

March 14, 2024



Clayton Properties Group, Inc., a Tennessee Corporation
4908 Tower Road
Denver, CO 80249

Re: Traffic Letter for Reunion Center – Duet & Commercial & Commercial Phase, a Supplement to Reunion Center – South Traffic Impact Study in Commerce City, CO dated March 6, 2020

To Whom It May Concern:

This Traffic Letter has been prepared to provide a supplement to the approved *Reunion Center – South Traffic Impact Study* (TIS) dated March 6, 2020, prepared by JR Engineering. “Reunion Center – South” is also known as the “Reunion Sports, Entertainment, & Cultural Metropolitan District”. The scope of this letter will be limited to the temporary road network for the Duet & Commercial Phase and the effects of the anticipated trip generation.

This traffic letter overrides the *Traffic Letter for Reunion Center – Duet Phase*, submitted by JR Engineering on May 26, 2022, and the *Reunion Center – STEAD School Phase 2 Traffic Letter*, submitted by JR Engineering on August 26, 2022, since the Duet and Commercial parcels are now combined.

Project Site

Reunion Center is located within Sections 9 and 10, Township 2 South, Range 66 West of the 6th Principal Meridian, City of Commerce City, County of Adams, State of Colorado.

The most recent site plans available are the *Reunion Center Duets*, prepared by Terracina Design on January 27, 2023, and the *Reunion Center – Commercial Parcel*, prepared by G3 Architecture on November 28, 2022. Residential townhomes are proposed within the Duet parcel, while mixed-use commercial buildings are proposed within the Commercial Parcel. This conformance letter will analyze the trip generation from these sites and the effects on the surrounding intersections. These site plans are included in **Appendix E**.

The Duet Townhomes & Commercial Parcel developments were shown as Parcels PA-2 and TC-2, respectively, in the *Reunion Center Village Plan*, prepared by Terracina Design on January 22, 2020. These parcels were also labeled as Traffic Analysis Zones (TAZ) 1-2, 1-3, and Future-2 in the *Reunion Center – South TIS*. Relevant figures are included in **Appendix F** and **Appendix G**, respectively.

The townhomes and commercial buildings are anticipated to be constructed by the Year 2028.

Roadway improvements include the following:

- Site accesses along Tower Road, 104th Avenue, Walden Street, and 105th Avenue. The accesses meet the City's minimum access spacing criteria for full-movement intersections and 3/4 movement intersections. However, the 3/4 movement intersection at 104th Avenue & Yampa Street is approximately 605 feet east of the intersection of 104th Avenue & Walden Street. A variance was approved on September 12, 2023.
- Connection of 105th Avenue to Tower Road will be 3/4 access. The ultimate median and west curb are proposed along Tower Road, between 104th Way and 105th Avenue.

Roadway improvements have already been completed along Homestead Trail per the *Reunion Center – Duet Phase District Improvements* construction plans approved on June 23, 2022. Improvements along Walden Street and 105th Avenue have not yet been constructed. Homestead Trail is not proposed to connect to Tower Road in this Duet & Commercial Phase.

This traffic letter will analyze the Level of Service (LOS) at the following intersections:

- E 104th Avenue & Tower Road (E1)
- E 104th Avenue & Walden Street (E2)
- Walden Street & E 105th Avenue (E3)
- Walden Street & Homestead Trail (E4)
- Tower Road & E 105th Avenue (A1)
- E 104th Avenue & Yampa Street (A2)
- Walden Street & E 104th Way (A3)
- Walden Street & E 105th Place (A4)
- 105th Ave & Yampa Street (A5)
- Homestead Trail & Yampa Street (A6)

Data Collection

Existing turning movement counts were collected by All Traffic Data on August 23, 2022 at the following study area intersections:

- 104th & Tower (E1)
- 104th & Walden (E2)
- Walden & 105th (E3)
- Walden & Homestead (E4)

The counts were collected from 7:00-9:00 AM and 4:00-6:00 PM along 104th Avenue and from 7:00-9:00 AM and 2:00-6:00 PM along Walden Street. The AM peak hour generally occurred 7:15-8:15 AM. The PM peak hour generally occurred 4:30-5:30 PM along 104th Avenue and 2:45-3:45 PM along Walden Street (due to the STEAD School). The traffic counts are included in **Appendix B**.

Additionally, signal timing plans along the 104th Avenue corridor (from State Highway 2 to Tower Road) were prepared by Michael Baker International on February 2, 2022 and provided by the City. The Implemented Signal Timing cycle length and parameters per their Synchro reports were utilized in the opening day Year 2028, but the phasing splits were optimized as necessary with the site generated traffic. These timing reports are included in **Appendix C**.



Background Traffic Summary

Traffic projections were updated based on new traffic counts and sources described in the *Reunion Center – South TIS – Addendum Letter* dated March 14, 2024, prepared by JR Engineering.

In order to align with projections by the DRCOG Focus Travel Model for Year 2050, a 3.0% growth rate was applied to the existing thru traffic volumes along 104th Avenue and Tower Road. A 2.0% growth rate was applied to the turning volumes at the intersection of 104th & Tower. A 1.0% growth rate was applied to the remaining minor streets and turning movements, since most of the traffic growth along these streets is accounted for in the Duet & Commercial site generated traffic. These rates were applied to estimate Year 2028 background volumes. JR notes that the City has observed 1.4% annual growth in recent years along 104th Avenue and Tower Road, according to traffic counts in December 2022.

JR also calculated average daily traffic (ADT) for the Year 2028 background condition. This was calculated by applying growth rates to existing ADT volumes. The sources of existing ADT volumes and the growth rates used are listed below, based on the highest ADT found for each segment:

- Tower Rd north of 104th Ave
 - 2022 ADT from DRCOG travel model
 - 3% growth rate
- Tower Rd south of 104th Ave
 - 2022 ADT from DRCOG travel model
 - 3% growth rate
- 104th Ave east of Tower Rd
 - May 2018 ADT from *Reunion Center – South TIS*
 - 3% growth rate
- 104th Ave west of Tower Rd
 - December 2022 ADT from traffic counts
 - 3% growth rate
- Walden St north of 104th Ave
 - August 2022 ADT from traffic counts
 - 1% growth rate

The *Reunion Center – STEAD School Phase 2 Traffic Letter* analyzed the Year 2024 scenario with half the STEAD School remaining (325 students) and the Duet townhomes. Therefore, site generated traffic of half the school was included in the Year 2028 Background Traffic in this conformance letter. The trip generation summary is included in **Appendix A**.

In the STEAD School Phase traffic letter, the AM Peak Hour of Adjacent Street Traffic and the PM Peak Hour of Generator options were used. This was because the PM peak hour of a school typically does not coincide with the PM peak hour of adjacent street traffic. In order to be conservative again, the PM Peak Hour of Generator was kept for the STEAD School.



Trip Generation Summary

Site generated traffic has been calculated from the latest data contained within the Institute of Transportation Engineers' (ITE) *Trip Generation Manual – 10th Edition*. The Duet & Commercial townhomes (2 units each) were studied as ITE Code 210 (Single-Family Detached Housing) with 190 total dwelling units. The townhomes were not studied as ITE Code 220 (Low-Rise Multifamily Housing) because the *Trip Generation Manual – 10th Edition* describes Code 220 as buildings with at least 4 residential units each. Based on the land use and the guidelines within Volume 1 of the *Trip Generation Manual*, JR used the fitted equations for the AM and PM peak hours of adjacent street traffic.

The land uses for the Commercial Parcel vary according to the site plan and are shown in the Trip Generation Summary as **Table 1**. This site plan is subject to change and will be updated as necessary in subsequent submittals.

No adjustments were made for internal capture trips, but adjustments were made for pass-by trips. The detailed land use reports are included in **Appendix A**.

The estimated site generated traffic for the Duet Townhomes are now less than the volumes assumed in the *Reunion Center – South TIS*, since the South TIS assumed a retail shopping center along with apartment buildings in TAZ's 1-2, 1-3a, and 1-3b. The estimated site generated traffic for the Commercial Parcel is now greater than the volumes assumed in the *Reunion Center – South TIS*, since the South TIS assumed multi-family housing and a shopping center in TAZ's Future-2a and Future-2b.

The TAZ Map and Trip Generation Table from the South TIS are included in **Appendix G**.



Trip Generation Summary

Alternative: Duet Phase and Commercial Center

Phase:

Open Date: 2/8/2023

Project: Reunion Center

Analysis Date: 2/8/2023

| ITE | Land Use | Weekday Average Daily Trips | | | | Weekday AM Peak Hour of Adjacent Street Traffic | | | | Weekday PM Peak Hour of Adjacent Street Traffic | | | |
|-----|-----------------------------------|-----------------------------|-------|------|-------|---|-------|------|-------|---|-------|------|-------|
| | | * | Enter | Exit | Total | * | Enter | Exit | Total | * | Enter | Exit | Total |
| 210 | Townhomes | | 939 | 938 | 1877 | | 35 | 105 | 140 | | 118 | 70 | 188 |
| | 190 Dwelling Units | | | | | | | | | | | | |
| 565 | Child Care Center | | 357 | 357 | 714 | | 87 | 78 | 165 | | 78 | 89 | 167 |
| | 15 1000 Sq. Ft. GFA | | | | | | | | | | | | |
| 720 | Medical Office Building | | 129 | 129 | 258 | | 20 | 6 | 26 | | 9 | 24 | 33 |
| | 9 1000 Sq. Ft. GFA | | | | | | | | | | | | |
| 820 | Retail | | 589 | 589 | 1178 | | 97 | 59 | 156 | | 44 | 48 | 92 |
| | 9.1 1000 Sq. Ft. GLA | | | | | | | | | | | | |
| 848 | Tire Store | | 64 | 64 | 128 | | 8 | 4 | 12 | | 8 | 10 | 18 |
| | 4.5 1000 Sq. Ft. GFA | | | | | | | | | | | | |
| 880 | Drug Store | | 681 | 681 | 1362 | | 53 | 29 | 82 | | 64 | 67 | 131 |
| | 15.4 1000 Sq. Ft. GFA | | | | | | | | | | | | |
| 911 | Bank | | | | 0 | | | | 0 | | 18 | 22 | 40 |
| | 3.3 1000 Sq. Ft. GFA | | | | | | | | | | | | |
| 932 | Restaurant | | 449 | 448 | 897 | | 44 | 36 | 80 | | 48 | 30 | 78 |
| | 8 1000 Sq. Ft. GFA | | | | | | | | | | | | |
| 934 | Fast Food West with Drive-Through | | 589 | 588 | 1177 | | 51 | 49 | 100 | | 43 | 39 | 82 |
| | 2.5 1000 Sq. Ft. GFA | | | | | | | | | | | | |
| 934 | Fast Food East with Drive-Through | | 589 | 588 | 1177 | | 51 | 49 | 100 | | 43 | 39 | 82 |
| | 2.5 1000 Sq. Ft. GFA | | | | | | | | | | | | |
| 937 | Coffee Shop with Drive-Through | | 357 | 357 | 714 | | 39 | 38 | 77 | | 19 | 19 | 38 |
| | 0.87 1000 Sq. Ft. GFA | | | | | | | | | | | | |
| 948 | Car Wash | | | | 0 | | | | 0 | | 39 | 39 | 78 |
| | 1 Car Wash Tunnels | | | | | | | | | | | | |

* - Custom rate used for selected time period.

Source: Institute of Transportation Engineers, Trip Generation Manual 10th Edition

TRIP GENERATION 10, TRAFFICWARE, LLC

Page 5

| ITE | Land Use | Weekday Average Daily Trips | | | | Weekday AM Peak Hour of Adjacent Street Traffic | | | | Weekday PM Peak Hour of Adjacent Street Traffic | | | |
|-----|----------------------------------|-----------------------------|-------|------|-------|---|-------|------|-------|---|-------|------|-------|
| | | * | Enter | Exit | Total | * | Enter | Exit | Total | * | Enter | Exit | Total |
| | Unadjusted Volume | | 4743 | 4739 | 9482 | | 485 | 453 | 938 | | 531 | 496 | 1027 |
| | Internal Capture Trips | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 |
| | Pass-By Trips | | 0 | 0 | 0 | | 48 | 48 | 96 | | 108 | 108 | 216 |
| | Volume Added to Adjacent Streets | | 4743 | 4739 | 9482 | | 437 | 405 | 842 | | 423 | 388 | 811 |

Total Weekday Average Daily Trips Internal Capture = 0 Percent

Total Weekday AM Peak Hour of Adjacent Street Traffic Internal Capture = 0 Percent

Total Weekday PM Peak Hour of Adjacent Street Traffic Internal Capture = 0 Percent

* - Custom rate used for selected time period.

In summary, the Duet Townhomes & Commercial Parcel are expected to generate the approximate following unadjusted number of trips:

- 9,482 weekday trips
- 938 AM peak hour vehicle trips, split 485 entering (52%) and 453 exiting (48%)
- 1,027 PM peak hour vehicle trips, split 531 entering (52%) and 496 exiting (48%)

Based on the projected volumes, the Year 2028 Background Traffic, Assignment of Site Generated Traffic, and Year 2028 Opening Day Traffic are shown in **Figure 1**, **Figure 2**, and **Figure 3**, respectively. Lane Geometry is shown in **Figures 1 and 3**, while directional distribution of site generated traffic is shown in **Figure 2**.

Also described in the *Reunion Center – South TIS – Addendum Letter*, the directional distribution of site generated traffic was updated based on the traffic counts in August 2022 at Tower & 104th (E1) and described as follows:

- 25% to the west along 104th Avenue
- 40% to the south along Tower Road
- 10% to the east along 104th Avenue (toward E470)
- 25% to the north along Tower Road

All-Way Stop Warrant

JR analyzed whether the intersection of Walden Street and Homestead Trail (E4) meets the minimum volumes for an all-way stop condition (AWSC) per MUTCD Section 2B.07 in the Year 2028 Opening Day. The approach speed of Walden Street is below 40mph, so the full values were used. The total of both major street approaches is expected to exceed 300 vehicles in the AM peak hour with 481 vehicles, but not the PM peak hour with 169 vehicles. It is unlikely it would average at least 300 vehicles per hour for 8 hours of an average day. The total of both minor street approaches is not expected to exceed 200 vehicles, pedestrians, and bicyclists during any peak hour in Year 2028.

However, based on comments and discussions with the City, an AWSC condition is typical at the intersection of two collector roads, particularly in residential areas. Furthermore, safety is a concern for pedestrians crossing to/from the STEAD School and residents of the Duet Townhomes who cross to/from the Reunion Park facilities along Reunion Parkway. Therefore, even though the MUTCD volume warrant is not expected to be met, all-way stop control is proposed at Walden & Homestead (E4).



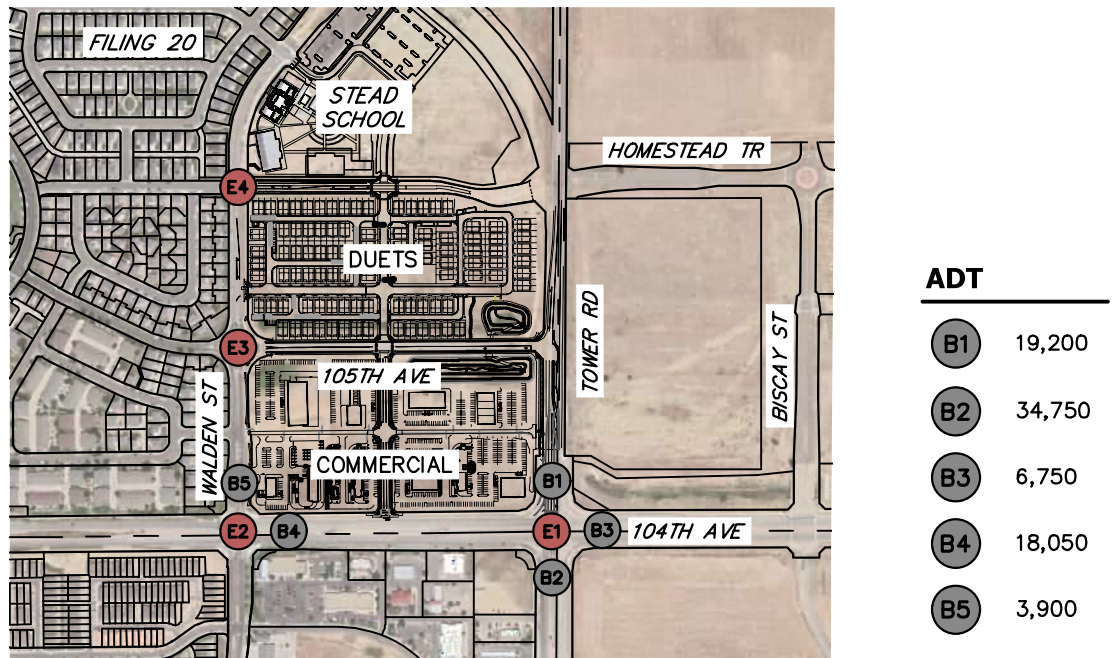
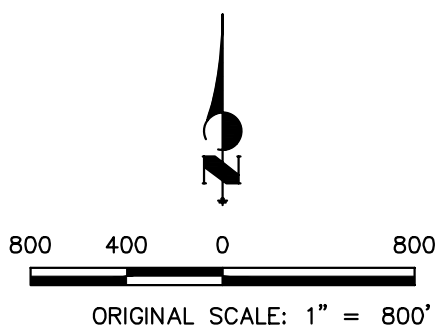
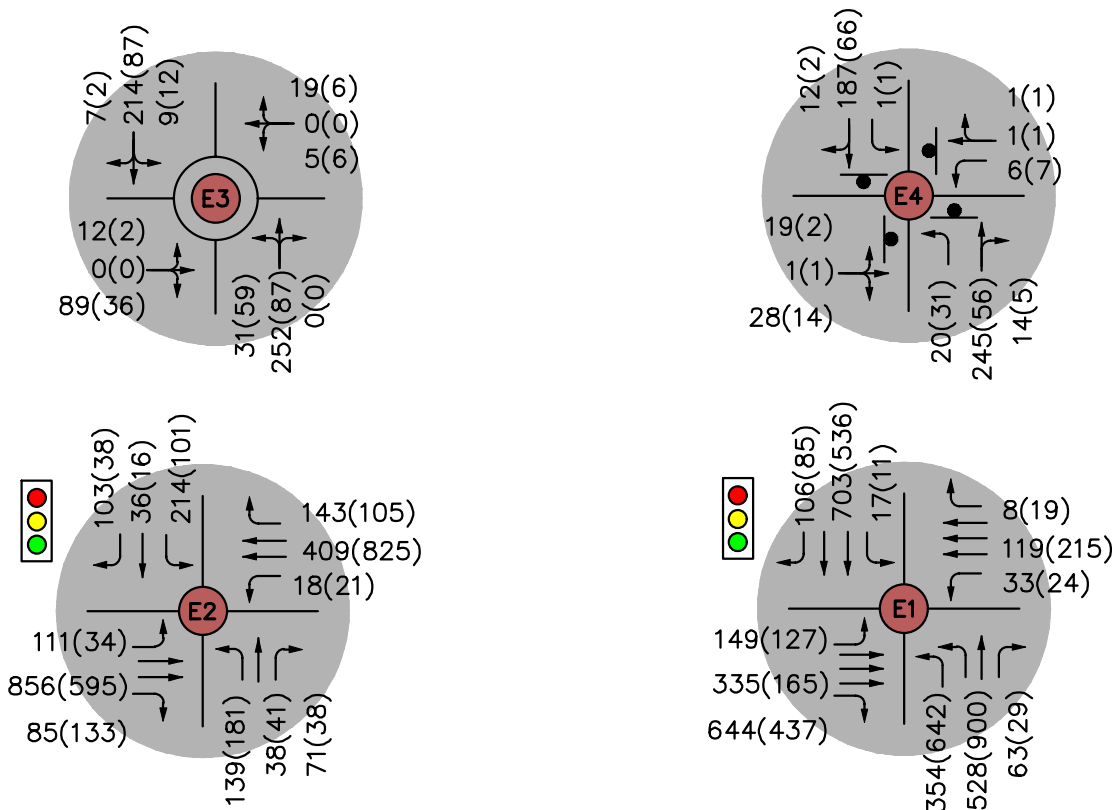
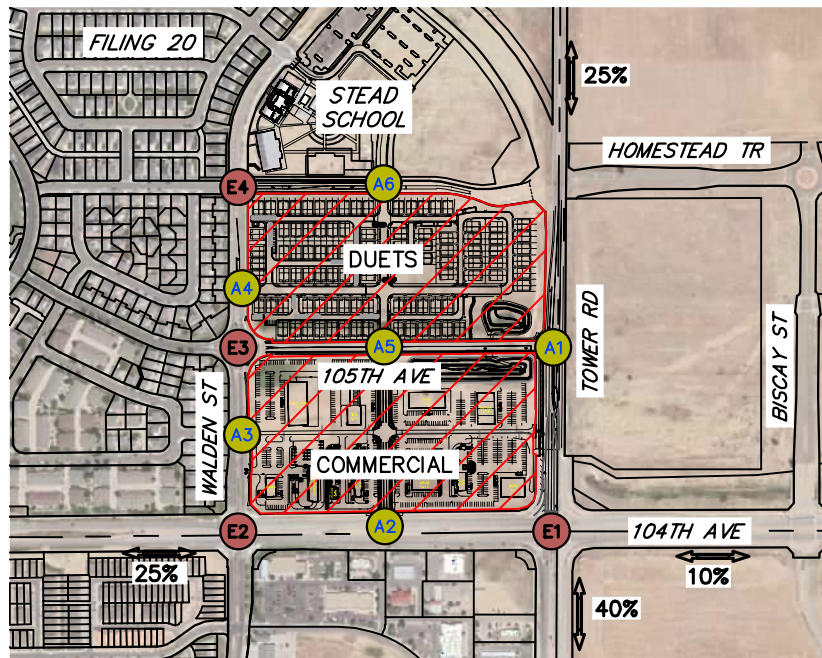


Figure 1 - Year 2028 Background Traffic and Lane Geometry



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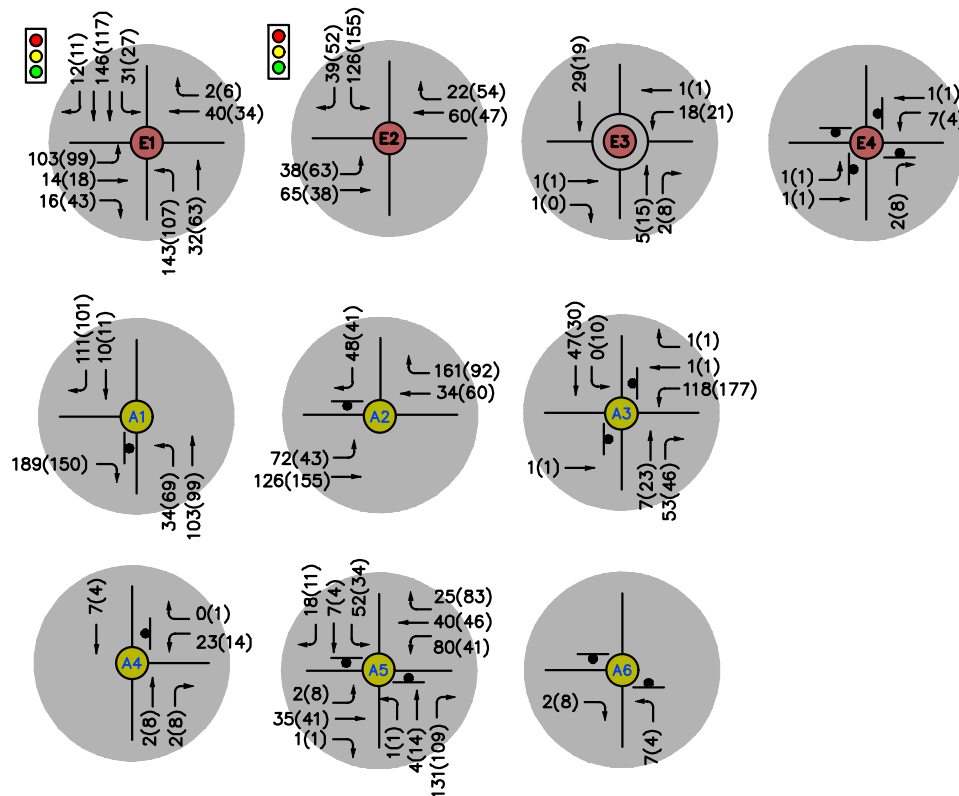
- EXISTING INTERSECTION
- AM (PM) PEAK HOUR TRIP DISTRIBUTION
- STOP SIGN CONTROL
- ROUNDABOUT CONTROL
- TRAFFIC SIGNAL



ADT

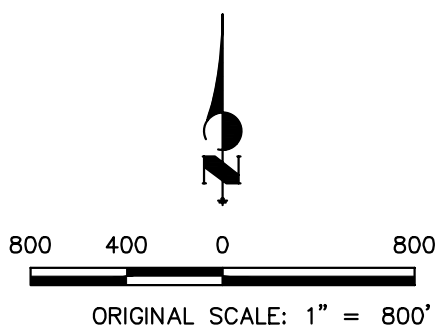
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|----|--------|
| B1 | 6,500 |
| B2 | 10,400 |
| B3 | 2,600 |
| B4 | 6,500 |
| B5 | 8,600 |

Figure 2 - Assignment of Site Generated Traffic



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| | | | | | |
|---------|-------------------------------------|--|--------------------|--|----------------|
| | PROPOSED INTERSECTION | | STOP SIGN CONTROL | | TRAFFIC SIGNAL |
| | EXISTING INTERSECTION | | ROUNDABOUT CONTROL | | |
| XX (XX) | AM (PM) PEAK HOUR TRIP DISTRIBUTION | | PROJECT SITE | | |



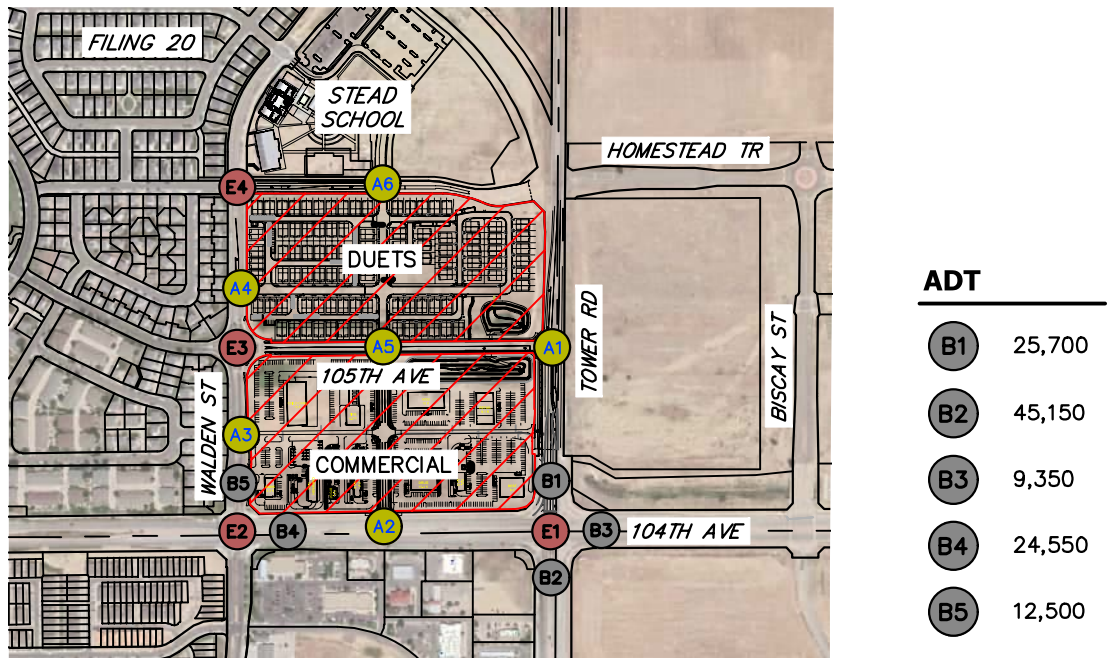
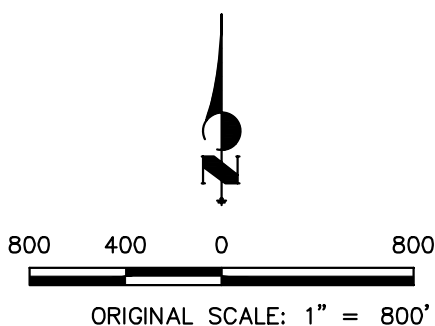
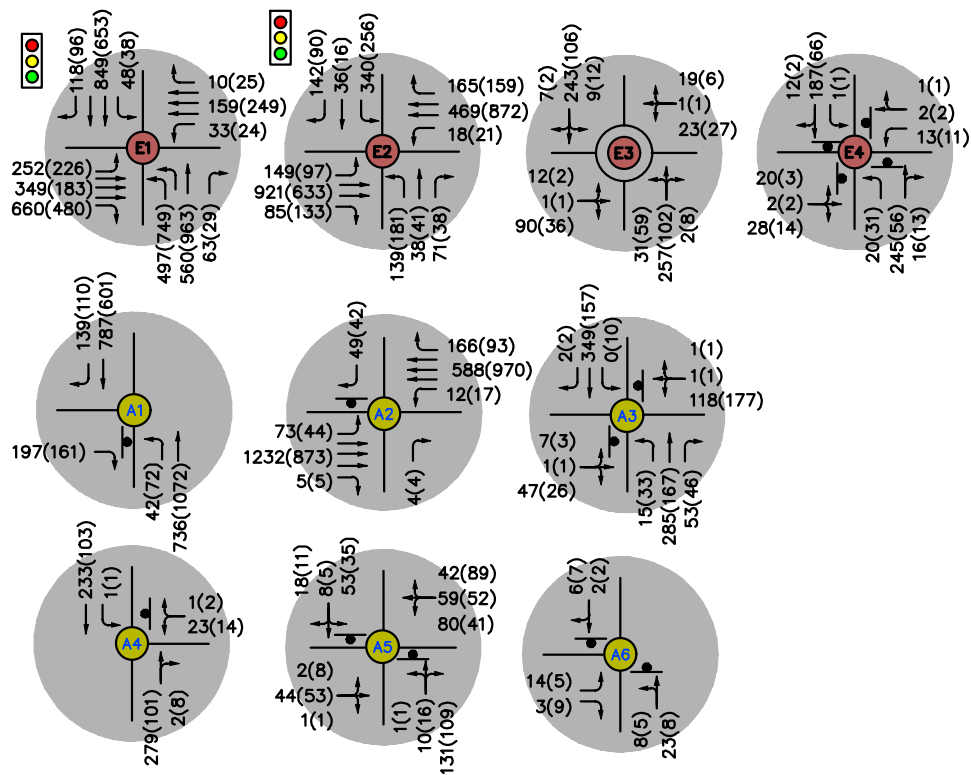


Figure 3 - Year 2028 Opening Day Traffic and Lane Geometry



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- PROPOSED INTERSECTION
- EXISTING INTERSECTION
- AM (PM) PEAK HOUR TRIP DISTRIBUTION
- STOP SIGN CONTROL
- ROUNDABOUT CONTROL
- PROJECT SITE
- TRAFFIC SIGNAL

Level of Service Results

Operational analyses were conducted in the Year 2028 AM and PM peak hours to determine the levels of service. The projected traffic volumes, lane geometry, and intersection control were input into *Synchro* software and the level of service results are summarized in **Table 2** below. For the traffic signals along 104th Avenue, the cycle length of 120 seconds and parameters were maintained from the Michael Baker implemented signal timings, but the phasing splits were optimized in order to improve LOS due to site generated traffic.

Table 2 – LOS for Year 2028 Traffic

| Signalized Intersection | Movement | Background Traffic LOS | | Opening Day Traffic LOS | |
|--------------------------------------|----------------|------------------------|--------------|-------------------------|--------------|
| | | AM Peak Hour | PM Peak Hour | AM Peak Hour | PM Peak Hour |
| E1 - 104th Avenue & Tower Road | EBL | D | D | D | D |
| | EBT | D | D | D | D |
| | WBL | D | D | D | D |
| | WBT | D | D | D | D |
| | NBL | D | D | D | D |
| | NBT | B | B | C | C |
| | SBL | E | E | E | E |
| | SBT | C | C | D | D |
| | OVERALL | D | D | D | D |
| E2 - 104th Avenue & Walden Street | EBL | B | B | B | C |
| | EBT | B | B | C | B |
| | EBR | B | B | B | B |
| | WBL | B | B | C | B |
| | WBT | C | D | D | D |
| | WBR | C | C | D | C |
| | NBL | D | D | D | D |
| | NBT | D | D | D | D |
| | NBR | E | D | E | D |
| | SBL | D | D | D | D |
| | SBT | D | D | D | D |
| | SBR | D | D | D | D |
| | OVERALL | C | C | C | C |
| AWSC Intersection | | | | | |
| E4 - Walden Street & Homestead Trail | EBLTR | A | A | A | A |
| | WBL | A | A | A | A |
| | WBTR | A | A | A | A |
| | NBL | A | A | A | A |
| | NBTR | B | A | B | A |
| | SBL | A | A | A | A |
| | SBTR | B | A | B | A |



| TWSC Intersection | Movement | Background Traffic LOS | | Opening Day Traffic LOS | |
|---|----------|------------------------|--------------|-------------------------|--------------|
| | | AM Peak Hour | PM Peak Hour | AM Peak Hour | PM Peak Hour |
| A1 - Tower Road & 105th Avenue | EBR | C | B | D | C |
| | NBL | A | A | B | A |
| A2 - 104th Avenue & Yampa Street (3/4 Access) | EBL | B | B | B | C |
| | WBL | C | B | C | B |
| | NBR | B | B | C | B |
| | SBR | B | B | B | B |
| A3 - Walden Street & E 104th Way | EBLTR | B | A | B | B |
| | WBLTR | N/A | N/A | D | C |
| | NBL | A | A | A | A |
| | SBL | N/A | N/A | A | A |
| A4 - Walden Street & E 105th Place | WBLR | B | A | B | A |
| | SBL | A | A | A | A |
| A5 - 105th Avenue & Yampa Street | EBLTR | N/A | N/A | A | A |
| | WBLTR | N/A | N/A | A | A |
| | NBLTR | A | A | A | A |
| | SBLTR | A | A | B | B |
| A6 - Homestead Trail & Yampa Street | EBL | A | A | A | A |
| | EBR | A | A | A | A |
| | NBLT | A | A | A | A |
| | SBTR | A | A | A | A |
| Roundabout Intersection | | | | | |
| E3 - Walden Street & E 105th Avenue | EBLTR | A | A | A | A |
| | WBLTR | A | A | A | A |
| | NBLTR | A | A | A | A |
| | SBLTR | A | A | A | A |

Notes:

1. EB=Eastbound, WB=Westbound, NB=Northbound, SB=Southbound, N/A=Not Applicable
2. L=Left, R=Right, T=Through
3. Yellow highlight does not meet established threshold of LOS D

The *HCM 6th Edition* Level of Service reports are included in **Appendix D**.



As shown in **Table 2**, all movements are expected to operate at acceptable levels of service in the Year 2028, except for the following:

Year 2028 Background Traffic

- 104th Avenue & Tower Road (E1): SBL in the AM and PM Peak Hours
- 104th Avenue & Walden Street (E2): NBR in the AM Peak Hour

Year 2028 Opening Day Traffic

- 104th Avenue & Tower Road (E1): SBL in the AM and PM Peak Hours
- 104th Avenue & Walden Street (E2): NBR in the AM Peak Hour

At 104th & Tower (E1), the 95th percentile queue lengths for the southbound-left lane are:

- 38 feet and 28 feet in the background AM and PM peak hours, respectively
- 78 feet and 67 feet in the opening day AM and PM peak hours, respectively

The existing storage length for the SBL lane is 250 feet. Because the upstream through lane is not expected to be impeded, JR recommends the City accept this failing LOS. Furthermore, this failure occurs in the background scenario and is not caused by site generated traffic.

At 104th & Walden (E2), the 95th percentile queue length for the northbound-right turn lane is nominal in the opening day AM peak hour. Therefore, JR recommends the City accept this failing LOS. Furthermore, this failure occurs in the background scenario and is not caused by site generated traffic.



Recommendations

In order to optimize traffic operations, below is a summary of the improvements recommended with the construction of the Duet Townhomes and Commercial Parcel. The improvements are categorized as Project responsibility and City responsibility. The recommended improvements are illustrated in **Figure 4**.

Project Responsibility

- Walden Street & Homestead Trail (E4): all-way stop control is recommended at this intersection.
- Tower Road & E 105th Avenue (A1): northbound-left and southbound-right turn lanes are recommended. This intersection is planned as a 3/4 access. 150 feet of storage is recommended for both turn lanes.
- E 104th Avenue & Yampa Street (A2): this is an existing 3/4 access intersection, but the access needs to be rebuilt to tie into Yampa Street.
- Walden Street & E 104th Way (A3): this is an existing full movement intersection, but the access needs to be rebuilt to tie into 104th Way.
- Walden Street & E 105th Place (A4): a southbound-left turn lane with 90 feet of storage is recommended.

City Responsibility

- E 104th Avenue & Tower Road (E1): stripe a second northbound through lane. Optimized traffic signal phasing is recommended.
- E 104th Avenue & Walden Street (E2): no roadway improvements are recommended, but optimized traffic signal phasing is recommended.



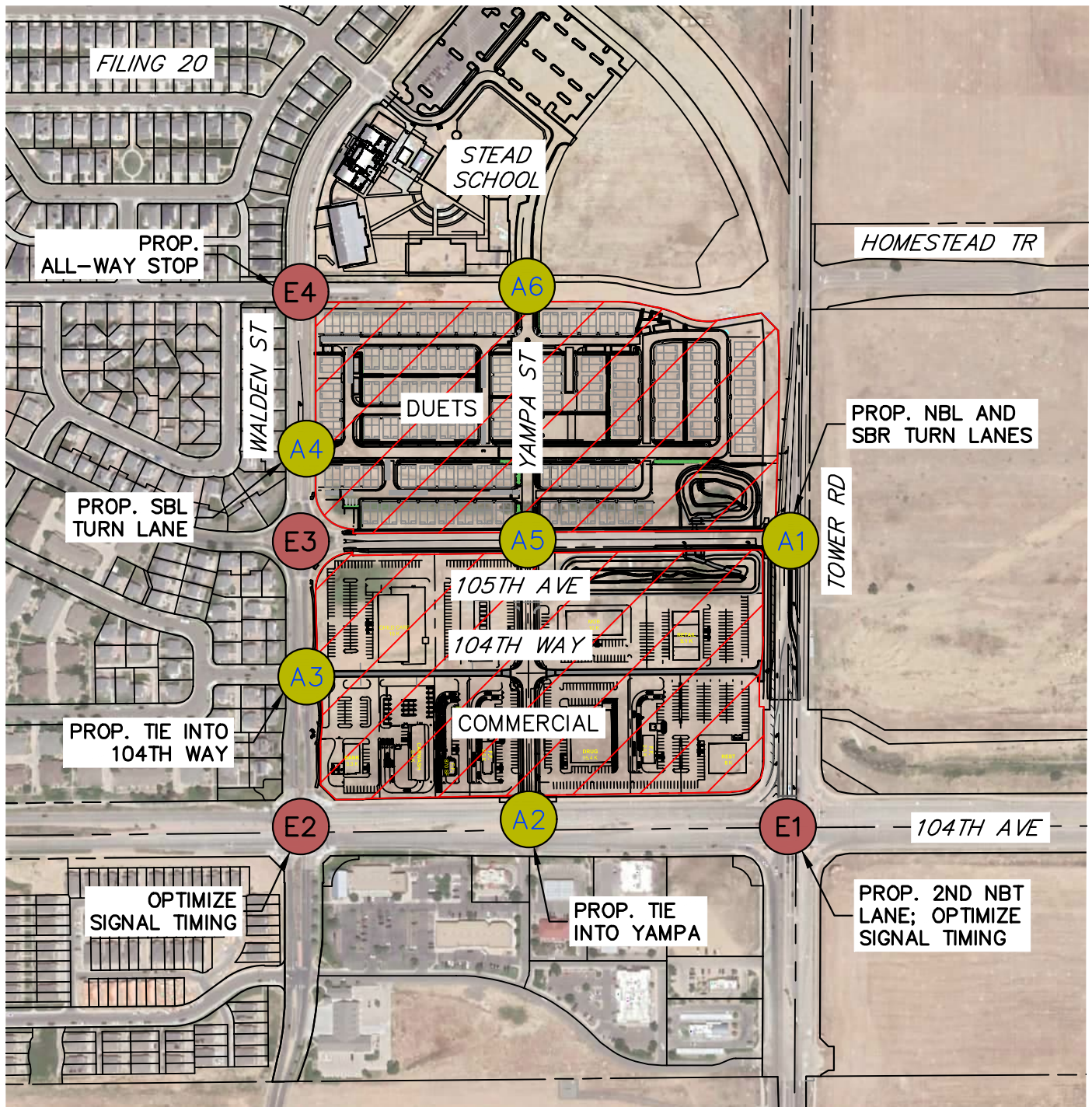
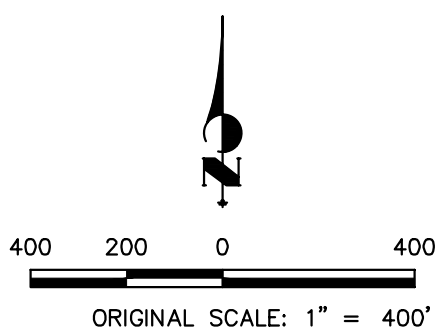


Figure 4 - Recommended Improvements



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- PROPOSED INTERSECTION
- EXISTING INTERSECTION
- PROJECT SITE

Conclusion

This Traffic Letter has been prepared as a supplement to the *Reunion Center – South Traffic Impact Study*, dated March 6, 2020 and prepared by JR Engineering. Based on the development described herein and the anticipated trip generation, JR Engineering is of the opinion that the adjacent roadway network will function satisfactorily with the Duet & Commercial Phase of Reunion Center.

If you have any questions or comments, please feel free to contact me at efarney@jrengineering.com or 303-267-6183.

Sincerely,
JR Engineering, LLC



Eli Farney, PE, PTOE
Director of Public Works



Attachments: Appendix A: TripGen Reports
Appendix B: Traffic Counts – August 2022
Appendix C: 104th Avenue Implemented Signal Timing – February 2022
(Michael Baker)
Appendix D: *HCM 6th Edition* Level of Service Reports
Appendix E: Site Plans – Reunion Center Duet and Commercial Parcel
Appendix F: *Reunion Center Village Plan* Figures
Appendix G: *Reunion Center – South TIS* Excerpts



APPENDIX A
TRIPGEN REPORTS



Detailed Land Use Data
For 190 Dwelling Units of Townhomes
(210) Single-Family Detached Housing

Project: Reunion Center

Open Date: 2/8/2023
Analysis Date: 2/8/2023

| <u>Day / Period</u> | <u>Total Trips</u> | <u>Pass-By Trips</u> | <u>Avg Rate</u> | <u>Min Rate</u> | <u>Max Rate</u> | <u>Std Dev</u> | <u>Avg Size</u> | <u>% Enter</u> | <u>% Exit</u> | <u>Use Eq.</u> | <u>Equation</u> | <u>R2</u> |
|---|------------------------|--------------------------|---------------------|---------------------|---------------------|--------------------|---------------------|--------------------|-------------------|--------------------|-------------------------------|-----------|
| Weekday Average Daily Trips Source : Trip Generation Manual 10th Edition | 1877 | 0 | 9.44 | 4.81 | 19.39 | 2.1 | 264 | 50 | 50 | True | $\ln(T) = 0.92 \ln(X) + 2.71$ | 0.95 |
| Weekday AM Peak Hour of Adjacent Street Traffic Source : Trip Generation Manual 10th Edition | 140 | 0 | 0.74 | 0.33 | 2.27 | 0.27 | 219 | 25 | 75 | True | $T = 0.71(X) + 4.8$ | 0.89 |
| Weekday PM Peak Hour of Adjacent Street Traffic Source : Trip Generation Manual 10th Edition | 188 | 0 | 0.99 | 0.44 | 2.98 | 0.31 | 242 | 63 | 37 | True | $\ln(T) = 0.96 \ln(X) + 0.2$ | 0.92 |

Detailed Land Use Data
For 15 1000 Sq. Ft. GFA of Child Care Center
(565) Day Care Center

Project: Reunion Center

Open Date: 2/8/2023
Analysis Date: 2/8/2023

| <u>Day / Period</u> | <u>Total Trips</u> | <u>Pass-By Trips</u> | <u>Avg Rate</u> | <u>Min Rate</u> | <u>Max Rate</u> | <u>Std Dev</u> | <u>Avg Size</u> | <u>% Enter</u> | <u>% Exit</u> | <u>Use Eq.</u> | <u>Equation</u> | <u>R2</u> |
|---|------------------------|--------------------------|---------------------|---------------------|---------------------|--------------------|---------------------|--------------------|-------------------|--------------------|-----------------|-----------|
| Weekday Average Daily Trips Source : Trip Generation Manual 10th Edition | 714 | 0 | 47.62 | 12.12 | 211.06 | 29.78 | 5 | 50 | 50 | False | | |
| Weekday AM Peak Hour of Adjacent Street Traffic Source : Trip Generation Manual 10th Edition | 165 | 0 | 11 | 1.79 | 57.02 | 6.08 | 5 | 53 | 47 | False | | |
| Weekday PM Peak Hour of Adjacent Street Traffic Source : Trip Generation Manual 10th Edition | 167 | 0 | 11.12 | 1.56 | 40.85 | 6.28 | 5 | 47 | 53 | False | | |

Detailed Land Use Data
For 1 Car Wash Tunnels of Car Wash
(948) Automated Car Wash

Project: Reunion Center

Open Date: 2/8/2023
Analysis Date: 2/8/2023

| <u>Day / Period</u> | <u>Total Trips</u> | <u>Pass-By Trips</u> | <u>Avg Rate</u> | <u>Min Rate</u> | <u>Max Rate</u> | <u>Std Dev</u> | <u>Avg Size</u> | <u>% Enter</u> | <u>% Exit</u> | <u>Use Eq.</u> | <u>Equation</u> | <u>R2</u> |
|---|------------------------|--------------------------|---------------------|---------------------|---------------------|--------------------|---------------------|--------------------|-------------------|--------------------|-----------------|-----------|
| Weekday PM Peak Hour of Adjacent Street Traffic Source : Trip Generation Manual 10th Edition | 78 | 0 | 77.5 | 50 | 104.5 | 33.07 | 1 | 50 | 50 | False | | |

Detailed Land Use Data
For 4.5 1000 Sq. Ft. GFA of Tire Store
(848) Tire Store

Project: Reunion Center

Open Date: 2/8/2023
Analysis Date: 2/8/2023

| <u>Day / Period</u> | <u>Total Trips</u> | <u>Pass-By Trips</u> | <u>Avg Rate</u> | <u>Min Rate</u> | <u>Max Rate</u> | <u>Std Dev</u> | <u>Avg Size</u> | <u>% Enter</u> | <u>% Exit</u> | <u>Use Eq.</u> | <u>Equation</u> | <u>R2</u> |
|---|------------------------|--------------------------|---------------------|---------------------|---------------------|--------------------|---------------------|--------------------|-------------------|--------------------|-----------------|-----------|
| Weekday Average Daily Trips Source : Trip Generation Manual 10th Edition | 128 | 0 | 28.52 | 19.02 | 88.78 | 16.45 | 5 | 50 | 50 | False | | |
| Weekday AM Peak Hour of Adjacent Street Traffic Source : Trip Generation Manual 10th Edition | 12 | 0 | 2.72 | 0.51 | 7.78 | 1.45 | 5 | 64 | 36 | False | | |
| Weekday PM Peak Hour of Adjacent Street Traffic Source : Trip Generation Manual 10th Edition | 18 | 0 | 3.98 | 1.46 | 12.76 | 2.12 | 6 | 43 | 57 | False | | |

Detailed Land Use Data

For 2.5 1000 Sq. Ft. GFA of Fast Food East with Drive-Through
(934) Fast-Food Restaurant with Drive-Through Window

Project: Reunion Center

Open Date: 2/8/2023

Analysis Date: 2/8/2023

| <u>Day / Period</u> | <u>Total Trips</u> | <u>Pass-By Trips</u> | <u>Avg Rate</u> | <u>Min Rate</u> | <u>Max Rate</u> | <u>Std Dev</u> | <u>Avg Size</u> | <u>% Enter</u> | <u>% Exit</u> | <u>Use Eq.</u> | <u>Equation</u> | <u>R2</u> |
|---|------------------------|--------------------------|---------------------|---------------------|---------------------|--------------------|---------------------|--------------------|-------------------|--------------------|-----------------|-----------|
| Weekday Average Daily Trips Source : Trip Generation Manual 10th Edition | 1177 | 0 | 470.95 | 98.89 | 1137.66 | 244.44 | 3 | 50 | 50 | False | | |
| Weekday AM Peak Hour of Adjacent Street Traffic Source : Trip Generation Manual 10th Edition | 100 | 49 | 40.19 | 0.38 | 164.25 | 28.78 | 4 | 51 | 49 | False | | |
| Weekday PM Peak Hour of Adjacent Street Traffic Source : Trip Generation Manual 10th Edition | 82 | 41 | 32.67 | 8.17 | 117.22 | 17.87 | 3 | 52 | 48 | False | | |

Source: Institute of Transportation Engineers, Trip Generation Manual 10th Edition

TRIP GENERATION 10, TRAFFICWARE, LLC

Detailed Land Use Data
For 9.1 1000 Sq. Ft. GLA of Retail
(820) Shopping Center

Project: Reunion Center

Open Date: 2/8/2023
Analysis Date: 2/8/2023

| <u>Day / Period</u> | <u>Total Trips</u> | <u>Pass-By Trips</u> | <u>Avg Rate</u> | <u>Min Rate</u> | <u>Max Rate</u> | <u>Std Dev</u> | <u>Avg Size</u> | <u>% Enter</u> | <u>% Exit</u> | <u>Use Eq.</u> | <u>Equation</u> | <u>R2</u> |
|---|------------------------|--------------------------|---------------------|---------------------|---------------------|--------------------|---------------------|--------------------|-------------------|--------------------|-------------------------------|-----------|
| Weekday Average Daily Trips Source : Trip Generation Manual 10th Edition | 1178 | 0 | 37.75 | 7.42 | 207.98 | 16.41 | 453 | 50 | 50 | True | $\ln(T) = 0.68 \ln(X) + 5.57$ | 0.76 |
| Weekday AM Peak Hour of Adjacent Street Traffic Source : Trip Generation Manual 10th Edition | 156 | 0 | 0.94 | 0.18 | 23.74 | 0.87 | 351 | 62 | 38 | True | $T = 0.5(X) + 151.78$ | 0.5 |
| Weekday PM Peak Hour of Adjacent Street Traffic Source : Trip Generation Manual 10th Edition | 92 | 31 | 3.81 | 0.74 | 18.69 | 2.04 | 327 | 48 | 52 | True | $\ln(T) = 0.74 \ln(X) + 2.89$ | 0.82 |

Detailed Land Use Data

For 0.87 1000 Sq. Ft. GFA of Coffee Shop with Drive-Through
(937) Coffee/Donut Shop with Drive-Through Window

Project: Reunion Center

Open Date: 2/8/2023

Analysis Date: 2/8/2023

| <u>Day / Period</u> | <u>Total Trips</u> | <u>Pass-By Trips</u> | <u>Avg Rate</u> | <u>Min Rate</u> | <u>Max Rate</u> | <u>Std Dev</u> | <u>Avg Size</u> | <u>% Enter</u> | <u>% Exit</u> | <u>Use Eq.</u> | <u>Equation</u> | <u>R2</u> |
|---|------------------------|--------------------------|---------------------|---------------------|---------------------|--------------------|---------------------|--------------------|-------------------|--------------------|-----------------|-----------|
| Weekday Average Daily Trips Source : Trip Generation Manual 10th Edition | 714 | 0 | 820.38 | 738.66 | 869 | | 2 | 50 | 50 | False | | |
| Weekday AM Peak Hour of Adjacent Street Traffic Source : Trip Generation Manual 10th Edition | 77 | 0 | 88.99 | 18.32 | 353.57 | 48.19 | 2 | 51 | 49 | False | | |
| Weekday PM Peak Hour of Adjacent Street Traffic Source : Trip Generation Manual 10th Edition | 38 | 0 | 43.38 | 2.09 | 92.31 | 18.88 | 2 | 50 | 50 | False | | |

Source: Institute of Transportation Engineers, Trip Generation Manual 10th Edition

TRIP GENERATION 10, TRAFFICWARE, LLC

Detailed Land Use Data
For 9 1000 Sq. Ft. GFA of Medical Office Building
(720) Medical-Dental Office Building

Project: Reunion Center

Open Date: 2/8/2023
Analysis Date: 2/8/2023

| Day / Period | Total Trips | Pass-By Trips | Avg Rate | Min Rate | Max Rate | Std Dev | Avg Size | % Enter | % Exit | Use Eq. | Equation | R2 |
|---|----------------|------------------|-------------|-------------|-------------|------------|-------------|------------|-----------|------------|-------------------------------|------|
| Weekday Average Daily Trips Source : Trip Generation Manual 10th Edition | 258 | 0 | 34.8 | 9.14 | 100.75 | 9.79 | 24 | 50 | 50 | True | $T = 38.42(X) - 87.62$ | 0.95 |
| Weekday AM Peak Hour of Adjacent Street Traffic Source : Trip Generation Manual 10th Edition | 26 | 0 | 2.78 | 0.85 | 14.3 | 1.28 | 32 | 78 | 22 | True | $\ln(T) = 0.89 \ln(X) + 1.31$ | 0.8 |
| Weekday PM Peak Hour of Adjacent Street Traffic Source : Trip Generation Manual 10th Edition | 33 | 0 | 3.46 | 0.25 | 8.86 | 1.58 | 28 | 28 | 72 | True | $T = 3.39(X) + 2.02$ | 0.73 |

Detailed Land Use Data
For 3.3 1000 Sq. Ft. GFA of Bank
(911) Walk-in Bank

Project: Reunion Center

Open Date: 2/8/2023
Analysis Date: 2/8/2023

| <u>Day / Period</u> | <u>Total Trips</u> | <u>Pass-By Trips</u> | <u>Avg Rate</u> | <u>Min Rate</u> | <u>Max Rate</u> | <u>Std Dev</u> | <u>Avg Size</u> | <u>% Enter</u> | <u>% Exit</u> | <u>Use Eq.</u> | <u>Equation</u> | <u>R2</u> |
|---|------------------------|--------------------------|---------------------|---------------------|---------------------|--------------------|---------------------|--------------------|-------------------|--------------------|-----------------|-----------|
| Weekday PM Peak Hour of Adjacent Street Traffic Source : Trip Generation Manual 10th Edition | 40 | 0 | 12.13 | 2 | 24.15 | 12.41 | 5 | 44 | 56 | False | | |

Detailed Land Use Data
For 8 1000 Sq. Ft. GFA of Restaurant
(932) High-Turnover (Sit-Down) Restaurant

Project: Reunion Center

Open Date: 2/8/2023
Analysis Date: 2/8/2023

| <u>Day / Period</u> | <u>Total Trips</u> | <u>Pass-By Trips</u> | <u>Avg Rate</u> | <u>Min Rate</u> | <u>Max Rate</u> | <u>Std Dev</u> | <u>Avg Size</u> | <u>% Enter</u> | <u>% Exit</u> | <u>Use Eq.</u> | <u>Equation</u> | <u>R2</u> |
|---|------------------------|--------------------------|---------------------|---------------------|---------------------|--------------------|---------------------|--------------------|-------------------|--------------------|-----------------|-----------|
| Weekday Average Daily Trips Source : Trip Generation Manual 10th Edition | 897 | 0 | 112.18 | 13.04 | 742.41 | 72.51 | 5 | 50 | 50 | False | | |
| Weekday AM Peak Hour of Adjacent Street Traffic Source : Trip Generation Manual 10th Edition | 80 | 0 | 9.94 | 0.76 | 102.39 | 11.33 | 5 | 55 | 45 | False | | |
| Weekday PM Peak Hour of Adjacent Street Traffic Source : Trip Generation Manual 10th Edition | 78 | 34 | 9.77 | 0.92 | 62 | 7.37 | 6 | 62 | 38 | False | | |

Detailed Land Use Data
For 15.4 1000 Sq. Ft. GFA of Drug Store
(880) Pharmacy/Drugstore without Drive-Through Window

Project: Reunion Center

Open Date: 2/8/2023
Analysis Date: 2/8/2023

| Day / Period | Total Trips | Pass-By Trips | Avg Rate | Min Rate | Max Rate | Std Dev | Avg Size | % Enter | % Exit | Use Eq. | Equation | R2 |
|---|----------------|------------------|-------------|-------------|-------------|------------|-------------|------------|-----------|------------|-------------------------------|------|
| Weekday Average Daily Trips Source : Trip Generation Manual 10th Edition | 1362 | 0 | 90.08 | 81 | 106.5 | 8.9 | 11 | 50 | 50 | True | $\ln(T) = 0.99 \ln(X) + 4.51$ | 0.73 |
| Weekday AM Peak Hour of Adjacent Street Traffic Source : Trip Generation Manual 10th Edition | 82 | 0 | 2.94 | 1.17 | 4.3 | 1.25 | 10 | 65 | 35 | True | $T = 10.22(X) - 75.7$ | 0.89 |
| Weekday PM Peak Hour of Adjacent Street Traffic Source : Trip Generation Manual 10th Edition | 131 | 69 | 8.51 | 5.11 | 11.7 | 2.16 | 11 | 49 | 51 | False | | |

Detailed Land Use Data

For 2.5 1000 Sq. Ft. GFA of Fast Food West with Drive-Through
(934) Fast-Food Restaurant with Drive-Through Window

Project: Reunion Center

Open Date: 2/8/2023

Analysis Date: 2/8/2023

| <u>Day / Period</u> | <u>Total Trips</u> | <u>Pass-By Trips</u> | <u>Avg Rate</u> | <u>Min Rate</u> | <u>Max Rate</u> | <u>Std Dev</u> | <u>Avg Size</u> | <u>% Enter</u> | <u>% Exit</u> | <u>Use Eq.</u> | <u>Equation</u> | <u>R2</u> |
|---|------------------------|--------------------------|---------------------|---------------------|---------------------|--------------------|---------------------|--------------------|-------------------|--------------------|-----------------|-----------|
| Weekday Average Daily Trips Source : Trip Generation Manual 10th Edition | 1177 | 0 | 470.95 | 98.89 | 1137.66 | 244.44 | 3 | 50 | 50 | False | | |
| Weekday AM Peak Hour of Adjacent Street Traffic Source : Trip Generation Manual 10th Edition | 100 | 49 | 40.19 | 0.38 | 164.25 | 28.78 | 4 | 51 | 49 | False | | |
| Weekday PM Peak Hour of Adjacent Street Traffic Source : Trip Generation Manual 10th Edition | 82 | 41 | 32.67 | 8.17 | 117.22 | 17.87 | 3 | 52 | 48 | False | | |

Detailed Land Use Data
For 325 Students of STEAD School
(530) High School

Project: Reunion Center

Open Date: 8/26/2022
Analysis Date: 8/26/2024

| <u>Day / Period</u> | <u>Total Trips</u> | <u>Pass-By Trips</u> | <u>Avg Rate</u> | <u>Min Rate</u> | <u>Max Rate</u> | <u>Std Dev</u> | <u>Avg Size</u> | <u>% Enter</u> | <u>% Exit</u> | <u>Use Eq.</u> | <u>Equation</u> | <u>R2</u> |
|---|------------------------|--------------------------|---------------------|---------------------|---------------------|--------------------|---------------------|--------------------|-------------------|--------------------|--|-----------|
| Weekday Average Daily Trips Source : Trip Generation Manual 10th Edition | 660 | 0 | 2.03 | 1.19 | 3.96 | 0.82 | 1498 | 50 | 50 | False | $\text{Ln}(T) = 0.76 \text{ Ln}(X) + 2.46$ | 0.6 |
| Weekday AM Peak Hour of Adjacent Street Traffic Source : Trip Generation Manual 10th Edition | 169 | 0 | 0.52 | 0.03 | 1.15 | 0.23 | 1202 | 67 | 33 | False | | |
| Weekday PM Peak Hour of Generator Source : Trip Generation Manual 10th Edition | 107 | 0 | 0.33 | 0.16 | 0.74 | 0.13 | 1127 | 32 | 68 | False | $\text{Ln}(T) = 0.69 \text{ Ln}(X) + 1.07$ | 0.64 |

APPENDIX B

TRAFFIC COUNTS – AUGUST 23, 2022





(303) 216-2439
www.alltrafficdata.net

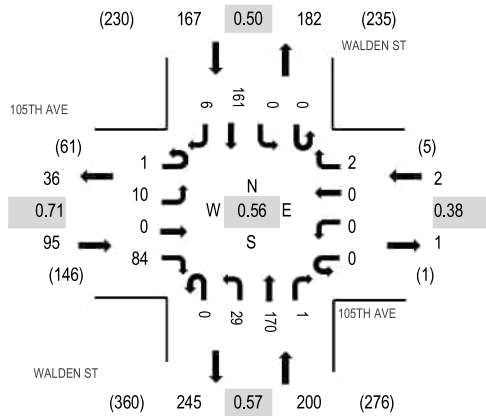
Location: 1 WALDEN ST & 105TH AVE AM

Date: Tuesday, August 23, 2022

Peak Hour: 07:15 AM - 08:15 AM

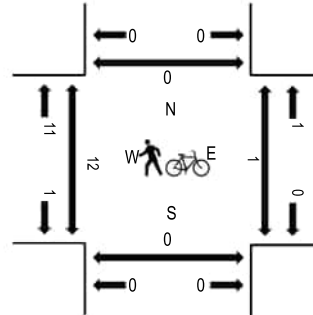
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

| Interval Start Time | 105TH AVE Eastbound | | | | 105TH AVE Westbound | | | | WALDEN ST Northbound | | | | WALDEN ST Southbound | | | | Total | Rolling Hour | Pedestrian Crossings | | | |
|------------------------|------------------------|------|------|-------|------------------------|------|------|-------|-------------------------|------|------|-------|-------------------------|------|------|-------|-------|-----------------|----------------------|------|-------|-------|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | | | West | East | South | North |
| 7:00 AM | 0 | 0 | 0 | 20 | 0 | 0 | 0 | 2 | 1 | 5 | 13 | 0 | 0 | 0 | 25 | 0 | 66 | 453 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 21 | 0 | 0 | 0 | 1 | 0 | 4 | 31 | 0 | 0 | 0 | 12 | 0 | 69 | 464 | 0 | 1 | 0 | 0 |
| 7:30 AM | 1 | 1 | 0 | 23 | 0 | 0 | 0 | 0 | 0 | 11 | 39 | 0 | 0 | 0 | 33 | 2 | 110 | 452 | 5 | 0 | 0 | 0 |
| 7:45 AM | 0 | 8 | 0 | 28 | 0 | 0 | 0 | 0 | 0 | 9 | 78 | 0 | 0 | 0 | 81 | 4 | 208 | 377 | 1 | 0 | 0 | 0 |
| 8:00 AM | 0 | 1 | 0 | 12 | 0 | 0 | 0 | 1 | 0 | 5 | 22 | 1 | 0 | 0 | 35 | 0 | 77 | 204 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 1 | 0 | 11 | 0 | 1 | 0 | 0 | 0 | 11 | 17 | 0 | 0 | 0 | 16 | 0 | 57 | | 1 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 4 | 11 | 0 | 0 | 0 | 9 | 0 | 35 | | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 5 | 9 | 0 | 0 | 0 | 13 | 0 | 35 | | 0 | 0 | 0 | 0 |
| Count Total | 1 | 11 | 0 | 134 | 0 | 1 | 0 | 4 | 1 | 54 | 220 | 1 | 0 | 0 | 224 | 6 | 657 | | 7 | 1 | 0 | 0 |
| Peak Hour | 1 | 10 | 0 | 84 | 0 | 0 | 0 | 2 | 0 | 29 | 170 | 1 | 0 | 0 | 161 | 6 | 464 | | 6 | 1 | 0 | 0 |



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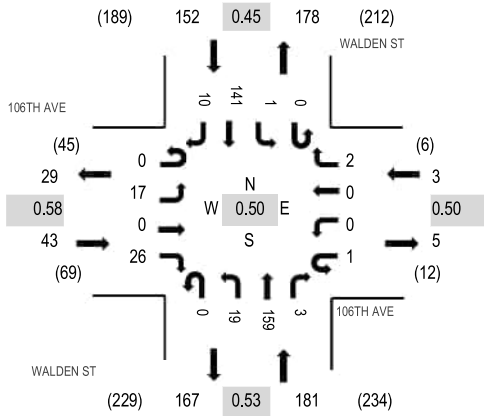
Location: 2 WALDEN ST & 106TH AVE AM

Date: Tuesday, August 23, 2022

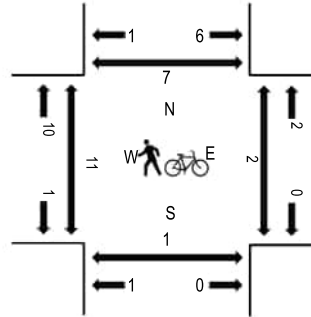
Peak Hour: 07:15 AM - 08:15 AM

Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

| Interval Start Time | 106TH AVE Eastbound | | | | 106TH AVE Westbound | | | | WALDEN ST Northbound | | | | WALDEN ST Southbound | | | | Total | Rolling Hour | Pedestrian Crossings | | | |
|------------------------|------------------------|------|------|-------|------------------------|------|------|-------|-------------------------|------|------|-------|-------------------------|------|------|-------|-------|-----------------|----------------------|------|-------|-------|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | | | West | East | South | North |
| 7:00 AM | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 1 | 0 | 1 | 9 | 4 | 0 | 0 | 13 | 0 | 39 | 356 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 7 | 23 | 2 | 0 | 0 | 9 | 0 | 45 | 379 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 3 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 4 | 36 | 0 | 0 | 0 | 29 | 3 | 81 | 368 | 1 | 1 | 0 | 1 |
| 7:45 AM | 0 | 11 | 0 | 9 | 0 | 0 | 0 | 1 | 0 | 7 | 79 | 0 | 0 | 1 | 78 | 5 | 191 | 308 | 5 | 0 | 0 | 4 |
| 8:00 AM | 0 | 2 | 0 | 8 | 1 | 0 | 0 | 1 | 0 | 1 | 21 | 1 | 0 | 0 | 25 | 2 | 62 | 142 | 1 | 0 | 0 | 1 |
| 8:15 AM | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 4 | 14 | 0 | 0 | 0 | 9 | 0 | 34 | | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 5 | 4 | 2 | 0 | 0 | 8 | 0 | 21 | | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 1 | 0 | 6 | 0 | 0 | 1 | 0 | 0 | 5 | 4 | 1 | 0 | 0 | 7 | 0 | 25 | | 0 | 0 | 0 | 0 |
| Count Total | 0 | 18 | 0 | 51 | 1 | 0 | 1 | 4 | 0 | 34 | 190 | 10 | 0 | 1 | 178 | 10 | 498 | | 7 | 1 | 0 | 6 |
| Peak Hour | 0 | 17 | 0 | 26 | 1 | 0 | 0 | 2 | 0 | 19 | 159 | 3 | 0 | 1 | 141 | 10 | 379 | | 7 | 1 | 0 | 6 |



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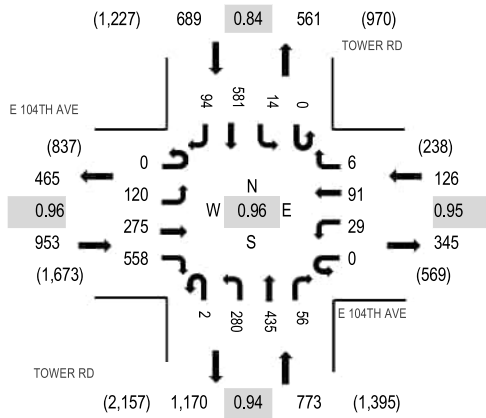
Location: 3 TOWER RD & E 104TH AVE AM

Date: Tuesday, August 23, 2022

Peak Hour: 07:00 AM - 08:00 AM

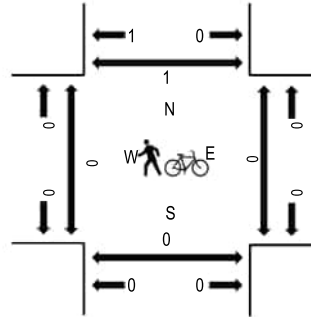
Peak 15-Minutes: 07:00 AM - 07:15 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

| Interval Start Time | E 104TH AVE Eastbound | | | | E 104TH AVE Westbound | | | | TOWER RD Northbound | | | | TOWER RD Southbound | | | | Total | Rolling Hour | Pedestrian Crossings | | | |
|------------------------|--------------------------|------|------|-------|--------------------------|------|------|-------|------------------------|------|------|-------|------------------------|------|-------|-------|-------|-----------------|----------------------|------|-------|-------|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | | | West | East | South | North |
| 7:00 AM | 0 | 19 | 67 | 155 | 0 | 8 | 15 | 0 | 0 | 57 | 127 | 9 | 0 | 4 | 187 | 13 | 661 | 2,541 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 22 | 65 | 141 | 0 | 4 | 25 | 3 | 0 | 83 | 72 | 14 | 0 | 4 | 167 | 16 | 616 | 2,462 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 38 | 69 | 130 | 0 | 10 | 26 | 0 | 1 | 62 | 122 | 21 | 0 | 4 | 127 | 35 | 645 | 2,375 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 41 | 74 | 132 | 0 | 7 | 25 | 3 | 1 | 78 | 114 | 12 | 0 | 2 | 100 | 30 | 619 | 2,201 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 20 | 65 | 140 | 0 | 10 | 22 | 2 | 0 | 55 | 97 | 15 | 0 | 1 | 139 | 16 | 582 | 1,992 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 15 | 53 | 116 | 0 | 7 | 16 | 1 | 2 | 73 | 101 | 7 | 0 | 1 | 116 | 21 | 529 | | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 19 | 31 | 122 | 0 | 7 | 20 | 2 | 0 | 50 | 83 | 11 | 0 | 2 | 113 | 11 | 471 | | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 6 | 33 | 100 | 0 | 4 | 21 | 0 | 0 | 60 | 63 | 5 | 0 | 0 | 111 | 7 | 410 | | 0 | 0 | 0 | 0 |
| Count Total | 0 | 180 | 457 | 1,036 | 0 | 57 | 170 | 11 | 4 | 518 | 779 | 94 | 0 | 18 | 1,060 | 149 | 4,533 | | 0 | 0 | 0 | 0 |
| Peak Hour | 0 | 120 | 275 | 558 | 0 | 29 | 91 | 6 | 2 | 280 | 435 | 56 | 0 | 14 | 581 | 94 | 2,541 | | 0 | 0 | 0 | 0 |



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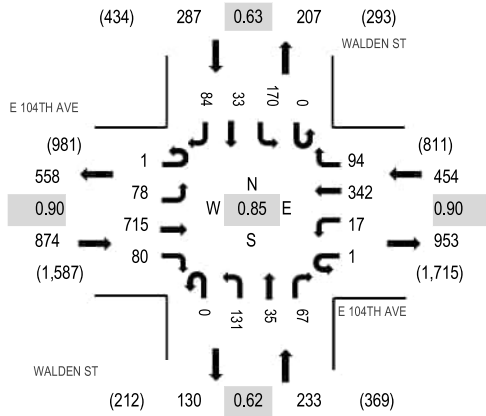
Location: 4 WALDEN ST & E 104TH AVE AM

Date: Tuesday, August 23, 2022

Peak Hour: 07:15 AM - 08:15 AM

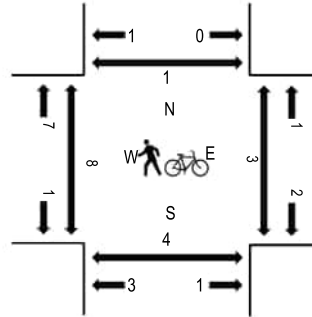
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

| Interval Start Time | E 104TH AVE Eastbound | | | | E 104TH AVE Westbound | | | | WALDEN ST Northbound | | | | WALDEN ST Southbound | | | | Total | Rolling Hour | Pedestrian Crossings | | | |
|------------------------|--------------------------|------|-------|-------|--------------------------|------|------|-------|-------------------------|------|------|-------|-------------------------|------|------|-------|-------|-----------------|----------------------|------|-------|-------|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | | | West | East | South | North |
| 7:00 AM | 0 | 8 | 210 | 6 | 0 | 4 | 74 | 9 | 0 | 20 | 3 | 12 | 0 | 39 | 4 | 15 | 404 | 1,788 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 7 | 160 | 17 | 1 | 3 | 71 | 23 | 0 | 21 | 7 | 11 | 0 | 42 | 5 | 6 | 374 | 1,848 | 2 | 3 | 2 | 0 |
| 7:30 AM | 0 | 19 | 201 | 18 | 0 | 9 | 86 | 29 | 0 | 21 | 3 | 21 | 0 | 38 | 8 | 12 | 465 | 1,828 | 3 | 0 | 0 | 0 |
| 7:45 AM | 0 | 37 | 148 | 24 | 0 | 3 | 95 | 31 | 0 | 53 | 20 | 21 | 0 | 56 | 14 | 43 | 545 | 1,671 | 1 | 0 | 0 | 0 |
| 8:00 AM | 1 | 15 | 206 | 21 | 0 | 2 | 90 | 11 | 0 | 36 | 5 | 14 | 0 | 34 | 6 | 23 | 464 | 1,413 | 1 | 0 | 2 | 0 |
| 8:15 AM | 1 | 10 | 142 | 15 | 0 | 5 | 90 | 15 | 0 | 20 | 7 | 10 | 0 | 26 | 3 | 10 | 354 | | 1 | 1 | 3 | 1 |
| 8:30 AM | 0 | 4 | 153 | 14 | 0 | 5 | 68 | 8 | 0 | 22 | 6 | 4 | 0 | 17 | 1 | 6 | 308 | | 1 | 0 | 0 | 0 |
| 8:45 AM | 0 | 2 | 129 | 19 | 0 | 4 | 67 | 8 | 0 | 22 | 6 | 4 | 0 | 16 | 2 | 8 | 287 | | 0 | 0 | 0 | 0 |
| Count Total | 2 | 102 | 1,349 | 134 | 1 | 35 | 641 | 134 | 0 | 215 | 57 | 97 | 0 | 268 | 43 | 123 | 3,201 | | 9 | 4 | 7 | 1 |
| Peak Hour | 1 | 78 | 715 | 80 | 1 | 17 | 342 | 94 | 0 | 131 | 35 | 67 | 0 | 170 | 33 | 84 | 1,848 | | 7 | 3 | 4 | 0 |



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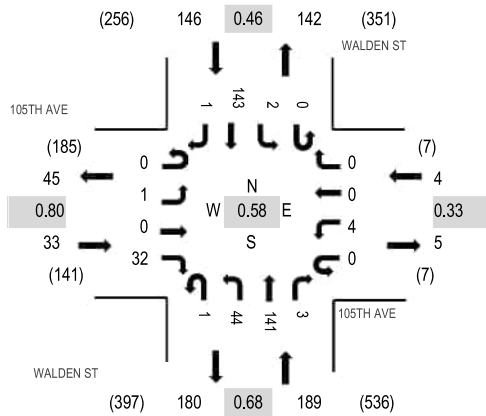
Location: 1 WALDEN ST & 105TH AVE PM

Date: Tuesday, August 23, 2022

Peak Hour: 02:45 PM - 03:45 PM

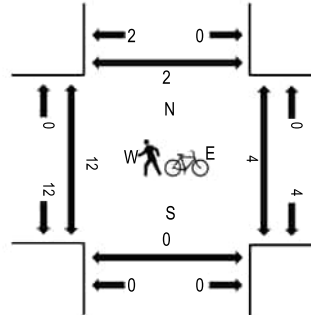
Peak 15-Minutes: 03:00 PM - 03:15 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

| Interval Start Time | 105TH AVE Eastbound | | | | 105TH AVE Westbound | | | | WALDEN ST Northbound | | | | WALDEN ST Southbound | | | | Total | Rolling Hour | Pedestrian Crossings | | | |
|------------------------|------------------------|------|------|-------|------------------------|------|------|-------|-------------------------|------|------|-------|-------------------------|------|------|-------|-------|-----------------|----------------------|------|-------|-------|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | | | West | East | South | North |
| 2:00 PM | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 1 | 0 | 8 | 10 | 1 | 0 | 0 | 10 | 1 | 39 | 211 | 0 | 0 | 0 | 0 |
| 2:15 PM | 1 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 7 | 18 | 0 | 0 | 0 | 8 | 0 | 41 | 331 | 0 | 0 | 0 | 0 |
| 2:30 PM | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 6 | 20 | 0 | 0 | 0 | 8 | 0 | 47 | 348 | 0 | 0 | 0 | 0 |
| 2:45 PM | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 10 | 55 | 1 | 0 | 1 | 14 | 0 | 84 | 372 | 0 | 0 | 0 | 0 |
| 3:00 PM | 0 | 0 | 0 | 7 | 0 | 3 | 0 | 0 | 0 | 17 | 52 | 1 | 0 | 0 | 79 | 0 | 159 | 342 | 7 | 3 | 0 | 2 |
| 3:15 PM | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 9 | 17 | 0 | 0 | 1 | 22 | 0 | 58 | 228 | 1 | 0 | 0 | 0 |
| 3:30 PM | 0 | 0 | 0 | 14 | 0 | 1 | 0 | 0 | 1 | 8 | 17 | 1 | 0 | 0 | 28 | 1 | 71 | 221 | 0 | 0 | 0 | 0 |
| 3:45 PM | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 13 | 22 | 0 | 0 | 0 | 8 | 0 | 54 | 191 | 0 | 1 | 0 | 1 |
| 4:00 PM | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 12 | 17 | 0 | 0 | 0 | 8 | 0 | 45 | 179 | 0 | 0 | 0 | 0 |
| 4:15 PM | 0 | 1 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 14 | 16 | 0 | 0 | 0 | 9 | 0 | 51 | 185 | 0 | 0 | 2 | 0 |
| 4:30 PM | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 14 | 8 | 0 | 0 | 0 | 7 | 0 | 41 | 182 | 1 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 10 | 17 | 0 | 0 | 0 | 9 | 0 | 42 | 198 | 0 | 0 | 1 | 0 |
| 5:00 PM | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 14 | 17 | 1 | 0 | 0 | 7 | 0 | 51 | 208 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 4 | 0 | 1 | 0 | 0 | 0 | 18 | 19 | 0 | 0 | 0 | 6 | 0 | 48 | | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 12 | 25 | 0 | 0 | 0 | 15 | 0 | 57 | | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | 9 | 0 | 1 | 0 | 0 | 0 | 10 | 18 | 0 | 0 | 0 | 14 | 0 | 52 | | 0 | 0 | 0 | 0 |
| Count Total | 1 | 2 | 0 | 138 | 0 | 6 | 0 | 1 | 1 | 182 | 348 | 5 | 0 | 2 | 252 | 2 | 940 | | 9 | 4 | 3 | 3 |
| Peak Hour | 0 | 1 | 0 | 32 | 0 | 4 | 0 | 0 | 1 | 44 | 141 | 3 | 0 | 2 | 143 | 1 | 372 | | 8 | 3 | 0 | 2 |



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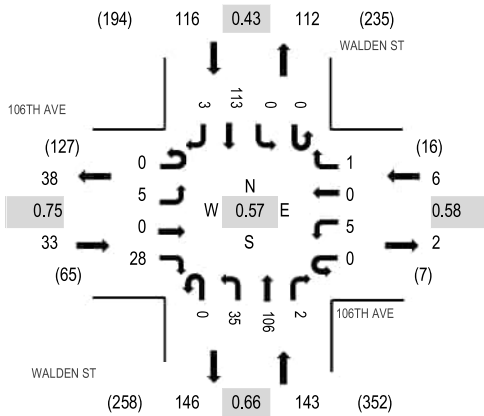
Location: 2 WALDEN ST & 106TH AVE PM

Date: Tuesday, August 23, 2022

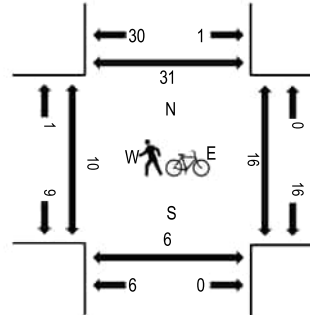
Peak Hour: 02:45 PM - 03:45 PM

Peak 15-Minutes: 03:00 PM - 03:15 PM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

| Interval Start Time | 106TH AVE Eastbound | | | | 106TH AVE Westbound | | | | WALDEN ST Northbound | | | | WALDEN ST Southbound | | | | Total | Rolling Hour | Pedestrian Crossings | | | |
|------------------------|------------------------|------|------|-------|------------------------|------|------|-------|-------------------------|------|------|-------|-------------------------|------|------|-------|-------|-----------------|----------------------|------|-------|-------|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | | | West | East | South | North |
| 2:00 PM | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 3 | 6 | 2 | 0 | 0 | 7 | 0 | 22 | 158 | 0 | 0 | 0 | 0 |
| 2:15 PM | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 9 | 9 | 0 | 0 | 0 | 4 | 3 | 29 | 267 | 0 | 0 | 0 | 0 |
| 2:30 PM | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 3 | 17 | 0 | 0 | 0 | 5 | 0 | 29 | 280 | 0 | 0 | 0 | 0 |
| 2:45 PM | 0 | 4 | 0 | 7 | 0 | 1 | 0 | 0 | 0 | 12 | 42 | 1 | 0 | 0 | 11 | 0 | 78 | 298 | 0 | 0 | 0 | 1 |
| 3:00 PM | 0 | 1 | 0 | 9 | 0 | 0 | 0 | 1 | 0 | 11 | 40 | 1 | 0 | 0 | 66 | 2 | 131 | 250 | 6 | 15 | 4 | 26 |
| 3:15 PM | 0 | 0 | 0 | 8 | 0 | 1 | 0 | 0 | 0 | 6 | 12 | 0 | 0 | 0 | 14 | 1 | 42 | 148 | 1 | 0 | 0 | 1 |
| 3:30 PM | 0 | 0 | 0 | 4 | 0 | 3 | 0 | 0 | 0 | 6 | 12 | 0 | 0 | 0 | 22 | 0 | 47 | 133 | 0 | 0 | 0 | 0 |
| 3:45 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 9 | 11 | 1 | 0 | 0 | 7 | 0 | 30 | 101 | 2 | 0 | 0 | 0 |
| 4:00 PM | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 12 | 6 | 0 | 0 | 0 | 7 | 0 | 29 | 98 | 0 | 0 | 0 | 0 |
| 4:15 PM | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 7 | 10 | 0 | 0 | 1 | 7 | 0 | 27 | 94 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 6 | 0 | 0 | 0 | 5 | 0 | 15 | 91 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 1 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 9 | 8 | 0 | 0 | 0 | 4 | 0 | 27 | 117 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 9 | 8 | 0 | 0 | 1 | 4 | 0 | 25 | 121 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 9 | 9 | 0 | 0 | 0 | 3 | 0 | 24 | | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 10 | 16 | 0 | 0 | 0 | 11 | 0 | 41 | | 2 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | 2 | 0 | 3 | 0 | 0 | 0 | 4 | 13 | 0 | 0 | 0 | 9 | 0 | 31 | | 1 | 0 | 0 | 0 |
| Count Total | 0 | 8 | 0 | 57 | 0 | 14 | 0 | 2 | 1 | 121 | 225 | 5 | 0 | 2 | 186 | 6 | 627 | | 12 | 15 | 4 | 28 |
| Peak Hour | 0 | 5 | 0 | 28 | 0 | 5 | 0 | 1 | 0 | 35 | 106 | 2 | 0 | 0 | 113 | 3 | 298 | | 7 | 15 | 4 | 28 |



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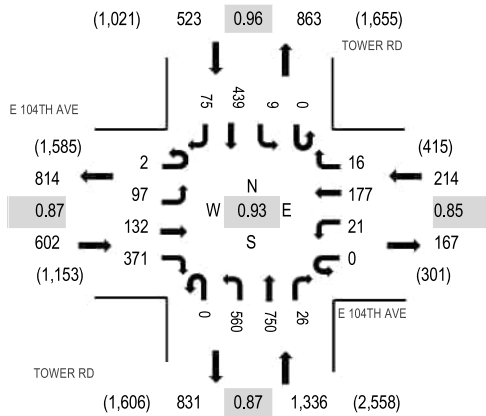
Location: 3 TOWER RD & E 104TH AVE PM

Date: Tuesday, August 23, 2022

Peak Hour: 04:45 PM - 05:45 PM

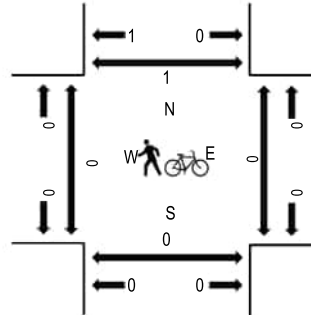
Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

| Interval Start Time | E 104TH AVE Eastbound | | | | E 104TH AVE Westbound | | | | TOWER RD Northbound | | | | TOWER RD Southbound | | | | Total | Rolling Hour | Pedestrian Crossings | | | |
|------------------------|--------------------------|------|------|-------|--------------------------|------|------|-------|------------------------|-------|-------|-------|------------------------|------|------|-------|-------|-----------------|----------------------|------|-------|-------|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | | | West | East | South | North |
| 4:00 PM | 0 | 28 | 32 | 80 | 0 | 4 | 47 | 2 | 0 | 160 | 184 | 9 | 0 | 1 | 103 | 22 | 672 | 2,508 | 0 | 0 | 0 | 0 |
| 4:15 PM | 0 | 25 | 23 | 79 | 0 | 12 | 33 | 2 | 0 | 114 | 183 | 6 | 0 | 1 | 81 | 24 | 583 | 2,539 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 26 | 30 | 88 | 0 | 6 | 52 | 2 | 0 | 128 | 170 | 1 | 0 | 1 | 95 | 25 | 624 | 2,673 | 0 | 0 | 0 | 0 |
| 4:45 PM | 1 | 30 | 26 | 79 | 0 | 6 | 48 | 3 | 0 | 129 | 187 | 6 | 0 | 1 | 97 | 16 | 629 | 2,675 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 20 | 30 | 102 | 0 | 5 | 32 | 5 | 0 | 159 | 215 | 9 | 0 | 2 | 108 | 16 | 703 | 2,639 | 0 | 0 | 0 | 0 |
| 5:15 PM | 1 | 35 | 43 | 95 | 0 | 7 | 54 | 5 | 0 | 141 | 185 | 6 | 0 | 6 | 111 | 28 | 717 | | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 12 | 33 | 95 | 0 | 3 | 43 | 3 | 0 | 131 | 163 | 5 | 0 | 0 | 123 | 15 | 626 | | 0 | 0 | 0 | 1 |
| 5:45 PM | 0 | 19 | 28 | 93 | 0 | 5 | 34 | 2 | 1 | 115 | 149 | 2 | 0 | 0 | 128 | 17 | 593 | | 0 | 0 | 0 | 0 |
| Count Total | 2 | 195 | 245 | 711 | 0 | 48 | 343 | 24 | 1 | 1,077 | 1,436 | 44 | 0 | 12 | 846 | 163 | 5,147 | | 0 | 0 | 0 | 1 |
| Peak Hour | 2 | 97 | 132 | 371 | 0 | 21 | 177 | 16 | 0 | 560 | 750 | 26 | 0 | 9 | 439 | 75 | 2,675 | | 0 | 0 | 0 | 1 |



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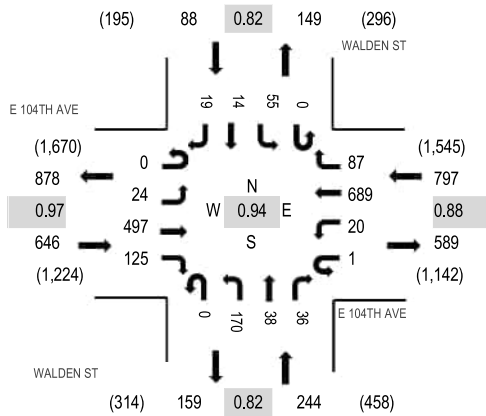
Location: 4 WALDEN ST & E 104TH AVE PM

Date: Tuesday, August 23, 2022

Peak Hour: 04:30 PM - 05:30 PM

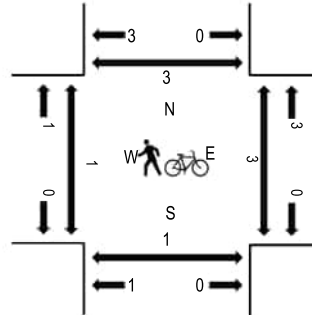
Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

| Interval Start Time | E 104TH AVE Eastbound | | | | E 104TH AVE Westbound | | | | WALDEN ST Northbound | | | | WALDEN ST Southbound | | | | Total | Rolling Hour | Pedestrian Crossings | | | |
|------------------------|--------------------------|------|------|-------|--------------------------|------|-------|-------|-------------------------|------|------|-------|-------------------------|------|------|-------|-------|-----------------|----------------------|------|-------|-------|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | | | West | East | South | North |
| 4:00 PM | 0 | 1 | 131 | 20 | 0 | 7 | 190 | 31 | 0 | 46 | 6 | 10 | 0 | 12 | 4 | 7 | 465 | 1,687 | 0 | 2 | 0 | 0 |
| 4:15 PM | 0 | 4 | 93 | 21 | 0 | 8 | 146 | 22 | 0 | 26 | 12 | 10 | 0 | 11 | 10 | 5 | 368 | 1,671 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 8 | 126 | 33 | 0 | 4 | 186 | 16 | 0 | 43 | 7 | 9 | 0 | 16 | 3 | 2 | 453 | 1,775 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 8 | 115 | 37 | 0 | 6 | 144 | 15 | 0 | 30 | 8 | 11 | 0 | 14 | 3 | 10 | 401 | 1,744 | 0 | 0 | 1 | 0 |
| 5:00 PM | 0 | 1 | 129 | 24 | 1 | 3 | 170 | 26 | 0 | 56 | 13 | 5 | 0 | 15 | 3 | 3 | 449 | 1,735 | 1 | 3 | 0 | 3 |
| 5:15 PM | 0 | 7 | 127 | 31 | 0 | 7 | 189 | 30 | 0 | 41 | 10 | 11 | 0 | 10 | 5 | 4 | 472 | | 0 | 0 | 0 | 0 |
| 5:30 PM | 1 | 6 | 120 | 32 | 0 | 8 | 151 | 26 | 0 | 32 | 6 | 12 | 0 | 17 | 4 | 7 | 422 | | 0 | 2 | 0 | 2 |
| 5:45 PM | 0 | 10 | 110 | 29 | 1 | 8 | 137 | 13 | 0 | 37 | 10 | 7 | 0 | 19 | 4 | 7 | 392 | | 0 | 0 | 0 | 0 |
| Count Total | 1 | 45 | 951 | 227 | 2 | 51 | 1,313 | 179 | 0 | 311 | 72 | 75 | 0 | 114 | 36 | 45 | 3,422 | | 1 | 7 | 1 | 5 |
| Peak Hour | 0 | 24 | 497 | 125 | 1 | 20 | 689 | 87 | 0 | 170 | 38 | 36 | 0 | 55 | 14 | 19 | 1,775 | | 1 | 3 | 1 | 3 |

APPENDIX C

104TH AVENUE IMPLEMENTED SIGNAL TIMING

BY MICHAEL BAKER INTERNATIONAL



























AM Peak Signal Timing Plan After Implementation

104th Avenue Implemented Signal Timing

10: Walden St & 104th Ave













AM Peak

| |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 10 | 742 | 42 | 1 | 296 | 44 | 64 | 10 | 26 | 75 | 7 | 18 |
| Future Volume (vph) | 10 | 742 | 42 | 1 | 296 | 44 | 64 | 10 | 26 | 75 | 7 | 18 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 400 | | 230 | 250 | | 0 | 230 | | 230 | 210 | | 140 |
| Storage Lanes | 1 | | 1 | 0 | | 1 | 1 | | 1 | 1 | | 1 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Ped Bike Factor | 1.00 | | | | | 0.98 | 1.00 | | | | | 0.99 |
| Fr't | | | 0.850 | | | 0.850 | | | 0.850 | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1805 | 3406 | 1538 | 1805 | 3406 | 1583 | 1770 | 1727 | 1615 | 1805 | 1900 | 1615 |
| Flt Permitted | 0.544 | | | 0.328 | | | 0.752 | | | 0.727 | | |
| Satd. Flow (perm) | 1031 | 3406 | 1538 | 623 | 3406 | 1545 | 1399 | 1727 | 1615 | 1381 | 1900 | 1594 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 159 | | | 159 | | | 168 | | | 168 |
| Link Speed (mph) | | 45 | | | 45 | | | 30 | | | 30 | |
| Link Distance (ft) | | 1290 | | | 1314 | | | 404 | | | 2709 | |
| Travel Time (s) | | 19.5 | | | 19.9 | | | 9.2 | | | 61.6 | |
| Confl. Peds. (#/hr) | 2 | | | | | 2 | 1 | | | | | 1 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.86 | 0.86 | 0.86 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Heavy Vehicles (%) | 0% | 6% | 5% | 0% | 6% | 2% | 2% | 10% | 0% | 0% | 0% | 0% |
| Adj. Flow (vph) | 11 | 789 | 45 | 1 | 344 | 51 | 69 | 11 | 28 | 81 | 8 | 19 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 11 | 789 | 45 | 1 | 344 | 51 | 69 | 11 | 28 | 81 | 8 | 19 |
| 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) | | 40 | | | 30 | | | 24 | | | 22 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway 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 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 |
| Detector Template | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Leading Detector (ft) | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 |
| Trailing Detector (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Position(ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Size(ft) | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | 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 | 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 | 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 | 0.0 | 0.0 | 0.0 |
| Detector 2 Position(ft) | | 94 | | | 94 | | | 94 | | | 94 | |
| 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 | |

104th Avenue Implemented Signal Timing

10: Walden St & 104th Ave

AM Peak

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | Perm | pm+pt | NA | Perm | pm+pt | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | 2 | | 2 | 6 | | 6 | 8 | | 8 | 4 | | 4 |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 6 | 3 | 8 | 8 | 7 | 4 | 4 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 |
| Minimum Split (s) | 12.5 | 36.5 | 36.5 | 12.5 | 36.5 | 36.5 | 14.5 | 42.5 | 42.5 | 14.5 | 42.5 | 42.5 |
| Total Split (s) | 14.0 | 67.0 | 67.0 | 14.0 | 67.0 | 67.0 | 19.0 | 20.0 | 20.0 | 19.0 | 20.0 | 20.0 |
| Total Split (%) | 11.7% | 55.8% | 55.8% | 11.7% | 55.8% | 55.8% | 15.8% | 16.7% | 16.7% | 15.8% | 16.7% | 16.7% |
| Maximum Green (s) | 6.5 | 59.5 | 59.5 | 6.5 | 59.5 | 59.5 | 12.5 | 13.5 | 13.5 | 12.5 | 13.5 | 13.5 |
| Yellow Time (s) | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| All-Red Time (s) | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Vehicle Extension (s) | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 |
| Recall Mode | None | C-Max | C-Max | None | C-Max | C-Max | None | None | None | None | None | None |
| Walk Time (s) | | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 |
| Flash Dont Walk (s) | | 24.0 | 24.0 | | 24.0 | 24.0 | | 31.0 | 31.0 | | 31.0 | 31.0 |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 |
| Act Effect Green (s) | 87.5 | 87.7 | 87.7 | 87.2 | 87.6 | 87.6 | 15.9 | 10.0 | 10.0 | 16.4 | 10.3 | 10.3 |
| Actuated g/C Ratio | 0.73 | 0.73 | 0.73 | 0.73 | 0.73 | 0.73 | 0.13 | 0.08 | 0.08 | 0.14 | 0.09 | 0.09 |
| v/c Ratio | 0.01 | 0.32 | 0.04 | 0.00 | 0.14 | 0.04 | 0.32 | 0.08 | 0.10 | 0.36 | 0.05 | 0.07 |
| Control Delay | 3.6 | 3.6 | 0.1 | 3.0 | 3.4 | 0.7 | 44.0 | 52.2 | 0.7 | 45.0 | 51.3 | 0.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 3.6 | 3.6 | 0.1 | 3.0 | 3.4 | 0.7 | 44.0 | 52.2 | 0.7 | 45.0 | 51.3 | 0.4 |
| LOS | A | A | A | A | A | A | D | D | A | D | D | A |
| Approach Delay | | 3.4 | | | 3.0 | | | 33.6 | | | 37.7 | |
| Approach LOS | | A | | | A | | | C | | | D | |

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.36

Intersection Signal Delay: 8.1

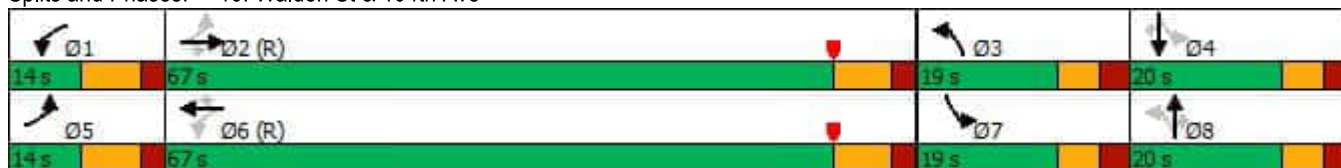
Intersection LOS: A

Intersection Capacity Utilization 57.0%

ICU Level of Service B

Analysis Period (min) 15


Splits and Phases: 10: Walden St & 104th Ave



104th Avenue Implemented Signal Timing

11: Tower Rd & 104th Ave













AM Peak

| |  | | | | | | | | | | | |
|----------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | ↰ | ↑↑↑ | ↱ | ↰ | ↑↑↑ | ↱ | ↰ | ↑ | ↱ | ↰ | ↑↑ | ↱ |
| Traffic Volume (vph) | 50 | 161 | 583 | 35 | 64 | 3 | 270 | 426 | 23 | 5 | 663 | 40 |
| Future Volume (vph) | 50 | 161 | 583 | 35 | 64 | 3 | 270 | 426 | 23 | 5 | 663 | 40 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 350 | | 590 | 330 | | 440 | 320 | | 290 | 290 | | 190 |
| Storage Lanes | 1 | | 1 | 1 | | 1 | 2 | | 1 | 1 | | 1 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frt | | | 0.850 | | | 0.850 | | | 0.850 | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1736 | 4848 | 1538 | 1467 | 4803 | 1615 | 3367 | 1743 | 1162 | 1504 | 3406 | 1538 |
| Flt Permitted | 0.693 | | | 0.628 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 1266 | 4848 | 1538 | 970 | 4803 | 1615 | 3367 | 1743 | 1162 | 1504 | 3406 | 1538 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 485 | | | 189 | | | 182 | | | 182 |
| Link Speed (mph) | | 45 | | | 45 | | | 45 | | | 45 | |
| Link Distance (ft) | | 1314 | | | 579 | | | 636 | | | 501 | |
| Travel Time (s) | | 19.9 | | | 8.8 | | | 9.6 | | | 7.6 | |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.71 | 0.71 | 0.71 | 0.93 | 0.93 | 0.93 | 0.94 | 0.94 | 0.94 |
| Heavy Vehicles (%) | 4% | 7% | 5% | 23% | 8% | 0% | 4% | 9% | 39% | 20% | 6% | 5% |
| Adj. Flow (vph) | 59 | 189 | 686 | 49 | 90 | 4 | 290 | 458 | 25 | 5 | 705 | 43 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 59 | 189 | 686 | 49 | 90 | 4 | 290 | 458 | 25 | 5 | 705 | 43 |
| 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) | | 12 | | | 12 | | | 24 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway 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 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 |
| Detector Template | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Leading Detector (ft) | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 |
| Trailing Detector (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Position(ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Size(ft) | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | 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 | 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 | 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 | 0.0 | 0.0 | 0.0 |
| Detector 2 Position(ft) | | 94 | | | 94 | | | 94 | | | 94 | |
| 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 | pm+pt | NA | Perm | pm+pt | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |

104th Avenue Implemented Signal Timing

11: Tower Rd & 104th Ave

AM Peak

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Permitted Phases | 4 | | 4 | 8 | | 8 | | | 2 | | | 6 |
| Detector Phase | 7 | 4 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 8.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 |
| Minimum Split (s) | 15.4 | 39.4 | 39.4 | 15.4 | 39.4 | 39.4 | 16.2 | 40.2 | 40.2 | 16.2 | 40.2 | 40.2 |
| Total Split (s) | 18.0 | 38.0 | 38.0 | 18.0 | 38.0 | 38.0 | 25.0 | 39.0 | 39.0 | 25.0 | 39.0 | 39.0 |
| Total Split (%) | 15.0% | 31.7% | 31.7% | 15.0% | 31.7% | 31.7% | 20.8% | 32.5% | 32.5% | 20.8% | 32.5% | 32.5% |
| Maximum Green (s) | 10.6 | 30.6 | 30.6 | 10.6 | 30.6 | 30.6 | 16.8 | 30.8 | 30.8 | 16.8 | 30.8 | 30.8 |
| Yellow Time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 |
| All-Red Time (s) | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Vehicle Extension (s) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 |
| Recall Mode | None | None | None | None | None | None | None | C-Max | C-Max | None | C-Max | C-Max |
| Walk Time (s) | | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 |
| Flash Dont Walk (s) | | 27.0 | 27.0 | | 27.0 | 27.0 | | 27.0 | 27.0 | | 27.0 | 27.0 |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 |
| Act Effect Green (s) | 33.2 | 26.5 | 26.5 | 33.3 | 26.6 | 26.6 | 14.2 | 62.0 | 62.0 | 8.0 | 42.8 | 42.8 |
| Actuated g/C Ratio | 0.28 | 0.22 | 0.22 | 0.28 | 0.22 | 0.22 | 0.12 | 0.52 | 0.52 | 0.07 | 0.36 | 0.36 |
| v/c Ratio | 0.15 | 0.18 | 0.96 | 0.16 | 0.08 | 0.01 | 0.73 | 0.51 | 0.04 | 0.05 | 0.58 | 0.06 |
| Control Delay | 24.6 | 38.8 | 51.5 | 24.5 | 34.7 | 0.0 | 61.8 | 26.4 | 0.1 | 53.6 | 37.2 | 0.2 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 24.6 | 38.8 | 51.5 | 24.5 | 34.7 | 0.0 | 61.8 | 26.4 | 0.1 | 53.6 | 37.2 | 0.2 |
| LOS | C | D | D | C | C | A | E | C | A | D | D | A |
| Approach Delay | | 47.3 | | | 30.2 | | | 38.8 | | | 35.2 | |
| Approach LOS | | D | | | C | | | D | | | D | |

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 115

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.96

Intersection Signal Delay: 40.3

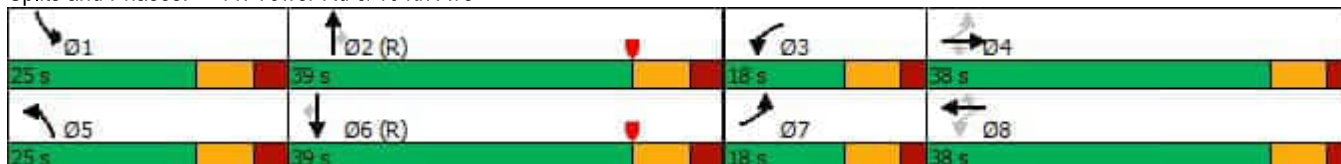
Intersection LOS: D

Intersection Capacity Utilization 80.3%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 11: Tower Rd & 104th Ave



























PM Peak Signal Timing Plan

After Implementation

104th Avenue Implemented Signal Timing

10: Walden St & 104th Ave













PM Peak

| |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 33 | 516 | 85 | 32 | 646 | 69 | 160 | 30 | 32 | 68 | 10 | 30 |
| Future Volume (vph) | 33 | 516 | 85 | 32 | 646 | 69 | 160 | 30 | 32 | 68 | 10 | 30 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 400 | | 230 | 250 | | 0 | 230 | | 230 | 210 | | 140 |
| Storage Lanes | 1 | | 1 | 0 | | 1 | 1 | | 1 | 1 | | 1 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Ped Bike Factor | | | | | | | 1.00 | | 0.99 | 1.00 | | 0.99 |
| Frt | | | 0.850 | | | 0.850 | | | 0.850 | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1805 | 3539 | 1599 | 1752 | 3471 | 1599 | 1770 | 1776 | 1568 | 1752 | 1727 | 1509 |
| Flt Permitted | 0.332 | | | 0.397 | | | 0.507 | | | 0.732 | | |
| Satd. Flow (perm) | 631 | 3539 | 1599 | 732 | 3471 | 1599 | 943 | 1776 | 1545 | 1346 | 1727 | 1488 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 159 | | | 159 | | | 168 | | | 168 |
| Link Speed (mph) | | 45 | | | 45 | | | 30 | | | 30 | |
| Link Distance (ft) | | 1290 | | | 1314 | | | 404 | | | 2709 | |
| Travel Time (s) | | 19.5 | | | 19.9 | | | 9.2 | | | 61.6 | |
| Confl. Peds. (#/hr) | | | | | | | 2 | | 3 | 3 | | 2 |
| Peak Hour Factor | 0.86 | 0.86 | 0.86 | 0.89 | 0.89 | 0.89 | 0.76 | 0.76 | 0.76 | 0.73 | 0.73 | 0.73 |
| Heavy Vehicles (%) | 0% | 2% | 1% | 3% | 4% | 1% | 2% | 7% | 3% | 3% | 10% | 7% |
| Adj. Flow (vph) | 38 | 600 | 99 | 36 | 726 | 78 | 211 | 39 | 42 | 93 | 14 | 41 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 38 | 600 | 99 | 36 | 726 | 78 | 211 | 39 | 42 | 93 | 14 | 41 |
| 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) | | 40 | | | 30 | | | 24 | | | 22 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway 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 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 |
| Detector Template | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Leading Detector (ft) | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 |
| Trailing Detector (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Position(ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Size(ft) | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | 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 | 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 | 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 | 0.0 | 0.0 | 0.0 |
| Detector 2 Position(ft) | | 94 | | | 94 | | | 94 | | | 94 | |
| 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 | |

104th Avenue Implemented Signal Timing

10: Walden St & 104th Ave

PM Peak

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | Perm | pm+pt | NA | Perm | pm+pt | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | 2 | | 2 | 6 | | 6 | 8 | | 8 | 4 | | 4 |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 6 | 3 | 8 | 8 | 7 | 4 | 4 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 |
| Minimum Split (s) | 12.5 | 36.5 | 36.5 | 12.5 | 36.5 | 36.5 | 14.5 | 42.5 | 42.5 | 14.5 | 42.5 | 42.5 |
| Total Split (s) | 14.0 | 60.0 | 60.0 | 14.0 | 60.0 | 60.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 |
| Total Split (%) | 11.7% | 50.0% | 50.0% | 11.7% | 50.0% | 50.0% | 19.2% | 19.2% | 19.2% | 19.2% | 19.2% | 19.2% |
| Maximum Green (s) | 6.5 | 52.5 | 52.5 | 6.5 | 52.5 | 52.5 | 16.5 | 16.5 | 16.5 | 16.5 | 16.5 | 16.5 |
| Yellow Time (s) | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| All-Red Time (s) | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Vehicle Extension (s) | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 |
| Recall Mode | None | C-Max | C-Max | None | C-Max | C-Max | None | None | None | None | None | None |
| Walk Time (s) | | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 |
| Flash Dont Walk (s) | | 24.0 | 24.0 | | 24.0 | 24.0 | | 31.0 | 31.0 | | 31.0 | 31.0 |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 |
| Act Effect Green (s) | 72.9 | 68.7 | 68.7 | 72.8 | 68.6 | 68.6 | 27.2 | 13.8 | 13.8 | 19.6 | 10.0 | 10.0 |
| Actuated g/C Ratio | 0.61 | 0.57 | 0.57 | 0.61 | 0.57 | 0.57 | 0.23 | 0.12 | 0.12 | 0.16 | 0.08 | 0.08 |
| v/c Ratio | 0.09 | 0.30 | 0.10 | 0.07 | 0.37 | 0.08 | 0.66 | 0.19 | 0.13 | 0.36 | 0.10 | 0.15 |
| Control Delay | 3.8 | 5.0 | 0.3 | 2.7 | 9.0 | 1.4 | 48.9 | 50.5 | 0.8 | 39.2 | 52.6 | 1.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 3.8 | 5.0 | 0.3 | 2.7 | 9.0 | 1.4 | 48.9 | 50.5 | 0.8 | 39.2 | 52.6 | 1.1 |
| LOS | A | A | A | A | A | A | D | D | A | D | D | A |
| Approach Delay | | 4.3 | | | 8.0 | | | 42.2 | | | 29.9 | |
| Approach LOS | | A | | | A | | | D | | | C | |

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 6 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 13.2

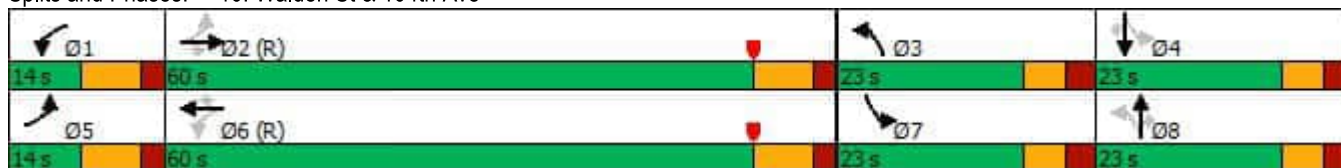
Intersection LOS: B

Intersection Capacity Utilization 56.0%

ICU Level of Service B

Analysis Period (min) 15


Splits and Phases: 10: Walden St & 104th Ave



104th Avenue Implemented Signal Timing

11: Tower Rd & 104th Ave













PM Peak

| |  | | | | | | | | | | | |
|----------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 102 | 127 | 405 | 23 | 159 | 9 | 576 | 708 | 22 | 8 | 431 | 67 |
| Future Volume (vph) | 102 | 127 | 405 | 23 | 159 | 9 | 576 | 708 | 22 | 8 | 431 | 67 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 350 | | 590 | 330 | | 440 | 320 | | 290 | 290 | | 190 |
| Storage Lanes | 1 | | 1 | 1 | | 1 | 2 | | 1 | 1 | | 1 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frt | | | 0.850 | | | 0.850 | | | 0.850 | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1787 | 4940 | 1583 | 1597 | 4759 | 1615 | 3433 | 1827 | 1417 | 1805 | 3406 | 1599 |
| Flt Permitted | 0.513 | | | 0.657 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 965 | 4940 | 1583 | 1105 | 4759 | 1615 | 3433 | 1827 | 1417 | 1805 | 3406 | 1599 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 460 | | | 264 | | | 182 | | | 256 |
| Link Speed (mph) | | 45 | | | 45 | | | 45 | | | 45 | |
| Link Distance (ft) | | 1314 | | | 579 | | | 636 | | | 501 | |
| Travel Time (s) | | 19.9 | | | 8.8 | | | 9.6 | | | 7.6 | |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.92 | 0.92 | 0.92 | 0.97 | 0.97 | 0.97 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 1% | 5% | 2% | 13% | 9% | 0% | 2% | 4% | 14% | 0% | 6% | 1% |
| Adj. Flow (vph) | 116 | 144 | 460 | 25 | 173 | 10 | 594 | 730 | 23 | 9 | 468 | 73 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 116 | 144 | 460 | 25 | 173 | 10 | 594 | 730 | 23 | 9 | 468 | 73 |
| 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) | | 12 | | | 12 | | | 24 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway 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 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 |
| Detector Template | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Leading Detector (ft) | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 |
| Trailing Detector (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Position(ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Size(ft) | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | 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 | 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 | 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 | 0.0 | 0.0 | 0.0 |
| Detector 2 Position(ft) | | 94 | | | 94 | | | 94 | | | 94 | |
| 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 | pm+pt | NA | Perm | pm+pt | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |

104th Avenue Implemented Signal Timing

11: Tower Rd & 104th Ave

PM Peak

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Permitted Phases | 4 | | 4 | 8 | | 8 | | | 2 | | | 6 |
| Detector Phase | 7 | 4 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 8.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 |
| Minimum Split (s) | 15.4 | 39.4 | 39.4 | 15.4 | 39.4 | 39.4 | 16.2 | 40.2 | 40.2 | 16.2 | 40.2 | 40.2 |
| Total Split (s) | 16.0 | 32.0 | 32.0 | 16.0 | 32.0 | 32.0 | 30.0 | 55.0 | 55.0 | 17.0 | 42.0 | 42.0 |
| Total Split (%) | 13.3% | 26.7% | 26.7% | 13.3% | 26.7% | 26.7% | 25.0% | 45.8% | 45.8% | 14.2% | 35.0% | 35.0% |
| Maximum Green (s) | 8.6 | 24.6 | 24.6 | 8.6 | 24.6 | 24.6 | 21.8 | 46.8 | 46.8 | 8.8 | 33.8 | 33.8 |
| Yellow Time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 |
| All-Red Time (s) | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Vehicle Extension (s) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 |
| Recall Mode | None | None | None | None | None | None | None | C-Max | C-Max | None | C-Max | C-Max |
| Walk Time (s) | | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 |
| Flash Dont Walk (s) | | 27.0 | 27.0 | | 27.0 | 27.0 | | 27.0 | 27.0 | | 27.0 | 27.0 |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 |
| Act Effect Green (s) | 24.0 | 18.9 | 18.9 | 20.2 | 12.2 | 12.2 | 25.5 | 73.1 | 73.1 | 8.0 | 42.6 | 42.6 |
| Actuated g/C Ratio | 0.20 | 0.16 | 0.16 | 0.17 | 0.10 | 0.10 | 0.21 | 0.61 | 0.61 | 0.07 | 0.36 | 0.36 |
| v/c Ratio | 0.46 | 0.19 | 0.72 | 0.11 | 0.36 | 0.02 | 0.82 | 0.66 | 0.02 | 0.07 | 0.39 | 0.10 |
| Control Delay | 36.0 | 38.9 | 25.1 | 35.4 | 51.5 | 0.1 | 54.4 | 21.2 | 0.0 | 54.0 | 31.1 | 0.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 36.0 | 38.9 | 25.1 | 35.4 | 51.5 | 0.1 | 54.4 | 21.5 | 0.0 | 54.0 | 31.1 | 0.3 |
| LOS | D | D | C | D | D | A | D | C | A | D | C | A |
| Approach Delay | | 29.6 | | | 47.1 | | | 35.6 | | | 27.4 | |
| Approach LOS | | C | | | D | | | D | | | C | |

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 125

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 33.3

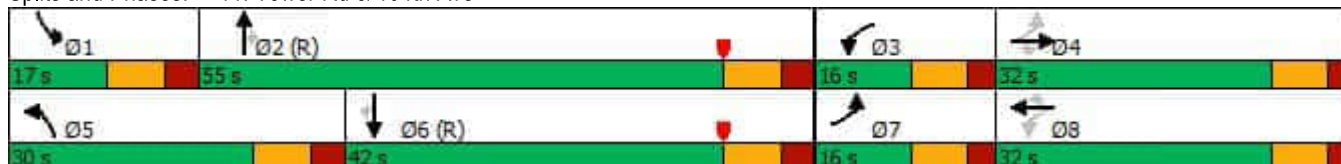
Intersection LOS: C

Intersection Capacity Utilization 84.9%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 11: Tower Rd & 104th Ave



































APPENDIX D

HCM 6TH EDITION LEVEL OF SERVICE REPORTS















Lanes, Volumes, Timings
1: Tower Road & 104th Avenue

JR Engineering
10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------|---|---|---|---|---|--|---|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |    |  |  |    |  |   |   |  |  |    |  |
| Traffic Volume (vph) | 149 | 335 | 644 | 33 | 119 | 8 | 354 | 528 | 63 | 17 | 703 | 106 |
| Future Volume (vph) | 149 | 335 | 644 | 33 | 119 | 8 | 354 | 528 | 63 | 17 | 703 | 106 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 350 | | 590 | 330 | | 440 | 320 | | 290 | 290 | | 190 |
| Storage Lanes | 1 | | 1 | 1 | | 1 | 2 | | 1 | 1 | | 1 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frt | | | 0.850 | | | 0.850 | | | 0.850 | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1770 | 5085 | 1583 | 1770 | 5085 | 1583 | 3433 | 3539 | 1583 | 1770 | 3539 | 1583 |
| Flt Permitted | 0.445 | | | 0.518 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 829 | 5085 | 1583 | 965 | 5085 | 1583 | 3433 | 3539 | 1583 | 1770 | 3539 | 1583 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 613 | | | 331 | | | 249 | | | 324 |
| Link Speed (mph) | | 45 | | | 45 | | | 45 | | | 45 | |
| Link Distance (ft) | | 660 | | | 1515 | | | 645 | | | 450 | |
| Travel Time (s) | | 10.0 | | | 23.0 | | | 9.8 | | | 6.8 | |
| Peak Hour Factor | 0.84 | 0.88 | 0.92 | 0.78 | 0.83 | 0.78 | 0.88 | 0.92 | 0.79 | 0.78 | 0.92 | 0.83 |
| Adj. Flow (vph) | 177 | 381 | 700 | 42 | 143 | 10 | 402 | 574 | 80 | 22 | 764 | 128 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 177 | 381 | 700 | 42 | 143 | 10 | 402 | 574 | 80 | 22 | 764 | 128 |
| 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) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway 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 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 |
| Detector Template | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Leading Detector (ft) | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 |
| Trailing Detector (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Position(ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Size(ft) | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | 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 | 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 | 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 | 0.0 | 0.0 | 0.0 |
| Detector 2 Position(ft) | | 94 | | | 94 | | | 94 | | | 94 | |
| 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 | pm+pt | NA | Perm | pm+pt | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | 8 | | 8 | | | 2 | | | 6 |

Lanes, Volumes, Timings
1: Tower Road & 104th Avenue

JR Engineering
10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Detector Phase | 7 | 4 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 8.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 |
| Minimum Split (s) | 15.4 | 17.4 | 17.4 | 15.4 | 17.4 | 17.4 | 16.2 | 18.2 | 18.2 | 16.2 | 18.2 | 18.2 |
| Total Split (s) | 28.0 | 37.0 | 37.0 | 16.0 | 25.0 | 25.0 | 39.0 | 47.0 | 47.0 | 20.0 | 28.0 | 28.0 |
| Total Split (%) | 23.3% | 30.8% | 30.8% | 13.3% | 20.8% | 20.8% | 32.5% | 39.2% | 39.2% | 16.7% | 23.3% | 23.3% |
| Maximum Green (s) | 20.6 | 29.6 | 29.6 | 8.6 | 17.6 | 17.6 | 30.8 | 38.8 | 38.8 | 11.8 | 19.8 | 19.8 |
| Yellow Time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 |
| All-Red Time (s) | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Vehicle Extension (s) | 3.0 | 2.0 | 2.0 | 3.0 | 2.0 | 2.0 | 2.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 |
| Recall Mode | None | None | None | None | None | None | None | C-Max | C-Max | None | C-Max | C-Max |
| Act Effect Green (s) | 35.7 | 23.7 | 23.7 | 22.1 | 13.9 | 13.9 | 18.5 | 61.8 | 61.8 | 8.0 | 41.6 | 41.6 |
| Actuated g/C Ratio | 0.30 | 0.20 | 0.20 | 0.18 | 0.12 | 0.12 | 0.15 | 0.52 | 0.52 | 0.07 | 0.35 | 0.35 |
| v/c Ratio | 0.49 | 0.38 | 0.87 | 0.18 | 0.24 | 0.02 | 0.76 | 0.32 | 0.09 | 0.19 | 0.62 | 0.17 |
| Control Delay | 31.1 | 39.0 | 32.0 | 30.1 | 48.1 | 0.1 | 58.1 | 20.5 | 0.2 | 56.8 | 37.7 | 0.5 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 31.1 | 39.0 | 32.0 | 30.1 | 48.1 | 0.1 | 58.1 | 20.5 | 0.2 | 56.8 | 37.7 | 0.5 |
| LOS | C | D | C | C | D | A | E | C | A | E | D | A |
| Approach Delay | | 34.0 | | | 41.8 | | | 33.3 | | | 32.9 | |
| Approach LOS | | C | | | D | | | C | | | C | |

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 33.9

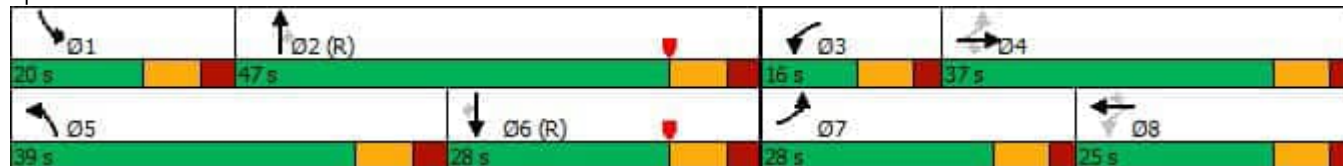
Intersection LOS: C

Intersection Capacity Utilization 85.1%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: Tower Road & 104th Avenue



Queues

JR Engineering

10/19/2023

1: Tower Road & 104th Avenue



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Group Flow (vph) | 177 | 381 | 700 | 42 | 143 | 10 | 402 | 574 | 80 | 22 | 764 | 128 |
| v/c Ratio | 0.49 | 0.38 | 0.87 | 0.18 | 0.24 | 0.02 | 0.76 | 0.32 | 0.09 | 0.19 | 0.62 | 0.17 |
| Control Delay | 31.1 | 39.0 | 32.0 | 30.1 | 48.1 | 0.1 | 58.1 | 20.5 | 0.2 | 56.8 | 37.7 | 0.5 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 31.1 | 39.0 | 32.0 | 30.1 | 48.1 | 0.1 | 58.1 | 20.5 | 0.2 | 56.8 | 37.7 | 0.5 |
| Queue Length 50th (ft) | 117 | 102 | 281 | 24 | 38 | 0 | 155 | 107 | 0 | 16 | 248 | 0 |
| Queue Length 95th (ft) | 157 | 123 | 458 | 39 | 52 | 0 | 195 | 232 | 0 | 38 | #433 | 0 |
| Internal Link Dist (ft) | | 580 | | | 1435 | | | 565 | | | 370 | |
| Turn Bay Length (ft) | 350 | | 590 | 330 | | 440 | 320 | | 290 | 290 | | 190 |
| Base Capacity (vph) | 411 | 1254 | 852 | 238 | 774 | 521 | 881 | 1821 | 935 | 174 | 1226 | 760 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.43 | 0.30 | 0.82 | 0.18 | 0.18 | 0.02 | 0.46 | 0.32 | 0.09 | 0.13 | 0.62 | 0.17 |

Intersection Summary

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

























Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary

1: Tower Road & 104th Avenue

JR Engineering

























10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h) | 149 | 335 | 644 | 33 | 119 | 8 | 354 | 528 | 63 | 17 | 703 | 106 |
| Future Volume (veh/h) | 149 | 335 | 644 | 33 | 119 | 8 | 354 | 528 | 63 | 17 | 703 | 106 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | No | | | No | | | No | | | No | | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 177 | 381 | 0 | 42 | 143 | 0 | 402 | 574 | 0 | 22 | 764 | 0 |
| Peak Hour Factor | 0.84 | 0.88 | 0.92 | 0.78 | 0.83 | 0.78 | 0.88 | 0.92 | 0.79 | 0.78 | 0.92 | 0.83 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 322 | 716 | | 217 | 426 | | 469 | 1830 | | 62 | 1470 | |
| Arrive On Green | 0.04 | 0.05 | 0.00 | 0.05 | 0.08 | 0.00 | 0.14 | 0.51 | 0.00 | 0.03 | 0.41 | 0.00 |
| Sat Flow, veh/h | 1781 | 5106 | 1585 | 1781 | 5106 | 1585 | 3456 | 3554 | 1585 | 1781 | 3554 | 1585 |
| Grp Volume(v), veh/h | 177 | 381 | 0 | 42 | 143 | 0 | 402 | 574 | 0 | 22 | 764 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1702 | 1585 | 1781 | 1702 | 1585 | 1728 | 1777 | 1585 | 1781 | 1777 | 1585 |
| Q Serve(g_s), s | 10.6 | 8.8 | 0.0 | 2.5 | 3.2 | 0.0 | 13.7 | 11.2 | 0.0 | 1.4 | 19.3 | 0.0 |
| Cycle Q Clear(g_c), s | 10.6 | 8.8 | 0.0 | 2.5 | 3.2 | 0.0 | 13.7 | 11.2 | 0.0 | 1.4 | 19.3 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 322 | 716 | | 217 | 426 | | 469 | 1830 | | 62 | 1470 | |
| V/C Ratio(X) | 0.55 | 0.53 | | 0.19 | 0.34 | | 0.86 | 0.31 | | 0.36 | 0.52 | |
| Avail Cap(c_a), veh/h | 437 | 1260 | | 255 | 749 | | 887 | 1830 | | 175 | 1470 | |
| HCM Platoon Ratio | 0.33 | 0.33 | 0.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 45.9 | 53.4 | 0.0 | 46.1 | 51.9 | 0.0 | 50.7 | 16.8 | 0.0 | 56.6 | 26.3 | 0.0 |
| Incr Delay (d2), s/veh | 1.5 | 0.2 | 0.0 | 0.4 | 0.2 | 0.0 | 1.8 | 0.4 | 0.0 | 1.3 | 1.3 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 5.1 | 3.9 | 0.0 | 1.1 | 1.3 | 0.0 | 5.9 | 4.4 | 0.0 | 0.7 | 8.0 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 47.4 | 53.6 | 0.0 | 46.6 | 52.0 | 0.0 | 52.5 | 17.3 | 0.0 | 57.9 | 27.6 | 0.0 |
| LnGrp LOS | D | D | | D | D | | D | B | | E | C | |
| Approach Vol, veh/h | 558 | | | 185 | | | 976 | | | 786 | | |
| Approach Delay, s/veh | 51.6 | | | 50.8 | | | 31.8 | | | 28.4 | | |
| Approach LOS | D | | | D | | | C | | | C | | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 12.4 | 70.0 | 13.4 | 24.2 | 24.5 | 57.8 | 20.3 | 17.4 | | | | |
| Change Period (Y+Rc), s | 8.2 | 8.2 | 7.4 | 7.4 | 8.2 | 8.2 | 7.4 | 7.4 | | | | |
| Max Green Setting (Gmax), s | 11.8 | 38.8 | 8.6 | 29.6 | 30.8 | 19.8 | 20.6 | 17.6 | | | | |
| Max Q Clear Time (g_c+I1), s | 3.4 | 13.2 | 4.5 | 10.8 | 15.7 | 21.3 | 12.6 | 5.2 | | | | |
| Green Ext Time (p_c), s | 0.0 | 6.8 | 0.0 | 1.4 | 0.6 | 0.0 | 0.3 | 0.4 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | 36.6 | | | | | | | | | | | |
| HCM 6th LOS | D | | | | | | | | | | | |

Lanes, Volumes, Timings

2: Walden Street & 104th Avenue


JR Engineering
10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 111 | 856 | 85 | 18 | 409 | 143 | 139 | 38 | 71 | 214 | 36 | 103 |
| Future Volume (vph) | 111 | 856 | 85 | 18 | 409 | 143 | 139 | 38 | 71 | 214 | 36 | 103 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 400 | | 230 | 0 | | 250 | 230 | | 230 | 210 | | 140 |
| Storage Lanes | 1 | | 1 | 1 | | 1 | 1 | | 1 | 1 | | 1 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.850 | | | 0.850 | | | 0.850 | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1770 | 3539 | 1583 | 1770 | 3539 | 1583 | 1770 | 1863 | 1583 | 1770 | 1863 | 1583 |
| Flt Permitted | 0.416 | | | 0.251 | | | 0.727 | | | 0.441 | | |
| Satd. Flow (perm) | 775 | 3539 | 1583 | 468 | 3539 | 1583 | 1354 | 1863 | 1583 | 821 | 1863 | 1583 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 218 | | | 218 | | | 227 | | | 168 |
| Link Speed (mph) | | 45 | | | 45 | | | 30 | | | 30 | |
| Link Distance (ft) | | 900 | | | 660 | | | 652 | | | 450 | |
| Travel Time (s) | | 13.6 | | | 10.0 | | | 14.8 | | | 10.2 | |
| Peak Hour Factor | 0.83 | 0.92 | 0.82 | 0.78 | 0.88 | 0.84 | 0.84 | 0.78 | 0.80 | 0.87 | 0.78 | 0.83 |
| Adj. Flow (vph) | 134 | 930 | 104 | 23 | 465 | 170 | 165 | 49 | 89 | 246 | 46 | 124 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 134 | 930 | 104 | 23 | 465 | 170 | 165 | 49 | 89 | 246 | 46 | 124 |
| 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) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway 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 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 |
| Detector Template | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Leading Detector (ft) | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 |
| Trailing Detector (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Position(ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Size(ft) | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | 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 | 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 | 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 | 0.0 | 0.0 | 0.0 |
| Detector 2 Position(ft) | | 94 | | | 94 | | | 94 | | | 94 | |
| 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 | pm+pt | NA | Perm | pm+pt | NA | Perm | pm+pt | NA | Perm | pm+pt | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | 2 | | 2 | 6 | | 6 | 8 | | 8 | 4 | | 4 |

Lanes, Volumes, Timings

2: Walden Street & 104th Avenue

JR Engineering
10/19/2023

| |  | | | | | | | | | | | |
|-----------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 6 | 3 | 8 | 8 | 7 | 4 | 4 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 |
| Minimum Split (s) | 12.5 | 17.5 | 17.5 | 12.5 | 17.5 | 17.5 | 14.5 | 16.5 | 16.5 | 14.5 | 16.5 | 16.5 |
| Total Split (s) | 19.0 | 50.0 | 50.0 | 13.0 | 44.0 | 44.0 | 20.0 | 17.0 | 17.0 | 40.0 | 37.0 | 37.0 |
| Total Split (%) | 15.8% | 41.7% | 41.7% | 10.8% | 36.7% | 36.7% | 16.7% | 14.2% | 14.2% | 33.3% | 30.8% | 30.8% |
| Maximum Green (s) | 11.5 | 42.5 | 42.5 | 5.5 | 36.5 | 36.5 | 13.5 | 10.5 | 10.5 | 33.5 | 30.5 | 30.5 |
| Yellow Time (s) | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| All-Red Time (s) | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Vehicle Extension (s) | 2.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Recall Mode | None | C-Max | C-Max | None | C-Max | C-Max | None | None | None | None | None | None |
| Act Effect Green (s) | 68.3 | 62.1 | 62.1 | 59.1 | 53.7 | 53.7 | 22.3 | 10.1 | 10.1 | 34.9 | 17.4 | 17.4 |
| Actuated g/C Ratio | 0.57 | 0.52 | 0.52 | 0.49 | 0.45 | 0.45 | 0.19 | 0.08 | 0.08 | 0.29 | 0.14 | 0.14 |
| v/c Ratio | 0.26 | 0.51 | 0.11 | 0.08 | 0.29 | 0.21 | 0.57 | 0.31 | 0.26 | 0.63 | 0.17 | 0.33 |
| Control Delay | 13.9 | 22.4 | 0.2 | 4.8 | 8.4 | 2.0 | 40.2 | 57.3 | 1.8 | 40.8 | 44.8 | 4.5 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 13.9 | 22.4 | 0.2 | 4.8 | 8.4 | 2.0 | 40.2 | 57.3 | 1.8 | 40.8 | 44.8 | 4.5 |
| LOS | B | C | A | A | A | A | D | E | A | D | D | A |
| Approach Delay | 19.5 | | | | 6.6 | | | 31.7 | | | 30.4 | |
| Approach LOS | B | | | | A | | | C | | | C | |

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 19.4

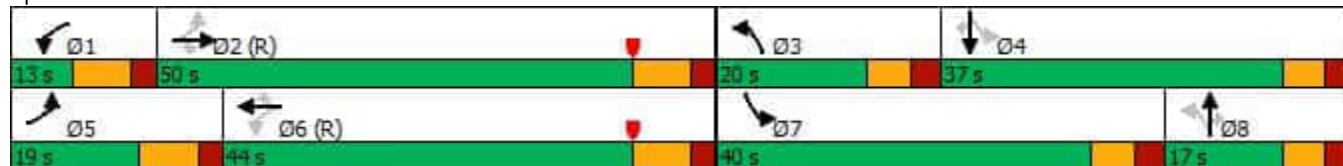
Intersection LOS: B

Intersection Capacity Utilization 64.3%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: Walden Street & 104th Avenue



Queues
2: Walden Street & 104th Avenue

JR Engineering
10/19/2023



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Group Flow (vph) | 134 | 930 | 104 | 23 | 465 | 170 | 165 | 49 | 89 | 246 | 46 | 124 |
| v/c Ratio | 0.26 | 0.51 | 0.11 | 0.08 | 0.29 | 0.21 | 0.57 | 0.31 | 0.26 | 0.63 | 0.17 | 0.33 |
| Control Delay | 13.9 | 22.4 | 0.2 | 4.8 | 8.4 | 2.0 | 40.2 | 57.3 | 1.8 | 40.8 | 44.8 | 4.5 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 13.9 | 22.4 | 0.2 | 4.8 | 8.4 | 2.0 | 40.2 | 57.3 | 1.8 | 40.8 | 44.8 | 4.5 |
| Queue Length 50th (ft) | 44 | 258 | 0 | 4 | 67 | 0 | 99 | 36 | 0 | 156 | 32 | 0 |
| Queue Length 95th (ft) | 81 | 378 | 0 | m5 | 93 | 0 | 132 | 65 | 0 | 202 | 54 | 11 |
| Internal Link Dist (ft) | 820 | | | | 580 | | | | 572 | | 370 | |
| Turn Bay Length (ft) | 400 | | 230 | | | | 250 | | 230 | | 210 | |
| Base Capacity (vph) | 543 | 1830 | 924 | 293 | 1583 | 828 | 313 | 164 | 345 | 518 | 473 | 527 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.25 | 0.51 | 0.11 | 0.08 | 0.29 | 0.21 | 0.53 | 0.30 | 0.26 | 0.47 | 0.10 | 0.24 |

Intersection Summary

























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

HCM 6th Signalized Intersection Summary

2: Walden Street & 104th Avenue

JR Engineering

10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h) | 111 | 856 | 85 | 18 | 409 | 143 | 139 | 38 | 71 | 214 | 36 | 103 |
| Future Volume (veh/h) | 111 | 856 | 85 | 18 | 409 | 143 | 139 | 38 | 71 | 214 | 36 | 103 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | No | | | No | | | No | | | No | | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 134 | 930 | 104 | 23 | 465 | 170 | 165 | 49 | 89 | 246 | 46 | 124 |
| Peak Hour Factor | 0.83 | 0.92 | 0.82 | 0.78 | 0.88 | 0.84 | 0.84 | 0.78 | 0.80 | 0.87 | 0.78 | 0.83 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 451 | 1843 | 822 | 290 | 1730 | 772 | 339 | 156 | 132 | 387 | 235 | 200 |
| Arrive On Green | 0.05 | 0.52 | 0.52 | 0.01 | 0.16 | 0.16 | 0.10 | 0.08 | 0.08 | 0.14 | 0.13 | 0.13 |
| Sat Flow, veh/h | 1781 | 3554 | 1585 | 1781 | 3554 | 1585 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 134 | 930 | 104 | 23 | 465 | 170 | 165 | 49 | 89 | 246 | 46 | 124 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1585 | 1781 | 1777 | 1585 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 4.5 | 20.5 | 4.1 | 0.8 | 13.8 | 11.2 | 10.0 | 3.0 | 6.5 | 14.8 | 2.6 | 8.9 |
| Cycle Q Clear(g_c), s | 4.5 | 20.5 | 4.1 | 0.8 | 13.8 | 11.2 | 10.0 | 3.0 | 6.5 | 14.8 | 2.6 | 8.9 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 451 | 1843 | 822 | 290 | 1730 | 772 | 339 | 156 | 132 | 387 | 235 | 200 |
| V/C Ratio(X) | 0.30 | 0.50 | 0.13 | 0.08 | 0.27 | 0.22 | 0.49 | 0.31 | 0.67 | 0.64 | 0.20 | 0.62 |
| Avail Cap(c_a), veh/h | 526 | 1843 | 822 | 331 | 1730 | 772 | 362 | 164 | 139 | 631 | 475 | 403 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 14.6 | 18.8 | 14.9 | 16.1 | 31.6 | 30.5 | 44.1 | 51.8 | 53.4 | 41.2 | 47.0 | 49.7 |
| Incr Delay (d2), s/veh | 0.1 | 1.0 | 0.3 | 0.0 | 0.4 | 0.7 | 0.4 | 0.4 | 9.0 | 0.6 | 0.1 | 1.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.7 | 8.1 | 1.5 | 0.3 | 6.6 | 4.9 | 4.5 | 1.4 | 2.9 | 6.6 | 1.2 | 3.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 14.8 | 19.8 | 15.2 | 16.1 | 32.0 | 31.2 | 44.5 | 52.2 | 62.5 | 41.9 | 47.1 | 50.9 |
| LnGrp LOS | B | B | B | B | C | C | D | D | E | D | D | D |
| Approach Vol, veh/h | 1168 | | | 658 | | | 303 | | | 416 | | |
| Approach Delay, s/veh | 18.8 | | | 31.2 | | | 51.0 | | | 45.2 | | |
| Approach LOS | B | | | C | | | D | | | D | | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 10.2 | 69.7 | 18.5 | 21.6 | 14.0 | 65.9 | 23.6 | 16.5 | | | | |
| Change Period (Y+Rc), s | * 7.5 | * 7.5 | 6.5 | 6.5 | * 7.5 | * 7.5 | 6.5 | 6.5 | | | | |
| Max Green Setting (Gmax), s | * 5.5 | * 43 | 13.5 | 30.5 | * 12 | * 37 | 33.5 | 10.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.8 | 22.5 | 12.0 | 10.9 | 6.5 | 15.8 | 16.8 | 8.5 | | | | |
| Green Ext Time (p_c), s | 0.0 | 10.9 | 0.0 | 0.3 | 0.1 | 6.3 | 0.3 | 0.1 | | | | |

Intersection Summary

















| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 30.2 |
| HCM 6th LOS | C |

Notes

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

Lanes, Volumes, Timings
3: Walden Street & 105th Avenue

JR Engineering
10/19/2023




















| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Volume (vph) | 12 | 0 | 89 | 5 | 0 | 19 | 31 | 252 | 0 | 9 | 214 | 7 |
| Future Volume (vph) | 12 | 0 | 89 | 5 | 0 | 19 | 31 | 252 | 0 | 9 | 214 | 7 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. 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 |
| Frt | | 0.881 | | | 0.892 | | | | | | 0.995 | |
| Flt Protected | | 0.994 | | | 0.990 | | | 0.994 | | | 0.998 | |
| Satd. Flow (prot) | 0 | 1631 | 0 | 0 | 1645 | 0 | 0 | 1852 | 0 | 0 | 1850 | 0 |
| Flt Permitted | | 0.994 | | | 0.990 | | | 0.994 | | | 0.998 | |
| Satd. Flow (perm) | 0 | 1631 | 0 | 0 | 1645 | 0 | 0 | 1852 | 0 | 0 | 1850 | 0 |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | |
| Link Distance (ft) | | 500 | | | 660 | | | 300 | | | 280 | |
| Travel Time (s) | | 13.6 | | | 18.0 | | | 8.2 | | | 7.6 | |
| Peak Hour Factor | 0.78 | 0.78 | 0.80 | 0.78 | 0.78 | 0.78 | 0.78 | 0.87 | 0.78 | 0.78 | 0.87 | 0.78 |
| Adj. Flow (vph) | 15 | 0 | 111 | 6 | 0 | 24 | 40 | 290 | 0 | 12 | 246 | 9 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 126 | 0 | 0 | 30 | 0 | 0 | 330 | 0 | 0 | 267 | 0 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Sign Control | | Yield | | | Yield | | | Yield | | | Yield | |
| Intersection Summary | | | | | | | | | | | | |
| Area Type: | Other | | | | | | | | | | | |
| Control Type: | Roundabout | | | | | | | | | | | |
| Intersection Capacity Utilization | 39.8% | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |
| ICU Level of Service A | | | | | | | | | | | | |

| Intersection | | | | |
|-----------------------------|-------|-------|-------|-------|
| Intersection Delay, s/veh | 4.7 | | | |
| Intersection LOS | A | | | |
| Approach | EB | WB | NB | SB |
| Entry Lanes | 1 | 1 | 1 | 1 |
| Conflicting Circle Lanes | 1 | 1 | 1 | 1 |
| Adj Approach Flow, veh/h | 126 | 30 | 330 | 267 |
| Demand Flow Rate, veh/h | 128 | 30 | 337 | 272 |
| Vehicles Circulating, veh/h | 269 | 352 | 27 | 47 |
| Vehicles Exiting, veh/h | 50 | 12 | 370 | 335 |
| Ped Vol Crossing Leg, #/h | 0 | 0 | 0 | 0 |
| Ped Cap Adj | 1.000 | 1.000 | 1.000 | 1.000 |
| Approach Delay, s/veh | 4.6 | 4.0 | 4.9 | 4.5 |
| Approach LOS | A | A | A | A |
| Lane | Left | Left | Left | Left |
| Designated Moves | LTR | LTR | LTR | LTR |
| Assumed Moves | LTR | LTR | LTR | LTR |
| RT Channelized | | | | |
| Lane Util | 1.000 | 1.000 | 1.000 | 1.000 |
| Follow-Up Headway, s | 2.609 | 2.609 | 2.609 | 2.609 |
| Critical Headway, s | 4.976 | 4.976 | 4.976 | 4.976 |
| Entry Flow, veh/h | 128 | 30 | 337 | 272 |
| Cap Entry Lane, veh/h | 1049 | 964 | 1342 | 1315 |
| Entry HV Adj Factor | 0.984 | 1.000 | 0.980 | 0.982 |
| Flow Entry, veh/h | 126 | 30 | 330 | 267 |
| Cap Entry, veh/h | 1032 | 964 | 1315 | 1291 |
| V/C Ratio | 0.122 | 0.031 | 0.251 | 0.207 |
| Control Delay, s/veh | 4.6 | 4.0 | 4.9 | 4.5 |
| LOS | A | A | A | A |
| 95th %tile Queue, veh | 0 | 0 | 1 | 1 |








Lanes, Volumes, Timings
4: Walden Street & Homestead Trail

JR Engineering

10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | |  |  | |  |  | |  |  | |
| Traffic Volume (vph) | 19 | 1 | 28 | 6 | 1 | 1 | 20 | 245 | 14 | 1 | 187 | 12 |
| Future Volume (vph) | 19 | 1 | 28 | 6 | 1 | 1 | 20 | 245 | 14 | 1 | 187 | 12 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | | 0 | 150 | | 0 | 150 | | 0 | 150 | | 0 |
| Storage Lanes | 0 | | 0 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. 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 |
| Frt | | 0.920 | | | 0.925 | | | 0.991 | | | 0.990 | |
| Flt Protected | | 0.981 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1681 | 0 | 1770 | 1723 | 0 | 1770 | 1846 | 0 | 1770 | 1844 | 0 |
| Flt Permitted | | 0.981 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 1681 | 0 | 1770 | 1723 | 0 | 1770 | 1846 | 0 | 1770 | 1844 | 0 |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | |
| Link Distance (ft) | | 500 | | | 666 | | | 395 | | | 595 | |
| Travel Time (s) | | 13.6 | | | 18.2 | | | 10.8 | | | 16.2 | |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.87 | 0.78 | 0.78 | 0.85 | 0.78 |
| Adj. Flow (vph) | 24 | 1 | 36 | 8 | 1 | 1 | 26 | 282 | 18 | 1 | 220 | 15 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 61 | 0 | 8 | 2 | 0 | 26 | 300 | 0 | 1 | 235 | 0 |
| 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) | | 12 | | | 12 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway 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 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Intersection Summary | | | | | | | | | | | | |
| Area Type: | Other | | | | | | | | | | | |
| Control Type: | Unsignalized | | | | | | | | | | | |
| Intersection Capacity Utilization | 32.8% | | | | | | ICU Level of Service A | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |

| Intersection | |
|---------------------------|------|
| Intersection Delay, s/veh | 10.4 |
| Intersection LOS | B |












| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---------------------|------|---|------|---|---|------|---|---|------|---|---|------|
| Lane Configurations | |  | |  |  | |  |  | |  |  | |
| Traffic Vol, veh/h | 19 | 1 | 28 | 6 | 1 | 1 | 20 | 245 | 14 | 1 | 187 | 12 |
| Future Vol, veh/h | 19 | 1 | 28 | 6 | 1 | 1 | 20 | 245 | 14 | 1 | 187 | 12 |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.87 | 0.78 | 0.78 | 0.85 | 0.78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 24 | 1 | 36 | 8 | 1 | 1 | 26 | 282 | 18 | 1 | 220 | 15 |
| Number of Lanes | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |






| Approach | EB | WB | NB | SB |
|----------------------------|-----|-----|------|------|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 2 | 1 | 2 | 2 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 2 | 1 | 2 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 2 | 2 | 2 | 1 |
| HCM Control Delay | 9.3 | 9.1 | 10.8 | 10.1 |
| HCM LOS | A | A | B | B |

| Lane | NBLn1 | NBLn2 | EBLn1 | WBLn1 | WBLn2 | SBLn1 | SBLn2 |
|------------------------|-------|-------|-------|-------|-------|-------|-------|
| Vol Left, % | 100% | 0% | 40% | 100% | 0% | 100% | 0% |
| Vol Thru, % | 0% | 95% | 2% | 0% | 50% | 0% | 94% |
| Vol Right, % | 0% | 5% | 58% | 0% | 50% | 0% | 6% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 20 | 259 | 48 | 6 | 2 | 1 | 199 |
| LT Vol | 20 | 0 | 19 | 6 | 0 | 1 | 0 |
| Through Vol | 0 | 245 | 1 | 0 | 1 | 0 | 187 |
| RT Vol | 0 | 14 | 28 | 0 | 1 | 0 | 12 |
| Lane Flow Rate | 26 | 300 | 62 | 8 | 3 | 1 | 235 |
| Geometry Grp | 7 | 7 | 6 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.039 | 0.407 | 0.096 | 0.014 | 0.004 | 0.002 | 0.325 |
| Departure Headway (Hd) | 5.433 | 4.893 | 5.613 | 6.47 | 5.612 | 5.512 | 4.967 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 660 | 737 | 638 | 552 | 636 | 650 | 725 |
| Service Time | 3.158 | 2.618 | 3.655 | 4.221 | 3.363 | 3.238 | 2.693 |
| HCM Lane V/C Ratio | 0.039 | 0.407 | 0.097 | 0.014 | 0.005 | 0.002 | 0.324 |
| HCM Control Delay | 8.4 | 11 | 9.3 | 9.3 | 8.4 | 8.2 | 10.1 |
| HCM Lane LOS | A | B | A | A | A | A | B |
| HCM 95th-tile Q | 0.1 | 2 | 0.3 | 0 | 0 | 0 | 1.4 |

Lanes, Volumes, Timings
11: Tower Road & 105th Avenue





















JR Engineering
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| |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | |  |  |  |  |  |
| Traffic Volume (vph) | 0 | 8 | 8 | 633 | 777 | 28 |
| Future Volume (vph) | 0 | 8 | 8 | 633 | 777 | 28 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 250 | 0 | 150 | | | 150 |
| Storage Lanes | 0 | 1 | 1 | | | 1 |
| Taper Length (ft) | 25 | | 25 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.865 | | | | 0.850 |
| Flt Protected | | | 0.950 | | | |
| Satd. Flow (prot) | 0 | 1611 | 1770 | 1863 | 1863 | 1583 |
| Flt Permitted | | | 0.950 | | | |
| Satd. Flow (perm) | 0 | 1611 | 1770 | 1863 | 1863 | 1583 |
| Link Speed (mph) | 30 | | | 30 | 30 | |
| Link Distance (ft) | 660 | | | 300 | 1403 | |
| Travel Time (s) | 15.0 | | | 6.8 | 31.9 | |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.92 | 0.92 | 0.78 |
| Adj. Flow (vph) | 0 | 10 | 10 | 688 | 845 | 36 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 0 | 10 | 10 | 688 | 845 | 36 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 0 | | | 12 | 12 | |
| Link Offset(ft) | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 60 | 60 | 60 | | | 60 |
| Sign Control | Stop | | | Free | Free | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 50.9% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

| Intersection | | | | | | |
|--------------------------|--------|---|---|---|---|---|
| Int Delay, s/veh | 0.1 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | |  |  |  |  |  |
| Traffic Vol, veh/h | 0 | 8 | 8 | 633 | 777 | 28 |
| Future Vol, veh/h | 0 | 8 | 8 | 633 | 777 | 28 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | 0 | 150 | - | - | 150 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 78 | 78 | 78 | 92 | 92 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 10 | 10 | 688 | 845 | 36 |
| Major/Minor | Minor2 | Major1 | | Major2 | | |
| Conflicting Flow All | - | 845 | 881 | 0 | - | 0 |
| Stage 1 | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - |
| Critical Hdwy | - | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - |
| Follow-up Hdwy | - | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 0 | 363 | 767 | - | - | - |
| Stage 1 | 0 | - | - | - | - | - |
| Stage 2 | 0 | - | - | - | - | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | 363 | 767 | - | - | - |
| Mov Cap-2 Maneuver | - | - | - | - | - | - |
| Stage 1 | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - |
| Approach | EB | NB | | SB | | |
| HCM Control Delay, s | 15.2 | 0.1 | | 0 | | |
| HCM LOS | C | | | | | |
| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR | |
| Capacity (veh/h) | 767 | - | 363 | - | - | |
| HCM Lane V/C Ratio | 0.013 | - | 0.028 | - | - | |
| HCM Control Delay (s) | 9.8 | - | 15.2 | - | - | |
| HCM Lane LOS | A | - | C | - | - | |
| HCM 95th %tile Q(veh) | 0 | - | 0.1 | - | - | |

Lanes, Volumes, Timings
13: Yampa Street & 104th Avenue





















JR Engineering
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| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  | | |  | | |  |
| Traffic Volume (vph) | 1 | 1106 | 5 | 12 | 554 | 5 | 0 | 0 | 4 | 0 | 0 | 1 |
| Future Volume (vph) | 1 | 1106 | 5 | 12 | 554 | 5 | 0 | 0 | 4 | 0 | 0 | 1 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 150 | | 150 | 150 | | 0 | 0 | | 0 | 0 | | 0 |
| Storage Lanes | 1 | | 1 | 1 | | 1 | 0 | | 1 | 0 | | 1 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.850 | | | 0.850 | | | 0.865 | | | 0.865 |
| Flt Protected | 0.950 | | | 0.950 | | | | | | | | |
| Satd. Flow (prot) | 1770 | 5085 | 1583 | 1770 | 5085 | 1583 | 0 | 0 | 1611 | 0 | 0 | 1611 |
| Flt Permitted | 0.950 | | | 0.950 | | | | | | | | |
| Satd. Flow (perm) | 1770 | 5085 | 1583 | 1770 | 5085 | 1583 | 0 | 0 | 1611 | 0 | 0 | 1611 |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 660 | | | 660 | | | 636 | | | 450 | |
| Travel Time (s) | | 15.0 | | | 15.0 | | | 14.5 | | | 10.2 | |
| Peak Hour Factor | 0.78 | 0.93 | 0.78 | 0.78 | 0.92 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 |
| Adj. Flow (vph) | 1 | 1189 | 6 | 15 | 602 | 6 | 0 | 0 | 5 | 0 | 0 | 1 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 1 | 1189 | 6 | 15 | 602 | 6 | 0 | 0 | 5 | 0 | 0 | 1 |
| 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) | | 12 | | | 12 | | | 0 | | | 0 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway 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 |
| Turning Speed (mph) | 60 | | 60 | 60 | | 60 | 60 | | 60 | 60 | | 60 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Intersection Summary | | | | | | | | | | | | |
| Area Type: | Other | | | | | | | | | | | |
| Control Type: | Unsignalized | | | | | | | | | | | |
| Intersection Capacity Utilization | 31.4% | | | | | | ICU Level of Service A | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |

| Intersection | | | | | | | | | | | | |
|--------------------------|---|---|---|---|---|---|--------|-------|---|--------|------|---|
| Int Delay, s/veh | 0.2 | | | | | | | | | | | |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  | | |  | | |  |
| Traffic Vol, veh/h | 1 | 1106 | 5 | 12 | 554 | 5 | 0 | 0 | 4 | 0 | 0 | 1 |
| Future Vol, veh/h | 1 | 1106 | 5 | 12 | 554 | 5 | 0 | 0 | 4 | 0 | 0 | 1 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | 150 | - | 150 | 150 | - | 0 | - | - | 0 | - | - | 0 |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 78 | 93 | 78 | 78 | 92 | 78 | 78 | 78 | 78 | 78 | 78 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 1 | 1189 | 6 | 15 | 602 | 6 | 0 | 0 | 5 | 0 | 0 | 1 |
| | | | | | | | | | | | | |
| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
| Conflicting Flow All | 608 | 0 | 0 | 1195 | 0 | 0 | - | - | 595 | - | - | 301 |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy | 5.34 | - | - | 5.34 | - | - | - | - | 7.14 | - | - | 7.14 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.12 | - | - | 3.12 | - | - | - | - | 3.92 | - | - | 3.92 |
| Pot Cap-1 Maneuver | 602 | - | - | 315 | - | - | 0 | 0 | 383 | 0 | 0 | 593 |
| Stage 1 | - | - | - | - | - | - | 0 | 0 | - | 0 | 0 | - |
| Stage 2 | - | - | - | - | - | - | 0 | 0 | - | 0 | 0 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 602 | - | - | 315 | - | - | - | - | 383 | - | - | 593 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | | | | | |
| Approach | EB | | | WB | | | NB | | | SB | | |
| HCM Control Delay, s | 0 | | | 0.4 | | | 14.5 | | | 11.1 | | |
| HCM LOS | | | | | | | B | | | B | | |
| | | | | | | | | | | | | |
| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 | | | | |
| Capacity (veh/h) | 383 | 602 | - | - | 315 | - | - | 593 | | | | |
| HCM Lane V/C Ratio | 0.013 | 0.002 | - | - | 0.049 | - | - | 0.002 | | | | |
| HCM Control Delay (s) | 14.5 | 11 | - | - | 17 | - | - | 11.1 | | | | |
| HCM Lane LOS | B | B | - | - | C | - | - | B | | | | |
| HCM 95th %tile Q(veh) | 0 | 0 | - | - | 0.2 | - | - | 0 | | | | |

Lanes, Volumes, Timings
14: Walden Street & 104th Way

JR Engineering
10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | |  |  |  |  |  |  |
| Traffic Volume (vph) | 7 | 0 | 47 | 0 | 0 | 0 | 15 | 278 | 0 | 0 | 302 | 2 |
| Future Volume (vph) | 7 | 0 | 47 | 0 | 0 | 0 | 15 | 278 | 0 | 0 | 302 | 2 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 150 | | 150 | 150 | | 0 |
| Storage Lanes | 0 | | 0 | 0 | | 0 | 1 | | 1 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. 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 |
| Frt | | 0.883 | | | | | | | | | 0.999 | |
| Flt Protected | | 0.994 | | | | | 0.950 | | | | | |
| Satd. Flow (prot) | 0 | 1635 | 0 | 0 | 1863 | 0 | 1770 | 1863 | 1863 | 1863 | 1861 | 0 |
| Flt Permitted | | 0.994 | | | | | 0.950 | | | | | |
| Satd. Flow (perm) | 0 | 1635 | 0 | 0 | 1863 | 0 | 1770 | 1863 | 1863 | 1863 | 1861 | 0 |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 501 | | | 660 | | | 450 | | | 300 | |
| Travel Time (s) | | 11.4 | | | 15.0 | | | 10.2 | | | 6.8 | |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.88 | 0.78 | 0.78 | 0.88 | 0.78 |
| Adj. Flow (vph) | 9 | 0 | 60 | 0 | 0 | 0 | 19 | 316 | 0 | 0 | 343 | 3 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 69 | 0 | 0 | 0 | 0 | 19 | 316 | 0 | 0 | 346 | 0 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 60 | | 60 | 60 | | 60 | 60 | | 60 | 60 | | 60 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Intersection Summary | | | | | | | | | | | | |
| Area Type: | Other | | | | | | | | | | | |
| Control Type: | Unsignalized | | | | | | | | | | | |
| Intersection Capacity Utilization | 26.0% | | | | | | ICU Level of Service A | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |

| Intersection | | | | | | | | | | | | |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh | 1.3 | | | | | | | | | | | |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | | ↔ | | | ↔ | | ↖ | ↑ | ↗ | ↖ | ↗ | |
| Traffic Vol, veh/h | 7 | 0 | 47 | 0 | 0 | 0 | 15 | 278 | 0 | 0 | 302 | 2 |
| Future Vol, veh/h | 7 | 0 | 47 | 0 | 0 | 0 | 15 | 278 | 0 | 0 | 302 | 2 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 150 | - | 150 | 150 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 88 | 78 | 78 | 88 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 9 | 0 | 60 | 0 | 0 | 0 | 19 | 316 | 0 | 0 | 343 | 3 |











| Major/Minor | Minor2 | | Minor1 | | Major1 | | Major2 | | | | | |
|----------------------|--------|-------|--------|-------|--------|-------|--------|---|---|-------|---|---|
| Conflicting Flow All | 699 | 699 | 345 | 729 | 700 | 316 | 346 | 0 | 0 | 316 | 0 | 0 |
| Stage 1 | 345 | 345 | - | 354 | 354 | - | - | - | - | - | - | - |
| Stage 2 | 354 | 354 | - | 375 | 346 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 354 | 364 | 698 | 338 | 363 | 724 | 1213 | - | - | 1244 | - | - |
| Stage 1 | 671 | 636 | - | 663 | 630 | - | - | - | - | - | - | - |
| Stage 2 | 663 | 630 | - | 646 | 635 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 350 | 358 | 698 | 305 | 357 | 724 | 1213 | - | - | 1244 | - | - |
| Mov Cap-2 Maneuver | 350 | 358 | - | 305 | 357 | - | - | - | - | - | - | - |
| Stage 1 | 660 | 636 | - | 652 | 620 | - | - | - | - | - | - | - |
| Stage 2 | 653 | 620 | - | 590 | 635 | - | - | - | - | - | - | - |





| Approach | EB | | WB | | NB | | SB | |
|----------------------|------|--|----|--|-----|--|----|--|
| HCM Control Delay, s | 11.6 | | 0 | | 0.5 | | 0 | |
| HCM LOS | B | | A | | | | | |

| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1WBLn1 | SBL | SBT | SBR |
|-----------------------|-------|-----|-----|------------|-----|------|-----|
| Capacity (veh/h) | 1213 | - | - | 618 | - | 1244 | - |
| HCM Lane V/C Ratio | 0.016 | - | - | 0.112 | - | - | - |
| HCM Control Delay (s) | 8 | - | - | 11.6 | 0 | 0 | - |
| HCM Lane LOS | A | - | - | B | A | A | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0.4 | - | 0 | - |

Lanes, Volumes, Timings
15: Walden Street & 105th Place

















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10/19/2023





| |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations |  | |  | |  |  |
| Traffic Volume (vph) | 0 | 1 | 277 | 0 | 1 | 226 |
| Future Volume (vph) | 0 | 1 | 277 | 0 | 1 | 226 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | 0 | | 0 | 100 | |
| Storage Lanes | 1 | 0 | | 0 | 1 | |
| Taper Length (ft) | 25 | | | | 25 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.865 | | | | | |
| Flt Protected | | | | | 0.950 | |
| Satd. Flow (prot) | 1611 | 0 | 1863 | 0 | 1770 | 1863 |
| Flt Permitted | | | | | 0.950 | |
| Satd. Flow (perm) | 1611 | 0 | 1863 | 0 | 1770 | 1863 |
| Link Speed (mph) | 30 | | 25 | | | 25 |
| Link Distance (ft) | 229 | | 280 | | | 395 |
| Travel Time (s) | 5.2 | | 7.6 | | | 10.8 |
| Peak Hour Factor | 0.78 | 0.78 | 0.87 | 0.78 | 0.78 | 0.87 |
| Adj. Flow (vph) | 0 | 1 | 318 | 0 | 1 | 260 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 1 | 0 | 318 | 0 | 1 | 260 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(ft) | 12 | | 12 | | | 12 |
| Link Offset(ft) | 0 | | 0 | | | 0 |
| Crosswalk Width(ft) | 16 | | 16 | | | 16 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 9 | | 9 | 15 | |
| Sign Control | Stop | | Free | | | Free |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 24.6% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

| Intersection | | | | | | |
|--------------------------|---|----------|---|--------|---|---|
| Int Delay, s/veh | 0 | | | | | |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations |  | |  | |  |  |
| Traffic Vol, veh/h | 0 | 1 | 277 | 0 | 1 | 226 |
| Future Vol, veh/h | 0 | 1 | 277 | 0 | 1 | 226 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 100 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 78 | 78 | 87 | 78 | 78 | 87 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 1 | 318 | 0 | 1 | 260 |
| | | | | | | |
| Major/Minor | Minor1 | Major1 | | Major2 | | |
| Conflicting Flow All | 580 | 318 | 0 | 0 | 318 | 0 |
| Stage 1 | 318 | - | - | - | - | - |
| Stage 2 | 262 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.12 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | 477 | 723 | - | - | 1242 | - |
| Stage 1 | 738 | - | - | - | - | - |
| Stage 2 | 782 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 477 | 723 | - | - | 1242 | - |
| Mov Cap-2 Maneuver | 477 | - | - | - | - | - |
| Stage 1 | 738 | - | - | - | - | - |
| Stage 2 | 781 | - | - | - | - | - |
| | | | | | | |
| | | | | | | |
| Approach | WB | NB | | SB | | |
| HCM Control Delay, s | 10 | 0 | | 0 | | |
| HCM LOS | B | | | | | |
| | | | | | | |
| Minor Lane/Major Mvmt | NBT | NBRWBLn1 | | SBL | SBT | |
| Capacity (veh/h) | - | - | 723 | 1242 | - | |
| HCM Lane V/C Ratio | - | - | 0.002 | 0.001 | - | |
| HCM Control Delay (s) | - | - | 10 | 7.9 | - | |
| HCM Lane LOS | - | - | B | A | - | |
| HCM 95th %tile Q(veh) | - | - | 0 | 0 | - | |

Lanes, Volumes, Timings
16: Yampa Street & 105th Avenue

JR Engineering
10/19/2023





| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Volume (vph) | 0 | 9 | 0 | 0 | 19 | 17 | 0 | 6 | 0 | 1 | 1 | 0 |
| Future Volume (vph) | 0 | 9 | 0 | 0 | 19 | 17 | 0 | 6 | 0 | 1 | 1 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. 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 |
| Frt | 0.935 | | | | | | | | | | | |
| Flt Protected | | | | | | | | | | | 0.976 | |
| Satd. Flow (prot) | 0 | 1863 | 0 | 0 | 1742 | 0 | 0 | 1863 | 0 | 0 | 1818 | 0 |
| Flt Permitted | | | | | | | | | | | 0.976 | |
| Satd. Flow (perm) | 0 | 1863 | 0 | 0 | 1742 | 0 | 0 | 1863 | 0 | 0 | 1818 | 0 |
| Link Speed (mph) | 25 | | | | 30 | | | | 30 | | | |
| Link Distance (ft) | 660 | | | | 660 | | | | 300 | | | |
| Travel Time (s) | 18.0 | | | | 15.0 | | | | 6.8 | | | |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 |
| Adj. Flow (vph) | 0 | 12 | 0 | 0 | 24 | 22 | 0 | 8 | 0 | 1 | 1 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 12 | 0 | 0 | 46 | 0 | 0 | 8 | 0 | 0 | 2 | 0 |
| 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 | | | | 0 | | | |
| Link Offset(ft) | 0 | | | | 0 | | | | 0 | | | |
| Crosswalk Width(ft) | 16 | | | | 16 | | | | 16 | | | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway 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 |
| Turning Speed (mph) | 60 | | 60 | 60 | | 60 | 60 | | 60 | 60 | | 60 |
| Sign Control | Free | | | | Free | | | | Stop | | | |
| Intersection Summary | | | | | | | | | | | | |
| Area Type: | Other | | | | | | | | | | | |
| Control Type: | Unsignalized | | | | | | | | | | | |
| Intersection Capacity Utilization | 13.3% | | | | ICU Level of Service A | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |

| Intersection | | | | | | | | | | | | |
|--------------------------|--------|---|------|--------|---|------|--------|---|-------|--------|---|-------|
| Int Delay, s/veh | 1.4 | | | | | | | | | | | |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Vol, veh/h | 0 | 9 | 0 | 0 | 19 | 17 | 0 | 6 | 0 | 1 | 1 | 0 |
| Future Vol, veh/h | 0 | 9 | 0 | 0 | 19 | 17 | 0 | 6 | 0 | 1 | 1 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 12 | 0 | 0 | 24 | 22 | 0 | 8 | 0 | 1 | 1 | 0 |
| | | | | | | | | | | | | |
| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
| Conflicting Flow All | 46 | 0 | 0 | 12 | 0 | 0 | 48 | 58 | 12 | 51 | 47 | 35 |
| Stage 1 | - | - | - | - | - | - | 12 | 12 | - | 35 | 35 | - |
| Stage 2 | - | - | - | - | - | - | 36 | 46 | - | 16 | 12 | - |
| Critical Hdwy | 4.12 | - | - | 4.12 | - | - | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Follow-up Hdwy | 2.218 | - | - | 2.218 | - | - | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 |
| Pot Cap-1 Maneuver | 1562 | - | - | 1607 | - | - | 953 | 833 | 1069 | 948 | 845 | 1038 |
| Stage 1 | - | - | - | - | - | - | 1009 | 886 | - | 981 | 866 | - |
| Stage 2 | - | - | - | - | - | - | 980 | 857 | - | 1004 | 886 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 1562 | - | - | 1607 | - | - | 952 | 833 | 1069 | 941 | 845 | 1038 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 952 | 833 | - | 941 | 845 | - |
| Stage 1 | - | - | - | - | - | - | 1009 | 886 | - | 981 | 866 | - |
| Stage 2 | - | - | - | - | - | - | 979 | 857 | - | 995 | 886 | - |
| | | | | | | | | | | | | |
| Approach | EB | | | WB | | | NB | | | SB | | |
| HCM Control Delay, s | 0 | | | 0 | | | 9.4 | | | 9.1 | | |
| HCM LOS | | | | | | | A | | | A | | |
| | | | | | | | | | | | | |
| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 | | | | |
| Capacity (veh/h) | 833 | 1562 | - | - | 1607 | - | - | 890 | | | | |
| HCM Lane V/C Ratio | 0.009 | - | - | - | - | - | - | 0.003 | | | | |
| HCM Control Delay (s) | 9.4 | 0 | - | - | 0 | - | - | 9.1 | | | | |
| HCM Lane LOS | A | A | - | - | A | - | - | A | | | | |
| HCM 95th %tile Q(veh) | 0 | 0 | - | - | 0 | - | - | 0 | | | | |

Lanes, Volumes, Timings
17: Yampa Street & Homestead Trail





JR Engineering
10/19/2023



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|---|---|------|---|---|-------|
| Lane Configurations |  |  | |  |  | |
| Traffic Volume (vph) | 14 | 1 | 1 | 23 | 2 | 6 |
| Future Volume (vph) | 14 | 1 | 1 | 23 | 2 | 6 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 100 | 0 | 0 | | | 0 |
| Storage Lanes | 1 | 1 | 0 | | | 0 |
| Taper Length (ft) | 25 | | 25 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | 0.902 | |
| Flt Protected | 0.950 | | | 0.998 | | |
| Satd. Flow (prot) | 1770 | 1583 | 0 | 1859 | 1680 | 0 |
| Flt Permitted | 0.950 | | | 0.998 | | |
| Satd. Flow (perm) | 1770 | 1583 | 0 | 1859 | 1680 | 0 |
| Link Speed (mph) | 25 | | | 30 | 30 | |
| Link Distance (ft) | 666 | | | 181 | 194 | |
| Travel Time (s) | 18.2 | | | 4.1 | 4.4 | |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 |
| Adj. Flow (vph) | 18 | 1 | 1 | 29 | 3 | 8 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 18 | 1 | 0 | 30 | 11 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 12 | | | 0 | 0 | |
| Link Offset(ft) | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 9 | 15 | | | 9 |
| Sign Control | Stop | | | Stop | Stop | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 13.3% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

Intersection

| | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.3 |
| Intersection LOS | A |

























| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---------------------|---|---|------|---|---|------|
| Lane Configurations |  |  | |  |  | |
| Traffic Vol, veh/h | 14 | 1 | 1 | 23 | 2 | 6 |
| Future Vol, veh/h | 14 | 1 | 1 | 23 | 2 | 6 |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 18 | 1 | 1 | 29 | 3 | 8 |
| Number of Lanes | 1 | 1 | 0 | 1 | 1 | 0 |

| Approach | EB | NB | SB |
|----------------------------|-----|-----|-----|
| Opposing Approach | | SB | NB |
| Opposing Lanes | 0 | 1 | 1 |
| Conflicting Approach Left | SB | EB | |
| Conflicting Lanes Left | 1 | 2 | 0 |
| Conflicting Approach Right | NB | | EB |
| Conflicting Lanes Right | 1 | 0 | 2 |
| HCM Control Delay | 7.9 | 7.1 | 6.6 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | EBLn2 | SBLn1 |
|------------------------|-------|-------|-------|-------|
| Vol Left, % | 4% | 100% | 0% | 0% |
| Vol Thru, % | 96% | 0% | 0% | 25% |
| Vol Right, % | 0% | 0% | 100% | 75% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 24 | 14 | 1 | 8 |
| LT Vol | 1 | 14 | 0 | 0 |
| Through Vol | 23 | 0 | 0 | 2 |
| RT Vol | 0 | 0 | 1 | 6 |
| Lane Flow Rate | 31 | 18 | 1 | 10 |
| Geometry Grp | 2 | 7 | 7 | 2 |
| Degree of Util (X) | 0.034 | 0.025 | 0.001 | 0.01 |
| Departure Headway (Hd) | 3.983 | 5.105 | 3.904 | 3.54 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 900 | 703 | 918 | 1011 |
| Service Time | 2.001 | 2.82 | 1.62 | 1.563 |
| HCM Lane V/C Ratio | 0.034 | 0.026 | 0.001 | 0.01 |
| HCM Control Delay | 7.1 | 8 | 6.6 | 6.6 |
| HCM Lane LOS | A | A | A | A |
| HCM 95th-tile Q | 0.1 | 0.1 | 0 | 0 |













Lanes, Volumes, Timings
1: Tower Road & 104th Avenue

JR Engineering
10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 127 | 165 | 437 | 24 | 215 | 19 | 642 | 900 | 29 | 11 | 536 | 85 |
| Future Volume (vph) | 127 | 165 | 437 | 24 | 215 | 19 | 642 | 900 | 29 | 11 | 536 | 85 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 350 | | 590 | 330 | | 440 | 320 | | 290 | 290 | | 190 |
| Storage Lanes | 1 | | 1 | 1 | | 1 | 2 | | 1 | 1 | | 1 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frt | | | 0.850 | | | 0.850 | | | 0.850 | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1770 | 5085 | 1583 | 1770 | 5085 | 1583 | 3433 | 3539 | 1583 | 1770 | 3539 | 1583 |
| Flt Permitted | 0.387 | | | 0.623 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 721 | 5085 | 1583 | 1160 | 5085 | 1583 | 3433 | 3539 | 1583 | 1770 | 3539 | 1583 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 497 | | | 264 | | | 182 | | | 256 |
| Link Speed (mph) | | 45 | | | 45 | | | 45 | | | 45 | |
| Link Distance (ft) | | 660 | | | 1515 | | | 645 | | | 450 | |
| Travel Time (s) | | 10.0 | | | 23.0 | | | 9.8 | | | 6.8 | |
| Peak Hour Factor | 0.83 | 0.84 | 0.88 | 0.78 | 0.87 | 0.78 | 0.92 | 0.92 | 0.78 | 0.78 | 0.92 | 0.80 |
| Adj. Flow (vph) | 153 | 196 | 497 | 31 | 247 | 24 | 698 | 978 | 37 | 14 | 583 | 106 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 153 | 196 | 497 | 31 | 247 | 24 | 698 | 978 | 37 | 14 | 583 | 106 |
| 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) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway 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 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 |
| Detector Template | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Leading Detector (ft) | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 |
| Trailing Detector (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Position(ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Size(ft) | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | 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 | 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 | 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 | 0.0 | 0.0 | 0.0 |
| Detector 2 Position(ft) | | 94 | | | 94 | | | 94 | | | 94 | |
| 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 | pm+pt | NA | Perm | pm+pt | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | 8 | | 8 | | | 2 | | | 6 |

Lanes, Volumes, Timings
1: Tower Road & 104th Avenue

JR Engineering
10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Detector Phase | 7 | 4 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 8.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 |
| Minimum Split (s) | 15.4 | 17.4 | 17.4 | 15.4 | 17.4 | 17.4 | 16.2 | 18.2 | 18.2 | 16.2 | 18.2 | 18.2 |
| Total Split (s) | 26.0 | 25.0 | 25.0 | 21.0 | 20.0 | 20.0 | 45.0 | 57.0 | 57.0 | 17.0 | 29.0 | 29.0 |
| Total Split (%) | 21.7% | 20.8% | 20.8% | 17.5% | 16.7% | 16.7% | 37.5% | 47.5% | 47.5% | 14.2% | 24.2% | 24.2% |
| Maximum Green (s) | 18.6 | 17.6 | 17.6 | 13.6 | 12.6 | 12.6 | 36.8 | 48.8 | 48.8 | 8.8 | 20.8 | 20.8 |
| Yellow Time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 |
| All-Red Time (s) | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Vehicle Extension (s) | 3.0 | 2.0 | 2.0 | 3.0 | 2.0 | 2.0 | 2.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 |
| Recall Mode | None | None | None | None | None | None | None | C-Max | C-Max | None | C-Max | C-Max |
| Act Effect Green (s) | 32.5 | 23.3 | 23.3 | 19.0 | 10.9 | 10.9 | 28.9 | 65.2 | 65.2 | 8.0 | 34.6 | 34.6 |
| Actuated g/C Ratio | 0.27 | 0.19 | 0.19 | 0.16 | 0.09 | 0.09 | 0.24 | 0.54 | 0.54 | 0.07 | 0.29 | 0.29 |
| v/c Ratio | 0.48 | 0.20 | 0.70 | 0.14 | 0.54 | 0.06 | 0.84 | 0.51 | 0.04 | 0.12 | 0.57 | 0.17 |
| Control Delay | 36.2 | 39.7 | 22.5 | 32.9 | 56.5 | 0.3 | 53.3 | 20.7 | 0.1 | 55.2 | 41.0 | 0.6 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 36.2 | 39.7 | 22.5 | 32.9 | 56.5 | 0.3 | 53.3 | 20.7 | 0.1 | 55.2 | 41.0 | 0.6 |
| LOS | D | D | C | C | E | A | D | C | A | E | D | A |
| Approach Delay | 29.0 | | | 49.6 | | | 33.5 | | | 35.2 | | |
| Approach LOS | C | | | D | | | C | | | D | | |

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 34.1

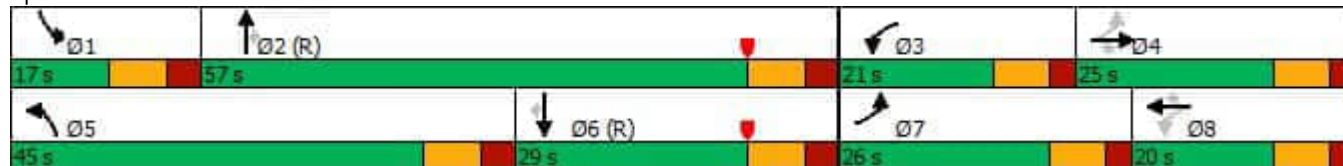
Intersection LOS: C

Intersection Capacity Utilization 74.5%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: Tower Road & 104th Avenue



Queues

JR Engineering

10/19/2023

1: Tower Road & 104th Avenue



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Group Flow (vph) | 153 | 196 | 497 | 31 | 247 | 24 | 698 | 978 | 37 | 14 | 583 | 106 |
| v/c Ratio | 0.48 | 0.20 | 0.70 | 0.14 | 0.54 | 0.06 | 0.84 | 0.51 | 0.04 | 0.12 | 0.57 | 0.17 |
| Control Delay | 36.2 | 39.7 | 22.5 | 32.9 | 56.5 | 0.3 | 53.3 | 20.7 | 0.1 | 55.2 | 41.0 | 0.6 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 36.2 | 39.7 | 22.5 | 32.9 | 56.5 | 0.3 | 53.3 | 20.7 | 0.1 | 55.2 | 41.0 | 0.6 |
| Queue Length 50th (ft) | 104 | 53 | 174 | 18 | 68 | 0 | 266 | 205 | 0 | 10 | 201 | 0 |
| Queue Length 95th (ft) | 141 | 69 | 252 | 34 | 93 | 0 | 314 | 392 | 0 | 28 | #330 | 0 |
| Internal Link Dist (ft) | | 580 | | | 1435 | | | 565 | | | 370 | |
| Turn Bay Length (ft) | 350 | | 590 | 330 | | 440 | 320 | | 290 | 290 | | 190 |
| Base Capacity (vph) | 358 | 994 | 709 | 305 | 536 | 403 | 1052 | 1924 | 943 | 129 | 1020 | 638 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.43 | 0.20 | 0.70 | 0.10 | 0.46 | 0.06 | 0.66 | 0.51 | 0.04 | 0.11 | 0.57 | 0.17 |

Intersection Summary

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
































Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary

1: Tower Road & 104th Avenue

JR Engineering

10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |    |  |  |    |  |   |   |  |  |   |  |
| Traffic Volume (veh/h) | 127 | 165 | 437 | 24 | 215 | 19 | 642 | 900 | 29 | 11 | 536 | 85 |
| Future Volume (veh/h) | 127 | 165 | 437 | 24 | 215 | 19 | 642 | 900 | 29 | 11 | 536 | 85 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 153 | 196 | 0 | 31 | 247 | 0 | 698 | 978 | 0 | 14 | 583 | 0 |
| Peak Hour Factor | 0.83 | 0.84 | 0.88 | 0.78 | 0.87 | 0.78 | 0.92 | 0.92 | 0.78 | 0.78 | 0.92 | 0.80 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 271 | 691 | | 235 | 426 | | 770 | 1908 | | 44 | 1205 | |
| Arrive On Green | 0.03 | 0.04 | 0.00 | 0.04 | 0.08 | 0.00 | 0.22 | 0.54 | 0.00 | 0.02 | 0.34 | 0.00 |
| Sat Flow, veh/h | 1781 | 5106 | 1585 | 1781 | 5106 | 1585 | 3456 | 3554 | 1585 | 1781 | 3554 | 1585 |
| Grp Volume(v), veh/h | 153 | 196 | 0 | 31 | 247 | 0 | 698 | 978 | 0 | 14 | 583 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1702 | 1585 | 1781 | 1702 | 1585 | 1728 | 1777 | 1585 | 1781 | 1777 | 1585 |
| Q Serve(g_s), s | 9.3 | 4.5 | 0.0 | 1.9 | 5.6 | 0.0 | 23.6 | 21.1 | 0.0 | 0.9 | 15.6 | 0.0 |
| Cycle Q Clear(g_c), s | 9.3 | 4.5 | 0.0 | 1.9 | 5.6 | 0.0 | 23.6 | 21.1 | 0.0 | 0.9 | 15.6 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 271 | 691 | | 235 | 426 | | 770 | 1908 | | 44 | 1205 | |
| V/C Ratio(X) | 0.57 | 0.28 | | 0.13 | 0.58 | | 0.91 | 0.51 | | 0.32 | 0.48 | |
| Avail Cap(c_a), veh/h | 378 | 749 | | 361 | 536 | | 1060 | 1908 | | 131 | 1205 | |
| HCM Platoon Ratio | 0.33 | 0.33 | 0.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 46.9 | 51.7 | 0.0 | 46.6 | 53.0 | 0.0 | 45.4 | 17.8 | 0.0 | 57.5 | 31.4 | 0.0 |
| Incr Delay (d2), s/veh | 1.9 | 0.1 | 0.0 | 0.3 | 0.5 | 0.0 | 7.2 | 1.0 | 0.0 | 1.5 | 1.4 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 4.4 | 1.9 | 0.0 | 0.8 | 2.4 | 0.0 | 10.5 | 8.3 | 0.0 | 0.4 | 6.7 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 48.7 | 51.8 | 0.0 | 46.9 | 53.4 | 0.0 | 52.6 | 18.7 | 0.0 | 59.0 | 32.8 | 0.0 |
| LnGrp LOS | D | D | | D | D | | D | B | | E | C | |
| Approach Vol, veh/h | | 349 | | | 278 | | | 1676 | | | 597 | |
| Approach Delay, s/veh | | 50.4 | | | 52.7 | | | 32.8 | | | 33.4 | |
| Approach LOS | | D | | | D | | | C | | | C | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 11.2 | 72.6 | 12.6 | 23.6 | 34.9 | 48.9 | 18.8 | 17.4 | | | | |
| Change Period (Y+Rc), s | 8.2 | 8.2 | 7.4 | 7.4 | 8.2 | 8.2 | 7.4 | 7.4 | | | | |
| Max Green Setting (Gmax), s | 8.8 | 48.8 | 13.6 | 17.6 | 36.8 | 20.8 | 18.6 | 12.6 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.9 | 23.1 | 3.9 | 6.5 | 25.6 | 17.6 | 11.3 | 7.6 | | | | |
| Green Ext Time (p_c), s | 0.0 | 12.5 | 0.0 | 0.5 | 1.1 | 1.6 | 0.2 | 0.4 | | | | |

Intersection Summary

| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 37.0 |
| HCM 6th LOS | D |

Notes

























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

Lanes, Volumes, Timings

2: Walden Street & 104th Avenue

JR Engineering













10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 34 | 595 | 133 | 21 | 825 | 105 | 181 | 41 | 38 | 101 | 16 | 38 |
| Future Volume (vph) | 34 | 595 | 133 | 21 | 825 | 105 | 181 | 41 | 38 | 101 | 16 | 38 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 400 | | 230 | 0 | | 250 | 230 | | 230 | 210 | | 140 |
| Storage Lanes | 1 | | 1 | 1 | | 1 | 1 | | 1 | 1 | | 1 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.850 | | | 0.850 | | | 0.850 | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1770 | 3539 | 1583 | 1770 | 3539 | 1583 | 1770 | 1863 | 1583 | 1770 | 1863 | 1583 |
| Flt Permitted | 0.248 | | | 0.380 | | | 0.496 | | | 0.722 | | |
| Satd. Flow (perm) | 462 | 3539 | 1583 | 708 | 3539 | 1583 | 924 | 1863 | 1583 | 1345 | 1863 | 1583 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 218 | | | 218 | | | 227 | | | 168 |
| Link Speed (mph) | | 45 | | | 45 | | | 30 | | | 30 | |
| Link Distance (ft) | | 900 | | | 660 | | | 652 | | | 450 | |
| Travel Time (s) | | 13.6 | | | 10.0 | | | 14.8 | | | 10.2 | |
| Peak Hour Factor | 0.78 | 0.92 | 0.83 | 0.78 | 0.92 | 0.83 | 0.84 | 0.78 | 0.78 | 0.82 | 0.78 | 0.78 |
| Adj. Flow (vph) | 44 | 647 | 160 | 27 | 897 | 127 | 215 | 53 | 49 | 123 | 21 | 49 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 44 | 647 | 160 | 27 | 897 | 127 | 215 | 53 | 49 | 123 | 21 | 49 |
| 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) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway 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 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 |
| Detector Template | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Leading Detector (ft) | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 |
| Trailing Detector (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Position(ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Size(ft) | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | 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 | 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 | 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 | 0.0 | 0.0 | 0.0 |
| Detector 2 Position(ft) | | 94 | | | 94 | | | 94 | | | 94 | |
| 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 | pm+pt | NA | Perm | pm+pt | NA | Perm | pm+pt | NA | Perm | pm+pt | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | 2 | | 2 | 6 | | 6 | 8 | | 8 | 4 | | 4 |

Lanes, Volumes, Timings

2: Walden Street & 104th Avenue

JR Engineering
10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 6 | 3 | 8 | 8 | 7 | 4 | 4 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 |
| Minimum Split (s) | 12.5 | 17.5 | 17.5 | 12.5 | 17.5 | 17.5 | 14.5 | 16.5 | 16.5 | 14.5 | 16.5 | 16.5 |
| Total Split (s) | 18.0 | 57.0 | 57.0 | 13.0 | 52.0 | 52.0 | 25.0 | 17.0 | 17.0 | 33.0 | 25.0 | 25.0 |
| Total Split (%) | 15.0% | 47.5% | 47.5% | 10.8% | 43.3% | 43.3% | 20.8% | 14.2% | 14.2% | 27.5% | 20.8% | 20.8% |
| Maximum Green (s) | 10.5 | 49.5 | 49.5 | 5.5 | 44.5 | 44.5 | 18.5 | 10.5 | 10.5 | 26.5 | 18.5 | 18.5 |
| Yellow Time (s) | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| All-Red Time (s) | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Vehicle Extension (s) | 2.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Recall Mode | None | C-Max | C-Max | None | C-Max | C-Max | None | None | None | None | None | None |
| Act Effect Green (s) | 72.7 | 68.9 | 68.9 | 70.4 | 65.9 | 65.9 | 28.0 | 14.0 | 14.0 | 20.0 | 10.0 | 10.0 |
| Actuated g/C Ratio | 0.61 | 0.57 | 0.57 | 0.59 | 0.55 | 0.55 | 0.23 | 0.12 | 0.12 | 0.17 | 0.08 | 0.08 |
| v/c Ratio | 0.13 | 0.32 | 0.16 | 0.06 | 0.46 | 0.13 | 0.66 | 0.25 | 0.13 | 0.46 | 0.14 | 0.17 |
| Control Delay | 11.0 | 16.3 | 1.0 | 2.7 | 5.9 | 1.2 | 47.6 | 50.9 | 0.7 | 41.2 | 53.2 | 1.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 11.0 | 16.3 | 1.0 | 2.7 | 5.9 | 1.2 | 47.6 | 50.9 | 0.7 | 41.2 | 53.2 | 1.3 |
| LOS | B | B | A | A | A | A | D | D | A | D | D | A |
| Approach Delay | 13.1 | | 5.3 | | 40.9 | | 32.4 | | | | | |
| Approach LOS | B | | A | | D | | C | | | | | |

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 6 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 14.9

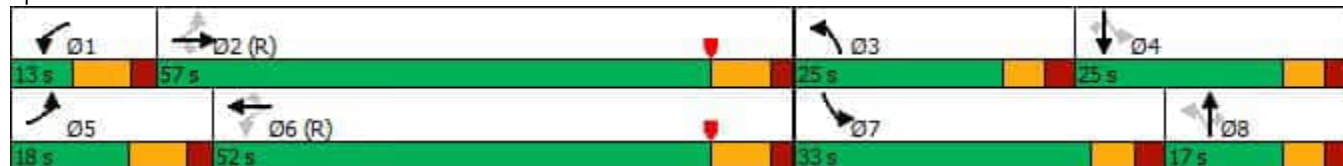
Intersection LOS: B

Intersection Capacity Utilization 58.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 2: Walden Street & 104th Avenue



Queues
2: Walden Street & 104th Avenue

JR Engineering
10/19/2023



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Group Flow (vph) | 44 | 647 | 160 | 27 | 897 | 127 | 215 | 53 | 49 | 123 | 21 | 49 |
| v/c Ratio | 0.13 | 0.32 | 0.16 | 0.06 | 0.46 | 0.13 | 0.66 | 0.25 | 0.13 | 0.46 | 0.14 | 0.17 |
| Control Delay | 11.0 | 16.3 | 1.0 | 2.7 | 5.9 | 1.2 | 47.6 | 50.9 | 0.7 | 41.2 | 53.2 | 1.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 11.0 | 16.3 | 1.0 | 2.7 | 5.9 | 1.2 | 47.6 | 50.9 | 0.7 | 41.2 | 53.2 | 1.3 |
| Queue Length 50th (ft) | 13 | 156 | 0 | 2 | 119 | 0 | 137 | 37 | 0 | 74 | 15 | 0 |
| Queue Length 95th (ft) | 25 | 210 | 4 | m3 | 142 | 8 | 191 | 69 | 0 | 112 | 36 | 0 |
| Internal Link Dist (ft) | | 820 | | | 580 | | | 572 | | | 370 | |
| Turn Bay Length (ft) | 400 | | 230 | | | 250 | 230 | | 230 | 210 | | 140 |
| Base Capacity (vph) | 403 | 2030 | 1001 | 466 | 1944 | 968 | 359 | 218 | 386 | 453 | 287 | 386 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.11 | 0.32 | 0.16 | 0.06 | 0.46 | 0.13 | 0.60 | 0.24 | 0.13 | 0.27 | 0.07 | 0.13 |

























Intersection Summary

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

HCM 6th Signalized Intersection Summary

2: Walden Street & 104th Avenue

JR Engineering
10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h) | 34 | 595 | 133 | 21 | 825 | 105 | 181 | 41 | 38 | 101 | 16 | 38 |
| Future Volume (veh/h) | 34 | 595 | 133 | 21 | 825 | 105 | 181 | 41 | 38 | 101 | 16 | 38 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | No | | | No | | | No | | | No | | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 44 | 647 | 160 | 27 | 897 | 127 | 215 | 53 | 49 | 123 | 21 | 49 |
| Peak Hour Factor | 0.78 | 0.92 | 0.83 | 0.78 | 0.92 | 0.83 | 0.84 | 0.78 | 0.78 | 0.82 | 0.78 | 0.78 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 282 | 1896 | 846 | 394 | 1870 | 834 | 380 | 243 | 206 | 308 | 156 | 132 |
| Arrive On Green | 0.03 | 0.53 | 0.53 | 0.01 | 0.17 | 0.17 | 0.12 | 0.13 | 0.13 | 0.08 | 0.08 | 0.08 |
| Sat Flow, veh/h | 1781 | 3554 | 1585 | 1781 | 3554 | 1585 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 44 | 647 | 160 | 27 | 897 | 127 | 215 | 53 | 49 | 123 | 21 | 49 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1585 | 1781 | 1777 | 1585 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 1.3 | 12.5 | 6.3 | 0.8 | 27.3 | 8.2 | 12.9 | 3.0 | 3.3 | 7.5 | 1.2 | 3.5 |
| Cycle Q Clear(g_c), s | 1.3 | 12.5 | 6.3 | 0.8 | 27.3 | 8.2 | 12.9 | 3.0 | 3.3 | 7.5 | 1.2 | 3.5 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 282 | 1896 | 846 | 394 | 1870 | 834 | 380 | 243 | 206 | 308 | 156 | 132 |
| V/C Ratio(X) | 0.16 | 0.34 | 0.19 | 0.07 | 0.48 | 0.15 | 0.57 | 0.22 | 0.24 | 0.40 | 0.13 | 0.37 |
| Avail Cap(c_a), veh/h | 380 | 1896 | 846 | 432 | 1870 | 834 | 432 | 243 | 206 | 561 | 288 | 244 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 15.4 | 16.0 | 14.5 | 13.1 | 34.8 | 26.9 | 41.8 | 46.8 | 46.9 | 45.3 | 51.0 | 52.0 |
| Incr Delay (d2), s/veh | 0.1 | 0.5 | 0.5 | 0.0 | 0.9 | 0.4 | 0.5 | 0.2 | 0.2 | 0.3 | 0.1 | 0.6 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.5 | 4.9 | 2.4 | 0.3 | 13.1 | 3.4 | 5.7 | 1.4 | 1.3 | 3.3 | 0.6 | 1.4 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 15.5 | 16.4 | 15.0 | 13.1 | 35.6 | 27.2 | 42.3 | 46.9 | 47.1 | 45.6 | 51.1 | 52.7 |
| LnGrp LOS | B | B | B | B | D | C | D | D | D | D | D | D |
| Approach Vol, veh/h | 851 | | | | 1051 | | | | 317 | | | |
| Approach Delay, s/veh | 16.1 | | | | 34.1 | | | | 43.9 | | | |
| Approach LOS | B | | | | C | | | | D | | | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 10.5 | 71.5 | 21.5 | 16.5 | 11.3 | 70.7 | 15.9 | 22.1 | | | | |
| Change Period (Y+Rc), s | * 7.5 | * 7.5 | 6.5 | 6.5 | * 7.5 | * 7.5 | 6.5 | 6.5 | | | | |
| Max Green Setting (Gmax), s | * 5.5 | * 50 | 18.5 | 18.5 | * 11 | * 45 | 26.5 | 10.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.8 | 14.5 | 14.9 | 5.5 | 3.3 | 29.3 | 9.5 | 5.3 | | | | |
| Green Ext Time (p_c), s | 0.0 | 10.4 | 0.1 | 0.1 | 0.0 | 8.9 | 0.1 | 0.1 | | | | |

Intersection Summary

| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 30.1 |
| HCM 6th LOS | C |

















Notes

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

Lanes, Volumes, Timings
3: Walden Street & 105th Avenue

JR Engineering

10/19/2023




















| |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Volume (vph) | 2 | 0 | 36 | 6 | 0 | 6 | 59 | 87 | 0 | 12 | 87 | 2 |
| Future Volume (vph) | 2 | 0 | 36 | 6 | 0 | 6 | 59 | 87 | 0 | 12 | 87 | 2 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. 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 |
| Frt | | 0.873 | | | 0.932 | | | | | | 0.997 | |
| Flt Protected | | 0.997 | | | 0.976 | | | 0.980 | | | 0.994 | |
| Satd. Flow (prot) | 0 | 1621 | 0 | 0 | 1694 | 0 | 0 | 1825 | 0 | 0 | 1846 | 0 |
| Flt Permitted | | 0.997 | | | 0.976 | | | 0.980 | | | 0.994 | |
| Satd. Flow (perm) | 0 | 1621 | 0 | 0 | 1694 | 0 | 0 | 1825 | 0 | 0 | 1846 | 0 |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | |
| Link Distance (ft) | | 500 | | | 660 | | | 300 | | | 280 | |
| Travel Time (s) | | 13.6 | | | 18.0 | | | 8.2 | | | 7.6 | |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.80 | 0.78 | 0.78 | 0.80 | 0.78 |
| Adj. Flow (vph) | 3 | 0 | 46 | 8 | 0 | 8 | 76 | 109 | 0 | 15 | 109 | 3 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 49 | 0 | 0 | 16 | 0 | 0 | 185 | 0 | 0 | 127 | 0 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Sign Control | | Yield | | | Yield | | | Yield | | | Yield | |
| Intersection Summary | | | | | | | | | | | | |
| Area Type: | Other | | | | | | | | | | | |
| Control Type: | Roundabout | | | | | | | | | | | |
| Intersection Capacity Utilization 24.5% | | | | | | | | | | | | |
| ICU Level of Service A | | | | | | | | | | | | |
| Analysis Period (min) 15 | | | | | | | | | | | | |

| Intersection | | | | |
|-----------------------------|-------|-------|-------|-------|
| Intersection Delay, s/veh | 3.7 | | | |
| Intersection LOS | A | | | |
| Approach | EB | WB | NB | SB |
| Entry Lanes | 1 | 1 | 1 | 1 |
| Conflicting Circle Lanes | 1 | 1 | 1 | 1 |
| Adj Approach Flow, veh/h | 49 | 16 | 185 | 127 |
| Demand Flow Rate, veh/h | 50 | 16 | 189 | 129 |
| Vehicles Circulating, veh/h | 134 | 192 | 18 | 86 |
| Vehicles Exiting, veh/h | 81 | 15 | 166 | 122 |
| Ped Vol Crossing Leg, #/h | 0 | 0 | 0 | 0 |
| Ped Cap Adj | 1.000 | 1.000 | 1.000 | 1.000 |
| Approach Delay, s/veh | 3.4 | 3.3 | 3.9 | 3.7 |
| Approach LOS | A | A | A | A |
| Lane | Left | Left | Left | Left |
| Designated Moves | LTR | LTR | LTR | LTR |
| Assumed Moves | LTR | LTR | LTR | LTR |
| RT Channelized | | | | |
| Lane Util | 1.000 | 1.000 | 1.000 | 1.000 |
| Follow-Up Headway, s | 2.609 | 2.609 | 2.609 | 2.609 |
| Critical Headway, s | 4.976 | 4.976 | 4.976 | 4.976 |
| Entry Flow, veh/h | 50 | 16 | 189 | 129 |
| Cap Entry Lane, veh/h | 1204 | 1134 | 1355 | 1264 |
| Entry HV Adj Factor | 0.980 | 1.000 | 0.978 | 0.983 |
| Flow Entry, veh/h | 49 | 16 | 185 | 127 |
| Cap Entry, veh/h | 1180 | 1134 | 1325 | 1243 |
| V/C Ratio | 0.042 | 0.014 | 0.140 | 0.102 |
| Control Delay, s/veh | 3.4 | 3.3 | 3.9 | 3.7 |
| LOS | A | A | A | A |
| 95th %tile Queue, veh | 0 | 0 | 0 | 0 |








Lanes, Volumes, Timings

4: Walden Street & Homestead Trail

JR Engineering
10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | |  |  | |  |  | |  |  | |
| Traffic Volume (vph) | 2 | 1 | 14 | 7 | 1 | 1 | 31 | 56 | 5 | 1 | 66 | 2 |
| Future Volume (vph) | 2 | 1 | 14 | 7 | 1 | 1 | 31 | 56 | 5 | 1 | 66 | 2 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | | 0 | 150 | | 0 | 150 | | 0 | 150 | | 0 |
| Storage Lanes | 0 | | 0 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. 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 |
| Frt | | 0.890 | | | 0.925 | | | 0.988 | | | 0.995 | |
| Flt Protected | | 0.993 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1646 | 0 | 1770 | 1723 | 0 | 1770 | 1840 | 0 | 1770 | 1853 | 0 |
| Flt Permitted | | 0.993 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 1646 | 0 | 1770 | 1723 | 0 | 1770 | 1840 | 0 | 1770 | 1853 | 0 |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | |
| Link Distance (ft) | | 500 | | | 666 | | | 395 | | | 595 | |
| Travel Time (s) | | 13.6 | | | 18.2 | | | 10.8 | | | 16.2 | |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.79 | 0.78 |
| Adj. Flow (vph) | 3 | 1 | 18 | 9 | 1 | 1 | 40 | 72 | 6 | 1 | 84 | 3 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 22 | 0 | 9 | 2 | 0 | 40 | 78 | 0 | 1 | 87 | 0 |
| 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) | | 12 | | | 12 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway 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 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Intersection Summary | | | | | | | | | | | | |
| Area Type: | Other | | | | | | | | | | | |
| Control Type: | Unsignalized | | | | | | | | | | | |
| Intersection Capacity Utilization | 18.4% | | | | | | ICU Level of Service A | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.9 |
| Intersection LOS | A |












| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---------------------|------|---|------|---|---|------|---|---|------|---|---|------|
| Lane Configurations | |  | |  |  | |  |  | |  |  | |
| Traffic Vol, veh/h | 2 | 1 | 14 | 7 | 1 | 1 | 31 | 56 | 5 | 1 | 66 | 2 |
| Future Vol, veh/h | 2 | 1 | 14 | 7 | 1 | 1 | 31 | 56 | 5 | 1 | 66 | 2 |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.79 | 0.78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 3 | 1 | 18 | 9 | 1 | 1 | 40 | 72 | 6 | 1 | 84 | 3 |
| Number of Lanes | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |






| Approach | EB | WB | NB | SB |
|----------------------------|-----|-----|-----|----|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 2 | 1 | 2 | 2 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 2 | 1 | 2 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 2 | 2 | 2 | 1 |
| HCM Control Delay | 7.7 | 8.1 | 7.9 | 8 |
| HCM LOS | A | A | A | A |

| Lane | NBLn1 | NBLn2 | EBLn1 | WBLn1 | WBLn2 | SBLn1 | SBLn2 |
|------------------------|-------|-------|-------|-------|-------|-------|-------|
| Vol Left, % | 100% | 0% | 12% | 100% | 0% | 100% | 0% |
| Vol Thru, % | 0% | 92% | 6% | 0% | 50% | 0% | 97% |
| Vol Right, % | 0% | 8% | 82% | 0% | 50% | 0% | 3% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 31 | 61 | 17 | 7 | 2 | 1 | 68 |
| LT Vol | 31 | 0 | 2 | 7 | 0 | 1 | 0 |
| Through Vol | 0 | 56 | 1 | 0 | 1 | 0 | 66 |
| RT Vol | 0 | 5 | 14 | 0 | 1 | 0 | 2 |
| Lane Flow Rate | 40 | 78 | 22 | 9 | 3 | 1 | 86 |
| Geometry Grp | 7 | 7 | 6 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.057 | 0.099 | 0.028 | 0.014 | 0.003 | 0.002 | 0.111 |
| Departure Headway (Hd) | 5.134 | 4.576 | 4.574 | 5.553 | 4.7 | 5.15 | 4.629 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 695 | 779 | 787 | 648 | 766 | 691 | 769 |
| Service Time | 2.885 | 2.327 | 2.575 | 3.253 | 2.401 | 2.913 | 2.391 |
| HCM Lane V/C Ratio | 0.058 | 0.1 | 0.028 | 0.014 | 0.004 | 0.001 | 0.112 |
| HCM Control Delay | 8.2 | 7.8 | 7.7 | 8.3 | 7.4 | 7.9 | 8 |
| HCM Lane LOS | A | A | A | A | A | A | A |
| HCM 95th-tile Q | 0.2 | 0.3 | 0.1 | 0 | 0 | 0 | 0.4 |

Lanes, Volumes, Timings
11: Tower Road & 105th Avenue





















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| |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|--|
| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | |  |  |  |  |  |
| Traffic Volume (vph) | 0 | 11 | 3 | 973 | 590 | 9 |
| Future Volume (vph) | 0 | 11 | 3 | 973 | 590 | 9 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 250 | 0 | 150 | | | 150 |
| Storage Lanes | 0 | 1 | 1 | | | 1 |
| Taper Length (ft) | 25 | | 25 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.865 | | | | 0.850 |
| Flt Protected | | | 0.950 | | | |
| Satd. Flow (prot) | 0 | 1611 | 1770 | 1863 | 1863 | 1583 |
| Flt Permitted | | | 0.950 | | | |
| Satd. Flow (perm) | 0 | 1611 | 1770 | 1863 | 1863 | 1583 |
| Link Speed (mph) | 30 | | | 30 | 30 | |
| Link Distance (ft) | 660 | | | 300 | 1403 | |
| Travel Time (s) | 15.0 | | | 6.8 | 31.9 | |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.92 | 0.92 | 0.78 |
| Adj. Flow (vph) | 0 | 14 | 4 | 1058 | 641 | 12 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 0 | 14 | 4 | 1058 | 641 | 12 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 0 | | | 12 | 12 | |
| Link Offset(ft) | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 60 | 60 | 60 | | | 60 |
| Sign Control | Stop | | | Free | Free | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 54.5% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

| Intersection | | | | | | |
|--------------------------|--------|---|---|---|---|---|
| Int Delay, s/veh | 0.1 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | |  |  |  |  |  |
| Traffic Vol, veh/h | 0 | 11 | 3 | 973 | 590 | 9 |
| Future Vol, veh/h | 0 | 11 | 3 | 973 | 590 | 9 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | 0 | 150 | - | - | 150 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 78 | 78 | 78 | 92 | 92 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 14 | 4 | 1058 | 641 | 12 |
| Major/Minor | Minor2 | Major1 | | Major2 | | |
| Conflicting Flow All | - | 641 | 653 | 0 | - | 0 |
| Stage 1 | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - |
| Critical Hdwy | - | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - |
| Follow-up Hdwy | - | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 0 | 475 | 934 | - | - | - |
| Stage 1 | 0 | - | - | - | - | - |
| Stage 2 | 0 | - | - | - | - | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | 475 | 934 | - | - | - |
| Mov Cap-2 Maneuver | - | - | - | - | - | - |
| Stage 1 | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - |
| Approach | EB | NB | | SB | | |
| HCM Control Delay, s | 12.8 | 0 | | 0 | | |
| HCM LOS | B | | | | | |
| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR | |
| Capacity (veh/h) | 934 | - | 475 | - | - | |
| HCM Lane V/C Ratio | 0.004 | - | 0.03 | - | - | |
| HCM Control Delay (s) | 8.9 | - | 12.8 | - | - | |
| HCM Lane LOS | A | - | B | - | - | |
| HCM 95th %tile Q(veh) | 0 | - | 0.1 | - | - | |

Lanes, Volumes, Timings
13: Yampa Street & 104th Avenue





















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| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  | | |  | | |  |
| Traffic Volume (vph) | 1 | 718 | 5 | 17 | 910 | 1 | 0 | 0 | 4 | 0 | 0 | 1 |
| Future Volume (vph) | 1 | 718 | 5 | 17 | 910 | 1 | 0 | 0 | 4 | 0 | 0 | 1 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 150 | | 150 | 150 | | 0 | 0 | | 0 | 0 | | 0 |
| Storage Lanes | 1 | | 1 | 1 | | 1 | 0 | | 1 | 0 | | 1 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.850 | | | 0.850 | | | 0.865 | | | 0.865 |
| Flt Protected | 0.950 | | | 0.950 | | | | | | | | |
| Satd. Flow (prot) | 1770 | 5085 | 1583 | 1770 | 5085 | 1583 | 0 | 0 | 1611 | 0 | 0 | 1611 |
| Flt Permitted | 0.950 | | | 0.950 | | | | | | | | |
| Satd. Flow (perm) | 1770 | 5085 | 1583 | 1770 | 5085 | 1583 | 0 | 0 | 1611 | 0 | 0 | 1611 |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 660 | | | 660 | | | 636 | | | 450 | |
| Travel Time (s) | | 15.0 | | | 15.0 | | | 14.5 | | | 10.2 | |
| Peak Hour Factor | 0.78 | 0.92 | 0.78 | 0.78 | 0.92 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 |
| Adj. Flow (vph) | 1 | 780 | 6 | 22 | 989 | 1 | 0 | 0 | 5 | 0 | 0 | 1 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 1 | 780 | 6 | 22 | 989 | 1 | 0 | 0 | 5 | 0 | 0 | 1 |
| 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) | | 12 | | | 12 | | | 0 | | | 0 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway 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 |
| Turning Speed (mph) | 60 | | 60 | 60 | | 60 | 60 | | 60 | 60 | | 60 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Intersection Summary | | | | | | | | | | | | |
| Area Type: | Other | | | | | | | | | | | |
| Control Type: | Unsignalized | | | | | | | | | | | |
| Intersection Capacity Utilization | 27.6% | | | | | | ICU Level of Service A | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |

| Intersection | | | | | | | | | | | | |
|--------------------------|---|---|---|---|---|---|--------|-------|---|--------|------|---|
| Int Delay, s/veh | 0.2 | | | | | | | | | | | |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  | | |  | | |  |
| Traffic Vol, veh/h | 1 | 718 | 5 | 17 | 910 | 1 | 0 | 0 | 4 | 0 | 0 | 1 |
| Future Vol, veh/h | 1 | 718 | 5 | 17 | 910 | 1 | 0 | 0 | 4 | 0 | 0 | 1 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | 150 | - | 150 | 150 | - | 0 | - | - | 0 | - | - | 0 |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 78 | 92 | 78 | 78 | 92 | 78 | 78 | 78 | 78 | 78 | 78 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 1 | 780 | 6 | 22 | 989 | 1 | 0 | 0 | 5 | 0 | 0 | 1 |
| | | | | | | | | | | | | |
| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
| Conflicting Flow All | 990 | 0 | 0 | 786 | 0 | 0 | - | - | 390 | - | - | 495 |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy | 5.34 | - | - | 5.34 | - | - | - | - | 7.14 | - | - | 7.14 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.12 | - | - | 3.12 | - | - | - | - | 3.92 | - | - | 3.92 |
| Pot Cap-1 Maneuver | 396 | - | - | 496 | - | - | 0 | 0 | 520 | 0 | 0 | 445 |
| Stage 1 | - | - | - | - | - | - | 0 | 0 | - | 0 | 0 | - |
| Stage 2 | - | - | - | - | - | - | 0 | 0 | - | 0 | 0 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 396 | - | - | 496 | - | - | - | - | 520 | - | - | 445 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | | | | | |
| Approach | EB | | | WB | | | NB | | | SB | | |
| HCM Control Delay, s | 0 | | | 0.3 | | | 12 | | | 13.1 | | |
| HCM LOS | | | | | | | B | | | B | | |
| | | | | | | | | | | | | |
| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 | | | | |
| Capacity (veh/h) | 520 | 396 | - | - | 496 | - | - | 445 | | | | |
| HCM Lane V/C Ratio | 0.01 | 0.003 | - | - | 0.044 | - | - | 0.003 | | | | |
| HCM Control Delay (s) | 12 | 14.1 | - | - | 12.6 | - | - | 13.1 | | | | |
| HCM Lane LOS | B | B | - | - | B | - | - | B | | | | |
| HCM 95th %tile Q(veh) | 0 | 0 | - | - | 0.1 | - | - | 0 | | | | |

Lanes, Volumes, Timings
14: Walden Street & 104th Way











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| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | |  |  |  |  |  |  |
| Traffic Volume (vph) | 3 | 0 | 26 | 0 | 0 | 0 | 33 | 144 | 0 | 0 | 127 | 2 |
| Future Volume (vph) | 3 | 0 | 26 | 0 | 0 | 0 | 33 | 144 | 0 | 0 | 127 | 2 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 150 | | 150 | 150 | | 0 |
| Storage Lanes | 0 | | 0 | 0 | | 0 | 1 | | 1 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. 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 |
| Frt | | 0.880 | | | | | | | | | 0.997 | |
| Flt Protected | | 0.995 | | | | | 0.950 | | | | | |
| Satd. Flow (prot) | 0 | 1631 | 0 | 0 | 1863 | 0 | 1770 | 1863 | 1863 | 1863 | 1857 | 0 |
| Flt Permitted | | 0.995 | | | | | 0.950 | | | | | |
| Satd. Flow (perm) | 0 | 1631 | 0 | 0 | 1863 | 0 | 1770 | 1863 | 1863 | 1863 | 1857 | 0 |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 501 | | | 660 | | | 450 | | | 300 | |
| Travel Time (s) | | 11.4 | | | 15.0 | | | 10.2 | | | 6.8 | |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.84 | 0.78 | 0.78 | 0.84 | 0.78 |
| Adj. Flow (vph) | 4 | 0 | 33 | 0 | 0 | 0 | 42 | 171 | 0 | 0 | 151 | 3 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 37 | 0 | 0 | 0 | 0 | 42 | 171 | 0 | 0 | 154 | 0 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 60 | | 60 | 60 | | 60 | 60 | | 60 | 60 | | 60 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Intersection Summary | | | | | | | | | | | | |
| Area Type: | Other | | | | | | | | | | | |
| Control Type: | Unsignalized | | | | | | | | | | | |
| Intersection Capacity Utilization | 24.2% | | | | | | ICU Level of Service A | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |

| Intersection | | | | | | | | | | | | |
|--------------------------|--------|---|--------|------------|---|-------|---|---|---|---|---|------|
| Int Delay, s/veh | 1.7 | | | | | | | | | | | |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | |  |  |  |  |  | |
| Traffic Vol, veh/h | 3 | 0 | 26 | 0 | 0 | 0 | 33 | 144 | 0 | 0 | 127 | 2 |
| Future Vol, veh/h | 3 | 0 | 26 | 0 | 0 | 0 | 33 | 144 | 0 | 0 | 127 | 2 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 150 | - | 150 | 150 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 84 | 78 | 78 | 84 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 4 | 0 | 33 | 0 | 0 | 0 | 42 | 171 | 0 | 0 | 151 | 3 |
| | | | | | | | | | | | | |
| Major/Minor | Minor2 | | Minor1 | | Major1 | | Major2 | | | | | |
| Conflicting Flow All | 408 | 408 | 153 | 424 | 409 | 171 | 154 | 0 | 0 | 171 | 0 | 0 |
| Stage 1 | 153 | 153 | - | 255 | 255 | - | - | - | - | - | - | - |
| Stage 2 | 255 | 255 | - | 169 | 154 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 554 | 533 | 893 | 540 | 532 | 873 | 1426 | - | - | 1406 | - | - |
| Stage 1 | 849 | 771 | - | 749 | 696 | - | - | - | - | - | - | - |
| Stage 2 | 749 | 696 | - | 833 | 770 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 542 | 518 | 893 | 508 | 517 | 873 | 1426 | - | - | 1406 | - | - |
| Mov Cap-2 Maneuver | 542 | 518 | - | 508 | 517 | - | - | - | - | - | - | - |
| Stage 1 | 824 | 771 | - | 727 | 676 | - | - | - | - | - | - | - |
| Stage 2 | 727 | 676 | - | 802 | 770 | - | - | - | - | - | - | - |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| Approach | EB | | WB | | NB | | SB | | | | | |
| HCM Control Delay, s | 9.5 | | 0 | | 1.5 | | 0 | | | | | |
| HCM LOS | A | | A | | | | | | | | | |
| | | | | | | | | | | | | |
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1WBLn1 | SBL | SBT | SBR | | | | | |
| Capacity (veh/h) | 1426 | - | - | 837 | - | 1406 | - | - | | | | |
| HCM Lane V/C Ratio | 0.03 | - | - | 0.044 | - | - | - | - | | | | |
| HCM Control Delay (s) | 7.6 | - | - | 9.5 | 0 | 0 | - | - | | | | |
| HCM Lane LOS | A | - | - | A | A | A | - | - | | | | |
| HCM 95th %tile Q(veh) | 0.1 | - | - | 0.1 | - | 0 | - | - | | | | |

Lanes, Volumes, Timings
15: Walden Street & 105th Place

JR Engineering
10/19/2023

| |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations |  | |  | |  |  |
| Traffic Volume (vph) | 0 | 1 | 93 | 0 | 1 | 99 |
| Future Volume (vph) | 0 | 1 | 93 | 0 | 1 | 99 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | 0 | | 0 | 100 | |
| Storage Lanes | 1 | 0 | | 0 | 1 | |
| Taper Length (ft) | 25 | | | | 25 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.865 | | | | | |
| Flt Protected | | | | | 0.950 | |
| Satd. Flow (prot) | 1611 | 0 | 1863 | 0 | 1770 | 1863 |
| Flt Permitted | | | | | 0.950 | |
| Satd. Flow (perm) | 1611 | 0 | 1863 | 0 | 1770 | 1863 |
| Link Speed (mph) | 30 | | 30 | | | 30 |
| Link Distance (ft) | 229 | | 280 | | | 395 |
| Travel Time (s) | 5.2 | | 6.4 | | | 9.0 |
| Peak Hour Factor | 0.78 | 0.78 | 0.80 | 0.78 | 0.78 | 0.80 |
| Adj. Flow (vph) | 0 | 1 | 116 | 0 | 1 | 124 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 1 | 0 | 116 | 0 | 1 | 124 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(ft) | 12 | | 12 | | | 12 |
| Link Offset(ft) | 0 | | 0 | | | 0 |
| Crosswalk Width(ft) | 16 | | 16 | | | 16 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 60 | 60 | | 60 | 60 | |
| Sign Control | Stop | | Free | | | Free |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 15.2% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

| Intersection | | | | | | |
|--------------------------|---|------|---|------|---|---|
| Int Delay, s/veh | 0.1 | | | | | |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations |  | |  | |  |  |
| Traffic Vol, veh/h | 0 | 1 | 93 | 0 | 1 | 99 |
| Future Vol, veh/h | 0 | 1 | 93 | 0 | 1 | 99 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 100 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 78 | 78 | 80 | 78 | 78 | 80 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 1 | 116 | 0 | 1 | 124 |

















| Major/Minor | Minor1 | Major1 | Major2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 242 | 116 | 0 |
| Stage 1 | 116 | - | - |
| Stage 2 | 126 | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 |
| Critical Hdwy Stg 1 | 5.42 | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 |
| Pot Cap-1 Maneuver | 746 | 936 | 1473 |
| Stage 1 | 909 | - | - |
| Stage 2 | 900 | - | - |
| Platoon blocked, % | | - | - |
| Mov Cap-1 Maneuver | 745 | 936 | 1473 |
| Mov Cap-2 Maneuver | 745 | - | - |
| Stage 1 | 909 | - | - |
| Stage 2 | 899 | - | - |





| Approach | WB | NB | SB |
|----------------------|-----|----|-----|
| HCM Control Delay, s | 8.9 | 0 | 0.1 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBT | NBRWBLn1 | SBL | SBT |
|-----------------------|-----|----------|-------|-------|
| Capacity (veh/h) | - | - | 936 | 1473 |
| HCM Lane V/C Ratio | - | - | 0.001 | 0.001 |
| HCM Control Delay (s) | - | - | 8.9 | 7.4 |
| HCM Lane LOS | - | - | A | A |
| HCM 95th %tile Q(veh) | - | - | 0 | 0 |

Lanes, Volumes, Timings
16: Yampa Street & 105th Avenue

JR Engineering
10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Volume (vph) | 0 | 12 | 0 | 0 | 6 | 6 | 0 | 2 | 0 | 1 | 1 | 0 |
| Future Volume (vph) | 0 | 12 | 0 | 0 | 6 | 6 | 0 | 2 | 0 | 1 | 1 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. 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 |
| Frt | 0.932 | | | | | | | | | | | |
| Flt Protected | | | | | | | | | | | 0.976 | |
| Satd. Flow (prot) | 0 | 1863 | 0 | 0 | 1736 | 0 | 0 | 1863 | 0 | 0 | 1818 | 0 |
| Flt Permitted | | | | | | | | | | | 0.976 | |
| Satd. Flow (perm) | 0 | 1863 | 0 | 0 | 1736 | 0 | 0 | 1863 | 0 | 0 | 1818 | 0 |
| Link Speed (mph) | 25 | | | | 30 | | | | 30 | | | |
| Link Distance (ft) | 660 | | | | 660 | | | | 300 | | | |
| Travel Time (s) | 18.0 | | | | 15.0 | | | | 6.8 | | | |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 |
| Adj. Flow (vph) | 0 | 15 | 0 | 0 | 8 | 8 | 0 | 3 | 0 | 1 | 1 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 15 | 0 | 0 | 16 | 0 | 0 | 3 | 0 | 0 | 2 | 0 |
| 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 | | | | 0 | | | |
| Link Offset(ft) | 0 | | | | 0 | | | | 0 | | | |
| Crosswalk Width(ft) | 16 | | | | 16 | | | | 16 | | | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway 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 |
| Turning Speed (mph) | 60 | | 60 | 60 | | 60 | 60 | | 60 | 60 | | 60 |
| Sign Control | Free | | | | Free | | | | Stop | | | |
| Intersection Summary | | | | | | | | | | | | |
| Area Type: | Other | | | | | | | | | | | |
| Control Type: | Unsignalized | | | | | | | | | | | |
| Intersection Capacity Utilization | 13.3% | | | | ICU Level of Service A | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |

| Intersection | | | | | | | | | | | | |
|--------------------------|--------|---|------|--------|---|------|--------|---|-------|--------|---|-------|
| Int Delay, s/veh | 1.3 | | | | | | | | | | | |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Vol, veh/h | 0 | 12 | 0 | 0 | 6 | 6 | 0 | 2 | 0 | 1 | 1 | 0 |
| Future Vol, veh/h | 0 | 12 | 0 | 0 | 6 | 6 | 0 | 2 | 0 | 1 | 1 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 15 | 0 | 0 | 8 | 8 | 0 | 3 | 0 | 1 | 1 | 0 |
| | | | | | | | | | | | | |
| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
| Conflicting Flow All | 16 | 0 | 0 | 15 | 0 | 0 | 28 | 31 | 15 | 29 | 27 | 12 |
| Stage 1 | - | - | - | - | - | - | 15 | 15 | - | 12 | 12 | - |
| Stage 2 | - | - | - | - | - | - | 13 | 16 | - | 17 | 15 | - |
| Critical Hdwy | 4.12 | - | - | 4.12 | - | - | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Follow-up Hdwy | 2.218 | - | - | 2.218 | - | - | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 |
| Pot Cap-1 Maneuver | 1602 | - | - | 1603 | - | - | 981 | 862 | 1065 | 980 | 866 | 1069 |
| Stage 1 | - | - | - | - | - | - | 1005 | 883 | - | 1009 | 886 | - |
| Stage 2 | - | - | - | - | - | - | 1007 | 882 | - | 1002 | 883 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 1602 | - | - | 1603 | - | - | 980 | 862 | 1065 | 978 | 866 | 1069 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 980 | 862 | - | 978 | 866 | - |
| Stage 1 | - | - | - | - | - | - | 1005 | 883 | - | 1009 | 886 | - |
| Stage 2 | - | - | - | - | - | - | 1006 | 882 | - | 999 | 883 | - |
| | | | | | | | | | | | | |
| Approach | EB | | | WB | | | NB | | | SB | | |
| HCM Control Delay, s | 0 | | | 0 | | | 9.2 | | | 8.9 | | |
| HCM LOS | | | | | | | A | | | A | | |
| | | | | | | | | | | | | |
| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 | | | | |
| Capacity (veh/h) | 862 | 1602 | - | - | 1603 | - | - | 919 | | | | |
| HCM Lane V/C Ratio | 0.003 | - | - | - | - | - | - | 0.003 | | | | |
| HCM Control Delay (s) | 9.2 | 0 | - | - | 0 | - | - | 8.9 | | | | |
| HCM Lane LOS | A | A | - | - | A | - | - | A | | | | |
| HCM 95th %tile Q(veh) | 0 | 0 | - | - | 0 | - | - | 0 | | | | |

Lanes, Volumes, Timings
17: Yampa Street & Homestead Trail

JR Engineering
10/19/2023



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|----------------------------|-------|-------|------|-------|-------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 5 | 1 | 1 | 8 | 2 | 7 |
| Future Volume (vph) | 5 | 1 | 1 | 8 | 2 | 7 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 100 | 0 | 0 | | | 0 |
| Storage Lanes | 1 | 1 | 0 | | | 0 |
| Taper Length (ft) | 25 | | 25 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | 0.899 | |
| Flt Protected | 0.950 | | | 0.995 | | |
| Satd. Flow (prot) | 1770 | 1583 | 0 | 1853 | 1675 | 0 |
| Flt Permitted | 0.950 | | | 0.995 | | |
| Satd. Flow (perm) | 1770 | 1583 | 0 | 1853 | 1675 | 0 |
| Link Speed (mph) | 25 | | | 30 | 30 | |
| Link Distance (ft) | 666 | | | 181 | 194 | |
| Travel Time (s) | 18.2 | | | 4.1 | 4.4 | |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 |
| Adj. Flow (vph) | 6 | 1 | 1 | 10 | 3 | 9 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 6 | 1 | 0 | 11 | 12 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 12 | | | 0 | 0 | |
| Link Offset(ft) | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 60 | 60 | | | 9 |
| Sign Control | Stop | | | Stop | Stop | |

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 13.3% ICU Level of Service A

Analysis Period (min) 15





Intersection

Intersection Delay, s/veh

7

Intersection LOS

A



































| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---------------------|---|---|------|---|---|------|
| Lane Configurations |  |  | |  |  | |
| Traffic Vol, veh/h | 5 | 1 | 1 | 8 | 2 | 7 |
| Future Vol, veh/h | 5 | 1 | 1 | 8 | 2 | 7 |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 6 | 1 | 1 | 10 | 3 | 9 |
| Number of Lanes | 1 | 1 | 0 | 1 | 1 | 0 |

| Approach | EB | NB | SB |
|----------------------------|-----|----|-----|
| Opposing Approach | | SB | NB |
| Opposing Lanes | 0 | 1 | 1 |
| Conflicting Approach Left | SB | EB | |
| Conflicting Lanes Left | 1 | 2 | 0 |
| Conflicting Approach Right | NB | | EB |
| Conflicting Lanes Right | 1 | 0 | 2 |
| HCM Control Delay | 7.6 | 7 | 6.5 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | EBLn2 | SBLn1 |
|------------------------|-------|-------|-------|-------|
| Vol Left, % | 11% | 100% | 0% | 0% |
| Vol Thru, % | 89% | 0% | 0% | 22% |
| Vol Right, % | 0% | 0% | 100% | 78% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 9 | 5 | 1 | 9 |
| LT Vol | 1 | 5 | 0 | 0 |
| Through Vol | 8 | 0 | 0 | 2 |
| RT Vol | 0 | 0 | 1 | 7 |
| Lane Flow Rate | 12 | 6 | 1 | 12 |
| Geometry Grp | 2 | 7 | 7 | 2 |
| Degree of Util (X) | 0.013 | 0.009 | 0.001 | 0.011 |
| Departure Headway (Hd) | 3.978 | 5.073 | 3.873 | 3.489 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 904 | 709 | 928 | 1029 |
| Service Time | 1.985 | 2.781 | 1.581 | 1.498 |
| HCM Lane V/C Ratio | 0.013 | 0.008 | 0.001 | 0.012 |
| HCM Control Delay | 7 | 7.8 | 6.6 | 6.5 |
| HCM Lane LOS | A | A | A | A |
| HCM 95th-tile Q | 0 | 0 | 0 | 0 |


Lanes, Volumes, Timings
1: Tower Road & 104th Avenue

JR Engineering
10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------|---|---|---|---|---|--|---|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |    |  |  |    |  |   |   |  |    |    |  |
| Traffic Volume (vph) | 252 | 349 | 660 | 33 | 159 | 10 | 497 | 560 | 63 | 48 | 849 | 118 |
| Future Volume (vph) | 252 | 349 | 660 | 33 | 159 | 10 | 497 | 560 | 63 | 48 | 849 | 118 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 350 | | 590 | 330 | | 440 | 320 | | 290 | 290 | | 190 |
| Storage Lanes | 1 | | 1 | 1 | | 1 | 2 | | 1 | 1 | | 1 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frt | | | 0.850 | | | 0.850 | | | 0.850 | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1770 | 5085 | 1583 | 1770 | 5085 | 1583 | 3433 | 3539 | 1583 | 1770 | 3539 | 1583 |
| Flt Permitted | 0.415 | | | 0.509 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 773 | 5085 | 1583 | 948 | 5085 | 1583 | 3433 | 3539 | 1583 | 1770 | 3539 | 1583 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 612 | | | 331 | | | 249 | | | 324 |
| Link Speed (mph) | | 45 | | | 45 | | | 45 | | | 45 | |
| Link Distance (ft) | | 660 | | | 1515 | | | 645 | | | 450 | |
| Travel Time (s) | | 19.9 | | | 8.8 | | | 9.6 | | | 7.6 | |
| Peak Hour Factor | 0.87 | 0.88 | 0.92 | 0.78 | 0.84 | 0.78 | 0.88 | 0.92 | 0.78 | 0.78 | 0.92 | 0.83 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% |
| Adj. Flow (vph) | 290 | 397 | 717 | 42 | 189 | 13 | 565 | 609 | 81 | 62 | 923 | 142 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 290 | 397 | 717 | 42 | 189 | 13 | 565 | 609 | 81 | 62 | 923 | 142 |
| 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) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway 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 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 |
| Detector Template | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Leading Detector (ft) | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 |
| Trailing Detector (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Position(ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Size(ft) | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | 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 | 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 | 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 | 0.0 | 0.0 | 0.0 |
| Detector 2 Position(ft) | | 94 | | | 94 | | | 94 | | | 94 | |
| 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 | pm+pt | NA | Perm | pm+pt | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |

Lanes, Volumes, Timings
1: Tower Road & 104th Avenue

JR Engineering
10/19/2023

| |  | | | | | | | | | | | |
|-----------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Permitted Phases | 4 | | 4 | 8 | | 8 | | | 2 | | | 6 |
| Detector Phase | 7 | 4 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 8.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 |
| Minimum Split (s) | 15.4 | 17.4 | 17.4 | 15.4 | 17.4 | 17.4 | 16.2 | 18.2 | 18.2 | 16.2 | 18.2 | 18.2 |
| Total Split (s) | 28.0 | 37.0 | 37.0 | 16.0 | 25.0 | 25.0 | 39.0 | 47.0 | 47.0 | 20.0 | 28.0 | 28.0 |
| Total Split (%) | 23.3% | 30.8% | 30.8% | 13.3% | 20.8% | 20.8% | 32.5% | 39.2% | 39.2% | 16.7% | 23.3% | 23.3% |
| Maximum Green (s) | 20.6 | 29.6 | 29.6 | 8.6 | 17.6 | 17.6 | 30.8 | 38.8 | 38.8 | 11.8 | 19.8 | 19.8 |
| Yellow Time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 |
| All-Red Time (s) | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Vehicle Extension (s) | 2.0 | 2.0 | 2.0 | 3.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 5.0 | 5.0 |
| Recall Mode | None | None | None | None | None | None | None | C-Max | C-Max | None | C-Max | C-Max |
| Act Effect Green (s) | 39.8 | 27.3 | 27.3 | 21.2 | 13.0 | 13.0 | 24.1 | 50.3 | 50.3 | 9.3 | 32.3 | 32.3 |
| Actuated g/C Ratio | 0.33 | 0.23 | 0.23 | 0.18 | 0.11 | 0.11 | 0.20 | 0.42 | 0.42 | 0.08 | 0.27 | 0.27 |
| v/c Ratio | 0.70 | 0.34 | 0.86 | 0.19 | 0.34 | 0.03 | 0.82 | 0.41 | 0.10 | 0.45 | 0.97 | 0.21 |
| Control Delay | 30.1 | 30.4 | 21.3 | 29.2 | 50.4 | 0.1 | 56.0 | 27.8 | 0.3 | 63.3 | 66.9 | 0.7 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 30.1 | 30.4 | 21.3 | 29.2 | 50.4 | 0.1 | 56.0 | 27.8 | 0.3 | 63.3 | 66.9 | 0.7 |
| LOS | C | C | C | C | D | A | E | C | A | E | E | A |
| Approach Delay | | 25.7 | | | 44.1 | | | 38.7 | | | 58.3 | |
| Approach LOS | | C | | | D | | | D | | | E | |

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 40.0

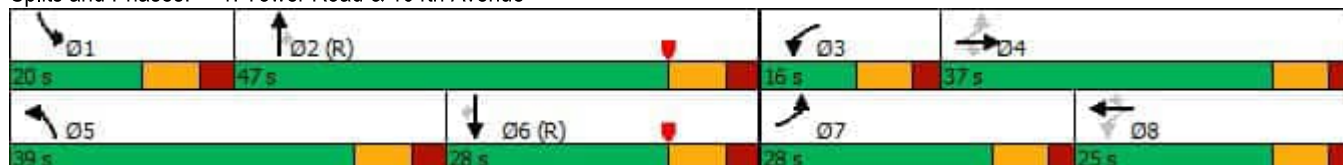
Intersection LOS: D

Intersection Capacity Utilization 90.2%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: Tower Road & 104th Avenue



1: Tower Road & 104th Avenue



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Group Flow (vph) | 290 | 397 | 717 | 42 | 189 | 13 | 565 | 609 | 81 | 62 | 923 | 142 |
| v/c Ratio | 0.70 | 0.34 | 0.86 | 0.19 | 0.34 | 0.03 | 0.82 | 0.41 | 0.10 | 0.45 | 0.97 | 0.21 |
| Control Delay | 30.1 | 30.4 | 21.3 | 29.2 | 50.4 | 0.1 | 56.0 | 27.8 | 0.3 | 63.3 | 66.9 | 0.7 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 30.1 | 30.4 | 21.3 | 29.2 | 50.4 | 0.1 | 56.0 | 27.8 | 0.3 | 63.3 | 66.9 | 0.7 |
| Queue Length 50th (ft) | 124 | 91 | 304 | 23 | 52 | 0 | 217 | 173 | 0 | 47 | 365 | 0 |
| Queue Length 95th (ft) | 122 | 92 | #438 | 39 | 68 | 0 | 258 | 260 | 0 | 78 | #652 | 0 |
| Internal Link Dist (ft) | | 580 | | | 1435 | | | 565 | | | 370 | |
| Turn Bay Length (ft) | 350 | | 590 | 330 | | 440 | 320 | | 290 | 290 | | 190 |
| Base Capacity (vph) | 427 | 1291 | 858 | 229 | 745 | 514 | 881 | 1484 | 808 | 174 | 952 | 662 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.68 | 0.31 | 0.84 | 0.18 | 0.25 | 0.03 | 0.64 | 0.41 | 0.10 | 0.36 | 0.97 | 0.21 |

Intersection Summary

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

































Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary

1: Tower Road & 104th Avenue

JR Engineering

10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |    |  |  |    |  |   |   |  |   |   |  |
| Traffic Volume (veh/h) | 252 | 349 | 660 | 33 | 159 | 10 | 497 | 560 | 63 | 48 | 849 | 118 |
| Future Volume (veh/h) | 252 | 349 | 660 | 33 | 159 | 10 | 497 | 560 | 63 | 48 | 849 | 118 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 290 | 397 | 0 | 42 | 189 | 0 | 565 | 609 | 0 | 62 | 923 | 0 |
| Peak Hour Factor | 0.87 | 0.88 | 0.92 | 0.78 | 0.84 | 0.78 | 0.88 | 0.92 | 0.78 | 0.78 | 0.92 | 0.83 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 404 | 990 | | 232 | 426 | | 633 | 1555 | | 104 | 1111 | |
| Arrive On Green | 0.05 | 0.06 | 0.00 | 0.05 | 0.08 | 0.00 | 0.18 | 0.44 | 0.00 | 0.06 | 0.31 | 0.00 |
| Sat Flow, veh/h | 1781 | 5106 | 1585 | 1781 | 5106 | 1585 | 3456 | 3554 | 1585 | 1781 | 3554 | 1585 |
| Grp Volume(v), veh/h | 290 | 397 | 0 | 42 | 189 | 0 | 565 | 609 | 0 | 62 | 923 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1702 | 1585 | 1781 | 1702 | 1585 | 1728 | 1777 | 1585 | 1781 | 1777 | 1585 |
| Q Serve(g_s), s | 17.2 | 9.0 | 0.0 | 2.5 | 4.2 | 0.0 | 19.2 | 14.0 | 0.0 | 4.1 | 28.9 | 0.0 |
| Cycle Q Clear(g_c), s | 17.2 | 9.0 | 0.0 | 2.5 | 4.2 | 0.0 | 19.2 | 14.0 | 0.0 | 4.1 | 28.9 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 404 | 990 | | 232 | 426 | | 633 | 1555 | | 104 | 1111 | |
| V/C Ratio(X) | 0.72 | 0.40 | | 0.18 | 0.44 | | 0.89 | 0.39 | | 0.60 | 0.83 | |
| Avail Cap(c_a), veh/h | 423 | 1260 | | 270 | 749 | | 887 | 1555 | | 175 | 1111 | |
| HCM Platoon Ratio | 0.33 | 0.33 | 0.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 44.4 | 49.5 | 0.0 | 46.1 | 52.4 | 0.0 | 47.8 | 22.9 | 0.0 | 55.1 | 38.3 | 0.0 |
| Incr Delay (d2), s/veh | 4.6 | 0.1 | 0.0 | 0.4 | 0.3 | 0.0 | 6.8 | 0.7 | 0.0 | 2.0 | 7.3 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 8.7 | 3.9 | 0.0 | 1.1 | 1.8 | 0.0 | 8.6 | 5.7 | 0.0 | 1.8 | 13.2 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 49.0 | 49.6 | 0.0 | 46.5 | 52.6 | 0.0 | 54.7 | 23.6 | 0.0 | 57.2 | 45.6 | 0.0 |
| LnGrp LOS | D | D | | D | D | | D | C | | E | D | |
| Approach Vol, veh/h | | 687 | | | 231 | | | 1174 | | | 985 | |
| Approach Delay, s/veh | | 49.3 | | | 51.5 | | | 38.6 | | | 46.3 | |
| Approach LOS | | D | | | D | | | D | | | D | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 15.2 | 60.7 | 13.4 | 30.7 | 30.2 | 45.7 | 26.7 | 17.4 | | | | |
| Change Period (Y+Rc), s | 8.2 | 8.2 | 7.4 | 7.4 | 8.2 | 8.2 | 7.4 | 7.4 | | | | |
| Max Green Setting (Gmax), s | 11.8 | 38.8 | 8.6 | 29.6 | 30.8 | 19.8 | 20.6 | 17.6 | | | | |
| Max Q Clear Time (g_c+I1), s | 6.1 | 16.0 | 4.5 | 11.0 | 21.2 | 30.9 | 19.2 | 6.2 | | | | |
| Green Ext Time (p_c), s | 0.0 | 2.4 | 0.0 | 1.5 | 0.8 | 0.0 | 0.1 | 0.5 | | | | |

Intersection Summary

| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 44.4 |
| HCM 6th LOS | D |

























Notes

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

Lanes, Volumes, Timings
2: Walden Street & 104th Avenue

JR Engineering


10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 149 | 921 | 85 | 18 | 469 | 165 | 139 | 38 | 71 | 340 | 36 | 142 |
| Future Volume (vph) | 149 | 921 | 85 | 18 | 469 | 165 | 139 | 38 | 71 | 340 | 36 | 142 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 400 | | 230 | 0 | | 250 | 230 | | 230 | 210 | | 140 |
| Storage Lanes | 1 | | 1 | 1 | | 1 | 1 | | 1 | 1 | | 1 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.850 | | | 0.850 | | | 0.850 | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1770 | 3539 | 1583 | 1770 | 3539 | 1583 | 1770 | 1863 | 1583 | 1770 | 1863 | 1583 |
| Flt Permitted | 0.342 | | | 0.190 | | | 0.727 | | | 0.441 | | |
| Satd. Flow (perm) | 637 | 3539 | 1583 | 354 | 3539 | 1583 | 1354 | 1863 | 1583 | 821 | 1863 | 1583 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 218 | | | 218 | | | 227 | | | 169 |
| Link Speed (mph) | | 45 | | | 45 | | | 30 | | | 30 | |
| Link Distance (ft) | | 900 | | | 660 | | | 652 | | | 450 | |
| Travel Time (s) | | 13.6 | | | 10.0 | | | 14.8 | | | 10.2 | |
| Peak Hour Factor | 0.84 | 0.92 | 0.80 | 0.78 | 0.91 | 0.84 | 0.84 | 0.78 | 0.80 | 0.88 | 0.78 | 0.84 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% |
| Adj. Flow (vph) | 177 | 1001 | 106 | 23 | 515 | 196 | 165 | 49 | 89 | 386 | 46 | 169 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 177 | 1001 | 106 | 23 | 515 | 196 | 165 | 49 | 89 | 386 | 46 | 169 |
| 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) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway 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 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 |
| Detector Template | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Leading Detector (ft) | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 |
| Trailing Detector (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Position(ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Size(ft) | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | 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 | 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 | 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 | 0.0 | 0.0 | 0.0 |
| Detector 2 Position(ft) | | 94 | | | 94 | | | 94 | | | 94 | |
| 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 | pm+pt | NA | Perm | pm+pt | NA | Perm | pm+pt | NA | Perm | pm+pt | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |

Lanes, Volumes, Timings
2: Walden Street & 104th Avenue

JR Engineering

10/19/2023

| |  | | | | | | | | | | | |
|-----------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Permitted Phases | 2 | | 2 | 6 | | 6 | 8 | | 8 | 4 | | 4 |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 6 | 3 | 8 | 8 | 7 | 4 | 4 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 3.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 |
| Minimum Split (s) | 10.5 | 17.5 | 17.5 | 12.5 | 17.5 | 17.5 | 14.5 | 16.5 | 16.5 | 14.5 | 16.5 | 16.5 |
| Total Split (s) | 19.0 | 50.0 | 50.0 | 13.0 | 44.0 | 44.0 | 20.0 | 17.0 | 17.0 | 40.0 | 37.0 | 37.0 |
| Total Split (%) | 15.8% | 41.7% | 41.7% | 10.8% | 36.7% | 36.7% | 16.7% | 14.2% | 14.2% | 33.3% | 30.8% | 30.8% |
| Maximum Green (s) | 11.5 | 42.5 | 42.5 | 5.5 | 36.5 | 36.5 | 13.5 | 10.5 | 10.5 | 33.5 | 30.5 | 30.5 |
| Yellow Time (s) | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| All-Red Time (s) | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Vehicle Extension (s) | 2.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Recall Mode | None | C-Max | C-Max | None | C-Max | C-Max | None | None | None | None | None | None |
| Act Effect Green (s) | 60.0 | 53.1 | 53.1 | 48.5 | 43.2 | 43.2 | 21.9 | 10.1 | 10.1 | 45.1 | 26.8 | 26.8 |
| Actuated g/C Ratio | 0.50 | 0.44 | 0.44 | 0.40 | 0.36 | 0.36 | 0.18 | 0.08 | 0.08 | 0.38 | 0.22 | 0.22 |
| v/c Ratio | 0.43 | 0.64 | 0.13 | 0.11 | 0.40 | 0.28 | 0.57 | 0.31 | 0.26 | 0.72 | 0.11 | 0.35 |
| Control Delay | 20.8 | 30.7 | 0.3 | 12.1 | 22.7 | 6.9 | 35.9 | 57.4 | 1.9 | 37.7 | 36.3 | 7.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 20.8 | 30.7 | 0.3 | 12.1 | 22.7 | 6.9 | 35.9 | 57.4 | 1.9 | 37.7 | 36.3 | 7.3 |
| LOS | C | C | A | B | C | A | D | E | A | D | D | A |
| Approach Delay | | 26.9 | | | 18.2 | | | 29.4 | | | 29.1 | |
| Approach LOS | | C | | | B | | | C | | | C | |

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 25.4

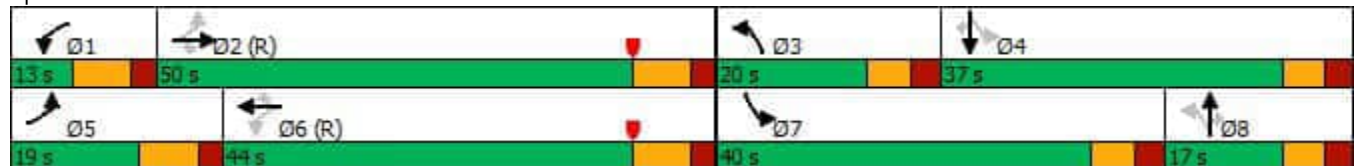
Intersection LOS: C

Intersection Capacity Utilization 73.0%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 2: Walden Street & 104th Avenue



Queues
2: Walden Street & 104th Avenue

JR Engineering
10/19/2023



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Group Flow (vph) | 177 | 1001 | 106 | 23 | 515 | 196 | 165 | 49 | 89 | 386 | 46 | 169 |
| v/c Ratio | 0.43 | 0.64 | 0.13 | 0.11 | 0.40 | 0.28 | 0.57 | 0.31 | 0.26 | 0.72 | 0.11 | 0.35 |
| Control Delay | 20.8 | 30.7 | 0.3 | 12.1 | 22.7 | 6.9 | 35.9 | 57.4 | 1.9 | 37.7 | 36.3 | 7.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 20.8 | 30.7 | 0.3 | 12.1 | 22.7 | 6.9 | 35.9 | 57.4 | 1.9 | 37.7 | 36.3 | 7.3 |
| Queue Length 50th (ft) | 74 | 342 | 0 | 6 | 210 | 66 | 86 | 36 | 0 | 232 | 28 | 0 |
| Queue Length 95th (ft) | 118 | 449 | 0 | m11 | 267 | 68 | 120 | 66 | 0 | 303 | 50 | 43 |
| Internal Link Dist (ft) | | 820 | | | 580 | | | 572 | | | 370 | |
| Turn Bay Length (ft) | 400 | | 230 | | | 250 | 230 | | 230 | 210 | | 140 |
| Base Capacity (vph) | 428 | 1566 | 821 | 209 | 1274 | 709 | 312 | 163 | 345 | 573 | 473 | 528 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.41 | 0.64 | 0.13 | 0.11 | 0.40 | 0.28 | 0.53 | 0.30 | 0.26 | 0.67 | 0.10 | 0.32 |

Intersection Summary

























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

HCM 6th Signalized Intersection Summary

2: Walden Street & 104th Avenue

JR Engineering

10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h) | 149 | 921 | 85 | 18 | 469 | 165 | 139 | 38 | 71 | 340 | 36 | 142 |
| Future Volume (veh/h) | 149 | 921 | 85 | 18 | 469 | 165 | 139 | 38 | 71 | 340 | 36 | 142 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | No | | | No | | | No | | | No | | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 177 | 1001 | 106 | 23 | 515 | 196 | 165 | 49 | 89 | 386 | 46 | 169 |
| Peak Hour Factor | 0.84 | 0.92 | 0.80 | 0.78 | 0.91 | 0.84 | 0.84 | 0.78 | 0.80 | 0.88 | 0.78 | 0.84 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 389 | 1600 | 713 | 219 | 1414 | 631 | 335 | 156 | 132 | 509 | 363 | 308 |
| Arrive On Green | 0.07 | 0.45 | 0.45 | 0.01 | 0.13 | 0.13 | 0.10 | 0.08 | 0.08 | 0.21 | 0.19 | 0.19 |
| Sat Flow, veh/h | 1781 | 3554 | 1585 | 1781 | 3554 | 1585 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 177 | 1001 | 106 | 23 | 515 | 196 | 165 | 49 | 89 | 386 | 46 | 169 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1585 | 1781 | 1777 | 1585 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 6.9 | 25.9 | 4.7 | 0.9 | 15.9 | 13.4 | 10.0 | 3.0 | 6.5 | 22.9 | 2.4 | 11.5 |
| Cycle Q Clear(g_c), s | 6.9 | 25.9 | 4.7 | 0.9 | 15.9 | 13.4 | 10.0 | 3.0 | 6.5 | 22.9 | 2.4 | 11.5 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 389 | 1600 | 713 | 219 | 1414 | 631 | 335 | 156 | 132 | 509 | 363 | 308 |
| V/C Ratio(X) | 0.46 | 0.63 | 0.15 | 0.10 | 0.36 | 0.31 | 0.49 | 0.31 | 0.67 | 0.76 | 0.13 | 0.55 |
| Avail Cap(c_a), veh/h | 427 | 1600 | 713 | 261 | 1414 | 631 | 358 | 164 | 139 | 631 | 475 | 403 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 19.6 | 25.3 | 19.4 | 22.4 | 38.3 | 37.2 | 44.1 | 51.8 | 53.4 | 36.5 | 39.9 | 43.6 |
| Incr Delay (d2), s/veh | 0.3 | 1.9 | 0.4 | 0.1 | 0.7 | 1.3 | 0.4 | 0.4 | 9.0 | 3.1 | 0.1 | 0.6 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.7 | 10.7 | 1.8 | 0.4 | 7.7 | 5.9 | 4.5 | 1.4 | 2.9 | 10.3 | 1.1 | 4.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 19.9 | 27.1 | 19.9 | 22.5 | 39.0 | 38.5 | 44.5 | 52.2 | 62.5 | 39.6 | 40.0 | 44.2 |
| LnGrp LOS | B | C | B | C | D | D | D | D | E | D | D | D |
| Approach Vol, veh/h | 1284 | | | | 734 | | | | 303 | | 601 | |
| Approach Delay, s/veh | 25.5 | | | | 38.3 | | | | 51.0 | | 40.9 | |
| Approach LOS | C | | | | D | | | | D | | D | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 10.2 | 61.5 | 18.5 | 29.8 | 16.4 | 55.3 | 31.8 | 16.5 | | | | |
| Change Period (Y+Rc), s | * 7.5 | * 7.5 | 6.5 | 6.5 | * 7.5 | * 7.5 | 6.5 | 6.5 | | | | |
| Max Green Setting (Gmax), s | * 5.5 | * 43 | 13.5 | 30.5 | * 12 | * 37 | 33.5 | 10.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.9 | 27.9 | 12.0 | 13.5 | 8.9 | 17.9 | 24.9 | 8.5 | | | | |
| Green Ext Time (p_c), s | 0.0 | 9.3 | 0.0 | 0.4 | 0.1 | 6.7 | 0.4 | 0.1 | | | | |

Intersection Summary

HCM 6th Ctrl Delay 34.6

















HCM 6th LOS C

Notes

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

Lanes, Volumes, Timings
3: Walden Street & 105th Avenue




















JR Engineering
10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Volume (vph) | 12 | 1 | 90 | 23 | 0 | 19 | 31 | 257 | 2 | 9 | 243 | 7 |
| Future Volume (vph) | 12 | 1 | 90 | 23 | 0 | 19 | 31 | 257 | 2 | 9 | 243 | 7 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. 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 |
| Frt | | 0.882 | | | 0.939 | | | 0.999 | | | 0.996 | |
| Flt Protected | | 0.994 | | | 0.973 | | | 0.994 | | | 0.998 | |
| Satd. Flow (prot) | 0 | 1633 | 0 | 0 | 1702 | 0 | 0 | 1850 | 0 | 0 | 1852 | 0 |
| Flt Permitted | | 0.994 | | | 0.973 | | | 0.994 | | | 0.998 | |
| Satd. Flow (perm) | 0 | 1633 | 0 | 0 | 1702 | 0 | 0 | 1850 | 0 | 0 | 1852 | 0 |
| Link Speed (mph) | | 45 | | | 45 | | | 45 | | | 45 | |
| Link Distance (ft) | | 500 | | | 660 | | | 300 | | | 280 | |
| Travel Time (s) | | 7.6 | | | 10.0 | | | 4.5 | | | 4.2 | |
| Peak Hour Factor | 0.78 | 0.78 | 0.80 | 0.78 | 0.78 | 0.78 | 0.78 | 0.87 | 0.78 | 0.78 | 0.87 | 0.78 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% |
| Adj. Flow (vph) | 15 | 1 | 113 | 29 | 0 | 24 | 40 | 295 | 3 | 12 | 279 | 9 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 129 | 0 | 0 | 53 | 0 | 0 | 338 | 0 | 0 | 300 | 0 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Sign Control | | Yield | | | Yield | | | Yield | | | Yield | |
| Intersection Summary | | | | | | | | | | | | |
| Area Type: | Other | | | | | | | | | | | |
| Control Type: | Roundabout | | | | | | | | | | | |
| Intersection Capacity Utilization 41.6% | | | | | | | | | | | | |
| ICU Level of Service A | | | | | | | | | | | | |
| Analysis Period (min) 15 | | | | | | | | | | | | |








| Intersection | | | | |
|-----------------------------|-------|-------|-------|-------|
| Intersection Delay, s/veh | 4.9 | | | |
| Intersection LOS | A | | | |
| Approach | EB | WB | NB | SB |
| Entry Lanes | 1 | 1 | 1 | 1 |
| Conflicting Circle Lanes | 1 | 1 | 1 | 1 |
| Adj Approach Flow, veh/h | 128 | 53 | 338 | 300 |
| Demand Flow Rate, veh/h | 130 | 54 | 345 | 306 |
| Vehicles Circulating, veh/h | 327 | 357 | 28 | 71 |
| Vehicles Exiting, veh/h | 50 | 16 | 429 | 340 |
| Ped Vol Crossing Leg, #/h | 0 | 0 | 0 | 0 |
| Ped Cap Adj | 1.000 | 1.000 | 1.000 | 1.000 |
| Approach Delay, s/veh | 4.9 | 4.3 | 5.0 | 4.9 |
| Approach LOS | A | A | A | A |
| Lane | Left | Left | Left | Left |
| Designated Moves | LTR | LTR | LTR | LTR |
| Assumed Moves | LTR | LTR | LTR | LTR |
| RT Channelized | | | | |
| Lane Util | 1.000 | 1.000 | 1.000 | 1.000 |
| Follow-Up Headway, s | 2.609 | 2.609 | 2.609 | 2.609 |
| Critical Headway, s | 4.976 | 4.976 | 4.976 | 4.976 |
| Entry Flow, veh/h | 130 | 54 | 345 | 306 |
| Cap Entry Lane, veh/h | 989 | 959 | 1341 | 1283 |
| Entry HV Adj Factor | 0.984 | 0.981 | 0.980 | 0.982 |
| Flow Entry, veh/h | 128 | 53 | 338 | 300 |
| Cap Entry, veh/h | 973 | 941 | 1314 | 1260 |
| V/C Ratio | 0.132 | 0.056 | 0.257 | 0.238 |
| Control Delay, s/veh | 4.9 | 4.3 | 5.0 | 4.9 |
| LOS | A | A | A | A |
| 95th %tile Queue, veh | 0 | 0 | 1 | 1 |

Lanes, Volumes, Timings
4: Walden Street & Homestead Trail

JR Engineering
10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | |  |  | |  |  | |  |  | |
| Traffic Volume (vph) | 20 | 2 | 28 | 13 | 2 | 1 | 20 | 245 | 16 | 1 | 187 | 12 |
| Future Volume (vph) | 20 | 2 | 28 | 13 | 2 | 1 | 20 | 245 | 16 | 1 | 187 | 12 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | | 0 | 150 | | 0 | 150 | | 0 | 150 | | 0 |
| Storage Lanes | 0 | | 0 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. 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 |
| Frt | | 0.925 | | | 0.962 | | | 0.990 | | | 0.991 | |
| Flt Protected | | 0.980 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1689 | 0 | 1770 | 1792 | 0 | 1770 | 1844 | 0 | 1770 | 1846 | 0 |
| Flt Permitted | | 0.980 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 1689 | 0 | 1770 | 1792 | 0 | 1770 | 1844 | 0 | 1770 | 1846 | 0 |
| Link Speed (mph) | | 45 | | | 45 | | | 45 | | | 45 | |
| Link Distance (ft) | | 500 | | | 666 | | | 395 | | | 595 | |
| Travel Time (s) | | 7.6 | | | 10.1 | | | 6.0 | | | 9.0 | |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.87 | 0.78 | 0.78 | 0.84 | 0.78 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% |
| Adj. Flow (vph) | 26 | 3 | 36 | 17 | 3 | 1 | 26 | 282 | 21 | 1 | 223 | 15 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 65 | 0 | 17 | 4 | 0 | 26 | 303 | 0 | 1 | 238 | 0 |
| 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) | | 12 | | | 12 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway 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 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Intersection Summary | | | | | | | | | | | | |
| Area Type: | Other | | | | | | | | | | | |
| Control Type: | Unsignalized | | | | | | | | | | | |
| Intersection Capacity Utilization | 32.9% | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |
| ICU Level of Service A | | | | | | | | | | | | |

| Intersection | |
|---------------------------|------|
| Intersection Delay, s/veh | 10.4 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---------------------|------|---|------|---|---|------|---|---|------|---|---|------|
| Lane Configurations | |  | |  |  | |  |  | |  |  | |
| Traffic Vol, veh/h | 20 | 2 | 28 | 13 | 2 | 1 | 20 | 245 | 16 | 1 | 187 | 12 |
| Future Vol, veh/h | 20 | 2 | 28 | 13 | 2 | 1 | 20 | 245 | 16 | 1 | 187 | 12 |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.87 | 0.78 | 0.78 | 0.84 | 0.78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 26 | 3 | 36 | 17 | 3 | 1 | 26 | 282 | 21 | 1 | 223 | 15 |
| Number of Lanes | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |






| Approach | EB | WB | NB | SB |
|----------------------------|-----|-----|------|------|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 2 | 1 | 2 | 2 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 2 | 1 | 2 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 2 | 2 | 2 | 1 |
| HCM Control Delay | 9.4 | 9.3 | 10.9 | 10.2 |
| HCM LOS | A | A | B | B |






| Lane | NBLn1 | NBLn2 | EBLn1 | WBLn1 | WBLn2 | SBLn1 | SBLn2 |
|------------------------|-------|-------|-------|-------|-------|-------|-------|
| Vol Left, % | 100% | 0% | 40% | 100% | 0% | 100% | 0% |
| Vol Thru, % | 0% | 94% | 4% | 0% | 67% | 0% | 94% |
| Vol Right, % | 0% | 6% | 56% | 0% | 33% | 0% | 6% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 20 | 261 | 50 | 13 | 3 | 1 | 199 |
| LT Vol | 20 | 0 | 20 | 13 | 0 | 1 | 0 |
| Through Vol | 0 | 245 | 2 | 0 | 2 | 0 | 187 |
| RT Vol | 0 | 16 | 28 | 0 | 1 | 0 | 12 |
| Lane Flow Rate | 26 | 302 | 64 | 17 | 4 | 1 | 238 |
| Geometry Grp | 7 | 7 | 6 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.039 | 0.414 | 0.101 | 0.03 | 0.006 | 0.002 | 0.332 |
| Departure Headway (Hd) | 5.481 | 4.936 | 5.666 | 6.492 | 5.752 | 5.562 | 5.017 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 654 | 728 | 631 | 550 | 620 | 644 | 716 |
| Service Time | 3.212 | 2.667 | 3.717 | 4.251 | 3.51 | 3.294 | 2.749 |
| HCM Lane V/C Ratio | 0.04 | 0.415 | 0.101 | 0.031 | 0.006 | 0.002 | 0.332 |
| HCM Control Delay | 8.4 | 11.1 | 9.4 | 9.5 | 8.5 | 8.3 | 10.2 |
| HCM Lane LOS | A | B | A | A | A | A | B |
| HCM 95th-tile Q | 0.1 | 2 | 0.3 | 0.1 | 0 | 0 | 1.5 |

Lanes, Volumes, Timings
11: Tower Road & 105th Avenue

JR Engineering
10/19/2023































| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|--------------|---|---|---|---|---|
| Lane Configurations | |  |  |  |  |  |
| Traffic Volume (vph) | 0 | 197 | 42 | 736 | 787 | 139 |
| Future Volume (vph) | 0 | 197 | 42 | 736 | 787 | 139 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 250 | 0 | 150 | | | 150 |
| Storage Lanes | 0 | 1 | 1 | | | 1 |
| Taper Length (ft) | 25 | | 25 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.865 | | | | 0.850 |
| Flt Protected | | | 0.950 | | | |
| Satd. Flow (prot) | 0 | 1611 | 1770 | 1863 | 1863 | 1583 |
| Flt Permitted | | | 0.950 | | | |
| Satd. Flow (perm) | 0 | 1611 | 1770 | 1863 | 1863 | 1583 |
| Link Speed (mph) | 30 | | | 30 | 30 | |
| Link Distance (ft) | 660 | | | 300 | 1403 | |
| Travel Time (s) | 15.0 | | | 6.8 | 31.9 | |
| Peak Hour Factor | 0.78 | 0.80 | 0.78 | 0.92 | 0.92 | 0.78 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% |
| Adj. Flow (vph) | 0 | 246 | 54 | 800 | 855 | 178 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 0 | 246 | 54 | 800 | 855 | 178 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 0 | | | 12 | 12 | |
| Link Offset(ft) | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 60 | 60 | 60 | | | 60 |
| Sign Control | Stop | | | Free | Free | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 60.3% | | | ICU Level of Service B | | |
| Analysis Period (min) | 15 | | | | | |

| Intersection | | | | | | |
|--------------------------|--------|---|---|---|---|---|
| Int Delay, s/veh | 4.3 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | |  |  |  |  |  |
| Traffic Vol, veh/h | 0 | 197 | 42 | 736 | 787 | 139 |
| Future Vol, veh/h | 0 | 197 | 42 | 736 | 787 | 139 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | 0 | 150 | - | - | 150 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 78 | 80 | 78 | 92 | 92 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 246 | 54 | 800 | 855 | 178 |
| Major/Minor | Minor2 | Major1 | | Major2 | | |
| Conflicting Flow All | - | 855 | 1033 | 0 | - | 0 |
| Stage 1 | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - |
| Critical Hdwy | - | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - |
| Follow-up Hdwy | - | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 0 | 358 | 673 | - | - | - |
| Stage 1 | 0 | - | - | - | - | - |
| Stage 2 | 0 | - | - | - | - | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | 358 | 673 | - | - | - |
| Mov Cap-2 Maneuver | - | - | - | - | - | - |
| Stage 1 | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - |
| Approach | EB | NB | | SB | | |
| HCM Control Delay, s | 34.5 | 0.7 | | 0 | | |
| HCM LOS | D | | | | | |
| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR | |
| Capacity (veh/h) | 673 | - | 358 | - | - | |
| HCM Lane V/C Ratio | 0.08 | - | 0.688 | - | - | |
| HCM Control Delay (s) | 10.8 | - | 34.5 | - | - | |
| HCM Lane LOS | B | - | D | - | - | |
| HCM 95th %tile Q(veh) | 0.3 | - | 4.9 | - | - | |

Lanes, Volumes, Timings
13: Yampa Street & 104th Avenue





















JR Engineering
10/19/2023








| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  | | |  | | |  |
| Traffic Volume (vph) | 73 | 1232 | 5 | 12 | 588 | 166 | 0 | 0 | 4 | 0 | 0 | 49 |
| Future Volume (vph) | 73 | 1232 | 5 | 12 | 588 | 166 | 0 | 0 | 4 | 0 | 0 | 49 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 150 | | 150 | 150 | | 0 | 0 | | 0 | 0 | | 0 |
| Storage Lanes | 1 | | 1 | 1 | | 1 | 0 | | 1 | 0 | | 1 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.850 | | | 0.850 | | | 0.865 | | | 0.865 |
| Flt Protected | 0.950 | | | 0.950 | | | | | | | | |
| Satd. Flow (prot) | 1770 | 5085 | 1583 | 1770 | 5085 | 1583 | 0 | 0 | 1611 | 0 | 0 | 1611 |
| Flt Permitted | 0.950 | | | 0.950 | | | | | | | | |
| Satd. Flow (perm) | 1770 | 5085 | 1583 | 1770 | 5085 | 1583 | 0 | 0 | 1611 | 0 | 0 | 1611 |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 660 | | | 660 | | | 636 | | | 450 | |
| Travel Time (s) | | 15.0 | | | 15.0 | | | 14.5 | | | 10.2 | |
| Peak Hour Factor | 0.78 | 0.93 | 0.78 | 0.78 | 0.92 | 0.84 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% |
| Adj. Flow (vph) | 94 | 1325 | 6 | 15 | 639 | 198 | 0 | 0 | 5 | 0 | 0 | 63 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 94 | 1325 | 6 | 15 | 639 | 198 | 0 | 0 | 5 | 0 | 0 | 63 |
| 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) | | 12 | | | 12 | | | 0 | | | 0 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway 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 |
| Turning Speed (mph) | 60 | | 60 | 60 | | 60 | 60 | | 60 | 60 | | 60 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Intersection Summary | | | | | | | | | | | | |
| Area Type: | Other | | | | | | | | | | | |
| Control Type: | Unsignalized | | | | | | | | | | | |
| Intersection Capacity Utilization | 33.8% | | | | | | ICU Level of Service A | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |

| Intersection | | | | | | | | | | | | |
|--------------------------|---|---|---|---|---|---|------|-------|---|------|------|---|
| Int Delay, s/veh | 1.1 | | | | | | | | | | | |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  | | |  | | |  |
| Traffic Vol, veh/h | 73 | 1232 | 5 | 12 | 588 | 166 | 0 | 0 | 4 | 0 | 0 | 49 |
| Future Vol, veh/h | 73 | 1232 | 5 | 12 | 588 | 166 | 0 | 0 | 4 | 0 | 0 | 49 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | 150 | - | 150 | 150 | - | 0 | - | - | 0 | - | - | 0 |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 78 | 93 | 78 | 78 | 92 | 84 | 78 | 78 | 78 | 78 | 78 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 94 | 1325 | 6 | 15 | 639 | 198 | 0 | 0 | 5 | 0 | 0 | 63 |
| | | | | | | | | | | | | |
| Major/Minor | Major1 | | Major2 | | | Minor1 | | | Minor2 | | | |
| Conflicting Flow All | 837 | 0 | 0 | 1331 | 0 | 0 | - | - | 663 | - | - | 320 |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy | 5.34 | - | - | 5.34 | - | - | - | - | 7.14 | - | - | 7.14 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.12 | - | - | 3.12 | - | - | - | - | 3.92 | - | - | 3.92 |
| Pot Cap-1 Maneuver | 469 | - | - | 270 | - | - | 0 | 0 | 346 | 0 | 0 | 577 |
| Stage 1 | - | - | - | - | - | - | 0 | 0 | - | 0 | 0 | - |
| Stage 2 | - | - | - | - | - | - | 0 | 0 | - | 0 | 0 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 469 | - | - | 270 | - | - | - | - | 346 | - | - | 577 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | | | | | |
| Approach | EB | | WB | | | NB | | | SB | | | |
| HCM Control Delay, s | 1 | | 0.3 | | | 15.6 | | | 12 | | | |
| HCM LOS | | | | | | C | | | B | | | |
| | | | | | | | | | | | | |
| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 | | | | |
| Capacity (veh/h) | 346 | 469 | - | - | 270 | - | - | 577 | | | | |
| HCM Lane V/C Ratio | 0.015 | 0.2 | - | - | 0.057 | - | - | 0.109 | | | | |
| HCM Control Delay (s) | 15.6 | 14.6 | - | - | 19.1 | - | - | 12 | | | | |
| HCM Lane LOS | C | B | - | - | C | - | - | B | | | | |
| HCM 95th %tile Q(veh) | 0 | 0.7 | - | - | 0.2 | - | - | 0.4 | | | | |

Lanes, Volumes, Timings
14: Walden Street & 104th Way











JR Engineering
10/19/2023





| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | |  |  |  |  |  |  |
| Traffic Volume (vph) | 7 | 1 | 47 | 118 | 1 | 1 | 15 | 285 | 53 | 0 | 349 | 2 |
| Future Volume (vph) | 7 | 1 | 47 | 118 | 1 | 1 | 15 | 285 | 53 | 0 | 349 | 2 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 150 | | 150 | 150 | | 0 |
| Storage Lanes | 0 | | 0 | 0 | | 0 | 1 | | 1 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. 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 |
| Frt | | 0.884 | | | 0.999 | | | | 0.850 | | 0.999 | |
| Flt Protected | | 0.994 | | | 0.953 | | 0.950 | | | | | |
| Satd. Flow (prot) | 0 | 1637 | 0 | 0 | 1773 | 0 | 1770 | 1863 | 1583 | 1863 | 1861 | 0 |
| Flt Permitted | | 0.994 | | | 0.953 | | 0.950 | | | | | |
| Satd. Flow (perm) | 0 | 1637 | 0 | 0 | 1773 | 0 | 1770 | 1863 | 1583 | 1863 | 1861 | 0 |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 501 | | | 660 | | | 450 | | | 300 | |
| Travel Time (s) | | 11.4 | | | 15.0 | | | 10.2 | | | 6.8 | |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.83 | 0.78 | 0.78 | 0.78 | 0.88 | 0.78 | 0.78 | 0.88 | 0.78 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% |
| Adj. Flow (vph) | 9 | 1 | 60 | 142 | 1 | 1 | 19 | 324 | 68 | 0 | 397 | 3 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 70 | 0 | 0 | 144 | 0 | 19 | 324 | 68 | 0 | 400 | 0 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 60 | | 60 | 60 | | 60 | 60 | | 60 | 60 | | 60 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Intersection Summary | | | | | | | | | | | | |
| Area Type: | Other | | | | | | | | | | | |
| Control Type: | Unsignalized | | | | | | | | | | | |
| Intersection Capacity Utilization | 38.5% | | | | | | ICU Level of Service A | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |

| Intersection | | | | | | | | | | | | |
|--------------------------|--------|---|--------|-------|---|--------|---|---|---|---|---|------|
| Int Delay, s/veh | 5.5 | | | | | | | | | | | |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | |  |  |  |  |  | |
| Traffic Vol, veh/h | 7 | 1 | 47 | 118 | 1 | 1 | 15 | 285 | 53 | 0 | 349 | 2 |
| Future Vol, veh/h | 7 | 1 | 47 | 118 | 1 | 1 | 15 | 285 | 53 | 0 | 349 | 2 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 150 | - | 150 | 150 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 78 | 78 | 78 | 83 | 78 | 78 | 78 | 88 | 78 | 78 | 88 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 9 | 1 | 60 | 142 | 1 | 1 | 19 | 324 | 68 | 0 | 397 | 3 |
| | | | | | | | | | | | | |
| Major/Minor | Minor2 | | Minor1 | | | Major1 | | | Major2 | | | |
| Conflicting Flow All | 796 | 829 | 399 | 791 | 762 | 324 | 400 | 0 | 0 | 392 | 0 | 0 |
| Stage 1 | 399 | 399 | - | 362 | 362 | - | - | - | - | - | - | - |
| Stage 2 | 397 | 430 | - | 429 | 400 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 305 | 306 | 651 | 307 | 335 | 717 | 1159 | - | - | 1167 | - | - |
| Stage 1 | 627 | 602 | - | 657 | 625 | - | - | - | - | - | - | - |
| Stage 2 | 629 | 583 | - | 604 | 602 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 300 | 301 | 651 | 274 | 330 | 717 | 1159 | - | - | 1167 | - | - |
| Mov Cap-2 Maneuver | 300 | 301 | - | 274 | 330 | - | - | - | - | - | - | - |
| Stage 1 | 617 | 602 | - | 646 | 615 | - | - | - | - | - | - | - |
| Stage 2 | 616 | 574 | - | 547 | 602 | - | - | - | - | - | - | - |
| | | | | | | | | | | | | |
| Approach | EB | | WB | | | NB | | | SB | | | |
| HCM Control Delay, s | 12.4 | | 31.6 | | | 0.4 | | | 0 | | | |
| HCM LOS | B | | D | | | | | | | | | |
| | | | | | | | | | | | | |
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR | | | | |
| Capacity (veh/h) | 1159 | - | - | 556 | 276 | 1167 | - | - | | | | |
| HCM Lane V/C Ratio | 0.017 | - | - | 0.127 | 0.524 | - | - | - | | | | |
| HCM Control Delay (s) | 8.2 | - | - | 12.4 | 31.6 | 0 | - | - | | | | |
| HCM Lane LOS | A | - | - | B | D | A | - | - | | | | |
| HCM 95th %tile Q(veh) | 0.1 | - | - | 0.4 | 2.8 | 0 | - | - | | | | |

Lanes, Volumes, Timings
15: Walden Street & 105th Place

JR Engineering
10/19/2023

| |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations |  | |  | |  |  |
| Traffic Volume (vph) | 23 | 1 | 279 | 2 | 1 | 233 |
| Future Volume (vph) | 23 | 1 | 279 | 2 | 1 | 233 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | 0 | | 0 | 100 | |
| Storage Lanes | 1 | 0 | | 0 | 1 | |
| Taper Length (ft) | 25 | | | | 25 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.995 | | 0.999 | | | |
| Flt Protected | 0.954 | | | | 0.950 | |
| Satd. Flow (prot) | 1768 | 0 | 1861 | 0 | 1770 | 1863 |
| Flt Permitted | 0.954 | | | | 0.950 | |
| Satd. Flow (perm) | 1768 | 0 | 1861 | 0 | 1770 | 1863 |
| Link Speed (mph) | 45 | | 45 | | | 45 |
| Link Distance (ft) | 229 | | 280 | | | 395 |
| Travel Time (s) | 3.5 | | 4.2 | | | 6.0 |
| Peak Hour Factor | 0.78 | 0.78 | 0.88 | 0.78 | 0.78 | 0.87 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% |
| Adj. Flow (vph) | 29 | 1 | 317 | 3 | 1 | 268 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 30 | 0 | 320 | 0 | 1 | 268 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(ft) | 12 | | 12 | | | 12 |
| Link Offset(ft) | 0 | | 0 | | | 0 |
| Crosswalk Width(ft) | 16 | | 16 | | | 16 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 60 | 60 | | 60 | 60 | |
| Sign Control | Stop | | Free | | | Free |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 24.8% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

| Intersection | | | | | | |
|--------------------------|---|------|---|------|---|---|
| Int Delay, s/veh | 0.6 | | | | | |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations |  | |  | |  |  |
| Traffic Vol, veh/h | 23 | 1 | 279 | 2 | 1 | 233 |
| Future Vol, veh/h | 23 | 1 | 279 | 2 | 1 | 233 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 100 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 78 | 78 | 88 | 78 | 78 | 87 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 29 | 1 | 317 | 3 | 1 | 268 |

















| Major/Minor | Minor1 | Major1 | Major2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 589 | 319 | 0 |
| Stage 1 | 319 | - | - |
| Stage 2 | 270 | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 |
| Critical Hdwy Stg 1 | 5.42 | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 |
| Pot Cap-1 Maneuver | 471 | 722 | 1240 |
| Stage 1 | 737 | - | - |
| Stage 2 | 775 | - | - |
| Platoon blocked, % | | - | - |
| Mov Cap-1 Maneuver | 471 | 722 | 1240 |
| Mov Cap-2 Maneuver | 471 | - | - |
| Stage 1 | 737 | - | - |
| Stage 2 | 774 | - | - |





| Approach | WB | NB | SB |
|----------------------|----|----|----|
| HCM Control Delay, s | 13 | 0 | 0 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NBT | NBRWBLn1 | SBL | SBT |
|-----------------------|-----|----------|-------|-------|
| Capacity (veh/h) | - | - | 478 | 1240 |
| HCM Lane V/C Ratio | - | - | 0.064 | 0.001 |
| HCM Control Delay (s) | - | - | 13 | 7.9 |
| HCM Lane LOS | - | - | B | A |
| HCM 95th %tile Q(veh) | - | - | 0.2 | 0 |

Lanes, Volumes, Timings
16: Yampa Street & 105th Avenue

JR Engineering
10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Volume (vph) | 2 | 44 | 1 | 80 | 59 | 42 | 1 | 10 | 131 | 53 | 8 | 18 |
| Future Volume (vph) | 2 | 44 | 1 | 80 | 59 | 42 | 1 | 10 | 131 | 53 | 8 | 18 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. 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 |
| Frt | | 0.998 | | | 0.969 | | | 0.875 | | | 0.969 | |
| Flt Protected | | 0.998 | | | 0.978 | | | | | | 0.967 | |
| Satd. Flow (prot) | 0 | 1855 | 0 | 0 | 1765 | 0 | 0 | 1630 | 0 | 0 | 1745 | 0 |
| Flt Permitted | | 0.998 | | | 0.978 | | | | | | 0.967 | |
| Satd. Flow (perm) | 0 | 1855 | 0 | 0 | 1765 | 0 | 0 | 1630 | 0 | 0 | 1745 | 0 |
| Link Speed (mph) | | 25 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 660 | | | 660 | | | 300 | | | 280 | |
| Travel Time (s) | | 18.0 | | | 15.0 | | | 6.8 | | | 6.4 | |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% |
| Adj. Flow (vph) | 3 | 56 | 1 | 103 | 76 | 54 | 1 | 13 | 168 | 68 | 10 | 23 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 60 | 0 | 0 | 233 | 0 | 0 | 182 | 0 | 0 | 101 | 0 |
| 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 | | | 0 | | | 0 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway 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 |
| Turning Speed (mph) | 60 | | 60 | 60 | | 60 | 60 | | 60 | 60 | | 60 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Intersection Summary | | | | | | | | | | | | |
| Area Type: | Other | | | | | | | | | | | |
| Control Type: | Unsignalized | | | | | | | | | | | |
| Intersection Capacity Utilization | 39.9% | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |
| | ICU Level of Service A | | | | | | | | | | | |

| Intersection | | | | | | | | | | | | |
|--------------------------|--------|---|------|--------|---|------|--------|---|-------|--------|---|-------|
| Int Delay, s/veh | 7.1 | | | | | | | | | | | |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Vol, veh/h | 2 | 44 | 1 | 80 | 59 | 42 | 1 | 10 | 131 | 53 | 8 | 18 |
| Future Vol, veh/h | 2 | 44 | 1 | 80 | 59 | 42 | 1 | 10 | 131 | 53 | 8 | 18 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 3 | 56 | 1 | 103 | 76 | 54 | 1 | 13 | 168 | 68 | 10 | 23 |
| | | | | | | | | | | | | |
| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
| Conflicting Flow All | 130 | 0 | 0 | 57 | 0 | 0 | 389 | 399 | 57 | 462 | 372 | 103 |
| Stage 1 | - | - | - | - | - | - | 63 | 63 | - | 309 | 309 | - |
| Stage 2 | - | - | - | - | - | - | 326 | 336 | - | 153 | 63 | - |
| Critical Hdwy | 4.12 | - | - | 4.12 | - | - | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Follow-up Hdwy | 2.218 | - | - | 2.218 | - | - | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 |
| Pot Cap-1 Maneuver | 1455 | - | - | 1547 | - | - | 570 | 539 | 1009 | 510 | 558 | 952 |
| Stage 1 | - | - | - | - | - | - | 948 | 842 | - | 701 | 660 | - |
| Stage 2 | - | - | - | - | - | - | 687 | 642 | - | 849 | 842 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 1455 | - | - | 1547 | - | - | 517 | 499 | 1009 | 393 | 517 | 952 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 517 | 499 | - | 393 | 517 | - |
| Stage 1 | - | - | - | - | - | - | 946 | 840 | - | 700 | 612 | - |
| Stage 2 | - | - | - | - | - | - | 612 | 596 | - | 695 | 840 | - |
| | | | | | | | | | | | | |
| Approach | EB | | | WB | | | NB | | | SB | | |
| HCM Control Delay, s | 0.3 | | | 3.3 | | | 9.8 | | | 14.8 | | |
| HCM LOS | | | | | | | A | | | B | | |
| | | | | | | | | | | | | |
| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 | | | | |
| Capacity (veh/h) | 935 | 1455 | - | - | 1547 | - | - | 467 | | | | |
| HCM Lane V/C Ratio | 0.195 | 0.002 | - | - | 0.066 | - | - | 0.217 | | | | |
| HCM Control Delay (s) | 9.8 | 7.5 | 0 | - | 7.5 | 0 | - | 14.8 | | | | |
| HCM Lane LOS | A | A | A | - | A | A | - | B | | | | |
| HCM 95th %tile Q(veh) | 0.7 | 0 | - | - | 0.2 | - | - | 0.8 | | | | |

Lanes, Volumes, Timings
17: Yampa Street & Homestead Trail

JR Engineering
10/19/2023



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|----------------------------|-------|-------|------|-------|-------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 14 | 3 | 8 | 23 | 2 | 6 |
| Future Volume (vph) | 14 | 3 | 8 | 23 | 2 | 6 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 100 | 0 | 0 | | | 0 |
| Storage Lanes | 1 | 1 | 0 | | | 0 |
| Taper Length (ft) | 25 | | 25 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | 0.902 | |
| Flt Protected | 0.950 | | | 0.987 | | |
| Satd. Flow (prot) | 1770 | 1583 | 0 | 1839 | 1680 | 0 |
| Flt Permitted | 0.950 | | | 0.987 | | |
| Satd. Flow (perm) | 1770 | 1583 | 0 | 1839 | 1680 | 0 |
| Link Speed (mph) | 45 | | | 45 | 45 | |
| Link Distance (ft) | 666 | | | 181 | 194 | |
| Travel Time (s) | 10.1 | | | 2.7 | 2.9 | |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% |
| Adj. Flow (vph) | 18 | 4 | 10 | 29 | 3 | 8 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 18 | 4 | 0 | 39 | 11 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 12 | | | 0 | 0 | |
| Link Offset(ft) | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 60 | 60 | | | 9 |
| Sign Control | Stop | | | Stop | Stop | |

Intersection Summary

Area Type: Other





Control Type: Unsignalized

Intersection Capacity Utilization 18.2% ICU Level of Service A

Analysis Period (min) 15

Intersection

| | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.3 |
| Intersection LOS | A |

































| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---------------------|---|---|------|---|---|------|
| Lane Configurations |  |  | |  |  | |
| Traffic Vol, veh/h | 14 | 3 | 8 | 23 | 2 | 6 |
| Future Vol, veh/h | 14 | 3 | 8 | 23 | 2 | 6 |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 18 | 4 | 10 | 29 | 3 | 8 |
| Number of Lanes | 1 | 1 | 0 | 1 | 1 | 0 |

| Approach | EB | NB | SB |
|----------------------------|-----|-----|-----|
| Opposing Approach | | SB | NB |
| Opposing Lanes | 0 | 1 | 1 |
| Conflicting Approach Left | SB | EB | |
| Conflicting Lanes Left | 1 | 2 | 0 |
| Conflicting Approach Right | NB | | EB |
| Conflicting Lanes Right | 1 | 0 | 2 |
| HCM Control Delay | 7.8 | 7.2 | 6.6 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | EBLn2 | SBLn1 |
|------------------------|-------|-------|-------|-------|
| Vol Left, % | 26% | 100% | 0% | 0% |
| Vol Thru, % | 74% | 0% | 0% | 25% |
| Vol Right, % | 0% | 0% | 100% | 75% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 31 | 14 | 3 | 8 |
| LT Vol | 8 | 14 | 0 | 0 |
| Through Vol | 23 | 0 | 0 | 2 |
| RT Vol | 0 | 0 | 3 | 6 |
| Lane Flow Rate | 40 | 18 | 4 | 10 |
| Geometry Grp | 2 | 7 | 7 | 2 |
| Degree of Util (X) | 0.044 | 0.026 | 0.004 | 0.01 |
| Departure Headway (Hd) | 4.03 | 5.121 | 3.92 | 3.55 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 889 | 701 | 914 | 1006 |
| Service Time | 2.052 | 2.84 | 1.639 | 1.579 |
| HCM Lane V/C Ratio | 0.045 | 0.026 | 0.004 | 0.01 |
| HCM Control Delay | 7.2 | 8 | 6.7 | 6.6 |
| HCM Lane LOS | A | A | A | A |
| HCM 95th-tile Q | 0.1 | 0.1 | 0 | 0 |

Lanes, Volumes, Timings
1: Tower Road & 104th Avenue













JR Engineering
10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------|---|---|---|---|---|--|---|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |    |  |  |    |  |   |   |  |  |    |  |
| Traffic Volume (vph) | 226 | 183 | 480 | 24 | 249 | 25 | 749 | 963 | 29 | 38 | 653 | 96 |
| Future Volume (vph) | 226 | 183 | 480 | 24 | 249 | 25 | 749 | 963 | 29 | 38 | 653 | 96 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 350 | | 590 | 330 | | 440 | 320 | | 290 | 290 | | 190 |
| Storage Lanes | 1 | | 1 | 1 | | 1 | 2 | | 1 | 1 | | 1 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frt | | | 0.850 | | | 0.850 | | | 0.850 | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1770 | 5085 | 1583 | 1770 | 5085 | 1583 | 3433 | 3539 | 1583 | 1770 | 3539 | 1583 |
| Flt Permitted | 0.375 | | | 0.610 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 699 | 5085 | 1583 | 1136 | 5085 | 1583 | 3433 | 3539 | 1583 | 1770 | 3539 | 1583 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 545 | | | 264 | | | 182 | | | 256 |
| Link Speed (mph) | | 45 | | | 45 | | | 45 | | | 45 | |
| Link Distance (ft) | | 660 | | | 1515 | | | 645 | | | 450 | |
| Travel Time (s) | | 10.0 | | | 23.0 | | | 9.8 | | | 6.8 | |
| Peak Hour Factor | 0.87 | 0.84 | 0.88 | 0.78 | 0.88 | 0.78 | 0.92 | 0.92 | 0.78 | 0.78 | 0.92 | 0.80 |
| Adj. Flow (vph) | 260 | 218 | 545 | 31 | 283 | 32 | 814 | 1047 | 37 | 49 | 710 | 120 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 260 | 218 | 545 | 31 | 283 | 32 | 814 | 1047 | 37 | 49 | 710 | 120 |
| 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) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway 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 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 |
| Detector Template | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Leading Detector (ft) | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 |
| Trailing Detector (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Position(ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Size(ft) | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | 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 | 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 | 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 | 0.0 | 0.0 | 0.0 |
| Detector 2 Position(ft) | | 94 | | | 94 | | | 94 | | | 94 | |
| 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 | pm+pt | NA | Perm | pm+pt | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | 8 | | 8 | | | 2 | | | 6 |

Lanes, Volumes, Timings

1: Tower Road & 104th Avenue

JR Engineering
10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Detector Phase | 7 | 4 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 8.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 |
| Minimum Split (s) | 15.4 | 17.4 | 17.4 | 15.4 | 17.4 | 17.4 | 16.2 | 18.2 | 18.2 | 16.2 | 18.2 | 18.2 |
| Total Split (s) | 26.0 | 25.0 | 25.0 | 21.0 | 20.0 | 20.0 | 45.0 | 57.0 | 57.0 | 17.0 | 29.0 | 29.0 |
| Total Split (%) | 21.7% | 20.8% | 20.8% | 17.5% | 16.7% | 16.7% | 37.5% | 47.5% | 47.5% | 14.2% | 24.2% | 24.2% |
| Maximum Green (s) | 18.6 | 17.6 | 17.6 | 13.6 | 12.6 | 12.6 | 36.8 | 48.8 | 48.8 | 8.8 | 20.8 | 20.8 |
| Yellow Time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 |
| All-Red Time (s) | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Vehicle Extension (s) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 5.0 | 5.0 | 3.0 | 5.0 | 5.0 |
| Recall Mode | None | None | None | None | None | None | None | C-Max | C-Max | None | C-Max | C-Max |
| Act Effect Green (s) | 36.3 | 27.1 | 27.1 | 19.1 | 11.1 | 11.1 | 32.3 | 54.6 | 54.6 | 8.6 | 27.6 | 27.6 |
| Actuated g/C Ratio | 0.30 | 0.23 | 0.23 | 0.16 | 0.09 | 0.09 | 0.27 | 0.46 | 0.46 | 0.07 | 0.23 | 0.23 |
| v/c Ratio | 0.70 | 0.19 | 0.70 | 0.14 | 0.60 | 0.08 | 0.88 | 0.65 | 0.05 | 0.39 | 0.87 | 0.21 |
| Control Delay | 41.9 | 37.0 | 18.0 | 31.6 | 57.8 | 0.4 | 53.7 | 29.3 | 0.1 | 62.5 | 58.2 | 0.9 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 41.9 | 37.0 | 18.0 | 31.6 | 57.8 | 0.4 | 53.7 | 29.3 | 0.1 | 62.5 | 58.2 | 0.9 |
| LOS | D | D | B | C | E | A | D | C | A | E | E | A |
| Approach Delay | 28.1 | | | 50.1 | | | 39.2 | | | 50.6 | | |
| Approach LOS | C | | | D | | | D | | | D | | |

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 39.8

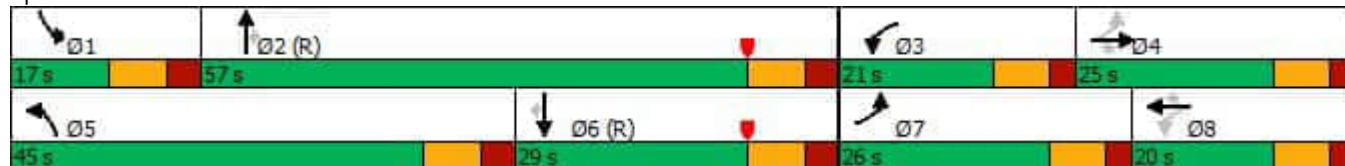
Intersection LOS: D

Intersection Capacity Utilization 86.3%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: Tower Road & 104th Avenue



Queues

JR Engineering

10/19/2023

1: Tower Road & 104th Avenue



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Group Flow (vph) | 260 | 218 | 545 | 31 | 283 | 32 | 814 | 1047 | 37 | 49 | 710 | 120 |
| v/c Ratio | 0.70 | 0.19 | 0.70 | 0.14 | 0.60 | 0.08 | 0.88 | 0.65 | 0.05 | 0.39 | 0.87 | 0.21 |
| Control Delay | 41.9 | 37.0 | 18.0 | 31.6 | 57.8 | 0.4 | 53.7 | 29.3 | 0.1 | 62.5 | 58.2 | 0.9 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 41.9 | 37.0 | 18.0 | 31.6 | 57.8 | 0.4 | 53.7 | 29.3 | 0.1 | 62.5 | 58.2 | 0.9 |
| Queue Length 50th (ft) | 165 | 53 | 161 | 17 | 78 | 0 | 309 | 345 | 0 | 37 | 284 | 0 |
| Queue Length 95th (ft) | 244 | 75 | 249 | 34 | 106 | 0 | 370 | 435 | 0 | 67 | #465 | 0 |
| Internal Link Dist (ft) | | 580 | | | 1435 | | | 565 | | | 370 | |
| Turn Bay Length (ft) | 350 | | 590 | 330 | | 440 | 320 | | 290 | 290 | | 190 |
| Base Capacity (vph) | 377 | 1146 | 779 | 306 | 533 | 402 | 1052 | 1609 | 819 | 131 | 814 | 561 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.69 | 0.19 | 0.70 | 0.10 | 0.53 | 0.08 | 0.77 | 0.65 | 0.05 | 0.37 | 0.87 | 0.21 |

Intersection Summary
































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

Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary

1: Tower Road & 104th Avenue

JR Engineering
10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|--|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |    |  |  |    |  |   |   |  |  |   |  |
| Traffic Volume (veh/h) | 226 | 183 | 480 | 24 | 249 | 25 | 749 | 963 | 29 | 38 | 653 | 96 |
| Future Volume (veh/h) | 226 | 183 | 480 | 24 | 249 | 25 | 749 | 963 | 29 | 38 | 653 | 96 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 260 | 218 | 0 | 31 | 283 | 0 | 814 | 1047 | 0 | 49 | 710 | 0 |
| Peak Hour Factor | 0.87 | 0.84 | 0.88 | 0.78 | 0.88 | 0.78 | 0.92 | 0.92 | 0.78 | 0.78 | 0.92 | 0.80 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 352 | 951 | | 233 | 426 | | 883 | 1624 | | 96 | 907 | |
| Arrive On Green | 0.05 | 0.06 | 0.00 | 0.04 | 0.08 | 0.00 | 0.26 | 0.46 | 0.00 | 0.05 | 0.26 | 0.00 |
| Sat Flow, veh/h | 1781 | 5106 | 1585 | 1781 | 5106 | 1585 | 3456 | 3554 | 1585 | 1781 | 3554 | 1585 |
| Grp Volume(v), veh/h | 260 | 218 | 0 | 31 | 283 | 0 | 814 | 1047 | 0 | 49 | 710 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1702 | 1585 | 1781 | 1702 | 1585 | 1728 | 1777 | 1585 | 1781 | 1777 | 1585 |
| Q Serve(g_s), s | 15.5 | 4.9 | 0.0 | 1.9 | 6.5 | 0.0 | 27.5 | 27.2 | 0.0 | 3.2 | 22.3 | 0.0 |
| Cycle Q Clear(g_c), s | 15.5 | 4.9 | 0.0 | 1.9 | 6.5 | 0.0 | 27.5 | 27.2 | 0.0 | 3.2 | 22.3 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 352 | 951 | | 233 | 426 | | 883 | 1624 | | 96 | 907 | |
| V/C Ratio(X) | 0.74 | 0.23 | | 0.13 | 0.67 | | 0.92 | 0.64 | | 0.51 | 0.78 | |
| Avail Cap(c_a), veh/h | 368 | 951 | | 359 | 536 | | 1060 | 1624 | | 131 | 907 | |
| HCM Platoon Ratio | 0.33 | 0.33 | 0.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 45.0 | 48.1 | 0.0 | 46.6 | 53.4 | 0.0 | 43.5 | 25.1 | 0.0 | 55.3 | 41.6 | 0.0 |
| Incr Delay (d2), s/veh | 6.3 | 0.0 | 0.0 | 0.1 | 1.1 | 0.0 | 10.5 | 2.0 | 0.0 | 4.2 | 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 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 7.9 | 2.1 | 0.0 | 0.8 | 2.7 | 0.0 | 12.6 | 11.2 | 0.0 | 1.5 | 10.3 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 51.2 | 48.2 | 0.0 | 46.7 | 54.5 | 0.0 | 54.0 | 27.1 | 0.0 | 59.5 | 48.3 | 0.0 |
| LnGrp LOS | D | D | | D | D | | D | C | | E | D | |
| Approach Vol, veh/h | | 478 | | | 314 | | | 1861 | | | 759 | |
| Approach Delay, s/veh | | 49.8 | | | 53.7 | | | 38.9 | | | 49.0 | |
| Approach LOS | | D | | | D | | | D | | | D | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 14.6 | 63.1 | 12.6 | 29.8 | 38.9 | 38.8 | 24.9 | 17.4 | | | | |
| Change Period (Y+Rc), s | 8.2 | 8.2 | 7.4 | 7.4 | 8.2 | 8.2 | 7.4 | 7.4 | | | | |
| Max Green Setting (Gmax), s | 8.8 | 48.8 | 13.6 | 17.6 | 36.8 | 20.8 | 18.6 | 12.6 | | | | |
| Max Q Clear Time (g_c+I1), s | 5.2 | 29.2 | 3.9 | 6.9 | 29.5 | 24.3 | 17.5 | 8.5 | | | | |
| Green Ext Time (p_c), s | 0.0 | 11.3 | 0.0 | 0.6 | 1.2 | 0.0 | 0.0 | 0.4 | | | | |

Intersection Summary

| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 44.0 |
| HCM 6th LOS | D |

























Notes

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

Lanes, Volumes, Timings

2: Walden Street & 104th Avenue













JR Engineering
10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 97 | 633 | 133 | 21 | 872 | 159 | 181 | 41 | 38 | 256 | 16 | 90 |
| Future Volume (vph) | 97 | 633 | 133 | 21 | 872 | 159 | 181 | 41 | 38 | 256 | 16 | 90 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 400 | | 230 | 0 | | 250 | 230 | | 230 | 210 | | 140 |
| Storage Lanes | 1 | | 1 | 1 | | 1 | 1 | | 1 | 1 | | 1 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.850 | | | 0.850 | | | 0.850 | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1770 | 3539 | 1583 | 1770 | 3539 | 1583 | 1770 | 1863 | 1583 | 1770 | 1863 | 1583 |
| Flt Permitted | 0.175 | | | 0.363 | | | 0.744 | | | 0.401 | | |
| Satd. Flow (perm) | 326 | 3539 | 1583 | 676 | 3539 | 1583 | 1386 | 1863 | 1583 | 747 | 1863 | 1583 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 218 | | | 218 | | | 227 | | | 168 |
| Link Speed (mph) | | 45 | | | 45 | | | 25 | | | 25 | |
| Link Distance (ft) | | 900 | | | 660 | | | 652 | | | 450 | |
| Travel Time (s) | | 13.6 | | | 10.0 | | | 17.8 | | | 12.3 | |
| Peak Hour Factor | 0.80 | 0.92 | 0.84 | 0.78 | 0.92 | 0.84 | 0.84 | 0.78 | 0.78 | 0.87 | 0.78 | 0.80 |
| Adj. Flow (vph) | 121 | 688 | 158 | 27 | 948 | 189 | 215 | 53 | 49 | 294 | 21 | 113 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 121 | 688 | 158 | 27 | 948 | 189 | 215 | 53 | 49 | 294 | 21 | 113 |
| 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) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway 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 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 |
| Detector Template | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Leading Detector (ft) | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 |
| Trailing Detector (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Position(ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Size(ft) | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | 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 | 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 | 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 | 0.0 | 0.0 | 0.0 |
| Detector 2 Position(ft) | | 94 | | | 94 | | | 94 | | | 94 | |
| 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 | pm+pt | NA | Perm | pm+pt | NA | Perm | pm+pt | NA | Perm | pm+pt | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | 2 | | 2 | 6 | | 6 | 8 | | 8 | 4 | | 4 |

Lanes, Volumes, Timings

2: Walden Street & 104th Avenue

JR Engineering
10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 6 | 3 | 8 | 8 | 7 | 4 | 4 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 | 8.0 | 10.0 | 10.0 |
| Minimum Split (s) | 12.5 | 17.5 | 17.5 | 12.5 | 17.5 | 17.5 | 14.5 | 16.5 | 16.5 | 14.5 | 16.5 | 16.5 |
| Total Split (s) | 18.0 | 57.0 | 57.0 | 13.0 | 52.0 | 52.0 | 25.0 | 17.0 | 17.0 | 33.0 | 25.0 | 25.0 |
| Total Split (%) | 15.0% | 47.5% | 47.5% | 10.8% | 43.3% | 43.3% | 20.8% | 14.2% | 14.2% | 27.5% | 20.8% | 20.8% |
| Maximum Green (s) | 10.5 | 49.5 | 49.5 | 5.5 | 44.5 | 44.5 | 18.5 | 10.5 | 10.5 | 26.5 | 18.5 | 18.5 |
| Yellow Time (s) | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| All-Red Time (s) | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Vehicle Extension (s) | 2.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Recall Mode | None | C-Max | C-Max | None | C-Max | C-Max | None | None | None | None | None | None |
| Act Effect Green (s) | 66.4 | 60.7 | 60.7 | 58.1 | 52.8 | 52.8 | 23.8 | 10.1 | 10.1 | 37.0 | 15.2 | 15.2 |
| Actuated g/C Ratio | 0.55 | 0.51 | 0.51 | 0.48 | 0.44 | 0.44 | 0.20 | 0.08 | 0.08 | 0.31 | 0.13 | 0.13 |
| v/c Ratio | 0.43 | 0.38 | 0.17 | 0.07 | 0.61 | 0.23 | 0.66 | 0.34 | 0.14 | 0.67 | 0.09 | 0.33 |
| Control Delay | 18.1 | 21.0 | 1.2 | 4.0 | 15.9 | 3.2 | 43.9 | 58.1 | 0.9 | 41.5 | 45.6 | 4.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 18.1 | 21.0 | 1.2 | 4.0 | 15.9 | 3.2 | 43.9 | 58.1 | 0.9 | 41.5 | 45.6 | 4.0 |
| LOS | B | C | A | A | B | A | D | E | A | D | D | A |
| Approach Delay | 17.4 | | | 13.6 | | | 39.6 | | | 31.8 | | |
| Approach LOS | B | | | B | | | D | | | C | | |

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 6 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 20.5

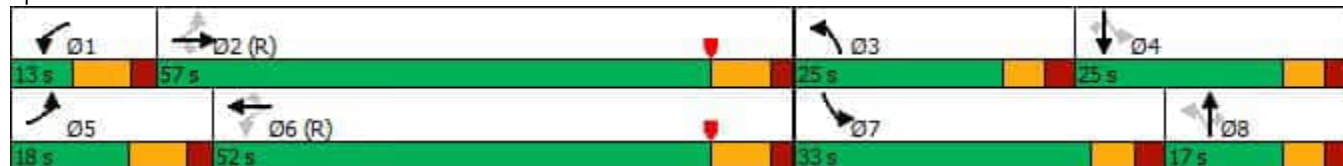
Intersection LOS: C

Intersection Capacity Utilization 68.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: Walden Street & 104th Avenue



Queues
2: Walden Street & 104th Avenue

JR Engineering
10/19/2023



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Group Flow (vph) | 121 | 688 | 158 | 27 | 948 | 189 | 215 | 53 | 49 | 294 | 21 | 113 |
| v/c Ratio | 0.43 | 0.38 | 0.17 | 0.07 | 0.61 | 0.23 | 0.66 | 0.34 | 0.14 | 0.67 | 0.09 | 0.33 |
| Control Delay | 18.1 | 21.0 | 1.2 | 4.0 | 15.9 | 3.2 | 43.9 | 58.1 | 0.9 | 41.5 | 45.6 | 4.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 18.1 | 21.0 | 1.2 | 4.0 | 15.9 | 3.2 | 43.9 | 58.1 | 0.9 | 41.5 | 45.6 | 4.0 |
| Queue Length 50th (ft) | 42 | 184 | 0 | 2 | 334 | 2 | 128 | 39 | 0 | 185 | 15 | 0 |
| Queue Length 95th (ft) | 70 | 256 | 5 | m6 | 473 | m16 | 170 | 70 | 0 | 245 | 33 | 0 |
| Internal Link Dist (ft) | | 820 | | | 580 | | | 572 | | | 370 | |
| Turn Bay Length (ft) | 400 | | 230 | | | 250 | 230 | | 230 | 210 | | 140 |
| Base Capacity (vph) | 308 | 1790 | 908 | 379 | 1557 | 819 | 366 | 163 | 345 | 462 | 287 | 386 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.39 | 0.38 | 0.17 | 0.07 | 0.61 | 0.23 | 0.59 | 0.33 | 0.14 | 0.64 | 0.07 | 0.29 |

























Intersection Summary

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

HCM 6th Signalized Intersection Summary

2: Walden Street & 104th Avenue

JR Engineering
10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h) | 97 | 633 | 133 | 21 | 872 | 159 | 181 | 41 | 38 | 256 | 16 | 90 |
| Future Volume (veh/h) | 97 | 633 | 133 | 21 | 872 | 159 | 181 | 41 | 38 | 256 | 16 | 90 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 121 | 688 | 158 | 27 | 948 | 189 | 215 | 53 | 49 | 294 | 21 | 112 |
| Peak Hour Factor | 0.80 | 0.92 | 0.84 | 0.78 | 0.92 | 0.84 | 0.84 | 0.78 | 0.78 | 0.87 | 0.78 | 0.80 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 259 | 1748 | 780 | 345 | 1654 | 738 | 389 | 156 | 132 | 430 | 232 | 196 |
| Arrive On Green | 0.05 | 0.49 | 0.49 | 0.01 | 0.15 | 0.15 | 0.13 | 0.08 | 0.08 | 0.17 | 0.12 | 0.12 |
| Sat Flow, veh/h | 1781 | 3554 | 1585 | 1781 | 3554 | 1585 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 121 | 688 | 158 | 27 | 948 | 189 | 215 | 53 | 49 | 294 | 21 | 112 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1585 | 1781 | 1777 | 1585 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 4.2 | 14.6 | 6.7 | 0.9 | 29.7 | 12.6 | 13.0 | 3.2 | 3.5 | 17.7 | 1.2 | 8.0 |
| Cycle Q Clear(g_c), s | 4.2 | 14.6 | 6.7 | 0.9 | 29.7 | 12.6 | 13.0 | 3.2 | 3.5 | 17.7 | 1.2 | 8.0 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 259 | 1748 | 780 | 345 | 1654 | 738 | 389 | 156 | 132 | 430 | 232 | 196 |
| V/C Ratio(X) | 0.47 | 0.39 | 0.20 | 0.08 | 0.57 | 0.26 | 0.55 | 0.34 | 0.37 | 0.68 | 0.09 | 0.57 |
| Avail Cap(c_a), veh/h | 324 | 1748 | 780 | 383 | 1654 | 738 | 439 | 164 | 139 | 527 | 288 | 244 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 19.9 | 19.2 | 17.2 | 16.7 | 39.7 | 32.5 | 42.7 | 51.9 | 52.0 | 40.2 | 46.6 | 49.6 |
| Incr Delay (d2), s/veh | 0.5 | 0.7 | 0.6 | 0.0 | 1.5 | 0.8 | 0.5 | 0.5 | 0.6 | 1.7 | 0.1 | 1.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.7 | 5.9 | 2.6 | 0.4 | 14.4 | 5.5 | 5.8 | 1.5 | 1.4 | 8.0 | 0.6 | 3.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 20.4 | 19.9 | 17.8 | 16.7 | 41.2 | 33.3 | 43.1 | 52.4 | 52.7 | 41.8 | 46.6 | 50.5 |
| LnGrp LOS | C | B | B | B | D | C | D | D | D | D | D | D |
| Approach Vol, veh/h | | 967 | | | 1164 | | | 317 | | | 427 | |
| Approach Delay, s/veh | | 19.6 | | | 39.3 | | | 46.1 | | | 44.4 | |
| Approach LOS | | B | | | D | | | D | | | D | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 10.5 | 66.5 | 21.6 | 21.4 | 13.7 | 63.3 | 26.5 | 16.5 | | | | |
| Change Period (Y+Rc), s | * 7.5 | * 7.5 | 6.5 | 6.5 | * 7.5 | * 7.5 | 6.5 | 6.5 | | | | |
| Max Green Setting (Gmax), s | * 5.5 | * 50 | 18.5 | 18.5 | * 11 | * 45 | 26.5 | 10.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.9 | 16.6 | 15.0 | 10.0 | 6.2 | 31.7 | 19.7 | 5.5 | | | | |
| Green Ext Time (p_c), s | 0.0 | 10.8 | 0.1 | 0.1 | 0.0 | 8.4 | 0.3 | 0.1 | | | | |

Intersection Summary

















| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 34.2 |
| HCM 6th LOS | C |

Notes

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

Lanes, Volumes, Timings
3: Walden Street & 105th Avenue

JR Engineering
10/19/2023




















| |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Volume (vph) | 2 | 0 | 36 | 27 | 1 | 6 | 59 | 102 | 8 | 12 | 106 | 2 |
| Future Volume (vph) | 2 | 0 | 36 | 27 | 1 | 6 | 59 | 102 | 8 | 12 | 106 | 2 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. 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 |
| Frt | | 0.873 | | | 0.975 | | | 0.994 | | | 0.997 | |
| Flt Protected | | 0.997 | | | 0.962 | | | 0.982 | | | 0.995 | |
| Satd. Flow (prot) | 0 | 1621 | 0 | 0 | 1747 | 0 | 0 | 1818 | 0 | 0 | 1848 | 0 |
| Flt Permitted | | 0.997 | | | 0.962 | | | 0.982 | | | 0.995 | |
| Satd. Flow (perm) | 0 | 1621 | 0 | 0 | 1747 | 0 | 0 | 1818 | 0 | 0 | 1848 | 0 |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | |
| Link Distance (ft) | | 500 | | | 660 | | | 300 | | | 280 | |
| Travel Time (s) | | 13.6 | | | 18.0 | | | 8.2 | | | 7.6 | |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.83 | 0.78 | 0.78 | 0.83 | 0.78 |
| Adj. Flow (vph) | 3 | 0 | 46 | 35 | 1 | 8 | 76 | 123 | 10 | 15 | 128 | 3 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 49 | 0 | 0 | 44 | 0 | 0 | 209 | 0 | 0 | 146 | 0 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Sign Control | | Yield | | | Yield | | | Yield | | | Yield | |
| Intersection Summary | | | | | | | | | | | | |
| Area Type: | Other | | | | | | | | | | | |
| Control Type: | Roundabout | | | | | | | | | | | |
| Intersection Capacity Utilization 31.0% | | | | | | | | | | | | |
| ICU Level of Service A | | | | | | | | | | | | |
| Analysis Period (min) 15 | | | | | | | | | | | | |

| Intersection | | | | |
|-----------------------------|-------|-------|-------|-------|
| Intersection Delay, s/veh | 3.9 | | | |
| Intersection LOS | A | | | |
| Approach | EB | WB | NB | SB |
| Entry Lanes | 1 | 1 | 1 | 1 |
| Conflicting Circle Lanes | 1 | 1 | 1 | 1 |
| Adj Approach Flow, veh/h | 49 | 44 | 209 | 146 |
| Demand Flow Rate, veh/h | 50 | 45 | 213 | 149 |
| Vehicles Circulating, veh/h | 182 | 206 | 18 | 115 |
| Vehicles Exiting, veh/h | 82 | 25 | 214 | 136 |
| Ped Vol Crossing Leg, #/h | 0 | 0 | 0 | 0 |
| Ped Cap Adj | 1.000 | 1.000 | 1.000 | 1.000 |
| Approach Delay, s/veh | 3.6 | 3.6 | 4.0 | 4.0 |
| Approach LOS | A | A | A | A |
| Lane | Left | Left | Left | Left |
| Designated Moves | LTR | LTR | LTR | LTR |
| Assumed Moves | LTR | LTR | LTR | LTR |
| RT Channelized | | | | |
| Lane Util | 1.000 | 1.000 | 1.000 | 1.000 |
| Follow-Up Headway, s | 2.609 | 2.609 | 2.609 | 2.609 |
| Critical Headway, s | 4.976 | 4.976 | 4.976 | 4.976 |
| Entry Flow, veh/h | 50 | 45 | 213 | 149 |
| Cap Entry Lane, veh/h | 1146 | 1118 | 1355 | 1227 |
| Entry HV Adj Factor | 0.980 | 0.977 | 0.979 | 0.983 |
| Flow Entry, veh/h | 49 | 44 | 209 | 146 |
| Cap Entry, veh/h | 1123 | 1093 | 1326 | 1206 |
| V/C Ratio | 0.044 | 0.040 | 0.157 | 0.121 |
| Control Delay, s/veh | 3.6 | 3.6 | 4.0 | 4.0 |
| LOS | A | A | A | A |
| 95th %tile Queue, veh | 0 | 0 | 1 | 0 |








Lanes, Volumes, Timings
4: Walden Street & Homestead Trail

JR Engineering

10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | |  |  | |  |  | |  |  | |
| Traffic Volume (vph) | 3 | 2 | 14 | 11 | 2 | 1 | 31 | 56 | 13 | 1 | 66 | 2 |
| Future Volume (vph) | 3 | 2 | 14 | 11 | 2 | 1 | 31 | 56 | 13 | 1 | 66 | 2 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | | 0 | 150 | | 0 | 150 | | 0 | 150 | | 0 |
| Storage Lanes | 0 | | 0 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. 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 |
| Frt | | 0.903 | | | 0.962 | | | 0.970 | | | 0.995 | |
| Flt Protected | | 0.992 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1669 | 0 | 1770 | 1792 | 0 | 1770 | 1807 | 0 | 1770 | 1853 | 0 |
| Flt Permitted | | 0.992 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 1669 | 0 | 1770 | 1792 | 0 | 1770 | 1807 | 0 | 1770 | 1853 | 0 |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | |
| Link Distance (ft) | | 500 | | | 666 | | | 395 | | | 595 | |
| Travel Time (s) | | 13.6 | | | 18.2 | | | 10.8 | | | 16.2 | |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.79 | 0.78 | 0.78 | 0.78 | 0.84 | 0.78 | 0.78 | 0.84 | 0.78 |
| Adj. Flow (vph) | 4 | 3 | 18 | 14 | 3 | 1 | 40 | 67 | 17 | 1 | 79 | 3 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 25 | 0 | 14 | 4 | 0 | 40 | 84 | 0 | 1 | 82 | 0 |
| 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) | | 12 | | | 12 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway 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 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Intersection Summary | | | | | | | | | | | | |
| Area Type: | Other | | | | | | | | | | | |
| Control Type: | Unsignalized | | | | | | | | | | | |
| Intersection Capacity Utilization | 18.9% | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |
| ICU Level of Service A | | | | | | | | | | | | |

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.9 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---------------------|------|---|------|---|---|------|---|---|------|---|---|------|
| Lane Configurations | |  | |  |  | |  |  | |  |  | |
| Traffic Vol, veh/h | 3 | 2 | 14 | 11 | 2 | 1 | 31 | 56 | 13 | 1 | 66 | 2 |
| Future Vol, veh/h | 3 | 2 | 14 | 11 | 2 | 1 | 31 | 56 | 13 | 1 | 66 | 2 |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.79 | 0.78 | 0.78 | 0.78 | 0.84 | 0.78 | 0.78 | 0.84 | 0.78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 4 | 3 | 18 | 14 | 3 | 1 | 40 | 67 | 17 | 1 | 79 | 3 |
| Number of Lanes | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|----------------------------|-----|-----|-----|----|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 2 | 1 | 2 | 2 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 2 | 1 | 2 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 2 | 2 | 2 | 1 |
| HCM Control Delay | 7.8 | 8.2 | 7.9 | 8 |
| HCM LOS | A | A | A | A |

| Lane | NBLn1 | NBLn2 | EBLn1 | WBLn1 | WBLn2 | SBLn1 | SBLn2 |
|------------------------|-------|-------|-------|-------|-------|-------|-------|
| Vol Left, % | 100% | 0% | 16% | 100% | 0% | 100% | 0% |
| Vol Thru, % | 0% | 81% | 11% | 0% | 67% | 0% | 97% |
| Vol Right, % | 0% | 19% | 74% | 0% | 33% | 0% | 3% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 31 | 69 | 19 | 11 | 3 | 1 | 68 |
| LT Vol | 31 | 0 | 3 | 11 | 0 | 1 | 0 |
| Through Vol | 0 | 56 | 2 | 0 | 2 | 0 | 66 |
| RT Vol | 0 | 13 | 14 | 0 | 1 | 0 | 2 |
| Lane Flow Rate | 40 | 83 | 24 | 14 | 4 | 1 | 81 |
| Geometry Grp | 7 | 7 | 6 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.057 | 0.104 | 0.031 | 0.021 | 0.005 | 0.002 | 0.105 |
| Departure Headway (Hd) | 5.147 | 4.514 | 4.642 | 5.553 | 4.818 | 5.168 | 4.647 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 692 | 788 | 776 | 648 | 747 | 687 | 764 |
| Service Time | 2.906 | 2.274 | 2.642 | 3.254 | 2.518 | 2.94 | 2.419 |
| HCM Lane V/C Ratio | 0.058 | 0.105 | 0.031 | 0.022 | 0.005 | 0.001 | 0.106 |
| HCM Control Delay | 8.2 | 7.8 | 7.8 | 8.4 | 7.5 | 8 | 8 |
| HCM Lane LOS | A | A | A | A | A | A | A |
| HCM 95th-tile Q | 0.2 | 0.3 | 0.1 | 0.1 | 0 | 0 | 0.4 |

Lanes, Volumes, Timings
11: Tower Road & 105th Avenue

JR Engineering
10/19/2023



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|----------------------------|------|-------|-------|------|------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 0 | 161 | 72 | 1072 | 601 | 110 |
| Future Volume (vph) | 0 | 161 | 72 | 1072 | 601 | 110 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 250 | 0 | 150 | | | 150 |
| Storage Lanes | 0 | 1 | 1 | | | 1 |
| Taper Length (ft) | 25 | | 25 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.865 | | | | 0.850 |
| Flt Protected | | | 0.950 | | | |
| Satd. Flow (prot) | 0 | 1611 | 1770 | 1863 | 1863 | 1583 |
| Flt Permitted | | | 0.950 | | | |
| Satd. Flow (perm) | 0 | 1611 | 1770 | 1863 | 1863 | 1583 |
| Link Speed (mph) | 30 | | | 50 | 50 | |
| Link Distance (ft) | 660 | | | 300 | 1403 | |
| Travel Time (s) | 15.0 | | | 4.1 | 19.1 | |
| Peak Hour Factor | 0.78 | 0.79 | 0.78 | 0.93 | 0.92 | 0.80 |
| Adj. Flow (vph) | 0 | 204 | 92 | 1153 | 653 | 138 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 0 | 204 | 92 | 1153 | 653 | 138 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 0 | | | 12 | 12 | |
| Link Offset(ft) | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 9 | 15 | | | 9 |
| Sign Control | Stop | | | Free | Free | |






Intersection Summary

Area Type: Other

Control Type: Unsignalized

























Intersection Capacity Utilization 59.8% ICU Level of Service B









Analysis Period (min) 15

| Intersection | | | | | | |
|--------------------------|--------|---|---|---|---|---|
| Int Delay, s/veh | 2.1 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | |  |  |  |  |  |
| Traffic Vol, veh/h | 0 | 161 | 72 | 1072 | 601 | 110 |
| Future Vol, veh/h | 0 | 161 | 72 | 1072 | 601 | 110 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | 0 | 150 | - | - | 150 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 78 | 79 | 78 | 93 | 92 | 80 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 204 | 92 | 1153 | 653 | 138 |
| Major/Minor | Minor2 | Major1 | | Major2 | | |
| Conflicting Flow All | - | 653 | 791 | 0 | - | 0 |
| Stage 1 | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - |
| Critical Hdwy | - | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - |
| Follow-up Hdwy | - | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 0 | 467 | 829 | - | - | - |
| Stage 1 | 0 | - | - | - | - | - |
| Stage 2 | 0 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | - | 467 | 829 | - | - | - |
| Mov Cap-2 Maneuver | - | - | - | - | - | - |
| Stage 1 | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - |
| Approach | EB | NB | | SB | | |
| HCM Control Delay, s | 18.5 | 0.7 | | 0 | | |
| HCM LOS | C | | | | | |
| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR | |
| Capacity (veh/h) | 829 | - | 467 | - | - | |
| HCM Lane V/C Ratio | 0.111 | - | 0.436 | - | - | |
| HCM Control Delay (s) | 9.9 | - | 18.5 | - | - | |
| HCM Lane LOS | A | - | C | - | - | |
| HCM 95th %tile Q(veh) | 0.4 | - | 2.2 | - | - | |

Lanes, Volumes, Timings
13: Yampa Street & 104th Avenue





















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10/19/2023









| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |    |  |  |    |  | | |  | | |  |
| Traffic Volume (vph) | 44 | 873 | 5 | 17 | 970 | 93 | 0 | 0 | 4 | 0 | 0 | 42 |
| Future Volume (vph) | 44 | 873 | 5 | 17 | 970 | 93 | 0 | 0 | 4 | 0 | 0 | 42 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 150 | | 150 | 150 | | 0 | 0 | | 0 | 0 | | 0 |
| Storage Lanes | 1 | | 1 | 1 | | 1 | 0 | | 1 | 0 | | 1 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.850 | | | 0.850 | | | 0.865 | | | 0.865 |
| Flt Protected | 0.950 | | | 0.950 | | | | | | | | |
| Satd. Flow (prot) | 1770 | 5085 | 1583 | 1770 | 5085 | 1583 | 0 | 0 | 1611 | 0 | 0 | 1611 |
| Flt Permitted | 0.950 | | | 0.950 | | | | | | | | |
| Satd. Flow (perm) | 1770 | 5085 | 1583 | 1770 | 5085 | 1583 | 0 | 0 | 1611 | 0 | 0 | 1611 |
| Link Speed (mph) | | 45 | | | 45 | | | 30 | | | 30 | |
| Link Distance (ft) | | 660 | | | 660 | | | 636 | | | 450 | |
| Travel Time (s) | | 10.0 | | | 10.0 | | | 14.5 | | | 10.2 | |
| Peak Hour Factor | 0.78 | 0.92 | 0.78 | 0.78 | 0.92 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 |
| Adj. Flow (vph) | 56 | 949 | 6 | 22 | 1054 | 119 | 0 | 0 | 5 | 0 | 0 | 54 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 56 | 949 | 6 | 22 | 1054 | 119 | 0 | 0 | 5 | 0 | 0 | 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) | | 12 | | | 12 | | | 0 | | | 0 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway 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 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Intersection Summary | | | | | | | | | | | | |
| Area Type: | Other | | | | | | | | | | | |
| Control Type: | Unsignalized | | | | | | | | | | | |
| Intersection Capacity Utilization | 28.7% | | | | | | ICU Level of Service A | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |

| Intersection | | | | | | | | | | | | |
|--------------------------|---|---|---|---|---|---|------|-------|---|------|------|---|
| Int Delay, s/veh | 1 | | | | | | | | | | | |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  | | |  | | |  |
| Traffic Vol, veh/h | 44 | 873 | 5 | 17 | 970 | 93 | 0 | 0 | 4 | 0 | 0 | 42 |
| Future Vol, veh/h | 44 | 873 | 5 | 17 | 970 | 93 | 0 | 0 | 4 | 0 | 0 | 42 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | 150 | - | 150 | 150 | - | 0 | - | - | 0 | - | - | 0 |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 78 | 92 | 78 | 78 | 92 | 78 | 78 | 78 | 78 | 78 | 78 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 56 | 949 | 6 | 22 | 1054 | 119 | 0 | 0 | 5 | 0 | 0 | 54 |
| | | | | | | | | | | | | |
| Major/Minor | Major1 | | Major2 | | | Minor1 | | | Minor2 | | | |
| Conflicting Flow All | 1173 | 0 | 0 | 955 | 0 | 0 | - | - | 475 | - | - | 527 |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy | 5.34 | - | - | 5.34 | - | - | - | - | 7.14 | - | - | 7.14 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.12 | - | - | 3.12 | - | - | - | - | 3.92 | - | - | 3.92 |
| Pot Cap-1 Maneuver | 323 | - | - | 411 | - | - | 0 | 0 | 459 | 0 | 0 | 424 |
| Stage 1 | - | - | - | - | - | - | 0 | 0 | - | 0 | 0 | - |
| Stage 2 | - | - | - | - | - | - | 0 | 0 | - | 0 | 0 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 323 | - | - | 411 | - | - | - | - | 459 | - | - | 424 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | | | | | |
| Approach | EB | | WB | | | NB | | | SB | | | |
| HCM Control Delay, s | 1 | | 0.3 | | | 12.9 | | | 14.7 | | | |
| HCM LOS | | | | | | B | | | B | | | |
| | | | | | | | | | | | | |
| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 | | | | |
| Capacity (veh/h) | 459 | 323 | - | - | 411 | - | - | 424 | | | | |
| HCM Lane V/C Ratio | 0.011 | 0.175 | - | - | 0.053 | - | - | 0.127 | | | | |
| HCM Control Delay (s) | 12.9 | 18.5 | - | - | 14.2 | - | - | 14.7 | | | | |
| HCM Lane LOS | B | C | - | - | B | - | - | B | | | | |
| HCM 95th %tile Q(veh) | 0 | 0.6 | - | - | 0.2 | - | - | 0.4 | | | | |

Lanes, Volumes, Timings
14: Walden Street & 104th Way











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| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | |  |  |  |  |  |  |
| Traffic Volume (vph) | 3 | 1 | 26 | 177 | 1 | 1 | 33 | 167 | 46 | 10 | 157 | 2 |
| Future Volume (vph) | 3 | 1 | 26 | 177 | 1 | 1 | 33 | 167 | 46 | 10 | 157 | 2 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 150 | | 150 | 150 | | 0 |
| Storage Lanes | 0 | | 0 | 0 | | 0 | 1 | | 1 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. 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 |
| Frt | | 0.883 | | | 0.999 | | | | 0.850 | | 0.998 | |
| Flt Protected | | 0.995 | | | 0.953 | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1637 | 0 | 0 | 1773 | 0 | 1770 | 1863 | 1583 | 1770 | 1859 | 0 |
| Flt Permitted | | 0.995 | | | 0.953 | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 1637 | 0 | 0 | 1773 | 0 | 1770 | 1863 | 1583 | 1770 | 1859 | 0 |
| Link Speed (mph) | | 30 | | | 30 | | | 25 | | | 25 | |
| Link Distance (ft) | | 501 | | | 660 | | | 450 | | | 300 | |
| Travel Time (s) | | 11.4 | | | 15.0 | | | 12.3 | | | 8.2 | |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.84 | 0.78 | 0.78 | 0.78 | 0.84 | 0.78 | 0.78 | 0.84 | 0.78 |
| Adj. Flow (vph) | 4 | 1 | 33 | 211 | 1 | 1 | 42 | 199 | 59 | 13 | 187 | 3 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 38 | 0 | 0 | 213 | 0 | 42 | 199 | 59 | 13 | 190 | 0 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Intersection Summary | | | | | | | | | | | | |
| Area Type: | Other | | | | | | | | | | | |
| Control Type: | Unsignalized | | | | | | | | | | | |
| Intersection Capacity Utilization | 38.7% | | | | | | ICU Level of Service A | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |

| Intersection | | | | | | | | | | | | |
|--------------------------|--------|---|--------|------------|---|--------|---|---|---|---|---|---|
| Int Delay, s/veh | 7 | | | | | | | | | | | |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | |  |  |  |  |  |  |
| Traffic Vol, veh/h | 3 | 1 | 26 | 177 | 1 | 1 | 33 | 167 | 46 | 10 | 157 | 2 |
| Future Vol, veh/h | 3 | 1 | 26 | 177 | 1 | 1 | 33 | 167 | 46 | 10 | 157 | 2 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 150 | - | 150 | 150 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 78 | 78 | 78 | 84 | 78 | 78 | 78 | 84 | 78 | 78 | 84 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 4 | 1 | 33 | 211 | 1 | 1 | 42 | 199 | 59 | 13 | 187 | 3 |
| | | | | | | | | | | | | |
| Major/Minor | Minor2 | | Minor1 | | | Major1 | | | Major2 | | | |
| Conflicting Flow All | 529 | 557 | 189 | 515 | 499 | 199 | 190 | 0 | 0 | 258 | 0 | 0 |
| Stage 1 | 215 | 215 | - | 283 | 283 | - | - | - | - | - | - | - |
| Stage 2 | 314 | 342 | - | 232 | 216 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 460 | 439 | 853 | 470 | 473 | 842 | 1384 | - | - | 1307 | - | - |
| Stage 1 | 787 | 725 | - | 724 | 677 | - | - | - | - | - | - | - |
| Stage 2 | 697 | 638 | - | 771 | 724 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 444 | 421 | 853 | 437 | 454 | 842 | 1384 | - | - | 1307 | - | - |
| Mov Cap-2 Maneuver | 444 | 421 | - | 437 | 454 | - | - | - | - | - | - | - |
| Stage 1 | 763 | 718 | - | 702 | 657 | - | - | - | - | - | - | - |
| Stage 2 | 674 | 619 | - | 732 | 717 | - | - | - | - | - | - | - |
| | | | | | | | | | | | | |
| Approach | EB | | WB | | | NB | | | SB | | | |
| HCM Control Delay, s | 10 | | 20.8 | | | 1.1 | | | 0.5 | | | |
| HCM LOS | B | | C | | | | | | | | | |
| | | | | | | | | | | | | |
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1WBLn1 | SBL | SBT | SBR | | | | | |
| Capacity (veh/h) | 1384 | - | - | 757 | 438 | 1307 | - | - | | | | |
| HCM Lane V/C Ratio | 0.031 | - | - | 0.051 | 0.487 | 0.01 | - | - | | | | |
| HCM Control Delay (s) | 7.7 | - | - | 10 | 20.8 | 7.8 | - | - | | | | |
| HCM Lane LOS | A | - | - | B | C | A | - | - | | | | |
| HCM 95th %tile Q(veh) | 0.1 | - | - | 0.2 | 2.6 | 0 | - | - | | | | |

Lanes, Volumes, Timings
15: Walden Street & 105th Place

















JR Engineering
10/19/2023





| |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations |  | |  | |  |  |
| Traffic Volume (vph) | 14 | 2 | 101 | 8 | 1 | 103 |
| Future Volume (vph) | 14 | 2 | 101 | 8 | 1 | 103 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | 0 | | 0 | 100 | |
| Storage Lanes | 1 | 0 | | 0 | 1 | |
| Taper Length (ft) | 25 | | | | 25 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.981 | | 0.990 | | | |
| Flt Protected | 0.959 | | | | 0.950 | |
| Satd. Flow (prot) | 1752 | 0 | 1844 | 0 | 1770 | 1863 |
| Flt Permitted | 0.959 | | | | 0.950 | |
| Satd. Flow (perm) | 1752 | 0 | 1844 | 0 | 1770 | 1863 |
| Link Speed (mph) | 30 | | 30 | | | 30 |
| Link Distance (ft) | 229 | | 280 | | | 395 |
| Travel Time (s) | 5.2 | | 6.4 | | | 9.0 |
| Peak Hour Factor | 0.78 | 0.78 | 0.83 | 0.78 | 0.78 | 0.83 |
| Adj. Flow (vph) | 18 | 3 | 122 | 10 | 1 | 124 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 21 | 0 | 132 | 0 | 1 | 124 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(ft) | 12 | | 12 | | | 12 |
| Link Offset(ft) | 0 | | 0 | | | 0 |
| Crosswalk Width(ft) | 16 | | 16 | | | 16 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 60 | 60 | | 60 | 60 | |
| Sign Control | Stop | | Free | | | Free |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 15.8% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

| Intersection | | | | | | |
|--------------------------|---|----------|---|-------|---|---|
| Int Delay, s/veh | 0.8 | | | | | |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations |  | |  | |  |  |
| Traffic Vol, veh/h | 14 | 2 | 101 | 8 | 1 | 103 |
| Future Vol, veh/h | 14 | 2 | 101 | 8 | 1 | 103 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 100 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 78 | 78 | 83 | 78 | 78 | 83 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 18 | 3 | 122 | 10 | 1 | 124 |
| Major/Minor | Minor1 | Major1 | Major2 | | | |
| Conflicting Flow All | 253 | 127 | 0 | 0 | 132 | 0 |
| Stage 1 | 127 | - | - | - | - | - |
| Stage 2 | 126 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.12 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | 736 | 923 | - | - | 1453 | - |
| Stage 1 | 899 | - | - | - | - | - |
| Stage 2 | 900 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 735 | 923 | - | - | 1453 | - |
| Mov Cap-2 Maneuver | 735 | - | - | - | - | - |
| Stage 1 | 899 | - | - | - | - | - |
| Stage 2 | 899 | - | - | - | - | - |
| Approach | WB | NB | SB | | | |
| HCM Control Delay, s | 9.9 | 0 | 0.1 | | | |
| HCM LOS | A | | | | | |
| Minor Lane/Major Mvmt | NBT | NBRWBLn1 | SBL | SBT | | |
| Capacity (veh/h) | - | - | 754 | 1453 | - | |
| HCM Lane V/C Ratio | - | - | 0.027 | 0.001 | - | |
| HCM Control Delay (s) | - | - | 9.9 | 7.5 | - | |
| HCM Lane LOS | - | - | A | A | - | |
| HCM 95th %tile Q(veh) | - | - | 0.1 | 0 | - | |

Lanes, Volumes, Timings
16: Yampa Street & 105th Avenue

JR Engineering
10/19/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Volume (vph) | 8 | 53 | 1 | 41 | 52 | 89 | 1 | 16 | 109 | 35 | 5 | 11 |
| Future Volume (vph) | 8 | 53 | 1 | 41 | 52 | 89 | 1 | 16 | 109 | 35 | 5 | 11 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. 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 |
| Frt | | 0.998 | | | 0.935 | | | 0.883 | | | 0.971 | |
| Flt Protected | | 0.994 | | | 0.989 | | | | | | 0.967 | |
| Satd. Flow (prot) | 0 | 1848 | 0 | 0 | 1723 | 0 | 0 | 1645 | 0 | 0 | 1749 | 0 |
| Flt Permitted | | 0.994 | | | 0.989 | | | | | | 0.967 | |
| Satd. Flow (perm) | 0 | 1848 | 0 | 0 | 1723 | 0 | 0 | 1645 | 0 | 0 | 1749 | 0 |
| Link Speed (mph) | | 25 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 660 | | | 660 | | | 300 | | | 280 | |
| Travel Time (s) | | 18.0 | | | 15.0 | | | 6.8 | | | 6.4 | |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.80 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 |
| Adj. Flow (vph) | 10 | 68 | 1 | 53 | 67 | 111 | 1 | 21 | 140 | 45 | 6 | 14 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 79 | 0 | 0 | 231 | 0 | 0 | 162 | 0 | 0 | 65 | 0 |
| 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 | | | 0 | | | 0 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway 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 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Intersection Summary | | | | | | | | | | | | |
| Area Type: | Other | | | | | | | | | | | |
| Control Type: | Unsignalized | | | | | | | | | | | |
| Intersection Capacity Utilization | 38.1% | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |
| | ICU Level of Service A | | | | | | | | | | | |

| Intersection | | | | | | | | | | | | |
|--------------------------|--------|---|------|--------|---|------|--------|---|-------|--------|---|-------|
| Int Delay, s/veh | 5.4 | | | | | | | | | | | |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Vol, veh/h | 8 | 53 | 1 | 41 | 52 | 89 | 1 | 16 | 109 | 35 | 5 | 11 |
| Future Vol, veh/h | 8 | 53 | 1 | 41 | 52 | 89 | 1 | 16 | 109 | 35 | 5 | 11 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 78 | 78 | 78 | 78 | 78 | 80 | 78 | 78 | 78 | 78 | 78 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 10 | 68 | 1 | 53 | 67 | 111 | 1 | 21 | 140 | 45 | 6 | 14 |
| | | | | | | | | | | | | |
| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
| Conflicting Flow All | 178 | 0 | 0 | 69 | 0 | 0 | 328 | 373 | 69 | 398 | 318 | 123 |
| Stage 1 | - | - | - | - | - | - | 89 | 89 | - | 229 | 229 | - |
| Stage 2 | - | - | - | - | - | - | 239 | 284 | - | 169 | 89 | - |
| Critical Hdwy | 4.12 | - | - | 4.12 | - | - | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Follow-up Hdwy | 2.218 | - | - | 2.218 | - | - | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 |
| Pot Cap-1 Maneuver | 1398 | - | - | 1532 | - | - | 625 | 557 | 994 | 562 | 598 | 928 |
| Stage 1 | - | - | - | - | - | - | 918 | 821 | - | 774 | 715 | - |
| Stage 2 | - | - | - | - | - | - | 764 | 676 | - | 833 | 821 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 1398 | - | - | 1532 | - | - | 589 | 531 | 994 | 452 | 570 | 928 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 589 | 531 | - | 452 | 570 | - |
| Stage 1 | - | - | - | - | - | - | 912 | 815 | - | 769 | 687 | - |
| Stage 2 | - | - | - | - | - | - | 716 | 650 | - | 693 | 815 | - |
| | | | | | | | | | | | | |
| Approach | EB | | WB | | | | NB | | SB | | | |
| HCM Control Delay, s | 1 | | 1.7 | | | | 9.9 | | 12.9 | | | |
| HCM LOS | | | | | | | A | | B | | | |
| | | | | | | | | | | | | |
| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 | | | | |
| Capacity (veh/h) | 891 | 1398 | - | - | 1532 | - | - | 520 | | | | |
| HCM Lane V/C Ratio | 0.181 | 0.007 | - | - | 0.034 | - | - | 0.126 | | | | |
| HCM Control Delay (s) | 9.9 | 7.6 | 0 | - | 7.4 | 0 | - | 12.9 | | | | |
| HCM Lane LOS | A | A | A | - | A | A | - | B | | | | |
| HCM 95th %tile Q(veh) | 0.7 | 0 | - | - | 0.1 | - | - | 0.4 | | | | |

Lanes, Volumes, Timings
17: Yampa Street & Homestead Trail

JR Engineering
10/19/2023



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|----------------------------|-------|-------|------|-------|-------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 5 | 9 | 5 | 8 | 2 | 7 |
| Future Volume (vph) | 5 | 9 | 5 | 8 | 2 | 7 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 100 | 0 | 0 | | | 0 |
| Storage Lanes | 1 | 1 | 0 | | | 0 |
| Taper Length (ft) | 25 | | 25 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | 0.899 | |
| Flt Protected | 0.950 | | | 0.982 | | |
| Satd. Flow (prot) | 1770 | 1583 | 0 | 1829 | 1675 | 0 |
| Flt Permitted | 0.950 | | | 0.982 | | |
| Satd. Flow (perm) | 1770 | 1583 | 0 | 1829 | 1675 | 0 |
| Link Speed (mph) | 25 | | | 30 | 30 | |
| Link Distance (ft) | 666 | | | 181 | 194 | |
| Travel Time (s) | 18.2 | | | 4.1 | 4.4 | |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 |
| Adj. Flow (vph) | 6 | 12 | 6 | 10 | 3 | 9 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 6 | 12 | 0 | 16 | 12 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 12 | | | 0 | 0 | |
| Link Offset(ft) | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 60 | 60 | | | 9 |
| Sign Control | Stop | | | Stop | Stop | |

Intersection Summary

Area Type: Other





Control Type: Unsignalized

Intersection Capacity Utilization 14.9% ICU Level of Service A

Analysis Period (min) 15

Intersection

| | |
|---------------------------|-----|
| Intersection Delay, s/veh | 6.9 |
| Intersection LOS | A |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---------------------|---|---|------|---|---|------|
| Lane Configurations |  |  | |  |  | |
| Traffic Vol, veh/h | 5 | 9 | 5 | 8 | 2 | 7 |
| Future Vol, veh/h | 5 | 9 | 5 | 8 | 2 | 7 |
| Peak Hour Factor | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 6 | 12 | 6 | 10 | 3 | 9 |
| Number of Lanes | 1 | 1 | 0 | 1 | 1 | 0 |

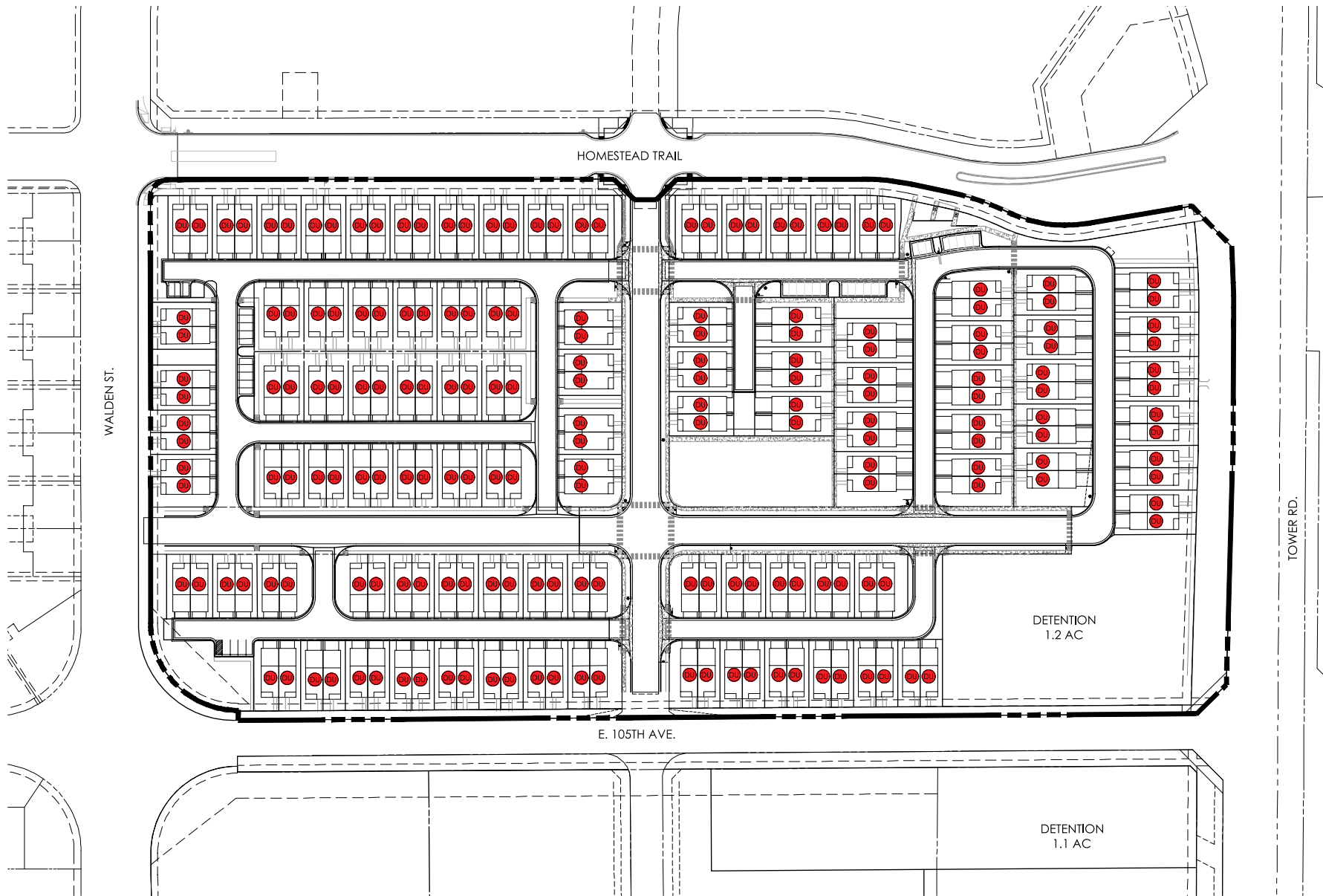
| Approach | EB | NB | SB |
|----------------------------|----|-----|-----|
| Opposing Approach | | SB | NB |
| Opposing Lanes | 0 | 1 | 1 |
| Conflicting Approach Left | SB | EB | |
| Conflicting Lanes Left | 1 | 2 | 0 |
| Conflicting Approach Right | NB | | EB |
| Conflicting Lanes Right | 1 | 0 | 2 |
| HCM Control Delay | 7 | 7.1 | 6.6 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | EBLn2 | SBLn1 |
|------------------------|-------|-------|-------|-------|
| Vol Left, % | 38% | 100% | 0% | 0% |
| Vol Thru, % | 62% | 0% | 0% | 22% |
| Vol Right, % | 0% | 0% | 100% | 78% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 13 | 5 | 9 | 9 |
| LT Vol | 5 | 5 | 0 | 0 |
| Through Vol | 8 | 0 | 0 | 2 |
| RT Vol | 0 | 0 | 9 | 7 |
| Lane Flow Rate | 17 | 6 | 12 | 12 |
| Geometry Grp | 2 | 7 | 7 | 2 |
| Degree of Util (X) | 0.019 | 0.009 | 0.012 | 0.011 |
| Departure Headway (Hd) | 4.05 | 5.083 | 3.883 | 3.511 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 887 | 707 | 925 | 1022 |
| Service Time | 2.061 | 2.793 | 1.592 | 1.524 |
| HCM Lane V/C Ratio | 0.019 | 0.008 | 0.013 | 0.012 |
| HCM Control Delay | 7.1 | 7.8 | 6.6 | 6.6 |
| HCM Lane LOS | A | A | A | A |
| HCM 95th-tile Q | 0.1 | 0 | 0 | 0 |

APPENDIX E

REUNION CENTER – DUET TOWNHOMES & COMMERCIAL PARCEL SITE PLANS





LEGEND
 ● STERLING DUETS
 190 UNITS

SITE PLAN

REUNION CENTER DUETS

COMMERCE CITY, CO

JANUARY 27, 2023

td terracina
 design
 10200 E. Girard Ave. Ste A-314
 Denver, CO 80231
 ph: 303.630.8867



Scale: 1"= 50'-0"
 0 25 50 75 100

APPENDIX F

REUNION CENTER VILLAGE PLAN





| SITE DATA | | | | | |
|---------------|------------------------------|--------------|------------------------|-------------------|------------|
| PLANNING AREA | LAND USE | ACREAGE | COMMERCIAL SQUARE FEET | RESIDENTIAL UNITS | DU/AC FAR |
| 1 | SCHOOL/LIBRARY | 18.9 | 127,700 | | 0.15 |
| 2 | RESIDENTIAL | 20.1 | | 291 | 14.5 |
| 3 | RESIDENTIAL | 24.6 | | 440 | 17.9 |
| 4 | RETAIL/SPORTS COMPLEX | 19.1 | 232,000 | | 0.30 |
| 5 | RETAIL/LODGING/ENTERTAINMENT | 33.5 | 207,300 | | 0.13 |
| 6 | SPORTS COMPLEX | 42.2 | 30,000 | | 0.02 |
| TOTAL | | 158.4 | 597,000 | 731 | 4.6 |

| PARKING DATA | | | |
|---------------|----------------------------------|------------------|----------------------|
| PLANNING AREA | LAND USE | PARKING REQUIRED | PARKING PROVIDED (5) |
| 1 | SCHOOL/LIBRARY (1) | 335 | 607 |
| 2 | RESIDENTIAL | 537 | 554 |
| 3 | RESIDENTIAL | 770 | 785 |
| 4 | RETAIL/SPORTS COMPLEX (2)(3) | 600 | 575 |
| 5 | RETAIL/LODGING/ENTERTAINMENT (2) | 1,489 | 1,258 |
| 6 | SPORTS COMPLEX (3) | 230 | 230 |
| TOTAL | | 3,961 | 4,009 |

NOTES:
 (1) LARGE INDOOR SPORTS VENUES WILL BE PARKED USING OUTDOOR RECREATION PARKING REQUIREMENTS.
 (2) PARKING NUMBERS ARE CONCEPTUAL AND SUBJECT TO CHANGE AT TIME OF PUD PERMIT.
 (3) SHARED PARKING PERCENTAGE HAS NOT BEEN APPLIED TO PARKING PROVIDED.
 (4) THE MINIMUM NUMBER OF PARKING SPACES FOR A MIXED USE DEVELOPMENT OR WHERE SHARED PARKING STRATEGIES ARE PROPOSED SHALL BE DETERMINED BY A STUDY PREPARED BY THE APPLICANT FOLLOWING THE PROCEDURES OF THE URBAN LAND INSTITUTE SHARED PARKING REPORT, ITS SHARED PARKING GUIDELINES, OR OTHER APPROVED PROCEDURES. A FORMAL PARKING STUDY MAY BE WAIVED FOR SMALL DEVELOPMENTS WHERE THERE IS ESTABLISHED EXPERIENCE WITH THE LAND USE MIX AND ITS IMPACT IS EXPECTED TO BE MINIMAL. THE ACTUAL NUMBER OF PARKING SPACES REQUIRED SHALL BE BASED ON WELL-RECOGNIZED SOURCES OF PARKING DATA SUCH AS THE ULI OR ITE REPORTS. IF STANDARD RATES ARE NOT AVAILABLE OR LIMITED, THE APPLICANT MAY COLLECT DATA AT SIMILAR SITES TO ESTABLISH LOCAL PARKING DEMAND RATES. IF THE SHARED PARKING PLAN ASSUMES USE OF AN EXISTING PARKING FACILITY, THEN FIELD SURVEYS SHALL BE CONDUCTED TO DETERMINE ACTUAL PARKING ACCUMULATION, IF POSSIBLE. THESE SURVEYS SHOULD CONSIDER THE SEASONAL PEAK PERIOD FOR THE COMBINATION OF LAND USES INVOLVED.

SITE PLAN NOTES:
 1. RESIDENTIAL DENSITIES AND COMMERCIAL SQUARE FOOTAGE SHOWN ARE CONCEPTUAL. DENSITIES TO MEET THE REQUIREMENTS OF REUNION PUD ZONE DOCUMENT AMENDMENT #5.

ROAD SECTION NOTES:
 1. REFER TO "ALTERNATE ROADWAY DESIGN STANDARDS REUNION CENTER - SOUTH" FOR PROPOSED ROAD AND INTERSECTION STANDARDS.

CITY STAFF CERTIFICATE
 APPROVED BY THE DEPARTMENT OF COMMUNITY DEVELOPMENT OF THE CITY OF COMMERCE CITY, THIS ____ DAY OF _____, 2019.

DEPARTMENT OF COMMUNITY DEVELOPMENT



REUNION
 REAL HOMETOWN
 ILLUSTRATIVE SITE PLAN

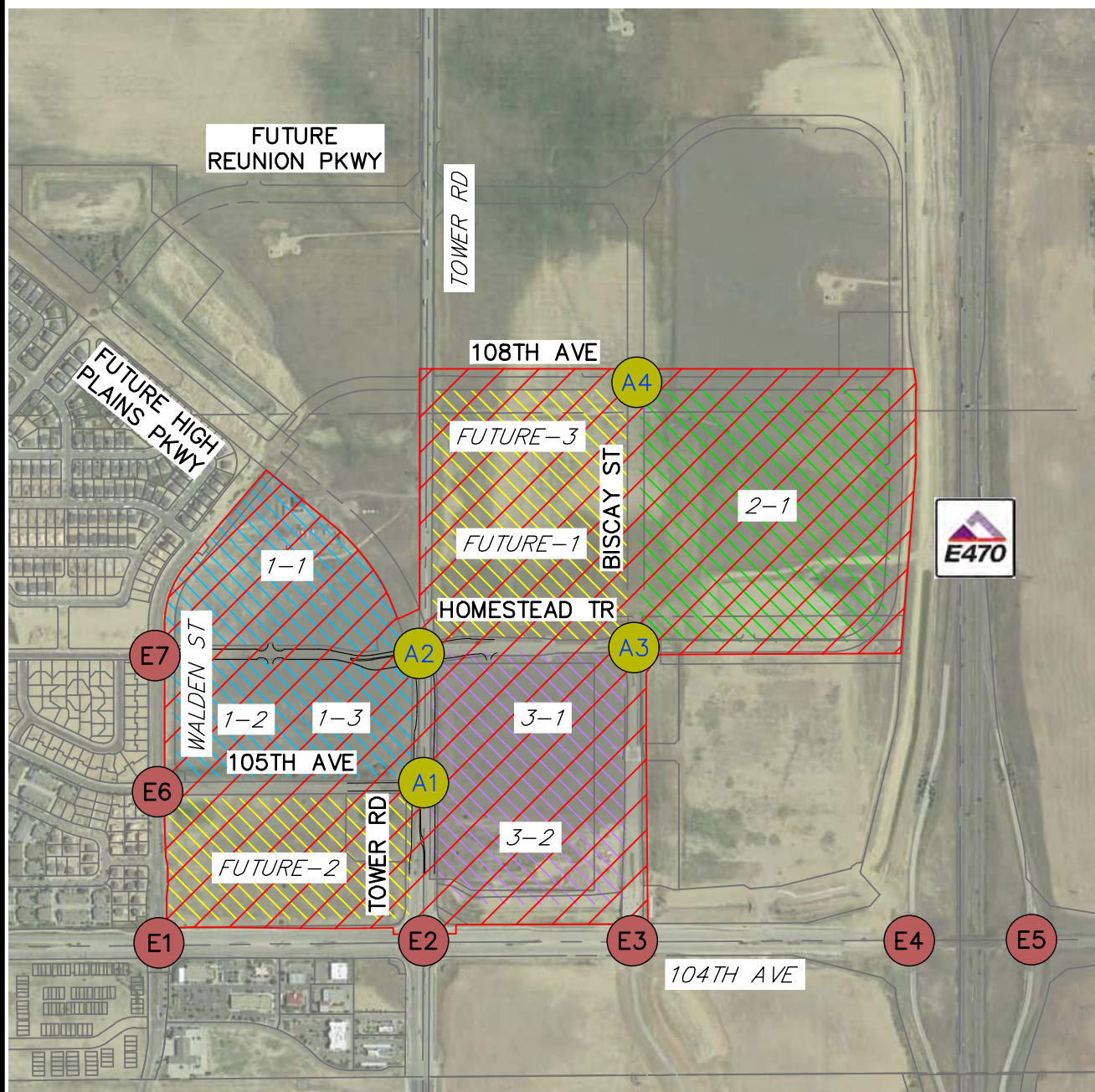


Scale: 1" = 200'
 0 200 400 800
 January 22, 2020

APPENDIX G

REUNION CENTER - SOUTH TIS EXCERPTS





LEGEND

- PROPOSED INTERSECTION
- EXISTING INTERSECTION
- PROJECT SITE
- PHASE 1 TAZ
- PHASE 2 TAZ
- PHASE 3 TAZ
- FUTURE PHASE TAZ

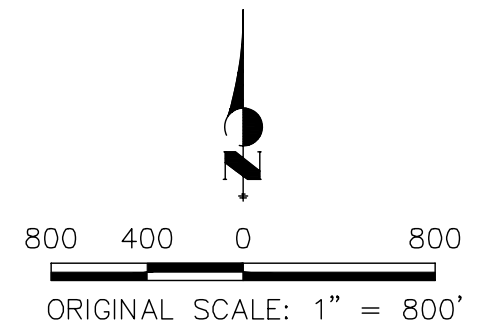


FIGURE 6 – TRAFFIC ANALYSIS
ZONES MAP
REUNION CENTER – SOUTH
PROJ. NO. 14421.49
PAGE 15

Project Traffic

Trip Generation

Trip generation has been calculated from the latest data contained within the Institute of Transportation Engineers' (ITE) *Trip Generation Manual 10th Edition, 2017*. Based on the land use and the guidelines within the *Trip Generation Manual*, JR used the appropriate fitted curve equation or average rate for the AM peak hour traffic, PM peak hour traffic, and weekday average daily traffic (ADT) for each land use.

A map of the assigned traffic analysis zones is shown in Figure 6. These zones are based on the currently anticipated phases 1, 2, and 3, as well as future phases.

Based on the Reunion Center concept plans, Table 1 shows a summary of land use and external vehicle trips generated. Adjustments were made for internal site trips, but adjustments were not made for pass-by trips.

Table 1 – Trip Generation Table

| Parcel | Land Use Code No. | Number of Units | Weekday Trips | AM Peak Hour Trips | PM Peak Hour Trips |
|-------------|--------------------------|---------------------|---------------|---------------------|---------------------|
| 1-1a | 530 (High School) | 650 Students | 1,608 | 338 67% entering | 91 48% entering |
| 1-1b | 590 (Library) | 29,000 sq ft GFA | 2,089 | 29 71% entering | 237 48% entering |
| 1-1c | 444 (Movie Theater) | 2 Screens | 440 | 0 | 29 44% entering |
| 1-2 | 220 (MFH Low-Rise) | 97 DU | 692 | 46 23% entering | 57 63% entering |
| 1-3a | 220 (MFH Low-Rise) | 122 DU | 881 | 58 23% entering | 70 63% entering |
| 1-3b | 820 (Shopping Center) | 8,000 sq ft GFA | 1,079 | 156 62% entering | 84 48% entering |
| 2-1 | 488 (Soccer Complex) | 7 Fields | 499 | 7 61% entering | 115 66% entering |
| 3-1a | 310 (Hotel) | 130 Rooms | 1,087 | 60 59% entering | 71 51% entering |
| 3-1b | 820 (Shopping Center) | 26,000 sq ft GFA | 2,405 | 165 62% entering | 201 48% entering |
| 3-1c | 435 (MPRF) | 50,000 sq ft GFA | N/A | 0 | 179 55% entering |
| 3-1d | 850 (Supermarket) | 16,000 sq ft GFA | 1,708 | 61 60% entering | 198 51% entering |

Notes: DU = Dwelling Units, GFA = Gross Floor Area
 MFH = Multifamily Housing, SFH = Single Family Housing
 MPRF = Multipurpose Recreational Facility
 N/A = Not Applicable; Data Not Given

| Parcel | Land Use Code No. | Number of Units | Weekday Trips | AM Peak Hour Trips | PM Peak Hour Trips |
|------------------|-----------------------------|----------------------|---------------|---------------------|---------------------|
| 3-2a | 310 (Hotel) | 130 Rooms | 1,087 | 61 59% entering | 78 51% entering |
| 3-2b | 931 (Quality Restaurant) | 7,000 sq ft GFA | 587 | 5 50% entering | 55 51% entering |
| 3-2c | 437 (Bowling Alley) | 38,000 sq ft GFA | N/A | 31 95% entering | 44 65% entering |
| 3-2d | 444 (Movie Theater) | 9 Screens | 1,980 | 0 | 131 44% entering |
| 3-2e | 431 (Mini Golf Course) | 18 Holes | N/A | 0 | 6 33% entering |
| Future-1 | 435 (MPRF) | 213,000 sq ft GFA | 6,139 | 277 66% entering | 435 47% entering |
| Future-2a | 220 (MFH Low-Rise) | 82 DU | 579 | 40 23% entering | 50 63% entering |
| Future-2b | 820 (Shopping Center) | 19,000 sq ft GFA | 1,943 | 161 62% entering | 159 48% entering |
| Future-3 | 221 (MFH Mid-Rise) | 139 DU | 756 | 47 26% entering | 61 61% entering |

Notes: DU = Dwelling Units, GFA = Gross Floor Area
 MFH = Multifamily Housing, SFH = Single Family Housing
 MPRF = Multipurpose Recreational Facility
 N/A = Not Applicable; Data Not Given

In summary, Reunion Center – South is expected to generate approximately 26,000 weekday trips, including 1,519 AM peak hour trips and 1,979 PM peak hour trips.

The Trip Generation summary, detailed land use reports, and internal capture report are included in **Appendix C**.

Project Trip Distribution

An important element in the determination of the proposed project's traffic impact is the directional distribution of its traffic onto the surrounding roadway system. The relative location of the site, the type of land use, and specific characteristics of the roadway and access system will dictate this distribution of traffic. Note that in this analysis, the distribution was based on the Reunion Center master traffic study, which utilized the traffic counts along E 104th Avenue and Tower Road, the DRCOG Travel Demand Model, and the approved *Reunion, Colorado Phase 3 (Villages 5 & 6) Traffic Study*, prepared by Carter and Burgess in 2005.