base Conditions (Without BRT Service)

Appendix B provides the HCM reports from Syncho11 for the 2024 Base Conditions (without BRT service). The traffic modeling indicates US 151/East Washington Avenue will operate at LOS D or better for most intersection movements in 2024 without BRT service. The movements that operate at LOS E and LOS F on US and state highway intersection approaches (US 151, WIS 113, and WIS 30) are summarized in the following. Those that represent United States (US) or state highway *route movements* are shown in **bold** text.

1. AM Peak Hour
 - a. LOS E Movements (six total)
 - (1) **Blair Street: northbound left**

¹ <http://www.northeastern.edu/pe-ter.furth/research/level-of-traffic-stress/>, accessed July 21, 2021

- (2) Baldwin Street: eastbound left,
- (3) First Street: **eastbound left**
- (4) First Street: **southbound left**
- (5) Eagan Road/Continental Lane: westbound left
- (6) Zeier Road: eastbound left
- b. LOS F movements (three total)
 - (1) First Street: southbound through
 - (2) Fourth Street: eastbound left
 - (3) Milwaukee Street/North Street: **westbound through**
- 2. Noon Hour
 - a. LOS E Movements (three total)
 - (1) First Street: **eastbound left**
 - (2) Thierer Road/Portage Road: eastbound left
 - (3) East Springs Drive: westbound left
 - b. LOS F Movements (three total)
 - (1) First Street: **southbound left**
 - (2) Zeier Road: eastbound left
 - (3) Zeier Road: westbound left
- 3. PM Peak Hour
 - a. LOS E movements (three total)
 - (1) Johnson Street: westbound left
 - (2) Zeier Road: eastbound left
 - (3) Zeier Road: westbound left

- b. LOS F Movements (ten total)
 - (1) Blair Street: northbound left
 - (2) Blair Street: **northbound right**
 - (3) Livingston Street: westbound left
 - (4) Ingersoll Street: **eastbound through**
 - (5) Baldwin Street: **eastbound through**,
 - (6) First Street: **eastbound through**
 - (7) First Street: **westbound right**
 - (8) First Street: **southbound left**
 - (9) Fourth Street: **eastbound through**
 - (10) Milwaukee Street/North Street: **eastbound through**

In 2024 without BRT service, bicycle accommodations are provided for the length of the corridor 24 hours per day. The bicycle LTS along East Washington Avenue from Blair Street to Marquette Street ranges from 2.0 to 2.5.

B. BRT Conditions

Appendix C provides the HCM reports from Syncho11 for the 2024 BRT Conditions. The traffic modeling indicates US 151/East Washington Avenue will operate at LOS D or better for most intersection movements in 2024 with BRT service. The movements that operate at LOS E and LOS F on US and state highway intersection approaches (US 151, WIS 113, and WIS 30) are summarized in the following. Those that represent US or state highway *route movements* are shown in **bold** text.

- 1. AM Peak Hour
 - a. LOS E Movements (13 total)
 - (1) Paterson Street: westbound left
 - (2) Baldwin Street: westbound left
 - (3) First Street: **eastbound left**
 - (4) First Street: westbound left

- (5) First Street: westbound through
- (6) First Street: **southbound left**
- (7) Milwaukee Street/North Street: eastbound left
- (8) Rethke Avenue/Melvin Court: eastbound left
- (9) Rethke Avenue/Melvin Court: westbound left
- (10) Fair Oaks Avenue/Wright Street: eastbound left
- (11) Eagan Road/Continental Avenue: westbound left
- (12) Independence Lane: eastbound left
- (13) Zeier Road: eastbound left

b. LOS F movements (five total)

- (1) Blair Street: northbound left
- (2) First Street: southbound through
- (3) Fourth Street: eastbound left
- (4) Fourth Street: **westbound through**
- (5) Westbound WIS 30 Ramps: eastbound left

2. Noon Hour

a. LOS E Movements (13 total)

- (1) Blair Street: northbound left
- (2) Paterson Street: westbound left
- (3) First Street: **eastbound left**
- (4) First Street: westbound left
- (5) First Street: **southbound left**
- (6) Fourth Street: eastbound left

- (7) Milwaukee Street/North Street: eastbound left
- (8) Eastbound WIS 30 Ramps: **westbound left**
- (9) Rethke Avenue/Melvin Court: eastbound left
- (10) Rethke Avenue/Melvin Court: westbound left
- (11) Fair Oaks Avenue/Wright Street: eastbound left
- (12) Fair Oaks Avenue/Wright Street: westbound left
- (13) Eagan Road/Continental Avenue: eastbound left
- b. LOS F movements (one total)
 - (1) Baldwin Street: westbound left
- 3. PM Peak Hour
 - a. LOS E Movements (nine total)
 - (1) First Street: **eastbound left**
 - (2) First Street: westbound left
 - (3) First Street: southbound through
 - (4) Milwaukee Street/North Street: eastbound left
 - (5) Eastbound WIS 30 Ramps: **westbound left**
 - (6) Rethke Avenue/Melvin Court: eastbound left
 - (7) Rethke Avenue/Melvin Court: westbound left
 - (8) Fair Oaks Avenue/Wright Street: eastbound left
 - (9) Zeier Road: westbound left
 - b. LOS F Movements (11 total)
 - (1) Blair Street: northbound left
 - (2) Blair Street: **northbound right**

- (3) Livingston Street: westbound left
- (4) Paterson Street: **eastbound through**
- (5) Paterson Street: westbound left
- (6) Ingersoll Street: **eastbound through**
- (7) Baldwin Street: **eastbound through**
- (8) Baldwin Street: westbound left
- (9) First Street: **eastbound through**
- (10) First Street: **southbound left**
- (11) Marquette Street: westbound left

In 2024 with the proposed BRT service and associated lane usage, the LTS along East Washington Avenue from Blair Street to Marquette Street ranges from 2.0 to 2.5 during the off-peak periods. The LTS is 4.0 during the peak periods in the peak directions due to allowing general purpose motor vehicle travel in the shared parking/bike lane.

C. Comparison of 2024 Conditions

Table 2.02-1 compares the number of US and state highway approach movements that operate at LOS E or LOS F without and with BRT service in 2024.

Time Period	Operations	Base Conditions (approach movements)	With BRT (approach movements)
AM Peak Hour	LOS E	6	13
	LOS F	3	5
Noon Hour	LOS E	3	13
	LOS F	3	1
PM Peak Hour	LOS E	3	8
	LOS F	10	11

Table 2.02-1 2024 US and State Highway Intersection Approach Operations Comparison

In general, operations in 2024 with BRT in service are similar to the Base Conditions. There is some congestion and queuing along US 151/East Washington Avenue in either scenario. Adding the BRT service combined with optimizing signal cycle lengths, phasing, and coordination scenarios results in a

higher number of LOS E movements but a similar number of LOS F results on the US and state highway intersection *approaches*.

Notably, the number of US and state highway *route movements* that operate at LOS F is the same or higher without the BRT service than with BRT service and optimized signal settings for all three peak hours: one versus one in the AM peak hour; one versus none in the noon hour; and eight versus six in the PM peak hour.

In 2024 without BRT service, bicycle accommodations are provided for the length of the corridor 24 hours per day. The bicycle LTS along East Washington Avenue from Blair Street to Marquette Street ranges from 2.0 to 2.5. With the proposed BRT service and associated lane usage the LTS along East Washington Avenue from Blair Street to Marquette Street continues to range from 2.0 to 2.5 during the off-peak periods. The LTS is 4.0 during the peak periods in the peak directions due to allowing general purpose motor vehicle travel in the shared parking/bike lane.

2.03 2034 CONDITIONS

A. Base Conditions (Without BRT Service)

Appendix D provides the HCM reports from Syncho11 for the 2034 Base Conditions (without BRT service). The traffic modeling indicates US 151/East Washington Avenue will operate at LOS D or better for most intersection movements in 2034 without BRT service. The movements that operate at LOS E and LOS F on US and state highway intersection approaches (US 151, WIS 113, and WIS 30) are summarized in the following. Those that represent US or state highway *route movements* are shown in **bold** text.

1. AM Peak Hour

a. LOS E Movements (six total)

- (1) Blair Street: northbound left
- (2) First Street: **westbound through**
- (3) First Street: **southbound left**
- (4) Westbound WIS 30 Ramps: **southbound right**
- (5) Eagan Road/Continental Lane: westbound left
- (6) Zeier Road: eastbound left

b. LOS F Movements (seven total)

- (1) Baldwin Street: eastbound left

- (2) Baldwin Street: **westbound through**
 - (3) First Street: eastbound left
 - (4) First Street: southbound through
 - (5) Fourth Street: eastbound left
 - (6) Fourth Street: **westbound through**
 - (7) Milwaukee Street: **westbound through**
2. Noon hour
- a. LOS E movements (two total)
 - (1) Blair Street: northbound left
 - (2) Thierer Road/Portage Road: eastbound left
 - b. LOS F movements (three total)
 - (1) First Street: **southbound left**
 - (2) Zeier Road: eastbound left
 - (3) Zeier Road: westbound left
3. PM Peak Hour
- a. LOS E movements (seven total)
 - (1) Blair Street: **westbound left**
 - (2) Livingston Street: westbound left
 - (3) Johnson Street: westbound left
 - (4) Marquette Street: **eastbound through**
 - (5) Eagan Road/Continental Lane: **eastbound through**
 - (6) Zeier Road: eastbound left
 - (7) Zeier Road: westbound left

- b. LOS F Movements (13 total)
 - (1) Blair Street: northbound left
 - (2) Blair Street: **northbound right**
 - (3) Paterson Street: **eastbound through**
 - (3) Paterson Street: westbound left
 - (5) Ingersoll Street: **eastbound through**
 - (6) Baldwin Street: **eastbound through**
 - (7) First Street: **eastbound through**
 - (8) First Street: **westbound right**
 - (9) First Street: **southbound left**
 - (10) Fourth Street: **eastbound through**
 - (11) Sixth Street: **eastbound through**
 - (12) Milwaukee Street/North Street: **eastbound through**
 - (13) Milwaukee Street/North Street: southbound through

In 2034 without BRT service, bicycle accommodations are provided for the length of the corridor 24 hours per day. The bicycle LTS along East Washington Avenue from Blair Street to Marquette Street ranges from 2.0 to 2.5.

B. BRT Conditions

Appendix E provides the HCM reports from Syncho11 for the 2034 BRT Conditions. The traffic modeling indicates US 151/East Washington Avenue will operate at LOS D or better for most intersection movements in 2034 with BRT service. The movements that operate at LOS E and LOS F on US and state highway intersection approaches (US 151, WIS 113, and WIS 30) are summarized in the following. Those that represent US or state highway route *movements* are shown in **bold** text.

- 1. AM Peak Hour
 - a. LOS E Movements (14 total)
 - (1) Blair Street: northbound left

- (2) Paterson Street: westbound left
 - (3) Baldwin Street: westbound left
 - (4) Baldwin Street: **westbound through**
 - (5) First Street: **eastbound left**
 - (6) First Street: westbound left
 - (7) First Street: **southbound left**
 - (8) Milwaukee Street/North Street: eastbound left
 - (9) WIS 30 Eastbound Ramps: **westbound left**
 - (10) Rethke Avenue/Melvin Court: eastbound left
 - (11) Rethke Avenue/Melvin Court: westbound left
 - (12) Fair Oaks Avenue/Wright Street: eastbound left
 - (13) Independence Lane: eastbound left
 - (14) Zeier Road: eastbound left
- b. LOS F Movements (four total)
- (1) First Street: **westbound through**
 - (2) First Street: southbound through
 - (3) Fourth Street: eastbound left
 - (4) Fourth Street: **westbound through**
2. Noon hour
- a. LOS E movements (eight total)
- (1) Blair Street: northbound left
 - (2) First Street: **eastbound left**
 - (3) First Street: westbound left
 - (4) First Street: **southbound left**

- (5) Fourth Street: eastbound left
- (6) Milwaukee Street/North Street: eastbound left
- (7) Johnson Street: westbound left
- (8) Eagan Road/Continental Lane: eastbound left
- b. LOS F Movements (two total)
 - (1) Paterson Street: westbound left
 - (2) Baldwin Street: westbound left
- 3. PM Peak Hour
 - a. LOS E Movements (13 total)
 - (1) First Street: **eastbound left**
 - (2) First Street: **westbound through**
 - (3) Fourth Street: eastbound left
 - (4) Milwaukee Street/North Street: eastbound left
 - (5) Milwaukee Street/North Street: **eastbound through**
 - (6) Eastbound WIS 30 Ramps: westbound left
 - (7) Rethke Avenue/Melvin Court: eastbound left
 - (8) Rethke Avenue/Melvin Court: westbound left
 - (9) Fair Oaks Avenue/Wright Street: eastbound left
 - (10) Fair Oaks Avenue/Wright Street: westbound left
 - (11) Independence Lane: eastbound left
 - (12) Zeier Road: westbound left
 - (13) East Springs Drive: westbound left
 - b. LOS F Movements (17 total)
 - (1) Blair Street: northbound left

- (2) Blair Street: **northbound right**
- (3) Livingston Street: westbound left
- (4) Paterson Street: **eastbound through**
- (5) Paterson Street: westbound left
- (6) Ingersoll Street: **eastbound through**
- (7) Baldwin Street: **eastbound through**
- (8) Baldwin Street: westbound left
- (9) First Street: **eastbound through**
- (10) First Street: westbound left
- (11) First Street: **southbound left**
- (12) First Street: southbound through
- (13) Fourth Street: **eastbound through**
- (14) Sixth Street: **eastbound through**
- (15) Marquette Street: westbound left
- (16) Independence Lane: **eastbound through**
- (17) Independence Lane: eastbound right

In 2034 with the proposed BRT service and associated lane usage, the LTS along East Washington Avenue from Blair Street to Marquette Street ranges from 2.0 to 2.5 during the off-peak periods. The LTS is 4.0 during the peak periods in the peak directions due to allowing general purpose motor vehicle travel in the shared parking/bike lane.

C. Comparison of 2034 Conditions

Table 2.03-1 compares the number of US and state highway approach movements that operate at LOS E or LOS F without and with BRT service in 2034.

Time Period	Operations	Base Conditions (approach movements)	With BRT (approach movements)
AM Peak Hour	LOS E	6	14
	LOS F	7	4
Noon Hour	LOS E	2	8
	LOS F	3	2
PM Peak Hour	LOS E	7	13
	LOS F	12	17

Table 2.03-1 2034 US and State Highway Intersection Approach Operations Comparison

In general, operations in 2034 with BRT in service results in more movements on US and state highway *approaches* experiencing LOS E and LOS F operations compared to Base Conditions without BRT service.

Notably, the number of US and state highway *route movements* that operate at LOS F is higher without the BRT service versus with BRT service for all three peak hours: three versus two in the AM peak hour; one versus none in the noon hour; and ten versus nine in the PM peak hour.

The 2034 sensitivity analysis for motor vehicle traffic documented in this report applies a 0.94 percent annual growth rate over ten years at WisDOT’s request. This represents more traffic volume growth from 2024 to 2034 than occurred from the early 2000s through 2019. The City agrees to monitor traffic volumes and operations along US 151/East Washington Avenue and coordinate with WisDOT to evaluate the need for and timing of any adjustments to BRT and general purpose time-of-day lane usage.

In 2034 without BRT service, bicycle accommodations are provided for the length of the corridor 24 hours per day. The bicycle LTS along East Washington Avenue from Blair Street to Marquette Street ranges from 2.0 to 2.5. With the proposed BRT service and associated lane usage the LTS along East Washington Avenue from Blair Street to Marquette Street continues to range from 2.0 to 2.5 during the off-peak periods. The LTS is 4.0 during the peak periods in the peak directions due to allowing general purpose motor vehicle travel in the shared parking/bike lane.

SECTION 3
SUMMARY OF ADDITIONAL WISDOT INQUIRIES

3.01 SUMMARY OF ADDITIONAL WISDOT INQUIRIES

For the majority of all movements in the models, the traffic modeling suggests that implementing BRT service by prohibiting the left-turn movements and providing the proposed bus-only lane configurations while also optimizing the signal timings and splits essentially maintains (or potentially improves) operations at the East Washington Avenue traffic signals, particularly with the 2024 volumes set.

WisDOT Southwest Region staff requested the following information related to the traffic modeling for the proposed BRT service.

A. Provide Motor Vehicle Capacity Analysis for the Off-Peak Lane Reductions

Table 3.01-1 summarizes the US 151 movements in the off-peak direction where general purpose lane reductions are proposed to accommodate BRT service using the 2024 volume set. With the proposed BRT lane configurations, the shared parking and bicycle lane remains in use in the off-peak directions. The table rows represent the following movements:

1. Eastbound (off-peak direction in the AM peak and noon hours):
 - a. Northbound right-turn
 - (1) Blair Street
 - b. Eastbound through
 - (1) Livingston Street
 - (2) Paterson Street
 - (3) Ingersoll Street
 - (4) Baldwin Street
 - (5) First Street
 - (6) Fourth Street
 - (7) Sixth Street
 - (8) Milwaukee Street/North Street
 - (9) Johnson Street
 - (10) Marquette Street
 - (11) WIS 30 Eastbound Ramps
 - (12) WIS 30 Westbound Ramps
 - (13) Melvin Court
 - (14) Fair Oaks Avenue/Wright Street
 - (15) Eagan Road/Continental Lane
 - (16) Independence Lane
 - (17) Zeier Road

2. Westbound (off-peak direction in the noon and PM peak hours):

a. Westbound through

- (1) Zeier Road
- (2) Independence Lane
- (3) Eagan Road/Continental Lane
- (4) Fair Oaks Avenue/Wright Street
- (5) Melvin Court
- (6) WIS 30 Westbound Ramps
- (7) WIS 30 Eastbound Ramps
- (8) Marquette Street
- (9) Johnson Street
- (10) Milwaukee Street/North Street
- (11) Sixth Street
- (12) Fourth Street
- (13) First Street
- (14) Baldwin Street
- (15) Ingersoll Street
- (16) Paterson Street
- (17) Livingston Street

b. Westbound left-turn

- (1) Blair Street

Time Period	Operations	Base Conditions	With BRT
AM Peak Hour (Eastbound)	LOS E	0	0
	LOS F	0	0
	v/c > 0.95	0	0
Noon Hour (Eastbound)	LOS E	0	0
	LOS F	0	0
	v/c > 0.95	0	0
Noon Hour (Westbound)	LOS E	0	0
	LOS F	0	0
	v/c > 0.95	0	0
PM Peak Hour (Westbound)	LOS E	0	0
	LOS F	0	0
	v/c > 0.95	0	1*

*Westbound through at First Street (0.96)
 v/c=volume to capacity

Table 3.01-1 2024 Off-Peak Direction Operations Comparison

The only intersection with marginal operations in the off-peak direction with the proposed general purpose lane reduction is First Street westbound during the PM peak hour. The westbound through movement operates at LOS D with an average of 53.7 seconds of delay per vehicle and a v/c ratio of 0.96.

These types of conditions for motor vehicle traffic are not out of character for the US 151/East Washington Avenue corridor in general, particularly in the peak inbound AM and outbound PM directions. The project team proposes that this is a reasonable tradeoff for providing a dedicated bus lane for BRT service as well as an on-street bicycle accommodation (shared with the on-street parking) for 22 hours of the day.

B. Provide Motor Vehicle Operations and Safety Analysis for the Left-Turn Restrictions

1. Operations Analysis

Table 3.01-2 summarizes the operations at signalized intersections that may receive additional left-turn traffic because of the proposed left-turn restrictions that allow space for center stations on US 151/East Washington Avenue based on the following redistribution assumptions:

- a. 50 percent turn left at the closest upstream signal (if possible, otherwise downstream).
- b. 30 percent turn left at the closest downstream signal (if possible, otherwise upstream).
- c. 20 percent use a different route or use an unsignalized intersection for a left turn or U-turn (not modeled).

Intersections receiving additional left-turn traffic include:

- a. Ingersoll Street eastbound left
- b. First Street eastbound left and westbound left
- c. Sixth Street westbound left
- d. Marquette Street westbound left
- e. Wright Street eastbound left

Time Period	Operations	Base Conditions	With BRT
AM Peak Hour	Ingersoll Street Eastbound Left	LOS A	LOS B
	First Street Eastbound Left	LOS E	LOS E
	First Street Westbound Left	LOS A	LOS E
	Marquette Street Westbound Left	LOS A	LOS D
	Wright Street Eastbound Left	LOS D	LOS E
Noon Hour	Ingersoll Street Eastbound Left	LOS A	LOS A
	First Street Eastbound Left	LOS E	LOS E
	First Street Westbound Left	LOS A	LOS E
	Marquette Street Westbound Left	LOS A	LOS A
	Wright Street Eastbound Left	LOS D	LOS E
PM Peak Hour	Ingersoll Street Eastbound Left	LOS A	LOS A
	First Street Eastbound Left	LOS D	LOS E
	First Street Westbound Left	LOS D	LOS E
	Marquette Street Westbound Left	LOS D	LOS F
	Wright Street Eastbound Left	LOS D	LOS E

Table 3.01-2 2024 Intersections Receiving Additional Left-Traffic Turn Traffic Operations Comparison

While the left turns that receive additional traffic experience higher delay, none of them operate with a volume to capacity ratio that exceeds 1.0. The westbound left at Marquette Street drops just into the LOS F range during the PM peak hour with 86.9 seconds of delay per vehicle and a volume to capacity ratio of 0.86. Observation of the SimTraffic simulation does not suggest the westbound left operations or queuing are of concern for westbound US 151/East Washington Avenue traffic.

2. Safety Analysis

Based on the operations results, the project team does not foresee safety concerns associated with the left-turn restrictions and the redistributed traffic causing undue congestion. None of the left-turn movements receiving traffic are predicted to exceed the movement capacity. Also, the local street system nearby is a grid, providing multiple route options for the redistributed traffic which should help disperse it relatively quickly moving away from the US 151/East Washington Avenue corridor.

Some drivers may elect to perform a downstream U-turn maneuver in lieu of one of the restricted left-turn movements; however, U-turns are generally allowed on US 151/East Washington Avenue today and the City has not identified any safety concerns associated with them. The City provided crash summary information indicating the percentage of crashes that were labeled as U-turn related from 2015 through 2019 was 0.46 percent. The peer corridors of University Avenue, Fish Hatchery Road, Park Street, and Stoughton Road had U-turn crash percentages ranging from 0.19 to 0.58 percent over the same time frame, though it is worth noting that the number of intersections where U-turns are allowed, the number of opposing through lanes, and overall corridor lengths vary across these streets.

Based on the above, as well as the generally accepted premise that alternatives to left-turn movements tend to provide capacity and safety benefits (such as the quadrant intersection and Michigan u-turn designs), the project team does not foresee safety concerns associated with restricting the relatively low-volume left-turn movements at select center/median station locations.

C. Provide Operations Analysis for Blair Street, First Street, Mendota Street, Portage Road, and East Springs Drive

Full reports for these intersections are provided in Appendices B through E. Following is a more detailed summary of the 2024 modeling results for each location.

1. Blair Street

a. AM Peak Hour

Modest congestion and queuing occur at Blair Street in the Base Conditions (without BRT) but all movements operate at LOS D or better except the northbound left, which is just into the LOS E range at 57.9 seconds per vehicle. The overall intersection operates at LOS C with 24.0 seconds of delay per vehicle.

When BRT service is added the northbound left movement drops to LOS F with 102.8 seconds of delay per vehicle but operates below capacity with a v/c ratio of 0.87. The southbound left movement drops just into LOS E operations but has a low v/c ratio of 0.54. The other movements remain at LOS D or better and the overall intersection operates well at LOS B with 14.1 seconds of delay per vehicle.

b. Noon Hour

Modest congestion and queuing occur at Blair Street in the Base Conditions (without BRT) with all movements operating at LOS D or better. The overall intersection operates at LOS C with 23.7 seconds of delay per vehicle.

When BRT service is added and the signal timings, phasing, and coordination is optimized, all movements operate at LOS D or better, except the northbound left, which operates just into the LOS E range with 56.8 seconds of delay per vehicle and a low v/c

ratio of 0.47. The overall intersection operates at LOS C with 25.0 seconds of delay per vehicle.

c. PM Peak Hour

Congestion and queuing occur at Blair Street in the Base Conditions (without BRT). The northbound right (US 151) operates at LOS F with 125.3 seconds of delay per vehicle and a v/c ratio of 1.15. The non-US/state route eastbound through and northbound left movements also operate at LOS F, and the southbound left movement operates at LOS E. The overall intersection operates at LOS E with 70.3 seconds of delay per vehicle.

Congestion and queuing remain at Blair Street when BRT is in service. The optimized signal timings provide similar operations for the northbound right (US 151) movement operating at LOS F with 113.7 seconds of delay per vehicle and a v/c ratio of 1.13. The non-US/state route eastbound through and northbound left movements also operate at LOS F and the southbound left movement operates at LOS E. The overall intersection operations drop to LOS F with 141.1 seconds of delay per vehicle because of the eastbound through movement general purpose lane reduction from three to two.

Observation of SimTraffic microsimulation suggests similar northbound (US 151) queue lengths without versus with BRT service. SimTraffic reports averaging the results from nine simulation runs indicate modestly longer northbound queue lengths without BRT (average length 640 to 660 feet and 95th percentile length 1,030 to 1,070-feet) versus with BRT (average length 580 to 590 feet and 95th percentile length 920 to 950-feet). The eastbound queuing does worsen with the BRT service converting one of the three existing eastbound general purpose lanes to bus only, but City staff have reviewed this and are comfortable with these conditions considering the context adjacent to the Capitol Square and Capitol Loop in the City's downtown area.

2. First Street

a. AM Peak Hour

Congestion and queuing occur at First Street in the Base Conditions (without BRT). The eastbound left and southbound left operate at LOS E while the southbound through operates at LOS F with a v/c ratio of 0.89. The inbound/westbound through movement operates at LOS D but the v/c ratio is 1.10. The overall intersection operates at LOS D with 44.5 seconds of delay per vehicle.

When BRT service is added and the signal timings are optimized, the eastbound left, westbound left, westbound through, and southbound left operate at LOS E. The left turns have v/c ratios of 0.66 or less, while the inbound/westbound through has a v/c ratio of 1.07 (slightly better than Base Conditions). The overall intersection operates at LOS E with 60.4 seconds of delay per vehicle.

b. Noon Hour

Modest congestion and queuing occur at First Street in the Base Conditions (without BRT) with all movements operating at LOS D or better, except the eastbound left (LOS E with 65.5 seconds of delay per vehicle and a v/c ratio of 0.66) and the southbound left (LOS F with 103.6 seconds of delay per vehicle and a v/c ratio of 0.98). The overall intersection operates at LOS B with 17.0 seconds of delay per vehicle.

When BRT service is added and the signal timings, phasing, and coordination is optimized all movements operate at LOS D or better except the eastbound left (LOS E with 56.3 seconds of delay per vehicle and a v/c ratio of 0.67), the westbound left (LOS E with 58.1 seconds of delay and a v/c ratio of 0.52) and the southbound left (LOS E with 69.5 seconds of delay per vehicle and a v/c ratio of 0.81). The overall intersection operates at LOS C with 33.0 seconds of delay per vehicle.

c. PM Peak Hour

Congestion and queuing occurs at First Street in the Base Conditions (without BRT), with three movements operating at LOS F: the eastbound through with a v/c of 1.30; the westbound right with a v/c of 0.09; and the southbound left with a v/c of 1.02. The overall intersection operates at LOS F with 102.4 seconds of delay per vehicle.

Congestion and queuing remain at First Street when BRT is in service. There are three movements that operate at LOS E: the eastbound left with a v/c ratio of 0.76; the westbound left with a v/c ratio of 0.59; and the southbound through with a v/c ratio of 0.74. The eastbound through operates at LOS F with a v/c of 1.27. The southbound left operates at LOS F with a v/c ratio of 1.19. The overall intersection operations are similar at LOS F with 105.9 seconds of delay per vehicle.

Observation of SimTraffic microsimulation shows similar operations without BRT compared to with BRT. In either case, despite the poor LOS and high v/c ratios predicted by HCS for the eastbound through movement, traffic in the simulation is nearly always accommodated in one signal cycle (cycle failures are rare and do not appear more frequent when BRT service is added).

3. Mendota Street

a. AM Peak Hour

Congestion and queuing are low at Mendota Street in the Base Conditions (without BRT) with all movements operating at LOS D or better. The overall intersection operates at LOS A with 4.8 seconds of delay per vehicle.

Adding BRT service does not change the intersection geometry. Eastbound BRT buses make a southbound left turn on to US 151/East Washington Avenue via the regular signal phase, while westbound BRT buses make a westbound right turn on to Mendota Street.

The modeling indicates all movements operate at LOS D or better and the overall intersection operates at LOS A with 5.0 seconds of delay.

b. Noon Hour

Congestion and queuing are low at Mendota Street in the Base Conditions (without BRT) with all movements operating at LOS D or better. The overall intersection operates at LOS A with 8.0 seconds of delay per vehicle.

Congestion and queuing remain low at Mendota Street with BRT service. The modeling indicates all movements operate at LOS D or better and the overall intersection operates at LOS A with 9.3 seconds of delay.

c. PM Peak Hour

Congestion and queuing are low at Mendota Street in the Base Conditions (without BRT) with all movements operating at LOS D or better. The overall intersection operates at LOS B with 12.4 seconds of delay per vehicle.

Congestion and queuing remain low at Mendota Street with BRT service. The modeling indicates all movements operate at LOS D or better, except the northbound left which is just into the LOS E range with 57.9 seconds of delay per vehicle and a v/c ratio of 0.78. The overall intersection operates at LOS B with 11.2 seconds of delay.

4. Portage Road/Thierer Road

a. AM Peak Hour

Congestion and queuing are low at Portage Road/Thierer Road in the Base Conditions (without BRT) with all movements operating at LOS D or better. The overall intersection operates at LOS A with 5.0 seconds of delay per vehicle.

Adding BRT service does not change the intersection geometry. Similar to Base Conditions, all movements operate at LOS D or better. The overall intersection operates at LOS A with 5.4 seconds of delay per vehicle.

b. Noon Hour

Congestion and queuing are low at Portage Road in the Base Conditions (without BRT) with all movements operating at LOS D or better. The overall intersection operates at LOS A with 8.0 seconds of delay per vehicle.

Similar to Base Conditions, with BRT service all movements operate at LOS D or better. The overall intersection operates at LOS B with 18.8 seconds of delay per vehicle.

c. PM Peak Hour

Congestion and queuing are low at Portage Road in the Base Conditions (without BRT) with all movements operating at LOS D or better except the northbound left which operates at LOS E with 69.6 seconds of delay per vehicle. The overall intersection operates at LOS A with 9.2 seconds of delay per vehicle.

With BRT service all movements operate at LOS D or better. The overall intersection operates at LOS B with 13.9 seconds of delay per vehicle.

5. East Springs Drive

a. AM Peak Hour

Congestion and queuing are low at East Springs Drive in the Base Conditions (without BRT) with all movements operating at LOS D or better. The overall intersection operates at LOS A with 9.5 seconds of delay per vehicle.

Adding BRT service does not change the intersection geometry. Similar to Base Conditions, all movements operate at LOS D or better. The overall intersection operates at LOS B with 13.3 seconds of delay per vehicle.

b. Noon Hour

Congestion and queuing are low at East Springs Drive in the Base Conditions (without BRT) with all movements operating at LOS D, or better, except the westbound left which operates at LOS E with 64.4 seconds of delay per vehicle and a v/c ratio of 0.93. The overall intersection operates at LOS B with 15.9 seconds of delay per vehicle.

Similar to Base Conditions, with BRT service all movements operate at LOS D or better except one. The northbound right operates at LOS E with 56.2 seconds of delay per vehicle and a v/c ratio of 0.83. The overall intersection operates at LOS B with 14.5 seconds of delay per vehicle.

c. PM Peak Hour

Congestion and queuing are low at East Springs Drive in the Base Conditions (without BRT) with all movements operating at LOS D or better except the northbound right which operates at LOS E with 62.0 seconds of delay per vehicle and a v/c ratio of 0.86. The overall intersection operates at LOS B with 11.1 seconds of delay per vehicle.

Similar to Base Conditions, with BRT service all movements operate at LOS D or better except the northbound right which operates at LOS E with 68.8 seconds of delay per vehicle and a v/c ratio of 0.88. The overall intersection operates at LOS B with 11.7 seconds of delay per vehicle.

D. Provide Operations Analysis for Any Bus Signal Phases

The only intersection along US 151/East Washington Avenue where a bus only signal phase is proposed is at First Street. The BRT project anticipates using BRT buses to serve a north-south route that make an eastbound left turn at First Street. Considering that the phase would only be called once every 15 minutes and provide a brief 10-second phase, it will have little impact on the overall operations.

Synchro/SimTraffic software is not capable of modeling a signal phase that is called only once every six to nine signal cycles. Considering this, the project team used the following approach and assumptions to understand the impact of adding a bus-only phase at First Street:

- The bus-only phase will be called once every 15 minutes.
- The cycle length when the bus phase is called is extended by 10 seconds (modeled as a 10 second hold phase).
- The subsequent two cycle lengths are reduced by 5 seconds each to make up the 10-second bus phase and get the signal back into coordination.
- The operations reported here are a weighted average of the standard cycle length, the bus-only cycle (10 seconds longer), and two recovery cycles (5 seconds shorter each) rounded up to the number of full cycles occurring in 15 minutes.

Appendix F contains the HCS reports and weighted average calculations.

1. AM Peak Hour

The optimized cycle length at First Street in the BRT Synchro model is 140 seconds in the AM peak hour. This results in (rounding up) seven signal cycles in a 15-minute period, of which four will be 140 seconds, one will be 150 seconds (serving the 10-second bus only phase), and two will be 135 seconds (resynching the corridor signal progression over two cycles).

Table 3.01-3 compares the operations for key movements and overall using the BRT geometry without the bus phase and with it, to understand the impact the bus phase itself has on operations.

Movement	Operations	BRT without Bus Phase	BRT with Bus Phase
Eastbound Left	LOS	E (60.2 sec/veh)	E (70.9 sec/veh)
	V/C	0.57	0.66
Westbound Left	LOS	E (66.9 sec/veh)	E (70.1 sec/veh)
	V/C	0.56	0.59
Westbound Through	LOS	E (73.3 sec/veh)	E (63.6 sec/veh)
	V/C	1.07	1.04
Northbound Left	LOS	LOS F (107.1 sec/veh)	F (116.5 sec/veh)
	V/C	1.00	1.03
Southbound Left	LOS	E (71.0 sec/veh)	E (73.2 sec/veh)
	V/C	0.66	0.67
Southbound Through	LOS	F (89.8 sec/veh)	F (95.1 sec/veh)
	V/C	0.85	0.81
Overall	LOS	E (60.4 sec/veh)	E (56.4 sec/veh)
	V/C	1.00	1.00

sec/veh=seconds per vehicle

Table 3.01-3 2024 AM Operations at First Street with BRT Geometry and without Versus with a Bus-Only Signal Phase

2. Noon Hour

The optimized cycle length at First Street in the BRT Synchro model is 125 seconds in the noon hour. This results in (rounding up) eight signal cycles in a 15-minute period, of which five will be 125 seconds, one will be 135 seconds (serving the 10-second bus only phase), and two will be 120 seconds (resynching the corridor signal progression over two cycles).

Table 3.01-4 compares the operations for key movements and overall using the BRT geometry without the bus phase and with it, to understand the impact the bus phase itself has on operations.

Movement	Operations	BRT without Bus Phase	BRT with Bus Phase
Eastbound Left	LOS	E (56.3 sec/veh)	E (56.0 sec/veh)
	V/C	0.67	0.67
Westbound Left	LOS	E (58.1 sec/veh)	E (64.3 sec/veh)
	V/C	0.52	0.57
Southbound Left	LOS	E (69.5 sec/veh)	E (68.0 sec/veh)
	V/C	0.81	0.81
Overall	LOS	C (33.0 sec/veh)	C (32.0 sec/veh)
	V/C	0.76	0.76

sec/veh=seconds per vehicle

Table 3.01-4 2024 Noon-Hour Operations at First Street with BRT Geometry and without Versus with a Bus-Only Signal Phase

3. PM Peak Hour

The optimized cycle length at First Street in the BRT Synchro model is 135 seconds in the PM peak hour. This results in (rounding up) seven signal cycles in a 15-minute period, of which four will be 135 seconds, one will be 145 seconds (serving the 10-second bus only phase), and two will be 130 seconds (resynching the corridor signal progression over two cycles).

Table 3.01-5 compares the operations for key movements and overall using the BRT geometry without the bus phase and with it, to understand the impact the bus phase itself has on operations.

Movement	Operations	BRT without Bus Phase	BRT with Bus Phase
Eastbound Left	LOS	E (56.8 sec/veh)	E (59.6 sec/veh)
	V/C	0.76	0.79
Eastbound Through	LOS	F (154.0 sec/veh)	F (129.6 sec/veh)
	V/C	1.27	1.21
Westbound Left	LOS	E (69.5 sec/veh)	F (109.0 sec/veh)
	V/C	0.59	0.70
Southbound Left	LOS	F (188.3 sec/veh)	F (181.4 sec/veh)
	V/C	1.19	1.17
Southbound Through	LOS	E (65.0 sec/veh)	E (63.5 sec/veh)
	V/C	0.74	0.73
Overall	LOS	F (105.9 sec/veh)	F (92.7 sec/veh)
	V/C	1.14	1.14

sec/veh=seconds per vehicle

Table 3.01-5 2024 PM Operations at First Street with BRT Geometry and without Versus with a Bus-Only Signal Phase

The operations modeling indicates the addition of a bus-only phase that occurs only once every 15 minutes has mostly negligible impacts on operations at US 151/East Washington Avenue and First Street. Some movements experience increased delay while others experience decreased delay. For all three hours considered, the overall intersection delay and v/c ratio is the same, or a little less, with the added bus phase.

**APPENDIX A
TRAFFIC VOLUMES**

East Wash Average Daily Volumes - Streetlight 2019

MODEL value 30%

use average value when +/- this amount

Order	Movement	Day Type	Time	Count	Synchro	% diff	MODEL	Time	Count	Synchro	% diff	MODEL	Time	Count	Synchro	% diff	MODEL
2	WebsterEBL	Weekday	7am-8am	11				4pm-5pm	39				12noon-1pm	18			
2	WebsterEBT	Weekday	7am-8am	165				4pm-5pm	548				12noon-1pm	187			
2	WebsterNBL	Weekday	7am-8am	23				4pm-5pm	20				12noon-1pm	19			
2	WebsterNBR	Weekday	7am-8am	126				4pm-5pm	758				12noon-1pm	261			
2	WebsterNBT	Weekday	7am-8am	80				4pm-5pm	212				12noon-1pm	101			
2	WebsterWBR	Weekday	7am-8am	799				4pm-5pm	405				12noon-1pm	365			
2	WebsterWBT	Weekday	7am-8am	357				4pm-5pm	152				12noon-1pm	139			
3	BlairEBR	Weekday	7am-8am	13	10	130%	13	4pm-5pm	38	40	95%	38	12noon-1pm	26	24	108%	26
3	BlairEBT	Weekday	7am-8am	256	320	80%	256	4pm-5pm	1,598	1,300	123%	1,598	12noon-1pm	489	650	75%	489
3	BlairNBL	Weekday	7am-8am	44	105	42%	75	4pm-5pm	47	110	43%	79	12noon-1pm	54	54	100%	54
3	BlairNBR	Weekday	7am-8am	459	545	84%	459	4pm-5pm	990	955	104%	990	12noon-1pm	561	571	98%	561
3	BlairSBL	Weekday	7am-8am	207	245	84%	207	4pm-5pm	656	775	85%	656	12noon-1pm	301	258	117%	301
3	BlairSBR	Weekday	7am-8am	31	10	310%	21	4pm-5pm	15	30	50%	23	12noon-1pm	17	19	89%	17
3	BlairSBT	Weekday	7am-8am	68	120	57%	94	4pm-5pm	84			84	12noon-1pm	72	76	95%	72
3	BlairWBL	Weekday	7am-8am	998	885	113%	998	4pm-5pm	617	655	94%	617	12noon-1pm	568	531	107%	568
3	BlairWBT	Weekday	7am-8am	1,899	1,990	95%	1,899	4pm-5pm	737	740	100%	737	12noon-1pm	688	809	85%	688
4	LivEBL	Weekday	7am-8am	73			73	4pm-5pm	194			194	12noon-1pm	107			107
4	LivEBR	Weekday	7am-8am	25			25	4pm-5pm	68			68	12noon-1pm	43			43
4	LivEBT	Weekday	7am-8am				824	4pm-5pm				1,201	12noon-1pm				2,982
4	LivNBR	Weekday	7am-8am	27			27	4pm-5pm	73			73	12noon-1pm	39			39
4	LivSBR	Weekday	7am-8am	36			36	4pm-5pm	38			38	12noon-1pm	30			30
4	LivWBL	Weekday	7am-8am	139			139	4pm-5pm	75			75	12noon-1pm	100			100
4	LivWBR	Weekday	7am-8am	39			39	4pm-5pm	49			49	12noon-1pm	36			36
4	LivWBT	Weekday	7am-8am	2,953			2,953	4pm-5pm	1,352			1,352	12noon-1pm	1,257			1,257
5	PatEBL	Weekday	7am-8am	10	40	25%	25	4pm-5pm	45	110	41%	78	12noon-1pm	24	40	60%	32
5	PatEBR	Weekday	7am-8am	10	20	50%	15	4pm-5pm	51	35	146%	43	12noon-1pm	32	25	128%	32
5	PatEBT	Weekday	7am-8am	927	1,050	88%	927	4pm-5pm	3,436	2,940	117%	3,436	12noon-1pm	1,412	1,318	107%	1,412
5	PatNBL	Weekday	7am-8am	26	25	104%	26	4pm-5pm	28	20	140%	24	12noon-1pm	16	19	84%	16
5	PatNBR	Weekday	7am-8am	13	30	43%	22	4pm-5pm	45	110	41%	78	12noon-1pm	23	43	53%	33
5	PatNBT	Weekday	7am-8am	17	35	49%	26	4pm-5pm	34	65	52%	50	12noon-1pm	16	31	52%	24
5	PatSBL	Weekday	7am-8am	55	60	92%	55	4pm-5pm	172	120	143%	146	12noon-1pm	79	50	158%	65
5	PatSBR	Weekday	7am-8am	36	40	90%	36	4pm-5pm	49	35	140%	42	12noon-1pm	38	14	271%	26
5	PatSBT	Weekday	7am-8am	39	30	130%	39	4pm-5pm	48	50	96%	48	12noon-1pm	24	31	77%	24
5	PatWBL	Weekday	7am-8am	34	65	52%	50	4pm-5pm	21	45	47%	33	12noon-1pm	22	33	67%	28
5	PatWBR	Weekday	7am-8am	49	50	98%	49	4pm-5pm	61	40	153%	51	12noon-1pm	43	27	159%	35
5	PatWBT	Weekday	7am-8am	2,938	2,900	101%	2,938	4pm-5pm	1,338	1,410	95%	1,338	12noon-1pm	1,255	1,336	94%	1,255
6	IngEBL	Weekday	7am-8am	44	20	220%	32	4pm-5pm	84	50	168%	67	12noon-1pm	37	31	119%	37
6	IngEBR	Weekday	7am-8am	11	25	44%	18	4pm-5pm	55	60	92%	55	12noon-1pm	25	46	54%	36
6	IngEBT	Weekday	7am-8am	919	1,020	90%	919	4pm-5pm	3,593	3,145	114%	3,593	12noon-1pm	1,483	1,390	107%	1,483
6	IngNBL	Weekday	7am-8am	77	8	963%	43	4pm-5pm	82	30	273%	56	12noon-1pm	62	21	295%	42
6	IngNBR	Weekday	7am-8am	21	15	140%	18	4pm-5pm	71	10	710%	41	12noon-1pm	27	48	56%	38
6	IngNBT	Weekday	7am-8am	16	45	36%	31	4pm-5pm	25	10	250%	18	12noon-1pm	18	33	55%	26
6	IngSBL	Weekday	7am-8am	33	7	471%	20	4pm-5pm	137	15	913%	76	12noon-1pm	49	13	377%	31
6	IngSBR	Weekday	7am-8am	49	20	245%	35	4pm-5pm	22	120	18%	71	12noon-1pm	21	15	140%	18
6	IngSBT	Weekday	7am-8am	24	8	300%	16	4pm-5pm	47	20	235%	34	12noon-1pm	19	12	158%	16
6	IngWBL	Weekday	7am-8am	30	70	43%	50	4pm-5pm	55	45	122%	55	12noon-1pm	36	78	46%	57
6	IngWBR	Weekday	7am-8am	67	35	191%	51	4pm-5pm	34	25	136%	30	12noon-1pm	28	44	64%	36
6	IngWBT	Weekday	7am-8am	3,099	3,000	103%	3,099	4pm-5pm	1,414	1,445	98%	1,414	12noon-1pm	1,326	1,403	95%	1,326

7	BaldEBL	Weekday	7am-8am	45	40	113%	45	4pm-5pm	121	115	105%	121	12noon-1pm	86	51	169%	69
7	BaldEBR	Weekday	7am-8am	28	20	140%	24	4pm-5pm	66	25	264%	46	12noon-1pm	30	23	130%	27
7	BaldEBT	Weekday	7am-8am	902	940	96%	902	4pm-5pm	3,607	3,135	115%	3,607	12noon-1pm	1,463	1,454	101%	1,463
7	BaldNBL	Weekday	7am-8am	55	24	229%	40	4pm-5pm	31	25	124%	31	12noon-1pm	24	15	160%	20
7	BaldNBR	Weekday	7am-8am	19	30	63%	25	4pm-5pm	62	110	56%	86	12noon-1pm	37	52	71%	37
7	BaldNBT	Weekday	7am-8am	26	115	23%	71	4pm-5pm	41	120	34%	81	12noon-1pm	29	70	41%	50
7	BaldSBL	Weekday	7am-8am	53	50	106%	53	4pm-5pm	153	120	128%	153	12noon-1pm	88	67	131%	78
7	BaldSBR	Weekday	7am-8am	119	245	49%	182	4pm-5pm	52	110	47%	81	12noon-1pm	62	87	71%	62
7	BaldSBT	Weekday	7am-8am	39	100	39%	70	4pm-5pm	49	115	43%	82	12noon-1pm	33	82	40%	58
7	BaldWBL	Weekday	7am-8am	33	55	60%	44	4pm-5pm	54	30	180%	42	12noon-1pm	42	45	93%	42
7	BaldWBR	Weekday	7am-8am	100	75	133%	88	4pm-5pm	112	55	204%	84	12noon-1pm	112	38	295%	75
7	BaldWBT	Weekday	7am-8am	3,016	2,940	103%	3,016	4pm-5pm	1,395	1,455	96%	1,395	12noon-1pm	1,297	1,480	88%	1,297
8	FirstEBL	Weekday	7am-8am	114	230	50%	172	4pm-5pm	397	550	72%	397	12noon-1pm	191	236	81%	191
8	FirstEBR	Weekday	7am-8am	58	25	232%	42	4pm-5pm	245	110	223%	178	12noon-1pm	97	83	117%	97
8	FirstEBT	Weekday	7am-8am	777	735	106%	777	4pm-5pm	3,162	2,580	123%	3,162	12noon-1pm	1,297	1,300	100%	1,297
8	FirstNBL	Weekday	7am-8am	249	265	94%	249	4pm-5pm	128	175	73%	128	12noon-1pm	127	97	131%	112
8	FirstNBR	Weekday	7am-8am	34	200	17%	117	4pm-5pm	96	160	60%	128	12noon-1pm	52	43	121%	52
8	FirstNBT	Weekday	7am-8am	85	240	35%	163	4pm-5pm	126	280	45%	203	12noon-1pm	83	143	58%	113
8	FirstSBL	Weekday	7am-8am	72	70	103%	72	4pm-5pm	178	160	111%	178	12noon-1pm	157	132	119%	157
8	FirstSBR	Weekday	7am-8am	392	485	81%	392	4pm-5pm	194	250	78%	194	12noon-1pm	197	191	103%	197
8	FirstSBT	Weekday	7am-8am	104	185	56%	145	4pm-5pm	120	235	51%	178	12noon-1pm	90	119	76%	90
8	FirstWBL	Weekday	7am-8am	87	20	435%	54	4pm-5pm	62	25	248%	44	12noon-1pm	59	27	219%	43
8	FirstWBR	Weekday	7am-8am	86	135	64%	111	4pm-5pm	89	160	56%	125	12noon-1pm	74	121	61%	98
8	FirstWBT	Weekday	7am-8am	2,636	2,470	107%	2,636	4pm-5pm	1,261	1,050	120%	1,261	12noon-1pm	1,164	1,260	92%	1,164
9	FourthEBL	Weekday	7am-8am	20	35	57%	28	4pm-5pm	27	20	135%	24	12noon-1pm	17	14	121%	17
9	FourthEBR	Weekday	7am-8am	5	10	50%	8	4pm-5pm	20	10	200%	15	12noon-1pm	10	16	63%	13
9	FourthEBT	Weekday	7am-8am	840	865	97%	840	4pm-5pm	3,316	2,720	122%	3,316	12noon-1pm	1,457	1,490	98%	1,457
9	FourthNBL	Weekday	7am-8am	35	10	350%	23	4pm-5pm	33	5	660%	19	12noon-1pm	29	3	967%	16
9	FourthNBR	Weekday	7am-8am	24	15	160%	20	4pm-5pm	32	20	160%	26	12noon-1pm	26	20	130%	26
9	FourthNBT	Weekday	7am-8am	58	55	105%	58	4pm-5pm	31	30	103%	31	12noon-1pm	12	19	63%	16
9	FourthSBL	Weekday	7am-8am	50	70	71%	50	4pm-5pm	75	30	250%	53	12noon-1pm	64	21	305%	43
9	FourthSBR	Weekday	7am-8am	32	70	46%	51	4pm-5pm	15	25	60%	20	12noon-1pm	11	27	41%	19
9	FourthSBT	Weekday	7am-8am	31	35	89%	31	4pm-5pm	27	10	270%	19	12noon-1pm	10	15	67%	13
9	FourthWBL	Weekday	7am-8am	29	15	193%	22	4pm-5pm	42	20	210%	31	12noon-1pm	38	18	211%	28
9	FourthWBR	Weekday	7am-8am	73	90	81%	73	4pm-5pm	39	25	156%	32	12noon-1pm	32	29	110%	32
9	FourthWBT	Weekday	7am-8am	2,729	2,695	101%	2,729	4pm-5pm	1,359	1,285	106%	1,359	12noon-1pm	1,247	1,405	89%	1,247
10	SixthEBL	Weekday	7am-8am	19	5	380%	12	4pm-5pm	36	5	720%	21	12noon-1pm	19	5	380%	12
10	SixthEBR	Weekday	7am-8am	9	5	180%	7	4pm-5pm	39	5	780%	22	12noon-1pm	19	5	380%	12
10	SixthEBT	Weekday	7am-8am	855	865	99%	855	4pm-5pm	3,310	2,785	119%	3,310	12noon-1pm	1,506	1,500	100%	1,506
10	SixthNBL	Weekday	7am-8am	31	5	620%	18	4pm-5pm	37	5	740%	21	12noon-1pm	31	5	620%	18
10	SixthNBR	Weekday	7am-8am	23	5	460%	14	4pm-5pm	54	5	1080%	30	12noon-1pm	37	5	740%	21
10	SixthNBT	Weekday	7am-8am	14	5	280%	10	4pm-5pm	26	5	520%	16	12noon-1pm	15	5	300%	10
10	SixthSBL	Weekday	7am-8am	19	40	48%	30	4pm-5pm	42	40	105%	42	12noon-1pm	28	40	70%	28
10	SixthSBR	Weekday	7am-8am	30	40	75%	30	4pm-5pm	11	40	28%	26	12noon-1pm	10	10	100%	10
10	SixthSBT	Weekday	7am-8am	25	25	100%	25	4pm-5pm	44	44	100%	44	12noon-1pm	18	40	45%	29
10	SixthWBL	Weekday	7am-8am	137	5	2740%	71	4pm-5pm	62	2	3100%	32	12noon-1pm	63	5	1260%	34
10	SixthWBR	Weekday	7am-8am	19	20	95%	19	4pm-5pm	14	20	70%	14	12noon-1pm	11	20	55%	16
10	SixthWBT	Weekday	7am-8am	2,771	2,880	96%	2,771	4pm-5pm	1,349	1,500	90%	1,349	12noon-1pm	1,247	1,570	79%	1,247

11	MiIEBL	Weekday	7am-8am	27	30	90%	27	4pm-5pm	60	100	60%	80	12noon-1pm	40	46	87%	40
11	MiIEBR	Weekday	7am-8am	152	100	152%	126	4pm-5pm	431	335	129%	431	12noon-1pm	177	168	105%	177
11	MiIEBT	Weekday	7am-8am	727	780	93%	727	4pm-5pm	2,919	2,455	119%	2,919	12noon-1pm	1,380	1,349	102%	1,380
11	MiINBL	Weekday	7am-8am	342	455	75%	342	4pm-5pm	214	430	50%	322	12noon-1pm	155	182	85%	155
11	MiINBR	Weekday	7am-8am	24	10	240%	17	4pm-5pm	68	10	680%	39	12noon-1pm	47	38	124%	47
11	MiINBT	Weekday	7am-8am	80	60	133%	70	4pm-5pm	103	60	172%	82	12noon-1pm	68	99	69%	84
11	MiISBL	Weekday	7am-8am	47	45	104%	47	4pm-5pm	34	50	68%	42	12noon-1pm	25	38	66%	32
11	MiISBR	Weekday	7am-8am	2,307	95	2428%	95	4pm-5pm	1,166	80	1458%	80	12noon-1pm	745	44	1693%	44
11	MiISBT	Weekday	7am-8am	83	115	72%	83	4pm-5pm	177	165	107%	177	12noon-1pm	103	109	94%	103
11	MiIWBL	Weekday	7am-8am	52	50	104%	52	4pm-5pm	46	50	92%	46	12noon-1pm	48	10	480%	29
11	MiIWBR	Weekday	7am-8am	9	5	180%	7	4pm-5pm	8	30	27%	19	12noon-1pm	11	30	37%	21
11	MiIWBT	Weekday	7am-8am	2,480	2,425	102%	2,480	4pm-5pm	1,155	1,250	92%	1,155	12noon-1pm	1,128	1,490	76%	1,128
12	JohnEBL	Weekday	7am-8am	8	5	160%	7	4pm-5pm	18	5	360%	12	12noon-1pm	17	22	77%	17
12	JohnEBR	Weekday	7am-8am	3	5	60%	4	4pm-5pm	21	15	140%	18	12noon-1pm	16	17	94%	16
12	JohnEBT	Weekday	7am-8am	730	0%	730	730	4pm-5pm	2,520	0%	2,520	2,520	12noon-1pm	1,600	0%	1,600	1,600
12	JohnNBL	Weekday	7am-8am	9	20	45%	15	4pm-5pm	14	25	56%	20	12noon-1pm	13	45	29%	29
12	JohnNBR	Weekday	7am-8am	8	5	160%	7	4pm-5pm	31	70	44%	51	12noon-1pm	28	76	37%	52
12	JohnNBT	Weekday	7am-8am	4	10	40%	7	4pm-5pm	11	20	55%	16	12noon-1pm	9	29	31%	19
12	JohnSBL	Weekday	7am-8am	65	205	32%	135	4pm-5pm	236	335	70%	236	12noon-1pm	129	316	41%	223
12	JohnSBR	Weekday	7am-8am	17	5	340%	11	4pm-5pm	16	5	320%	11	12noon-1pm	21	17	124%	21
12	JohnSBT	Weekday	7am-8am	3	20	15%	12	4pm-5pm	12	30	40%	21	12noon-1pm	13	36	36%	25
12	JohnWBL	Weekday	7am-8am	31	45	69%	38	4pm-5pm	32	70	46%	51	12noon-1pm	38	81	47%	60
12	JohnWBR	Weekday	7am-8am	216	130	166%	173	4pm-5pm	131	100	131%	116	12noon-1pm	127	238	53%	183
12	JohnWBT	Weekday	7am-8am	2,407	2,330	103%	2,407	4pm-5pm	1,140	1,350	84%	1,140	12noon-1pm	1,091	1,200	91%	1,091
13	MarqEBR	Weekday	7am-8am	14	50	28%	32	4pm-5pm	47	65	72%	47	12noon-1pm	33	82	40%	58
13	MarqEBT	Weekday	7am-8am	797	990	81%	797	4pm-5pm	3,167	2,965	107%	3,167	12noon-1pm	1,506	1,640	92%	1,506
13	MarqNBL	Weekday	7am-8am	60	95	63%	78	4pm-5pm	53	115	46%	84	12noon-1pm	53	90	59%	72
13	MarqNBR	Weekday	7am-8am	37	60	62%	49	4pm-5pm	184	36	511%	110	12noon-1pm	49	69	71%	49
13	MarqWBL	Weekday	7am-8am	55	105	52%	80	4pm-5pm	54	85	64%	70	12noon-1pm	42	69	61%	56
13	MarqWBT	Weekday	7am-8am	2,568	2,335	110%	2,568	4pm-5pm	1,281	1,465	87%	1,281	12noon-1pm	1,216	1,450	84%	1,216
14	EB30EBR	Weekday	7am-8am	268	240	112%	268	4pm-5pm	1,346	735	183%	1,041	12noon-1pm	454	240	189%	347
14	EB30EBT	Weekday	7am-8am	573	915	63%	744	4pm-5pm	1,973	2,265	87%	1,973	12noon-1pm	1,095	1,450	76%	1,095
14	EB30NBL	Weekday	7am-8am	97	80	121%	97	4pm-5pm	144	80	180%	112	12noon-1pm	127	80	159%	104
14	EB30NBR	Weekday	7am-8am	164	355	46%	260	4pm-5pm	262	230	114%	262	12noon-1pm	205	355	58%	280
14	EB30WBL	Weekday	7am-8am	71	80	89%	71	4pm-5pm	114	80	143%	97	12noon-1pm	93	80	116%	93
14	EB30WBT	Weekday	7am-8am	2,656	2,360	113%	2,656	4pm-5pm	1,369	1,400	98%	1,369	12noon-1pm	1,260	1,440	88%	1,260
15	WB30EBL	Weekday	7am-8am	72	80	90%	72	4pm-5pm	237	80	296%	159	12noon-1pm	113	80	141%	97
15	WB30EBT	Weekday	7am-8am	660	1,190	55%	925	4pm-5pm	2,131	2,355	90%	2,131	12noon-1pm	1,227	1,725	71%	1,227
15	WB30SBL	Weekday	7am-8am	46	80	58%	63	4pm-5pm	42	80	53%	61	12noon-1pm	36	80	45%	58
15	WB30SBR	Weekday	7am-8am	807	735	110%	807	4pm-5pm	269	240	112%	269	12noon-1pm	219	350	63%	285
15	WB30WBR	Weekday	7am-8am	231	230	100%	231	4pm-5pm	165	355	46%	260	12noon-1pm	151	230	66%	191
15	WB30WBT	Weekday	7am-8am	1,770	1,705	104%	1,770	4pm-5pm	1,066	1,185	90%	1,066	12noon-1pm	1,004	1,089	92%	1,004
16	MelvEBL	Weekday	7am-8am	11			11	4pm-5pm	45			45	12noon-1pm	21			21
16	MelvEBR	Weekday	7am-8am	6			6	4pm-5pm	14			14	12noon-1pm	9			9
16	MelvEBT	Weekday	7am-8am	655			655	4pm-5pm	2,119			2,119	12noon-1pm	1,229			1,229
16	MelvNBL	Weekday	7am-8am	140			140	4pm-5pm	61			61	12noon-1pm	51			51
16	MelvNBR	Weekday	7am-8am	5			5	4pm-5pm	15			15	12noon-1pm	11			11
16	MelvNBT	Weekday	7am-8am	1			1	4pm-5pm	9			9	12noon-1pm	4			4
16	MelvSBL	Weekday	7am-8am	15			15	4pm-5pm	13			13	12noon-1pm	13			13
16	MelvSBR	Weekday	7am-8am	27			27	4pm-5pm	12			12	12noon-1pm	7			7
16	MelvSBT	Weekday	7am-8am	4			4	4pm-5pm	5			5	12noon-1pm	5			5
16	MelvWBL	Weekday	7am-8am	15			15	4pm-5pm	13			13	12noon-1pm	8			8
16	MelvWBR	Weekday	7am-8am	13			13	4pm-5pm	17			17	12noon-1pm	17			17
16	MelvWBT	Weekday	7am-8am	2,048			2,048	4pm-5pm	1,283			1,283	12noon-1pm	1,210			1,210

17	LexEBR	Weekday	7am-8am	19		19	4pm-5pm	53		53	12noon-1pm	32		32	
17	LexEBT	Weekday	7am-8am	642		642	4pm-5pm	2,073		2,073	12noon-1pm	1,225		1,225	
17	LexNBL	Weekday	7am-8am	122		122	4pm-5pm	92		92	12noon-1pm	73		73	
17	LexNBR	Weekday	7am-8am	5		5	4pm-5pm	15		15	12noon-1pm	8		8	
17	LexWBL	Weekday	7am-8am	5		5	4pm-5pm	8		8	12noon-1pm	11		11	
17	LexWBT	Weekday	7am-8am	1,969		1,969	4pm-5pm	1,248		1,248	12noon-1pm	1,185		1,185	
18	WrightEBL	Weekday	7am-8am	165	145	114%	4pm-5pm	150	200	75%	12noon-1pm	164	152	108%	164
18	WrightEBR	Weekday	7am-8am	37	8	463%	4pm-5pm	88	5	1760%	12noon-1pm	66	12	550%	39
18	WrightEBT	Weekday	7am-8am	525	810	65%	4pm-5pm	1,950	2,180	89%	12noon-1pm	1,109	1,436	77%	1,109
18	WrightNBL	Weekday	7am-8am	1,083	45	2407%	4pm-5pm	1,036	55	1884%	12noon-1pm	675	46	1467%	46
18	WrightNBR	Weekday	7am-8am	119	110	108%	4pm-5pm	210	190	111%	12noon-1pm	147	100	147%	124
18	WrightNBT	Weekday	7am-8am	492	240	205%	4pm-5pm	107	165	65%	12noon-1pm	126	143	88%	126
18	WrightSBL	Weekday	7am-8am	30	30	100%	4pm-5pm	80	60	133%	12noon-1pm	92	93	99%	92
18	WrightSBR	Weekday	7am-8am	78	80	98%	4pm-5pm	142	110	129%	12noon-1pm	107	135	79%	107
18	WrightSBT	Weekday	7am-8am	37	70	53%	4pm-5pm	365	180	203%	12noon-1pm	124	155	80%	124
18	WrightWBL	Weekday	7am-8am	115	160	72%	4pm-5pm	117	190	62%	12noon-1pm	114	109	105%	114
18	WrightWBR	Weekday	7am-8am	150	20	750%	4pm-5pm	149	30	497%	12noon-1pm	180	88	205%	134
18	WrightWBT	Weekday	7am-8am	1,758	1,825	96%	4pm-5pm	1,014	1,275	80%	12noon-1pm	1,003	1,331	75%	1,003
19	StoEBL	Weekday	7am-8am	148	150	99%	4pm-5pm	341	420	81%	12noon-1pm	180	450	40%	315
19	StoEBR	Weekday	7am-8am	33	40	83%	4pm-5pm	119	45	264%	12noon-1pm	86	370	23%	228
19	StoEBT	Weekday	7am-8am	470	745	63%	4pm-5pm	1,880	1,825	103%	12noon-1pm	1,160	670	173%	915
19	StoNBL	Weekday	7am-8am	102	65	157%	4pm-5pm	111	100	111%	12noon-1pm	107	325	33%	216
19	StoNBR	Weekday	7am-8am	304	360	84%	4pm-5pm	705	720	98%	12noon-1pm	546	540	101%	546
19	StoNBT	Weekday	7am-8am	626	730	86%	4pm-5pm	527	770	68%	12noon-1pm	398	360	111%	398
19	StoSBL	Weekday	7am-8am	159	220	72%	4pm-5pm	569	505	113%	12noon-1pm	466	625	75%	466
19	StoSBR	Weekday	7am-8am	321	405	79%	4pm-5pm	226	170	133%	12noon-1pm	177	380	47%	279
19	StoSBT	Weekday	7am-8am	284	600	47%	4pm-5pm	653	625	104%	12noon-1pm	389	350	111%	389
19	StoWBL	Weekday	7am-8am	429	440	98%	4pm-5pm	435	530	82%	12noon-1pm	435	590	74%	435
19	StoWBR	Weekday	7am-8am	337	295	114%	4pm-5pm	331	440	75%	12noon-1pm	401	710	56%	556
19	StoWBT	Weekday	7am-8am	1,731	1,630	106%	4pm-5pm	1,046	1,230	85%	12noon-1pm	1,072	640	168%	856
20	MendEBL	Weekday	7am-8am	8	5	160%	4pm-5pm	18	40	45%	12noon-1pm	19	20	95%	19
20	MendEBR	Weekday	7am-8am	52	85	61%	4pm-5pm	171	200	86%	12noon-1pm	137	100	137%	119
20	MendEBT	Weekday	7am-8am	730	1,200	61%	4pm-5pm	2,583	2,810	92%	12noon-1pm	1,749	2,060	85%	1,749
20	MendNBL	Weekday	7am-8am	137	160	86%	4pm-5pm	124	240	52%	12noon-1pm	125	200	63%	163
20	MendNBR	Weekday	7am-8am	35	40	88%	4pm-5pm	69	110	63%	12noon-1pm	51	100	51%	76
20	MendNBT	Weekday	7am-8am	3	5	60%	4pm-5pm	5	5	100%	12noon-1pm	6	10	60%	8
20	MendSBL	Weekday	7am-8am	15	15	100%	4pm-5pm	47	40	118%	12noon-1pm	36	40	90%	36
20	MendSBR	Weekday	7am-8am	18	20	90%	4pm-5pm	12	45	27%	12noon-1pm	12	50	24%	31
20	MendSBT	Weekday	7am-8am	5	5	100%	4pm-5pm	4	10	40%	12noon-1pm	4	20	20%	12
20	MendWBL	Weekday	7am-8am	39	40	98%	4pm-5pm	103	110	94%	12noon-1pm	95	50	190%	73
20	MendWBR	Weekday	7am-8am	11	10	110%	4pm-5pm	17	25	68%	12noon-1pm	18	30	60%	24
20	MendWBT	Weekday	7am-8am	2,041	2,085	98%	4pm-5pm	1,406	1,960	72%	12noon-1pm	1,493	1,700	88%	1,493
21	LienEBL	Weekday	7am-8am	12	45	27%	4pm-5pm	26	70	37%	12noon-1pm	32	50	64%	41
21	LienEBR	Weekday	7am-8am	212	115	184%	4pm-5pm	491	340	144%	12noon-1pm	381	210	181%	296
21	LienEBT	Weekday	7am-8am	638	1,120	57%	4pm-5pm	2,447	2,600	94%	12noon-1pm	1,621	1,700	95%	1,621
21	LienNBL	Weekday	7am-8am	95	110	86%	4pm-5pm	147	280	53%	12noon-1pm	148	350	42%	249
21	LienNBR	Weekday	7am-8am	17	30	57%	4pm-5pm	46	55	84%	12noon-1pm	42	70	60%	56
21	LienNBT	Weekday	7am-8am	2	10	20%	4pm-5pm	10	10	100%	12noon-1pm	11	15	73%	11
21	LienSBL	Weekday	7am-8am	7	30	23%	4pm-5pm	11	30	37%	12noon-1pm	17	30	57%	24
21	LienSBR	Weekday	7am-8am	11	10	110%	4pm-5pm	30	30	100%	12noon-1pm	28	30	93%	28
21	LienSBT	Weekday	7am-8am	1	5	20%	4pm-5pm	6	15	40%	12noon-1pm	5	10	50%	8
21	LienWBL	Weekday	7am-8am	65	40	163%	4pm-5pm	111	40	278%	12noon-1pm	123	60	205%	92
21	LienWBR	Weekday	7am-8am	5	35	14%	4pm-5pm	7	30	23%	12noon-1pm	9	40	23%	25
21	LienWBT	Weekday	7am-8am	2,017	1,940	104%	4pm-5pm	1,381	1,820	76%	12noon-1pm	1,436	1,610	89%	1,436

22	PortEBL	Weekday	7am-8am	42	65	65%	54	4pm-5pm	150	185	81%	150	12noon-1pm	95	200	48%	148
22	PortEBR	Weekday	7am-8am	53	100	53%	77	4pm-5pm	187	190	98%	187	12noon-1pm	164	67	245%	116
22	PortEBT	Weekday	7am-8am	560	1,025	55%	793	4pm-5pm	2,119	2,170	98%	2,119	12noon-1pm	1,405	1,400	100%	1,405
22	PortNBL	Weekday	7am-8am	87	85	102%	87	4pm-5pm	211	175	121%	211	12noon-1pm	230	145	159%	188
22	PortNBR	Weekday	7am-8am	11	20	55%	16	4pm-5pm	71	70	101%	71	12noon-1pm	71	60	118%	71
22	PortNBT	Weekday	7am-8am	34	10	340%	22	4pm-5pm	38	80	48%	59	12noon-1pm	54	40	135%	47
22	PortSBL	Weekday	7am-8am	12	20	60%	16	4pm-5pm	83	25	332%	54	12noon-1pm	63	90	70%	63
22	PortSBR	Weekday	7am-8am	113	100	113%	113	4pm-5pm	66	40	165%	53	12noon-1pm	53	150	35%	102
22	PortSBT	Weekday	7am-8am	15	55	27%	35	4pm-5pm	92	90	102%	92	12noon-1pm	72	30	240%	51
22	PortWBL	Weekday	7am-8am	25	20	125%	25	4pm-5pm	71	55	129%	71	12noon-1pm	101	71	142%	86
22	PortWBR	Weekday	7am-8am	32	10	320%	21	4pm-5pm	25	45	56%	35	12noon-1pm	40	90	44%	65
22	PortWBT	Weekday	7am-8am	1,850	1,760	105%	1,850	4pm-5pm	1,152	1,610	72%	1,152	12noon-1pm	1,211	1,350	90%	1,211
23	EagEBL	Weekday	7am-8am	40	20	200%	30	4pm-5pm	117	165	71%	117	12noon-1pm	137	45	304%	91
23	EagEBR	Weekday	7am-8am	38	20	190%	29	4pm-5pm	241	500	48%	371	12noon-1pm	258	300	86%	258
23	EagEBT	Weekday	7am-8am	520	1,025	51%	773	4pm-5pm	1,984	1,600	124%	1,984	12noon-1pm	1,208	1,250	97%	1,208
23	EagNBL	Weekday	7am-8am	49	20	245%	35	4pm-5pm	169	480	35%	325	12noon-1pm	213	330	65%	272
23	EagNBR	Weekday	7am-8am	33	20	165%	27	4pm-5pm	179	110	163%	145	12noon-1pm	181	40	453%	111
23	EagNBT	Weekday	7am-8am	26	20	130%	26	4pm-5pm	55	46	120%	55	12noon-1pm	68	80	85%	68
23	EagSBL	Weekday	7am-8am	21	50	42%	36	4pm-5pm	82	75	109%	82	12noon-1pm	85	30	283%	58
23	EagSBR	Weekday	7am-8am	56	200	28%	128	4pm-5pm	46	110	42%	78	12noon-1pm	44	20	220%	32
23	EagSBT	Weekday	7am-8am	5	20	25%	13	4pm-5pm	32	45	71%	32	12noon-1pm	28	30	93%	28
23	EagWBL	Weekday	7am-8am	41	20	205%	31	4pm-5pm	175	62	282%	119	12noon-1pm	161	150	107%	161
23	EagWBR	Weekday	7am-8am	129	20	645%	75	4pm-5pm	140	85	165%	113	12noon-1pm	195	30	650%	113
23	EagWBT	Weekday	7am-8am	1,737	1,570	111%	1,737	4pm-5pm	955	1,100	87%	955	12noon-1pm	993	1,350	74%	993
24	IndEBL	Weekday	7am-8am	71	50	142%	61	4pm-5pm	192	400	48%	296	12noon-1pm	158	50	316%	104
24	IndEBR	Weekday	7am-8am	9	100	9%	55	4pm-5pm	106	153	69%	130	12noon-1pm	114	60	190%	87
24	IndEBT	Weekday	7am-8am	533	940	57%	737	4pm-5pm	2,046	1,230	166%	1,638	12noon-1pm	1,303	1,250	104%	1,303
24	IndNBR	Weekday	7am-8am	356	30	1187%	30	4pm-5pm	2,522	30	8407%	30	12noon-1pm	2,967	140	2119%	140
24	IndSBR	Weekday	7am-8am	108	350	31%	229	4pm-5pm	80	350	23%	215	12noon-1pm	86	110	78%	86
24	IndWBL	Weekday	7am-8am	57	20	285%	39	4pm-5pm	146	50	292%	98	12noon-1pm	148	40	370%	94
24	IndWBR	Weekday	7am-8am	63	30	210%	47	4pm-5pm	64	30	213%	47	12noon-1pm	52	40	130%	52
24	IndWBT	Weekday	7am-8am	1,822	1,250	146%	1,536	4pm-5pm	1,166	1,250	93%	1,166	12noon-1pm	1,241	1,450	86%	1,241
25	ZeierEBL	Weekday	7am-8am	48	40	120%	48	4pm-5pm	124	134	93%	124	12noon-1pm	98	80	123%	98
25	ZeierEBR	Weekday	7am-8am	13	20	65%	17	4pm-5pm	148	120	123%	148	12noon-1pm	150	90	167%	120
25	ZeierEBT	Weekday	7am-8am	477	900	53%	689	4pm-5pm	1,895	1,158	164%	1,527	12noon-1pm	1,229	1,150	107%	1,229
25	ZeierNBL	Weekday	7am-8am	42	20	210%	31	4pm-5pm	162	62	261%	112	12noon-1pm	200	170	118%	200
25	ZeierNBR	Weekday	7am-8am	127	32	397%	80	4pm-5pm	358	319	112%	358	12noon-1pm	282	200	141%	241
25	ZeierNBT	Weekday	7am-8am	17	10	170%	14	4pm-5pm	56	60	93%	56	12noon-1pm	51	40	128%	51
25	ZeierSBL	Weekday	7am-8am	74	103	72%	74	4pm-5pm	117	119	98%	117	12noon-1pm	107	100	107%	107
25	ZeierSBR	Weekday	7am-8am	43	40	108%	43	4pm-5pm	64	10	640%	37	12noon-1pm	74	50	148%	62
25	ZeierSBT	Weekday	7am-8am	15	28	54%	22	4pm-5pm	35	46	76%	35	12noon-1pm	39	30	130%	39
25	ZeierWBL	Weekday	7am-8am	126	100	126%	126	4pm-5pm	297	400	74%	297	12noon-1pm	241	260	93%	241
25	ZeierWBR	Weekday	7am-8am	83	80	104%	83	4pm-5pm	83	49	169%	66	12noon-1pm	97	55	176%	76
25	ZeierWBT	Weekday	7am-8am	1,829	1,204	152%	1,517	4pm-5pm	1,158	1,200	97%	1,158	12noon-1pm	1,162	1,450	80%	1,162
26	EastSpEBR	Weekday	7am-8am	751	100	751%	100	4pm-5pm	2,214	115	1925%	115	12noon-1pm	2,031	175	1161%	175
26	EastSpEBT	Weekday	7am-8am	591	935	63%	763	4pm-5pm	2,109	1,700	124%	2,109	12noon-1pm	1,400	1,348	104%	1,400
26	EastSpNBL	Weekday	7am-8am	9,725	115	8457%	115	4pm-5pm	14,623	220	6647%	220	12noon-1pm	16,605	350	4744%	350
26	EastSpNBR	Weekday	7am-8am	58	38	153%	48	4pm-5pm	197	155	127%	197	12noon-1pm	187	250	75%	187
26	EastSpWBL	Weekday	7am-8am	121	287	42%	204	4pm-5pm	319	310	103%	319	12noon-1pm	312	465	67%	389
26	EastSpWBT	Weekday	7am-8am	1,857	1,269	146%	1,563	4pm-5pm	1,304	1,435	91%	1,304	12noon-1pm	1,210	1,450	83%	1,210

Madison East-West BRT
2021-06 TM Volumes, Left Turn Restrictions Volume Redistribution

Base Assumptions for Restricted Lefts - AM peak
 50% turn left at closest upstream signal (if possible, otherwise downstream)
 30% turn left at closest downstream signal (if possible, otherwise upstream)
 20% use a different route or an unsignalized intersection for a left turn or u-turn.
 100% check

AM Peak Hour Existing

x	21	94	207	x	25	36	39	55	49	32	35	16	20	51	45	182	70	53	88
256		Blair		1899	927		Paterson		2938	919		Ingersoll		3099	902		Baldwin		3016
13				998	15				50	18				50	24				44
	75	x	459			26	26	22			43	31	18			40	71	25	

AM Peak Hour Redistribution

x	21	94	207	Redistributed:	36	39	55	49	Received:	35	16	20	51	Redistributed:	182	70	53	88	
256		Blair		25	0	Paterson		2938	43	75		Ingersoll		45	0		Baldwin		3016
13				15	947			50	18	897			50	24	916				44
	75	x	459			26	26	22			43	31	18			40	71	25	

Base Assumptions for Restricted Lefts - PM peak
 50% turn left at closest upstream signal (if possible, otherwise downstream)
 30% turn left at closest downstream signal (if possible, otherwise upstream)
 20% use a different route or an unsignalized intersection for a left turn or u-turn.
 100% check

PM Peak Hour Existing

x	23	84	656	x	78	42	48	146	51	67	71	34	76	30	121	81	82	153	84
1598		Blair		737	3436		Paterson		1338	3593		Ingersoll		1414	3607		Baldwin		1395
38				617	43			33		55				55	46				42
	79	x	990			24	50	78			56	18	41			31	81	86	

PM Peak Hour Redistribution

x	23	84	656	Redistributed:	42	48	146	51	Received:	71	34	76	30	Redistributed:	81	82	153	84	
1598		Blair		78	0	Paterson		1338	122.9	190		Ingersoll		121	0		Baldwin		1395
38				43	3498			33		3533			55	46	3643				42
	79	x	990			24	50	78			56	18	41			31	81	86	

Base Assumptions for Restricted Lefts - MID peak
 50% turn left at closest upstream signal (if possible, otherwise downstream)
 30% turn left at closest downstream signal (if possible, otherwise upstream)
 20% use a different route or an unsignalized intersection for a left turn or u-turn.
 100% check

MID Peak Hour Existing

x	17	72	301	x	32	26	24	65	35	37	18	16	31	36	69	62	58	78	75
489		Blair		688	1412		Paterson		1255	1483		Ingersoll		1326	1463		Baldwin		1297
26				568	32			28		36				57	27				42
	54	x	561			16	24	33			42	26	38			20	50	37	

MID Peak Hour Redistribution

x	17	72	301	Redistributed:	26	24	65	35	Received:	18	16	31	36	Redistributed:	62	58	78	75	
489		Blair		32	0	Paterson		1255	61	98		Ingersoll		69	0		Baldwin		1297
26					1438			28		1449			57	27	1484				42
	54	x	561			16	24	33			42	26	38			20	50	37	

Madison East-West BRT
2021-06 TM Volumes, Left Turn Restrictions Volume Redistribution

Base Assumptions for Restricted Lefts - AM peak

50% turn left at closest upstream signal (if possible, otherwise downstream)
30% turn left at closest downstream signal (if possible, otherwise upstream)
20% use a different route or an unsignalized intersection for a left turn or u-turn.
100% check

27	95	83	47			11	12	135														
727		Milwaukee		7		7		Johnson		173		x	x	x	x		x	x	x	x		
126				2480		730				2407		797		Marquette		2568		744		EB WIS 30		2656
				52		4				38		32				80		268				71
	342	70	17				15	7	7				78	x	49			97	x	260		
27	95	83	47			11	12	135														
727		Milwaukee		7		7		Johnson		173		x	x	x	x		Received:	x	x	x	x	x
126				2496		730				2381		797		Marquette		2542		744		EB WIS 30		2656
				0	52	4				38		32				106	26	268				71
	342	70	17				15	7	7				78	x	49			97	x	260		

Base Assumptions for Restricted Lefts - PM peak

50% turn left at closest upstream signal (if possible, otherwise downstream)
30% turn left at closest downstream signal (if possible, otherwise upstream)
20% use a different route or an unsignalized intersection for a left turn or u-turn.
100% check

80	80	177	42			11	21	236														
2919		Milwaukee		19		12		Johnson		116		x	x	x	x		x	x	x	x		x
431				1155		2520				1140		3167		Marquette		1281		1973		EB WIS 30		1369
				46		18				51		47				70		1041				97
	322	82	39				20	16	51				84	x	110			112	x	262		
80	80	177	42			11	21	236														
2919		Milwaukee		19		12		Johnson		116		x	x	x	x		Received:	x	x	x	x	x
431				1169		2520				1117		3167		Marquette		1258		1973		EB WIS 30		1369
				0	46	18				51		47				93	23	1041				97
	322	82	39				20	16	51				84	x	110			112	x	262		

Base Assumptions for Restricted Lefts - MID peak

50% turn left at closest upstream signal (if possible, otherwise downstream)
30% turn left at closest downstream signal (if possible, otherwise upstream)
20% use a different route or an unsignalized intersection for a left turn or u-turn.
100% check

40	44	103	32			21	25	223														
1380		Milwaukee		21		17		Johnson		183		x	x	x	x		x	x	x	x		x
177				1128		1600				1091		1506		Marquette		1216		1095		EB WIS 30		1260
				29		16				60		58				56		347				93
	155	84	47				29	19	52				72	x	49			104	x	280		
40	44	103	32			21	25	223														
1380		Milwaukee		21		17		Johnson		183		x	x	x	x		Received:	x	x	x	x	x
177				1137		1600				1077		1506		Marquette		1202		1095		EB WIS 30		1260
				0	29	16				60		58				71	15	347				93
	155	84	47				29	19	52				72	x	49			104	x	280		

Madison East-West BRT
 2021-06 TM Volumes, Left Turn Restrictions Volume Redistribution

Base Assumptions for Restricted Lefts - AM peak
 50% turn left at closest upstream signal (if possible, otherwise downstream)
 30% turn left at closest downstream signal (if possible, otherwise upstream)
 20% use a different route or an unsignalized intersection for a left turn or u-turn.
 100% check

72	807	x	63			27	4	15			78	54	30	
925		WB WIS 30		231		11			13		165			85
x			x	1770		655		Melvin Ct	2048		668		Wright St	1758
	x	x	x	x		6			15		23			115
						140	1	5			45	366	119	
x	807	x	63			27	4	15			78	54	30	
925		WB WIS 30		x		11	0		13		9	174		85
x			x	1770		655	664	Melvin Ct	2048		668		Wright St	1758
	x	x	x	x		6			15		23			115
						140	x	5			45	x	119	

Base Assumptions for Restricted Lefts - PM peak
 50% turn left at closest upstream signal (if possible, otherwise downstream)
 30% turn left at closest downstream signal (if possible, otherwise upstream)
 20% use a different route or an unsignalized intersection for a left turn or u-turn.
 100% check

159	269	x	61			12	5	13			142	273	70	
2131		WB WIS 30		260		45			17		150			90
x			x	1066		2119		Melvin Ct	1283		1950		Wright St	1014
	x	x	x	x		14			13		47			154
						61	9	15			55	136	210	
159	269	x	61			12	5	13			142	273	70	
2131		WB WIS 30		260		45	0		17		36	186		90
x			x	1066		2119	2155	Melvin Ct	1283		1950		Wright St	1014
	x	x	x	x		14			13		47			154
						61	9	15			55	136	210	

Base Assumptions for Restricted Lefts - MID peak
 50% turn left at closest upstream signal (if possible, otherwise downstream)
 30% turn left at closest downstream signal (if possible, otherwise upstream)
 20% use a different route or an unsignalized intersection for a left turn or u-turn.
 100% check













97	285	x	58			7	5	13			107	124	92	
1227		WB WIS 30		191		21			17		164			134
x			x	1004		1229		Melvin Ct	1210		1109		Wright St	1003
	x	x	x	x		9			8		39			114
						51	4	11			46	126	124	
97	285	x	58			7	5	13			107	124	92	
1227		WB WIS 30		x		21	0		17		17	181		134
x			x	1004		1229	1246	Melvin Ct	1210		1109		Wright St	1003
	x	x	x	x		9			8		39			114
						51	x	11			46	x	124	

HCM Signalized Intersection Capacity Analysis

2024 Base Condiitons

1: Blair St. & East Washington Ave.

AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↔↔	↑↑		↔		↔↔	↔	↑↑	
Traffic Volume (vph)	0	256	13	998	1899	0	75	0	459	207	94	21
Future Volume (vph)	0	256	13	998	1899	0	75	0	459	207	94	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0		4.0	4.0	4.0	
Lane Util. Factor		0.91		0.97	0.95		1.00		0.88	0.91	0.91	
Frt		0.99		1.00	1.00		1.00		0.85	1.00	0.99	
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	0.98	
Satd. Flow (prot)		5048		3433	3539		1770		2787	1610	3265	
Flt Permitted		1.00		0.95	1.00		0.95		1.00	0.95	0.98	
Satd. Flow (perm)		5048		3433	3539		1770		2787	1610	3265	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	269	14	1051	1999	0	79	0	483	218	99	22
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	0	9	0
Lane Group Flow (vph)	0	278	0	1051	1999	0	79	0	483	113	217	0
Turn Type		NA		Prot	NA		Prot		pt+ov	Split	NA	
Protected Phases		1		2	1 2		3		2 3	4	4	
Permitted Phases							3		3 2			
Actuated Green, G (s)		25.5		52.3	82.3		9.1		65.9	14.1	14.1	
Effective Green, g (s)		26.0		52.8	82.8		9.1		66.4	16.1	16.1	
Actuated g/C Ratio		0.22		0.44	0.69		0.08		0.55	0.13	0.13	
Clearance Time (s)		4.5		4.5			4.0			6.0	6.0	
Vehicle Extension (s)		3.0		3.0			2.0			3.0	3.0	
Lane Grp Cap (vph)		1093		1510	2441		134		1542	216	438	
v/s Ratio Prot		0.06		0.31	c0.56		c0.04		0.17	c0.07	0.07	
v/s Ratio Perm												
v/c Ratio		0.25		0.70	0.82		0.59		0.31	0.52	0.50	
Uniform Delay, d1		39.0		27.1	13.3		53.6		14.5	48.4	48.2	
Progression Factor		1.00		1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2		0.1		2.7	2.3		4.2		0.0	2.3	0.9	
Delay (s)		39.1		29.8	15.5		57.9		14.5	50.7	49.1	
Level of Service		D		C	B		E		B	D	D	
Approach Delay (s)		39.1			20.4			20.6			49.6	
Approach LOS		D			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			24.0				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			71.6%				ICU Level of Service			C		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 2: Livingston Ave & East Washington Ave.

2024 Base Condiitons

AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑		↖	↑↑↑				↗			↖
Traffic Volume (vph)	73	824	25	139	2953	39	0	0	27	0	0	36
Future Volume (vph)	73	824	25	139	2953	39	0	0	27	0	0	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0				5.0			5.0
Lane Util. Factor	1.00	0.91		1.00	0.91				1.00			1.00
Frt	1.00	1.00		1.00	1.00				0.86			0.86
Flt Protected	0.95	1.00		0.95	1.00				1.00			1.00
Satd. Flow (prot)	1770	5063		1770	5075				1611			1611
Flt Permitted	0.06	1.00		0.30	1.00				1.00			1.00
Satd. Flow (perm)	103	5063		561	5075				1611			1611
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	77	867	26	146	3108	41	0	0	28	0	0	38
RTOR Reduction (vph)	0	3	0	0	1	0	0	0	23	0	0	18
Lane Group Flow (vph)	77	890	0	146	3148	0	0	0	5	0	0	20
Turn Type	D.P+P	NA		D.Pm	NA				Prot			Over
Protected Phases	4	2			6				8			4
Permitted Phases	6			2								
Actuated Green, G (s)	90.0	72.0		72.0	72.0				18.0			18.0
Effective Green, g (s)	90.0	72.0		72.0	72.0				18.0			18.0
Actuated g/C Ratio	0.90	0.72		0.72	0.72				0.18			0.18
Clearance Time (s)	5.0	5.0		5.0	5.0				5.0			5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0				3.0			3.0
Lane Grp Cap (vph)	392	3645		403	3654				289			289
v/s Ratio Prot	c0.04	0.18			c0.62				0.00			0.01
v/s Ratio Perm	0.14			0.26								
v/c Ratio	0.20	0.24		0.36	0.86				0.02			0.07
Uniform Delay, d1	14.5	4.8		5.3	10.3				33.7			34.0
Progression Factor	1.00	1.00		1.00	1.00				1.00			1.00
Incremental Delay, d2	0.2	0.2		2.5	2.9				0.0			0.1
Delay (s)	14.8	4.9		7.8	13.2				33.8			34.1
Level of Service	B	A		A	B				C			C
Approach Delay (s)		5.7			13.0			33.8			34.1	
Approach LOS		A			B			C			C	

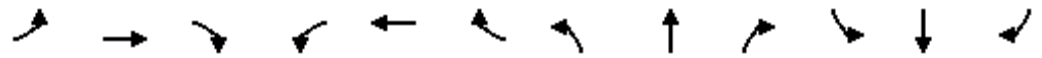
Intersection Summary			
HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
 3: Paterson St. & East Washington Ave.

2024 Base Condiitons

AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑	↗		↕		↘	↑	↗
Traffic Volume (veh/h)	25	927	15	50	2938	49	26	26	22	55	39	36
Future Volume (veh/h)	25	927	15	50	2938	49	26	26	22	55	39	36
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	26	976	16	53	3093	52	27	27	23	58	41	38
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	118	4319	1341	519	4319	1341	69	45	31	162	132	112
Arrive On Green	0.85	0.85	0.85	1.00	1.00	1.00	0.08	0.07	0.07	0.08	0.07	0.07
Sat Flow, veh/h	68	5106	1585	568	5106	1585	403	638	443	1355	1870	1585
Grp Volume(v), veh/h	26	976	16	53	3093	52	77	0	0	58	41	38
Grp Sat Flow(s),veh/h/ln	68	1702	1585	568	1702	1585	1484	0	0	1355	1870	1585
Q Serve(g_s), s	11.3	4.4	0.2	0.5	0.0	0.0	3.7	0.0	0.0	0.0	2.5	2.7
Cycle Q Clear(g_c), s	11.3	4.4	0.2	4.9	0.0	0.0	6.2	0.0	0.0	5.4	2.5	2.7
Prop In Lane	1.00		1.00	1.00		1.00	0.35		0.30	1.00		1.00
Lane Grp Cap(c), veh/h	118	4319	1341	519	4319	1341	158	0	0	162	132	112
V/C Ratio(X)	0.22	0.23	0.01	0.10	0.72	0.04	0.49	0.00	0.00	0.36	0.31	0.34
Avail Cap(c_a), veh/h	118	4319	1341	519	4319	1341	535	0	0	489	584	495
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.98	0.98	0.98	0.09	0.09	0.09	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	2.3	1.8	1.4	0.1	0.0	0.0	54.6	0.0	0.0	53.4	53.0	53.1
Incr Delay (d2), s/veh	4.2	0.1	0.0	0.0	0.1	0.0	2.3	0.0	0.0	1.3	1.3	1.8
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(95%),veh/ln	0.4	1.5	0.1	0.0	0.1	0.0	4.3	0.0	0.0	3.2	2.2	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.5	1.9	1.5	0.1	0.1	0.0	56.9	0.0	0.0	54.7	54.3	54.8
LnGrp LOS	A	A	A	A	A	A	E	A	A	D	D	D
Approach Vol, veh/h		1018			3198			77			137	
Approach Delay, s/veh		2.0			0.1			56.9			54.6	
Approach LOS		A			A			E			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		106.5		13.5		106.5		13.5				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		72.5		37.5		72.5		37.5				
Max Q Clear Time (g_c+I1), s		13.3		7.4		6.9		8.2				
Green Ext Time (p_c), s		8.3		0.5		47.1		0.3				
Intersection Summary												
HCM 6th Ctrl Delay				3.2								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary
 4: Ingersoll St. & East Washington Ave.

2024 Base Condiitons
 AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑	↗		↑	↗		↘	
Traffic Volume (veh/h)	32	919	18	50	3099	51	43	31	18	20	16	35
Future Volume (veh/h)	32	919	18	50	3099	51	43	31	18	20	16	35
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	34	967	19	53	3262	54	45	33	19	21	17	37
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	103	3821	1186	536	4196	1303	112	62	137	58	35	53
Arrive On Green	1.00	1.00	1.00	0.06	1.00	1.00	0.11	0.09	0.09	0.11	0.09	0.09
Sat Flow, veh/h	57	5106	1585	1781	5106	1585	743	718	1585	229	403	616
Grp Volume(v), veh/h	34	967	19	53	3262	54	78	0	19	75	0	0
Grp Sat Flow(s),veh/h/ln	57	1702	1585	1781	1702	1585	1460	0	1585	1248	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	1.3	2.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.8	0.0	0.0	6.1	0.0	1.3	8.2	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.58		1.00	0.28		0.49
Lane Grp Cap(c), veh/h	103	3821	1186	536	4196	1303	204	0	137	172	0	0
V/C Ratio(X)	0.33	0.25	0.02	0.10	0.78	0.04	0.38	0.00	0.14	0.44	0.00	0.00
Avail Cap(c_a), veh/h	103	3821	1186	548	4196	1303	543	0	489	519	0	0
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)	0.96	0.96	0.96	0.12	0.12	0.12	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	2.6	0.0	0.0	52.0	0.0	50.7	53.0	0.0	0.0
Incr Delay (d2), s/veh	8.1	0.2	0.0	0.0	0.2	0.0	1.2	0.0	0.5	1.7	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(95%),veh/ln	0.4	0.1	0.0	0.4	0.1	0.0	4.1	0.0	1.0	4.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.1	0.2	0.0	2.6	0.2	0.0	53.2	0.0	51.1	54.7	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	D	D	A	A
Approach Vol, veh/h		1020			3369			97				75
Approach Delay, s/veh		0.4			0.2			52.8				54.7
Approach LOS		A			A			D				D
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	8.8	94.3		16.9		103.1		16.9				
Change Period (Y+Rc), s	5.5	4.5		6.5		4.5		6.5				
Max Green Setting (Gmax), s	4.1	62.4		37.0		72.0		37.0				
Max Q Clear Time (g_c+l1), s	2.8	2.0		10.2		2.0		8.1				
Green Ext Time (p_c), s	0.0	9.2		0.3		52.2		0.3				
Intersection Summary												
HCM 6th Ctrl Delay				2.3								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary
 5: Baldwin St. & East Washington Ave.

2024 Base Condiitons

AM Peak



























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑	↗		↑	↗		↘	↗
Traffic Volume (veh/h)	45	902	24	44	3016	88	40	71	25	53	70	182
Future Volume (veh/h)	45	902	24	44	3016	88	40	71	25	53	70	182
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	47	949	25	46	3175	93	42	75	26	56	74	192
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	66	2760	857	419	3106	964	41	54	489	43	40	489
Arrive On Green	1.00	1.00	1.00	0.05	1.00	1.00	0.32	0.31	0.31	0.32	0.31	0.31
Sat Flow, veh/h	60	5106	1585	1781	5106	1585	0	176	1585	0	130	1585
Grp Volume(v), veh/h	47	949	25	46	3175	93	117	0	26	130	0	192
Grp Sat Flow(s),veh/h/ln	60	1702	1585	1781	1702	1585	176	0	1585	130	0	1585
Q Serve(g_s), s	12.2	0.0	0.0	1.3	73.0	0.0	0.0	0.0	1.4	0.0	0.0	11.4
Cycle Q Clear(g_c), s	64.9	0.0	0.0	1.3	73.0	0.0	38.0	0.0	1.4	38.0	0.0	11.4
Prop In Lane	1.00		1.00	1.00		1.00	0.36		1.00	0.43		1.00
Lane Grp Cap(c), veh/h	66	2760	857	419	3106	964	96	0	489	84	0	489
V/C Ratio(X)	0.71	0.34	0.03	0.11	1.02	0.10	1.21	0.00	0.05	1.55	0.00	0.39
Avail Cap(c_a), veh/h	66	2760	857	431	3106	964	96	0	489	84	0	489
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)	0.95	0.95	0.95	0.09	0.09	0.09	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.6	0.0	0.0	10.4	0.0	0.0	39.8	0.0	29.2	42.7	0.0	32.7
Incr Delay (d2), s/veh	46.7	0.3	0.1	0.0	12.0	0.0	159.8	0.0	0.0	295.8	0.0	0.5
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(95%),veh/ln	3.9	0.1	0.0	0.8	4.4	0.0	12.8	0.0	1.0	17.0	0.0	8.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	78.3	0.3	0.1	10.4	12.0	0.0	199.6	0.0	29.2	338.5	0.0	33.2
LnGrp LOS	E	A	A	B	F	A	F	A	C	F	A	C
Approach Vol, veh/h		1021			3314			143				322
Approach Delay, s/veh		3.9			11.6			168.6				156.4
Approach LOS		A			B			F				F
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	8.1	69.9		42.0		78.0		42.0				
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s	4.0	64.0		37.0		73.0		37.0				
Max Q Clear Time (g_c+l1), s	3.3	66.9		40.0		75.0		40.0				
Green Ext Time (p_c), s	0.0	0.0		0.0		0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				24.4								
HCM 6th LOS				C								

HCM Signalized Intersection Capacity Analysis

2024 Base Condiitons

6: First & E Wash



























AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	172	777	42	54	2636	111	249	163	117	72	145	392
Future Volume (vph)	172	777	42	54	2636	111	249	163	117	72	145	392
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.5	6.5	6.5
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	2787
Flt Permitted	0.95	1.00	1.00	0.29	1.00	1.00	0.43	1.00	1.00	0.65	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	544	5085	1583	804	1863	1583	1203	1863	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	187	845	46	59	2865	121	271	177	127	78	158	426
RTOR Reduction (vph)	0	0	22	0	0	59	0	0	91	0	0	60
Lane Group Flow (vph)	187	845	24	59	2865	62	271	177	36	78	158	366
Turn Type	Prot	NA	custom	D.P+P	NA	Perm	D.P+P	NA	Perm	Perm	NA	custom
Protected Phases	1	6		5	2		3	3 4			4	
Permitted Phases			2	6		2	4		3 4	4		4 1
Actuated Green, G (s)	7.3	66.3	61.7	69.5	61.7	61.7	29.0	34.0	34.0	11.5	11.5	25.3
Effective Green, g (s)	7.3	66.3	61.7	69.5	61.7	61.7	29.0	34.0	34.0	11.5	11.5	25.3
Actuated g/C Ratio	0.06	0.55	0.51	0.58	0.51	0.51	0.24	0.28	0.28	0.10	0.10	0.21
Clearance Time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0			6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	208	2809	813	347	2614	813	335	527	448	115	178	587
v/s Ratio Prot	0.05	c0.17		0.00	c0.56		c0.12	0.10			c0.08	
v/s Ratio Perm			0.01	0.09		0.04	0.08		0.02	0.06		c0.13
v/c Ratio	0.90	0.30	0.03	0.17	1.10	0.08	0.81	0.34	0.08	0.68	0.89	0.62
Uniform Delay, d1	56.0	14.4	14.4	11.2	29.1	14.7	40.8	34.1	31.5	52.5	53.6	43.0
Progression Factor	0.71	0.71	1.00	0.10	0.24	0.14	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	34.7	0.3	0.1	0.1	45.5	0.1	13.4	0.4	0.1	14.7	37.2	2.1
Delay (s)	74.7	10.4	14.4	1.2	52.7	2.1	54.2	34.4	31.6	67.2	90.8	45.1
Level of Service	E	B	B	A	D	A	D	C	C	E	F	D
Approach Delay (s)		21.8			49.7			43.1			58.6	
Approach LOS		C			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			44.5									D
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			120.0								22.0	
Intersection Capacity Utilization			95.6%									F
Analysis Period (min)			15									

c Critical Lane Group

HCM 6th Signalized Intersection Summary
7: Fourth & E Wash

2024 Base Condiitons
AM Peak

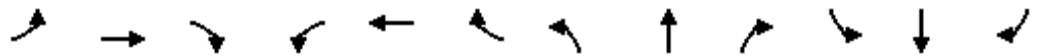
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  							
Traffic Volume (veh/h)	28	840	8	22	2729	73	23	58	20	50	31	51
Future Volume (veh/h)	28	840	8	22	2729	73	23	58	20	50	31	51
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		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	30	913	9	24	2966	79	25	63	22	54	34	55
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	63	3043	945	329	3043	945	39	79	489	49	20	489
Arrive On Green	0.20	0.20	0.20	0.60	0.60	0.60	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	76	5106	1585	606	5106	1585	1	256	1585	1	64	1585
Grp Volume(v), veh/h	30	913	9	24	2966	79	88	0	22	88	0	55
Grp Sat Flow(s),veh/h/ln	76	1702	1585	606	1702	1585	257	0	1585	66	0	1585
Q Serve(g_s), s	4.5	18.3	0.5	2.8	67.2	2.5	0.1	0.0	1.2	0.1	0.0	3.0
Cycle Q Clear(g_c), s	71.5	18.3	0.5	21.0	67.2	2.5	37.0	0.0	1.2	37.0	0.0	3.0
Prop In Lane	1.00		1.00	1.00		1.00	0.28		1.00	0.61		1.00
Lane Grp Cap(c), veh/h	63	3043	945	329	3043	945	118	0	489	69	0	489
V/C Ratio(X)	0.48	0.30	0.01	0.07	0.97	0.08	0.75	0.00	0.05	1.28	0.00	0.11
Avail Cap(c_a), veh/h	63	3043	945	329	3043	945	118	0	489	69	0	489
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)	0.96	0.96	0.96	0.63	0.63	0.63	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	83.7	26.8	19.7	19.3	23.4	10.3	34.4	0.0	29.1	49.6	0.0	29.7
Incr Delay (d2), s/veh	22.9	0.2	0.0	0.3	8.3	0.1	22.8	0.0	0.0	201.7	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(95%),veh/ln	2.5	13.1	0.3	0.7	33.5	1.6	4.7	0.0	0.8	10.7	0.0	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	106.6	27.1	19.7	19.6	31.7	10.4	57.2	0.0	29.2	251.3	0.0	29.8
LnGrp LOS	F	C	B	B	C	B	E	A	C	F	A	C
Approach Vol, veh/h		952			3069			110			143	
Approach Delay, s/veh		29.5			31.0			51.6			166.1	
Approach LOS		C			C			D			F	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		76.5		43.5		76.5		43.5				
Change Period (Y+Rc), s		5.0		6.5		5.0		6.5				
Max Green Setting (Gmax), s		71.5		37.0		71.5		37.0				
Max Q Clear Time (g_c+I1), s		73.5		39.0		69.2		39.0				
Green Ext Time (p_c), s		0.0		0.0		2.3		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				35.7								
HCM 6th LOS				D								

HCM 6th Signalized Intersection Summary

2024 Base Condiitons

8: Sixth & E Wash

AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑	↗	↖	↑			↕	
Traffic Volume (veh/h)	12	855	7	71	2771	19	18	10	14	30	25	30
Future Volume (veh/h)	12	855	7	71	2771	19	18	10	14	30	25	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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	13	929	8	77	3012	21	20	11	15	33	27	33
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	126	3564	1106	528	4045	1256	206	70	96	90	61	56
Arrive On Green	0.70	0.70	0.70	0.09	1.00	1.00	0.10	0.10	0.10	0.10	0.10	0.10
Sat Flow, veh/h	77	5106	1585	1781	5106	1585	1343	717	978	425	619	574
Grp Volume(v), veh/h	13	929	8	77	3012	21	20	0	26	93	0	0
Grp Sat Flow(s),veh/h/ln	77	1702	1585	1781	1702	1585	1343	0	1694	1618	0	0
Q Serve(g_s), s	6.2	6.7	0.2	1.1	0.0	0.0	0.0	0.0	1.4	3.0	0.0	0.0
Cycle Q Clear(g_c), s	6.2	6.7	0.2	1.1	0.0	0.0	1.3	0.0	1.4	5.4	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.58	0.35		0.35
Lane Grp Cap(c), veh/h	126	3564	1106	528	4045	1256	206	0	166	207	0	0
V/C Ratio(X)	0.10	0.26	0.01	0.15	0.74	0.02	0.10	0.00	0.16	0.45	0.00	0.00
Avail Cap(c_a), veh/h	126	3564	1106	556	4045	1256	222	0	186	226	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.97	0.97	0.97	0.09	0.09	0.09	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.5	5.6	4.6	3.2	0.0	0.0	41.3	0.0	41.3	43.0	0.0	0.0
Incr Delay (d2), s/veh	1.6	0.2	0.0	0.0	0.1	0.0	0.2	0.0	0.4	1.5	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(95%),veh/ln	0.2	3.7	0.1	0.5	0.1	0.0	0.8	0.0	1.1	4.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.1	5.7	4.6	3.2	0.1	0.0	41.5	0.0	41.8	44.6	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	D	D	A	A
Approach Vol, veh/h		950			3110			46				93
Approach Delay, s/veh		5.8			0.2			41.6				44.6
Approach LOS		A			A			D				D
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	9.4	74.8		15.8		84.2		15.8				
Change Period (Y+Rc), s	5.0	5.0		6.0		5.0		6.0				
Max Green Setting (Gmax), s	6.0	67.0		11.0		78.0		11.0				
Max Q Clear Time (g_c+l1), s	3.1	8.7		7.4		2.0		3.4				
Green Ext Time (p_c), s	0.0	6.4		0.1		47.2		0.1				

Intersection Summary

HCM 6th Ctrl Delay	2.9
HCM 6th LOS	A

Notes























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

HCM Signalized Intersection Capacity Analysis

2024 Base Condiitons

9: Milwaukee/North & E Wash

AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	727	126	52	2480	7	342	70	17	47	83	95
Future Volume (vph)	27	727	126	52	2480	7	342	70	17	47	83	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	6.5	6.5		5.0	5.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.97	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1809		1770	1714	
Flt Permitted	0.10	1.00	1.00	0.30	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	189	5085	1583	550	5085	1583	3433	1809		1770	1714	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	790	137	57	2696	8	372	76	18	51	90	103
RTOR Reduction (vph)	0	0	61	0	0	8	0	8	0	0	42	0
Lane Group Flow (vph)	29	790	76	57	2696	0	372	86	0	51	151	0
Turn Type	D.P+P	NA	custom	D.P+P	NA	custom	Split	NA		Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases	6		1 2	2		1						
Actuated Green, G (s)	51.2	45.1	55.7	51.2	39.5	6.1	15.7	15.7		12.6	12.6	
Effective Green, g (s)	51.2	45.1	55.7	51.2	39.5	6.1	15.7	15.7		12.6	12.6	
Actuated g/C Ratio	0.51	0.45	0.56	0.51	0.40	0.06	0.16	0.16		0.13	0.13	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	6.5	6.5		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	281	2293	881	356	2008	96	538	284		223	215	
v/s Ratio Prot	0.01	c0.16		c0.01	c0.53		c0.11	0.05		0.03	c0.09	
v/s Ratio Perm	0.04		0.05	0.07		0.00						
v/c Ratio	0.10	0.34	0.09	0.16	1.34	0.01	0.69	0.30		0.23	0.70	
Uniform Delay, d1	18.5	17.8	10.3	12.5	30.2	44.1	39.9	37.3		39.3	41.9	
Progression Factor	1.28	0.93	0.87	1.11	0.93	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.4	0.0	0.2	156.7	0.0	3.8	0.6		0.5	9.9	
Delay (s)	24.4	17.1	9.0	14.0	184.8	44.1	43.7	37.9		39.9	51.8	
Level of Service	C	B	A	B	F	D	D	D		D	D	
Approach Delay (s)		16.1			180.9			42.5			49.3	
Approach LOS		B			F			D			D	
Intersection Summary												
HCM 2000 Control Delay			123.5									F
HCM 2000 Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			100.0							20.5		
Intersection Capacity Utilization			81.2%									D
Analysis Period (min)			15									

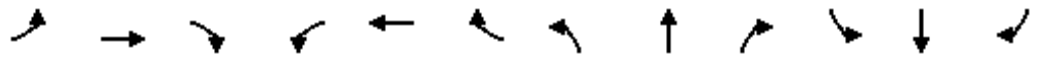
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2024 Base Condiitons

10: Johnson & E Wash

AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↖↖		↖	↖↖↖	↖		↕		↖	↕	
Traffic Volume (vph)	7	730	4	38	2407	173	15	7	7	135	12	11
Future Volume (vph)	7	730	4	38	2407	173	15	7	7	135	12	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		5.0		6.0	6.0	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00		1.00		0.95	0.95	
Frt	1.00	1.00		1.00	1.00	0.85		0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98		0.95	0.97	
Satd. Flow (prot)	1770	5081		1770	5085	1583		1756		1681	1673	
Flt Permitted	0.06	1.00		0.33	1.00	1.00		0.98		0.74	0.77	
Satd. Flow (perm)	106	5081		619	5085	1583		1756		1303	1334	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	793	4	41	2616	188	16	8	8	147	13	12
RTOR Reduction (vph)	0	0	0	0	0	30	0	8	0	0	6	0
Lane Group Flow (vph)	8	797	0	41	2616	158	0	24	0	87	79	0
Turn Type	Perm	NA		Perm	NA	Perm	Split	NA		Perm	NA	
Protected Phases		2			2		3	3			4	
Permitted Phases	2			2		2				4		
Actuated Green, G (s)	70.2	70.2		70.2	70.2	70.2		3.0		11.3	11.3	
Effective Green, g (s)	70.2	70.2		70.2	70.2	70.2		3.0		11.3	11.3	
Actuated g/C Ratio	0.70	0.70		0.70	0.70	0.70		0.03		0.11	0.11	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		5.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	74	3566		434	3569	1111		52		147	150	
v/s Ratio Prot		0.16			c0.51			c0.01				
v/s Ratio Perm	0.08			0.07		0.10				c0.07	0.06	
v/c Ratio	0.11	0.22		0.09	0.73	0.14		0.47		0.59	0.53	
Uniform Delay, d1	4.8	5.3		4.8	9.1	4.9		47.7		42.2	41.8	
Progression Factor	1.36	0.79		0.60	0.42	0.35		1.00		1.00	1.00	
Incremental Delay, d2	2.8	0.1		0.3	1.0	0.2		6.5		6.3	3.3	
Delay (s)	9.3	4.3		3.1	4.8	1.9		54.2		48.4	45.1	
Level of Service	A	A		A	A	A		D		D	D	
Approach Delay (s)		4.3			4.6			54.2			46.8	
Approach LOS		A			A			D			D	

Intersection Summary

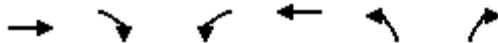
HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

11: Marquette & E Wash

2024 Base Condiitons
AM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↗	↖	↑↑↑	↗	
Traffic Volume (vph)	797	32	80	2568	78	49
Future Volume (vph)	797	32	80	2568	78	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.0	4.5	6.5	
Lane Util. Factor	0.91	1.00	1.00	0.91	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (prot)	5085	1583	1770	5085	1713	
Flt Permitted	1.00	1.00	0.30	1.00	0.97	
Satd. Flow (perm)	5085	1583	558	5085	1713	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	866	35	87	2791	85	53
RTOR Reduction (vph)	0	13	0	0	25	0
Lane Group Flow (vph)	866	22	87	2791	113	0
Turn Type	NA	Perm	D.P+P	NA	Prot	
Protected Phases	2		3	2 3	4	
Permitted Phases		2	2			
Actuated Green, G (s)	64.2	64.2	73.2	77.7	11.8	
Effective Green, g (s)	64.2	64.2	73.2	77.7	11.8	
Actuated g/C Ratio	0.64	0.64	0.73	0.78	0.12	
Clearance Time (s)	4.5	4.5	4.0		6.5	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	3264	1016	517	3951	202	
v/s Ratio Prot	0.17		0.02	c0.55	c0.07	
v/s Ratio Perm		0.01	0.11			
v/c Ratio	0.27	0.02	0.17	0.71	0.56	
Uniform Delay, d1	7.7	6.5	5.3	5.5	41.7	
Progression Factor	0.53	0.60	0.45	0.29	1.00	
Incremental Delay, d2	0.2	0.0	0.1	0.4	3.5	
Delay (s)	4.3	4.0	2.5	2.1	45.2	
Level of Service	A	A	A	A	D	
Approach Delay (s)	4.3			2.1	45.2	
Approach LOS	A			A	D	

Intersection Summary

HCM 2000 Control Delay	4.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

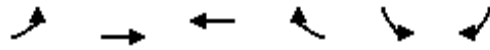
HCM Signalized Intersection Capacity Analysis
 12: EB Ramps & E Wash

2024 Base Condiitons
 AM Peak

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↗↘	↙	↑↑↑	↗↘	↗↘
Traffic Volume (vph)	744	268	71	2656	97	260
Future Volume (vph)	744	268	71	2656	97	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.91	0.88	1.00	0.91	0.97	0.88
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)	5085	2787	1770	5085	3433	2787
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	2787	1770	5085	3433	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	783	282	75	2796	102	274
RTOR Reduction (vph)	0	54	0	0	0	109
Lane Group Flow (vph)	783	228	75	2796	102	165
Turn Type	NA	custom	Prot	NA	Prot	custom
Protected Phases	5	5 2	3	1 8	7	7 8 3
Permitted Phases		2				8
Actuated Green, G (s)	46.9	80.9	9.1	81.7	8.3	43.1
Effective Green, g (s)	46.9	80.9	9.1	81.7	8.3	43.1
Actuated g/C Ratio	0.47	0.81	0.09	0.82	0.08	0.43
Clearance Time (s)	5.0		5.0		5.0	
Vehicle Extension (s)	3.0		3.0		3.0	
Lane Grp Cap (vph)	2384	2254	161	4154	284	1201
v/s Ratio Prot	0.15	0.08	0.04	c0.55	c0.03	0.06
v/s Ratio Perm						
v/c Ratio	0.33	0.10	0.47	0.67	0.36	0.14
Uniform Delay, d1	16.7	2.0	43.1	3.7	43.3	17.2
Progression Factor	0.30	0.49	1.17	0.49	1.00	1.00
Incremental Delay, d2	0.4	0.1	1.5	0.3	0.8	0.1
Delay (s)	5.4	1.1	51.9	2.1	44.1	17.3
Level of Service	A	A	D	A	D	B
Approach Delay (s)	4.3			3.4	24.5	
Approach LOS	A			A	C	
Intersection Summary						
HCM 2000 Control Delay			5.5		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.72			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	20.0
Intersection Capacity Utilization			63.0%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
 13: East Wash & WB Ramps

2024 Base Condiitons
 AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑↑↑	↗	↘	↙	↘
Traffic Volume (vph)	72	925	1770	231	63	807
Future Volume (vph)	72	925	1770	231	63	807
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.91	0.91	1.00	0.97	0.88
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	3433	2787
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	5085	5085	1583	3433	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	76	974	1863	243	66	849
RTOR Reduction (vph)	0	0	0	58	0	15
Lane Group Flow (vph)	76	974	1863	185	66	834
Turn Type	Prot	NA	NA	custom	Prot	pt+ov
Protected Phases	1	6	2		8	8 1
Permitted Phases				6		
Actuated Green, G (s)	14.0	76.0	57.0	76.0	14.0	33.0
Effective Green, g (s)	14.0	76.0	57.0	76.0	14.0	33.0
Actuated g/C Ratio	0.14	0.76	0.57	0.76	0.14	0.33
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	247	3864	2898	1203	480	919
v/s Ratio Prot	0.04	0.19	c0.37		0.02	c0.30
v/s Ratio Perm				0.12		
v/c Ratio	0.31	0.25	0.64	0.15	0.14	0.91
Uniform Delay, d1	38.6	3.6	14.6	3.3	37.7	32.0
Progression Factor	0.79	1.13	0.30	0.00	1.00	1.00
Incremental Delay, d2	0.7	0.2	0.9	0.2	0.1	12.5
Delay (s)	31.3	4.2	5.3	0.2	37.8	44.5
Level of Service	C	A	A	A	D	D
Approach Delay (s)		6.1	4.7		44.0	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
 16: Fair Oaks/Wright & East Wash

2024 Base Condiitons
 AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑		↗	↑↑↑			↑↑		↗	↑	↗
Traffic Volume (veh/h)	165	668	23	115	1758	85	45	366	119	30	54	78
Future Volume (veh/h)	165	668	23	115	1758	85	45	366	119	30	54	78
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	179	726	25	125	1911	92	49	398	129	33	59	85
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	223	2953	101	173	2770	133	87	469	150	101	374	317
Arrive On Green	0.25	1.00	1.00	0.10	0.56	0.55	0.20	0.20	0.17	0.20	0.20	0.20
Sat Flow, veh/h	1781	5069	174	1781	4991	240	226	2347	750	876	1870	1585
Grp Volume(v), veh/h	179	487	264	125	1302	701	307	0	269	33	59	85
Grp Sat Flow(s),veh/h/ln	1781	1702	1839	1781	1702	1827	1757	0	1567	876	1870	1585
Q Serve(g_s), s	9.4	0.0	0.0	6.8	27.6	27.7	13.2	0.0	16.7	3.3	2.6	4.5
Cycle Q Clear(g_c), s	9.4	0.0	0.0	6.8	27.6	27.7	16.9	0.0	16.7	20.0	2.6	4.5
Prop In Lane	1.00		0.09	1.00		0.13	0.16		0.48	1.00		1.00
Lane Grp Cap(c), veh/h	223	1983	1072	173	1889	1014	393	0	313	101	374	317
V/C Ratio(X)	0.80	0.25	0.25	0.72	0.69	0.69	0.78	0.00	0.86	0.33	0.16	0.27
Avail Cap(c_a), veh/h	267	1983	1072	303	1889	1014	393	0	313	101	374	317
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)	1.00	1.00	1.00	0.51	0.51	0.51	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.4	0.0	0.0	43.8	16.0	16.1	38.6	0.0	39.4	48.5	33.0	33.8
Incr Delay (d2), s/veh	13.8	0.3	0.5	2.9	1.1	2.0	9.7	0.0	20.7	1.8	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(95%),veh/ln	7.9	0.1	0.3	5.1	13.7	15.0	12.9	0.0	12.9	1.6	2.2	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.2	0.3	0.5	46.7	17.1	18.1	48.3	0.0	60.0	50.4	33.2	34.3
LnGrp LOS	D	A	A	D	B	B	D	A	E	D	C	C
Approach Vol, veh/h		930			2128			576				177
Approach Delay, s/veh		10.0			19.2			53.8				36.9
Approach LOS		A			B			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.7	62.3		24.0	16.5	59.5		24.0				
Change Period (Y+Rc), s	5.0	5.0		7.0	5.0	5.0		7.0				
Max Green Setting (Gmax), s	16.0	50.0		17.0	14.0	52.0		17.0				
Max Q Clear Time (g_c+I1), s	8.8	2.0		22.0	11.4	29.7		18.9				
Green Ext Time (p_c), s	0.2	3.5		0.0	0.1	11.3		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				23.0								
HCM 6th LOS				C								

HCM 6th Signalized Intersection Summary
18: Mendota & East Wash

2024 Base Condiitons
AM Peak



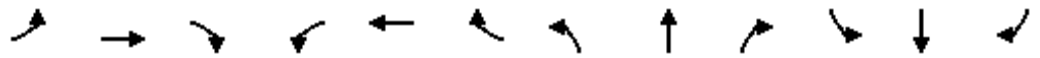
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑			↕			↕	
Traffic Volume (veh/h)	7	965	69	39	2041	11	137	4	35	15	5	18
Future Volume (veh/h)	7	965	69	39	2041	11	137	4	35	15	5	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	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	8	1049	75	42	2218	12	149	4	38	16	5	20
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	232	3508	1089	455	3710	20	282	19	185	119	49	107
Arrive On Green	0.02	0.69	0.69	0.08	1.00	1.00	0.14	0.14	0.12	0.14	0.14	0.12
Sat Flow, veh/h	1781	5106	1585	1781	5241	28	1446	139	1324	451	350	764
Grp Volume(v), veh/h	8	1049	75	42	1440	790	149	0	42	41	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1865	1446	0	1464	1566	0	0
Q Serve(g_s), s	0.1	7.3	1.4	0.6	0.0	0.0	6.8	0.0	2.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	7.3	1.4	0.6	0.0	0.0	8.7	0.0	2.3	1.9	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.90	0.39		0.49
Lane Grp Cap(c), veh/h	232	3508	1089	455	2410	1321	282	0	204	274	0	0
V/C Ratio(X)	0.03	0.30	0.07	0.09	0.60	0.60	0.53	0.00	0.21	0.15	0.00	0.00
Avail Cap(c_a), veh/h	297	3508	1089	483	2410	1321	381	0	309	383	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.91	0.91	0.91	0.67	0.67	0.67	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	3.9	5.5	4.6	3.6	0.0	0.0	36.9	0.0	34.9	34.5	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.2	0.1	0.1	0.7	1.3	1.5	0.0	0.5	0.2	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(95%),veh/ln	0.1	3.7	0.7	0.3	0.4	0.9	5.8	0.0	1.5	1.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.0	5.7	4.7	3.7	0.7	1.3	38.4	0.0	35.4	34.7	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	D	C	A	A
Approach Vol, veh/h		1132			2272			191				41
Approach Delay, s/veh		5.7			1.0			37.8				34.7
Approach LOS		A			A			D				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.7	67.7		16.6	7.6	65.8		16.6				
Change Period (Y+Rc), s	5.0	5.0		5.5	5.0	5.0		5.5				
Max Green Setting (Gmax), s	4.0	53.0		17.5	4.0	53.0		17.5				
Max Q Clear Time (g_c+l1), s	2.1	2.0		3.9	2.6	9.3		10.7				
Green Ext Time (p_c), s	0.0	18.0		0.1	0.0	6.2		0.4				
Intersection Summary												
HCM 6th Ctrl Delay			4.8									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary

2024 Base Condiitons

19: Lien & East Wash

AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑		↖	↗			↕	
Traffic Volume (veh/h)	29	879	164	53	2017	20	95	6	24	19	3	11
Future Volume (veh/h)	29	879	164	53	2017	20	95	6	24	19	3	11
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	32	955	178	58	2192	22	103	7	26	21	3	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	284	3064	951	477	3128	31	382	73	272	231	43	105
Arrive On Green	0.11	1.00	1.00	0.11	1.00	1.00	0.21	0.21	0.19	0.21	0.21	0.19
Sat Flow, veh/h	1781	5106	1585	1781	5213	52	1398	347	1291	792	202	497
Grp Volume(v), veh/h	32	955	178	58	1431	783	103	0	33	36	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1861	1398	0	1638	1490	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	3.6	0.0	1.5	0.1	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	5.2	0.0	1.5	1.6	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.03	1.00		0.79	0.58		0.33
Lane Grp Cap(c), veh/h	284	3064	951	477	2042	1117	382	0	346	378	0	0
V/C Ratio(X)	0.11	0.31	0.19	0.12	0.70	0.70	0.27	0.00	0.10	0.10	0.00	0.00
Avail Cap(c_a), veh/h	284	3064	951	477	2042	1117	382	0	346	378	0	0
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)	0.97	0.97	0.97	0.77	0.77	0.77	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.1	0.0	0.0	5.6	0.0	0.0	29.9	0.0	29.2	28.9	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.3	0.4	0.1	1.6	2.9	0.4	0.0	0.1	0.5	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(95%),veh/ln	0.4	0.1	0.2	0.6	0.8	1.6	3.4	0.0	1.0	1.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.2	0.3	0.4	5.7	1.6	2.9	30.3	0.0	29.3	29.4	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C	A	C	C	A	A
Approach Vol, veh/h		1165			2272			136				36
Approach Delay, s/veh		0.4			2.1			30.1				29.4
Approach LOS		A			A			C				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	58.0		23.0	9.0	58.0		23.0				
Change Period (Y+Rc), s	5.0	5.0		6.0	5.0	5.0		6.0				
Max Green Setting (Gmax), s	4.0	53.0		17.0	4.0	53.0		17.0				
Max Q Clear Time (g_c+l1), s	2.0	2.0		7.2	2.0	2.0		3.6				
Green Ext Time (p_c), s	0.0	6.2		0.3	0.0	17.7		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			2.9									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary
 20: Thierer/Portage & East Wash

2024 Base Condiitons

AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑	↗	↖	↖		↖	↑	↗
Traffic Volume (veh/h)	54	793	77	25	1850	21	87	22	16	16	35	113
Future Volume (veh/h)	54	793	77	25	1850	21	87	22	16	16	35	113
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	59	862	84	27	2011	23	95	24	17	17	38	123
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	104	3493	1084	69	3393	1053	235	147	104	248	269	228
Arrive On Green	0.12	1.00	1.00	0.08	1.00	1.00	0.14	0.14	0.12	0.14	0.14	0.14
Sat Flow, veh/h	1781	5106	1585	1781	5106	1585	1225	1019	722	1366	1870	1585
Grp Volume(v), veh/h	59	862	84	27	2011	23	95	0	41	17	38	123
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1585	1225	0	1740	1366	1870	1585
Q Serve(g_s), s	2.8	0.0	0.0	1.3	0.0	0.0	6.6	0.0	1.9	1.0	1.6	6.5
Cycle Q Clear(g_c), s	2.8	0.0	0.0	1.3	0.0	0.0	8.2	0.0	1.9	2.9	1.6	6.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.41	1.00		1.00
Lane Grp Cap(c), veh/h	104	3493	1084	69	3393	1053	235	0	251	248	269	228
V/C Ratio(X)	0.57	0.25	0.08	0.39	0.59	0.02	0.40	0.00	0.16	0.07	0.14	0.54
Avail Cap(c_a), veh/h	178	3493	1084	178	3393	1053	331	0	387	355	416	352
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)	0.96	0.96	0.96	0.83	0.83	0.83	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.7	0.0	0.0	40.5	0.0	0.0	37.2	0.0	34.2	35.0	33.7	35.7
Incr Delay (d2), s/veh	4.6	0.2	0.1	3.0	0.6	0.0	1.1	0.0	0.3	0.1	0.2	2.0
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(95%),veh/ln	2.3	0.1	0.1	1.1	0.4	0.0	3.6	0.0	1.5	0.6	1.3	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.3	0.2	0.1	43.6	0.6	0.0	38.4	0.0	34.5	35.1	33.9	37.7
LnGrp LOS	D	A	A	D	A	A	D	A	C	D	C	D
Approach Vol, veh/h		1005			2061			136				178
Approach Delay, s/veh		2.7			1.2			37.2				36.7
Approach LOS		A			A			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.5	65.6		17.0	9.2	63.8		17.0				
Change Period (Y+Rc), s	5.5	5.5		6.5	5.5	5.5		6.5				
Max Green Setting (Gmax), s	7.5	47.5		17.5	7.5	47.5		17.5				
Max Q Clear Time (g_c+I1), s	3.3	2.0		8.5	4.8	2.0		10.2				
Green Ext Time (p_c), s	0.0	4.9		0.4	0.0	16.3		0.3				
Intersection Summary												
HCM 6th Ctrl Delay				5.0								
HCM 6th LOS				A								

HCM Signalized Intersection Capacity Analysis

21: Eagan/Continental & East Wash

2024 Base Condiitons
AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	773	29	31	1737	75	35	26	27	36	13	128
Future Volume (vph)	30	773	29	31	1737	75	35	26	27	36	13	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.86		0.97	0.86		0.95	0.95	1.00		1.00	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85		0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.99	1.00		0.99	
Satd. Flow (prot)	1770	6373		3433	6368		1681	1754	1583		1664	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.99	1.00		0.99	
Satd. Flow (perm)	1770	6373		3433	6368		1681	1754	1583		1664	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	840	32	34	1888	82	38	28	29	39	14	139
RTOR Reduction (vph)	0	4	0	0	5	0	0	0	26	0	110	0
Lane Group Flow (vph)	33	868	0	34	1965	0	32	34	3	0	82	0
Turn Type	Prot	NA		Prot	NA		Split	NA	Perm		Split	NA
Protected Phases	5	2		1	6		4	4			3	3
Permitted Phases									4			
Actuated Green, G (s)	4.9	47.5		4.1	46.7		6.2	6.2	6.2		9.2	
Effective Green, g (s)	6.4	49.0		5.6	48.2		8.2	8.2	8.2		11.2	
Actuated g/C Ratio	0.07	0.54		0.06	0.54		0.09	0.09	0.09		0.12	
Clearance Time (s)	5.5	5.5		5.5	5.5		6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	125	3469		213	3410		153	159	144		207	
v/s Ratio Prot	c0.02	0.14		0.01	c0.31		0.02	c0.02			c0.05	
v/s Ratio Perm									0.00			
v/c Ratio	0.26	0.25		0.16	0.58		0.21	0.21	0.02		0.39	
Uniform Delay, d1	39.6	10.8		40.0	14.0		37.9	37.9	37.2		36.3	
Progression Factor	1.18	1.19		1.46	0.30		1.00	1.00	1.00		1.00	
Incremental Delay, d2	1.1	0.2		0.3	0.7		0.7	0.7	0.1		1.2	
Delay (s)	47.7	13.0		58.7	4.8		38.6	38.6	37.3		37.5	
Level of Service	D	B		E	A		D	D	D		D	
Approach Delay (s)		14.3			5.7			38.2			37.5	
Approach LOS		B			A			D			D	

Intersection Summary

HCM 2000 Control Delay	11.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary

2024 Base Condiitons

23: Zeier & E Wash

AM Peak

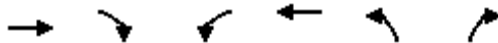


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	48	689	17	126	1517	83	31	14	80	74	22	43
Future Volume (veh/h)	48	689	17	126	1517	83	31	14	80	74	22	43
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		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	51	725	18	133	1597	87	33	15	84	78	23	45
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	65	3515	87	200	3498	190	254	137	117	120	38	74
Arrive On Green	0.01	0.18	0.18	0.06	0.56	0.56	0.07	0.07	0.07	0.07	0.07	0.07
Sat Flow, veh/h	1781	6506	161	3456	6292	343	3456	1870	1585	1781	565	1106
Grp Volume(v), veh/h	51	537	206	133	1225	459	33	15	84	78	0	68
Grp Sat Flow(s),veh/h/ln	1781	1609	1841	1728	1609	1809	1728	1870	1585	1781	0	1671
Q Serve(g_s), s	2.6	8.5	8.6	3.4	13.6	13.6	0.8	0.7	4.7	3.8	0.0	3.6
Cycle Q Clear(g_c), s	2.6	8.5	8.6	3.4	13.6	13.6	0.8	0.7	4.7	3.8	0.0	3.6
Prop In Lane	1.00		0.09	1.00		0.19	1.00		1.00	1.00		0.66
Lane Grp Cap(c), veh/h	65	2607	995	200	2683	1006	254	137	117	120	0	112
V/C Ratio(X)	0.78	0.21	0.21	0.67	0.46	0.46	0.13	0.11	0.72	0.65	0.00	0.60
Avail Cap(c_a), veh/h	99	2607	995	211	2683	1006	518	281	238	247	0	232
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)	1.00	1.00	1.00	0.91	0.91	0.91	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	44.1	20.5	20.5	41.5	11.9	11.9	39.0	38.9	40.8	40.9	0.0	40.8
Incr Delay (d2), s/veh	19.8	0.2	0.5	6.6	0.5	1.4	0.2	0.3	8.1	5.8	0.0	5.1
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(95%),veh/ln	2.7	5.9	7.0	2.8	7.7	8.7	0.6	0.6	3.7	3.4	0.0	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.9	20.7	21.0	48.1	12.4	13.3	39.2	39.3	48.9	46.8	0.0	46.0
LnGrp LOS	E	C	C	D	B	B	D	D	D	D	A	D
Approach Vol, veh/h		794			1817			132			146	
Approach Delay, s/veh		23.5			15.2			45.4			46.4	
Approach LOS		C			B			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.7	54.6		12.6	9.3	56.0		12.1				
Change Period (Y+Rc), s	5.5	6.0		6.5	6.0	6.0		5.5				
Max Green Setting (Gmax), s	5.5	35.0		12.5	5.0	35.0		13.5				
Max Q Clear Time (g_c+I1), s	5.4	10.6		5.8	4.6	15.6		6.7				
Green Ext Time (p_c), s	0.0	4.8		0.4	0.0	11.0		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			20.5									
HCM 6th LOS			C									

HCM 6th Signalized Intersection Summary

24: E Springs & E Wash

2024 Base Condiitons
AM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↗	↖↗	↑↑↑	↖↗	↗
Traffic Volume (veh/h)	763	100	204	1563	115	48
Future Volume (veh/h)	763	100	204	1563	115	48
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	803	0	215	1645	121	51
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	3345		295	4093	206	94
Arrive On Green	0.66	0.00	0.09	0.80	0.06	0.06
Sat Flow, veh/h	5274	1585	3456	5274	3456	1585
Grp Volume(v), veh/h	803	0	215	1645	121	51
Grp Sat Flow(s),veh/h/ln	1702	1585	1728	1702	1728	1585
Q Serve(g_s), s	5.8	0.0	5.5	8.5	3.1	2.8
Cycle Q Clear(g_c), s	5.8	0.0	5.5	8.5	3.1	2.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	3345		295	4093	206	94
V/C Ratio(X)	0.24		0.73	0.40	0.59	0.54
Avail Cap(c_a), veh/h	3345		442	4093	595	273
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.98	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	6.3	0.0	40.2	2.6	41.2	41.1
Incr Delay (d2), s/veh	0.2	0.0	3.5	0.3	2.7	4.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.1	0.0	4.3	2.6	2.5	2.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	6.5	0.0	43.6	2.9	43.9	45.8
LnGrp LOS	A		D	A	D	D
Approach Vol, veh/h	803	A		1860	172	
Approach Delay, s/veh	6.5			7.6	44.5	
Approach LOS	A			A	D	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	13.2	65.0		11.9		78.1
Change Period (Y+Rc), s	5.5	6.0		6.5		6.0
Max Green Setting (Gmax), s	11.5	45.0		15.5		62.0
Max Q Clear Time (g_c+I1), s	7.5	7.8		5.1		10.5
Green Ext Time (p_c), s	0.2	6.0		0.4		17.9

Intersection Summary

HCM 6th Ctrl Delay		9.5	
HCM 6th LOS		A	

Notes













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

HCM Signalized Intersection Capacity Analysis

2024 Base Conditions

1: Blair St. & East Washington Ave.

MD Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↑↑	↑↑		↑		↑↑	↑	↑↑	
Traffic Volume (vph)	0	489	26	568	688	0	54	0	561	301	72	17
Future Volume (vph)	0	489	26	568	688	0	54	0	561	301	72	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0		4.0	4.0	4.0	
Lane Util. Factor		0.91		0.97	0.95		1.00		0.88	0.91	0.91	
Frt		0.99		1.00	1.00		1.00		0.85	1.00	0.99	
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	0.97	
Satd. Flow (prot)		5047		3433	3539		1770		2787	1610	3252	
Flt Permitted		1.00		0.95	1.00		0.95		1.00	0.95	0.97	
Satd. Flow (perm)		5047		3433	3539		1770		2787	1610	3252	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	515	27	598	724	0	57	0	591	317	76	18
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	536	0	598	724	0	57	0	591	158	246	0
Turn Type		NA		Prot	NA		Prot		pt+ov	Split	NA	
Protected Phases		1		2	1 2		3		2 3	4	4	
Permitted Phases							3		3 2			
Actuated Green, G (s)		18.7		40.4	63.6		6.5		51.4	15.4	15.4	
Effective Green, g (s)		19.2		40.9	64.1		6.5		51.9	17.4	17.4	
Actuated g/C Ratio		0.19		0.41	0.64		0.06		0.52	0.17	0.17	
Clearance Time (s)		4.5		4.5			4.0			6.0	6.0	
Vehicle Extension (s)		3.0		3.0			2.0			3.0	3.0	
Lane Grp Cap (vph)		969		1404	2268		115		1446	280	565	
v/s Ratio Prot		c0.11		c0.17	0.20		0.03		c0.21	c0.10	0.08	
v/s Ratio Perm												
v/c Ratio		0.55		0.43	0.32		0.50		0.41	0.56	0.43	
Uniform Delay, d1		36.5		21.1	8.1		45.2		14.7	37.8	36.9	
Progression Factor		1.00		1.19	1.06		1.00		1.00	1.00	1.00	
Incremental Delay, d2		0.7		0.9	0.1		1.2		0.1	2.6	0.5	
Delay (s)		37.2		26.1	8.7		46.4		14.8	40.4	37.4	
Level of Service		D		C	A		D		B	D	D	
Approach Delay (s)		37.2			16.6			17.5			38.6	
Approach LOS		D			B			B			D	
Intersection Summary												
HCM 2000 Control Delay			23.7				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			53.7%				ICU Level of Service			A		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: Livingston Ave & East Washington Ave.

2024 Base Conditions

MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑		↖	↑↑↑				↗			↖
Traffic Volume (vph)	107	1201	43	100	1257	36	0	0	39	0	0	30
Future Volume (vph)	107	1201	43	100	1257	36	0	0	39	0	0	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0				5.0			5.0
Lane Util. Factor	1.00	0.91		1.00	0.91				1.00			1.00
Frt	1.00	0.99		1.00	1.00				0.86			0.86
Flt Protected	0.95	1.00		0.95	1.00				1.00			1.00
Satd. Flow (prot)	1770	5059		1770	5064				1611			1611
Flt Permitted	0.18	1.00		0.19	1.00				1.00			1.00
Satd. Flow (perm)	327	5059		348	5064				1611			1611
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	113	1264	45	105	1323	38	0	0	41	0	0	32
RTOR Reduction (vph)	0	3	0	0	2	0	0	0	34	0	0	27
Lane Group Flow (vph)	113	1306	0	105	1359	0	0	0	7	0	0	5
Turn Type	D.P+P	NA		D.Pm	NA				Prot			Over
Protected Phases	4	2			6				8			4
Permitted Phases	6			2								
Actuated Green, G (s)	90.0	74.0		74.0	74.0				16.0			16.0
Effective Green, g (s)	90.0	74.0		74.0	74.0				16.0			16.0
Actuated g/C Ratio	0.90	0.74		0.74	0.74				0.16			0.16
Clearance Time (s)	5.0	5.0		5.0	5.0				5.0			5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0				3.0			3.0
Lane Grp Cap (vph)	525	3743		257	3747				257			257
v/s Ratio Prot	c0.03	0.26			0.27				0.00			0.00
v/s Ratio Perm	0.16			c0.30								
v/c Ratio	0.22	0.35		0.41	0.36				0.03			0.02
Uniform Delay, d1	0.7	4.6		4.8	4.6				35.4			35.4
Progression Factor	4.42	1.24		0.33	0.10				1.00			1.00
Incremental Delay, d2	0.2	0.2		4.3	0.2				0.0			0.0
Delay (s)	3.4	5.9		5.9	0.7				35.5			35.4
Level of Service	A	A		A	A				D			D
Approach Delay (s)		5.7			1.1			35.5			35.4	
Approach LOS		A			A			D			D	

Intersection Summary

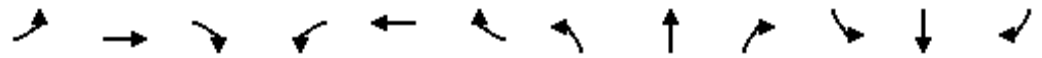
HCM 2000 Control Delay	4.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	39.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
 3: Paterson St. & East Washington Ave.

2024 Base Conditions

MD Peak

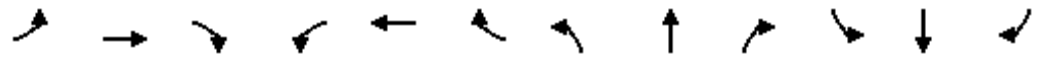


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑	↗		↕		↘	↑	↗
Traffic Volume (veh/h)	32	1412	32	28	1255	35	16	24	33	65	24	26
Future Volume (veh/h)	32	1412	32	28	1255	35	16	24	33	65	24	26
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	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	34	1486	34	29	1321	37	17	25	35	68	25	27
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	382	4250	1319	358	4250	1319	62	42	50	185	126	107
Arrive On Green	1.00	1.00	1.00	0.83	0.83	0.83	0.08	0.07	0.07	0.08	0.07	0.07
Sat Flow, veh/h	401	5106	1585	343	5106	1585	265	627	743	1343	1870	1585
Grp Volume(v), veh/h	34	1486	34	29	1321	37	77	0	0	68	25	27
Grp Sat Flow(s),veh/h/ln	401	1702	1585	343	1702	1585	1635	0	0	1343	1870	1585
Q Serve(g_s), s	0.7	0.0	0.0	1.5	5.8	0.4	2.6	0.0	0.0	0.0	1.3	1.6
Cycle Q Clear(g_c), s	6.5	0.0	0.0	1.5	5.8	0.4	4.5	0.0	0.0	4.3	1.3	1.6
Prop In Lane	1.00		1.00	1.00		1.00	0.22		0.45	1.00		1.00
Lane Grp Cap(c), veh/h	382	4250	1319	358	4250	1319	171	0	0	185	126	107
V/C Ratio(X)	0.09	0.35	0.03	0.08	0.31	0.03	0.45	0.00	0.00	0.37	0.20	0.25
Avail Cap(c_a), veh/h	382	4250	1319	358	4250	1319	672	0	0	604	711	602
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)	0.95	0.95	0.95	0.84	0.84	0.84	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.2	0.0	0.0	1.5	1.9	1.4	45.4	0.0	0.0	44.5	44.1	44.2
Incr Delay (d2), s/veh	0.4	0.2	0.0	0.4	0.2	0.0	1.9	0.0	0.0	1.2	0.8	1.2
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	0.1	0.0	0.1	1.0	0.1	1.9	0.0	0.0	1.7	0.6	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.7	0.2	0.0	1.9	2.1	1.5	47.3	0.0	0.0	45.7	44.8	45.4
LnGrp LOS	A	A	A	A	A	A	D	A	A	D	D	D
Approach Vol, veh/h		1554			1387			77			120	
Approach Delay, s/veh		0.2			2.0			47.3			45.5	
Approach LOS		A			A			D			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		88.2		11.8		88.2		11.8				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		52.0		38.0		52.0		38.0				
Max Q Clear Time (g_c+l1), s		8.5		6.3		7.8		6.5				
Green Ext Time (p_c), s		11.1		0.5		9.5		0.3				
Intersection Summary												
HCM 6th Ctrl Delay				3.9								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary
 4: Ingersoll St. & East Washington Ave.

2024 Base Conditions

MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑	↗		↑	↗		↘	
Traffic Volume (veh/h)	37	1483	36	57	1326	36	42	26	38	31	16	18
Future Volume (veh/h)	37	1483	36	57	1326	36	42	26	38	31	16	18
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	39	1561	38	60	1396	38	44	27	40	33	17	19
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	315	3665	1138	358	4112	1276	132	61	134	92	38	29
Arrive On Green	1.00	1.00	1.00	0.02	0.54	0.54	0.11	0.08	0.08	0.11	0.08	0.08
Sat Flow, veh/h	373	5106	1585	1781	5106	1585	875	717	1585	459	443	343
Grp Volume(v), veh/h	39	1561	38	60	1396	38	71	0	40	69	0	0
Grp Sat Flow(s),veh/h/ln	373	1702	1585	1781	1702	1585	1592	0	1585	1244	0	0
Q Serve(g_s), s	1.1	0.0	0.0	0.8	15.4	1.1	0.0	0.0	2.4	2.3	0.0	0.0
Cycle Q Clear(g_c), s	7.8	0.0	0.0	0.8	15.4	1.1	4.0	0.0	2.4	6.3	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.62		1.00	0.48		0.28
Lane Grp Cap(c), veh/h	315	3665	1138	358	4112	1276	233	0	134	190	0	0
V/C Ratio(X)	0.12	0.43	0.03	0.17	0.34	0.03	0.30	0.00	0.30	0.36	0.00	0.00
Avail Cap(c_a), veh/h	315	3665	1138	413	4112	1276	669	0	586	619	0	0
HCM Platoon Ratio	2.00	2.00	2.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.83	0.83	0.83	0.87	0.87	0.87	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.4	0.0	0.0	2.8	8.0	4.7	42.9	0.0	43.0	44.2	0.0	0.0
Incr Delay (d2), s/veh	0.7	0.3	0.0	0.2	0.0	0.0	0.7	0.0	1.2	1.2	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	0.1	0.1	0.0	0.2	6.1	0.2	1.7	0.0	1.0	1.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	1.0	0.3	0.0	3.0	8.1	4.8	43.6	0.0	44.2	45.3	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	D	D	A	A
Approach Vol, veh/h		1638			1494			111				69
Approach Delay, s/veh		0.3			7.8			43.8				45.3
Approach LOS		A			A			D				D
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	8.7	76.3		15.0		85.0		15.0				
Change Period (Y+Rc), s	5.5	4.5		6.5		4.5		6.5				
Max Green Setting (Gmax), s	6.3	40.2		37.0		52.0		37.0				
Max Q Clear Time (g_c+I1), s	2.8	9.8		8.3		17.4		6.0				
Green Ext Time (p_c), s	0.0	11.2		0.2		8.9		0.4				

Intersection Summary

HCM 6th Ctrl Delay				6.1								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary
 5: Baldwin St. & East Washington Ave.

2024 Base Conditions

MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	69	1463	27	42	1297	75	20	50	37	78	58	62
Future Volume (veh/h)	69	1463	27	42	1297	75	20	50	37	78	58	62
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	73	1540	28	44	1365	79	21	53	39	82	61	65
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	239	2307	716	246	2706	840	46	92	586	57	27	586
Arrive On Green	0.90	0.90	0.90	0.06	1.00	1.00	0.38	0.37	0.37	0.38	0.37	0.37
Sat Flow, veh/h	369	5106	1585	1781	5106	1585	0	248	1585	0	73	1585
Grp Volume(v), veh/h	73	1540	28	44	1365	79	74	0	39	143	0	65
Grp Sat Flow(s),veh/h/ln	369	1702	1585	1781	1702	1585	248	0	1585	73	0	1585
Q Serve(g_s), s	3.2	7.3	0.2	1.3	0.0	0.0	0.0	0.0	1.6	0.0	0.0	2.7
Cycle Q Clear(g_c), s	3.2	7.3	0.2	1.3	0.0	0.0	38.0	0.0	1.6	38.0	0.0	2.7
Prop In Lane	1.00		1.00	1.00		1.00	0.28		1.00	0.57		1.00
Lane Grp Cap(c), veh/h	239	2307	716	246	2706	840	140	0	586	84	0	586
V/C Ratio(X)	0.31	0.67	0.04	0.18	0.50	0.09	0.53	0.00	0.07	1.69	0.00	0.11
Avail Cap(c_a), veh/h	239	2307	716	267	2706	840	140	0	586	84	0	586
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)	0.64	0.64	0.64	0.87	0.87	0.87	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	2.8	3.0	2.7	12.9	0.0	0.0	25.9	0.0	20.3	38.3	0.0	20.7
Incr Delay (d2), s/veh	2.1	1.0	0.1	0.3	0.6	0.2	3.6	0.0	0.0	357.2	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	0.3	1.4	0.1	0.5	0.1	0.0	1.3	0.0	0.6	10.5	0.0	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.9	4.0	2.7	13.2	0.6	0.2	29.5	0.0	20.4	395.4	0.0	20.8
LnGrp LOS	A	A	A	B	A	A	C	A	C	F	A	C
Approach Vol, veh/h		1641			1488			113				208
Approach Delay, s/veh		4.0			0.9			26.4				278.4
Approach LOS		A			A			C				F
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	7.8	50.2		42.0		58.0		42.0				
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s	4.0	44.0		37.0		53.0		37.0				
Max Q Clear Time (g_c+I1), s	3.3	9.3		40.0		2.0		40.0				
Green Ext Time (p_c), s	0.0	12.4		0.0		9.4		0.0				

Intersection Summary
































HCM 6th Ctrl Delay	20.0
HCM 6th LOS	B

HCM Signalized Intersection Capacity Analysis

2024 Base Conditions

6: First & E Wash

MD Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	 	  			  						 	 	
Traffic Volume (vph)	191	1297	97	43	1164	98	112	113	52	157	90	197	
Future Volume (vph)	191	1297	97	43	1164	98	112	113	52	157	90	197	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.5	6.5	6.5	
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.88	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	2787	
Flt Permitted	0.95	1.00	1.00	0.13	1.00	1.00	0.69	1.00	1.00	0.68	1.00	1.00	
Satd. Flow (perm)	3433	5085	1583	245	5085	1583	1292	1863	1583	1263	1863	2787	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	208	1410	105	47	1265	107	122	123	57	171	98	214	
RTOR Reduction (vph)	0	0	56	0	0	57	0	0	41	0	0	128	
Lane Group Flow (vph)	208	1410	49	47	1265	50	122	123	16	171	98	86	
Turn Type	Prot	NA	custom	D.P+P	NA	Perm	D.P+P	NA	Perm	Perm	NA	custom	
Protected Phases	1	6		5	2		3	3 4			4		
Permitted Phases			2	6		2	4		3 4	4		4 1	
Actuated Green, G (s)	9.2	53.0	46.3	56.0	46.3	46.3	22.5	27.5	27.5	13.9	13.9	29.6	
Effective Green, g (s)	9.2	53.0	46.3	56.0	46.3	46.3	22.5	27.5	27.5	13.9	13.9	29.6	
Actuated g/C Ratio	0.09	0.53	0.46	0.56	0.46	0.46	0.22	0.28	0.28	0.14	0.14	0.30	
Clearance Time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0			6.5	6.5		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0		
Lane Grp Cap (vph)	315	2695	732	182	2354	732	331	512	435	175	258	824	
v/s Ratio Prot	c0.06	c0.28		0.01	0.25		c0.03	0.07			0.05		
v/s Ratio Perm			0.03	0.14		0.03	0.05		0.01	c0.14		0.03	
v/c Ratio	0.66	0.52	0.07	0.26	0.54	0.07	0.37	0.24	0.04	0.98	0.38	0.10	
Uniform Delay, d1	43.9	15.3	14.9	11.1	19.2	14.9	32.3	28.1	26.5	42.9	39.1	25.6	
Progression Factor	1.40	0.17	0.59	0.55	0.36	0.75	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.2	0.6	0.1	0.7	0.9	0.2	0.7	0.2	0.0	60.7	0.9	0.1	
Delay (s)	65.5	3.2	9.0	6.8	7.9	11.4	33.0	28.4	26.6	103.6	40.1	25.6	
Level of Service	E	A	A	A	A	B	C	C	C	F	D	C	
Approach Delay (s)		11.0			8.1			29.9			56.2		
Approach LOS		B			A			C			E		
Intersection Summary													
HCM 2000 Control Delay			17.0									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.62										
Actuated Cycle Length (s)			100.0									Sum of lost time (s)	22.0
Intersection Capacity Utilization			57.5%									ICU Level of Service	B
Analysis Period (min)			15										

c Critical Lane Group

HCM 6th Signalized Intersection Summary

2024 Base Conditions

7: Fourth & E Wash

MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	1457	13	28	1247	32	16	16	26	43	13	19
Future Volume (veh/h)	17	1457	13	28	1247	32	16	16	26	43	13	19
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	18	1584	14	30	1355	35	17	17	28	47	14	21
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	313	3167	983	269	3167	983	55	38	420	65	11	420
Arrive On Green	1.00	1.00	1.00	1.00	1.00	1.00	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	389	5106	1585	318	5106	1585	2	144	1585	4	43	1585
Grp Volume(v), veh/h	18	1584	14	30	1355	35	34	0	28	61	0	21
Grp Sat Flow(s),veh/h/ln	389	1702	1585	318	1702	1585	146	0	1585	48	0	1585
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	1.3	0.1	0.0	1.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	26.5	0.0	1.3	26.5	0.0	1.0
Prop In Lane	1.00		1.00	1.00		1.00	0.50		1.00	0.77		1.00
Lane Grp Cap(c), veh/h	313	3167	983	269	3167	983	93	0	420	76	0	420
V/C Ratio(X)	0.06	0.50	0.01	0.11	0.43	0.04	0.37	0.00	0.07	0.80	0.00	0.05
Avail Cap(c_a), veh/h	313	3167	983	269	3167	983	93	0	420	77	0	420
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)	0.83	0.83	0.83	0.96	0.96	0.96	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	30.5	0.0	27.5	45.2	0.0	27.4
Incr Delay (d2), s/veh	0.3	0.5	0.0	0.8	0.4	0.1	2.4	0.0	0.1	43.1	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	0.0	0.1	0.0	0.1	0.1	0.0	0.7	0.0	0.5	2.4	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.3	0.5	0.0	0.8	0.4	0.1	32.9	0.0	27.6	88.3	0.0	27.4
LnGrp LOS	A	A	A	A	A	A	C	A	C	F	A	C
Approach Vol, veh/h		1616			1420			62				82
Approach Delay, s/veh		0.5			0.4			30.5				72.7
Approach LOS		A			A			C				E
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		67.0		33.0		67.0		33.0				
Change Period (Y+Rc), s		5.0		6.5		5.0		6.5				
Max Green Setting (Gmax), s		62.0		26.5		62.0		26.5				
Max Q Clear Time (g_c+I1), s		2.0		28.5		2.0		28.5				
Green Ext Time (p_c), s		19.1		0.0		15.8		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				2.9								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary

2024 Base Conditions

8: Sixth & E Wash

MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	1506	12	34	1247	16	18	10	21	28	29	10
Future Volume (veh/h)	12	1506	12	34	1247	16	18	10	21	28	29	10
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	13	1637	13	37	1355	17	20	11	23	30	32	11
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	353	3630	1127	303	4049	1257	219	52	109	98	89	24
Arrive On Green	0.71	0.71	0.71	0.03	0.79	0.79	0.10	0.10	0.10	0.10	0.10	0.10
Sat Flow, veh/h	396	5106	1585	1781	5106	1585	1364	539	1128	485	917	249
Grp Volume(v), veh/h	13	1637	13	37	1355	17	20	0	34	73	0	0
Grp Sat Flow(s),veh/h/ln	396	1702	1585	1781	1702	1585	1364	0	1667	1651	0	0
Q Serve(g_s), s	1.0	13.6	0.2	0.5	7.5	0.2	0.0	0.0	1.9	1.5	0.0	0.0
Cycle Q Clear(g_c), s	1.0	13.6	0.2	0.5	7.5	0.2	1.0	0.0	1.9	4.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.68	0.41		0.15
Lane Grp Cap(c), veh/h	353	3630	1127	303	4049	1257	219	0	162	211	0	0
V/C Ratio(X)	0.04	0.45	0.01	0.12	0.33	0.01	0.09	0.00	0.21	0.35	0.00	0.00
Avail Cap(c_a), veh/h	353	3630	1127	353	4049	1257	237	0	183	232	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)	0.93	0.93	0.93	0.78	0.78	0.78	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	4.3	6.2	4.2	4.3	2.9	2.2	41.2	0.0	41.6	42.5	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.4	0.0	0.1	0.2	0.0	0.2	0.0	0.6	1.0	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	0.1	4.1	0.1	0.1	1.7	0.1	0.5	0.0	0.8	1.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.5	6.5	4.2	4.4	3.1	2.2	41.4	0.0	42.3	43.5	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	D	D	A	A
Approach Vol, veh/h		1663			1409			54				73
Approach Delay, s/veh		6.5			3.1			41.9				43.5
Approach LOS		A			A			D				D
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	8.2	76.1		15.7		84.3		15.7				
Change Period (Y+Rc), s	5.0	5.0		6.0		5.0		6.0				
Max Green Setting (Gmax), s	6.0	67.0		11.0		78.0		11.0				
Max Q Clear Time (g_c+I1), s	2.5	15.6		6.0		9.5		3.9				
Green Ext Time (p_c), s	0.0	12.4		0.1		8.9		0.1				

Intersection Summary

HCM 6th Ctrl Delay	6.5
HCM 6th LOS	A

Notes























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

HCM Signalized Intersection Capacity Analysis

2024 Base Conditions

9: Milwaukee/North & E Wash

MD Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	1380	177	29	1128	21	155	84	47	32	103	44
Future Volume (vph)	40	1380	177	29	1128	21	155	84	47	32	103	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	6.5	6.5		5.0	5.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.97	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1762		1770	1779	
Flt Permitted	0.13	1.00	1.00	0.10	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	244	5085	1583	186	5085	1583	3433	1762		1770	1779	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	1500	192	32	1226	23	168	91	51	35	112	48
RTOR Reduction (vph)	0	0	52	0	0	21	0	22	0	0	16	0
Lane Group Flow (vph)	43	1500	140	32	1226	2	168	120	0	35	144	0
Turn Type	D.P+P	NA	custom	D.P+P	NA	custom	Split	NA		Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases	6		1 2	2		1						
Actuated Green, G (s)	54.9	47.9	59.4	54.9	39.5	7.0	12.1	12.1		12.5	12.5	
Effective Green, g (s)	54.9	47.9	59.4	54.9	39.5	7.0	12.1	12.1		12.5	12.5	
Actuated g/C Ratio	0.55	0.48	0.59	0.55	0.40	0.07	0.12	0.12		0.12	0.12	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	6.5	6.5		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	368	2435	940	212	2008	110	415	213		221	222	
v/s Ratio Prot	0.02	c0.29		0.01	0.24		0.05	c0.07		0.02	c0.08	
v/s Ratio Perm	0.05		c0.09	0.07		0.00						
v/c Ratio	0.12	0.62	0.15	0.15	0.61	0.01	0.40	0.56		0.16	0.65	
Uniform Delay, d1	11.8	19.3	9.0	12.2	24.1	43.3	40.6	41.5		39.1	41.7	
Progression Factor	0.75	1.37	1.69	0.67	0.61	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	1.1	0.1	0.3	1.3	0.1	0.6	3.4		0.3	6.4	
Delay (s)	9.4	27.4	15.3	8.5	15.9	43.3	41.3	44.8		39.4	48.1	
Level of Service	A	C	B	A	B	D	D	D		D	D	
Approach Delay (s)		25.6			16.2			42.9			46.5	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			24.9				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			20.5		
Intersection Capacity Utilization			59.1%				ICU Level of Service			B		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2024 Base Conditions

10: Johnson & E Wash

MD Peak



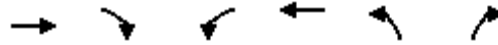
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	1600	16	60	1091	183	29	19	52	223	25	21
Future Volume (vph)	17	1600	16	60	1091	183	29	19	52	223	25	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		5.0		6.0	6.0	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00		1.00		0.95	0.95	
Frt	1.00	1.00		1.00	1.00	0.85		0.93		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	0.97	
Satd. Flow (prot)	1770	5078		1770	5085	1583		1708		1681	1673	
Flt Permitted	0.20	1.00		0.10	1.00	1.00		0.99		0.69	0.74	
Satd. Flow (perm)	380	5078		179	5085	1583		1708		1214	1270	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	18	1739	17	65	1186	199	32	21	57	242	27	23
RTOR Reduction (vph)	0	1	0	0	0	68	0	39	0	0	7	0
Lane Group Flow (vph)	18	1755	0	65	1186	131	0	71	0	145	140	0
Turn Type	Perm	NA		Perm	NA	Perm	Split	NA		Perm	NA	
Protected Phases		2			2		3	3			4	
Permitted Phases	2			2		2				4		
Actuated Green, G (s)	65.9	65.9		65.9	65.9	65.9		5.0		13.6	13.6	
Effective Green, g (s)	65.9	65.9		65.9	65.9	65.9		5.0		13.6	13.6	
Actuated g/C Ratio	0.66	0.66		0.66	0.66	0.66		0.05		0.14	0.14	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		5.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	250	3346		117	3351	1043		85		165	172	
v/s Ratio Prot		0.35			0.23			c0.04				
v/s Ratio Perm	0.05			c0.36		0.08				c0.12	0.11	
v/c Ratio	0.07	0.52		0.56	0.35	0.13		0.84		0.88	0.81	
Uniform Delay, d1	6.1	8.9		9.2	7.6	6.3		47.1		42.4	42.0	
Progression Factor	2.23	1.60		0.70	0.40	0.13		1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.5		17.0	0.3	0.2		47.7		37.2	24.7	
Delay (s)	14.1	14.8		23.5	3.3	1.1		94.8		79.6	66.7	
Level of Service	B	B		C	A	A		F		E	E	
Approach Delay (s)		14.7			3.9			94.8			73.1	
Approach LOS		B			A			F			E	
Intersection Summary												
HCM 2000 Control Delay			17.6				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			15.5		
Intersection Capacity Utilization			61.2%				ICU Level of Service			B		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 11: Marquette & E Wash

2024 Base Conditions

MD Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↗	↖	↑↑↑	↘	
Traffic Volume (vph)	1506	58	56	1216	72	49
Future Volume (vph)	1506	58	56	1216	72	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.0	4.5	6.5	
Lane Util. Factor	0.91	1.00	1.00	0.91	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (prot)	5085	1583	1770	5085	1710	
Flt Permitted	1.00	1.00	0.11	1.00	0.97	
Satd. Flow (perm)	5085	1583	208	5085	1710	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1637	63	61	1322	78	53
RTOR Reduction (vph)	0	15	0	0	27	0
Lane Group Flow (vph)	1637	48	61	1322	104	0
Turn Type	NA	Perm	D.P+P	NA	Prot	
Protected Phases	2		3	2 3	4	
Permitted Phases		2	2			
Actuated Green, G (s)	64.8	64.8	73.7	78.2	11.3	
Effective Green, g (s)	64.8	64.8	73.7	78.2	11.3	
Actuated g/C Ratio	0.65	0.65	0.74	0.78	0.11	
Clearance Time (s)	4.5	4.5	4.0		6.5	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	3295	1025	292	3976	193	
v/s Ratio Prot	c0.32		0.02	c0.26	c0.06	
v/s Ratio Perm		0.03	0.14			
v/c Ratio	0.50	0.05	0.21	0.33	0.54	
Uniform Delay, d1	9.1	6.4	10.1	3.2	41.9	
Progression Factor	0.69	0.44	0.64	0.37	1.00	
Incremental Delay, d2	0.4	0.1	0.3	0.0	3.1	
Delay (s)	6.7	2.9	6.8	1.2	45.0	
Level of Service	A	A	A	A	D	
Approach Delay (s)	6.6			1.5	45.0	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	6.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 12: EB Ramps & E Wash

2024 Base Conditions

MD Peak

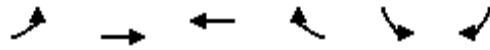
	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↗↘	↙	↑↑↑	↗↘	↗↘
Traffic Volume (vph)	1095	347	93	1260	104	280
Future Volume (vph)	1095	347	93	1260	104	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.91	0.88	1.00	0.91	0.97	0.88
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)	5085	2787	1770	5085	3433	2787
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	2787	1770	5085	3433	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1153	365	98	1326	109	295
RTOR Reduction (vph)	0	72	0	0	0	34
Lane Group Flow (vph)	1153	293	98	1326	109	261
Turn Type	NA	custom	Prot	NA	Prot	custom
Protected Phases	5	5 2	3	1 8	7	7 8 3
Permitted Phases		2				8
Actuated Green, G (s)	46.3	80.3	9.7	79.6	10.4	43.7
Effective Green, g (s)	46.3	80.3	9.7	79.6	10.4	43.7
Actuated g/C Ratio	0.46	0.80	0.10	0.80	0.10	0.44
Clearance Time (s)	5.0		5.0		5.0	
Vehicle Extension (s)	3.0		3.0		3.0	
Lane Grp Cap (vph)	2354	2237	171	4047	357	1217
v/s Ratio Prot	c0.23	0.11	c0.06	c0.26	c0.03	0.09
v/s Ratio Perm						
v/c Ratio	0.49	0.13	0.57	0.33	0.31	0.21
Uniform Delay, d1	18.6	2.2	43.2	2.8	41.5	17.5
Progression Factor	0.89	0.00	0.76	0.71	1.00	1.00
Incremental Delay, d2	0.6	0.1	4.4	0.0	0.5	0.1
Delay (s)	17.2	0.1	37.2	2.1	41.9	17.6
Level of Service	B	A	D	A	D	B
Approach Delay (s)	13.1			4.5	24.2	
Approach LOS	B			A	C	
Intersection Summary						
HCM 2000 Control Delay			10.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.46			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	20.0
Intersection Capacity Utilization			42.1%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

13: East Wash & WB Ramps

2024 Base Conditions

MD Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	97	1227	1004	191	58	285
Future Volume (vph)	97	1227	1004	191	58	285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.91	0.91	1.00	0.97	0.88
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	3433	2787
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	5085	5085	1583	3433	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	102	1292	1057	201	61	300
RTOR Reduction (vph)	0	0	0	39	0	122
Lane Group Flow (vph)	102	1292	1057	162	61	178
Turn Type	Prot	NA	NA	custom	Prot	pt+ov
Protected Phases	1	6	2		8	8 1
Permitted Phases				6		
Actuated Green, G (s)	11.0	80.6	64.6	80.6	9.4	25.4
Effective Green, g (s)	11.0	80.6	64.6	80.6	9.4	25.4
Actuated g/C Ratio	0.11	0.81	0.65	0.81	0.09	0.25
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	194	4098	3284	1275	322	707
v/s Ratio Prot	c0.06	c0.25	0.21		0.02	c0.06
v/s Ratio Perm				0.10		
v/c Ratio	0.53	0.32	0.32	0.13	0.19	0.25
Uniform Delay, d1	42.0	2.5	7.9	2.1	41.8	29.7
Progression Factor	0.71	4.40	0.69	0.38	1.00	1.00
Incremental Delay, d2	2.3	0.2	0.2	0.2	0.3	0.2
Delay (s)	32.0	11.3	5.7	1.0	42.1	29.9
Level of Service	C	B	A	A	D	C
Approach Delay (s)		12.8	4.9		32.0	
Approach LOS		B	A		C	

Intersection Summary

HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	40.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
 16: Fair Oaks/Wright & East Wash

2024 Base Conditions

MD Peak

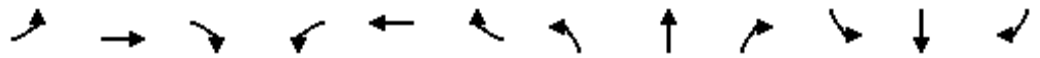


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑		↖	↑↑↑			↕		↗	↑	↖
Traffic Volume (veh/h)	164	1109	39	114	1003	134	46	126	124	92	124	107
Future Volume (veh/h)	164	1109	39	114	1003	134	46	126	124	92	124	107
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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	178	1205	42	124	1090	146	50	137	135	100	135	116
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	222	2955	103	172	2531	339	111	255	256	187	374	317
Arrive On Green	0.25	1.00	1.00	0.10	0.56	0.55	0.20	0.20	0.17	0.20	0.20	0.20
Sat Flow, veh/h	1781	5066	177	1781	4555	610	322	1277	1282	1107	1870	1585
Grp Volume(v), veh/h	178	810	437	124	814	422	167	0	155	100	135	116
Grp Sat Flow(s),veh/h/ln	1781	1702	1839	1781	1702	1761	1410	0	1471	1107	1870	1585
Q Serve(g_s), s	9.4	0.0	0.0	6.8	14.0	14.1	5.5	0.0	9.6	8.9	6.2	6.3
Cycle Q Clear(g_c), s	9.4	0.0	0.0	6.8	14.0	14.1	11.8	0.0	9.6	18.5	6.2	6.3
Prop In Lane	1.00		0.10	1.00		0.35	0.30		0.87	1.00		1.00
Lane Grp Cap(c), veh/h	222	1985	1072	172	1891	978	329	0	294	187	374	317
V/C Ratio(X)	0.80	0.41	0.41	0.72	0.43	0.43	0.51	0.00	0.53	0.53	0.36	0.37
Avail Cap(c_a), veh/h	267	1985	1072	303	1891	978	329	0	294	187	374	317
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)	1.00	1.00	1.00	0.65	0.65	0.65	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.4	0.0	0.0	43.8	13.0	13.1	36.7	0.0	37.0	44.1	34.5	34.5
Incr Delay (d2), s/veh	13.7	0.6	1.2	3.7	0.5	0.9	1.3	0.0	1.7	2.9	0.6	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	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	0.2	0.3	3.1	5.1	5.4	3.8	0.0	3.6	2.6	2.9	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.1	0.6	1.2	47.5	13.4	14.0	38.0	0.0	38.7	47.0	35.1	35.2
LnGrp LOS	D	A	A	D	B	B	D	A	D	D	D	D
Approach Vol, veh/h		1425			1360			322			351	
Approach Delay, s/veh		7.0			16.7			38.3			38.5	
Approach LOS		A			B			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.7	62.3		24.0	16.4	59.6		24.0				
Change Period (Y+Rc), s	5.0	5.0		7.0	5.0	5.0		7.0				
Max Green Setting (Gmax), s	16.0	50.0		17.0	14.0	52.0		17.0				
Max Q Clear Time (g_c+l1), s	8.8	2.0		20.5	11.4	16.1		13.8				
Green Ext Time (p_c), s	0.2	6.8		0.0	0.1	6.7		0.4				
Intersection Summary												
HCM 6th Ctrl Delay				16.9								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary
 18: Mendota & East Wash

2024 Base Conditions

MD Peak

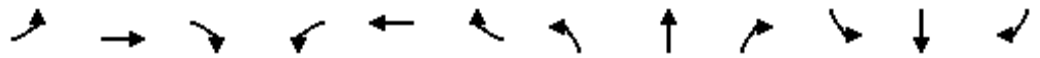


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↑↑↑	↷	↶	↑↑↑			↶↷			↶↷	
Traffic Volume (veh/h)	19	1749	119	73	1493	24	163	8	76	36	12	31
Future Volume (veh/h)	19	1749	119	73	1493	24	163	8	76	36	12	31
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	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	21	1901	129	79	1623	26	177	9	83	39	13	34
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	327	3280	1018	258	3429	55	308	25	231	138	55	88
Arrive On Green	0.03	0.64	0.64	0.10	1.00	1.00	0.17	0.17	0.16	0.17	0.17	0.16
Sat Flow, veh/h	1781	5106	1585	1781	5177	83	1302	143	1321	455	312	501
Grp Volume(v), veh/h	21	1901	129	79	1067	582	177	0	92	86	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1855	1302	0	1464	1268	0	0
Q Serve(g_s), s	0.4	19.1	2.9	1.3	0.0	0.0	4.9	0.0	5.0	1.9	0.0	0.0
Cycle Q Clear(g_c), s	0.4	19.1	2.9	1.3	0.0	0.0	11.9	0.0	5.0	7.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.04	1.00		0.90	0.45		0.40
Lane Grp Cap(c), veh/h	327	3280	1018	258	2255	1229	308	0	256	280	0	0
V/C Ratio(X)	0.06	0.58	0.13	0.31	0.47	0.47	0.58	0.00	0.36	0.31	0.00	0.00
Avail Cap(c_a), veh/h	374	3280	1018	269	2255	1229	357	0	309	333	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.22	0.22	0.22	0.81	0.81	0.81	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	4.9	9.2	6.3	7.2	0.0	0.0	35.7	0.0	33.3	33.5	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.2	0.1	0.5	0.6	1.1	1.7	0.0	0.8	0.6	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	0.1	5.7	0.8	0.4	0.2	0.4	3.8	0.0	1.9	1.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.9	9.3	6.3	7.8	0.6	1.1	37.4	0.0	34.2	34.1	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	C	C	A	A
Approach Vol, veh/h		2051			1728			269				86
Approach Delay, s/veh		9.1			1.1			36.3				34.1
Approach LOS		A			A			D				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.6	63.6		19.7	8.4	61.8		19.7				
Change Period (Y+Rc), s	5.0	5.0		5.5	5.0	5.0		5.5				
Max Green Setting (Gmax), s	4.0	53.0		17.5	4.0	53.0		17.5				
Max Q Clear Time (g_c+I1), s	2.4	2.0		9.0	3.3	21.1		13.9				
Green Ext Time (p_c), s	0.0	10.2		0.2	0.0	14.0		0.4				
Intersection Summary												
HCM 6th Ctrl Delay			8.0									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary
 19: Lien & East Wash

2024 Base Conditions

MD Peak

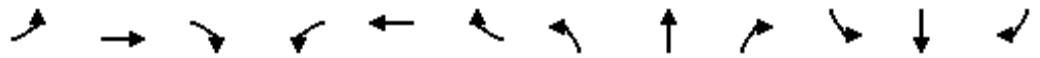


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑		↖	↗			↕	
Traffic Volume (veh/h)	41	1621	296	92	1436	25	249	11	56	24	8	28
Future Volume (veh/h)	41	1621	296	92	1436	25	249	11	56	24	8	28
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	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	45	1762	322	100	1561	27	271	12	61	26	9	30
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	372	3064	951	272	3101	54	385	56	287	160	67	146
Arrive On Green	0.07	0.80	0.80	0.11	1.00	1.00	0.21	0.21	0.19	0.21	0.21	0.19
Sat Flow, veh/h	1781	5106	1585	1781	5169	89	1368	267	1359	493	316	693
Grp Volume(v), veh/h	45	1762	322	100	1028	560	271	0	73	65	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1854	1368	0	1626	1502	0	0
Q Serve(g_s), s	0.0	11.6	5.1	0.0	0.0	0.0	12.8	0.0	3.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	11.6	5.1	0.0	0.0	0.0	16.2	0.0	3.4	3.4	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.05	1.00		0.84	0.40		0.46
Lane Grp Cap(c), veh/h	372	3064	951	272	2042	1113	385	0	343	373	0	0
V/C Ratio(X)	0.12	0.58	0.34	0.37	0.50	0.50	0.70	0.00	0.21	0.17	0.00	0.00
Avail Cap(c_a), veh/h	372	3064	951	272	2042	1113	385	0	343	373	0	0
HCM Platoon Ratio	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.80	0.80	0.80	0.87	0.87	0.87	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.1	4.8	4.1	18.1	0.0	0.0	34.0	0.0	30.0	29.5	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.6	0.8	0.7	0.8	1.4	5.7	0.0	0.3	1.0	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	0.3	2.6	1.4	1.6	0.2	0.4	6.1	0.0	1.3	1.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.2	5.4	4.9	18.8	0.8	1.4	39.8	0.0	30.3	30.5	0.0	0.0
LnGrp LOS	A	A	A	B	A	A	D	A	C	C	A	A
Approach Vol, veh/h		2129			1688			344				65
Approach Delay, s/veh		5.4			2.1			37.8				30.5
Approach LOS		A			A			D				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	58.0		23.0	9.0	58.0		23.0				
Change Period (Y+Rc), s	5.0	5.0		6.0	5.0	5.0		6.0				
Max Green Setting (Gmax), s	4.0	53.0		17.0	4.0	53.0		17.0				
Max Q Clear Time (g_c+I1), s	2.0	13.6		18.2	2.0	2.0		5.4				
Green Ext Time (p_c), s	0.0	15.3		0.0	0.0	9.6		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			7.1									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary
 20: Thierer/Portage & East Wash

2024 Base Conditions

MD Peak
























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑	↗	↖	↑		↖	↑	↗
Traffic Volume (veh/h)	148	1405	116	86	1211	65	188	47	71	63	51	102
Future Volume (veh/h)	148	1405	116	86	1211	65	188	47	71	63	51	102
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	161	1527	126	93	1316	71	204	51	77	68	55	111
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	178	2877	893	144	2780	863	322	149	226	279	416	352
Arrive On Green	0.20	1.00	1.00	0.16	1.00	1.00	0.22	0.22	0.19	0.22	0.22	0.22
Sat Flow, veh/h	1781	5106	1585	1781	5106	1585	1220	672	1015	1262	1870	1585
Grp Volume(v), veh/h	161	1527	126	93	1316	71	204	0	128	68	55	111
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1585	1220	0	1688	1262	1870	1585
Q Serve(g_s), s	7.9	0.0	0.0	4.4	0.0	0.0	14.5	0.0	5.8	4.3	2.1	5.3
Cycle Q Clear(g_c), s	7.9	0.0	0.0	4.4	0.0	0.0	16.6	0.0	5.8	10.1	2.1	5.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.60	1.00		1.00
Lane Grp Cap(c), veh/h	178	2877	893	144	2780	863	322	0	375	279	416	352
V/C Ratio(X)	0.90	0.53	0.14	0.64	0.47	0.08	0.63	0.00	0.34	0.24	0.13	0.32
Avail Cap(c_a), veh/h	178	2877	893	178	2780	863	322	0	375	279	416	352
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)	0.79	0.79	0.79	0.88	0.88	0.88	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.6	0.0	0.0	36.5	0.0	0.0	34.7	0.0	30.1	33.8	28.0	29.3
Incr Delay (d2), s/veh	35.2	0.6	0.3	4.8	0.5	0.2	4.0	0.0	0.5	0.4	0.1	0.5
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	4.7	0.1	0.1	1.9	0.1	0.0	4.6	0.0	2.4	1.3	1.0	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.7	0.6	0.3	41.3	0.5	0.2	38.7	0.0	30.7	34.2	28.2	29.8
LnGrp LOS	E	A	A	D	A	A	D	A	C	C	C	C
Approach Vol, veh/h		1814			1480			332			234	
Approach Delay, s/veh		6.8			3.1			35.6			30.7	
Approach LOS		A			A			D			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.3	54.7		24.0	13.0	53.0		24.0				
Change Period (Y+Rc), s	5.5	5.5		6.5	5.5	5.5		6.5				
Max Green Setting (Gmax), s	7.5	47.5		17.5	7.5	47.5		17.5				
Max Q Clear Time (g_c+I1), s	6.4	2.0		12.1	9.9	2.0		18.6				
Green Ext Time (p_c), s	0.0	11.0		0.4	0.0	8.4		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			9.3									
HCM 6th LOS			A									

HCM Signalized Intersection Capacity Analysis

21: Eagan/Continental & East Wash

2024 Base Conditions

MD Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	1208	258	161	993	113	272	68	111	58	28	32
Future Volume (vph)	91	1208	258	161	993	113	272	68	111	58	28	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.86		0.97	0.86		0.95	0.95	1.00		1.00	
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85		0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.97	1.00		0.98	
Satd. Flow (prot)	1770	6239		3433	6309		1681	1718	1583		1751	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.97	1.00		0.98	
Satd. Flow (perm)	1770	6239		3433	6309		1681	1718	1583		1751	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	99	1313	280	175	1079	123	296	74	121	63	30	35
RTOR Reduction (vph)	0	39	0	0	20	0	0	0	99	0	16	0
Lane Group Flow (vph)	99	1554	0	175	1182	0	184	186	22	0	113	0
Turn Type	Prot	NA		Prot	NA		Split	NA	Perm		Split	NA
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases									4			
Actuated Green, G (s)	7.2	33.7		8.6	35.1		14.2	14.2	14.2		10.5	
Effective Green, g (s)	8.7	35.2		10.1	36.6		16.2	16.2	16.2		12.5	
Actuated g/C Ratio	0.10	0.39		0.11	0.41		0.18	0.18	0.18		0.14	
Clearance Time (s)	5.5	5.5		5.5	5.5		6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	171	2440		385	2565		302	309	284		243	
v/s Ratio Prot	c0.06	c0.25		0.05	0.19		c0.11	0.11			c0.06	
v/s Ratio Perm									0.01			
v/c Ratio	0.58	0.64		0.45	0.46		0.61	0.60	0.08		0.46	
Uniform Delay, d1	38.9	22.2		37.4	19.5		34.0	33.9	30.7		35.7	
Progression Factor	0.71	1.33		1.28	0.64		1.00	1.00	1.00		1.00	
Incremental Delay, d2	4.2	1.1		0.8	0.5		3.5	3.3	0.1		1.4	
Delay (s)	31.6	30.7		48.8	13.1		37.4	37.2	30.8		37.1	
Level of Service	C	C		D	B		D	D	C		D	
Approach Delay (s)		30.8			17.6			35.7			37.1	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			26.7				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)				16.0	
Intersection Capacity Utilization			51.1%				ICU Level of Service				A	
Analysis Period (min)			15									

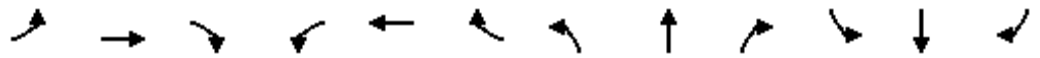
c Critical Lane Group

HCM 6th Signalized Intersection Summary

2024 Base Conditions

23: Zeier & E Wash

MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	98	1229	120	241	1162	76	200	51	241	107	39	62
Future Volume (veh/h)	98	1229	120	241	1162	76	200	51	241	107	39	62
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	103	1294	126	254	1223	80	211	54	254	113	41	65
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	99	2626	255	211	2718	177	518	281	238	157	60	96
Arrive On Green	0.04	0.29	0.29	0.12	0.87	0.87	0.15	0.15	0.15	0.09	0.09	0.09
Sat Flow, veh/h	1781	6008	583	3456	6218	405	3456	1870	1585	1737	666	1060
Grp Volume(v), veh/h	103	1039	381	254	948	355	211	54	254	116	0	103
Grp Sat Flow(s),veh/h/ln	1781	1609	1765	1728	1609	1797	1728	1870	1585	1784	0	1680
Q Serve(g_s), s	5.0	16.0	16.1	5.5	3.7	3.7	5.0	2.3	13.5	5.7	0.0	5.3
Cycle Q Clear(g_c), s	5.0	16.0	16.1	5.5	3.7	3.7	5.0	2.3	13.5	5.7	0.0	5.3
Prop In Lane	1.00		0.33	1.00		0.23	1.00		1.00	0.97		0.63
Lane Grp Cap(c), veh/h	99	2109	772	211	2109	786	518	281	238	162	0	152
V/C Ratio(X)	1.04	0.49	0.49	1.20	0.45	0.45	0.41	0.19	1.07	0.72	0.00	0.68
Avail Cap(c_a), veh/h	99	2109	772	211	2109	786	518	281	238	248	0	233
HCM Platoon Ratio	0.67	0.67	0.67	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.90	0.90	0.90	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	43.3	23.6	23.6	39.5	3.4	3.4	34.6	33.5	38.2	39.8	0.0	39.6
Incr Delay (d2), s/veh	101.9	0.8	2.3	124.6	0.6	1.7	0.5	0.3	77.6	5.8	0.0	5.2
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	6.4	7.4	5.8	0.9	1.3	2.1	1.1	10.3	2.8	0.0	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	145.3	24.4	25.9	164.1	4.0	5.1	35.1	33.8	115.9	45.6	0.0	44.8
LnGrp LOS	F	C	C	F	A	A	D	C	F	D	A	D
Approach Vol, veh/h		1523			1557			519			219	
Approach Delay, s/veh		32.9			30.4			74.5			45.2	
Approach LOS		C			C			E			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.0	45.3		14.7	11.0	45.3		19.0				
Change Period (Y+Rc), s	5.5	6.0		6.5	6.0	6.0		5.5				
Max Green Setting (Gmax), s	5.5	35.0		12.5	5.0	35.0		13.5				
Max Q Clear Time (g_c+l1), s	7.5	18.1		7.7	7.0	5.7		15.5				
Green Ext Time (p_c), s	0.0	8.6		0.5	0.0	10.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				38.3								
HCM 6th LOS				D								

HCM 6th Signalized Intersection Summary

24: E Springs & E Wash

2024 Base Conditions
MD Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↗	↙↘	↑↑↑	↙↘	↗
Traffic Volume (veh/h)	1400	175	389	1210	350	187
Future Volume (veh/h)	1400	175	389	1210	350	187
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	1474	0	409	1274	368	197
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2668		442	3632	517	237
Arrive On Green	1.00	0.00	0.13	0.71	0.15	0.15
Sat Flow, veh/h	5274	1585	3456	5274	3456	1585
Grp Volume(v), veh/h	1474	0	409	1274	368	197
Grp Sat Flow(s),veh/h/ln	1702	1585	1728	1702	1728	1585
Q Serve(g_s), s	0.0	0.0	10.5	8.6	9.1	10.9
Cycle Q Clear(g_c), s	0.0	0.0	10.5	8.6	9.1	10.9
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2668		442	3632	517	237
V/C Ratio(X)	0.55		0.93	0.35	0.71	0.83
Avail Cap(c_a), veh/h	2668		442	3632	595	273
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.79	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	38.8	5.0	36.4	37.1
Incr Delay (d2), s/veh	0.7	0.0	25.6	0.3	3.4	17.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	5.9	2.3	4.0	5.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.7	0.0	64.4	5.3	39.8	54.2
LnGrp LOS	A		E	A	D	D
Approach Vol, veh/h	1474	A		1683	565	
Approach Delay, s/veh	0.7			19.6	44.8	
Approach LOS	A			B	D	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	17.0	53.0		20.0		70.0
Change Period (Y+Rc), s	5.5	6.0		6.5		6.0
Max Green Setting (Gmax), s	11.5	45.0		15.5		62.0
Max Q Clear Time (g_c+I1), s	12.5	2.0		12.9		10.6
Green Ext Time (p_c), s	0.0	14.3		0.6		11.8

Intersection Summary

HCM 6th Ctrl Delay	15.9
HCM 6th LOS	B

Notes













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

HCM Signalized Intersection Capacity Analysis

2024 Base Conditions

1: Blair St. & East Washington Ave.

PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↔↔	↑↑		↔		↔↔	↔	↑↑	
Traffic Volume (vph)	0	1598	38	617	737	0	79	0	990	656	84	23
Future Volume (vph)	0	1598	38	617	737	0	79	0	990	656	84	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0		4.0	4.0	4.0	
Lane Util. Factor		0.91		0.97	0.95		1.00		0.88	0.91	0.91	
Frt		1.00		1.00	1.00		1.00		0.85	1.00	0.99	
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	0.96	
Satd. Flow (prot)		5068		3433	3539		1770		2787	1610	3241	
Flt Permitted		1.00		0.95	1.00		0.95		1.00	0.95	0.96	
Satd. Flow (perm)		5068		3433	3539		1770		2787	1610	3241	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1682	40	649	776	0	83	0	1042	691	88	24
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	1720	0	649	776	0	83	0	1042	345	455	0
Turn Type		NA		Prot	NA		Prot		pt+ov	Split	NA	
Protected Phases		1		2	1 2		3		2 3	4	4	
Permitted Phases							3		3 2			
Actuated Green, G (s)		41.5		30.2	76.2		7.0		41.7	32.3	32.3	
Effective Green, g (s)		42.0		30.7	76.7		7.0		42.2	34.3	34.3	
Actuated g/C Ratio		0.32		0.24	0.59		0.05		0.32	0.26	0.26	
Clearance Time (s)		4.5		4.5			4.0			6.0	6.0	
Vehicle Extension (s)		3.0		3.0			2.0			3.0	3.0	
Lane Grp Cap (vph)		1637		810	2088		95		904	424	855	
v/s Ratio Prot		c0.34		0.19	0.22		0.05		c0.37	c0.21	0.14	
v/s Ratio Perm												
v/c Ratio		1.05		0.80	0.37		0.87		1.15	0.81	0.53	
Uniform Delay, d1		44.0		46.8	14.0		61.1		43.9	44.9	41.0	
Progression Factor		1.00		0.78	0.94		1.00		1.00	1.00	1.00	
Incremental Delay, d2		36.9		7.8	0.1		52.3		81.4	11.4	0.6	
Delay (s)		80.9		44.5	13.3		113.3		125.3	56.2	41.6	
Level of Service		F		D	B		F		F	E	D	
Approach Delay (s)		80.9			27.5			124.4			47.9	
Approach LOS		F			C			F			D	
Intersection Summary												
HCM 2000 Control Delay			70.3				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			1.06									
Actuated Cycle Length (s)			130.0				Sum of lost time (s)		16.0			
Intersection Capacity Utilization			94.5%				ICU Level of Service		F			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: Livingston Ave & East Washington Ave.

2024 Base Conditions

PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑		↖	↑↑↑				↗			↖
Traffic Volume (vph)	194	2982	68	75	1352	49	0	0	73	0	0	38
Future Volume (vph)	194	2982	68	75	1352	49	0	0	73	0	0	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0				5.0			5.0
Lane Util. Factor	1.00	0.91		1.00	0.91				1.00			1.00
Frt	1.00	1.00		1.00	0.99				0.86			0.86
Flt Protected	0.95	1.00		0.95	1.00				1.00			1.00
Satd. Flow (prot)	1770	5068		1770	5058				1611			1611
Flt Permitted	0.16	1.00		0.04	1.00				1.00			1.00
Satd. Flow (perm)	289	5068		73	5058				1611			1611
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	204	3139	72	79	1423	52	0	0	77	0	0	40
RTOR Reduction (vph)	0	2	0	0	2	0	0	0	15	0	0	34
Lane Group Flow (vph)	204	3209	0	79	1473	0	0	0	62	0	0	6
Turn Type	D.P+P	NA		D.Pm	NA				Prot			Over
Protected Phases	4	2			6				8			4
Permitted Phases	6			2								
Actuated Green, G (s)	120.0	102.0		102.0	102.0				18.0			18.0
Effective Green, g (s)	120.0	102.0		102.0	102.0				18.0			18.0
Actuated g/C Ratio	0.92	0.78		0.78	0.78				0.14			0.14
Clearance Time (s)	5.0	5.0		5.0	5.0				5.0			5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0				3.0			3.0
Lane Grp Cap (vph)	471	3976		57	3968				223			223
v/s Ratio Prot	c0.06	0.63			0.29				0.04			0.00
v/s Ratio Perm	0.34			c1.08								
v/c Ratio	0.43	0.81		1.39	0.37				0.28			0.02
Uniform Delay, d1	1.0	8.2		14.0	4.3				50.2			48.4
Progression Factor	2.49	0.89		1.44	0.12				1.00			1.00
Incremental Delay, d2	0.2	0.5		247.8	0.2				0.7			0.0
Delay (s)	2.6	7.8		268.0	0.8				50.9			48.5
Level of Service	A	A		F	A				D			D
Approach Delay (s)		7.5			14.4			50.9			48.5	
Approach LOS		A			B			D			D	

Intersection Summary

HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
 3: Paterson St. & East Washington Ave.

2024 Base Conditions

PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	3436	43	33	1338	51	24	50	78	146	48	42
Future Volume (veh/h)	78	3436	43	33	1338	51	24	50	78	146	48	42
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	82	3617	45	35	1408	54	25	53	82	154	51	44
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	326	3803	1181	85	3803	1181	61	114	150	242	333	283
Arrive On Green	1.00	1.00	1.00	1.00	1.00	1.00	0.19	0.18	0.18	0.19	0.18	0.18
Sat Flow, veh/h	363	5106	1585	40	5106	1585	165	638	844	1254	1870	1585
Grp Volume(v), veh/h	82	3617	45	35	1408	54	160	0	0	154	51	44
Grp Sat Flow(s),veh/h/ln	363	1702	1585	40	1702	1585	1646	0	0	1254	1870	1585
Q Serve(g_s), s	0.0	0.0	0.0	96.8	0.0	0.0	2.8	0.0	0.0	9.1	3.0	3.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	96.8	0.0	0.0	11.1	0.0	0.0	20.3	3.0	3.0
Prop In Lane	1.00		1.00	1.00		1.00	0.16		0.51	1.00		1.00
Lane Grp Cap(c), veh/h	326	3803	1181	85	3803	1181	338	0	0	242	333	283
V/C Ratio(X)	0.25	0.95	0.04	0.41	0.37	0.05	0.47	0.00	0.00	0.64	0.15	0.16
Avail Cap(c_a), veh/h	326	3803	1181	85	3803	1181	516	0	0	381	540	457
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)	0.51	0.51	0.51	0.88	0.88	0.88	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	7.0	0.0	0.0	48.3	0.0	0.0	52.7	45.1	45.1
Incr Delay (d2), s/veh	0.9	4.0	0.0	12.3	0.2	0.1	1.0	0.0	0.0	2.7	0.2	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(95%),veh/ln	0.2	2.5	0.0	1.0	0.2	0.0	8.4	0.0	0.0	8.8	2.6	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.9	4.0	0.0	19.3	0.2	0.1	49.4	0.0	0.0	55.4	45.3	45.4
LnGrp LOS	A	A	A	B	A	A	D	A	A	E	D	D
Approach Vol, veh/h		3744			1497			160			249	
Approach Delay, s/veh		3.9			0.7			49.4			51.6	
Approach LOS		A			A			D			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		101.8		28.2		101.8		28.2				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		82.5		37.5		82.5		37.5				
Max Q Clear Time (g_c+l1), s		2.0		22.3		98.8		13.1				
Green Ext Time (p_c), s		70.1		0.9		0.0		0.6				
Intersection Summary												
HCM 6th Ctrl Delay				6.4								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary
 4: Ingersoll St. & East Washington Ave.

2024 Base Conditions

PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑	↗		↑	↗		↘	
Traffic Volume (veh/h)	67	3593	55	55	1414	30	56	18	41	76	34	71
Future Volume (veh/h)	67	3593	55	55	1414	30	56	18	41	76	34	71
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	71	3782	58	58	1488	32	59	19	43	80	36	75
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	242	3373	1047	103	3726	1157	190	54	294	119	54	87
Arrive On Green	0.88	0.88	0.88	0.02	0.49	0.49	0.20	0.19	0.19	0.20	0.19	0.19
Sat Flow, veh/h	343	5106	1585	1781	5106	1585	764	291	1585	429	293	467
Grp Volume(v), veh/h	71	3782	58	58	1488	32	78	0	43	191	0	0
Grp Sat Flow(s),veh/h/ln	343	1702	1585	1781	1702	1585	1055	0	1585	1188	0	0
Q Serve(g_s), s	10.2	85.9	0.6	1.3	24.1	1.4	0.0	0.0	3.0	12.9	0.0	0.0
Cycle Q Clear(g_c), s	25.3	85.9	0.6	1.3	24.1	1.4	8.6	0.0	3.0	21.5	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.76		1.00	0.42		0.39
Lane Grp Cap(c), veh/h	242	3373	1047	103	3726	1157	265	0	294	283	0	0
V/C Ratio(X)	0.29	1.12	0.06	0.56	0.40	0.03	0.29	0.00	0.15	0.68	0.00	0.00
Avail Cap(c_a), veh/h	242	3373	1047	110	3726	1157	402	0	451	432	0	0
HCM Platoon Ratio	1.33	1.33	1.33	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.09	0.90	0.90	0.90	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.1	7.9	2.7	36.0	15.1	9.3	45.6	0.0	44.3	53.1	0.0	0.0
Incr Delay (d2), s/veh	0.3	55.1	0.0	5.0	0.3	0.0	0.6	0.0	0.2	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(95%),veh/ln	1.0	27.1	0.4	2.5	15.2	0.8	4.0	0.0	2.2	10.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.4	63.0	2.7	41.0	15.4	9.4	46.2	0.0	44.5	55.9	0.0	0.0
LnGrp LOS	A	F	A	D	B	A	D	A	D	E	A	A
Approach Vol, veh/h		3911			1578			121			191	
Approach Delay, s/veh		61.1			16.2			45.6			55.9	
Approach LOS		E			B			D			E	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	9.0	90.4		30.6		99.4		30.6				
Change Period (Y+Rc), s	5.5	4.5		6.5		4.5		6.5				
Max Green Setting (Gmax), s	4.0	72.5		37.0		82.0		37.0				
Max Q Clear Time (g_c+I1), s	3.3	87.9		23.5		26.1		10.6				
Green Ext Time (p_c), s	0.0	0.0		0.6		10.4		0.5				
Intersection Summary												
HCM 6th Ctrl Delay				48.4								
HCM 6th LOS				D								

HCM 6th Signalized Intersection Summary
5: Baldwin St. & East Washington Ave.

2024 Base Conditions

PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑	↗		↘	↗		↘	↗
Traffic Volume (veh/h)	121	3607	46	42	1395	84	31	81	86	153	82	81
Future Volume (veh/h)	121	3607	46	42	1395	84	31	81	86	153	82	81
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	127	3797	48	44	1468	88	33	85	91	161	86	85
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	219	2939	912	99	3260	1012	35	72	451	46	0	451
Arrive On Green	0.77	0.77	0.77	0.02	0.64	0.64	0.29	0.28	0.28	0.29	0.28	0.28
Sat Flow, veh/h	332	5106	1585	1781	5106	1585	0	253	1585	0	0	1585
Grp Volume(v), veh/h	127	3797	48	44	1468	88	118	0	91	247	0	85
Grp Sat Flow(s),veh/h/ln	332	1702	1585	1781	1702	1585	253	0	1585	0	0	1585
Q Serve(g_s), s	35.0	74.8	1.0	1.3	19.0	2.8	0.0	0.0	5.7	0.0	0.0	5.3
Cycle Q Clear(g_c), s	45.8	74.8	1.0	1.3	19.0	2.8	38.0	0.0	5.7	38.0	0.0	5.3
Prop In Lane	1.00		1.00	1.00		1.00	0.28		1.00	0.65		1.00
Lane Grp Cap(c), veh/h	219	2939	912	99	3260	1012	109	0	451	46	0	451
V/C Ratio(X)	0.58	1.29	0.05	0.44	0.45	0.09	1.08	0.00	0.20	5.40	0.00	0.19
Avail Cap(c_a), veh/h	219	2939	912	110	3260	1012	109	0	451	46	0	451
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	0.72	0.72	0.72	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.6	15.2	6.6	32.6	11.9	9.0	41.8	0.0	35.3	65.5	0.0	35.2
Incr Delay (d2), s/veh	1.0	131.7	0.0	2.2	0.3	0.1	108.8	0.0	0.2	2027.1	0.0	0.2
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(95%),veh/ln	2.9	70.9	0.6	1.6	10.6	1.7	10.3	0.0	4.1	48.1	0.0	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.7	146.9	6.6	34.8	12.2	9.1	150.5	0.0	35.5	2092.6	0.0	35.4
LnGrp LOS	B	F	A	C	B	A	F	A	D	F	A	D
Approach Vol, veh/h		3972			1600			209				332
Approach Delay, s/veh		141.1			12.7			100.4				1565.9
Approach LOS		F			B			F				F
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	8.2	79.8		42.0		88.0		42.0				
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s	4.0	74.0		37.0		83.0		37.0				
Max Q Clear Time (g_c+I1), s	3.3	76.8		40.0		21.0		40.0				
Green Ext Time (p_c), s	0.0	0.0		0.0		10.7		0.0				

Intersection Summary

HCM 6th Ctrl Delay	183.5
HCM 6th LOS	F

HCM Signalized Intersection Capacity Analysis

2024 Base Conditions

6: First & E Wash

PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	397	3162	178	44	1261	125	128	203	128	178	178	194
Future Volume (vph)	397	3162	178	44	1261	125	128	203	128	178	178	194
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.5	6.5	6.5
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	2787
Flt Permitted	0.95	1.00	1.00	0.08	1.00	1.00	0.50	1.00	1.00	0.62	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	143	5085	1583	932	1863	1583	1155	1863	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	432	3437	193	48	1371	136	139	221	139	193	193	211
RTOR Reduction (vph)	0	0	122	0	0	86	0	0	99	0	0	68
Lane Group Flow (vph)	432	3437	71	48	1371	50	139	221	40	193	193	143
Turn Type	Prot	NA	custom	D.P+P	NA	Perm	D.P+P	NA	Perm	Perm	NA	custom
Protected Phases	1	6		5	2		3	3 4			4	
Permitted Phases			2	6		2	4		3 4	4		4 1
Actuated Green, G (s)	18.6	52.0	36.9	56.0	36.9	36.9	22.5	27.5	27.5	16.5	16.5	41.6
Effective Green, g (s)	18.6	52.0	36.9	56.0	36.9	36.9	22.5	27.5	27.5	16.5	16.5	41.6
Actuated g/C Ratio	0.19	0.52	0.37	0.56	0.37	0.37	0.22	0.28	0.28	0.16	0.16	0.42
Clearance Time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0			6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	638	2644	584	145	1876	584	259	512	435	190	307	1159
v/s Ratio Prot	c0.13	c0.68		0.01	0.27		0.03	c0.12			0.10	
v/s Ratio Perm			0.04	0.17		0.03	0.09		0.03	c0.17		0.05
v/c Ratio	0.68	1.30	0.12	0.33	0.73	0.09	0.54	0.43	0.09	1.02	0.63	0.12
Uniform Delay, d1	37.9	24.0	20.8	21.8	27.3	20.6	33.0	29.8	27.0	41.8	38.9	18.0
Progression Factor	1.00	1.00	1.00	2.06	1.02	6.06	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.9	137.9	0.4	1.3	2.4	0.3	2.1	0.6	0.1	69.5	4.0	0.0
Delay (s)	40.8	161.9	21.3	46.1	30.1	124.8	35.1	30.4	27.1	111.2	42.9	18.0
Level of Service	D	F	C	D	C	F	D	C	C	F	D	B
Approach Delay (s)		142.3			38.9			30.8			56.2	
Approach LOS		F			D			C			E	

Intersection Summary

HCM 2000 Control Delay	102.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	102.9%	ICU Level of Service	G
Analysis Period (min)	15		



























c Critical Lane Group

HCM 6th Signalized Intersection Summary

2024 Base Conditions

7: Fourth & E Wash

PM Peak

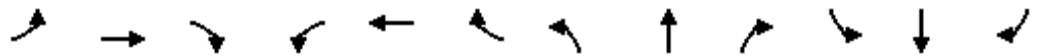
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  							
Traffic Volume (veh/h)	24	3316	15	31	1359	32	19	31	26	53	19	20
Future Volume (veh/h)	24	3316	15	31	1359	32	19	31	26	53	19	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	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	26	3604	16	34	1477	35	21	34	28	58	21	22
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	286	3166	983	73	3166	983	50	60	420	62	14	420
Arrive On Green	1.00	1.00	1.00	1.00	1.00	1.00	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	346	5106	1585	42	5106	1585	0	228	1585	0	51	1585
Grp Volume(v), veh/h	26	3604	16	34	1477	35	55	0	28	79	0	22
Grp Sat Flow(s),veh/h/ln	346	1702	1585	42	1702	1585	228	0	1585	51	0	1585
Q Serve(g_s), s	0.0	62.0	0.0	3.4	0.0	0.0	0.0	0.0	1.3	0.0	0.0	1.0
Cycle Q Clear(g_c), s	0.0	62.0	0.0	62.0	0.0	0.0	26.5	0.0	1.3	26.5	0.0	1.0
Prop In Lane	1.00		1.00	1.00		1.00	0.38		1.00	0.73		1.00
Lane Grp Cap(c), veh/h	286	3166	983	73	3166	983	110	0	420	76	0	420
V/C Ratio(X)	0.09	1.14	0.02	0.46	0.47	0.04	0.50	0.00	0.07	1.04	0.00	0.05
Avail Cap(c_a), veh/h	286	3166	983	73	3166	983	110	0	420	76	0	420
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(l)	0.09	0.09	0.09	0.94	0.94	0.94	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	30.9	0.0	0.0	30.5	0.0	27.5	45.3	0.0	27.4
Incr Delay (d2), s/veh	0.1	62.7	0.0	18.5	0.5	0.1	3.5	0.0	0.1	114.4	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(95%),veh/ln	0.0	23.1	0.0	2.1	0.2	0.0	2.0	0.0	0.9	7.8	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.1	62.7	0.0	49.4	0.5	0.1	34.0	0.0	27.6	159.7	0.0	27.4
LnGrp LOS	A	F	A	D	A	A	C	A	C	F	A	C
Approach Vol, veh/h		3646			1546			83			101	
Approach Delay, s/veh		62.0			1.5			31.8			130.9	
Approach LOS		E			A			C			F	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		67.0		33.0		67.0		33.0				
Change Period (Y+Rc), s		5.0		6.5		5.0		6.5				
Max Green Setting (Gmax), s		62.0		26.5		62.0		26.5				
Max Q Clear Time (g_c+l1), s		64.0		28.5		64.0		28.5				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				45.4								
HCM 6th LOS				D								

HCM 6th Signalized Intersection Summary

2024 Base Conditions

8: Sixth & E Wash

PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	3310	22	32	1349	14	21	16	30	42	44	26
Future Volume (veh/h)	21	3310	22	32	1349	14	21	16	30	42	44	26
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	23	3598	24	35	1466	15	23	17	33	46	48	28
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	293	3605	1119	128	4019	1247	186	59	114	94	71	35
Arrive On Green	0.94	0.94	0.94	0.02	0.53	0.53	0.10	0.10	0.10	0.10	0.10	0.10
Sat Flow, veh/h	356	5106	1585	1781	5106	1585	1323	568	1103	435	693	336
Grp Volume(v), veh/h	23	3598	24	35	1466	15	23	0	50	122	0	0
Grp Sat Flow(s),veh/h/ln	356	1702	1585	1781	1702	1585	1323	0	1672	1464	0	0
Q Serve(g_s), s	1.2	68.6	0.1	0.5	16.8	0.5	0.0	0.0	2.8	5.6	0.0	0.0
Cycle Q Clear(g_c), s	9.9	68.6	0.1	0.5	16.8	0.5	2.0	0.0	2.8	8.3	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.66	0.38		0.23
Lane Grp Cap(c), veh/h	293	3605	1119	128	4019	1247	186	0	172	200	0	0
V/C Ratio(X)	0.08	1.00	0.02	0.27	0.36	0.01	0.12	0.00	0.29	0.61	0.00	0.00
Avail Cap(c_a), veh/h	293	3605	1119	180	4019	1247	196	0	184	211	0	0
HCM Platoon Ratio	1.33	1.33	1.33	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.38	0.38	0.38	0.77	0.77	0.77	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	2.0	3.0	0.9	29.6	9.0	5.1	41.1	0.0	41.5	44.1	0.0	0.0
Incr Delay (d2), s/veh	0.2	8.8	0.0	0.9	0.2	0.0	0.3	0.0	0.9	4.6	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(95%),veh/ln	0.1	6.6	0.1	1.1	10.5	0.2	1.0	0.0	2.1	5.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	2.2	11.8	0.9	30.5	9.2	5.2	41.4	0.0	42.4	48.7	0.0	0.0
LnGrp LOS	A	B	A	C	A	A	D	A	D	D	A	A
Approach Vol, veh/h		3645			1516			73			122	
Approach Delay, s/veh		11.7			9.7			42.1			48.7	
Approach LOS		B			A			D			D	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	8.1	75.6		16.3		83.7		16.3				
Change Period (Y+Rc), s	5.0	5.0		6.0		5.0		6.0				
Max Green Setting (Gmax), s	6.0	67.0		11.0		78.0		11.0				
Max Q Clear Time (g_c+I1), s	2.5	70.6		10.3		18.8		4.8				
Green Ext Time (p_c), s	0.0	0.0		0.0		10.0		0.1				

Intersection Summary

HCM 6th Ctrl Delay	12.4
HCM 6th LOS	B

Notes























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

HCM Signalized Intersection Capacity Analysis

2024 Base Conditions

9: Milwaukee/North & E Wash

PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	2919	431	46	1155	19	322	82	39	42	177	80
Future Volume (vph)	80	2919	431	46	1155	19	322	82	39	42	177	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	6.5	6.5		5.0	5.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.97	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1773		1770	1776	
Flt Permitted	0.14	1.00	1.00	0.09	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	269	5085	1583	160	5085	1583	3433	1773		1770	1776	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	3173	468	50	1255	21	350	89	42	46	192	87
RTOR Reduction (vph)	0	0	72	0	0	20	0	17	0	0	16	0
Lane Group Flow (vph)	87	3173	396	50	1255	1	350	114	0	46	263	0
Turn Type	D.P+P	NA	custom	D.P+P	NA	custom	Split	NA		Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases	6		1 2	2		1						
Actuated Green, G (s)	52.4	46.5	56.9	52.4	45.5	5.9	13.1	13.1		14.0	14.0	
Effective Green, g (s)	52.4	46.5	56.9	52.4	45.5	5.9	13.1	13.1		14.0	14.0	
Actuated g/C Ratio	0.52	0.46	0.57	0.52	0.46	0.06	0.13	0.13		0.14	0.14	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	6.5	6.5		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	244	2364	900	178	2313	93	449	232		247	248	
v/s Ratio Prot	0.02	c0.62		0.02	0.25		c0.10	0.06		0.03	c0.15	
v/s Ratio Perm	0.16		c0.25	0.13		0.00						
v/c Ratio	0.36	1.34	0.44	0.28	0.54	0.01	0.78	0.49		0.19	1.06	
Uniform Delay, d1	13.2	26.8	12.4	20.9	19.7	44.3	42.1	40.3		38.0	43.0	
Progression Factor	0.64	1.07	0.90	1.29	0.35	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	154.9	0.1	0.8	0.9	0.1	8.3	1.6		0.4	73.6	
Delay (s)	9.7	183.6	11.2	27.8	7.8	44.4	50.4	42.0		38.3	116.6	
Level of Service	A	F	B	C	A	D	D	D		D	F	
Approach Delay (s)		157.9			9.2			48.1			105.5	
Approach LOS		F			A			D			F	
Intersection Summary												
HCM 2000 Control Delay			112.3			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			1.15									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.5			
Intersection Capacity Utilization			100.2%			ICU Level of Service			G			
Analysis Period (min)			15									





















c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2024 Base Conditions

10: Johnson & E Wash

PM Peak

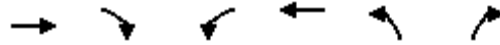
													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	12	2520	18	51	1140	116	20	16	51	236	21	11	
Future Volume (vph)	12	2520	18	51	1140	116	20	16	51	236	21	11	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		5.0		6.0	6.0		
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00		1.00		0.95	0.95		
Frt	1.00	1.00		1.00	1.00	0.85		0.92		1.00	0.99		
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	0.96		
Satd. Flow (prot)	1770	5080		1770	5085	1583		1696		1681	1684		
Flt Permitted	0.18	1.00		0.07	1.00	1.00		0.99		0.70	0.72		
Satd. Flow (perm)	342	5080		122	5085	1583		1696		1232	1252		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	13	2739	20	55	1239	126	22	17	55	257	23	12	
RTOR Reduction (vph)	0	1	0	0	0	42	0	45	0	0	3	0	
Lane Group Flow (vph)	13	2758	0	55	1239	84	0	49	0	146	143	0	
Turn Type	Perm	NA		Perm	NA	Perm	Split	NA		Perm	NA		
Protected Phases		2			2		3	3			4		
Permitted Phases	2			2		2				4			
Actuated Green, G (s)	61.2	61.2		61.2	61.2	61.2		7.3		16.0	16.0		
Effective Green, g (s)	61.2	61.2		61.2	61.2	61.2		7.3		16.0	16.0		
Actuated g/C Ratio	0.61	0.61		0.61	0.61	0.61		0.07		0.16	0.16		
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		5.0		6.0	6.0		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0		
Lane Grp Cap (vph)	209	3108		74	3112	968		123		197	200		
v/s Ratio Prot		c0.54			0.24			c0.03					
v/s Ratio Perm	0.04			0.45		0.05				c0.12	0.11		
v/c Ratio	0.06	0.89		0.74	0.40	0.09		0.39		0.74	0.71		
Uniform Delay, d1	7.8	16.5		13.8	10.0	8.0		44.2		40.0	39.8		
Progression Factor	2.25	2.35		0.64	0.55	0.19		1.00		1.00	1.00		
Incremental Delay, d2	0.1	0.4		47.0	0.4	0.2		2.1		13.9	11.4		
Delay (s)	17.6	39.1		55.8	5.8	1.7		46.3		54.0	51.2		
Level of Service	B	D		E	A	A		D		D	D		
Approach Delay (s)		39.0			7.4			46.3			52.6		
Approach LOS		D			A			D			D		
Intersection Summary													
HCM 2000 Control Delay			30.2									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.82										
Actuated Cycle Length (s)			100.0									Sum of lost time (s)	15.5
Intersection Capacity Utilization			71.9%									ICU Level of Service	C
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 11: Marquette & E Wash

2024 Base Conditions

PM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↗	↖	↑↑↑	↗	↖
Traffic Volume (vph)	3167	47	70	1281	84	110
Future Volume (vph)	3167	47	70	1281	84	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.0	4.5	6.5	
Lane Util. Factor	0.91	1.00	1.00	0.91	1.00	
Frt	1.00	0.85	1.00	1.00	0.92	
Flt Protected	1.00	1.00	0.95	1.00	0.98	
Satd. Flow (prot)	5085	1583	1770	5085	1683	
Flt Permitted	1.00	1.00	0.06	1.00	0.98	
Satd. Flow (perm)	5085	1583	112	5085	1683	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3442	51	76	1392	91	120
RTOR Reduction (vph)	0	7	0	0	48	0
Lane Group Flow (vph)	3442	44	76	1392	163	0
Turn Type	NA	Perm	D.P+P	NA	Prot	
Protected Phases	2		3	2 3	4	
Permitted Phases		2	2			
Actuated Green, G (s)	66.8	66.8	73.8	78.3	11.2	
Effective Green, g (s)	66.8	66.8	73.8	78.3	11.2	
Actuated g/C Ratio	0.67	0.67	0.74	0.78	0.11	
Clearance Time (s)	4.5	4.5	4.0		6.5	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	3396	1057	198	3981	188	
v/s Ratio Prot	c0.68		0.03	c0.27	c0.10	
v/s Ratio Perm		0.03	0.26			
v/c Ratio	1.01	0.04	0.38	0.35	0.87	
Uniform Delay, d1	16.6	5.7	41.3	3.2	43.7	
Progression Factor	0.70	1.34	1.13	0.44	1.00	
Incremental Delay, d2	16.0	0.0	1.2	0.1	31.7	
Delay (s)	27.6	7.7	48.0	1.5	75.4	
Level of Service	C	A	D	A	E	
Approach Delay (s)	27.3			3.9	75.4	
Approach LOS	C			A	E	

Intersection Summary

HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	81.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 12: EB Ramps & E Wash

2024 Base Conditions

PM Peak

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↗↘	↙	↑↑↑	↗↘	↗↘
Traffic Volume (vph)	1973	1041	97	1369	112	262
Future Volume (vph)	1973	1041	97	1369	112	262
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.91	0.88	1.00	0.91	0.97	0.88
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)	5085	2787	1770	5085	3433	2787
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	2787	1770	5085	3433	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	2077	1096	102	1441	118	276
RTOR Reduction (vph)	0	81	0	0	0	2
Lane Group Flow (vph)	2077	1015	102	1441	118	274
Turn Type	NA	custom	Prot	NA	Prot	custom
Protected Phases	5	5 2	3	1 8	7	7 8 3
Permitted Phases		2				8
Actuated Green, G (s)	47.4	81.4	8.6	79.1	10.9	42.6
Effective Green, g (s)	47.4	81.4	8.6	79.1	10.9	42.6
Actuated g/C Ratio	0.47	0.81	0.09	0.79	0.11	0.43
Clearance Time (s)	5.0		5.0		5.0	
Vehicle Extension (s)	3.0		3.0		3.0	
Lane Grp Cap (vph)	2410	2268	152	4022	374	1187
v/s Ratio Prot	c0.41	c0.36	c0.06	0.28	0.03	0.10
v/s Ratio Perm						
v/c Ratio	0.86	0.45	0.67	0.36	0.32	0.23
Uniform Delay, d1	23.4	2.7	44.3	3.0	41.1	18.3
Progression Factor	0.89	0.00	0.78	0.33	1.00	1.00
Incremental Delay, d2	0.4	0.1	10.7	0.1	0.5	0.1
Delay (s)	21.3	0.1	45.4	1.0	41.6	18.4
Level of Service	C	A	D	A	D	B
Approach Delay (s)	13.9			4.0	25.3	
Approach LOS	B			A	C	
Intersection Summary						
HCM 2000 Control Delay			11.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.76			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	20.0
Intersection Capacity Utilization			59.3%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
 13: East Wash & WB Ramps

2024 Base Conditions

PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	159	2131	1066	260	61	269
Future Volume (vph)	159	2131	1066	260	61	269
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.91	0.91	1.00	0.97	0.88
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	3433	2787
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	5085	5085	1583	3433	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	167	2243	1122	274	64	283
RTOR Reduction (vph)	0	0	0	52	0	117
Lane Group Flow (vph)	167	2243	1122	222	64	166
Turn Type	Prot	NA	NA	custom	Prot	pt+ov
Protected Phases	1	6	2		8	8 1
Permitted Phases				6		
Actuated Green, G (s)	13.0	81.1	63.1	81.1	8.9	26.9
Effective Green, g (s)	13.0	81.1	63.1	81.1	8.9	26.9
Actuated g/C Ratio	0.13	0.81	0.63	0.81	0.09	0.27
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	230	4123	3208	1283	305	749
v/s Ratio Prot	c0.09	c0.44	0.22		0.02	c0.06
v/s Ratio Perm				0.14		
v/c Ratio	0.73	0.54	0.35	0.17	0.21	0.22
Uniform Delay, d1	41.8	3.2	8.7	2.1	42.3	28.4
Progression Factor	0.70	4.09	0.35	0.07	1.00	1.00
Incremental Delay, d2	6.9	0.3	0.3	0.3	0.3	0.2
Delay (s)	36.3	13.4	3.3	0.4	42.6	28.6
Level of Service	D	B	A	A	D	C
Approach Delay (s)		15.0	2.8		31.2	
Approach LOS		B	A		C	

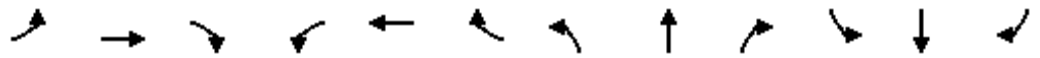
Intersection Summary			
HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
 16: Fair Oaks/Wright & East Wash

2024 Base Conditions

PM Peak

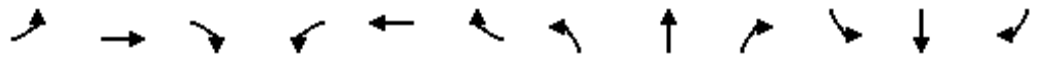


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑		↗	↑↑↑			↑↑		↗	↑	↗
Traffic Volume (veh/h)	150	1950	47	154	1014	90	55	136	210	70	273	142
Future Volume (veh/h)	150	1950	47	154	1014	90	55	136	210	70	273	142
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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	163	2120	51	167	1102	98	60	148	228	76	297	154
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	207	2811	67	217	2643	235	72	120	303	132	393	333
Arrive On Green	0.23	1.00	1.00	0.12	0.55	0.54	0.21	0.21	0.18	0.21	0.21	0.21
Sat Flow, veh/h	1781	5129	123	1781	4774	424	122	571	1442	1007	1870	1585
Grp Volume(v), veh/h	163	1406	765	167	785	415	208	0	228	76	297	154
Grp Sat Flow(s),veh/h/ln	1781	1702	1848	1781	1702	1794	693	0	1442	1007	1870	1585
Q Serve(g_s), s	8.6	0.0	0.0	9.1	13.4	13.5	6.1	0.0	15.0	6.0	14.9	8.5
Cycle Q Clear(g_c), s	8.6	0.0	0.0	9.1	13.4	13.5	21.0	0.0	15.0	21.0	14.9	8.5
Prop In Lane	1.00		0.07	1.00		0.24	0.29		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	207	1865	1013	217	1885	993	192	0	303	132	393	333
V/C Ratio(X)	0.79	0.75	0.76	0.77	0.42	0.42	1.08	0.00	0.75	0.57	0.76	0.46
Avail Cap(c_a), veh/h	267	1865	1013	303	1885	993	192	0	303	132	393	333
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)	1.00	1.00	1.00	0.81	0.81	0.81	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.2	0.0	0.0	42.5	13.0	13.0	42.8	0.0	38.5	47.6	37.1	34.6
Incr Delay (d2), s/veh	11.1	2.9	5.2	6.2	0.6	1.0	89.2	0.0	10.1	5.9	8.2	1.0
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(95%),veh/ln	7.1	1.3	2.7	7.4	8.2	8.7	15.2	0.0	10.3	3.8	12.1	6.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.3	2.9	5.2	48.8	13.5	14.1	132.0	0.0	48.7	53.5	45.3	35.6
LnGrp LOS	D	A	A	D	B	B	F	A	D	D	D	D
Approach Vol, veh/h		2334			1367			436			527	
Approach Delay, s/veh		6.8			18.0			88.4			43.6	
Approach LOS		A			B			F			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	16.2	58.8		25.0	15.6	59.4		25.0				
Change Period (Y+Rc), s	5.0	5.0		7.0	5.0	5.0		7.0				
Max Green Setting (Gmax), s	16.0	49.0		18.0	14.0	51.0		18.0				
Max Q Clear Time (g_c+l1), s	11.1	2.0		23.0	10.6	15.5		23.0				
Green Ext Time (p_c), s	0.2	17.4		0.0	0.2	6.4		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				21.9								
HCM 6th LOS				C								

HCM 6th Signalized Intersection Summary
 18: Mendota & East Wash

2024 Base Conditions

PM Peak

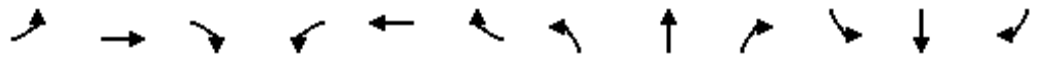


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	2583	171	103	1406	21	182	5	90	47	7	29
Future Volume (veh/h)	29	2583	171	103	1406	21	182	5	90	47	7	29
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	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	32	2808	186	112	1528	23	198	5	98	51	8	32
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	345	3268	1014	177	3402	51	311	13	263	158	34	73
Arrive On Green	0.03	0.64	0.64	0.10	1.00	1.00	0.19	0.19	0.17	0.19	0.19	0.17
Sat Flow, veh/h	1781	5106	1585	1781	5182	78	1258	71	1383	535	178	387
Grp Volume(v), veh/h	32	2808	186	112	1004	547	198	0	103	91	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1856	1258	0	1453	1100	0	0
Q Serve(g_s), s	0.6	44.0	4.8	2.1	0.0	0.0	5.3	0.0	6.3	3.9	0.0	0.0
Cycle Q Clear(g_c), s	0.6	44.0	4.8	2.1	0.0	0.0	15.5	0.0	6.3	10.2	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.04	1.00		0.95	0.56		0.35
Lane Grp Cap(c), veh/h	345	3268	1014	177	2235	1219	311	0	276	265	0	0
V/C Ratio(X)	0.09	0.86	0.18	0.63	0.45	0.45	0.64	0.00	0.37	0.34	0.00	0.00
Avail Cap(c_a), veh/h	392	3268	1014	230	2235	1219	311	0	276	265	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.09	0.84	0.84	0.84	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.4	14.4	7.3	22.8	0.0	0.0	39.4	0.0	36.0	37.8	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.3	0.0	3.1	0.6	1.0	4.3	0.0	0.8	0.8	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(95%),veh/ln	0.3	15.8	2.0	3.0	0.3	0.6	8.7	0.0	4.2	3.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.4	14.7	7.4	26.0	0.6	1.0	43.6	0.0	36.8	38.5	0.0	0.0
LnGrp LOS	A	B	A	C	A	A	D	A	D	D	A	A
Approach Vol, veh/h		3026			1663			301				91
Approach Delay, s/veh		14.2			2.4			41.3				38.5
Approach LOS		B			A			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.4	69.6		23.0	9.0	68.0		23.0				
Change Period (Y+Rc), s	5.0	5.0		5.5	5.0	5.0		5.5				
Max Green Setting (Gmax), s	5.0	62.0		17.5	7.0	60.0		17.5				
Max Q Clear Time (g_c+l1), s	2.6	2.0		12.2	4.1	46.0		17.5				
Green Ext Time (p_c), s	0.0	9.3		0.1	0.1	12.2		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				12.4								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary
 19: Lien & East Wash

2024 Base Conditions

PM Peak

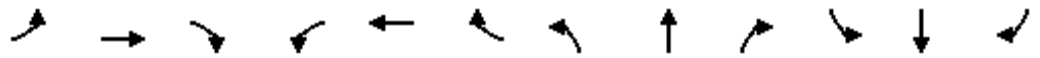


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑		↖	↗			↕	
Traffic Volume (veh/h)	48	2447	416	76	1381	19	214	10	46	21	11	30
Future Volume (veh/h)	48	2447	416	76	1381	19	214	10	46	21	11	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	52	2660	452	83	1501	21	233	11	50	23	12	33
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	370	3115	967	182	3165	44	385	65	294	142	83	167
Arrive On Green	0.07	0.81	0.81	0.10	1.00	1.00	0.22	0.22	0.20	0.22	0.22	0.20
Sat Flow, veh/h	1781	5106	1585	1781	5189	73	1361	294	1336	427	379	760
Grp Volume(v), veh/h	52	2660	452	83	985	537	233	0	61	68	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1857	1361	0	1630	1565	0	0
Q Serve(g_s), s	0.0	32.0	8.7	0.0	0.0	0.0	11.7	0.0	3.1	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	32.0	8.7	0.0	0.0	0.0	14.9	0.0	3.1	3.2	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.04	1.00		0.82	0.34		0.49
Lane Grp Cap(c), veh/h	370	3115	967	182	2076	1133	385	0	359	393	0	0
V/C Ratio(X)	0.14	0.85	0.47	0.46	0.47	0.47	0.61	0.00	0.17	0.17	0.00	0.00
Avail Cap(c_a), veh/h	370	3115	967	182	2076	1133	385	0	359	393	0	0
HCM Platoon Ratio	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.40	0.40	0.40	0.86	0.86	0.86	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.7	6.7	4.5	39.2	0.0	0.0	35.9	0.0	32.3	32.1	0.0	0.0
Incr Delay (d2), s/veh	0.1	1.3	0.7	1.5	0.7	1.2	2.7	0.0	0.2	1.0	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(95%),veh/ln	0.7	6.9	3.6	3.4	0.3	0.7	9.2	0.0	2.2	2.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.7	8.0	5.1	40.7	0.7	1.2	38.6	0.0	32.5	33.0	0.0	0.0
LnGrp LOS	A	A	A	D	A	A	D	A	C	C	A	A
Approach Vol, veh/h		3164			1605			294				68
Approach Delay, s/veh		7.6			2.9			37.3				33.0
Approach LOS		A			A			D				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	65.0		26.0	9.0	65.0		26.0				
Change Period (Y+Rc), s	5.0	5.0		6.0	5.0	5.0		6.0				
Max Green Setting (Gmax), s	4.0	60.0		20.0	4.0	60.0		20.0				
Max Q Clear Time (g_c+l1), s	2.0	34.0		16.9	2.0	2.0		5.2				
Green Ext Time (p_c), s	0.0	20.7		0.4	0.0	9.0		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			8.2									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary
 20: Thierer/Portage & East Wash

2024 Base Conditions

PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑	↗	↖	↗		↖	↑	↗
Traffic Volume (veh/h)	150	2119	187	71	1152	35	211	59	71	54	92	53
Future Volume (veh/h)	150	2119	187	71	1152	35	211	59	71	54	92	53
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	163	2303	203	77	1252	38	229	64	77	59	100	58
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	196	3121	969	123	2910	903	262	155	186	230	374	317
Arrive On Green	0.22	1.00	1.00	0.14	1.00	1.00	0.20	0.20	0.17	0.20	0.20	0.20
Sat Flow, veh/h	1781	5106	1585	1781	5106	1585	1228	773	930	1248	1870	1585
Grp Volume(v), veh/h	163	2303	203	77	1252	38	229	0	141	59	100	58
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1585	1228	0	1703	1248	1870	1585
Q Serve(g_s), s	8.7	0.0	0.0	4.1	0.0	0.0	15.5	0.0	7.3	4.3	4.5	3.0
Cycle Q Clear(g_c), s	8.7	0.0	0.0	4.1	0.0	0.0	20.0	0.0	7.3	11.6	4.5	3.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.55	1.00		1.00
Lane Grp Cap(c), veh/h	196	3121	969	123	2910	903	262	0	341	230	374	317
V/C Ratio(X)	0.83	0.74	0.21	0.63	0.43	0.04	0.87	0.00	0.41	0.26	0.27	0.18
Avail Cap(c_a), veh/h	196	3121	969	160	2910	903	262	0	341	230	374	317
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)	0.40	0.40	0.40	0.88	0.88	0.88	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.1	0.0	0.0	41.9	0.0	0.0	43.6	0.0	35.5	40.0	33.8	33.2
Incr Delay (d2), s/veh	11.6	0.6	0.2	4.6	0.4	0.1	26.1	0.0	0.8	0.6	0.4	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(95%),veh/ln	6.0	0.3	0.1	3.3	0.2	0.0	12.1	0.0	5.6	2.4	3.7	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.7	0.6	0.2	46.5	0.4	0.1	69.6	0.0	36.3	40.6	34.2	33.5
LnGrp LOS	D	A	A	D	A	A	E	A	D	D	C	C
Approach Vol, veh/h		2669			1367			370			217	
Approach Delay, s/veh		3.6			3.0			56.9			35.7	
Approach LOS		A			A			E			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.9	65.1		24.0	15.0	61.0		24.0				
Change Period (Y+Rc), s	5.5	5.5		6.5	5.5	5.5		6.5				
Max Green Setting (Gmax), s	7.5	57.5		17.5	9.5	55.5		17.5				
Max Q Clear Time (g_c+I1), s	6.1	2.0		13.6	10.7	2.0		22.0				
Green Ext Time (p_c), s	0.0	24.9		0.3	0.0	7.7		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			9.2									
HCM 6th LOS			A									

HCM Signalized Intersection Capacity Analysis

21: Eagan/Continental & East Wash

2024 Base Conditions

PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	117	1984	371	119	955	113	325	55	145	82	32	78
Future Volume (vph)	117	1984	371	119	955	113	325	55	145	82	32	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.86		0.97	0.86		0.95	0.95	1.00		1.00	
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85		0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.97	1.00		0.98	
Satd. Flow (prot)	1770	6257		3433	6306		1681	1709	1583		1724	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.97	1.00		0.98	
Satd. Flow (perm)	1770	6257		3433	6306		1681	1709	1583		1724	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	127	2157	403	129	1038	123	353	60	158	89	35	85
RTOR Reduction (vph)	0	30	0	0	19	0	0	0	127	0	25	0
Lane Group Flow (vph)	127	2530	0	129	1142	0	205	208	31	0	184	0
Turn Type	Prot	NA		Prot	NA		Split	NA	Perm		Split	NA
Protected Phases	5	2		1	6		4	4			3	3
Permitted Phases									4			
Actuated Green, G (s)	10.6	41.7		8.9	40.0		17.4	17.4	17.4		9.0	
Effective Green, g (s)	12.1	43.2		10.4	41.5		19.4	19.4	19.4		11.0	
Actuated g/C Ratio	0.12	0.43		0.10	0.42		0.19	0.19	0.19		0.11	
Clearance Time (s)	5.5	5.5		5.5	5.5		6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	214	2703		357	2616		326	331	307		189	
v/s Ratio Prot	c0.07	c0.40		0.04	0.18		c0.12	0.12			c0.11	
v/s Ratio Perm									0.02			
v/c Ratio	0.59	0.94		0.36	0.44		0.63	0.63	0.10		0.97	
Uniform Delay, d1	41.6	27.1		41.7	20.9		37.0	37.0	33.1		44.4	
Progression Factor	0.70	1.52		0.72	0.95		1.00	1.00	1.00		1.00	
Incremental Delay, d2	3.3	6.1		0.6	0.5		3.8	3.7	0.1		57.5	
Delay (s)	32.6	47.4		30.7	20.4		40.8	40.7	33.3		101.8	
Level of Service	C	D		C	C		D	D	C		F	
Approach Delay (s)		46.7			21.5			38.7			101.8	
Approach LOS		D			C			D			F	

Intersection Summary

HCM 2000 Control Delay	41.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		

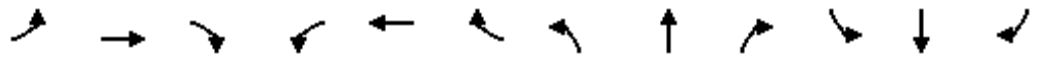
c Critical Lane Group

HCM 6th Signalized Intersection Summary

2024 Base Conditions

23: Zeier & E Wash

PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	124	1527	148	297	1158	66	112	56	358	117	35	37
Future Volume (veh/h)	124	1527	148	297	1158	66	112	56	358	117	35	37
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	131	1607	156	313	1219	69	118	59	377	123	37	39
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	2434	236	363	2606	147	570	309	262	160	75	79
Arrive On Green	0.09	0.41	0.41	0.21	0.83	0.83	0.17	0.17	0.17	0.09	0.09	0.09
Sat Flow, veh/h	1781	6008	583	3456	6278	354	3456	1870	1585	1781	834	879
Grp Volume(v), veh/h	131	1291	472	313	936	352	118	59	377	123	0	76
Grp Sat Flow(s),veh/h/ln	1781	1609	1765	1728	1609	1807	1728	1870	1585	1781	0	1712
Q Serve(g_s), s	7.2	21.7	21.7	8.7	5.4	5.4	3.0	2.7	16.5	6.8	0.0	4.2
Cycle Q Clear(g_c), s	7.2	21.7	21.7	8.7	5.4	5.4	3.0	2.7	16.5	6.8	0.0	4.2
Prop In Lane	1.00		0.33	1.00		0.20	1.00		1.00	1.00		0.51
Lane Grp Cap(c), veh/h	160	1955	715	363	2003	750	570	309	262	160	0	154
V/C Ratio(X)	0.82	0.66	0.66	0.86	0.47	0.47	0.21	0.19	1.44	0.77	0.00	0.49
Avail Cap(c_a), veh/h	178	1955	715	363	2003	750	570	309	262	205	0	197
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	0.93	0.93	0.93	0.89	0.89	0.89	1.00	0.00	1.00
Uniform Delay (d), s/veh	44.7	24.2	24.2	38.8	5.4	5.4	36.1	36.0	41.8	44.5	0.0	43.3
Incr Delay (d2), s/veh	22.9	1.8	4.7	17.7	0.7	2.0	0.2	0.3	217.0	12.5	0.0	2.4
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(95%),veh/ln	7.4	12.7	14.5	7.3	2.5	3.2	2.3	2.3	34.3	6.4	0.0	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.6	25.9	28.9	56.5	6.2	7.4	36.3	36.3	258.7	57.0	0.0	45.8
LnGrp LOS	E	C	C	E	A	A	D	D	F	E	A	D
Approach Vol, veh/h		1894			1601			554				199
Approach Delay, s/veh		29.5			16.3			187.7				52.7
Approach LOS		C			B			F				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	16.0	46.5		15.5	15.0	47.5		22.0				
Change Period (Y+Rc), s	5.5	6.0		6.5	6.0	6.0		5.5				
Max Green Setting (Gmax), s	10.5	38.0		11.5	10.0	38.0		16.5				
Max Q Clear Time (g_c+l1), s	10.7	23.7		8.8	9.2	7.4		18.5				
Green Ext Time (p_c), s	0.0	9.4		0.3	0.0	9.9		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				46.2								
HCM 6th LOS				D								

HCM 6th Signalized Intersection Summary

24: E Springs & E Wash

2024 Base Conditions
PM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↗	↙↘	↑↑↑	↙↘	↗
Traffic Volume (veh/h)	2109	115	319	1304	220	197
Future Volume (veh/h)	2109	115	319	1304	220	197
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	2220	0	336	1373	232	207
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2786		423	3691	526	241
Arrive On Green	1.00	0.00	0.12	0.72	0.15	0.15
Sat Flow, veh/h	5274	1585	3456	5274	3456	1585
Grp Volume(v), veh/h	2220	0	336	1373	232	207
Grp Sat Flow(s),veh/h/ln	1702	1585	1728	1702	1728	1585
Q Serve(g_s), s	0.0	0.0	9.5	10.2	6.1	12.7
Cycle Q Clear(g_c), s	0.0	0.0	9.5	10.2	6.1	12.7
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2786		423	3691	526	241
V/C Ratio(X)	0.80		0.79	0.37	0.44	0.86
Avail Cap(c_a), veh/h	2786		708	3691	605	277
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.64	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	42.7	5.3	38.5	41.3
Incr Delay (d2), s/veh	1.6	0.0	3.4	0.3	0.6	20.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.7	0.0	7.4	5.1	4.7	10.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	1.6	0.0	46.1	5.5	39.1	62.0
LnGrp LOS	A		D	A	D	E
Approach Vol, veh/h	2220	A		1709	439	
Approach Delay, s/veh	1.6			13.5	49.9	
Approach LOS	A			B	D	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	17.7	60.6		21.7		78.3
Change Period (Y+Rc), s	5.5	6.0		6.5		6.0
Max Green Setting (Gmax), s	20.5	44.0		17.5		70.0
Max Q Clear Time (g_c+l1), s	11.5	2.0		14.7		12.2
Green Ext Time (p_c), s	0.8	26.4		0.5		13.5

Intersection Summary













HCM 6th Ctrl Delay	11.1
HCM 6th LOS	B

Notes

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

HCM Signalized Intersection Capacity Analysis
 1: Blair St. & East Washington Ave.

2024 with BRT
 AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑↑	↑↑		↑		↑↑	↑	↑↑	
Traffic Volume (vph)	0	256	13	998	1899	0	75	0	459	207	94	21
Future Volume (vph)	0	256	13	998	1899	0	75	0	459	207	94	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0		4.0	4.0	4.0	
Lane Util. Factor		0.95		0.97	0.95		1.00		0.88	0.91	0.91	
Frt		0.99		1.00	1.00		1.00		0.85	1.00	0.99	
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	0.98	
Satd. Flow (prot)		3513		3433	3539		1770		2787	1610	3265	
Flt Permitted		1.00		0.95	1.00		0.95		1.00	0.95	0.98	
Satd. Flow (perm)		3513		3433	3539		1770		2787	1610	3265	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	269	14	1051	1999	0	79	0	483	218	99	22
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	8	0
Lane Group Flow (vph)	0	280	0	1051	1999	0	79	0	483	113	218	0
Turn Type		NA		Prot	NA		Prot		pt+ov	Split	NA	
Protected Phases		1		2	1 2		3		2 3	4	4	
Permitted Phases							3		3 2			
Actuated Green, G (s)		28.7		60.5	93.7		7.0		72.0	14.8	14.8	
Effective Green, g (s)		29.2		61.0	94.2		7.0		72.5	16.8	16.8	
Actuated g/C Ratio		0.22		0.47	0.72		0.05		0.56	0.13	0.13	
Clearance Time (s)		4.5		4.5			4.0			6.0	6.0	
Vehicle Extension (s)		3.0		3.0			2.0			3.0	3.0	
Lane Grp Cap (vph)		789		1610	2564		95		1554	208	421	
v/s Ratio Prot		0.08		0.31	c0.56		c0.04		0.17	c0.07	0.07	
v/s Ratio Perm												
v/c Ratio		0.35		0.65	0.78		0.83		0.31	0.54	0.52	
Uniform Delay, d1		42.5		26.4	11.3		60.9		15.4	53.0	52.8	
Progression Factor		1.00		0.32	0.05		1.00		1.00	1.00	1.00	
Incremental Delay, d2		0.3		1.2	0.9		41.8		0.0	2.9	1.1	
Delay (s)		42.7		9.8	1.5		102.8		15.4	55.9	53.9	
Level of Service		D		A	A		F		B	E	D	
Approach Delay (s)		42.7			4.4			27.7			54.6	
Approach LOS		D			A			C			D	
Intersection Summary												
HCM 2000 Control Delay			14.1			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			130.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			71.6%			ICU Level of Service			C			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: Livingston Ave & East Washington Ave.

2024 with BRT
AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	824	25	139	2953	39	0	0	27	0	0	36
Future Volume (vph)	73	824	25	139	2953	39	0	0	27	0	0	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0				5.0			5.0
Lane Util. Factor	1.00	0.95		1.00	0.91				1.00			1.00
Frt	1.00	1.00		1.00	1.00				0.86			0.86
Flt Protected	0.95	1.00		0.95	1.00				1.00			1.00
Satd. Flow (prot)	1770	3524		1770	5075				1611			1611
Flt Permitted	0.04	1.00		0.30	1.00				1.00			1.00
Satd. Flow (perm)	73	3524		565	5075				1611			1611
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	77	867	26	146	3108	41	0	0	28	0	0	38
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	24	0	0	15
Lane Group Flow (vph)	77	892	0	146	3148	0	0	0	4	0	0	23
Turn Type	D.P+P	NA		D.Pm	NA				Prot			Over
Protected Phases	4	2			6				8			4
Permitted Phases	6			2								
Actuated Green, G (s)	120.0	102.0		102.0	102.0				18.0			18.0
Effective Green, g (s)	120.0	102.0		102.0	102.0				18.0			18.0
Actuated g/C Ratio	0.92	0.78		0.78	0.78				0.14			0.14
Clearance Time (s)	5.0	5.0		5.0	5.0				5.0			5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0				3.0			3.0
Lane Grp Cap (vph)	302	2764		443	3981				223			223
v/s Ratio Prot	c0.04	0.25			c0.62				0.00			0.01
v/s Ratio Perm	0.20			0.26								
v/c Ratio	0.25	0.32		0.33	0.79				0.02			0.10
Uniform Delay, d1	19.6	4.0		4.1	7.9				48.4			49.0
Progression Factor	0.81	1.12		0.05	0.13				1.00			1.00
Incremental Delay, d2	0.4	0.3		0.8	0.7				0.0			0.2
Delay (s)	16.3	4.8		1.0	1.7				48.4			49.2
Level of Service	B	A		A	A				D			D
Approach Delay (s)		5.7			1.7			48.4			49.2	
Approach LOS		A			A			D			D	

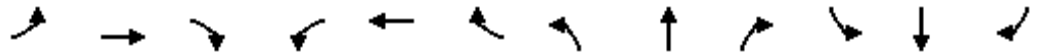
Intersection Summary

HCM 2000 Control Delay	3.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
 3: Paterson St. & East Washington Ave.

2024 with BRT
 AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↘	↑↑↑	↗		↕		↘	↑	↗
Traffic Volume (veh/h)	0	947	15	50	2938	49	26	26	22	55	39	36
Future Volume (veh/h)	0	947	15	50	2938	49	26	26	22	55	39	36
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	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	997	16	53	3093	52	27	27	23	58	41	38
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, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	2760	1231	68	4357	1352	65	44	31	151	131	111
Arrive On Green	0.00	1.00	1.00	0.08	1.00	1.00	0.08	0.07	0.07	0.08	0.07	0.07
Sat Flow, veh/h	0	3647	1585	1781	5106	1585	400	634	440	1355	1870	1585
Grp Volume(v), veh/h	0	997	16	53	3093	52	77	0	0	58	41	38
Grp Sat Flow(s),veh/h/ln	0	1777	1585	1781	1702	1585	1473	0	0	1355	1870	1585
Q Serve(g_s), s	0.0	0.0	0.0	3.8	0.0	0.0	4.1	0.0	0.0	0.0	2.7	3.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	3.8	0.0	0.0	6.8	0.0	0.0	6.2	2.7	3.0
Prop In Lane	0.00		1.00	1.00		1.00	0.35		0.30	1.00		1.00
Lane Grp Cap(c), veh/h	0	2760	1231	68	4357	1352	152	0	0	151	131	111
V/C Ratio(X)	0.00	0.36	0.01	0.78	0.71	0.04	0.51	0.00	0.00	0.38	0.31	0.34
Avail Cap(c_a), veh/h	0	2760	1231	123	4357	1352	492	0	0	447	540	457
HCM Platoon Ratio	1.00	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.96	0.96	0.09	0.09	0.09	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	59.5	0.0	0.0	59.2	0.0	0.0	58.2	57.5	57.6
Incr Delay (d2), s/veh	0.0	0.4	0.0	1.8	0.1	0.0	2.6	0.0	0.0	1.6	1.4	1.8
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(95%),veh/ln	0.0	0.2	0.0	2.3	0.1	0.0	4.7	0.0	0.0	3.5	2.4	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.4	0.0	61.3	0.1	0.0	61.8	0.0	0.0	59.8	58.9	59.4
LnGrp LOS	A	A	A	E	A	A	E	A	A	E	E	E
Approach Vol, veh/h		1013			3198			77			137	
Approach Delay, s/veh		0.3			1.1			61.8			59.4	
Approach LOS		A			A			E			E	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	10.0	106.0		14.1		115.9		14.1				
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s	9.0	68.5		37.5		82.5		37.5				
Max Q Clear Time (g_c+I1), s	5.8	2.0		8.2		2.0		8.8				
Green Ext Time (p_c), s	0.0	5.8		0.5		52.1		0.3				
Intersection Summary												
HCM 6th Ctrl Delay				3.8								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary
 4: Ingersoll St. & East Washington Ave.

2024 with BRT
 AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘	↑↑↑	↗		↑	↗		↕	
Traffic Volume (veh/h)	75	897	18	50	3099	51	43	31	18	20	16	35
Future Volume (veh/h)	75	897	18	50	3099	51	43	31	18	20	16	35
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	79	944	19	53	3262	54	45	33	19	21	17	37
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	151	2698	1203	545	3882	1205	106	61	139	54	35	52
Arrive On Green	0.06	1.00	1.00	0.05	1.00	1.00	0.11	0.09	0.09	0.11	0.09	0.09
Sat Flow, veh/h	1781	3554	1585	1781	5106	1585	714	694	1585	217	397	597
Grp Volume(v), veh/h	79	944	19	53	3262	54	78	0	19	75	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1702	1585	1408	0	1585	1210	0	0
Q Serve(g_s), s	1.3	0.0	0.0	0.9	0.0	0.0	0.0	0.0	1.4	2.2	0.0	0.0
Cycle Q Clear(g_c), s	1.3	0.0	0.0	0.9	0.0	0.0	7.0	0.0	1.4	9.2	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.58		1.00	0.28		0.49
Lane Grp Cap(c), veh/h	151	2698	1203	545	3882	1205	194	0	139	165	0	0
V/C Ratio(X)	0.52	0.35	0.02	0.10	0.84	0.04	0.40	0.00	0.14	0.45	0.00	0.00
Avail Cap(c_a), veh/h	154	2698	1203	557	3882	1205	496	0	451	473	0	0
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)	0.86	0.86	0.86	0.22	0.22	0.22	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	12.1	0.0	0.0	3.0	0.0	0.0	56.4	0.0	54.7	57.4	0.0	0.0
Incr Delay (d2), s/veh	2.7	0.3	0.0	0.0	0.5	0.0	1.3	0.0	0.4	2.0	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(95%),veh/ln	2.3	0.2	0.0	0.4	0.3	0.0	4.5	0.0	1.1	4.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.7	0.3	0.0	3.0	0.5	0.0	57.7	0.0	55.2	59.3	0.0	0.0
LnGrp LOS	B	A	A	A	A	A	E	A	E	E	A	A
Approach Vol, veh/h		1042			3369			97				75
Approach Delay, s/veh		1.4			0.6			57.2				59.3
Approach LOS		A			A			E				E
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.9	103.2		17.9	8.8	103.3		17.9				
Change Period (Y+Rc), s	5.5	4.5		6.5	5.0	4.5		6.5				
Max Green Setting (Gmax), s	4.3	72.2		37.0	4.0	73.0		37.0				
Max Q Clear Time (g_c+l1), s	2.9	2.0		11.2	3.3	2.0		9.0				
Green Ext Time (p_c), s	0.0	5.4		0.2	0.0	52.8		0.3				
Intersection Summary												
HCM 6th Ctrl Delay				2.9								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary
 5: Baldwin St. & East Washington Ave.

2024 with BRT
 AM Peak



























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↘	↑↑↑	↗		↑	↗		↗	↗
Traffic Volume (veh/h)	0	916	24	44	3016	88	40	71	25	53	70	182
Future Volume (veh/h)	0	916	24	44	3016	88	40	71	25	53	70	182
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	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	964	25	46	3175	93	42	75	26	56	74	192
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, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	2014	898	59	3260	1012	38	50	451	40	37	451
Arrive On Green	0.00	1.00	1.00	0.03	0.64	0.64	0.29	0.28	0.28	0.29	0.28	0.28
Sat Flow, veh/h	0	3647	1585	1781	5106	1585	0	176	1585	0	130	1585
Grp Volume(v), veh/h	0	964	25	46	3175	93	117	0	26	130	0	192
Grp Sat Flow(s),veh/h/ln	0	1777	1585	1781	1702	1585	176	0	1585	130	0	1585
Q Serve(g_s), s	0.0	0.0	0.0	3.3	77.3	2.9	0.0	0.0	1.6	0.0	0.0	12.8
Cycle Q Clear(g_c), s	0.0	0.0	0.0	3.3	77.3	2.9	38.0	0.0	1.6	38.0	0.0	12.8
Prop In Lane	0.00		1.00	1.00		1.00	0.36		1.00	0.43		1.00
Lane Grp Cap(c), veh/h	0	2014	898	59	3260	1012	89	0	451	78	0	451
V/C Ratio(X)	0.00	0.48	0.03	0.77	0.97	0.09	1.31	0.00	0.06	1.67	0.00	0.43
Avail Cap(c_a), veh/h	0	2014	898	110	3260	1012	89	0	451	78	0	451
HCM Platoon Ratio	1.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	0.89	0.89	0.09	0.09	0.09	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	62.3	22.5	9.0	44.8	0.0	33.8	47.7	0.0	37.9
Incr Delay (d2), s/veh	0.0	0.7	0.1	2.0	1.6	0.0	201.0	0.0	0.1	352.9	0.0	0.6
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(95%),veh/ln	0.0	0.4	0.0	2.1	30.9	1.5	14.2	0.0	1.1	18.3	0.0	8.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.7	0.1	64.3	24.1	9.0	245.8	0.0	33.9	400.6	0.0	38.5
LnGrp LOS	A	A	A	E	C	A	F	A	C	F	A	D
Approach Vol, veh/h		989			3314			143				322
Approach Delay, s/veh		0.7			24.2			207.3				184.7
Approach LOS		A			C			F				F
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	9.3	78.7		42.0		88.0		42.0				
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s	8.0	70.0		37.0		83.0		37.0				
Max Q Clear Time (g_c+l1), s	5.3	2.0		40.0		79.3		40.0				
Green Ext Time (p_c), s	0.0	5.6		0.0		3.6		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				35.7								
HCM 6th LOS				D								

HCM Signalized Intersection Capacity Analysis

2024 with BRT

6: First & E Wash

AM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	186	777	42	61	2636	111	249	163	117	72	145	392	
Future Volume (vph)	186	777	42	61	2636	111	249	163	117	72	145	392	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.5	6.5	6.5	
Lane Util. Factor	0.97	0.95	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.88	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	3539	1583	1770	5085	1583	1770	1863	1583	1770	1863	2787	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.40	1.00	1.00	0.65	1.00	1.00	
Satd. Flow (perm)	3433	3539	1583	1770	5085	1583	749	1863	1583	1203	1863	2787	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	202	845	46	66	2865	121	271	177	127	78	158	426	
RTOR Reduction (vph)	0	0	22	0	0	52	0	0	96	0	0	41	
Lane Group Flow (vph)	202	845	24	66	2865	69	271	177	31	78	158	385	
Turn Type	Prot	NA	custom	Prot	NA	Perm	D.P+P	NA	Perm	Perm	NA	custom	
Protected Phases	1	6		5	2		3	3 4			4		
Permitted Phases			2			2	4		3 4	4		4 1	
Actuated Green, G (s)	13.9	76.4	71.1	9.1	71.1	71.1	28.5	33.5	33.5	13.5	13.5	33.9	
Effective Green, g (s)	13.9	76.4	71.1	9.1	71.1	71.1	28.5	33.5	33.5	13.5	13.5	33.9	
Actuated g/C Ratio	0.10	0.56	0.52	0.07	0.52	0.52	0.21	0.25	0.25	0.10	0.10	0.25	
Clearance Time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0			6.5	6.5		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0		
Lane Grp Cap (vph)	352	1995	830	118	2668	830	270	460	391	119	185	697	
v/s Ratio Prot	0.06	c0.24		0.04	c0.56		c0.11	0.10			0.08		
v/s Ratio Perm			0.02			0.04	c0.10		0.02	0.06		c0.14	
v/c Ratio	0.57	0.42	0.03	0.56	1.07	0.08	1.00	0.38	0.08	0.66	0.85	0.55	
Uniform Delay, d1	58.0	16.9	15.5	61.3	32.2	16.0	51.4	42.4	39.2	58.8	60.0	44.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.3	0.7	0.1	5.6	41.1	0.2	55.7	0.5	0.1	12.3	29.8	1.0	
Delay (s)	60.2	17.6	15.6	66.9	73.3	16.2	107.1	43.0	39.3	71.0	89.8	45.1	
Level of Service	E	B	B	E	E	B	F	D	D	E	F	D	
Approach Delay (s)		25.4			70.9			72.4			58.9		
Approach LOS		C			E			E			E		
Intersection Summary													
HCM 2000 Control Delay			60.4									HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio			1.00										
Actuated Cycle Length (s)			135.5									Sum of lost time (s)	22.0
Intersection Capacity Utilization			96.0%									ICU Level of Service	F
Analysis Period (min)			15										

c Critical Lane Group

HCM 6th Signalized Intersection Summary

2024 with BRT

7: Fourth & E Wash

AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	840	8	0	2736	73	23	58	20	50	31	51
Future Volume (veh/h)	28	840	8	0	2736	73	23	58	20	50	31	51
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	0	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	30	913	9	0	2974	79	25	63	22	54	34	55
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	0	2	2	2	2	2	2	2	2
Cap, veh/h	38	2229	994	0	2897	899	36	74	451	46	19	451
Arrive On Green	0.02	0.63	0.63	0.00	0.57	0.57	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	1781	3554	1585	0	5274	1585	2	259	1585	3	66	1585
Grp Volume(v), veh/h	30	913	9	0	2974	79	88	0	22	88	0	55
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	0	1702	1585	260	0	1585	69	0	1585
Q Serve(g_s), s	2.2	16.8	0.3	0.0	73.7	2.9	0.1	0.0	1.3	0.1	0.0	3.3
Cycle Q Clear(g_c), s	2.2	16.8	0.3	0.0	73.7	2.9	37.0	0.0	1.3	37.0	0.0	3.3
Prop In Lane	1.00		1.00	0.00		1.00	0.28		1.00	0.61		1.00
Lane Grp Cap(c), veh/h	38	2229	994	0	2897	899	110	0	451	64	0	451
V/C Ratio(X)	0.79	0.41	0.01	0.00	1.03	0.09	0.80	0.00	0.05	1.37	0.00	0.12
Avail Cap(c_a), veh/h	55	2229	994	0	2897	899	110	0	451	65	0	451
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	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	63.3	12.2	9.1	0.0	28.1	12.8	38.8	0.0	33.7	54.7	0.0	34.5
Incr Delay (d2), s/veh	37.7	0.6	0.0	0.0	23.9	0.2	33.4	0.0	0.0	238.8	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(95%),veh/ln	2.5	10.7	0.2	0.0	45.0	2.0	5.7	0.0	0.9	11.5	0.0	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	101.0	12.7	9.1	0.0	52.0	13.0	72.3	0.0	33.8	293.5	0.0	34.6
LnGrp LOS	F	B	A	A	F	B	E	A	C	F	A	C
Approach Vol, veh/h		952			3053			110				143
Approach Delay, s/veh		15.5			51.0			64.6				193.9
Approach LOS		B			D			E				F
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		86.5		43.5	7.8	78.7		43.5				
Change Period (Y+Rc), s		5.0		6.5	5.0	5.0		6.5				
Max Green Setting (Gmax), s		81.5		37.0	4.0	72.5		37.0				
Max Q Clear Time (g_c+I1), s		18.8		39.0	4.2	75.7		39.0				
Green Ext Time (p_c), s		7.9		0.0	0.0	0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			48.2									
HCM 6th LOS			D									

HCM 6th Signalized Intersection Summary

2024 with BRT

8: Sixth & E Wash

AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	855	7	98	2771	19	18	10	14	30	25	30
Future Volume (veh/h)	12	855	7	98	2771	19	18	10	14	30	25	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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	13	929	8	107	3012	21	20	11	15	33	27	33
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	117	2643	1179	522	4217	1309	163	59	81	78	49	47
Arrive On Green	0.74	0.74	0.74	0.08	1.00	1.00	0.08	0.08	0.08	0.08	0.08	0.08
Sat Flow, veh/h	77	3554	1585	1781	5106	1585	1343	717	978	447	592	572
Grp Volume(v), veh/h	13	929	8	107	3012	21	20	0	26	93	0	0
Grp Sat Flow(s),veh/h/ln	77	1777	1585	1781	1702	1585	1343	0	1694	1611	0	0
Q Serve(g_s), s	6.3	10.9	0.2	1.6	0.0	0.0	0.0	0.0	1.7	4.7	0.0	0.0
Cycle Q Clear(g_c), s	6.3	10.9	0.2	1.6	0.0	0.0	1.9	0.0	1.7	6.7	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.58	0.35		0.35
Lane Grp Cap(c), veh/h	117	2643	1179	522	4217	1309	163	0	140	174	0	0
V/C Ratio(X)	0.11	0.35	0.01	0.20	0.71	0.02	0.12	0.00	0.19	0.54	0.00	0.00
Avail Cap(c_a), veh/h	117	2643	1179	539	4217	1309	220	0	212	240	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.92	0.92	0.92	0.23	0.23	0.23	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	4.7	5.3	4.0	3.2	0.0	0.0	51.4	0.0	51.3	53.5	0.0	0.0
Incr Delay (d2), s/veh	1.8	0.3	0.0	0.0	0.2	0.0	0.3	0.0	0.6	2.6	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(95%),veh/ln	0.3	6.4	0.1	0.7	0.2	0.0	1.0	0.0	1.4	5.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.5	5.7	4.0	3.3	0.2	0.0	51.7	0.0	51.9	56.0	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	D	E	A	A
Approach Vol, veh/h		950			3140			46				93
Approach Delay, s/veh		5.7			0.3			51.8				56.0
Approach LOS		A			A			D				E
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	9.9	94.2		15.9		104.1		15.9				
Change Period (Y+Rc), s	5.0	5.0		6.0		5.0		6.0				
Max Green Setting (Gmax), s	6.0	83.0		15.0		94.0		15.0				
Max Q Clear Time (g_c+l1), s	3.6	12.9		8.7		2.0		3.9				
Green Ext Time (p_c), s	0.1	6.4		0.1		52.5		0.1				

Intersection Summary

HCM 6th Ctrl Delay	3.3
HCM 6th LOS	A

Notes






















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

HCM Signalized Intersection Capacity Analysis

2024 with BRT

9: Milwaukee/North & E Wash

AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	727	126	0	2496	7	342	70	17	47	83	95
Future Volume (vph)	27	727	126	0	2496	7	342	70	17	47	83	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5	6.5	6.5		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00		0.91	1.00	0.97	1.00		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.97		1.00	0.92	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583		5085	1583	3433	1809		1770	1714	
Flt Permitted	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1583		5085	1583	3433	1809		1770	1714	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	790	137	0	2713	8	372	76	18	51	90	103
RTOR Reduction (vph)	0	0	46	0	0	3	0	7	0	0	35	0
Lane Group Flow (vph)	29	790	91	0	2713	5	372	87	0	51	158	0
Turn Type	Prot	NA	Perm		NA	Perm	Split	NA		Split	NA	
Protected Phases	5	2			6		4	4		3	3	
Permitted Phases			2			6						
Actuated Green, G (s)	6.5	79.5	79.5		68.5	68.5	13.5	13.5		11.0	11.0	
Effective Green, g (s)	6.5	79.5	79.5		68.5	68.5	13.5	13.5		11.0	11.0	
Actuated g/C Ratio	0.05	0.66	0.66		0.57	0.57	0.11	0.11		0.09	0.09	
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5	6.5	6.5		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	95	2344	1048		2902	903	386	203		162	157	
v/s Ratio Prot	0.02	c0.22			c0.53		c0.11	0.05		0.03	c0.09	
v/s Ratio Perm			0.06			0.00						
v/c Ratio	0.31	0.34	0.09		0.93	0.01	0.96	0.43		0.31	1.01	
Uniform Delay, d1	54.6	8.8	7.3		23.7	11.1	53.0	49.7		51.0	54.5	
Progression Factor	1.05	0.89	0.82		0.51	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.7	0.4	0.2		5.7	0.0	36.1	1.5		1.1	74.3	
Delay (s)	64.9	8.2	6.1		17.8	11.1	89.1	51.1		52.1	128.8	
Level of Service	E	A	A		B	B	F	D		D	F	
Approach Delay (s)		9.6			17.8			81.4			112.8	
Approach LOS		A			B			F			F	
Intersection Summary												
HCM 2000 Control Delay			28.1		HCM 2000 Level of Service						C	
HCM 2000 Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			120.0		Sum of lost time (s)						20.5	
Intersection Capacity Utilization			81.5%		ICU Level of Service						D	
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2024 with BRT

10: Johnson & E Wash

AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	730	4	38	2381	173	15	7	7	135	12	11
Future Volume (vph)	7	730	4	38	2381	173	15	7	7	135	12	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		5.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.91	1.00		1.00		0.95	0.95	
Frt	1.00	1.00		1.00	1.00	0.85		0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98		0.95	0.97	
Satd. Flow (prot)	1770	3537		1770	5085	1583		1756		1681	1673	
Flt Permitted	0.05	1.00		0.33	1.00	1.00		0.98		0.74	0.77	
Satd. Flow (perm)	85	3537		614	5085	1583		1756		1303	1334	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	793	4	41	2588	188	16	8	8	147	13	12
RTOR Reduction (vph)	0	0	0	0	0	25	0	8	0	0	5	0
Lane Group Flow (vph)	8	797	0	41	2588	163	0	24	0	87	80	0
Turn Type	Perm	NA		Perm	NA	Perm	Split	NA		Perm	NA	
Protected Phases		2			2		3	3			4	4
Permitted Phases	2			2		2				4		
Actuated Green, G (s)	88.0	88.0		88.0	88.0	88.0		3.6		12.9	12.9	
Effective Green, g (s)	88.0	88.0		88.0	88.0	88.0		3.6		12.9	12.9	
Actuated g/C Ratio	0.73	0.73		0.73	0.73	0.73		0.03		0.11	0.11	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		5.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	62	2593		450	3729	1160		52		140	143	
v/s Ratio Prot		0.23			c0.51			c0.01				
v/s Ratio Perm	0.09			0.07		0.10				c0.07	0.06	
v/c Ratio	0.13	0.31		0.09	0.69	0.14		0.47		0.62	0.56	
Uniform Delay, d1	4.7	5.5		4.6	8.7	4.8		57.3		51.2	50.8	
Progression Factor	0.79	0.78		1.20	0.85	1.30		1.00		1.00	1.00	
Incremental Delay, d2	4.1	0.3		0.3	0.8	0.2		6.5		8.3	4.6	
Delay (s)	7.8	4.6		5.8	8.2	6.4		63.7		59.5	55.5	
Level of Service	A	A		A	A	A		E		E	E	
Approach Delay (s)		4.6			8.0			63.7			57.5	
Approach LOS		A			A			E			E	

Intersection Summary

HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 11: Marquette & E Wash

2024 with BRT
 AM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↙	↑↑↑	↘	
Traffic Volume (vph)	797	32	106	2542	78	49
Future Volume (vph)	797	32	106	2542	78	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.0	4.5	6.5	
Lane Util. Factor	0.95	1.00	1.00	0.91	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (prot)	3539	1583	1770	5085	1713	
Flt Permitted	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (perm)	3539	1583	1770	5085	1713	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	866	35	115	2763	85	53
RTOR Reduction (vph)	0	11	0	0	20	0
Lane Group Flow (vph)	866	24	115	2763	118	0
Turn Type	NA	Perm	Prot	NA	Prot	
Protected Phases	2		3	2 3	4	
Permitted Phases		2				
Actuated Green, G (s)	69.5	69.5	22.1	95.6	13.4	
Effective Green, g (s)	69.5	69.5	22.1	91.6	13.4	
Actuated g/C Ratio	0.58	0.58	0.18	0.76	0.11	
Clearance Time (s)	4.5	4.5	4.0		6.5	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	2049	916	325	3881	191	
v/s Ratio Prot	0.24		0.06	c0.54	c0.07	
v/s Ratio Perm		0.01				
v/c Ratio	0.42	0.03	0.35	0.71	0.62	
Uniform Delay, d1	14.1	10.8	42.7	7.4	50.9	
Progression Factor	0.82	0.73	0.89	0.82	1.00	
Incremental Delay, d2	0.6	0.1	0.5	0.5	6.1	
Delay (s)	12.2	7.9	38.3	6.5	57.0	
Level of Service	B	A	D	A	E	
Approach Delay (s)	12.1			7.8	57.0	
Approach LOS	B			A	E	

Intersection Summary

HCM 2000 Control Delay	10.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

12: EB Ramps & E Wash

2024 with BRT
AM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↵	↑↑↑	↵	↑↑
Traffic Volume (vph)	744	268	71	2656	97	260
Future Volume (vph)	744	268	71	2656	97	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.95	0.88	1.00	0.91	0.97	0.88
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)	3539	2787	1770	5085	3433	2787
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	2787	1770	5085	3433	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	783	282	75	2796	102	274
RTOR Reduction (vph)	0	48	0	0	0	177
Lane Group Flow (vph)	783	234	75	2796	102	97
Turn Type	NA	custom	Prot	NA	Prot	custom
Protected Phases	5	5 2	3	1 8	7	7 8 3
Permitted Phases		2				8
Actuated Green, G (s)	67.7	99.7	10.3	101.1	8.9	42.3
Effective Green, g (s)	67.7	99.7	10.3	101.1	8.9	42.3
Actuated g/C Ratio	0.56	0.83	0.09	0.84	0.07	0.35
Clearance Time (s)	5.0		5.0		5.0	
Vehicle Extension (s)	3.0		3.0		3.0	
Lane Grp Cap (vph)	1996	2315	151	4284	254	982
v/s Ratio Prot	0.22	0.08	0.04	c0.55	c0.03	0.03
v/s Ratio Perm						
v/c Ratio	0.39	0.10	0.50	0.65	0.40	0.10
Uniform Delay, d1	14.6	1.9	52.4	3.3	53.0	26.1
Progression Factor	0.67	12.97	0.98	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.1	1.8	0.3	1.0	0.0
Delay (s)	10.3	24.4	53.0	3.6	54.1	26.1
Level of Service	B	C	D	A	D	C
Approach Delay (s)	14.0			4.9	33.7	
Approach LOS	B			A	C	

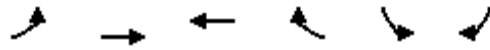
Intersection Summary

HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 13: East Wash & WB Ramps

2024 with BRT
 AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	72	925	1770	231	63	807
Future Volume (vph)	72	925	1770	231	63	807
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.95	0.91	1.00	0.97	0.88
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	5085	1583	3433	2787
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	5085	1583	3433	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	76	974	1863	243	66	849
RTOR Reduction (vph)	0	0	0	85	0	6
Lane Group Flow (vph)	76	974	1863	158	66	843
Turn Type	Prot	NA	NA	custom	Prot	pt+ov
Protected Phases	1	6	2		8	8 1
Permitted Phases				6		
Actuated Green, G (s)	9.9	76.3	61.4	76.3	33.7	48.6
Effective Green, g (s)	9.9	76.3	61.4	76.3	33.7	48.6
Actuated g/C Ratio	0.08	0.64	0.51	0.64	0.28	0.41
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	146	2250	2601	1006	964	1128
v/s Ratio Prot	0.04	0.28	c0.37		0.02	c0.30
v/s Ratio Perm				0.10		
v/c Ratio	0.52	0.43	0.72	0.16	0.07	0.75
Uniform Delay, d1	52.8	11.0	22.6	8.8	31.6	30.5
Progression Factor	1.53	0.29	0.31	0.07	1.00	1.00
Incremental Delay, d2	3.2	0.6	1.4	0.3	0.0	2.7
Delay (s)	83.7	3.8	8.3	0.9	31.7	33.2
Level of Service	F	A	A	A	C	C
Approach Delay (s)		9.6	7.5		33.1	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
 14: Rethke Ave/Melvin Ct & East Wash

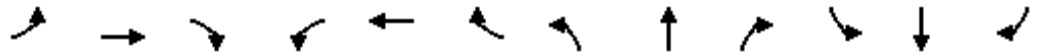
2024 with BRT
 AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑		↖	↑↑↑			↕				↕
Traffic Volume (veh/h)	11	655	6	15	2048	13	140	1	5	15	4	27
Future Volume (veh/h)	11	655	6	15	2048	13	140	1	5	15	4	27
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	12	689	6	16	2156	14	147	1	5	16	4	28
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	44	3870	34	52	3901	25	266	1	7	104	43	150
Arrive On Green	0.05	1.00	1.00	0.04	0.99	0.98	0.12	0.15	0.12	0.12	0.15	0.12
Sat Flow, veh/h	1781	5221	45	1781	5234	34	1412	10	48	437	293	1021
Grp Volume(v), veh/h	12	449	246	16	1402	768	153	0	0	48	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1862	1781	1702	1864	1470	0	0	1750	0	0
Q Serve(g_s), s	0.8	0.0	0.0	1.0	0.9	1.0	9.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.8	0.0	0.0	1.0	0.9	1.0	12.1	0.0	0.0	3.1	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.02	0.96		0.03	0.33		0.58
Lane Grp Cap(c), veh/h	44	2523	1380	52	2537	1390	237	0	0	253	0	0
V/C Ratio(X)	0.27	0.18	0.18	0.31	0.55	0.55	0.64	0.00	0.00	0.19	0.00	0.00
Avail Cap(c_a), veh/h	104	2523	1380	104	2537	1390	346	0	0	374	0	0
HCM Platoon Ratio	2.00	2.00	2.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.92	0.92	0.92	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	56.0	0.0	0.0	56.5	0.1	0.1	50.0	0.0	0.0	46.2	0.0	0.0
Incr Delay (d2), s/veh	3.0	0.1	0.3	3.3	0.9	1.6	2.9	0.0	0.0	0.4	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(95%),veh/ln	0.7	0.1	0.2	0.9	0.8	1.4	8.4	0.0	0.0	2.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.0	0.1	0.3	59.9	1.0	1.7	52.9	0.0	0.0	46.6	0.0	0.0
LnGrp LOS	E	A	A	E	A	A	D	A	A	D	A	A
Approach Vol, veh/h		707			2186			153				48
Approach Delay, s/veh		1.2			1.7			52.9				46.6
Approach LOS		A			A			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.5	92.9		19.6	7.0	93.4		19.6				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	6.0	75.0		24.0	6.0	75.0		24.0				
Max Q Clear Time (g_c+l1), s	3.0	2.0		5.1	2.8	3.0		14.1				
Green Ext Time (p_c), s	0.0	5.0		0.2	0.0	32.5		0.5				
Intersection Summary												
HCM 6th Ctrl Delay				4.8								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary
 16: Fair Oaks/Wright & East Wash

2024 with BRT
 AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑		↖	↑↑↑			↑↑		↖	↑	↗
Traffic Volume (veh/h)	165	668	23	115	1758	85	45	366	119	30	54	78
Future Volume (veh/h)	165	668	23	115	1758	85	45	366	119	30	54	78
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	179	726	25	125	1911	92	49	398	129	33	59	85
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	226	2893	99	163	2673	128	89	558	178	128	445	377
Arrive On Green	0.04	0.19	0.19	0.18	1.00	1.00	0.24	0.24	0.21	0.24	0.24	0.24
Sat Flow, veh/h	1781	5069	174	1781	4991	240	226	2350	748	876	1870	1585
Grp Volume(v), veh/h	179	487	264	125	1302	701	306	0	270	33	59	85
Grp Sat Flow(s),veh/h/ln	1781	1702	1839	1781	1702	1827	1757	0	1567	876	1870	1585
Q Serve(g_s), s	12.0	14.6	14.7	8.0	0.0	0.0	13.8	0.0	19.2	4.3	3.0	5.2
Cycle Q Clear(g_c), s	12.0	14.6	14.7	8.0	0.0	0.0	19.1	0.0	19.2	23.5	3.0	5.2
Prop In Lane	1.00		0.09	1.00		0.13	0.16		0.48	1.00		1.00
Lane Grp Cap(c), veh/h	226	1943	1050	163	1823	979	452	0	372	128	445	377
V/C Ratio(X)	0.79	0.25	0.25	0.77	0.71	0.72	0.68	0.00	0.73	0.26	0.13	0.23
Avail Cap(c_a), veh/h	312	1943	1050	238	1823	979	459	0	379	132	452	383
HCM Platoon Ratio	0.33	0.33	0.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.39	0.39	0.39	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.9	26.8	26.9	47.8	0.0	0.0	42.0	0.0	42.8	53.0	36.0	36.8
Incr Delay (d2), s/veh	9.2	0.3	0.6	3.5	1.0	1.8	3.9	0.0	6.7	1.0	0.1	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(95%),veh/ln	10.4	11.0	11.9	5.3	0.4	0.9	13.7	0.0	12.8	1.8	2.5	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.2	27.1	27.5	51.3	1.0	1.8	45.9	0.0	49.5	54.0	36.1	37.1
LnGrp LOS	E	C	C	D	A	A	D	A	D	D	D	D
Approach Vol, veh/h		930			2128			576			177	
Approach Delay, s/veh		34.5			4.2			47.6			40.0	
Approach LOS		C			A			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.0	72.5		32.5	19.2	68.3		32.5				
Change Period (Y+Rc), s	5.0	5.0		7.0	5.0	5.0		7.0				
Max Green Setting (Gmax), s	15.0	62.0		26.0	20.0	57.0		26.0				
Max Q Clear Time (g_c+l1), s	10.0	16.7		25.5	14.0	2.0		21.2				
Green Ext Time (p_c), s	0.2	3.5		0.0	0.3	15.5		1.2				
Intersection Summary												
HCM 6th Ctrl Delay				19.8								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary
 18: Mendota & East Wash

2024 with BRT
 AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑			↖↗			↖↗	
Traffic Volume (veh/h)	7	965	69	39	2041	11	137	4	35	15	5	18
Future Volume (veh/h)	7	965	69	39	2041	11	137	4	35	15	5	18
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	8	1049	75	42	2218	12	149	4	38	16	5	20
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	225	3608	1120	455	3806	21	269	19	180	113	46	104
Arrive On Green	0.02	0.71	0.71	0.08	1.00	1.00	0.14	0.14	0.12	0.14	0.14	0.12
Sat Flow, veh/h	1781	5106	1585	1781	5241	28	1448	139	1324	461	340	762
Grp Volume(v), veh/h	8	1049	75	42	1440	790	149	0	42	41	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1865	1448	0	1464	1562	0	0
Q Serve(g_s), s	0.1	7.6	1.5	0.6	0.0	0.0	7.6	0.0	2.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	7.6	1.5	0.6	0.0	0.0	9.7	0.0	2.6	2.1	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.90	0.39		0.49
Lane Grp Cap(c), veh/h	225	3608	1120	455	2472	1355	269	0	199	262	0	0
V/C Ratio(X)	0.04	0.29	0.07	0.09	0.58	0.58	0.55	0.00	0.21	0.16	0.00	0.00
Avail Cap(c_a), veh/h	282	3608	1120	477	2472	1355	358	0	293	360	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.91	0.91	0.91	0.70	0.70	0.70	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	3.8	5.4	4.5	3.5	0.0	0.0	41.3	0.0	39.1	38.6	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.2	0.1	0.1	0.7	1.3	1.8	0.0	0.5	0.3	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(95%),veh/ln	0.1	3.9	0.7	0.3	0.4	0.9	6.6	0.0	1.7	1.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	3.9	5.6	4.6	3.6	0.7	1.3	43.1	0.0	39.6	38.9	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	D	D	A	A
Approach Vol, veh/h		1132			2272			191				41
Approach Delay, s/veh		5.5			1.0			42.3				38.9
Approach LOS		A			A			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.8	76.6		17.6	7.8	74.7		17.6				
Change Period (Y+Rc), s	5.0	5.0		5.5	5.0	5.0		5.5				
Max Green Setting (Gmax), s	4.0	62.0		18.5	4.0	62.0		18.5				
Max Q Clear Time (g_c+I1), s	2.1	2.0		4.1	2.6	9.6		11.7				
Green Ext Time (p_c), s	0.0	18.6		0.1	0.0	6.3		0.4				
Intersection Summary												
HCM 6th Ctrl Delay			5.0									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary
 19: Lien & East Wash

2024 with BRT
 AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑		↖	↗			↕	
Traffic Volume (veh/h)	29	879	164	53	2017	20	95	6	24	19	3	11
Future Volume (veh/h)	29	879	164	53	2017	20	95	6	24	19	3	11
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	32	955	178	58	2192	22	103	7	26	21	3	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	224	3217	999	474	3284	33	359	69	258	214	39	98
Arrive On Green	0.10	1.00	1.00	0.05	0.63	0.62	0.20	0.20	0.18	0.20	0.20	0.18
Sat Flow, veh/h	1781	5106	1585	1781	5213	52	1398	347	1291	787	196	492
Grp Volume(v), veh/h	32	955	178	58	1431	783	103	0	33	36	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1861	1398	0	1638	1476	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	26.8	26.9	3.8	0.0	1.7	0.3	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	26.8	26.9	5.8	0.0	1.7	2.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.03	1.00		0.79	0.58		0.33
Lane Grp Cap(c), veh/h	224	3217	999	474	2145	1172	359	0	328	352	0	0
V/C Ratio(X)	0.14	0.30	0.18	0.12	0.67	0.67	0.29	0.00	0.10	0.10	0.00	0.00
Avail Cap(c_a), veh/h	224	3217	999	474	2145	1172	359	0	328	352	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)	0.97	0.97	0.97	0.79	0.79	0.79	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	19.9	0.0	0.0	5.8	11.8	11.8	34.2	0.0	33.3	33.0	0.0	0.0
Incr Delay (d2), s/veh	0.3	0.2	0.4	0.1	1.3	2.4	0.4	0.0	0.1	0.6	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(95%),veh/ln	0.9	0.1	0.2	0.7	13.3	14.8	3.9	0.0	1.2	1.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.2	0.2	0.4	5.9	13.1	14.2	34.6	0.0	33.4	33.6	0.0	0.0
LnGrp LOS	C	A	A	A	B	B	C	A	C	C	A	A
Approach Vol, veh/h		1165			2272			136				36
Approach Delay, s/veh		0.8			13.3			34.3				33.6
Approach LOS		A			B			C				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	67.0		24.0	9.0	67.0		24.0				
Change Period (Y+Rc), s	5.0	5.0		6.0	5.0	5.0		6.0				
Max Green Setting (Gmax), s	4.0	62.0		18.0	4.0	62.0		18.0				
Max Q Clear Time (g_c+l1), s	2.0	2.0		7.8	2.0	28.9		4.0				
Green Ext Time (p_c), s	0.0	6.2		0.3	0.0	15.3		0.1				

Intersection Summary												
HCM 6th Ctrl Delay											10.3	
HCM 6th LOS											B	

HCM 6th Signalized Intersection Summary
 20: Thierer/Portage & East Wash

2024 with BRT
 AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑	↗	↖	↗		↖	↑	↗
Traffic Volume (veh/h)	54	793	77	25	1850	21	87	22	16	16	35	113
Future Volume (veh/h)	54	793	77	25	1850	21	87	22	16	16	35	113
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	59	862	84	27	2011	23	95	24	17	17	38	123
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	101	3599	1117	64	3494	1085	220	142	100	233	260	220
Arrive On Green	0.11	1.00	1.00	0.07	1.00	1.00	0.14	0.14	0.11	0.14	0.14	0.14
Sat Flow, veh/h	1781	5106	1585	1781	5106	1585	1225	1019	722	1366	1870	1585
Grp Volume(v), veh/h	59	862	84	27	2011	23	95	0	41	17	38	123
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1585	1225	0	1740	1366	1870	1585
Q Serve(g_s), s	3.1	0.0	0.0	1.5	0.0	0.0	7.4	0.0	2.1	1.1	1.8	7.2
Cycle Q Clear(g_c), s	3.1	0.0	0.0	1.5	0.0	0.0	9.2	0.0	2.1	3.2	1.8	7.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.41	1.00		1.00
Lane Grp Cap(c), veh/h	101	3599	1117	64	3494	1085	220	0	242	233	260	220
V/C Ratio(X)	0.58	0.24	0.08	0.42	0.58	0.02	0.43	0.00	0.17	0.07	0.15	0.56
Avail Cap(c_a), veh/h	178	3599	1117	125	3494	1085	295	0	348	317	374	317
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)	0.96	0.96	0.96	0.74	0.74	0.74	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.2	0.0	0.0	45.4	0.0	0.0	41.9	0.0	38.4	39.4	37.8	40.2
Incr Delay (d2), s/veh	5.1	0.2	0.1	3.2	0.5	0.0	1.3	0.0	0.3	0.1	0.3	2.2
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(95%),veh/ln	2.6	0.1	0.1	1.2	0.3	0.0	4.1	0.0	1.6	0.7	1.5	5.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.3	0.2	0.1	48.6	0.5	0.0	43.2	0.0	38.7	39.5	38.1	42.4
LnGrp LOS	D	A	A	D	A	A	D	A	D	D	D	D
Approach Vol, veh/h		1005			2061			136				178
Approach Delay, s/veh		3.0			1.1			41.9				41.2
Approach LOS		A			A			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.6	74.5		17.9	9.7	72.4		17.9				
Change Period (Y+Rc), s	5.5	5.5		6.5	5.5	5.5		6.5				
Max Green Setting (Gmax), s	5.5	59.5		17.5	8.5	56.5		17.5				
Max Q Clear Time (g_c+I1), s	3.5	2.0		9.2	5.1	2.0		11.2				
Green Ext Time (p_c), s	0.0	5.0		0.4	0.0	17.0		0.2				

Intersection Summary

HCM 6th Ctrl Delay			5.4									
HCM 6th LOS			A									

HCM Signalized Intersection Capacity Analysis

21: Eagan/Continental & East Wash

2024 with BRT
AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑		↖↗	↑↑↑		↖	↑	↗		↕	
Traffic Volume (vph)	30	773	29	31	1737	75	35	26	27	36	13	128
Future Volume (vph)	30	773	29	31	1737	75	35	26	27	36	13	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.91		0.97	0.91		0.95	0.95	1.00		1.00	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85		0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.99	1.00		0.99	
Satd. Flow (prot)	1770	5057		3433	5054		1681	1754	1583		1664	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.99	1.00		0.99	
Satd. Flow (perm)	1770	5057		3433	5054		1681	1754	1583		1664	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	840	32	34	1888	82	38	28	29	39	14	139
RTOR Reduction (vph)	0	3	0	0	4	0	0	0	27	0	97	0
Lane Group Flow (vph)	33	869	0	34	1966	0	32	34	2	0	95	0
Turn Type	Prot	NA		Prot	NA		Split	NA	Perm		Split	NA
Protected Phases	5	2		1	6		4	4			3	3
Permitted Phases									4			
Actuated Green, G (s)	5.0	57.2		4.2	56.4		6.4	6.4	6.4		9.2	
Effective Green, g (s)	6.5	58.7		5.7	57.9		8.4	8.4	8.4		11.2	
Actuated g/C Ratio	0.06	0.59		0.06	0.58		0.08	0.08	0.08		0.11	
Clearance Time (s)	5.5	5.5		5.5	5.5		6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	115	2968		195	2926		141	147	132		186	
v/s Ratio Prot	c0.02	0.17		0.01	c0.39		0.02	c0.02			c0.06	
v/s Ratio Perm									0.00			
v/c Ratio	0.29	0.29		0.17	0.67		0.23	0.23	0.02		0.51	
Uniform Delay, d1	44.5	10.3		44.9	14.5		42.8	42.8	42.0		41.8	
Progression Factor	0.90	0.37		1.24	0.39		1.00	1.00	1.00		1.00	
Incremental Delay, d2	1.4	0.2		0.4	1.1		0.8	0.8	0.1		2.4	
Delay (s)	41.5	4.0		55.9	6.7		43.6	43.6	42.1		44.2	
Level of Service	D	A		E	A		D	D	D		D	
Approach Delay (s)		5.4			7.6			43.1			44.2	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	10.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	59.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
 22: Independence/Independence & East Wash

2024 with BRT
 AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑		↖	↑↑↑			↕			↕	
Traffic Volume (veh/h)	61	737	55	39	1536	47	25	25	30	30	15	229
Future Volume (veh/h)	61	737	55	39	1536	47	25	25	30	30	15	229
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	64	776	58	41	1617	49	26	26	32	32	16	241
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	83	2279	170	316	3061	93	105	105	100	63	31	268
Arrive On Green	0.09	0.94	0.94	0.36	1.00	1.00	0.20	0.20	0.20	0.20	0.20	0.20
Sat Flow, veh/h	1781	4849	361	1781	5092	154	285	518	494	113	151	1324
Grp Volume(v), veh/h	64	544	290	41	1081	585	84	0	0	289	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1805	1781	1702	1843	1296	0	0	1588	0	0
Q Serve(g_s), s	3.5	1.4	1.4	1.6	0.0	0.0	0.0	0.0	0.0	10.6	0.0	0.0
Cycle Q Clear(g_c), s	3.5	1.4	1.4	1.6	0.0	0.0	4.0	0.0	0.0	17.7	0.0	0.0
Prop In Lane	1.00		0.20	1.00		0.08	0.31		0.38	0.11		0.83
Lane Grp Cap(c), veh/h	83	1600	849	316	2046	1108	310	0	0	361	0	0
V/C Ratio(X)	0.77	0.34	0.34	0.13	0.53	0.53	0.27	0.00	0.00	0.80	0.00	0.00
Avail Cap(c_a), veh/h	267	1600	849	316	2046	1108	350	0	0	405	0	0
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)	0.97	0.97	0.97	0.83	0.83	0.83	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.9	1.6	1.6	27.0	0.0	0.0	33.4	0.0	0.0	38.8	0.0	0.0
Incr Delay (d2), s/veh	13.8	0.6	1.1	0.2	0.8	1.5	0.5	0.0	0.0	9.9	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(95%),veh/ln	3.2	0.9	1.1	1.2	0.4	0.8	3.1	0.0	0.0	12.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.7	2.2	2.7	27.2	0.8	1.5	33.9	0.0	0.0	48.7	0.0	0.0
LnGrp LOS	E	A	A	C	A	A	C	A	A	D	A	A
Approach Vol, veh/h		898			1707			84				289
Approach Delay, s/veh		6.4			1.7			33.9				48.7
Approach LOS		A			A			C				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	22.8	52.0		25.2	9.6	65.1		25.2				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	15.0	47.0		23.0	15.0	47.0		23.0				
Max Q Clear Time (g_c+I1), s	3.6	3.4		19.7	5.5	2.0		6.0				
Green Ext Time (p_c), s	0.0	5.9		0.5	0.1	16.3		0.3				
Intersection Summary												
HCM 6th Ctrl Delay				8.6								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary
 23: Zeier & E Wash

2024 with BRT
 AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘↗	↑↑↑	↗	↘↗	↑	↗		↔	
Traffic Volume (veh/h)	48	689	17	126	1517	83	31	14	80	74	22	43
Future Volume (veh/h)	48	689	17	126	1517	83	31	14	80	74	22	43
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	51	725	18	133	1597	87	33	15	84	78	23	45
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	65	2923	907	200	3006	933	245	133	112	114	36	71
Arrive On Green	0.07	1.00	1.00	0.02	0.19	0.19	0.07	0.07	0.07	0.06	0.06	0.06
Sat Flow, veh/h	1781	5106	1585	3456	5106	1585	3456	1870	1585	1781	565	1106
Grp Volume(v), veh/h	51	725	18	133	1597	87	33	15	84	78	0	68
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1728	1702	1585	1728	1870	1585	1781	0	1671
Q Serve(g_s), s	2.8	0.0	0.0	3.8	28.1	4.5	0.9	0.8	5.2	4.3	0.0	4.0
Cycle Q Clear(g_c), s	2.8	0.0	0.0	3.8	28.1	4.5	0.9	0.8	5.2	4.3	0.0	4.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.66
Lane Grp Cap(c), veh/h	65	2923	907	200	3006	933	245	133	112	114	0	107
V/C Ratio(X)	0.78	0.25	0.02	0.66	0.53	0.09	0.13	0.11	0.75	0.69	0.00	0.64
Avail Cap(c_a), veh/h	143	2923	907	328	3006	933	328	178	151	169	0	159
HCM Platoon Ratio	2.00	2.00	2.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.97	0.97	0.97	0.92	0.92	0.92	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	45.9	0.0	0.0	48.1	27.9	18.4	43.6	43.5	45.6	45.8	0.0	45.7
Incr Delay (d2), s/veh	17.6	0.2	0.0	3.5	0.6	0.2	0.2	0.4	13.0	7.1	0.0	6.2
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(95%),veh/ln	2.7	0.1	0.0	3.1	18.5	2.9	0.7	0.7	4.4	3.8	0.0	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.5	0.2	0.0	51.5	28.5	18.6	43.8	43.9	58.6	53.0	0.0	51.9
LnGrp LOS	E	A	A	D	C	B	D	D	E	D	A	D
Approach Vol, veh/h		794			1817			132				146
Approach Delay, s/veh		4.3			29.7			53.2				52.5
Approach LOS		A			C			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.3	63.2		12.9	9.7	64.9		12.6				
Change Period (Y+Rc), s	5.5	6.0		6.5	6.0	6.0		5.5				
Max Green Setting (Gmax), s	9.5	48.0		9.5	8.0	49.0		9.5				
Max Q Clear Time (g_c+I1), s	5.8	2.0		6.3	4.8	30.1		7.2				
Green Ext Time (p_c), s	0.1	5.5		0.2	0.0	11.1		0.1				
Intersection Summary												
HCM 6th Ctrl Delay					24.9							
HCM 6th LOS					C							

HCM 6th Signalized Intersection Summary
 24: E Springs & E Wash

2024 with BRT
 AM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↗	↙↘	↑↑↑	↙↘	↗
Traffic Volume (veh/h)	763	100	204	1563	115	48
Future Volume (veh/h)	763	100	204	1563	115	48
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	803	0	215	1645	121	51
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	3453		296	4171	201	92
Arrive On Green	0.22	0.00	0.09	0.82	0.06	0.06
Sat Flow, veh/h	5274	1585	3456	5274	3456	1585
Grp Volume(v), veh/h	803	0	215	1645	121	51
Grp Sat Flow(s),veh/h/ln	1702	1585	1728	1702	1728	1585
Q Serve(g_s), s	12.9	0.0	6.1	8.7	3.4	3.1
Cycle Q Clear(g_c), s	12.9	0.0	6.1	8.7	3.4	3.1
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	3453		296	4171	201	92
V/C Ratio(X)	0.23		0.73	0.39	0.60	0.55
Avail Cap(c_a), veh/h	3453		674	4171	708	325
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.97	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.6	0.0	44.6	2.5	46.0	45.8
Incr Delay (d2), s/veh	0.2	0.0	3.4	0.3	2.9	5.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.7	0.0	4.8	2.7	2.8	2.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.7	0.0	48.0	2.8	48.8	50.9
LnGrp LOS	B		D	A	D	D
Approach Vol, veh/h	803	A		1860	172	
Approach Delay, s/veh	17.7			8.0	49.5	
Approach LOS	B			A	D	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	14.1	73.6		12.3		87.7
Change Period (Y+Rc), s	5.5	6.0		6.5		6.0
Max Green Setting (Gmax), s	19.5	42.0		20.5		67.0
Max Q Clear Time (g_c+l1), s	8.1	14.9		5.4		10.7
Green Ext Time (p_c), s	0.5	5.7		0.4		18.3

Intersection Summary

HCM 6th Ctrl Delay	13.3
HCM 6th LOS	B

Notes

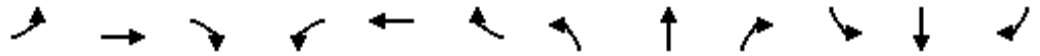
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM Signalized Intersection Capacity Analysis

2024 with BRT

1: Blair St. & East Washington Ave.

MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑↑	↑↑		↑		↑↑	↑	↑↑	
Traffic Volume (vph)	0	489	26	568	688	0	54	0	561	301	72	17
Future Volume (vph)	0	489	26	568	688	0	54	0	561	301	72	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0		4.0	4.0	4.0	
Lane Util. Factor		0.95		0.97	0.95		1.00		0.88	0.91	0.91	
Frt		0.99		1.00	1.00		1.00		0.85	1.00	0.99	
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	0.97	
Satd. Flow (prot)		3513		3433	3539		1770		2787	1610	3252	
Flt Permitted		1.00		0.95	1.00		0.95		1.00	0.95	0.97	
Satd. Flow (perm)		3513		3433	3539		1770		2787	1610	3252	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	515	27	598	724	0	57	0	591	317	76	18
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	6	0
Lane Group Flow (vph)	0	539	0	598	724	0	57	0	591	158	247	0
Turn Type		NA		Prot	NA		Prot		pt+ov	Split	NA	
Protected Phases		1		2	1 2		3		2 3	4	4	
Permitted Phases							3		3 2			
Actuated Green, G (s)		24.0		51.4	79.9		8.2		64.1	17.4	17.4	
Effective Green, g (s)		24.5		51.9	80.4		8.2		64.6	19.4	19.4	
Actuated g/C Ratio		0.20		0.43	0.67		0.07		0.54	0.16	0.16	
Clearance Time (s)		4.5		4.5			4.0			6.0	6.0	
Vehicle Extension (s)		3.0		3.0			3.0			3.0	3.0	
Lane Grp Cap (vph)		717		1484	2371		120		1500	260	525	
v/s Ratio Prot		c0.15		0.17	0.20		0.03		c0.21	c0.10	0.08	
v/s Ratio Perm												
v/c Ratio		0.75		0.40	0.31		0.47		0.39	0.61	0.47	
Uniform Delay, d1		44.9		23.4	8.2		53.8		16.2	46.8	45.6	
Progression Factor		1.00		0.64	0.70		1.00		1.00	1.00	1.00	
Incremental Delay, d2		4.5		0.7	0.1		2.9		0.2	4.0	0.7	
Delay (s)		49.3		15.6	5.8		56.8		16.4	50.7	46.3	
Level of Service		D		B	A		E		B	D	D	
Approach Delay (s)		49.3			10.3			20.0			48.0	
Approach LOS		D			B			B			D	
Intersection Summary												
HCM 2000 Control Delay			25.0				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			55.6%				ICU Level of Service			B		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: Livingston Ave & East Washington Ave.

2024 with BRT
MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	1201	43	100	1257	36	0	0	39	0	0	30
Future Volume (vph)	107	1201	43	100	1257	36	0	0	39	0	0	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0				5.0			5.0
Lane Util. Factor	1.00	0.95		1.00	0.95				1.00			1.00
Frt	1.00	0.99		1.00	1.00				0.86			0.86
Flt Protected	0.95	1.00		0.95	1.00				1.00			1.00
Satd. Flow (prot)	1770	3521		1770	3524				1611			1611
Flt Permitted	0.17	1.00		0.18	1.00				1.00			1.00
Satd. Flow (perm)	317	3521		339	3524				1611			1611
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	113	1264	45	105	1323	38	0	0	41	0	0	32
RTOR Reduction (vph)	0	2	0	0	1	0	0	0	35	0	0	27
Lane Group Flow (vph)	113	1307	0	105	1360	0	0	0	6	0	0	5
Turn Type	D.P+P	NA		D.Pm	NA				Prot			Over
Protected Phases	4	2			6				8			4
Permitted Phases	6			2								
Actuated Green, G (s)	110.0	92.0		92.0	92.0				18.0			18.0
Effective Green, g (s)	110.0	92.0		92.0	92.0				18.0			18.0
Actuated g/C Ratio	0.92	0.77		0.77	0.77				0.15			0.15
Clearance Time (s)	5.0	5.0		5.0	5.0				5.0			5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0				3.0			3.0
Lane Grp Cap (vph)	508	2699		259	2701				241			241
v/s Ratio Prot	c0.03	0.37			c0.39				0.00			0.00
v/s Ratio Perm	0.17			0.31								
v/c Ratio	0.22	0.48		0.41	0.50				0.03			0.02
Uniform Delay, d1	1.5	5.2		4.7	5.3				43.5			43.5
Progression Factor	0.99	0.60		0.73	0.70				1.00			1.00
Incremental Delay, d2	0.2	0.6		3.9	0.6				0.0			0.0
Delay (s)	1.7	3.7		7.4	4.3				43.6			43.5
Level of Service	A	A		A	A				D			D
Approach Delay (s)		3.5			4.5			43.6			43.5	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	5.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
 3: Paterson St. & East Washington Ave.

2024 with BRT
 MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑	↗		↕		↖	↑	↗
Traffic Volume (veh/h)	0	1444	32	28	1255	35	16	24	33	65	24	26
Future Volume (veh/h)	0	1444	32	28	1255	35	16	24	33	65	24	26
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	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	1520	34	29	1321	37	17	25	35	68	25	27
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, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	2787	1243	37	3008	1342	55	45	52	165	131	111
Arrive On Green	0.00	1.00	1.00	0.03	1.00	1.00	0.08	0.07	0.07	0.08	0.07	0.07
Sat Flow, veh/h	0	3647	1585	1781	3554	1585	256	638	745	1343	1870	1585
Grp Volume(v), veh/h	0	1520	34	29	1321	37	77	0	0	68	25	27
Grp Sat Flow(s),veh/h/ln	0	1777	1585	1781	1777	1585	1638	0	0	1343	1870	1585
Q Serve(g_s), s	0.0	0.0	0.0	1.9	0.0	0.0	2.8	0.0	0.0	0.6	1.5	1.9
Cycle Q Clear(g_c), s	0.0	0.0	0.0	1.9	0.0	0.0	5.4	0.0	0.0	6.0	1.5	1.9
Prop In Lane	0.00		1.00	1.00		1.00	0.22		0.45	1.00		1.00
Lane Grp Cap(c), veh/h	0	2787	1243	37	3008	1342	165	0	0	165	131	111
V/C Ratio(X)	0.00	0.55	0.03	0.79	0.44	0.03	0.47	0.00	0.00	0.41	0.19	0.24
Avail Cap(c_a), veh/h	0	2787	1243	59	3008	1342	554	0	0	490	584	495
HCM Platoon Ratio	1.00	2.00	2.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.88	0.88	0.52	0.52	0.52	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	58.1	0.0	0.0	54.1	0.0	0.0	53.7	52.6	52.8
Incr Delay (d2), s/veh	0.0	0.7	0.0	17.3	0.2	0.0	2.0	0.0	0.0	1.7	0.7	1.1
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	0.0	0.3	0.0	1.0	0.1	0.0	2.3	0.0	0.0	2.1	0.7	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.7	0.0	75.4	0.2	0.0	56.2	0.0	0.0	55.4	53.3	53.9
LnGrp LOS	A	A	A	E	A	A	E	A	A	E	D	D
Approach Vol, veh/h		1554			1387			77			120	
Approach Delay, s/veh		0.7			1.8			56.2			54.6	
Approach LOS		A			A			E			D	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	7.5	99.1		13.4		106.6		13.4				
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s	4.0	63.5		37.5		72.5		37.5				
Max Q Clear Time (g_c+I1), s	3.9	2.0		8.0		2.0		7.4				
Green Ext Time (p_c), s	0.0	11.5		0.5		9.1		0.3				
Intersection Summary												
HCM 6th Ctrl Delay				4.6								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary
4: Ingersoll St. & East Washington Ave.

2024 with BRT
MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	104	1449	36	57	1326	36	42	26	38	31	16	18
Future Volume (veh/h)	104	1449	36	57	1326	36	42	26	38	31	16	18
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	109	1525	38	60	1396	38	44	27	40	33	17	19
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	298	2660	1186	358	2662	1187	119	58	135	81	37	28
Arrive On Green	0.06	1.00	1.00	0.02	0.50	0.50	0.11	0.09	0.09	0.11	0.09	0.09
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	828	685	1585	425	433	326
Grp Volume(v), veh/h	109	1525	38	60	1396	38	71	0	40	69	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1513	0	1585	1184	0	0
Q Serve(g_s), s	1.8	0.0	0.0	0.9	31.9	1.5	0.0	0.0	2.8	2.8	0.0	0.0
Cycle Q Clear(g_c), s	1.8	0.0	0.0	0.9	31.9	1.5	5.2	0.0	2.8	8.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.62		1.00	0.48		0.28
Lane Grp Cap(c), veh/h	298	2660	1186	358	2662	1187	209	0	135	170	0	0
V/C Ratio(X)	0.37	0.57	0.03	0.17	0.52	0.03	0.34	0.00	0.30	0.41	0.00	0.00
Avail Cap(c_a), veh/h	344	2660	1186	373	2662	1187	550	0	489	506	0	0
HCM Platoon Ratio	2.00	2.00	2.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.59	0.59	0.59	0.76	0.76	0.76	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	8.7	0.0	0.0	3.1	15.4	7.9	51.7	0.0	51.5	53.3	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.5	0.0	0.2	0.6	0.0	1.0	0.0	1.2	1.6	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	0.9	0.2	0.0	0.3	14.0	0.4	2.0	0.0	1.2	2.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.1	0.5	0.0	3.3	16.0	7.9	52.7	0.0	52.7	54.8	0.0	0.0
LnGrp LOS	A	A	A	A	B	A	D	A	D	D	A	A
Approach Vol, veh/h		1672			1494			111				69
Approach Delay, s/veh		1.1			15.3			52.7				54.8
Approach LOS		A			B			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	94.3		16.7	8.9	94.4		16.7				
Change Period (Y+Rc), s	5.5	4.5		6.5	5.0	4.5		6.5				
Max Green Setting (Gmax), s	4.5	62.0		37.0	7.0	60.0		37.0				
Max Q Clear Time (g_c+l1), s	2.9	2.0		10.0	3.8	33.9		7.2				
Green Ext Time (p_c), s	0.0	11.6		0.2	0.1	8.6		0.4				
Intersection Summary												
HCM 6th Ctrl Delay				10.2								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary
5: Baldwin St. & East Washington Ave.

2024 with BRT
MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑	↗		↑	↗		↑	↗
Traffic Volume (veh/h)	0	1498	27	42	1297	75	20	50	37	78	58	62
Future Volume (veh/h)	0	1498	27	42	1297	75	20	50	37	78	58	62
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	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	1577	28	44	1365	79	21	53	39	82	61	65
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, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	1901	848	56	2162	964	39	76	489	47	23	489
Arrive On Green	0.00	1.00	1.00	0.03	0.61	0.61	0.32	0.31	0.31	0.32	0.31	0.31
Sat Flow, veh/h	0	3647	1585	1781	3554	1585	0	248	1585	0	73	1585
Grp Volume(v), veh/h	0	1577	28	44	1365	79	74	0	39	143	0	65
Grp Sat Flow(s),veh/h/ln	0	1777	1585	1781	1777	1585	248	0	1585	73	0	1585
Q Serve(g_s), s	0.0	0.0	0.0	2.9	29.3	2.5	0.0	0.0	2.1	0.0	0.0	3.5
Cycle Q Clear(g_c), s	0.0	0.0	0.0	2.9	29.3	2.5	38.0	0.0	2.1	38.0	0.0	3.5
Prop In Lane	0.00		1.00	1.00		1.00	0.28		1.00	0.57		1.00
Lane Grp Cap(c), veh/h	0	1901	848	56	2162	964	117	0	489	70	0	489
V/C Ratio(X)	0.00	0.83	0.03	0.78	0.63	0.08	0.63	0.00	0.08	2.03	0.00	0.13
Avail Cap(c_a), veh/h	0	1901	848	74	2162	964	117	0	489	70	0	489
HCM Platoon Ratio	1.00	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)	0.00	0.52	0.52	0.69	0.69	0.69	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	57.7	14.9	9.7	34.2	0.0	29.4	48.3	0.0	29.9
Incr Delay (d2), s/veh	0.0	2.3	0.0	22.9	1.0	0.1	10.5	0.0	0.1	510.0	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	0.0	0.6	0.0	1.7	11.3	0.9	1.9	0.0	0.8	12.1	0.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	2.3	0.0	80.5	15.9	9.8	44.7	0.0	29.5	558.3	0.0	30.1
LnGrp LOS	A	A	A	F	B	A	D	A	C	F	A	C
Approach Vol, veh/h		1605			1488			113				208
Approach Delay, s/veh		2.3			17.5			39.5				393.2
Approach LOS		A			B			D				F
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	8.8	69.2		42.0		78.0		42.0				
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s	5.0	63.0		37.0		73.0		37.0				
Max Q Clear Time (g_c+I1), s	4.9	2.0		40.0		31.3		40.0				
Green Ext Time (p_c), s	0.0	12.3		0.0		9.5		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				34.0								
HCM 6th LOS				C								

HCM Signalized Intersection Capacity Analysis

2024 with BRT

6: First & E Wash

MD Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	226	1297	97	57	1164	98	112	113	52	157	90	197	
Future Volume (vph)	226	1297	97	57	1164	98	112	113	52	157	90	197	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.5	6.5	6.5	
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.88	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	1770	1863	1583	1770	1863	2787	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.69	1.00	1.00	0.68	1.00	1.00	
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	1292	1863	1583	1263	1863	2787	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	246	1410	105	62	1265	107	122	123	57	171	98	214	
RTOR Reduction (vph)	0	0	56	0	0	57	0	0	41	0	0	121	
Lane Group Flow (vph)	246	1410	49	62	1265	50	122	123	16	171	98	93	
Turn Type	Prot	NA	custom	Prot	NA	Perm	D.P+P	NA	Perm	Perm	NA	custom	
Protected Phases	1	6		5	2		3	3 4				4	
Permitted Phases			2			2	4		3 4	4		4 1	
Actuated Green, G (s)	13.0	61.5	56.2	8.2	56.2	56.2	29.6	34.6	34.6	20.1	20.1	39.6	
Effective Green, g (s)	13.0	61.5	56.2	8.2	56.2	56.2	29.6	34.6	34.6	20.1	20.1	39.6	
Actuated g/C Ratio	0.11	0.51	0.47	0.07	0.47	0.47	0.25	0.29	0.29	0.17	0.17	0.33	
Clearance Time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0			6.5	6.5		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0		
Lane Grp Cap (vph)	369	1801	736	120	1646	736	354	533	453	210	309	913	
v/s Ratio Prot	c0.07	c0.40		0.04	0.36		c0.03	0.07			0.05		
v/s Ratio Perm			0.03			0.03	0.06		0.01	c0.14		0.03	
v/c Ratio	0.67	0.78	0.07	0.52	0.77	0.07	0.34	0.23	0.04	0.81	0.32	0.10	
Uniform Delay, d1	51.8	24.2	17.8	54.4	26.9	17.8	37.0	32.9	31.1	48.6	44.3	28.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.5	3.5	0.2	3.7	3.5	0.2	0.6	0.2	0.0	20.9	0.6	0.0	
Delay (s)	56.3	27.7	18.0	58.1	30.4	18.0	37.6	33.2	31.1	69.5	44.9	28.3	
Level of Service	E	C	B	E	C	B	D	C	C	E	D	C	
Approach Delay (s)		31.1			30.7			34.5			46.2		
Approach LOS		C			C			C			D		
Intersection Summary													
HCM 2000 Control Delay			33.0									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.76										
Actuated Cycle Length (s)			120.8									Sum of lost time (s)	22.0
Intersection Capacity Utilization			68.3%									ICU Level of Service	C
Analysis Period (min)			15										

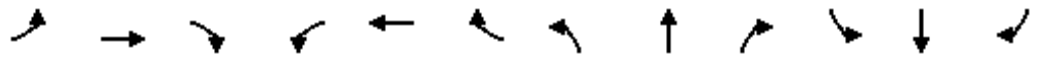
c Critical Lane Group

HCM 6th Signalized Intersection Summary

2024 with BRT

7: Fourth & E Wash

MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	1457	13	0	1261	32	16	16	26	43	13	19
Future Volume (veh/h)	17	1457	13	0	1261	32	16	16	26	43	13	19
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	0	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	18	1584	14	0	1371	35	17	17	28	47	14	21
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	0	2	2	2	2	2	2	2	2
Cap, veh/h	27	2636	1176	0	2434	1086	45	31	258	53	9	258
Arrive On Green	0.02	0.74	0.74	0.00	1.00	1.00	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	1781	3554	1585	0	3647	1585	0	192	1585	0	57	1585
Grp Volume(v), veh/h	18	1584	14	0	1371	35	34	0	28	61	0	21
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	0	1777	1585	192	0	1585	57	0	1585
Q Serve(g_s), s	1.2	24.9	0.3	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0	1.3
Cycle Q Clear(g_c), s	1.2	24.9	0.3	0.0	0.0	0.0	19.5	0.0	1.8	19.5	0.0	1.3
Prop In Lane	1.00		1.00	0.00		1.00	0.50		1.00	0.77		1.00
Lane Grp Cap(c), veh/h	27	2636	1176	0	2434	1086	76	0	258	62	0	258
V/C Ratio(X)	0.67	0.60	0.01	0.00	0.56	0.03	0.45	0.00	0.11	0.98	0.00	0.08
Avail Cap(c_a), veh/h	104	2636	1176	0	2434	1086	76	0	258	62	0	258
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.57	0.57	0.57	0.00	0.90	0.90	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	58.8	7.2	4.0	0.0	0.0	0.0	44.1	0.0	42.8	57.1	0.0	42.6
Incr Delay (d2), s/veh	15.3	0.6	0.0	0.0	0.9	0.0	4.1	0.0	0.2	105.7	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	0.7	8.1	0.1	0.0	0.3	0.0	1.0	0.0	0.7	3.7	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.2	7.8	4.1	0.0	0.9	0.0	48.2	0.0	43.0	162.8	0.0	42.8
LnGrp LOS	E	A	A	A	A	A	D	A	D	F	A	D
Approach Vol, veh/h		1616			1406			62				82
Approach Delay, s/veh		8.5			0.8			45.9				132.1
Approach LOS		A			A			D				F
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		94.0		26.0	6.8	87.2		26.0				
Change Period (Y+Rc), s		5.0		6.5	5.0	5.0		6.5				
Max Green Setting (Gmax), s		89.0		19.5	7.0	77.0		19.5				
Max Q Clear Time (g_c+I1), s		26.9		21.5	3.2	2.0		21.5				
Green Ext Time (p_c), s		20.1		0.0	0.0	15.9		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				9.0								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary

2024 with BRT

8: Sixth & E Wash

MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	1506	12	63	1247	16	18	10	21	28	29	10
Future Volume (veh/h)	12	1506	12	63	1247	16	18	10	21	28	29	10
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	13	1637	13	68	1355	17	20	11	23	30	32	11
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	356	2655	1184	353	2936	1310	176	44	93	84	72	20
Arrive On Green	1.00	1.00	1.00	0.07	1.00	1.00	0.08	0.08	0.08	0.08	0.08	0.08
Sat Flow, veh/h	396	3554	1585	1781	3554	1585	1364	539	1128	502	876	244
Grp Volume(v), veh/h	13	1637	13	68	1355	17	20	0	34	73	0	0
Grp Sat Flow(s),veh/h/ln	396	1777	1585	1781	1777	1585	1364	0	1667	1622	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	2.3	2.8	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.9	0.0	0.0	1.5	0.0	2.3	5.1	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.68	0.41		0.15
Lane Grp Cap(c), veh/h	356	2655	1184	353	2936	1310	176	0	137	176	0	0
V/C Ratio(X)	0.04	0.62	0.01	0.19	0.46	0.01	0.11	0.00	0.25	0.42	0.00	0.00
Avail Cap(c_a), veh/h	356	2655	1184	405	2936	1310	212	0	181	217	0	0
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)	0.84	0.84	0.84	0.69	0.69	0.69	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	2.4	0.0	0.0	51.3	0.0	51.6	52.8	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.9	0.0	0.2	0.4	0.0	0.3	0.0	0.9	1.6	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	0.0	0.3	0.0	0.3	0.1	0.0	0.6	0.0	1.0	2.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.2	0.9	0.0	2.6	0.4	0.0	51.5	0.0	52.5	54.4	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	D	D	A	A
Approach Vol, veh/h		1663			1440			54				73
Approach Delay, s/veh		0.9			0.5			52.2				54.4
Approach LOS		A			A			D				D
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	9.5	94.7		15.9		104.1		15.9				
Change Period (Y+Rc), s	5.0	5.0		6.0		5.0		6.0				
Max Green Setting (Gmax), s	8.0	83.0		13.0		96.0		13.0				
Max Q Clear Time (g_c+l1), s	2.9	2.0		7.1		2.0		4.3				
Green Ext Time (p_c), s	0.1	13.8		0.1		9.3		0.1				

Intersection Summary

HCM 6th Ctrl Delay	2.8
HCM 6th LOS	A

Notes

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

HCM Signalized Intersection Capacity Analysis

2024 with BRT

9: Milwaukee/North & E Wash

MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	1380	177	0	1143	21	155	84	47	32	103	44
Future Volume (vph)	40	1380	177	0	1143	21	155	84	47	32	103	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5	6.5	6.5		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00	0.97	1.00		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.95		1.00	0.95	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583		3539	1583	3433	1762		1770	1779	
Flt Permitted	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1583		3539	1583	3433	1762		1770	1779	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	1500	192	0	1242	23	168	91	51	35	112	48
RTOR Reduction (vph)	0	0	32	0	0	11	0	17	0	0	13	0
Lane Group Flow (vph)	43	1500	160	0	1242	12	168	125	0	35	147	0
Turn Type	Prot	NA	Perm		NA	Perm	Split	NA		Split	NA	
Protected Phases	5	2			6		4	4		3	3	
Permitted Phases			2			6						
Actuated Green, G (s)	12.0	77.0	77.0		60.5	60.5	12.8	12.8		14.2	14.2	
Effective Green, g (s)	12.0	77.0	77.0		60.5	60.5	12.8	12.8		14.2	14.2	
Actuated g/C Ratio	0.10	0.64	0.64		0.50	0.50	0.11	0.11		0.12	0.12	
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5	6.5	6.5		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	177	2270	1015		1784	798	366	187		209	210	
v/s Ratio Prot	0.02	c0.42			c0.35		0.05	c0.07		0.02	c0.08	
v/s Ratio Perm			0.10			0.01						
v/c Ratio	0.24	0.66	0.16		0.70	0.01	0.46	0.67		0.17	0.70	
Uniform Delay, d1	49.8	13.4	8.6		22.7	14.9	50.3	51.6		47.6	50.8	
Progression Factor	1.08	0.42	0.13		0.89	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.7	1.3	0.3		2.0	0.0	0.9	8.7		0.4	9.7	
Delay (s)	56.6	6.9	1.4		22.1	14.9	51.3	60.3		48.0	60.6	
Level of Service	E	A	A		C	B	D	E		D	E	
Approach Delay (s)		7.5			22.0			55.4			58.3	
Approach LOS		A			C			E			E	

Intersection Summary

HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	64.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2024 with BRT

10: Johnson & E Wash

MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	1600	16	60	1077	183	29	19	52	223	25	21
Future Volume (vph)	17	1600	16	60	1077	183	29	19	52	223	25	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		5.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00		0.95	0.95	
Frt	1.00	1.00		1.00	1.00	0.85		0.93		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	0.97	
Satd. Flow (prot)	1770	3534		1770	3539	1583		1708		1681	1673	
Flt Permitted	0.19	1.00		0.07	1.00	1.00		0.99		0.69	0.74	
Satd. Flow (perm)	363	3534		137	3539	1583		1708		1214	1270	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	18	1739	17	65	1171	199	32	21	57	242	27	23
RTOR Reduction (vph)	0	1	0	0	0	48	0	32	0	0	5	0
Lane Group Flow (vph)	18	1755	0	65	1171	151	0	78	0	145	142	0
Turn Type	Perm	NA		Perm	NA	Perm	Split	NA		Perm	NA	
Protected Phases		2			2		3	3			4	
Permitted Phases	2			2		2				4		
Actuated Green, G (s)	81.2	81.2		81.2	81.2	81.2		7.0		16.3	16.3	
Effective Green, g (s)	81.2	81.2		81.2	81.2	81.2		7.0		16.3	16.3	
Actuated g/C Ratio	0.68	0.68		0.68	0.68	0.68		0.06		0.14	0.14	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		5.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	245	2391		92	2394	1071		99		164	172	
v/s Ratio Prot		c0.50			0.33			c0.05				
v/s Ratio Perm	0.05			0.47		0.10				c0.12	0.11	
v/c Ratio	0.07	0.73		0.71	0.49	0.14		0.79		0.88	0.82	
Uniform Delay, d1	6.6	12.5		12.0	9.4	6.9		55.8		50.9	50.5	
Progression Factor	0.23	0.24		0.76	0.56	0.21		1.00		1.00	1.00	
Incremental Delay, d2	0.5	1.7		34.1	0.7	0.3		32.8		38.8	26.3	
Delay (s)	2.0	4.7		43.3	5.9	1.7		88.5		89.7	76.7	
Level of Service	A	A		D	A	A		F		F	E	
Approach Delay (s)		4.6			7.0			88.5			83.2	
Approach LOS		A			A			F			F	

Intersection Summary

HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 11: Marquette & E Wash

2024 with BRT
 MD Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↙	↑↑	↘	
Traffic Volume (vph)	1506	58	71	1202	72	49
Future Volume (vph)	1506	58	71	1202	72	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.0	4.5	6.5	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (prot)	3539	1583	1770	3539	1710	
Flt Permitted	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (perm)	3539	1583	1770	3539	1710	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1637	63	77	1307	78	53
RTOR Reduction (vph)	0	11	0	0	21	0
Lane Group Flow (vph)	1637	52	77	1307	110	0
Turn Type	NA	Perm	Prot	NA	Prot	
Protected Phases	2!		5!	2 3	4	
Permitted Phases		2				
Actuated Green, G (s)	82.5	82.5	83.0	96.1	12.9	
Effective Green, g (s)	82.5	82.5	83.0	92.1	12.9	
Actuated g/C Ratio	0.69	0.69	0.69	0.77	0.11	
Clearance Time (s)	4.5	4.5	4.0		6.5	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	2433	1088	1224	2716	183	
v/s Ratio Prot	c0.46		0.04	c0.37	c0.06	
v/s Ratio Perm		0.03				
v/c Ratio	0.67	0.05	0.06	0.48	0.60	
Uniform Delay, d1	10.9	6.1	6.0	5.1	51.1	
Progression Factor	0.49	0.52	0.83	0.77	1.00	
Incremental Delay, d2	1.0	0.1	0.0	0.1	5.2	
Delay (s)	6.3	3.2	5.0	4.1	56.3	
Level of Service	A	A	A	A	E	
Approach Delay (s)	6.2			4.1	56.3	
Approach LOS	A			A	E	

Intersection Summary

HCM 2000 Control Delay	7.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 12: EB Ramps & E Wash

2024 with BRT
 MD Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↵	↑↑	↑↑	↑↑
Traffic Volume (vph)	1095	347	93	1260	104	280
Future Volume (vph)	1095	347	93	1260	104	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.95	0.88	1.00	0.95	0.97	0.88
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)	3539	2787	1770	3539	3433	2787
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	2787	1770	3539	3433	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1153	365	98	1326	109	295
RTOR Reduction (vph)	0	66	0	0	0	64
Lane Group Flow (vph)	1153	299	98	1326	109	231
Turn Type	NA	custom	Prot	NA	Prot	custom
Protected Phases	5	5 2	3	1 8	7	7 8 3
Permitted Phases		2				8
Actuated Green, G (s)	66.4	98.4	11.6	99.4	10.6	43.6
Effective Green, g (s)	66.4	98.4	11.6	99.4	10.6	43.6
Actuated g/C Ratio	0.55	0.82	0.10	0.83	0.09	0.36
Clearance Time (s)	5.0		5.0		5.0	
Vehicle Extension (s)	3.0		3.0		3.0	
Lane Grp Cap (vph)	1958	2285	171	2931	303	1012
v/s Ratio Prot	c0.33	0.11	0.06	c0.37	c0.03	0.08
v/s Ratio Perm						
v/c Ratio	0.59	0.13	0.57	0.45	0.36	0.23
Uniform Delay, d1	17.8	2.2	51.8	2.8	51.5	26.5
Progression Factor	0.33	4.58	1.05	0.32	1.00	1.00
Incremental Delay, d2	1.0	0.1	4.3	0.1	0.7	0.1
Delay (s)	6.9	10.1	58.8	1.0	52.2	26.6
Level of Service	A	B	E	A	D	C
Approach Delay (s)	7.6			5.0	33.5	
Approach LOS	A			A	C	

Intersection Summary

HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 13: East Wash & WB Ramps

2024 with BRT
 MD Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	97	1227	1004	191	58	285
Future Volume (vph)	97	1227	1004	191	58	285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	0.88
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	3433	2787
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	3539	1583	3433	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	102	1292	1057	201	61	300
RTOR Reduction (vph)	0	0	0	34	0	129
Lane Group Flow (vph)	102	1292	1057	167	61	171
Turn Type	Prot	NA	NA	custom	Prot	pt+ov
Protected Phases	1	6	2		8	8 1
Permitted Phases				6		
Actuated Green, G (s)	12.2	99.6	82.4	99.6	10.4	27.6
Effective Green, g (s)	12.2	99.6	82.4	99.6	10.4	27.6
Actuated g/C Ratio	0.10	0.83	0.69	0.83	0.09	0.23
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	179	2937	2430	1313	297	641
v/s Ratio Prot	c0.06	c0.37	0.30		0.02	c0.06
v/s Ratio Perm				0.11		
v/c Ratio	0.57	0.44	0.43	0.13	0.21	0.27
Uniform Delay, d1	51.4	2.7	8.4	1.9	51.0	37.9
Progression Factor	0.79	1.52	0.47	0.28	1.00	1.00
Incremental Delay, d2	3.6	0.4	0.5	0.2	0.3	0.2
Delay (s)	44.0	4.6	4.5	0.7	51.3	38.1
Level of Service	D	A	A	A	D	D
Approach Delay (s)		7.5	3.9		40.4	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
 14: Rethke Ave/Melvin Ct & East Wash

2024 with BRT
 MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑		↖	↑↑			↕			↕	
Traffic Volume (veh/h)	21	1229	9	8	1210	17	51	4	11	13	5	7
Future Volume (veh/h)	21	1229	9	8	1210	17	51	4	11	13	5	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		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	22	1294	9	8	1274	18	54	4	12	14	5	7
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	61	4225	29	36	2846	40	155	11	23	110	48	41
Arrive On Green	0.07	1.00	1.00	0.02	0.79	0.79	0.06	0.09	0.06	0.06	0.09	0.06
Sat Flow, veh/h	1781	5231	36	1781	3587	51	1140	126	262	722	534	463
Grp Volume(v), veh/h	22	842	461	8	631	661	70	0	0	26	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1864	1781	1777	1861	1527	0	0	1719	0	0
Q Serve(g_s), s	1.4	0.0	0.0	0.5	13.6	13.7	3.6	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.4	0.0	0.0	0.5	13.6	13.7	5.3	0.0	0.0	1.7	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.03	0.77		0.17	0.54		0.27
Lane Grp Cap(c), veh/h	61	2749	1505	36	1410	1477	151	0	0	156	0	0
V/C Ratio(X)	0.36	0.31	0.31	0.22	0.45	0.45	0.46	0.00	0.00	0.17	0.00	0.00
Avail Cap(c_a), veh/h	148	2749	1505	134	1410	1477	252	0	0	262	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)	0.91	0.91	0.91	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	54.6	0.0	0.0	57.9	4.0	4.0	53.4	0.0	0.0	51.7	0.0	0.0
Incr Delay (d2), s/veh	3.2	0.3	0.5	3.1	1.0	1.0	2.2	0.0	0.0	0.5	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	0.7	0.1	0.2	0.3	4.1	4.3	2.2	0.0	0.0	0.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.8	0.3	0.5	61.0	5.0	5.0	55.6	0.0	0.0	52.2	0.0	0.0
LnGrp LOS	E	A	A	E	A	A	E	A	A	D	A	A
Approach Vol, veh/h		1325			1300			70			26	
Approach Delay, s/veh		1.3			5.3			55.6			52.2	
Approach LOS		A			A			E			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.4	100.9		12.7	8.1	99.2		12.7				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	8.0	81.0		16.0	9.0	80.0		16.0				
Max Q Clear Time (g_c+l1), s	2.5	2.0		3.7	3.4	15.7		7.3				
Green Ext Time (p_c), s	0.0	12.2		0.0	0.0	12.1		0.1				
Intersection Summary												
HCM 6th Ctrl Delay				5.1								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary
 16: Fair Oaks/Wright & East Wash

2024 with BRT
 MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↕↕↕		↖	↕↕			↕↕		↖	↕	↗
Traffic Volume (veh/h)	164	1109	39	114	1003	134	46	126	124	92	124	107
Future Volume (veh/h)	164	1109	39	114	1003	134	46	126	124	92	124	107
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	178	1205	42	124	1090	146	50	137	135	100	135	116
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	225	2961	103	165	1736	232	115	292	286	204	417	353
Arrive On Green	0.04	0.19	0.19	0.09	0.55	0.54	0.22	0.22	0.20	0.22	0.22	0.22
Sat Flow, veh/h	1781	5066	177	1781	3150	421	340	1310	1285	1107	1870	1585
Grp Volume(v), veh/h	178	810	437	124	614	622	168	0	154	100	135	116
Grp Sat Flow(s),veh/h/ln	1781	1702	1839	1781	1777	1795	1465	0	1471	1107	1870	1585
Q Serve(g_s), s	11.9	25.0	25.0	8.1	28.5	28.7	5.8	0.0	11.1	10.4	7.3	7.4
Cycle Q Clear(g_c), s	11.9	25.0	25.0	8.1	28.5	28.7	13.1	0.0	11.1	21.5	7.3	7.4
Prop In Lane	1.00		0.10	1.00		0.23	0.30		0.87	1.00		1.00
Lane Grp Cap(c), veh/h	225	1990	1075	165	979	989	365	0	328	204	417	353
V/C Ratio(X)	0.79	0.41	0.41	0.75	0.63	0.63	0.46	0.00	0.47	0.49	0.32	0.33
Avail Cap(c_a), veh/h	312	1990	1075	238	979	989	382	0	343	216	436	370
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)	1.00	1.00	1.00	0.76	0.76	0.76	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.9	30.2	30.2	53.1	18.5	18.6	41.1	0.0	41.7	49.9	39.1	39.1
Incr Delay (d2), s/veh	9.1	0.6	1.1	5.9	2.3	2.3	0.9	0.0	1.1	1.8	0.4	0.5
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	6.3	11.5	12.6	3.9	11.8	12.0	4.5	0.0	4.2	3.0	3.4	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.0	30.8	31.4	59.0	20.8	20.9	42.0	0.0	42.8	51.7	39.5	39.6
LnGrp LOS	E	C	C	E	C	C	D	A	D	D	D	D
Approach Vol, veh/h		1425			1360			322			351	
Approach Delay, s/veh		35.3			24.3			42.4			43.0	
Approach LOS		D			C			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.1	74.1		30.7	19.1	70.1		30.7				
Change Period (Y+Rc), s	5.0	5.0		7.0	5.0	5.0		7.0				
Max Green Setting (Gmax), s	15.0	63.0		25.0	20.0	58.0		25.0				
Max Q Clear Time (g_c+l1), s	10.1	27.0		23.5	13.9	30.7		15.1				
Green Ext Time (p_c), s	0.1	6.7		0.2	0.3	6.2		1.0				
Intersection Summary												
HCM 6th Ctrl Delay					32.4							
HCM 6th LOS					C							

HCM 6th Signalized Intersection Summary
 18: Mendota & East Wash

2024 with BRT
 MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑	↖	↗	↑↑↑			↕			↕	
Traffic Volume (veh/h)	19	1749	119	73	1493	24	163	8	76	36	12	31
Future Volume (veh/h)	19	1749	119	73	1493	24	163	8	76	36	12	31
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	21	1901	129	79	1623	26	177	9	83	39	13	34
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	309	3359	1043	248	3498	56	295	25	233	133	52	87
Arrive On Green	0.03	0.66	0.66	0.06	0.90	0.89	0.18	0.18	0.16	0.18	0.18	0.16
Sat Flow, veh/h	1781	5106	1585	1781	5177	83	1262	143	1321	457	296	493
Grp Volume(v), veh/h	21	1901	129	79	1067	582	177	0	92	86	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1855	1262	0	1464	1246	0	0
Q Serve(g_s), s	0.4	20.3	3.0	1.4	5.4	5.5	5.7	0.0	5.6	2.4	0.0	0.0
Cycle Q Clear(g_c), s	0.4	20.3	3.0	1.4	5.4	5.5	13.8	0.0	5.6	8.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.04	1.00		0.90	0.45		0.40
Lane Grp Cap(c), veh/h	309	3359	1043	248	2300	1254	295	0	259	272	0	0
V/C Ratio(X)	0.07	0.57	0.12	0.32	0.46	0.46	0.60	0.00	0.36	0.32	0.00	0.00
Avail Cap(c_a), veh/h	349	3359	1043	310	2300	1254	340	0	307	322	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.65	0.65	0.65	0.77	0.77	0.77	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.1	9.3	6.4	7.8	1.9	1.9	39.8	0.0	36.8	37.3	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.5	0.2	0.6	0.5	1.0	2.2	0.0	0.8	0.7	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	0.1	6.4	0.9	0.4	1.2	1.5	4.4	0.0	2.1	2.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.1	9.8	6.5	8.3	2.4	2.9	42.1	0.0	37.6	37.9	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	D	D	A	A
Approach Vol, veh/h		2051			1728			269				86
Approach Delay, s/veh		9.5			2.9			40.6				37.9
Approach LOS		A			A			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.8	71.6		21.7	8.6	69.8		21.7				
Change Period (Y+Rc), s	5.0	5.0		5.5	5.0	5.0		5.5				
Max Green Setting (Gmax), s	4.0	61.0		19.5	7.0	58.0		19.5				
Max Q Clear Time (g_c+I1), s	2.4	7.5		10.0	3.4	22.3		15.8				
Green Ext Time (p_c), s	0.0	10.2		0.2	0.1	14.6		0.4				
Intersection Summary												
HCM 6th Ctrl Delay			9.3									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary
 19: Lien & East Wash






























2024 with BRT
 MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑		↖	↗			↕	
Traffic Volume (veh/h)	41	1621	296	92	1436	25	249	11	56	24	8	28
Future Volume (veh/h)	41	1621	296	92	1436	25	249	11	56	24	8	28
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	45	1762	322	100	1561	27	271	12	61	26	9	30
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	312	2400	745	258	2584	45	537	88	448	229	90	230
Arrive On Green	0.07	0.63	0.63	0.16	1.00	0.98	0.33	0.33	0.31	0.33	0.33	0.31
Sat Flow, veh/h	1781	5106	1585	1781	5169	89	1368	267	1359	541	272	697
Grp Volume(v), veh/h	45	1762	322	100	1028	560	271	0	73	65	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1854	1368	0	1626	1511	0	0
Q Serve(g_s), s	0.0	23.9	10.4	0.0	0.0	0.1	12.1	0.0	3.2	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	23.9	10.4	0.0	0.0	0.1	15.3	0.0	3.2	3.2	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.05	1.00		0.84	0.40		0.46
Lane Grp Cap(c), veh/h	312	2400	745	258	1702	927	537	0	537	549	0	0
V/C Ratio(X)	0.14	0.73	0.43	0.39	0.60	0.60	0.50	0.00	0.14	0.12	0.00	0.00
Avail Cap(c_a), veh/h	312	2400	745	258	1702	927	537	0	537	549	0	0
HCM Platoon Ratio	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.81	0.81	0.81	0.85	0.85	0.85	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	13.2	14.4	11.9	33.8	0.0	0.0	27.3	0.0	24.1	23.7	0.0	0.0
Incr Delay (d2), s/veh	0.2	1.7	1.5	0.8	1.4	2.5	0.8	0.0	0.1	0.4	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	0.5	6.9	3.3	2.1	0.3	0.7	5.3	0.0	1.2	1.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.3	16.1	13.4	34.6	1.4	2.5	28.0	0.0	24.2	24.1	0.0	0.0
LnGrp LOS	B	B	B	C	A	A	C	A	C	C	A	A
Approach Vol, veh/h		2129			1688			344				65
Approach Delay, s/veh		15.6			3.7			27.2				24.1
Approach LOS		B			A			C				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.0	51.0		37.0	9.0	54.0		37.0				
Change Period (Y+Rc), s	5.0	5.0		6.0	5.0	5.0		6.0				
Max Green Setting (Gmax), s	7.0	46.0		31.0	4.0	49.0		31.0				
Max Q Clear Time (g_c+I1), s	2.0	25.9		17.3	2.0	2.1		5.2				
Green Ext Time (p_c), s	0.1	11.2		1.2	0.0	9.5		0.2				
Intersection Summary												
HCM 6th Ctrl Delay				11.9								
HCM 6th LOS				B								





















HCM 6th Signalized Intersection Summary
 20: Thierer/Portage & East Wash

2024 with BRT
 MD Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			 			 	
Traffic Volume (veh/h)	148	1405	116	86	1211	65	188	47	71	63	51	102
Future Volume (veh/h)	148	1405	116	86	1211	65	188	47	71	63	51	102
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	161	1527	126	93	1316	71	204	51	77	68	55	111
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	214	2881	894	146	2685	834	329	157	237	287	437	370
Arrive On Green	0.24	1.00	1.00	0.03	0.17	0.17	0.23	0.23	0.21	0.23	0.23	0.23
Sat Flow, veh/h	1781	5106	1585	1781	5106	1585	1220	672	1015	1262	1870	1585
Grp Volume(v), veh/h	161	1527	126	93	1316	71	204	0	128	68	55	111
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1585	1220	0	1688	1262	1870	1585
Q Serve(g_s), s	8.4	0.0	0.0	5.2	23.3	3.8	15.9	0.0	6.4	4.7	2.3	5.8
Cycle Q Clear(g_c), s	8.4	0.0	0.0	5.2	23.3	3.8	18.2	0.0	6.4	11.1	2.3	5.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.60	1.00		1.00
Lane Grp Cap(c), veh/h	214	2881	894	146	2685	834	329	0	394	287	437	370
V/C Ratio(X)	0.75	0.53	0.14	0.64	0.49	0.09	0.62	0.00	0.32	0.24	0.13	0.30
Avail Cap(c_a), veh/h	338	2881	894	232	2685	834	385	0	473	345	524	444
HCM Platoon Ratio	2.00	2.00	2.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.61	0.61	0.61	0.83	0.83	0.83	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.6	0.0	0.0	47.2	29.2	21.1	37.4	0.0	32.4	36.4	30.2	31.6
Incr Delay (d2), s/veh	3.2	0.4	0.2	3.8	0.5	0.2	2.3	0.0	0.5	0.4	0.1	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	3.4	0.1	0.0	2.5	10.6	1.4	4.9	0.0	2.7	1.5	1.1	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.8	0.4	0.2	50.9	29.7	21.3	39.7	0.0	32.9	36.8	30.4	32.0
LnGrp LOS	D	A	A	D	C	C	D	A	C	D	C	C
Approach Vol, veh/h		1814			1480			332			234	
Approach Delay, s/veh		3.9			30.7			37.1			33.0	
Approach LOS		A			C			D			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.2	60.4		27.4	16.0	56.6		27.4				
Change Period (Y+Rc), s	5.5	5.5		6.5	5.5	5.5		6.5				
Max Green Setting (Gmax), s	11.5	45.5		25.5	17.5	39.5		25.5				
Max Q Clear Time (g_c+l1), s	7.2	2.0		13.1	10.4	25.3		20.2				
Green Ext Time (p_c), s	0.1	10.9		0.7	0.3	6.0		0.7				
Intersection Summary												
HCM 6th Ctrl Delay				18.8								
HCM 6th LOS				B								

HCM Signalized Intersection Capacity Analysis
 21: Eagan/Continental & East Wash

2024 with BRT
 MD Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	1208	258	161	993	113	272	68	111	58	28	32
Future Volume (vph)	91	1208	258	161	993	113	272	68	111	58	28	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.91		0.97	0.91		0.95	0.95	1.00		1.00	
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85		0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.97	1.00		0.98	
Satd. Flow (prot)	1770	4951		3433	5007		1681	1718	1583		1751	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.97	1.00		0.98	
Satd. Flow (perm)	1770	4951		3433	5007		1681	1718	1583		1751	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	99	1313	280	175	1079	123	296	74	121	63	30	35
RTOR Reduction (vph)	0	31	0	0	13	0	0	0	101	0	14	0
Lane Group Flow (vph)	99	1562	0	175	1189	0	184	186	20	0	114	0
Turn Type	Prot	NA		Prot	NA		Split	NA	Perm		Split	NA
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases									4			
Actuated Green, G (s)	8.4	43.7		8.6	43.9		14.8	14.8	14.8		9.9	
Effective Green, g (s)	9.9	45.2		10.1	45.4		16.8	16.8	16.8		11.9	
Actuated g/C Ratio	0.10	0.45		0.10	0.45		0.17	0.17	0.17		0.12	
Clearance Time (s)	5.5	5.5		5.5	5.5		6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	175	2237		346	2273		282	288	265		208	
v/s Ratio Prot	c0.06	c0.32		0.05	0.24		c0.11	0.11			c0.07	
v/s Ratio Perm									0.01			
v/c Ratio	0.57	0.70		0.51	0.52		0.65	0.65	0.08		0.55	
Uniform Delay, d1	43.0	21.9		42.6	19.6		38.9	38.8	35.1		41.5	
Progression Factor	1.47	0.28		1.03	1.11		1.00	1.00	1.00		1.00	
Incremental Delay, d2	3.7	1.6		0.9	0.7		5.3	4.9	0.1		2.9	
Delay (s)	66.7	7.7		44.9	22.5		44.2	43.7	35.2		44.4	
Level of Service	E	A		D	C		D	D	D		D	
Approach Delay (s)		11.2			25.3			41.8			44.4	
Approach LOS		B			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			21.7				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)				16.0		
Intersection Capacity Utilization			58.4%			ICU Level of Service				B		
Analysis Period (min)			15									

c Critical Lane Group

HCM 6th Signalized Intersection Summary
 22: Independence/Independence & East Wash

2024 with BRT
 MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	104	1303	87	94	1241	52	150	40	140	65	25	86
Future Volume (veh/h)	104	1303	87	94	1241	52	150	40	140	65	25	86
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	109	1372	92	99	1306	55	158	42	147	68	26	91
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	136	1760	118	389	2523	106	219	55	163	166	75	185
Arrive On Green	0.15	0.72	0.72	0.44	1.00	1.00	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	1781	4888	328	1781	5025	212	614	203	600	430	275	683
Grp Volume(v), veh/h	109	956	508	99	885	476	347	0	0	185	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1811	1781	1702	1832	1416	0	0	1388	0	0
Q Serve(g_s), s	5.9	17.9	17.9	3.5	0.0	0.0	13.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	5.9	17.9	17.9	3.5	0.0	0.0	23.8	0.0	0.0	10.6	0.0	0.0
Prop In Lane	1.00		0.18	1.00		0.12	0.46		0.42	0.37		0.49
Lane Grp Cap(c), veh/h	136	1225	652	389	1709	920	437	0	0	426	0	0
V/C Ratio(X)	0.80	0.78	0.78	0.25	0.52	0.52	0.79	0.00	0.00	0.43	0.00	0.00
Avail Cap(c_a), veh/h	267	1225	652	389	1709	920	536	0	0	525	0	0
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)	0.68	0.68	0.68	0.81	0.81	0.81	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	41.6	11.5	11.5	23.0	0.0	0.0	35.3	0.0	0.0	30.2	0.0	0.0
Incr Delay (d2), s/veh	7.2	3.4	6.3	0.3	0.9	1.7	6.6	0.0	0.0	0.7	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	2.6	4.0	4.8	1.4	0.2	0.4	8.8	0.0	0.0	3.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.9	14.9	17.7	23.3	0.9	1.7	41.9	0.0	0.0	30.8	0.0	0.0
LnGrp LOS	D	B	B	C	A	A	D	A	A	C	A	A
Approach Vol, veh/h		1573			1460			347				185
Approach Delay, s/veh		18.2			2.7			41.9				30.8
Approach LOS		B			A			D				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	26.8	41.0		32.2	12.6	55.2		32.2				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	15.0	36.0		34.0	15.0	36.0		34.0				
Max Q Clear Time (g_c+I1), s	5.5	19.9		12.6	7.9	2.0		25.8				
Green Ext Time (p_c), s	0.1	8.6		1.1	0.1	11.0		1.4				
Intersection Summary												
HCM 6th Ctrl Delay				14.8								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary

2024 with BRT

23: Zeier & E Wash

MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	98	1229	120	241	1162	76	200	51	241	107	39	62
Future Volume (veh/h)	98	1229	120	241	1162	76	200	51	241	107	39	62
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	103	1294	126	254	1223	80	211	54	254	113	41	65
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	129	2145	666	328	2236	694	570	309	262	147	56	90
Arrive On Green	0.14	0.84	0.84	0.09	0.44	0.44	0.17	0.17	0.17	0.08	0.08	0.08
Sat Flow, veh/h	1781	5106	1585	3456	5106	1585	3456	1870	1585	1737	666	1060
Grp Volume(v), veh/h	103	1294	126	254	1223	80	211	54	254	116	0	103
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1728	1702	1585	1728	1870	1585	1784	0	1680
Q Serve(g_s), s	5.6	8.2	1.5	7.2	17.7	3.0	5.4	2.5	15.9	6.4	0.0	6.0
Cycle Q Clear(g_c), s	5.6	8.2	1.5	7.2	17.7	3.0	5.4	2.5	15.9	6.4	0.0	6.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	0.97		0.63
Lane Grp Cap(c), veh/h	129	2145	666	328	2236	694	570	309	262	151	0	142
V/C Ratio(X)	0.80	0.60	0.19	0.77	0.55	0.12	0.37	0.17	0.97	0.77	0.00	0.72
Avail Cap(c_a), veh/h	214	2145	666	467	2236	694	570	309	262	169	0	160
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)	0.73	0.73	0.73	0.91	0.91	0.91	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	42.1	5.3	4.7	44.2	20.8	16.6	37.1	35.9	41.5	44.8	0.0	44.6
Incr Delay (d2), s/veh	8.1	0.9	0.5	4.7	0.9	0.3	0.4	0.3	47.5	17.0	0.0	13.2
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	1.8	0.5	3.2	6.8	1.1	2.3	1.2	9.7	3.5	0.0	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.1	6.2	5.2	48.9	21.7	16.9	37.5	36.2	89.0	61.8	0.0	57.8
LnGrp LOS	D	A	A	D	C	B	D	D	F	E	A	E
Approach Vol, veh/h		1523			1557			519				219
Approach Delay, s/veh		9.1			25.9			62.6				59.9
Approach LOS		A			C			E				E
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.0	48.0		15.0	13.2	49.8		22.0				
Change Period (Y+Rc), s	5.5	6.0		6.5	6.0	6.0		5.5				
Max Green Setting (Gmax), s	13.5	37.0		9.5	12.0	38.0		16.5				
Max Q Clear Time (g_c+I1), s	9.2	10.2		8.4	7.6	19.7		17.9				
Green Ext Time (p_c), s	0.3	10.7		0.1	0.1	8.3		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				26.1								
HCM 6th LOS				C								

HCM 6th Signalized Intersection Summary
24: E Springs & E Wash

2024 with BRT
MD Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↗	↙↘	↑↑↑	↙↘	↗
Traffic Volume (veh/h)	1400	175	389	1210	350	187
Future Volume (veh/h)	1400	175	389	1210	350	187
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	1474	0	409	1274	368	197
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2688		496	3702	518	238
Arrive On Green	1.00	0.00	0.14	0.73	0.15	0.15
Sat Flow, veh/h	5274	1585	3456	5274	3456	1585
Grp Volume(v), veh/h	1474	0	409	1274	368	197
Grp Sat Flow(s),veh/h/ln	1702	1585	1728	1702	1728	1585
Q Serve(g_s), s	0.0	0.0	11.5	9.1	10.1	12.1
Cycle Q Clear(g_c), s	0.0	0.0	11.5	9.1	10.1	12.1
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2688		496	3702	518	238
V/C Ratio(X)	0.55		0.82	0.34	0.71	0.83
Avail Cap(c_a), veh/h	2688		708	3702	639	293
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.76	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	41.6	5.0	40.4	41.3
Incr Delay (d2), s/veh	0.6	0.0	5.4	0.3	2.8	14.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	5.1	2.5	4.5	5.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.6	0.0	47.0	5.3	43.2	56.2
LnGrp LOS	A		D	A	D	E
Approach Vol, veh/h	1474	A		1683	565	
Approach Delay, s/veh	0.6			15.4	47.7	
Approach LOS	A			B	D	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	19.9	58.6		21.5		78.5
Change Period (Y+Rc), s	5.5	6.0		6.5		6.0
Max Green Setting (Gmax), s	20.5	43.0		18.5		69.0
Max Q Clear Time (g_c+I1), s	13.5	2.0		14.1		11.1
Green Ext Time (p_c), s	0.9	14.1		0.9		12.0

Intersection Summary

HCM 6th Ctrl Delay	14.5
HCM 6th LOS	B

Notes













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

HCM Signalized Intersection Capacity Analysis

2024 with BRT

1: Blair St. & East Washington Ave.

PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑↑	↑↑		↑		↑↑	↑	↑↑	
Traffic Volume (vph)	0	1598	38	617	737	0	79	0	990	656	84	23
Future Volume (vph)	0	1598	38	617	737	0	79	0	990	656	84	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0		4.0	4.0	4.0	
Lane Util. Factor		0.95		0.97	0.95		1.00		0.88	0.91	0.91	
Frt		1.00		1.00	1.00		1.00		0.85	1.00	0.99	
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	0.96	
Satd. Flow (prot)		3527		3433	3539		1770		2787	1610	3241	
Flt Permitted		1.00		0.95	1.00		0.95		1.00	0.95	0.96	
Satd. Flow (perm)		3527		3433	3539		1770		2787	1610	3241	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1682	40	649	776	0	83	0	1042	691	88	24
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	1721	0	649	776	0	83	0	1042	345	455	0
Turn Type		NA		Prot	NA		Prot		pt+ov	Split	NA	
Protected Phases		1		2	1 2		3		2 3	4	4	
Permitted Phases							3		3 2			
Actuated Green, G (s)		40.5		31.2	76.2		7.0		42.7	32.3	32.3	
Effective Green, g (s)		41.0		31.7	76.7		7.0		43.2	34.3	34.3	
Actuated g/C Ratio		0.32		0.24	0.59		0.05		0.33	0.26	0.26	
Clearance Time (s)		4.5		4.5			4.0			6.0	6.0	
Vehicle Extension (s)		3.0		3.0			2.0			3.0	3.0	
Lane Grp Cap (vph)		1112		837	2088		95		926	424	855	
v/s Ratio Prot		c0.49		0.19	0.22		0.05		c0.37	c0.21	0.14	
v/s Ratio Perm												
v/c Ratio		1.55		0.78	0.37		0.87		1.13	0.81	0.53	
Uniform Delay, d1		44.5		45.8	14.0		61.1		43.4	44.9	41.0	
Progression Factor		1.00		0.85	1.08		1.00		1.00	1.00	1.00	
Incremental Delay, d2		250.8		6.1	0.1		52.3		70.4	11.4	0.6	
Delay (s)		295.3		45.1	15.2		113.3		113.8	56.2	41.6	
Level of Service		F		D	B		F		F	E	D	
Approach Delay (s)		295.3			28.8			113.7			47.9	
Approach LOS		F			C			F			D	
Intersection Summary												
HCM 2000 Control Delay			141.1			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			1.23									
Actuated Cycle Length (s)			130.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			108.2%			ICU Level of Service			G			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: Livingston Ave & East Washington Ave.

2024 with BRT
PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑		↖	↑↑				↗			↖
Traffic Volume (vph)	194	2982	68	75	1352	49	0	0	73	0	0	38
Future Volume (vph)	194	2982	68	75	1352	49	0	0	73	0	0	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0				5.0			5.0
Lane Util. Factor	1.00	0.91		1.00	0.95				1.00			1.00
Frt	1.00	1.00		1.00	0.99				0.86			0.86
Flt Protected	0.95	1.00		0.95	1.00				1.00			1.00
Satd. Flow (prot)	1770	5068		1770	3520				1611			1611
Flt Permitted	0.15	1.00		0.04	1.00				1.00			1.00
Satd. Flow (perm)	279	5068		73	3520				1611			1611
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	204	3139	72	79	1423	52	0	0	77	0	0	40
RTOR Reduction (vph)	0	2	0	0	2	0	0	0	15	0	0	34
Lane Group Flow (vph)	204	3209	0	79	1473	0	0	0	62	0	0	6
Turn Type	D.P+P	NA		D.Pm	NA				Prot			Over
Protected Phases	4	2			6				8			4
Permitted Phases	6			2								
Actuated Green, G (s)	120.0	102.0		102.0	102.0				18.0			18.0
Effective Green, g (s)	120.0	102.0		102.0	102.0				18.0			18.0
Actuated g/C Ratio	0.92	0.78		0.78	0.78				0.14			0.14
Clearance Time (s)	5.0	5.0		5.0	5.0				5.0			5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0				3.0			3.0
Lane Grp Cap (vph)	463	3976		57	2761				223			223
v/s Ratio Prot	c0.06	0.63			0.42				0.04			0.00
v/s Ratio Perm	0.35			c1.08								
v/c Ratio	0.44	0.81		1.39	0.53				0.28			0.02
Uniform Delay, d1	3.1	8.2		14.0	5.2				50.2			48.4
Progression Factor	2.42	0.90		1.42	0.82				1.00			1.00
Incremental Delay, d2	0.1	0.2		241.0	0.6				0.7			0.0
Delay (s)	7.5	7.6		260.9	4.8				50.9			48.5
Level of Service	A	A		F	A				D			D
Approach Delay (s)		7.6			17.9			50.9			48.5	
Approach LOS		A			B			D			D	

Intersection Summary

HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
 3: Paterson St. & East Washington Ave.

2024 with BRT
 PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↗	↖	↑↑	↗		↕		↖	↑	↗
Traffic Volume (veh/h)	0	3491	43	33	1338	51	24	50	78	146	48	42
Future Volume (veh/h)	0	3491	43	33	1338	51	24	50	78	146	48	42
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	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	3675	45	35	1408	54	25	53	82	154	51	44
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, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	3478	1080	45	2647	1181	61	114	150	242	333	283
Arrive On Green	0.00	0.46	0.46	0.01	0.25	0.25	0.19	0.18	0.18	0.19	0.18	0.18
Sat Flow, veh/h	0	5274	1585	1781	3554	1585	165	638	844	1254	1870	1585
Grp Volume(v), veh/h	0	3675	45	35	1408	54	160	0	0	154	51	44
Grp Sat Flow(s),veh/h/ln	0	1702	1585	1781	1777	1585	1646	0	0	1254	1870	1585
Q Serve(g_s), s	0.0	88.6	2.0	2.5	44.7	3.4	2.8	0.0	0.0	9.1	3.0	3.0
Cycle Q Clear(g_c), s	0.0	88.6	2.0	2.5	44.7	3.4	11.1	0.0	0.0	20.3	3.0	3.0
Prop In Lane	0.00		1.00	1.00		1.00	0.16		0.51	1.00		1.00
Lane Grp Cap(c), veh/h	0	3478	1080	45	2647	1181	338	0	0	242	333	283
V/C Ratio(X)	0.00	1.06	0.04	0.78	0.53	0.05	0.47	0.00	0.00	0.64	0.15	0.16
Avail Cap(c_a), veh/h	0	3478	1080	55	2647	1181	516	0	0	381	540	457
HCM Platoon Ratio	1.00	0.67	0.67	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.51	0.51	0.69	0.69	0.69	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	35.3	11.8	64.1	29.4	13.8	48.3	0.0	0.0	52.7	45.1	45.1
Incr Delay (d2), s/veh	0.0	29.7	0.0	32.5	0.5	0.1	1.0	0.0	0.0	2.7	0.2	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(95%),veh/ln	0.0	58.0	1.2	2.8	27.7	2.0	8.4	0.0	0.0	8.8	2.6	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	65.0	11.9	96.6	29.9	13.8	49.4	0.0	0.0	55.4	45.3	45.4
LnGrp LOS	A	F	B	F	C	B	D	A	A	E	D	D
Approach Vol, veh/h		3720			1497			160			249	
Approach Delay, s/veh		64.4			30.9			49.4			51.6	
Approach LOS		E			C			D			D	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	8.3	93.6		28.2		101.8		28.2				
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s	4.0	73.5		37.5		82.5		37.5				
Max Q Clear Time (g_c+I1), s	4.5	90.6		22.3		46.7		13.1				
Green Ext Time (p_c), s	0.0	0.0		0.9		9.6		0.6				

Intersection Summary

HCM 6th Ctrl Delay			54.5									
HCM 6th LOS			D									

HCM 6th Signalized Intersection Summary
 4: Ingersoll St. & East Washington Ave.

2024 with BRT
 PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑	↗		↑	↗		↕	
Traffic Volume (veh/h)	170	3545	55	55	1414	30	56	18	41	76	34	71
Future Volume (veh/h)	170	3545	55	55	1414	30	56	18	41	76	34	71
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	179	3732	58	58	1488	32	59	19	43	80	36	75
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	239	3373	1047	103	2593	1157	190	54	294	119	54	87
Arrive On Green	0.88	0.88	0.88	0.03	0.73	0.73	0.20	0.19	0.19	0.20	0.19	0.19
Sat Flow, veh/h	343	5106	1585	1781	3554	1585	764	291	1585	429	293	467
Grp Volume(v), veh/h	179	3732	58	58	1488	32	78	0	43	191	0	0
Grp Sat Flow(s),veh/h/ln	343	1702	1585	1781	1777	1585	1055	0	1585	1188	0	0
Q Serve(g_s), s	63.8	85.9	0.6	1.3	25.3	0.7	0.0	0.0	3.0	12.9	0.0	0.0
Cycle Q Clear(g_c), s	80.1	85.9	0.6	1.3	25.3	0.7	8.6	0.0	3.0	21.5	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.76		1.00	0.42		0.39
Lane Grp Cap(c), veh/h	239	3373	1047	103	2593	1157	265	0	294	283	0	0
V/C Ratio(X)	0.75	1.11	0.06	0.56	0.57	0.03	0.29	0.00	0.15	0.68	0.00	0.00
Avail Cap(c_a), veh/h	239	3373	1047	110	2593	1157	402	0	451	432	0	0
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(l)	0.09	0.09	0.09	0.80	0.80	0.80	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	15.2	7.9	2.7	35.6	8.2	4.8	45.6	0.0	44.3	53.1	0.0	0.0
Incr Delay (d2), s/veh	2.0	48.4	0.0	4.5	0.7	0.0	0.6	0.0	0.2	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(95%),veh/ln	4.8	24.4	0.4	2.5	13.1	0.4	4.0	0.0	2.2	10.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.2	56.3	2.7	40.1	8.9	4.9	46.2	0.0	44.5	55.9	0.0	0.0
LnGrp LOS	B	F	A	D	A	A	D	A	D	E	A	A
Approach Vol, veh/h		3969			1578			121			191	
Approach Delay, s/veh		53.8			10.0			45.6			55.9	
Approach LOS		D			A			D			E	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	9.0	90.4		30.6		99.4		30.6				
Change Period (Y+Rc), s	5.5	4.5		6.5		4.5		6.5				
Max Green Setting (Gmax), s	4.0	72.5		37.0		82.0		37.0				
Max Q Clear Time (g_c+l1), s	3.3	87.9		23.5		27.3		10.6				
Green Ext Time (p_c), s	0.0	0.0		0.6		11.0		0.5				

Intersection Summary												
HCM 6th Ctrl Delay				41.9								
HCM 6th LOS				D								

HCM 6th Signalized Intersection Summary
 5: Baldwin St. & East Washington Ave.

2024 with BRT
 PM Peak

































Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↗	↖	↑↑	↗		↖	↗		↖	↗
Traffic Volume (veh/h)	0	3643	46	42	1395	84	31	81	86	153	82	81
Future Volume (veh/h)	0	3643	46	42	1395	84	31	81	86	153	82	81
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	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	3835	48	44	1468	88	33	85	91	161	86	85
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, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	2907	902	55	2269	1012	35	72	451	46	0	451
Arrive On Green	0.00	1.00	1.00	0.03	0.64	0.64	0.29	0.28	0.28	0.29	0.28	0.28
Sat Flow, veh/h	0	5274	1585	1781	3554	1585	0	253	1585	0	0	1585
Grp Volume(v), veh/h	0	3835	48	44	1468	88	118	0	91	247	0	85
Grp Sat Flow(s),veh/h/ln	0	1702	1585	1781	1777	1585	253	0	1585	0	0	1585
Q Serve(g_s), s	0.0	74.0	0.0	3.2	33.1	2.8	0.0	0.0	5.7	0.0	0.0	5.3
Cycle Q Clear(g_c), s	0.0	74.0	0.0	3.2	33.1	2.8	38.0	0.0	5.7	38.0	0.0	5.3
Prop In Lane	0.00		1.00	1.00		1.00	0.28		1.00	0.65		1.00
Lane Grp Cap(c), veh/h	0	2907	902	55	2269	1012	109	0	451	46	0	451
V/C Ratio(X)	0.00	1.32	0.05	0.80	0.65	0.09	1.08	0.00	0.20	5.40	0.00	0.19
Avail Cap(c_a), veh/h	0	2907	902	55	2269	1012	109	0	451	46	0	451
HCM Platoon Ratio	1.00	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)	0.00	0.09	0.09	0.45	0.45	0.45	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	62.6	14.5	9.0	41.8	0.0	35.3	65.5	0.0	35.2
Incr Delay (d2), s/veh	0.0	144.0	0.0	30.8	0.7	0.1	108.8	0.0	0.2	2027.1	0.0	0.2
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(95%),veh/ln	0.0	52.1	0.0	3.4	16.5	1.7	10.3	0.0	4.1	48.1	0.0	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	144.0	0.0	93.4	15.1	9.1	150.5	0.0	35.5	2092.6	0.0	35.4
LnGrp LOS	A	F	A	F	B	A	F	A	D	F	A	D
Approach Vol, veh/h		3883			1600			209				332
Approach Delay, s/veh		142.2			16.9			100.4				1565.9
Approach LOS		F			B			F				F
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	9.0	79.0		42.0		88.0		42.0				
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s	4.0	74.0		37.0		83.0		37.0				
Max Q Clear Time (g_c+I1), s	5.2	76.0		40.0		35.1		40.0				
Green Ext Time (p_c), s	0.0	0.0		0.0		11.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				185.9								
HCM 6th LOS				F								

HCM Signalized Intersection Capacity Analysis

2024 with BRT

6: First & E Wash

PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  			 						 	 
Traffic Volume (vph)	433	3162	178	53	1261	125	128	203	128	178	178	194
Future Volume (vph)	433	3162	178	53	1261	125	128	203	128	178	178	194
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.5	6.5	6.5
Lane Util. Factor	0.97	0.91	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	1770	3539	1583	1770	1863	1583	1770	1863	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.39	1.00	1.00	0.62	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	1770	3539	1583	729	1863	1583	1155	1863	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	471	3437	193	58	1371	136	139	221	139	193	193	211
RTOR Reduction (vph)	0	0	92	0	0	81	0	0	99	0	0	104
Lane Group Flow (vph)	471	3437	101	58	1371	55	139	221	40	193	193	107
Turn Type	Prot	NA	custom	Prot	NA	Perm	D.P+P	NA	Perm	Perm	NA	custom
Protected Phases	1	6		5	2		3	3 4			4	
Permitted Phases			2			2	4		3 4	4		4 1
Actuated Green, G (s)	23.9	70.6	53.6	7.4	53.6	53.6	32.8	37.8	37.8	18.6	18.6	49.0
Effective Green, g (s)	23.9	70.6	53.6	7.4	53.6	53.6	32.8	37.8	37.8	18.6	18.6	49.0
Actuated g/C Ratio	0.18	0.53	0.41	0.06	0.41	0.41	0.25	0.29	0.29	0.14	0.14	0.37
Clearance Time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0			6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	620	2713	641	99	1433	641	292	532	452	162	261	1032
v/s Ratio Prot	c0.14	c0.68		0.03	0.39		0.05	c0.12			0.10	
v/s Ratio Perm			0.06			0.03	0.07		0.03	c0.17		0.04
v/c Ratio	0.76	1.27	0.16	0.59	0.96	0.09	0.48	0.42	0.09	1.19	0.74	0.10
Uniform Delay, d1	51.5	30.9	25.0	61.0	38.2	24.3	40.8	38.3	34.6	56.9	54.5	27.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.3	123.2	0.5	8.6	15.5	0.3	1.2	0.5	0.1	131.4	10.5	0.0
Delay (s)	56.8	154.0	25.5	69.5	53.7	24.5	42.1	38.8	34.7	188.3	65.0	27.3
Level of Service	E	F	C	E	D	C	D	D	C	F	E	C
Approach Delay (s)		136.8			51.7			38.6			91.5	
Approach LOS		F			D			D			F	
Intersection Summary												
HCM 2000 Control Delay			105.9			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			1.14									
Actuated Cycle Length (s)			132.3	Sum of lost time (s)				22.0				
Intersection Capacity Utilization			102.9%	ICU Level of Service			G					
Analysis Period (min)			15									

c Critical Lane Group

HCM 6th Signalized Intersection Summary

2024 with BRT

7: Fourth & E Wash

PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	3316	15	0	1368	32	19	31	26	53	19	20
Future Volume (veh/h)	24	3316	15	0	1368	32	19	31	26	53	19	20
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	0	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	26	3604	16	0	1487	35	21	34	28	58	21	22
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	0	2	2	2	2	2	2	2	2
Cap, veh/h	322	3830	1189	0	2665	1189	45	54	231	57	12	231
Arrive On Green	0.75	0.75	0.75	0.00	1.00	1.00	0.15	0.15	0.15	0.15	0.15	0.15
Sat Flow, veh/h	343	5106	1585	0	3647	1585	0	370	1585	0	85	1585
Grp Volume(v), veh/h	26	3604	16	0	1487	35	55	0	28	79	0	22
Grp Sat Flow(s),veh/h/ln	343	1702	1585	0	1777	1585	370	0	1585	85	0	1585
Q Serve(g_s), s	2.3	66.0	0.3	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	1.3
Cycle Q Clear(g_c), s	2.3	66.0	0.3	0.0	0.0	0.0	16.0	0.0	1.7	16.0	0.0	1.3
Prop In Lane	1.00		1.00	0.00		1.00	0.38		1.00	0.73		1.00
Lane Grp Cap(c), veh/h	322	3830	1189	0	2665	1189	99	0	231	69	0	231
V/C Ratio(X)	0.08	0.94	0.01	0.00	0.56	0.03	0.55	0.00	0.12	1.14	0.00	0.10
Avail Cap(c_a), veh/h	322	3830	1189	0	2665	1189	99	0	231	69	0	231
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.09	0.00	0.94	0.94	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	3.7	11.7	3.5	0.0	0.0	0.0	42.1	0.0	40.9	52.2	0.0	40.7
Incr Delay (d2), s/veh	0.0	0.7	0.0	0.0	0.8	0.0	6.6	0.0	0.2	152.6	0.0	0.2
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(95%),veh/ln	0.2	20.8	0.1	0.0	0.5	0.0	2.7	0.0	1.2	8.7	0.0	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	3.8	12.3	3.5	0.0	0.8	0.0	48.8	0.0	41.1	204.8	0.0	40.9
LnGrp LOS	A	B	A	A	A	A	D	A	D	F	A	D
Approach Vol, veh/h		3646			1522			83				101
Approach Delay, s/veh		12.2			0.8			46.2				169.1
Approach LOS		B			A			D				F
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		87.5		22.5		87.5		22.5				
Change Period (Y+Rc), s		5.0		6.5		5.0		6.5				
Max Green Setting (Gmax), s		82.5		16.0		82.5		16.0				
Max Q Clear Time (g_c+I1), s		68.0		18.0		2.0		18.0				
Green Ext Time (p_c), s		14.4		0.0		18.8		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				12.5								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary
8: Sixth & E Wash

2024 with BRT
PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑	↗	↘	↗			↕	
Traffic Volume (veh/h)	21	3310	22	59	1349	14	21	16	30	42	44	26
Future Volume (veh/h)	21	3310	22	59	1349	14	21	16	30	42	44	26
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	23	3598	24	64	1466	15	23	17	33	46	48	28
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	320	3654	1134	165	4085	1268	170	57	110	88	67	33
Arrive On Green	1.00	1.00	1.00	0.08	1.00	1.00	0.10	0.10	0.10	0.10	0.10	0.10
Sat Flow, veh/h	356	5106	1585	1781	5106	1585	1323	568	1103	430	674	329
Grp Volume(v), veh/h	23	3598	24	64	1466	15	23	0	50	122	0	0
Grp Sat Flow(s),veh/h/ln	356	1702	1585	1781	1702	1585	1323	0	1672	1433	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	3.1	6.3	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.9	0.0	0.0	2.3	0.0	3.1	9.4	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.66	0.38		0.23
Lane Grp Cap(c), veh/h	320	3654	1134	165	4085	1268	170	0	167	188	0	0
V/C Ratio(X)	0.07	0.98	0.02	0.39	0.36	0.01	0.14	0.00	0.30	0.65	0.00	0.00
Avail Cap(c_a), veh/h	320	3654	1134	193	4085	1268	170	0	167	188	0	0
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)	0.40	0.40	0.40	0.53	0.53	0.53	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	12.8	0.0	0.0	45.6	0.0	45.9	49.0	0.0	0.0
Incr Delay (d2), s/veh	0.2	6.5	0.0	0.8	0.1	0.0	0.4	0.0	1.0	7.5	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(95%),veh/ln	0.0	3.8	0.0	1.6	0.1	0.0	1.1	0.0	2.4	6.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.2	6.5	0.0	13.6	0.1	0.0	46.0	0.0	46.9	56.5	0.0	0.0
LnGrp LOS	A	A	A	B	A	A	D	A	D	E	A	A
Approach Vol, veh/h		3645			1545			73			122	
Approach Delay, s/veh		6.4			0.7			46.6			56.5	
Approach LOS		A			A			D			E	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	9.3	83.7		17.0		93.0		17.0				
Change Period (Y+Rc), s	5.0	5.0		6.0		5.0		6.0				
Max Green Setting (Gmax), s	6.0	77.0		11.0		88.0		11.0				
Max Q Clear Time (g_c+I1), s	2.9	2.0		11.4		2.0		5.1				
Green Ext Time (p_c), s	0.0	63.8		0.0		10.1		0.1				

Intersection Summary												
HCM 6th Ctrl Delay				6.5								
HCM 6th LOS				A								

Notes





























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

HCM Signalized Intersection Capacity Analysis

2024 with BRT

9: Milwaukee/North & E Wash

PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			 		 	 			 	
Traffic Volume (vph)	80	2919	431	0	1169	19	322	82	39	42	177	80
Future Volume (vph)	80	2919	431	0	1169	19	322	82	39	42	177	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5	6.5	6.5		5.0	5.0	
Lane Util. Factor	1.00	0.91	1.00		0.95	1.00	0.97	1.00		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.95		1.00	0.95	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1583		3539	1583	3433	1773		1770	1776	
Flt Permitted	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	5085	1583		3539	1583	3433	1773		1770	1776	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	3173	468	0	1271	21	350	89	42	46	192	87
RTOR Reduction (vph)	0	0	66	0	0	11	0	15	0	0	15	0
Lane Group Flow (vph)	87	3173	402	0	1271	10	350	116	0	46	264	0
Turn Type	Prot	NA	Perm		NA	Perm	Split	NA		Split	NA	
Protected Phases	5	2			6		4	4		3	3	
Permitted Phases			2			6						
Actuated Green, G (s)	8.5	67.5	67.5		54.5	54.5	11.5	11.5		15.0	15.0	
Effective Green, g (s)	8.5	67.5	67.5		54.5	54.5	11.5	11.5		15.0	15.0	
Actuated g/C Ratio	0.08	0.61	0.61		0.50	0.50	0.10	0.10		0.14	0.14	
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5	6.5	6.5		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	136	3120	971		1753	784	358	185		241	242	
v/s Ratio Prot	0.05	c0.62			0.36		c0.10	0.07		0.03	c0.15	
v/s Ratio Perm			0.25			0.01						
v/c Ratio	0.64	1.02	0.41		0.73	0.01	0.98	0.63		0.19	1.09	
Uniform Delay, d1	49.3	21.2	11.0		21.9	14.1	49.1	47.2		42.1	47.5	
Progression Factor	1.17	0.36	0.15		0.82	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.0	13.7	0.4		2.4	0.0	41.1	6.5		0.4	84.7	
Delay (s)	64.5	21.3	2.0		20.3	14.1	90.3	53.6		42.5	132.2	
Level of Service	E	C	A		C	B	F	D		D	F	
Approach Delay (s)		19.8			20.2			80.3			119.5	
Approach LOS		B			C			F			F	
Intersection Summary												
HCM 2000 Control Delay			30.5									C
HCM 2000 Volume to Capacity ratio			1.08									
Actuated Cycle Length (s)			110.0							20.5		
Intersection Capacity Utilization			93.1%									F
ICU Level of Service												
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2024 with BRT

10: Johnson & E Wash

PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗↘↙		↖	↗↘	↗		↕		↖	↕	
Traffic Volume (vph)	12	2520	18	51	1122	116	20	16	51	236	21	11
Future Volume (vph)	12	2520	18	51	1122	116	20	16	51	236	21	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		5.0	4.5	4.5		5.0		6.0	6.0	
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00		1.00		0.95	0.95	
Frt	1.00	1.00		1.00	1.00	0.85		0.92		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	0.96	
Satd. Flow (prot)	1770	5080		1770	3539	1583		1696		1681	1684	
Flt Permitted	0.21	1.00		0.06	1.00	1.00		0.99		0.70	0.72	
Satd. Flow (perm)	385	5080		104	3539	1583		1696		1232	1252	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	2739	20	55	1220	126	22	17	55	257	23	12
RTOR Reduction (vph)	0	1	0	0	0	32	0	46	0	0	3	0
Lane Group Flow (vph)	13	2758	0	55	1220	94	0	48	0	146	143	0
Turn Type	Perm	NA		pm+pt	NA	Perm	Split	NA		Perm	NA	
Protected Phases		6		5	2		3	3			4	
Permitted Phases	6			2		2				4		
Actuated Green, G (s)	66.7	66.7		74.9	74.9	74.9		5.0		14.6	14.6	
Effective Green, g (s)	66.7	66.7		74.9	74.9	74.9		5.0		14.6	14.6	
Actuated g/C Ratio	0.61	0.61		0.68	0.68	0.68		0.05		0.13	0.13	
Clearance Time (s)	4.5	4.5		5.0	4.5	4.5		5.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	233	3080		119	2409	1077		77		163	166	
v/s Ratio Prot		c0.54		0.01	c0.34			c0.03				
v/s Ratio Perm	0.03			0.30		0.06				c0.12	0.11	
v/c Ratio	0.06	0.90		0.46	0.51	0.09		0.63		0.90	0.86	
Uniform Delay, d1	8.8	18.6		21.9	8.5	6.0		51.6		47.0	46.7	
Progression Factor	0.07	0.09		0.96	1.08	1.05		1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.4		2.5	0.7	0.1		14.8		41.5	34.2	
Delay (s)	0.7	2.1		23.5	9.9	6.4		66.4		88.4	81.0	
Level of Service	A	A		C	A	A		E		F	F	
Approach Delay (s)		2.1			10.1			66.4			84.7	
Approach LOS		A			B			E			F	

Intersection Summary

HCM 2000 Control Delay	11.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

11: Marquette & E Wash

2024 with BRT
PM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↗	↖	↑↑	↘	
Traffic Volume (vph)	3167	47	89	1263	84	110
Future Volume (vph)	3167	47	89	1263	84	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.0	4.5	6.5	
Lane Util. Factor	0.91	1.00	1.00	0.95	1.00	
Frt	1.00	0.85	1.00	1.00	0.92	
Flt Protected	1.00	1.00	0.95	1.00	0.98	
Satd. Flow (prot)	5085	1583	1770	3539	1683	
Flt Permitted	1.00	1.00	0.95	1.00	0.98	
Satd. Flow (perm)	5085	1583	1770	3539	1683	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3442	51	97	1373	91	120
RTOR Reduction (vph)	0	7	0	0	43	0
Lane Group Flow (vph)	3442	45	97	1373	168	0
Turn Type	NA	Perm	Prot	NA	Prot	
Protected Phases	2		3	2 3	4	
Permitted Phases		2				
Actuated Green, G (s)	77.5	77.5	7.0	89.0	10.5	
Effective Green, g (s)	77.5	77.5	7.0	89.0	10.5	
Actuated g/C Ratio	0.70	0.70	0.06	0.81	0.10	
Clearance Time (s)	4.5	4.5	4.0		6.5	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	3582	1115	112	2863	160	
v/s Ratio Prot	c0.68		c0.05	0.39	c0.10	
v/s Ratio Perm		0.03				
v/c Ratio	0.96	0.04	0.87	0.48	1.05	
Uniform Delay, d1	14.9	4.9	51.0	3.3	49.8	
Progression Factor	0.21	0.19	0.88	1.08	1.00	
Incremental Delay, d2	5.8	0.0	42.1	0.1	84.3	
Delay (s)	8.9	1.0	86.9	3.7	134.0	
Level of Service	A	A	F	A	F	
Approach Delay (s)	8.8			9.2	134.0	
Approach LOS	A			A	F	







Intersection Summary

HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 12: EB Ramps & E Wash

2024 with BRT
 PM Peak

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↑↑	↑	↑↑	↑↑	↑↑
Traffic Volume (vph)	1973	1041	97	1369	112	262
Future Volume (vph)	1973	1041	97	1369	112	262
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.91	0.88	1.00	0.95	0.97	0.88
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)	5085	2787	1770	3539	3433	2787
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	2787	1770	3539	3433	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	2077	1096	102	1441	118	276
RTOR Reduction (vph)	0	106	0	0	0	5
Lane Group Flow (vph)	2077	990	102	1441	118	271
Turn Type	NA	custom	Prot	NA	Prot	custom
Protected Phases	5	5 2	3	1 8	7	7 8 3
Permitted Phases		2				8
Actuated Green, G (s)	59.5	89.5	10.5	92.0	8.0	40.5
Effective Green, g (s)	59.5	89.5	10.5	92.0	8.0	40.5
Actuated g/C Ratio	0.54	0.81	0.10	0.84	0.07	0.37
Clearance Time (s)	5.0		5.0		5.0	
Vehicle Extension (s)	3.0		3.0		3.0	
Lane Grp Cap (vph)	2750	2267	168	2959	249	1026
v/s Ratio Prot	c0.41	c0.36	0.06	c0.41	0.03	0.10
v/s Ratio Perm						
v/c Ratio	0.76	0.44	0.61	0.49	0.47	0.26
Uniform Delay, d1	19.6	3.0	47.8	2.5	49.0	24.3
Progression Factor	0.35	1.92	1.39	0.53	1.00	1.00
Incremental Delay, d2	0.6	0.2	5.6	0.1	1.4	0.1
Delay (s)	7.4	5.9	71.8	1.4	50.4	24.5
Level of Service	A	A	E	A	D	C
Approach Delay (s)	6.8			6.1	32.2	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	8.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 13: East Wash & WB Ramps

2024 with BRT
 PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	159	2131	1066	260	61	269
Future Volume (vph)	159	2131	1066	260	61	269
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.91	0.95	1.00	0.97	0.88
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	3539	1583	3433	2787
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	5085	3539	1583	3433	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	167	2243	1122	274	64	283
RTOR Reduction (vph)	0	0	0	43	0	84
Lane Group Flow (vph)	167	2243	1122	231	64	199
Turn Type	Prot	NA	NA	custom	Prot	pt+ov
Protected Phases	1	6	2		8	8 1
Permitted Phases				6		
Actuated Green, G (s)	23.0	92.6	64.6	92.6	7.4	35.4
Effective Green, g (s)	23.0	92.6	64.6	92.6	7.4	35.4
Actuated g/C Ratio	0.21	0.84	0.59	0.84	0.07	0.32
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	370	4280	2078	1332	230	896
v/s Ratio Prot	0.09	c0.44	0.32		0.02	c0.07
v/s Ratio Perm				0.15		
v/c Ratio	0.45	0.52	0.54	0.17	0.28	0.22
Uniform Delay, d1	38.0	2.5	13.7	1.6	48.8	27.2
Progression Factor	0.64	0.36	0.49	2.97	1.00	1.00
Incremental Delay, d2	0.6	0.3	0.9	0.2	0.7	0.1
Delay (s)	24.8	1.2	7.6	5.0	49.4	27.4
Level of Service	C	A	A	A	D	C
Approach Delay (s)		2.9	7.1		31.4	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay		6.7	HCM 2000 Level of Service A
HCM 2000 Volume to Capacity ratio		0.53	
Actuated Cycle Length (s)		110.0	Sum of lost time (s) 15.0
Intersection Capacity Utilization		54.1%	ICU Level of Service A
Analysis Period (min)		15	

c Critical Lane Group

HCM 6th Signalized Intersection Summary
 14: Rethke Ave/Melvin Ct & East Wash

2024 with BRT
 PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑		↖	↑↑			↕			↕	
Traffic Volume (veh/h)	45	2119	14	13	1283	17	61	9	15	13	5	12
Future Volume (veh/h)	45	2119	14	13	1283	17	61	9	15	13	5	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	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	47	2231	15	14	1351	18	64	9	16	14	5	13
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	60	4061	27	23	2710	36	137	14	21	88	36	53
Arrive On Green	0.03	0.78	0.78	0.03	1.00	1.00	0.07	0.07	0.07	0.07	0.07	0.07
Sat Flow, veh/h	1781	5233	35	1781	3591	48	1075	191	277	540	485	702
Grp Volume(v), veh/h	47	1451	795	14	668	701	89	0	0	32	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1864	1781	1777	1862	1543	0	0	1727	0	0
Q Serve(g_s), s	2.9	18.3	18.3	0.9	0.0	0.0	4.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.9	18.3	18.3	0.9	0.0	0.0	6.1	0.0	0.0	1.9	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.03	0.72		0.18	0.44		0.41
Lane Grp Cap(c), veh/h	60	2642	1447	23	1341	1405	172	0	0	176	0	0
V/C Ratio(X)	0.78	0.55	0.55	0.62	0.50	0.50	0.52	0.00	0.00	0.18	0.00	0.00
Avail Cap(c_a), veh/h	113	2642	1447	65	1341	1405	395	0	0	409	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.84	0.84	0.84	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	52.7	4.8	4.8	53.3	0.0	0.0	49.8	0.0	0.0	47.9	0.0	0.0
Incr Delay (d2), s/veh	16.3	0.7	1.3	24.7	1.3	1.3	2.4	0.0	0.0	0.5	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(95%),veh/ln	2.8	8.3	9.3	1.0	0.9	0.9	4.5	0.0	0.0	1.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.1	5.5	6.1	78.0	1.3	1.3	52.2	0.0	0.0	48.4	0.0	0.0
LnGrp LOS	E	A	A	E	A	A	D	A	A	D	A	A
Approach Vol, veh/h		2293			1383			89				32
Approach Delay, s/veh		7.0			2.1			52.2				48.4
Approach LOS		A			A			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.4	90.4		13.2	8.7	88.0		13.2				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	4.0	66.0		25.0	7.0	63.0		25.0				
Max Q Clear Time (g_c+l1), s	2.9	20.3		3.9	4.9	2.0		8.1				
Green Ext Time (p_c), s	0.0	27.6		0.1	0.0	13.5		0.3				
Intersection Summary												
HCM 6th Ctrl Delay				6.6								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary
 16: Fair Oaks/Wright & East Wash

2024 with BRT
 PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑		↖	↑↑			↕		↗	↑	↖
Traffic Volume (veh/h)	150	1950	47	154	1014	90	55	136	210	70	273	142
Future Volume (veh/h)	150	1950	47	154	1014	90	55	136	210	70	273	142
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	163	2120	51	167	1102	98	60	148	228	76	297	154
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	209	2797	67	211	1803	160	76	146	328	146	425	360
Arrive On Green	0.12	0.55	0.54	0.16	0.73	0.71	0.23	0.23	0.20	0.23	0.23	0.23
Sat Flow, veh/h	1781	5129	123	1781	3301	293	150	643	1442	1007	1870	1585
Grp Volume(v), veh/h	163	1406	765	167	593	607	208	0	228	76	297	154
Grp Sat Flow(s),veh/h/ln	1781	1702	1848	1781	1777	1818	793	0	1442	1007	1870	1585
Q Serve(g_s), s	9.8	35.2	35.4	9.9	18.1	18.2	9.0	0.0	16.2	8.3	16.0	9.1
Cycle Q Clear(g_c), s	9.8	35.2	35.4	9.9	18.1	18.2	25.0	0.0	16.2	24.4	16.0	9.1
Prop In Lane	1.00		0.07	1.00		0.16	0.29		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	209	1856	1008	211	970	993	222	0	328	146	425	360
V/C Ratio(X)	0.78	0.76	0.76	0.79	0.61	0.61	0.94	0.00	0.70	0.52	0.70	0.43
Avail Cap(c_a), veh/h	291	1856	1008	259	970	993	222	0	328	146	425	360
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.71	0.71	0.71	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.1	19.4	19.4	45.1	9.3	9.4	45.6	0.0	40.5	50.3	39.0	36.4
Incr Delay (d2), s/veh	8.6	2.9	5.4	9.3	2.0	2.0	42.7	0.0	6.3	3.2	5.0	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(95%),veh/ln	8.4	19.7	22.1	7.7	8.6	8.8	13.1	0.0	10.5	4.0	12.5	6.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.8	22.3	24.8	54.4	11.3	11.4	88.2	0.0	46.7	53.5	44.0	37.2
LnGrp LOS	E	C	C	D	B	B	F	A	D	D	D	D
Approach Vol, veh/h		2334			1367			436			527	
Approach Delay, s/veh		25.5			16.6			66.5			43.4	
Approach LOS		C			B			E			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	17.0	64.0		29.0	16.9	64.1		29.0				
Change Period (Y+Rc), s	5.0	5.0		7.0	5.0	5.0		7.0				
Max Green Setting (Gmax), s	15.0	56.0		22.0	17.0	54.0		22.0				
Max Q Clear Time (g_c+l1), s	11.9	37.4		26.4	11.8	20.2		27.0				
Green Ext Time (p_c), s	0.2	11.3		0.0	0.2	6.1		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				28.7								
HCM 6th LOS				C								

HCM 6th Signalized Intersection Summary
18: Mendota & East Wash

2024 with BRT
PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	2583	171	103	1406	21	182	5	90	47	7	29
Future Volume (veh/h)	29	2583	171	103	1406	21	182	5	90	47	7	29
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	32	2808	186	112	1528	23	198	5	98	51	8	32
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	359	3481	1081	181	3609	54	253	11	207	124	28	52
Arrive On Green	0.03	0.68	0.68	0.10	1.00	1.00	0.15	0.15	0.14	0.15	0.15	0.14
Sat Flow, veh/h	1781	5106	1585	1781	5182	78	1209	71	1383	449	190	347
Grp Volume(v), veh/h	32	2808	186	112	1004	547	198	0	103	91	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1856	1209	0	1453	985	0	0
Q Serve(g_s), s	0.5	38.9	4.2	1.8	0.0	0.0	4.3	0.0	6.5	4.2	0.0	0.0
Cycle Q Clear(g_c), s	0.5	38.9	4.2	1.8	0.0	0.0	15.0	0.0	6.5	10.7	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.04	1.00		0.95	0.56		0.35
Lane Grp Cap(c), veh/h	359	3481	1081	181	2371	1293	253	0	218	204	0	0
V/C Ratio(X)	0.09	0.81	0.17	0.62	0.42	0.42	0.78	0.00	0.47	0.45	0.00	0.00
Avail Cap(c_a), veh/h	388	3481	1081	220	2371	1293	253	0	218	204	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.09	0.84	0.84	0.84	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	4.1	11.2	5.7	22.7	0.0	0.0	43.4	0.0	39.6	41.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.2	0.0	3.0	0.5	0.9	14.5	0.0	1.6	1.5	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(95%),veh/ln	0.3	13.2	1.7	3.3	0.3	0.6	10.0	0.0	4.4	4.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.1	11.4	5.8	25.8	0.5	0.9	57.9	0.0	41.1	43.2	0.0	0.0
LnGrp LOS	A	B	A	C	A	A	E	A	D	D	A	A
Approach Vol, veh/h		3026			1663			301				91
Approach Delay, s/veh		11.0			2.3			52.2				43.2
Approach LOS		B			A			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.4	73.6		19.0	8.8	72.2		19.0				
Change Period (Y+Rc), s	5.0	5.0		5.5	5.0	5.0		5.5				
Max Green Setting (Gmax), s	4.0	67.0		13.5	6.0	65.0		13.5				
Max Q Clear Time (g_c+l1), s	2.5	2.0		12.7	3.8	40.9		17.0				
Green Ext Time (p_c), s	0.0	9.3		0.0	0.1	19.3		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				11.2								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary
 19: Lien & East Wash

2024 with BRT
 PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑		↖	↗			↕	
Traffic Volume (veh/h)	48	2447	416	76	1381	19	214	10	46	21	11	30
Future Volume (veh/h)	48	2447	416	76	1381	19	214	10	46	21	11	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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	52	2660	452	83	1501	21	233	11	50	23	12	33
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	355	3135	973	197	3214	45	385	65	294	142	83	167
Arrive On Green	0.08	1.00	1.00	0.09	1.00	1.00	0.22	0.22	0.20	0.22	0.22	0.20
Sat Flow, veh/h	1781	5106	1585	1781	5189	73	1361	294	1336	427	379	760
Grp Volume(v), veh/h	52	2660	452	83	985	537	233	0	61	68	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1857	1361	0	1630	1565	0	0
Q Serve(g_s), s	1.0	0.0	0.0	1.7	0.0	0.0	11.7	0.0	3.1	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.0	0.0	0.0	1.7	0.0	0.0	14.9	0.0	3.1	3.2	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.04	1.00		0.82	0.34		0.49
Lane Grp Cap(c), veh/h	355	3135	973	197	2109	1150	385	0	359	393	0	0
V/C Ratio(X)	0.15	0.85	0.46	0.42	0.47	0.47	0.61	0.00	0.17	0.17	0.00	0.00
Avail Cap(c_a), veh/h	371	3135	973	205	2109	1150	385	0	359	393	0	0
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)	0.46	0.46	0.46	0.84	0.84	0.84	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.9	0.0	0.0	7.6	0.0	0.0	35.9	0.0	32.3	32.1	0.0	0.0
Incr Delay (d2), s/veh	0.1	1.4	0.7	1.2	0.6	1.1	2.7	0.0	0.2	1.0	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(95%),veh/ln	0.6	0.8	0.4	1.0	0.3	0.7	9.2	0.0	2.2	2.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.0	1.4	0.7	8.8	0.6	1.1	38.6	0.0	32.5	33.0	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	C	C	A	A
Approach Vol, veh/h		3164			1605			294				68
Approach Delay, s/veh		1.4			1.2			37.3				33.0
Approach LOS		A			A			D				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.6	65.4		26.0	8.1	65.9		26.0				
Change Period (Y+Rc), s	5.0	5.0		6.0	5.0	5.0		6.0				
Max Green Setting (Gmax), s	4.0	60.0		20.0	4.0	60.0		20.0				
Max Q Clear Time (g_c+I1), s	3.7	2.0		16.9	3.0	2.0		5.2				
Green Ext Time (p_c), s	0.0	36.8		0.4	0.0	9.0		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			3.8									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary
 20: Thierer/Portage & East Wash

2024 with BRT
 PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑	↗	↖	↗		↖	↑	↗
Traffic Volume (veh/h)	150	2119	187	71	1152	35	211	59	71	54	92	53
Future Volume (veh/h)	150	2119	187	71	1152	35	211	59	71	54	92	53
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	163	2303	203	77	1252	38	229	64	77	59	100	58
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	216	2859	887	125	2599	807	327	193	232	298	468	396
Arrive On Green	0.24	1.00	1.00	0.05	0.34	0.34	0.25	0.25	0.22	0.25	0.25	0.25
Sat Flow, veh/h	1781	5106	1585	1781	5106	1585	1228	773	930	1248	1870	1585
Grp Volume(v), veh/h	163	2303	203	77	1252	38	229	0	141	59	100	58
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1585	1228	0	1703	1248	1870	1585
Q Serve(g_s), s	8.5	0.0	0.0	4.2	19.3	1.6	18.2	0.0	6.9	4.1	4.2	2.8
Cycle Q Clear(g_c), s	8.5	0.0	0.0	4.2	19.3	1.6	22.4	0.0	6.9	10.9	4.2	2.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.55	1.00		1.00
Lane Grp Cap(c), veh/h	216	2859	887	125	2599	807	327	0	426	298	468	396
V/C Ratio(X)	0.76	0.81	0.23	0.62	0.48	0.05	0.70	0.00	0.33	0.20	0.21	0.15
Avail Cap(c_a), veh/h	310	2859	887	143	2599	807	327	0	426	298	468	396
HCM Platoon Ratio	2.00	2.00	2.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.44	0.44	0.44	0.78	0.78	0.78	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.5	0.0	0.0	46.3	22.6	16.7	38.6	0.0	31.3	35.2	29.7	29.2
Incr Delay (d2), s/veh	2.8	1.1	0.3	4.9	0.5	0.1	6.5	0.0	0.5	0.3	0.2	0.2
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(95%),veh/ln	5.4	0.5	0.1	3.6	12.3	1.0	10.0	0.0	5.2	2.3	3.5	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.4	1.1	0.3	51.2	23.1	16.8	45.1	0.0	31.7	35.5	29.9	29.4
LnGrp LOS	D	A	A	D	C	B	D	A	C	D	C	C
Approach Vol, veh/h		2669			1367			370			217	
Approach Delay, s/veh		3.4			24.5			40.0			31.3	
Approach LOS		A			C			D			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.0	60.0		29.0	16.1	54.9		29.0				
Change Period (Y+Rc), s	5.5	5.5		6.5	5.5	5.5		6.5				
Max Green Setting (Gmax), s	6.5	53.5		22.5	15.9	44.1		22.5				
Max Q Clear Time (g_c+l1), s	6.2	2.0		12.9	10.5	21.3		24.4				
Green Ext Time (p_c), s	0.0	24.2		0.6	0.2	6.7		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				13.9								
HCM 6th LOS				B								

HCM Signalized Intersection Capacity Analysis

21: Eagan/Continental & East Wash

2024 with BRT
PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	117	1984	371	119	955	113	325	55	145	82	32	78
Future Volume (vph)	117	1984	371	119	955	113	325	55	145	82	32	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.86		0.97	0.91		0.95	0.95	1.00		1.00	
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85		0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.97	1.00		0.98	
Satd. Flow (prot)	1770	6257		3433	5004		1681	1709	1583		1724	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.97	1.00		0.98	
Satd. Flow (perm)	1770	6257		3433	5004		1681	1709	1583		1724	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	127	2157	403	129	1038	123	353	60	158	89	35	85
RTOR Reduction (vph)	0	33	0	0	14	0	0	0	134	0	25	0
Lane Group Flow (vph)	127	2527	0	129	1147	0	205	208	24	0	184	0
Turn Type	Prot	NA		Prot	NA		Split	NA	Perm		Split	NA
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases									4			
Actuated Green, G (s)	11.5	46.7		5.1	40.3		13.5	13.5	13.5		11.7	
Effective Green, g (s)	13.0	48.2		6.6	41.8		15.5	15.5	15.5		13.7	
Actuated g/C Ratio	0.13	0.48		0.07	0.42		0.16	0.16	0.16		0.14	
Clearance Time (s)	5.5	5.5		5.5	5.5		6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	230	3015		226	2091		260	264	245		236	
v/s Ratio Prot	c0.07	c0.40		0.04	0.23		c0.12	0.12			c0.11	
v/s Ratio Perm									0.02			
v/c Ratio	0.55	0.84		0.57	0.55		0.79	0.79	0.10		0.78	
Uniform Delay, d1	40.8	22.5		45.3	22.0		40.7	40.7	36.3		41.7	
Progression Factor	1.25	0.38		0.64	1.43		1.00	1.00	1.00		1.00	
Incremental Delay, d2	2.1	2.2		2.1	0.6		14.6	14.4	0.2		15.0	
Delay (s)	53.2	10.8		31.0	32.0		55.3	55.0	36.4		56.6	
Level of Service	D	B		C	C		E	E	D		E	
Approach Delay (s)		12.8			31.9			50.0			56.6	
Approach LOS		B			C			D			E	
Intersection Summary												
HCM 2000 Control Delay			24.4				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)				16.0		
Intersection Capacity Utilization			66.0%			ICU Level of Service				C		
Analysis Period (min)			15									

c Critical Lane Group

HCM 6th Signalized Intersection Summary
 22: Independence/Independence & East Wash

2024 with BRT
 PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑		↖	↑↑↑			↕				↕
Traffic Volume (veh/h)	296	1638	130	98	1166	47	200	60	30	80	30	215
Future Volume (veh/h)	296	1638	130	98	1166	47	200	60	30	80	30	215
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	312	1724	137	103	1227	49	211	63	32	84	32	226
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	343	1833	145	267	1699	68	281	71	34	154	72	354
Arrive On Green	0.26	0.51	0.51	0.30	0.67	0.67	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1781	4823	383	1781	5037	201	687	223	106	342	226	1105
Grp Volume(v), veh/h	312	1216	645	103	829	447	306	0	0	342	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1802	1781	1702	1834	1016	0	0	1672	0	0
Q Serve(g_s), s	17.0	33.6	33.8	4.6	15.5	15.5	12.6	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	17.0	33.6	33.8	4.6	15.5	15.5	30.0	0.0	0.0	17.4	0.0	0.0
Prop In Lane	1.00		0.21	1.00		0.11	0.69		0.10	0.25		0.66
Lane Grp Cap(c), veh/h	343	1294	685	267	1148	619	386	0	0	580	0	0
V/C Ratio(X)	0.91	0.94	0.94	0.39	0.72	0.72	0.79	0.00	0.00	0.59	0.00	0.00
Avail Cap(c_a), veh/h	392	1294	685	267	1148	619	386	0	0	580	0	0
HCM Platoon Ratio	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.48	0.48	0.48	0.80	0.80	0.80	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	36.3	23.7	23.7	31.4	13.3	13.3	34.9	0.0	0.0	29.0	0.0	0.0
Incr Delay (d2), s/veh	13.0	8.0	13.6	0.7	3.2	5.8	10.8	0.0	0.0	1.6	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(95%),veh/ln	11.0	16.2	18.3	3.3	6.9	7.9	13.0	0.0	0.0	11.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.3	31.7	37.3	32.1	16.5	19.1	45.7	0.0	0.0	30.6	0.0	0.0
LnGrp LOS	D	C	D	C	B	B	D	A	A	C	A	A
Approach Vol, veh/h		2173			1379			306				342
Approach Delay, s/veh		35.9			18.5			45.7				30.6
Approach LOS		D			B			D				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	20.0	43.0		37.0	24.3	38.7		37.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	15.0	38.0		32.0	22.0	31.0		32.0				
Max Q Clear Time (g_c+I1), s	6.6	35.8		19.4	19.0	17.5		32.0				
Green Ext Time (p_c), s	0.1	1.9		1.8	0.3	6.7		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				30.5								
HCM 6th LOS				C								

HCM 6th Signalized Intersection Summary
 23: Zeier & E Wash

2024 with BRT
 PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	124	1527	148	297	1158	66	112	56	358	117	35	37
Future Volume (veh/h)	124	1527	148	297	1158	66	112	56	358	117	35	37
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	131	1607	156	313	1219	69	118	59	377	123	37	39
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	249	2011	624	384	1838	571	605	327	277	151	71	75
Arrive On Green	0.28	0.79	0.79	0.07	0.24	0.24	0.06	0.06	0.06	0.09	0.09	0.09
Sat Flow, veh/h	1781	5106	1585	3456	5106	1585	3456	1870	1585	1781	834	879
Grp Volume(v), veh/h	131	1607	156	313	1219	69	118	59	377	123	0	76
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1728	1702	1585	1728	1870	1585	1781	0	1712
Q Serve(g_s), s	6.2	18.0	2.6	8.9	21.6	3.4	3.3	3.0	17.5	6.8	0.0	4.3
Cycle Q Clear(g_c), s	6.2	18.0	2.6	8.9	21.6	3.4	3.3	3.0	17.5	6.8	0.0	4.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.51
Lane Grp Cap(c), veh/h	249	2011	624	384	1838	571	605	327	277	151	0	146
V/C Ratio(X)	0.53	0.80	0.25	0.82	0.66	0.12	0.20	0.18	1.36	0.81	0.00	0.52
Avail Cap(c_a), veh/h	249	2011	624	432	1838	571	605	327	277	151	0	146
HCM Platoon Ratio	2.00	2.00	2.00	0.67	0.67	0.67	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	0.36	0.36	0.36	0.93	0.93	0.93	0.90	0.90	0.90	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.2	8.3	6.7	45.3	32.5	25.6	40.4	40.3	47.1	45.0	0.0	43.8
Incr Delay (d2), s/veh	0.7	1.3	0.3	9.8	1.8	0.4	0.1	0.2	181.3	27.4	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(95%),veh/ln	4.0	4.8	1.5	7.7	14.3	2.4	2.6	2.6	32.8	7.5	0.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.9	9.6	7.0	55.1	34.2	26.0	40.5	40.5	228.4	72.4	0.0	47.1
LnGrp LOS	C	A	A	E	C	C	D	D	F	E	A	D
Approach Vol, veh/h		1894			1601			554				199
Approach Delay, s/veh		11.1			38.0			168.4				62.7
Approach LOS		B			D			F				E
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	16.6	45.4		15.0	20.0	42.0		23.0				
Change Period (Y+Rc), s	5.5	6.0		6.5	6.0	6.0		5.5				
Max Green Setting (Gmax), s	12.5	38.0		8.5	14.0	36.0		17.5				
Max Q Clear Time (g_c+I1), s	10.9	20.0		8.8	8.2	23.6		19.5				
Green Ext Time (p_c), s	0.2	11.1		0.0	0.1	6.5		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				44.1								
HCM 6th LOS				D								

HCM 6th Signalized Intersection Summary
 24: E Springs & E Wash

2024 with BRT
 PM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↗	↙↘	↑↑↑	↙↘	↗
Traffic Volume (veh/h)	2109	115	319	1304	220	197
Future Volume (veh/h)	2109	115	319	1304	220	197
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	2220	0	336	1373	232	207
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2820		409	3706	516	236
Arrive On Green	1.00	0.00	0.12	0.73	0.15	0.15
Sat Flow, veh/h	5274	1585	3456	5274	3456	1585
Grp Volume(v), veh/h	2220	0	336	1373	232	207
Grp Sat Flow(s),veh/h/ln	1702	1585	1728	1702	1728	1585
Q Serve(g_s), s	0.0	0.0	9.5	10.1	6.1	12.8
Cycle Q Clear(g_c), s	0.0	0.0	9.5	10.1	6.1	12.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2820		409	3706	516	236
V/C Ratio(X)	0.79		0.82	0.37	0.45	0.88
Avail Cap(c_a), veh/h	2820		501	3706	536	246
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.57	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	43.0	5.1	38.8	41.6
Incr Delay (d2), s/veh	1.3	0.0	8.8	0.3	0.6	27.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.6	0.0	7.9	5.0	4.7	11.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	1.3	0.0	51.8	5.4	39.4	68.8
LnGrp LOS	A		D	A	D	E
Approach Vol, veh/h	2220	A		1709	439	
Approach Delay, s/veh	1.3			14.5	53.3	
Approach LOS	A			B	D	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	17.3	61.2		21.4		78.6
Change Period (Y+Rc), s	5.5	6.0		6.5		6.0
Max Green Setting (Gmax), s	14.5	52.0		15.5		72.0
Max Q Clear Time (g_c+l1), s	11.5	2.0		14.8		12.1
Green Ext Time (p_c), s	0.4	29.2		0.1		13.5

Intersection Summary

HCM 6th Ctrl Delay	11.7
HCM 6th LOS	B

Notes













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

HCM Signalized Intersection Capacity Analysis

2034 Base Conditions

1: Blair St. & East Washington Ave.

AM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑↑↑		↑↑	↑↑		↑		↑↑	↑	↑↑		
Traffic Volume (vph)	0	256	13	998	1899	0	75	0	459	207	94	21	
Future Volume (vph)	0	256	13	998	1899	0	75	0	459	207	94	21	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0		4.0	4.0		4.0		4.0	4.0	4.0		
Lane Util. Factor		0.91		0.97	0.95		1.00		0.88	0.91	0.91		
Frt		0.99		1.00	1.00		1.00		0.85	1.00	0.99		
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	0.98		
Satd. Flow (prot)		5048		3433	3539		1770		2787	1610	3265		
Flt Permitted		1.00		0.95	1.00		0.95		1.00	0.95	0.98		
Satd. Flow (perm)		5048		3433	3539		1770		2787	1610	3265		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	
Adj. Flow (vph)	0	294	15	1145	2179	0	86	0	527	238	108	24	
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	0	9	0	
Lane Group Flow (vph)	0	304	0	1145	2179	0	86	0	527	124	237	0	
Turn Type		NA		Prot	NA		Prot		pt+ov	Split	NA		
Protected Phases		1		2	1 2		3		2 3	4	4		
Permitted Phases							3		3 2				
Actuated Green, G (s)		26.5		51.2	82.2		8.4		64.1	14.9	14.9		
Effective Green, g (s)		27.0		51.7	82.7		8.4		64.6	16.9	16.9		
Actuated g/C Ratio		0.22		0.43	0.69		0.07		0.54	0.14	0.14		
Clearance Time (s)		4.5		4.5			4.0			6.0	6.0		
Vehicle Extension (s)		3.0		3.0			2.0			3.0	3.0		
Lane Grp Cap (vph)		1135		1479	2438		123		1500	226	459		
v/s Ratio Prot		0.06		0.33	c0.62		c0.05		0.19	c0.08	0.07		
v/s Ratio Perm													
v/c Ratio		0.27		0.77	0.89		0.70		0.35	0.55	0.52		
Uniform Delay, d1		38.4		29.2	15.1		54.6		15.8	48.0	47.8		
Progression Factor		1.00		0.47	0.17		1.00		1.00	1.00	1.00		
Incremental Delay, d2		0.1		1.9	2.3		13.1		0.1	2.7	1.0		
Delay (s)		38.5		15.6	4.9		67.7		15.8	50.7	48.8		
Level of Service		D		B	A		E		B	D	D		
Approach Delay (s)		38.5			8.6			23.1			49.4		
Approach LOS		D			A			C			D		
Intersection Summary													
HCM 2000 Control Delay			15.8									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.86										
Actuated Cycle Length (s)			120.0									Sum of lost time (s)	16.0
Intersection Capacity Utilization			78.5%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis

2: Livingston Ave & East Washington Ave.

2034 Base Conditions

AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑		↖	↑↑↑				↖			↖
Traffic Volume (vph)	73	824	25	139	2953	39	0	0	27	0	0	36
Future Volume (vph)	73	824	25	139	2953	39	0	0	27	0	0	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0				5.0			5.0
Lane Util. Factor	1.00	0.91		1.00	0.91				1.00			1.00
Frt	1.00	1.00		1.00	1.00				0.86			0.86
Flt Protected	0.95	1.00		0.95	1.00				1.00			1.00
Satd. Flow (prot)	1770	5063		1770	5075				1611			1611
Flt Permitted	0.04	1.00		0.28	1.00				1.00			1.00
Satd. Flow (perm)	81	5063		514	5075				1611			1611
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	84	945	29	159	3388	45	0	0	31	0	0	41
RTOR Reduction (vph)	0	2	0	0	1	0	0	0	26	0	0	15
Lane Group Flow (vph)	84	972	0	159	3432	0	0	0	5	0	0	26
Turn Type	D.P+P	NA		D.Pm	NA				Prot			Over
Protected Phases	4	2			6				8			4
Permitted Phases	6			2								
Actuated Green, G (s)	110.0	92.0		92.0	92.0				18.0			18.0
Effective Green, g (s)	110.0	92.0		92.0	92.0				18.0			18.0
Actuated g/C Ratio	0.92	0.77		0.77	0.77				0.15			0.15
Clearance Time (s)	5.0	5.0		5.0	5.0				5.0			5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0				3.0			3.0
Lane Grp Cap (vph)	327	3881		394	3890				241			241
v/s Ratio Prot	c0.04	0.19			c0.68				0.00			0.02
v/s Ratio Perm	0.20			0.31								
v/c Ratio	0.26	0.25		0.40	0.88				0.02			0.11
Uniform Delay, d1	24.1	4.0		4.7	10.1				43.5			44.1
Progression Factor	0.79	1.55		0.06	0.51				1.00			1.00
Incremental Delay, d2	0.4	0.2		0.3	0.3				0.0			0.2
Delay (s)	19.6	6.4		0.6	5.4				43.5			44.3
Level of Service	B	A		A	A				D			D
Approach Delay (s)		7.5			5.2			43.5			44.3	
Approach LOS		A			A			D			D	

Intersection Summary		
HCM 2000 Control Delay	6.3	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.78	A
Actuated Cycle Length (s)	120.0	Sum of lost time (s)
Intersection Capacity Utilization	75.9%	10.0
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		D

HCM 6th Signalized Intersection Summary
 3: Paterson St. & East Washington Ave.

2034 Base Conditions
 AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑	↗		↕		↖	↑	↗
Traffic Volume (veh/h)	25	927	15	50	2938	49	26	26	22	55	39	36
Future Volume (veh/h)	25	927	15	50	2938	49	26	26	22	55	39	36
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	29	1064	17	57	3371	56	30	30	25	63	45	41
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	103	4287	1331	498	4287	1331	72	49	33	164	144	122
Arrive On Green	1.00	1.00	1.00	1.00	1.00	1.00	0.09	0.08	0.08	0.09	0.08	0.08
Sat Flow, veh/h	51	5106	1585	522	5106	1585	402	636	433	1349	1870	1585
Grp Volume(v), veh/h	29	1064	17	57	3371	56	85	0	0	63	45	41
Grp Sat Flow(s),veh/h/ln	51	1702	1585	522	1702	1585	1471	0	0	1349	1870	1585
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	4.2	0.0	0.0	0.0	2.7	2.9
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	6.9	0.0	0.0	6.3	2.7	2.9
Prop In Lane	1.00		1.00	1.00		1.00	0.35		0.29	1.00		1.00
Lane Grp Cap(c), veh/h	103	4287	1331	498	4287	1331	166	0	0	164	144	122
V/C Ratio(X)	0.28	0.25	0.01	0.11	0.79	0.04	0.51	0.00	0.00	0.38	0.31	0.34
Avail Cap(c_a), veh/h	103	4287	1331	498	4287	1331	532	0	0	482	584	495
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)	0.98	0.98	0.98	0.09	0.09	0.09	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	54.2	0.0	0.0	53.1	52.4	52.5
Incr Delay (d2), s/veh	6.6	0.1	0.0	0.0	0.1	0.0	2.4	0.0	0.0	1.5	1.2	1.6
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	0.1	0.0	0.0	0.1	0.0	2.6	0.0	0.0	1.9	1.3	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.6	0.1	0.0	0.0	0.1	0.0	56.6	0.0	0.0	54.5	53.6	54.1
LnGrp LOS	A	A	A	A	A	A	E	A	A	D	D	D
Approach Vol, veh/h		1110			3484			85			149	
Approach Delay, s/veh		0.3			0.1			56.6			54.1	
Approach LOS		A			A			E			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		105.8		14.2		105.8		14.2				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		72.5		37.5		72.5		37.5				
Max Q Clear Time (g_c+I1), s		2.0		8.3		2.0		8.9				
Green Ext Time (p_c), s		9.5		0.6		56.7		0.3				
Intersection Summary												
HCM 6th Ctrl Delay				2.8								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary
 4: Ingersoll St. & East Washington Ave.

2034 Base Conditions

AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑	↗		↑	↗		↘	
Traffic Volume (veh/h)	32	919	18	50	3099	51	43	31	18	20	16	35
Future Volume (veh/h)	32	919	18	50	3099	51	43	31	18	20	16	35
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	37	1054	21	57	3556	59	49	36	21	23	18	40
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	91	3773	1171	498	4152	1289	115	66	151	59	37	57
Arrive On Green	1.00	1.00	1.00	0.06	1.00	1.00	0.12	0.10	0.10	0.12	0.10	0.10
Sat Flow, veh/h	42	5106	1585	1781	5106	1585	714	694	1585	219	391	596
Grp Volume(v), veh/h	37	1054	21	57	3556	59	85	0	21	81	0	0
Grp Sat Flow(s),veh/h/ln	42	1702	1585	1781	1702	1585	1409	0	1585	1206	0	0
Q Serve(g_s), s	88.7	0.0	0.0	0.9	0.0	0.0	0.0	0.0	1.5	2.1	0.0	0.0
Cycle Q Clear(g_c), s	88.7	0.0	0.0	0.9	0.0	0.0	7.0	0.0	1.5	9.2	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.58		1.00	0.28		0.49
Lane Grp Cap(c), veh/h	91	3773	1171	498	4152	1289	211	0	151	178	0	0
V/C Ratio(X)	0.41	0.28	0.02	0.11	0.86	0.05	0.40	0.00	0.14	0.45	0.00	0.00
Avail Cap(c_a), veh/h	91	3773	1171	509	4152	1289	536	0	489	511	0	0
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)	0.95	0.95	0.95	0.09	0.09	0.09	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.9	0.0	0.0	2.8	0.0	0.0	51.4	0.0	49.8	52.4	0.0	0.0
Incr Delay (d2), s/veh	12.2	0.2	0.0	0.0	0.2	0.0	1.2	0.0	0.4	1.8	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	0.5	0.1	0.0	0.2	0.1	0.0	2.5	0.0	0.6	2.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.2	0.2	0.0	2.8	0.2	0.0	52.6	0.0	50.2	54.2	0.0	0.0
LnGrp LOS	B	A	A	A	A	A	D	A	D	D	A	A
Approach Vol, veh/h		1112			3672			106				81
Approach Delay, s/veh		0.8			0.3			52.1				54.2
Approach LOS		A			A			D				D
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	8.9	93.2		17.9		102.1		17.9				
Change Period (Y+Rc), s	5.5	4.5		6.5		4.5		6.5				
Max Green Setting (Gmax), s	4.1	62.4		37.0		72.0		37.0				
Max Q Clear Time (g_c+l1), s	2.9	90.7		11.2		2.0		9.0				
Green Ext Time (p_c), s	0.0	0.0		0.3		59.0		0.4				
Intersection Summary												
HCM 6th Ctrl Delay				2.4								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary
 5: Baldwin St. & East Washington Ave.

2034 Base Conditions

AM Peak


































Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↑↑↑	↷	↶	↑↑↑	↷		↑	↷		↑	↷
Traffic Volume (veh/h)	45	902	24	44	3016	88	40	71	25	53	70	182
Future Volume (veh/h)	45	902	24	44	3016	88	40	71	25	53	70	182
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	52	1035	28	50	3460	101	46	81	29	61	80	209
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	61	2755	855	395	3106	964	41	53	489	43	40	489
Arrive On Green	1.00	1.00	1.00	0.05	1.00	1.00	0.32	0.31	0.31	0.32	0.31	0.31
Sat Flow, veh/h	45	5106	1585	1781	5106	1585	0	173	1585	0	129	1585
Grp Volume(v), veh/h	52	1035	28	50	3460	101	127	0	29	141	0	209
Grp Sat Flow(s),veh/h/ln	45	1702	1585	1781	1702	1585	173	0	1585	129	0	1585
Q Serve(g_s), s	2.1	0.0	0.0	1.4	73.0	0.0	0.0	0.0	1.5	0.0	0.0	12.6
Cycle Q Clear(g_c), s	64.8	0.0	0.0	1.4	73.0	0.0	38.0	0.0	1.5	38.0	0.0	12.6
Prop In Lane	1.00		1.00	1.00		1.00	0.36		1.00	0.43		1.00
Lane Grp Cap(c), veh/h	61	2755	855	395	3106	964	96	0	489	84	0	489
V/C Ratio(X)	0.86	0.38	0.03	0.13	1.11	0.10	1.33	0.00	0.06	1.68	0.00	0.43
Avail Cap(c_a), veh/h	61	2755	855	406	3106	964	96	0	489	84	0	489
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)	0.93	0.93	0.93	0.09	0.09	0.09	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	32.4	0.0	0.0	10.4	0.0	0.0	39.9	0.0	29.2	42.7	0.0	33.1
Incr Delay (d2), s/veh	75.5	0.4	0.1	0.0	51.8	0.0	202.3	0.0	0.1	352.7	0.0	0.6
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	2.7	0.1	0.0	0.5	14.9	0.0	8.3	0.0	0.6	10.8	0.0	5.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	107.9	0.4	0.1	10.5	51.8	0.0	242.2	0.0	29.3	395.4	0.0	33.7
LnGrp LOS	F	A	A	B	F	A	F	A	C	F	A	C
Approach Vol, veh/h		1115			3611			156				350
Approach Delay, s/veh		5.4			49.7			202.6				179.4
Approach LOS		A			D			F				F
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	8.2	69.8		42.0		78.0		42.0				
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s	4.0	64.0		37.0		73.0		37.0				
Max Q Clear Time (g_c+l1), s	3.4	66.8		40.0		75.0		40.0				
Green Ext Time (p_c), s	0.0	0.0		0.0		0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				53.5								
HCM 6th LOS				D								

HCM Signalized Intersection Capacity Analysis

2034 Base Conditions

6: First & E Wash

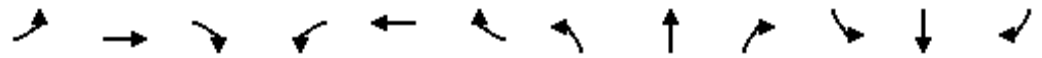
AM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	 	  			  						 	 	
Traffic Volume (vph)	172	777	42	54	2636	111	249	163	117	72	145	392	
Future Volume (vph)	172	777	42	54	2636	111	249	163	117	72	145	392	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.5	6.5	6.5	
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.88	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	2787	
Flt Permitted	0.95	1.00	1.00	0.27	1.00	1.00	0.37	1.00	1.00	0.64	1.00	1.00	
Satd. Flow (perm)	3433	5085	1583	505	5085	1583	687	1863	1583	1185	1863	2787	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	
Adj. Flow (vph)	204	921	50	64	3123	132	295	193	139	85	172	464	
RTOR Reduction (vph)	0	0	23	0	0	55	0	0	105	0	0	50	
Lane Group Flow (vph)	204	921	28	64	3123	77	295	193	34	85	172	414	
Turn Type	Prot	NA	custom	D.P+P	NA	Perm	D.P+P	NA	Perm	Perm	NA	custom	
Protected Phases	1	6		5	2		3	3 4				4	
Permitted Phases			2	6		2	4		3 4	4		4 1	
Actuated Green, G (s)	7.5	70.8	66.0	74.0	66.0	66.0	24.5	29.5	29.5	11.5	11.5	25.5	
Effective Green, g (s)	7.5	70.8	66.0	74.0	66.0	66.0	24.5	29.5	29.5	11.5	11.5	25.5	
Actuated g/C Ratio	0.06	0.59	0.55	0.62	0.55	0.55	0.20	0.25	0.25	0.10	0.10	0.21	
Clearance Time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0			6.5	6.5		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0		
Lane Grp Cap (vph)	214	3000	870	345	2796	870	257	457	389	113	178	592	
v/s Ratio Prot	0.06	c0.18		0.00	c0.61		c0.12	0.10			0.09		
v/s Ratio Perm			0.02	0.11		0.05	c0.11		0.02	0.07		c0.15	
v/c Ratio	0.95	0.31	0.03	0.19	1.12	0.09	1.15	0.42	0.09	0.75	0.97	0.70	
Uniform Delay, d1	56.1	12.3	12.4	9.3	27.0	12.8	45.7	38.1	34.9	52.9	54.1	43.7	
Progression Factor	0.78	0.61	1.00	0.09	0.16	0.04	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	46.8	0.3	0.1	0.0	53.2	0.0	102.0	0.6	0.1	24.2	57.0	3.6	
Delay (s)	90.4	7.8	12.4	0.9	57.5	0.5	147.7	38.7	35.0	77.1	111.1	47.3	
Level of Service	F	A	B	A	E	A	F	D	C	E	F	D	
Approach Delay (s)		22.4			54.1			89.2			66.0		
Approach LOS		C			D			F			E		
Intersection Summary													
HCM 2000 Control Delay			53.0									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.10										
Actuated Cycle Length (s)			120.0									Sum of lost time (s)	22.0
Intersection Capacity Utilization			102.6%									ICU Level of Service	G
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary
7: Fourth & E Wash

2034 Base Conditions

AM Peak



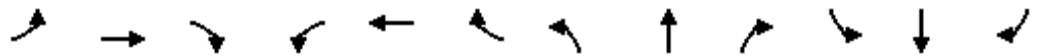
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	840	8	22	2729	73	23	58	20	50	31	51
Future Volume (veh/h)	28	840	8	22	2729	73	23	58	20	50	31	51
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		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	33	995	9	26	3233	86	27	69	24	59	37	60
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	60	3043	944	301	3043	944	39	80	489	49	20	489
Arrive On Green	0.20	0.20	0.20	0.60	0.60	0.60	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	57	5106	1585	561	5106	1585	0	258	1585	1	64	1585
Grp Volume(v), veh/h	33	995	9	26	3233	86	96	0	24	96	0	60
Grp Sat Flow(s),veh/h/ln	57	1702	1585	561	1702	1585	259	0	1585	64	0	1585
Q Serve(g_s), s	0.0	20.1	0.5	3.3	71.5	2.8	0.0	0.0	1.3	0.0	0.0	3.3
Cycle Q Clear(g_c), s	71.5	20.1	0.5	23.4	71.5	2.8	37.0	0.0	1.3	37.0	0.0	3.3
Prop In Lane	1.00		1.00	1.00		1.00	0.28		1.00	0.61		1.00
Lane Grp Cap(c), veh/h	60	3043	944	301	3043	944	118	0	489	68	0	489
V/C Ratio(X)	0.55	0.33	0.01	0.09	1.06	0.09	0.81	0.00	0.05	1.41	0.00	0.12
Avail Cap(c_a), veh/h	60	3043	944	301	3043	944	118	0	489	68	0	489
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)	0.95	0.95	0.95	0.54	0.54	0.54	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	84.0	27.5	19.7	20.5	24.2	10.4	34.5	0.0	29.1	49.6	0.0	29.8
Incr Delay (d2), s/veh	30.3	0.3	0.0	0.3	32.8	0.1	33.3	0.0	0.0	249.9	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	1.6	9.2	0.2	0.5	35.2	1.0	3.2	0.0	0.5	6.8	0.0	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	114.3	27.8	19.7	20.8	57.1	10.5	67.8	0.0	29.2	299.4	0.0	29.9
LnGrp LOS	F	C	B	C	F	B	E	A	C	F	A	C
Approach Vol, veh/h		1037			3345			120				156
Approach Delay, s/veh		30.5			55.6			60.1				195.8
Approach LOS		C			E			E				F
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		76.5		43.5		76.5		43.5				
Change Period (Y+Rc), s		5.0		6.5		5.0		6.5				
Max Green Setting (Gmax), s		71.5		37.0		71.5		37.0				
Max Q Clear Time (g_c+I1), s		73.5		39.0		73.5		39.0				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				54.8								
HCM 6th LOS				D								

HCM 6th Signalized Intersection Summary

2034 Base Conditions

8: Sixth & E Wash

AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	855	7	71	2771	19	18	10	14	30	25	30
Future Volume (veh/h)	12	855	7	71	2771	19	18	10	14	30	25	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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	14	1013	8	84	3283	23	21	12	17	36	30	36
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	112	3555	1104	495	4041	1255	200	69	98	91	60	56
Arrive On Green	0.70	0.70	0.70	0.06	1.00	1.00	0.10	0.10	0.10	0.10	0.10	0.10
Sat Flow, veh/h	58	5106	1585	1781	5106	1585	1335	700	992	433	611	570
Grp Volume(v), veh/h	14	1013	8	84	3283	23	21	0	29	102	0	0
Grp Sat Flow(s),veh/h/ln	58	1702	1585	1781	1702	1585	1335	0	1692	1614	0	0
Q Serve(g_s), s	9.7	7.5	0.2	1.2	0.0	0.0	0.0	0.0	1.6	3.8	0.0	0.0
Cycle Q Clear(g_c), s	9.7	7.5	0.2	1.2	0.0	0.0	1.5	0.0	1.6	6.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.59	0.35		0.35
Lane Grp Cap(c), veh/h	112	3555	1104	495	4041	1255	200	0	167	208	0	0
V/C Ratio(X)	0.12	0.28	0.01	0.17	0.81	0.02	0.10	0.00	0.17	0.49	0.00	0.00
Avail Cap(c_a), veh/h	112	3555	1104	522	4041	1255	216	0	186	226	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.96	0.96	0.09	0.09	0.09	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.1	5.8	4.6	3.5	0.0	0.0	41.3	0.0	41.3	43.3	0.0	0.0
Incr Delay (d2), s/veh	2.2	0.2	0.0	0.0	0.2	0.0	0.2	0.0	0.5	1.8	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	2.3	0.0	0.3	0.1	0.0	0.5	0.0	0.7	2.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.3	5.9	4.6	3.5	0.2	0.0	41.5	0.0	41.8	45.0	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	D	D	A	A
Approach Vol, veh/h		1035			3390			50			102	
Approach Delay, s/veh		6.0			0.3			41.7			45.0	
Approach LOS		A			A			D			D	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	9.5	74.6		15.9		84.1		15.9				
Change Period (Y+Rc), s	5.0	5.0		6.0		5.0		6.0				
Max Green Setting (Gmax), s	6.0	67.0		11.0		78.0		11.0				
Max Q Clear Time (g_c+l1), s	3.2	11.7		8.0		2.0		3.6				
Green Ext Time (p_c), s	0.0	7.2		0.1		55.6		0.1				

Intersection Summary

HCM 6th Ctrl Delay	3.0
HCM 6th LOS	A

Notes























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

HCM Signalized Intersection Capacity Analysis

2034 Base Conditions

9: Milwaukee/North & E Wash

AM Peak






















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	727	126	52	2480	7	342	70	17	47	83	95
Future Volume (vph)	27	727	126	52	2480	7	342	70	17	47	83	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	6.5	6.5		5.0	5.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.97	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1808		1770	1713	
Flt Permitted	0.10	1.00	1.00	0.26	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	189	5085	1583	490	5085	1583	3433	1808		1770	1713	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	32	861	149	62	2938	8	405	83	20	56	98	113
RTOR Reduction (vph)	0	0	68	0	0	8	0	9	0	0	42	0
Lane Group Flow (vph)	32	861	81	62	2938	0	405	94	0	56	169	0
Turn Type	D.P+P	NA	custom	D.P+P	NA	custom	Split	NA		Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases	6		1 2	2		1						
Actuated Green, G (s)	49.9	43.9	54.4	49.9	39.5	6.0	16.3	16.3		13.3	13.3	
Effective Green, g (s)	49.9	43.9	54.4	49.9	39.5	6.0	16.3	16.3		13.3	13.3	
Actuated g/C Ratio	0.50	0.44	0.54	0.50	0.40	0.06	0.16	0.16		0.13	0.13	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	6.5	6.5		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	258	2232	861	321	2008	94	559	294		235	227	
v/s Ratio Prot	0.01	c0.17		c0.01	c0.58		c0.12	0.05		0.03	c0.10	
v/s Ratio Perm	0.05		0.05	0.08		0.00						
v/c Ratio	0.12	0.39	0.09	0.19	1.46	0.01	0.72	0.32		0.24	0.74	
Uniform Delay, d1	19.2	18.9	11.0	13.3	30.2	44.2	39.7	36.9		38.8	41.7	
Progression Factor	0.85	0.98	2.86	0.96	0.71	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.5	0.0	0.2	210.3	0.0	4.6	0.6		0.5	12.3	
Delay (s)	17.3	19.0	31.4	12.9	231.6	44.2	44.4	37.6		39.3	54.0	
Level of Service	B	B	C	B	F	D	D	D		D	D	
Approach Delay (s)		20.8			226.6			43.0			50.9	
Approach LOS		C			F			D			D	
Intersection Summary												
HCM 2000 Control Delay			153.1									F
HCM 2000 Volume to Capacity ratio			1.02									
Actuated Cycle Length (s)			100.0						20.5			
Intersection Capacity Utilization			87.3%									E
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2034 Base Conditions

10: Johnson & E Wash

AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	730	4	38	2407	173	15	7	7	135	12	11
Future Volume (vph)	7	730	4	38	2407	173	15	7	7	135	12	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		5.0		6.0	6.0	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00		1.00		0.95	0.95	
Frt	1.00	1.00		1.00	1.00	0.85		0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97		0.95	0.97	
Satd. Flow (prot)	1770	5081		1770	5085	1583		1757		1681	1673	
Flt Permitted	0.06	1.00		0.31	1.00	1.00		0.97		0.73	0.77	
Satd. Flow (perm)	106	5081		568	5085	1583		1757		1301	1330	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	8	865	5	45	2852	205	18	8	8	160	14	13
RTOR Reduction (vph)	0	1	0	0	0	31	0	8	0	0	6	0
Lane Group Flow (vph)	8	869	0	45	2852	174	0	26	0	94	87	0
Turn Type	Perm	NA		Perm	NA	Perm	Split	NA		Perm	NA	
Protected Phases		2			2		3	3				4
Permitted Phases	2			2		2				4		
Actuated Green, G (s)	70.0	70.0		70.0	70.0	70.0		3.0		11.5	11.5	
Effective Green, g (s)	70.0	70.0		70.0	70.0	70.0		3.0		11.5	11.5	
Actuated g/C Ratio	0.70	0.70		0.70	0.70	0.70		0.03		0.12	0.12	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		5.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	74	3556		397	3559	1108		52		149	152	
v/s Ratio Prot		0.17			c0.56			c0.01				
v/s Ratio Perm	0.08			0.08		0.11				c0.07	0.07	
v/c Ratio	0.11	0.24		0.11	0.80	0.16		0.50		0.63	0.57	
Uniform Delay, d1	4.9	5.4		4.9	10.2	5.1		47.8		42.2	41.9	
Progression Factor	2.19	1.61		0.50	0.27	0.29		1.00		1.00	1.00	
Incremental Delay, d2	2.8	0.2		0.4	1.2	0.2		7.5		8.4	5.1	
Delay (s)	13.4	8.9		2.8	4.0	1.6		55.3		50.6	47.0	
Level of Service	B	A		A	A	A		E		D	D	
Approach Delay (s)		8.9			3.8			55.3			48.8	
Approach LOS		A			A			E			D	
Intersection Summary												
HCM 2000 Control Delay			7.3									A
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			100.0								15.5	
Intersection Capacity Utilization			67.0%									C
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 11: Marquette & E Wash

2034 Base Conditions
 AM Peak



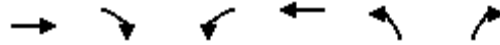
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↑	↑	↑↑↑	↑	↑
Traffic Volume (vph)	797	32	80	2568	78	49
Future Volume (vph)	797	32	80	2568	78	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.0	4.5	6.5	
Lane Util. Factor	0.91	1.00	1.00	0.91	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (prot)	5085	1583	1770	5085	1713	
Flt Permitted	1.00	1.00	0.27	1.00	0.97	
Satd. Flow (perm)	5085	1583	506	5085	1713	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	944	38	95	3043	92	58
RTOR Reduction (vph)	0	14	0	0	25	0
Lane Group Flow (vph)	944	24	95	3043	126	0
Turn Type	NA	Perm	D.P+P	NA	Prot	
Protected Phases	2		3	2 3	4	
Permitted Phases		2	2			
Actuated Green, G (s)	63.5	63.5	72.5	77.0	12.5	
Effective Green, g (s)	63.5	63.5	72.5	77.0	12.5	
Actuated g/C Ratio	0.64	0.64	0.72	0.77	0.12	
Clearance Time (s)	4.5	4.5	4.0		6.5	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	3228	1005	480	3915	214	
v/s Ratio Prot	0.19		0.02	c0.60	c0.07	
v/s Ratio Perm		0.02	0.13			
v/c Ratio	0.29	0.02	0.20	0.78	0.59	
Uniform Delay, d1	8.2	6.8	6.1	6.6	41.3	
Progression Factor	0.55	0.70	0.42	0.57	1.00	
Incremental Delay, d2	0.2	0.0	0.1	0.7	4.1	
Delay (s)	4.7	4.8	2.7	4.5	45.4	
Level of Service	A	A	A	A	D	
Approach Delay (s)	4.7			4.4	45.4	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	5.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
12: EB Ramps & E Wash

2034 Base Conditions

AM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↑↑	↑	↑↑↑	↑↑	↑↑
Traffic Volume (vph)	744	268	71	2656	97	260
Future Volume (vph)	744	268	71	2656	97	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.91	0.88	1.00	0.91	0.97	0.88
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)	5085	2787	1770	5085	3433	2787
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	2787	1770	5085	3433	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	854	307	81	3047	111	298
RTOR Reduction (vph)	0	59	0	0	0	87
Lane Group Flow (vph)	854	248	81	3047	111	211
Turn Type	NA	custom	Prot	NA	Prot	custom
Protected Phases	5	5 2	3	1 8	7	7 8 3
Permitted Phases		2				8
Actuated Green, G (s)	46.7	80.7	9.3	81.1	8.9	43.3
Effective Green, g (s)	46.7	80.7	9.3	81.1	8.9	43.3
Actuated g/C Ratio	0.47	0.81	0.09	0.81	0.09	0.43
Clearance Time (s)	5.0		5.0		5.0	
Vehicle Extension (s)	3.0		3.0		3.0	
Lane Grp Cap (vph)	2374	2249	164	4123	305	1206
v/s Ratio Prot	0.17	0.09	0.05	c0.60	c0.03	0.08
v/s Ratio Perm						
v/c Ratio	0.36	0.11	0.49	0.74	0.36	0.17
Uniform Delay, d1	17.1	2.0	43.1	4.5	42.9	17.4
Progression Factor	0.47	0.00	0.98	0.96	1.00	1.00
Incremental Delay, d2	0.4	0.1	1.5	0.5	0.7	0.1
Delay (s)	8.5	0.1	43.8	4.7	43.6	17.5
Level of Service	A	A	D	A	D	B
Approach Delay (s)	6.3			5.8	24.6	
Approach LOS	A			A	C	
Intersection Summary						
HCM 2000 Control Delay			7.5		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.79			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	20.0
Intersection Capacity Utilization			67.6%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
 13: East Wash & WB Ramps

2034 Base Conditions
 AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	72	925	1770	231	63	807
Future Volume (vph)	72	925	1770	231	63	807
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.91	0.91	1.00	0.97	0.88
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	3433	2787
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	5085	5085	1583	3433	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	83	1061	2031	265	72	926
RTOR Reduction (vph)	0	0	0	64	0	9
Lane Group Flow (vph)	83	1061	2031	201	72	917
Turn Type	Prot	NA	NA	custom	Prot	pt+ov
Protected Phases	1	6	2		8	8 1
Permitted Phases				6		
Actuated Green, G (s)	14.0	76.0	57.0	76.0	14.0	33.0
Effective Green, g (s)	14.0	76.0	57.0	76.0	14.0	33.0
Actuated g/C Ratio	0.14	0.76	0.57	0.76	0.14	0.33
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	247	3864	2898	1203	480	919
v/s Ratio Prot	0.05	0.21	c0.40		0.02	c0.33
v/s Ratio Perm				0.13		
v/c Ratio	0.34	0.27	0.70	0.17	0.15	1.00
Uniform Delay, d1	38.8	3.6	15.4	3.3	37.8	33.5
Progression Factor	0.87	3.22	0.20	0.00	1.00	1.00
Incremental Delay, d2	0.8	0.2	1.0	0.2	0.1	28.8
Delay (s)	34.7	11.9	4.1	0.2	37.9	62.3
Level of Service	C	B	A	A	D	E
Approach Delay (s)		13.5	3.7		60.5	
Approach LOS		B	A		E	
Intersection Summary						
HCM 2000 Control Delay			19.0		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.86			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	15.0
Intersection Capacity Utilization			76.4%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Signalized Intersection Summary
 16: Fair Oaks/Wright & East Wash

2034 Base Conditions
 AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑		↖	↑↑↑			↑↑		↖	↑	↖
Traffic Volume (veh/h)	165	668	23	115	1758	85	45	366	119	30	54	78
Future Volume (veh/h)	165	668	23	115	1758	85	45	366	119	30	54	78
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	195	791	27	136	2083	101	53	434	141	36	64	92
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	238	2921	99	185	2728	132	87	468	150	85	374	317
Arrive On Green	0.27	1.00	1.00	0.10	0.55	0.54	0.20	0.20	0.17	0.20	0.20	0.20
Sat Flow, veh/h	1781	5071	173	1781	4990	241	229	2338	752	838	1870	1585
Grp Volume(v), veh/h	195	530	288	136	1418	766	334	0	294	36	64	92
Grp Sat Flow(s),veh/h/ln	1781	1702	1839	1781	1702	1827	1751	0	1567	838	1870	1585
Q Serve(g_s), s	10.3	0.0	0.0	7.4	32.4	32.7	15.5	0.0	18.5	1.5	2.8	4.9
Cycle Q Clear(g_c), s	10.3	0.0	0.0	7.4	32.4	32.7	18.8	0.0	18.5	20.0	2.8	4.9
Prop In Lane	1.00		0.09	1.00		0.13	0.16		0.48	1.00		1.00
Lane Grp Cap(c), veh/h	238	1961	1059	185	1861	999	392	0	313	85	374	317
V/C Ratio(X)	0.82	0.27	0.27	0.73	0.76	0.77	0.85	0.00	0.94	0.43	0.17	0.29
Avail Cap(c_a), veh/h	267	1961	1059	303	1861	999	392	0	313	85	374	317
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)	1.00	1.00	1.00	0.41	0.41	0.41	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.5	0.0	0.0	43.5	17.6	17.8	39.4	0.0	40.1	49.7	33.1	34.0
Incr Delay (d2), s/veh	16.6	0.3	0.6	2.3	1.3	2.4	16.3	0.0	34.9	3.4	0.2	0.5
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	4.9	0.1	0.2	3.3	11.9	13.2	9.7	0.0	10.1	1.0	1.3	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.1	0.3	0.6	45.8	18.9	20.1	55.8	0.0	75.0	53.1	33.3	34.5
LnGrp LOS	D	A	A	D	B	C	E	A	E	D	C	C
Approach Vol, veh/h		1013			2320			628			192	
Approach Delay, s/veh		10.4			20.9			64.8			37.6	
Approach LOS		B			C			E			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	14.4	61.6		24.0	17.3	58.7		24.0				
Change Period (Y+Rc), s	5.0	5.0		7.0	5.0	5.0		7.0				
Max Green Setting (Gmax), s	16.0	50.0		17.0	14.0	52.0		17.0				
Max Q Clear Time (g_c+l1), s	9.4	2.0		22.0	12.3	34.7		20.8				
Green Ext Time (p_c), s	0.2	3.9		0.0	0.1	10.8		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				25.7								
HCM 6th LOS				C								

HCM 6th Signalized Intersection Summary
18: Mendota & East Wash

2034 Base Conditions
AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷↷↷	↷	↶	↷↷↷			↷↷			↷	
Traffic Volume (veh/h)	7	965	69	39	2041	11	137	4	35	15	5	18
Future Volume (veh/h)	7	965	69	39	2041	11	137	4	35	15	5	18
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	8	1143	82	46	2418	13	162	5	41	18	6	21
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	209	3456	1073	420	3664	20	294	24	194	126	53	108
Arrive On Green	0.02	0.68	0.68	0.08	1.00	1.00	0.15	0.15	0.13	0.15	0.15	0.13
Sat Flow, veh/h	1781	5106	1585	1781	5241	28	1445	159	1307	475	358	728
Grp Volume(v), veh/h	8	1143	82	46	1570	861	162	0	46	45	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1865	1445	0	1467	1561	0	0
Q Serve(g_s), s	0.1	8.4	1.6	0.7	0.0	0.0	7.4	0.0	2.5	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	8.4	1.6	0.7	0.0	0.0	9.5	0.0	2.5	2.1	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.89	0.40		0.47
Lane Grp Cap(c), veh/h	209	3456	1073	420	2380	1304	294	0	218	288	0	0
V/C Ratio(X)	0.04	0.33	0.08	0.11	0.66	0.66	0.55	0.00	0.21	0.16	0.00	0.00
Avail Cap(c_a), veh/h	274	3456	1073	445	2380	1304	381	0	310	383	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.89	0.89	0.89	0.58	0.58	0.58	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	4.2	6.1	5.0	3.9	0.0	0.0	36.5	0.0	34.3	33.8	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.2	0.1	0.1	0.8	1.5	1.6	0.0	0.5	0.3	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	0.0	2.4	0.4	0.2	0.3	0.6	3.5	0.0	0.9	0.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.2	6.3	5.1	4.0	0.8	1.5	38.1	0.0	34.8	34.1	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	C	C	A	A
Approach Vol, veh/h		1233			2477			208				45
Approach Delay, s/veh		6.2			1.1			37.3				34.1
Approach LOS		A			A			D				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.7	66.9		17.4	7.7	64.9		17.4				
Change Period (Y+Rc), s	5.0	5.0		5.5	5.0	5.0		5.5				
Max Green Setting (Gmax), s	4.0	53.0		17.5	4.0	53.0		17.5				
Max Q Clear Time (g_c+I1), s	2.1	2.0		4.1	2.7	10.4		11.5				
Green Ext Time (p_c), s	0.0	21.4		0.1	0.0	7.0		0.4				
Intersection Summary												
HCM 6th Ctrl Delay			5.0									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary
 19: Lien & East Wash






























2034 Base Conditions
 AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑		↖	↗			↕	
Traffic Volume (veh/h)	29	879	164	53	2017	20	95	6	24	19	3	11
Future Volume (veh/h)	29	879	164	53	2017	20	95	6	24	19	3	11
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	34	1041	194	63	2390	24	113	7	28	23	4	13
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	265	3064	951	450	3128	31	382	69	276	227	48	102
Arrive On Green	0.11	1.00	1.00	0.11	1.00	1.00	0.21	0.21	0.19	0.21	0.21	0.19
Sat Flow, veh/h	1781	5106	1585	1781	5213	52	1396	327	1308	778	228	485
Grp Volume(v), veh/h	34	1041	194	63	1560	854	113	0	35	40	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1861	1396	0	1635	1491	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.0	1.6	0.2	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	5.7	0.0	1.6	1.8	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.03	1.00		0.80	0.57		0.32
Lane Grp Cap(c), veh/h	265	3064	951	450	2042	1117	382	0	345	378	0	0
V/C Ratio(X)	0.13	0.34	0.20	0.14	0.76	0.77	0.30	0.00	0.10	0.11	0.00	0.00
Avail Cap(c_a), veh/h	265	3064	951	450	2042	1117	382	0	345	378	0	0
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)	0.96	0.96	0.96	0.70	0.70	0.70	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.5	0.0	0.0	5.8	0.0	0.0	30.1	0.0	29.3	28.9	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.3	0.5	0.1	2.0	3.6	0.4	0.0	0.1	0.6	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	0.1	0.1	0.4	0.6	1.1	2.1	0.0	0.6	0.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.7	0.3	0.5	5.9	2.0	3.6	30.6	0.0	29.4	29.5	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C	A	C	C	A	A
Approach Vol, veh/h		1269			2477			148				40
Approach Delay, s/veh		0.5			2.6			30.3				29.5
Approach LOS		A			A			C				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	58.0		23.0	9.0	58.0		23.0				
Change Period (Y+Rc), s	5.0	5.0		6.0	5.0	5.0		6.0				
Max Green Setting (Gmax), s	4.0	53.0		17.0	4.0	53.0		17.0				
Max Q Clear Time (g_c+l1), s	2.0	2.0		7.7	2.0	2.0		3.8				
Green Ext Time (p_c), s	0.0	7.0		0.3	0.0	21.1		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			3.2									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary
 20: Thierer/Portage & East Wash

2034 Base Conditions
 AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  						 	
Traffic Volume (veh/h)	54	793	77	25	1850	21	87	22	16	16	35	113
Future Volume (veh/h)	54	793	77	25	1850	21	87	22	16	16	35	113
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	64	940	91	30	2192	25	103	26	19	19	41	134
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	110	3441	1068	71	3331	1034	242	153	112	257	286	242
Arrive On Green	0.12	1.00	1.00	0.08	1.00	1.00	0.15	0.15	0.12	0.15	0.15	0.15
Sat Flow, veh/h	1781	5106	1585	1781	5106	1585	1210	1004	734	1361	1870	1585
Grp Volume(v), veh/h	64	940	91	30	2192	25	103	0	45	19	41	134
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1585	1210	0	1738	1361	1870	1585
Q Serve(g_s), s	3.1	0.0	0.0	1.4	0.0	0.0	7.3	0.0	2.1	1.1	1.7	7.0
Cycle Q Clear(g_c), s	3.1	0.0	0.0	1.4	0.0	0.0	9.0	0.0	2.1	3.2	1.7	7.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.42	1.00		1.00
Lane Grp Cap(c), veh/h	110	3441	1068	71	3331	1034	242	0	265	257	286	242
V/C Ratio(X)	0.58	0.27	0.09	0.42	0.66	0.02	0.43	0.00	0.17	0.07	0.14	0.55
Avail Cap(c_a), veh/h	178	3441	1068	178	3331	1034	326	0	386	351	416	352
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)	0.95	0.95	0.95	0.78	0.78	0.78	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.3	0.0	0.0	40.4	0.0	0.0	36.9	0.0	33.6	34.6	33.0	35.3
Incr Delay (d2), s/veh	4.6	0.2	0.1	3.0	0.8	0.0	1.2	0.0	0.3	0.1	0.2	2.0
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	1.4	0.1	0.0	0.7	0.2	0.0	2.2	0.0	0.9	0.4	0.8	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.9	0.2	0.1	43.4	0.8	0.0	38.1	0.0	33.9	34.7	33.3	37.3
LnGrp LOS	D	A	A	D	A	A	D	A	C	C	C	D
Approach Vol, veh/h		1095			2247			148			194	
Approach Delay, s/veh		2.7			1.4			36.8			36.2	
Approach LOS		A			A			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.6	64.7		17.7	9.6	62.7		17.7				
Change Period (Y+Rc), s	5.5	5.5		6.5	5.5	5.5		6.5				
Max Green Setting (Gmax), s	7.5	47.5		17.5	7.5	47.5		17.5				
Max Q Clear Time (g_c+l1), s	3.4	2.0		9.0	5.1	2.0		11.0				
Green Ext Time (p_c), s	0.0	5.5		0.5	0.0	19.1		0.3				
Intersection Summary												
HCM 6th Ctrl Delay			5.0									
HCM 6th LOS			A									

HCM Signalized Intersection Capacity Analysis

21: Eagan/Continental & East Wash

2034 Base Conditions

AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	773	29	31	1737	75	35	26	27	36	13	128
Future Volume (vph)	30	773	29	31	1737	75	35	26	27	36	13	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.86		0.97	0.86		0.95	0.95	1.00		1.00	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85		0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.99	1.00		0.99	
Satd. Flow (prot)	1770	6373		3433	6368		1681	1755	1583		1664	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.99	1.00		0.99	
Satd. Flow (perm)	1770	6373		3433	6368		1681	1755	1583		1664	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	36	916	34	37	2058	89	41	31	32	43	15	152
RTOR Reduction (vph)	0	4	0	0	5	0	0	0	29	0	109	0
Lane Group Flow (vph)	36	946	0	37	2142	0	35	37	3	0	101	0
Turn Type	Prot	NA		Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases									4			
Actuated Green, G (s)	5.0	46.7		4.2	45.9		6.3	6.3	6.3		9.8	
Effective Green, g (s)	6.5	48.2		5.7	47.4		8.3	8.3	8.3		11.8	
Actuated g/C Ratio	0.07	0.54		0.06	0.53		0.09	0.09	0.09		0.13	
Clearance Time (s)	5.5	5.5		5.5	5.5		6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	127	3413		217	3353		155	161	145		218	
v/s Ratio Prot	c0.02	0.15		0.01	c0.34		0.02	c0.02			c0.06	
v/s Ratio Perm									0.00			
v/c Ratio	0.28	0.28		0.17	0.64		0.23	0.23	0.02		0.46	
Uniform Delay, d1	39.5	11.4		39.9	15.2		37.9	37.9	37.2		36.2	
Progression Factor	0.82	1.58		1.57	0.51		1.00	1.00	1.00		1.00	
Incremental Delay, d2	1.2	0.2		0.3	0.9		0.7	0.7	0.1		1.5	
Delay (s)	33.5	18.3		63.2	8.7		38.6	38.6	37.2		37.7	
Level of Service	C	B		E	A		D	D	D		D	
Approach Delay (s)		18.8			9.6			38.2			37.7	
Approach LOS		B			A			D			D	

Intersection Summary

HCM 2000 Control Delay	14.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
 23: Zeier & E Wash

2034 Base Conditions
 AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	48	689	17	126	1517	83	31	14	80	74	22	43
Future Volume (veh/h)	48	689	17	126	1517	83	31	14	80	74	22	43
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	55	791	20	145	1741	95	36	16	92	85	25	49
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	71	3428	86	210	3414	186	274	148	125	128	41	79
Arrive On Green	0.01	0.17	0.17	0.12	1.00	1.00	0.08	0.08	0.08	0.07	0.07	0.07
Sat Flow, veh/h	1781	6503	164	3456	6291	343	3456	1870	1585	1781	565	1107
Grp Volume(v), veh/h	55	586	225	145	1335	501	36	16	92	85	0	74
Grp Sat Flow(s),veh/h/ln	1781	1609	1841	1728	1609	1809	1728	1870	1585	1781	0	1671
Q Serve(g_s), s	2.8	9.4	9.5	3.6	0.0	0.0	0.9	0.7	5.1	4.2	0.0	3.9
Cycle Q Clear(g_c), s	2.8	9.4	9.5	3.6	0.0	0.0	0.9	0.7	5.1	4.2	0.0	3.9
Prop In Lane	1.00		0.09	1.00		0.19	1.00		1.00	1.00		0.66
Lane Grp Cap(c), veh/h	71	2544	970	210	2619	982	274	148	125	128	0	120
V/C Ratio(X)	0.78	0.23	0.23	0.69	0.51	0.51	0.13	0.11	0.73	0.66	0.00	0.62
Avail Cap(c_a), veh/h	99	2544	970	211	2619	982	518	281	238	247	0	232
HCM Platoon Ratio	0.33	0.33	0.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.89	0.89	0.89	0.99	0.99	0.99	1.00	0.00	1.00
Uniform Delay (d), s/veh	44.0	21.5	21.5	38.7	0.0	0.0	38.6	38.5	40.5	40.7	0.0	40.6
Incr Delay (d2), s/veh	22.3	0.2	0.6	8.2	0.6	1.7	0.2	0.3	7.9	5.8	0.0	5.1
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	1.6	3.7	4.4	1.7	0.2	0.5	0.4	0.3	2.3	2.0	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.3	21.7	22.0	46.9	0.6	1.7	38.8	38.8	48.4	46.5	0.0	45.6
LnGrp LOS	E	C	C	D	A	A	D	D	D	D	A	D
Approach Vol, veh/h		866			1981			144				159
Approach Delay, s/veh		24.6			4.3			44.9				46.1
Approach LOS		C			A			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.0	53.4		13.0	9.6	54.8		12.6				
Change Period (Y+Rc), s	5.5	6.0		6.5	6.0	6.0		5.5				
Max Green Setting (Gmax), s	5.5	35.0		12.5	5.0	35.0		13.5				
Max Q Clear Time (g_c+I1), s	5.6	11.5		6.2	4.8	2.0		7.1				
Green Ext Time (p_c), s	0.0	5.2		0.4	0.0	16.4		0.2				
Intersection Summary												
HCM 6th Ctrl Delay				13.8								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary
24: E Springs & E Wash

2034 Base Conditions
AM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↗	↖↖	↑↑↑	↖↖	↗
Traffic Volume (veh/h)	763	100	204	1563	115	48
Future Volume (veh/h)	763	100	204	1563	115	48
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	875	0	234	1793	132	55
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	3298		314	4074	219	100
Arrive On Green	1.00	0.00	0.09	0.80	0.06	0.06
Sat Flow, veh/h	5274	1585	3456	5274	3456	1585
Grp Volume(v), veh/h	875	0	234	1793	132	55
Grp Sat Flow(s),veh/h/ln	1702	1585	1728	1702	1728	1585
Q Serve(g_s), s	0.0	0.0	5.9	9.8	3.3	3.0
Cycle Q Clear(g_c), s	0.0	0.0	5.9	9.8	3.3	3.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	3298		314	4074	219	100
V/C Ratio(X)	0.27		0.75	0.44	0.60	0.55
Avail Cap(c_a), veh/h	3298		442	4074	595	273
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.97	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	39.9	2.8	41.1	40.9
Incr Delay (d2), s/veh	0.2	0.0	4.3	0.3	2.7	4.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	2.6	1.7	1.5	1.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.2	0.0	44.2	3.2	43.7	45.5
LnGrp LOS	A		D	A	D	D
Approach Vol, veh/h	875	A		2027	187	
Approach Delay, s/veh	0.2			7.9	44.2	
Approach LOS	A			A	D	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	13.7	64.1		12.2		77.8
Change Period (Y+Rc), s	5.5	6.0		6.5		6.0
Max Green Setting (Gmax), s	11.5	45.0		15.5		62.0
Max Q Clear Time (g_c+I1), s	7.9	2.0		5.3		11.8
Green Ext Time (p_c), s	0.3	6.8		0.4		20.5

Intersection Summary

HCM 6th Ctrl Delay			7.9			
HCM 6th LOS			A			

Notes













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

HCM Signalized Intersection Capacity Analysis

2034 Base Conditions

1: Blair St. & East Washington Ave.

MD Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↑↑	↑↑		↑		↑↑	↑	↑↑	
Traffic Volume (vph)	0	489	26	568	688	0	54	0	561	301	72	17
Future Volume (vph)	0	489	26	568	688	0	54	0	561	301	72	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0		4.0	4.0	4.0	
Lane Util. Factor		0.91		0.97	0.95		1.00		0.88	0.91	0.91	
Frt		0.99		1.00	1.00		1.00		0.85	1.00	0.99	
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	0.97	
Satd. Flow (prot)		5047		3433	3539		1770		2787	1610	3251	
Flt Permitted		1.00		0.95	1.00		0.95		1.00	0.95	0.97	
Satd. Flow (perm)		5047		3433	3539		1770		2787	1610	3251	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	0	561	30	652	789	0	62	0	644	345	83	20
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	586	0	652	789	0	62	0	644	172	271	0
Turn Type		NA		Prot	NA		Prot		pt+ov	Split	NA	
Protected Phases		1		2	1 2		3		2 3	4	4	
Permitted Phases							3		3 2			
Actuated Green, G (s)		20.3		58.1	82.9		8.2		70.8	18.9	18.9	
Effective Green, g (s)		20.8		58.6	83.4		8.2		71.3	20.9	20.9	
Actuated g/C Ratio		0.17		0.47	0.67		0.07		0.57	0.17	0.17	
Clearance Time (s)		4.5		4.5			4.0			6.0	6.0	
Vehicle Extension (s)		3.0		3.0			2.0			3.0	3.0	
Lane Grp Cap (vph)		843		1615	2370		116		1596	270	545	
v/s Ratio Prot		c0.12		0.19	0.22		0.04		c0.23	c0.11	0.08	
v/s Ratio Perm												
v/c Ratio		0.70		0.40	0.33		0.53		0.40	0.64	0.50	
Uniform Delay, d1		48.9		21.5	8.7		56.3		14.8	48.3	47.0	
Progression Factor		1.00		1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2		2.5		0.8	0.1		2.4		0.1	4.9	0.7	
Delay (s)		51.4		22.3	8.8		58.7		14.8	53.1	47.7	
Level of Service		D		C	A		E		B	D	D	
Approach Delay (s)		51.4		14.9			18.7				49.8	
Approach LOS		D		B			B				D	
Intersection Summary												
HCM 2000 Control Delay			27.4				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			124.5				Sum of lost time (s)		16.0			
Intersection Capacity Utilization			55.9%				ICU Level of Service		B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Livingston Ave & East Washington Ave.

2034 Base Conditions

MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑		↗	↑↑↑				↗			↗
Traffic Volume (vph)	107	1201	43	100	1257	36	0	0	39	0	0	30
Future Volume (vph)	107	1201	43	100	1257	36	0	0	39	0	0	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0				5.0			5.0
Lane Util. Factor	1.00	0.91		1.00	0.91				1.00			1.00
Frt	1.00	0.99		1.00	1.00				0.86			0.86
Flt Protected	0.95	1.00		0.95	1.00				1.00			1.00
Satd. Flow (prot)	1770	5059		1770	5064				1611			1611
Flt Permitted	0.17	1.00		0.18	1.00				1.00			1.00
Satd. Flow (perm)	311	5059		333	5064				1611			1611
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	113	1264	45	105	1323	38	0	0	41	0	0	32
RTOR Reduction (vph)	0	3	0	0	2	0	0	0	21	0	0	21
Lane Group Flow (vph)	113	1306	0	105	1359	0	0	0	20	0	0	11
Turn Type	D.P+P	NA		D.Pm	NA				Prot			Over
Protected Phases	4	2			6				8			4
Permitted Phases	6			2								
Actuated Green, G (s)	70.0	52.0		52.0	52.0				18.0			18.0
Effective Green, g (s)	70.0	52.0		52.0	52.0				18.0			18.0
Actuated g/C Ratio	0.88	0.65		0.65	0.65				0.22			0.22
Clearance Time (s)	5.0	5.0		5.0	5.0				5.0			5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0				3.0			3.0
Lane Grp Cap (vph)	600	3288		216	3291				362			362
v/s Ratio Prot	c0.04	0.26			0.27				0.01			0.01
v/s Ratio Perm	0.12			c0.32								
v/c Ratio	0.19	0.40		0.49	0.41				0.06			0.03
Uniform Delay, d1	1.0	6.6		7.2	6.7				24.3			24.2
Progression Factor	1.00	1.00		1.00	1.00				1.00			1.00
Incremental Delay, d2	0.2	0.4		7.6	0.4				0.1			0.0
Delay (s)	1.1	7.0		14.8	7.1				24.4			24.2
Level of Service	A	A		B	A				C			C
Approach Delay (s)		6.5			7.6			24.4			24.2	
Approach LOS		A			A			C			C	

Intersection Summary

HCM 2000 Control Delay	7.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	39.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
 3: Paterson St. & East Washington Ave.

2034 Base Conditions

MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑	↗		↕		↘	↑	↗
Traffic Volume (veh/h)	32	1412	32	28	1255	35	16	24	33	65	24	26
Future Volume (veh/h)	32	1412	32	28	1255	35	16	24	33	65	24	26
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	37	1620	37	32	1440	40	18	28	38	75	28	30
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	339	4247	1318	292	4247	1318	59	50	57	181	145	123
Arrive On Green	0.83	0.83	0.83	0.83	0.83	0.83	0.09	0.08	0.08	0.09	0.08	0.08
Sat Flow, veh/h	357	5106	1585	301	5106	1585	246	653	742	1335	1870	1585
Grp Volume(v), veh/h	37	1620	37	32	1440	40	84	0	0	75	28	30
Grp Sat Flow(s),veh/h/ln	357	1702	1585	301	1702	1585	1641	0	0	1335	1870	1585
Q Serve(g_s), s	3.0	8.6	0.4	3.2	7.3	0.5	2.6	0.0	0.0	0.7	1.5	2.0
Cycle Q Clear(g_c), s	10.3	8.6	0.4	11.8	7.3	0.5	5.3	0.0	0.0	6.0	1.5	2.0
Prop In Lane	1.00		1.00	1.00		1.00	0.21		0.45	1.00		1.00
Lane Grp Cap(c), veh/h	339	4247	1318	292	4247	1318	182	0	0	181	145	123
V/C Ratio(X)	0.11	0.38	0.03	0.11	0.34	0.03	0.46	0.00	0.00	0.42	0.19	0.24
Avail Cap(c_a), veh/h	339	4247	1318	292	4247	1318	605	0	0	533	638	540
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)	0.93	0.93	0.93	0.87	0.87	0.87	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	3.4	2.3	1.6	3.7	2.2	1.6	49.1	0.0	0.0	48.6	47.5	47.7
Incr Delay (d2), s/veh	0.6	0.2	0.0	0.7	0.2	0.0	1.8	0.0	0.0	1.5	0.6	1.0
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	1.7	0.1	0.2	1.4	0.1	2.3	0.0	0.0	2.1	0.8	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.0	2.5	1.6	4.4	2.4	1.6	51.0	0.0	0.0	50.2	48.2	48.8
LnGrp LOS	A	A	A	A	A	A	D	A	A	D	D	D
Approach Vol, veh/h		1694			1512			84			133	
Approach Delay, s/veh		2.5			2.4			51.0			49.4	
Approach LOS		A			A			D			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		96.5		13.5		96.5		13.5				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		62.0		37.5		62.0		37.5				
Max Q Clear Time (g_c+I1), s		12.3		8.0		13.8		7.3				
Green Ext Time (p_c), s		13.3		0.5		11.1		0.3				
Intersection Summary												
HCM 6th Ctrl Delay				5.5								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary
4: Ingersoll St. & East Washington Ave.

2034 Base Conditions

MD Peak

























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷↷↷	↷	↶	↷↷↷	↷		↶	↷		↷	
Traffic Volume (veh/h)	37	1483	36	57	1326	36	42	26	38	31	16	18
Future Volume (veh/h)	37	1483	36	57	1326	36	42	26	38	31	16	18
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	42	1702	41	65	1521	41	48	30	44	36	18	21
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	301	3788	1176	279	4162	1292	123	63	152	82	38	30
Arrive On Green	0.74	0.74	0.74	0.03	0.82	0.82	0.12	0.10	0.10	0.12	0.10	0.10
Sat Flow, veh/h	330	5106	1585	1781	5106	1585	793	657	1585	407	394	312
Grp Volume(v), veh/h	42	1702	41	65	1521	41	78	0	44	75	0	0
Grp Sat Flow(s),veh/h/ln	330	1702	1585	1781	1702	1585	1450	0	1585	1114	0	0
Q Serve(g_s), s	4.8	16.0	0.8	1.0	9.7	0.6	0.0	0.0	3.2	3.4	0.0	0.0
Cycle Q Clear(g_c), s	5.4	16.0	0.8	1.0	9.7	0.6	6.3	0.0	3.2	9.7	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.62		1.00	0.48		0.28
Lane Grp Cap(c), veh/h	301	3788	1176	279	4162	1292	216	0	152	173	0	0
V/C Ratio(X)	0.14	0.45	0.03	0.23	0.37	0.03	0.36	0.00	0.29	0.43	0.00	0.00
Avail Cap(c_a), veh/h	301	3788	1176	350	4162	1292	524	0	473	476	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)	0.82	0.82	0.82	0.87	0.87	0.87	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	4.9	6.2	4.2	4.6	3.0	2.2	52.6	0.0	52.1	54.6	0.0	0.0
Incr Delay (d2), s/veh	0.8	0.3	0.0	0.4	0.2	0.0	1.0	0.0	1.0	1.7	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	0.4	5.0	0.3	0.3	2.4	0.2	2.3	0.0	1.3	2.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.7	6.5	4.3	5.0	3.2	2.2	53.6	0.0	53.1	56.3	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	D	E	A	A
Approach Vol, veh/h		1785			1627			122				75
Approach Delay, s/veh		6.4			3.3			53.4				56.3
Approach LOS		A			A			D				E
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	9.1	96.5		18.4		105.6		18.4				
Change Period (Y+Rc), s	5.5	4.5		6.5		4.5		6.5				
Max Green Setting (Gmax), s	8.5	61.5		37.0		75.5		37.0				
Max Q Clear Time (g_c+l1), s	3.0	18.0		11.7		11.7		8.3				
Green Ext Time (p_c), s	0.1	14.3		0.2		10.9		0.5				
Intersection Summary												
HCM 6th Ctrl Delay				7.6								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary
 5: Baldwin St. & East Washington Ave.

2034 Base Conditions

MD Peak

























												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	69	1463	27	42	1297	75	20	50	37	78	58	62
Future Volume (veh/h)	69	1463	27	42	1297	75	20	50	37	78	58	62
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	79	1679	31	48	1488	86	23	57	42	89	67	71
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	198	2616	812	191	2982	926	41	80	519	50	24	519
Arrive On Green	0.51	0.51	0.51	0.03	0.58	0.58	0.34	0.33	0.33	0.34	0.33	0.33
Sat Flow, veh/h	326	5106	1585	1781	5106	1585	0	244	1585	0	74	1585
Grp Volume(v), veh/h	79	1679	31	48	1488	86	80	0	42	156	0	71
Grp Sat Flow(s),veh/h/ln	326	1702	1585	1781	1702	1585	244	0	1585	74	0	1585
Q Serve(g_s), s	21.2	27.0	1.1	1.4	19.3	2.7	0.0	0.0	2.1	0.0	0.0	3.6
Cycle Q Clear(g_c), s	32.4	27.0	1.1	1.4	19.3	2.7	38.0	0.0	2.1	38.0	0.0	3.6
Prop In Lane	1.00		1.00	1.00		1.00	0.29		1.00	0.57		1.00
Lane Grp Cap(c), veh/h	198	2616	812	191	2982	926	123	0	519	75	0	519
V/C Ratio(X)	0.40	0.64	0.04	0.25	0.50	0.09	0.65	0.00	0.08	2.08	0.00	0.14
Avail Cap(c_a), veh/h	198	2616	812	299	2982	926	123	0	519	75	0	519
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)	0.75	0.75	0.75	0.84	0.84	0.84	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.7	20.0	13.7	15.8	13.8	10.3	31.3	0.0	26.3	44.7	0.0	26.8
Incr Delay (d2), s/veh	4.4	0.9	0.1	0.6	0.5	0.2	11.5	0.0	0.1	529.1	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	1.8	10.4	0.4	0.6	7.1	0.9	1.9	0.0	0.8	13.1	0.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.1	20.9	13.8	16.4	14.3	10.5	42.8	0.0	26.3	573.7	0.0	26.9
LnGrp LOS	C	C	B	B	B	B	D	A	C	F	A	C
Approach Vol, veh/h		1789			1622			122				227
Approach Delay, s/veh		21.2			14.2			37.2				402.7
Approach LOS		C			B			D				F
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	8.1	62.9		42.0		71.0		42.0				
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s	10.0	51.0		37.0		66.0		37.0				
Max Q Clear Time (g_c+l1), s	3.4	34.4		40.0		21.3		40.0				
Green Ext Time (p_c), s	0.0	9.8		0.0		10.6		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				41.7								
HCM 6th LOS				D								

HCM Signalized Intersection Capacity Analysis

2034 Base Conditions

6: First & E Wash

MD Peak

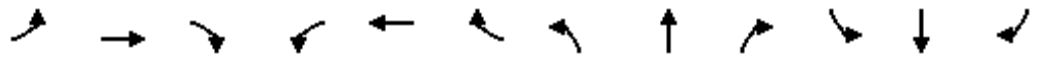
													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	191	1297	97	43	1164	98	112	113	52	157	90	197	
Future Volume (vph)	191	1297	97	43	1164	98	112	113	52	157	90	197	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.5	6.5	6.5	
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.88	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	2787	
Flt Permitted	0.95	1.00	1.00	0.11	1.00	1.00	0.69	1.00	1.00	0.67	1.00	1.00	
Satd. Flow (perm)	3433	5085	1583	196	5085	1583	1281	1863	1583	1250	1863	2787	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	
Adj. Flow (vph)	226	1537	115	51	1379	116	133	134	62	186	107	233	
RTOR Reduction (vph)	0	0	62	0	0	62	0	0	45	0	0	112	
Lane Group Flow (vph)	226	1537	53	51	1379	54	133	134	17	186	107	121	
Turn Type	Prot	NA	custom	D.P+P	NA	Perm	D.P+P	NA	Perm	Perm	NA	custom	
Protected Phases	1	6		5	2		3	3 4				4	
Permitted Phases			2	6		2	4		3 4	4		4 1	
Actuated Green, G (s)	9.3	52.0	46.2	56.0	46.2	46.2	22.5	27.5	27.5	13.8	13.8	29.6	
Effective Green, g (s)	9.3	52.0	46.2	56.0	46.2	46.2	22.5	27.5	27.5	13.8	13.8	29.6	
Actuated g/C Ratio	0.09	0.52	0.46	0.56	0.46	0.46	0.22	0.28	0.28	0.14	0.14	0.30	
Clearance Time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0			6.5	6.5		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0		
Lane Grp Cap (vph)	319	2644	731	172	2349	731	330	512	435	172	257	824	
v/s Ratio Prot	c0.07	c0.30		0.01	0.27		c0.03	0.07			0.06		
v/s Ratio Perm			0.03	0.15		0.03	0.06		0.01	c0.15		0.04	
v/c Ratio	0.71	0.58	0.07	0.30	0.59	0.07	0.40	0.26	0.04	1.08	0.42	0.15	
Uniform Delay, d1	44.0	16.5	15.0	11.7	19.9	15.0	32.5	28.3	26.6	43.1	39.4	25.9	
Progression Factor	1.00	1.00	1.00	0.96	0.39	0.97	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	7.0	0.9	0.2	0.9	1.0	0.2	0.8	0.3	0.0	92.0	1.1	0.1	
Delay (s)	51.1	17.5	15.2	12.1	8.7	14.7	33.3	28.6	26.6	135.1	40.5	26.0	
Level of Service	D	B	B	B	A	B	C	C	C	F	D	C	
Approach Delay (s)		21.4			9.3			30.1			67.5		
Approach LOS		C			A			C			E		
Intersection Summary													
HCM 2000 Control Delay			23.3									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.68										
Actuated Cycle Length (s)			100.0									Sum of lost time (s)	22.0
Intersection Capacity Utilization			64.8%									ICU Level of Service	C
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary

2034 Base Conditions

7: Fourth & E Wash

MD Peak



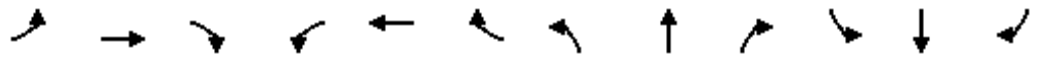
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑	↗		↖	↗		↖	↗
Traffic Volume (veh/h)	17	1457	13	28	1247	32	16	16	26	43	13	19
Future Volume (veh/h)	17	1457	13	28	1247	32	16	16	26	43	13	19
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	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	20	1726	15	33	1477	38	19	19	31	51	15	23
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	286	3166	983	244	3166	983	54	38	420	64	11	420
Arrive On Green	1.00	1.00	1.00	1.00	1.00	1.00	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	345	5106	1585	277	5106	1585	1	142	1585	1	42	1585
Grp Volume(v), veh/h	20	1726	15	33	1477	38	38	0	31	66	0	23
Grp Sat Flow(s),veh/h/ln	345	1702	1585	277	1702	1585	143	0	1585	43	0	1585
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	1.1
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	26.5	0.0	1.5	26.5	0.0	1.1
Prop In Lane	1.00		1.00	1.00		1.00	0.50		1.00	0.77		1.00
Lane Grp Cap(c), veh/h	286	3166	983	244	3166	983	92	0	420	75	0	420
V/C Ratio(X)	0.07	0.55	0.02	0.14	0.47	0.04	0.41	0.00	0.07	0.88	0.00	0.05
Avail Cap(c_a), veh/h	286	3166	983	244	3166	983	92	0	420	75	0	420
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)	0.76	0.76	0.76	0.95	0.95	0.95	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	30.6	0.0	27.6	45.6	0.0	27.4
Incr Delay (d2), s/veh	0.4	0.5	0.0	1.1	0.5	0.1	3.0	0.0	0.1	64.0	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	0.0	0.2	0.0	0.1	0.1	0.0	0.8	0.0	0.6	3.0	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.4	0.5	0.0	1.1	0.5	0.1	33.5	0.0	27.6	109.6	0.0	27.5
LnGrp LOS	A	A	A	A	A	A	C	A	C	F	A	C
Approach Vol, veh/h		1761			1548			69				89
Approach Delay, s/veh		0.5			0.5			30.9				88.4
Approach LOS		A			A			C				F
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		67.0		33.0		67.0		33.0				
Change Period (Y+Rc), s		5.0		6.5		5.0		6.5				
Max Green Setting (Gmax), s		62.0		26.5		62.0		26.5				
Max Q Clear Time (g_c+I1), s		2.0		28.5		2.0		28.5				
Green Ext Time (p_c), s		22.5		0.0		18.6		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				3.4								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary

2034 Base Conditions

8: Sixth & E Wash

MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑	↗	↖	↑			↕	
Traffic Volume (veh/h)	12	1506	12	34	1247	16	18	10	21	28	29	10
Future Volume (veh/h)	12	1506	12	34	1247	16	18	10	21	28	29	10
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	14	1784	14	40	1477	19	21	12	25	33	34	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	321	3619	1123	277	4045	1256	216	53	110	100	87	24
Arrive On Green	0.71	0.71	0.71	0.03	0.79	0.79	0.10	0.10	0.10	0.10	0.10	0.10
Sat Flow, veh/h	351	5106	1585	1781	5106	1585	1360	541	1127	504	888	249
Grp Volume(v), veh/h	14	1784	14	40	1477	19	21	0	37	79	0	0
Grp Sat Flow(s),veh/h/ln	351	1702	1585	1781	1702	1585	1360	0	1668	1642	0	0
Q Serve(g_s), s	1.2	15.6	0.3	0.5	8.5	0.3	0.0	0.0	2.0	2.0	0.0	0.0
Cycle Q Clear(g_c), s	1.3	15.6	0.3	0.5	8.5	0.3	1.2	0.0	2.0	4.4	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.68	0.42		0.15
Lane Grp Cap(c), veh/h	321	3619	1123	277	4045	1256	216	0	163	212	0	0
V/C Ratio(X)	0.04	0.49	0.01	0.14	0.37	0.02	0.10	0.00	0.23	0.37	0.00	0.00
Avail Cap(c_a), veh/h	321	3619	1123	324	4045	1256	233	0	183	231	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)	0.92	0.92	0.92	0.73	0.73	0.73	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	4.5	6.5	4.3	4.7	3.0	2.2	41.2	0.0	41.6	42.6	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.4	0.0	0.2	0.2	0.0	0.2	0.0	0.7	1.1	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	0.1	4.7	0.1	0.2	1.9	0.1	0.5	0.0	0.9	1.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.7	7.0	4.3	4.9	3.2	2.2	41.4	0.0	42.3	43.7	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	D	D	A	A
Approach Vol, veh/h		1812			1536			58				79
Approach Delay, s/veh		6.9			3.3			42.0				43.7
Approach LOS		A			A			D				D
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	8.4	75.9		15.8		84.2		15.8				
Change Period (Y+Rc), s	5.0	5.0		6.0		5.0		6.0				
Max Green Setting (Gmax), s	6.0	67.0		11.0		78.0		11.0				
Max Q Clear Time (g_c+l1), s	2.5	17.6		6.4		10.5		4.0				
Green Ext Time (p_c), s	0.0	14.4		0.1		10.2		0.1				

Intersection Summary

HCM 6th Ctrl Delay	6.7
HCM 6th LOS	A

Notes

























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

HCM Signalized Intersection Capacity Analysis

2034 Base Conditions

9: Milwaukee/North & E Wash

MD Peak






















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	1380	177	29	1128	21	155	84	47	32	103	44
Future Volume (vph)	40	1380	177	29	1128	21	155	84	47	32	103	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	6.5	6.5		5.0	5.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.97	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1762		1770	1779	
Flt Permitted	0.10	1.00	1.00	0.09	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	195	5085	1583	159	5085	1583	3433	1762		1770	1779	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	47	1635	210	34	1336	25	184	100	56	38	122	52
RTOR Reduction (vph)	0	0	53	0	0	23	0	22	0	0	16	0
Lane Group Flow (vph)	47	1635	157	34	1336	2	184	134	0	38	158	0
Turn Type	D.P+P	NA	custom	D.P+P	NA	custom	Split	NA		Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases	6		1 2	2		1						
Actuated Green, G (s)	53.8	46.8	58.3	53.8	39.5	7.0	12.8	12.8		12.9	12.9	
Effective Green, g (s)	53.8	46.8	58.3	53.8	39.5	7.0	12.8	12.8		12.9	12.9	
Actuated g/C Ratio	0.54	0.47	0.58	0.54	0.40	0.07	0.13	0.13		0.13	0.13	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	6.5	6.5		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	330	2379	922	198	2008	110	439	225		228	229	
v/s Ratio Prot	0.02	c0.32		0.01	0.26		0.05	c0.08		0.02	c0.09	
v/s Ratio Perm	0.06		c0.10	0.08		0.00						
v/c Ratio	0.14	0.69	0.17	0.17	0.67	0.02	0.42	0.60		0.17	0.69	
Uniform Delay, d1	12.8	20.9	9.7	13.6	24.8	43.3	40.2	41.2		38.8	41.6	
Progression Factor	0.74	1.28	1.45	0.73	0.59	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	1.5	0.1	0.4	1.6	0.1	0.6	4.2		0.3	8.7	
Delay (s)	10.3	28.2	14.0	10.3	16.2	43.3	40.8	45.4		39.1	50.3	
Level of Service	B	C	B	B	B	D	D	D		D	D	
Approach Delay (s)		26.2			16.6			42.9			48.3	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			25.4				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			20.5		
Intersection Capacity Utilization			63.1%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2034 Base Conditions

10: Johnson & E Wash

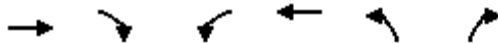
MD Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	1600	16	60	1091	183	29	19	52	223	25	21
Future Volume (vph)	17	1600	16	60	1091	183	29	19	52	223	25	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		5.0		6.0	6.0	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00		1.00		0.95	0.95	
Frt	1.00	1.00		1.00	1.00	0.85		0.93		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	0.97	
Satd. Flow (prot)	1770	5078		1770	5085	1583		1707		1681	1673	
Flt Permitted	0.18	1.00		0.08	1.00	1.00		0.99		0.68	0.73	
Satd. Flow (perm)	331	5078		142	5085	1583		1707		1204	1262	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	20	1896	19	71	1293	217	34	23	62	264	30	25
RTOR Reduction (vph)	0	1	0	0	0	75	0	31	0	0	7	0
Lane Group Flow (vph)	20	1914	0	71	1293	142	0	88	0	158	154	0
Turn Type	Perm	NA		Perm	NA	Perm	Split	NA		Perm	NA	
Protected Phases		2			2		3	3			4	
Permitted Phases	2			2		2				4		
Actuated Green, G (s)	65.5	65.5		65.5	65.5	65.5		5.0		14.0	14.0	
Effective Green, g (s)	65.5	65.5		65.5	65.5	65.5		5.0		14.0	14.0	
Actuated g/C Ratio	0.66	0.66		0.66	0.66	0.66		0.05		0.14	0.14	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		5.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	216	3326		93	3330	1036		85		168	176	
v/s Ratio Prot		0.38			0.25			c0.05				
v/s Ratio Perm	0.06			c0.50		0.09				c0.13	0.12	
v/c Ratio	0.09	0.58		0.76	0.39	0.14		1.03		0.94	0.88	
Uniform Delay, d1	6.3	9.6		11.9	8.0	6.5		47.5		42.6	42.1	
Progression Factor	2.29	1.73		0.74	0.42	0.13		1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.6		42.4	0.3	0.3		106.4		52.0	35.1	
Delay (s)	15.2	17.1		51.3	3.7	1.1		153.9		94.6	77.2	
Level of Service	B	B		D	A	A		F		F	E	
Approach Delay (s)		17.1			5.5			153.9			85.8	
Approach LOS		B			A			F			F	
Intersection Summary												
HCM 2000 Control Delay			22.1				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			15.5		
Intersection Capacity Utilization			65.0%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

11: Marquette & E Wash

2034 Base Conditions
MD Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↑	↓	↑↑↑	↓	↑
Traffic Volume (vph)	1506	58	56	1216	72	49
Future Volume (vph)	1506	58	56	1216	72	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.0	4.5	6.5	
Lane Util. Factor	0.91	1.00	1.00	0.91	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (prot)	5085	1583	1770	5085	1710	
Flt Permitted	1.00	1.00	0.09	1.00	0.97	
Satd. Flow (perm)	5085	1583	167	5085	1710	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	1784	69	66	1441	85	58
RTOR Reduction (vph)	0	16	0	0	26	0
Lane Group Flow (vph)	1784	53	66	1441	117	0
Turn Type	NA	Perm	D.P+P	NA	Prot	
Protected Phases	2		3	2 3	4	
Permitted Phases		2	2			
Actuated Green, G (s)	64.0	64.0	73.0	77.5	12.0	
Effective Green, g (s)	64.0	64.0	73.0	77.5	12.0	
Actuated g/C Ratio	0.64	0.64	0.73	0.78	0.12	
Clearance Time (s)	4.5	4.5	4.0		6.5	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	3254	1013	266	3940	205	
v/s Ratio Prot	c0.35		0.02	c0.28	c0.07	
v/s Ratio Perm		0.03	0.16			
v/c Ratio	0.55	0.05	0.25	0.37	0.57	
Uniform Delay, d1	10.0	6.7	13.1	3.5	41.6	
Progression Factor	0.70	0.63	0.88	0.44	1.00	
Incremental Delay, d2	0.5	0.1	0.5	0.1	3.6	
Delay (s)	7.5	4.3	12.1	1.6	45.1	
Level of Service	A	A	B	A	D	
Approach Delay (s)	7.4			2.1	45.1	
Approach LOS	A			A	D	

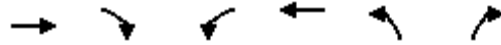
Intersection Summary

HCM 2000 Control Delay	6.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
12: EB Ramps & E Wash

2034 Base Conditions

MD Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↑↑	↑	↑↑↑	↑↑	↑↑
Traffic Volume (vph)	1095	347	93	1260	104	280
Future Volume (vph)	1095	347	93	1260	104	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.91	0.88	1.00	0.91	0.97	0.88
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)	5085	2787	1770	5085	3433	2787
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	2787	1770	5085	3433	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	1256	398	107	1446	119	321
RTOR Reduction (vph)	0	79	0	0	0	25
Lane Group Flow (vph)	1256	319	107	1446	119	296
Turn Type	NA	custom	Prot	NA	Prot	custom
Protected Phases	5	5 2	3	1 8	7	7 8 3
Permitted Phases		2				8
Actuated Green, G (s)	46.1	80.1	9.9	79.1	10.9	43.9
Effective Green, g (s)	46.1	80.1	9.9	79.1	10.9	43.9
Actuated g/C Ratio	0.46	0.80	0.10	0.79	0.11	0.44
Clearance Time (s)	5.0		5.0		5.0	
Vehicle Extension (s)	3.0		3.0		3.0	
Lane Grp Cap (vph)	2344	2232	175	4022	374	1223
v/s Ratio Prot	c0.25	0.11	c0.06	c0.28	c0.03	0.11
v/s Ratio Perm						
v/c Ratio	0.54	0.14	0.61	0.36	0.32	0.24
Uniform Delay, d1	19.3	2.2	43.2	3.1	41.1	17.6
Progression Factor	0.94	0.00	0.78	0.53	1.00	1.00
Incremental Delay, d2	0.7	0.1	5.9	0.1	0.5	0.1
Delay (s)	19.0	0.1	39.8	1.7	41.6	17.7
Level of Service	B	A	D	A	D	B
Approach Delay (s)	14.4			4.3	24.2	
Approach LOS	B			A	C	

Intersection Summary

HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 13: East Wash & WB Ramps

2034 Base Conditions

MD Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	97	1227	1004	191	58	285
Future Volume (vph)	97	1227	1004	191	58	285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.91	0.91	1.00	0.97	0.88
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	3433	2787
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	5085	5085	1583	3433	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	111	1408	1152	219	67	327
RTOR Reduction (vph)	0	0	0	46	0	95
Lane Group Flow (vph)	111	1408	1152	173	67	232
Turn Type	Prot	NA	NA	custom	Prot	pt+ov
Protected Phases	1	6	2		8	8 1
Permitted Phases				6		
Actuated Green, G (s)	11.1	79.0	62.9	79.0	11.0	27.1
Effective Green, g (s)	11.1	79.0	62.9	79.0	11.0	27.1
Actuated g/C Ratio	0.11	0.79	0.63	0.79	0.11	0.27
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	196	4017	3198	1250	377	755
v/s Ratio Prot	c0.06	c0.28	0.23		0.02	c0.08
v/s Ratio Perm				0.11		
v/c Ratio	0.57	0.35	0.36	0.14	0.18	0.31
Uniform Delay, d1	42.2	3.0	8.9	2.5	40.4	29.0
Progression Factor	0.70	4.16	0.52	0.25	1.00	1.00
Incremental Delay, d2	3.3	0.2	0.3	0.2	0.2	0.2
Delay (s)	32.9	12.9	5.0	0.8	40.6	29.2
Level of Service	C	B	A	A	D	C
Approach Delay (s)		14.4	4.3		31.2	
Approach LOS		B	A		C	
Intersection Summary						
HCM 2000 Control Delay			12.2		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.39			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	15.0
Intersection Capacity Utilization			42.8%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Signalized Intersection Summary
 16: Fair Oaks/Wright & East Wash

2034 Base Conditions

MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑		↗	↑↑↑			↕		↗	↑	↗
Traffic Volume (veh/h)	164	1109	39	114	1003	134	46	126	124	92	124	107
Future Volume (veh/h)	164	1109	39	114	1003	134	46	126	124	92	124	107
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	194	1314	46	135	1188	159	54	149	147	109	147	127
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	237	2921	102	184	2492	333	108	243	254	174	374	317
Arrive On Green	0.27	1.00	1.00	0.10	0.55	0.54	0.20	0.20	0.17	0.20	0.20	0.20
Sat Flow, veh/h	1781	5065	177	1781	4555	610	306	1216	1272	1083	1870	1585
Grp Volume(v), veh/h	194	883	477	135	888	459	180	0	170	109	147	127
Grp Sat Flow(s),veh/h/ln	1781	1702	1838	1781	1702	1761	1322	0	1473	1083	1870	1585
Q Serve(g_s), s	10.2	0.0	0.0	7.4	16.0	16.1	7.0	0.0	10.6	9.4	6.8	7.0
Cycle Q Clear(g_c), s	10.2	0.0	0.0	7.4	16.0	16.1	13.8	0.0	10.6	20.0	6.8	7.0
Prop In Lane	1.00		0.10	1.00		0.35	0.30		0.86	1.00		1.00
Lane Grp Cap(c), veh/h	237	1963	1060	184	1863	963	311	0	295	174	374	317
V/C Ratio(X)	0.82	0.45	0.45	0.73	0.48	0.48	0.58	0.00	0.58	0.63	0.39	0.40
Avail Cap(c_a), veh/h	267	1963	1060	303	1863	963	311	0	295	174	374	317
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)	1.00	1.00	1.00	0.65	0.65	0.65	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.6	0.0	0.0	43.5	13.9	14.0	37.8	0.0	37.4	45.6	34.7	34.8
Incr Delay (d2), s/veh	16.4	0.7	1.4	3.7	0.6	1.1	2.6	0.0	2.8	7.0	0.7	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	4.9	0.2	0.4	3.4	5.8	6.2	4.3	0.0	4.1	3.0	3.2	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.0	0.7	1.4	47.1	14.4	15.1	40.4	0.0	40.2	52.6	35.4	35.6
LnGrp LOS	D	A	A	D	B	B	D	A	D	D	D	D
Approach Vol, veh/h		1554			1482			350			383	
Approach Delay, s/veh		7.3			17.6			40.3			40.4	
Approach LOS		A			B			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	14.3	61.7		24.0	17.3	58.7		24.0				
Change Period (Y+Rc), s	5.0	5.0		7.0	5.0	5.0		7.0				
Max Green Setting (Gmax), s	16.0	50.0		17.0	14.0	52.0		17.0				
Max Q Clear Time (g_c+l1), s	9.4	2.0		22.0	12.2	18.1		15.8				
Green Ext Time (p_c), s	0.2	7.8		0.0	0.1	7.5		0.2				

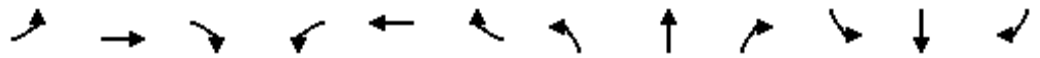
Intersection Summary

HCM 6th Ctrl Delay	17.8
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
 18: Mendota & East Wash

2034 Base Conditions

MD Peak



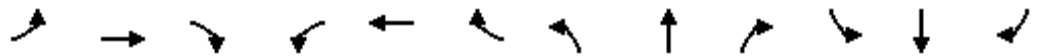
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑			↕			↕	
Traffic Volume (veh/h)	19	1749	119	73	1493	24	163	8	76	36	12	31
Future Volume (veh/h)	19	1749	119	73	1493	24	163	8	76	36	12	31
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	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	21	1901	129	79	1623	26	177	9	83	39	13	34
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	327	3280	1018	258	3429	55	308	25	231	138	55	88
Arrive On Green	0.03	0.64	0.64	0.10	1.00	1.00	0.17	0.17	0.16	0.17	0.17	0.16
Sat Flow, veh/h	1781	5106	1585	1781	5177	83	1302	143	1321	455	312	501
Grp Volume(v), veh/h	21	1901	129	79	1067	582	177	0	92	86	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1855	1302	0	1464	1268	0	0
Q Serve(g_s), s	0.4	19.1	2.9	1.3	0.0	0.0	4.9	0.0	5.0	1.9	0.0	0.0
Cycle Q Clear(g_c), s	0.4	19.1	2.9	1.3	0.0	0.0	11.9	0.0	5.0	7.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.04	1.00		0.90	0.45		0.40
Lane Grp Cap(c), veh/h	327	3280	1018	258	2255	1229	308	0	256	280	0	0
V/C Ratio(X)	0.06	0.58	0.13	0.31	0.47	0.47	0.58	0.00	0.36	0.31	0.00	0.00
Avail Cap(c_a), veh/h	374	3280	1018	269	2255	1229	357	0	309	333	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.22	0.22	0.22	0.81	0.81	0.81	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	4.9	9.2	6.3	7.2	0.0	0.0	35.7	0.0	33.3	33.5	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.2	0.1	0.5	0.6	1.1	1.7	0.0	0.8	0.6	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	0.1	5.7	0.8	0.4	0.2	0.4	3.8	0.0	1.9	1.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.9	9.3	6.3	7.8	0.6	1.1	37.4	0.0	34.2	34.1	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	C	C	A	A
Approach Vol, veh/h		2051			1728			269				86
Approach Delay, s/veh		9.1			1.1			36.3				34.1
Approach LOS		A			A			D				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.6	63.6		19.7	8.4	61.8		19.7				
Change Period (Y+Rc), s	5.0	5.0		5.5	5.0	5.0		5.5				
Max Green Setting (Gmax), s	4.0	53.0		17.5	4.0	53.0		17.5				
Max Q Clear Time (g_c+I1), s	2.4	2.0		9.0	3.3	21.1		13.9				
Green Ext Time (p_c), s	0.0	10.2		0.2	0.0	14.0		0.4				
Intersection Summary												
HCM 6th Ctrl Delay			8.0									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary

2034 Base Conditions

19: Lien & East Wash

MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑		↖	↗			↕	
Traffic Volume (veh/h)	41	1621	296	92	1436	25	249	11	56	24	8	28
Future Volume (veh/h)	41	1621	296	92	1436	25	249	11	56	24	8	28
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	45	1762	322	100	1561	27	271	12	61	26	9	30
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	372	3064	951	272	3101	54	385	56	287	160	67	146
Arrive On Green	0.07	0.80	0.80	0.11	1.00	1.00	0.21	0.21	0.19	0.21	0.21	0.19
Sat Flow, veh/h	1781	5106	1585	1781	5169	89	1368	267	1359	493	316	693
Grp Volume(v), veh/h	45	1762	322	100	1028	560	271	0	73	65	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1854	1368	0	1626	1502	0	0
Q Serve(g_s), s	0.0	11.6	5.1	0.0	0.0	0.0	12.8	0.0	3.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	11.6	5.1	0.0	0.0	0.0	16.2	0.0	3.4	3.4	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.05	1.00		0.84	0.40		0.46
Lane Grp Cap(c), veh/h	372	3064	951	272	2042	1113	385	0	343	373	0	0
V/C Ratio(X)	0.12	0.58	0.34	0.37	0.50	0.50	0.70	0.00	0.21	0.17	0.00	0.00
Avail Cap(c_a), veh/h	372	3064	951	272	2042	1113	385	0	343	373	0	0
HCM Platoon Ratio	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.80	0.80	0.80	0.87	0.87	0.87	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.1	4.8	4.1	18.1	0.0	0.0	34.0	0.0	30.0	29.5	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.6	0.8	0.7	0.8	1.4	5.7	0.0	0.3	1.0	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	0.3	2.6	1.4	1.6	0.2	0.4	6.1	0.0	1.3	1.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.2	5.4	4.9	18.8	0.8	1.4	39.8	0.0	30.3	30.5	0.0	0.0
LnGrp LOS	A	A	A	B	A	A	D	A	C	C	A	A
Approach Vol, veh/h		2129			1688			344				65
Approach Delay, s/veh		5.4			2.1			37.8				30.5
Approach LOS		A			A			D				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	58.0		23.0	9.0	58.0		23.0				
Change Period (Y+Rc), s	5.0	5.0		6.0	5.0	5.0		6.0				
Max Green Setting (Gmax), s	4.0	53.0		17.0	4.0	53.0		17.0				
Max Q Clear Time (g_c+I1), s	2.0	13.6		18.2	2.0	2.0		5.4				
Green Ext Time (p_c), s	0.0	15.3		0.0	0.0	9.6		0.1				
Intersection Summary												
HCM 6th Ctrl Delay				7.1								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary
 20: Thierer/Portage & East Wash

2034 Base Conditions
 MD Peak
























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	148	1405	116	86	1211	65	188	47	71	63	51	102
Future Volume (veh/h)	148	1405	116	86	1211	65	188	47	71	63	51	102
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	161	1527	126	93	1316	71	204	51	77	68	55	111
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	178	2877	893	144	2780	863	322	149	226	279	416	352
Arrive On Green	0.20	1.00	1.00	0.16	1.00	1.00	0.22	0.22	0.19	0.22	0.22	0.22
Sat Flow, veh/h	1781	5106	1585	1781	5106	1585	1220	672	1015	1262	1870	1585
Grp Volume(v), veh/h	161	1527	126	93	1316	71	204	0	128	68	55	111
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1585	1220	0	1688	1262	1870	1585
Q Serve(g_s), s	7.9	0.0	0.0	4.4	0.0	0.0	14.5	0.0	5.8	4.3	2.1	5.3
Cycle Q Clear(g_c), s	7.9	0.0	0.0	4.4	0.0	0.0	16.6	0.0	5.8	10.1	2.1	5.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.60	1.00		1.00
Lane Grp Cap(c), veh/h	178	2877	893	144	2780	863	322	0	375	279	416	352
V/C Ratio(X)	0.90	0.53	0.14	0.64	0.47	0.08	0.63	0.00	0.34	0.24	0.13	0.32
Avail Cap(c_a), veh/h	178	2877	893	178	2780	863	322	0	375	279	416	352
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)	0.79	0.79	0.79	0.88	0.88	0.88	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.6	0.0	0.0	36.5	0.0	0.0	34.7	0.0	30.1	33.8	28.0	29.3
Incr Delay (d2), s/veh	35.2	0.6	0.3	4.8	0.5	0.2	4.0	0.0	0.5	0.4	0.1	0.5
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	4.7	0.1	0.1	1.9	0.1	0.0	4.6	0.0	2.4	1.3	1.0	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.7	0.6	0.3	41.3	0.5	0.2	38.7	0.0	30.7	34.2	28.2	29.8
LnGrp LOS	E	A	A	D	A	A	D	A	C	C	C	C
Approach Vol, veh/h		1814			1480			332			234	
Approach Delay, s/veh		6.8			3.1			35.6			30.7	
Approach LOS		A			A			D			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.3	54.7		24.0	13.0	53.0		24.0				
Change Period (Y+Rc), s	5.5	5.5		6.5	5.5	5.5		6.5				
Max Green Setting (Gmax), s	7.5	47.5		17.5	7.5	47.5		17.5				
Max Q Clear Time (g_c+I1), s	6.4	2.0		12.1	9.9	2.0		18.6				
Green Ext Time (p_c), s	0.0	11.0		0.4	0.0	8.4		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			9.3									
HCM 6th LOS			A									

HCM Signalized Intersection Capacity Analysis

21: Eagan/Continental & East Wash

2034 Base Conditions

MD Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	1208	258	161	993	113	272	68	111	58	28	32
Future Volume (vph)	91	1208	258	161	993	113	272	68	111	58	28	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.86		0.97	0.86		0.95	0.95	1.00		1.00	
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85		0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.97	1.00		0.98	
Satd. Flow (prot)	1770	6239		3433	6309		1681	1718	1583		1751	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.97	1.00		0.98	
Satd. Flow (perm)	1770	6239		3433	6309		1681	1718	1583		1751	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	99	1313	280	175	1079	123	296	74	121	63	30	35
RTOR Reduction (vph)	0	39	0	0	20	0	0	0	99	0	16	0
Lane Group Flow (vph)	99	1554	0	175	1182	0	184	186	22	0	113	0
Turn Type	Prot	NA		Prot	NA		Split	NA	Perm		Split	NA
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases									4			
Actuated Green, G (s)	7.2	33.7		8.6	35.1		14.2	14.2	14.2		10.5	
Effective Green, g (s)	8.7	35.2		10.1	36.6		16.2	16.2	16.2		12.5	
Actuated g/C Ratio	0.10	0.39		0.11	0.41		0.18	0.18	0.18		0.14	
Clearance Time (s)	5.5	5.5		5.5	5.5		6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	171	2440		385	2565		302	309	284		243	
v/s Ratio Prot	c0.06	c0.25		0.05	0.19		c0.11	0.11			c0.06	
v/s Ratio Perm									0.01			
v/c Ratio	0.58	0.64		0.45	0.46		0.61	0.60	0.08		0.46	
Uniform Delay, d1	38.9	22.2		37.4	19.5		34.0	33.9	30.7		35.7	
Progression Factor	0.71	1.33		1.28	0.64		1.00	1.00	1.00		1.00	
Incremental Delay, d2	4.2	1.1		0.8	0.5		3.5	3.3	0.1		1.4	
Delay (s)	31.6	30.7		48.8	13.1		37.4	37.2	30.8		37.1	
Level of Service	C	C		D	B		D	D	C		D	
Approach Delay (s)		30.8			17.6			35.7			37.1	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			26.7				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)				16.0		
Intersection Capacity Utilization			51.1%			ICU Level of Service				A		
Analysis Period (min)			15									

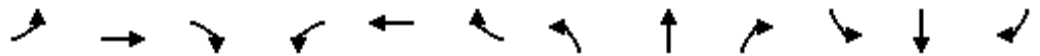
c Critical Lane Group

HCM 6th Signalized Intersection Summary

2034 Base Conditions

23: Zeier & E Wash

MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	98	1229	120	241	1162	76	200	51	241	107	39	62
Future Volume (veh/h)	98	1229	120	241	1162	76	200	51	241	107	39	62
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	103	1294	126	254	1223	80	211	54	254	113	41	65
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	99	2626	255	211	2718	177	518	281	238	157	60	96
Arrive On Green	0.04	0.29	0.29	0.12	0.87	0.87	0.15	0.15	0.15	0.09	0.09	0.09
Sat Flow, veh/h	1781	6008	583	3456	6218	405	3456	1870	1585	1737	666	1060
Grp Volume(v), veh/h	103	1039	381	254	948	355	211	54	254	116	0	103
Grp Sat Flow(s),veh/h/ln	1781	1609	1765	1728	1609	1797	1728	1870	1585	1784	0	1680
Q Serve(g_s), s	5.0	16.0	16.1	5.5	3.7	3.7	5.0	2.3	13.5	5.7	0.0	5.3
Cycle Q Clear(g_c), s	5.0	16.0	16.1	5.5	3.7	3.7	5.0	2.3	13.5	5.7	0.0	5.3
Prop In Lane	1.00		0.33	1.00		0.23	1.00		1.00	0.97		0.63
Lane Grp Cap(c), veh/h	99	2109	772	211	2109	786	518	281	238	162	0	152
V/C Ratio(X)	1.04	0.49	0.49	1.20	0.45	0.45	0.41	0.19	1.07	0.72	0.00	0.68
Avail Cap(c_a), veh/h	99	2109	772	211	2109	786	518	281	238	248	0	233
HCM Platoon Ratio	0.67	0.67	0.67	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.90	0.90	0.90	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	43.3	23.6	23.6	39.5	3.4	3.4	34.6	33.5	38.2	39.8	0.0	39.6
Incr Delay (d2), s/veh	101.9	0.8	2.3	124.6	0.6	1.7	0.5	0.3	77.6	5.8	0.0	5.2
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	6.4	7.4	5.8	0.9	1.3	2.1	1.1	10.3	2.8	0.0	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	145.3	24.4	25.9	164.1	4.0	5.1	35.1	33.8	115.9	45.6	0.0	44.8
LnGrp LOS	F	C	C	F	A	A	D	C	F	D	A	D
Approach Vol, veh/h		1523			1557			519			219	
Approach Delay, s/veh		32.9			30.4			74.5			45.2	
Approach LOS		C			C			E			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.0	45.3		14.7	11.0	45.3		19.0				
Change Period (Y+Rc), s	5.5	6.0		6.5	6.0	6.0		5.5				
Max Green Setting (Gmax), s	5.5	35.0		12.5	5.0	35.0		13.5				
Max Q Clear Time (g_c+I1), s	7.5	18.1		7.7	7.0	5.7		15.5				
Green Ext Time (p_c), s	0.0	8.6		0.5	0.0	10.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				38.3								
HCM 6th LOS				D								

HCM 6th Signalized Intersection Summary
24: E Springs & E Wash

2034 Base Conditions
MD Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↗	↖↗	↑↑↑	↖↗	↗
Traffic Volume (veh/h)	1400	175	389	1210	350	187
Future Volume (veh/h)	1400	175	389	1210	350	187
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	1474	0	409	1274	368	197
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2668		442	3632	517	237
Arrive On Green	1.00	0.00	0.13	0.71	0.15	0.15
Sat Flow, veh/h	5274	1585	3456	5274	3456	1585
Grp Volume(v), veh/h	1474	0	409	1274	368	197
Grp Sat Flow(s),veh/h/ln	1702	1585	1728	1702	1728	1585
Q Serve(g_s), s	0.0	0.0	10.5	8.6	9.1	10.9
Cycle Q Clear(g_c), s	0.0	0.0	10.5	8.6	9.1	10.9
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2668		442	3632	517	237
V/C Ratio(X)	0.55		0.93	0.35	0.71	0.83
Avail Cap(c_a), veh/h	2668		442	3632	595	273
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.79	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	38.8	5.0	36.4	37.1
Incr Delay (d2), s/veh	0.7	0.0	25.6	0.3	3.4	17.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	5.9	2.3	4.0	5.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.7	0.0	64.4	5.3	39.8	54.2
LnGrp LOS	A		E	A	D	D
Approach Vol, veh/h	1474	A		1683	565	
Approach Delay, s/veh	0.7			19.6	44.8	
Approach LOS	A			B	D	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	17.0	53.0		20.0		70.0
Change Period (Y+Rc), s	5.5	6.0		6.5		6.0
Max Green Setting (Gmax), s	11.5	45.0		15.5		62.0
Max Q Clear Time (g_c+I1), s	12.5	2.0		12.9		10.6
Green Ext Time (p_c), s	0.0	14.3		0.6		11.8

Intersection Summary

HCM 6th Ctrl Delay	15.9
HCM 6th LOS	B

Notes













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

HCM Signalized Intersection Capacity Analysis

2034 Base Conditions

1: Blair St. & East Washington Ave.

PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↔↔	↑↑		↔		↔↔	↔	↑↑	
Traffic Volume (vph)	0	1598	38	617	737	0	79	0	990	656	84	23
Future Volume (vph)	0	1598	38	617	737	0	79	0	990	656	84	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0		4.0	4.0	4.0	
Lane Util. Factor		0.91		0.97	0.95		1.00		0.88	0.91	0.91	
Frt		1.00		1.00	1.00		1.00		0.85	1.00	0.99	
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	0.96	
Satd. Flow (prot)		5067		3433	3539		1770		2787	1610	3241	
Flt Permitted		1.00		0.95	1.00		0.95		1.00	0.95	0.96	
Satd. Flow (perm)		5067		3433	3539		1770		2787	1610	3241	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	0	1833	44	708	846	0	91	0	1136	753	96	26
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	1875	0	708	846	0	91	0	1136	376	496	0
Turn Type		NA		Prot	NA		Prot		pt+ov	Split	NA	
Protected Phases		1		2	1 2		3		2 3	4	4	
Permitted Phases							3		3 2			
Actuated Green, G (s)		35.5		34.5	74.5		7.0		46.0	34.0	34.0	
Effective Green, g (s)		36.0		35.0	75.0		7.0		46.5	36.0	36.0	
Actuated g/C Ratio		0.28		0.27	0.58		0.05		0.36	0.28	0.28	
Clearance Time (s)		4.5		4.5			4.0			6.0	6.0	
Vehicle Extension (s)		3.0		3.0			2.0			3.0	3.0	
Lane Grp Cap (vph)		1403		924	2041		95		996	445	897	
v/s Ratio Prot		c0.37		0.21	0.24		0.05		c0.41	c0.23	0.15	
v/s Ratio Perm												
v/c Ratio		1.34		0.77	0.41		0.96		1.14	0.84	0.55	
Uniform Delay, d1		47.0		43.7	15.3		61.4		41.8	44.4	40.1	
Progression Factor		1.00		1.34	1.50		1.00		1.00	1.00	1.00	
Incremental Delay, d2		156.3		5.7	0.1		77.3		75.5	13.7	0.7	
Delay (s)		203.3		64.2	23.0		138.6		117.3	58.1	40.9	
Level of Service		F		E	C		F		F	E	D	
Approach Delay (s)		203.3			41.8			118.9			48.3	
Approach LOS		F			D			F			D	
Intersection Summary												
HCM 2000 Control Delay			114.7			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			1.15									
Actuated Cycle Length (s)			130.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			102.1%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
2: Livingston Ave & East Washington Ave.

2034 Base Conditions

PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↗	↑↑↑		↗	↑↑↑				↗			↗	
Traffic Volume (vph)	194	2982	68	75	1352	49	0	0	73	0	0	38	
Future Volume (vph)	194	2982	68	75	1352	49	0	0	73	0	0	38	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.0	5.0		5.0	5.0				5.0			5.0	
Lane Util. Factor	1.00	0.91		1.00	0.91				1.00			1.00	
Frt	1.00	1.00		1.00	0.99				0.86			0.86	
Flt Protected	0.95	1.00		0.95	1.00				1.00			1.00	
Satd. Flow (prot)	1770	5068		1770	5059				1611			1611	
Flt Permitted	0.13	1.00		0.04	1.00				1.00			1.00	
Satd. Flow (perm)	247	5068		73	5059				1611			1611	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	
Adj. Flow (vph)	223	3421	78	86	1551	56	0	0	84	0	0	44	
RTOR Reduction (vph)	0	2	0	0	2	0	0	0	15	0	0	38	
Lane Group Flow (vph)	223	3497	0	86	1605	0	0	0	69	0	0	6	
Turn Type	D.P+P	NA		D.Pm	NA				Prot			Over	
Protected Phases	4	2			6				8			4	
Permitted Phases	6			2									
Actuated Green, G (s)	120.0	102.0		102.0	102.0				18.0			18.0	
Effective Green, g (s)	120.0	102.0		102.0	102.0				18.0			18.0	
Actuated g/C Ratio	0.92	0.78		0.78	0.78				0.14			0.14	
Clearance Time (s)	5.0	5.0		5.0	5.0				5.0			5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0				3.0			3.0	
Lane Grp Cap (vph)	438	3976		57	3969				223			223	
v/s Ratio Prot	c0.07	0.69			0.32				0.04			0.00	
v/s Ratio Perm	0.40			c1.18									
v/c Ratio	0.51	0.88		1.51	0.40				0.31			0.03	
Uniform Delay, d1	2.1	9.7		14.0	4.4				50.4			48.4	
Progression Factor	2.74	1.21		1.09	0.13				1.00			1.00	
Incremental Delay, d2	0.1	0.3		295.3	0.3				0.8			0.0	
Delay (s)	5.8	12.1		310.6	0.9				51.2			48.5	
Level of Service	A	B		F	A				D			D	
Approach Delay (s)		11.7			16.6			51.2			48.5		
Approach LOS		B			B			D			D		
Intersection Summary													
HCM 2000 Control Delay			14.1									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			1.35										
Actuated Cycle Length (s)			130.0									Sum of lost time (s)	10.0
Intersection Capacity Utilization			77.7%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary
 3: Paterson St. & East Washington Ave.

2034 Base Conditions

PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	3436	43	33	1338	51	24	50	78	146	48	42
Future Volume (veh/h)	78	3436	43	33	1338	51	24	50	78	146	48	42
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	89	3942	49	38	1535	59	28	57	89	168	55	48
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	288	3715	1153	55	3715	1153	66	123	164	256	366	310
Arrive On Green	1.00	1.00	1.00	1.00	1.00	1.00	0.20	0.20	0.20	0.20	0.20	0.20
Sat Flow, veh/h	320	5106	1585	29	5106	1585	173	628	840	1242	1870	1585
Grp Volume(v), veh/h	89	3942	49	38	1535	59	174	0	0	168	55	48
Grp Sat Flow(s),veh/h/ln	320	1702	1585	29	1702	1585	1641	0	0	1242	1870	1585
Q Serve(g_s), s	0.0	94.6	0.0	0.5	0.0	0.0	3.3	0.0	0.0	10.5	3.2	3.3
Cycle Q Clear(g_c), s	0.0	94.6	0.0	94.6	0.0	0.0	12.0	0.0	0.0	22.5	3.2	3.3
Prop In Lane	1.00		1.00	1.00		1.00	0.16		0.51	1.00		1.00
Lane Grp Cap(c), veh/h	288	3715	1153	55	3715	1153	366	0	0	256	366	310
V/C Ratio(X)	0.31	1.06	0.04	0.68	0.41	0.05	0.48	0.00	0.00	0.66	0.15	0.15
Avail Cap(c_a), veh/h	288	3715	1153	55	3715	1153	515	0	0	371	540	457
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)	0.38	0.38	0.38	0.85	0.85	0.85	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	47.3	0.0	0.0	46.7	0.0	0.0	51.8	43.3	43.4
Incr Delay (d2), s/veh	1.1	30.4	0.0	45.4	0.3	0.1	1.0	0.0	0.0	2.8	0.2	0.2
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	10.5	0.0	1.9	0.1	0.0	5.1	0.0	0.0	5.6	1.5	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	1.1	30.4	0.0	92.7	0.3	0.1	47.7	0.0	0.0	54.7	43.5	43.6
LnGrp LOS	A	F	A	F	A	A	D	A	A	D	D	D
Approach Vol, veh/h		4080			1632			174			271	
Approach Delay, s/veh		29.4			2.4			47.7			50.5	
Approach LOS		C			A			D			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		99.6		30.4		99.6		30.4				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		82.5		37.5		82.5		37.5				
Max Q Clear Time (g_c+I1), s		96.6		24.5		96.6		14.0				
Green Ext Time (p_c), s		0.0		0.9		0.0		0.7				
Intersection Summary												
HCM 6th Ctrl Delay				23.7								
HCM 6th LOS				C								

HCM 6th Signalized Intersection Summary
 4: Ingersoll St. & East Washington Ave.

2034 Base Conditions

PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑	↗		↑	↗		↘	
Traffic Volume (veh/h)	67	3593	55	55	1414	30	56	18	41	76	34	71
Future Volume (veh/h)	67	3593	55	55	1414	30	56	18	41	76	34	71
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	77	4122	63	63	1622	34	64	21	47	87	39	81
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	249	3285	1020	105	3642	1131	201	59	320	126	57	92
Arrive On Green	0.86	0.86	0.86	0.06	1.00	1.00	0.22	0.20	0.20	0.22	0.20	0.20
Sat Flow, veh/h	301	5106	1585	1781	5106	1585	752	290	1585	428	284	457
Grp Volume(v), veh/h	77	4122	63	63	1622	34	85	0	47	207	0	0
Grp Sat Flow(s),veh/h/ln	301	1702	1585	1781	1702	1585	1042	0	1585	1169	0	0
Q Serve(g_s), s	7.3	83.6	0.8	1.5	0.0	0.0	0.0	0.0	3.2	14.3	0.0	0.0
Cycle Q Clear(g_c), s	7.3	83.6	0.8	1.5	0.0	0.0	9.4	0.0	3.2	23.7	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.75		1.00	0.42		0.39
Lane Grp Cap(c), veh/h	249	3285	1020	105	3642	1131	279	0	320	298	0	0
V/C Ratio(X)	0.31	1.25	0.06	0.60	0.45	0.03	0.30	0.00	0.15	0.69	0.00	0.00
Avail Cap(c_a), veh/h	249	3285	1020	110	3642	1131	393	0	451	423	0	0
HCM Platoon Ratio	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.09	0.88	0.88	0.88	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	3.9	9.4	3.4	33.9	0.0	0.0	44.1	0.0	42.7	52.3	0.0	0.0
Incr Delay (d2), s/veh	0.3	114.8	0.0	7.3	0.3	0.0	0.6	0.0	0.2	2.9	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	0.4	43.1	0.3	1.5	0.1	0.0	2.4	0.0	1.3	6.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.2	124.2	3.4	41.1	0.3	0.0	44.7	0.0	42.9	55.3	0.0	0.0
LnGrp LOS	A	F	A	D	A	A	D	A	D	E	A	A
Approach Vol, veh/h		4262			1719			132			207	
Approach Delay, s/veh		120.3			1.8			44.0			55.3	
Approach LOS		F			A			D			E	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	9.1	88.1		32.8		97.2		32.8				
Change Period (Y+Rc), s	5.5	4.5		6.5		4.5		6.5				
Max Green Setting (Gmax), s	4.0	72.5		37.0		82.0		37.0				
Max Q Clear Time (g_c+l1), s	3.5	85.6		25.7		2.0		11.4				
Green Ext Time (p_c), s	0.0	0.0		0.6		12.3		0.5				

Intersection Summary

HCM 6th Ctrl Delay	84.3
HCM 6th LOS	F

HCM 6th Signalized Intersection Summary
 5: Baldwin St. & East Washington Ave.

2034 Base Conditions

PM Peak


































Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	121	3607	46	42	1395	84	31	81	86	153	82	81
Future Volume (veh/h)	121	3607	46	42	1395	84	31	81	86	153	82	81
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	139	4139	53	48	1601	96	36	93	99	176	94	93
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	192	2934	911	114	3260	1012	35	72	451	46	0	451
Arrive On Green	1.00	1.00	1.00	0.03	0.64	0.64	0.29	0.28	0.28	0.29	0.28	0.28
Sat Flow, veh/h	289	5106	1585	1781	5106	1585	0	254	1585	0	0	1585
Grp Volume(v), veh/h	139	4139	53	48	1601	96	129	0	99	270	0	93
Grp Sat Flow(s),veh/h/ln	289	1702	1585	1781	1702	1585	254	0	1585	0	0	1585
Q Serve(g_s), s	61.5	0.0	0.0	1.4	21.5	3.0	0.0	0.0	6.2	0.0	0.0	5.8
Cycle Q Clear(g_c), s	74.7	0.0	0.0	1.4	21.5	3.0	38.0	0.0	6.2	38.0	0.0	5.8
Prop In Lane	1.00		1.00	1.00		1.00	0.28		1.00	0.65		1.00
Lane Grp Cap(c), veh/h	192	2934	911	114	3260	1012	110	0	451	46	0	451
V/C Ratio(X)	0.72	1.41	0.06	0.42	0.49	0.09	1.18	0.00	0.22	5.90	0.00	0.21
Avail Cap(c_a), veh/h	192	2934	911	123	3260	1012	110	0	451	46	0	451
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	0.60	0.60	0.60	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.0	0.0	0.0	22.2	12.4	9.0	41.7	0.0	35.5	65.5	0.0	35.3
Incr Delay (d2), s/veh	2.2	184.9	0.0	1.5	0.3	0.1	141.2	0.0	0.2	2252.5	0.0	0.2
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	50.2	0.0	0.8	7.8	1.0	7.0	0.0	2.5	30.1	0.0	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.2	184.9	0.0	23.7	12.7	9.2	183.0	0.0	35.7	2318.0	0.0	35.6
LnGrp LOS	A	F	A	C	B	A	F	A	D	F	A	D
Approach Vol, veh/h		4331			1745			228				363
Approach Delay, s/veh		177.0			12.8			119.0				1733.3
Approach LOS		F			B			F				F
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	8.3	79.7		42.0		88.0		42.0				
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s	4.0	74.0		37.0		83.0		37.0				
Max Q Clear Time (g_c+l1), s	3.4	76.7		40.0		23.5		40.0				
Green Ext Time (p_c), s	0.0	0.0		0.0		12.4		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				216.8								
HCM 6th LOS				F								

HCM Signalized Intersection Capacity Analysis

2034 Base Conditions

6: First & E Wash

PM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	 	  			  						 	 	
Traffic Volume (vph)	397	3162	178	44	1261	125	128	203	128	178	178	194	
Future Volume (vph)	397	3162	178	44	1261	125	128	203	128	178	178	194	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.5	6.5	6.5	
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.88	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	2787	
Flt Permitted	0.95	1.00	1.00	0.08	1.00	1.00	0.45	1.00	1.00	0.61	1.00	1.00	
Satd. Flow (perm)	3433	5085	1583	143	5085	1583	842	1863	1583	1134	1863	2787	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	
Adj. Flow (vph)	470	3746	211	52	1494	148	152	241	152	211	211	230	
RTOR Reduction (vph)	0	0	134	0	0	96	0	0	99	0	0	55	
Lane Group Flow (vph)	470	3746	77	52	1494	52	152	241	53	211	211	175	
Turn Type	Prot	NA	custom	D.P+P	NA	Perm	D.P+P	NA	Perm	Perm	NA	custom	
Protected Phases	1	6		5	2		3	3 4				4	
Permitted Phases			2	6		2	4		3 4	4		4 1	
Actuated Green, G (s)	20.1	52.0	35.4	56.0	35.4	35.4	22.5	27.5	27.5	16.5	16.5	43.1	
Effective Green, g (s)	20.1	52.0	35.4	56.0	35.4	35.4	22.5	27.5	27.5	16.5	16.5	43.1	
Actuated g/C Ratio	0.20	0.52	0.35	0.56	0.35	0.35	0.22	0.28	0.28	0.16	0.16	0.43	
Clearance Time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0			6.5	6.5		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0		
Lane Grp Cap (vph)	690	2644	560	145	1800	560	245	512	435	187	307	1201	
v/s Ratio Prot	c0.14	c0.74		0.01	0.29		0.04	c0.13				0.11	
v/s Ratio Perm			0.05	0.19		0.03	0.10		0.03	c0.19		0.06	
v/c Ratio	0.68	1.42	0.14	0.36	0.83	0.09	0.62	0.47	0.12	1.13	0.69	0.15	
Uniform Delay, d1	37.0	24.0	21.9	21.8	29.5	21.6	33.7	30.2	27.2	41.8	39.3	17.3	
Progression Factor	1.00	1.00	1.00	2.08	1.06	4.16	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.8	189.8	0.5	1.4	4.4	0.3	4.8	0.7	0.1	104.5	6.3	0.1	
Delay (s)	39.8	213.8	22.5	46.9	35.6	90.1	38.6	30.9	27.3	146.3	45.6	17.3	
Level of Service	D	F	C	D	D	F	D	C	C	F	D	B	
Approach Delay (s)		186.2			40.7			32.0			68.2		
Approach LOS		F			D			C			E		
Intersection Summary													
HCM 2000 Control Delay			130.5									HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio			1.29										
Actuated Cycle Length (s)			100.0									Sum of lost time (s)	22.0
Intersection Capacity Utilization			110.2%									ICU Level of Service	H
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary

2034 Base Conditions

7: Fourth & E Wash

PM Peak



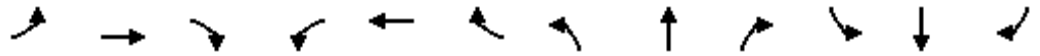
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	3316	15	31	1359	32	19	31	26	53	19	20
Future Volume (veh/h)	24	3316	15	31	1359	32	19	31	26	53	19	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		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	28	3929	18	37	1610	38	23	37	31	63	23	24
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	260	3166	983	73	3166	983	50	60	420	62	14	420
Arrive On Green	1.00	1.00	1.00	1.00	1.00	1.00	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	303	5106	1585	30	5106	1585	0	227	1585	0	52	1585
Grp Volume(v), veh/h	28	3929	18	37	1610	38	60	0	31	86	0	24
Grp Sat Flow(s),veh/h/ln	303	1702	1585	30	1702	1585	227	0	1585	52	0	1585
Q Serve(g_s), s	0.0	62.0	0.0	2.2	0.0	0.0	0.0	0.0	1.5	0.0	0.0	1.1
Cycle Q Clear(g_c), s	0.0	62.0	0.0	62.0	0.0	0.0	26.5	0.0	1.5	26.5	0.0	1.1
Prop In Lane	1.00		1.00	1.00		1.00	0.38		1.00	0.73		1.00
Lane Grp Cap(c), veh/h	260	3166	983	73	3166	983	110	0	420	76	0	420
V/C Ratio(X)	0.11	1.24	0.02	0.51	0.51	0.04	0.55	0.00	0.07	1.13	0.00	0.06
Avail Cap(c_a), veh/h	260	3166	983	73	3166	983	110	0	420	76	0	420
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)	0.09	0.09	0.09	0.92	0.92	0.92	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	31.0	0.0	0.0	30.6	0.0	27.6	45.3	0.0	27.4
Incr Delay (d2), s/veh	0.1	108.8	0.0	21.6	0.5	0.1	5.5	0.0	0.1	143.1	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	0.0	31.9	0.0	1.3	0.2	0.0	1.3	0.0	0.6	4.9	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.1	108.8	0.0	52.5	0.5	0.1	36.1	0.0	27.6	188.4	0.0	27.5
LnGrp LOS	A	F	A	D	A	A	D	A	C	F	A	C
Approach Vol, veh/h		3975			1685			91				110
Approach Delay, s/veh		107.5			1.7			33.2				153.3
Approach LOS		F			A			C				F
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		67.0		33.0		67.0		33.0				
Change Period (Y+Rc), s		5.0		6.5		5.0		6.5				
Max Green Setting (Gmax), s		62.0		26.5		62.0		26.5				
Max Q Clear Time (g_c+I1), s		64.0		28.5		64.0		28.5				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				76.8								
HCM 6th LOS				E								

HCM 6th Signalized Intersection Summary

2034 Base Conditions

8: Sixth & E Wash

PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑	↗	↘	↗			↕	
Traffic Volume (veh/h)	21	3310	22	32	1349	14	21	16	30	42	44	26
Future Volume (veh/h)	21	3310	22	32	1349	14	21	16	30	42	44	26
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	25	3922	26	38	1598	17	25	19	36	50	52	31
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	257	3561	1105	130	3983	1236	188	64	120	97	74	37
Arrive On Green	0.93	0.93	0.93	0.02	0.52	0.52	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	313	5106	1585	1781	5106	1585	1315	578	1095	429	674	335
Grp Volume(v), veh/h	25	3922	26	38	1598	17	25	0	55	133	0	0
Grp Sat Flow(s),veh/h/ln	313	1702	1585	1781	1702	1585	1315	0	1673	1439	0	0
Q Serve(g_s), s	1.9	69.7	0.1	0.5	18.9	0.5	0.0	0.0	3.0	6.2	0.0	0.0
Cycle Q Clear(g_c), s	12.6	69.7	0.1	0.5	18.9	0.5	2.3	0.0	3.0	9.2	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.65	0.38		0.23
Lane Grp Cap(c), veh/h	257	3561	1105	130	3983	1236	188	0	184	208	0	0
V/C Ratio(X)	0.10	1.10	0.02	0.29	0.40	0.01	0.13	0.00	0.30	0.64	0.00	0.00
Avail Cap(c_a), veh/h	257	3561	1105	179	3983	1236	188	0	184	208	0	0
HCM Platoon Ratio	1.33	1.33	1.33	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.20	0.20	0.20	0.72	0.72	0.72	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	2.8	3.6	1.1	29.2	9.8	5.4	40.6	0.0	41.0	43.9	0.0	0.0
Incr Delay (d2), s/veh	0.2	46.7	0.0	0.9	0.2	0.0	0.3	0.0	0.9	6.4	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	0.1	17.2	0.0	0.7	7.6	0.1	0.6	0.0	1.3	3.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	3.0	50.3	1.1	30.1	10.0	5.4	40.9	0.0	41.8	50.4	0.0	0.0
LnGrp LOS	A	F	A	C	A	A	D	A	D	D	A	A
Approach Vol, veh/h		3973			1653			80			133	
Approach Delay, s/veh		49.7			10.4			41.6			50.4	
Approach LOS		D			B			D			D	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	8.3	74.7		17.0		83.0		17.0				
Change Period (Y+Rc), s	5.0	5.0		6.0		5.0		6.0				
Max Green Setting (Gmax), s	6.0	67.0		11.0		78.0		11.0				
Max Q Clear Time (g_c+l1), s	2.5	71.7		11.2		20.9		5.0				
Green Ext Time (p_c), s	0.0	0.0		0.0		11.6		0.1				

Intersection Summary

HCM 6th Ctrl Delay	38.5
HCM 6th LOS	D

Notes

























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

HCM Signalized Intersection Capacity Analysis

2034 Base Conditions

9: Milwaukee/North & E Wash

PM Peak





















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	2919	431	46	1155	19	322	82	39	42	177	80
Future Volume (vph)	80	2919	431	46	1155	19	322	82	39	42	177	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	6.5	6.5		5.0	5.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.97	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1773		1770	1776	
Flt Permitted	0.12	1.00	1.00	0.09	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	221	5085	1583	160	5085	1583	3433	1773		1770	1776	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	95	3458	511	54	1368	23	382	97	46	50	210	95
RTOR Reduction (vph)	0	0	72	0	0	22	0	17	0	0	16	0
Lane Group Flow (vph)	95	3458	439	55	1368	1	382	126	0	50	289	0
Turn Type	D.P+P	NA	custom	D.P+P	NA	custom	Split	NA		Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases	6		1 2	2		1						
Actuated Green, G (s)	52.2	46.5	56.7	52.2	45.5	5.7	13.3	13.3		14.0	14.0	
Effective Green, g (s)	52.2	46.5	56.7	52.2	45.5	5.7	13.3	13.3		14.0	14.0	
Actuated g/C Ratio	0.52	0.46	0.57	0.52	0.46	0.06	0.13	0.13		0.14	0.14	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	6.5	6.5		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	219	2364	897	175	2313	90	456	235		247	248	
v/s Ratio Prot	0.03	c0.68		0.02	0.27		c0.11	0.07		0.03	c0.16	
v/s Ratio Perm	0.20		c0.28	0.15		0.00						
v/c Ratio	0.43	1.46	0.49	0.31	0.59	0.01	0.84	0.53		0.20	1.16	
Uniform Delay, d1	14.0	26.8	13.0	21.1	20.3	44.5	42.3	40.5		38.1	43.0	
Progression Factor	0.72	1.03	0.87	1.45	0.35	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	208.5	0.0	1.0	1.0	0.1	12.6	2.3		0.4	108.7	
Delay (s)	10.6	236.1	11.3	31.5	8.1	44.6	54.9	42.8		38.5	151.7	
Level of Service	B	F	B	C	A	D	D	D		D	F	
Approach Delay (s)		202.5			9.6			51.6			135.8	
Approach LOS		F			A			D			F	
Intersection Summary												
HCM 2000 Control Delay			142.8			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			1.25									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.5			
Intersection Capacity Utilization			107.4%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2034 Base Conditions

10: Johnson & E Wash

PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	2520	18	51	1140	116	20	16	51	236	21	11
Future Volume (vph)	12	2520	18	51	1140	116	20	16	51	236	21	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		5.0		6.0	6.0	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00		1.00		0.95	0.95	
Frt	1.00	1.00		1.00	1.00	0.85		0.92		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	0.96	
Satd. Flow (prot)	1770	5080		1770	5085	1583		1696		1681	1684	
Flt Permitted	0.16	1.00		0.07	1.00	1.00		0.99		0.69	0.71	
Satd. Flow (perm)	290	5080		125	5085	1583		1696		1222	1243	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	14	2986	21	60	1351	137	24	19	60	280	25	13
RTOR Reduction (vph)	0	1	0	0	0	43	0	38	0	0	3	0
Lane Group Flow (vph)	14	3006	0	60	1351	94	0	65	0	160	155	0
Turn Type	Perm	NA		Perm	NA	Perm	Split	NA		Perm	NA	
Protected Phases		2			2		3	3			4	
Permitted Phases	2			2		2				4		
Actuated Green, G (s)	59.7	59.7		59.7	59.7	59.7		7.9		16.9	16.9	
Effective Green, g (s)	59.7	59.7		59.7	59.7	59.7		7.9		16.9	16.9	
Actuated g/C Ratio	0.60	0.60		0.60	0.60	0.60		0.08		0.17	0.17	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		5.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	173	3032		74	3035	945		133		206	210	
v/s Ratio Prot		c0.59			0.27			c0.04				
v/s Ratio Perm	0.05			0.48		0.06				c0.13	0.12	
v/c Ratio	0.08	0.99		0.81	0.45	0.10		0.49		0.78	0.74	
Uniform Delay, d1	8.5	19.9		15.7	11.1	8.6		44.1		39.7	39.4	
Progression Factor	2.28	2.28		0.64	0.54	0.22		1.00		1.00	1.00	
Incremental Delay, d2	0.1	3.3		57.5	0.4	0.2		2.8		16.6	12.6	
Delay (s)	19.6	48.7		67.5	6.5	2.1		47.0		56.4	52.0	
Level of Service	B	D		E	A	A		D		E	D	
Approach Delay (s)		48.6			8.4			47.0			54.2	
Approach LOS		D			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			36.5				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)		15.5			
Intersection Capacity Utilization			77.0%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 11: Marquette & E Wash

2034 Base Conditions
 PM Peak



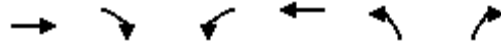
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↗	↖	↑↑↑	↘	↙
Traffic Volume (vph)	3167	47	70	1281	84	110
Future Volume (vph)	3167	47	70	1281	84	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.0	4.5	6.5	
Lane Util. Factor	0.91	1.00	1.00	0.91	1.00	
Frt	1.00	0.85	1.00	1.00	0.92	
Flt Protected	1.00	1.00	0.95	1.00	0.98	
Satd. Flow (prot)	5085	1583	1770	5085	1684	
Flt Permitted	1.00	1.00	0.06	1.00	0.98	
Satd. Flow (perm)	5085	1583	112	5085	1684	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	3752	56	83	1518	100	130
RTOR Reduction (vph)	0	7	0	0	47	0
Lane Group Flow (vph)	3752	49	83	1518	183	0
Turn Type	NA	Perm	D.P+P	NA	Prot	
Protected Phases	2		3	2 3	4	
Permitted Phases		2	2			
Actuated Green, G (s)	66.5	66.5	73.5	78.0	11.5	
Effective Green, g (s)	66.5	66.5	73.5	78.0	11.5	
Actuated g/C Ratio	0.66	0.66	0.74	0.78	0.12	
Clearance Time (s)	4.5	4.5	4.0		6.5	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	3381	1052	198	3966	193	
v/s Ratio Prot	c0.74		0.03	c0.30	c0.11	
v/s Ratio Perm		0.03	0.28			
v/c Ratio	1.11	0.05	0.42	0.38	0.95	
Uniform Delay, d1	16.8	5.8	41.4	3.4	44.0	
Progression Factor	0.70	1.42	1.08	0.43	1.00	
Incremental Delay, d2	52.2	0.0	1.3	0.1	49.5	
Delay (s)	63.9	8.3	46.3	1.6	93.5	
Level of Service	E	A	D	A	F	
Approach Delay (s)	63.1			3.9	93.5	
Approach LOS	E			A	F	

Intersection Summary			
HCM 2000 Control Delay	47.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	88.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
12: EB Ramps & E Wash

2034 Base Conditions

PM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↑↑	↑	↑↑↑	↑↑	↑↑
Traffic Volume (vph)	1973	1041	97	1369	112	262
Future Volume (vph)	1973	1041	97	1369	112	262
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.91	0.88	1.00	0.91	0.97	0.88
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)	5085	2787	1770	5085	3433	2787
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	2787	1770	5085	3433	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	2264	1194	111	1571	129	301
RTOR Reduction (vph)	0	71	0	0	0	1
Lane Group Flow (vph)	2264	1123	111	1571	129	300
Turn Type	NA	custom	Prot	NA	Prot	custom
Protected Phases	5	5 2	3	1 8	7	7 8 3
Permitted Phases		2				8
Actuated Green, G (s)	47.3	81.3	8.7	78.8	11.2	42.7
Effective Green, g (s)	47.3	81.3	8.7	78.8	11.2	42.7
Actuated g/C Ratio	0.47	0.81	0.09	0.79	0.11	0.43
Clearance Time (s)	5.0		5.0		5.0	
Vehicle Extension (s)	3.0		3.0		3.0	
Lane Grp Cap (vph)	2405	2265	153	4006	384	1190
v/s Ratio Prot	c0.45	c0.40	c0.06	0.31	0.04	0.11
v/s Ratio Perm						
v/c Ratio	0.94	0.50	0.73	0.39	0.34	0.25
Uniform Delay, d1	25.0	2.9	44.5	3.3	41.0	18.4
Progression Factor	0.90	0.00	0.80	0.22	1.00	1.00
Incremental Delay, d2	1.0	0.1	15.0	0.1	0.5	0.1
Delay (s)	23.5	0.1	50.5	0.8	41.5	18.5
Level of Service	C	A	D	A	D	B
Approach Delay (s)	15.4			4.1	25.4	
Approach LOS	B			A	C	

Intersection Summary

HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	63.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 13: East Wash & WB Ramps

2034 Base Conditions

PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	159	2131	1066	260	61	269
Future Volume (vph)	159	2131	1066	260	61	269
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.91	0.91	1.00	0.97	0.88
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	3433	2787
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	5085	5085	1583	3433	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	182	2445	1223	298	70	309
RTOR Reduction (vph)	0	0	0	60	0	91
Lane Group Flow (vph)	182	2445	1223	238	70	218
Turn Type	Prot	NA	NA	custom	Prot	pt+ov
Protected Phases	1	6	2		8	8 1
Permitted Phases				6		
Actuated Green, G (s)	13.0	79.9	61.9	79.9	10.1	28.1
Effective Green, g (s)	13.0	79.9	61.9	79.9	10.1	28.1
Actuated g/C Ratio	0.13	0.80	0.62	0.80	0.10	0.28
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	230	4062	3147	1264	346	783
v/s Ratio Prot	c0.10	c0.48	0.24		0.02	c0.08
v/s Ratio Perm				0.15		
v/c Ratio	0.79	0.60	0.39	0.19	0.20	0.28
Uniform Delay, d1	42.2	3.9	9.6	2.4	41.3	28.0
Progression Factor	0.72	3.94	0.31	0.05	1.00	1.00
Incremental Delay, d2	9.2	0.3	0.3	0.3	0.3	0.2
Delay (s)	39.4	15.7	3.3	0.4	41.5	28.2
Level of Service	D	B	A	A	D	C
Approach Delay (s)		17.3	2.7		30.7	
Approach LOS		B	A		C	
Intersection Summary						
HCM 2000 Control Delay			13.5		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.62			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	15.0
Intersection Capacity Utilization			56.5%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Signalized Intersection Summary
 16: Fair Oaks/Wright & East Wash

2034 Base Conditions

PM Peak

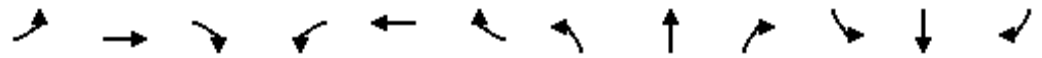


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑		↗	↑↑↑			↕		↗	↑	↗
Traffic Volume (veh/h)	150	1950	47	154	1014	90	55	136	210	70	273	142
Future Volume (veh/h)	150	1950	47	154	1014	90	55	136	210	70	273	142
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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	178	2310	56	182	1201	107	65	161	249	83	323	168
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	222	2767	67	232	2604	232	65	96	303	115	393	333
Arrive On Green	0.25	1.00	1.00	0.13	0.55	0.54	0.21	0.21	0.18	0.21	0.21	0.21
Sat Flow, veh/h	1781	5128	124	1781	4773	425	88	458	1442	976	1870	1585
Grp Volume(v), veh/h	178	1531	835	182	856	452	226	0	249	83	323	168
Grp Sat Flow(s),veh/h/ln	1781	1702	1848	1781	1702	1794	546	0	1442	976	1870	1585
Q Serve(g_s), s	9.4	0.0	0.0	9.9	15.3	15.3	4.5	0.0	16.6	4.4	16.5	9.4
Cycle Q Clear(g_c), s	9.4	0.0	0.0	9.9	15.3	15.3	21.0	0.0	16.6	21.0	16.5	9.4
Prop In Lane	1.00		0.07	1.00		0.24	0.29		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	222	1837	997	232	1857	979	161	0	303	115	393	333
V/C Ratio(X)	0.80	0.83	0.84	0.78	0.46	0.46	1.40	0.00	0.82	0.72	0.82	0.50
Avail Cap(c_a), veh/h	267	1837	997	303	1857	979	161	0	303	115	393	333
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)	1.00	1.00	1.00	0.76	0.76	0.76	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.4	0.0	0.0	42.1	13.8	13.9	43.0	0.0	39.2	48.9	37.7	34.9
Incr Delay (d2), s/veh	13.7	4.6	8.3	7.4	0.6	1.2	214.5	0.0	16.4	20.0	13.1	1.2
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	4.4	1.2	2.3	4.7	5.6	6.1	13.6	0.0	7.3	2.7	8.9	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.1	4.6	8.3	49.5	14.4	15.1	257.5	0.0	55.6	68.8	50.9	36.1
LnGrp LOS	D	A	A	D	B	B	F	A	E	E	D	D
Approach Vol, veh/h		2544			1490			475			574	
Approach Delay, s/veh		9.0			18.9			151.7			49.1	
Approach LOS		A			B			F			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	17.0	58.0		25.0	16.4	58.6		25.0				
Change Period (Y+Rc), s	5.0	5.0		7.0	5.0	5.0		7.0				
Max Green Setting (Gmax), s	16.0	49.0		18.0	14.0	51.0		18.0				
Max Q Clear Time (g_c+l1), s	11.9	2.0		23.0	11.4	17.3		23.0				
Green Ext Time (p_c), s	0.2	20.5		0.0	0.1	7.1		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				29.8								
HCM 6th LOS				C								

HCM 6th Signalized Intersection Summary
 18: Mendota & East Wash

2034 Base Conditions

PM Peak

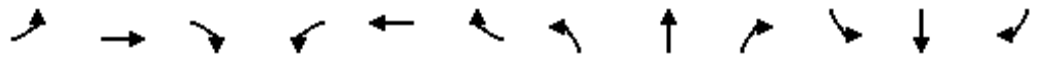


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑			↕			↕	
Traffic Volume (veh/h)	29	2583	171	103	1406	21	182	5	90	47	7	29
Future Volume (veh/h)	29	2583	171	103	1406	21	182	5	90	47	7	29
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	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	34	3060	203	122	1666	25	216	6	107	56	8	34
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	319	3255	1010	171	3398	51	306	15	262	154	31	68
Arrive On Green	0.03	0.64	0.64	0.11	1.00	1.00	0.19	0.19	0.17	0.19	0.19	0.17
Sat Flow, veh/h	1781	5106	1585	1781	5183	78	1233	77	1377	513	164	360
Grp Volume(v), veh/h	34	3060	203	122	1094	597	216	0	113	98	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1856	1233	0	1454	1037	0	0
Q Serve(g_s), s	0.6	54.2	5.3	2.3	0.0	0.0	5.9	0.0	6.9	4.6	0.0	0.0
Cycle Q Clear(g_c), s	0.6	54.2	5.3	2.3	0.0	0.0	17.4	0.0	6.9	11.5	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.04	1.00		0.95	0.57		0.35
Lane Grp Cap(c), veh/h	319	3255	1010	171	2232	1217	306	0	276	254	0	0
V/C Ratio(X)	0.11	0.94	0.20	0.71	0.49	0.49	0.71	0.00	0.41	0.39	0.00	0.00
Avail Cap(c_a), veh/h	364	3255	1010	220	2232	1217	306	0	276	254	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.09	0.80	0.80	0.80	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.5	16.4	7.5	23.8	0.0	0.0	40.2	0.0	36.2	38.6	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.8	0.0	6.0	0.6	1.1	7.2	0.0	1.0	1.0	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	17.4	1.6	1.9	0.2	0.4	5.8	0.0	2.5	2.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.5	17.2	7.6	29.8	0.6	1.1	47.4	0.0	37.2	39.6	0.0	0.0
LnGrp LOS	A	B	A	C	A	A	D	A	D	D	A	A
Approach Vol, veh/h		3297			1813			329				98
Approach Delay, s/veh		16.5			2.8			43.9				39.6
Approach LOS		B			A			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.4	69.6		23.0	9.3	67.7		23.0				
Change Period (Y+Rc), s	5.0	5.0		5.5	5.0	5.0		5.5				
Max Green Setting (Gmax), s	5.0	62.0		17.5	7.0	60.0		17.5				
Max Q Clear Time (g_c+l1), s	2.6	2.0		13.5	4.3	56.2		19.4				
Green Ext Time (p_c), s	0.0	10.8		0.1	0.1	3.6		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				14.0								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary
 19: Lien & East Wash

2034 Base Conditions

PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑		↖	↗			↕	
Traffic Volume (veh/h)	48	2447	416	76	1381	19	214	10	46	21	11	30
Future Volume (veh/h)	48	2447	416	76	1381	19	214	10	46	21	11	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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	57	2899	493	90	1636	23	254	12	54	25	13	36
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	344	3115	967	170	3165	44	385	65	293	142	83	167
Arrive On Green	0.07	0.81	0.81	0.10	1.00	1.00	0.22	0.22	0.20	0.22	0.22	0.20
Sat Flow, veh/h	1781	5106	1585	1781	5188	73	1356	296	1334	426	377	760
Grp Volume(v), veh/h	57	2899	493	90	1073	586	254	0	66	74	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1857	1356	0	1630	1563	0	0
Q Serve(g_s), s	0.0	43.7	10.0	0.0	0.0	0.0	13.1	0.0	3.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	43.7	10.0	0.0	0.0	0.0	16.6	0.0	3.3	3.5	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.04	1.00		0.82	0.34		0.49
Lane Grp Cap(c), veh/h	344	3115	967	170	2076	1133	385	0	359	392	0	0
V/C Ratio(X)	0.17	0.93	0.51	0.53	0.52	0.52	0.66	0.00	0.18	0.19	0.00	0.00
Avail Cap(c_a), veh/h	344	3115	967	170	2076	1133	385	0	359	392	0	0
HCM Platoon Ratio	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.22	0.22	0.22	0.82	0.82	0.82	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.0	7.8	4.6	41.9	0.0	0.0	36.5	0.0	32.4	32.2	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.6	0.4	2.5	0.8	1.4	4.1	0.0	0.2	1.1	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	5.3	2.2	2.1	0.2	0.4	6.1	0.0	1.3	1.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.0	9.4	5.0	44.4	0.8	1.4	40.6	0.0	32.6	33.3	0.0	0.0
LnGrp LOS	A	A	A	D	A	A	D	A	C	C	A	A
Approach Vol, veh/h		3449			1749			320				74
Approach Delay, s/veh		8.8			3.2			39.0				33.3
Approach LOS		A			A			D				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	65.0		26.0	9.0	65.0		26.0				
Change Period (Y+Rc), s	5.0	5.0		6.0	5.0	5.0		6.0				
Max Green Setting (Gmax), s	4.0	60.0		20.0	4.0	60.0		20.0				
Max Q Clear Time (g_c+l1), s	2.0	45.7		18.6	2.0	2.0		5.5				
Green Ext Time (p_c), s	0.0	13.0		0.2	0.0	10.4		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			9.1									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary
 20: Thierer/Portage & East Wash

2034 Base Conditions

PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑	↗	↘	↗		↘	↑	↗
Traffic Volume (veh/h)	150	2119	187	71	1152	35	211	59	71	54	92	53
Future Volume (veh/h)	150	2119	187	71	1152	35	211	59	71	54	92	53
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	178	2511	222	84	1365	41	250	70	84	64	109	63
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	196	3098	962	131	2910	903	255	155	186	220	374	317
Arrive On Green	0.22	1.00	1.00	0.15	1.00	1.00	0.20	0.20	0.17	0.20	0.20	0.20
Sat Flow, veh/h	1781	5106	1585	1781	5106	1585	1213	774	929	1233	1870	1585
Grp Volume(v), veh/h	178	2511	222	84	1365	41	250	0	154	64	109	63
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1585	1213	0	1703	1233	1870	1585
Q Serve(g_s), s	9.7	0.0	0.0	4.4	0.0	0.0	15.0	0.0	8.0	4.8	5.0	3.3
Cycle Q Clear(g_c), s	9.7	0.0	0.0	4.4	0.0	0.0	20.0	0.0	8.0	12.9	5.0	3.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.55	1.00		1.00
Lane Grp Cap(c), veh/h	196	3098	962	131	2910	903	255	0	341	220	374	317
V/C Ratio(X)	0.91	0.81	0.23	0.64	0.47	0.05	0.98	0.00	0.45	0.29	0.29	0.20
Avail Cap(c_a), veh/h	196	3098	962	160	2910	903	255	0	341	220	374	317
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)	0.24	0.24	0.24	0.85	0.85	0.85	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.5	0.0	0.0	41.4	0.0	0.0	44.5	0.0	35.8	40.9	34.0	33.3
Incr Delay (d2), s/veh	14.0	0.6	0.1	5.2	0.5	0.1	51.3	0.0	0.9	0.7	0.4	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	4.4	0.2	0.0	2.0	0.1	0.0	9.8	0.0	3.4	1.5	2.3	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.5	0.6	0.1	46.6	0.5	0.1	95.8	0.0	36.8	41.6	34.4	33.6
LnGrp LOS	D	A	A	D	A	A	F	A	D	D	C	C
Approach Vol, veh/h		2911			1490			404			236	
Approach Delay, s/veh		3.7			3.1			73.3			36.1	
Approach LOS		A			A			E			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.3	64.7		24.0	15.0	61.0		24.0				
Change Period (Y+Rc), s	5.5	5.5		6.5	5.5	5.5		6.5				
Max Green Setting (Gmax), s	7.5	57.5		17.5	9.5	55.5		17.5				
Max Q Clear Time (g_c+l1), s	6.4	2.0		14.9	11.7	2.0		22.0				
Green Ext Time (p_c), s	0.0	29.5		0.2	0.0	8.8		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				10.6								
HCM 6th LOS				B								

HCM Signalized Intersection Capacity Analysis

21: Eagan/Continental & East Wash

2034 Base Conditions

PM Peak



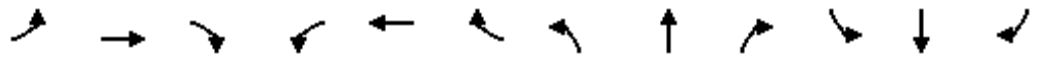
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	117	1984	371	119	955	113	325	55	145	82	32	78
Future Volume (vph)	117	1984	371	119	955	113	325	55	145	82	32	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.86		0.97	0.86		0.95	0.95	1.00		1.00	
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85		0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.97	1.00		0.98	
Satd. Flow (prot)	1770	6256		3433	6306		1681	1709	1583		1724	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.97	1.00		0.98	
Satd. Flow (perm)	1770	6256		3433	6306		1681	1709	1583		1724	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	139	2351	440	141	1131	134	385	65	172	97	38	92
RTOR Reduction (vph)	0	31	0	0	20	0	0	0	137	0	25	0
Lane Group Flow (vph)	139	2760	0	141	1245	0	223	227	35	0	202	0
Turn Type	Prot	NA		Prot	NA		Split	NA	Perm		Split	NA
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases									4			
Actuated Green, G (s)	10.8	40.7		9.1	39.0		18.2	18.2	18.2		9.0	
Effective Green, g (s)	12.3	42.2		10.6	40.5		20.2	20.2	20.2		11.0	
Actuated g/C Ratio	0.12	0.42		0.11	0.40		0.20	0.20	0.20		0.11	
Clearance Time (s)	5.5	5.5		5.5	5.5		6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	217	2640		363	2553		339	345	319		189	
v/s Ratio Prot	c0.08	c0.44		0.04	0.20		0.13	c0.13			c0.12	
v/s Ratio Perm									0.02			
v/c Ratio	0.64	1.05		0.39	0.49		0.66	0.66	0.11		1.07	
Uniform Delay, d1	41.7	28.9		41.7	22.1		36.7	36.7	32.6		44.5	
Progression Factor	0.70	1.49		0.80	0.92		1.00	1.00	1.00		1.00	
Incremental Delay, d2	4.4	28.4		0.6	0.6		4.6	4.5	0.2		85.0	
Delay (s)	33.7	71.4		34.1	20.9		41.3	41.2	32.7		129.5	
Level of Service	C	E		C	C		D	D	C		F	
Approach Delay (s)		69.6			22.2			38.9			129.5	
Approach LOS		E			C			D			F	
Intersection Summary												
HCM 2000 Control Delay			55.7			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			70.5%			ICU Level of Service			C			
Analysis Period (min)			15									
c	Critical Lane Group											

HCM 6th Signalized Intersection Summary

2034 Base Conditions

23: Zeier & E Wash

PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	124	1527	148	297	1158	66	112	56	358	117	35	37
Future Volume (veh/h)	124	1527	148	297	1158	66	112	56	358	117	35	37
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	142	1752	170	341	1329	76	129	64	411	134	40	42
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	172	2399	233	363	2527	144	570	309	262	171	80	84
Arrive On Green	0.10	0.40	0.40	0.21	0.81	0.81	0.17	0.17	0.17	0.10	0.10	0.10
Sat Flow, veh/h	1781	6008	583	3456	6273	358	3456	1870	1585	1781	835	877
Grp Volume(v), veh/h	142	1407	515	341	1022	383	129	64	411	134	0	82
Grp Sat Flow(s),veh/h/ln	1781	1609	1765	1728	1609	1806	1728	1870	1585	1781	0	1712
Q Serve(g_s), s	7.8	24.7	24.7	9.7	7.1	7.2	3.2	3.0	16.5	7.4	0.0	4.5
Cycle Q Clear(g_c), s	7.8	24.7	24.7	9.7	7.1	7.2	3.2	3.0	16.5	7.4	0.0	4.5
Prop In Lane	1.00		0.33	1.00		0.20	1.00		1.00	1.00		0.51
Lane Grp Cap(c), veh/h	172	1927	705	363	1944	728	570	309	262	171	0	164
V/C Ratio(X)	0.83	0.73	0.73	0.94	0.53	0.53	0.23	0.21	1.57	0.79	0.00	0.50
Avail Cap(c_a), veh/h	178	1927	705	363	1944	728	570	309	262	205	0	197
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.91	0.91	0.91	0.85	0.85	0.85	1.00	0.00	1.00
Uniform Delay (d), s/veh	44.4	25.5	25.5	39.2	6.5	6.5	36.2	36.1	41.8	44.2	0.0	42.9
Incr Delay (d2), s/veh	25.7	2.5	6.6	30.2	0.9	2.5	0.2	0.3	272.4	15.3	0.0	2.4
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	4.6	9.3	11.0	5.1	1.7	2.3	1.4	1.4	26.2	4.0	0.0	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.0	28.0	32.0	69.4	7.4	9.0	36.4	36.4	314.1	59.5	0.0	45.3
LnGrp LOS	E	C	C	E	A	A	D	D	F	E	A	D
Approach Vol, veh/h		2064			1746			604				216
Approach Delay, s/veh		31.9			19.9			225.4				54.1
Approach LOS		C			B			F				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	16.0	45.9		16.1	15.6	46.3		22.0				
Change Period (Y+Rc), s	5.5	6.0		6.5	6.0	6.0		5.5				
Max Green Setting (Gmax), s	10.5	38.0		11.5	10.0	38.0		16.5				
Max Q Clear Time (g_c+l1), s	11.7	26.7		9.4	9.8	9.2		18.5				
Green Ext Time (p_c), s	0.0	8.4		0.2	0.0	10.9		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				53.6								
HCM 6th LOS				D								

HCM 6th Signalized Intersection Summary
24: E Springs & E Wash

2034 Base Conditions
PM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↗	↙↘	↑↑↑	↙↘	↗
Traffic Volume (veh/h)	2109	115	319	1304	220	197
Future Volume (veh/h)	2109	115	319	1304	220	197
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	2420	0	366	1496	252	226
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2688		453	3638	561	258
Arrive On Green	1.00	0.00	0.13	0.71	0.16	0.16
Sat Flow, veh/h	5274	1585	3456	5274	3456	1585
Grp Volume(v), veh/h	2420	0	366	1496	252	226
Grp Sat Flow(s),veh/h/ln	1702	1585	1728	1702	1728	1585
Q Serve(g_s), s	0.0	0.0	10.3	11.9	6.6	13.9
Cycle Q Clear(g_c), s	0.0	0.0	10.3	11.9	6.6	13.9
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2688		453	3638	561	258
V/C Ratio(X)	0.90		0.81	0.41	0.45	0.88
Avail Cap(c_a), veh/h	2688		708	3638	605	277
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.51	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	42.2	5.8	37.8	40.9
Incr Delay (d2), s/veh	2.9	0.0	3.9	0.3	0.6	24.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	4.5	3.4	2.8	7.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	2.9	0.0	46.1	6.2	38.4	65.5
LnGrp LOS	A		D	A	D	E
Approach Vol, veh/h	2420	A		1862	478	
Approach Delay, s/veh	2.9			14.0	51.2	
Approach LOS	A			B	D	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	18.6	58.6		22.7		77.3
Change Period (Y+Rc), s	5.5	6.0		6.5		6.0
Max Green Setting (Gmax), s	20.5	44.0		17.5		70.0
Max Q Clear Time (g_c+l1), s	12.3	2.0		15.9		13.9
Green Ext Time (p_c), s	0.8	29.5		0.3		15.5

Intersection Summary

HCM 6th Ctrl Delay	12.1
HCM 6th LOS	B

Notes




















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

HCM Signalized Intersection Capacity Analysis

2034 with BRT

1: Blair St. & East Washington Ave.

AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	256	13	998	1899	0	75	0	459	207	94	21
Future Volume (vph)	0	256	13	998	1899	0	75	0	459	207	94	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0		4.0	4.0	4.0	
Lane Util. Factor		0.95		0.97	0.95		1.00		0.88	0.91	0.91	
Frt		0.99		1.00	1.00		1.00		0.85	1.00	0.99	
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	0.98	
Satd. Flow (prot)		3513		3433	3539		1770		2787	1610	3265	
Flt Permitted		1.00		0.95	1.00		0.95		1.00	0.95	0.98	
Satd. Flow (perm)		3513		3433	3539		1770		2787	1610	3265	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	0	294	15	1145	2179	0	86	0	527	238	108	24
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	306	0	1145	2179	0	86	0	527	124	239	0
Turn Type		NA		Prot	NA		Prot		pt+ov	Split	NA	
Protected Phases		1		2	1 2		3		2 3	4	4	
Permitted Phases							3		3 2			
Actuated Green, G (s)		29.5		55.8	89.8		10.0		70.3	15.7	15.7	
Effective Green, g (s)		30.0		56.3	90.3		10.0		70.8	17.7	17.7	
Actuated g/C Ratio		0.23		0.43	0.69		0.08		0.54	0.14	0.14	
Clearance Time (s)		4.5		4.5			4.0			6.0	6.0	
Vehicle Extension (s)		3.0		3.0			3.0			3.0	3.0	
Lane Grp Cap (vph)		810		1486	2458		136		1517	219	444	
v/s Ratio Prot		0.09		0.33	c0.62		c0.05		0.19	c0.08	0.07	
v/s Ratio Perm												
v/c Ratio		0.38		0.77	0.89		0.63		0.35	0.57	0.54	
Uniform Delay, d1		42.1		31.4	15.8		58.2		16.6	52.6	52.3	
Progression Factor		1.00		0.50	0.16		1.00		1.00	1.00	1.00	
Incremental Delay, d2		0.3		2.0	2.2		9.2		0.1	3.3	1.3	
Delay (s)		42.4		17.5	4.7		67.4		16.8	55.9	53.6	
Level of Service		D		B	A		E		B	E	D	
Approach Delay (s)		42.4			9.1			23.9			54.4	
Approach LOS		D			A			C			D	
Intersection Summary												
HCM 2000 Control Delay			16.9			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			130.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			78.5%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
2: Livingston Ave & East Washington Ave.

2034 with BRT
AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	824	25	139	2953	39	0	0	27	0	0	36
Future Volume (vph)	73	824	25	139	2953	39	0	0	27	0	0	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0				5.0			5.0
Lane Util. Factor	1.00	0.95		1.00	0.91				1.00			1.00
Frt	1.00	1.00		1.00	1.00				0.86			0.86
Flt Protected	0.95	1.00		0.95	1.00				1.00			1.00
Satd. Flow (prot)	1770	3523		1770	5075				1611			1611
Flt Permitted	0.04	1.00		0.28	1.00				1.00			1.00
Satd. Flow (perm)	73	3523		515	5075				1611			1611
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	84	945	29	159	3388	45	0	0	31	0	0	41
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	27	0	0	15
Lane Group Flow (vph)	84	973	0	159	3432	0	0	0	4	0	0	26
Turn Type	D.P+P	NA		D.Pm	NA				Prot			Over
Protected Phases	4	2			6				8			4
Permitted Phases	6			2								
Actuated Green, G (s)	120.0	102.0		102.0	102.0				18.0			18.0
Effective Green, g (s)	120.0	102.0		102.0	102.0				18.0			18.0
Actuated g/C Ratio	0.92	0.78		0.78	0.78				0.14			0.14
Clearance Time (s)	5.0	5.0		5.0	5.0				5.0			5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0				3.0			3.0
Lane Grp Cap (vph)	302	2764		404	3981				223			223
v/s Ratio Prot	c0.04	0.28			c0.68				0.00			0.02
v/s Ratio Perm	0.22			0.31								
v/c Ratio	0.28	0.35		0.39	0.86				0.02			0.12
Uniform Delay, d1	27.2	4.2		4.4	9.3				48.4			49.0
Progression Factor	0.70	1.54		0.04	0.34				1.00			1.00
Incremental Delay, d2	0.5	0.3		0.8	0.7				0.0			0.2
Delay (s)	19.4	6.8		0.9	3.9				48.4			49.3
Level of Service	B	A		A	A				D			D
Approach Delay (s)		7.8			3.8			48.4			49.3	
Approach LOS		A			A			D			D	

Intersection Summary		
HCM 2000 Control Delay	5.4	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.77	A
Actuated Cycle Length (s)	130.0	Sum of lost time (s)
Intersection Capacity Utilization	75.9%	10.0
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		D

HCM 6th Signalized Intersection Summary
 3: Paterson St. & East Washington Ave.

2034 with BRT
 AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↘	↑↑↑	↗		↕		↘	↑	↗
Traffic Volume (veh/h)	0	947	15	50	2938	49	26	26	22	55	39	36
Future Volume (veh/h)	0	947	15	50	2938	49	26	26	22	55	39	36
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	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	1087	17	57	3371	56	30	30	25	63	45	41
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, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	2727	1216	73	4324	1342	68	48	33	154	142	121
Arrive On Green	0.00	1.00	1.00	0.08	1.00	1.00	0.08	0.08	0.08	0.08	0.08	0.08
Sat Flow, veh/h	0	3647	1585	1781	5106	1585	400	630	429	1349	1870	1585
Grp Volume(v), veh/h	0	1087	17	57	3371	56	85	0	0	63	45	41
Grp Sat Flow(s),veh/h/ln	0	1777	1585	1781	1702	1585	1459	0	0	1349	1870	1585
Q Serve(g_s), s	0.0	0.0	0.0	4.1	0.0	0.0	4.6	0.0	0.0	0.0	3.0	3.2
Cycle Q Clear(g_c), s	0.0	0.0	0.0	4.1	0.0	0.0	7.6	0.0	0.0	7.3	3.0	3.2
Prop In Lane	0.00		1.00	1.00		1.00	0.35		0.29	1.00		1.00
Lane Grp Cap(c), veh/h	0	2727	1216	73	4324	1342	160	0	0	154	142	121
V/C Ratio(X)	0.00	0.40	0.01	0.78	0.78	0.04	0.53	0.00	0.00	0.41	0.32	0.34
Avail Cap(c_a), veh/h	0	2727	1216	123	4324	1342	490	0	0	440	540	457
HCM Platoon Ratio	1.00	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)	0.00	0.95	0.95	0.09	0.09	0.09	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	59.1	0.0	0.0	58.8	0.0	0.0	57.9	56.8	56.9
Incr Delay (d2), s/veh	0.0	0.4	0.0	1.7	0.1	0.0	2.7	0.0	0.0	1.7	1.3	1.6
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	0.2	0.0	1.8	0.1	0.0	2.9	0.0	0.0	2.1	1.5	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.4	0.0	60.8	0.1	0.0	61.5	0.0	0.0	59.6	58.1	58.6
LnGrp LOS	A	A	A	E	A	A	E	A	A	E	E	E
Approach Vol, veh/h		1104			3484			85			149	
Approach Delay, s/veh		0.4			1.1			61.5			58.9	
Approach LOS		A			A			E			E	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	10.3	104.8		14.9		115.1		14.9				
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s	9.0	68.5		37.5		82.5		37.5				
Max Q Clear Time (g_c+I1), s	6.1	2.0		9.3		2.0		9.6				
Green Ext Time (p_c), s	0.0	6.5		0.6		61.1		0.3				
Intersection Summary												
HCM 6th Ctrl Delay				3.8								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary
 4: Ingersoll St. & East Washington Ave.

2034 with BRT
 AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷	↷	↶	↷	↷		↷	↷		↷	↷
Traffic Volume (veh/h)	75	897	18	50	3099	51	43	31	18	20	16	35
Future Volume (veh/h)	75	897	18	50	3099	51	43	31	18	20	16	35
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	86	1029	21	57	3556	59	49	36	21	23	18	40
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	139	2663	1188	506	3833	1190	110	65	154	56	37	56
Arrive On Green	0.06	1.00	1.00	0.05	1.00	1.00	0.12	0.10	0.10	0.12	0.10	0.10
Sat Flow, veh/h	1781	3554	1585	1781	5106	1585	686	670	1585	206	384	576
Grp Volume(v), veh/h	86	1029	21	57	3556	59	85	0	21	81	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1702	1585	1356	0	1585	1166	0	0
Q Serve(g_s), s	1.5	0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.6	2.3	0.0	0.0
Cycle Q Clear(g_c), s	1.5	0.0	0.0	1.0	0.0	0.0	8.1	0.0	1.6	10.3	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.58		1.00	0.28		0.49
Lane Grp Cap(c), veh/h	139	2663	1188	506	3833	1190	201	0	154	171	0	0
V/C Ratio(X)	0.62	0.39	0.02	0.11	0.93	0.05	0.42	0.00	0.14	0.47	0.00	0.00
Avail Cap(c_a), veh/h	142	2663	1188	532	3833	1190	488	0	451	464	0	0
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)	0.83	0.83	0.83	0.09	0.09	0.09	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	20.7	0.0	0.0	3.3	0.0	0.0	55.7	0.0	53.7	56.7	0.0	0.0
Incr Delay (d2), s/veh	6.4	0.4	0.0	0.0	0.5	0.0	1.4	0.0	0.4	2.0	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	2.0	0.1	0.0	0.3	0.2	0.0	2.7	0.0	0.7	2.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.1	0.4	0.0	3.3	0.5	0.0	57.1	0.0	54.1	58.7	0.0	0.0
LnGrp LOS	C	A	A	A	A	A	E	A	D	E	A	A
Approach Vol, veh/h		1136			3672			106				81
Approach Delay, s/veh		2.4			0.6			56.5				58.7
Approach LOS		A			A			E				E
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	101.9		19.1	8.8	102.1		19.1				
Change Period (Y+Rc), s	5.5	4.5		6.5	5.0	4.5		6.5				
Max Green Setting (Gmax), s	5.4	71.1		37.0	4.0	73.0		37.0				
Max Q Clear Time (g_c+l1), s	3.0	2.0		12.3	3.5	2.0		10.1				
Green Ext Time (p_c), s	0.0	6.1		0.3	0.0	59.7		0.4				
Intersection Summary												
HCM 6th Ctrl Delay				3.1								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary
 5: Baldwin St. & East Washington Ave.

2034 with BRT
 AM Peak
































Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↘	↑↑↑	↗		↑	↗		↗	↗
Traffic Volume (veh/h)	0	916	24	44	3016	88	40	71	25	53	70	182
Future Volume (veh/h)	0	916	24	44	3016	88	40	71	25	53	70	182
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	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	1051	28	50	3460	101	46	81	29	61	80	209
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, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	2003	894	65	3260	1012	38	49	451	40	37	451
Arrive On Green	0.00	1.00	1.00	0.04	0.64	0.64	0.29	0.28	0.28	0.29	0.28	0.28
Sat Flow, veh/h	0	3647	1585	1781	5106	1585	0	173	1585	0	129	1585
Grp Volume(v), veh/h	0	1051	28	50	3460	101	127	0	29	141	0	209
Grp Sat Flow(s),veh/h/ln	0	1777	1585	1781	1702	1585	173	0	1585	129	0	1585
Q Serve(g_s), s	0.0	0.0	0.0	3.6	83.0	3.2	0.0	0.0	1.7	0.0	0.0	14.1
Cycle Q Clear(g_c), s	0.0	0.0	0.0	3.6	83.0	3.2	38.0	0.0	1.7	38.0	0.0	14.1
Prop In Lane	0.00		1.00	1.00		1.00	0.36		1.00	0.43		1.00
Lane Grp Cap(c), veh/h	0	2003	894	65	3260	1012	88	0	451	77	0	451
V/C Ratio(X)	0.00	0.52	0.03	0.77	1.06	0.10	1.44	0.00	0.06	1.82	0.00	0.46
Avail Cap(c_a), veh/h	0	2003	894	123	3260	1012	88	0	451	77	0	451
HCM Platoon Ratio	1.00	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)	0.00	0.85	0.85	0.09	0.09	0.09	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	62.1	23.5	9.1	44.9	0.0	33.9	47.8	0.0	38.3
Incr Delay (d2), s/veh	0.0	0.8	0.1	1.8	28.4	0.0	249.4	0.0	0.1	415.5	0.0	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	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.0	1.7	38.5	1.1	9.1	0.0	0.7	11.5	0.0	5.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.8	0.1	63.9	51.9	9.1	294.3	0.0	33.9	463.3	0.0	39.1
LnGrp LOS	A	A	A	E	F	A	F	A	C	F	A	D
Approach Vol, veh/h		1079			3611			156				350
Approach Delay, s/veh		0.8			50.9			245.9				210.0
Approach LOS		A			D			F				F
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	9.7	78.3		42.0		88.0		42.0				
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s	9.0	69.0		37.0		83.0		37.0				
Max Q Clear Time (g_c+I1), s	5.6	2.0		40.0		85.0		40.0				
Green Ext Time (p_c), s	0.0	6.3		0.0		0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				57.1								
HCM 6th LOS				E								

HCM Signalized Intersection Capacity Analysis

2034 with BRT






















6: First & E Wash

AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			  							 
Traffic Volume (vph)	186	777	42	61	2636	111	249	163	117	72	145	392
Future Volume (vph)	186	777	42	61	2636	111	249	163	117	72	145	392
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.5	6.5	6.5
Lane Util. Factor	0.97	0.95	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	5085	1583	1770	1863	1583	1770	1863	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.34	1.00	1.00	0.64	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	5085	1583	626	1863	1583	1185	1863	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	220	921	50	72	3123	132	295	193	139	85	172	464
RTOR Reduction (vph)	0	0	24	0	0	52	0	0	105	0	0	41
Lane Group Flow (vph)	220	921	26	72	3123	80	295	193	34	85	172	423
Turn Type	Prot	NA	custom	Prot	NA	Perm	D.P+P	NA	Perm	Perm	NA	custom
Protected Phases	1	6		5	2		3	3 4			4	
Permitted Phases			2			2	4		3 4	4		4 1
Actuated Green, G (s)	15.0	77.1	71.1	9.5	71.1	71.1	28.5	33.5	33.5	13.5	13.5	35.0
Effective Green, g (s)	15.0	77.1	71.1	9.5	71.1	71.1	28.5	33.5	33.5	13.5	13.5	35.0
Actuated g/C Ratio	0.11	0.56	0.52	0.07	0.52	0.52	0.21	0.25	0.25	0.10	0.10	0.26
Clearance Time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0			6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	376	1997	823	123	2646	823	256	456	388	117	184	714
v/s Ratio Prot	0.06	0.26		0.04	c0.61		c0.13	0.10			0.09	
v/s Ratio Perm			0.02			0.05	c0.11		0.02	0.07		c0.15
v/c Ratio	0.59	0.46	0.03	0.59	1.18	0.10	1.15	0.42	0.09	0.73	0.93	0.59
Uniform Delay, d1	57.8	17.5	16.0	61.6	32.8	16.5	51.5	43.4	39.8	59.8	61.1	44.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.3	0.8	0.1	6.9	85.4	0.2	103.7	0.6	0.1	20.0	47.5	1.3
Delay (s)	60.2	18.3	16.0	68.6	118.1	16.8	155.2	44.0	39.9	79.7	108.6	45.9
Level of Service	E	B	B	E	F	B	F	D	D	E	F	D
Approach Delay (s)		25.9			113.0			95.4			64.8	
Approach LOS		C			F			F			E	
Intersection Summary												
HCM 2000 Control Delay			87.5									F
HCM 2000 Volume to Capacity ratio			1.11									
Actuated Cycle Length (s)			136.6						22.0			
Intersection Capacity Utilization			103.0%									G
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
7: Fourth & E Wash

2034 with BRT
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	840	8	0	2736	73	23	58	20	50	31	51
Future Volume (veh/h)	28	840	8	0	2736	73	23	58	20	50	31	51
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	0	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	995	9	0	3242	86	27	69	24	59	37	60
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	0	2	2	2	2	2	2	2	2
Cap, veh/h	42	2228	994	0	2885	896	36	74	451	45	18	451
Arrive On Green	0.02	0.63	0.63	0.00	0.57	0.57	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	1781	3554	1585	0	5274	1585	1	260	1585	1	64	1585
Grp Volume(v), veh/h	33	995	9	0	3242	86	96	0	24	96	0	60
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	0	1702	1585	260	0	1585	66	0	1585
Q Serve(g_s), s	2.4	18.9	0.3	0.0	73.4	3.2	0.1	0.0	1.4	0.1	0.0	3.7
Cycle Q Clear(g_c), s	2.4	18.9	0.3	0.0	73.4	3.2	37.0	0.0	1.4	37.0	0.0	3.7
Prop In Lane	1.00		1.00	0.00		1.00	0.28		1.00	0.61		1.00
Lane Grp Cap(c), veh/h	42	2228	994	0	2885	896	110	0	451	63	0	451
V/C Ratio(X)	0.79	0.45	0.01	0.00	1.12	0.10	0.88	0.00	0.05	1.51	0.00	0.13
Avail Cap(c_a), veh/h	55	2228	994	0	2885	896	110	0	451	64	0	451
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	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	63.1	12.6	9.1	0.0	28.3	13.0	39.0	0.0	33.8	54.6	0.0	34.6
Incr Delay (d2), s/veh	41.7	0.7	0.0	0.0	60.9	0.2	49.4	0.0	0.0	296.5	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	1.6	7.4	0.1	0.0	44.1	1.2	3.8	0.0	0.6	7.3	0.0	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	104.8	13.2	9.1	0.0	89.2	13.2	88.4	0.0	33.8	351.2	0.0	34.7
LnGrp LOS	F	B	A	A	F	B	F	A	C	F	A	C
Approach Vol, veh/h		1037			3328			120				156
Approach Delay, s/veh		16.1			87.2			77.5				229.5
Approach LOS		B			F			E				F
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		86.5		43.5	8.1	78.4		43.5				
Change Period (Y+Rc), s		5.0		6.5	5.0	5.0		6.5				
Max Green Setting (Gmax), s		81.5		37.0	4.0	72.5		37.0				
Max Q Clear Time (g_c+I1), s		20.9		39.0	4.4	75.4		39.0				
Green Ext Time (p_c), s		9.0		0.0	0.0	0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				75.8								
HCM 6th LOS				E								

HCM 6th Signalized Intersection Summary

2034 with BRT

8: Sixth & E Wash

AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	855	7	98	2771	19	18	10	14	30	25	30
Future Volume (veh/h)	12	855	7	98	2771	19	18	10	14	30	25	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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	14	1013	8	116	3283	23	21	12	17	36	30	36
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	103	2641	1178	486	4215	1308	156	58	82	78	48	46
Arrive On Green	0.74	0.74	0.74	0.08	1.00	1.00	0.08	0.08	0.08	0.08	0.08	0.08
Sat Flow, veh/h	58	3554	1585	1781	5106	1585	1335	700	992	448	578	560
Grp Volume(v), veh/h	14	1013	8	116	3283	23	21	0	29	102	0	0
Grp Sat Flow(s),veh/h/ln	58	1777	1585	1781	1702	1585	1335	0	1692	1586	0	0
Q Serve(g_s), s	9.8	12.3	0.2	1.7	0.0	0.0	0.0	0.0	1.9	5.6	0.0	0.0
Cycle Q Clear(g_c), s	9.8	12.3	0.2	1.7	0.0	0.0	2.1	0.0	1.9	7.5	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.59	0.35		0.35
Lane Grp Cap(c), veh/h	103	2641	1178	486	4215	1308	156	0	140	172	0	0
V/C Ratio(X)	0.14	0.38	0.01	0.24	0.78	0.02	0.13	0.00	0.21	0.59	0.00	0.00
Avail Cap(c_a), veh/h	103	2641	1178	503	4215	1308	201	0	197	225	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.90	0.90	0.09	0.09	0.09	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.2	5.5	4.0	3.5	0.0	0.0	51.5	0.0	51.4	53.9	0.0	0.0
Incr Delay (d2), s/veh	2.5	0.4	0.0	0.0	0.1	0.0	0.4	0.0	0.7	3.2	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	4.0	0.0	0.4	0.1	0.0	0.6	0.0	0.9	3.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.7	5.9	4.0	3.5	0.1	0.0	51.8	0.0	52.1	57.1	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	D	E	A	A
Approach Vol, veh/h		1035			3422			50			102	
Approach Delay, s/veh		5.9			0.2			52.0			57.1	
Approach LOS		A			A			D			E	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	9.9	94.2		15.9		104.1		15.9				
Change Period (Y+Rc), s	5.0	5.0		6.0		5.0		6.0				
Max Green Setting (Gmax), s	6.0	84.0		14.0		95.0		14.0				
Max Q Clear Time (g_c+l1), s	3.7	14.3		9.5		2.0		4.1				
Green Ext Time (p_c), s	0.1	7.3		0.1		64.0		0.1				

Intersection Summary

HCM 6th Ctrl Delay	3.3
HCM 6th LOS	A

Notes

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

HCM Signalized Intersection Capacity Analysis

2034 with BRT

9: Milwaukee/North & E Wash

AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	727	126	0	2496	7	342	70	17	47	83	95
Future Volume (vph)	27	727	126	0	2496	7	342	70	17	47	83	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5	6.5	6.5		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00		0.91	1.00	0.97	1.00		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.97		1.00	0.92	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583		5085	1583	3433	1808		1770	1713	
Flt Permitted	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1583		5085	1583	3433	1808		1770	1713	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	32	861	149	0	2957	8	405	83	20	56	98	113
RTOR Reduction (vph)	0	0	49	0	0	3	0	7	0	0	35	0
Lane Group Flow (vph)	32	861	100	0	2957	5	405	96	0	56	176	0
Turn Type	Prot	NA	Perm		NA	Perm	Split	NA		Split	NA	
Protected Phases	5	2			6		4	4		3	3	
Permitted Phases			2			6						
Actuated Green, G (s)	6.5	79.5	79.5		68.5	68.5	13.5	13.5		11.0	11.0	
Effective Green, g (s)	6.5	79.5	79.5		68.5	68.5	13.5	13.5		11.0	11.0	
Actuated g/C Ratio	0.05	0.66	0.66		0.57	0.57	0.11	0.11		0.09	0.09	
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5	6.5	6.5		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	95	2344	1048		2902	903	386	203		162	157	
v/s Ratio Prot	0.02	c0.24			c0.58		c0.12	0.05		0.03	c0.10	
v/s Ratio Perm			0.06			0.00						
v/c Ratio	0.34	0.37	0.10		1.02	0.01	1.05	0.47		0.35	1.12	
Uniform Delay, d1	54.7	9.0	7.3		25.8	11.1	53.2	49.9		51.1	54.5	
Progression Factor	1.04	0.88	0.80		0.39	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.7	0.4	0.2		19.0	0.0	59.3	1.7		1.3	109.0	
Delay (s)	65.8	8.4	6.0		29.0	11.1	112.5	51.6		52.4	163.5	
Level of Service	E	A	A		C	B	F	D		D	F	
Approach Delay (s)		9.8			28.9			100.2			140.2	
Approach LOS		A			C			F			F	

Intersection Summary






















HCM 2000 Control Delay	38.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	87.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2034 with BRT

10: Johnson & E Wash

AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	730	4	38	2381	173	15	7	7	135	12	11
Future Volume (vph)	7	730	4	38	2381	173	15	7	7	135	12	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		5.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.91	1.00		1.00		0.95	0.95	
Frt	1.00	1.00		1.00	1.00	0.85		0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97		0.95	0.97	
Satd. Flow (prot)	1770	3536		1770	5085	1583		1757		1681	1673	
Flt Permitted	0.05	1.00		0.30	1.00	1.00		0.97		0.73	0.77	
Satd. Flow (perm)	84	3536		564	5085	1583		1757		1301	1330	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	8	865	5	45	2821	205	18	8	8	160	14	13
RTOR Reduction (vph)	0	0	0	0	0	26	0	8	0	0	5	0
Lane Group Flow (vph)	8	870	0	45	2821	179	0	26	0	94	88	0
Turn Type	Perm	NA		Perm	NA	Perm	Split	NA		Perm	NA	
Protected Phases		2			2		3	3			4	
Permitted Phases	2			2		2				4		
Actuated Green, G (s)	88.5	88.5		88.5	88.5	88.5		3.0		13.0	13.0	
Effective Green, g (s)	88.5	88.5		88.5	88.5	88.5		3.0		13.0	13.0	
Actuated g/C Ratio	0.74	0.74		0.74	0.74	0.74		0.02		0.11	0.11	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		5.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	61	2607		415	3750	1167		43		140	144	
v/s Ratio Prot		0.25			c0.55			c0.01				
v/s Ratio Perm	0.10			0.08		0.11				c0.07	0.07	
v/c Ratio	0.13	0.33		0.11	0.75	0.15		0.61		0.67	0.61	
Uniform Delay, d1	4.6	5.5		4.5	9.3	4.7		57.9		51.4	51.1	
Progression Factor	2.01	1.83		0.44	0.46	0.42		1.00		1.00	1.00	
Incremental Delay, d2	4.2	0.3		0.3	0.9	0.2		22.0		12.0	7.1	
Delay (s)	13.4	10.3		2.3	5.2	2.1		80.0		63.4	58.2	
Level of Service	B	B		A	A	A		E		E	E	
Approach Delay (s)		10.4			5.0			80.0			60.8	
Approach LOS		B			A			E			E	
Intersection Summary												
HCM 2000 Control Delay			9.2									A
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			120.0							15.5		
Intersection Capacity Utilization			66.5%									C
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 11: Marquette & E Wash

2034 with BRT
 AM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↓	↑↑↑	↓	↓
Traffic Volume (vph)	797	32	106	2542	78	49
Future Volume (vph)	797	32	106	2542	78	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.0	4.5	6.5	
Lane Util. Factor	0.95	1.00	1.00	0.91	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (prot)	3539	1583	1770	5085	1713	
Flt Permitted	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (perm)	3539	1583	1770	5085	1713	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	944	38	126	3012	92	58
RTOR Reduction (vph)	0	11	0	0	19	0
Lane Group Flow (vph)	944	27	126	3012	131	0
Turn Type	NA	Perm	Prot	NA	Prot	
Protected Phases	2		3	2 3	4	
Permitted Phases		2				
Actuated Green, G (s)	71.5	71.5	19.7	95.2	13.8	
Effective Green, g (s)	71.5	71.5	19.7	91.2	13.8	
Actuated g/C Ratio	0.60	0.60	0.16	0.76	0.12	
Clearance Time (s)	4.5	4.5	4.0		6.5	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	2108	943	290	3864	196	
v/s Ratio Prot	0.27		0.07	c0.59	c0.08	
v/s Ratio Perm		0.02				
v/c Ratio	0.45	0.03	0.43	0.78	0.67	
Uniform Delay, d1	13.4	10.0	45.1	8.5	50.9	
Progression Factor	0.91	1.21	1.11	0.41	1.00	
Incremental Delay, d2	0.7	0.1	0.7	0.7	8.3	
Delay (s)	12.8	12.1	50.7	4.2	59.2	
Level of Service	B	B	D	A	E	
Approach Delay (s)	12.7			6.1	59.2	
Approach LOS	B			A	E	

Intersection Summary			
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 12: EB Ramps & E Wash

2034 with BRT
 AM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑	↑↑↑	↑↑	↑↑
Traffic Volume (vph)	744	268	71	2656	97	260
Future Volume (vph)	744	268	71	2656	97	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.95	0.88	1.00	0.91	0.97	0.88
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)	3539	2787	1770	5085	3433	2787
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	2787	1770	5085	3433	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	854	307	81	3047	111	298
RTOR Reduction (vph)	0	53	0	0	0	164
Lane Group Flow (vph)	854	254	81	3047	111	134
Turn Type	NA	custom	Prot	NA	Prot	custom
Protected Phases	5	5 2	3	1 8	7	7 8 3
Permitted Phases		2				8
Actuated Green, G (s)	69.4	99.4	10.6	101.2	8.8	40.6
Effective Green, g (s)	69.4	99.4	10.6	101.2	8.8	40.6
Actuated g/C Ratio	0.58	0.83	0.09	0.84	0.07	0.34
Clearance Time (s)	5.0		5.0		5.0	
Vehicle Extension (s)	3.0		3.0		3.0	
Lane Grp Cap (vph)	2046	2308	156	4288	251	942
v/s Ratio Prot	0.24	0.09	0.05	c0.60	c0.03	0.05
v/s Ratio Perm						
v/c Ratio	0.42	0.11	0.52	0.71	0.44	0.14
Uniform Delay, d1	14.1	1.9	52.3	3.7	53.2	27.6
Progression Factor	0.26	0.00	1.15	0.53	1.00	1.00
Incremental Delay, d2	0.6	0.1	1.9	0.4	1.2	0.1
Delay (s)	4.2	0.1	61.9	2.3	54.5	27.7
Level of Service	A	A	E	A	D	C
Approach Delay (s)	3.1			3.9	34.9	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	6.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 13: East Wash & WB Ramps

2034 with BRT
 AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	72	925	1770	231	63	807
Future Volume (vph)	72	925	1770	231	63	807
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.95	0.91	1.00	0.97	0.88
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	5085	1583	3433	2787
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	5085	1583	3433	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	83	1061	2031	265	72	926
RTOR Reduction (vph)	0	0	0	87	0	4
Lane Group Flow (vph)	83	1061	2031	178	72	922
Turn Type	Prot	NA	NA	custom	Prot	pt+ov
Protected Phases	1	6	2		8	8 1
Permitted Phases				6		
Actuated Green, G (s)	10.3	75.4	60.1	75.4	34.6	49.9
Effective Green, g (s)	10.3	75.4	60.1	75.4	34.6	49.9
Actuated g/C Ratio	0.09	0.63	0.50	0.63	0.29	0.42
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	151	2223	2546	994	989	1158
v/s Ratio Prot	0.05	0.30	c0.40		0.02	c0.33
v/s Ratio Perm				0.11		
v/c Ratio	0.55	0.48	0.80	0.18	0.07	0.80
Uniform Delay, d1	52.6	11.8	24.9	9.3	31.0	30.6
Progression Factor	0.88	1.57	0.35	0.02	1.00	1.00
Incremental Delay, d2	3.8	0.7	2.1	0.3	0.0	3.9
Delay (s)	50.2	19.2	10.7	0.4	31.1	34.5
Level of Service	D	B	B	A	C	C
Approach Delay (s)		21.5	9.6		34.3	
Approach LOS		C	A		C	
Intersection Summary						
HCM 2000 Control Delay			18.2		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.83			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	15.0
Intersection Capacity Utilization			76.4%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Signalized Intersection Summary
 14: Rethke Ave/Melvin Ct & East Wash

2034 with BRT
 AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑		↗	↑↑↑			↕			↕	
Traffic Volume (veh/h)	11	655	6	15	2048	13	140	1	5	15	4	27
Future Volume (veh/h)	11	655	6	15	2048	13	140	1	5	15	4	27
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	13	752	7	17	2350	15	161	1	6	17	5	31
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	46	3808	35	53	3842	25	279	1	8	106	48	161
Arrive On Green	0.05	1.00	1.00	0.06	1.00	1.00	0.13	0.16	0.13	0.13	0.16	0.13
Sat Flow, veh/h	1781	5217	49	1781	5235	33	1406	9	52	425	304	1027
Grp Volume(v), veh/h	13	490	269	17	1527	838	168	0	0	53	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1862	1781	1702	1864	1467	0	0	1756	0	0
Q Serve(g_s), s	0.8	0.0	0.0	1.1	0.0	0.0	9.9	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.8	0.0	0.0	1.1	0.0	0.0	13.3	0.0	0.0	3.4	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.02	0.96		0.04	0.32		0.58
Lane Grp Cap(c), veh/h	46	2484	1359	53	2498	1368	252	0	0	271	0	0
V/C Ratio(X)	0.28	0.20	0.20	0.32	0.61	0.61	0.67	0.00	0.00	0.20	0.00	0.00
Avail Cap(c_a), veh/h	312	2484	1359	327	2498	1368	346	0	0	376	0	0
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)	0.89	0.89	0.89	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	55.8	0.0	0.0	55.2	0.0	0.0	49.4	0.0	0.0	45.3	0.0	0.0
Incr Delay (d2), s/veh	2.9	0.2	0.3	3.4	1.1	2.1	3.0	0.0	0.0	0.3	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	0.1	0.1	0.5	0.4	0.8	5.3	0.0	0.0	1.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.7	0.2	0.3	58.6	1.1	2.1	52.4	0.0	0.0	45.6	0.0	0.0
LnGrp LOS	E	A	A	E	A	A	D	A	A	D	A	A
Approach Vol, veh/h		772			2382			168				53
Approach Delay, s/veh		1.2			1.9			52.4				45.6
Approach LOS		A			A			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.6	91.6		20.8	7.1	92.1		20.8				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	21.0	60.0		24.0	20.0	61.0		24.0				
Max Q Clear Time (g_c+l1), s	3.1	2.0		5.4	2.8	2.0		15.3				
Green Ext Time (p_c), s	0.0	5.6		0.2	0.0	34.7		0.5				
Intersection Summary												
HCM 6th Ctrl Delay				4.9								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary
 16: Fair Oaks/Wright & East Wash

2034 with BRT
 AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑		↗	↑↑↑			↕		↗	↑	↗
Traffic Volume (veh/h)	165	668	23	115	1758	85	45	366	119	30	54	78
Future Volume (veh/h)	165	668	23	115	1758	85	45	366	119	30	54	78
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	195	791	27	136	2083	101	53	434	141	36	64	92
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	237	2877	98	177	2663	129	88	546	175	106	436	370
Arrive On Green	0.13	0.57	0.56	0.13	0.71	0.70	0.23	0.23	0.21	0.23	0.23	0.23
Sat Flow, veh/h	1781	5071	173	1781	4990	241	229	2340	749	838	1870	1585
Grp Volume(v), veh/h	195	530	288	136	1418	766	333	0	295	36	64	92
Grp Sat Flow(s),veh/h/ln	1781	1702	1839	1781	1702	1827	1751	0	1567	838	1870	1585
Q Serve(g_s), s	12.8	9.6	9.6	8.9	32.6	33.1	16.9	0.0	21.4	5.1	3.3	5.7
Cycle Q Clear(g_c), s	12.8	9.6	9.6	8.9	32.6	33.1	21.5	0.0	21.4	26.5	3.3	5.7
Prop In Lane	1.00		0.09	1.00		0.13	0.16		0.48	1.00		1.00
Lane Grp Cap(c), veh/h	237	1932	1044	177	1816	975	443	0	366	106	436	370
V/C Ratio(X)	0.82	0.27	0.28	0.77	0.78	0.79	0.75	0.00	0.81	0.34	0.15	0.25
Avail Cap(c_a), veh/h	282	1932	1044	252	1816	975	443	0	366	106	436	370
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.23	0.23	0.23	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.6	13.3	13.3	50.8	12.8	13.0	43.4	0.0	44.1	56.0	36.5	37.4
Incr Delay (d2), s/veh	15.3	0.4	0.7	2.1	0.8	1.5	7.0	0.0	12.5	1.9	0.2	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	6.7	3.7	4.1	3.9	9.0	10.1	10.2	0.0	9.6	1.1	1.5	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.9	13.7	14.0	52.9	13.7	14.5	50.4	0.0	56.6	57.9	36.7	37.8
LnGrp LOS	E	B	B	D	B	B	D	A	E	E	D	D
Approach Vol, veh/h		1013			2320			628			192	
Approach Delay, s/veh		23.8			16.2			53.3			41.2	
Approach LOS		C			B			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.9	72.1		32.0	20.0	68.0		32.0				
Change Period (Y+Rc), s	5.0	5.0		7.0	5.0	5.0		7.0				
Max Green Setting (Gmax), s	16.0	62.0		25.0	18.0	60.0		25.0				
Max Q Clear Time (g_c+l1), s	10.9	11.6		28.5	14.8	35.1		23.5				
Green Ext Time (p_c), s	0.2	3.9		0.0	0.2	13.5		0.5				
Intersection Summary												
HCM 6th Ctrl Delay				24.8								
HCM 6th LOS				C								

HCM 6th Signalized Intersection Summary
 18: Mendota & East Wash

2034 with BRT
 AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑			↕			↕	
Traffic Volume (veh/h)	7	965	69	39	2041	11	137	4	35	15	5	18
Future Volume (veh/h)	7	965	69	39	2041	11	137	4	35	15	5	18
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	8	1143	82	46	2418	13	162	5	41	18	6	21
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	202	3561	1106	419	3765	20	280	23	188	120	50	104
Arrive On Green	0.02	0.70	0.70	0.08	1.00	1.00	0.14	0.14	0.13	0.14	0.14	0.13
Sat Flow, veh/h	1781	5106	1585	1781	5241	28	1447	159	1307	483	348	727
Grp Volume(v), veh/h	8	1143	82	46	1570	861	162	0	46	45	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1865	1447	0	1467	1558	0	0
Q Serve(g_s), s	0.1	8.7	1.7	0.7	0.0	0.0	8.3	0.0	2.8	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	8.7	1.7	0.7	0.0	0.0	10.6	0.0	2.8	2.3	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.89	0.40		0.47
Lane Grp Cap(c), veh/h	202	3561	1106	419	2445	1340	280	0	211	274	0	0
V/C Ratio(X)	0.04	0.32	0.07	0.11	0.64	0.64	0.58	0.00	0.22	0.16	0.00	0.00
Avail Cap(c_a), veh/h	259	3561	1106	439	2445	1340	330	0	264	329	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.88	0.88	0.88	0.64	0.64	0.64	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	4.1	5.9	4.8	3.8	0.0	0.0	41.0	0.0	38.5	38.0	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.2	0.1	0.1	0.8	1.5	1.9	0.0	0.5	0.3	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	0.0	2.5	0.5	0.2	0.3	0.6	4.0	0.0	1.1	1.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.1	6.1	4.9	3.9	0.8	1.5	42.9	0.0	39.0	38.2	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	D	D	A	A
Approach Vol, veh/h		1233			2477			208				45
Approach Delay, s/veh		6.0			1.1			42.0				38.2
Approach LOS		A			A			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.8	75.8		18.4	7.9	73.7		18.4				
Change Period (Y+Rc), s	5.0	5.0		5.5	5.0	5.0		5.5				
Max Green Setting (Gmax), s	4.0	64.0		16.5	4.0	64.0		16.5				
Max Q Clear Time (g_c+I1), s	2.1	2.0		4.3	2.7	10.7		12.6				
Green Ext Time (p_c), s	0.0	22.7		0.1	0.0	7.1		0.3				
Intersection Summary												
HCM 6th Ctrl Delay					5.2							
HCM 6th LOS					A							

HCM 6th Signalized Intersection Summary
 19: Lien & East Wash

2034 with BRT
 AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑		↖	↗			↕	
Traffic Volume (veh/h)	29	879	164	53	2017	20	95	6	24	19	3	11
Future Volume (veh/h)	29	879	164	53	2017	20	95	6	24	19	3	11
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	34	1041	194	63	2390	24	113	7	28	23	4	13
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	253	3268	1014	450	3336	33	346	62	249	203	43	91
Arrive On Green	0.10	1.00	1.00	0.10	1.00	1.00	0.19	0.19	0.17	0.19	0.19	0.17
Sat Flow, veh/h	1781	5106	1585	1781	5213	52	1396	327	1308	769	226	479
Grp Volume(v), veh/h	34	1041	194	63	1560	854	113	0	35	40	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1861	1396	0	1635	1474	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	4.1	0.0	1.8	0.5	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	6.4	0.0	1.8	2.3	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.03	1.00		0.80	0.57		0.32
Lane Grp Cap(c), veh/h	253	3268	1014	450	2179	1191	346	0	311	337	0	0
V/C Ratio(X)	0.13	0.32	0.19	0.14	0.72	0.72	0.33	0.00	0.11	0.12	0.00	0.00
Avail Cap(c_a), veh/h	253	3268	1014	450	2179	1191	346	0	311	337	0	0
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)	0.96	0.96	0.96	0.73	0.73	0.73	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.9	0.0	0.0	5.2	0.0	0.0	35.3	0.0	34.2	33.9	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.2	0.4	0.1	1.5	2.7	0.5	0.0	0.2	0.7	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	0.2	0.1	0.1	0.4	0.5	0.9	2.4	0.0	0.7	0.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.1	0.2	0.4	5.3	1.5	2.7	35.8	0.0	34.4	34.6	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	C	C	A	A
Approach Vol, veh/h		1269			2477			148				40
Approach Delay, s/veh		0.4			2.0			35.5				34.6
Approach LOS		A			A			D				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	68.0		23.0	9.0	68.0		23.0				
Change Period (Y+Rc), s	5.0	5.0		6.0	5.0	5.0		6.0				
Max Green Setting (Gmax), s	4.0	63.0		17.0	4.0	63.0		17.0				
Max Q Clear Time (g_c+l1), s	2.0	2.0		8.4	2.0	2.0		4.3				
Green Ext Time (p_c), s	0.0	7.0		0.3	0.0	22.3		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			3.1									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary
 20: Thierer/Portage & East Wash

2034 with BRT
 AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑	↗	↖	↑		↖	↑	↗
Traffic Volume (veh/h)	54	793	77	25	1850	21	87	22	16	16	35	113
Future Volume (veh/h)	54	793	77	25	1850	21	87	22	16	16	35	113
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	64	940	91	30	2192	25	103	26	19	19	41	134
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	107	3551	1102	67	3436	1067	227	148	108	241	275	233
Arrive On Green	0.12	1.00	1.00	0.08	1.00	1.00	0.15	0.15	0.12	0.15	0.15	0.15
Sat Flow, veh/h	1781	5106	1585	1781	5106	1585	1210	1004	734	1361	1870	1585
Grp Volume(v), veh/h	64	940	91	30	2192	25	103	0	45	19	41	134
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1585	1210	0	1738	1361	1870	1585
Q Serve(g_s), s	3.4	0.0	0.0	1.6	0.0	0.0	8.1	0.0	2.3	1.2	1.9	7.9
Cycle Q Clear(g_c), s	3.4	0.0	0.0	1.6	0.0	0.0	10.0	0.0	2.3	3.5	1.9	7.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.42	1.00		1.00
Lane Grp Cap(c), veh/h	107	3551	1102	67	3436	1067	227	0	255	241	275	233
V/C Ratio(X)	0.60	0.26	0.08	0.45	0.64	0.02	0.45	0.00	0.18	0.08	0.15	0.58
Avail Cap(c_a), veh/h	178	3551	1102	107	3436	1067	267	0	313	286	337	285
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)	0.96	0.96	0.96	0.67	0.67	0.67	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.8	0.0	0.0	45.2	0.0	0.0	41.6	0.0	37.8	38.9	37.2	39.7
Incr Delay (d2), s/veh	5.0	0.2	0.1	3.1	0.6	0.0	1.4	0.0	0.3	0.1	0.2	2.2
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	0.1	0.0	0.7	0.2	0.0	2.5	0.0	1.0	0.4	0.9	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.8	0.2	0.1	48.4	0.6	0.0	43.0	0.0	38.2	39.0	37.5	42.0
LnGrp LOS	D	A	A	D	A	A	D	A	D	D	D	D
Approach Vol, veh/h		1095			2247			148			194	
Approach Delay, s/veh		3.0			1.2			41.5			40.7	
Approach LOS		A			A			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.8	73.5		18.7	10.0	71.3		18.7				
Change Period (Y+Rc), s	5.5	5.5		6.5	5.5	5.5		6.5				
Max Green Setting (Gmax), s	4.5	62.5		15.5	8.5	58.5		15.5				
Max Q Clear Time (g_c+I1), s	3.6	2.0		9.9	5.4	2.0		12.0				
Green Ext Time (p_c), s	0.0	5.6		0.3	0.0	20.5		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			5.5									
HCM 6th LOS			A									

HCM Signalized Intersection Capacity Analysis

21: Eagan/Continental & East Wash

2034 with BRT
AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑		↖↖	↑↑↑		↖	↑	↗		↕	
Traffic Volume (vph)	30	773	29	31	1737	75	35	26	27	36	13	128
Future Volume (vph)	30	773	29	31	1737	75	35	26	27	36	13	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.91		0.97	0.91		0.95	0.95	1.00		1.00	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85		0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.99	1.00		0.99	
Satd. Flow (prot)	1770	5058		3433	5054		1681	1755	1583		1664	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.99	1.00		0.99	
Satd. Flow (perm)	1770	5058		3433	5054		1681	1755	1583		1664	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	36	916	34	37	2058	89	41	31	32	43	15	152
RTOR Reduction (vph)	0	3	0	0	4	0	0	0	29	0	95	0
Lane Group Flow (vph)	36	947	0	37	2143	0	35	37	3	0	115	0
Turn Type	Prot	NA		Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases									4			
Actuated Green, G (s)	5.2	57.1		4.3	56.2		6.5	6.5	6.5		9.1	
Effective Green, g (s)	6.7	58.6		5.8	57.7		8.5	8.5	8.5		11.1	
Actuated g/C Ratio	0.07	0.59		0.06	0.58		0.08	0.08	0.08		0.11	
Clearance Time (s)	5.5	5.5		5.5	5.5		6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	118	2963		199	2916		142	149	134		184	
v/s Ratio Prot	c0.02	0.19		0.01	c0.42		0.02	c0.02			c0.07	
v/s Ratio Perm									0.00			
v/c Ratio	0.31	0.32		0.19	0.73		0.25	0.25	0.02		0.62	
Uniform Delay, d1	44.4	10.5		44.9	15.5		42.8	42.8	41.9		42.5	
Progression Factor	0.82	0.37		1.20	0.39		1.00	1.00	1.00		1.00	
Incremental Delay, d2	1.4	0.3		0.4	1.5		0.9	0.9	0.1		6.5	
Delay (s)	37.7	4.2		54.3	7.5		43.7	43.6	42.0		48.9	
Level of Service	D	A		D	A		D	D	D		D	
Approach Delay (s)		5.4			8.3			43.1			48.9	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	10.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
 22: Independence/Independence & East Wash

2034 with BRT
 AM Peak



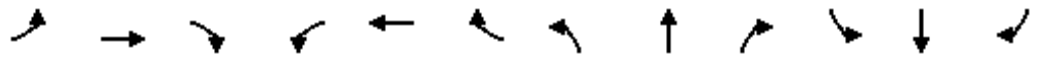
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑		↖	↑↑↑			↕			↕	
Traffic Volume (veh/h)	61	737	55	39	1536	47	25	25	30	30	15	229
Future Volume (veh/h)	61	737	55	39	1536	47	25	25	30	30	15	229
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		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	70	846	63	45	1762	54	29	29	34	34	17	263
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	90	2328	173	277	2976	91	107	107	97	64	31	285
Arrive On Green	0.10	0.96	0.96	0.21	0.78	0.78	0.21	0.21	0.21	0.21	0.21	0.21
Sat Flow, veh/h	1781	4850	360	1781	5090	156	276	496	453	111	146	1329
Grp Volume(v), veh/h	70	593	316	45	1178	638	92	0	0	314	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1806	1781	1702	1842	1225	0	0	1587	0	0
Q Serve(g_s), s	3.8	1.1	1.1	2.1	14.3	14.3	0.0	0.0	0.0	12.0	0.0	0.0
Cycle Q Clear(g_c), s	3.8	1.1	1.1	2.1	14.3	14.3	4.4	0.0	0.0	19.3	0.0	0.0
Prop In Lane	1.00		0.20	1.00		0.08	0.32		0.37	0.11		0.84
Lane Grp Cap(c), veh/h	90	1634	867	277	1990	1077	310	0	0	381	0	0
V/C Ratio(X)	0.78	0.36	0.36	0.16	0.59	0.59	0.30	0.00	0.00	0.82	0.00	0.00
Avail Cap(c_a), veh/h	267	1634	867	277	1990	1077	318	0	0	389	0	0
HCM Platoon Ratio	2.00	2.00	2.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.97	0.97	0.97	0.78	0.78	0.78	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.4	1.1	1.1	34.3	6.2	6.2	32.5	0.0	0.0	38.3	0.0	0.0
Incr Delay (d2), s/veh	12.8	0.6	1.2	0.2	1.0	1.9	0.5	0.0	0.0	13.3	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	1.9	0.4	0.6	0.9	3.5	4.0	1.9	0.0	0.0	8.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.2	1.7	2.2	34.6	7.2	8.1	33.1	0.0	0.0	51.6	0.0	0.0
LnGrp LOS	E	A	A	C	A	A	C	A	A	D	A	A
Approach Vol, veh/h		979			1861			92				314
Approach Delay, s/veh		5.8			8.2			33.1				51.6
Approach LOS		A			A			C				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	20.5	53.0		26.5	10.1	63.5		26.5				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	15.0	48.0		22.0	15.0	48.0		22.0				
Max Q Clear Time (g_c+l1), s	4.1	3.1		21.3	5.8	16.3		6.4				
Green Ext Time (p_c), s	0.0	6.6		0.1	0.1	16.1		0.4				
Intersection Summary												
HCM 6th Ctrl Delay				12.4								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary

2034 with BRT

23: Zeier & E Wash

AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	48	689	17	126	1517	83	31	14	80	74	22	43
Future Volume (veh/h)	48	689	17	126	1517	83	31	14	80	74	22	43
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	55	791	20	145	1741	95	36	16	92	85	25	49
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	70	2858	887	213	2946	915	263	143	121	120	38	74
Arrive On Green	0.08	1.00	1.00	0.02	0.19	0.19	0.08	0.08	0.08	0.07	0.07	0.07
Sat Flow, veh/h	1781	5106	1585	3456	5106	1585	3456	1870	1585	1781	565	1107
Grp Volume(v), veh/h	55	791	20	145	1741	95	36	16	92	85	0	74
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1728	1702	1585	1728	1870	1585	1781	0	1671
Q Serve(g_s), s	3.0	0.0	0.0	4.2	31.1	5.0	1.0	0.8	5.7	4.7	0.0	4.3
Cycle Q Clear(g_c), s	3.0	0.0	0.0	4.2	31.1	5.0	1.0	0.8	5.7	4.7	0.0	4.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.66
Lane Grp Cap(c), veh/h	70	2858	887	213	2946	915	263	143	121	120	0	112
V/C Ratio(X)	0.78	0.28	0.02	0.68	0.59	0.10	0.14	0.11	0.76	0.71	0.00	0.66
Avail Cap(c_a), veh/h	143	2858	887	328	2946	915	328	178	151	151	0	142
HCM Platoon Ratio	2.00	2.00	2.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.97	0.97	0.97	0.89	0.89	0.89	0.99	0.99	0.99	1.00	0.00	1.00
Uniform Delay (d), s/veh	45.6	0.0	0.0	48.0	29.7	19.1	43.1	43.0	45.3	45.7	0.0	45.5
Incr Delay (d2), s/veh	16.4	0.2	0.0	3.4	0.8	0.2	0.2	0.3	16.0	10.6	0.0	7.3
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	0.1	0.0	1.9	14.2	1.8	0.4	0.4	2.8	2.4	0.0	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.0	0.2	0.0	51.4	30.5	19.3	43.3	43.4	61.3	56.3	0.0	52.8
LnGrp LOS	E	A	A	D	C	B	D	D	E	E	A	D
Approach Vol, veh/h		866			1981			144				159
Approach Delay, s/veh		4.2			31.5			54.8				54.7
Approach LOS		A			C			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.7	62.0		13.2	10.0	63.7		13.1				
Change Period (Y+Rc), s	5.5	6.0		6.5	6.0	6.0		5.5				
Max Green Setting (Gmax), s	9.5	49.0		8.5	8.0	50.0		9.5				
Max Q Clear Time (g_c+l1), s	6.2	2.0		6.7	5.0	33.1		7.7				
Green Ext Time (p_c), s	0.1	6.1		0.1	0.0	11.2		0.1				
Intersection Summary												
HCM 6th Ctrl Delay				26.2								
HCM 6th LOS				C								

HCM 6th Signalized Intersection Summary
24: E Springs & E Wash

2034 with BRT
AM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↗	↙↙	↑↑↑	↙↙	↗
Traffic Volume (veh/h)	763	100	204	1563	115	48
Future Volume (veh/h)	763	100	204	1563	115	48
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	875	0	234	1793	132	55
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	3406		316	4153	213	98
Arrive On Green	0.22	0.00	0.09	0.81	0.06	0.06
Sat Flow, veh/h	5274	1585	3456	5274	3456	1585
Grp Volume(v), veh/h	875	0	234	1793	132	55
Grp Sat Flow(s),veh/h/ln	1702	1585	1728	1702	1728	1585
Q Serve(g_s), s	14.2	0.0	6.6	10.1	3.7	3.4
Cycle Q Clear(g_c), s	14.2	0.0	6.6	10.1	3.7	3.4
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	3406		316	4153	213	98
V/C Ratio(X)	0.26		0.74	0.43	0.62	0.56
Avail Cap(c_a), veh/h	3406		674	4153	674	309
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.97	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.5	0.0	44.3	2.7	45.8	45.6
Incr Delay (d2), s/veh	0.2	0.0	3.4	0.3	2.9	5.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.4	0.0	2.9	1.8	1.7	1.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	18.7	0.0	47.7	3.0	48.7	50.6
LnGrp LOS	B		D	A	D	D
Approach Vol, veh/h	875	A		2027	187	
Approach Delay, s/veh	18.7			8.2	49.3	
Approach LOS	B			A	D	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	14.6	72.7		12.7		87.3
Change Period (Y+Rc), s	5.5	6.0		6.5		6.0
Max Green Setting (Gmax), s	19.5	43.0		19.5		68.0
Max Q Clear Time (g_c+l1), s	8.6	16.2		5.7		12.1
Green Ext Time (p_c), s	0.6	6.3		0.5		21.3

Intersection Summary

HCM 6th Ctrl Delay			13.6			
HCM 6th LOS			B			

Notes













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

HCM Signalized Intersection Capacity Analysis

2034 with BRT

1: Blair St. & East Washington Ave.

MD Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑↑	↑↑		↑		↑↑	↑	↑↑	
Traffic Volume (vph)	0	489	26	568	688	0	54	0	561	301	72	17
Future Volume (vph)	0	489	26	568	688	0	54	0	561	301	72	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0		4.0	4.0	4.0	
Lane Util. Factor		0.95		0.97	0.95		1.00		0.88	0.91	0.91	
Frt		0.99		1.00	1.00		1.00		0.85	1.00	0.99	
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	0.97	
Satd. Flow (prot)		3512		3433	3539		1770		2787	1610	3251	
Flt Permitted		1.00		0.95	1.00		0.95		1.00	0.95	0.97	
Satd. Flow (perm)		3512		3433	3539		1770		2787	1610	3251	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	0	561	30	652	789	0	62	0	644	345	83	20
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	588	0	652	789	0	62	0	644	172	271	0
Turn Type		NA		Prot	NA		Prot		pt+ov	Split	NA	
Protected Phases		1		2	1 2		3		2 3	4	4	
Permitted Phases							3		3 2			
Actuated Green, G (s)		27.7		54.7	86.9		9.1		68.3	19.5	19.5	
Effective Green, g (s)		28.2		55.2	87.4		9.1		68.8	21.5	21.5	
Actuated g/C Ratio		0.22		0.42	0.67		0.07		0.53	0.17	0.17	
Clearance Time (s)		4.5		4.5			4.0			6.0	6.0	
Vehicle Extension (s)		3.0		3.0			3.0			3.0	3.0	
Lane Grp Cap (vph)		761		1457	2379		123		1474	266	537	
v/s Ratio Prot		c0.17		0.19	0.22		0.04		c0.23	c0.11	0.08	
v/s Ratio Perm												
v/c Ratio		0.77		0.45	0.33		0.50		0.44	0.65	0.50	
Uniform Delay, d1		47.9		26.6	9.0		58.3		18.7	50.7	49.4	
Progression Factor		1.00		0.64	0.67		1.00		1.00	1.00	1.00	
Incremental Delay, d2		4.9		0.9	0.1		3.2		0.2	5.3	0.7	
Delay (s)		52.8		17.9	6.1		61.5		18.9	56.0	50.1	
Level of Service		D		B	A		E		B	E	D	
Approach Delay (s)		52.8			11.5			22.7			52.4	
Approach LOS		D			B			C			D	
Intersection Summary												
HCM 2000 Control Delay			27.4			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			130.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			59.1%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
2: Livingston Ave & East Washington Ave.

2034 with BRT
MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	1201	43	100	1257	36	0	0	39	0	0	30
Future Volume (vph)	107	1201	43	100	1257	36	0	0	39	0	0	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0				5.0			5.0
Lane Util. Factor	1.00	0.95		1.00	0.95				1.00			1.00
Frt	1.00	0.99		1.00	1.00				0.86			0.86
Flt Protected	0.95	1.00		0.95	1.00				1.00			1.00
Satd. Flow (prot)	1770	3521		1770	3525				1611			1611
Flt Permitted	0.15	1.00		0.16	1.00				1.00			1.00
Satd. Flow (perm)	276	3521		296	3525				1611			1611
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	123	1378	49	115	1442	41	0	0	45	0	0	34
RTOR Reduction (vph)	0	2	0	0	1	0	0	0	39	0	0	29
Lane Group Flow (vph)	123	1425	0	115	1482	0	0	0	6	0	0	5
Turn Type	D.P+P	NA		D.Pm	NA				Prot			Over
Protected Phases	4	2			6				8			4
Permitted Phases	6			2								
Actuated Green, G (s)	120.0	102.0		102.0	102.0				18.0			18.0
Effective Green, g (s)	120.0	102.0		102.0	102.0				18.0			18.0
Actuated g/C Ratio	0.92	0.78		0.78	0.78				0.14			0.14
Clearance Time (s)	5.0	5.0		5.0	5.0				5.0			5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0				3.0			3.0
Lane Grp Cap (vph)	461	2762		232	2765				223			223
v/s Ratio Prot	c0.04	0.40			c0.42				0.00			0.00
v/s Ratio Perm	0.21			0.39								
v/c Ratio	0.27	0.52		0.50	0.54				0.03			0.02
Uniform Delay, d1	2.1	5.1		4.9	5.2				48.4			48.4
Progression Factor	2.21	0.67		0.19	0.06				1.00			1.00
Incremental Delay, d2	0.3	0.6		6.1	0.6				0.1			0.0
Delay (s)	4.9	4.0		7.0	0.9				48.5			48.4
Level of Service	A	A		A	A				D			D
Approach Delay (s)		4.0			1.4			48.5			48.4	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	3.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
 3: Paterson St. & East Washington Ave.

2034 with BRT
 MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑	↗		↕		↖	↑	↗
Traffic Volume (veh/h)	0	1444	32	28	1255	35	16	24	33	65	24	26
Future Volume (veh/h)	0	1444	32	28	1255	35	16	24	33	65	24	26
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	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	1657	37	32	1440	40	18	28	38	75	28	30
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, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	2778	1239	40	2996	1336	53	53	59	164	150	127
Arrive On Green	0.00	1.00	1.00	0.05	1.00	1.00	0.09	0.08	0.08	0.09	0.08	0.08
Sat Flow, veh/h	0	3647	1585	1781	3554	1585	241	658	743	1335	1870	1585
Grp Volume(v), veh/h	0	1657	37	32	1440	40	84	0	0	75	28	30
Grp Sat Flow(s),veh/h/ln	0	1777	1585	1781	1777	1585	1642	0	0	1335	1870	1585
Q Serve(g_s), s	0.0	0.0	0.0	2.3	0.0	0.0	2.9	0.0	0.0	1.6	1.8	2.3
Cycle Q Clear(g_c), s	0.0	0.0	0.0	2.3	0.0	0.0	6.3	0.0	0.0	7.9	1.8	2.3
Prop In Lane	0.00		1.00	1.00		1.00	0.21		0.45	1.00		1.00
Lane Grp Cap(c), veh/h	0	2778	1239	40	2996	1336	178	0	0	164	150	127
V/C Ratio(X)	0.00	0.60	0.03	0.79	0.48	0.03	0.47	0.00	0.00	0.46	0.19	0.24
Avail Cap(c_a), veh/h	0	2778	1239	55	2996	1336	512	0	0	443	540	457
HCM Platoon Ratio	1.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	0.85	0.85	0.49	0.49	0.49	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	61.7	0.0	0.0	57.6	0.0	0.0	57.8	55.8	56.1
Incr Delay (d2), s/veh	0.0	0.8	0.0	23.0	0.3	0.0	1.9	0.0	0.0	2.0	0.6	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	0.0	0.3	0.0	1.3	0.1	0.0	2.8	0.0	0.0	2.5	0.9	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.8	0.0	84.7	0.3	0.0	59.6	0.0	0.0	59.8	56.4	57.0
LnGrp LOS	A	A	A	F	A	A	E	A	A	E	E	E
Approach Vol, veh/h		1694			1512			84			133	
Approach Delay, s/veh		0.8			2.1			59.6			58.4	
Approach LOS		A			A			E			E	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	8.0	106.6		15.4		114.6		15.4				
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s	4.0	73.5		37.5		82.5		37.5				
Max Q Clear Time (g_c+l1), s	4.3	2.0		9.9		2.0		8.3				
Green Ext Time (p_c), s	0.0	13.8		0.5		10.6		0.3				
Intersection Summary												
HCM 6th Ctrl Delay				5.0								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary
 4: Ingersoll St. & East Washington Ave.

2034 with BRT
 MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	104	1449	36	57	1326	36	42	26	38	31	16	18
Future Volume (veh/h)	104	1449	36	57	1326	36	42	26	38	31	16	18
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	119	1663	41	65	1521	41	48	30	44	36	18	21
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	260	2657	1185	320	2655	1184	121	63	155	80	37	30
Arrive On Green	0.06	1.00	1.00	0.02	0.50	0.50	0.12	0.10	0.10	0.12	0.10	0.10
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	782	642	1585	401	382	304
Grp Volume(v), veh/h	119	1663	41	65	1521	41	78	0	44	75	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1424	0	1585	1087	0	0
Q Serve(g_s), s	2.1	0.0	0.0	1.1	39.0	1.7	0.0	0.0	3.3	3.7	0.0	0.0
Cycle Q Clear(g_c), s	2.1	0.0	0.0	1.1	39.0	1.7	6.7	0.0	3.3	10.5	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.62		1.00	0.48		0.28
Lane Grp Cap(c), veh/h	260	2657	1185	320	2655	1184	211	0	155	168	0	0
V/C Ratio(X)	0.46	0.63	0.03	0.20	0.57	0.03	0.37	0.00	0.28	0.45	0.00	0.00
Avail Cap(c_a), veh/h	312	2657	1185	345	2655	1184	497	0	451	448	0	0
HCM Platoon Ratio	2.00	2.00	2.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.53	0.53	0.53	0.73	0.73	0.73	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	12.0	0.0	0.0	3.5	17.9	8.6	55.0	0.0	54.4	57.4	0.0	0.0
Incr Delay (d2), s/veh	0.7	0.6	0.0	0.2	0.7	0.0	1.1	0.0	1.0	1.9	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	1.4	0.2	0.0	0.4	17.3	0.5	2.4	0.0	1.4	2.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.6	0.6	0.0	3.7	18.6	8.7	56.1	0.0	55.4	59.2	0.0	0.0
LnGrp LOS	B	A	A	A	B	A	E	A	E	E	A	A
Approach Vol, veh/h		1823			1627			122				75
Approach Delay, s/veh		1.4			17.8			55.9				59.2
Approach LOS		A			B			E				E
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.1	101.7		19.2	9.2	101.6		19.2				
Change Period (Y+Rc), s	5.5	4.5		6.5	5.0	4.5		6.5				
Max Green Setting (Gmax), s	5.5	71.0		37.0	8.0	69.0		37.0				
Max Q Clear Time (g_c+l1), s	3.1	2.0		12.5	4.1	41.0		8.7				
Green Ext Time (p_c), s	0.0	13.9		0.2	0.1	10.0		0.5				
Intersection Summary												
HCM 6th Ctrl Delay				11.7								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary
 5: Baldwin St. & East Washington Ave.

2034 with BRT
 MD Peak



























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑	↗		↑	↗		↗	↗
Traffic Volume (veh/h)	0	1498	27	42	1297	75	20	50	37	78	58	62
Future Volume (veh/h)	0	1498	27	42	1297	75	20	50	37	78	58	62
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	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	1719	31	48	1488	86	23	57	42	89	67	71
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, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	2009	896	62	2269	1012	36	69	451	43	21	451
Arrive On Green	0.00	1.00	1.00	0.03	0.64	0.64	0.29	0.28	0.28	0.29	0.28	0.28
Sat Flow, veh/h	0	3647	1585	1781	3554	1585	0	244	1585	0	74	1585
Grp Volume(v), veh/h	0	1719	31	48	1488	86	80	0	42	156	0	71
Grp Sat Flow(s),veh/h/ln	0	1777	1585	1781	1777	1585	244	0	1585	74	0	1585
Q Serve(g_s), s	0.0	0.0	0.0	3.5	33.9	2.7	0.0	0.0	2.5	0.0	0.0	4.4
Cycle Q Clear(g_c), s	0.0	0.0	0.0	3.5	33.9	2.7	38.0	0.0	2.5	38.0	0.0	4.4
Prop In Lane	0.00		1.00	1.00		1.00	0.29		1.00	0.57		1.00
Lane Grp Cap(c), veh/h	0	2009	896	62	2269	1012	107	0	451	65	0	451
V/C Ratio(X)	0.00	0.86	0.03	0.78	0.66	0.08	0.75	0.00	0.09	2.39	0.00	0.16
Avail Cap(c_a), veh/h	0	2009	896	82	2269	1012	107	0	451	65	0	451
HCM Platoon Ratio	1.00	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)	0.00	0.47	0.47	0.60	0.60	0.60	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	62.2	14.6	9.0	38.8	0.0	34.2	53.2	0.0	34.8
Incr Delay (d2), s/veh	0.0	2.4	0.0	17.9	0.9	0.1	24.9	0.0	0.1	671.8	0.0	0.2
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	0.7	0.0	1.9	13.0	0.9	2.6	0.0	1.0	14.3	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	2.4	0.0	80.2	15.5	9.1	63.7	0.0	34.3	725.0	0.0	35.0
LnGrp LOS	A	A	A	F	B	A	E	A	C	F	A	C
Approach Vol, veh/h		1750			1622			122				227
Approach Delay, s/veh		2.4			17.1			53.6				509.2
Approach LOS		A			B			D				F
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	9.5	78.5		42.0		88.0		42.0				
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s	6.0	72.0		37.0		83.0		37.0				
Max Q Clear Time (g_c+I1), s	5.5	2.0		40.0		35.9		40.0				
Green Ext Time (p_c), s	0.0	14.8		0.0		11.2		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				41.4								
HCM 6th LOS				D								

HCM Signalized Intersection Capacity Analysis

2034 with BRT






















6: First & E Wash

MD Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	226	1297	97	57	1164	98	112	113	52	157	90	197	
Future Volume (vph)	226	1297	97	57	1164	98	112	113	52	157	90	197	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.5	6.5	6.5	
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.88	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	1770	1863	1583	1770	1863	2787	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.69	1.00	1.00	0.67	1.00	1.00	
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	1281	1863	1583	1250	1863	2787	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	
Adj. Flow (vph)	268	1537	115	68	1379	116	133	134	62	186	107	233	
RTOR Reduction (vph)	0	0	62	0	0	63	0	0	44	0	0	107	
Lane Group Flow (vph)	268	1537	53	68	1379	53	133	134	18	186	107	126	
Turn Type	Prot	NA	custom	Prot	NA	Perm	D.P+P	NA	Perm	Perm	NA	custom	
Protected Phases	1	6		5	2		3	3 4				4	
Permitted Phases			2			2	4		3 4	4		4 1	
Actuated Green, G (s)	13.3	61.4	56.3	8.7	56.3	56.3	30.6	35.6	35.6	21.0	21.0	40.8	
Effective Green, g (s)	13.3	61.4	56.3	8.7	56.3	56.3	30.6	35.6	35.6	21.0	21.0	40.8	
Actuated g/C Ratio	0.11	0.50	0.46	0.07	0.46	0.46	0.25	0.29	0.29	0.17	0.17	0.33	
Clearance Time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0			6.5	6.5		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0		
Lane Grp Cap (vph)	373	1778	729	126	1630	729	359	542	461	214	320	930	
v/s Ratio Prot	c0.08	c0.43		0.04	0.39		c0.03	0.07				0.06	
v/s Ratio Perm			0.03			0.03	0.06		0.01	c0.15		0.05	
v/c Ratio	0.72	0.86	0.07	0.54	0.85	0.07	0.37	0.25	0.04	0.87	0.33	0.14	
Uniform Delay, d1	52.6	26.7	18.4	54.8	29.1	18.4	37.1	33.1	31.0	49.3	44.5	28.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.5	5.9	0.2	4.4	5.6	0.2	0.6	0.2	0.0	29.0	0.6	0.1	
Delay (s)	59.1	32.6	18.6	59.2	34.7	18.6	37.8	33.3	31.1	78.3	45.1	28.5	
Level of Service	E	C	B	E	C	B	D	C	C	E	D	C	
Approach Delay (s)		35.5			34.6			34.7			49.5		
Approach LOS		D			C			C			D		
Intersection Summary													
HCM 2000 Control Delay			36.8									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.83										
Actuated Cycle Length (s)			122.2									Sum of lost time (s)	22.0
Intersection Capacity Utilization			76.4%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary
7: Fourth & E Wash

2034 with BRT
MD Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	1457	13	0	1261	32	16	16	26	43	13	19
Future Volume (veh/h)	17	1457	13	0	1261	32	16	16	26	43	13	19
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	0	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	20	1726	15	0	1494	38	19	19	31	51	15	23
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	0	2	2	2	2	2	2	2	2
Cap, veh/h	30	2523	1125	0	2285	1019	54	37	277	64	11	277
Arrive On Green	0.02	0.71	0.71	0.00	1.00	1.00	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	1781	3554	1585	0	3647	1585	0	213	1585	0	63	1585
Grp Volume(v), veh/h	20	1726	15	0	1494	38	38	0	31	66	0	23
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	0	1777	1585	213	0	1585	63	0	1585
Q Serve(g_s), s	1.1	27.4	0.3	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	1.2
Cycle Q Clear(g_c), s	1.1	27.4	0.3	0.0	0.0	0.0	17.5	0.0	1.6	17.5	0.0	1.2
Prop In Lane	1.00		1.00	0.00		1.00	0.50		1.00	0.77		1.00
Lane Grp Cap(c), veh/h	30	2523	1125	0	2285	1019	91	0	277	75	0	277
V/C Ratio(X)	0.66	0.68	0.01	0.00	0.65	0.04	0.42	0.00	0.11	0.88	0.00	0.08
Avail Cap(c_a), veh/h	89	2523	1125	0	2285	1019	91	0	277	75	0	277
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.45	0.45	0.45	0.00	0.86	0.86	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	48.9	8.2	4.2	0.0	0.0	0.0	35.9	0.0	34.7	47.1	0.0	34.5
Incr Delay (d2), s/veh	10.4	0.7	0.0	0.0	1.3	0.1	3.0	0.0	0.2	65.6	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	0.6	8.5	0.1	0.0	0.4	0.0	0.9	0.0	0.7	3.0	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.3	8.9	4.3	0.0	1.3	0.1	38.9	0.0	34.9	112.7	0.0	34.7
LnGrp LOS	E	A	A	A	A	A	D	A	C	F	A	C
Approach Vol, veh/h		1761			1532			69				89
Approach Delay, s/veh		9.4			1.2			37.1				92.6
Approach LOS		A			A			D				F
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		76.0		24.0	6.7	69.3		24.0				
Change Period (Y+Rc), s		5.0		6.5	5.0	5.0		6.5				
Max Green Setting (Gmax), s		71.0		17.5	5.0	61.0		17.5				
Max Q Clear Time (g_c+I1), s		29.4		19.5	3.1	2.0		19.5				
Green Ext Time (p_c), s		20.4		0.0	0.0	18.1		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			8.5									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary
 8: Sixth & E Wash

2034 with BRT
 MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘		↕	
Traffic Volume (veh/h)	12	1506	12	63	1247	16	18	10	21	28	29	10
Future Volume (veh/h)	12	1506	12	63	1247	16	18	10	21	28	29	10
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	14	1784	14	75	1477	19	21	12	25	33	34	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	317	2482	1107	333	2815	1256	216	53	110	100	87	24
Arrive On Green	1.00	1.00	1.00	0.09	1.00	1.00	0.10	0.10	0.10	0.10	0.10	0.10
Sat Flow, veh/h	351	3554	1585	1781	3554	1585	1360	541	1127	504	888	249
Grp Volume(v), veh/h	14	1784	14	75	1477	19	21	0	37	79	0	0
Grp Sat Flow(s),veh/h/ln	351	1777	1585	1781	1777	1585	1360	0	1668	1642	0	0
Q Serve(g_s), s	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	2.0	2.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	1.0	0.0	0.0	1.2	0.0	2.0	4.4	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.68	0.42		0.15
Lane Grp Cap(c), veh/h	317	2482	1107	333	2815	1256	216	0	163	212	0	0
V/C Ratio(X)	0.04	0.72	0.01	0.23	0.52	0.02	0.10	0.00	0.23	0.37	0.00	0.00
Avail Cap(c_a), veh/h	317	2482	1107	362	2815	1256	233	0	183	231	0	0
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)	0.78	0.78	0.78	0.57	0.57	0.57	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	2.8	0.0	0.0	41.2	0.0	41.6	42.6	0.0	0.0
Incr Delay (d2), s/veh	0.2	1.4	0.0	0.2	0.4	0.0	0.2	0.0	0.7	1.1	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	0.0	0.5	0.0	0.3	0.2	0.0	0.5	0.0	0.9	1.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.2	1.4	0.0	3.0	0.4	0.0	41.4	0.0	42.3	43.7	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	D	D	A	A
Approach Vol, veh/h		1812			1571			58				79
Approach Delay, s/veh		1.4			0.5			42.0				43.7
Approach LOS		A			A			D				D
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	9.4	74.8		15.8		84.2		15.8				
Change Period (Y+Rc), s	5.0	5.0		6.0		5.0		6.0				
Max Green Setting (Gmax), s	6.0	67.0		11.0		78.0		11.0				
Max Q Clear Time (g_c+I1), s	3.0	2.0		6.4		2.0		4.0				
Green Ext Time (p_c), s	0.0	16.3		0.1		10.9		0.1				

Intersection Summary

HCM 6th Ctrl Delay	2.6
HCM 6th LOS	A

Notes






















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

HCM Signalized Intersection Capacity Analysis

2034 with BRT

9: Milwaukee/North & E Wash

MD Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	1380	177	0	1143	21	155	84	47	32	103	44
Future Volume (vph)	40	1380	177	0	1143	21	155	84	47	32	103	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5	6.5	6.5		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00	0.97	1.00		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583		3539	1583	3433	1762		1770	1779	
Flt Permitted	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1583		3539	1583	3433	1762		1770	1779	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	47	1635	210	0	1354	25	184	100	56	38	122	52
RTOR Reduction (vph)	0	0	42	0	0	13	0	21	0	0	16	0
Lane Group Flow (vph)	47	1635	168	0	1354	12	184	135	0	38	158	0
Turn Type	Prot	NA	Perm		NA	Perm	Split	NA		Split	NA	
Protected Phases	5	2			6		4	4		3	3	
Permitted Phases			2			6						
Actuated Green, G (s)	8.3	61.3	61.3		48.5	48.5	10.7	10.7		12.0	12.0	
Effective Green, g (s)	8.3	61.3	61.3		48.5	48.5	10.7	10.7		12.0	12.0	
Actuated g/C Ratio	0.08	0.61	0.61		0.48	0.48	0.11	0.11		0.12	0.12	
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5	6.5	6.5		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	146	2169	970		1716	767	367	188		212	213	
v/s Ratio Prot	0.03	c0.46			0.38		0.05	c0.08		0.02	c0.09	
v/s Ratio Perm			0.11			0.01						
v/c Ratio	0.32	0.75	0.17		0.79	0.02	0.50	0.72		0.18	0.74	
Uniform Delay, d1	43.2	13.9	8.4		21.5	13.4	42.1	43.2		39.6	42.5	
Progression Factor	1.40	0.42	0.24		0.95	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.3	1.9	0.3		3.2	0.0	1.1	12.7		0.4	13.1	
Delay (s)	64.8	7.8	2.3		23.5	13.4	43.2	55.9		40.0	55.6	
Level of Service	E	A	A		C	B	D	E		D	E	
Approach Delay (s)		8.6			23.3			49.1			52.8	
Approach LOS		A			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			20.0				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			20.5		
Intersection Capacity Utilization			68.6%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2034 with BRT

10: Johnson & E Wash

MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	1600	16	60	1077	183	29	19	52	223	25	21
Future Volume (vph)	17	1600	16	60	1077	183	29	19	52	223	25	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		5.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00		0.95	0.95	
Frt	1.00	1.00		1.00	1.00	0.85		0.93		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	0.97	
Satd. Flow (prot)	1770	3534		1770	3539	1583		1707		1681	1673	
Flt Permitted	0.16	1.00		0.06	1.00	1.00		0.99		0.68	0.73	
Satd. Flow (perm)	301	3534		116	3539	1583		1707		1204	1262	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	20	1896	19	71	1276	217	34	23	62	264	30	25
RTOR Reduction (vph)	0	1	0	0	0	58	0	30	0	0	7	0
Lane Group Flow (vph)	20	1914	0	71	1276	159	0	89	0	158	154	0
Turn Type	Perm	NA		Perm	NA	Perm	Split	NA		Perm	NA	
Protected Phases		2			2		3	3			4	
Permitted Phases	2			2		2				4		
Actuated Green, G (s)	64.5	64.5		64.5	64.5	64.5		6.0		14.0	14.0	
Effective Green, g (s)	64.5	64.5		64.5	64.5	64.5		6.0		14.0	14.0	
Actuated g/C Ratio	0.64	0.64		0.64	0.64	0.64		0.06		0.14	0.14	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		5.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	194	2279		74	2282	1021		102		168	176	
v/s Ratio Prot		0.54			0.36			c0.05				
v/s Ratio Perm	0.07			c0.61		0.10				c0.13	0.12	
v/c Ratio	0.10	0.84		0.96	0.56	0.16		0.87		0.94	0.88	
Uniform Delay, d1	6.8	13.8		16.5	9.9	7.0		46.6		42.6	42.1	
Progression Factor	0.36	0.27		0.80	0.57	0.43		1.00		1.00	1.00	
Incremental Delay, d2	0.8	3.0		87.4	0.9	0.3		50.6		52.0	35.1	
Delay (s)	3.2	6.6		100.7	6.5	3.3		97.2		94.6	77.2	
Level of Service	A	A		F	A	A		F		F	E	
Approach Delay (s)		6.6			10.3			97.2			85.8	
Approach LOS		A			B			F			F	

Intersection Summary

HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 11: Marquette & E Wash

2034 with BRT
 MD Peak



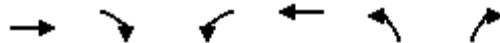
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	
Traffic Volume (vph)	1506	58	71	1202	72	49
Future Volume (vph)	1506	58	71	1202	72	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.0	4.5	6.5	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (prot)	3539	1583	1770	3539	1710	
Flt Permitted	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (perm)	3539	1583	1770	3539	1710	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	1784	69	84	1424	85	58
RTOR Reduction (vph)	0	13	0	0	25	0
Lane Group Flow (vph)	1784	56	84	1424	118	0
Turn Type	NA	Perm	Prot	NA	Prot	
Protected Phases	2		3	2 3	4	
Permitted Phases		2				
Actuated Green, G (s)	65.5	65.5	9.2	78.7	10.3	
Effective Green, g (s)	65.5	65.5	9.2	74.7	10.3	
Actuated g/C Ratio	0.66	0.66	0.09	0.75	0.10	
Clearance Time (s)	4.5	4.5	4.0		6.5	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	2318	1036	162	2643	176	
v/s Ratio Prot	c0.50		0.05	c0.40	c0.07	
v/s Ratio Perm		0.04				
v/c Ratio	0.77	0.05	0.52	0.54	0.67	
Uniform Delay, d1	12.0	6.2	43.3	5.4	43.2	
Progression Factor	0.32	0.21	0.89	1.34	1.00	
Incremental Delay, d2	1.3	0.0	2.5	0.2	9.3	
Delay (s)	5.1	1.4	41.0	7.4	52.5	
Level of Service	A	A	D	A	D	
Approach Delay (s)	5.0			9.2	52.5	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	8.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

12: EB Ramps & E Wash

2034 with BRT
MD Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↵	↑↑	↵	↑↑
Traffic Volume (vph)	1095	347	93	1260	104	280
Future Volume (vph)	1095	347	93	1260	104	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.95	0.88	1.00	0.95	0.97	0.88
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)	3539	2787	1770	3539	3433	2787
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	2787	1770	3539	3433	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	1256	398	107	1446	119	321
RTOR Reduction (vph)	0	81	0	0	0	33
Lane Group Flow (vph)	1256	317	107	1446	119	288
Turn Type	NA	custom	Prot	NA	Prot	custom
Protected Phases	5	5 2	3	1 8	7	7 8 3
Permitted Phases		2				8
Actuated Green, G (s)	49.7	79.7	10.3	80.3	9.7	40.3
Effective Green, g (s)	49.7	79.7	10.3	80.3	9.7	40.3
Actuated g/C Ratio	0.50	0.80	0.10	0.80	0.10	0.40
Clearance Time (s)	5.0		5.0		5.0	
Vehicle Extension (s)	3.0		3.0		3.0	
Lane Grp Cap (vph)	1758	2221	182	2841	333	1123
v/s Ratio Prot	c0.35	0.11	0.06	c0.41	c0.03	0.10
v/s Ratio Perm						
v/c Ratio	0.71	0.14	0.59	0.51	0.36	0.26
Uniform Delay, d1	19.6	2.3	42.8	3.3	42.2	19.9
Progression Factor	0.47	0.01	1.15	0.81	1.00	1.00
Incremental Delay, d2	1.6	0.1	4.3	0.1	0.7	0.1
Delay (s)	10.8	0.1	53.5	2.8	42.9	20.0
Level of Service	B	A	D	A	D	B
Approach Delay (s)	8.3			6.3	26.2	
Approach LOS	A			A	C	

Intersection Summary

HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 13: East Wash & WB Ramps

2034 with BRT
 MD Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	97	1227	1004	191	58	285
Future Volume (vph)	97	1227	1004	191	58	285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	0.88
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	3433	2787
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	3539	1583	3433	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	111	1408	1152	219	67	327
RTOR Reduction (vph)	0	0	0	45	0	95
Lane Group Flow (vph)	111	1408	1152	174	67	232
Turn Type	Prot	NA	NA	custom	Prot	pt+ov
Protected Phases	1	6	2		8	8 1
Permitted Phases				6		
Actuated Green, G (s)	11.6	79.5	62.9	79.5	10.5	27.1
Effective Green, g (s)	11.6	79.5	62.9	79.5	10.5	27.1
Actuated g/C Ratio	0.12	0.80	0.63	0.80	0.10	0.27
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	205	2813	2226	1258	360	755
v/s Ratio Prot	0.06	c0.40	0.33		0.02	c0.08
v/s Ratio Perm				0.11		
v/c Ratio	0.54	0.50	0.52	0.14	0.19	0.31
Uniform Delay, d1	41.7	3.5	10.2	2.4	40.8	29.0
Progression Factor	1.02	0.73	0.75	1.69	1.00	1.00
Incremental Delay, d2	2.3	0.5	0.8	0.2	0.3	0.2
Delay (s)	44.7	3.0	8.4	4.2	41.1	29.2
Level of Service	D	A	A	A	D	C
Approach Delay (s)		6.1	7.7		31.2	
Approach LOS		A	A		C	
Intersection Summary						
HCM 2000 Control Delay			9.8		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.52			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	15.0
Intersection Capacity Utilization			51.9%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Signalized Intersection Summary
 14: Rethke Ave/Melvin Ct & East Wash

2034 with BRT
 MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑		↖	↑↑			↕			↕	
Traffic Volume (veh/h)	21	1229	9	8	1210	17	51	4	11	13	5	7
Future Volume (veh/h)	21	1229	9	8	1210	17	51	4	11	13	5	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		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	24	1410	10	9	1388	20	59	5	13	15	6	8
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	70	4033	29	41	2708	39	180	17	27	125	60	50
Arrive On Green	0.01	0.25	0.25	0.05	1.00	1.00	0.08	0.11	0.08	0.08	0.11	0.08
Sat Flow, veh/h	1781	5231	37	1781	3586	52	1104	162	257	669	565	470
Grp Volume(v), veh/h	24	918	502	9	687	721	77	0	0	29	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1864	1781	1777	1861	1523	0	0	1704	0	0
Q Serve(g_s), s	1.3	22.1	22.1	0.5	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.3	22.1	22.1	0.5	0.0	0.0	4.8	0.0	0.0	1.5	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.03	0.77		0.17	0.52		0.28
Lane Grp Cap(c), veh/h	70	2624	1437	41	1342	1405	179	0	0	184	0	0
V/C Ratio(X)	0.34	0.35	0.35	0.22	0.51	0.51	0.43	0.00	0.00	0.16	0.00	0.00
Avail Cap(c_a), veh/h	160	2624	1437	125	1342	1405	243	0	0	251	0	0
HCM Platoon Ratio	0.33	0.33	0.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.87	0.87	0.87	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	48.1	16.8	16.8	46.8	0.0	0.0	43.3	0.0	0.0	41.7	0.0	0.0
Incr Delay (d2), s/veh	2.5	0.3	0.6	2.6	1.4	1.3	1.6	0.0	0.0	0.4	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	0.6	10.1	11.1	0.2	0.5	0.5	2.0	0.0	0.0	0.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.6	17.1	17.4	49.4	1.4	1.3	45.0	0.0	0.0	42.1	0.0	0.0
LnGrp LOS	D	B	B	D	A	A	D	A	A	D	A	A
Approach Vol, veh/h		1444			1417			77				29
Approach Delay, s/veh		17.7			1.7			45.0				42.1
Approach LOS		B			A			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.3	81.1		12.6	7.9	79.5		12.6				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	6.0	67.0		12.0	8.0	65.0		12.0				
Max Q Clear Time (g_c+I1), s	2.5	24.1		3.5	3.3	2.0		6.8				
Green Ext Time (p_c), s	0.0	13.1		0.0	0.0	14.3		0.1				

Intersection Summary

HCM 6th Ctrl Delay	11.0
HCM 6th LOS	B

Notes

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

HCM 6th Signalized Intersection Summary
 16: Fair Oaks/Wright & East Wash

2034 with BRT
 MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↗↗↗		↗	↗↗			↗↗		↗	↗	↗
Traffic Volume (veh/h)	164	1109	39	114	1003	134	46	126	124	92	124	107
Future Volume (veh/h)	164	1109	39	114	1003	134	46	126	124	92	124	107
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	194	1314	46	135	1188	159	54	149	147	109	147	127
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	238	2771	97	183	1627	217	122	299	296	212	430	365
Arrive On Green	0.27	1.00	1.00	0.10	0.52	0.51	0.23	0.23	0.20	0.23	0.23	0.23
Sat Flow, veh/h	1781	5065	177	1781	3151	420	328	1299	1289	1083	1870	1585
Grp Volume(v), veh/h	194	883	477	135	668	679	182	0	168	109	147	127
Grp Sat Flow(s),veh/h/ln	1781	1702	1838	1781	1777	1795	1446	0	1470	1083	1870	1585
Q Serve(g_s), s	10.2	0.0	0.0	7.4	29.1	29.5	5.5	0.0	10.1	9.7	6.6	6.7
Cycle Q Clear(g_c), s	10.2	0.0	0.0	7.4	29.1	29.5	12.0	0.0	10.1	19.8	6.6	6.7
Prop In Lane	1.00		0.10	1.00		0.23	0.30		0.88	1.00		1.00
Lane Grp Cap(c), veh/h	238	1862	1006	183	917	927	379	0	338	212	430	365
V/C Ratio(X)	0.81	0.47	0.47	0.74	0.73	0.73	0.48	0.00	0.50	0.51	0.34	0.35
Avail Cap(c_a), veh/h	303	1862	1006	267	917	927	379	0	338	212	430	365
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)	1.00	1.00	1.00	0.76	0.76	0.76	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.5	0.0	0.0	43.5	18.7	18.9	34.1	0.0	34.7	42.2	32.2	32.2
Incr Delay (d2), s/veh	12.6	0.9	1.6	4.5	3.9	3.9	0.9	0.0	1.1	2.1	0.5	0.6
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	4.6	0.2	0.4	3.4	12.0	12.3	4.0	0.0	3.7	2.7	3.0	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.0	0.9	1.6	48.0	22.6	22.8	35.1	0.0	35.8	44.3	32.6	32.8
LnGrp LOS	D	A	A	D	C	C	D	A	D	D	C	C
Approach Vol, veh/h		1554			1482			350			383	
Approach Delay, s/veh		7.0			25.0			35.4			36.0	
Approach LOS		A			C			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	14.3	58.7		27.0	17.4	55.6		27.0				
Change Period (Y+Rc), s	5.0	5.0		7.0	5.0	5.0		7.0				
Max Green Setting (Gmax), s	14.0	49.0		20.0	16.0	47.0		20.0				
Max Q Clear Time (g_c+l1), s	9.4	2.0		21.8	12.2	31.5		14.0				
Green Ext Time (p_c), s	0.2	7.7		0.0	0.2	5.8		0.8				
Intersection Summary												
HCM 6th Ctrl Delay				19.7								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary
 18: Mendota & East Wash

2034 with BRT
 MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	1749	119	73	1493	24	163	8	76	36	12	31
Future Volume (veh/h)	19	1749	119	73	1493	24	163	8	76	36	12	31
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	23	2072	141	86	1769	28	193	9	90	43	14	37
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	292	3283	1019	224	3420	54	307	25	253	141	54	92
Arrive On Green	0.03	0.64	0.64	0.09	1.00	1.00	0.19	0.19	0.18	0.19	0.19	0.18
Sat Flow, veh/h	1781	5106	1585	1781	5178	82	1234	133	1330	462	282	483
Grp Volume(v), veh/h	23	2072	141	86	1163	634	193	0	99	94	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1856	1234	0	1463	1227	0	0
Q Serve(g_s), s	0.4	24.4	3.5	1.6	0.0	0.0	6.5	0.0	5.9	3.0	0.0	0.0
Cycle Q Clear(g_c), s	0.4	24.4	3.5	1.6	0.0	0.0	15.4	0.0	5.9	8.9	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.04	1.00		0.91	0.46		0.39
Lane Grp Cap(c), veh/h	292	3283	1019	224	2248	1226	307	0	279	286	0	0
V/C Ratio(X)	0.08	0.63	0.14	0.38	0.52	0.52	0.63	0.00	0.36	0.33	0.00	0.00
Avail Cap(c_a), veh/h	330	3283	1019	284	2248	1226	320	0	293	300	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.59	0.59	0.59	0.70	0.70	0.70	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.5	10.7	7.0	10.1	0.0	0.0	39.4	0.0	35.8	36.6	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.6	0.2	0.8	0.6	1.1	3.7	0.0	0.8	0.7	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	0.1	7.8	1.1	0.6	0.2	0.4	4.9	0.0	2.2	2.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.5	11.3	7.2	10.9	0.6	1.1	43.0	0.0	36.5	37.2	0.0	0.0
LnGrp LOS	A	B	A	B	A	A	D	A	D	D	A	A
Approach Vol, veh/h		2236			1883			292				94
Approach Delay, s/veh		11.0			1.2			40.8				37.2
Approach LOS		B			A			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.9	70.0		23.1	8.6	68.3		23.1				
Change Period (Y+Rc), s	5.0	5.0		5.5	5.0	5.0		5.5				
Max Green Setting (Gmax), s	4.0	62.0		18.5	7.0	59.0		18.5				
Max Q Clear Time (g_c+l1), s	2.4	2.0		10.9	3.6	26.4		17.4				
Green Ext Time (p_c), s	0.0	12.1		0.2	0.1	16.1		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			9.4									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary
19: Lien & East Wash

2034 with BRT
MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑		↖	↗			↕	
Traffic Volume (veh/h)	41	1621	296	92	1436	25	249	11	56	24	8	28
Future Volume (veh/h)	41	1621	296	92	1436	25	249	11	56	24	8	28
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	49	1921	351	109	1701	30	295	13	66	28	9	33
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	292	2400	745	275	2583	46	537	88	448	227	84	232
Arrive On Green	0.10	0.94	0.94	0.16	1.00	0.98	0.33	0.33	0.31	0.33	0.33	0.31
Sat Flow, veh/h	1781	5106	1585	1781	5167	91	1365	268	1358	534	255	704
Grp Volume(v), veh/h	49	1921	351	109	1121	610	295	0	79	70	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1854	1365	0	1626	1493	0	0
Q Serve(g_s), s	0.0	9.1	2.4	0.0	0.0	0.1	13.6	0.0	3.5	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	9.1	2.4	0.0	0.0	0.1	17.1	0.0	3.5	3.5	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.05	1.00		0.84	0.40		0.47
Lane Grp Cap(c), veh/h	292	2400	745	275	1702	927	537	0	537	543	0	0
V/C Ratio(X)	0.17	0.80	0.47	0.40	0.66	0.66	0.55	0.00	0.15	0.13	0.00	0.00
Avail Cap(c_a), veh/h	292	2400	745	275	1702	927	537	0	537	543	0	0
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)	0.76	0.76	0.76	0.79	0.79	0.79	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	13.1	1.9	1.7	28.4	0.0	0.0	27.8	0.0	24.2	23.7	0.0	0.0
Incr Delay (d2), s/veh	0.2	2.2	1.6	0.7	1.6	2.9	1.2	0.0	0.1	0.5	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	0.6	1.4	0.8	2.3	0.4	0.8	5.9	0.0	1.3	1.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.3	4.1	3.3	29.1	1.6	2.9	29.0	0.0	24.3	24.2	0.0	0.0
LnGrp LOS	B	A	A	C	A	A	C	A	C	C	A	A
Approach Vol, veh/h		2321			1840			374				70
Approach Delay, s/veh		4.2			3.7			28.0				24.2
Approach LOS		A			A			C				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.0	51.0		37.0	9.0	54.0		37.0				
Change Period (Y+Rc), s	5.0	5.0		6.0	5.0	5.0		6.0				
Max Green Setting (Gmax), s	7.0	46.0		31.0	4.0	49.0		31.0				
Max Q Clear Time (g_c+l1), s	2.0	11.1		19.1	2.0	2.1		5.5				
Green Ext Time (p_c), s	0.1	16.8		1.2	0.0	11.0		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			6.2									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary
 20: Thierer/Portage & East Wash

2034 with BRT
 MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑	↗	↘	↗		↘	↑	↗
Traffic Volume (veh/h)	148	1405	116	86	1211	65	188	47	71	63	51	102
Future Volume (veh/h)	148	1405	116	86	1211	65	188	47	71	63	51	102
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	175	1665	137	102	1435	77	223	56	84	75	60	121
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	228	2761	857	157	2557	794	345	170	255	300	470	398
Arrive On Green	0.26	1.00	1.00	0.03	0.17	0.17	0.25	0.25	0.23	0.25	0.25	0.25
Sat Flow, veh/h	1781	5106	1585	1781	5106	1585	1203	675	1013	1249	1870	1585
Grp Volume(v), veh/h	175	1665	137	102	1435	77	223	0	140	75	60	121
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1585	1203	0	1688	1249	1870	1585
Q Serve(g_s), s	9.1	0.0	0.0	5.7	25.9	4.1	17.6	0.0	6.9	5.2	2.5	6.2
Cycle Q Clear(g_c), s	9.1	0.0	0.0	5.7	25.9	4.1	20.1	0.0	6.9	12.1	2.5	6.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.60	1.00		1.00
Lane Grp Cap(c), veh/h	228	2761	857	157	2557	794	345	0	424	300	470	398
V/C Ratio(X)	0.77	0.60	0.16	0.65	0.56	0.10	0.65	0.00	0.33	0.25	0.13	0.30
Avail Cap(c_a), veh/h	338	2761	857	232	2557	794	379	0	473	336	524	444
HCM Platoon Ratio	2.00	2.00	2.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.49	0.49	0.49	0.75	0.75	0.75	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.8	0.0	0.0	47.0	31.6	22.6	36.7	0.0	31.2	35.5	29.0	30.3
Incr Delay (d2), s/veh	3.0	0.5	0.2	3.4	0.7	0.2	3.3	0.0	0.5	0.4	0.1	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	3.6	0.1	0.0	2.7	11.8	1.5	5.4	0.0	2.8	1.6	1.1	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.8	0.5	0.2	50.4	32.3	22.7	40.1	0.0	31.7	36.0	29.1	30.8
LnGrp LOS	D	A	A	D	C	C	D	A	C	D	C	C
Approach Vol, veh/h		1977			1614			363			256	
Approach Delay, s/veh		3.9			33.0			36.8			31.9	
Approach LOS		A			C			D			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.8	58.1		29.1	16.8	54.1		29.1				
Change Period (Y+Rc), s	5.5	5.5		6.5	5.5	5.5		6.5				
Max Green Setting (Gmax), s	11.5	45.5		25.5	17.5	39.5		25.5				
Max Q Clear Time (g_c+l1), s	7.7	2.0		14.1	11.1	27.9		22.1				
Green Ext Time (p_c), s	0.1	12.6		0.8	0.3	5.9		0.6				
Intersection Summary												
HCM 6th Ctrl Delay				19.6								
HCM 6th LOS				B								

HCM Signalized Intersection Capacity Analysis

21: Eagan/Continental & East Wash

2034 with BRT
MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗	↗		↕	
Traffic Volume (vph)	91	1208	258	161	993	113	272	68	111	58	28	32
Future Volume (vph)	91	1208	258	161	993	113	272	68	111	58	28	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.91		0.97	0.91		0.95	0.95	1.00		1.00	
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85		0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.97	1.00		0.98	
Satd. Flow (prot)	1770	4951		3433	5007		1681	1718	1583		1751	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.97	1.00		0.98	
Satd. Flow (perm)	1770	4951		3433	5007		1681	1718	1583		1751	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	108	1431	306	191	1176	134	322	81	132	69	33	38
RTOR Reduction (vph)	0	32	0	0	13	0	0	0	109	0	13	0
Lane Group Flow (vph)	108	1705	0	191	1297	0	200	203	23	0	127	0
Turn Type	Prot	NA		Prot	NA		Split	NA	Perm		Split	NA
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases									4			
Actuated Green, G (s)	10.1	43.6		8.0	41.5		15.2	15.2	15.2		10.2	
Effective Green, g (s)	11.6	45.1		9.5	43.0		17.2	17.2	17.2		12.2	
Actuated g/C Ratio	0.12	0.45		0.10	0.43		0.17	0.17	0.17		0.12	
Clearance Time (s)	5.5	5.5		5.5	5.5		6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	205	2232		326	2153		289	295	272		213	
v/s Ratio Prot	c0.06	c0.34		0.06	0.26		c0.12	0.12			c0.07	
v/s Ratio Perm									0.01			
v/c Ratio	0.53	0.76		0.59	0.60		0.69	0.69	0.08		0.60	
Uniform Delay, d1	41.6	23.0		43.4	21.9		38.9	38.9	34.8		41.6	
Progression Factor	1.34	0.30		0.66	1.16		1.00	1.00	1.00		1.00	
Incremental Delay, d2	2.1	2.1		1.9	0.9		7.0	6.5	0.1		4.4	
Delay (s)	57.7	8.9		30.6	26.4		45.9	45.4	34.9		46.0	
Level of Service	E	A		C	C		D	D	C		D	
Approach Delay (s)		11.8			27.0			43.0			46.0	
Approach LOS		B			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			22.8				HCM 2000 Level of Service		C			
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)		16.0				
Intersection Capacity Utilization			62.7%			ICU Level of Service		B				
Analysis Period (min)			15									
c	Critical Lane Group											

HCM 6th Signalized Intersection Summary
 22: Independence/Independence & East Wash

2034 with BRT
 MD Peak



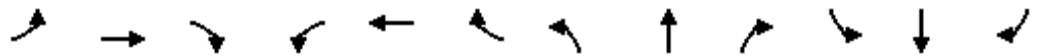
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑		↗	↑↑↑			↕				↕
Traffic Volume (veh/h)	104	1303	87	94	1241	52	150	40	140	65	25	86
Future Volume (veh/h)	104	1303	87	94	1241	52	150	40	140	65	25	86
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	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	119	1495	100	108	1424	60	172	46	161	75	29	99
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	149	1760	118	345	2363	100	232	58	175	178	80	198
Arrive On Green	0.08	0.36	0.36	0.39	0.94	0.94	0.30	0.30	0.30	0.30	0.30	0.30
Sat Flow, veh/h	1781	4889	327	1781	5025	212	607	195	592	433	269	668
Grp Volume(v), veh/h	119	1041	554	108	965	519	379	0	0	203	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1812	1781	1702	1832	1394	0	0	1370	0	0
Q Serve(g_s), s	6.6	28.2	28.2	4.2	3.9	3.9	14.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	6.6	28.2	28.2	4.2	3.9	3.9	26.4	0.0	0.0	11.6	0.0	0.0
Prop In Lane	1.00		0.18	1.00		0.12	0.45		0.42	0.37		0.49
Lane Grp Cap(c), veh/h	149	1225	652	345	1601	862	465	0	0	455	0	0
V/C Ratio(X)	0.80	0.85	0.85	0.31	0.60	0.60	0.81	0.00	0.00	0.45	0.00	0.00
Avail Cap(c_a), veh/h	267	1225	652	345	1601	862	529	0	0	518	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.60	0.60	0.60	0.72	0.72	0.72	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	45.0	29.5	29.5	26.0	1.7	1.7	34.3	0.0	0.0	28.6	0.0	0.0
Incr Delay (d2), s/veh	5.8	4.7	8.3	0.4	1.2	2.3	8.6	0.0	0.0	0.7	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	3.1	11.6	13.0	1.7	0.9	1.2	9.8	0.0	0.0	4.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.8	34.2	37.8	26.3	2.9	3.9	42.9	0.0	0.0	29.3	0.0	0.0
LnGrp LOS	D	C	D	C	A	A	D	A	A	C	A	A
Approach Vol, veh/h		1714			1592			379				203
Approach Delay, s/veh		36.5			4.8			42.9				29.3
Approach LOS		D			A			D				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	24.4	41.0		34.6	13.4	52.0		34.6				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	15.0	36.0		34.0	15.0	36.0		34.0				
Max Q Clear Time (g_c+I1), s	6.2	30.2		13.6	8.6	5.9		28.4				
Green Ext Time (p_c), s	0.1	4.3		1.2	0.1	12.0		1.2				
Intersection Summary												
HCM 6th Ctrl Delay												23.8
HCM 6th LOS												C

HCM 6th Signalized Intersection Summary

2034 with BRT

23: Zeier & E Wash

MD Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	98	1229	120	241	1162	76	200	51	241	107	39	62
Future Volume (veh/h)	98	1229	120	241	1162	76	200	51	241	107	39	62
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	112	1410	138	277	1333	87	229	59	277	123	45	71
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	139	2145	666	345	2231	693	536	290	246	156	60	96
Arrive On Green	0.16	0.84	0.84	0.20	0.87	0.87	0.16	0.16	0.16	0.09	0.09	0.09
Sat Flow, veh/h	1781	5106	1585	3456	5106	1585	3456	1870	1585	1731	670	1062
Grp Volume(v), veh/h	112	1410	138	277	1333	87	229	59	277	127	0	112
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1728	1702	1585	1728	1870	1585	1784	0	1679
Q Serve(g_s), s	6.1	9.9	1.7	7.6	6.9	0.8	6.0	2.8	15.5	7.0	0.0	6.5
Cycle Q Clear(g_c), s	6.1	9.9	1.7	7.6	6.9	0.8	6.0	2.8	15.5	7.0	0.0	6.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	0.97		0.63
Lane Grp Cap(c), veh/h	139	2145	666	345	2231	693	536	290	246	161	0	151
V/C Ratio(X)	0.81	0.66	0.21	0.80	0.60	0.13	0.43	0.20	1.13	0.79	0.00	0.74
Avail Cap(c_a), veh/h	214	2145	666	467	2231	693	536	290	246	169	0	160
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)	0.51	0.51	0.51	0.89	0.89	0.89	0.99	0.99	0.99	1.00	0.00	1.00
Uniform Delay (d), s/veh	41.5	5.4	4.8	39.1	4.0	3.6	38.2	36.9	42.2	44.6	0.0	44.3
Incr Delay (d2), s/veh	6.5	0.8	0.4	6.4	1.1	0.3	0.5	0.3	95.8	20.6	0.0	16.0
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	2.7	1.9	0.6	3.2	1.5	0.3	2.6	1.3	12.6	4.0	0.0	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.0	6.2	5.1	45.5	5.0	3.9	38.8	37.2	138.0	65.2	0.0	60.3
LnGrp LOS	D	A	A	D	A	A	D	D	F	E	A	E
Approach Vol, veh/h		1660			1697			565				239
Approach Delay, s/veh		9.0			11.6			87.3				62.9
Approach LOS		A			B			F				E
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.5	48.0		15.5	13.8	49.7		21.0				
Change Period (Y+Rc), s	5.5	6.0		6.5	6.0	6.0		5.5				
Max Green Setting (Gmax), s	13.5	38.0		9.5	12.0	39.0		15.5				
Max Q Clear Time (g_c+I1), s	9.6	11.9		9.0	8.1	8.9		17.5				
Green Ext Time (p_c), s	0.3	11.8		0.1	0.1	11.5		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				23.8								
HCM 6th LOS				C								

HCM 6th Signalized Intersection Summary
24: E Springs & E Wash

2034 with BRT
MD Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↗	↙↙	↑↑↑	↙↙	↗
Traffic Volume (veh/h)	1400	175	389	1210	350	187
Future Volume (veh/h)	1400	175	389	1210	350	187
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	1606	0	446	1388	402	215
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2593		532	3660	547	251
Arrive On Green	1.00	0.00	0.15	0.72	0.16	0.16
Sat Flow, veh/h	5274	1585	3456	5274	3456	1585
Grp Volume(v), veh/h	1606	0	446	1388	402	215
Grp Sat Flow(s),veh/h/ln	1702	1585	1728	1702	1728	1585
Q Serve(g_s), s	0.0	0.0	12.5	10.6	11.1	13.2
Cycle Q Clear(g_c), s	0.0	0.0	12.5	10.6	11.1	13.2
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2593		532	3660	547	251
V/C Ratio(X)	0.62		0.84	0.38	0.74	0.86
Avail Cap(c_a), veh/h	2593		708	3660	605	277
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.69	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	41.1	5.5	40.1	41.0
Incr Delay (d2), s/veh	0.8	0.0	6.7	0.3	4.2	21.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	5.7	3.0	5.0	6.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.8	0.0	47.8	5.8	44.3	62.1
LnGrp LOS	A		D	A	D	E
Approach Vol, veh/h	1606	A		1834	617	
Approach Delay, s/veh	0.8			16.0	50.5	
Approach LOS	A			B	D	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	20.9	56.8		22.3		77.7
Change Period (Y+Rc), s	5.5	6.0		6.5		6.0
Max Green Setting (Gmax), s	20.5	44.0		17.5		70.0
Max Q Clear Time (g_c+I1), s	14.5	2.0		15.2		12.6
Green Ext Time (p_c), s	0.9	16.2		0.6		13.7

Intersection Summary

HCM 6th Ctrl Delay	15.2
HCM 6th LOS	B

Notes













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

HCM Signalized Intersection Capacity Analysis

2034 with BRT

1: Blair St. & East Washington Ave.

PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑↑	↑↑		↑		↑↑	↑	↑↑	
Traffic Volume (vph)	0	1598	38	617	737	0	79	0	990	656	84	23
Future Volume (vph)	0	1598	38	617	737	0	79	0	990	656	84	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0		4.0	4.0	4.0	
Lane Util. Factor		0.95		0.97	0.95		1.00		0.88	0.91	0.91	
Frt		1.00		1.00	1.00		1.00		0.85	1.00	0.99	
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	0.96	
Satd. Flow (prot)		3527		3433	3539		1770		2787	1610	3241	
Flt Permitted		1.00		0.95	1.00		0.95		1.00	0.95	0.96	
Satd. Flow (perm)		3527		3433	3539		1770		2787	1610	3241	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	0	1833	44	708	846	0	91	0	1136	753	96	26
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	1876	0	708	846	0	91	0	1136	376	496	0
Turn Type		NA		Prot	NA		Prot		pt+ov	Split	NA	
Protected Phases		1		2	1 2		3		2 3	4	4	
Permitted Phases							3		3 2			
Actuated Green, G (s)		40.5		38.5	83.5		7.0		50.0	35.0	35.0	
Effective Green, g (s)		41.0		39.0	84.0		7.0		50.5	37.0	37.0	
Actuated g/C Ratio		0.29		0.28	0.60		0.05		0.36	0.26	0.26	
Clearance Time (s)		4.5		4.5			4.0			6.0	6.0	
Vehicle Extension (s)		3.0		3.0			3.0			3.0	3.0	
Lane Grp Cap (vph)		1032		956	2123		88		1005	425	856	
v/s Ratio Prot		c0.53		0.21	0.24		0.05		c0.41	c0.23	0.15	
v/s Ratio Perm												
v/c Ratio		1.82		0.74	0.40		1.03		1.13	0.88	0.58	
Uniform Delay, d1		49.5		45.9	14.7		66.5		44.8	49.5	44.7	
Progression Factor		1.00		0.71	0.96		1.00		1.00	1.00	1.00	
Incremental Delay, d2		371.7		4.3	0.1		105.5		71.4	19.2	1.0	
Delay (s)		421.2		37.1	14.2		172.0		116.2	68.6	45.7	
Level of Service		F		D	B		F		F	E	D	
Approach Delay (s)		421.2			24.7			120.3			55.6	
Approach LOS		F			C			F			E	
Intersection Summary												
HCM 2000 Control Delay			185.3			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			1.32									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			117.0%			ICU Level of Service			H			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 2: Livingston Ave & East Washington Ave.

2034 with BRT
 PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑		↖	↑↑				↖			↖
Traffic Volume (vph)	194	2982	68	75	1352	49	0	0	73	0	0	38
Future Volume (vph)	194	2982	68	75	1352	49	0	0	73	0	0	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0				5.0			5.0
Lane Util. Factor	1.00	0.91		1.00	0.95				1.00			1.00
Frt	1.00	1.00		1.00	0.99				0.86			0.86
Flt Protected	0.95	1.00		0.95	1.00				1.00			1.00
Satd. Flow (prot)	1770	5068		1770	3521				1611			1611
Flt Permitted	0.13	1.00		0.04	1.00				1.00			1.00
Satd. Flow (perm)	238	5068		67	3521				1611			1611
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	223	3421	78	86	1551	56	0	0	84	0	0	44
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	14	0	0	38
Lane Group Flow (vph)	223	3498	0	86	1606	0	0	0	70	0	0	6
Turn Type	D.P+P	NA		D.Pm	NA				Prot			Over
Protected Phases	4	2			6				8			4
Permitted Phases	6			2								
Actuated Green, G (s)	130.0	112.0		112.0	112.0				18.0			18.0
Effective Green, g (s)	130.0	112.0		112.0	112.0				18.0			18.0
Actuated g/C Ratio	0.93	0.80		0.80	0.80				0.13			0.13
Clearance Time (s)	5.0	5.0		5.0	5.0				5.0			5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0				3.0			3.0
Lane Grp Cap (vph)	417	4054		53	2816				207			207
v/s Ratio Prot	c0.07	0.69			0.46				0.04			0.00
v/s Ratio Perm	0.43			c1.29								
v/c Ratio	0.53	0.86		1.62	0.57				0.34			0.03
Uniform Delay, d1	6.5	9.0		14.0	5.1				55.6			53.3
Progression Factor	1.73	0.79		2.08	1.44				1.00			1.00
Incremental Delay, d2	0.1	0.3		338.7	0.7				1.0			0.1
Delay (s)	11.4	7.4		367.8	8.1				56.6			53.4
Level of Service	B	A		F	A				E			D
Approach Delay (s)		7.6			26.4			56.6			53.4	
Approach LOS		A			C			E			D	

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	1.46		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
 3: Paterson St. & East Washington Ave.

2034 with BRT
 PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↗	↖	↑↑	↗		↕		↖	↑	↗
Traffic Volume (veh/h)	0	3491	43	33	1338	51	24	50	78	146	48	42
Future Volume (veh/h)	0	3491	43	33	1338	51	24	50	78	146	48	42
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	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	4005	49	38	1535	59	28	57	89	168	55	48
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, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	3417	1061	49	2602	1160	64	123	165	249	367	311
Arrive On Green	0.00	0.89	0.89	0.05	1.00	1.00	0.20	0.20	0.20	0.20	0.20	0.20
Sat Flow, veh/h	0	5274	1585	1781	3554	1585	176	625	839	1242	1870	1585
Grp Volume(v), veh/h	0	4005	49	38	1535	59	174	0	0	168	55	48
Grp Sat Flow(s),veh/h/ln	0	1702	1585	1781	1777	1585	1640	0	0	1242	1870	1585
Q Serve(g_s), s	0.0	93.7	0.5	2.9	0.0	0.0	3.8	0.0	0.0	11.7	3.4	3.5
Cycle Q Clear(g_c), s	0.0	93.7	0.5	2.9	0.0	0.0	12.9	0.0	0.0	24.6	3.4	3.5
Prop In Lane	0.00		1.00	1.00		1.00	0.16		0.51	1.00		1.00
Lane Grp Cap(c), veh/h	0	3417	1061	49	2602	1160	364	0	0	249	367	311
V/C Ratio(X)	0.00	1.17	0.05	0.78	0.59	0.05	0.48	0.00	0.00	0.67	0.15	0.15
Avail Cap(c_a), veh/h	0	3417	1061	51	2602	1160	479	0	0	338	501	425
HCM Platoon Ratio	1.00	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.41	0.41	0.65	0.65	0.65	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	7.7	2.6	65.8	0.0	0.0	50.2	0.0	0.0	56.1	46.6	46.6
Incr Delay (d2), s/veh	0.0	78.9	0.0	37.6	0.6	0.1	1.0	0.0	0.0	3.2	0.2	0.2
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(95%),veh/ln	0.0	40.6	0.3	3.3	0.4	0.0	9.5	0.0	0.0	10.1	3.0	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	86.6	2.6	103.4	0.6	0.1	51.2	0.0	0.0	59.3	46.8	46.8
LnGrp LOS	A	F	A	F	A	A	D	A	A	E	D	D
Approach Vol, veh/h		4054			1632			174			271	
Approach Delay, s/veh		85.6			3.0			51.2			54.6	
Approach LOS		F			A			D			D	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	8.8	98.7		32.5		107.5		32.5				
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s	4.0	83.5		37.5		92.5		37.5				
Max Q Clear Time (g_c+I1), s	4.9	95.7		26.6		2.0		14.9				
Green Ext Time (p_c), s	0.0	0.0		0.9		12.1		0.7				
Intersection Summary												
HCM 6th Ctrl Delay				61.3								
HCM 6th LOS				E								

HCM 6th Signalized Intersection Summary
 4: Ingersoll St. & East Washington Ave.

2034 with BRT
 PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↙	↑↑↑	↗	↙	↑↑	↗		↑	↗		↕	
Traffic Volume (veh/h)	170	3545	55	55	1414	30	56	18	41	76	34	71
Future Volume (veh/h)	170	3545	55	55	1414	30	56	18	41	76	34	71
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	195	4067	63	63	1622	34	64	21	47	87	39	81
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	248	3333	1035	99	2552	1138	196	58	322	123	56	91
Arrive On Green	1.00	1.00	1.00	0.05	1.00	1.00	0.22	0.20	0.20	0.22	0.20	0.20
Sat Flow, veh/h	301	5106	1585	1781	3554	1585	744	284	1585	425	275	450
Grp Volume(v), veh/h	195	4067	63	63	1622	34	85	0	47	207	0	0
Grp Sat Flow(s),veh/h/ln	301	1702	1585	1781	1777	1585	1028	0	1585	1150	0	0
Q Serve(g_s), s	0.0	91.4	0.0	1.6	0.0	0.0	0.0	0.0	3.4	15.7	0.0	0.0
Cycle Q Clear(g_c), s	0.0	91.4	0.0	1.6	0.0	0.0	10.2	0.0	3.4	25.9	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.75		1.00	0.42		0.39
Lane Grp Cap(c), veh/h	248	3333	1035	99	2552	1138	272	0	322	291	0	0
V/C Ratio(X)	0.79	1.22	0.06	0.64	0.64	0.03	0.31	0.00	0.15	0.71	0.00	0.00
Avail Cap(c_a), veh/h	248	3333	1035	103	2552	1138	357	0	419	383	0	0
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)	0.09	0.09	0.09	0.71	0.71	0.71	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	36.9	0.0	0.0	47.4	0.0	45.8	56.7	0.0	0.0
Incr Delay (d2), s/veh	2.3	99.3	0.0	8.4	0.9	0.0	0.6	0.0	0.2	4.2	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(95%),veh/ln	0.3	39.8	0.0	2.9	0.6	0.0	4.6	0.0	2.5	11.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	2.3	99.3	0.0	45.4	0.9	0.0	48.1	0.0	46.0	60.8	0.0	0.0
LnGrp LOS	A	F	A	D	A	A	D	A	D	E	A	A
Approach Vol, veh/h		4325			1719			132			207	
Approach Delay, s/veh		93.5			2.5			47.3			60.8	
Approach LOS		F			A			D			E	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	9.2	95.9		35.0		105.0		35.0				
Change Period (Y+Rc), s	5.5	4.5		6.5		4.5		6.5				
Max Green Setting (Gmax), s	4.0	82.5		37.0		92.0		37.0				
Max Q Clear Time (g_c+l1), s	3.6	93.4		27.9		2.0		12.2				
Green Ext Time (p_c), s	0.0	0.0		0.5		13.3		0.5				

Intersection Summary												
HCM 6th Ctrl Delay				67.0								
HCM 6th LOS				E								

HCM 6th Signalized Intersection Summary
 5: Baldwin St. & East Washington Ave.

2034 with BRT
 PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↗	↘	↑↑	↗		↖	↗		↖	↗
Traffic Volume (veh/h)	0	3643	46	42	1395	84	31	81	86	153	82	81
Future Volume (veh/h)	0	3643	46	42	1395	84	31	81	86	153	82	81
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	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	4180	53	48	1601	96	36	93	99	176	94	93
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, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	3064	951	51	2361	1053	33	67	419	42	0	419
Arrive On Green	0.00	1.00	1.00	0.03	0.66	0.66	0.27	0.26	0.26	0.27	0.26	0.26
Sat Flow, veh/h	0	5274	1585	1781	3554	1585	0	254	1585	0	0	1585
Grp Volume(v), veh/h	0	4180	53	48	1601	96	129	0	99	270	0	93
Grp Sat Flow(s),veh/h/ln	0	1702	1585	1781	1777	1585	254	0	1585	0	0	1585
Q Serve(g_s), s	0.0	84.0	0.0	3.8	38.5	3.0	0.0	0.0	6.9	0.0	0.0	6.4
Cycle Q Clear(g_c), s	0.0	84.0	0.0	3.8	38.5	3.0	38.0	0.0	6.9	38.0	0.0	6.4
Prop In Lane	0.00		1.00	1.00		1.00	0.28		1.00	0.65		1.00
Lane Grp Cap(c), veh/h	0	3064	951	51	2361	1053	102	0	419	42	0	419
V/C Ratio(X)	0.00	1.36	0.06	0.94	0.68	0.09	1.27	0.00	0.24	6.36	0.00	0.22
Avail Cap(c_a), veh/h	0	3064	951	51	2361	1053	102	0	419	42	0	419
HCM Platoon Ratio	1.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	0.09	0.09	0.35	0.35	0.35	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	67.9	14.4	8.4	46.8	0.0	40.4	70.5	0.0	40.3
Incr Delay (d2), s/veh	0.0	164.2	0.0	57.6	0.6	0.1	177.3	0.0	0.3	2459.7	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(95%),veh/ln	0.0	63.7	0.0	4.1	18.4	1.9	15.1	0.0	5.0	53.0	0.0	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	164.2	0.0	125.4	14.9	8.5	224.0	0.0	40.7	2530.2	0.0	40.5
LnGrp LOS	A	F	A	F	B	A	F	A	D	F	A	D
Approach Vol, veh/h		4233			1745			228				363
Approach Delay, s/veh		162.1			17.6			144.4				1892.4
Approach LOS		F			B			F				F
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	9.0	89.0		42.0		98.0		42.0				
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s	4.0	84.0		37.0		93.0		37.0				
Max Q Clear Time (g_c+l1), s	5.8	86.0		40.0		40.5		40.0				
Green Ext Time (p_c), s	0.0	0.0		0.0		13.1		0.0				

























Intersection Summary												
HCM 6th Ctrl Delay	218.7											
HCM 6th LOS	F											

HCM Signalized Intersection Capacity Analysis

2034 with BRT

6: First & E Wash

PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	433	3162	178	53	1261	125	128	203	128	178	178	194
Future Volume (vph)	433	3162	178	53	1261	125	128	203	128	178	178	194
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.5	6.5	6.5
Lane Util. Factor	0.97	0.91	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	1770	3539	1583	1770	1863	1583	1770	1863	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.29	1.00	1.00	0.61	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	1770	3539	1583	539	1863	1583	1134	1863	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	513	3746	211	63	1494	148	152	241	152	211	211	230
RTOR Reduction (vph)	0	0	83	0	0	83	0	0	94	0	0	74
Lane Group Flow (vph)	513	3746	128	63	1494	65	152	241	58	211	211	156
Turn Type	Prot	NA	custom	Prot	NA	Perm	D.P+P	NA	Perm	Perm	NA	custom
Protected Phases	1	6		5	2		3	3 4			4	
Permitted Phases			2			2	4		3 4	4		4 1
Actuated Green, G (s)	27.5	80.2	59.8	7.6	59.8	59.8	33.1	38.1	38.1	18.5	18.5	52.5
Effective Green, g (s)	27.5	80.2	59.8	7.6	59.8	59.8	33.1	38.1	38.1	18.5	18.5	52.5
Actuated g/C Ratio	0.19	0.56	0.42	0.05	0.42	0.42	0.23	0.27	0.27	0.13	0.13	0.37
Clearance Time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0			6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	662	2863	664	94	1486	664	251	498	423	147	242	1027
v/s Ratio Prot	c0.15	c0.74		0.04	0.42		c0.06	0.13			0.11	
v/s Ratio Perm			0.08			0.04	0.08		0.04	c0.19		0.06
v/c Ratio	0.77	1.31	0.19	0.67	1.01	0.10	0.61	0.48	0.14	1.44	0.87	0.15
Uniform Delay, d1	54.5	31.1	26.1	66.2	41.3	25.0	46.3	43.9	39.6	62.0	60.8	30.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.7	141.4	0.6	17.2	24.7	0.3	4.1	0.7	0.1	230.3	27.2	0.1
Delay (s)	60.2	172.5	26.7	83.3	66.0	25.3	50.4	44.6	39.8	292.2	88.0	30.1
Level of Service	E	F	C	F	E	C	D	D	D	F	F	C
Approach Delay (s)		152.7			63.1			44.9			133.7	
Approach LOS		F			E			D			F	
Intersection Summary												
HCM 2000 Control Delay			122.3			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			1.23									
Actuated Cycle Length (s)			142.4	Sum of lost time (s)				22.0				
Intersection Capacity Utilization			110.2%	ICU Level of Service			H					
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

2034 with BRT

7: Fourth & E Wash

PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	3316	15	0	1368	32	19	31	26	53	19	20
Future Volume (veh/h)	24	3316	15	0	1368	32	19	31	26	53	19	20
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	0	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	28	3929	18	0	1621	38	23	37	31	63	23	24
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	0	2	2	2	2	2	2	2	2
Cap, veh/h	37	3830	1189	0	2429	1084	45	54	231	57	12	231
Arrive On Green	0.02	0.75	0.75	0.00	1.00	1.00	0.15	0.15	0.15	0.15	0.15	0.15
Sat Flow, veh/h	1781	5106	1585	0	3647	1585	0	368	1585	0	85	1585
Grp Volume(v), veh/h	28	3929	18	0	1621	38	60	0	31	86	0	24
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	0	1777	1585	368	0	1585	85	0	1585
Q Serve(g_s), s	1.7	82.5	0.3	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	1.4
Cycle Q Clear(g_c), s	1.7	82.5	0.3	0.0	0.0	0.0	16.0	0.0	1.9	16.0	0.0	1.4
Prop In Lane	1.00		1.00	0.00		1.00	0.38		1.00	0.73		1.00
Lane Grp Cap(c), veh/h	37	3830	1189	0	2429	1084	99	0	231	69	0	231
V/C Ratio(X)	0.75	1.03	0.02	0.00	0.67	0.04	0.61	0.00	0.13	1.24	0.00	0.10
Avail Cap(c_a), veh/h	97	3830	1189	0	2429	1084	99	0	231	69	0	231
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.09	0.00	0.93	0.93	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	53.6	13.7	3.5	0.0	0.0	0.0	42.2	0.0	41.0	52.2	0.0	40.8
Incr Delay (d2), s/veh	2.8	13.2	0.0	0.0	1.4	0.1	10.2	0.0	0.3	187.6	0.0	0.2
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(95%),veh/ln	1.2	31.2	0.1	0.0	0.8	0.0	3.1	0.0	1.4	10.0	0.0	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.3	26.9	3.5	0.0	1.4	0.1	52.5	0.0	41.2	239.8	0.0	41.0
LnGrp LOS	E	F	A	A	A	A	D	A	D	F	A	D
Approach Vol, veh/h		3975			1659			91				110
Approach Delay, s/veh		27.0			1.3			48.6				196.4
Approach LOS		C			A			D				F
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		87.5		22.5	7.3	80.2		22.5				
Change Period (Y+Rc), s		5.0		6.5	5.0	5.0		6.5				
Max Green Setting (Gmax), s		82.5		16.0	6.0	71.5		16.0				
Max Q Clear Time (g_c+I1), s		84.5		18.0	3.7	2.0		18.0				
Green Ext Time (p_c), s		0.0		0.0	0.0	21.9		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				23.2								
HCM 6th LOS				C								

HCM 6th Signalized Intersection Summary
8: Sixth & E Wash

2034 with BRT
PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑	↗	↖	↗			↕	
Traffic Volume (veh/h)	21	3310	22	59	1349	14	21	16	30	42	44	26
Future Volume (veh/h)	21	3310	22	59	1349	14	21	16	30	42	44	26
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	25	3922	26	70	1598	17	25	19	36	50	52	31
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	289	3648	1132	137	4085	1268	159	58	110	86	63	31
Arrive On Green	1.00	1.00	1.00	0.08	1.00	1.00	0.10	0.10	0.10	0.10	0.10	0.10
Sat Flow, veh/h	313	5106	1585	1781	5106	1585	1315	578	1095	411	625	315
Grp Volume(v), veh/h	25	3922	26	70	1598	17	25	0	55	133	0	0
Grp Sat Flow(s),veh/h/ln	313	1702	1585	1781	1702	1585	1315	0	1673	1351	0	0
Q Serve(g_s), s	0.0	78.6	0.0	1.0	0.0	0.0	0.0	0.0	3.4	7.5	0.0	0.0
Cycle Q Clear(g_c), s	0.0	78.6	0.0	1.0	0.0	0.0	2.7	0.0	3.4	10.8	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.65	0.38		0.23
Lane Grp Cap(c), veh/h	289	3648	1132	137	4085	1268	159	0	167	180	0	0
V/C Ratio(X)	0.09	1.08	0.02	0.51	0.39	0.01	0.16	0.00	0.33	0.74	0.00	0.00
Avail Cap(c_a), veh/h	289	3648	1132	163	4085	1268	159	0	167	180	0	0
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)	0.24	0.24	0.24	0.45	0.45	0.45	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	31.1	0.0	0.0	45.8	0.0	46.1	49.9	0.0	0.0
Incr Delay (d2), s/veh	0.1	35.4	0.0	1.3	0.1	0.0	0.5	0.0	1.1	14.8	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(95%),veh/ln	0.0	15.8	0.0	2.4	0.1	0.0	1.2	0.0	2.6	7.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.1	35.4	0.0	32.5	0.1	0.0	46.2	0.0	47.2	64.7	0.0	0.0
LnGrp LOS	A	F	A	C	A	A	D	A	D	E	A	A
Approach Vol, veh/h		3973			1685			80			133	
Approach Delay, s/veh		35.0			1.5			46.9			64.7	
Approach LOS		C			A			D			E	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	9.4	83.6		17.0		93.0		17.0				
Change Period (Y+Rc), s	5.0	5.0		6.0		5.0		6.0				
Max Green Setting (Gmax), s	6.0	77.0		11.0		88.0		11.0				
Max Q Clear Time (g_c+I1), s	3.0	80.6		12.8		2.0		5.4				
Green Ext Time (p_c), s	0.0	0.0		0.0		11.8		0.1				

Intersection Summary

HCM 6th Ctrl Delay	26.2
HCM 6th LOS	C

Notes

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

HCM Signalized Intersection Capacity Analysis

2034 with BRT

9: Milwaukee/North & E Wash

PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	2919	431	0	1169	19	322	82	39	42	177	80
Future Volume (vph)	80	2919	431	0	1169	19	322	82	39	42	177	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5	6.5	6.5		5.0	5.0	
Lane Util. Factor	1.00	0.91	1.00		0.95	1.00	0.97	1.00		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.95		1.00	0.95	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1583		3539	1583	3433	1773		1770	1776	
Flt Permitted	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	5085	1583		3539	1583	3433	1773		1770	1776	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	95	3458	511	0	1385	23	382	97	46	50	210	95
RTOR Reduction (vph)	0	0	66	0	0	12	0	16	0	0	15	0
Lane Group Flow (vph)	95	3458	445	0	1385	11	382	127	0	50	290	0
Turn Type	Prot	NA	Perm		NA	Perm	Split	NA		Split	NA	
Protected Phases	5	2			6		4	4		3	3	
Permitted Phases			2			6						
Actuated Green, G (s)	8.5	67.5	67.5		54.5	54.5	12.5	12.5		14.0	14.0	
Effective Green, g (s)	8.5	67.5	67.5		54.5	54.5	12.5	12.5		14.0	14.0	
Actuated g/C Ratio	0.08	0.61	0.61		0.50	0.50	0.11	0.11		0.13	0.13	
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5	6.5	6.5		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	136	3120	971		1753	784	390	201		225	226	
v/s Ratio Prot	0.05	c0.68			0.39		c0.11	0.07		0.03	c0.16	
v/s Ratio Perm			0.28			0.01						
v/c Ratio	0.70	1.11	0.46		0.79	0.01	0.98	0.63		0.22	1.28	
Uniform Delay, d1	49.5	21.2	11.4		23.0	14.1	48.6	46.6		43.1	48.0	
Progression Factor	1.20	0.44	0.14		0.93	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.7	49.3	0.1		3.2	0.0	39.6	6.3		0.5	157.1	
Delay (s)	62.4	58.5	1.7		24.6	14.1	88.3	52.9		43.6	205.1	
Level of Service	E	E	A		C	B	F	D		D	F	
Approach Delay (s)		51.5			24.4			78.6			182.3	
Approach LOS		D			C			E			F	

Intersection Summary

HCM 2000 Control Delay	55.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	100.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2034 with BRT

10: Johnson & E Wash

PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑		↘	↑↑	↗		↕		↘	↕	
Traffic Volume (vph)	12	2520	18	51	1122	116	20	16	51	236	21	11
Future Volume (vph)	12	2520	18	51	1122	116	20	16	51	236	21	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		5.0	4.5	4.5		5.0		6.0	6.0	
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00		1.00		0.95	0.95	
Frt	1.00	1.00		1.00	1.00	0.85		0.92		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	0.96	
Satd. Flow (prot)	1770	5080		1770	3539	1583		1696		1681	1684	
Flt Permitted	0.18	1.00		0.06	1.00	1.00		0.99		0.69	0.71	
Satd. Flow (perm)	327	5080		105	3539	1583		1696		1222	1243	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	14	2986	21	60	1329	137	24	19	60	280	25	13
RTOR Reduction (vph)	0	1	0	0	0	32	0	46	0	0	3	0
Lane Group Flow (vph)	14	3006	0	60	1329	105	0	57	0	160	155	0
Turn Type	Perm	NA		pm+pt	NA	Perm	Split	NA		Perm	NA	
Protected Phases		6		5	2		3	3			4	
Permitted Phases	6			2		2				4		
Actuated Green, G (s)	66.3	66.3		74.5	74.5	74.5		5.0		15.0	15.0	
Effective Green, g (s)	66.3	66.3		74.5	74.5	74.5		5.0		15.0	15.0	
Actuated g/C Ratio	0.60	0.60		0.68	0.68	0.68		0.05		0.14	0.14	
Clearance Time (s)	4.5	4.5		5.0	4.5	4.5		5.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	197	3061		119	2396	1072		77		166	169	
v/s Ratio Prot		c0.59		0.01	c0.38			c0.03				
v/s Ratio Perm	0.04			0.33		0.07				c0.13	0.13	
v/c Ratio	0.07	0.98		0.50	0.55	0.10		0.74		0.96	0.92	
Uniform Delay, d1	9.1	21.3		27.2	9.2	6.1		51.9		47.2	46.9	
Progression Factor	0.09	0.18		1.03	0.81	0.57		1.00		1.00	1.00	
Incremental Delay, d2	0.1	2.3		2.8	0.8	0.2		31.6		58.7	45.9	
Delay (s)	0.9	6.1		30.7	8.2	3.7		83.5		105.9	92.8	
Level of Service	A	A		C	A	A		F		F	F	
Approach Delay (s)		6.1			8.7			83.5			99.4	
Approach LOS		A			A			F			F	

Intersection Summary

HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

11: Marquette & E Wash

2034 with BRT
PM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↗	↖	↑↑	↘	
Traffic Volume (vph)	3167	47	89	1263	84	110
Future Volume (vph)	3167	47	89	1263	84	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.0	4.5	6.5	
Lane Util. Factor	0.91	1.00	1.00	0.95	1.00	
Frt	1.00	0.85	1.00	1.00	0.92	
Flt Protected	1.00	1.00	0.95	1.00	0.98	
Satd. Flow (prot)	5085	1583	1770	3539	1684	
Flt Permitted	1.00	1.00	0.95	1.00	0.98	
Satd. Flow (perm)	5085	1583	1770	3539	1684	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	3752	56	105	1496	100	130
RTOR Reduction (vph)	0	7	0	0	43	0
Lane Group Flow (vph)	3752	49	105	1496	187	0
Turn Type	NA	Perm	Prot	NA	Prot	
Protected Phases	2		3	2 3	4	
Permitted Phases		2				
Actuated Green, G (s)	77.5	77.5	7.0	89.0	10.5	
Effective Green, g (s)	77.5	77.5	7.0	89.0	10.5	
Actuated g/C Ratio	0.70	0.70	0.06	0.81	0.10	
Clearance Time (s)	4.5	4.5	4.0		6.5	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	3582	1115	112	2863	160	
v/s Ratio Prot	c0.74		c0.06	0.42	c0.11	
v/s Ratio Perm		0.03				
v/c Ratio	1.05	0.04	0.94	0.52	1.17	
Uniform Delay, d1	16.2	5.0	51.3	3.5	49.8	
Progression Factor	0.23	0.19	0.94	1.29	1.00	
Incremental Delay, d2	26.0	0.0	59.2	0.1	124.8	
Delay (s)	29.7	1.0	107.4	4.6	174.6	
Level of Service	C	A	F	A	F	
Approach Delay (s)	29.3			11.4	174.6	
Approach LOS	C			B	F	

Intersection Summary

HCM 2000 Control Delay	30.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	97.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 12: EB Ramps & E Wash

2034 with BRT
 PM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↑↑	↑	↑↑	↑↑	↑↑
Traffic Volume (vph)	1973	1041	97	1369	112	262
Future Volume (vph)	1973	1041	97	1369	112	262
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.91	0.88	1.00	0.95	0.97	0.88
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)	5085	2787	1770	3539	3433	2787
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	2787	1770	3539	3433	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	2264	1194	111	1571	129	301
RTOR Reduction (vph)	0	83	0	0	0	3
Lane Group Flow (vph)	2264	1111	111	1571	129	298
Turn Type	NA	custom	Prot	NA	Prot	custom
Protected Phases	5	5 2	3	1 8	7	7 8 3
Permitted Phases		2				8
Actuated Green, G (s)	59.8	89.8	10.2	92.0	8.0	40.2
Effective Green, g (s)	59.8	89.8	10.2	92.0	8.0	40.2
Actuated g/C Ratio	0.54	0.82	0.09	0.84	0.07	0.37
Clearance Time (s)	5.0		5.0		5.0	
Vehicle Extension (s)	3.0		3.0		3.0	
Lane Grp Cap (vph)	2764	2275	164	2959	249	1018
v/s Ratio Prot	c0.45	c0.40	0.06	c0.44	0.04	0.11
v/s Ratio Perm						
v/c Ratio	0.82	0.49	0.68	0.53	0.52	0.29
Uniform Delay, d1	20.7	3.1	48.3	2.6	49.1	24.8
Progression Factor	0.35	1.75	1.31	0.49	1.00	1.00
Incremental Delay, d2	0.3	0.1	9.4	0.2	1.8	0.2
Delay (s)	7.5	5.5	72.9	1.5	51.0	25.0
Level of Service	A	A	E	A	D	C
Approach Delay (s)	6.8			6.2	32.8	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	8.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	63.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 13: East Wash & WB Ramps

2034 with BRT
 PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	159	2131	1066	260	61	269
Future Volume (vph)	159	2131	1066	260	61	269
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.91	0.95	1.00	0.97	0.88
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	3539	1583	3433	2787
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	5085	3539	1583	3433	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	182	2445	1223	298	70	309
RTOR Reduction (vph)	0	0	0	48	0	60
Lane Group Flow (vph)	182	2445	1223	250	70	249
Turn Type	Prot	NA	NA	custom	Prot	pt+ov
Protected Phases	1	6	2		8	8 1
Permitted Phases				6		
Actuated Green, G (s)	24.0	92.4	63.4	92.4	7.6	36.6
Effective Green, g (s)	24.0	92.4	63.4	92.4	7.6	36.6
Actuated g/C Ratio	0.22	0.84	0.58	0.84	0.07	0.33
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	386	4271	2039	1329	237	927
v/s Ratio Prot	0.10	c0.48	c0.35		0.02	c0.09
v/s Ratio Perm				0.16		
v/c Ratio	0.47	0.57	0.60	0.19	0.30	0.27
Uniform Delay, d1	37.5	2.7	15.1	1.7	48.7	26.9
Progression Factor	0.68	0.42	0.34	3.49	1.00	1.00
Incremental Delay, d2	0.6	0.4	1.1	0.3	0.7	0.2
Delay (s)	26.0	1.5	6.2	6.1	49.4	27.0
Level of Service	C	A	A	A	D	C
Approach Delay (s)		3.2	6.2		31.2	
Approach LOS		A	A		C	

Intersection Summary

HCM 2000 Control Delay	6.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
 14: Rethke Ave/Melvin Ct & East Wash

2034 with BRT
 PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑		↖	↑↑			↕			↕	
Traffic Volume (veh/h)	45	2119	14	13	1283	17	61	9	15	13	5	12
Future Volume (veh/h)	45	2119	14	13	1283	17	61	9	15	13	5	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	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	52	2431	16	15	1472	20	70	10	17	15	6	14
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	67	4028	26	24	2675	36	144	15	22	90	40	56
Arrive On Green	0.03	0.52	0.52	0.03	1.00	1.00	0.08	0.08	0.08	0.08	0.08	0.08
Sat Flow, veh/h	1781	5234	34	1781	3590	49	1081	191	270	532	501	689
Grp Volume(v), veh/h	52	1580	867	15	728	764	97	0	0	35	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1864	1781	1777	1862	1542	0	0	1723	0	0
Q Serve(g_s), s	3.2	35.9	36.0	0.9	0.0	0.0	4.6	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.2	35.9	36.0	0.9	0.0	0.0	6.7	0.0	0.0	2.1	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.03	0.72		0.18	0.43		0.40
Lane Grp Cap(c), veh/h	67	2620	1435	24	1324	1387	181	0	0	186	0	0
V/C Ratio(X)	0.77	0.60	0.60	0.63	0.55	0.55	0.54	0.00	0.00	0.19	0.00	0.00
Avail Cap(c_a), veh/h	130	2620	1435	65	1324	1387	395	0	0	410	0	0
HCM Platoon Ratio	0.67	0.67	0.67	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.80	0.80	0.80	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	53.1	14.8	14.9	53.3	0.0	0.0	49.4	0.0	0.0	47.4	0.0	0.0
Incr Delay (d2), s/veh	14.0	0.8	1.5	24.3	1.6	1.6	2.5	0.0	0.0	0.5	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(95%),veh/ln	3.0	20.6	22.6	1.0	1.1	1.1	4.9	0.0	0.0	1.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.1	15.7	16.4	77.5	1.6	1.6	51.8	0.0	0.0	47.9	0.0	0.0
LnGrp LOS	E	B	B	E	A	A	D	A	A	D	A	A
Approach Vol, veh/h		2499			1507			97				35
Approach Delay, s/veh		17.0			2.4			51.8				47.9
Approach LOS		B			A			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.5	89.6		13.9	9.1	87.0		13.9				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	4.0	66.0		25.0	8.0	62.0		25.0				
Max Q Clear Time (g_c+I1), s	2.9	38.0		4.1	5.2	2.0		8.7				
Green Ext Time (p_c), s	0.0	21.7		0.1	0.0	15.9		0.4				
Intersection Summary												
HCM 6th Ctrl Delay				12.7								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary
 16: Fair Oaks/Wright & East Wash

2034 with BRT
 PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↗↗↗		↗	↗↗			↗↗		↗	↗	↗
Traffic Volume (veh/h)	150	1950	47	154	1014	90	55	136	210	70	273	142
Future Volume (veh/h)	150	1950	47	154	1014	90	55	136	210	70	273	142
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	178	2310	56	182	1201	107	65	161	249	83	323	168
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	218	2753	67	226	1786	159	69	122	328	128	425	360
Arrive On Green	0.24	1.00	1.00	0.13	0.54	0.53	0.23	0.23	0.20	0.23	0.23	0.23
Sat Flow, veh/h	1781	5128	124	1781	3301	294	120	535	1442	976	1870	1585
Grp Volume(v), veh/h	178	1531	835	182	646	662	226	0	249	83	323	168
Grp Sat Flow(s),veh/h/ln	1781	1702	1848	1781	1777	1818	655	0	1442	976	1870	1585
Q Serve(g_s), s	10.4	0.0	0.0	10.9	28.8	29.0	7.3	0.0	17.9	7.1	17.7	10.1
Cycle Q Clear(g_c), s	10.4	0.0	0.0	10.9	28.8	29.0	25.0	0.0	17.9	25.0	17.7	10.1
Prop In Lane	1.00		0.07	1.00		0.16	0.29		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	218	1827	992	226	962	984	191	0	328	128	425	360
V/C Ratio(X)	0.82	0.84	0.84	0.81	0.67	0.67	1.18	0.00	0.76	0.65	0.76	0.47
Avail Cap(c_a), veh/h	259	1827	992	243	962	984	191	0	328	128	425	360
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)	1.00	1.00	1.00	0.65	0.65	0.65	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.4	0.0	0.0	46.7	18.2	18.3	46.5	0.0	41.2	52.3	39.7	36.7
Incr Delay (d2), s/veh	15.7	4.8	8.6	11.5	2.4	2.4	123.2	0.0	9.9	10.7	7.8	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(95%),veh/ln	8.6	2.2	4.3	8.6	16.2	16.7	19.0	0.0	11.8	4.8	13.9	7.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.1	4.8	8.6	58.2	20.6	20.7	169.8	0.0	51.1	63.1	47.5	37.7
LnGrp LOS	E	A	A	E	C	C	F	A	D	E	D	D
Approach Vol, veh/h		2544			1490			475			574	
Approach Delay, s/veh		9.6			25.3			107.5			46.9	
Approach LOS		A			C			F			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	17.9	63.1		29.0	17.5	63.5		29.0				
Change Period (Y+Rc), s	5.0	5.0		7.0	5.0	5.0		7.0				
Max Green Setting (Gmax), s	14.0	57.0		22.0	15.0	56.0		22.0				
Max Q Clear Time (g_c+l1), s	12.9	2.0		27.0	12.4	31.0		27.0				
Green Ext Time (p_c), s	0.1	21.7		0.0	0.1	6.6		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				27.6								
HCM 6th LOS				C								

HCM 6th Signalized Intersection Summary
 18: Mendota & East Wash

2034 with BRT
 PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑	↖	↗	↑↑↑			↕			↕	
Traffic Volume (veh/h)	29	2583	171	103	1406	21	182	5	90	47	7	29
Future Volume (veh/h)	29	2583	171	103	1406	21	182	5	90	47	7	29
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	34	3060	203	122	1666	25	216	6	107	56	8	34
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	3476	1079	172	3605	54	249	12	207	119	26	47
Arrive On Green	0.03	0.68	0.68	0.10	1.00	1.00	0.15	0.15	0.14	0.15	0.15	0.14
Sat Flow, veh/h	1781	5106	1585	1781	5183	78	1179	77	1377	418	174	315
Grp Volume(v), veh/h	34	3060	203	122	1094	597	216	0	113	98	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1856	1179	0	1454	907	0	0
Q Serve(g_s), s	0.6	47.7	4.7	2.0	0.0	0.0	2.9	0.0	7.2	4.9	0.0	0.0
Cycle Q Clear(g_c), s	0.6	47.7	4.7	2.0	0.0	0.0	15.0	0.0	7.2	12.1	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.04	1.00		0.95	0.57		0.35
Lane Grp Cap(c), veh/h	331	3476	1079	172	2368	1291	249	0	218	193	0	0
V/C Ratio(X)	0.10	0.88	0.19	0.71	0.46	0.46	0.87	0.00	0.52	0.51	0.00	0.00
Avail Cap(c_a), veh/h	359	3476	1079	191	2368	1291	249	0	218	193	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.09	0.80	0.80	0.80	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	4.1	12.7	5.8	24.7	0.0	0.0	44.0	0.0	39.9	42.6	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.3	0.0	8.3	0.5	1.0	26.2	0.0	2.1	2.2	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(95%),veh/ln	0.3	16.1	1.9	4.0	0.3	0.6	11.6	0.0	4.9	4.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.1	13.1	5.9	33.0	0.5	1.0	70.2	0.0	42.0	44.8	0.0	0.0
LnGrp LOS	A	B	A	C	A	A	E	A	D	D	A	A
Approach Vol, veh/h		3297			1813			329				98
Approach Delay, s/veh		12.5			2.8			60.5				44.8
Approach LOS		B			A			E				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.4	73.6		19.0	8.9	72.1		19.0				
Change Period (Y+Rc), s	5.0	5.0		5.5	5.0	5.0		5.5				
Max Green Setting (Gmax), s	4.0	67.0		13.5	5.0	66.0		13.5				
Max Q Clear Time (g_c+I1), s	2.6	2.0		14.1	4.0	49.7		17.0				
Green Ext Time (p_c), s	0.0	10.8		0.0	0.0	14.6		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				12.8								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary
19: Lien & East Wash






























2034 with BRT
PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑	↗	↖	↑↑↑		↖	↗			↕	
Traffic Volume (veh/h)	48	2447	416	76	1381	19	214	10	46	21	11	30
Future Volume (veh/h)	48	2447	416	76	1381	19	214	10	46	21	11	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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	57	2899	493	90	1636	23	254	12	54	25	13	36
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	3131	972	188	3207	45	385	65	293	142	83	167
Arrive On Green	0.08	1.00	1.00	0.09	1.00	1.00	0.22	0.22	0.20	0.22	0.22	0.20
Sat Flow, veh/h	1781	5106	1585	1781	5188	73	1356	296	1334	426	377	760
Grp Volume(v), veh/h	57	2899	493	90	1073	586	254	0	66	74	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1857	1356	0	1630	1563	0	0
Q Serve(g_s), s	1.1	0.0	0.0	1.8	0.0	0.0	13.1	0.0	3.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.1	0.0	0.0	1.8	0.0	0.0	16.6	0.0	3.3	3.5	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.04	1.00		0.82	0.34		0.49
Lane Grp Cap(c), veh/h	331	3131	972	188	2104	1148	385	0	359	392	0	0
V/C Ratio(X)	0.17	0.93	0.51	0.48	0.51	0.51	0.66	0.00	0.18	0.19	0.00	0.00
Avail Cap(c_a), veh/h	345	3131	972	194	2104	1148	385	0	359	392	0	0
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)	0.32	0.32	0.32	0.79	0.79	0.79	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.9	0.0	0.0	12.6	0.0	0.0	36.5	0.0	32.4	32.2	0.0	0.0
Incr Delay (d2), s/veh	0.1	2.2	0.6	1.5	0.7	1.3	4.1	0.0	0.2	1.1	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(95%),veh/ln	0.6	1.1	0.3	1.4	0.4	0.7	10.2	0.0	2.4	2.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.0	2.2	0.6	14.1	0.7	1.3	40.6	0.0	32.6	33.3	0.0	0.0
LnGrp LOS	A	A	A	B	A	A	D	A	C	C	A	A
Approach Vol, veh/h		3449			1749			320				74
Approach Delay, s/veh		2.0			1.6			39.0				33.3
Approach LOS		A			A			D				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.7	65.3		26.0	8.2	65.8		26.0				
Change Period (Y+Rc), s	5.0	5.0		6.0	5.0	5.0		6.0				
Max Green Setting (Gmax), s	4.0	60.0		20.0	4.0	60.0		20.0				
Max Q Clear Time (g_c+l1), s	3.8	2.0		18.6	3.1	2.0		5.5				
Green Ext Time (p_c), s	0.0	42.3		0.2	0.0	10.4		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			4.4									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary
 20: Thierer/Portage & East Wash

2034 with BRT
 PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  						 	
Traffic Volume (veh/h)	150	2119	187	71	1152	35	211	59	71	54	92	53
Future Volume (veh/h)	150	2119	187	71	1152	35	211	59	71	54	92	53
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	178	2511	222	84	1365	41	250	70	84	64	109	63
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	230	2839	881	132	2556	794	319	194	232	287	468	396
Arrive On Green	0.26	1.00	1.00	0.05	0.34	0.34	0.25	0.25	0.22	0.25	0.25	0.25
Sat Flow, veh/h	1781	5106	1585	1781	5106	1585	1213	774	929	1233	1870	1585
Grp Volume(v), veh/h	178	2511	222	84	1365	41	250	0	154	64	109	63
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1585	1213	0	1703	1233	1870	1585
Q Serve(g_s), s	9.3	0.0	0.0	4.6	21.6	1.7	20.4	0.0	7.6	4.5	4.6	3.1
Cycle Q Clear(g_c), s	9.3	0.0	0.0	4.6	21.6	1.7	25.0	0.0	7.6	12.1	4.6	3.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.55	1.00		1.00
Lane Grp Cap(c), veh/h	230	2839	881	132	2556	794	319	0	426	287	468	396
V/C Ratio(X)	0.77	0.88	0.25	0.64	0.53	0.05	0.78	0.00	0.36	0.22	0.23	0.16
Avail Cap(c_a), veh/h	324	2839	881	132	2556	794	319	0	426	287	468	396
HCM Platoon Ratio	2.00	2.00	2.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.30	0.30	0.30	0.72	0.72	0.72	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.7	0.0	0.0	46.2	23.8	17.2	39.9	0.0	31.5	35.9	29.9	29.3
Incr Delay (d2), s/veh	2.3	1.4	0.2	7.1	0.6	0.1	12.0	0.0	0.5	0.4	0.3	0.2
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(95%),veh/ln	5.3	0.7	0.1	4.1	13.3	1.1	11.5	0.0	5.7	2.5	3.8	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.0	1.4	0.2	53.3	24.4	17.3	52.0	0.0	32.0	36.3	30.1	29.5
LnGrp LOS	D	A	A	D	C	B	D	A	C	D	C	C
Approach Vol, veh/h		2911			1490			404			236	
Approach Delay, s/veh		3.6			25.8			44.4			31.6	
Approach LOS		A			C			D			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.4	59.6		29.0	16.9	54.1		29.0				
Change Period (Y+Rc), s	5.5	5.5		6.5	5.5	5.5		6.5				
Max Green Setting (Gmax), s	5.9	54.1		22.5	16.7	43.3		22.5				
Max Q Clear Time (g_c+l1), s	6.6	2.0		14.1	11.3	23.6		27.0				
Green Ext Time (p_c), s	0.0	28.6		0.6	0.3	7.1		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				14.7								
HCM 6th LOS				B								

HCM Signalized Intersection Capacity Analysis

21: Eagan/Continental & East Wash

2034 with BRT
PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	117	1984	371	119	955	113	325	55	145	82	32	78
Future Volume (vph)	117	1984	371	119	955	113	325	55	145	82	32	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.86		0.97	0.91		0.95	0.95	1.00		1.00	
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85		0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.97	1.00		0.98	
Satd. Flow (prot)	1770	6256		3433	5004		1681	1709	1583		1724	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.97	1.00		0.98	
Satd. Flow (perm)	1770	6256		3433	5004		1681	1709	1583		1724	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%	109%
Adj. Flow (vph)	139	2351	440	141	1131	134	385	65	172	97	38	92
RTOR Reduction (vph)	0	34	0	0	14	0	0	0	146	0	25	0
Lane Group Flow (vph)	139	2757	0	141	1251	0	223	227	26	0	202	0
Turn Type	Prot	NA		Prot	NA		Split	NA	Perm		Split	NA
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases									4			
Actuated Green, G (s)	12.1	47.5		4.5	39.9		13.0	13.0	13.0		12.0	
Effective Green, g (s)	13.6	49.0		6.0	41.4		15.0	15.0	15.0		14.0	
Actuated g/C Ratio	0.14	0.49		0.06	0.41		0.15	0.15	0.15		0.14	
Clearance Time (s)	5.5	5.5		5.5	5.5		6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	240	3065		205	2071		252	256	237		241	
v/s Ratio Prot	c0.08	c0.44		0.04	0.25		0.13	c0.13			c0.12	
v/s Ratio Perm									0.02			
v/c Ratio	0.58	0.90		0.69	0.60		0.88	0.89	0.11		0.84	
Uniform Delay, d1	40.5	23.3		46.1	22.9		41.7	41.7	36.7		41.9	
Progression Factor	1.25	0.37		0.64	1.29		1.00	1.00	1.00		1.00	
Incremental Delay, d2	2.2	3.3		4.5	0.6		28.6	28.5	0.2		21.7	
Delay (s)	52.8	11.8		33.9	30.1		70.2	70.2	36.9		63.6	
Level of Service	D	B		C	C		E	E	D		E	
Approach Delay (s)		13.7			30.5			61.0			63.6	
Approach LOS		B			C			E			E	
Intersection Summary												
HCM 2000 Control Delay			26.1			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			70.5%			ICU Level of Service			C			
Analysis Period (min)			15									
c	Critical Lane Group											

HCM 6th Signalized Intersection Summary
 22: Independence/Independence & East Wash

2034 with BRT
 PM Peak



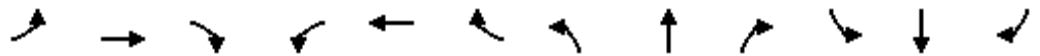
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑		↖	↑↑↑			↕				↕
Traffic Volume (veh/h)	296	1638	130	98	1166	47	200	60	30	80	30	215
Future Volume (veh/h)	296	1638	130	98	1166	47	200	60	30	80	30	215
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		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	340	1879	149	112	1338	54	229	69	34	92	34	247
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	356	1785	141	267	1611	65	279	67	33	161	71	368
Arrive On Green	0.20	0.37	0.37	0.30	0.64	0.64	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	1781	4825	381	1781	5035	203	661	204	99	352	216	1114
Grp Volume(v), veh/h	340	1324	704	112	905	487	332	0	0	373	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1802	1781	1702	1834	964	0	0	1682	0	0
Q Serve(g_s), s	18.9	37.0	37.0	5.0	20.4	20.4	13.9	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	18.9	37.0	37.0	5.0	20.4	20.4	33.0	0.0	0.0	19.1	0.0	0.0
Prop In Lane	1.00		0.21	1.00		0.11	0.69		0.10	0.25		0.66
Lane Grp Cap(c), veh/h	356	1260	667	267	1089	587	379	0	0	600	0	0
V/C Ratio(X)	0.95	1.05	1.06	0.42	0.83	0.83	0.88	0.00	0.00	0.62	0.00	0.00
Avail Cap(c_a), veh/h	356	1260	667	267	1089	587	379	0	0	600	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.37	0.37	0.37	0.71	0.71	0.71	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	39.5	31.5	31.5	31.5	15.9	15.9	36.1	0.0	0.0	28.9	0.0	0.0
Incr Delay (d2), s/veh	18.9	31.0	38.0	0.7	5.4	9.5	20.0	0.0	0.0	2.0	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(95%),veh/ln	12.9	24.9	27.9	3.6	8.3	9.7	15.4	0.0	0.0	12.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.4	62.5	69.5	32.3	21.3	25.4	56.1	0.0	0.0	30.8	0.0	0.0
LnGrp LOS	E	F	F	C	C	C	E	A	A	C	A	A
Approach Vol, veh/h		2368			1504			332				373
Approach Delay, s/veh		64.0			23.4			56.1				30.8
Approach LOS		E			C			E				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	20.0	42.0		38.0	25.0	37.0		38.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	15.0	37.0		33.0	20.0	32.0		33.0				
Max Q Clear Time (g_c+I1), s	7.0	39.0		21.1	20.9	22.4		35.0				
Green Ext Time (p_c), s	0.1	0.0		1.9	0.0	5.7		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				47.4								
HCM 6th LOS				D								

HCM 6th Signalized Intersection Summary

2034 with BRT

23: Zeier & E Wash

PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	124	1527	148	297	1158	66	112	56	358	117	35	37
Future Volume (veh/h)	124	1527	148	297	1158	66	112	56	358	117	35	37
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	142	1752	170	341	1329	76	129	64	411	134	40	42
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	267	2024	628	410	1838	571	570	309	262	151	71	75
Arrive On Green	0.30	0.79	0.79	0.08	0.24	0.24	0.05	0.05	0.05	0.09	0.09	0.09
Sat Flow, veh/h	1781	5106	1585	3456	5106	1585	3456	1870	1585	1781	835	877
Grp Volume(v), veh/h	142	1752	170	341	1329	76	129	64	411	134	0	82
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1728	1702	1585	1728	1870	1585	1781	0	1712
Q Serve(g_s), s	6.6	22.7	2.8	9.7	23.9	3.8	3.6	3.3	16.5	7.4	0.0	4.6
Cycle Q Clear(g_c), s	6.6	22.7	2.8	9.7	23.9	3.8	3.6	3.3	16.5	7.4	0.0	4.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.51
Lane Grp Cap(c), veh/h	267	2024	628	410	1838	571	570	309	262	151	0	146
V/C Ratio(X)	0.53	0.87	0.27	0.83	0.72	0.13	0.23	0.21	1.57	0.89	0.00	0.56
Avail Cap(c_a), veh/h	267	2024	628	442	1838	571	570	309	262	151	0	146
HCM Platoon Ratio	2.00	2.00	2.00	0.67	0.67	0.67	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.09	0.91	0.91	0.91	0.85	0.85	0.85	1.00	0.00	1.00
Uniform Delay (d), s/veh	32.1	8.6	6.6	45.0	33.4	25.7	41.2	41.0	47.3	45.3	0.0	44.0
Incr Delay (d2), s/veh	0.2	0.5	0.1	11.0	2.3	0.4	0.2	0.3	272.4	41.6	0.0	4.9
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(95%),veh/ln	3.3	4.0	1.3	8.3	15.5	2.6	2.8	2.8	41.4	8.7	0.0	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.3	9.1	6.6	56.0	35.6	26.1	41.3	41.3	319.6	86.9	0.0	48.9
LnGrp LOS	C	A	A	E	D	C	D	D	F	F	A	D
Approach Vol, veh/h		2064			1746			604				216
Approach Delay, s/veh		10.5			39.2			230.7				72.4
Approach LOS		B			D			F				E
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	17.4	45.6		15.0	21.0	42.0		22.0				
Change Period (Y+Rc), s	5.5	6.0		6.5	6.0	6.0		5.5				
Max Green Setting (Gmax), s	12.8	38.7		8.5	15.0	36.0		16.5				
Max Q Clear Time (g_c+l1), s	11.7	24.7		9.4	8.6	25.9		18.5				
Green Ext Time (p_c), s	0.1	10.0		0.0	0.2	6.1		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				53.0								
HCM 6th LOS				D								

HCM 6th Signalized Intersection Summary
24: E Springs & E Wash

2034 with BRT
PM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↗	↙↘	↑↑↑	↙↘	↗
Traffic Volume (veh/h)	2109	115	319	1304	220	197
Future Volume (veh/h)	2109	115	319	1304	220	197
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	2420	0	366	1496	252	226
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2755		434	3676	536	246
Arrive On Green	1.00	0.00	0.13	0.72	0.16	0.16
Sat Flow, veh/h	5274	1585	3456	5274	3456	1585
Grp Volume(v), veh/h	2420	0	366	1496	252	226
Grp Sat Flow(s),veh/h/ln	1702	1585	1728	1702	1728	1585
Q Serve(g_s), s	0.0	0.0	10.4	11.6	6.6	14.1
Cycle Q Clear(g_c), s	0.0	0.0	10.4	11.6	6.6	14.1
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2755		434	3676	536	246
V/C Ratio(X)	0.88		0.84	0.41	0.47	0.92
Avail Cap(c_a), veh/h	2755		473	3676	536	246
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.43	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	42.8	5.5	38.5	41.6
Incr Delay (d2), s/veh	2.0	0.0	12.3	0.3	0.6	36.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.9	0.0	8.7	5.8	5.1	12.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	2.0	0.0	55.0	5.9	39.2	78.2
LnGrp LOS	A		E	A	D	E
Approach Vol, veh/h	2420	A		1862	478	
Approach Delay, s/veh	2.0			15.5	57.6	
Approach LOS	A			B	E	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	18.1	59.9		22.0		78.0
Change Period (Y+Rc), s	5.5	6.0		6.5		6.0
Max Green Setting (Gmax), s	13.7	52.8		15.5		72.0
Max Q Clear Time (g_c+I1), s	12.4	2.0		16.1		13.6
Green Ext Time (p_c), s	0.2	33.6		0.0		15.6

Intersection Summary

HCM 6th Ctrl Delay	12.9
HCM 6th LOS	B

Notes

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

APPENDIX F
FIRST STREET BUS SIGNAL PHASE CALCULATIONS

HCM Signalized Intersection Capacity Analysis

2024 with BRT

6: First & E Wash

135 second cycle length AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	186	777	42	61	2636	111	249	163	117	72	145	392
Future Volume (vph)	186	777	42	61	2636	111	249	163	117	72	145	392
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.5	6.5	6.5
Lane Util. Factor	0.97	0.95	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	5085	1583	1770	1863	1583	1770	1863	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.37	1.00	1.00	0.65	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	5085	1583	697	1863	1583	1203	1863	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	202	845	46	66	2865	121	271	177	127	78	158	426
RTOR Reduction (vph)	0	0	19	0	0	48	0	0	98	0	0	45
Lane Group Flow (vph)	202	845	27	66	2865	73	271	177	29	78	158	381
Turn Type	Prot	NA	custom	Prot	NA	Perm	D.P+P	NA	Perm	Perm	NA	custom
Protected Phases	1	6		5	2		3	3 4				4
Permitted Phases			2			2	4		3 4	4		4 1
Actuated Green, G (s)	8.9	80.3	78.6	7.7	78.6	78.6	26.5	31.5	31.5	12.5	12.5	27.9
Effective Green, g (s)	8.9	80.3	78.6	7.7	78.6	78.6	26.5	31.5	31.5	12.5	12.5	27.9
Actuated g/C Ratio	0.07	0.59	0.58	0.06	0.58	0.58	0.19	0.23	0.23	0.09	0.09	0.21
Clearance Time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0			6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	224	2089	914	100	2938	914	246	431	366	110	171	571
v/s Ratio Prot	c0.06	0.24		0.04	c0.56		c0.11	0.10			0.08	
v/s Ratio Perm			0.02			0.05	c0.10		0.02	0.06		0.14
v/c Ratio	0.90	0.40	0.03	0.66	0.98	0.08	1.10	0.41	0.08	0.71	0.92	0.67
Uniform Delay, d1	63.1	15.0	12.3	62.9	27.8	12.7	52.6	44.4	40.9	60.0	61.3	49.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	34.7	0.6	0.1	15.1	11.7	0.2	87.3	0.6	0.1	18.8	47.0	2.9
Delay (s)	97.8	15.6	12.4	78.0	39.5	12.9	139.9	45.0	41.0	78.8	108.3	52.7
Level of Service	F	B	B	E	D	B	F	D	D	E	F	D
Approach Delay (s)		30.6			39.3			88.9			69.0	
Approach LOS		C			D			F			E	
Intersection Summary												
HCM 2000 Control Delay			46.5									D
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			136.0								22.0	
Intersection Capacity Utilization			96.0%									F
Analysis Period (min)			15									

























c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2024 with BRT

6: First & E Wash

140 second cycle length AM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	186	777	42	61	2636	111	249	163	117	72	145	392	
Future Volume (vph)	186	777	42	61	2636	111	249	163	117	72	145	392	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.5	6.5	6.5	
Lane Util. Factor	0.97	0.95	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.88	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	3539	1583	1770	5085	1583	1770	1863	1583	1770	1863	2787	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.40	1.00	1.00	0.65	1.00	1.00	
Satd. Flow (perm)	3433	3539	1583	1770	5085	1583	749	1863	1583	1203	1863	2787	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	202	845	46	66	2865	121	271	177	127	78	158	426	
RTOR Reduction (vph)	0	0	22	0	0	52	0	0	96	0	0	41	
Lane Group Flow (vph)	202	845	24	66	2865	69	271	177	31	78	158	385	
Turn Type	Prot	NA	custom	Prot	NA	Perm	D.P+P	NA	Perm	Perm	NA	custom	
Protected Phases	1	6		5	2		3	3 4				4	
Permitted Phases			2			2	4		3 4	4		4 1	
Actuated Green, G (s)	13.9	76.4	71.1	9.1	71.1	71.1	28.5	33.5	33.5	13.5	13.5	33.9	
Effective Green, g (s)	13.9	76.4	71.1	9.1	71.1	71.1	28.5	33.5	33.5	13.5	13.5	33.9	
Actuated g/C Ratio	0.10	0.56	0.52	0.07	0.52	0.52	0.21	0.25	0.25	0.10	0.10	0.25	
Clearance Time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0			6.5	6.5		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0		
Lane Grp Cap (vph)	352	1995	830	118	2668	830	270	460	391	119	185	697	
v/s Ratio Prot	0.06	c0.24		0.04	c0.56		c0.11	0.10			0.08		
v/s Ratio Perm			0.02			0.04	c0.10		0.02	0.06		c0.14	
v/c Ratio	0.57	0.42	0.03	0.56	1.07	0.08	1.00	0.38	0.08	0.66	0.85	0.55	
Uniform Delay, d1	58.0	16.9	15.5	61.3	32.2	16.0	51.4	42.4	39.2	58.8	60.0	44.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.3	0.7	0.1	5.6	41.1	0.2	55.7	0.5	0.1	12.3	29.8	1.0	
Delay (s)	60.2	17.6	15.6	66.9	73.3	16.2	107.1	43.0	39.3	71.0	89.8	45.1	
Level of Service	E	B	B	E	E	B	F	D	D	E	F	D	
Approach Delay (s)		25.4			70.9			72.4			58.9		
Approach LOS		C			E			E			E		
Intersection Summary													
HCM 2000 Control Delay			60.4									HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio			1.00										
Actuated Cycle Length (s)			135.5									Sum of lost time (s)	22.0
Intersection Capacity Utilization			96.0%									ICU Level of Service	F
Analysis Period (min)			15										































c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2024 with BRT

6: First & E Wash

150 second cycle length AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			  						 	 
Traffic Volume (vph)	186	777	42	61	2636	111	249	163	117	72	145	392
Future Volume (vph)	186	777	42	61	2636	111	249	163	117	72	145	392
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.5	6.5	6.5
Lane Util. Factor	0.97	0.95	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	5085	1583	1770	1863	1583	1770	1863	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.33	1.00	1.00	0.65	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	5085	1583	613	1863	1583	1203	1863	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	202	845	46	66	2865	121	271	177	127	78	158	426
RTOR Reduction (vph)	0	0	19	0	0	42	0	0	97	0	0	41
Lane Group Flow (vph)	202	845	27	66	2865	79	271	177	30	78	158	385
Turn Type	Prot	NA	custom	Prot	NA	Perm	D.P+P	NA	Perm	Perm	NA	custom
Protected Phases	1	6		5	2		3	3 4			4	
Permitted Phases			2			2	4		3 4	4		4 1
Actuated Green, G (s)	9.9	90.2	88.6	8.8	88.6	88.6	30.5	35.5	35.5	13.5	13.5	29.9
Effective Green, g (s)	9.9	90.2	88.6	8.8	88.6	88.6	30.5	35.5	35.5	13.5	13.5	29.9
Actuated g/C Ratio	0.07	0.60	0.59	0.06	0.59	0.59	0.20	0.24	0.24	0.09	0.09	0.20
Clearance Time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0			6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	225	2114	928	103	2983	928	254	437	372	107	166	551
v/s Ratio Prot	c0.06	0.24		0.04	c0.56		c0.12	0.10			0.08	
v/s Ratio Perm			0.02			0.05	c0.10		0.02	0.06		0.14
v/c Ratio	0.90	0.40	0.03	0.64	0.96	0.08	1.07	0.41	0.08	0.73	0.95	0.70
Uniform Delay, d1	70.0	16.1	13.1	69.6	29.5	13.6	57.5	48.8	45.0	67.0	68.4	56.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	33.5	0.6	0.1	12.8	9.5	0.2	75.3	0.6	0.1	21.8	55.4	3.9
Delay (s)	103.5	16.6	13.2	82.4	39.1	13.7	132.8	49.4	45.1	88.8	123.8	60.2
Level of Service	F	B	B	F	D	B	F	D	D	F	F	E
Approach Delay (s)		32.6			39.0			87.8			78.8	
Approach LOS		C			D			F			E	
Intersection Summary												
HCM 2000 Control Delay			47.8				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			151.0			Sum of lost time (s)				22.0		
Intersection Capacity Utilization			96.0%			ICU Level of Service				F		
Analysis Period (min)			15									





























c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2024 with BRT

6: First & E Wash

120 second cycle length MD Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	 	 			 							 	
Traffic Volume (vph)	226	1297	97	57	1164	98	112	113	52	157	90	197	
Future Volume (vph)	226	1297	97	57	1164	98	112	113	52	157	90	197	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.5	6.5	6.5	
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.88	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	1770	1863	1583	1770	1863	2787	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.69	1.00	1.00	0.68	1.00	1.00	
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	1292	1863	1583	1263	1863	2787	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	246	1410	105	62	1265	107	122	123	57	171	98	214	
RTOR Reduction (vph)	0	0	53	0	0	54	0	0	43	0	0	68	
Lane Group Flow (vph)	246	1410	52	62	1265	53	122	123	14	171	98	146	
Turn Type	Prot	NA	custom	Prot	NA	Perm	D.P+P	NA	Perm	Perm	NA	custom	
Protected Phases	1	6		5	2		3	3 4			4		
Permitted Phases			2			2	4		3 4	4		4 1	
Actuated Green, G (s)	12.3	65.0	57.7	5.5	57.7	57.7	23.8	28.8	28.8	19.8	19.8	38.6	
Effective Green, g (s)	12.3	65.0	57.7	5.5	57.7	57.7	23.8	28.8	28.8	19.8	19.8	38.6	
Actuated g/C Ratio	0.11	0.56	0.50	0.05	0.50	0.50	0.21	0.25	0.25	0.17	0.17	0.33	
Clearance Time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0			6.5	6.5		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0		
Lane Grp Cap (vph)	364	1986	788	84	1763	788	282	463	393	215	318	929	
v/s Ratio Prot	c0.07	c0.40		0.04	0.36		c0.01	0.07			0.05		
v/s Ratio Perm			0.03			0.03	0.07		0.01	c0.14		0.05	
v/c Ratio	0.68	0.71	0.07	0.74	0.72	0.07	0.43	0.27	0.04	0.80	0.31	0.16	
Uniform Delay, d1	49.8	18.5	15.1	54.4	22.7	15.1	39.4	35.0	33.0	46.1	42.0	27.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.9	2.2	0.2	28.3	2.5	0.2	1.1	0.3	0.0	18.1	0.6	0.1	
Delay (s)	54.7	20.7	15.2	82.8	25.2	15.2	40.5	35.3	33.0	64.2	42.6	27.2	
Level of Service	D	C	B	F	C	B	D	D	C	E	D	C	
Approach Delay (s)		25.1			27.0			37.0			43.4		
Approach LOS		C			C			D			D		
Intersection Summary													
HCM 2000 Control Delay			28.9									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.73										
Actuated Cycle Length (s)			115.8									Sum of lost time (s)	22.0
Intersection Capacity Utilization			68.3%									ICU Level of Service	C
Analysis Period (min)			15										






























c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2024 with BRT

6: First & E Wash

125 second cycle length MD Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	 	 			 						 	 	
Traffic Volume (vph)	226	1297	97	57	1164	98	112	113	52	157	90	197	
Future Volume (vph)	226	1297	97	57	1164	98	112	113	52	157	90	197	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.5	6.5	6.5	
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.88	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	1770	1863	1583	1770	1863	2787	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.69	1.00	1.00	0.68	1.00	1.00	
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	1292	1863	1583	1263	1863	2787	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	246	1410	105	62	1265	107	122	123	57	171	98	214	
RTOR Reduction (vph)	0	0	56	0	0	57	0	0	41	0	0	121	
Lane Group Flow (vph)	246	1410	49	62	1265	50	122	123	16	171	98	93	
Turn Type	Prot	NA	custom	Prot	NA	Perm	D.P+P	NA	Perm	Perm	NA	custom	
Protected Phases	1	6		5	2		3	3 4			4		
Permitted Phases			2			2	4		3 4	4		4 1	
Actuated Green, G (s)	13.0	61.5	56.2	8.2	56.2	56.2	29.6	34.6	34.6	20.1	20.1	39.6	
Effective Green, g (s)	13.0	61.5	56.2	8.2	56.2	56.2	29.6	34.6	34.6	20.1	20.1	39.6	
Actuated g/C Ratio	0.11	0.51	0.47	0.07	0.47	0.47	0.25	0.29	0.29	0.17	0.17	0.33	
Clearance Time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0			6.5	6.5		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0		
Lane Grp Cap (vph)	369	1801	736	120	1646	736	354	533	453	210	309	913	
v/s Ratio Prot	c0.07	c0.40		0.04	0.36		c0.03	0.07			0.05		
v/s Ratio Perm			0.03			0.03	0.06		0.01	c0.14		0.03	
v/c Ratio	0.67	0.78	0.07	0.52	0.77	0.07	0.34	0.23	0.04	0.81	0.32	0.10	
Uniform Delay, d1	51.8	24.2	17.8	54.4	26.9	17.8	37.0	32.9	31.1	48.6	44.3	28.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.5	3.5	0.2	3.7	3.5	0.2	0.6	0.2	0.0	20.9	0.6	0.0	
Delay (s)	56.3	27.7	18.0	58.1	30.4	18.0	37.6	33.2	31.1	69.5	44.9	28.3	
Level of Service	E	C	B	E	C	B	D	C	C	E	D	C	
Approach Delay (s)		31.1			30.7			34.5			46.2		
Approach LOS		C			C			C			D		
Intersection Summary													
HCM 2000 Control Delay			33.0									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.76										
Actuated Cycle Length (s)			120.8									Sum of lost time (s)	22.0
Intersection Capacity Utilization			68.3%									ICU Level of Service	C
Analysis Period (min)			15										






























c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2024 with BRT

6: First & E Wash

135 second cycle length MD Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			 						 	 
Traffic Volume (vph)	226	1297	97	57	1164	98	112	113	52	157	90	197
Future Volume (vph)	226	1297	97	57	1164	98	112	113	52	157	90	197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.5	6.5	6.5
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	1770	1863	1583	1770	1863	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.69	1.00	1.00	0.68	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	1292	1863	1583	1263	1863	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	246	1410	105	62	1265	107	122	123	57	171	98	214
RTOR Reduction (vph)	0	0	52	0	0	53	0	0	42	0	0	95
Lane Group Flow (vph)	246	1410	53	62	1265	54	122	123	15	171	98	119
Turn Type	Prot	NA	custom	Prot	NA	Perm	D.P+P	NA	Perm	Perm	NA	custom
Protected Phases	1	6		5	2		3	3 4			4	
Permitted Phases			2			2	4		3 4	4		4 1
Actuated Green, G (s)	13.6	71.4	64.7	7.4	64.7	64.7	28.1	33.1	33.1	22.1	22.1	42.2
Effective Green, g (s)	13.6	71.4	64.7	7.4	64.7	64.7	28.1	33.1	33.1	22.1	22.1	42.2
Actuated g/C Ratio	0.11	0.56	0.50	0.06	0.50	0.50	0.22	0.26	0.26	0.17	0.17	0.33
Clearance Time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0			6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	363	1967	797	102	1783	797	305	480	408	217	320	915
v/s Ratio Prot	c0.07	c0.40		0.04	0.36		c0.02	0.07			0.05	
v/s Ratio Perm			0.03			0.03	0.07		0.01	c0.14		0.04
v/c Ratio	0.68	0.72	0.07	0.61	0.71	0.07	0.40	0.26	0.04	0.79	0.31	0.13
Uniform Delay, d1	55.3	21.0	16.3	59.1	24.6	16.4	42.1	37.9	35.7	50.9	46.5	30.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.0	2.3	0.2	9.8	2.4	0.2	0.9	0.3	0.0	17.1	0.5	0.1
Delay (s)	60.2	23.3	16.5	68.9	27.0	16.5	43.0	38.2	35.7	68.0	47.0	30.3
Level of Service	E	C	B	E	C	B	D	D	D	E	D	C
Approach Delay (s)		28.1			28.0			39.6			47.0	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			31.2				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			128.4			Sum of lost time (s)				22.0		
Intersection Capacity Utilization			68.3%			ICU Level of Service				C		
Analysis Period (min)			15									































c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2024 with BRT

6: First & E Wash

130 second cycle length PM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	 	  			 						 	 	
Traffic Volume (vph)	433	3162	178	53	1261	125	128	203	128	178	178	194	
Future Volume (vph)	433	3162	178	53	1261	125	128	203	128	178	178	194	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.5	6.5	6.5	
Lane Util. Factor	0.97	0.91	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.88	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	5085	1583	1770	3539	1583	1770	1863	1583	1770	1863	2787	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.42	1.00	1.00	0.61	1.00	1.00	
Satd. Flow (perm)	3433	5085	1583	1770	3539	1583	774	1863	1583	1143	1863	2787	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	471	3437	193	58	1371	136	139	221	139	193	193	211	
RTOR Reduction (vph)	0	0	81	0	0	69	0	0	82	0	0	38	
Lane Group Flow (vph)	471	3437	112	58	1371	67	139	221	57	193	193	173	
Turn Type	Prot	NA	custom	Prot	NA	Perm	D.P+P	NA	Perm	Perm	NA	custom	
Protected Phases	1	6		5	2		3	3 4			4		
Permitted Phases			2			2	4		3 4	4		4 1	
Actuated Green, G (s)	20.7	81.0	63.8	4.0	63.8	63.8	23.5	28.5	28.5	19.5	19.5	46.7	
Effective Green, g (s)	20.7	81.0	63.8	4.0	63.8	63.8	23.5	28.5	28.5	19.5	19.5	46.7	
Actuated g/C Ratio	0.16	0.62	0.49	0.03	0.49	0.49	0.18	0.22	0.22	0.15	0.15	0.36	
Clearance Time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0			6.5	6.5		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0		
Lane Grp Cap (vph)	546	3168	776	54	1736	776	170	408	347	171	279	1001	
v/s Ratio Prot	c0.14	c0.68		0.03	0.39		0.03	c0.12			0.10		
v/s Ratio Perm			0.07			0.04	0.12		0.04	c0.17		0.06	
v/c Ratio	0.86	1.08	0.14	1.07	0.79	0.09	0.82	0.54	0.16	1.13	0.69	0.17	
Uniform Delay, d1	53.3	24.5	18.1	63.0	27.5	17.6	51.7	45.0	41.1	55.2	52.4	28.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	13.2	44.5	0.4	144.7	3.7	0.2	25.3	1.5	0.2	107.6	7.2	0.1	
Delay (s)	66.5	69.0	18.5	207.7	31.3	17.8	77.0	46.4	41.3	162.8	59.6	28.5	
Level of Service	E	E	B	F	C	B	E	D	D	F	E	C	
Approach Delay (s)		66.3			36.6			53.5			82.0		
Approach LOS		E			D			D			F		
Intersection Summary													
HCM 2000 Control Delay			59.9									HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio			1.10										
Actuated Cycle Length (s)			130.0									Sum of lost time (s)	22.0
Intersection Capacity Utilization			102.9%									ICU Level of Service	G
Analysis Period (min)			15										































c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2024 with BRT

6: First & E Wash

135 second cycle length PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  			 						 	 
Traffic Volume (vph)	433	3162	178	53	1261	125	128	203	128	178	178	194
Future Volume (vph)	433	3162	178	53	1261	125	128	203	128	178	178	194
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.5	6.5	6.5
Lane Util. Factor	0.97	0.91	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	1770	3539	1583	1770	1863	1583	1770	1863	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.39	1.00	1.00	0.62	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	1770	3539	1583	729	1863	1583	1155	1863	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	471	3437	193	58	1371	136	139	221	139	193	193	211
RTOR Reduction (vph)	0	0	92	0	0	81	0	0	99	0	0	104
Lane Group Flow (vph)	471	3437	101	58	1371	55	139	221	40	193	193	107
Turn Type	Prot	NA	custom	Prot	NA	Perm	D.P+P	NA	Perm	Perm	NA	custom
Protected Phases	1	6		5	2		3	3 4			4	
Permitted Phases			2			2	4		3 4	4		4 1
Actuated Green, G (s)	23.9	70.6	53.6	7.4	53.6	53.6	32.8	37.8	37.8	18.6	18.6	49.0
Effective Green, g (s)	23.9	70.6	53.6	7.4	53.6	53.6	32.8	37.8	37.8	18.6	18.6	49.0
Actuated g/C Ratio	0.18	0.53	0.41	0.06	0.41	0.41	0.25	0.29	0.29	0.14	0.14	0.37
Clearance Time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0			6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	620	2713	641	99	1433	641	292	532	452	162	261	1032
v/s Ratio Prot	c0.14	c0.68		0.03	0.39		0.05	c0.12			0.10	
v/s Ratio Perm			0.06			0.03	0.07		0.03	c0.17		0.04
v/c Ratio	0.76	1.27	0.16	0.59	0.96	0.09	0.48	0.42	0.09	1.19	0.74	0.10
Uniform Delay, d1	51.5	30.9	25.0	61.0	38.2	24.3	40.8	38.3	34.6	56.9	54.5	27.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.3	123.2	0.5	8.6	15.5	0.3	1.2	0.5	0.1	131.4	10.5	0.0
Delay (s)	56.8	154.0	25.5	69.5	53.7	24.5	42.1	38.8	34.7	188.3	65.0	27.3
Level of Service	E	F	C	E	D	C	D	D	C	F	E	C
Approach Delay (s)		136.8			51.7			38.6			91.5	
Approach LOS		F			D			D			F	
Intersection Summary												
HCM 2000 Control Delay			105.9	HCM 2000 Level of Service				F				
HCM 2000 Volume to Capacity ratio			1.14									
Actuated Cycle Length (s)			132.3	Sum of lost time (s)				22.0				
Intersection Capacity Utilization			102.9%	ICU Level of Service				G				
Analysis Period (min)			15									































c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2024 with BRT

6: First & E Wash

145 second cycle length PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  			 						 	 
Traffic Volume (vph)	433	3162	178	53	1261	125	128	203	128	178	178	194
Future Volume (vph)	433	3162	178	53	1261	125	128	203	128	178	178	194
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.5	6.5	6.5
Lane Util. Factor	0.97	0.91	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	1770	3539	1583	1770	1863	1583	1770	1863	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.40	1.00	1.00	0.57	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	1770	3539	1583	753	1863	1583	1058	1863	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	471	3437	193	58	1371	136	139	221	139	193	193	211
RTOR Reduction (vph)	0	0	70	0	0	67	0	0	74	0	0	39
Lane Group Flow (vph)	471	3437	123	58	1371	69	139	221	65	193	193	172
Turn Type	Prot	NA	custom	Prot	NA	Perm	D.P+P	NA	Perm	Perm	NA	custom
Protected Phases	1	6		5	2		3	3 4			4	
Permitted Phases			2			2	4		3 4	4		4 1
Actuated Green, G (s)	22.9	92.0	73.6	5.0	73.6	73.6	26.5	31.5	31.5	22.5	22.5	51.9
Effective Green, g (s)	22.9	92.0	73.6	5.0	73.6	73.6	26.5	31.5	31.5	22.5	22.5	51.9
Actuated g/C Ratio	0.16	0.63	0.51	0.03	0.51	0.51	0.18	0.22	0.22	0.16	0.16	0.36
Clearance Time (s)	5.5	5.0	5.0	5.0	5.0	5.0	5.0			6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	542	3226	803	61	1796	803	165	404	343	164	289	997
v/s Ratio Prot	c0.14	c0.68		0.03	0.39		0.02	c0.12			0.10	
v/s Ratio Perm			0.08			0.04	0.13		0.04	c0.18		0.06
v/c Ratio	0.87	1.07	0.15	0.95	0.76	0.09	0.84	0.55	0.19	1.18	0.67	0.17
Uniform Delay, d1	59.6	26.5	19.1	69.9	28.7	18.4	58.2	50.4	46.3	61.2	57.7	31.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.8	36.7	0.4	97.3	3.1	0.2	30.4	1.5	0.3	125.8	5.7	0.1
Delay (s)	73.4	63.2	19.5	167.2	31.8	18.6	88.6	51.9	46.6	187.0	63.5	31.9
Level of Service	E	E	B	F	C	B	F	D	D	F	E	C
Approach Delay (s)		62.3			35.7			60.7			92.3	
Approach LOS		E			D			E			F	
Intersection Summary												
HCM 2000 Control Delay			58.7									HCM 2000 Level of Service E
HCM 2000 Volume to Capacity ratio			1.09									
Actuated Cycle Length (s)			145.0									Sum of lost time (s) 22.0
Intersection Capacity Utilization			102.9%									ICU Level of Service G
Analysis Period (min)			15									

c Critical Lane Group

East-West BRT: US 151/East Washington Avenue Operations Analysis
 Bus Only Phase at First Street

The bus-only phase will be called once every 15-minutes.

The cycle length when the bus phase is called is extended by 10 seconds (modeled as a 10 second Hold phase).

The subsequent two cycle lengths are reduced by 5 seconds each to make up the 10 second bus phase and get the signal back into coordination.

The operations reported here are a weighted average of the standard cycle length, the bus only cycle (10 seconds longer) and two recovery cycles (5 seconds shorter each) rounded up to the number of full cycles occurring in 15-minutes.

<u>AM Peak Hour</u>					<u>Noon Hour</u>					<u>PM Peak Hour</u>							
	Cycle	140	150	135	Weighted Average		Cycle	125	135	120	Weighted Average		Cycle	135	145	130	Weighted Average
	Occurrences	4	1	2			Occurrences	5	1	2			Occurrences	4	1	2	
EBL	Delay	60.2	60.2	97.8	70.9	EBL	Delay	56.3	56.9	54.7	56.0	EBL	Delay	56.8	57.2	66.5	59.6
	V/C	0.57	0.57	0.9	0.66		V/C	0.67	0.67	0.68	0.67		V/C	0.76	0.76	0.86	0.79
WBL	Delay	66.9	67.4	78	70.1	WBL	Delay	58.1	58.2	82.8	64.3	EBT	Delay	154	153.1	69	129.6
	V/C	0.56	0.56	0.66	0.59		V/C	0.52	0.51	0.74	0.57		V/C	1.27	1.26	1.08	1.21
WBT	Delay	73.3	73.3	39.5	63.6	SBL	Delay	69.5	67.7	64.2	68.0	WBL	Delay	69.5	69.5	207.7	109.0
	V/C	1.07	1.07	0.98	1.04		V/C	0.81	0.8	0.8	0.81		V/C	0.59	0.59	1.07	0.7
NBL	Delay	107.1	107.1	139.9	116.5	Overall	Delay	33	33.2	28.9	32.0	SBL	Delay	188.3	191.2	162.8	181.4
	V/C	1	1	1.1	1.03		V/C	0.76	0.8	0.73	0.76		V/C	1.19	1.2	1.13	1.17
SBL	Delay	71	71	78.8	73.2	SBT	Delay	65	65.5	59.6	63.5	Overall	Delay	105.9	105.4	59.9	92.7
	V/C	0.66	0.66	0.71	0.67		V/C	0.74	0.74	0.69	0.73		V/C	1.14	1.2	1.1	1.14
SBT	Delay	89.8	89.8	108.3	95.1	Overall	Delay	60.4	60.2	46.5	56.4	Overall	Delay	60.4	60.2	46.5	56.4
	V/C	0.85	0.85	0.71	0.81		V/C	1	1.01	1	1.00		V/C	1	1.01	1	1.00

APPENDIX G
SUMMARY OF WISDOT COMMENTS AND BRT PROJECT TEAM REPLIES



ID	Document	Page	Comment Made by Initials	Comment (Limit to One Item Per Row)	Agree	Response	Follow-Up	Additional Notes
1	Traffic Analysis for Bus Rapid Transit on US 151/East Washington Avenue		WisDOT-MM	1. The BRT Traffic Report indicates LTS ranges from 2 to 2.5 between Blair Street and Marquette Street. The report further states that segment will have an LTS of 4.0 during peak periods in the peak directions when the bike/parking lane becomes a traffic lane and bicycles will need to take the lane and ride in mixed traffic or seek another route.	Yes	Correct. The numbers cited in the report were calculated considering the LTS criteria for corridors and averaged across the factors that are included (see the attached spreadsheet). The scores use a slightly different methodology than the ratings developed by the MPO, as seen on the MPO's Low-Stress Bike Route Finder map (https://www.arcgis.com/apps/webappviewer/index.html?id=cb7a2e78477044c19bf6a5eaa1820e38). The MPO methodology includes probe data for the speed input as well as approach and intersection LTS.		
2	Traffic Analysis for Bus Rapid Transit on US 151/East Washington Avenue		WisDOT-MM	2. The BRT Traffic Report does not mention bike accommodations or LTS for other sections of E Washington within the BRT corridor. I assume that if the report doesn't mention bike accommodations or changes, the existing facilities will remain as they are today.	Yes	Correct. East of Marquette Street there are no changes to the bike facilities. Based on the spreadsheet corridor calculation, from Marquette Street to Wright Street and from Mendota Street to Portage Road/Thierer Road the LTS without BRT and with BRT is 2.0. From Portage Road/Thierer Road to East Springs Drive the LTS without BRT and with BRT is 2.3.		
3	Traffic Analysis for Bus Rapid Transit on US 151/East Washington Avenue		WisDOT-MM	3. I have indicated LTS shown in the MPO Low-Stress Bike Route Finder for routes not mentioned in the BRT report:	Yes	As noted above this MPO map uses a slightly different methodology than the spreadsheet calculations for the corridor LTS.		
4	Traffic Analysis for Bus Rapid Transit on US 151/East Washington Avenue		WisDOT-MM	a. Webster St - USH 151/Blair St - no bike lanes existing or with BRT - LTS 4 exist/4 BRT.	Yes	i. Note that this is not part of the US 151 Connecting Highway. ii. There is an existing bike lane in the westbound direction that will remain. Eastbound there is not a bike lane, and that is being evaluated. iii. Eastbound LTS above correct per the MPO map. iv. The BRT service does not alter the existing bike LTS. v. The City is seeking to strengthen Main Street as a cycling corridor (LTS 2), and recently requested a signal at the Main Street/Blair intersection for pedestrians and cyclists.		
5	Traffic Analysis for Bus Rapid Transit on US 151/East Washington Avenue		WisDOT-MM	b. Blair St - Blount St WB - bike lanes existing, no bike lane with BRT - must share vehicle lane - LTS 4 exist/4 BRT.	Yes	i. With existing conditions and per the MPO map there is no bike lane WB in this section (LTS 4). However, a 4-ft marked lane (adjacent to a 10-ft travel lane) will be added with WisDOT's Blair Street pavement replacement project scheduled for 2023. See https://www.cityofmadison.com/engineering/projects/blair-street-south ii. The spreadsheet corridor calculation (after construction of WisDOT's Blair Street improvements) is LTS 1.8 exist/1.8 BRT.		
6	Traffic Analysis for Bus Rapid Transit on US 151/East Washington Avenue		WisDOT-MM	c. Blount to Livingston WB - no bike lanes existing or with BRT - must share vehicle lane - LTS 4 exist/4 BRT.	Yes	i. With existing conditions and per the MPO map there is a shared parking/bike lane WB in this section (LTS 3). ii. With BRT, per the spreadsheet corridor calculation LTS 2.0 exist/2.0 BRT 22-hrs off-peak, 4.0 BRT 2-hr peak period.		
7	Traffic Analysis for Bus Rapid Transit on US 151/East Washington Avenue		WisDOT-MM	d. Blair St - Livingston St EB - bike lane or combined bike/parking lane existing, no bike lane with BRT - must share vehicle lane - LTS 2 - 3 exist/4 BRT.	Yes	i. Existing is correct per the MPO map. ii. To be more precise: Blair to Blount EB the existing bike lane remains, spreadsheet corridor calculation LTS 1.5 exist/1.5 BRT; iii. Blount to Livingston EB per the spreadsheet corridor calculation LTS 2.0 exist/2.0 BRT 22-hrs off-peak, 4.0 BRT 2-hrs peak period.		
8	Traffic Analysis for Bus Rapid Transit on US 151/East Washington Avenue		WisDOT-MM	e. Livingston St - Milwaukee St - combined bike/parking lane existing, no bike lane with BRT - must share vehicle lane - LTS 2 - 3 exist/4 BRT	Yes	i. Existing correct per the MPO map. ii. Per the spreadsheet corridor calculation: Livingston to Baldwin LTS 2.0 exist/2.0 BRT 22-hrs off-peak, 4.0 BRT 2-hrs peak period; iii. Baldwin to Milwaukee LTS 2.3 exist/2.3 BRT 22-hrs off-peak, 4.0 BRT 2-hrs peak period.		
9	Traffic Analysis for Bus Rapid Transit on US 151/East Washington Avenue		WisDOT-MM	f. Milwaukee St - Stoughton Rd - bike lane existing and with BRT - LTS 4 exist/ 4 BRT.	Yes	i. Per the MPO map existing LTS 3. The BRT does not use US 151/E Washington from Wright Street to Mendota Street. Conditions are unchanged with BRT. ii. Per the spreadsheet corridor calculation Milwaukee to Wright Street LTS 2.0 to 2.5 exist/2.0 to 2.5 BRT 22-hrs off-peak, 2.0 to 4.0* BRT 2-hrs peak period (*4.0 WB WIS 30 to Milwaukee Street only).		
10	Traffic Analysis for Bus Rapid Transit on US 151/East Washington Avenue		WisDOT-MM	g. Stoughton Rd - Thierer Rd - bike lane existing and with BRT - LTS 4 exist/ 4 BRT.	Yes	i. Existing correct per the MPO map. The BRT does not use US 151/E Washington from Stoughton Road to Mendota Street. The BRT does not modify the bike accommodations from Mendota Street to the east. ii. Per the spreadsheet corridor calculation Mendota to Portage/Thierer LTS 2.0 exist/2.0 BRT		
11	Traffic Analysis for Bus Rapid Transit on US 151/East Washington Avenue		WisDOT-MM	h. Thierer Rd - E Springs Dr - bike lanes existing and with BRT - LTS 4 exist/ 4 BRT.	Yes	i. Existing correct per the MPO map. ii. Per the spreadsheet corridor calculation Mendota to Portage/Thierer LTS 2.3 exist/2.3 BRT		
12	Traffic Analysis for Bus Rapid Transit on US 151/East Washington Avenue		WisDOT-MM	5. Based on my review, I would say that there are some segments with bike lanes or bike/parking lanes during non-peak times with LTS 2 to 3. Those segments during peak periods in the peak direction, will have LTS of 4.	Yes	Correct, based on the calculations in the spreadsheet.		
13	Traffic Analysis for Bus Rapid Transit on US 151/East Washington Avenue		WisDOT-MM	6. Remaining segments either have no bike lanes or higher traffic volumes for LTS of 4 at all times. See above.	Yes	The MPO map uses a slightly different methodology in assigning LTS. In the areas outside where shared parking lanes are provided US 151/E Washington Avenue generally has an on-street bike lane more than 6-feet wide (including the gutter pan) and a spreadsheet corridor calculation LTS of 2.0 to 2.5 both existing and with BRT.		
14	Traffic Analysis for Bus Rapid Transit on US 151/East Washington Avenue		WisDOT-MM	7. Please provide remedial measures that are being undertaken to mitigate segments with LTS 4.	No	For much of the corridor there is no change in bicycle LTS with the addition of BRT service. Generally, from Blair Street to Marquette Street where a shared parking/bicycle lane exists the LTS will remain at existing levels (2.0 to 2.5) for 22 hours on weekdays (and all day Saturday and Sunday). For 2 hours westbound/inbound on weekday mornings and 2 hours eastbound/outbound on weekday afternoons the LTS increases to 4.0 for travel along US 151/East Washington Avenue. The City prefers to limit parking restrictions to only the period absolutely necessary to provide motor vehicle LOS acceptable to WisDOT. If WisDOT is willing to accept higher motor vehicle delays, the City could explore maintaining the parking and bike facility full time.	No	WisDOT accepts the higher LTS in the peak periods, as higher motor vehicle delays would lead to unacceptable operations along the corridor. WisDOT is not open to maintaining the parking and bike facilities full time as acceptable LOS cannot be maintained during the peak hours.
15	Traffic Analysis for Bus Rapid Transit on US 151/East Washington Avenue		WisDOT-MM		Yes	Along this entire portion of the corridor there are nearby parallel facilities with LTS of 1.0 to 2.0, the majority of which are within one block of US 151/East Washington Avenue and often times exist to both the north and the south. The BRT project will not propose additional improvements to parallel or alternate bike accommodations as part of the BRT project. The City of Madison has incorporated East Madison Bicycle Enhancements as part of the Safe Streets Capital Budget Request. Many of the projects in this budget item would strengthen east-west bicycle facilities from the Capitol to Highway 30.		
16	Traffic Analysis for Bus Rapid Transit on US 151/East Washington Avenue	ES-2	WisDOT	The Dane County Demand Model show 0.94% growth, and recent 2020 Census data indicate a 1.5% county-wide growth, and socio-economic in the next version of the TDM indicate infill along the East Washington Ave corridor, all which support the recommended growth rate. Please remove the statement, "It is likely the sensitivity analysis volumes will not be reached by 2034."	Yes	Statement will be removed.		

17	Traffic Analysis for Bus Rapid Transit on US 151/East Washington Avenue	1-8	WisDOT	Were signal timings and split optimized for non-BRT conditions in 2024 & 2034 analyses? If not, why?	No	The signal timings used in the non-BRT conditions in 2024 & 2034 were not changed from the original City of Madison models because they represent the current signal timings that are in place ("existing conditions", or non-BRT). The modeling approach is intended to demonstrate how conditions with BRT will compare with existing/recent conditions which the project team and reviewing authorities have a feel for from personally traveling along and across the corridor. The modeling demonstrates that by optimizing the signal timings and coordination and using longer cycle-lengths travel along the State and US routes is minimally impacted by BRT compared to existing conditions. No changes proposed.		
18	Traffic Analysis for Bus Rapid Transit on US 151/East Washington Avenue	ES-5 & 3-11	WisDOT	Can First St intersection queues be further detailed?	Yes	<p>2024 AM longest 95th Percentile Queues from Synchro on US/WIS Route Approaches</p> <ul style="list-style-type: none"> - No BRT EBT: 176-ft - With BRT EBT: 290-ft - No BRT WBT: m#952-ft - With BRT WBT: #1175-ft - No BRT SBT: #249-ft - With BRT SBT: #276-ft <p>2024 MID longest 95th Percentile Queues from Synchro on US/WIS Route Approaches</p> <ul style="list-style-type: none"> - No BRT EBT: 25-ft - With BRT EBT: 643-ft - No BRT WBT: 83-ft - With BRT WBT: 555-ft - No BRT SBL: #247-ft - With BRT SBL: #232-ft <p>2024 PM longest 95th Percentile Queues from Synchro on US/WIS Route Approaches</p> <ul style="list-style-type: none"> - No BRT EBT: #1132-ft - With BRT EBT: #1482-ft - No BRT WBT: 276-ft - With BRT WBT: #825-ft - No BRT SBL: #269-ft - With BRT SBL: #366-ft 		
19	30% Plans	209	WisDOT	Please clarify lane alignments/utilization inbound in AM between Livingston to Blair. It appears the two left lanes at the Livingston intersection align with the left-turn only lanes. This may lead to unnecessary lane changes/weaving.	Yes	<p>Upstream of Livingston Street the Bus lane is on the left/median side, the leftmost GP lane must turn left at Blair, the middle GP lane can turn left by making one lane change to the left between Livingston Street and Blount Street or can stay in their lane to go through, the rightmost GP lane traffic (in the bike/parking lane) will likely go through at Blair Street. Buses will make one lane change to the right between Livingston Street and Blount Street.</p>		
20	Traffic Analysis for Bus Rapid Transit on US 151/East Washington Avenue	ES-3	WisDOT	In last line of second paragraph, please clarify to what LTS level is increased to. (Currently shows "xx")	Yes	Report will be updated as follows: "... increases the LTS to 4.0 because cyclists must take a full travel lane."		
21	Models		WisDOT	Detail queues from left turn conversions to protected-only, will queues be backing up into thru lanes?	Yes	<p>No, the queuing reports do not indicate that left-turn movements converted to protected-only phasing will back into thru lanes. Results below are from Synchro11 output. The only left-turn where queuing may use all of the available storage is in the PM peak with BRT for the westbound left-turn at Marquette Street. As noted in the report, observation of SimTraffic simulation does not suggest the westbound left operations or queuing are of concern for westbound US 151/ East Washington Avenue traffic.</p> <p>2024 AM locations converted from permitted to protected-only left-turns 95th% Queues</p> <ul style="list-style-type: none"> - No BRT Paterson WBL: <m25-ft - With BRT Paterson WBL: m40-ft/180-ft storage* - No BRT Baldwin WBL: <m25-ft - With BRT Paterson WBL: 81-ft/130-ft storage - No BRT First WBL: <m25-ft - With BRT First WBL: 107-ft/130-ft storage - No BRT Fourth EBL: m#56-ft - With BRT Fourth EBL: #73-ft/115-ft storage - No BRT Milwaukee EBL: m29-ft - With BRT Milwaukee EBL: m57-ft/135-ft storage - No BRT Marquette WBL: <m25-ft - With BRT Marquette WBL: m123-ft/170-ft storage <p>2024 MID locations converted from permitted to protected-only left-turns 95th% Queues</p> <ul style="list-style-type: none"> - No BRT Paterson WBL: <m25-ft - With BRT Paterson WBL: m29-ft/180-ft storage* - No BRT Baldwin WBL: <m25-ft - With BRT Paterson WBL: #92-ft/130-ft storage - No BRT First WBL: <25-ft - With BRT First WBL: 94-ft/130-ft storage - No BRT Fourth EBL: <m25-ft - With BRT Fourth EBL: 38-ft/115-ft storage - No BRT Milwaukee EBL: 36-ft - With BRT Milwaukee EBL: m53-ft/135-ft storage - No BRT Marquette WBL: <25-ft - With BRT Marquette WBL: 33-ft/170-ft storage <p>2024 PM locations converted from permitted to protected-only left-turns 95th% Queues</p> <ul style="list-style-type: none"> - No BRT Paterson WBL: m#86-ft - With BRT Paterson WBL: m#46-ft/180-ft storage* - No BRT Baldwin WBL: 27-ft - With BRT Paterson WBL: #112-ft/130-ft storage - No BRT First WBL: 38-ft - With BRT First WBL: 98-ft/130-ft storage - No BRT Fourth EBL: <m25-ft - With BRT Fourth EBL: <25-ft/115-ft storage - No BRT Milwaukee EBL: <m25-ft - With BRT Milwaukee EBL: m61-ft/135-ft storage - No BRT Marquette WBL: 43-ft - With BRT Marquette WBL: #169-ft/170-ft storage <p>* Storage measured from stop-bar to point at which left-turn lane is approximately 8-ft wide from face of curb to adjacent through lane edge.</p>		
22	6-month and 1 year check-in after facility is operational - Signal Timings and operations (no-parking etc.)		WisDOT	We will want to ensure updated signal coordination patterns are installed and running, as updating timing plans are vital to maintaining acceptable LOS. Also, prohibited left-turns and parking are working as envisioned.	Yes	The City agrees to continue coordinating with WisDOT regarding operations along US 151/ East Washington Avenue including 6-month and 1-year check-ins after BRT service begins.		
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