



July 20, 2018

Mr. Narsai Tailo
Meridian Investment Management, Inc.
702 Marshall Street #322
Redwood City, CA 94063

Traffic Impact Study for a Residential Project at 3150 Dutton Avenue

Dear Mr. Tailo;

As requested, W-Trans has prepared a traffic impact analysis relative to the proposed multi-family residential development to be located at 3150 Dutton Avenue in the City of Santa Rosa.

Study Area and Periods

The study area consists of Dutton Avenue, which runs along the frontage of the project site in the City of Santa Rosa as well as the following two intersections.

1. Bellevue Avenue/Dutton Avenue (City of Santa Rosa)
2. Todd Road/Standish Avenue-Ghilotti Avenue (County of Sonoma)

Operating conditions during the a.m. and p.m. peak periods were evaluated to capture the highest potential impacts for the proposed project as well as the highest volumes on the local transportation network. The morning peak hour occurs between 7:00 and 9:00 a.m. and reflects conditions during the home to work or school commute, while the p.m. peak hour occurs between 4:00 and 6:00 p.m. and typically reflects the highest level of congestion during the homeward bound commute. Turning movement counts were collected on October 4, 2016, early in the project application process.

Existing Conditions

Dutton Avenue generally runs north-south and is classified an arterial street. Along the project frontage, the road has two 12-foot travel lanes and parking is permitted on both sides of the street. Traffic counts obtained from the City of Santa Rosa indicate that the roadway is carrying approximately 7,000 vehicles per day.

Bellevue Avenue/Dutton Avenue is an all-way stop-controlled intersection with one approach lane on each leg. There are marked crosswalks on all four legs of the intersection with curb ramps provided on three corners. On-street parking occurs on both Bellevue Avenue and Dutton Avenue near the intersection.

Todd Road/Standish Avenue-Ghilotti Avenue is a two-way stop-controlled intersection with stop signs on the Standish Avenue and Ghilotti Avenue approaches. There are no marked crosswalks at this study intersection. This intersection is under the jurisdiction of the County of Sonoma.

Collision History

The collision history for the study area was reviewed to determine any trends or patterns that may indicate a safety issue. Collision rates were calculated based on records available from the California Highway Patrol as published in their Statewide Integrated Traffic Records System (SWITRS) reports. The most current five-year period available is January 1, 2013 through December 31, 2017.

As presented in Table 1, the calculated collision rates for the study intersections were compared to average collision rates for similar facilities statewide, as indicated in *2014 Collision Data on California State Highways*,

California Department of Transportation. Both intersections experienced collisions at above-average rates, so the data was reviewed in more detail. Copies of the collision rate calculations are enclosed.

Table 1 – Collision Rates at the Study Intersections

Study Intersection	Number of Collisions (2011-2016)	Calculated Collision Rate (c/mve)	Statewide Average Collision Rate (c/mve)
1. Bellevue Avenue/Dutton Avenue	8	0.38	0.32
2. Todd Road/Standish Avenue -Ghilotti Avenue	11	0.51	0.26

Note: c/mve = collisions per million vehicles entering

There were eight collisions reported during the review period at the all-way stop-controlled intersection of Bellevue Avenue/Dutton Avenue, five of which resulted in injuries to at least one party involved and six of which involved an eastbound vehicle. Two of these collisions involved pedestrians. Of the six collisions that did not involve pedestrians, three were broadside collisions involving vehicles traveling eastbound on Bellevue Avenue and a northbound or southbound vehicle. Two of the remaining three collisions were rear-end collisions involving vehicles traveling on Bellevue Avenue. A sideswipe collision occurred between two northbound vehicles with one attempting to make a right turn. In terms of the primary collision factors, two were due to unsafe speed, there were two pedestrian right-of-way violations and one vehicle right-of-way violation, two were associated with the signing, and one was due to unsafe turning. No lane striping, aside from roadway centerlines, is present on any of the approaches or receiving lanes at the intersection except the westbound approach, which has a separate right-turn lane, with some of the lanes exceeding 20 feet in width. The crosswalk on the east leg of Bellevue Avenue has an angle point at the right-turn lane, is about an 80-foot crossing. There are clear sight lines from the stop bars at the intersection. No specific issues that would contribute to the above-average collision rate were identified except the non-standard crosswalk striping; to comply with national standards, crosswalks should be straight.

Todd Road/Standish Avenue-Ghilotti Avenue experienced eleven collisions reported during the review period, of which six were broadside collisions involving a southbound vehicle and a vehicle making a left turn. Nine of the eleven involved a southbound driver, and eight of these had vehicle right-of-way cited as the primary collision factor. One collision involved a bicyclist and a motor vehicle. Todd Road is straight and flat and parking is prohibited along the north curb, affording drivers a good line of sight. While there was a maximum of three crashes of a type correctible through installation of either all-way stop controls or a traffic signal, the continuing pattern of such crashes indicates that this location should be considered for additional right-of-way controls.

Safety conditions on Dutton Road between Bellevue Avenue and West Robles Avenue were also considered. There was one reported collision during the review period resulting in a collision rate of 0.16 collisions per million vehicle miles traveled on the segment(c/mvm). The statewide average collision rate for similar facilities is 2.39 c/mvm.

Alternative Modes

Pedestrian Facilities

Pedestrian facilities include sidewalks, crosswalks, curb ramps, curb extensions, and various streetscape amenities. In general, a network of sidewalks, crosswalks, and curb ramps provide access for pedestrians in the vicinity of the proposed project site; however, sidewalk gaps can be found along the roadway adjacent to the project site. Existing gaps on the adjacent roadway impact convenient and continuous access for pedestrians and present

safety concerns in those locations where appropriate pedestrian infrastructure would address potential conflict points.

- **Dutton Avenue** – Intermittent sidewalk coverage is provided on Dutton Avenue with significant gaps on the west side of the street between Bellevue Avenue and West Robles Avenue. Sidewalks are provided along developed property frontages on the east side of the street. Curb ramps and crosswalks are provided at the intersection of Bellevue Avenue and Dutton Avenue. Lighting is non-existent along Dutton Avenue.
- **Standish Avenue** – There are no sidewalks on either side of Standish Avenue between West Robles Avenue and Todd Road nor are there street lights.

Bicycle Facilities

In the project area, Class II bike lanes exist on Bellevue Avenue between Moorland Avenue and Bellevue Avenue. Bicyclists ride in the roadway and/or on sidewalks along all other streets within the project study area.

Transit Facilities

Sonoma County Transit (SCT) provides fixed route bus service along the Dutton Avenue and the project frontage. SCT Route 42 provides service to the West Industrial Park along Dutton Avenue, residences and businesses along Santa Rosa Avenue and the downtown Santa Rosa Transit Center. Route 42 operates Monday through Friday with approximately two-hour headways between 6:00 a.m. and 6:00 p.m. Weekend service is not provided along this route.

Two bicycles can be carried on all SCT buses. Bike rack space is on a first come, first served basis. Additional bicycles can be carried on some buses, which have three bicycle racks.

Dial-a-ride, also known as paratransit, or door-to-door service, is available for those who are unable to independently use the transit system due to a physical or mental disability. SCT Paratransit is designed to serve the needs of individuals with disabilities within unincorporated areas of Sonoma County, the Greater Santa Rosa Area, and between the County's nine incorporated cities.

Traffic Operations Standards

City of Santa Rosa

The City of Santa Rosa's adopted Level of Service (LOS) Standard is contained in *Santa Rosa General Plan 2035*. Standard TD-1 states that the City will try to maintain a Level of Service (LOS) D or better along all major corridors. Exceptions to meeting this standard are allowed where attainment would result in significant environmental degradation; where topography or environmental impacts make the improvement impossible; or where attainment would ensure loss of an area's unique character.

While a corridor level of service is applied by the City in its analysis of the entire City as part of the environmental documentation supporting the General Plan, this type of analysis only provides relevant data when performed on a much longer segment than the one included as the study area for the project. Therefore, although the City's standard does not specify criteria for intersections, for the purposes of this study a minimum operation of LOS D for the overall operation of signalized intersections was applied.

Sonoma County

The level of service standard for County intersection operations is to maintain a Level of Service D or better pursuant to General Plan Policy CT-4.2. The project would have a significant traffic impact if the project's traffic would cause an intersection currently operating at an acceptable level of service (LOS D or better) to operate at an unacceptable level (LOS E or worse). If the intersection currently operates or is projected to operate below the

County standard, the project's impact is considered significant and cumulatively considerable if it causes the average delay to increase by five seconds or more. The delay will be determined by comparing intersection operations with and without the project's traffic for both the existing baseline and projected future conditions. This criterion applies to all controlled intersections except for driveways and minor side streets that have less than 30 vehicle trips per hour per approach or exclusive left turn movement

Existing Conditions

The Existing Conditions scenario provides an evaluation of current operation based on existing traffic volumes during the a.m. and p.m. peak periods. This condition does not include project-generated traffic volumes. Volume data was collected when while local schools were in session during October 2016. Under existing conditions, the study intersections operate acceptably at LOS C or better overall during the a.m. peak hour; however, Todd Road/Standish Avenue-Ghilotti Avenue operates unacceptably at LOS E during the p.m. peak hour. The southbound Standish Avenue approach operates at LOS F during both the a.m. and p.m. peak periods.

A summary of the intersection level of service calculations is contained in Table 2, and copies of the Level of Service calculations for all scenarios are enclosed.

Table 2 – Existing Peak Hour Intersection Levels of Service

Study Intersection Approach	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
1. Bellevue Avenue/Dutton Avenue	15.2	C	22.0	C
2. Todd Road/Standish Avenue – Ghilotti Avenue	13.2	B	49.4	E
<i>Northbound (Ghilotti Ave) Approach</i>	12.6	<i>B</i>	12.4	<i>B</i>
<i>Southbound (Standish Ave) Approach</i>	69.1	F	**	F
<i>Restripe to add SB left-turn lane and install signal</i>	17.4	B	18.7	B
<i>Restripe to add SB left-turn lane and WB right-turn lane and convert to All-Way Stop Control</i>	14.5	B	19.7	C

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*; ** = delay greater than 120 seconds; **Bold** text = deficient operation; Shaded cells = conditions with recommended improvements

A signal warrant analysis was performed to determine the potential need for traffic signals at both study intersections. Chapter 4C of the *California Manual on Uniform Traffic Control Devices* (CA-MUTCD) provides guidance on when a traffic signal should be considered based on nine different warrants, or criteria. For the purposes of this study, Warrant 3, the Peak Hour volume warrant, which determines the need for traffic control based on the highest volume hour of the day, was used as an initial indication of traffic control needs. The use of this signal warrant is common practice for planning studies.

Todd Road/Standish Avenue-Ghilotti Avenue meets the criteria established by Warrant 3 during the p.m. peak period, and for this reason, it is recommended that the County consider installing a traffic signal at the intersection and restriping the Standish Avenue approach to provide a southbound left-turn lane to reduce delay. The CA-MUTCD allows for the installation of all-way stop control (AWSC) at intersections where it has been determined that a traffic signal is warranted as an interim measure while arrangements are made for the installation of a traffic signal. At Todd Road/Standish Avenue-Ghilotti Avenue, the installation of AWSC, in conjunction with restriping the Standish Avenue approach to provide a southbound left-turn lane and the westbound approach of Todd Road to provide a right-turn lane, would reduce delay to an acceptable level.

The intersection of Bellevue Avenue/Dutton Avenue does not meet the criteria established by Warrant 3 during either the a.m. or p.m. peak periods. A copy of the signal warrants spreadsheet is enclosed.

Future Conditions

Segment volumes for the horizon year of 2040 were obtained from the County's gravity demand model maintained by the Sonoma County Transportation Authority (SCTA) and translated to peak hour turning movement volumes at the Todd Road/Standish Avenue-Ghilotti Avenue study intersection using the "Furness" method. The Furness method is an iterative process that employs existing turn movement data, existing link volumes, and future link volumes to project likely future turning movement volumes at intersections. Turning movement volumes at the Bellevue Avenue/Dutton Avenue study intersection were obtained from the *Traffic Impact Study for the Roseland Area/Sebastopol Road Specific Plan & Annexation*, W-Trans, April 19, 2016, which were derived from a special run of the SCTA SCTM\10 travel demand model to incorporate the specific plan land use changes.

The Roseland Area/Sebastopol Road Specific Plan traffic study recommended that the intersection of Bellevue Avenue/Dutton Avenue be signalized and restriped to include left-turn pockets on all four approaches. Further, the *Southwest Area Plan* prepared for the City in 1994 includes this signal as one of the planned future improvements (Figure 3.1.4-10b). The County has previously collected fees from developers for the Todd Road/Standish Avenue-Ghilotti Avenue signal, so this project was assumed to be funded. These improvements and the previously discussed intersection improvements at Todd Road/Standish Avenue-Ghilotti Avenue were assumed to exist for the Future Conditions analysis.

Intersection Level of Service

Under the anticipated Future volumes, and with signals and turn lanes added at both locations, the study intersections are expected to operate acceptably at LOS D or better during both a.m. and p.m. peak periods. The resulting operating conditions are summarized in Table 3.

Table 3 – Future Peak Hour Intersection Levels of Service

Study Intersection Approach	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
1. Bellevue Avenue/Dutton Avenue	25.6	C	40.5	D
2. Todd Road/Standish Avenue – Ghilotti Avenue	23.4	C	44.4	D

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service

Project Description

The Dutton Avenue Apartments (to be renamed at a later date) project is a proposed 107-unit market rate multi-family community to be located on an approximately 5.95-acre site (APN: 043-133-013) at 3150 Dutton Avenue in the City of Santa Rosa. The project would provide a total of 242 spaces on-site consisting of 135 uncovered and 107 covered spaces. The total parking supply exceeds the City of Santa Rosa's Municipal Code requirements by seven parking spaces. Electric vehicle charging stations will be provided in accordance to the requirements outlined in the California Green Building Code. In addition to vehicle parking, the project would provide 104 bicycle storage lockers. Access to the apartments would be provided via one driveway on Dutton Avenue.

Trip Generation

The anticipated trip generation for the 107 new dwelling units was estimated using standard rates published by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual*, 9th Edition, 2012 for an apartment (Land Use #220). Based on application of these rates, the proposed project is expected to generate an average of 712 trips per day, including 55 a.m. peak hour trips and 66 trips during the p.m. peak hour. These results are summarized in Table 4.

Table 4 – Trip Generation Summary

Land Use	Units	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
Apartment	107 du	6.65	712	0.51	55	11	44	0.62	66	43	23

Note: du = dwelling unit

Trip Distribution

The pattern used to allocate new project trips to the street network was determined by reviewing Census data for home-to-work trips. Given the project location south of downtown Santa Rosa, it was assumed that a majority of trips would be to/from downtown Santa Rosa and other destinations to the north in Sonoma County via US 101. Approximately a third of home-to-work trips are to/from cities south of Santa Rosa and would use the interchange at Todd Road. The trip distribution to access southbound US 101 was not varied based on the intersection control at Todd Road/Standish Avenue-Ghilotti Avenue in the analysis scenarios since the increase in travel time to the Hearn Avenue interchange was assumed to be higher than the expected delay at the intersection to access the Todd Road interchange. The applied distribution assumptions are shown in Table 5.

Table 5 – Trip Distribution Assumptions

Route	Percent
To the east via Bellevue Avenue	55%
To the west via Bellevue Avenue	20%
To the east via Todd Road	20%
To the west via Todd Road	5%
TOTAL	100%

Intersection Operation

Existing plus Project Conditions

Upon the addition of project-related traffic to the existing volumes, the study intersections are expected to continue operating acceptably overall during the a.m. peak hour; however, the operation of Todd Road/Standish Avenue-Ghilotti Avenue is expected to drop from LOS E to LOS F during the p.m. peak hour. The intersection is currently operating unacceptably at LOS E during the p.m. peak hour and the project generated trips are expected to increase the delay on the southbound approach by more than five seconds during the a.m. peak period. Since the project would be expected to increase the average delay by more than five seconds on the southbound approach, the impact would be considered significant per the County's Standard. These results are summarized in Table 6.

Table 6 – Existing and Existing plus Project Peak Hour Intersection Levels of Service

Study Intersection Approach	Existing Conditions				Existing plus Project			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Bellevue Ave/Dutton Ave	15.2	C	22.0	C	16.4	C	26.7	D
2. Todd Rd/Standish Ave-Ghilotti Ave	13.2	B	49.4	E	15.8	C	54.1	F
<i>Northbound (Ghilotti Ave) Approach</i>	<i>12.6</i>	<i>B</i>	<i>12.4</i>	<i>B</i>	<i>12.6</i>	<i>B</i>	<i>12.4</i>	<i>B</i>
<i>Southbound (Standish Ave) Approach</i>	69.1	F	**	F	80.6	F	**	F
<i>Signalize and add SB left-turn-lane</i>	17.4	B	18.7	B	17.6	B	18.3	C
<i>AWSC and add SB left-turn lane and EB right-turn lane</i>	14.5	B	14.8	B	19.7	C	20.1	C

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*; ** = delay greater than 120 seconds; **Bold** text = deficient operation; **Shaded cells** = conditions with recommended improvements; AWSC = all-way stop control

Finding – The study intersection of Todd Road/Standish Avenue-Ghilotti Avenue is operating unacceptably under existing conditions and would deteriorate further upon adding project-generated traffic; with an increase in delay of 11.5 seconds on the southbound approach during the a.m. peak period the impact is considered significant under the applicable County standard. The installation of AWSC and restriping the southbound and westbound approaches would be expected to result in a less-than-significant impact while the County determines an appropriate long-term plan to install a traffic signal at Todd Road/Standish Avenue-Ghilotti Avenue. The addition of project-generated trips to existing traffic volumes during both the a.m. and p.m. peak periods at the intersection of Bellevue Avenue/Dutton Avenue does not satisfy the signal warrant criteria established by MUTCD Warrant 3. A copy of the signal warrants spreadsheet is enclosed.

Recommendation – To achieve acceptable operation at Todd Road/Standish Avenue-Ghilotti Avenue the project applicant should install AWSC and restripe the southbound Standish Road approach to include a left-turn lane and restripe the westbound Todd Road approach to include a right-turn lane.

Future plus Project Conditions

Upon the addition of project-generated traffic to the anticipated Future volumes, and with the suggested improvements, the study intersections would be expected to operate acceptably. The Future plus Project operating conditions are summarized in Table 7.

Table 7 – Future and Future plus Project Peak Hour Intersection Levels of Service

Study Intersection Approach	Future Conditions				Future plus Project			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Bellevue Ave/Dutton Ave	25.6	C	40.5	D	28.0	C	45.2	D
2. Todd Rd/Standish Ave – Ghilotti Ave	23.4	C	44.4	D	23.7	C	45.9	D

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service

Finding – The study intersections will continue operating acceptably with project traffic added, at the same Levels of Service as without it, assuming both locations are signalized and improved with the addition of turn lanes.

Recommendation – The project applicant shall pay a proportional share of 2.2 percent of the cost to signalize Todd Road/Standish Avenue-Ghilotti Avenue as a future mitigation unless charged as impacts fees. A proportional share contribution of 4.5 percent of the cost to signalize Bellevue Avenue/Dutton Avenue to mitigate future impacts shall be paid by the project applicant unless charged as impacts fees. A copy of the proportional share calculations is enclosed.

Alternative Modes

Pedestrian Facilities

Sidewalks do not currently exist along the project frontage. The project frontage represents a gap in the pedestrian network along Dutton Avenue. Sidewalks exist to the north and south of the project site. The project site plan identifies a sidewalk connection to close the pedestrian gap along the project frontage on Dutton Avenue.

Finding – Pedestrian facilities serving the project site will be adequate.

Bicycle Facilities

Existing bicycle facilities, including bike lanes on Bellevue Avenue and the off-street path along the SMART tracks, provide access for bicyclists. Class II Bike Lanes are proposed along Dutton Avenue-Standish Avenue between Todd Road and Bellevue Avenue, and the project includes paved width as necessary to provide the bike lane along the site's frontage. Currently bicyclists ride in the travel lane along Dutton Avenue-Standish Avenue.

Bicycle Parking

The City of Santa Rosa's Municipal Code stipulates the City's bicycle parking requirements for new developments. According to the City of Santa Rosa Municipal Code, bicycle parking is required for multifamily residential developments at a ratio of one space per four units if units do not have a private garage or private storage space for bike storage. For the proposed project, bicycle parking would be required for 27 bicycles. The site plan identifies 104 bicycle storage lockers distributed throughout the project site.

Finding – Bicycle facilities serving the project site are adequate.

Transit

Existing transit routes are adequate to accommodate project-generated transit trips. Existing stops are located approximately half a mile from the project site on both West Robles Avenue and Moorland Avenue. There are existing gaps in the pedestrian network between the project site and both nearby transit stops. The project applicant is willing to coordinate and facilitate the construction of a new bus stop, including appropriate amenities, along the project frontage.

Finding – Transit facilities serving the project site are adequate, but would be improved if a stop can be located at or near the site.

Access and Circulation

Sight Distance

Sight distance along Dutton Avenue at the project driveway location was evaluated based on sight distance criteria contained in the *Highway Design Manual* published by Caltrans. These guidelines include recommended sight distances for drivers stopped on driveways and waiting to enter a public street based upon approach travel speeds.

For the posted 40-mph speed limit on Dutton Avenue adjacent to the project site, the recommended stopping sight distance is 300 feet. Based on a review of field conditions, sight distance extends beyond 500 feet to both the north and south which is enough to satisfy speeds greater than 50-mph. Vehicles parked along the frontage would have the potential of reducing sight lines to an inadequate distance.

Finding – Sight distances along Dutton Avenue at the project driveway are adequate for the approach speeds; however, it is noted that parked vehicles along the project frontage could interrupt sight lines.

Recommendation – To ensure that adequate sight lines are maintained, it is recommended that parking be prohibited within 50 feet of the project driveway, if on-street parking is maintained along the project frontage.

Access Analysis

Left-Turn Lane Warrants

The need for a left-turn lane on Dutton Avenue was evaluated based on criteria contained in the *Intersection Channelization Design Guide*, National Cooperative Highway Research Program (NCHRP) Report No. 279, Transportation Research Board, 1985, as well as a more recent update of the methodology developed by the Washington State Department of Transportation. Based on Existing plus Project volumes, as well as safety criteria, a left-turn lane is not warranted on Dutton Avenue at the project site. Based on Future plus Project volumes, a left-turn lane would be warranted during the p.m. peak period on Dutton Avenue at the project site. A copy of the warrant spreadsheet is enclosed.

Finding – A southbound left-turn lane at the project driveway on Dutton Avenue is warranted based on Future plus Project volumes during the p.m. peak period. The project frontage improvements, as designed, include the 22-foot half-width on Dutton Avenue necessary to accommodate a center two-way left-turn lane. Currently Dutton Avenue is approximately 40-foot wide curb to curb and the future curb to curb width is to be 44-foot upon full buildout of the parcels on Dutton Avenue. Upon completion of the project frontage, the roadway improvements will include a five-foot northbound bike lane, 12-foot northbound travel lane, 10-foot center turn lane, and a 12-foot southbound travel lane on Dutton Avenue. The future development on the west side of Dutton Avenue should complete the roadway widening and stripe a five-foot southbound bike lane to complete the cross-section.

Conclusions and Recommendations

- The project is expected to generate an average of 712 new trips per day including 55 trips during the a.m. peak hour and 66 trips during the p.m. peak hour.
- Under Existing Conditions, the study intersections operate acceptably at LOC C or better overall during the a.m. peak hour; however, Todd Road/Standish Avenue-Ghilotti Avenue operates unacceptably at LOS E overall during the p.m. peak hour.
- The peak hour signal warrant is met based on p.m. peak hour volumes at the intersection of Todd Road/Standish Avenue-Ghilotti Avenue. The peak hour signal warrant is not met at the intersection of Bellevue Road/Dutton Avenue under Existing or Existing plus Project Conditions.
- Upon the addition of project-generated traffic to Existing Conditions, the study intersections are expected to continue operating acceptably overall during the a.m. peak hour, but Todd Road/Standish Avenue-Ghilotti Avenue is expected to deteriorate to LOS F overall during the p.m. peak hour. The increase in delay on the southbound approach at Todd Road/Standish Avenue-Ghilotti Avenue during the a.m. peak period is greater than five seconds and is considered a significant impact under County Standards.

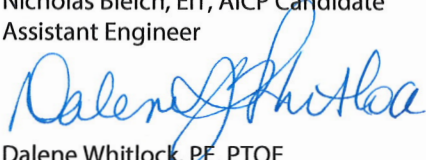
- Under anticipated Future volumes, and assuming completion of suggested improvements, the study intersections are expected to operate acceptably during both peak periods.
- It is recommended that the County consider installing a traffic signal at Todd Road/Standish Avenue-Ghilotti Avenue and restriping the Standish Avenue approach to provide a southbound left-turn lane to achieve acceptable operation under existing and future conditions, without or with the project.
- The project applicant should install all-way stop controls, restripe the southbound Standish Avenue approach to include a left-turn lane and restripe the westbound Todd Road approach to include a right-turn lane at Todd Road/Standish Avenue-Ghilotti Avenue to achieve acceptable operation in the short-term.
- A proportional share contribution of 2.2 percent of the costs funded by private development should be paid towards the future improvements at Todd Road/Standish Avenue-Ghilotti Avenue to install a traffic signal unless such costs are included in traffic impact fees.
- A proportional share contribution of 4.5 percent of the costs funded by private development should be paid for future improvements at Bellevue Avenue/Dutton Avenue to install a traffic signal, unless such costs are included in traffic impact fees.
- Pedestrian, bicycle, and transit facilities serving the project site are expected to be adequate with the completion of project frontage improvements.
- Sight distances along Dutton Avenue at the project driveway are adequate for the approach speeds; however, parking should be prohibited along the project frontage for a distance of 50 feet on either side of the proposed driveway.
- A southbound left-turn lane is warranted under Future plus Project volumes during the p.m. peak period. The frontage improvements should be constructed to accommodate a center turn lane on Dutton Avenue in the future, providing left-turn access at the project driveway.

Thank you for giving W-Trans the opportunity to provide these services. Please call if you have any questions.

Sincerely,



Nicholas Bleich, EIT, AICP Candidate
Assistant Engineer



Dalene Whitlock, PE, PTOE
Principal

DJW/nfb/SRO405.L1



Enclosures: Collision Rate Calculations
Level of Service Calculations
Signal Warrant Calculations
Equitable Share Calculations
Turn Lane Warrant Calculations
Traffic Count Data

Intersection Collision Rate Calculations

3150 Dutton Avenue Traffic Impact Study

Intersection # 1: Bellevue Avenue & Dutton Avenue

Date of Count: Tuesday, October 04, 2016

Number of Collisions: 8

Number of Injuries: 5

Number of Fatalities: 0

ADT: 11400

Start Date: January 1, 2013

End Date: December 31, 2017

Number of Years: 5

Intersection Type: Four-Legged

Control Type: 4 Way Stop

Area: Suburban

$$\text{collision rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Number of Years}}$$

$$\text{collision rate} = \frac{8}{11,400} \times \frac{1,000,000}{365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.38 c/mve	0.0%	62.5%
Statewide Average*	0.32 c/mve	0.4%	44.7%

ADT = average daily total vehicles entering intersection

c/mve = collisions per million vehicles entering intersection

* 2014 Collision Data on California State Highways, Caltrans

Intersection # 2: Todd Road & Standish Avenue

Date of Count: Tuesday, October 04, 2016

Number of Collisions: 11

Number of Injuries: 3

Number of Fatalities: 0

ADT: 11900

Start Date: January 1, 2013

End Date: December 31, 2017

Number of Years: 5

Intersection Type: Four-Legged

Control Type: Stop & Yield Controls

Area: Suburban

$$\text{collision rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Number of Years}}$$

$$\text{collision rate} = \frac{11}{11,900} \times \frac{1,000,000}{365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.51 c/mve	0.0%	27.3%
Statewide Average*	0.26 c/mve	0.9%	37.4%

ADT = average daily total vehicles entering intersection

c/mve = collisions per million vehicles entering intersection

* 2014 Collision Data on California State Highways, Caltrans

3150 Dutton Avenue TIS

Collision Report Summary

7/13/2018

Date Range Reported: 1/1/13 - 12/31/17

Total Number of Collisions: 8

Total Number of Persons Injured: 7

Total Number of Persons Killed: 0

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Report#	Date	Time	Location	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Dir. of Travel 1	Movement Prec. Coll. 1	Dir. of Travel 2	Movement Prec. Coll. 2	PCF	Inj. Kil.
5988599	3/6/13	15:35	Bellevue Av & Dutton Av	0'	In Int.	Broadside	Other Motor Vehicle	East	Proceeding Straight	North	Making Left Turn	Traffic Signals and Signs	0 0
6527084	4/20/14	13:00	Dutton Av & Bellevue Av	30'	South	Sideswipe	Other Motor Vehicle	North	Making Right Turn	North	Not Stated	Improper Turning	0 0
6719091	10/12/14	02:11	Bellevue Av & Dutton Meadow	0'	In Int.	Rear-End	Other Motor Vehicle	East	Proceeding Straight	East	Proceeding Straight	Unsafe Speed	0 0
6888491	4/2/15	07:54	Bellevue Av & Dutton Av	3'	East	Vehicle - Pedestrian	Pedestrian	East	Proceeding Straight	North	Not Stated	Ped R/W Violation	1 0
6888535	4/8/15	14:04	Bellevue Av & Dutton Av	0'	In Int.	Broadside	Other Motor Vehicle	East	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	3 0
8188869	11/18/16	09:09	Bellevue Av & Dutton Av	0'	In Int.	Broadside	Other Motor Vehicle	South	Proceeding Straight	East	Proceeding Straight	Auto R/W Violation	1 0
8314224	12/15/16	18:02	Bellevue Av & Dutton Av	0'	In Int.	Vehicle - Pedestrian	Pedestrian	East	Making Left Turn	South	Not Stated	Ped R/W Violation	1 0
8393080	5/30/17	19:02	Bellevue Av & Dutton Av	0'	In Int.	Rear-End	Other Motor Vehicle	West	Proceeding Straight	West	Stopped in Road	Unsafe Speed	1 0

Settings Used For Query

<u>Parameter</u>	<u>Setting</u>
Street Name	BEL*
Cross Street	DUT*
Starting Date	1/1/2013
Ending Date	12/31/2017
Distance from Intersection	>= 0' for non rear-end collisions
	>= 0' for rear-end collisions

3150 Dutton Avenue TIS

Collision Report Summary

7/13/2018

Date Range Reported: 1/1/13 - 12/31/17

Total Number of Collisions: 11

Total Number of Persons Injured: 3

Total Number of Persons Killed: 0

Page 1

Report#	Date	Time	Location	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Dir. of Travel 1	Movement Prec. Coll. 1	Dir. of Travel 2	Movement Prec. Coll. 2	PCF	Inj. Kil.
6015350	3/28/13	12:00	Todd Rd & Standish Av	0'	In Int.	Broadside	Other Motor Vehicle	South	Making Left Turn	West	Proceeding Straight	Auto RW Violation	1 0
6288500	11/30/13	17:55	Todd Rd & Standish Av	0'	In Int.	Hit Object	Fixed Object	East	Making Left Turn			Improper Turning	0 0
6344416	1/24/14	07:45	Todd Rd & Standish Av	0'	In Int.	Broadside	Other Motor Vehicle	South	Making Left Turn	West	Proceeding Straight	Auto RW Violation	0 0
6557827	7/8/14	15:00	Standish Av & Todd Rd	50'	North	Sideswipe	Other Motor Vehicle	South	Other Unsafe Turning	South	Proceeding Straight	Improper Turning	0 0
6774319	12/23/14	20:00	Todd Rd & Standish Av	167'	East	Rear-End	Other Motor Vehicle	West	Proceeding Straight	West	Stopped in Road	Unsafe Speed	0 0
7105206	9/3/15	16:55	Todd Rd & Standish Av	0'	In Int.	Broadside	Other Motor Vehicle	South	Making Left Turn	West	Proceeding Straight	Auto RW Violation	0 0
90053771	11/7/15	13:07	Todd Rd & Standish Ave	0'	In Int.	Broadside	Other Motor Vehicle	South	Making Left Turn	East	Making Left Turn	Auto RW Violation	0 0
90059533	11/12/15	13:53	Todd Rd & Standish Ave	0'	In Int.	Broadside	Bicycle	South	Making Left Turn	East	Making Left Turn	Auto RW Violation	1 0
90299086	10/19/16	11:55	Todd Rd & Standish Ave	0'	In Int.	Sideswipe	Other Motor Vehicle	South	Making Left Turn	North	Proceeding Straight	Auto RW Violation	0 0
90353750	12/5/16	06:23	Todd Rd. & Standish Ave.	0'	In Int.	Overturned	Non-Collision	South	Making Left Turn	East	Proceeding Straight	Auto RW Violation	1 0
90420591	3/20/17	17:40	Todd Road & Standish Ave	0'	In Int.	Broadside	Other Motor Vehicle	South	Making Left Turn	West	Proceeding Straight	Auto RW Violation	0 0

Settings Used For Query

<u>Parameter</u>	<u>Setting</u>
Street Name	TOD*
Cross Street	STA*
Starting Date	1/1/2013
Ending Date	12/31/2017
Distance from Intersection	>= 0' for non rear-end collisions
	>= 0' for rear-end collisions

SEGMENT COLLISION RATE CALCULATIONS**3150 Dutton Avenue Traffic Impact Study**

Location: Dutton Avenue Between Bellevue Avenue and West
Robles Avenue

Date of Count: Wednesday, January 27, 2016

ADT: 5,400

Number of Collisions: 1

Number of Injuries: 1

Number of Fatalities: 0

Start Date: January 1, 2013

End Date: December 31, 2017

Number of Years: 5

Highway Type: Conventional 2 lanes or less

Area: Suburban

Design Speed: ≤45

Segment Length: 0.5 miles

Direction: North/South

Number of Collisions x 1 Million					
ADT x 365 Days per Year x Segment Length x Number of Years					
	1	x	1,000,000		
5,400	x	365	x	0.5	x 5

	Collision Rate	Fatality Rate	Injury Rate
Study Segment	0.20 c/mvm	0.0%	100.0%
Statewide Average*	2.39 c/mvm	0.6%	37.1%

ADT = average daily traffic volume

c/mvm = collisions per million vehicle miles

* 2014 Collision Data on California State Highways, Caltrans

Location:

Date of Count:

ADT:

Number of Collisions:

Number of Injuries:

Number of Fatalities:

Start Date:

End Date:

Number of Years:

Highway Type:

Area:

Design Speed:

Terrain:

Segment Length:

Number of Collisions x 1 Million					
ADT x 365 Days per Year x Segment Length x Number of Years					
	0	x	1,000,000		
0	x	365	x	0	x 0

	Collision Rate	Fatality Rate	Injury Rate
Study Segment	c/mvm		
Statewide Average*	c/mvm		

ADT = average daily traffic volume

c/mvm = collisions per million vehicle miles

* 2014 Collision Data on California State Highways, Caltrans

3150 Dutton Avenue TIS

Collision Report Summary

7/13/2018

Date Range Reported: 1/1/13 - 12/31/17

Total Number of Collisions: 1

Total Number of Persons Injured: 4

Total Number of Persons Killed: 0

Page 1

Report#	Date	Time	Location	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Dir. of Travel 1	Movement Prec. Coll. 1	Dir. of Travel 2	Movement Prec. Coll. 2	PCF	Inj. Kil.
8353668	3/28/17	09:21	Dutton Av & Bellevue Av	1273'	South	Head-On	Other Motor Vehicle	South	Making Left Turn	North	Proceeding Straight	Auto RW Violation	4 0

Settings Used For Query

<u>Parameter</u>	<u>Setting</u>
Street Name	DUT*
Cross Street	BEL*
Starting Date	1/1/2013
Ending Date	12/31/2017
Distance from Intersection	>= 0' for non rear-end collisions
	>= 0' for rear-end collisions

Intersection Level Of Service Report

Intersection 1: Bellevue Avenue/Dutton Avenue

Control Type: All-way stop
Analysis Method: HCM 2010
Analysis Period: 15 minutes
Delay (sec / veh): 15.2
Level Of Service: C

Intersection Setup

Name	Dutton Avenue				Bellevue Avenue				Bellevue Ave
Approach	Northbound				Southbound				Westbound
Lane Configuration	+				+				
Turning Movement	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
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	150.00
Speed [mph]	40.00				25.00				35.00
Grade [%]	0.00				0.00				0.00
Crosswalk	Yes				Yes				Yes

volumes

Name	Dutton Avenue				Dutton Avenue				Bellevue Avenue				Bellevue Ave
Base Volume Input [veh/h]	110	40	97	35	29	12	29	173	117	121	173	108	108
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	1.0000
Heavy Vehicles Percentage [%]	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
Growth Rate	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
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Diverfed Trips [veh/h]	0	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	0
Existing Site Adjustment Volume [veh/h]	0	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	0
Total Hourly Volume [veh/h]	110	40	97	35	29	12	29	173	117	121	173	108	108
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
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	1.0000
Total 15-Minute Volume [veh/h]	31	11	27	10	8	3	8	48	33	34	48	30	30
Total Analyse Volume [veh/h]	122	44	108	39	32	13	32	192	130	134	192	120	120
Pedestrian Volume [ped/h]	0				0				0				0

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	2.48	0.56	3.56	3.77	0.68
95th-Percentile Queue Length [ft]	62.04	14.10	88.98	94.28	16.90
Approach Delay [s/veh]	14.44	11.13	16.06	15.71	
Approach LOS	B	B	C	C	C
Intersection Delay [s/veh]	15.19				
Intersection LOS	C				

Intersection Level Of Service Report

Intersection 2: Todd Road/Standish Avenue - Ghilotti Avenue

Control Type: Two-way stop
Analysis Method: HCM 2010
Analysis Period: 15 minutes
Delay (sec / veh): 71.8
Level Of Service: F
Volume to Capacity (v/c): 0.780

Intersection Setup

Name	Ghilotti Road				Standish Avenue				Todd Road			
Approach	Northbound				Southbound				Eastbound			
Lane Configuration	+				+				+			
Turning Movement	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	
No. of Lanes in Pocket	0	0	0		0	0	0		1	0	1	
Pocket Length [ft]	100.00	100.00	100.00		100.00	100.00	100.00		120.00	100.00	100.00	
Speed [mph]	25.00				30.00				35.00			
Grade [%]	0.00				0.00				0.00			
Crosswalk	No				No				No			

volumes

Name	Ghilotti Road				Standish Avenue				Todd Road			
Base Volume Input [veh/h]	3	2	24		150	1	43		91	283	3	
Base Volume Adjustment Factor	1.0000	1.0000	1.0000		1.0000	1.0000	1.0000		1.0000	1.0000	1.0000	
Heavy Vehicles Percentage [%]	2.00	2.00	2.00		2.00	2.00	2.00		2.00	2.00	2.00	
Growth Rate	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
In-Process Volume [veh/h]	0	0	0		0	0	0		0	0	0	
Site-Generated Trips [veh/h]	0	0	0		0	0	0		0	0	0	
Diverfed Trips [veh/h]	0	0	0		0	0	0		0	0	0	
Pass-by Trips [veh/h]	0	0	0		0	0	0		0	0	0	
Existing Site Adjustment Volume [veh/h]	0	0	0		0	0	0		0	0	0	
Other Volume [veh/h]	0	0	0		0	0	0		0	0	0	
Total Hourly Volume [veh/h]	3	2	24		150	1	43		91	283	3	
Peak Hour Factor	0.9300	0.9300	0.9300		0.9300	0.9300	0.9300		0.9300	0.9300	0.9300	
Other Adjustment Factor	1.0000	1.0000	1.0000		1.0000	1.0000	1.0000		1.0000	1.0000	1.0000	
Total 15-Minute Volume [veh/h]	1	1	6		40	0	12		24	76	1	
Total Analyse Volume [veh/h]	3	2	26		161	1	46		98	304	3	
Pedestrian Volume [ped/h]	0				0				0			

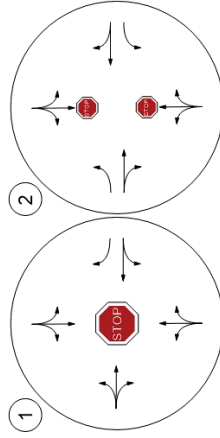
Intersection Settings

Priority Scheme	Stop	Stop	Stop	Free	Free
Flared Lane	No	No	No		
Storage Area [veh]	1	0	0	0	0
Two-Stage Gap Acceptance	No	No	No		
Number of Storage Spaces in Median	0	0	0	0	0

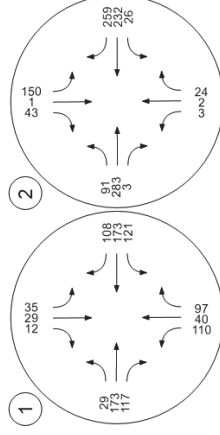
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.01	0.04	0.78	0.00	0.07	0.09	0.00	0.00	0.02	0.00	0.00
d_M, Delay for Movement [s/veh]	23.73	24.22	10.36	71.80	66.92	59.81	8.82	0.00	0.00	7.94	0.00	0.00
Movement LOS	C	C	B	F	F	F	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.19	0.19	0.19	6.88	6.88	6.88	0.31	0.00	0.00	0.07	0.00	0.00
95th-Percentile Queue Length [ft]	4.86	4.86	4.86	172.10	172.10	172.10	7.78	0.00	0.00	1.71	0.00	0.00
d_A, Approach Delay [s/veh]	12.55				66.14				2.13			
Approach LOS	B				F				A			
d_I, Intersection Delay [s/veh]	13.22											
Intersection LOS	F											

Lane Configuration and Traffic Control



Traffic Volume - Base Volume



Intersection Level Of Service Report

Intersection 1: Bellevue Avenue/Dutton Avenue

Control Type: All-way stop

Analysis Method: HCM 2010

Analysis Period: 15 minutes

Delay (sec / veh): 15.2

Level Of Service: C

Intersection Setup

Name	Dutton Avenue				Bellevue Avenue			
Approach	Northbound				Eastbound			
Lane Configuration	+				+			
Turning Movement	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
No. of Lanes in Pocket	0	0	0	0	0	0	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	150.00
Speed [mph]	40.00				35.00			
Grade [%]	0.00				0.00			
Crosswalk	Yes				Yes			

volumes

Name	Dutton Avenue				Bellevue Avenue			
Base Volume Input [veh/h]	110	40	97	35	29	12	29	173
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0
Diverged Trips [veh/h]	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	110	40	97	35	29	12	29	173
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	31	11	27	10	8	3	8	48
Total Analyse Volume [veh/h]	122	44	108	39	32	13	32	192
Pedestrian Volume [ped/h]	0	0	0	0	0	0	0	0

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	2.48	0.56	3.56	3.77	0.68
95th-Percentile Queue Length [ft]	62.04	14.10	88.98	94.26	16.90
Approach Delay [s/veh]	14.44	11.13	16.06		15.71
Approach LOS	B	B	C		C
Intersection Delay [s/veh]		15.19			
Intersection LOS		C			

Intersection Level Of Service Report

Intersection 2: Todd Road/Standish Avenue – Ghillotti Avenue
Signalized
HCM 2010
15 minutes
Control Type:
Analysis Method:
Analysis Period:
Delay (sec / veh):
Level Of Service:
Volume to Capacity (v/c):
17.4
B
0.605

Intersection Setup

Name	Ghillotti Road				Standish Avenue				Todd Road			
Approach	Northbound				Southbound				Eastbound			
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	1	0	0	1	0	1	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	250.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00				30.00				35.00			
Grade [%]	0.00				0.00				0.00			
Crosswalk	No				No				No			

volumes

Name	Ghillotti Road				Standish Avenue				Todd Road			
Base Volume Input [veh/h]	3	2	24	150	1	43	91	283	3	26	232	259
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	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]	3	2	24	150	1	43	91	283	3	26	232	259
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
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]	1	1	6	40	0	12	24	76	1	7	62	70
Total Analysis Volume [veh/h]	3	2	26	161	1	46	98	304	3	28	249	276
Presence of On-Street Parking	No	No	No	No	No	No	No	No	No	No	No	No
On-Street Parking Maneuver Rate [1/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [1/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0	0	0	0	0	0	0	0	0	0	0	0
Bicycle Volume [bicycl/h]	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Protecte	Permiss	Protecte	Permiss	Protecte	Permiss
Signal group	0	2	0	0	6	0	3	0	8	0	4
Auxiliary Signal Groups											
Lead / Lag	-	-	-	-	-	Lead	-	-	-	Lead	-
Minimum Green [s]	0	5	0	0	5	0	5	0	5	0	5
Maximum Green [s]	0	30	0	0	30	0	30	0	30	0	30
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
Split [s]	0	20	0	0	15	0	10	16	0	9	15
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10
I1, StartUp Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0
Minimum Recall	No	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	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
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
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

Exclusive Pedestrian Phase

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

Lane Group Calculations

Lane Group	C	L	C	L	C	L	C	L	C
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
I1, 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
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g.I, Effective Green Time [s]	2	5	5	4	35	2	33		
g / C, Green / Cycle	0.03	0.08	0.08	0.07	0.58	0.03	0.54		
(v / s) , Volume / Saturation Flow Rate	0.02	0.06	0.06	0.06	0.17	0.02	0.31		
s, saturation flow rate [veh/h]	1616	1774	1683	1774	1860	1774	1704		
c, Capacity [veh/h]	58	150	142	133	1080	60	919		
d1, Uniform Delay [s]	28.56	26.88	26.90	27.30	6.35	28.61	9.27		
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.11	0.50		
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
d2, Incremental Delay [s]	7.30	5.99	6.63	7.65	0.66	5.67	2.60		
d3, Initial Queue Delay [s]	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		
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00		

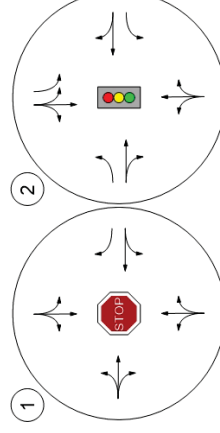
Lane Group Results

X, volume / capacity	0.53	0.71	0.72	0.74	0.28	0.47	0.57		
d, Delay for Lane Group [s/veh]	36.86	32.86	33.54	34.95	7.01	34.28	11.88		
Lane Group LOS	D	C	C	C	A	C	B		
Critical Lane Group	Yes	No	Yes	Yes	No	No	Yes		
50th-Percentile Queue Length [veh]	0.54	1.65	1.61	1.57	1.61	0.47	4.13		
50th-Percentile Queue Length [ft]	13.60	41.23	40.34	39.13	40.33	11.63	103.25		
95th-Percentile Queue Length [veh]	0.98	2.97	2.90	2.82	2.90	0.84	7.43		
95th-Percentile Queue Length [ft]	24.48	74.21	72.62	70.43	72.59	20.93	185.86		

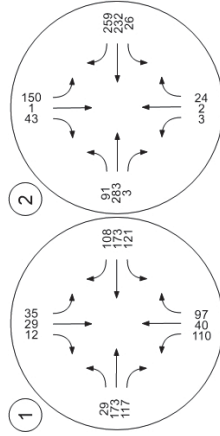
Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	35.86	35.86	35.86	33.10	33.54	33.54	34.95	7.01	7.01	34.28	11.68	11.68
Movement LOS	D	D	D	C	C	C	C	A	A	C	B	B
d_A, Approach Delay [s/veh]	35.86			33.19			13.78				13.01	
Approach LOS	D			C			B				B	
d_I, Intersection Delay [s/veh]							17.36					
Intersection LOS							B					
Intersection V/C							0.605					

Sequence

[illegible]

Traffic Volume - Base Volume



Intersection Level Of Service Report

Control Type: All-way stop
Analysis Method: HCM 2010
Analysis Period: 15 minutes
Delay (sec / veh): 15.2
Level Of Service: C
Volume to Capacity (v/c): 0.587

Intersection Setup

Name	Dutton Avenue				Dutton Avenue				Bellevue Avenue				Bellevue Ave
Approach	Northbound				Southbound				Eastbound				Westbound
Lane Configuration	+				+				+				+
Turning Movement	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
No. of Lanes in Pocket	0	0	0		0	0	0		0	0	0		1
Pocket Length [ft]	100.00	100.00	100.00		100.00	100.00	100.00		100.00	100.00	100.00		150.00
Speed [mph]	40.00				25.00				35.00				35.00
Grade [%]	0.00				0.00				0.00				0.00
Crosswalk	Yes				Yes				Yes				Yes

Volumes

Name	Dutton Avenue				Dutton Avenue				Bellevue Avenue				Bellevue Ave
Base Volume Input [veh/h]	110	40	97		35	29	12		29	173	117		108
Base Volume Adjustment Factor	1.0000	1.0000	1.0000		1.0000	1.0000	1.0000		1.0000	1.0000	1.0000		1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00		2.00	2.00	2.00		2.00	2.00	2.00		2.00
Growth Rate	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00
In-Process Volume [veh/h]	0	0	0		0	0	0		0	0	0		0
Site-Generated Trips [veh/h]	0	0	0		0	0	0		0	0	0		0
Diverter Trips [veh/h]	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
Existing Site Adjustment Volume [veh/h]	0	0	0		0	0	0		0	0	0		0
Other Volume [veh/h]	0	0	0		0	0	0		0	0	0		0
Total Hourly Volume [veh/h]	110	40	97		35	29	12		29	173	117		108
Peak Hour Factor	0.9000	0.9000	0.9000		0.9000	0.9000	0.9000		0.9000	0.9000	0.9000		0.9000
Other Adjustment Factor	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]	31	11	27		10	8	3		8	48	33		48
Total Analysis Volume [veh/h]	122	44	108		39	32	13		32	192	130		120
Pedestrian Volume [ped/h]	0				0				0				0

Intersection Settings

Lanes					
Capacity per Entry Lane [veh/h]	585	527	624	555	647
Degree of Utilization, x	0.47	0.16	0.57	0.59	0.19

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	2.48	0.56	3.56	3.77	0.68
95th-Percentile Queue Length [ft]	62.04	14.10	88.98	94.26	16.90
Approach Delay [s/veh]	14.44	11.13	16.06	15.71	
Approach LOS	B	B	C	C	
Intersection Delay [s/veh]	15.19				
Intersection LOS	C				

Intersection Level Of Service Report

Control Type :
Analysis Method:
Analysis Period:

Intersection 2: Todd Road/Standish Avenue – Ghilotti Avenue
Delay (sec / veh):
Level Of Service:
Volume to Capacity (v/c):

Intersection Setup

Name	Ghilotti Road			Standish Avenue			Todd Road		
Approach	Northbound			Southbound			Eastbound		
Lane Configuration	+			T			T		
Turning Movement	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
No. of Lanes in Pocket	0	0	0	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	150.00	100.00	100.00	100.00	100.00	150.00
Speed [mph]	25.00			30.00			35.00		
Grade [%]	0.00			0.00			0.00		
Crosswalk	No			No			No		

Volumes

Name	Ghilotti Road			Standish Avenue			Todd Road		
Base Volume Input [veh/h]	3	2	24	150	1	43	91	283	3
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0
Diverter Trips [veh/h]	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	2	24	150	1	43	91	283	3
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	1	6	40	0	12	24	76	1
Total Analysis Volume [veh/h]	3	2	26	161	1	46	98	304	3
Pedestrian Volume [ped/h]	0			0			0		

Intersection Settings

Lanes										
Capacity per Entry Lane [veh/h]	502	466	549	500	538	509	549	614		
Degree of Utilization, x	0.06	0.35	0.09	0.20	0.57	0.06	0.45	0.45		

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.20	1.52	0.28	0.72	3.56	0.17	2.35	2.35		
95th-Percentile Queue Length [ft]	4.92	38.08	6.99	18.05	88.99	4.35	58.74	58.74		
Approach Delay [s/veh]	10.65									
Approach LOS	B		13.42		16.43				13.74	
Intersection Delay [s/veh]									B	
Intersection LOS				14.51					B	

Intersection Level Of Service Report

Control Type: All-way stop
Analysis Method: HCM 2010
Analysis Period: 15 minutes
Delay (sec / veh): 21.9
Level Of Service: C

Intersection Setup

Name	Dutton Avenue				Dutton Avenue				Bellevue Avenue				Bellevue Avenue			
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		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]	40.00				25.00				35.00				35.00			
Grade [%]	0.00				0.00				0.00				0.00			
Crosswalk	Yes				Yes				Yes				Yes			

volumes

Name	Dutton Avenue				Dutton Avenue				Bellevue Avenue				Bellevue Avenue			
Base Volume Input [veh/h]	165	23	179		113	55	42		10	143	75		109	182	42	
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 [%]	2.00	2.00	2.00		2.00	2.00	2.00		2.00	2.00	2.00		2.00	2.00	2.00	
Growth Rate	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
In-Process Volume [veh/h]	0	0	0		0	0	0		0	0	0		0	0	0	
Site-Generated Trips [veh/h]	0	0	0		0	0	0		0	0	0		0	0	0	
Diverter 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	
Total Hourly Volume [veh/h]	165	23	179		113	55	42		10	143	75		109	182	42	
Peak Hour Factor	0.9000	0.9000	0.9000		0.9000	0.9000	0.9000		0.9000	0.9000	0.9000		0.9000	0.9000	0.9000	
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]	46	6	50		31	15	12		3	40	21		30	51	12	
Total Analysis Volume [veh/h]	183	26	199		126	61	47		11	159	83		121	202	47	
Pedestrian Volume [ped/h]	0				0				0				0			

Intersection Settings

Lanes						
Movement, Approach, & Intersection Results						
	95th-Percentile Queue Length [veh]	6.47	2.50	2.81	5.08	0.29
	95th-Percentile Queue Length [ft]	161.84	62.43	70.13	127.11	7.16
	Approach Delay [s/veh]	26.66	16.62	17.28	23.25	
	Approach LOS	D	C	C	C	C
Intersection Delay [s/veh]		21.03				
Intersection LOS		C				

Control Type: Two-way stop
Analysis Method: HCM 2010
Analysis Period: 15 minutes
Intersection 2: Todd Road/Standish Avenue – Ghilotti Avenue
Delay (sec / veh): 182.4
Level Of Service: F
Volume to Capacity (v/c): 1.146

Intersection Setup

Name	Ghilotti Road				Standish Avenue				Todd Road			
Approach	Northbound				Southbound				Eastbound			
Lane Configuration	+				+				+			
Turning Movement	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	
No. of Lanes in Pocket	0	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	
Speed [mph]	25.00				30.00				35.00			
Grade [%]	0.00				0.00				0.00			
Crosswalk	No				No				No			

volumes

Name	Ghilotti Road				Standish Avenue				Todd Road			
Base Volume Input [veh/h]	3	4	34		252	2	65		316	8	23	
Base Volume Adjustment Factor	1.0000	1.0000	1.0000		1.0000	1.0000	1.0000		1.0000	1.0000	1.0000	
Heavy Vehicles Percentage [%]	2.00	2.00	2.00		2.00	2.00	2.00		2.00	2.00	2.00	
Growth Rate	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
In-Process Volume [veh/h]	0	0	0		0	0	0		0	0	0	
Site-Generated Trips [veh/h]	0	0	0		0	0	0		0	0	0	
Diverted Trips [veh/h]	0	0	0		0	0	0		0	0	0	
Pass-by Trips [veh/h]	0	0	0		0	0	0		0	0	0	
Existing Site Adjustment Volume [veh/h]	0	0	0		0	0	0		0	0	0	
Other Volume [veh/h]	0	0	0		0	0	0		0	0	0	
Total Hourly Volume [veh/h]	3	4	34		252	2	65		316	8	23	
Peak Hour Factor	0.9300	0.9300	0.9300		0.9300	0.9300	0.9300		0.9300	0.9300	0.9300	
Other Adjustment Factor	1.0000	1.0000	1.0000		1.0000	1.0000	1.0000		1.0000	1.0000	1.0000	
Total 15-Minute Volume [veh/h]	1	1	9		68	1	17		85	2	6	
Total Analysis Volume [veh/h]	3	4	37		271	2	70		340	9	25	
Pedestrian Volume [ped/h]	0				0				0			

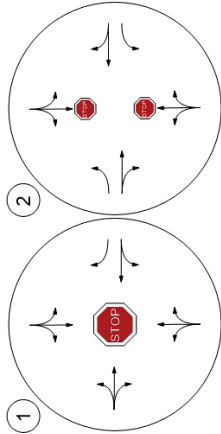
Intersection Settings

Priority Scheme	Stop	Stop	Stop	Free
Flared Lane	No	No	No	Free
Storage Area [veh]	1	0	0	0
Two-Stage Gap Acceptance	No	No	No	0
Number of Storage Spaces in Median	0	0	0	0

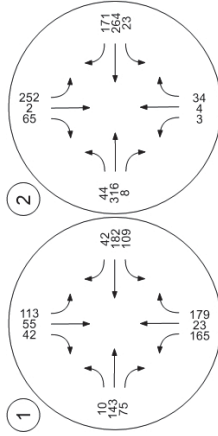
Movement, Approach, & Intersection Results

V/C Movement V/C Ratio	0.01	0.02	0.05	1.15	0.01	0.10	0.04	0.00	0.02	0.00	0.00
d_M Delay for Movement [s/veh]	21.99	20.51	10.77	182.36	180.38	172.51	8.44	0.00	8.04	0.00	0.00
Movement LOS	C	C	B	F	F	F	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.27	0.27	0.27	16.56	16.56	16.56	0.13	0.00	0.06	0.00	0.00
95th-Percentile Queue Length [ft]	6.77	6.77	6.77	413.95	413.95	413.95	3.36	0.00	1.58	0.00	0.00
d_A Approach Delay [s/veh]		12.42			180.34		1.00				0.41
Approach LOS		B			F		A		A		A
d_I Intersection Delay [s/veh]						49.37					
Intersection LOS						F					

Lane Configuration and Traffic Control



Traffic Volume - Base Volume



Intersection Level Of Service Report

Intersection 1: Bellevue Avenue/Dutton Avenue

Control Type: All-way stop
Analysis Method: HCM 2010
Analysis Period: 15 minutes
Delay (sec / veh): 21.9
Level Of Service: C

Intersection Setup

Name	Dutton Avenue Northbound	Dutton Avenue Southbound	Bellevue Avenue Eastbound	Bellevue Avenue Westbound
Approach				
Lane Configuration				
Turning Movement				
Lane Width [ft]	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00
Speed [mph]	40.00	25.00	35.00	35.00
Grade [%]	0.00	0.00	0.00	0.00
Crosswalk	Yes	Yes	Yes	Yes

volumes

Name	Dutton Avenue Northbound	Dutton Avenue Southbound	Bellevue Avenue Eastbound	Bellevue Avenue Westbound
Base Volume Input [veh/h]	165	23	113	55
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0
Diverter Trips [veh/h]	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0
Other Volume [veh/h]	0	0	0	0
Total Hourly Volume [veh/h]	165	23	113	55
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	46	6	50	31
Total Analysis Volume [veh/h]	183	26	199	126
Pedestrian Volume [ped/h]	0	0	0	0

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	6.47	2.50	2.81	5.08	0.29
95th-Percentile Queue Length [ft]	161.84	62.43	70.13	127.11	7.16
Approach Delay [s/veh]	26.66	16.62	17.28	23.25	
Approach LOS	D	C	C	C	C
Intersection Delay [s/veh]	21.93				
Intersection LOS	C				



Intersection Level Of Service Report

Control Type: Signalized
Analysis Method: HCM 2010
Analysis Period: 15 minutes
Intersection 2: Todd Road/Standish Avenue – Ghilotti Avenue
Delay (sec / veh): 18.2
Level Of Service: B
Volume to Capacity (v/c): 0.575

Intersection Setup

Name	Ghilotti Road				Standish Avenue				Todd Road			
Approach	Northbound				Southbound				Eastbound			
Lane Configuration	+				+				+			
Turning Movement	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	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	250.00	100.00	100.00	100.00	100.00	100.00	150.00	100.00	100.00
Speed [mph]	25.00				30.00				35.00			
Grade [%]	0.00				0.00				0.00			
Crosswalk	No				No				No			

volumes

Name	Ghilotti Road				Standish Avenue				Todd Road			
Base Volume Input [veh/h]	3	4	34		252	2	65	44	316	8	23	284
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
Heavy Vehicles Percentage [%]	2.00	2.00	2.00		2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0		0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0		0	0	0	0	0	0	0	0
Diverged Trips [veh/h]	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
Existing Site Adjustment Volume [veh/h]	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
Right-Turn on Red Volume [veh/h]	0	0	0		0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	4	34		252	2	65	44	316	8	23	284
Peak Hour Factor	0.9300	0.9300	0.9300		0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
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
Total 15-Minute Volume [veh/h]	1	1	9		68	1	17	12	85	2	6	71
Total Analysis Volume [veh/h]	3	4	37		271	2	70	47	340	9	25	284
Presence of On-Street Parking	No	No	No		No	No	No	No	No	No	No	No
On-Street Parking Maneuver Rate [1/h]	0	0	0		0	0	0	0	0	0	0	0
Local Bus Stopping Rate [1/h]	0	0	0		0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0				0				0			
Bicycle Volume [bicycles/h]	0				0				0			

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Protecte	Permiss	Protecte	Permiss
Signal group	0	2	0	0	6	0	3	0	8	0	7	4
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	Lead	-
Minimum Green [s]	0	5	0	0	5	0	5	0	5	0	5	5
Maximum Green [s]	0	30	0	0	30	0	30	0	30	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0
Split [s]	0	21	0	0	15	0	9	15	0	9	15	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0	0.0
Minimum Recall	No	No	No	No	No	No	No	No	No	No	No	No
Maximum Recall	No	No	No	No	No	No	No	No	No	No	No	No
Pedestrian Recall	No	No	No	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	C	L	C	L	C	L	C
L, Total Lost Time per Cycle [s]	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
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	3	8	8	3	32	2	31
g / C, Green / Cycle	0.04	0.13	0.13	0.05	0.53	0.03	0.51
(V / s)_j Volume / Saturation Flow Rate	0.03	0.10	0.10	0.03	0.19	0.01	0.27
s, saturation flow rate [veh/h]	1617	1774	1690	1774	1854	1774	1742
c, Capacity [veh/h]	72	238	227	82	974	53	886
d1, Uniform Delay [s]	28.22	25.01	25.02	28.09	8.34	28.72	9.92
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.11	0.50
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	8.04	4.39	4.67	6.10	1.03	6.50	2.25
d3, Initial Queue Delay [s]	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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.61	0.74	0.74	0.57	0.36	0.47	0.53
d, Delay for Lane Group [s/veh]	36.26	29.41	29.69	34.20	9.37	35.22	12.17
Lane Group LOS	D	C	C	C	A	D	B
Critical Lane Group	Yes	No	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	0.76	2.54	2.45	0.76	2.33	0.43	3.79
50th-Percentile Queue Length [ft]	19.06	63.56	61.22	18.95	58.34	10.67	94.82
95th-Percentile Queue Length [veh]	1.37	4.58	4.41	1.36	4.20	0.77	6.83
95th-Percentile Queue Length [ft]	34.31	114.41	110.20	34.11	105.02	19.21	170.68

Movement, Approach, & Intersection Results

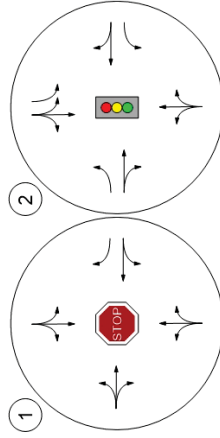
d_M, Delay for Movement [s/veh]	36.26	36.26	36.26	36.26	29.69	29.69	34.20	9.37	9.37	35.22	12.17	12.17
Movement LOS	D	D	D	D	C	C	C	A	A	D	B	B
d_A, Approach Delay [s/veh]		36.26			29.55			12.32			13.34	
Approach LOS		D			C			B			B	
d_I, Intersection Delay [s/veh]							18.17					
Intersection LOS							B					
Intersection V/C							0.575					

Sequence

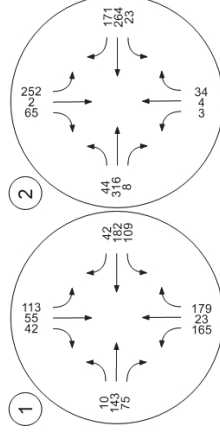
Ring 1	2	6	3	4	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-



Lane Configuration and Traffic Control



Traffic Volume - Base Volume



Intersection Level Of Service Report
Intersection 1: Bellevue Avenue/Dutton Avenue

Control Type: All-way stop
Analysis Method: HCM 2010
Analysis Period: 15 minutes
Delay (sec / veh): 21.9
Level Of Service: C
Volume to Capacity (V/C): 0.748

Intersection Setup

Name	Dutton Avenue				Bellevue Avenue				Bellevue Ave
Approach	Northbound				Southbound				Westbound
Lane Configuration	+				+				
Turning Movement	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
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	150.00
Speed [mph]	40.00				25.00				35.00
Grade [%]	0.00				0.00				0.00
Crosswalk	Yes				Yes				Yes

Volumes

Name	Dutton Avenue				Dutton Avenue				Bellevue Avenue			
Base Volume Input [veh/h]	165	23	179	113	55	42	10	143	75	109	182	42
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	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
Total Hourly Volume [veh/h]	165	23	179	113	55	42	10	143	75	109	182	42
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
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]	46	6	50	31	15	12	3	40	21	30	51	12
Total Analyse Volume [veh/h]	183	26	199	126	61	47	11	159	83	121	202	47
Pedestrian Volume [ped/h]	0				0				0			

Intersection Settings

Lanes					
Capacity per Entry Lane [veh/h]	546		495		538
Degree of Utilization, x	0.75		0.47		0.09

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	6.47	2.50	2.81	5.08	0.29
95th-Percentile Queue Length [ft]	161.84	62.43	70.13	127.11	7.16
Approach Delay [s/veh]	26.66	16.62	17.28	23.25	
Approach LOS	D	C	C	C	C
Intersection Delay [s/veh]	21.93				
Intersection LOS	C				

Intersection Level Of Service Report

Intersection 2: Todd Road/Standish Avenue - Ghilotti Avenue

Delay (sec / veh): 19.7
Level Of Service: C
Volume to Capacity (V/C): 0.714

Control Type: All-way stop
Analysis Method: HCM 2010
Analysis Period: 15 minutes

Intersection Setup

Name	Ghilotti Road				Standish Avenue				Todd Road			
Approach	Northbound				Southbound				Eastbound			
Lane Configuration	+				T				T			
Turning Movement	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	0	1	0	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	150.00	100.00	100.00	100.00	120.00	100.00	150.00	100.00
Speed [mph]	25.00				30.00				35.00			
Grade [%]	0.00				0.00				0.00			
Crosswalk	No				No				No			

Volumes

Name	Ghilotti Road				Standish Avenue				Todd Road			
Base Volume Input [veh/h]	3	4	34	252	2	65	44	316	8	23	264	171
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverfed 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
Total Hourly Volume [veh/h]	3	4	34	252	2	65	44	316	8	23	264	171
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
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]	1	1	9	68	1	17	12	85	2	6	71	46
Total Analyse Volume [veh/h]	3	4	37	271	2	70	47	340	9	25	284	184
Pedestrian Volume [ped/h]	0				0				0			

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	459	450	528	456	489	460	483	545
Degree of Utilization, x	0.10	0.60	0.14	0.10	0.71	0.05	0.58	0.34

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.32	3.86	0.47	0.34	5.66	0.17	3.60	1.48
95th-Percentile Queue Length [ft]	7.91	96.46	11.74	8.56	141.56	4.30	89.95	37.02
Approach Delay [s/veh]	11.68				24.64		16.52	
Approach LOS	B				C		C	
Intersection Delay [s/veh]	19.70							
Intersection LOS	C							

Intersection Level Of Service Report

Intersection 1: Bellevue Avenue/Dutton Avenue

Control Type: All-way stop

Analysis Method: HCM 2010

Analysis Period: 15 minutes

Delay (sec / veh):

Level Of Service:

16.4

C

Intersection Setup

Name	Dutton Avenue				Bellevue Avenue				Bellevue Ave			
Approach	Northbound				Southbound				Eastbound			
Lane Configuration	+				+				+			
Turning Movement	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	0	0	0	0	0	1
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	150.00
Speed [mph]	40.00				25.00				35.00			
Grade [%]	0.00				0.00				0.00			
Crosswalk	Yes				Yes				Yes			

volumes

Name	Dutton Avenue				Dutton Avenue				Bellevue Avenue				Bellevue Ave			
Base Volume Input [veh/h]	110	40	97		35	29	12		29	173	117		121	173	108	
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 [%]	2.00	2.00	2.00		2.00	2.00	2.00		2.00	2.00	2.00		2.00	2.00	2.00	
Growth Rate	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
In-Process Volume [veh/h]	0	0	0		0	0	0		0	0	0		0	0	0	
Site-Generated Trips [veh/h]	9	0	24		0	0	0		0	0	2		6	0	0	
Diverfed 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	
Total Hourly Volume [veh/h]	119	40	121		35	29	12		29	173	119		127	173	108	
Peak Hour Factor	0.9000	0.9000	0.9000		0.9000	0.9000	0.9000		0.9000	0.9000	0.9000		0.9000	0.9000	0.9000	
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]	33	11	34		10	8	3		8	48	33		35	48	30	
Total Analyse Volume [veh/h]	132	44	134		39	32	13		32	192	132		141	192	120	
Pedestrian Volume [ped/h]	0				0				0				0			

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	3.15	0.58	3.83	4.17	0.70
95th-Percentile Queue Length [ft]	78.85	14.62	95.78	104.17	17.57
Approach Delay [s/veh]	16.12	11.44	17.15	16.96	C
Approach LOS	C	B	C	C	C
Intersection Delay [s/veh]	16.41				
Intersection LOS	C				

Intersection Level Of Service Report

Intersection 2: Todd Road/Standish Avenue - Ghilotti Avenue

Control Type: Two-way stop
Analysis Method: HCM 2010
Analysis Period: 15 minutes
Delay (sec / veh): 83.2
Level Of Service: F
Volume to Capacity (v/c): 0.834

Intersection Setup

Name	Ghilotti Road				Standish Avenue				Todd Road			
Approach	Northbound				Southbound				Eastbound			
Lane Configuration	+				+				+			
Turning Movement	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	
No. of Lanes in Pocket	0	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	
Speed [mph]	25.00				30.00				35.00			
Grade [%]	0.00				0.00				0.00			
Crosswalk	No				No				No			

volumes

Name	Ghilotti Road				Standish Avenue				Todd Road			
Base Volume Input [veh/h]	3	2	24		150	1	43		91	283	3	
Base Volume Adjustment Factor	1.0000	1.0000	1.0000		1.0000	1.0000	1.0000		1.0000	1.0000	1.0000	
Heavy Vehicles Percentage [%]	2.00	2.00	2.00		2.00	2.00	2.00		2.00	2.00	2.00	
Growth Rate	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
In-Process Volume [veh/h]	0	0	0		0	0	0		0	0	0	
Site-Generated Trips [veh/h]	0	0	0		9	0	2		1	0	0	
Diverted Trips [veh/h]	0	0	0		0	0	0		0	0	0	
Pass-by Trips [veh/h]	0	0	0		0	0	0		0	0	0	
Existing Site Adjustment Volume [veh/h]	0	0	0		0	0	0		0	0	0	
Other Volume [veh/h]	0	0	0		0	0	0		0	0	0	
Total Hourly Volume [veh/h]	3	2	24		159	1	45		92	283	3	
Peak Hour Factor	0.9300	0.9300	0.9300		0.9300	0.9300	0.9300		0.9300	0.9300	0.9300	
Other Adjustment Factor	1.0000	1.0000	1.0000		1.0000	1.0000	1.0000		1.0000	1.0000	1.0000	
Total 15-Minute Volume [veh/h]	1	1	6		43	0	12		25	76	1	
Total Analyse Volume [veh/h]	3	2	26		171	1	48		99	304	3	
Pedestrian Volume [ped/h]	0				0				0			

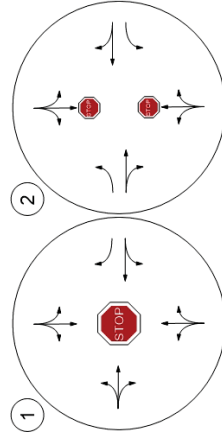
Intersection Settings

Priority Scheme	Stop	Stop	Stop	Free	Free
Flared Lane	No	No	No		
Storage Area [veh]	1	0	0	0	0
Two-Stage Gap Acceptance	No	No	No		
Number of Storage Spaces in Median	0	0	0	0	0

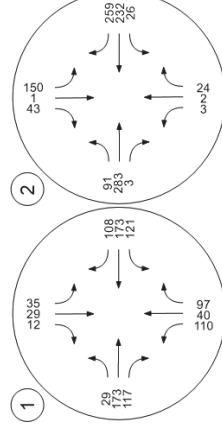
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.01	0.04	0.83	0.00	0.07	0.10	0.00	0.00	0.02	0.00	0.00
d_M, Delay for Movement [s/veh]	23.94	24.38	10.37	83.24	81.34	71.15	8.84	0.00	0.00	7.94	0.00	0.00
Movement LOS	C	C	B	F	F	F	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.20	0.20	0.20	7.84	7.84	7.84	0.32	0.00	0.00	0.07	0.00	0.00
95th-Percentile Queue Length [ft]	4.88	4.88	4.88	195.97	195.97	195.97	7.89	0.00	0.00	1.71	0.00	0.00
d_A, Approach Delay [s/veh]	12.58				80.59				2.15			
Approach LOS	B				F				A			
d_I, Intersection Delay [s/veh]	15.82											
Intersection LOS	F											

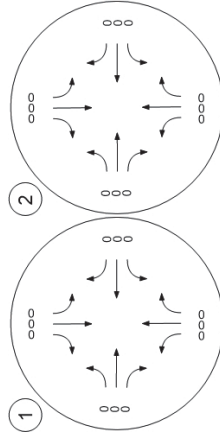
Lane Configuration and Traffic Control



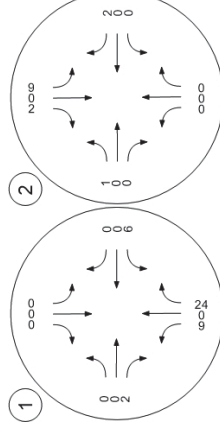
Traffic Volume - Base Volume



Traffic Volume - In-Process Volume



Traffic Volume - Net New Site Trips



Intersection Level Of Service Report

Intersection 1: Bellevue Avenue/Dutton Avenue

Control Type: All-way stop
Analysis Method: HCM 2010
Analysis Period: 15 minutes

Delay (sec / veh): 16.4
Level Of Service: C

Intersection Setup

Name	Dutton Avenue				Bellevue Avenue			
Approach	Northbound				Eastbound			
Lane Configuration	+				+			
Turning Movement	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
No. of Lanes in Pocket	0	0	0	0	0	0	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	150.00
Speed [mph]	40.00				35.00			
Grade [%]	0.00				0.00			
Crosswalk	Yes				Yes			

volumes

Name	Dutton Avenue				Bellevue Avenue			
Base Volume Input [veh/h]	110	40	97	35	29	12	29	173
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	9	0	24	0	0	0	0	0
Diverter Trips [veh/h]	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	119	40	121	35	29	12	29	173
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	33	11	34	10	8	3	8	48
Total Analyse Volume [veh/h]	132	44	134	39	32	13	32	192
Pedestrian Volume [ped/h]	0				0			

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	3.15	0.58	3.83	4.17	0.70
95th-Percentile Queue Length [ft]	78.85	14.62	95.78	104.17	17.57
Approach Delay [s/veh]	16.12	11.44	17.15	16.96	
Approach LOS	C	B	C	C	C
Intersection Delay [s/veh]	16.41				
Intersection LOS	C				

Intersection Level Of Service Report

Intersection 2: Todd Road/Standish Avenue - Ghillotti Avenue
Signalized
HCM 2010
15 minutes
Control Type: Delay (sec / veh): 17.6
Analysis Method: Level Of Service: B
Analysis Period: Volume to Capacity (v/c): 0.613

Intersection Setup

Name	Ghillotti Road			Standish Avenue			Todd Road		
Approach	Northbound			Southbound			Eastbound		
Lane Configuration	+			+			+		
Turning Movement	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
No. of Lanes in Pocket	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	250.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			30.00			35.00		
Grade [%]	0.00			0.00			0.00		
Crosswalk	No			No			No		

volumes

Name	Ghillotti Road			Standish Avenue			Todd Road		
Base Volume Input [veh/h]	3	2	24	150	1	43	91	283	3
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	9	0	2	1	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	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
Total Hourly Volume [veh/h]	3	2	24	159	1	45	92	283	3
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	1	6	43	0	12	25	76	1
Total Analysis Volume [veh/h]	3	2	26	171	1	48	99	304	3
Presence of On-Street Parking	No	No	No	No	No	No	No	No	No
On-Street Parking Maneuver Rate [1/h]	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [1/h]	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0		
Bicycle Volume [bicyclist/h]	0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Protecte	Permiss	Protecte	Permiss	Protecte	Permiss
Signal group	0	2	0	0	6	0	3	0	8	0	4
Auxiliary Signal Groups											
Lead / Lag	-	-	-	-	-	Lead	-	-	-	Lead	-
Minimum Green [s]	0	5	0	0	5	0	5	0	5	0	5
Maximum Green [s]	0	30	0	0	30	0	30	0	30	0	30
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
Split [s]	0	20	0	0	15	0	10	16	0	9	15
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10
I1, StartUp Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0
Minimum Recall	No	No	No	No	No	No	No	No	No	No	No
Maximum Recall	No	No	No	No	No	No	No	No	No	No	No
Pedestrian Recall	No	No	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
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
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

Exclusive Pedestrian Phase

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



Lane Group Calculations

Lane Group	C	L	C	L	C	L	C	L	C
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
I1, 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
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g.I, Effective Green Time [s]	2	5	5	4	35	2	32		
g / C, Green / Cycle	0.03	0.09	0.09	0.07	0.58	0.03	0.54		
(v / s) , Volume / Saturation Flow Rate	0.02	0.06	0.06	0.06	0.17	0.02	0.31		
s, saturation flow rate [veh/h]	1616	1774	1685	1774	1860	1774	1703		
c, Capacity [veh/h]	58	188	150	134	1071	60	909		
d1, Uniform Delay [s]	28.56	26.69	26.72	27.27	6.50	28.61	9.52		
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.11	0.50		
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
d2, Incremental Delay [s]	7.30	5.70	6.28	7.59	0.67	5.67	2.73		
d3, Initial Queue Delay [s]	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		
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00		

Lane Group Results

X, volume / capacity	0.53	0.71	0.72	0.74	0.29	0.47	0.58		
d, Delay for Lane Group [s/veh]	36.86	32.40	33.00	34.86	7.17	34.28	12.26		
Lane Group LOS	D	C	C	C	A	C	B		
Critical Lane Group	Yes	No	Yes	Yes	No	No	Yes		
50th-Percentile Queue Length [veh]	0.54	1.73	1.69	1.58	1.64	0.47	4.26		
50th-Percentile Queue Length [ft]	13.60	43.20	42.19	39.46	41.12	11.63	106.41		
95th-Percentile Queue Length [veh]	0.98	3.11	3.04	2.84	2.96	0.84	7.64		
95th-Percentile Queue Length [ft]	24.48	77.77	75.94	71.02	74.02	20.93	191.00		



Movement, Approach, & Intersection Results

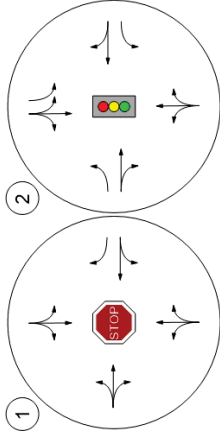
d_M, Delay for Movement [s/veh]	35.86	35.86	35.86	35.86	32.61	33.00	33.00	34.86	7.17	7.17	34.28	12.26	12.26
Movement LOS	D	D	D	D	C	C	C	C	A	A	C	B	B
d_A, Approach Delay [s/veh]	35.86	35.86	35.86	35.86	32.69	32.69	32.69	35.86	13.93	13.93	13.36	13.36	13.36
Approach LOS	D	D	D	D	C	C	C	D	B	B	B	B	B
d_I, Intersection Delay [s/veh]	17.62												
Intersection LOS	B												
Intersection V/C	0.613												

Sequence

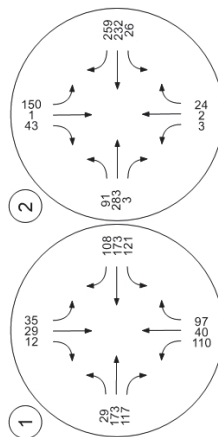
Ring 1	2	6	3	4	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-



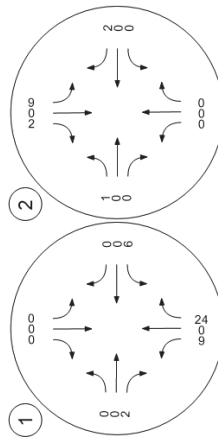
Lane Configuration and Traffic Control



Traffic Volume - Base Volume



Traffic Volume - Net New Site Trips



Intersection Level Of Service Report				
Intersection 1: Bellevue Avenue/Dutton Avenue				
Control Type:	All-way stop			16.4
Analysis Method:	HCM 2010			C
Analysis Period:	15 minutes			0.617
	Delay (sec / veh):			
	Level Of Service:			
	Volume to Capacity (v/c):			

Intersection Setup

Name	Dutton Avenue				Bellevue Avenue				Bellevue Ave
Approach	Northbound				Southbound				Westbound
Lane Configuration	+				+				
Turning Movement	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
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	150.00
Speed [mph]	40.00				25.00				35.00
Grade [%]	0.00				0.00				0.00
Crosswalk	Yes				Yes				Yes

Volumes

Name	Dutton Avenue				Dutton Avenue				Bellevue Avenue				Bellevue Ave
Base Volume Input [veh/h]	110	40	97		35	29	12		29	173	117		108
Base Volume Adjustment Factor	1.0000	1.0000	1.0000		1.0000	1.0000	1.0000		1.0000	1.0000	1.0000		1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00		2.00	2.00	2.00		2.00	2.00	2.00		2.00
Growth Rate	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00
In-Process Volume [veh/h]	0	0	0		0	0	0		0	0	0		0
Site-Generated Trips [veh/h]	9	0	24		0	0	0		0	0	2		0
Diverfed Trips [veh/h]	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
Existing Site Adjustment Volume [veh/h]	0	0	0		0	0	0		0	0	0		0
Other Volume [veh/h]	0	0	0		0	0	0		0	0	0		0
Total Hourly Volume [veh/h]	119	40	121		35	29	12		29	173	119		108
Peak Hour Factor	0.9000	0.9000	0.9000		0.9000	0.9000	0.9000		0.9000	0.9000	0.9000		0.9000
Other Adjustment Factor	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]	33	11	34		10	8	3		8	48	33		30
Total Analyse Volume [veh/h]	132	44	134		39	32	13		32	192	132		120
Pedestrian Volume [ped/h]	0				0				0				0



Intersection Settings

Lanes				
Capacity per Entry Lane [veh/h]	580		511	604
Degree of Utilization, x	0.53		0.16	0.59

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	3.15		0.58	3.83	4.17	0.70
95th-Percentile Queue Length [ft]	78.85		14.62	95.78	104.17	17.57
Approach Delay [s/veh]	16.12		11.44	17.15	16.96	
Approach LOS	C		B	C	C	
Intersection Delay [s/veh]	16.41					
Intersection LOS	C					



Intersection Level Of Service Report
Intersection 2: Todd Road/Standish Avenue - Ghilotti Avenue
All-way stop
Delay (sec / veh): 14.8
HCM 2010
Level Of Service: B
Analysis Method: 15 minutes
Volume to Capacity (v/c): 0.577

Intersection Setup

Name	Ghilotti Road				Standish Avenue				Todd Road			
Approach	Northbound				Southbound				Eastbound			
Lane Configuration	+				T				T			
Turning Movement	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	
No. of Lanes in Pocket	0	0	1	0	1	0	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00		150.00	100.00	100.00		120.00	100.00	100.00	
Speed [mph]	25.00				30.00				35.00			
Grade [%]	0.00				0.00				0.00			
Crosswalk	No				No				No			

Volumes

Name	Ghilotti Road				Standish Avenue				Todd Road			
Base Volume Input [veh/h]	3	2	24		150	1	43		91	283	3	
Base Volume Adjustment Factor	1.0000	1.0000	1.0000		1.0000	1.0000	1.0000		1.0000	1.0000	1.0000	
Heavy Vehicles Percentage [%]	2.00	2.00	2.00		2.00	2.00	2.00		2.00	2.00	2.00	
Growth Rate	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	9	0	2	1	0	0	0	0	2
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
Total Hourly Volume [veh/h]	3	2	24	159	1	45	92	283	3	26	232	261
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
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]	1	1	6	43	0	12	25	76	1	7	62	70
Total Analyse Volume [veh/h]	3	2	26	171	1	48	99	304	3	28	249	281
Pedestrian Volume [ped/h]	0				0				0			

Intersection Settings

Lanes												
Capacity per Entry Lane [veh/h]	488			464			547			532		
Degree of Utilization, x	0.06			0.37			0.09			0.58		

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.20	1.67	0.29	0.74	3.63	0.18	2.39	2.44
95th-Percentile Queue Length [ft]	4.97	41.83	7.35	18.49	90.67	4.39	59.66	60.88
Approach Delay [s/veh]	10.72	13.80		16.71			13.99	
Approach LOS	B	B		C			B	
Intersection Delay [s/veh]	14.78							
Intersection LOS	B							

Control Type: All-way stop
Analysis Method: HCM 2010
Analysis Period: 15 minutes

Intersection Level Of Service Report
Intersection 1: Bellevue Avenue/Dutton Avenue

Delay (sec / veh): 26.7
Level Of Service: D

Intersection Setup

Name	Dutton Avenue			Dutton Avenue			Bellevue Avenue			Bellevue Ave
Approach	Northbound			Southbound			Eastbound			Westbound
Lane Configuration	+			+			+			+
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left
Lane Width [ft]	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	0	0	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	150.00
Speed [mph]	40.00			25.00			35.00			35.00
Grade [%]	0.00			0.00			0.00			0.00
Crosswalk	Yes			Yes			Yes			Yes

volumes

Name	Dutton Avenue			Dutton Avenue			Bellevue Avenue			Bellevue Ave
Base Volume Input [veh/h]	165	23	179	113	55	42	10	143	75	182
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	5	0	12	0	0	0	0	9	24	0
Diverfed Trips [veh/h]	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
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	170	23	191	113	55	42	10	143	84	182
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	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]	47	6	53	31	15	12	3	40	23	51
Total Analyse Volume [veh/h]	189	26	212	126	61	47	11	159	93	148
Pedestrian Volume [ped/h]	0			0			0			0



Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	7.98	2.72	3.25	6.58	0.30
95th-Percentile Queue Length [ft]	199.45	68.07	81.26	164.60	7.44
Approach Delay [s/veh]	33.50	18.01	19.23	29.46	
Approach LOS	D	C	C	D	
Intersection Delay [s/veh]	26.70				
Intersection LOS	D				



Intersection Level Of Service Report

Intersection 2: Todd Road/Standish Avenue - Ghilotti Avenue

Control Type: Two-way stop
Analysis Method: HCM 2010
Analysis Period: 15 minutes
Delay (sec / veh): 199.4
Level Of Service: F
Volume to Capacity (v/c): 1.186

Intersection Setup

Name	Ghilotti Road				Standish Avenue				Todd Road			
Approach	Northbound				Southbound				Eastbound			
Lane Configuration	+				+				+			
Turning Movement	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	
No. of Lanes in Pocket	0	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	
Speed [mph]	25.00				30.00				35.00			
Grade [%]	0.00				0.00				0.00			
Crosswalk	No				No				No			

volumes

Name	Ghilotti Road				Standish Avenue				Todd Road			
Base Volume Input [veh/h]	3	4	34		252	2	65		44	316	8	
Base Volume Adjustment Factor	1.0000	1.0000	1.0000		1.0000	1.0000	1.0000		1.0000	1.0000	1.0000	
Heavy Vehicles Percentage [%]	2.00	2.00	2.00		2.00	2.00	2.00		2.00	2.00	2.00	
Growth Rate	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
In-Process Volume [veh/h]	0	0	0		0	0	0		0	0	0	
Site-Generated Trips [veh/h]	0	0	0		5	0	1		2	0	0	
Diverfed Trips [veh/h]	0	0	0		0	0	0		0	0	0	
Pass-by Trips [veh/h]	0	0	0		0	0	0		0	0	0	
Existing Site Adjustment Volume [veh/h]	0	0	0		0	0	0		0	0	0	
Other Volume [veh/h]	0	0	0		0	0	0		0	0	0	
Total Hourly Volume [veh/h]	3	4	34		257	2	66		46	316	8	
Peak Hour Factor	0.9300	0.9300	0.9300		0.9300	0.9300	0.9300		0.9300	0.9300	0.9300	
Other Adjustment Factor	1.0000	1.0000	1.0000		1.0000	1.0000	1.0000		1.0000	1.0000	1.0000	
Total 15-Minute Volume [veh/h]	1	1	9		69	1	18		12	85	2	
Total Analyse Volume [veh/h]	3	4	37		276	2	71		49	340	9	
Pedestrian Volume [ped/h]	0				0				0			



Intersection Settings

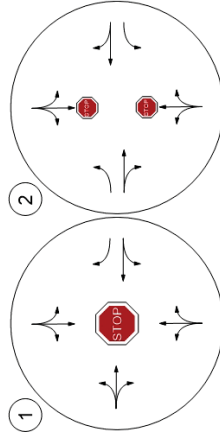
Priority Scheme	Stop	Stop	Stop	Free	Free
Flared Lane	No	No	No	No	No
Storage Area [veh]	1	0	0	0	0
Two-Stage Gap Acceptance	No	No	No	No	No
Number of Storage Spaces in Median	0	0	0	0	0

Movement, Approach, & Intersection Results

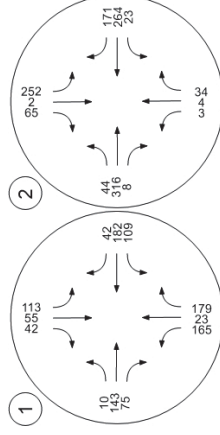
V/C, Movement V/C Ratio	0.01	0.02	0.05	1.19	0.01	0.11	0.05	0.00	0.00	0.02	0.00	0.00
d_M, Delay for Movement [s/veh]	22.32	20.84	10.78	199.41	197.37	189.34	8.48	0.00	0.00	8.04	0.00	0.00
Movement LOS	C	C	B	F	F	F	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.27	0.27	0.27	17.54	17.54	17.54	0.14	0.00	0.00	0.06	0.00	0.00
95th-Percentile Queue Length [ft]	6.83	6.83	6.83	438.39	438.39	438.39	3.55	0.00	0.00	1.58	0.00	0.00
d_A, Approach Delay [s/veh]	12.48			197.35			1.04			0.40		
Approach LOS	B			F			A			A		
d_I, Intersection Delay [s/veh]	54.13											
Intersection LOS	F											



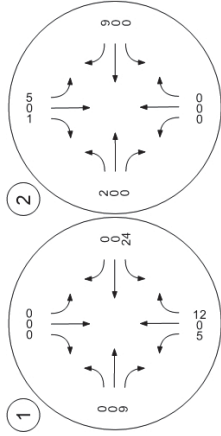
Lane Configuration and Traffic Control



Traffic Volume - Base Volume



Traffic Volume - Net New Site Trips



Intersection Level Of Service Report

Control Type: All-way stop
Analysis Method: HCM 2010
Analysis Period: 15 minutes
Delay (sec / veh): 26.7
Level Of Service: D

Intersection Setup

Name	Dutton Avenue Northbound	Dutton Avenue Southbound	Bellevue Avenue Eastbound	Bellevue Avenue Westbound
Approach				
Lane Configuration				
Turning Movement				
Lane Width [ft]	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00
Speed [mph]	40.00	25.00	35.00	35.00
Grade [%]	0.00	0.00	0.00	0.00
Crosswalk	Yes	Yes	Yes	Yes

volumes

Name	Dutton Avenue Northbound	Dutton Avenue Southbound	Bellevue Avenue Eastbound	Bellevue Avenue Westbound
Base Volume Input [veh/h]	165	23	113	55
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0
Site-Generated Trips [veh/h]	5	0	12	0
Diverter Trips [veh/h]	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0
Other Volume [veh/h]	0	0	0	0
Total Hourly Volume [veh/h]	170	23	113	55
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	47	6	53	31
Total Analysis Volume [veh/h]	189	26	126	61
Pedestrian Volume [ped/h]	0	0	0	0

Intersection Settings

Movement, Approach, & Intersection Results

Lanes

95th-Percentile Queue Length [veh]	7.98	2.72	3.25	6.58	0.30
95th-Percentile Queue Length [ft]	199.45	68.07	81.26	164.60	7.44
Approach Delay [s/veh]	33.50	18.01	19.23	29.46	
Approach LOS	D	C	C	D	D
Intersection Delay [s/veh]	26.70				
Intersection LOS	D				



Intersection Level Of Service Report

Intersection 2: Todd Road/Standish Avenue - Ghilotti Avenue

Control Type: Signalized
Analysis Method: HCM 2010
Analysis Period: 15 minutes
Delay (sec / veh): 18.3
Level Of Service: B
Volume to Capacity (V/C): 0.587

Intersection Setup

Name	Ghilotti Road				Standish Avenue				Todd Road			
Approach	Northbound				Southbound				Eastbound			
Lane Configuration	+				+				+			
Turning Movement	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	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	250.00	100.00	100.00	100.00	100.00	100.00	150.00	100.00	100.00
Speed [mph]	25.00				30.00				35.00			
Grade [%]	0.00				0.00				0.00			
Crosswalk	No				No				No			

volumes

Name	Ghilotti Road				Standish Avenue				Todd Road			
Base Volume Input [veh/h]	3	4	34	252	2	65	44	316	8	23	284	171
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	5	0	1	2	0	0	0	0	9
Diverged 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]	3	4	34	257	2	66	46	316	8	23	284	180
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
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]	1	1	9	69	1	18	12	85	2	6	71	48
Total Analysis Volume [veh/h]	3	4	37	276	2	71	49	340	9	25	284	194
Presence of On-Street Parking	No	No	No	No	No	No	No	No	No	No	No	No
On-Street Parking Maneuver Rate [1/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [1/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0				0				0			
Bicycle Volume [bicycles/h]	0				0				0			

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Protecte	Permiss	Protecte	Permiss
Signal group	0	2	0	0	6	0	3	0	8	0	7	4
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	Lead	-
Minimum Green [s]	0	5	0	0	5	0	5	0	5	0	5	5
Maximum Green [s]	0	30	0	0	30	0	30	0	30	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0
Split [s]	0	21	0	0	15	0	9	15	0	9	15	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0	0.0
Minimum Recall	No	No	No	No	No	No	No	No	No	No	No	No
Maximum Recall	No	No	No	No	No	No	No	No	No	No	No	No
Pedestrian Recall	No	No	No	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	C	L	C	L	C	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	3	8	8	3	32	2	30
g / C, Green / Cycle	0.04	0.14	0.14	0.05	0.52	0.03	0.51
(V / s)_J Volume / Saturation Flow Rate	0.03	0.10	0.10	0.03	0.19	0.01	0.27
s, saturation flow rate [veh/h]	1617	1774	1690	1774	1854	1774	1738
c, Capacity [veh/h]	72	242	231	84	970	53	878
d1, Uniform Delay [s]	28.22	24.94	24.95	28.05	8.42	28.72	10.15
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.11	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	8.04	4.35	4.62	6.16	1.04	6.50	2.42
d3, Initial Queue Delay [s]	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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.61	0.74	0.74	0.58	0.36	0.47	0.54
d, Delay for Lane Group [s/veh]	36.26	29.29	29.57	34.21	9.46	35.22	12.57
Lane Group LOS	D	C	C	C	A	D	B
Critical Lane Group	Yes	No	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	0.76	2.58	2.49	0.79	2.35	0.43	3.96
50th-Percentile Queue Length [ft]	19.06	64.54	62.14	19.73	58.77	10.67	99.11
95th-Percentile Queue Length [veh]	1.37	4.65	4.47	1.42	4.23	0.77	7.14
95th-Percentile Queue Length [ft]	34.31	116.16	111.84	35.51	105.79	19.21	178.39

Movement, Approach, & Intersection Results

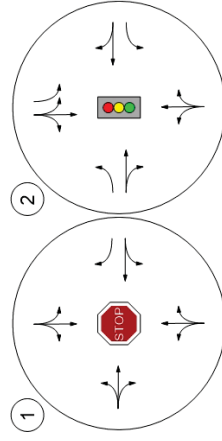
d_M, Delay for Movement [s/veh]	36.26	36.26	36.26	29.39	29.57	29.57	34.21	9.46	9.46	35.22	12.57	12.57
Movement LOS	D	D	D	C	C	C	C	A	A	D	B	B
d_A, Approach Delay [s/veh]			36.26			29.43			12.50			13.69
Approach LOS			D			C			B			B
d_I, Intersection Delay [s/veh]							18.34					
Intersection LOS							B					
Intersection V/C							0.587					

Sequence

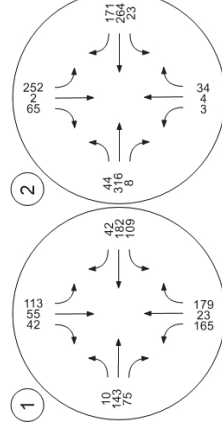
Ring 1	2	6	3	4	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-



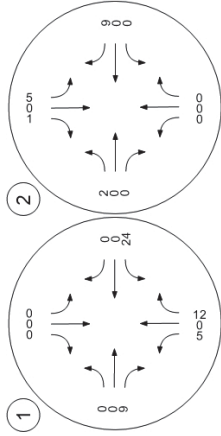
Lane Configuration and Traffic Control



Traffic Volume - Base Volume



Traffic Volume - Net New Site Trips



Intersection Level Of Service Report

Control Type: All-way stop
Analysis Method: HCM 2010
Analysis Period: 15 minutes
Delay (sec / veh): 26.7
Level Of Service: D
Volume to Capacity (v/c): 0.815

Intersection Setup

Name	Dutton Avenue Northbound	Dutton Avenue Southbound	Bellevue Avenue Eastbound	Bellevue Avenue Westbound
Approach				
Lane Configuration				
Turning Movement				
Lane Width [ft]	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00
Speed [mph]	40.00	25.00	35.00	35.00
Grade [%]	0.00	0.00	0.00	0.00
Crosswalk	Yes	Yes	Yes	Yes

Volumes

Name	Dutton Avenue Northbound	Dutton Avenue Southbound	Bellevue Avenue Eastbound	Bellevue Avenue Westbound
Base Volume Input [veh/h]	165	23	113	55
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0
Site-Generated Trips [veh/h]	5	0	12	0
Diversified Trips [veh/h]	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0
Other Volume [veh/h]	0	0	0	0
Total Hourly Volume [veh/h]	170	23	113	55
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	47	6	53	31
Total Analysis Volume [veh/h]	189	26	126	61
Pedestrian Volume [ped/h]	0	0	0	0

Intersection Settings

Lanes					
Capacity per Entry Lane [veh/h]	523	470	479	457	518
Degree of Utilization, x	0.82	0.50	0.55	0.77	0.09

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	7.98	2.72	3.25	6.58	0.30
95th-Percentile Queue Length [ft]	159.45	68.07	81.26	164.60	7.44
Approach Delay [s/veh]	33.50	18.01	19.23	29.46	
Approach LOS	D	C	C	D	
Intersection Delay [s/veh]	26.70				
Intersection LOS	D				

Intersection Level Of Service Report

Control Type :
Analysis Method:
Analysis Period:
Intersection 2: Todd Road/Standish Avenue – Ghilotti Avenue
HCM 2010
15 minutes
Delay (sec / veh):
Level Of Service:
Volume to Capacity (v/c):
20.1
C
0.720

Intersection Setup

Name	Ghilotti Road				Standish Avenue				Todd Road			
Approach	Northbound				Southbound				Eastbound			
Lane Configuration	+				T				T			
Turning Movement	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	
No. of Lanes in Pocket	0	0	0		1	0	0		1	0	1	
Pocket Length [ft]	100.00	100.00	100.00		150.00	100.00	100.00		120.00	100.00	100.00	
Speed [mph]	25.00				30.00				35.00			
Grade [%]	0.00				0.00				0.00			
Crosswalk	No				No				No			

Volumes

Name	Ghilotti Road				Standish Avenue				Todd Road			
Base Volume Input [veh/h]	3	4	34		252	2	65		44	316	8	
Base Volume Adjustment Factor	1.0000	1.0000	1.0000		1.0000	1.0000	1.0000		1.0000	1.0000	1.0000	
Heavy Vehicles Percentage [%]	2.00	2.00	2.00		2.00	2.00	2.00		2.00	2.00	2.00	
Growth Rate	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
In-Process Volume [veh/h]	0	0	0		0	0	0		0	0	0	
Site-Generated Trips [veh/h]	0	0	0		5	0	1		2	0	0	
Diverter Trips [veh/h]	0	0	0		0	0	0		0	0	0	
Pass-by Trips [veh/h]	0	0	0		0	0	0		0	0	0	
Existing Site Adjustment Volume [veh/h]	0	0	0		0	0	0		0	0	0	
Other Volume [veh/h]	0	0	0		0	0	0		0	0	0	
Total Hourly Volume [veh/h]	3	4	34		257	2	66		46	316	8	
Peak Hour Factor	0.9300	0.9300	0.9300		0.9300	0.9300	0.9300		0.9300	0.9300	0.9300	
Other Adjustment Factor	1.0000	1.0000	1.0000		1.0000	1.0000	1.0000		1.0000	1.0000	1.0000	
Total 15-Minute Volume [veh/h]	1	1	9		69	1	18		12	85	2	
Total Analysis Volume [veh/h]	3	4	37		276	2	71		49	340	9	
Pedestrian Volume [ped/h]	0				0				0			

Intersection Settings

Intersection Level Of Service Report

Lanes		Capacity per Entry Lane [veh/h]	455	449	526	453	485	458	489	542
Degree of Utilization, x		0.10	0.62	0.14	0.11	0.72	0.05	0.58	0.36	

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.32	4.04	0.48	0.36	5.76	0.17	3.64	1.62		
95th-Percentile Queue Length [ft]	7.98	101.02	12.00	9.04	143.90	4.32	90.95	40.38		
Approach Delay [s/veh]	11.76		20.20		25.07		16.72			
Approach LOS	B		C		D		C			
Intersection Delay [s/veh]				20.06						
Intersection LOS				C						

Control Type: Signalized
Analysis Method: HCM 2010
Analysis Period: 15 minutes
Delay (sec / veh): 25.6
Level Of Service: C
Volume to Capacity (v/c): 0.842

Intersection Setup

Name	Dutton Avenue			Dutton Avenue			Bellevue Avenue			Bellevue Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	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	1	0	0	1	0	1
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	150.00
Speed [mph]	40.00			25.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Dutton Avenue			Dutton Avenue			Bellevue Avenue			Bellevue Avenue		
Base Volume Input [veh/h]	180	66	202	101	34	37	51	373	224	174	397	127
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverter 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	138	0	0	33	0	0	22	0	0	49
Total Hourly Volume [veh/h]	180	66	64	101	34	4	51	373	202	174	397	78
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
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]	50	18	18	28	9	1	14	104	56	48	110	22
Total Analysis Volume [veh/h]	200	73	71	112	38	4	57	414	224	193	441	87
Presence of On-Street Parking	No	No	No	No	No	No	No	No	No	No	No	No
On-Street Parking Maneuver Rate [1/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [1/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2			2			12			12		
Bicycle Volume [bicycle/h]	3			3			3			3		



Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	76
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Protecte	Permiss	Protecte	Permiss	Protecte	Permiss	Protecte	Permiss
Signal group	3	8	0	7	4	0	5	2	0	1
Auxiliary Signal Groups	Lead	-	-	Lead	-	-	Lead	-	-	Lead
Minimum Green [s]	5	5	0	5	5	0	4	5	0	5
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0
All red [s]	0.5	1.0	0.0	0.5	1.0	0.0	0.5	1.0	0.0	0.5
Split [s]	9	28	0	9	28	0	9	28	0	11
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0
Walk [s]	0	7	0	0	7	0	0	7	0	7
Pedestrian Clearance [s]	0	17	0	0	17	0	0	17	0	17
I1, StartUp Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0
I2, Clearance Lost Time [s]	1.5	2.0	0.0	1.5	2.0	0.0	1.5	2.0	0.0	1.5
Minimum Recall	No	No	No	No	No	No	No	No	No	No
Maximum Recall	No	No	No	No	No	No	No	No	No	No
Pedestrian Recall	No	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
Detector Length [ft]	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

Exclusive Pedestrian Phase

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

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C	L	C	R
L, Total Lost Time per Cycle [s]	3.50	4.00	3.50	4.00	3.50	4.00	3.50	4.00	3.50	4.00	4.00
I1, 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
I2, Clearance Lost Time [s]	1.50	2.00	1.50	2.00	1.50	2.00	1.50	2.00	1.50	2.00	2.00
g.I, Effective Green Time [s]	9	9	5	5	3	25	9	31	31	31	31
g / C, Green / Cycle	0.14	0.14	0.08	0.08	0.04	0.40	0.14	0.50	0.50	0.50	0.50
(v / s), Volume / Saturation Flow Rate	0.11	0.09	0.06	0.02	0.03	0.37	0.11	0.24	0.06	0.06	0.06
s, saturation flow rate [veh/h]	1774	1647	1774	1808	1774	1737	1774	1863	1545	1545	1545
c, Capacity [veh/h]	255	228	149	142	73	694	247	927	769	769	769
d1, Uniform Delay [s]	25.95	25.55	28.12	27.29	29.81	17.87	26.10	10.38	8.39	8.39	8.39
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.28	0.11	0.11	0.11	0.11	0.11
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
d2, Incremental Delay [s]	5.30	2.90	7.45	1.15	15.91	12.32	5.35	0.38	0.06	0.06	0.06
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

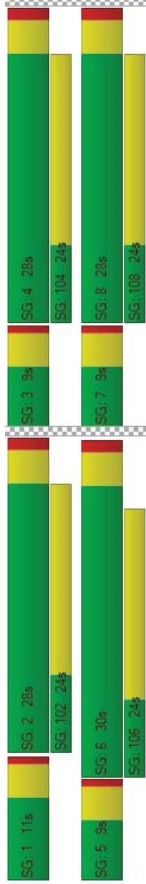
X, volume / capacity	0.79	0.63	0.75	0.30	0.78	0.82	0.78	0.48	0.11	0.11	0.11
d, Delay for Lane Group [s/veh]	31.25	28.45	35.57	28.44	45.72	30.19	31.45	10.76	8.46	8.46	8.46
Lane Group LOS	C	C	D	C	D	C	C	B	A	A	A
Critical Lane Group	No	Yes	Yes	No	No	Yes	Yes	No	No	No	No
50th-Percentile Queue Length [veh]	2.88	2.02	1.90	0.62	1.12	9.77	2.94	3.35	0.53	0.53	0.53
50th-Percentile Queue Length [ft]	74.56	50.58	47.41	15.51	28.09	244.36	73.44	83.83	13.33	13.33	13.33
95th-Percentile Queue Length [veh]	5.37	3.64	3.41	1.12	2.02	14.90	5.29	6.04	0.96	0.96	0.96
95th-Percentile Queue Length [ft]	134.20	91.05	85.33	27.93	50.57	372.54	132.20	150.89	23.99	23.99	23.99

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	31.25	28.45	28.45	35.57	28.44	28.44	45.72	30.19	30.19	31.45	10.76	8.46
Movement LOS	C	C	C	D	C	C	D	C	C	C	B	A
d_A, Approach Delay [s/veh]	30.08			33.63			31.47			16.02		
Approach LOS	C			C			C			B		
d_I, Intersection Delay [s/veh]	25.57											
Intersection LOS	C											
Intersection V/C	0.842											

Sequence

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



Intersection Level Of Service Report

Control Type: Signalized
Analysis Method: HCM 2010
Analysis Period: 15 minutes
Intersection 2: Todd Road/Standish Avenue – Ghillotti Avenue
Delay (sec / veh): 23.4
Level Of Service: C
Volume to Capacity (v/c): 0.881

Intersection Setup

Name	Ghillotti Road				Standish Avenue				Todd Road			
Approach	Northbound				Southbound				Eastbound			
Lane Configuration	+				+				+			
Turning Movement	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	
No. of Lanes in Pocket	0	0	0		1	0	0		1	0	1	
Pocket Length [ft]	100.00	100.00	100.00		250.00	100.00	100.00		100.00	100.00	100.00	
Speed [mph]	25.00				30.00				35.00			
Grade [%]	0.00				0.00				0.00			
Crosswalk	Yes				Yes				Yes			

volumes

Name	Ghillotti Road				Standish Avenue				Todd Road			
Base Volume Input [veh/h]	3	2	24		226	1	74		404	3	26	435
Base Volume Adjustment Factor	1.0000	1.0000	1.0000		1.0000	1.0000	1.0000		1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00		2.00	2.00	2.00		2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0		0	0	0		0	0	0	0
Site-Generated Trips [veh/h]	0	0	0		0	0	0		0	0	0	0
Diverter Trips [veh/h]	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
Existing Site Adjustment Volume [veh/h]	0	0	0		0	0	0		0	0	0	0
Other Volume [veh/h]	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
Total Hourly Volume [veh/h]	3	2	24		226	1	74		404	3	26	435
Peak Hour Factor	0.9300	0.9300	0.9300		0.9300	0.9300	0.9300		0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	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]	1	1	6		61	0	20		40	1	7	117
Total Analysis Volume [veh/h]	3	2	26		243	1	80		434	3	28	468
Presence of On-Street Parking	No	No	No		No	No	No		No	No	No	No
On-Street Parking Maneuver Rate [1/h]	0	0	0		0	0	0		0	0	0	0
Local Bus Stopping Rate [1/h]	0	0	0		0	0	0		0	0	0	0
Pedestrian Volume [ped/h]	0				0				0			
Bicycle Volume [bicycle/h]	0				0				0			

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	76
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Protecte	Permiss	Protecte	Permiss	Protecte	Permiss	Permiss
Signal group	0	2	0	0	6	0	3	8	0	7	4	0	0
Auxiliary Signal Groups													
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-	-
Minimum Green [s]	0	5	0	0	5	0	5	5	0	5	5	5	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.5	1.0	0.0	0.5	1.0	0.0	0.0
Split [s]	0	28	0	0	30	0	9	28	0	9	28	0	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0	0
Pedestrian Clearance [s]	0	17	0	0	17	0	0	17	0	0	17	0	0
I1, StartUp Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	1.5	2.0	0.0	1.5	2.0	0.0	0.0
Minimum Recall	No	No			No		No	No		No	No		
Maximum Recall		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	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	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	1.00

Exclusive Pedestrian Phase

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

Lane Group Calculations

Lane Group	C	L	C	L	C	L	C	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	3.50	4.00	3.50	4.00	3.50	4.00
I1, p, Permitted Start-Up Lost Time [s]	2.00	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	1.50	2.00	1.50	2.00	1.50	2.00
g.I, Effective Green Time [s]	5	5	5	7	35	2	30	2	30
g / C, Green / Cycle	0.09	0.09	0.09	0.12	0.62	0.03	0.53	0.03	0.53
(v / s) , Volume / Saturation Flow Rate	0.02	0.06	0.16	0.09	0.23	0.02	0.52	0.02	0.52
s, saturation flow rate [veh/h]	1600	1377	1461	1774	1860	1774	1705	1774	1705
c, Capacity [veh/h]	208	0	0	212	1144	59	901	59	901
d1, Uniform Delay [s]	24.14	0.00	0.00	24.16	5.49	26.96	13.23	5.49	26.96
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.44	0.11	0.44
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.33	0.00	0.00	5.23	0.21	5.95	25.94	0.21	5.95
d3, Initial Queue Delay [s]	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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

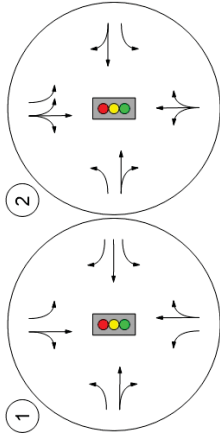
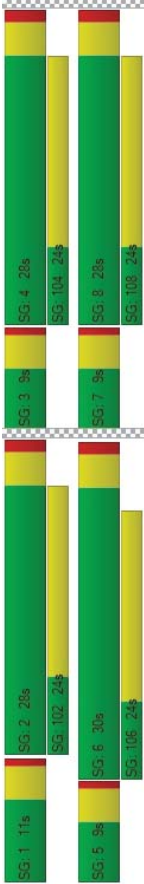
X, volume / capacity	0.15	0.00	0.00	0.75	0.38	0.48	0.99	0.38	0.48
d, Delay for Lane Group [s/veh]	24.47	0.00	0.00	29.38	5.70	32.91	39.17	5.70	32.91
Lane Group LOS	C	A	A	C	A	C	D	A	C
Critical Lane Group	Yes	No	No	Yes	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	0.39	0.00	0.00	2.19	1.74	0.44	14.52	1.74	0.44
50th-Percentile Queue Length [ft]	9.73	0.00	0.00	54.67	43.53	11.03	363.00	43.53	11.03
95th-Percentile Queue Length [veh]	0.70	0.00	0.00	3.94	3.13	0.79	20.77	3.13	0.79
95th-Percentile Queue Length [ft]	17.51	0.00	0.00	98.40	78.35	19.86	519.23	78.35	19.86

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	24.47	24.47	24.47	24.47	0.00	0.00	0.00	29.38	5.70	5.70	32.91	39.17	39.17
Movement LOS	C	C	C	C	A	A	A	C	A	A	C	D	D
d_A, Approach Delay [s/veh]	24.47	24.47	24.47	24.47	0.00	0.00	0.00	12.02	12.02	12.02	38.98	38.98	38.98
Approach LOS	C	C	C	C	A	A	A	B	B	B	D	D	D
d_I, Intersection Delay [s/veh]								23.40	23.40	23.40			
Intersection LOS								C	C	C			
Intersection V/C								0.881	0.881	0.881			

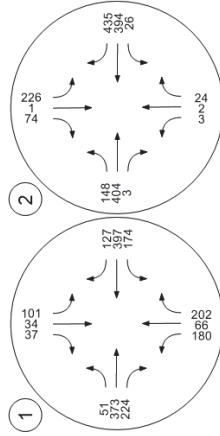
Sequence

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



Lane Configuration and Traffic Control

Traffic Volume - Base Volume



Intersection Level Of Service Report

Control Type: Signalized
Analysis Method: HCM 2010
Analysis Period: 15 minutes
Delay (sec / veh): 40.5
Level Of Service: D
Volume to Capacity (v/c): 0.733

Intersection Setup

Name	Dutton Avenue				Dutton Avenue				Bellevue Avenue			
Approach	Northbound				Southbound				Eastbound			
Lane Configuration	T				T				T			
Turning Movement	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	
No. of Lanes in Pocket	1	0	0		1	0	0		1	0	0	
Pocket Length [ft]	100.00	100.00	100.00		100.00	100.00	100.00		100.00	100.00	100.00	
Speed [mph]	40.00				25.00				35.00			
Grade [%]	0.00				0.00				0.00			
Crosswalk	Yes				Yes				Yes			

volumes

Name	Dutton Avenue				Dutton Avenue				Bellevue Avenue			
Base Volume Input [veh/h]	269	117	260	132	99	96	80	367	137	247	351	100
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	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	138	0	0	33	0	0	22	0	0	49
Total Hourly Volume [veh/h]	269	117	122	132	99	65	80	367	115	247	351	51
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
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]	75	33	34	37	28	18	22	102	32	69	98	14
Total Analysis Volume [veh/h]	269	130	136	147	110	72	89	408	128	274	390	57
Presence of On-Street Parking	No	No	No	No	No	No	No	No	No	No	No	No
On-Street Parking Maneuver Rate [1/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [1/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2				2				12			
Bicycle Volume [bicyclist/h]	3				3				3			

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	85
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Protecte	Permiss	Protecte	Permiss	Protecte	Permiss	Protecte	Permiss		
Signal group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	5	0	5	5	0	5	5	0	5	5	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]	0.5	1.0	0.0	0.5	1.0	0.0	0.5	1.0	0.0	0.5	1.0	0.0
Split [s]	13	29	0	12	28	0	9	33	0	11	35	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	17	0	0	17	0	0	17	0	0	22	0
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]	1.5	2.0	0.0	1.5	2.0	0.0	1.5	2.0	0.0	1.5	2.0	0.0
Minimum Recall	No	No	No	No	No	No	No	No	No	No	No	No
Maximum Recall	No	No	No	No	No	No	No	No	No	No	No	No
Pedestrian Recall	No	No	No	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	L	C	L	C	L	C	L	C	L	C	R
L, Total Lost Time per Cycle [s]	3.50	4.00	3.50	4.00	3.50	4.00	3.50	4.00	3.50	4.00	3.50	4.00	4.00
I1, 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
I2, Clearance Lost Time [s]	1.50	2.00	1.50	2.00	1.50	2.00	1.50	2.00	1.50	2.00	1.50	2.00	2.00
g.I, Effective Green Time [s]	18	22	10	14	6	29	16	40	40	40	40	40	40
g / C, Green / Cycle	0.19	0.24	0.10	0.15	0.07	0.32	0.18	0.43	0.43	0.43	0.43	0.43	0.43
(v / s), Volume / Saturation Flow Rate	0.17	0.16	0.08	0.11	0.05	0.30	0.15	0.21	0.04	0.04	0.04	0.04	0.04
s, saturation flow rate [veh/h]	1774	1661	1774	1688	1774	1774	1774	1863	1544	1544	1544	1544	1544
c, Capacity [veh/h]	341	382	184	249	117	567	316	805	867	867	867	867	867
d1, Uniform Delay [s]	36.21	32.07	40.41	37.59	42.42	30.64	36.86	18.84	15.47	15.47	15.47	15.47	15.47
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.40	0.11	0.19	0.11	0.11	0.11	0.11	0.11
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	1.00
d2, Incremental Delay [s]	7.15	2.06	7.68	4.10	9.87	22.86	7.13	0.80	0.05	0.05	0.05	0.05	0.05
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

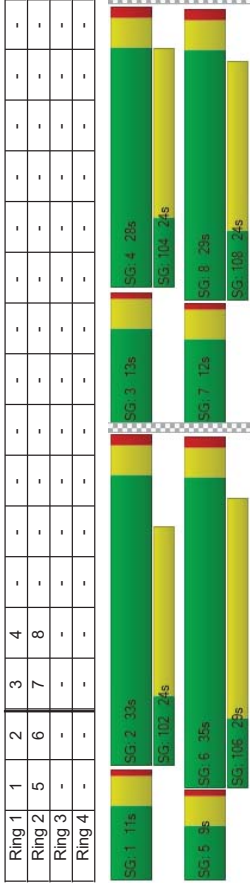
Lane Group Results

X, volume / capacity	0.88	0.68	0.80	0.73	0.76	0.85	0.87	0.48	0.09	0.09	0.09	0.09	0.09
d, Delay for Lane Group [s/veh]	43.35	34.14	48.09	41.69	52.28	53.50	43.99	19.63	15.52	15.52	15.52	15.52	15.52
Lane Group LOS	D	C	D	D	D	D	D	B	B	B	B	B	B
Critical Lane Group	Yes	No	No	Yes	No	Yes	Yes	No	No	No	No	No	No
50th-Percentile Queue Length [veh]	6.91	5.36	3.64	4.19	2.27	14.59	6.43	5.82	0.69	0.69	0.69	0.69	0.69
50th-Percentile Queue Length [ft]	172.77	134.02	91.08	104.80	56.71	364.72	160.86	145.40	17.16	17.16	17.16	17.16	17.16
95th-Percentile Queue Length [veh]	11.22	9.16	6.56	7.55	4.08	20.85	10.59	9.77	1.24	1.24	1.24	1.24	1.24
95th-Percentile Queue Length [ft]	280.55	228.94	163.95	188.63	102.09	521.32	264.86	244.27	30.90	30.90	30.90	30.90	30.90

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	43.35	34.14	34.14	48.09	41.69	41.69	52.28	53.50	53.50	43.99	19.63	15.52
Movement LOS	D	C	C	D	D	D	D	D	D	D	B	B
d_A, Approach Delay [s/veh]	39.01	D	D	44.55	D	D	53.33	D	D	28.57	C	C
Approach LOS	D	D	D	D	D	D	D	D	D	D	C	C
d_I, Intersection Delay [s/veh]	40.46	D	D	D	D	D	D	D	D	D	C	C
Intersection LOS	D	D	D	D	D	D	D	D	D	D	C	C
Intersection V/C	0.733	0.733	0.733	0.733	0.733	0.733	0.733	0.733	0.733	0.733	0.733	0.733

Sequence



Intersection Level Of Service Report

Signalized
HCM 2010
15 minutes
Delay (sec / veh):
Level Of Service:
Volume to Capacity (v/c):
44.4
D
0.913

Intersection Setup

Name	Ghiliotti Road				Standish Avenue				Todd Road			
Approach	Northbound				Southbound				Eastbound			
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	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]	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Grade [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crosswalk	Yes				Yes				Yes			

volumes

Name	Ghiliotti Road				Standish Avenue				Todd Road			
Base Volume Input [veh/h]	3	4	34	438	2	199	108	350	8	24	443	355
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverged 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]	3	4	34	438	2	199	108	350	8	24	443	355
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
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]	1	1	9	118	1	53	29	94	2	6	119	95
Total Analysis Volume [veh/h]	3	4	37	471	2	214	116	376	9	26	476	382
Presence of On-Street Parking	No	No	No	No	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
Pedestrian Volume [ped/h]	0	0	0	0	0	0	0	0	0	0	0	0
Bicycle Volume [bicyclist/h]	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Protecte	Permiss	Protecte	Permiss	Protecte	Permiss
Signal group	1	2	0	5	6	0	3	8	0	7	4
Auxiliary Signal Groups											
Lead / Lag	-	-	-	-	-	Lead	-	-	-	Lead	-
Minimum Green [s]	0	5	0	0	5	0	5	5	0	5	5
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	34	0	0	29	0	9	48	0	9	48
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20
I1, StartUp Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	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
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
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

Exclusive Pedestrian Phase

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

Lane Group Calculations

Lane Group	C	L	C	L	C	L	C	L	C
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
I1, 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
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g.I, Effective Green Time [s]	4	27	27	10	70	3	63		
g / C, Green / Cycle	0.03	0.23	0.23	0.08	0.58	0.02	0.52		
(v / s) , Volume / Saturation Flow Rate	0.03	0.20	0.20	0.07	0.21	0.01	0.50		
s, saturation flow rate [veh/h]	1617	1774	1647	1774	1855	1774	1727		
c, Capacity [veh/h]	56	404	375	144	1075	44	903		
d1, Uniform Delay [s]	57.48	44.76	44.89	54.21	13.41	57.91	27.14		
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.11	0.50		
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
d2, Incremental Delay [s]	20.26	6.21	7.20	9.97	0.93	11.58	20.00		
d3, Initial Queue Delay [s]	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		
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00		

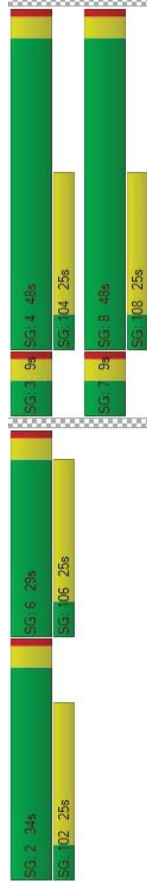
Lane Group Results

X, volume / capacity	0.78	0.88	0.89	0.80	0.36	0.58	0.95		
d, Delay for Lane Group [s/veh]	77.74	50.97	52.09	64.18	14.34	69.49	47.14		
Lane Group LOS	E	D	D	E	B	E	D		
Critical Lane Group	Yes	No	Yes	No	No	No	Yes		
50th-Percentile Queue Length [veh]	1.65	10.82	10.29	3.82	5.57	0.92	26.79		
50th-Percentile Queue Length [ft]	41.33	270.66	257.23	95.40	139.17	22.98	669.78		
95th-Percentile Queue Length [veh]	2.98	16.22	15.55	6.67	9.44	1.65	35.28		
95th-Percentile Queue Length [ft]	74.40	405.43	388.74	171.71	235.90	41.36	882.00		

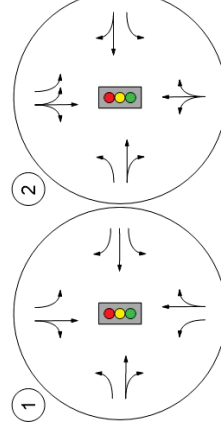
Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	77.74	77.74	77.74	51.26	52.09	52.09	64.18	14.34	14.34	69.49	47.14	47.14
Movement LOS	E	E	E	D	D	D	E	B	B	E	D	D
d_A, Approach Delay [s/veh]	77.74			51.51			25.88			47.80		
Approach LOS	E			D			C			D		
d_I, Intersection Delay [s/veh]				44.44								
Intersection LOS				D								
Intersection V/C				0.913								

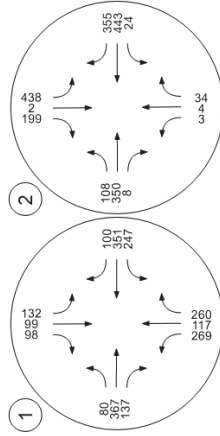
Sequence

[illegible]

Lane Configuration and Traffic Control



Traffic Volume - Base Volume



Intersection Level Of Service Report

Control Type: Signalized
Analysis Method: HCM 2010
Analysis Period: 15 minutes
Delay (sec / veh): 28.0
Level Of Service: C
Volume to Capacity (v/c): 0.853

Intersection Setup

Name	Dutton Avenue				Dutton Avenue				Bellevue Avenue			
Approach	Northbound				Southbound				Eastbound			
Lane Configuration	T				T				T			
Turning Movement	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	
No. of Lanes in Pocket	1	0	0		1	0	0		1	0	0	
Pocket Length [ft]	100.00	100.00	100.00		100.00	100.00	100.00		100.00	100.00	100.00	
Speed [mph]	40.00				25.00				35.00			
Grade [%]	0.00				0.00				0.00			
Crosswalk	Yes				Yes				Yes			

volumes

Name	Dutton Avenue				Dutton Avenue				Bellevue Avenue			
Base Volume Input [veh/h]	180	66	202	101	34	37	51	373	224	174	397	127
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	9	0	24	0	0	0	0	0	2	6	0	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	138	0	0	33	0	0	22	0	0	49
Total Hourly Volume [veh/h]	189	66	88	101	34	4	51	373	204	180	397	78
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
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]	53	18	24	28	9	1	14	104	57	50	110	22
Total Analysis Volume [veh/h]	210	73	98	112	38	4	57	414	227	200	441	87
Presence of On-Street Parking	No	No	No	No	No	No	No	No	No	No	No	No
On-Street Parking Maneuver Rate [1/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [1/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2				2				12			
Bicycle Volume [bicyclist/h]	3				3				3			

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	84
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Protecte	Permiss	Protecte	Permiss	Protecte	Permiss	Protecte	Permiss
Signal group	3	8	0	7	4	0	5	2	0	1
Auxiliary Signal Groups	Lead	-	-	Lead	-	-	Lead	-	-	Lead
Minimum Green [s]	5	5	0	5	5	0	5	5	0	5
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0
All red [s]	0.5	1.0	0.0	0.5	1.0	0.0	0.5	1.0	0.0	0.5
Split [s]	9	29	0	9	29	0	9	36	0	10
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0
Walk [s]	0	7	0	0	7	0	0	7	0	7
Pedestrian Clearance [s]	0	17	0	0	17	0	0	17	0	17
I1, StartUp Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0
I2, Clearance Lost Time [s]	1.5	2.0	0.0	1.5	2.0	0.0	1.5	2.0	0.0	1.5
Minimum Recall	No	No	No	No	No	No	No	No	No	No
Maximum Recall	No	No	No	No	No	No	No	No	No	No
Pedestrian Recall	No	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
Detector Length [ft]	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

Exclusive Pedestrian Phase

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

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C	L	C	R
L, Total Lost Time per Cycle [s]	3.50	4.00	3.50	4.00	3.50	4.00	3.50	4.00	3.50	4.00	4.00
I1, 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
I2, Clearance Lost Time [s]	1.50	2.00	1.50	2.00	1.50	2.00	1.50	2.00	1.50	2.00	2.00
g, I, Effective Green Time [s]	10	10	6	6	3	27	10	33	33	33	33
g / C, Green / Cycle	0.15	0.15	0.08	0.09	0.05	0.40	0.14	0.49	0.49	0.49	0.49
(v / s), Volume / Saturation Flow Rate	0.12	0.11	0.06	0.02	0.03	0.37	0.11	0.24	0.24	0.06	0.06
s, saturation flow rate [veh/h]	1774	1623	1774	1811	1774	1736	1774	1863	1863	1545	1545
c, Capacity [veh/h]	263	251	148	163	87	690	252	914	758	914	758
d1, Uniform Delay [s]	27.78	26.96	30.27	28.62	31.56	19.45	28.00	11.48	9.28	11.48	9.28
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.33	0.11	0.11	0.11	0.11	0.11
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
d2, Incremental Delay [s]	5.51	3.23	7.57	0.82	8.19	15.23	5.57	0.40	0.07	0.40	0.07
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
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

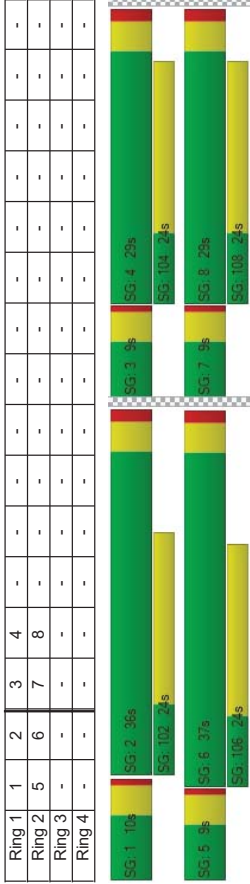
Lane Group Results

X, volume / capacity	0.80	0.68	0.76	0.26	0.66	0.83	0.79	0.48	0.11	0.48	0.11
d, Delay for Lane Group [s/veh]	33.30	30.19	37.83	29.44	39.76	34.68	33.58	11.88	9.35	11.88	9.35
Lane Group LOS	C	C	D	C	D	C	C	B	A	B	A
Critical Lane Group	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	3.41	2.61	2.04	0.66	1.06	11.22	3.31	3.81	0.61	3.81	0.61
50th-Percentile Queue Length [ft]	85.14	65.28	51.12	16.38	26.56	280.62	82.73	95.37	15.17	95.37	15.17
95th-Percentile Queue Length [veh]	6.13	4.70	3.68	1.18	1.91	16.72	5.96	6.87	1.09	6.87	1.09
95th-Percentile Queue Length [ft]	155.26	117.51	92.01	29.49	47.81	417.98	148.91	171.67	27.30	171.67	27.30

Movement, Approach, & Intersection Results

d_M Delay for Movement [s/veh]	33.30	30.19	30.19	37.83	29.44	29.44	39.76	34.68	34.68	33.58	11.88	9.35
Movement LOS	C	C	C	D	C	C	D	C	C	C	B	A
d_A Approach Delay [s/veh]	31.90	C	C	D	35.54	35.10	D	D	D	17.54	B	
Approach LOS		C	C	D	D	D	D	D	D	B		
d_I Intersection Delay [s/veh]					27.99							
Intersection LOS					C							
Intersection V/C					0.853							

Sequence



Intersection Level Of Service Report

Intersection 2: Todd Road/Standish Avenue – Ghilotti Avenue
Signalized
HCM 2010
Level Of Service: C
Volume to Capacity (v/c): 0.883
Delay (sec / veh): 23.7
Analysis Method:
Analysis Period: 15 minutes

Intersection Setup

Name	Ghilotti Road				Standish Avenue				Todd Road			
Approach	Northbound				Southbound				Eastbound			
Lane Configuration	+				+				+			
Turning Movement	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	1	0	0	1	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	250.00	100.00	100.00	120.00	100.00	100.00	150.00	100.00
Speed [mph]	25.00				30.00				35.00			
Grade [%]	0.00				0.00				0.00			
Crosswalk	Yes				Yes				Yes			

volumes

Name	Ghilotti Road				Standish Avenue				Todd Road			
Base Volume Input [veh/h]	3	2	24	226	1	74	148	404	3	26	394	435
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 [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	9	0	2	1	0	0	0	0	2
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]	3	2	24	235	1	76	149	404	3	26	394	437
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
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]	1	1	6	63	0	20	40	109	1	7	106	117
Total Analysis Volume [veh/h]	3	2	26	253	1	82	160	434	3	28	424	470
Presence of On-Street Parking	No	No	No	No	No	No	No	No	No	No	No	No
On-Street Parking Maneuver Rate [1/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [1/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0	0	0	0	0	0	0	0	0	0	0	0
Bicycle Volume [bicycle/h]	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	84
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Protecte	Permiss	Permiss	Protecte	Protecte	Permiss	Permiss
Signal group	0	2	0	0	6	0	3	8	0	7	4	0	0
Auxiliary Signal Groups													
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-	-
Minimum Green [s]	0	5	0	0	5	0	5	5	0	5	5	5	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.5	1.0	0.0	0.5	1.0	0.0	0.0
Split [s]	0	36	0	0	37	0	9	29	0	9	29	0	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0	0
Pedestrian Clearance [s]	0	17	0	0	17	0	0	17	0	0	17	0	0
I1, StartUp Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	1.5	2.0	0.0	1.5	2.0	0.0	0.0
Minimum Recall	No	No	No	No	No	No	No	No	No	No	No	No	No
Maximum Recall	No	No	No	No	No	No	No	No	No	No	No	No	No
Pedestrian Recall	No	No	No	No	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	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	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	1.00

Exclusive Pedestrian Phase

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

Lane Group Calculations

Lane Group	C	L	C	L	C	L	C	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	3.50	4.00	3.50	4.00	3.50	4.00
I1, p, Permitted Start-Up Lost Time [s]	2.00	2.00	2.00	0.00	2.00	0.00	2.00	0.00	0.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	1.50	2.00	1.50	2.00	1.50	2.00
g.I, Effective Green Time [s]	5	5	5	7	35	2	30	2	30
g / C, Green / Cycle	0.09	0.09	0.09	0.12	0.62	0.03	0.53	0.03	0.53
(v / s) , Volume / Saturation Flow Rate	0.02	0.07	0.17	0.09	0.23	0.02	0.52	0.02	0.52
s, saturation flow rate [veh/h]	1599	1377	1459	1774	1860	1774	1705	1774	1705
c, Capacity [veh/h]	208	0	0	214	1145	59	900	59	900
d1, Uniform Delay [s]	24.16	0.00	0.00	24.16	5.50	26.99	13.32	5.50	26.99
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.33	0.00	0.00	5.20	0.21	5.95	26.83	0.21	5.95
d3, Initial Queue Delay [s]	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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

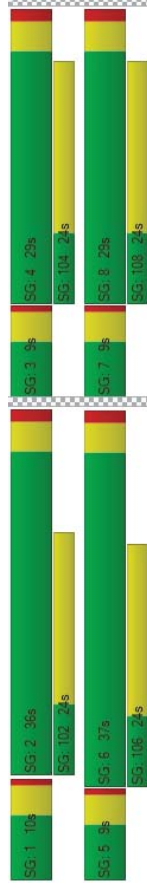
Lane Group Results

X, volume / capacity	0.15	0.00	0.00	0.75	0.38	0.48	0.99	0.38	0.48
d, Delay for Lane Group [s/veh]	24.48	0.00	0.00	29.37	5.71	32.94	40.15	5.71	32.94
Lane Group LOS	C	A	A	C	A	C	D	A	C
Critical Lane Group	Yes	No	No	Yes	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	0.39	0.00	0.00	2.20	1.74	0.44	14.81	1.74	0.44
50th-Percentile Queue Length [ft]	9.74	0.00	0.00	55.03	43.60	11.05	370.16	43.60	11.05
95th-Percentile Queue Length [veh]	0.70	0.00	0.00	3.96	3.14	0.80	21.12	3.14	0.80
95th-Percentile Queue Length [ft]	17.53	0.00	0.00	99.05	78.48	19.88	527.92	78.48	19.88

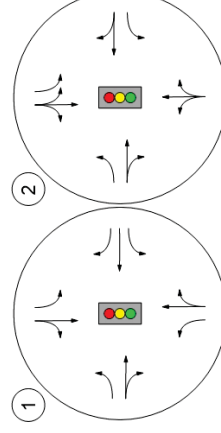
Movement, Approach, & Intersection Results

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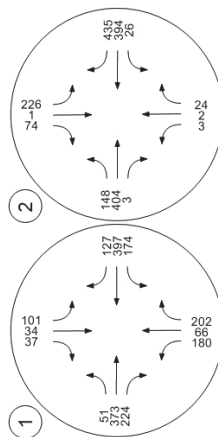
Sequence

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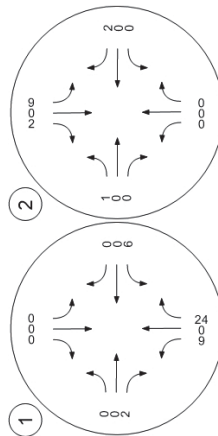
Lane Configuration and Traffic Control



Traffic Volume - Base Volume



Traffic Volume - Net New Site Trips



Intersection Level Of Service Report

Intersection 1: Bellevue Avenue/Dutton Avenue

Control Type: Signalized
Analysis Method: HCM 2010
Analysis Period: 15 minutes
Delay (sec / veh): 45.2
D
Volume to Capacity (V/C): 0.757

Intersection Setup

Name	Dutton Avenue				Bellevue Avenue				Bellevue Ave
Approach	Northbound				Eastbound				Westbound
Lane Configuration	T				T				T
Turning Movement	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
No. of Lanes in Pocket	1	0	0	1	0	1	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	150.00
Speed [mph]	40.00				35.00				35.00
Grade [%]	0.00				0.00				0.00
Crosswalk	Yes				Yes				Yes

volumes

Name	Dutton Avenue				Bellevue Avenue				Bellevue Ave
Base Volume Input [veh/h]	269	117	260	132	99	96	80	367	137
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	5	0	12	0	0	0	0	9	24
Diverged Trips [veh/h]	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	138	0	0	33	0	0	22
Total Hourly Volume [veh/h]	274	117	134	132	99	65	80	367	124
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	76	33	37	37	28	18	22	102	34
Total Analysis Volume [veh/h]	304	130	149	147	110	72	89	408	138
Presence of On-Street Parking	No	No	No	No	No	No	No	No	No
On-Street Parking Maneuver Rate [1/h]	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [1/h]	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2				2				12
Bicycle Volume [bicycles/h]	3				3				3

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Protecte	Permiss	Protecte	Permiss	Protecte	Permiss	Protecte	Permiss
Signal group	3	8	0	7	4	0	5	2	0	1
Auxiliary Signal Groups	Lead	-	-	Lead	-	-	Lead	-	-	-
Minimum Green [s]	5	5	0	5	5	0	5	5	0	5
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0
All red [s]	0.5	1.0	0.0	0.5	1.0	0.0	0.5	1.0	0.0	0.5
Split [s]	10	29	0	9	28	0	9	32	0	10
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0
Walk [s]	0	7	0	0	7	0	0	7	0	0
Pedestrian Clearance [s]	0	17	0	0	17	0	0	17	0	22
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
I2, Clearance Lost Time [s]	1.5	2.0	0.0	1.5	2.0	0.0	1.5	2.0	0.0	1.5
Minimum Recall	No	No	No	No	No	No	No	No	No	No
Maximum Recall	No	No	No	No	No	No	No	No	No	No
Pedestrian Recall	No	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
Detector Length [ft]	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

Exclusive Pedestrian Phase

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

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C	L	C	R
L, Total Lost Time per Cycle [s]	3.50	4.00	3.50	4.00	3.50	4.00	3.50	4.00	3.50	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]	1.50	2.00	1.50	2.00	1.50	2.00	1.50	2.00	1.50	2.00	2.00
g_l, Effective Green Time [s]	19	23	10	14	6	30	19	42	42	42	42
g / C, Green / Cycle	0.19	0.24	0.10	0.15	0.07	0.31	0.19	0.44	0.44	0.44	0.44
(V / s), Volume / Saturation Flow Rate	0.17	0.17	0.08	0.11	0.05	0.31	0.17	0.21	0.04	0.04	0.04
s, saturation flow rate [veh/h]	1774	1653	1774	1688	1774	1769	1774	1863	1544	1544	1544
c, Capacity [veh/h]	345	382	184	247	117	550	342	815	875	875	875
d1, Uniform Delay [s]	37.77	33.76	42.23	39.37	44.26	33.11	37.84	19.30	15.84	15.84	15.84
k, delay calibration	0.13	0.11	0.11	0.11	0.11	0.45	0.12	0.21	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]	8.54	2.56	7.73	4.24	9.51	34.38	8.28	0.85	0.05	0.05	0.05
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

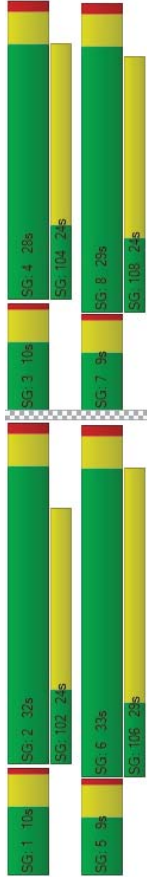
X, volume / capacity	0.88	0.71	0.80	0.74	0.76	0.99	0.88	0.48	0.08	0.08	0.08
d, Delay for Lane Group [s/veh]	46.31	36.32	49.96	43.61	53.77	67.49	46.13	20.15	15.90	15.90	15.90
Lane Group LOS	D	D	D	D	D	E	D	C	B	B	B
Critical Lane Group	Yes	No	No	Yes	No	Yes	Yes	No	No	No	No
50th-Percentile Queue Length [veh]	7.50	6.01	3.81	4.41	2.36	17.34	7.49	6.07	0.71	0.71	0.71
50th-Percentile Queue Length [ft]	187.50	150.19	95.30	110.16	58.99	433.39	187.18	151.71	17.87	17.87	17.87
95th-Percentile Queue Length [veh]	11.99	10.03	6.86	7.85	4.25	24.16	11.97	10.11	1.29	1.29	1.29
95th-Percentile Queue Length [ft]	299.78	250.68	171.55	196.23	106.19	604.10	299.37	252.71	32.17	32.17	32.17

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	46.31	36.32	36.32	49.96	43.61	43.61	53.77	67.49	67.49	46.13	20.15	15.90
Movement LOS	D	D	D	D	D	D	D	E	E	D	C	B
d_A, Approach Delay [s/veh]		41.53			46.45		65.57			30.28		
Approach LOS		D			D		E			C		
d_I, Intersection Delay [s/veh]							45.22					
Intersection LOS							D					
Intersection V/C							0.757					

Sequence

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



Control Type: Signalized
Analysis Method: HCM 2010
Analysis Period: 15 minutes

Intersection Level Of Service Report
Intersection 2: Todd Road/Standish Avenue - Ghilotti Avenue
Delay (sec / veh): 45.9
Level Of Service: D
Volume to Capacity (V/C): 0.923

Intersection Setup

Name	Ghilotti Road				Standish Avenue				Todd Road			
Approach	Northbound				Southbound				Eastbound			
Lane Configuration	+				+				+			
Turning Movement	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	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	250.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00				30.00				35.00			
Grade [%]	0.00				0.00				0.00			
Crosswalk	Yes				Yes				Yes			

volumes

Name	Ghilotti Road				Standish Avenue				Todd Road			
Base Volume Input [veh/h]	3	4	34		438	2	199		108	350	8	24
Base Volume Adjustment Factor	1.0000	1.0000	1.0000		1.0000	1.0000	1.0000		1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00		2.00	2.00	2.00		2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0		0	0	0		0	0	0	0
Site-Generated Trips [veh/h]	0	0	0		5	0	1		2	0	0	0
Diverged Trips [veh/h]	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
Existing Site Adjustment Volume [veh/h]	0	0	0		0	0	0		0	0	0	0
Other Volume [veh/h]	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
Total Hourly Volume [veh/h]	3	4	34		443	2	200		110	350	8	24
Peak Hour Factor	0.9300	0.9300	0.9300		0.9300	0.9300	0.9300		0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	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]	1	1	9		119	1	54		30	94	2	6
Total Analysis Volume [veh/h]	3	4	37		476	2	215		118	376	9	26
Presence of On-Street Parking	No	No	No		No	No	No		No	No	No	No
On-Street Parking Maneuver Rate [1/h]	0	0	0		0	0	0		0	0	0	0
Local Bus Stopping Rate [1/h]	0	0	0		0	0	0		0	0	0	0
Pedestrian Volume [ped/h]	0				0				0			
Bicycle Volume [bicycles/h]	0				0				0			

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Protecte	Permiss	Protecte	Permiss
Signal group	1	2	0	5	6	0	3	8	0
Auxiliary Signal Groups									
Lead / Lag	-	-	-	-	-	-	Lead	-	-
Minimum Green [s]	0	5	0	0	5	0	5	0	5
Maximum Green [s]	0	30	0	0	30	0	30	0	30
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	3.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0
Split [s]	0	34	0	0	29	0	9	48	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	3.0
Walk [s]	0	5	0	0	5	0	5	0	5
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	2.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	2.0
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
Detector Length [ft]	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

Exclusive Pedestrian Phase

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

Lane Group Calculations

[illegible]

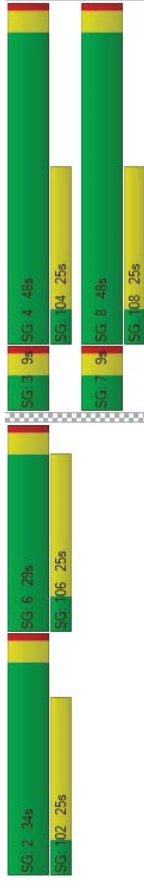
Lane Group Results

X, volume / capacity d, Delay for Lane Group [s/veh]												
	Lane Group LOS		D		E		B		D		E	
	Critical Lane Group				Yes				No			
50th-Percentile Queue Length [veh]	1.65				10.90				10.38			
50th-Percentile Queue Length [ft]	41.33				259.45				98.96			
95th-Percentile Queue Length [veh]	2.98				16.31				15.66			
95th-Percentile Queue Length [ft]	74.40				407.86				391.53			
	0.78				0.88				0.89			
	77.74				50.80				51.96			
					64.07				64.07			
					50.73				50.73			
					0.58				0.58			
					921.07				921.07			

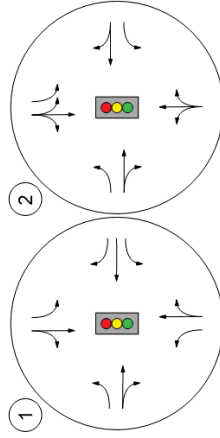
Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	77.74	77.74	77.74	51.10	51.96	51.96	64.07	14.47	14.47	69.49	50.73	50.73
Movement LOS	E	E	E	D	D	D	E	B	B	E	D	D
d_A, Approach Delay [s/veh]	77.74	77.74	77.74	51.36	51.36	51.36	28.11	C	C		51.27	
Approach LOS	E	E	E	D	D	D						
d_I, Intersection Delay [s/veh]							45.91	D	D			
Intersection LOS												
Intersection V/C							0.923					

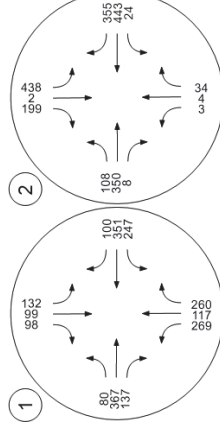
Sequence

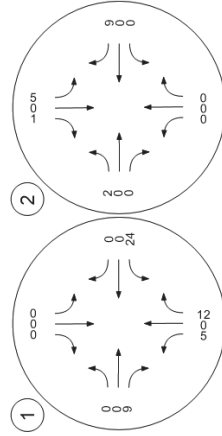
[illegible]

Lane Configuration and Traffic Control



Traffic Volume - Base Volume





Warrant 3: Peak-Hour Volumes and Delay

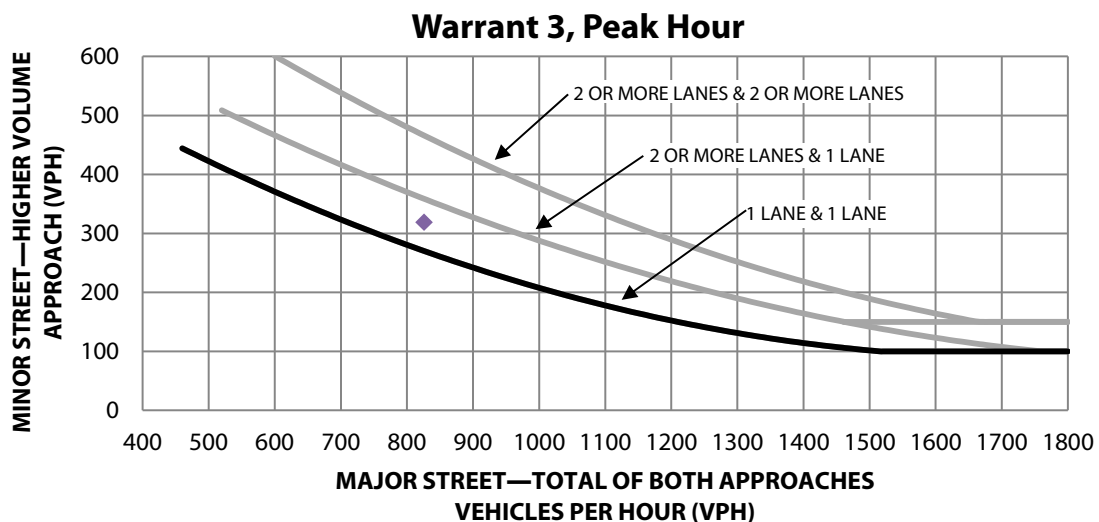
Sonoma County
Todd Rd & Standish-Ghilotti Ave

3510 Dutton Avenue
TIS

	<u>Major Street</u>	<u>Minor Street</u>
Street Name	Todd Rd	Standish-Ghilotti Ave
Direction	E-W	N-S
Number of Lanes	1	1
Approach Speed	35	30

Population less than 10,000? No
Date of Count: Tuesday, October 04, 2016
Scenario: PM Existing

Warrant 3 Met?: Met when either Condition A or B is met	Yes
Condition A: Met when conditions A1, A2, and A3 are met	Met
<i>Condition A1</i> The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one lane approach, or five vehicle-hours for a two-lane approach Minor Approach Delay: 15.99 vehicle-hours	Met
<i>Condition A2</i> The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic of 150 vph for two moving lanes Minor Approach Volume: 319 vph	Met
<i>Condition A3</i> The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches Total Entering Volume: 1186 vph	Met
Condition B The plotted point falls above the curve	Met



Warrant 3: Peak-Hour Volumes and Delay

Sonoma County
Bellevue Avenue & Dutton Avenue

3510 Dutton Avenue
TIS

	<u>Major Street</u>	<u>Minor Street</u>
Street Name	Bellevue Avenue	Dutton Avenue
Direction	E-W	N-S
Number of Lanes	1	1
Approach Speed	35	40

Population less than 10,000? No
Date of Count: Tuesday, October 04, 2016
Scenario: AM Existing

Warrant 3 Met?: Met when either Condition A or B is met

Condition A: Met when conditions A1, A2, and A3 are met

Condition A1

The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one lane approach, or five vehicle-hours for a two-lane approach

Minor Approach Delay: 0.99 vehicle-hours

Condition A2

The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic of 150 vph for two moving lanes

Minor Approach Volume: 247 vph

Condition A3

The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches

Total Entering Volume: 1044 vph

Condition B

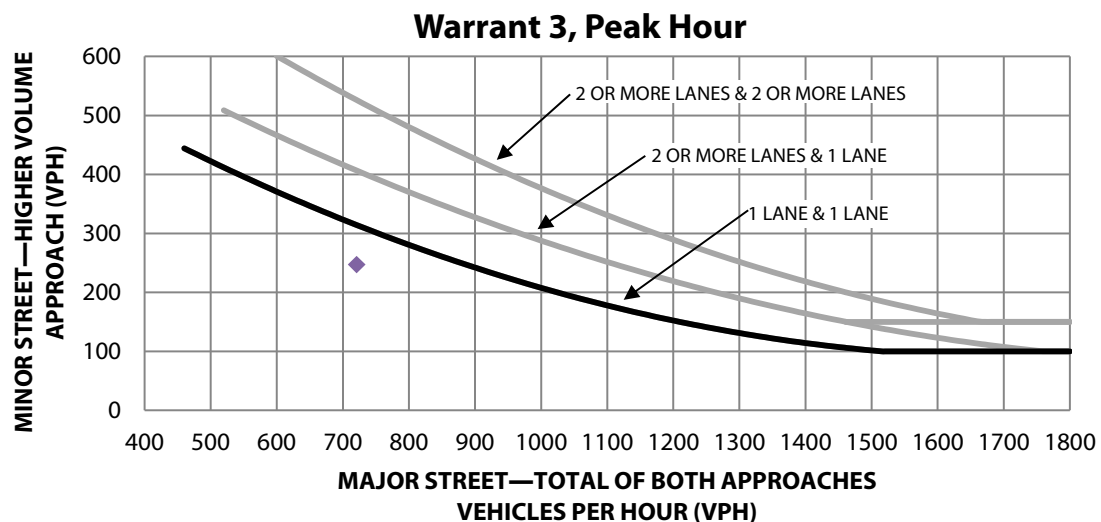
The plotted point falls above the curve

No
Not Met
Not Met

Met

Met

Not Met



Warrant 3: Peak-Hour Volumes and Delay

Sonoma County
Bellevue Avenue & Dutton Avenue

3510 Dutton Avenue
TIS

	<u>Major Street</u>	<u>Minor Street</u>
Street Name	Bellevue Avenue	Dutton Avenue
Direction	E-W	N-S
Number of Lanes	1	1
Approach Speed	35	40

Population less than 10,000? No
Date of Count: Tuesday, October 04, 2016
Scenario: AM Existing plus Project

Warrant 3 Met?: Met when either Condition A or B is met

Condition A: Met when conditions A1, A2, and A3 are met

Condition A1

The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one lane approach, or five vehicle-hours for a two-lane approach

Minor Approach Delay: 1.25 vehicle-hours

Condition A2

The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic of 150 vph for two moving lanes

Minor Approach Volume: 280 vph

Condition A3

The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches

Total Entering Volume: 1085 vph

Condition B

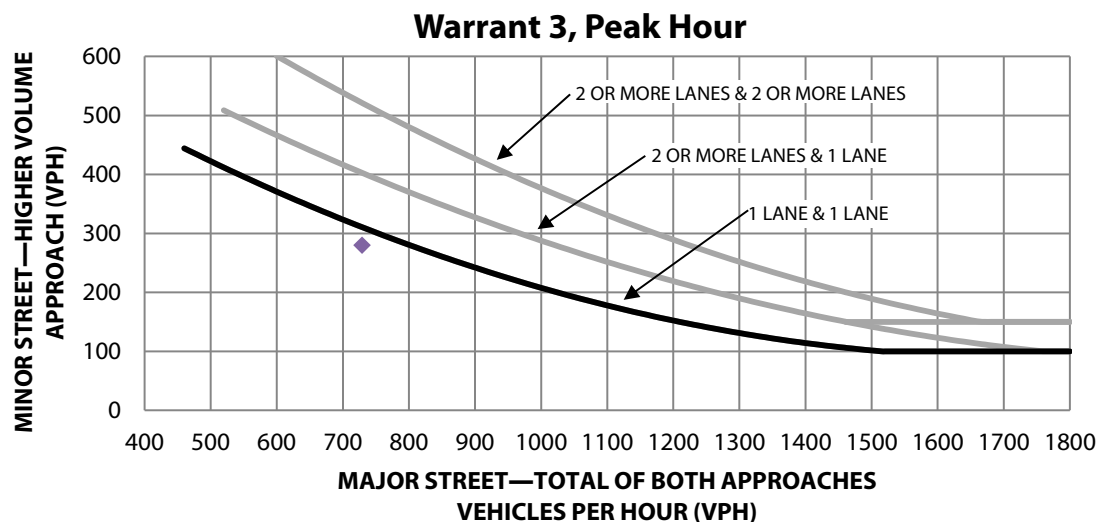
The plotted point falls above the curve

No
Not Met
Not Met

Met

Met

Not Met



Warrant 3: Peak-Hour Volumes and Delay

Sonoma County
Dutton Avenue & Bellevue Avenue

3510 Dutton Avenue
TIS

	<u>Major Street</u>	<u>Minor Street</u>
Street Name	Dutton Avenue	Bellevue Avenue
Direction	N-S	E-W
Number of Lanes	1	1
Approach Speed	40	35

Population less than 10,000? No
Date of Count: Tuesday, October 04, 2016
Scenario: PM Existing

Warrant 3 Met?: Met when either Condition A or B is met

Condition A: Met when conditions A1, A2, and A3 are met

Condition A1

The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one lane approach, or five vehicle-hours for a two-lane approach

Minor Approach Delay: 2.15 vehicle-hours

Condition A2

The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic of 150 vph for two moving lanes

Minor Approach Volume: 333 vph

Condition A3

The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches

Total Entering Volume: 1138 vph

Condition B

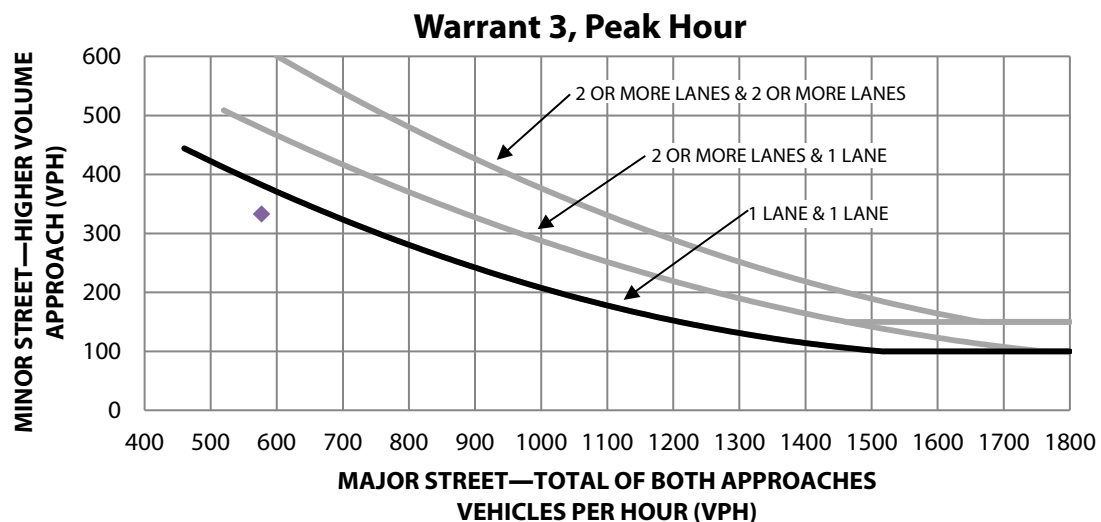
The plotted point falls above the curve

No
Not Met
Not Met

Met

Met

Not Met



Warrant 3: Peak-Hour Volumes and Delay

Sonoma County
Dutton Avenue & Bellevue Avenue

3510 Dutton Avenue
TIS

	<u>Major Street</u>	<u>Minor Street</u>
Street Name	Dutton Avenue	Bellevue Avenue
Direction	N-S	E-W
Number of Lanes	1	1
Approach Speed	40	35

Population less than 10,000? No
Date of Count: Tuesday, October 04, 2016
Scenario: PM Existing plus Project

Warrant 3 Met?: Met when either Condition A or B is met

Condition A: Met when conditions A1, A2, and A3 are met

Condition A1

The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one lane approach, or five vehicle-hours for a two-lane approach

Minor Approach Delay: 2.92 vehicle-hours

Condition A2

The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic of 150 vph for two moving lanes

Minor Approach Volume: 357 vph

Condition A3

The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches

Total Entering Volume: 1188 vph

Condition B

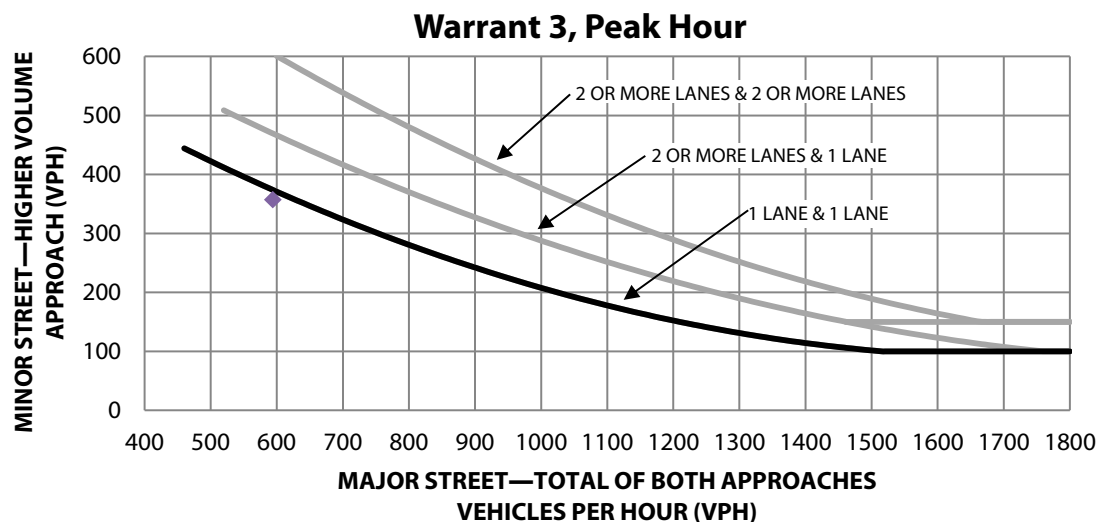
The plotted point falls above the curve

No
Not Met
Not Met

Met

Met

Not Met



Equitable Share Calculations 3150 Dutton Avenue Traffic Impact Study

		<i>Total Volume Entering the Intersection of</i>	
		Todd Rd/Standish Ave-Ghilotti Ave	
	PM		PM
		Existing	1186
Project Trips (T)*	17	Future Year	1968

Description of Project Improvement:

Install a traffic signal and restripe southbound approach to provide a left-turn lane.

Calculation of Project Share

$$P = T / (TB - TE)$$

where:

P = Equitable Share

T = Project trips during the affected peak hour

TB = Build-out volumes

TE = Existing volumes

T	17	* Trips are PCE (1 truck = 3 passenger cars)
TB	1968	
TE	1186	
P	2.2%	

Equitable Share (per Caltrans "Guide for the Preparation of Traffic Impact Studies")

Equitable Share Calculations 3150 Dutton Avenue Traffic Impact Study

		Total Volume Entering the Intersection of	
		Bellevue Avenue/Dutton Avenue	
	PM		PM
		Existing	1138
Project Trips (T)*	50	Future Year	2257

Description of Project Improvement:

Install a traffic signal and restripe all approaches to provide left-turn lanes.

Calculation of Project Share

$$P = T / (TB - TE)$$

where:

P = Equitable Share

T = Project trips during the affected peak hour

TB = Build-out volumes

TE = Existing volumes

T	50	* Trips are PCE (1 truck = 3 passenger cars)
TB	2257	
TE	1138	
P	4.5%	

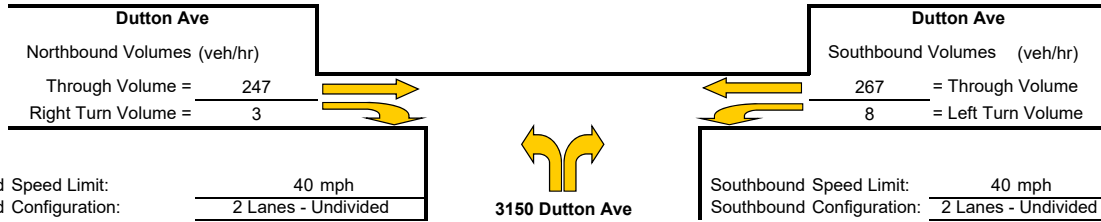
Equitable Share (per Caltrans "Guide for the Preparation of Traffic Impact Studies")

Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: 3150 Dutton Avenue Driveway
Study Scenario: AM Existing plus Project

Direction of Analysis Street: North/South

Cross Street Intersects: From the East



Northbound Right Turn Lane Warrants

1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold AV = 1027.6
Advancing Volume Va = 250
If $AV < Va$ then warrant is met No

Right Turn Lane Warranted: NO

Northbound Right Turn Taper Warrants (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

NOT WARRANTED - Less than 20 vehicles

2. Check advance volume threshold criteria for taper

Advancing Volume Threshold AV = -
Advancing Volume Va = 250
If $AV < Va$ then warrant is met -

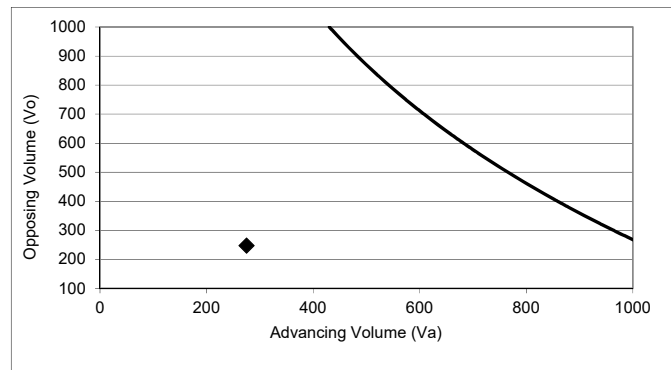
Right Turn Taper Warranted: NO

Southbound Left Turn Lane Warrants

Percentage Left Turns %lt 2.9 %

Advancing Volume Threshold AV 1024 veh/hr

If $AV < Va$ then warrant is met



◆ Study Intersection

Two lane roadway warrant threshold for: 40 mph

Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: NO

Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, January 1997.

The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.

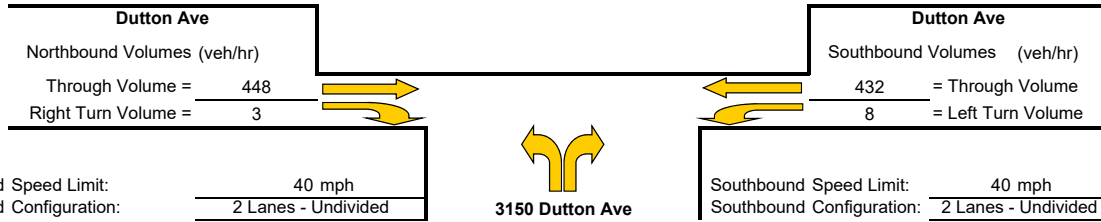
The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroborty in 1991.

Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: 3150 Dutton Avenue Driveway
Study Scenario: AM Future plus Project

Direction of Analysis Street: North/South

Cross Street Intersects: From the East



Northbound Right Turn Lane Warrants

1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold AV = 1027.6
Advancing Volume Va = 451
If $AV < Va$ then warrant is met No

Right Turn Lane Warranted: NO

Northbound Right Turn Taper Warrants (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

NOT WARRANTED - Less than 20 vehicles

2. Check advance volume threshold criteria for taper

Advancing Volume Threshold AV = -
Advancing Volume Va = 451
If $AV < Va$ then warrant is met -

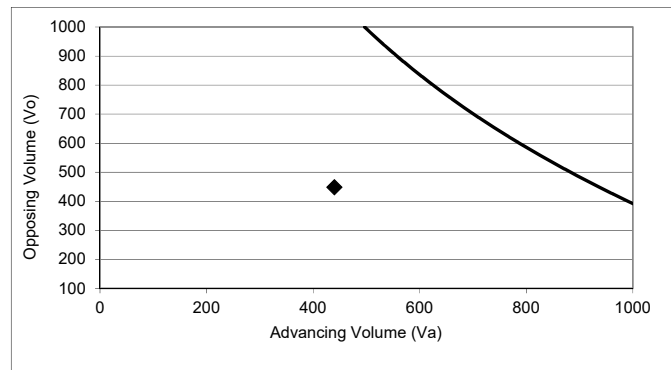
Right Turn Taper Warranted: NO

Southbound Left Turn Lane Warrants

Percentage Left Turns %lt 1.8 %

Advancing Volume Threshold AV 937 veh/hr

If $AV < Va$ then warrant is met



◆ Study Intersection

Two lane roadway warrant threshold for: 40 mph

Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: NO

Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, January 1997.

The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.

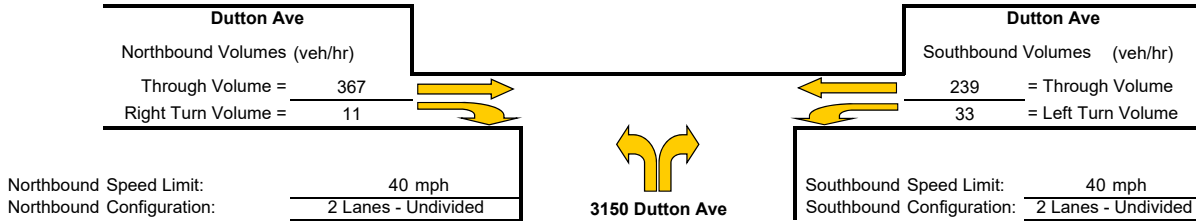
The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroborty in 1991.

Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: 3150 Dutton Avenue Driveway
Study Scenario: PM Existing plus Project

Direction of Analysis Street: North/South

Cross Street Intersects: From the East



Northbound Right Turn Lane Warrants

1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold AV = 967.6
Advancing Volume Va = 378
If $AV < Va$ then warrant is met No

Right Turn Lane Warranted: NO

Northbound Right Turn Taper Warrants (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

NOT WARRANTED - Less than 20 vehicles

2. Check advance volume threshold criteria for taper

Advancing Volume Threshold AV = -
Advancing Volume Va = 378
If $AV < Va$ then warrant is met -

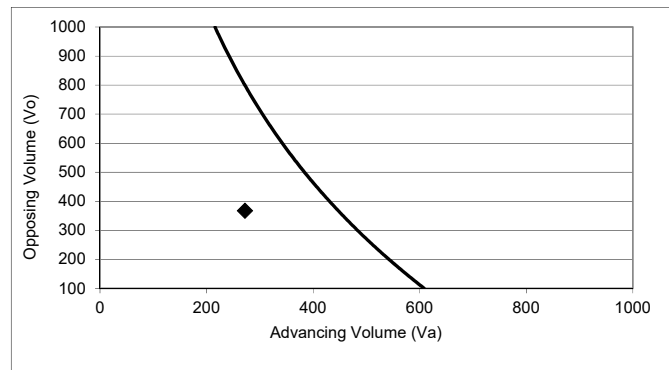
Right Turn Taper Warranted: NO

Southbound Left Turn Lane Warrants

Percentage Left Turns %lt 12.1 %

Advancing Volume Threshold AV 447 veh/hr

If $AV < Va$ then warrant is met



◆ Study Intersection

Two lane roadway warrant threshold for: 40 mph

Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: NO

Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, January 1997.

The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.

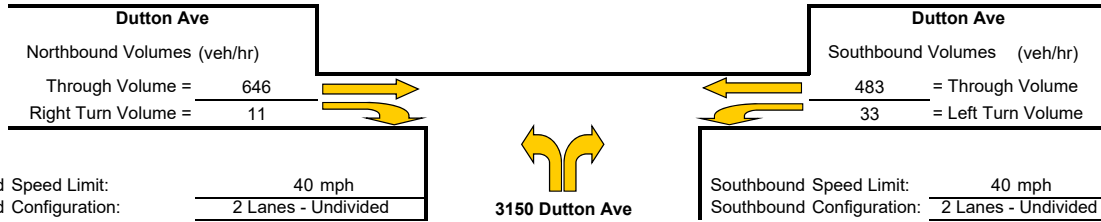
The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroborty in 1991.

Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: 3150 Dutton Avenue Driveway
Study Scenario: PM Future plus Project

Direction of Analysis Street: North/South

Cross Street Intersects: From the East



Northbound Right Turn Lane Warrants

1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold AV = 967.6
Advancing Volume Va = 657
If $AV < Va$ then warrant is met No

Right Turn Lane Warranted: NO

Northbound Right Turn Taper Warrants (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

NOT WARRANTED - Less than 20 vehicles

2. Check advance volume threshold criteria for taper

Advancing Volume Threshold AV = -
Advancing Volume Va = 657
If $AV < Va$ then warrant is met -

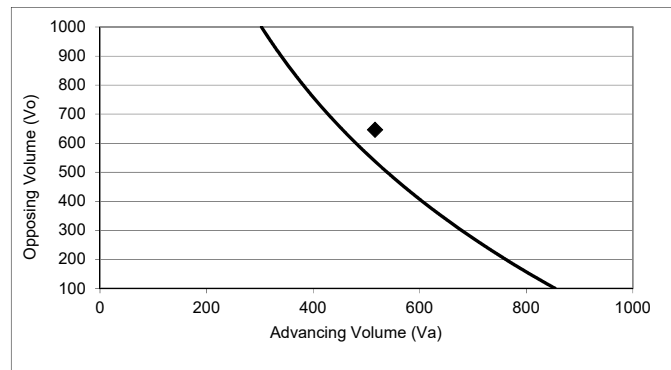
Right Turn Taper Warranted: NO

Southbound Left Turn Lane Warrants

Percentage Left Turns %lt 6.4 %

Advancing Volume Threshold AV 456 veh/hr

If $AV < Va$ then warrant is met



◆ Study Intersection

Two lane roadway warrant threshold for: 40 mph

Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, January 1997.

The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.

The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroborty in 1991.

ALL TRAFFIC DATA

(916) 771-8700
orders@atdtraffic.com

File Name : 16-7701-001 Dutton Ave & Bellevue Ave
Date : 10/4/2016

Unshifted Count = All Vehicles & Utturns

	Dutton Ave Southbound					Bellevue Ave Westbound					Dutton Ave Northbound					Bellevue Ave Eastbound						
	LEFT	THRU	RIGHT	UTURNS	APP TOTAL	LEFT	THRU	RIGHT	UTURNS	APP TOTAL	LEFT	THRU	RIGHT	UTURNS	APP TOTAL	LEFT	THRU	RIGHT	UTURNS	APP TOTAL	Total	Utturns Total
START TIME	3	5	1	0	9	11	19	19	0	49	15	10	13	0	38	5	27	12	0	44	140	0
7:00	8	5	6	0	19	29	35	21	1	86	19	10	18	0	47	12	29	15	0	56	208	1
7:15	8	10	6	0	24	31	44	25	0	100	36	12	28	0	76	4	36	16	0	56	256	0
7:30	8	4	2	0	14	33	25	45	0	103	27	9	29	0	65	10	57	42	0	109	291	0
7:45	8	4	2	0	14	33	25	45	0	103	27	9	29	0	65	10	57	42	0	109	291	0
Total	27	24	15	0	66	104	123	110	1	338	97	41	88	0	226	31	149	85	0	265	895	1
8:00	14	8	1	0	23	29	53	18	0	100	19	12	25	0	56	6	39	28	1	74	253	1
8:15	5	7	3	0	15	28	51	20	0	99	28	7	15	0	50	9	41	31	0	81	245	0
8:30	6	8	4	0	18	23	43	13	1	80	15	6	19	0	40	5	54	28	0	87	225	1
8:45	9	5	1	0	15	51	31	24	0	106	17	11	19	0	47	8	28	18	0	54	222	0
Total	34	28	9	0	71	131	178	75	1	385	79	36	78	0	193	28	162	105	1	296	945	2
16:00	32	17	12	0	61	27	36	12	0	75	43	7	49	0	99	6	34	13	0	53	288	0
16:15	25	8	6	0	39	32	43	12	0	87	37	6	28	0	71	4	32	17	0	53	250	0
16:30	39	19	11	0	69	31	44	15	1	91	44	4	49	0	97	2	42	15	0	59	316	1
16:45	29	9	11	0	49	28	48	7	0	83	32	4	36	0	72	1	36	18	0	55	259	0
Total	125	53	40	0	218	118	171	46	1	336	156	21	162	0	339	13	144	63	0	220	1113	1
17:00	20	19	14	0	53	18	47	8	0	73	52	9	66	0	127	3	33	25	0	61	314	0
17:15	20	8	7	0	35	14	54	10	0	78	32	4	27	0	63	4	37	15	1	57	233	1
17:30	20	11	8	0	39	16	40	5	0	61	39	5	27	0	71	1	47	11	0	59	230	0
17:45	11	6	6	0	23	11	49	6	0	66	32	0	27	0	59	1	42	19	0	62	210	0
Total	71	44	35	0	150	59	190	29	0	278	155	18	147	0	320	9	159	70	1	239	987	1
Grand Total	257	149	99	0	505	412	662	260	3	1337	487	116	475	0	1078	81	614	323	2	1020	3940	5
Approch %	50.9%	29.5%	19.6%	0.0%		30.8%	49.5%	19.4%	0.2%		45.2%	10.8%	44.1%	0.0%		7.9%	60.2%	31.7%	0.2%			
Total %	6.5%	3.8%	2.5%	0.0%	12.8%	10.5%	16.8%	6.6%	0.1%	33.9%	12.4%	2.9%	12.1%	0.0%	27.4%	2.1%	15.6%	8.2%	0.1%	25.9%		100.0%

AM PEAK HOUR		Dutton Ave Southbound				Bellevue Ave Westbound				Dutton Ave Northbound				Bellevue Ave Eastbound				Total			
START TIME	LEFT	THRU	RIGHT	UTURNS	APP TOTAL	LEFT	THRU	RIGHT	UTURNS	APP TOTAL	LEFT	THRU	RIGHT	UTURNS	APP TOTAL	LEFT	THRU	RIGHT	UTURNS	APP TOTAL	Total
Peak Hour For Entire Intersection Begins at 07:30																					
7:30	8	10	6	0	24	31	44	25	0	100	36	12	28	0	76	4	36	16	0	56	256
7:45	8	4	2	0	14	33	25	45	0	103	27	9	29	0	65	10	57	42	0	109	291
8:00	14	8	1	0	23	29	53	18	0	100	19	12	25	0	56	6	39	28	1	74	253
8:15	5	7	3	0	15	28	51	20	0	99	28	7	15	0	50	9	41	31	0	81	245
Total Volume	35	29	12	0	76	121	173	108	0	402	110	40	97	0	247	29	173	117	1	320	1045
% App Total	46.1%	38.2%	15.8%	0.0%		30.1%	43.0%	26.9%	0.0%		44.5%	16.2%	39.3%	0.0%		9.1%	54.1%	36.6%	0.3%		
PHF	.625	.725	.500	.000	.792	.917	.816	.600	.000	.976	.764	.833	.836	.000	.813	.725	.759	.696	.250	.734	.898
PM PEAK HOUR		Dutton Ave Southbound				Bellevue Ave Westbound				Dutton Ave Northbound				Bellevue Ave Eastbound				Total			
START TIME	LEFT	THRU	RIGHT	UTURNS	APP TOTAL	LEFT	THRU	RIGHT	UTURNS	APP TOTAL	LEFT	THRU	RIGHT	UTURNS	APP TOTAL	LEFT	THRU	RIGHT	UTURNS	APP TOTAL	Total
Peak Hour Analysis From 16:15 to 17:15																					
Peak Hour For Entire Intersection Begins at 16:15																					
16:15	25	8	6	0	39	32	43	12	0	87	37	6	28	0	71	4	32	17	0	53	250
16:30	39	19	11	0	69	31	44	15	1	91	44	4	49	0	97	2	42	15	0	59	316
16:45	29	9	11	0	49	28	48	7	0	83	32	4	36	0	72	1	36	18	0	55	259
17:00	20	19	14	0	53	18	47	8	0	73	52	9	66	0	127	3	33	25	0	61	314
Total Volume	113	55	42	0	210	109	182	42	1	334	165	23	179	0	367	10	143	75	0	228	1139
% App Total	53.8%	26.2%	20.0%	0.0%		32.6%	54.5%	12.6%	0.3%		45.0%	6.3%	48.8%	0.0%		4.4%	62.7%	32.9%	0.0%		
PHF	.724	.724	.750	.000	.761	.852	.948	.700	.250	.918	.793	.639	.678	.000	.722	.625	.851	.750	.000	.934	.901

ALL TRAFFIC DATA

(916) 771-8700
orders@atdtraffic.com

File Name : 16-7701-002 Standish Ave/Ghillotti Ave & Todd Road
Date : 10/4/2016

Unshifted Count = All Vehicles & Utturns																						
Standish Ave/Ghillotti Ave Southbound						Todd Road Westbound						Standish Ave/Ghillotti Ave Northbound						Todd Road Eastbound				
START TIME	LEFT	THRU	RIGHT	UTURNS	APP TOTAL	LEFT	THRU	RIGHT	UTURNS	APP TOTAL	LEFT	THRU	RIGHT	UTURNS	APP TOTAL	LEFT	THRU	RIGHT	UTURNS	APP TOTAL	Total	Utturns Total
7:00	49	0	7	0	56	7	33	42	0	82	0	0	6	0	6	8	53	0	0	61	205	0
7:15	32	0	9	0	41	2	45	51	0	98	0	0	3	0	3	14	59	1	0	74	216	0
7:30	33	0	14	0	47	6	47	61	0	114	1	0	3	0	4	18	82	2	0	102	267	0
7:45	41	0	6	0	47	10	49	72	0	131	1	1	4	0	6	26	91	0	0	117	301	0
Total	155	0	36	0	191	25	174	226	0	425	2	1	16	0	19	66	285	3	0	354	989	0
8:00	39	0	12	0	51	10	75	56	0	141	0	0	6	0	6	18	49	1	0	68	266	0
8:15	36	0	15	0	51	4	54	71	0	129	1	0	6	0	7	19	67	1	0	87	274	0
8:30	34	1	10	0	45	2	54	60	0	116	1	1	8	0	10	28	76	1	0	105	276	0
8:45	50	0	7	0	57	4	50	52	0	106	2	0	2	0	4	20	63	1	0	84	251	0
Total	159	1	44	0	204	20	233	239	0	492	4	1	22	0	27	85	255	4	0	344	1067	0
16:00	64	0	12	0	76	5	47	51	0	103	0	0	4	0	4	19	74	0	0	93	276	0
16:15	62	1	15	0	78	3	55	44	0	102	0	1	9	0	10	13	75	1	0	89	279	0
16:30	62	0	17	0	79	9	88	43	0	140	0	0	5	0	5	14	81	0	0	95	319	0
16:45	61	1	23	0	85	3	54	45	1	103	2	1	12	0	15	9	86	7	1	103	306	2
Total	249	2	67	0	318	20	244	183	1	448	2	2	30	0	34	55	316	8	1	380	1180	2
17:00	67	0	10	0	77	8	67	39	0	114	1	2	8	0	11	8	74	0	0	82	284	0
17:15	43	0	7	0	50	3	70	38	0	111	1	0	3	0	4	10	71	2	0	83	248	0
17:30	38	0	9	1	48	2	64	34	0	100	1	0	8	0	9	13	55	1	0	69	226	1
17:45	30	1	5	0	36	3	76	30	0	109	1	2	2	0	5	11	68	1	0	80	230	0
Total	178	1	31	1	211	16	277	141	0	434	4	4	21	0	29	42	268	4	0	314	988	1
Grand Total	741	4	178	1	924	81	928	789	1	1799	12	8	89	0	109	248	1124	19	1	1392	4224	3
Approach %	80.2%	0.4%	19.3%	0.1%		4.5%	51.6%	43.9%	0.1%		11.0%	7.3%	81.7%	0.0%		17.8%	80.7%	1.4%	0.1%			
Total %	17.5%	0.1%	4.2%	0.0%	21.9%	1.9%	22.0%	18.7%	0.0%	42.6%	0.3%	0.2%	2.1%	0.0%	2.6%	5.9%	26.6%	0.4%	0.0%	33.0%		100.0%

Standish Ave/Ghillotti Ave Southbound						Todd Road Westbound						Standish Ave/Ghillotti Ave Northbound						Todd Road Eastbound				
START TIME	LEFT	THRU	RIGHT	UTURNS	APP TOTAL	LEFT	THRU	RIGHT	UTURNS	APP TOTAL	LEFT	THRU	RIGHT	UTURNS	APP TOTAL	LEFT	THRU	RIGHT	UTURNS	APP TOTAL	Total	
7:45	41	0	6	0	47	10	49	72	0	131	1	1	4	0	6	26	91	0	0	117	301	
8:00	39	0	12	0	51	10	75	56	0	141	0	0	6	0	6	18	49	1	0	68	266	
8:15	36	0	15	0	51	4	54	71	0	129	1	0	6	0	7	19	67	1	0	87	274	
8:30	34	1	10	0	45	2	54	60	0	116	1	1	8	0	10	28	76	1	0	105	276	
Total Volume	150	1	43	0	194	26	232	259	0	517	3	2	24	0	29	91	283	3	0	377	1117	
% App Total	77.3%	0.5%	22.2%	0.0%		5.0%	44.9%	50.1%	0.0%		10.3%	6.9%	82.8%	0.0%		24.1%	75.1%	0.8%	0.0%			
PHF	.915	.250	.717	.000	.951	.850	.773	.899	.000	.917	.750	.500	.750	.000	.725	.813	.777	.750	.000	.806	.928	

Standish Ave/Ghillotti Ave Southbound						Todd Road Westbound						Standish Ave/Ghillotti Ave Northbound						Todd Road Eastbound				
START TIME	LEFT	THRU	RIGHT	UTURNS	APP TOTAL	LEFT	THRU	RIGHT	UTURNS	APP TOTAL	LEFT	THRU	RIGHT	UTURNS	APP TOTAL	LEFT	THRU	RIGHT	UTURNS	APP TOTAL	Total	
16:15	62	1	15	0	78	3	55	44	0	102	0	1	9	0	10	13	75	1	0	89	279	
16:30	62	0	17	0	79	9	88	43	0	140	0	0	5	0	5	14	81	0	0	95	319	
16:45	61	1	23	0	85	3	54	45	1	103	2	1	12	0	15	9	86	7	1	103	306	
17:00	67	0	10	0	77	8	67	39	0	114	1	2	8	0	11	8	74	0	0	82	284	
Total Volume	252	2	65	0	319	23	264	171	1	459	3	4	34	0	41	44	316	8	1	369	1188	
% App Total	79.0%	0.6%	20.4%	0.0%		5.0%	57.5%	37.3%	0.2%		7.3%	9.8%	82.9%	0.0%		11.9%	85.6%	2.2%	0.3%			
PHF	.940	.500	.707	.000	.938	.639	.750	.950	.250	.820	.375	.500	.708	.000	.683	.786	.919	.286	.250	.896	.931	