



July 5, 2019

Mr. Steven Christie, Development Manager
SIGNAL HILL XC, LLC
3010 Old Ranch Parkway, Suite 470
Seal Beach, CA 90740

RE: Signal Hill Business Center Supplemental Traffic Analysis
18-0056

Dear Mr. Christie:

INTRODUCTION

Ganddini Group is pleased to submit this Supplemental Traffic Analysis for the Signal Hill Business Center project. The purpose of this Supplemental Traffic Analysis is to evaluate the potential for additional project traffic impacts based on two additional thresholds not included in the Signal Hill Business Center Traffic Impact Analysis.

This traffic analysis supplements the Signal Hill Business Center Traffic Impact Analysis (Kunzman Associates, Inc., Final July 2019) ["Project Traffic Impact Analysis"] and the Supplemental Afternoon School Peak Hour Analysis (Kunzman Associates, Inc, May 31, 2018). The project site is generally bounded by Gundry Avenue to the west, Gundry Hill Apartments and American University of Health Sciences to the north, Gaviota Avenue to the east, and the Signal Hill City Limits and Alamitos Avenue to the south. The project site is currently vacant. The proposed project involves developing the project site with a business park consisting of nine buildings totaling 139,080 square feet plus 12,000 square feet of mezzanine, for a total of 151,080 square feet of gross floor area. Full access driveways are proposed at Gundry Avenue, Walnut Avenue, and Alamitos Avenue. The proposed project is anticipated to be constructed and fully operational by Year 2020.

Although this is a technical report, effort has been made to write the report clearly and concisely. To assist the reader with technical terms related to transportation engineering, a glossary is provided in Appendix A.

THRESHOLDS OF SIGNIFICANCE

Per City of Signal Hill traffic study criteria, the intersection mitigation requirement should include (all) following elements:

- Drop of 0.02 (2%) in LOS (ICU); or
- 40 vehicles added to an intersection; or
- Left-turn queue length is greater than the existing storage length.

As requested by City of Signal Hill staff, this Supplemental Traffic Analysis will address the second and third elements (40 vehicles added to an intersection and left-turn queue exceeds existing storage length).

ELEMENT 2 – 40 VEHICLES ADDED TO A STUDY INTERSECTION

Table 1 summarizes the number of project-generated trips forecast to be added at each study intersection within City of Signal Hill jurisdiction during the morning, school afternoon, and evening peak hours. Non-City of Signal Hill intersections are omitted since this threshold only applies to City of Signal Hill. The proposed project is forecast to contribute 40 or more peak hour trips at the following study intersections:

Orange Avenue (NS) at Willow Street (EW) - #2

This signalized intersection is forecast to operate at Level of Service F during the evening peak hour for General Plan Buildout Without and With Project conditions and did not previously meet the significant impact threshold related to drop in ICU.

Proposed Mitigation: Update signal timing as needed.

Orange Avenue (NS) at Burnett Street (EW) - #3

This signalized intersection is forecast to operate at Level of Service C during the peak hours for General Plan Buildout Without and With Project conditions and did not previously meet the significant impact threshold related to drop in ICU.

Proposed Mitigation: Update signal timing as needed.

Orange Avenue (NS) at Hill Street (EW) - #4

This signalized intersection is forecast to operate at Level of Service D or better during the peak hours for General Plan Buildout Without and With Project conditions and did not previously meet the significant impact threshold related to drop in ICU.

Proposed Mitigation: Update signal timing as needed.

Gundry Avenue (NS) at Hill Street (EW) - #6

This unsignalized intersection is forecast to operate at Level of Service C or better during the peak hours for General Plan Buildout Without and With Project conditions. A traffic signal is not forecast to be warranted based on the peak hour volume traffic signal warrant (see Appendix B.)

Proposed Mitigation: N/A. Since the unsignalized intersection is forecast to operate within acceptable Level of Service and the peak hour traffic signal warrant is not satisfied, the project impact is considered less than significant and no mitigation is required.

Walnut Avenue (NS) at Hill Street (EW) - #10

This unsignalized intersection is forecast to operate at Level of Service C during the morning/evening peak hours and Level of Service E during the school afternoon peak hour only; however, a traffic signal is not forecast to be warranted (see Appendix B). As previously noted in the Supplemental Afternoon School Peak Hour Analysis (Kunzman Associates, Inc, May 31, 2018), extending the parking restriction on the northbound approach would effectively allow for operation of a right turn lane.

Proposed Mitigation: Extend the no parking restriction on the northbound approach to 100 feet south of the intersection. This will result in the loss of approximately two on-street parking spaces, but will allow for a de facto right turn lane.

Gaviota Avenue (NS) at Hill Street (EW) - #13

This unsignalized intersection is forecast to operate at Level of Service B during the peak hours for General Plan Buildout Without and With Project conditions. A traffic signal is not forecast to be warranted based on the peak hour volume traffic signal warrant (see Appendix B.)

Proposed Mitigation: N/A. Since the unsignalized intersection is forecast to operate within acceptable Level of Service and the peak hour traffic signal warrant is not satisfied, the project impact is considered less than significant and no mitigation is required.

Cherry Avenue (NS) at Willow Street (EW) - #15

This signalized intersection is forecast to operate at Level of Service F during the evening peak hour for General Plan Buildout Without and With Project conditions and did not previously meet the significant impact threshold related to drop in ICU.

Proposed Mitigation: Update signal timing as needed.

Cherry Avenue (NS) at Burnett Street (EW) - #16

This signalized intersection is forecast to operate at Level of Service C during the peak hours for General Plan Buildout Without and With Project conditions and did not previously meet the significant impact threshold related to drop in ICU.

Proposed Mitigation: Update signal timing as needed.

Cherry Avenue (NS) at Hill Street (EW) - #17

This signalized intersection is forecast to operate at Level of Service C during the peak hours for General Plan Buildout Without and With Project conditions and did not previously meet the significant impact threshold related to drop in ICU.

Proposed Mitigation: Update signal timing as needed.

ELEMENT 3 – LEFT-TURN QUEUE EXCEEDS STORAGE LENGTH

Table 2 summarizes the existing left-turn storage lengths and the corresponding queue length during the morning, school afternoon (where applicable), and evening peak hours for study intersections within City of Signal Hill jurisdiction where the project is forecast to add trips to the left turn movement. Non-City of Signal Hill intersections are omitted since this threshold only applies to City of Signal Hill. The queue length was calculated in accordance with the Highway Capacity Manual, 6th Edition back of queue methodology for the 95th-percentile queue length. Queue worksheets are provided in Appendix C.

As shown in Table 2, adequate left-turn storage is forecast to be provided at the City of Signal Hill study intersections where the proposed project is forecast to increase the left-turn volume during the peak hours for Opening Year (2020) With Project conditions.

As also shown in Table 2, adequate left-turn storage is forecast to be provided at the City of Signal Hill study intersections where the proposed project is forecast to increase the left-turn volume during the peak hours for General Plan Buildout (Year 2040) With Project conditions, with exception of the southbound left turn at Orange Avenue/Hill Street and the westbound left turn at Cherry Avenue/Willow Street.

Orange Avenue (NS) at Hill Street (EW) - #4

Southbound left-turn storage length is forecast to be exceeded during the morning peak hour for General Plan Buildout (Year 2040) With Project conditions. It should be noted that there is additional storage available within the painted median to accommodate the additional queue.

Proposed Mitigation: If necessary, extend the southbound left turn lane striping to provide 250 feet of storage length (including bay taper).

Cherry Avenue (NS) at Willow Street (EW) - #15

Westbound left-turn storage length is forecast to be exceeded during the evening peak hour for General Plan Buildout (Year 2040) With Project conditions. The existing left-turn lane storage is approximately 200 feet for dual left turn lanes plus a left-turn bay taper of approximately 120 feet.

Proposed Mitigation: Modify the westbound raised median to accommodate 250 feet of storage length for dual left turn lanes plus a left-turn bay taper of approximately 120 feet.

FAIR SHARE IMPROVEMENT COSTS

Figure 3 shows a summary of project fair share percentages at each of the intersection improvement locations. Fair share percentages were determined based on the following formula:

$$\text{Project Fair Share} = \text{Improvement Cost} \times \frac{\text{Project Trips}}{\text{New Traffic} - (\text{Future Traffic} - \text{Existing Traffic})}$$

Table 4 shows the cost estimate for off-site improvements. These cost estimates are intended for informational purposes only and do not imply any legal responsibility or formula for contributions or mitigation. As shown in Table 4, the total project share of estimated off-site improvement costs is \$6,016.

SUMMARY

The proposed project should contribute towards updated signal timing at the following study intersections:

- Orange Avenue (NS) at Willow Street (EW) - #2
- Orange Avenue (NS) at Burnett Street (EW) - #3
- Orange Avenue (NS) at Hill Street (EW) - #4
- Cherry Avenue (NS) at Willow Street (EW) - #15
- Cherry Avenue (NS) at Burnett Street (EW) - #16
- Cherry Avenue (NS) at Hill Street (EW) - #17

Additionally, the project should contribute towards its share of costs for the following improvements:

Orange Avenue (NS) at Hill Street (EW) - #4

If necessary, extend the southbound left turn lane striping to provide 250 feet of storage length (including bay taper).

Mr. Steven Christie
SIGNAL HILL XC, LLC
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Walnut Avenue (NS) at Hill Street (EW) - #10

Extend the no parking restriction on the northbound approach to 100 feet south of the intersection. This will result in the loss of approximately two on-street parking spaces, but will allow for a de facto right turn lane.

Cherry Avenue (NS) at Willow Street (EW) - #15

Modify the westbound raised median to accommodate 250 feet of storage length for dual left turn lanes plus a left-turn bay taper of approximately 120 feet.

CONCLUSION

We appreciate the opportunity to assist you on this project. Should you have any questions or if we can be of further assistance, please do not hesitate to call at (714) 795-3100.

Sincerely,



Giancarlo Ganddini, PE, PTP
Principal



Table 1
Project Trip Contribution

ID	Study Intersection	Jurisdiction ¹	Peak Hour Project Trips		40 or More Trips Added?	Mitigation Required?
			Morning	School PM/ Evening		
1.	Orange Ave at Spring St	SH/LB	36	37	No	No
2.	Orange Ave at Willow St	SH/LB	60	62	Yes	Yes - update signal timing.
3.	Orange Ave at Burnett St	SH	60	62	Yes	Yes - update signal timing.
4.	Orange Ave at Hill St	SH/LB	69	71	Yes	Yes - update signal timing.
6.	Gundry Ave at Hill St	SH	71	72	Yes	No ²
7.	Walnut Ave at Spring St	SH/LB	9	9	No	No
8.	Walnut Ave at Willow St	SH	9	9	No	No
9.	Walnut Ave at Burnett St	SH	9	9	No	No
10.	Walnut Ave at Hill St	SH	95	93	Yes	Yes - update signal timing.
13.	Gaviota Ave at Hill St	SH	64	62	Yes	No ²
14.	Cherry Ave at Spring St	SH/LB	28	29	No	No
15.	Cherry Ave at Willow St	SH	79	78	Yes	Yes - update signal timing.
16.	Cherry Ave at Burnett St	SH	79	78	Yes	Yes - update signal timing.
17.	Cherry Ave at Hill St	SH	79	78	Yes	Yes - update signal timing.
18.	Cherry Ave at 21st St	SH	15	16	No	No
19.	Cherry Ave at 20th St	SH	0	0	No	No

Notes:

(1) SH = City of Signal Hill; LB = City of Long Beach

(2) Since the unsignalized intersection is forecast to operate within acceptable Level of Service and the peak hour traffic signal warrant is not satisfied, the project impact is considered less than significant and no mitigation is required.

Table 2
Left-Turn Lane Queue Lengths

ID	Study Intersection	Movement ¹	Storage Length ²	Opening Year (2020) With Project			Adequate Storage Length?
				95th-Percentile Queue Length (Feet)			
				Morning	School PM	Evening	
2.	Orange Ave at Willow St	NBL	145+	46	n/a	47	Yes
4.	Orange Ave at Hill St	SBL	225+	219	84	86	Yes
14.	Cherry Ave at Spring St	WBL	215+	138	n/a	120	Yes
15.	Cherry Ave at Willow St	WBL	225	167	n/a	201	Yes

ID	Study Intersection	Movement ¹	Storage Length ²	General Plan Buildout (Year 2040) With Project			
				95th-Percentile Queue Length (Feet)			Adequate Storage Length?
				Morning	School PM	Evening	
2.	Orange Ave at Willow St	NBL	145+	66	n/a	59	Yes
4.	Orange Ave at Hill St	SBL	225+	240	98	104	No
14.	Cherry Ave at Spring St	WBL	215+	162	n/a	140	Yes
15.	Cherry Ave at Willow St	WBL	225	195	n/a	276	No

Table 3
Project Fair Share Percentage

ID	Study Intersection	Peak Hour	Existing Volume	General Plan Buildout Volume	Total New Volume	Project Trips	Project % of New Traffic
2.	Orange Ave at Willow St	Morning	3,574	4,507	933	60	6.4%
		Evening	4,159	5,235	1,076	62	5.8%
3.	Orange Ave at Burnett St	Morning	1,537	1,999	462	60	13.0%
		Evening	1,521	1,988	467	62	13.3%
4.	Orange Ave at Hill St	Morning	1,742	2,260	518	69	13.3%
		School PM	1,683	2,195	512	71	13.9%
		Evening	1,641	2,142	501	71	14.2%
10.	Walnut Ave at Hill St	Morning	805	1,098	293	95	32.4%
		School PM	951	1,269	318	93	29.2%
		Evening	859	1,156	297	93	31.3%
15.	Cherry Ave at Willow St	Morning	4,989	6,283	1,294	79	6.1%
		Evening	5,804	7,286	1,482	78	5.3%
16.	Cherry Ave at Burnett St	Morning	2,609	3,311	702	79	11.3%
		Evening	2,852	3,611	759	78	10.3%
17.	Cherry Ave at Hill St	Morning	2,388	3,042	654	79	12.1%
		Evening	2,600	3,302	702	78	11.1%

Table 4
Cost Estimate and Project Fair Share

ID	Study Intersection	Improvement	Cost Estimate	Project % of New Traffic ¹	Project Fair Share of Cost
2.	Orange Ave at Willow St	- Update signal timing ²	\$ 5,000	6.4%	\$ 322
3.	Orange Ave at Burnett St	- Update signal timing	\$ 5,000	13.3%	\$ 664
4.	Orange Ave at Hill St	- Update signal timing - Extend the southbound left turn lane striping to provide 250 feet of storage length (including bay taper). ³	\$ 5,000 \$ 3,750	14.2%	\$ 1,240
10.	Walnut Ave at Hill St	- Extend the no parking restriction on the northbound approach to 100 feet south of the intersection. This will result in the loss of approximately two on-street parking spaces, but will allow for a de facto right turn lane.	\$ 1,500	32.4%	\$ 486
15.	Cherry Ave at Willow St	- Update signal timing - Modify the westbound raised median to accommodate 250 feet of storage length for dual left turn lanes plus a left-turn bay taper of approximately 120 feet. ⁴	\$ 5,000 \$ 30,000	6.1%	\$ 2,137
16.	Cherry Ave at Burnett St	- Update signal timing	\$ 5,000	11.3%	\$ 563
17.	Cherry Ave at Hill St	- Update signal timing	\$ 5,000	12.1%	\$ 604
TOTAL			\$ 65,250		\$ 6,016

Notes:

(1) Based on greater of morning, school afternoon, or evening peak hour share from Table 3.

(2) Source: National Traffic Signal Report Card: Technical Report 2005, National Transportation Operations Coalition (http://www.ite.org/reportcard/NTS_TechReport.pdf)

(3) Cost to remove and add striping is estimated at \$15 per linear foot.

(4) <https://safety.fhwa.dot.gov/saferjourney1/Library/countermeasures/16.htm>

APPENDIX A

GLOSSARY

GLOSSARY OF TERMS

ACRONYMS

AC	Acres
ADT	Average Daily Traffic
Caltrans	California Department of Transportation
DU	Dwelling Unit
ICU	Intersection Capacity Utilization
LOS	Level of Service
TSF	Thousand Square Feet
V/C	Volume/Capacity
VMT	Vehicle Miles Traveled

TERMS

AVERAGE DAILY TRAFFIC: The average 24-hour volume for a stated period divided by the number of days in that period. For example, Annual Average Daily Traffic is the total volume during a year divided by 365 days.

BANDWIDTH: The number of seconds of green time available for through traffic in a signal progression.

BOTTLENECK: A point of constriction along a roadway that limits the amount of traffic that can proceed downstream from its location.

CAPACITY: The maximum number of vehicles that can be reasonably expected to pass over a given section of a lane or a roadway in a given time period.

CHANNELIZATION: The separation or regulation of conflicting traffic movements into definite paths of travel by the use of pavement markings, raised islands, or other suitable means to facilitate the safe and orderly movements of both vehicles and pedestrians.

CLEARANCE INTERVAL: Nearly same as yellow time. If there is an all red interval after the end of a yellow, then that is also added into the clearance interval.

CONTROL DELAY: The component of delay, typically expressed in seconds per vehicle, resulting from the type of traffic control at an intersection. Control delay is measured by comparison with the uncontrolled condition; it includes delay incurred by slowing down, stopping/waiting, and speeding up.

CORDON: An imaginary line around an area across which vehicles, persons, or other items are counted (in and out).

CORNER SIGHT DISTANCE: The minimum sight distance required by the driver of a vehicle to cross or enter the lanes of the major roadway without requiring approaching traffic travelling at a given speed to radically alter their speed or trajectory. Corner sight distance is measured from the driver's eye at 42 inches above the pavement to an object height of 36 inches above the pavement in the center of the nearest approach lane.

CYCLE LENGTH: The time period in seconds required for a traffic signal to complete one full cycle of indications.

CUL-DE-SAC: A local street open at one end only and with special provisions for turning around.

DAILY CAPACITY: A theoretical value representing the daily traffic volume that will typically result in a peak hour volume equal to the capacity of the roadway.

DELAY: The time consumed while traffic is impeded in its movement by some element over which it has no control, usually expressed in seconds per vehicle.

DEMAND RESPONSIVE SIGNAL: Same as traffic-actuated signal.

DENSITY: The number of vehicles occupying in a unit length of the through traffic lanes of a roadway at any given instant. Usually expressed in vehicles per mile.

DETECTOR: A device that responds to a physical stimulus and transmits a resulting impulse to the signal controller.

DESIGN SPEED: A speed selected for purposes of design. Features of a highway, such as curvature, superelevation, and sight distance (upon which the safe operation of vehicles is dependent) are correlated to design speed.

DIRECTIONAL SPLIT: The percent of traffic in the peak direction at any point in time.

DIVERSION: The rerouting of peak hour traffic to avoid congestion.

FORCED FLOW: Opposite of free flow.

FREE FLOW: Volumes are well below capacity. Vehicles can maneuver freely and travel is unimpeded by other traffic.

GAP: Time or distance between successive vehicles in a traffic stream, rear bumper to front bumper.

HEADWAY: Time or distance spacing between successive vehicles in a traffic stream, front bumper to front bumper.

INTERCONNECTED SIGNAL SYSTEM: A number of intersections that are connected to achieve signal progression.

LEVEL OF SERVICE: A qualitative measure of a number of factors, which include speed and travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience, and operating costs.

LOOP DETECTOR: A vehicle detector consisting of a loop of wire embedded in the roadway, energized by alternating current and producing an output circuit closure when passed over by a vehicle.

MINIMUM ACCEPTABLE GAP: Smallest time headway between successive vehicles in a traffic stream into which another vehicle is willing and able to cross or merge.

MULTI-MODAL: More than one mode; such as automobile, bus transit, rail rapid transit, and bicycle transportation modes.

OFFSET: The time interval in seconds between the beginning of green at one intersection and the beginning of green at an adjacent intersection.

PLATOON: A closely grouped component of traffic that is composed of several vehicles moving, or standing ready to move, with clear spaces ahead and behind.

PASSENGER CAR EQUIVALENT (PCE): A metric used to assess the impact of larger vehicles, such as trucks, recreational vehicles, and buses, by converting the traffic volume of larger vehicles to an equivalent number of passenger cars.

PEAK HOUR: The 60 consecutive minutes with the highest number of vehicles.

PRETIMED SIGNAL: A type of traffic signal that directs traffic to stop and go on a predetermined time schedule without regard to traffic conditions. Also, fixed time signal.

PROGRESSION: A term used to describe the progressive movement of traffic through several signalized intersections.

QUEUE: The number of vehicles waiting at a service area such as a traffic signal, stop sign, or access gate.

QUEUE LENGTH: The length of vehicle queue, typically expressed in feet, waiting at a service area such as a traffic signal, stop sign, or access gate.

SCREEN-LINE: An imaginary line or physical feature across which all trips are counted, normally to verify the validity of mathematical traffic models.

SHARED/RECIPROCAL PARKING AGREEMENT: A written binding document executed between property owners to provide a designated number of off-street parking stalls within a designated area to be available for specified businesses or land uses.

SIGHT DISTANCE: The continuous length of roadway visible to a driver or roadway user.

SIGNAL CYCLE: The time period in seconds required for one complete sequence of signal indications.

SIGNAL PHASE: The part of the signal cycle allocated to one or more traffic movements.

STACKING DISTANCE: The length of area available behind a service area, such as a traffic signal or gate, for vehicle queueing to occur.

STARTING DELAY: The delay experienced in initiating the movement of queued traffic from a stop to an average running speed through an intersection.

STOPPING SIGHT DISTANCE: The minimum distance required by the driver of a vehicle on the major roadway travelling at a given speed to bring the vehicle to a stop after an object on the road becomes visible. Stopping sight distance is measured from the driver's eye at 42 inches above the pavement to an object height of 6 inches above the pavement.

TRAFFIC-ACTUATED SIGNAL: A type of traffic signal that directs traffic to stop and go in accordance with the demands of traffic, as registered by the actuation of detectors.

TRIP: The movement of a person or vehicle from one location (origin) to another (destination). For example, from home to store to home is two trips, not one.

TRIP-END: One end of a trip at either the origin or destination (i.e., each trip has two trip-ends). A trip-end occurs when a person, object, or message is transferred to or from a vehicle.

TRIP GENERATION RATE: The quantity of trips produced and/or attracted by a specific land use stated in terms of units such as per dwelling, per acre, and per 1,000 square feet of floor space.

TRUCK: A vehicle having dual tires on one or more axles, or having more than two axles.

TURNING RADIUS: The circular arc formed by the smallest turning path radius of the front outside tire of a vehicle, such as that performed by a U-turn maneuver. This is based on the length and width of the wheel base as well as the steering mechanism of the vehicle.

UNBALANCED FLOW: Heavier traffic flow in one direction than the other. On a daily basis, most facilities have balanced flow. During the peak hours, flow is seldom balanced in an urban area.

VEHICLE MILES OF TRAVEL: A measure of the amount of usage of a section of highway, obtained by multiplying the average daily traffic by length of facility in miles.

APPENDIX B

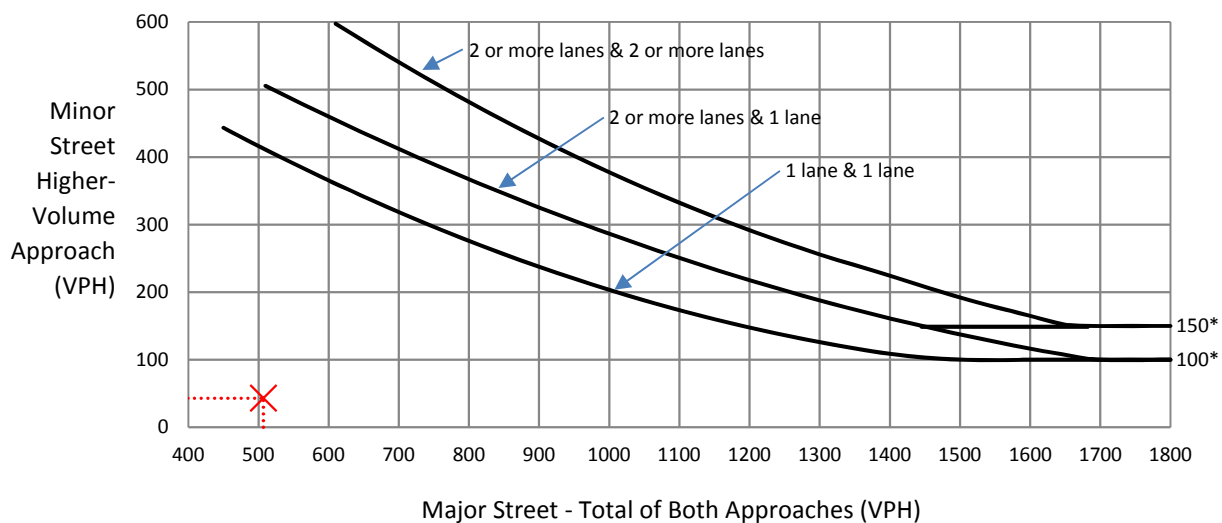
TRAFFIC SIGNAL WARRANT WORKSHEETS

Figure C-1

**Gundry Ave (NS) / Hill St (EW) - #6
General Plan Buildout With Project
AM Peak Hour**

Major Street: <u>Hill St</u>	Volume: <u>507</u>
Minor Street: <u>Gundry Ave</u>	Volume: <u>43</u>

Warrant 3, Peak Hour Vehicular Volume (100% Factor)



Traffic Signal Warrant Is NOT Satisfied

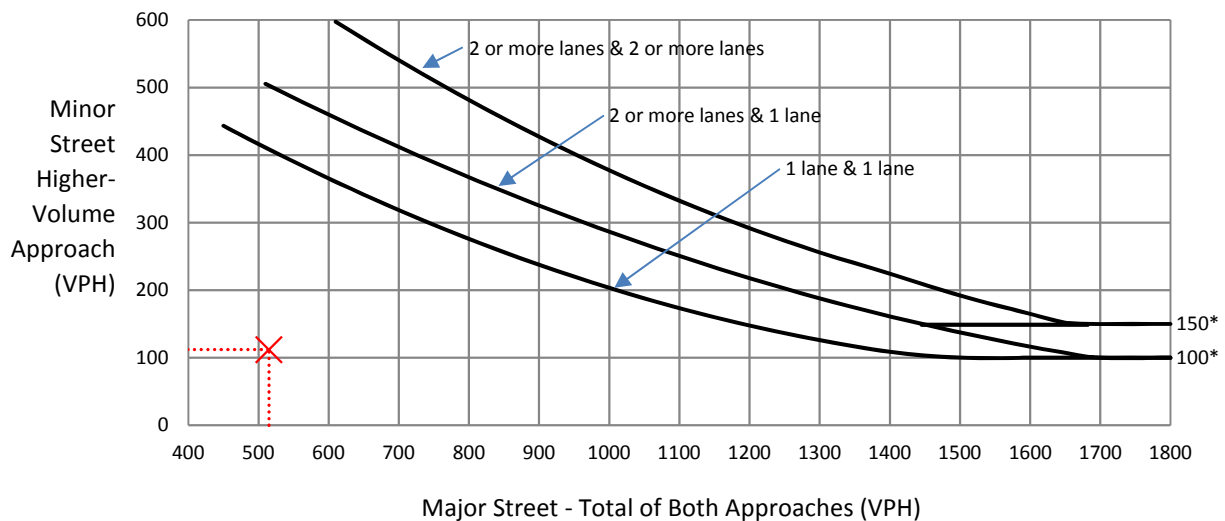
*Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

Figure C-2

**Gundry Ave (NS) / Hill St (EW) - #6
General Plan Buildout With Project
School PM Peak Hour**

Major Street: <u>Hill St</u>	Volume: <u>515</u>
Minor Street: <u>Gundry Ave</u>	Volume: <u>112</u>

Warrant 3, Peak Hour Vehicular Volume (100% Factor)



Traffic Signal Warrant Is NOT Satisfied

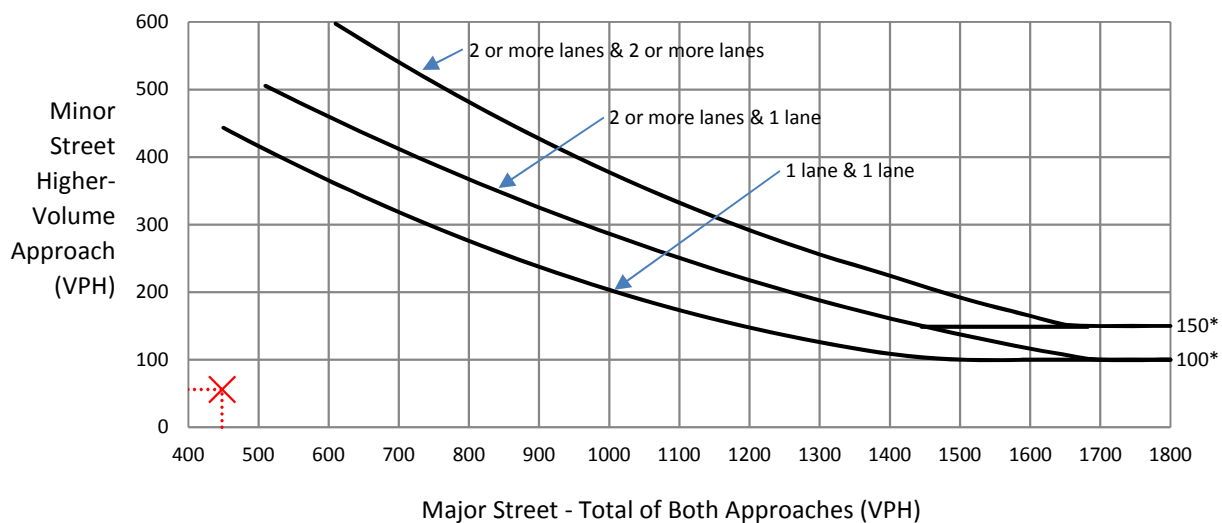
*Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

Figure C-3

**Gundry Ave (NS) / Hill St (EW) - #6
General Plan Buildout With Project
PM Peak Hour**

Major Street: <u>Hill St</u>	Volume: <u>448</u>
Minor Street: <u>Gundry Ave</u>	Volume: <u>56</u>

Warrant 3, Peak Hour Vehicular Volume (100% Factor)



Traffic Signal Warrant Is NOT Satisfied

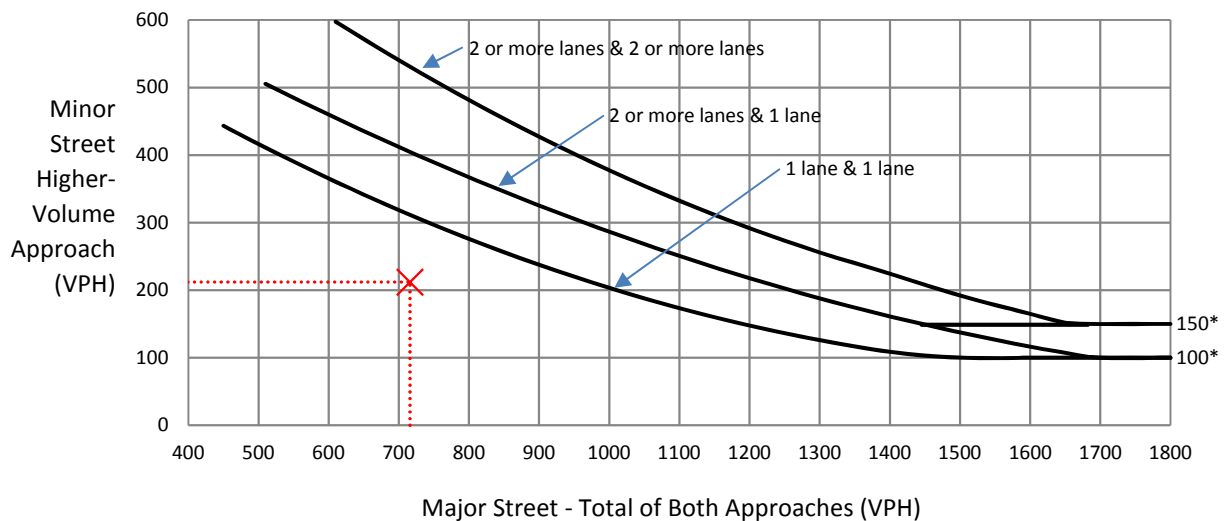
*Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

Figure C-4

Walnut Ave (NS) / Hill St (EW) - #10
General Plan Buildout With Project
AM Peak Hour

Major Street: <u>Walnut Ave</u>	Volume: <u>716</u>
Minor Street: <u>Hill St</u>	Volume: <u>212</u>

Warrant 3, Peak Hour Vehicular Volume (100% Factor)



Traffic Signal Warrant Is NOT Satisfied

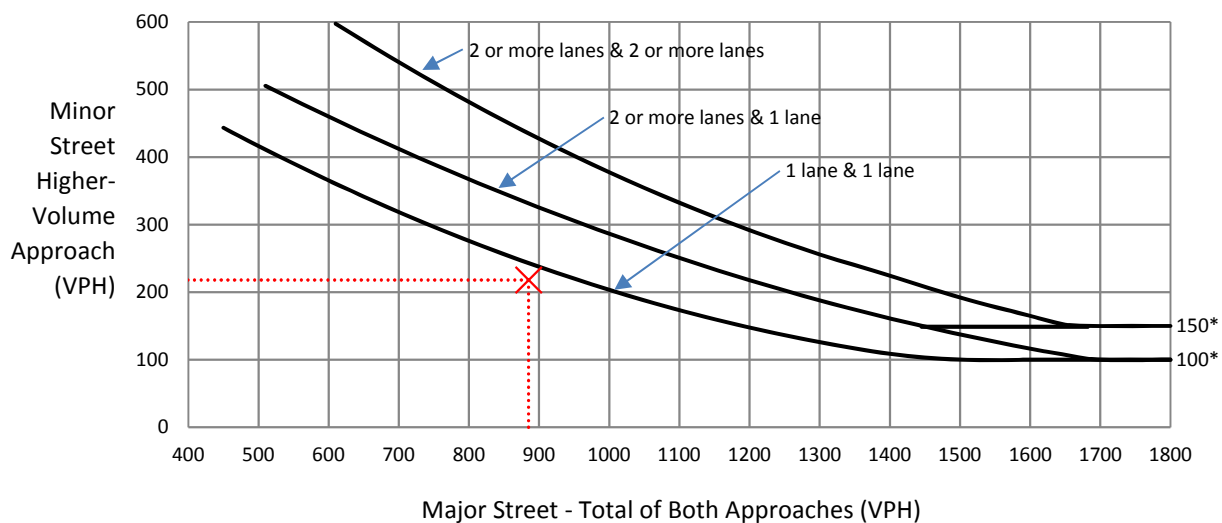
*Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

Figure C-5

**Walnut Ave (NS) / Hill St (EW) - #10
General Plan Buildout With Project
School PM Peak Hour**

Major Street: <u>Walnut Ave</u>	Volume: <u>885</u>
Minor Street: <u>Hill St</u>	Volume: <u>218</u>

Warrant 3, Peak Hour Vehicular Volume (100% Factor)



Traffic Signal Warrant Is NOT Satisfied

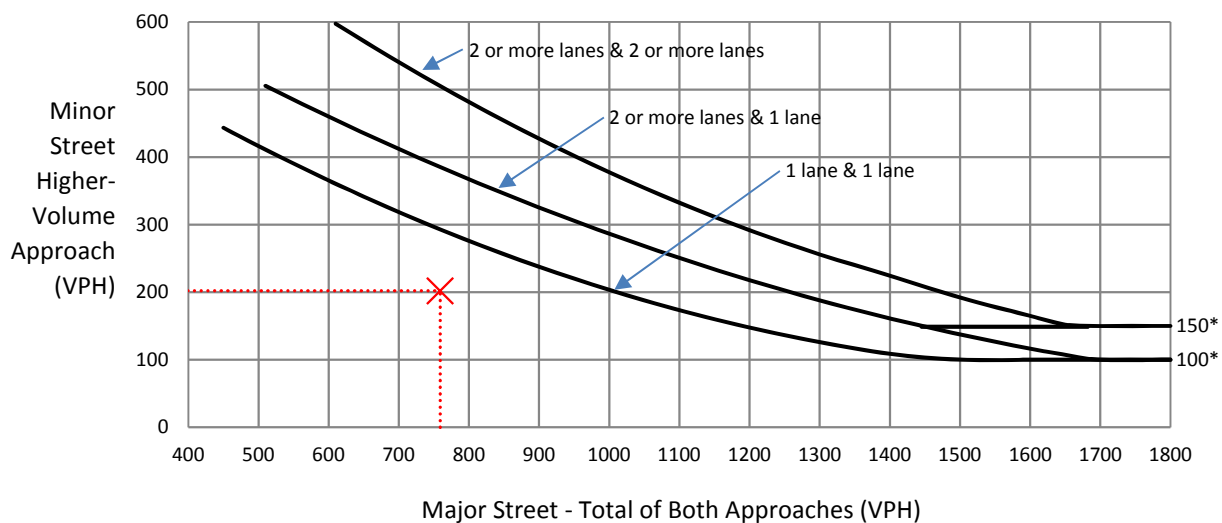
*Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

Figure C-6

**Walnut Ave (NS) / Hill St (EW) - #10
General Plan Buildout With Project
PM Peak Hour**

Major Street: <u>Walnut Ave</u>	Volume: <u>759</u>
Minor Street: <u>Hill St</u>	Volume: <u>202</u>

Warrant 3, Peak Hour Vehicular Volume (100% Factor)



Traffic Signal Warrant Is NOT Satisfied

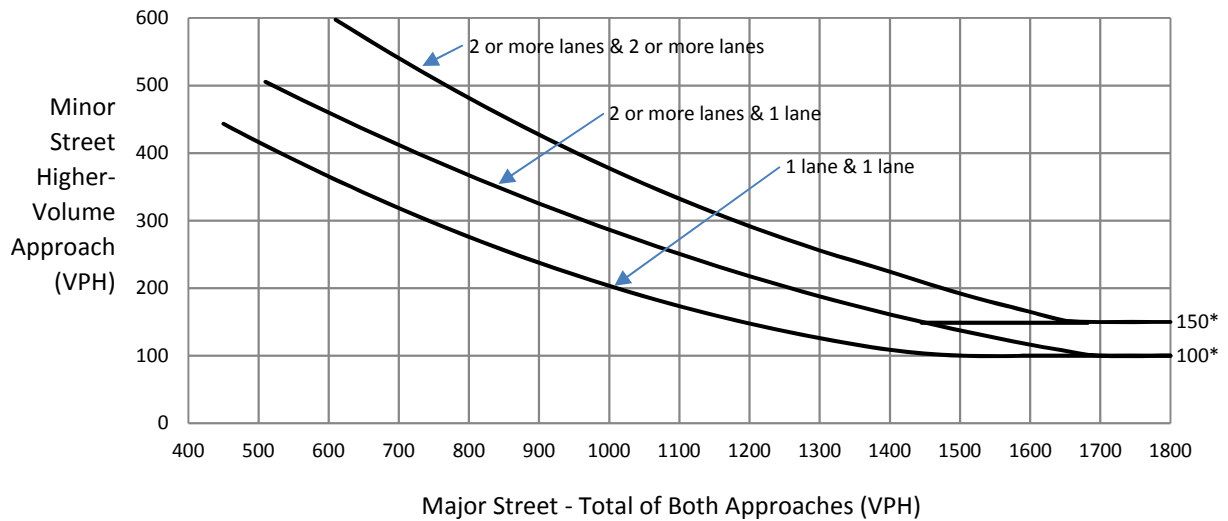
*Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

Figure C-7

Gaviota Ave (NS) / Hill St (EW) - #13
General Plan Buildout With Project
AM Peak Hour

Major Street: <u>Hill St</u>	Volume: <u>374</u>
Minor Street: <u>Gaviota Ave</u>	Volume: <u>45</u>

Warrant 3, Peak Hour Vehicular Volume (100% Factor)



Traffic Signal Warrant Is NOT Satisfied

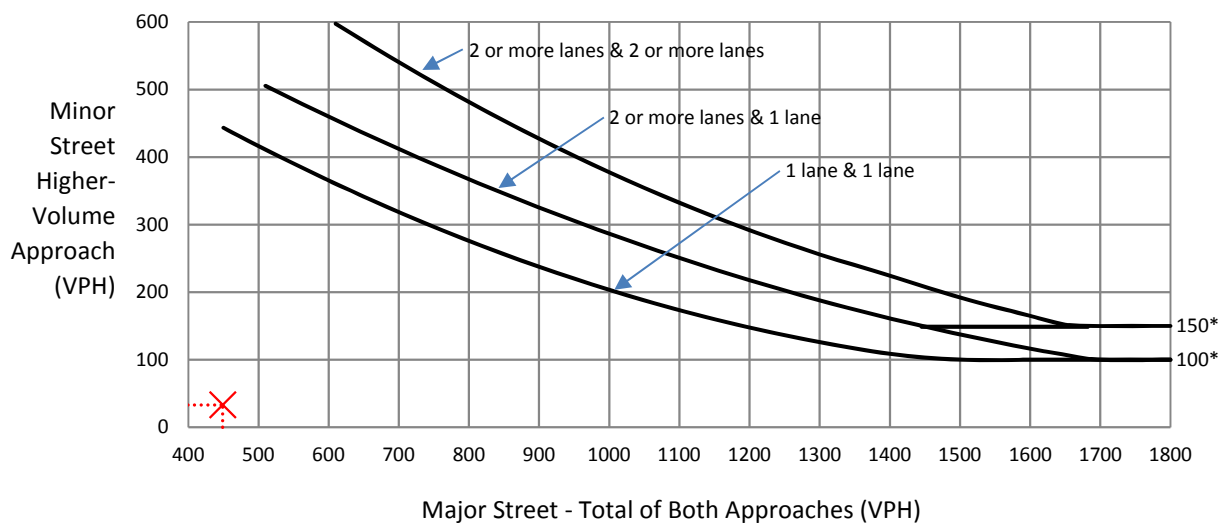
*Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

Figure C-8

Gaviota Ave (NS) / Hill St (EW) - #13
General Plan Buildout With Project
PM Peak Hour

Major Street: <u>Hill St</u>	Volume: <u>449</u>
Minor Street: <u>Gaviota Ave</u>	Volume: <u>33</u>

Warrant 3, Peak Hour Vehicular Volume (100% Factor)



Traffic Signal Warrant Is NOT Satisfied

*Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

APPENDIX C

HCM QUEUE LENGTH WORKSHEETS

Opening Year (2020) With Project

Intersection Level Of Service Report

Intersection 2: Orange Ave (NS) at Willow St (EW)

Control Type:	Signalized	Delay (sec / veh):	32.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.625

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	↵↵↵			↵↵↵			↵↵↵			↵↵↵		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	175.00	100.00	100.00	125.00	100.00	100.00	235.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	82	492	92	40	439	83	84	931	72	69	1128	62
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	5	12	0	8	36	2	4	30	21	0	16	13
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	89	514	94	49	484	87	90	980	94	70	1167	76
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	22	129	24	12	121	22	23	245	24	18	292	19
Total Analysis Volume [veh/h]	89	514	94	49	484	87	90	980	94	70	1167	76
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Unsigna	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	0	7	7	0	7	7	0	7	7	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	11	31	0	11	31	0	31	46	0	12	27	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	55	45	55	44	44	7	27	27	6	27	27
g / C, Green / Cycle	0.55	0.45	0.55	0.44	0.44	0.07	0.27	0.27	0.06	0.27	0.27
(v / s)_i Volume / Saturation Flow Rate	0.08	0.27	0.05	0.25	0.05	0.05	0.20	0.20	0.04	0.23	0.23
s, saturation flow rate [veh/h]	1064	1900	1023	1900	1615	1810	3618	1816	1810	3618	1841
c, Capacity [veh/h]	502	858	473	836	710	119	993	498	110	975	496
d1, Uniform Delay [s]	13.14	20.64	13.07	21.08	16.61	45.99	32.85	32.87	45.92	34.58	34.59
k, delay calibration	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.77	3.08	0.09	2.92	0.35	9.35	1.00	1.99	5.89	2.10	4.13
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.18	0.60	0.10	0.58	0.12	0.76	0.72	0.72	0.63	0.84	0.84
d, Delay for Lane Group [s/veh]	13.91	23.72	13.17	24.01	16.96	55.34	33.85	34.86	51.81	36.69	38.71
Lane Group LOS	B	C	B	C	B	E	C	C	D	D	D
Critical Lane Group	No	Yes	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	1.02	9.42	0.50	8.90	1.23	2.50	7.84	8.03	1.87	9.58	10.03
50th-Percentile Queue Length [ft/ln]	25.50	235.41	12.59	222.39	30.83	62.42	195.98	200.64	46.81	239.46	250.80
95th-Percentile Queue Length [veh/ln]	1.84	14.45	0.91	13.79	2.22	4.49	12.43	12.67	3.37	14.65	15.23
95th-Percentile Queue Length [ft/ln]	45.90	361.22	22.65	344.68	55.50	112.36	310.78	316.79	84.25	366.35	380.67

Movement, Approach, & Intersection Results

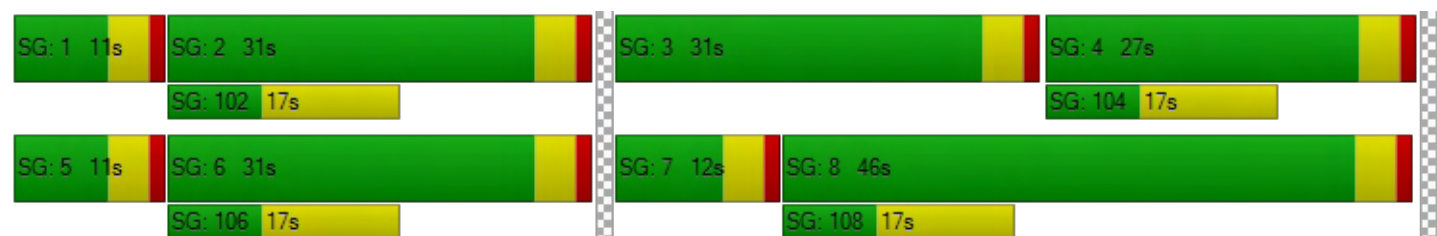
d_M, Delay for Movement [s/veh]	13.91	23.72	0.00	13.17	24.01	16.96	55.34	34.13	34.86	51.81	37.28	38.71
Movement LOS	B	C		B	C	B	E	C	C	D	D	D
d_A, Approach Delay [s/veh]	22.27			22.16			35.83			38.14		
Approach LOS	C			C			D			D		
d_I, Intersection Delay [s/veh]	32.15											
Intersection LOS	C											
Intersection V/C	0.625											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	39.61			39.61			39.61			39.61		
I_p,int, Pedestrian LOS Score for Intersection	2.549			2.558			3.006			2.958		
Crosswalk LOS	B			B			C			C		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	540			540			840			460		
d_b, Bicycle Delay [s]	26.65			26.65			16.82			29.65		
I_b,int, Bicycle LOS Score for Intersection	2.555			2.583			2.200			2.282		
Bicycle LOS	B			B			B			B		

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 4: Orange Ave (NS) at Hill St (EW)

Control Type:	Signalized	Delay (sec / veh):	341.3
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	3.755

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	↵↵			↵↵			↵↵			↵↵		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	40	667	22	28	526	25	78	90	38	47	124	57
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	15	3	54	19	9	6	9	0	4	2	13
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	41	695	25	83	556	35	86	101	39	52	128	71
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	174	6	21	139	9	22	25	10	13	32	18
Total Analysis Volume [veh/h]	41	695	25	83	556	35	86	101	39	52	128	71
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	0	7	0	0	7	0	0	7	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	24	0	0	24	0	0	76	0	0	76	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	R	C	R
C, Cycle Length [s]	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	20	20	20	20	72	72	72	72
g / C, Green / Cycle	0.20	0.20	0.20	0.20	0.72	0.72	0.72	0.72
(v / s)_i Volume / Saturation Flow Rate	0.05	0.38	0.11	0.31	3.00	0.02	1.38	0.04
s, saturation flow rate [veh/h]	839	1888	744	1880	62	1615	130	1615
c, Capacity [veh/h]	72	381	72	379	97	1160	140	1160
d1, Uniform Delay [s]	50.00	39.92	50.00	39.92	32.94	4.06	37.36	4.15
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.50	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	28.63	410.77	153.09	264.12	449.81	0.01	171.35	0.02
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.57	1.89	1.15	1.56	1.92	0.03	1.28	0.06
d, Delay for Lane Group [s/veh]	78.63	450.69	203.09	304.04	482.74	4.08	208.71	4.17
Lane Group LOS	E	F	F	F	F	A	F	A
Critical Lane Group	No	Yes	No	No	Yes	No	No	No
50th-Percentile Queue Length [veh/ln]	1.59	52.65	4.86	36.99	13.11	0.20	8.83	0.37
50th-Percentile Queue Length [ft/ln]	39.86	1316.37	121.42	924.65	327.80	5.01	220.86	9.30
95th-Percentile Queue Length [veh/ln]	2.87	81.97	8.74	56.86	23.60	0.36	15.90	0.67
95th-Percentile Queue Length [ft/ln]	71.75	2049.37	218.55	1421.53	590.04	9.01	397.55	16.75

Movement, Approach, & Intersection Results

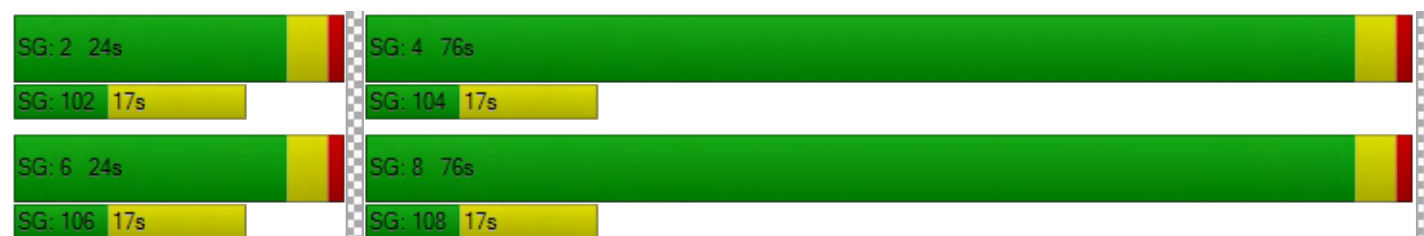
d_M, Delay for Movement [s/veh]	78.63	450.69	450.69	203.09	304.04	304.04	482.74	482.74	4.08	208.71	208.71	4.17
Movement LOS	E	F	F	F	F	F	F	F	A	F	F	A
d_A, Approach Delay [s/veh]	430.64			291.61			400.14			150.85		
Approach LOS	F			F			F			F		
d_I, Intersection Delay [s/veh]	341.30											
Intersection LOS	F											
Intersection V/C	3.755											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	39.61			39.61			39.61			39.61		
I_p,int, Pedestrian LOS Score for Intersection	2.553			2.630			2.143			2.213		
Crosswalk LOS	B			B			B			B		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	400			400			1440			1440		
d_b, Bicycle Delay [s]	32.00			32.00			3.92			3.92		
I_b,int, Bicycle LOS Score for Intersection	2.815			2.672			1.933			1.974		
Bicycle LOS	C			B			A			A		

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report**Intersection 14: Cherry Ave (NS) at Spring St (EW)**

Control Type:	Signalized	Delay (sec / veh):	33.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.685

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	↵↵↵			↵↵↵			↵↵↵			↵↵↵↵		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Pocket Length [ft]	175.00	100.00	100.00	200.00	100.00	100.00	147.00	100.00	100.00	195.00	100.00	206.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	86	1069	170	281	1098	137	120	544	75	105	1052	358
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	21	1	0	46	0	0	1	8	5	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	90	1111	174	287	1166	140	122	556	85	112	1074	365
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	23	278	44	72	292	35	31	139	21	28	269	91
Total Analysis Volume [veh/h]	90	1111	174	287	1166	140	122	556	85	112	1074	365
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	0	7	7	0	7	7	0	7	7	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	23	39	0	17	33	0	13	21	0	23	31	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	C	R
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	39	39	13	45	45	8	24	24	8	24	24	24
g / C, Green / Cycle	0.06	0.39	0.39	0.13	0.45	0.45	0.08	0.24	0.24	0.08	0.24	0.24	0.24
(v / s)_i Volume / Saturation Flow Rate	0.05	0.24	0.24	0.11	0.24	0.24	0.07	0.12	0.12	0.06	0.20	0.20	0.20
s, saturation flow rate [veh/h]	1810	3618	1771	2663	3618	1798	1810	3618	1775	1810	3618	1867	1615
c, Capacity [veh/h]	118	1418	694	338	1640	815	153	875	429	144	857	442	383
d1, Uniform Delay [s]	46.02	24.30	24.30	42.79	19.71	19.71	45.00	32.65	32.71	45.22	36.57	36.57	36.57
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.21	0.21
l, Upstream Filtering 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	1.00
d2, Incremental Delay [s]	9.56	1.95	3.94	5.98	1.24	2.48	9.15	0.43	0.89	8.69	2.58	9.02	10.29
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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	1.00
PF, 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	1.00

Lane Group Results

X, volume / capacity	0.76	0.61	0.61	0.85	0.53	0.53	0.80	0.49	0.50	0.78	0.86	0.86	0.86
d, Delay for Lane Group [s/veh]	55.58	26.25	28.24	48.76	20.95	22.20	54.16	33.07	33.60	53.90	39.15	45.58	46.86
Lane Group LOS	E	C	C	D	C	C	D	C	C	D	D	D	D
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	2.50	8.32	8.53	3.72	7.35	7.59	3.34	4.46	4.51	3.06	8.72	9.80	8.61
50th-Percentile Queue Length [ft/ln]	62.58	207.98	213.31	93.05	183.83	189.83	83.56	111.53	112.71	76.49	218.1	244.9	215.3
95th-Percentile Queue Length [veh/ln]	4.51	13.05	13.32	6.70	11.80	12.11	6.02	7.93	7.99	5.51	13.57	14.93	13.43
95th-Percentile Queue Length [ft/ln]	112.64	326.23	333.08	167.50	295.01	302.81	150.40	198.13	199.76	137.6	339.2	373.2	335.7

Movement, Approach, & Intersection Results

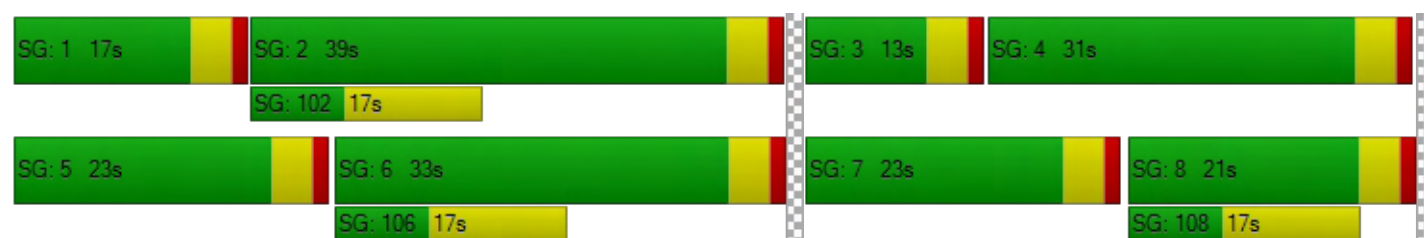
d_M, Delay for Movement [s/veh]	55.58	26.70	28.24	48.76	21.26	22.20	54.16	33.19	33.60	53.90	41.19	46.84
Movement LOS	E	C	C	D	C	C	D	C	C	D	D	D
d_A, Approach Delay [s/veh]	28.78			26.30			36.59			43.41		
Approach LOS	C			C			D			D		
d_I, Intersection Delay [s/veh]	33.46											
Intersection LOS	C											
Intersection V/C	0.685											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			0.0			11.0			11.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	39.61			0.00			39.61			39.61		
I_p,int, Pedestrian LOS Score for Intersection	3.064			0.000			2.887			3.043		
Crosswalk LOS	C			F			C			C		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	700			580			340			540		
d_b, Bicycle Delay [s]	21.13			25.21			34.45			26.65		
I_b,int, Bicycle LOS Score for Intersection	2.316			2.436			1.979			2.413		
Bicycle LOS	B			B			A			B		

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report**Intersection 15: Cherry Ave (NS) at Willow St (EW)**

Control Type:	Signalized	Delay (sec / veh):	35.0
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.643

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	T T T			T T T			T T T			T T T		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	2	0	0	2	0	0
Pocket Length [ft]	170.00	100.00	100.00	175.00	100.00	100.00	247.00	100.00	100.00	205.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	167	1031	161	149	765	147	177	836	85	231	1124	116
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	15	24	28	31	0	1	28	0	51	10	8
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	170	1067	188	180	811	150	182	881	87	287	1156	126
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	43	267	47	45	203	38	46	220	22	72	289	32
Total Analysis Volume [veh/h]	170	1067	188	180	811	150	182	881	87	287	1156	126
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	2	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups			2,7									
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	7	7	7	0	7	7	0	7	7	0
Maximum Green [s]	30	30	30	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	33	41	41	13	21	0	13	29	0	17	33	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	10	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No	No	No	No		No	No		No	No	
Maximum Recall	No	No	No	No	No		No	No		No	No	
Pedestrian Recall	No	No	No	No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	C	L	C	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	11	40	57	9	37	37	9	23	23	13	27	27
g / C, Green / Cycle	0.11	0.40	0.57	0.09	0.37	0.37	0.09	0.23	0.23	0.13	0.27	0.27
(v / s)_i Volume / Saturation Flow Rate	0.09	0.21	0.12	0.07	0.18	0.18	0.07	0.18	0.18	0.11	0.24	0.24
s, saturation flow rate [veh/h]	1810	5176	1615	2663	3618	1752	2663	3618	1814	2663	3618	1806
c, Capacity [veh/h]	208	2077	918	231	1350	654	233	814	408	339	957	478
d1, Uniform Delay [s]	43.28	22.61	10.55	44.78	23.96	23.98	44.75	36.60	36.61	42.75	35.47	35.47
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.15	0.11	0.11	0.30
l, Upstream Filtering 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
d2, Incremental Delay [s]	7.64	0.91	0.50	5.60	1.22	2.52	5.62	1.78	4.95	5.87	3.19	14.41
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, 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

Lane Group Results

X, volume / capacity	0.82	0.51	0.20	0.78	0.48	0.48	0.78	0.79	0.79	0.85	0.89	0.89
d, Delay for Lane Group [s/veh]	50.92	23.52	11.06	50.38	25.18	26.50	50.36	38.38	41.57	48.63	38.66	49.88
Lane Group LOS	D	C	B	D	C	C	D	D	D	D	D	D
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	4.52	6.34	2.07	2.35	5.95	6.03	2.38	7.51	7.91	3.72	10.25	11.72
50th-Percentile Queue Length [ft/ln]	112.96	158.40	51.70	58.82	148.76	150.67	59.47	187.75	197.72	92.91	256.15	293.06
95th-Percentile Queue Length [veh/ln]	8.00	10.46	3.72	4.23	9.95	10.05	4.28	12.00	12.52	6.69	15.50	17.34
95th-Percentile Queue Length [ft/ln]	200.11	261.61	93.07	105.87	248.77	251.32	107.05	300.11	313.02	167.24	387.39	433.43

Movement, Approach, & Intersection Results

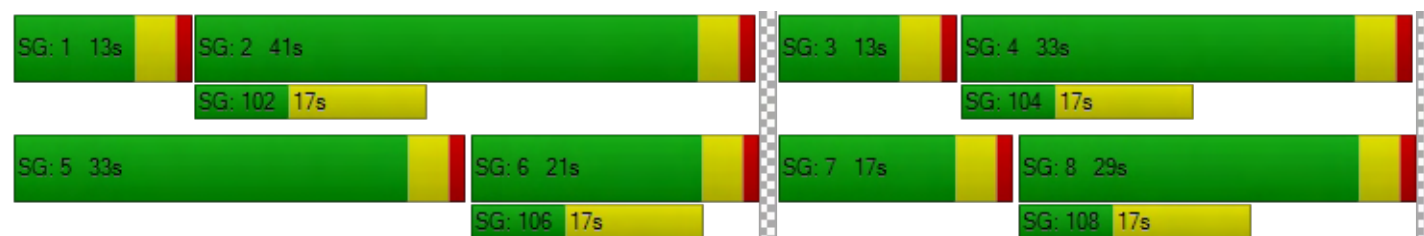
d_M, Delay for Movement [s/veh]	50.92	23.52	11.06	50.38	25.44	26.50	50.36	39.24	41.57	48.63	41.58	49.88
Movement LOS	D	C	B	D	C	C	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	25.14			29.52			41.17			43.54		
Approach LOS	C			C			D			D		
d_I, Intersection Delay [s/veh]	35.04											
Intersection LOS	D											
Intersection V/C	0.643											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	39.61			39.61			39.61			39.61		
I_p,int, Pedestrian LOS Score for Intersection	3.048			3.037			3.050			3.074		
Crosswalk LOS	C			C			C			C		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	740			340			500			580		
d_b, Bicycle Delay [s]	19.85			34.45			28.13			25.21		
I_b,int, Bicycle LOS Score for Intersection	2.343			2.187			2.192			2.423		
Bicycle LOS	B			B			B			B		

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 4: Orange Ave (NS) at Hill St (EW)

Control Type:	Signalized	Delay (sec / veh):	287.3
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	3.064

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	49	564	41	25	553	39	58	77	41	61	130	45
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	23	3	20	16	5	11	3	0	3	8	48
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	50	598	45	46	580	45	70	82	42	65	141	94
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	13	150	11	12	145	11	18	21	11	16	35	24
Total Analysis Volume [veh/h]	50	598	45	46	580	45	70	82	42	65	141	94
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	0	7	0	0	7	0	0	7	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	25	0	0	25	0	0	75	0	0	75	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	R	C	R
C, Cycle Length [s]	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	21	21	21	21	71	71	71	71
g / C, Green / Cycle	0.21	0.21	0.21	0.21	0.71	0.71	0.71	0.71
(v / s)_i Volume / Saturation Flow Rate	0.06	0.34	0.06	0.33	2.42	0.03	1.77	0.06
s, saturation flow rate [veh/h]	813	1877	799	1876	63	1615	116	1615
c, Capacity [veh/h]	72	397	72	397	97	1144	130	1144
d1, Uniform Delay [s]	50.00	39.42	50.00	39.42	32.40	4.36	36.39	4.51
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.50	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	43.11	290.16	36.10	270.50	297.75	0.01	297.10	0.03
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.69	1.62	0.64	1.57	1.56	0.04	1.59	0.08
d, Delay for Lane Group [s/veh]	93.11	329.58	86.10	309.92	330.15	4.38	333.49	4.54
Lane Group LOS	F	F	F	F	F	A	F	A
Critical Lane Group	No	Yes	No	No	Yes	No	No	No
50th-Percentile Queue Length [veh/ln]	2.11	41.59	1.87	39.41	8.98	0.23	12.60	0.53
50th-Percentile Queue Length [ft/ln]	52.69	1039.71	46.69	985.16	224.45	5.70	315.12	13.20
95th-Percentile Queue Length [veh/ln]	3.79	64.10	3.36	60.58	16.16	0.41	22.69	0.95
95th-Percentile Queue Length [ft/ln]	94.84	1602.61	84.04	1514.56	404.00	10.26	567.22	23.76

Movement, Approach, & Intersection Results

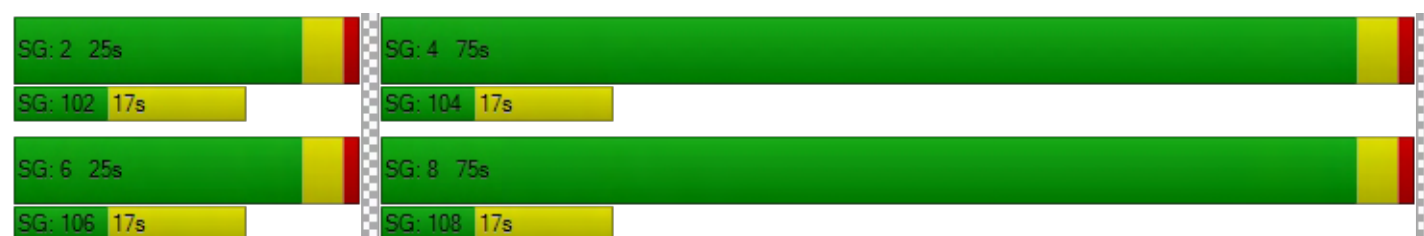
d_M, Delay for Movement [s/veh]	93.11	329.58	329.58	86.10	309.92	309.92	330.15	330.15	4.38	333.49	333.49	4.54
Movement LOS	F	F	F	F	F	F	F	F	A	F	F	A
d_A, Approach Delay [s/veh]	312.52			294.58			259.62			230.42		
Approach LOS	F			F			F			F		
d_I, Intersection Delay [s/veh]	287.26											
Intersection LOS	F											
Intersection V/C	3.064											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	39.61			39.61			39.61			39.61		
I_p,int, Pedestrian LOS Score for Intersection	2.565			2.585			2.156			2.164		
Crosswalk LOS	B			B			B			B		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	420			420			1420			1420		
d_b, Bicycle Delay [s]	31.21			31.21			4.21			4.21		
I_b,int, Bicycle LOS Score for Intersection	2.703			2.667			1.880			2.055		
Bicycle LOS	B			B			A			B		

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 2: Orange Ave (NS) at Willow St (EW)

Control Type: Signalized
 Analysis Method: HCM 6th Edition
 Analysis Period: 15 minutes

Delay (sec / veh): 33.3
 Level Of Service: C
 Volume to Capacity (v/c): 0.743

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	↵↵↵			↵↵↵			↵↵↵			↵↵↵		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	175.00	100.00	100.00	125.00	100.00	100.00	235.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	51	460	101	73	500	67	89	1451	74	135	1077	81
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	19	34	0	16	17	5	3	22	8	0	29	8
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	71	503	103	90	527	73	94	1502	83	138	1128	91
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	18	126	26	23	132	18	24	376	21	35	282	23
Total Analysis Volume [veh/h]	71	503	103	90	527	73	94	1502	83	138	1128	91
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Unsigna	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	0	7	7	0	7	7	0	7	7	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	11	21	0	11	21	0	22	54	0	14	46	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	45	34	45	35	35	7	34	34	9	37	37
g / C, Green / Cycle	0.45	0.34	0.45	0.35	0.35	0.07	0.34	0.34	0.09	0.37	0.37
(v / s)_i Volume / Saturation Flow Rate	0.07	0.26	0.08	0.28	0.05	0.05	0.29	0.29	0.08	0.22	0.22
s, saturation flow rate [veh/h]	1058	1900	1082	1900	1615	1810	3618	1849	1810	3618	1828
c, Capacity [veh/h]	349	646	368	654	556	123	1233	630	170	1327	671
d1, Uniform Delay [s]	19.68	29.65	19.52	29.81	22.56	45.87	30.63	30.64	44.50	25.87	25.87
k, delay calibration	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.15	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.31	8.96	0.34	10.24	0.49	9.39	1.75	4.57	8.92	0.46	0.90
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.20	0.78	0.24	0.81	0.13	0.76	0.85	0.85	0.81	0.61	0.61
d, Delay for Lane Group [s/veh]	20.99	38.61	19.87	40.04	23.05	55.26	32.38	35.22	53.42	26.32	26.77
Lane Group LOS	C	D	B	D	C	E	C	D	D	C	C
Critical Lane Group	Yes	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.05	12.16	1.22	13.03	1.25	2.61	11.70	12.47	3.75	7.76	7.93
50th-Percentile Queue Length [ft/ln]	26.30	304.03	30.50	325.69	31.16	65.13	292.60	311.80	93.87	194.12	198.34
95th-Percentile Queue Length [veh/ln]	1.89	17.88	2.20	18.95	2.24	4.69	17.31	18.26	6.76	12.33	12.55
95th-Percentile Queue Length [ft/ln]	47.34	447.01	54.91	473.67	56.09	117.23	432.87	456.60	168.97	308.37	313.82

Movement, Approach, & Intersection Results

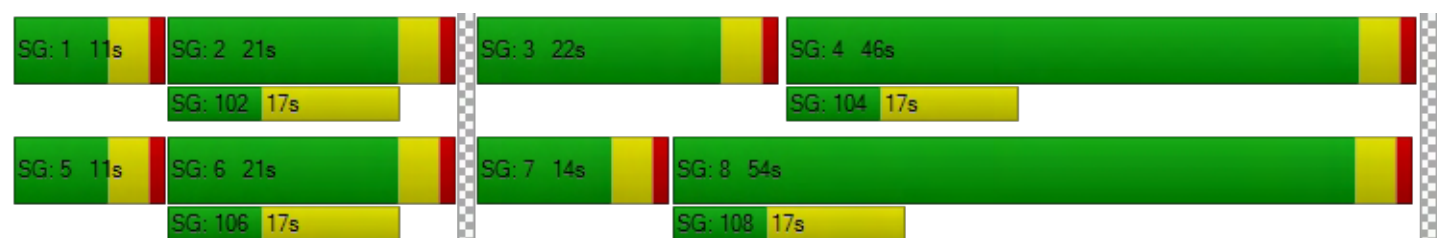
d_M, Delay for Movement [s/veh]	20.99	38.61	0.00	19.87	40.04	23.05	55.26	33.24	35.22	53.42	26.45	26.77
Movement LOS	C	D		B	D	C	E	C	D	D	C	C
d_A, Approach Delay [s/veh]	36.43			35.61			34.57			29.21		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	33.29											
Intersection LOS	C											
Intersection V/C	0.743											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	39.61			39.61			39.61			39.61		
I_p,int, Pedestrian LOS Score for Intersection	2.562			2.573			3.047			3.056		
Crosswalk LOS	B			B			C			C		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	340			340			1000			840		
d_b, Bicycle Delay [s]	34.45			34.45			12.50			16.82		
I_b,int, Bicycle LOS Score for Intersection	2.507			2.698			2.483			2.306		
Bicycle LOS	B			B			B			B		

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 4: Orange Ave (NS) at Hill St (EW)

Control Type: Signalized
 Analysis Method: HCM 6th Edition
 Analysis Period: 15 minutes

Delay (sec / veh): 98.5
 Level Of Service: F
 Volume to Capacity (v/c): 1.594

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	31	563	33	27	592	43	36	107	30	42	103	34
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	23	3	20	16	5	11	3	0	3	8	48
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	32	597	37	48	620	49	48	112	31	46	113	83
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	149	9	12	155	12	12	28	8	12	28	21
Total Analysis Volume [veh/h]	32	597	37	48	620	49	48	112	31	46	113	83
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	0	7	0	0	7	0	0	7	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	34	0	0	34	0	0	66	0	0	66	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	R	C	R
C, Cycle Length [s]	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	31	31	31	31	61	61	61	61
g / C, Green / Cycle	0.31	0.31	0.31	0.31	0.61	0.61	0.61	0.61
(v / s)_i Volume / Saturation Flow Rate	0.04	0.34	0.06	0.36	1.08	0.02	1.02	0.05
s, saturation flow rate [veh/h]	780	1881	806	1876	148	1615	156	1615
c, Capacity [veh/h]	74	607	76	605	135	965	140	965
d1, Uniform Delay [s]	49.99	33.86	49.98	33.86	32.95	8.27	33.35	8.55
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.50	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	17.42	48.64	33.26	68.73	134.15	0.01	117.88	0.04
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.43	1.04	0.63	1.10	1.18	0.03	1.14	0.09
d, Delay for Lane Group [s/veh]	67.41	82.50	83.24	102.60	167.10	8.28	151.23	8.59
Lane Group LOS	E	F	F	F	F	A	F	A
Critical Lane Group	No	No	No	Yes	Yes	No	No	No
50th-Percentile Queue Length [veh/ln]	1.15	22.73	1.90	26.05	7.05	0.26	6.70	0.71
50th-Percentile Queue Length [ft/ln]	28.85	568.15	47.51	651.15	176.37	6.43	167.44	17.82
95th-Percentile Queue Length [veh/ln]	2.08	31.43	3.42	36.69	12.64	0.46	11.87	1.28
95th-Percentile Queue Length [ft/ln]	51.93	785.85	85.52	917.17	315.98	11.58	296.64	32.07

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	67.41	82.50	82.50	83.24	102.60	102.60	167.10	167.10	8.28	151.23	151.23	8.59
Movement LOS	E	F	F	F	F	F	F	F	A	F	F	A
d_A, Approach Delay [s/veh]	81.78			101.30			141.32			102.31		
Approach LOS	F			F			F			F		
d_I, Intersection Delay [s/veh]	98.48											
Intersection LOS	F											
Intersection V/C	1.594											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	39.61			39.61			39.61			39.61		
I_p,int, Pedestrian LOS Score for Intersection	2.534			2.556			2.116			2.156		
Crosswalk LOS	B			B			B			B		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	600			600			1240			1240		
d_b, Bicycle Delay [s]	24.50			24.50			7.22			7.22		
I_b,int, Bicycle LOS Score for Intersection	2.659			2.743			1.875			1.959		
Bicycle LOS	B			B			A			A		

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report**Intersection 14: Cherry Ave (NS) at Spring St (EW)**

Control Type:
Analysis Method:
Analysis Period:

Signalized
HCM 6th Edition
15 minutes

Delay (sec / veh):
Level Of Service:
Volume to Capacity (v/c):

32.6
C
0.662

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	↵↵↵			↵↵↵			↵↵↵			↵↵↵↵		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Pocket Length [ft]	175.00	100.00	100.00	200.00	100.00	100.00	147.00	100.00	100.00	195.00	100.00	206.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	98	1170	144	228	1250	109	155	916	128	93	656	368
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	8	43	5	0	28	0	0	2	4	2	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	108	1236	152	233	1303	111	158	936	135	97	670	375
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	27	309	38	58	326	28	40	234	34	24	168	94
Total Analysis Volume [veh/h]	108	1236	152	233	1303	111	158	936	135	97	670	375
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	0	7	7	0	7	7	0	7	7	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	17	24	0	14	21	0	15	21	0	41	47	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	C	R
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	8	43	43	10	46	46	11	24	24	7	20	20	20
g / C, Green / Cycle	0.08	0.43	0.43	0.10	0.46	0.46	0.10	0.24	0.24	0.07	0.20	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.06	0.26	0.26	0.09	0.26	0.26	0.09	0.20	0.20	0.05	0.15	0.15	0.15
s, saturation flow rate [veh/h]	1810	3618	1795	2663	3618	1825	1810	3618	1780	1810	3618	1745	1615
c, Capacity [veh/h]	139	1559	774	268	1646	830	191	861	424	128	735	354	328
d1, Uniform Delay [s]	45.41	21.80	21.80	44.38	20.08	20.09	43.90	36.27	36.28	45.70	37.38	37.41	37.43
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11	0.11
l, Upstream Filtering 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	1.00
d2, Incremental Delay [s]	9.10	1.68	3.35	8.44	1.44	2.84	8.81	2.20	4.38	8.85	1.45	3.02	3.29
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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	1.00
PF, 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	1.00

Lane Group Results

X, volume / capacity	0.78	0.59	0.59	0.87	0.57	0.57	0.83	0.83	0.83	0.76	0.74	0.74	0.74
d, Delay for Lane Group [s/veh]	54.51	23.48	25.16	52.82	21.53	22.93	52.71	38.47	40.67	54.55	38.83	40.42	40.72
Lane Group LOS	D	C	C	D	C	C	D	D	D	D	D	D	D
Critical Lane Group	No	No	Yes	Yes	No	No	No	No	Yes	Yes	No	No	No
50th-Percentile Queue Length [veh/ln]	2.97	8.41	8.71	3.14	8.09	8.49	4.27	8.46	8.59	2.67	6.27	6.23	5.81
50th-Percentile Queue Length [ft/ln]	74.22	210.27	217.72	78.47	202.26	212.29	106.86	211.39	214.85	66.70	156.8	155.7	145.3
95th-Percentile Queue Length [veh/ln]	5.34	13.17	13.55	5.65	12.76	13.27	7.67	13.22	13.40	4.80	10.38	10.32	9.77
95th-Percentile Queue Length [ft/ln]	133.60	329.17	338.71	141.24	318.88	331.76	191.63	330.61	335.05	120.0	259.5	258.1	244.2

Movement, Approach, & Intersection Results

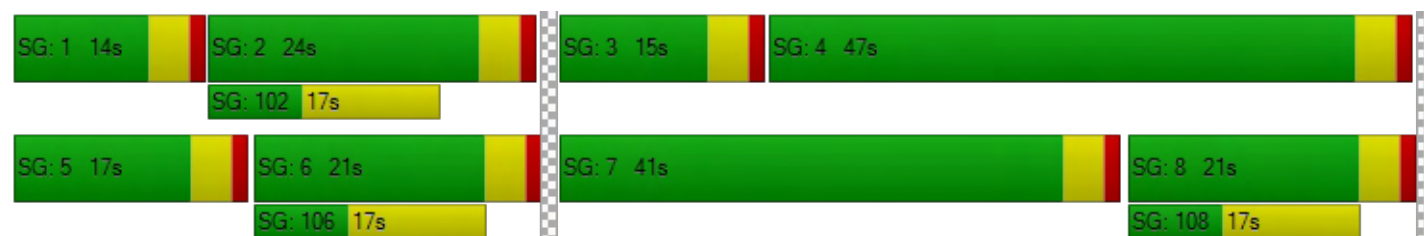
d_M, Delay for Movement [s/veh]	54.51	23.90	25.16	52.82	21.92	22.93	52.71	38.98	40.67	54.55	39.14	40.63
Movement LOS	D	C	C	D	C	C	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	26.24			26.36			40.93			40.93		
Approach LOS	C			C			D			D		
d_I, Intersection Delay [s/veh]	32.59											
Intersection LOS	C											
Intersection V/C	0.662											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			0.0			11.0			11.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	39.61			0.00			39.61			39.61		
I_p,int, Pedestrian LOS Score for Intersection	3.100			0.000			2.894			3.030		
Crosswalk LOS	C			F			C			C		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	400			340			340			860		
d_b, Bicycle Delay [s]	32.00			34.45			34.45			16.25		
I_b,int, Bicycle LOS Score for Intersection	2.382			2.465			2.236			2.188		
Bicycle LOS	B			B			B			B		

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report**Intersection 15: Cherry Ave (NS) at Willow St (EW)**

Control Type:
Analysis Method:
Analysis Period:

Signalized
HCM 6th Edition
15 minutes

Delay (sec / veh):
Level Of Service:
Volume to Capacity (v/c):

38.8
D
0.801

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	2	0	0	2	0	0
Pocket Length [ft]	170.00	100.00	100.00	175.00	100.00	100.00	247.00	100.00	100.00	205.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	166	835	219	303	980	183	211	1292	132	318	990	175
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	28	43	13	20	1	0	15	0	27	29	28
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	169	880	266	322	1020	188	215	1333	135	351	1039	207
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	42	220	67	81	255	47	54	333	34	88	260	52
Total Analysis Volume [veh/h]	169	880	266	322	1020	188	215	1333	135	351	1039	207
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	2	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups			2,7									
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	7	7	7	0	7	7	0	7	7	0
Maximum Green [s]	30	30	30	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	24	27	27	18	21	0	14	36	0	19	41	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	10	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No	No	No	No		No	No		No	No	
Maximum Recall	No	No	No	No	No		No	No		No	No	
Pedestrian Recall	No	No	No	No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	C	L	C	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	11	25	44	14	28	28	10	30	30	15	35	35
g / C, Green / Cycle	0.11	0.25	0.44	0.14	0.28	0.28	0.10	0.30	0.30	0.15	0.35	0.35
(v / s)_i Volume / Saturation Flow Rate	0.09	0.17	0.16	0.12	0.22	0.22	0.08	0.27	0.27	0.13	0.23	0.23
s, saturation flow rate [veh/h]	1810	5176	1615	2663	3618	1753	2663	3618	1812	2663	3618	1743
c, Capacity [veh/h]	205	1306	714	371	1007	488	266	1080	541	400	1261	608
d1, Uniform Delay [s]	43.40	33.72	18.64	42.18	33.65	33.66	44.14	33.77	33.79	41.66	27.68	27.68
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.34	0.11	0.11	0.19
l, Upstream Filtering 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
d2, Incremental Delay [s]	7.97	2.79	1.49	6.20	6.98	13.48	5.80	3.22	16.04	6.31	0.61	2.17
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, 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

Lane Group Results

X, volume / capacity	0.82	0.67	0.37	0.87	0.81	0.81	0.81	0.91	0.91	0.88	0.67	0.67
d, Delay for Lane Group [s/veh]	51.37	36.51	20.13	48.38	40.64	47.14	49.94	36.99	49.83	47.97	28.29	29.85
Lane Group LOS	D	D	C	D	D	D	D	D	D	D	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.51	6.66	4.32	4.17	9.99	10.56	2.80	11.60	13.57	4.54	8.43	8.40
50th-Percentile Queue Length [ft/ln]	112.82	166.58	107.89	104.36	249.82	264.12	70.11	290.12	339.20	113.62	210.82	209.89
95th-Percentile Queue Length [veh/ln]	8.00	10.90	7.72	7.51	15.18	15.90	5.05	17.19	19.61	8.04	13.20	13.15
95th-Percentile Queue Length [ft/ln]	199.92	272.42	193.06	187.84	379.43	397.38	126.20	429.79	490.22	201.02	329.88	328.68

Movement, Approach, & Intersection Results

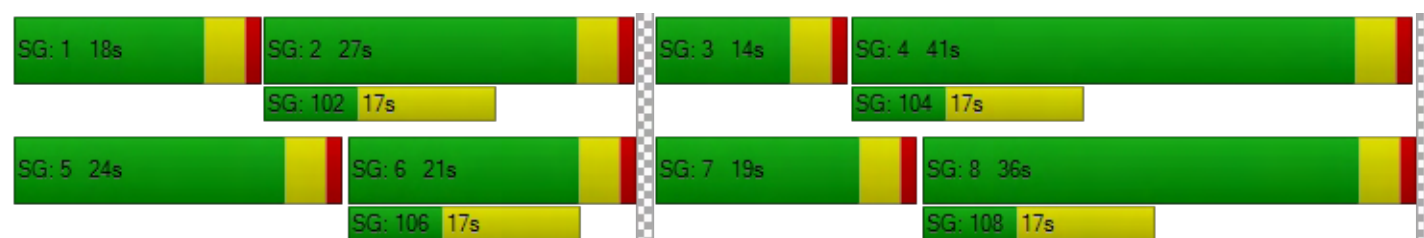
d_M, Delay for Movement [s/veh]	51.37	36.51	20.13	48.38	41.95	47.14	49.94	40.41	49.83	47.97	28.59	29.85
Movement LOS	D	D	C	D	D	D	D	D	D	D	C	C
d_A, Approach Delay [s/veh]	35.11			43.94			42.39			33.01		
Approach LOS	D			D			D			C		
d_I, Intersection Delay [s/veh]	38.77											
Intersection LOS	D											
Intersection V/C	0.801											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	39.61			39.61			39.61			39.61		
I_p,int, Pedestrian LOS Score for Intersection	3.074			3.075			3.106			3.159		
Crosswalk LOS	C			C			C			C		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	460			340			640			740		
d_b, Bicycle Delay [s]	29.65			34.45			23.12			19.85		
I_b,int, Bicycle LOS Score for Intersection	2.283			2.401			2.485			2.438		
Bicycle LOS	B			B			B			B		

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



General Plan Buildout (Year 2040) With Project

Intersection Level Of Service Report

Intersection 2: Orange Ave (NS) at Willow St (EW)

Control Type:	Signalized	Delay (sec / veh):	34.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.745

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	↵↵↵			↵↵↵			↵↵↵			↵↵↵		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	175.00	100.00	100.00	125.00	100.00	100.00	235.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	82	492	92	40	439	83	84	931	72	69	1128	62
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	5	12	0	8	36	2	4	30	21	0	16	13
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	105	612	112	57	572	103	106	1166	109	84	1392	89
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	26	153	28	14	143	26	27	292	27	21	348	22
Total Analysis Volume [veh/h]	105	612	112	57	572	103	106	1166	109	84	1392	89
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Unsigna	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	0	7	7	0	7	7	0	7	7	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	14	23	0	12	21	0	26	21	0	44	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	49	39	49	38	38	8	33	33	6	32	32
g / C, Green / Cycle	0.49	0.39	0.49	0.38	0.38	0.08	0.33	0.33	0.06	0.32	0.32
(v / s)_i Volume / Saturation Flow Rate	0.10	0.32	0.06	0.30	0.06	0.06	0.23	0.23	0.05	0.27	0.27
s, saturation flow rate [veh/h]	1025	1900	979	1900	1615	1810	3618	1818	1810	3618	1842
c, Capacity [veh/h]	369	737	335	718	610	138	1198	602	116	1156	588
d1, Uniform Delay [s]	18.49	27.66	18.58	27.74	20.71	45.41	29.26	29.26	45.98	31.82	31.83
k, delay calibration	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.13
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.93	10.48	0.24	8.97	0.60	8.77	0.78	1.55	8.20	1.84	4.26
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.28	0.83	0.17	0.80	0.17	0.77	0.71	0.71	0.72	0.85	0.85
d, Delay for Lane Group [s/veh]	20.42	38.14	18.82	36.72	21.31	54.18	30.04	30.81	54.19	33.67	36.09
Lane Group LOS	C	D	B	D	C	D	C	C	D	C	D
Critical Lane Group	No	Yes	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	1.47	14.87	0.69	13.56	1.68	2.90	8.84	9.02	2.30	11.10	11.70
50th-Percentile Queue Length [ft/ln]	36.76	371.68	17.35	338.96	42.09	72.60	221.03	225.40	57.58	277.43	292.48
95th-Percentile Queue Length [veh/ln]	2.65	21.19	1.25	19.60	3.03	5.23	13.72	13.94	4.15	16.56	17.31
95th-Percentile Queue Length [ft/ln]	66.17	529.77	31.23	489.92	75.76	130.67	342.95	348.51	103.65	414.02	432.71

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	20.42	38.14	0.00	18.82	36.72	21.31	54.18	30.25	30.81	54.19	34.38	36.09
Movement LOS	C	D		B	D	C	D	C	C	D	C	D
d_A, Approach Delay [s/veh]	35.54			33.16			32.13			35.54		
Approach LOS	D			C			C			D		
d_I, Intersection Delay [s/veh]	34.07											
Intersection LOS	C											
Intersection V/C	0.745											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	39.61			39.61			39.61			39.61		
I_p,int, Pedestrian LOS Score for Intersection	2.594			2.605			3.074			3.020		
Crosswalk LOS	B			B			C			C		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	380			340			340			700		
d_b, Bicycle Delay [s]	32.81			34.45			34.45			21.13		
I_b,int, Bicycle LOS Score for Intersection	2.743			2.767			2.319			2.420		
Bicycle LOS	B			C			B			B		

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 4: Orange Ave (NS) at Hill St (EW)

Control Type: Signalized
 Analysis Method: HCM 6th Edition
 Analysis Period: 15 minutes

Delay (sec / veh): 469.8
 Level Of Service: F
 Volume to Capacity (v/c): 4.414

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	40	667	22	28	526	25	78	90	38	47	124	57
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	15	3	54	19	9	6	9	0	4	2	13
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	49	829	30	88	661	40	101	119	46	61	153	83
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	207	8	22	165	10	25	30	12	15	38	21
Total Analysis Volume [veh/h]	49	829	30	88	661	40	101	119	46	61	153	83
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	0	7	0	0	7	0	0	7	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	24	0	0	24	0	0	76	0	0	76	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	R	C	R
C, Cycle Length [s]	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	20	20	20	20	72	72	72	72
g / C, Green / Cycle	0.20	0.20	0.20	0.20	0.72	0.72	0.72	0.72
(v / s)_i Volume / Saturation Flow Rate	0.06	0.45	0.13	0.37	3.52	0.03	1.61	0.05
s, saturation flow rate [veh/h]	757	1888	653	1881	63	1615	133	1615
c, Capacity [veh/h]	72	380	72	378	97	1161	142	1161
d1, Uniform Delay [s]	50.00	39.95	50.00	39.95	32.99	4.06	37.46	4.16
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.50	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	41.28	576.62	177.40	394.25	596.84	0.01	262.09	0.03
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.68	2.26	1.22	1.85	2.26	0.04	1.51	0.07
d, Delay for Lane Group [s/veh]	91.28	616.57	227.40	434.20	629.82	4.08	299.55	4.19
Lane Group LOS	F	F	F	F	F	A	F	A
Critical Lane Group	No	Yes	No	No	Yes	No	No	No
50th-Percentile Queue Length [veh/ln]	2.05	69.99	5.34	50.56	17.12	0.24	12.53	0.44
50th-Percentile Queue Length [ft/ln]	51.15	1749.66	133.53	1263.99	427.88	5.92	313.30	10.94
95th-Percentile Queue Length [veh/ln]	3.68	109.31	9.61	78.68	30.81	0.43	22.56	0.79
95th-Percentile Queue Length [ft/ln]	92.07	2732.63	240.35	1966.93	770.18	10.66	563.94	19.70

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	91.28	616.57	616.57	227.40	434.20	434.20	629.82	629.82	4.08	299.55	299.55	4.19
Movement LOS	F	F	F	F	F	F	F	F	A	F	F	A
d_A, Approach Delay [s/veh]	588.22			411.13			521.61			217.00		
Approach LOS	F			F			F			F		
d_I, Intersection Delay [s/veh]	469.77											
Intersection LOS	F											
Intersection V/C	4.414											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	39.61			39.61			39.61			39.61		
I_p,int, Pedestrian LOS Score for Intersection	2.631			2.719			2.180			2.244		
Crosswalk LOS	B			B			B			B		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	400			400			1440			1440		
d_b, Bicycle Delay [s]	32.00			32.00			3.92			3.92		
I_b,int, Bicycle LOS Score for Intersection	3.058			2.861			1.999			2.050		
Bicycle LOS	C			C			A			B		

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 14: Cherry Ave (NS) at Spring St (EW)

Control Type:	Signalized	Delay (sec / veh):	39.5
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.821

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	↵↵↵			↵↵↵			↵↵↵			↵↵↵↵		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Pocket Length [ft]	175.00	100.00	100.00	200.00	100.00	100.00	147.00	100.00	100.00	195.00	100.00	206.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	86	1069	170	281	1098	137	120	544	75	105	1052	358
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	21	1	0	46	0	0	1	8	5	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	107	1325	208	343	1386	167	146	665	100	133	1284	437
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	27	331	52	86	347	42	37	166	25	33	321	109
Total Analysis Volume [veh/h]	107	1325	208	343	1386	167	146	665	100	133	1284	437
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	0	7	7	0	7	7	0	7	7	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	33	36	0	18	21	0	14	21	0	25	32	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	C	R
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	8	33	33	14	40	40	10	28	28	9	27	27	27
g / C, Green / Cycle	0.08	0.33	0.33	0.14	0.40	0.40	0.10	0.28	0.28	0.09	0.27	0.27	0.27
(v / s)_i Volume / Saturation Flow Rate	0.06	0.28	0.28	0.13	0.29	0.29	0.08	0.14	0.14	0.07	0.24	0.24	0.24
s, saturation flow rate [veh/h]	1810	3618	1771	2663	3618	1798	1810	3618	1776	1810	3618	1869	1615
c, Capacity [veh/h]	138	1203	589	373	1434	712	177	996	489	167	975	504	435
d1, Uniform Delay [s]	45.36	31.15	31.17	42.46	25.55	25.60	44.28	30.61	30.66	44.51	35.22	35.23	35.34
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.31	0.32
l, Upstream Filtering 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	1.00
d2, Incremental Delay [s]	8.84	7.89	14.81	9.35	3.19	6.37	9.16	0.41	0.85	8.41	3.25	14.75	17.83
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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	1.00
PF, 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	1.00

Lane Group Results

X, volume / capacity	0.77	0.86	0.86	0.92	0.72	0.73	0.82	0.51	0.52	0.80	0.90	0.90	0.91
d, Delay for Lane Group [s/veh]	54.20	39.04	45.97	51.81	28.74	31.97	53.44	31.02	31.51	52.92	38.47	49.98	53.17
Lane Group LOS	D	D	D	D	C	C	D	C	C	D	D	D	D
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	2.93	12.59	13.48	4.62	10.73	11.36	3.97	5.19	5.21	3.60	10.46	12.44	11.24
50th-Percentile Queue Length [ft/ln]	73.28	314.77	336.90	115.52	268.15	283.92	99.37	129.72	130.25	89.95	261.6	310.9	280.9
95th-Percentile Queue Length [veh/ln]	5.28	18.41	19.50	8.15	16.10	16.88	7.15	8.92	8.95	6.48	15.77	18.22	16.73
95th-Percentile Queue Length [ft/ln]	131.90	460.25	487.41	203.66	402.43	422.09	178.87	223.11	223.84	161.9	394.2	455.5	418.3

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	54.20	40.59	45.97	51.81	29.56	31.97	53.44	31.14	31.51	52.92	42.14	53.12
Movement LOS	D	D	D	D	C	C	D	C	C	D	D	D
d_A, Approach Delay [s/veh]	42.16			33.79			34.75			45.44		
Approach LOS	D			C			C			D		
d_I, Intersection Delay [s/veh]	39.54											
Intersection LOS	D											
Intersection V/C	0.821											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	0.00	39.61	39.61
I_p,int, Pedestrian LOS Score for Intersection	3.127	0.000	2.943	3.104
Crosswalk LOS	C	F	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	640	340	340	560
d_b, Bicycle Delay [s]	23.12	34.45	34.45	25.92
I_b,int, Bicycle LOS Score for Intersection	2.462	2.602	2.061	2.579
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report**Intersection 15: Cherry Ave (NS) at Willow St (EW)**

Control Type:
Analysis Method:
Analysis Period:

Signalized
HCM 6th Edition
15 minutes

Delay (sec / veh):
Level Of Service:
Volume to Capacity (v/c):

38.2
D
0.767

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	2	0	0	2	0	0
Pocket Length [ft]	170.00	100.00	100.00	175.00	100.00	100.00	247.00	100.00	100.00	205.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	167	1031	161	149	765	147	177	836	85	231	1124	116
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	15	24	28	31	0	1	28	0	51	10	8
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	204	1273	220	210	964	179	217	1048	104	333	1381	150
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	51	318	55	53	241	45	54	262	26	83	345	38
Total Analysis Volume [veh/h]	204	1273	220	210	964	179	217	1048	104	333	1381	150
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	2	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups			2,7									
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	7	7	7	0	7	7	0	7	7	0
Maximum Green [s]	30	30	30	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	28	35	35	14	21	0	14	33	0	18	37	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	10	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No	No	No	No		No	No		No	No	
Maximum Recall	No	No	No	No	No		No	No		No	No	
Pedestrian Recall	No	No	No	No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	C	L	C	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	13	33	51	10	30	30	10	27	27	14	31	31
g / C, Green / Cycle	0.13	0.33	0.51	0.10	0.30	0.30	0.10	0.27	0.27	0.14	0.31	0.31
(v / s)_i Volume / Saturation Flow Rate	0.11	0.25	0.14	0.08	0.21	0.21	0.08	0.21	0.21	0.13	0.28	0.28
s, saturation flow rate [veh/h]	1810	5176	1615	2663	3618	1752	2663	3618	1813	2663	3618	1806
c, Capacity [veh/h]	242	1717	827	261	1071	519	268	976	489	374	1121	560
d1, Uniform Delay [s]	42.33	29.65	13.79	44.22	31.53	31.53	44.11	33.88	33.88	42.28	33.21	33.26
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.24	0.11	0.11	0.35
l, Upstream Filtering 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
d2, Incremental Delay [s]	7.71	2.93	0.79	5.73	4.17	8.35	5.84	1.44	6.01	7.35	3.24	16.74
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, 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

Lane Group Results

X, volume / capacity	0.84	0.74	0.27	0.80	0.72	0.72	0.81	0.79	0.79	0.89	0.91	0.91
d, Delay for Lane Group [s/veh]	50.04	32.57	14.58	49.95	35.69	39.88	49.95	35.32	39.89	49.63	36.45	50.00
Lane Group LOS	D	C	B	D	D	D	D	D	D	D	D	D
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	5.39	9.30	2.90	2.74	8.78	9.11	2.83	8.66	9.31	4.38	12.06	14.21
50th-Percentile Queue Length [ft/ln]	134.85	232.44	72.56	68.46	219.57	227.80	70.78	216.58	232.74	109.52	301.52	355.15
95th-Percentile Queue Length [veh/ln]	9.20	14.30	5.22	4.93	13.64	14.06	5.10	13.49	14.31	7.81	17.76	20.39
95th-Percentile Queue Length [ft/ln]	230.08	357.46	130.60	123.23	341.08	351.56	127.41	337.26	357.83	195.34	443.91	509.69

Movement, Approach, & Intersection Results

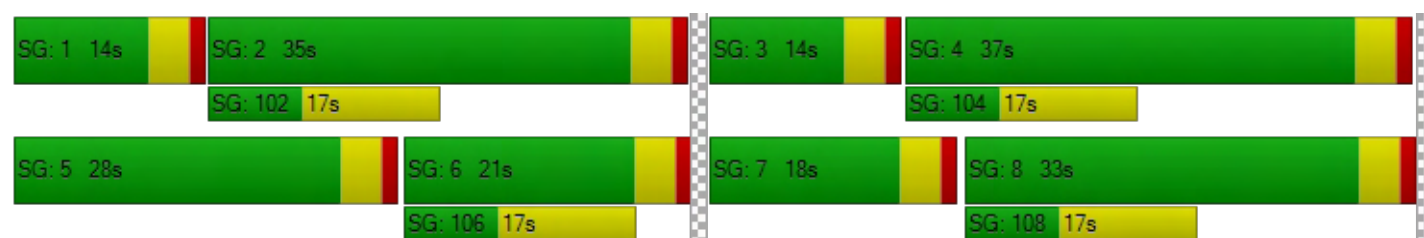
d_M, Delay for Movement [s/veh]	50.04	32.57	14.58	49.95	36.53	39.88	49.95	36.54	39.89	49.63	40.00	50.00
Movement LOS	D	C	B	D	D	D	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	32.34			39.06			38.92			42.52		
Approach LOS	C			D			D			D		
d_I, Intersection Delay [s/veh]	38.24											
Intersection LOS	D											
Intersection V/C	0.767											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	39.61			39.61			39.61			39.61		
I_p,int, Pedestrian LOS Score for Intersection	3.108			3.095			3.112			3.138		
Crosswalk LOS	C			C			C			C		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	620			340			580			660		
d_b, Bicycle Delay [s]	23.81			34.45			25.21			22.45		
I_b,int, Bicycle LOS Score for Intersection	2.493			2.304			2.313			2.585		
Bicycle LOS	B			B			B			B		

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 4: Orange Ave (NS) at Hill St (EW)

Control Type:	Signalized	Delay (sec / veh):	377.9
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	3.533

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	49	564	41	25	553	39	58	77	41	61	130	45
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	23	3	20	16	5	11	3	0	3	8	48
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	60	711	53	51	691	53	82	97	50	77	167	103
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	15	178	13	13	173	13	21	24	13	19	42	26
Total Analysis Volume [veh/h]	60	711	53	51	691	53	82	97	50	77	167	103
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	0	7	0	0	7	0	0	7	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	26	0	0	26	0	0	74	0	0	74	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	R	C	R
C, Cycle Length [s]	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	22	22	22	22	70	70	70	70
g / C, Green / Cycle	0.22	0.22	0.22	0.22	0.70	0.70	0.70	0.70
(v / s)_i Volume / Saturation Flow Rate	0.08	0.41	0.07	0.40	2.77	0.03	2.06	0.06
s, saturation flow rate [veh/h]	728	1877	714	1876	65	1615	118	1615
c, Capacity [veh/h]	72	416	72	416	98	1128	130	1128
d1, Uniform Delay [s]	50.00	38.93	50.00	38.93	31.92	4.69	36.01	4.85
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.50	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	66.23	386.33	45.11	365.22	412.34	0.02	422.74	0.03
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.83	1.84	0.71	1.79	1.83	0.04	1.88	0.09
d, Delay for Lane Group [s/veh]	116.23	425.25	95.11	404.15	444.26	4.71	458.75	4.89
Lane Group LOS	F	F	F	F	F	A	F	A
Critical Lane Group	No	Yes	No	No	Yes	No	No	No
50th-Percentile Queue Length [veh/ln]	2.82	54.63	2.17	52.17	12.13	0.29	17.15	0.61
50th-Percentile Queue Length [ft/ln]	70.47	1365.67	54.31	1304.33	303.29	7.18	428.67	15.31
95th-Percentile Queue Length [veh/ln]	5.07	84.97	3.91	81.02	21.84	0.52	30.86	1.10
95th-Percentile Queue Length [ft/ln]	126.85	2124.26	97.75	2025.57	545.93	12.92	771.60	27.57

Movement, Approach, & Intersection Results

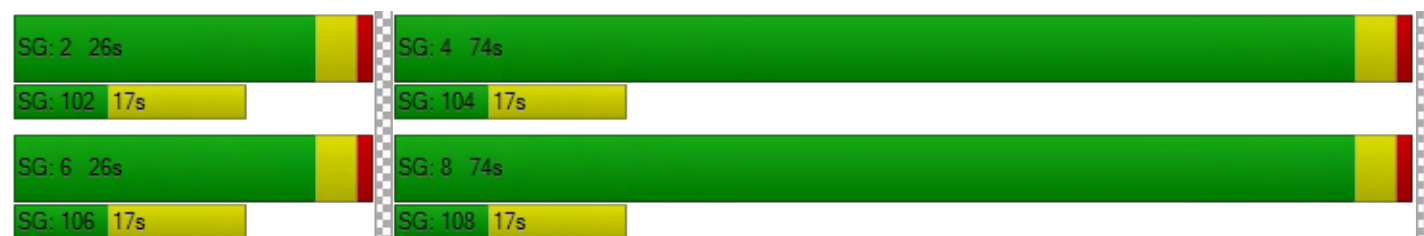
d_M, Delay for Movement [s/veh]	116.23	425.25	425.25	95.11	404.15	404.15	444.26	444.26	4.71	458.75	458.75	4.89
Movement LOS	F	F	F	F	F	F	F	F	A	F	F	A
d_A, Approach Delay [s/veh]	402.75			384.32			348.29			324.03		
Approach LOS	F			F			F			F		
d_I, Intersection Delay [s/veh]	377.95											
Intersection LOS	F											
Intersection V/C	3.533											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	39.61	39.61
I_p,int, Pedestrian LOS Score for Intersection	2.646	2.665	2.196	2.196
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	440	440	1400	1400
d_b, Bicycle Delay [s]	30.42	30.42	4.50	4.50
I_b,int, Bicycle LOS Score for Intersection	2.919	2.871	1.937	2.132
Bicycle LOS	C	C	A	B

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 2: Orange Ave (NS) at Willow St (EW)

Control Type:	Signalized	Delay (sec / veh):	46.8
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.885

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	↵↵↵			↵↵↵			↵↵↵			↵↵↵		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	175.00	100.00	100.00	125.00	100.00	100.00	235.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	51	460	101	73	500	67	89	1451	74	135	1077	81
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	19	34	0	16	17	5	3	22	8	0	29	8
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	81	595	123	105	627	87	112	1792	98	165	1343	107
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	20	149	31	26	157	22	28	448	25	41	336	27
Total Analysis Volume [veh/h]	81	595	123	105	627	87	112	1792	98	165	1343	107
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Unsigna	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	0	7	7	0	7	7	0	7	7	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	26	36	0	11	21	0	12	39	0	14	41	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	43	32	43	33	33	8	35	35	10	37	37
g / C, Green / Cycle	0.43	0.32	0.43	0.33	0.33	0.08	0.35	0.35	0.10	0.37	0.37
(v / s)_i Volume / Saturation Flow Rate	0.08	0.31	0.10	0.33	0.05	0.06	0.35	0.35	0.09	0.27	0.27
s, saturation flow rate [veh/h]	1003	1900	1030	1900	1615	1810	3618	1850	1810	3618	1829
c, Capacity [veh/h]	277	618	299	624	531	140	1261	645	181	1343	679
d1, Uniform Delay [s]	22.74	33.17	22.42	33.57	23.82	45.37	32.42	32.48	44.56	26.95	26.95
k, delay calibration	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.45	0.11	0.11	0.25
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.67	28.24	0.70	37.02	0.66	9.97	9.79	32.26	15.78	0.73	3.26
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.29	0.96	0.35	1.00	0.16	0.80	0.99	0.99	0.91	0.72	0.72
d, Delay for Lane Group [s/veh]	25.41	61.40	23.12	70.59	24.49	55.34	42.21	64.74	60.35	27.68	30.21
Lane Group LOS	C	E	C	F	C	E	D	E	E	C	C
Critical Lane Group	Yes	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.30	18.60	1.50	21.10	1.55	3.10	16.21	20.68	4.81	9.69	10.28
50th-Percentile Queue Length [ft/ln]	32.54	465.07	37.49	527.53	38.73	77.59	405.16	517.11	120.24	242.30	257.06
95th-Percentile Queue Length [veh/ln]	2.34	25.68	2.70	28.71	2.79	5.59	22.81	28.14	8.41	14.80	15.54
95th-Percentile Queue Length [ft/ln]	58.58	641.90	67.47	717.87	69.71	139.67	570.22	703.58	210.15	369.94	388.54

Movement, Approach, & Intersection Results

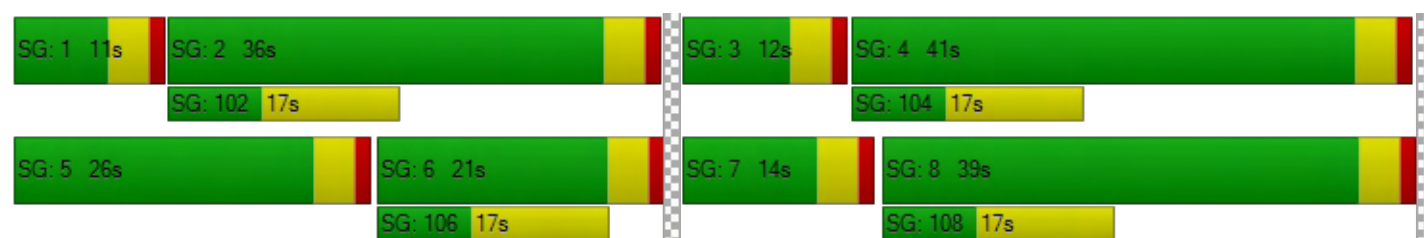
d_M, Delay for Movement [s/veh]	25.41	61.40	0.00	23.12	70.59	24.49	55.34	49.04	64.74	60.35	28.39	30.21
Movement LOS	C	E		C	F	C	E	D	E	E	C	C
d_A, Approach Delay [s/veh]	57.09			59.61			50.16			31.78		
Approach LOS	E			E			D			C		
d_I, Intersection Delay [s/veh]	46.78											
Intersection LOS	D											
Intersection V/C	0.885											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	39.61			39.61			39.61			39.61		
I_p,int, Pedestrian LOS Score for Intersection	2.610			2.623			3.128			3.139		
Crosswalk LOS	B			B			C			C		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	640			340			700			740		
d_b, Bicycle Delay [s]	23.12			34.45			21.13			19.85		
I_b,int, Bicycle LOS Score for Intersection	2.675			2.911			2.661			2.448		
Bicycle LOS	B			C			B			B		

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Orange Ave (NS) at Hill St (EW)

Control Type: Signalized
 Analysis Method: HCM 6th Edition
 Analysis Period: 15 minutes

Delay (sec / veh): 182.9
 Level Of Service: F
 Volume to Capacity (v/c): 1.850

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	31	563	33	27	592	43	36	107	30	42	103	34
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	23	3	20	16	5	11	3	0	3	8	48
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	38	710	43	53	738	57	55	134	37	54	134	89
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	178	11	13	185	14	14	34	9	14	34	22
Total Analysis Volume [veh/h]	38	710	43	53	738	57	55	134	37	54	134	89
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	0	7	0	0	7	0	0	7	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	35	0	0	35	0	0	65	0	0	65	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	R	C	R
C, Cycle Length [s]	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	31	31	31	31	61	61	61	61
g / C, Green / Cycle	0.31	0.31	0.31	0.31	0.61	0.61	0.61	0.61
(v / s)_i Volume / Saturation Flow Rate	0.05	0.40	0.07	0.42	1.24	0.02	1.21	0.06
s, saturation flow rate [veh/h]	694	1881	721	1876	152	1615	155	1615
c, Capacity [veh/h]	72	587	72	585	139	982	141	982
d1, Uniform Delay [s]	50.00	34.41	50.00	34.41	33.65	7.86	33.79	8.12
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.50	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	24.98	140.33	49.19	172.39	201.01	0.02	191.72	0.04
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.53	1.28	0.74	1.36	1.36	0.04	1.34	0.09
d, Delay for Lane Group [s/veh]	74.98	174.74	99.19	206.80	234.67	7.87	225.51	8.16
Lane Group LOS	E	F	F	F	F	A	F	A
Critical Lane Group	No	No	No	Yes	Yes	No	No	No
50th-Percentile Queue Length [veh/ln]	1.45	36.72	2.30	41.84	9.90	0.31	9.67	0.76
50th-Percentile Queue Length [ft/ln]	36.14	918.02	57.59	1045.94	247.50	7.66	241.69	19.05
95th-Percentile Queue Length [veh/ln]	2.60	53.97	4.15	62.29	17.82	0.55	17.40	1.37
95th-Percentile Queue Length [ft/ln]	65.06	1349.17	103.67	1557.26	445.50	13.78	435.04	34.28

Movement, Approach, & Intersection Results

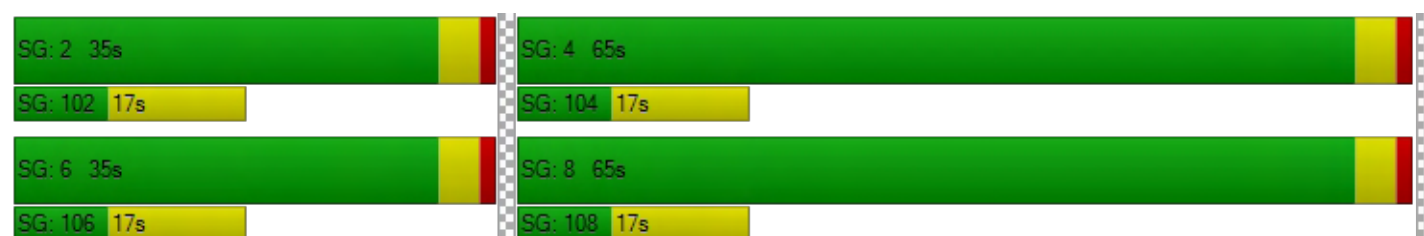
d_M, Delay for Movement [s/veh]	74.98	174.74	174.74	99.19	206.80	206.80	234.67	234.67	7.87	225.51	225.51	8.16
Movement LOS	E	F	F	F	F	F	F	F	A	F	F	A
d_A, Approach Delay [s/veh]	169.95			200.07			197.54			155.68		
Approach LOS	F			F			F			F		
d_I, Intersection Delay [s/veh]	182.94											
Intersection LOS	F											
Intersection V/C	1.850											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	39.61			39.61			39.61			39.61		
I_p,int, Pedestrian LOS Score for Intersection	2.608			2.629			2.147			2.185		
Crosswalk LOS	B			B			B			B		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	620			620			1220			1220		
d_b, Bicycle Delay [s]	23.81			23.81			7.61			7.61		
I_b,int, Bicycle LOS Score for Intersection	2.865			2.959			1.933			2.017		
Bicycle LOS	C			C			A			B		

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 5: Orange Ave (NS) at Pacific Coast Hwy (EW)

Control Type:	Signalized	Delay (sec / veh):	27.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.755

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	1	1	0	0	1	0	0
Pocket Length [ft]	145.00	100.00	192.00	100.00	100.00	100.00	150.00	100.00	100.00	300.00	100.00	100.00
Speed [mph]	35.00			30.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	73	495	277	80	499	97	84	1383	105	183	879	79
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	8	2	0	6	13	18	22	0	7	50	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	89	612	340	98	615	131	120	1709	128	230	1122	96
Peak Hour Factor	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	23	157	87	25	158	34	31	438	33	59	287	25
Total Analysis Volume [veh/h]	91	627	348	100	630	134	123	1751	131	236	1150	98
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - Coordination Group
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	2	2	0	6	0	3	8	0	7	4	0
Auxiliary Signal Groups			2,7									
Lead / Lag	-	-	-	-	-	-	Lag	-	-	Lead	-	-
Minimum Green [s]	0	7	7	0	7	0	7	7	0	7	7	0
Maximum Green [s]	0	30	30	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	31	31	0	31	0	13	41	0	18	46	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	20	0	17	0	0	20	0	0	15	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No	No		No		No	No		No	No	
Maximum Recall		No	No		No		No	No		No	No	
Pedestrian Recall		No	No		No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	27	27	45	27	27	27	8	37	37	14	43	43
g / C, Green / Cycle	0.30	0.30	0.50	0.30	0.30	0.30	0.09	0.41	0.41	0.16	0.48	0.48
(v / s)_i Volume / Saturation Flow Rate	0.11	0.17	0.22	0.12	0.17	0.08	0.07	0.34	0.35	0.13	0.23	0.23
s, saturation flow rate [veh/h]	809	3618	1615	811	3618	1615	1810	3618	1833	1810	3618	1825
c, Capacity [veh/h]	185	1085	806	186	1085	484	157	1490	755	280	1737	876
d1, Uniform Delay [s]	38.42	26.70	14.39	38.82	26.73	24.07	40.32	23.78	23.84	36.99	15.79	15.79
k, delay calibration	0.11	0.11	0.19	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
l, Upstream Filtering 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
d2, Incremental Delay [s]	2.02	0.49	0.65	2.40	0.49	0.31	8.31	5.75	10.93	6.73	0.94	1.86
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, 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

Lane Group Results

X, volume / capacity	0.49	0.58	0.43	0.54	0.58	0.28	0.78	0.84	0.84	0.84	0.48	0.48
d, Delay for Lane Group [s/veh]	40.43	27.19	15.04	41.22	27.23	24.38	48.62	29.52	34.77	43.73	16.74	17.66
Lane Group LOS	D	C	B	D	C	C	D	C	C	D	B	B
Critical Lane Group	No	No	Yes	No	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.02	5.53	4.32	2.28	5.65	2.18	2.97	12.23	13.57	5.42	5.54	5.81
50th-Percentile Queue Length [ft/ln]	50.40	138.36	107.96	56.88	141.33	54.46	74.22	305.79	339.25	135.39	138.54	145.35
95th-Percentile Queue Length [veh/ln]	3.63	9.39	7.73	4.10	9.55	3.92	5.34	17.97	19.61	9.23	9.40	9.77
95th-Percentile Queue Length [ft/ln]	90.73	234.81	193.16	102.38	238.81	98.03	133.60	449.19	490.28	230.81	235.05	244.21

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	40.43	27.19	15.04	41.22	27.23	24.38	48.62	31.03	34.77	43.73	16.99	17.66
Movement LOS	D	C	B	D	C	C	D	C	C	D	B	B
d_A, Approach Delay [s/veh]	24.36			28.40			32.36			21.29		
Approach LOS	C			C			C			C		
d_I, Intersection Delay [s/veh]	27.12											
Intersection LOS	C											
Intersection V/C	0.755											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	34.67			34.67			34.67			34.67		
I_p,int, Pedestrian LOS Score for Intersection	2.843			2.731			3.272			3.334		
Crosswalk LOS	C			B			C			C		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	600			600			822			933		
d_b, Bicycle Delay [s]	22.05			22.05			15.61			12.80		
I_b,int, Bicycle LOS Score for Intersection	2.439			2.272			2.662			2.376		
Bicycle LOS	B			B			B			B		

Sequence

Ring 1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 12: Walnut Ave (NS) at Pacific Coast Hwy (EW)

Control Type:	Signalized	Delay (sec / veh):	15.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.754

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			↵			↵		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	130.00	100.00	100.00	177.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	25	106	29	51	134	84	107	1682	54	58	1030	61
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	6	0	27	4	40	14	10	0	0	17	11
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	31	135	35	89	167	142	145	2062	66	71	1274	85
Peak Hour Factor	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	35	9	23	44	37	38	541	17	19	335	22
Total Analysis Volume [veh/h]	33	142	37	93	175	149	152	2166	69	75	1338	89
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - Coordination Group
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	44.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	0	7	0	0	7	0	0	7	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	34	0	0	34	0	0	56	0	0	56	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	6	0	0	6	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	25	25	57	57	57	57	57	57
g / C, Green / Cycle	0.28	0.28	0.64	0.64	0.64	0.64	0.64	0.64
(v / s)_i Volume / Saturation Flow Rate	0.13	0.26	0.40	0.41	0.41	0.43	0.26	0.26
s, saturation flow rate [veh/h]	1616	1635	381	3618	1870	174	3618	1840
c, Capacity [veh/h]	491	499	265	2300	1189	143	2300	1170
d1, Uniform Delay [s]	26.69	31.50	19.83	10.04	10.08	31.23	8.07	8.07
k, delay calibration	0.11	0.28	0.50	0.50	0.50	0.50	0.50	0.50
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.60	9.10	8.74	1.37	2.68	13.06	0.55	1.07
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.43	0.84	0.57	0.64	0.64	0.52	0.41	0.41
d, Delay for Lane Group [s/veh]	27.29	40.60	28.57	11.41	12.77	44.29	8.62	9.14
Lane Group LOS	C	D	C	B	B	D	A	A
Critical Lane Group	No	Yes	No	No	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.73	9.76	3.17	8.14	8.94	2.18	4.16	4.40
50th-Percentile Queue Length [ft/ln]	93.21	244.04	79.20	203.55	223.42	54.42	103.95	110.00
95th-Percentile Queue Length [veh/ln]	6.71	14.89	5.70	12.82	13.84	3.92	7.48	7.84
95th-Percentile Queue Length [ft/ln]	167.77	372.14	142.57	320.54	345.98	97.96	187.11	196.01

Movement, Approach, & Intersection Results

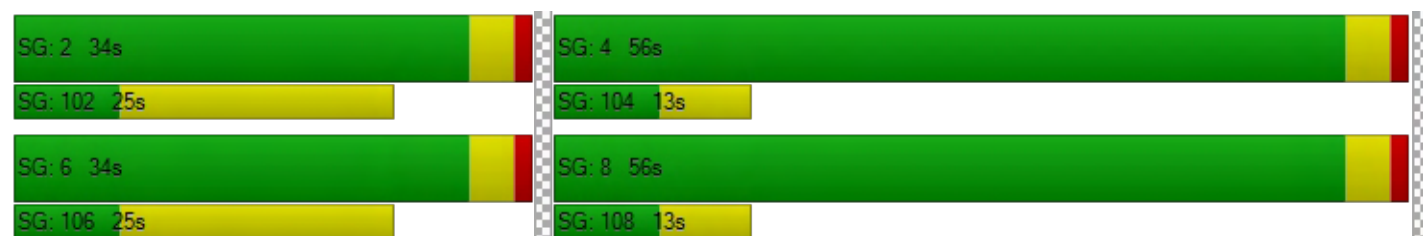
d_M, Delay for Movement [s/veh]	27.29	27.29	27.29	40.60	40.60	40.60	28.57	11.85	12.77	44.29	8.77	9.14
Movement LOS	C	C	C	D	D	D	C	B	B	D	A	A
d_A, Approach Delay [s/veh]	27.29			40.60			12.94			10.57		
Approach LOS	C			D			B			B		
d_I, Intersection Delay [s/veh]	15.38											
Intersection LOS	B											
Intersection V/C	0.754											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	34.67			34.67			34.67			34.67		
I_p,int, Pedestrian LOS Score for Intersection	2.080			2.416			3.185			3.255		
Crosswalk LOS	B			B			C			C		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	667			667			1156			1156		
d_b, Bicycle Delay [s]	20.00			20.00			8.02			8.02		
I_b,int, Bicycle LOS Score for Intersection	1.909			2.248			2.872			2.386		
Bicycle LOS	A			B			C			B		

Sequence

Ring 1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 14: Cherry Ave (NS) at Spring St (EW)

Control Type:	Signalized	Delay (sec / veh):	38.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.789

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	1
Pocket Length [ft]	175.00	100.00	100.00	200.00	100.00	100.00	147.00	100.00	100.00	195.00	100.00	206.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	98	1170	144	228	1250	109	155	916	128	93	656	368
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	8	43	5	0	28	0	0	2	4	2	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	128	1470	181	278	1553	133	189	1120	160	115	801	449
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	32	368	45	70	388	33	47	280	40	29	200	112
Total Analysis Volume [veh/h]	128	1470	181	278	1553	133	189	1120	160	115	801	449
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	0	7	7	0	7	7	0	7	7	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	19	24	0	16	21	0	16	21	0	39	44	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	C	L	C	C	R
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	9	36	36	12	39	39	12	28	28	8	24	24	24
g / C, Green / Cycle	0.09	0.36	0.36	0.12	0.39	0.39	0.12	0.28	0.28	0.08	0.24	0.24	0.24
(v / s)_i Volume / Saturation Flow Rate	0.07	0.30	0.31	0.10	0.31	0.31	0.10	0.24	0.24	0.06	0.18	0.18	0.18
s, saturation flow rate [veh/h]	1810	3618	1795	2663	3618	1824	1810	3618	1781	1810	3618	1743	1615
c, Capacity [veh/h]	161	1293	642	321	1407	710	218	1013	499	149	874	421	390
d1, Uniform Delay [s]	44.72	29.73	29.77	43.24	27.06	27.12	43.24	34.02	34.02	45.04	35.08	35.08	35.08
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.12	0.11	0.11	0.11	0.11
l, Upstream Filtering 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	1.00
d2, Incremental Delay [s]	8.57	7.25	13.65	7.01	4.72	9.15	9.93	2.06	4.62	8.26	1.26	2.59	2.79
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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	1.00
PF, 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	1.00

Lane Group Results

X, volume / capacity	0.79	0.85	0.85	0.87	0.80	0.80	0.87	0.85	0.85	0.77	0.74	0.74	0.74
d, Delay for Lane Group [s/veh]	53.28	36.98	43.42	50.25	31.78	36.27	53.18	36.08	38.64	53.30	36.34	37.67	37.88
Lane Group LOS	D	D	D	D	C	D	D	D	D	D	D	D	D
Critical Lane Group	No	No	Yes	Yes	No	No	No	No	Yes	Yes	No	No	No
50th-Percentile Queue Length [veh/ln]	3.48	13.15	14.24	3.66	12.32	13.38	5.15	9.92	10.13	3.12	7.34	7.23	6.73
50th-Percentile Queue Length [ft/ln]	86.90	328.85	356.07	91.51	307.93	334.41	128.85	248.10	253.14	78.04	183.5	180.8	168.1
95th-Percentile Queue Length [veh/ln]	6.26	19.10	20.43	6.59	18.07	19.37	8.88	15.09	15.34	5.62	11.79	11.64	10.98
95th-Percentile Queue Length [ft/ln]	156.41	477.55	510.80	164.72	451.82	484.37	221.93	377.26	383.61	140.4	294.6	291.1	274.5

Movement, Approach, & Intersection Results

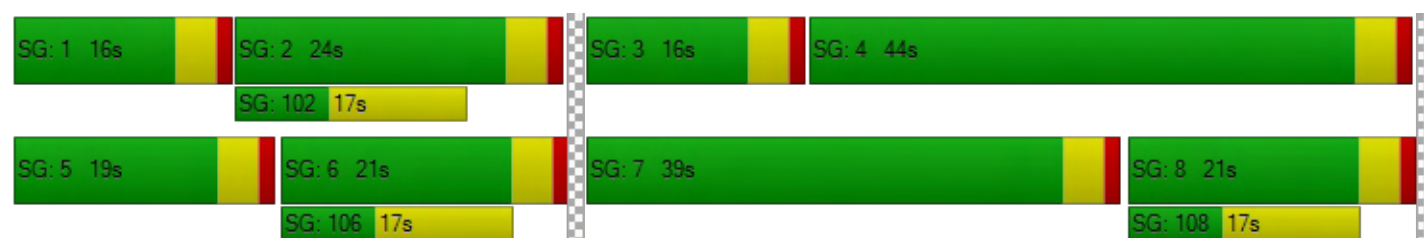
d_M, Delay for Movement [s/veh]	53.28	38.59	43.42	50.25	33.04	36.27	53.18	36.68	38.64	53.30	36.59	37.81
Movement LOS	D	D	D	D	C	D	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	40.14			35.69			39.01			38.40		
Approach LOS	D			D			D			D		
d_I, Intersection Delay [s/veh]	38.20											
Intersection LOS	D											
Intersection V/C	0.789											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	0.00	39.61	39.61
I_p,int, Pedestrian LOS Score for Intersection	3.170	0.000	2.951	3.089
Crosswalk LOS	C	F	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	340	340	800
d_b, Bicycle Delay [s]	32.00	34.45	34.45	18.00
I_b,int, Bicycle LOS Score for Intersection	2.538	2.640	2.368	2.310
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 15: Cherry Ave (NS) at Willow St (EW)

Control Type:
Analysis Method:
Analysis Period:

Signalized
HCM 6th Edition
15 minutes

Delay (sec / veh):
Level Of Service:
Volume to Capacity (v/c):

54.8
D
0.957

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	2	0	0	2	0	0
Pocket Length [ft]	170.00	100.00	100.00	175.00	100.00	100.00	247.00	100.00	100.00	205.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	166	835	219	303	980	183	211	1292	132	318	990	175
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	28	43	13	20	1	0	15	0	27	29	28
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	203	1047	310	383	1216	224	257	1591	161	415	1237	242
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	51	262	78	96	304	56	64	398	40	104	309	61
Total Analysis Volume [veh/h]	203	1047	310	383	1216	224	257	1591	161	415	1237	242
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	2	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups			2,7									
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	7	7	7	0	7	7	0	7	7	0
Maximum Green [s]	30	30	30	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	15	26	26	19	30	0	15	36	0	19	40	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	10	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No	No	No	No		No	No		No	No	
Maximum Recall	No	No	No	No	No		No	No		No	No	
Pedestrian Recall	No	No	No	No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	C	L	C	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	11	22	41	15	26	26	11	32	32	15	36	36
g / C, Green / Cycle	0.11	0.22	0.41	0.15	0.26	0.26	0.11	0.32	0.32	0.15	0.36	0.36
(v / s)_i Volume / Saturation Flow Rate	0.11	0.20	0.19	0.14	0.27	0.27	0.10	0.32	0.32	0.16	0.28	0.28
s, saturation flow rate [veh/h]	1810	5176	1615	2663	3618	1753	2663	3618	1812	2663	3618	1746
c, Capacity [veh/h]	199	1147	665	400	947	459	293	1151	577	400	1296	625
d1, Uniform Delay [s]	44.51	37.98	21.42	42.20	36.93	36.93	43.84	34.10	34.10	42.51	28.43	28.51
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.46	0.11	0.11	0.29
l, Upstream Filtering 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
d2, Incremental Delay [s]	34.35	12.43	2.34	13.12	35.26	49.40	8.17	15.35	40.85	31.57	0.99	5.39
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, 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

Lane Group Results

X, volume / capacity	1.02	0.91	0.47	0.96	1.02	1.03	0.88	1.01	1.02	1.04	0.77	0.77
d, Delay for Lane Group [s/veh]	78.86	50.42	23.76	55.32	72.19	86.33	52.01	49.46	74.95	74.08	29.41	33.90
Lane Group LOS	F	D	C	E	F	F	D	F	F	F	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	6.79	9.53	5.60	5.36	15.95	17.26	3.44	15.99	20.10	6.63	10.42	10.92
50th-Percentile Queue Length [ft/ln]	169.85	238.22	140.11	134.12	398.71	431.46	85.98	399.75	502.62	165.69	260.56	273.12
95th-Percentile Queue Length [veh/ln]	11.15	14.59	9.49	9.16	22.81	24.48	6.19	22.72	27.80	11.03	15.72	16.35
95th-Percentile Queue Length [ft/ln]	278.73	364.79	237.17	229.09	570.27	612.01	154.77	568.04	694.92	275.64	392.93	408.64

Movement, Approach, & Intersection Results

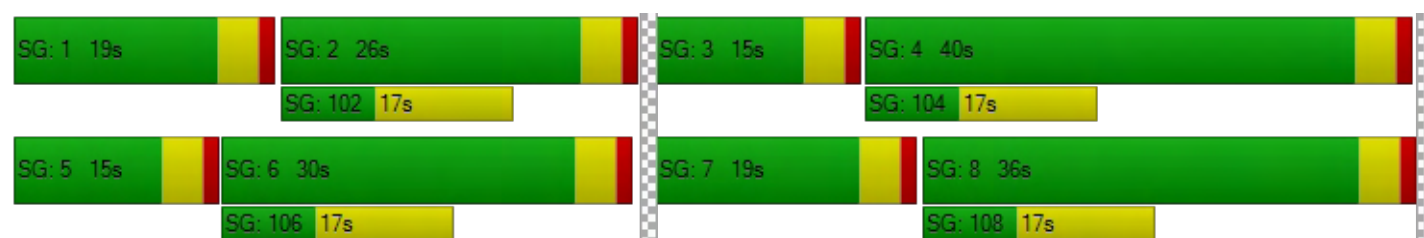
d_M, Delay for Movement [s/veh]	78.86	50.42	23.76	55.32	75.07	86.33	52.01	56.29	74.95	74.08	30.29	33.90
Movement LOS	F	D	C	E	E	F	D	E	E	F	C	C
d_A, Approach Delay [s/veh]	48.82			72.30			57.24			40.35		
Approach LOS	D			E			E			D		
d_I, Intersection Delay [s/veh]	54.81											
Intersection LOS	D											
Intersection V/C	0.957											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	39.61			39.61			39.61			39.61		
I_p,int, Pedestrian LOS Score for Intersection	3.139			3.141			3.178			3.239		
Crosswalk LOS	C			C			C			C		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	440			520			640			720		
d_b, Bicycle Delay [s]	30.42			27.38			23.12			20.48		
I_b,int, Bicycle LOS Score for Intersection	2.418			2.562			2.665			2.601		
Bicycle LOS	B			B			B			B		

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report**Intersection 20: Cherry Ave (NS) at Pacific Coast Hwy (EW)**

Control Type:	Signalized	Delay (sec / veh):	30.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.794

Intersection Setup

Name	Northbound			Southbound			Eastbound			Westbound		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	↵↵↵			↵↵↵			↵↵↵			↵↵↵		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	118.00	135.00	100.00	100.00	180.00	100.00	100.00	186.00	100.00	100.00
Speed [mph]	30.00			30.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name												
Base Volume Input [veh/h]	78	419	41	185	588	235	195	1413	78	72	891	170
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	5	0	8	3	0	0	30	7	0	26	14
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	97	516	50	234	720	287	238	1754	102	88	1113	221
Peak Hour Factor	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760	0.9760
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	25	132	13	60	184	74	61	449	26	23	285	57
Total Analysis Volume [veh/h]	99	529	51	240	738	294	244	1797	105	90	1140	226
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - Coordination Group
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	86.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lag	-	-
Minimum Green [s]	7	7	0	7	7	0	7	7	0	7	7	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	11	29	0	11	29	0	18	39	0	11	32	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	18	0	0	0	0	0	12	0	0	16	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	32	21	21	32	22	22	14	40	40	6	32	32
g / C, Green / Cycle	0.36	0.23	0.23	0.36	0.24	0.24	0.16	0.44	0.44	0.07	0.35	0.35
(v / s)_i Volume / Saturation Flow Rate	0.10	0.15	0.16	0.21	0.20	0.18	0.13	0.35	0.35	0.05	0.25	0.25
s, saturation flow rate [veh/h]	1018	1900	1842	1120	3618	1615	1810	3618	1847	1810	3618	1743
c, Capacity [veh/h]	335	442	429	392	865	386	284	1593	813	128	1282	618
d1, Uniform Delay [s]	21.91	31.39	31.41	22.96	32.79	31.91	37.06	21.64	21.71	40.98	25.23	25.23
k, delay calibration	0.11	0.11	0.11	0.19	0.11	0.12	0.11	0.50	0.50	0.11	0.50	0.50
l, Upstream Filtering 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
d2, Incremental Delay [s]	0.49	1.72	1.79	2.70	2.51	3.40	7.52	4.05	7.85	6.86	3.50	7.07
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, 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

Lane Group Results

X, volume / capacity	0.30	0.66	0.67	0.61	0.85	0.76	0.86	0.79	0.79	0.70	0.72	0.72
d, Delay for Lane Group [s/veh]	22.39	33.12	33.20	25.66	35.30	35.31	44.58	25.68	29.55	47.83	28.73	32.29
Lane Group LOS	C	C	C	C	D	D	D	C	C	D	C	C
Critical Lane Group	No	No	Yes	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.43	5.88	5.73	3.95	7.78	6.17	5.67	11.38	12.58	2.15	8.69	8.99
50th-Percentile Queue Length [ft/ln]	35.77	147.05	143.22	98.86	194.55	154.13	141.75	284.46	314.49	53.82	217.31	224.77
95th-Percentile Queue Length [veh/ln]	2.58	9.86	9.65	7.12	12.36	10.24	9.57	16.91	18.40	3.88	13.53	13.91
95th-Percentile Queue Length [ft/ln]	64.38	246.49	241.36	177.94	308.93	255.93	239.37	422.76	459.90	96.88	338.20	347.71

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	22.39	33.15	33.20	25.66	35.30	35.31	44.58	26.85	29.55	47.83	29.41	32.29
Movement LOS	C	C	C	C	D	D	D	C	C	D	C	C
d_A, Approach Delay [s/veh]	31.59			33.49			28.99			31.00		
Approach LOS	C			C			C			C		
d_I, Intersection Delay [s/veh]	30.87											
Intersection LOS	C											
Intersection V/C	0.794											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			0.0			11.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	34.67			34.67			0.00			34.67		
I_p,int, Pedestrian LOS Score for Intersection	2.614			2.821			0.000			3.257		
Crosswalk LOS	B			C			F			C		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	556			556			778			622		
d_b, Bicycle Delay [s]	23.47			23.47			16.81			21.36		
I_b,int, Bicycle LOS Score for Intersection	2.120			2.609			2.740			2.360		
Bicycle LOS	B			B			B			B		

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

