

West Dallas Street Bikeway Improvements Technical Memorandum

Prepared for:



Montrose / Tax Increment Reinvestment Zone 27
WSB No. N-T27000-0003-7

Prepared By:



Traffic Engineers, Inc.
712 Main Street, Suite 950
Houston, Texas 77002

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A handwritten signature in cursive script that reads 'Sarah L. Wetmore'.

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1. Existing Conditions

The project limits of the W Dallas Street improvements are (see **Figure 1**):

- **W Dallas Street** from just west of Waugh Drive to just east of Montrose Boulevard at Columbus Street. W Dallas Street is classified as a Major Collector on the City of Houston Major Thoroughfare & Freeway Plan (MTFP).

A detailed existing conditions assessment was conducted to better understand the W Dallas Street Study Corridor. Field observations and information from GIMS database were used to evaluate the existing conditions. The extensive data collected for the 2020 Walk+Bike Montrose plan was also used to evaluate sidewalk and ramp conditions along the study corridor. Twenty-four-hour vehicular traffic volumes and speeds were collected at one location on the corridor. Peak hour turning movement counts were collected for both signalized intersections.



Figure 1: Project Location & Existing Conditions

1.1. Roadway

W Dallas Street between Waugh Drive and Montrose Boulevard is a two-way, four-lane, undivided roadway with curbs and gutters and a speed limit of 30 mph. The typical width of the roadway for this segment is 44 feet. The ROW is 60 feet. This section of W Dallas Street is classified on the City of Houston Major Thoroughfare and Freeway Plan (MTFP) as MJ-4-60 with sufficient right of way.

The typical section is shown below in **Figure 2**.

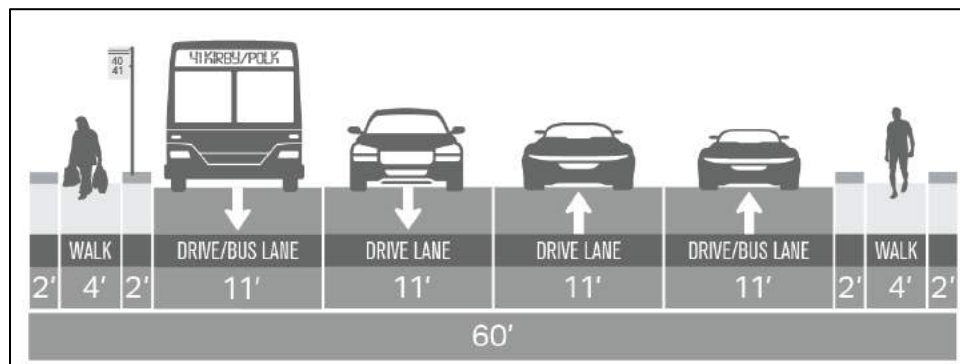


Figure 2: Existing Typical Section of W Dallas Street between Waugh Drive and Montrose Boulevard

Existing pavement is asphalt between Waugh Drive and Montrose Boulevard and concrete west of Waugh Drive and east of Montrose Boulevard. The PCI for this segment based on 2017 City of Houston data is 54.4. However, pavement quality appears smooth based on field observations and thus better than the 54.4 PCI, except for cracks in the pavement immediately west of Eberhard Street. Sidewalks are present for the majority of the corridor and generally in good condition, although width varies. Construction of a new apartment complex on the northwest corner of W Dallas Drive and Montrose Blvd shows minimum 5-foot sidewalks along this parcel within the projects TIA. Curb ramp condition also varies from nonexistent to ADA compliant. See **Figure 4** for more details on sidewalk condition.

This segment of W Dallas is on the *Houston Bike Plan* as an existing low-comfort shared on-street bicycle route. This segment is included on the *Houston Bike Plan* Vision Network as a dedicated on-street bikeway. In addition, the 2020 *Walk+Bike Montrose* plan prioritized W Dallas Street from Waugh Drive to Montrose Boulevard as a priority on-street bikeway corridor. The corridor was prioritized due its location within the rapidly growing on-street bikeway network that is enhancing high-comfort connectivity across the City. This segment is a key east-west link in a larger corridor that is poised to eventually reach from Shepherd Drive to Bagby Street and Sesquicentennial Park downtown. In addition, the segment intersects a planned shared-use path to be developed along Montrose Boulevard from W Dallas Street to Allen Parkway and Buffalo Bayou Park. This path is being developed within TIRZ 27's ongoing study of Montrose Boulevard.



Figure 3: W Dallas Street looking east toward Peveto Street

1.2. Sidewalks and Curb Ramps

As part of the 2020 *Walk+Bike Montrose* plan, every block within the study area was assessed to determine condition, comfort, perceived safety, and feasibility of future sidewalk improvements. Assessments were conducted on a per parcel basis. All data was recorded in 2019 and is presented in **Figure 4**. Details of the conditions along W Dallas Street are presented in **Figure 5** with updates from November 2021 field observations.

TIRZ 27 has set a goal of 6-foot minimum sidewalks on key corridors like W Dallas Street. Any existing sidewalk less than 5 feet wide does not meet the current City standard and will be replaced where feasible.

Excluding construction along the northeast segment of the corridor, the quality of sidewalk is generally good. Sidewalk width varies from 4 feet along most of the corridor to 9 feet in front of The Viv Apartments. Most curb ramps, however, are either nonexistent or not ADA compliant, although a few ADA compliant curb ramps are scattered throughout the corridor.

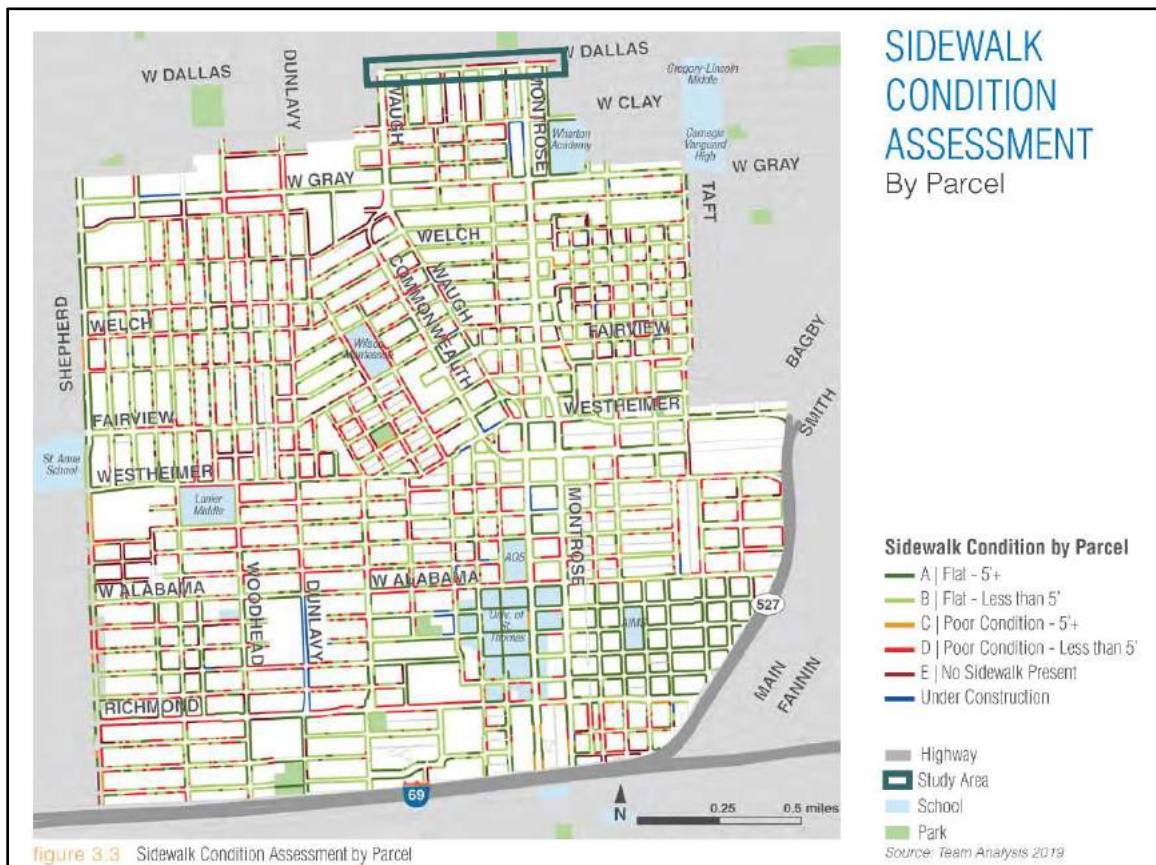


figure 3.3 Sidewalk Condition Assessment by Parcel

Figure 4: Sidewalk Condition by Parcel from 2020 Walk+Bike Montrose

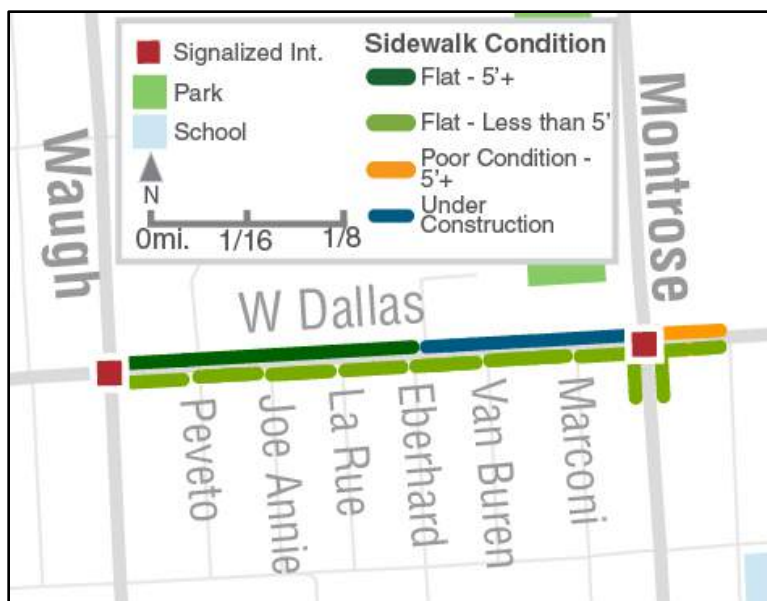


Figure 5: W Dallas Street Sidewalk Condition (2021), Waugh Drive to Montrose Boulevard

1.3. Existing Vehicular Volume and Speeds

Vehicular volume and speed counts were collected at one location along the study corridor. The counts are summarized in **Table 1**. The posted speed limit on W Dallas Street is 30 mph. The ADTs presented below from May 2011, April 2019 (pre-COVID), and November 2021 indicate excess capacity along the corridor and minimal historical growth in traffic volumes. The existing traffic volumes can be comfortably accommodated on a three-lane roadway. Excess capacity along the corridor can lead to high vehicular travel speeds and decreased safety for all users. In 2019, the 85th percentile speed was almost 10 mph higher than the posted speed limit.

Table 1: Summary of Vehicular Volume and Speed Counts

Location & Year	ADT	85 th percentile speed (mph)	95 th percentile speed (mph)
2900 W Dallas, west of Eberhard (2021) ¹	9,272	33.9	36.8
2933 W Dallas, east of Peveto (2019) ²	11,848	39.0	-
2933 W Dallas, east of Peveto (2011) ³	11,155	-	-

¹ Source: CJ Hensch Counts (2021/11/16)

² Source: City of Houston GIMS (2019/04/09)

³ Source: City of Houston GIMS (2011/05/03)

Right-sizing W Dallas Street from Waugh Drive to Montrose Boulevard by converting the roadway from 4-lanes to 3-lanes allows for the inclusion of an on-street bikeway. Reallocating space better aligns capacity

with roadway demand and meets the on-street bikeway needs prioritized in the *Houston Bike Plan* and *Walk+Bike Montrose*.

Peak hour turning movement counts, including pedestrian and bicycle counts, were also collected at two locations along the study corridor at the intersections of W Dallas Street with the following streets:

Waugh Drive: collected Tue Nov 9, 2021 from 7–9 AM & 4–6 PM

- 126 crossing pedestrians and 17 crossing bicyclists

Montrose Boulevard: collected Tue Nov 9, 2021 from 7–9 AM & 4–6PM

- 73 crossing pedestrians and 5 crossing bicyclists

Intersection capacity analyses for both signalized intersections were conducted for this study and are included within **Section 4** of this report. See **Appendix 1** for detailed vehicular volumes and speeds.

1.4. Safety - Crash History

This segment of W Dallas Street from Waugh Drive to Montrose Boulevard is included on the City of Houston Vision Zero High Injury Network (HIN) due to its high severe crash rate. The HIN designates the 6% of Houston streets that account for 60% of traffic deaths and serious injuries.

For this study, historical crashes between 2016–2020 were obtained from TxDOT’s CRIS database. The database includes all recorded and geocoded crashes that occurred along a corridor with property damage exceeding \$1,000, or injury or death. Therefore, it is a useful representation of safety along a corridor, but not a complete picture of all possible safety issues.

Over the five-year period, there were a total of 113 recorded crashes along W Dallas Street (including intersection crashes at Waugh Drive and Montrose Boulevard). **Table 2** summarizes the number of crashes for each of the five years analyzed. Crash rates adjusted for volumes for the two signalized intersections were similar as shown in **Table 3**: 0.36 crashes per million entering vehicles (MEV) at W Dallas Street & Montrose Boulevard, and 0.41 crashes per MEV at W Dallas Street & Waugh Drive. A crash density was developed for all crashes along the corridor and is presented in **Figure 6**.

Table 2: Summary of Five-Year Crash Analysis (2016–2020)

Year	Total Crashes	Fatalities	Incapacitating Injuries	Pedestrian Involved Crashes	Bike Involved Crashes
2016	29	0	1	1	1
2017	24	0	1	1	0
2018	22	0	0	2	0
2019	26	0	1	1	0
2020	12	0	0	1	1
Total	113	0	3	6	2

Table 3: Signalized Intersection Crash Rates at W Dallas Street

Intersection Crash Rate* (crashes per million entering vehicles)	
W Dallas at Waugh	0.41
W Dallas at Montrose	0.36

* Volumes sourced from 2021 CJ Hensch 24-hour ADT counts, and extrapolation from 2021 CJ Hensch peak hour turning movement counts for approaches without 24-hour ADT data

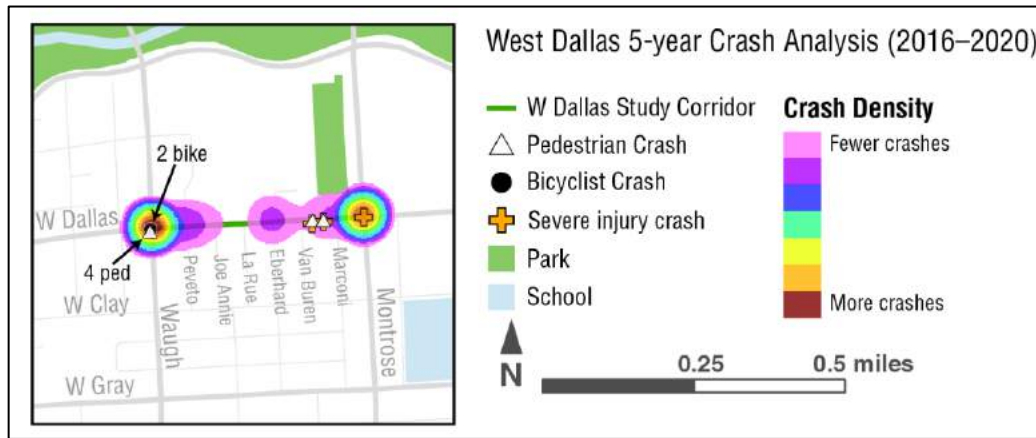


Figure 6: Five-year Crash Density for West Dallas Study Corridor

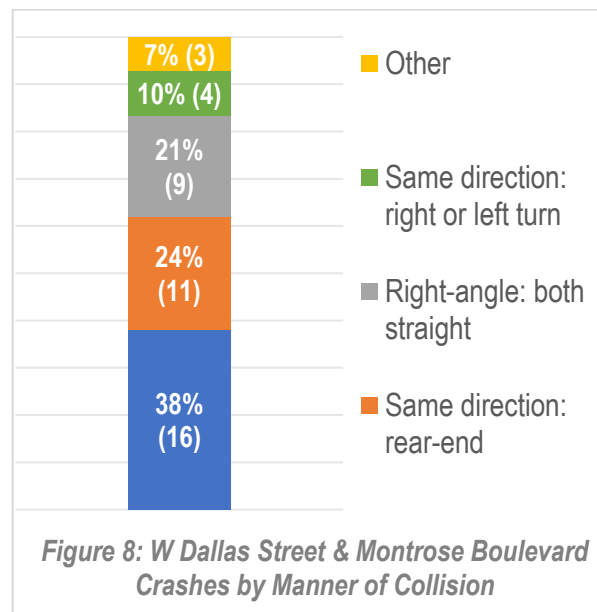
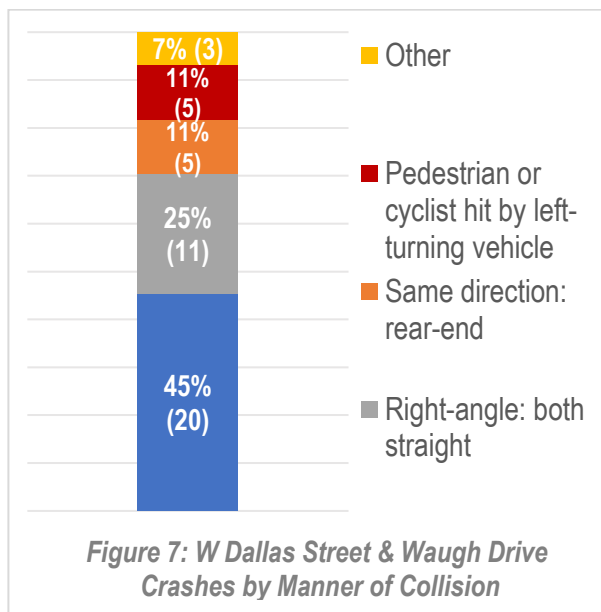
The majority of crashes within the study area (88%) occurred at intersections. **Table 4** summarizes the total number of crashes that occurred at each intersection for each of the five years analyzed.

Table 4: Summary of all Intersection Related Crashes along Study Corridor

Total Number of Intersection Crashes at:	2016	2017	2018	2019	2020	5-year Total
Waugh	10	10	10	8	6	44
Peveto	1	2	0	0	0	3
Joe Annie	0	1	1	0	0	2
La Rue	0	0	0	0	0	0
Eberhard	4	0	0	0	0	4
Van Buren	0	0	0	0	0	0
Marconi	1	0	0	2	0	3
Montrose	10	7	8	14	3	42

The most common manners of collision are similar at both signalized intersections as shown in **Figure 7** and **Figure 8**. The most common type for both is “Opposite direction: one straight, one left”. However, rear-end collisions are more common at Montrose Boulevard. Both intersections have a similar proportion of “Right-angle: both straight” crashes. Notably, Waugh Drive has a significant number of pedestrians and cyclists (5) hit by left-turning vehicles.

Additionally, the two non-intersection pedestrian crashes toward the east end of the Study Corridor both resulted in severe injury.



1.5. Transit Network

The 40 Telephone/Heights & 41 Kirby/Polk bus routes overlap on W Dallas Street to provide medium- to high-frequency service every 15-30 minutes during all times of day. The full 40 Telephone/Heights route runs from North Shepherd Park & Ride to Hobby Airport. The full 41 Kirby/Polk route runs from TMC Transit Center to Eastwood Transit Center. The two routes overlap from W Dallas Street at Waugh Drive to Eastwood Transit Center. 2019 METRO data shows an average of 178 weekday boardings and 172 weekday alightings along the segment of W Dallas Street from Waugh Drive to Montrose Boulevard.

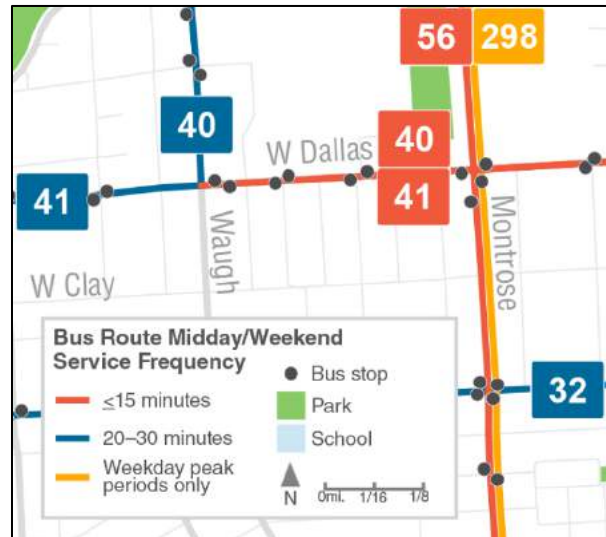


Figure 9: Transit Network Surrounding Study Area

Running along Montrose Boulevard, the high-ridership 56 Airline/Montrose (20-minute frequency) and the 298 Kingsland/Addicks/NWTC/TMC bus routes intersect the study corridor at W Dallas Street at Montrose Boulevard. At this intersection, the two routes combined show an average of 110 weekday boardings and 94 weekday alightings. The 56 Airline/Montrose route was designated as a Bus Operations Optimized System Treatments (BOOST) corridor as a part of METRONext. As a result of its BOOST designation, stop location and station design along the Montrose corridor will be built to incorporate elements of a better walk, stop, and ride. The 56 Airline/Montrose is part of the frequent network with 15-minute headways at most times, but service has been modified during the COVID-19 pandemic.

The segment of W Dallas Street from Waugh Drive to Montrose Boulevard has four stop pairs for Routes 40/41. A pair of bus stops just south of Montrose Boulevard at W Dallas Street serves Routes 56 and 298. See Figure 9 for exact locations of existing bus stops.

1.6. Hydrologic and Hydraulic Conditions:

Existing Conditions

A thorough existing conditions assessment was conducted to better understand the characteristics of West Dallas Street. Field investigations and record drawings from the City of Houston were used to evaluate the existing conditions. The existing runoff was calculated for 2-year and 100-year storm events using the rational method. The C values used were 0.90 for the impervious area and 0.55 for all pervious area. The 0.55 value was chosen because the grassy areas are very compacted; water runs off faster over it than areas with less-compacted, well-draining soil. The 2-year and 100-year intensity values were based on Atlas 14, Region III data and were taken from the City of Houston Public Works Infrastructure Design Manual (July 2021).

Two drainage areas were delineated for City of Houston ROW per outfall location and the two storm sewer systems, which outfall into Buffalo Bayou.

- System A collects runoff from drainage area A01 and goes north along Waugh Drive.
- System B collects runoff from drainage area B01 and goes north along Montrose Boulevard.

The total existing impervious cover is 4.18 acres. The existing runoff can be seen in **Exhibit 1**.

Proposed Conditions

The entire project area has existing sidewalks that range from 4-feet to 5-feet wide. There are also existing curb ramps and driveways that are not ADA compliant or are in poor condition. Dallas Street is classified as a major collector. The City’s Infrastructure Design Manual requires 6-foot sidewalks for collector streets. Therefore, this project will expand the existing 4-foot or 5-foot sidewalks to be 6-foot and upgrade the curb ramps and driveways to be ADA compliant. The proposed sidewalk improvements can be seen in **Exhibit 2**.

The proposed runoff was calculated for 2-year and 100-year storm events using the rational method. Drainage areas are identical to those in the existing conditions. To offset the increase in runoff due to increased impervious area, a 2-foot strip of coarse sand 6.5” deep and covered in sod is proposed as seen in **Exhibit 3**. Other strip sizes of coarse sand covered in sod are proposed in areas wherever 2 feet is not possible or where there is room for more than 2 feet. The C values of the coarse sand covered in sod is 0.18 because coarse sand enables rainwater to infiltrate much quicker than the compacted topsoil that is typically present. A breakdown of the C values is shown in **Exhibit 4**. By offsetting the minor additional sidewalk impervious cover with a very porous sand with sod, we eliminate any increase in runoff.

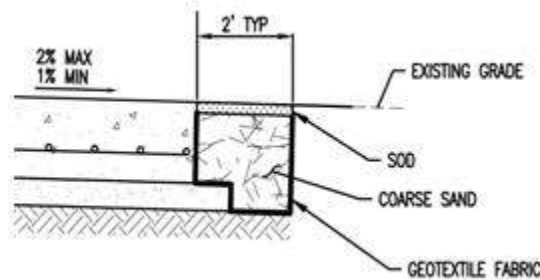


Exhibit 3: Coarse Sand Detail

Drainage Area	Subarea (acres)		C Value		Description		C Value	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
A01	3.1532	3.2144	0.90	0.90	ROW	ROW	0.856	0.855
	0.4516	0.3258	0.55	0.55	Parks	Parks		
		0.0650		0.18		Sand		
B01	1.0226	1.0354	0.90	0.90	ROW	ROW	0.865	0.865
	0.1121	0.0852	0.55	0.55	Parks	Parks		
		0.0141		0.18		Sand		

Exhibit 4: C Value Calculations

The total proposed impervious cover is 4.25 acres. The proposed runoff can be seen in **Exhibit 1**.

- In System A, the existing 100-year runoff is 39.83 cfs and the proposed 100-year runoff is 39.79 cfs.
- In System B, the existing 100-year runoff is 12.67 cfs and the proposed 100-year runoff is 12.66 cfs.

Impact Analysis

The proposed sidewalk, curb ramp, and driveway improvements along West Dallas Street from Waugh Drive to Montrose Boulevard will result in an increase in impervious cover of 2664.36 square feet in System A and 558.33 square feet in System B. The increase is completely offset by a 2-foot strip of coarse sand covered in sod. On a watershed level, Systems A and B are in the Buffalo Bayou Watershed and in the W100M sub-watershed. The minor change in impervious cover associated with this improvement does not change the overall impervious cover or any of the watershed parameters. On the drainage system level, there is no increase in runoff because the coarse sand next to the sidewalks offsets the runoff associated with the increase in impervious cover.

Conclusion

The proposed improvements along West Dallas Street will increase the impervious cover by over 3,000 square feet to be added over 0.42 miles, which is offset by over 3,000 square feet of coarse sand. This project will have no adverse impact up to and including the 100-year event.

2. Agency Coordination

There are currently no active CIP projects listed in COH GIMS that run along or intersect the corridor. However, a variety of projects are planned by other entities within the area (see **Figure 10**).

At the time of this memorandum's development, the W Dallas Street bikeway from Waugh Drive to Montrose Boulevard is poised to fill in a critical segment in a larger bikeway network. Immediately to the west, TIRZ 5 has finalized design for a bikeway on W Dallas Street from Dunlavy Street to Waugh Drive. The cross-section will have three 10-foot vehicle lanes, two 5-foot bike lanes, and two 2-foot armadillo buffers. Further west on W Dallas Street, a similar bikeway undertaken by a private developer is under construction from Dunlavy Street to Shepherd Drive. To the south of W Dallas Street, TIRZ 27 recently completed construction of a protected bikeway on Waugh Drive from W Dallas Street to W Gray Street that continues south along both Commonwealth Street and Waugh Drive to Yoakum Street.

The *Houston Bike Plan* Vision Network recommends an on-street bikeway along W Dallas from east of Montrose Boulevard through Fourth Ward to the recently completed Bagby Street bikeway on the west side of Downtown, providing a safe and comfortable bikeway route from Shepherd Drive to the north side of Downtown. There are currently no known plans for the design and construction of a bikeway on W Dallas from east of Montrose Boulevard to Bagby Street; however, this project and the TIRZ 5 project could generate momentum for the completion of the bikeway corridor.

In addition, Montrose Boulevard between Allen Parkway and IH-69 is currently under review by TIRZ 27. The TIRZ is conducting a Design Concept Report (DCR) for the corridor to better understand mobility and drainage needs. The TIRZ hopes to complete the DCR by summer 2022 and start construction sometime in 2024. This project will rebuild the intersection of W Dallas Street at Montrose Blvd and develop a shared-use path along the east side of Montrose Boulevard to Allen Parkway to provide a key connection to Buffalo Bayou Park for those bicycling and walking. This future shared-use path will be part of the ever-expanding bikeway network within Montrose and provide an additional high-quality connection to Buffalo Bayou Park.

These existing and future connections to other bikeways multiply the benefits of the W Dallas Street bikeway from Waugh Drive to Montrose Boulevard, thereby improving connectivity and access of bicyclists to destinations throughout the City of Houston.

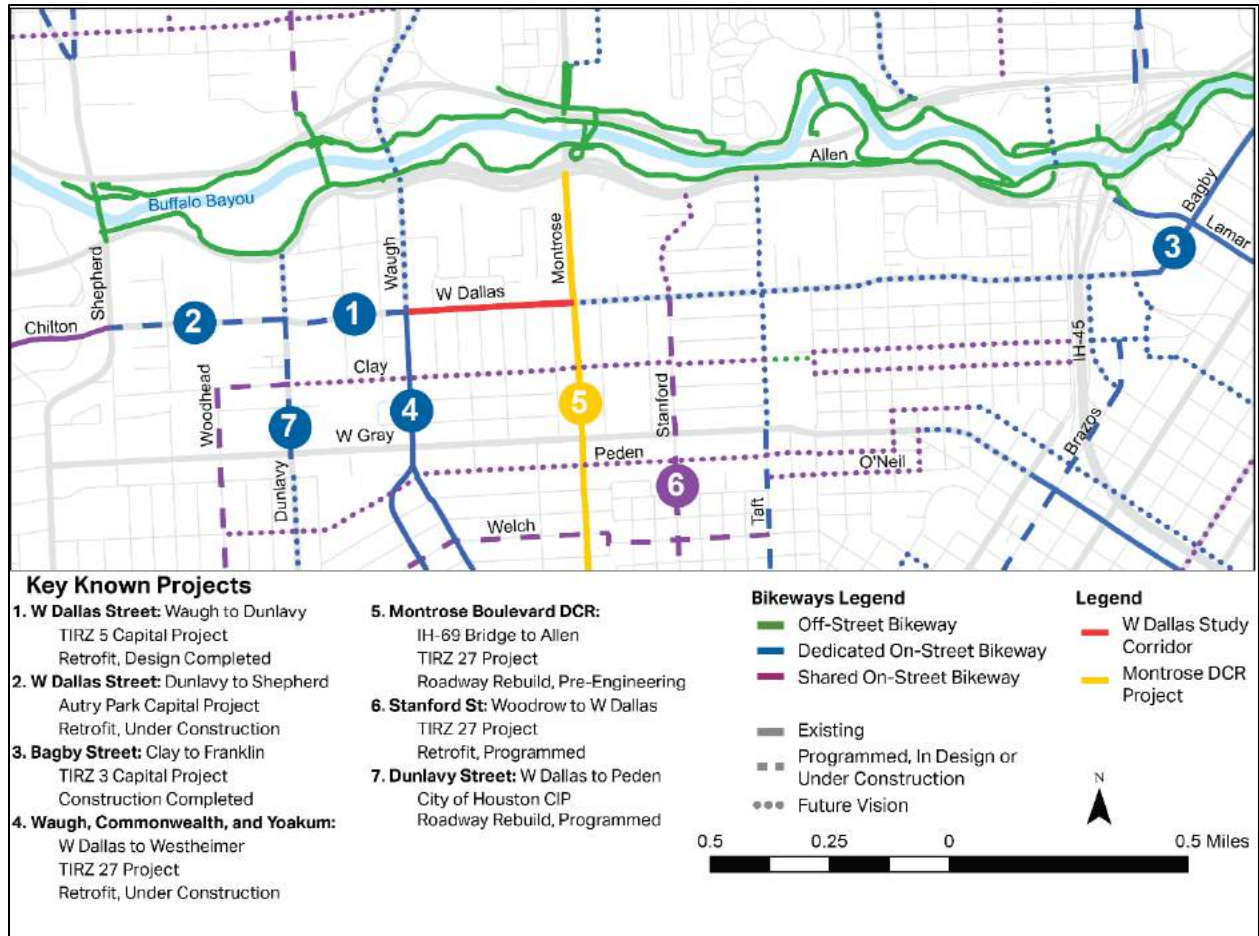


Figure 10: W Dallas Street Vicinity Bikeway and Relevant Projects

3. W Dallas Corridor Proposed Improvements

3.1. Concept Plan: Roadway & Sidewalk Recommendation

The W Dallas Street corridor will be enhanced with a dedicated on-street bikeway and improved sidewalks, curb ramps, and safety enhancements at intersections. The project will follow the principles of designing for bicyclists of All Ages & Abilities to achieve the TIRZ’s Project Plan goal of enhancing the Montrose transportation network and promoting mode choice for the corridor.

This section will present the proposed corridor improvements. Proposed intersection treatments will be included within the following section. The proposed cross-section aligns with the corridor vision for W Dallas presented within the *Houston Bike Plan* and *Walk+Bike Montrose*.

The proposed typical section, shown in **Figure 11**, reallocates space to convert W Dallas from a 4-lane roadway to a 3-lane roadway. The section includes two 5-foot bike lane, two 2-foot bike buffer with flexible delineator posts and precast concrete curbs, two 10-foot drive lanes, and a 10-foot shared center turn lane. Intersection treatments are presented in the following section.

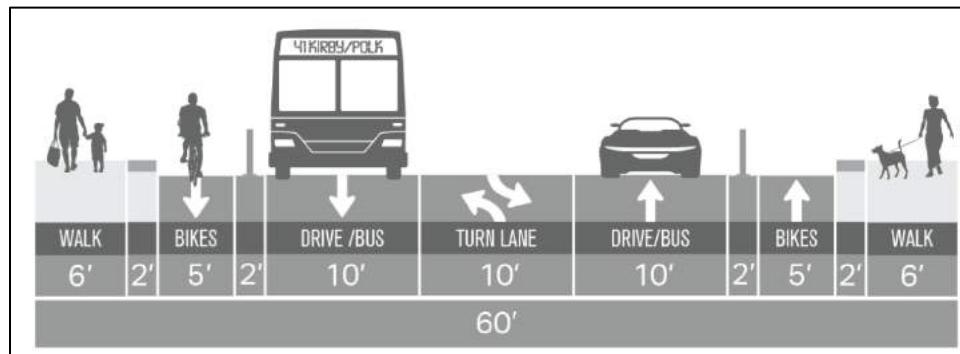


Figure 11: Proposed Typical Section of W Dallas Street from Waugh Drive to Montrose Boulevard

To provide a more pedestrian friendly environment and improve corridor mobility, the existing sidewalks in poor condition or less than 5 feet wide will be removed and replaced with 6-foot sidewalks in alignment with the walkability goals of the TIRZ. Additionally, the existing non-compliant curb ramps will be removed and replaced with ADA compliant ramps. Recently rebuilt sidewalks and curb ramps that are in fair to good condition will remain in place.

Asphalt and concrete pavement will be spot repaired from Waugh Drive to Montrose Boulevard as needed. W Dallas Street is paved with asphalt between Waugh Drive and Montrose Boulevard, and with concrete west of Waugh Drive and east of Montrose Boulevard.

3.2. Concept Plan: Intersection Recommendations

The primary intersection recommendations along the W Dallas Corridor (seen in **Figure 12**) are concerned with the signalized intersections with Waugh Drive and with Montrose Boulevard. Using the guidelines of designing for All Ages & Abilities, the following treatments are recommended as described in more detail below.

- Protected bike lanes
- Bike two-stage left-turn boxes
- Bike signals
- Bus stop location optimization
- Protected left turns



Figure 12: W Dallas Corridor Map

W Dallas Street at Waugh Drive Intersection Recommendations

This intersection is the transition point from the TIRZ 5 bikeway project west of Waugh Drive to the Study Corridor to the east. It is recommended that the following improvements be implemented at the intersection of W Dallas Street at Waugh Drive:

- At all intersection approaches:
 - Bike two-stage left-turn boxes
 - Bike signals
- On the eastbound and westbound approaches W Dallas Street:
 - Exclusive left-turn lanes with protected left-turn signal phases
 - Protected bike lanes
- On W Dallas Street across the intersection:
 - Bike crossing markings

A schematic design of the proposed westbound approach of the W Dallas Street & Waugh Drive intersection is shown in **Figure 13**.

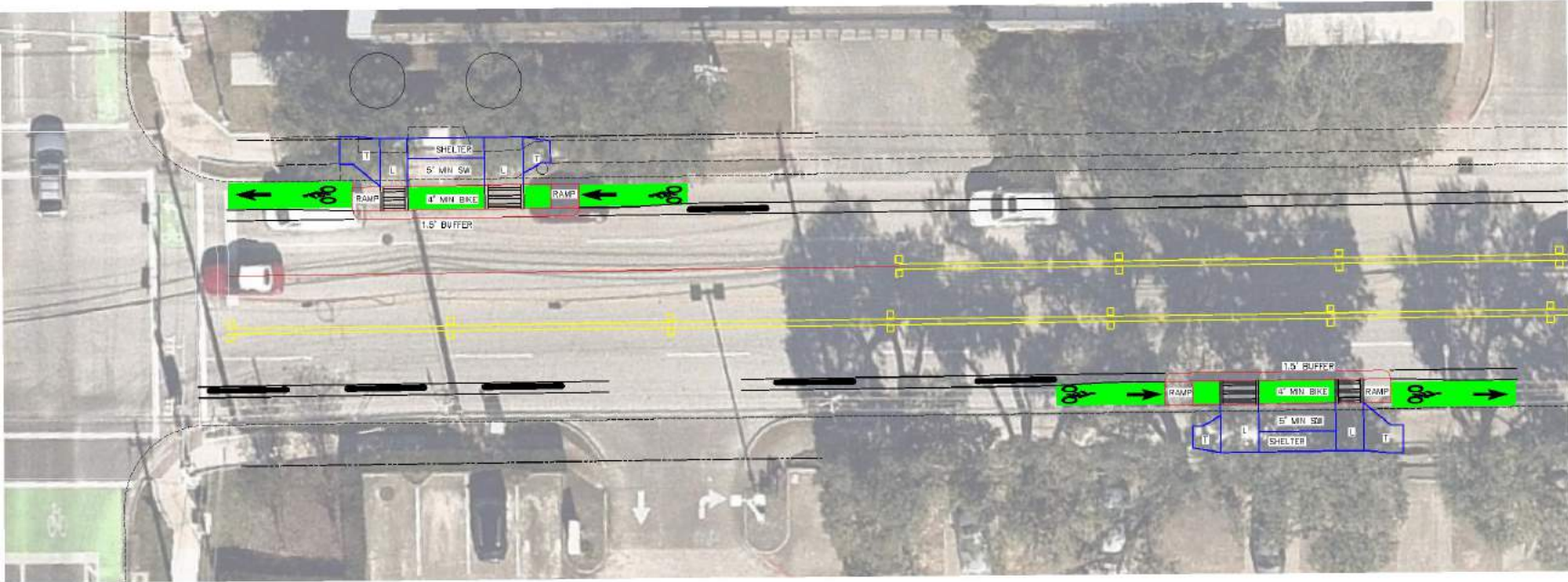


Figure 13: Proposed W Dallas Street & Waugh Drive Intersection Schematic— Westbound Approach

W Dallas Street at Montrose Boulevard Intersection Recommendations

It is recommended that the following treatments be implemented at the intersection of W Dallas Street at Montrose Boulevard:

- On the eastbound and westbound approaches W Dallas Street:
 - Exclusive left-turn lanes with protected left-turn signal phases
 - Protected bike lanes
 - Bike signals
- On W Dallas Street across the intersection:
 - Bike crossing markings

W Dallas Street east of Montrose Boulevard is currently signed as a shared on-street bikeway and does not have existing or programmed bike lanes. It is recommended that the two westbound lanes on the westbound approach of the W Dallas Street & Montrose Boulevard intersection merge into one lane at Columbus Street to facilitate the transition of W Dallas Street into the single westbound travel lane within the Study Corridor. Immediately west of this merge point at Columbus Street, the cross-section will reflect the typical W Dallas Study Corridor cross-section with a 10-foot left-turn lane, one eastbound and one westbound 10-foot through/right-turn lane, and two 5-foot bike lanes with 2-foot buffers.

On the westbound approach of the W Dallas Street & Montrose Boulevard intersection in the eastbound direction, it is recommended that a bike lane be installed from the signal until Columbus Street. At Columbus Street, the eastbound bike lane will end, and a second eastbound travel lane will be added to match the existing two eastbound lanes as the bike lane transitions into a shared on-street bikeway.

A schematic design of the proposed W Dallas Street & Montrose Boulevard intersection is shown in **Figure 14**.

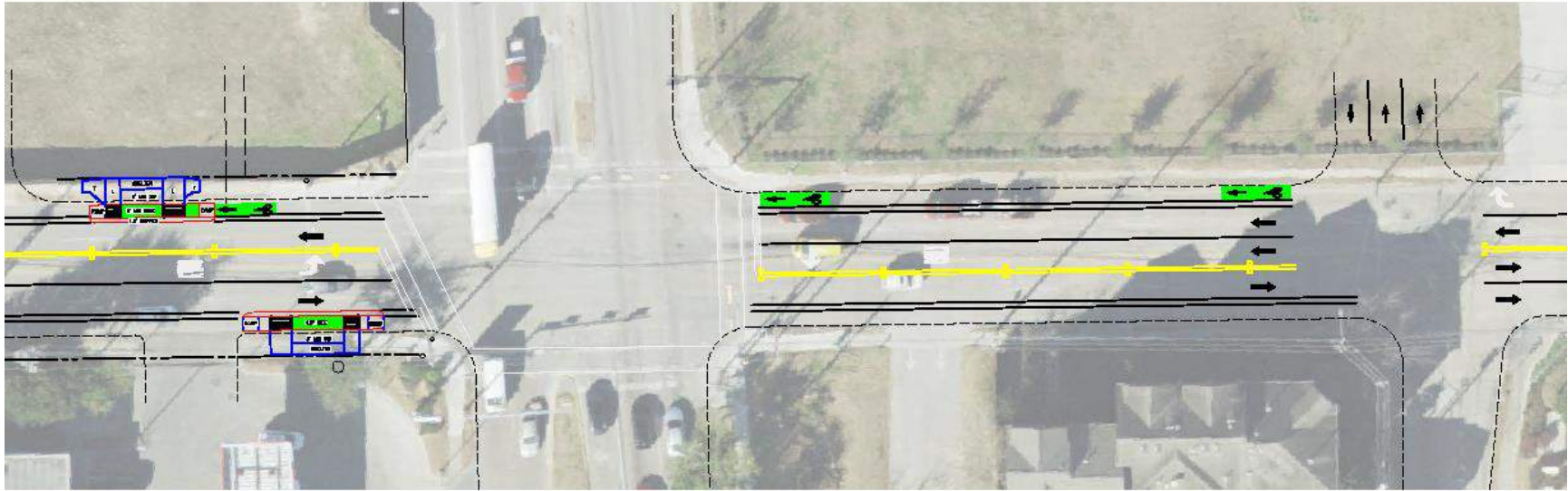


Figure 14: Proposed W Dallas Street & Montrose Boulevard Intersection Schematic

Unsignalized Intersection Crossing Recommendations

It is recommended that a north-south crosswalk be installed at the approximate midpoint of the corridor immediately west of La Rue Street. The existing corridor's marked crosswalks at the signalized intersections are spaced 1,800 feet apart. A marked crosswalk just west of La Rue Street would decrease this crosswalk spacing to 1,000 feet. Locating the crosswalk immediately west of La Rue Street would allow for the installation of a pedestrian median island in place of the unneeded left turn lane at that location. The proposed crosswalk would serve area residents or employees walking to the existing bus stop pair at Eberhard Street. See **Section 3.3. Bus Stop Recommendations** for more information on proposed bus stop locations and correlation to the proposed mid-block crossing at La Rue Street.

3.3. Concept Plan: Bus Stop Recommendations

In support of Houston METRO's objective to improve transit operations through the optimization of stops along transit corridors, it is recommended that bus stops along the W Dallas Study Corridor be consolidated and relocated. Bus stops along the corridor are currently spaced an average of 0.1 miles apart, far below the METRO target of 0.25-mile stop spacing to improve bus speed and reliability. To optimize bus stop locations, it is recommended that the following bus stops be removed, relocated, or maintained along the W Dallas Study Corridor in coordination with METRO:

- Removing the following stops:
 - W Dallas Street & Joe Annie Street eastbound near side (BSID: 3380)
 - W Dallas Street & Joe Annie Street westbound near side (BSID: 3365)
- Keeping the following stops:
 - W Dallas Street & Waugh Drive westbound near side (BSID: 3366)
 - W Dallas Street & Waugh Drive eastbound far side (BSID: 12066)
 - W Dallas Street & Eberhard Street westbound near side (BSID: 3364)
 - W Dallas Street & Eberhard Street eastbound near side (BSID: 3381)
 - W Dallas Street & Montrose Boulevard eastbound near side (BSID: 3382)
- Relocating the following stops:
 - W Dallas Street & Montrose Boulevard westbound near side (BSID: 3363) to far side

Bus stops are proposed to be located on the far side of signalized intersections, where possible, to improve bus speed and reliability. Far side stop locations also reduce conflicts with right turning vehicles, improving traffic operations for all vehicles along the corridor. Constrained back-of-curb space limits the ability to move all near-side bus stops to far-side along the Study Corridor.

Post-optimization, the resulting average distance between bus stops on the Study Corridor is 0.16 miles between stops. This consolidated spacing is closer to the target of 0.25-mile stop spacing. The bus stop optimization recommendations are summarized in **Figure 15** and **Table 5**.

Table 5: Bus Stop Optimization Recommendations

BSID	Dir.	Stop Name	Recommendation	Rec. Spot ¹	Rec. Dist. ²	Weekday Boardings + Alightings
3366	WB	W Dallas Street @ Waugh Drive	Keep	NS	50	93
12066	EB	W Dallas Street @ Waugh Drive	Keep	FS	150	80
3380	EB	W Dallas Street @ Joe Annie Street	Remove	NS	10	7
3365	WB	W Dallas Street @ Joe Annie Street	Remove	NS	10	6
3381	EB	W Dallas Street @ Eberhard Street	Keep	NS	0	20
3364	WB	W Dallas Street @ Eberhard Street	Keep	NS	15	19
3382	EB	W Dallas Street @ Montrose Boulevard	Keep	NS	30	59
3363	WB	W Dallas Street @ Montrose Boulevard	Relocate	FS	70	49

¹ Recommended placement relative to intersection (NS = near side, FS = far side).

² Recommended distance from the intersection to the bus stop pole in feet, measured from the crosswalk edge (or from the curb return if crosswalk does not exist). Value is approximate; exact distance should be adjusted in design based on site conditions.

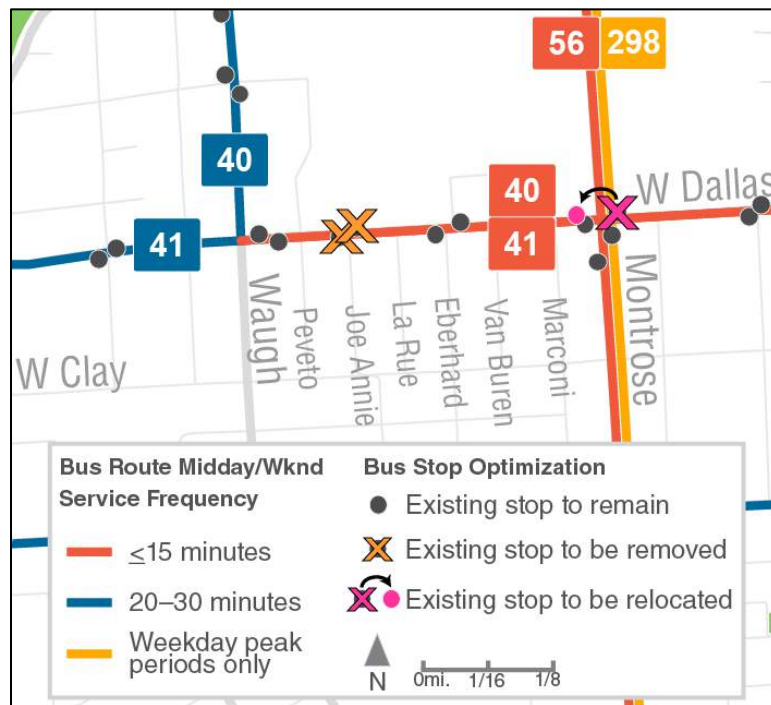


Figure 15: Proposed W Dallas Corridor Bus Stop Optimization

At all remaining post-optimization bus stops on the W Dallas Corridor at all locations, it is recommended that a constrained bus stop design with an elevated bike lane be implemented. This design brings bicyclists from street level to curb level through the bus stop. The bike lane is set back 2 feet from the curb to allow space between bicyclists and bus riders exiting the bus. A cross-section of a typical constrained bus stop with an elevated bike lane is shown in **Figure 16**. This constrained bus stop is presented in the Massachusetts DOT *Separated Bike Lane Planning & Design Guide* in **Figure 17**.

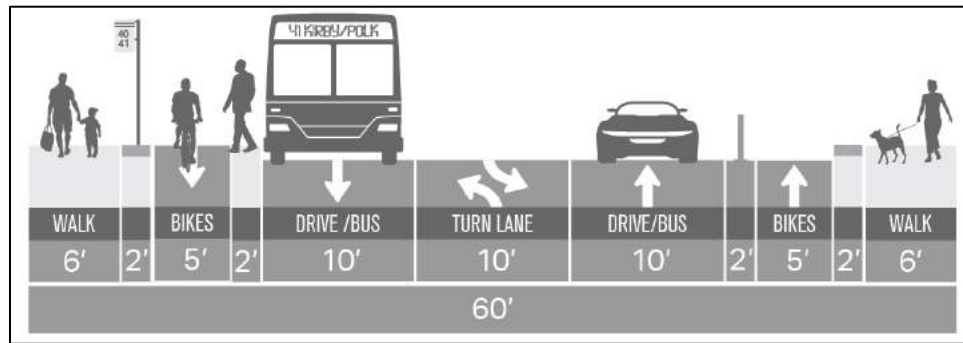


Figure 16: Typical Constrained Bus Stop + Elevated Bike Lane Section

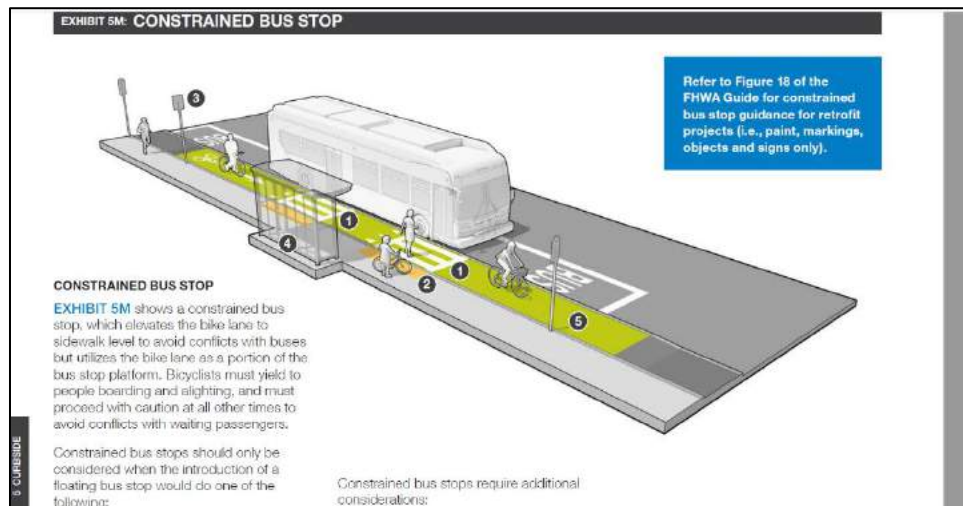


Figure 17: Massachusetts DOT Separated Bike Lane Planning & Design Guide Constrained Bus Stop Guidance



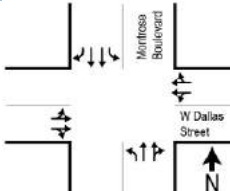
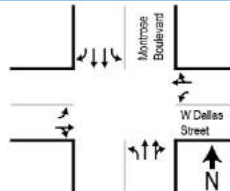
4. Intersection Capacity Analysis

Capacity analysis provides information regarding traffic operations at an intersection and is expressed in terms of level-of-service (LOS). The level-of-service indicates the average seconds of delay experienced by a motorist at a signalized intersection or at the stop-controlled approaches of an unsignalized intersection. As a frame of reference, intersection level-of-service ranges from A to F, with LOS A representing free flow conditions and LOS F representing highly congested conditions. In general, a signalized intersection or a stop-controlled approach at an unsignalized intersection operating at LOS D or better in an urban area is considered to exhibit acceptable delay.

The intersection capacity analysis was conducted using the *Highway Capacity Manual, 6th Edition*, and the modeling software *Synchro 10*. Each scenario analyzed is described below and the resulting intersection LOS are summarized in **Table 7** and **Table 8**.

Four scenarios were analyzed as described in **Table 6**:

Table 6: Modeled Intersection Scenarios

	2021 Existing	2021 No-Build	2021 Proposed	2026 Proposed
W Dallas Street & Waugh Drive				
Lane Configuration				
Traffic Volumes	2021 volumes	2021 volumes	2021 volumes	2021 volumes grown 1% annually for 5 years
Signal Phasing ¹	<ul style="list-style-type: none"> NB/SB: Protected/Permitted LT Phases EB/WB: Permitted LT Phases 		<ul style="list-style-type: none"> NB/SB: Protected/Permitted LT Phases EB/WB: Protected LT Phases 	
W Dallas Street & Montrose Boulevard				
Lane Configuration				
Traffic Volumes	2021 volumes	2021 volumes	2021 volumes	2021 volumes grown 1% annually for 5 years + Additional know development trips
Signal Phasing ¹	<ul style="list-style-type: none"> NB/SB: Protected LT Phases EB/WB: Alternating Protected and Permitted LT Phases 		<ul style="list-style-type: none"> NB/SB: Protected LT Phases EB/WB: Protected LT Phases 	

¹ Refer to Appendix 4 for detailed signal phasing and lane assignment information

4.1. Existing Conditions Intersection Capacity Analysis

Capacity analyses at the two signalized intersections were conducted for the existing traffic conditions using turning movement count volumes collected in 2021 and signal timing information provided by Houston Public Works. The model was calibrated to closely resemble observed conditions, including queue lengths and movement delays.

2021 Existing - This scenario establishes a baseline condition of existing operations at the time of traffic volume data collection. It includes the changes to the Waugh Drive approaches (northbound and southbound) implemented as part of the TIRZ 27 Waugh Drive Bikeway and Corridor Improvements Project. Waugh Drive southbound at W Dallas has one left-turn lane, two through lanes, and one right-turn lane and northbound has one left-turn lane, one through lane, and one through/right lane.

2021 No Build – This scenario adapts the 2021 Existing Condition models to include the Memorial Heights Redevelopment Authority / TIRZ 5 W Dallas Restriping Project. This project, approved by the COH, restripes W Dallas Street from Dunlavy Street to Waugh Drive to a three-lane roadway with protected bike lanes in each direction. The termination of this project at Waugh Drive modifies the existing eastbound approach to a dedicated left-turn lane and a through/right lane with a bike box to end the eastbound bike lane. The westbound approach is modified to an exclusive left turn lane and a single through-right lane, with a bike box to start the westbound bike lane. This project does not provide any signal modification to the intersection, therefore signal timings are not changed from the 2021 Existing Conditions models.

4.2. Proposed Conditions Intersection Capacity Analysis

The existing conditions models were used to analyze the proposed recommended cross-sections and intersection modifications as described above. Two proposed conditions models were developed:

2021 Proposed – 2021 existing volume counts were used. The geometry at each intersection was modified to reduce the two-lane approach to a single lane approach with an exclusive left turn lane at each W Dallas Street approach. Additionally, the signal phasing was modified to account for an exclusive left turn phase as well as match standard NEMA phasing. Signal timings were then optimized to account for the geometry and phasing changes.

2026 Proposed – The 2021 existing volumes were grown by 1% annually for 5 years to 2026 volumes and includes additional vehicle trips generated by the W Dallas Apartment Complex and Ismaili Center developments currently under construction on the north corners of the W Dallas Street at Montrose Boulevard intersection. The proposed intersection geometry and signal phasing was held consistent with the 2021 Proposed scenario. Signal timings were optimized to account for the increased volume along the corridor.

A summary of the intersection capacity analysis for the four analyzed conditions is shown in **Table 7** and **Table 8** for the AM and PM peaks, respectively. Detailed capacity analysis reports are provided in Appendix 4.

Table 7: Summary of AM Peak Capacity Analysis

	2021 Existing		2021 No-Build		2021 Proposed		2026 Proposed	
	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)
W Dallas St & Waugh Dr	C	30.0	C	30.8	C	34.4	D	35.2
W Dallas EB	D	48.6	D	46.2	D	53.9	D	53.3
W Dallas WB	D	54.0	D	53.8	E	62.0	E	62.4
Waugh NB	D	51.8	D	51.8	D	54.0	E	55.1
Waugh SB	B	10.9	B	12.7	B	15.5	B	16.6
W Dallas St & Montrose Blvd	E	79.6	E	79.3	E	58.4	E	63.6
W Dallas EB	F	94.5	F	92.5	F	90.7	F	100.3
W Dallas WB	F	89.4	F	89.4	E	71.2	E	77.0
Montrose NB	F	83.8	F	83.8	D	54.9	E	57.2
Montrose SB	E	67.5	E	67.5	D	43.2	D	48.5

Table 8. Summary of PM Peak Capacity Analysis

	2021 Existing		2021 No-Build		2021 Proposed		2026 Proposed	
	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)
W Dallas St & Waugh Dr	D	40.5	D	39.1	D	43.1	D	42.5
W Dallas EB	D	43.6	D	39.2	D	43.0	D	52.9
W Dallas WB	D	54.1	D	40.4	E	65.8	E	71.3
Waugh NB	D	53.0	D	53.0	D	45.8	D	41.6
Waugh SB	B	17.5	C	20.9	C	29.0	C	27.1
W Dallas St & Montrose Blvd	F	87.5	F	88.4	E	68.2	E	78.5
W Dallas EB	F	105.6	F	111.4	F	85.4	F	96.3
W Dallas WB	F	121.2	F	121.2	F	90.4	F	112.1
Montrose NB	F	82.7	F	82.7	E	72.9	F	82.0
Montrose SB	E	59.7	E	59.7	D	35.6	D	38.9

The W Dallas Street & Waugh Drive intersection maintains an acceptable intersection LOS C or D for both AM & PM peak periods for all conditions analyzed. During the AM Peak period, the intersection delay increases slightly (0.8 seconds) from 2021 Proposed Condition to the 2026 Proposed Condition, causing the LOS to change from LOS C to LOS D. This is due to the area vehicle volume growth from W Dallas Apartments and Ismaili Center as well as assumed regional growth of 1% per year for 5 years. During the PM Peak hour, the intersection maintains a LOS D for all scenarios. While the overall intersection vehicular capacity is lower in the 2021 and 2026 Proposed scenarios compared to the 2021 No-Build due to the

proposed project, it still operated within the acceptable LOS D and bicycle and pedestrian LOS greatly improves with the bicycling infrastructure and phase separation for pedestrians with the protected left turns.

At the W Dallas Street & Montrose Boulevard intersection, the intersection operates at a LOS E during the AM peak and LOS F during the PM peak in the 2021 Existing and No-Build scenarios. Much of the existing intersection inefficiency, as observed, is due to the non-standard signal timings that currently reduces the left-turn capacity due to the alternating protected left-turn phases every other cycle. The LOS is expected to improve from both 2021 Existing and No-Build scenarios to the 2026 Proposed scenario by simplifying signal phasing, despite the removal of east- and westbound vehicle through lanes. Proposed conditions indicate that this intersection will operate at an LOS E during both the AM and PM peak hours.

5. Opinion of Probably Construction Cost

Cost estimates from the 2020 Walk+Bike Montrose plan are shown in **Table 9** below. The assumptions of the 2020 plan differ from the current plans in that some asphalt mill and overlay is anticipated, and less than 80% of sidewalk is anticipated to be replaced. Additionally, the 2020 plan did not anticipate improvements, including bicycle signals, to the project intersections or precast concrete curbs that will be used to separate the bike and vehicle lanes. These differences could increase the cost by 10%.

Table 9: Opinion of Probable Construction Cost

			West Dallas Street (Waugh to Columbus) 0.42 miles		
Item	Unit	Unit Price	Unit	Cost	Notes
Mobilization	LS		1	\$27,601.18	
Traffic Control	LS		1	\$10,000.00	
Asphalt Mill & Overlay (2-inches)	SY	\$8.00		\$0.00	Pavement in good condition
Excavation	CY	\$25.00	131	\$3,285.33	
Manhole Covers ¹	EA	\$500.00	40	\$20,000.00	
Adjust water meter valve	EA	\$200.00	20	\$4,000.00	Assumed
Remove & Replace Existing Curb	LF	\$15.00	444	\$6,652.80	10% Assumed
Curb Ramps ²	EA	\$2,000.00	8	\$16,000.00	9 ramps;80% assumed to be replaced
Remove Existing Sidewalk ³	SY	\$5.00	2,105	\$10,522.67	80% sidewalks removed; 4' of concrete
Sidewalk 4-1/2-inch thick	SF	\$8.00	17,741	\$141,926.40	5' sidewalks (assumed 80% replaced)
Speed Hump Replacement ⁴	EA	\$2,000.00	9	\$0.00	
Irrigation System	LS	\$10,000.00	1	\$5,000.00	
Grading	SF	\$10.00	89	\$888.89	
Retaining Wall	LS	\$10,000.00	1	\$6,000.00	
Relocate Sign	EA	\$310.00	10	\$3,100.00	
Concrete Removal/Replacement ⁵	SY	\$130.00		\$0.00	
Concrete Driveway ⁶	SF	\$9.00	1,200	\$10,800.00	8 driveways (15'x10')
Bike Lane Protection Device	EA	\$100.00		\$0.00	
Striping	LS		1	\$15,000.00	
REFL PAV MRK TY I (W) (6") (SLD)	LF	\$1.75	2,065	\$3,613.75	
REFL PAV MRK TY I (W) (4") (BRK)	LF	\$0.50	3,980	\$1,990.00	
REFL PAV MRK TY I (W) (12") (SLD)	LF	\$2.00	285	\$570.00	
REFL PAV MRK TY I (W) (24") (SLD)	LF	\$7.00	66	\$462.00	
Thermoplastic Pav. Markings Solid ⁷	LF	\$0.50	3,980	\$1,990.00	
Thermoplastic Pav. Markings Break ⁸	LF	\$0.50		\$0.00	
REFL PAV MRK TY I (W) (ARROW)	EA	\$250.00		\$0.00	
REFL PAV MRK TY B (W) (SYMBOL)	EA	\$300.00	9	\$2,700.00	
Bike Arrow Markings ⁹	EA	\$200.00	8	\$1,600.00	
Solid Green Thermoplastic Block ¹⁰	SF	\$2.50	364	\$910.00	Assumed bike lane 4FT width
SW3P	LS		1	\$4,000.00	
Landscaping Removal with trees			1	\$5,000.00	
(Subtotal) Total with 30% Contingency				(\$303,613.02) \$394,698.00	

1 - Adjust Manhole Frame & Cover/valve boxes to Match Prop Elevations And Grades; **2** - Construct ADA Complaint Wheelchair Ramp, Including ADA Truncated Domes (complete in place); **3** - Remove & Dispose Conc Sidewalk, driveway and Ramp, all thickness; **4** - Remove & Replace Asphalt Speed Bump; **5** - Remove And Replace Concrete Pavement; **6** - 7 Inch High Early Strength Concrete Driveway, Including Excavation And Base; **7** - THERMOPLASTIC PAVEMENT MARKINGS (Y) 4" (SLD); **8** - THERMOPLASTIC PAVEMENT MARKINGS (Y) 4" (BRK); **9** - REFL PAV MRK TY C (W) (BIKE ARROW); **10** - SOLID GREEN THERMOPLASTIC BLOCK

6. Conclusion

A dedicated on-street bikeway and three-lane cross-section is proposed on W Dallas Street from Waugh Drive to Montrose Boulevard. Improvements to the corridor will focus on accessibility, as well as pedestrian and bicyclist safety.

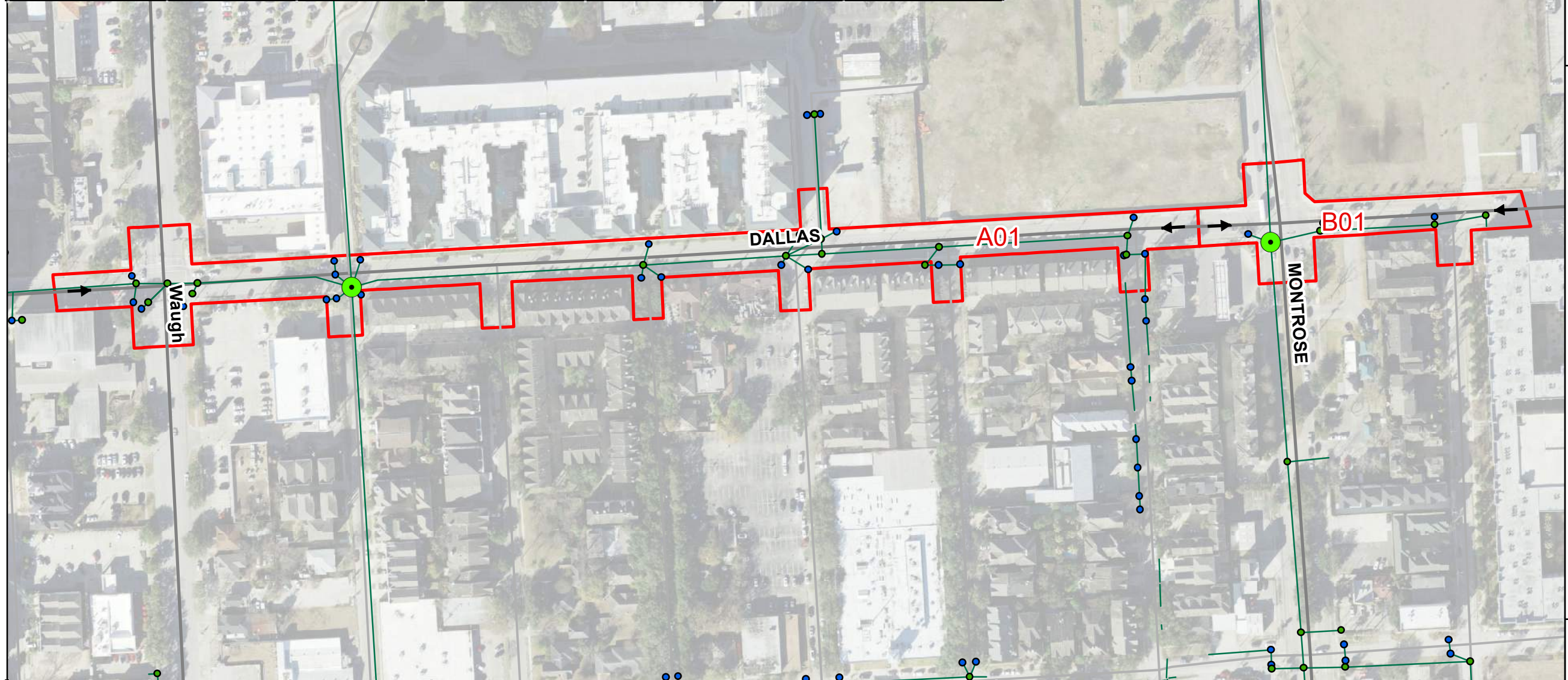
Roadway pavement is proposed to be rehabilitated along the segments of the corridor where existing pavement is poor quality. Proposed signalized intersection improvements at the intersections of W Dallas Street with Waugh Drive and with Montrose Boulevard include bike signals, bike two-stage left-turn boxes, and bike crossing markings. A midblock north-south crosswalk is proposed immediately west of La Rue Street to serve area residents, employees, and bus riders. Several bus stops are proposed for removal and relocation to increase bus stop spacing closer to METRO targets. At signalized intersections and mid-block stops, a constrained bus stop design will be used with an elevated bikeway through the stop. Non-compliant sidewalks and curb ramps will be rebuilt to be 6-feet and ADA compliant. Improvements will be coordinated with an Urban Forester to maintain healthy trees along the corridor.

Exhibits

Exhibit 1. Drainage Areas

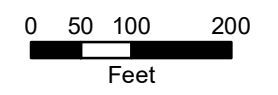
Exhibit 2: Sidewalk Improvements

	System A			System B		
	Discharge (cfs)		Impervious Area (sqft)	Discharge (cfs)		Impervious Area (sqft)
	2 Year	100 Year		2 Year	100 Year	
Existing	17.64	39.83	137353.66	5.61	12.67	44544.93
Proposed	17.62	39.79	140018.02	5.61	12.66	45103.26
Increase	0.00	0.00	2664.36	0.00	0.00	558.33



TIRZ 27
EXHIBIT 1
Drainage Areas and Runoff

- Legend**
- Exist_Outfall
 - swManhole
 - swInlet
 - Flow_Direction
 - swGravityMain
 - ▭ Exist_DA



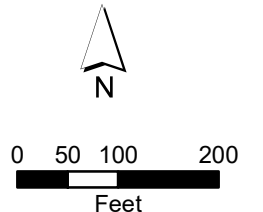
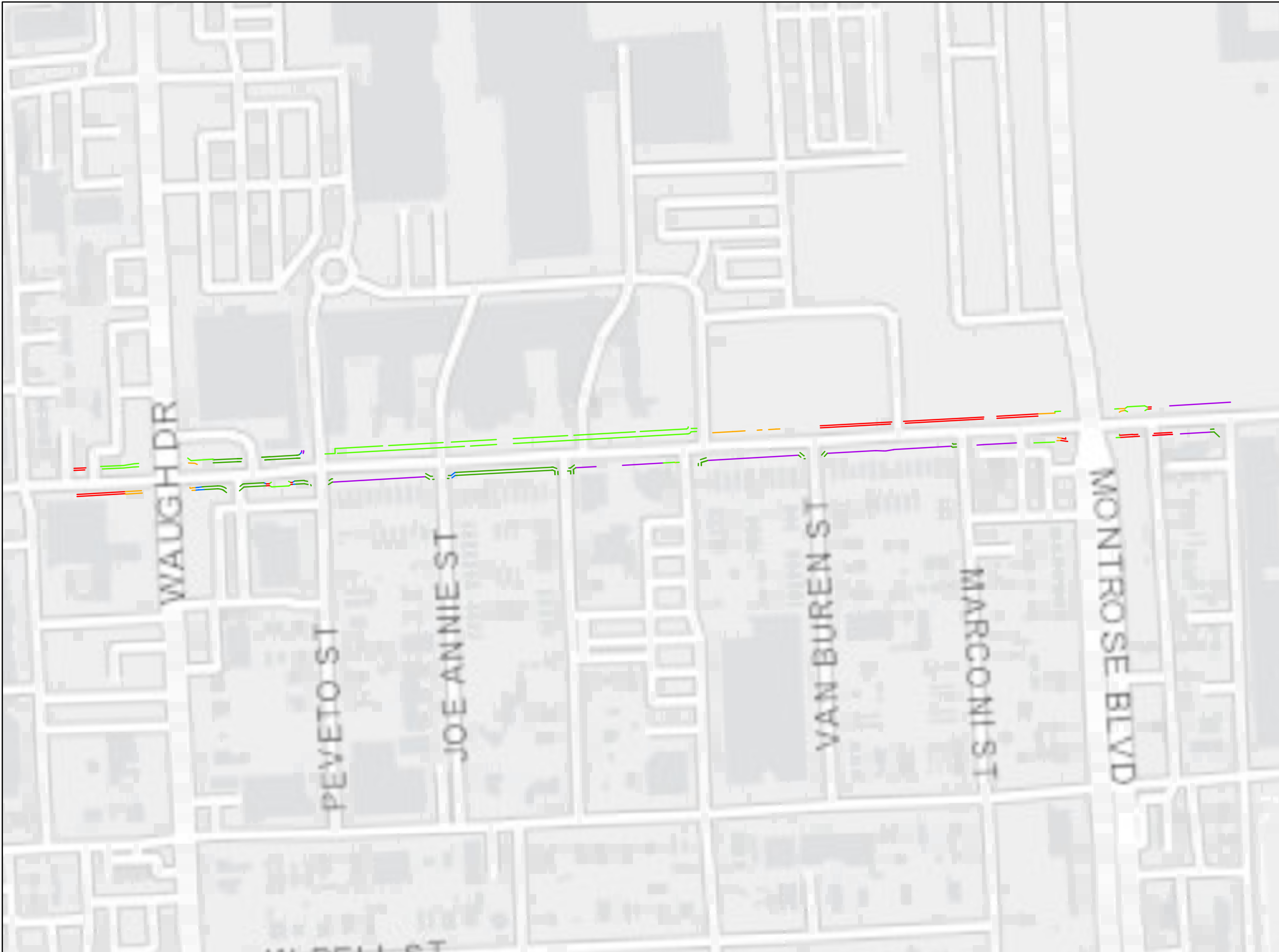
Drainage Area	C Value		Drainage Area (acres)	Tc (min)	Intensity		Discharge (cfs)			
	Existing	Proposed			2 Year	100 Year	2 Year		100 Year	
							Existing	Proposed	Existing	Proposed
A01	0.86	0.86	3.61	10.00	5.71	12.90	17.64	17.62	39.83	39.79
B01	0.87	0.87	1.14	10.00	5.71	12.90	5.61	5.61	12.67	12.66



TIRZ 27
EXHIBIT 2
Sidewalk Improvements

Legend

- Existing Sidewalk Width**
- 4' - 4.5'
 - 5' - 5.5'
 - 6'+
- Proposed Sidewalk Width**
- 4' - 4.5'
 - 5' - 5.5'
 - 6'+



Appendix

Appendix 1. Counts

Appendix 2: Photos for Study Corridor

Appendix 3: Detailed Capacity Analysis

Appendix 1: Counts

W. Dallas St at Waugh Dr - TMC

Tue Nov 9, 2021

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 898180, Location: 29.75737, -95.398041



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Waugh Dr Northbound							Waugh Dr Southbound							W. Dallas St Eastbound							W. Dallas St Westbound							Int
	L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		
2021-11-09 7:00AM	6	66	6	0	78	1		46	123	10	0	179	2		9	18	0	0	27	3		5	18	22	0	45	0		329
7:15AM	1	109	7	0	117	0		54	219	8	0	281	2		6	25	7	0	38	0		12	18	20	0	50	1		486
7:30AM	5	142	12	0	159	0		48	232	7	0	287	5		13	27	3	0	43	3		11	17	41	0	69	0		558
7:45AM	7	168	14	0	189	0		68	253	12	0	333	2		13	30	5	0	48	0		12	23	23	0	58	3		628
Hourly Total	19	485	39	0	543	1		216	827	37	0	1080	11		41	100	15	0	156	6		40	76	106	0	222	4		2001
8:00AM	11	138	12	1	162	3		68	244	14	0	326	0		10	28	8	0	46	1		10	27	30	0	67	1		601
8:15AM	4	168	15	0	187	3		64	243	20	1	328	2		17	24	7	0	48	1		8	29	24	0	61	2		624
8:30AM	5	136	14	1	156	3		53	244	16	0	313	1		15	23	6	0	44	0		19	27	30	1	77	5		590
8:45AM	10	137	20	0	167	0		55	231	16	0	302	0		13	17	5	0	35	3		14	24	22	0	60	2		564
Hourly Total	30	579	61	2	672	9		240	962	66	1	1269	3		55	92	26	0	173	5		51	107	106	1	265	10		2379
4:00PM	5	243	7	0	255	3		31	123	24	1	179	1		11	42	5	0	58	0		25	35	48	0	108	3		600
4:15PM	12	280	8	0	300	4		66	194	25	0	285	0		11	20	3	0	34	5		17	29	40	0	86	5		705
4:30PM	10	240	15	0	265	0		49	157	29	0	235	5		11	24	7	0	42	7		34	38	52	0	124	2		666
4:45PM	11	272	8	0	291	3		64	196	25	0	285	5		14	15	5	0	34	3		19	33	28	0	80	1		690
Hourly Total	38	1035	38	0	1111	10		210	670	103	1	984	11		47	101	20	0	168	15		95	135	168	0	398	11		2661
5:00PM	11	278	11	0	300	1		36	149	22	0	207	2		21	41	12	0	74	2		31	43	44	0	118	3		699
5:15PM	12	309	6	0	327	0		56	193	27	0	276	4		10	28	12	0	50	2		21	39	51	0	111	7		764
5:30PM	12	283	8	0	303	1		42	153	23	0	218	4		17	46	9	0	72	2		25	52	49	0	126	5		719
5:45PM	10	271	9	1	291	1		53	191	26	1	271	8		17	29	6	0	52	3		18	44	46	0	108	2		722
Hourly Total	45	1141	34	1	1221	3		187	686	98	1	972	18		65	144	39	0	248	9		95	178	190	0	463	17		2904
Total	132	3240	172	3	3547	23		853	3145	304	3	4305	43		208	437	100	0	745	35		281	496	570	1	1348	42		9945
% Approach	3.7%	91.3%	4.8%	0.1%	-	-		19.8%	73.1%	7.1%	0.1%	-	-	27.9%	58.7%	13.4%	0%	-	-	20.8%	36.8%	42.3%	0.1%	-	-	-			
% Total	1.3%	32.6%	1.7%	0%	35.7%	-		8.6%	31.6%	3.1%	0%	43.3%	-	2.1%	4.4%	1.0%	0%	7.5%	-	2.8%	5.0%	5.7%	0%	13.6%	-	-			
Lights	129	3213	171	2	3515	-		832	3118	295	3	4248	-	207	424	97	0	728	-	279	473	550	1	1303	-	9794			
% Lights	97.7%	99.2%	99.4%	66.7%	99.1%	-		97.5%	99.1%	97.0%	100%	98.7%	-	99.5%	97.0%	97.0%	0%	97.7%	-	99.3%	95.4%	96.5%	100%	96.7%	-	98.5%			
Articulated Trucks	0	7	1	0	8	-		2	0	3	0	5	-	0	1	0	0	1	-	1	1	2	0	4	-	18			
% Articulated Trucks	0%	0.2%	0.6%	0%	0.2%	-		0.2%	0%	1.0%	0%	0.1%	-	0%	0.2%	0%	0%	0.1%	-	0.4%	0.2%	0.4%	0%	0.3%	-	0.2%			
Buses and Single-Unit Trucks	3	20	0	1	24	-		19	27	6	0	52	-	1	12	3	0	16	-	1	22	18	0	41	-	133			
% Buses and Single-Unit Trucks	2.3%	0.6%	0%	33.3%	0.7%	-		2.2%	0.9%	2.0%	0%	1.2%	-	0.5%	2.7%	3.0%	0%	2.1%	-	0.4%	4.4%	3.2%	0%	3.0%	-	1.3%			
Pedestrians	-	-	-	-	-	20		-	-	-	-	38		-	-	-	-	31		-	-	-	-	-	37				
% Pedestrians	-	-	-	-	-	87.0%		-	-	-	-	88.4%		-	-	-	-	88.6%		-	-	-	-	-	88.1%				
Bicycles on Crosswalk	-	-	-	-	-	3		-	-	-	-	5		-	-	-	-	4		-	-	-	-	-	5				
% Bicycles on Crosswalk	-	-	-	-	-	13.0%		-	-	-	-	11.6%		-	-	-	-	11.4%		-	-	-	-	-	11.9%				

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

W. Dallas St at Waugh Dr - TMC

Tue Nov 9, 2021

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

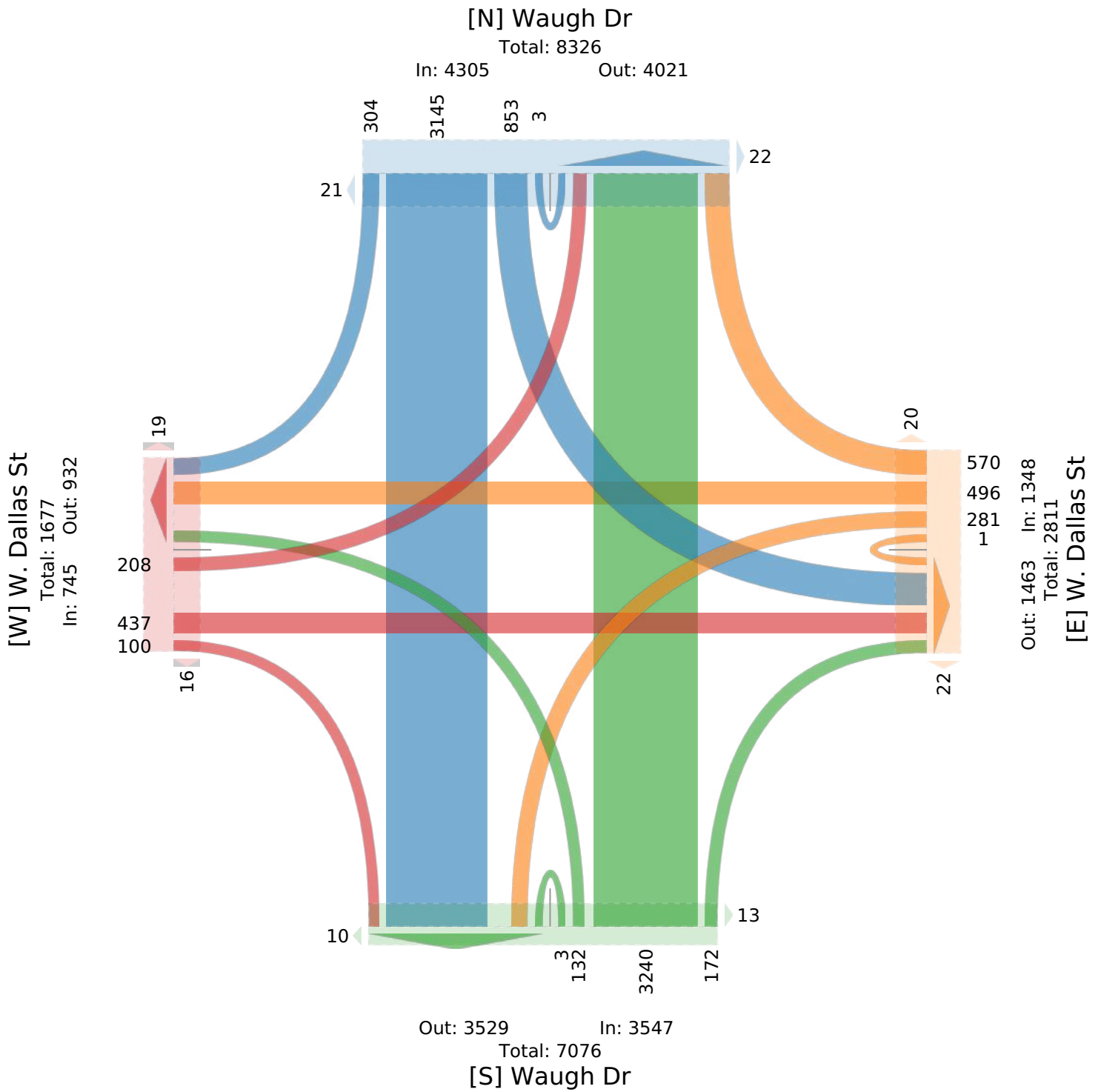
All Movements

ID: 898180, Location: 29.75737, -95.398041



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US



W. Dallas St at Waugh Dr - TMC

Tue Nov 9, 2021

AM Peak (7:45 AM - 8:45 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 898180, Location: 29.75737, -95.398041



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Waugh Dr Northbound						Waugh Dr Southbound						W. Dallas St Eastbound						W. Dallas St Westbound						Int
	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	
2021-11-09 7:45AM	7	168	14	0	189	0	68	253	12	0	333	2	13	30	5	0	48	0	12	23	23	0	58	3	628
8:00AM	11	138	12	1	162	3	68	244	14	0	326	0	10	28	8	0	46	1	10	27	30	0	67	1	601
8:15AM	4	168	15	0	187	3	64	243	20	1	328	2	17	24	7	0	48	1	8	29	24	0	61	2	624
8:30AM	5	136	14	1	156	3	53	244	16	0	313	1	15	23	6	0	44	0	19	27	30	1	77	5	590
Total	27	610	55	2	694	9	253	984	62	1	1300	5	55	105	26	0	186	2	49	106	107	1	263	11	2443
% Approach	3.9%	87.9%	7.9%	0.3%	-	-	19.5%	75.7%	4.8%	0.1%	-	-	29.6%	56.5%	14.0%	0%	-	-	18.6%	40.3%	40.7%	0.4%	-	-	-
% Total	1.1%	25.0%	2.3%	0.1%	28.4%	-	10.4%	40.3%	2.5%	0%	53.2%	-	2.3%	4.3%	1.1%	0%	7.6%	-	2.0%	4.3%	4.4%	0%	10.8%	-	-
PHF	0.614	0.908	0.917	0.500	0.918	-	0.930	0.972	0.775	0.250	0.976	-	0.809	0.875	0.813	-	0.969	-	0.645	0.914	0.892	0.250	0.854	-	0.973
Lights	25	600	55	1	681	-	244	969	58	1	1272	-	54	99	25	0	178	-	48	96	99	1	244	-	2375
% Lights	92.6%	98.4%	100%	50.0%	98.1%	-	96.4%	98.5%	93.5%	100%	97.8%	-	98.2%	94.3%	96.2%	0%	95.7%	-	98.0%	90.6%	92.5%	100%	92.8%	-	97.2%
Articulated Trucks	0	2	0	0	2	-	1	0	1	0	2	-	0	1	0	0	1	-	1	0	2	0	3	-	8
% Articulated Trucks	0%	0.3%	0%	0%	0.3%	-	0.4%	0%	1.6%	0%	0.2%	-	0%	1.0%	0%	0%	0.5%	-	2.0%	0%	1.9%	0%	1.1%	-	0.3%
Buses and Single-Unit Trucks	2	8	0	1	11	-	8	15	3	0	26	-	1	5	1	0	7	-	0	10	6	0	16	-	60
% Buses and Single-Unit Trucks	7.4%	1.3%	0%	50.0%	1.6%	-	3.2%	1.5%	4.8%	0%	2.0%	-	1.8%	4.8%	3.8%	0%	3.8%	-	0%	9.4%	5.6%	0%	6.1%	-	2.5%
Pedestrians	-	-	-	-	-	7	-	-	-	-	-	5	-	-	-	-	-	2	-	-	-	-	-	11	-
% Pedestrians	-	-	-	-	-	77.8%	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	22.2%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

W. Dallas St at Waugh Dr - TMC

Tue Nov 9, 2021

AM Peak (7:45 AM - 8:45 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 898180, Location: 29.75737, -95.398041



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Waugh Dr

Total: 2073

In: 1300

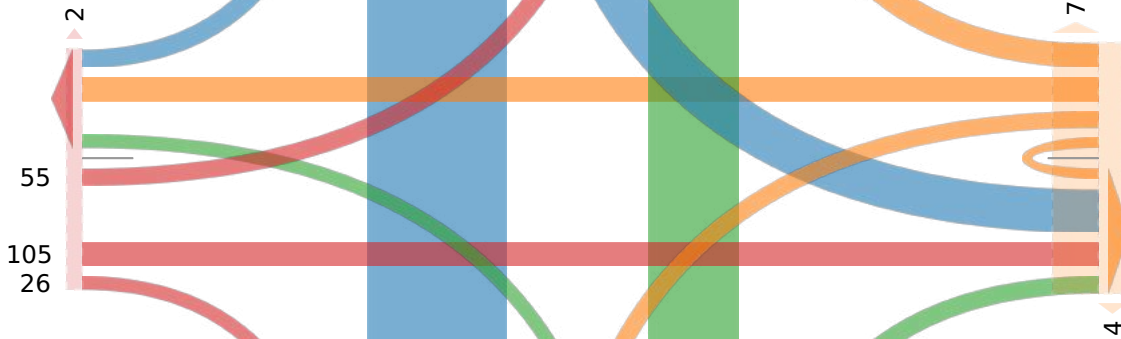
Out: 773

62 984 253 1



[W] W. Dallas St

Total: 381
In: 186 Out: 195



Out: 414 In: 263
Total: 677

[E] W. Dallas St

[S] Waugh Dr

Out: 1061

In: 694

Total: 1755

[S] Waugh Dr



W. Dallas St at Waugh Dr - TMC

Tue Nov 9, 2021

PM Peak (5 PM - 6 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 898180, Location: 29.75737, -95.398041



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Waugh Dr Northbound						Waugh Dr Southbound						W. Dallas St Eastbound						W. Dallas St Westbound						Int
	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	
2021-11-09 5:00PM	11	278	11	0	300	1	36	149	22	0	207	2	21	41	12	0	74	2	31	43	44	0	118	3	699
5:15PM	12	309	6	0	327	0	56	193	27	0	276	4	10	28	12	0	50	2	21	39	51	0	111	7	764
5:30PM	12	283	8	0	303	1	42	153	23	0	218	4	17	46	9	0	72	2	25	52	49	0	126	5	719
5:45PM	10	271	9	1	291	1	53	191	26	1	271	8	17	29	6	0	52	3	18	44	46	0	108	2	722
Total	45	1141	34	1	1221	3	187	686	98	1	972	18	65	144	39	0	248	9	95	178	190	0	463	17	2904
% Approach	3.7%	93.4%	2.8%	0.1%	-	-	19.2%	70.6%	10.1%	0.1%	-	-	26.2%	58.1%	15.7%	0%	-	-	20.5%	38.4%	41.0%	0%	-	-	-
% Total	1.5%	39.3%	1.2%	0%	42.0%	-	6.4%	23.6%	3.4%	0%	33.5%	-	2.2%	5.0%	1.3%	0%	8.5%	-	3.3%	6.1%	6.5%	0%	15.9%	-	-
PHF	0.938	0.923	0.773	0.250	0.933	-	0.835	0.889	0.907	0.250	0.880	-	0.774	0.783	0.813	-	0.838	-	0.766	0.856	0.931	-	0.919	-	0.950
Lights	45	1137	34	1	1217	-	184	681	98	1	964	-	65	141	38	0	244	-	95	176	188	0	459	-	2884
% Lights	100%	99.6%	100%	100%	99.7%	-	98.4%	99.3%	100%	100%	99.2%	-	100%	97.9%	97.4%	0%	98.4%	-	100%	98.9%	98.9%	0%	99.1%	-	99.3%
Articulated Trucks	0	1	0	0	1	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	1
% Articulated Trucks	0%	0.1%	0%	0%	0.1%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%
Buses and Single-Unit Trucks	0	3	0	0	3	-	3	5	0	0	8	-	0	3	1	0	4	-	0	2	2	0	4	-	19
% Buses and Single-Unit Trucks	0%	0.3%	0%	0%	0.2%	-	1.6%	0.7%	0%	0%	0.8%	-	0%	2.1%	2.6%	0%	1.6%	-	0%	1.1%	1.1%	0%	0.9%	-	0.7%
Pedestrians	-	-	-	-	-	3	-	-	-	-	-	14	-	-	-	-	-	7	-	-	-	-	-	16	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	77.8%	-	-	-	-	-	77.8%	-	-	-	-	-	94.1%	
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	4	-	-	-	-	-	2	-	-	-	-	-	1	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	22.2%	-	-	-	-	-	22.2%	-	-	-	-	-	5.9%	

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Dallas St at Montrose Blvd - TMC

Tue Nov 9, 2021

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 898181, Location: 29.757474, -95.392233



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Montrose Blvd Northbound						Montrose Blvd Southbound						Dallas St Eastbound						Dallas St Westbound						Int
	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	
2021-11-09 7:00AM	7	78	7	1	93	0	21	212	10	0	243	0	8	31	34	0	73	0	16	32	21	0	69	1	478
7:15AM	13	102	11	0	126	2	17	213	13	0	243	0	8	47	29	0	84	1	16	40	34	0	90	2	543
7:30AM	9	142	8	0	159	1	22	209	11	0	242	1	8	53	30	0	91	1	24	43	37	0	104	1	596
7:45AM	15	149	7	0	171	2	19	223	12	0	254	0	12	80	28	0	120	1	21	34	44	0	99	4	644
Hourly Total	44	471	33	1	549	5	79	857	46	0	982	1	36	211	121	0	368	3	77	149	136	0	362	8	2261
8:00AM	25	120	15	1	161	2	47	238	9	0	294	1	10	70	28	0	108	1	19	50	29	0	98	1	661
8:15AM	27	172	13	0	212	1	28	224	15	0	267	0	8	84	24	0	116	0	25	47	31	0	103	0	698
8:30AM	17	140	12	5	174	0	13	239	15	0	267	0	8	49	27	0	84	0	24	46	22	0	92	2	617
8:45AM	13	113	9	1	136	2	12	208	19	0	239	1	11	46	34	0	91	1	21	42	22	0	85	2	551
Hourly Total	82	545	49	7	683	5	100	909	58	0	1067	2	37	249	113	0	399	2	89	185	104	0	378	5	2527
4:00PM	15	222	11	1	249	2	39	160	9	0	208	1	13	58	19	0	90	1	31	61	37	0	129	3	676
4:15PM	23	298	13	3	337	3	37	175	12	0	224	0	14	68	25	0	107	0	33	63	42	0	138	3	806
4:30PM	19	225	14	2	260	0	37	164	15	1	217	2	9	72	23	0	104	0	24	65	34	0	123	1	704
4:45PM	17	264	17	1	299	3	17	156	10	0	183	0	7	67	26	0	100	0	37	64	49	0	150	3	732
Hourly Total	74	1009	55	7	1145	8	130	655	46	1	832	3	43	265	93	0	401	1	125	253	162	0	540	10	2918
5:00PM	16	267	10	0	293	2	41	176	20	0	237	0	14	75	24	0	113	0	25	79	51	0	155	1	798
5:15PM	23	261	22	5	311	3	29	177	13	0	219	0	15	85	26	0	126	0	25	74	39	0	138	8	794
5:30PM	11	289	25	1	326	0	22	159	14	0	195	0	11	68	31	0	110	0	25	87	49	0	161	6	792
5:45PM	24	254	17	1	296	0	25	169	11	1	206	0	12	76	28	0	116	1	33	102	42	0	177	4	795
Hourly Total	74	1071	74	7	1226	5	117	681	58	1	857	0	52	304	109	0	465	1	108	342	181	0	631	19	3179
Total	274	3096	211	22	3603	23	426	3102	208	2	3738	6	168	1029	436	0	1633	7	399	929	583	0	1911	42	10885
% Approach	7.6%	85.9%	5.9%	0.6%	-	-	11.4%	83.0%	5.6%	0.1%	-	-	10.3%	63.0%	26.7%	0%	-	-	20.9%	48.6%	30.5%	0%	-	-	-
% Total	2.5%	28.4%	1.9%	0.2%	33.1%	-	3.9%	28.5%	1.9%	0%	34.3%	-	1.5%	9.5%	4.0%	0%	15.0%	-	3.7%	8.5%	5.4%	0%	17.6%	-	-
Lights	272	3033	205	22	3532	-	414	3036	203	2	3655	-	161	1002	433	0	1596	-	389	889	544	0	1822	-	10605
% Lights	99.3%	98.0%	97.2%	100%	98.0%	-	97.2%	97.9%	97.6%	100%	97.8%	-	95.8%	97.4%	99.3%	0%	97.7%	-	97.5%	95.7%	93.3%	0%	95.3%	-	97.4%
Articulated Trucks	0	1	0	0	1	-	1	1	3	0	5	-	1	1	0	0	2	-	0	2	2	0	4	-	12
% Articulated Trucks	0%	0%	0%	0%	0%	-	0.2%	0%	1.4%	0%	0.1%	-	0.6%	0.1%	0%	0%	0.1%	-	0%	0.2%	0.3%	0%	0.2%	-	0.1%
Buses and Single-Unit Trucks	2	62	6	0	70	-	11	65	2	0	78	-	6	26	3	0	35	-	10	38	37	0	85	-	268
% Buses and Single-Unit Trucks	0.7%	2.0%	2.8%	0%	1.9%	-	2.6%	2.1%	1.0%	0%	2.1%	-	3.6%	2.5%	0.7%	0%	2.1%	-	2.5%	4.1%	6.3%	0%	4.4%	-	2.5%
Pedestrians	-	-	-	-	-	20	-	-	-	-	-	6	-	-	-	-	-	6	-	-	-	-	-	41	-
% Pedestrians	-	-	-	-	-	87.0%	-	-	-	-	-	100%	-	-	-	-	-	85.7%	-	-	-	-	-	97.6%	-
Bicycles on Crosswalk	-	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	1	-
% Bicycles on Crosswalk	-	-	-	-	-	13.0%	-	-	-	-	-	0%	-	-	-	-	-	14.3%	-	-	-	-	-	2.4%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Dallas St at Montrose Blvd - TMC

Tue Nov 9, 2021

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

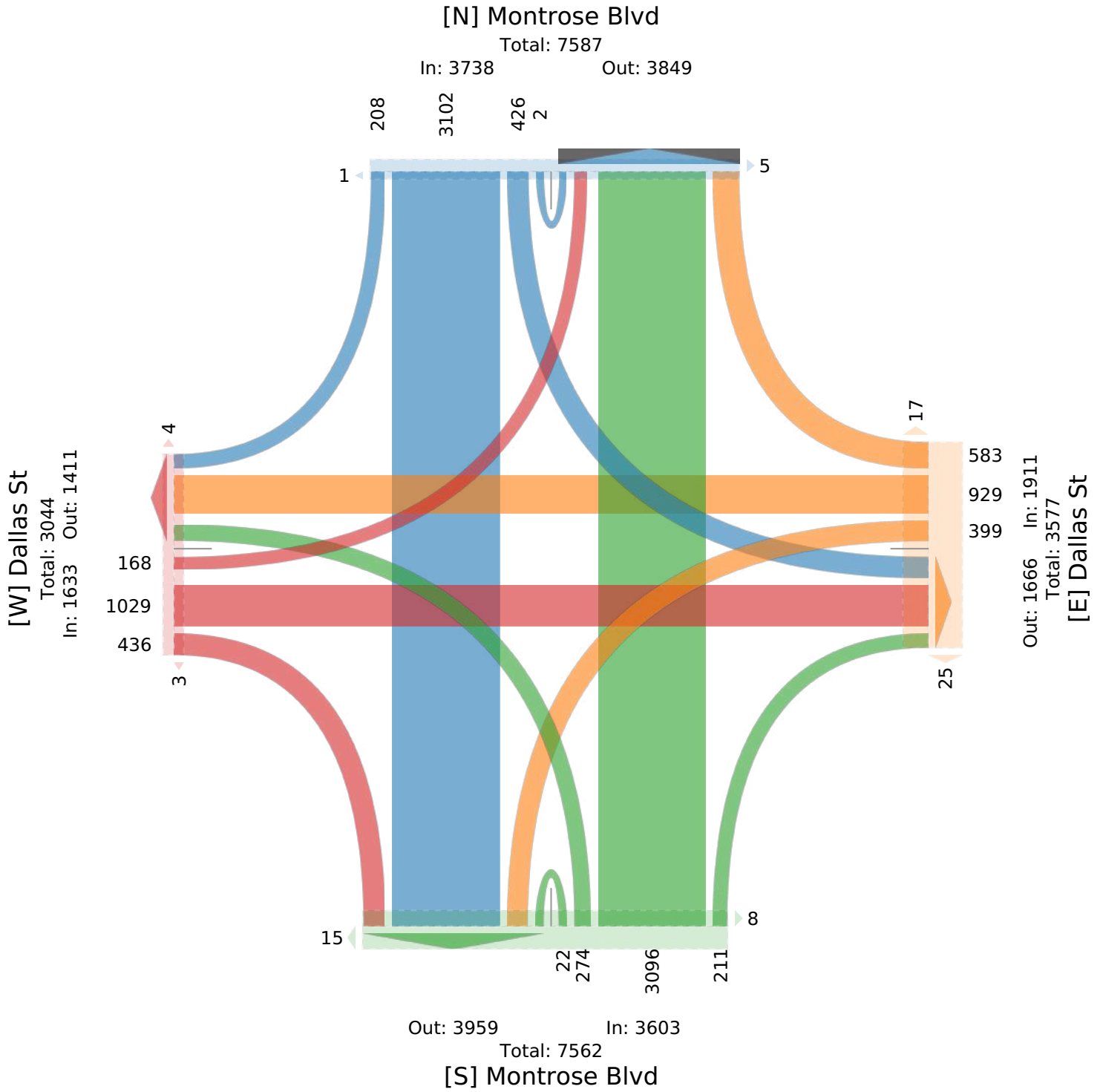
All Movements

ID: 898181, Location: 29.757474, -95.392233



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US



Dallas St at Montrose Blvd - TMC

Tue Nov 9, 2021

AM Peak (7:45 AM - 8:45 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 898181, Location: 29.757474, -95.392233



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Montrose Blvd Northbound						Montrose Blvd Southbound						Dallas St Eastbound						Dallas St Westbound						Int
	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	
2021-11-09 7:45AM	15	149	7	0	171	2	19	223	12	0	254	0	12	80	28	0	120	1	21	34	44	0	99	4	644
8:00AM	25	120	15	1	161	2	47	238	9	0	294	1	10	70	28	0	108	1	19	50	29	0	98	1	661
8:15AM	27	172	13	0	212	1	28	224	15	0	267	0	8	84	24	0	116	0	25	47	31	0	103	0	698
8:30AM	17	140	12	5	174	0	13	239	15	0	267	0	8	49	27	0	84	0	24	46	22	0	92	2	617
Total	84	581	47	6	718	5	107	924	51	0	1082	1	38	283	107	0	428	2	89	177	126	0	392	7	2620
% Approach	11.7%	80.9%	6.5%	0.8%	-	-	9.9%	85.4%	4.7%	0%	-	-	8.9%	66.1%	25.0%	0%	-	-	22.7%	45.2%	32.1%	0%	-	-	-
% Total	3.2%	22.2%	1.8%	0.2%	27.4%	-	4.1%	35.3%	1.9%	0%	41.3%	-	1.5%	10.8%	4.1%	0%	16.3%	-	3.4%	6.8%	4.8%	0%	15.0%	-	-
PHF	0.778	0.844	0.783	0.300	0.847	-	0.569	0.967	0.850	-	0.920	-	0.792	0.842	0.955	-	0.892	-	0.890	0.885	0.716	-	0.951	-	0.938
Lights	84	568	46	6	704	-	106	897	49	0	1052	-	35	275	106	0	416	-	86	160	117	0	363	-	2535
% Lights	100%	97.8%	97.9%	100%	98.1%	-	99.1%	97.1%	96.1%	0%	97.2%	-	92.1%	97.2%	99.1%	0%	97.2%	-	96.6%	90.4%	92.9%	0%	92.6%	-	96.8%
Articulated Trucks	0	0	0	0	0	-	0	1	2	0	3	-	0	0	0	0	0	-	0	0	0	0	0	-	3
% Articulated Trucks	0%	0%	0%	0%	0%	-	0%	0.1%	3.9%	0%	0.3%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0.1%
Buses and Single-Unit Trucks	0	13	1	0	14	-	1	26	0	0	27	-	3	8	1	0	12	-	3	17	9	0	29	-	82
% Buses and Single-Unit Trucks	0%	2.2%	2.1%	0%	1.9%	-	0.9%	2.8%	0%	0%	2.5%	-	7.9%	2.8%	0.9%	0%	2.8%	-	3.4%	9.6%	7.1%	0%	7.4%	-	3.1%
Pedestrians	-	-	-	-	-	4	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	6	
% Pedestrians	-	-	-	-	-	80.0%	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	85.7%	
Bicycles on Crosswalk	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	
% Bicycles on Crosswalk	-	-	-	-	-	20.0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	14.3%	

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Dallas St at Montrose Blvd - TMC

Tue Nov 9, 2021

AM Peak (7:45 AM - 8:45 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

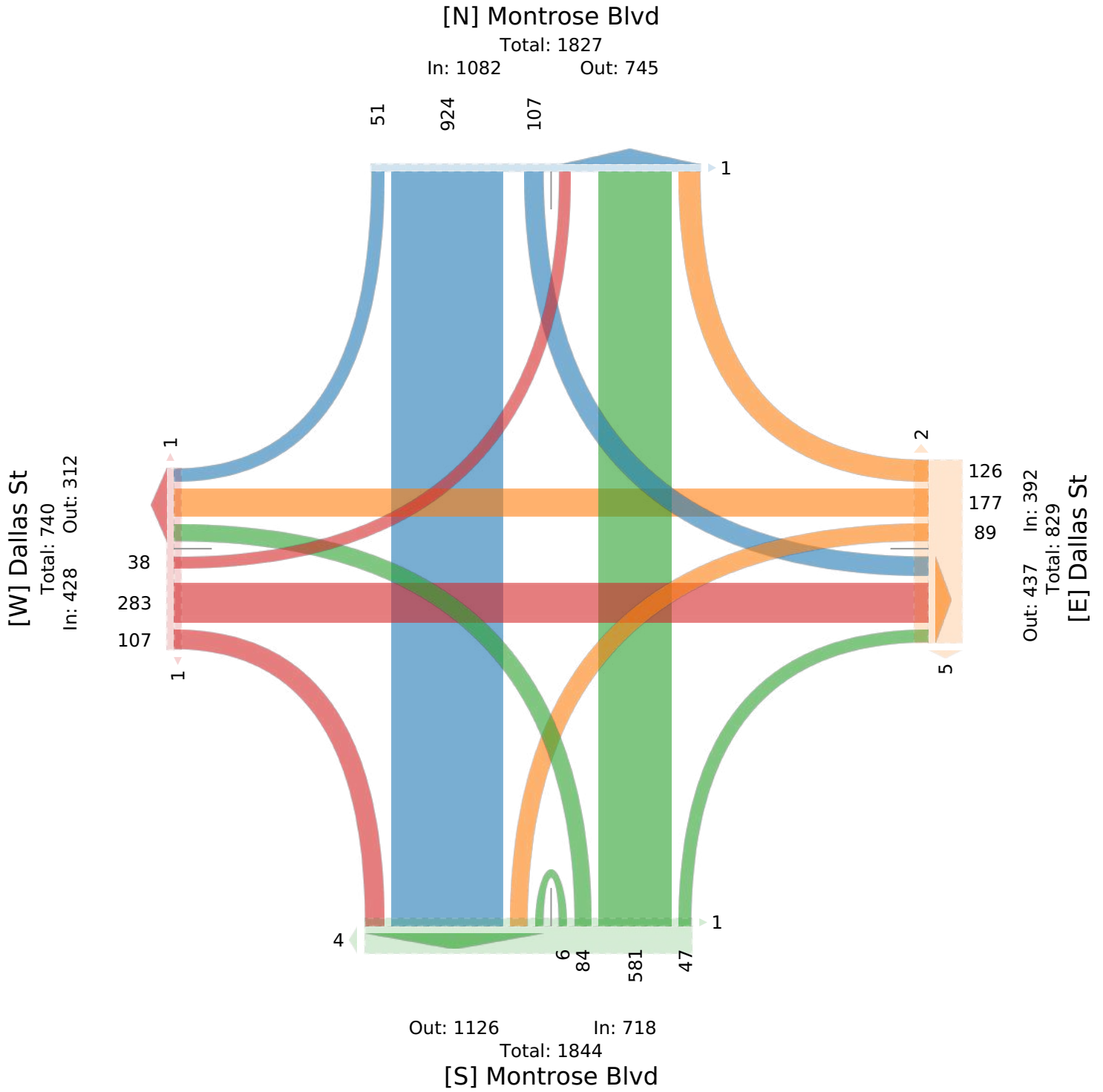
All Movements

ID: 898181, Location: 29.757474, -95.392233



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US



Dallas St at Montrose Blvd - TMC

Tue Nov 9, 2021

PM Peak (5 PM - 6 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 898181, Location: 29.757474, -95.392233



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Montrose Blvd Northbound						Montrose Blvd Southbound						Dallas St Eastbound						Dallas St Westbound						Int
	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	
2021-11-09 5:00PM	16	267	10	0	293	2	41	176	20	0	237	0	14	75	24	0	113	0	25	79	51	0	155	1	798
5:15PM	23	261	22	5	311	3	29	177	13	0	219	0	15	85	26	0	126	0	25	74	39	0	138	8	794
5:30PM	11	289	25	1	326	0	22	159	14	0	195	0	11	68	31	0	110	0	25	87	49	0	161	6	792
5:45PM	24	254	17	1	296	0	25	169	11	1	206	0	12	76	28	0	116	1	33	102	42	0	177	4	795
Total	74	1071	74	7	1226	5	117	681	58	1	857	0	52	304	109	0	465	1	108	342	181	0	631	19	3179
% Approach	6.0%	87.4%	6.0%	0.6%	-	-	13.7%	79.5%	6.8%	0.1%	-	-	11.2%	65.4%	23.4%	0%	-	-	17.1%	54.2%	28.7%	0%	-	-	-
% Total	2.3%	33.7%	2.3%	0.2%	38.6%	-	3.7%	21.4%	1.8%	0%	27.0%	-	1.6%	9.6%	3.4%	0%	14.6%	-	3.4%	10.8%	5.7%	0%	19.8%	-	-
PHF	0.771	0.926	0.740	0.350	0.940	-	0.713	0.962	0.725	0.250	0.904	-	0.867	0.894	0.879	-	0.923	-	0.818	0.838	0.887	-	0.891	-	0.996
Lights	74	1053	72	7	1206	-	115	674	58	1	848	-	52	300	108	0	460	-	107	337	179	0	623	-	3137
% Lights	100%	98.3%	97.3%	100%	98.4%	-	98.3%	99.0%	100%	100%	98.9%	-	100%	98.7%	99.1%	0%	98.9%	-	99.1%	98.5%	98.9%	0%	98.7%	-	98.7%
Articulated Trucks	0	0	0	0	0	-	1	0	0	0	1	-	0	0	0	0	0	-	0	1	1	0	2	-	3
% Articulated Trucks	0%	0%	0%	0%	0%	-	0.9%	0%	0%	0%	0.1%	-	0%	0%	0%	0%	0%	-	0%	0.3%	0.6%	0%	0.3%	-	0.1%
Buses and Single-Unit Trucks	0	18	2	0	20	-	1	7	0	0	8	-	0	4	1	0	5	-	1	4	1	0	6	-	39
% Buses and Single-Unit Trucks	0%	1.7%	2.7%	0%	1.6%	-	0.9%	1.0%	0%	0%	0.9%	-	0%	1.3%	0.9%	0%	1.1%	-	0.9%	1.2%	0.6%	0%	1.0%	-	1.2%
Pedestrians	-	-	-	-	-	5	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	19	-
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	-	-	100%	-	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Dallas St at Montrose Blvd - TMC

Tue Nov 9, 2021

PM Peak (5 PM - 6 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

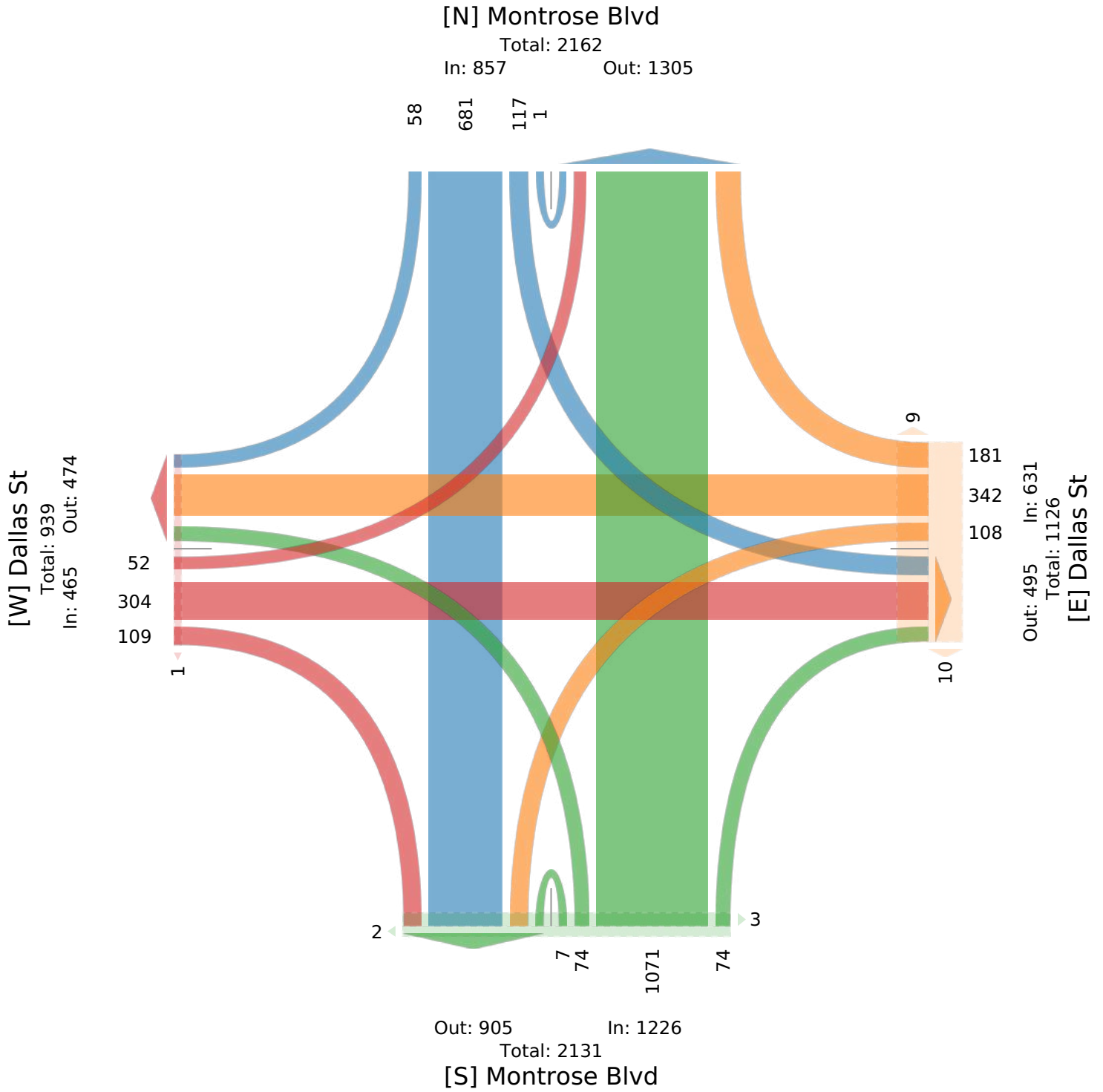
All Movements

ID: 898181, Location: 29.757474, -95.392233



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US





TRAFFIC DATA REPORT
SPEED STUDY

Location: Dallas St between Peveto
St and Eberhard St
Start Date: 11/16/2021

Direction: Eastbound

11/16/2021	0 - 15	> 15 -	> 20 -	> 25 -	> 30 -	> 35 -	> 40 -	> 45 -	> 50 -	> 55 -	> 60 -	> 65 -	> 70	Total
Time	MPH	20 MPH	25 MPH	30 MPH	35 MPH	40 MPH	45 MPH	50 MPH	55 MPH	60 MPH	65 MPH	70 MPH	MPH	
0:00	0	1	0	1	4	1	1	0	0	0	0	0	0	8
0:15	0	0	2	1	0	0	1	0	0	0	0	0	0	4
0:30	0	0	2	1	2	0	1	0	0	0	0	0	0	6
0:45	0	1	0	1	0	1	0	0	0	0	0	0	0	3
1:00	0	2	4	4	6	2	3	0	0	0	0	0	0	21
1:15	0	0	1	0	0	0	0	0	0	0	0	0	0	1
1:30	0	0	0	2	1	0	0	0	0	0	0	0	0	3
1:45	0	0	2	2	1	0	0	0	0	0	0	0	0	5
2:00	0	0	1	1	1	0	0	0	0	0	0	0	0	3
2:15	0	0	4	5	3	0	0	0	0	0	0	0	0	12
2:30	0	0	0	3	0	0	0	0	0	0	0	0	0	3
2:45	0	1	0	4	1	0	0	0	0	0	0	0	0	6
3:00	0	0	0	0	1	1	0	0	0	0	0	0	0	2
3:15	0	0	0	2	0	0	0	0	0	0	0	0	0	2
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45	0	0	0	0	3	0	0	0	0	0	0	0	0	3
4:00	0	0	0	2	4	1	0	0	0	0	0	0	0	7
4:15	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4:30	0	1	0	2	1	0	0	0	0	0	0	0	0	4
4:45	0	0	0	2	0	0	0	0	0	0	0	0	0	2
5:00	0	0	2	0	3	1	0	0	0	0	0	0	0	6
5:15	0	1	2	4	5	1	0	0	0	0	0	0	0	13
5:30	0	0	1	0	3	0	1	0	0	0	0	0	0	5
5:45	0	0	0	1	1	0	0	0	0	0	0	0	0	2
6:00	0	0	1	5	8	1	0	0	0	0	0	0	0	15
6:15	0	0	0	4	4	0	0	0	0	0	0	0	0	8
6:30	0	0	2	10	16	1	1	0	0	0	0	0	0	30
6:45	0	2	3	10	10	3	3	0	0	0	0	0	0	31
7:00	0	0	3	12	7	6	0	0	0	0	0	0	0	28
7:15	0	0	2	9	10	8	0	1	0	0	0	0	0	30
7:30	0	2	4	11	18	5	2	0	0	0	0	0	0	42
7:45	0	4	12	42	45	22	5	1	0	0	0	0	0	131
8:00	0	1	7	19	28	9	3	0	0	0	0	0	0	67
8:15	0	0	8	24	27	3	2	0	0	0	0	0	0	64
8:30	0	2	3	30	36	6	0	0	0	0	0	0	0	77
8:45	0	0	7	28	48	6	0	0	0	0	0	0	0	89
9:00	0	3	25	101	139	24	5	0	0	0	0	0	0	297
9:15	0	0	5	40	57	5	1	0	0	0	0	0	0	108
9:30	0	1	5	37	46	13	1	0	0	0	0	0	0	103
9:45	0	1	8	24	27	9	1	0	0	0	0	0	0	70
10:00	0	0	2	18	26	13	1	1	0	0	0	0	0	61
10:15	0	2	20	119	156	40	4	1	0	0	0	0	0	342
10:30	0	0	8	16	24	8	1	0	0	0	0	0	0	57
10:45	1	1	6	21	20	5	0	0	0	0	0	0	0	54
11:00	0	0	5	16	27	7	0	1	0	0	0	0	0	56
11:15	0	0	7	22	23	7	1	1	0	0	0	0	0	61
11:30	1	1	26	75	94	27	2	2	0	0	0	0	0	228
11:45	0	3	5	10	28	5	0	0	0	0	0	0	0	51
12:00	0	1	8	14	20	7	1	0	0	0	0	0	0	51
12:15	0	2	5	22	16	2	1	0	0	0	0	0	0	48
12:30	0	5	9	9	17	4	0	0	0	0	0	0	0	44
12:45	0	11	27	55	81	18	2	0	0	0	0	0	0	194
13:00	0	1	6	17	30	7	1	0	0	0	0	0	0	62
13:15	0	0	9	22	18	5	0	0	0	0	0	0	0	54
13:30	1	2	8	23	30	7	0	0	0	0	0	0	0	71
13:45	0	0	9	32	26	6	1	0	0	0	0	0	0	74
14:00	1	3	32	94	104	25	2	0	0	0	0	0	0	261
14:15	0	4	6	24	29	3	1	0	0	0	0	0	0	67



TRAFFIC DATA REPORT
SPEED STUDY

Location: Dallas St between Peveto
St and Eberhard St
Start Date: 11/16/2021

12:15	0	1	7	17	32	4	0	0	0	0	0	0	0	61
12:30	0	1	14	22	23	1	0	0	0	0	0	0	0	61
12:45	0	2	7	26	30	6	0	0	0	0	0	0	0	71
	0	8	34	89	114	14	1	0	0	0	0	0	0	260
13:00	0	1	13	36	30	3	2	0	0	0	0	0	0	85
13:15	0	0	12	29	17	3	2	0	0	0	0	0	0	63
13:30	1	2	8	25	21	9	0	0	0	0	0	0	0	66
13:45	0	2	7	26	20	7	1	0	0	0	0	0	0	63
	1	5	40	116	88	22	5	0	0	0	0	0	0	277
14:00	0	0	10	27	23	5	0	0	0	0	0	0	0	65
14:15	1	0	12	25	31	3	1	0	0	0	0	0	0	73
14:30	0	1	9	25	26	5	0	0	0	0	0	0	0	66
14:45	0	3	8	30	16	6	1	1	0	0	0	0	0	65
	1	4	39	107	96	19	2	1	0	0	0	0	0	269
15:00	0	3	10	25	25	4	0	0	0	0	0	0	0	67
15:15	0	3	14	29	29	3	0	0	0	0	0	0	0	78
15:30	0	4	7	20	15	11	1	0	0	0	0	0	0	58
15:45	0	1	16	43	31	6	1	0	0	0	0	0	0	98
	0	11	47	117	100	24	2	0	0	0	0	0	0	301
16:00	0	0	15	44	31	5	2	0	0	0	0	0	0	97
16:15	0	2	10	29	48	6	2	0	0	0	0	0	0	97
16:30	0	2	13	41	39	6	1	0	0	0	0	0	0	102
16:45	0	1	23	49	45	12	1	0	0	0	0	0	0	131
	0	5	61	163	163	29	6	0	0	0	0	0	0	427
17:00	0	2	23	36	37	9	0	0	0	0	0	0	0	107
17:15	0	2	30	58	41	4	1	0	0	0	0	0	0	136
17:30	1	6	21	58	20	7	1	0	0	0	0	0	0	114
17:45	0	4	25	69	37	10	4	0	0	0	0	0	0	149
	1	14	99	221	135	30	6	0	0	0	0	0	0	506
18:00	0	1	22	61	44	4	0	0	0	0	0	0	0	132
18:15	0	3	18	54	57	10	1	0	0	0	0	0	0	143
18:30	0	3	27	33	36	10	0	0	0	0	0	0	0	109
18:45	0	3	17	37	36	5	1	0	0	0	0	0	0	99
	0	10	84	185	173	29	2	0	0	0	0	0	0	483
19:00	0	0	13	26	39	4	0	1	0	0	0	0	0	83
19:15	0	1	8	26	22	6	0	0	0	0	0	0	0	63
19:30	1	1	9	22	28	7	3	0	0	0	0	0	0	71
19:45	0	4	10	20	24	8	0	0	0	0	0	0	0	66
	1	6	40	94	113	25	3	1	0	0	0	0	0	283
20:00	0	1	9	19	25	4	0	0	0	0	0	0	0	58
20:15	0	0	5	24	19	4	0	0	0	0	0	0	0	52
20:30	0	1	2	19	14	3	0	0	0	0	0	0	0	39
20:45	0	0	9	14	17	6	1	0	0	0	0	0	0	47
	0	2	25	76	75	17	1	0	0	0	0	0	0	196
21:00	0	1	6	8	16	5	0	0	0	0	0	0	0	36
21:15	0	0	2	11	17	3	0	0	0	0	0	0	0	33
21:30	1	3	5	13	5	3	0	0	0	0	0	0	0	30
21:45	0	1	2	6	13	2	1	0	0	0	0	0	0	25
	1	5	15	38	51	13	1	0	0	0	0	0	0	124
22:00	0	1	3	10	13	1	0	0	0	0	0	0	0	28
22:15	0	0	1	8	7	5	0	0	0	0	0	0	0	21
22:30	0	1	4	10	10	4	0	0	0	0	0	0	0	29
22:45	1	2	2	6	7	1	0	0	0	0	0	0	0	19
	1	4	10	34	37	11	0	0	0	0	0	0	0	97
23:00	0	0	0	9	3	1	0	0	0	0	0	0	0	13
23:15	0	0	2	9	6	3	1	0	0	0	0	0	0	21
23:30	0	1	1	7	6	1	0	0	0	0	0	0	0	16
23:45	0	0	2	4	1	0	0	0	0	0	0	0	0	7
	0	1	5	29	16	5	1	0	0	0	0	0	0	57
Total	8	104	654	1787	1820	401	54	6	0	0	0	0	0	4834

Percentile 15th 50th 85th 95th
Speed 24.7 29.6 33.8 36.4
Mean Speed (Average) 29.5
10 MPH Pace Speed 25-34



TRAFFIC DATA REPORT
SPEED STUDY

Location: Dallas St between Peveto
St and Eberhard St
Start Date: 11/16/2021

Number in Pace	3584
Percent in Pace	74.1%
Number > 30 MPH	2281
Percent > 30 MPH	47.2%



TRAFFIC DATA REPORT
SPEED STUDY

Location: Dallas St between Peveto
St and Eberhard St
Start Date: 11/16/2021

Direction: Westbound

11/16/2021	0 - 15	> 15 -	> 20 -	> 25 -	> 30 -	> 35 -	> 40 -	> 45 -	> 50 -	> 55 -	> 60 -	> 65 -	> 70	Total
Time	MPH	20 MPH	25 MPH	30 MPH	35 MPH	40 MPH	45 MPH	50 MPH	55 MPH	60 MPH	65 MPH	70 MPH	MPH	
0:00	0	1	2	3	7	2	1	0	0	0	0	0	0	16
0:15	0	0	0	2	3	5	1	0	0	0	0	0	0	11
0:30	0	0	1	1	1	1	0	0	0	0	0	0	0	4
0:45	0	1	0	1	1	0	0	0	0	0	0	0	0	3
1:00	0	2	3	7	12	8	2	0	0	0	0	0	0	34
1:15	0	0	0	2	1	2	1	0	1	0	0	0	0	7
1:30	0	1	1	3	3	0	0	1	0	0	0	0	0	9
1:45	0	1	1	2	3	1	0	0	0	0	0	0	0	8
2:00	0	0	0	0	2	1	0	0	0	0	0	0	0	3
2:15	0	2	2	7	9	4	1	1	1	0	0	0	0	27
2:30	0	0	1	1	1	1	1	0	0	0	0	0	0	5
2:45	0	0	0	0	2	3	0	0	0	0	0	0	0	5
3:00	0	0	0	2	2	0	0	1	0	0	0	0	0	5
3:15	0	0	2	3	6	4	1	1	0	0	0	0	0	17
3:30	0	0	0	0	0	0	1	0	0	0	0	0	0	1
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00	0	0	0	1	1	0	0	0	0	0	0	0	0	2
4:15	0	0	0	1	2	1	0	0	0	0	0	0	0	4
4:30	0	0	0	2	3	1	1	0	0	0	0	0	0	7
4:45	0	0	0	0	0	0	0	0	0	1	0	0	0	1
5:00	0	1	1	1	1	0	0	0	0	0	0	0	0	4
5:15	0	0	2	0	1	0	0	0	0	0	0	0	0	3
5:30	0	0	1	1	1	0	0	0	0	0	0	0	0	4
5:45	0	1	4	2	3	1	0	0	1	0	0	0	0	12
6:00	0	0	1	2	3	3	0	2	0	0	0	0	0	11
6:15	0	0	3	6	1	0	0	0	0	0	0	0	0	10
6:30	0	1	1	2	3	1	0	0	0	0	0	0	0	8
6:45	0	0	2	13	5	1	0	0	0	0	0	0	0	21
7:00	0	1	7	23	12	5	0	2	0	0	0	0	0	50
7:15	0	0	4	17	10	2	0	1	0	0	0	0	0	34
7:30	0	0	2	3	9	4	0	0	0	0	0	0	0	18
7:45	0	0	4	14	11	5	0	0	0	0	0	0	0	34
8:00	0	0	9	16	19	7	0	1	0	0	0	0	0	52
8:15	0	0	19	50	49	18	0	2	0	0	0	0	0	138
8:30	0	0	5	12	14	8	0	1	0	0	0	0	0	40
8:45	0	1	9	17	15	7	1	0	0	0	0	0	0	50
9:00	1	1	10	20	25	7	2	1	0	0	0	0	0	67
9:15	0	3	4	18	30	13	0	1	0	0	0	0	0	69
9:30	1	5	28	67	84	35	3	3	0	0	0	0	0	226
9:45	0	1	10	28	16	11	2	0	0	0	0	0	0	68
10:00	0	5	9	24	28	6	1	0	0	0	0	0	0	73
10:15	0	1	11	21	28	6	2	0	0	0	0	0	0	69
10:30	0	1	11	27	26	8	1	0	0	0	0	0	0	74
10:45	0	8	41	100	98	31	6	0	0	0	0	0	0	284
11:00	0	0	17	18	20	12	0	0	0	0	0	0	0	67
11:15	0	1	6	29	19	10	1	0	0	0	0	0	0	66
11:30	0	1	5	18	20	5	1	0	0	0	0	0	0	50
11:45	0	2	4	26	25	4	0	1	0	0	0	0	0	62
12:00	0	4	32	91	84	31	2	1	0	0	0	0	0	245
12:15	0	1	7	18	15	8	0	1	0	0	0	0	0	50
12:30	0	1	8	26	17	5	1	0	0	0	0	0	0	58
12:45	0	1	7	22	17	6	0	0	0	0	0	0	0	53
13:00	0	1	6	19	14	5	0	0	0	0	0	0	0	45
13:15	0	4	28	85	63	24	1	1	0	0	0	0	0	206
13:30	1	0	2	18	22	5	0	0	0	0	0	0	0	48
13:45	0	0	5	22	31	6	2	0	0	0	0	0	0	66
14:00	0	1	9	14	21	11	1	0	0	0	0	0	0	57
14:15	0	0	11	24	18	4	0	1	0	0	0	0	0	58
14:30	1	1	27	78	92	26	3	1	0	0	0	0	0	229
14:45	1	3	10	28	24	3	1	0	0	0	0	0	0	70



TRAFFIC DATA REPORT
SPEED STUDY

Location: Dallas St between Peveto
St and Eberhard St
Start Date: 11/16/2021

12:15	0	1	11	30	18	4	1	0	0	0	0	0	0	65
12:30	0	3	7	24	25	7	0	1	0	0	0	0	0	67
12:45	0	2	21	38	13	3	1	0	0	0	0	0	0	78
	1	9	49	120	80	17	3	1	0	0	0	0	0	280
13:00	0	1	7	21	23	8	2	0	0	0	0	0	0	62
13:15	0	1	9	14	27	6	0	0	0	0	0	0	0	57
13:30	0	0	17	19	17	6	1	0	0	0	0	0	0	60
13:45	0	0	4	25	26	7	2	0	0	0	0	0	0	64
	0	2	37	79	93	27	5	0	0	0	0	0	0	243
14:00	1	1	10	25	15	3	1	1	0	0	0	0	0	57
14:15	0	2	10	19	24	5	1	0	0	0	0	0	0	61
14:30	1	0	6	23	24	6	0	0	0	0	0	0	0	60
14:45	0	0	8	17	22	8	3	1	0	0	0	0	0	59
	2	3	34	84	85	22	5	2	0	0	0	0	0	237
15:00	0	5	9	21	26	13	1	1	0	0	0	0	0	76
15:15	0	2	5	30	20	9	0	0	0	0	0	0	0	66
15:30	0	3	8	24	31	14	3	0	0	0	0	0	0	83
15:45	0	0	7	25	34	8	1	0	0	0	0	0	0	75
	0	10	29	100	111	44	5	1	0	0	0	0	0	300
16:00	1	4	20	21	33	8	0	0	0	0	0	0	0	87
16:15	4	7	28	54	35	7	2	0	0	0	0	0	0	137
16:30	3	6	27	49	31	8	1	0	0	0	0	0	0	125
16:45	0	1	18	44	29	5	2	0	0	0	0	0	0	99
	8	18	93	168	128	28	5	0	0	0	0	0	0	448
17:00	0	10	29	43	32	7	0	0	0	0	0	0	0	121
17:15	2	11	33	32	23	3	0	0	0	0	0	0	0	104
17:30	0	1	21	57	24	2	1	0	0	0	0	0	0	106
17:45	7	11	19	37	20	3	1	0	0	0	0	0	0	98
	9	33	102	169	99	15	2	0	0	0	0	0	0	429
18:00	0	4	18	35	38	8	0	0	0	0	0	0	0	103
18:15	0	2	13	30	24	6	1	0	0	0	0	0	0	76
18:30	1	11	15	36	31	3	0	0	0	0	0	0	0	97
18:45	0	1	13	32	16	5	1	0	0	0	0	0	0	68
	1	18	59	133	109	22	2	0	0	0	0	0	0	344
19:00	0	1	16	25	20	4	1	0	0	0	0	0	0	67
19:15	0	5	9	19	25	5	0	0	0	0	0	0	0	63
19:30	0	0	13	29	14	2	0	0	0	0	0	0	0	58
19:45	0	3	9	24	15	3	0	0	0	0	0	0	0	54
	0	9	47	97	74	14	1	0	0	0	0	0	0	242
20:00	0	4	5	19	13	2	1	0	0	0	0	0	0	44
20:15	1	2	7	17	12	7	1	0	0	0	0	0	0	47
20:30	0	2	8	11	10	1	0	0	0	0	0	0	0	32
20:45	1	1	13	14	6	2	0	0	0	0	0	0	0	37
	2	9	33	61	41	12	2	0	0	0	0	0	0	160
21:00	0	1	2	11	8	4	0	0	0	0	0	0	0	26
21:15	0	1	6	9	6	2	0	0	0	0	0	0	0	24
21:30	0	3	4	19	9	6	0	0	0	0	0	0	0	41
21:45	0	1	5	6	13	7	0	0	0	0	0	0	0	32
	0	6	17	45	36	19	0	0	0	0	0	0	0	123
22:00	0	1	3	8	8	3	1	0	0	0	0	0	0	24
22:15	0	2	9	12	7	5	0	0	0	0	0	0	0	35
22:30	0	0	2	8	8	4	1	0	0	0	0	0	0	23
22:45	0	1	1	5	8	2	0	0	0	0	0	0	0	17
	0	4	15	33	31	14	2	0	0	0	0	0	0	99
23:00	1	0	1	5	2	4	3	0	0	0	0	0	0	16
23:15	0	1	2	7	6	1	0	0	0	0	0	0	0	17
23:30	0	0	2	4	6	0	0	0	0	0	0	0	0	12
23:45	0	1	2	5	1	4	0	0	0	0	0	0	0	13
Total	1	2	7	21	15	9	3	0	0	0	0	0	0	58
	26	151	715	1625	1417	431	55	16	1	1	0	0	0	4438

Percentile 15th 50th 85th 95th
Speed 23.8 29.2 34 37.2
Mean Speed (Average) 29.1
10 MPH Pace Speed 25-34



TRAFFIC DATA REPORT
SPEED STUDY

Location: Dallas St between Peveto
St and Eberhard St
Start Date: 11/16/2021

Number in Pace	3028
Percent in Pace	68.2%
Number > 30 MPH	1921
Percent > 30 MPH	43.3%

City of Houston

Traffic Management - Volume

Requested Address: **2933 DALLAS W**
 Segment: **TAFT TO WAUGH**

LAT, LONG : 29.7573429, -95.3938567

Incoming Radar Unit : **R1023**

Outgoing Radar Unit : **R1011**

hr:mm	Monday 4/8/2019		Tuesday 4/9/2019		Wednesday 4/10/2019		Thursday 4/11/2019		Friday 4/12/2019		Saturday 4/13/2019		Sunday 4/14/2019		Mon-Fri Average		7 Day Average		
	EAST	WEST	EAST	WEST	EAST	WEST	EAST	WEST	EAST	WEST	EAST	WEST	EAST	WEST	EAST	WEST	EAST	WEST	
12:00 AM	0	0	23	37	31	33	0	0	0	0	0	0	0	0	27.0	35.0	27.0	35.0	
1:00 AM	0	0	11	17	19	18	0	0	0	0	0	0	0	0	15.0	17.5	15.0	17.5	
2:00 AM	0	0	18	18	15	19	0	0	0	0	0	0	0	0	16.5	18.5	16.5	18.5	
3:00 AM	0	0	3	9	13	11	0	0	0	0	0	0	0	0	8.0	10.0	8.0	10.0	
4:00 AM	0	0	17	21	17	23	0	0	0	0	0	0	0	0	17.0	22.0	17.0	22.0	
5:00 AM	0	0	59	53	74	72	0	0	0	0	0	0	0	0	66.5	62.5	66.5	62.5	
6:00 AM	0	0	180	192	157	165	0	0	0	0	0	0	0	0	168.5	178.5	168.5	178.5	
7:00 AM	0	0	431	338	388	318	0	0	0	0	0	0	0	0	409.5	328.0	409.5	328.0	
8:00 AM	0	0	476	408	487	430	0	0	0	0	0	0	0	0	481.5	419.0	481.5	419.0	
9:00 AM	43	22	355	330	344	319	0	0	0	0	0	0	0	0	247.3	223.7	247.3	223.7	
10:00 AM	250	244	264	262	136	127	0	0	0	0	0	0	0	0	216.7	211.0	216.7	211.0	
11:00 AM	310	316	329	348	0	0	0	0	0	0	0	0	0	0	319.5	332.0	319.5	332.0	
12:00 PM	386	344	389	385	0	0	0	0	0	0	0	0	0	0	387.5	364.5	387.5	364.5	
1:00 PM	378	319	366	336	0	0	0	0	0	0	0	0	0	0	372.0	327.5	372.0	327.5	
2:00 PM	329	263	346	334	0	0	0	0	0	0	0	0	0	0	337.5	298.5	337.5	298.5	
3:00 PM	377	297	395	310	0	0	0	0	0	0	0	0	0	0	386.0	303.5	386.0	303.5	
4:00 PM	526	395	588	346	0	0	0	0	0	0	0	0	0	0	557.0	370.5	557.0	370.5	
5:00 PM	615	432	552	444	0	0	0	0	0	0	0	0	0	0	583.5	438.0	583.5	438.0	
6:00 PM	457	420	510	405	0	0	0	0	0	0	0	0	0	0	483.5	412.5	483.5	412.5	
7:00 PM	380	302	343	328	0	0	0	0	0	0	0	0	0	0	361.5	315.0	361.5	315.0	
8:00 PM	246	219	286	262	0	0	0	0	0	0	0	0	0	0	266.0	240.5	266.0	240.5	
9:00 PM	188	144	216	161	0	0	0	0	0	0	0	0	0	0	202.0	152.5	202.0	152.5	
10:00 PM	106	100	117	94	0	0	0	0	0	0	0	0	0	0	111.5	97.0	111.5	97.0	
11:00 PM	77	77	66	70	0	0	0	0	0	0	0	0	0	0	71.5	73.5	71.5	73.5	
TOTALS	4668	3894	6340	5508	1681	1535	0	0	0	0	0	0	0	0	6112.5	5251.2	6112.5	5251.2	
COMBINED	8562		11848		3216		0		0		0		0		11363.7		11363.7		
SPLIT (%)	54.5%	45.5%	53.5%	46.5%	52.3%	47.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	53.8%	46.2%	53.8%	46.2%	
PEAK HOURS																			
12:00:00 AM -																			
	11:00 AM	11:00 AM	8:00 AM	8:00 AM	8:00 AM	8:00 AM	-	-	-	-	-	-	-	-	8:00 AM	8:00 AM	8:00 AM	8:00 AM	
Volume	310	316	476	408	487	430	-	-	-	-	-	-	-	-	482	419	482	419	
12:00:00 PM -																			
	5:00 PM	5:00 PM	4:00 PM	5:00 PM	-	-	-	-	-	-	-	-	-	-	5:00 PM	5:00 PM	5:00 PM	5:00 PM	
Volume	615	432	588	444	-	-	-	-	-	-	-	-	-	-	584	438	584	438	

City of Houston

Traffic Management - Speed Report

Requested Address: 2933 DALLAS W

DATE TESTED: 4/9/2019

Radar Unit : R1023 & R1011

Segment: TAFT TO WAUGH

DAILY COMBINED SPEED

Starting Hr:min	<15	15 to <20	20 to <25	25 to <30	30 to <35	35 to <40	40 to <45	45 to <50	50 to <55	55 to <60	60 to <65	65 to <70	70 to <75	75 to >100	Total Counts
12:00 AM	0	4	2	1	30	16	6	1	0	0	0	0	0	0	60
1:00 AM	0	2	2	5	4	11	3	2	0	0	0	0	0	0	29
2:00 AM	0	1	1	2	9	11	5	6	0	0	0	0	0	0	35
3:00 AM	1	1	1	7	0	1	1	0	0	0	0	0	0	0	12
4:00 AM	0	1	2	4	11	12	3	3	0	0	2	0	0	0	38
5:00 AM	0	2	5	17	39	35	12	2	0	0	0	0	0	0	112
6:00 AM	4	10	20	50	128	115	36	6	3	0	0	0	0	0	372
7:00 AM	2	10	39	122	277	229	73	13	2	2	0	0	0	0	769
8:00 AM	3	4	43	132	349	253	77	19	4	0	0	0	0	0	884
9:00 AM	2	10	25	105	232	215	79	14	3	0	0	0	0	0	685
10:00 AM	0	8	18	79	189	156	63	11	2	0	0	0	0	0	526
11:00 AM	1	5	57	114	241	185	59	13	2	0	0	0	0	0	677
12:00 PM	0	8	34	169	303	207	44	8	1	0	1	0	0	0	775
1:00 PM	1	6	29	107	267	206	75	10	2	0	0	0	0	0	703
2:00 PM	1	6	17	86	241	244	71	11	1	1	0	0	0	0	679
3:00 PM	0	5	35	127	278	183	61	12	2	1	0	0	0	0	704
4:00 PM	1	8	55	183	326	274	71	12	3	1	0	0	0	0	934
5:00 PM	4	36	92	184	329	260	77	11	3	0	0	0	0	0	996
6:00 PM	4	16	46	137	305	286	101	16	3	1	0	0	0	0	915
7:00 PM	1	4	18	75	266	236	56	12	1	2	0	0	0	0	671
8:00 PM	0	6	15	81	249	143	44	9	1	0	0	0	0	0	548
9:00 PM	2	2	7	59	144	124	32	6	1	0	0	0	0	0	377
10:00 PM	0	7	9	22	84	66	20	3	0	0	0	0	0	0	211
11:00 PM	0	1	2	21	43	47	19	2	1	0	0	0	0	0	136
Totals	27	163	574	1889	4344	3515	1088	202	35	8	3	0	0	0	11848

Percentile Speeds	10%	15%	50%	85%	90%	Posted Speed	30	Average (Mean)	Minimum (mph)	Maximum (mph)
(mph)	26.5	28.0	33.5	39.0	40.0			33.3	12.0	62.5
Speeds Exceeded	25mph	35mph	45mph	55mph	65mph	75mph				
	11084	4851	248	11	0	0				
	93.6%	40.9%	2.1%	0.1%	0.0%	0.0%				

City of Houston Traffic Management

Requested Address: 2933 DALLAS W
Segment: TAFT TO WAUGH

DATE TESTED: 4/9/2019

Radar Unit : R1023
Radar Unit : R1011

EAST

Time	Percentile	Small	Medium	Large
12:00 AM	0.4%	1	20	2
1:00 AM	0.2%	1	10	0
2:00 AM	0.3%	1	17	0
3:00 AM	0.0%	0	3	0
4:00 AM	0.3%	0	16	1
5:00 AM	0.9%	4	48	7
6:00 AM	2.8%	5	168	7
7:00 AM	6.8%	21	387	23
8:00 AM	7.5%	26	432	18
9:00 AM	5.6%	15	316	24
10:00 AM	4.2%	10	235	19
11:00 AM	5.2%	8	310	11
12:00 PM	6.1%	11	355	23
1:00 PM	5.8%	17	328	21
2:00 PM	5.5%	14	313	19
3:00 PM	6.2%	18	355	22
4:00 PM	9.3%	10	555	23
5:00 PM	8.7%	26	505	21
6:00 PM	8.0%	14	484	12
7:00 PM	5.4%	13	325	5
8:00 PM	4.5%	15	261	10
9:00 PM	3.4%	7	203	6
10:00 PM	1.8%	7	104	6
11:00 PM	1.0%	5	57	4

WEST

Time	Percentile	Small	Medium	Large
12:00 AM	0.7%	0	35	2
1:00 AM	0.3%	0	16	1
2:00 AM	0.3%	0	17	1
3:00 AM	0.2%	0	8	1
4:00 AM	0.4%	0	19	2
5:00 AM	1.0%	2	45	6
6:00 AM	3.5%	5	179	8
7:00 AM	6.1%	7	308	23
8:00 AM	7.4%	11	376	21
9:00 AM	6.0%	8	307	15
10:00 AM	4.8%	8	236	18
11:00 AM	6.3%	12	325	11
12:00 PM	7.0%	12	358	15
1:00 PM	6.1%	11	298	27
2:00 PM	6.1%	6	301	27
3:00 PM	5.6%	8	288	14
4:00 PM	6.3%	9	322	15
5:00 PM	8.1%	9	422	13
6:00 PM	7.4%	10	381	14
7:00 PM	6.0%	7	310	11
8:00 PM	4.8%	4	251	7
9:00 PM	2.9%	2	148	11
10:00 PM	1.7%	1	87	6
11:00 PM	1.3%	2	61	7

MERGED VEHICLE CLASS

Time	Percentile	Small	Medium	Large
12:00 AM	0.5%	1	55	4
1:00 AM	0.2%	1	26	1
2:00 AM	0.3%	1	34	1
3:00 AM	0.1%	0	11	1
4:00 AM	0.3%	0	35	3
5:00 AM	0.9%	6	93	13
6:00 AM	3.1%	10	347	15
7:00 AM	6.5%	28	695	46
8:00 AM	7.5%	37	808	39
9:00 AM	5.8%	23	623	39
10:00 AM	4.4%	18	471	37
11:00 AM	5.7%	20	635	22
12:00 PM	6.5%	23	713	38
1:00 PM	5.9%	28	626	48
2:00 PM	5.7%	20	614	46
3:00 PM	6.0%	26	643	36
4:00 PM	7.9%	19	877	38
5:00 PM	8.4%	35	927	34
6:00 PM	7.7%	24	865	26
7:00 PM	5.7%	20	635	16
8:00 PM	4.6%	19	512	17
9:00 PM	3.2%	9	351	17
10:00 PM	1.8%	8	191	12
11:00 PM	1.1%	7	118	11

TOTAL	6340	249	5807	284
Percentile %		3.9%	91.6%	4.5%

TOTAL	5508	134	5098	276
Percentile %		2.4%	92.6%	5.0%

TOTAL	11848	383	10905	560
Percentile %		3.2%	92.0%	4.7%

Small Vehicle less than 14ft
 Medium Vehicle between 14ft and 20ft
 Large Vehicle greater than 20ft

Appendix 2:
Photos of Study Corridor


























Appendix 3: Detailed Capacity Analysis

Lanes, Volumes, Timings
1: Waugh & W. Dallas

02/14/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	105	26	49	106	107	27	610	55	253	984	62
Future Volume (vph)	55	105	26	49	106	107	27	610	55	253	984	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	12	10	10	12	12	10	10	12	10	10
Storage Length (ft)	0		0	0		0	100		0	150		0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (ft)	25			25			75			75		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor		1.00			0.99			1.00		0.99		0.99
Frt		0.979			0.939			0.988				0.850
Flt Protected		0.985			0.991		0.950			0.950		
Satd. Flow (prot)	0	3336	0	0	2935	0	1770	3256	0	1770	3303	1478
Flt Permitted		0.691			0.821		0.219			0.391		
Satd. Flow (perm)	0	2337	0	0	2428	0	408	3256	0	724	3303	1456
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			110			9				70
Link Speed (mph)		30			30			30				30
Link Distance (ft)		395			1427			536				448
Travel Time (s)		9.0			32.4			12.2				10.2
Confl. Peds. (#/hr)	5		7	7		5	2		11	11		2
Confl. Bikes (#/hr)			2									
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	4%	4%	4%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	2	0	0	6	0	0	0	0	0	0
Adj. Flow (vph)	57	108	27	51	109	110	28	629	57	261	1014	64
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	192	0	0	270	0	28	686	0	261	1014	64
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.09	1.00	1.00	1.09	1.09	1.00	1.00	1.09	1.09	1.00	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	1
Detector Template	Left			Left			Left			Left		Right
Leading Detector (ft)	40	6		40	6		40	6		40	6	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	40	6		40	6		40	6		40	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		2			6		3	8		7		4

Lanes, Volumes, Timings
1: Waugh & W. Dallas

02/14/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		4
Detector Phase	2	2		6	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		4.0	12.0		4.0	12.0	12.0
Minimum Split (s)	30.4	30.4		30.4	30.4		9.3	30.3		9.3	30.3	30.3
Total Split (s)	44.0	44.0		44.0	44.0		23.0	53.0		23.0	53.0	53.0
Total Split (%)	36.7%	36.7%		36.7%	36.7%		19.2%	44.2%		19.2%	44.2%	44.2%
Maximum Green (s)	38.6	38.6		38.6	38.6		17.7	47.7		17.7	47.7	47.7
Yellow Time (s)	3.2	3.2		3.2	3.2		3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	2.2	2.2		2.2	2.2		1.7	1.7		1.7	1.7	1.7
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.4			5.4		5.3	5.3		5.3	5.3	5.3
Lead/Lag							Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	3.0
Recall Mode	Min	Min		Min	Min		None	Min		None	C-Min	C-Min
Walk Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0			20.0			20.0	20.0
Pedestrian Calls (#/hr)	6	6		6	6			7			7	7
Act Effct Green (s)		15.1			15.1		70.4	70.4		87.4	87.4	87.4
Actuated g/C Ratio		0.13			0.13		0.59	0.59		0.73	0.73	0.73
v/c Ratio		0.62			0.67		0.09	0.36		0.38	0.42	0.06
Control Delay		53.5			38.9		13.9	14.7		11.9	8.5	2.0
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		53.5			38.9		13.9	14.7		11.9	8.5	2.0
LOS		D			D		B	B		B	A	A
Approach Delay		53.5			38.9			14.7			8.9	
Approach LOS		D			D			B			A	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 9 (8%), Referenced to phase 4:SBTL, Start of Yellow
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 17.1
 Intersection LOS: B
 Intersection Capacity Utilization 72.4%
 ICU Level of Service C
 Analysis Period (min) 15
 Description: Waugh at W Dallas

Splits and Phases: 1: Waugh & W. Dallas



Queues

1: Waugh & W. Dallas

02/14/2022



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	192	270	28	686	261	1014	64
v/c Ratio	0.62	0.67	0.09	0.36	0.38	0.42	0.06
Control Delay	53.5	38.9	13.9	14.7	11.9	8.5	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.5	38.9	13.9	14.7	11.9	8.5	2.0
Queue Length 50th (ft)	70	78	8	131	61	153	0
Queue Length 95th (ft)	99	96	28	231	134	277	16
Internal Link Dist (ft)	315	1347		456		368	
Turn Bay Length (ft)			100		150		
Base Capacity (vph)	762	855	440	1912	697	2406	1079
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.32	0.06	0.36	0.37	0.42	0.06

Intersection Summary

Description: Waugh at W Dallas

HCM Signalized Intersection Capacity Analysis

1: Waugh & W. Dallas

02/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↕	↕↕		↕	↕↕	↕
Traffic Volume (vph)	55	105	26	49	106	107	27	610	55	253	984	62
Future Volume (vph)	55	105	26	49	106	107	27	610	55	253	984	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	10	12	12	10	10	12	10	10
Total Lost time (s)		5.4			5.4		5.3	5.3		5.3	5.3	5.3
Lane Util. Factor		0.95			0.95		1.00	0.95		1.00	0.95	1.00
Frbp, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frt		0.98			0.94		1.00	0.99		1.00	1.00	0.85
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3332			2929		1769	3255		1766	3303	1456
Flt Permitted		0.69			0.82		0.22	1.00		0.39	1.00	1.00
Satd. Flow (perm)		2335			2427		407	3255		726	3303	1456
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	57	108	27	51	109	110	28	629	57	261	1014	64
RTOR Reduction (vph)	0	14	0	0	96	0	0	4	0	0	0	19
Lane Group Flow (vph)	0	178	0	0	174	0	28	682	0	261	1014	45
Confl. Peds. (#/hr)	5		7	7		5	2		11	11		2
Confl. Bikes (#/hr)			2									
Heavy Vehicles (%)	4%	4%	4%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	2	0	0	6	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		2			6		3	8		7	4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)		15.1			15.1		68.3	68.3		85.3	85.3	85.3
Effective Green, g (s)		15.1			15.1		68.3	68.3		85.3	85.3	85.3
Actuated g/C Ratio		0.13			0.13		0.57	0.57		0.71	0.71	0.71
Clearance Time (s)		5.4			5.4		5.3	5.3		5.3	5.3	5.3
Vehicle Extension (s)		3.0			3.0		2.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)		293			305		272	1852		694	2347	1034
v/s Ratio Prot							0.00	c0.21		0.06	c0.31	
v/s Ratio Perm		c0.08			0.07		0.06			0.20		0.03
v/c Ratio		0.61			0.57		0.10	0.37		0.38	0.43	0.04
Uniform Delay, d1		49.6			49.4		12.3	14.1		7.8	7.2	5.2
Progression Factor		1.00			1.12		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		3.5			2.0		0.1	0.1		0.1	0.6	0.1
Delay (s)		53.2			57.1		12.3	14.2		8.0	7.8	5.3
Level of Service		D			E		B	B		A	A	A
Approach Delay (s)		53.2			57.1		14.1			7.7		
Approach LOS		D			E		B			A		

Intersection Summary




















HCM 2000 Control Delay	18.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		
Description: Waugh at W Dallas			

c Critical Lane Group

HCM 6th Signalized Intersection Summary

1: Waugh & W. Dallas




















02/14/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	105	26	49	106	107	27	610	55	253	984	62
Future Volume (veh/h)	55	105	26	49	106	107	27	610	55	253	984	62
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.97	0.99		0.99	1.00		0.98	0.99		1.00
Parking Bus, Adj	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1811	1811	1811	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	57	108	27	51	109	110	28	629	57	261	1014	64
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	4	4	4	6	6	6	2	2	2	2	2	2
Cap, veh/h	121	255	69	104	199	203	107	713	65	921	2393	1062
Arrive On Green	0.17	0.17	0.17	0.06	0.06	0.06	0.02	0.22	0.22	0.48	0.67	0.67
Sat Flow, veh/h	410	1472	400	363	1149	1174	1781	3290	298	1781	3554	1577
Grp Volume(v), veh/h	86	0	106	141	0	129	28	339	347	261	1014	64
Grp Sat Flow(s),veh/h/ln	705	0	1577	1306	0	1380	1781	1777	1811	1781	1777	1577
Q Serve(g_s), s	6.2	0.0	7.2	6.7	0.0	10.9	1.6	22.2	22.3	5.2	15.6	1.7
Cycle Q Clear(g_c), s	17.2	0.0	7.2	13.9	0.0	10.9	1.6	22.2	22.3	5.2	15.6	1.7
Prop In Lane	0.67		0.25	0.36		0.85	1.00		0.16	1.00		1.00
Lane Grp Cap(c), veh/h	172	0	273	267	0	239	107	385	392	921	2393	1062
V/C Ratio(X)	0.50	0.00	0.39	0.53	0.00	0.54	0.26	0.88	0.88	0.28	0.42	0.06
Avail Cap(c_a), veh/h	366	0	507	494	0	444	334	706	720	921	2393	1062
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.67	0.00	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.0	0.0	44.0	53.6	0.0	51.9	41.5	45.5	45.5	17.0	9.0	6.7
Incr Delay (d2), s/veh	2.2	0.0	0.9	1.1	0.0	1.3	0.5	6.7	6.7	0.1	0.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.0	2.9	4.5	0.0	4.2	0.7	10.5	10.7	4.1	5.8	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.2	0.0	44.9	54.6	0.0	53.2	41.9	52.2	52.2	17.1	9.5	6.8
LnGrp LOS	D	A	D	D	A	D	D	D	D	B	A	A
Approach Vol, veh/h		192			270			714			1339	
Approach Delay, s/veh		48.6			54.0			51.8			10.9	
Approach LOS		D			D			D			B	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		26.2	7.7	86.1		26.2	62.5	31.3				
Change Period (Y+Rc), s		5.4	* 5.3	* 5.3		5.4	* 5.3	* 5.3				
Max Green Setting (Gmax), s		38.6	* 18	* 48		38.6	* 18	* 48				
Max Q Clear Time (g_c+I1), s		19.2	3.6	17.6		15.9	7.2	24.3				
Green Ext Time (p_c), s		0.4	0.0	3.8		0.7	0.4	1.7				
Intersection Summary												
HCM 6th Ctrl Delay			30.0									
HCM 6th LOS			C									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Capacity Analysis

1: Waugh & W. Dallas

02/14/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	105	26	49	106	107	27	610	55	253	984	62
Future Volume (veh/h)	55	105	26	49	106	107	27	610	55	253	984	62
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	0.99		0.97	0.99		0.99	1.00		0.98	0.99		1.00
Parking Bus Adj	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1841	1841	1841	1811	1811	1811	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	57	108	27	51	109	110	28	629	57	261	1014	64
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	4	4	4	6	6	6	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	121	255	69	104	199	203	107	713	65	921	2393	1062
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.17	0.17	0.17	0.06	0.06	0.06	0.02	0.22	0.22	0.48	0.67	0.67
Unsig. Movement Delay												
Ln Grp Delay, s/veh	53.2	0.0	44.9	54.6	0.0	53.2	41.9	52.2	52.2	17.1	9.5	6.8
Ln Grp LOS	D	A	D	D	A	D	D	D	D	B	A	A
Approach Vol, veh/h		192			270			714			1339	
Approach Delay, s/veh		48.6			54.0			51.8			10.9	
Approach LOS		D			D			D			B	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs			2	3	4		6	8	7			
Case No			8.0	1.2	3.0		8.0	4.0	1.3			
Phs Duration (G+Y+Rc), s			26.2	7.7	86.1		26.2	31.3	62.5			
Change Period (Y+Rc), s			5.4	* 5.3	* 5.3		5.4	* 5.3	* 5.3			
Max Green (Gmax), s			38.6	* 18	* 48		38.6	* 48	* 18			
Max Allow Headway (MAH), s			3.7	3.2	3.5		3.7	3.5	3.2			
Max Q Clear (g_c+I1), s			19.2	3.6	17.6		15.9	24.3	7.2			
Green Ext Time (g_e), s			0.4	0.0	3.8		0.7	1.7	0.4			
Prob of Phs Call (p_c)			1.00	0.61	1.00		1.00	1.00	1.00			
Prob of Max Out (p_x)			0.00	0.00	0.00		0.00	0.00	0.00			
Left-Turn Movement Data												
Assigned Mvmt			5	3			1		7			
Mvmt Sat Flow, veh/h			410	1781			363		1781			
Through Movement Data												
Assigned Mvmt			2		4		6	8				
Mvmt Sat Flow, veh/h			1472		3554		1149	3290				
Right-Turn Movement Data												
Assigned Mvmt			12		14		16	18				
Mvmt Sat Flow, veh/h			400		1577		1174	298				
Left Lane Group Data												
Assigned Mvmt		0	5	3	0	0	1	0	7			
Lane Assignment			L+TL (Pr/Pm)					L+T		L (Pr/Pm)		

HCM 6th Signalized Intersection Capacity Analysis
1: Waugh & W. Dallas

02/14/2022

Lanes in Grp	0	1	1	0	0	1	0	1
Grp Vol (v), veh/h	0	86	28	0	0	141	0	261
Grp Sat Flow (s), veh/h/ln	0	705	1781	0	0	1306	0	1781
Q Serve Time (g_s), s	0.0	6.2	1.6	0.0	0.0	6.7	0.0	5.2
Cycle Q Clear Time (g_c), s	0.0	17.2	1.6	0.0	0.0	13.9	0.0	5.2
Perm LT Sat Flow (s_l), veh/h/ln	0	1173	522	0	0	1264	0	752
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	20.8	20.3	0.0	0.0	20.8	0.0	16.3
Perm LT Serve Time (g_u), s	0.0	9.8	2.6	0.0	0.0	13.6	0.0	1.7
Perm LT Q Serve Time (g_ps), s	0.0	6.2	1.0	0.0	0.0	6.7	0.0	1.7
Time to First Blk (g_f), s	0.0	1.0	0.0	0.0	0.0	3.5	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	1.0	0.0	0.0	0.0	3.5	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	0.67	1.00	0.00	0.00	0.36	0.00	1.00
Lane Grp Cap (c), veh/h	0	172	107	0	0	267	0	921
V/C Ratio (X)	0.00	0.50	0.26	0.00	0.00	0.53	0.00	0.28
Avail Cap (c_a), veh/h	0	366	334	0	0	494	0	921
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	0.67	0.00	1.00
Uniform Delay (d1), s/veh	0.0	51.0	41.5	0.0	0.0	53.6	0.0	17.0
Incr Delay (d2), s/veh	0.0	2.2	0.5	0.0	0.0	1.1	0.0	0.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	53.2	41.9	0.0	0.0	54.6	0.0	17.1
1st-Term Q (Q1), veh/ln	0.0	2.5	0.7	0.0	0.0	4.5	0.0	4.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	2.6	0.7	0.0	0.0	4.5	0.0	4.1
%ile Storage Ratio (RQ%)	0.00	0.20	0.18	0.00	0.00	0.09	0.00	0.69
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	8	0
Lane Assignment				T			T	
Lanes in Grp	0	0	0	2	0	0	1	0
Grp Vol (v), veh/h	0	0	0	1014	0	0	339	0
Grp Sat Flow (s), veh/h/ln	0	0	0	1777	0	0	1777	0
Q Serve Time (g_s), s	0.0	0.0	0.0	15.6	0.0	0.0	22.2	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	15.6	0.0	0.0	22.2	0.0
Lane Grp Cap (c), veh/h	0	0	0	2393	0	0	385	0
V/C Ratio (X)	0.00	0.00	0.00	0.42	0.00	0.00	0.88	0.00
Avail Cap (c_a), veh/h	0	0	0	2393	0	0	706	0
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	9.0	0.0	0.0	45.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.6	0.0	0.0	6.7	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	9.5	0.0	0.0	52.2	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	5.7	0.0	0.0	9.7	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.2	0.0	0.0	0.7	0.0

HCM 6th Signalized Intersection Capacity Analysis

1: Waugh & W. Dallas

02/14/2022

3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	5.8	0.0	0.0	10.5	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.36	0.00	0.00	0.54	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	18	0
Lane Assignment		T+R		R		T+R	T+R	
Lanes in Grp	0	1	0	1	0	1	1	0
Grp Vol (v), veh/h	0	106	0	64	0	129	347	0
Grp Sat Flow (s), veh/h/ln	0	1577	0	1577	0	1380	1811	0
Q Serve Time (g_s), s	0.0	7.2	0.0	1.7	0.0	10.9	22.3	0.0
Cycle Q Clear Time (g_c), s	0.0	7.2	0.0	1.7	0.0	10.9	22.3	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.25	0.00	1.00	0.00	0.85	0.16	0.00
Lane Grp Cap (c), veh/h	0	273	0	1062	0	239	392	0
V/C Ratio (X)	0.00	0.39	0.00	0.06	0.00	0.54	0.88	0.00
Avail Cap (c_a), veh/h	0	507	0	1062	0	444	720	0
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	0.67	1.00	0.00
Uniform Delay (d1), s/veh	0.0	44.0	0.0	6.7	0.0	51.9	45.5	0.0
Incr Delay (d2), s/veh	0.0	0.9	0.0	0.1	0.0	1.3	6.7	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	44.9	0.0	6.8	0.0	53.2	52.2	0.0
1st-Term Q (Q1), veh/ln	0.0	2.8	0.0	0.5	0.0	4.1	10.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.1	0.7	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	2.9	0.0	0.6	0.0	4.2	10.7	0.0
%ile Storage Ratio (RQ%)	0.00	0.22	0.00	0.04	0.00	0.08	0.55	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	30.0
HCM 6th LOS	C

Notes

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

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	48.3	42.3	78.0	78.2
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	4	4	5	6
Number of Right-Turn Islands	0	0	0	0
Type of Control	None	None	None	None
Corresponding Signal Phase	4	8	2	6
Effective Walk Time (s)	0.0	0.0	0.0	0.0
Right Corner Size A (ft)	9.0	9.0	9.0	9.0
Right Corner Size B (ft)	9.0	9.0	9.0	9.0
Right Corner Curb Radius (ft)	0.0	0.0	0.0	0.0
Right Corner Total Area (sq.ft)	81.00	81.00	81.00	81.00
Ped. Left-Right Flow Rate (p/h)	0	0	0	0
Ped. Right-Left Flow Rate (p/h)	0	0	0	0
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	30	30	30	30
Right Corner Area per Ped (sq.ft)	0.0	0.0	0.0	0.0
Right Corner Quality of Service	-	-	-	-
Ped. Circulation Area (sq.ft)	0.0	0.0	0.0	0.0
Crosswalk Circulation Code	-	-	-	-
Pedestrian Delay (s/p)	60.0	60.0	60.0	60.0
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.25	2.32	2.67	2.82
Pedestrian Crosswalk LOS	B	B	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	192	270	714	1339
Effct. Green for Bike (s)	15.1	15.1	70.4	87.4
Cross Street Width (ft)	56.0	66.3	42.1	48.6
Through Lanes Number	2	2	2	2
Through Lane Width (ft)	12.0	10.0	10.0	10.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	No	No	No	No
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	252	252	1173	1457
Bicycle Delay (s/bike)	45.9	45.9	10.3	4.4
Bicycle Compliance	Poor	Poor	Fair	Good
Bicycle LOS Score	2.57	3.23	3.22	3.84
Bicycle LOS	C	C	C	D

Lanes, Volumes, Timings
2: Montrose & W. Dallas

02/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↕	↕↕		↕	↕↕	↕
Traffic Volume (vph)	38	283	107	89	177	126	84	581	47	107	924	51
Future Volume (vph)	38	283	107	89	177	126	84	581	47	107	924	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1500	1400	1500	1500	1400	1500
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	16
Storage Length (ft)	0		0	0		0	100		0	150		100
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (ft)	25			25			100			50		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor		0.99			0.99		1.00	1.00		0.99		0.98
Frt		0.962			0.952			0.989				0.850
Flt Protected		0.996			0.989		0.950			0.950		
Satd. Flow (prot)	0	3228	0	0	3056	0	1397	2573	0	1383	2583	1403
Flt Permitted		0.849			0.534		0.950			0.950		
Satd. Flow (perm)	0	2751	0	0	1649	0	1394	2573	0	1372	2583	1375
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			31			5				181
Link Speed (mph)		30			30			35				35
Link Distance (ft)		1427			896			647				438
Travel Time (s)		32.4			20.4			12.6				8.5
Confl. Peds. (#/hr)	1		4	4		1	2		6	6		2
Confl. Bikes (#/hr)			1						1			1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	3%	3%	3%	7%	7%	7%	2%	2%	2%	3%	3%	3%
Bus Blockages (#/hr)	0	0	5	0	0	6	0	0	3	0	0	0
Adj. Flow (vph)	40	301	114	95	188	134	89	618	50	114	983	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	455	0	0	417	0	89	668	0	114	983	54
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.35	1.46	1.35	1.35	1.46	1.15
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	40	226		40	226		40	226		40	226	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	40	6		40	6		40	6		40	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		220			220			220			220	
Detector 2 Size(ft)		6			6			6			6	

Lanes, Volumes, Timings
 2: Montrose & W. Dallas

02/14/2022

Lane Group	Ø2	Ø3	Ø6	Ø7	Ø8	Ø12	Ø13	Ø14	Ø16	Ø17	Ø18
Lane Configurations											
Traffic Volume (vph)											
Future Volume (vph)											
Ideal Flow (vphpl)											
Lane Width (ft)											
Storage Length (ft)											
Storage Lanes											
Taper Length (ft)											
Lane Util. Factor											
Ped Bike Factor											
Frt											
Flt Protected											
Satd. Flow (prot)											
Flt Permitted											
Satd. Flow (perm)											
Right Turn on Red											
Satd. Flow (RTOR)											
Link Speed (mph)											
Link Distance (ft)											
Travel Time (s)											
Confl. Peds. (#/hr)											
Confl. Bikes (#/hr)											
Peak Hour Factor											
Heavy Vehicles (%)											
Bus Blockages (#/hr)											
Adj. Flow (vph)											
Shared Lane Traffic (%)											
Lane Group Flow (vph)											
Enter Blocked Intersection											
Lane Alignment											
Median Width(ft)											
Link Offset(ft)											
Crosswalk Width(ft)											
Two way Left Turn Lane											
Headway Factor											
Turning Speed (mph)											
Number of Detectors											
Detector Template											
Leading Detector (ft)											
Trailing Detector (ft)											
Detector 1 Position(ft)											
Detector 1 Size(ft)											
Detector 1 Type											
Detector 1 Channel											
Detector 1 Extend (s)											
Detector 1 Queue (s)											
Detector 1 Delay (s)											
Detector 2 Position(ft)											
Detector 2 Size(ft)											

Lanes, Volumes, Timings

2: Montrose & W. Dallas

02/14/2022

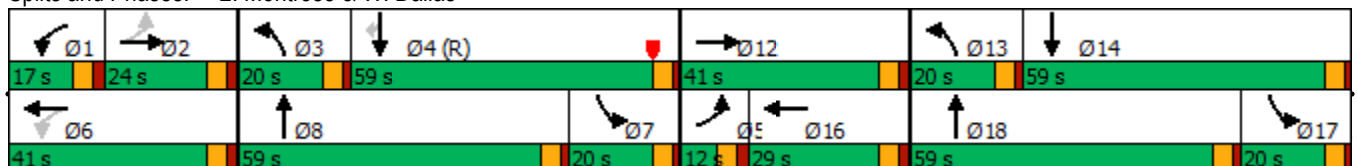


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Detector 2 Type	Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex			
Detector 2 Channel													
Detector 2 Extend (s)	0.0			0.0			0.0			0.0			
Turn Type	custom	NA		custom	NA		Prot	NA		Prot	NA		custom
Protected Phases	5	2 12		1	6 16		3 13	8 18		7 17	4 14		
Permitted Phases	2		6									4	
Detector Phase	5	2 12		1	6 16		3 13	8 18		7 17	4 14		
Switch Phase													
Minimum Initial (s)	5.0			5.0						10.0			
Minimum Split (s)	10.6			10.6						25.1			
Total Split (s)	12.0			17.0						59.0			
Total Split (%)	5.0%			7.1%						24.6%			
Maximum Green (s)	6.4			11.4						53.9			
Yellow Time (s)	3.6			3.6						3.6			
All-Red Time (s)	2.0			2.0						1.5			
Lost Time Adjust (s)	0.0												
Total Lost Time (s)	5.1												
Lead/Lag	Lead			Lead						Lag			
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0			3.0						3.0			
Recall Mode	Max			Max						C-Min			
Walk Time (s)	4.0												
Flash Dont Walk (s)	16.0												
Pedestrian Calls (#/hr)	2												
Act Effct Green (s)	50.0			61.5			24.8	77.2		54.5	106.8		56.2
Actuated g/C Ratio	0.21			0.26			0.10	0.32		0.23	0.44		0.23
v/c Ratio	0.76			0.78			0.62	0.80		0.36	0.85		0.12
Control Delay	60.4			60.3			69.5	44.7		43.2	38.3		0.5
Queue Delay	0.0			0.0			0.0	0.0		0.0	0.0		0.0
Total Delay	60.4			60.3			69.5	44.7		43.2	38.3		0.5
LOS	E			E			E	D		D	D		A
Approach Delay	60.4			60.3			47.7				37.0		
Approach LOS	E			E			D				D		

Intersection Summary

Area Type: Other
 Cycle Length: 240
 Actuated Cycle Length: 240
 Offset: 69 (29%), Referenced to phase 4:SBT, Start of Yellow
 Natural Cycle: 165
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 47.2 Intersection LOS: D
 Intersection Capacity Utilization 109.6% ICU Level of Service H
 Analysis Period (min) 15

Splits and Phases: 2: Montrose & W. Dallas



Lanes, Volumes, Timings
2: Montrose & W. Dallas

02/14/2022

Lane Group	Ø2	Ø3	Ø6	Ø7	Ø8	Ø12	Ø13	Ø14	Ø16	Ø17	Ø18
Detector 2 Type											
Detector 2 Channel											
Detector 2 Extend (s)											
Turn Type											
Protected Phases	2	3	6	7	8	12	13	14	16	17	18
Permitted Phases											
Detector Phase											
Switch Phase											
Minimum Initial (s)	8.0	5.0	8.0	5.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	34.6	10.1	34.6	10.1	25.1	34.6	10.1	25.1	34.6	10.1	25.1
Total Split (s)	24.0	20.0	41.0	20.0	59.0	41.0	20.0	59.0	29.0	20.0	59.0
Total Split (%)	10%	8%	17%	8%	25%	17%	8%	25%	12%	8%	25%
Maximum Green (s)	18.4	14.9	35.4	14.9	53.9	35.4	14.9	53.9	23.4	14.9	53.9
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	2.0	1.5	2.0	1.5	1.5	2.0	1.5	1.5	2.0	1.5	1.5
Lost Time Adjust (s)											
Total Lost Time (s)											
Lead/Lag	Lag	Lead		Lag	Lead		Lead	Lag	Lag	Lag	Lead
Lead-Lag Optimize?											
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Min	Min	None	Min	Min	None	Min
Walk Time (s)	4.0		4.0		4.0	4.0		4.0	4.0		4.0
Flash Dont Walk (s)	25.0		25.0		16.0	25.0		16.0	25.0		16.0
Pedestrian Calls (#/hr)	2		2		2	2		2	2		2
Act Effct Green (s)											
Actuated g/C Ratio											
v/c Ratio											
Control Delay											
Queue Delay											
Total Delay											
LOS											
Approach Delay											
Approach LOS											
Intersection Summary											

Queues

2: Montrose & W. Dallas

02/14/2022



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	455	417	89	668	114	983	54
v/c Ratio	0.76	0.78	0.62	0.80	0.36	0.85	0.12
Control Delay	60.4	60.3	69.5	44.7	43.2	38.3	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.4	60.3	69.5	44.7	43.2	38.3	0.5
Queue Length 50th (ft)	193	174	67	251	74	343	0
Queue Length 95th (ft)	241	#274	102	268	119	397	0
Internal Link Dist (ft)	1347	816		567		358	
Turn Bay Length (ft)			100		150		100
Base Capacity (vph)	596	537	173	1158	313	1187	460
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.78	0.51	0.58	0.36	0.83	0.12

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2: Montrose & W. Dallas

02/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations		↕↕			↕↕		↗	↕↕		↗	↕↕	↗		
Traffic Volume (vph)	38	283	107	89	177	126	84	581	47	107	924	51		
Future Volume (vph)	38	283	107	89	177	126	84	581	47	107	924	51		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1500	1400	1500	1500	1400	1500		
Lane Width	11	11	11	11	11	11	12	12	12	12	12	16		
Total Lost time (s)		7.6			7.1		5.1	5.1		5.1	5.1	5.1		
Lane Util. Factor		0.95			0.95		1.00	0.95		1.00	0.95	1.00		
Frbp, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	0.98		
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	1.00		
Frt		0.96			0.95		1.00	0.99		1.00	1.00	0.85		
Flt Protected		1.00			0.99		0.95	1.00		0.95	1.00	1.00		
Satd. Flow (prot)		3228			3054		1397	2572		1383	2583	1375		
Flt Permitted		0.85			0.53		0.95	1.00		0.95	1.00	1.00		
Satd. Flow (perm)		2752			1649		1397	2572		1383	2583	1375		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94		
Adj. Flow (vph)	40	301	114	95	188	134	89	618	50	114	983	54		
RTOR Reduction (vph)	0	13	0	0	23	0	0	3	0	0	0	41		
Lane Group Flow (vph)	0	442	0	0	394	0	89	665	0	114	983	13		
Confl. Peds. (#/hr)	1		4	4		1	2		6	6		2		
Confl. Bikes (#/hr)			1						1			1		
Heavy Vehicles (%)	3%	3%	3%	7%	7%	7%	2%	2%	2%	3%	3%	3%		
Bus Blockages (#/hr)	0	0	5	0	0	6	0	0	3	0	0	0		
Turn Type	custom	NA		custom	NA		Prot	NA		Prot	NA	custom		
Protected Phases	5	2 12		1	6 16		3 13	8 18		7 17	4 14			
Permitted Phases	2			6								4		
Actuated Green, G (s)		54.0			64.5		24.8	77.2		54.5	106.9	56.2		
Effective Green, g (s)		50.0			61.5		24.8	77.2		54.5	106.9	56.2		
Actuated g/C Ratio		0.21			0.26		0.10	0.32		0.23	0.45	0.23		
Clearance Time (s)												5.1		
Vehicle Extension (s)												3.0		
Lane Grp Cap (vph)		582			513		144	827		314	1150	321		
v/s Ratio Prot		c0.01			c0.05		0.06	c0.26		0.08	c0.38			
v/s Ratio Perm		c0.14			c0.15							0.01		
v/c Ratio		0.76			0.77		0.62	0.80		0.36	0.85	0.04		
Uniform Delay, d1		89.3			82.6		103.1	74.5		78.1	59.6	71.0		
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	1.00		
Incremental Delay, d2		5.4			6.8		7.7	5.7		0.7	6.4	0.2		
Delay (s)		94.5			89.4		110.7	80.2		78.8	66.0	71.3		
Level of Service		F			F		F	F		E	E	E		
Approach Delay (s)		94.5			89.4			83.8			67.5			
Approach LOS		F			F			F			E			
Intersection Summary														
HCM 2000 Control Delay			79.6									HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio			0.87											
Actuated Cycle Length (s)			240.0								46.3			
Intersection Capacity Utilization			109.6%										ICU Level of Service	H
Analysis Period (min)			15											
c Critical Lane Group														

HCM 6th Edition methodology does not support non-NEMA phasing.























HCM 6th Edition methodology does not support non-NEMA phasing.

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	45.3	46.0	60.1	76.0
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	4	4	5	6
Number of Right-Turn Islands	0	0	0	0
Type of Control	None	None	None	None
Corresponding Signal Phase	4	8	2	6
Effective Walk Time (s)	0.0	0.0	0.0	0.0
Right Corner Size A (ft)	9.0	9.0	9.0	9.0
Right Corner Size B (ft)	9.0	9.0	9.0	9.0
Right Corner Curb Radius (ft)	0.0	0.0	0.0	0.0
Right Corner Total Area (sq.ft)	81.00	81.00	81.00	81.00
Ped. Left-Right Flow Rate (p/h)	0	0	0	0
Ped. Right-Left Flow Rate (p/h)	0	0	0	0
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	30	30	35	35
Right Corner Area per Ped (sq.ft)	0.0	0.0	0.0	0.0
Right Corner Quality of Service	-	-	-	-
Ped. Circulation Area (sq.ft)	0.0	0.0	0.0	0.0
Crosswalk Circulation Code	-	-	-	-
Pedestrian Delay (s/p)	120.0	120.0	120.0	120.0
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.37	2.40	2.79	2.87
Pedestrian Crosswalk LOS	B	B	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	455	417	757	1151
Effct. Green for Bike (s)	50.0	61.5	77.2	106.8
Cross Street Width (ft)	60.1	76.0	46.0	45.3
Through Lanes Number	2	2	2	2
Through Lane Width (ft)	11.0	11.0	12.0	12.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	No	No	No	No
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	417	512	643	890
Bicycle Delay (s/bike)	75.2	66.4	55.2	37.0
Bicycle Compliance	Poor	Poor	Poor	Poor
Bicycle LOS Score	3.07	3.28	2.89	3.20
Bicycle LOS	C	C	C	C

Lanes, Volumes, Timings
1: Waugh & W. Dallas

02/16/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	105	26	49	106	107	27	610	55	253	984	62
Future Volume (vph)	55	105	26	49	106	107	27	610	55	253	984	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	12	10	10	12	12	10	10	12	10	10
Storage Length (ft)	150		0	150		0	100		0	150		0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	0.99	1.00		0.99	0.99			1.00		0.99		0.98
Frt		0.970			0.925			0.988				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1620	1764	0	1589	1533	0	1770	3251	0	1770	3303	1478
Flt Permitted	0.950			0.950			0.158			0.374		
Satd. Flow (perm)	1611	1764	0	1576	1533	0	294	3251	0	690	3303	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			39			9				111
Link Speed (mph)		30			30			30				30
Link Distance (ft)		395			1427			536				448
Travel Time (s)		9.0			32.4			12.2				10.2
Confl. Peds. (#/hr)	5		7	7		5	2		11	11		2
Confl. Bikes (#/hr)			2									
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	4%	4%	4%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	2	0	0	6	0	0	0	0	0	0
Adj. Flow (vph)	57	108	27	51	109	110	28	629	57	261	1014	64
Shared Lane Traffic (%)												
Lane Group Flow (vph)	57	135	0	51	219	0	28	686	0	261	1014	64
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.09	1.00	1.00	1.09	1.09	1.00	1.00	1.09	1.09	1.00	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	1
Detector Template	Left			Left			Left			Left		Right
Leading Detector (ft)	40	6		40	6		40	6		40	6	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	40	6		40	6		40	6		40	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Turn Type	Prot	NA		Prot	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	

Lanes, Volumes, Timings
1: Waugh & W. Dallas

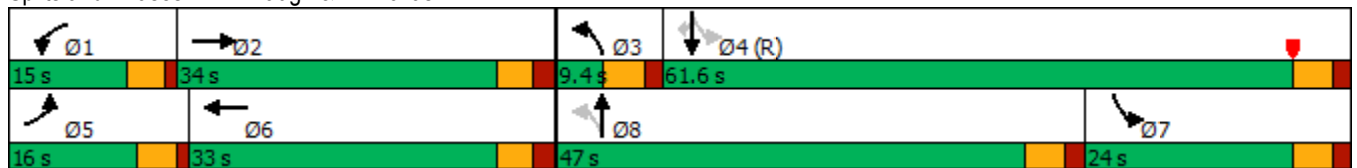
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							8			4		4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		4.0	12.0		4.0	12.0	12.0
Minimum Split (s)	9.5	30.4		9.5	30.4		9.3	30.3		9.3	30.3	30.3
Total Split (s)	16.0	34.0		15.0	33.0		9.4	47.0		24.0	61.6	61.6
Total Split (%)	13.3%	28.3%		12.5%	27.5%		7.8%	39.2%		20.0%	51.3%	51.3%
Maximum Green (s)	11.5	28.6		10.5	27.6		4.1	41.7		18.7	56.3	56.3
Yellow Time (s)	3.5	3.2		3.5	3.2		3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	2.2		1.0	2.2		1.7	1.7		1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	5.4		4.5	5.4		5.3	5.3		5.3	5.3	5.3
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	Min		None	C-Min	C-Min
Walk Time (s)		5.0			5.0			5.0			5.0	5.0
Flash Dont Walk (s)		20.0			20.0			20.0			20.0	20.0
Pedestrian Calls (#/hr)		6			6			7			7	7
Act Effct Green (s)	9.6	20.0		9.2	19.7		57.0	57.0		70.7	70.7	70.7
Actuated g/C Ratio	0.08	0.17		0.08	0.16		0.48	0.48		0.59	0.59	0.59
v/c Ratio	0.44	0.45		0.42	0.77		0.13	0.44		0.48	0.52	0.07
Control Delay	62.5	44.8		57.7	63.0		24.7	24.9		25.9	19.5	0.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	62.5	44.8		57.7	63.0		24.7	24.9		25.9	19.5	0.7
LOS	E	D		E	E		C	C		C	B	A
Approach Delay		50.1			62.0			24.9			19.8	
Approach LOS		D			E			C			B	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 4:SBTL, Start of Yellow
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 28.1 Intersection LOS: C
 Intersection Capacity Utilization 68.3% ICU Level of Service C
 Analysis Period (min) 15
 Description: Waugh at W Dallas

Splits and Phases: 1: Waugh & W. Dallas



Queues

1: Waugh & W. Dallas

02/16/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	57	135	51	219	28	686	261	1014	64
v/c Ratio	0.44	0.45	0.42	0.77	0.13	0.44	0.48	0.52	0.07
Control Delay	62.5	44.8	57.7	63.0	24.7	24.9	25.9	19.5	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.5	44.8	57.7	63.0	24.7	24.9	25.9	19.5	0.7
Queue Length 50th (ft)	43	88	42	152	12	184	105	263	0
Queue Length 95th (ft)	85	140	m61	m184	37	303	201	415	5
Internal Link Dist (ft)		315		1347		456		368	
Turn Bay Length (ft)	150		150		100		150		
Base Capacity (vph)	160	428	146	382	208	1565	597	1972	905
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.32	0.35	0.57	0.13	0.44	0.44	0.51	0.07

Intersection Summary

Description: Waugh at W Dallas

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

HCM Signalized Intersection Capacity Analysis

1: Waugh & W. Dallas

02/16/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	105	26	49	106	107	27	610	55	253	984	62
Future Volume (vph)	55	105	26	49	106	107	27	610	55	253	984	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	10	12	12	10	10	12	10	10
Total Lost time (s)	4.5	5.4		4.5	5.4		5.3	5.3		5.3	5.3	5.3
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.92		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1620	1763		1589	1532		1769	3250		1764	3303	1441
Flt Permitted	0.95	1.00		0.95	1.00		0.16	1.00		0.37	1.00	1.00
Satd. Flow (perm)	1620	1763		1589	1532		294	3250		694	3303	1441
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	57	108	27	51	109	110	28	629	57	261	1014	64
RTOR Reduction (vph)	0	8	0	0	33	0	0	5	0	0	0	28
Lane Group Flow (vph)	57	127	0	51	186	0	28	681	0	261	1014	36
Confl. Peds. (#/hr)	5		7	7		5	2		11	11		2
Confl. Bikes (#/hr)			2									
Heavy Vehicles (%)	4%	4%	4%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	2	0	0	6	0	0	0	0	0	0
Turn Type	Prot	NA		Prot	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases							8			4		4
Actuated Green, G (s)	8.4	20.0		8.1	19.7		53.9	53.9		67.6	67.6	67.6
Effective Green, g (s)	8.4	20.0		8.1	19.7		53.9	53.9		67.6	67.6	67.6
Actuated g/C Ratio	0.07	0.17		0.07	0.16		0.45	0.45		0.56	0.56	0.56
Clearance Time (s)	4.5	5.4		4.5	5.4		5.3	5.3		5.3	5.3	5.3
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)	113	293		107	251		178	1459		546	1860	811
v/s Ratio Prot	c0.04	0.07		0.03	c0.12		0.00	c0.21		0.07	c0.31	
v/s Ratio Perm							0.07			0.20		0.03
v/c Ratio	0.50	0.43		0.48	0.74		0.16	0.47		0.48	0.55	0.04
Uniform Delay, d1	53.8	44.9		53.9	47.7		20.6	23.0		19.4	16.5	11.7
Progression Factor	1.00	1.00		0.96	1.26		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.5	1.0		2.6	8.8		0.2	0.2		0.2	1.2	0.1
Delay (s)	57.3	45.9		54.1	69.2		20.8	23.3		19.6	17.7	11.8
Level of Service	E	D		D	E		C	C		B	B	B
Approach Delay (s)		49.3			66.3			23.2			17.8	
Approach LOS		D			E			C			B	

Intersection Summary

HCM 2000 Control Delay	26.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		

Description: Waugh at W Dallas

c Critical Lane Group

HCM 6th Signalized Intersection Summary

1: Waugh & W. Dallas

02/16/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	105	26	49	106	107	27	610	55	253	984	62
Future Volume (veh/h)	55	105	26	49	106	107	27	610	55	253	984	62
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		0.97	0.99		0.99
Parking Bus, Adj	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1811	1811	1811	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	57	108	27	51	109	110	28	629	57	261	1014	64
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	4	4	4	6	6	6	2	2	2	2	2	2
Cap, veh/h	73	238	59	65	133	134	96	711	64	792	2136	944
Arrive On Green	0.04	0.17	0.17	0.01	0.05	0.05	0.02	0.22	0.22	0.41	0.60	0.60
Sat Flow, veh/h	1753	1401	350	1725	801	809	1781	3287	297	1781	3554	1571
Grp Volume(v), veh/h	57	0	135	51	0	219	28	340	346	261	1014	64
Grp Sat Flow(s),veh/h/ln	1753	0	1752	1725	0	1610	1781	1777	1808	1781	1777	1571
Q Serve(g_s), s	3.9	0.0	8.3	3.5	0.0	16.2	1.6	22.2	22.3	6.7	19.1	2.0
Cycle Q Clear(g_c), s	3.9	0.0	8.3	3.5	0.0	16.2	1.6	22.2	22.3	6.7	19.1	2.0
Prop In Lane	1.00		0.20	1.00		0.50	1.00		0.16	1.00		1.00
Lane Grp Cap(c), veh/h	73	0	297	65	0	267	96	384	391	792	2136	944
V/C Ratio(X)	0.78	0.00	0.45	0.78	0.00	0.82	0.29	0.88	0.89	0.33	0.47	0.07
Avail Cap(c_a), veh/h	168	0	417	151	0	370	121	617	628	792	2136	944
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.53	0.00	0.53	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.9	0.0	44.8	58.7	0.0	54.9	41.8	45.5	45.6	22.3	13.4	9.9
Incr Delay (d2), s/veh	15.9	0.0	1.1	10.1	0.0	5.5	0.6	8.9	9.0	0.1	0.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.0	3.7	1.8	0.0	7.4	0.7	10.7	10.9	4.8	7.6	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	72.8	0.0	45.9	68.8	0.0	60.4	42.4	54.5	54.6	22.4	14.1	10.1
LnGrp LOS	E	A	D	E	A	E	D	D	D	C	B	B
Approach Vol, veh/h		192			270			714			1339	
Approach Delay, s/veh		53.9			62.0			54.0			15.5	
Approach LOS		D			E			D			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.1	25.8	7.7	77.4	9.5	25.3	53.9	31.3				
Change Period (Y+Rc), s	4.5	5.4	* 5.3	* 5.3	4.5	5.4	* 5.3	* 5.3				
Max Green Setting (Gmax), s	10.5	28.6	* 4.1	* 56	11.5	27.6	* 19	* 42				
Max Q Clear Time (g_c+I1), s	5.5	10.3	3.6	21.1	5.9	18.2	8.7	24.3				
Green Ext Time (p_c), s	0.0	0.3	0.0	3.9	0.0	0.4	0.4	1.7				

Intersection Summary

HCM 6th Ctrl Delay	34.4
HCM 6th LOS	C

Notes

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

HCM 6th Signalized Intersection Capacity Analysis

1: Waugh & W. Dallas

02/16/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	105	26	49	106	107	27	610	55	253	984	62
Future Volume (veh/h)	55	105	26	49	106	107	27	610	55	253	984	62
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		0.97	1.00		0.99	1.00		0.97	0.99		0.99
Parking Bus Adj	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1841	1841	1841	1811	1811	1811	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	57	108	27	51	109	110	28	629	57	261	1014	64
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	4	4	4	6	6	6	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	73	238	59	65	133	134	96	711	64	792	2136	944
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.04	0.17	0.17	0.01	0.05	0.05	0.02	0.22	0.22	0.41	0.60	0.60
Unsig. Movement Delay												
Ln Grp Delay, s/veh	72.8	0.0	45.9	68.8	0.0	60.4	42.4	54.5	54.6	22.4	14.1	10.1
Ln Grp LOS	E	A	D	E	A	E	D	D	D	C	B	B
Approach Vol, veh/h		192			270			714			1339	
Approach Delay, s/veh		53.9			62.0			54.0			15.5	
Approach LOS		D			E			D			B	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		1	2	3	4	5	6	8	7			
Case No		2.0	4.0	1.2	3.0	2.0	4.0	4.0	1.3			
Phs Duration (G+Y+Rc), s		9.1	25.8	7.7	77.4	9.5	25.3	31.3	53.9			
Change Period (Y+Rc), s		4.5	5.4	* 5.3	* 5.3	4.5	5.4	* 5.3	* 5.3			
Max Green (Gmax), s		10.5	28.6	* 4.1	* 56	11.5	27.6	* 42	* 19			
Max Allow Headway (MAH), s		4.2	3.5	3.2	3.5	4.2	3.6	3.5	3.2			
Max Q Clear (g_c+I1), s		5.5	10.3	3.6	21.1	5.9	18.2	24.3	8.7			
Green Ext Time (g_e), s		0.0	0.3	0.0	3.9	0.0	0.4	1.7	0.4			
Prob of Phs Call (p_c)		0.82	1.00	0.61	1.00	0.85	1.00	1.00	1.00			
Prob of Max Out (p_x)		0.40	0.00	1.00	0.00	0.19	0.01	0.00	0.00			
Left-Turn Movement Data												
Assigned Mvmt		1		3		5					7	
Mvmt Sat Flow, veh/h		1725		1781		1753					1781	
Through Movement Data												
Assigned Mvmt			2		4		6	8				
Mvmt Sat Flow, veh/h			1401		3554		801	3287				
Right-Turn Movement Data												
Assigned Mvmt			12		14		16	18				
Mvmt Sat Flow, veh/h			350		1571		809	297				
Left Lane Group Data												
Assigned Mvmt		1	0	3	0	5	0	0	7			
Lane Assignment		L (Prot)		L (Pr/Pm)		L (Prot)			L (Pr/Pm)			

HCM 6th Signalized Intersection Capacity Analysis

1: Waugh & W. Dallas

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Lanes in Grp	1	0	1	0	1	0	0	1
Grp Vol (v), veh/h	51	0	28	0	57	0	0	261
Grp Sat Flow (s), veh/h/ln	1725	0	1781	0	1753	0	0	1781
Q Serve Time (g_s), s	3.5	0.0	1.6	0.0	3.9	0.0	0.0	6.7
Cycle Q Clear Time (g_c), s	3.5	0.0	1.6	0.0	3.9	0.0	0.0	6.7
Perm LT Sat Flow (s_l), veh/h/ln	0	0	523	0	0	0	0	749
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	20.2	0.0	0.0	0.0	0.0	16.2
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	65	0	96	0	73	0	0	792
V/C Ratio (X)	0.78	0.00	0.29	0.00	0.78	0.00	0.00	0.33
Avail Cap (c_a), veh/h	151	0	121	0	168	0	0	792
Upstream Filter (I)	0.53	0.00	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	58.7	0.0	41.8	0.0	56.9	0.0	0.0	22.3
Incr Delay (d2), s/veh	10.1	0.0	0.6	0.0	15.9	0.0	0.0	0.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	68.8	0.0	42.4	0.0	72.8	0.0	0.0	22.4
1st-Term Q (Q1), veh/ln	1.6	0.0	0.7	0.0	1.7	0.0	0.0	4.8
2nd-Term Q (Q2), veh/ln	0.2	0.0	0.0	0.0	0.3	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	1.8	0.0	0.7	0.0	2.0	0.0	0.0	4.8
%ile Storage Ratio (RQ%)	0.31	0.00	0.18	0.00	0.35	0.00	0.00	0.81
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	8	0
Lane Assignment				T			T	
Lanes in Grp	0	0	0	2	0	0	1	0
Grp Vol (v), veh/h	0	0	0	1014	0	0	340	0
Grp Sat Flow (s), veh/h/ln	0	0	0	1777	0	0	1777	0
Q Serve Time (g_s), s	0.0	0.0	0.0	19.1	0.0	0.0	22.2	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	19.1	0.0	0.0	22.2	0.0
Lane Grp Cap (c), veh/h	0	0	0	2136	0	0	384	0
V/C Ratio (X)	0.00	0.00	0.00	0.47	0.00	0.00	0.88	0.00
Avail Cap (c_a), veh/h	0	0	0	2136	0	0	617	0
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	13.4	0.0	0.0	45.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.8	0.0	0.0	8.9	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	14.1	0.0	0.0	54.5	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	7.4	0.0	0.0	9.8	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.2	0.0	0.0	1.0	0.0

HCM 6th Signalized Intersection Capacity Analysis

1: Waugh & W. Dallas

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	7.6	0.0	0.0	10.7	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.47	0.00	0.00	0.54	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	18	0
Lane Assignment		T+R		R		T+R	T+R	
Lanes in Grp	0	1	0	1	0	1	1	0
Grp Vol (v), veh/h	0	135	0	64	0	219	346	0
Grp Sat Flow (s), veh/h/ln	0	1752	0	1571	0	1610	1808	0
Q Serve Time (g_s), s	0.0	8.3	0.0	2.0	0.0	16.2	22.3	0.0
Cycle Q Clear Time (g_c), s	0.0	8.3	0.0	2.0	0.0	16.2	22.3	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.20	0.00	1.00	0.00	0.50	0.16	0.00
Lane Grp Cap (c), veh/h	0	297	0	944	0	267	391	0
V/C Ratio (X)	0.00	0.45	0.00	0.07	0.00	0.82	0.89	0.00
Avail Cap (c_a), veh/h	0	417	0	944	0	370	628	0
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	0.53	1.00	0.00
Uniform Delay (d1), s/veh	0.0	44.8	0.0	9.9	0.0	54.9	45.6	0.0
Incr Delay (d2), s/veh	0.0	1.1	0.0	0.1	0.0	5.5	9.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	45.9	0.0	10.1	0.0	60.4	54.6	0.0
1st-Term Q (Q1), veh/ln	0.0	3.6	0.0	0.7	0.0	7.0	10.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.4	1.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	3.7	0.0	0.7	0.0	7.4	10.9	0.0
%ile Storage Ratio (RQ%)	0.00	0.28	0.00	0.04	0.00	0.15	0.55	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	34.4
HCM 6th LOS	C

Notes

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

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	48.3	42.3	78.0	78.2
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	3	3	5	6
Number of Right-Turn Islands	0	0	0	0
Type of Control	None	None	None	None
Corresponding Signal Phase	4	8	2	6
Effective Walk Time (s)	0.0	0.0	0.0	0.0
Right Corner Size A (ft)	9.0	9.0	9.0	9.0
Right Corner Size B (ft)	9.0	9.0	9.0	9.0
Right Corner Curb Radius (ft)	0.0	0.0	0.0	0.0
Right Corner Total Area (sq.ft)	81.00	81.00	81.00	81.00
Ped. Left-Right Flow Rate (p/h)	0	0	0	0
Ped. Right-Left Flow Rate (p/h)	0	0	0	0
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	30	30	30	30
Right Corner Area per Ped (sq.ft)	0.0	0.0	0.0	0.0
Right Corner Quality of Service	-	-	-	-
Ped. Circulation Area (sq.ft)	0.0	0.0	0.0	0.0
Crosswalk Circulation Code	-	-	-	-
Pedestrian Delay (s/p)	60.0	60.0	60.0	60.0
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.09	2.19	2.67	2.82
Pedestrian Crosswalk LOS	B	B	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	192	270	714	1339
Effct. Green for Bike (s)	20.0	19.7	57.0	70.7
Cross Street Width (ft)	56.0	66.1	32.2	35.5
Through Lanes Number	1	1	2	2
Through Lane Width (ft)	12.0	10.0	10.0	10.0
Bicycle Lane Width (ft)	5.0	5.0	0.0	0.0
Striped Parking Lane Width (ft)	2.0	2.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	No	No	No	No
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	333	328	950	1178
Bicycle Delay (s/bike)	41.7	41.9	16.5	10.1
Bicycle Compliance	Poor	Poor	Fair	Fair
Bicycle LOS Score	1.23	1.94	3.07	3.64
Bicycle LOS	A	B	C	D

Lanes, Volumes, Timings
2: Montrose & W. Dallas

02/16/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	283	107	89	177	126	84	581	47	107	924	51
Future Volume (vph)	38	283	107	89	177	126	84	581	47	107	924	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1500	1400	1500	1500	1400	1500
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	16
Storage Length (ft)	150		0	150		0	100		0	150		100
Storage Lanes	1		0	0		0	1		0	1		1
Taper Length (ft)	75			75			100			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00	1.00		1.00	0.99		1.00	1.00		1.00		0.97
Frt		0.959			0.938			0.989				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1694	1702	0	1631	1601	0	1397	2575	0	1383	2583	1403
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1693	1702	0	1626	1601	0	1395	2575	0	1378	2583	1365
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			30			8				172
Link Speed (mph)		30			30			35				35
Link Distance (ft)		1427			896			647				438
Travel Time (s)		32.4			20.4			12.6				8.5
Confl. Peds. (#/hr)	1		4	4		1	2		6	6		2
Confl. Bikes (#/hr)			1						1			1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	3%	3%	3%	7%	7%	7%	2%	2%	2%	3%	3%	3%
Bus Blockages (#/hr)	0	0	5	0	0	6	0	0	3	0	0	0
Adj. Flow (vph)	40	301	114	95	188	134	89	618	50	114	983	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	415	0	95	322	0	89	668	0	114	983	54
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.35	1.46	1.35	1.35	1.46	1.15
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	40	226		40	226		40	226		40	226	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	40	6		40	6		40	6		40	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		220			220			220			220	
Detector 2 Size(ft)		6			6			6			6	

Lanes, Volumes, Timings

2: Montrose & W. Dallas

02/16/2022

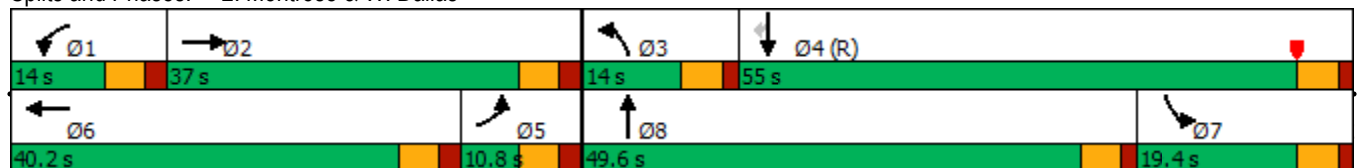


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Type	Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												4
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	8.0		5.0	8.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	10.6	34.6		10.6	34.6		10.1	25.1		10.1	25.1	
Total Split (s)	10.8	37.0		14.0	40.2		14.0	49.6		19.4	55.0	
Total Split (%)	9.0%	30.8%		11.7%	33.5%		11.7%	41.3%		16.2%	45.8%	
Maximum Green (s)	5.2	31.4		8.4	34.6		8.9	44.5		14.3	49.9	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	2.0		0.0	1.5		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.6	7.6		5.6	7.1		5.1	5.1		5.1	5.1	
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	None		Max	None		None	Min		None	C-Min	C-Min
Walk Time (s)	4.0		4.0		4.0		4.0		4.0		4.0	
Flash Dont Walk (s)	25.0		25.0		16.0		16.0		16.0		16.0	
Pedestrian Calls (#/hr)	2		2		2		2		2		2	
Act Effct Green (s)	13.0	29.4		9.0	25.9		8.9	38.3		19.9	49.3	
Actuated g/C Ratio	0.11	0.24		0.08	0.22		0.07	0.32		0.17	0.41	
v/c Ratio	0.22	0.97		0.78	0.88		0.86	0.81		0.50	0.93	
Control Delay	60.3	80.8		93.2	64.3		113.0	44.9		56.0	48.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	60.3	80.8		93.2	64.3		113.0	44.9		56.0	48.8	
LOS	E	F		F	E		F	D		E	D	
Approach Delay	79.0		70.9		52.9		47.3					
Approach LOS	E		E		D		D					

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 4:SBT, Start of Yellow
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.97
 Intersection Signal Delay: 57.5
 Intersection LOS: E
 Intersection Capacity Utilization 89.2%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 2: Montrose & W. Dallas



Queues

2: Montrose & W. Dallas

02/16/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	40	415	95	322	89	668	114	983	54
v/c Ratio	0.22	0.97	0.78	0.88	0.86	0.81	0.50	0.93	0.08
Control Delay	60.3	80.8	93.2	64.3	113.0	44.9	56.0	48.8	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.3	80.8	93.2	64.3	113.0	44.9	56.0	48.8	0.2
Queue Length 50th (ft)	32	330	74	220	69	243	82	372	0
Queue Length 95th (ft)	#85	#532	#174	312	#170	297	#172	#510	0
Internal Link Dist (ft)		1347		816		567		358	
Turn Bay Length (ft)	150		150		100		150		100
Base Capacity (vph)	183	428	122	463	103	959	228	1074	668
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.97	0.78	0.70	0.86	0.70	0.50	0.92	0.08

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2: Montrose & W. Dallas

02/16/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↕		↖	↗	↖
Traffic Volume (vph)	38	283	107	89	177	126	84	581	47	107	924	51
Future Volume (vph)	38	283	107	89	177	126	84	581	47	107	924	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1500	1400	1500	1500	1400	1500
Lane Width	11	11	11	11	11	11	12	12	12	12	12	16
Total Lost time (s)	5.6	7.6		5.6	7.1		5.1	5.1		5.1	5.1	5.1
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.96		1.00	0.94		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1694	1701		1631	1601		1397	2574		1383	2583	1365
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1694	1701		1631	1601		1397	2574		1383	2583	1365
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	40	301	114	95	188	134	89	618	50	114	983	54
RTOR Reduction (vph)	0	11	0	0	24	0	0	5	0	0	0	32
Lane Group Flow (vph)	40	404	0	95	298	0	89	663	0	114	983	22
Confl. Peds. (#/hr)	1		4	4		1	2		6	6		2
Confl. Bikes (#/hr)			1						1			1
Heavy Vehicles (%)	3%	3%	3%	7%	7%	7%	2%	2%	2%	3%	3%	3%
Bus Blockages (#/hr)	0	0	5	0	0	6	0	0	3	0	0	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												4
Actuated Green, G (s)	13.0	31.4		9.0	27.4		8.9	38.3		19.9	49.3	49.3
Effective Green, g (s)	13.0	29.4		9.0	25.9		8.9	38.3		19.9	49.3	49.3
Actuated g/C Ratio	0.11	0.24		0.08	0.22		0.07	0.32		0.17	0.41	0.41
Clearance Time (s)	5.6	5.6		5.6	5.6		5.1	5.1		5.1	5.1	5.1
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	183	416		122	345		103	821		229	1061	560
v/s Ratio Prot	0.02	c0.24		0.06	c0.19		0.06	c0.26		0.08	c0.38	
v/s Ratio Perm												0.02
v/c Ratio	0.22	0.97		0.78	0.87		0.86	0.81		0.50	0.93	0.04
Uniform Delay, d1	48.9	44.9		54.5	45.4		55.0	37.5		45.5	33.6	21.2
Progression Factor	1.07	1.04		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.6	35.0		37.7	19.6		48.2	5.8		1.7	14.8	0.1
Delay (s)	55.0	81.9		92.2	65.0		103.2	43.3		47.2	48.4	21.3
Level of Service	E	F		F	E		F	D		D	D	C
Approach Delay (s)		79.5			71.2			50.3			47.0	
Approach LOS		E			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			56.9									E
HCM 2000 Volume to Capacity ratio			0.97									
Actuated Cycle Length (s)			120.0						23.4			
Intersection Capacity Utilization			89.2%									E
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

2: Montrose & W. Dallas

02/16/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↕		↖	↗	↗
Traffic Volume (veh/h)	38	283	107	89	177	126	84	581	47	107	924	51
Future Volume (veh/h)	38	283	107	89	177	126	84	581	47	107	924	51
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1796	1796	1796	1477	1378	1477	1465	1367	1524
Adj Flow Rate, veh/h	40	301	114	95	188	134	89	618	50	114	983	54
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3	7	7	7	2	2	2	3	3	3
Cap, veh/h	173	303	115	120	208	148	104	742	60	262	1087	525
Arrive On Green	0.03	0.08	0.09	0.07	0.22	0.23	0.07	0.30	0.30	0.19	0.42	0.42
Sat Flow, veh/h	1767	1250	473	1711	950	677	1406	2434	197	1395	2598	1255
Grp Volume(v), veh/h	40	0	415	95	0	322	89	332	336	114	983	54
Grp Sat Flow(s),veh/h/ln	1767	0	1723	1711	0	1627	1406	1309	1322	1395	1299	1255
Q Serve(g_s), s	2.6	0.0	28.9	6.6	0.0	23.1	7.5	28.3	28.4	8.7	42.5	2.1
Cycle Q Clear(g_c), s	2.6	0.0	28.9	6.6	0.0	23.1	7.5	28.3	28.4	8.7	42.5	2.1
Prop In Lane	1.00		0.27	1.00		0.42	1.00		0.15	1.00		1.00
Lane Grp Cap(c), veh/h	173	0	418	120	0	356	104	399	403	262	1087	525
V/C Ratio(X)	0.23	0.00	0.99	0.79	0.00	0.91	0.85	0.83	0.83	0.44	0.90	0.10
Avail Cap(c_a), veh/h	173	0	422	120	0	449	104	486	490	262	1087	525
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.88	0.00	0.88	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.6	0.0	55.0	54.9	0.0	45.4	54.9	38.8	38.9	43.1	32.7	9.8
Incr Delay (d2), s/veh	2.7	0.0	39.0	40.3	0.0	18.7	45.7	9.9	10.0	1.1	12.2	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	17.9	4.2	0.0	11.1	4.0	10.0	10.2	3.1	14.7	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.4	0.0	94.0	95.2	0.0	64.1	100.6	48.8	48.9	44.3	44.9	10.1
LnGrp LOS	E	A	F	F	A	E	F	D	D	D	D	B
Approach Vol, veh/h		455			417			757				1151
Approach Delay, s/veh		90.7			71.2			54.9				43.2
Approach LOS		F			E			D				D
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.0	36.7	14.0	55.3	17.4	33.3	27.6	41.7				
Change Period (Y+Rc), s	5.6	5.6	5.1	5.1	5.6	5.6	5.1	5.1				
Max Green Setting (Gmax), s	8.4	31.4	8.9	49.9	5.2	34.6	14.3	44.5				
Max Q Clear Time (g_c+I1), s	8.6	30.9	9.5	44.5	4.6	25.1	10.7	30.4				
Green Ext Time (p_c), s	0.0	0.2	0.0	4.1	0.0	2.4	0.1	6.1				
Intersection Summary												
HCM 6th Ctrl Delay			58.4									
HCM 6th LOS			E									

HCM 6th Signalized Intersection Capacity Analysis
2: Montrose & W. Dallas

02/16/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	283	107	89	177	126	84	581	47	107	924	51
Future Volume (veh/h)	38	283	107	89	177	126	84	581	47	107	924	51
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		0.98	1.00		0.99	1.00		0.98	1.00		0.97
Parking Bus Adj	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1856	1856	1856	1796	1796	1796	1477	1378	1477	1465	1367	1524
Adj Flow Rate, veh/h	40	301	114	95	188	134	89	618	50	114	983	54
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3	7	7	7	2	2	2	3	3	3
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	173	303	115	120	208	148	104	742	60	262	1087	525
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.03	0.08	0.09	0.07	0.22	0.23	0.07	0.30	0.30	0.19	0.42	0.42
Unsig. Movement Delay												
Ln Grp Delay, s/veh	56.4	0.0	94.0	95.2	0.0	64.1	100.6	48.8	48.9	44.3	44.9	10.1
Ln Grp LOS	E	A	F	F	A	E	F	D	D	D	D	B
Approach Vol, veh/h		455			417			757			1151	
Approach Delay, s/veh		90.7			71.2			54.9			43.2	
Approach LOS		F			E			D			D	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		1	2	3	4	6	5	8	7			
Case No		2.0	4.0	2.0	3.0	4.0	2.0	4.0	2.0			
Phs Duration (G+Y+Rc), s		14.0	36.7	14.0	55.3	33.3	17.4	41.7	27.6			
Change Period (Y+Rc), s		5.6	5.6	5.1	5.1	5.6	5.6	5.1	5.1			
Max Green (Gmax), s		8.4	31.4	8.9	49.9	34.6	5.2	44.5	14.3			
Max Allow Headway (MAH), s		4.2	7.8	4.1	7.2	7.8	4.2	7.4	4.1			
Max Q Clear (g_c+I1), s		8.6	30.9	9.5	44.5	25.1	4.6	30.4	10.7			
Green Ext Time (g_e), s		0.0	0.2	0.0	4.1	2.4	0.0	6.1	0.1			
Prob of Phs Call (p_c)		1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.98			
Prob of Max Out (p_x)		0.00	1.00	1.00	1.00	0.74	0.00	0.55	1.00			
Left-Turn Movement Data												
Assigned Mvmt		1		3			5		7			
Mvmt Sat Flow, veh/h		1711		1406			1767		1395			
Through Movement Data												
Assigned Mvmt			2		4	6		8				
Mvmt Sat Flow, veh/h			1250		2598	950		2434				
Right-Turn Movement Data												
Assigned Mvmt			12		14	16		18				
Mvmt Sat Flow, veh/h			473		1255	677		197				
Left Lane Group Data												
Assigned Mvmt		1	0	3	0	0	5	0	7			
Lane Assignment		L (Prot)		L (Prot)			L (Prot)		L (Prot)			

HCM 6th Signalized Intersection Capacity Analysis

2: Montrose & W. Dallas

02/16/2022

Lanes in Grp	1	0	1	0	0	1	0	1
Grp Vol (v), veh/h	95	0	89	0	0	40	0	114
Grp Sat Flow (s), veh/h/ln	1711	0	1406	0	0	1767	0	1395
Q Serve Time (g_s), s	6.6	0.0	7.5	0.0	0.0	2.6	0.0	8.7
Cycle Q Clear Time (g_c), s	6.6	0.0	7.5	0.0	0.0	2.6	0.0	8.7
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	120	0	104	0	0	173	0	262
V/C Ratio (X)	0.79	0.00	0.85	0.00	0.00	0.23	0.00	0.44
Avail Cap (c_a), veh/h	120	0	104	0	0	173	0	262
Upstream Filter (I)	1.00	0.00	1.00	0.00	0.00	0.88	0.00	1.00
Uniform Delay (d1), s/veh	54.9	0.0	54.9	0.0	0.0	53.6	0.0	43.1
Incr Delay (d2), s/veh	40.3	0.0	45.7	0.0	0.0	2.7	0.0	1.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	95.2	0.0	100.6	0.0	0.0	56.4	0.0	44.3
1st-Term Q (Q1), veh/ln	2.8	0.0	2.6	0.0	0.0	1.2	0.0	3.0
2nd-Term Q (Q2), veh/ln	1.3	0.0	1.3	0.0	0.0	0.1	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	4.2	0.0	4.0	0.0	0.0	1.3	0.0	3.1
%ile Storage Ratio (RQ%)	0.13	0.00	1.01	0.00	0.00	0.23	0.00	0.52
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	6	0	8	0
Lane Assignment				T			T	
Lanes in Grp	0	0	0	2	0	0	1	0
Grp Vol (v), veh/h	0	0	0	983	0	0	332	0
Grp Sat Flow (s), veh/h/ln	0	0	0	1299	0	0	1309	0
Q Serve Time (g_s), s	0.0	0.0	0.0	42.5	0.0	0.0	28.3	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	42.5	0.0	0.0	28.3	0.0
Lane Grp Cap (c), veh/h	0	0	0	1087	0	0	399	0
V/C Ratio (X)	0.00	0.00	0.00	0.90	0.00	0.00	0.83	0.00
Avail Cap (c_a), veh/h	0	0	0	1087	0	0	486	0
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	32.7	0.0	0.0	38.8	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	12.2	0.0	0.0	9.9	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	44.9	0.0	0.0	48.8	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	12.9	0.0	0.0	8.9	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	1.8	0.0	0.0	1.1	0.0

HCM 6th Signalized Intersection Capacity Analysis 2: Montrose & W. Dallas

02/16/2022

3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	14.7	0.0	0.0	10.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.93	0.00	0.00	0.42	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	16	0	18	0
Lane Assignment		T+R		R	T+R		T+R	
Lanes in Grp	0	1	0	1	1	0	1	0
Grp Vol (v), veh/h	0	415	0	54	322	0	336	0
Grp Sat Flow (s), veh/h/ln	0	1723	0	1255	1627	0	1322	0
Q Serve Time (g_s), s	0.0	28.9	0.0	2.1	23.1	0.0	28.4	0.0
Cycle Q Clear Time (g_c), s	0.0	28.9	0.0	2.1	23.1	0.0	28.4	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.27	0.00	1.00	0.42	0.00	0.15	0.00
Lane Grp Cap (c), veh/h	0	418	0	525	356	0	403	0
V/C Ratio (X)	0.00	0.99	0.00	0.10	0.91	0.00	0.83	0.00
Avail Cap (c_a), veh/h	0	422	0	525	449	0	490	0
Upstream Filter (I)	0.00	0.88	0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	55.0	0.0	9.8	45.4	0.0	38.9	0.0
Incr Delay (d2), s/veh	0.0	39.0	0.0	0.4	18.7	0.0	10.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	94.0	0.0	10.1	64.1	0.0	48.9	0.0
1st-Term Q (Q1), veh/ln	0.0	13.4	0.0	0.9	9.2	0.0	9.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	4.5	0.0	0.1	1.8	0.0	1.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	17.9	0.0	1.0	11.1	0.0	10.2	0.0
%ile Storage Ratio (RQ%)	0.00	0.35	0.00	0.25	0.35	0.00	0.43	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary























HCM 6th Ctrl Delay	58.4
HCM 6th LOS	E

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	45.3	46.0	60.1	76.0
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	3	4	5	6
Number of Right-Turn Islands	0	0	0	0
Type of Control	None	None	None	None
Corresponding Signal Phase	4	8	2	6
Effective Walk Time (s)	0.0	0.0	0.0	0.0
Right Corner Size A (ft)	9.0	9.0	9.0	9.0
Right Corner Size B (ft)	9.0	9.0	9.0	9.0
Right Corner Curb Radius (ft)	0.0	0.0	0.0	0.0
Right Corner Total Area (sq.ft)	81.00	81.00	81.00	81.00
Ped. Left-Right Flow Rate (p/h)	0	0	0	0
Ped. Right-Left Flow Rate (p/h)	0	0	0	0
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	30	30	35	35
Right Corner Area per Ped (sq.ft)	0.0	0.0	0.0	0.0
Right Corner Quality of Service	-	-	-	-
Ped. Circulation Area (sq.ft)	0.0	0.0	0.0	0.0
Crosswalk Circulation Code	-	-	-	-
Pedestrian Delay (s/p)	60.0	60.0	60.0	60.0
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.22	2.37	2.76	2.84
Pedestrian Crosswalk LOS	B	B	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	455	417	757	1151
Effct. Green for Bike (s)	29.4	25.9	38.3	49.3
Cross Street Width (ft)	61.7	76.0	46.0	36.2
Through Lanes Number	1	1	2	2
Through Lane Width (ft)	11.0	11.0	12.0	12.0
Bicycle Lane Width (ft)	5.0	5.0	0.0	0.0
Striped Parking Lane Width (ft)	2.0	2.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	Yes	Yes	Yes	Yes
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	490	432	638	822
Bicycle Delay (s/bike)	34.2	36.9	27.8	20.8
Bicycle Compliance	Poor	Poor	Fair	Fair
Bicycle LOS Score	1.97	2.12	2.89	3.06
Bicycle LOS	B	B	C	C

Lanes, Volumes, Timings
1: Waugh & W. Dallas

02/16/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	105	26	49	106	107	27	610	55	253	984	62
Future Volume (vph)	55	105	26	49	106	107	27	610	55	253	984	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	12	10	10	12	12	10	10	12	10	10
Storage Length (ft)	150		0	0		0	100		0	150		0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00	1.00		0.99	0.99			1.00		0.99		0.98
Frt		0.970			0.925			0.988				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1620	1764	0	1589	1533	0	1770	3256	0	1770	3303	1478
Flt Permitted	0.350			0.576			0.205			0.391		
Satd. Flow (perm)	594	1764	0	956	1533	0	382	3256	0	724	3303	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			45			9				70
Link Speed (mph)		30			30			30				30
Link Distance (ft)		395			1427			536				448
Travel Time (s)		9.0			32.4			12.2				10.2
Confl. Peds. (#/hr)	5		7	7		5	2		11	11		2
Confl. Bikes (#/hr)			2									
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	4%	4%	4%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	2	0	0	6	0	0	0	0	0	0
Adj. Flow (vph)	57	108	27	51	109	110	28	629	57	261	1014	64
Shared Lane Traffic (%)												
Lane Group Flow (vph)	57	135	0	51	219	0	28	686	0	261	1014	64
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		10			10			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane		Yes										
Headway Factor	1.09	1.00	1.00	1.09	1.09	1.00	1.00	1.09	1.09	1.00	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	1
Detector Template	Left			Left			Left			Left		Right
Leading Detector (ft)	40	6		40	6		40	6		40	6	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	40	6		40	6		40	6		40	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		2			6		3	8		7		4

Lanes, Volumes, Timings
1: Waugh & W. Dallas

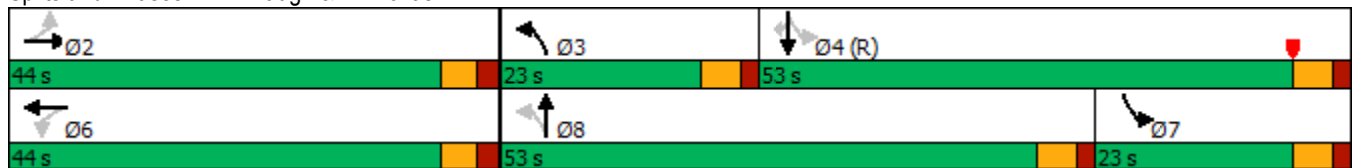
02/16/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		4
Detector Phase	2	2		6	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		4.0	12.0		4.0	12.0	12.0
Minimum Split (s)	30.4	30.4		30.4	30.4		9.3	30.3		9.3	30.3	30.3
Total Split (s)	44.0	44.0		44.0	44.0		23.0	53.0		23.0	53.0	53.0
Total Split (%)	36.7%	36.7%		36.7%	36.7%		19.2%	44.2%		19.2%	44.2%	44.2%
Maximum Green (s)	38.6	38.6		38.6	38.6		17.7	47.7		17.7	47.7	47.7
Yellow Time (s)	3.2	3.2		3.2	3.2		3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	2.2	2.2		2.2	2.2		1.7	1.7		1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.4	5.4		5.4	5.4		5.3	5.3		5.3	5.3	5.3
Lead/Lag							Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	3.0
Recall Mode	Min	Min		Min	Min		None	Min		None	C-Min	C-Min
Walk Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0			20.0			20.0	20.0
Pedestrian Calls (#/hr)	6	6		6	6			7			7	7
Act Effct Green (s)	19.5	19.5		19.5	19.5		65.8	65.8		83.0	83.0	83.0
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.55	0.55		0.69	0.69	0.69
v/c Ratio	0.59	0.46		0.33	0.77		0.10	0.38		0.39	0.44	0.06
Control Delay	69.3	45.2		42.2	50.9		16.6	17.5		14.7	10.7	2.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	69.3	45.2		42.2	50.9		16.6	17.5		14.7	10.7	2.3
LOS	E	D		D	D		B	B		B	B	A
Approach Delay		52.3			49.3			17.5			11.1	
Approach LOS		D			D			B			B	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 9 (8%), Referenced to phase 4:SBTL, Start of Yellow
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 20.2 Intersection LOS: C
 Intersection Capacity Utilization 73.2% ICU Level of Service D
 Analysis Period (min) 15
 Description: Waugh at W Dallas

Splits and Phases: 1: Waugh & W. Dallas



Queues

1: Waugh & W. Dallas

02/16/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	57	135	51	219	28	686	261	1014	64
v/c Ratio	0.59	0.46	0.33	0.77	0.10	0.38	0.39	0.44	0.06
Control Delay	69.3	45.2	42.2	50.9	16.6	17.5	14.7	10.7	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.3	45.2	42.2	50.9	16.6	17.5	14.7	10.7	2.3
Queue Length 50th (ft)	41	88	34	172	10	153	74	186	0
Queue Length 95th (ft)	83	139	m47	202	30	243	144	297	17
Internal Link Dist (ft)		315		1347		456		368	
Turn Bay Length (ft)	150				100		150		
Base Capacity (vph)	191	574	307	523	414	1788	674	2284	1018
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.24	0.17	0.42	0.07	0.38	0.39	0.44	0.06

Intersection Summary

Description: Waugh at W Dallas

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

HCM Signalized Intersection Capacity Analysis

1: Waugh & W. Dallas

02/16/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↕		↔	↕	↔
Traffic Volume (vph)	55	105	26	49	106	107	27	610	55	253	984	62
Future Volume (vph)	55	105	26	49	106	107	27	610	55	253	984	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	10	12	12	10	10	12	10	10
Total Lost time (s)	5.4	5.4		5.4	5.4		5.3	5.3		5.3	5.3	5.3
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		0.99	1.00		1.00	1.00		1.00	1.00	1.00
Fr _t	1.00	0.97		1.00	0.92		1.00	0.99		1.00	1.00	0.85
Fl _t Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1613	1763		1577	1532		1769	3255		1766	3303	1441
Fl _t Permitted	0.35	1.00		0.58	1.00		0.21	1.00		0.39	1.00	1.00
Satd. Flow (perm)	594	1763		956	1532		382	3255		726	3303	1441
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	57	108	27	51	109	110	28	629	57	261	1014	64
RTOR Reduction (vph)	0	9	0	0	38	0	0	4	0	0	0	21
Lane Group Flow (vph)	57	126	0	51	181	0	28	682	0	261	1014	43
Confl. Peds. (#/hr)	5		7	7		5	2		11	11		2
Confl. Bikes (#/hr)			2									
Heavy Vehicles (%)	4%	4%	4%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	2	0	0	6	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		2			6		3	8		7	4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)	19.5	19.5		19.5	19.5		63.7	63.7		80.9	80.9	80.9
Effective Green, g (s)	19.5	19.5		19.5	19.5		63.7	63.7		80.9	80.9	80.9
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.53	0.53		0.67	0.67	0.67
Clearance Time (s)	5.4	5.4		5.4	5.4		5.3	5.3		5.3	5.3	5.3
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)	96	286		155	248		244	1727		669	2226	971
v/s Ratio Prot		0.07			c0.12		0.00	c0.21		0.07	c0.31	
v/s Ratio Perm	0.10			0.05			0.06			0.20		0.03
v/c Ratio	0.59	0.44		0.33	0.73		0.11	0.39		0.39	0.46	0.04
Uniform Delay, d1	46.6	45.3		44.5	47.8		14.6	16.7		9.9	9.2	6.6
Progression Factor	1.00	1.00		0.88	0.98		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	9.5	1.1		1.0	8.6		0.1	0.1		0.1	0.7	0.1
Delay (s)	56.1	46.4		40.3	55.5		14.7	16.9		10.1	9.9	6.7
Level of Service	E	D		D	E		B	B		B	A	A
Approach Delay (s)		49.3			52.7			16.8			9.8	
Approach LOS		D			D			B			A	

Intersection Summary

HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Waugh at W Dallas			

c Critical Lane Group

HCM 6th Signalized Intersection Summary

1: Waugh & W. Dallas

02/16/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↕		↖	↗	↖
Traffic Volume (veh/h)	55	105	26	49	106	107	27	610	55	253	984	62
Future Volume (veh/h)	55	105	26	49	106	107	27	610	55	253	984	62
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.99	1.00		0.98	0.99		0.99
Parking Bus, Adj	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1811	1811	1811	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	57	108	27	51	109	110	28	629	57	261	1014	64
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	4	4	4	6	6	6	2	2	2	2	2	2
Cap, veh/h	141	285	71	225	163	165	101	713	65	866	2285	1010
Arrive On Green	0.20	0.20	0.20	0.07	0.07	0.07	0.02	0.22	0.22	0.45	0.64	0.64
Sat Flow, veh/h	1138	1402	351	1206	802	810	1781	3290	298	1781	3554	1571
Grp Volume(v), veh/h	57	0	135	51	0	219	28	339	347	261	1014	64
Grp Sat Flow(s),veh/h/ln	1138	0	1753	1206	0	1612	1781	1777	1811	1781	1777	1571
Q Serve(g_s), s	5.9	0.0	8.0	4.9	0.0	15.9	1.6	22.2	22.3	5.8	17.1	1.8
Cycle Q Clear(g_c), s	21.8	0.0	8.0	12.9	0.0	15.9	1.6	22.2	22.3	5.8	17.1	1.8
Prop In Lane	1.00		0.20	1.00		0.50	1.00		0.16	1.00		1.00
Lane Grp Cap(c), veh/h	141	0	357	225	0	328	101	385	392	866	2285	1010
V/C Ratio(X)	0.41	0.00	0.38	0.23	0.00	0.67	0.28	0.88	0.88	0.30	0.44	0.06
Avail Cap(c_a), veh/h	275	0	564	368	0	518	328	706	720	866	2285	1010
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.67	0.00	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.5	0.0	41.2	54.5	0.0	52.0	41.7	45.5	45.5	19.2	10.7	8.0
Incr Delay (d2), s/veh	1.9	0.0	0.7	0.3	0.0	1.6	0.5	6.7	6.7	0.1	0.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	3.5	1.6	0.0	7.1	0.7	10.5	10.7	4.4	6.6	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.4	0.0	41.9	54.8	0.0	53.6	42.2	52.2	52.2	19.2	11.3	8.1
LnGrp LOS	E	A	D	D	A	D	D	D	D	B	B	A
Approach Vol, veh/h		192			270			714			1339	
Approach Delay, s/veh		46.2			53.8			51.8			12.7	
Approach LOS		D			D			D			B	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		29.8	7.7	82.5		29.8	58.9	31.3				
Change Period (Y+Rc), s		5.4	* 5.3	* 5.3		5.4	* 5.3	* 5.3				
Max Green Setting (Gmax), s		38.6	* 18	* 48		38.6	* 18	* 48				
Max Q Clear Time (g_c+I1), s		23.8	3.6	19.1		17.9	7.8	24.3				
Green Ext Time (p_c), s		0.5	0.0	3.8		0.7	0.4	1.7				
Intersection Summary												
HCM 6th Ctrl Delay			30.8									
HCM 6th LOS			C									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Capacity Analysis

1: Waugh & W. Dallas

02/16/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	105	26	49	106	107	27	610	55	253	984	62
Future Volume (veh/h)	55	105	26	49	106	107	27	610	55	253	984	62
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	0.99		0.98	0.99		0.99	1.00		0.98	0.99		0.99
Parking Bus Adj	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1841	1841	1841	1811	1811	1811	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	57	108	27	51	109	110	28	629	57	261	1014	64
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	4	4	4	6	6	6	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	141	285	71	225	163	165	101	713	65	866	2285	1010
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.20	0.20	0.20	0.07	0.07	0.07	0.02	0.22	0.22	0.45	0.64	0.64
Unsig. Movement Delay												
Ln Grp Delay, s/veh	56.4	0.0	41.9	54.8	0.0	53.6	42.2	52.2	52.2	19.2	11.3	8.1
Ln Grp LOS	E	A	D	D	A	D	D	D	D	B	B	A
Approach Vol, veh/h		192			270			714			1339	
Approach Delay, s/veh		46.2			53.8			51.8			12.7	
Approach LOS		D			D			D			B	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs			2	3	4		6	8	7			
Case No			6.0	1.2	3.0		6.0	4.0	1.3			
Phs Duration (G+Y+Rc), s			29.8	7.7	82.5		29.8	31.3	58.9			
Change Period (Y+Rc), s			5.4	* 5.3	* 5.3		5.4	* 5.3	* 5.3			
Max Green (Gmax), s			38.6	* 18	* 48		38.6	* 48	* 18			
Max Allow Headway (MAH), s			3.9	3.2	3.5		3.8	3.5	3.2			
Max Q Clear (g_c+I1), s			23.8	3.6	19.1		17.9	24.3	7.8			
Green Ext Time (g_e), s			0.5	0.0	3.8		0.7	1.7	0.4			
Prob of Phs Call (p_c)			1.00	0.61	1.00		1.00	1.00	1.00			
Prob of Max Out (p_x)			0.00	0.00	0.00		0.00	0.00	0.00			
Left-Turn Movement Data												
Assigned Mvmt			5	3			1		7			
Mvmt Sat Flow, veh/h			1138	1781			1206		1781			
Through Movement Data												
Assigned Mvmt			2		4		6	8				
Mvmt Sat Flow, veh/h			1402		3554		802	3290				
Right-Turn Movement Data												
Assigned Mvmt			12		14		16	18				
Mvmt Sat Flow, veh/h			351		1571		810	298				
Left Lane Group Data												
Assigned Mvmt		0	5	3	0	0	1	0	7			
Lane Assignment			LL (Pr/Pm)				L	L (Pr/Pm)				

HCM 6th Signalized Intersection Capacity Analysis

1: Waugh & W. Dallas

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Lanes in Grp	0	1	1	0	0	1	0	1
Grp Vol (v), veh/h	0	57	28	0	0	51	0	261
Grp Sat Flow (s), veh/h/ln	0	1138	1781	0	0	1206	0	1781
Q Serve Time (g_s), s	0.0	5.9	1.6	0.0	0.0	4.9	0.0	5.8
Cycle Q Clear Time (g_c), s	0.0	21.8	1.6	0.0	0.0	12.9	0.0	5.8
Perm LT Sat Flow (s_l), veh/h/ln	0	1138	521	0	0	1206	0	752
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	24.4	20.3	0.0	0.0	24.4	0.0	16.3
Perm LT Serve Time (g_u), s	0.0	8.5	1.2	0.0	0.0	16.4	0.0	1.7
Perm LT Q Serve Time (g_ps), s	0.0	5.9	1.1	0.0	0.0	4.9	0.0	1.7
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	141	101	0	0	225	0	866
V/C Ratio (X)	0.00	0.41	0.28	0.00	0.00	0.23	0.00	0.30
Avail Cap (c_a), veh/h	0	275	328	0	0	368	0	866
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	0.67	0.00	1.00
Uniform Delay (d1), s/veh	0.0	54.5	41.7	0.0	0.0	54.5	0.0	19.2
Incr Delay (d2), s/veh	0.0	1.9	0.5	0.0	0.0	0.3	0.0	0.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	56.4	42.2	0.0	0.0	54.8	0.0	19.2
1st-Term Q (Q1), veh/ln	0.0	1.7	0.7	0.0	0.0	1.6	0.0	4.4
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	1.8	0.7	0.0	0.0	1.6	0.0	4.4
%ile Storage Ratio (RQ%)	0.00	0.30	0.18	0.00	0.00	0.03	0.00	0.74
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	8	0
Lane Assignment				T			T	
Lanes in Grp	0	0	0	2	0	0	1	0
Grp Vol (v), veh/h	0	0	0	1014	0	0	339	0
Grp Sat Flow (s), veh/h/ln	0	0	0	1777	0	0	1777	0
Q Serve Time (g_s), s	0.0	0.0	0.0	17.1	0.0	0.0	22.2	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	17.1	0.0	0.0	22.2	0.0
Lane Grp Cap (c), veh/h	0	0	0	2285	0	0	385	0
V/C Ratio (X)	0.00	0.00	0.00	0.44	0.00	0.00	0.88	0.00
Avail Cap (c_a), veh/h	0	0	0	2285	0	0	706	0
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	10.7	0.0	0.0	45.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.6	0.0	0.0	6.7	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	11.3	0.0	0.0	52.2	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	6.4	0.0	0.0	9.7	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.2	0.0	0.0	0.7	0.0

HCM 6th Signalized Intersection Capacity Analysis

1: Waugh & W. Dallas

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	6.6	0.0	0.0	10.5	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.40	0.00	0.00	0.54	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	18	0
Lane Assignment		T+R		R		T+R	T+R	
Lanes in Grp	0	1	0	1	0	1	1	0
Grp Vol (v), veh/h	0	135	0	64	0	219	347	0
Grp Sat Flow (s), veh/h/ln	0	1753	0	1571	0	1612	1811	0
Q Serve Time (g_s), s	0.0	8.0	0.0	1.8	0.0	15.9	22.3	0.0
Cycle Q Clear Time (g_c), s	0.0	8.0	0.0	1.8	0.0	15.9	22.3	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.20	0.00	1.00	0.00	0.50	0.16	0.00
Lane Grp Cap (c), veh/h	0	357	0	1010	0	328	392	0
V/C Ratio (X)	0.00	0.38	0.00	0.06	0.00	0.67	0.88	0.00
Avail Cap (c_a), veh/h	0	564	0	1010	0	518	720	0
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	0.67	1.00	0.00
Uniform Delay (d1), s/veh	0.0	41.2	0.0	8.0	0.0	52.0	45.5	0.0
Incr Delay (d2), s/veh	0.0	0.7	0.0	0.1	0.0	1.6	6.7	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	41.9	0.0	8.1	0.0	53.6	52.2	0.0
1st-Term Q (Q1), veh/ln	0.0	3.5	0.0	0.6	0.0	6.9	10.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.1	0.7	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	3.5	0.0	0.6	0.0	7.1	10.7	0.0
%ile Storage Ratio (RQ%)	0.00	0.27	0.00	0.04	0.00	0.14	0.55	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	30.8
HCM 6th LOS	C

Notes

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

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	48.3	42.3	78.0	78.2
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	3	4	5	6
Number of Right-Turn Islands	0	0	0	0
Type of Control	None	None	None	None
Corresponding Signal Phase	4	8	2	6
Effective Walk Time (s)	0.0	0.0	0.0	0.0
Right Corner Size A (ft)	9.0	9.0	9.0	9.0
Right Corner Size B (ft)	9.0	9.0	9.0	9.0
Right Corner Curb Radius (ft)	0.0	0.0	0.0	0.0
Right Corner Total Area (sq.ft)	81.00	81.00	81.00	81.00
Ped. Left-Right Flow Rate (p/h)	0	0	0	0
Ped. Right-Left Flow Rate (p/h)	0	0	0	0
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	30	30	30	30
Right Corner Area per Ped (sq.ft)	0.0	0.0	0.0	0.0
Right Corner Quality of Service	-	-	-	-
Ped. Circulation Area (sq.ft)	0.0	0.0	0.0	0.0
Crosswalk Circulation Code	-	-	-	-
Pedestrian Delay (s/p)	60.0	60.0	60.0	60.0
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.09	2.32	2.67	2.82
Pedestrian Crosswalk LOS	B	B	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	192	270	714	1339
Effct. Green for Bike (s)	19.5	19.5	65.8	83.0
Cross Street Width (ft)	57.1	66.1	42.0	34.8
Through Lanes Number	1	1	2	2
Through Lane Width (ft)	12.0	10.0	10.0	10.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	No	No	No	No
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	325	325	1097	1383
Bicycle Delay (s/bike)	42.1	42.1	12.2	5.7
Bicycle Compliance	Poor	Poor	Fair	Good
Bicycle LOS Score	2.75	3.45	3.22	3.63
Bicycle LOS	C	C	C	D

Lanes, Volumes, Timings
2: Montrose & W. Dallas

02/16/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↕	↕↕		↕	↕↕	↕
Traffic Volume (vph)	38	283	107	89	177	126	84	581	47	107	924	51
Future Volume (vph)	38	283	107	89	177	126	84	581	47	107	924	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1500	1400	1500	1500	1400	1500
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	16
Storage Length (ft)	0		0	0		0	100		0	150		100
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (ft)	25			25			100			50		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor		0.99			0.99		1.00	1.00		0.99		0.98
Frt		0.962			0.952			0.989				0.850
Flt Protected		0.996			0.989		0.950			0.950		
Satd. Flow (prot)	0	3228	0	0	3056	0	1397	2573	0	1383	2583	1403
Flt Permitted		0.849			0.534		0.950			0.950		
Satd. Flow (perm)	0	2751	0	0	1649	0	1394	2573	0	1372	2583	1375
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			31			5				181
Link Speed (mph)		30			30			35				35
Link Distance (ft)		1427			896			647				438
Travel Time (s)		32.4			20.4			12.6				8.5
Confl. Peds. (#/hr)	1		4	4		1	2		6	6		2
Confl. Bikes (#/hr)			1						1			1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	3%	3%	3%	7%	7%	7%	2%	2%	2%	3%	3%	3%
Bus Blockages (#/hr)	0	0	5	0	0	6	0	0	3	0	0	0
Adj. Flow (vph)	40	301	114	95	188	134	89	618	50	114	983	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	455	0	0	417	0	89	668	0	114	983	54
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.35	1.46	1.35	1.35	1.46	1.15
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	40	226		40	226		40	226		40	226	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	40	6		40	6		40	6		40	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		220			220			220			220	
Detector 2 Size(ft)		6			6			6			6	

Lanes, Volumes, Timings
 2: Montrose & W. Dallas

02/16/2022

Lane Group	Ø2	Ø3	Ø6	Ø7	Ø8	Ø12	Ø13	Ø14	Ø16	Ø17	Ø18
Lane Configurations											
Traffic Volume (vph)											
Future Volume (vph)											
Ideal Flow (vphpl)											
Lane Width (ft)											
Storage Length (ft)											
Storage Lanes											
Taper Length (ft)											
Lane Util. Factor											
Ped Bike Factor											
Frt											
Flt Protected											
Satd. Flow (prot)											
Flt Permitted											
Satd. Flow (perm)											
Right Turn on Red											
Satd. Flow (RTOR)											
Link Speed (mph)											
Link Distance (ft)											
Travel Time (s)											
Confl. Peds. (#/hr)											
Confl. Bikes (#/hr)											
Peak Hour Factor											
Heavy Vehicles (%)											
Bus Blockages (#/hr)											
Adj. Flow (vph)											
Shared Lane Traffic (%)											
Lane Group Flow (vph)											
Enter Blocked Intersection											
Lane Alignment											
Median Width(ft)											
Link Offset(ft)											
Crosswalk Width(ft)											
Two way Left Turn Lane											
Headway Factor											
Turning Speed (mph)											
Number of Detectors											
Detector Template											
Leading Detector (ft)											
Trailing Detector (ft)											
Detector 1 Position(ft)											
Detector 1 Size(ft)											
Detector 1 Type											
Detector 1 Channel											
Detector 1 Extend (s)											
Detector 1 Queue (s)											
Detector 1 Delay (s)											
Detector 2 Position(ft)											
Detector 2 Size(ft)											

Lanes, Volumes, Timings

2: Montrose & W. Dallas

02/16/2022

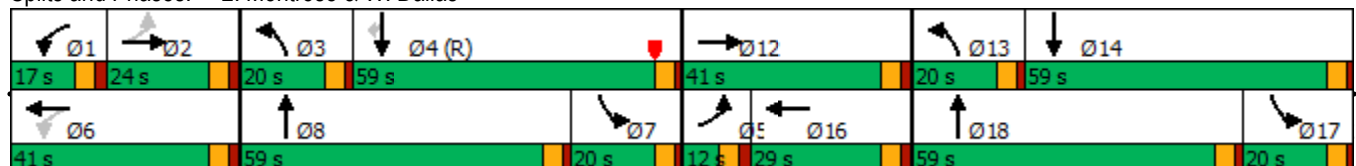


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Detector 2 Type	Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex			
Detector 2 Channel													
Detector 2 Extend (s)	0.0			0.0			0.0			0.0			
Turn Type	custom	NA		custom	NA		Prot	NA		Prot	NA		custom
Protected Phases	5	2 12		1	6 16		3 13	8 18		7 17	4 14		
Permitted Phases	2		6									4	
Detector Phase	5	2 12		1	6 16		3 13	8 18		7 17	4 14		
Switch Phase													
Minimum Initial (s)	5.0			5.0						10.0			
Minimum Split (s)	10.6			10.6						25.1			
Total Split (s)	12.0			17.0						59.0			
Total Split (%)	5.0%			7.1%						24.6%			
Maximum Green (s)	6.4			11.4						53.9			
Yellow Time (s)	3.6			3.6						3.6			
All-Red Time (s)	2.0			2.0						1.5			
Lost Time Adjust (s)	0.0												
Total Lost Time (s)	5.1												
Lead/Lag	Lead			Lead						Lag			
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0			3.0						3.0			
Recall Mode	Max			Max						C-Min			
Walk Time (s)	4.0												
Flash Dont Walk (s)	16.0												
Pedestrian Calls (#/hr)	2												
Act Effct Green (s)	50.0			61.5			24.8	77.2		54.5	106.8		56.2
Actuated g/C Ratio	0.21			0.26			0.10	0.32		0.23	0.44		0.23
v/c Ratio	0.76			0.78			0.62	0.80		0.36	0.85		0.12
Control Delay	59.2			60.3			69.5	44.7		43.2	38.3		0.5
Queue Delay	0.0			0.0			0.0	0.0		0.0	0.0		0.0
Total Delay	59.2			60.3			69.5	44.7		43.2	38.3		0.5
LOS	E			E			E	D		D	D		A
Approach Delay	59.2			60.3			47.7				37.0		
Approach LOS	E			E			D				D		

Intersection Summary

Area Type: Other
 Cycle Length: 240
 Actuated Cycle Length: 240
 Offset: 69 (29%), Referenced to phase 4:SBT, Start of Yellow
 Natural Cycle: 165
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 47.0
 Intersection LOS: D
 Intersection Capacity Utilization 109.6%
 ICU Level of Service H
 Analysis Period (min) 15

Splits and Phases: 2: Montrose & W. Dallas



Lanes, Volumes, Timings
2: Montrose & W. Dallas

02/16/2022

Lane Group	Ø2	Ø3	Ø6	Ø7	Ø8	Ø12	Ø13	Ø14	Ø16	Ø17	Ø18
Detector 2 Type											
Detector 2 Channel											
Detector 2 Extend (s)											
Turn Type											
Protected Phases	2	3	6	7	8	12	13	14	16	17	18
Permitted Phases											
Detector Phase											
Switch Phase											
Minimum Initial (s)	8.0	5.0	8.0	5.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	34.6	10.1	34.6	10.1	25.1	34.6	10.1	25.1	34.6	10.1	25.1
Total Split (s)	24.0	20.0	41.0	20.0	59.0	41.0	20.0	59.0	29.0	20.0	59.0
Total Split (%)	10%	8%	17%	8%	25%	17%	8%	25%	12%	8%	25%
Maximum Green (s)	18.4	14.9	35.4	14.9	53.9	35.4	14.9	53.9	23.4	14.9	53.9
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	2.0	1.5	2.0	1.5	1.5	2.0	1.5	1.5	2.0	1.5	1.5
Lost Time Adjust (s)											
Total Lost Time (s)											
Lead/Lag	Lag	Lead		Lag	Lead		Lead	Lag	Lag	Lag	Lead
Lead-Lag Optimize?											
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Min	Min	None	Min	Min	None	Min
Walk Time (s)	4.0		4.0		4.0	4.0		4.0	4.0		4.0
Flash Dont Walk (s)	25.0		25.0		16.0	25.0		16.0	25.0		16.0
Pedestrian Calls (#/hr)	2		2		2	2		2	2		2
Act Effct Green (s)											
Actuated g/C Ratio											
v/c Ratio											
Control Delay											
Queue Delay											
Total Delay											
LOS											
Approach Delay											
Approach LOS											
Intersection Summary											

Queues

2: Montrose & W. Dallas

02/16/2022



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	455	417	89	668	114	983	54
v/c Ratio	0.76	0.78	0.62	0.80	0.36	0.85	0.12
Control Delay	59.2	60.3	69.5	44.7	43.2	38.3	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.2	60.3	69.5	44.7	43.2	38.3	0.5
Queue Length 50th (ft)	193	174	67	251	74	343	0
Queue Length 95th (ft)	236	#274	102	268	119	397	0
Internal Link Dist (ft)	1347	816		567		358	
Turn Bay Length (ft)			100		150		100
Base Capacity (vph)	596	537	173	1158	313	1187	460
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.78	0.51	0.58	0.36	0.83	0.12

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2: Montrose & W. Dallas

02/16/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations		↕↕			↕↕		↕	↕↕		↕	↕↕	↕		
Traffic Volume (vph)	38	283	107	89	177	126	84	581	47	107	924	51		
Future Volume (vph)	38	283	107	89	177	126	84	581	47	107	924	51		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1500	1400	1500	1500	1400	1500		
Lane Width	11	11	11	11	11	11	12	12	12	12	12	16		
Total Lost time (s)		7.6			7.1		5.1	5.1		5.1	5.1	5.1		
Lane Util. Factor		0.95			0.95		1.00	0.95		1.00	0.95	1.00		
Frbp, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	0.98		
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	1.00		
Frt		0.96			0.95		1.00	0.99		1.00	1.00	0.85		
Flt Protected		1.00			0.99		0.95	1.00		0.95	1.00	1.00		
Satd. Flow (prot)		3228			3054		1397	2572		1383	2583	1375		
Flt Permitted		0.85			0.53		0.95	1.00		0.95	1.00	1.00		
Satd. Flow (perm)		2752			1649		1397	2572		1383	2583	1375		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94		
Adj. Flow (vph)	40	301	114	95	188	134	89	618	50	114	983	54		
RTOR Reduction (vph)	0	13	0	0	23	0	0	3	0	0	0	41		
Lane Group Flow (vph)	0	442	0	0	394	0	89	665	0	114	983	13		
Confl. Peds. (#/hr)	1		4	4		1	2		6	6		2		
Confl. Bikes (#/hr)			1						1			1		
Heavy Vehicles (%)	3%	3%	3%	7%	7%	7%	2%	2%	2%	3%	3%	3%		
Bus Blockages (#/hr)	0	0	5	0	0	6	0	0	3	0	0	0		
Turn Type	custom	NA		custom	NA		Prot	NA		Prot	NA	custom		
Protected Phases	5	2 12		1	6 16		3 13	8 18		7 17	4 14			
Permitted Phases	2			6								4		
Actuated Green, G (s)		54.0			64.5		24.8	77.2		54.5	106.9	56.2		
Effective Green, g (s)		50.0			61.5		24.8	77.2		54.5	106.9	56.2		
Actuated g/C Ratio		0.21			0.26		0.10	0.32		0.23	0.45	0.23		
Clearance Time (s)												5.1		
Vehicle Extension (s)												3.0		
Lane Grp Cap (vph)		582			513		144	827		314	1150	321		
v/s Ratio Prot		c0.01			c0.05		0.06	c0.26		0.08	c0.38			
v/s Ratio Perm		c0.14			c0.15							0.01		
v/c Ratio		0.76			0.77		0.62	0.80		0.36	0.85	0.04		
Uniform Delay, d1		89.3			82.6		103.1	74.5		78.1	59.6	71.0		
Progression Factor		0.97			1.00		1.00	1.00		1.00	1.00	1.00		
Incremental Delay, d2		5.4			6.8		7.7	5.7		0.7	6.4	0.2		
Delay (s)		92.5			89.4		110.7	80.2		78.8	66.0	71.3		
Level of Service		F			F		F	F		E	E	E		
Approach Delay (s)		92.5			89.4			83.8			67.5			
Approach LOS		F			F			F			E			
Intersection Summary														
HCM 2000 Control Delay			79.3									HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio			0.87											
Actuated Cycle Length (s)			240.0							46.3				
Intersection Capacity Utilization			109.6%										ICU Level of Service	H
Analysis Period (min)			15											
c Critical Lane Group														

HCM 6th Edition methodology does not support non-NEMA phasing.

HCM 6th Edition methodology does not support non-NEMA phasing.

HCM 6th Signals-Pedestrians
2: Montrose & W. Dallas

02/16/2022

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	45.3	46.0	60.1	76.0
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	4	4	5	6
Number of Right-Turn Islands	0	0	0	0
Type of Control	None	None	None	None
Corresponding Signal Phase	4	8	2	6
Effective Walk Time (s)	0.0	0.0	0.0	0.0
Right Corner Size A (ft)	9.0	9.0	9.0	9.0
Right Corner Size B (ft)	9.0	9.0	9.0	9.0
Right Corner Curb Radius (ft)	0.0	0.0	0.0	0.0
Right Corner Total Area (sq.ft)	81.00	81.00	81.00	81.00
Ped. Left-Right Flow Rate (p/h)	0	0	0	0
Ped. Right-Left Flow Rate (p/h)	0	0	0	0
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	30	30	35	35
Right Corner Area per Ped (sq.ft)	0.0	0.0	0.0	0.0
Right Corner Quality of Service	-	-	-	-
Ped. Circulation Area (sq.ft)	0.0	0.0	0.0	0.0
Crosswalk Circulation Code	-	-	-	-
Pedestrian Delay (s/p)	120.0	120.0	120.0	120.0
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.37	2.40	2.79	2.87
Pedestrian Crosswalk LOS	B	B	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	455	417	757	1151
Effct. Green for Bike (s)	50.0	61.5	77.2	106.8
Cross Street Width (ft)	60.1	76.0	46.0	45.3
Through Lanes Number	2	2	2	2
Through Lane Width (ft)	11.0	11.0	12.0	12.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	No	No	No	No
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	417	512	643	890
Bicycle Delay (s/bike)	75.2	66.4	55.2	37.0
Bicycle Compliance	Poor	Poor	Poor	Poor
Bicycle LOS Score	3.07	3.28	2.89	3.20
Bicycle LOS	C	C	C	C

Lanes, Volumes, Timings
1: Waugh & W. Dallas

02/16/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	105	26	49	106	107	27	610	55	253	984	62
Future Volume (vph)	55	105	26	49	106	107	27	610	55	253	984	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	12	10	10	12	12	10	10	12	10	10
Storage Length (ft)	150		0	150		0	100		0	150		0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	0.99	1.00		0.99	0.99			1.00		0.99		0.98
Frt		0.970			0.925			0.987				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1620	1764	0	1589	1533	0	1770	3248	0	1770	3303	1478
Flt Permitted	0.950			0.950			0.138			0.347		
Satd. Flow (perm)	1611	1764	0	1576	1533	0	257	3248	0	641	3303	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			39			9				111
Link Speed (mph)		30			30			30				30
Link Distance (ft)		395			1427			536				448
Travel Time (s)		9.0			32.4			12.2				10.2
Confl. Peds. (#/hr)	5		7	7		5	2		11	11		2
Confl. Bikes (#/hr)			2									
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%
Heavy Vehicles (%)	4%	4%	4%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	2	0	0	6	0	0	0	0	0	0
Adj. Flow (vph)	60	114	28	53	115	116	29	660	60	274	1065	67
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	142	0	53	231	0	29	720	0	274	1065	67
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.09	1.00	1.00	1.09	1.09	1.00	1.00	1.09	1.09	1.00	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	1
Detector Template	Left			Left			Left			Left		Right
Leading Detector (ft)	40	6		40	6		40	6		40	6	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	40	6		40	6		40	6		40	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Turn Type	Prot	NA		Prot	NA		pm+pt	NA		pm+pt	NA	Perm

Lanes, Volumes, Timings
1: Waugh & W. Dallas

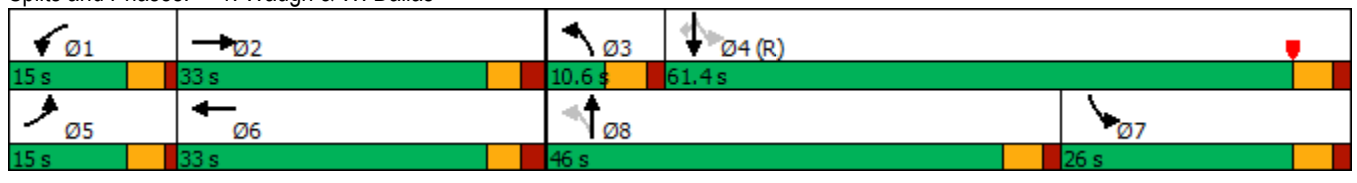
02/16/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases							8			4		4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		4.0	12.0		4.0	12.0	12.0
Minimum Split (s)	9.5	30.4		9.5	30.4		9.3	30.3		9.3	30.3	30.3
Total Split (s)	15.0	33.0		15.0	33.0		10.6	46.0		26.0	61.4	61.4
Total Split (%)	12.5%	27.5%		12.5%	27.5%		8.8%	38.3%		21.7%	51.2%	51.2%
Maximum Green (s)	10.5	27.6		10.5	27.6		5.3	40.7		20.7	56.1	56.1
Yellow Time (s)	3.5	3.2		3.5	3.2		3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	2.2		1.0	2.2		1.7	1.7		1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	5.4		4.5	5.4		5.3	5.3		5.3	5.3	5.3
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	Min		None	C-Min	C-Min
Walk Time (s)		5.0			5.0			5.0			5.0	5.0
Flash Dont Walk (s)		20.0			20.0			20.0			20.0	20.0
Pedestrian Calls (#/hr)		6			6			7			7	7
Act Effct Green (s)	9.4	20.6		9.1	20.4		55.4	55.4		70.5	70.5	70.5
Actuated g/C Ratio	0.08	0.17		0.08	0.17		0.46	0.46		0.59	0.59	0.59
v/c Ratio	0.47	0.46		0.44	0.79		0.16	0.48		0.52	0.55	0.08
Control Delay	64.5	44.8		59.9	64.0		25.9	26.4		27.6	19.8	0.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	64.5	44.8		59.9	64.0		25.9	26.4		27.6	19.8	0.9
LOS	E	D		E	E		C	C		C	B	A
Approach Delay		50.7			63.3			26.4			20.4	
Approach LOS		D			E			C			C	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 4:SBTL, Start of Yellow
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 29.0
 Intersection LOS: C
 Intersection Capacity Utilization 70.2%
 ICU Level of Service C
 Analysis Period (min) 15
 Description: Waugh at W Dallas

Splits and Phases: 1: Waugh & W. Dallas



Queues

1: Waugh & W. Dallas

02/16/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	60	142	53	231	29	720	274	1065	67
v/c Ratio	0.47	0.46	0.44	0.79	0.16	0.48	0.52	0.55	0.08
Control Delay	64.5	44.8	59.9	64.0	25.9	26.4	27.6	19.8	0.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.5	44.8	59.9	64.0	25.9	26.4	27.6	19.8	0.9
Queue Length 50th (ft)	45	92	44	163	13	203	114	291	0
Queue Length 95th (ft)	89	147	m60	m176	38	320	200	421	7
Internal Link Dist (ft)		315		1347		456		368	
Turn Bay Length (ft)	150		150		100		150		
Base Capacity (vph)	147	413	144	382	188	1514	595	1947	895
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.34	0.37	0.60	0.15	0.48	0.46	0.55	0.07

Intersection Summary

Description: Waugh at W Dallas

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

HCM 6th Signalized Intersection Summary

1: Waugh & W. Dallas

02/16/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↕		↖	↗	↖
Traffic Volume (veh/h)	55	105	26	49	106	107	27	610	55	253	984	62
Future Volume (veh/h)	55	105	26	49	106	107	27	610	55	253	984	62
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		0.98	0.99		0.99
Parking Bus, Adj	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1811	1811	1811	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	114	28	53	115	116	29	660	60	274	1065	67
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	4	4	4	6	6	6	2	2	2	2	2	2
Cap, veh/h	77	248	61	68	138	139	97	742	67	761	2106	931
Arrive On Green	0.04	0.18	0.18	0.01	0.06	0.06	0.02	0.23	0.23	0.39	0.59	0.59
Sat Flow, veh/h	1753	1407	346	1725	802	809	1781	3286	298	1781	3554	1570
Grp Volume(v), veh/h	60	0	142	53	0	231	29	356	364	274	1065	67
Grp Sat Flow(s),veh/h/ln	1753	0	1753	1725	0	1610	1781	1777	1808	1781	1777	1570
Q Serve(g_s), s	4.1	0.0	8.7	3.7	0.0	17.0	1.6	23.3	23.4	7.8	20.9	2.2
Cycle Q Clear(g_c), s	4.1	0.0	8.7	3.7	0.0	17.0	1.6	23.3	23.4	7.8	20.9	2.2
Prop In Lane	1.00		0.20	1.00		0.50	1.00		0.17	1.00		1.00
Lane Grp Cap(c), veh/h	77	0	309	68	0	277	97	401	408	761	2106	931
V/C Ratio(X)	0.78	0.00	0.46	0.78	0.00	0.84	0.30	0.89	0.89	0.36	0.51	0.07
Avail Cap(c_a), veh/h	153	0	403	151	0	370	139	603	613	761	2106	931
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.50	0.00	0.50	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.8	0.0	44.3	58.7	0.0	54.9	41.1	45.0	45.0	23.9	14.2	10.4
Incr Delay (d2), s/veh	15.3	0.0	1.1	9.2	0.0	6.2	0.6	10.6	10.6	0.1	0.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.0	3.9	1.8	0.0	7.9	0.7	11.4	11.6	5.3	8.4	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	72.1	0.0	45.4	67.9	0.0	61.2	41.7	55.6	55.6	24.0	15.1	10.5
LnGrp LOS	E	A	D	E	A	E	D	E	E	C	B	B
Approach Vol, veh/h		202			284			749			1406	
Approach Delay, s/veh		53.3			62.4			55.1			16.6	
Approach LOS		D			E			E			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.2	26.6	7.8	76.4	9.8	26.0	51.8	32.4				
Change Period (Y+Rc), s	4.5	5.4	* 5.3	* 5.3	4.5	5.4	* 5.3	* 5.3				
Max Green Setting (Gmax), s	10.5	27.6	* 5.3	* 56	10.5	27.6	* 21	* 41				
Max Q Clear Time (g_c+I1), s	5.7	10.7	3.6	22.9	6.1	19.0	9.8	25.4				
Green Ext Time (p_c), s	0.0	0.3	0.0	4.1	0.0	0.4	0.4	1.7				

Intersection Summary

HCM 6th Ctrl Delay	35.2
HCM 6th LOS	D

Notes

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

HCM 6th Signalized Intersection Capacity Analysis

1: Waugh & W. Dallas

02/16/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	105	26	49	106	107	27	610	55	253	984	62
Future Volume (veh/h)	55	105	26	49	106	107	27	610	55	253	984	62
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		0.97	1.00		0.99	1.00		0.98	0.99		0.99
Parking Bus Adj	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1841	1841	1841	1811	1811	1811	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	114	28	53	115	116	29	660	60	274	1065	67
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	4	4	4	6	6	6	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	77	248	61	68	138	139	97	742	67	761	2106	931
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.04	0.18	0.18	0.01	0.06	0.06	0.02	0.23	0.23	0.39	0.59	0.59
Unsig. Movement Delay												
Ln Grp Delay, s/veh	72.1	0.0	45.4	67.9	0.0	61.2	41.7	55.6	55.6	24.0	15.1	10.5
Ln Grp LOS	E	A	D	E	A	E	D	E	E	C	B	B
Approach Vol, veh/h		202			284			749			1406	
Approach Delay, s/veh		53.3			62.4			55.1			16.6	
Approach LOS		D			E			E			B	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		1	2	3	4	5	6	8	7			
Case No		2.0	4.0	1.2	3.0	2.0	4.0	4.0	1.3			
Phs Duration (G+Y+Rc), s		9.2	26.6	7.8	76.4	9.8	26.0	32.4	51.8			
Change Period (Y+Rc), s		4.5	5.4	* 5.3	* 5.3	4.5	5.4	* 5.3	* 5.3			
Max Green (Gmax), s		10.5	27.6	* 5.3	* 56	10.5	27.6	* 41	* 21			
Max Allow Headway (MAH), s		4.2	3.5	3.2	3.5	4.2	3.6	3.5	3.2			
Max Q Clear (g_c+I1), s		5.7	10.7	3.6	22.9	6.1	19.0	25.4	9.8			
Green Ext Time (g_e), s		0.0	0.3	0.0	4.1	0.0	0.4	1.7	0.4			
Prob of Phs Call (p_c)		0.83	1.00	0.62	1.00	0.86	1.00	1.00	1.00			
Prob of Max Out (p_x)		0.48	0.00	1.00	0.00	0.76	0.02	0.01	0.00			
Left-Turn Movement Data												
Assigned Mvmt		1		3		5					7	
Mvmt Sat Flow, veh/h		1725		1781		1753					1781	
Through Movement Data												
Assigned Mvmt			2		4		6	8				
Mvmt Sat Flow, veh/h			1407		3554		802	3286				
Right-Turn Movement Data												
Assigned Mvmt			12		14		16	18				
Mvmt Sat Flow, veh/h			346		1570		809	298				
Left Lane Group Data												
Assigned Mvmt		1	0	3	0	5	0	0	7			
Lane Assignment		L (Prot)		L (Pr/Pm)		L (Prot)			L (Pr/Pm)			

HCM 6th Signalized Intersection Capacity Analysis

1: Waugh & W. Dallas

02/16/2022

Lanes in Grp	1	0	1	0	1	0	0	1
Grp Vol (v), veh/h	53	0	29	0	60	0	0	274
Grp Sat Flow (s), veh/h/ln	1725	0	1781	0	1753	0	0	1781
Q Serve Time (g_s), s	3.7	0.0	1.6	0.0	4.1	0.0	0.0	7.8
Cycle Q Clear Time (g_c), s	3.7	0.0	1.6	0.0	4.1	0.0	0.0	7.8
Perm LT Sat Flow (s_l), veh/h/ln	0	0	497	0	0	0	0	727
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	21.3	0.0	0.0	0.0	0.0	17.3
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	68	0	97	0	77	0	0	761
V/C Ratio (X)	0.78	0.00	0.30	0.00	0.78	0.00	0.00	0.36
Avail Cap (c_a), veh/h	151	0	139	0	153	0	0	761
Upstream Filter (I)	0.50	0.00	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	58.7	0.0	41.1	0.0	56.8	0.0	0.0	23.9
Incr Delay (d2), s/veh	9.2	0.0	0.6	0.0	15.3	0.0	0.0	0.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	67.9	0.0	41.7	0.0	72.1	0.0	0.0	24.0
1st-Term Q (Q1), veh/ln	1.6	0.0	0.7	0.0	1.8	0.0	0.0	5.2
2nd-Term Q (Q2), veh/ln	0.2	0.0	0.0	0.0	0.3	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	1.8	0.0	0.7	0.0	2.1	0.0	0.0	5.3
%ile Storage Ratio (RQ%)	0.32	0.00	0.18	0.00	0.37	0.00	0.00	0.89
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	8	0
Lane Assignment				T			T	
Lanes in Grp	0	0	0	2	0	0	1	0
Grp Vol (v), veh/h	0	0	0	1065	0	0	356	0
Grp Sat Flow (s), veh/h/ln	0	0	0	1777	0	0	1777	0
Q Serve Time (g_s), s	0.0	0.0	0.0	20.9	0.0	0.0	23.3	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	20.9	0.0	0.0	23.3	0.0
Lane Grp Cap (c), veh/h	0	0	0	2106	0	0	401	0
V/C Ratio (X)	0.00	0.00	0.00	0.51	0.00	0.00	0.89	0.00
Avail Cap (c_a), veh/h	0	0	0	2106	0	0	603	0
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	14.2	0.0	0.0	45.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.9	0.0	0.0	10.6	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	15.1	0.0	0.0	55.6	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	8.1	0.0	0.0	10.2	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.3	0.0	0.0	1.2	0.0

HCM 6th Signalized Intersection Capacity Analysis

1: Waugh & W. Dallas

02/16/2022

3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	8.4	0.0	0.0	11.4	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.51	0.00	0.00	0.58	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	18	0
Lane Assignment		T+R		R		T+R	T+R	
Lanes in Grp	0	1	0	1	0	1	1	0
Grp Vol (v), veh/h	0	142	0	67	0	231	364	0
Grp Sat Flow (s), veh/h/ln	0	1753	0	1570	0	1610	1808	0
Q Serve Time (g_s), s	0.0	8.7	0.0	2.2	0.0	17.0	23.4	0.0
Cycle Q Clear Time (g_c), s	0.0	8.7	0.0	2.2	0.0	17.0	23.4	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.20	0.00	1.00	0.00	0.50	0.17	0.00
Lane Grp Cap (c), veh/h	0	309	0	931	0	277	408	0
V/C Ratio (X)	0.00	0.46	0.00	0.07	0.00	0.84	0.89	0.00
Avail Cap (c_a), veh/h	0	403	0	931	0	370	613	0
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	0.50	1.00	0.00
Uniform Delay (d1), s/veh	0.0	44.3	0.0	10.4	0.0	54.9	45.0	0.0
Incr Delay (d2), s/veh	0.0	1.1	0.0	0.1	0.0	6.2	10.6	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	45.4	0.0	10.5	0.0	61.2	55.6	0.0
1st-Term Q (Q1), veh/ln	0.0	3.8	0.0	0.7	0.0	7.4	10.4	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.5	1.2	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	3.9	0.0	0.8	0.0	7.9	11.6	0.0
%ile Storage Ratio (RQ%)	0.00	0.29	0.00	0.05	0.00	0.16	0.59	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	35.2
HCM 6th LOS	D

Notes

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

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	48.3	42.3	78.0	78.2
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	3	3	5	6
Number of Right-Turn Islands	0	0	0	0
Type of Control	None	None	None	None
Corresponding Signal Phase	4	8	2	6
Effective Walk Time (s)	0.0	0.0	0.0	0.0
Right Corner Size A (ft)	9.0	9.0	9.0	9.0
Right Corner Size B (ft)	9.0	9.0	9.0	9.0
Right Corner Curb Radius (ft)	0.0	0.0	0.0	0.0
Right Corner Total Area (sq.ft)	81.00	81.00	81.00	81.00
Ped. Left-Right Flow Rate (p/h)	0	0	0	0
Ped. Right-Left Flow Rate (p/h)	0	0	0	0
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	30	30	30	30
Right Corner Area per Ped (sq.ft)	0.0	0.0	0.0	0.0
Right Corner Quality of Service	-	-	-	-
Ped. Circulation Area (sq.ft)	0.0	0.0	0.0	0.0
Crosswalk Circulation Code	-	-	-	-
Pedestrian Delay (s/p)	60.0	60.0	60.0	60.0
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.10	2.20	2.69	2.84
Pedestrian Crosswalk LOS	B	B	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	202	284	749	1406
Effct. Green for Bike (s)	20.6	20.4	55.4	70.5
Cross Street Width (ft)	56.0	66.1	32.2	35.5
Through Lanes Number	1	1	2	2
Through Lane Width (ft)	12.0	10.0	10.0	10.0
Bicycle Lane Width (ft)	5.0	5.0	0.0	0.0
Striped Parking Lane Width (ft)	2.0	2.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	No	No	No	No
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	343	340	923	1175
Bicycle Delay (s/bike)	41.2	41.3	17.4	10.2
Bicycle Compliance	Poor	Poor	Fair	Fair
Bicycle LOS Score	1.25	1.97	3.10	3.69
Bicycle LOS	A	B	C	D

Lanes, Volumes, Timings
2: Montrose & W. Dallas

02/16/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	283	107	89	177	126	84	581	47	107	924	51
Future Volume (vph)	38	283	107	89	177	126	84	581	47	107	924	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1500	1400	1500	1500	1400	1500
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	16
Storage Length (ft)	150		0	150		0	100		0	150		100
Storage Lanes	1		0	0		0	1		0	1		1
Taper Length (ft)	75			75			100			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00	1.00		1.00	0.99		1.00	1.00		1.00		0.97
Frt		0.959			0.938			0.989				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1694	1702	0	1631	1601	0	1397	2575	0	1383	2583	1403
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1693	1702	0	1626	1601	0	1395	2575	0	1378	2583	1365
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			29			8				172
Link Speed (mph)		30			30			35				35
Link Distance (ft)		1427			896			647				438
Travel Time (s)		32.4			20.4			12.6				8.5
Confl. Peds. (#/hr)	1		4	4		1	2		6	6		2
Confl. Bikes (#/hr)			1						1			1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%
Heavy Vehicles (%)	3%	3%	3%	7%	7%	7%	2%	2%	2%	3%	3%	3%
Bus Blockages (#/hr)	0	0	5	0	0	6	0	0	3	0	0	0
Adj. Flow (vph)	42	316	120	99	198	141	94	649	53	120	1032	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	436	0	99	339	0	94	702	0	120	1032	57
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane		Yes										
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.35	1.46	1.35	1.35	1.46	1.15
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	40	226		40	226		40	226		40	226	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	40	6		40	6		40	6		40	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		220			220			220				220

Lanes, Volumes, Timings
2: Montrose & W. Dallas

02/16/2022

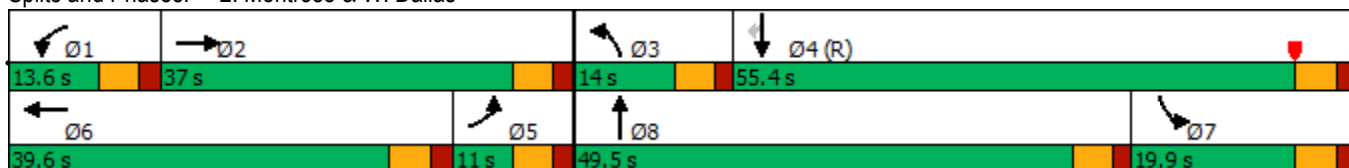


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Size(ft)	6			6			6			6		
Detector 2 Type	Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												4
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	8.0		5.0	8.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	10.6	34.6		10.6	34.6		10.1	25.1		10.1	25.1	
Total Split (s)	11.0	37.0		13.6	39.6		14.0	49.5		19.9	55.4	
Total Split (%)	9.2%	30.8%		11.3%	33.0%		11.7%	41.3%		16.6%	46.2%	
Maximum Green (s)	5.4	31.4		8.0	34.0		8.9	44.4		14.8	50.3	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	2.0		0.0	1.5		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.6	7.6		5.6	7.1		5.1	5.1		5.1	5.1	
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	None		Max	None		None	Min		None	C-Min	C-Min
Walk Time (s)	4.0		4.0		4.0		4.0		4.0		4.0	
Flash Dont Walk (s)	25.0		25.0		16.0		16.0		16.0		16.0	
Pedestrian Calls (#/hr)	2		2		2		2		2		2	
Act Effct Green (s)	11.0	29.4		8.0	26.9		8.9	39.6		19.6	50.3	
Actuated g/C Ratio	0.09	0.24		0.07	0.22		0.07	0.33		0.16	0.42	
v/c Ratio	0.27	1.02		0.91	0.89		0.91	0.82		0.53	0.95	
Control Delay	60.4	91.4		121.1	65.9		123.1	44.9		57.8	52.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	60.4	91.4		121.1	65.9		123.1	44.9		57.8	52.7	
LOS	E	F		F	E		F	D		E	D	
Approach Delay	88.7		78.4		54.2		50.7					
Approach LOS	F		E		D		D					

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 4:SBT, Start of Yellow
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.02
 Intersection Signal Delay: 62.0
 Intersection LOS: E
 Intersection Capacity Utilization 91.4%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 2: Montrose & W. Dallas



Queues

2: Montrose & W. Dallas

02/16/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	42	436	99	339	94	702	120	1032	57
v/c Ratio	0.27	1.02	0.91	0.89	0.91	0.82	0.53	0.95	0.08
Control Delay	60.4	91.4	121.1	65.9	123.1	44.9	57.8	52.7	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.4	91.4	121.1	65.9	123.1	44.9	57.8	52.7	0.2
Queue Length 50th (ft)	33	~358	78	232	74	253	88	400	0
Queue Length 95th (ft)	m#87	#571	#186	#336	#179	317	#180	#549	0
Internal Link Dist (ft)		1347		816		567		358	
Turn Bay Length (ft)	150		150		100		150		100
Base Capacity (vph)	156	428	109	454	103	957	225	1082	672
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	1.02	0.91	0.75	0.91	0.73	0.53	0.95	0.08

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM 6th Signalized Intersection Summary

2: Montrose & W. Dallas

02/16/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	283	107	89	177	126	84	581	47	107	924	51
Future Volume (veh/h)	38	283	107	89	177	126	84	581	47	107	924	51
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1796	1796	1796	1477	1378	1477	1465	1367	1524
Adj Flow Rate, veh/h	42	316	120	99	198	141	94	649	52	120	1032	57
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3	7	7	7	2	2	2	3	3	3
Cap, veh/h	158	306	116	114	215	153	104	768	61	248	1089	526
Arrive On Green	0.03	0.08	0.09	0.07	0.23	0.24	0.07	0.32	0.32	0.18	0.42	0.42
Sat Flow, veh/h	1767	1249	474	1711	950	677	1406	2437	195	1395	2598	1255
Grp Volume(v), veh/h	42	0	436	99	0	339	94	348	353	120	1032	57
Grp Sat Flow(s),veh/h/ln	1767	0	1723	1711	0	1627	1406	1309	1322	1395	1299	1255
Q Serve(g_s), s	2.8	0.0	29.4	6.9	0.0	24.4	8.0	29.8	29.9	9.3	45.9	2.3
Cycle Q Clear(g_c), s	2.8	0.0	29.4	6.9	0.0	24.4	8.0	29.8	29.9	9.3	45.9	2.3
Prop In Lane	1.00		0.28	1.00		0.42	1.00		0.15	1.00		1.00
Lane Grp Cap(c), veh/h	158	0	422	114	0	368	104	413	417	248	1089	526
V/C Ratio(X)	0.27	0.00	1.03	0.87	0.00	0.92	0.90	0.84	0.85	0.48	0.95	0.11
Avail Cap(c_a), veh/h	158	0	422	114	0	441	104	484	489	248	1089	526
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.86	0.00	0.86	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.4	0.0	55.1	55.5	0.0	45.1	55.1	38.3	38.4	44.3	33.6	10.2
Incr Delay (d2), s/veh	3.5	0.0	49.3	54.3	0.0	22.3	57.8	11.4	11.4	1.5	17.3	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	19.4	4.7	0.0	12.1	4.5	10.7	10.8	3.3	16.5	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.9	0.0	104.4	109.7	0.0	67.4	113.0	49.7	49.8	45.8	50.9	10.6
LnGrp LOS	E	A	F	F	A	E	F	D	D	D	D	B
Approach Vol, veh/h		478			438			795			1209	
Approach Delay, s/veh		100.3			77.0			57.2			48.5	
Approach LOS		F			E			E			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.6	37.0	14.0	55.4	16.4	34.2	26.5	42.9				
Change Period (Y+Rc), s	5.6	5.6	5.1	5.1	5.6	5.6	5.1	5.1				
Max Green Setting (Gmax), s	8.0	31.4	8.9	50.3	5.4	34.0	14.8	44.4				
Max Q Clear Time (g_c+I1), s	8.9	31.4	10.0	47.9	4.8	26.4	11.3	31.9				
Green Ext Time (p_c), s	0.0	0.0	0.0	1.9	0.0	2.2	0.1	5.9				
Intersection Summary												
HCM 6th Ctrl Delay			63.6									
HCM 6th LOS			E									

HCM 6th Signalized Intersection Capacity Analysis
2: Montrose & W. Dallas

02/16/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	283	107	89	177	126	84	581	47	107	924	51
Future Volume (veh/h)	38	283	107	89	177	126	84	581	47	107	924	51
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		0.98	1.00		0.99	1.00		0.98	1.00		0.97
Parking Bus Adj	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1856	1856	1856	1796	1796	1796	1477	1378	1477	1465	1367	1524
Adj Flow Rate, veh/h	42	316	120	99	198	141	94	649	52	120	1032	57
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3	7	7	7	2	2	2	3	3	3
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	158	306	116	114	215	153	104	768	61	248	1089	526
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.03	0.08	0.09	0.07	0.23	0.24	0.07	0.32	0.32	0.18	0.42	0.42
Unsig. Movement Delay												
Ln Grp Delay, s/veh	57.9	0.0	104.4	109.7	0.0	67.4	113.0	49.7	49.8	45.8	50.9	10.6
Ln Grp LOS	E	A	F	F	A	E	F	D	D	D	D	B
Approach Vol, veh/h		478			438			795			1209	
Approach Delay, s/veh		100.3			77.0			57.2			48.5	
Approach LOS		F			E			E			D	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		1	2	3	4	6	5	8	7			
Case No		2.0	4.0	2.0	3.0	4.0	2.0	4.0	2.0			
Phs Duration (G+Y+Rc), s		13.6	37.0	14.0	55.4	34.2	16.4	42.9	26.5			
Change Period (Y+Rc), s		5.6	5.6	5.1	5.1	5.6	5.6	5.1	5.1			
Max Green (Gmax), s		8.0	31.4	8.9	50.3	34.0	5.4	44.4	14.8			
Max Allow Headway (MAH), s		4.2	7.8	4.1	7.2	7.8	4.2	7.4	4.1			
Max Q Clear (g_c+I1), s		8.9	31.4	10.0	47.9	26.4	4.8	31.9	11.3			
Green Ext Time (g_e), s		0.0	0.0	0.0	1.9	2.2	0.0	5.9	0.1			
Prob of Phs Call (p_c)		1.00	1.00	0.96	1.00	1.00	1.00	1.00	0.98			
Prob of Max Out (p_x)		0.00	1.00	1.00	1.00	1.00	0.00	0.65	1.00			
Left-Turn Movement Data												
Assigned Mvmt		1		3			5		7			
Mvmt Sat Flow, veh/h		1711		1406			1767		1395			
Through Movement Data												
Assigned Mvmt			2		4	6		8				
Mvmt Sat Flow, veh/h			1249		2598	950		2437				
Right-Turn Movement Data												
Assigned Mvmt			12		14	16		18				
Mvmt Sat Flow, veh/h			474		1255	677		195				
Left Lane Group Data												
Assigned Mvmt		1	0	3	0	0	5	0	7			
Lane Assignment		L (Prot)		L (Prot)			L (Prot)		L (Prot)			

HCM 6th Signalized Intersection Capacity Analysis

2: Montrose & W. Dallas

02/16/2022

Lanes in Grp	1	0	1	0	0	1	0	1
Grp Vol (v), veh/h	99	0	94	0	0	42	0	120
Grp Sat Flow (s), veh/h/ln	1711	0	1406	0	0	1767	0	1395
Q Serve Time (g_s), s	6.9	0.0	8.0	0.0	0.0	2.8	0.0	9.3
Cycle Q Clear Time (g_c), s	6.9	0.0	8.0	0.0	0.0	2.8	0.0	9.3
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	114	0	104	0	0	158	0	248
V/C Ratio (X)	0.87	0.00	0.90	0.00	0.00	0.27	0.00	0.48
Avail Cap (c_a), veh/h	114	0	104	0	0	158	0	248
Upstream Filter (I)	1.00	0.00	1.00	0.00	0.00	0.86	0.00	1.00
Uniform Delay (d1), s/veh	55.5	0.0	55.1	0.0	0.0	54.4	0.0	44.3
Incr Delay (d2), s/veh	54.3	0.0	57.8	0.0	0.0	3.5	0.0	1.5
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	109.7	0.0	113.0	0.0	0.0	57.9	0.0	45.8
1st-Term Q (Q1), veh/ln	3.0	0.0	2.8	0.0	0.0	1.3	0.0	3.2
2nd-Term Q (Q2), veh/ln	1.7	0.0	1.7	0.0	0.0	0.2	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	4.7	0.0	4.5	0.0	0.0	1.4	0.0	3.3
%ile Storage Ratio (RQ%)	0.15	0.00	1.14	0.00	0.00	0.24	0.00	0.56
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	6	0	8	0
Lane Assignment				T			T	
Lanes in Grp	0	0	0	2	0	0	1	0
Grp Vol (v), veh/h	0	0	0	1032	0	0	348	0
Grp Sat Flow (s), veh/h/ln	0	0	0	1299	0	0	1309	0
Q Serve Time (g_s), s	0.0	0.0	0.0	45.9	0.0	0.0	29.8	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	45.9	0.0	0.0	29.8	0.0
Lane Grp Cap (c), veh/h	0	0	0	1089	0	0	413	0
V/C Ratio (X)	0.00	0.00	0.00	0.95	0.00	0.00	0.84	0.00
Avail Cap (c_a), veh/h	0	0	0	1089	0	0	484	0
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	33.6	0.0	0.0	38.3	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	17.3	0.0	0.0	11.4	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	50.9	0.0	0.0	49.7	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	13.9	0.0	0.0	9.4	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	2.6	0.0	0.0	1.3	0.0

HCM 6th Signalized Intersection Capacity Analysis 2: Montrose & W. Dallas

02/16/2022

3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	16.5	0.0	0.0	10.7	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	1.04	0.00	0.00	0.45	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	16	0	18	0
Lane Assignment		T+R		R	T+R		T+R	
Lanes in Grp	0	1	0	1	1	0	1	0
Grp Vol (v), veh/h	0	436	0	57	339	0	353	0
Grp Sat Flow (s), veh/h/ln	0	1723	0	1255	1627	0	1322	0
Q Serve Time (g_s), s	0.0	29.4	0.0	2.3	24.4	0.0	29.9	0.0
Cycle Q Clear Time (g_c), s	0.0	29.4	0.0	2.3	24.4	0.0	29.9	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.28	0.00	1.00	0.42	0.00	0.15	0.00
Lane Grp Cap (c), veh/h	0	422	0	526	368	0	417	0
V/C Ratio (X)	0.00	1.03	0.00	0.11	0.92	0.00	0.85	0.00
Avail Cap (c_a), veh/h	0	422	0	526	441	0	489	0
Upstream Filter (I)	0.00	0.86	0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	55.1	0.0	10.2	45.1	0.0	38.4	0.0
Incr Delay (d2), s/veh	0.0	49.3	0.0	0.4	22.3	0.0	11.4	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	104.4	0.0	10.6	67.4	0.0	49.8	0.0
1st-Term Q (Q1), veh/ln	0.0	13.6	0.0	1.0	9.8	0.0	9.5	0.0
2nd-Term Q (Q2), veh/ln	0.0	5.8	0.0	0.1	2.3	0.0	1.3	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	19.4	0.0	1.0	12.1	0.0	10.8	0.0
%ile Storage Ratio (RQ%)	0.00	0.38	0.00	0.26	0.37	0.00	0.46	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	63.6
HCM 6th LOS	E

HCM 6th Signals-Pedestrians
2: Montrose & W. Dallas

02/16/2022

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	45.3	46.0	60.1	76.0
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	3	4	5	6
Number of Right-Turn Islands	0	0	0	0
Type of Control	None	None	None	None
Corresponding Signal Phase	4	8	2	6
Effective Walk Time (s)	0.0	0.0	0.0	0.0
Right Corner Size A (ft)	9.0	9.0	9.0	9.0
Right Corner Size B (ft)	9.0	9.0	9.0	9.0
Right Corner Curb Radius (ft)	0.0	0.0	0.0	0.0
Right Corner Total Area (sq.ft)	81.00	81.00	81.00	81.00
Ped. Left-Right Flow Rate (p/h)	0	0	0	0
Ped. Right-Left Flow Rate (p/h)	0	0	0	0
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	30	30	35	35
Right Corner Area per Ped (sq.ft)	0.0	0.0	0.0	0.0
Right Corner Quality of Service	-	-	-	-
Ped. Circulation Area (sq.ft)	0.0	0.0	0.0	0.0
Crosswalk Circulation Code	-	-	-	-
Pedestrian Delay (s/p)	60.0	60.0	60.0	60.0
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.23	2.38	2.79	2.86
Pedestrian Crosswalk LOS	B	B	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	478	438	795	1209
Effct. Green for Bike (s)	29.4	26.9	39.6	50.3
Cross Street Width (ft)	61.7	76.0	46.0	36.2
Through Lanes Number	1	1	2	2
Through Lane Width (ft)	11.0	11.0	12.0	12.0
Bicycle Lane Width (ft)	5.0	5.0	0.0	0.0
Striped Parking Lane Width (ft)	2.0	2.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	Yes	Yes	Yes	Yes
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	490	448	660	838
Bicycle Delay (s/bike)	34.2	36.1	26.9	20.2
Bicycle Compliance	Poor	Poor	Fair	Fair
Bicycle LOS Score	2.01	2.16	2.92	3.11
Bicycle LOS	B	B	C	C

Lanes, Volumes, Timings
1: Waugh & W. Dallas

02/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↕	↕↕		↕	↕↕	↕
Traffic Volume (vph)	65	144	39	95	178	190	45	1141	34	187	686	98
Future Volume (vph)	65	144	39	95	178	190	45	1141	34	187	686	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	12	10	10	12	12	10	10	12	10	10
Storage Length (ft)	0		0	0		0	100		0	150		0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (ft)	25			25			75			75		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor		1.00			0.99		1.00	1.00		1.00		0.98
Frt		0.976			0.938			0.996				0.850
Flt Protected		0.987			0.990		0.950			0.950		
Satd. Flow (prot)	0	3401	0	0	3054	0	1787	3319	0	1787	3336	1492
Flt Permitted		0.575			0.765		0.300			0.160		
Satd. Flow (perm)	0	1977	0	0	2359	0	563	3319	0	300	3336	1458
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			161			3				103
Link Speed (mph)		30			30			30				30
Link Distance (ft)		579			1427			606				794
Travel Time (s)		13.2			32.4			13.8				18.0
Confl. Peds. (#/hr)	14		3	3		14	7		16	16		7
Confl. Bikes (#/hr)						4			1			2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Bus Blockages (#/hr)	0	0	2	0	0	7	0	0	0	0	0	0
Adj. Flow (vph)	68	152	41	100	187	200	47	1201	36	197	722	103
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	261	0	0	487	0	47	1237	0	197	722	103
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.09	1.00	1.00	1.09	1.09	1.00	1.00	1.09	1.09	1.00	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	1
Detector Template	Left			Left			Left			Left		Right
Leading Detector (ft)	40	6		40	6		40	6		40	6	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	40	6		40	6		40	6		40	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		2			6		3	8		7		4

Lanes, Volumes, Timings
1: Waugh & W. Dallas

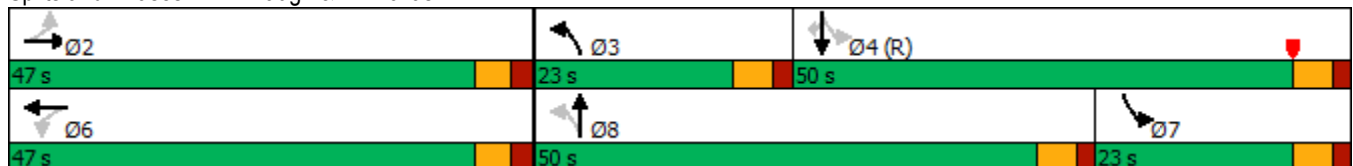
02/14/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		4
Detector Phase	2	2		6	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		4.0	12.0		4.0	12.0	12.0
Minimum Split (s)	30.4	30.4		30.4	30.4		10.3	30.3		10.3	30.3	30.3
Total Split (s)	47.0	47.0		47.0	47.0		23.0	50.0		23.0	50.0	50.0
Total Split (%)	39.2%	39.2%		39.2%	39.2%		19.2%	41.7%		19.2%	41.7%	41.7%
Maximum Green (s)	41.6	41.6		41.6	41.6		17.7	44.7		17.7	44.7	44.7
Yellow Time (s)	3.2	3.2		3.2	3.2		3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	2.2	2.2		2.2	2.2		1.7	1.7		1.7	1.7	1.7
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.4			5.4		5.3	5.3		5.3	5.3	5.3
Lead/Lag							Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	C-Max	C-Max
Walk Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0			20.0			20.0	20.0
Pedestrian Calls (#/hr)	8	8		8	8			11			11	11
Act Effct Green (s)		22.7			22.7		63.6	63.6		77.1	77.1	77.1
Actuated g/C Ratio		0.19			0.19		0.53	0.53		0.64	0.64	0.64
v/c Ratio		0.67			0.85		0.13	0.70		0.48	0.34	0.11
Control Delay		49.5			31.4		16.6	24.9		29.2	11.8	2.6
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		49.5			31.4		16.6	24.9		29.2	11.8	2.6
LOS		D			C		B	C		C	B	A
Approach Delay		49.5			31.4			24.6			14.2	
Approach LOS		D			C			C			B	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 113.7 (95%), Referenced to phase 4:SBTL, Start of Yellow
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 24.3 Intersection LOS: C
 Intersection Capacity Utilization 87.2% ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 1: Waugh & W. Dallas



Queues

1: Waugh & W. Dallas

02/14/2022



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	261	487	47	1237	197	722	103
v/c Ratio	0.67	0.85	0.13	0.70	0.48	0.34	0.11
Control Delay	49.5	31.4	16.6	24.9	29.2	11.8	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.5	31.4	16.6	24.9	29.2	11.8	2.6
Queue Length 50th (ft)	92	208	17	362	60	130	0
Queue Length 95th (ft)	128	m212	42	516	118	210	26
Internal Link Dist (ft)	499	1347		526		714	
Turn Bay Length (ft)			100		150		
Base Capacity (vph)	698	922	478	1760	412	2144	973
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.53	0.10	0.70	0.48	0.34	0.11

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

1: Waugh & W. Dallas

02/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔		↗	↕↔		↗	↕↕	↗
Traffic Volume (vph)	65	144	39	95	178	190	45	1141	34	187	686	98
Future Volume (vph)	65	144	39	95	178	190	45	1141	34	187	686	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	10	12	12	10	10	12	10	10
Total Lost time (s)		5.4			5.4		5.3	5.3		5.3	5.3	5.3
Lane Util. Factor		0.95			0.95		1.00	0.95		1.00	0.95	1.00
Frbp, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frt		0.98			0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3396			3051		1786	3318		1787	3336	1459
Flt Permitted		0.58			0.76		0.30	1.00		0.16	1.00	1.00
Satd. Flow (perm)		1979			2356		564	3318		301	3336	1459
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	68	152	41	100	187	200	47	1201	36	197	722	103
RTOR Reduction (vph)	0	16	0	0	131	0	0	1	0	0	0	38
Lane Group Flow (vph)	0	245	0	0	356	0	47	1236	0	197	722	65
Confl. Peds. (#/hr)	14		3	3			14	7		16	16	7
Confl. Bikes (#/hr)							4			1		2
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Bus Blockages (#/hr)	0	0	2	0	0	7	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		2			6		3	8		7	4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)		22.7			22.7		62.6	62.6		76.1	76.1	76.1
Effective Green, g (s)		22.7			22.7		62.6	62.6		76.1	76.1	76.1
Actuated g/C Ratio		0.19			0.19		0.52	0.52		0.63	0.63	0.63
Clearance Time (s)		5.4			5.4		5.3	5.3		5.3	5.3	5.3
Vehicle Extension (s)		3.0			3.0		2.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)		374			445		347	1730		422	2115	925
v/s Ratio Prot							0.01	c0.37		c0.07	0.22	
v/s Ratio Perm		0.12			c0.15		0.06			0.22		0.04
v/c Ratio		0.65			0.80		0.14	0.71		0.47	0.34	0.07
Uniform Delay, d1		45.0			46.5		14.7	21.9		25.9	10.2	8.4
Progression Factor		1.00			0.73		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		4.1			6.2		0.1	2.5		0.3	0.4	0.1
Delay (s)		49.1			40.2		14.8	24.4		26.2	10.7	8.6
Level of Service		D			D		B	C		C	B	A
Approach Delay (s)		49.1			40.2			24.1			13.5	
Approach LOS		D			D			C			B	

Intersection Summary

HCM 2000 Control Delay	25.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	87.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary

1: Waugh & W. Dallas

02/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔		↗	↕↔		↗	↕↕	↗
Traffic Volume (veh/h)	65	144	39	95	178	190	45	1141	34	187	686	98
Future Volume (veh/h)	65	144	39	95	178	190	45	1141	34	187	686	98
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	0.99		0.97	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	68	152	41	100	187	200	47	1201	36	197	722	103
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	1	1	1	1	1	1	1	1	1
Cap, veh/h	120	359	109	148	243	307	240	1321	40	505	2093	914
Arrive On Green	0.25	0.25	0.25	0.08	0.08	0.08	0.03	0.37	0.37	0.24	0.58	0.58
Sat Flow, veh/h	280	1407	427	417	951	1203	1795	3547	106	1795	3582	1564
Grp Volume(v), veh/h	107	0	154	253	0	234	47	606	631	197	722	103
Grp Sat Flow(s),veh/h/ln	512	0	1603	1166	0	1405	1795	1791	1863	1795	1791	1564
Q Serve(g_s), s	8.7	0.0	9.5	17.5	0.0	19.3	2.1	38.5	38.6	5.6	12.6	3.5
Cycle Q Clear(g_c), s	28.0	0.0	9.5	27.0	0.0	19.3	2.1	38.5	38.6	5.6	12.6	3.5
Prop In Lane	0.63		0.27	0.39		0.86	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	179	0	409	339	0	358	240	667	694	505	2093	914
V/C Ratio(X)	0.60	0.00	0.38	0.75	0.00	0.65	0.20	0.91	0.91	0.39	0.34	0.11
Avail Cap(c_a), veh/h	289	0	556	479	0	487	456	667	694	505	2093	914
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.35	0.00	0.35	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.3	0.0	36.8	56.1	0.0	49.8	27.4	35.7	35.7	35.6	13.0	11.1
Incr Delay (d2), s/veh	3.2	0.0	0.6	1.4	0.0	0.7	0.1	18.5	18.0	0.2	0.5	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	0.0	3.8	8.2	0.0	7.4	0.9	19.9	20.7	4.7	5.1	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.5	0.0	37.4	57.5	0.0	50.5	27.5	54.2	53.8	35.8	13.4	11.3
LnGrp LOS	D	A	D	E	A	D	C	D	D	D	B	B
Approach Vol, veh/h		261			487			1284			1022	
Approach Delay, s/veh		43.6			54.1			53.0			17.5	
Approach LOS		D			D			D			B	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		36.0	8.6	75.4		36.0	34.0	50.0				
Change Period (Y+Rc), s		5.4	* 5.3	* 5.3		5.4	* 5.3	* 5.3				
Max Green Setting (Gmax), s		41.6	* 18	* 45		41.6	* 18	* 45				
Max Q Clear Time (g_c+I1), s		30.0	4.1	14.6		29.0	7.6	40.6				
Green Ext Time (p_c), s		0.6	0.0	2.7		1.2	0.3	1.7				

Intersection Summary




















HCM 6th Ctrl Delay	40.5
HCM 6th LOS	D

Notes

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

HCM 6th Signalized Intersection Capacity Analysis
1: Waugh & W. Dallas

02/14/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	144	39	95	178	190	45	1141	34	187	686	98
Future Volume (veh/h)	65	144	39	95	178	190	45	1141	34	187	686	98
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		0.98	0.99		0.97	1.00		0.97	1.00		0.98
Parking Bus Adj	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	68	152	41	100	187	200	47	1201	36	197	722	103
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	120	359	109	148	243	307	240	1321	40	505	2093	914
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.25	0.25	0.25	0.08	0.08	0.08	0.03	0.37	0.37	0.24	0.58	0.58
Unsig. Movement Delay												
Ln Grp Delay, s/veh	52.5	0.0	37.4	57.5	0.0	50.5	27.5	54.2	53.8	35.8	13.4	11.3
Ln Grp LOS	D	A	D	E	A	D	C	D	D	D	B	B
Approach Vol, veh/h		261			487			1284			1022	
Approach Delay, s/veh		43.6			54.1			53.0			17.5	
Approach LOS		D			D			D			B	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs			2	3	4		6	8	7			
Case No			8.0	1.2	3.0		8.0	4.0	1.3			
Phs Duration (G+Y+Rc), s			36.0	8.6	75.4		36.0	50.0	34.0			
Change Period (Y+Rc), s			5.4	* 5.3	* 5.3		5.4	* 5.3	* 5.3			
Max Green (Gmax), s			41.6	* 18	* 45		41.6	* 45	* 18			
Max Allow Headway (MAH), s			3.8	3.2	3.5		3.7	3.5	3.2			
Max Q Clear (g_c+I1), s			30.0	4.1	14.6		29.0	40.6	7.6			
Green Ext Time (g_e), s			0.6	0.0	2.7		1.2	1.7	0.3			
Prob of Phs Call (p_c)			1.00	0.79	1.00		1.00	1.00	1.00			
Prob of Max Out (p_x)			0.00	0.00	0.00		0.01	0.00	0.00			
Left-Turn Movement Data												
Assigned Mvmt			5	3			1		7			
Mvmt Sat Flow, veh/h			280	1795			417		1795			
Through Movement Data												
Assigned Mvmt			2		4		6	8				
Mvmt Sat Flow, veh/h			1407		3582		951	3547				
Right-Turn Movement Data												
Assigned Mvmt			12		14		16	18				
Mvmt Sat Flow, veh/h			427		1564		1203	106				
Left Lane Group Data												
Assigned Mvmt		0	5	3	0	0	1	0	7			
Lane Assignment			L+TL (Pr/Pm)				L+T		L (Pr/Pm)			

HCM 6th Signalized Intersection Capacity Analysis
 1: Waugh & W. Dallas

02/14/2022

Lanes in Grp	0	1	1	0	0	1	0	1
Grp Vol (v), veh/h	0	107	47	0	0	253	0	197
Grp Sat Flow (s), veh/h/ln	0	512	1795	0	0	1166	0	1795
Q Serve Time (g_s), s	0.0	8.7	2.1	0.0	0.0	17.5	0.0	5.6
Cycle Q Clear Time (g_c), s	0.0	28.0	2.1	0.0	0.0	27.0	0.0	5.6
Perm LT Sat Flow (s_l), veh/h/ln	0	1009	668	0	0	1198	0	454
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	30.6	38.1	0.0	0.0	30.6	0.0	34.1
Perm LT Serve Time (g_u), s	0.0	11.3	23.5	0.0	0.0	21.1	0.0	4.1
Perm LT Q Serve Time (g_ps), s	0.0	8.7	1.1	0.0	0.0	17.5	0.0	4.1
Time to First Blk (g_f), s	0.0	1.2	0.0	0.0	0.0	1.8	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	1.2	0.0	0.0	0.0	1.8	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	0.63	1.00	0.00	0.00	0.39	0.00	1.00
Lane Grp Cap (c), veh/h	0	179	240	0	0	339	0	505
V/C Ratio (X)	0.00	0.60	0.20	0.00	0.00	0.75	0.00	0.39
Avail Cap (c_a), veh/h	0	289	456	0	0	479	0	505
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	0.35	0.00	1.00
Uniform Delay (d1), s/veh	0.0	49.3	27.4	0.0	0.0	56.1	0.0	35.6
Incr Delay (d2), s/veh	0.0	3.2	0.1	0.0	0.0	1.4	0.0	0.2
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	52.5	27.5	0.0	0.0	57.5	0.0	35.8
1st-Term Q (Q1), veh/ln	0.0	3.2	0.9	0.0	0.0	8.1	0.0	4.7
2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.0	0.0	0.1	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	3.3	0.9	0.0	0.0	8.2	0.0	4.7
%ile Storage Ratio (RQ%)	0.00	0.16	0.23	0.00	0.00	0.16	0.00	0.79
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	8	0
Lane Assignment				T			T	
Lanes in Grp	0	0	0	2	0	0	1	0
Grp Vol (v), veh/h	0	0	0	722	0	0	606	0
Grp Sat Flow (s), veh/h/ln	0	0	0	1791	0	0	1791	0
Q Serve Time (g_s), s	0.0	0.0	0.0	12.6	0.0	0.0	38.5	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	12.6	0.0	0.0	38.5	0.0
Lane Grp Cap (c), veh/h	0	0	0	2093	0	0	667	0
V/C Ratio (X)	0.00	0.00	0.00	0.34	0.00	0.00	0.91	0.00
Avail Cap (c_a), veh/h	0	0	0	2093	0	0	667	0
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	13.0	0.0	0.0	35.7	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.5	0.0	0.0	18.5	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	13.4	0.0	0.0	54.2	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	5.0	0.0	0.0	16.5	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.1	0.0	0.0	3.4	0.0

HCM 6th Signalized Intersection Capacity Analysis

1: Waugh & W. Dallas

02/14/2022

3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	5.1	0.0	0.0	19.9	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.17	0.00	0.00	0.89	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	18	0
Lane Assignment		T+R		R		T+R	T+R	
Lanes in Grp	0	1	0	1	0	1	1	0
Grp Vol (v), veh/h	0	154	0	103	0	234	631	0
Grp Sat Flow (s), veh/h/ln	0	1603	0	1564	0	1405	1863	0
Q Serve Time (g_s), s	0.0	9.5	0.0	3.5	0.0	19.3	38.6	0.0
Cycle Q Clear Time (g_c), s	0.0	9.5	0.0	3.5	0.0	19.3	38.6	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.27	0.00	1.00	0.00	0.86	0.06	0.00
Lane Grp Cap (c), veh/h	0	409	0	914	0	358	694	0
V/C Ratio (X)	0.00	0.38	0.00	0.11	0.00	0.65	0.91	0.00
Avail Cap (c_a), veh/h	0	556	0	914	0	487	694	0
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	0.35	1.00	0.00
Uniform Delay (d1), s/veh	0.0	36.8	0.0	11.1	0.0	49.8	35.7	0.0
Incr Delay (d2), s/veh	0.0	0.6	0.0	0.2	0.0	0.7	18.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	37.4	0.0	11.3	0.0	50.5	53.8	0.0
1st-Term Q (Q1), veh/ln	0.0	3.7	0.0	1.2	0.0	7.3	17.2	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.1	0.0	0.1	3.5	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	3.8	0.0	1.3	0.0	7.4	20.7	0.0
%ile Storage Ratio (RQ%)	0.00	0.18	0.00	0.04	0.00	0.14	0.92	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	40.5
HCM 6th LOS	D

Notes

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

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	49.0	42.5	78.2	78.0
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	4	4	5	6
Number of Right-Turn Islands	0	0	0	0
Type of Control	None	None	None	None
Corresponding Signal Phase	4	8	2	6
Effective Walk Time (s)	0.0	0.0	0.0	0.0
Right Corner Size A (ft)	9.0	9.0	9.0	9.0
Right Corner Size B (ft)	9.0	9.0	9.0	9.0
Right Corner Curb Radius (ft)	0.0	0.0	0.0	0.0
Right Corner Total Area (sq.ft)	81.00	81.00	81.00	81.00
Ped. Left-Right Flow Rate (p/h)	0	0	0	0
Ped. Right-Left Flow Rate (p/h)	0	0	0	0
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	30	30	30	30
Right Corner Area per Ped (sq.ft)	0.0	0.0	0.0	0.0
Right Corner Quality of Service	-	-	-	-
Ped. Circulation Area (sq.ft)	0.0	0.0	0.0	0.0
Crosswalk Circulation Code	-	-	-	-
Pedestrian Delay (s/p)	60.0	60.0	60.0	60.0
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.30	2.37	2.74	2.88
Pedestrian Crosswalk LOS	B	B	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	261	487	1284	1022
Effct. Green for Bike (s)	22.7	22.7	63.6	77.1
Cross Street Width (ft)	56.2	66.0	42.3	48.1
Through Lanes Number	2	2	2	2
Through Lane Width (ft)	12.0	10.0	10.0	10.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	No	No	No	No
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	378	378	1060	1285
Bicycle Delay (s/bike)	39.4	39.4	13.3	7.7
Bicycle Compliance	Poor	Poor	Fair	Good
Bicycle LOS Score	2.63	3.40	3.69	3.57
Bicycle LOS	C	C	D	D

Lanes, Volumes, Timings
2: Montrose & W. Dallas

02/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↕	↕↕		↕	↕↕	↕
Traffic Volume (vph)	52	304	109	108	342	181	81	1071	74	118	681	58
Future Volume (vph)	52	304	109	108	342	181	81	1071	74	118	681	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1600	1500	1600	1600	1500	1600
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	16
Storage Length (ft)	0		0	0		0	100		0	150		100
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (ft)	25			25			100			50		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor		0.99			1.00			0.99		0.99		0.99
Frt		0.965			0.957			0.990				0.850
Flt Protected		0.994			0.992		0.950			0.950		
Satd. Flow (prot)	0	3295	0	0	3280	0	1490	2752	0	1505	2822	1526
Flt Permitted		0.664			0.571		0.950			0.950		
Satd. Flow (perm)	0	2201	0	0	1887	0	1490	2752	0	1484	2822	1507
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			25			4				135
Link Speed (mph)		30			30			35				35
Link Distance (ft)		1427			808			614				845
Travel Time (s)		32.4			18.4			12.0				16.5
Confl. Peds. (#/hr)			5	5					19	19		
Confl. Bikes (#/hr)												1
Peak Hour 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
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	2%	2%	2%	1%	1%	1%
Bus Blockages (#/hr)	0	0	5	0	0	5	0	0	11	0	0	0
Adj. Flow (vph)	52	304	109	108	342	181	81	1071	74	118	681	58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	465	0	0	631	0	81	1145	0	118	681	58
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.24	1.35	1.24	1.24	1.35	1.06
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	40	226		40	226		40	226		40	226	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	40	6		40	6		40	6		40	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		220			220			220				220
Detector 2 Size(ft)		6			6			6				6

Lanes, Volumes, Timings
 2: Montrose & W. Dallas

02/14/2022

Lane Group	Ø2	Ø3	Ø4	Ø6	Ø7	Ø8	Ø10	Ø11	Ø12	Ø14	Ø15	Ø16
Lane Configurations												
Traffic Volume (vph)												
Future Volume (vph)												
Ideal Flow (vphpl)												
Lane Width (ft)												
Storage Length (ft)												
Storage Lanes												
Taper Length (ft)												
Lane Util. Factor												
Ped Bike Factor												
Frt												
Flt Protected												
Satd. Flow (prot)												
Flt Permitted												
Satd. Flow (perm)												
Right Turn on Red												
Satd. Flow (RTOR)												
Link Speed (mph)												
Link Distance (ft)												
Travel Time (s)												
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor												
Heavy Vehicles (%)												
Bus Blockages (#/hr)												
Adj. Flow (vph)												
Shared Lane Traffic (%)												
Lane Group Flow (vph)												
Enter Blocked Intersection												
Lane Alignment												
Median Width(ft)												
Link Offset(ft)												
Crosswalk Width(ft)												
Two way Left Turn Lane												
Headway Factor												
Turning Speed (mph)												
Number of Detectors												
Detector Template												
Leading Detector (ft)												
Trailing Detector (ft)												
Detector 1 Position(ft)												
Detector 1 Size(ft)												
Detector 1 Type												
Detector 1 Channel												
Detector 1 Extend (s)												
Detector 1 Queue (s)												
Detector 1 Delay (s)												
Detector 2 Position(ft)												
Detector 2 Size(ft)												

Lanes, Volumes, Timings

2: Montrose & W. Dallas

02/14/2022

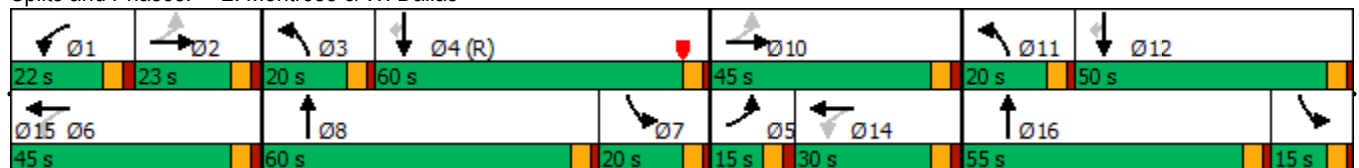


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Type	Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	5	2 10		1	6 14		3 11	8 16		7 15	4 12	
Permitted Phases	2 10					6 14					4 12	
Detector Phase	5	2 10		1	6 14		3 11	8 16		7 15	4 12	
Switch Phase												
Minimum Initial (s)	5.0			5.0								
Minimum Split (s)	10.6			10.6								
Total Split (s)	15.0			22.0								
Total Split (%)	6.3%			9.2%								
Maximum Green (s)	9.4			16.4								
Yellow Time (s)	3.6			3.6								
All-Red Time (s)	2.0			2.0								
Lost Time Adjust (s)												
Total Lost Time (s)												
Lead/Lag	Lead			Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0			2.0								
Recall Mode	Max			Max								
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	53.8			65.8			22.4	104.8		23.8	106.2	
Actuated g/C Ratio	0.22			0.27			0.09	0.44		0.10	0.44	
v/c Ratio	0.86			0.99			0.59	0.95		0.79	0.55	
Control Delay	77.6			91.5			68.6	50.6		90.8	26.7	
Queue Delay	0.0			0.0			0.0	0.0		0.0	0.0	
Total Delay	77.6			91.5			68.6	50.6		90.8	26.7	
LOS	E			F			E	D		F	C	
Approach Delay	77.6			91.5			51.8			33.7		
Approach LOS	E			F			D			C		

Intersection Summary

Area Type: Other
 Cycle Length: 240
 Actuated Cycle Length: 240
 Offset: 64 (27%), Referenced to phase 4:SBT, Start of Yellow
 Natural Cycle: 165
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.99
 Intersection Signal Delay: 58.6
 Intersection LOS: E
 Intersection Capacity Utilization 109.6%
 ICU Level of Service H
 Analysis Period (min) 15

Splits and Phases: 2: Montrose & W. Dallas



Lanes, Volumes, Timings
2: Montrose & W. Dallas

02/14/2022

Lane Group	Ø2	Ø3	Ø4	Ø6	Ø7	Ø8	Ø10	Ø11	Ø12	Ø14	Ø15	Ø16
Detector 2 Type												
Detector 2 Channel												
Detector 2 Extend (s)												
Turn Type												
Protected Phases	2	3	4	6	7	8	10	11	12	14	15	16
Permitted Phases												
Detector Phase												
Switch Phase												
Minimum Initial (s)	8.0	5.0	10.0	8.0	5.0	10.0	5.0	5.0	10.0	5.0	5.0	10.0
Minimum Split (s)	34.6	10.1	25.1	34.6	10.1	25.1	34.6	10.1	25.1	34.6	10.1	25.1
Total Split (s)	23.0	20.0	60.0	45.0	20.0	60.0	45.0	20.0	50.0	30.0	15.0	55.0
Total Split (%)	10%	8%	25%	19%	8%	25%	19%	8%	21%	13%	6%	23%
Maximum Green (s)	17.4	14.9	54.9	39.4	14.9	54.9	39.4	14.9	44.9	24.4	9.9	49.9
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	2.0	1.5	1.5	2.0	1.5	1.5	2.0	1.5	1.5	2.0	1.5	1.5
Lost Time Adjust (s)												
Total Lost Time (s)												
Lead/Lag	Lag	Lead	Lag		Lag	Lead		Lead	Lag	Lag	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	None	C-Min	None	None	Min	Min	None	Min	Min	None	Min
Walk Time (s)	4.0		4.0	4.0		4.0	4.0		4.0	4.0		4.0
Flash Dont Walk (s)	25.0		16.0	25.0		16.0	25.0		16.0	25.0		16.0
Pedestrian Calls (#/hr)	2		5	2		5	1		5	1		5
Act Effct Green (s)												
Actuated g/C Ratio												
v/c Ratio												
Control Delay												
Queue Delay												
Total Delay												
LOS												
Approach Delay												
Approach LOS												
Intersection Summary												

Queues

2: Montrose & W. Dallas

02/14/2022



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	465	631	81	1145	118	681	58
v/c Ratio	0.86	0.99	0.59	0.95	0.79	0.55	0.08
Control Delay	77.6	91.5	68.6	50.6	90.8	26.7	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.6	91.5	68.6	50.6	90.8	26.7	0.2
Queue Length 50th (ft)	235	316	64	457	93	198	0
Queue Length 95th (ft)	#328	#489	98	#571	#191	243	0
Internal Link Dist (ft)	1347	728		534		765	
Turn Bay Length (ft)			100		150		100
Base Capacity (vph)	543	636	185	1203	155	1249	742
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.99	0.44	0.95	0.76	0.55	0.08

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2: Montrose & W. Dallas

02/14/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↕	↕↕		↕	↕↕	↕
Traffic Volume (vph)	52	304	109	108	342	181	81	1071	74	118	681	58
Future Volume (vph)	52	304	109	108	342	181	81	1071	74	118	681	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1600	1500	1600	1600	1500	1600
Lane Width	11	11	11	11	11	11	12	12	12	12	12	16
Total Lost time (s)		7.6			4.6		5.1	5.1		5.1	5.1	5.1
Lane Util. Factor		0.95			0.95		1.00	0.95		1.00	0.95	1.00
Frbp, ped/bikes		0.99			1.00		1.00	0.99		1.00	1.00	0.99
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frt		0.96			0.96		1.00	0.99		1.00	1.00	0.85
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3296			3277		1490	2753		1505	2822	1507
Flt Permitted		0.66			0.57		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		2200			1886		1490	2753		1505	2822	1507
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	52	304	109	108	342	181	81	1071	74	118	681	58
RTOR Reduction (vph)	0	12	0	0	18	0	0	2	0	0	0	32
Lane Group Flow (vph)	0	453	0	0	613	0	81	1143	0	118	681	26
Confl. Peds. (#/hr)			5	5					19	19		
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	2%	2%	2%	1%	1%	1%
Bus Blockages (#/hr)	0	0	5	0	0	5	0	0	11	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	5	2 10		1	6 14		3 11	8 16		7 15	4 12	
Permitted Phases	2 10			6 14								4 12
Actuated Green, G (s)		57.8			63.8		22.4	104.8		23.8	106.2	106.2
Effective Green, g (s)		53.8			65.8		22.4	104.8		23.8	106.2	106.2
Actuated g/C Ratio		0.22			0.27		0.09	0.44		0.10	0.44	0.44
Clearance Time (s)												
Vehicle Extension (s)												
Lane Grp Cap (vph)		531			617		139	1202		149	1248	666
v/s Ratio Prot		c0.03			c0.07		0.05	c0.42		c0.08	0.24	
v/s Ratio Perm		0.16			c0.20							0.02
v/c Ratio		0.85			0.99		0.58	0.95		0.79	0.55	0.04
Uniform Delay, d1		89.3			86.9		104.3	65.1		105.7	49.2	37.9
Progression Factor		1.05			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		12.0			34.3		6.1	15.6		24.3	0.3	0.0
Delay (s)		105.6			121.2		110.4	80.7		130.0	49.4	38.0
Level of Service		F			F		F	F		F	D	D
Approach Delay (s)		105.6			121.2			82.7			59.7	
Approach LOS		F			F			F			E	
Intersection Summary												
HCM 2000 Control Delay			87.5				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			240.0			Sum of lost time (s)			43.8			
Intersection Capacity Utilization			109.6%			ICU Level of Service			H			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Edition methodology does not support non-NEMA phasing.

HCM 6th Edition methodology does not support non-NEMA phasing.

HCM 6th Signals-Pedestrians
2: Montrose & W. Dallas

02/14/2022

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	45.8	46.0	60.1	76.1
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	4	4	5	6
Number of Right-Turn Islands	0	0	0	0
Type of Control	None	None	None	None
Corresponding Signal Phase	4	8	2	6
Effective Walk Time (s)	0.0	0.0	0.0	0.0
Right Corner Size A (ft)	9.0	9.0	9.0	9.0
Right Corner Size B (ft)	9.0	9.0	9.0	9.0
Right Corner Curb Radius (ft)	0.0	0.0	0.0	0.0
Right Corner Total Area (sq.ft)	81.00	81.00	81.00	81.00
Ped. Left-Right Flow Rate (p/h)	0	0	0	0
Ped. Right-Left Flow Rate (p/h)	0	0	0	0
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	30	30	35	35
Right Corner Area per Ped (sq.ft)	0.0	0.0	0.0	0.0
Right Corner Quality of Service	-	-	-	-
Ped. Circulation Area (sq.ft)	0.0	0.0	0.0	0.0
Crosswalk Circulation Code	-	-	-	-
Pedestrian Delay (s/p)	120.0	120.0	120.0	120.0
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.41	2.46	2.83	2.91
Pedestrian Crosswalk LOS	B	B	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	465	631	1226	857
Effct. Green for Bike (s)	53.8	65.8	104.8	106.2
Cross Street Width (ft)	60.1	76.1	46.0	45.8
Through Lanes Number	2	2	2	2
Through Lane Width (ft)	11.0	11.0	12.0	12.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	No	No	No	No
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	448	548	873	885
Bicycle Delay (s/bike)	72.2	63.2	38.1	37.3
Bicycle Compliance	Poor	Poor	Poor	Poor
Bicycle LOS Score	3.08	3.46	3.27	2.97
Bicycle LOS	C	C	C	C

Lanes, Volumes, Timings
1: Waugh & W. Dallas

02/16/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	144	39	95	178	190	45	1141	34	187	686	98
Future Volume (vph)	65	144	39	95	178	190	45	1141	34	187	686	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	12	10	10	12	12	10	10	12	10	10
Storage Length (ft)	150		0	150		0	100		0	150		0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	0.99	1.00		1.00	0.98		1.00	1.00				0.96
Frt		0.968			0.922			0.996				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1652	1797	0	1668	1589	0	1787	3317	0	1787	3336	1492
Flt Permitted	0.950			0.950			0.234			0.096		
Satd. Flow (perm)	1632	1797	0	1662	1589	0	438	3317	0	181	3336	1436
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			43			3				119
Link Speed (mph)		30			30			30				30
Link Distance (ft)		579			1427			606				794
Travel Time (s)		13.2			32.4			13.8				18.0
Confl. Peds. (#/hr)	14		3	3		14	7		16	16		7
Confl. Bikes (#/hr)						4			1			2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Bus Blockages (#/hr)	0	0	2	0	0	7	0	0	0	0	0	0
Adj. Flow (vph)	68	152	41	100	187	200	47	1201	36	197	722	103
Shared Lane Traffic (%)												
Lane Group Flow (vph)	68	193	0	100	387	0	47	1237	0	197	722	103
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.09	1.00	1.00	1.09	1.09	1.00	1.00	1.09	1.09	1.00	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	1
Detector Template	Left			Left			Left			Left		Right
Leading Detector (ft)	40	6		40	6		40	6		40	6	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	40	6		40	6		40	6		40	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Turn Type	Prot	NA		Prot	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	

Lanes, Volumes, Timings
1: Waugh & W. Dallas

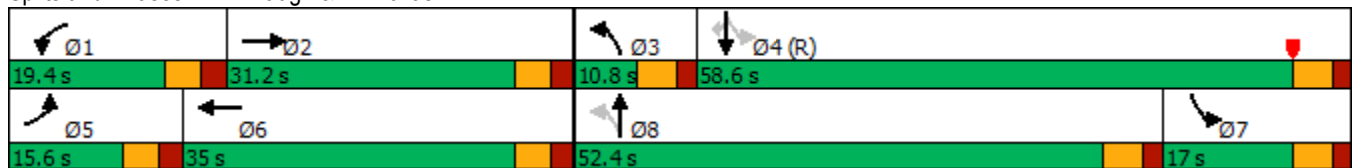
02/16/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							8			4		4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		4.0	12.0		4.0	12.0	12.0
Minimum Split (s)	15.4	30.4		15.4	30.4		10.3	30.3		10.3	30.3	30.3
Total Split (s)	15.6	31.2		19.4	35.0		10.8	52.4		17.0	58.6	58.6
Total Split (%)	13.0%	26.0%		16.2%	29.2%		9.0%	43.7%		14.2%	48.8%	48.8%
Maximum Green (s)	10.2	25.8		14.0	29.6		5.5	47.1		11.7	53.3	53.3
Yellow Time (s)	3.2	3.2		3.2	3.2		3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	2.2	2.2		2.2	2.2		1.7	1.7		1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.4	5.4		5.4	5.4		5.3	5.3		5.3	5.3	5.3
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	C-Max	C-Max
Walk Time (s)		5.0			5.0			5.0			5.0	5.0
Flash Dont Walk (s)		20.0			20.0			20.0			20.0	20.0
Pedestrian Calls (#/hr)		8			8			11			11	11
Act Effct Green (s)	10.1	23.9		12.2	29.0		50.8	50.8		59.2	59.2	59.2
Actuated g/C Ratio	0.08	0.20		0.10	0.24		0.42	0.42		0.49	0.49	0.49
v/c Ratio	0.49	0.53		0.59	0.93		0.19	0.88		0.80	0.44	0.13
Control Delay	65.0	45.5		74.7	72.9		24.8	41.5		66.9	22.5	2.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	65.0	45.5		74.7	72.9		24.8	41.5		66.9	22.5	2.9
LOS	E	D		E	E		C	D		E	C	A
Approach Delay		50.6			73.3			40.9			29.1	
Approach LOS		D			E			D			C	

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	0 (0%), Referenced to phase 4:SBTL, Start of Yellow
Natural Cycle:	100
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.93
Intersection Signal Delay:	42.9
Intersection LOS:	D
Intersection Capacity Utilization:	90.9%
ICU Level of Service:	E
Analysis Period (min):	15

Splits and Phases: 1: Waugh & W. Dallas



Queues

1: Waugh & W. Dallas

02/16/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	68	193	100	387	47	1237	197	722	103
v/c Ratio	0.49	0.53	0.59	0.93	0.19	0.88	0.80	0.44	0.13
Control Delay	65.0	45.5	74.7	72.9	24.8	41.5	66.9	22.5	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.0	45.5	74.7	72.9	24.8	41.5	66.9	22.5	2.9
Queue Length 50th (ft)	51	123	82	209	22	481	99	204	0
Queue Length 95th (ft)	100	201	m102	m#241	48	#634	#227	260	25
Internal Link Dist (ft)		499		1347		526		714	
Turn Bay Length (ft)	150		150		100		150		
Base Capacity (vph)	140	409	194	424	247	1406	245	1645	768
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.47	0.52	0.91	0.19	0.88	0.80	0.44	0.13

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

1: Waugh & W. Dallas

02/16/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	144	39	95	178	190	45	1141	34	187	686	98
Future Volume (vph)	65	144	39	95	178	190	45	1141	34	187	686	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	10	12	12	10	10	12	10	10
Total Lost time (s)	5.4	5.4		5.4	5.4		5.3	5.3		5.3	5.3	5.3
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00		1.00	0.98		1.00	1.00		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.92		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1652	1797		1668	1590		1786	3316		1787	3336	1436
Flt Permitted	0.95	1.00		0.95	1.00		0.23	1.00		0.10	1.00	1.00
Satd. Flow (perm)	1652	1797		1668	1590		440	3316		181	3336	1436
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	68	152	41	100	187	200	47	1201	36	197	722	103
RTOR Reduction (vph)	0	8	0	0	33	0	0	2	0	0	0	54
Lane Group Flow (vph)	68	185	0	100	354	0	47	1235	0	197	722	49
Confl. Peds. (#/hr)	14		3	3		14	7		16	16		7
Confl. Bikes (#/hr)						4			1			2
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Bus Blockages (#/hr)	0	0	2	0	0	7	0	0	0	0	0	0
Turn Type	Prot	NA		Prot	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases							8			4		4
Actuated Green, G (s)	8.1	24.9		12.2	29.0		48.7	48.7		57.1	57.1	57.1
Effective Green, g (s)	8.1	24.9		12.2	29.0		48.7	48.7		57.1	57.1	57.1
Actuated g/C Ratio	0.07	0.21		0.10	0.24		0.41	0.41		0.48	0.48	0.48
Clearance Time (s)	5.4	5.4		5.4	5.4		5.3	5.3		5.3	5.3	5.3
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)	111	372		169	384		227	1345		257	1587	683
v/s Ratio Prot	0.04	0.10		c0.06	c0.22		0.01	c0.37		c0.08	0.22	
v/s Ratio Perm							0.08			0.28		0.03
v/c Ratio	0.61	0.50		0.59	0.92		0.21	0.92		0.77	0.45	0.07
Uniform Delay, d1	54.4	42.0		51.5	44.4		23.0	33.8		41.8	21.0	17.1
Progression Factor	1.00	1.00		1.27	1.33		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	9.6	1.0		3.4	19.4		0.2	11.5		11.6	0.9	0.2
Delay (s)	64.0	43.1		68.9	78.3		23.2	45.2		53.4	22.0	17.3
Level of Service	E	D		E	E		C	D		D	C	B
Approach Delay (s)		48.5			76.4			44.4			27.6	
Approach LOS		D			E			D			C	

Intersection Summary		
HCM 2000 Control Delay	44.2	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.89	D
Actuated Cycle Length (s)	120.0	Sum of lost time (s)
Intersection Capacity Utilization	90.9%	21.4
Analysis Period (min)	15	ICU Level of Service
		E
c Critical Lane Group		

HCM 6th Signalized Intersection Summary

1: Waugh & W. Dallas

02/16/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↕		↖	↗	↗
Traffic Volume (veh/h)	65	144	39	95	178	190	45	1141	34	187	686	98
Future Volume (veh/h)	65	144	39	95	178	190	45	1141	34	187	686	98
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.96	1.00		0.96
Parking Bus, Adj	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	68	152	41	100	187	200	47	1201	36	197	722	103
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	1	1	1	1	1	1	1	1	1
Cap, veh/h	148	346	93	150	196	210	233	1392	42	267	1665	714
Arrive On Green	0.08	0.25	0.25	0.06	0.17	0.17	0.03	0.39	0.39	0.10	0.46	0.46
Sat Flow, veh/h	1781	1402	378	1795	795	851	1795	3545	106	1795	3582	1536
Grp Volume(v), veh/h	68	0	193	100	0	387	47	606	631	197	722	103
Grp Sat Flow(s),veh/h/ln	1781	0	1780	1795	0	1646	1795	1791	1861	1795	1791	1536
Q Serve(g_s), s	4.4	0.0	11.0	6.6	0.0	28.0	2.0	37.3	37.4	6.6	16.2	4.6
Cycle Q Clear(g_c), s	4.4	0.0	11.0	6.6	0.0	28.0	2.0	37.3	37.4	6.6	16.2	4.6
Prop In Lane	1.00		0.21	1.00		0.52	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	148	0	439	150	0	406	233	703	730	267	1665	714
V/C Ratio(X)	0.46	0.00	0.44	0.67	0.00	0.95	0.20	0.86	0.86	0.74	0.43	0.14
Avail Cap(c_a), veh/h	151	0	439	209	0	406	267	703	730	267	1665	714
HCM Platoon Ratio	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.42	0.00	0.42	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.4	0.0	38.2	55.0	0.0	49.4	26.3	33.5	33.5	49.6	21.5	18.4
Incr Delay (d2), s/veh	2.2	0.0	0.7	2.2	0.0	18.6	0.2	13.2	12.9	9.1	0.8	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.0	4.9	3.1	0.0	14.0	0.9	18.5	19.2	6.3	7.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.6	0.0	38.9	57.2	0.0	68.0	26.5	46.7	46.4	58.7	22.3	18.8
LnGrp LOS	D	A	D	E	A	E	C	D	D	E	C	B
Approach Vol, veh/h		261			487			1284			1022	
Approach Delay, s/veh		43.0			65.8			45.8			29.0	
Approach LOS		D			E			D			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.4	35.0	8.5	61.1	15.4	35.0	17.2	52.4				
Change Period (Y+Rc), s	5.4	5.4	* 5.3	* 5.3	5.4	5.4	* 5.3	* 5.3				
Max Green Setting (Gmax), s	14.0	25.8	* 5.5	* 5.3	10.2	29.6	* 12	* 47				
Max Q Clear Time (g_c+I1), s	8.6	13.0	4.0	18.2	6.4	30.0	8.6	39.4				
Green Ext Time (p_c), s	0.1	0.4	0.0	2.7	0.0	0.0	0.1	2.5				

Intersection Summary

HCM 6th Ctrl Delay	43.1
HCM 6th LOS	D

Notes

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

HCM 6th Signalized Intersection Capacity Analysis

1: Waugh & W. Dallas

02/16/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↕↔		↔	↕↕	↔
Traffic Volume (veh/h)	65	144	39	95	178	190	45	1141	34	187	686	98
Future Volume (veh/h)	65	144	39	95	178	190	45	1141	34	187	686	98
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		0.98	1.00		0.97	1.00		0.96	1.00		0.96
Parking Bus Adj	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	68	152	41	100	187	200	47	1201	36	197	722	103
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	148	346	93	150	196	210	233	1392	42	267	1665	714
HCM Platoon Ratio	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.08	0.25	0.25	0.06	0.17	0.17	0.03	0.39	0.39	0.10	0.46	0.46
Unsig. Movement Delay												
Ln Grp Delay, s/veh	54.6	0.0	38.9	57.2	0.0	68.0	26.5	46.7	46.4	58.7	22.3	18.8
Ln Grp LOS	D	A	D	E	A	E	C	D	D	E	C	B
Approach Vol, veh/h		261			487			1284			1022	
Approach Delay, s/veh		43.0			65.8			45.8			29.0	
Approach LOS		D			E			D			C	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		1	2	3	4	5	6	8	7			
Case No		2.0	4.0	1.2	3.0	2.0	4.0	4.0	1.3			
Phs Duration (G+Y+Rc), s		15.4	35.0	8.5	61.1	15.4	35.0	52.4	17.2			
Change Period (Y+Rc), s		5.4	5.4	* 5.3	* 5.3	5.4	5.4	* 5.3	* 5.3			
Max Green (Gmax), s		14.0	25.8	* 5.5	* 5.3	10.2	29.6	* 4.7	* 1.2			
Max Allow Headway (MAH), s		4.2	3.5	3.2	3.5	4.2	3.7	3.5	3.2			
Max Q Clear (g_c+I1), s		8.6	13.0	4.0	18.2	6.4	30.0	39.4	8.6			
Green Ext Time (g_e), s		0.1	0.4	0.0	2.7	0.0	0.0	2.5	0.1			
Prob of Phs Call (p_c)		1.00	1.00	0.79	1.00	1.00	1.00	1.00	1.00			
Prob of Max Out (p_x)		0.31	0.00	1.00	0.00	1.00	1.00	0.00	1.00			
Left-Turn Movement Data												
Assigned Mvmt		1		3		5					7	
Mvmt Sat Flow, veh/h		1795		1795		1781					1795	
Through Movement Data												
Assigned Mvmt			2		4		6	8				
Mvmt Sat Flow, veh/h			1402		3582		795	3545				
Right-Turn Movement Data												
Assigned Mvmt			12		14		16	18				
Mvmt Sat Flow, veh/h			378		1536		851	106				
Left Lane Group Data												
Assigned Mvmt		1	0	3	0	5	0	0	7			
Lane Assignment		L (Prot)		L (Pr/Pm)		L (Prot)			L (Pr/Pm)			

HCM 6th Signalized Intersection Capacity Analysis

1: Waugh & W. Dallas

02/16/2022

Lanes in Grp	1	0	1	0	1	0	0	1
Grp Vol (v), veh/h	100	0	47	0	68	0	0	197
Grp Sat Flow (s), veh/h/ln	1795	0	1795	0	1781	0	0	1795
Q Serve Time (g_s), s	6.6	0.0	2.0	0.0	4.4	0.0	0.0	6.6
Cycle Q Clear Time (g_c), s	6.6	0.0	2.0	0.0	4.4	0.0	0.0	6.6
Perm LT Sat Flow (s_l), veh/h/ln	0	0	668	0	0	0	0	454
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	40.6	0.0	0.0	0.0	0.0	36.6
Perm LT Serve Time (g_u), s	0.0	0.0	22.4	0.0	0.0	0.0	0.0	7.7
Perm LT Q Serve Time (g_ps), s	0.0	0.0	1.4	0.0	0.0	0.0	0.0	7.7
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	150	0	233	0	148	0	0	267
V/C Ratio (X)	0.67	0.00	0.20	0.00	0.46	0.00	0.00	0.74
Avail Cap (c_a), veh/h	209	0	267	0	151	0	0	267
Upstream Filter (I)	0.42	0.00	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	55.0	0.0	26.3	0.0	52.4	0.0	0.0	49.6
Incr Delay (d2), s/veh	2.2	0.0	0.2	0.0	2.2	0.0	0.0	9.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	57.2	0.0	26.5	0.0	54.6	0.0	0.0	58.7
1st-Term Q (Q1), veh/ln	3.0	0.0	0.9	0.0	2.0	0.0	0.0	5.6
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.7
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	3.1	0.0	0.9	0.0	2.0	0.0	0.0	6.3
%ile Storage Ratio (RQ%)	0.52	0.00	0.22	0.00	0.35	0.00	0.00	1.06
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	8	0
Lane Assignment				T			T	
Lanes in Grp	0	0	0	2	0	0	1	0
Grp Vol (v), veh/h	0	0	0	722	0	0	606	0
Grp Sat Flow (s), veh/h/ln	0	0	0	1791	0	0	1791	0
Q Serve Time (g_s), s	0.0	0.0	0.0	16.2	0.0	0.0	37.3	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	16.2	0.0	0.0	37.3	0.0
Lane Grp Cap (c), veh/h	0	0	0	1665	0	0	703	0
V/C Ratio (X)	0.00	0.00	0.00	0.43	0.00	0.00	0.86	0.00
Avail Cap (c_a), veh/h	0	0	0	1665	0	0	703	0
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	21.5	0.0	0.0	33.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.8	0.0	0.0	13.2	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	22.3	0.0	0.0	46.7	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	6.8	0.0	0.0	15.9	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.2	0.0	0.0	2.6	0.0

HCM 6th Signalized Intersection Capacity Analysis

1: Waugh & W. Dallas

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	7.0	0.0	0.0	18.5	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.23	0.00	0.00	0.82	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	18	0
Lane Assignment		T+R		R		T+R	T+R	
Lanes in Grp	0	1	0	1	0	1	1	0
Grp Vol (v), veh/h	0	193	0	103	0	387	631	0
Grp Sat Flow (s), veh/h/ln	0	1780	0	1536	0	1646	1861	0
Q Serve Time (g_s), s	0.0	11.0	0.0	4.6	0.0	28.0	37.4	0.0
Cycle Q Clear Time (g_c), s	0.0	11.0	0.0	4.6	0.0	28.0	37.4	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.21	0.00	1.00	0.00	0.52	0.06	0.00
Lane Grp Cap (c), veh/h	0	439	0	714	0	406	730	0
V/C Ratio (X)	0.00	0.44	0.00	0.14	0.00	0.95	0.86	0.00
Avail Cap (c_a), veh/h	0	439	0	714	0	406	730	0
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	0.42	1.00	0.00
Uniform Delay (d1), s/veh	0.0	38.2	0.0	18.4	0.0	49.4	33.5	0.0
Incr Delay (d2), s/veh	0.0	0.7	0.0	0.4	0.0	18.6	12.9	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	38.9	0.0	18.8	0.0	68.0	46.4	0.0
1st-Term Q (Q1), veh/ln	0.0	4.8	0.0	1.6	0.0	11.9	16.6	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.1	0.0	2.1	2.6	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	4.9	0.0	1.7	0.0	14.0	19.2	0.0
%ile Storage Ratio (RQ%)	0.00	0.24	0.00	0.06	0.00	0.27	0.85	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	43.1
HCM 6th LOS	D

Notes

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

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	49.0	42.5	78.2	78.0
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	3	3	5	6
Number of Right-Turn Islands	0	0	0	0
Type of Control	None	None	None	None
Corresponding Signal Phase	4	8	2	6
Effective Walk Time (s)	0.0	0.0	0.0	0.0
Right Corner Size A (ft)	9.0	9.0	9.0	9.0
Right Corner Size B (ft)	9.0	9.0	9.0	9.0
Right Corner Curb Radius (ft)	0.0	0.0	0.0	0.0
Right Corner Total Area (sq.ft)	81.00	81.00	81.00	81.00
Ped. Left-Right Flow Rate (p/h)	0	0	0	0
Ped. Right-Left Flow Rate (p/h)	0	0	0	0
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	30	30	30	30
Right Corner Area per Ped (sq.ft)	0.0	0.0	0.0	0.0
Right Corner Quality of Service	-	-	-	-
Ped. Circulation Area (sq.ft)	0.0	0.0	0.0	0.0
Crosswalk Circulation Code	-	-	-	-
Pedestrian Delay (s/p)	60.0	60.0	60.0	60.0
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.16	2.25	2.74	2.88
Pedestrian Crosswalk LOS	B	B	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	261	487	1284	1022
Effct. Green for Bike (s)	23.9	29.0	50.8	59.2
Cross Street Width (ft)	56.1	66.0	32.3	35.1
Through Lanes Number	1	1	2	2
Through Lane Width (ft)	12.0	10.0	10.0	10.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	No	No	No	No
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	398	483	847	987
Bicycle Delay (s/bike)	38.5	34.5	20.0	15.4
Bicycle Compliance	Poor	Poor	Fair	Fair
Bicycle LOS Score	2.85	3.80	3.54	3.37
Bicycle LOS	C	D	D	C

Lanes, Volumes, Timings
2: Montrose & W. Dallas

02/16/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	304	109	108	342	181	81	1071	74	118	681	58
Future Volume (vph)	52	304	109	108	342	181	81	1071	74	118	681	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1600	1500	1600	1600	1500	1600
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	16
Storage Length (ft)	150		0	0		0	100		0	150		100
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			100			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor		1.00		1.00				1.00		0.99		0.98
Frt		0.960			0.948			0.990				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1728	1737	0	1728	1724	0	1490	2758	0	1505	2822	1526
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1728	1737	0	1722	1724	0	1490	2758	0	1494	2822	1494
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			22			7				162
Link Speed (mph)		30			30			35				35
Link Distance (ft)		1427			808			614				845
Travel Time (s)		32.4			18.4			12.0				16.5
Confl. Peds. (#/hr)			5	5					19	19		
Confl. Bikes (#/hr)												1
Peak Hour 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
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	2%	2%	2%	1%	1%	1%
Bus Blockages (#/hr)	0	0	5	0	0	5	0	0	11	0	0	0
Adj. Flow (vph)	52	304	109	108	342	181	81	1071	74	118	681	58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	52	413	0	108	523	0	81	1145	0	118	681	58
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane		Yes										
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.24	1.35	1.24	1.24	1.35	1.06
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	40	226		40	226		40	226		40	226	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	40	6		40	6		40	6		40	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		220			220			220				220
Detector 2 Size(ft)		6			6			6				6

Lanes, Volumes, Timings

2: Montrose & W. Dallas

02/16/2022

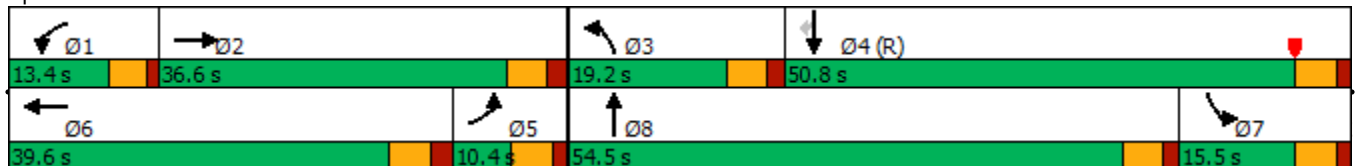


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Type	Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	8.0		5.0	8.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	10.1	34.6		9.5	34.6		10.1	25.1		10.1	25.1	25.1
Total Split (s)	10.4	36.6		13.4	39.6		19.2	54.5		15.5	50.8	50.8
Total Split (%)	8.7%	30.5%		11.2%	33.0%		16.0%	45.4%		12.9%	42.3%	42.3%
Maximum Green (s)	5.3	31.0		8.9	34.0		14.1	49.4		10.4	45.7	45.7
Yellow Time (s)	3.6	3.6		3.5	3.6		3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.5	2.0		1.0	2.0		1.5	1.5		1.5	1.5	1.5
Lost Time Adjust (s)	0.0	2.0		0.0	-1.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.1	7.6		4.5	4.6		5.1	5.1		5.1	5.1	5.1
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Min		None	C-Min	C-Min
Walk Time (s)	4.0			4.0			4.0			4.0		4.0
Flash Dont Walk (s)	25.0			25.0			16.0			16.0		16.0
Pedestrian Calls (#/hr)	2			2			5			5		5
Act Effct Green (s)	5.3	28.4		8.9	36.5		11.3	50.0		10.4	51.5	51.5
Actuated g/C Ratio	0.04	0.24		0.07	0.30		0.09	0.42		0.09	0.43	0.43
v/c Ratio	0.68	0.98		0.84	0.97		0.58	0.99		0.91	0.56	0.08
Control Delay	94.2	82.0		101.4	72.5		67.9	60.2		112.2	29.6	0.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	94.2	82.0		101.4	72.5		67.9	60.2		112.2	29.6	0.2
LOS	F	F		F	E		E	E		F	C	A
Approach Delay	83.3			77.5			60.7			39.0		
Approach LOS	F			E			E			D		

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 4:SBT, Start of Yellow
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.99
 Intersection Signal Delay: 61.5
 Intersection LOS: E
 Intersection Capacity Utilization 98.1%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 2: Montrose & W. Dallas



Queues

2: Montrose & W. Dallas

02/16/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	52	413	108	523	81	1145	118	681	58
v/c Ratio	0.68	0.98	0.84	0.97	0.58	0.99	0.91	0.56	0.08
Control Delay	94.2	82.0	101.4	72.5	67.9	60.2	112.2	29.6	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	94.2	82.0	101.4	72.5	67.9	60.2	112.2	29.6	0.2
Queue Length 50th (ft)	43	332	84	~399	61	~463	92	216	0
Queue Length 95th (ft)	m#76	m#501	#190	#630	112	#624	#208	290	0
Internal Link Dist (ft)		1347		728		534		765	
Turn Bay Length (ft)	150				100		150		100
Base Capacity (vph)	76	430	128	539	175	1152	130	1210	733
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.96	0.84	0.97	0.46	0.99	0.91	0.56	0.08

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: Montrose & W. Dallas

02/16/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↕		↖	↗	↖
Traffic Volume (vph)	52	304	109	108	342	181	81	1071	74	118	681	58
Future Volume (vph)	52	304	109	108	342	181	81	1071	74	118	681	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1600	1500	1600	1600	1500	1600
Lane Width	11	11	11	11	11	11	12	12	12	12	12	16
Total Lost time (s)	5.1	7.6		4.5	4.6		5.1	5.1		5.1	5.1	5.1
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.96		1.00	0.95		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1728	1738		1728	1724		1490	2759		1505	2822	1494
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1728	1738		1728	1724		1490	2759		1505	2822	1494
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	52	304	109	108	342	181	81	1071	74	118	681	58
RTOR Reduction (vph)	0	11	0	0	15	0	0	4	0	0	0	34
Lane Group Flow (vph)	52	402	0	108	508	0	81	1141	0	118	681	24
Confl. Peds. (#/hr)			5	5					19	19		
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	2%	2%	2%	1%	1%	1%
Bus Blockages (#/hr)	0	0	5	0	0	5	0	0	11	0	0	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												4
Actuated Green, G (s)	4.2	31.4		8.9	35.5		9.9	48.0		11.4	49.5	49.5
Effective Green, g (s)	4.2	29.4		8.9	36.5		9.9	48.0		11.4	49.5	49.5
Actuated g/C Ratio	0.04	0.24		0.07	0.30		0.08	0.40		0.10	0.41	0.41
Clearance Time (s)	5.1	5.6		4.5	5.6		5.1	5.1		5.1	5.1	5.1
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	60	425		128	524		122	1103		142	1164	616
v/s Ratio Prot	0.03	c0.23		0.06	c0.29		0.05	c0.41		c0.08	0.24	
v/s Ratio Perm												0.02
v/c Ratio	0.87	0.95		0.84	0.97		0.66	1.03		0.83	0.59	0.04
Uniform Delay, d1	57.6	44.5		54.9	41.2		53.4	36.0		53.4	27.3	21.0
Progression Factor	1.05	1.06		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	62.1	26.8		37.0	31.1		12.8	36.3		32.0	2.2	0.1
Delay (s)	122.5	74.0		91.9	72.3		66.2	72.3		85.3	29.5	21.2
Level of Service	F	E		F	E		E	E		F	C	C
Approach Delay (s)		79.5			75.6			71.9			36.6	
Approach LOS		E			E			E			D	

Intersection Summary

HCM 2000 Control Delay	64.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.3
Intersection Capacity Utilization	98.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary

2: Montrose & W. Dallas

02/16/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↕		↖	↗	↖
Traffic Volume (veh/h)	52	304	109	108	342	181	81	1071	74	118	681	58
Future Volume (veh/h)	52	304	109	108	342	181	81	1071	74	118	681	58
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.99	1.00		0.96
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.96	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1575	1477	1575	1588	1488	1651
Adj Flow Rate, veh/h	52	304	109	108	342	181	81	1071	74	118	681	58
Peak Hour 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
Percent Heavy Veh, %	1	1	1	1	1	1	2	2	2	1	1	1
Cap, veh/h	67	310	111	133	331	175	99	1070	74	135	1230	583
Arrive On Green	0.01	0.08	0.08	0.07	0.29	0.28	0.07	0.41	0.41	0.09	0.43	0.43
Sat Flow, veh/h	1795	1296	465	1795	1135	601	1500	2600	180	1512	2828	1340
Grp Volume(v), veh/h	52	0	413	108	0	523	81	578	567	118	681	58
Grp Sat Flow(s),veh/h/ln	1795	0	1761	1795	0	1736	1500	1403	1376	1512	1414	1340
Q Serve(g_s), s	3.5	0.0	28.1	7.1	0.0	35.0	6.4	49.4	49.4	9.3	21.5	2.4
Cycle Q Clear(g_c), s	3.5	0.0	28.1	7.1	0.0	35.0	6.4	49.4	49.4	9.3	21.5	2.4
Prop In Lane	1.00		0.26	1.00		0.35	1.00		0.13	1.00		1.00
Lane Grp Cap(c), veh/h	67	0	422	133	0	506	99	577	567	135	1230	583
V/C Ratio(X)	0.77	0.00	0.98	0.81	0.00	1.03	0.82	1.00	1.00	0.88	0.55	0.10
Avail Cap(c_a), veh/h	79	0	425	133	0	506	176	577	567	135	1230	583
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.69	0.00	0.69	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.7	0.0	54.9	54.8	0.0	42.7	55.3	35.3	35.3	54.0	25.2	12.1
Incr Delay (d2), s/veh	23.4	0.0	30.9	30.7	0.0	48.8	15.1	37.6	38.1	42.8	1.8	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.0	16.9	4.3	0.0	21.7	2.8	22.2	21.9	5.1	7.4	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	82.2	0.0	85.8	85.4	0.0	91.5	70.4	72.9	73.4	96.8	27.0	12.4
LnGrp LOS	F	A	F	F	A	F	E	F	F	F	C	B
Approach Vol, veh/h		465			631			1226				857
Approach Delay, s/veh		85.4			90.4			72.9				35.6
Approach LOS		F			F			E				D
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.4	36.3	13.0	57.3	10.1	39.6	15.8	54.5				
Change Period (Y+Rc), s	4.5	5.6	5.1	5.1	5.6	* 5.6	5.1	5.1				
Max Green Setting (Gmax), s	8.9	31.0	14.1	45.7	5.3	* 34	10.4	49.4				
Max Q Clear Time (g_c+I1), s	9.1	30.1	8.4	23.5	5.5	37.0	11.3	51.4				
Green Ext Time (p_c), s	0.0	0.4	0.1	8.8	0.0	0.0	0.0	0.0				

Intersection Summary
























HCM 6th Ctrl Delay	68.2
HCM 6th LOS	E

Notes

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

HCM 6th Signalized Intersection Capacity Analysis
2: Montrose & W. Dallas

02/16/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								 			 	
Traffic Volume (veh/h)	52	304	109	108	342	181	81	1071	74	118	681	58
Future Volume (veh/h)	52	304	109	108	342	181	81	1071	74	118	681	58
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		0.99	1.00		0.99	1.00		0.99	1.00		0.96
Parking Bus Adj	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.96	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1575	1477	1575	1588	1488	1651
Adj Flow Rate, veh/h	52	304	109	108	342	181	81	1071	74	118	681	58
Peak Hour 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
Percent Heavy Veh, %	1	1	1	1	1	1	2	2	2	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	67	310	111	133	331	175	99	1070	74	135	1230	583
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.01	0.08	0.08	0.07	0.29	0.28	0.07	0.41	0.41	0.09	0.43	0.43
Unsig. Movement Delay												
Ln Grp Delay, s/veh	82.2	0.0	85.8	85.4	0.0	91.5	70.4	72.9	73.4	96.8	27.0	12.4
Ln Grp LOS	F	A	F	F	A	F	E	F	F	F	C	B
Approach Vol, veh/h		465			631			1226			857	
Approach Delay, s/veh		85.4			90.4			72.9			35.6	
Approach LOS		F			F			E			D	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		1	2	3	4	6	5	8	7			
Case No		2.0	4.0	2.0	3.0	4.0	2.0	4.0	2.0			
Phs Duration (G+Y+Rc), s		13.4	36.3	13.0	57.3	39.6	10.1	54.5	15.8			
Change Period (Y+Rc), s		4.5	5.6	5.1	5.1	* 5.6	5.6	5.1	5.1			
Max Green (Gmax), s		8.9	31.0	14.1	45.7	* 34	5.3	49.4	10.4			
Max Allow Headway (MAH), s		4.2	7.7	4.1	7.1	7.8	4.2	7.4	4.1			
Max Q Clear (g_c+I1), s		9.1	30.1	8.4	23.5	37.0	5.5	51.4	11.3			
Green Ext Time (g_e), s		0.0	0.4	0.1	8.8	0.0	0.0	0.0	0.0			
Prob of Phs Call (p_c)		0.97	1.00	0.93	1.00	1.00	0.82	1.00	0.98			
Prob of Max Out (p_x)		1.00	1.00	0.19	0.26	1.00	1.00	1.00	1.00			
Left-Turn Movement Data												
Assigned Mvmt		1		3			5		7			
Mvmt Sat Flow, veh/h		1795		1500			1795		1512			
Through Movement Data												
Assigned Mvmt			2		4	6		8				
Mvmt Sat Flow, veh/h			1296		2828	1135		2600				
Right-Turn Movement Data												
Assigned Mvmt			12		14	16		18				
Mvmt Sat Flow, veh/h			465		1340	601		180				
Left Lane Group Data												
Assigned Mvmt		1	0	3	0	0	5	0	7			
Lane Assignment		L (Prot)		L (Prot)			L (Prot)		L (Prot)			

HCM 6th Signalized Intersection Capacity Analysis

2: Montrose & W. Dallas

02/16/2022

Lanes in Grp	1	0	1	0	0	1	0	1
Grp Vol (v), veh/h	108	0	81	0	0	52	0	118
Grp Sat Flow (s), veh/h/ln	1795	0	1500	0	0	1795	0	1512
Q Serve Time (g_s), s	7.1	0.0	6.4	0.0	0.0	3.5	0.0	9.3
Cycle Q Clear Time (g_c), s	7.1	0.0	6.4	0.0	0.0	3.5	0.0	9.3
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	133	0	99	0	0	67	0	135
V/C Ratio (X)	0.81	0.00	0.82	0.00	0.00	0.77	0.00	0.88
Avail Cap (c_a), veh/h	133	0	176	0	0	79	0	135
Upstream Filter (I)	1.00	0.00	1.00	0.00	0.00	0.69	0.00	1.00
Uniform Delay (d1), s/veh	54.8	0.0	55.3	0.0	0.0	58.7	0.0	54.0
Incr Delay (d2), s/veh	30.7	0.0	15.1	0.0	0.0	23.4	0.0	42.8
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	85.4	0.0	70.4	0.0	0.0	82.2	0.0	96.8
1st-Term Q (Q1), veh/ln	3.2	0.0	2.4	0.0	0.0	1.6	0.0	3.5
2nd-Term Q (Q2), veh/ln	1.1	0.0	0.4	0.0	0.0	0.4	0.0	1.6
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	4.3	0.0	2.8	0.0	0.0	2.0	0.0	5.1
%ile Storage Ratio (RQ%)	0.14	0.00	0.71	0.00	0.00	0.34	0.00	0.86
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	6	0	8	0
Lane Assignment				T			T	
Lanes in Grp	0	0	0	2	0	0	1	0
Grp Vol (v), veh/h	0	0	0	681	0	0	578	0
Grp Sat Flow (s), veh/h/ln	0	0	0	1414	0	0	1403	0
Q Serve Time (g_s), s	0.0	0.0	0.0	21.5	0.0	0.0	49.4	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	21.5	0.0	0.0	49.4	0.0
Lane Grp Cap (c), veh/h	0	0	0	1230	0	0	577	0
V/C Ratio (X)	0.00	0.00	0.00	0.55	0.00	0.00	1.00	0.00
Avail Cap (c_a), veh/h	0	0	0	1230	0	0	577	0
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	25.2	0.0	0.0	35.3	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	1.8	0.0	0.0	37.6	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	27.0	0.0	0.0	72.9	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	7.1	0.0	0.0	16.2	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.3	0.0	0.0	6.0	0.0

HCM 6th Signalized Intersection Capacity Analysis 2: Montrose & W. Dallas

02/16/2022

3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	7.4	0.0	0.0	22.2	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.23	0.00	0.00	0.99	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	16	0	18	0
Lane Assignment		T+R		R	T+R		T+R	
Lanes in Grp	0	1	0	1	1	0	1	0
Grp Vol (v), veh/h	0	413	0	58	523	0	567	0
Grp Sat Flow (s), veh/h/ln	0	1761	0	1340	1736	0	1376	0
Q Serve Time (g_s), s	0.0	28.1	0.0	2.4	35.0	0.0	49.4	0.0
Cycle Q Clear Time (g_c), s	0.0	28.1	0.0	2.4	35.0	0.0	49.4	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.26	0.00	1.00	0.35	0.00	0.13	0.00
Lane Grp Cap (c), veh/h	0	422	0	583	506	0	567	0
V/C Ratio (X)	0.00	0.98	0.00	0.10	1.03	0.00	1.00	0.00
Avail Cap (c_a), veh/h	0	425	0	583	506	0	567	0
Upstream Filter (I)	0.00	0.69	0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	54.9	0.0	12.1	42.7	0.0	35.3	0.0
Incr Delay (d2), s/veh	0.0	30.9	0.0	0.3	48.8	0.0	38.1	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	85.8	0.0	12.4	91.5	0.0	73.4	0.0
1st-Term Q (Q1), veh/ln	0.0	13.3	0.0	0.9	14.8	0.0	15.9	0.0
2nd-Term Q (Q2), veh/ln	0.0	3.6	0.0	0.1	6.9	0.0	6.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	16.9	0.0	1.0	21.7	0.0	21.9	0.0
%ile Storage Ratio (RQ%)	0.00	0.32	0.00	0.25	0.72	0.00	0.98	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	4.2	0.0	0.2	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.0

Intersection Summary

HCM 6th Ctrl Delay	68.2
HCM 6th LOS	E

Notes

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

HCM 6th Signals-Pedestrians
2: Montrose & W. Dallas























02/16/2022

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	45.8	46.0	60.1	76.1
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	3	4	5	6
Number of Right-Turn Islands	0	0	0	0
Type of Control	None	None	None	None
Corresponding Signal Phase	4	8	2	6
Effective Walk Time (s)	0.0	0.0	0.0	0.0
Right Corner Size A (ft)	9.0	9.0	9.0	9.0
Right Corner Size B (ft)	9.0	9.0	9.0	9.0
Right Corner Curb Radius (ft)	0.0	0.0	0.0	0.0
Right Corner Total Area (sq.ft)	81.00	81.00	81.00	81.00
Ped. Left-Right Flow Rate (p/h)	0	0	0	0
Ped. Right-Left Flow Rate (p/h)	0	0	0	0
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	30	30	35	35
Right Corner Area per Ped (sq.ft)	0.0	0.0	0.0	0.0
Right Corner Quality of Service	-	-	-	-
Ped. Circulation Area (sq.ft)	0.0	0.0	0.0	0.0
Crosswalk Circulation Code	-	-	-	-
Pedestrian Delay (s/p)	60.0	60.0	60.0	60.0
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.27	2.43	2.80	2.88
Pedestrian Crosswalk LOS	B	B	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	465	631	1226	857
Effct. Green for Bike (s)	28.4	36.5	50.0	51.5
Cross Street Width (ft)	61.6	76.1	46.0	36.7
Through Lanes Number	1	1	2	2
Through Lane Width (ft)	11.0	11.0	12.0	12.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	No	No	No	No
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	473	608	833	858
Bicycle Delay (s/bike)	35.0	29.1	20.4	19.6
Bicycle Compliance	Poor	Fair	Fair	Fair
Bicycle LOS Score	3.48	3.98	3.27	2.83
Bicycle LOS	C	D	C	C

Lanes, Volumes, Timings
1: Waugh & W. Dallas

02/16/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	144	39	95	178	190	45	1141	34	187	686	98
Future Volume (vph)	65	144	39	95	178	190	45	1141	34	187	686	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	12	10	10	12	12	10	10	12	10	10
Storage Length (ft)	150		0	0		0	100		0	150		0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	0.99	1.00		1.00	0.98		1.00	1.00		1.00		0.96
Frt		0.968			0.922			0.996				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1652	1797	0	1668	1590	0	1787	3319	0	1787	3336	1492
Flt Permitted	0.217			0.532			0.265			0.124		
Satd. Flow (perm)	374	1797	0	931	1590	0	497	3319	0	233	3336	1435
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			49			3				103
Link Speed (mph)		30			30			30				30
Link Distance (ft)		579			1427			606				794
Travel Time (s)		13.2			32.4			13.8				18.0
Confl. Peds. (#/hr)	14		3	3		14	7		16	16		7
Confl. Bikes (#/hr)						4			1			2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Bus Blockages (#/hr)	0	0	2	0	0	7	0	0	0	0	0	0
Adj. Flow (vph)	68	152	41	100	187	200	47	1201	36	197	722	103
Shared Lane Traffic (%)												
Lane Group Flow (vph)	68	193	0	100	387	0	47	1237	0	197	722	103
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		10			10			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
Headway Factor	1.09	1.00	1.00	1.09	1.09	1.00	1.00	1.09	1.09	1.00	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	1
Detector Template	Left			Left			Left			Left		Right
Leading Detector (ft)	40	6		40	6		40	6		40	6	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	40	6		40	6		40	6		40	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		2			6		3	8		7		4

Lanes, Volumes, Timings
1: Waugh & W. Dallas

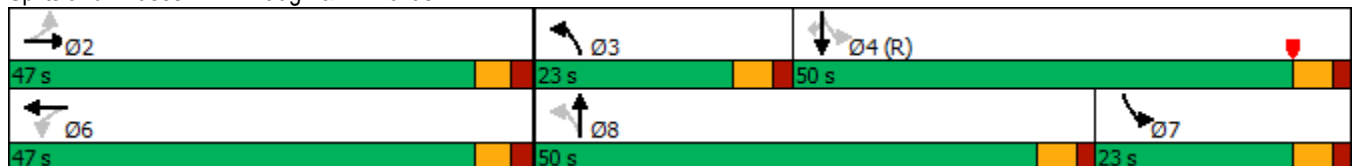
02/16/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		4
Detector Phase	2	2		6	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		4.0	12.0		4.0	12.0	12.0
Minimum Split (s)	30.4	30.4		30.4	30.4		10.3	30.3		10.3	30.3	30.3
Total Split (s)	47.0	47.0		47.0	47.0		23.0	50.0		23.0	50.0	50.0
Total Split (%)	39.2%	39.2%		39.2%	39.2%		19.2%	41.7%		19.2%	41.7%	41.7%
Maximum Green (s)	41.6	41.6		41.6	41.6		17.7	44.7		17.7	44.7	44.7
Yellow Time (s)	3.2	3.2		3.2	3.2		3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	2.2	2.2		2.2	2.2		1.7	1.7		1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.4	5.4		5.4	5.4		5.3	5.3		5.3	5.3	5.3
Lead/Lag							Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	C-Max	C-Max
Walk Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0			20.0			20.0	20.0
Pedestrian Calls (#/hr)	8	8		8	8			11			11	11
Act Effct Green (s)	31.7	31.7		31.7	31.7		54.6	54.6		67.9	67.9	67.9
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.46	0.46		0.57	0.57	0.57
v/c Ratio	0.69	0.40		0.41	0.85		0.16	0.82		0.55	0.38	0.12
Control Delay	72.7	35.0		18.7	32.3		22.7	35.2		39.8	17.3	3.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	72.7	35.0		18.7	32.3		22.7	35.2		39.8	17.3	3.8
LOS	E	C		B	C		C	D		D	B	A
Approach Delay		44.8			29.5			34.7			20.3	
Approach LOS		D			C			C			C	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 113.7 (95%), Referenced to phase 4:SBTL, Start of Yellow
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 29.9 Intersection LOS: C
 Intersection Capacity Utilization 90.9% ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 1: Waugh & W. Dallas



Queues

1: Waugh & W. Dallas

02/16/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	68	193	100	387	47	1237	197	722	103
v/c Ratio	0.69	0.40	0.41	0.85	0.16	0.82	0.55	0.38	0.12
Control Delay	72.7	35.0	18.7	32.3	22.7	35.2	39.8	17.3	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.7	35.0	18.7	32.3	22.7	35.2	39.8	17.3	3.8
Queue Length 50th (ft)	47	115	75	383	20	427	74	162	0
Queue Length 95th (ft)	98	163	m80	m357	50	#663	163	258	32
Internal Link Dist (ft)		499		1347		526		714	
Turn Bay Length (ft)	150				100		150		
Base Capacity (vph)	129	630	322	583	416	1512	361	1887	856
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.31	0.31	0.66	0.11	0.82	0.55	0.38	0.12

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

1: Waugh & W. Dallas

02/16/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↕		↖	↗	↖
Traffic Volume (vph)	65	144	39	95	178	190	45	1141	34	187	686	98
Future Volume (vph)	65	144	39	95	178	190	45	1141	34	187	686	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	10	12	12	10	10	12	10	10
Total Lost time (s)	5.4	5.4		5.4	5.4		5.3	5.3		5.3	5.3	5.3
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00		1.00	0.98		1.00	1.00		1.00	1.00	0.96
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.92		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1639	1797		1663	1590		1785	3318		1787	3336	1436
Flt Permitted	0.22	1.00		0.53	1.00		0.27	1.00		0.12	1.00	1.00
Satd. Flow (perm)	375	1797		931	1590		499	3318		234	3336	1436
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	68	152	41	100	187	200	47	1201	36	197	722	103
RTOR Reduction (vph)	0	9	0	0	36	0	0	2	0	0	0	46
Lane Group Flow (vph)	68	184	0	100	351	0	47	1235	0	197	722	57
Confl. Peds. (#/hr)	14		3	3		14	7		16	16		7
Confl. Bikes (#/hr)						4			1			2
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Bus Blockages (#/hr)	0	0	2	0	0	7	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		2			6		3	8		7	4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)	31.7	31.7		31.7	31.7		53.5	53.5		66.8	66.8	66.8
Effective Green, g (s)	31.7	31.7		31.7	31.7		53.5	53.5		66.8	66.8	66.8
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.45	0.45		0.56	0.56	0.56
Clearance Time (s)	5.4	5.4		5.4	5.4		5.3	5.3		5.3	5.3	5.3
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)	99	474		245	420		281	1479		373	1857	799
v/s Ratio Prot		0.10			c0.22		0.01	c0.37		c0.08	0.22	
v/s Ratio Perm	0.18			0.11			0.07			0.21		0.04
v/c Ratio	0.69	0.39		0.41	0.84		0.17	0.84		0.53	0.39	0.07
Uniform Delay, d1	39.7	36.2		36.4	41.7		19.8	29.4		32.7	15.0	12.3
Progression Factor	1.00	1.00		0.45	0.58		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	18.0	0.5		0.7	8.6		0.1	5.7		0.6	0.6	0.2
Delay (s)	57.7	36.7		17.0	32.9		19.9	35.1		33.3	15.7	12.5
Level of Service	E	D		B	C		B	D		C	B	B
Approach Delay (s)		42.2			29.6			34.5			18.7	
Approach LOS		D			C			C			B	

Intersection Summary

HCM 2000 Control Delay	29.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	90.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary

1: Waugh & W. Dallas

02/16/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷		↶	↷		↶	↷	↷
Traffic Volume (veh/h)	65	144	39	95	178	190	45	1141	34	187	686	98
Future Volume (veh/h)	65	144	39	95	178	190	45	1141	34	187	686	98
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	0.99		0.97	1.00		0.97	1.00		0.96
Parking Bus, Adj	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	68	152	41	100	187	200	47	1201	36	197	722	103
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	1	1	1	1	1	1	1	1	1
Cap, veh/h	147	422	114	318	240	257	232	1321	40	422	1927	829
Arrive On Green	0.30	0.30	0.30	0.30	0.30	0.30	0.03	0.37	0.37	0.19	0.54	0.54
Sat Flow, veh/h	997	1403	378	1191	797	852	1795	3547	106	1795	3582	1540
Grp Volume(v), veh/h	68	0	193	100	0	387	47	606	631	197	722	103
Grp Sat Flow(s),veh/h/ln	997	0	1781	1191	0	1649	1795	1791	1863	1795	1791	1540
Q Serve(g_s), s	8.0	0.0	10.2	8.6	0.0	25.7	2.1	38.5	38.6	6.3	14.0	4.0
Cycle Q Clear(g_c), s	33.7	0.0	10.2	18.8	0.0	25.7	2.1	38.5	38.6	6.3	14.0	4.0
Prop In Lane	1.00		0.21	1.00		0.52	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	147	0	536	318	0	497	232	667	694	422	1927	829
V/C Ratio(X)	0.46	0.00	0.36	0.31	0.00	0.78	0.20	0.91	0.91	0.47	0.37	0.12
Avail Cap(c_a), veh/h	192	0	617	372	0	572	448	667	694	422	1927	829
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.35	0.00	0.35	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.7	0.0	32.9	40.2	0.0	38.3	27.6	35.7	35.7	40.2	16.0	13.7
Incr Delay (d2), s/veh	2.3	0.0	0.4	0.2	0.0	2.2	0.2	18.5	18.0	0.3	0.6	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.0	4.5	2.6	0.0	10.6	0.9	19.9	20.7	5.0	5.8	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.0	0.0	33.3	40.4	0.0	40.4	27.7	54.2	53.8	40.5	16.6	14.0
LnGrp LOS	E	A	C	D	A	D	C	D	D	D	B	B
Approach Vol, veh/h		261			487			1284			1022	
Approach Delay, s/veh		39.2			40.4			53.0			20.9	
Approach LOS		D			D			D			C	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		41.5	8.6	69.9		41.5	28.5	50.0				
Change Period (Y+Rc), s		5.4	* 5.3	* 5.3		5.4	* 5.3	* 5.3				
Max Green Setting (Gmax), s		41.6	* 18	* 45		41.6	* 18	* 45				
Max Q Clear Time (g_c+I1), s		35.7	4.1	16.0		27.7	8.3	40.6				
Green Ext Time (p_c), s		0.4	0.0	2.7		1.3	0.2	1.7				

Intersection Summary

HCM 6th Ctrl Delay	39.1
HCM 6th LOS	D

Notes

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

HCM 6th Signalized Intersection Capacity Analysis
1: Waugh & W. Dallas

02/16/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	65	144	39	95	178	190	45	1141	34	187	686	98	
Future Volume (veh/h)	65	144	39	95	178	190	45	1141	34	187	686	98	
Number	5	2	12	1	6	16	3	8	18	7	4	14	
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0	
Ped-Bike Adj (A_pbT)	1.00		0.99	0.99		0.97	1.00		0.97	1.00		0.96	
Parking Bus Adj	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach		No			No			No			No		
Lanes Open During Work Zone													
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1885	1885	1885	1885	1885	1885	
Adj Flow Rate, veh/h	68	152	41	100	187	200	47	1201	36	197	722	103	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Percent Heavy Veh, %	2	2	2	1	1	1	1	1	1	1	1	1	
Opposing Right Turn Influence	Yes			Yes			Yes			Yes			
Cap, veh/h	147	422	114	318	240	257	232	1321	40	422	1927	829	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Prop Arrive On Green	0.30	0.30	0.30	0.30	0.30	0.30	0.03	0.37	0.37	0.19	0.54	0.54	
Unsig. Movement Delay													
Ln Grp Delay, s/veh	56.0	0.0	33.3	40.4	0.0	40.4	27.7	54.2	53.8	40.5	16.6	14.0	
Ln Grp LOS	E	A	C	D	A	D	C	D	D	D	B	B	
Approach Vol, veh/h		261			487			1284			1022		
Approach Delay, s/veh		39.2			40.4			53.0			20.9		
Approach LOS		D			D			D			C		
Timer:		1	2	3	4	5	6	7	8				
Assigned Phs			2	3	4		6	8	7				
Case No			6.0	1.2	3.0		6.0	4.0	1.3				
Phs Duration (G+Y+Rc), s			41.5	8.6	69.9		41.5	50.0	28.5				
Change Period (Y+Rc), s			5.4	* 5.3	* 5.3		5.4	* 5.3	* 5.3				
Max Green (Gmax), s			41.6	* 18	* 45		41.6	* 45	* 18				
Max Allow Headway (MAH), s			4.0	3.2	3.5		3.8	3.5	3.2				
Max Q Clear (g_c+I1), s			35.7	4.1	16.0		27.7	40.6	8.3				
Green Ext Time (g_e), s			0.4	0.0	2.7		1.3	1.7	0.2				
Prob of Phs Call (p_c)			1.00	0.79	1.00		1.00	1.00	1.00				
Prob of Max Out (p_x)			0.29	0.00	0.00		0.01	0.00	0.00				
Left-Turn Movement Data													
Assigned Mvmt			5	3			1		7				
Mvmt Sat Flow, veh/h			997	1795			1191		1795				
Through Movement Data													
Assigned Mvmt			2		4		6	8					
Mvmt Sat Flow, veh/h			1403		3582		797	3547					
Right-Turn Movement Data													
Assigned Mvmt			12		14		16	18					
Mvmt Sat Flow, veh/h			378		1540		852	106					
Left Lane Group Data													
Assigned Mvmt		0	5	3	0	0	1	0	7				
Lane Assignment			LL (Pr/Pm)					L	L (Pr/Pm)				

HCM 6th Signalized Intersection Capacity Analysis
1: Waugh & W. Dallas

02/16/2022

Lanes in Grp	0	1	1	0	0	1	0	1
Grp Vol (v), veh/h	0	68	47	0	0	100	0	197
Grp Sat Flow (s), veh/h/ln	0	997	1795	0	0	1191	0	1795
Q Serve Time (g_s), s	0.0	8.0	2.1	0.0	0.0	8.6	0.0	6.3
Cycle Q Clear Time (g_c), s	0.0	33.7	2.1	0.0	0.0	18.8	0.0	6.3
Perm LT Sat Flow (s_l), veh/h/ln	0	997	667	0	0	1191	0	454
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	36.1	38.1	0.0	0.0	36.1	0.0	34.1
Perm LT Serve Time (g_u), s	0.0	10.4	22.1	0.0	0.0	25.9	0.0	4.1
Perm LT Q Serve Time (g_ps), s	0.0	8.0	1.2	0.0	0.0	8.6	0.0	4.1
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	147	232	0	0	318	0	422
V/C Ratio (X)	0.00	0.46	0.20	0.00	0.00	0.31	0.00	0.47
Avail Cap (c_a), veh/h	0	192	448	0	0	372	0	422
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	0.35	0.00	1.00
Uniform Delay (d1), s/veh	0.0	53.7	27.6	0.0	0.0	40.2	0.0	40.2
Incr Delay (d2), s/veh	0.0	2.3	0.2	0.0	0.0	0.2	0.0	0.3
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	56.0	27.7	0.0	0.0	40.4	0.0	40.5
1st-Term Q (Q1), veh/ln	0.0	2.0	0.9	0.0	0.0	2.5	0.0	5.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	2.1	0.9	0.0	0.0	2.6	0.0	5.0
%ile Storage Ratio (RQ%)	0.00	0.36	0.23	0.00	0.00	0.05	0.00	0.85
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	8	0
Lane Assignment				T			T	
Lanes in Grp	0	0	0	2	0	0	1	0
Grp Vol (v), veh/h	0	0	0	722	0	0	606	0
Grp Sat Flow (s), veh/h/ln	0	0	0	1791	0	0	1791	0
Q Serve Time (g_s), s	0.0	0.0	0.0	14.0	0.0	0.0	38.5	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	14.0	0.0	0.0	38.5	0.0
Lane Grp Cap (c), veh/h	0	0	0	1927	0	0	667	0
V/C Ratio (X)	0.00	0.00	0.00	0.37	0.00	0.00	0.91	0.00
Avail Cap (c_a), veh/h	0	0	0	1927	0	0	667	0
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	16.0	0.0	0.0	35.7	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.6	0.0	0.0	18.5	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	16.6	0.0	0.0	54.2	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	5.7	0.0	0.0	16.5	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.1	0.0	0.0	3.4	0.0

HCM 6th Signalized Intersection Capacity Analysis

1: Waugh & W. Dallas

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	5.8	0.0	0.0	19.9	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.19	0.00	0.00	0.89	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	18	0
Lane Assignment		T+R		R		T+R	T+R	
Lanes in Grp	0	1	0	1	0	1	1	0
Grp Vol (v), veh/h	0	193	0	103	0	387	631	0
Grp Sat Flow (s), veh/h/ln	0	1781	0	1540	0	1649	1863	0
Q Serve Time (g_s), s	0.0	10.2	0.0	4.0	0.0	25.7	38.6	0.0
Cycle Q Clear Time (g_c), s	0.0	10.2	0.0	4.0	0.0	25.7	38.6	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.21	0.00	1.00	0.00	0.52	0.06	0.00
Lane Grp Cap (c), veh/h	0	536	0	829	0	497	694	0
V/C Ratio (X)	0.00	0.36	0.00	0.12	0.00	0.78	0.91	0.00
Avail Cap (c_a), veh/h	0	617	0	829	0	572	694	0
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	0.35	1.00	0.00
Uniform Delay (d1), s/veh	0.0	32.9	0.0	13.7	0.0	38.3	35.7	0.0
Incr Delay (d2), s/veh	0.0	0.4	0.0	0.3	0.0	2.2	18.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	33.3	0.0	14.0	0.0	40.4	53.8	0.0
1st-Term Q (Q1), veh/ln	0.0	4.4	0.0	1.4	0.0	10.3	17.2	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.1	0.0	0.3	3.5	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	4.5	0.0	1.5	0.0	10.6	20.7	0.0
%ile Storage Ratio (RQ%)	0.00	0.22	0.00	0.05	0.00	0.20	0.93	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	39.1
HCM 6th LOS	D

Notes

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

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	49.0	42.5	78.2	78.0
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	3	4	5	6
Number of Right-Turn Islands	0	0	0	0
Type of Control	None	None	None	None
Corresponding Signal Phase	4	8	2	6
Effective Walk Time (s)	0.0	0.0	0.0	0.0
Right Corner Size A (ft)	9.0	9.0	9.0	9.0
Right Corner Size B (ft)	9.0	9.0	9.0	9.0
Right Corner Curb Radius (ft)	0.0	0.0	0.0	0.0
Right Corner Total Area (sq.ft)	81.00	81.00	81.00	81.00
Ped. Left-Right Flow Rate (p/h)	0	0	0	0
Ped. Right-Left Flow Rate (p/h)	0	0	0	0
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	30	30	30	30
Right Corner Area per Ped (sq.ft)	0.0	0.0	0.0	0.0
Right Corner Quality of Service	-	-	-	-
Ped. Circulation Area (sq.ft)	0.0	0.0	0.0	0.0
Crosswalk Circulation Code	-	-	-	-
Pedestrian Delay (s/p)	60.0	60.0	60.0	60.0
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.16	2.37	2.74	2.88
Pedestrian Crosswalk LOS	B	B	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	261	487	1284	1022
Effct. Green for Bike (s)	31.7	31.7	54.6	67.9
Cross Street Width (ft)	56.5	66.0	42.2	34.2
Through Lanes Number	1	1	2	2
Through Lane Width (ft)	12.0	10.0	10.0	10.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	No	No	No	No
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	528	528	910	1132
Bicycle Delay (s/bike)	32.5	32.5	17.8	11.3
Bicycle Compliance	Poor	Poor	Fair	Fair
Bicycle LOS Score	2.85	3.80	3.69	3.35
Bicycle LOS	C	D	D	C

Lanes, Volumes, Timings
2: Montrose & W. Dallas

02/16/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↕	↕↕		↕	↕↕	↕
Traffic Volume (vph)	52	304	109	108	342	181	81	1071	74	118	681	58
Future Volume (vph)	52	304	109	108	342	181	81	1071	74	118	681	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1600	1500	1600	1600	1500	1600
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	16
Storage Length (ft)	0		0	0		0	100		0	150		100
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (ft)	25			25			100			50		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor		0.99			1.00			0.99		0.99		0.99
Frt		0.965			0.957			0.990				0.850
Flt Protected		0.994			0.992		0.950			0.950		
Satd. Flow (prot)	0	3295	0	0	3280	0	1490	2752	0	1505	2822	1526
Flt Permitted		0.664			0.571		0.950			0.950		
Satd. Flow (perm)	0	2201	0	0	1887	0	1490	2752	0	1484	2822	1507
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			25			4				135
Link Speed (mph)		30			30			35				35
Link Distance (ft)		1427			808			614				845
Travel Time (s)		32.4			18.4			12.0				16.5
Confl. Peds. (#/hr)			5	5					19	19		
Confl. Bikes (#/hr)												1
Peak Hour 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
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	2%	2%	2%	1%	1%	1%
Bus Blockages (#/hr)	0	0	5	0	0	5	0	0	11	0	0	0
Adj. Flow (vph)	52	304	109	108	342	181	81	1071	74	118	681	58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	465	0	0	631	0	81	1145	0	118	681	58
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.24	1.35	1.24	1.24	1.35	1.06
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	40	226		40	226		40	226		40	226	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	40	6		40	6		40	6		40	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		220			220			220				220
Detector 2 Size(ft)		6			6			6				6

Lanes, Volumes, Timings
 2: Montrose & W. Dallas

02/16/2022

Lane Group	Ø2	Ø3	Ø4	Ø6	Ø7	Ø8	Ø10	Ø11	Ø12	Ø14	Ø15	Ø16
Lane Configurations												
Traffic Volume (vph)												
Future Volume (vph)												
Ideal Flow (vphpl)												
Lane Width (ft)												
Storage Length (ft)												
Storage Lanes												
Taper Length (ft)												
Lane Util. Factor												
Ped Bike Factor												
Frt												
Flt Protected												
Satd. Flow (prot)												
Flt Permitted												
Satd. Flow (perm)												
Right Turn on Red												
Satd. Flow (RTOR)												
Link Speed (mph)												
Link Distance (ft)												
Travel Time (s)												
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor												
Heavy Vehicles (%)												
Bus Blockages (#/hr)												
Adj. Flow (vph)												
Shared Lane Traffic (%)												
Lane Group Flow (vph)												
Enter Blocked Intersection												
Lane Alignment												
Median Width(ft)												
Link Offset(ft)												
Crosswalk Width(ft)												
Two way Left Turn Lane												
Headway Factor												
Turning Speed (mph)												
Number of Detectors												
Detector Template												
Leading Detector (ft)												
Trailing Detector (ft)												
Detector 1 Position(ft)												
Detector 1 Size(ft)												
Detector 1 Type												
Detector 1 Channel												
Detector 1 Extend (s)												
Detector 1 Queue (s)												
Detector 1 Delay (s)												
Detector 2 Position(ft)												
Detector 2 Size(ft)												

Lanes, Volumes, Timings

2: Montrose & W. Dallas

02/16/2022

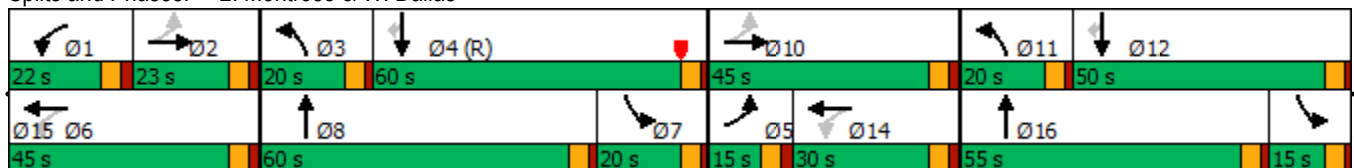


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Detector 2 Type	Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex			
Detector 2 Channel													
Detector 2 Extend (s)	0.0			0.0			0.0			0.0			
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA		Perm
Protected Phases	5	2 10		1	6 14		3 11	8 16		7 15	4 12		
Permitted Phases	2 10		6 14									4 12	
Detector Phase	5	2 10		1	6 14		3 11	8 16		7 15	4 12		
Switch Phase													
Minimum Initial (s)	5.0			5.0									
Minimum Split (s)	10.6			10.6									
Total Split (s)	15.0			22.0									
Total Split (%)	6.3%			9.2%									
Maximum Green (s)	9.4			16.4									
Yellow Time (s)	3.6			3.6									
All-Red Time (s)	2.0			2.0									
Lost Time Adjust (s)													
Total Lost Time (s)													
Lead/Lag	Lead			Lead									
Lead-Lag Optimize?													
Vehicle Extension (s)	2.0			2.0									
Recall Mode	Max			Max									
Walk Time (s)													
Flash Dont Walk (s)													
Pedestrian Calls (#/hr)													
Act Effct Green (s)	53.8			65.8			22.4	104.8		23.8	106.2		106.2
Actuated g/C Ratio	0.22			0.27			0.09	0.44		0.10	0.44		0.44
v/c Ratio	0.86			0.99			0.59	0.95		0.79	0.55		0.08
Control Delay	81.4			91.5			68.6	50.6		90.8	26.7		0.2
Queue Delay	0.0			0.0			0.0	0.0		0.0	0.0		0.0
Total Delay	81.4			91.5			68.6	50.6		90.8	26.7		0.2
LOS	F			F			E	D		F	C		A
Approach Delay	81.4			91.5			51.8		33.7				
Approach LOS	F			F			D		C				

Intersection Summary

Area Type: Other
 Cycle Length: 240
 Actuated Cycle Length: 240
 Offset: 64 (27%), Referenced to phase 4:SBT, Start of Yellow
 Natural Cycle: 165
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.99
 Intersection Signal Delay: 59.1
 Intersection LOS: E
 Intersection Capacity Utilization 109.6%
 ICU Level of Service H
 Analysis Period (min) 15

Splits and Phases: 2: Montrose & W. Dallas



Lanes, Volumes, Timings
2: Montrose & W. Dallas

02/16/2022

Lane Group	Ø2	Ø3	Ø4	Ø6	Ø7	Ø8	Ø10	Ø11	Ø12	Ø14	Ø15	Ø16
Detector 2 Type												
Detector 2 Channel												
Detector 2 Extend (s)												
Turn Type												
Protected Phases	2	3	4	6	7	8	10	11	12	14	15	16
Permitted Phases												
Detector Phase												
Switch Phase												
Minimum Initial (s)	8.0	5.0	10.0	8.0	5.0	10.0	5.0	5.0	10.0	5.0	5.0	10.0
Minimum Split (s)	34.6	10.1	25.1	34.6	10.1	25.1	34.6	10.1	25.1	34.6	10.1	25.1
Total Split (s)	23.0	20.0	60.0	45.0	20.0	60.0	45.0	20.0	50.0	30.0	15.0	55.0
Total Split (%)	10%	8%	25%	19%	8%	25%	19%	8%	21%	13%	6%	23%
Maximum Green (s)	17.4	14.9	54.9	39.4	14.9	54.9	39.4	14.9	44.9	24.4	9.9	49.9
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	2.0	1.5	1.5	2.0	1.5	1.5	2.0	1.5	1.5	2.0	1.5	1.5
Lost Time Adjust (s)												
Total Lost Time (s)												
Lead/Lag	Lag	Lead	Lag		Lag	Lead		Lead	Lag	Lag	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	None	C-Min	None	None	Min	Min	None	Min	Min	None	Min
Walk Time (s)	4.0		4.0	4.0		4.0	4.0		4.0	4.0		4.0
Flash Dont Walk (s)	25.0		16.0	25.0		16.0	25.0		16.0	25.0		16.0
Pedestrian Calls (#/hr)	2		5	2		5	1		5	1		5
Act Effct Green (s)												
Actuated g/C Ratio												
v/c Ratio												
Control Delay												
Queue Delay												
Total Delay												
LOS												
Approach Delay												
Approach LOS												
Intersection Summary												

Queues

2: Montrose & W. Dallas

02/16/2022



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	465	631	81	1145	118	681	58
v/c Ratio	0.86	0.99	0.59	0.95	0.79	0.55	0.08
Control Delay	81.4	91.5	68.6	50.6	90.8	26.7	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	81.4	91.5	68.6	50.6	90.8	26.7	0.2
Queue Length 50th (ft)	238	316	64	457	93	198	0
Queue Length 95th (ft)	#332	#489	98	#571	#191	243	0
Internal Link Dist (ft)	1347	728		534		765	
Turn Bay Length (ft)			100		150		100
Base Capacity (vph)	543	636	185	1203	155	1249	742
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.99	0.44	0.95	0.76	0.55	0.08

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2: Montrose & W. Dallas

02/16/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↕	↕↕		↕	↕↕	↕
Traffic Volume (vph)	52	304	109	108	342	181	81	1071	74	118	681	58
Future Volume (vph)	52	304	109	108	342	181	81	1071	74	118	681	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1600	1500	1600	1600	1500	1600
Lane Width	11	11	11	11	11	11	12	12	12	12	12	16
Total Lost time (s)		7.6			4.6		5.1	5.1		5.1	5.1	5.1
Lane Util. Factor		0.95			0.95		1.00	0.95		1.00	0.95	1.00
Frbp, ped/bikes		0.99			1.00		1.00	0.99		1.00	1.00	0.99
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frt		0.96			0.96		1.00	0.99		1.00	1.00	0.85
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3296			3277		1490	2753		1505	2822	1507
Flt Permitted		0.66			0.57		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		2200			1886		1490	2753		1505	2822	1507
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	52	304	109	108	342	181	81	1071	74	118	681	58
RTOR Reduction (vph)	0	12	0	0	18	0	0	2	0	0	0	32
Lane Group Flow (vph)	0	453	0	0	613	0	81	1143	0	118	681	26
Confl. Peds. (#/hr)			5	5					19	19		
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	2%	2%	2%	1%	1%	1%
Bus Blockages (#/hr)	0	0	5	0	0	5	0	0	11	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	5	2 10		1	6 14		3 11	8 16		7 15	4 12	
Permitted Phases	2 10			6 14								4 12
Actuated Green, G (s)		57.8			63.8		22.4	104.8		23.8	106.2	106.2
Effective Green, g (s)		53.8			65.8		22.4	104.8		23.8	106.2	106.2
Actuated g/C Ratio		0.22			0.27		0.09	0.44		0.10	0.44	0.44
Clearance Time (s)												
Vehicle Extension (s)												
Lane Grp Cap (vph)		531			617		139	1202		149	1248	666
v/s Ratio Prot		c0.03			c0.07		0.05	c0.42		c0.08	0.24	
v/s Ratio Perm		0.16			c0.20							0.02
v/c Ratio		0.85			0.99		0.58	0.95		0.79	0.55	0.04
Uniform Delay, d1		89.3			86.9		104.3	65.1		105.7	49.2	37.9
Progression Factor		1.11			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		11.9			34.3		6.1	15.6		24.3	0.3	0.0
Delay (s)		111.4			121.2		110.4	80.7		130.0	49.4	38.0
Level of Service		F			F		F	F		F	D	D
Approach Delay (s)		111.4			121.2			82.7			59.7	
Approach LOS		F			F			F			E	
Intersection Summary												
HCM 2000 Control Delay			88.4				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			240.0			Sum of lost time (s)			43.8			
Intersection Capacity Utilization			109.6%			ICU Level of Service			H			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Edition methodology does not support non-NEMA phasing.

HCM 6th Edition methodology does not support non-NEMA phasing.

HCM 6th Signals-Pedestrians
2: Montrose & W. Dallas























02/16/2022

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	45.8	46.0	60.1	76.1
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	4	4	5	6
Number of Right-Turn Islands	0	0	0	0
Type of Control	None	None	None	None
Corresponding Signal Phase	4	8	2	6
Effective Walk Time (s)	0.0	0.0	0.0	0.0
Right Corner Size A (ft)	9.0	9.0	9.0	9.0
Right Corner Size B (ft)	9.0	9.0	9.0	9.0
Right Corner Curb Radius (ft)	0.0	0.0	0.0	0.0
Right Corner Total Area (sq.ft)	81.00	81.00	81.00	81.00
Ped. Left-Right Flow Rate (p/h)	0	0	0	0
Ped. Right-Left Flow Rate (p/h)	0	0	0	0
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	30	30	35	35
Right Corner Area per Ped (sq.ft)	0.0	0.0	0.0	0.0
Right Corner Quality of Service	-	-	-	-
Ped. Circulation Area (sq.ft)	0.0	0.0	0.0	0.0
Crosswalk Circulation Code	-	-	-	-
Pedestrian Delay (s/p)	120.0	120.0	120.0	120.0
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.41	2.46	2.83	2.91
Pedestrian Crosswalk LOS	B	B	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	465	631	1226	857
Effct. Green for Bike (s)	53.8	65.8	104.8	106.2
Cross Street Width (ft)	60.1	76.1	46.0	45.7
Through Lanes Number	2	2	2	2
Through Lane Width (ft)	11.0	11.0	12.0	12.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	No	No	No	No
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	448	548	873	885
Bicycle Delay (s/bike)	72.2	63.2	38.1	37.3
Bicycle Compliance	Poor	Poor	Poor	Poor
Bicycle LOS Score	3.08	3.46	3.27	2.97
Bicycle LOS	C	C	C	C

Lanes, Volumes, Timings
1: Waugh & W. Dallas

02/16/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	144	39	95	178	190	45	1141	34	187	686	98
Future Volume (vph)	65	144	39	95	178	190	45	1141	34	187	686	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	12	10	10	12	12	10	10	12	10	10
Storage Length (ft)	150		0	150		0	100		0	150		0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	0.99	1.00		1.00	0.98		1.00	1.00				0.96
Frt		0.968			0.923			0.996				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1652	1797	0	1668	1591	0	1787	3317	0	1787	3336	1492
Flt Permitted	0.950			0.950			0.225			0.087		
Satd. Flow (perm)	1633	1797	0	1663	1591	0	422	3317	0	164	3336	1436
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			43			3				152
Link Speed (mph)		30			30			30				30
Link Distance (ft)		579			1427			606				794
Travel Time (s)		13.2			32.4			13.8				18.0
Confl. Peds. (#/hr)	14		3	3		14	7		16	16		7
Confl. Bikes (#/hr)						4			1			2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Bus Blockages (#/hr)	0	0	2	0	0	7	0	0	0	0	0	0
Adj. Flow (vph)	72	159	43	105	197	210	50	1261	38	207	758	108
Shared Lane Traffic (%)												
Lane Group Flow (vph)	72	202	0	105	407	0	50	1299	0	207	758	108
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.09	1.00	1.00	1.09	1.09	1.00	1.00	1.09	1.09	1.00	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	1
Detector Template	Left			Left			Left			Left		Right
Leading Detector (ft)	40	6		40	6		40	6		40	6	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	40	6		40	6		40	6		40	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Turn Type	Prot	NA		Prot	NA		pm+pt	NA		pm+pt	NA	Perm

Lanes, Volumes, Timings
1: Waugh & W. Dallas

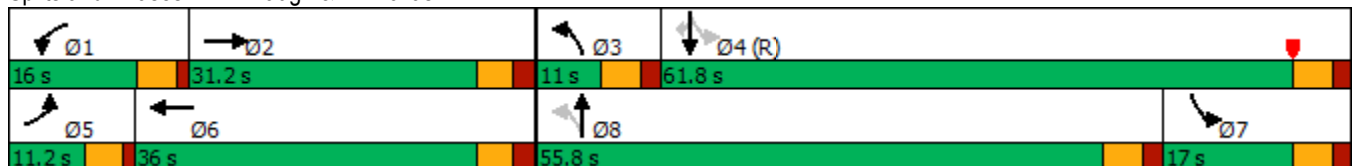
02/16/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases							8			4		4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		4.0	12.0		4.0	12.0	12.0
Minimum Split (s)	9.5	30.4		9.5	30.4		10.3	30.3		10.3	30.3	30.3
Total Split (s)	11.2	31.2		16.0	36.0		11.0	55.8		17.0	61.8	61.8
Total Split (%)	9.3%	26.0%		13.3%	30.0%		9.2%	46.5%		14.2%	51.5%	51.5%
Maximum Green (s)	6.7	25.8		11.5	30.6		5.7	50.5		11.7	56.5	56.5
Yellow Time (s)	3.5	3.2		3.5	3.2		3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	2.2		1.0	2.2		1.7	1.7		1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	5.4		4.5	5.4		5.3	5.3		5.3	5.3	5.3
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	C-Max	C-Max
Walk Time (s)		5.0			5.0			5.0			5.0	5.0
Flash Dont Walk (s)		20.0			20.0			20.0			20.0	20.0
Pedestrian Calls (#/hr)		8			8			11			11	11
Act Effct Green (s)	6.7	25.8		10.7	29.8		51.3	51.3		59.5	59.5	59.5
Actuated g/C Ratio	0.06	0.22		0.09	0.25		0.43	0.43		0.50	0.50	0.50
v/c Ratio	0.78	0.51		0.70	0.95		0.21	0.92		0.87	0.46	0.14
Control Delay	104.0	44.8		80.5	78.3		22.9	43.6		76.5	21.6	1.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	104.0	44.8		80.5	78.3		22.9	43.6		76.5	21.6	1.3
LOS	F	D		F	E		C	D		E	C	A
Approach Delay		60.3			78.8			42.9			30.2	
Approach LOS		E			E			D			C	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 4:SBTL, Start of Yellow
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.95
 Intersection Signal Delay: 45.8
 Intersection LOS: D
 Intersection Capacity Utilization 89.2%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 1: Waugh & W. Dallas



Queues

1: Waugh & W. Dallas

02/16/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	72	202	105	407	50	1299	207	758	108
v/c Ratio	0.78	0.51	0.70	0.95	0.21	0.92	0.87	0.46	0.14
Control Delay	104.0	44.8	80.5	78.3	22.9	43.6	76.5	21.6	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	104.0	44.8	80.5	78.3	22.9	43.6	76.5	21.6	1.3
Queue Length 50th (ft)	56	132	86	243	23	494	109	206	0
Queue Length 95th (ft)	#140	210	m103	m#265	48	#647	#249	261	12
Internal Link Dist (ft)		499		1347		526		714	
Turn Bay Length (ft)	150		150		100		150		
Base Capacity (vph)	92	395	159	437	245	1419	239	1654	788
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.51	0.66	0.93	0.20	0.92	0.87	0.46	0.14

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

HCM 6th Signalized Intersection Summary

1: Waugh & W. Dallas

02/16/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↕		↖	↗	↖
Traffic Volume (veh/h)	65	144	39	95	178	190	45	1141	34	187	686	98
Future Volume (veh/h)	65	144	39	95	178	190	45	1141	34	187	686	98
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.96	1.00		0.96
Parking Bus, Adj	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	72	159	43	105	197	210	50	1261	38	207	758	108
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	1	1	1	1	1	1	1	1	1
Cap, veh/h	92	327	88	131	203	217	247	1492	45	279	1773	761
Arrive On Green	0.05	0.23	0.23	0.02	0.08	0.08	0.03	0.42	0.42	0.10	0.50	0.50
Sat Flow, veh/h	1781	1400	379	1795	797	850	1795	3545	107	1795	3582	1538
Grp Volume(v), veh/h	72	0	202	105	0	407	50	637	662	207	758	108
Grp Sat Flow(s),veh/h/ln	1781	0	1779	1795	0	1647	1795	1791	1861	1795	1791	1538
Q Serve(g_s), s	4.8	0.0	11.8	7.0	0.0	29.6	2.1	38.3	38.4	6.8	16.3	4.6
Cycle Q Clear(g_c), s	4.8	0.0	11.8	7.0	0.0	29.6	2.1	38.3	38.4	6.8	16.3	4.6
Prop In Lane	1.00		0.21	1.00		0.52	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	92	0	415	131	0	420	247	754	783	279	1773	761
V/C Ratio(X)	0.79	0.00	0.49	0.80	0.00	0.97	0.20	0.84	0.85	0.74	0.43	0.14
Avail Cap(c_a), veh/h	99	0	415	172	0	420	282	754	783	279	1773	761
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.34	0.00	0.34	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.3	0.0	39.8	57.7	0.0	54.5	24.2	31.2	31.3	49.0	19.4	16.5
Incr Delay (d2), s/veh	30.8	0.0	0.9	6.8	0.0	18.6	0.1	11.2	10.9	9.1	0.8	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	5.3	3.5	0.0	15.3	0.9	18.5	19.2	6.6	6.9	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	87.1	0.0	40.7	64.4	0.0	73.1	24.4	42.4	42.2	58.1	20.2	16.8
LnGrp LOS	F	A	D	E	A	E	C	D	D	E	C	B
Approach Vol, veh/h		274			512			1349			1073	
Approach Delay, s/veh		52.9			71.3			41.6			27.1	
Approach LOS		D			E			D			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.3	33.4	8.6	64.7	10.7	36.0	17.5	55.8				
Change Period (Y+Rc), s	4.5	5.4	* 5.3	* 5.3	4.5	5.4	* 5.3	* 5.3				
Max Green Setting (Gmax), s	11.5	25.8	* 5.7	* 5.7	6.7	30.6	* 12	* 51				
Max Q Clear Time (g_c+I1), s	9.0	13.8	4.1	18.3	6.8	31.6	8.8	40.4				
Green Ext Time (p_c), s	0.1	0.4	0.0	2.9	0.0	0.0	0.1	3.1				

Intersection Summary

HCM 6th Ctrl Delay	42.5
HCM 6th LOS	D

Notes

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

HCM 6th Signalized Intersection Capacity Analysis
1: Waugh & W. Dallas

02/16/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	144	39	95	178	190	45	1141	34	187	686	98
Future Volume (veh/h)	65	144	39	95	178	190	45	1141	34	187	686	98
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		0.98	1.00		0.97	1.00		0.96	1.00		0.96
Parking Bus Adj	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	72	159	43	105	197	210	50	1261	38	207	758	108
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	92	327	88	131	203	217	247	1492	45	279	1773	761
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.05	0.23	0.23	0.02	0.08	0.08	0.03	0.42	0.42	0.10	0.50	0.50
Unsig. Movement Delay												
Ln Grp Delay, s/veh	87.1	0.0	40.7	64.4	0.0	73.1	24.4	42.4	42.2	58.1	20.2	16.8
Ln Grp LOS	F	A	D	E	A	E	C	D	D	E	C	B
Approach Vol, veh/h		274			512			1349			1073	
Approach Delay, s/veh		52.9			71.3			41.6			27.1	
Approach LOS		D			E			D			C	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		1	2	3	4	5	6	8	7			
Case No		2.0	4.0	1.2	3.0	2.0	4.0	4.0	1.3			
Phs Duration (G+Y+Rc), s		13.3	33.4	8.6	64.7	10.7	36.0	55.8	17.5			
Change Period (Y+Rc), s		4.5	5.4	* 5.3	* 5.3	4.5	5.4	* 5.3	* 5.3			
Max Green (Gmax), s		11.5	25.8	* 5.7	* 5.7	6.7	30.6	* 5.1	* 12			
Max Allow Headway (MAH), s		4.2	3.5	3.2	3.5	4.2	3.7	3.5	3.2			
Max Q Clear (g_c+I1), s		9.0	13.8	4.1	18.3	6.8	31.6	40.4	8.8			
Green Ext Time (g_e), s		0.1	0.4	0.0	2.9	0.0	0.0	3.1	0.1			
Prob of Phs Call (p_c)		0.97	1.00	0.81	1.00	0.91	1.00	1.00	1.00			
Prob of Max Out (p_x)		1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00			
Left-Turn Movement Data												
Assigned Mvmt		1		3		5				7		
Mvmt Sat Flow, veh/h		1795		1795		1781				1795		
Through Movement Data												
Assigned Mvmt			2		4		6	8				
Mvmt Sat Flow, veh/h			1400		3582		797	3545				
Right-Turn Movement Data												
Assigned Mvmt			12		14		16	18				
Mvmt Sat Flow, veh/h			379		1538		850	107				
Left Lane Group Data												
Assigned Mvmt		1	0	3	0	5	0	0	7			
Lane Assignment		L (Prot)		L (Pr/Pm)		L (Prot)			L (Pr/Pm)			

HCM 6th Signalized Intersection Capacity Analysis

1: Waugh & W. Dallas

02/16/2022

Lanes in Grp	1	0	1	0	1	0	0	1
Grp Vol (v), veh/h	105	0	50	0	72	0	0	207
Grp Sat Flow (s), veh/h/ln	1795	0	1795	0	1781	0	0	1795
Q Serve Time (g_s), s	7.0	0.0	2.1	0.0	4.8	0.0	0.0	6.8
Cycle Q Clear Time (g_c), s	7.0	0.0	2.1	0.0	4.8	0.0	0.0	6.8
Perm LT Sat Flow (s_l), veh/h/ln	0	0	643	0	0	0	0	428
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	43.9	0.0	0.0	0.0	0.0	39.9
Perm LT Serve Time (g_u), s	0.0	0.0	25.6	0.0	0.0	0.0	0.0	10.1
Perm LT Q Serve Time (g_ps), s	0.0	0.0	1.5	0.0	0.0	0.0	0.0	10.1
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	131	0	247	0	92	0	0	279
V/C Ratio (X)	0.80	0.00	0.20	0.00	0.79	0.00	0.00	0.74
Avail Cap (c_a), veh/h	172	0	282	0	99	0	0	279
Upstream Filter (I)	0.34	0.00	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	57.7	0.0	24.2	0.0	56.3	0.0	0.0	49.0
Incr Delay (d2), s/veh	6.8	0.0	0.1	0.0	30.8	0.0	0.0	9.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	64.4	0.0	24.4	0.0	87.1	0.0	0.0	58.1
1st-Term Q (Q1), veh/ln	3.3	0.0	0.9	0.0	2.2	0.0	0.0	5.9
2nd-Term Q (Q2), veh/ln	0.2	0.0	0.0	0.0	0.8	0.0	0.0	0.7
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	3.5	0.0	0.9	0.0	2.9	0.0	0.0	6.6
%ile Storage Ratio (RQ%)	0.60	0.00	0.23	0.00	0.50	0.00	0.00	1.11
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	8	0
Lane Assignment				T			T	
Lanes in Grp	0	0	0	2	0	0	1	0
Grp Vol (v), veh/h	0	0	0	758	0	0	637	0
Grp Sat Flow (s), veh/h/ln	0	0	0	1791	0	0	1791	0
Q Serve Time (g_s), s	0.0	0.0	0.0	16.3	0.0	0.0	38.3	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	16.3	0.0	0.0	38.3	0.0
Lane Grp Cap (c), veh/h	0	0	0	1773	0	0	754	0
V/C Ratio (X)	0.00	0.00	0.00	0.43	0.00	0.00	0.84	0.00
Avail Cap (c_a), veh/h	0	0	0	1773	0	0	754	0
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	19.4	0.0	0.0	31.2	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.8	0.0	0.0	11.2	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	20.2	0.0	0.0	42.4	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	6.7	0.0	0.0	16.2	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.2	0.0	0.0	2.3	0.0

HCM 6th Signalized Intersection Capacity Analysis

1: Waugh & W. Dallas

02/16/2022

3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	6.9	0.0	0.0	18.5	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.23	0.00	0.00	0.82	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	18	0
Lane Assignment		T+R		R		T+R	T+R	
Lanes in Grp	0	1	0	1	0	1	1	0
Grp Vol (v), veh/h	0	202	0	108	0	407	662	0
Grp Sat Flow (s), veh/h/ln	0	1779	0	1538	0	1647	1861	0
Q Serve Time (g_s), s	0.0	11.8	0.0	4.6	0.0	29.6	38.4	0.0
Cycle Q Clear Time (g_c), s	0.0	11.8	0.0	4.6	0.0	29.6	38.4	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.21	0.00	1.00	0.00	0.52	0.06	0.00
Lane Grp Cap (c), veh/h	0	415	0	761	0	420	783	0
V/C Ratio (X)	0.00	0.49	0.00	0.14	0.00	0.97	0.85	0.00
Avail Cap (c_a), veh/h	0	415	0	761	0	420	783	0
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	0.34	1.00	0.00
Uniform Delay (d1), s/veh	0.0	39.8	0.0	16.5	0.0	54.5	31.3	0.0
Incr Delay (d2), s/veh	0.0	0.9	0.0	0.4	0.0	18.6	10.9	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	40.7	0.0	16.8	0.0	73.1	42.2	0.0
1st-Term Q (Q1), veh/ln	0.0	5.2	0.0	1.6	0.0	13.1	16.9	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.1	0.0	2.2	2.4	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	5.3	0.0	1.7	0.0	15.3	19.2	0.0
%ile Storage Ratio (RQ%)	0.00	0.25	0.00	0.06	0.00	0.29	0.85	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	42.5
HCM 6th LOS	D

Notes

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

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	49.0	42.5	78.2	78.0
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	3	3	5	6
Number of Right-Turn Islands	0	0	0	0
Type of Control	None	None	None	None
Corresponding Signal Phase	4	8	2	6
Effective Walk Time (s)	0.0	0.0	0.0	0.0
Right Corner Size A (ft)	9.0	9.0	9.0	9.0
Right Corner Size B (ft)	9.0	9.0	9.0	9.0
Right Corner Curb Radius (ft)	0.0	0.0	0.0	0.0
Right Corner Total Area (sq.ft)	81.00	81.00	81.00	81.00
Ped. Left-Right Flow Rate (p/h)	0	0	0	0
Ped. Right-Left Flow Rate (p/h)	0	0	0	0
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	30	30	30	30
Right Corner Area per Ped (sq.ft)	0.0	0.0	0.0	0.0
Right Corner Quality of Service	-	-	-	-
Ped. Circulation Area (sq.ft)	0.0	0.0	0.0	0.0
Crosswalk Circulation Code	-	-	-	-
Pedestrian Delay (s/p)	60.0	60.0	60.0	60.0
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.17	2.26	2.76	2.90
Pedestrian Crosswalk LOS	B	B	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	274	512	1349	1073
Effct. Green for Bike (s)	25.8	29.8	51.3	59.5
Cross Street Width (ft)	56.1	66.0	32.3	35.1
Through Lanes Number	1	1	2	2
Through Lane Width (ft)	12.0	10.0	10.0	10.0
Bicycle Lane Width (ft)	5.0	5.0	0.0	0.0
Striped Parking Lane Width (ft)	2.0	2.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	Yes	Yes	Yes	Yes
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	430	497	855	992
Bicycle Delay (s/bike)	37.0	33.9	19.7	15.3
Bicycle Compliance	Poor	Poor	Fair	Fair
Bicycle LOS Score	1.37	2.34	3.60	3.41
Bicycle LOS	A	B	D	C

Lanes, Volumes, Timings
2: Montrose & W. Dallas

02/16/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	304	109	108	342	181	81	1071	74	118	681	58
Future Volume (vph)	52	304	109	108	342	181	81	1071	74	118	681	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1600	1500	1600	1600	1500	1600
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	16
Storage Length (ft)	100		0	100		0	100		0	150		100
Storage Lanes	1		0	0		0	1		0	1		1
Taper Length (ft)	75			75			100			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor		1.00		1.00				1.00		0.99		0.98
Frt		0.961			0.948			0.990				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1728	1739	0	1728	1724	0	1490	2758	0	1505	2822	1526
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1728	1739	0	1722	1724	0	1490	2758	0	1495	2822	1494
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			22			7				162
Link Speed (mph)		30			30			35				35
Link Distance (ft)		1427			808			614				845
Travel Time (s)		32.4			18.4			12.0				16.5
Confl. Peds. (#/hr)			5	5					19	19		
Confl. Bikes (#/hr)												1
Peak Hour 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
Growth Factor	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	2%	2%	2%	1%	1%	1%
Bus Blockages (#/hr)	0	0	5	0	0	5	0	0	11	0	0	0
Adj. Flow (vph)	55	319	114	113	359	190	85	1125	78	124	715	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	433	0	113	549	0	85	1203	0	124	715	61
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane		Yes										
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.24	1.35	1.24	1.24	1.35	1.06
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	40	226		40	226		40	226		40	226	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	40	6		40	6		40	6		40	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		220			220			220				220

Lanes, Volumes, Timings

2: Montrose & W. Dallas

02/16/2022

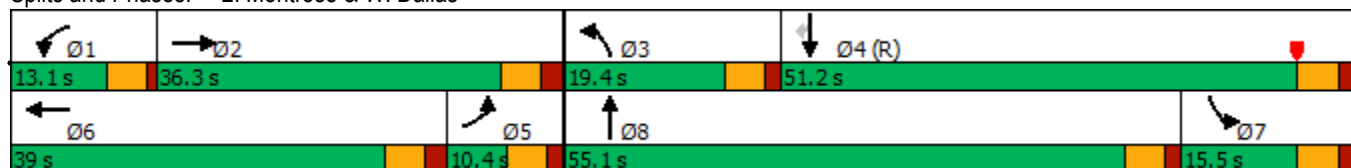


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Size(ft)	6			6			6			6		
Detector 2 Type	Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	8.0		5.0	8.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	10.1	34.6		9.5	34.6		10.1	25.1		10.1	25.1	25.1
Total Split (s)	10.4	36.3		13.1	39.0		19.4	55.1		15.5	51.2	51.2
Total Split (%)	8.7%	30.3%		10.9%	32.5%		16.2%	45.9%		12.9%	42.7%	42.7%
Maximum Green (s)	5.3	30.7		8.6	33.4		14.3	50.0		10.4	46.1	46.1
Yellow Time (s)	3.6	3.6		3.5	3.6		3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.5	2.0		1.0	2.0		1.5	1.5		1.5	1.5	1.5
Lost Time Adjust (s)	0.0	2.0		0.0	-1.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.1	7.6		4.5	4.6		5.1	5.1		5.1	5.1	5.1
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Min		None	C-Min	C-Min
Walk Time (s)	4.0			4.0			4.0			4.0		4.0
Flash Dont Walk (s)	25.0			25.0			16.0			16.0		16.0
Pedestrian Calls (#/hr)	2			2			5			5		5
Act Effct Green (s)	5.3	28.7		8.6	36.5		11.5	50.0		10.4	51.3	51.3
Actuated g/C Ratio	0.04	0.24		0.07	0.30		0.10	0.42		0.09	0.43	0.43
v/c Ratio	0.72	1.02		0.92	1.02		0.59	1.04		0.95	0.59	0.08
Control Delay	98.2	89.3		117.5	84.4		68.5	73.1		122.5	30.2	0.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	98.2	89.3		117.5	84.4		68.5	73.1		122.5	30.2	0.2
LOS	F	F		F	F		E	E		F	C	A
Approach Delay	90.3			90.0			72.8			40.9		
Approach LOS	F			F			E			D		

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	0 (0%), Referenced to phase 4:SBT, Start of Yellow
Natural Cycle:	140
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.04
Intersection Signal Delay:	70.2
Intersection LOS:	E
Intersection Capacity Utilization:	102.0%
ICU Level of Service:	G
Analysis Period (min):	15

Splits and Phases: 2: Montrose & W. Dallas



Queues

2: Montrose & W. Dallas

02/16/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	55	433	113	549	85	1203	124	715	61
v/c Ratio	0.72	1.02	0.92	1.02	0.59	1.04	0.95	0.59	0.08
Control Delay	98.2	89.3	117.5	84.4	68.5	73.1	122.5	30.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	98.2	89.3	117.5	84.4	68.5	73.1	122.5	30.2	0.2
Queue Length 50th (ft)	45	~357	89	~462	64	~530	97	230	0
Queue Length 95th (ft)	m#80	m#515	#203	#683	116	#669	#220	306	0
Internal Link Dist (ft)		1347		728		534		765	
Turn Bay Length (ft)	100		100		100		150		100
Base Capacity (vph)	76	426	123	539	177	1153	130	1206	731
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	1.02	0.92	1.02	0.48	1.04	0.95	0.59	0.08

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM 6th Signalized Intersection Summary

2: Montrose & W. Dallas

02/16/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↘		↗	↘		↗	↕		↗	↕	↗
Traffic Volume (veh/h)	52	304	109	108	342	181	81	1071	74	118	681	58
Future Volume (veh/h)	52	304	109	108	342	181	81	1071	74	118	681	58
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.99	1.00		0.96
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.96	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1575	1477	1575	1588	1488	1651
Adj Flow Rate, veh/h	55	319	114	113	359	190	85	1125	78	124	715	61
Peak Hour 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
Percent Heavy Veh, %	1	1	1	1	1	1	2	2	2	1	1	1
Cap, veh/h	72	310	111	129	325	172	103	1083	75	131	1228	582
Arrive On Green	0.01	0.08	0.08	0.07	0.29	0.28	0.07	0.42	0.42	0.09	0.43	0.43
Sat Flow, veh/h	1795	1297	464	1795	1135	601	1500	2599	180	1512	2828	1340
Grp Volume(v), veh/h	55	0	433	113	0	549	85	607	596	124	715	61
Grp Sat Flow(s),veh/h/ln	1795	0	1761	1795	0	1736	1500	1403	1376	1512	1414	1340
Q Serve(g_s), s	3.7	0.0	28.7	7.5	0.0	34.4	6.7	50.0	50.0	9.8	23.0	2.5
Cycle Q Clear(g_c), s	3.7	0.0	28.7	7.5	0.0	34.4	6.7	50.0	50.0	9.8	23.0	2.5
Prop In Lane	1.00		0.26	1.00		0.35	1.00		0.13	1.00		1.00
Lane Grp Cap(c), veh/h	72	0	421	129	0	498	103	584	573	131	1228	582
V/C Ratio(X)	0.77	0.00	1.03	0.88	0.00	1.10	0.82	1.04	1.04	0.95	0.58	0.10
Avail Cap(c_a), veh/h	79	0	421	129	0	498	179	584	573	131	1228	582
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.66	0.00	0.66	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.6	0.0	55.2	55.2	0.0	43.0	55.1	35.0	35.0	54.5	25.7	12.0
Incr Delay (d2), s/veh	23.1	0.0	43.0	44.9	0.0	71.6	14.6	47.5	48.3	62.1	2.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	0.0	18.6	5.0	0.0	24.5	2.9	24.1	23.7	5.9	7.9	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	81.7	0.0	98.2	100.1	0.0	114.6	69.8	82.5	83.3	116.6	27.7	12.3
LnGrp LOS	F	A	F	F	A	F	E	F	F	F	C	B
Approach Vol, veh/h		488			662			1288				900
Approach Delay, s/veh		96.3			112.1			82.0				38.9
Approach LOS		F			F			F				D
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.1	36.3	13.4	57.2	10.4	39.0	15.5	55.1				
Change Period (Y+Rc), s	4.5	5.6	5.1	5.1	5.6	* 5.6	5.1	5.1				
Max Green Setting (Gmax), s	8.6	30.7	14.3	46.1	5.3	* 33	10.4	50.0				
Max Q Clear Time (g_c+I1), s	9.5	30.7	8.7	25.0	5.7	36.4	11.8	52.0				
Green Ext Time (p_c), s	0.0	0.0	0.1	9.0	0.0	0.0	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay	78.5
HCM 6th LOS	E

Notes

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

HCM 6th Signalized Intersection Capacity Analysis
2: Montrose & W. Dallas

02/16/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	304	109	108	342	181	81	1071	74	118	681	58
Future Volume (veh/h)	52	304	109	108	342	181	81	1071	74	118	681	58
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		0.99	1.00		0.99	1.00		0.99	1.00		0.96
Parking Bus Adj	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.96	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1575	1477	1575	1588	1488	1651
Adj Flow Rate, veh/h	55	319	114	113	359	190	85	1125	78	124	715	61
Peak Hour 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
Percent Heavy Veh, %	1	1	1	1	1	1	2	2	2	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	72	310	111	129	325	172	103	1083	75	131	1228	582
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.01	0.08	0.08	0.07	0.29	0.28	0.07	0.42	0.42	0.09	0.43	0.43
Unsig. Movement Delay												
Ln Grp Delay, s/veh	81.7	0.0	98.2	100.1	0.0	114.6	69.8	82.5	83.3	116.6	27.7	12.3
Ln Grp LOS	F	A	F	F	A	F	E	F	F	F	C	B
Approach Vol, veh/h		488			662			1288			900	
Approach Delay, s/veh		96.3			112.1			82.0			38.9	
Approach LOS		F			F			F			D	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		1	2	3	4	6	5	8	7			
Case No		2.0	4.0	2.0	3.0	4.0	2.0	4.0	2.0			
Phs Duration (G+Y+Rc), s		13.1	36.3	13.4	57.2	39.0	10.4	55.1	15.5			
Change Period (Y+Rc), s		4.5	5.6	5.1	5.1	* 5.6	5.6	5.1	5.1			
Max Green (Gmax), s		8.6	30.7	14.3	46.1	* 33	5.3	50.0	10.4			
Max Allow Headway (MAH), s		4.2	7.7	4.1	7.1	7.8	4.2	7.4	4.1			
Max Q Clear (g_c+I1), s		9.5	30.7	8.7	25.0	36.4	5.7	52.0	11.8			
Green Ext Time (g_e), s		0.0	0.0	0.1	9.0	0.0	0.0	0.0	0.0			
Prob of Phs Call (p_c)		0.98	1.00	0.94	1.00	1.00	0.84	1.00	0.98			
Prob of Max Out (p_x)		1.00	1.00	0.22	0.31	1.00	1.00	1.00	1.00			
Left-Turn Movement Data												
Assigned Mvmt		1		3			5		7			
Mvmt Sat Flow, veh/h		1795		1500			1795		1512			
Through Movement Data												
Assigned Mvmt			2		4	6		8				
Mvmt Sat Flow, veh/h			1297		2828	1135		2599				
Right-Turn Movement Data												
Assigned Mvmt			12		14	16		18				
Mvmt Sat Flow, veh/h			464		1340	601		180				
Left Lane Group Data												
Assigned Mvmt		1	0	3	0	0	5	0	7			
Lane Assignment		L (Prot)		L (Prot)			L (Prot)		L (Prot)			

HCM 6th Signalized Intersection Capacity Analysis

2: Montrose & W. Dallas

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Lanes in Grp	1	0	1	0	0	1	0	1
Grp Vol (v), veh/h	113	0	85	0	0	55	0	124
Grp Sat Flow (s), veh/h/ln	1795	0	1500	0	0	1795	0	1512
Q Serve Time (g_s), s	7.5	0.0	6.7	0.0	0.0	3.7	0.0	9.8
Cycle Q Clear Time (g_c), s	7.5	0.0	6.7	0.0	0.0	3.7	0.0	9.8
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	129	0	103	0	0	72	0	131
V/C Ratio (X)	0.88	0.00	0.82	0.00	0.00	0.77	0.00	0.95
Avail Cap (c_a), veh/h	129	0	179	0	0	79	0	131
Upstream Filter (I)	1.00	0.00	1.00	0.00	0.00	0.66	0.00	1.00
Uniform Delay (d1), s/veh	55.2	0.0	55.1	0.0	0.0	58.6	0.0	54.5
Incr Delay (d2), s/veh	44.9	0.0	14.6	0.0	0.0	23.1	0.0	62.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	100.1	0.0	69.8	0.0	0.0	81.7	0.0	116.6
1st-Term Q (Q1), veh/ln	3.4	0.0	2.5	0.0	0.0	1.7	0.0	3.7
2nd-Term Q (Q2), veh/ln	1.6	0.0	0.4	0.0	0.0	0.5	0.0	2.3
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	5.0	0.0	2.9	0.0	0.0	2.2	0.0	5.9
%ile Storage Ratio (RQ%)	0.16	0.00	0.75	0.00	0.00	0.54	0.00	1.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	6	0	8	0
Lane Assignment				T			T	
Lanes in Grp	0	0	0	2	0	0	1	0
Grp Vol (v), veh/h	0	0	0	715	0	0	607	0
Grp Sat Flow (s), veh/h/ln	0	0	0	1414	0	0	1403	0
Q Serve Time (g_s), s	0.0	0.0	0.0	23.0	0.0	0.0	50.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	23.0	0.0	0.0	50.0	0.0
Lane Grp Cap (c), veh/h	0	0	0	1228	0	0	584	0
V/C Ratio (X)	0.00	0.00	0.00	0.58	0.00	0.00	1.04	0.00
Avail Cap (c_a), veh/h	0	0	0	1228	0	0	584	0
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	25.7	0.0	0.0	35.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.0	0.0	0.0	47.5	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	27.7	0.0	0.0	82.5	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	7.5	0.0	0.0	16.3	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.3	0.0	0.0	7.7	0.0

HCM 6th Signalized Intersection Capacity Analysis 2: Montrose & W. Dallas

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	7.9	0.0	0.0	24.1	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.24	0.00	0.00	1.08	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	5.6	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	16	0	18	0
Lane Assignment		T+R		R	T+R		T+R	
Lanes in Grp	0	1	0	1	1	0	1	0
Grp Vol (v), veh/h	0	433	0	61	549	0	596	0
Grp Sat Flow (s), veh/h/ln	0	1761	0	1340	1736	0	1376	0
Q Serve Time (g_s), s	0.0	28.7	0.0	2.5	34.4	0.0	50.0	0.0
Cycle Q Clear Time (g_c), s	0.0	28.7	0.0	2.5	34.4	0.0	50.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.26	0.00	1.00	0.35	0.00	0.13	0.00
Lane Grp Cap (c), veh/h	0	421	0	582	498	0	573	0
V/C Ratio (X)	0.00	1.03	0.00	0.10	1.10	0.00	1.04	0.00
Avail Cap (c_a), veh/h	0	421	0	582	498	0	573	0
Upstream Filter (I)	0.00	0.66	0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	55.2	0.0	12.0	43.0	0.0	35.0	0.0
Incr Delay (d2), s/veh	0.0	43.0	0.0	0.4	71.6	0.0	48.3	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	98.2	0.0	12.3	114.6	0.0	83.3	0.0
1st-Term Q (Q1), veh/ln	0.0	13.6	0.0	1.0	14.6	0.0	16.1	0.0
2nd-Term Q (Q2), veh/ln	0.0	5.0	0.0	0.1	9.9	0.0	7.7	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	18.6	0.0	1.0	24.5	0.0	23.7	0.0
%ile Storage Ratio (RQ%)	0.00	0.36	0.00	0.26	0.81	0.00	1.06	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	3.0	0.0	0.0	12.9	0.0	5.7	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.3	0.0	0.0	0.3	0.0	0.3	0.0

Intersection Summary

HCM 6th Ctrl Delay	78.5
HCM 6th LOS	E

Notes

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

HCM 6th Signals-Pedestrians
2: Montrose & W. Dallas

02/16/2022

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	45.8	46.0	60.1	76.1
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	3	4	5	6
Number of Right-Turn Islands	0	0	0	0
Type of Control	None	None	None	None
Corresponding Signal Phase	4	8	2	6
Effective Walk Time (s)	0.0	0.0	0.0	0.0
Right Corner Size A (ft)	9.0	9.0	9.0	9.0
Right Corner Size B (ft)	9.0	9.0	9.0	9.0
Right Corner Curb Radius (ft)	0.0	0.0	0.0	0.0
Right Corner Total Area (sq.ft)	81.00	81.00	81.00	81.00
Ped. Left-Right Flow Rate (p/h)	0	0	0	0
Ped. Right-Left Flow Rate (p/h)	0	0	0	0
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	30	30	35	35
Right Corner Area per Ped (sq.ft)	0.0	0.0	0.0	0.0
Right Corner Quality of Service	-	-	-	-
Ped. Circulation Area (sq.ft)	0.0	0.0	0.0	0.0
Crosswalk Circulation Code	-	-	-	-
Pedestrian Delay (s/p)	60.0	60.0	60.0	60.0
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.28	2.44	2.83	2.90
Pedestrian Crosswalk LOS	B	B	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	488	662	1288	900
Effct. Green for Bike (s)	28.7	36.5	50.0	51.3
Cross Street Width (ft)	61.6	76.1	46.0	36.7
Through Lanes Number	1	1	2	2
Through Lane Width (ft)	11.0	11.0	12.0	12.0
Bicycle Lane Width (ft)	5.0	5.0	0.0	0.0
Striped Parking Lane Width (ft)	2.0	2.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	Yes	Yes	Yes	Yes
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	478	608	833	855
Bicycle Delay (s/bike)	34.7	29.1	20.4	19.7
Bicycle Compliance	Poor	Fair	Fair	Fair
Bicycle LOS Score	2.02	2.53	3.33	2.86
Bicycle LOS	B	C	C	C